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December 2, 2024

Project/File: 175578434

Darrel Hague, PE

Ohio Department of Transportation - District 10
338 Muskingum Drive
Marietta, Ohio 45750

Reference: Report of Roadway Exploration (Final)
MEG-33-19.11 PID 119144
Meigs County, Ohio

Dear Mr. Hague,

Stantec Consulting Services Inc. (Stantec) has completed the final roadway exploration report for the MEG-33-19.11 project. The enclosed report contains a brief description of the site, geologic conditions encountered, the scope of work performed, and geotechnical recommendations for the project. Please contact us if you have any questions.

Regards,

STANTEC CONSULTING SERVICES INC.

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Attachment: Report of Geotechnical Exploration (Final)



MEG-33-19.11 Geotechnical Comment Log

A. Geotechnical Report

Review Comment	Stantec Response
1) NO CUTS WERE DONE ON THE REAR APPROACH OF THE BOWMANS RD BRIDGE, SEE SHEET 157 OF 19719 / OLD TOWNNE CREEK BRIDGE, SEE SHEET 235 OF 19738 PLANS / TRIB OF OLD TOWNNE CREEK BRIDGE 262 OF 19738 (pdf pg. 21)	Settlement analyses completed at each bridge rear approach and recommended wait times added to report and drawings.
2) WERE ANY ROCKFALL SIMULATIONS FOR CATCHMENT WIDTH PERFORMED? (pdf pg. 23)	RocFall analyses completed.
3) SEE GDM TABLE 500-2 FOR EMBANKMENT FILL PROPERTIES. WILL A 2:1 REINFORCED SOIL SLOPE BE NEEDED WHEN USING THE PROPERTIES PER GDM TABLE 500-2? (pdf pg. 24)	ODOT recommended embankment fill properties evaluated and recommendations updated.
4) IS THE FOUNDATION SOIL SETTLEMENT GREATER THAN 3" AT STA. 1341+00, 1353+00, AND 1367+50? (pdf pg. 25)	Settlement analyses completed at 1367+50 as typical section and wait times added to report and drawings.
5) ADD NOTE AND PAY ITEMS TO PLANS TO ACCOMPLISH THE ABOVE DIRECTION (pdf pg. 25)	Note and pay items added to plans.
6) IS THERE A NOTE AND PAY ITEMS IN PLANS TO ACCOMPLISH THIS? (pdf pg. 26)	Note and pay items added to plans after discussion with District.
7) EXISTING 2:1 IS STABLE AT THIS LOCATION WITH OUT A REINFORCED SOIL SLOPE? (pdf pg. 27)	Re-evaluated material properties and recommendations updated.
8) DCP TESTING AND SOIL CLASSIFICATION NEEDS TO BE INCLUDED IN GEOTECH PROFILE	DCP logs and classifications available added to profile.
9) HIGH VALUE? (pdf pg. 1394, friction angle of sandy silt for 1367+50 stability model)	Friction angle for soil layer reviewed and updated.

B. Geotechnical Profile

1) Add DCP test reports and soil classifications to geotech profile	DCP logs and classifications added to the profile.
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C. Comments from Drawing

1)	Room to add bench at some sections to reduce undermining of sandstone (pdf pg. 154, 155)	Evaluated possibility of adding 8-10 foot bench.
2)	Potential landslide caused at STA 1030+00 (pdf pg. 197)	Evaluated risk and potential solutions.
3)	Need to drill at station 1165+00 (815 to 760), 1195+00 (760 to 740), 1205+00 (660 to 685), 1299+00 (pdf pg 314, 349, 370, 552)	Additional borings completed and information gathered added to report and drawings.

D. Comments from Structural Report

1)	Maximum moments at piers from lateral load analysis do not match structural reported maximum moments.	Issue came to rounding, but after structural discussions Lpile analyses updated for the piers to include maximum load combinations and updated P-multiplier.
2)	Granular backfill properties provided no longer match was is outlined in BDM.	Updated values to reflect what is outlined in BDM.



**Report of Roadway Exploration
(Final)**

MEG-33-19.11

Meigs County, Ohio

PID No.119144

December 2, 2024

Prepared for:

ODOT District 10
Marietta, Ohio

Prepared by:

Stantec Consulting Services Inc.
Cincinnati, Ohio

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Executive Summary

The Ohio Department of Transportation (ODOT) is planning to convert 14.78 miles of existing United States (US) 33 in Meigs County, Ohio from a two-lane highway to a four-lane divided highway by adding a median and two lanes north of the existing alignment. Stantec Consulting Services Inc. (Stantec) has been contracted by ODOT to perform engineering and design services for the eastern portion of the project, which is approximately 10 miles long. Historical geotechnical records were primarily used for current project geotechnical recommendations; however, a geotechnical exploration was needed to provide recommendations for three new companion bridges for US 33 over Bowman's Run, Old Town Creek, and a tributary of Old Town Creek. Borings were also advanced near wet areas planned for fill north of the existing two-lane alignment, identified during a site reconnaissance performed by others during previous phases of work. During a later phase of drilling, additional borings were performed along cut slopes to fill data gaps and to obtain undisturbed samples for one-dimensional consolidation testing.

Stantec advanced 19 borings near the proposed bridge foundation locations, wet areas planned for fill and cut slopes. Moderate and low plasticity fine-grained soils were encountered in all borings. The soils encountered were silt and clay (A-6a), silty clay (A-6b), clay (A-7-6), sandy silt (A-4a), silt (A-4b), and gravel and stone fragments with sand, silt, and clay (A-2-6). The soils were described as medium stiff to hard and damp to moist. Rock coring was performed in all eight bridge borings and five cut slope borings. Sandstone interbedded with shale was encountered in seven of the eight bridge borings, while claystone and shale were encountered in three of the eight bridge borings. Cut slope borings encountered shale followed by interbedded shale and sandstone and either sandstone or shale.

It is recommended that the bridge abutments and/or piers for the bridges be supported by drilled shafts bearing on bedrock. Bridge seismic site classifications varied between Seismic Site Class C and Seismic Site Class D. More detailed recommendations for the bridges are included within this report.

New roadway embankments will be constructed for this project, along with areas of cut excavations. Stability analyses were performed for the proposed embankments. For embankments taller than 25 feet, 3H:1V (horizontal to vertical) slopes are suggested to meet minimum factors of safety. Using less conservative shear strength parameters (as recommended in the ODOT Geotechnical Design Manual (GDM)) for the proposed embankment indicates that 2H:1V slopes can be used if necessary for taller slopes. Reinforced soil slopes can be used for slopes steeper than 3H:1V to achieve minimum factors of safety assuming more conservative shear strength parameters (as used in historic stability analyses) for the proposed embankment material.

Roadway cut slopes were designed using slopes of 2H:1V for shale, claystone and mudstone and 1H:1V for sandstone. The slopes were designed with 15-foot-wide horizontal benches on taller cuts to slow water flow down the slope. The benches were positioned at the bases of more durable bedrock layers where possible to resist the undercutting of the more durable rock over time.

A subgrade analysis was performed in general accordance with ODOT GDM based on dynamic cone penetrometer (DCP) tests and shallow profile borings performed along the alignment by others in April 2023. The DCP testing indicates that subgrade stabilization may be necessary from approximately Station 1305+00 to 1343+00, but only where less than 3 feet of cut or fill is planned. As such, 12 inches of subgrade stabilization should be assumed for about 10 percent of this station range that consists of several deep cuts and fills not requiring stabilization.

1.0 INTRODUCTION

The Ohio Department of Transportation (ODOT) is planning to convert 14.78 miles of existing United States (US) 33 in Meigs County, Ohio from a two-lane highway to a four-lane divided highway by adding a median and two lanes north of the existing alignment. Stantec Consulting Services Inc. (Stantec) has been contracted by ODOT to perform engineering and design services for the eastern portion of the project, which is approximately 10 miles long. Historical geotechnical records were primarily used for geotechnical recommendations for the project; however, an additional geotechnical exploration was performed to obtain subsurface information for three new companion bridges for US 33 over Bowman’s Run, Old Town Creek, and a tributary of Old Town Creek. Borings were also advanced near wet areas planned for fill north of the existing two-lane alignment which were identified during a site reconnaissance performed by others during previous phases of work. During a later phase of drilling, additional borings were performed along cut slopes to fill data gaps and to obtain undisturbed samples for one-dimensional consolidation testing. Figure 1 shows the overview of the portion of US 33 being widened to four lanes and the aforementioned existing bridge locations.

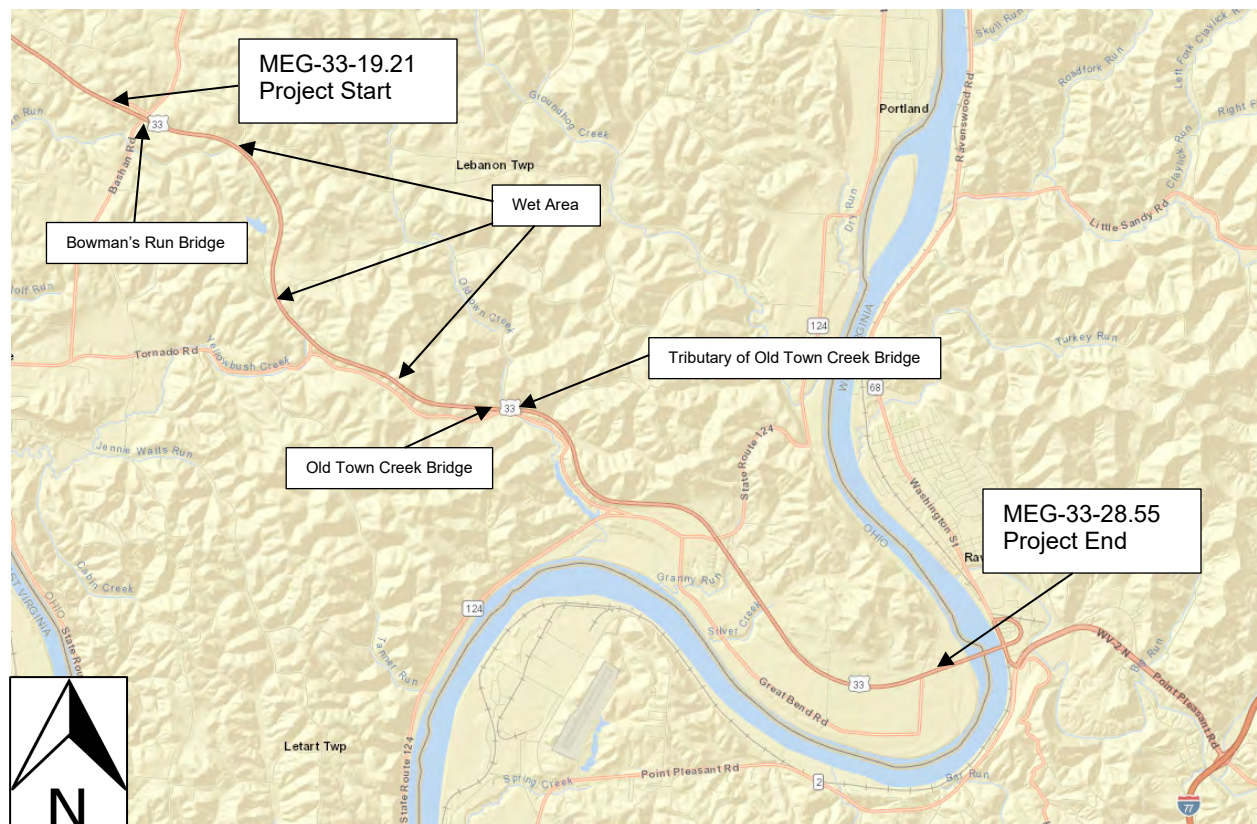


Figure 1. Site Overview
(ODOT Traffic Information Mapping System (TIMS), 2023)

2.0 GEOLOGY AND OBSERVATIONS OF THE PROJECT

2.1 GENERAL

The *Physiographic Regions of Ohio Map* (Ohio Department of Natural Resources (ODNR), 1998) indicates that the project site is located within the Marietta Plateau region. The region is described as a dissected plateau with high relief (generally 350 feet up to 600 feet) near the Ohio River containing mostly fine-grained rocks. Red shales, red soils, and landslides are relatively common. Elevations typically range from 515 to 1,060 feet.

2.2 SOIL GEOLOGY

According to the *Ohio Geology Interactive Map* (ODNR, 2024), the project site is primarily underlain by Cenozoic colluvium from the Holocene age, underlain by lacustrine deposits from the early to middle Pleistocene age and outwash from the late Wisconsinan age. The USDA web soil survey (2023) indicates that approximately 40 percent of the project site is underlain by the Upshur-Gilpin complex. These soils are typically well drained with a moderately low to moderately high capacity to transmit water. The typical profile consists of 1 inch of slightly decomposed plant material, 5 inches of silt loam, 28 inches of silty clay loam, 3 inches of very channery silty clay loam, and 10 inches of bedrock. The remaining soil types make up 5 percent or less of the project site according to the web soil survey. The project is located in an unglaciated region of Ohio; however, the *Ohio Geology Interactive Map* suggests the far southern portion of the site situated within the Ohio River valley has a drift thickness of up to 120 feet.

2.3 BEDROCK GEOLOGY

Bedrock mapping (*Ohio Geology Interactive Map* [ODNR, 2023]) indicates that the majority of the site is underlain by sedimentary bedrock from the Dunkard and Monongahela Groups of the Permian and Pennsylvanian ages. Bedrock of the Dunkard Group typically consists of shale, siltstone, and sandstone with lesser amounts of limestone and coal. The bedrock is described as brown, gray, red, and green with thicknesses ranging from 500 to 600 feet. Bedrock of the Monongahela Group typically consists of shale, siltstone, limestone, sandstone, and coal. The bedrock is described as gray, green, and infrequently red with thicknesses over 350 feet.

According to the *Ohio Oil and Gas Well Viewer* map (ODNR, 2023), there are six wells located near the current alignment of US 33. Well logs indicate sandstone, shale, limestone, and dolomite bedrock are present in the area. One log at the far southern region of the site location indicates a bedrock depth of 129 feet.

According to the *Ohio Mine Locator* (ODNR, 2023), there are no active or inactive mines within the project footprint. The *Karst Interactive Map* (ODNR, 2023) indicates there are no known karst features in Meigs County.

2.4 HYDROLOGY

The three bridges at the site cross Bowman's Run, Old Town Creek, and a tributary to Old Town Creek. Bowman's Run flows west into the Ohio River near Racine, Ohio. Old Town Creek flows south into the Ohio River near Rolandus, Ohio.

2.5 HYDROGEOLOGY

According to the *Ohio Geology Interactive Map* (ODNR, 2023), bedrock aquifers at the project site yield less than 5 gallons of water per minute. The far southern portion of the site is located in the Ohio River Valley Fill Aquifer, which typically yields over 500 gallons of water per minute. The thickness of this sand and gravel aquifer ranges from 25 to 100 feet.

A search was performed using the ODNR Ohio Water Wells Map (2023) to determine if any water wells are located near the project site. According to the map, 35 water wells have been drilled near US 33 in the project area. The well logs indicate bedrock was encountered at depths ranging from 3 to 92 feet and the static water was encountered at depths varying from 5 to 80 feet.

2.6 SEISMIC

A review of the seismic data available in the project vicinity was completed using the *ODNR Ohio Earthquake Epicenters Map* (2023). Overall, Ohio has a relatively limited amount of seismic activity. Within a radius of 10 miles from the center of the project site, four earthquake epicenters have been recorded. The magnitudes of these earthquakes range from 1.6 to 2.8. The available data reviewed included events that occurred in Ohio from 1936 to present day.

2.7 SITE RECONNAISSANCE

Stantec representatives visited the site from November 27 to 29, 2023 to examine field conditions, road conditions, embankment conditions, and to mark boring locations. The land surrounding the project site can be described as rural and agricultural. In general, the existing embankments were observed to be in fair condition. Wet areas, standing water, surface erosion, erosion gullies, areas of exposed geo-fabric/geo-mesh, and damaged culverts were observed south of the existing embankments. Pavement conditions were generally fair throughout the site; however, conditions were poor to fair between approximate mile markers 25.00 and 28.80. A memo summarizing the inspection findings was provided to the District on December 21, 2023. Stantec representatives visited the site again on September 9, 2024 to mark borings for cut slope sections and offset structure borings to obtain samples for consolidation testing.

3.0 EXPLORATION

3.1 HISTORIC EXPLORATION PROGRAMS

The ODOT Traffic Information Management System (TIMS) provided documentation for the original investigations for MEG-124-26.66 and MEG-124-31.57, both now US 33, completed in 1999. Soils encountered during these explorations were classified or described as clay (A-7-6), sandy silt (A-4a), silty clay (A-6b), and silt and clay (A-6a). A considerable amount of silt (A-4b), coarse- and fine-grained sand (A-3a), gravel with sand (A-1-b), gravel (A-1-a), and gravel with sand and silt (A-2-4) were also observed. Bedrock was described as non-durable shale interbedded with thin to thick seams of sandstone or siltstone.

3.2 CURRENT PROJECT EXPLORATION PROGRAM

Stantec advanced 19 borings to obtain additional geotechnical data for the project. Eleven were for three new companion bridges along US 33, three borings were advanced near the previously observed wet areas planned for fill north of the existing two-lane alignment, and five were advanced in cut slope areas where there were data gaps of bedrock stratigraphy. A summary of these borings is shown in Table 1. Boring locations are shown on the geotechnical profile sheets in Appendix A. The borings were surveyed following the project exploration program.

Table 1. Boring Summary

Boring No.	Boring Purpose	Station (feet)	Offset (feet)	Ground Surface Elevation (feet)	Boring Depth (feet)	Bottom of Boring Elevation (feet)
B-001-0-23	Bowman's Run Bridge	974+71	104 Lt.	654.6	30.2	624.4
B-001-1-24	Bowman's Run Bridge	975+05	71 Lt.	649.0	4.5	644.5
B-002-0-23	Bowman's Run Bridge	976+02	32 Lt.	642.0	30.8	611.2
B-003-0-23	Bowman's Run Bridge	977+26	3 Lt.	677.3	31.3	646.0
B-004-0-23	Wet Area	1,018+67	101 Lt.	730.7	1.5	729.2
B-005-0-23	Wet Area	1,077+71	89 Lt.	688.7	3.6	685.1
B-006-0-23	Wet Area	1,155+23	141 Lt.	695.1	20.9	674.2
B-006-1-24	Cut Slope	1,165+94	130 Lt.	776.5	55.0	721.5
B-006-2-24	Cut Slope	1,194+20	238 Lt.	743.2	29.4	713.8
B-006-3-24	Cut Slope	1,205+39	175 Lt.	681.9	36.0	645.9
B-007-0-23	Old Town Creek Bridge	1,213+95	51 Lt.	586.4	32.0	554.4
B-007-1-24	Old Town Creek Bridge	1,213+96	53 Lt.	585.9	1.5	584.4
B-008-0-23	Old Town Creek Bridge	1,215+27	35 Lt.	579.9	35.8	544.1
B-009-0-23	Old Town Creek Bridge	1,216+56	1 Lt.	603.2	32.2	571.0
B-010-0-23	Tributary of Old Town Creek Bridge	1,230+18	35 Lt.	594.7	37.3	557.4

REPORT OF ROADWAY EXPLORATION (FINAL) – MEG-33-19.11

Boring No.	Boring Purpose	Station (feet)	Offset (feet)	Ground Surface Elevation (feet)	Boring Depth (feet)	Bottom of Boring Elevation (feet)
B-010-1-24	Tributary of Old Town Creek Bridge	1,230+71	37 Lt.	594.4	12.0	582.4
B-011-0-23	Tributary of Old Town Creek Bridge	1,232+26	9 Rt.	606.9	31.5	575.4
B-012-0-24	Cut Slope	1,292+57	154 Lt.	690.5	35.8	654.7
B-013-0-24	Cut Slope	1,304+99	258 Lt.	708.3	73.3	635.0

The borings were advanced in accordance with the ODOT Specifications for Geotechnical Explorations (SGE). The borings were performed with a CME 45 track mounted drill rig using 3¼-inch inside diameter (ID) hollow stem augers to advance the borings through soil. Standard Penetration Test (SPT) sampling was performed at 2.5-foot or continuous intervals until the target depth or bedrock was encountered. The depths and elevations of the SPTs with the corresponding N_{60} -values are shown on the boring logs in Appendix A and B. The energy ratio (ER) of the automatic hammer and drill rod system was measured to be 93.1 percent on July 5, 2023.

Upon encountering relatively unweathered bedrock in the bridge borings, rock coring was performed using NQ2-size equipment. Recovery, core loss, and rock quality designation (RQD) values were recorded as percentages for each coring run. These values are shown on the boring logs contained in Appendix A and B.

The materials encountered were logged by an engineer or geologist, with attention given to soil type, consistency, and moisture content. The borings were checked for the presence of groundwater during drilling and at its conclusion with the depth of water recorded. The borings were sealed and/or backfilled according to the ODOT SGE.

The soil samples obtained from the borings were returned to a geotechnical laboratory for visual classification and tested for water content. Engineering classification testing was performed on samples reflecting each of the main soil horizons. The engineering classification tests conducted on the samples were sieve and hydrometer analysis (ASTM D422) and Atterberg limits (ASTM D4318). The samples were classified according to the ODOT classification method.

Five Shelby tube sample were extruded in the laboratory, where one unconfined compressive strength of soil (UCS) test (ASTM D2166), four one-dimensional consolidation of soil tests (ASTM D2435) and five engineering classification were completed. Sixteen rock core samples were subjected to unconfined compressive strength of rock core (UCR) testing (ASTM D7012) and five rock samples were subjected to slake durability index (SDI) testing (ASTM D4644). Results of the laboratory testing are included with the boring logs and detailed laboratory reports for unconfined compressive strength testing are provided with the geotechnical profile sheets in Appendix A.

4.0 RESULTS OF CURRENT EXPLORATION PROGRAM

4.1 BOWMAN'S RUN BRIDGE (MEG-00033-19.462)

Borings B-001-0-23, B-002-0-23, and B-003-0-23 were advanced for the proposed bridge crossing Bowman's Run. Boring B-001-1-24 was advanced to obtain consolidation test samples for soils at the rear abutment. Surficial soils encountered were 3 to 4 inches of topsoil. Moderate and low plasticity fine-grained soils were observed throughout at the site. The soils classified as sandy silt (A-4a) and silt and clay (A-6a). The soils were described as stiff to very stiff, with SPT N₆₀-values ranging from 11 to 23 blows per foot with an average of 19 blows per foot. Moisture contents varied from 11 to 16 percent with an average of 14 percent. A bouldery zone was encountered in boring B-002-0-23 from a depth of 1 to 5 feet (Elevation 641.0 to 637.0 feet).

Bedrock was encountered at depths between 1.0 and 7.0 feet (from Elevation 635.0 to 676.3 feet) in the three borings. Rock coring was performed in all three bridge borings. The bedrock obtained from rock coring in B-001-0-23 consisted of sandstone with shale partings. In B-002-0-23, 13.8 feet of sandstone was underlain by claystone until the bottom of boring elevation. The bedrock encountered in B-003-0-23 consisted of 10.3 feet of claystone and shale, underlain by sandstone until the bottom of boring elevation. The sandstone was described as gray to brownish gray, moderately to highly weathered, moderately fractured, coarse grained, and arenaceous. Three UCR tests were completed on samples of sandstone, resulting in compressive strengths ranging from 4,050 to 8,680 pounds per square inch (psi) with an average of 6,116 psi. Claystone was described as reddish brown, moderately to highly weathered, highly to moderately fractured, and argillaceous. The shale was described as tan, highly weathered, and moderately fractured. The shale and claystone were not subjected to UCR testing due to the fragility of the samples.

Groundwater was not encountered in these borings while drilling; however, detection of groundwater may have been obscured by the addition of water during rock coring for the bridge foundation borings. Groundwater level may be present within bedrock. Boring logs and photographs of the rock core are presented with the geotechnical profile sheets in Appendix A.

4.2 OLD TOWN CREEK BRIDGE (MEG-00033-23.994)

Borings B-007-0-23, B-008-0-23, and B-009-0-23 were advanced for the proposed new companion bridge crossing Old Town Creek. Boring B-007-1-24 was advanced to obtain consolidation test samples for soils at the rear abutment. Moderate and low plasticity fine-grained overburden soils were observed. The soils classified as sandy silt (A-4a), silt (A-4b), silt and clay (A-6a), silty clay (A-6b), clay (A-7-6), and gravel and stone fragments with sand, silt, and clay (A-2-6). Cohesive soils were described as medium stiff to very stiff, with SPT N₆₀-values ranging from 8 to 29 blows per foot with an average of 17 blows per foot. Moisture contents varied from 11 to 28 percent with an average of 17 percent. According to the ODOT Geotechnical Design Manual (GDM), A-2-6 material is considered a "transitional" material that can be described as cohesive or granular depending on laboratory testing. Two samples of A-2-6 soil resulted in plastic limits of 35 and 37 with a plasticity index of 11, which is why the soil was given cohesive strength descriptions.

Bedrock was encountered at depths varying between 5.4 and 25.0 feet (from Elevation 554.9 to 597.8 feet) in the three borings. Rock coring was performed in all three bridge borings. The bedrock obtained from rock coring in B-

008-0-23 consisted of 1.3 feet of claystone underlain by sandstone with shale partings. In B-008-0-23, 2.8 feet of shale was underlain by claystone until the bottom of boring elevation. The bedrock encountered in B-009-0-23 consisted of sandstone with shale partings. The sandstone was described as brown to gray, moderately to highly weathered, moderately to slightly fractured, and coarse grained. Four UCR tests were completed on sandstone samples from these borings, resulting in compressive strengths ranging from 2,706 to 7,610 psi with an average of 5,259 psi. The shale was described as greenish gray, moderately to highly weathered, highly to severely fractured, laminated to thin bedded, and argillaceous. The claystone was described as reddish brown, moderately to highly weathered, highly fractured, laminated, and argillaceous. The shale and claystone were not subjected to UCR testing due to the fragility of the samples.

Groundwater was not encountered in these borings while drilling; however, detection of groundwater may have been obscured by the addition of water during rock coring for the bridge foundation borings. Groundwater level may be present within bedrock. Boring logs and photographs of the rock core are presented with the geotechnical profile sheets in Appendix A.

4.3 TRIBUTARY OF OLD TOWN CREEK BRIDGE (MEG-00033-24.307)

Borings B-010-0-23 and B-011-0-23 were advanced for the new bridge crossing a tributary of Old Town Creek. Boring B-010-24 was advanced to obtain consolidation test samples for soils at the rear abutment. Moderate and low plasticity fine-grained soils were encountered throughout the site. The soils encountered classified as silt and clay (A-6a), clay (A-7-6), and sandy silt (A-4a). The soils were described as medium stiff to hard, with SPT N_{60} -values ranging from 8 to 38 blows per foot with an average of 18 blows per foot. Moisture contents varied from 12 to 24 percent with an average of 17 percent.

Bedrock was encountered at depths of 25.0 feet (Elevation 569.7 feet) in B-010-0-23 and 3.0 feet (Elevation 603.9 feet) in B-011-0-23. Brown to gray sandstone with dark gray shale partings was encountered in both borings. The sandstone was described as moderately to highly weathered, moderately fractured, coarse grained, micaceous, and arenaceous. Three UCR tests were completed on sandstone samples from these borings, resulting in compressive strengths ranging from 2,437 to 6,820 psi with an average of 3,983 psi. One UCR test was completed on a shale sample, resulting in a compressive strength of 603 psi.

Groundwater was not encountered in these borings while drilling; however, detection of groundwater may have been obscured by the addition of water during rock coring for the bridge foundation borings. Groundwater level may be present within bedrock. Boring logs and photographs of the rock core are presented in with the geotechnical profile sheets Appendix A.

4.4 WET AREAS

Borings B-004-0-23, B-005-0-23, and B-006-0-23 were advanced in the previously observed wet areas planned for fill north of the existing 2-lane alignment. Surficial soils encountered at the site include 2 to 4 inches of topsoil. Moderate and low plasticity fine-grained soils were encountered throughout the sites. The soils encountered classified as silt and clay (A-6a), silty clay (A-6b), clay (A-7-6), and sandy silt (A-4a). The soils were described as medium stiff to very stiff, with SPT N_{60} -values ranging from 8 to 23 blows per foot with an average of 15 blows per foot. Moisture contents varied from 17 to 32 percent with an average of 21 percent. One sample in Boring B-004-0-23 possessed a moisture

content of 75 percent; however, this boring is located in a wetland area and was not included in the average. One UCS test was performed using the Shelby tube obtained from B-006-0-23, resulting in an unconfined compressive strength of 1.4 tons per square foot (tsf).

Bedrock was encountered at shallow depths (0.3 to 2.5 feet) in B-004-0-23 and B-005-0-23 and at a depth of 15.0 feet in B-006-0-23. Rock coring was not performed in these borings. Groundwater was encountered at a depth of 1.0 feet in Boring B-004-0-23 during drilling. Groundwater was not encountered in other borings while drilling. Boring logs are presented with the geotechnical profile sheets in Appendix A.

4.5 CUT SLOPES

Borings B-006-1-24, B-006-2-24, B-006-3-24, B-012-0-24, and B-013-0-24 were advanced in areas to fill data gaps in bedrock stratigraphy for cut slopes. Surficial soils encountered at the cut slope borings include 1 to 2 inches of topsoil where bulldozing operations did not occur. Moderate and low plasticity soils were encountered in all cut slope borings, classifying as silt and clay (A-6a), silty clay (A-6b), and clay (A-7-6). These soils were described as stiff to hard. The soils were described as stiff to hard, with SPT N_{60} -values ranging from 23 to 65 blows per foot with an average of 38 blows per foot. Moisture contents varied from 7 to 14 percent with an average of 11 percent.

Bedrock was encountered at depths ranging from 2.0 feet in B-006-2-24 to 19.5 feet in B-013-0-24. Borings typically first encountered red to gray highly weathered shale followed by moderately to highly weathered gray interbedded shale and sandstone, and either slightly weathered grey sandstone or highly weathered reddish gray shale. Five UCR tests were completed on bedrock samples from the cut slope borings. The compressive strength of three shale samples ranged from 2,285 to 6,960 psi, while the strength of two sandstone samples was 3,920 and 4,670 psi. Five SDI tests were completed on each type of rock described. SDI values in weathered shale ranged from 9 to 50 percent, while SDI values in less weathered shale and sandstone ranged from 75 to 97 percent.

Groundwater was not encountered in these borings while drilling; however, detection of groundwater may have been obscured by the addition of water during rock coring for the borings. Groundwater level may be present within bedrock. Boring logs and rock core photographs for the cut slope borings are provided in Appendix B.

5.0 ANALYSES AND RECOMMENDATIONS

5.1 GENERAL

The recommendations that follow are based on the information discussed in this report and the interpretation of the subsurface conditions documented in historic drilling programs and from those encountered at the site during our fieldwork. If future design changes are made, Stantec should be notified so that such changes can be reviewed, and the recommendations amended as necessary.

These conclusions and recommendations are based on data and subsurface conditions from historic drilling programs and the borings advanced during this exploration using the degree of care and skill ordinarily exercised under similar circumstances by competent members of the engineering profession. No warranties can be made regarding the continuity of conditions.

It is recommended that the project specifications refer to the Ohio Department of Transportation Construction and Materials Specifications (CMS), current edition. The use of special notes referring to the CMS should be included as necessary in relating the construction documents to the specific conditions within the project limits.

5.2 STRUCTURE RECOMMENDATIONS

5.2.1 Scour Analysis Parameters

A scour analysis will be performed by the bridge designer. Parameters to use for the scour analysis following methods outlined in Section 1302 of the ODOT GDM for each bridge are provided in the following sections. Parameter determinations for each bridge are provided in Appendix C.

5.2.1.1 Bowman's Run Bridge (MEG-00033-19.462)

Table 2 provides recommended parameters to use for soil scour analysis for the bridge crossing Bowman's Run. The estimated streambed elevation for the bridge is 636 feet.

Table 2. Recommended Soil Scour Parameters; Bowman’s Run Bridge

Boring No.	Sample	Elevation (ft)	D ₅₀ (mm)	τ _c (psf)	D _{50, equiv} (mm)	Erosion Category (EC)
B-001-0-23 (Rear Abutment)	SS-1 & SS-2	654.6-649.6	0.0805	0.1523	7.2917	2.754
	SS-3	649.6-648.4	0.0715	0.1039	4.9746	2.754
B-002-0-23 (Pier)	SS-2	637.0-635.0	0.1321	0.0173	0.8301	2.211
B-003-0-23 (Forward Abutment)	SS-1	677.3-676.3	0.0106	0.2598	12.4347	3.075

The bedrock at the site should be considered non-scour resistant according to ODOT Bridge Design Manual (BDM) 305.2.1.2.b. The erodibility index of bedrock at the bridge location was determined according to ODOT GDM 1302.1.3 and the 2012 Hydraulic Engineering Circular Number 18. Table 3 summarizes the recommended scour parameters for bedrock encountered in the bridge borings.

Table 3. Recommended Rock Scour Parameters; Bowman’s Run Bridge

Bedrock Type	Erodibility Index	τ _c (psf)	Erosion Category (EC)
Sandstone	158.0	66.5	4.4
Shale	11.9	18.2	3.9
Claystone	4.1	10.7	2.9

5.2.1.2 Old Town Creek Bridge (MEG-00033-23.994)

Table 4 provides recommended parameters to use for soil scour analysis for the bridge crossing Old Town Creek. The estimated streambed elevation for the bridge is 563 feet.

Table 4. Recommended Soil Scour Parameters; Old Town Creek Bridge

Boring No.	Sample	Elevation (ft)	D ₅₀ (mm)	τ _c (psf)	D _{50, equiv} (mm)	Erosion Category (EC)
B-007-0-23 (Rear Abutment)	SS-1 to SS-5	586.4-573.9	2.8537	0.0596	2.8549	3.075
	SS-6	573.9-571.4	0.0101	0.4783	22.8956	3.168
B-008-0-23 (Pier)	SS-6 to SS-10	569.2-554.9	0.0466	0.2115	10.1230	2.868
B-009-0-23 (Forward Abutment)	SS-1 & SS-2	603.2-597.8	0.2105	0.0044	0.2105	1.388

The bedrock at the site should be considered non-scour resistant according to ODOT BDM 305.2.1.2.b. The erodibility index of bedrock was determined according to ODOT GDM 1302.1.3 and the 2012 Hydraulic Engineering Circular Number 18. Table 5 summarizes the recommended scour parameters for bedrock encountered in the bridge borings.

Table 5. Recommended Rock Scour Parameters; Old Town Creek Bridge

Bedrock Type	Erodibility Index	τ _c (psf)	Erosion Category (EC)
Sandstone	163.5	67.6	4.2
Shale	12.3	18.6	3.7
Claystone	4.2	10.9	2.9

5.2.1.3 Tributary of Old Town Creek Bridge (MEG-00033-24.307)

Table 6 provides recommended parameters to use for soil scour analysis for the bridge crossing a tributary of Old Town Creek. The estimated streambed elevation for the bridge is 573 feet.

Table 6. Recommended Soil Scour Parameters; Tributary of Old Town Creek Bridge

Boring No.	Sample	Elevation (ft)	D ₅₀ (mm)	τ _c (psf)	D _{50, equiv} (mm)	Erosion Category (EC)
B-010-0-23 (Rear Abutment)	SS-7 & SS-8	579.3-574.7	0.0205	0.4771	22.8373	3.550
	SS-9 & SS-10	574.7-569.7	0.0049	0.4260	20.3927	3.168
B-011-0-23 (Forward Abutment)	SS-1	606.9-603.9	0.1696	0.0930	4.4521	2.632

The bedrock at the site should be considered non-scour resistant according to ODOT BDM 305.2.1.2.b. The erodibility index of bedrock was determined according to ODOT GDM 1302.1.3 and the 2012 Hydraulic Engineering Circular Number 18. Table 7 summarizes the recommended scour parameters for bedrock encountered in the bridge borings.

Table 7. Recommended Rock Scour Parameters; Tributary of Old Town Creek Bridge

Bedrock Type	Erodibility Index	τ _c (psf)	Erosion Category (EC)
Sandstone	134.1	61.2	4.2
Shale	10.1	16.8	3.6

5.2.2 Bridge Foundations

Bridge abutments and piers may be supported by drilled shafts, steel H-piles driven to refusal on bedrock, or prebored H-piles. The structural engineer for this project indicated the preferred foundation type would be drilled shafts because drilled shafts were successfully used for the existing bridges. Drilled shaft capacity calculation results for each bridge are provided in the following sections. The recommended side and tip resistances for drilled shafts were estimated following guidelines in the AASHTO LRFD Bridge Design Specifications 9th Edition Article 10.8.3.5 using the compressive strength of the bedrock. Where interbedded layers of soft and hard bedrock were observed, weighted averages of compressive strengths were used. A typical compressive strength of claystone was used because no samples were able to be tested due to the fragile nature of the claystone at the site. A side resistance factor of 0.55 and tip resistance factor of 0.50 are recommended based on Table 305-1 in the 2020 ODOT BDM for drilled shafts bearing on rock.

For the drilled shaft resistance calculations, it was assumed that two feet of the 10-foot rock socket will be in severely to highly weathered bedrock that was augured through during the exploration. The remaining eight feet will be in cored bedrock, considered to be “competent” rock. The side resistance was determined by using a weighted average of the rock strengths in the first eight feet of competent rock. The tip resistance was determined by using a weighted average of the rock strengths below the assumed rock socket to the terminus of each boring. Supporting calculations for each bridge are provided in Appendix D.

The shaft resistance provided by non-scour resistant bedrock should be neglected in the scour zone as recommended in Section 305.4.1.1 of the 2020 ODOT BDM. At a minimum, shaft resistance should be neglected for the top 2 feet of bedrock. Drilled shafts socketed into non-scour resistant bedrock should be extended a minimum of 10 feet below the controlling scour elevation in the bedrock. The recommended side and tip resistances assume a minimum rock socket length of 1.5 times the rock socket diameter as stated in section 305.4.2 of the 2020 ODOT BDM. Side resistance should be neglected for rock sockets with less than 1.5 times the rock socket diameter. When determining the load capacity of the bedrock below each bridge, consider either the side or tip resistance according to GDM Section 1306.1.2. If both are used, guidelines provided in Section 1306.3.2 of the GDM should be followed.

5.2.2.1 Bowman’s Run Bridge (MEG-00033-19.462)

The most common rock type at the two-span bridge crossing Bowman’s Run is the sandstone bedrock encountered in all three borings for the bridge. A typical rock compression strength of 6,116 psi was selected for drilled shaft capacity calculations based on the rock compression test results performed in borings B-001-0-23 and B-003-0-23. Shale and claystone bedrock were also encountered in the borings. A typical rock compression strength of 600 psi was assigned to shale from the sample tested in B-010-0-23. A value of 250 psi was selected for claystone bedrock based on testing from other projects and the bedrock conditions observed. Recommended nominal and factored side and tip resistances for each substructure unit are provided in Table 8 through Table 10.

Table 8. Drilled Shaft Axial Capacity Parameters; Bowman’s Run Bridge, Rear Abutment

Resistance	Nominal (ksf)	Factored (ksf)
Side	40.7	22.4
Tip	1,837.8	918.9

Table 9. Drilled Shaft Axial Capacity Parameters; Bowman’s Run Bridge, Pier

Resistance	Nominal (ksf)	Factored (ksf)
Side	39.4	21.7
Tip	446.9	223.4

Table 10. Drilled Shaft Axial Capacity Parameters; Bowman’s Run Bridge, Forward Abutment

Resistance	Nominal (ksf)	Factored (ksf)
Side	13.0	7.2
Tip	1,832.4	916.2

5.2.2.2 Old Town Creek Bridge (MEG-00033-23.994)

The most common rock type at the two-span bridge crossing Old Town Creek is the sandstone bedrock encountered in all three borings for the bridge. A typical rock compression strength of 5,259 psi was selected for drilled shaft capacity calculations based on the rock compression test results performed in borings B-007-0-23 and B-009-0-23.

Shale and claystone bedrock were also encountered in the borings. A typical rock compression strength of 600 psi was assigned to shale from the sample tested in B-010-0-23. A value of 250 psi was selected for claystone bedrock based on testing from other projects and the bedrock conditions observed. Recommended nominal and factored side and tip resistances for each substructure unit are provided in Table 11 through Table 13 .

Table 11. Drilled Shaft Axial Capacity Parameters; Old Town Creek Bridge, Rear Abutment

Resistance	Nominal (ksf)	Factored (ksf)
Side	33.9	18.7
Tip	1,875.0	937.5

Table 12. Drilled Shaft Axial Capacity Parameters; Old Town Creek Bridge, Pier

Resistance	Nominal (ksf)	Factored (ksf)
Side	10.5	5.8
Tip	90.0	45.0

Table 13. Drilled Shaft Axial Capacity Parameters; Old Town Creek Bridge, Forward Abutment

Resistance	Nominal (ksf)	Factored (ksf)
Side	39.9	21.9
Tip	1,825.0	912.5

5.2.2.3 Tributary of Old Town Creek Bridge (MEG-00033-24.307)

The most common rock type at the single-span bridge crossing a tributary of Old Town Creek is the sandstone bedrock encountered in all three borings for the bridge. A typical rock compression strength of 3,983 psi was selected for drilled shaft capacity calculations based on the rock compression test results performed in borings B-010-0-23 and B-011-0-23. Shale bedrock was also encountered in the borings. A typical rock compression strength of 600 psi was assigned to shale from the sample tested in B-010-0-23. Recommended nominal and factored side and tip resistances for each substructure unit are provided in Table 14 and Table 15.

Table 14. Drilled Shaft Axial Capacity Parameters; Tributary of Old Town Creek Bridge, Rear Abutment

Resistance	Nominal (ksf)	Factored (ksf)
Side	30.9	17.0
Tip	1,122.5	561.3

Table 15. Drilled Shaft Axial Capacity Parameters; Tributary of Old Town Creek Bridge, Forward Abutment

Resistance	Nominal (ksf)	Factored (ksf)
Side	34.8	19.1
Tip	1,425.0	712.5

5.2.3 Seismic Site Classification

A site-specific seismic classification was developed using the SPT N-values recorded during the field exploration program at each bridge location. The following sections discuss the results of each analysis. Seismic site classification is determined according to the ODOT BDM and 9th Edition AASHTO LRFD Bridge Design Specification (2020). N-values to a depth of 100 feet are used to determine seismic site classification. If bedrock was encountered before a depth of 100 feet, an N-value of 100 is assigned from the bedrock depth to 100 feet. Calculations for each site classification are provided in Appendix E.

5.2.3.1 Bowman’s Run Bridge (MEG-00033-19.462)

An average N-value of 80.1 was calculated at the bridge location based upon the two abutment borings and one pier boring advanced for this project. Per the current AASHTO LRFD Bridge Design Specifications and an average N-value of 80.1, the site classified as Seismic Site Class C.

5.2.3.2 Old Town Creek Bridge (MEG-00033-23.994)

An average N-value of 44.8 was calculated at the bridge location based upon the two abutment borings and one pier boring advanced for this project. Per the current AASHTO LRFD Bridge Design Specifications and an average N-value of 44.8, the site classified as Seismic Site Class D.

5.2.3.3 Tributary of Old Town Creek Bridge (MEG-00033-24.307)

An average N-value of 55.3 was calculated at the bridge location based upon the two abutment borings advanced for this project. Per the current AASHTO LRFD Bridge Design Specifications and an average N-value of 55.3, the site classified as Seismic Site Class C.

5.2.4 Lateral Load Analyses

A lateral capacity analysis was performed for the abutment and pier piles at each bridge using the computer program LPILE v 2022. The lateral loads were provided by the structural designer and were computed from the bridge loading and the lateral earth pressures on the back of the abutment wall above the driven piles. Detailed results of the LPILE analysis are shown in Appendix F. Drilled shafts were modeled for the abutments and piers. Group effects were taken into account by applying a P-multiplier as specified in the *AASHTO LRFD Bridge Design Specifications* Section 10.7.2.4. The methodology for applying the multipliers is shown in Appendix F.

Multiple loading cases were analyzed for each substructure. Each case was analyzed with service limit state loading and strength limit state loading, as provided by the structural designer. The service limit state cases are used to determine the maximum deflection of the piles, while the strength limit state cases provide shear and bending

moments for structural capacity analysis. Shear and moment loading provided by the structural engineer were input into each load case at each substructure unit. Maximum results for each bridge substructure are summarized in Table 16, Table 17, and Table 18.

Table 16. Lateral Load Analysis Results; Bowman’s Run Bridge

Bridge Substructure	Maximum Deflection (in)	Maximum Shear (kips)	Maximum Moment (kip-ft)
Rear Abutment	0.12	119.4	381.7
Pier	0.043	496.7	991.7
Forward Abutment	0.0006	124.9	167.7

Table 17. Lateral Load Analysis Results; Old Town Creek Bridge

Bridge Substructure	Maximum Deflection (in)	Maximum Shear (kips)	Maximum Moment (kip-ft)
Rear Abutment	0.40	194.2	757.3
Pier	0.052	177.4	1225.0
Forward Abutment	0.0007	114.2	160.0

Table 18. Lateral Load Analysis Results; Tributary of Old Town Creek Bridge

Bridge Substructure	Maximum Deflection (in)	Maximum Shear (kips)	Maximum Moment (kip-ft)
Rear Abutment	0.48	932.1	2375.0
Forward Abutment	0.0006	75.6	100.0

5.2.5 Approach Embankments

The need for slope stability and settlement calculations were evaluated at the bridge approach embankments. Maximum approach embankment height required to reach planned roadway elevation is expected to be less than 20 feet (19 feet for Bowman’s Run Bridge, 19 feet for Old Town Creek Bridge, and 18 feet for Tributary of Old Town Creek Bridge). Slopes of 2H:1V are recommended for embankments of this height. Settlement analyses are to be considered for the rear abutment of all three bridges. Analyses for the forward abutments are not required due to the need of rock cuts to reach the foundation elevation for each bridge.

According to the ODOT GDM Section 1303.2.1, settlement for foundations on cohesive soils may be assumed to be negligible if the Service Limit State bearing stress over the effective area is less than 50 percent of the undrained shear strength of the foundation soil. The bearing stress from the embankment onto the foundation soils was assumed to be the unit weight of unknown embankment fill (125 pcf) times the maximum height of the embankment. After comparing undrained shear strengths developed using relationships provided in Section 404 of the ODOT GDM

with the bearing stresses at each embankment location, it was determined that settlement analyses would be needed at all three locations.

Settlement analyses using Settle3D modelling software were performed for the rear approach embankment at each bridge. Subsurface conditions were based on the results of boring near this structure and soil parameters were based on consolidation tests performed in offset borings. Laboratory test results and settlement parameter estimations are provided in Appendix G.

Due to the cohesive nature of the soil at the site, no immediate settlement was predicted. Results from the Settle3D analyses are provided in Appendix G. The results of the consolidation settlement predictions are summarized in Table 19.

Table 19. Summary of Settlement Analyses at Rear Approach and Abutment

Rear Approach Abutment	Estimated Consolidation Settlement (inches)	Recommended Waiting Period Before Construction of Drilled Shafts (Days)
Bowman’s Run Bridge (MEG-00033-19.462)	3.4	94
Old Town Creek Bridge (MEG-00033-23.994)	5.4	35
Tributary of Old Town Creek Bridge (MEG-00033-24.307)	13.2	62

Predicted settlement at each rear approach is greater than the 0.4 inches required to mitigate down drag loading on the drilled shafts. Table 19 also provides the recommended waiting period at for each bridge abutment prior to drilled shaft construction to allow settlement of the foundation soils to occur and reduce down drag loading. To monitor the consolidation, settlement platforms are recommended. The reading of these platforms will allow construction to proceed once the Engineer has determined that sufficient settlement has occurred. Two platforms are recommended at each rear approach abutment at Stations 974+90, 1,214+00, and 1,230+50, one just beyond the left shoulder and one just beyond the right shoulder.

5.2.6 Lateral Earth Pressure

Temporary sheeting and shoring systems should be designed to withstand the development of lateral earth pressures and hydrostatic pressures. The magnitude of such pressures varies based on soil type, permissible wall movement and configuration of backfill. Table 20 provides the recommended lateral earth pressure parameters for on-site cohesive soil and select granular backfill. The friction angle of on-site soil was determined using blow count relationships. Assumed material properties for embankment fill are outlined in Table 500-2 of the GDM. Material properties for select granular backfill are provided in the ODOT Construction and Materials Specifications (CMS).

Table 20. Lateral Earth Pressure Parameters

Soil Parameter	Soil at Project Site	ODOT Assumed for Unknown Soil	Granular Backfill
Drained Friction Angle (degrees)	24	26	32
Unit Weight (pcf)	Moist	122	120
	Buoyant	60	73
Earth Pressure Coefficient	Active Case (K_A)	0.37	0.28
	Passive Case (K_P)	4.01	7.8
	At-Rest Case (K_0)	0.59	0.47
Equivalent Fluid Unit Weights (pcf)	Active Case	45	34
	Passive Case	489	936
	At-Rest Case	72	56

To reduce lateral earth pressures applied to the retaining structures due to hydrostatic buildup, free drainage should be provided in accordance with ODOT CMS Item 518. Placement of the granular backfill should be in accordance with ODOT CMS Item 518.05 “Porous Backfill”. Positive drainage of the granular backfill using weepholes or pipe drains is necessary to minimize the hydrostatic pressures against the structures. Providing positive drainage from the backfill will allow the use of the design parameters associated with the “drained” condition. If selected walls are capable of deflecting a distance of approximately 0.1 percent of the wall height, then an “active” condition could be used for design. If not, the “at-rest” condition should be used for design.

Backfill comprised of cohesive soils and/or granular soils with significant clay content may result in high magnitudes of lateral loads due to creep and swelling pressures. These materials are not recommended for use as backfill behind permanent structures. It is recommended that a backfill material comprised of free-draining granular material, such as the material specified under ODOT CMS Item 518.03, be used. The backfill material should be coarse angular gravel with a gradation equivalent to No. 57 aggregate, as specified under ODOT CMS Item 703, Table 703.01-1.

Backfill should be compacted in accordance with ODOT CMS Item 203.07 “Compaction and Moisture Requirements”. Overcompaction in areas directly behind structures should be avoided as this can cause damage to the structures. Appropriate equipment should be used to obtain the required compaction without causing damage.

5.3 ROADWAY RECOMMENDATIONS

5.3.1 Cut Slopes

Guidelines outlined in ODOT’s GDM section 1000, results of the UCR testing, historical exploration data, existing natural slopes, and experience on similar projects were used to establish recommendations for cut slope configurations within various soil and bedrock types.

Cuts will be necessary left of centerline along the alignment to allow for the widening of US 33 to four lanes. The cut slopes used for the two-lane highway were used as a general guide for the cut slopes for the widening. Where sandstone is expected, the slopes were designed with a 1:1 grade. Where shale, claystone, or mudstone is anticipated, the slopes were designed with a 2:1 grade. Intermediate benches were positioned atop where poor bedrock is anticipated, where construction limits allowed, to prevent undermining, and to provide a reduction to stormwater drainage velocity down the slope. The design of the catchment for the widening meets the intent of the guidelines presented in the ODOT GDM.

Where 1:1 cut slopes are planned on the lower slopes that are at least 10 feet tall, rockfall catchment should be provided in accordance with Table 1000-4 of the ODOT GDM. It is recommended that the planned catchment ditches consist of a combination of flat ditch (typically 10 feet wide) and foreslope catchment on a 4:1 slope that, combined with the flat ditch, provide a total catchment width of 20 feet. This is applicable from Station 964+50 to 966+00, 968+00 to 973+00, and 978+50 to 983+50, as well as from Station 1217+00 to 1218+00.

Along the current two-lane alignment, there are four Tier 2 Rockfall Sites within the project limits. These sites were reviewed during the field review and photos were viewed on the ODOT TIMS website. Table 21 provides a description of the conditions at the sites and the proposed rock cut in the area of that site.

Table 21. Rock Cut Slope Conditions and Recommendations

Tier 2 Site Straight Line Mileage and Approximate Project Stationing	Description of Cut Slope Condition	Planned Cut Slope for Widening
19.229 / 967+78	Degrading sandstone at base of cut and eroding shale at top	1:1 within the sandstone at the base and 2:1 in shale at top
24.076 / 1223+70	Slip at upper portion of cut near 2nd bench, erosion gullies in shale throughout	2:1 with intermediate bench(es)
24.321 / 1236+64	Lower existing 1:1 looks to be in shale and not performing well, erosion in shale on upper portion	Lower 1:1 removed, 2:1 with intermediate bench(es)
24.949 / 1269+80	Slip on lower slope, erosion gullies throughout	2:1 with intermediate bench(es)

In summary, cutting further into the slopes should improve the rock quality by exposing fresher bedrock and help against rockfall being an issue on the planned slopes. The removal of the lower 1:1 slope near mile marker 24.321 and making the entire cut a 2:1 slope should result in a less rockfall prone slope.

The computer program *RocFall*, Version 6.011, developed by Rocscience Inc. was used to run rockfall simulations for the stations listed in Table 21 using the guidelines suggested by ODOT in Section 503 of the *Rock Slope Design Guide*. To be conservative, strong smooth rock was used to model the outcrop and 500 one-foot spherical rock specimens were used on each exposed slope. For each simulation, energy from 100 percent of the rockfalls was dissipated on either the slope or in the catchment area, with no rockfall specimens entering the roadway. Outputs from the *RocFall* program can be found in Appendix H.

5.3.2 Embankment Slopes

Critical embankment cross sections were analyzed for slope stability using the program Slope/W from GeoStudio, Inc. A minimum of one section was chosen from each embankment along the project length, varying in slope from 2:1 to 3:1, as shown on the design cross sections. Short-term analyses, using total stress shear strength parameters for foundations and embankment materials, simulate conditions that will exist during embankment construction and immediately following completion of the embankment. Long-term analyses, using effective-stress shear strength parameters, simulate conditions that will exist long after the embankment is constructed and excess pore pressures within the foundation materials have dissipated. The computed factor of safety was compared to ODOT’s published minimum factor of safety for embankments, as shown in Table 22.

Table 22. ODOT Minimum Factors of Safety for Slope Stability

Embankment Scenario	Short-Term	Long-Term
Roadway Embankment	1.3	1.3
Embankments Supporting Structures	1.3	1.5

The shear strength parameters for the foundation soils were derived from soil classifications and laboratory testing of the historic and current explorations, SPT values, and associated published correlations of such data. The proposed embankment material is assumed to consist mostly of cut material along the project alignment, which is a combination of mostly shale bedrock and, to a lesser degree, cohesionless and cohesive soils. Table 23 shows the selected shear strength values of the embankment material used in the analyses. These values closely reflect the parameters used during the evaluation of the existing slopes in the historic geotechnical reports and analysis.

Table 23. Embankment Material Shear Strength Parameters

Parameter	Total Stress	Effective Stress
c or c' (psf)	1,500	200
Φ or Φ' (deg)	0	20
γ (pcf)	125	125

It was determined that factors of safety for 2H:1V slopes (or steeper) of heights greater than 25 feet will have lower than the ODOT recommended values for short-term and/or long-term conditions when using the embankment strengths shown in Table 22. These sections could be constructed using reinforced soil slopes (RSS) to achieve acceptable factors of safety. Results of the reinforced soil slope analyses are summarized in Section 5.3.3 and presented in Appendix J.

Alternatively, slope stability analyses were performed at two cross sections with 1.5H:1V or 2H:1V slopes of heights greater than 25 feet, but with soil strengths for the new embankment chosen from the values in Table 500-2 of the GDM, which assume stronger shear strength for proposed embankment material than shown in Table 22. It was assumed that the proposed embankment would consist of A-6b (silty clay) soil when the excavated shale material is broken down. The drained shear strength derived from GDM Table 500-2 were a cohesion of 250 psf, and friction angle of 28 degrees. The corresponding undrained shear strength assumed from the GDM was 2,500 psf cohesion

with a friction angle of zero. The factors of safety for these two cross sections with increased soil strength yielded adequate values for both short- and long-term conditions. A comparison of these factors of safety is presented in Table 24.

Table 24. Embankment Stability Results of 2:1 Slopes greater than 25 feet in Height

Station	Slope	Proposed Embankment Strengths	Applies to Station		Short Term FS	Long Term FS
			From	To		
1019+50	1.5H:1V	Report Table 22	1016+00	1020+00	1.5	1.0
1019+50	1.5H:1V	GDM Table 500-2	1016+00	1020+00	1.6	1.3
1022+00	2H:1V	Report Table 22	1020+00	1025+50	1.6	1.2
1022+00	2H:1V	GDM Table 500-2	1020+00	1025+50	1.8	1.6

Based on the results of this analysis and comparison, it would be acceptable that the 2H:1V slope at Station 1019+50 be unreinforced. It is not recommended that the 1.5H:1V slope at Station 1019+50 be unreinforced due to past experience showing that slopes steeper than 2H:1V have long term stability issues. If the slope configuration at Station 1019+50 can be adjusted to have a 2H:1V slope, the factors of safety for slope stability for an unreinforced slope would be adequate using the embankment parameters from GDM Table 500-2.

Table 25 summarizes the results of the slope stability analyses for the remaining 2:1 slopes of heights less than 25 feet, as well as 3:1 slopes, along with the stationing ranges that each cross section represents. The Slope/W analysis files showing the cross sections, shear strength parameters, and calculated factors of safety can be found in Appendix I.

Table 25. Embankment Stability Results

Station	Slope (H:V)	Applies to Station		Short Term FS	Long Term FS
		From	To		
1053+00	2:1	1053+00	1055+00	3.4	1.5
1076+50	2:1	1076+50	1077+50	3.7	1.6
1155+00	3:1	1153+00	1156+00	2.2	1.6
1178+50	3:1	1177+00	1180+00	2.1	1.6
1230+50	2:1	1230+00	1230+50	2.7	1.4
1341+50	3:1	1337+00	1346+50	1.5	1.7
1353+00	3:1	1350+00	1353+50	1.3	1.7
1367+50	3:1	1367+00	1370+00	1.1	1.6

The slope stability results indicate that the predicted short-term factor of safety at station 1367+50 does not meet the minimum factor of safety required by ODOT as shown in Table 22. Where the factor of safety is lower than the targeted value, remedial methods should be utilized for the embankment construction, such as a controlled rate of fill placement. Settlement versus time relationships were used to estimate the permissible construction rates for this cross section using a control rate of fill. This rate was calculated assuming the gain in shear strength for foundation soil under imposed loads should be proportional to the percent consolidation. A summary of the results is shown in Table 26 and the calculations are presented in Appendix I.

Table 26. Summary of Permissible Construction Rates

Station Analyzed	Maximum Embankment Elevation using Normal Construction Rates (feet)	Permissible Construction Rate (feet/week)	Approximate Station Interval for Rate Construction
1367+50	633	3.4	1367+00 to 1369+50

Settlement platforms and piezometers should be installed to monitor settlement and pore water pressures of the foundation soils during construction using controlled rate of fill methods. If excess pore water pressure is observed during the construction, appropriate remedial construction techniques should then be initiated to maintain embankment stability.

It is recommended that the rate of embankment construction be controlled to maintain adequate short term slope stability of the roadway embankments, as summarized in Table 27. Normal construction rates can be used up to the elevations given, then a controlled rate of fill be used above that elevation to final grade. A piezometer is recommended to be installed prior to embankment construction to monitor the pore water pressures of the foundation soils. Based upon the piezometer readings, the construction of the embankments may be restricted and, if necessary, halted until excess pore pressures have dissipated. The following recommended piezometer locations are preliminary and may be modified prior to construction. The number of piezometers installed at each location and the elevations at which they are installed are dependent upon the subsurface conditions present. A minimum of one piezometer should be installed for each compressible horizon at the recommended location. Additional piezometers should be installed in locations where there may be a concern for foundation instability beneath the embankment fill at the direction of the Engineer.

Table 27. Piezometer Installation Locations

Station	Offset (feet)	Elevation of Piezometer Tip (feet)
1367+50	140 Left	575

Review of existing ground on surveyed cross sections show hummocky ground, indicative of a preexisting or current landslide, was evident upslope from the alignment near Station 1030+00. A back calculation was performed to determine the in-situ soil strength corresponding to a factor of safety for slope stability of 1.0, given the existing geography and topography. Once determined, those soil strengths were used in conjunction with an excavate and replace approach within the existing right-of-way, replacing the existing material with No. 2 stone. The resulting long-term factor of safety is 1.7. Refer to the output of the stability analysis in Appendix I.

It is Stantec's understanding that the roadway embankments for this project will be constructed using material from cut areas. A review of the subsurface conditions encountered within the cut intervals indicates that the excavated material will consist primarily of non-durable shale and claystone, along with durable and non-durable sandstone. Durable sandstone should be utilized at the bottoms of fill areas to provide a stable base for embankment construction.

Any saturated, soft, and unstable areas encountered within embankment foundation limits and/or other areas as specified by the Engineer should be stabilized using broken durable sandstone from cut areas in accordance with

CMS 203.06.C. A minimum three-foot working platform should be constructed in such areas. The materials should be placed as directed by the Engineer based on site and climatic conditions during construction.

Special benching should be constructed for the embankments for the stations listed below to aid in long term stability. The benches should be constructed one at a time beginning with the lowest bench. The Stantec geotechnical engineering team designed the special benching shown on the construction plan cross sections where deemed necessary.

5.3.3 Embankment Settlement

A settlement analysis using Settle3D modelling software was performed on a typical embankment cross-section representing conditions from Station 1337+00 to 1370+00 where embankment heights of up to 30 feet are planned to be placed upon existing embankment material and silty soil foundation deposits exceeding 40 feet in depth. Subsurface conditions were based on the results of historic borings completed near Station 1367+50 and soil consolidation parameters were based on consolidation tests performed during the current exploration. Laboratory test results and settlement parameter estimations are provided in Appendix G. Due to the cohesive nature of the soil at the site, immediate settlement was negligible. The analysis was performed assuming that the existing embankment placed in the early 2000s caused a certain amount of settlement and the planned embankment would cause additional consolidation to occur. According to the settlement analysis, approximately 4 inches of settlement is expected after constructing and keying in the widened embankment to the existing embankment. Results from the Settle3D analyses are provided in Appendix I.

Because the analysis predicts that the settlement caused by embankment construction from Station 1337+00 to 1370+00 is expected to be greater than 3 inches, corrective actions are required by the GDM. Therefore, the settlement analysis described above estimated the time to get to within 3 inches of the predicted total settlement. Based on the result of the analysis, a waiting period of 35 days is recommended before pavement construction from Station 1337+00 to 1370+00. To monitor the consolidation, settlement platforms are recommended. The reading of these platforms will allow construction to proceed once the Engineer has determined that sufficient settlement has occurred. Settlement platforms are recommended at Station 1341+00, 1353+00, and 1367+50 at offsets of 70 feet left of center.

5.3.4 Reinforced Soil Slopes

Where it is not feasible to use 3H:1V slopes for embankments greater than 25 feet tall, geogrid reinforced soil slopes could be used to achieve acceptable factors of safety (although the analysis explained in Section 5.3.2 showed that 2H:1V slopes are acceptable using GDM-recommended shear strength parameters for proposed embankments). The reinforced slopes were designed as 2H:1V slopes with the necessary geogrid reinforcement to achieve slope stability factors of safety required by ODOT for embankments. The 2H:1V slopes are being used for areas where right-of-way restrictions prohibit the use of shallower slopes.

The computer program ReSSA was used for the design of the reinforced soil slopes. The slopes were analyzed for short-term and long-term conditions. Simplified geometry and foundation soil characterization were used because of the software limitations. The Comprehensive Bishop Method was used for global slope stability estimations. A traffic surcharge load of 250 pounds per square foot was used at the crest of the slope. The guidelines in the ODOT

Supplemental Specification 863 titled “Reinforced Soil Slopes” were used for selection of geogrid tensile strengths and resistance factors. The results of the analyses are summarized in Table 28 and are included in Appendix J.

Table 28. Reinforced Soil Slope Stability Results for 2H:1V Slopes

Station	Applies to Station		Short Term FS	Long Term FS
	From	To		
1019+50	1019+50	1020+00	1.5	1.3
1022+00	1020+50	1026+00	1.5	1.3

Primary geogrid reinforcement should be used to support the embankment on the steepened slope, and secondary reinforcement near the face of the slope should be used to protect against sloughing and shallow instability.

5.3.5 Subgrade Stabilization

The ODOT Geotechnical Design Manual (GDM) outlines the procedure for estimating the methods and limits of subgrade treatment that will be required to stabilize pavement subgrade prior to construction of the pavement section. The procedure is based on the results of a series of Dynamic Cone Penetrometer (DCP) borings, SPT borings, field testing, and laboratory testing.

A subgrade analysis was performed in accordance with ODOT GDM. Forty DCP tests were conducted along the alignment in April 2023. Thirteen of these locations were performed at stations where mechanical classification of the subgrade soil was completed. The DCP tests and mechanical classification results are shown on the geotechnical profile sheets in Appendix A. To perform the subgrade stability analysis, the results of the DCP tests were correlated to SPT blow counts (N-value) using the procedure outlined in *Validation of Correlations Between a Number of Penetration Tests and In Situ California Bearing Ratio Tests* (Transportation Research Record 1219, 1989, pp 56-67). The number of blows to penetrate successive two-inch increments in the subgrade soil was used to determine the DCP Index, which was correlated to a California Bearing Ratio (CBR) percentage. The CBR percentage was used to determine the SPT (mm/blow) from Equation 3 or Figure 1 of the TRR paper. The SPT value was converted to the imperial unit system and the value used to determine the number of blows per foot. These values were used as inputs in the Subgrade Analysis spreadsheet for the Standard N_{60} values to determine areas of unstable soil that would need to be remedied. Refer to the Subgrade Analysis spreadsheet in Appendix K. An average N_{60L} of 19 was calculated from the data obtained from the borings. A design CBR of 7 was estimated based on the subgrade analysis.

Unsuitable or unstable soils were present along the alignment, but in only 27 percent (4 of 13) of the subgrade borings, thus not necessitating global remediation. The DCP testing indicates that subgrade stabilization may be necessary from approximately Station 1305+00 to 1343+00, but only where less than 3 feet of cut or fill is planned. As such, 12 inches of subgrade stabilization should be assumed for about 10 percent of this station range that consists of several deep cuts and fills not requiring stabilization.

Excavation for subgrade stabilization should extend 12 inches beyond the edge of the surface of the pavement, and ODOT CMS Item 204 Geotextile Fabric should be placed underneath the selected granular fill material. Select fill should consist of Type B or C granular material.

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Where bedrock is exposed at the subgrade elevation, an undercut and replacement operation should be performed so that a more consistent and less rigid material underlies the pavement section. In these areas, rock, shale, or coal encountered in the subgrade should be excavated to 6 inches below the final subgrade elevation. It should be ensured that the excavated surface be shaped to drain and have a uniform surface that cannot trap water. The excavation should extend for a width of 1 foot beyond the roadway shoulders. The excavation should be replaced to the subgrade profile with suitable material conforming to ODOT CMS 204.02 Granular Material Type B, following the gradation of 703.17, and compacted according to 204.03. From review of the cross sections, bedrock undercutting would be needed within these approximate station ranges:

- 963+25 to 974+25
- 977+75 to 988+50
- 1009+75 to 1010+25
- 1028+75 to 1029+50
- 1062+25 to 1062+75
- 1081+75 to 1084+00
- 1089+25 to 1093+25
- 1118+75 to 1120+75
- 1130+25 to 1136+25
- 1141+25 to 1143+75
- 1160+00 to 1168+25
- 1171+75 to 1176+25
- 1181+25 to 1185+25
- 1190+75 to 1201+75
- 1203+75 to 1213+00
- 1216+25 to 1229+25
- 1232+25 to 1241+25
- 1248+25 to 1274+50
- 1281+50 to 1284+50
- 1295+75 to 1296+75
- 1297+25 to 1306+00

APPENDIX A
GEO TECHNICAL PROFILE DRAWINGS

PROJECT DESCRIPTION

THIS PROJECT, MEG-33-19.21, IS THE EXPLORATION TO CONVERT A 2-LANE HIGHWAY TO A 4-LANE DIVIDED HIGHWAY BY ADDING A MEDIAN AND TWO LANES NORTH OF THE EXISTING ALIGNMENT AND THREE COMPANION BRIDGES OVER 14.78 MILES IN MEIGS COUNTY.

HISTORIC RECORDS

THE ODOT TRAFFIC INFORMATION MANAGEMENT SYSTEM (TIMS) PROVIDED DOCUMENTATION FOR THE ORIGINAL INVESTIGATION FOR MEG-124-31.57 AND MEG-124-26.66, BOTH NOW US 33, COMPLETED IN 1999. SOILS ENCOUNTERED DURING THIS EXPLORATION WERE CLASSIFIED OR DESCRIBED AS CLAY (A-7-6), SANDY SILT (A-4A), SILTY CLAY (A-6B), AND SILT AND CLAY (A-6A). IT WAS ALSO NOTED THAT A CONSIDERABLE AMOUNT OF SILT (A-4B), COARSE- AND FINE-GRAINED SAND (A-3A), GRAVEL WITH SAND (A-1-B), GRAVEL (A-1-A), AND GRAVEL WITH SAND AND SILT (A-2-4) WAS ALSO OBSERVED. BEDROCK WAS DESCRIBED AS NON-DURABLE SHALE INTERBEDDED WITH THIN TO THICK SEAMS OF SANDSTONE OR SILTSTONE.

GEOLOGY

THE PROJECT SITE IS LOCATED WITHIN THE MARIETTA PLATEAU PHYSIOGRAPHIC REGION. THE REGION IS DESCRIBED AS A DISSECTED PLATEAU WITH HIGH RELIEF (GENERALLY 350 FEET UP TO 600 FEET) NEAR THE OHIO RIVER CONTAINING MOSTLY FINE-GRAINED ROCKS, RED SHALES, RED SOILS, AND LANDSLIDES ARE RELATIVELY COMMON. ELEVATIONS TYPICALLY RANGE FROM 515 TO 1,060 FEET. OVERBURDEN SOILS AT THE PROJECT SITE ARE UNDERLAIN PRIMARILY BY SEDIMENTARY BEDROCK FROM THE DUNKARD AND MONONGAHELA GROUPS OF THE PERMIAN AND PENNSYLVANIAN AGES. BEDROCK OF THE DUNKARD GROUP TYPICALLY CONSISTS OF SHALE, SILTSTONE, AND SANDSTONE WITH LESSER AMOUNTS OF LIMESTONE AND COAL. THE BEDROCK IS DESCRIBED AS BROWN, GRAY, RED, AND GREEN WITH THICKNESSES RANGING FROM 500 TO 600 FEET. BEDROCK OF THE MONONGAHELA GROUP TYPICALLY CONSISTS OF SHALE, SILTSTONE, LIMESTONE, SANDSTONE, AND COAL. THE BEDROCK IS DESCRIBED AS GRAY, GREEN, AND INFREQUENTLY RED WITH THICKNESSES OVER 350 FEET.

RECONNAISSANCE

STANTEC REPRESENTATIVES VISITED THE SITE FROM NOVEMBER 27 TO 29, 2023 TO EXAMINE FIELD CONDITIONS, ROAD CONDITIONS, EMBANKMENT CONDITIONS, AND TO MARK BORING LOCATIONS. THE LAND SURROUNDING THE PROJECT SITE CAN BE DESCRIBED AS RURAL AND AGRICULTURAL. IN GENERAL, THE EXISTING EMBANKMENTS WERE OBSERVED TO BE IN FAIR CONDITION. WET AREAS, STANDING WATER, SURFACE EROSION, EROSION GULLIES, AREAS OF EXPOSED GEO-FABRIC/ GEO-MESH, AND DAMAGED CULVERTS WERE OBSERVED SOUTH OF THE EXISTING EMBANKMENTS. PAVEMENT CONDITIONS WERE GENERALLY FAIR THROUGHOUT THE SITE; HOWEVER, CONDITIONS WERE POOR TO FAIR BETWEEN APPROXIMATE MILE MARKERS 25.00 AND 28.80. A MEMO SUMMARIZING THE INSPECTION FINDINGS WAS PROVIDED TO THE DISTRICT ON DECEMBER 21, 2023.

STANTEC REPRESENTATIVES VISITED THE SITE AGAIN ON SEPTEMBER 9, 2024 TO MARK BORINGS FOR CUT SLOPE SECTIONS AND OFFSET STRUCTURE BORINGS TO OBTAIN SAMPLES FOR CONSOLIDATION TESTING.

SUBSURFACE EXPLORATION

STANTEC ADVANCED 11 BORINGS FROM JANUARY 3 TO 17, 2024 TO OBTAIN GEOTECHNICAL DATA FOR THE PROJECT. OF THESE 11 BORINGS, EIGHT ARE FOR THREE NEW COMPANION BRIDGES ALONG US 33 WHILE THREE BORINGS WERE ADVANCED NEAR THE PREVIOUSLY OBSERVED WET AREAS PLANNED FOR FILL NORTH OF THE EXISTING TWO-LANE ALIGNMENT. THE BORINGS WERE DRILLED WITH A CME 45 TRACK MOUNTED DRILL RIG USING 3.25-INCH I.D. HOLLOW-STEM AUGERS. DISTURBED SOIL SAMPLES WERE OBTAINED IN ACCORDANCE WITH THE STANDARD PENETRATION TEST (AASHTO T206) AT CONTINUOUS OR 2.5-FOOT INTERVALS. THE AUTOMATIC SAMPLING WAS CALIBRATED ON JULY 5, 2023 AND HAS A DRILL ROD ENERGY RATIO (ER) OF 93.1 PERCENT. ROCK CORING WAS PERFORMED IN ALL BRIDGE BORINGS USING NQ2-SIZE CORING EQUIPMENT.

STANTEC ADVANCED 8 ADDITIONAL BORINGS FROM OCTOBER 11 TO 22, 2024 TO OBTAIN SAMPLES FOR CONSOLIDATION TESTING NEAR THE REAR ABUTMENT OF EACH BRIDGE AND PROFILE DATA FOR CUT SLOPES. THE BORINGS WERE DRILLED WITH THE SAME DRILL RIG AND METHODS USED DURING THE FIRST EXPLORATION. SOIL SAMPLES WERE OBTAINED AT 2.5-FOOT INTERVALS AND ROCK CORING WAS PERFORMED IN ALL CUT SLOPE BORINGS.

EXPLORATION FINDINGS

BOWMAN'S RUN BRIDGE

BORINGS B-001-0-23, B-002-0-23, AND B-003-0-23 WERE ADVANCED FOR THE PROPOSED BRIDGE CROSSING BOWMAN'S RUN. BORING B-001-1-24 WAS ADVANCED TO OBTAIN CONSOLIDATION PARAMETERS FOR SOILS AT THE REAR ABUTMENT. SURFICIAL SOILS ENCOUNTERED WERE 3 TO 4 INCHES OF TOPSOIL. MODERATE AND LOW PLASTICITY FINE-GRAINED SOILS WERE OBSERVED THROUGHOUT AT THE SITE. THE SOILS CLASSIFIED AS SANDY SILT (A-4A) AND SILT AND CLAY (A-6A). THE SOILS WERE DESCRIBED AS STIFF TO VERY STIFF. A BOULDERY ZONE WAS ENCOUNTERED IN BORING B-002-0-23 FROM A DEPTH OF 1 TO 5 FEET (ELEVATION 641.0 TO 637.0 FEET).

BEDROCK WAS ENCOUNTERED AT DEPTHS BETWEEN 1.0 AND 7.0 FEET (FROM ELEVATION 635.0 TO 676.3 FEET) IN THE THREE BORINGS. THE BEDROCK OBTAINED FROM ROCK CORING IN B-001-0-23 CONSISTED OF SANDSTONE WITH SHALE PARTINGS. IN B-002-0-23, 13.8 FEET OF SANDSTONE WAS UNDERLAIN BY CLAYSTONE UNTIL THE BOTTOM OF BORING ELEVATION. THE BEDROCK ENCOUNTERED IN B-003-0-23 CONSISTED OF 10.3 FEET OF CLAYSTONE AND SHALE, UNDERLAIN BY SANDSTONE UNTIL THE BOTTOM OF BORING ELEVATION. THE SANDSTONE WAS DESCRIBED AS GRAY TO BROWNISH GRAY, MODERATELY TO HIGHLY WEATHERED, MODERATELY FRACTURED, COARSE GRAINED, AND ARENACEOUS. CLAYSTONE WAS DESCRIBED AS REDDISH BROWN, MODERATELY TO HIGHLY WEATHERED, HIGHLY TO MODERATELY FRACTURED, AND ARGILLACEOUS. THE SHALE WAS DESCRIBED AS TAN, HIGHLY WEATHERED, AND MODERATELY FRACTURED.

GROUNDWATER WAS NOT ENCOUNTERED IN THESE BORINGS WHILE DRILLING; HOWEVER, DETECTION OF GROUNDWATER MAY HAVE BEEN OBSCURED BY THE ADDITION OF WATER DURING ROCK CORING FOR THE BRIDGE FOUNDATION BORINGS. GROUNDWATER LEVEL MAY BE PRESENT WITHIN BEDROCK.

OLD TOWN CREEK BRIDGE

BORINGS B-007-0-23, B-008-0-23, AND B-009-0-23 WERE ADVANCED FOR THE PROPOSED NEW COMPANION BRIDGE CROSSING OLD TOWN CREEK. BORING B-007-1-24 WAS ADVANCED TO OBTAIN CONSOLIDATION PARAMETERS FOR SOILS AT THE REAR ABUTMENT. MODERATE AND LOW PLASTICITY FINE-GRAINED OVERBURDEN SOILS WERE OBSERVED. THE SOILS CLASSIFIED AS SANDY SILT (A-4A), SILT (A-4B), SILT AND CLAY (A-6A), SILTY CLAY (A-6B), CLAY (A-7-6), AND GRAVEL AND STONE FRAGMENTS WITH SAND, SILT, AND CLAY (A-2-6). THE SOILS WERE DESCRIBED AS MEDIUM STIFF TO VERY STIFF.

BEDROCK WAS ENCOUNTERED AT DEPTHS VARYING BETWEEN 5.4 AND 25.0 FEET (FROM ELEVATION 554.9 TO 597.8 FEET) IN THE THREE BORINGS. ROCK CORING WAS PERFORMED IN ALL THREE BRIDGE BORINGS. THE BEDROCK OBTAINED FROM ROCK CORING IN B-008-0-23 CONSISTED OF 1.3 FEET OF CLAYSTONE UNDERLAIN BY SANDSTONE WITH SHALE PARTINGS. IN B-008-0-23, 2.8 FEET OF SHALE WAS UNDERLAIN BY CLAYSTONE UNTIL THE BOTTOM OF BORING ELEVATION. THE BEDROCK ENCOUNTERED IN B-009-0-23 CONSISTED OF SANDSTONE WITH SHALE PARTINGS. THE SANDSTONE WAS DESCRIBED AS BROWN TO GRAY, MODERATELY TO HIGHLY WEATHERED, MODERATELY TO SLIGHTLY FRACTURED, AND COARSE GRAINED. THE SHALE WAS DESCRIBED AS GREENISH GRAY, MODERATELY TO HIGHLY WEATHERED, HIGHLY TO SEVERELY FRACTURED, LAMINATED TO THIN BEDDED, AND ARGILLACEOUS. THE CLAYSTONE WAS DESCRIBED AS REDDISH BROWN, MODERATELY TO HIGHLY WEATHERED, HIGHLY FRACTURED, LAMINATED, AND ARGILLACEOUS.

GROUNDWATER WAS NOT ENCOUNTERED IN THESE BORINGS WHILE DRILLING; HOWEVER, DETECTION OF GROUNDWATER MAY HAVE BEEN OBSCURED BY THE ADDITION OF WATER DURING ROCK CORING FOR THE BRIDGE FOUNDATION BORINGS. GROUNDWATER LEVEL MAY BE PRESENT WITHIN BEDROCK.

TRIBUTARY OF OLD TOWN CREEK BRIDGE

BORINGS B-010-0-23 AND B-011-0-23 WERE ADVANCED FOR THE NEW BRIDGE CROSSING A TRIBUTARY OF OLD TOWN CREEK. BORING B-010-1-24 WAS ADVANCED TO OBTAIN CONSOLIDATION PARAMETERS FOR SOILS AT THE REAR ABUTMENT. MODERATE AND LOW PLASTICITY FINE-GRAINED SOILS WERE ENCOUNTERED THROUGHOUT THE SITE. THE SOILS ENCOUNTERED CLASSIFIED AS SILT AND CLAY (A-6A), CLAY (A-7-6), AND SANDY SILT (A-4A). THE SOILS WERE DESCRIBED AS MEDIUM STIFF TO HARD.

BEDROCK WAS ENCOUNTERED AT DEPTHS OF 25.0 FEET (ELEVATION 569.7 FEET) IN B-010-0-23 AND 3.0 FEET (ELEVATION 603.9 FEET) IN B-011-0-23. BROWN TO GRAY SANDSTONE WITH DARK GRAY SHALE PARTINGS WAS ENCOUNTERED IN ALL BORINGS. THE SANDSTONE WAS DESCRIBED AS MODERATELY TO HIGHLY WEATHERED, MODERATELY FRACTURED, COARSE GRAINED, MICACEOUS, AND ARENACEOUS.

GROUNDWATER WAS NOT ENCOUNTERED IN THESE BORINGS WHILE DRILLING; HOWEVER, DETECTION OF GROUNDWATER MAY HAVE BEEN OBSCURED BY THE ADDITION OF WATER DURING ROCK CORING FOR THE BRIDGE FOUNDATION BORINGS. GROUNDWATER LEVEL MAY BE PRESENT WITHIN BEDROCK.

WET AREAS

BORINGS B-004-0-23, B-005-0-23, AND B-006-0-23 WERE ADVANCED IN THE PREVIOUSLY OBSERVED WET AREAS PLANNED FOR FILL NORTH OF THE EXISTING 2-LANE ALIGNMENT. SURFICIAL SOILS ENCOUNTERED AT THE SITE INCLUDE 2 TO 4 INCHES OF TOPSOIL. MODERATE AND LOW PLASTICITY FINE-GRAINED SOILS WERE ENCOUNTERED THROUGHOUT THE SITES. THE SOILS ENCOUNTERED CLASSIFIED AS SILT AND CLAY (A-6A), SILTY CLAY (A-6B), CLAY (A-7-6), AND SANDY SILT (A-4A). THE SOILS WERE DESCRIBED AS MEDIUM STIFF TO VERY STIFF.

BEDROCK WAS ENCOUNTERED AT SHALLOW DEPTHS (0.3 TO 2.5 FEET) IN B-004-0-23 AND B-005-0-23. BEDROCK WAS ENCOUNTERED AT A DEPTH OF 15.0 FEET IN B-006-0-23. ROCK CORING WAS NOT PERFORMED IN THESE BORINGS. GROUNDWATER WAS ENCOUNTERED AT A DEPTH OF 1.0 FEET IN BORING B-004-0-23 DURING DRILLING.

GROUNDWATER WAS NOT ENCOUNTERED IN OTHER BORINGS WHILE DRILLING.

CUT SLOPES

BORINGS B-006-1-24, B-006-2-24, B-006-3-24, B-012-0-24, AND B-013-0-24 WERE ADVANCED IN AREAS WHERE LITTLE PROFILE INFORMATION WAS AVAILABLE FOR CUT SLOPES. SURFICIAL SOILS ENCOUNTERED AT THE CUT SLOPE BORINGS INCLUDE 1 TO 2 INCHES OF TOPSOIL WHERE BULLDOZING OPERATIONS DID NOT OCCUR. MODERATE AND LOW PLASTICITY SOILS WERE ENCOUNTERED IN ALL CUT SLOPE BORINGS, CLASSIFYING AS SILT AND CLAY (A-6A), SILTY CLAY (A-6B), AND CLAY (A-7-6). THESE SOILS WERE DESCRIBED AS STIFF TO HARD.

BEDROCK WAS ENCOUNTERED AT DEPTHS RANGING FROM 2.0 FEET IN B-006-2-24 TO 19.5 FEET IN B-013-0-24. BORINGS TYPICALLY FIRST ENCOUNTERED RED TO GRAY HIGHLY WEATHERED SHALE FOLLOWED BY MODERATELY TO HIGHLY WEATHERED GRAY INTERBEDDED SHALE AND SANDSTONE, AND EITHER SLIGHTLY WEATHERED GREY SANDSTONE OR HIGHLY WEATHERED REDDISH GRAY SHALE.

GROUNDWATER WAS NOT ENCOUNTERED IN THESE BORINGS WHILE DRILLING; HOWEVER, DETECTION OF GROUNDWATER MAY HAVE BEEN OBSCURED BY THE ADDITION OF WATER DURING ROCK CORING FOR THE BRIDGE FOUNDATION BORINGS. GROUNDWATER LEVEL MAY BE PRESENT WITHIN BEDROCK.

SPECIFICATIONS

THIS GEOTECHNICAL EXPLORATION WAS PERFORMED IN ACCORDANCE WITH THE STATE OF OHIO, DEPARTMENT OF TRANSPORTATION, OFFICE OF GEOTECHNICAL ENGINEERING, SPECIFICATIONS FOR GEOTECHNICAL EXPLORATIONS, DATED JULY 2023.

AVAILABLE INFORMATION

THE SOIL, BEDROCK, AND GROUNDWATER INFORMATION COLLECTED FOR THIS SUBSURFACE EXPLORATION THAT CAN BE CONVENIENTLY DISPLAYED ON THE SOIL PROFILE SHEETS HAS BEEN PRESENTED. GEOTECHNICAL REPORTS, IF PREPARED, ARE AVAILABLE FOR REVIEW ON THE OFFICE OF CONTRACT SALES WEBSITE.



LOCATION MAP
SCALE IN MILES



PARTICLE SIZE DEFINITIONS

12"	3"	2.0 mm	0.42 mm	0.074 mm	0.005 mm
BOULDERS	COBBLES	GRAVEL	COARSE SAND	FINE SAND	SILT
		No. 10 SIEVE	No. 40 SIEVE	No. 200 SIEVE	CLAY

- RECON. - JS & RL 11/27/2023-11/29/2023
RL & GK 09/06/2024
- DRILLING - BM & NS/JS 01/03/2024-01/17/2024
ZB & GK/NU 10/11/2024-10/22/2024
- DRAWN - MJ 06/2024
- REVIEWED - EK 11/22/2024

DESIGN AGENCY

10200 Alliance Road,
Suite 300
Cincinnati, OH 45242
(513) 842-8200

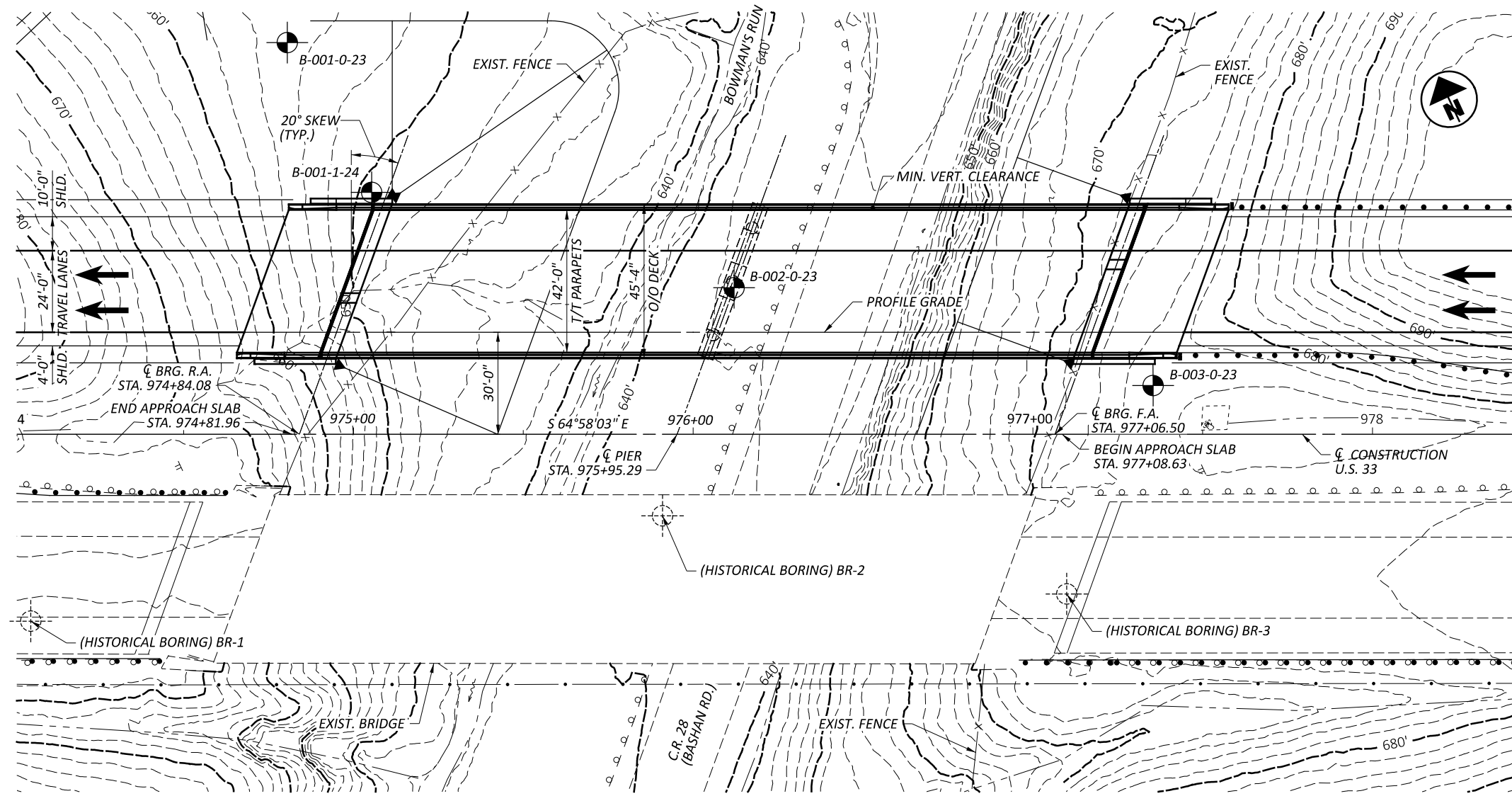
DESIGNER
MSJ

REVIEWER
EMK 11-22-24

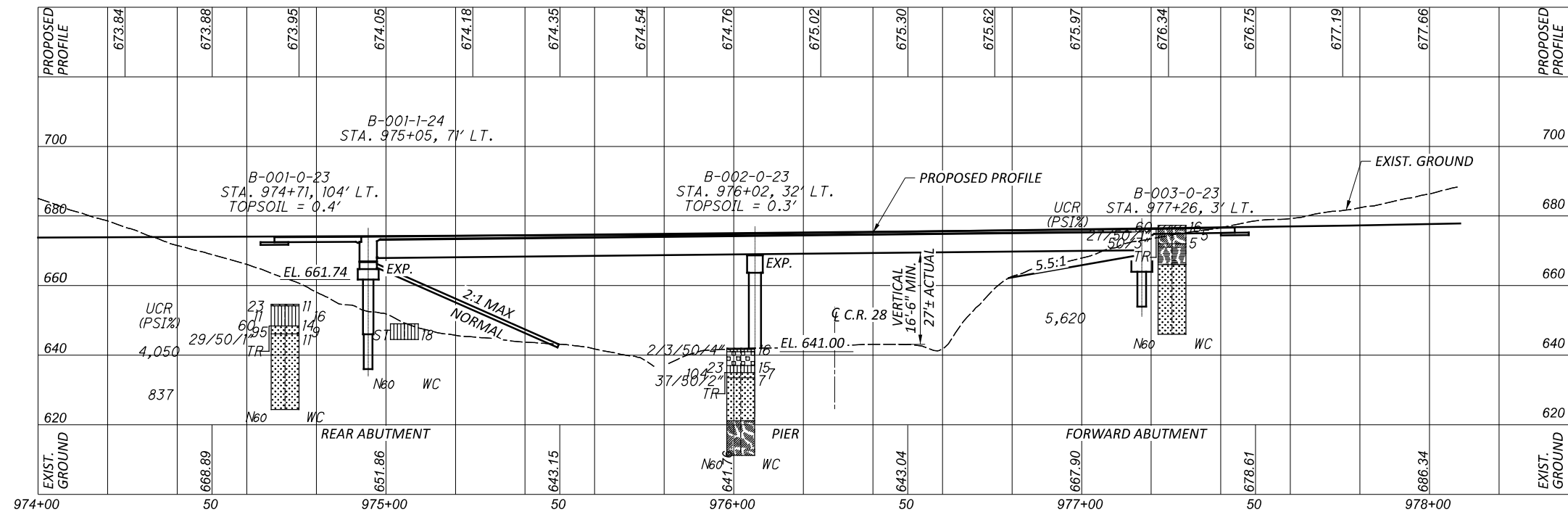
PROJECT ID
119144

SUBSET	TOTAL
-	-

SHEET	TOTAL
P.868	940



PLAN



PROFILE



GEOTECHNICAL PROFILE - STRUCTURE
 U.S. 33 OVER BOWMAN'S RUN AND C.R. 28 (BASHIAN ROAD)

DESIGN AGENCY

 10200 Alliance Road,
 Suite 300
 Cincinnati, OH 45242
 (513) 842-8200

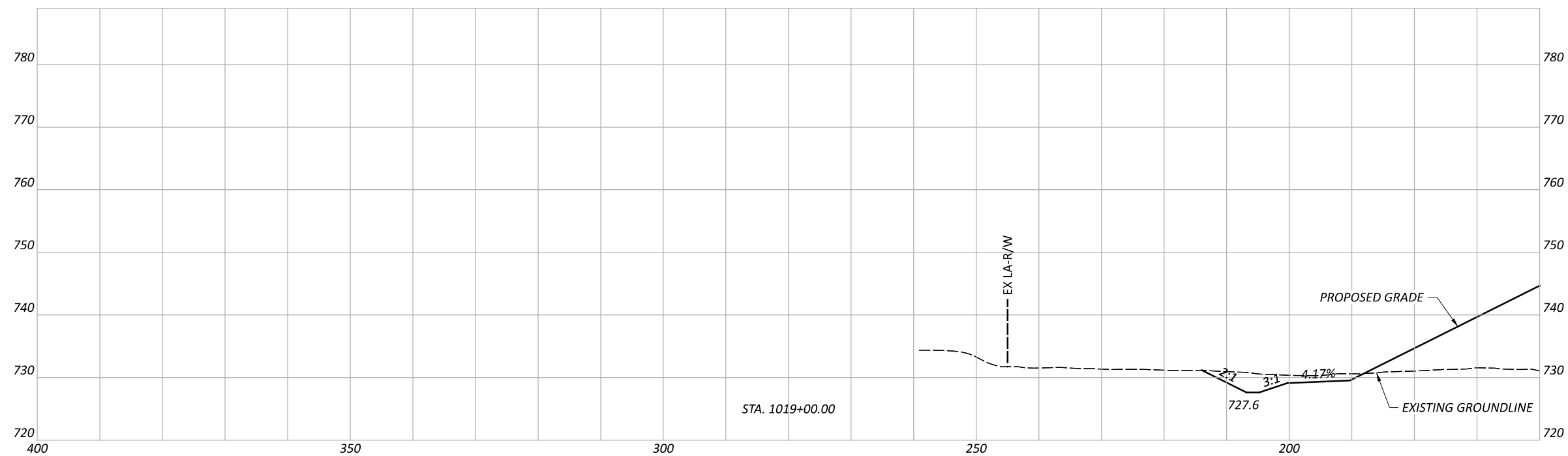
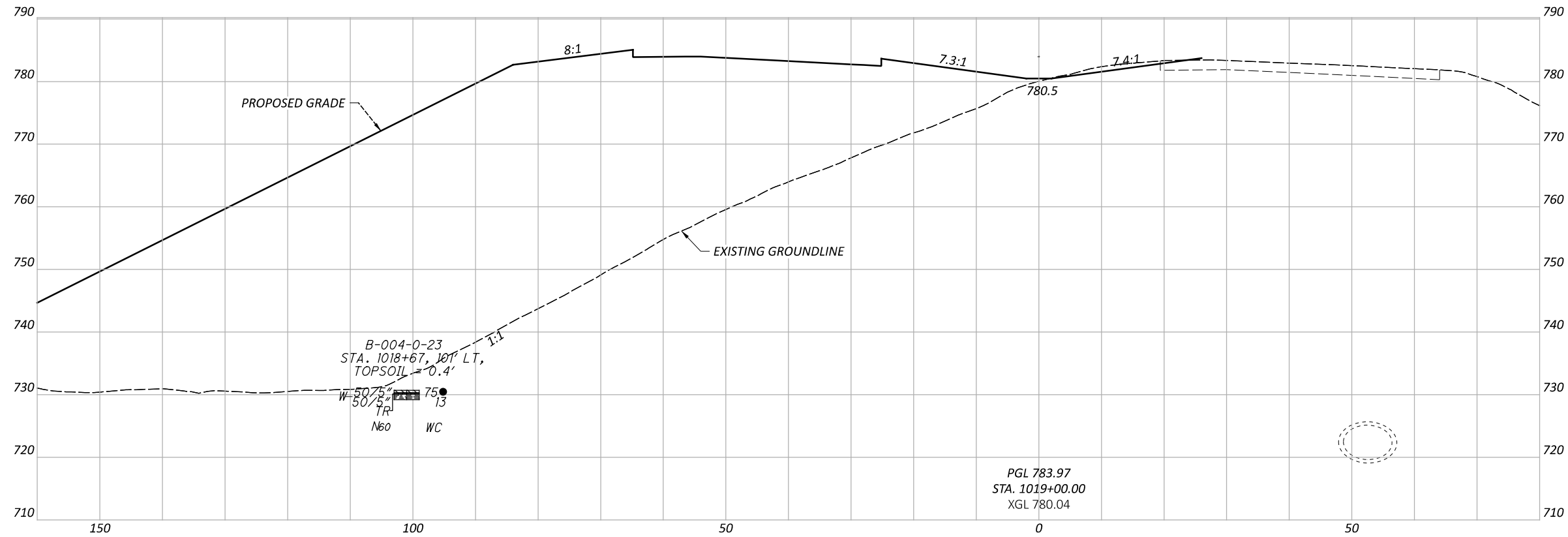
DESIGNER
 MSJ

REVIEWER
 EMK 11-22-24

PROJECT ID
 119144

SUBSET TOTAL
 0 0

SHEET TOTAL
 P.870 940



CROSS SECTION - U.S. 33
 STA. 1019+00



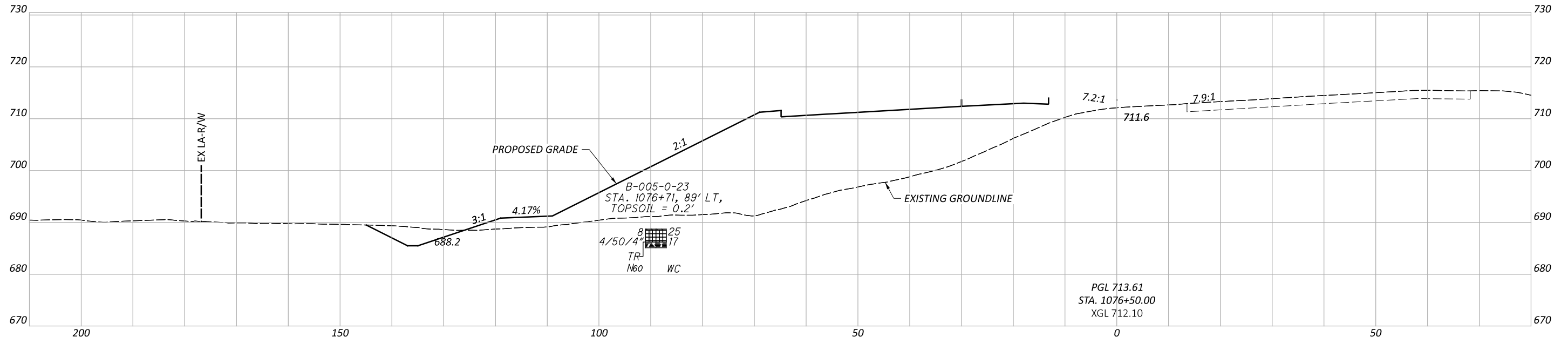
DESIGNER
MSJ

REVIEWER
EMK 11-22-24

PROJECT ID
119144

SUBSET	TOTAL
0	0

SHEET	TOTAL
P.871	940



CROSS SECTION - U.S. 33
STA. 1076+50

DESIGN AGENCY



Stantec
10200 Alliance Road,
Suite 300
Cincinnati, OH 45242
(513) 842-8200

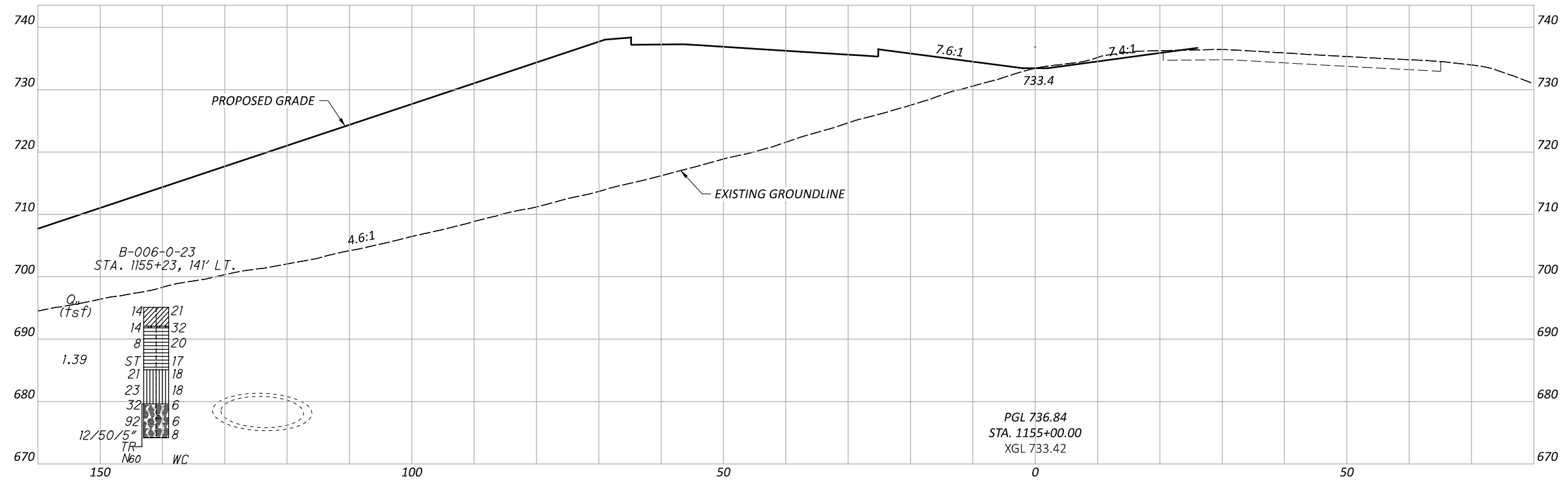
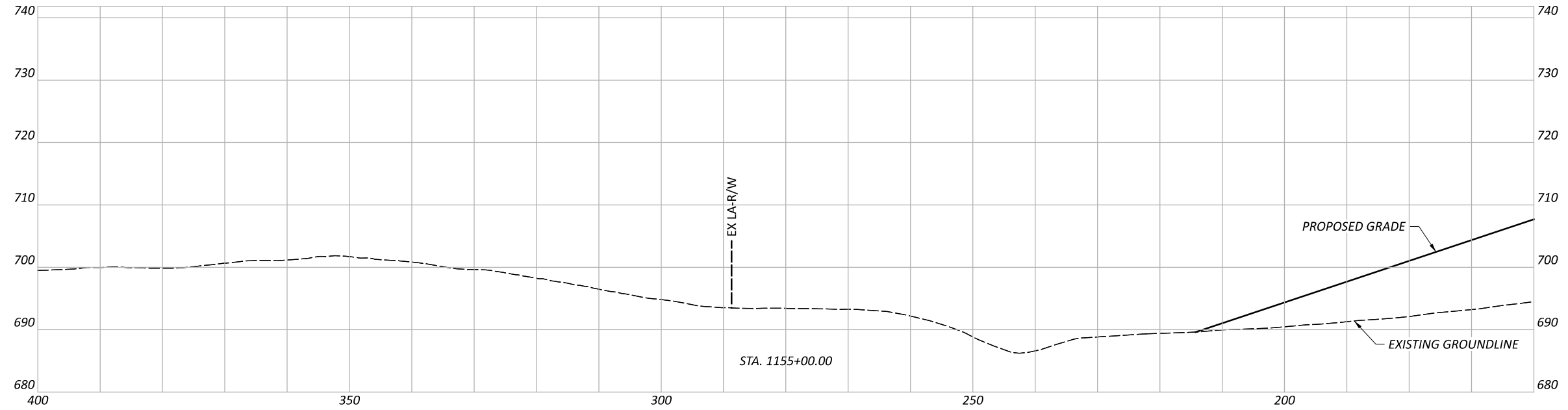
DESIGNER
MSJ

REVIEWER
EMK 11-22-24

PROJECT ID
119144

SUBSET	TOTAL
0	0

SHEET	TOTAL
P.872	940



CROSS SECTION - U.S. 33
 STA. 1155+00

DESIGN AGENCY

 10200 Alliance Road,
 Suite 300
 Cincinnati, OH 45242
 (513) 842-8200

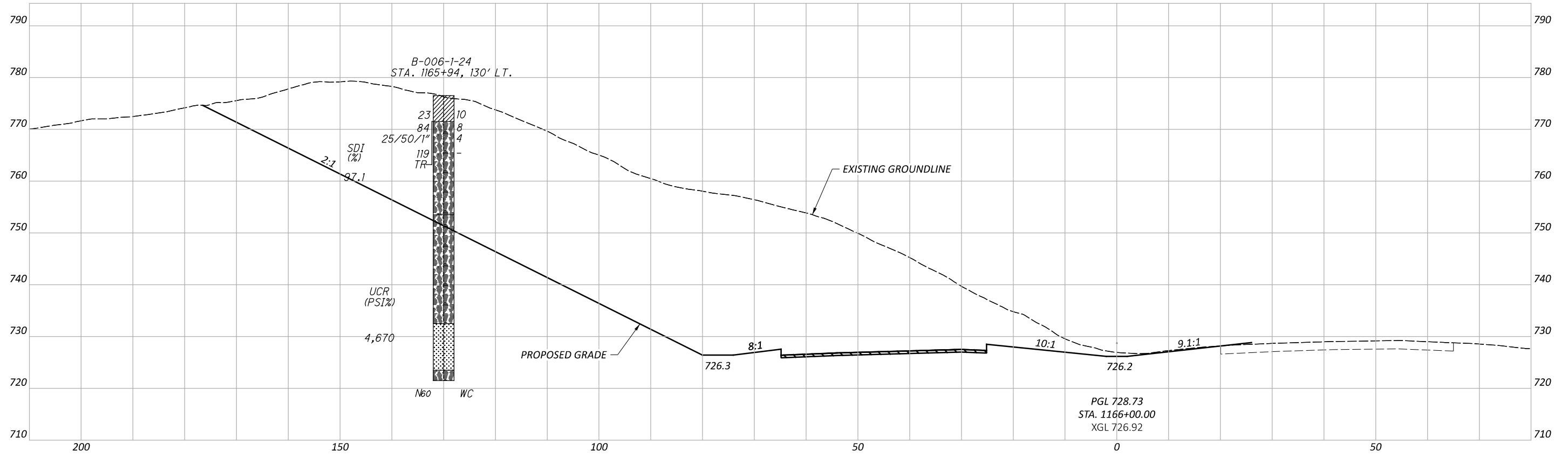
DESIGNER
MSJ

REVIEWER
EMK 11-22-24

PROJECT ID
119144

SUBSET	TOTAL
0	0

SHEET	TOTAL
P.873	940



CROSS SECTION - U.S. 33
 STA. 1166+00.00

DESIGN AGENCY

 10200 Alliance Road,
 Suite 300
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 (513) 842-6200

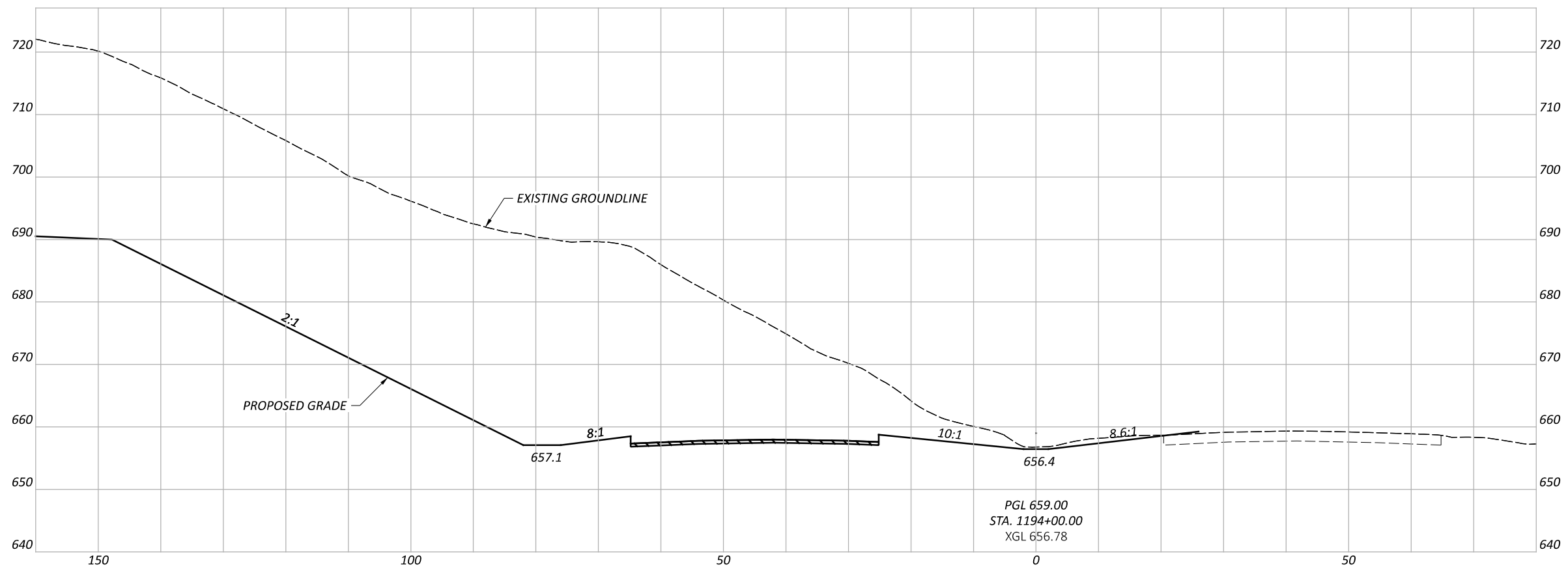
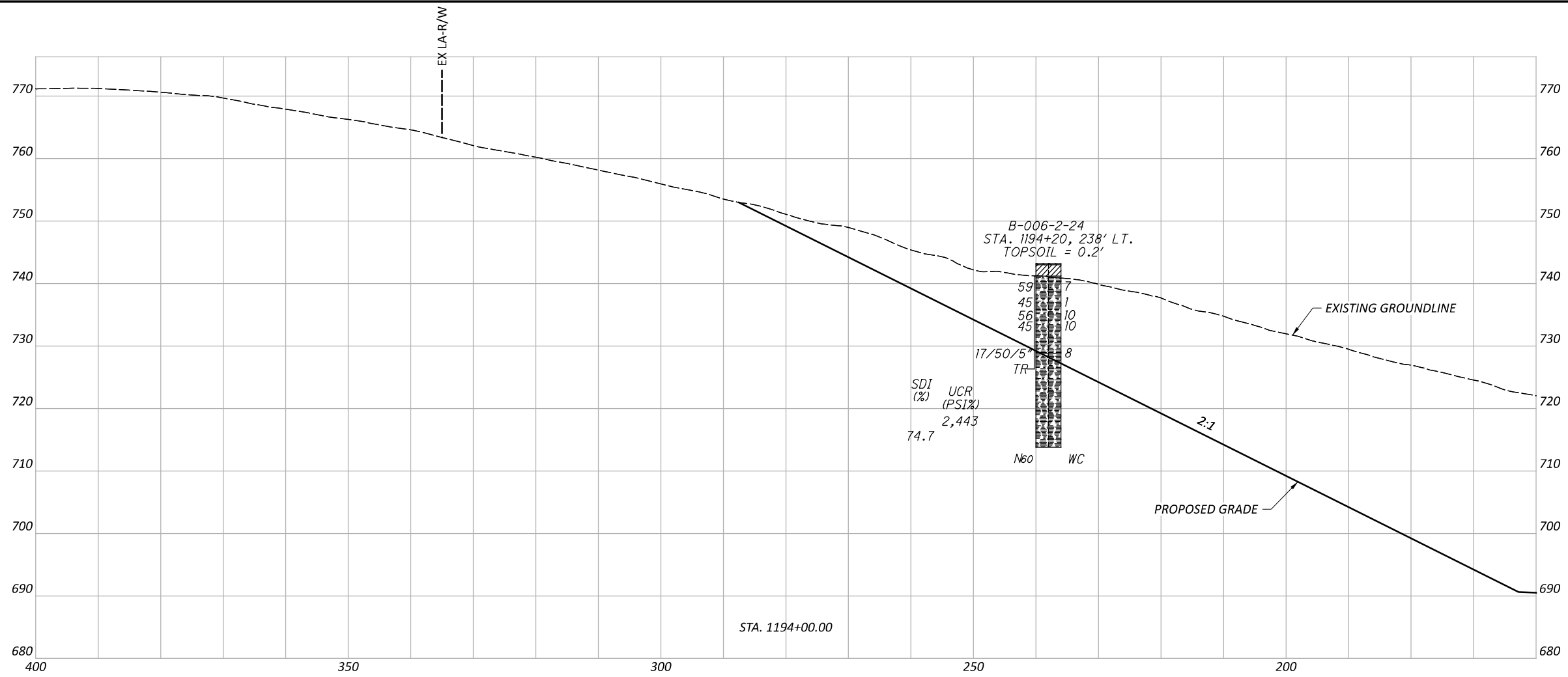
DESIGNER
 MSJ

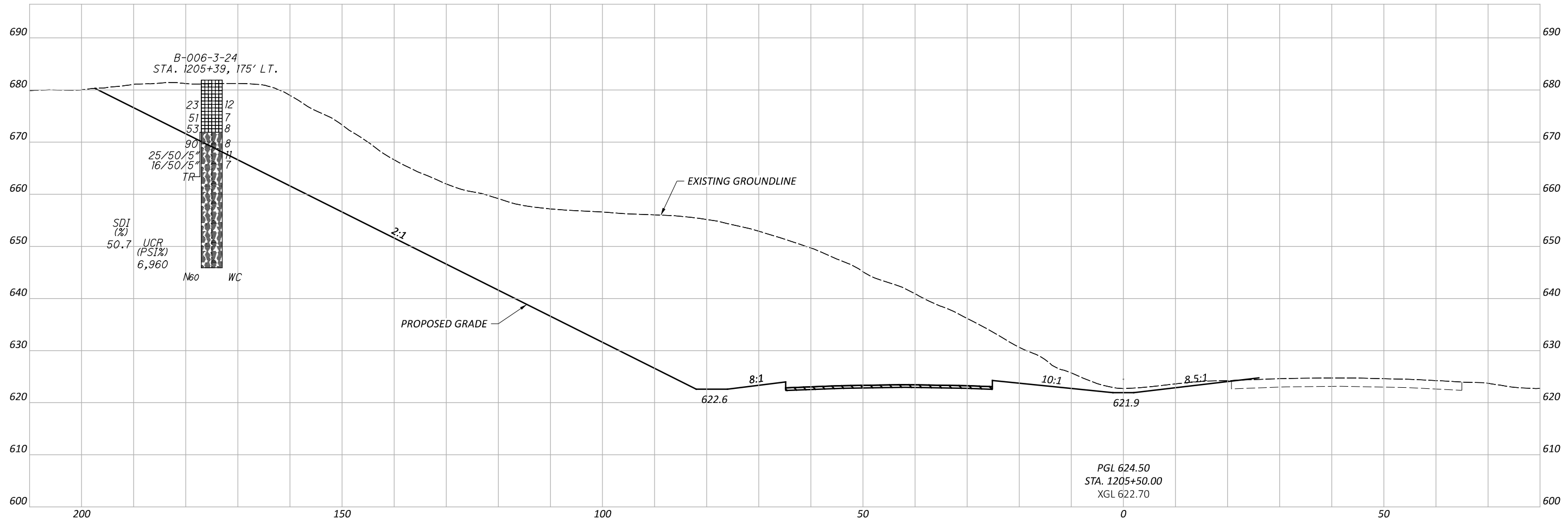
REVIEWER
 EMK 11-22-24

PROJECT ID
 119144

SUBSET	TOTAL
0	0

SHEET	TOTAL
P.874	940





CROSS SECTION - U.S. 33
 STA. 1205+50.00

DESIGN AGENCY

Stantec
 10200 Alliance Road,
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 (513) 842-6200

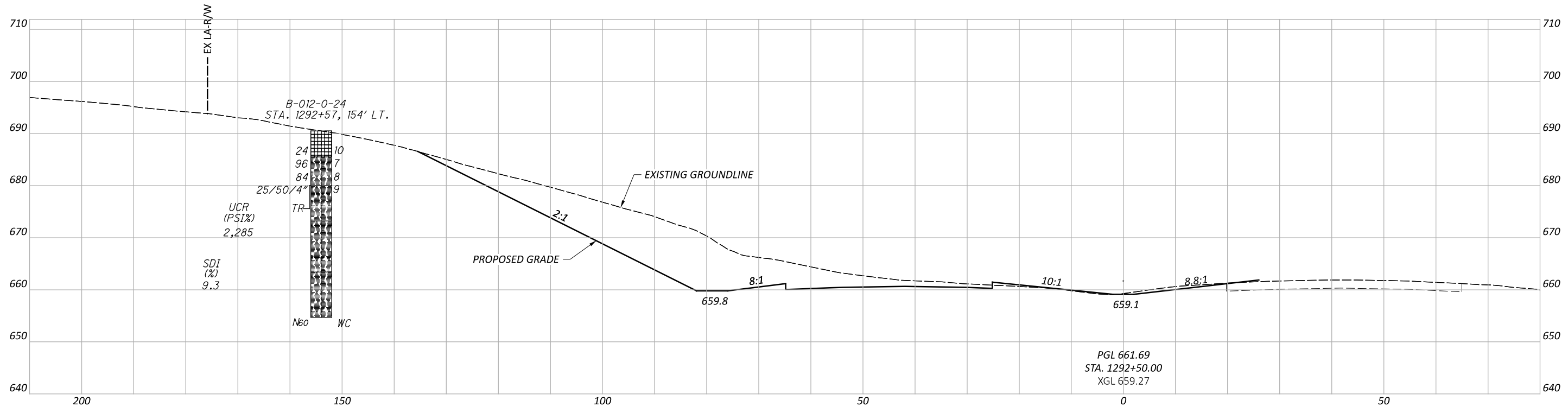
DESIGNER
MSJ

REVIEWER
EMK 11-22-24

PROJECT ID
119144

SUBSET	TOTAL
0	0

SHEET	TOTAL
P.876	940



CROSS SECTION - U.S. 33
 STA. 1292+50.00

DESIGN AGENCY

Stantec
 10200 Alliance Road,
 Suite 300
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 (513) 842-6200

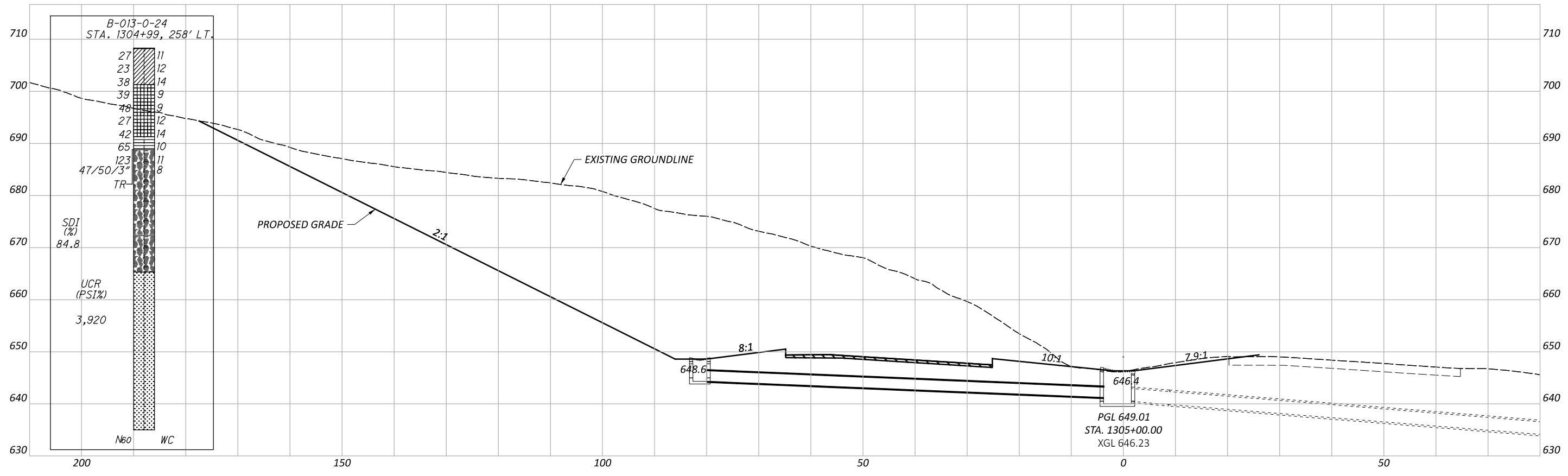
DESIGNER
MSJ

REVIEWER
EMK 11-22-24

PROJECT ID
119144

SUBSET	TOTAL
0	0

SHEET	TOTAL
P.877	940



CROSS SECTION - U.S. 33
 STA. 1305+00.00

DESIGN AGENCY



Stantec
 10200 Alliance Road,
 Suite 300
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 (513) 842-6200

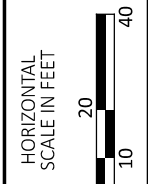
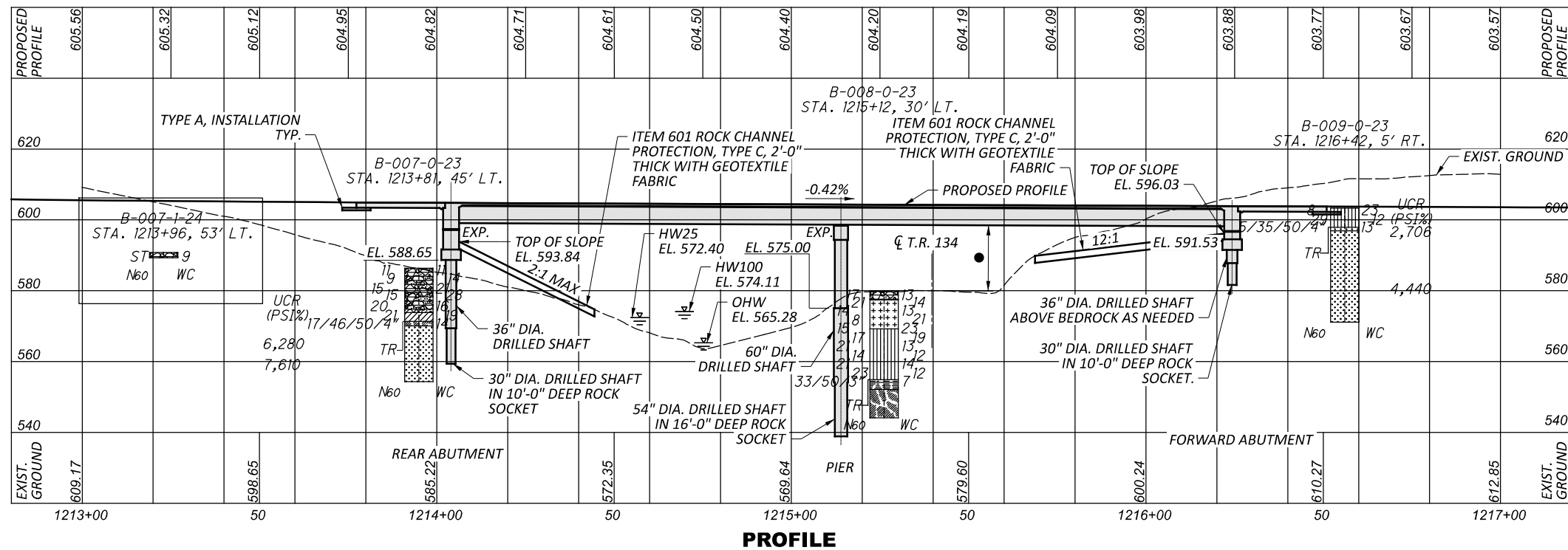
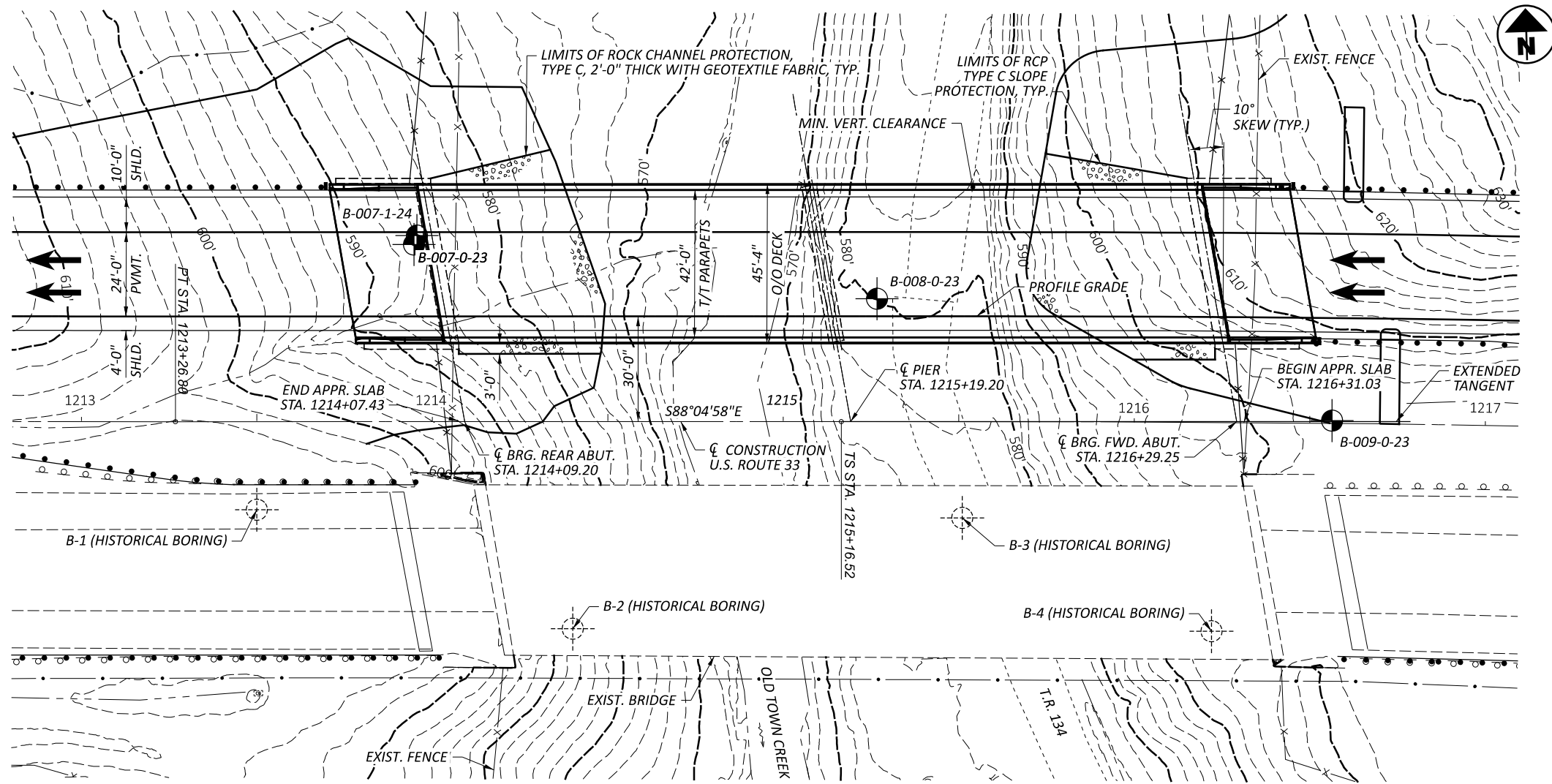
DESIGNER
MSJ

REVIEWER
EMK 11-22-24

PROJECT ID
119144

SUBSET	TOTAL
0	0

SHEET	TOTAL
P.878	940



GEOTECHNICAL PROFILE - STRUCTURE
U.S. 33 OVER OLD TOWNE CREEK AND T.R. 134

DESIGN AGENCY

 10200 Alliance Road, Suite 300
 Cincinnati, OH 45242
 (513) 842-6200

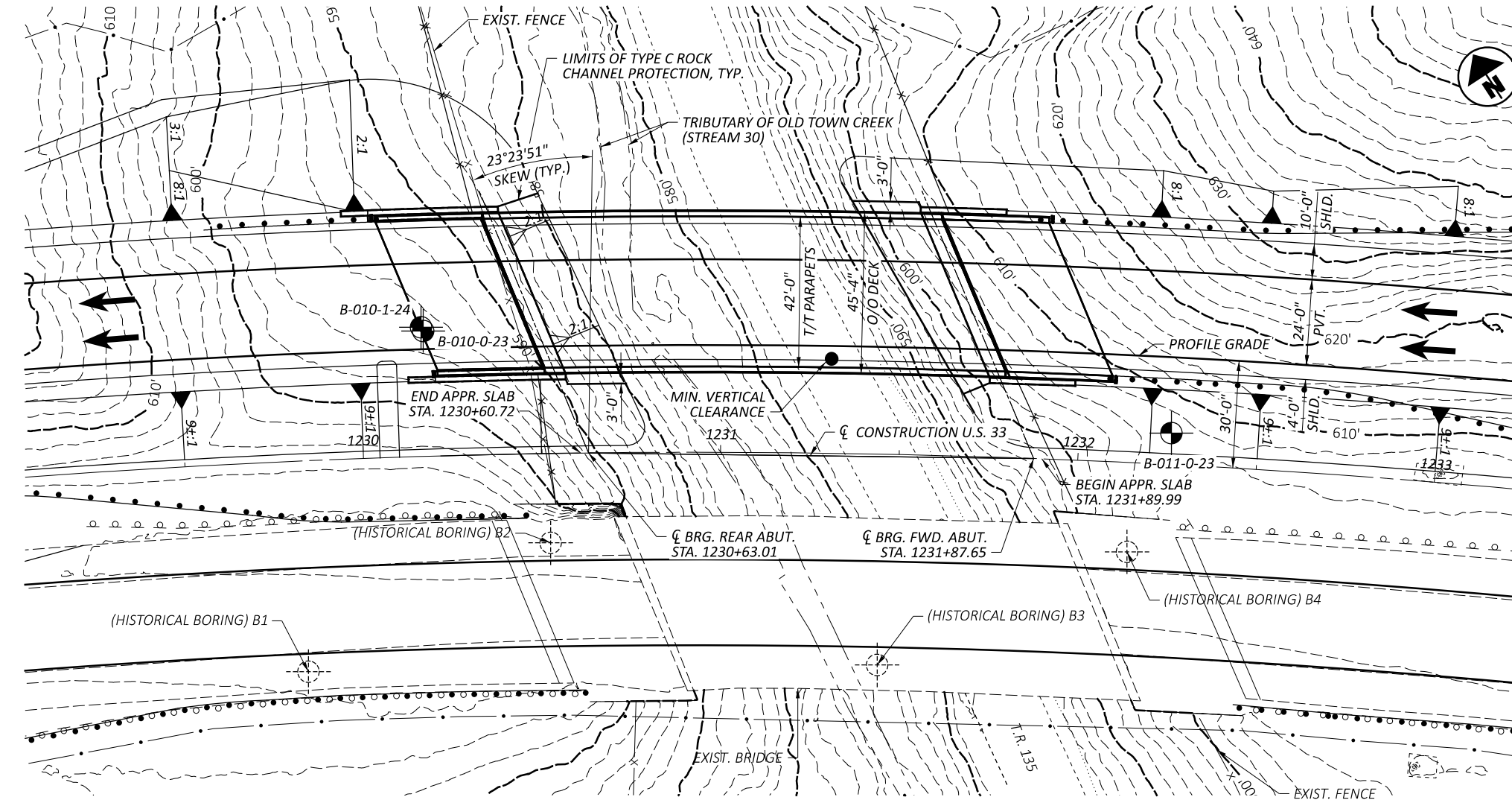
DESIGNER
MSJ

REVIEWER
EMK 11-22-24

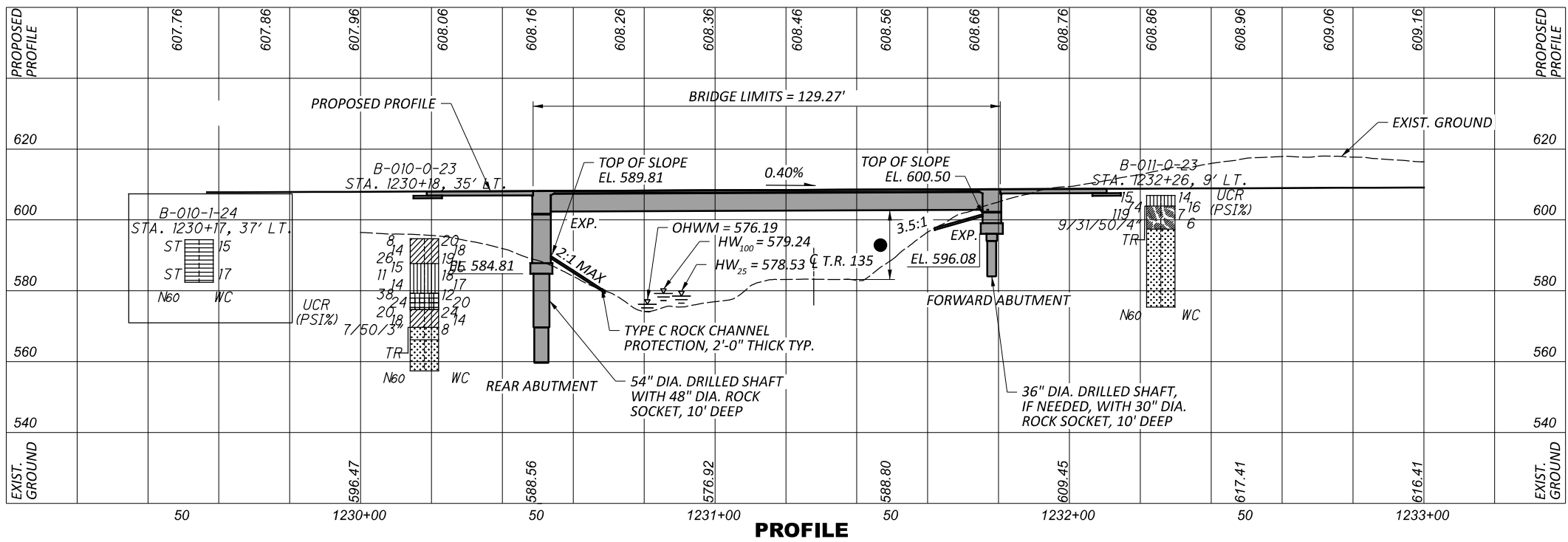
PROJECT ID
119144

SUBSET	TOTAL
0	0

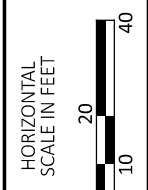
SHEET	TOTAL
P.879	940



PLAN



PROFILE



GEOTECHNICAL PROFILE - STRUCTURE
 U.S. 33 OVER UNNAMED TRIBUTARY OF OLD TOWNE CREEK

DESIGN AGENCY

 10200 Alliance Road,
 Suite 300
 Cincinnati, OH 45242
 (513) 842-6300

DESIGNER
 MSJ

REVIEWER
 EMK 11-22-24

PROJECT ID
 119144

SUBSET TOTAL
 0 0

SHEET TOTAL
 P.880 940

MEG-33-19.21

MODEL SHEET PAPER SIZE: 17x11 (in.) DATE: 12/2/2024 TIME: 12:07:56 PM USER: Mlenings
 pw:\ohiodot-pw.bentley.com\ohiodot-pw-02\Documents\01.Active Projects\District 10\Meigs\119144\03-Engineering_Stantec\Geotechnical\Sheets\119144_ZL001.dgn

PROJECT: MEG-33-19.11		DRILLING FIRM / OPERATOR: STANTEC / BM		DRILL RIG: CME 45#3T (815)		STATION / OFFSET: 974+71, 104' LT.		EXPLORATION ID								
TYPE: STRUCTURE FOUNDATION		SAMPLING FIRM / LOGGER: STANTEC / JS		HAMMER: CME AUTOMATIC		ALIGNMENT: US 33		B-001-0-23								
PID: 119144 SFN: N/A		DRILLING METHOD: 3.25" HSA / NQ2		CALIBRATION DATE: 7/5/23		ELEVATION: 654.6 (MSL) EOB: 30.2 ft.		PAGE								
START: 1/16/24 END: 1/16/24		SAMPLING METHOD: SPT / NQ2		ENERGY RATIO (%): 90*		LAT / LONG: 39.001422, -81.888211		1 OF 2								
MATERIAL DESCRIPTION AND NOTES		ELEV.	DEPTHS	SPT/ RQD	REC SAMPLE (%)	HP (tsf)	GR	GRADATION (%)				WC	ODOT CLASS (GI)	HOLE SEALED		
		654.6						CS	FS	SI	CL	LL	PL	PI		
DARK BROWN, TOPSOIL, 4 INCHES		654.3		4	100	3.50	7	10	34	30	19	28	20	8	11	A-4a (3)
STIFF TO VERY STIFF, BROWN, SANDY SILT, TRACE GRAVEL, LITTLE CLAY, DAMP				10	89	2.00	-	-	-	-	-	-	-	-	-	A-4a (V)
SANDSTONE, GRAY, SEVERELY TO HIGHLY WEATHERED, WEAK.		648.4	TR	3	61	-	7	7	35	31	20	26	18	8	14	A-4a (3)
				16	33	-	-	-	-	-	-	-	-	-	-	9
INTERBEDDED SANDSTONE (70%) AND SHALE (30%), MODERATELY FRACTURED, ROD 86%, REC. 99%; SANDSTONE, GRAY, MODERATELY TO HIGHLY WEATHERED, VERY STRONG, COARSE GRAINED, ARENACEOUS; SHALE, DARK GRAY, MODERATELY TO HIGHLY WEATHERED, WEAK, LAMINATED TO THIN BEDDED.		646.1		29	43	-	-	-	-	-	-	-	-	-	11	Rock (V)
				32	100	-	-	-	-	-	-	-	-	-	-	-
FROM 13.4 FT. TO 13.7 FT., UCR = 4,050 PSI				88	100	-	-	-	-	-	-	-	-	-	-	CORE
				97	100	-	-	-	-	-	-	-	-	-	-	-
				73	100	-	-	-	-	-	-	-	-	-	-	CORE
		629.6														

BORING CONTINUES

DESIGN AGENCY

Stantec
 10200 Alliance Road,
 Suite 300
 Cincinnati, OH 45242
 (513) 842-8200
 DESIGNER
MSJ
 REVIEWER
EMK 11-22-24
 PROJECT ID
119144
 SUBSET TOTAL
 0 0
 SHEET TOTAL
 P.881 940

GEOTECHNICAL PROFILE - BRIDGE
BORING LOG B-001-0-23

MEG-33-19.21

MODEL SHEET PAPER SIZE: 17x11 (in.) DATE: 12/2/2024 TIME: 12:09:01 PM USER: Mlenings
 pw:\ohiodot-pw.bentley.com\ohiodot-pw-02\Documents\01.Active Projects\District 10\Meigs\119144\03-Engineering_Stantec\Geotechnical\Sheets\119144_ZL002.dgn

PROJECT: MEG-33-19.11	DRILLING FIRM / OPERATOR: STANTEC / BM	DRILL RIG: CME 45#3T (815)	STATION / OFFSET: 974+71, 104' LT.	EXPLORATION ID
TYPE: STRUCTURE FOUNDATION	SAMPLING FIRM / LOGGER: STANTEC / JS	HAMMER: CME AUTOMATIC	ALIGNMENT: US 33	B-001-0-23
PID: 119144 SFN: N/A	DRILLING METHOD: 3.25" HSA / NQ2	CALIBRATION DATE: 7/5/23	ELEVATION: 654.6 (MSL) EOB: 30.2 ft.	PAGE
START: 1/16/24 END: 1/16/24	SAMPLING METHOD: SPT / NQ2	ENERGY RATIO (%): 90*	LAT / LONG: 39.001422, -81.888211	2 OF 2
MATERIAL DESCRIPTION AND NOTES				
(CONTINUED)				
INTERBEDDED SANDSTONE (70%) AND SHALE (30%), MODERATELY FRACTURED, RQD 86%, REC. 99%; SANDSTONE , GRAY, MODERATELY TO HIGHLY WEATHERED, VERY STRONG, COARSE GRAINED, ARENACEOUS; SHALE , DARK GRAY, MODERATELY TO HIGHLY WEATHERED, WEAK, LAMINATED TO THIN BEDDED. FROM 25.9 FT. TO 26.3 FT., UCR = 8,680 PSI				
ELEV. 629.6	DEPTHS 25	SPT/ RQD	GRADATION (%)	ODOT CLASS (GI)
			GR CS FS SI CL LL PL PI WC	
			HP (tsf) ATTERBERG	
			ID	
			REC SAMPLE (%)	
			N ₆₀	
		77	98	
			NQ2-5	CORE
ELEV. 624.4	DEPTHS 30			
	EOB			

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: AUGER CUTTINGS MIXED WITH BENTONITE CHIPS; CEMENT/BENTONITE GROUT

PROJECT: MEG-US 33-19.11	DRILLING FIRM / OPERATOR: STANTEC / ZB	DRILL RIG: CME 45#3T (815)	STATION / OFFSET: 975+05, 71' LT.	EXPLORATION ID
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: STANTEC / NU	HAMMER: CME AUTOMATIC	ALIGNMENT: US 33	B-001-1-24
PID: 119144 SFN: NA	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 6/27/23	ELEVATION: 649.0 (MSL) EOB: 4.5 ft.	PAGE
START: 10/11/24 END: 10/11/24	SAMPLING METHOD: ST	ENERGY RATIO (%): 90*	LAT / LONG: 39.001238, -81.888197	1 OF 1
MATERIAL DESCRIPTION AND NOTES				
STIFF TO VERY STIFF, BROWN, SANDY SILT, TRACE GRAVEL, SOME CLAY, CONSISTENCY FROM B-001-0-23, MOIST				
ELEV. 649.0	DEPTHS 1	SPT/ RQD	GRADATION (%)	ODOT CLASS (GI)
			GR CS FS SI CL LL PL PI WC	
			HP (tsf) ATTERBERG	
			ID	
			REC SAMPLE (%)	
			N ₆₀	
			100	
			ST-1	A-4a (4)
ELEV. 644.5	DEPTHS 4			
	EOB			

NOTES: NONE
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: AUGER CUTTINGS

B-001-0-23



Run #:	Depth	Recovery	RQD
NQ2-1	8.5'	36/36	100%
NQ2-2	11.5'	60/60	100%
MEG-33-19.11, PID 119144			

B-001-0-23



Run #:	Depth	Recovery	RQD
NQ2-3	16.5'	60/60	100%
NQ2-4	21.5'	60/60	100%
MEG-33-19.11, PID 119144			

B-001-0-23



Run #:	Depth	Recovery	RQD
NQ2-5	26.5'	43/44	98%
MEG-33-19.11, PID 119144			

MEG-33-19.21

MODEL SHEET PAPER SIZE: 17x11 (in.) DATE: 12/7/2024 TIME: 12:11:04 PM USER: Mlenning
 pw:\ohiodot-pw.bentley.com\ohiodot-pw-02\Documents\01_Active Projects\District 10\Meigs\119144\03-Engineering_Stantec\Geotechnical\Sheets\119144_ZL004.dgn

PROJECT: MEG-33-19.11 TYPE: STRUCTURE FOUNDATION PID: 119144 SFN: N/A START: 1/17/24 END: 1/17/24	DRILLING FIRM / OPERATOR: STANTEC / BM SAMPLING FIRM / LOGGER: STANTEC / JS DRILLING METHOD: 3.25" HSA / NQ2 SAMPLING METHOD: SPT / NQ2	DRILL RIG: CME 45#3T (815) HAMMER: CME AUTOMATIC CALIBRATION DATE: 7/5/23 ENERGY RATIO (%): 90*	STATION / OFFSET: ALIGNMENT: US 33 ELEVATION: 642.0 (MSL) EOB: 30.8 ft. LAT / LONG: 39.001089, -81.887899							EXPLORATION ID B-002-0-23								
			ELEV. 642.0 641.7 641.0 637.0 635.0 633.5	DEPTH	SPT/ RQD	N ₆₀	REC SAMPLE (%)	HP (tsf)	GR		CS	FS	SI	CL	LL	PL	PI	WC
MATERIAL DESCRIPTION AND NOTES DARK BROWN, TOPSOIL, 3 INCHES																		
STIFF, BROWN, SANDY SILT, LITTLE GRAVEL, LITTLE CLAY, DAMP			2 3 50.4"		88	SS-1	-								16	A-4a (V)		
BOULDER ZONE CORED THROUGH BOULDERS, RESTARTED SPT SAMPLING AT 5.0 FT.																		
VERY STIFF, BROWN, SANDY SILT, LITTLE GRAVEL, LITTLE CLAY, DAMP			3 5 10	78	SS-2	-	17	3	44	21	15	27	23	4	15	A-4a (0)		
SANDSTONE, GRAY, SEVERELY TO HIGHLY WEATHERED, WEAK.			4 31 38	78	SS-3	-								-	7	Rock (V)		
			37 50.2"	88	SS-4	-								-	7	Rock (V)		
INTERBEDDED SANDSTONE (75%) AND SHALE (25%), MODERATELY FRACTURED, ROD 76%, REC. 98%; SANDSTONE, GRAY TO BROWNISH GRAY. MODERATELY TO HIGHLY WEATHERED, VERY STRONG, COARSE GRAINED, ARENACEOUS; SHALE, DARK GRAY, MODERATELY TO HIGHLY WEATHERED, WEAK, LAMINATED TO THIN BEDDED.			29	87	NQ2-1											CORE		
																CORE		
			73	100	NQ2-2											CORE		
																CORE		
			100	100	NQ2-3											CORE		
																CORE		
																CORE		
CLAYSTONE, REDDISH BROWN, MODERATELY TO HIGHLY WEATHERED, VERY WEAK TO WEAK ARGILLACEOUS, HIGHLY TO MODERATELY FRACTURED; RQD 63%, REC 92%.																CORE		
																CORE		
																CORE		
			33	83	NQ2-4											CORE		
																CORE		
																CORE		

← BORING CONTINUES

DESIGN AGENCY

 10200 Alliance Road,
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 (513) 842-8200

DESIGNER
MSJ

REVIEWER
EMK 11-22-24

PROJECT ID
119144

SUBSET	TOTAL
0	0

SHEET	TOTAL
P.884	940

**GEOTECHNICAL PROFILE - BRIDGE
 BORING LOG B-002-0-23**

MEG-33-19.21

MODEL SHEET PAPER SIZE: 17x11 (in.) DATE: 12/2/2024 TIME: 12:11:59 PM USER: Mlenning
 pw:\ohiodot-pw.bentley.com\ohiodot-pw-02\Documents\01.Active Projects\District 10\Meigs\119144\03-Engineering_Stantec\Geotechnical\Sheets\119144_ZL005.dgn

PROJECT: MEG-33-19.11	DRILLING FIRM / OPERATOR: STANTEC / BM	DRILL RIG: CME 45#3T (815)	STATION / OFFSET: 976+02, 32' LT.	EXPLORATION ID
TYPE: STRUCTURE FOUNDATION	SAMPLING FIRM / LOGGER: STANTEC / JS	HAMMER: CME AUTOMATIC	ALIGNMENT: US 33	B-002-0-23
PID: 119144 SFN: N/A	DRILLING METHOD: 3.25" HSA / NQ2	CALIBRATION DATE: 7/5/23	ELEVATION: 642.0 (MSL) EOB: 30.8 ft.	PAGE
START: 1/17/24 END: 1/17/24	SAMPLING METHOD: SPT / NQ2	ENERGY RATIO (%): 90*	LAT / LONG: 39.001089, -81.887899	2 OF 2
MATERIAL DESCRIPTION AND NOTES				
(CONTINUED) CLAYSTONE REDDISH BROWN, MODERATELY TO HIGHLY WEATHERED, VERY WEAK TO WEAK, ARGILLACEOUS, HIGHLY TO MODERATELY FRACTURED; RQD 63%, REC 92%.				
ELEV. 617.0	DEPTHS 25	SPT/ RQD	GRADATION (%)	ODOT CLASS (G) SEALED
			GR CS FS SI CL LL PL PI WC	
			HP (tsf)	ATTERBERG
			REC SAMPLE ID	
		92	100 NQ2-5	
611.2	EOB			

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: AUGER CUTTINGS MIXED WITH BENTONITE CHIPS; CEMENT/BENTONITE GROUT

DESIGN AGENCY



Stantec
 10200 Alliance Road,
 Suite 300
 Cincinnati, OH 45242
 (513) 842-8200

DESIGNER

MSJ

REVIEWER

EMK 11-22-24

PROJECT ID

119144

SUBSET TOTAL

0 0

SHEET TOTAL

P.885 940

**GEOTECHNICAL PROFILE - BRIDGE
 BORING LOG B-002-0-23 (CONTINUED)**

B-002-0-23



Run #:	Depth	Recovery	RQD
NQ2-1	8.5'	24/28	86%
NQ2-2	10.8'	60/60	100%
MEG-33-19.11, PID 119144			
		8/28	29%
		44/60	73%

B-002-0-23



Run #:	Depth	Recovery	RQD
NQ2-3	15.8'	60/60	100%
NQ2-4	20.8'	50/60	83%
MEG-33-19.11, PID 119144			
		60/60	100%
		20/60	33%

B-002-0-23



Run #:	Depth	Recovery	RQD
NQ2-5	25.8'	60/60	100%
MEG-33-19.11, PID 119144			
		55/60	92%

MEG-33-19.21

MODEL SHEET PAPER SIZE: 17x11 (in.) DATE: 12/2/2024 TIME: 12:13:50 PM USER: Mlenings
 pw:\ohiodot-pw.bentley.com\ohiodot-pw-02\Documents\01.Active Projects\District 10\Meigs\119144\03-Engineering_Stantec\Geotechnical\Sheets\119144_ZL007.dgn

PROJECT: MEG-33-19.11 STRUCTURE FOUNDATION	DRILLING FIRM / OPERATOR: STANTEC / BM	STATION / OFFSET: 977+26, 3' LT.	EXPLORATION ID B-003-0-23	STATION / OFFSET: 977+26, 3' LT.																				
				ALIGNMENT: US 33	GRADATION (%)	ATTERBERG	WC	PI	PL	LL	CL	SI	FS	CS	GR									
PID: 119144 SFN: N/A	SAMPLING FIRM / LOGGER: 3.25" HSA / NQ2	DRILLING METHOD: SPT / NQ2	HOLE SEaled	DRILL RIG: CME 45#3T (815)	HAMMER: CME AUTOMATIC	CALIBRATION DATE: 7/5/23	ELEVATION: 677.3 (MSL)	EOB: 31.3 ft.	ENERGY RATIO (%): 90*	SPT/ RQD	N ₆₀	REC SAMPLE ID	REC (%)	HP (tsf)	GR	CS	FS	SI	CL	LL	PL	PI	WC	ODOT CLASS (GI)
START: 1/12/24 END: 1/12/24	SAMPLING METHOD: SPT / NQ2	DEPTHS	ELEV. 677.3																					
MATERIAL DESCRIPTION AND NOTES																								
STIFF TO VERY STIFF, REDDISH BROWN, SILT AND CLAY, TRACE GRAVEL, LITTLE SAND, DAMP																								
CLAYSTONE, REDDISH BROWN, SEVERELY TO HIGHLY WEATHERED.																								
CLAYSTONE, REDDISH BROWN, HIGHLY WEATHERED, VERY WEAK, ARGILLACEOUS, HIGHLY FRACURED; RQD 0%, REC 100%.																								
SHALE, TAN, HIGHLY WEATHERED, WEAK, LAMINATED, ARGILLACEOUS, MODERATELY FRACURED; RQD 87%, REC 93%.																								
INTERBEDDED SANDSTONE (70%) AND SHALE (30%), MODERATELY FRACTURED, RQD 95%, REC, 99%; SANDSTONE, GRAY, MODERATELY TO HIGHLY WEATHERED, STRONG, COARSE GRAINED, ARENACEOUS; SHALE, DARK GRAY, HIGHLY TO MODERATELY WEATHERED, WEAK, LAMINATED TO THIN BEDDED.																								

BORING CONTINUES

DESIGN AGENCY

 Stantec
 10200 Alliance Road,
 Suite 300
 Cincinnati, OH 45242
 (513) 842-8200
 DESIGNER
 MSJ
 REVIEWER
 EMK 11-22-24
 PROJECT ID
 119144
 SUBSET TOTAL
 0 0
 SHEET TOTAL
 P.887 940

**GEOTECHNICAL PROFILE - BRIDGE
 BORING LOG B-003-0-23**

MEG-33-19.21

MODEL SHEET PAPER SIZE: 17x11 (in.) DATE: 12/2/2024 TIME: 12:14:37 PM USER: Mlenning
 pw:\ohiodot-pw.bentley.com\ohiodot-pw-02\Documents\01.Active Projects\District 10\Meigs\119144\03-Engineering_Stantec\Geotechnical\Sheets\119144_ZL008.dgn

PROJECT: MEG-33-19.11	DRILLING FIRM / OPERATOR: STANTEC / BM	DRILL RIG: CME 45#3T (815)	STATION / OFFSET: 977+26, 3' LT.	EXPLORATION ID											
TYPE: STRUCTURE FOUNDATION	SAMPLING FIRM / LOGGER: STANTEC / NS	HAMMER: CME AUTOMATIC	ALIGNMENT: US 33	B-003-0-23											
PID: 119144 SFN: N/A	DRILLING METHOD: 3.25" HSA / NQ2	CALIBRATION DATE: 7/5/23	ELEVATION: 677.3 (MSL) EOB: 31.3 ft.	PAGE											
START: 1/12/24 END: 1/12/24	SAMPLING METHOD: SPT / NQ2	ENERGY RATIO (%): 90*	LAT / LONG: 39.000874, -81.887549	2 OF 2											
MATERIAL DESCRIPTION AND NOTES															
(CONTINUED) INTERBEDDED SANDSTONE (70%) AND SHALE (30%). MODERATELY FRACTURED, ROD 95% REC. 99%; SANDSTONE , GRAY, MODERATELY TO HIGHLY WEATHERED, STRONG, COARSE GRAINED, ARENACEOUS; SHALE , DARK GRAY, HIGHLY TO MODERATELY WEATHERED, WEAK, LAMINATED TO THIN BEDDED, FROM 26.3 FT. TO 26.7 FT., UCR = 5.620 PSI															
ELEV.	DEPTHS	SPT/ RQD	REC SAMPLE N ₆₀ (%)	HP (tsf)	GR	CS	FS	SI	CL	LL	PL	PI	WC	ODOT CLASS (G)	HOLE SEALED
652.3	25														
	26														
	27														
	28														
	29	93	98												CORE
	30														
646.0	31														
	EOB														

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: AUGER CUTTINGS MIXED WITH BENTONITE CHIPS; CEMENT/BENTONITE GROUT

DESIGN AGENCY

Stantec
 10200 Alliance Road,
 Suite 300
 Cincinnati, OH 45242
 (513) 842-8200
 DESIGNER
 MSJ
 REVIEWER
 EMK 11-22-24
 PROJECT ID
 119144

SUBSET	TOTAL
0	0
SHEET	TOTAL
P.888	940

GEOTECHNICAL PROFILE - BRIDGE
 BORING LOG B-003-0-23 (CONTINUED)

B-003-0-23



Run #:	Depth	Recovery	RQD
NQ2-1	5.3'	12/12	0/12
NQ2-2	6.3'	56/60	52/60
NQ2-3	11.3'	60/60	58/60
MEG-33-19.11, PID 119144			

B-003-0-23



Run #:	Depth	Recovery	RQD
NQ2-3	11.3'	60/60	58/60
NQ2-4	16.3'	59/60	54/60
NQ2-5	21.3'	60/60	60/60
MEG-33-19.11, PID 119144			

B-003-0-23



Run #:	Depth	Recovery	RQD
NQ2-5	21.3'	60/60	60/60
NQ2-6	26.3'	59/60	56/60
MEG-33-19.11, PID 119144			

PROJECT: MEG-33-19.11
 TYPE: STRUCTURE FOUNDATION
 PID: 119144 SFN: N/A
 START: 1/10/24 END: 1/11/24

DRILLING FIRM / OPERATOR: STANTEC / BM
 SAMPLING FIRM / LOGGER: STANTEC / NS
 DRILLING METHOD: 3.25" HSA / NQ2
 SAMPLING METHOD: SPT / NQ2

ELEV. 586.4
 DEPTHS

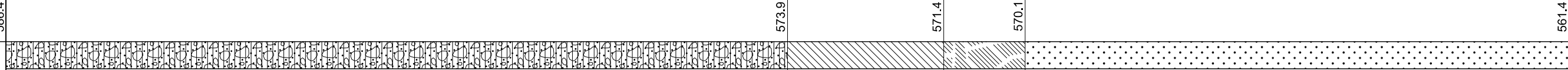
DRILL RIG: CME 45#3T (815)
 HAMMER: CME AUTOMATIC
 CALIBRATION DATE: 7/5/23
 ENERGY RATIO (%): 90*

STATION / OFFSET: 1213+95, 51' LT.
 ALIGNMENT: US 33
 ELEVATION: 586.4 (MSL) EOB: 32.0 ft.
 LAT / LONG: 38.965943, -81.830462

EXPLORATION ID
 B-007-0-23
 PAGE
 1 OF 2

MATERIAL DESCRIPTION AND NOTES

STIFF TO VERY STIFF, REDDISH BROWN TO BROWN, GRAVEL AND STONE FRAGMENTS WITH SAND, SILT, AND CLAY, DAMP TO MOIST



SPT/ RQD	N ₆₀	REC SAMPLE (%)	HP (tsf)	GR	GRADATION (%)							WC	HOLE SEALED
					CS	FS	SI	CL	LL	PL	PI		
1	11	72	1.00	-	-	-	-	-	-	-	-	11	A-2-6 (V)
2	5												
3	5	44	4.50	-	-	-	-	-	-	-	-	14	A-2-6 (V)
4													
5													
6	15	50	4.50	53	4	9	17	35	24	11	21		A-2-6 (0)
7													
8	15	67	0.50	-	-	-	-	-	-	-	28		A-2-6 (V)
9													
10													
11	20	33	2.00	-	-	-	-	-	-	-	16		A-2-6 (V)
12													
13	21	89	4.50	0	0	16	47	37	24	12	19		A-6a (9)
14													
15													
16	46 50/4"	75	4.50	-	-	-	-	-	-	-	14		Rock (V)
17	0	38	NQ2-1										CORE
18													
19													
20	60	100	NQ2-2										CORE
21													
22													
23													
24													
25	88	100	NQ2-3										CORE

FROM 20.1 FT. TO 20.5 FT., UCR = 6,280 PSI

BORING CONTINUES

DESIGN AGENCY

 10200 Alliance Road, Suite 300
 Cincinnati, OH 45242
 (513) 842-8200
 DESIGNER: MSJ
 REVIEWER: EMK
 PROJECT ID: 119144
 SUBSET: 0 TOTAL: 0
 SHEET: P.890 TOTAL: 940

GEOTECHNICAL PROFILE - BRIDGE
 BORING LOG B-007-0-23

PROJECT: MEG-33-19.11	DRILLING FIRM / OPERATOR: STANTEC / BM	DRILL RIG: CME 45#3T (815)	STATION / OFFSET: 1213+95, 51' LT.	EXPLORATION ID: B-007-0-23											
TYPE: STRUCTURE FOUNDATION	SAMPLING FIRM / LOGGER: STANTEC / NS	HAMMER: CME AUTOMATIC	ALIGNMENT: US 33												
PID: 119144 SFN: N/A	DRILLING METHOD: 3.25" HSA / NQ2	CALIBRATION DATE: 7/5/23	ELEVATION: 586.4 (MSL) EOB: 32.0 ft.	PAGE: 2 OF 2											
START: 1/10/24 END: 1/11/24	SAMPLING METHOD: SPT / NQ2	ENERGY RATIO (%): 90*	LAT / LONG: 38.965943, -81.830462												
MATERIAL DESCRIPTION AND NOTES															
(CONTINUED)															
INTERBEDDED SANDSTONE (70%) AND SHALE (30%), MODERATELY FRACTURED, RQD 79%, REC. 97%;															
SANDSTONE, BROWN TO GRAY, MODERATELY TO HIGHLY WEATHERED, STRONG, FINE TO COARSE GRAINED, ARENACEOUS;															
SHALE, DARK GRAY, HIGHLY WEATHERED, WEAK, LAMINATED TO THIN BEDDED.															
FROM 27.0 FT. TO 27.4 FT., UCR = 7,610 PSI															
ELEV.	DEPTHS	SPT/ RQD	REC SAMPLE ID	HP (tsf)	GR	CS	FS	SI	CL	LL	PL	PI	WC	ODOT CLASS (GI)	HOLE SEALED
561.4	25														
	26														
	27														
	28														
	29	95	100	NQ2-4											CORE
554.4	30														
	31														
	32														

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: AUGER CUTTINGS MIXED WITH BENTONITE CHIPS; CEMENT/BENTONITE GROUT

B-007-0-23



Run #:	Depth	Recovery	RQD
NQ2-1	16.3'	3/8	0/8
NQ2-2	17.0'	60/60	36/60
NQ2-3	22.0'	60/60	53/60
MEG-33-19.11, PID 119144			

B-007-0-23



Run #:	Depth	Recovery	RQD
NQ2-3	22.0'	60/60	53/60
NQ2-4	27.0'	60/60	57/60
MEG-33-19.11, PID 119144			

MEG-33-19.21

MODEL SHEET PAPER SIZE: 17x11 (in.) DATE: 12/2/2024 TIME: 12:19:29 PM USER: Mlenings
 pw:\ohiodot-pw.bentley.com\ohiodot-pw-02\Documents\01.Active Projects\District 10\Meigs\119144\03-Engineering_Stantec\Geotechnical\Sheets\119144_ZL01.A.dgn

PROJECT: MEG-US 33-19.11	DRILLING FIRM / OPERATOR: STANTEC / ZB	DRILL RIG: CME 45#3T (815)	STATION / OFFSET: 1213+96, 53' LT.	EXPLORATION ID																																														
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: STANTEC / GK	HAMMER: CME AUTOMATIC	ALIGNMENT: US 33	B-007-1-24																																														
PID: 119144 SFN: NA	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 6/27/23	ELEVATION: 585.9 (MSL) EOB: 1.5 ft.	PAGE																																														
START: 10/15/24 END: 10/15/24	SAMPLING METHOD: ST	ENERGY RATIO (%): 90*	LAT / LONG: 38.965595, -81.830459	1 OF 1																																														
MATERIAL DESCRIPTION AND NOTES																																																		
STIFF TO VERY STIFF, BROWN, GRAVEL AND STONE FRAGMENTS WITH SAND, SILT, AND CLAY, CONSISTENCY FROM B-007-0-23, DAMP		REC SAMPLE ID	GRADATION (%)	ODOT CLASS (GI)																																														
<table border="1"> <tr> <td>ELEV.</td> <td>DEPTHS</td> <td>GR</td> <td>CS</td> <td>FS</td> <td>SI</td> <td>CL</td> <td>LL</td> <td>PL</td> <td>PI</td> <td>WC</td> <td>BACK FILL</td> </tr> <tr> <td>585.9</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>584.4</td> <td>EOB</td> <td>51</td> <td>8</td> <td>12</td> <td>15</td> <td>14</td> <td>27</td> <td>13</td> <td>14</td> <td>9</td> <td>A-2-6 (1)</td> </tr> </table>		ELEV.	DEPTHS	GR	CS	FS	SI	CL	LL	PL	PI	WC	BACK FILL	585.9												584.4	EOB	51	8	12	15	14	27	13	14	9	A-2-6 (1)	100	ST-1	-	51	8	12	15	14	27	13	14	9	A-2-6 (1)
ELEV.	DEPTHS	GR	CS	FS	SI	CL	LL	PL	PI	WC	BACK FILL																																							
585.9																																																		
584.4	EOB	51	8	12	15	14	27	13	14	9	A-2-6 (1)																																							

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: NOT RECORDED

DESIGN AGENCY



DESIGNER

MSJ

REVIEWER

EMK 11-22-24

PROJECT ID

119144

SUBSET	TOTAL
0	0

SHEET	TOTAL
P.892	940

10200 Alliance Road, Suite 300 Cincinnati, OH 45242 (513) 842-8200

DESIGNER

MSJ

REVIEWER

EMK 11-22-24

PROJECT ID

119144

SUBSET	TOTAL
0	0

SHEET	TOTAL
P.892	940

**GEOTECHNICAL PROFILE - BRIDGE
BORING LOG B-007-1-24**

MEG-33-19.21

MODEL SHEET PAPER SIZE: 17x11 (in.) DATE: 12/2/2024 TIME: 12:20:28 PM USER: Mlenings
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PROJECT: MEG-33-19.11 TYPE: STRUCTURE FOUNDATION PID: 119144 SFN: N/A START: 1/11/24 END: 1/11/24	DRILLING FIRM / OPERATOR: STANTEC / BM SAMPLING FIRM / LOGGER: STANTEC / NS DRILLING METHOD: 3.25" HSA / NQ2 SAMPLING METHOD: SPT / NQ2	ELEV. 579.9	DEPTHS	SPT/ RQD	N ₆₀	REC SAMPLE (%)	ID	HP (tsf)	GRADATION (%)										WC	EXPLORATION ID B-008-0-23	
									GR	CS	FS	SI	CL	LL	PL	PI	ODOT CLASS (GI)				
MATERIAL DESCRIPTION AND NOTES VERY STIFF, BROWN, GRAVEL AND STONE FRAGMENTS WITH SAND, SILT, AND CLAY, DAMP STIFF TO VERY STIFF, GRAYISH BROWN, SILT, LITTLE SAND, SOME CLAY, DAMP MEDIUM STIFF @ SS-4 STIFF TO VERY STIFF, BROWNISH GRAY, SANDY SILT, TRACE GRAVEL, SOME CLAY, DAMP				1	4	78	SS-1	0.50	53	13	10	13	11	37	26	11	13	A-2-6 (0)			
				10	8	21	SS-2	4.50	-	-	-	-	-	-	-	-	-	-	14	A-4b (V)	
				8	5	14	SS-3	-	-	-	-	-	-	-	-	-	-	-	13	A-4b (V)	
				1	2	3	SS-4	1.00	0	1	10	61	28	34	25	9	21	A-4b (8)			
				2	4	6	SS-5	2.50	-	-	-	-	-	-	-	-	-	-	23	A-4b (V)	
				2	5	6	SS-6	4.50	-	-	-	-	-	-	-	-	-	-	19	A-4a (V)	
				4	5	9	SS-7	3.00	5	8	34	22	31	27	18	9	13	A-4a (4)			
				1	4	5	SS-8	3.00	-	-	-	-	-	-	-	-	-	-	12	A-4a (V)	
				2	4	10	SS-9	2.00	-	-	-	-	-	-	-	-	-	-	14	A-4a (V)	
				5	6	9	SS-10	4.50	-	-	-	-	-	-	-	-	-	-	12	A-4a (V)	
				554.9				TR	25												

BORING CONTINUES

DESIGN AGENCY

 10200 Alliance Road,
 Suite 300
 Cincinnati, OH 45242
 (513) 842-8200
 DESIGNER
 MSJ
 REVIEWER
 EMK 11-22-24
 PROJECT ID
 119144
 SUBSET TOTAL
 0 0
 SHEET TOTAL
 P.893 940

**GEOTECHNICAL PROFILE - BRIDGE
 BORING LOG B-008-0-23**

PROJECT: MEG-33-19.11	DRILLING FIRM / OPERATOR: STANTEC / BM	DRILL RIG: CME 45#3T (815)	STATION / OFFSET: 1215+27, 35' LT.	EXPLORATION ID												
TYPE: STRUCTURE FOUNDATION	SAMPLING FIRM / LOGGER: STANTEC / NS	HAMMER: CME AUTOMATIC	ALIGNMENT: US 33	B-008-0-23												
PID: 119144 SFN: N/A	DRILLING METHOD: 3.25" HSA / NQ2	CALIBRATION DATE: 7/5/23	ELEVATION: 579.9 (MSL) EOB: 35.8 ft.	PAGE												
START: 1/11/24 END: 1/11/24	SAMPLING METHOD: SPT / NQ2	ENERGY RATIO (%): 90*	LAT / LONG: 38.965889, -81.830000	2 OF 2												
MATERIAL DESCRIPTION AND NOTES																
SHALE, GREENISH GRAY, SEVERELY WEATHERED, VERY WEAK.																
SHALE, GREENISH GRAY, HIGHLY TO MODERATELY WEATHERED, WEAK, LAMINATED TO THIN BEDDED, ARGILLACEOUS, SEVERELY TO HIGHLY FRACTURED; RQD 0%, REC 100%.																
CLAYSTONE, REDDISH BROWN, HIGHLY TO MODERATELY WEATHERED, VERY WEAK TO WEAK, LAMINATED, ARGILLACEOUS, HIGHLY FRACTURED; RQD 65%, REC 99%.																
	ELEV.	DEPTHS	SPT/ RQD	REC SAMPLE ID	HP (tsf)	GR	CS	FS	SI	CL	LL	PL	PI	WC	ODOT CLASS (GI)	HOLE SEALED
	554.9	25	33	100	4.50	-	-	-	-	-	-	-	-	7	Rock (V)	
	554.1	26														
	552.1	27														
		28	43	100	NQ2-1										CORE	
		29														
		30														
		31														
		32														
		33	63	98	NQ2-2										CORE	
		34														
		35														
	544.1	EOB														

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: AUGER CUTTINGS MIXED WITH BENTONITE CHIPS; CEMENT/BENTONITE GROUT

B-008-0-23



Run #:	Depth	Recovery	RQD
NQ2-1	25.8'	60/60	43%
NQ2-2	30.8'	59/60	63%
MEG-33-19.11, PID 119144			

MEG-33-19.21

MODEL SHEET PAPER SIZE: 17x11 (in.) DATE: 12/2/2024 TIME: 12:22:21 PM USER: Mlenings
 pw:\ohiodot-pw.bentley.com\ohiodot-pw-02\Documents\01.Active Projects\District 10\Meigs\119144\03-Engineering_Stantec\Geotechnical\Sheets\119144_ZL01.dgn

PROJECT: MEG-33-19.11 STRUCTURE FOUNDATION	DRILLING FIRM / OPERATOR: STANTEC / BM	ELEV. 603.2	DEPTHS	STATION / OFFSET: 1216+57.1' LT.										EXPLORATION ID B-009-0-23								
				GRADATION (%)	ATTERBERG	WC	ALIGNMENT: US 33			ELEVATION: 603.2 (MSL) EOB: 32.2 ft.												
TYPE: 119144 SFN: N/A	SAMPLING FIRM / LOGGER: 3.25" HSA / NQ2			GR	CS	FS	SI	CL	LL	PL	PI	ODOT CLASS (GI)	PAGE									
START: 1/10/24 END: 1/10/24	SAMPLING METHOD: SPT / NQ2			HP (tsf)	GR	CS	FS	SI	CL	LL	PL	PI	1 OF 2									
MATERIAL DESCRIPTION AND NOTES				REC SAMPLE ID	REC (%)	SPT/ RQD	N ₆₀	HP (tsf)	GR	CS	FS	SI	CL	LL	PL	PI	WC	ODOT CLASS (GI)	HOLE SEALED			
<p>MEDIUM STIFF, REDDISH BROWN, SANDY SILT, "AND" GRAVEL, SOME CLAY, DAMP TO MOIST</p> <p>VERY STIFF @ SS-2</p> <p>SANDSTONE, BROWNISH GRAY, SEVERELY WEATHERED, WEAK.</p> <p>INTERBEDDED SANDSTONE (75%) AND SHALE (25%), MODERATELY TO SLIGHTLY FRACTURED, RQD 99%, REC. 99%.</p> <p>SANDSTONE, BROWNISH GRAY TO GRAY, HIGHLY TO MODERATELY WEATHERED, STRONG, FINE TO COARSE GRAINED, ARENACEOUS.</p> <p>SHALE, DARK GRAY, HIGHLY TO MODERATELY WEATHERED, WEAK, LAMINATED TO THIN BEDDED, FROM 6.7 FT. TO 7.2 FT., UCR = 2,706 PSI</p>		1	1	8	39	SS-1	1.00	-	-	-	-	-	-	-	-	-	-	-	A-4a (V)			
		2	1	4																		
		3	6	9	29	67	SS-2	3.50	38	4	20	15	23	29	20	9	12			A-4a (1)		
		4																				
		5																				
		6	5	35	-	75	SS-3	4.50	-	-	-	-	-	-	-	-	-	-	13		Rock (V)	
		7				100	NQ2-1														CORE	
		8																				
		9																				
		10				98	98	NQ2-2													CORE	
		11																				
		12																				
		13																				
		14																				
		15				100	100	NQ2-3													CORE	
		16																				
		17																				
		18																				
		19																				
		20				100	100	NQ2-4													CORE	
		21																				
		22																				
		23																				
		24																				
		25		578.2		100	100	NQ2-5													CORE	

FROM 22.8 FT. TO 23.2 FT., UCR = 4,440 PSI

BORING CONTINUES

DESIGN AGENCY

 10200 Alliance Road, Suite 300
 Cincinnati, OH 45242
 (513) 842-8200

DESIGNER
 MSJ

REVIEWER
 EMK 11-22-24

PROJECT ID
 119144

SUBSET	TOTAL
0	0

SHEET	TOTAL
P.895	940

GEOTECHNICAL PROFILE - BRIDGE
BORING LOG B-009-0-23

MEG-33-19.21

MODEL: Sheet PAPER: 17x11 (in.) DATE: 12/2/2024 TIME: 12:23:14 PM USER: Mlenings
 pw:\ohiodot-pw.bentley.com\ohiodot-pw-02\Documents\01.Active Projects\District 10\Meigs\119144\03-Engineering_Stantec\Geotechnical\Sheets\119144_ZL015.dgn

PROJECT: MEG-33-19.11	DRILLING FIRM / OPERATOR: STANTEC / BM	DRILL RIG: CME 45#3T (815)	STATION / OFFSET: 1216+57, 1' LT.	EXPLORATION ID												
TYPE: STRUCTURE FOUNDATION	SAMPLING FIRM / LOGGER: STANTEC / NS	HAMMER: CME AUTOMATIC	ALIGNMENT: US 33	B-009-0-23												
PID: 119144 SFN: N/A	DRILLING METHOD: 3.25" HSA / NQ2	CALIBRATION DATE: 7/5/23	ELEVATION: 603.2 (MSL) EOB: 32.2 ft.	PAGE												
START: 1/10/24 END: 1/10/24	SAMPLING METHOD: SPT / NQ2	ENERGY RATIO (%): 90*	LAT / LONG: 38.965780, -81.829549	2 OF 2												
MATERIAL DESCRIPTION AND NOTES																
(CONTINUED) INTERBEDDED SANDSTONE (75%) AND SHALE (25%), MODERATELY TO SLIGHTLY FRACTURED, RQD 99%, REC. 99%; SANDSTONE , BROWNISH GRAY TO GRAY, HIGHLY TO MODERATELY WEATHERED, STRONG, FINE TO COARSE GRAINED, ARENACEOUS; SHALE , DARK GRAY, HIGHLY TO MODERATELY WEATHERED, WEAK, LAMINATED TO THIN BEDDED.																
ELEV.	DEPTHS	SPT/ RQD	REC SAMPLE (%)	ID	HP (tsf)	GR	CS	FS	SI	CL	LL	PL	PI	WC	ODOT CLASS(GI)	HOLE SEALED
578.2	25															
	26															
	27															
	28															
	29															
	30	100	100	NQ2-6												CORE
	31															
571.0	32															
	EOB															

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: AUGER CUTTINGS MIXED WITH BENTONITE CHIPS; CEMENT/BENTONITE GROUT

DESIGN AGENCY



Stantec
 10200 Alliance Road,
 Suite 300
 Cincinnati, OH 45242
 (513) 842-8200

DESIGNER
MSJ

REVIEWER
EMK 11-22-24

PROJECT ID
119144

SUBSET	TOTAL
0	0

SHEET	TOTAL
P.896	940

**GEOTECHNICAL PROFILE - BRIDGE
 BORING LOG B-009-0-23 (CONTINUED)**

B-009-0-23



Run #:	Depth	Recovery	RQD
NQ2-1	6.4'	10/10	90%
NQ2-2	7.2'	59/60	98%
NQ2-3	12.2'	60/60	100%

MEG-33-19.11, PID 119144

B-009-0-23



Run #:	Depth	Recovery	RQD
NQ2-3	12.2'	60/60	100%
NQ2-4	17.2'	60/60	100%
NQ2-5	22.2'	60/60	100%

MEG-33-19.11, PID 119144

B-009-0-23



Run #:	Depth	Recovery	RQD
NQ2-5	22.2'	60/60	100%
NQ2-6	27.2'	60/60	100%

MEG-33-19.11, PID 119144

MEG-33-19.21

MODEL SHEET PAPER SIZE: 17x11 (in.) DATE: 12/2/2024 TIME: 12:25:02 PM USER: Mlenings
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PROJECT: MEG-33-19.11 TYPE: STRUCTURE FOUNDATION PID: 119144 SFN: N/A START: 1/8/24 END: 1/10/24	DRILLING FIRM / OPERATOR: STANTEC / BM SAMPLING FIRM / LOGGER: STANTEC / NS DRILLING METHOD: 3.25" HSA / NQ2 SAMPLING METHOD: SPT / NQ2	ELEV. 594.7	DEPTHS	SPT/ RQD	N ₆₀	REC SAMPLE (%)	ID	HP (tsf)	GRADATION (%)										WC	EXPLORATION ID B-010-0-23	
									GR	CS	FS	SI	CL	LL	PL	PI	ATTERBERG	ODOT CLASS (GI)			
MATERIAL DESCRIPTION AND NOTES MEDIUM STIFF TO STIFF, REDDISH BROWN, SILT AND CLAY, SOME GRAVEL, LITTLE SAND, DAMP VERY STIFF @ SS-3 STIFF, REDDISH BROWN, SANDY SILT, LITTLE GRAVEL, SOME CLAY, DAMP 587.7 579.3 574.7 569.7				1	2	61	SS-1	2.00	23	3	15	31	28	39	26	13	20	A-6a (6)			
				2	3	61	SS-1	2.00	23	3	15	31	28	39	26	13	20	A-6a (6)			
				3	4	56	SS-2	1.00	-	-	-	-	-	-	-	-	-	-	-	18	A-6a (V)
				4	5	56	SS-2	1.00	-	-	-	-	-	-	-	-	-	-	-	18	A-6a (V)
				5	6	56	SS-2	1.00	-	-	-	-	-	-	-	-	-	-	-	18	A-6a (V)
				6	8	61	SS-3	2.50	-	-	-	-	-	-	-	-	-	-	-	19	A-6a (V)
				7	9	61	SS-3	2.50	-	-	-	-	-	-	-	-	-	-	-	19	A-6a (V)
				8	2	56	SS-4	4.50	-	-	-	-	-	-	-	-	-	-	-	15	A-4a (V)
				9	4	56	SS-4	4.50	-	-	-	-	-	-	-	-	-	-	-	15	A-4a (V)
				10	6	56	SS-4	4.50	-	-	-	-	-	-	-	-	-	-	-	15	A-4a (V)
				11	3	39	SS-5	2.50	-	-	-	-	-	-	-	-	-	-	-	18	A-4a (V)
				12	3	39	SS-5	2.50	-	-	-	-	-	-	-	-	-	-	-	18	A-4a (V)
				13	4	39	SS-5	2.50	-	-	-	-	-	-	-	-	-	-	-	18	A-4a (V)
				14	4	56	SS-6	4.50	19	3	19	29	30	34	24	10	17			17	A-4a (5)
				15	2	56	SS-6	4.50	19	3	19	29	30	34	24	10	17			17	A-4a (5)
				16	4	56	SS-6	4.50	19	3	19	29	30	34	24	10	17			17	A-4a (5)
				17	3	50	SS-7	4.50	20	6	14	24	36	42	25	17	12			20	A-7-6 (8)
				18	7	50	SS-7	4.50	20	6	14	24	36	42	25	17	12			20	A-7-6 (8)
				19	18	50	SS-7	4.50	20	6	14	24	36	42	25	17	12			20	A-7-6 (8)
				20	1	56	SS-8	2.00	20	6	14	24	36	42	25	17	20			24	A-6a (9)
				21	7	56	SS-8	2.00	20	6	14	24	36	42	25	17	20			24	A-6a (9)
				22	9	56	SS-8	2.00	20	6	14	24	36	42	25	17	20			24	A-6a (9)
				23	1	67	SS-9	4.50	0	7	10	32	51	37	25	12	24			24	A-6a (9)
				24	4	67	SS-9	4.50	0	7	10	32	51	37	25	12	24			24	A-6a (9)
25	9	67	SS-9	4.50	0	7	10	32	51	37	25	12	24			24	A-6a (9)				
26	2	33	SS-10	3.00	-	-	-	-	-	-	-	-	-	-	-	14	A-6a (V)				
27	5	33	SS-10	3.00	-	-	-	-	-	-	-	-	-	-	-	14	A-6a (V)				
28	7	33	SS-10	3.00	-	-	-	-	-	-	-	-	-	-	-	14	A-6a (V)				
29	18	33	SS-10	3.00	-	-	-	-	-	-	-	-	-	-	-	14	A-6a (V)				
30	TR	33	SS-10	3.00	-	-	-	-	-	-	-	-	-	-	-	14	A-6a (V)				

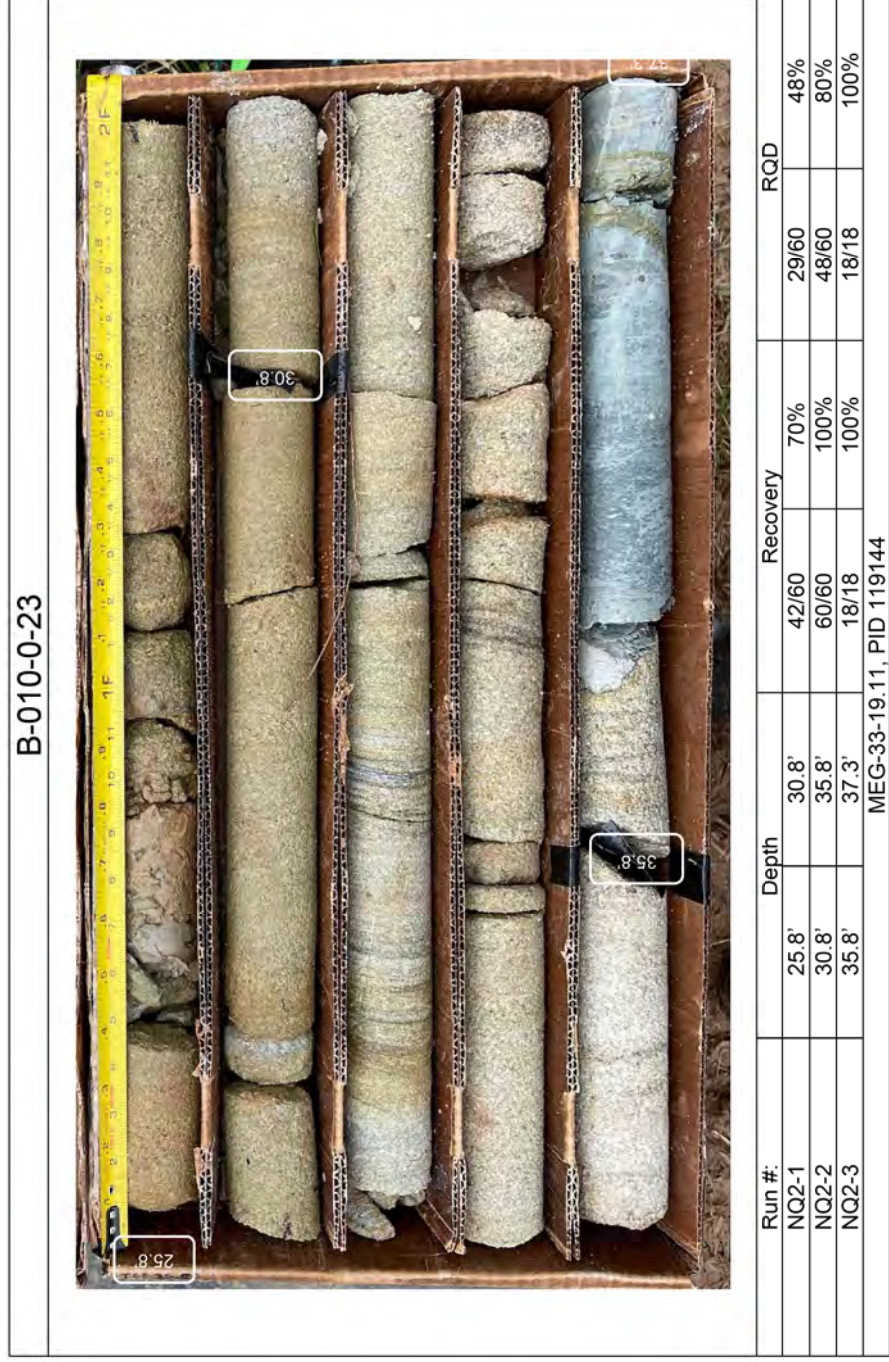
BORING CONTINUES

DESIGN AGENCY

 10200 Alliance Road,
 Suite 300
 Cincinnati, OH 45242
 (513) 842-8200
 DESIGNER
 MSJ
 REVIEWER
 EMK 11-22-24
 PROJECT ID
 119144
 SUBSET TOTAL
 0 0
 SHEET TOTAL
 P.898 940

**GEOTECHNICAL PROFILE - BRIDGE
 BORING LOG B-010-0-23**

PROJECT: MEG-33-19.11	DRILLING FIRM / OPERATOR: STANTEC / BM	DRILL RIG: CME 45#3T (815)	STATION / OFFSET: 1230+18, 35' LT.	EXPLORATION ID: B-010-0-23
TYPE: STRUCTURE FOUNDATION	SAMPLING FIRM / LOGGER: STANTEC / NS	HAMMER: CME AUTOMATIC	ALIGNMENT: US 33	
PID: 119144 SFN: N/A	DRILLING METHOD: 3.25" HSA / NQ2	CALIBRATION DATE: 7/5/23	ELEVATION: 594.7 (MSL) EOB: 37.3 ft.	PAGE: 2 OF 2
START: 1/8/24 END: 1/10/24	SAMPLING METHOD: SPT / NQ2	ENERGY RATIO (%): 90*	LAT / LONG: 38.964812, -81.824946	
MATERIAL DESCRIPTION AND NOTES				
SANDSTONE, BROWN, SEVERELY WEATHERED, WEAK.				
INTERBEDDED SANDSTONE (80%) AND SHALE (20%), MODERATELY FRACTURED, ROD 69%, REC. 87%; SANDSTONE. BROWN TO GRAY, HIGHLY TO MODERATELY WEATHERED, STRONG, MEDIUM TO COARSE GRAINED, ARENACEOUS, MICACEOUS; SHALE, DARK GRAY, HIGHLY TO MODERATELY WEATHERED, VERY WEAK TO WEAK, LAMINATED TO THIN BEDDED. CLAY SEAM FROM 26.2 FT. TO 28.1 FT.				
FROM 33.2 FT. TO 33.6 FT., UCR = 2,692 PSI				
FROM 36.2 FT. TO 36.7 FT., UCR = 603 PSI				
NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. ABANDONMENT METHODS, MATERIALS, QUANTITIES: AUGER CUTTINGS MIXED WITH BENTONITE CHIPS; CEMENT/BENTONITE GROUT				



MEG-33-19.21

MODEL SHEET PAPER SIZE: 17x11 (in.) DATE: 12/2/2024 TIME: 12:26:55 PM USER: Mlenings
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PROJECT: MEG-US 33-19.11	DRILLING FIRM / OPERATOR: STANTEC / ZB	DRILL RIG: CME 45#3T (815)	STATION / OFFSET: 1230+17, 37' LT.	EXPLORATION ID								
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: STANTEC / GK	HAMMER: CME AUTOMATIC	ALIGNMENT: US 33	B-010-1-24								
PID: 119144 SFN: NA	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 6/27/23	ELEVATION: 594.4 (MSL) EOB: 12.0 ft.	PAGE								
START: 10/16/24 END: 10/16/24	SAMPLING METHOD: ST	ENERGY RATIO (%): 90*	LAT / LONG: 38.964818, -81.824944	1 OF 1								
MATERIAL DESCRIPTION AND NOTES												
MEDIUM STIFF TO STIFF, BROWN TO REDDISH BROWN, SILTY CLAY, TRACE TO LITTLE GRAVEL, LITTLE TO SOME SAND, CONSISTENCY FROM B-010-0-23, MOIST												
ELEV. 594.4		GRADATION (%)										
DEPTHS		GR	CS	FS	SI	CL	LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
1												<V><L>
2		100	4	10	37	38	36	17	19	15	A-6b (12)	<V><L>
3												<V><L>
4												<V><L>
5												<V><L>
6												<V><L>
7												<V><L>
8												<V><L>
9												<V><L>
10												<V><L>
11		90	6	17	32	39	34	17	17	17	A-6b (10)	<V><L>
12												<V><L>
EOB												<V><L>
582.4												<V><L>

NOTES: NONE
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: AUGER CUTTINGS

DESIGN AGENCY

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 10200 Alliance Road,
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 (513) 842-8200
 DESIGNER
 MSJ
 REVIEWER
 EMK 11-22-24
 PROJECT ID
 119144
 SUBSET TOTAL
 0 0
 SHEET TOTAL
 P.900 940

**GEOTECHNICAL PROFILE - BRIDGE
 BORING LOG B-010-1-24**

MEG-33-19.21

MODEL SHEET PAPER SIZE: 17x11 (in.) DATE: 12/27/2024 TIME: 12:27:50 PM USER: Mlenning
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PROJECT: TYPE: PID: START:	MEG-33-19.11 STRUCTURE FOUNDATION 119144 1/4/24	END: SFN: END:	N/A 1/8/24	DRILLING FIRM / OPERATOR:				DRILL RIG:				STATION / OFFSET:				EXPLORATION ID						
				STANTEC / BM	STANTEC / NS	SPT / NO2	ELEV.	DEPTH	SPT / RQD	N ₆₀	REC SAMPLE (%)	HP (tsf)	GR	CS	FS	SI	CL	LL	PL	PI	WC	ODOT CLASS (GI)
MATERIAL DESCRIPTION AND NOTES STIFF TO VERY STIFF, REDDISH BROWN, SANDY SILT, SOME GRAVEL, LITTLE CLAY, DAMP				606.9																		
MATERIAL DESCRIPTION AND NOTES CLAYSTONE, REDDISH BROWN TO BROWN, SEVERELY WEATHERED, VERY WEAK.				603.9	TR																	
MATERIAL DESCRIPTION AND NOTES INTERBEDDED SANDSTONE (70%) AND SHALE (30%), MODERATELY FRACTURED, RQD 81%, REC. 99%. SANDSTONE, GRAY TO BROWNISH GRAY, HIGHLY TO MODERATELY WEATHERED, STRONG, MEDIUM TO COARSE GRAINED, ARENACEOUS; SHALE, DARK GRAY, HIGHLY TO MODERATELY WEATHERED, WEAK, LAMINATED TO THIN BEDDED.				597.4																		
FROM 15.2 FT. TO 15.6 FT., UCR = 6,820 PSI																						

BORING CONTINUES

DESIGN AGENCY

 10200 Alliance Road,
 Suite 300
 Cincinnati, OH 45242
 (513) 842-8200

DESIGNER
 MSJ

REVIEWER
 EMK 11-22-24

PROJECT ID
 119144

SUBSET	TOTAL
0	0

SHEET	TOTAL
P.901	940

**GEOTECHNICAL PROFILE - BRIDGE
 BORING LOG B-011-0-23**

MEG-33-19.21

MODEL SHEET PAPER SIZE: 17x11 (in.) DATE: 12/2/2024 TIME: 12:28:48 PM USER: Mlenings
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PROJECT: MEG-33-19.11 DRILLING FIRM / OPERATOR: STANTEC / BM STATION / OFFSET: 1232+26, 9' LT. EXPLORATION ID
 TYPE: STRUCTURE FOUNDATION SAMPLING FIRM / LOGGER: STANTEC / NS ALIGNMENT: US 33 B-011-0-23
 PID: 119144 SFN: N/A DRILLING METHOD: 3.25" HSA / NQ2 CALIBRATION DATE: 7/5/23 ELEVATION: 606.9 (MSL) EOB: 31.5 ft. PAGE
 START: 1/4/24 END: 1/8/24 SAMPLING METHOD: SPT / NQ2 ENERGY RATIO (%): 90* LAT / LONG: 38.964430, -81.824386 2 OF 2

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	REC SAMPLE N ₆₀ (%)	ID	HP (tsf)	GRADATION (%)							WC	HOLE CLASS (G) SEALED	
							GR	CS	FS	SI	CL	LL	PL			PI
(CONTINUED) INTERBEDDED SANDSTONE (70%) AND SHALE (30%), MODERATELY FRACTURED, RQD 81%, REC. 99%. SANDSTONE, GRAY TO BROWNISH GRAY, HIGHLY TO MODERATELY WEATHERED, STRONG, MEDIUM TO COARSE GRAINED, ARENACEOUS; SHALE, DARK GRAY, HIGHLY TO MODERATELY WEATHERED, WEAK, LAMINATED TO THIN BEDDED.	581.9	25														
		26														
		27														
		28														
		29		98	98	NQ2-5										CORE
		30														
		31														
		575.4 EOB														

FROM 29.3 FT. TO 29.7 FT., UCR = 2.437 PSI

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: AUGER CUTTINGS MIXED WITH BENTONITE CHIPS; CEMENT/BENTONITE GROUT

DESIGN AGENCY

Stantec
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 REVIEWER
 EMK 11-22-24
 PROJECT ID
 119144
 SUBSET TOTAL
 0 0
 SHEET TOTAL
 P.902 940

**GEOTECHNICAL PROFILE - BRIDGE
 BORING LOG B-011-0-23 (CONTINUED)**

B-011-0-23



Run #:	Depth	Recovery	RQD
NQ2-1	9.5'	23/24	0/24
NQ2-2	11.5'	60/60	40/60
NQ2-3	16.5'	60/60	56/60
MEG-33-19.11, PID 119144			

B-011-0-23



Run #:	Depth	Recovery	RQD
NQ2-3	16.5'	60/60	56/60
NQ2-4	21.5'	60/60	52/60
MEG-33-19.11, PID 119144			

B-011-0-23



Run #:	Depth	Recovery	RQD
NQ2-5	26.5'	59/60	59/60
MEG-33-19.11, PID 119144			

Unconfined Compressive Strength of Cohesive Soil

ASTM D 2166

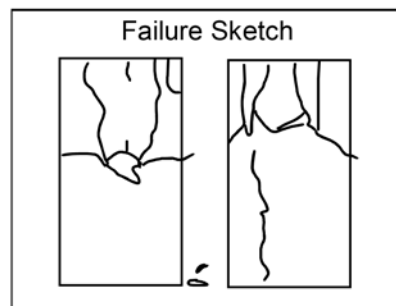
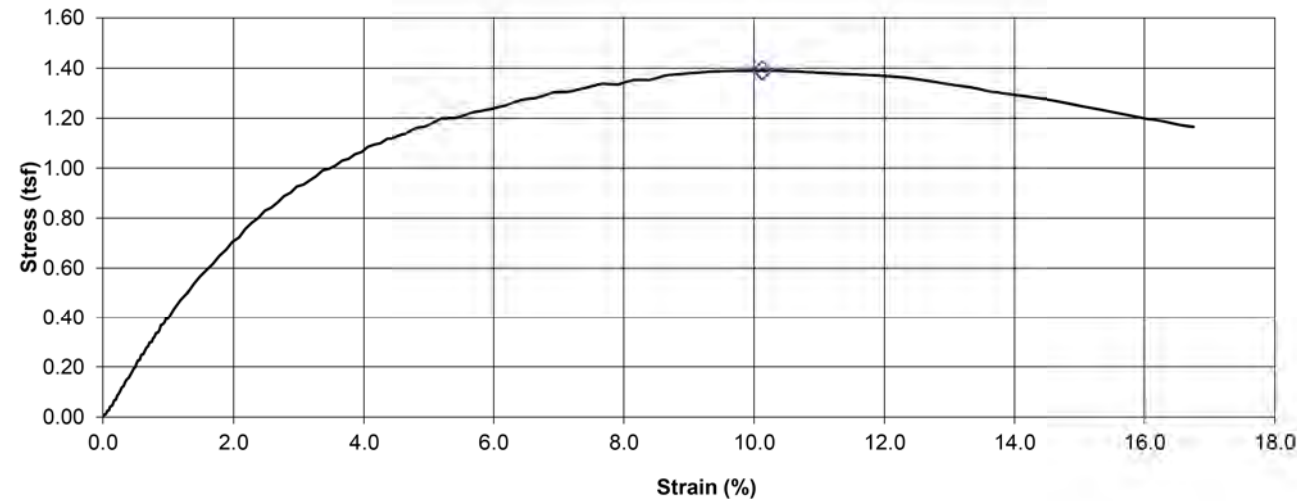
Project Name MEG-33-19.11 Project Number 173609140
 Source B-006-0-23, 7.5'-9.5' Lab ID 1
 Visual Description Lean Clay with Sand (CL), red brown, moist, firm

Recovered 0.9'
 Test Interval 7.5' - 8.0'

Specimen Type: Undisturbed LL 36 PL 20
 PI 16 Date Extruded 02/06/2024
 Date Tested 02/06/2024

Initial Wet Density (pcf) 129.7
 Initial Moisture Content (%) 17.0 Initial MC Taken Before Test, From Trimmings
 Initial Dry Density (pcf) 110.8
 At Test Moisture Content (%) N/A At Test MC Taken N/A
 At Test Dry Density (pcf) N/A
 Specific Gravity N/A
 Degree of Saturation (%) N/A Unconfined Compressive Strength (tsf) 1.39
 Average Height (in) 5.987 Undrained Shear Strength (tsf) 0.70
 Average Diameter (in) 2.870 Strain at Maximum Stress (%) 10.1
 Height to Diameter Ratio 2.1 Strain Rate to Failure (% / min.) 0.99

Stress vs. Strain



Pocket Penetrometer Reading (tsf) N/A
 Torvane Reading (kg/cm²) N/A

Comments 7.5'-8.0' - UC
8.0'-8.4' - short piece
 Classification data from same Shelby tube sample:
A-6b (11)
%GR = 9.1; %CS = 3.2; %FS = 12.4; %SI = 30.6; %CL = 44.7
LL = 36; PL = 20

Reviewed By RHB

Uniaxial Compressive Strength of Intact Rock Core Specimens

ASTM D 7012, Method C

Project Name MEG-33-19.11 Project Number 173609140
 Lithology Sandstone, gray, slightly strong Lab ID UCR-63
 Hole Number B-001-0-23 Depth (ft) 13.4'-13.7' Date Received 02/07/2024

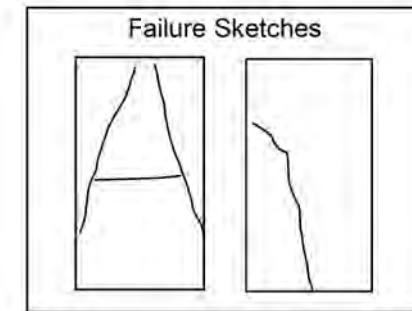
Temperature (°C) 21.1 Moisture Condition As Prepared, Moist Date Tested 02/14/2024

Side Planeness N/A Height (in) 4.071 Wet Unit Weight (pcf) 152.7
 Perpendicularity N/A Diameter (in) 1.984 Dry Unit Weight (pcf) N/A
 End Planeness N/A Area (in²) 3.092 Moisture Content (%) N/A
 Parallelism N/A
 Dimensions were not confirmed.

Loading Rate (lbf/sec) 35
 Peak Load (lbf) 12515

Failure Type Shear

Compressive Strength (psi) 4050
 Compressive Strength (psf) 583200
 Compressive Strength (tsf) 291



Comments Fragile nature of specimen inhibited preparation, required capping of ends with Hydro-Stone.
Dimensional tolerances were not confirmed.

Pre-test



Post-test



Reviewed By REL

**Uniaxial Compressive Strength
 of Intact Rock Core Specimens**
 ASTM D 7012, Method C

Project Name MEG-33-19.11 Project Number 173609140
 Lithology Sandstone, gray, moderately strong Lab ID UCR-64
 Hole Number B-001-0-23 Depth (ft) 25.9'-26.3' Date Received 02/07/2024

Temperature (°C) 20.6 Moisture Condition As Prepared, Moist Date Tested 02/09/2024

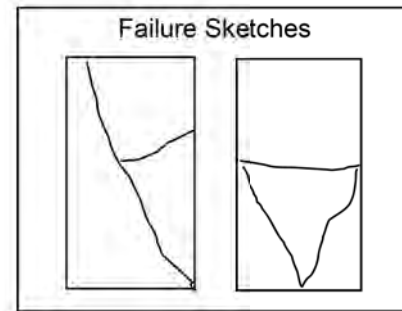
Side Planeness N/A Height (in) 4.821 Wet Unit Weight (pcf) 156.3
 Perpendicularity N/A Diameter (in) 1.986 Dry Unit Weight (pcf) N/A
 End Planeness N/A Area (in²) 3.099 Moisture Content (%) N/A
 Parallelism N/A

Dimensions were not confirmed.

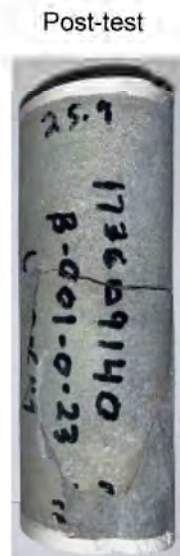
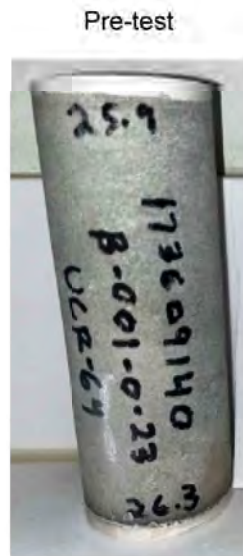
Loading Rate (lb/sec) 44
 Peak Load (lb) 26910

Failure Type Shear

Compressive Strength (psi) 8680
 Compressive Strength (psf) 1249920
 Compressive Strength (tsf) 625



Comments Fragile nature of specimen inhibited preparation, required capping of ends with Hydro-Stone.
Dimensional tolerances were not confirmed.



Reviewed By REL

**Uniaxial Compressive Strength
 of Intact Rock Core Specimens**
 ASTM D 7012, Method C

Project Name MEG-33-19.11 Project Number 173609140
 Lithology Sandstone, gray, slightly strong Lab ID UCR-67
 Hole Number B-003-0-23 Depth (ft) 26.3'-26.7' Date Received 02/07/2024

Temperature (°C) 21.6 Moisture Condition As Prepared, Moist Date Tested 02/09/2024

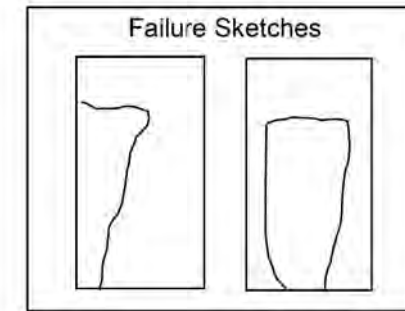
Side Planeness N/A Height (in) 5.062 Wet Unit Weight (pcf) 148.5
 Perpendicularity N/A Diameter (in) 1.984 Dry Unit Weight (pcf) N/A
 End Planeness N/A Area (in²) 3.093 Moisture Content (%) N/A
 Parallelism N/A

Dimensions were not confirmed.

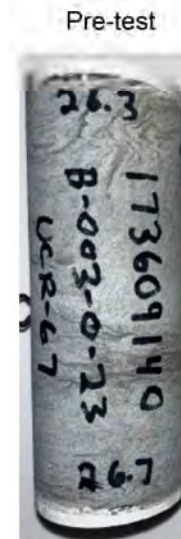
Loading Rate (lb/sec) 63
 Peak Load (lb) 17380

Failure Type Shear

Compressive Strength (psi) 5620
 Compressive Strength (psf) 809280
 Compressive Strength (tsf) 405



Comments Fragile nature of specimen inhibited preparation, required capping of ends with Hydro-Stone.
Dimensional tolerances were not confirmed.



Reviewed By REL

**Uniaxial Compressive Strength
 of Intact Rock Core Specimens**
 ASTM D 7012, Method C

Project Name MEG-33-19.11 Project Number 173609140
 Lithology Sandstone, gray, moderately strong Lab ID UCR-68
 Hole Number B-007-0-23 Depth (ft) 20.1'-20.5' Date Received 02/07/2024

Temperature (°C) 21.5 Moisture Condition As Prepared, Moist Date Tested 02/09/2024

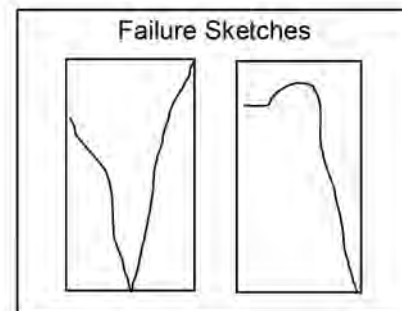
Side Planeness N/A Height (in) 5.084 Wet Unit Weight (pcf) 151.4
 Perpendicularity N/A Diameter (in) 1.983 Dry Unit Weight (pcf) N/A
 End Planeness N/A Area (in²) 3.089 Moisture Content (%) N/A
 Parallelism N/A

Dimensions were not confirmed.

Loading Rate (lbf/sec) 46
 Peak Load (lbf) 19390

Failure Type Cone and Split

Compressive Strength (psi) 6280
 Compressive Strength (psf) 904320
 Compressive Strength (tsf) 452



Comments Fragile nature of specimen inhibited preparation, required capping of ends with Hydro-Stone.
Dimensional tolerances were not confirmed.



Reviewed By REL

**Uniaxial Compressive Strength
 of Intact Rock Core Specimens**
 ASTM D 7012, Method C

Project Name MEG-33-19.11 Project Number 173609140
 Lithology Sandstone, gray, moderately strong Lab ID UCR-69
 Hole Number B-007-0-23 Depth (ft) 27.0'-27.4' Date Received 02/07/2024

Temperature (°C) 20 Moisture Condition As Prepared, Moist Date Tested 02/08/2024

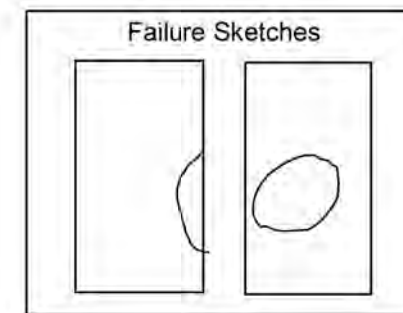
Side Planeness N/A Height (in) 4.598 Wet Unit Weight (pcf) 154.4
 Perpendicularity N/A Diameter (in) 1.987 Dry Unit Weight (pcf) N/A
 End Planeness N/A Area (in²) 3.102 Moisture Content (%) N/A
 Parallelism N/A

Dimensions were not confirmed.

Loading Rate (lbf/sec) 54
 Peak Load (lbf) 23600

Failure Type Undetermined

Compressive Strength (psi) 7610
 Compressive Strength (psf) 1095840
 Compressive Strength (tsf) 548



Comments Fragile nature of specimen inhibited preparation, required capping of ends with Hydro-Stone.
Dimensional tolerances were not confirmed.



Reviewed By REL

**Uniaxial Compressive Strength
 of Intact Rock Core Specimens**
 ASTM D 7012, Method C

Project Name MEG-33-19.11 Project Number 173609140
 Lithology Sandstone, brown, slightly strong Lab ID UCR-71
 Hole Number B-009-0-23 Depth (ft) 22.8'-23.2' Date Received 02/07/2024

Temperature (°C) 21.2 Moisture Condition As Prepared, Moist Date Tested 02/08/2024

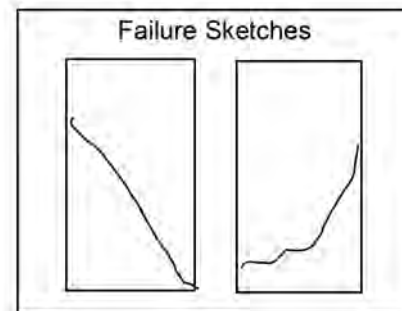
Side Planeness N/A Height (in) 4.834 Wet Unit Weight (pcf) 147.0
 Perpendicularity N/A Diameter (in) 1.983 Dry Unit Weight (pcf) N/A
 End Planeness N/A Area (in²) 3.088 Moisture Content (%) N/A
 Parallelism N/A

Dimensions were not confirmed.

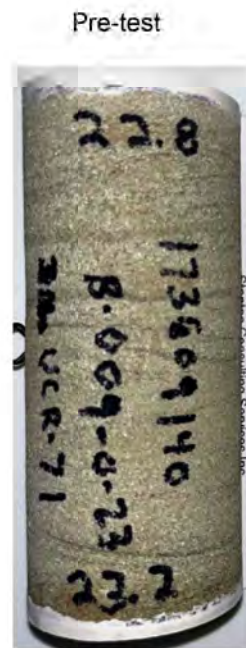
Loading Rate (lbf/sec) 34
 Peak Load (lbf) 13700

Failure Type Shear

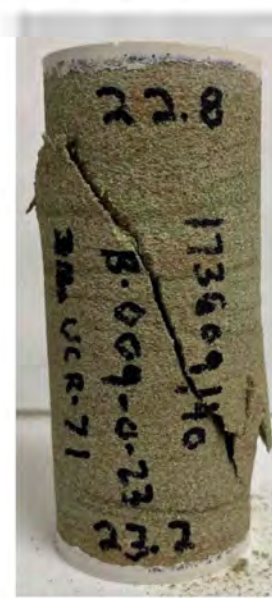
Compressive Strength (psi) 4440
 Compressive Strength (psf) 639360
 Compressive Strength (tsf) 319



Comments Fragile nature of specimen inhibited preparation, required capping of ends with Hydro-Stone.
Dimensional tolerances were not confirmed.



Pre-test



Post-test

Reviewed By REL

**Uniaxial Compressive Strength
 of Intact Rock Core Specimens**
 ASTM D 7012, Method C

Project Name MEG-33-19.11 Project Number 173609140
 Lithology Sandstone, brown, slightly strong Lab ID UCR-72
 Hole Number B-009-0-23 Depth (ft) 6.7'-7.2' Date Received 02/07/2024

Temperature (°C) 21.1 Moisture Condition As Prepared, Moist Date Tested 02/09/2024

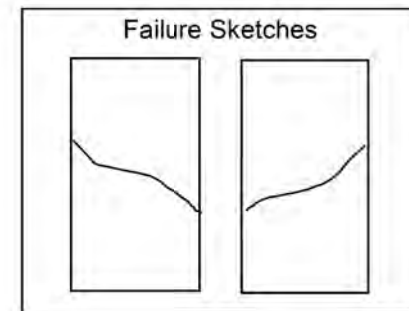
Side Planeness N/A Height (in) 5.991 Wet Unit Weight (pcf) 135.3
 Perpendicularity N/A Diameter (in) 1.984 Dry Unit Weight (pcf) N/A
 End Planeness N/A Area (in²) 3.090 Moisture Content (%) N/A
 Parallelism N/A

Dimensions were not confirmed.

Loading Rate (lbf/sec) 24
 Peak Load (lbf) 8360

Failure Type Shear

Compressive Strength (psi) 2706
 Compressive Strength (psf) 389664
 Compressive Strength (tsf) 195



Comments Fragile nature of specimen inhibited preparation, required capping of ends with Hydro-Stone.
Dimensional tolerances were not confirmed.



Pre-test



Post-test

Reviewed By REL

Uniaxial Compressive Strength of Intact Rock Core Specimens
 ASTM D 7012, Method C

Project Name MEG-33-19.11 Project Number 173609140
 Lithology Sandstone, brown, slightly strong Lab ID UCR-73
 Hole Number B-010-0-23 Depth (ft) 33.2'-33.6' Date Received 02/07/2024

Temperature (°C) 20.6 Moisture Condition As Prepared, Moist Date Tested 02/12/2024

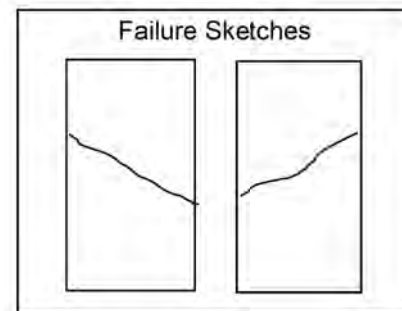
Side Planeness N/A Height (in) 4.776 Wet Unit Weight (pcf) 140.0
 Perpendicularity N/A Diameter (in) 1.922 Dry Unit Weight (pcf) N/A
 End Planeness N/A Area (in²) 2.901 Moisture Content (%) N/A
 Parallelism N/A

Dimensions were not confirmed.

Loading Rate (lbf/sec) 41
 Peak Load (lbf) 7810

Failure Type Shear

Compressive Strength (psi) 2692
 Compressive Strength (psf) 387648
 Compressive Strength (tsf) 194



Comments Fragile nature of specimen inhibited preparation, required capping of ends with Hydro-Stone.
Dimensional tolerances were not confirmed.



Reviewed By REL

Uniaxial Compressive Strength of Intact Rock Core Specimens
 ASTM D 7012, Method C

Project Name MEG-33-19.11 Project Number 173609140
 Lithology Shale, grey, weak Lab ID UCR-74
 Hole Number B-010-0-23 Depth (ft) 36.2'-36.7' Date Received 02/07/2024

Temperature (°C) 20.3 Moisture Condition As Prepared, Moist Date Tested 02/13/2024

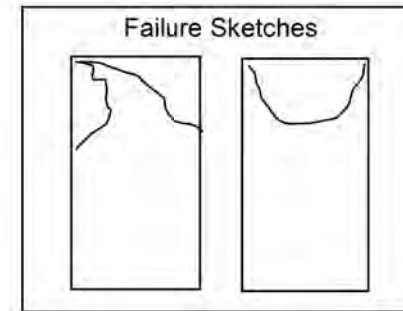
Side Planeness N/A Height (in) 4.936 Wet Unit Weight (pcf) 154.4
 Perpendicularity N/A Diameter (in) 1.977 Dry Unit Weight (pcf) N/A
 End Planeness N/A Area (in²) 3.071 Moisture Content (%) N/A
 Parallelism N/A

Dimensions were not confirmed.

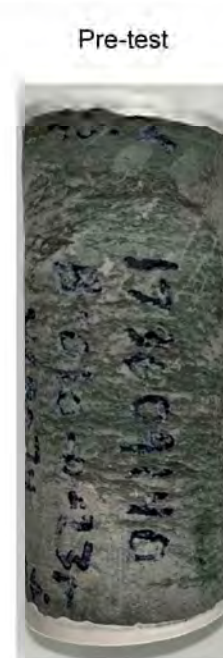
Loading Rate (lbf/sec) 6
 Peak Load (lbf) 1852

Failure Type Cone and Shear

Compressive Strength (psi) 603
 Compressive Strength (psf) 86832
 Compressive Strength (tsf) 43



Comments Fragile nature of specimen inhibited preparation, required capping of ends with Hydro-Stone.
Dimensional tolerances were not confirmed.



Reviewed By REL



DESIGNER	MSJ
REVIEWER	EMK
PROJECT ID	119144
SUBSET	TOTAL
0	0
SHEET	TOTAL
P.908	940

Uniaxial Compressive Strength of Intact Rock Core Specimens
 ASTM D 7012, Method C

Project Name MEG-33-19.11 Project Number 173609140
 Lithology Sandstone, gray, moderately strong Lab ID UCR-75
 Hole Number B-011-0-23 Depth (ft) 15.2'-15.6' Date Received 02/07/2024

Temperature (°C) 20.3 Moisture Condition As Prepared, Moist Date Tested 02/08/2024

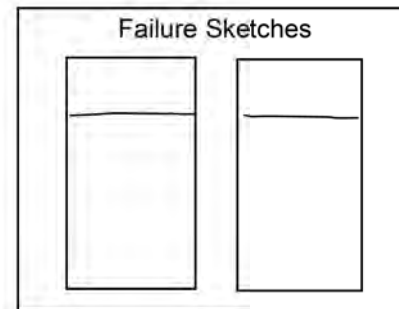
Side Planeness N/A Height (in) 4.871 Wet Unit Weight (pcf) 149.4
 Perpendicularity N/A Diameter (in) 1.981 Dry Unit Weight (pcf) N/A
 End Planeness N/A Area (in²) 3.083 Moisture Content (%) N/A
 Parallelism N/A

Dimensions were not confirmed.

Loading Rate (lbf/sec) 39
 Peak Load (lbf) 21030

Failure Type Shear

Compressive Strength (psi) 6820
 Compressive Strength (psf) 982080
 Compressive Strength (tsf) 491



Comments Fragile nature of specimen inhibited preparation, required capping of ends with Hydro-Stone.
Dimensional tolerances were not confirmed.



Pre-test



Post-test

Reviewed By REL

Uniaxial Compressive Strength of Intact Rock Core Specimens
 ASTM D 7012, Method C

Project Name MEG-33-19.11 Project Number 173609140
 Lithology Sandstone, brown, slightly strong Lab ID UCR-76
 Hole Number B-011-0-23 Depth (ft) 29.3'-29.7' Date Received 02/07/2024

Temperature (°C) 21.3 Moisture Condition As Prepared, Moist Date Tested 02/09/2024

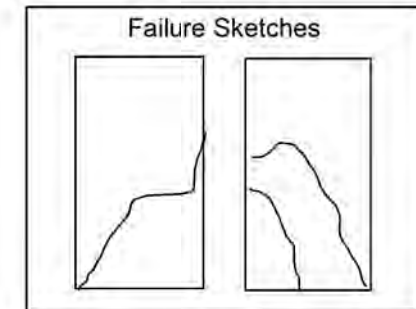
Side Planeness N/A Height (in) 4.807 Wet Unit Weight (pcf) 146.6
 Perpendicularity N/A Diameter (in) 1.974 Dry Unit Weight (pcf) N/A
 End Planeness N/A Area (in²) 3.061 Moisture Content (%) N/A
 Parallelism N/A

Dimensions were not confirmed.

Loading Rate (lbf/sec) 30
 Peak Load (lbf) 7460

Failure Type Undetermined

Compressive Strength (psi) 2437
 Compressive Strength (psf) 350928
 Compressive Strength (tsf) 175



Comments Fragile nature of specimen inhibited preparation, required capping of ends with Hydro-Stone.
Dimensional tolerances were not confirmed.



Pre-test



Post-test

Reviewed By REL



DESIGNER	MSJ
REVIEWER	EMK
PROJECT ID	119144
SUBSET	0
TOTAL	0
SHEET	P.909
TOTAL	940

One Dimensional Consolidation of Soils Using Incremental Loading ASTM D 2435

Project Name MEG-33-19.11 Project No. 175578434
 Source B-001-1-24, 4.2'-4.3' Lab ID 454
 Description Sandy Lean Clay (CL), gray, moist, soft Date Received 11/07/2024
 Specimen Type Undisturbed

LL 25 Specific Gravity 2.72 ASTM D 854, Dry Prepared Using Cutting Ring
 PL 17 Test Method B - for 60 min.
 PI 8 Test Condition Inundated at 0.05 tsf

Initial Specimen Conditions

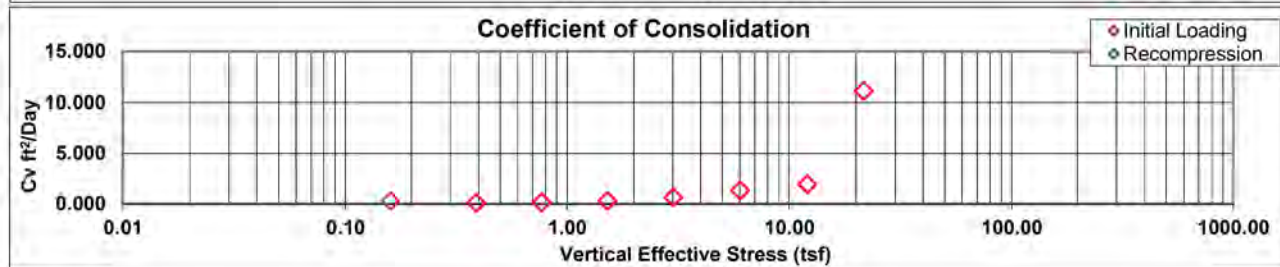
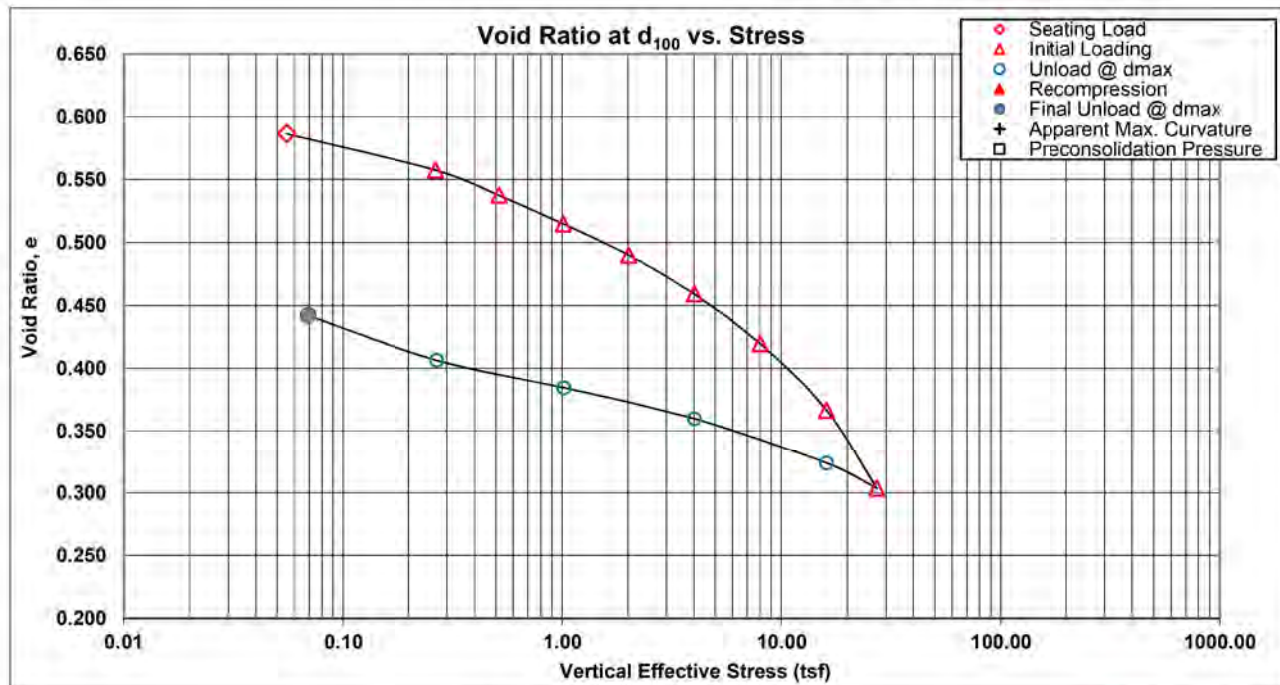
Moisture Content (%)	18.4
Dry Unit Weight (pcf)	106.8
Void Ratio	0.587
Degree of Saturation (%)	85.2
Initial Specimen Height (in)	1.0015

Final Specimen Conditions

Moisture Content (%)	15.8
Dry Unit Weight (pcf)	117.5
Void Ratio	0.442
Degree of Saturation (%)	97.3
Final Specimen Height (in)	0.9104

Equivalent Height of Solids (in) 0.631

Preconsolidation Pressure* (tsf) _____
 Void Ratio @ Preconsolidation Pressure _____



Comments _____

 Reviewed By KG

One Dimensional Consolidation of Soils Using Incremental Loading ASTM D 2435

Project Name MEG-33-19.11 Project No. 175578434
 Source B-007-1-24, 1.4'-1.5' Lab ID 455
 Description Clayey Gravel with Sand (GC), brown, moist, hard Date Received 11/07/2024
 Specimen Type Undisturbed

LL 27 Specific Gravity 2.79 ASTM D 854, Dry Prepared Using Cutting Ring
 PL 13 Test Method B - for 60 min.
 PI 14 Test Condition Inundated at 0.05 tsf

Initial Specimen Conditions

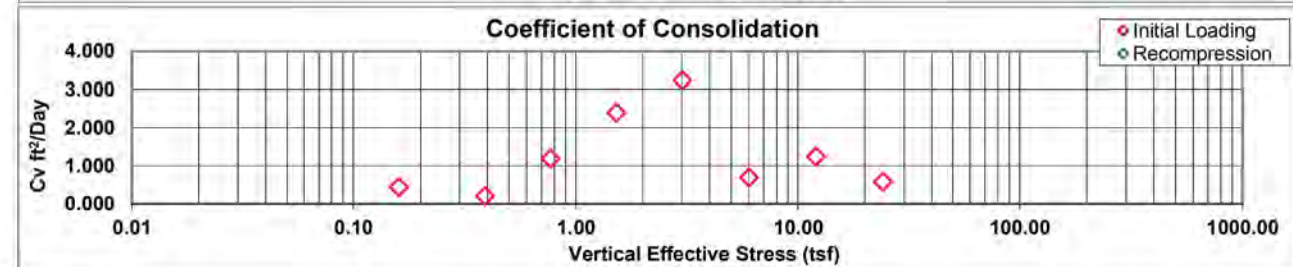
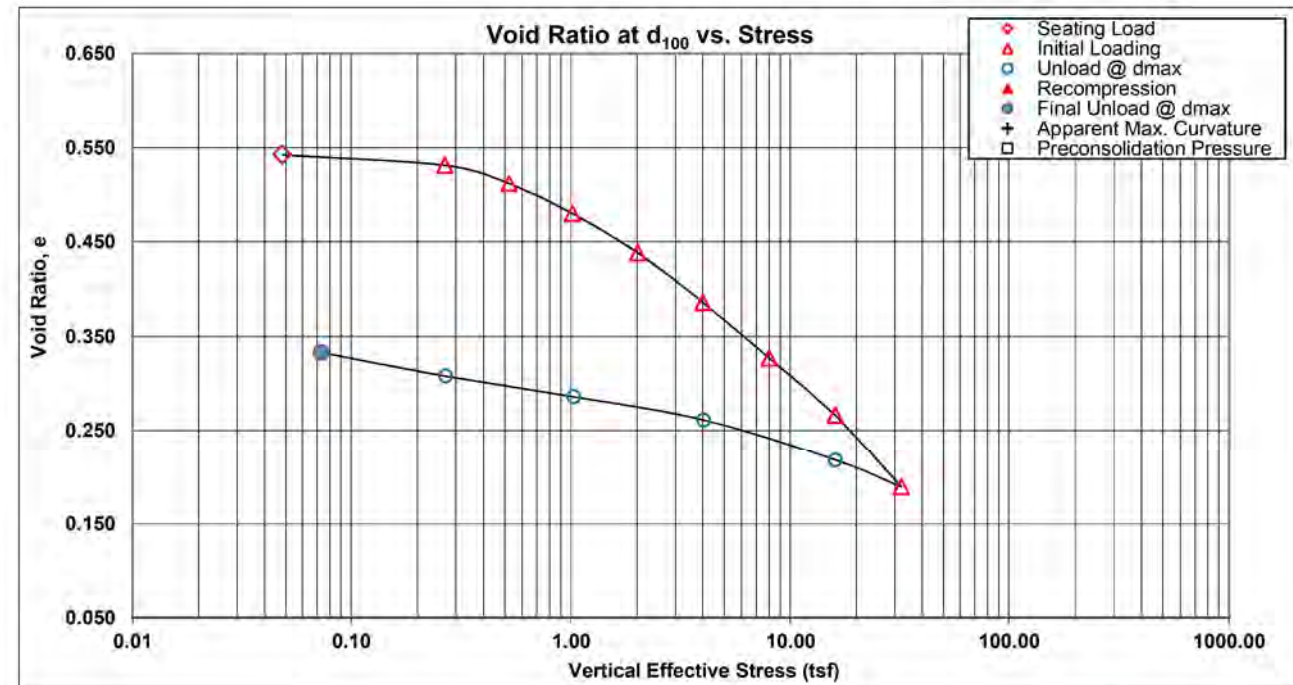
Moisture Content (%)	8.9
Dry Unit Weight (pcf)	112.7
Void Ratio	0.542
Degree of Saturation (%)	45.8
Initial Specimen Height (in)	1.0099

Final Specimen Conditions

Moisture Content (%)	11.7
Dry Unit Weight (pcf)	130.4
Void Ratio	0.333
Degree of Saturation (%)	98.0
Final Specimen Height (in)	0.8727

Equivalent Height of Solids (in) 0.655

Preconsolidation Pressure* (tsf) _____
 Void Ratio @ Preconsolidation Pressure _____



Comments _____

 Reviewed By KG

One Dimensional Consolidation of Soils Using Incremental Loading ASTM D 2435

Project Name MEG-33-19.11
 Source B-010-1-24, 2.8'-2.9'
 Description Lean Clay with Sand (CL), brown, moist, firm
 Specimen Type Undisturbed

Project No. 175578434
 Lab ID 456
 Date Received 11/07/2024

LL 36 Specific Gravity 2.77 ASTM D 854, Dry
 PL 17
 PI 19

Prepared Using Cutting Ring
 Test Method B - for 120 min.
 Test Condition Inundated at 0.05 tsf

Initial Specimen Conditions

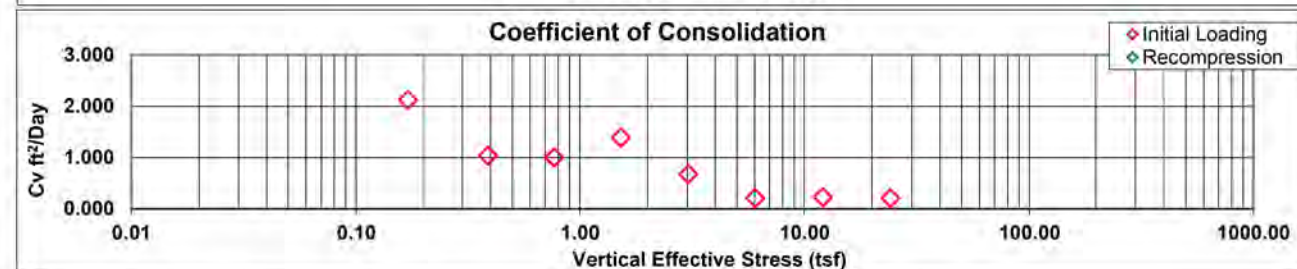
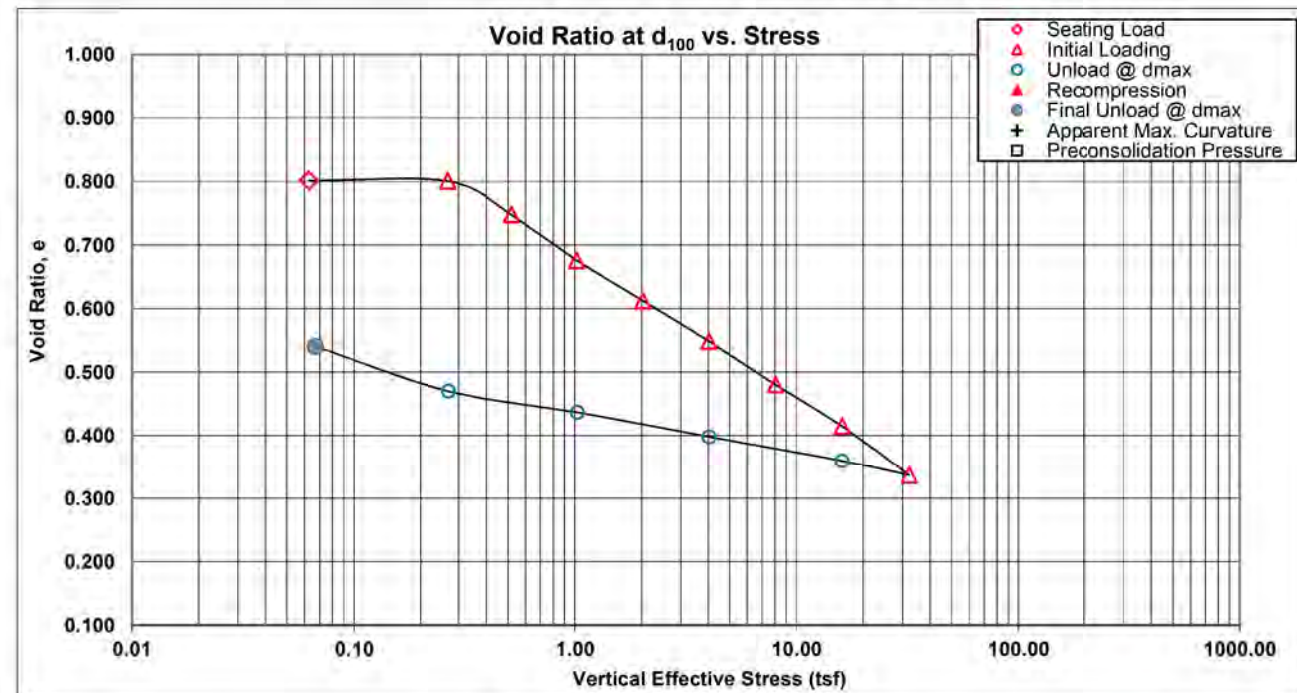
Moisture Content (%) 15.0
 Dry Unit Weight (pcf) 95.8
 Void Ratio 0.802
 Degree of Saturation (%) 51.8
 Initial Specimen Height (in) 0.9872

Final Specimen Conditions

Moisture Content (%) 21.0
 Dry Unit Weight (pcf) 112.0
 Void Ratio 0.541
 Degree of Saturation (%) 107.4
 Final Specimen Height (in) 0.8442

Equivalent Height of Solids (in) 0.548

Preconsolidation Pressure* (tsf) _____
 Void Ratio @ Preconsolidation Pressure _____



Comments Swelling of the test specimen was observed between the seating load and first load.

Reviewed By KG

One Dimensional Consolidation of Soils Using Incremental Loading ASTM D 2435

Project Name MEG-33-19.11
 Source B-010-1-24, 11.0'-11.1'
 Description Lean Clay with Sand (CL), brown, moist, firm
 Specimen Type Undisturbed

Project No. 175578434
 Lab ID 457
 Date Received 11/07/2024

LL 34 Specific Gravity 2.88 ASTM D 854, Dry
 PL 17
 PI 17

Prepared Using Cutting Ring
 Test Method B - for 60 min.
 Test Condition Inundated at 0.05 tsf

Initial Specimen Conditions

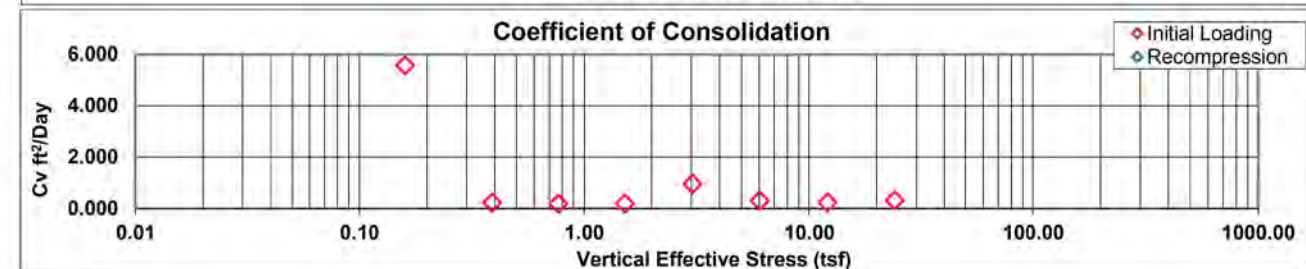
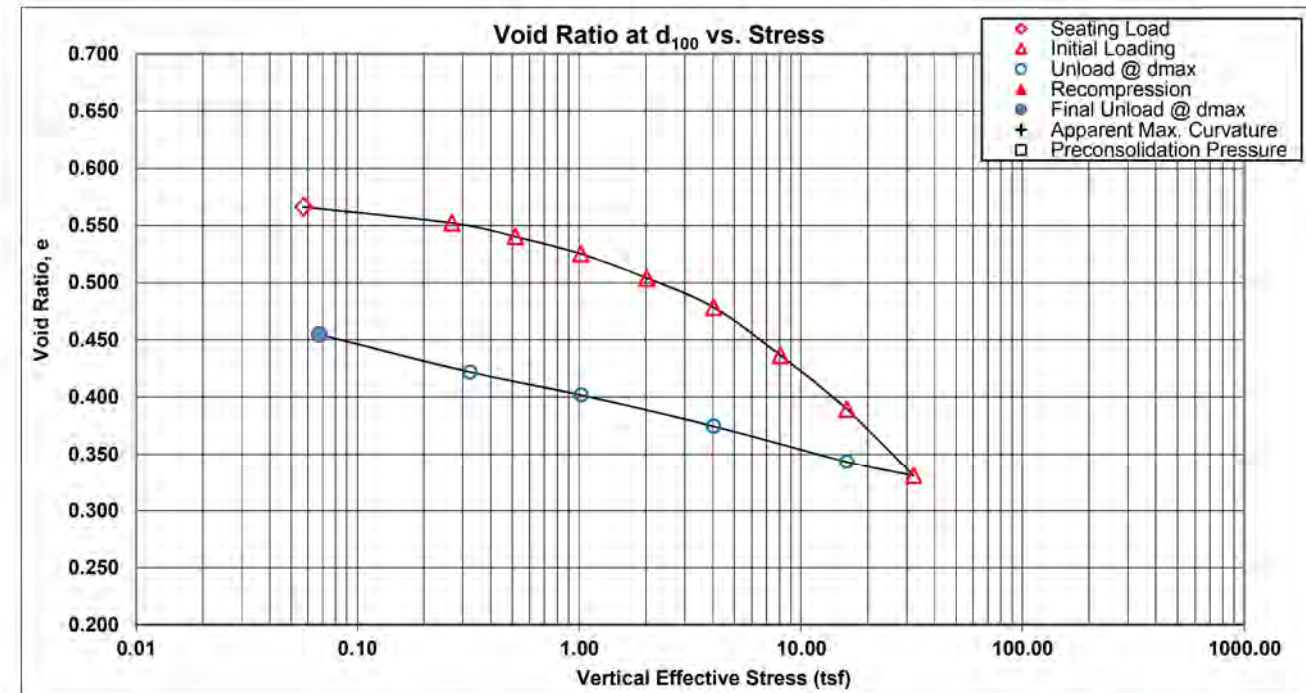
Moisture Content (%) 16.7
 Dry Unit Weight (pcf) 114.6
 Void Ratio 0.566
 Degree of Saturation (%) 85.0
 Initial Specimen Height (in) 0.9963

Final Specimen Conditions

Moisture Content (%) 16.3
 Dry Unit Weight (pcf) 123.3
 Void Ratio 0.455
 Degree of Saturation (%) 103.2
 Final Specimen Height (in) 0.9253

Equivalent Height of Solids (in) 0.636

Preconsolidation Pressure* (tsf) _____
 Void Ratio @ Preconsolidation Pressure _____



Comments _____

Reviewed By KG

**Uniaxial Compressive Strength
 of Intact Rock Core Specimens**
 ASTM D 7012, Method C

Project Name MEG-33-19.11 Project Number 175578434
 Lithology Sandstone, light brown, slightly strong Lab ID UCR-459
 Hole Number B-006-1-24 Depth (ft) 46.2'-46.6' Date Received 11/07/2024

Temperature (°C) 20.2 Moisture Condition As Prepared, Moist Date Tested 11/21/2024

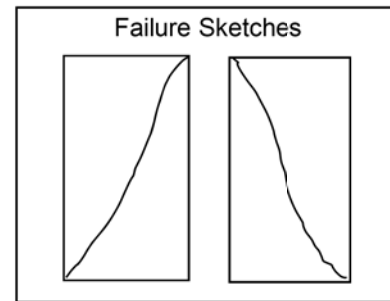
Side Planeness N/A Height (in) 4.018 Wet Unit Weight (pcf) 148.2
 Perpendicularity N/A Diameter (in) 1.989 Dry Unit Weight (pcf) N/A
 End Planeness N/A Area (in²) 3.107 Moisture Content (%) N/A
 Parallelism N/A

Dimensions were not confirmed.

Loading Rate (lbf/sec) 103
 Peak Load (lbf) 14510

Failure Type Shear

Compressive Strength (psi) 4670
 Compressive Strength (psf) 672480
 Compressive Strength (tsf) 336



Comments Fragile nature of specimen inhibited preparation, required capping of ends with Hydro-Stone.
Dimensional tolerances were not confirmed.

PRE TEST



Note: Incorrect depth written on rock core

POST TEST



Note: Incorrect depth written on rock core

Reviewed By REL

**Uniaxial Compressive Strength
 of Intact Rock Core Specimens**
 ASTM D 7012, Method C

Project Name MEG-33-19.11 Project Number 175578434
 Lithology Shale, grayish green, slightly strong Lab ID UCR-460
 Hole Number B-006-2-24 Depth (ft) 24.7'-25.1' Date Received 11/07/2024

Temperature (°C) 20.2 Moisture Condition As Prepared, Moist Date Tested 11/21/2024

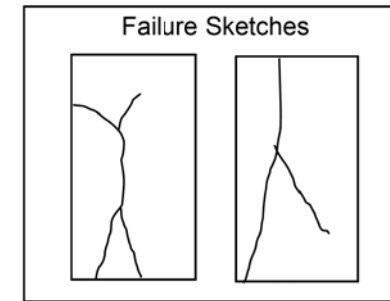
Side Planeness N/A Height (in) 4.025 Wet Unit Weight (pcf) 157.5
 Perpendicularity N/A Diameter (in) 1.972 Dry Unit Weight (pcf) N/A
 End Planeness N/A Area (in²) 3.054 Moisture Content (%) N/A
 Parallelism N/A

Dimensions were not confirmed.

Loading Rate (lbf/sec) 88
 Peak Load (lbf) 7460

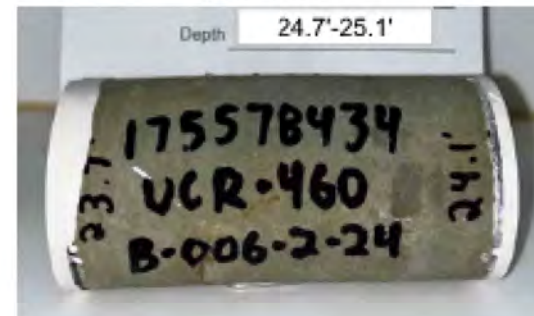
Failure Type Cone and Split

Compressive Strength (psi) 2443
 Compressive Strength (psf) 351792
 Compressive Strength (tsf) 176



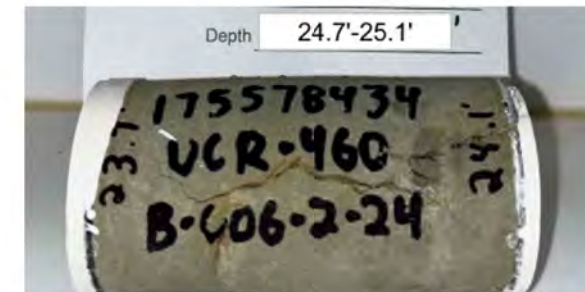
Comments Fragile nature of specimen inhibited preparation, required capping of ends with Hydro-Stone.
Dimensional tolerances were not confirmed.

PRE TEST



NOTE: INCORRECT DEPTH WRITTEN ON ROCK CORE

POST TEST



NOTE: INCORRECT DEPTH WRITTEN ON ROCK CORE

Reviewed By REL

**Uniaxial Compressive Strength
 of Intact Rock Core Specimens**
 ASTM D 7012, Method C

Project Name MEG-33-19.11 Project Number 175578434
 Lithology Shale, gray, slightly strong Lab ID UCR-463
 Hole Number B-006-3-24 Depth (ft) 35.2'-35.6' Date Received 11/07/2024

Temperature (°C) 20.2 Moisture Condition As Prepared, Moist Date Tested 11/21/2024

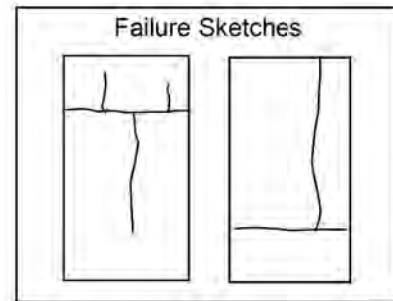
Side Planeness N/A Height (in) 3.986 Wet Unit Weight (pcf) 158.9
 Perpendicularity N/A Diameter (in) 1.984 Dry Unit Weight (pcf) N/A
 End Planeness N/A Area (in²) 3.092 Moisture Content (%) N/A
 Parallelism N/A

Dimensions were not confirmed.

Loading Rate (lbf/sec) 89
 Peak Load (lbf) 21520

Failure Type Undetermined

Compressive Strength (psi) 6960
 Compressive Strength (psf) 1002240
 Compressive Strength (tsf) 501



Comments Fragile nature of specimen inhibited preparation, required capping of ends with Hydro-Stone.
Dimensional tolerances were not confirmed.

PRE TEST



POST TEST



Reviewed By REL

**Uniaxial Compressive Strength
 of Intact Rock Core Specimens**
 ASTM D 7012, Method C

Project Name MEG-33-19.11 Project Number 175578434
 Lithology Shale, grayish green, slightly strong Lab ID UCR-464
 Hole Number B-012-0-24 Depth (ft) 18.6'-19.0' Date Received 11/07/2024

Temperature (°C) 20.2 Moisture Condition As Prepared, Moist Date Tested 11/21/2024

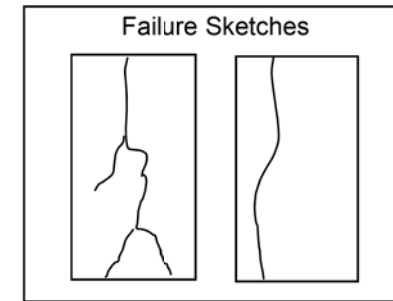
Side Planeness N/A Height (in) 4.075 Wet Unit Weight (pcf) 157.4
 Perpendicularity N/A Diameter (in) 1.981 Dry Unit Weight (pcf) N/A
 End Planeness N/A Area (in²) 3.081 Moisture Content (%) N/A
 Parallelism N/A

Dimensions were not confirmed.

Loading Rate (lbf/sec) 63
 Peak Load (lbf) 7040

Failure Type Undetermined

Compressive Strength (psi) 2285
 Compressive Strength (psf) 329040
 Compressive Strength (tsf) 165



Comments Fragile nature of specimen inhibited preparation, required capping of ends with Hydro-Stone.
Dimensional tolerances were not confirmed.

PRE TEST



POST TEST



Reviewed By REL

**Uniaxial Compressive Strength
 of Intact Rock Core Specimens**
 ASTM D 7012, Method C

Project Name MEG-33-19.11 Project Number 175578434
 Lithology Sandstone, light brown, slightly strong Lab ID UCR-467
 Hole Number B-013-0-24 Depth (ft) 51.4'-51.8' Date Received 11/07/2024

Temperature (°C) 20.2 Moisture Condition As Prepared, Moist Date Tested 11/21/2024

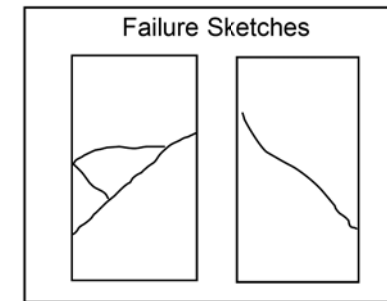
Side Planeness N/A Height (in) 4.127 Wet Unit Weight (pcf) 141.0
 Perpendicularity N/A Diameter (in) 1.997 Dry Unit Weight (pcf) N/A
 End Planeness N/A Area (in²) 3.132 Moisture Content (%) N/A
 Parallelism N/A

Dimensions were not confirmed.

Loading Rate (lbf/sec) 93
 Peak Load (lbf) 12280

Failure Type Cone and Shear

Compressive Strength (psi) 3920
 Compressive Strength (psf) 564480
 Compressive Strength (tsf) 282



Comments Fragile nature of specimen inhibited preparation, required capping of ends with Hydro-Stone.
Dimensional tolerances were not confirmed.

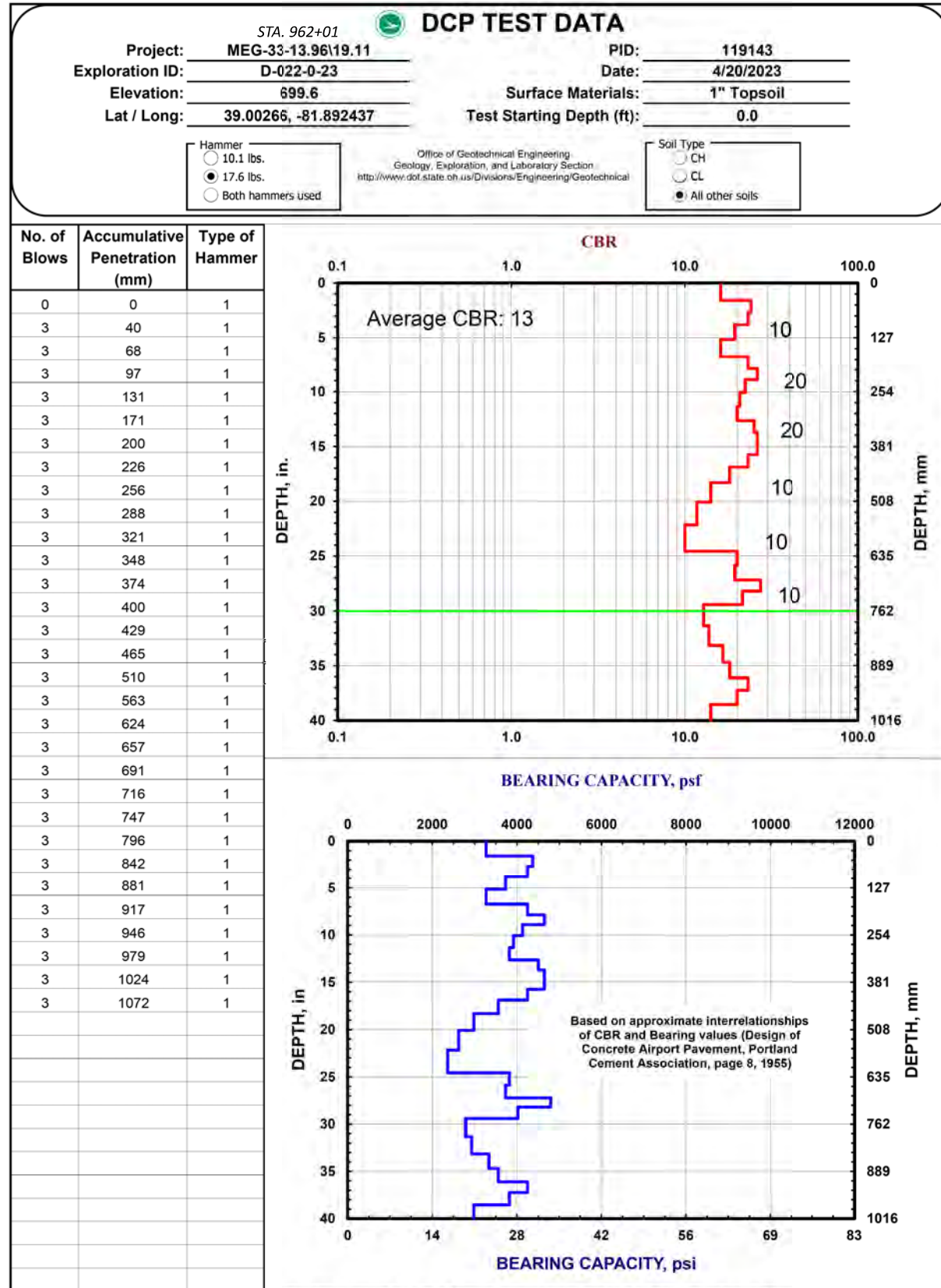
PRE TEST



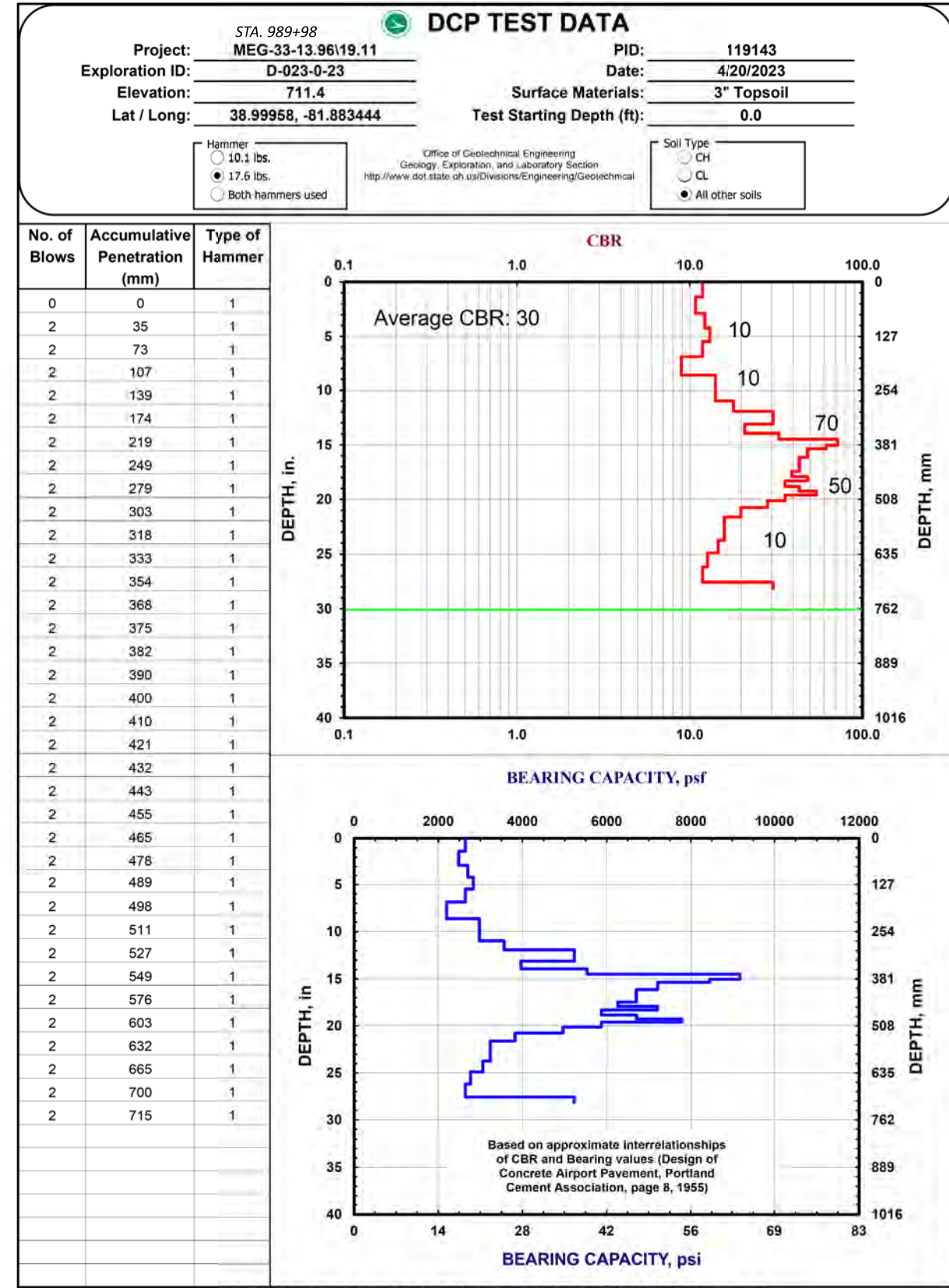
POST TEST



Reviewed By REL



NOTES: Latitude, Longitude & Elevation from OGE GPS unit utilizing the ODOT VRS network.



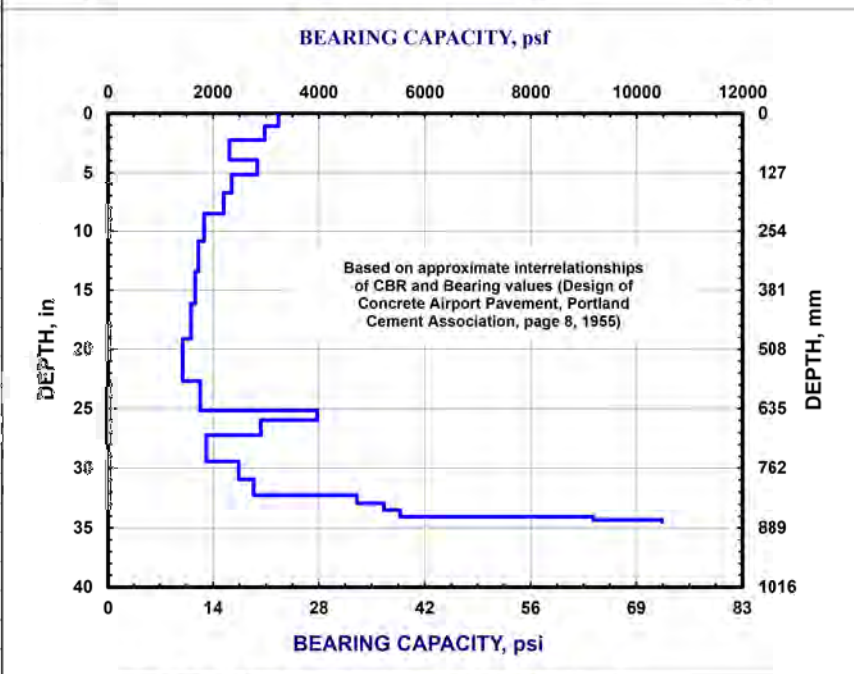
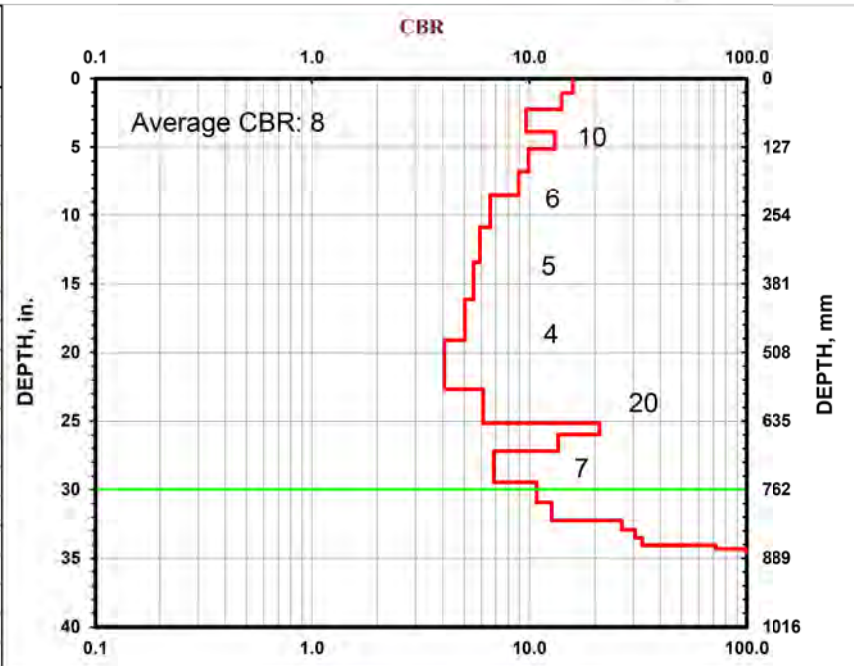
NOTES: Latitude, Longitude & Elevation from OGE GPS unit utilizing the ODOT VRS network.
 Sounding terminated at refusal.

Project: MEG-33-13.9619.11		PID: 119143	
Exploration ID: D-024-0-23		Date: 4/20/2023	
Elevation: 744.0		Surface Materials: 4" Topsoil	
Lat / Long: 38.999151, -81.879972		Test Starting Depth (ft): 0.0	

Hammer: 10.1 lbs. 17.6 lbs. Both hammers used
 Soil Type: CH CL All other soils

Office of Geotechnical Engineering
 Geology, Exploration, and Laboratory Section
<http://www.dot.state.oh.us/Divisions/Engineering/Geotechnical>

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
2	27	1
2	57	1
2	99	1
2	131	1
2	172	1
2	217	1
2	276	1
2	341	1
2	410	1
2	485	1
2	576	1
2	639	1
2	660	1
2	691	1
2	748	1
2	786	1
2	819	1
2	836	1
2	851	1
2	865	1
2	872	1
2	874	1
2	877	1



NOTES: Latitude, Longitude & Elevation from OGE GPS unit utilizing the ODOT VRS network.
 Sounding terminated at refusal.

PROJECT: MEG-33-13.96	DRILLING FIRM / OPERATOR: ODOT / BINKLEY	DRILL RIG: SIMCO 255	STATION / OFFSET: 1000+02, 29.8' LT.	EXPLORATION ID: D-024-0-23
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: ODOT / BINKLEY	HAMMER: SIMCO 255	ALIGNMENT: US 33	PAGE: 1 OF 1
PID: 119143 SFN:	DRILLING METHOD: 3.5" SSA	CALIBRATION DATE: N/A	ELEVATION: 744.0 (ft) EOB: 2.5 ft.	
START: 4/20/23 END: 4/20/23	SAMPLING METHOD: CUTTINGS	ENERGY RATIO (%):	LAT / LONG: 38.999151, -81.879972	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI		
TOPSOIL (4")	744.0																
RED, SILTY CLAY, TRACE SAND, DAMP	743.7																
		1				AS-1		0	2	7	39	52	37	21	16	15	A-6b (10)
@1.5' LITTLE SAND		2				AS-2		0	3	13	36	48	37	21	16	17	A-6b (10)
	741.5	EOB															

NOTES: LAT/LONG/ELEV FROM OGE HANDHELD GPS UNIT. HOLE DRY UPON COMPLETION.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

DESIGN AGENCY

10200 Alliance Road, Suite 300
 Cincinnati, OH 45242
 (513) 842-8200

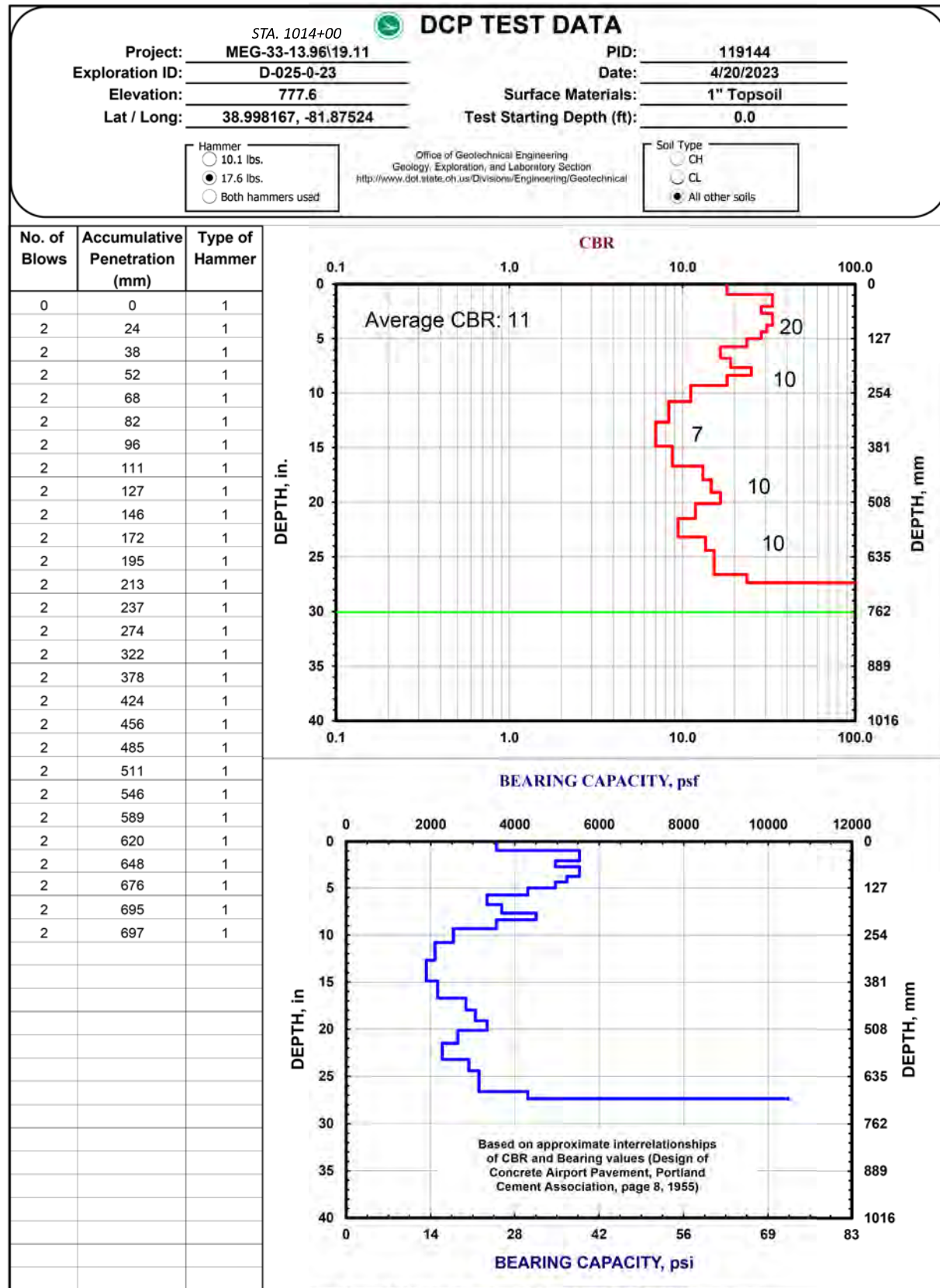
DESIGNER: MSJ

REVIEWER: EMK 11-22-24

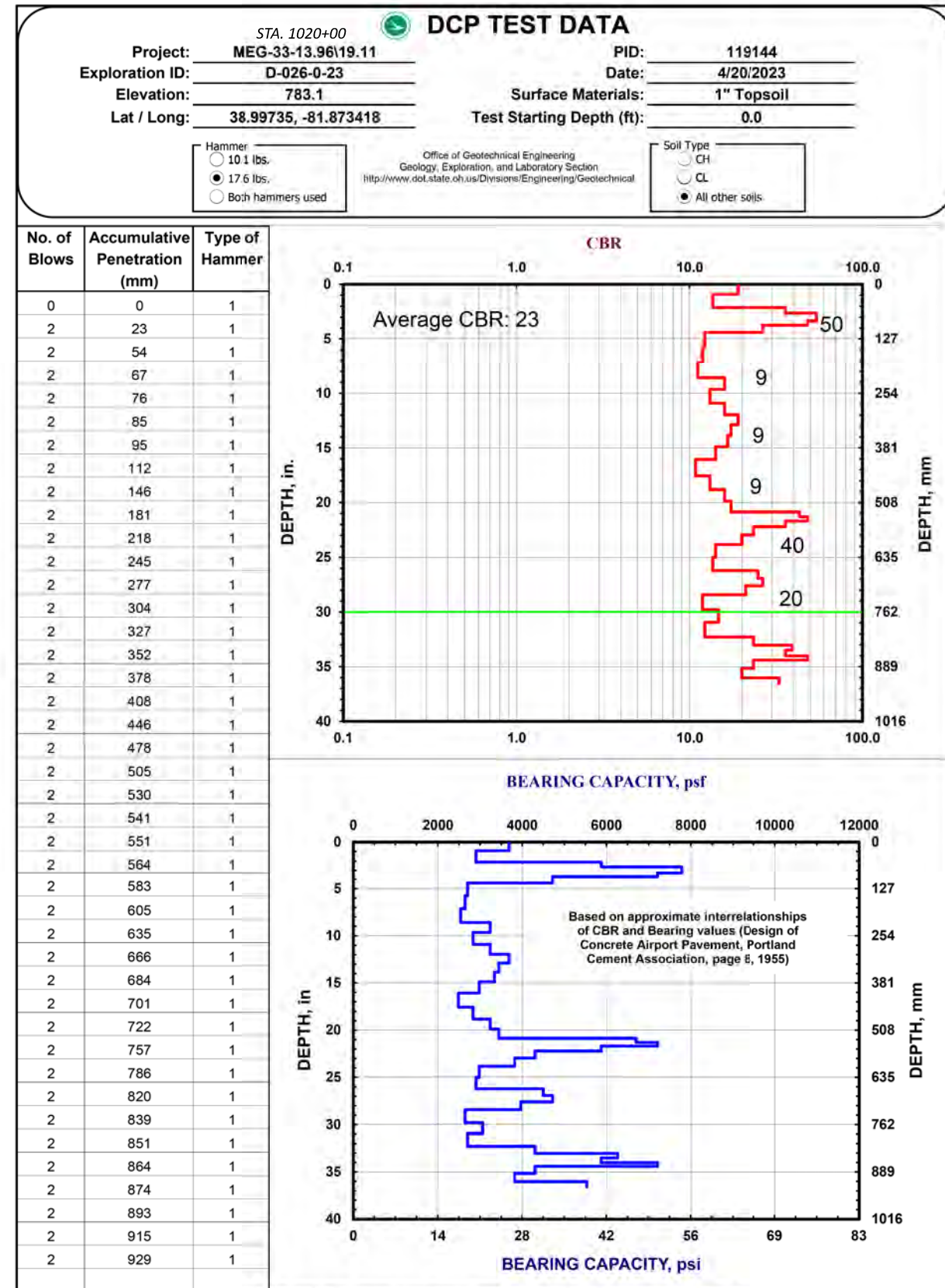
PROJECT ID: 119144

SUBSET	TOTAL
0	0

SHEET	TOTAL
P.916	940



NOTES: Latitude, Longitude & Elevation from OGE GPS unit utilizing the ODOT VRS network.
 Sounding terminated at refusal.



NOTES: Latitude, Longitude & Elevation from OGE GPS unit utilizing the ODOT VRS network.
 Sounding terminated at refusal.

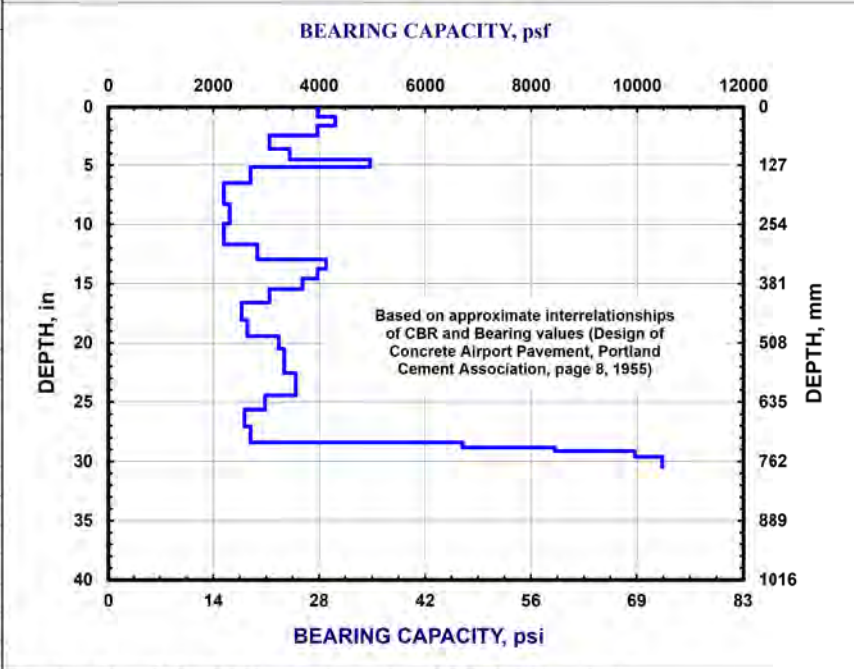
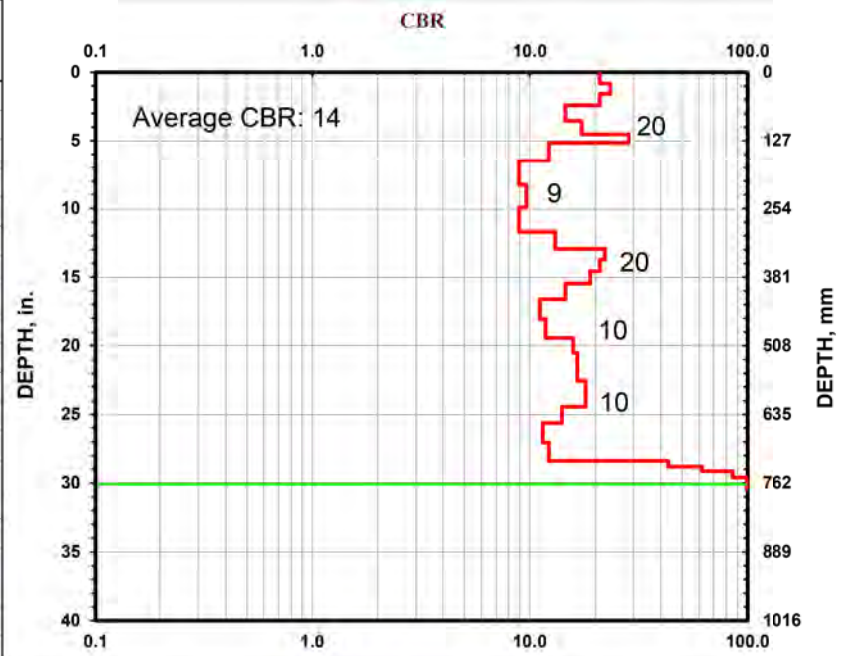
DCP TEST DATA

Project: MEG-33-13.96\19.11 PID: 119144
 Exploration ID: D-027-0-23 Date: 4/20/2023
 Elevation: 783.6 Surface Materials: 2" Topsoil
 Lat / Long: 38.995897, -81.871344 Test Starting Depth (ft): 0.0

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 http://www.dot.state.oh.us/Divisions/Engineering/Geotechnical

Soil Type:
 CH
 CL
 All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
2	21	1
2	40	1
2	61	1
2	90	1
2	115	1
2	131	1
2	165	1
2	210	1
2	252	1
2	297	1
2	329	1
2	349	1
2	370	1
2	393	1
2	422	1
2	459	1
2	494	1
2	521	1
2	547	1
2	573	1
2	597	1
2	621	1
2	651	1
2	687	1
2	721	1
2	732	1
2	740	1
2	746	1
2	752	1
2	757	1
2	762	1
2	767	1
2	771	1
2	774	1



NOTES: Latitude, Longitude & Elevation from OGE GPS unit utilizing the ODOT VRS network.
 Sounding terminated at refusal.

PROJECT: MEG-33-19.11		DRILLING FIRM / OPERATOR: ODOT / BINKLEY		DRILL RIG: SIMCO 255		STATION / OFFSET: 1027+98.12.6' RT.		EXPLORATION ID: D-027-0-23											
TYPE: ROADWAY		SAMPLING FIRM / LOGGER: ODOT / BINKLEY		HAMMER: SIMCO 255		ALIGNMENT: US 33		PAGE: 1 OF 1											
PID: 119144 SFN:		DRILLING METHOD: 3.5" SSA		CALIBRATION DATE: N/A		ELEVATION: 783.6 (ft) EOB: 2.5 ft.		LAT / LONG: 38.995897, -81.871344											
START: 4/20/23 END: 4/20/23		SAMPLING METHOD: CUTTINGS		ENERGY RATIO (%):															
MATERIAL DESCRIPTION AND NOTES		ELEV.	DEPTHS	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG	ODOT CLASS (G)	BACK FILL			
TOPSOIL (2")		783.6							GR	CS	FS	SI	CL	LL	PL	PI	WC		
RED, SILTY CLAY, LITTLE SAND, DAMP		783.4																	
			1				AS-1	0	5	10	41	44	37	18	19	12		A-6b (12)	
			2				AS-2	0	6	10	37	47	37	18	19	12		A-6b (12)	
		781.1																	
NOTES: NONE																			
ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS																			

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT.GDT - 5/22/23.09.04 - X:\GINT\PROJECTS\601058.GPJ

DCP TEST DATA

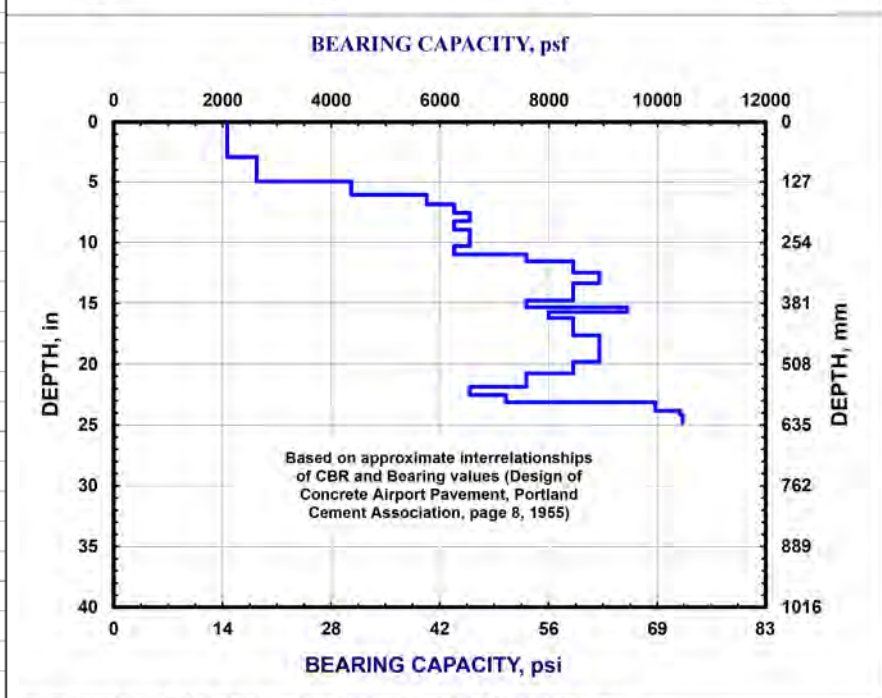
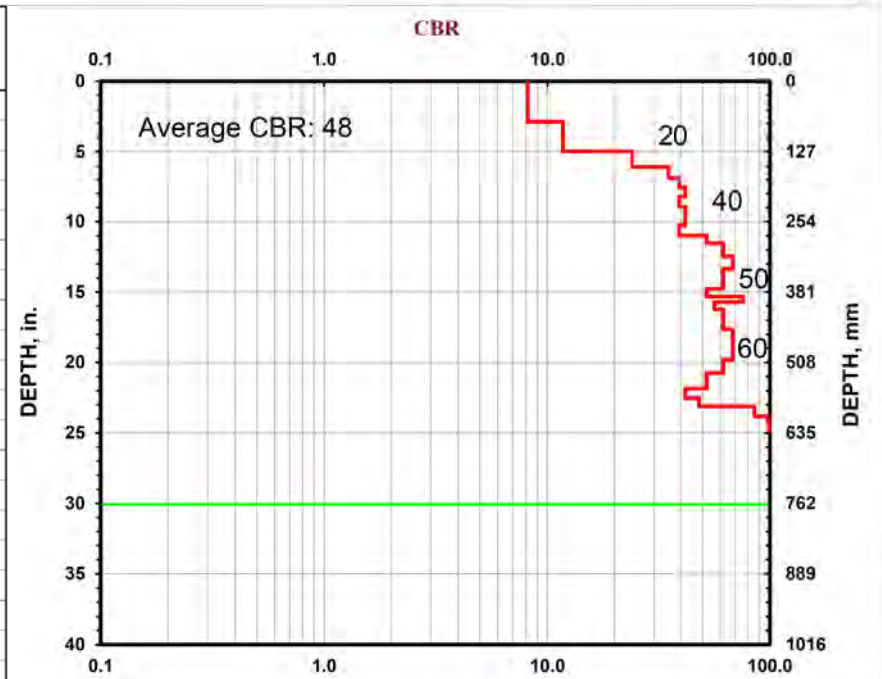
Project: STA. 1041+00
MEG-33-13.96\19.11 PID: 119144
 Exploration ID: D-028-0-23 Date: 4/20/2023
 Elevation: 766.4 Surface Materials: 1" Topsoil
 Lat / Long: 38.992906, -81.868867 Test Starting Depth (ft): 0.0

Hammer: 10.1 lbs. 17.6 lbs. Both hammers used

Soil Type: CH CL All other soils

Office of Geotechnical Engineering
 Geology, Exploration, and Laboratory Section
 http://www.dot.state.oh.us/Divisions/Engineering/Geotechnical

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
3	73	1
3	126	1
3	154	1
3	174	1
3	192	1
3	209	1
3	227	1
3	244	1
3	261	1
3	279	1
3	293	1
3	305	1
3	317	1
3	328	1
3	339	1
3	351	1
3	363	1
3	375	1
3	389	1
3	399	1
3	412	1
3	424	1
3	436	1
3	448	1
3	459	1
3	470	1
3	481	1
3	492	1
3	503	1
3	515	1
3	527	1
3	541	1
3	555	1
3	572	1
3	587	1
3	596	1
3	605	1
3	613	1
3	619	1
3	626	1
3	631	1
3	637	1



NOTES: Latitude, Longitude & Elevation from OGE GPS unit utilizing the ODOT VRS network.
 Sounding terminated at refusal.

DCP TEST DATA

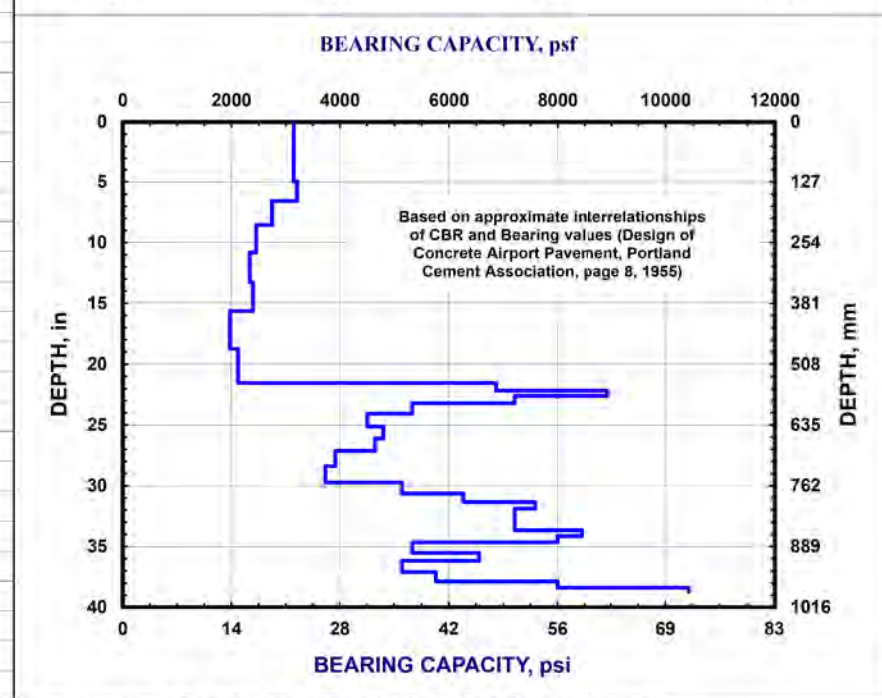
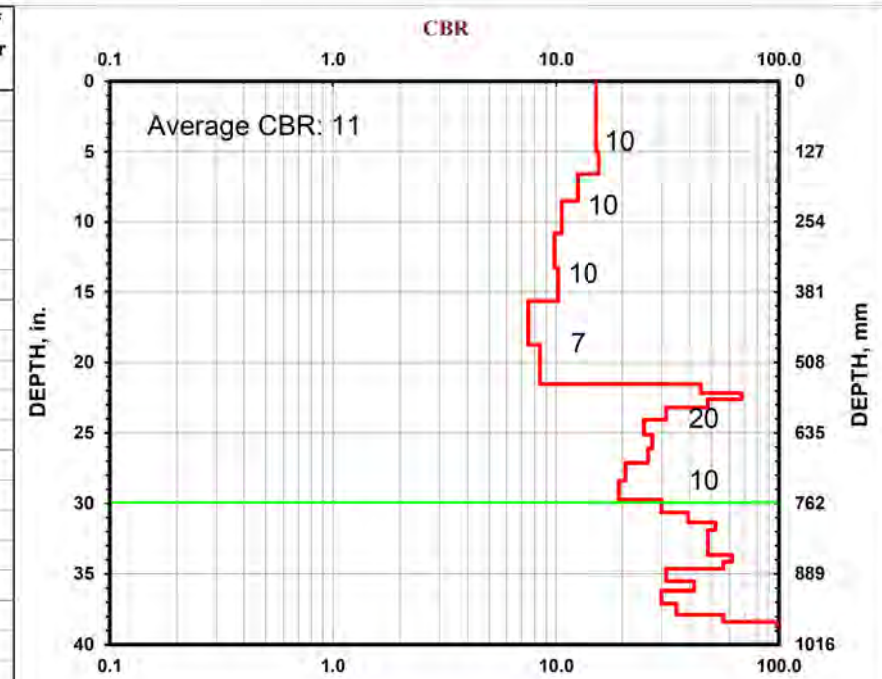
Project: STA. 1053+00
MEG-33-13.96\19.11 PID: 119144
 Exploration ID: D-029-0-23 Date: 4/20/2023
 Elevation: 748.0 Surface Materials: 4" Topsoil
 Lat / Long: 38.989959, -81.867007 Test Starting Depth (ft): 0.0

Hammer: 10.1 lbs. 17.6 lbs. Both hammers used

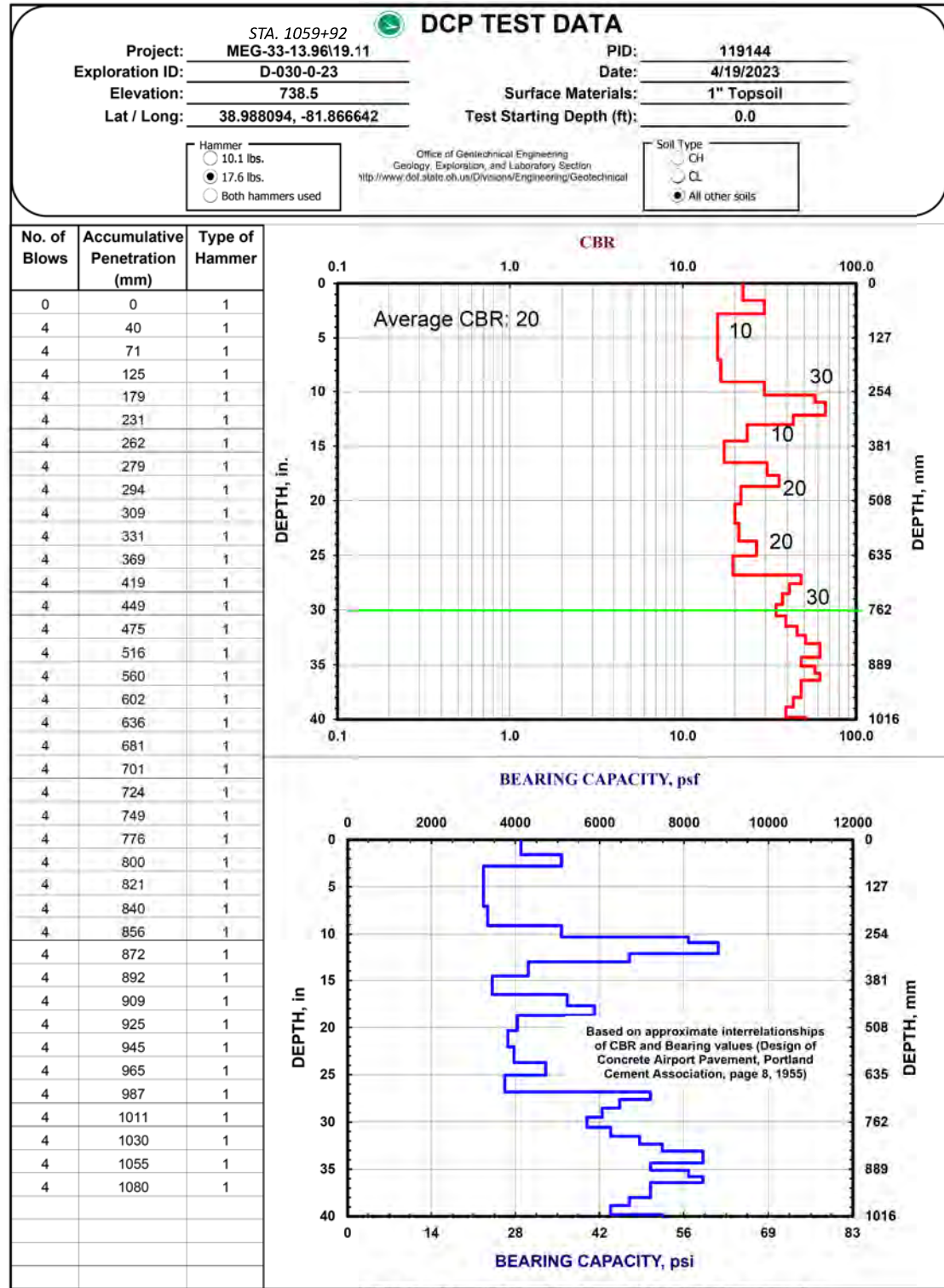
Soil Type: CH CL All other soils

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No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
3	42	1
3	84	1
3	126	1
3	167	1
3	217	1
3	275	1
3	337	1
3	397	1
3	476	1
3	547	1
3	563	1
3	574	1
3	589	1
3	611	1
3	638	1
3	663	1
3	689	1
3	721	1
3	755	1
3	778	1
3	796	1
3	810	1
3	825	1
3	840	1
3	855	1
3	867	1
3	880	1
3	902	1
3	919	1
3	942	1
3	962	1
3	975	1
3	983	1



NOTES: Latitude, Longitude & Elevation from OGE GPS unit utilizing the ODOT VRS network.
 Sounding terminated at refusal.



NOTES: Latitude & Longitude from OGE handheld GPS unit. Elevation from USGS 3DEP map service.

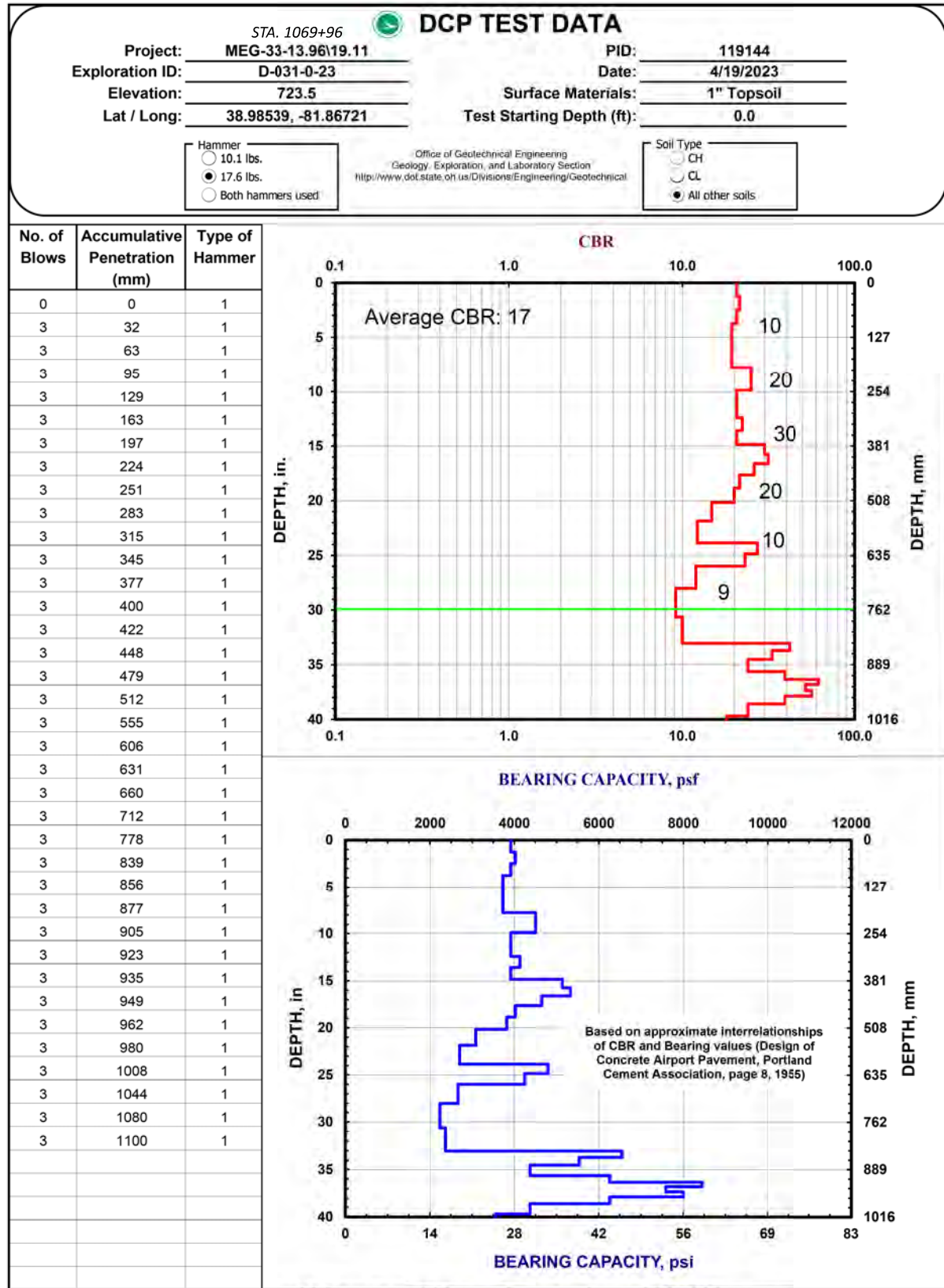
PROJECT: MEG-33-19.11	DRILLING FIRM / OPERATOR: ODOT / BINKLEY	DRILL RIG: SIMCO 255	STATION / OFFSET: 1059+92, 7.2' RT.	EXPLORATION ID: D-030-0-23
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: ODOT / BINKLEY	HAMMER: N/A	ALIGNMENT: US 33	PAGE 1 OF 1
PID: 119144 SFN:	DRILLING METHOD: 3.5" SSA	CALIBRATION DATE: N/A	ELEVATION: 739.8 (ft) EOB: 2.5 ft	
START: 4/19/23 END: 4/19/23	SAMPLING METHOD: CUTTINGS	ENERGY RATIO (%):	LAT / LONG: 38.988094, -81.866642	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
TOPSOIL (1") REDDISH BROWN, SILTY CLAY, LITTLE SAND, TRACE GRAVEL AND STONE FRAGMENTS, DAMP	739.8																	
	739.7																	
		1				AS-1		5	6	7	41	41	34	18	16	10	A-6b (10)	
@1.5'; SOME GRAVEL AND STONE FRAGMENTS																		
		2				AS-2		21	6	8	31	34	34	18	16	10	A-6b (8)	
	737.3	EOB																

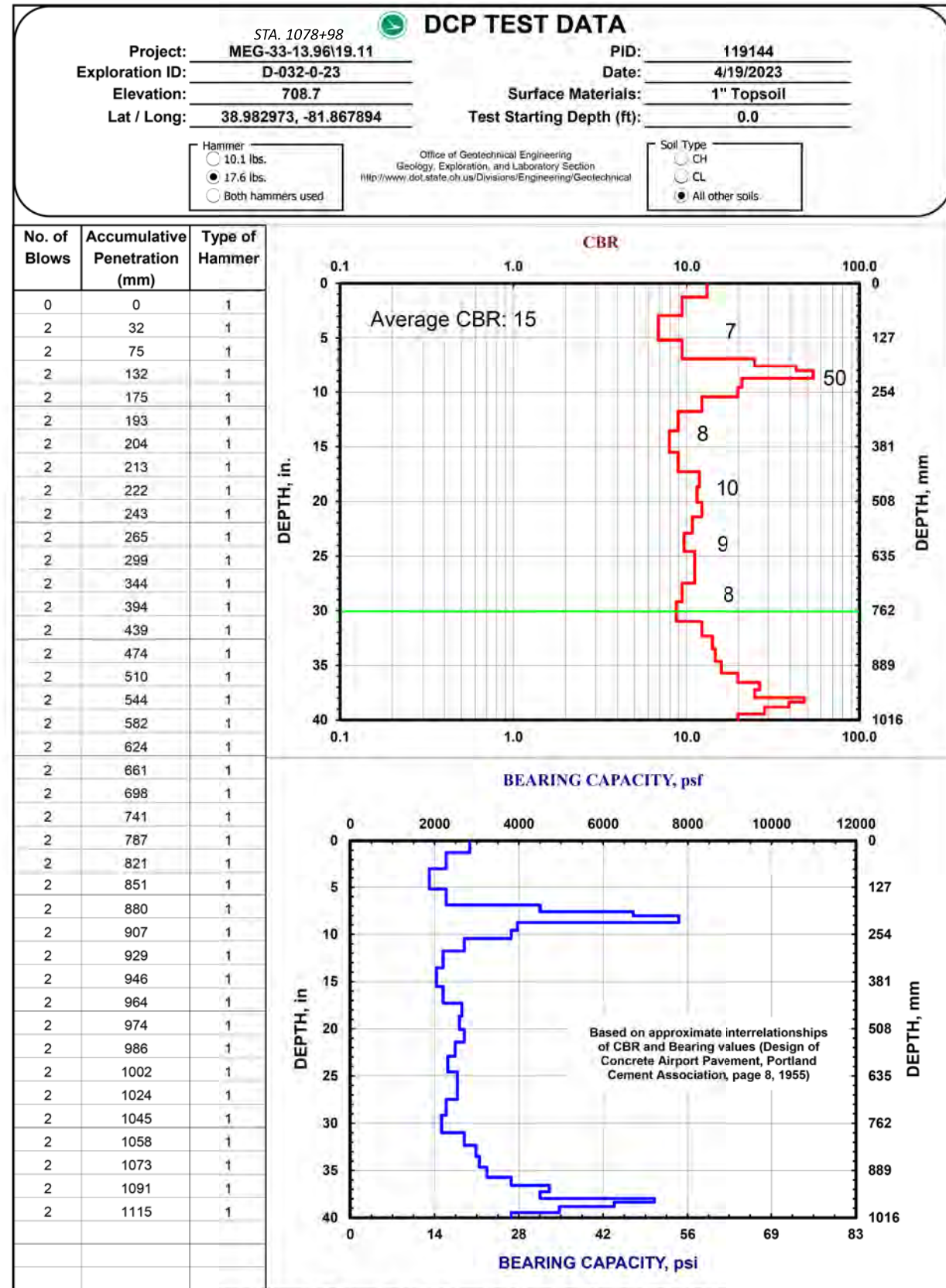
NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT.GDT - 5/2/23 09:05 - X:\GINT\PROJECTS\601058.GPJ



NOTES: Latitude & Longitude from OGE handheld GPS unit. Elevation from USGS 3DEP map service.

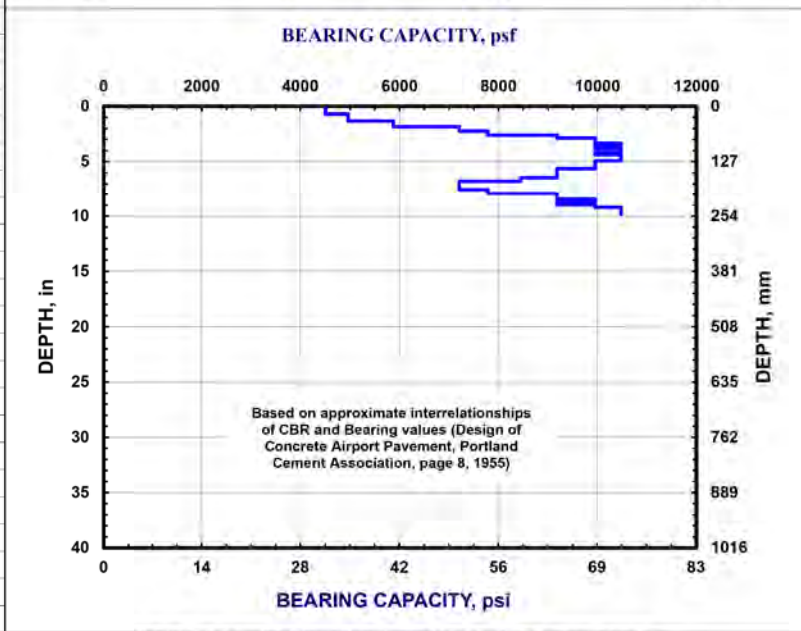


NOTES: Latitude & Longitude from OGE handheld GPS unit. Elevation from USGS 3DEP map service.

Project: STA. 1093+88 MEG-33-13.96\19.11		PID: 119144	
Exploration ID: D-033-0-23		Date: 4/19/2023	
Elevation: 686.0		Surface Materials: 1" Topsoil	
Lat / Long: 38.978986, -81.867078		Test Starting Depth (ft): 0.0	

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No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
2	18	1
2	34	1
2	47	1
2	57	1
2	66	1
2	73	1
2	79	1
2	85	1
2	90	1
2	96	1
2	101	1
2	105	1
2	111	1
2	116	1
2	120	1
2	125	1
2	131	1
2	137	1
2	143	1
2	150	1
2	157	1
2	164	1
2	172	1
2	182	1
2	192	1
2	201	1
2	208	1
2	215	1
2	221	1
2	228	1
2	234	1
2	238	1
2	242	1
2	245	1
2	249	1

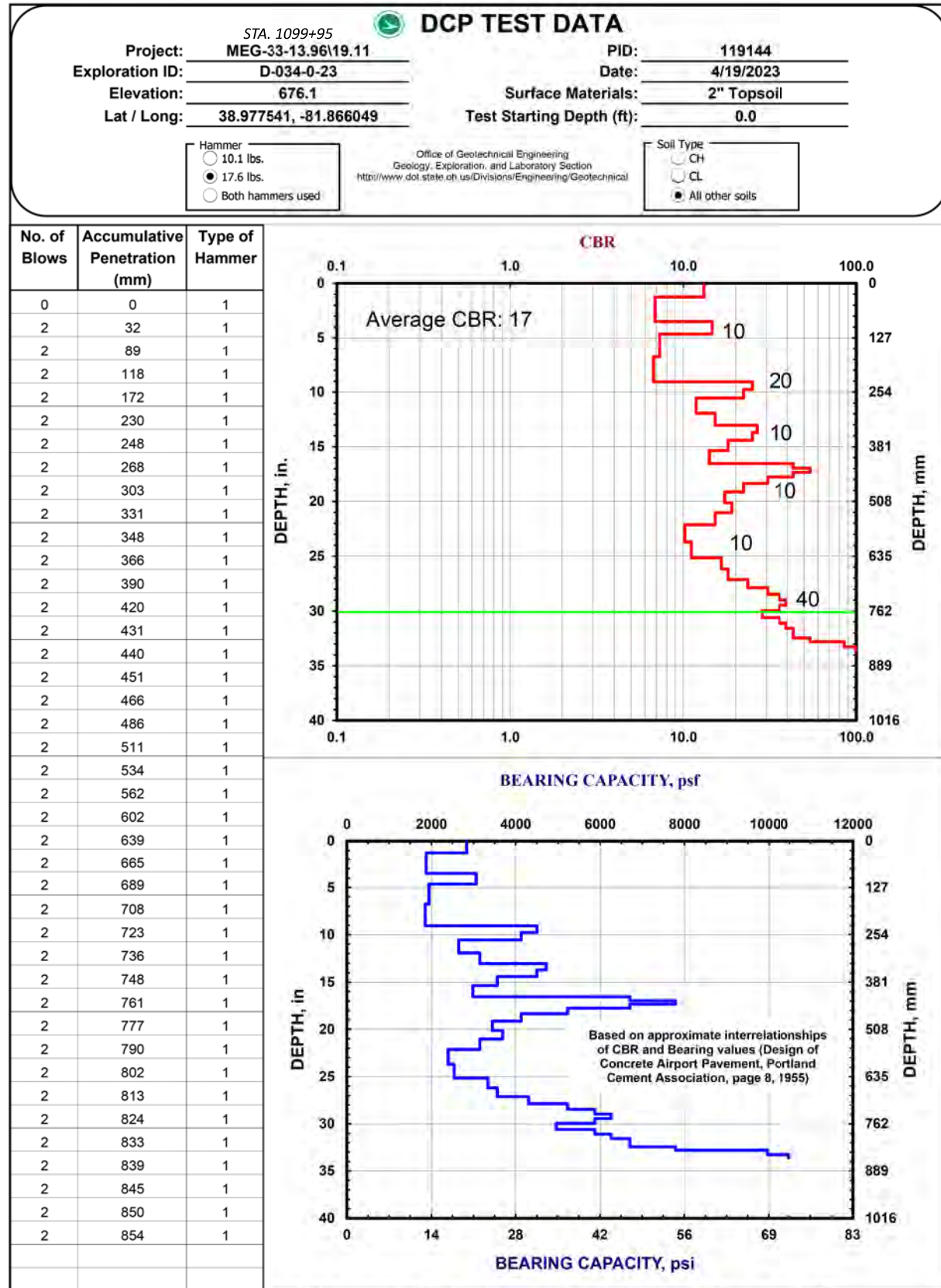


NOTES: Latitude & Longitude from OGE handheld GPS unit. Elevation from USGS 3DEP map service. Sounding terminated at refusal.

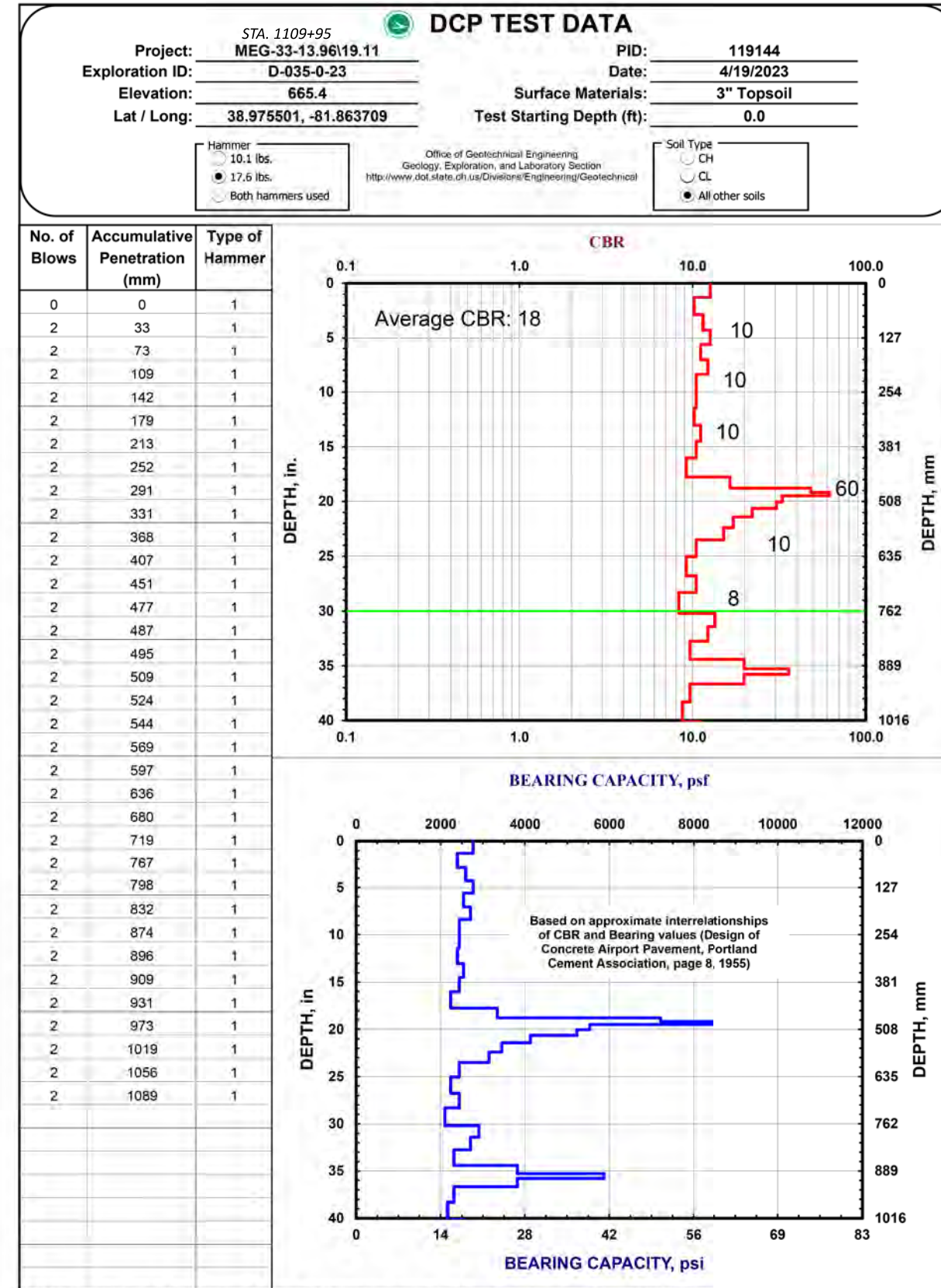
PROJECT: MEG-33-19.11	DRILLING FIRM / OPERATOR: ODOT / BINKLEY	DRILL RIG: SIMCO 255	STATION / OFFSET: 1093+88, 15.9' LT.	EXPLORATION ID: D-033-0-23
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: ODOT / BINKLEY	HAMMER: SIMCO 255	ALIGNMENT: US 33	PAGE: 1 OF 1
PID: 119144 SFN: 119144	DRILLING METHOD: 3.5" SSA	CALIBRATION DATE: N/A	ELEVATION: 681.3 (ft) EOB: 2.5 ft	
START: 4/19/23 END: 4/19/23	SAMPLING METHOD: CUTTINGS	ENERGY RATIO (%):	LAT / LONG: 38.978986, -81.867078	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
TOPSOIL (1") YELLOWISH BROWN, GRAVEL AND STONE FRAGMENTS WITH SAND AND SILT, LITTLE CLAY, DAMP	681.3																	
	681.2																	
		1				AS-1		34	7	24	24	11	25	18	7	5		A-2-4 (0)
		2				AS-2		47	7	15	20	11	27	17	10	6		A-2-4 (0)
	678.8																	

NOTES: NONE
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS



NOTES: Latitude & Longitude from OGE handheld GPS unit. Elevation from USGS 3DEP map service.
 Sounding terminated at refusal.



NOTES: Latitude & Longitude from OGE handheld GPS unit. Elevation from USGS 3DEP map service.

DCP TEST DATA

Project: STA. 1126+00
 Exploration ID: MEG-33-13.96\19.11
 Elevation: 697.6
 Lat / Long: 38.97264, -81.859445

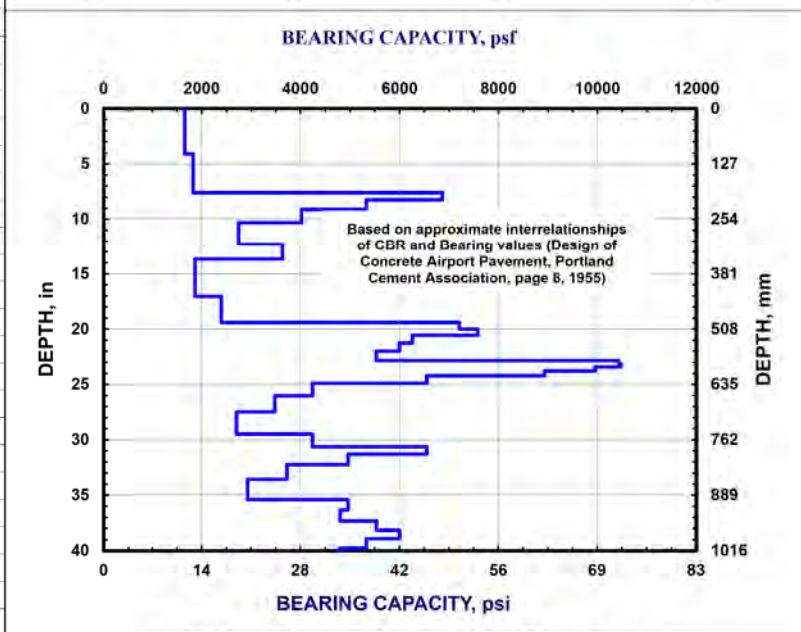
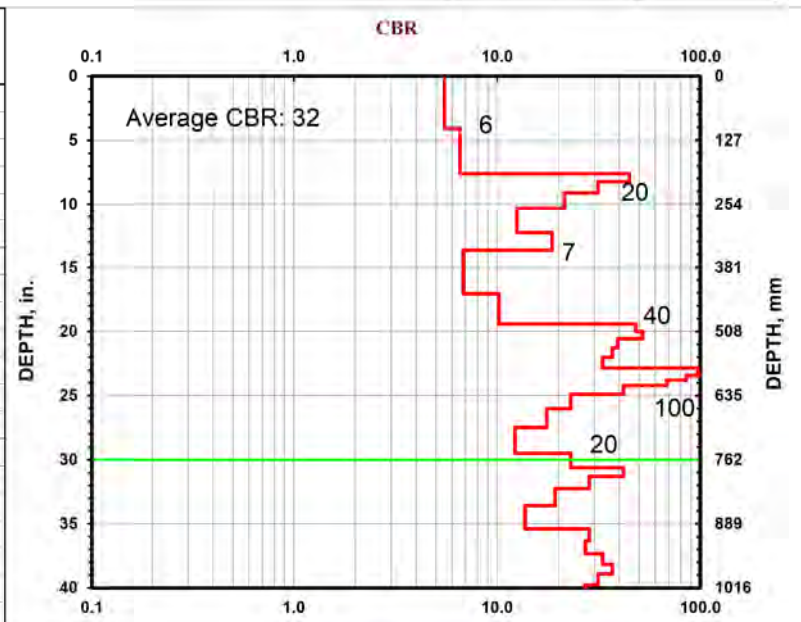
PID: 119144
 Date: 4/19/2023
 Surface Materials: 4" Topsoil
 Test Starting Depth (ft): 0.0

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 http://www.dot.mt.gov/Divisions/Engineering/Geotechnical

Soil Type:
 CH
 CL
 All other soils

Hammer:
 10.1 lbs.
 17.6 lbs.
 Both hammers used

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
3	104	1
3	193	1
3	209	1
3	231	1
3	262	1
3	312	1
3	347	1
3	433	1
3	493	1
3	508	1
3	522	1
3	540	1
3	559	1
3	580	1
3	588	1
3	595	1
3	604	1
3	615	1
3	632	1
3	661	1
3	698	1
3	749	1
3	778	1
3	795	1
3	819	1
3	853	1
3	899	1
3	923	1
3	948	1
3	969	1
3	988	1
3	1010	1
3	1035	1
3	1065	1

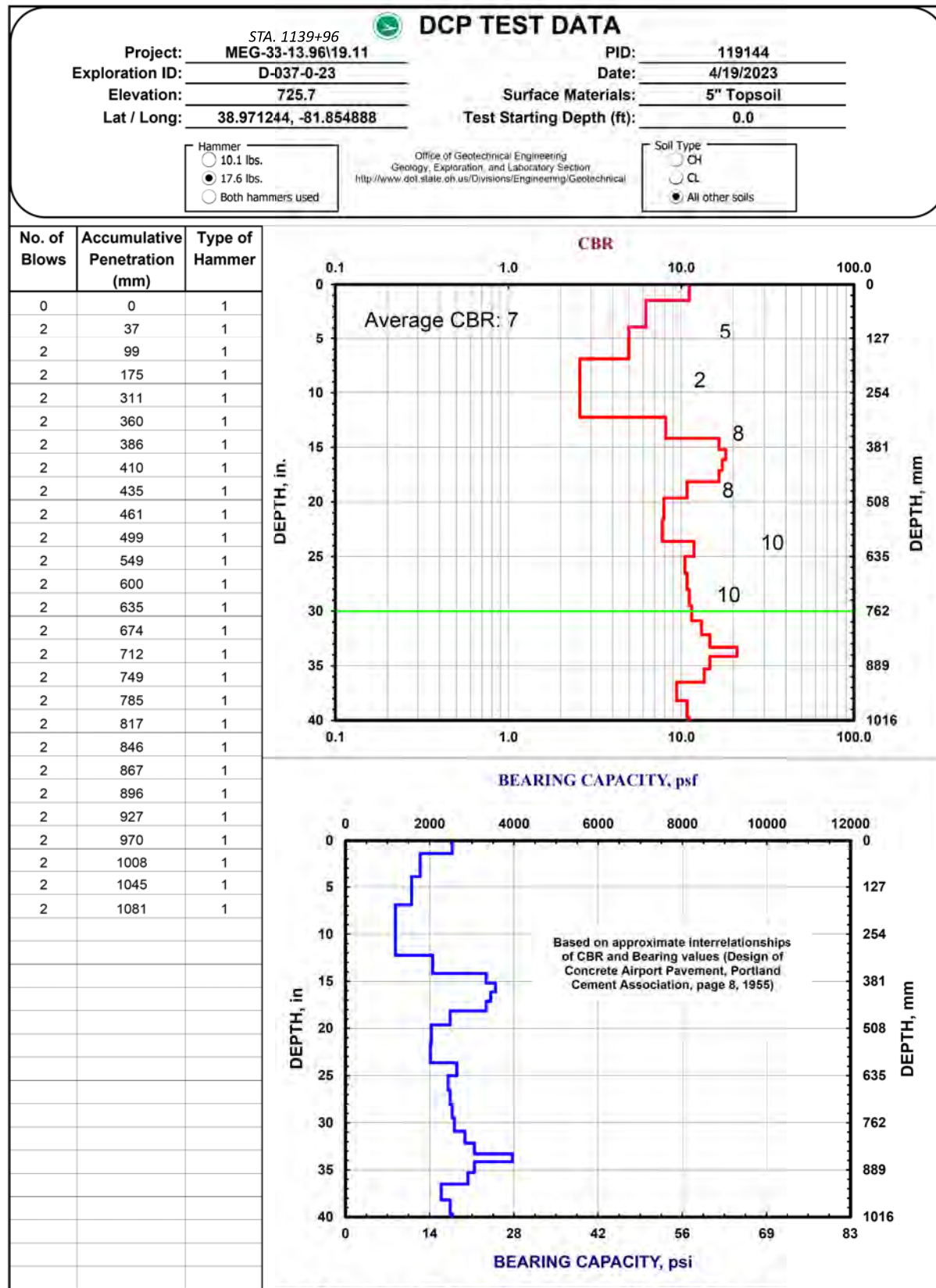


NOTES: Latitude & Longitude from OGE handheld GPS unit. Elevation from USGS 3DEP map service.

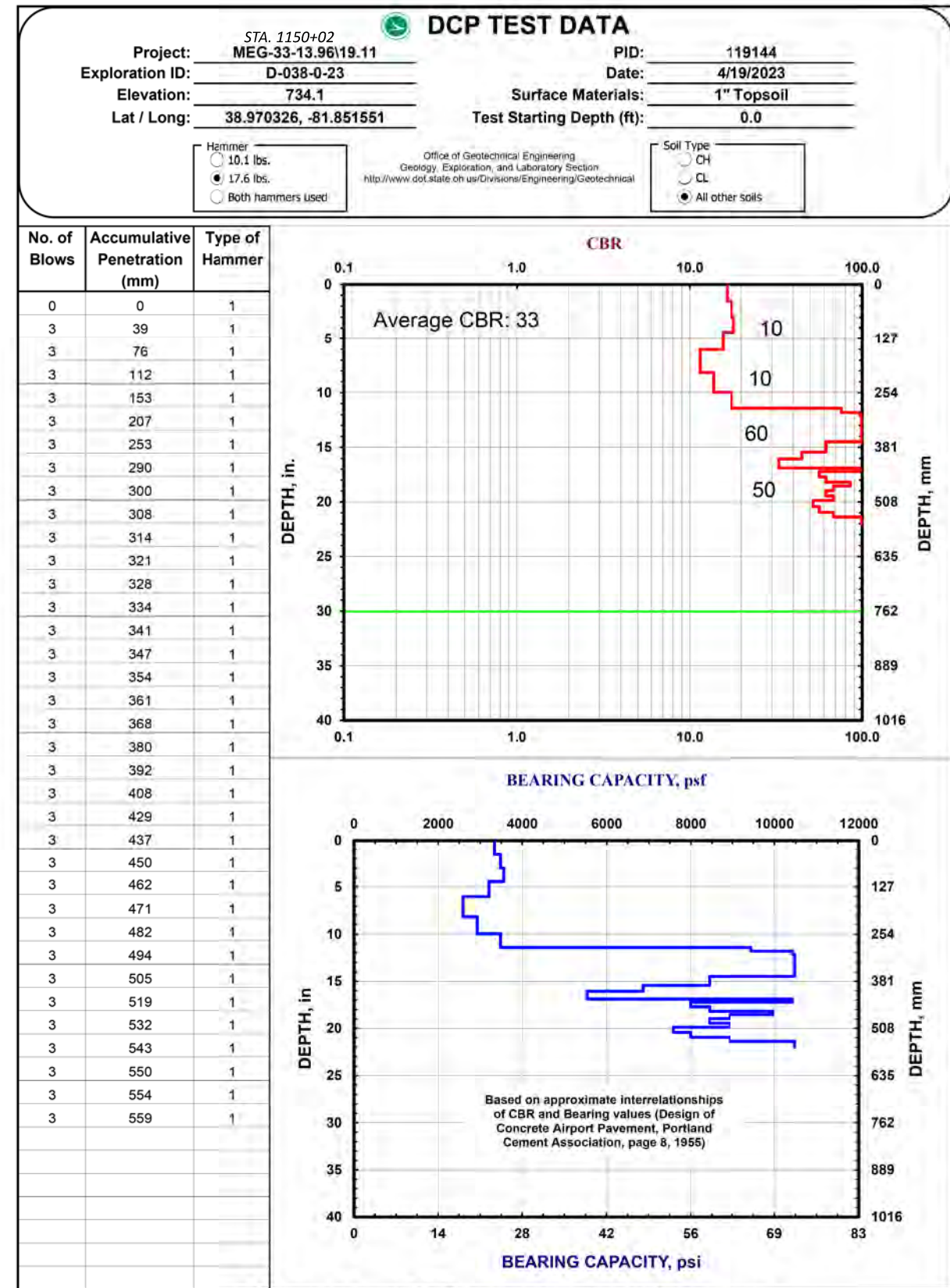
STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT.GDT - 5/2/23 09:05 - X:\GINT\PROJECTS\601058.GPJ

PROJECT: MEG-33-19.11		DRILLING FIRM / OPERATOR: ODOT / BINKLEY		DRILL RIG: SIMCO 255		STATION / OFFSET: 1126+00, 7.5' LT.		EXPLORATION ID: D-036-0-23												
TYPE: ROADWAY		SAMPLING FIRM / LOGGER: ODOT / BINKLEY		HAMMER: ODOT / BINKLEY		ALIGNMENT: US 33		PAGE: 1 OF 1												
PID: 119144 SFN:		DRILLING METHOD: 3.5" SSA		CALIBRATION DATE: N/A		ELEVATION: 696.3 (ft) EOB: 2.5 ft.														
START: 4/19/23 END: 4/19/23		SAMPLING METHOD: CUTTINGS		ENERGY RATIO (%):		LAT / LONG: 38.972640, -81.859445														
MATERIAL DESCRIPTION AND NOTES		ELEV.	DEPTHS	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)				ATTERBERG			WC	ODOT CLASS (G)	BACK FILL		
TOPSOIL (4")		696.3							GR	CS	FS	SI	CL	LL	PL	PI				
OLIVE GRAY, SANDY SILT, SOME CLAY, TRACE GRAVEL AND STONE FRAGMENTS, DAMP		696.0																		
			1				AS-1		8	4	22	38	28	28	18	10	14	A-4a (6)		
			2				AS-2		6	6	23	37	28	27	17	10	13	A-4a (6)		
		693.8	EOB																	

NOTES: NONE
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS



NOTES: Latitude & Longitude from OGE handheld GPS unit. Elevation from USGS 3DEP map service.



NOTES: Latitude, Longitude & Elevation from OGE GPS unit utilizing the ODOT VRS network. Sounding terminated at refusal.



DESIGNER: MSJ

REVIEWER: EMK 11-22-24

PROJECT ID	119144
SUBSET	TOTAL
0	0
SHEET	TOTAL
P.925	940

DCP TEST DATA

Project: STA. 1157+99
 MEG-33-13.96\19.11
 Exploration ID: D-039-0-23
 Elevation: 733.9
 Lat / Long: 38.969269, -81.849114

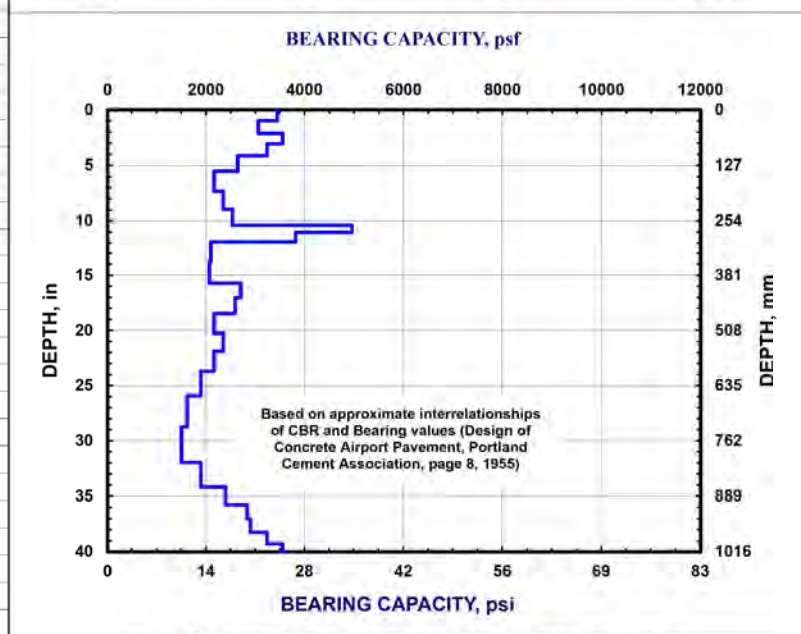
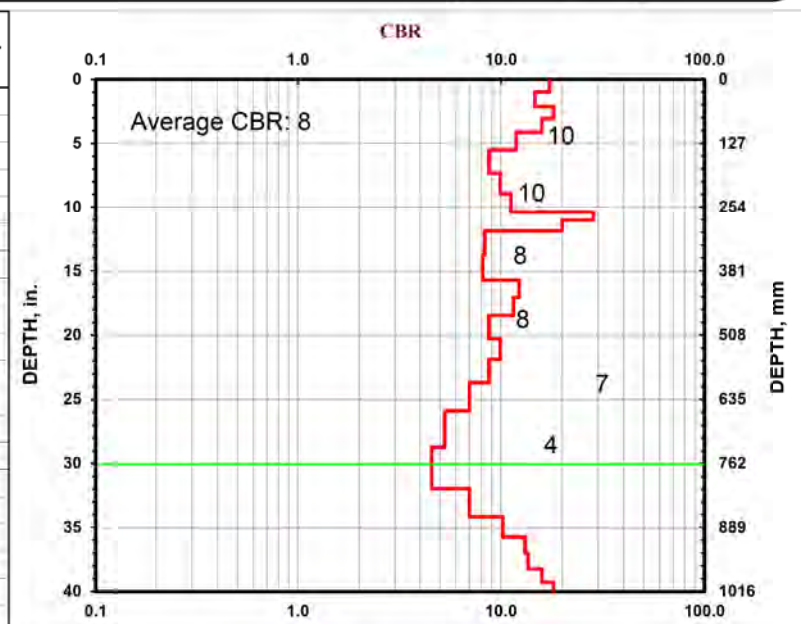
PID: 119144
 Date: 4/19/2023
 Surface Materials: 4" Topsoil
 Test Starting Depth (ft): 0.0

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Soil Type:
 CH
 CL
 All other soils

Hammer:
 10.1 lbs.
 17.6 lbs.
 Both hammers used

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
2	25	1
2	54	1
2	78	1
2	105	1
2	140	1
2	186	1
2	227	1
2	264	1
2	280	1
2	302	1
2	350	1
2	399	1
2	433	1
2	469	1
2	515	1
2	556	1
2	602	1
2	658	1
2	730	1
2	812	1
2	868	1
2	908	1
2	940	1
2	971	1
2	998	1
2	1022	1
2	1044	1
2	1064	1
2	1083	1
2	1107	1



NOTES: Latitude & Longitude from OGE handheld GPS unit. Elevation from USGS 3DEP map service.
 Sounding terminated at refusal.

PROJECT:	MEG-33-19.11	DRILLING FIRM / OPERATOR:	ODOT / BINKLEY	DRILL RIG:	SIMCO 255	STATION / OFFSET:	1157+99, 6.0' RT.	EXPLORATION ID	D-039-0-23												
TYPE:	ROADWAY	SAMPLING FIRM / LOGGER:	ODOT / BINKLEY	HAMMER:		ALIGNMENT:	US 33	PAGE	1 OF 1												
PID:	119144 SFN:	DRILLING METHOD:	3.5" SSA	CALIBRATION DATE:	N/A	ELEVATION:	733.7 (ft) EOB: 2.5 ft														
START:	4/19/23	END:	4/19/23	SAMPLING METHOD:	CUTTINGS	LAT / LONG:	38.969269, -81.849114														
MATERIAL DESCRIPTION AND NOTES		ELEV.	DEPTHS	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL		
TOPSOIL (4")		733.7							GR	CS	FS	SI	CL	LL	PL	PI					
REDDISH BROWN, SILT AND CLAY, SOME SAND, MOIST		733.4																			
@1.5'; LITTLE SAND, TRACE GRAVEL AND STONE FRAGMENTS		731.2	EOB																		
NOTES: NONE																					
ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS																					

DESIGN AGENCY

10200 Alliance Road,
 Suite 300
 Cincinnati, OH 45242
 (513) 842-8200

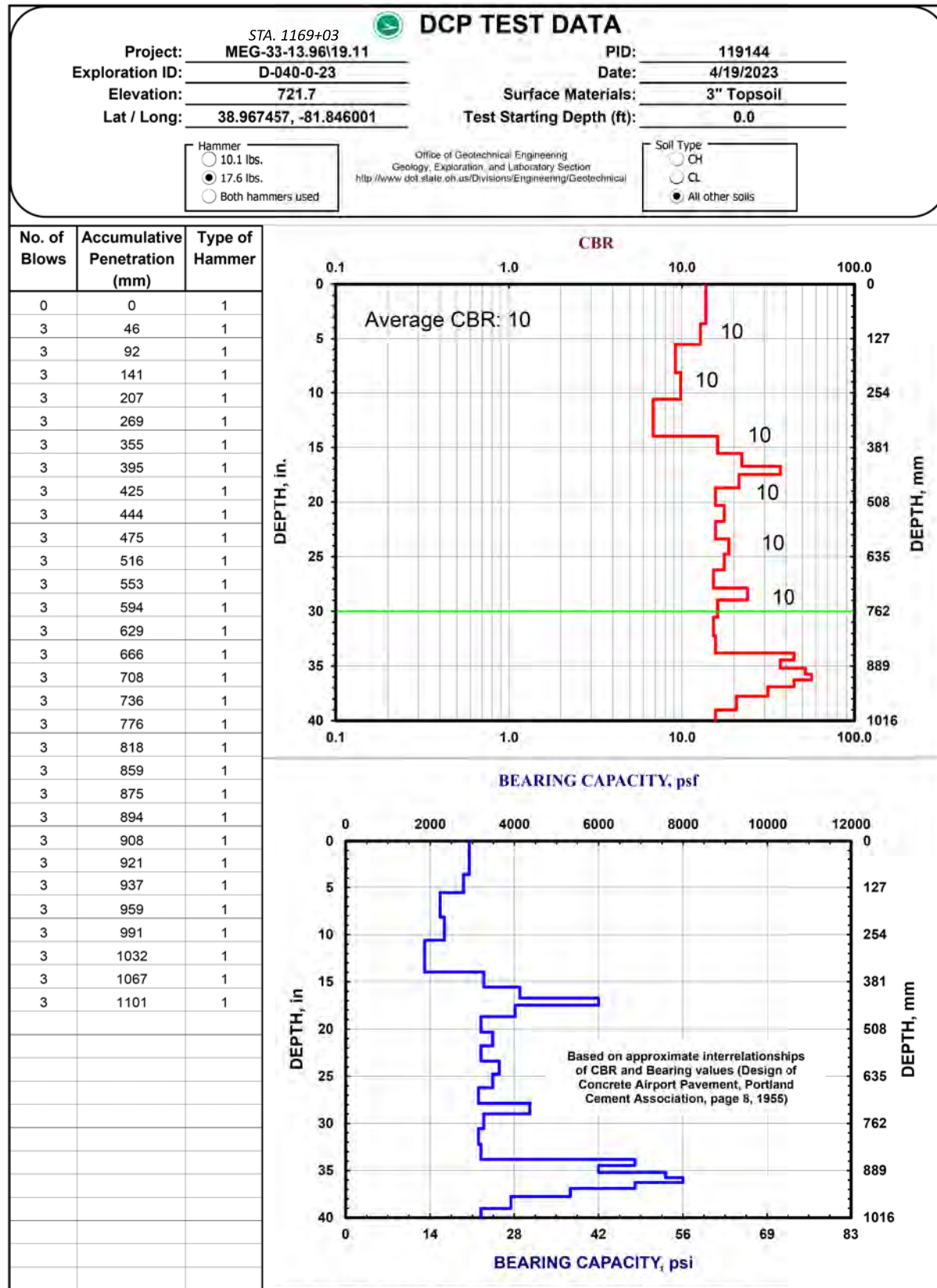
DESIGNER
 MSJ

REVIEWER
 EMK 11-22-24

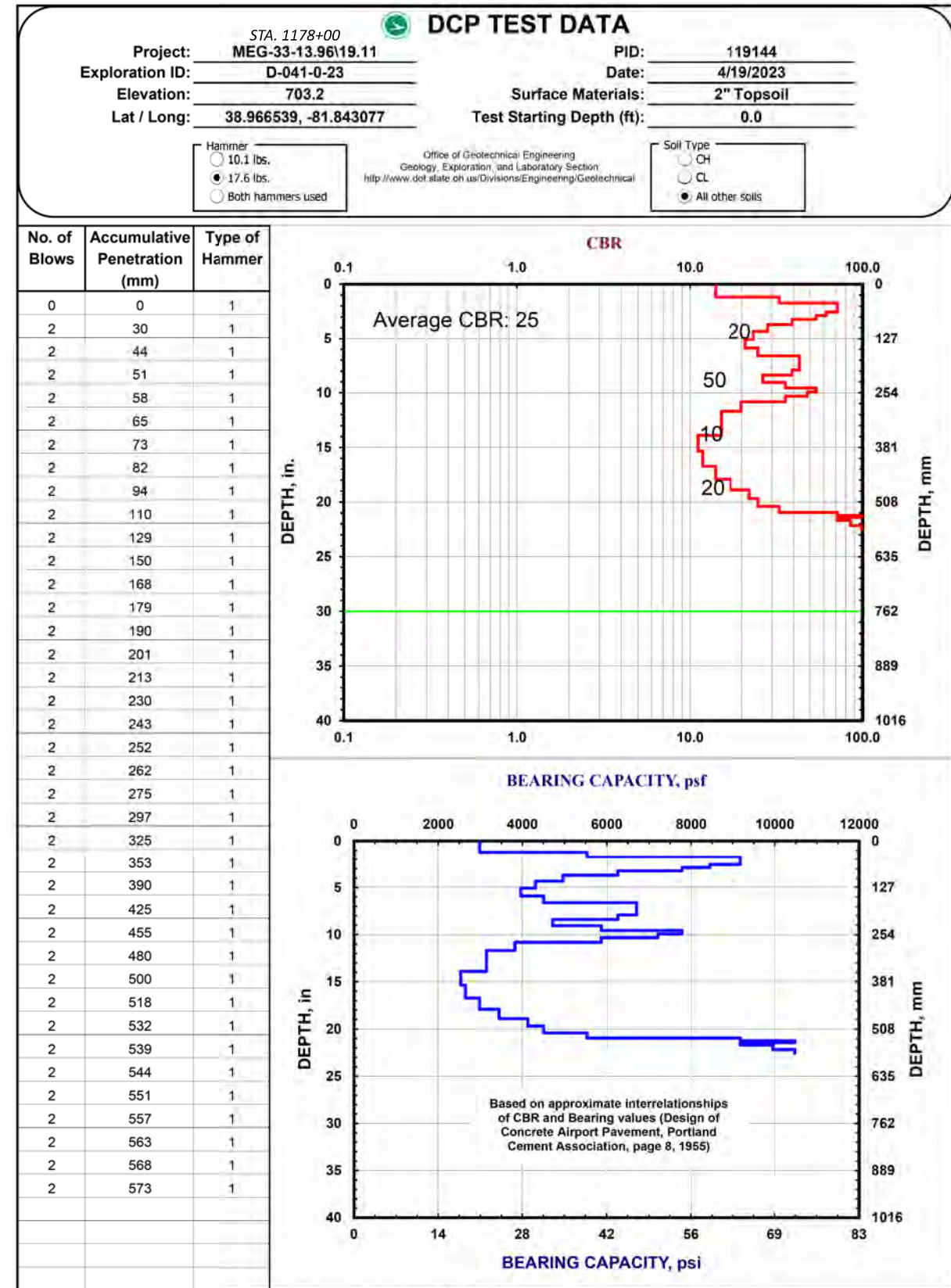
PROJECT ID
 119144

SUBSET TOTAL
 0 0

SHEET TOTAL
 P.926 940



NOTES: Latitude, Longitude & Elevation from OGE GPS unit utilizing the ODOT VRS network.



NOTES: Latitude, Longitude & Elevation from OGE GPS unit utilizing the ODOT VRS network.
 Sounding terminated at refusal.



DESIGNER: MSJ

REVIEWER: EMK 11-22-24

PROJECT ID	119144
SUBSET	0
TOTAL	0
SHEET	P.927
TOTAL	940

DCP TEST DATA

Project: STA. 1187+01
 Exploration ID: MEG-33-13.96\19.11
 Elevation: 677.1
 Lat / Long: 38.966392, -81.839909

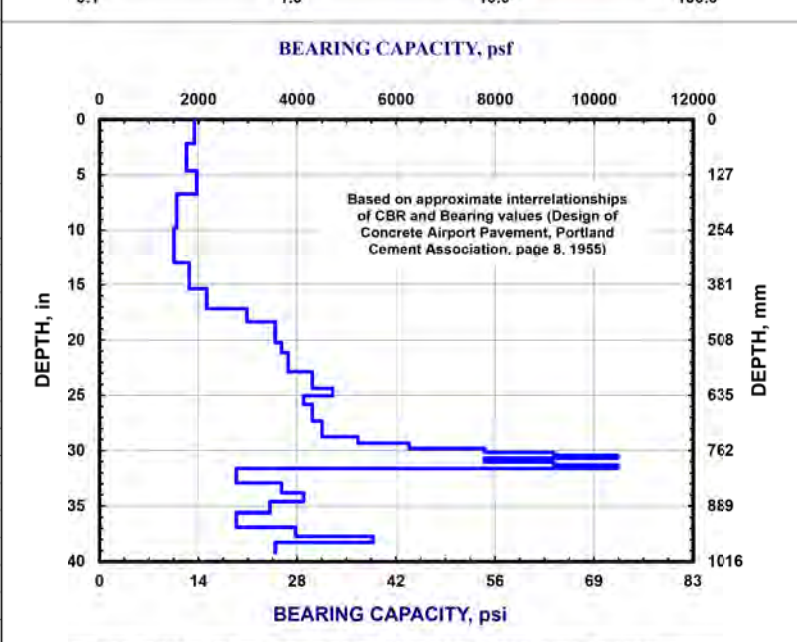
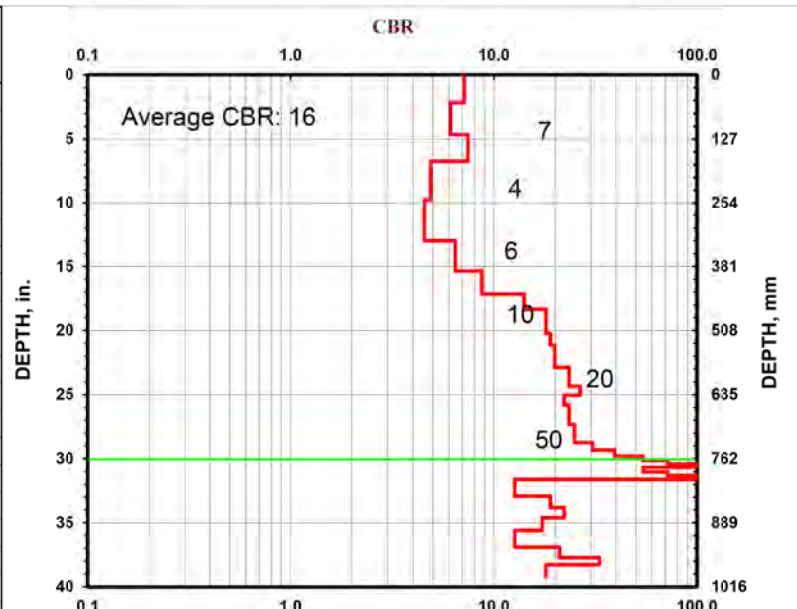
PID: 119144
 Date: 4/19/2023
 Surface Materials: 4" Topsoil
 Test Starting Depth (ft): 0.0

Office of Geotechnical Engineering
 Geology, Exploration, and Laboratory Section
 http://www.dot.state.oh.us/Divisions/Engineering/Geotechnical

Soil Type
 CH
 CL
 All other soils

Hammer
 10.1 lbs.
 17.6 lbs.
 Both hammers used

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
2	55	1
2	118	1
2	171	1
2	248	1
2	330	1
2	390	1
2	436	1
2	466	1
2	490	1
2	514	1
2	537	1
2	559	1
2	581	1
2	600	1
2	619	1
2	636	1
2	656	1
2	675	1
2	694	1
2	712	1
2	730	1
2	745	1
2	757	1
2	766	1
2	773	1
2	779	1
2	788	1
2	795	1
2	800	1
2	803	1
2	836	1
2	859	1
2	879	1
2	904	1
2	937	1
2	958	1
2	972	1
2	996	1



NOTES: Latitude & Longitude from OGE handheld GPS unit. Elevation from USGS 3DEP map service.
 Sounding terminated at refusal.

PROJECT:	MEG-33-19.11	DRILLING FIRM / OPERATOR:	ODOT / BINKLEY	DRILL RIG:	SIMCO 255	STATION / OFFSET:	1187+01, 25.9' LT.	EXPLORATION ID	D-042-0-23
TYPE:	ROADWAY	SAMPLING FIRM / LOGGER:	ODOT / BINKLEY	HAMMER:		ALIGNMENT:	US 33	PAGE	1 OF 1
PID:	119144	DRILLING METHOD:	3.5" SSA	CALIBRATION DATE:	N/A	ELEVATION:	676.3 (ft) EOB: 2.5 ft.		
START:	4/19/23	END:	4/19/23	SAMPLING METHOD:	CUTTINGS	LAT / LONG:	38.966392, -81.839909		

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
TOPSOIL (4")	676.3																	
REDDISH BROWN, SILT AND CLAY, LITTLE SAND, TRACE GRAVEL AND STONE FRAGMENTS, DAMP	676.0					AS-1		1	2	14	39	44	33	18	15	13	A-6a (10)	
REDDISH BROWN, SILTY CLAY, LITTLE SAND, TRACE GRAVEL AND STONE FRAGMENTS, DAMP	674.8					AS-2		4	3	14	39	40	35	18	17	13	A-6b (11)	
	673.8	EOB																

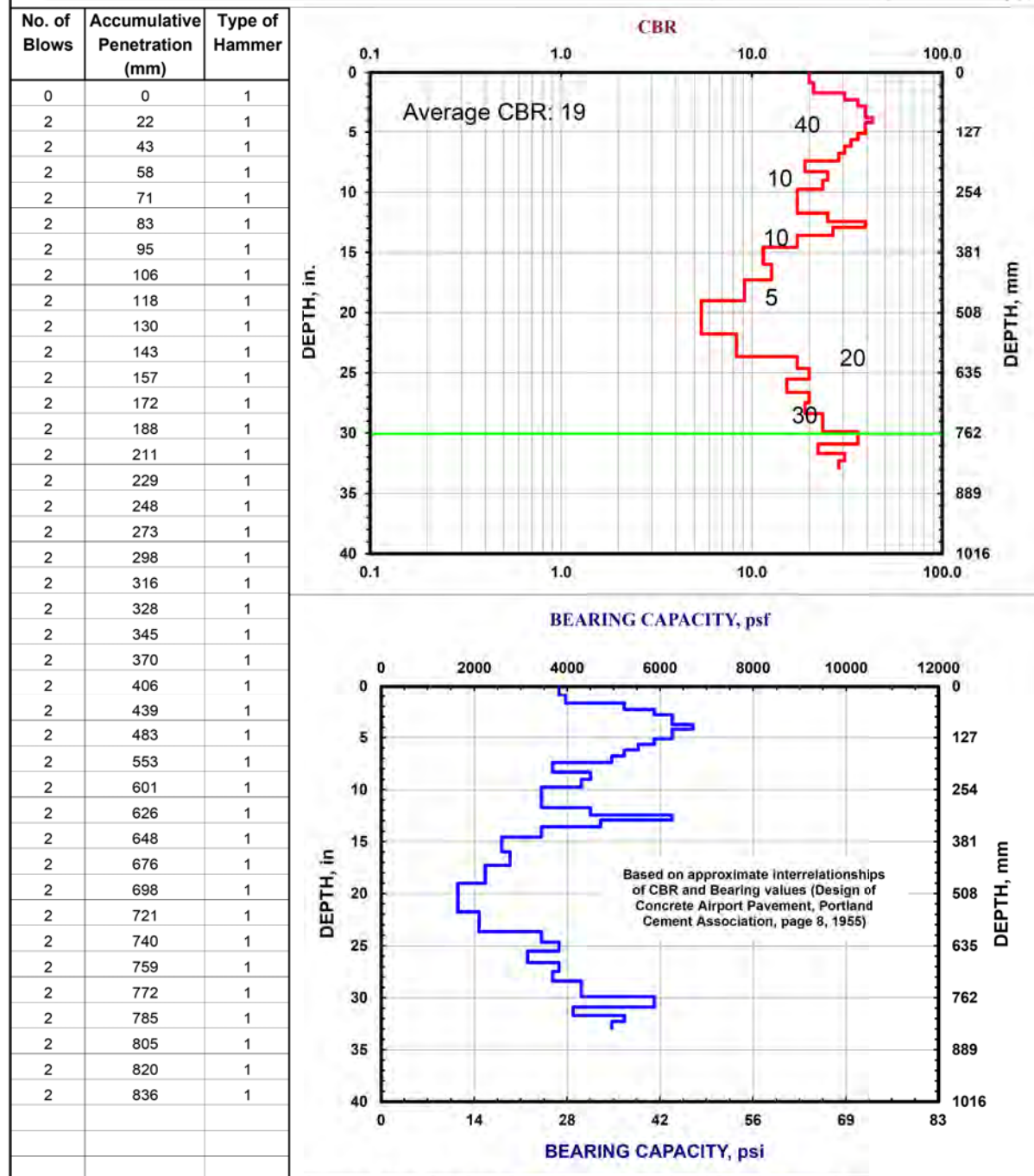
NOTES: NONE
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

DCP TEST DATA

Project: STA. 1202+04 MEG-33-13.96\19.11 PID: 119144
 Exploration ID: D-043-0-23 Date: 4/19/2023
 Elevation: 632.1 Surface Materials: 2" Topsoil
 Lat / Long: 38.965996, -81.834647 Test Starting Depth (ft): 0.0

Hammer: 10.1 lbs. 17.6 lbs. Both hammers used
 Soil Type: CH CL All other soils

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 Geology, Exploration, and Laboratory Section
 http://www.dot.state.oh.us/Divisions/Engineering/Geotechnical



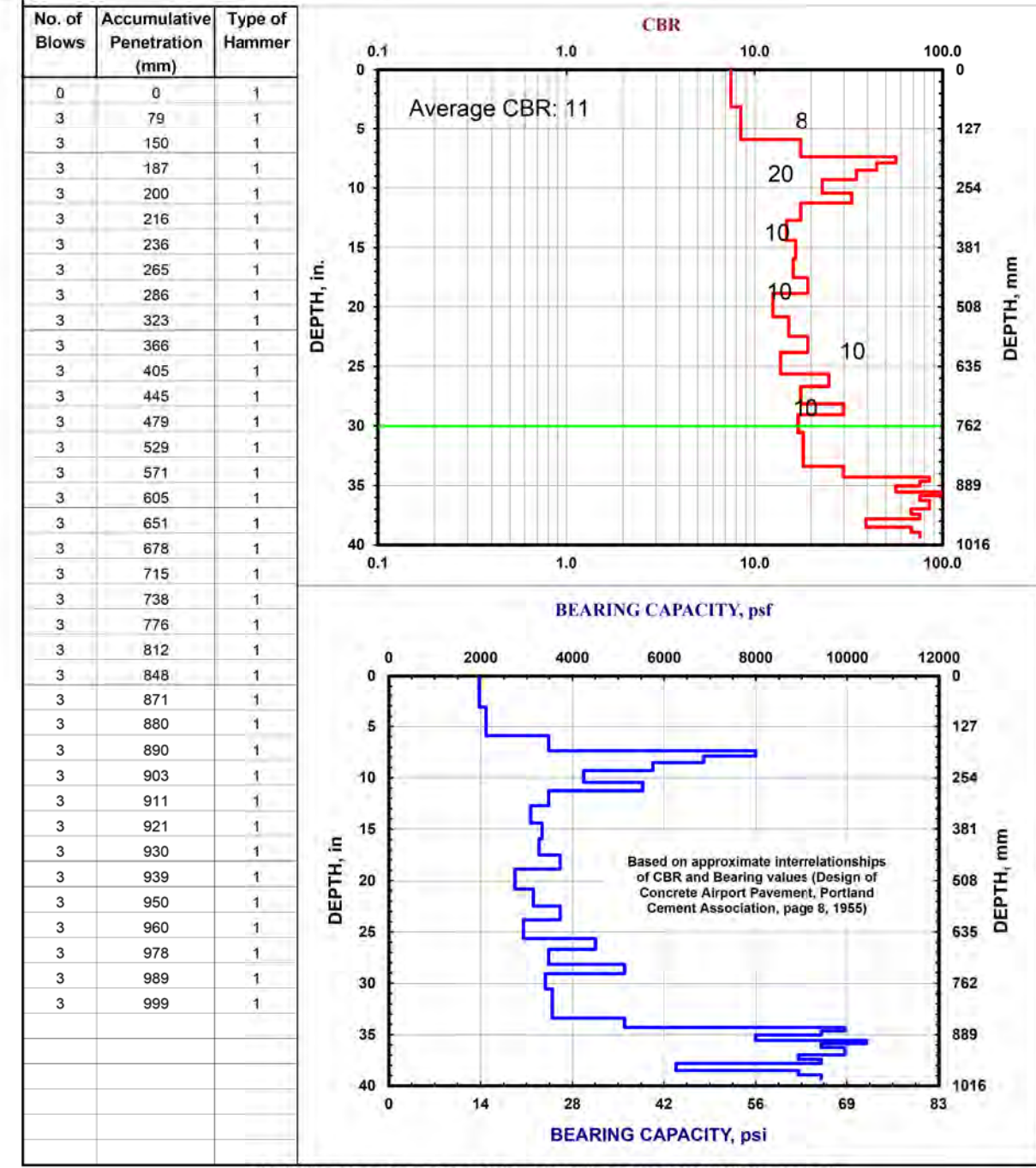
NOTES: Latitude, Longitude & Elevation from OGE GPS unit utilizing the ODOT VRS network.
 Sounding terminated at refusal.

DCP TEST DATA

Project: STA. 1244+04 MEG-33-13.96\19.11 PID: 119144
 Exploration ID: D-044-0-23 Date: 4/19/2023
 Elevation: 626.7 Surface Materials: 4" Topsoil
 Lat / Long: 38.962001, -81.821665 Test Starting Depth (ft): 0.0

Hammer: 10.1 lbs. 17.6 lbs. Both hammers used
 Soil Type: CH CL All other soils

Office of Geotechnical Engineering
 Geology, Exploration, and Laboratory Section
 http://www.dot.state.oh.us/Divisions/Engineering/Geotechnical



NOTES: Latitude, Longitude & Elevation from OGE GPS unit utilizing the ODOT VRS network.
 Sounding terminated at refusal.

DCP TEST DATA

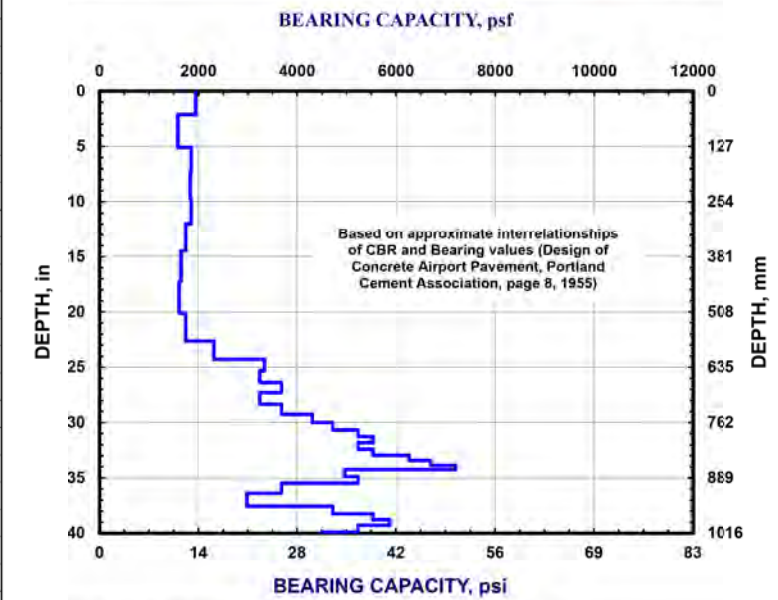
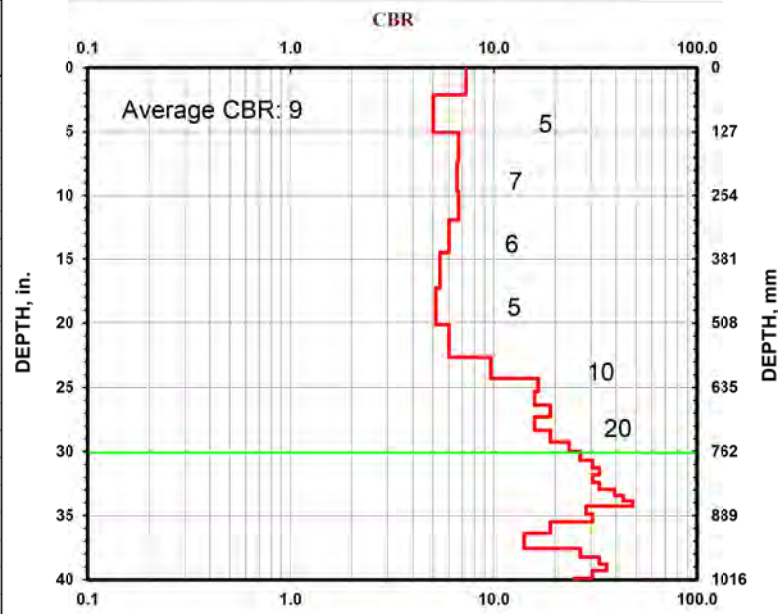
Project: STA. 1274+98
 Exploration ID: MEG-33-13.96\19.11
 Elevation: 695.3
 Lat / Long: 38.955064, -81.816374

PID: 119144
 Date: 4/19/2023
 Surface Materials: 4" Topsoil
 Test Starting Depth (ft): 0.0

Office of Geotechnical Engineering
 Geology, Exploration, and Laboratory Section
 http://www.dot.state.oh.us/Divisions/Engineering/Geotechnical

Soil Type:
 CH
 CL
 All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
2	54	1
2	129	1
2	187	1
2	246	1
2	304	1
2	368	1
2	438	1
2	511	1
2	575	1
2	617	1
2	643	1
2	670	1
2	693	1
2	720	1
2	743	1
2	762	1
2	779	1
2	794	1
2	808	1
2	823	1
2	837	1
2	849	1
2	860	1
2	870	1
2	886	1
2	901	1
2	924	1
2	954	1
2	971	1
2	985	1
2	998	1
2	1013	1
2	1031	1
2	1044	1
2	1054	1
2	1065	1
2	1075	1
2	1087	1
2	1098	1

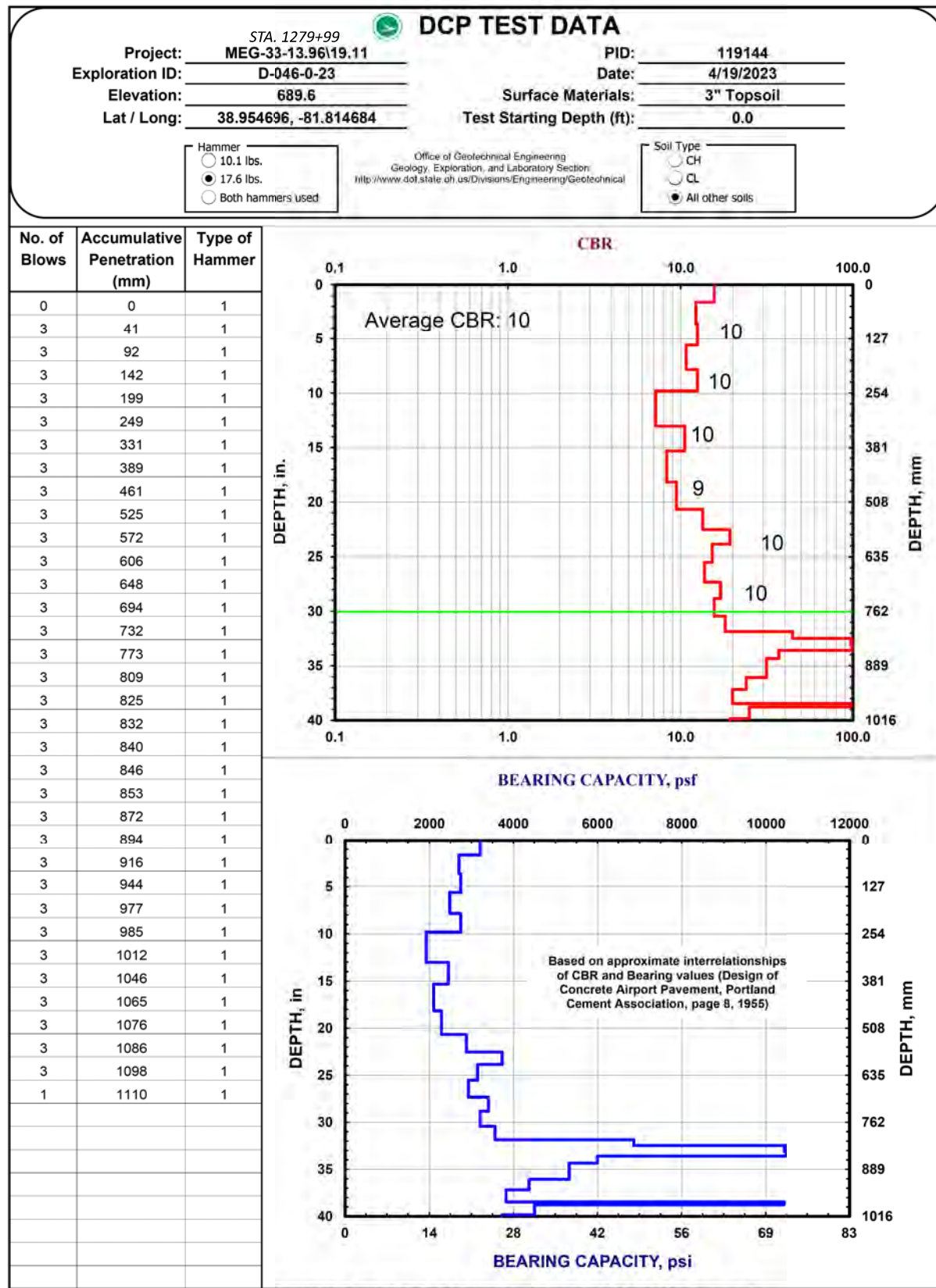


NOTES: Latitude, Longitude & Elevation from OGE GPS unit utilizing the ODOT VRS network.

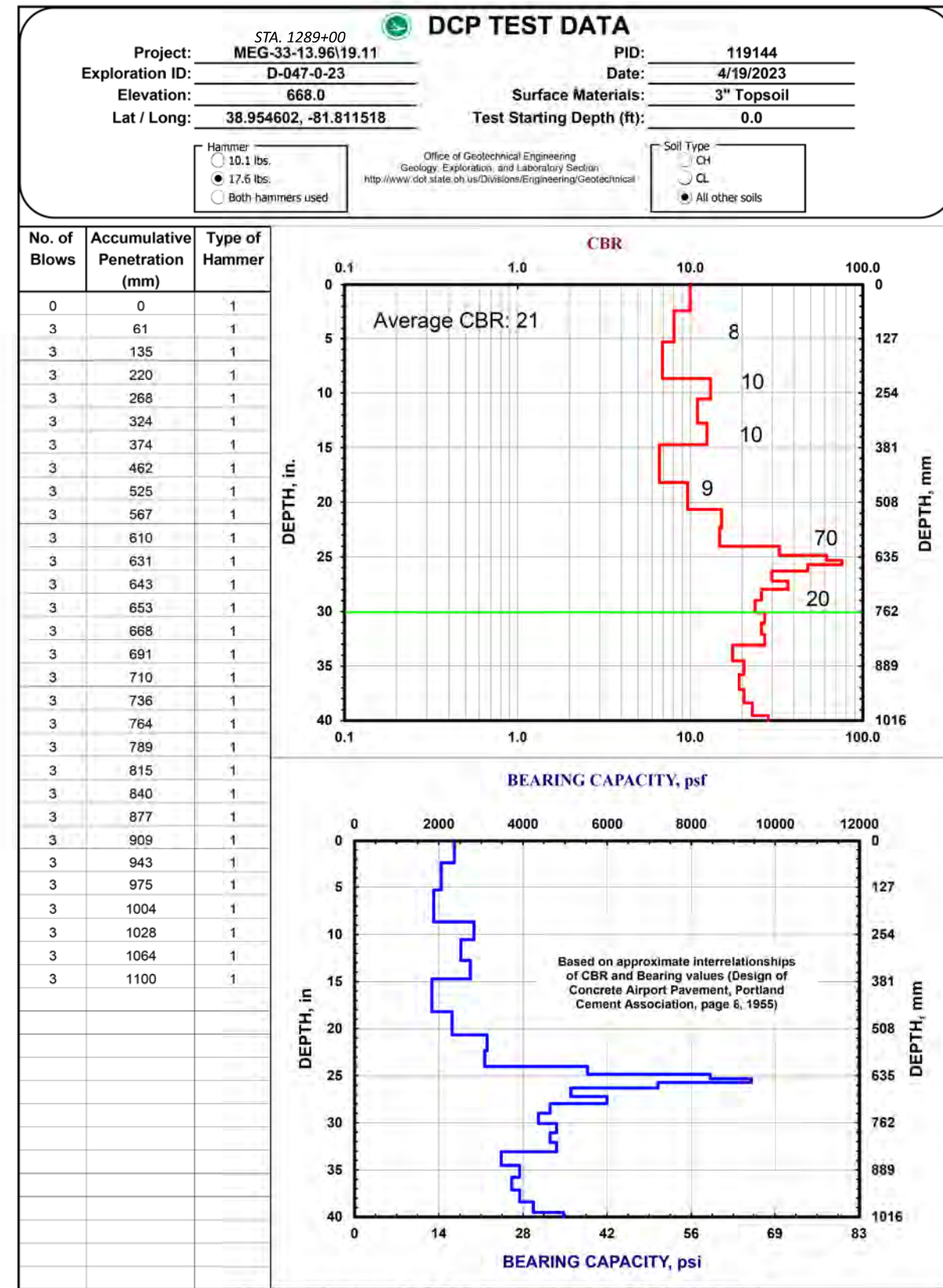
MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			ODOT CLASS (SI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI		
TOPSOIL (4")	695.3																
BROWN, SILTY CLAY, LITTLE SAND, TRACE GRAVEL AND STONE FRAGMENTS, DAMP	695.0																
		1				AS-1		1	6	14	39	40	34	18	16	14	A-6b (10)
		2				AS-2		4	5	11	38	42	36	18	18	17	A-6b (11)
	692.8	EOB															

NOTES: NONE
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT.GDT - 5/2/23 09:05 - X:\GINT\PROJECTS\6010688.GPJ



NOTES: Latitude, Longitude & Elevation from OGE GPS unit utilizing the ODOT VRS network.



NOTES: Latitude, Longitude & Elevation from OGE GPS unit utilizing the ODOT VRS network.

DCP TEST DATA

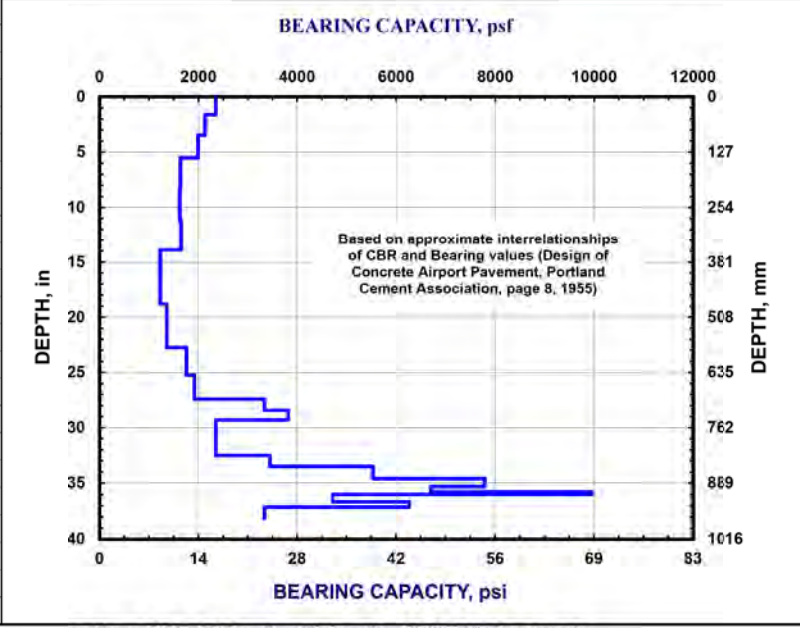
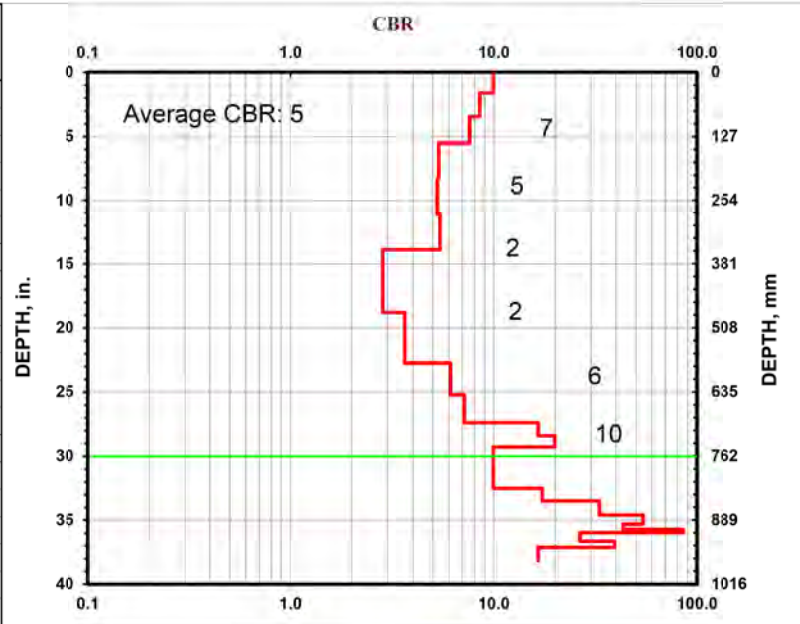
Project: STA. 1306+98
 Exploration ID: MEG-33-13.96\19.11
 Elevation: 646.4
 Lat / Long: 38.954123, -81.805234

PID: 119144
 Date: 4/18/2023
 Surface Materials: 6" Topsoil
 Test Starting Depth (ft): 0.0

Office of Geotechnical Engineering
 Geology, Exploration, and Laboratory Section
 http://www.ohdot.state.oh.us/Divisions/Engineering/Geotechnical

Soil Type:
 CH
 CL
 All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
2	41	1
2	88	1
2	140	1
2	211	1
2	283	1
2	353	1
2	478	1
2	578	1
2	641	1
2	696	1
2	722	1
2	744	1
2	785	1
2	826	1
2	851	1
2	865	1
2	879	1
2	888	1
2	897	1
2	908	1
2	914	1
2	931	1
2	943	1
2	969	1

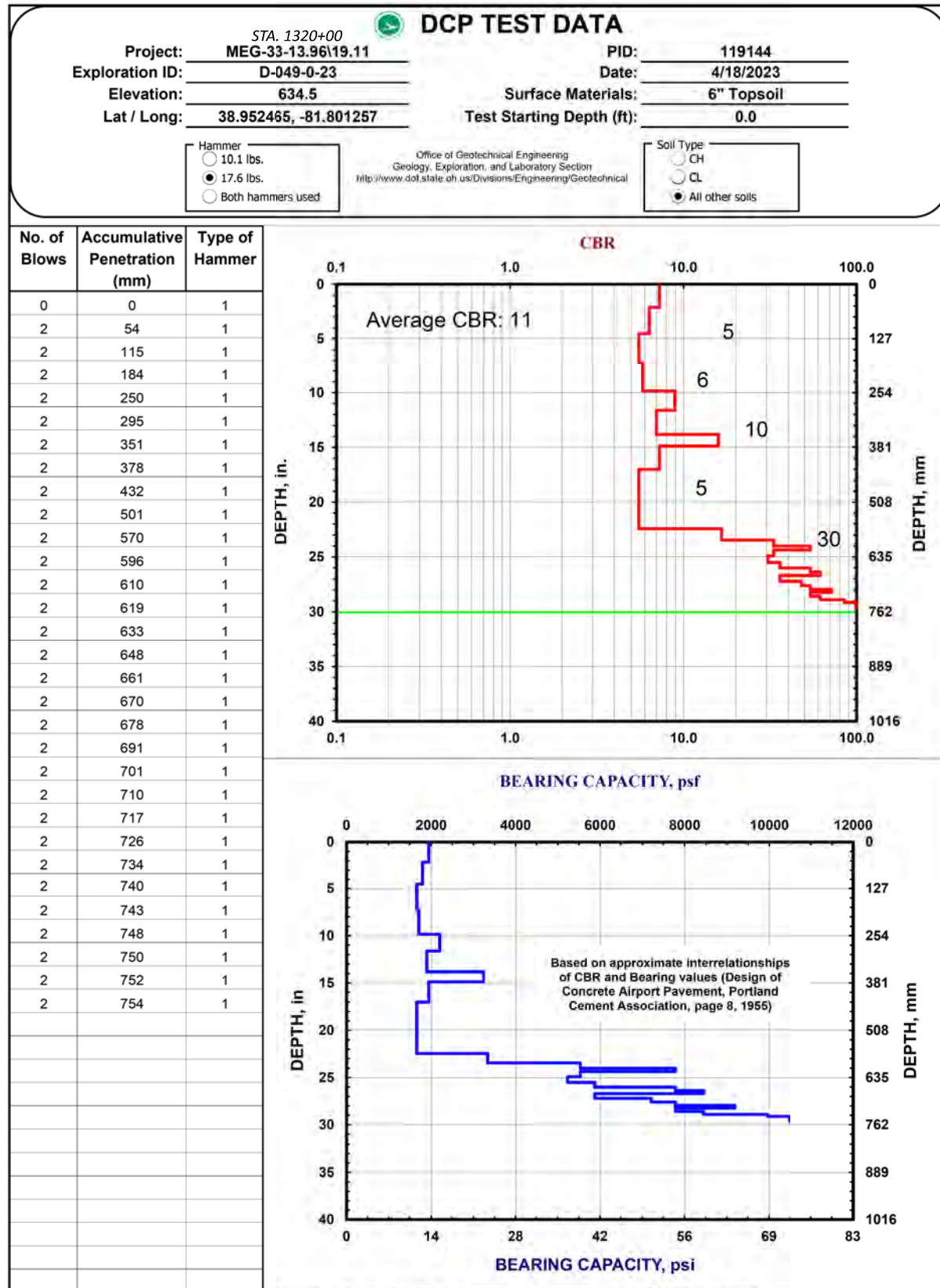


NOTES: Latitude, Longitude & Elevation from OGE GPS unit utilizing the ODOT VRS network.
 Sounding terminated at refusal.

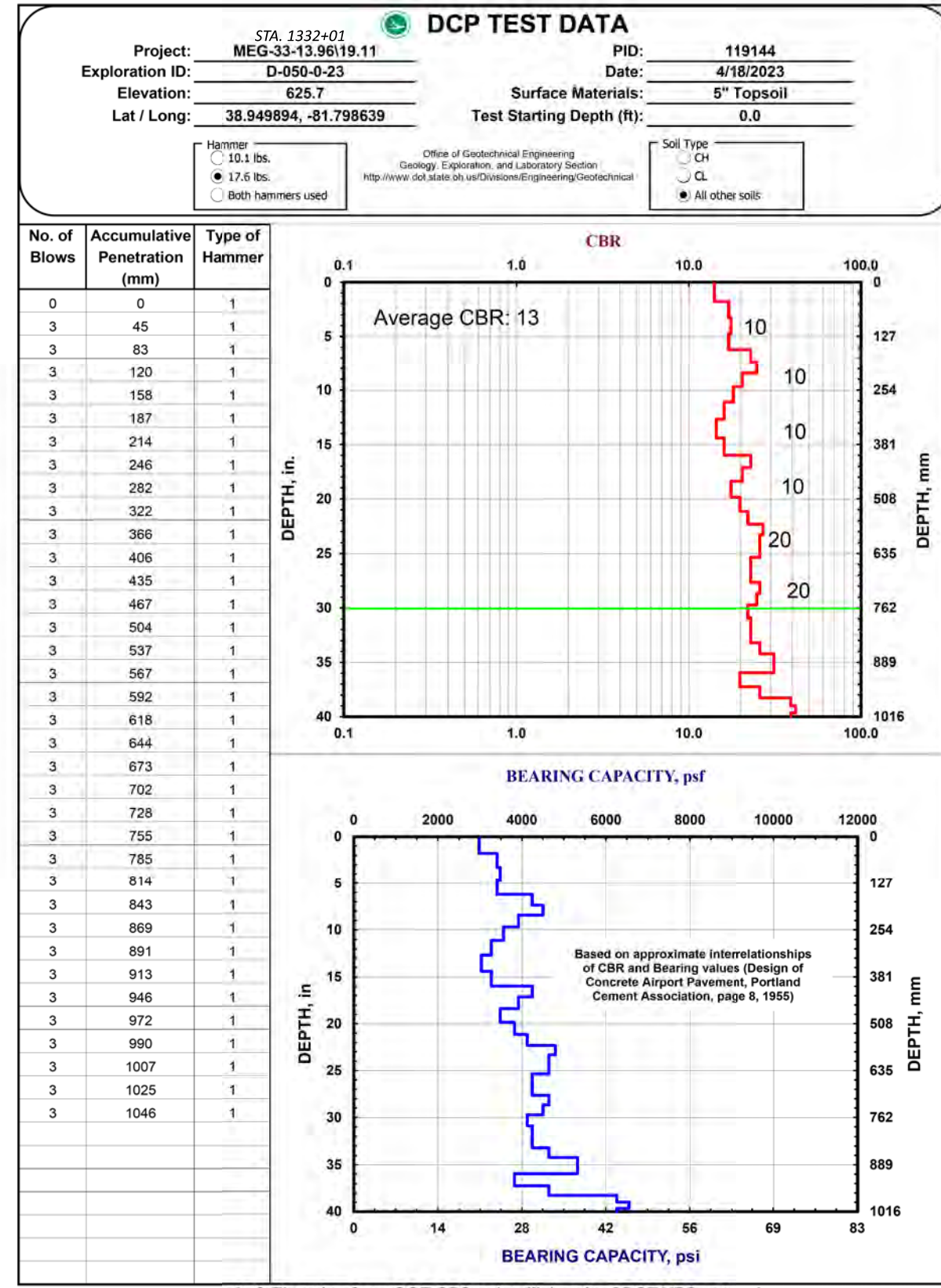
PROJECT: MEG-33-19.11		DRILLING FIRM / OPERATOR: ODOT / BINKLEY		DRILL RIG: SIMCO 255		STATION / OFFSET: 1306+98, 11.5' RT.		EXPLORATION ID: D-048-0-23													
TYPE: ROADWAY		SAMPLING FIRM / LOGGER: ODOT / BINKLEY		HAMMER: SIMCO 255		ALIGNMENT: US 33		PAGE: 1 OF 1													
PID: 119144 SFN:		DRILLING METHOD: 3.5" SSA		CALIBRATION DATE: N/A		ELEVATION: 646.4 (ft) EOB: 2.5 ft.		LAT / LONG: 38.954123, -81.805234													
START: 4/18/23 END: 4/18/23		SAMPLING METHOD: CUTTINGS		ENERGY RATIO (%):																	
MATERIAL DESCRIPTION AND NOTES		ELEV.	DEPTHS	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			ODOT CLASS (GI)	BACK FILL			
TOPSOIL (6")		646.4							GR	CS	FS	SI	CL	LL	PL	PI	WC				
REDDISH BROWN, SILTY CLAY, LITTLE SAND, TRACE GRAVEL AND STONE FRAGMENTS, DAMP		645.9	1		-		AS-1	-	5	6	12	35	42	35	18	17	17			A-6b (11)	
		643.9	2		-		AS-2	-	9	6	11	32	42	35	18	17	16			A-6b (11)	
		EOB																			

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT.GDT - 5/2/23 09:05 - X:\GINT\PROJECTS\1601056.GPJ

NOTES: NONE
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS



NOTES: Latitude, Longitude & Elevation from OGE GPS unit utilizing the ODOT VRS network.
 Sounding terminated at refusal.



NOTES: Latitude, Longitude & Elevation from OGE GPS unit utilizing the ODOT VRS network.



DESIGNER: MSJ

REVIEWER: EMK 11-22-24

PROJECT ID	119144
SUBSET	TOTAL
0	0
SHEET	TOTAL
P.933	940

DCP TEST DATA

Project: STA. 1340+02
MEG-33-13.96\19.11
 Exploration ID: D-051-0-23
 Elevation: 629.5
 Lat / Long: 38.948059, -81.797089

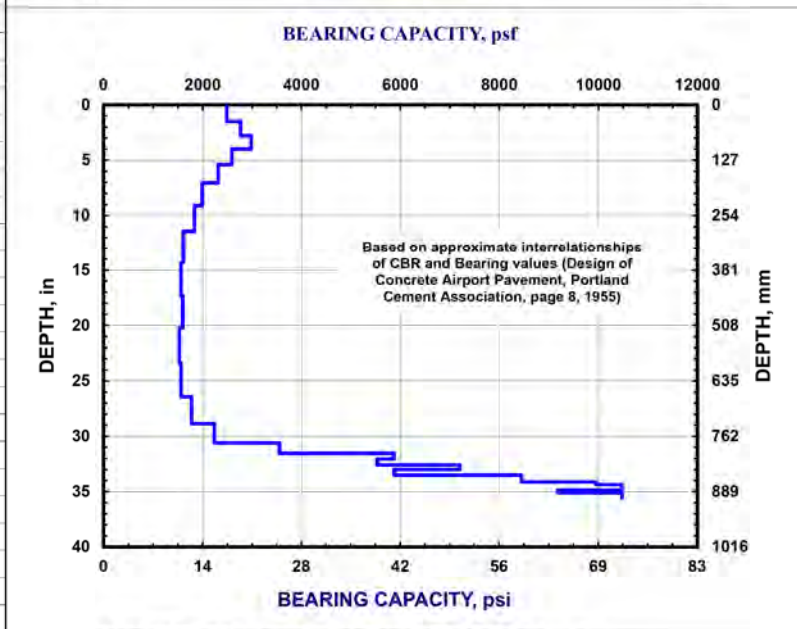
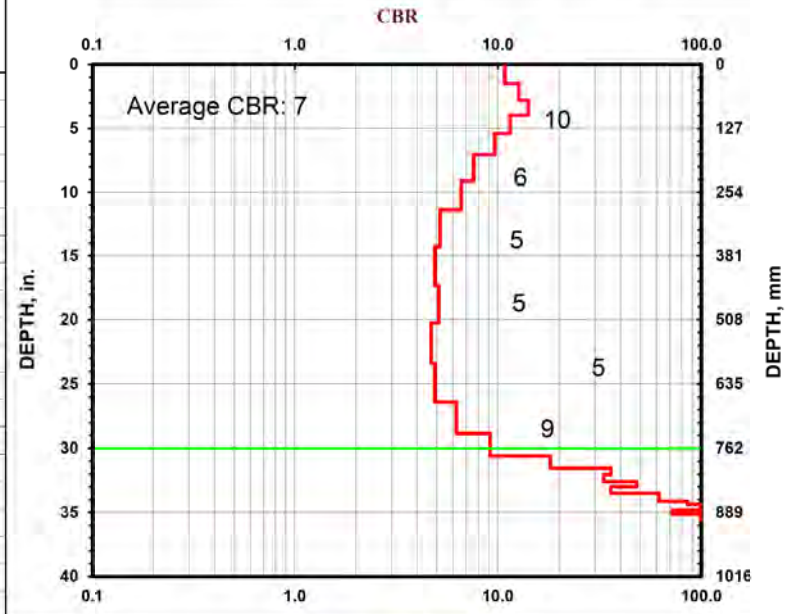
PID: 119144
 Date: 4/18/2023
 Surface Materials: 2" Topsoil
 Test Starting Depth (ft): 0.0

Hammer
 10.1 lbs.
 17.6 lbs.
 Both hammers used

Office of Geotechnical Engineering
 Geology, Exploration, and Laboratory Section
<http://www.dnr.state.oh.us/Divisions/Engineering/Geotechnical>

Soil Type
 CH
 CL
 All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
2	38	1
2	71	1
2	101	1
2	137	1
2	179	1
2	231	1
2	290	1
2	363	1
2	440	1
2	514	1
2	594	1
2	671	1
2	733	1
2	777	1
2	801	1
2	814	1
2	828	1
2	838	1
2	851	1
2	859	1
2	867	1
2	873	1
2	877	1
2	881	1
2	885	1
2	892	1
2	894	1
2	899	1
2	904	1



NOTES: Latitude, Longitude & Elevation from OGE GPS unit utilizing the ODOT VRS network.
 Sounding terminated at refusal.

PROJECT: MEG-33-19.11		DRILLING FIRM / OPERATOR: ODOT / BINKLEY		DRILL RIG: SIMCO 255		STATION / OFFSET: 1340+02, 11.3' RT.		EXPLORATION ID: D-051-0-23														
TYPE: ROADWAY		SAMPLING FIRM / LOGGER: ODOT / BINKLEY		HAMMER: SIMCO 255		ALIGNMENT: US 33		PAGE: 1 OF 1														
PID: 119144 SFN:		DRILLING METHOD: 3.5" SSA		CALIBRATION DATE: N/A		ELEVATION: 629.5 (ft) EOB: 2.5 ft.		LAT / LONG: 38.948059, -81.797089														
START: 4/18/23 END: 4/18/23		SAMPLING METHOD: CUTTINGS		ENERGY RATIO (%):																		
MATERIAL DESCRIPTION AND NOTES			ELEV.	DEPTH	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)				ATTERBERG				WC	ODOT CLASS (GI)	BACK FILL		
TOPSOIL (2")			629.3								GR	CS	FS	SI	CL	LL	PL	PI				
REDDISH BROWN, SILTY CLAY, LITTLE SAND, TRACE GRAVEL AND STONE FRAGMENTS, DAMP																						
				1		-		AS-1	-	3	5	15	33	44	34	17	17		15		A-6b (11)	
				2		-		AS-2	-	3	4	7	32	54	39	19	20		18		A-6b (12)	
			627.0	EOB																		
NOTES: NONE																						
ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS																						

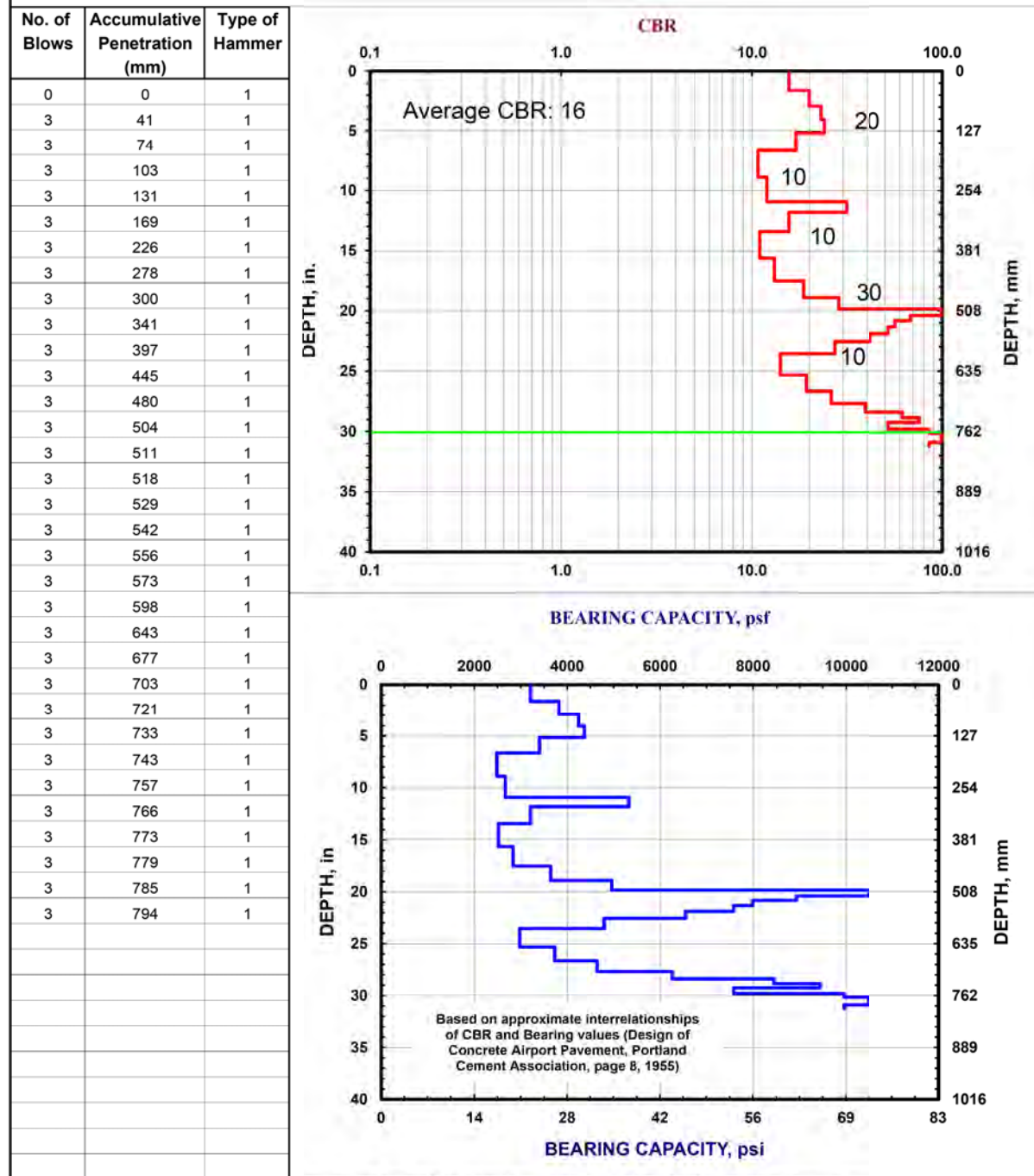
DCP TEST DATA

Project: STA. 1350+03
 Exploration ID: MEG-33-13.96\19.11 PID: 119144
 Date: 4/18/2023
 Elevation: 634.6 Surface Materials: 2" Topsoil
 Lat / Long: 38.945795, -81.795091 Test Starting Depth (ft): 0.0

Hammer: 10.1 lbs. 17.5 lbs. Both hammers used

Soil Type: CH CL All other soils

Office of Geotechnical Engineering
 Geology, Exploration, and Laboratory Section
 http://www.dot.state.oh.us/Divisions/Engineering/Geotechnical



NOTES: Latitude, Longitude & Elevation from OGE GPS unit utilizing the ODOT VRS network.

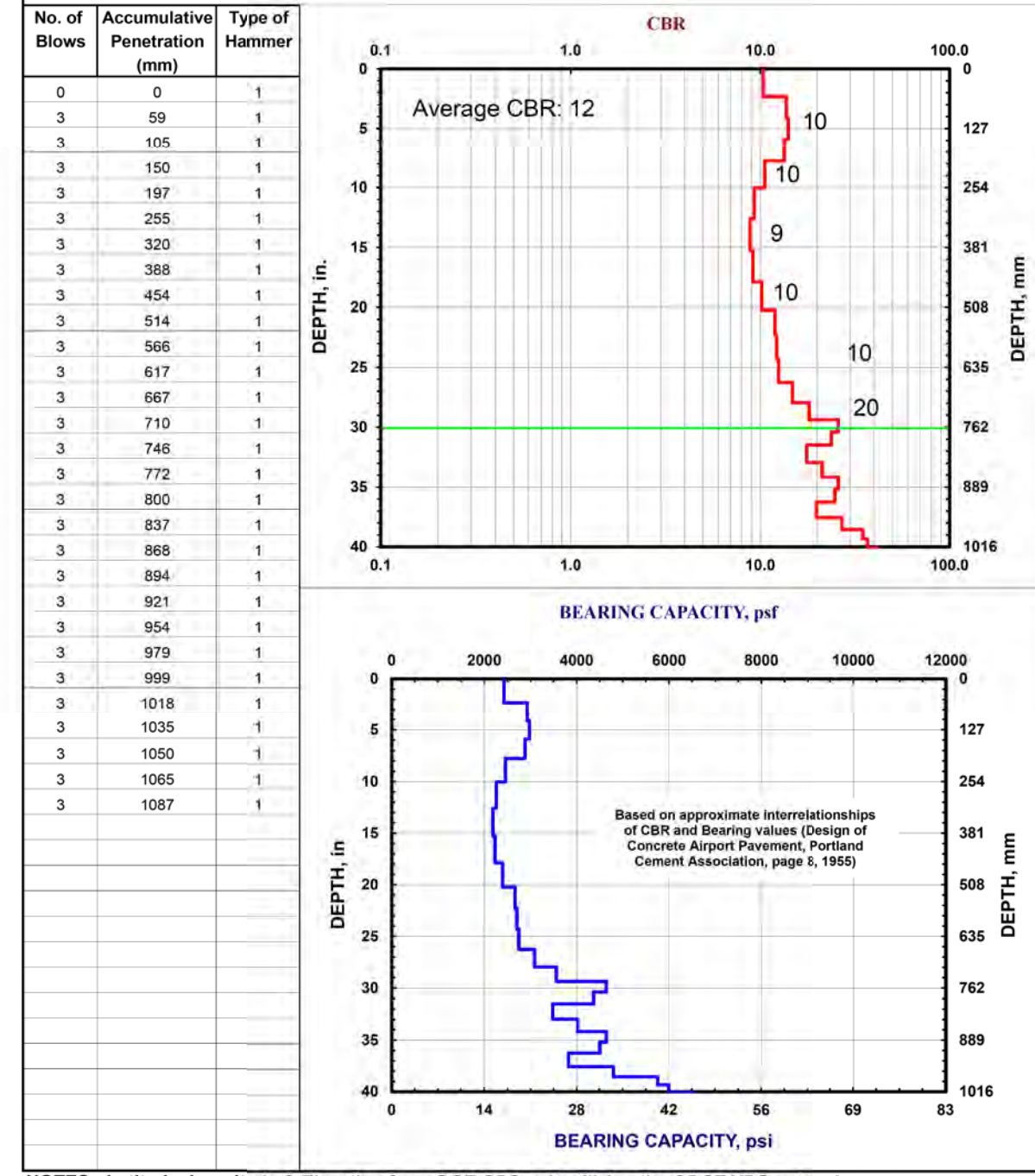
DCP TEST DATA

Project: STA. 1359+99
 Exploration ID: MEG-33-13.96\19.11 PID: 119144
 Date: 4/18/2023
 Elevation: 640.6 Surface Materials: 4" Topsoil
 Lat / Long: 38.943546, -81.793098 Test Starting Depth (ft): 0.0

Hammer: 10.1 lbs. 17.5 lbs. Both hammers used

Soil Type: CH CL All other soils

Office of Geotechnical Engineering
 Geology, Exploration, and Laboratory Section
 http://www.dot.state.oh.us/Divisions/Engineering/Geotechnical



NOTES: Latitude, Longitude & Elevation from OGE GPS unit utilizing the ODOT VRS network.

DCP TEST DATA

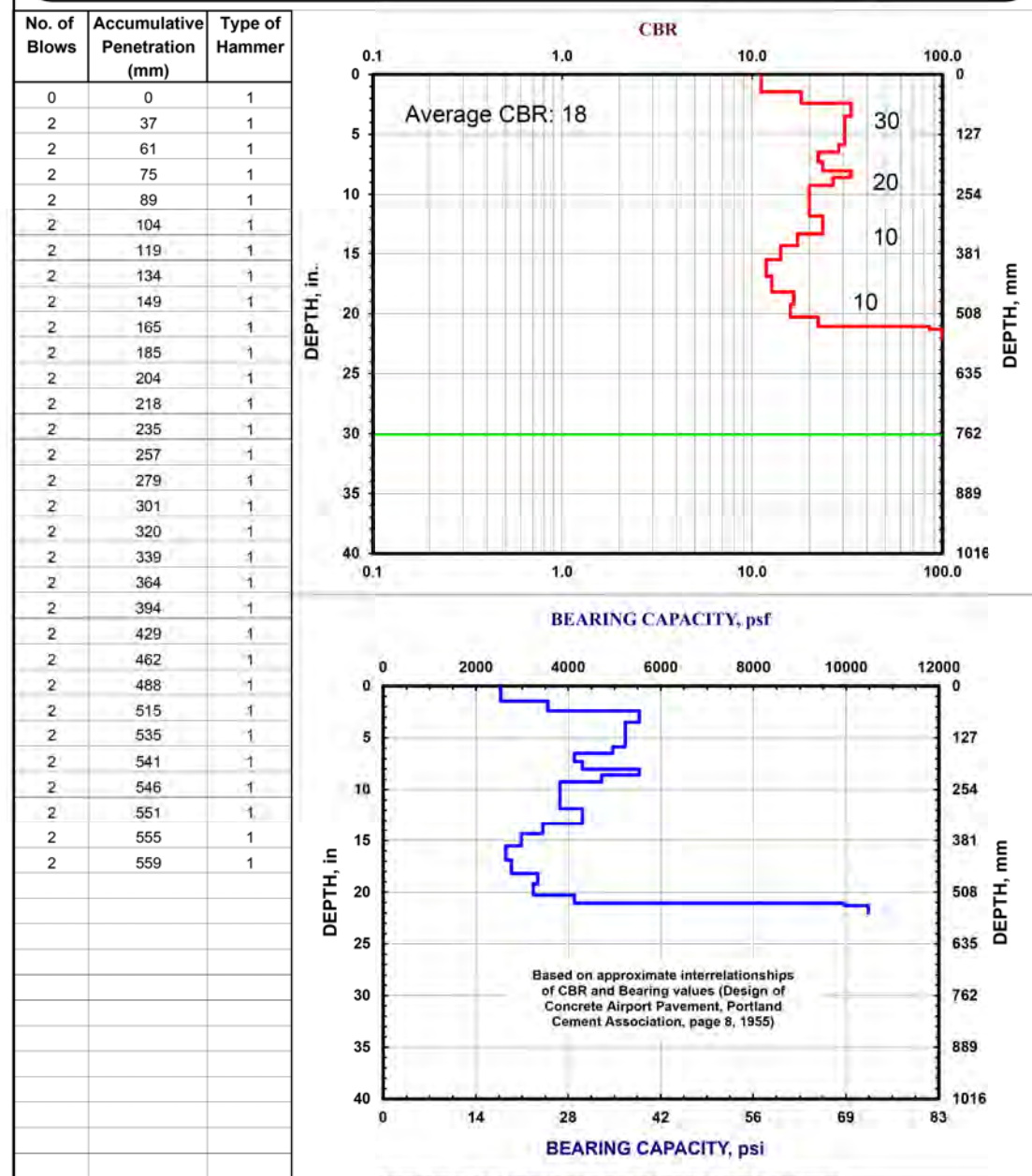
Project: STA. 1370+00
 MEG-33-13.96\19.11
 Exploration ID: D-054-0-23
 Elevation: 646.2
 Lat / Long: 38.941283, -81.7911

PID: 119144
 Date: 4/18/2023
 Surface Materials: 2" Topsoil
 Test Starting Depth (ft): 0.0

Office of Geotechnical Engineering
 Geology, Exploration, and Laboratory Section
 http://www.ohio.gov/odot/Divisions/Engineering/Geotechnical

Soil Type:
 CH
 CL
 All other soils

Hammer:
 10.1 lbs.
 17.6 lbs.
 Both hammers used



NOTES: Latitude, Longitude & Elevation from OGE GPS unit utilizing the ODOT VRS network.
 Sounding terminated at refusal.

PROJECT: MEG-33-19.11		DRILLING FIRM / OPERATOR: ODOT / BINKLEY		DRILL RIG: SIMCO 255		STATION / OFFSET: 1370+00, 12.9' RT.		EXPLORATION ID: D-054-0-23											
TYPE: ROADWAY		SAMPLING FIRM / LOGGER: ODOT / BINKLEY		HAMMER:		ALIGNMENT: US 33		PAGE: 1 OF 1											
PID: 119144 SFN:		DRILLING METHOD: 3.5" SSA		CALIBRATION DATE: N/A		ELEVATION: 646.2 (ft) EOB: 2.5 ft.		LAT / LONG: 38.941283, -81.791100											
START: 4/18/23		END: 4/18/23		SAMPLING METHOD: CUTTINGS		ENERGY RATIO (%):													
MATERIAL DESCRIPTION AND NOTES		ELEV.	DEPTHS	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			ODOT CLASS (GI)	BACK FILL	
TOPSOIL (2")		646.2							GR	CS	FS	SI	CL	LL	PL	PI	WC		
BROWN AND GRAY, SILT AND CLAY, LITTLE SAND, TRACE GRAVEL AND STONE FRAGMENTS, DAMP		646.0																	
			1				AS-1		6	7	10	45	32	31	18	13	10	A-6a (9)	
			2				AS-2		5	5	11	43	36	32	17	15	11	A-6a (10)	
		643.7	EOB																

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT.GDT - 5/2/23 09:05 - X:\GINT\PROJECTS\601058.GPJ

DESIGN AGENCY

10200 Alliance Road,
 Suite 300
 Cincinnati, OH 45242
 (513) 842-8200

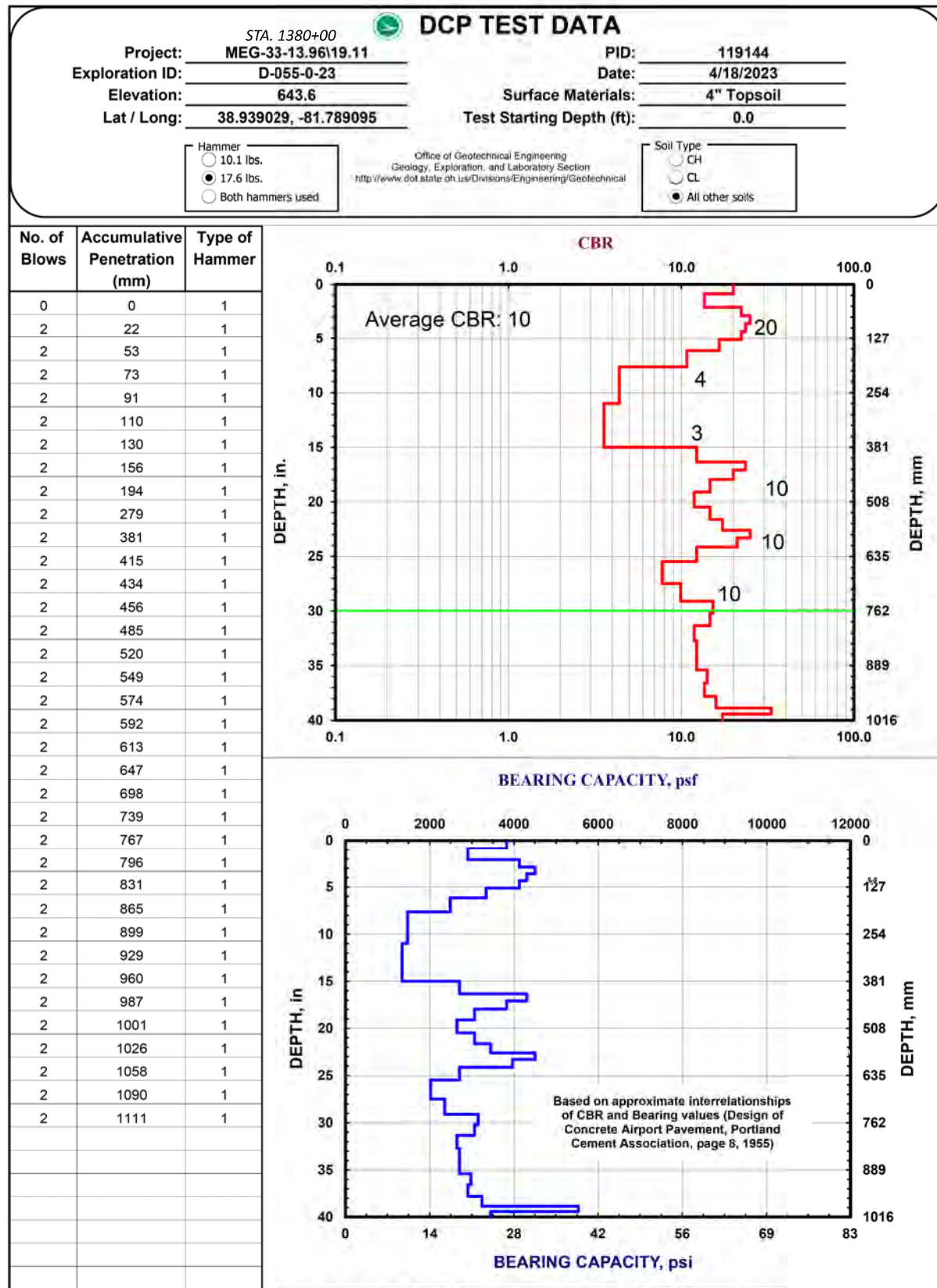
DESIGNER
 MSJ

REVIEWER
 EMK 11-22-24

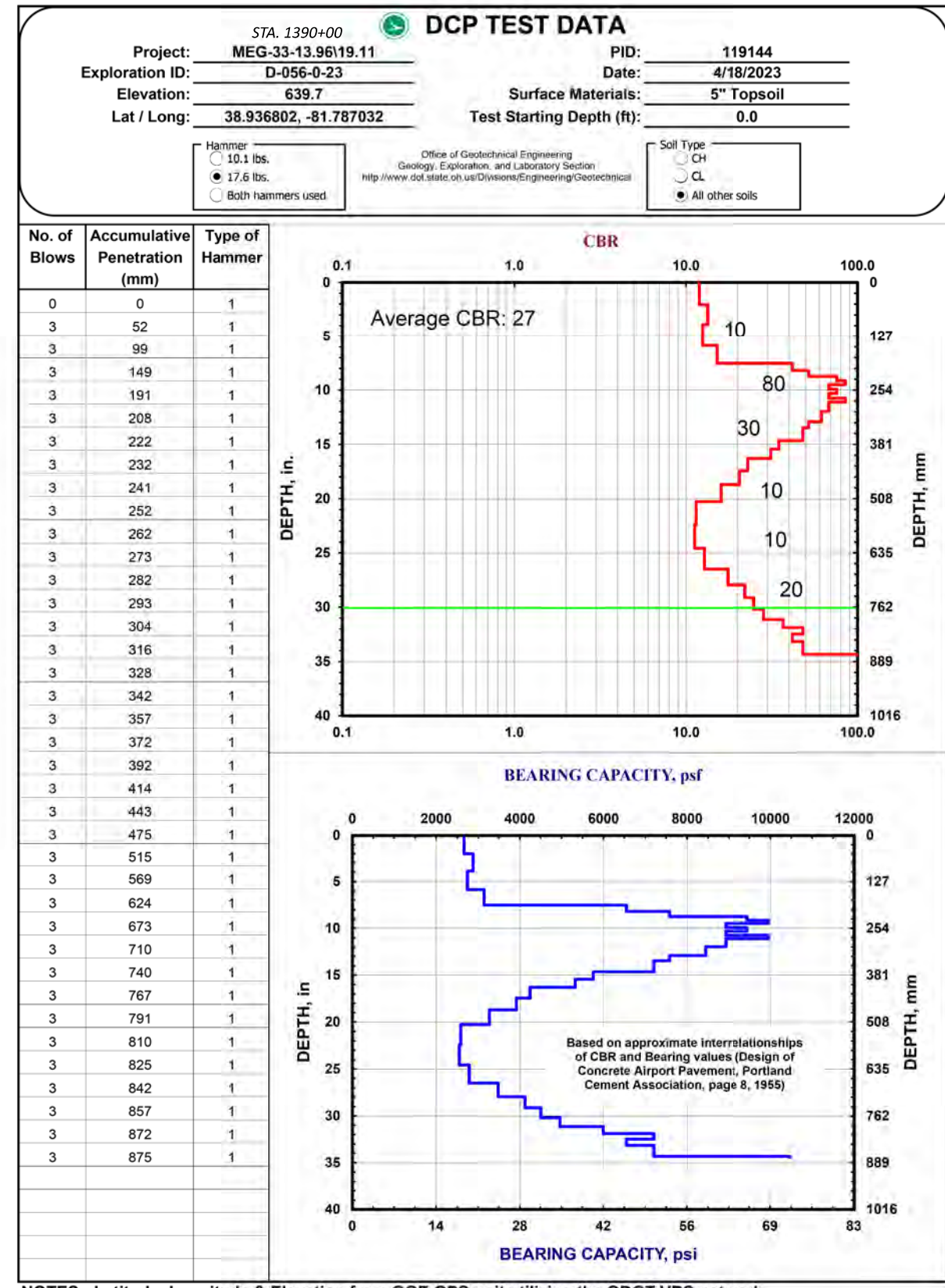
PROJECT ID
 119144

SUBSET TOTAL
 0 0

SHEET TOTAL
 P.936 940



NOTES: Latitude, Longitude & Elevation from OGE GPS unit utilizing the ODOT VRS network.



NOTES: Latitude, Longitude & Elevation from OGE GPS unit utilizing the ODOT VRS network.



DESIGNER	
MSJ	
REVIEWER	
EMK 11-22-24	
PROJECT ID	
119144	
SUBSET	TOTAL
0	0
SHEET	TOTAL
P.937	940

DCP TEST DATA

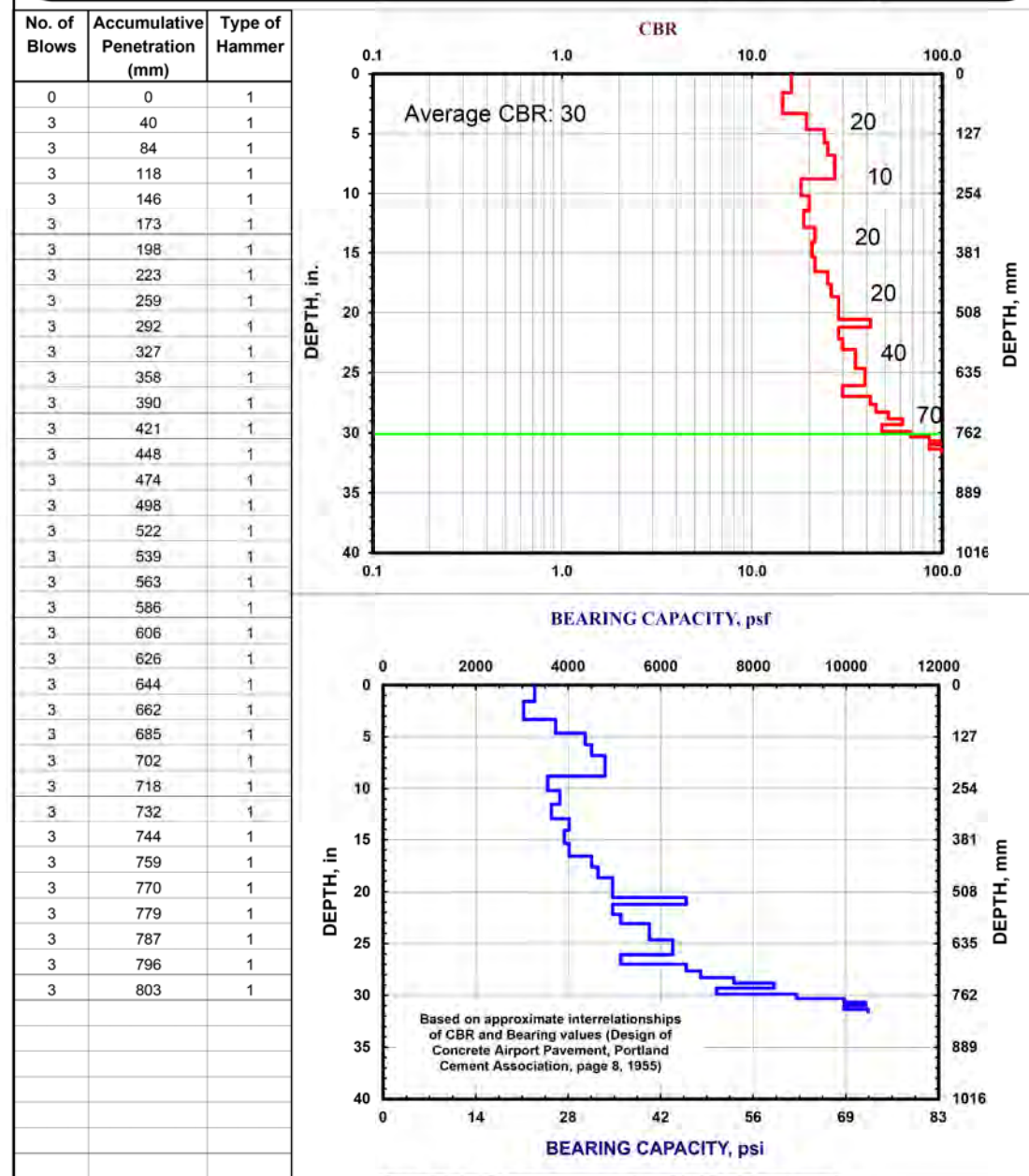
Project: STA. 1400+02
 Exploration ID: MEG-33-13.96(19.11)
 Elevation: 635.6
 Lat / Long: 38.934911, -81.784474

PID: 119144
 Date: 4/18/2023
 Surface Materials: 3" Topsoil
 Test Starting Depth (ft): 0.0

Office of Geotechnical Engineering
 Geology, Exploration, and Laboratory Section
 http://www.ohio.gov/Divisions/Engineering/Geotechnical

Hammer:
 10.1 lbs.
 17.6 lbs.
 Both hammers used

Soil Type:
 CH
 CL
 All other soils



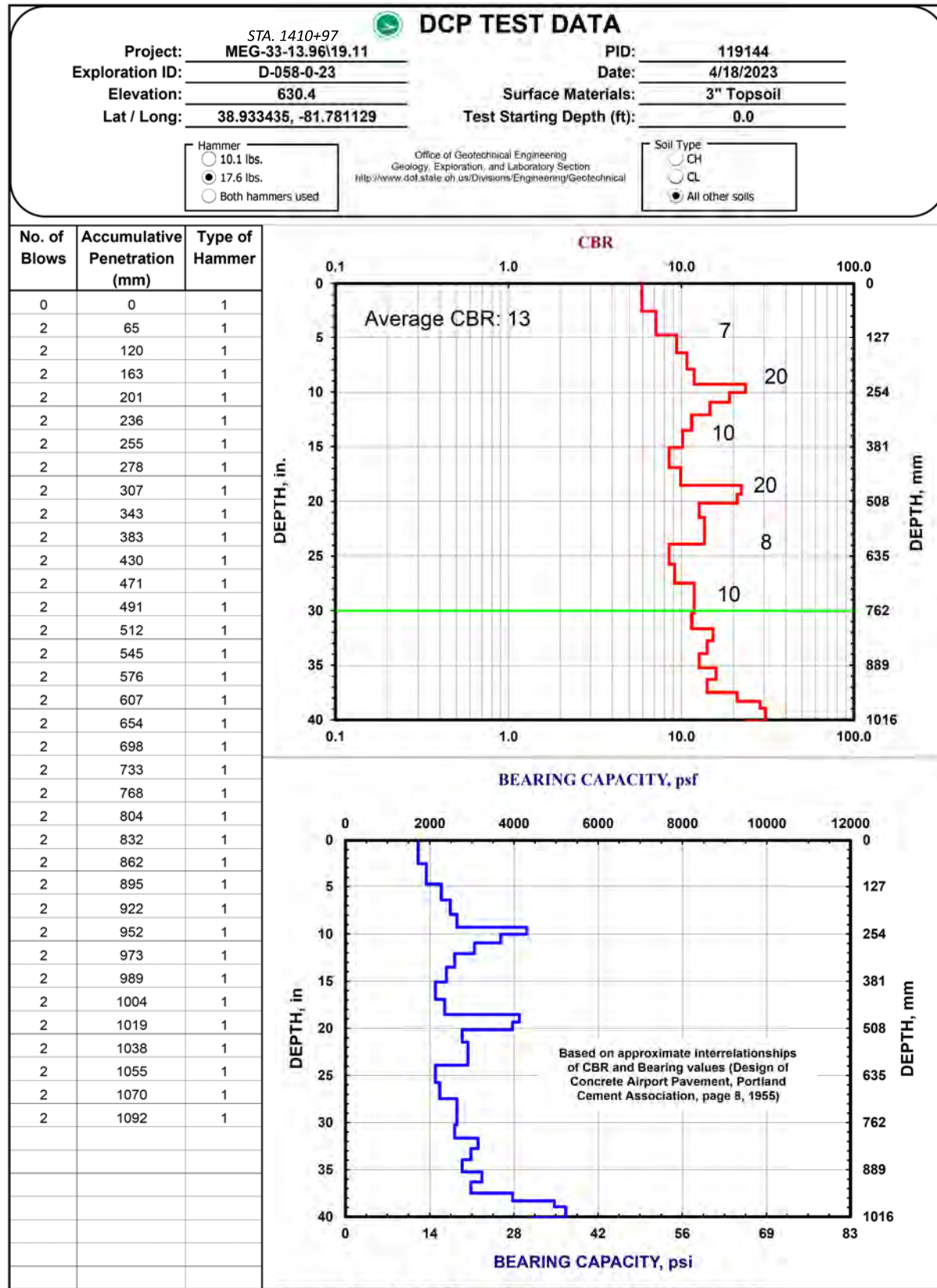
NOTES: Latitude, Longitude & Elevation from OGE GPS unit utilizing the ODOT VRS network.
 Sounding terminated at refusal.

PROJECT: <u>MEG-33-19.11</u>	DRILLING FIRM / OPERATOR: <u>ODOT / BINKLEY</u>	DRILL RIG: <u>SIMCO 255</u>	STATION / OFFSET: <u>1400+02, 10.4' RT.</u>	EXPLORATION ID: <u>D-057-0-23</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>ODOT / BINKLEY</u>	HAMMER: <u></u>	ALIGNMENT: <u>US 33</u>	PAGE: <u>1 OF 1</u>
PID: <u>119144</u> SFN: <u></u>	DRILLING METHOD: <u>3.5" SSA</u>	CALIBRATION DATE: <u>N/A</u>	ELEVATION: <u>635.6 (ft)</u> EOB: <u>2.5 ft.</u>	
START: <u>4/18/23</u> END: <u>4/18/23</u>	SAMPLING METHOD: <u>CUTTINGS</u>	ENERGY RATIO (%): <u></u>	LAT / LONG: <u>38.934911, -81.784474</u>	

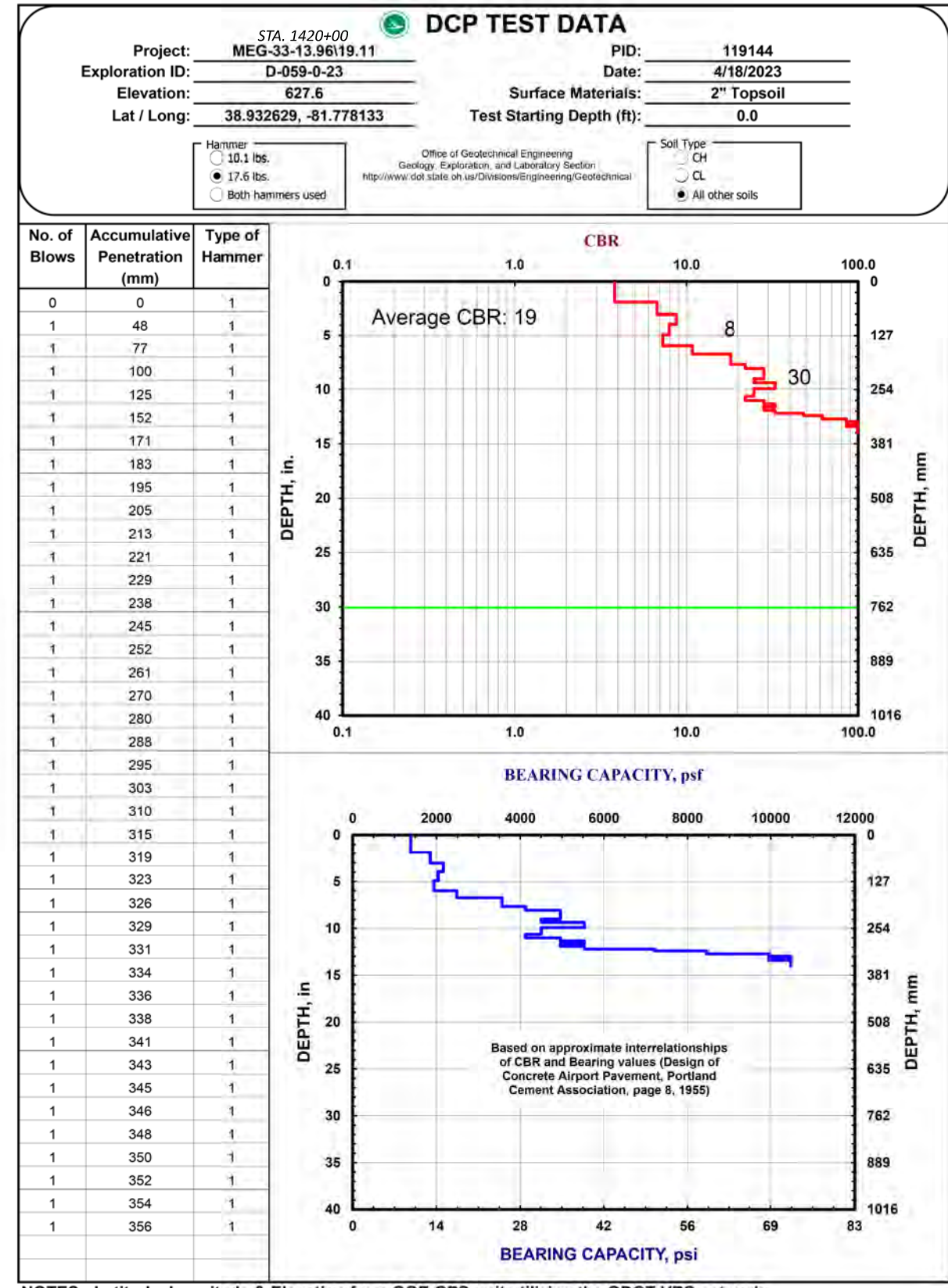
MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
TOPSOIL (3")	635.6																	
BROWN WITH GRAY, SILT AND CLAY, LITTLE SAND, TRACE GRAVEL AND STONE FRAGMENTS, DAMP	635.4																	
		1				AS-1		8	4	8	37	43	33	18	15	13		A-6a (10)
@1.5'; BROWN AND GRAY, TRACE SAND																		
		2				AS-2		4	3	6	37	50	34	19	15	12		A-6a (10)
	633.1	EOB																

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS



NOTES: Latitude, Longitude & Elevation from OGE GPS unit utilizing the ODOT VRS network.



NOTES: Latitude, Longitude & Elevation from OGE GPS unit utilizing the ODOT VRS network.
 Sounding terminated at refusal.

DCP TEST DATA

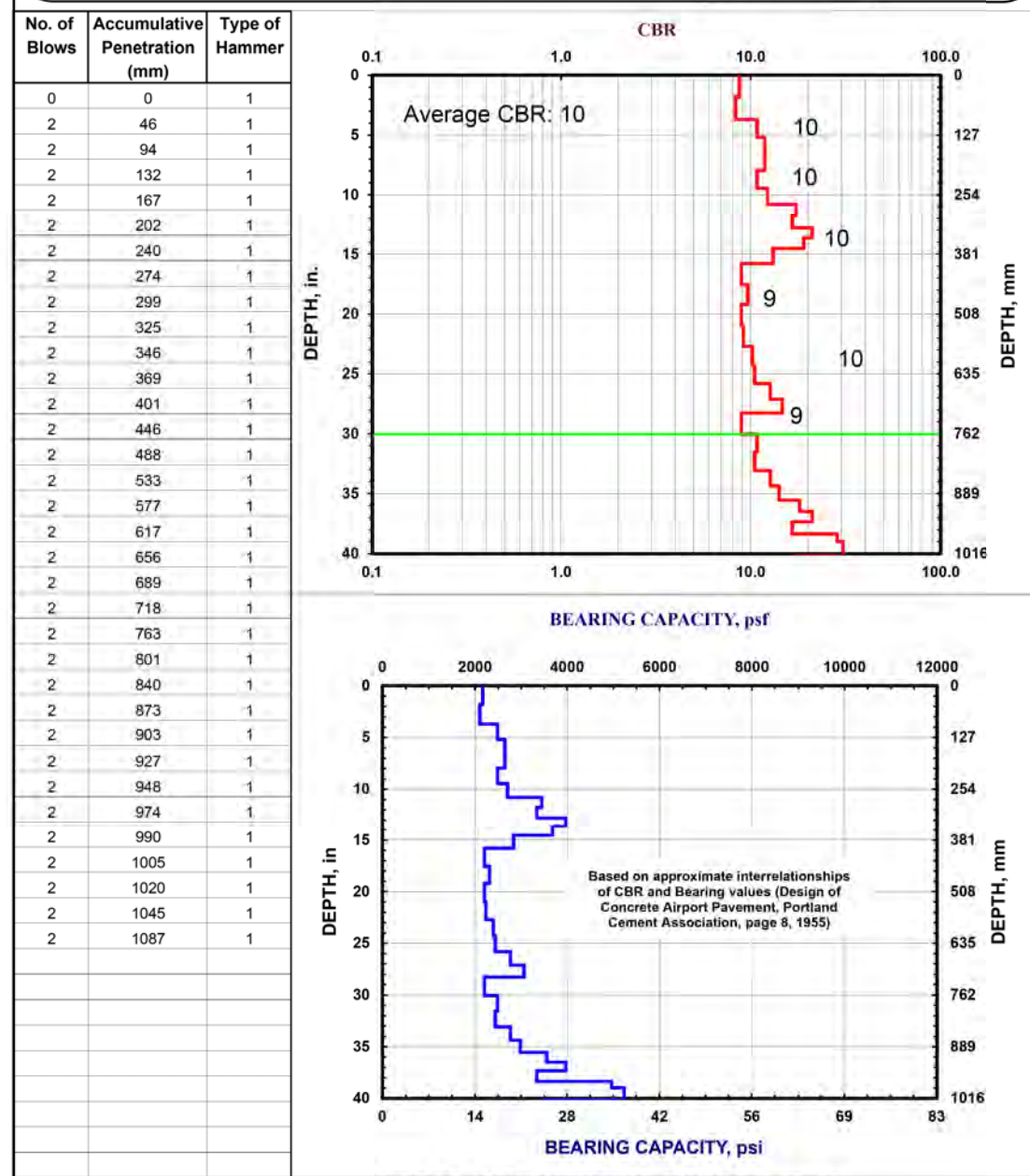
Project: STA. 1429+99
 MEG-33-13.96\19.11
 Exploration ID: D-060-0-23
 Elevation: 623.3
 Lat / Long: 38.932339, -81.774639

PID: 119144
 Date: 4/18/2023
 Surface Materials: 5" Topsoil
 Test Starting Depth (ft): 0.0

Office of Geotechnical Engineering
 Geology, Exploration, and Laboratory Section
 http://www.dot.state.oh.us/Division/Engineering/Geotechnical

Soil Type:
 CH
 CL
 All other soils

Hammer:
 10.1 lbs.
 17.6 lbs.
 Both hammers used



NOTES: Latitude, Longitude & Elevation from OGE GPS unit utilizing the ODOT VRS network.

PROJECT:	MEG-33-19.11	DRILLING FIRM / OPERATOR:	ODOT / BINKLEY	DRILL RIG:	SIMCO 255	STATION / OFFSET:	1429+99, 11.6' RT.	EXPLORATION ID	D-060-0-23									
TYPE:	ROADWAY	SAMPLING FIRM / LOGGER:	ODOT / BINKLEY	HAMMER:		ALIGNMENT:	US 33	PAGE	1 OF 1									
PID:	119144 SFN:	DRILLING METHOD:	3.5" SSA	CALIBRATION DATE:	N/A	ELEVATION:	623.3 (ft) EOB: 2.5 ft.											
START:	4/18/23	END:	4/18/23	SAMPLING METHOD:	CUTTINGS	ENERGY RATIO (%):												
						LAT / LONG:	38.932339, -81.774639											
MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GR	CS	FS	SI	CL	LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
TOPSOIL (5")	623.3																	
BROWN, GRAVEL WITH SAND, SILT, AND CLAY, DAMP	622.9																	
		1				AS-1		64	15	6	7	8	30	17	13	9	A-2-6 (0)	
		2				AS-2		66	14	6	7	7	30	17	13	9	A-2-6 (0)	
	620.8	EOB																


NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

**APPENDIX B
CUT SLOPE BORING LOGS AND
ROCK CORE PHOTOGRAPHS**

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT GDT - 11/26/24 13:46 - U:\175578434\TECHNICAL_PRODUCTION\FIELD_DATA\10K-MEG-33-19.11\GINT LOGS_2024.GPJ

PID: 119144		SFN: NA		PROJECT: MEG-US 33-19.11		STATION / OFFSET: 1165+94, 130' LT.		START: 10/21/24		END: 10/22/24		PG 2 OF 3		B-006-1-24						
MATERIAL DESCRIPTION AND NOTES			ELEV. 751.5	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
										GR	CS	FS	SI	CL	LL	PL	PI			
INTERBEDDED SHALE (75%) AND SANDSTONE (25%), NMODERATELY FRACTURED, RQD 93%, REC. 98%; SHALE , GRAY, MODERATELY WEATHERED, SLIGHTLY STRONG, THIN BEDDED; SANDSTONE , GRAY, SLIGHTLY WEATHERED, STRONG, THIN BEDDED, SLIGHTLY FRACTURED. <i>(continued)</i>			751.5	26	100		100	NQ2-4										CORE		
				27																
				28																
				29																
				30																
				31																
				32																
				33																
				34																
				35																
SANDSTONE , LIGHT GRAY TO GRAY, SLIGHTLY WEATHERED, STRONG, THIN BEDDED, SLIGHTLY FRACTURED; RQD 87%, REC 100%. UCR FROM 46.2 FT. TO 46.6 FT. = 4,670 PSI			732.5	36	100		100	NQ2-5										CORE		
				37																
				38																
				39																
				40																
				41																
				42																
				43																
				44																
				45																
			732.5	46	86		90	NQ2-6										CORE		
				47																
				48																
				49																
				50																
				51																
				51																

PID: 119144	SFN: NA	PROJECT: MEG-US 33-19.11	STATION / OFFSET: 1165+94, 130' LT.	START: 10/21/24	END: 10/22/24	PG 3 OF 3	B-006-1-24												
MATERIAL DESCRIPTION AND NOTES	ELEV.	724.7	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
									GR	CS	FS	SI	CL	LL	PL	PI			
 SHALE, GRAY TO RED, HIGHLY WEATEHRED WEATHERED, WEAK, THIN BEDDED, HIGHLY FRACTURED; RQD 85%, REC 95%.	723.5		52															<>	
			53															<>	
			54	85		95	NQ2-10											CORE	<>
		721.5		55														EOB	<>

NOTES: NONE
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: AUGER CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT GDT - 11/26/24 13:46 - U:\175578434\TECHNICAL_PRODUCTION\FIELD_DATA\10K-MEG-33-19.11\MEG-33-19.11 GINT LOGS_2024.GPJ

PROJECT: MEG-US 33-19.11	DRILLING FIRM / OPERATOR: STANTEC / ZB	DRILL RIG: CME 45#3T (815)	STATION / OFFSET: 1194+20, 238' LT.	EXPLORATION ID: B-006-2-24
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: STANTEC / GK	HAMMER: CME AUTOMATIC	ALIGNMENT: US 33	
PID: 119144 SFN: NA	DRILLING METHOD: 3.25" HSA / NQ2	CALIBRATION DATE: 6/27/23	ELEVATION: 743.2 (MSL) EOB: 29.4 ft.	PAGE: 1 OF 2
START: 10/17/24 END: 10/18/24	SAMPLING METHOD: SPT / NQ2	ENERGY RATIO (%): 90*	LAT / LONG: 38.966816, -81.837330	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
DARK BROWN, TOPSOIL	743.0																	
STIFF TO VERY STIFF, BROWN, SILT AND CLAY, VISUAL DESCRIPTION, DAMP	741.2	TR																
SHALE, RED TO GRAY, HIGHLY WEATHERED, WEAK, THIN BEDDED, HIGHLY FRACTURED; RQD 40%, REC 87%.		1																
		2																
		3		32	59	53	SS-1	4.50	-	-	-	-	-	-	-	7	Rock (V)	
		4		21														
		5		18														
		6		12	45	20	SS-2	4.50	-	-	-	-	-	-	-	1	Rock (V)	
		7		11														
		8		19														
		9		13	56	80	SS-3	4.50	-	-	-	-	-	-	-	10	Rock (V)	
		10		17														
	11		20															
	12		12	45	53	SS-4	4.50	-	-	-	-	-	-	-	10	Rock (V)		
	13		18															
	14		17	-	100	SS-5	4.50	-	-	-	-	-	-	-	8	Rock (V)		
	15		50/5"															
	16		0		36	NQ2-1										CORE		
	17																	
	18																	
	19		66		96	NQ2-2										CORE		
	20																	
	21																	
	22																	
	23																	
	24		36		96	NQ2-3										CORE		

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH.DOT.GDT - 11/26/24 13:46 - U:\175578434\TECHNICAL_PRODUCTION\FIELD_DATA\10K-MEG-33-19.11\MEG-33-19.11 GINT LOGS_2024.GPJ

PID:	SFN:	PROJECT:	STATION / OFFSET:	START:	END:	PG 2 OF 2	B-006-2-24	MATERIAL DESCRIPTION AND NOTES						ELEV.	DEPTHS	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI					LL	PL	PI									
	119144	NA	MEG-US 33-19.11	1194+20, 238' LT.	10/17/24	10/18/24																									

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: AUGER CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH.DOT.GDT - 11/26/24 13:46 - U\175578434\TECHNICAL_PRODUCTION\FIELD_DATA\10K-MEG-33-19.11\MEG-33-19.11 GINT LOGS_2024.GPJ

PID: 119144 | SFN: NA | PROJECT: MEG-US 33-19.11 | STATION / OFFSET: 1205+39, 175' LT. | START: 10/16/24 | END: 10/17/24 | PG 2 OF 2 | B-006-3-24

MATERIAL DESCRIPTION AND NOTES	ELEV. 656.9	DEPTH	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
SHALE, RED TO GRAY, HIGHLY TO MODERATELY WEATHERED, VERY WEAK TO WEAK, THIN BEDDED, HIGHLY TO MODERATELY FRACTURED; RQD 25%, REC 68%. (continued) SDI FROM 31.0 FT. TO 32.0 FT. = 50.7 % UCR FROM 35.2 FT. TO 35.6 FT. = 6,960 PSI		26																
		27																
		28																
		29																
		30		66		94	NQ2-4										CORE	
		31																
		32																
		33																
		34		28		95	NQ2-5											CORE
		35																
	645.9	EOB	36															

NOTES: NONE
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: AUGER CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH.DOT.GDT - 11/26/24 13:46 - U:\175578434\TECHNICAL_PRODUCTION\FIELD_DATA\10K-MEG-33-19.11\MEG-33-19.11 GINT LOGS_2024.GPJ

PID: 119144 | SFN: NA | PROJECT: MEG-US 33-19.11 | STATION / OFFSET: 1292+57, 154' LT. | START: 10/15/24 | END: 10/16/24 | PG 2 OF 2 | B-012-0-24

MATERIAL DESCRIPTION AND NOTES	ELEV. 665.5	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
<p>SHALE, REDDISH GRAY TO BROWN, HIGHLY WEATHERED, WEAK, THIN BEDDED, HIGHLY FRACTURED; RQD 52%, REC 100%.</p> <p>SDI FROM 29.5 FT. TO 30.0 FT. = 9.3%</p>	663.2	26																
		27																
		28																
		29																
		30	70	100	NQ2-5												CORE	
		31																
		32																
		33																
		34	26	100	NQ2-6												CORE	
		35																
	654.7	EOB																

NOTES: NONE
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: AUGER CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT GDT - 11/26/24 13:46 - U\175578434\TECHNICAL_PRODUCTION\FIELD_DATA\10K-MEG-33-19.11\MEG-33-19.11 GINT LOGS_2024.GPJ

PID: 119144 | SFN: NA | PROJECT: MEG-US 33-19.11 | STATION / OFFSET: 1304+99, 258' LT. | START: 10/11/24 | END: 10/14/24 | PG 3 OF 3 | B-013-0-24

MATERIAL DESCRIPTION AND NOTES	ELEV. 656.5	DEPTH	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
UCR FROM 51.4 FT. TO 51.8 FT. = 3,920 PSI SANDSTONE , GRAY TO BROWN, MODERATELY TO SLIGHTLY WEATHERED, STRONG, THIN BEDDED, MODERATELY TO SLIGHTLY FRACTURED; RQD 97%, REC 99%. <i>(continued)</i>		52																
		53																
		54	96	96	NQ2												CORE	
		55																
		56																
		57																
		58																
		59	98	98	NQ2													CORE
		60																
		61																
		62																
		63																
	64	100	100	NQ2													CORE	
	65																	
	66																	
	67																	
	68																	
	69	100	100	NQ2													CORE	
	70																	
	71																	
	72	100	100	NQ2													CORE	
	73																	
	635.0	EOB																

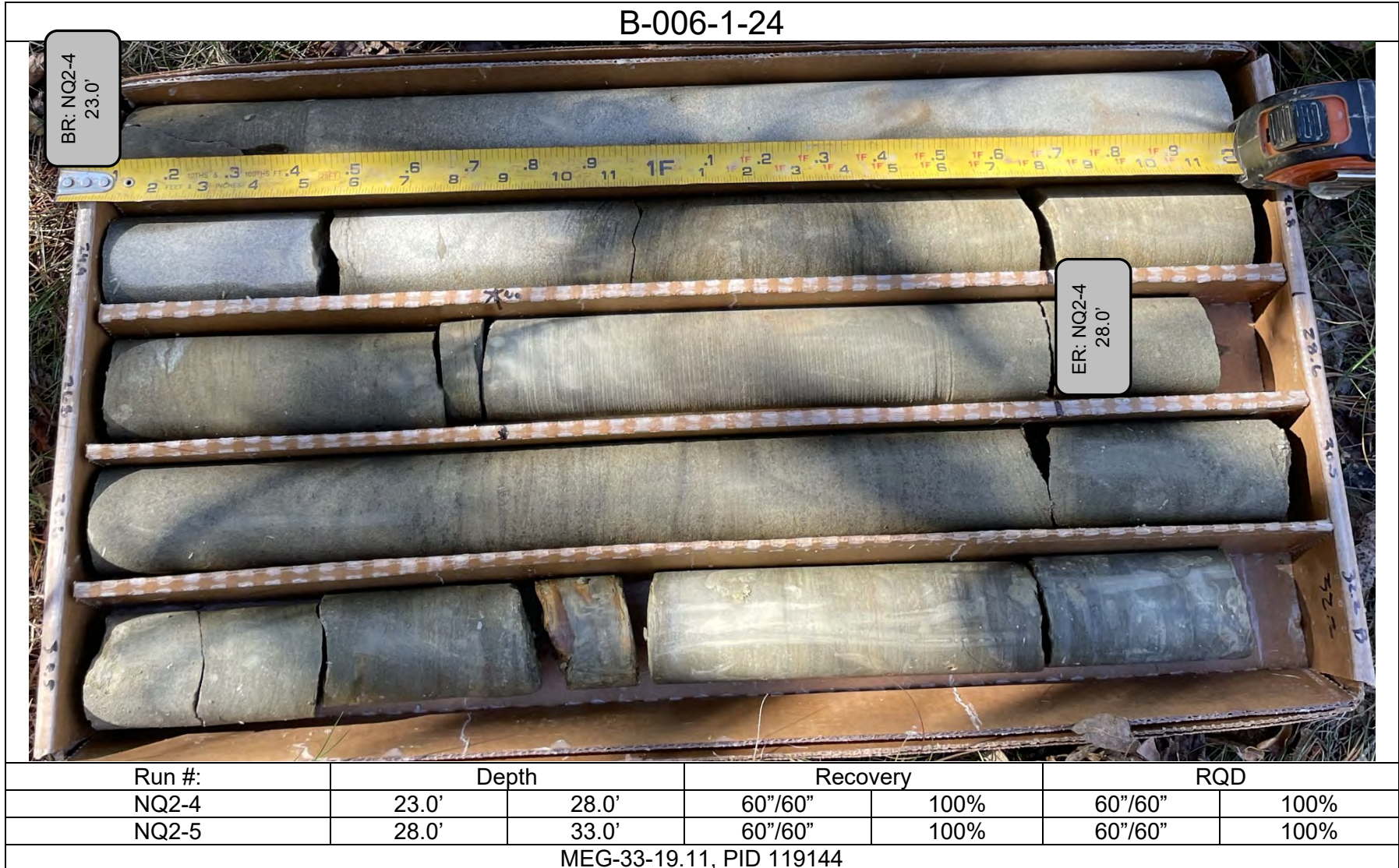
NOTES: NONE
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: AUGER CUTTINGS

B-006-1-24


Run #:	Depth		Recovery		RQD	
NQ2-1	11.5'	13.0'	0"/18"	0%	0"/18"	0%
NQ2-2	13.0'	18.0'	53"/60"	88%	30"/60"	50%
NQ2-2	18.0'	23.0'	58"/60"	96%	58"/60"	96%

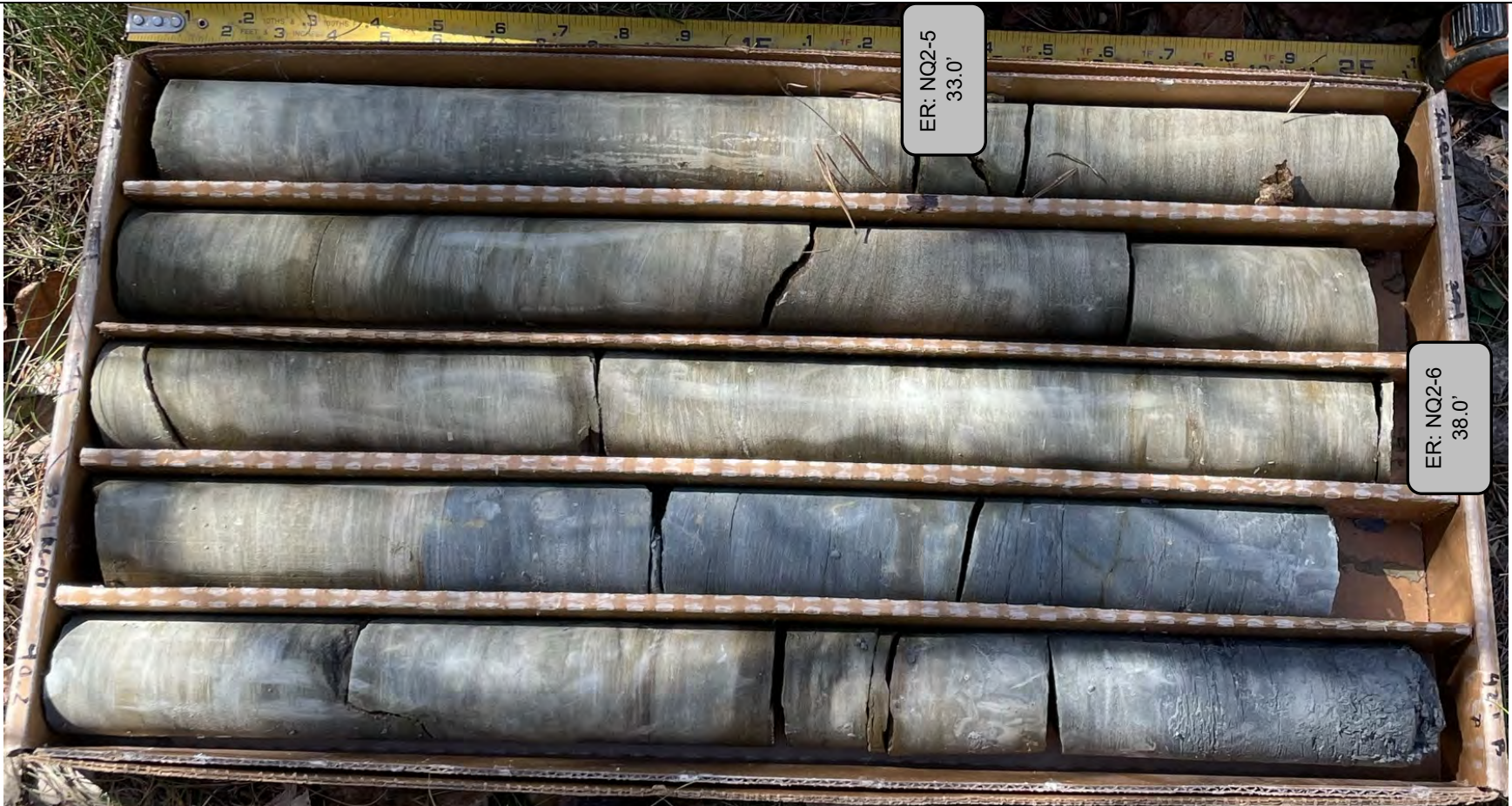
MEG-33-19.11, PID 119144

B-006-1-24



Run #:	Depth		Recovery		RQD	
NQ2-4	23.0'	28.0'	60"/60"	100%	60"/60"	100%
NQ2-5	28.0'	33.0'	60"/60"	100%	60"/60"	100%

MEG-33-19.11, PID 119144

B-006-1-24


Run #:	Depth		Recovery		RQD	
NQ2-5	28.0'	33.0'	60"/60"	100%	60"/60"	100%
NQ2-6	33.0'	38.0'	54"/60"	90%	52"/60"	86%
NQ2-7	38.0'	43.0'	60"/60"	100%	50"/60"	84%

MEG-33-19.11, PID 119144

B-006-1-24



Run #:	Depth		Recovery		RQD	
NQ2-7	38.0'	43.0'	60"/60"	100%	50"/60"	84%
NQ2-8	43.0'	48.0'	60"/60"	100%	52"/60"	86%
NQ2-9	48.0'	53.0'	60"/60"	100%	53"/60"	88%

MEG-33-19.11, PID 119144

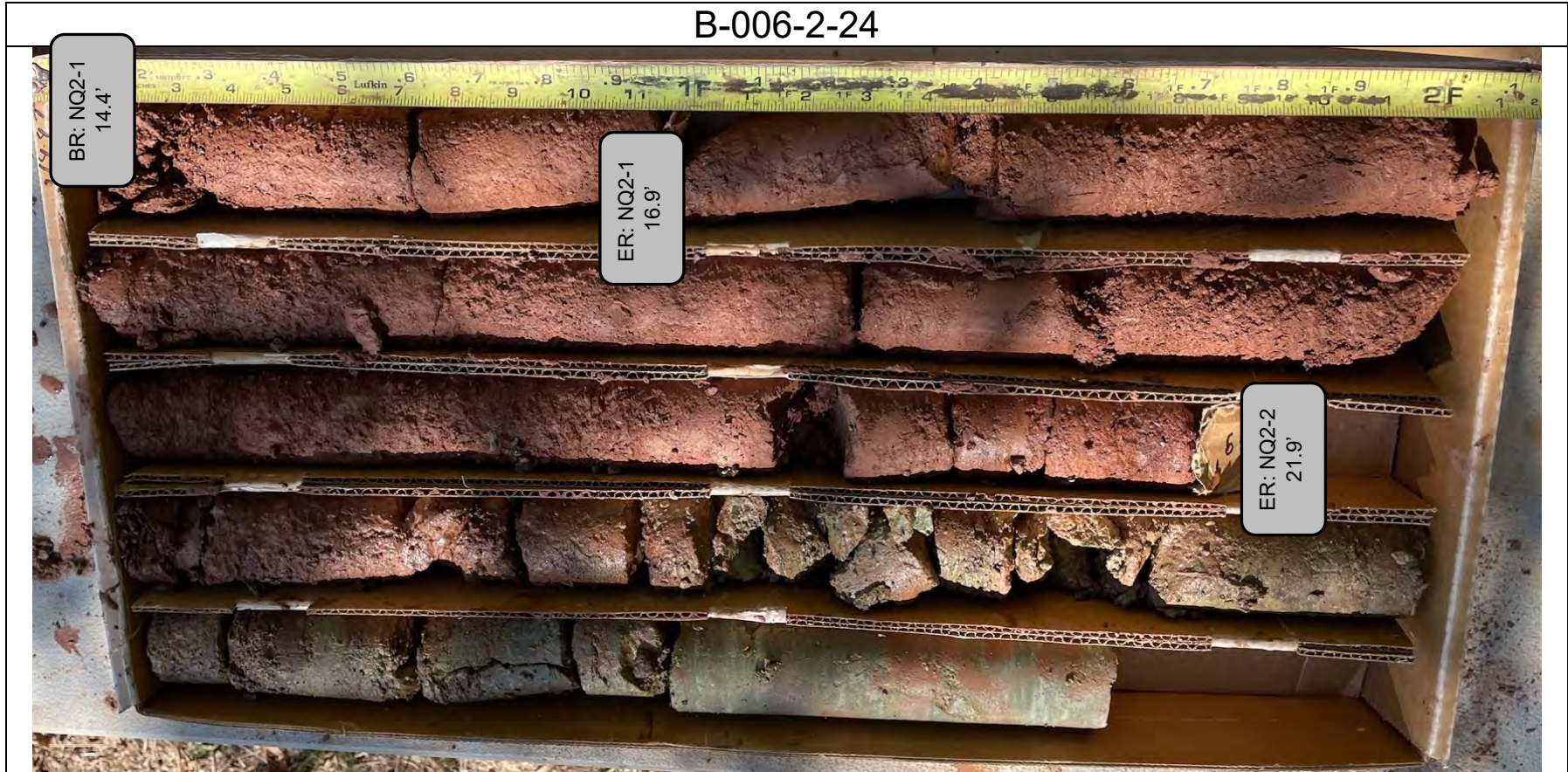
B-006-1-24

 ER: NQ2-9
 53.0'

 ER: NQ2-10
 55.0'

Run #:	Depth		Recovery		RQD	
NQ2-9	48.0'	53.0'	60"/60"	100%	53"/60"	88%
NQ2-10	53.0'	55.0'	23"/24"	95%	20"/24"	85%
MEG-33-19.11, PID 119144						

B-006-2-24



Run #:	Depth		Recovery		RQD	
NQ2-1	14.4'	16.9'	11"/30"	36%	0"/30"	0%
NQ2-2	16.9'	21.9'	58"/60"	96%	40"/60"	66%
NQ2-3	21.9'	26.9'	58"/60"	96%	22"/60"	37%

MEG-33-19.11, PID 119144

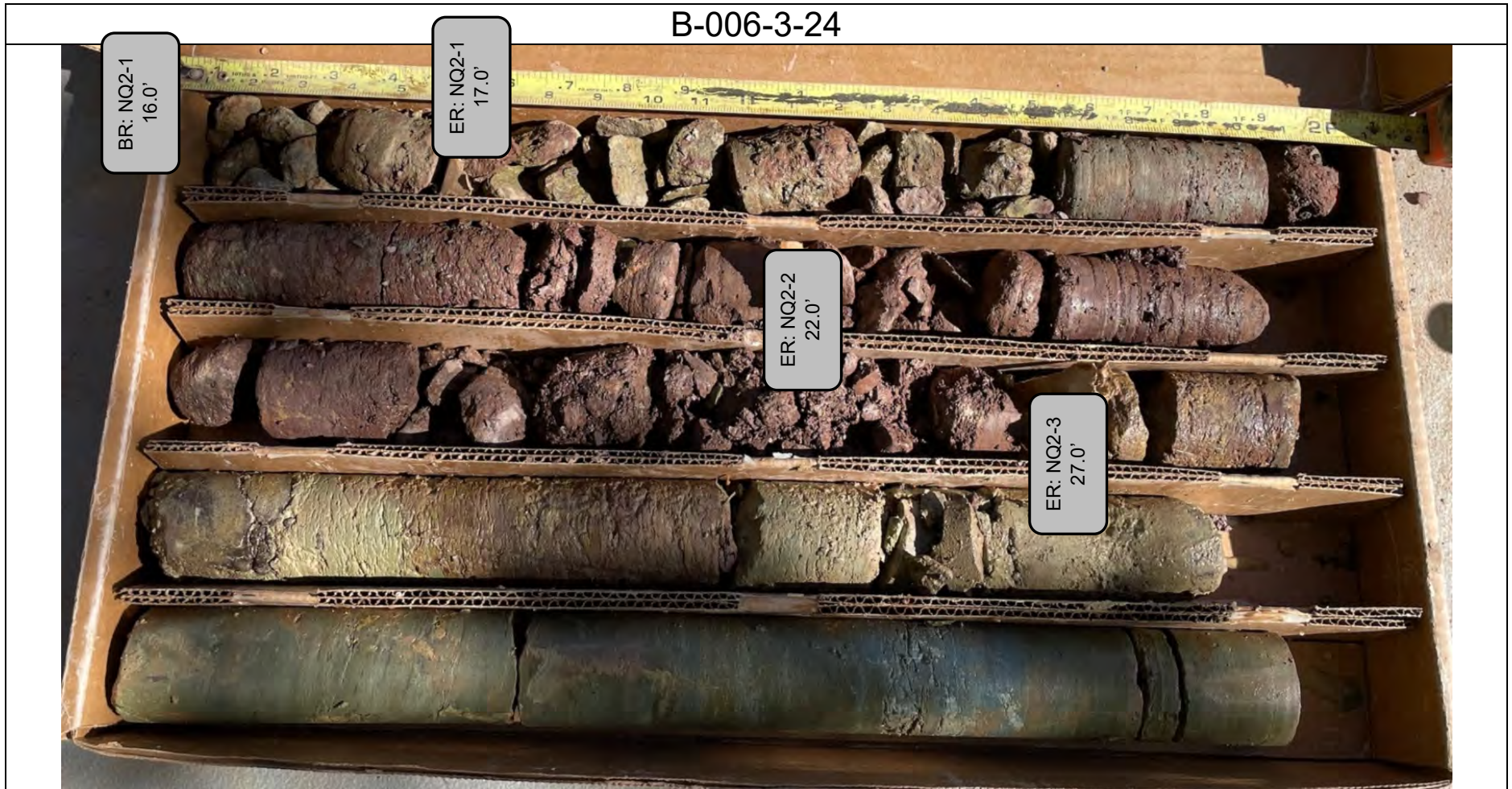
B-006-2-24



Run #:	Depth		Recovery		RQD	
NQ2-3	21.9'	26.9'	58"/60"	96%	22"/60"	37%
NQ2-4	26.9'	29.4'	30"/30"	100%	10"/30"	32%

MEG-33-19.11, PID 119144

B-006-3-24



Run #:	Depth		Recovery		RQD	
NQ2-1	16.0'	17.0'	5"/12"	40%	0"/12"	0%
NQ2-2	17.0'	22.0'	31"/60"	52%	7"/60"	12%
NQ2-3	22.0'	27.0'	25"/60"	42%	0"/60"	0%
NQ2-4	27.0'	32.0'	56"/60"	94%	40"/60"	66%

MEG-33-19.11, PID 119144

B-006-3-24



Run #:	Depth		Recovery		RQD	
NQ2-4	27.0'	32.0'	56"/60"	94%	40"/60"	66%
NQ2-5	32.0'	36.0'	46"/48"	95%	13"/48"	28%

MEG-33-19.11, PID 119144

B-012-0-24


Run #:	Depth		Recovery		RQD	
NQ2-1	10.8'	12.3'	4"/18"	20%	0"/18"	0%
NQ2-2	12.3'	17.3'	48"/60"	80%	22"/60"	36%
NQ2-3	17.3'	22.3'	49"/60"	82%	29"/60"	48%
NQ2-4	22.3'	27.3'	60"/60"	100%	28"/60"	46%

MEG-33-19.11, PID 119144

B-012-0-24


Run #:	Depth		Recovery		RQD	
NQ2-4	22.3'	27.3'	60"/60"	100%	28"/60"	46%
NQ2-5	27.3'	32.3'	60"/60"	100%	42"/60"	70%

MEG-33-19.11, PID 119144

B-012-0-24

 BR: NQ2-6
 32.3'

 ER: NQ2-6
 35.8'

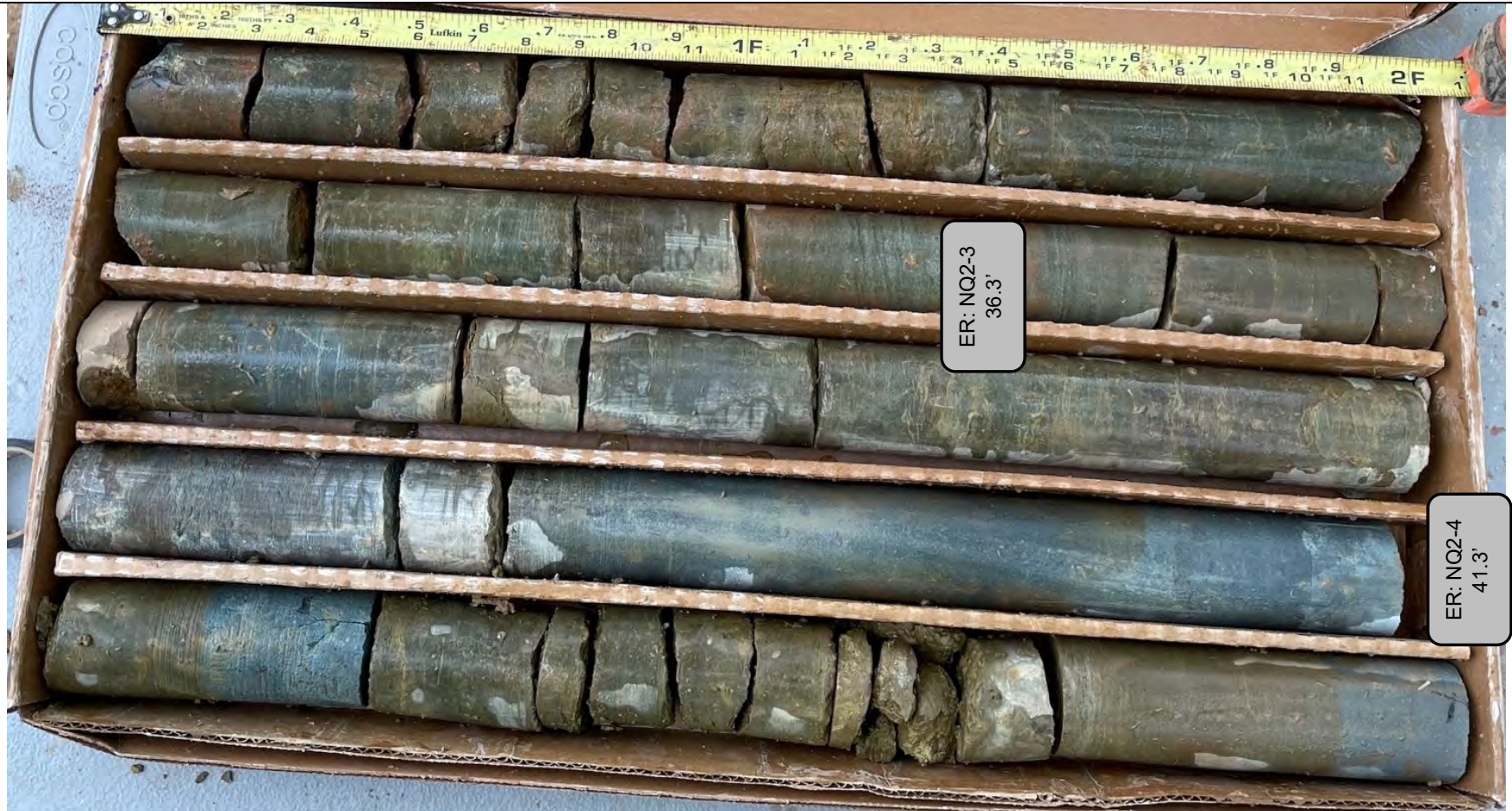
Run #:	Depth		Recovery		RQD	
NQ2-1	32.3'	35.8'	42"/42"	100%	11"/42"	26%
MEG-33-19.11, PID 119144						

B-013-0-24


Run #:	Depth		Recovery		RQD	
NQ2-1	23.3'	26.3'	32"/36"	90%	17"/36"	47%
NQ2-2	26.3'	31.3'	58"/60"	96%	37"/60"	62%
NQ2-3	31.3'	36.3'	60"/60"	100%	30"/60"	50%

MEG-33-19.11, PID 119144

B-013-0-24



Run #:	Depth		Recovery		RQD	
NQ2-3	31.3'	36.3'	60"/60"	100%	30"/60"	50%
NQ2-4	36.3'	41.3'	54"/60"	90%	36"/60"	60%
NQ2-5	41.3'	46.3'	59"/60"	98%	44"/60"	74%

MEG-33-19.11, PID 119144

B-013-0-24


Run #:	Depth		Recovery		RQD	
NQ2-5	41.3'	46.3'	59"/60"	98%	44"/60"	74%
NQ2-6	46.3'	51.3'	60"/60"	100%	60"/60"	100%
NQ2-7	51.3'	56.3'	58"/60"	96%	58"/60"	96%

MEG-33-19.11, PID 119144

B-013-0-24



Run #:	Depth		Recovery		RQD	
NQ2-7	51.3'	56.3'	58"/60"	96%	58"/60"	96%
NQ2-8	56.3'	61.3'	59"/60"	98%	59"/60"	98%
NQ2-9	61.3'	66.3'	60"/60"	100%	60"/60"	100%

MEG-33-19.11, PID 119144

B-013-0-24


Run #:	Depth		Recovery		RQD	
NQ2-9	61.3'	66.3'	60"/60"	100%	60"/60"	100%
NQ2-10	66.3'	71.3'	60"/60"	100%	60"/60"	100%
NQ2-11	71.3'	73.3'	24"/24"	100%	24"/24"	100%

MEG-33-19.11, PID 119144

APPENDIX C
SCOUR PARAMETER CALCULATIONS

Scour Calculations - Soil

Project: MEG-33-19.21 - Bowman's Run Bridge
 Performed By: James Samples 2/21/2024
 Checked By: Robert Lopina 2/22/2024

Boring	Sample	Elevation	ODOT Class.	D ₅₀ , mm	Soil Type	Treat As	Cohesive Soil					Granular Soil								
							Water Content, w, %	Fines Content, F, %	Tested PI	PI for eqn.	Hand Pen., tsf	q _u (other testing), tsf	q _u for eqn., psf	α	τ _c , psf	D _{50, equiv} , mm	EC	τ _c , psf	D _{50, equiv} , mm	EC
B-001-0-23	SS-1&2	654.6'-649.6'	A-4a	0.0805	Transitional	Cohesive	13.5	48.6	8	8	2.75		5500	0.01	0.1523	7.2917	2.754			
B-001-0-23	SS-3	649.6'-648.4'	A-4a	0.0715	Transitional	Cohesive	13.9	50.6	8	8			2000	0.01	0.1039	4.9746	2.754			
B-002-0-23	SS-2	637.0'-635.0'	A-4a	0.1321	Transitional	Cohesive	15.3	35.7	4	4			2000	0.01	0.0173	0.8301	2.211			
B-003-0-23	SS-1	677.3'-676.3'	A-6a	0.0106	Cohesive	-	15.9	74.4	11	11			2000	0.01	0.2598	12.4347	3.075			

Scour Calculations - Sandstone

Project:	MEG-33-19.21 - Bowman's Run Bridge
Performed By:	James Samples 2/22/2024
Checked By:	Robert Lopina 2/22/2024

Critical Shear Stress

$$\tau_c = \rho \left(\frac{1000 K^{0.75}}{7.853 \rho} \right)^{2/3}$$

ODOT GDM Section 1302.1.3

where:

- τ_c = Critical shear stress (Pa)
- ρ = Mass density of water (1000 kg/m³)
- K = Erodibility Index (dim.)

$$K = (M_s)(K_b)(K_d)(J_s)$$

HEC 18 Equation 4.17

where:

- K = Erodibility Index
- M_s = Intact rock mass strength parameter
- K_b = Block size parameter
- K_d = Shear strength parameter
- J_s = Relative orientation parameter

M_s	=	35	(see determination below)
K_b	=	17.20	(see determination below)
K_d	=	0.25	(see determination below)
J_s	=	1.05	(see determination below)
K	=	158.03	
τ_c , Pa	=	3181.8	
τ_c , psf	=	66.47	

Erosion Category (EC)

S_v , mm	=	160	(average vertical spacing between horizontal discontinuities)
EC	=	4.367	(note if $S_v < 0.2$ mm, 0.2 mm is used in the EC calculation)

M_s Determination

6116	Rock Unconfined Compressive Strength (psi)
42.17	Rock Unconfined Compressive Strength (MPa)
35	M _s (HEC 18 Table 4.22)

Table 4.22. Values of the Rock Mass Strength Parameter M_s.

Hardness	Identification in Profile	Unconfined Compressive Strength (MPa)	Mass Strength Number (M _s)
Very soft rock	Material crumbles under firm (moderate) blows with sharp end of geological pick and	Less than 1.7	0.87
	can be peeled off with a knife; is too hard to cut triaxial sample by hand.	1.7 – 3.3	1.86
Soft rock	Can just be scraped and peeled with a knife; indentations 1 mm to 3-mm show in the	3.3 – 6.6	3.95
	specimen with firm (moderate) blows of the pick point.	6.6 – 13.2	8.39
Hard rock	Cannot be scraped or peeled with a knife; hand-held specimen can be broken with hammer end of geological pick with a single firm (moderate) blow.	13.2 – 26.4	17.70
Very hard rock	Hand-held specimen breaks with hammer end of pick under more than one blow.	26.4 – 53.0	35.0
		53.00 – 106.0	70.0
Extremely hard rock	Specimen requires many blows with geological pick to break through intact material.	Larger than 212.0	280.0

K_b Determination

$$K_b = \frac{RQD}{J_n} \quad \text{HEC 18 Equation 4.18}$$

86 RQD, percent (value 0 to 100)

5.00 J_n (HEC 18 Table 4.23)

17.20 K_b (per ODOT GDM, if RQD = 0, use K_b = 0.10)

Table 4.23. Rock Joint Set Number J_n.

Number of Joint Sets	Joint Set Number (J _n)
Intact, no or few joints/fissures	1.00
One joint/fissure set	1.22
One joint/fissure set plus random	1.50
Two joint/fissure sets	1.83
Two joint/fissure sets plus random	2.24
Three joint/fissure sets	2.73
Three joint/fissure sets plus random	3.34
Four joint/fissure sets	4.09
Multiple joint/fissure sets	5.00

K_d Determination

$$K_d = \frac{J_r}{J_a} \quad \text{HEC 18 Equation 4.19}$$

1.5	J _r (HEC 18 Table 4.24)
6.0	J _a (HEC 18 Table 4.25)
0.25	K _d

Condition of Joint	Joint Roughness Number J _r
Stepped joints/fissures	4.0
Rough or irregular, undulating	3.0
Smooth undulating	2.0
Slickensided undulating	1.5
Rough or irregular, planar	1.5
Smooth planar	1.0
Slickensided planar	0.5
Joints/fissures either open or containing relatively soft gouge of sufficient thickness to prevent joint/fissure wall contact upon excavation	1.0
Shattered or micro-shattered clays	1.0

Description of Gouge	Joint Alteration Number (J _a) for Joint Separation (mm)		
	1.0 ⁽¹⁾	1.0 – 5.0 ⁽²⁾	5.0 ⁽³⁾
Tightly healed, hard, non-softening impermeable filling	0.75	-	-
Unaltered joint walls, surface staining only	1.0	-	-
Slightly altered, non-softening, non-cohesive rock mineral or crushed rock filling	2.0	2.0	4.0
Non-softening, slightly clayey non-cohesive filling	3.0	6.0	10.0
Non-softening, strongly over-consolidated clay mineral filling, with or without crushed rock	3.0	6.0**	10.0
Softening or low friction clay mineral coatings and small quantities of swelling clays	4.0	8.0	13.0
Softening moderately over-consolidated clay mineral filling, with or without crushed rock	4.0	8.00**	13.0
Shattered or micro-shattered (swelling) clay gouge, with or without crushed rock	5.0	10.0**	18.0

Note:

(1) Joint walls effectively in contact.
 (2) Joint walls come into contact after approximately 100-mm shear.
 (3) Joint walls do not come into contact at all upon shear.
 **Also applies when crushed rock occurs in clay gouge without rock wall contact.

J_s Determination

1.05 J_s (HEC 18 Table 4.26)

From HEC-18:

Relative orientation, in the case of rock, is a function of the relative shape of the rock and its dip and dip direction relative to the direction of flow. The relative orientation parameter J_s represents the relative ability of earth material to resist erosion due to the structure of the ground. This parameter is a function of the dip and dip direction of the least favorable discontinuity (most easily eroded) in the rock with respect to the direction of flow, and the shape of the material units. These two variables (orientation and shape) affect the ease by which the stream can penetrate the ground and dislodge individual material units.

Conceptually, the function of the relative orientation parameter J_s incorporating shape and orientation is as follows. If rock is dipped against the direction flow, it will be more difficult to scour the rock than when it is dipped in the direction of flow. When it is dipped in the direction of flow, it is easier for the flow to lift the rock, penetrate underneath and remove it. Rock that is dipped against the direction of flow will be more difficult to dislodge. The shape of the rock, represented by the length to width ratio *r*, impacts the erodibility of rock in the following manner. Elongated rock will be more difficult to remove than equi-sided blocks of rock. Therefore, large ratios of *r* represent rock that is more difficult to remove because it represents elongated rock shapes. Values of the relative orientation parameter J_s are provided in Table 4.26.

Table 4.26. Relative Orientation Parameter J_s.

Dip Direction of Closer Spaced Joint Set (degrees)	Dip Angle of Closer Spaced Joint Set (degrees)	Ratio of Joint Spacing, r			
		Ratio 1:1	Ratio 1:2	Ratio 1:4	Ratio 1:8
Dip Direction	Dip Angle				
180/0	90	1.14	1.20	1.24	1.26
In direction of stream flow	89	0.78	0.71	0.65	0.61
In direction of stream flow	85	0.73	0.66	0.61	0.57
In direction of stream flow	80	0.67	0.60	0.55	0.52
In direction of stream flow	70	0.56	0.50	0.46	0.43
In direction of stream flow	60	0.50	0.46	0.42	0.40
In direction of stream flow	50	0.49	0.46	0.43	0.41
In direction of stream flow	40	0.53	0.49	0.46	0.45
In direction of stream flow	30	0.63	0.59	0.55	0.53
In direction of stream flow	20	0.84	0.77	0.71	0.67
In direction of stream flow	10	1.25	1.10	0.98	0.90
In direction of stream flow	5	1.39	1.23	1.09	1.01
In direction of stream flow	1	1.50	1.33	1.19	1.10
0/180	0	1.14	1.09	1.05	1.02
Against direction of stream flow	-1	0.78	0.85	0.90	0.94
Against direction of stream flow	-5	0.73	0.79	0.84	0.88
Against direction of stream flow	-10	0.67	0.72	0.78	0.81
Against direction of stream flow	-20	0.56	0.62	0.66	0.69
Against direction of stream flow	-30	0.50	0.55	0.58	0.60
Against direction of stream flow	-40	0.49	0.52	0.55	0.57
Against direction of stream flow	-50	0.53	0.56	0.59	0.61
Against direction of stream flow	-60	0.63	0.68	0.71	0.73
Against direction of stream flow	-70	0.84	0.91	0.97	1.01
Against direction of stream flow	-80	1.26	1.41	1.53	1.61
Against direction of stream flow	-85	1.39	1.55	1.69	1.77
Against direction of stream flow	-89	1.50	1.68	1.82	1.91
180/0	-90	1.14	1.20	1.24	1.26

Notes:

1. For intact material take J_s = 1.0.
2. For values of r greater than 8 take J_s as for r = 8.
3. If the flow direction FD is not in the direction of the true dip TD, the effective dip ED is determined by adding the ground slope to the apparent dip AD: ED = AD + GS

Scour Calculations - Shale

Project:	MEG-33-19.21 - Bowman's Run Bridge
Performed By:	James Samples 2/22/2024
Checked By:	Robert Lopina 2/22/2024

Critical Shear Stress

$$\tau_c = \rho \left(\frac{1000 K^{0.75}}{7.853 \rho} \right)^{2/3}$$

ODOT GDM Section 1302.1.3

where:

- τ_c = Critical shear stress (Pa)
- ρ = Mass density of water (1000 kg/m³)
- K = Erodibility Index (dim.)

$$K = (M_s)(K_b)(K_d)(J_s)$$

HEC 18 Equation 4.17

where:

- K = Erodibility Index
- M_s = Intact rock mass strength parameter
- K_b = Block size parameter
- K_d = Shear strength parameter
- J_s = Relative orientation parameter

M_s	=	3.95	(see determination below)
K_b	=	17.20	(see determination below)
K_d	=	0.17	(see determination below)
J_s	=	1.05	(see determination below)
K	=	11.89	
τ_c , Pa	=	872.8	
τ_c , psf	=	18.23	

Erosion Category (EC)

S_v , mm	=	60	(average vertical spacing between horizontal discontinuities)
EC	=	3.856	(note if $S_v < 0.2$ mm, 0.2 mm is used in the EC calculation)

M_s Determination

600	Rock Unconfined Compressive Strength (psi)	Conservative average estimate using GDM
4.14	Rock Unconfined Compressive Strength (MPa)	Table 400-5.
3.95	M _s	(HEC 18 Table 4.22)

Table 4.22. Values of the Rock Mass Strength Parameter M_s.

Hardness	Identification in Profile	Unconfined Compressive Strength (MPa)	Mass Strength Number (M _s)
Very soft rock	Material crumbles under firm (moderate) blows with sharp end of geological pick and	Less than 1.7	0.87
	can be peeled off with a knife; is too hard to cut triaxial sample by hand.	1.7 – 3.3	1.86
Soft rock	Can just be scraped and peeled with a knife; indentations 1 mm to 3-mm show in the	3.3 – 6.6	3.95
	specimen with firm (moderate) blows of the pick point.	6.6 – 13.2	8.39
Hard rock	Cannot be scraped or peeled with a knife; hand-held specimen can be broken with hammer end of geological pick with a single firm (moderate) blow.	13.2 – 26.4	17.70
Very hard rock	Hand-held specimen breaks with hammer end of pick under more than one blow.	26.4 – 53.0	35.0
		53.00 – 106.0	70.0
Extremely hard rock	Specimen requires many blows with geological pick to break through intact material.	Larger than 212.0	280.0

K_b Determination

$$K_b = \frac{RQD}{J_n} \quad \text{HEC 18 Equation 4.18}$$

86	RQD, percent (value 0 to 100)
5.00	J _n (HEC 18 Table 4.23)
17.20	K _b (per ODOT GDM, if RQD = 0, use K _b = 0.10)

Table 4.23. Rock Joint Set Number J_n.

Number of Joint Sets	Joint Set Number (J _n)
Intact, no or few joints/fissures	1.00
One joint/fissure set	1.22
One joint/fissure set plus random	1.50
Two joint/fissure sets	1.83
Two joint/fissure sets plus random	2.24
Three joint/fissure sets	2.73
Three joint/fissure sets plus random	3.34
Four joint/fissure sets	4.09
Multiple joint/fissure sets	5.00

K_d Determination

$$K_d = \frac{J_r}{J_a} \quad \text{HEC 18 Equation 4.19}$$

1.0	J _r (HEC 18 Table 4.24)
6.0	J _a (HEC 18 Table 4.25)
0.17	K _d

Condition of Joint	Joint Roughness Number J _r
Stepped joints/fissures	4.0
Rough or irregular, undulating	3.0
Smooth undulating	2.0
Slickensided undulating	1.5
Rough or irregular, planar	1.5
Smooth planar	1.0
Slickensided planar	0.5
Joints/fissures either open or containing relatively soft gouge of sufficient thickness to prevent joint/fissure wall contact upon excavation	1.0
Shattered or micro-shattered clays	1.0

Description of Gouge	Joint Alteration Number (J _a) for Joint Separation (mm)		
	1.0 ⁽¹⁾	1.0 – 5.0 ⁽²⁾	5.0 ⁽³⁾
Tightly healed, hard, non-softening impermeable filling	0.75	-	-
Unaltered joint walls, surface staining only	1.0	-	-
Slightly altered, non-softening, non-cohesive rock mineral or crushed rock filling	2.0	2.0	4.0
Non-softening, slightly clayey non-cohesive filling	3.0	6.0	10.0
Non-softening, strongly over-consolidated clay mineral filling, with or without crushed rock	3.0	6.0**	10.0
Softening or low friction clay mineral coatings and small quantities of swelling clays	4.0	8.0	13.0
Softening moderately over-consolidated clay mineral filling, with or without crushed rock	4.0	8.00**	13.0
Shattered or micro-shattered (swelling) clay gouge, with or without crushed rock	5.0	10.0**	18.0

Note:

(1) Joint walls effectively in contact.
 (2) Joint walls come into contact after approximately 100-mm shear.
 (3) Joint walls do not come into contact at all upon shear.
 **Also applies when crushed rock occurs in clay gouge without rock wall contact.

J_s Determination

1.05 J_s (HEC 18 Table 4.26)

From HEC-18:

Relative orientation, in the case of rock, is a function of the relative shape of the rock and its dip and dip direction relative to the direction of flow. The relative orientation parameter J_s represents the relative ability of earth material to resist erosion due to the structure of the ground. This parameter is a function of the dip and dip direction of the least favorable discontinuity (most easily eroded) in the rock with respect to the direction of flow, and the shape of the material units. These two variables (orientation and shape) affect the ease by which the stream can penetrate the ground and dislodge individual material units.

Conceptually, the function of the relative orientation parameter J_s incorporating shape and orientation is as follows. If rock is dipped against the direction flow, it will be more difficult to scour the rock than when it is dipped in the direction of flow. When it is dipped in the direction of flow, it is easier for the flow to lift the rock, penetrate underneath and remove it. Rock that is dipped against the direction of flow will be more difficult to dislodge. The shape of the rock, represented by the length to width ratio *r*, impacts the erodibility of rock in the following manner. Elongated rock will be more difficult to remove than equi-sided blocks of rock. Therefore, large ratios of *r* represent rock that is more difficult to remove because it represents elongated rock shapes. Values of the relative orientation parameter J_s are provided in Table 4.26.

Table 4.26. Relative Orientation Parameter J_s.

Dip Direction of Closer Spaced Joint Set (degrees)	Dip Angle of Closer Spaced Joint Set (degrees)	Ratio of Joint Spacing, r			
		Ratio 1:1	Ratio 1:2	Ratio 1:4	Ratio 1:8
Dip Direction	Dip Angle				
180/0	90	1.14	1.20	1.24	1.26
In direction of stream flow	89	0.78	0.71	0.65	0.61
In direction of stream flow	85	0.73	0.66	0.61	0.57
In direction of stream flow	80	0.67	0.60	0.55	0.52
In direction of stream flow	70	0.56	0.50	0.46	0.43
In direction of stream flow	60	0.50	0.46	0.42	0.40
In direction of stream flow	50	0.49	0.46	0.43	0.41
In direction of stream flow	40	0.53	0.49	0.46	0.45
In direction of stream flow	30	0.63	0.59	0.55	0.53
In direction of stream flow	20	0.84	0.77	0.71	0.67
In direction of stream flow	10	1.25	1.10	0.98	0.90
In direction of stream flow	5	1.39	1.23	1.09	1.01
In direction of stream flow	1	1.50	1.33	1.19	1.10
0/180	0	1.14	1.09	1.05	1.02
Against direction of stream flow	-1	0.78	0.85	0.90	0.94
Against direction of stream flow	-5	0.73	0.79	0.84	0.88
Against direction of stream flow	-10	0.67	0.72	0.78	0.81
Against direction of stream flow	-20	0.56	0.62	0.66	0.69
Against direction of stream flow	-30	0.50	0.55	0.58	0.60
Against direction of stream flow	-40	0.49	0.52	0.55	0.57
Against direction of stream flow	-50	0.53	0.56	0.59	0.61
Against direction of stream flow	-60	0.63	0.68	0.71	0.73
Against direction of stream flow	-70	0.84	0.91	0.97	1.01
Against direction of stream flow	-80	1.26	1.41	1.53	1.61
Against direction of stream flow	-85	1.39	1.55	1.69	1.77
Against direction of stream flow	-89	1.50	1.68	1.82	1.91
180/0	-90	1.14	1.20	1.24	1.26

Notes:

1. For intact material take J_s = 1.0.
2. For values of r greater than 8 take J_s as for r = 8.
3. If the flow direction FD is not in the direction of the true dip TD, the effective dip ED is determined by adding the ground slope to the apparent dip AD: ED = AD + GS

Scour Calculations - Claystone

Project:	MEG-33-19.21 - Bowman's Run Bridge
Performed By:	James Samples 2/22/2024
Checked By:	Robert Lopina 2/22/2024

Critical Shear Stress

$$\tau_c = \rho \left(\frac{1000 K^{0.75}}{7.853 \rho} \right)^{2/3}$$

ODOT GDM Section 1302.1.3

where:

τ_c = Critical shear stress (Pa)
 ρ = Mass density of water (1000 kg/m³)
K = Erodibility Index (dim.)

$$K = (M_s)(K_b)(K_d)(J_s)$$

HEC 18 Equation 4.17

where:

K = Erodibility Index
M_s = Intact rock mass strength parameter
K_b = Block size parameter
K_d = Shear strength parameter
J_s = Relative orientation parameter

M _s	=	1.86	(see determination below)
K _b	=	12.60	(see determination below)
K _d	=	0.17	(see determination below)
J _s	=	1.05	(see determination below)
K	=	4.10	
τ_c , Pa	=	512.6	
τ_c , psf	=	10.71	

Erosion Category (EC)

S _v , mm	=	10	(average vertical spacing between horizontal discontinuities)
EC	=	2.922	(note if S _v < 0.2 mm, 0.2 mm is used in the EC calculation)

M_s Determination

250	Rock Unconfined Compressive Strength (psi)	Conservative average estimate using GDM
1.72	Rock Unconfined Compressive Strength (MPa)	Table 400-5.
1.86	M _s	(HEC 18 Table 4.22)

Table 4.22. Values of the Rock Mass Strength Parameter M_s.

Hardness	Identification in Profile	Unconfined Compressive Strength (MPa)	Mass Strength Number (M _s)
Very soft rock	Material crumbles under firm (moderate) blows with sharp end of geological pick and	Less than 1.7	0.87
	can be peeled off with a knife; is too hard to cut triaxial sample by hand.	1.7 – 3.3	1.86
Soft rock	Can just be scraped and peeled with a knife; indentations 1 mm to 3-mm show in the	3.3 – 6.6	3.95
	specimen with firm (moderate) blows of the pick point.	6.6 – 13.2	8.39
Hard rock	Cannot be scraped or peeled with a knife; hand-held specimen can be broken with hammer end of geological pick with a single firm (moderate) blow.	13.2 – 26.4	17.70
Very hard rock	Hand-held specimen breaks with hammer end of pick under more than one blow.	26.4 – 53.0 53.00 – 106.0	35.0 70.0
Extremely hard rock	Specimen requires many blows with geological pick to break through intact material.	Larger than 212.0	280.0

K_b Determination

$$K_b = \frac{RQD}{J_n} \quad \text{HEC 18 Equation 4.18}$$

63	RQD, percent (value 0 to 100)
5.00	J _n (HEC 18 Table 4.23)
12.60	K _b (per ODOT GDM, if RQD = 0, use K _b = 0.10)

Table 4.23. Rock Joint Set Number J_n.

Number of Joint Sets	Joint Set Number (J _n)
Intact, no or few joints/fissures	1.00
One joint/fissure set	1.22
One joint/fissure set plus random	1.50
Two joint/fissure sets	1.83
Two joint/fissure sets plus random	2.24
Three joint/fissure sets	2.73
Three joint/fissure sets plus random	3.34
Four joint/fissure sets	4.09
Multiple joint/fissure sets	5.00

K_d Determination

$$K_d = \frac{J_r}{J_a} \quad \text{HEC 18 Equation 4.19}$$

1.0	J _r (HEC 18 Table 4.24)
6.0	J _a (HEC 18 Table 4.25)
0.17	K _d

Condition of Joint	Joint Roughness Number J _r
Stepped joints/fissures	4.0
Rough or irregular, undulating	3.0
Smooth undulating	2.0
Slickensided undulating	1.5
Rough or irregular, planar	1.5
Smooth planar	1.0
Slickensided planar	0.5
Joints/fissures either open or containing relatively soft gouge of sufficient thickness to prevent joint/fissure wall contact upon excavation	1.0
Shattered or micro-shattered clays	1.0

Description of Gouge	Joint Alteration Number (J _a) for Joint Separation (mm)		
	1.0 ⁽¹⁾	1.0 – 5.0 ⁽²⁾	5.0 ⁽³⁾
Tightly healed, hard, non-softening impermeable filling	0.75	-	-
Unaltered joint walls, surface staining only	1.0	-	-
Slightly altered, non-softening, non-cohesive rock mineral or crushed rock filling	2.0	2.0	4.0
Non-softening, slightly clayey non-cohesive filling	3.0	6.0	10.0
Non-softening, strongly over-consolidated clay mineral filling, with or without crushed rock	3.0	6.0*	10.0
Softening or low friction clay mineral coatings and small quantities of swelling clays	4.0	8.0	13.0
Softening moderately over-consolidated clay mineral filling, with or without crushed rock	4.0	8.00**	13.0
Shattered or micro-shattered (swelling) clay gouge, with or without crushed rock	5.0	10.0**	18.0

Note:

(1) Joint walls effectively in contact.
 (2) Joint walls come into contact after approximately 100-mm shear.
 (3) Joint walls do not come into contact at all upon shear.
 **Also applies when crushed rock occurs in clay gouge without rock wall contact.

J_s Determination

1.05 J_s (HEC 18 Table 4.26)

From HEC-18:

Relative orientation, in the case of rock, is a function of the relative shape of the rock and its dip and dip direction relative to the direction of flow. The relative orientation parameter J_s represents the relative ability of earth material to resist erosion due to the structure of the ground. This parameter is a function of the dip and dip direction of the least favorable discontinuity (most easily eroded) in the rock with respect to the direction of flow, and the shape of the material units. These two variables (orientation and shape) affect the ease by which the stream can penetrate the ground and dislodge individual material units.

Conceptually, the function of the relative orientation parameter J_s incorporating shape and orientation is as follows. If rock is dipped against the direction flow, it will be more difficult to scour the rock than when it is dipped in the direction of flow. When it is dipped in the direction of flow, it is easier for the flow to lift the rock, penetrate underneath and remove it. Rock that is dipped against the direction of flow will be more difficult to dislodge. The shape of the rock, represented by the length to width ratio *r*, impacts the erodibility of rock in the following manner. Elongated rock will be more difficult to remove than equi-sided blocks of rock. Therefore, large ratios of *r* represent rock that is more difficult to remove because it represents elongated rock shapes. Values of the relative orientation parameter J_s are provided in Table 4.26.

Table 4.26. Relative Orientation Parameter J_s.

Dip Direction of Closer Spaced Joint Set (degrees)	Dip Angle of Closer Spaced Joint Set (degrees)	Ratio of Joint Spacing, r			
		Ratio 1:1	Ratio 1:2	Ratio 1:4	Ratio 1:8
Dip Direction	Dip Angle	Ratio 1:1	Ratio 1:2	Ratio 1:4	Ratio 1:8
180/0	90	1.14	1.20	1.24	1.26
In direction of stream flow	89	0.78	0.71	0.65	0.61
In direction of stream flow	85	0.73	0.66	0.61	0.57
In direction of stream flow	80	0.67	0.60	0.55	0.52
In direction of stream flow	70	0.56	0.50	0.46	0.43
In direction of stream flow	60	0.50	0.46	0.42	0.40
In direction of stream flow	50	0.49	0.46	0.43	0.41
In direction of stream flow	40	0.53	0.49	0.46	0.45
In direction of stream flow	30	0.63	0.59	0.55	0.53
In direction of stream flow	20	0.84	0.77	0.71	0.67
In direction of stream flow	10	1.25	1.10	0.98	0.90
In direction of stream flow	5	1.39	1.23	1.09	1.01
In direction of stream flow	1	1.50	1.33	1.19	1.10
0/180	0	1.14	1.09	1.05	1.02
Against direction of stream flow	-1	0.78	0.85	0.90	0.94
Against direction of stream flow	-5	0.73	0.79	0.84	0.88
Against direction of stream flow	-10	0.67	0.72	0.78	0.81
Against direction of stream flow	-20	0.56	0.62	0.66	0.69
Against direction of stream flow	-30	0.50	0.55	0.58	0.60
Against direction of stream flow	-40	0.49	0.52	0.55	0.57
Against direction of stream flow	-50	0.53	0.56	0.59	0.61
Against direction of stream flow	-60	0.63	0.68	0.71	0.73
Against direction of stream flow	-70	0.84	0.91	0.97	1.01
Against direction of stream flow	-80	1.26	1.41	1.53	1.61
Against direction of stream flow	-85	1.39	1.55	1.69	1.77
Against direction of stream flow	-89	1.50	1.68	1.82	1.91
180/0	-90	1.14	1.20	1.24	1.26

Notes:

1. For intact material take J_s = 1.0.
2. For values of r greater than 8 take J_s as for r = 8.
3. If the flow direction FD is not in the direction of the true dip TD, the effective dip ED is determined by adding the ground slope to the apparent dip AD: ED = AD + GS

Scour Calculations - Soil

Project: MEG-33-19.21 - Old Town Creek Bridge
 Performed By: James Samples 2/21/2024
 Checked By: Robert Lopina 2/22/2024

Boring	Sample	Elevation	ODOT Class.	D ₅₀ , mm	Soil Type	Treat As	Cohesive Soil					Granular Soil								
							Water Content, w, %	Fines Content, F, %	Tested PI	PI for eqn.	Hand Pen., tsf	q _u (other testing), tsf	q _u for eqn., psf	α	τ _c , psf	D _{50, equiv} , mm	EC	τ _c , psf	D _{50, equiv} , mm	EC
B-007-0-23	SS-1 to 5	586.4'-573.9'	A-2-6	2.8537	Cohesive	-	18.0	33.6	11	11	2.5		5000	0.01	0.0596	2.8549	3.075			
B-007-0-23	SS-6	573.9'-571.4'	A-6a	0.0101	Cohesive	-	18.8	83.5	12	12	4.5		9000	0.01	0.4783	22.8956	3.168			
B-008-0-23	SS-6 to 10	569.2'-554.9'	A-4a	0.0466	Transitional	Cohesive	14.0	53.2	9	9	3.25		6500	0.01	0.2115	10.1230	2.868			
B-009-0-23	SS-1 & 2	603.2'-597.8'	A-4a	0.2105	Transitional	Granular												0.0044	0.2105	1.388

Scour Calculations - Sandstone

Project:	MEG-33-19.21 - Old Town Creek Bridge
Performed By:	James Samples 2/22/2024
Checked By:	Robert Lopina 2/22/2024

Critical Shear Stress

$$\tau_c = \rho \left(\frac{1000 K^{0.75}}{7.853 \rho} \right)^{2/3}$$

ODOT GDM Section 1302.1.3

where:

- τ_c = Critical shear stress (Pa)
- ρ = Mass density of water (1000 kg/m³)
- K = Erodibility Index (dim.)

$$K = (M_s)(K_b)(K_d)(J_s)$$

HEC 18 Equation 4.17

where:

- K = Erodibility Index
- M_s = Intact rock mass strength parameter
- K_b = Block size parameter
- K_d = Shear strength parameter
- J_s = Relative orientation parameter

M_s	=	35	(see determination below)
K_b	=	17.80	(see determination below)
K_d	=	0.25	(see determination below)
J_s	=	1.05	(see determination below)
K	=	163.54	
τ_c , Pa	=	3236.8	
τ_c , psf	=	67.62	

Erosion Category (EC)

S_v , mm	=	125	(average vertical spacing between horizontal discontinuities)
EC	=	4.239	(note if $S_v < 0.2$ mm, 0.2 mm is used in the EC calculation)

M_s Determination

5259	Rock Unconfined Compressive Strength (psi) Conservative average assuming 750 psi
36.26	Rock Unconfined Compressive Strength (MPa strength of claystone).
35	M _s (HEC 18 Table 4.22)

Table 4.22. Values of the Rock Mass Strength Parameter M_s.

Hardness	Identification in Profile	Unconfined Compressive Strength (MPa)	Mass Strength Number (M _s)
Very soft rock	Material crumbles under firm (moderate) blows with sharp end of geological pick and	Less than 1.7	0.87
	can be peeled off with a knife; is too hard to cut triaxial sample by hand.	1.7 – 3.3	1.86
Soft rock	Can just be scraped and peeled with a knife; indentations 1 mm to 3-mm show in the	3.3 – 6.6	3.95
	specimen with firm (moderate) blows of the pick point.	6.6 – 13.2	8.39
Hard rock	Cannot be scraped or peeled with a knife; hand-held specimen can be broken with hammer end of geological pick with a single firm (moderate) blow.	13.2 – 26.4	17.70
Very hard rock	Hand-held specimen breaks with hammer end of pick under more than one blow.	26.4 – 53.0 53.00 – 106.0	35.0 70.0
Extremely hard rock	Specimen requires many blows with geological pick to break through intact material.	Larger than 212.0	280.0

K_b Determination

$$K_b = \frac{RQD}{J_n} \quad \text{HEC 18 Equation 4.18}$$

89 RQD, percent (value 0 to 100)

5.00 J_n (HEC 18 Table 4.23)

17.80 K_b (per ODOT GDM, if RQD = 0, use K_b = 0.10)

Table 4.23. Rock Joint Set Number J_n.

Number of Joint Sets	Joint Set Number (J _n)
Intact, no or few joints/fissures	1.00
One joint/fissure set	1.22
One joint/fissure set plus random	1.50
Two joint/fissure sets	1.83
Two joint/fissure sets plus random	2.24
Three joint/fissure sets	2.73
Three joint/fissure sets plus random	3.34
Four joint/fissure sets	4.09
Multiple joint/fissure sets	5.00

K_d Determination

$$K_d = \frac{J_r}{J_a} \quad \text{HEC 18 Equation 4.19}$$

1.5	J _r (HEC 18 Table 4.24)
6.0	J _a (HEC 18 Table 4.25)
0.25	K _d

Condition of Joint	Joint Roughness Number J _r
Stepped joints/fissures	4.0
Rough or irregular, undulating	3.0
Smooth undulating	2.0
Slickensided undulating	1.5
Rough or irregular, planar	1.5
Smooth planar	1.0
Slickensided planar	0.5
Joints/fissures either open or containing relatively soft gouge of sufficient thickness to prevent joint/fissure wall contact upon excavation	1.0
Shattered or micro-shattered clays	1.0

Description of Gouge	Joint Alteration Number (J _a) for Joint Separation (mm)		
	1.0 ⁽¹⁾	1.0 – 5.0 ⁽²⁾	5.0 ⁽³⁾
Tightly healed, hard, non-softening impermeable filling	0.75	-	-
Unaltered joint walls, surface staining only	1.0	-	-
Slightly altered, non-softening, non-cohesive rock mineral or crushed rock filling	2.0	2.0	4.0
Non-softening, slightly clayey non-cohesive filling	3.0	6.0	10.0
Non-softening, strongly over-consolidated clay mineral filling, with or without crushed rock	3.0	6.0**	10.0
Softening or low friction clay mineral coatings and small quantities of swelling clays	4.0	8.0	13.0
Softening moderately over-consolidated clay mineral filling, with or without crushed rock	4.0	8.00**	13.0
Shattered or micro-shattered (swelling) clay gouge, with or without crushed rock	5.0	10.0**	18.0

Note:

(1) Joint walls effectively in contact.
 (2) Joint walls come into contact after approximately 100-mm shear.
 (3) Joint walls do not come into contact at all upon shear.
 **Also applies when crushed rock occurs in clay gouge without rock wall contact.

J_s Determination

1.05 J_s (HEC 18 Table 4.26)

From HEC-18:

Relative orientation, in the case of rock, is a function of the relative shape of the rock and its dip and dip direction relative to the direction of flow. The relative orientation parameter J_s represents the relative ability of earth material to resist erosion due to the structure of the ground. This parameter is a function of the dip and dip direction of the least favorable discontinuity (most easily eroded) in the rock with respect to the direction of flow, and the shape of the material units. These two variables (orientation and shape) affect the ease by which the stream can penetrate the ground and dislodge individual material units.

Conceptually, the function of the relative orientation parameter J_s incorporating shape and orientation is as follows. If rock is dipped against the direction flow, it will be more difficult to scour the rock than when it is dipped in the direction of flow. When it is dipped in the direction of flow, it is easier for the flow to lift the rock, penetrate underneath and remove it. Rock that is dipped against the direction of flow will be more difficult to dislodge. The shape of the rock, represented by the length to width ratio *r*, impacts the erodibility of rock in the following manner. Elongated rock will be more difficult to remove than equi-sided blocks of rock. Therefore, large ratios of *r* represent rock that is more difficult to remove because it represents elongated rock shapes. Values of the relative orientation parameter J_s are provided in Table 4.26.

Table 4.26. Relative Orientation Parameter J_s.

Dip Direction of Closer Spaced Joint Set (degrees)	Dip Angle of Closer Spaced Joint Set (degrees)	Ratio of Joint Spacing, r			
		Ratio 1:1	Ratio 1:2	Ratio 1:4	Ratio 1:8
Dip Direction	Dip Angle	Ratio 1:1	Ratio 1:2	Ratio 1:4	Ratio 1:8
180/0	90	1.14	1.20	1.24	1.26
In direction of stream flow	89	0.78	0.71	0.65	0.61
In direction of stream flow	85	0.73	0.66	0.61	0.57
In direction of stream flow	80	0.67	0.60	0.55	0.52
In direction of stream flow	70	0.56	0.50	0.46	0.43
In direction of stream flow	60	0.50	0.46	0.42	0.40
In direction of stream flow	50	0.49	0.46	0.43	0.41
In direction of stream flow	40	0.53	0.49	0.46	0.45
In direction of stream flow	30	0.63	0.59	0.55	0.53
In direction of stream flow	20	0.84	0.77	0.71	0.67
In direction of stream flow	10	1.25	1.10	0.98	0.90
In direction of stream flow	5	1.39	1.23	1.09	1.01
In direction of stream flow	1	1.50	1.33	1.19	1.10
0/180	0	1.14	1.09	1.05	1.02
Against direction of stream flow	-1	0.78	0.85	0.90	0.94
Against direction of stream flow	-5	0.73	0.79	0.84	0.88
Against direction of stream flow	-10	0.67	0.72	0.78	0.81
Against direction of stream flow	-20	0.56	0.62	0.66	0.69
Against direction of stream flow	-30	0.50	0.55	0.58	0.60
Against direction of stream flow	-40	0.49	0.52	0.55	0.57
Against direction of stream flow	-50	0.53	0.56	0.59	0.61
Against direction of stream flow	-60	0.63	0.68	0.71	0.73
Against direction of stream flow	-70	0.84	0.91	0.97	1.01
Against direction of stream flow	-80	1.26	1.41	1.53	1.61
Against direction of stream flow	-85	1.39	1.55	1.69	1.77
Against direction of stream flow	-89	1.50	1.68	1.82	1.91
180/0	-90	1.14	1.20	1.24	1.26

Notes:

1. For intact material take J_s = 1.0.
2. For values of r greater than 8 take J_s as for r = 8.
3. If the flow direction FD is not in the direction of the true dip TD, the effective dip ED is determined by adding the ground slope to the apparent dip AD: ED = AD + GS

Scour Calculations - Shale

Project:	MEG-33-19.21 - Old Town Creek Bridge
Performed By:	James Samples 2/22/2024
Checked By:	Robert Lopina 2/22/2024

Critical Shear Stress

$$\tau_c = \rho \left(\frac{1000 K^{0.75}}{7.853 \rho} \right)^{2/3}$$

ODOT GDM Section 1302.1.3

where:

- τ_c = Critical shear stress (Pa)
- ρ = Mass density of water (1000 kg/m³)
- K = Erodibility Index (dim.)

$$K = (M_s)(K_b)(K_d)(J_s)$$

HEC 18 Equation 4.17

where:

- K = Erodibility Index
- M_s = Intact rock mass strength parameter
- K_b = Block size parameter
- K_d = Shear strength parameter
- J_s = Relative orientation parameter

M_s	=	3.95	(see determination below)
K_b	=	17.80	(see determination below)
K_d	=	0.17	(see determination below)
J_s	=	1.05	(see determination below)
K	=	12.30	
τ_c , Pa	=	887.8	
τ_c , psf	=	18.55	

Erosion Category (EC)

S_v , mm	=	45	(average vertical spacing between horizontal discontinuities)
EC	=	3.706	(note if $S_v < 0.2$ mm, 0.2 mm is used in the EC calculation)

M_s Determination

600	Rock Unconfined Compressive Strength (psi)	Conservative average from GDM
4.14	Rock Unconfined Compressive Strength (MPa)	Table 400-5.
3.95	M _s	(HEC 18 Table 4.22)

Table 4.22. Values of the Rock Mass Strength Parameter M_s.

Hardness	Identification in Profile	Unconfined Compressive Strength (MPa)	Mass Strength Number (M _s)
Very soft rock	Material crumbles under firm (moderate) blows with sharp end of geological pick and	Less than 1.7	0.87
	can be peeled off with a knife; is too hard to cut triaxial sample by hand.	1.7 – 3.3	1.86
Soft rock	Can just be scraped and peeled with a knife; indentations 1 mm to 3-mm show in the	3.3 – 6.6	3.95
	specimen with firm (moderate) blows of the pick point.	6.6 – 13.2	8.39
Hard rock	Cannot be scraped or peeled with a knife; hand-held specimen can be broken with hammer end of geological pick with a single firm (moderate) blow.	13.2 – 26.4	17.70
Very hard rock	Hand-held specimen breaks with hammer end of pick under more than one blow.	26.4 – 53.0	35.0
		53.00 – 106.0	70.0
Extremely hard rock	Specimen requires many blows with geological pick to break through intact material.	Larger than 212.0	280.0

K_b Determination

$$K_b = \frac{RQD}{J_n} \quad \text{HEC 18 Equation 4.18}$$

89 RQD, percent (value 0 to 100)

5.00 J_n (HEC 18 Table 4.23)

17.80 K_b (per ODOT GDM, if RQD = 0, use K_b = 0.10)

Table 4.23. Rock Joint Set Number J_n.

Number of Joint Sets	Joint Set Number (J _n)
Intact, no or few joints/fissures	1.00
One joint/fissure set	1.22
One joint/fissure set plus random	1.50
Two joint/fissure sets	1.83
Two joint/fissure sets plus random	2.24
Three joint/fissure sets	2.73
Three joint/fissure sets plus random	3.34
Four joint/fissure sets	4.09
Multiple joint/fissure sets	5.00

K_d Determination

$$K_d = \frac{J_r}{J_a} \quad \text{HEC 18 Equation 4.19}$$

1.0	J _r (HEC 18 Table 4.24)
6.0	J _a (HEC 18 Table 4.25)
0.17	K _d

Condition of Joint	Joint Roughness Number J _r
Stepped joints/fissures	4.0
Rough or irregular, undulating	3.0
Smooth undulating	2.0
Slickensided undulating	1.5
Rough or irregular, planar	1.5
Smooth planar	1.0
Slickensided planar	0.5
Joints/fissures either open or containing relatively soft gouge of sufficient thickness to prevent joint/fissure wall contact upon excavation	1.0
Shattered or micro-shattered clays	1.0

Description of Gouge	Joint Alteration Number (J _a) for Joint Separation (mm)		
	1.0 ⁽¹⁾	1.0 – 5.0 ⁽²⁾	5.0 ⁽³⁾
Tightly healed, hard, non-softening impermeable filling	0.75	-	-
Unaltered joint walls, surface staining only	1.0	-	-
Slightly altered, non-softening, non-cohesive rock mineral or crushed rock filling	2.0	2.0	4.0
Non-softening, slightly clayey non-cohesive filling	3.0	6.0	10.0
Non-softening, strongly over-consolidated clay mineral filling, with or without crushed rock	3.0	6.0*	10.0
Softening or low friction clay mineral coatings and small quantities of swelling clays	4.0	8.0	13.0
Softening moderately over-consolidated clay mineral filling, with or without crushed rock	4.0	8.00**	13.0
Shattered or micro-shattered (swelling) clay gouge, with or without crushed rock	5.0	10.0**	18.0

Note:

(1) Joint walls effectively in contact.
 (2) Joint walls come into contact after approximately 100-mm shear.
 (3) Joint walls do not come into contact at all upon shear.
 **Also applies when crushed rock occurs in clay gouge without rock wall contact.

J_s Determination

1.05 J_s (HEC 18 Table 4.26)

From HEC-18:

Relative orientation, in the case of rock, is a function of the relative shape of the rock and its dip and dip direction relative to the direction of flow. The relative orientation parameter J_s represents the relative ability of earth material to resist erosion due to the structure of the ground. This parameter is a function of the dip and dip direction of the least favorable discontinuity (most easily eroded) in the rock with respect to the direction of flow, and the shape of the material units. These two variables (orientation and shape) affect the ease by which the stream can penetrate the ground and dislodge individual material units.

Conceptually, the function of the relative orientation parameter J_s incorporating shape and orientation is as follows. If rock is dipped against the direction flow, it will be more difficult to scour the rock than when it is dipped in the direction of flow. When it is dipped in the direction of flow, it is easier for the flow to lift the rock, penetrate underneath and remove it. Rock that is dipped against the direction of flow will be more difficult to dislodge. The shape of the rock, represented by the length to width ratio *r*, impacts the erodibility of rock in the following manner. Elongated rock will be more difficult to remove than equi-sided blocks of rock. Therefore, large ratios of *r* represent rock that is more difficult to remove because it represents elongated rock shapes. Values of the relative orientation parameter J_s are provided in Table 4.26.

Table 4.26. Relative Orientation Parameter J_s.

Dip Direction of Closer Spaced Joint Set (degrees)	Dip Angle of Closer Spaced Joint Set (degrees)	Ratio of Joint Spacing, r			
		Ratio 1:1	Ratio 1:2	Ratio 1:4	Ratio 1:8
Dip Direction	Dip Angle	Ratio 1:1	Ratio 1:2	Ratio 1:4	Ratio 1:8
180/0	90	1.14	1.20	1.24	1.26
In direction of stream flow	89	0.78	0.71	0.65	0.61
In direction of stream flow	85	0.73	0.66	0.61	0.57
In direction of stream flow	80	0.67	0.60	0.55	0.52
In direction of stream flow	70	0.56	0.50	0.46	0.43
In direction of stream flow	60	0.50	0.46	0.42	0.40
In direction of stream flow	50	0.49	0.46	0.43	0.41
In direction of stream flow	40	0.53	0.49	0.46	0.45
In direction of stream flow	30	0.63	0.59	0.55	0.53
In direction of stream flow	20	0.84	0.77	0.71	0.67
In direction of stream flow	10	1.25	1.10	0.98	0.90
In direction of stream flow	5	1.39	1.23	1.09	1.01
In direction of stream flow	1	1.50	1.33	1.19	1.10
0/180	0	1.14	1.09	1.05	1.02
Against direction of stream flow	-1	0.78	0.85	0.90	0.94
Against direction of stream flow	-5	0.73	0.79	0.84	0.88
Against direction of stream flow	-10	0.67	0.72	0.78	0.81
Against direction of stream flow	-20	0.56	0.62	0.66	0.69
Against direction of stream flow	-30	0.50	0.55	0.58	0.60
Against direction of stream flow	-40	0.49	0.52	0.55	0.57
Against direction of stream flow	-50	0.53	0.56	0.59	0.61
Against direction of stream flow	-60	0.63	0.68	0.71	0.73
Against direction of stream flow	-70	0.84	0.91	0.97	1.01
Against direction of stream flow	-80	1.26	1.41	1.53	1.61
Against direction of stream flow	-85	1.39	1.55	1.69	1.77
Against direction of stream flow	-89	1.50	1.68	1.82	1.91
180/0	-90	1.14	1.20	1.24	1.26

Notes:

1. For intact material take J_s = 1.0.
2. For values of r greater than 8 take J_s as for r = 8.
3. If the flow direction FD is not in the direction of the true dip TD, the effective dip ED is determined by adding the ground slope to the apparent dip AD: ED = AD + GS

Scour Calculations - Claystone

Project:	MEG-33-19.21 - Old Town Creek Bridge
Performed By:	James Samples 2/22/2024
Checked By:	Robert Lopina 2/22/2024

Critical Shear Stress

$$\tau_c = \rho \left(\frac{1000 K^{0.75}}{7.853 \rho} \right)^{2/3}$$

ODOT GDM Section 1302.1.3

where:

- τ_c = Critical shear stress (Pa)
- ρ = Mass density of water (1000 kg/m³)
- K = Erodibility Index (dim.)

$$K = (M_s)(K_b)(K_d)(J_s)$$

HEC 18 Equation 4.17

where:

- K = Erodibility Index
- M_s = Intact rock mass strength parameter
- K_b = Block size parameter
- K_d = Shear strength parameter
- J_s = Relative orientation parameter

M_s	=	1.86	(see determination below)
K_b	=	13.00	(see determination below)
K_d	=	0.17	(see determination below)
J_s	=	1.05	(see determination below)
K	=	4.23	
τ_c , Pa	=	520.7	
τ_c , psf	=	10.88	

Erosion Category (EC)

S_v , mm	=	10	(average vertical spacing between horizontal discontinuities)
EC	=	2.922	(note if $S_v < 0.2$ mm, 0.2 mm is used in the EC calculation)

M_s Determination

250	Rock Unconfined Compressive Strength (psi)	Conservative average from GDM
1.72	Rock Unconfined Compressive Strength (MPa)	Table 400-5.
1.86	M _s	(HEC 18 Table 4.22)

Table 4.22. Values of the Rock Mass Strength Parameter M_s.

Hardness	Identification in Profile	Unconfined Compressive Strength (MPa)	Mass Strength Number (M _s)
Very soft rock	Material crumbles under firm (moderate) blows with sharp end of geological pick and	Less than 1.7	0.87
	can be peeled off with a knife; is too hard to cut triaxial sample by hand.	1.7 – 3.3	1.86
Soft rock	Can just be scraped and peeled with a knife; indentations 1 mm to 3-mm show in the	3.3 – 6.6	3.95
	specimen with firm (moderate) blows of the pick point.	6.6 – 13.2	8.39
Hard rock	Cannot be scraped or peeled with a knife; hand-held specimen can be broken with hammer end of geological pick with a single firm (moderate) blow.	13.2 – 26.4	17.70
Very hard rock	Hand-held specimen breaks with hammer end of pick under more than one blow.	26.4 – 53.0 53.00 – 106.0	35.0 70.0
Extremely hard rock	Specimen requires many blows with geological pick to break through intact material.	Larger than 212.0	280.0

K_b Determination

$$K_b = \frac{RQD}{J_n} \quad \text{HEC 18 Equation 4.18}$$

65	RQD, percent (value 0 to 100)
5.00	J _n (HEC 18 Table 4.23)
13.00	K _b (per ODOT GDM, if RQD = 0, use K _b = 0.10)

Table 4.23. Rock Joint Set Number J_n.

Number of Joint Sets	Joint Set Number (J _n)
Intact, no or few joints/fissures	1.00
One joint/fissure set	1.22
One joint/fissure set plus random	1.50
Two joint/fissure sets	1.83
Two joint/fissure sets plus random	2.24
Three joint/fissure sets	2.73
Three joint/fissure sets plus random	3.34
Four joint/fissure sets	4.09
Multiple joint/fissure sets	5.00

K_d Determination

$$K_d = \frac{J_r}{J_a} \quad \text{HEC 18 Equation 4.19}$$

1.0	J _r (HEC 18 Table 4.24)
6.0	J _a (HEC 18 Table 4.25)
0.17	K _d

Condition of Joint	Joint Roughness Number J _r
Stepped joints/fissures	4.0
Rough or irregular, undulating	3.0
Smooth undulating	2.0
Slickensided undulating	1.5
Rough or irregular, planar	1.5
Smooth planar	1.0
Slickensided planar	0.5
Joints/fissures either open or containing relatively soft gouge of sufficient thickness to prevent joint/fissure wall contact upon excavation	1.0
Shattered or micro-shattered clays	1.0

Description of Gouge	Joint Alteration Number (J _a) for Joint Separation (mm)		
	1.0 ⁽¹⁾	1.0 – 5.0 ⁽²⁾	5.0 ⁽³⁾
Tightly healed, hard, non-softening impermeable filling	0.75	-	-
Unaltered joint walls, surface staining only	1.0	-	-
Slightly altered, non-softening, non-cohesive rock mineral or crushed rock filling	2.0	2.0	4.0
Non-softening, slightly clayey non-cohesive filling	3.0	6.0	10.0
Non-softening, strongly over-consolidated clay mineral filling, with or without crushed rock	3.0	6.0*	10.0
Softening or low friction clay mineral coatings and small quantities of swelling clays	4.0	8.0	13.0
Softening moderately over-consolidated clay mineral filling, with or without crushed rock	4.0	8.00**	13.0
Shattered or micro-shattered (swelling) clay gouge, with or without crushed rock	5.0	10.0**	18.0

Note:

(1) Joint walls effectively in contact.
 (2) Joint walls come into contact after approximately 100-mm shear.
 (3) Joint walls do not come into contact at all upon shear.
 **Also applies when crushed rock occurs in clay gouge without rock wall contact.

J_s Determination

1.05 J_s (HEC 18 Table 4.26)

From HEC-18:

Relative orientation, in the case of rock, is a function of the relative shape of the rock and its dip and dip direction relative to the direction of flow. The relative orientation parameter J_s represents the relative ability of earth material to resist erosion due to the structure of the ground. This parameter is a function of the dip and dip direction of the least favorable discontinuity (most easily eroded) in the rock with respect to the direction of flow, and the shape of the material units. These two variables (orientation and shape) affect the ease by which the stream can penetrate the ground and dislodge individual material units.

Conceptually, the function of the relative orientation parameter J_s incorporating shape and orientation is as follows. If rock is dipped against the direction flow, it will be more difficult to scour the rock than when it is dipped in the direction of flow. When it is dipped in the direction of flow, it is easier for the flow to lift the rock, penetrate underneath and remove it. Rock that is dipped against the direction of flow will be more difficult to dislodge. The shape of the rock, represented by the length to width ratio *r*, impacts the erodibility of rock in the following manner. Elongated rock will be more difficult to remove than equi-sided blocks of rock. Therefore, large ratios of *r* represent rock that is more difficult to remove because it represents elongated rock shapes. Values of the relative orientation parameter J_s are provided in Table 4.26.

Table 4.26. Relative Orientation Parameter J_s.

Dip Direction of Closer Spaced Joint Set (degrees)	Dip Angle of Closer Spaced Joint Set (degrees)	Ratio of Joint Spacing, r			
		Ratio 1:1	Ratio 1:2	Ratio 1:4	Ratio 1:8
Dip Direction	Dip Angle	Ratio 1:1	Ratio 1:2	Ratio 1:4	Ratio 1:8
180/0	90	1.14	1.20	1.24	1.26
In direction of stream flow	89	0.78	0.71	0.65	0.61
In direction of stream flow	85	0.73	0.66	0.61	0.57
In direction of stream flow	80	0.67	0.60	0.55	0.52
In direction of stream flow	70	0.56	0.50	0.46	0.43
In direction of stream flow	60	0.50	0.46	0.42	0.40
In direction of stream flow	50	0.49	0.46	0.43	0.41
In direction of stream flow	40	0.53	0.49	0.46	0.45
In direction of stream flow	30	0.63	0.59	0.55	0.53
In direction of stream flow	20	0.84	0.77	0.71	0.67
In direction of stream flow	10	1.25	1.10	0.98	0.90
In direction of stream flow	5	1.39	1.23	1.09	1.01
In direction of stream flow	1	1.50	1.33	1.19	1.10
0/180	0	1.14	1.09	1.05	1.02
Against direction of stream flow	-1	0.78	0.85	0.90	0.94
Against direction of stream flow	-5	0.73	0.79	0.84	0.88
Against direction of stream flow	-10	0.67	0.72	0.78	0.81
Against direction of stream flow	-20	0.56	0.62	0.66	0.69
Against direction of stream flow	-30	0.50	0.55	0.58	0.60
Against direction of stream flow	-40	0.49	0.52	0.55	0.57
Against direction of stream flow	-50	0.53	0.56	0.59	0.61
Against direction of stream flow	-60	0.63	0.68	0.71	0.73
Against direction of stream flow	-70	0.84	0.91	0.97	1.01
Against direction of stream flow	-80	1.26	1.41	1.53	1.61
Against direction of stream flow	-85	1.39	1.55	1.69	1.77
Against direction of stream flow	-89	1.50	1.68	1.82	1.91
180/0	-90	1.14	1.20	1.24	1.26

Notes:

1. For intact material take J_s = 1.0.
2. For values of r greater than 8 take J_s as for r = 8.
3. If the flow direction FD is not in the direction of the true dip TD, the effective dip ED is determined by adding the ground slope to the apparent dip AD: ED = AD + GS

Scour Calculations - Soil

Project: MEG-33-19.21 - Old Town Creek Tributary Bridge
 Performed By: James Samples 2/21/2024
 Checked By: Robert Lopina 2/22/2024

Boring	Sample	Elevation	ODOT Class.	D ₅₀ , mm	Soil Type	Treat As	Cohesive Soil					Granular Soil								
							Water Content, w, %	Fines Content, F, %	Tested PI	PI for eqn.	Hand Pen., tsf	q _u (other testing), tsf	q _u for eqn., psf	α	τ _c , psf	D _{50, equiv} , mm	EC	τ _c , psf	D _{50, equiv} , mm	EC
B-010-0-23	SS-7 & 8	579.3'-574.7'	A-7-6	0.0205	Cohesive	-	16.0	60.4	17	17	3.25		6500	0.01	0.4771	22.8373	3.550			
B-010-0-23	SS-9 & 10	574.7'-569.7'	A-6a	0.0049	Cohesive	-	19.0	82.6	12	12	3.75		7500	0.01	0.4260	20.3927	3.168			
B-011-0-23	SS-1	606.9'-603.9'	A-4a	0.1696	Transitional	Cohesive	14.4	42.1	7	7	3.5		7000	0.01	0.0930	4.4521	2.632			

Scour Calculations - Sandstone

Project:	MEG-33-19.21 - Old Town Creek Tributary Bridge
Performed By:	James Samples 2/22/2024
Checked By:	Robert Lopina 2/22/2024

Critical Shear Stress

$$\tau_c = \rho \left(\frac{1000 K^{0.75}}{7.853 \rho} \right)^{2/3}$$

ODOT GDM Section 1302.1.3

where:

- τ_c = Critical shear stress (Pa)
- ρ = Mass density of water (1000 kg/m³)
- K = Erodibility Index (dim.)

$$K = (M_s)(K_b)(K_d)(J_s)$$

HEC 18 Equation 4.17

where:

- K = Erodibility Index
- M_s = Intact rock mass strength parameter
- K_b = Block size parameter
- K_d = Shear strength parameter
- J_s = Relative orientation parameter

M _s	=	35	(see determination below)
K _b	=	14.60	(see determination below)
K _d	=	0.25	(see determination below)
J _s	=	1.05	(see determination below)
K	=	134.14	
τ_c , Pa	=	2931.5	
τ_c , psf	=	61.24	

Erosion Category (EC)

S _v , mm	=	120	(average vertical spacing between horizontal discontinuities)
EC	=	4.217	(note if S _v < 0.2 mm, 0.2 mm is used in the EC calculation)

M_s Determination

3983	Rock Unconfined Compressive Strength (psi)
27.46	Rock Unconfined Compressive Strength (MPa)
35	M _s (HEC 18 Table 4.22)

Table 4.22. Values of the Rock Mass Strength Parameter M_s.

Hardness	Identification in Profile	Unconfined Compressive Strength (MPa)	Mass Strength Number (M _s)
Very soft rock	Material crumbles under firm (moderate) blows with sharp end of geological pick and	Less than 1.7	0.87
	can be peeled off with a knife; is too hard to cut triaxial sample by hand.	1.7 – 3.3	1.86
Soft rock	Can just be scraped and peeled with a knife; indentations 1 mm to 3-mm show in the	3.3 – 6.6	3.95
	specimen with firm (moderate) blows of the pick point.	6.6 – 13.2	8.39
Hard rock	Cannot be scraped or peeled with a knife; hand-held specimen can be broken with hammer end of geological pick with a single firm (moderate) blow.	13.2 – 26.4	17.70
Very hard rock	Hand-held specimen breaks with hammer end of pick under more than one blow.	26.4 – 53.0	35.0
		53.00 – 106.0	70.0
Extremely hard rock	Specimen requires many blows with geological pick to break through intact material.	Larger than 212.0	280.0

K_b Determination

$$K_b = \frac{RQD}{J_n} \quad \text{HEC 18 Equation 4.18}$$

73	RQD, percent (value 0 to 100)
5.00	J _n (HEC 18 Table 4.23)
14.60	K _b (per ODOT GDM, if RQD = 0, use K _b = 0.10)

Table 4.23. Rock Joint Set Number J_n.

Number of Joint Sets	Joint Set Number (J _n)
Intact, no or few joints/fissures	1.00
One joint/fissure set	1.22
One joint/fissure set plus random	1.50
Two joint/fissure sets	1.83
Two joint/fissure sets plus random	2.24
Three joint/fissure sets	2.73
Three joint/fissure sets plus random	3.34
Four joint/fissure sets	4.09
Multiple joint/fissure sets	5.00

K_d Determination

$$K_d = \frac{J_r}{J_a} \quad \text{HEC 18 Equation 4.19}$$

1.5	J _r (HEC 18 Table 4.24)
6.0	J _a (HEC 18 Table 4.25)
0.25	K _d

Condition of Joint	Joint Roughness Number J _r
Stepped joints/fissures	4.0
Rough or irregular, undulating	3.0
Smooth undulating	2.0
Slickensided undulating	1.5
Rough or irregular, planar	1.5
Smooth planar	1.0
Slickensided planar	0.5
Joints/fissures either open or containing relatively soft gouge of sufficient thickness to prevent joint/fissure wall contact upon excavation	1.0
Shattered or micro-shattered clays	1.0

Description of Gouge	Joint Alteration Number (J _a) for Joint Separation (mm)		
	1.0 ⁽¹⁾	1.0 – 5.0 ⁽²⁾	5.0 ⁽³⁾
Tightly healed, hard, non-softening impermeable filling	0.75	-	-
Unaltered joint walls, surface staining only	1.0	-	-
Slightly altered, non-softening, non-cohesive rock mineral or crushed rock filling	2.0	2.0	4.0
Non-softening, slightly clayey non-cohesive filling	3.0	6.0	10.0
Non-softening, strongly over-consolidated clay mineral filling, with or without crushed rock	3.0	6.0**	10.0
Softening or low friction clay mineral coatings and small quantities of swelling clays	4.0	8.0	13.0
Softening moderately over-consolidated clay mineral filling, with or without crushed rock	4.0	8.00**	13.0
Shattered or micro-shattered (swelling) clay gouge, with or without crushed rock	5.0	10.0**	18.0

Note:

(1) Joint walls effectively in contact.
 (2) Joint walls come into contact after approximately 100-mm shear.
 (3) Joint walls do not come into contact at all upon shear.
 **Also applies when crushed rock occurs in clay gouge without rock wall contact.

J_s Determination

1.05 J_s (HEC 18 Table 4.26)

From HEC-18:

Relative orientation, in the case of rock, is a function of the relative shape of the rock and its dip and dip direction relative to the direction of flow. The relative orientation parameter J_s represents the relative ability of earth material to resist erosion due to the structure of the ground. This parameter is a function of the dip and dip direction of the least favorable discontinuity (most easily eroded) in the rock with respect to the direction of flow, and the shape of the material units. These two variables (orientation and shape) affect the ease by which the stream can penetrate the ground and dislodge individual material units.

Conceptually, the function of the relative orientation parameter J_s incorporating shape and orientation is as follows. If rock is dipped against the direction flow, it will be more difficult to scour the rock than when it is dipped in the direction of flow. When it is dipped in the direction of flow, it is easier for the flow to lift the rock, penetrate underneath and remove it. Rock that is dipped against the direction of flow will be more difficult to dislodge. The shape of the rock, represented by the length to width ratio *r*, impacts the erodibility of rock in the following manner. Elongated rock will be more difficult to remove than equi-sided blocks of rock. Therefore, large ratios of *r* represent rock that is more difficult to remove because it represents elongated rock shapes. Values of the relative orientation parameter J_s are provided in Table 4.26.

Table 4.26. Relative Orientation Parameter J_s.

Dip Direction of Closer Spaced Joint Set (degrees)	Dip Angle of Closer Spaced Joint Set (degrees)	Ratio of Joint Spacing, r			
		Ratio 1:1	Ratio 1:2	Ratio 1:4	Ratio 1:8
Dip Direction	Dip Angle				
180/0	90	1.14	1.20	1.24	1.26
In direction of stream flow	89	0.78	0.71	0.65	0.61
In direction of stream flow	85	0.73	0.66	0.61	0.57
In direction of stream flow	80	0.67	0.60	0.55	0.52
In direction of stream flow	70	0.56	0.50	0.46	0.43
In direction of stream flow	60	0.50	0.46	0.42	0.40
In direction of stream flow	50	0.49	0.46	0.43	0.41
In direction of stream flow	40	0.53	0.49	0.46	0.45
In direction of stream flow	30	0.63	0.59	0.55	0.53
In direction of stream flow	20	0.84	0.77	0.71	0.67
In direction of stream flow	10	1.25	1.10	0.98	0.90
In direction of stream flow	5	1.39	1.23	1.09	1.01
In direction of stream flow	1	1.50	1.33	1.19	1.10
0/180	0	1.14	1.09	1.05	1.02
Against direction of stream flow	-1	0.78	0.85	0.90	0.94
Against direction of stream flow	-5	0.73	0.79	0.84	0.88
Against direction of stream flow	-10	0.67	0.72	0.78	0.81
Against direction of stream flow	-20	0.56	0.62	0.66	0.69
Against direction of stream flow	-30	0.50	0.55	0.58	0.60
Against direction of stream flow	-40	0.49	0.52	0.55	0.57
Against direction of stream flow	-50	0.53	0.56	0.59	0.61
Against direction of stream flow	-60	0.63	0.68	0.71	0.73
Against direction of stream flow	-70	0.84	0.91	0.97	1.01
Against direction of stream flow	-80	1.26	1.41	1.53	1.61
Against direction of stream flow	-85	1.39	1.55	1.69	1.77
Against direction of stream flow	-89	1.50	1.68	1.82	1.91
180/0	-90	1.14	1.20	1.24	1.26

Notes:

1. For intact material take J_s = 1.0.
2. For values of r greater than 8 take J_s as for r = 8.
3. If the flow direction FD is not in the direction of the true dip TD, the effective dip ED is determined by adding the ground slope to the apparent dip AD: ED = AD + GS

Scour Calculations - Shale

Project:	MEG-33-19.21 - Old Town Creek Tributary Bridge
Performed By:	James Samples 2/22/2024
Checked By:	Robert Lopina 2/22/2024

Critical Shear Stress

$$\tau_c = \rho \left(\frac{1000 K^{0.75}}{7.853 \rho} \right)^{2/3}$$

ODOT GDM Section 1302.1.3

where:

- τ_c = Critical shear stress (Pa)
- ρ = Mass density of water (1000 kg/m³)
- K = Erodibility Index (dim.)

$$K = (M_s)(K_b)(K_d)(J_s)$$

HEC 18 Equation 4.17

where:

- K = Erodibility Index
- M_s = Intact rock mass strength parameter
- K_b = Block size parameter
- K_d = Shear strength parameter
- J_s = Relative orientation parameter

M_s	=	3.95	(see determination below)
K_b	=	14.60	(see determination below)
K_d	=	0.17	(see determination below)
J_s	=	1.05	(see determination below)
K	=	10.09	
τ_c , Pa	=	804.1	
τ_c , psf	=	16.80	

Erosion Category (EC)

S_v , mm	=	35	(average vertical spacing between horizontal discontinuities)
EC	=	3.575	(note if $S_v < 0.2$ mm, 0.2 mm is used in the EC calculation)

M_s Determination

600	Rock Unconfined Compressive Strength (psi)
4.14	Rock Unconfined Compressive Strength (MPa)
3.95	M _s (HEC 18 Table 4.22)

Table 4.22. Values of the Rock Mass Strength Parameter M_s.

Hardness	Identification in Profile	Unconfined Compressive Strength (MPa)	Mass Strength Number (M _s)
Very soft rock	Material crumbles under firm (moderate) blows with sharp end of geological pick and	Less than 1.7	0.87
	can be peeled off with a knife; is too hard to cut triaxial sample by hand.	1.7 – 3.3	1.86
Soft rock	Can just be scraped and peeled with a knife; indentations 1 mm to 3-mm show in the	3.3 – 6.6	3.95
	specimen with firm (moderate) blows of the pick point.	6.6 – 13.2	8.39
Hard rock	Cannot be scraped or peeled with a knife; hand-held specimen can be broken with hammer end of geological pick with a single firm (moderate) blow.	13.2 – 26.4	17.70
Very hard rock	Hand-held specimen breaks with hammer end of pick under more than one blow.	26.4 – 53.0	35.0
		53.00 – 106.0	70.0
Extremely hard rock	Specimen requires many blows with geological pick to break through intact material.	Larger than 212.0	280.0

K_b Determination

$$K_b = \frac{RQD}{J_n} \quad \text{HEC 18 Equation 4.18}$$

73	RQD, percent (value 0 to 100)
5.00	J _n (HEC 18 Table 4.23)
14.60	K _b (per ODOT GDM, if RQD = 0, use K _b = 0.10)

Table 4.23. Rock Joint Set Number J_n.

Number of Joint Sets	Joint Set Number (J _n)
Intact, no or few joints/fissures	1.00
One joint/fissure set	1.22
One joint/fissure set plus random	1.50
Two joint/fissure sets	1.83
Two joint/fissure sets plus random	2.24
Three joint/fissure sets	2.73
Three joint/fissure sets plus random	3.34
Four joint/fissure sets	4.09
Multiple joint/fissure sets	5.00

K_d Determination

$$K_d = \frac{J_r}{J_a} \quad \text{HEC 18 Equation 4.19}$$

1.0	J _r (HEC 18 Table 4.24)
6.0	J _a (HEC 18 Table 4.25)
0.17	K _d

Condition of Joint	Joint Roughness Number J _r
Stepped joints/fissures	4.0
Rough or irregular, undulating	3.0
Smooth undulating	2.0
Slickensided undulating	1.5
Rough or irregular, planar	1.5
Smooth planar	1.0
Slickensided planar	0.5
Joints/fissures either open or containing relatively soft gouge of sufficient thickness to prevent joint/fissure wall contact upon excavation	1.0
Shattered or micro-shattered clays	1.0

Description of Gouge	Joint Alteration Number (J _a) for Joint Separation (mm)		
	1.0 ⁽¹⁾	1.0 – 5.0 ⁽²⁾	5.0 ⁽³⁾
Tightly healed, hard, non-softening impermeable filling	0.75	-	-
Unaltered joint walls, surface staining only	1.0	-	-
Slightly altered, non-softening, non-cohesive rock mineral or crushed rock filling	2.0	2.0	4.0
Non-softening, slightly clayey non-cohesive filling	3.0	6.0	10.0
Non-softening, strongly over-consolidated clay mineral filling, with or without crushed rock	3.0	6.0**	10.0
Softening or low friction clay mineral coatings and small quantities of swelling clays	4.0	8.0	13.0
Softening moderately over-consolidated clay mineral filling, with or without crushed rock	4.0	8.00**	13.0
Shattered or micro-shattered (swelling) clay gouge, with or without crushed rock	5.0	10.0**	18.0

Note:

(1) Joint walls effectively in contact.
 (2) Joint walls come into contact after approximately 100-mm shear.
 (3) Joint walls do not come into contact at all upon shear.
 **Also applies when crushed rock occurs in clay gouge without rock wall contact.

J_s Determination

1.05 J_s (HEC 18 Table 4.26)

From HEC-18:

Relative orientation, in the case of rock, is a function of the relative shape of the rock and its dip and dip direction relative to the direction of flow. The relative orientation parameter J_s represents the relative ability of earth material to resist erosion due to the structure of the ground. This parameter is a function of the dip and dip direction of the least favorable discontinuity (most easily eroded) in the rock with respect to the direction of flow, and the shape of the material units. These two variables (orientation and shape) affect the ease by which the stream can penetrate the ground and dislodge individual material units.

Conceptually, the function of the relative orientation parameter J_s incorporating shape and orientation is as follows. If rock is dipped against the direction flow, it will be more difficult to scour the rock than when it is dipped in the direction of flow. When it is dipped in the direction of flow, it is easier for the flow to lift the rock, penetrate underneath and remove it. Rock that is dipped against the direction of flow will be more difficult to dislodge. The shape of the rock, represented by the length to width ratio *r*, impacts the erodibility of rock in the following manner. Elongated rock will be more difficult to remove than equi-sided blocks of rock. Therefore, large ratios of *r* represent rock that is more difficult to remove because it represents elongated rock shapes. Values of the relative orientation parameter J_s are provided in Table 4.26.

Table 4.26. Relative Orientation Parameter J_s.

Dip Direction of Closer Spaced Joint Set (degrees)	Dip Angle of Closer Spaced Joint Set (degrees)	Ratio of Joint Spacing, r			
		Ratio 1:1	Ratio 1:2	Ratio 1:4	Ratio 1:8
Dip Direction	Dip Angle	Ratio 1:1	Ratio 1:2	Ratio 1:4	Ratio 1:8
180/0	90	1.14	1.20	1.24	1.26
In direction of stream flow	89	0.78	0.71	0.65	0.61
In direction of stream flow	85	0.73	0.66	0.61	0.57
In direction of stream flow	80	0.67	0.60	0.55	0.52
In direction of stream flow	70	0.56	0.50	0.46	0.43
In direction of stream flow	60	0.50	0.46	0.42	0.40
In direction of stream flow	50	0.49	0.46	0.43	0.41
In direction of stream flow	40	0.53	0.49	0.46	0.45
In direction of stream flow	30	0.63	0.59	0.55	0.53
In direction of stream flow	20	0.84	0.77	0.71	0.67
In direction of stream flow	10	1.25	1.10	0.98	0.90
In direction of stream flow	5	1.39	1.23	1.09	1.01
In direction of stream flow	1	1.50	1.33	1.19	1.10
0/180	0	1.14	1.09	1.05	1.02
Against direction of stream flow	-1	0.78	0.85	0.90	0.94
Against direction of stream flow	-5	0.73	0.79	0.84	0.88
Against direction of stream flow	-10	0.67	0.72	0.78	0.81
Against direction of stream flow	-20	0.56	0.62	0.66	0.69
Against direction of stream flow	-30	0.50	0.55	0.58	0.60
Against direction of stream flow	-40	0.49	0.52	0.55	0.57
Against direction of stream flow	-50	0.53	0.56	0.59	0.61
Against direction of stream flow	-60	0.63	0.68	0.71	0.73
Against direction of stream flow	-70	0.84	0.91	0.97	1.01
Against direction of stream flow	-80	1.26	1.41	1.53	1.61
Against direction of stream flow	-85	1.39	1.55	1.69	1.77
Against direction of stream flow	-89	1.50	1.68	1.82	1.91
180/0	-90	1.14	1.20	1.24	1.26

Notes:

1. For intact material take J_s = 1.0.
2. For values of r greater than 8 take J_s as for r = 8.
3. If the flow direction FD is not in the direction of the true dip TD, the effective dip ED is determined by adding the ground slope to the apparent dip AD: ED = AD + GS

APPENDIX D
BRIDGE FOUNDATION CALCULATIONS

MEG-33-19.21 BOWMAN'S RUN DRILLED SHAFT AXIAL CAPACITY CALCULATIONS

BEDROCK CONDITIONS

The dominate bedrock type at the bridge locations is sandstone with shale partings. Three unconfined compression strength tests were completed on this bedrock. The unconfined compressive strength (q_u) of rock at the site is:

$$q_u = 4,050, 5620, \quad 8680 \text{ pounds per square inch (psi)}$$

$$\text{Converting to kips per square foot (ksf) : } q_u = 582, 810, \quad 1,250$$

A compressive strength of 880 ksf was selected based on average testing and field conditions due to the consistent nature of the sandstone.

Since multiple types of bedrock were encountered in the borings, weighted averages based on the length of bedrock observed will be used to develop conservative rock strengths for drilled shaft capacity analysis. A typical q_u of 600 psi (86 ksf) is applied to shale from testing completed in B-010-0-23. Claystone was not able to be tested due to its fragile nature. A typical q_u of 250 psi (36 ksf) is applied to claystone based on lab tests performed on other projects and the bedrock conditions.

Drilled shafts typically extend 10 feet into the top of bedrock. For the side resistance calculations, it is assumed shafts extend 8 feet into the top of cored bedrock. The top two feet will consist of severely to highly weathered bedrock and are ignored in shaft resistance calculations as outlined in Section 305.4.1.1 of the 2020 Ohio Department of Transportation Bridge Design Manual. Remaining bedrock observed from rock coring is averaged to determine tip resistance.

RESISTANCE FACTORS

Drilled shaft resistance factors per ODOT BDM Table 305-1:

- Tip Resistance in Rock = 0.50
- Side Resistance in Rock = 0.55

UNIT SIDE RESISTANCE

From the AASHTO LRFD 9th Edition, the nominal unit side resistance (q_s) is determined by:

$$\frac{q_s}{p_a} = C \sqrt{\frac{q_u}{p_a}} \quad (10.8.3.5.4b - 1)$$

Where:

p_a = atmospheric pressure taken as 2.12 ksf

C = regression coefficient taken as 1.0 for normal conditions

For the rear abutment (B-001-0-23, observed approximately 1 ft of interbedded shale):

$$q_s = (2.12 \text{ ksf}) (1.0) \sqrt{\frac{\left(\frac{(880 \text{ ksf} * 7 \text{ ft}) + (86 \text{ ksf} * 1 \text{ ft})}{8 \text{ ft}}\right)}{2.12 \text{ ksf}}} = 40.7 \text{ ksf} \rightarrow 22.4 \text{ ksf factored resistance}$$

For the pier (B-002-0-23, observed approximately 1.5 ft of interbedded shale):

$$q_s = (2.12 \text{ ksf}) (1.0) \sqrt{\frac{\left(\frac{(880 \text{ ksf} * 6.5 \text{ ft}) + (86 \text{ ksf} * 1.5 \text{ ft})}{8 \text{ ft}}\right)}{2.12 \text{ ksf}}} = 39.4 \text{ ksf} \rightarrow 21.7 \text{ ksf factored resistance}$$

For the forward abutment (B-003-0-23, assume highly weathered sandstone has same strength as shale):

$$q_s = (2.12 \text{ ksf}) (1.0) \sqrt{\frac{\left(\frac{(36 \text{ ksf} * 1 \text{ ft}) + (86 \text{ ksf} * 7 \text{ ft})}{8 \text{ ft}}\right)}{2.12 \text{ ksf}}} = 13.0 \text{ ksf} \rightarrow 7.2 \text{ ksf factored resistance}$$

UNIT TIP RESISTANCE

From the AASHTO LRFD 9th Edition, the nominal unit tip resistance (q_p) is determined by:

$$q_p = 2.5 q_u \quad (10.8.3.5.4c - 1)$$

For the rear abutment (B-001-0-23, observed approximately 2.5 ft of interbedded shale):

$$q_p = 2.5 \left(\frac{(880 \text{ ksf} * 11.2 \text{ ft}) + (86 \text{ ksf} * 2.5 \text{ ft})}{13.7 \text{ ft}} \right) = 1,837.8 \text{ ksf} \rightarrow 918.9 \text{ ksf factored resistance}$$

For the pier (B-002-0-23):

$$q_p = 2.5 \left(\frac{(880 \text{ ksf} * 2.3 \text{ ft}) + (86 \text{ ksf} * 2 \text{ ft}) + (36 \text{ ksf} * 10 \text{ ft})}{14.3 \text{ ft}} \right) = 446.9 \text{ ksf}$$

→ 223.4 ksf factored resistance

For the forward abutment (B-003-0-23):

$$q_p = 2.5 \left(\frac{(86 \text{ ksf} * 3 \text{ ft}) + (880 \text{ ksf} * 13.2 \text{ ft})}{16.2 \text{ ft}} \right) = 1,832.4 \text{ ksf} \rightarrow 916.2 \text{ ksf factored resistance}$$

MEG-33-19.21 OLD TOWN CREEK DRILLED SHAFT AXIAL CAPACITY CALCULATIONS

BEDROCK CONDITIONS

The dominate bedrock type at the bridge locations is sandstone with shale partings. Four unconfined compression strength tests were completed on this bedrock. The unconfined compressive strength (q_u) of rock at the site is:

$$q_u = 2,706, 4,440, 6,280, \quad 7,610 \text{ pounds per square inch (psi)}$$

$$\text{Converting to kips per square foot (ksf) : } q_u = 390, 638, 904, \quad 1,096$$

A compressive strength of 750 ksf was selected based on average testing and field conditions due to the consistent nature of the sandstone.

Since multiple types of bedrock were encountered in the borings, weighted averages based on the length of bedrock observed will be used to develop conservative rock strengths for drilled shaft capacity analysis. A typical q_u of 600 psi (86 ksf) is applied to shale from testing completed in B-010-0-23. Claystone was not able to be tested due to its fragile nature. A typical q_u of 250 psi (36 ksf) is applied to claystone based on lab tests performed on other projects and the bedrock conditions.

Drilled shafts typically extend 10 feet into the top of bedrock. For the side resistance calculations, it is assumed shafts extend 8 feet into the top of cored bedrock. The top two feet will consist of severely to highly weathered bedrock and are ignored in shaft resistance calculations as outlined in Section 305.4.1.1 of the 2020 Ohio Department of Transportation Bridge Design Manual. Remaining bedrock observed from rock coring is averaged to determine tip resistance.

RESISTANCE FACTORS

Drilled shaft resistance factors per ODOT BDM Table 305-1:

- Tip Resistance in Rock = 0.50
- Side Resistance in Rock = 0.55

UNIT SIDE RESISTANCE

From the AASHTO LRFD 9th Edition, the nominal unit side resistance (q_s) is determined by:

$$\frac{q_s}{p_a} = C \sqrt{\frac{q_u}{p_a}} \quad (10.8.3.5.4b - 1)$$

Where:

p_a = atmospheric pressure taken as 2.12 ksf

C = regression coefficient taken as 1.0 for normal conditions

For the rear abutment (B-007-0-23, observed approximately 2.5 ft of interbedded shale):

$$q_s = (2.12 \text{ ksf}) (1.0) \sqrt{\frac{\left(\frac{(750 \text{ ksf} * 5.5 \text{ ft}) + (86 \text{ ksf} * 2.5 \text{ ft})}{8 \text{ ft}}\right)}{2.12 \text{ ksf}}} = 33.9 \text{ ksf} \rightarrow 18.7 \text{ ksf factored resistance}$$

For the pier (B-008-0-23):

$$q_s = (2.12 \text{ ksf}) (1.0) \sqrt{\frac{\left(\frac{(86 \text{ ksf} * 2.5 \text{ ft}) + (36 \text{ ksf} * 5.5 \text{ ft})}{8 \text{ ft}}\right)}{2.12 \text{ ksf}}} = 10.5 \text{ ksf} \rightarrow 5.8 \text{ ksf factored resistance}$$

For the forward abutment (B-009-0-23):

$$q_s = (2.12 \text{ ksf}) (1.0) \sqrt{\frac{750 \text{ ksf}}{2.12 \text{ ksf}}} = 39.9 \text{ ksf} \rightarrow 21.9 \text{ ksf factored resistance}$$

UNIT TIP RESISTANCE

From the AASHTO LRFD 9th Edition, the nominal unit tip resistance (q_p) is determined by:

$$q_p = 2.5 q_u \quad (10.8.3.5.4c - 1)$$

For the rear abutment (B-007-0-23):

$$q_p = 2.5(750 \text{ ksf}) = 1,875 \text{ ksf} \rightarrow 937.5 \text{ ksf}$$

For the pier (B-008-0-23):

$$q_p = 2.5(36 \text{ ksf}) = 90 \text{ ksf} \rightarrow 45 \text{ ksf}$$

For the forward abutment (B-009-0-23):

$$q_p = 2.5 \left(\frac{(750 \text{ ksf} * 16.1 \text{ ft}) + (86 \text{ ksf} * 0.5 \text{ ft})}{16.6 \text{ ft}} \right) = 1,825 \text{ ksf} \rightarrow 912.5 \text{ ksf}$$

MEG-33-19.21 TRIBUTARY TO OLD TOWN CREEK DRILLED SHAFT AXIAL CAPACITY CALCULATIONS

BEDROCK CONDITIONS

The dominate bedrock type at the bridge locations is sandstone with shale partings. Three unconfined compression strength tests were completed on this bedrock. The unconfined compressive strength (q_u) of rock at the site is:

$$q_u = 2,437, 2,692, \text{ and } 6,820 \text{ pounds per square inch (psi)}$$

$$\text{Converting to kips per square foot (ksf)} : q_u = 350, 388, \text{ and } 982 \text{ ksf}$$

A compressive strength of 570 ksf was selected based on average testing and field conditions due to the consistent nature of the interbedded sandstone and shale.

Since multiple types of bedrock were encountered in the borings, weighted averages based on the length of bedrock observed will be used to develop conservative rock strengths for drilled shaft capacity analysis. A typical q_u of 600 psi (86 ksf) is applied to shale from testing completed in B-010-0-23. Claystone was not able to be tested due to its fragile nature. Claystone was not observed in the borings for this bridge.

Drilled shafts typically extend 10 feet into the top of bedrock. For the side resistance calculations, it is assumed shafts extend 8 feet into the top of cored bedrock. The top two feet will consist of severely to highly weathered bedrock and are ignored in shaft resistance calculations as outlined in Section 305.4.1.1 of the 2020 Ohio Department of Transportation Bridge Design Manual. Remaining bedrock observed from rock coring is averaged to determine tip resistance.

RESISTANCE FACTORS

Drilled shaft resistance factors per ODOT BDM Table 305-1:

- Tip Resistance in Rock = 0.50
- Side Resistance in Rock = 0.55

UNIT SIDE RESISTANCE

From the AASHTO LRFD 9th Edition, the nominal unit side resistance (q_s) is determined by:

$$\frac{q_s}{p_a} = C \sqrt{\frac{q_u}{p_a}} \quad (10.8.3.5.4b - 1)$$

Where:

p_a = atmospheric pressure taken as 2.12 ksf

C = regression coefficient taken as 1.0 for normal conditions

For the rear abutment (B-010-0-23):

$$q_s = (2.12 \text{ ksf}) (1.0) \sqrt{\frac{((570 \text{ ksf} * 6 \text{ ft}) + (86 \text{ ksf} * 2 \text{ ft}))}{8 \text{ ft}}}{2.12 \text{ ksf}} = 30.9 \text{ ksf} \rightarrow 17.0 \text{ ksf factored resistance}$$

For the forward (B-011-0-23):

$$q_s = (2.12 \text{ ksf}) (1.0) \sqrt{\frac{570 \text{ ksf}}{2.12 \text{ ksf}}} = 34.8 \text{ ksf} \rightarrow 19.1 \text{ ksf factored resistance}$$

UNIT TIP RESISTANCE

From the AASHTO LRFD 9th Edition, the nominal unit tip resistance (q_p) is determined by:

$$q_p = 2.5 q_u \quad (10.8.3.5.4c - 1)$$

For the rear abutment (B-010-0-23, observed approximately 0.5 ft of shale):

$$q_p = 2.5 \left(\frac{(570 \text{ ksf} * 1.5 \text{ ft}) + (86 \text{ ksf} * 0.5 \text{ ft})}{2 \text{ ft}} \right) = 1,122.5 \text{ ksf} \rightarrow 561.3 \text{ ksf factored resistance}$$

For the forward abutment (B-011-0-23):

$$q_p = 2.5(570 \text{ ksf}) = 1,425 \text{ ksf} \rightarrow 712.5 \text{ ksf factored resistance}$$

APPENDIX E
SEISMIC SITE CALCULATIONS

Seismic Site Class Determination

Bridge: MEG-33-19.21 - Bowman's Run

Boring: B-001-0-23

N-value	Range	Range/N
15	2.5	0.17
7	2.5	0.36
40	1.5	0.04
63	1.5	0.02
100	92	0.92

Σ Range/N 1.51
 \check{N} = 66.4

Boring: B-002-0-23

N-value	Range	Range/N
100	1.5	0.02
15	5	0.33
69	1.5	0.02
100	92	0.92

Σ Range/N 1.29
 \check{N} = 77.5

Boring: B-003-0-23

N-value	Range	Range/N
40	2.5	0.06
100	97.5	0.98

Σ Range/N 1.04
 \check{N} = 96.4

Average \check{N} = 80.1

In accordance with ODOT BDM 2020 and AASHTO LRFD Bridge Design Specifications (9th edition, 2020), the average \check{N} for the three borings is $\check{N} > 50$.

Therefore, based on AASHTO Table 3.10.3.1-1, use **Site Class C**.

Seismic Site Class Determination
Bridge: MEG-33-19.21 - Old Town Creek

Boring: B-007-0-23

N-value	Range	Range/N
7	2.5	0.36
6	2.5	0.42
10	1.5	0.15
10	3.5	0.35
13	2.5	0.19
14	2.5	0.18
100	85	0.85

Σ Range/N 2.49
 \check{N} = 40.1

Average \check{N} = 44.8

Boring: B-008-0-23

N-value	Range	Range/N
11	2.5	0.23
14	2.5	0.18
9	2.5	0.28
5	2.5	0.50
10	2.5	0.25
11	2.5	0.23
14	2.5	0.18
9	2.5	0.28
14	2.5	0.18
15	2.5	0.17
100	75	0.75

Σ Range/N 3.21
 \check{N} = 31.1

Boring: B-009-0-23

N-value	Range	Range/N
5	2.5	0.50
19	2.5	0.13
100	95	0.95

Σ Range/N 1.58
 \check{N} = 63.2

In accordance with ODOT BDM 2020 and AASHTO LRFD Bridge Design Specifications (9th edition, 2020), the average \check{N} for the three borings is $15 < \check{N} < 50$. Therefore, based on AASHTO Table 3.10.3.1-1, use **Site Class D**.

Seismic Site Class Determination

Bridge: MEG-33-19.21 - Tributary of Old Town Creek

Boring: B-010-0-23

N-value	Range	Range/N
5	2.5	0.50
9	2.5	0.28
17	2.5	0.15
10	2.5	0.25
7	2.5	0.36
9	2.5	0.28
25	2.5	0.10
16	2.5	0.16
13	2.5	0.19
12	2.5	0.21
100	75	0.75

Σ Range/N 3.22

\check{N} = 31.1

Average \check{N} = 55.3

Boring: B-011-0-23

N-value	Range	Range/N
10	2.5	0.25
49	2.5	0.05
79	2.5	0.03
100	92.5	0.93

Σ Range/N 1.26

\check{N} = 79.5

In accordance with ODOT BDM 2020 and AASHTO LRFD Bridge Design Specifications (9th edition, 2020), the average \check{N} for the three borings is $\check{N} > 50$.

Therefore, based on AASHTO Table 3.10.3.1-1, use **Site Class C**.

APPENDIX F
LATERAL LOAD ANALYSES

**BOWMAN'S RUN BRIDGE
LATERAL LOAD ANALYSIS**

MEG-33-19.21

Lateral Capacity Analyses for bridge at Bowman's Run

Rear Abutment

Material Parameters

The following table presents the material parameters used for the lateral capacity analyses. The material parameters are based on information found in the Ohio Department of Transportation (ODOT) Geotechnical Design Manual (GDM) and boring logs (blow counts). The groundwater table depth at the pile head was assumed to be below the top of the rock.

Material Parameters

Material	Moist Unit Weight (pcf)	Undrained Cohesion (psf)	Friction Angle (degrees)	Compressive Strength (psi)	RQD (%)
Fill (mod stiff w/o free water)	125	2,500	-	-	-
Sandy Silt (mod stiff w/o free water)	122	2,000	-	-	-
Bedrock	150	-	-	4,380	86

Rear Abutment Loading

- The rear abutment loading provided from the structural team is provided in this appendix. Each abutment consists of 1 row of piles spaced at 16.67' c/c.
- The pile cap is assumed to be rigid; therefore, each pile experiences the same lateral load.
- X and Z represents lateral loads (Z direction being perpendicular to the single row of four piles) while Y represents axial load. The load combinations used in the LPile are as follows:

Load State	Load Direction	Lateral Force (kips)	Lateral Moment (kip-ft)	Axial Load (kips)
Service	X	3.54	124.20	765.80
Service	Z	63.03	0	765.80
Strength	X	4.77	167.70	985.50
Strength	Z	85.10	0	985.50

- To take into account group effects, P-multipliers (P_m) were applied to the p-y curves in LPILE. The P-multipliers are provided in AASHTO LRFD 9th Edition Section 10.7.2.4 (presented in this appendix). From the structural engineer, the drilled shaft diameter (B) is 3 ft above the socket and 2.5 ft for the socket.

Performed By:	J. Samples	Date:	8/28/2024
Checked By:	G. Khatri	Date:	8/29/2024

- Spacing between rows laterally (X) is 16.67' c/c, which is greater than 5B. P-multipliers are provided in AASHTO LRFD 9th edition section 10.7.2.7. Therefore, the P-multiplier at 16.67 ft is taken as same as 5B.
 - Row 1 → $P_m = 1$
 - Row 2 → $P_m = 0.85$
 - Row 3 → $P_m = 0.7$
- Since there is only a single row of piles in the perpendicular (Z) direction, $P_m = 1.0$ is only needed

Rear Abutment LPile Results

The following table summarizes the LPile results for each load and P_m combination discussed at the rear abutment:

LPile Results

Abutment	Direction	Row	P_m	Deflection (in, Service Load)	Maximum Shear (kips, Strength Load)	Maximum Moment (kip-ft, Strength Load)
Rear	X	1	1	0.02	20.5	174.0
	X	2	0.85	0.02	20.0	174.3
	X	3 and up	0.7	0.03	19.5	174.6
	Z	1	1.0	0.12	119.4	381.7

Performed By:	J. Samples	Date:	8/28/2024
Checked By:	G. Khatri	Date:	8/29/2024

Forward Abutment

The forward consists of the bedrock at the ground surface. The material parameters are based on information found in the Ohio Department of Transportation (ODOT) Geotechnical Design Manual (GDM) and boring logs (blow counts). The groundwater table depth at the pile head was assumed to be below the top of the rock.

Material Parameters

Material	Moist Unit Weight (pcf)	Undrained Cohesion (psf)	Friction Angle (degrees)	Compressive Strength (psi)	RQD (%)
Bedrock	150	-	-	4,380	81

Forward Abutment Loading

- The forward abutment loading provided from the structural team is provided in this appendix. Each abutment consists of 1 row of piles spaced at 16.67' c/c.
- The pile cap is assumed to be rigid; therefore, each pile experiences the same lateral load.
- X and Z represents lateral loads (Z direction being perpendicular to the single row of four piles) while Y represents axial load. The load combinations used in the LPILE are as follows:

Load State	Load Direction	Lateral Load (kips)	Lateral Moment (kip-ft)	Axial Load (kips)
Service	X	3.54	124.20	751.80
Service	Z	63.04	0	751.80
Strength	X	4.77	167.70	967.80
Strength	Z	85.10	0	967.80

- To take into account group effects, P-multipliers (P_m) were applied to the p-y curves in LPILE. The P-multipliers are provided in AASHTO LRFD 9th Edition Section 10.7.2.4 (presented in this appendix). From the structural engineer, the drilled shaft diameter (B) is 3 ft above the socket and 2.5 ft for the socket.
 - Spacing between rows laterally (X) is 16.67' c/c, which is greater than 5B. P-multipliers are provided in AASHTO LRFD 9th edition section 10.7.2.7. Therefore, the P-multiplier at 16.67 ft is taken same as 5B.
 - Row 1 → $P_m = 1$
 - Row 2 → $P_m = 0.85$
 - Row 3 → $P_m = 0.7$

Performed By:	J. Samples	Date:	8/28/2024
Checked By:	G. Khatri	Date:	8/29/2024

- Since there is only a single row of piles in the perpendicular (Z) direction, $P_m = 1.0$ is only needed

LPile Results

Abutment	Direction	Row	P_m	Deflection (in, Service Load)	Maximum Shear (kips, Strength Load)	Maximum Moment (kip-ft, Strength Load)
Abutment	X	1	1	0.0006	124.7	167.7
	X	2	0.85	0.0006	124.8	167.7
	X	3 and up	0.7	0.0006	124.9	167.7
	Z	1	1.0	0.0003	85.1	26.2

Performed By:	J. Samples	Date:	8/28/2024
Checked By:	G. Khatri	Date:	8/29/2024

Pier

Material Parameters

The material parameters are based on information found in the Ohio Department of Transportation (ODOT) Geotechnical Design Manual (GDM) and boring logs (blow counts). The groundwater table depth at the pile head was assumed to be below the top of the rock.

Material	Moist Unit Weight (pcf)	Undrained Cohesion (psf)	Friction Angle (degrees)	Compressive Strength (psi)	RQD (%)
Sandy Silt (mod stiff w/o free water)	122	2,000	-	-	-
Bedrock	150	-	-	4,380	74

Pier Abutment Loading

- The pier abutment loading provided from the structural team is provided in this appendix. Each abutment consists of 1 row of piles spaced at 16.75' c/c.
- The pile cap is assumed to be rigid; therefore, each pile experiences the same lateral load.
- X and Z represents lateral loads (Z direction being perpendicular to the single row of four piles) while Y represents axial load. The load combinations used in the LPile are as follows:

Load State	Case	Lateral Load (kips)	Lateral Moment (kip-ft)	Axial Load (kips)
Service	I	19.02	319.70	848.90
Strength		23.99	418.80	1102.00
Service	II	10.16	370.95	1018.00
Strength		13.67	499.60	1326.00
Service	III	17.85	698.60	846.00
Strength		23.13	913.32	1091.00

- To take into account group effects, P-multipliers (P_m) were applied to the p-y curves in LPILE. The P-multipliers are provided in AASHTO LRFD 9th Edition Section 10.7.2.4 (presented in this appendix). From the structural engineer, the drilled shaft diameter (B) is 4 ft above the socket and 3.5 ft for the socket.
 - Spacing between rows laterally (X) is 16.75' c/c, which is between the 3B and 5B. P-multipliers are provided in AASHTO LRFD 9th edition section 10.7.2.7. Therefore, the P-multiplier at 16.75 ft is calculated through interpolation:
 - Row 1 → $P_m = 0.92$

Performed By:	J. Samples	Date:	8/28/2024
Checked By:	G. Khatri	Date:	8/29/2024

- Row 2 → $P_m = 0.67$
- Row 3 → $P_m = 0.54$

L Pile Results

Abutment	Direction	Row	P_m	Deflection (in, Service Load)	Maximum Shear (kips, Strength Load)	Maximum Moment (kip-ft, Strength Load)
Pier	X & Z	1	0.92	0.038	486.2	958.3
	X	2	0.67	0.041	495.7	975.0
	X	3 and up	0.54	0.043	496.7	991.7

Performed By:	J. Samples	Date:	8/28/2024
Checked By:	G. Khatri	Date:	8/29/2024

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LPile for Windows, Version 2022-12.006

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method
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Files Used for Analysis

Path to file locations:

\\US0247-PPFSS01\shared_projects\173609140\119144\400-Engineering\Geotechnical\Analysis\Lpile\bridges\LPile
Analysis\Bowman's Run\Rear Abutment B-001\

Name of input data file:

MEG-33 rear abutment X direction row1.lp12d

Name of output report file:

MEG-33 rear abutment X direction row1.lp12o

MEG-33 rear abutment X direction row1

Name of plot output file:

MEG-33 rear abutment X direction row1.lp12p

Name of runtime message file:

MEG-33 rear abutment X direction row1.lp12r

Date and Time of Analysis

Date: June 28, 2024

Time: 14:52:15

Problem Title

Project Name: MEG-33-19.21

Job Number: 173609140

Client: ODOT

Engineer: G. Khatri

Description: Rear Abutment Lateral Load Analysis at Bowman's Run Bridge

MEG-33 rear abutment X direction row1
Program Options and Settings

Computational Options:

- Conventional Analysis

Engineering Units Used for Data Input and Computations:

- US Customary System Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed = 500
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 100.0000 in
- Number of pile increments = 100

Loading Type and Number of Cycles of Loading:

- Static loading specified

- Analysis uses p-y modification factors for p-y curves
- Analysis uses layering correction (Method of Georgiadis)
- No distributed lateral loads are entered
- Loading by lateral soil movements acting on pile not selected
- Input of shear resistance at the pile tip not selected
- Input of moment resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:

- Output files use decimal points to denote decimal symbols.
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1
- No p-y curves to be computed and reported for user-specified depths
- Print using wide report formats

MEG-33 rear abutment X direction row1

Number of pile sections defined = 2
Total length of pile = 25.840 ft
Depth of ground surface below top of pile = 0.0000 ft

Pile diameters used for p-y curve computations are defined using 4 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile. A summary of values of pile diameter vs. depth follows.

Point No.	Depth Below Pile Head feet	Pile Diameter inches
1	0.000	36.0000
2	15.840	36.0000
3	15.840	36.0000
4	25.840	36.0000

Input Structural Properties for Pile Sections:

Pile Section No. 1:

Section 1 is a round drilled shaft, bored pile, or CIDH pile
Length of section = 15.840000 ft
Shaft Diameter = 36.000000 in

Pile Section No. 2:

Section 2 is a round drilled shaft, bored pile, or CIDH pile
Length of section = 10.000000 ft
Shaft Diameter = 36.000000 in

Soil and Rock Layering Information

The soil profile is modelled using 3 layers

Layer 1 is stiff clay with user-defined k-value

Distance from top of pile to top of layer	=	0.0000	ft
Distance from top of pile to bottom of layer	=	7.500000	ft
Effective unit weight at top of layer	=	125.000000	pcf
Effective unit weight at bottom of layer	=	125.000000	pcf
Undrained cohesion at top of layer	=	2500.	psf
Undrained cohesion at bottom of layer	=	2500.	psf
Epsilon-50 at top of layer	=	0.0000	
Epsilon-50 at bottom of layer	=	0.0000	
Subgrade k at top of layer	=	0.0000	pci
Subgrade k at bottom of layer	=	0.0000	pci

NOTE: Default values for Epsilon-50 will be computed for this layer.

NOTE: Default values for subgrade k will be computed for this layer.

Layer 2 is stiff clay with user-defined k-value

Distance from top of pile to top of layer	=	7.500000	ft
Distance from top of pile to bottom of layer	=	15.840000	ft
Effective unit weight at top of layer	=	122.000000	pcf
Effective unit weight at bottom of layer	=	122.000000	pcf
Undrained cohesion at top of layer	=	2000.	psf
Undrained cohesion at bottom of layer	=	2000.	psf
Epsilon-50 at top of layer	=	0.0000	
Epsilon-50 at bottom of layer	=	0.0000	
Subgrade k at top of layer	=	0.0000	pci
Subgrade k at bottom of layer	=	0.0000	pci

NOTE: Default values for Epsilon-50 will be computed for this layer.

NOTE: Default values for subgrade k will be computed for this layer.

Layer 3 is weak rock, p-y criteria by Reese, 1997

Distance from top of pile to top of layer	=	15.840000	ft
Distance from top of pile to bottom of layer	=	30.000000	ft

MEG-33 rear abutment X direction row1

Effective unit weight at top of layer = 87.600000 pcf
 Effective unit weight at bottom of layer = 87.600000 pcf
 Uniaxial compressive strength at top of layer = 4380. psi
 Uniaxial compressive strength at bottom of layer = 4380. psi
 Initial modulus of rock at top of layer = 394200. psi
 Initial modulus of rock at bottom of layer = 394200. psi
 RQD of rock at top of layer = 86.000000 %
 RQD of rock at bottom of layer = 86.000000 %
 k rm of rock at top of layer = 0.0000500
 k rm of rock at bottom of layer = 0.0000500

(Depth of the lowest soil layer extends 4.160 ft below the pile tip)

 Summary of Input Soil Properties

Layer Rock Mass Num. Modulus (p-y Curve Type) psi	Soil Type Name	Layer Depth ft	Effective Unit Wt. pcf	Cohesion psf	Uniaxial qu psi	RQD %	E50 or krm	kpy pci
1	Stiff Clay w/o	0.00	125.0000	2500.	--	--	default	default
--	Free Water, using k	7.5000	125.0000	2500.	--	--	default	default
2	Stiff Clay w/o	7.5000	122.0000	2000.	--	--	default	default
--	Free Water, using k	15.8400	122.0000	2000.	--	--	default	default
3	Weak	15.8400	87.6000	--	4380.	86.0000	5.00E-05	--
394200.	Rock	30.0000	87.6000	--	4380.	86.0000	5.00E-05	--
394200.								

 Modification Factors for p-y Curves

Distribution of p-y modifiers with depth defined using 3 points

Point No.	Depth X ft	p-mult	y-mult
1	0.000	1.0000	1.0000
2	15.840	1.0000	1.0000
3	25.840	1.0000	1.0000

 Static Loading Type

Static loading criteria were used when computing p-y curves for all analyses.

 Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 2

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length	Run Analysis
1	1	V = 3540. lbs	M = 1490400. in-lbs	765800.	No	Yes
2	1	V = 4770. lbs	M = 2012400. in-lbs	985500.	No	Yes

V = shear force applied normal to pile axis
 M = bending moment applied to pile head

y = lateral deflection normal to pile axis

S = pile slope relative to original pile batter angle

R = rotational stiffness applied to pile head

Values of top y vs. pile lengths can be computed only for load types with specified shear loading (Load Types 1, 2, and 3).

Thrust force is assumed to be acting axially for all pile batter angles.

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 2

Pile Section No. 1:

Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section	=	15.840000 ft
Shaft Diameter	=	36.000000 in
Concrete Cover Thickness (to edge of trans. reinf.)	=	3.000000 in
Number of Reinforcing Bars	=	8 bars
Yield Stress of Reinforcing Bars	=	50000. psi
Modulus of Elasticity of Reinforcing Bars	=	29000000. psi
Gross Area of Shaft	=	1018. sq. in.
Total Area of Reinforcing Steel	=	8.000000 sq. in.
Area Ratio of Steel Reinforcement	=	0.79 percent
Edge-to-Edge Bar Spacing	=	9.538153 in
Maximum Concrete Aggregate Size	=	0.750000 in
Ratio of Bar Spacing to Aggregate Size	=	12.72
Offset of Center of Rebar Cage from Center of Pile	=	0.0000 in
Transverse Reinforcement		
Type: Spiral		
Number of Transverse Reinf. (per spacing)	=	1
Spacing of Transverse Reinf.	=	4.000000 in

MEG-33 rear abutment X direction row1

Yield Stress of Transverse Reinf. = 50000. psi
 Diameter of Transverse Reinf. = 0.500000 in

Axial Structural Capacities:

Nom. Axial Structural Capacity = $0.85 F_c A_c + F_y A_s$ = 3833.578 kips
 Tensile Load for Cracking of Concrete = -446.783 kips
 Nominal Axial Tensile Capacity = -400.000 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.128000	1.000000	13.936000	0.000000
2	1.128000	1.000000	9.854240	9.854240
3	1.128000	1.000000	0.000000	13.936000
4	1.128000	1.000000	-9.85424	9.854240
5	1.128000	1.000000	-13.93600	0.000000
6	1.128000	1.000000	-9.85424	-9.85424
7	1.128000	1.000000	0.000000	-13.93600
8	1.128000	1.000000	9.854240	-9.85424

NOTE: The positions of the above rebars were computed by LPILE

Minimum spacing between any two bars not equal to zero = 9.538 inches
 between bars 3 and 4.

Ratio of bar spacing to maximum aggregate size = 12.72

Concrete Properties:

Compressive Strength of Concrete = 4000. psi
 Modulus of Elasticity of Concrete = 3604997. psi
 Modulus of Rupture of Concrete = -474.34165 psi

MEG-33 rear abutment X direction row1

Compression Strain at Peak Stress = 0.001886
 Tensile Strain at Fracture of Concrete = -0.0001154
 Maximum Coarse Aggregate Size = 0.750000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 2

Number	Axial Thrust Force kips
1	765.800
2	985.500

Definitions of Run Messages and Notes:

- C = concrete in section has cracked in tension.
- Y = stress in reinforcing steel has reached yield stress.
- T = ACI 318 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than 0.003. See ACI 318-14, Section 21.2.3.
- Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
 Position of neutral axis is measured from edge of compression side of pile.
 Compressive stresses and strains are positive in sign.
 Tensile stresses and strains are negative in sign.

Axial Thrust Force = 765.800 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in ²	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	210.2199654	336351945.	302.0711512	0.0001888	0.0001663	0.7602095	5.4130521	
0.00000125	420.4405562	336352445.	160.0565164	0.0002001	0.0001551	0.8026804	5.6780737	
0.00000188	630.6491287	336346202.	112.7276103	0.0002114	0.0001439	0.8449367	5.9436013	

MEG-33 rear abutment X direction row1

0.00000250	840.8396742	336335870.	89.0701368	0.0002227	0.0001327	0.8869773	6.2096349
0.00000313	1051.	336321979.	74.8812370	0.0002340	0.0001215	0.9288008	6.4761746
0.00000375	1261.	336304705.	65.4266245	0.0002453	0.0001103	0.9704058	6.7432204
0.00000438	1471.	336284125.	58.6773198	0.0002567	0.00009921	1.0117911	7.0107725
0.00000500	1681.	336260275.	53.6188331	0.0002681	0.00008809	1.0529553	7.2788308
0.00000563	1891.	336233176.	49.6875591	0.0002795	0.00007699	1.0938971	7.5473956
0.00000625	2101.	336202839.	46.5453346	0.0002909	0.00006591	1.1346153	7.8164669
0.00000688	2311.	336169273.	43.9769650	0.0003023	0.00005484	1.1751085	8.0860449
0.00000750	2521.	336132480.	41.8389873	0.0003138	0.00004379	1.2153753	8.3561298
0.00000813	2731.	336092464.	40.0320811	0.0003253	0.00003276	1.2554145	8.6267216
0.00000875	2940.	336049227.	38.4853031	0.0003367	0.00002175	1.2952248	8.8978207
0.00000938	3150.	336002768.	37.1466284	0.0003482	0.00001075	1.3348048	9.1694271
0.00001000	3360.	335953089.	35.9770384	0.0003598	-2.29616E-07	1.3741532	9.4415412
0.00001063	3569.	335899271.	34.9466824	0.0003713	-0.00001119	1.4132683	9.7141590
0.00001125	3778.	335835739.	34.0322719	0.0003829	-0.00002214	1.4521455	9.9872537
0.00001188	3987.	335755857.	33.2153828	0.0003944	-0.00003307	1.4907788	10.2607850
0.00001250	4196.	335654708.	32.4812751	0.0004060	-0.00004398	1.5291626	10.5347123
0.00001313	4404.	335529259.	31.8180259	0.0004176	-0.00005489	1.5672914	10.8089987
0.00001375	4611.	335378029.	31.2158925	0.0004292	-0.00006578	1.6051608	11.0836122
0.00001438	4819.	335200558.	30.6668361	0.0004408	-0.00007666	1.6427668	11.3585249
0.00001500	5025.	334996915.	30.1641635	0.0004525	-0.00008754	1.6801055	11.6337112
0.00001563	5231.	334767745.	29.7022611	0.0004641	-0.00009840	1.7171741	11.9091496
0.00001625	5436.	334513938.	29.2763840	0.0004757	-0.000109	1.7539696	12.1848210
0.00001688	5436.	322124533.	28.3881710	0.0004791	-0.000128	1.7641173	12.2187987 C
0.00001750	5436.	310620086.	27.9511295	0.0004891	-0.000141	1.7956567	12.4495483 C
0.00001813	5436.	299909048.	27.5388414	0.0004991	-0.000153	1.8266668	12.6774661 C
0.00001875	5512.	293972286.	27.1485233	0.0005090	-0.000166	1.8571362	12.9023846 C
0.00001938	5621.	290104229.	26.7785282	0.0005188	-0.000179	1.8871003	13.1245731 C
0.00002000	5726.	286288218.	26.4271301	0.0005285	-0.000191	1.9165763	13.3441355 C
0.00002063	5827.	282533459.	26.0928612	0.0005382	-0.000204	1.9455840	13.5612052 C
0.00002125	5925.	278830147.	25.7739072	0.0005477	-0.000217	1.9741094	13.7755954 C
0.00002188	6020.	275192399.	25.4693379	0.0005571	-0.000230	2.0021836	13.9875488 C
0.00002250	6112.	271630965.	25.1783202	0.0005665	-0.000243	2.0298363	14.1973040 C
0.00002313	6201.	268151963.	24.9000419	0.0005758	-0.000257	2.0570918	14.4050532 C
0.00002375	6288.	264760701.	24.6338065	0.0005851	-0.000270	2.0839760	14.6110093 C
0.00002438	6372.	261422496.	24.3776229	0.0005942	-0.000283	2.1104170	14.8144198 C
0.00002563	6534.	255000318.	23.8958892	0.0006123	-0.000310	2.1622428	15.2161452 C
0.00002688	6688.	248863574.	23.4492514	0.0006302	-0.000337	2.2126077	15.6102976 C
0.00002813	6835.	243029058.	23.0345475	0.0006478	-0.000365	2.2616621	15.9981147 C
0.00002938	6976.	237477858.	22.6480400	0.0006653	-0.000392	2.3094593	16.3798866 C

MEG-33 rear abutment X direction row1

0.00003063	7111.	232193762.	22.2866483	0.0006825	-0.000420	2.3560542	16.7559421	C
0.00003188	7241.	227162744.	21.9478236	0.0006996	-0.000448	2.4015043	17.1266570	C
0.00003313	7366.	222372455.	21.6294520	0.0007165	-0.000476	2.4458691	17.4924549	C
0.00003438	7487.	217811887.	21.3297790	0.0007332	-0.000504	2.4892103	17.8538110	C
0.00003563	7605.	213471087.	21.0473513	0.0007498	-0.000533	2.5315923	18.2112574	C
0.00003688	7718.	209307729.	20.7791068	0.0007662	-0.000561	2.5729075	18.5633950	C
0.00003813	7828.	205337184.	20.5251752	0.0007825	-0.000590	2.6133212	18.9119094	C
0.00003938	7936.	201557702.	20.2850342	0.0007987	-0.000619	2.6529285	19.2577610	C
0.00004063	8041.	197932200.	20.0561423	0.0008148	-0.000648	2.6916142	19.5994552	C
0.00004188	8143.	194460687.	19.8381094	0.0008307	-0.000677	2.7294554	19.9377418	C
0.00004313	8244.	191154981.	19.6315480	0.0008466	-0.000706	2.7666226	20.2745673	C
0.00004438	8341.	187958039.	19.4325170	0.0008623	-0.000735	2.8028154	20.6061079	C
0.00004563	8437.	184919979.	19.2442774	0.0008780	-0.000764	2.8384572	20.9374972	C
0.00004688	8530.	181976647.	19.0623093	0.0008935	-0.000794	2.8731629	21.2637643	C
0.00004813	8623.	179176876.	18.8900588	0.0009091	-0.000823	2.9073705	21.5904009	C
0.00004938	8713.	176457324.	18.7228406	0.0009244	-0.000853	2.9406532	21.9117550	C
0.00005063	8802.	173866693.	18.5643709	0.0009398	-0.000883	2.9734745	22.2338288	C
0.00005188	8889.	171352249.	18.4105331	0.0009550	-0.000912	3.0054498	22.5513831	C
0.00005313	8975.	168943161.	18.2637514	0.0009703	-0.000942	3.0368989	22.8686546	C
0.00005438	9060.	166622164.	18.1226398	0.0009854	-0.000972	3.0677226	23.1842253	C
0.00005563	9143.	164375395.	17.9861179	0.0010005	-0.001002	3.0978487	-23.541756	C
0.00005688	9226.	162222836.	17.8560168	0.0010156	-0.001032	3.1275273	-24.285370	C
0.00005813	9308.	160131487.	17.7294365	0.0010305	-0.001062	3.1564746	-25.032481	C
0.00005938	9388.	158113427.	17.6076091	0.0010455	-0.001092	3.1848681	-25.780586	C
0.00006063	9468.	156174408.	17.4911933	0.0010604	-0.001122	3.2128196	-26.528009	C
0.00006188	9546.	154285228.	17.3774252	0.0010752	-0.001152	3.2400485	-27.279120	C
0.00006313	9624.	152457860.	17.2676200	0.0010900	-0.001182	3.2667358	-28.031225	C
0.00006438	9701.	150697620.	17.1624387	0.0011048	-0.001213	3.2929874	-28.782660	C
0.00006563	9777.	148989276.	17.0603870	0.0011196	-0.001243	3.3186597	-29.535763	C
0.00006688	9852.	147323411.	16.9605681	0.0011342	-0.001273	3.3436755	-30.291936	C
0.00006813	9927.	145715150.	16.8647474	0.0011489	-0.001304	3.3682619	-31.047446	C
0.00006938	10001.	144161349.	16.7727104	0.0011636	-0.001334	3.3924169	-31.802291	C
0.00007063	10074.	142643417.	16.6823997	0.0011782	-0.001364	3.4159258	-32.560272	C
0.00007188	10146.	141166141.	16.5944955	0.0011927	-0.001395	3.4388869	-33.319786	C
0.00007313	10218.	139736147.	16.5099066	0.0012073	-0.001425	3.4614229	-34.078642	C
0.00007438	10290.	138351025.	16.4284673	0.0012219	-0.001456	3.4835318	-34.836837	C
0.00007938	10569.	133150678.	16.1225585	0.0012797	-0.001578	3.5666910	-37.882973	C
0.00008438	10840.	128470050.	15.8497840	0.0013373	-0.001700	3.6422212	-40.936747	C
0.00008938	11104.	124237225.	15.6063903	0.0013948	-0.001823	3.7104072	-43.993475	C
0.00009438	11360.	120375044.	15.3863356	0.0014521	-0.001945	3.7711568	-47.056910	C

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0.00009938	11611.	116840154.	15.1878571	0.0015093	-0.002068	3.8247131	-50.000000	CY
0.0001044	11830.	113343154.	15.0000352	0.0015656	-0.002192	3.8704756	-50.000000	CY
0.0001094	12008.	109784526.	14.8157660	0.0016205	-0.002317	3.9083747	-50.000000	CY
0.0001144	12181.	106496543.	14.6483521	0.0016754	-0.002442	3.9397749	-50.000000	CY
0.0001194	12348.	103441883.	14.4943284	0.0017303	-0.002567	3.9645808	-50.000000	CY
0.0001244	12510.	100584567.	14.3523135	0.0017851	-0.002692	3.9828283	-50.000000	CY
0.0001294	12629.	97618697.	14.2083733	0.0018382	-0.002819	3.9942768	-50.000000	CY
0.0001344	12698.	94496465.	14.0536796	0.0018885	-0.002949	3.9994561	-50.000000	CY
0.0001394	12763.	91574401.	13.9121518	0.0019390	-0.003078	3.9994295	-50.000000	CY
0.0001444	12824.	88822594.	13.7787758	0.0019893	-0.003208	3.9991866	-50.000000	CY
0.0001494	12881.	86230205.	13.6541689	0.0020396	-0.003338	3.9986313	-50.000000	CY
0.0001544	12935.	83792019.	13.5400008	0.0020902	-0.003467	3.9976086	-50.000000	CY
0.0001594	12986.	81481962.	13.4314034	0.0021406	-0.003597	3.9999835	-50.000000	CY
0.0001644	13034.	79293696.	13.3294103	0.0021910	-0.003726	3.9995177	-50.000000	CY
0.0001694	13080.	77224802.	13.2353911	0.0022417	-0.003856	3.9981227	-50.000000	CY
0.0001744	13124.	75265765.	13.1485635	0.0022928	-0.003985	3.9999974	-50.000000	CY
0.0001794	13165.	73394379.	13.0638987	0.0023433	-0.004114	3.9991654	50.000000	CY
0.0001844	13204.	71615471.	12.9850557	0.0023941	-0.004243	3.9968534	50.000000	CY
0.0001894	13241.	69921494.	12.9123679	0.0024453	-0.004372	3.9995285	50.000000	CY
0.0001944	13276.	68299557.	12.8466402	0.0024971	-0.004500	3.9967257	50.000000	CY
0.0001994	13309.	66752915.	12.7856694	0.0025491	-0.004628	3.9995946	50.000000	CY
0.0002044	13337.	65259109.	12.7277170	0.0026012	-0.004756	3.9962725	50.000000	CY
0.0002094	13365.	63830744.	12.6735454	0.0026535	-0.004884	3.9993424	50.000000	CY
0.0002144	13390.	62461659.	12.6238722	0.0027062	-0.005011	3.9969794	50.000000	CY
0.0002194	13414.	61147688.	12.5784072	0.0027594	-0.005138	3.9986153	50.000000	CY
0.0002244	13438.	59889181.	12.5359498	0.0028128	-0.005265	3.9999934	50.000000	CY
0.0002294	13460.	58680489.	12.4967730	0.0028664	-0.005391	3.9969588	50.000000	CY
0.0002344	13481.	57520567.	12.4601838	0.0029204	-0.005517	3.9995228	50.000000	CY
0.0002394	13502.	56405718.	12.4261845	0.0029745	-0.005643	3.9965326	50.000000	CY
0.0002444	13521.	55330596.	12.3924636	0.0030284	-0.005769	3.9976700	50.000000	CY
0.0002494	13540.	54296026.	12.3603610	0.0030824	-0.005895	3.9997169	50.000000	CY
0.0002544	13558.	53299201.	12.3305698	0.0031366	-0.006021	3.9955933	50.000000	CY
0.0002594	13575.	52338045.	12.3029331	0.0031911	-0.006146	3.9972858	50.000000	CYT
0.0002644	13592.	51411546.	12.2770423	0.0032457	-0.006272	3.9995245	50.000000	CYT
0.0002694	13608.	50517240.	12.2529716	0.0033006	-0.006397	3.9974179	50.000000	CYT
0.0002744	13623.	49651428.	12.2304689	0.0033557	-0.006522	3.9957412	50.000000	CYT
0.0003044	13672.	44918381.	12.0959895	0.0036817	-0.007276	3.9998232	50.000000	CYT
0.0003344	13672.	40888321.	12.0718370	0.0040365	-0.008001	3.9933884	50.000000	CYT

MEG-33 rear abutment X direction row1

Axial Thrust Force = 985.500 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	203.9917885	326386862.	388.8590461	0.0002430	0.0002205	0.9639414	6.9860827	
0.00000125	407.9860656	326388852.	203.4511105	0.0002543	0.0002093	1.0050537	7.2511277	
0.00000188	611.9679531	326382908.	141.6580582	0.0002656	0.0001981	1.0459513	7.5166944	
0.00000250	815.9312569	326372503.	110.7687271	0.0002769	0.0001869	1.0866329	7.7827827	
0.00000313	1020.	326358330.	92.2408853	0.0002883	0.0001758	1.1270971	8.0493927	
0.00000375	1224.	326340622.	79.8937887	0.0002996	0.0001646	1.1673424	8.3165245	
0.00000438	1428.	326319476.	71.0785472	0.0003110	0.0001535	1.2073677	8.5841782	
0.00000500	1631.	326294942.	64.4707158	0.0003224	0.0001424	1.2471715	8.8523538	
0.00000563	1835.	326267046.	59.3344920	0.0003338	0.0001313	1.2867525	9.1210515	
0.00000625	2039.	326235805.	55.2283942	0.0003452	0.0001202	1.3261094	9.3902715	
0.00000688	2243.	326201227.	51.8714798	0.0003566	0.0001091	1.3652407	9.6600138	
0.00000750	2446.	326163319.	49.0764535	0.0003681	0.00009807	1.4041451	9.9302787	
0.00000813	2650.	326122085.	46.7136499	0.0003795	0.00008705	1.4428212	10.2010663	
0.00000875	2853.	326077526.	44.6904504	0.0003910	0.00007604	1.4812678	10.4723768	
0.00000938	3057.	326029644.	42.9389351	0.0004026	0.00006505	1.5194834	10.7442105	
0.00001000	3260.	325978439.	41.4081640	0.0004141	0.00005408	1.5574667	11.0165676	
0.00001063	3463.	325923911.	40.0591830	0.0004256	0.00004313	1.5952163	11.2894483	
0.00001125	3666.	325866060.	38.8616946	0.0004372	0.00003219	1.6327308	11.5628529	
0.00001188	3869.	325804884.	37.7917798	0.0004488	0.00002128	1.6700090	11.8367817	
0.00001250	4072.	325740383.	36.8303033	0.0004604	0.00001038	1.7070493	12.1112350	
0.00001313	4274.	325672555.	35.9617747	0.0004720	-5.01706E-07	1.7438506	12.3862131	
0.00001375	4477.	325600882.	35.1735127	0.0004836	-0.00001136	1.7804110	12.6617132	
0.00001438	4679.	325522318.	34.4550016	0.0004953	-0.00002221	1.8167270	12.9377163	
0.00001500	4881.	325432923.	33.7974547	0.0005070	-0.00003304	1.8527943	13.2141928	
0.00001563	5083.	325329376.	33.1934873	0.0005186	-0.00004385	1.8886081	13.4911115	
0.00001625	5285.	325209160.	32.6368528	0.0005303	-0.00005465	1.9241642	13.7684419	
0.00001688	5486.	325070637.	32.1222355	0.0005421	-0.00006544	1.9594584	14.0461565	
0.00001750	5686.	324912770.	31.6450834	0.0005538	-0.00007621	1.9944871	14.3242299	
0.00001813	5886.	324735145.	31.2014791	0.0005655	-0.00008697	2.0292472	14.6026400	
0.00001875	6085.	324537642.	30.7880306	0.0005773	-0.00009772	2.0637356	14.8813667	
0.00001938	6284.	324320367.	30.4017860	0.0005890	-0.000108	2.0979496	15.1603911	
0.00002000	6284.	314185356.	29.7226196	0.0005945	-0.000126	2.1134338	15.2555194	C
0.00002063	6284.	304664587.	29.3330884	0.0006050	-0.000138	2.1436908	15.4992661	C
0.00002125	6377.	300112242.	28.9621023	0.0006154	-0.000150	2.1734373	15.7403206	C

MEG-33 rear abutment X direction row1

0.00002188	6501.	297175532.	28.6084526	0.0006258	-0.000162	2.2027032	15.9789246	C
0.00002250	6620.	294220651.	28.2707001	0.0006361	-0.000174	2.2314949	16.2150819	C
0.00002313	6735.	291260281.	27.9476923	0.0006463	-0.000186	2.2598268	16.4488837	C
0.00002375	6847.	288315485.	27.6386715	0.0006564	-0.000199	2.2877314	16.6806100	C
0.00002438	6956.	285394864.	27.3427172	0.0006665	-0.000211	2.3152239	16.9103708	C
0.00002563	7166.	279648602.	26.7866618	0.0006864	-0.000236	2.3690240	17.3643506	C
0.00002688	7363.	273987420.	26.2714783	0.0007060	-0.000261	2.4211739	17.8098710	C
0.00002813	7551.	268495773.	25.7939669	0.0007255	-0.000287	2.4718776	18.2487669	C
0.00002938	7730.	263156607.	25.3489516	0.0007446	-0.000313	2.5211371	18.6807258	C
0.00003063	7900.	257972225.	24.9326418	0.0007636	-0.000339	2.5689975	19.1059151	C
0.00003188	8063.	252967524.	24.5427305	0.0007823	-0.000365	2.6155733	19.5253241	C
0.00003313	8220.	248139779.	24.1765243	0.0008008	-0.000392	2.6609135	19.9392362	C
0.00003438	8370.	243486447.	23.8317642	0.0008192	-0.000418	2.7050686	20.3479776	C
0.00003563	8515.	239005070.	23.5065522	0.0008374	-0.000445	2.7480907	20.7519192	C
0.00003688	8654.	234693214.	23.1992930	0.0008555	-0.000472	2.7900339	21.1514815	C
0.00003813	8789.	230526427.	22.9076383	0.0008734	-0.000499	2.8308652	21.5460201	C
0.00003938	8919.	226508980.	22.6306521	0.0008911	-0.000526	2.8706542	21.9361635	C
0.00004063	9045.	222648666.	22.3678140	0.0009087	-0.000554	2.9094938	22.3228935	C
0.00004188	9168.	218943532.	22.1183480	0.0009262	-0.000581	2.9474423	22.7068058	C
0.00004313	9287.	215348370.	21.8793292	0.0009435	-0.000609	2.9843490	23.0856985	C
0.00004438	9403.	211891844.	21.6516375	0.0009608	-0.000637	3.0203977	23.4618387	C
0.00004563	9516.	208575033.	21.4349839	0.0009780	-0.000665	3.0556599	23.8360756	C
0.00004688	9626.	205346136.	21.2260711	0.0009950	-0.000693	3.0899142	24.2051278	C
0.00004813	9734.	202257565.	21.0275721	0.0010120	-0.000721	3.1234937	24.5735680	C
0.00004938	9838.	199252423.	20.8359107	0.0010288	-0.000749	3.1561330	24.9374072	C
0.00005063	9941.	196369599.	20.6531876	0.0010456	-0.000777	3.1881021	25.3004736	C
0.00005188	10041.	193566417.	20.4766067	0.0010622	-0.000805	3.2191950	25.6595328	C
0.00005313	10140.	190875821.	20.3081117	0.0010789	-0.000834	3.2496589	26.0182472	C
0.00005438	10236.	188251240.	20.1445329	0.0010954	-0.000862	3.2792397	26.3724980	C
0.00005563	10332.	185737926.	19.9888563	0.0011119	-0.000891	3.3082795	26.7276365	C
0.00005688	10424.	183275723.	19.8367923	0.0011282	-0.000919	3.3364049	27.0774470	C
0.00005813	10515.	180909986.	19.6915567	0.0011446	-0.000948	3.3639749	27.4277430	C
0.00005938	10605.	178613137.	19.5510732	0.0011608	-0.000977	3.3908260	27.7756918	C
0.00006063	10693.	176380055.	19.4149615	0.0011770	-0.001005	3.4169586	28.1211418	C
0.00006188	10781.	174231456.	19.2848273	0.0011932	-0.001034	3.4425651	28.4674496	C
0.00006313	10866.	172127043.	19.1574372	0.0012093	-0.001063	3.4673611	28.8093461	C
0.00006438	10950.	170090563.	19.0347585	0.0012254	-0.001092	3.4915702	29.1508025	C
0.00006563	11033.	168126358.	18.9171981	0.0012414	-0.001121	3.5152593	29.4931052	C
0.00006688	11114.	166197842.	18.8016112	0.0012574	-0.001150	3.5381499	29.8307125	C
0.00006813	11195.	164329510.	18.6901932	0.0012733	-0.001179	3.5604800	30.1681756	C

MEG-33 rear abutment X direction row1

0.00006938	11275.	162523588.	18.5832058	0.0012892	-0.001208	3.5822962	30.5064735	C
0.00007063	11354.	160757672.	18.4786039	0.0013051	-0.001237	3.6034250	30.8419027	C
0.00007188	11431.	159035226.	18.3767719	0.0013208	-0.001267	3.6239243	31.1755212	C
0.00007313	11507.	157367113.	18.2788116	0.0013366	-0.001296	3.6439157	31.5099675	C
0.00007438	11584.	155750544.	18.1845298	0.0013525	-0.001325	3.6633965	31.8452455	C
0.00007938	11879.	149651551.	17.8303493	0.0014153	-0.001442	3.7352557	-33.951852	C
0.00008438	12161.	144128808.	17.5140442	0.0014777	-0.001560	3.7981675	-36.864511	C
0.00008938	12432.	139101865.	17.2303448	0.0015400	-0.001678	3.8523548	-39.784387	C
0.00009438	12694.	134507743.	16.9755777	0.0016021	-0.001795	3.8980170	-42.707353	C
0.00009938	12948.	130293291.	16.7469216	0.0016642	-0.001913	3.9352810	-45.628953	C
0.0001044	13191.	126384816.	16.5371928	0.0017261	-0.002031	3.9639833	-48.559572	C
0.0001094	13425.	122744437.	16.3484517	0.0017881	-0.002149	3.9843870	-50.000000	CY
0.0001144	13612.	119011329.	16.1620312	0.0018485	-0.002269	3.9961755	-50.000000	CY
0.0001194	13779.	115423118.	15.9892131	0.0019087	-0.002389	3.9997009	-50.000000	CY
0.0001244	13937.	112054355.	15.8287933	0.0019687	-0.002509	3.9990215	-50.000000	CY
0.0001294	14090.	108906531.	15.6849424	0.0020292	-0.002628	3.9995483	-50.000000	CY
0.0001344	14235.	105935157.	15.5508282	0.0020896	-0.002748	3.9997696	-50.000000	CY
0.0001394	14354.	102989737.	15.4207507	0.0021493	-0.002868	3.9998110	-50.000000	CY
0.0001444	14428.	99932061.	15.2859374	0.0022069	-0.002991	3.9996674	-50.000000	CY
0.0001494	14482.	96950710.	15.1522097	0.0022634	-0.003114	3.9992270	50.000000	CY
0.0001544	14533.	94138725.	15.0306519	0.0023204	-0.003237	3.9983508	50.000000	CY
0.0001594	14578.	91472822.	14.9196998	0.0023778	-0.003360	3.9987870	50.000000	CY
0.0001644	14617.	88923333.	14.8153480	0.0024353	-0.003482	3.9998053	50.000000	CY
0.0001694	14652.	86507502.	14.7202165	0.0024932	-0.003604	3.9987555	50.000000	CY
0.0001744	14685.	84212361.	14.6338144	0.0025518	-0.003726	3.9980050	50.000000	CY
0.0001794	14714.	82030066.	14.5526774	0.0026104	-0.003847	3.9996154	50.000000	CY
0.0001844	14741.	79949585.	14.4744302	0.0026687	-0.003969	3.9974917	50.000000	CY
0.0001894	14766.	77971421.	14.4020617	0.0027274	-0.004090	3.9998623	50.000000	CY
0.0001944	14789.	76087099.	14.3352437	0.0027864	-0.004211	3.9977717	50.000000	CY
0.0001994	14812.	74291358.	14.2732507	0.0028457	-0.004332	3.9998985	50.000000	CY
0.0002044	14833.	72575837.	14.2156871	0.0029053	-0.004452	3.9974338	50.000000	CY
0.0002094	14851.	70930899.	14.1583641	0.0029644	-0.004573	3.9997537	50.000000	CY
0.0002144	14868.	69357401.	14.1051807	0.0030238	-0.004694	3.9961282	50.000000	CY
0.0002194	14885.	67851145.	14.0557151	0.0030835	-0.004814	3.9991858	50.000000	CY
0.0002244	14900.	66408435.	14.0095562	0.0031434	-0.004934	3.9983976	50.000000	CY
0.0002294	14915.	65023572.	13.9668498	0.0032036	-0.005054	3.9977121	50.000000	CY
0.0002344	14929.	63695164.	13.9268526	0.0032641	-0.005173	3.9997684	50.000000	CY
0.0002394	14941.	62418360.	13.8897192	0.0033249	-0.005293	3.9947663	50.000000	CY
0.0002444	14953.	61190000.	13.8547320	0.0033858	-0.005412	3.9981938	50.000000	CY
0.0002494	14964.	60006116.	13.8193973	0.0034462	-0.005531	3.9998610	50.000000	CY

MEG-33 rear abutment X direction row1

0.0002544	14974.	58865554.	13.7865947	0.0035070	-0.005651	3.9943153	50.0000000 CY
0.0002594	14983.	57766524.	13.7559764	0.0035680	-0.005770	3.9976467	50.0000000 CY
0.0002644	14992.	56707417.	13.7272059	0.0036291	-0.005888	3.9996407	50.0000000 CY
0.0002694	15000.	55685311.	13.7004028	0.0036905	-0.006007	3.9967903	50.0000000 CY
0.0002744	15008.	54697896.	13.6755600	0.0037522	-0.006125	3.9959323	50.0000000 CYT
0.0003044	15008.	49306727.	13.8733038	0.0042227	-0.006735	3.9995748	50.0000000 CYT

 Summary of Results for Nominal Moment Capacity for Section 1

Moment values interpolated at maximum compressive strain = 0.003
 or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain	Max. Tens. Strain
1	765.800	13511.243	0.00300000	-0.00570261
2	985.500	14861.546	0.00300000	-0.00464537

Note that the values of moment capacity in the table above are not factored by a strength reduction factor (phi-factor).

In ACI 318, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.75).

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318, or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Load No.	Resist. Factor	Nominal Ax. Thrust kips	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in ²
1	0.65	765.800000	13511.	497.770000	8782.	174437239.

MEG-33 rear abutment X direction row1						
2	0.65	985.500000	14862.	640.575000	9660.	204362639.
1	0.75	765.800000	13511.	574.350000	10133.	141430041.
2	0.75	985.500000	14862.	739.125000	11146.	165462302.
1	0.90	765.800000	13511.	689.220000	12160.	106885023.
2	0.90	985.500000	14862.	886.950000	13375.	123519694.

Pile Section No. 2:

Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section	=	10.000000	ft
Shaft Diameter	=	36.000000	in
Concrete Cover Thickness (to edge of trans. reinf.)	=	3.000000	in
Number of Reinforcing Bars	=	8	bars
Yield Stress of Reinforcing Bars	=	50000.	psi
Modulus of Elasticity of Reinforcing Bars	=	29000000.	psi
Gross Area of Shaft	=	1018.	sq. in.
Total Area of Reinforcing Steel	=	8.000000	sq. in.
Area Ratio of Steel Reinforcement	=	0.79	percent
Edge-to-Edge Bar Spacing	=	9.538153	in
Maximum Concrete Aggregate Size	=	0.750000	in
Ratio of Bar Spacing to Aggregate Size	=	12.72	
Offset of Center of Rebar Cage from Center of Pile	=	0.0000	in
Transverse Reinforcement			
Type: Spiral			
Number of Transverse Reinf. (per spacing)	=	1	
Spacing of Transverse Reinf.	=	4.000000	in
Yield Stress of Transverse Reinf.	=	50000.	psi
Diameter of Transverse Reinf.	=	0.500000	in

Axial Structural Capacities:

Nom. Axial Structural Capacity = $0.85 F_c A_c + F_y A_s$	=	3833.578	kips
Tensile Load for Cracking of Concrete	=	-446.783	kips

MEG-33 rear abutment X direction row1

Nominal Axial Tensile Capacity = -400.000 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.128000	1.000000	13.936000	0.000000
2	1.128000	1.000000	9.854240	9.854240
3	1.128000	1.000000	0.000000	13.936000
4	1.128000	1.000000	-9.85424	9.854240
5	1.128000	1.000000	-13.93600	0.000000
6	1.128000	1.000000	-9.85424	-9.85424
7	1.128000	1.000000	0.000000	-13.93600
8	1.128000	1.000000	9.854240	-9.85424

NOTE: The positions of the above rebars were computed by LPILE

Minimum spacing between any two bars not equal to zero = 9.538 inches
between bars 3 and 4.

Ratio of bar spacing to maximum aggregate size = 12.72

Concrete Properties:

Compressive Strength of Concrete = 4000. psi
Modulus of Elasticity of Concrete = 3604997. psi
Modulus of Rupture of Concrete = -474.34165 psi
Compression Strain at Peak Stress = 0.001886
Tensile Strain at Fracture of Concrete = -0.0001154
Maximum Coarse Aggregate Size = 0.750000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 2

Number Axial Thrust Force

MEG-33 rear abutment X direction row1

 kips

1 765.800
 2 985.500

Definitions of Run Messages and Notes:

- C = concrete in section has cracked in tension.
- Y = stress in reinforcing steel has reached yield stress.
- T = ACI 318 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than 0.003. See ACI 318-14, Section 21.2.3.
- Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
 Position of neutral axis is measured from edge of compression side of pile.
 Compressive stresses and strains are positive in sign.
 Tensile stresses and strains are negative in sign.

Axial Thrust Force = 765.800 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	210.2199654	336351945.	302.0711512	0.0001888	0.0001663	0.7602095	5.4130521	
0.00000125	420.4405562	336352445.	160.0565164	0.0002001	0.0001551	0.8026804	5.6780737	
0.00000188	630.6491287	336346202.	112.7276103	0.0002114	0.0001439	0.8449367	5.9436013	
0.00000250	840.8396742	336335870.	89.0701368	0.0002227	0.0001327	0.8869773	6.2096349	
0.00000313	1051.	336321979.	74.8812370	0.0002340	0.0001215	0.9288008	6.4761746	
0.00000375	1261.	336304705.	65.4266245	0.0002453	0.0001103	0.9704058	6.7432204	
0.00000438	1471.	336284125.	58.6773198	0.0002567	0.00009921	1.0117911	7.0107725	
0.00000500	1681.	336260275.	53.6188331	0.0002681	0.00008809	1.0529553	7.2788308	
0.00000563	1891.	336233176.	49.6875591	0.0002795	0.00007699	1.0938971	7.5473956	
0.00000625	2101.	336202839.	46.5453346	0.0002909	0.00006591	1.1346153	7.8164669	
0.00000688	2311.	336169273.	43.9769650	0.0003023	0.00005484	1.1751085	8.0860449	

MEG-33 rear abutment X direction row1

0.00000750	2521.	336132480.	41.8389873	0.0003138	0.00004379	1.2153753	8.3561298
0.00000813	2731.	336092464.	40.0320811	0.0003253	0.00003276	1.2554145	8.6267216
0.00000875	2940.	336049227.	38.4853031	0.0003367	0.00002175	1.2952248	8.8978207
0.00000938	3150.	336002768.	37.1466284	0.0003482	0.00001075	1.3348048	9.1694271
0.00001000	3360.	335953089.	35.9770384	0.0003598	-2.29616E-07	1.3741532	9.4415412
0.00001063	3569.	335899271.	34.9466824	0.0003713	-0.00001119	1.4132683	9.7141590
0.00001125	3778.	335835739.	34.0322719	0.0003829	-0.00002214	1.4521455	9.9872537
0.00001188	3987.	335755857.	33.2153828	0.0003944	-0.00003307	1.4907788	10.2607850
0.00001250	4196.	335654708.	32.4812751	0.0004060	-0.00004398	1.5291626	10.5347123
0.00001313	4404.	335529259.	31.8180259	0.0004176	-0.00005489	1.5672914	10.8089987
0.00001375	4611.	335378029.	31.2158925	0.0004292	-0.00006578	1.6051608	11.0836122
0.00001438	4819.	335200558.	30.6668361	0.0004408	-0.00007666	1.6427668	11.3585249
0.00001500	5025.	334996915.	30.1641635	0.0004525	-0.00008754	1.6801055	11.6337112
0.00001563	5231.	334767745.	29.7022611	0.0004641	-0.00009840	1.7171741	11.9091496
0.00001625	5436.	334513938.	29.2763840	0.0004757	-0.000109	1.7539696	12.1848210
0.00001688	5436.	322124533.	28.3881710	0.0004791	-0.000128	1.7641173	12.2187987 C
0.00001750	5436.	310620086.	27.9511295	0.0004891	-0.000141	1.7956567	12.4495483 C
0.00001813	5436.	299909048.	27.5388414	0.0004991	-0.000153	1.8266668	12.6774661 C
0.00001875	5512.	293972286.	27.1485233	0.0005090	-0.000166	1.8571362	12.9023846 C
0.00001938	5621.	290104229.	26.7785282	0.0005188	-0.000179	1.8871003	13.1245731 C
0.00002000	5726.	286288218.	26.4271301	0.0005285	-0.000191	1.9165763	13.3441355 C
0.00002063	5827.	282533459.	26.0928612	0.0005382	-0.000204	1.9455840	13.5612052 C
0.00002125	5925.	278830147.	25.7739072	0.0005477	-0.000217	1.9741094	13.7755954 C
0.00002188	6020.	275192399.	25.4693379	0.0005571	-0.000230	2.0021836	13.9875488 C
0.00002250	6112.	271630965.	25.1783202	0.0005665	-0.000243	2.0298363	14.1973040 C
0.00002313	6201.	268151963.	24.9000419	0.0005758	-0.000257	2.0570918	14.4050532 C
0.00002375	6288.	264760701.	24.6338065	0.0005851	-0.000270	2.0839760	14.6110093 C
0.00002438	6372.	261422496.	24.3776229	0.0005942	-0.000283	2.1104170	14.8144198 C
0.00002563	6534.	255000318.	23.8958892	0.0006123	-0.000310	2.1622428	15.2161452 C
0.00002688	6688.	248863574.	23.4492514	0.0006302	-0.000337	2.2126077	15.6102976 C
0.00002813	6835.	243029058.	23.0345475	0.0006478	-0.000365	2.2616621	15.9981147 C
0.00002938	6976.	237477858.	22.6480400	0.0006653	-0.000392	2.3094593	16.3798866 C
0.00003063	7111.	232193762.	22.2866483	0.0006825	-0.000420	2.3560542	16.7559421 C
0.00003188	7241.	227162744.	21.9478236	0.0006996	-0.000448	2.4015043	17.1266570 C
0.00003313	7366.	222372455.	21.6294520	0.0007165	-0.000476	2.4458691	17.4924549 C
0.00003438	7487.	217811887.	21.3297790	0.0007332	-0.000504	2.4892103	17.8538110 C
0.00003563	7605.	213471087.	21.0473513	0.0007498	-0.000533	2.5315923	18.2112574 C
0.00003688	7718.	209307729.	20.7791068	0.0007662	-0.000561	2.5729075	18.5633950 C
0.00003813	7828.	205337184.	20.5251752	0.0007825	-0.000590	2.6133212	18.9119094 C
0.00003938	7936.	201557702.	20.2850342	0.0007987	-0.000619	2.6529285	19.2577610 C

MEG-33 rear abutment X direction row1

0.00004063	8041.	197932200.	20.0561423	0.0008148	-0.000648	2.6916142	19.5994552	C
0.00004188	8143.	194460687.	19.8381094	0.0008307	-0.000677	2.7294554	19.9377418	C
0.00004313	8244.	191154981.	19.6315480	0.0008466	-0.000706	2.7666226	20.2745673	C
0.00004438	8341.	187958039.	19.4325170	0.0008623	-0.000735	2.8028154	20.6061079	C
0.00004563	8437.	184919979.	19.2442774	0.0008780	-0.000764	2.8384572	20.9374972	C
0.00004688	8530.	181976647.	19.0623093	0.0008935	-0.000794	2.8731629	21.2637643	C
0.00004813	8623.	179176876.	18.8900588	0.0009091	-0.000823	2.9073705	21.5904009	C
0.00004938	8713.	176457324.	18.7228406	0.0009244	-0.000853	2.9406532	21.9117550	C
0.00005063	8802.	173866693.	18.5643709	0.0009398	-0.000883	2.9734745	22.2338288	C
0.00005188	8889.	171352249.	18.4105331	0.0009550	-0.000912	3.0054498	22.5513831	C
0.00005313	8975.	168943161.	18.2637514	0.0009703	-0.000942	3.0368989	22.8686546	C
0.00005438	9060.	166622164.	18.1226398	0.0009854	-0.000972	3.0677226	23.1842253	C
0.00005563	9143.	164375395.	17.9861179	0.0010005	-0.001002	3.0978487	-23.541756	C
0.00005688	9226.	162222836.	17.8560168	0.0010156	-0.001032	3.1275273	-24.285370	C
0.00005813	9308.	160131487.	17.7294365	0.0010305	-0.001062	3.1564746	-25.032481	C
0.00005938	9388.	158113427.	17.6076091	0.0010455	-0.001092	3.1848681	-25.780586	C
0.00006063	9468.	156174408.	17.4911933	0.0010604	-0.001122	3.2128196	-26.528009	C
0.00006188	9546.	154285228.	17.3774252	0.0010752	-0.001152	3.2400485	-27.279120	C
0.00006313	9624.	152457860.	17.2676200	0.0010900	-0.001182	3.2667358	-28.031225	C
0.00006438	9701.	150697620.	17.1624387	0.0011048	-0.001213	3.2929874	-28.782660	C
0.00006563	9777.	148989276.	17.0603870	0.0011196	-0.001243	3.3186597	-29.535763	C
0.00006688	9852.	147323411.	16.9605681	0.0011342	-0.001273	3.3436755	-30.291936	C
0.00006813	9927.	145715150.	16.8647474	0.0011489	-0.001304	3.3682619	-31.047446	C
0.00006938	10001.	144161349.	16.7727104	0.0011636	-0.001334	3.3924169	-31.802291	C
0.00007063	10074.	142643417.	16.6823997	0.0011782	-0.001364	3.4159258	-32.560272	C
0.00007188	10146.	141166141.	16.5944955	0.0011927	-0.001395	3.4388869	-33.319786	C
0.00007313	10218.	139736147.	16.5099066	0.0012073	-0.001425	3.4614229	-34.078642	C
0.00007438	10290.	138351025.	16.4284673	0.0012219	-0.001456	3.4835318	-34.836837	C
0.00007938	10569.	133150678.	16.1225585	0.0012797	-0.001578	3.5666910	-37.882973	C
0.00008438	10840.	128470050.	15.8497840	0.0013373	-0.001700	3.6422212	-40.936747	C
0.00008938	11104.	124237225.	15.6063903	0.0013948	-0.001823	3.7104072	-43.993475	C
0.00009438	11360.	120375044.	15.3863356	0.0014521	-0.001945	3.7711568	-47.056910	C
0.00009938	11611.	116840154.	15.1878571	0.0015093	-0.002068	3.8247131	-50.000000	CY
0.0001044	11830.	113343154.	15.0000352	0.0015656	-0.002192	3.8704756	-50.000000	CY
0.0001094	12008.	109784526.	14.8157660	0.0016205	-0.002317	3.9083747	-50.000000	CY
0.0001144	12181.	106496543.	14.6483521	0.0016754	-0.002442	3.9397749	-50.000000	CY
0.0001194	12348.	103441883.	14.4943284	0.0017303	-0.002567	3.9645808	-50.000000	CY
0.0001244	12510.	100584567.	14.3523135	0.0017851	-0.002692	3.9828283	-50.000000	CY
0.0001294	12629.	97618697.	14.2083733	0.0018382	-0.002819	3.9942768	-50.000000	CY
0.0001344	12698.	94496465.	14.0536796	0.0018885	-0.002949	3.9994561	-50.000000	CY

MEG-33 rear abutment X direction row1

0.0001394	12763.	91574401.	13.9121518	0.0019390	-0.003078	3.9994295	-50.000000	CY
0.0001444	12824.	88822594.	13.7787758	0.0019893	-0.003208	3.9991866	-50.000000	CY
0.0001494	12881.	86230205.	13.6541689	0.0020396	-0.003338	3.9986313	-50.000000	CY
0.0001544	12935.	83792019.	13.5400008	0.0020902	-0.003467	3.9976086	-50.000000	CY
0.0001594	12986.	81481962.	13.4314034	0.0021406	-0.003597	3.9999835	-50.000000	CY
0.0001644	13034.	79293696.	13.3294103	0.0021910	-0.003726	3.9995177	-50.000000	CY
0.0001694	13080.	77224802.	13.2353911	0.0022417	-0.003856	3.9981227	-50.000000	CY
0.0001744	13124.	75265765.	13.1485635	0.0022928	-0.003985	3.9999974	-50.000000	CY
0.0001794	13165.	73394379.	13.0638987	0.0023433	-0.004114	3.9991654	50.000000	CY
0.0001844	13204.	71615471.	12.9850557	0.0023941	-0.004243	3.9968534	50.000000	CY
0.0001894	13241.	69921494.	12.9123679	0.0024453	-0.004372	3.9995285	50.000000	CY
0.0001944	13276.	68299557.	12.8466402	0.0024971	-0.004500	3.9967257	50.000000	CY
0.0001994	13309.	66752915.	12.7856694	0.0025491	-0.004628	3.9995946	50.000000	CY
0.0002044	13337.	65259109.	12.7277170	0.0026012	-0.004756	3.9962725	50.000000	CY
0.0002094	13365.	63830744.	12.6735454	0.0026535	-0.004884	3.9993424	50.000000	CY
0.0002144	13390.	62461659.	12.6238722	0.0027062	-0.005011	3.9969794	50.000000	CY
0.0002194	13414.	61147688.	12.5784072	0.0027594	-0.005138	3.9986153	50.000000	CY
0.0002244	13438.	59889181.	12.5359498	0.0028128	-0.005265	3.9999934	50.000000	CY
0.0002294	13460.	58680489.	12.4967730	0.0028664	-0.005391	3.9969588	50.000000	CY
0.0002344	13481.	57520567.	12.4601838	0.0029204	-0.005517	3.9995228	50.000000	CY
0.0002394	13502.	56405718.	12.4261845	0.0029745	-0.005643	3.9965326	50.000000	CY
0.0002444	13521.	55330596.	12.3924636	0.0030284	-0.005769	3.9976700	50.000000	CY
0.0002494	13540.	54296026.	12.3603610	0.0030824	-0.005895	3.9997169	50.000000	CY
0.0002544	13558.	53299201.	12.3305698	0.0031366	-0.006021	3.9955933	50.000000	CY
0.0002594	13575.	52338045.	12.3029331	0.0031911	-0.006146	3.9972858	50.000000	CYT
0.0002644	13592.	51411546.	12.2770423	0.0032457	-0.006272	3.9995245	50.000000	CYT
0.0002694	13608.	50517240.	12.2529716	0.0033006	-0.006397	3.9974179	50.000000	CYT
0.0002744	13623.	49651428.	12.2304689	0.0033557	-0.006522	3.9957412	50.000000	CYT
0.0003044	13672.	44918381.	12.0959895	0.0036817	-0.007276	3.9998232	50.000000	CYT
0.0003344	13672.	40888321.	12.0718370	0.0040365	-0.008001	3.9933884	50.000000	CYT

Axial Thrust Force = 985.500 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	203.9917885	326386862.	388.8590461	0.0002430	0.0002205	0.9639414	6.9860827	
0.00000125	407.9860656	326388852.	203.4511105	0.0002543	0.0002093	1.0050537	7.2511277	

MEG-33 rear abutment X direction row1

0.00000188	611.9679531	326382908.	141.6580582	0.0002656	0.0001981	1.0459513	7.5166944
0.00000250	815.9312569	326372503.	110.7687271	0.0002769	0.0001869	1.0866329	7.7827827
0.00000313	1020.	326358330.	92.2408853	0.0002883	0.0001758	1.1270971	8.0493927
0.00000375	1224.	326340622.	79.8937887	0.0002996	0.0001646	1.1673424	8.3165245
0.00000438	1428.	326319476.	71.0785472	0.0003110	0.0001535	1.2073677	8.5841782
0.00000500	1631.	326294942.	64.4707158	0.0003224	0.0001424	1.2471715	8.8523538
0.00000563	1835.	326267046.	59.3344920	0.0003338	0.0001313	1.2867525	9.1210515
0.00000625	2039.	326235805.	55.2283942	0.0003452	0.0001202	1.3261094	9.3902715
0.00000688	2243.	326201227.	51.8714798	0.0003566	0.0001091	1.3652407	9.6600138
0.00000750	2446.	326163319.	49.0764535	0.0003681	0.00009807	1.4041451	9.9302787
0.00000813	2650.	326122085.	46.7136499	0.0003795	0.00008705	1.4428212	10.2010663
0.00000875	2853.	326077526.	44.6904504	0.0003910	0.00007604	1.4812678	10.4723768
0.00000938	3057.	326029644.	42.9389351	0.0004026	0.00006505	1.5194834	10.7442105
0.00001000	3260.	325978439.	41.4081640	0.0004141	0.00005408	1.5574667	11.0165676
0.00001063	3463.	325923911.	40.0591830	0.0004256	0.00004313	1.5952163	11.2894483
0.00001125	3666.	325866060.	38.8616946	0.0004372	0.00003219	1.6327308	11.5628529
0.00001188	3869.	325804884.	37.7917798	0.0004488	0.00002128	1.6700090	11.8367817
0.00001250	4072.	325740383.	36.8303033	0.0004604	0.00001038	1.7070493	12.1112350
0.00001313	4274.	325672555.	35.9617747	0.0004720	-5.01706E-07	1.7438506	12.3862131
0.00001375	4477.	325600882.	35.1735127	0.0004836	-0.00001136	1.7804110	12.6617132
0.00001438	4679.	325522318.	34.4550016	0.0004953	-0.00002221	1.8167270	12.9377163
0.00001500	4881.	325432923.	33.7974547	0.0005070	-0.00003304	1.8527943	13.2141928
0.00001563	5083.	325329376.	33.1934873	0.0005186	-0.00004385	1.8886081	13.4911115
0.00001625	5285.	325209160.	32.6368528	0.0005303	-0.00005465	1.9241642	13.7684419
0.00001688	5486.	325070637.	32.1222355	0.0005421	-0.00006544	1.9594584	14.0461565
0.00001750	5686.	324912770.	31.6450834	0.0005538	-0.00007621	1.9944871	14.3242299
0.00001813	5886.	324735145.	31.2014791	0.0005655	-0.00008697	2.0292472	14.6026400
0.00001875	6085.	324537642.	30.7880306	0.0005773	-0.00009772	2.0637356	14.8813667
0.00001938	6284.	324320367.	30.4017860	0.0005890	-0.000108	2.0979496	15.1603911
0.00002000	6284.	314185356.	29.7226196	0.0005945	-0.000126	2.1134338	15.2555194 C
0.00002063	6284.	304664587.	29.3330884	0.0006050	-0.000138	2.1436908	15.4992661 C
0.00002125	6377.	300112242.	28.9621023	0.0006154	-0.000150	2.1734373	15.7403206 C
0.00002188	6501.	297175532.	28.6084526	0.0006258	-0.000162	2.2027032	15.9789246 C
0.00002250	6620.	294220651.	28.2707001	0.0006361	-0.000174	2.2314949	16.2150819 C
0.00002313	6735.	291260281.	27.9476923	0.0006463	-0.000186	2.2598268	16.4488837 C
0.00002375	6847.	288315485.	27.6386715	0.0006564	-0.000199	2.2877314	16.6806100 C
0.00002438	6956.	285394864.	27.3427172	0.0006665	-0.000211	2.3152239	16.9103708 C
0.00002563	7166.	279648602.	26.7866618	0.0006864	-0.000236	2.3690240	17.3643506 C
0.00002688	7363.	273987420.	26.2714783	0.0007060	-0.000261	2.4211739	17.8098710 C
0.00002813	7551.	268495773.	25.7939669	0.0007255	-0.000287	2.4718776	18.2487669 C

MEG-33 rear abutment X direction row1

0.00002938	7730.	263156607.	25.3489516	0.0007446	-0.000313	2.5211371	18.6807258	C
0.00003063	7900.	257972225.	24.9326418	0.0007636	-0.000339	2.5689975	19.1059151	C
0.00003188	8063.	252967524.	24.5427305	0.0007823	-0.000365	2.6155733	19.5253241	C
0.00003313	8220.	248139779.	24.1765243	0.0008008	-0.000392	2.6609135	19.9392362	C
0.00003438	8370.	243486447.	23.8317642	0.0008192	-0.000418	2.7050686	20.3479776	C
0.00003563	8515.	239005070.	23.5065522	0.0008374	-0.000445	2.7480907	20.7519192	C
0.00003688	8654.	234693214.	23.1992930	0.0008555	-0.000472	2.7900339	21.1514815	C
0.00003813	8789.	230526427.	22.9076383	0.0008734	-0.000499	2.8308652	21.5460201	C
0.00003938	8919.	226508980.	22.6306521	0.0008911	-0.000526	2.8706542	21.9361635	C
0.00004063	9045.	222648666.	22.3678140	0.0009087	-0.000554	2.9094938	22.3228935	C
0.00004188	9168.	218943532.	22.1183480	0.0009262	-0.000581	2.9474423	22.7068058	C
0.00004313	9287.	215348370.	21.8793292	0.0009435	-0.000609	2.9843490	23.0856985	C
0.00004438	9403.	211891844.	21.6516375	0.0009608	-0.000637	3.0203977	23.4618387	C
0.00004563	9516.	208575033.	21.4349839	0.0009780	-0.000665	3.0556599	23.8360756	C
0.00004688	9626.	205346136.	21.2260711	0.0009950	-0.000693	3.0899142	24.2051278	C
0.00004813	9734.	202257565.	21.0275721	0.0010120	-0.000721	3.1234937	24.5735680	C
0.00004938	9838.	199252423.	20.8359107	0.0010288	-0.000749	3.1561330	24.9374072	C
0.00005063	9941.	196369599.	20.6531876	0.0010456	-0.000777	3.1881021	25.3004736	C
0.00005188	10041.	193566417.	20.4766067	0.0010622	-0.000805	3.2191950	25.6595328	C
0.00005313	10140.	190875821.	20.3081117	0.0010789	-0.000834	3.2496589	26.0182472	C
0.00005438	10236.	188251240.	20.1445329	0.0010954	-0.000862	3.2792397	26.3724980	C
0.00005563	10332.	185737926.	19.9888563	0.0011119	-0.000891	3.3082795	26.7276365	C
0.00005688	10424.	183275723.	19.8367923	0.0011282	-0.000919	3.3364049	27.0774470	C
0.00005813	10515.	180909986.	19.6915567	0.0011446	-0.000948	3.3639749	27.4277430	C
0.00005938	10605.	178613137.	19.5510732	0.0011608	-0.000977	3.3908260	27.7756918	C
0.00006063	10693.	176380055.	19.4149615	0.0011770	-0.001005	3.4169586	28.1211418	C
0.00006188	10781.	174231456.	19.2848273	0.0011932	-0.001034	3.4425651	28.4674496	C
0.00006313	10866.	172127043.	19.1574372	0.0012093	-0.001063	3.4673611	28.8093461	C
0.00006438	10950.	170090563.	19.0347585	0.0012254	-0.001092	3.4915702	29.1508025	C
0.00006563	11033.	168126358.	18.9171981	0.0012414	-0.001121	3.5152593	29.4931052	C
0.00006688	11114.	166197842.	18.8016112	0.0012574	-0.001150	3.5381499	29.8307125	C
0.00006813	11195.	164329510.	18.6901932	0.0012733	-0.001179	3.5604800	30.1681756	C
0.00006938	11275.	162523588.	18.5832058	0.0012892	-0.001208	3.5822962	30.5064735	C
0.00007063	11354.	160757672.	18.4786039	0.0013051	-0.001237	3.6034250	30.8419027	C
0.00007188	11431.	159035226.	18.3767719	0.0013208	-0.001267	3.6239243	31.1755212	C
0.00007313	11507.	157367113.	18.2788116	0.0013366	-0.001296	3.6439157	31.5099675	C
0.00007438	11584.	155750544.	18.1845298	0.0013525	-0.001325	3.6633965	31.8452455	C
0.00007938	11879.	149651551.	17.8303493	0.0014153	-0.001442	3.7352557	-33.951852	C
0.00008438	12161.	144128808.	17.5140442	0.0014777	-0.001560	3.7981675	-36.864511	C
0.00008938	12432.	139101865.	17.2303448	0.0015400	-0.001678	3.8523548	-39.784387	C

MEG-33 rear abutment X direction row1

0.00009438	12694.	134507743.	16.9755777	0.0016021	-0.001795	3.8980170	-42.707353	C
0.00009938	12948.	130293291.	16.7469216	0.0016642	-0.001913	3.9352810	-45.628953	C
0.0001044	13191.	126384816.	16.5371928	0.0017261	-0.002031	3.9639833	-48.559572	C
0.0001094	13425.	122744437.	16.3484517	0.0017881	-0.002149	3.9843870	-50.000000	CY
0.0001144	13612.	119011329.	16.1620312	0.0018485	-0.002269	3.9961755	-50.000000	CY
0.0001194	13779.	115423118.	15.9892131	0.0019087	-0.002389	3.9997009	-50.000000	CY
0.0001244	13937.	112054355.	15.8287933	0.0019687	-0.002509	3.9990215	-50.000000	CY
0.0001294	14090.	108906531.	15.6849424	0.0020292	-0.002628	3.9995483	-50.000000	CY
0.0001344	14235.	105935157.	15.5508282	0.0020896	-0.002748	3.9997696	-50.000000	CY
0.0001394	14354.	102989737.	15.4207507	0.0021493	-0.002868	3.9998110	-50.000000	CY
0.0001444	14428.	99932061.	15.2859374	0.0022069	-0.002991	3.9996674	-50.000000	CY
0.0001494	14482.	96950710.	15.1522097	0.0022634	-0.003114	3.9992270	50.000000	CY
0.0001544	14533.	94138725.	15.0306519	0.0023204	-0.003237	3.9983508	50.000000	CY
0.0001594	14578.	91472822.	14.9196998	0.0023778	-0.003360	3.9987870	50.000000	CY
0.0001644	14617.	88923333.	14.8153480	0.0024353	-0.003482	3.9998053	50.000000	CY
0.0001694	14652.	86507502.	14.7202165	0.0024932	-0.003604	3.9987555	50.000000	CY
0.0001744	14685.	84212361.	14.6338144	0.0025518	-0.003726	3.9980050	50.000000	CY
0.0001794	14714.	82030066.	14.5526774	0.0026104	-0.003847	3.9996154	50.000000	CY
0.0001844	14741.	79949585.	14.4744302	0.0026687	-0.003969	3.9974917	50.000000	CY
0.0001894	14766.	77971421.	14.4020617	0.0027274	-0.004090	3.9998623	50.000000	CY
0.0001944	14789.	76087099.	14.3352437	0.0027864	-0.004211	3.9977717	50.000000	CY
0.0001994	14812.	74291358.	14.2732507	0.0028457	-0.004332	3.9998985	50.000000	CY
0.0002044	14833.	72575837.	14.2156871	0.0029053	-0.004452	3.9974338	50.000000	CY
0.0002094	14851.	70930899.	14.1583641	0.0029644	-0.004573	3.9997537	50.000000	CY
0.0002144	14868.	69357401.	14.1051807	0.0030238	-0.004694	3.9961282	50.000000	CY
0.0002194	14885.	67851145.	14.0557151	0.0030835	-0.004814	3.9991858	50.000000	CY
0.0002244	14900.	66408435.	14.0095562	0.0031434	-0.004934	3.9983976	50.000000	CY
0.0002294	14915.	65023572.	13.9668498	0.0032036	-0.005054	3.9977121	50.000000	CY
0.0002344	14929.	63695164.	13.9268526	0.0032641	-0.005173	3.9997684	50.000000	CY
0.0002394	14941.	62418360.	13.8897192	0.0033249	-0.005293	3.9947663	50.000000	CY
0.0002444	14953.	61190000.	13.8547320	0.0033858	-0.005412	3.9981938	50.000000	CY
0.0002494	14964.	60006116.	13.8193973	0.0034462	-0.005531	3.9998610	50.000000	CY
0.0002544	14974.	58865554.	13.7865947	0.0035070	-0.005651	3.9943153	50.000000	CY
0.0002594	14983.	57766524.	13.7559764	0.0035680	-0.005770	3.9976467	50.000000	CY
0.0002644	14992.	56707417.	13.7272059	0.0036291	-0.005888	3.9996407	50.000000	CY
0.0002694	15000.	55685311.	13.7004028	0.0036905	-0.006007	3.9967903	50.000000	CY
0.0002744	15008.	54697896.	13.6755600	0.0037522	-0.006125	3.9959323	50.000000	CYT
0.0003044	15008.	49306727.	13.8733038	0.0042227	-0.006735	3.9995748	50.000000	CYT

MEG-33 rear abutment X direction row1

 Summary of Results for Nominal Moment Capacity for Section 2

Moment values interpolated at maximum compressive strain = 0.003
 or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain	Max. Tens. Strain
1	765.800	13511.243	0.00300000	-0.00570261
2	985.500	14861.546	0.00300000	-0.00464537

Note that the values of moment capacity in the table above are not factored by a strength reduction factor (phi-factor).

In ACI 318, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.75).

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318, or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Load No.	Resist. Factor	Nominal Ax. Thrust kips	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in^2
1	0.65	765.800000	13511.	497.770000	8782.	174437239.
2	0.65	985.500000	14862.	640.575000	9660.	204362639.
1	0.75	765.800000	13511.	574.350000	10133.	141430041.
2	0.75	985.500000	14862.	739.125000	11146.	165462302.
1	0.90	765.800000	13511.	689.220000	12160.	106885023.
2	0.90	985.500000	14862.	886.950000	13375.	123519694.

 Layering Correction Equivalent Depths of Soil & Rock Layers

Layer No.	Top of Layer Below Pile Head ft	Equivalent Top Depth Below Grnd Surf ft	Same Layer Type As Layer Above	Layer is Rock or is Below Rock Layer	F0 Integral for Layer lbs	F1 Integral for Layer lbs
1	0.00	0.00	N.A.	No	0.00	214373.
2	7.5000	8.8906	Yes	No	214373.	454073.
3	15.8400	15.8400	No	Yes	N.A.	N.A.

Notes: The F0 integral of Layer n+1 equals the sum of the F0 and F1 integrals for Layer n. Layering correction equivalent depths are computed only for soil types with both shallow-depth and deep-depth expressions for peak lateral load transfer. These soil types are soft and stiff clays, non-liquefied sands, and cemented c-phi soil.

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 1

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 3540.0 lbs
 Applied moment at pile head = 1490400.0 in-lbs
 Axial thrust load on pile head = 765800.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
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MEG-33 rear abutment X direction row1

0.00	0.02176	1490400.	3540.	-4.36E-04	0.00	3.36E+11	0.00	0.00	0.00
0.2584	0.02043	1502396.	3442.	-4.22E-04	0.00	3.36E+11	-63.335	9615.	0.00
0.5168	0.01914	1513750.	3160.	-4.08E-04	0.00	3.36E+11	-118.682	19230.	0.00
0.7752	0.01789	1523930.	2718.	-3.94E-04	0.00	3.36E+11	-166.443	28845.	0.00
1.0336	0.01669	1532477.	2139.	-3.80E-04	0.00	3.36E+11	-207.024	38460.	0.00
1.2920	0.01553	1538999.	1444.	-3.66E-04	0.00	3.36E+11	-240.836	48075.	0.00
1.5504	0.01442	1543172.	654.8198	-3.52E-04	0.00	3.36E+11	-268.288	57690.	0.00
1.8088	0.01335	1544731.	-210.428	-3.38E-04	0.00	3.36E+11	-289.793	67305.	0.00
2.0672	0.01233	1543471.	-1134.	-3.23E-04	0.00	3.36E+11	-305.762	76920.	0.00
2.3256	0.01134	1539237.	-2099.	-3.09E-04	0.00	3.36E+11	-316.605	86535.	0.00
2.5840	0.01041	1531924.	-3090.	-2.95E-04	0.00	3.36E+11	-322.729	96150.	0.00
2.8424	0.00951	1521476.	-4093.	-2.81E-04	0.00	3.36E+11	-324.536	105765.	0.00
3.1008	0.00867	1507873.	-5096.	-2.67E-04	0.00	3.36E+11	-322.423	115380.	0.00
3.3592	0.00786	1491138.	-6088.	-2.53E-04	0.00	3.36E+11	-316.779	124994.	0.00
3.6176	0.00709	1471324.	-7056.	-2.40E-04	0.00	3.36E+11	-307.983	134609.	0.00
3.8760	0.00637	1448516.	-7993.	-2.26E-04	0.00	3.36E+11	-296.406	144224.	0.00
4.1344	0.00569	1422827.	-8891.	-2.13E-04	0.00	3.36E+11	-282.407	153839.	0.00
4.3928	0.00505	1394391.	-9741.	-2.00E-04	0.00	3.36E+11	-266.333	163454.	0.00
4.6512	0.00445	1363365.	-10540.	-1.87E-04	0.00	3.36E+11	-248.516	173069.	0.00
4.9096	0.00389	1329918.	-11280.	-1.75E-04	0.00	3.36E+11	-229.275	182684.	0.00
5.1680	0.00337	1294239.	-11960.	-1.63E-04	0.00	3.36E+11	-208.914	192299.	0.00
5.4264	0.00288	1256522.	-12575.	-1.51E-04	0.00	3.36E+11	-187.720	201914.	0.00
5.6848	0.00243	1216972.	-13123.	-1.40E-04	0.00	3.36E+11	-165.962	211529.	0.00
5.9432	0.00202	1175801.	-13603.	-1.28E-04	0.00	3.36E+11	-143.896	221144.	0.00
6.2016	0.00164	1133220.	-14015.	-1.18E-04	0.00	3.36E+11	-121.756	230759.	0.00
6.4600	0.00129	1089443.	-14359.	-1.08E-04	0.00	3.36E+11	-99.762	240374.	0.00
6.7184	9.69E-04	1044684.	-14634.	-9.77E-05	0.00	3.36E+11	-78.113	249989.	0.00
6.9768	6.81E-04	999150.	-14844.	-8.83E-05	0.00	3.36E+11	-56.992	259604.	0.00
7.2352	4.21E-04	953047.	-14989.	-7.93E-05	0.00	3.36E+11	-36.564	269219.	0.00
7.4936	1.89E-04	906571.	-15072.	-7.08E-05	0.00	3.36E+11	-16.977	278834.	0.00
7.7520	-1.76E-05	859913.	-15096.	-6.26E-05	0.00	3.36E+11	1.6412	288449.	0.00
8.0104	-1.99E-04	813251.	-15063.	-5.49E-05	0.00	3.36E+11	19.1761	298064.	0.00
8.2688	-3.58E-04	766755.	-14979.	-4.76E-05	0.00	3.36E+11	35.5318	307679.	0.00
8.5272	-4.95E-04	720585.	-14845.	-4.08E-05	0.00	3.36E+11	50.6283	317294.	0.00
8.7856	-6.11E-04	674886.	-14667.	-3.43E-05	0.00	3.36E+11	64.4006	326909.	0.00
9.0440	-7.08E-04	629791.	-14448.	-2.83E-05	0.00	3.36E+11	76.7991	336524.	0.00
9.3024	-7.86E-04	585420.	-14193.	-2.27E-05	0.00	3.36E+11	87.7880	346139.	0.00
9.5608	-8.48E-04	541881.	-13906.	-1.75E-05	0.00	3.36E+11	97.3456	355754.	0.00
9.8192	-8.95E-04	499266.	-13591.	-1.27E-05	0.00	3.36E+11	105.4627	365369.	0.00
10.0776	-9.27E-04	457655.	-13254.	-8.30E-06	0.00	3.36E+11	112.1427	374983.	0.00

MEG-33 rear abutment X direction row1

10.3360	-9.47E-04	417111.	-12898.	-4.27E-06	0.00	3.36E+11	117.4002	384598.	0.00
10.5944	-9.54E-04	377687.	-12528.	-6.07E-07	0.00	3.36E+11	121.2609	394213.	0.00
10.8528	-9.50E-04	339421.	-12148.	2.70E-06	0.00	3.36E+11	123.7607	403828.	0.00
11.1112	-9.37E-04	302337.	-11762.	5.66E-06	0.00	3.36E+11	124.9451	413443.	0.00
11.3696	-9.15E-04	266448.	-11375.	8.28E-06	0.00	3.36E+11	124.8683	423058.	0.00
11.6280	-8.86E-04	231754.	-10990.	1.06E-05	0.00	3.36E+11	123.5931	432673.	0.00
11.8864	-8.50E-04	198242.	-10610.	1.26E-05	0.00	3.36E+11	121.1902	442288.	0.00
12.1448	-8.08E-04	165892.	-10240.	1.42E-05	0.00	3.36E+11	117.7375	451903.	0.00
12.4032	-7.61E-04	134671.	-9882.	1.56E-05	0.00	3.36E+11	113.3199	461518.	0.00
12.6616	-7.11E-04	104536.	-9539.	1.67E-05	0.00	3.36E+11	108.0290	471133.	0.00
12.9200	-6.58E-04	75437.	-9213.	1.76E-05	0.00	3.36E+11	101.9625	480748.	0.00
13.1784	-6.02E-04	47317.	-8907.	1.81E-05	0.00	3.36E+11	95.2241	490363.	0.00
13.4368	-5.45E-04	20111.	-8623.	1.84E-05	0.00	3.36E+11	87.9234	499978.	0.00
13.6952	-4.88E-04	-6249.	-8363.	1.85E-05	0.00	3.36E+11	80.1756	509593.	0.00
13.9536	-4.31E-04	-31839.	-8127.	1.83E-05	0.00	3.36E+11	72.1015	519208.	0.00
14.2120	-3.74E-04	-56734.	-7916.	1.79E-05	0.00	3.36E+11	63.8276	528823.	0.00
14.4704	-3.20E-04	-81015.	-7731.	1.73E-05	0.00	3.36E+11	55.4858	538438.	0.00
14.7288	-2.67E-04	-104760.	-7572.	1.64E-05	0.00	3.36E+11	47.2141	548053.	0.00
14.9872	-2.18E-04	-128049.	-7438.	1.53E-05	0.00	3.36E+11	39.1559	557668.	0.00
15.2456	-1.72E-04	-150959.	-7328.	1.41E-05	0.00	3.36E+11	31.4609	567283.	0.00
15.5040	-1.31E-04	-173563.	-7242.	1.26E-05	0.00	3.36E+11	24.2851	576898.	0.00
15.7624	-9.41E-05	-195929.	-7177.	1.09E-05	0.00	3.36E+11	17.7907	586513.	0.00
16.0208	-6.32E-05	-218121.	-2977.	8.95E-06	0.00	3.36E+11	2691.	1.32E+08	0.00
16.2792	-3.85E-05	-214435.	4010.	6.96E-06	0.00	3.36E+11	1816.	1.46E+08	0.00
16.5376	-2.00E-05	-193284.	8430.	5.08E-06	0.00	3.36E+11	1035.	1.60E+08	0.00
16.7960	-7.05E-06	-162180.	10648.	3.44E-06	0.00	3.36E+11	396.1409	1.74E+08	0.00
17.0544	1.29E-06	-127263.	11141.	2.11E-06	0.00	3.36E+11	-78.581	1.88E+08	0.00
17.3128	6.00E-06	-93100.	10412.	1.09E-06	0.00	3.36E+11	-391.602	2.02E+08	0.00
17.5712	8.05E-06	-62699.	8934.	3.71E-07	0.00	3.36E+11	-561.633	2.16E+08	0.00
17.8296	8.31E-06	-37697.	7106.	-9.13E-08	0.00	3.36E+11	-617.076	2.30E+08	0.00
18.0880	7.49E-06	-18628.	5235.	-3.51E-07	0.00	3.36E+11	-589.914	2.44E+08	0.00
18.3464	6.13E-06	-5230.	3528.	-4.61E-07	0.00	3.36E+11	-510.934	2.58E+08	0.00
18.6048	4.63E-06	3255.	2106.	-4.70E-07	0.00	3.36E+11	-406.555	2.72E+08	0.00
18.8632	3.22E-06	7832.	1015.	-4.19E-07	0.00	3.36E+11	-297.156	2.86E+08	0.00
19.1216	2.03E-06	9550.	249.1413	-3.39E-07	0.00	3.36E+11	-196.678	3.01E+08	0.00
19.3800	1.12E-06	9378.	-231.213	-2.52E-07	0.00	3.36E+11	-113.147	3.15E+08	0.00
19.6384	4.69E-07	8118.	-483.768	-1.71E-07	0.00	3.36E+11	-49.749	3.29E+08	0.00
19.8968	5.56E-08	6379.	-570.423	-1.04E-07	0.00	3.36E+11	-6.143	3.43E+08	0.00
20.1552	-1.76E-07	4581.	-548.575	-5.36E-08	0.00	3.36E+11	20.2358	3.57E+08	0.00
20.4136	-2.77E-07	2977.	-465.950	-1.87E-08	0.00	3.36E+11	33.0568	3.71E+08	0.00

MEG-33 rear abutment X direction row1

20.6720	-2.92E-07	1691.	-358.529	2.80E-09	0.00	3.36E+11	36.2291	3.85E+08	0.00
20.9304	-2.59E-07	753.6327	-250.693	1.41E-08	0.00	3.36E+11	33.3243	3.99E+08	0.00
21.1888	-2.05E-07	136.4468	-156.773	1.82E-08	0.00	3.36E+11	27.2538	4.13E+08	0.00
21.4472	-1.46E-07	-218.698	-83.273	1.78E-08	0.00	3.36E+11	20.1537	4.27E+08	0.00
21.7056	-9.43E-08	-380.061	-31.228	1.50E-08	0.00	3.36E+11	13.4145	4.41E+08	0.00
21.9640	-5.32E-08	-412.436	1.6594	1.14E-08	0.00	3.36E+11	7.7980	4.55E+08	0.00
22.2224	-2.37E-08	-369.825	19.3177	7.78E-09	0.00	3.36E+11	3.5915	4.69E+08	0.00
22.4808	-4.92E-09	-292.673	26.0730	4.72E-09	0.00	3.36E+11	0.7656	4.83E+08	0.00
22.7392	5.55E-09	-208.153	25.8805	2.42E-09	0.00	3.36E+11	-0.890	4.97E+08	0.00
22.9976	1.01E-08	-132.183	21.9286	8.47E-10	0.00	3.36E+11	-1.659	5.11E+08	0.00
23.2560	1.08E-08	-72.164	16.5197	-9.49E-11	0.00	3.36E+11	-1.830	5.25E+08	0.00
23.5144	9.48E-09	-29.734	11.1281	-5.65E-10	0.00	3.36E+11	-1.648	5.39E+08	0.00
23.7728	7.30E-09	-3.149	6.5534	-7.16E-10	0.00	3.36E+11	-1.303	5.53E+08	0.00
24.0312	5.04E-09	10.9109	3.1054	-6.80E-10	0.00	3.36E+11	-0.921	5.67E+08	0.00
24.2896	3.08E-09	16.1127	0.7813	-5.56E-10	0.00	3.36E+11	-0.578	5.81E+08	0.00
24.5480	1.59E-09	15.7586	-0.588	-4.09E-10	0.00	3.36E+11	-0.305	5.95E+08	0.00
24.8064	5.46E-10	12.4711	-1.227	-2.79E-10	0.00	3.36E+11	-0.107	6.09E+08	0.00
25.0648	-1.40E-10	8.1514	-1.350	-1.84E-10	0.00	3.36E+11	0.02763	6.11E+08	0.00
25.3232	-5.94E-10	4.0972	-1.126	-1.27E-10	0.00	3.36E+11	0.1170	6.11E+08	0.00
25.5816	-9.30E-10	1.1677	-0.661	-1.03E-10	0.00	3.36E+11	0.1832	6.11E+08	0.00
25.8400	-1.23E-09	0.00	0.00	-9.77E-11	0.00	3.36E+11	0.2429	3.06E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 1:

Pile-head deflection = 0.02175642 inches
 Computed slope at pile head = -0.0004361 radians
 Maximum bending moment = 1544731. inch-lbs
 Maximum shear force = -15096. lbs
 Depth of maximum bending moment = 1.80880000 feet below pile head
 Depth of maximum shear force = 7.75200000 feet below pile head
 Number of iterations = 6
 Number of zero deflection points = 5

MEG-33 rear abutment X direction row1

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 2

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 4770.0 lbs
 Applied moment at pile head = 2012400.0 in-lbs
 Axial thrust load on pile head = 985500.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	0.02997	2012400.	4770.	-6.04E-04	0.00	3.26E+11	0.00	0.00	0.00
0.2584	0.02812	2029008.	4635.	-5.85E-04	0.00	3.26E+11	-87.198	9615.	0.00
0.5168	0.02634	2044719.	4246.	-5.66E-04	0.00	3.26E+11	-163.330	19230.	0.00
0.7752	0.02461	2058800.	3638.	-5.46E-04	0.00	3.26E+11	-228.957	28845.	0.00
1.0336	0.02295	2070620.	2842.	-5.27E-04	0.00	3.26E+11	-284.645	38460.	0.00
1.2920	0.02135	2079643.	1887.	-5.07E-04	0.00	3.26E+11	-330.962	48075.	0.00
1.5504	0.01981	2085423.	803.0414	-4.87E-04	0.00	3.26E+11	-368.482	57690.	0.00
1.8088	0.01833	2087600.	-384.971	-4.67E-04	0.00	3.26E+11	-397.780	67305.	0.00
2.0672	0.01691	2085892.	-1652.	-4.47E-04	0.00	3.26E+11	-419.427	76920.	0.00
2.3256	0.01555	2080090.	-2975.	-4.28E-04	0.00	3.26E+11	-433.995	86535.	0.00
2.5840	0.01426	2070055.	-4333.	-4.08E-04	0.00	3.26E+11	-442.051	96150.	0.00
2.8424	0.01302	2055709.	-5707.	-3.88E-04	0.00	3.26E+11	-444.155	105765.	0.00
3.1008	0.01185	2037033.	-7079.	-3.69E-04	0.00	3.26E+11	-440.859	115380.	0.00
3.3592	0.01073	2014060.	-8434.	-3.50E-04	0.00	3.26E+11	-432.704	124994.	0.00
3.6176	0.00968	1986867.	-9756.	-3.31E-04	0.00	3.26E+11	-420.218	134609.	0.00
3.8760	0.00868	1955576.	-11034.	-3.12E-04	0.00	3.26E+11	-403.918	144224.	0.00
4.1344	0.00775	1920345.	-12256.	-2.93E-04	0.00	3.26E+11	-384.302	153839.	0.00
4.3928	0.00686	1881363.	-13413.	-2.75E-04	0.00	3.26E+11	-361.851	163454.	0.00
4.6512	0.00604	1838847.	-14496.	-2.58E-04	0.00	3.26E+11	-337.027	173069.	0.00
4.9096	0.00527	1793037.	-15500.	-2.40E-04	0.00	3.26E+11	-310.273	182684.	0.00
5.1680	0.00455	1744192.	-16418.	-2.24E-04	0.00	3.26E+11	-282.009	192299.	0.00
5.4264	0.00388	1692584.	-17247.	-2.07E-04	0.00	3.26E+11	-252.632	201914.	0.00

MEG-33 rear abutment X direction row1

5.6848	0.00326	1638499.	-17984.	-1.91E-04	0.00	3.26E+11	-222.517	211529.	0.00
5.9432	0.00269	1582226.	-18626.	-1.76E-04	0.00	3.26E+11	-192.014	221144.	0.00
6.2016	0.00217	1524062.	-19174.	-1.61E-04	0.00	3.26E+11	-161.448	230759.	0.00
6.4600	0.00169	1464300.	-19628.	-1.47E-04	0.00	3.26E+11	-131.121	240374.	0.00
6.7184	0.00126	1403236.	-19988.	-1.34E-04	0.00	3.26E+11	-101.308	249989.	0.00
6.9768	8.63E-04	1341156.	-20258.	-1.21E-04	0.00	3.26E+11	-72.260	259604.	0.00
7.2352	5.09E-04	1278343.	-20438.	-1.08E-04	0.00	3.26E+11	-44.203	269219.	0.00
7.4936	1.93E-04	1215068.	-20534.	-9.62E-05	0.00	3.26E+11	-17.337	278834.	0.00
7.7520	-8.77E-05	1151591.	-20548.	-8.50E-05	0.00	3.26E+11	8.1603	288449.	0.00
8.0104	-3.34E-04	1088159.	-20485.	-7.44E-05	0.00	3.26E+11	32.1359	298064.	0.00
8.2688	-5.49E-04	1025004.	-20351.	-6.43E-05	0.00	3.26E+11	54.4597	307679.	0.00
8.5272	-7.33E-04	962343.	-20150.	-5.49E-05	0.00	3.26E+11	75.0238	317294.	0.00
8.7856	-8.89E-04	900376.	-19889.	-4.60E-05	0.00	3.26E+11	93.7421	326909.	0.00
9.0440	-0.00102	839283.	-19572.	-3.78E-05	0.00	3.26E+11	110.5490	336524.	0.00
9.3024	-0.00112	779229.	-19206.	-3.01E-05	0.00	3.26E+11	125.3986	346139.	0.00
9.5608	-0.00121	720359.	-18797.	-2.30E-05	0.00	3.26E+11	138.2640	355754.	0.00
9.8192	-0.00127	662797.	-18352.	-1.64E-05	0.00	3.26E+11	149.1360	365369.	0.00
10.0776	-0.00131	606649.	-17875.	-1.03E-05	0.00	3.26E+11	158.0223	374983.	0.00
10.3360	-0.00133	552003.	-17375.	-4.85E-06	0.00	3.26E+11	164.9464	384598.	0.00
10.5944	-0.00134	498928.	-16856.	1.46E-07	0.00	3.26E+11	169.9467	394213.	0.00
10.8528	-0.00133	447471.	-16324.	4.64E-06	0.00	3.26E+11	173.0757	403828.	0.00
11.1112	-0.00131	397666.	-15785.	8.66E-06	0.00	3.26E+11	174.3986	413443.	0.00
11.3696	-0.00128	349526.	-15245.	1.22E-05	0.00	3.26E+11	173.9932	423058.	0.00
11.6280	-0.00123	303049.	-14708.	1.53E-05	0.00	3.26E+11	171.9482	432673.	0.00
11.8864	-0.00118	258217.	-14181.	1.80E-05	0.00	3.26E+11	168.3632	442288.	0.00
12.1448	-0.00112	214995.	-13667.	2.02E-05	0.00	3.26E+11	163.3475	451903.	0.00
12.4032	-0.00105	173338.	-13170.	2.21E-05	0.00	3.26E+11	157.0201	461518.	0.00
12.6616	-9.84E-04	133186.	-12695.	2.35E-05	0.00	3.26E+11	149.5083	471133.	0.00
12.9200	-9.09E-04	94468.	-12244.	2.46E-05	0.00	3.26E+11	140.9481	480748.	0.00
13.1784	-8.31E-04	57102.	-11822.	2.53E-05	0.00	3.26E+11	131.4834	490363.	0.00
13.4368	-7.52E-04	20998.	-11430.	2.57E-05	0.00	3.26E+11	121.2657	499978.	0.00
13.6952	-6.72E-04	-13940.	-11071.	2.57E-05	0.00	3.26E+11	110.4542	509593.	0.00
13.9536	-5.93E-04	-47816.	-10746.	2.54E-05	0.00	3.26E+11	99.2155	519208.	0.00
14.2120	-5.14E-04	-80736.	-10456.	2.48E-05	0.00	3.26E+11	87.7236	528823.	0.00
14.4704	-4.39E-04	-112811.	-10202.	2.39E-05	0.00	3.26E+11	76.1600	538438.	0.00
14.7288	-3.66E-04	-144150.	-9983.	2.27E-05	0.00	3.26E+11	64.7138	548053.	0.00
14.9872	-2.98E-04	-174863.	-9800.	2.12E-05	0.00	3.26E+11	53.5820	557668.	0.00
15.2456	-2.35E-04	-205055.	-9650.	1.94E-05	0.00	3.26E+11	42.9696	567283.	0.00
15.5040	-1.78E-04	-234828.	-9532.	1.73E-05	0.00	3.26E+11	33.0900	576898.	0.00
15.7624	-1.28E-04	-264277.	-9444.	1.49E-05	0.00	3.26E+11	24.1652	586513.	0.00

MEG-33 rear abutment X direction row1

16.0208	-8.54E-05	-293485.	-3764.	1.23E-05	0.00	3.26E+11	3639.	1.32E+08	0.00
16.2792	-5.18E-05	-287698.	5659.	9.49E-06	0.00	3.26E+11	2439.	1.46E+08	0.00
16.5376	-2.66E-05	-258447.	11570.	6.90E-06	0.00	3.26E+11	1373.	1.60E+08	0.00
16.7960	-9.00E-06	-215990.	14482.	4.64E-06	0.00	3.26E+11	505.6602	1.74E+08	0.00
17.0544	2.21E-06	-168665.	15057.	2.82E-06	0.00	3.26E+11	-134.408	1.88E+08	0.00
17.3128	8.46E-06	-122627.	13993.	1.43E-06	0.00	3.26E+11	-551.964	2.02E+08	0.00
17.5712	1.11E-05	-81893.	11937.	4.61E-07	0.00	3.26E+11	-774.124	2.16E+08	0.00
17.8296	1.13E-05	-48600.	9433.	-1.59E-07	0.00	3.26E+11	-840.956	2.30E+08	0.00
18.0880	1.01E-05	-23391.	6894.	-5.01E-07	0.00	3.26E+11	-796.986	2.44E+08	0.00
18.3464	8.22E-06	-5844.	4597.	-6.40E-07	0.00	3.26E+11	-684.655	2.58E+08	0.00
18.6048	6.15E-06	5120.	2698.	-6.43E-07	0.00	3.26E+11	-540.019	2.72E+08	0.00
18.8632	4.23E-06	10892.	1255.	-5.67E-07	0.00	3.26E+11	-390.580	2.86E+08	0.00
19.1216	2.63E-06	12908.	254.4550	-4.54E-07	0.00	3.26E+11	-254.863	3.01E+08	0.00
19.3800	1.41E-06	12473.	-362.779	-3.33E-07	0.00	3.26E+11	-143.250	3.15E+08	0.00
19.6384	5.62E-07	10660.	-677.198	-2.24E-07	0.00	3.26E+11	-59.548	3.29E+08	0.00
19.8968	2.58E-08	8274.	-773.934	-1.34E-07	0.00	3.26E+11	-2.846	3.43E+08	0.00
20.1552	-2.67E-07	5861.	-730.790	-6.65E-08	0.00	3.26E+11	30.6738	3.57E+08	0.00
20.4136	-3.86E-07	3743.	-611.604	-2.09E-08	0.00	3.26E+11	46.2006	3.71E+08	0.00
20.6720	-3.96E-07	2068.	-463.800	6.75E-09	0.00	3.26E+11	49.1322	3.85E+08	0.00
20.9304	-3.45E-07	866.2164	-318.920	2.07E-08	0.00	3.26E+11	44.3147	3.99E+08	0.00
21.1888	-2.68E-07	90.2760	-194.967	2.52E-08	0.00	3.26E+11	35.6345	4.13E+08	0.00
21.4472	-1.88E-07	-343.042	-99.576	2.40E-08	0.00	3.26E+11	25.8919	4.27E+08	0.00
21.7056	-1.19E-07	-527.401	-33.285	1.99E-08	0.00	3.26E+11	16.8656	4.41E+08	0.00
21.9640	-6.47E-08	-549.584	7.5762	1.48E-08	0.00	3.26E+11	9.4896	4.55E+08	0.00
22.2224	-2.69E-08	-480.507	28.6052	9.89E-09	0.00	3.26E+11	4.0740	4.69E+08	0.00
22.4808	-3.35E-09	-372.246	35.7299	5.84E-09	0.00	3.26E+11	0.5214	4.83E+08	0.00
22.7392	9.28E-09	-258.960	34.2330	2.84E-09	0.00	3.26E+11	-1.487	4.97E+08	0.00
22.9976	1.43E-08	-159.964	28.2808	8.51E-10	0.00	3.26E+11	-2.352	5.11E+08	0.00
23.2560	1.46E-08	-83.579	20.8126	-3.06E-10	0.00	3.26E+11	-2.465	5.25E+08	0.00
23.5144	1.24E-08	-30.890	13.6555	-8.50E-10	0.00	3.26E+11	-2.152	5.39E+08	0.00
23.7728	9.29E-09	1.1115	7.7513	-9.91E-10	0.00	3.26E+11	-1.656	5.53E+08	0.00
24.0312	6.23E-09	17.1862	3.4166	-9.04E-10	0.00	3.26E+11	-1.139	5.67E+08	0.00
24.2896	3.68E-09	22.3054	0.5811	-7.17E-10	0.00	3.26E+11	-0.689	5.81E+08	0.00
24.5480	1.78E-09	20.7946	-1.019	-5.12E-10	0.00	3.26E+11	-0.343	5.95E+08	0.00
24.8064	5.04E-10	15.9887	-1.704	-3.37E-10	0.00	3.26E+11	-0.09905	6.09E+08	0.00
25.0648	-3.06E-10	10.2299	-1.764	-2.13E-10	0.00	3.26E+11	0.06025	6.11E+08	0.00
25.3232	-8.14E-10	5.0502	-1.422	-1.40E-10	0.00	3.26E+11	0.1604	6.11E+08	0.00
25.5816	-1.17E-09	1.4131	-0.814	-1.09E-10	0.00	3.26E+11	0.2313	6.11E+08	0.00
25.8400	-1.49E-09	0.00	0.00	-1.03E-10	0.00	3.26E+11	0.2940	3.06E+08	0.00

MEG-33 rear abutment X direction row1

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 2:

Pile-head deflection = 0.02996537 inches
 Computed slope at pile head = -0.0006043 radians
 Maximum bending moment = 2087600. inch-lbs
 Maximum shear force = -20548. lbs
 Depth of maximum bending moment = 1.80880000 feet below pile head
 Depth of maximum shear force = 7.75200000 feet below pile head
 Number of iterations = 6
 Number of zero deflection points = 5

 Summary of Pile-head Responses for Conventional Analyses

Definitions of Pile-head Loading Conditions:

Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs
 Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
 Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.
 Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs
 Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians

Load Case No.	Load Type 1	Pile-head Load 1	Load Type 2	Pile-head Load 2	Axial Loading lbs	Pile-head Deflection inches	Pile-head Rotation radians	Max Shear in Pile lbs	Max Moment in Pile in-lbs
1	V, lb	3540.	M, in-lb	1490400.	765800.	0.02176	-4.36E-04	-15096.	1544731.
2	V, lb	4770.	M, in-lb	2012400.	985500.	0.02997	-6.04E-04	-20548.	2087600.

MEG-33 rear abutment X direction row1

Maximum pile-head deflection = 0.0299653654 inches

Maximum pile-head rotation = -0.0006043037 radians = -0.034624 deg.

Summary of Warning Messages

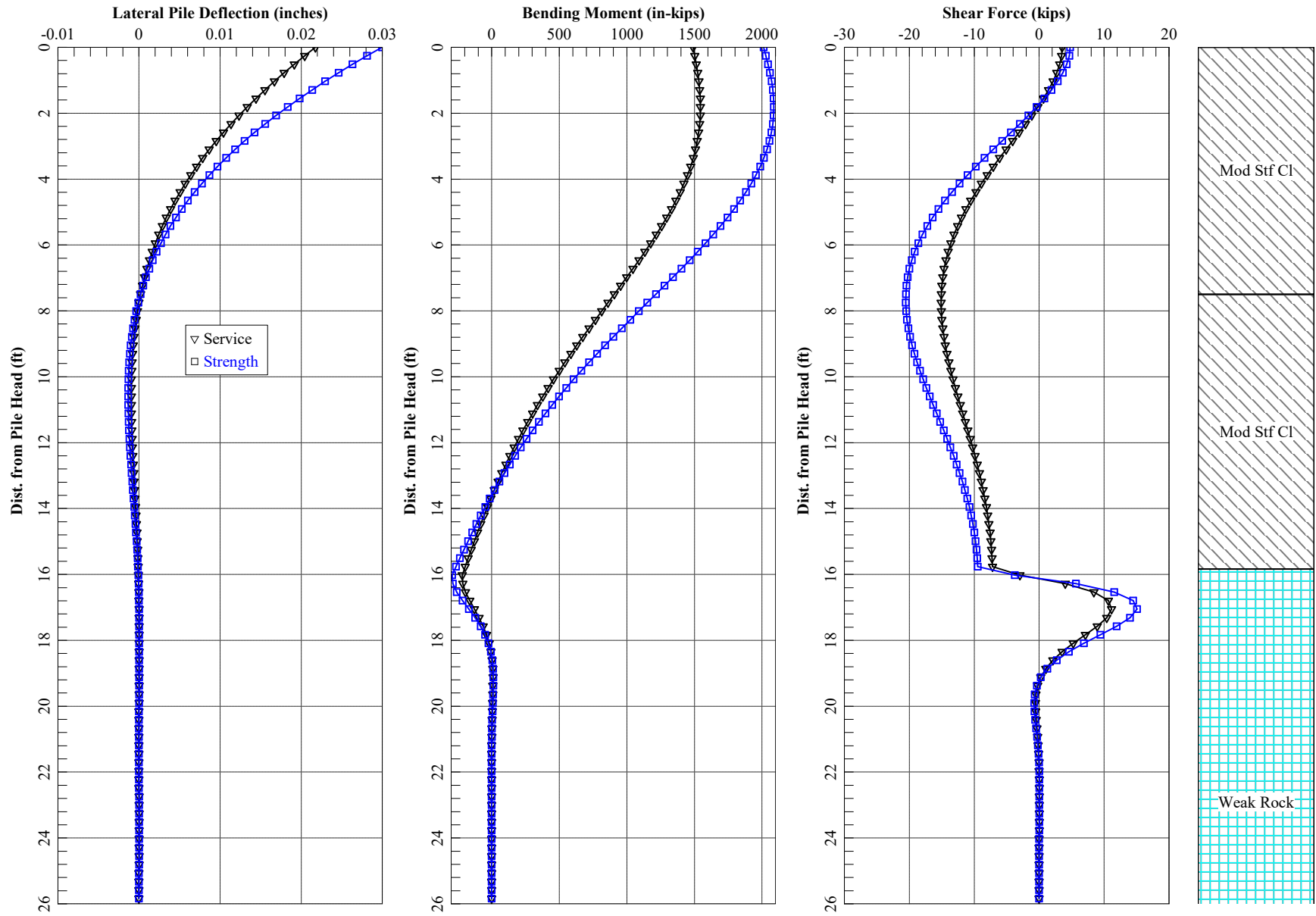
The following warning was reported 273 times

**** Warning ****

An unreasonable input value for unconfined compressive strength has been specified for a soil defined using the weak rock criteria. The input value is greater than 500 psi. Please check your input data for correctness.

The analysis ended normally.

MEG-33 Bowmans Run Bridge Rear Abutment X-Direction Row 1



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LPile for Windows, Version 2022-12.006

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method
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Files Used for Analysis

Path to file locations:

\\US0247-PPFSS01\shared_projects\173609140\119144\400-Engineering\Geotechnical\Analysis\Lpile\bridges\LPile
Analysis\Bowman's Run\Rear Abutment B-001\

Name of input data file:

MEG-33 rear abutment X direction row2.lp12d

Name of output report file:

MEG-33 rear abutment X direction row2.lp12o

MEG-33 rear abutment X direction row2

Name of plot output file:

MEG-33 rear abutment X direction row2.lp12p

Name of runtime message file:

MEG-33 rear abutment X direction row2.lp12r

Date and Time of Analysis

Date: June 28, 2024

Time: 14:55:13

Problem Title

Project Name: MEG-33-19.21

Job Number: 173609140

Client: ODOT

Engineer: G. Khatri

Description: Rear Abutment Lateral Load Analysis at Bowman's Run Bridge

MEG-33 rear abutment X direction row2
Program Options and Settings

Computational Options:

- Conventional Analysis

Engineering Units Used for Data Input and Computations:

- US Customary System Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed = 500
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 100.0000 in
- Number of pile increments = 100

Loading Type and Number of Cycles of Loading:

- Static loading specified

- Analysis uses p-y modification factors for p-y curves
- Analysis uses layering correction (Method of Georgiadis)
- No distributed lateral loads are entered
- Loading by lateral soil movements acting on pile not selected
- Input of shear resistance at the pile tip not selected
- Input of moment resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:

- Output files use decimal points to denote decimal symbols.
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1
- No p-y curves to be computed and reported for user-specified depths
- Print using wide report formats

MEG-33 rear abutment X direction row2

Number of pile sections defined = 2
Total length of pile = 25.840 ft
Depth of ground surface below top of pile = 0.0000 ft

Pile diameters used for p-y curve computations are defined using 4 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile. A summary of values of pile diameter vs. depth follows.

Point No.	Depth Below Pile Head feet	Pile Diameter inches
1	0.000	36.0000
2	15.840	36.0000
3	15.840	36.0000
4	25.840	36.0000

Input Structural Properties for Pile Sections:

Pile Section No. 1:

Section 1 is a round drilled shaft, bored pile, or CIDH pile
Length of section = 15.840000 ft
Shaft Diameter = 36.000000 in

Pile Section No. 2:

Section 2 is a round drilled shaft, bored pile, or CIDH pile
Length of section = 10.000000 ft
Shaft Diameter = 36.000000 in

Soil and Rock Layering Information

The soil profile is modelled using 3 layers

Layer 1 is stiff clay with user-defined k-value

Distance from top of pile to top of layer	=	0.0000	ft
Distance from top of pile to bottom of layer	=	7.500000	ft
Effective unit weight at top of layer	=	125.000000	pcf
Effective unit weight at bottom of layer	=	125.000000	pcf
Undrained cohesion at top of layer	=	2500.	psf
Undrained cohesion at bottom of layer	=	2500.	psf
Epsilon-50 at top of layer	=	0.0000	
Epsilon-50 at bottom of layer	=	0.0000	
Subgrade k at top of layer	=	0.0000	pci
Subgrade k at bottom of layer	=	0.0000	pci

NOTE: Default values for Epsilon-50 will be computed for this layer.

NOTE: Default values for subgrade k will be computed for this layer.

Layer 2 is stiff clay with user-defined k-value

Distance from top of pile to top of layer	=	7.500000	ft
Distance from top of pile to bottom of layer	=	15.840000	ft
Effective unit weight at top of layer	=	122.000000	pcf
Effective unit weight at bottom of layer	=	122.000000	pcf
Undrained cohesion at top of layer	=	2000.	psf
Undrained cohesion at bottom of layer	=	2000.	psf
Epsilon-50 at top of layer	=	0.0000	
Epsilon-50 at bottom of layer	=	0.0000	
Subgrade k at top of layer	=	0.0000	pci
Subgrade k at bottom of layer	=	0.0000	pci

NOTE: Default values for Epsilon-50 will be computed for this layer.

NOTE: Default values for subgrade k will be computed for this layer.

Layer 3 is weak rock, p-y criteria by Reese, 1997

Distance from top of pile to top of layer	=	15.840000	ft
Distance from top of pile to bottom of layer	=	30.000000	ft

MEG-33 rear abutment X direction row2

Effective unit weight at top of layer = 87.600000 pcf
 Effective unit weight at bottom of layer = 87.600000 pcf
 Uniaxial compressive strength at top of layer = 4380. psi
 Uniaxial compressive strength at bottom of layer = 4380. psi
 Initial modulus of rock at top of layer = 394200. psi
 Initial modulus of rock at bottom of layer = 394200. psi
 RQD of rock at top of layer = 86.000000 %
 RQD of rock at bottom of layer = 86.000000 %
 k rm of rock at top of layer = 0.0000500
 k rm of rock at bottom of layer = 0.0000500

(Depth of the lowest soil layer extends 4.160 ft below the pile tip)

 Summary of Input Soil Properties

Layer Rock Mass Num. Modulus psi	Soil Type Name (p-y Curve Type)	Layer Depth ft	Effective Unit Wt. pcf	Cohesion psf	Uniaxial qu psi	RQD %	E50 or krm	kpy pci
1	Stiff Clay w/o	0.00	125.0000	2500.	--	--	default	default
--	Free Water, using k	7.5000	125.0000	2500.	--	--	default	default
2	Stiff Clay w/o	7.5000	122.0000	2000.	--	--	default	default
--	Free Water, using k	15.8400	122.0000	2000.	--	--	default	default
3	Weak	15.8400	87.6000	--	4380.	86.0000	5.00E-05	--
394200.	Rock	30.0000	87.6000	--	4380.	86.0000	5.00E-05	--
394200.								

 Modification Factors for p-y Curves

Distribution of p-y modifiers with depth defined using 3 points

Point No.	Depth X ft	p-mult	y-mult
1	0.000	0.8500	1.0000
2	15.840	0.8500	1.0000
3	25.840	0.8500	1.0000

 Static Loading Type

Static loading criteria were used when computing p-y curves for all analyses.

 Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 2

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length	Run Analysis
1	1	V = 3540. lbs	M = 1490400. in-lbs	765800.	No	Yes
2	1	V = 4770. lbs	M = 2012400. in-lbs	985500.	No	Yes

V = shear force applied normal to pile axis
 M = bending moment applied to pile head

y = lateral deflection normal to pile axis

S = pile slope relative to original pile batter angle

R = rotational stiffness applied to pile head

Values of top y vs. pile lengths can be computed only for load types with specified shear loading (Load Types 1, 2, and 3).

Thrust force is assumed to be acting axially for all pile batter angles.

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 2

Pile Section No. 1:

Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section	=	15.840000 ft
Shaft Diameter	=	36.000000 in
Concrete Cover Thickness (to edge of trans. reinf.)	=	3.000000 in
Number of Reinforcing Bars	=	8 bars
Yield Stress of Reinforcing Bars	=	50000. psi
Modulus of Elasticity of Reinforcing Bars	=	29000000. psi
Gross Area of Shaft	=	1018. sq. in.
Total Area of Reinforcing Steel	=	8.000000 sq. in.
Area Ratio of Steel Reinforcement	=	0.79 percent
Edge-to-Edge Bar Spacing	=	9.538153 in
Maximum Concrete Aggregate Size	=	0.750000 in
Ratio of Bar Spacing to Aggregate Size	=	12.72
Offset of Center of Rebar Cage from Center of Pile	=	0.0000 in
Transverse Reinforcement		
Type: Spiral		
Number of Transverse Reinf. (per spacing)	=	1
Spacing of Transverse Reinf.	=	4.000000 in

MEG-33 rear abutment X direction row2

Yield Stress of Transverse Reinf. = 50000. psi
 Diameter of Transverse Reinf. = 0.500000 in

Axial Structural Capacities:

Nom. Axial Structural Capacity = $0.85 F_c A_c + F_y A_s$ = 3833.578 kips
 Tensile Load for Cracking of Concrete = -446.783 kips
 Nominal Axial Tensile Capacity = -400.000 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.128000	1.000000	13.936000	0.000000
2	1.128000	1.000000	9.854240	9.854240
3	1.128000	1.000000	0.000000	13.936000
4	1.128000	1.000000	-9.85424	9.854240
5	1.128000	1.000000	-13.93600	0.000000
6	1.128000	1.000000	-9.85424	-9.85424
7	1.128000	1.000000	0.000000	-13.93600
8	1.128000	1.000000	9.854240	-9.85424

NOTE: The positions of the above rebars were computed by LPILE

Minimum spacing between any two bars not equal to zero = 9.538 inches
 between bars 3 and 4.

Ratio of bar spacing to maximum aggregate size = 12.72

Concrete Properties:

Compressive Strength of Concrete = 4000. psi
 Modulus of Elasticity of Concrete = 3604997. psi
 Modulus of Rupture of Concrete = -474.34165 psi

MEG-33 rear abutment X direction row2

Compression Strain at Peak Stress = 0.001886
 Tensile Strain at Fracture of Concrete = -0.0001154
 Maximum Coarse Aggregate Size = 0.750000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 2

Number	Axial Thrust Force kips
1	765.800
2	985.500

Definitions of Run Messages and Notes:

- C = concrete in section has cracked in tension.
- Y = stress in reinforcing steel has reached yield stress.
- T = ACI 318 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than 0.003. See ACI 318-14, Section 21.2.3.
- Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
 Position of neutral axis is measured from edge of compression side of pile.
 Compressive stresses and strains are positive in sign.
 Tensile stresses and strains are negative in sign.

Axial Thrust Force = 765.800 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in ²	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	210.2199654	336351945.	302.0711512	0.0001888	0.0001663	0.7602095	5.4130521	
0.00000125	420.4405562	336352445.	160.0565164	0.0002001	0.0001551	0.8026804	5.6780737	
0.00000188	630.6491287	336346202.	112.7276103	0.0002114	0.0001439	0.8449367	5.9436013	

MEG-33 rear abutment X direction row2

0.00000250	840.8396742	336335870.	89.0701368	0.0002227	0.0001327	0.8869773	6.2096349
0.00000313	1051.	336321979.	74.8812370	0.0002340	0.0001215	0.9288008	6.4761746
0.00000375	1261.	336304705.	65.4266245	0.0002453	0.0001103	0.9704058	6.7432204
0.00000438	1471.	336284125.	58.6773198	0.0002567	0.00009921	1.0117911	7.0107725
0.00000500	1681.	336260275.	53.6188331	0.0002681	0.00008809	1.0529553	7.2788308
0.00000563	1891.	336233176.	49.6875591	0.0002795	0.00007699	1.0938971	7.5473956
0.00000625	2101.	336202839.	46.5453346	0.0002909	0.00006591	1.1346153	7.8164669
0.00000688	2311.	336169273.	43.9769650	0.0003023	0.00005484	1.1751085	8.0860449
0.00000750	2521.	336132480.	41.8389873	0.0003138	0.00004379	1.2153753	8.3561298
0.00000813	2731.	336092464.	40.0320811	0.0003253	0.00003276	1.2554145	8.6267216
0.00000875	2940.	336049227.	38.4853031	0.0003367	0.00002175	1.2952248	8.8978207
0.00000938	3150.	336002768.	37.1466284	0.0003482	0.00001075	1.3348048	9.1694271
0.00001000	3360.	335953089.	35.9770384	0.0003598	-2.29616E-07	1.3741532	9.4415412
0.00001063	3569.	335899271.	34.9466824	0.0003713	-0.00001119	1.4132683	9.7141590
0.00001125	3778.	335835739.	34.0322719	0.0003829	-0.00002214	1.4521455	9.9872537
0.00001188	3987.	335755857.	33.2153828	0.0003944	-0.00003307	1.4907788	10.2607850
0.00001250	4196.	335654708.	32.4812751	0.0004060	-0.00004398	1.5291626	10.5347123
0.00001313	4404.	335529259.	31.8180259	0.0004176	-0.00005489	1.5672914	10.8089987
0.00001375	4611.	335378029.	31.2158925	0.0004292	-0.00006578	1.6051608	11.0836122
0.00001438	4819.	335200558.	30.6668361	0.0004408	-0.00007666	1.6427668	11.3585249
0.00001500	5025.	334996915.	30.1641635	0.0004525	-0.00008754	1.6801055	11.6337112
0.00001563	5231.	334767745.	29.7022611	0.0004641	-0.00009840	1.7171741	11.9091496
0.00001625	5436.	334513938.	29.2763840	0.0004757	-0.000109	1.7539696	12.1848210
0.00001688	5436.	322124533.	28.3881710	0.0004791	-0.000128	1.7641173	12.2187987 C
0.00001750	5436.	310620086.	27.9511295	0.0004891	-0.000141	1.7956567	12.4495483 C
0.00001813	5436.	299909048.	27.5388414	0.0004991	-0.000153	1.8266668	12.6774661 C
0.00001875	5512.	293972286.	27.1485233	0.0005090	-0.000166	1.8571362	12.9023846 C
0.00001938	5621.	290104229.	26.7785282	0.0005188	-0.000179	1.8871003	13.1245731 C
0.00002000	5726.	286288218.	26.4271301	0.0005285	-0.000191	1.9165763	13.3441355 C
0.00002063	5827.	282533459.	26.0928612	0.0005382	-0.000204	1.9455840	13.5612052 C
0.00002125	5925.	278830147.	25.7739072	0.0005477	-0.000217	1.9741094	13.7755954 C
0.00002188	6020.	275192399.	25.4693379	0.0005571	-0.000230	2.0021836	13.9875488 C
0.00002250	6112.	271630965.	25.1783202	0.0005665	-0.000243	2.0298363	14.1973040 C
0.00002313	6201.	268151963.	24.9000419	0.0005758	-0.000257	2.0570918	14.4050532 C
0.00002375	6288.	264760701.	24.6338065	0.0005851	-0.000270	2.0839760	14.6110093 C
0.00002438	6372.	261422496.	24.3776229	0.0005942	-0.000283	2.1104170	14.8144198 C
0.00002563	6534.	255000318.	23.8958892	0.0006123	-0.000310	2.1622428	15.2161452 C
0.00002688	6688.	248863574.	23.4492514	0.0006302	-0.000337	2.2126077	15.6102976 C
0.00002813	6835.	243029058.	23.0345475	0.0006478	-0.000365	2.2616621	15.9981147 C
0.00002938	6976.	237477858.	22.6480400	0.0006653	-0.000392	2.3094593	16.3798866 C

MEG-33 rear abutment X direction row2

0.00003063	7111.	232193762.	22.2866483	0.0006825	-0.000420	2.3560542	16.7559421	C
0.00003188	7241.	227162744.	21.9478236	0.0006996	-0.000448	2.4015043	17.1266570	C
0.00003313	7366.	222372455.	21.6294520	0.0007165	-0.000476	2.4458691	17.4924549	C
0.00003438	7487.	217811887.	21.3297790	0.0007332	-0.000504	2.4892103	17.8538110	C
0.00003563	7605.	213471087.	21.0473513	0.0007498	-0.000533	2.5315923	18.2112574	C
0.00003688	7718.	209307729.	20.7791068	0.0007662	-0.000561	2.5729075	18.5633950	C
0.00003813	7828.	205337184.	20.5251752	0.0007825	-0.000590	2.6133212	18.9119094	C
0.00003938	7936.	201557702.	20.2850342	0.0007987	-0.000619	2.6529285	19.2577610	C
0.00004063	8041.	197932200.	20.0561423	0.0008148	-0.000648	2.6916142	19.5994552	C
0.00004188	8143.	194460687.	19.8381094	0.0008307	-0.000677	2.7294554	19.9377418	C
0.00004313	8244.	191154981.	19.6315480	0.0008466	-0.000706	2.7666226	20.2745673	C
0.00004438	8341.	187958039.	19.4325170	0.0008623	-0.000735	2.8028154	20.6061079	C
0.00004563	8437.	184919979.	19.2442774	0.0008780	-0.000764	2.8384572	20.9374972	C
0.00004688	8530.	181976647.	19.0623093	0.0008935	-0.000794	2.8731629	21.2637643	C
0.00004813	8623.	179176876.	18.8900588	0.0009091	-0.000823	2.9073705	21.5904009	C
0.00004938	8713.	176457324.	18.7228406	0.0009244	-0.000853	2.9406532	21.9117550	C
0.00005063	8802.	173866693.	18.5643709	0.0009398	-0.000883	2.9734745	22.2338288	C
0.00005188	8889.	171352249.	18.4105331	0.0009550	-0.000912	3.0054498	22.5513831	C
0.00005313	8975.	168943161.	18.2637514	0.0009703	-0.000942	3.0368989	22.8686546	C
0.00005438	9060.	166622164.	18.1226398	0.0009854	-0.000972	3.0677226	23.1842253	C
0.00005563	9143.	164375395.	17.9861179	0.0010005	-0.001002	3.0978487	-23.541756	C
0.00005688	9226.	162222836.	17.8560168	0.0010156	-0.001032	3.1275273	-24.285370	C
0.00005813	9308.	160131487.	17.7294365	0.0010305	-0.001062	3.1564746	-25.032481	C
0.00005938	9388.	158113427.	17.6076091	0.0010455	-0.001092	3.1848681	-25.780586	C
0.00006063	9468.	156174408.	17.4911933	0.0010604	-0.001122	3.2128196	-26.528009	C
0.00006188	9546.	154285228.	17.3774252	0.0010752	-0.001152	3.2400485	-27.279120	C
0.00006313	9624.	152457860.	17.2676200	0.0010900	-0.001182	3.2667358	-28.031225	C
0.00006438	9701.	150697620.	17.1624387	0.0011048	-0.001213	3.2929874	-28.782660	C
0.00006563	9777.	148989276.	17.0603870	0.0011196	-0.001243	3.3186597	-29.535763	C
0.00006688	9852.	147323411.	16.9605681	0.0011342	-0.001273	3.3436755	-30.291936	C
0.00006813	9927.	145715150.	16.8647474	0.0011489	-0.001304	3.3682619	-31.047446	C
0.00006938	10001.	144161349.	16.7727104	0.0011636	-0.001334	3.3924169	-31.802291	C
0.00007063	10074.	142643417.	16.6823997	0.0011782	-0.001364	3.4159258	-32.560272	C
0.00007188	10146.	141166141.	16.5944955	0.0011927	-0.001395	3.4388869	-33.319786	C
0.00007313	10218.	139736147.	16.5099066	0.0012073	-0.001425	3.4614229	-34.078642	C
0.00007438	10290.	138351025.	16.4284673	0.0012219	-0.001456	3.4835318	-34.836837	C
0.00007938	10569.	133150678.	16.1225585	0.0012797	-0.001578	3.5666910	-37.882973	C
0.00008438	10840.	128470050.	15.8497840	0.0013373	-0.001700	3.6422212	-40.936747	C
0.00008938	11104.	124237225.	15.6063903	0.0013948	-0.001823	3.7104072	-43.993475	C
0.00009438	11360.	120375044.	15.3863356	0.0014521	-0.001945	3.7711568	-47.056910	C

MEG-33 rear abutment X direction row2

0.00009938	11611.	116840154.	15.1878571	0.0015093	-0.002068	3.8247131	-50.000000	CY
0.0001044	11830.	113343154.	15.0000352	0.0015656	-0.002192	3.8704756	-50.000000	CY
0.0001094	12008.	109784526.	14.8157660	0.0016205	-0.002317	3.9083747	-50.000000	CY
0.0001144	12181.	106496543.	14.6483521	0.0016754	-0.002442	3.9397749	-50.000000	CY
0.0001194	12348.	103441883.	14.4943284	0.0017303	-0.002567	3.9645808	-50.000000	CY
0.0001244	12510.	100584567.	14.3523135	0.0017851	-0.002692	3.9828283	-50.000000	CY
0.0001294	12629.	97618697.	14.2083733	0.0018382	-0.002819	3.9942768	-50.000000	CY
0.0001344	12698.	94496465.	14.0536796	0.0018885	-0.002949	3.9994561	-50.000000	CY
0.0001394	12763.	91574401.	13.9121518	0.0019390	-0.003078	3.9994295	-50.000000	CY
0.0001444	12824.	88822594.	13.7787758	0.0019893	-0.003208	3.9991866	-50.000000	CY
0.0001494	12881.	86230205.	13.6541689	0.0020396	-0.003338	3.9986313	-50.000000	CY
0.0001544	12935.	83792019.	13.5400008	0.0020902	-0.003467	3.9976086	-50.000000	CY
0.0001594	12986.	81481962.	13.4314034	0.0021406	-0.003597	3.9999835	-50.000000	CY
0.0001644	13034.	79293696.	13.3294103	0.0021910	-0.003726	3.9995177	-50.000000	CY
0.0001694	13080.	77224802.	13.2353911	0.0022417	-0.003856	3.9981227	-50.000000	CY
0.0001744	13124.	75265765.	13.1485635	0.0022928	-0.003985	3.9999974	-50.000000	CY
0.0001794	13165.	73394379.	13.0638987	0.0023433	-0.004114	3.9991654	50.000000	CY
0.0001844	13204.	71615471.	12.9850557	0.0023941	-0.004243	3.9968534	50.000000	CY
0.0001894	13241.	69921494.	12.9123679	0.0024453	-0.004372	3.9995285	50.000000	CY
0.0001944	13276.	68299557.	12.8466402	0.0024971	-0.004500	3.9967257	50.000000	CY
0.0001994	13309.	66752915.	12.7856694	0.0025491	-0.004628	3.9995946	50.000000	CY
0.0002044	13337.	65259109.	12.7277170	0.0026012	-0.004756	3.9962725	50.000000	CY
0.0002094	13365.	63830744.	12.6735454	0.0026535	-0.004884	3.9993424	50.000000	CY
0.0002144	13390.	62461659.	12.6238722	0.0027062	-0.005011	3.9969794	50.000000	CY
0.0002194	13414.	61147688.	12.5784072	0.0027594	-0.005138	3.9986153	50.000000	CY
0.0002244	13438.	59889181.	12.5359498	0.0028128	-0.005265	3.9999934	50.000000	CY
0.0002294	13460.	58680489.	12.4967730	0.0028664	-0.005391	3.9969588	50.000000	CY
0.0002344	13481.	57520567.	12.4601838	0.0029204	-0.005517	3.9995228	50.000000	CY
0.0002394	13502.	56405718.	12.4261845	0.0029745	-0.005643	3.9965326	50.000000	CY
0.0002444	13521.	55330596.	12.3924636	0.0030284	-0.005769	3.9976700	50.000000	CY
0.0002494	13540.	54296026.	12.3603610	0.0030824	-0.005895	3.9997169	50.000000	CY
0.0002544	13558.	53299201.	12.3305698	0.0031366	-0.006021	3.9955933	50.000000	CY
0.0002594	13575.	52338045.	12.3029331	0.0031911	-0.006146	3.9972858	50.000000	CYT
0.0002644	13592.	51411546.	12.2770423	0.0032457	-0.006272	3.9995245	50.000000	CYT
0.0002694	13608.	50517240.	12.2529716	0.0033006	-0.006397	3.9974179	50.000000	CYT
0.0002744	13623.	49651428.	12.2304689	0.0033557	-0.006522	3.9957412	50.000000	CYT
0.0003044	13672.	44918381.	12.0959895	0.0036817	-0.007276	3.9998232	50.000000	CYT
0.0003344	13672.	40888321.	12.0718370	0.0040365	-0.008001	3.9933884	50.000000	CYT

MEG-33 rear abutment X direction row2

Axial Thrust Force = 985.500 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	203.9917885	326386862.	388.8590461	0.0002430	0.0002205	0.9639414	6.9860827	
0.00000125	407.9860656	326388852.	203.4511105	0.0002543	0.0002093	1.0050537	7.2511277	
0.00000188	611.9679531	326382908.	141.6580582	0.0002656	0.0001981	1.0459513	7.5166944	
0.00000250	815.9312569	326372503.	110.7687271	0.0002769	0.0001869	1.0866329	7.7827827	
0.00000313	1020.	326358330.	92.2408853	0.0002883	0.0001758	1.1270971	8.0493927	
0.00000375	1224.	326340622.	79.8937887	0.0002996	0.0001646	1.1673424	8.3165245	
0.00000438	1428.	326319476.	71.0785472	0.0003110	0.0001535	1.2073677	8.5841782	
0.00000500	1631.	326294942.	64.4707158	0.0003224	0.0001424	1.2471715	8.8523538	
0.00000563	1835.	326267046.	59.3344920	0.0003338	0.0001313	1.2867525	9.1210515	
0.00000625	2039.	326235805.	55.2283942	0.0003452	0.0001202	1.3261094	9.3902715	
0.00000688	2243.	326201227.	51.8714798	0.0003566	0.0001091	1.3652407	9.6600138	
0.00000750	2446.	326163319.	49.0764535	0.0003681	0.00009807	1.4041451	9.9302787	
0.00000813	2650.	326122085.	46.7136499	0.0003795	0.00008705	1.4428212	10.2010663	
0.00000875	2853.	326077526.	44.6904504	0.0003910	0.00007604	1.4812678	10.4723768	
0.00000938	3057.	326029644.	42.9389351	0.0004026	0.00006505	1.5194834	10.7442105	
0.00001000	3260.	325978439.	41.4081640	0.0004141	0.00005408	1.5574667	11.0165676	
0.00001063	3463.	325923911.	40.0591830	0.0004256	0.00004313	1.5952163	11.2894483	
0.00001125	3666.	325866060.	38.8616946	0.0004372	0.00003219	1.6327308	11.5628529	
0.00001188	3869.	325804884.	37.7917798	0.0004488	0.00002128	1.6700090	11.8367817	
0.00001250	4072.	325740383.	36.8303033	0.0004604	0.00001038	1.7070493	12.1112350	
0.00001313	4274.	325672555.	35.9617747	0.0004720	-5.01706E-07	1.7438506	12.3862131	
0.00001375	4477.	325600882.	35.1735127	0.0004836	-0.00001136	1.7804110	12.6617132	
0.00001438	4679.	325522318.	34.4550016	0.0004953	-0.00002221	1.8167270	12.9377163	
0.00001500	4881.	325432923.	33.7974547	0.0005070	-0.00003304	1.8527943	13.2141928	
0.00001563	5083.	325329376.	33.1934873	0.0005186	-0.00004385	1.8886081	13.4911115	
0.00001625	5285.	325209160.	32.6368528	0.0005303	-0.00005465	1.9241642	13.7684419	
0.00001688	5486.	325070637.	32.1222355	0.0005421	-0.00006544	1.9594584	14.0461565	
0.00001750	5686.	324912770.	31.6450834	0.0005538	-0.00007621	1.9944871	14.3242299	
0.00001813	5886.	324735145.	31.2014791	0.0005655	-0.00008697	2.0292472	14.6026400	
0.00001875	6085.	324537642.	30.7880306	0.0005773	-0.00009772	2.0637356	14.8813667	
0.00001938	6284.	324320367.	30.4017860	0.0005890	-0.000108	2.0979496	15.1603911	
0.00002000	6284.	314185356.	29.7226196	0.0005945	-0.000126	2.1134338	15.2555194	C
0.00002063	6284.	304664587.	29.3330884	0.0006050	-0.000138	2.1436908	15.4992661	C
0.00002125	6377.	300112242.	28.9621023	0.0006154	-0.000150	2.1734373	15.7403206	C

MEG-33 rear abutment X direction row2

0.00002188	6501.	297175532.	28.6084526	0.0006258	-0.000162	2.2027032	15.9789246	C
0.00002250	6620.	294220651.	28.2707001	0.0006361	-0.000174	2.2314949	16.2150819	C
0.00002313	6735.	291260281.	27.9476923	0.0006463	-0.000186	2.2598268	16.4488837	C
0.00002375	6847.	288315485.	27.6386715	0.0006564	-0.000199	2.2877314	16.6806100	C
0.00002438	6956.	285394864.	27.3427172	0.0006665	-0.000211	2.3152239	16.9103708	C
0.00002563	7166.	279648602.	26.7866618	0.0006864	-0.000236	2.3690240	17.3643506	C
0.00002688	7363.	273987420.	26.2714783	0.0007060	-0.000261	2.4211739	17.8098710	C
0.00002813	7551.	268495773.	25.7939669	0.0007255	-0.000287	2.4718776	18.2487669	C
0.00002938	7730.	263156607.	25.3489516	0.0007446	-0.000313	2.5211371	18.6807258	C
0.00003063	7900.	257972225.	24.9326418	0.0007636	-0.000339	2.5689975	19.1059151	C
0.00003188	8063.	252967524.	24.5427305	0.0007823	-0.000365	2.6155733	19.5253241	C
0.00003313	8220.	248139779.	24.1765243	0.0008008	-0.000392	2.6609135	19.9392362	C
0.00003438	8370.	243486447.	23.8317642	0.0008192	-0.000418	2.7050686	20.3479776	C
0.00003563	8515.	239005070.	23.5065522	0.0008374	-0.000445	2.7480907	20.7519192	C
0.00003688	8654.	234693214.	23.1992930	0.0008555	-0.000472	2.7900339	21.1514815	C
0.00003813	8789.	230526427.	22.9076383	0.0008734	-0.000499	2.8308652	21.5460201	C
0.00003938	8919.	226508980.	22.6306521	0.0008911	-0.000526	2.8706542	21.9361635	C
0.00004063	9045.	222648666.	22.3678140	0.0009087	-0.000554	2.9094938	22.3228935	C
0.00004188	9168.	218943532.	22.1183480	0.0009262	-0.000581	2.9474423	22.7068058	C
0.00004313	9287.	215348370.	21.8793292	0.0009435	-0.000609	2.9843490	23.0856985	C
0.00004438	9403.	211891844.	21.6516375	0.0009608	-0.000637	3.0203977	23.4618387	C
0.00004563	9516.	208575033.	21.4349839	0.0009780	-0.000665	3.0556599	23.8360756	C
0.00004688	9626.	205346136.	21.2260711	0.0009950	-0.000693	3.0899142	24.2051278	C
0.00004813	9734.	202257565.	21.0275721	0.0010120	-0.000721	3.1234937	24.5735680	C
0.00004938	9838.	199252423.	20.8359107	0.0010288	-0.000749	3.1561330	24.9374072	C
0.00005063	9941.	196369599.	20.6531876	0.0010456	-0.000777	3.1881021	25.3004736	C
0.00005188	10041.	193566417.	20.4766067	0.0010622	-0.000805	3.2191950	25.6595328	C
0.00005313	10140.	190875821.	20.3081117	0.0010789	-0.000834	3.2496589	26.0182472	C
0.00005438	10236.	188251240.	20.1445329	0.0010954	-0.000862	3.2792397	26.3724980	C
0.00005563	10332.	185737926.	19.9888563	0.0011119	-0.000891	3.3082795	26.7276365	C
0.00005688	10424.	183275723.	19.8367923	0.0011282	-0.000919	3.3364049	27.0774470	C
0.00005813	10515.	180909986.	19.6915567	0.0011446	-0.000948	3.3639749	27.4277430	C
0.00005938	10605.	178613137.	19.5510732	0.0011608	-0.000977	3.3908260	27.7756918	C
0.00006063	10693.	176380055.	19.4149615	0.0011770	-0.001005	3.4169586	28.1211418	C
0.00006188	10781.	174231456.	19.2848273	0.0011932	-0.001034	3.4425651	28.4674496	C
0.00006313	10866.	172127043.	19.1574372	0.0012093	-0.001063	3.4673611	28.8093461	C
0.00006438	10950.	170090563.	19.0347585	0.0012254	-0.001092	3.4915702	29.1508025	C
0.00006563	11033.	168126358.	18.9171981	0.0012414	-0.001121	3.5152593	29.4931052	C
0.00006688	11114.	166197842.	18.8016112	0.0012574	-0.001150	3.5381499	29.8307125	C
0.00006813	11195.	164329510.	18.6901932	0.0012733	-0.001179	3.5604800	30.1681756	C

MEG-33 rear abutment X direction row2

0.00006938	11275.	162523588.	18.5832058	0.0012892	-0.001208	3.5822962	30.5064735	C
0.00007063	11354.	160757672.	18.4786039	0.0013051	-0.001237	3.6034250	30.8419027	C
0.00007188	11431.	159035226.	18.3767719	0.0013208	-0.001267	3.6239243	31.1755212	C
0.00007313	11507.	157367113.	18.2788116	0.0013366	-0.001296	3.6439157	31.5099675	C
0.00007438	11584.	155750544.	18.1845298	0.0013525	-0.001325	3.6633965	31.8452455	C
0.00007938	11879.	149651551.	17.8303493	0.0014153	-0.001442	3.7352557	-33.951852	C
0.00008438	12161.	144128808.	17.5140442	0.0014777	-0.001560	3.7981675	-36.864511	C
0.00008938	12432.	139101865.	17.2303448	0.0015400	-0.001678	3.8523548	-39.784387	C
0.00009438	12694.	134507743.	16.9755777	0.0016021	-0.001795	3.8980170	-42.707353	C
0.00009938	12948.	130293291.	16.7469216	0.0016642	-0.001913	3.9352810	-45.628953	C
0.0001044	13191.	126384816.	16.5371928	0.0017261	-0.002031	3.9639833	-48.559572	C
0.0001094	13425.	122744437.	16.3484517	0.0017881	-0.002149	3.9843870	-50.000000	CY
0.0001144	13612.	119011329.	16.1620312	0.0018485	-0.002269	3.9961755	-50.000000	CY
0.0001194	13779.	115423118.	15.9892131	0.0019087	-0.002389	3.9997009	-50.000000	CY
0.0001244	13937.	112054355.	15.8287933	0.0019687	-0.002509	3.9990215	-50.000000	CY
0.0001294	14090.	108906531.	15.6849424	0.0020292	-0.002628	3.9995483	-50.000000	CY
0.0001344	14235.	105935157.	15.5508282	0.0020896	-0.002748	3.9997696	-50.000000	CY
0.0001394	14354.	102989737.	15.4207507	0.0021493	-0.002868	3.9998110	-50.000000	CY
0.0001444	14428.	99932061.	15.2859374	0.0022069	-0.002991	3.9996674	-50.000000	CY
0.0001494	14482.	96950710.	15.1522097	0.0022634	-0.003114	3.9992270	50.000000	CY
0.0001544	14533.	94138725.	15.0306519	0.0023204	-0.003237	3.9983508	50.000000	CY
0.0001594	14578.	91472822.	14.9196998	0.0023778	-0.003360	3.9987870	50.000000	CY
0.0001644	14617.	88923333.	14.8153480	0.0024353	-0.003482	3.9998053	50.000000	CY
0.0001694	14652.	86507502.	14.7202165	0.0024932	-0.003604	3.9987555	50.000000	CY
0.0001744	14685.	84212361.	14.6338144	0.0025518	-0.003726	3.9980050	50.000000	CY
0.0001794	14714.	82030066.	14.5526774	0.0026104	-0.003847	3.9996154	50.000000	CY
0.0001844	14741.	79949585.	14.4744302	0.0026687	-0.003969	3.9974917	50.000000	CY
0.0001894	14766.	77971421.	14.4020617	0.0027274	-0.004090	3.9998623	50.000000	CY
0.0001944	14789.	76087099.	14.3352437	0.0027864	-0.004211	3.9977717	50.000000	CY
0.0001994	14812.	74291358.	14.2732507	0.0028457	-0.004332	3.9998985	50.000000	CY
0.0002044	14833.	72575837.	14.2156871	0.0029053	-0.004452	3.9974338	50.000000	CY
0.0002094	14851.	70930899.	14.1583641	0.0029644	-0.004573	3.9997537	50.000000	CY
0.0002144	14868.	69357401.	14.1051807	0.0030238	-0.004694	3.9961282	50.000000	CY
0.0002194	14885.	67851145.	14.0557151	0.0030835	-0.004814	3.9991858	50.000000	CY
0.0002244	14900.	66408435.	14.0095562	0.0031434	-0.004934	3.9983976	50.000000	CY
0.0002294	14915.	65023572.	13.9668498	0.0032036	-0.005054	3.9977121	50.000000	CY
0.0002344	14929.	63695164.	13.9268526	0.0032641	-0.005173	3.9997684	50.000000	CY
0.0002394	14941.	62418360.	13.8897192	0.0033249	-0.005293	3.9947663	50.000000	CY
0.0002444	14953.	61190000.	13.8547320	0.0033858	-0.005412	3.9981938	50.000000	CY
0.0002494	14964.	60006116.	13.8193973	0.0034462	-0.005531	3.9998610	50.000000	CY

MEG-33 rear abutment X direction row2

0.0002544	14974.	58865554.	13.7865947	0.0035070	-0.005651	3.9943153	50.0000000	CY
0.0002594	14983.	57766524.	13.7559764	0.0035680	-0.005770	3.9976467	50.0000000	CY
0.0002644	14992.	56707417.	13.7272059	0.0036291	-0.005888	3.9996407	50.0000000	CY
0.0002694	15000.	55685311.	13.7004028	0.0036905	-0.006007	3.9967903	50.0000000	CY
0.0002744	15008.	54697896.	13.6755600	0.0037522	-0.006125	3.9959323	50.0000000	CYT
0.0003044	15008.	49306727.	13.8733038	0.0042227	-0.006735	3.9995748	50.0000000	CYT

 Summary of Results for Nominal Moment Capacity for Section 1

Moment values interpolated at maximum compressive strain = 0.003
 or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain	Max. Tens. Strain
1	765.800	13511.243	0.00300000	-0.00570261
2	985.500	14861.546	0.00300000	-0.00464537

Note that the values of moment capacity in the table above are not factored by a strength reduction factor (phi-factor).

In ACI 318, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.75).

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318, or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Load No.	Resist. Factor	Nominal Ax. Thrust kips	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in^2
1	0.65	765.800000	13511.	497.770000	8782.	174437239.

MEG-33 rear abutment X direction row2						
2	0.65	985.500000	14862.	640.575000	9660.	204362639.
1	0.75	765.800000	13511.	574.350000	10133.	141430041.
2	0.75	985.500000	14862.	739.125000	11146.	165462302.
1	0.90	765.800000	13511.	689.220000	12160.	106885023.
2	0.90	985.500000	14862.	886.950000	13375.	123519694.

Pile Section No. 2:

Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section	=	10.000000	ft
Shaft Diameter	=	36.000000	in
Concrete Cover Thickness (to edge of trans. reinf.)	=	3.000000	in
Number of Reinforcing Bars	=	8	bars
Yield Stress of Reinforcing Bars	=	50000.	psi
Modulus of Elasticity of Reinforcing Bars	=	29000000.	psi
Gross Area of Shaft	=	1018.	sq. in.
Total Area of Reinforcing Steel	=	8.000000	sq. in.
Area Ratio of Steel Reinforcement	=	0.79	percent
Edge-to-Edge Bar Spacing	=	9.538153	in
Maximum Concrete Aggregate Size	=	0.750000	in
Ratio of Bar Spacing to Aggregate Size	=	12.72	
Offset of Center of Rebar Cage from Center of Pile	=	0.0000	in
Transverse Reinforcement			
Type: Spiral			
Number of Transverse Reinf. (per spacing)	=	1	
Spacing of Transverse Reinf.	=	4.000000	in
Yield Stress of Transverse Reinf.	=	50000.	psi
Diameter of Transverse Reinf.	=	0.500000	in

Axial Structural Capacities:

Nom. Axial Structural Capacity = $0.85 F_c A_c + F_y A_s$	=	3833.578	kips
Tensile Load for Cracking of Concrete	=	-446.783	kips

MEG-33 rear abutment X direction row2

Nominal Axial Tensile Capacity = -400.000 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.128000	1.000000	13.936000	0.000000
2	1.128000	1.000000	9.854240	9.854240
3	1.128000	1.000000	0.000000	13.936000
4	1.128000	1.000000	-9.85424	9.854240
5	1.128000	1.000000	-13.93600	0.000000
6	1.128000	1.000000	-9.85424	-9.85424
7	1.128000	1.000000	0.000000	-13.93600
8	1.128000	1.000000	9.854240	-9.85424

NOTE: The positions of the above rebars were computed by LPILE

Minimum spacing between any two bars not equal to zero = 9.538 inches
between bars 3 and 4.

Ratio of bar spacing to maximum aggregate size = 12.72

Concrete Properties:

Compressive Strength of Concrete = 4000. psi
Modulus of Elasticity of Concrete = 3604997. psi
Modulus of Rupture of Concrete = -474.34165 psi
Compression Strain at Peak Stress = 0.001886
Tensile Strain at Fracture of Concrete = -0.0001154
Maximum Coarse Aggregate Size = 0.750000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 2

Number Axial Thrust Force

MEG-33 rear abutment X direction row2

 kips

1 765.800
 2 985.500

Definitions of Run Messages and Notes:

- C = concrete in section has cracked in tension.
- Y = stress in reinforcing steel has reached yield stress.
- T = ACI 318 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than 0.003. See ACI 318-14, Section 21.2.3.
- Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
 Position of neutral axis is measured from edge of compression side of pile.
 Compressive stresses and strains are positive in sign.
 Tensile stresses and strains are negative in sign.

Axial Thrust Force = 765.800 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	210.2199654	336351945.	302.0711512	0.0001888	0.0001663	0.7602095	5.4130521	
0.00000125	420.4405562	336352445.	160.0565164	0.0002001	0.0001551	0.8026804	5.6780737	
0.00000188	630.6491287	336346202.	112.7276103	0.0002114	0.0001439	0.8449367	5.9436013	
0.00000250	840.8396742	336335870.	89.0701368	0.0002227	0.0001327	0.8869773	6.2096349	
0.00000313	1051.	336321979.	74.8812370	0.0002340	0.0001215	0.9288008	6.4761746	
0.00000375	1261.	336304705.	65.4266245	0.0002453	0.0001103	0.9704058	6.7432204	
0.00000438	1471.	336284125.	58.6773198	0.0002567	0.00009921	1.0117911	7.0107725	
0.00000500	1681.	336260275.	53.6188331	0.0002681	0.00008809	1.0529553	7.2788308	
0.00000563	1891.	336233176.	49.6875591	0.0002795	0.00007699	1.0938971	7.5473956	
0.00000625	2101.	336202839.	46.5453346	0.0002909	0.00006591	1.1346153	7.8164669	
0.00000688	2311.	336169273.	43.9769650	0.0003023	0.00005484	1.1751085	8.0860449	

MEG-33 rear abutment X direction row2

0.00000750	2521.	336132480.	41.8389873	0.0003138	0.00004379	1.2153753	8.3561298
0.00000813	2731.	336092464.	40.0320811	0.0003253	0.00003276	1.2554145	8.6267216
0.00000875	2940.	336049227.	38.4853031	0.0003367	0.00002175	1.2952248	8.8978207
0.00000938	3150.	336002768.	37.1466284	0.0003482	0.00001075	1.3348048	9.1694271
0.00001000	3360.	335953089.	35.9770384	0.0003598	-2.29616E-07	1.3741532	9.4415412
0.00001063	3569.	335899271.	34.9466824	0.0003713	-0.00001119	1.4132683	9.7141590
0.00001125	3778.	335835739.	34.0322719	0.0003829	-0.00002214	1.4521455	9.9872537
0.00001188	3987.	335755857.	33.2153828	0.0003944	-0.00003307	1.4907788	10.2607850
0.00001250	4196.	335654708.	32.4812751	0.0004060	-0.00004398	1.5291626	10.5347123
0.00001313	4404.	335529259.	31.8180259	0.0004176	-0.00005489	1.5672914	10.8089987
0.00001375	4611.	335378029.	31.2158925	0.0004292	-0.00006578	1.6051608	11.0836122
0.00001438	4819.	335200558.	30.6668361	0.0004408	-0.00007666	1.6427668	11.3585249
0.00001500	5025.	334996915.	30.1641635	0.0004525	-0.00008754	1.6801055	11.6337112
0.00001563	5231.	334767745.	29.7022611	0.0004641	-0.00009840	1.7171741	11.9091496
0.00001625	5436.	334513938.	29.2763840	0.0004757	-0.000109	1.7539696	12.1848210
0.00001688	5436.	322124533.	28.3881710	0.0004791	-0.000128	1.7641173	12.2187987 C
0.00001750	5436.	310620086.	27.9511295	0.0004891	-0.000141	1.7956567	12.4495483 C
0.00001813	5436.	299909048.	27.5388414	0.0004991	-0.000153	1.8266668	12.6774661 C
0.00001875	5512.	293972286.	27.1485233	0.0005090	-0.000166	1.8571362	12.9023846 C
0.00001938	5621.	290104229.	26.7785282	0.0005188	-0.000179	1.8871003	13.1245731 C
0.00002000	5726.	286288218.	26.4271301	0.0005285	-0.000191	1.9165763	13.3441355 C
0.00002063	5827.	282533459.	26.0928612	0.0005382	-0.000204	1.9455840	13.5612052 C
0.00002125	5925.	278830147.	25.7739072	0.0005477	-0.000217	1.9741094	13.7755954 C
0.00002188	6020.	275192399.	25.4693379	0.0005571	-0.000230	2.0021836	13.9875488 C
0.00002250	6112.	271630965.	25.1783202	0.0005665	-0.000243	2.0298363	14.1973040 C
0.00002313	6201.	268151963.	24.9000419	0.0005758	-0.000257	2.0570918	14.4050532 C
0.00002375	6288.	264760701.	24.6338065	0.0005851	-0.000270	2.0839760	14.6110093 C
0.00002438	6372.	261422496.	24.3776229	0.0005942	-0.000283	2.1104170	14.8144198 C
0.00002563	6534.	255000318.	23.8958892	0.0006123	-0.000310	2.1622428	15.2161452 C
0.00002688	6688.	248863574.	23.4492514	0.0006302	-0.000337	2.2126077	15.6102976 C
0.00002813	6835.	243029058.	23.0345475	0.0006478	-0.000365	2.2616621	15.9981147 C
0.00002938	6976.	237477858.	22.6480400	0.0006653	-0.000392	2.3094593	16.3798866 C
0.00003063	7111.	232193762.	22.2866483	0.0006825	-0.000420	2.3560542	16.7559421 C
0.00003188	7241.	227162744.	21.9478236	0.0006996	-0.000448	2.4015043	17.1266570 C
0.00003313	7366.	222372455.	21.6294520	0.0007165	-0.000476	2.4458691	17.4924549 C
0.00003438	7487.	217811887.	21.3297790	0.0007332	-0.000504	2.4892103	17.8538110 C
0.00003563	7605.	213471087.	21.0473513	0.0007498	-0.000533	2.5315923	18.2112574 C
0.00003688	7718.	209307729.	20.7791068	0.0007662	-0.000561	2.5729075	18.5633950 C
0.00003813	7828.	205337184.	20.5251752	0.0007825	-0.000590	2.6133212	18.9119094 C
0.00003938	7936.	201557702.	20.2850342	0.0007987	-0.000619	2.6529285	19.2577610 C

MEG-33 rear abutment X direction row2

0.00004063	8041.	197932200.	20.0561423	0.0008148	-0.000648	2.6916142	19.5994552	C
0.00004188	8143.	194460687.	19.8381094	0.0008307	-0.000677	2.7294554	19.9377418	C
0.00004313	8244.	191154981.	19.6315480	0.0008466	-0.000706	2.7666226	20.2745673	C
0.00004438	8341.	187958039.	19.4325170	0.0008623	-0.000735	2.8028154	20.6061079	C
0.00004563	8437.	184919979.	19.2442774	0.0008780	-0.000764	2.8384572	20.9374972	C
0.00004688	8530.	181976647.	19.0623093	0.0008935	-0.000794	2.8731629	21.2637643	C
0.00004813	8623.	179176876.	18.8900588	0.0009091	-0.000823	2.9073705	21.5904009	C
0.00004938	8713.	176457324.	18.7228406	0.0009244	-0.000853	2.9406532	21.9117550	C
0.00005063	8802.	173866693.	18.5643709	0.0009398	-0.000883	2.9734745	22.2338288	C
0.00005188	8889.	171352249.	18.4105331	0.0009550	-0.000912	3.0054498	22.5513831	C
0.00005313	8975.	168943161.	18.2637514	0.0009703	-0.000942	3.0368989	22.8686546	C
0.00005438	9060.	166622164.	18.1226398	0.0009854	-0.000972	3.0677226	23.1842253	C
0.00005563	9143.	164375395.	17.9861179	0.0010005	-0.001002	3.0978487	-23.541756	C
0.00005688	9226.	162222836.	17.8560168	0.0010156	-0.001032	3.1275273	-24.285370	C
0.00005813	9308.	160131487.	17.7294365	0.0010305	-0.001062	3.1564746	-25.032481	C
0.00005938	9388.	158113427.	17.6076091	0.0010455	-0.001092	3.1848681	-25.780586	C
0.00006063	9468.	156174408.	17.4911933	0.0010604	-0.001122	3.2128196	-26.528009	C
0.00006188	9546.	154285228.	17.3774252	0.0010752	-0.001152	3.2400485	-27.279120	C
0.00006313	9624.	152457860.	17.2676200	0.0010900	-0.001182	3.2667358	-28.031225	C
0.00006438	9701.	150697620.	17.1624387	0.0011048	-0.001213	3.2929874	-28.782660	C
0.00006563	9777.	148989276.	17.0603870	0.0011196	-0.001243	3.3186597	-29.535763	C
0.00006688	9852.	147323411.	16.9605681	0.0011342	-0.001273	3.3436755	-30.291936	C
0.00006813	9927.	145715150.	16.8647474	0.0011489	-0.001304	3.3682619	-31.047446	C
0.00006938	10001.	144161349.	16.7727104	0.0011636	-0.001334	3.3924169	-31.802291	C
0.00007063	10074.	142643417.	16.6823997	0.0011782	-0.001364	3.4159258	-32.560272	C
0.00007188	10146.	141166141.	16.5944955	0.0011927	-0.001395	3.4388869	-33.319786	C
0.00007313	10218.	139736147.	16.5099066	0.0012073	-0.001425	3.4614229	-34.078642	C
0.00007438	10290.	138351025.	16.4284673	0.0012219	-0.001456	3.4835318	-34.836837	C
0.00007938	10569.	133150678.	16.1225585	0.0012797	-0.001578	3.5666910	-37.882973	C
0.00008438	10840.	128470050.	15.8497840	0.0013373	-0.001700	3.6422212	-40.936747	C
0.00008938	11104.	124237225.	15.6063903	0.0013948	-0.001823	3.7104072	-43.993475	C
0.00009438	11360.	120375044.	15.3863356	0.0014521	-0.001945	3.7711568	-47.056910	C
0.00009938	11611.	116840154.	15.1878571	0.0015093	-0.002068	3.8247131	-50.000000	CY
0.0001044	11830.	113343154.	15.0000352	0.0015656	-0.002192	3.8704756	-50.000000	CY
0.0001094	12008.	109784526.	14.8157660	0.0016205	-0.002317	3.9083747	-50.000000	CY
0.0001144	12181.	106496543.	14.6483521	0.0016754	-0.002442	3.9397749	-50.000000	CY
0.0001194	12348.	103441883.	14.4943284	0.0017303	-0.002567	3.9645808	-50.000000	CY
0.0001244	12510.	100584567.	14.3523135	0.0017851	-0.002692	3.9828283	-50.000000	CY
0.0001294	12629.	97618697.	14.2083733	0.0018382	-0.002819	3.9942768	-50.000000	CY
0.0001344	12698.	94496465.	14.0536796	0.0018885	-0.002949	3.9994561	-50.000000	CY

MEG-33 rear abutment X direction row2

0.0001394	12763.	91574401.	13.9121518	0.0019390	-0.003078	3.9994295	-50.000000	CY
0.0001444	12824.	88822594.	13.7787758	0.0019893	-0.003208	3.9991866	-50.000000	CY
0.0001494	12881.	86230205.	13.6541689	0.0020396	-0.003338	3.9986313	-50.000000	CY
0.0001544	12935.	83792019.	13.5400008	0.0020902	-0.003467	3.9976086	-50.000000	CY
0.0001594	12986.	81481962.	13.4314034	0.0021406	-0.003597	3.9999835	-50.000000	CY
0.0001644	13034.	79293696.	13.3294103	0.0021910	-0.003726	3.9995177	-50.000000	CY
0.0001694	13080.	77224802.	13.2353911	0.0022417	-0.003856	3.9981227	-50.000000	CY
0.0001744	13124.	75265765.	13.1485635	0.0022928	-0.003985	3.9999974	-50.000000	CY
0.0001794	13165.	73394379.	13.0638987	0.0023433	-0.004114	3.9991654	50.000000	CY
0.0001844	13204.	71615471.	12.9850557	0.0023941	-0.004243	3.9968534	50.000000	CY
0.0001894	13241.	69921494.	12.9123679	0.0024453	-0.004372	3.9995285	50.000000	CY
0.0001944	13276.	68299557.	12.8466402	0.0024971	-0.004500	3.9967257	50.000000	CY
0.0001994	13309.	66752915.	12.7856694	0.0025491	-0.004628	3.9995946	50.000000	CY
0.0002044	13337.	65259109.	12.7277170	0.0026012	-0.004756	3.9962725	50.000000	CY
0.0002094	13365.	63830744.	12.6735454	0.0026535	-0.004884	3.9993424	50.000000	CY
0.0002144	13390.	62461659.	12.6238722	0.0027062	-0.005011	3.9969794	50.000000	CY
0.0002194	13414.	61147688.	12.5784072	0.0027594	-0.005138	3.9986153	50.000000	CY
0.0002244	13438.	59889181.	12.5359498	0.0028128	-0.005265	3.9999934	50.000000	CY
0.0002294	13460.	58680489.	12.4967730	0.0028664	-0.005391	3.9969588	50.000000	CY
0.0002344	13481.	57520567.	12.4601838	0.0029204	-0.005517	3.9995228	50.000000	CY
0.0002394	13502.	56405718.	12.4261845	0.0029745	-0.005643	3.9965326	50.000000	CY
0.0002444	13521.	55330596.	12.3924636	0.0030284	-0.005769	3.9976700	50.000000	CY
0.0002494	13540.	54296026.	12.3603610	0.0030824	-0.005895	3.9997169	50.000000	CY
0.0002544	13558.	53299201.	12.3305698	0.0031366	-0.006021	3.9955933	50.000000	CY
0.0002594	13575.	52338045.	12.3029331	0.0031911	-0.006146	3.9972858	50.000000	CYT
0.0002644	13592.	51411546.	12.2770423	0.0032457	-0.006272	3.9995245	50.000000	CYT
0.0002694	13608.	50517240.	12.2529716	0.0033006	-0.006397	3.9974179	50.000000	CYT
0.0002744	13623.	49651428.	12.2304689	0.0033557	-0.006522	3.9957412	50.000000	CYT
0.0003044	13672.	44918381.	12.0959895	0.0036817	-0.007276	3.9998232	50.000000	CYT
0.0003344	13672.	40888321.	12.0718370	0.0040365	-0.008001	3.9933884	50.000000	CYT

Axial Thrust Force = 985.500 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	203.9917885	326386862.	388.8590461	0.0002430	0.0002205	0.9639414	6.9860827	
0.00000125	407.9860656	326388852.	203.4511105	0.0002543	0.0002093	1.0050537	7.2511277	

MEG-33 rear abutment X direction row2

0.00000188	611.9679531	326382908.	141.6580582	0.0002656	0.0001981	1.0459513	7.5166944
0.00000250	815.9312569	326372503.	110.7687271	0.0002769	0.0001869	1.0866329	7.7827827
0.00000313	1020.	326358330.	92.2408853	0.0002883	0.0001758	1.1270971	8.0493927
0.00000375	1224.	326340622.	79.8937887	0.0002996	0.0001646	1.1673424	8.3165245
0.00000438	1428.	326319476.	71.0785472	0.0003110	0.0001535	1.2073677	8.5841782
0.00000500	1631.	326294942.	64.4707158	0.0003224	0.0001424	1.2471715	8.8523538
0.00000563	1835.	326267046.	59.3344920	0.0003338	0.0001313	1.2867525	9.1210515
0.00000625	2039.	326235805.	55.2283942	0.0003452	0.0001202	1.3261094	9.3902715
0.00000688	2243.	326201227.	51.8714798	0.0003566	0.0001091	1.3652407	9.6600138
0.00000750	2446.	326163319.	49.0764535	0.0003681	0.00009807	1.4041451	9.9302787
0.00000813	2650.	326122085.	46.7136499	0.0003795	0.00008705	1.4428212	10.2010663
0.00000875	2853.	326077526.	44.6904504	0.0003910	0.00007604	1.4812678	10.4723768
0.00000938	3057.	326029644.	42.9389351	0.0004026	0.00006505	1.5194834	10.7442105
0.00001000	3260.	325978439.	41.4081640	0.0004141	0.00005408	1.5574667	11.0165676
0.00001063	3463.	325923911.	40.0591830	0.0004256	0.00004313	1.5952163	11.2894483
0.00001125	3666.	325866060.	38.8616946	0.0004372	0.00003219	1.6327308	11.5628529
0.00001188	3869.	325804884.	37.7917798	0.0004488	0.00002128	1.6700090	11.8367817
0.00001250	4072.	325740383.	36.8303033	0.0004604	0.00001038	1.7070493	12.1112350
0.00001313	4274.	325672555.	35.9617747	0.0004720	-5.01706E-07	1.7438506	12.3862131
0.00001375	4477.	325600882.	35.1735127	0.0004836	-0.00001136	1.7804110	12.6617132
0.00001438	4679.	325522318.	34.4550016	0.0004953	-0.00002221	1.8167270	12.9377163
0.00001500	4881.	325432923.	33.7974547	0.0005070	-0.00003304	1.8527943	13.2141928
0.00001563	5083.	325329376.	33.1934873	0.0005186	-0.00004385	1.8886081	13.4911115
0.00001625	5285.	325209160.	32.6368528	0.0005303	-0.00005465	1.9241642	13.7684419
0.00001688	5486.	325070637.	32.1222355	0.0005421	-0.00006544	1.9594584	14.0461565
0.00001750	5686.	324912770.	31.6450834	0.0005538	-0.00007621	1.9944871	14.3242299
0.00001813	5886.	324735145.	31.2014791	0.0005655	-0.00008697	2.0292472	14.6026400
0.00001875	6085.	324537642.	30.7880306	0.0005773	-0.00009772	2.0637356	14.8813667
0.00001938	6284.	324320367.	30.4017860	0.0005890	-0.000108	2.0979496	15.1603911
0.00002000	6284.	314185356.	29.7226196	0.0005945	-0.000126	2.1134338	15.2555194 C
0.00002063	6284.	304664587.	29.3330884	0.0006050	-0.000138	2.1436908	15.4992661 C
0.00002125	6377.	300112242.	28.9621023	0.0006154	-0.000150	2.1734373	15.7403206 C
0.00002188	6501.	297175532.	28.6084526	0.0006258	-0.000162	2.2027032	15.9789246 C
0.00002250	6620.	294220651.	28.2707001	0.0006361	-0.000174	2.2314949	16.2150819 C
0.00002313	6735.	291260281.	27.9476923	0.0006463	-0.000186	2.2598268	16.4488837 C
0.00002375	6847.	288315485.	27.6386715	0.0006564	-0.000199	2.2877314	16.6806100 C
0.00002438	6956.	285394864.	27.3427172	0.0006665	-0.000211	2.3152239	16.9103708 C
0.00002563	7166.	279648602.	26.7866618	0.0006864	-0.000236	2.3690240	17.3643506 C
0.00002688	7363.	273987420.	26.2714783	0.0007060	-0.000261	2.4211739	17.8098710 C
0.00002813	7551.	268495773.	25.7939669	0.0007255	-0.000287	2.4718776	18.2487669 C

MEG-33 rear abutment X direction row2

0.00002938	7730.	263156607.	25.3489516	0.0007446	-0.000313	2.5211371	18.6807258	C
0.00003063	7900.	257972225.	24.9326418	0.0007636	-0.000339	2.5689975	19.1059151	C
0.00003188	8063.	252967524.	24.5427305	0.0007823	-0.000365	2.6155733	19.5253241	C
0.00003313	8220.	248139779.	24.1765243	0.0008008	-0.000392	2.6609135	19.9392362	C
0.00003438	8370.	243486447.	23.8317642	0.0008192	-0.000418	2.7050686	20.3479776	C
0.00003563	8515.	239005070.	23.5065522	0.0008374	-0.000445	2.7480907	20.7519192	C
0.00003688	8654.	234693214.	23.1992930	0.0008555	-0.000472	2.7900339	21.1514815	C
0.00003813	8789.	230526427.	22.9076383	0.0008734	-0.000499	2.8308652	21.5460201	C
0.00003938	8919.	226508980.	22.6306521	0.0008911	-0.000526	2.8706542	21.9361635	C
0.00004063	9045.	222648666.	22.3678140	0.0009087	-0.000554	2.9094938	22.3228935	C
0.00004188	9168.	218943532.	22.1183480	0.0009262	-0.000581	2.9474423	22.7068058	C
0.00004313	9287.	215348370.	21.8793292	0.0009435	-0.000609	2.9843490	23.0856985	C
0.00004438	9403.	211891844.	21.6516375	0.0009608	-0.000637	3.0203977	23.4618387	C
0.00004563	9516.	208575033.	21.4349839	0.0009780	-0.000665	3.0556599	23.8360756	C
0.00004688	9626.	205346136.	21.2260711	0.0009950	-0.000693	3.0899142	24.2051278	C
0.00004813	9734.	202257565.	21.0275721	0.0010120	-0.000721	3.1234937	24.5735680	C
0.00004938	9838.	199252423.	20.8359107	0.0010288	-0.000749	3.1561330	24.9374072	C
0.00005063	9941.	196369599.	20.6531876	0.0010456	-0.000777	3.1881021	25.3004736	C
0.00005188	10041.	193566417.	20.4766067	0.0010622	-0.000805	3.2191950	25.6595328	C
0.00005313	10140.	190875821.	20.3081117	0.0010789	-0.000834	3.2496589	26.0182472	C
0.00005438	10236.	188251240.	20.1445329	0.0010954	-0.000862	3.2792397	26.3724980	C
0.00005563	10332.	185737926.	19.9888563	0.0011119	-0.000891	3.3082795	26.7276365	C
0.00005688	10424.	183275723.	19.8367923	0.0011282	-0.000919	3.3364049	27.0774470	C
0.00005813	10515.	180909986.	19.6915567	0.0011446	-0.000948	3.3639749	27.4277430	C
0.00005938	10605.	178613137.	19.5510732	0.0011608	-0.000977	3.3908260	27.7756918	C
0.00006063	10693.	176380055.	19.4149615	0.0011770	-0.001005	3.4169586	28.1211418	C
0.00006188	10781.	174231456.	19.2848273	0.0011932	-0.001034	3.4425651	28.4674496	C
0.00006313	10866.	172127043.	19.1574372	0.0012093	-0.001063	3.4673611	28.8093461	C
0.00006438	10950.	170090563.	19.0347585	0.0012254	-0.001092	3.4915702	29.1508025	C
0.00006563	11033.	168126358.	18.9171981	0.0012414	-0.001121	3.5152593	29.4931052	C
0.00006688	11114.	166197842.	18.8016112	0.0012574	-0.001150	3.5381499	29.8307125	C
0.00006813	11195.	164329510.	18.6901932	0.0012733	-0.001179	3.5604800	30.1681756	C
0.00006938	11275.	162523588.	18.5832058	0.0012892	-0.001208	3.5822962	30.5064735	C
0.00007063	11354.	160757672.	18.4786039	0.0013051	-0.001237	3.6034250	30.8419027	C
0.00007188	11431.	159035226.	18.3767719	0.0013208	-0.001267	3.6239243	31.1755212	C
0.00007313	11507.	157367113.	18.2788116	0.0013366	-0.001296	3.6439157	31.5099675	C
0.00007438	11584.	155750544.	18.1845298	0.0013525	-0.001325	3.6633965	31.8452455	C
0.00007938	11879.	149651551.	17.8303493	0.0014153	-0.001442	3.7352557	-33.951852	C
0.00008438	12161.	144128808.	17.5140442	0.0014777	-0.001560	3.7981675	-36.864511	C
0.00008938	12432.	139101865.	17.2303448	0.0015400	-0.001678	3.8523548	-39.784387	C

MEG-33 rear abutment X direction row2

0.00009438	12694.	134507743.	16.9755777	0.0016021	-0.001795	3.8980170	-42.707353	C
0.00009938	12948.	130293291.	16.7469216	0.0016642	-0.001913	3.9352810	-45.628953	C
0.0001044	13191.	126384816.	16.5371928	0.0017261	-0.002031	3.9639833	-48.559572	C
0.0001094	13425.	122744437.	16.3484517	0.0017881	-0.002149	3.9843870	-50.000000	CY
0.0001144	13612.	119011329.	16.1620312	0.0018485	-0.002269	3.9961755	-50.000000	CY
0.0001194	13779.	115423118.	15.9892131	0.0019087	-0.002389	3.9997009	-50.000000	CY
0.0001244	13937.	112054355.	15.8287933	0.0019687	-0.002509	3.9990215	-50.000000	CY
0.0001294	14090.	108906531.	15.6849424	0.0020292	-0.002628	3.9995483	-50.000000	CY
0.0001344	14235.	105935157.	15.5508282	0.0020896	-0.002748	3.9997696	-50.000000	CY
0.0001394	14354.	102989737.	15.4207507	0.0021493	-0.002868	3.9998110	-50.000000	CY
0.0001444	14428.	99932061.	15.2859374	0.0022069	-0.002991	3.9996674	-50.000000	CY
0.0001494	14482.	96950710.	15.1522097	0.0022634	-0.003114	3.9992270	50.000000	CY
0.0001544	14533.	94138725.	15.0306519	0.0023204	-0.003237	3.9983508	50.000000	CY
0.0001594	14578.	91472822.	14.9196998	0.0023778	-0.003360	3.9987870	50.000000	CY
0.0001644	14617.	88923333.	14.8153480	0.0024353	-0.003482	3.9998053	50.000000	CY
0.0001694	14652.	86507502.	14.7202165	0.0024932	-0.003604	3.9987555	50.000000	CY
0.0001744	14685.	84212361.	14.6338144	0.0025518	-0.003726	3.9980050	50.000000	CY
0.0001794	14714.	82030066.	14.5526774	0.0026104	-0.003847	3.9996154	50.000000	CY
0.0001844	14741.	79949585.	14.4744302	0.0026687	-0.003969	3.9974917	50.000000	CY
0.0001894	14766.	77971421.	14.4020617	0.0027274	-0.004090	3.9998623	50.000000	CY
0.0001944	14789.	76087099.	14.3352437	0.0027864	-0.004211	3.9977717	50.000000	CY
0.0001994	14812.	74291358.	14.2732507	0.0028457	-0.004332	3.9998985	50.000000	CY
0.0002044	14833.	72575837.	14.2156871	0.0029053	-0.004452	3.9974338	50.000000	CY
0.0002094	14851.	70930899.	14.1583641	0.0029644	-0.004573	3.9997537	50.000000	CY
0.0002144	14868.	69357401.	14.1051807	0.0030238	-0.004694	3.9961282	50.000000	CY
0.0002194	14885.	67851145.	14.0557151	0.0030835	-0.004814	3.9991858	50.000000	CY
0.0002244	14900.	66408435.	14.0095562	0.0031434	-0.004934	3.9983976	50.000000	CY
0.0002294	14915.	65023572.	13.9668498	0.0032036	-0.005054	3.9977121	50.000000	CY
0.0002344	14929.	63695164.	13.9268526	0.0032641	-0.005173	3.9997684	50.000000	CY
0.0002394	14941.	62418360.	13.8897192	0.0033249	-0.005293	3.9947663	50.000000	CY
0.0002444	14953.	61190000.	13.8547320	0.0033858	-0.005412	3.9981938	50.000000	CY
0.0002494	14964.	60006116.	13.8193973	0.0034462	-0.005531	3.9998610	50.000000	CY
0.0002544	14974.	58865554.	13.7865947	0.0035070	-0.005651	3.9943153	50.000000	CY
0.0002594	14983.	57766524.	13.7559764	0.0035680	-0.005770	3.9976467	50.000000	CY
0.0002644	14992.	56707417.	13.7272059	0.0036291	-0.005888	3.9996407	50.000000	CY
0.0002694	15000.	55685311.	13.7004028	0.0036905	-0.006007	3.9967903	50.000000	CY
0.0002744	15008.	54697896.	13.6755600	0.0037522	-0.006125	3.9959323	50.000000	CYT
0.0003044	15008.	49306727.	13.8733038	0.0042227	-0.006735	3.9995748	50.000000	CYT

MEG-33 rear abutment X direction row2

 Summary of Results for Nominal Moment Capacity for Section 2

Moment values interpolated at maximum compressive strain = 0.003
 or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain	Max. Tens. Strain
1	765.800	13511.243	0.00300000	-0.00570261
2	985.500	14861.546	0.00300000	-0.00464537

Note that the values of moment capacity in the table above are not factored by a strength reduction factor (phi-factor).

In ACI 318, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.75).

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318, or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Load No.	Resist. Factor	Nominal Ax. Thrust kips	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in^2
1	0.65	765.800000	13511.	497.770000	8782.	174437239.
2	0.65	985.500000	14862.	640.575000	9660.	204362639.
1	0.75	765.800000	13511.	574.350000	10133.	141430041.
2	0.75	985.500000	14862.	739.125000	11146.	165462302.
1	0.90	765.800000	13511.	689.220000	12160.	106885023.
2	0.90	985.500000	14862.	886.950000	13375.	123519694.

 Layering Correction Equivalent Depths of Soil & Rock Layers

Layer No.	Top of Layer Below Pile Head ft	Equivalent Top Depth Below Grnd Surf ft	Same Layer Type As Layer Above	Layer is Rock or is Below Rock Layer	F0 Integral for Layer lbs	F1 Integral for Layer lbs
1	0.00	0.00	N.A.	No	0.00	214373.
2	7.5000	8.8906	Yes	No	214373.	454073.
3	15.8400	15.8400	No	Yes	N.A.	N.A.

Notes: The F0 integral of Layer n+1 equals the sum of the F0 and F1 integrals for Layer n. Layering correction equivalent depths are computed only for soil types with both shallow-depth and deep-depth expressions for peak lateral load transfer. These soil types are soft and stiff clays, non-liquefied sands, and cemented c-phi soil.

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 1

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 3540.0 lbs
 Applied moment at pile head = 1490400.0 in-lbs
 Axial thrust load on pile head = 765800.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
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MEG-33 rear abutment X direction row2

0.00	0.02329	1490400.	3540.	-4.51E-04	0.00	3.36E+11	0.00	0.00	0.00
0.2584	0.02191	1502432.	3450.	-4.37E-04	0.00	3.36E+11	-57.745	8173.	0.00
0.5168	0.02057	1513875.	3193.	-4.23E-04	0.00	3.36E+11	-108.456	16345.	0.00
0.7752	0.01928	1524242.	2788.	-4.09E-04	0.00	3.36E+11	-152.477	24518.	0.00
1.0336	0.01804	1533110.	2257.	-3.95E-04	0.00	3.36E+11	-190.151	32691.	0.00
1.2920	0.01683	1540117.	1618.	-3.81E-04	0.00	3.36E+11	-221.827	40864.	0.00
1.5504	0.01567	1544956.	890.1096	-3.67E-04	0.00	3.36E+11	-247.855	49036.	0.00
1.8088	0.01456	1547379.	89.4207	-3.53E-04	0.00	3.36E+11	-268.585	57209.	0.00
2.0672	0.01349	1547185.	-767.880	-3.38E-04	0.00	3.36E+11	-284.369	65382.	0.00
2.3256	0.01246	1544224.	-1667.	-3.24E-04	0.00	3.36E+11	-295.556	73554.	0.00
2.5840	0.01148	1538386.	-2594.	-3.10E-04	0.00	3.36E+11	-302.493	81727.	0.00
2.8424	0.01054	1529607.	-3537.	-2.96E-04	0.00	3.36E+11	-305.525	89900.	0.00
3.1008	0.00964	1517856.	-4483.	-2.82E-04	0.00	3.36E+11	-304.992	98073.	0.00
3.3592	0.00879	1503140.	-5423.	-2.68E-04	0.00	3.36E+11	-301.228	106245.	0.00
3.6176	0.00798	1485494.	-6347.	-2.54E-04	0.00	3.36E+11	-294.561	114418.	0.00
3.8760	0.00722	1464984.	-7246.	-2.40E-04	0.00	3.36E+11	-285.310	122591.	0.00
4.1344	0.00649	1441699.	-8113.	-2.27E-04	0.00	3.36E+11	-273.786	130763.	0.00
4.3928	0.00581	1415749.	-8941.	-2.14E-04	0.00	3.36E+11	-260.291	138936.	0.00
4.6512	0.00517	1387266.	-9724.	-2.01E-04	0.00	3.36E+11	-245.117	147109.	0.00
4.9096	0.00456	1356396.	-10459.	-1.88E-04	0.00	3.36E+11	-228.540	155282.	0.00
5.1680	0.00400	1323298.	-11140.	-1.76E-04	0.00	3.36E+11	-210.830	163454.	0.00
5.4264	0.00347	1288144.	-11765.	-1.64E-04	0.00	3.36E+11	-192.241	171627.	0.00
5.6848	0.00298	1251114.	-12331.	-1.52E-04	0.00	3.36E+11	-173.012	179800.	0.00
5.9432	0.00253	1212393.	-12837.	-1.41E-04	0.00	3.36E+11	-153.371	187972.	0.00
6.2016	0.00211	1172171.	-13282.	-1.30E-04	0.00	3.36E+11	-133.532	196145.	0.00
6.4600	0.00173	1130639.	-13665.	-1.19E-04	0.00	3.36E+11	-113.691	204318.	0.00
6.7184	0.00137	1087989.	-13987.	-1.09E-04	0.00	3.36E+11	-94.033	212491.	0.00
6.9768	0.00105	1044412.	-14249.	-9.91E-05	0.00	3.36E+11	-74.727	220663.	0.00
7.2352	7.58E-04	1000093.	-14452.	-8.96E-05	0.00	3.36E+11	-55.926	228836.	0.00
7.4936	4.94E-04	955214.	-14597.	-8.06E-05	0.00	3.36E+11	-37.770	237009.	0.00
7.7520	2.58E-04	909951.	-14687.	-7.20E-05	0.00	3.36E+11	-20.383	245181.	0.00
8.0104	4.74E-05	864473.	-14725.	-6.39E-05	0.00	3.36E+11	-3.876	253354.	0.00
8.2688	-1.38E-04	818938.	-14713.	-5.61E-05	0.00	3.36E+11	11.6559	261527.	0.00
8.5272	-3.00E-04	773497.	-14654.	-4.88E-05	0.00	3.36E+11	26.1299	269700.	0.00
8.7856	-4.41E-04	728291.	-14552.	-4.18E-05	0.00	3.36E+11	39.4775	277872.	0.00
9.0440	-5.60E-04	683448.	-14411.	-3.53E-05	0.00	3.36E+11	51.6431	286045.	0.00
9.3024	-6.60E-04	639087.	-14234.	-2.92E-05	0.00	3.36E+11	62.5837	294218.	0.00
9.5608	-7.41E-04	595313.	-14025.	-2.35E-05	0.00	3.36E+11	72.2685	302391.	0.00
9.8192	-8.06E-04	552222.	-13788.	-1.82E-05	0.00	3.36E+11	80.6784	310563.	0.00
10.0776	-8.54E-04	509894.	-13527.	-1.33E-05	0.00	3.36E+11	87.8055	318736.	0.00

MEG-33 rear abutment X direction row2

10.3360	-8.88E-04	468399.	-13245.	-8.84E-06	0.00	3.36E+11	93.6525	326909.	0.00
10.5944	-9.09E-04	427794.	-12948.	-4.71E-06	0.00	3.36E+11	98.2324	335081.	0.00
10.8528	-9.18E-04	388125.	-12638.	-9.48E-07	0.00	3.36E+11	101.5677	343254.	0.00
11.1112	-9.15E-04	349423.	-12320.	2.45E-06	0.00	3.36E+11	103.6903	351427.	0.00
11.3696	-9.02E-04	311711.	-11997.	5.50E-06	0.00	3.36E+11	104.6408	359600.	0.00
11.6280	-8.81E-04	274999.	-11673.	8.20E-06	0.00	3.36E+11	104.4680	367772.	0.00
11.8864	-8.51E-04	239284.	-11350.	1.06E-05	0.00	3.36E+11	103.2288	375945.	0.00
12.1448	-8.15E-04	204557.	-11034.	1.26E-05	0.00	3.36E+11	100.9874	384118.	0.00
12.4032	-7.73E-04	170796.	-10726.	1.44E-05	0.00	3.36E+11	97.8153	392290.	0.00
12.6616	-7.26E-04	137973.	-10429.	1.58E-05	0.00	3.36E+11	93.7910	400463.	0.00
12.9200	-6.75E-04	106048.	-10145.	1.69E-05	0.00	3.36E+11	88.9995	408636.	0.00
13.1784	-6.21E-04	74976.	-9878.	1.77E-05	0.00	3.36E+11	83.5323	416809.	0.00
13.4368	-5.65E-04	44706.	-9628.	1.83E-05	0.00	3.36E+11	77.4872	424981.	0.00
13.6952	-5.08E-04	15180.	-9398.	1.86E-05	0.00	3.36E+11	70.9680	433154.	0.00
13.9536	-4.50E-04	-13664.	-9189.	1.86E-05	0.00	3.36E+11	64.0848	441327.	0.00
14.2120	-3.93E-04	-41892.	-9001.	1.83E-05	0.00	3.36E+11	56.9537	449499.	0.00
14.4704	-3.37E-04	-69571.	-8835.	1.78E-05	0.00	3.36E+11	49.6969	457672.	0.00
14.7288	-2.83E-04	-96771.	-8693.	1.70E-05	0.00	3.36E+11	42.4428	465845.	0.00
14.9872	-2.31E-04	-123560.	-8572.	1.60E-05	0.00	3.36E+11	35.3258	474018.	0.00
15.2456	-1.83E-04	-150007.	-8473.	1.48E-05	0.00	3.36E+11	28.4870	482190.	0.00
15.5040	-1.40E-04	-176177.	-8395.	1.33E-05	0.00	3.36E+11	22.0739	490363.	0.00
15.7624	-1.01E-04	-202131.	-8335.	1.15E-05	0.00	3.36E+11	16.2406	498536.	0.00
16.0208	-6.82E-05	-227924.	-3806.	9.52E-06	0.00	3.36E+11	2905.	1.32E+08	0.00
16.2792	-4.19E-05	-225777.	3763.	7.43E-06	0.00	3.36E+11	1976.	1.46E+08	0.00
16.5376	-2.21E-05	-204624.	8598.	5.45E-06	0.00	3.36E+11	1142.	1.60E+08	0.00
16.7960	-8.15E-06	-172483.	11079.	3.71E-06	0.00	3.36E+11	457.7007	1.74E+08	0.00
17.0544	8.94E-07	-135936.	11704.	2.29E-06	0.00	3.36E+11	-54.266	1.88E+08	0.00
17.3128	6.05E-06	-99909.	11008.	1.20E-06	0.00	3.36E+11	-394.658	2.02E+08	0.00
17.5712	8.35E-06	-67674.	9493.	4.30E-07	0.00	3.36E+11	-582.534	2.16E+08	0.00
17.8296	8.72E-06	-41038.	7586.	-7.10E-08	0.00	3.36E+11	-647.550	2.30E+08	0.00
18.0880	7.91E-06	-20628.	5615.	-3.55E-07	0.00	3.36E+11	-623.436	2.44E+08	0.00
18.3464	6.51E-06	-6212.	3807.	-4.79E-07	0.00	3.36E+11	-542.877	2.58E+08	0.00
18.6048	4.94E-06	2985.	2293.	-4.94E-07	0.00	3.36E+11	-434.072	2.72E+08	0.00
18.8632	3.45E-06	8008.	1125.	-4.43E-07	0.00	3.36E+11	-318.900	2.86E+08	0.00
19.1216	2.19E-06	9965.	301.3766	-3.60E-07	0.00	3.36E+11	-212.433	3.01E+08	0.00
19.3800	1.22E-06	9879.	-219.387	-2.69E-07	0.00	3.36E+11	-123.457	3.15E+08	0.00
19.6384	5.24E-07	8606.	-496.962	-1.84E-07	0.00	3.36E+11	-55.578	3.29E+08	0.00
19.8968	7.79E-08	6798.	-596.479	-1.13E-07	0.00	3.36E+11	-8.611	3.43E+08	0.00
20.1552	-1.74E-07	4907.	-578.747	-5.87E-08	0.00	3.36E+11	20.0480	3.57E+08	0.00
20.4136	-2.86E-07	3209.	-494.609	-2.13E-08	0.00	3.36E+11	34.2204	3.71E+08	0.00

MEG-33 rear abutment X direction row2

20.6720	-3.06E-07	1840.	-382.601	1.96E-09	0.00	3.36E+11	38.0245	3.85E+08	0.00
20.9304	-2.74E-07	836.2958	-268.999	1.43E-08	0.00	3.36E+11	35.2476	3.99E+08	0.00
21.1888	-2.18E-07	171.5915	-169.398	1.89E-08	0.00	3.36E+11	28.9949	4.13E+08	0.00
21.4472	-1.57E-07	-214.332	-91.022	1.87E-08	0.00	3.36E+11	21.5573	4.27E+08	0.00
21.7056	-1.02E-07	-392.977	-35.216	1.59E-08	0.00	3.36E+11	14.4369	4.41E+08	0.00
21.9640	-5.77E-08	-432.804	0.2923	1.21E-08	0.00	3.36E+11	8.4659	4.55E+08	0.00
22.2224	-2.62E-08	-391.222	19.5719	8.34E-09	0.00	3.36E+11	3.9693	4.69E+08	0.00
22.4808	-5.97E-09	-311.466	27.1674	5.10E-09	0.00	3.36E+11	0.9298	4.83E+08	0.00
22.7392	5.40E-09	-222.764	27.2662	2.64E-09	0.00	3.36E+11	-0.866	4.97E+08	0.00
22.9976	1.04E-08	-142.385	23.2640	9.58E-10	0.00	3.36E+11	-1.715	5.11E+08	0.00
23.2560	1.13E-08	-78.495	17.6268	-6.06E-11	0.00	3.36E+11	-1.921	5.25E+08	0.00
23.5144	1.00E-08	-33.070	11.9448	-5.75E-10	0.00	3.36E+11	-1.744	5.39E+08	0.00
23.7728	7.78E-09	-4.415	7.0897	-7.48E-10	0.00	3.36E+11	-1.387	5.53E+08	0.00
24.0312	5.39E-09	10.9013	3.4088	-7.18E-10	0.00	3.36E+11	-0.987	5.67E+08	0.00
24.2896	3.33E-09	16.7282	0.9123	-5.90E-10	0.00	3.36E+11	-0.623	5.81E+08	0.00
24.5480	1.73E-09	16.5616	-0.570	-4.37E-10	0.00	3.36E+11	-0.333	5.95E+08	0.00
24.8064	6.16E-10	13.1943	-1.274	-3.00E-10	0.00	3.36E+11	-0.121	6.09E+08	0.00
25.0648	-1.25E-10	8.6638	-1.423	-1.99E-10	0.00	3.36E+11	0.02472	6.11E+08	0.00
25.3232	-6.19E-10	4.3708	-1.196	-1.39E-10	0.00	3.36E+11	0.1219	6.11E+08	0.00
25.5816	-9.87E-10	1.2502	-0.705	-1.13E-10	0.00	3.36E+11	0.1945	6.11E+08	0.00
25.8400	-1.32E-09	0.00	0.00	-1.07E-10	0.00	3.36E+11	0.2601	3.06E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 1:

Pile-head deflection = 0.02328621 inches
 Computed slope at pile head = -0.0004510 radians
 Maximum bending moment = 1547379. inch-lbs
 Maximum shear force = -14725. lbs
 Depth of maximum bending moment = 1.80880000 feet below pile head
 Depth of maximum shear force = 8.01040000 feet below pile head
 Number of iterations = 6
 Number of zero deflection points = 5

MEG-33 rear abutment X direction row2

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 2

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 4770.0 lbs
 Applied moment at pile head = 2012400.0 in-lbs
 Axial thrust load on pile head = 985500.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	0.03218	2012400.	4770.	-6.26E-04	0.00	3.26E+11	0.00	0.00	0.00
0.2584	0.03026	2029074.	4646.	-6.07E-04	0.00	3.26E+11	-79.769	8173.	0.00
0.5168	0.02841	2044923.	4290.	-5.87E-04	0.00	3.26E+11	-149.777	16345.	0.00
0.7752	0.02662	2059272.	3732.	-5.68E-04	0.00	3.26E+11	-210.503	24518.	0.00
1.0336	0.02489	2071537.	2999.	-5.48E-04	0.00	3.26E+11	-262.425	32691.	0.00
1.2920	0.02322	2081219.	2117.	-5.29E-04	0.00	3.26E+11	-306.031	40864.	0.00
1.5504	0.02161	2087898.	1113.	-5.09E-04	0.00	3.26E+11	-341.805	49036.	0.00
1.8088	0.02007	2091230.	8.9422	-4.89E-04	0.00	3.26E+11	-370.238	57209.	0.00
2.0672	0.01858	2090941.	-1173.	-4.69E-04	0.00	3.26E+11	-391.818	65382.	0.00
2.3256	0.01716	2086824.	-2411.	-4.49E-04	0.00	3.26E+11	-407.032	73554.	0.00
2.5840	0.01580	2078733.	-3677.	-4.29E-04	0.00	3.26E+11	-409.306	80342.	0.00
2.8424	0.01450	2066646.	-4942.	-4.10E-04	0.00	3.26E+11	-406.909	87037.	0.00
3.1008	0.01326	2050587.	-6200.	-3.90E-04	0.00	3.26E+11	-404.077	94513.	0.00
3.3592	0.01208	2030583.	-7447.	-3.71E-04	0.00	3.26E+11	-400.794	102899.	0.00
3.6176	0.01096	2006666.	-8684.	-3.51E-04	0.00	3.26E+11	-397.041	112348.	0.00
3.8760	0.00990	1978874.	-9907.	-3.33E-04	0.00	3.26E+11	-391.324	122591.	0.00
4.1344	0.00890	1947261.	-11095.	-3.14E-04	0.00	3.26E+11	-375.161	130763.	0.00
4.3928	0.00795	1911985.	-12229.	-2.96E-04	0.00	3.26E+11	-356.287	138936.	0.00
4.6512	0.00706	1873228.	-13301.	-2.78E-04	0.00	3.26E+11	-335.107	147109.	0.00
4.9096	0.00623	1831194.	-14304.	-2.60E-04	0.00	3.26E+11	-312.010	155282.	0.00
5.1680	0.00545	1786107.	-15234.	-2.43E-04	0.00	3.26E+11	-287.367	163454.	0.00
5.4264	0.00473	1738205.	-16085.	-2.26E-04	0.00	3.26E+11	-261.531	171627.	0.00

MEG-33 rear abutment X direction row2

5.6848	0.00405	1687738.	-16854.	-2.10E-04	0.00	3.26E+11	-234.836	179800.	0.00
5.9432	0.00342	1634964.	-17540.	-1.94E-04	0.00	3.26E+11	-207.596	187972.	0.00
6.2016	0.00285	1580147.	-18141.	-1.79E-04	0.00	3.26E+11	-180.107	196145.	0.00
6.4600	0.00232	1523552.	-18657.	-1.64E-04	0.00	3.26E+11	-152.644	204318.	0.00
6.7184	0.00183	1465445.	-19088.	-1.50E-04	0.00	3.26E+11	-125.459	212491.	0.00
6.9768	0.00139	1406089.	-19436.	-1.36E-04	0.00	3.26E+11	-98.787	220663.	0.00
7.2352	9.87E-04	1345742.	-19702.	-1.23E-04	0.00	3.26E+11	-72.839	228836.	0.00
7.4936	6.25E-04	1284657.	-19889.	-1.10E-04	0.00	3.26E+11	-47.806	237009.	0.00
7.7520	3.02E-04	1223074.	-20000.	-9.86E-05	0.00	3.26E+11	-23.861	245181.	0.00
8.0104	1.41E-05	1161226.	-20039.	-8.72E-05	0.00	3.26E+11	-1.154	253354.	0.00
8.2688	-2.39E-04	1099333.	-20009.	-7.65E-05	0.00	3.26E+11	20.1840	261527.	0.00
8.5272	-4.60E-04	1037603.	-19916.	-6.64E-05	0.00	3.26E+11	40.0407	269700.	0.00
8.7856	-6.51E-04	976227.	-19764.	-5.68E-05	0.00	3.26E+11	58.3232	277872.	0.00
9.0440	-8.13E-04	915384.	-19557.	-4.78E-05	0.00	3.26E+11	74.9567	286045.	0.00
9.3024	-9.47E-04	855235.	-19301.	-3.94E-05	0.00	3.26E+11	89.8837	294218.	0.00
9.5608	-0.00106	795926.	-19002.	-3.15E-05	0.00	3.26E+11	103.0641	302391.	0.00
9.8192	-0.00114	737584.	-18665.	-2.43E-05	0.00	3.26E+11	114.4734	310563.	0.00
10.0776	-0.00121	680321.	-18295.	-1.75E-05	0.00	3.26E+11	124.1031	318736.	0.00
10.3360	-0.00125	624232.	-17898.	-1.13E-05	0.00	3.26E+11	131.9591	326909.	0.00
10.5944	-0.00128	569394.	-17479.	-5.66E-06	0.00	3.26E+11	138.0616	335081.	0.00
10.8528	-0.00129	515866.	-17045.	-5.07E-07	0.00	3.26E+11	142.4441	343254.	0.00
11.1112	-0.00128	463694.	-16599.	4.15E-06	0.00	3.26E+11	145.1525	351427.	0.00
11.3696	-0.00126	412903.	-16147.	8.31E-06	0.00	3.26E+11	146.2451	359600.	0.00
11.6280	-0.00123	363506.	-15694.	1.20E-05	0.00	3.26E+11	145.7912	367772.	0.00
11.8864	-0.00119	315501.	-15245.	1.52E-05	0.00	3.26E+11	143.8711	375945.	0.00
12.1448	-0.00113	268870.	-14804.	1.80E-05	0.00	3.26E+11	140.5754	384118.	0.00
12.4032	-0.00108	223583.	-14375.	2.03E-05	0.00	3.26E+11	136.0042	392290.	0.00
12.6616	-0.00101	179597.	-13962.	2.23E-05	0.00	3.26E+11	130.2674	400463.	0.00
12.9200	-9.37E-04	136858.	-13569.	2.38E-05	0.00	3.26E+11	123.4834	408636.	0.00
13.1784	-8.61E-04	95302.	-13198.	2.49E-05	0.00	3.26E+11	115.7799	416809.	0.00
13.4368	-7.83E-04	54857.	-12852.	2.56E-05	0.00	3.26E+11	107.2926	424981.	0.00
13.6952	-7.03E-04	15442.	-12534.	2.59E-05	0.00	3.26E+11	98.1659	433154.	0.00
13.9536	-6.22E-04	-23029.	-12244.	2.59E-05	0.00	3.26E+11	88.5521	441327.	0.00
14.2120	-5.42E-04	-60649.	-11985.	2.55E-05	0.00	3.26E+11	78.6120	449499.	0.00
14.4704	-4.64E-04	-97511.	-11757.	2.47E-05	0.00	3.26E+11	68.5145	457672.	0.00
14.7288	-3.89E-04	-133711.	-11560.	2.36E-05	0.00	3.26E+11	58.4369	465845.	0.00
14.9872	-3.18E-04	-169346.	-11394.	2.22E-05	0.00	3.26E+11	48.5649	474018.	0.00
15.2456	-2.51E-04	-204508.	-11258.	2.04E-05	0.00	3.26E+11	39.0929	482190.	0.00
15.5040	-1.91E-04	-239289.	-11151.	1.83E-05	0.00	3.26E+11	30.2242	490363.	0.00
15.7624	-1.38E-04	-273772.	-11069.	1.59E-05	0.00	3.26E+11	22.1711	498536.	0.00

MEG-33 rear abutment X direction row2

16.0208	-9.27E-05	-308035.	-4911.	1.31E-05	0.00	3.26E+11	3950.	1.32E+08	0.00
16.2792	-5.67E-05	-304311.	5351.	1.02E-05	0.00	3.26E+11	2670.	1.46E+08	0.00
16.5376	-2.95E-05	-274912.	11855.	7.44E-06	0.00	3.26E+11	1526.	1.60E+08	0.00
16.7960	-1.05E-05	-230835.	15137.	5.04E-06	0.00	3.26E+11	591.0922	1.74E+08	0.00
17.0544	1.70E-06	-181068.	15894.	3.08E-06	0.00	3.26E+11	-102.935	1.88E+08	0.00
17.3128	8.58E-06	-132286.	14867.	1.59E-06	0.00	3.26E+11	-559.696	2.02E+08	0.00
17.5712	1.16E-05	-88881.	12748.	5.42E-07	0.00	3.26E+11	-806.983	2.16E+08	0.00
17.8296	1.19E-05	-53232.	10122.	-1.34E-07	0.00	3.26E+11	-886.844	2.30E+08	0.00
18.0880	1.07E-05	-26110.	7434.	-5.10E-07	0.00	3.26E+11	-846.476	2.44E+08	0.00
18.3464	8.77E-06	-7125.	4988.	-6.68E-07	0.00	3.26E+11	-731.164	2.58E+08	0.00
18.6048	6.60E-06	4830.	2956.	-6.79E-07	0.00	3.26E+11	-579.598	2.72E+08	0.00
18.8632	4.56E-06	11212.	1404.	-6.03E-07	0.00	3.26E+11	-421.465	2.86E+08	0.00
19.1216	2.86E-06	13541.	321.2981	-4.85E-07	0.00	3.26E+11	-276.916	3.01E+08	0.00
19.3800	1.55E-06	13207.	-352.062	-3.58E-07	0.00	3.26E+11	-157.398	3.15E+08	0.00
19.6384	6.35E-07	11360.	-700.415	-2.42E-07	0.00	3.26E+11	-67.287	3.29E+08	0.00
19.8968	5.30E-08	8865.	-813.814	-1.46E-07	0.00	3.26E+11	-5.854	3.43E+08	0.00
20.1552	-2.68E-07	6314.	-775.124	-7.35E-08	0.00	3.26E+11	30.8089	3.57E+08	0.00
20.4136	-4.03E-07	4059.	-652.720	-2.42E-08	0.00	3.26E+11	48.1410	3.71E+08	0.00
20.6720	-4.18E-07	2266.	-497.680	5.84E-09	0.00	3.26E+11	51.8590	3.85E+08	0.00
20.9304	-3.66E-07	972.2149	-344.208	2.12E-08	0.00	3.26E+11	47.1298	3.99E+08	0.00
21.1888	-2.86E-07	131.3904	-212.035	2.65E-08	0.00	3.26E+11	38.1215	4.13E+08	0.00
21.4472	-2.02E-07	-342.901	-109.745	2.55E-08	0.00	3.26E+11	27.8549	4.27E+08	0.00
21.7056	-1.28E-07	-549.359	-38.242	2.12E-08	0.00	3.26E+11	18.2641	4.41E+08	0.00
21.9640	-7.07E-08	-580.192	6.1656	1.59E-08	0.00	3.26E+11	10.3785	4.55E+08	0.00
22.2224	-3.01E-08	-511.219	29.3190	1.07E-08	0.00	3.26E+11	4.5553	4.69E+08	0.00
22.4808	-4.56E-09	-398.432	37.4825	6.35E-09	0.00	3.26E+11	0.7101	4.83E+08	0.00
22.7392	9.26E-09	-278.806	36.2811	3.13E-09	0.00	3.26E+11	-1.485	4.97E+08	0.00
22.9976	1.49E-08	-173.450	30.1777	9.85E-10	0.00	3.26E+11	-2.452	5.11E+08	0.00
23.2560	1.54E-08	-91.662	22.3397	-2.74E-10	0.00	3.26E+11	-2.604	5.25E+08	0.00
23.5144	1.32E-08	-34.906	14.7510	-8.75E-10	0.00	3.26E+11	-2.291	5.39E+08	0.00
23.7728	9.95E-09	-0.177	8.4478	-1.04E-09	0.00	3.26E+11	-1.775	5.53E+08	0.00
24.0312	6.71E-09	17.4900	3.7921	-9.60E-10	0.00	3.26E+11	-1.228	5.67E+08	0.00
24.2896	4.00E-09	23.3464	0.7264	-7.66E-10	0.00	3.26E+11	-0.749	5.81E+08	0.00
24.5480	1.97E-09	21.9992	-1.020	-5.50E-10	0.00	3.26E+11	-0.377	5.95E+08	0.00
24.8064	5.84E-10	17.0220	-1.783	-3.65E-10	0.00	3.26E+11	-0.115	6.09E+08	0.00
25.0648	-2.97E-10	10.9409	-1.871	-2.32E-10	0.00	3.26E+11	0.05848	6.11E+08	0.00
25.3232	-8.55E-10	5.4217	-1.519	-1.54E-10	0.00	3.26E+11	0.1685	6.11E+08	0.00
25.5816	-1.25E-09	1.5229	-0.874	-1.21E-10	0.00	3.26E+11	0.2471	6.11E+08	0.00
25.8400	-1.61E-09	0.00	0.00	-1.14E-10	0.00	3.26E+11	0.3168	3.06E+08	0.00

MEG-33 rear abutment X direction row2

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 2:

Pile-head deflection = 0.03217620 inches
 Computed slope at pile head = -0.0006260 radians
 Maximum bending moment = 2091230. inch-lbs
 Maximum shear force = -20039. lbs
 Depth of maximum bending moment = 1.80880000 feet below pile head
 Depth of maximum shear force = 8.01040000 feet below pile head
 Number of iterations = 6
 Number of zero deflection points = 5

 Summary of Pile-head Responses for Conventional Analyses

Definitions of Pile-head Loading Conditions:

Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs
 Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
 Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.
 Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs
 Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians

Load Case No.	Load Type 1	Pile-head Load 1	Load Type 2	Pile-head Load 2	Axial Loading lbs	Pile-head Deflection inches	Pile-head Rotation radians	Max Shear in Pile lbs	Max Moment in Pile in-lbs
1	V, lb	3540.	M, in-lb	1490400.	765800.	0.02329	-4.51E-04	-14725.	1547379.
2	V, lb	4770.	M, in-lb	2012400.	985500.	0.03218	-6.26E-04	-20039.	2091230.

Maximum pile-head deflection = 0.0321762030 inches

Maximum pile-head rotation = -0.0006259541 radians = -0.035865 deg.

Summary of Warning Messages

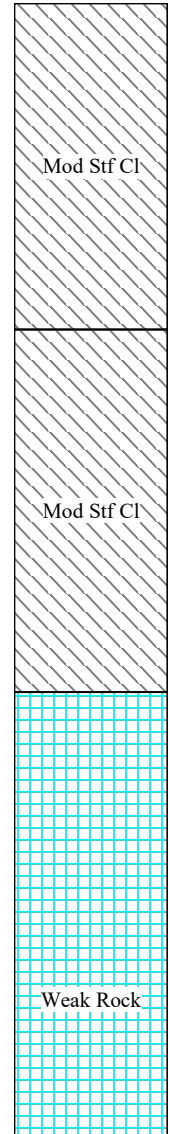
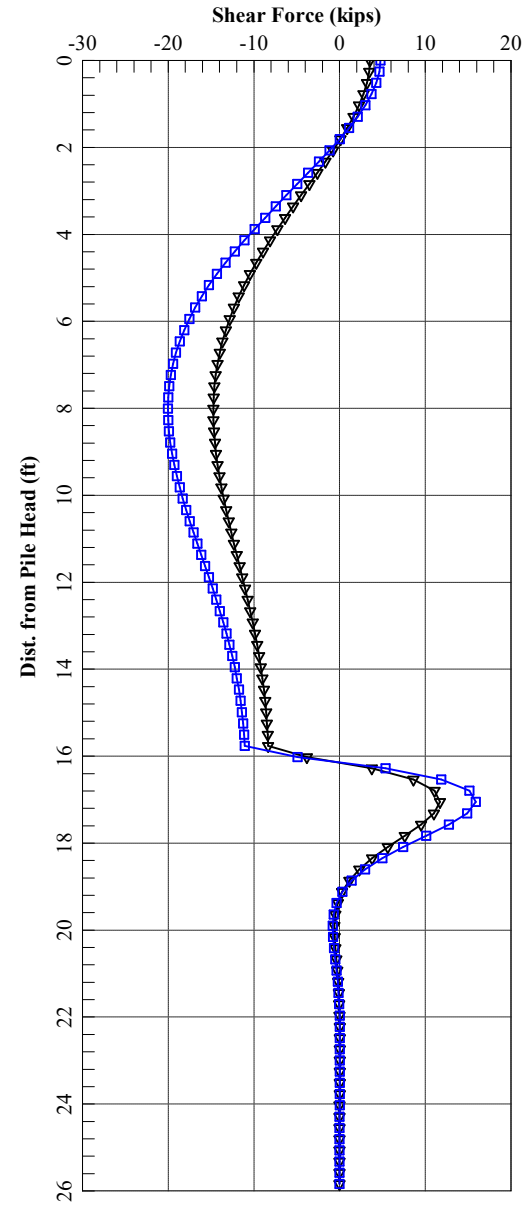
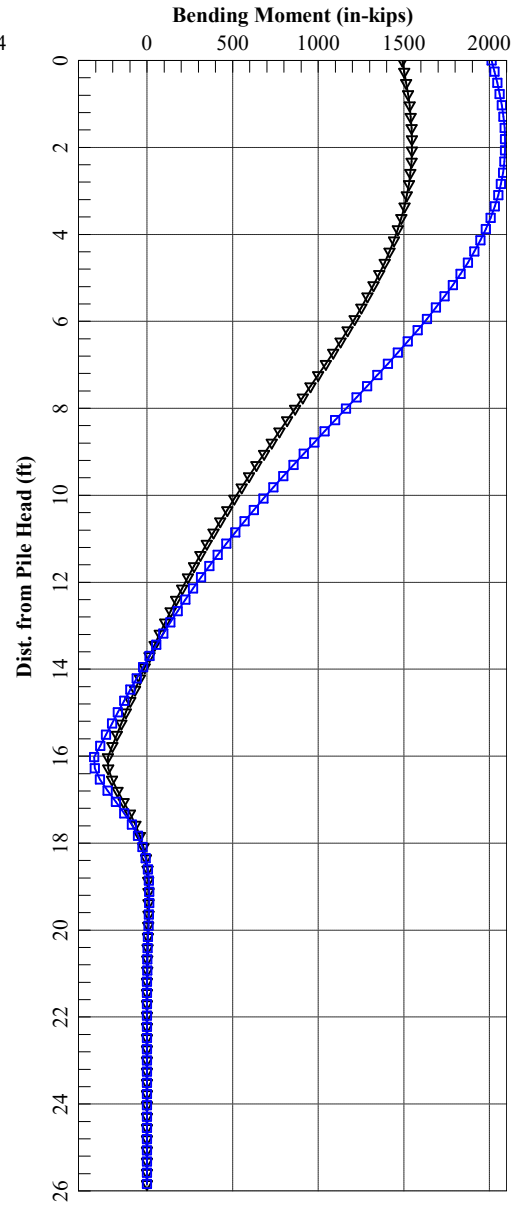
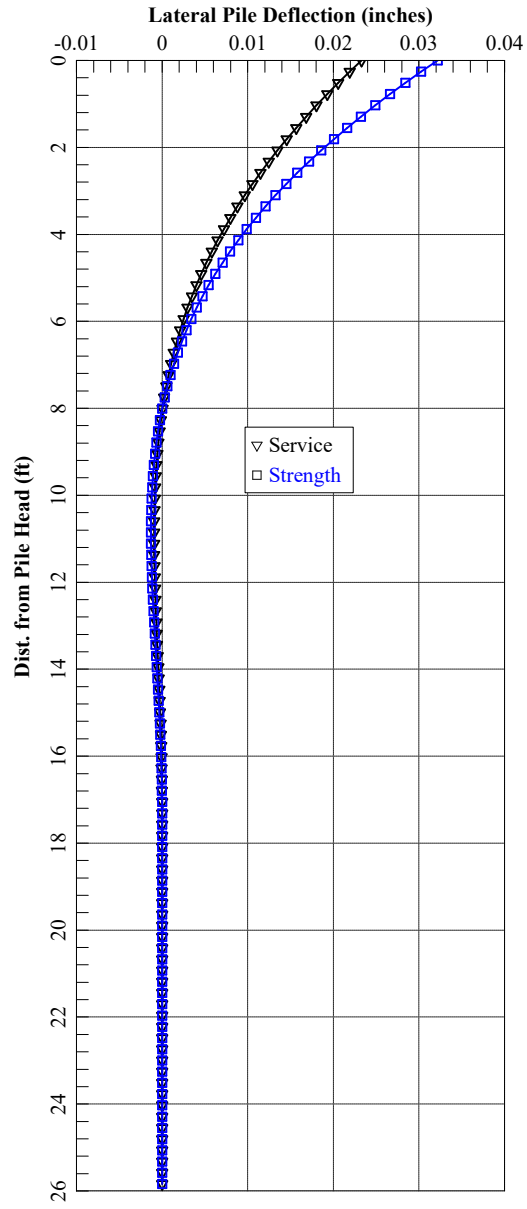
The following warning was reported 273 times

**** Warning ****

An unreasonable input value for unconfined compressive strength has been specified for a soil defined using the weak rock criteria. The input value is greater than 500 psi. Please check your input data for correctness.

The analysis ended normally.

MEG-33 Bowmans Run Bridge Rear Abutment X-Direction Row 2



=====
LPile for Windows, Version 2022-12.006

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method
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Files Used for Analysis

Path to file locations:

\\US0247-PPFSS01\shared_projects\173609140\119144\400-Engineering\Geotechnical\Analysis\Lpile\bridges\LPile
Analysis\Bowman's Run\Rear Abutment B-001\

Name of input data file:

MEG-33 rear abutment X direction row3.lp12d

Name of output report file:

MEG-33 rear abutment X direction row3.lp12o

MEG-33 rear abutment X direction row3

Name of plot output file:

MEG-33 rear abutment X direction row3.lp12p

Name of runtime message file:

MEG-33 rear abutment X direction row3.lp12r

Date and Time of Analysis

Date: June 28, 2024

Time: 15:06:27

Problem Title

Project Name: MEG-33-19.21

Job Number: 173609140

Client: ODOT

Engineer: G. Khatri

Description: Rear Abutment Lateral Load Analysis at Bowman's Run Bridge

MEG-33 rear abutment X direction row3
Program Options and Settings

Computational Options:

- Conventional Analysis

Engineering Units Used for Data Input and Computations:

- US Customary System Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed = 500
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 100.0000 in
- Number of pile increments = 100

Loading Type and Number of Cycles of Loading:

- Static loading specified

- Analysis uses p-y modification factors for p-y curves
- Analysis uses layering correction (Method of Georgiadis)
- No distributed lateral loads are entered
- Loading by lateral soil movements acting on pile not selected
- Input of shear resistance at the pile tip not selected
- Input of moment resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:

- Output files use decimal points to denote decimal symbols.
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1
- No p-y curves to be computed and reported for user-specified depths
- Print using wide report formats

Number of pile sections defined = 2
 Total length of pile = 25.840 ft
 Depth of ground surface below top of pile = 0.0000 ft

Pile diameters used for p-y curve computations are defined using 4 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile. A summary of values of pile diameter vs. depth follows.

Point No.	Depth Below Pile Head feet	Pile Diameter inches
1	0.000	36.0000
2	15.840	36.0000
3	15.840	36.0000
4	25.840	36.0000

Input Structural Properties for Pile Sections:

Pile Section No. 1:

Section 1 is a round drilled shaft, bored pile, or CIDH pile
 Length of section = 15.840000 ft
 Shaft Diameter = 36.000000 in

Pile Section No. 2:

Section 2 is a round drilled shaft, bored pile, or CIDH pile
 Length of section = 10.000000 ft
 Shaft Diameter = 36.000000 in

The soil profile is modelled using 3 layers

Layer 1 is stiff clay with user-defined k-value

Distance from top of pile to top of layer	=	0.0000	ft
Distance from top of pile to bottom of layer	=	7.500000	ft
Effective unit weight at top of layer	=	125.000000	pcf
Effective unit weight at bottom of layer	=	125.000000	pcf
Undrained cohesion at top of layer	=	2500.	psf
Undrained cohesion at bottom of layer	=	2500.	psf
Epsilon-50 at top of layer	=	0.0000	
Epsilon-50 at bottom of layer	=	0.0000	
Subgrade k at top of layer	=	0.0000	pci
Subgrade k at bottom of layer	=	0.0000	pci

NOTE: Default values for Epsilon-50 will be computed for this layer.

NOTE: Default values for subgrade k will be computed for this layer.

Layer 2 is stiff clay with user-defined k-value

Distance from top of pile to top of layer	=	7.500000	ft
Distance from top of pile to bottom of layer	=	15.840000	ft
Effective unit weight at top of layer	=	122.000000	pcf
Effective unit weight at bottom of layer	=	122.000000	pcf
Undrained cohesion at top of layer	=	2000.	psf
Undrained cohesion at bottom of layer	=	2000.	psf
Epsilon-50 at top of layer	=	0.0000	
Epsilon-50 at bottom of layer	=	0.0000	
Subgrade k at top of layer	=	0.0000	pci
Subgrade k at bottom of layer	=	0.0000	pci

NOTE: Default values for Epsilon-50 will be computed for this layer.

NOTE: Default values for subgrade k will be computed for this layer.

Layer 3 is weak rock, p-y criteria by Reese, 1997

Distance from top of pile to top of layer	=	15.840000	ft
Distance from top of pile to bottom of layer	=	30.000000	ft

MEG-33 rear abutment X direction row3

Effective unit weight at top of layer = 87.600000 pcf
 Effective unit weight at bottom of layer = 87.600000 pcf
 Uniaxial compressive strength at top of layer = 4380. psi
 Uniaxial compressive strength at bottom of layer = 4380. psi
 Initial modulus of rock at top of layer = 394200. psi
 Initial modulus of rock at bottom of layer = 394200. psi
 RQD of rock at top of layer = 86.000000 %
 RQD of rock at bottom of layer = 86.000000 %
 k rm of rock at top of layer = 0.0000500
 k rm of rock at bottom of layer = 0.0000500

(Depth of the lowest soil layer extends 4.160 ft below the pile tip)

 Summary of Input Soil Properties

Layer Rock Mass Num. Modulus (p-y Curve Type) psi	Soil Type Name	Layer Depth ft	Effective Unit Wt. pcf	Cohesion psf	Uniaxial qu psi	RQD %	E50 or krm	kpy pci
1	Stiff Clay w/o	0.00	125.0000	2500.	--	--	default	default
--	Free Water, using k	7.5000	125.0000	2500.	--	--	default	default
2	Stiff Clay w/o	7.5000	122.0000	2000.	--	--	default	default
--	Free Water, using k	15.8400	122.0000	2000.	--	--	default	default
3	Weak	15.8400	87.6000	--	4380.	86.0000	5.00E-05	--
394200.	Rock	30.0000	87.6000	--	4380.	86.0000	5.00E-05	--
394200.								

 Modification Factors for p-y Curves

Distribution of p-y modifiers with depth defined using 3 points

Point No.	Depth X ft	p-mult	y-mult
1	0.000	0.7000	1.0000
2	15.840	0.7000	1.0000
3	25.840	0.7000	1.0000

 Static Loading Type

Static loading criteria were used when computing p-y curves for all analyses.

 Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 2

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length	Run Analysis
1	1	V = 3540. lbs	M = 1490400. in-lbs	765800.	No	Yes
2	1	V = 4770. lbs	M = 2012400. in-lbs	985500.	No	Yes

V = shear force applied normal to pile axis
 M = bending moment applied to pile head

y = lateral deflection normal to pile axis

S = pile slope relative to original pile batter angle

R = rotational stiffness applied to pile head

Values of top y vs. pile lengths can be computed only for load types with specified shear loading (Load Types 1, 2, and 3).

Thrust force is assumed to be acting axially for all pile batter angles.

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 2

Pile Section No. 1:

Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section	=	15.840000 ft
Shaft Diameter	=	36.000000 in
Concrete Cover Thickness (to edge of trans. reinf.)	=	3.000000 in
Number of Reinforcing Bars	=	8 bars
Yield Stress of Reinforcing Bars	=	50000. psi
Modulus of Elasticity of Reinforcing Bars	=	29000000. psi
Gross Area of Shaft	=	1018. sq. in.
Total Area of Reinforcing Steel	=	8.000000 sq. in.
Area Ratio of Steel Reinforcement	=	0.79 percent
Edge-to-Edge Bar Spacing	=	9.538153 in
Maximum Concrete Aggregate Size	=	0.750000 in
Ratio of Bar Spacing to Aggregate Size	=	12.72
Offset of Center of Rebar Cage from Center of Pile	=	0.0000 in
Transverse Reinforcement		
Type: Spiral		
Number of Transverse Reinf. (per spacing)	=	1
Spacing of Transverse Reinf.	=	4.000000 in

MEG-33 rear abutment X direction row3

Yield Stress of Transverse Reinf. = 50000. psi
 Diameter of Transverse Reinf. = 0.500000 in

Axial Structural Capacities:

Nom. Axial Structural Capacity = $0.85 F_c A_c + F_y A_s$ = 3833.578 kips
 Tensile Load for Cracking of Concrete = -446.783 kips
 Nominal Axial Tensile Capacity = -400.000 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.128000	1.000000	13.936000	0.000000
2	1.128000	1.000000	9.854240	9.854240
3	1.128000	1.000000	0.000000	13.936000
4	1.128000	1.000000	-9.85424	9.854240
5	1.128000	1.000000	-13.93600	0.000000
6	1.128000	1.000000	-9.85424	-9.85424
7	1.128000	1.000000	0.000000	-13.93600
8	1.128000	1.000000	9.854240	-9.85424

NOTE: The positions of the above rebars were computed by LPILE

Minimum spacing between any two bars not equal to zero = 9.538 inches
 between bars 3 and 4.

Ratio of bar spacing to maximum aggregate size = 12.72

Concrete Properties:

Compressive Strength of Concrete = 4000. psi
 Modulus of Elasticity of Concrete = 3604997. psi
 Modulus of Rupture of Concrete = -474.34165 psi

MEG-33 rear abutment X direction row3

Compression Strain at Peak Stress = 0.001886
 Tensile Strain at Fracture of Concrete = -0.0001154
 Maximum Coarse Aggregate Size = 0.750000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 2

Number	Axial Thrust Force kips
1	765.800
2	985.500

Definitions of Run Messages and Notes:

- C = concrete in section has cracked in tension.
- Y = stress in reinforcing steel has reached yield stress.
- T = ACI 318 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than 0.003. See ACI 318-14, Section 21.2.3.
- Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
 Position of neutral axis is measured from edge of compression side of pile.
 Compressive stresses and strains are positive in sign.
 Tensile stresses and strains are negative in sign.

Axial Thrust Force = 765.800 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in ²	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	210.2199654	336351945.	302.0711512	0.0001888	0.0001663	0.7602095	5.4130521	
0.00000125	420.4405562	336352445.	160.0565164	0.0002001	0.0001551	0.8026804	5.6780737	
0.00000188	630.6491287	336346202.	112.7276103	0.0002114	0.0001439	0.8449367	5.9436013	

MEG-33 rear abutment X direction row3

0.00000250	840.8396742	336335870.	89.0701368	0.0002227	0.0001327	0.8869773	6.2096349
0.00000313	1051.	336321979.	74.8812370	0.0002340	0.0001215	0.9288008	6.4761746
0.00000375	1261.	336304705.	65.4266245	0.0002453	0.0001103	0.9704058	6.7432204
0.00000438	1471.	336284125.	58.6773198	0.0002567	0.00009921	1.0117911	7.0107725
0.00000500	1681.	336260275.	53.6188331	0.0002681	0.00008809	1.0529553	7.2788308
0.00000563	1891.	336233176.	49.6875591	0.0002795	0.00007699	1.0938971	7.5473956
0.00000625	2101.	336202839.	46.5453346	0.0002909	0.00006591	1.1346153	7.8164669
0.00000688	2311.	336169273.	43.9769650	0.0003023	0.00005484	1.1751085	8.0860449
0.00000750	2521.	336132480.	41.8389873	0.0003138	0.00004379	1.2153753	8.3561298
0.00000813	2731.	336092464.	40.0320811	0.0003253	0.00003276	1.2554145	8.6267216
0.00000875	2940.	336049227.	38.4853031	0.0003367	0.00002175	1.2952248	8.8978207
0.00000938	3150.	336002768.	37.1466284	0.0003482	0.00001075	1.3348048	9.1694271
0.00001000	3360.	335953089.	35.9770384	0.0003598	-2.29616E-07	1.3741532	9.4415412
0.00001063	3569.	335899271.	34.9466824	0.0003713	-0.00001119	1.4132683	9.7141590
0.00001125	3778.	335835739.	34.0322719	0.0003829	-0.00002214	1.4521455	9.9872537
0.00001188	3987.	335755857.	33.2153828	0.0003944	-0.00003307	1.4907788	10.2607850
0.00001250	4196.	335654708.	32.4812751	0.0004060	-0.00004398	1.5291626	10.5347123
0.00001313	4404.	335529259.	31.8180259	0.0004176	-0.00005489	1.5672914	10.8089987
0.00001375	4611.	335378029.	31.2158925	0.0004292	-0.00006578	1.6051608	11.0836122
0.00001438	4819.	335200558.	30.6668361	0.0004408	-0.00007666	1.6427668	11.3585249
0.00001500	5025.	334996915.	30.1641635	0.0004525	-0.00008754	1.6801055	11.6337112
0.00001563	5231.	334767745.	29.7022611	0.0004641	-0.00009840	1.7171741	11.9091496
0.00001625	5436.	334513938.	29.2763840	0.0004757	-0.000109	1.7539696	12.1848210
0.00001688	5436.	322124533.	28.3881710	0.0004791	-0.000128	1.7641173	12.2187987 C
0.00001750	5436.	310620086.	27.9511295	0.0004891	-0.000141	1.7956567	12.4495483 C
0.00001813	5436.	299909048.	27.5388414	0.0004991	-0.000153	1.8266668	12.6774661 C
0.00001875	5512.	293972286.	27.1485233	0.0005090	-0.000166	1.8571362	12.9023846 C
0.00001938	5621.	290104229.	26.7785282	0.0005188	-0.000179	1.8871003	13.1245731 C
0.00002000	5726.	286288218.	26.4271301	0.0005285	-0.000191	1.9165763	13.3441355 C
0.00002063	5827.	282533459.	26.0928612	0.0005382	-0.000204	1.9455840	13.5612052 C
0.00002125	5925.	278830147.	25.7739072	0.0005477	-0.000217	1.9741094	13.7755954 C
0.00002188	6020.	275192399.	25.4693379	0.0005571	-0.000230	2.0021836	13.9875488 C
0.00002250	6112.	271630965.	25.1783202	0.0005665	-0.000243	2.0298363	14.1973040 C
0.00002313	6201.	268151963.	24.9000419	0.0005758	-0.000257	2.0570918	14.4050532 C
0.00002375	6288.	264760701.	24.6338065	0.0005851	-0.000270	2.0839760	14.6110093 C
0.00002438	6372.	261422496.	24.3776229	0.0005942	-0.000283	2.1104170	14.8144198 C
0.00002563	6534.	255000318.	23.8958892	0.0006123	-0.000310	2.1622428	15.2161452 C
0.00002688	6688.	248863574.	23.4492514	0.0006302	-0.000337	2.2126077	15.6102976 C
0.00002813	6835.	243029058.	23.0345475	0.0006478	-0.000365	2.2616621	15.9981147 C
0.00002938	6976.	237477858.	22.6480400	0.0006653	-0.000392	2.3094593	16.3798866 C

MEG-33 rear abutment X direction row3

0.00003063	7111.	232193762.	22.2866483	0.0006825	-0.000420	2.3560542	16.7559421	C
0.00003188	7241.	227162744.	21.9478236	0.0006996	-0.000448	2.4015043	17.1266570	C
0.00003313	7366.	222372455.	21.6294520	0.0007165	-0.000476	2.4458691	17.4924549	C
0.00003438	7487.	217811887.	21.3297790	0.0007332	-0.000504	2.4892103	17.8538110	C
0.00003563	7605.	213471087.	21.0473513	0.0007498	-0.000533	2.5315923	18.2112574	C
0.00003688	7718.	209307729.	20.7791068	0.0007662	-0.000561	2.5729075	18.5633950	C
0.00003813	7828.	205337184.	20.5251752	0.0007825	-0.000590	2.6133212	18.9119094	C
0.00003938	7936.	201557702.	20.2850342	0.0007987	-0.000619	2.6529285	19.2577610	C
0.00004063	8041.	197932200.	20.0561423	0.0008148	-0.000648	2.6916142	19.5994552	C
0.00004188	8143.	194460687.	19.8381094	0.0008307	-0.000677	2.7294554	19.9377418	C
0.00004313	8244.	191154981.	19.6315480	0.0008466	-0.000706	2.7666226	20.2745673	C
0.00004438	8341.	187958039.	19.4325170	0.0008623	-0.000735	2.8028154	20.6061079	C
0.00004563	8437.	184919979.	19.2442774	0.0008780	-0.000764	2.8384572	20.9374972	C
0.00004688	8530.	181976647.	19.0623093	0.0008935	-0.000794	2.8731629	21.2637643	C
0.00004813	8623.	179176876.	18.8900588	0.0009091	-0.000823	2.9073705	21.5904009	C
0.00004938	8713.	176457324.	18.7228406	0.0009244	-0.000853	2.9406532	21.9117550	C
0.00005063	8802.	173866693.	18.5643709	0.0009398	-0.000883	2.9734745	22.2338288	C
0.00005188	8889.	171352249.	18.4105331	0.0009550	-0.000912	3.0054498	22.5513831	C
0.00005313	8975.	168943161.	18.2637514	0.0009703	-0.000942	3.0368989	22.8686546	C
0.00005438	9060.	166622164.	18.1226398	0.0009854	-0.000972	3.0677226	23.1842253	C
0.00005563	9143.	164375395.	17.9861179	0.0010005	-0.001002	3.0978487	-23.541756	C
0.00005688	9226.	162222836.	17.8560168	0.0010156	-0.001032	3.1275273	-24.285370	C
0.00005813	9308.	160131487.	17.7294365	0.0010305	-0.001062	3.1564746	-25.032481	C
0.00005938	9388.	158113427.	17.6076091	0.0010455	-0.001092	3.1848681	-25.780586	C
0.00006063	9468.	156174408.	17.4911933	0.0010604	-0.001122	3.2128196	-26.528009	C
0.00006188	9546.	154285228.	17.3774252	0.0010752	-0.001152	3.2400485	-27.279120	C
0.00006313	9624.	152457860.	17.2676200	0.0010900	-0.001182	3.2667358	-28.031225	C
0.00006438	9701.	150697620.	17.1624387	0.0011048	-0.001213	3.2929874	-28.782660	C
0.00006563	9777.	148989276.	17.0603870	0.0011196	-0.001243	3.3186597	-29.535763	C
0.00006688	9852.	147323411.	16.9605681	0.0011342	-0.001273	3.3436755	-30.291936	C
0.00006813	9927.	145715150.	16.8647474	0.0011489	-0.001304	3.3682619	-31.047446	C
0.00006938	10001.	144161349.	16.7727104	0.0011636	-0.001334	3.3924169	-31.802291	C
0.00007063	10074.	142643417.	16.6823997	0.0011782	-0.001364	3.4159258	-32.560272	C
0.00007188	10146.	141166141.	16.5944955	0.0011927	-0.001395	3.4388869	-33.319786	C
0.00007313	10218.	139736147.	16.5099066	0.0012073	-0.001425	3.4614229	-34.078642	C
0.00007438	10290.	138351025.	16.4284673	0.0012219	-0.001456	3.4835318	-34.836837	C
0.00007938	10569.	133150678.	16.1225585	0.0012797	-0.001578	3.5666910	-37.882973	C
0.00008438	10840.	128470050.	15.8497840	0.0013373	-0.001700	3.6422212	-40.936747	C
0.00008938	11104.	124237225.	15.6063903	0.0013948	-0.001823	3.7104072	-43.993475	C
0.00009438	11360.	120375044.	15.3863356	0.0014521	-0.001945	3.7711568	-47.056910	C

MEG-33 rear abutment X direction row3

0.00009938	11611.	116840154.	15.1878571	0.0015093	-0.002068	3.8247131	-50.000000	CY
0.0001044	11830.	113343154.	15.0000352	0.0015656	-0.002192	3.8704756	-50.000000	CY
0.0001094	12008.	109784526.	14.8157660	0.0016205	-0.002317	3.9083747	-50.000000	CY
0.0001144	12181.	106496543.	14.6483521	0.0016754	-0.002442	3.9397749	-50.000000	CY
0.0001194	12348.	103441883.	14.4943284	0.0017303	-0.002567	3.9645808	-50.000000	CY
0.0001244	12510.	100584567.	14.3523135	0.0017851	-0.002692	3.9828283	-50.000000	CY
0.0001294	12629.	97618697.	14.2083733	0.0018382	-0.002819	3.9942768	-50.000000	CY
0.0001344	12698.	94496465.	14.0536796	0.0018885	-0.002949	3.9994561	-50.000000	CY
0.0001394	12763.	91574401.	13.9121518	0.0019390	-0.003078	3.9994295	-50.000000	CY
0.0001444	12824.	88822594.	13.7787758	0.0019893	-0.003208	3.9991866	-50.000000	CY
0.0001494	12881.	86230205.	13.6541689	0.0020396	-0.003338	3.9986313	-50.000000	CY
0.0001544	12935.	83792019.	13.5400008	0.0020902	-0.003467	3.9976086	-50.000000	CY
0.0001594	12986.	81481962.	13.4314034	0.0021406	-0.003597	3.9999835	-50.000000	CY
0.0001644	13034.	79293696.	13.3294103	0.0021910	-0.003726	3.9995177	-50.000000	CY
0.0001694	13080.	77224802.	13.2353911	0.0022417	-0.003856	3.9981227	-50.000000	CY
0.0001744	13124.	75265765.	13.1485635	0.0022928	-0.003985	3.9999974	-50.000000	CY
0.0001794	13165.	73394379.	13.0638987	0.0023433	-0.004114	3.9991654	50.000000	CY
0.0001844	13204.	71615471.	12.9850557	0.0023941	-0.004243	3.9968534	50.000000	CY
0.0001894	13241.	69921494.	12.9123679	0.0024453	-0.004372	3.9995285	50.000000	CY
0.0001944	13276.	68299557.	12.8466402	0.0024971	-0.004500	3.9967257	50.000000	CY
0.0001994	13309.	66752915.	12.7856694	0.0025491	-0.004628	3.9995946	50.000000	CY
0.0002044	13337.	65259109.	12.7277170	0.0026012	-0.004756	3.9962725	50.000000	CY
0.0002094	13365.	63830744.	12.6735454	0.0026535	-0.004884	3.9993424	50.000000	CY
0.0002144	13390.	62461659.	12.6238722	0.0027062	-0.005011	3.9969794	50.000000	CY
0.0002194	13414.	61147688.	12.5784072	0.0027594	-0.005138	3.9986153	50.000000	CY
0.0002244	13438.	59889181.	12.5359498	0.0028128	-0.005265	3.9999934	50.000000	CY
0.0002294	13460.	58680489.	12.4967730	0.0028664	-0.005391	3.9969588	50.000000	CY
0.0002344	13481.	57520567.	12.4601838	0.0029204	-0.005517	3.9995228	50.000000	CY
0.0002394	13502.	56405718.	12.4261845	0.0029745	-0.005643	3.9965326	50.000000	CY
0.0002444	13521.	55330596.	12.3924636	0.0030284	-0.005769	3.9976700	50.000000	CY
0.0002494	13540.	54296026.	12.3603610	0.0030824	-0.005895	3.9997169	50.000000	CY
0.0002544	13558.	53299201.	12.3305698	0.0031366	-0.006021	3.9955933	50.000000	CY
0.0002594	13575.	52338045.	12.3029331	0.0031911	-0.006146	3.9972858	50.000000	CYT
0.0002644	13592.	51411546.	12.2770423	0.0032457	-0.006272	3.9995245	50.000000	CYT
0.0002694	13608.	50517240.	12.2529716	0.0033006	-0.006397	3.9974179	50.000000	CYT
0.0002744	13623.	49651428.	12.2304689	0.0033557	-0.006522	3.9957412	50.000000	CYT
0.0003044	13672.	44918381.	12.0959895	0.0036817	-0.007276	3.9998232	50.000000	CYT
0.0003344	13672.	40888321.	12.0718370	0.0040365	-0.008001	3.9933884	50.000000	CYT

MEG-33 rear abutment X direction row3

Axial Thrust Force = 985.500 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	203.9917885	326386862.	388.8590461	0.0002430	0.0002205	0.9639414	6.9860827	
0.00000125	407.9860656	326388852.	203.4511105	0.0002543	0.0002093	1.0050537	7.2511277	
0.00000188	611.9679531	326382908.	141.6580582	0.0002656	0.0001981	1.0459513	7.5166944	
0.00000250	815.9312569	326372503.	110.7687271	0.0002769	0.0001869	1.0866329	7.7827827	
0.00000313	1020.	326358330.	92.2408853	0.0002883	0.0001758	1.1270971	8.0493927	
0.00000375	1224.	326340622.	79.8937887	0.0002996	0.0001646	1.1673424	8.3165245	
0.00000438	1428.	326319476.	71.0785472	0.0003110	0.0001535	1.2073677	8.5841782	
0.00000500	1631.	326294942.	64.4707158	0.0003224	0.0001424	1.2471715	8.8523538	
0.00000563	1835.	326267046.	59.3344920	0.0003338	0.0001313	1.2867525	9.1210515	
0.00000625	2039.	326235805.	55.2283942	0.0003452	0.0001202	1.3261094	9.3902715	
0.00000688	2243.	326201227.	51.8714798	0.0003566	0.0001091	1.3652407	9.6600138	
0.00000750	2446.	326163319.	49.0764535	0.0003681	0.00009807	1.4041451	9.9302787	
0.00000813	2650.	326122085.	46.7136499	0.0003795	0.00008705	1.4428212	10.2010663	
0.00000875	2853.	326077526.	44.6904504	0.0003910	0.00007604	1.4812678	10.4723768	
0.00000938	3057.	326029644.	42.9389351	0.0004026	0.00006505	1.5194834	10.7442105	
0.00001000	3260.	325978439.	41.4081640	0.0004141	0.00005408	1.5574667	11.0165676	
0.00001063	3463.	325923911.	40.0591830	0.0004256	0.00004313	1.5952163	11.2894483	
0.00001125	3666.	325866060.	38.8616946	0.0004372	0.00003219	1.6327308	11.5628529	
0.00001188	3869.	325804884.	37.7917798	0.0004488	0.00002128	1.6700090	11.8367817	
0.00001250	4072.	325740383.	36.8303033	0.0004604	0.00001038	1.7070493	12.1112350	
0.00001313	4274.	325672555.	35.9617747	0.0004720	-5.01706E-07	1.7438506	12.3862131	
0.00001375	4477.	325600882.	35.1735127	0.0004836	-0.00001136	1.7804110	12.6617132	
0.00001438	4679.	325522318.	34.4550016	0.0004953	-0.00002221	1.8167270	12.9377163	
0.00001500	4881.	325432923.	33.7974547	0.0005070	-0.00003304	1.8527943	13.2141928	
0.00001563	5083.	325329376.	33.1934873	0.0005186	-0.00004385	1.8886081	13.4911115	
0.00001625	5285.	325209160.	32.6368528	0.0005303	-0.00005465	1.9241642	13.7684419	
0.00001688	5486.	325070637.	32.1222355	0.0005421	-0.00006544	1.9594584	14.0461565	
0.00001750	5686.	324912770.	31.6450834	0.0005538	-0.00007621	1.9944871	14.3242299	
0.00001813	5886.	324735145.	31.2014791	0.0005655	-0.00008697	2.0292472	14.6026400	
0.00001875	6085.	324537642.	30.7880306	0.0005773	-0.00009772	2.0637356	14.8813667	
0.00001938	6284.	324320367.	30.4017860	0.0005890	-0.000108	2.0979496	15.1603911	
0.00002000	6284.	314185356.	29.7226196	0.0005945	-0.000126	2.1134338	15.2555194	C
0.00002063	6284.	304664587.	29.3330884	0.0006050	-0.000138	2.1436908	15.4992661	C
0.00002125	6377.	300112242.	28.9621023	0.0006154	-0.000150	2.1734373	15.7403206	C

MEG-33 rear abutment X direction row3

0.00002188	6501.	297175532.	28.6084526	0.0006258	-0.000162	2.2027032	15.9789246	C
0.00002250	6620.	294220651.	28.2707001	0.0006361	-0.000174	2.2314949	16.2150819	C
0.00002313	6735.	291260281.	27.9476923	0.0006463	-0.000186	2.2598268	16.4488837	C
0.00002375	6847.	288315485.	27.6386715	0.0006564	-0.000199	2.2877314	16.6806100	C
0.00002438	6956.	285394864.	27.3427172	0.0006665	-0.000211	2.3152239	16.9103708	C
0.00002563	7166.	279648602.	26.7866618	0.0006864	-0.000236	2.3690240	17.3643506	C
0.00002688	7363.	273987420.	26.2714783	0.0007060	-0.000261	2.4211739	17.8098710	C
0.00002813	7551.	268495773.	25.7939669	0.0007255	-0.000287	2.4718776	18.2487669	C
0.00002938	7730.	263156607.	25.3489516	0.0007446	-0.000313	2.5211371	18.6807258	C
0.00003063	7900.	257972225.	24.9326418	0.0007636	-0.000339	2.5689975	19.1059151	C
0.00003188	8063.	252967524.	24.5427305	0.0007823	-0.000365	2.6155733	19.5253241	C
0.00003313	8220.	248139779.	24.1765243	0.0008008	-0.000392	2.6609135	19.9392362	C
0.00003438	8370.	243486447.	23.8317642	0.0008192	-0.000418	2.7050686	20.3479776	C
0.00003563	8515.	239005070.	23.5065522	0.0008374	-0.000445	2.7480907	20.7519192	C
0.00003688	8654.	234693214.	23.1992930	0.0008555	-0.000472	2.7900339	21.1514815	C
0.00003813	8789.	230526427.	22.9076383	0.0008734	-0.000499	2.8308652	21.5460201	C
0.00003938	8919.	226508980.	22.6306521	0.0008911	-0.000526	2.8706542	21.9361635	C
0.00004063	9045.	222648666.	22.3678140	0.0009087	-0.000554	2.9094938	22.3228935	C
0.00004188	9168.	218943532.	22.1183480	0.0009262	-0.000581	2.9474423	22.7068058	C
0.00004313	9287.	215348370.	21.8793292	0.0009435	-0.000609	2.9843490	23.0856985	C
0.00004438	9403.	211891844.	21.6516375	0.0009608	-0.000637	3.0203977	23.4618387	C
0.00004563	9516.	208575033.	21.4349839	0.0009780	-0.000665	3.0556599	23.8360756	C
0.00004688	9626.	205346136.	21.2260711	0.0009950	-0.000693	3.0899142	24.2051278	C
0.00004813	9734.	202257565.	21.0275721	0.0010120	-0.000721	3.1234937	24.5735680	C
0.00004938	9838.	199252423.	20.8359107	0.0010288	-0.000749	3.1561330	24.9374072	C
0.00005063	9941.	196369599.	20.6531876	0.0010456	-0.000777	3.1881021	25.3004736	C
0.00005188	10041.	193566417.	20.4766067	0.0010622	-0.000805	3.2191950	25.6595328	C
0.00005313	10140.	190875821.	20.3081117	0.0010789	-0.000834	3.2496589	26.0182472	C
0.00005438	10236.	188251240.	20.1445329	0.0010954	-0.000862	3.2792397	26.3724980	C
0.00005563	10332.	185737926.	19.9888563	0.0011119	-0.000891	3.3082795	26.7276365	C
0.00005688	10424.	183275723.	19.8367923	0.0011282	-0.000919	3.3364049	27.0774470	C
0.00005813	10515.	180909986.	19.6915567	0.0011446	-0.000948	3.3639749	27.4277430	C
0.00005938	10605.	178613137.	19.5510732	0.0011608	-0.000977	3.3908260	27.7756918	C
0.00006063	10693.	176380055.	19.4149615	0.0011770	-0.001005	3.4169586	28.1211418	C
0.00006188	10781.	174231456.	19.2848273	0.0011932	-0.001034	3.4425651	28.4674496	C
0.00006313	10866.	172127043.	19.1574372	0.0012093	-0.001063	3.4673611	28.8093461	C
0.00006438	10950.	170090563.	19.0347585	0.0012254	-0.001092	3.4915702	29.1508025	C
0.00006563	11033.	168126358.	18.9171981	0.0012414	-0.001121	3.5152593	29.4931052	C
0.00006688	11114.	166197842.	18.8016112	0.0012574	-0.001150	3.5381499	29.8307125	C
0.00006813	11195.	164329510.	18.6901932	0.0012733	-0.001179	3.5604800	30.1681756	C

MEG-33 rear abutment X direction row3

0.00006938	11275.	162523588.	18.5832058	0.0012892	-0.001208	3.5822962	30.5064735	C
0.00007063	11354.	160757672.	18.4786039	0.0013051	-0.001237	3.6034250	30.8419027	C
0.00007188	11431.	159035226.	18.3767719	0.0013208	-0.001267	3.6239243	31.1755212	C
0.00007313	11507.	157367113.	18.2788116	0.0013366	-0.001296	3.6439157	31.5099675	C
0.00007438	11584.	155750544.	18.1845298	0.0013525	-0.001325	3.6633965	31.8452455	C
0.00007938	11879.	149651551.	17.8303493	0.0014153	-0.001442	3.7352557	-33.951852	C
0.00008438	12161.	144128808.	17.5140442	0.0014777	-0.001560	3.7981675	-36.864511	C
0.00008938	12432.	139101865.	17.2303448	0.0015400	-0.001678	3.8523548	-39.784387	C
0.00009438	12694.	134507743.	16.9755777	0.0016021	-0.001795	3.8980170	-42.707353	C
0.00009938	12948.	130293291.	16.7469216	0.0016642	-0.001913	3.9352810	-45.628953	C
0.0001044	13191.	126384816.	16.5371928	0.0017261	-0.002031	3.9639833	-48.559572	C
0.0001094	13425.	122744437.	16.3484517	0.0017881	-0.002149	3.9843870	-50.000000	CY
0.0001144	13612.	119011329.	16.1620312	0.0018485	-0.002269	3.9961755	-50.000000	CY
0.0001194	13779.	115423118.	15.9892131	0.0019087	-0.002389	3.9997009	-50.000000	CY
0.0001244	13937.	112054355.	15.8287933	0.0019687	-0.002509	3.9990215	-50.000000	CY
0.0001294	14090.	108906531.	15.6849424	0.0020292	-0.002628	3.9995483	-50.000000	CY
0.0001344	14235.	105935157.	15.5508282	0.0020896	-0.002748	3.9997696	-50.000000	CY
0.0001394	14354.	102989737.	15.4207507	0.0021493	-0.002868	3.9998110	-50.000000	CY
0.0001444	14428.	99932061.	15.2859374	0.0022069	-0.002991	3.9996674	-50.000000	CY
0.0001494	14482.	96950710.	15.1522097	0.0022634	-0.003114	3.9992270	50.000000	CY
0.0001544	14533.	94138725.	15.0306519	0.0023204	-0.003237	3.9983508	50.000000	CY
0.0001594	14578.	91472822.	14.9196998	0.0023778	-0.003360	3.9987870	50.000000	CY
0.0001644	14617.	88923333.	14.8153480	0.0024353	-0.003482	3.9998053	50.000000	CY
0.0001694	14652.	86507502.	14.7202165	0.0024932	-0.003604	3.9987555	50.000000	CY
0.0001744	14685.	84212361.	14.6338144	0.0025518	-0.003726	3.9980050	50.000000	CY
0.0001794	14714.	82030066.	14.5526774	0.0026104	-0.003847	3.9996154	50.000000	CY
0.0001844	14741.	79949585.	14.4744302	0.0026687	-0.003969	3.9974917	50.000000	CY
0.0001894	14766.	77971421.	14.4020617	0.0027274	-0.004090	3.9998623	50.000000	CY
0.0001944	14789.	76087099.	14.3352437	0.0027864	-0.004211	3.9977717	50.000000	CY
0.0001994	14812.	74291358.	14.2732507	0.0028457	-0.004332	3.9998985	50.000000	CY
0.0002044	14833.	72575837.	14.2156871	0.0029053	-0.004452	3.9974338	50.000000	CY
0.0002094	14851.	70930899.	14.1583641	0.0029644	-0.004573	3.9997537	50.000000	CY
0.0002144	14868.	69357401.	14.1051807	0.0030238	-0.004694	3.9961282	50.000000	CY
0.0002194	14885.	67851145.	14.0557151	0.0030835	-0.004814	3.9991858	50.000000	CY
0.0002244	14900.	66408435.	14.0095562	0.0031434	-0.004934	3.9983976	50.000000	CY
0.0002294	14915.	65023572.	13.9668498	0.0032036	-0.005054	3.9977121	50.000000	CY
0.0002344	14929.	63695164.	13.9268526	0.0032641	-0.005173	3.9997684	50.000000	CY
0.0002394	14941.	62418360.	13.8897192	0.0033249	-0.005293	3.9947663	50.000000	CY
0.0002444	14953.	61190000.	13.8547320	0.0033858	-0.005412	3.9981938	50.000000	CY
0.0002494	14964.	60006116.	13.8193973	0.0034462	-0.005531	3.9998610	50.000000	CY

MEG-33 rear abutment X direction row3

0.0002544	14974.	58865554.	13.7865947	0.0035070	-0.005651	3.9943153	50.0000000 CY
0.0002594	14983.	57766524.	13.7559764	0.0035680	-0.005770	3.9976467	50.0000000 CY
0.0002644	14992.	56707417.	13.7272059	0.0036291	-0.005888	3.9996407	50.0000000 CY
0.0002694	15000.	55685311.	13.7004028	0.0036905	-0.006007	3.9967903	50.0000000 CY
0.0002744	15008.	54697896.	13.6755600	0.0037522	-0.006125	3.9959323	50.0000000 CYT
0.0003044	15008.	49306727.	13.8733038	0.0042227	-0.006735	3.9995748	50.0000000 CYT

 Summary of Results for Nominal Moment Capacity for Section 1

Moment values interpolated at maximum compressive strain = 0.003
 or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain	Max. Tens. Strain
1	765.800	13511.243	0.00300000	-0.00570261
2	985.500	14861.546	0.00300000	-0.00464537

Note that the values of moment capacity in the table above are not factored by a strength reduction factor (phi-factor).

In ACI 318, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.75).

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318, or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Load No.	Resist. Factor	Nominal Ax. Thrust kips	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in ²
1	0.65	765.800000	13511.	497.770000	8782.	174437239.

MEG-33 rear abutment X direction row3						
2	0.65	985.500000	14862.	640.575000	9660.	204362639.
1	0.75	765.800000	13511.	574.350000	10133.	141430041.
2	0.75	985.500000	14862.	739.125000	11146.	165462302.
1	0.90	765.800000	13511.	689.220000	12160.	106885023.
2	0.90	985.500000	14862.	886.950000	13375.	123519694.

Pile Section No. 2:

Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section	=	10.000000	ft
Shaft Diameter	=	36.000000	in
Concrete Cover Thickness (to edge of trans. reinf.)	=	3.000000	in
Number of Reinforcing Bars	=	8	bars
Yield Stress of Reinforcing Bars	=	50000.	psi
Modulus of Elasticity of Reinforcing Bars	=	29000000.	psi
Gross Area of Shaft	=	1018.	sq. in.
Total Area of Reinforcing Steel	=	8.000000	sq. in.
Area Ratio of Steel Reinforcement	=	0.79	percent
Edge-to-Edge Bar Spacing	=	9.538153	in
Maximum Concrete Aggregate Size	=	0.750000	in
Ratio of Bar Spacing to Aggregate Size	=	12.72	
Offset of Center of Rebar Cage from Center of Pile	=	0.0000	in
Transverse Reinforcement			
Type: Spiral			
Number of Transverse Reinf. (per spacing)	=	1	
Spacing of Transverse Reinf.	=	4.000000	in
Yield Stress of Transverse Reinf.	=	50000.	psi
Diameter of Transverse Reinf.	=	0.500000	in

Axial Structural Capacities:

Nom. Axial Structural Capacity = $0.85 F_c A_c + F_y A_s$	=	3833.578	kips
Tensile Load for Cracking of Concrete	=	-446.783	kips

MEG-33 rear abutment X direction row3

Nominal Axial Tensile Capacity = -400.000 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.128000	1.000000	13.936000	0.000000
2	1.128000	1.000000	9.854240	9.854240
3	1.128000	1.000000	0.000000	13.936000
4	1.128000	1.000000	-9.854240	9.854240
5	1.128000	1.000000	-13.936000	0.000000
6	1.128000	1.000000	-9.854240	-9.854240
7	1.128000	1.000000	0.000000	-13.936000
8	1.128000	1.000000	9.854240	-9.854240

NOTE: The positions of the above rebars were computed by LPILE

Minimum spacing between any two bars not equal to zero = 9.538 inches between bars 3 and 4.

Ratio of bar spacing to maximum aggregate size = 12.72

Concrete Properties:

Compressive Strength of Concrete = 4000. psi
Modulus of Elasticity of Concrete = 3604997. psi
Modulus of Rupture of Concrete = -474.34165 psi
Compression Strain at Peak Stress = 0.001886
Tensile Strain at Fracture of Concrete = -0.0001154
Maximum Coarse Aggregate Size = 0.750000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 2

Number Axial Thrust Force

MEG-33 rear abutment X direction row3

 kips

1 765.800
 2 985.500

Definitions of Run Messages and Notes:

- C = concrete in section has cracked in tension.
- Y = stress in reinforcing steel has reached yield stress.
- T = ACI 318 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than 0.003. See ACI 318-14, Section 21.2.3.
- Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
 Position of neutral axis is measured from edge of compression side of pile.
 Compressive stresses and strains are positive in sign.
 Tensile stresses and strains are negative in sign.

Axial Thrust Force = 765.800 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	210.2199654	336351945.	302.0711512	0.0001888	0.0001663	0.7602095	5.4130521	
0.00000125	420.4405562	336352445.	160.0565164	0.0002001	0.0001551	0.8026804	5.6780737	
0.00000188	630.6491287	336346202.	112.7276103	0.0002114	0.0001439	0.8449367	5.9436013	
0.00000250	840.8396742	336335870.	89.0701368	0.0002227	0.0001327	0.8869773	6.2096349	
0.00000313	1051.	336321979.	74.8812370	0.0002340	0.0001215	0.9288008	6.4761746	
0.00000375	1261.	336304705.	65.4266245	0.0002453	0.0001103	0.9704058	6.7432204	
0.00000438	1471.	336284125.	58.6773198	0.0002567	0.00009921	1.0117911	7.0107725	
0.00000500	1681.	336260275.	53.6188331	0.0002681	0.00008809	1.0529553	7.2788308	
0.00000563	1891.	336233176.	49.6875591	0.0002795	0.00007699	1.0938971	7.5473956	
0.00000625	2101.	336202839.	46.5453346	0.0002909	0.00006591	1.1346153	7.8164669	
0.00000688	2311.	336169273.	43.9769650	0.0003023	0.00005484	1.1751085	8.0860449	

MEG-33 rear abutment X direction row3

0.00000750	2521.	336132480.	41.8389873	0.0003138	0.00004379	1.2153753	8.3561298
0.00000813	2731.	336092464.	40.0320811	0.0003253	0.00003276	1.2554145	8.6267216
0.00000875	2940.	336049227.	38.4853031	0.0003367	0.00002175	1.2952248	8.8978207
0.00000938	3150.	336002768.	37.1466284	0.0003482	0.00001075	1.3348048	9.1694271
0.00001000	3360.	335953089.	35.9770384	0.0003598	-2.29616E-07	1.3741532	9.4415412
0.00001063	3569.	335899271.	34.9466824	0.0003713	-0.00001119	1.4132683	9.7141590
0.00001125	3778.	335835739.	34.0322719	0.0003829	-0.00002214	1.4521455	9.9872537
0.00001188	3987.	335755857.	33.2153828	0.0003944	-0.00003307	1.4907788	10.2607850
0.00001250	4196.	335654708.	32.4812751	0.0004060	-0.00004398	1.5291626	10.5347123
0.00001313	4404.	335529259.	31.8180259	0.0004176	-0.00005489	1.5672914	10.8089987
0.00001375	4611.	335378029.	31.2158925	0.0004292	-0.00006578	1.6051608	11.0836122
0.00001438	4819.	335200558.	30.6668361	0.0004408	-0.00007666	1.6427668	11.3585249
0.00001500	5025.	334996915.	30.1641635	0.0004525	-0.00008754	1.6801055	11.6337112
0.00001563	5231.	334767745.	29.7022611	0.0004641	-0.00009840	1.7171741	11.9091496
0.00001625	5436.	334513938.	29.2763840	0.0004757	-0.000109	1.7539696	12.1848210
0.00001688	5436.	322124533.	28.3881710	0.0004791	-0.000128	1.7641173	12.2187987 C
0.00001750	5436.	310620086.	27.9511295	0.0004891	-0.000141	1.7956567	12.4495483 C
0.00001813	5436.	299909048.	27.5388414	0.0004991	-0.000153	1.8266668	12.6774661 C
0.00001875	5512.	293972286.	27.1485233	0.0005090	-0.000166	1.8571362	12.9023846 C
0.00001938	5621.	290104229.	26.7785282	0.0005188	-0.000179	1.8871003	13.1245731 C
0.00002000	5726.	286288218.	26.4271301	0.0005285	-0.000191	1.9165763	13.3441355 C
0.00002063	5827.	282533459.	26.0928612	0.0005382	-0.000204	1.9455840	13.5612052 C
0.00002125	5925.	278830147.	25.7739072	0.0005477	-0.000217	1.9741094	13.7755954 C
0.00002188	6020.	275192399.	25.4693379	0.0005571	-0.000230	2.0021836	13.9875488 C
0.00002250	6112.	271630965.	25.1783202	0.0005665	-0.000243	2.0298363	14.1973040 C
0.00002313	6201.	268151963.	24.9000419	0.0005758	-0.000257	2.0570918	14.4050532 C
0.00002375	6288.	264760701.	24.6338065	0.0005851	-0.000270	2.0839760	14.6110093 C
0.00002438	6372.	261422496.	24.3776229	0.0005942	-0.000283	2.1104170	14.8144198 C
0.00002563	6534.	255000318.	23.8958892	0.0006123	-0.000310	2.1622428	15.2161452 C
0.00002688	6688.	248863574.	23.4492514	0.0006302	-0.000337	2.2126077	15.6102976 C
0.00002813	6835.	243029058.	23.0345475	0.0006478	-0.000365	2.2616621	15.9981147 C
0.00002938	6976.	237477858.	22.6480400	0.0006653	-0.000392	2.3094593	16.3798866 C
0.00003063	7111.	232193762.	22.2866483	0.0006825	-0.000420	2.3560542	16.7559421 C
0.00003188	7241.	227162744.	21.9478236	0.0006996	-0.000448	2.4015043	17.1266570 C
0.00003313	7366.	222372455.	21.6294520	0.0007165	-0.000476	2.4458691	17.4924549 C
0.00003438	7487.	217811887.	21.3297790	0.0007332	-0.000504	2.4892103	17.8538110 C
0.00003563	7605.	213471087.	21.0473513	0.0007498	-0.000533	2.5315923	18.2112574 C
0.00003688	7718.	209307729.	20.7791068	0.0007662	-0.000561	2.5729075	18.5633950 C
0.00003813	7828.	205337184.	20.5251752	0.0007825	-0.000590	2.6133212	18.9119094 C
0.00003938	7936.	201557702.	20.2850342	0.0007987	-0.000619	2.6529285	19.2577610 C

MEG-33 rear abutment X direction row3

0.00004063	8041.	197932200.	20.0561423	0.0008148	-0.000648	2.6916142	19.5994552	C
0.00004188	8143.	194460687.	19.8381094	0.0008307	-0.000677	2.7294554	19.9377418	C
0.00004313	8244.	191154981.	19.6315480	0.0008466	-0.000706	2.7666226	20.2745673	C
0.00004438	8341.	187958039.	19.4325170	0.0008623	-0.000735	2.8028154	20.6061079	C
0.00004563	8437.	184919979.	19.2442774	0.0008780	-0.000764	2.8384572	20.9374972	C
0.00004688	8530.	181976647.	19.0623093	0.0008935	-0.000794	2.8731629	21.2637643	C
0.00004813	8623.	179176876.	18.8900588	0.0009091	-0.000823	2.9073705	21.5904009	C
0.00004938	8713.	176457324.	18.7228406	0.0009244	-0.000853	2.9406532	21.9117550	C
0.00005063	8802.	173866693.	18.5643709	0.0009398	-0.000883	2.9734745	22.2338288	C
0.00005188	8889.	171352249.	18.4105331	0.0009550	-0.000912	3.0054498	22.5513831	C
0.00005313	8975.	168943161.	18.2637514	0.0009703	-0.000942	3.0368989	22.8686546	C
0.00005438	9060.	166622164.	18.1226398	0.0009854	-0.000972	3.0677226	23.1842253	C
0.00005563	9143.	164375395.	17.9861179	0.0010005	-0.001002	3.0978487	-23.541756	C
0.00005688	9226.	162222836.	17.8560168	0.0010156	-0.001032	3.1275273	-24.285370	C
0.00005813	9308.	160131487.	17.7294365	0.0010305	-0.001062	3.1564746	-25.032481	C
0.00005938	9388.	158113427.	17.6076091	0.0010455	-0.001092	3.1848681	-25.780586	C
0.00006063	9468.	156174408.	17.4911933	0.0010604	-0.001122	3.2128196	-26.528009	C
0.00006188	9546.	154285228.	17.3774252	0.0010752	-0.001152	3.2400485	-27.279120	C
0.00006313	9624.	152457860.	17.2676200	0.0010900	-0.001182	3.2667358	-28.031225	C
0.00006438	9701.	150697620.	17.1624387	0.0011048	-0.001213	3.2929874	-28.782660	C
0.00006563	9777.	148989276.	17.0603870	0.0011196	-0.001243	3.3186597	-29.535763	C
0.00006688	9852.	147323411.	16.9605681	0.0011342	-0.001273	3.3436755	-30.291936	C
0.00006813	9927.	145715150.	16.8647474	0.0011489	-0.001304	3.3682619	-31.047446	C
0.00006938	10001.	144161349.	16.7727104	0.0011636	-0.001334	3.3924169	-31.802291	C
0.00007063	10074.	142643417.	16.6823997	0.0011782	-0.001364	3.4159258	-32.560272	C
0.00007188	10146.	141166141.	16.5944955	0.0011927	-0.001395	3.4388869	-33.319786	C
0.00007313	10218.	139736147.	16.5099066	0.0012073	-0.001425	3.4614229	-34.078642	C
0.00007438	10290.	138351025.	16.4284673	0.0012219	-0.001456	3.4835318	-34.836837	C
0.00007938	10569.	133150678.	16.1225585	0.0012797	-0.001578	3.5666910	-37.882973	C
0.00008438	10840.	128470050.	15.8497840	0.0013373	-0.001700	3.6422212	-40.936747	C
0.00008938	11104.	124237225.	15.6063903	0.0013948	-0.001823	3.7104072	-43.993475	C
0.00009438	11360.	120375044.	15.3863356	0.0014521	-0.001945	3.7711568	-47.056910	C
0.00009938	11611.	116840154.	15.1878571	0.0015093	-0.002068	3.8247131	-50.000000	CY
0.0001044	11830.	113343154.	15.0000352	0.0015656	-0.002192	3.8704756	-50.000000	CY
0.0001094	12008.	109784526.	14.8157660	0.0016205	-0.002317	3.9083747	-50.000000	CY
0.0001144	12181.	106496543.	14.6483521	0.0016754	-0.002442	3.9397749	-50.000000	CY
0.0001194	12348.	103441883.	14.4943284	0.0017303	-0.002567	3.9645808	-50.000000	CY
0.0001244	12510.	100584567.	14.3523135	0.0017851	-0.002692	3.9828283	-50.000000	CY
0.0001294	12629.	97618697.	14.2083733	0.0018382	-0.002819	3.9942768	-50.000000	CY
0.0001344	12698.	94496465.	14.0536796	0.0018885	-0.002949	3.9994561	-50.000000	CY

MEG-33 rear abutment X direction row3

0.0001394	12763.	91574401.	13.9121518	0.0019390	-0.003078	3.9994295	-50.000000	CY
0.0001444	12824.	88822594.	13.7787758	0.0019893	-0.003208	3.9991866	-50.000000	CY
0.0001494	12881.	86230205.	13.6541689	0.0020396	-0.003338	3.9986313	-50.000000	CY
0.0001544	12935.	83792019.	13.5400008	0.0020902	-0.003467	3.9976086	-50.000000	CY
0.0001594	12986.	81481962.	13.4314034	0.0021406	-0.003597	3.9999835	-50.000000	CY
0.0001644	13034.	79293696.	13.3294103	0.0021910	-0.003726	3.9995177	-50.000000	CY
0.0001694	13080.	77224802.	13.2353911	0.0022417	-0.003856	3.9981227	-50.000000	CY
0.0001744	13124.	75265765.	13.1485635	0.0022928	-0.003985	3.9999974	-50.000000	CY
0.0001794	13165.	73394379.	13.0638987	0.0023433	-0.004114	3.9991654	50.000000	CY
0.0001844	13204.	71615471.	12.9850557	0.0023941	-0.004243	3.9968534	50.000000	CY
0.0001894	13241.	69921494.	12.9123679	0.0024453	-0.004372	3.9995285	50.000000	CY
0.0001944	13276.	68299557.	12.8466402	0.0024971	-0.004500	3.9967257	50.000000	CY
0.0001994	13309.	66752915.	12.7856694	0.0025491	-0.004628	3.9995946	50.000000	CY
0.0002044	13337.	65259109.	12.7277170	0.0026012	-0.004756	3.9962725	50.000000	CY
0.0002094	13365.	63830744.	12.6735454	0.0026535	-0.004884	3.9993424	50.000000	CY
0.0002144	13390.	62461659.	12.6238722	0.0027062	-0.005011	3.9969794	50.000000	CY
0.0002194	13414.	61147688.	12.5784072	0.0027594	-0.005138	3.9986153	50.000000	CY
0.0002244	13438.	59889181.	12.5359498	0.0028128	-0.005265	3.9999934	50.000000	CY
0.0002294	13460.	58680489.	12.4967730	0.0028664	-0.005391	3.9969588	50.000000	CY
0.0002344	13481.	57520567.	12.4601838	0.0029204	-0.005517	3.9995228	50.000000	CY
0.0002394	13502.	56405718.	12.4261845	0.0029745	-0.005643	3.9965326	50.000000	CY
0.0002444	13521.	55330596.	12.3924636	0.0030284	-0.005769	3.9976700	50.000000	CY
0.0002494	13540.	54296026.	12.3603610	0.0030824	-0.005895	3.9997169	50.000000	CY
0.0002544	13558.	53299201.	12.3305698	0.0031366	-0.006021	3.9955933	50.000000	CY
0.0002594	13575.	52338045.	12.3029331	0.0031911	-0.006146	3.9972858	50.000000	CYT
0.0002644	13592.	51411546.	12.2770423	0.0032457	-0.006272	3.9995245	50.000000	CYT
0.0002694	13608.	50517240.	12.2529716	0.0033006	-0.006397	3.9974179	50.000000	CYT
0.0002744	13623.	49651428.	12.2304689	0.0033557	-0.006522	3.9957412	50.000000	CYT
0.0003044	13672.	44918381.	12.0959895	0.0036817	-0.007276	3.9998232	50.000000	CYT
0.0003344	13672.	40888321.	12.0718370	0.0040365	-0.008001	3.9933884	50.000000	CYT

Axial Thrust Force = 985.500 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	203.9917885	326386862.	388.8590461	0.0002430	0.0002205	0.9639414	6.9860827	
0.00000125	407.9860656	326388852.	203.4511105	0.0002543	0.0002093	1.0050537	7.2511277	

MEG-33 rear abutment X direction row3

0.00000188	611.9679531	326382908.	141.6580582	0.0002656	0.0001981	1.0459513	7.5166944
0.00000250	815.9312569	326372503.	110.7687271	0.0002769	0.0001869	1.0866329	7.7827827
0.00000313	1020.	326358330.	92.2408853	0.0002883	0.0001758	1.1270971	8.0493927
0.00000375	1224.	326340622.	79.8937887	0.0002996	0.0001646	1.1673424	8.3165245
0.00000438	1428.	326319476.	71.0785472	0.0003110	0.0001535	1.2073677	8.5841782
0.00000500	1631.	326294942.	64.4707158	0.0003224	0.0001424	1.2471715	8.8523538
0.00000563	1835.	326267046.	59.3344920	0.0003338	0.0001313	1.2867525	9.1210515
0.00000625	2039.	326235805.	55.2283942	0.0003452	0.0001202	1.3261094	9.3902715
0.00000688	2243.	326201227.	51.8714798	0.0003566	0.0001091	1.3652407	9.6600138
0.00000750	2446.	326163319.	49.0764535	0.0003681	0.00009807	1.4041451	9.9302787
0.00000813	2650.	326122085.	46.7136499	0.0003795	0.00008705	1.4428212	10.2010663
0.00000875	2853.	326077526.	44.6904504	0.0003910	0.00007604	1.4812678	10.4723768
0.00000938	3057.	326029644.	42.9389351	0.0004026	0.00006505	1.5194834	10.7442105
0.00001000	3260.	325978439.	41.4081640	0.0004141	0.00005408	1.5574667	11.0165676
0.00001063	3463.	325923911.	40.0591830	0.0004256	0.00004313	1.5952163	11.2894483
0.00001125	3666.	325866060.	38.8616946	0.0004372	0.00003219	1.6327308	11.5628529
0.00001188	3869.	325804884.	37.7917798	0.0004488	0.00002128	1.6700090	11.8367817
0.00001250	4072.	325740383.	36.8303033	0.0004604	0.00001038	1.7070493	12.1112350
0.00001313	4274.	325672555.	35.9617747	0.0004720	-5.01706E-07	1.7438506	12.3862131
0.00001375	4477.	325600882.	35.1735127	0.0004836	-0.00001136	1.7804110	12.6617132
0.00001438	4679.	325522318.	34.4550016	0.0004953	-0.00002221	1.8167270	12.9377163
0.00001500	4881.	325432923.	33.7974547	0.0005070	-0.00003304	1.8527943	13.2141928
0.00001563	5083.	325329376.	33.1934873	0.0005186	-0.00004385	1.8886081	13.4911115
0.00001625	5285.	325209160.	32.6368528	0.0005303	-0.00005465	1.9241642	13.7684419
0.00001688	5486.	325070637.	32.1222355	0.0005421	-0.00006544	1.9594584	14.0461565
0.00001750	5686.	324912770.	31.6450834	0.0005538	-0.00007621	1.9944871	14.3242299
0.00001813	5886.	324735145.	31.2014791	0.0005655	-0.00008697	2.0292472	14.6026400
0.00001875	6085.	324537642.	30.7880306	0.0005773	-0.00009772	2.0637356	14.8813667
0.00001938	6284.	324320367.	30.4017860	0.0005890	-0.000108	2.0979496	15.1603911
0.00002000	6284.	314185356.	29.7226196	0.0005945	-0.000126	2.1134338	15.2555194 C
0.00002063	6284.	304664587.	29.3330884	0.0006050	-0.000138	2.1436908	15.4992661 C
0.00002125	6377.	300112242.	28.9621023	0.0006154	-0.000150	2.1734373	15.7403206 C
0.00002188	6501.	297175532.	28.6084526	0.0006258	-0.000162	2.2027032	15.9789246 C
0.00002250	6620.	294220651.	28.2707001	0.0006361	-0.000174	2.2314949	16.2150819 C
0.00002313	6735.	291260281.	27.9476923	0.0006463	-0.000186	2.2598268	16.4488837 C
0.00002375	6847.	288315485.	27.6386715	0.0006564	-0.000199	2.2877314	16.6806100 C
0.00002438	6956.	285394864.	27.3427172	0.0006665	-0.000211	2.3152239	16.9103708 C
0.00002563	7166.	279648602.	26.7866618	0.0006864	-0.000236	2.3690240	17.3643506 C
0.00002688	7363.	273987420.	26.2714783	0.0007060	-0.000261	2.4211739	17.8098710 C
0.00002813	7551.	268495773.	25.7939669	0.0007255	-0.000287	2.4718776	18.2487669 C

MEG-33 rear abutment X direction row3

0.00002938	7730.	263156607.	25.3489516	0.0007446	-0.000313	2.5211371	18.6807258	C
0.00003063	7900.	257972225.	24.9326418	0.0007636	-0.000339	2.5689975	19.1059151	C
0.00003188	8063.	252967524.	24.5427305	0.0007823	-0.000365	2.6155733	19.5253241	C
0.00003313	8220.	248139779.	24.1765243	0.0008008	-0.000392	2.6609135	19.9392362	C
0.00003438	8370.	243486447.	23.8317642	0.0008192	-0.000418	2.7050686	20.3479776	C
0.00003563	8515.	239005070.	23.5065522	0.0008374	-0.000445	2.7480907	20.7519192	C
0.00003688	8654.	234693214.	23.1992930	0.0008555	-0.000472	2.7900339	21.1514815	C
0.00003813	8789.	230526427.	22.9076383	0.0008734	-0.000499	2.8308652	21.5460201	C
0.00003938	8919.	226508980.	22.6306521	0.0008911	-0.000526	2.8706542	21.9361635	C
0.00004063	9045.	222648666.	22.3678140	0.0009087	-0.000554	2.9094938	22.3228935	C
0.00004188	9168.	218943532.	22.1183480	0.0009262	-0.000581	2.9474423	22.7068058	C
0.00004313	9287.	215348370.	21.8793292	0.0009435	-0.000609	2.9843490	23.0856985	C
0.00004438	9403.	211891844.	21.6516375	0.0009608	-0.000637	3.0203977	23.4618387	C
0.00004563	9516.	208575033.	21.4349839	0.0009780	-0.000665	3.0556599	23.8360756	C
0.00004688	9626.	205346136.	21.2260711	0.0009950	-0.000693	3.0899142	24.2051278	C
0.00004813	9734.	202257565.	21.0275721	0.0010120	-0.000721	3.1234937	24.5735680	C
0.00004938	9838.	199252423.	20.8359107	0.0010288	-0.000749	3.1561330	24.9374072	C
0.00005063	9941.	196369599.	20.6531876	0.0010456	-0.000777	3.1881021	25.3004736	C
0.00005188	10041.	193566417.	20.4766067	0.0010622	-0.000805	3.2191950	25.6595328	C
0.00005313	10140.	190875821.	20.3081117	0.0010789	-0.000834	3.2496589	26.0182472	C
0.00005438	10236.	188251240.	20.1445329	0.0010954	-0.000862	3.2792397	26.3724980	C
0.00005563	10332.	185737926.	19.9888563	0.0011119	-0.000891	3.3082795	26.7276365	C
0.00005688	10424.	183275723.	19.8367923	0.0011282	-0.000919	3.3364049	27.0774470	C
0.00005813	10515.	180909986.	19.6915567	0.0011446	-0.000948	3.3639749	27.4277430	C
0.00005938	10605.	178613137.	19.5510732	0.0011608	-0.000977	3.3908260	27.7756918	C
0.00006063	10693.	176380055.	19.4149615	0.0011770	-0.001005	3.4169586	28.1211418	C
0.00006188	10781.	174231456.	19.2848273	0.0011932	-0.001034	3.4425651	28.4674496	C
0.00006313	10866.	172127043.	19.1574372	0.0012093	-0.001063	3.4673611	28.8093461	C
0.00006438	10950.	170090563.	19.0347585	0.0012254	-0.001092	3.4915702	29.1508025	C
0.00006563	11033.	168126358.	18.9171981	0.0012414	-0.001121	3.5152593	29.4931052	C
0.00006688	11114.	166197842.	18.8016112	0.0012574	-0.001150	3.5381499	29.8307125	C
0.00006813	11195.	164329510.	18.6901932	0.0012733	-0.001179	3.5604800	30.1681756	C
0.00006938	11275.	162523588.	18.5832058	0.0012892	-0.001208	3.5822962	30.5064735	C
0.00007063	11354.	160757672.	18.4786039	0.0013051	-0.001237	3.6034250	30.8419027	C
0.00007188	11431.	159035226.	18.3767719	0.0013208	-0.001267	3.6239243	31.1755212	C
0.00007313	11507.	157367113.	18.2788116	0.0013366	-0.001296	3.6439157	31.5099675	C
0.00007438	11584.	155750544.	18.1845298	0.0013525	-0.001325	3.6633965	31.8452455	C
0.00007938	11879.	149651551.	17.8303493	0.0014153	-0.001442	3.7352557	-33.951852	C
0.00008438	12161.	144128808.	17.5140442	0.0014777	-0.001560	3.7981675	-36.864511	C
0.00008938	12432.	139101865.	17.2303448	0.0015400	-0.001678	3.8523548	-39.784387	C

MEG-33 rear abutment X direction row3

0.00009438	12694.	134507743.	16.9755777	0.0016021	-0.001795	3.8980170	-42.707353	C
0.00009938	12948.	130293291.	16.7469216	0.0016642	-0.001913	3.9352810	-45.628953	C
0.0001044	13191.	126384816.	16.5371928	0.0017261	-0.002031	3.9639833	-48.559572	C
0.0001094	13425.	122744437.	16.3484517	0.0017881	-0.002149	3.9843870	-50.000000	CY
0.0001144	13612.	119011329.	16.1620312	0.0018485	-0.002269	3.9961755	-50.000000	CY
0.0001194	13779.	115423118.	15.9892131	0.0019087	-0.002389	3.9997009	-50.000000	CY
0.0001244	13937.	112054355.	15.8287933	0.0019687	-0.002509	3.9990215	-50.000000	CY
0.0001294	14090.	108906531.	15.6849424	0.0020292	-0.002628	3.9995483	-50.000000	CY
0.0001344	14235.	105935157.	15.5508282	0.0020896	-0.002748	3.9997696	-50.000000	CY
0.0001394	14354.	102989737.	15.4207507	0.0021493	-0.002868	3.9998110	-50.000000	CY
0.0001444	14428.	99932061.	15.2859374	0.0022069	-0.002991	3.9996674	-50.000000	CY
0.0001494	14482.	96950710.	15.1522097	0.0022634	-0.003114	3.9992270	50.000000	CY
0.0001544	14533.	94138725.	15.0306519	0.0023204	-0.003237	3.9983508	50.000000	CY
0.0001594	14578.	91472822.	14.9196998	0.0023778	-0.003360	3.9987870	50.000000	CY
0.0001644	14617.	88923333.	14.8153480	0.0024353	-0.003482	3.9998053	50.000000	CY
0.0001694	14652.	86507502.	14.7202165	0.0024932	-0.003604	3.9987555	50.000000	CY
0.0001744	14685.	84212361.	14.6338144	0.0025518	-0.003726	3.9980050	50.000000	CY
0.0001794	14714.	82030066.	14.5526774	0.0026104	-0.003847	3.9996154	50.000000	CY
0.0001844	14741.	79949585.	14.4744302	0.0026687	-0.003969	3.9974917	50.000000	CY
0.0001894	14766.	77971421.	14.4020617	0.0027274	-0.004090	3.9998623	50.000000	CY
0.0001944	14789.	76087099.	14.3352437	0.0027864	-0.004211	3.9977717	50.000000	CY
0.0001994	14812.	74291358.	14.2732507	0.0028457	-0.004332	3.9998985	50.000000	CY
0.0002044	14833.	72575837.	14.2156871	0.0029053	-0.004452	3.9974338	50.000000	CY
0.0002094	14851.	70930899.	14.1583641	0.0029644	-0.004573	3.9997537	50.000000	CY
0.0002144	14868.	69357401.	14.1051807	0.0030238	-0.004694	3.9961282	50.000000	CY
0.0002194	14885.	67851145.	14.0557151	0.0030835	-0.004814	3.9991858	50.000000	CY
0.0002244	14900.	66408435.	14.0095562	0.0031434	-0.004934	3.9983976	50.000000	CY
0.0002294	14915.	65023572.	13.9668498	0.0032036	-0.005054	3.9977121	50.000000	CY
0.0002344	14929.	63695164.	13.9268526	0.0032641	-0.005173	3.9997684	50.000000	CY
0.0002394	14941.	62418360.	13.8897192	0.0033249	-0.005293	3.9947663	50.000000	CY
0.0002444	14953.	61190000.	13.8547320	0.0033858	-0.005412	3.9981938	50.000000	CY
0.0002494	14964.	60006116.	13.8193973	0.0034462	-0.005531	3.9998610	50.000000	CY
0.0002544	14974.	58865554.	13.7865947	0.0035070	-0.005651	3.9943153	50.000000	CY
0.0002594	14983.	57766524.	13.7559764	0.0035680	-0.005770	3.9976467	50.000000	CY
0.0002644	14992.	56707417.	13.7272059	0.0036291	-0.005888	3.9996407	50.000000	CY
0.0002694	15000.	55685311.	13.7004028	0.0036905	-0.006007	3.9967903	50.000000	CY
0.0002744	15008.	54697896.	13.6755600	0.0037522	-0.006125	3.9959323	50.000000	CYT
0.0003044	15008.	49306727.	13.8733038	0.0042227	-0.006735	3.9995748	50.000000	CYT

 Summary of Results for Nominal Moment Capacity for Section 2

Moment values interpolated at maximum compressive strain = 0.003
 or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain	Max. Tens. Strain
1	765.800	13511.243	0.00300000	-0.00570261
2	985.500	14861.546	0.00300000	-0.00464537

Note that the values of moment capacity in the table above are not factored by a strength reduction factor (phi-factor).

In ACI 318, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.75).

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318, or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Load No.	Resist. Factor	Nominal Ax. Thrust kips	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in ²
1	0.65	765.800000	13511.	497.770000	8782.	174437239.
2	0.65	985.500000	14862.	640.575000	9660.	204362639.
1	0.75	765.800000	13511.	574.350000	10133.	141430041.
2	0.75	985.500000	14862.	739.125000	11146.	165462302.
1	0.90	765.800000	13511.	689.220000	12160.	106885023.
2	0.90	985.500000	14862.	886.950000	13375.	123519694.

 Layering Correction Equivalent Depths of Soil & Rock Layers

Layer No.	Top of Layer Below Pile Head ft	Equivalent Top Depth Below Grnd Surf ft	Same Layer Type As Layer Above	Layer is Rock or is Below Rock Layer	F0 Integral for Layer lbs	F1 Integral for Layer lbs
1	0.00	0.00	N.A.	No	0.00	214373.
2	7.5000	8.8906	Yes	No	214373.	454073.
3	15.8400	15.8400	No	Yes	N.A.	N.A.

Notes: The F0 integral of Layer n+1 equals the sum of the F0 and F1 integrals for Layer n. Layering correction equivalent depths are computed only for soil types with both shallow-depth and deep-depth expressions for peak lateral load transfer. These soil types are soft and stiff clays, non-liquefied sands, and cemented c-phi soil.

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 1

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 3540.0 lbs
 Applied moment at pile head = 1490400.0 in-lbs
 Axial thrust load on pile head = 765800.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
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MEG-33 rear abutment X direction row3

0.00	0.02526	1490400.	3540.	-4.69E-04	0.00	3.36E+11	0.00	0.00	0.00
0.2584	0.02383	1502475.	3460.	-4.56E-04	0.00	3.36E+11	-51.726	6730.	0.00
0.5168	0.02244	1514020.	3229.	-4.42E-04	0.00	3.36E+11	-97.411	13461.	0.00
0.7752	0.02109	1524595.	2865.	-4.28E-04	0.00	3.36E+11	-137.340	20191.	0.00
1.0336	0.01979	1533817.	2385.	-4.14E-04	0.00	3.36E+11	-171.794	26922.	0.00
1.2920	0.01853	1541352.	1807.	-3.99E-04	0.00	3.36E+11	-201.062	33652.	0.00
1.5504	0.01731	1546921.	1146.	-3.85E-04	0.00	3.36E+11	-225.432	40383.	0.00
1.8088	0.01614	1550289.	416.3714	-3.71E-04	0.00	3.36E+11	-245.193	47113.	0.00
2.0672	0.01501	1551265.	-367.866	-3.57E-04	0.00	3.36E+11	-260.635	53844.	0.00
2.3256	0.01393	1549701.	-1194.	-3.42E-04	0.00	3.36E+11	-272.047	60574.	0.00
2.5840	0.01289	1545488.	-2049.	-3.28E-04	0.00	3.36E+11	-279.717	67305.	0.00
2.8424	0.01189	1538551.	-2923.	-3.14E-04	0.00	3.36E+11	-283.931	74035.	0.00
3.1008	0.01094	1528850.	-3805.	-3.00E-04	0.00	3.36E+11	-284.971	80766.	0.00
3.3592	0.01003	1516376.	-4686.	-2.86E-04	0.00	3.36E+11	-283.115	87496.	0.00
3.6176	0.00917	1501147.	-5557.	-2.72E-04	0.00	3.36E+11	-278.638	94227.	0.00
3.8760	0.00835	1483206.	-6410.	-2.58E-04	0.00	3.36E+11	-271.808	100957.	0.00
4.1344	0.00757	1462618.	-7239.	-2.44E-04	0.00	3.36E+11	-262.886	107688.	0.00
4.3928	0.00683	1439472.	-8038.	-2.31E-04	0.00	3.36E+11	-252.127	114418.	0.00
4.6512	0.00614	1413869.	-8800.	-2.18E-04	0.00	3.36E+11	-239.777	121149.	0.00
4.9096	0.00548	1385930.	-9523.	-2.05E-04	0.00	3.36E+11	-226.074	127879.	0.00
5.1680	0.00487	1355787.	-10201.	-1.92E-04	0.00	3.36E+11	-211.247	134609.	0.00
5.4264	0.00429	1323583.	-10831.	-1.80E-04	0.00	3.36E+11	-195.514	141340.	0.00
5.6848	0.00375	1289471.	-11412.	-1.68E-04	0.00	3.36E+11	-179.084	148070.	0.00
5.9432	0.00325	1253608.	-11941.	-1.56E-04	0.00	3.36E+11	-162.154	154801.	0.00
6.2016	0.00278	1216158.	-12417.	-1.45E-04	0.00	3.36E+11	-144.911	161531.	0.00
6.4600	0.00235	1177289.	-12840.	-1.34E-04	0.00	3.36E+11	-127.531	168262.	0.00
6.7184	0.00195	1137168.	-13208.	-1.23E-04	0.00	3.36E+11	-110.176	174992.	0.00
6.9768	0.00159	1095962.	-13523.	-1.13E-04	0.00	3.36E+11	-93.000	181723.	0.00
7.2352	0.00125	1053839.	-13785.	-1.03E-04	0.00	3.36E+11	-76.142	188453.	0.00
7.4936	9.49E-04	1010960.	-13996.	-9.34E-05	0.00	3.36E+11	-59.729	195184.	0.00
7.7520	6.74E-04	967485.	-14157.	-8.42E-05	0.00	3.36E+11	-43.880	201914.	0.00
8.0104	4.26E-04	923566.	-14269.	-7.55E-05	0.00	3.36E+11	-28.697	208645.	0.00
8.2688	2.06E-04	879352.	-14336.	-6.72E-05	0.00	3.36E+11	-14.275	215375.	0.00
8.5272	9.68E-06	834981.	-14359.	-5.93E-05	0.00	3.36E+11	-0.694	222106.	0.00
8.7856	-1.62E-04	790585.	-14341.	-5.18E-05	0.00	3.36E+11	11.9760	228836.	0.00
9.0440	-3.12E-04	746287.	-14286.	-4.47E-05	0.00	3.36E+11	23.6753	235567.	0.00
9.3024	-4.40E-04	702200.	-14196.	-3.81E-05	0.00	3.36E+11	34.3558	242297.	0.00
9.5608	-5.48E-04	658428.	-14075.	-3.18E-05	0.00	3.36E+11	43.9800	249027.	0.00
9.8192	-6.37E-04	615065.	-13925.	-2.59E-05	0.00	3.36E+11	52.5204	255758.	0.00
10.0776	-7.08E-04	572193.	-13751.	-2.04E-05	0.00	3.36E+11	59.9593	262488.	0.00

MEG-33 rear abutment X direction row3

10.3360	-7.63E-04	529885.	-13555.	-1.54E-05	0.00	3.36E+11	66.2887	269219.	0.00
10.5944	-8.04E-04	488203.	-13341.	-1.07E-05	0.00	3.36E+11	71.5096	275949.	0.00
10.8528	-8.30E-04	447198.	-13113.	-6.35E-06	0.00	3.36E+11	75.6322	282680.	0.00
11.1112	-8.43E-04	406910.	-12874.	-2.42E-06	0.00	3.36E+11	78.6748	289410.	0.00
11.3696	-8.45E-04	367370.	-12627.	1.15E-06	0.00	3.36E+11	80.6643	296141.	0.00
11.6280	-8.36E-04	328597.	-12375.	4.36E-06	0.00	3.36E+11	81.6353	302871.	0.00
11.8864	-8.18E-04	290602.	-12122.	7.22E-06	0.00	3.36E+11	81.6301	309602.	0.00
12.1448	-7.91E-04	253385.	-11871.	9.72E-06	0.00	3.36E+11	80.6984	316332.	0.00
12.4032	-7.57E-04	216939.	-11623.	1.19E-05	0.00	3.36E+11	78.8968	323063.	0.00
12.6616	-7.17E-04	181247.	-11383.	1.37E-05	0.00	3.36E+11	76.2891	329793.	0.00
12.9200	-6.72E-04	146284.	-11151.	1.52E-05	0.00	3.36E+11	72.9455	336524.	0.00
13.1784	-6.23E-04	112020.	-10931.	1.64E-05	0.00	3.36E+11	68.9430	343254.	0.00
13.4368	-5.70E-04	78415.	-10724.	1.73E-05	0.00	3.36E+11	64.3649	349985.	0.00
13.6952	-5.15E-04	45428.	-10533.	1.79E-05	0.00	3.36E+11	59.3009	356715.	0.00
13.9536	-4.59E-04	13011.	-10357.	1.81E-05	0.00	3.36E+11	53.8468	363446.	0.00
14.2120	-4.03E-04	-18890.	-10199.	1.81E-05	0.00	3.36E+11	48.1049	370176.	0.00
14.4704	-3.47E-04	-50327.	-10059.	1.78E-05	0.00	3.36E+11	42.1836	376906.	0.00
14.7288	-2.93E-04	-81358.	-9938.	1.72E-05	0.00	3.36E+11	36.1976	383637.	0.00
14.9872	-2.40E-04	-112039.	-9835.	1.63E-05	0.00	3.36E+11	30.2678	390367.	0.00
15.2456	-1.91E-04	-142426.	-9750.	1.51E-05	0.00	3.36E+11	24.5219	397098.	0.00
15.5040	-1.47E-04	-172575.	-9682.	1.37E-05	0.00	3.36E+11	19.0937	403828.	0.00
15.7624	-1.07E-04	-202536.	-9631.	1.19E-05	0.00	3.36E+11	14.1240	410559.	0.00
16.0208	-7.25E-05	-232357.	-4820.	9.94E-06	0.00	3.36E+11	3089.	1.32E+08	0.00
16.2792	-4.50E-05	-232476.	3257.	7.80E-06	0.00	3.36E+11	2121.	1.46E+08	0.00
16.5376	-2.42E-05	-212196.	8479.	5.75E-06	0.00	3.36E+11	1248.	1.60E+08	0.00
16.7960	-9.36E-06	-179917.	11229.	3.94E-06	0.00	3.36E+11	525.8385	1.74E+08	0.00
17.0544	2.90E-07	-142578.	12017.	2.46E-06	0.00	3.36E+11	-17.623	1.88E+08	0.00
17.3128	5.87E-06	-105405.	11396.	1.31E-06	0.00	3.36E+11	-382.643	2.02E+08	0.00
17.5712	8.43E-06	-71909.	9891.	4.95E-07	0.00	3.36E+11	-587.987	2.16E+08	0.00
17.8296	8.94E-06	-44065.	7950.	-3.94E-08	0.00	3.36E+11	-663.853	2.30E+08	0.00
18.0880	8.19E-06	-22603.	5921.	-3.47E-07	0.00	3.36E+11	-645.048	2.44E+08	0.00
18.3464	6.79E-06	-7343.	4044.	-4.85E-07	0.00	3.36E+11	-565.590	2.58E+08	0.00
18.6048	5.18E-06	2479.	2462.	-5.07E-07	0.00	3.36E+11	-455.030	2.72E+08	0.00
18.8632	3.64E-06	7927.	1235.	-4.59E-07	0.00	3.36E+11	-336.457	2.86E+08	0.00
19.1216	2.33E-06	10139.	362.7949	-3.76E-07	0.00	3.36E+11	-225.927	3.01E+08	0.00
19.3800	1.31E-06	10178.	-193.575	-2.82E-07	0.00	3.36E+11	-132.929	3.15E+08	0.00
19.6384	5.81E-07	8940.	-495.054	-1.94E-07	0.00	3.36E+11	-61.522	3.29E+08	0.00
19.8968	1.06E-07	7109.	-608.646	-1.20E-07	0.00	3.36E+11	-11.744	3.43E+08	0.00
20.1552	-1.65E-07	5166.	-597.471	-6.36E-08	0.00	3.36E+11	18.9525	3.57E+08	0.00
20.4136	-2.88E-07	3404.	-514.676	-2.41E-08	0.00	3.36E+11	34.4500	3.71E+08	0.00

MEG-33 rear abutment X direction row3

20.6720	-3.14E-07	1974.	-400.814	6.89E-10	0.00	3.36E+11	38.9901	3.85E+08	0.00
20.9304	-2.84E-07	918.6142	-283.760	1.40E-08	0.00	3.36E+11	36.5093	3.99E+08	0.00
21.1888	-2.27E-07	214.2055	-180.244	1.92E-08	0.00	3.36E+11	30.2577	4.13E+08	0.00
21.4472	-1.65E-07	-199.281	-98.215	1.93E-08	0.00	3.36E+11	22.6506	4.27E+08	0.00
21.7056	-1.08E-07	-394.979	-39.399	1.66E-08	0.00	3.36E+11	15.2854	4.41E+08	0.00
21.9640	-6.18E-08	-443.699	-1.654	1.27E-08	0.00	3.36E+11	9.0604	4.55E+08	0.00
22.2224	-2.87E-08	-405.295	19.1212	8.79E-09	0.00	3.36E+11	4.3393	4.69E+08	0.00
22.4808	-7.21E-09	-325.159	27.5909	5.43E-09	0.00	3.36E+11	1.1236	4.83E+08	0.00
22.7392	4.97E-09	-234.213	28.0977	2.85E-09	0.00	3.36E+11	-0.797	4.97E+08	0.00
22.9976	1.05E-08	-150.922	24.1900	1.07E-09	0.00	3.36E+11	-1.724	5.11E+08	0.00
23.2560	1.16E-08	-84.201	18.4633	-9.52E-12	0.00	3.36E+11	-1.970	5.25E+08	0.00
23.5144	1.04E-08	-36.419	12.6057	-5.66E-10	0.00	3.36E+11	-1.808	5.39E+08	0.00
23.7728	8.13E-09	-6.023	7.5549	-7.61E-10	0.00	3.36E+11	-1.450	5.53E+08	0.00
24.0312	5.68E-09	10.4363	3.6968	-7.41E-10	0.00	3.36E+11	-1.039	5.67E+08	0.00
24.2896	3.53E-09	16.9065	1.0598	-6.15E-10	0.00	3.36E+11	-0.662	5.81E+08	0.00
24.5480	1.87E-09	17.0118	-0.522	-4.58E-10	0.00	3.36E+11	-0.358	5.95E+08	0.00
24.8064	6.88E-10	13.6713	-1.287	-3.17E-10	0.00	3.36E+11	-0.135	6.09E+08	0.00
25.0648	-9.93E-11	9.0301	-1.467	-2.12E-10	0.00	3.36E+11	0.01957	6.11E+08	0.00
25.3232	-6.29E-10	4.5769	-1.244	-1.50E-10	0.00	3.36E+11	0.1239	6.11E+08	0.00
25.5816	-1.03E-09	1.3151	-0.738	-1.22E-10	0.00	3.36E+11	0.2025	6.11E+08	0.00
25.8400	-1.39E-09	0.00	0.00	-1.16E-10	0.00	3.36E+11	0.2736	3.06E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 1:

Pile-head deflection = 0.02526476 inches
 Computed slope at pile head = -0.0004694 radians
 Maximum bending moment = 1551265. inch-lbs
 Maximum shear force = -14359. lbs
 Depth of maximum bending moment = 2.06720000 feet below pile head
 Depth of maximum shear force = 8.52720000 feet below pile head
 Number of iterations = 6
 Number of zero deflection points = 5

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 2

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 4770.0 lbs
 Applied moment at pile head = 2012400.0 in-lbs
 Axial thrust load on pile head = 985500.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	0.03574	2012400.	4770.	-6.59E-04	0.00	3.26E+11	0.00	0.00	0.00
0.2584	0.03372	2029174.	4657.	-6.39E-04	0.00	3.26E+11	-73.200	6730.	0.00
0.5168	0.03177	2045186.	4329.	-6.20E-04	0.00	3.26E+11	-137.921	13461.	0.00
0.7752	0.02988	2059812.	3814.	-6.01E-04	0.00	3.26E+11	-194.556	20191.	0.00
1.0336	0.02805	2072508.	3135.	-5.81E-04	0.00	3.26E+11	-243.502	26922.	0.00
1.2920	0.02628	2082802.	2315.	-5.61E-04	0.00	3.26E+11	-285.158	33652.	0.00
1.5504	0.02457	2090294.	1377.	-5.41E-04	0.00	3.26E+11	-319.926	40383.	0.00
1.8088	0.02292	2094649.	340.9178	-5.22E-04	0.00	3.26E+11	-348.208	47113.	0.00
2.0672	0.02133	2095596.	-744.634	-5.02E-04	0.00	3.26E+11	-351.967	51163.	0.00
2.3256	0.01981	2093097.	-1835.	-4.82E-04	0.00	3.26E+11	-351.115	54968.	0.00
2.5840	0.01834	2087162.	-2922.	-4.62E-04	0.00	3.26E+11	-349.950	59154.	0.00
2.8424	0.01694	2077801.	-4004.	-4.42E-04	0.00	3.26E+11	-348.464	63774.	0.00
3.1008	0.01560	2065029.	-5082.	-4.22E-04	0.00	3.26E+11	-346.647	68890.	0.00
3.3592	0.01432	2048865.	-6154.	-4.03E-04	0.00	3.26E+11	-344.489	74575.	0.00
3.6176	0.01310	2029328.	-7218.	-3.83E-04	0.00	3.26E+11	-341.978	80916.	0.00
3.8760	0.01195	2006445.	-8274.	-3.64E-04	0.00	3.26E+11	-339.099	88019.	0.00
4.1344	0.01085	1980243.	-9320.	-3.45E-04	0.00	3.26E+11	-335.838	96012.	0.00
4.3928	0.00980	1950754.	-10356.	-3.27E-04	0.00	3.26E+11	-332.178	105053.	0.00
4.6512	0.00882	1918015.	-11380.	-3.08E-04	0.00	3.26E+11	-328.097	115337.	0.00
4.9096	0.00789	1882065.	-12390.	-2.90E-04	0.00	3.26E+11	-323.572	127111.	0.00
5.1680	0.00702	1842950.	-13364.	-2.72E-04	0.00	3.26E+11	-304.807	134609.	0.00
5.4264	0.00620	1800850.	-14275.	-2.55E-04	0.00	3.26E+11	-282.776	141340.	0.00

MEG-33 rear abutment X direction row3

5.6848	0.00544	1755979.	-15116.	-2.38E-04	0.00	3.26E+11	-259.731	148070.	0.00
5.9432	0.00473	1708560.	-15885.	-2.22E-04	0.00	3.26E+11	-235.949	154801.	0.00
6.2016	0.00406	1658823.	-16579.	-2.06E-04	0.00	3.26E+11	-211.696	161531.	0.00
6.4600	0.00345	1607002.	-17197.	-1.90E-04	0.00	3.26E+11	-187.220	168262.	0.00
6.7184	0.00288	1553334.	-17740.	-1.75E-04	0.00	3.26E+11	-162.751	174992.	0.00
6.9768	0.00236	1498056.	-18207.	-1.61E-04	0.00	3.26E+11	-138.507	181723.	0.00
7.2352	0.00189	1441403.	-18600.	-1.47E-04	0.00	3.26E+11	-114.687	188453.	0.00
7.4936	0.00145	1383606.	-18919.	-1.33E-04	0.00	3.26E+11	-91.472	195184.	0.00
7.7520	0.00106	1324889.	-19168.	-1.20E-04	0.00	3.26E+11	-69.027	201914.	0.00
8.0104	7.06E-04	1265469.	-19349.	-1.08E-04	0.00	3.26E+11	-47.503	208645.	0.00
8.2688	3.89E-04	1205556.	-19464.	-9.64E-05	0.00	3.26E+11	-27.032	215375.	0.00
8.5272	1.08E-04	1145349.	-19518.	-8.53E-05	0.00	3.26E+11	-7.729	222106.	0.00
8.7856	-1.40E-04	1085033.	-19514.	-7.47E-05	0.00	3.26E+11	10.3037	228836.	0.00
9.0440	-3.55E-04	1024786.	-19456.	-6.46E-05	0.00	3.26E+11	26.9828	235567.	0.00
9.3024	-5.41E-04	964768.	-19349.	-5.52E-05	0.00	3.26E+11	42.2386	242297.	0.00
9.5608	-6.97E-04	905128.	-19197.	-4.63E-05	0.00	3.26E+11	56.0164	249027.	0.00
9.8192	-8.28E-04	846000.	-19004.	-3.80E-05	0.00	3.26E+11	68.2761	255758.	0.00
10.0776	-9.33E-04	787504.	-18776.	-3.02E-05	0.00	3.26E+11	78.9916	262488.	0.00
10.3360	-0.00102	729745.	-18517.	-2.30E-05	0.00	3.26E+11	88.1502	269219.	0.00
10.5944	-0.00108	672812.	-18231.	-1.64E-05	0.00	3.26E+11	95.7522	275949.	0.00
10.8528	-0.00112	616781.	-17925.	-1.02E-05	0.00	3.26E+11	101.8107	282680.	0.00
11.1112	-0.00114	561710.	-17602.	-4.64E-06	0.00	3.26E+11	106.3506	289410.	0.00
11.3696	-0.00115	507646.	-17268.	4.37E-07	0.00	3.26E+11	109.4085	296141.	0.00
11.6280	-0.00114	454619.	-16926.	5.01E-06	0.00	3.26E+11	111.0323	302871.	0.00
11.8864	-0.00111	402646.	-16581.	9.08E-06	0.00	3.26E+11	111.2806	309602.	0.00
12.1448	-0.00108	351731.	-16238.	1.27E-05	0.00	3.26E+11	110.2223	316332.	0.00
12.4032	-0.00104	301866.	-15900.	1.58E-05	0.00	3.26E+11	107.9365	323063.	0.00
12.6616	-9.83E-04	253030.	-15570.	1.84E-05	0.00	3.26E+11	104.5120	329793.	0.00
12.9200	-9.22E-04	205192.	-15253.	2.06E-05	0.00	3.26E+11	100.0469	336524.	0.00
13.1784	-8.55E-04	158310.	-14951.	2.23E-05	0.00	3.26E+11	94.6488	343254.	0.00
13.4368	-7.84E-04	112333.	-14668.	2.36E-05	0.00	3.26E+11	88.4342	349985.	0.00
13.6952	-7.09E-04	67203.	-14404.	2.44E-05	0.00	3.26E+11	81.5285	356715.	0.00
13.9536	-6.32E-04	22855.	-14163.	2.49E-05	0.00	3.26E+11	74.0659	363446.	0.00
14.2120	-5.54E-04	-20782.	-13945.	2.49E-05	0.00	3.26E+11	66.1897	370176.	0.00
14.4704	-4.78E-04	-63781.	-13753.	2.45E-05	0.00	3.26E+11	58.0515	376906.	0.00
14.7288	-4.03E-04	-106220.	-13586.	2.37E-05	0.00	3.26E+11	49.8122	383637.	0.00
14.9872	-3.31E-04	-148178.	-13444.	2.25E-05	0.00	3.26E+11	41.6413	390367.	0.00
15.2456	-2.63E-04	-189731.	-13327.	2.09E-05	0.00	3.26E+11	33.7176	397098.	0.00
15.5040	-2.01E-04	-230954.	-13234.	1.89E-05	0.00	3.26E+11	26.2288	403828.	0.00
15.7624	-1.46E-04	-271918.	-13163.	1.65E-05	0.00	3.26E+11	19.3722	410559.	0.00

MEG-33 rear abutment X direction row3

16.0208	-9.92E-05	-312688.	-6581.	1.37E-05	0.00	3.26E+11	4226.	1.32E+08	0.00
16.2792	-6.14E-05	-312814.	4454.	1.07E-05	0.00	3.26E+11	2891.	1.46E+08	0.00
16.5376	-3.27E-05	-285131.	11556.	7.89E-06	0.00	3.26E+11	1690.	1.60E+08	0.00
16.7960	-1.25E-05	-241194.	15262.	5.39E-06	0.00	3.26E+11	700.2994	1.74E+08	0.00
17.0544	6.78E-07	-190517.	16284.	3.33E-06	0.00	3.26E+11	-41.138	1.88E+08	0.00
17.3128	8.21E-06	-140230.	15390.	1.76E-06	0.00	3.26E+11	-535.538	2.02E+08	0.00
17.5712	1.16E-05	-95087.	13304.	6.45E-07	0.00	3.26E+11	-810.006	2.16E+08	0.00
17.8296	1.22E-05	-57731.	10641.	-8.04E-08	0.00	3.26E+11	-907.213	2.30E+08	0.00
18.0880	1.11E-05	-29095.	7877.	-4.93E-07	0.00	3.26E+11	-875.840	2.44E+08	0.00
18.3464	9.16E-06	-8879.	5336.	-6.73E-07	0.00	3.26E+11	-763.085	2.58E+08	0.00
18.6048	6.94E-06	3999.	3207.	-6.96E-07	0.00	3.26E+11	-609.629	2.72E+08	0.00
18.8632	4.84E-06	11016.	1569.	-6.25E-07	0.00	3.26E+11	-446.972	2.86E+08	0.00
19.1216	3.06E-06	13735.	416.2375	-5.08E-07	0.00	3.26E+11	-296.745	3.01E+08	0.00
19.3800	1.69E-06	13601.	-309.700	-3.78E-07	0.00	3.26E+11	-171.481	3.15E+08	0.00
19.6384	7.20E-07	11817.	-693.792	-2.57E-07	0.00	3.26E+11	-76.256	3.29E+08	0.00
19.8968	9.69E-08	9300.	-828.619	-1.57E-07	0.00	3.26E+11	-10.706	3.43E+08	0.00
20.1552	-2.52E-07	6679.	-800.298	-8.08E-08	0.00	3.26E+11	28.9726	3.57E+08	0.00
20.4136	-4.04E-07	4337.	-680.515	-2.84E-08	0.00	3.26E+11	48.2869	3.71E+08	0.00
20.6720	-4.28E-07	2459.	-523.285	3.86E-09	0.00	3.26E+11	53.1257	3.85E+08	0.00
20.9304	-3.80E-07	1092.	-365.153	2.07E-08	0.00	3.26E+11	48.8687	3.99E+08	0.00
21.1888	-3.00E-07	194.2408	-227.535	2.68E-08	0.00	3.26E+11	39.8941	4.13E+08	0.00
21.4472	-2.14E-07	-319.595	-120.095	2.62E-08	0.00	3.26E+11	29.4045	4.27E+08	0.00
21.7056	-1.37E-07	-550.699	-44.313	2.21E-08	0.00	3.26E+11	19.4743	4.41E+08	0.00
21.9640	-7.65E-08	-594.541	3.2916	1.67E-08	0.00	3.26E+11	11.2304	4.55E+08	0.00
22.2224	-3.36E-08	-530.387	28.5919	1.13E-08	0.00	3.26E+11	5.0882	4.69E+08	0.00
22.4808	-6.36E-09	-417.295	38.0177	6.82E-09	0.00	3.26E+11	0.9914	4.83E+08	0.00
22.7392	8.62E-09	-294.658	37.4123	3.43E-09	0.00	3.26E+11	-1.382	4.97E+08	0.00
22.9976	1.49E-08	-185.300	31.4556	1.15E-09	0.00	3.26E+11	-2.460	5.11E+08	0.00
23.2560	1.58E-08	-99.590	23.5000	-2.00E-10	0.00	3.26E+11	-2.671	5.25E+08	0.00
23.5144	1.37E-08	-39.561	15.6693	-8.61E-10	0.00	3.26E+11	-2.380	5.39E+08	0.00
23.7728	1.04E-08	-2.410	9.0941	-1.06E-09	0.00	3.26E+11	-1.861	5.53E+08	0.00
24.0312	7.11E-09	16.8435	4.1918	-9.92E-10	0.00	3.26E+11	-1.301	5.67E+08	0.00
24.2896	4.28E-09	23.5915	0.9307	-8.00E-10	0.00	3.26E+11	-0.803	5.81E+08	0.00
24.5480	2.15E-09	22.6201	-0.954	-5.80E-10	0.00	3.26E+11	-0.413	5.95E+08	0.00
24.8064	6.84E-10	17.6790	-1.802	-3.89E-10	0.00	3.26E+11	-0.134	6.09E+08	0.00
25.0648	-2.61E-10	11.4447	-1.931	-2.50E-10	0.00	3.26E+11	0.05146	6.11E+08	0.00
25.3232	-8.69E-10	5.7049	-1.586	-1.69E-10	0.00	3.26E+11	0.1713	6.11E+08	0.00
25.5816	-1.31E-09	1.6120	-0.920	-1.34E-10	0.00	3.26E+11	0.2580	6.11E+08	0.00
25.8400	-1.70E-09	0.00	0.00	-1.27E-10	0.00	3.26E+11	0.3354	3.06E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 2:

Pile-head deflection = 0.03573665 inches
 Computed slope at pile head = -0.0006587 radians
 Maximum bending moment = 2095596. inch-lbs
 Maximum shear force = -19518. lbs
 Depth of maximum bending moment = 2.06720000 feet below pile head
 Depth of maximum shear force = 8.52720000 feet below pile head
 Number of iterations = 7
 Number of zero deflection points = 5

 Summary of Pile-head Responses for Conventional Analyses

Definitions of Pile-head Loading Conditions:

Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs
 Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
 Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.
 Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs
 Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians

Load Case No.	Load Type 1	Pile-head Load 1	Load Type 2	Pile-head Load 2	Axial Loading lbs	Pile-head Deflection inches	Pile-head Rotation radians	Max Shear in Pile lbs	Max Moment in Pile in-lbs
1	V, lb	3540.	M, in-lb	1490400.	765800.	0.02526	-4.69E-04	-14359.	1551265.
2	V, lb	4770.	M, in-lb	2012400.	985500.	0.03574	-6.59E-04	-19518.	2095596.

Maximum pile-head deflection = 0.0357366512 inches

Maximum pile-head rotation = -0.0006586930 radians = -0.037740 deg.

Summary of Warning Messages

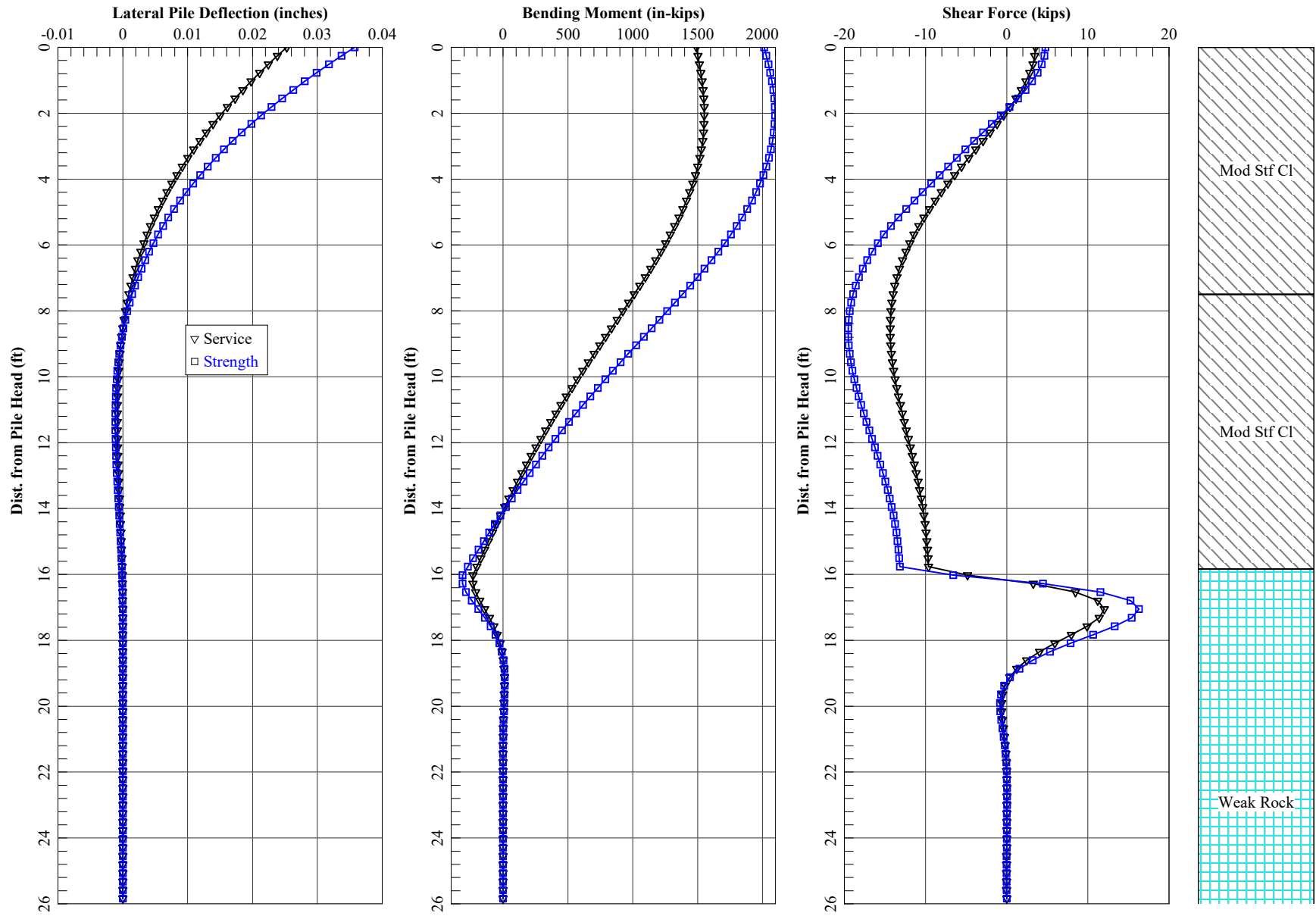
The following warning was reported 312 times

**** Warning ****

An unreasonable input value for unconfined compressive strength has been specified for a soil defined using the weak rock criteria. The input value is greater than 500 psi. Please check your input data for correctness.

The analysis ended normally.

MEG-33 Bowmans Run Bridge Rear Abutment X-Direction Row 3



MEG-33 rear abutment Z direction

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LPile for Windows, Version 2022-12.006

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method
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Files Used for Analysis

Path to file locations:

\\US0247-PPFSS01\shared_projects\173609140\119144\400-Engineering\Geotechnical\Analysis\Lpile\bridges\LPile
Analysis\Bowman's Run\Rear Abutment B-001\

Name of input data file:

MEG-33 rear abutment Z direction.lp12d

Name of output report file:

MEG-33 rear abutment Z direction.lp12o

MEG-33 rear abutment Z direction

Name of plot output file:

MEG-33 rear abutment Z direction.lp12p

Name of runtime message file:

MEG-33 rear abutment Z direction.lp12r

Date and Time of Analysis

Date: June 28, 2024

Time: 14:45:07

Problem Title

Project Name: MEG-33-19.21

Job Number: 173609140

Client: ODOT

Engineer: G. Khatri

Description: Rear Abutment Lateral Load Analysis at Bowman's Run Bridge

MEG-33 rear abutment Z direction
Program Options and Settings

Computational Options:

- Conventional Analysis

Engineering Units Used for Data Input and Computations:

- US Customary System Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed = 500
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 100.0000 in
- Number of pile increments = 100

Loading Type and Number of Cycles of Loading:

- Static loading specified

- Analysis uses p-y modification factors for p-y curves
- Analysis uses layering correction (Method of Georgiadis)
- No distributed lateral loads are entered
- Loading by lateral soil movements acting on pile not selected
- Input of shear resistance at the pile tip not selected
- Input of moment resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:

- Output files use decimal points to denote decimal symbols.
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1
- No p-y curves to be computed and reported for user-specified depths
- Print using wide report formats

MEG-33 rear abutment Z direction

Number of pile sections defined = 2
Total length of pile = 25.840 ft
Depth of ground surface below top of pile = 0.0000 ft

Pile diameters used for p-y curve computations are defined using 4 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile. A summary of values of pile diameter vs. depth follows.

Point No.	Depth Below Pile Head feet	Pile Diameter inches
1	0.000	36.0000
2	15.840	36.0000
3	15.840	30.0000
4	25.840	30.0000

Input Structural Properties for Pile Sections:

Pile Section No. 1:

Section 1 is a round drilled shaft, bored pile, or CIDH pile
Length of section = 15.840000 ft
Shaft Diameter = 36.000000 in

Pile Section No. 2:

Section 2 is a round drilled shaft, bored pile, or CIDH pile
Length of section = 10.000000 ft
Shaft Diameter = 30.000000 in

Soil and Rock Layering Information

MEG-33 rear abutment Z direction

The soil profile is modelled using 3 layers

Layer 1 is stiff clay with user-defined k-value

Distance from top of pile to top of layer	=	0.0000	ft
Distance from top of pile to bottom of layer	=	7.500000	ft
Effective unit weight at top of layer	=	125.000000	pcf
Effective unit weight at bottom of layer	=	125.000000	pcf
Undrained cohesion at top of layer	=	2500.	psf
Undrained cohesion at bottom of layer	=	2500.	psf
Epsilon-50 at top of layer	=	0.0000	
Epsilon-50 at bottom of layer	=	0.0000	
Subgrade k at top of layer	=	0.0000	pci
Subgrade k at bottom of layer	=	0.0000	pci

NOTE: Default values for Epsilon-50 will be computed for this layer.

NOTE: Default values for subgrade k will be computed for this layer.

Layer 2 is stiff clay with user-defined k-value

Distance from top of pile to top of layer	=	7.500000	ft
Distance from top of pile to bottom of layer	=	15.840000	ft
Effective unit weight at top of layer	=	122.000000	pcf
Effective unit weight at bottom of layer	=	122.000000	pcf
Undrained cohesion at top of layer	=	2000.	psf
Undrained cohesion at bottom of layer	=	2000.	psf
Epsilon-50 at top of layer	=	0.0000	
Epsilon-50 at bottom of layer	=	0.0000	
Subgrade k at top of layer	=	0.0000	pci
Subgrade k at bottom of layer	=	0.0000	pci

NOTE: Default values for Epsilon-50 will be computed for this layer.

NOTE: Default values for subgrade k will be computed for this layer.

Layer 3 is weak rock, p-y criteria by Reese, 1997

Distance from top of pile to top of layer	=	15.840000	ft
Distance from top of pile to bottom of layer	=	30.000000	ft

MEG-33 rear abutment Z direction

Effective unit weight at top of layer = 87.600000 pcf
 Effective unit weight at bottom of layer = 87.600000 pcf
 Uniaxial compressive strength at top of layer = 4380. psi
 Uniaxial compressive strength at bottom of layer = 4380. psi
 Initial modulus of rock at top of layer = 394200. psi
 Initial modulus of rock at bottom of layer = 394200. psi
 RQD of rock at top of layer = 86.000000 %
 RQD of rock at bottom of layer = 86.000000 %
 k rm of rock at top of layer = 0.0000500
 k rm of rock at bottom of layer = 0.0000500

(Depth of the lowest soil layer extends 4.160 ft below the pile tip)

 Summary of Input Soil Properties

Layer Rock Mass Num. Modulus (p-y Curve Type) psi	Soil Type Name	Layer Depth ft	Effective Unit Wt. pcf	Cohesion psf	Uniaxial qu psi	RQD %	E50 or krm	pci
1	Stiff Clay w/o	0.00	125.0000	2500.	--	--	default	default
--	Free Water, using k	7.5000	125.0000	2500.	--	--	default	default
2	Stiff Clay w/o	7.5000	122.0000	2000.	--	--	default	default
--	Free Water, using k	15.8400	122.0000	2000.	--	--	default	default
3	Weak	15.8400	87.6000	--	4380.	86.0000	5.00E-05	--
394200.	Rock	30.0000	87.6000	--	4380.	86.0000	5.00E-05	--
394200.								

MEG-33 rear abutment Z direction

 Modification Factors for p-y Curves

Distribution of p-y modifiers with depth defined using 3 points

Point No.	Depth X ft	p-mult	y-mult
1	0.000	1.0000	1.0000
2	15.840	1.0000	1.0000
3	25.840	1.0000	1.0000

 Static Loading Type

Static loading criteria were used when computing p-y curves for all analyses.

 Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 2

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length	Run Analysis
1	1	V = 63030. lbs	M = 0.0000 in-lbs	765800.	No	Yes
2	1	V = 85100. lbs	M = 0.0000 in-lbs	985500.	No	Yes

V = shear force applied normal to pile axis
 M = bending moment applied to pile head

MEG-33 rear abutment Z direction

y = lateral deflection normal to pile axis

S = pile slope relative to original pile batter angle

R = rotational stiffness applied to pile head

Values of top y vs. pile lengths can be computed only for load types with specified shear loading (Load Types 1, 2, and 3).

Thrust force is assumed to be acting axially for all pile batter angles.

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 2

Pile Section No. 1:

Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section	=	15.840000 ft
Shaft Diameter	=	36.000000 in
Concrete Cover Thickness (to edge of trans. reinf.)	=	3.000000 in
Number of Reinforcing Bars	=	8 bars
Yield Stress of Reinforcing Bars	=	50000. psi
Modulus of Elasticity of Reinforcing Bars	=	29000000. psi
Gross Area of Shaft	=	1018. sq. in.
Total Area of Reinforcing Steel	=	8.000000 sq. in.
Area Ratio of Steel Reinforcement	=	0.79 percent
Edge-to-Edge Bar Spacing	=	9.538153 in
Maximum Concrete Aggregate Size	=	0.750000 in
Ratio of Bar Spacing to Aggregate Size	=	12.72
Offset of Center of Rebar Cage from Center of Pile	=	0.0000 in
Transverse Reinforcement		
Type: Spiral		
Number of Transverse Reinf. (per spacing)	=	1
Spacing of Transverse Reinf.	=	4.000000 in

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Performed by: James Samples 6/28/2024

Checked by: Gokul Khatri 7/1/2024

MEG-33 rear abutment Z direction

Yield Stress of Transverse Reinf. = 50000. psi
 Diameter of Transverse Reinf. = 0.500000 in

Axial Structural Capacities:

Nom. Axial Structural Capacity = $0.85 F_c A_c + F_y A_s$ = 3833.578 kips
 Tensile Load for Cracking of Concrete = -446.783 kips
 Nominal Axial Tensile Capacity = -400.000 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.128000	1.000000	13.936000	0.000000
2	1.128000	1.000000	9.854240	9.854240
3	1.128000	1.000000	0.000000	13.936000
4	1.128000	1.000000	-9.85424	9.854240
5	1.128000	1.000000	-13.93600	0.000000
6	1.128000	1.000000	-9.85424	-9.85424
7	1.128000	1.000000	0.000000	-13.93600
8	1.128000	1.000000	9.854240	-9.85424

NOTE: The positions of the above rebars were computed by LPILE

Minimum spacing between any two bars not equal to zero = 9.538 inches between bars 3 and 4.

Ratio of bar spacing to maximum aggregate size = 12.72

Concrete Properties:

Compressive Strength of Concrete = 4000. psi
 Modulus of Elasticity of Concrete = 3604997. psi
 Modulus of Rupture of Concrete = -474.34165 psi

MEG-33 rear abutment Z direction

Compression Strain at Peak Stress = 0.001886
 Tensile Strain at Fracture of Concrete = -0.0001154
 Maximum Coarse Aggregate Size = 0.750000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 2

Number	Axial Thrust Force kips
1	765.800
2	985.500

Definitions of Run Messages and Notes:

- C = concrete in section has cracked in tension.
- Y = stress in reinforcing steel has reached yield stress.
- T = ACI 318 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than 0.003. See ACI 318-14, Section 21.2.3.
- Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
 Position of neutral axis is measured from edge of compression side of pile.
 Compressive stresses and strains are positive in sign.
 Tensile stresses and strains are negative in sign.

Axial Thrust Force = 765.800 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in ²	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	210.2199654	336351945.	302.0711512	0.0001888	0.0001663	0.7602095	5.4130521	
0.00000125	420.4405562	336352445.	160.0565164	0.0002001	0.0001551	0.8026804	5.6780737	
0.00000188	630.6491287	336346202.	112.7276103	0.0002114	0.0001439	0.8449367	5.9436013	

MEG-33 rear abutment Z direction

0.00000250	840.8396742	336335870.	89.0701368	0.0002227	0.0001327	0.8869773	6.2096349
0.00000313	1051.	336321979.	74.8812370	0.0002340	0.0001215	0.9288008	6.4761746
0.00000375	1261.	336304705.	65.4266245	0.0002453	0.0001103	0.9704058	6.7432204
0.00000438	1471.	336284125.	58.6773198	0.0002567	0.00009921	1.0117911	7.0107725
0.00000500	1681.	336260275.	53.6188331	0.0002681	0.00008809	1.0529553	7.2788308
0.00000563	1891.	336233176.	49.6875591	0.0002795	0.00007699	1.0938971	7.5473956
0.00000625	2101.	336202839.	46.5453346	0.0002909	0.00006591	1.1346153	7.8164669
0.00000688	2311.	336169273.	43.9769650	0.0003023	0.00005484	1.1751085	8.0860449
0.00000750	2521.	336132480.	41.8389873	0.0003138	0.00004379	1.2153753	8.3561298
0.00000813	2731.	336092464.	40.0320811	0.0003253	0.00003276	1.2554145	8.6267216
0.00000875	2940.	336049227.	38.4853031	0.0003367	0.00002175	1.2952248	8.8978207
0.00000938	3150.	336002768.	37.1466284	0.0003482	0.00001075	1.3348048	9.1694271
0.00001000	3360.	335953089.	35.9770384	0.0003598	-2.29616E-07	1.3741532	9.4415412
0.00001063	3569.	335899271.	34.9466824	0.0003713	-0.00001119	1.4132683	9.7141590
0.00001125	3778.	335835739.	34.0322719	0.0003829	-0.00002214	1.4521455	9.9872537
0.00001188	3987.	335755857.	33.2153828	0.0003944	-0.00003307	1.4907788	10.2607850
0.00001250	4196.	335654708.	32.4812751	0.0004060	-0.00004398	1.5291626	10.5347123
0.00001313	4404.	335529259.	31.8180259	0.0004176	-0.00005489	1.5672914	10.8089987
0.00001375	4611.	335378029.	31.2158925	0.0004292	-0.00006578	1.6051608	11.0836122
0.00001438	4819.	335200558.	30.6668361	0.0004408	-0.00007666	1.6427668	11.3585249
0.00001500	5025.	334996915.	30.1641635	0.0004525	-0.00008754	1.6801055	11.6337112
0.00001563	5231.	334767745.	29.7022611	0.0004641	-0.00009840	1.7171741	11.9091496
0.00001625	5436.	334513938.	29.2763840	0.0004757	-0.000109	1.7539696	12.1848210
0.00001688	5436.	322124533.	28.3881710	0.0004791	-0.000128	1.7641173	12.2187987 C
0.00001750	5436.	310620086.	27.9511295	0.0004891	-0.000141	1.7956567	12.4495483 C
0.00001813	5436.	299909048.	27.5388414	0.0004991	-0.000153	1.8266668	12.6774661 C
0.00001875	5512.	293972286.	27.1485233	0.0005090	-0.000166	1.8571362	12.9023846 C
0.00001938	5621.	290104229.	26.7785282	0.0005188	-0.000179	1.8871003	13.1245731 C
0.00002000	5726.	286288218.	26.4271301	0.0005285	-0.000191	1.9165763	13.3441355 C
0.00002063	5827.	282533459.	26.0928612	0.0005382	-0.000204	1.9455840	13.5612052 C
0.00002125	5925.	278830147.	25.7739072	0.0005477	-0.000217	1.9741094	13.7755954 C
0.00002188	6020.	275192399.	25.4693379	0.0005571	-0.000230	2.0021836	13.9875488 C
0.00002250	6112.	271630965.	25.1783202	0.0005665	-0.000243	2.0298363	14.1973040 C
0.00002313	6201.	268151963.	24.9000419	0.0005758	-0.000257	2.0570918	14.4050532 C
0.00002375	6288.	264760701.	24.6338065	0.0005851	-0.000270	2.0839760	14.6110093 C
0.00002438	6372.	261422496.	24.3776229	0.0005942	-0.000283	2.1104170	14.8144198 C
0.00002563	6534.	255000318.	23.8958892	0.0006123	-0.000310	2.1622428	15.2161452 C
0.00002688	6688.	248863574.	23.4492514	0.0006302	-0.000337	2.2126077	15.6102976 C
0.00002813	6835.	243029058.	23.0345475	0.0006478	-0.000365	2.2616621	15.9981147 C
0.00002938	6976.	237477858.	22.6480400	0.0006653	-0.000392	2.3094593	16.3798866 C

MEG-33 rear abutment Z direction

0.00003063	7111.	232193762.	22.2866483	0.0006825	-0.000420	2.3560542	16.7559421	C
0.00003188	7241.	227162744.	21.9478236	0.0006996	-0.000448	2.4015043	17.1266570	C
0.00003313	7366.	222372455.	21.6294520	0.0007165	-0.000476	2.4458691	17.4924549	C
0.00003438	7487.	217811887.	21.3297790	0.0007332	-0.000504	2.4892103	17.8538110	C
0.00003563	7605.	213471087.	21.0473513	0.0007498	-0.000533	2.5315923	18.2112574	C
0.00003688	7718.	209307729.	20.7791068	0.0007662	-0.000561	2.5729075	18.5633950	C
0.00003813	7828.	205337184.	20.5251752	0.0007825	-0.000590	2.6133212	18.9119094	C
0.00003938	7936.	201557702.	20.2850342	0.0007987	-0.000619	2.6529285	19.2577610	C
0.00004063	8041.	197932200.	20.0561423	0.0008148	-0.000648	2.6916142	19.5994552	C
0.00004188	8143.	194460687.	19.8381094	0.0008307	-0.000677	2.7294554	19.9377418	C
0.00004313	8244.	191154981.	19.6315480	0.0008466	-0.000706	2.7666226	20.2745673	C
0.00004438	8341.	187958039.	19.4325170	0.0008623	-0.000735	2.8028154	20.6061079	C
0.00004563	8437.	184919979.	19.2442774	0.0008780	-0.000764	2.8384572	20.9374972	C
0.00004688	8530.	181976647.	19.0623093	0.0008935	-0.000794	2.8731629	21.2637643	C
0.00004813	8623.	179176876.	18.8900588	0.0009091	-0.000823	2.9073705	21.5904009	C
0.00004938	8713.	176457324.	18.7228406	0.0009244	-0.000853	2.9406532	21.9117550	C
0.00005063	8802.	173866693.	18.5643709	0.0009398	-0.000883	2.9734745	22.2338288	C
0.00005188	8889.	171352249.	18.4105331	0.0009550	-0.000912	3.0054498	22.5513831	C
0.00005313	8975.	168943161.	18.2637514	0.0009703	-0.000942	3.0368989	22.8686546	C
0.00005438	9060.	166622164.	18.1226398	0.0009854	-0.000972	3.0677226	23.1842253	C
0.00005563	9143.	164375395.	17.9861179	0.0010005	-0.001002	3.0978487	-23.541756	C
0.00005688	9226.	162222836.	17.8560168	0.0010156	-0.001032	3.1275273	-24.285370	C
0.00005813	9308.	160131487.	17.7294365	0.0010305	-0.001062	3.1564746	-25.032481	C
0.00005938	9388.	158113427.	17.6076091	0.0010455	-0.001092	3.1848681	-25.780586	C
0.00006063	9468.	156174408.	17.4911933	0.0010604	-0.001122	3.2128196	-26.528009	C
0.00006188	9546.	154285228.	17.3774252	0.0010752	-0.001152	3.2400485	-27.279120	C
0.00006313	9624.	152457860.	17.2676200	0.0010900	-0.001182	3.2667358	-28.031225	C
0.00006438	9701.	150697620.	17.1624387	0.0011048	-0.001213	3.2929874	-28.782660	C
0.00006563	9777.	148989276.	17.0603870	0.0011196	-0.001243	3.3186597	-29.535763	C
0.00006688	9852.	147323411.	16.9605681	0.0011342	-0.001273	3.3436755	-30.291936	C
0.00006813	9927.	145715150.	16.8647474	0.0011489	-0.001304	3.3682619	-31.047446	C
0.00006938	10001.	144161349.	16.7727104	0.0011636	-0.001334	3.3924169	-31.802291	C
0.00007063	10074.	142643417.	16.6823997	0.0011782	-0.001364	3.4159258	-32.560272	C
0.00007188	10146.	141166141.	16.5944955	0.0011927	-0.001395	3.4388869	-33.319786	C
0.00007313	10218.	139736147.	16.5099066	0.0012073	-0.001425	3.4614229	-34.078642	C
0.00007438	10290.	138351025.	16.4284673	0.0012219	-0.001456	3.4835318	-34.836837	C
0.00007938	10569.	133150678.	16.1225585	0.0012797	-0.001578	3.5666910	-37.882973	C
0.00008438	10840.	128470050.	15.8497840	0.0013373	-0.001700	3.6422212	-40.936747	C
0.00008938	11104.	124237225.	15.6063903	0.0013948	-0.001823	3.7104072	-43.993475	C
0.00009438	11360.	120375044.	15.3863356	0.0014521	-0.001945	3.7711568	-47.056910	C

MEG-33 rear abutment Z direction

0.00009938	11611.	116840154.	15.1878571	0.0015093	-0.002068	3.8247131	-50.000000	CY
0.0001044	11830.	113343154.	15.0000352	0.0015656	-0.002192	3.8704756	-50.000000	CY
0.0001094	12008.	109784526.	14.8157660	0.0016205	-0.002317	3.9083747	-50.000000	CY
0.0001144	12181.	106496543.	14.6483521	0.0016754	-0.002442	3.9397749	-50.000000	CY
0.0001194	12348.	103441883.	14.4943284	0.0017303	-0.002567	3.9645808	-50.000000	CY
0.0001244	12510.	100584567.	14.3523135	0.0017851	-0.002692	3.9828283	-50.000000	CY
0.0001294	12629.	97618697.	14.2083733	0.0018382	-0.002819	3.9942768	-50.000000	CY
0.0001344	12698.	94496465.	14.0536796	0.0018885	-0.002949	3.9994561	-50.000000	CY
0.0001394	12763.	91574401.	13.9121518	0.0019390	-0.003078	3.9994295	-50.000000	CY
0.0001444	12824.	88822594.	13.7787758	0.0019893	-0.003208	3.9991866	-50.000000	CY
0.0001494	12881.	86230205.	13.6541689	0.0020396	-0.003338	3.9986313	-50.000000	CY
0.0001544	12935.	83792019.	13.5400008	0.0020902	-0.003467	3.9976086	-50.000000	CY
0.0001594	12986.	81481962.	13.4314034	0.0021406	-0.003597	3.9999835	-50.000000	CY
0.0001644	13034.	79293696.	13.3294103	0.0021910	-0.003726	3.9995177	-50.000000	CY
0.0001694	13080.	77224802.	13.2353911	0.0022417	-0.003856	3.9981227	-50.000000	CY
0.0001744	13124.	75265765.	13.1485635	0.0022928	-0.003985	3.9999974	-50.000000	CY
0.0001794	13165.	73394379.	13.0638987	0.0023433	-0.004114	3.9991654	50.000000	CY
0.0001844	13204.	71615471.	12.9850557	0.0023941	-0.004243	3.9968534	50.000000	CY
0.0001894	13241.	69921494.	12.9123679	0.0024453	-0.004372	3.9995285	50.000000	CY
0.0001944	13276.	68299557.	12.8466402	0.0024971	-0.004500	3.9967257	50.000000	CY
0.0001994	13309.	66752915.	12.7856694	0.0025491	-0.004628	3.9995946	50.000000	CY
0.0002044	13337.	65259109.	12.7277170	0.0026012	-0.004756	3.9962725	50.000000	CY
0.0002094	13365.	63830744.	12.6735454	0.0026535	-0.004884	3.9993424	50.000000	CY
0.0002144	13390.	62461659.	12.6238722	0.0027062	-0.005011	3.9969794	50.000000	CY
0.0002194	13414.	61147688.	12.5784072	0.0027594	-0.005138	3.9986153	50.000000	CY
0.0002244	13438.	59889181.	12.5359498	0.0028128	-0.005265	3.9999934	50.000000	CY
0.0002294	13460.	58680489.	12.4967730	0.0028664	-0.005391	3.9969588	50.000000	CY
0.0002344	13481.	57520567.	12.4601838	0.0029204	-0.005517	3.9995228	50.000000	CY
0.0002394	13502.	56405718.	12.4261845	0.0029745	-0.005643	3.9965326	50.000000	CY
0.0002444	13521.	55330596.	12.3924636	0.0030284	-0.005769	3.9976700	50.000000	CY
0.0002494	13540.	54296026.	12.3603610	0.0030824	-0.005895	3.9997169	50.000000	CY
0.0002544	13558.	53299201.	12.3305698	0.0031366	-0.006021	3.9955933	50.000000	CY
0.0002594	13575.	52338045.	12.3029331	0.0031911	-0.006146	3.9972858	50.000000	CYT
0.0002644	13592.	51411546.	12.2770423	0.0032457	-0.006272	3.9995245	50.000000	CYT
0.0002694	13608.	50517240.	12.2529716	0.0033006	-0.006397	3.9974179	50.000000	CYT
0.0002744	13623.	49651428.	12.2304689	0.0033557	-0.006522	3.9957412	50.000000	CYT
0.0003044	13672.	44918381.	12.0959895	0.0036817	-0.007276	3.9998232	50.000000	CYT
0.0003344	13672.	40888321.	12.0718370	0.0040365	-0.008001	3.9933884	50.000000	CYT

MEG-33 rear abutment Z direction

Axial Thrust Force = 985.500 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	203.9917885	326386862.	388.8590461	0.0002430	0.0002205	0.9639414	6.9860827	
0.00000125	407.9860656	326388852.	203.4511105	0.0002543	0.0002093	1.0050537	7.2511277	
0.00000188	611.9679531	326382908.	141.6580582	0.0002656	0.0001981	1.0459513	7.5166944	
0.00000250	815.9312569	326372503.	110.7687271	0.0002769	0.0001869	1.0866329	7.7827827	
0.00000313	1020.	326358330.	92.2408853	0.0002883	0.0001758	1.1270971	8.0493927	
0.00000375	1224.	326340622.	79.8937887	0.0002996	0.0001646	1.1673424	8.3165245	
0.00000438	1428.	326319476.	71.0785472	0.0003110	0.0001535	1.2073677	8.5841782	
0.00000500	1631.	326294942.	64.4707158	0.0003224	0.0001424	1.2471715	8.8523538	
0.00000563	1835.	326267046.	59.3344920	0.0003338	0.0001313	1.2867525	9.1210515	
0.00000625	2039.	326235805.	55.2283942	0.0003452	0.0001202	1.3261094	9.3902715	
0.00000688	2243.	326201227.	51.8714798	0.0003566	0.0001091	1.3652407	9.6600138	
0.00000750	2446.	326163319.	49.0764535	0.0003681	0.00009807	1.4041451	9.9302787	
0.00000813	2650.	326122085.	46.7136499	0.0003795	0.00008705	1.4428212	10.2010663	
0.00000875	2853.	326077526.	44.6904504	0.0003910	0.00007604	1.4812678	10.4723768	
0.00000938	3057.	326029644.	42.9389351	0.0004026	0.00006505	1.5194834	10.7442105	
0.00001000	3260.	325978439.	41.4081640	0.0004141	0.00005408	1.5574667	11.0165676	
0.00001063	3463.	325923911.	40.0591830	0.0004256	0.00004313	1.5952163	11.2894483	
0.00001125	3666.	325866060.	38.8616946	0.0004372	0.00003219	1.6327308	11.5628529	
0.00001188	3869.	325804884.	37.7917798	0.0004488	0.00002128	1.6700090	11.8367817	
0.00001250	4072.	325740383.	36.8303033	0.0004604	0.00001038	1.7070493	12.1112350	
0.00001313	4274.	325672555.	35.9617747	0.0004720	-5.01706E-07	1.7438506	12.3862131	
0.00001375	4477.	325600882.	35.1735127	0.0004836	-0.00001136	1.7804110	12.6617132	
0.00001438	4679.	325522318.	34.4550016	0.0004953	-0.00002221	1.8167270	12.9377163	
0.00001500	4881.	325432923.	33.7974547	0.0005070	-0.00003304	1.8527943	13.2141928	
0.00001563	5083.	325329376.	33.1934873	0.0005186	-0.00004385	1.8886081	13.4911115	
0.00001625	5285.	325209160.	32.6368528	0.0005303	-0.00005465	1.9241642	13.7684419	
0.00001688	5486.	325070637.	32.1222355	0.0005421	-0.00006544	1.9594584	14.0461565	
0.00001750	5686.	324912770.	31.6450834	0.0005538	-0.00007621	1.9944871	14.3242299	
0.00001813	5886.	324735145.	31.2014791	0.0005655	-0.00008697	2.0292472	14.6026400	
0.00001875	6085.	324537642.	30.7880306	0.0005773	-0.00009772	2.0637356	14.8813667	
0.00001938	6284.	324320367.	30.4017860	0.0005890	-0.000108	2.0979496	15.1603911	
0.00002000	6284.	314185356.	29.7226196	0.0005945	-0.000126	2.1134338	15.2555194	C
0.00002063	6284.	304664587.	29.3330884	0.0006050	-0.000138	2.1436908	15.4992661	C
0.00002125	6377.	300112242.	28.9621023	0.0006154	-0.000150	2.1734373	15.7403206	C

MEG-33 rear abutment Z direction

0.00002188	6501.	297175532.	28.6084526	0.0006258	-0.000162	2.2027032	15.9789246	C
0.00002250	6620.	294220651.	28.2707001	0.0006361	-0.000174	2.2314949	16.2150819	C
0.00002313	6735.	291260281.	27.9476923	0.0006463	-0.000186	2.2598268	16.4488837	C
0.00002375	6847.	288315485.	27.6386715	0.0006564	-0.000199	2.2877314	16.6806100	C
0.00002438	6956.	285394864.	27.3427172	0.0006665	-0.000211	2.3152239	16.9103708	C
0.00002563	7166.	279648602.	26.7866618	0.0006864	-0.000236	2.3690240	17.3643506	C
0.00002688	7363.	273987420.	26.2714783	0.0007060	-0.000261	2.4211739	17.8098710	C
0.00002813	7551.	268495773.	25.7939669	0.0007255	-0.000287	2.4718776	18.2487669	C
0.00002938	7730.	263156607.	25.3489516	0.0007446	-0.000313	2.5211371	18.6807258	C
0.00003063	7900.	257972225.	24.9326418	0.0007636	-0.000339	2.5689975	19.1059151	C
0.00003188	8063.	252967524.	24.5427305	0.0007823	-0.000365	2.6155733	19.5253241	C
0.00003313	8220.	248139779.	24.1765243	0.0008008	-0.000392	2.6609135	19.9392362	C
0.00003438	8370.	243486447.	23.8317642	0.0008192	-0.000418	2.7050686	20.3479776	C
0.00003563	8515.	239005070.	23.5065522	0.0008374	-0.000445	2.7480907	20.7519192	C
0.00003688	8654.	234693214.	23.1992930	0.0008555	-0.000472	2.7900339	21.1514815	C
0.00003813	8789.	230526427.	22.9076383	0.0008734	-0.000499	2.8308652	21.5460201	C
0.00003938	8919.	226508980.	22.6306521	0.0008911	-0.000526	2.8706542	21.9361635	C
0.00004063	9045.	222648666.	22.3678140	0.0009087	-0.000554	2.9094938	22.3228935	C
0.00004188	9168.	218943532.	22.1183480	0.0009262	-0.000581	2.9474423	22.7068058	C
0.00004313	9287.	215348370.	21.8793292	0.0009435	-0.000609	2.9843490	23.0856985	C
0.00004438	9403.	211891844.	21.6516375	0.0009608	-0.000637	3.0203977	23.4618387	C
0.00004563	9516.	208575033.	21.4349839	0.0009780	-0.000665	3.0556599	23.8360756	C
0.00004688	9626.	205346136.	21.2260711	0.0009950	-0.000693	3.0899142	24.2051278	C
0.00004813	9734.	202257565.	21.0275721	0.0010120	-0.000721	3.1234937	24.5735680	C
0.00004938	9838.	199252423.	20.8359107	0.0010288	-0.000749	3.1561330	24.9374072	C
0.00005063	9941.	196369599.	20.6531876	0.0010456	-0.000777	3.1881021	25.3004736	C
0.00005188	10041.	193566417.	20.4766067	0.0010622	-0.000805	3.2191950	25.6595328	C
0.00005313	10140.	190875821.	20.3081117	0.0010789	-0.000834	3.2496589	26.0182472	C
0.00005438	10236.	188251240.	20.1445329	0.0010954	-0.000862	3.2792397	26.3724980	C
0.00005563	10332.	185737926.	19.9888563	0.0011119	-0.000891	3.3082795	26.7276365	C
0.00005688	10424.	183275723.	19.8367923	0.0011282	-0.000919	3.3364049	27.0774470	C
0.00005813	10515.	180909986.	19.6915567	0.0011446	-0.000948	3.3639749	27.4277430	C
0.00005938	10605.	178613137.	19.5510732	0.0011608	-0.000977	3.3908260	27.7756918	C
0.00006063	10693.	176380055.	19.4149615	0.0011770	-0.001005	3.4169586	28.1211418	C
0.00006188	10781.	174231456.	19.2848273	0.0011932	-0.001034	3.4425651	28.4674496	C
0.00006313	10866.	172127043.	19.1574372	0.0012093	-0.001063	3.4673611	28.8093461	C
0.00006438	10950.	170090563.	19.0347585	0.0012254	-0.001092	3.4915702	29.1508025	C
0.00006563	11033.	168126358.	18.9171981	0.0012414	-0.001121	3.5152593	29.4931052	C
0.00006688	11114.	166197842.	18.8016112	0.0012574	-0.001150	3.5381499	29.8307125	C
0.00006813	11195.	164329510.	18.6901932	0.0012733	-0.001179	3.5604800	30.1681756	C

MEG-33 rear abutment Z direction

0.00006938	11275.	162523588.	18.5832058	0.0012892	-0.001208	3.5822962	30.5064735	C
0.00007063	11354.	160757672.	18.4786039	0.0013051	-0.001237	3.6034250	30.8419027	C
0.00007188	11431.	159035226.	18.3767719	0.0013208	-0.001267	3.6239243	31.1755212	C
0.00007313	11507.	157367113.	18.2788116	0.0013366	-0.001296	3.6439157	31.5099675	C
0.00007438	11584.	155750544.	18.1845298	0.0013525	-0.001325	3.6633965	31.8452455	C
0.00007938	11879.	149651551.	17.8303493	0.0014153	-0.001442	3.7352557	-33.951852	C
0.00008438	12161.	144128808.	17.5140442	0.0014777	-0.001560	3.7981675	-36.864511	C
0.00008938	12432.	139101865.	17.2303448	0.0015400	-0.001678	3.8523548	-39.784387	C
0.00009438	12694.	134507743.	16.9755777	0.0016021	-0.001795	3.8980170	-42.707353	C
0.00009938	12948.	130293291.	16.7469216	0.0016642	-0.001913	3.9352810	-45.628953	C
0.0001044	13191.	126384816.	16.5371928	0.0017261	-0.002031	3.9639833	-48.559572	C
0.0001094	13425.	122744437.	16.3484517	0.0017881	-0.002149	3.9843870	-50.000000	CY
0.0001144	13612.	119011329.	16.1620312	0.0018485	-0.002269	3.9961755	-50.000000	CY
0.0001194	13779.	115423118.	15.9892131	0.0019087	-0.002389	3.9997009	-50.000000	CY
0.0001244	13937.	112054355.	15.8287933	0.0019687	-0.002509	3.9990215	-50.000000	CY
0.0001294	14090.	108906531.	15.6849424	0.0020292	-0.002628	3.9995483	-50.000000	CY
0.0001344	14235.	105935157.	15.5508282	0.0020896	-0.002748	3.9997696	-50.000000	CY
0.0001394	14354.	102989737.	15.4207507	0.0021493	-0.002868	3.9998110	-50.000000	CY
0.0001444	14428.	99932061.	15.2859374	0.0022069	-0.002991	3.9996674	-50.000000	CY
0.0001494	14482.	96950710.	15.1522097	0.0022634	-0.003114	3.9992270	50.000000	CY
0.0001544	14533.	94138725.	15.0306519	0.0023204	-0.003237	3.9983508	50.000000	CY
0.0001594	14578.	91472822.	14.9196998	0.0023778	-0.003360	3.9987870	50.000000	CY
0.0001644	14617.	88923333.	14.8153480	0.0024353	-0.003482	3.9998053	50.000000	CY
0.0001694	14652.	86507502.	14.7202165	0.0024932	-0.003604	3.9987555	50.000000	CY
0.0001744	14685.	84212361.	14.6338144	0.0025518	-0.003726	3.9980050	50.000000	CY
0.0001794	14714.	82030066.	14.5526774	0.0026104	-0.003847	3.9996154	50.000000	CY
0.0001844	14741.	79949585.	14.4744302	0.0026687	-0.003969	3.9974917	50.000000	CY
0.0001894	14766.	77971421.	14.4020617	0.0027274	-0.004090	3.9998623	50.000000	CY
0.0001944	14789.	76087099.	14.3352437	0.0027864	-0.004211	3.9977717	50.000000	CY
0.0001994	14812.	74291358.	14.2732507	0.0028457	-0.004332	3.9998985	50.000000	CY
0.0002044	14833.	72575837.	14.2156871	0.0029053	-0.004452	3.9974338	50.000000	CY
0.0002094	14851.	70930899.	14.1583641	0.0029644	-0.004573	3.9997537	50.000000	CY
0.0002144	14868.	69357401.	14.1051807	0.0030238	-0.004694	3.9961282	50.000000	CY
0.0002194	14885.	67851145.	14.0557151	0.0030835	-0.004814	3.9991858	50.000000	CY
0.0002244	14900.	66408435.	14.0095562	0.0031434	-0.004934	3.9983976	50.000000	CY
0.0002294	14915.	65023572.	13.9668498	0.0032036	-0.005054	3.9977121	50.000000	CY
0.0002344	14929.	63695164.	13.9268526	0.0032641	-0.005173	3.9997684	50.000000	CY
0.0002394	14941.	62418360.	13.8897192	0.0033249	-0.005293	3.9947663	50.000000	CY
0.0002444	14953.	61190000.	13.8547320	0.0033858	-0.005412	3.9981938	50.000000	CY
0.0002494	14964.	60006116.	13.8193973	0.0034462	-0.005531	3.9998610	50.000000	CY

MEG-33 rear abutment Z direction

0.0002544	14974.	58865554.	13.7865947	0.0035070	-0.005651	3.9943153	50.0000000 CY
0.0002594	14983.	57766524.	13.7559764	0.0035680	-0.005770	3.9976467	50.0000000 CY
0.0002644	14992.	56707417.	13.7272059	0.0036291	-0.005888	3.9996407	50.0000000 CY
0.0002694	15000.	55685311.	13.7004028	0.0036905	-0.006007	3.9967903	50.0000000 CY
0.0002744	15008.	54697896.	13.6755600	0.0037522	-0.006125	3.9959323	50.0000000 CYT
0.0003044	15008.	49306727.	13.8733038	0.0042227	-0.006735	3.9995748	50.0000000 CYT

 Summary of Results for Nominal Moment Capacity for Section 1

Moment values interpolated at maximum compressive strain = 0.003
 or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain	Max. Tens. Strain
1	765.800	13511.243	0.00300000	-0.00570261
2	985.500	14861.546	0.00300000	-0.00464537

Note that the values of moment capacity in the table above are not factored by a strength reduction factor (phi-factor).

In ACI 318, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.75).

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318, or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Load No.	Resist. Factor	Nominal Ax. Thrust kips	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in^2
1	0.65	765.800000	13511.	497.770000	8782.	174437239.

MEG-33 rear abutment Z direction						
2	0.65	985.500000	14862.	640.575000	9660.	204362639.
1	0.75	765.800000	13511.	574.350000	10133.	141430041.
2	0.75	985.500000	14862.	739.125000	11146.	165462302.
1	0.90	765.800000	13511.	689.220000	12160.	106885023.
2	0.90	985.500000	14862.	886.950000	13375.	123519694.

Pile Section No. 2:

Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section	=	10.000000	ft
Shaft Diameter	=	30.000000	in
Concrete Cover Thickness (to edge of trans. reinf.)	=	3.000000	in
Number of Reinforcing Bars	=	8	bars
Yield Stress of Reinforcing Bars	=	50000.	psi
Modulus of Elasticity of Reinforcing Bars	=	29000000.	psi
Gross Area of Shaft	=	706.858347	sq. in.
Total Area of Reinforcing Steel	=	8.000000	sq. in.
Area Ratio of Steel Reinforcement	=	1.13	percent
Edge-to-Edge Bar Spacing	=	7.242052	in
Maximum Concrete Aggregate Size	=	0.750000	in
Ratio of Bar Spacing to Aggregate Size	=	9.66	
Offset of Center of Rebar Cage from Center of Pile	=	0.0000	in
Transverse Reinforcement			
Type: Spiral			
Number of Transverse Reinf. (per spacing)	=	1	
Spacing of Transverse Reinf.	=	4.000000	in
Yield Stress of Transverse Reinf.	=	50000.	psi
Diameter of Transverse Reinf.	=	0.500000	in

Axial Structural Capacities:

Nom. Axial Structural Capacity = $0.85 F_c A_c + F_y A_s$	=	2776.118	kips
Tensile Load for Cracking of Concrete	=	-317.428	kips

MEG-33 rear abutment Z direction

Nominal Axial Tensile Capacity = -400.000 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.128000	1.000000	10.936000	0.000000
2	1.128000	1.000000	7.732920	7.732920
3	1.128000	1.000000	0.000000	10.936000
4	1.128000	1.000000	-7.73292	7.732920
5	1.128000	1.000000	-10.93600	0.000000
6	1.128000	1.000000	-7.73292	-7.73292
7	1.128000	1.000000	0.000000	-10.93600
8	1.128000	1.000000	7.732920	-7.73292

NOTE: The positions of the above rebars were computed by LPILE

Minimum spacing between any two bars not equal to zero = 7.242 inches between bars 1 and 2.

Ratio of bar spacing to maximum aggregate size = 9.66

Concrete Properties:

Compressive Strength of Concrete = 4000. psi
Modulus of Elasticity of Concrete = 3604997. psi
Modulus of Rupture of Concrete = -474.34165 psi
Compression Strain at Peak Stress = 0.001886
Tensile Strain at Fracture of Concrete = -0.0001154
Maximum Coarse Aggregate Size = 0.750000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 2

Number Axial Thrust Force

MEG-33 rear abutment Z direction

kips

1	765.800
2	985.500

Definitions of Run Messages and Notes:

- C = concrete in section has cracked in tension.
- Y = stress in reinforcing steel has reached yield stress.
- T = ACI 318 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than 0.003. See ACI 318-14, Section 21.2.3.
- Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
 Position of neutral axis is measured from edge of compression side of pile.
 Compressive stresses and strains are positive in sign.
 Tensile stresses and strains are negative in sign.

Axial Thrust Force = 765.800 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in ²	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
0.00000125	197.4044128	157923530.	219.5675756	0.0002745	0.0002370	1.0786650	7.8342621	
0.00000250	394.8021616	157920865.	117.3134327	0.0002933	0.0002183	1.1458227	8.2550989	
0.00000375	592.1671762	157911247.	83.2418927	0.0003122	0.0001997	1.2123744	8.6773683	
0.00000500	789.4830872	157896617.	66.2160055	0.0003311	0.0001811	1.2783139	9.1010708	
0.00000625	986.7335183	157877363.	56.0083817	0.0003501	0.0001626	1.3436350	9.5262067	
0.00000750	1184.	157853611.	49.2098921	0.0003691	0.0001441	1.4083314	9.9527766	
0.00000875	1381.	157825416.	44.3594818	0.0003881	0.0001256	1.4723971	10.3807810	
0.00001000	1578.	157792802.	40.7266237	0.0004073	0.0001073	1.5358257	10.8102209	
0.00001125	1775.	157755782.	37.9054698	0.0004264	0.00008894	1.5986111	11.2410971	
0.00001250	1971.	157714363.	35.6525117	0.0004457	0.00007066	1.6607471	11.6734105	
0.00001375	2168.	157668547.	33.8127898	0.0004649	0.00005243	1.7222273	12.1071625	

MEG-33 rear abutment Z direction

0.00001500	2364.	157618334.	32.2829979	0.0004842	0.00003424	1.7830456	12.5423541
0.00001625	2560.	157563722.	30.9916166	0.0005036	0.00001611	1.8431957	12.9789869
0.00001750	2756.	157504709.	29.8875610	0.0005230	-0.00000197	1.9026713	13.4170622
0.00001875	2952.	157440037.	28.9333368	0.0005425	-0.00002000	1.9614643	13.8565644
0.00002000	3147.	157363761.	28.1006902	0.0005620	-0.00003799	2.0195587	14.2974004
0.00002125	3342.	157269831.	27.3679625	0.0005816	-0.00005593	2.0769359	14.7394445
0.00002250	3536.	157154330.	26.7183165	0.0006012	-0.00007384	2.1335783	15.1825766
0.00002375	3729.	157015272.	26.1384812	0.0006208	-0.00009171	2.1894708	15.6266915
0.00002500	3921.	156852081.	25.6178630	0.0006404	-0.000110	2.2446002	16.0717008
0.00002625	3921.	149382935.	24.9011218	0.0006537	-0.000134	2.2809916	16.3296665 C
0.00002750	4025.	146374609.	24.4137367	0.0006714	-0.000154	2.3294011	16.7185801 C
0.00002875	4148.	144270761.	23.9608348	0.0006889	-0.000174	2.3765057	17.1009086 C
0.00003000	4265.	142160332.	23.5395615	0.0007062	-0.000194	2.4224482	17.4779186 C
0.00003125	4376.	140030635.	23.1451509	0.0007233	-0.000214	2.4671703	17.8487306 C
0.00003250	4483.	137928528.	22.7761780	0.0007402	-0.000235	2.5108371	18.2149228 C
0.00003375	4585.	135863045.	22.4301353	0.0007570	-0.000255	2.5534940	18.5768075 C
0.00003500	4684.	133836383.	22.1046329	0.0007737	-0.000276	2.5951637	18.9344525 C
0.00003625	4779.	131846864.	21.7974395	0.0007902	-0.000297	2.6358528	19.2877458 C
0.00003750	4871.	129896953.	21.5068416	0.0008065	-0.000318	2.6755885	19.6368153 C
0.00003875	4960.	127990106.	21.2314431	0.0008227	-0.000340	2.7144062	19.9818968 C
0.00004000	5045.	126129320.	20.9700527	0.0008388	-0.000361	2.7523430	20.3232613 C
0.00004125	5128.	124317149.	20.7216533	0.0008548	-0.000383	2.7894373	20.6612154 C
0.00004250	5209.	122555742.	20.4853778	0.0008706	-0.000404	2.8257289	20.9961032 C
0.00004375	5287.	120844005.	20.2602966	0.0008864	-0.000426	2.8612396	21.3280630 C
0.00004500	5362.	119166114.	20.0445464	0.0009020	-0.000448	2.8958871	21.6558825 C
0.00004625	5436.	117541434.	19.8387573	0.0009175	-0.000470	2.9298268	21.9814206 C
0.00004750	5509.	115971101.	19.6424899	0.0009330	-0.000492	2.9631023	22.3051550 C
0.00004875	5578.	114428749.	19.4532811	0.0009483	-0.000514	2.9955408	22.6246388 C
0.00005125	5714.	111492105.	19.0990414	0.0009788	-0.000559	3.0585011	23.2583879 C
0.00005375	5844.	108717703.	18.7720030	0.0010090	-0.000604	3.1188085	23.8831720 C
0.00005625	5968.	106093956.	18.4688995	0.0010389	-0.000649	3.1765642	24.4995794 C
0.00005875	6087.	103610986.	18.1870744	0.0010685	-0.000694	3.2318694	25.1082901 C
0.00006125	6202.	101260235.	17.9243608	0.0010979	-0.000740	3.2848244	25.7100835 C
0.00006375	6313.	99034169.	17.6789902	0.0011270	-0.000785	3.3355289	26.3058453 C
0.00006625	6421.	96926064.	17.4495227	0.0011560	-0.000831	3.3840810	26.8965831 C
0.00006875	6526.	94929814.	17.2347936	0.0011849	-0.000878	3.4305767	27.4834324 C
0.00007125	6628.	93022423.	17.0317535	0.0012135	-0.000924	3.4748780	28.0632983 C
0.00007375	6727.	91211590.	16.8409320	0.0012420	-0.000970	3.5172174	28.6398561 C
0.00007625	6824.	89493648.	16.6618094	0.0012705	-0.001017	3.5576899	29.2146137 C
0.00007875	6918.	87843716.	16.4910138	0.0012987	-0.001064	3.5960677	29.7824154 C

MEG-33 rear abutment Z direction

0.00008125	7010.	86280493.	16.3310020	0.0013269	-0.001111	3.6327327	30.3508612	C
0.00008375	7100.	84776059.	16.1779145	0.0013549	-0.001158	3.6673843	30.9129226	C
0.00008625	7189.	83347660.	16.0342777	0.0013830	-0.001205	3.7003769	31.4764248	C
0.00008875	7275.	81969136.	15.8962482	0.0014108	-0.001252	3.7314044	32.0335315	C
0.00009125	7360.	80658401.	15.7667403	0.0014387	-0.001299	3.7608271	32.5931743	C
0.00009375	7443.	79391194.	15.6419209	0.0014664	-0.001346	3.7883405	33.1467852	C
0.00009625	7525.	78179731.	15.5240187	0.0014942	-0.001393	3.8142113	33.7016032	C
0.00009875	7605.	77016430.	15.4118707	0.0015219	-0.001441	3.8383783	34.2558071	C
0.0001013	7684.	75892307.	15.3040311	0.0015495	-0.001488	3.8607636	34.8063990	C
0.0001038	7762.	74815615.	15.2022432	0.0015772	-0.001535	3.8815458	35.3595620	C
0.0001063	7839.	73776451.	15.1047621	0.0016049	-0.001583	3.9006148	35.9112362	C
0.0001088	7914.	72771343.	15.0110884	0.0016325	-0.001630	3.9179668	36.4607829	C
0.0001113	7988.	71805088.	14.9224377	0.0016601	-0.001677	3.9337048	-37.513423	C
0.0001138	8062.	70873453.	14.8381257	0.0016878	-0.001725	3.9477925	-38.634545	C
0.0001163	8134.	69966385.	14.7560569	0.0017154	-0.001772	3.9601315	-39.760330	C
0.0001188	8205.	69091554.	14.6782251	0.0017430	-0.001819	3.9708431	-40.883425	C
0.0001213	8275.	68246870.	14.6043784	0.0017708	-0.001867	3.9799105	-42.003792	C
0.0001238	8344.	67428384.	14.5337460	0.0017986	-0.001914	3.9873009	-43.123332	C
0.0001263	8412.	66629895.	14.4648892	0.0018262	-0.001961	3.9929809	-44.246612	C
0.0001288	8479.	65856796.	14.3994615	0.0018539	-0.002009	3.9970006	-45.367075	C
0.0001313	8545.	65107545.	14.3372776	0.0018818	-0.002056	3.9993421	-46.484676	C
0.0001338	8611.	64380608.	14.2781758	0.0019097	-0.002103	3.9989426	-47.599339	C
0.0001363	8675.	63670789.	14.2209808	0.0019376	-0.002150	3.9998881	-48.715039	C
0.0001388	8738.	62977252.	14.1656266	0.0019655	-0.002197	3.9993056	-49.831625	C
0.0001413	8800.	62298221.	14.1126962	0.0019934	-0.002244	3.9996206	-50.000000	CY
0.0001438	8857.	61612419.	14.0608181	0.0020212	-0.002291	3.9997134	-50.000000	CY
0.0001463	8909.	60915298.	14.0093788	0.0020489	-0.002339	3.9986356	-50.000000	CY
0.0001488	8956.	60209798.	13.9585064	0.0020763	-0.002386	3.9998699	-50.000000	CY
0.0001588	9122.	57462620.	13.7636086	0.0021850	-0.002578	3.9998674	-50.000000	CY
0.0001688	9277.	54975882.	13.5981461	0.0022947	-0.002768	3.9994610	-50.000000	CY
0.0001788	9419.	52693801.	13.4547961	0.0024050	-0.002957	3.9977949	50.000000	CY
0.0001888	9512.	50395231.	13.3170331	0.0025136	-0.003149	3.9993595	50.000000	CY
0.0001988	9554.	48068378.	13.1743652	0.0026184	-0.003344	3.9998048	50.000000	CY
0.0002088	9586.	45921265.	13.0507011	0.0027243	-0.003538	3.9999389	50.000000	CY
0.0002188	9613.	43944216.	12.9366675	0.0028299	-0.003733	3.9999292	50.000000	CY
0.0002288	9637.	42128138.	12.8367702	0.0029364	-0.003926	3.9997937	50.000000	CY
0.0002388	9658.	40453816.	12.7489963	0.0030438	-0.004119	3.9993383	50.000000	CY
0.0002488	9676.	38899385.	12.6662819	0.0031507	-0.004312	3.9980665	50.000000	CY
0.0002588	9692.	37458136.	12.5930156	0.0032584	-0.004504	3.9956939	50.000000	CY
0.0002688	9707.	36117755.	12.5280814	0.0033669	-0.004696	3.9998661	50.000000	CY

MEG-33 rear abutment Z direction

0.0002788	9719.	34867672.	12.4705423	0.0034762	-0.004886	3.9981291	50.0000000	CY
0.0002888	9730.	33697943.	12.4166948	0.0035853	-0.005077	3.9969079	50.0000000	CY
0.0002988	9740.	32600945.	12.3673133	0.0036947	-0.005268	3.9990644	50.0000000	CY
0.0003088	9748.	31571644.	12.3231021	0.0038048	-0.005458	3.9940171	50.0000000	CY

Axial Thrust Force = 985.500 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
0.00000125	188.5185878	150814870.	283.9257569	0.0003549	0.0003174	1.3629710	10.1672462	
0.00000250	377.0328356	150813134.	149.4939282	0.0003737	0.0002987	1.4267696	10.5881848	
0.00000375	565.5127979	150803413.	104.6971174	0.0003926	0.0002801	1.4899609	11.0106240	
0.00000500	753.9413288	150788266.	82.3090635	0.0004115	0.0002615	1.5525383	11.4345642	
0.00000625	942.3012780	150768204.	68.8845149	0.0004305	0.0002430	1.6144952	11.8600057	
0.00000750	1131.	150743397.	59.9417219	0.0004496	0.0002246	1.6758254	12.2869494	
0.00000875	1319.	150713913.	53.5599350	0.0004686	0.0002061	1.7365222	12.7153960	
0.00001000	1507.	150679789.	48.7787801	0.0004878	0.0001878	1.7965792	13.1453462	
0.00001125	1695.	150641041.	45.0647162	0.0005070	0.0001695	1.8559898	13.5768012	
0.00001250	1882.	150597678.	42.0976194	0.0005262	0.0001512	1.9147474	14.0097621	
0.00001375	2070.	150549703.	39.6737746	0.0005455	0.0001330	1.9728457	14.4442301	
0.00001500	2257.	150497117.	37.6573722	0.0005649	0.0001149	2.0302779	14.8802069	
0.00001625	2445.	150439918.	35.9543903	0.0005843	0.00009676	2.0870376	15.3176940	
0.00001750	2632.	150378105.	34.4976709	0.0006037	0.00007871	2.1431181	15.7566930	
0.00001875	2818.	150311673.	33.2379649	0.0006232	0.00006071	2.1985130	16.1972060	
0.00002000	3005.	150240618.	32.1383358	0.0006428	0.00004277	2.2532155	16.6392348	
0.00002125	3191.	150164933.	31.1705382	0.0006624	0.00002487	2.3072190	17.0827817	
0.00002250	3377.	150084614.	30.3126038	0.0006820	0.00000703	2.3605170	17.5278490	
0.00002375	3562.	149999570.	29.5471871	0.0007017	-0.00001075	2.4131026	17.9744377	
0.00002500	3748.	149907979.	28.8603639	0.0007215	-0.00002849	2.4649658	18.4225139	
0.00002625	3932.	149806160.	28.2407976	0.0007413	-0.00004618	2.5160925	18.8719947	
0.00002750	4116.	149690890.	27.6791995	0.0007612	-0.00006382	2.5664681	19.3227867	
0.00002875	4300.	149559856.	27.1679002	0.0007811	-0.00008142	2.6160788	19.7747994	
0.00003000	4482.	149411635.	26.7005184	0.0008010	-0.00009898	2.6649121	20.2279511	
0.00003125	4530.	144964230.	26.1402693	0.0008169	-0.000121	2.7030565	20.5630566	C
0.00003250	4668.	143616949.	25.7066961	0.0008355	-0.000140	2.7471040	20.9769362	C
0.00003375	4799.	142198909.	25.3003772	0.0008539	-0.000159	2.7900078	21.3860568	C
0.00003500	4925.	140720937.	24.9182344	0.0008721	-0.000178	2.8317753	21.7902580	C

MEG-33 rear abutment Z direction

0.00003625	5046.	139208730.	24.5583082	0.0008902	-0.000197	2.8724716	22.1901091	C
0.00003750	5163.	137672071.	24.2184309	0.0009082	-0.000217	2.9121190	22.5856687	C
0.00003875	5275.	136119806.	23.8967424	0.0009260	-0.000237	2.9507422	22.9770269	C
0.00004000	5382.	134559918.	23.5916428	0.0009437	-0.000256	2.9883673	23.3643057	C
0.00004125	5486.	132999602.	23.3017528	0.0009612	-0.000276	3.0250221	23.7476594	C
0.00004250	5587.	131447411.	23.0259884	0.0009786	-0.000296	3.0607449	24.1274058	C
0.00004375	5684.	129911939.	22.7634738	0.0009959	-0.000317	3.0955797	24.5039700	C
0.00004500	5778.	128398561.	22.5133439	0.0010131	-0.000337	3.1295604	24.8776639	C
0.00004625	5870.	126910723.	22.2747818	0.0010302	-0.000357	3.1627153	25.2487388	C
0.00004750	5959.	125451176.	22.0470668	0.0010472	-0.000378	3.1950719	25.6174596	C
0.00004875	6045.	123998567.	21.8281205	0.0010641	-0.000398	3.2265266	25.9820679	C
0.00005125	6211.	121185226.	21.4179564	0.0010977	-0.000440	3.2871596	26.7048754	C
0.00005375	6367.	118463154.	21.0389355	0.0011308	-0.000482	3.3446711	27.4167521	C
0.00005625	6517.	115850136.	20.6883204	0.0011637	-0.000524	3.3992757	28.1200103	C
0.00005875	6659.	113342336.	20.3627500	0.0011963	-0.000566	3.4510628	28.8150976	C
0.00006125	6795.	110936420.	20.0594600	0.0012286	-0.000609	3.5001214	29.5025523	C
0.00006375	6925.	108629398.	19.7761697	0.0012607	-0.000652	3.5465394	30.1830064	C
0.00006625	7050.	106418510.	19.5109946	0.0012926	-0.000695	3.5904023	30.8571862	C
0.00006875	7171.	104301159.	19.2623790	0.0013243	-0.000738	3.6317934	31.5259290	C
0.00007125	7287.	102274851.	19.0290428	0.0013558	-0.000782	3.6707925	32.1901965	C
0.00007375	7399.	100323399.	18.8085367	0.0013871	-0.000825	3.7073562	32.8480700	C
0.00007625	7507.	98451230.	18.6005071	0.0014183	-0.000869	3.7416053	33.5015588	C
0.00007875	7612.	96661271.	18.4047463	0.0014494	-0.000913	3.7736489	34.1529021	C
0.00008125	7714.	94936247.	18.2189511	0.0014803	-0.000957	3.8034130	34.7993411	C
0.00008375	7812.	93278394.	18.0429302	0.0015111	-0.001001	3.8309837	35.4425793	C
0.00008625	7908.	91690113.	17.8767738	0.0015419	-0.001046	3.8564488	36.0849681	C
0.00008875	8001.	90151982.	17.7178202	0.0015725	-0.001090	3.8796948	36.7218020	C
0.00009125	8092.	88681261.	17.5681590	0.0016031	-0.001134	3.9009244	37.3601786	C
0.00009375	8180.	87252756.	17.4242970	0.0016335	-0.001179	3.9199721	37.9926204	C
0.00009625	8266.	85884113.	17.2886277	0.0016640	-0.001223	3.9370251	38.6270698	C
0.00009875	8350.	84556736.	17.1584190	0.0016944	-0.001268	3.9519726	39.2574852	C
0.0001013	8432.	83277519.	17.0347252	0.0017248	-0.001313	3.9649016	39.8881496	C
0.0001038	8512.	82043878.	16.9171594	0.0017552	-0.001357	3.9758130	40.5193160	C
0.0001063	8590.	80843614.	16.8038015	0.0017854	-0.001402	3.9846619	41.1464011	C
0.0001088	8666.	79688891.	16.6967465	0.0018158	-0.001447	3.9915275	41.7769272	C
0.0001113	8741.	78566993.	16.5938551	0.0018461	-0.001491	3.9963612	42.4053629	C
0.0001138	8813.	77477436.	16.4951347	0.0018763	-0.001536	3.9991797	43.0326385	C
0.0001163	8884.	76425492.	16.4017189	0.0019067	-0.001581	3.9990621	43.6634826	C
0.0001188	8954.	75401886.	16.3121182	0.0019371	-0.001625	3.9999921	44.2939200	C
0.0001213	9021.	74402328.	16.2256986	0.0019674	-0.001670	3.9998911	44.9225506	C

MEG-33 rear abutment Z direction

0.0001238	9087.	73433470.	16.1438713	0.0019978	-0.001715	3.9996192	45.5551309	C
0.0001263	9152.	72493677.	16.0663545	0.0020284	-0.001759	3.9990976	46.1916282	C
0.0001288	9215.	71572996.	15.9908599	0.0020588	-0.001804	3.9999982	46.8244361	C
0.0001313	9276.	70675928.	15.9187693	0.0020893	-0.001848	3.9997953	47.4592534	C
0.0001338	9336.	69804639.	15.8503398	0.0021200	-0.001893	3.9991743	48.0978154	C
0.0001363	9396.	68958022.	15.7853466	0.0021508	-0.001937	3.9999984	48.7400375	C
0.0001388	9453.	68130150.	15.7227168	0.0021815	-0.001981	3.9996777	49.3823442	C
0.0001413	9509.	67320802.	15.6618757	0.0022122	-0.002025	3.9986836	50.0000000	CY
0.0001438	9564.	66531329.	15.6042276	0.0022431	-0.002069	3.9998937	50.0000000	CY
0.0001463	9618.	65761863.	15.5494937	0.0022741	-0.002113	3.9990565	50.0000000	CY
0.0001488	9669.	65003388.	15.4984744	0.0023054	-0.002157	3.9999740	50.0000000	CY
0.0001588	9856.	62085256.	15.3169903	0.0024316	-0.002331	3.9999936	50.0000000	CY
0.0001688	9991.	59205052.	15.1558682	0.0025576	-0.002505	3.9998339	50.0000000	CY
0.0001788	10097.	56487242.	15.0081315	0.0026827	-0.002680	3.9986421	50.0000000	CY
0.0001888	10196.	54015913.	14.8840609	0.0028094	-0.002853	3.9998586	50.0000000	CY
0.0001988	10286.	51753345.	14.7764801	0.0029368	-0.003026	3.9977686	50.0000000	CY
0.0002088	10365.	49653229.	14.6812772	0.0030647	-0.003198	3.9979462	50.0000000	CY
0.0002188	10411.	47590937.	14.5812343	0.0031896	-0.003373	3.9980227	50.0000000	CY
0.0002288	10427.	45583401.	14.4771412	0.0033116	-0.003551	3.9971824	50.0000000	CY
0.0002388	10434.	43703039.	14.3852854	0.0034345	-0.003728	3.9974045	50.0000000	CY
0.0002488	10436.	41951830.	14.3090285	0.0035594	-0.003903	3.9999600	50.0000000	CY
0.0002588	10436.	40330504.	14.2490044	0.0036869	-0.004076	3.9993776	50.0000000	CY
0.0002688	10436.	38829834.	14.1967599	0.0038154	-0.004247	3.9976000	50.0000000	CY

 Summary of Results for Nominal Moment Capacity for Section 2

Moment values interpolated at maximum compressive strain = 0.003
 or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain	Max. Tens. Strain
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1	765.800	9649.562	0.00300000	-0.00404010
2	985.500	10325.067	0.00300000	-0.00311069

Note that the values of moment capacity in the table above are not factored by a strength reduction factor (phi-factor).

MEG-33 rear abutment Z direction

In ACI 318, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are tied hoops (Ø.65) or spirals (Ø.75).

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318, or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Load No.	Resist. Factor	Nominal Ax. Thrust kips	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in ²
1	0.65	765.800000	9650.	497.770000	6272.	99858910.
2	0.65	985.500000	10325.	640.575000	6711.	112414748.
1	0.75	765.800000	9650.	574.350000	7237.	82571497.
2	0.75	985.500000	10325.	739.125000	7744.	94427415.
1	0.90	765.800000	9650.	689.220000	8685.	63566558.
2	0.90	985.500000	10325.	886.950000	9293.	70439185.

Layering Correction Equivalent Depths of Soil & Rock Layers

Layer No.	Top of Layer Below Pile Head ft	Equivalent Top Depth Below Grnd Surf ft	Same Layer Type As Layer Above	Layer is Rock or is Below Rock Layer	F0 Integral for Layer lbs	F1 Integral for Layer lbs
1	0.00	0.00	N.A.	No	0.00	214373.
2	7.5000	8.8906	Yes	No	214373.	454073.
3	15.8400	15.8400	No	Yes	N.A.	N.A.

MEG-33 rear abutment Z direction

Notes: The F0 integral of Layer n+1 equals the sum of the F0 and F1 integrals for Layer n. Layering correction equivalent depths are computed only for soil types with both shallow-depth and deep-depth expressions for peak lateral load transfer. These soil types are soft and stiff clays, non-liquefied sands, and cemented c-phi soil.

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 1

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 63030.0 lbs
 Applied moment at pile head = 0.0 in-lbs
 Axial thrust load on pile head = 765800.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	0.1161	-1.17E-05	63030.	-0.00119	0.00	3.36E+11	0.00	0.00	0.00
0.2584	0.1124	198272.	62490.	-0.00119	0.00	3.36E+11	-348.483	9615.	0.00
0.5168	0.1087	393188.	60904.	-0.00119	0.00	3.36E+11	-674.098	19230.	0.00
0.7752	0.1050	581615.	58792.	-0.00118	0.00	3.36E+11	-688.137	20318.	0.00
1.0336	0.1014	763413.	56649.	-0.00118	0.00	3.36E+11	-694.116	21234.	0.00
1.2920	0.09772	938519.	54488.	-0.00117	0.00	3.36E+11	-699.748	22203.	0.00
1.5504	0.09411	1106878.	52310.	-0.00116	0.00	3.36E+11	-705.025	23229.	0.00
1.8088	0.09053	1268433.	50116.	-0.00115	0.00	3.36E+11	-709.943	24316.	0.00
2.0672	0.08699	1423134.	47908.	-0.00114	0.00	3.36E+11	-714.496	25468.	0.00
2.3256	0.08349	1570935.	45686.	-0.00112	0.00	3.36E+11	-718.677	26692.	0.00
2.5840	0.08003	1711791.	43452.	-0.00111	0.00	3.36E+11	-722.481	27993.	0.00
2.8424	0.07662	1845663.	41206.	-0.00109	0.00	3.36E+11	-725.903	29377.	0.00
3.1008	0.07327	1972515.	38950.	-0.00107	0.00	3.36E+11	-728.937	30850.	0.00
3.3592	0.06997	2092315.	36686.	-0.00105	0.00	3.36E+11	-731.576	32422.	0.00
3.6176	0.06673	2205035.	34414.	-0.00103	0.00	3.36E+11	-733.816	34100.	0.00

MEG-33 rear abutment Z direction

3.8760	0.06355	2310651.	32136.	-0.00101	0.00	3.36E+11	-735.650	35894.	0.00
4.1344	0.06044	2409143.	29853.	-9.92E-04	0.00	3.36E+11	-737.073	37815.	0.00
4.3928	0.05740	2500496.	27566.	-9.69E-04	0.00	3.36E+11	-738.078	39873.	0.00
4.6512	0.05443	2584697.	25276.	-9.46E-04	0.00	3.36E+11	-738.659	42081.	0.00
4.9096	0.05153	2661740.	22985.	-9.22E-04	0.00	3.36E+11	-738.812	44455.	0.00
5.1680	0.04871	2731620.	20695.	-8.97E-04	0.00	3.36E+11	-738.529	47011.	0.00
5.4264	0.04597	2794340.	18406.	-8.71E-04	0.00	3.36E+11	-737.804	49766.	0.00
5.6848	0.04331	2849905.	16120.	-8.45E-04	0.00	3.36E+11	-736.632	52740.	0.00
5.9432	0.04073	2898324.	13838.	-8.19E-04	0.00	3.36E+11	-735.006	55958.	0.00
6.2016	0.03823	2939613.	11562.	-7.92E-04	0.00	3.36E+11	-732.919	59444.	0.00
6.4600	0.03582	2973790.	9294.	-7.65E-04	0.00	3.36E+11	-730.366	63227.	0.00
6.7184	0.03349	3000880.	7034.	-7.37E-04	0.00	3.36E+11	-727.339	67342.	0.00
6.9768	0.03125	3020911.	4784.	-7.09E-04	0.00	3.36E+11	-723.831	71827.	0.00
7.2352	0.02909	3033916.	2546.	-6.81E-04	0.00	3.36E+11	-719.836	76723.	0.00
7.4936	0.02702	3039933.	320.5194	-6.53E-04	0.00	3.36E+11	-715.346	82082.	0.00
7.7520	0.02504	3039006.	-1748.	-6.25E-04	0.00	3.36E+11	-618.697	76611.	0.00
8.0104	0.02315	3032063.	-3658.	-5.97E-04	0.00	3.36E+11	-613.644	82207.	0.00
8.2688	0.02134	3019154.	-5553.	-5.69E-04	0.00	3.36E+11	-608.151	88375.	0.00
8.5272	0.01962	3000331.	-7429.	-5.41E-04	0.00	3.36E+11	-602.209	95194.	0.00
8.7856	0.01798	2975653.	-9287.	-5.14E-04	0.00	3.36E+11	-595.813	102752.	0.00
9.0440	0.01643	2945180.	-11123.	-4.87E-04	0.00	3.36E+11	-588.954	111158.	0.00
9.3024	0.01496	2908980.	-12938.	-4.60E-04	0.00	3.36E+11	-581.625	120535.	0.00
9.5608	0.01358	2867124.	-14730.	-4.33E-04	0.00	3.36E+11	-573.818	131032.	0.00
9.8192	0.01228	2819688.	-16496.	-4.07E-04	0.00	3.36E+11	-565.524	142826.	0.00
10.0776	0.01106	2766753.	-18236.	-3.81E-04	0.00	3.36E+11	-556.734	156130.	0.00
10.3360	0.00992	2708404.	-19948.	-3.56E-04	0.00	3.36E+11	-547.439	171199.	0.00
10.5944	0.00885	2644732.	-21630.	-3.31E-04	0.00	3.36E+11	-537.631	188344.	0.00
10.8528	0.00786	2575833.	-23281.	-3.07E-04	0.00	3.36E+11	-527.299	207947.	0.00
11.1112	0.00695	2501807.	-24900.	-2.83E-04	0.00	3.36E+11	-516.431	230474.	0.00
11.3696	0.00610	2422762.	-26483.	-2.61E-04	0.00	3.36E+11	-505.019	256510.	0.00
11.6280	0.00533	2338807.	-28031.	-2.39E-04	0.00	3.36E+11	-493.048	286785.	0.00
11.8864	0.00462	2250061.	-29540.	-2.18E-04	0.00	3.36E+11	-480.507	322223.	0.00
12.1448	0.00398	2156645.	-31010.	-1.97E-04	0.00	3.36E+11	-467.380	364011.	0.00
12.4032	0.00340	2058688.	-32438.	-1.78E-04	0.00	3.36E+11	-453.651	413684.	0.00
12.6616	0.00288	1956325.	-33819.	-1.59E-04	0.00	3.36E+11	-437.324	471133.	0.00
12.9200	0.00241	1849713.	-35077.	-1.42E-04	0.00	3.36E+11	-373.977	480748.	0.00
13.1784	0.00200	1739465.	-36147.	-1.25E-04	0.00	3.36E+11	-316.105	490363.	0.00
13.4368	0.00164	1626140.	-37046.	-1.10E-04	0.00	3.36E+11	-263.689	499978.	0.00
13.6952	0.00132	1510244.	-37790.	-9.53E-05	0.00	3.36E+11	-216.661	509593.	0.00
13.9536	0.00104	1392232.	-38397.	-8.19E-05	0.00	3.36E+11	-174.897	519208.	0.00

MEG-33 rear abutment Z direction

14.2120	8.10E-04	1272507.	-38883.	-6.96E-05	0.00	3.36E+11	-138.223	528823.	0.00
14.4704	6.13E-04	1151426.	-39262.	-5.84E-05	0.00	3.36E+11	-106.416	538438.	0.00
14.7288	4.48E-04	1029296.	-39550.	-4.84E-05	0.00	3.36E+11	-79.201	548053.	0.00
14.9872	3.13E-04	906382.	-39760.	-3.95E-05	0.00	3.36E+11	-56.256	557668.	0.00
15.2456	2.03E-04	782908.	-39905.	-3.17E-05	0.00	3.36E+11	-37.213	567283.	0.00
15.5040	1.16E-04	659058.	-39996.	-2.50E-05	0.00	3.36E+11	-21.655	576898.	0.00
15.7624	4.82E-05	534986.	-40044.	-1.95E-05	0.00	3.36E+11	-9.122	586513.	0.00
16.0208	-4.65E-06	410815.	-39746.	-1.30E-05	0.00	1.58E+11	201.1179	1.34E+08	0.00
16.2792	-3.25E-05	288558.	-36981.	-6.15E-06	0.00	1.58E+11	1582.	1.51E+08	0.00
16.5376	-4.28E-05	181500.	-30938.	-1.54E-06	0.00	1.58E+11	2316.	1.68E+08	0.00
16.7960	-4.21E-05	96700.	-23466.	1.19E-06	0.00	1.58E+11	2504.	1.85E+08	0.00
17.0544	-3.54E-05	35967.	-16018.	2.49E-06	0.00	1.58E+11	2301.	2.01E+08	0.00
17.3128	-2.66E-05	-2647.	-9549.	2.82E-06	0.00	1.58E+11	1872.	2.18E+08	0.00
17.5712	-1.79E-05	-23264.	-4540.	2.57E-06	0.00	1.58E+11	1359.	2.35E+08	0.00
17.8296	-1.07E-05	-30814.	-1089.	2.04E-06	0.00	1.58E+11	866.9366	2.52E+08	0.00
18.0880	-5.29E-06	-30028.	966.3141	1.44E-06	0.00	1.58E+11	458.8329	2.69E+08	0.00
18.3464	-1.74E-06	-24828.	1927.	9.01E-07	0.00	1.58E+11	160.7135	2.86E+08	0.00
18.6048	2.92E-07	-18083.	2132.	4.79E-07	0.00	1.58E+11	-28.506	3.02E+08	0.00
18.8632	1.23E-06	-11610.	1892.	1.88E-07	0.00	1.58E+11	-126.483	3.19E+08	0.00
19.1216	1.46E-06	-6353.	1450.	1.15E-08	0.00	1.58E+11	-157.999	3.36E+08	0.00
19.3800	1.30E-06	-2615.	976.1026	-7.65E-08	0.00	1.58E+11	-147.971	3.53E+08	0.00
19.6384	9.83E-07	-299.063	564.9136	-1.05E-07	0.00	1.58E+11	-117.243	3.70E+08	0.00
19.8968	6.48E-07	889.2317	257.8629	-9.93E-08	0.00	1.58E+11	-80.803	3.87E+08	0.00
20.1552	3.67E-07	1301.	58.5276	-7.78E-08	0.00	1.58E+11	-47.768	4.04E+08	0.00
20.4136	1.65E-07	1253.	-50.285	-5.28E-08	0.00	1.58E+11	-22.416	4.20E+08	0.00
20.6720	3.99E-08	988.9734	-93.762	-3.07E-08	0.00	1.58E+11	-5.626	4.37E+08	0.00
20.9304	-2.53E-08	671.2376	-96.735	-1.44E-08	0.00	1.58E+11	3.7088	4.54E+08	0.00
21.1888	-4.97E-08	389.1300	-79.286	-4.04E-09	0.00	1.58E+11	7.5459	4.71E+08	0.00
21.4472	-5.04E-08	179.5576	-55.306	1.55E-09	0.00	1.58E+11	7.9209	4.88E+08	0.00
21.7056	-4.01E-08	46.1356	-32.911	3.76E-09	0.00	1.58E+11	6.5240	5.05E+08	0.00
21.9640	-2.70E-08	-24.560	-15.752	3.97E-09	0.00	1.58E+11	4.5433	5.21E+08	0.00
22.2224	-1.54E-08	-51.572	-4.553	3.23E-09	0.00	1.58E+11	2.6801	5.38E+08	0.00
22.4808	-7.00E-09	-52.813	1.5450	2.20E-09	0.00	1.58E+11	1.2532	5.55E+08	0.00
22.7392	-1.78E-09	-42.001	3.9963	1.27E-09	0.00	1.58E+11	0.3279	5.72E+08	0.00
22.9976	8.88E-10	-28.035	4.2431	5.84E-10	0.00	1.58E+11	-0.169	5.89E+08	0.00
23.2560	1.85E-09	-15.690	3.4224	1.55E-10	0.00	1.58E+11	-0.361	6.06E+08	0.00
23.5144	1.85E-09	-6.812	2.2979	-6.58E-11	0.00	1.58E+11	-0.365	6.11E+08	0.00
23.7728	1.44E-09	-1.439	1.2932	-1.47E-10	0.00	1.58E+11	-0.283	6.11E+08	0.00
24.0312	9.39E-10	1.2087	0.5667	-1.49E-10	0.00	1.58E+11	-0.185	6.11E+08	0.00
24.2896	5.14E-10	2.0764	0.1228	-1.17E-10	0.00	1.58E+11	-0.101	6.11E+08	0.00

MEG-33 rear abutment Z direction									
24.5480	2.14E-10	1.9708	-0.09966	-7.71E-11	0.00	1.58E+11	-0.04227	6.11E+08	0.00
24.8064	3.53E-11	1.4587	-0.176	-4.34E-11	0.00	1.58E+11	-0.00696	6.11E+08	0.00
25.0648	-5.50E-11	0.8796	-0.170	-2.05E-11	0.00	1.58E+11	0.01085	6.11E+08	0.00
25.3232	-9.18E-11	0.4048	-0.125	-7.88E-12	0.00	1.58E+11	0.01809	6.11E+08	0.00
25.5816	-1.04E-10	0.1039	-0.06528	-2.89E-12	0.00	1.58E+11	0.02048	6.11E+08	0.00
25.8400	-1.10E-10	0.00	0.00	-1.87E-12	0.00	1.58E+11	0.02162	3.06E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 1:

Pile-head deflection = 0.11607823 inches
 Computed slope at pile head = -0.0011910 radians
 Maximum bending moment = 3039933. inch-lbs
 Maximum shear force = 63030. lbs
 Depth of maximum bending moment = 7.49360000 feet below pile head
 Depth of maximum shear force = 0.000000 feet below pile head
 Number of iterations = 18
 Number of zero deflection points = 5

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 2

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 85100.0 lbs
 Applied moment at pile head = 0.0 in-lbs
 Axial thrust load on pile head = 985500.0 lbs

Depth Deflect. Bending Shear Slope Total Bending Soil Res. Soil Spr. Distrib.

X feet	y inches	Moment in-lbs	Force lbs	MEG-33 rear S radians	abutment Z Stress psi*	direction Stiffness lb-in^2	p lb/inch	Es*H lb/inch	Lat. Load lb/inch
0.00	0.2241	-2.17E-05	85100.	-0.00207	0.00	3.26E+11	0.00	0.00	0.00
0.2584	0.2177	270200.	84054.	-0.00207	0.00	3.26E+11	-674.957	9615.	0.00
0.5168	0.2113	533903.	81759.	-0.00206	0.00	3.26E+11	-805.010	11815.	0.00
0.7752	0.2049	789850.	79250.	-0.00206	0.00	3.26E+11	-813.224	12308.	0.00
1.0336	0.1985	1037955.	76716.	-0.00205	0.00	3.26E+11	-821.088	12826.	0.00
1.2920	0.1922	1278135.	74159.	-0.00204	0.00	3.26E+11	-828.599	13370.	0.00
1.5504	0.1859	1510311.	71578.	-0.00202	0.00	3.26E+11	-835.749	13943.	0.00
1.8088	0.1796	1734407.	68976.	-0.00201	0.00	3.26E+11	-842.534	14545.	0.00
2.0672	0.1734	1950352.	66354.	-0.00199	0.00	3.26E+11	-848.947	15180.	0.00
2.3256	0.1673	2158078.	63712.	-0.00197	0.00	3.26E+11	-854.984	15850.	0.00
2.5840	0.1612	2357521.	61052.	-0.00195	0.00	3.26E+11	-860.638	16557.	0.00
2.8424	0.1552	2548620.	58375.	-0.00193	0.00	3.26E+11	-865.903	17304.	0.00
3.1008	0.1492	2731319.	55683.	-0.00190	0.00	3.26E+11	-870.773	18094.	0.00
3.3592	0.1434	2905567.	52976.	-0.00188	0.00	3.26E+11	-875.244	18930.	0.00
3.6176	0.1376	3071315.	50255.	-0.00185	0.00	3.26E+11	-879.309	19816.	0.00
3.8760	0.1319	3228519.	47523.	-0.00182	0.00	3.26E+11	-882.962	20755.	0.00
4.1344	0.1263	3377139.	44780.	-0.00179	0.00	3.26E+11	-886.198	21752.	0.00
4.3928	0.1208	3517141.	42028.	-0.00175	0.00	3.26E+11	-889.010	22812.	0.00
4.6512	0.1155	3648492.	39268.	-0.00172	0.00	3.26E+11	-891.392	23940.	0.00
4.9096	0.1102	3771167.	36501.	-0.00168	0.00	3.26E+11	-893.338	25141.	0.00
5.1680	0.1050	3885142.	33728.	-0.00165	0.00	3.26E+11	-894.843	26422.	0.00
5.4264	0.09997	3990401.	30952.	-0.00161	0.00	3.26E+11	-895.899	27789.	0.00
5.6848	0.09504	4086930.	28173.	-0.00157	0.00	3.26E+11	-896.500	29251.	0.00
5.9432	0.09022	4174720.	25393.	-0.00153	0.00	3.26E+11	-896.641	30815.	0.00
6.2016	0.08554	4253767.	22613.	-0.00149	0.00	3.26E+11	-896.313	32492.	0.00
6.4600	0.08097	4324073.	19835.	-0.00145	0.00	3.26E+11	-895.511	34292.	0.00
6.7184	0.07654	4385642.	17060.	-0.00141	0.00	3.26E+11	-894.227	36227.	0.00
6.9768	0.07223	4438486.	14290.	-0.00137	0.00	3.26E+11	-892.454	38310.	0.00
7.2352	0.06806	4482620.	11526.	-0.00132	0.00	3.26E+11	-890.184	40556.	0.00
7.4936	0.06402	4518064.	8770.	-0.00128	0.00	3.26E+11	-887.409	42982.	0.00
7.7520	0.06011	4544844.	6201.	-0.00124	0.00	3.26E+11	-770.044	39723.	0.00
8.0104	0.05634	4564088.	3818.	-0.00120	0.00	3.26E+11	-766.401	42183.	0.00
8.2688	0.05270	4575831.	1448.	-0.00115	0.00	3.26E+11	-762.308	44856.	0.00
8.5272	0.04919	4580110.	-908.351	-0.00111	0.00	3.26E+11	-757.757	47764.	0.00
8.7856	0.04582	4576971.	-3250.	-0.00106	0.00	3.26E+11	-752.738	50936.	0.00
9.0440	0.04259	4566461.	-5576.	-0.00102	0.00	3.26E+11	-747.243	54403.	0.00
9.3024	0.03949	4548633.	-7884.	-9.78E-04	0.00	3.26E+11	-741.263	58202.	0.00

MEG-33 rear abutment Z direction

9.5608	0.03653	4523545.	-10172.	-9.35E-04	0.00	3.26E+11	-734.788	62376.	0.00
9.8192	0.03370	4491261.	-12440.	-8.92E-04	0.00	3.26E+11	-727.807	66974.	0.00
10.0776	0.03100	4451849.	-14685.	-8.49E-04	0.00	3.26E+11	-720.308	72054.	0.00
10.3360	0.02843	4405381.	-16906.	-8.07E-04	0.00	3.26E+11	-712.280	77684.	0.00
10.5944	0.02599	4351936.	-19101.	-7.65E-04	0.00	3.26E+11	-703.709	83944.	0.00
10.8528	0.02369	4291599.	-21269.	-7.24E-04	0.00	3.26E+11	-694.579	90929.	0.00
11.1112	0.02150	4224458.	-23408.	-6.83E-04	0.00	3.26E+11	-684.876	98754.	0.00
11.3696	0.01945	4150610.	-25516.	-6.44E-04	0.00	3.26E+11	-674.581	107557.	0.00
11.6280	0.01751	4070154.	-27590.	-6.04E-04	0.00	3.26E+11	-663.673	117506.	0.00
11.8864	0.01570	3983199.	-29630.	-5.66E-04	0.00	3.26E+11	-652.129	128804.	0.00
12.1448	0.01400	3889858.	-31634.	-5.29E-04	0.00	3.26E+11	-639.923	141708.	0.00
12.4032	0.01242	3790251.	-33598.	-4.92E-04	0.00	3.26E+11	-627.024	156535.	0.00
12.6616	0.01095	3684505.	-35521.	-4.57E-04	0.00	3.26E+11	-613.395	173688.	0.00
12.9200	0.00959	3572754.	-37401.	-4.22E-04	0.00	3.26E+11	-598.992	193686.	0.00
13.1784	0.00833	3455140.	-39234.	-3.89E-04	0.00	3.26E+11	-583.762	217207.	0.00
13.4368	0.00718	3331813.	-41020.	-3.56E-04	0.00	3.26E+11	-567.638	245153.	0.00
13.6952	0.00612	3202931.	-42753.	-3.25E-04	0.00	3.26E+11	-550.536	278752.	0.00
13.9536	0.00516	3068662.	-44432.	-2.95E-04	0.00	3.26E+11	-532.345	319723.	0.00
14.2120	0.00429	2929186.	-46053.	-2.67E-04	0.00	3.26E+11	-512.921	370545.	0.00
14.4704	0.00351	2784693.	-47611.	-2.40E-04	0.00	3.26E+11	-492.059	434950.	0.00
14.7288	0.00281	2635388.	-49102.	-2.14E-04	0.00	3.26E+11	-469.469	518838.	0.00
14.9872	0.00218	2481492.	-50438.	-1.90E-04	0.00	3.26E+11	-392.291	557668.	0.00
15.2456	0.00163	2323753.	-51508.	-1.67E-04	0.00	3.26E+11	-298.189	567283.	0.00
15.5040	0.00115	2163078.	-52301.	-1.45E-04	0.00	3.26E+11	-213.412	576898.	0.00
15.7624	7.28E-04	2000290.	-52846.	-1.26E-04	0.00	3.26E+11	-137.699	586513.	0.00
16.0208	3.68E-04	1836119.	-77710.	-9.72E-05	0.00	1.51E+11	-15899.	1.34E+08	0.00
16.2792	1.25E-04	1518960.	-111785.	-6.27E-05	0.00	1.51E+11	-6079.	1.51E+08	0.00
16.5376	-2.10E-05	1143254.	-119447.	-3.53E-05	0.00	1.51E+11	1138.	1.68E+08	0.00
16.7960	-9.41E-05	778415.	-109000.	-1.56E-05	0.00	1.51E+11	5601.	1.85E+08	0.00
17.0544	-1.18E-04	467376.	-88482.	-2.75E-06	0.00	1.51E+11	7633.	2.01E+08	0.00
17.3128	-1.11E-04	229702.	-64518.	4.42E-06	0.00	1.51E+11	7823.	2.18E+08	0.00
17.5712	-9.01E-05	67236.	-41793.	7.47E-06	0.00	1.51E+11	6834.	2.35E+08	0.00
17.8296	-6.48E-05	-29528.	-23031.	7.86E-06	0.00	1.51E+11	5268.	2.52E+08	0.00
18.0880	-4.14E-05	-75642.	-9299.	6.78E-06	0.00	1.51E+11	3590.	2.69E+08	0.00
18.3464	-2.28E-05	-87236.	-474.834	5.10E-06	0.00	1.51E+11	2102.	2.86E+08	0.00
18.6048	-9.78E-06	-78618.	4262.	3.40E-06	0.00	1.51E+11	953.9020	3.02E+08	0.00
18.8632	-1.75E-06	-60823.	6022.	1.96E-06	0.00	1.51E+11	180.7197	3.19E+08	0.00
19.1216	2.39E-06	-41287.	5900.	9.13E-07	0.00	1.51E+11	-259.254	3.36E+08	0.00
19.3800	3.91E-06	-24241.	4808.	2.39E-07	0.00	1.51E+11	-444.615	3.53E+08	0.00
19.6384	3.87E-06	-11468.	3403.	-1.28E-07	0.00	1.51E+11	-462.089	3.70E+08	0.00

MEG-33 rear abutment Z direction									
19.8968	3.11E-06	-3138.	2085.	-2.78E-07	0.00	1.51E+11	-388.041	3.87E+08	0.00
20.1552	2.15E-06	1462.	1049.	-2.95E-07	0.00	1.51E+11	-279.674	4.04E+08	0.00
20.4136	1.28E-06	3372.	346.8968	-2.46E-07	0.00	1.51E+11	-173.484	4.20E+08	0.00
20.6720	6.25E-07	3615.	-58.764	-1.74E-07	0.00	1.51E+11	-88.165	4.37E+08	0.00
20.9304	2.01E-07	3009.	-241.165	-1.06E-07	0.00	1.51E+11	-29.483	4.54E+08	0.00
21.1888	-3.07E-08	2120.	-279.636	-5.31E-08	0.00	1.51E+11	4.6698	4.71E+08	0.00
21.4472	-1.28E-07	1275.	-241.254	-1.82E-08	0.00	1.51E+11	20.0862	4.88E+08	0.00
21.7056	-1.43E-07	623.6698	-173.948	1.37E-09	0.00	1.51E+11	23.3258	5.05E+08	0.00
21.9640	-1.19E-07	196.4072	-106.700	9.80E-09	0.00	1.51E+11	20.0488	5.21E+08	0.00
22.2224	-8.26E-08	-38.099	-53.390	1.14E-08	0.00	1.51E+11	14.3359	5.38E+08	0.00
22.4808	-4.84E-08	-134.765	-17.737	9.65E-09	0.00	1.51E+11	8.6598	5.55E+08	0.00
22.7392	-2.28E-08	-148.158	2.1956	6.74E-09	0.00	1.51E+11	4.1969	5.72E+08	0.00
22.9976	-6.58E-09	-121.190	10.6395	3.97E-09	0.00	1.51E+11	1.2494	5.89E+08	0.00
23.2560	1.87E-09	-82.201	12.0111	1.88E-09	0.00	1.51E+11	-0.365	6.06E+08	0.00
23.5144	5.07E-09	-46.713	9.8959	5.53E-10	0.00	1.51E+11	-1.000	6.11E+08	0.00
23.7728	5.30E-09	-20.834	6.7267	-1.41E-10	0.00	1.51E+11	-1.044	6.11E+08	0.00
24.0312	4.20E-09	-4.996	3.8245	-4.06E-10	0.00	1.51E+11	-0.827	6.11E+08	0.00
24.2896	2.78E-09	2.8866	1.6927	-4.28E-10	0.00	1.51E+11	-0.548	6.11E+08	0.00
24.5480	1.54E-09	5.5040	0.3723	-3.42E-10	0.00	1.51E+11	-0.304	6.11E+08	0.00
24.8064	6.58E-10	5.1977	-0.300	-2.32E-10	0.00	1.51E+11	-0.130	6.11E+08	0.00
25.0648	1.04E-10	3.6444	-0.533	-1.41E-10	0.00	1.51E+11	-0.02060	6.11E+08	0.00
25.3232	-2.17E-10	1.8928	-0.499	-8.41E-11	0.00	1.51E+11	0.04268	6.11E+08	0.00
25.5816	-4.17E-10	0.5514	-0.305	-5.89E-11	0.00	1.51E+11	0.08217	6.11E+08	0.00
25.8400	-5.82E-10	0.00	0.00	-5.33E-11	0.00	1.51E+11	0.1147	3.06E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 2:

Pile-head deflection = 0.22408683 inches
 Computed slope at pile head = -0.0020688 radians
 Maximum bending moment = 4580110. inch-lbs
 Maximum shear force = -119447. lbs
 Depth of maximum bending moment = 8.52720000 feet below pile head

MEG-33 rear abutment Z direction

Depth of maximum shear force = 16.53760000 feet below pile head
 Number of iterations = 20
 Number of zero deflection points = 5

 Summary of Pile-head Responses for Conventional Analyses

Definitions of Pile-head Loading Conditions:

Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs
 Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
 Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.
 Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs
 Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians

Load Case No.	Load Type 1	Pile-head Load 1	Load Type 2	Pile-head Load 2	Axial Loading lbs	Pile-head Deflection inches	Pile-head Rotation radians	Max Shear in Pile lbs	Max Moment in Pile in-lbs
1	V, lb	63030.	M, in-lb	0.00	765800.	0.1161	-0.00119	63030.	3039933.
2	V, lb	85100.	M, in-lb	0.00	985500.	0.2241	-0.00207	-119447.	4580110.

Maximum pile-head deflection = 0.2240868313 inches
 Maximum pile-head rotation = -0.0020688457 radians = -0.118536 deg.

 Summary of Warning Messages

The following warning was reported 819 times

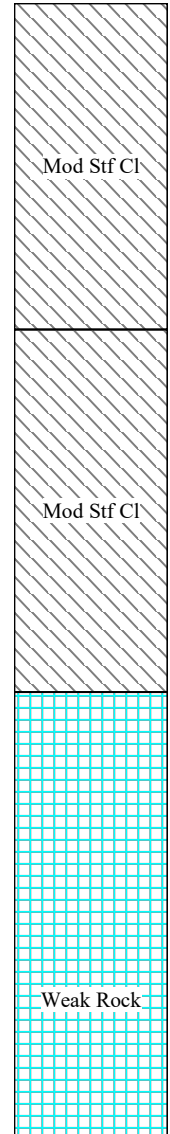
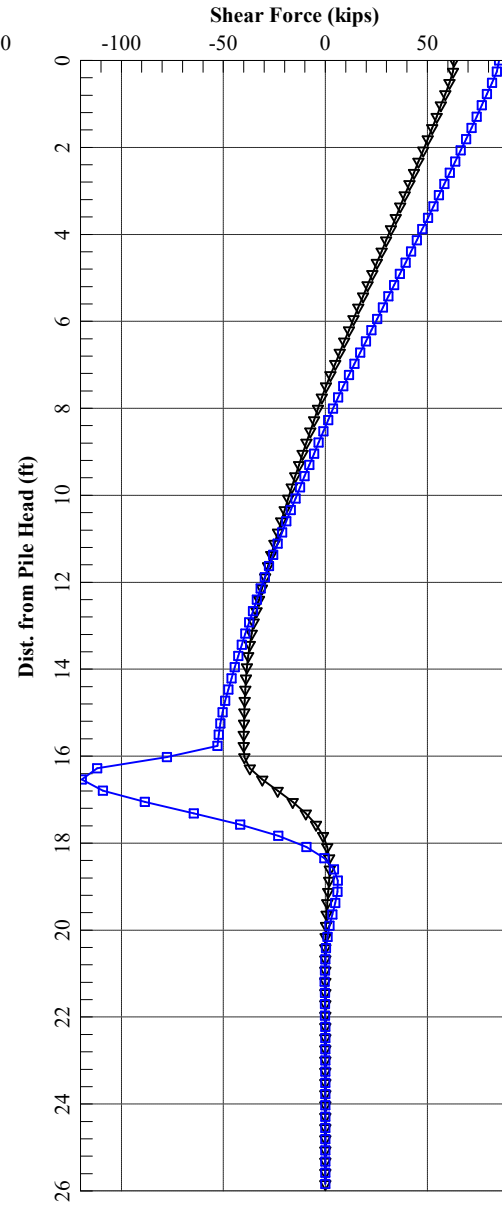
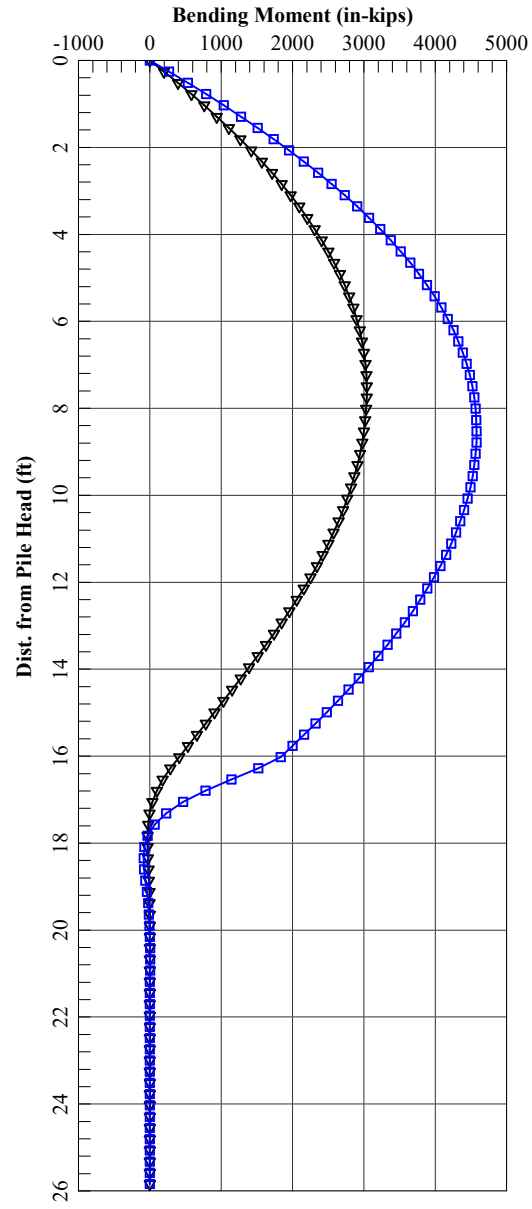
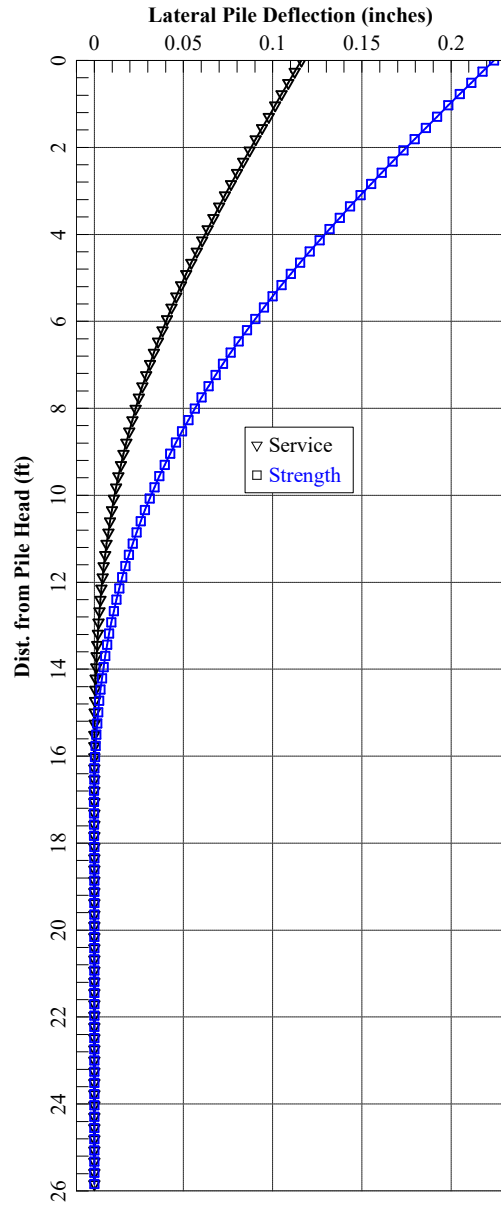
**** Warning ****

An unreasonable input value for unconfined compressive strength has been specified for a soil defined using the weak rock criteria. The input value

MEG-33 rear abutment Z direction
is greater than 500 psi. Please check your input data for correctness.

The analysis ended normally.

MEG-33 Bowmans Run Bridge Rear Abutment Z-Direction



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LPile for Windows, Version 2022-12.006

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method
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Files Used for Analysis

Path to file locations:

\\US0247-PPFSS01\shared_projects\173609140\119144\400-Engineering\Geotechnical\Analysis\Lpile\bridges\LPile
Analysis\Bowman's Run\pier\

Name of input data file:

Pier drilled shaft_row1.lp12d

Name of output report file:

Pier drilled shaft_row1.lp12o

Pier drilled shaft_row1

Name of plot output file:

Pier drilled shaft_row1.lp12p

Name of runtime message file:

Pier drilled shaft_row1.lp12r

Date and Time of Analysis

Date: August 28, 2024

Time: 14:42:00

Problem Title

Project Name: MEG-33-19.21

Job Number: 173609140

Client: ODOT

Engineer: G. Khatri

Description: Pier Drilled Shaft Lateral Load Analysis at Bowman's Run

Pier drilled shaft_row1
Program Options and Settings

Computational Options:

- Conventional Analysis

Engineering Units Used for Data Input and Computations:

- US Customary System Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed = 1000
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 100.0000 in
- Number of pile increments = 100

Loading Type and Number of Cycles of Loading:

- Static loading specified

- Analysis uses p-y modification factors for p-y curves
- Analysis uses layering correction (Method of Georgiadis)
- No distributed lateral loads are entered
- Loading by lateral soil movements acting on pile not selected
- Input of shear resistance at the pile tip not selected
- Input of moment resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:

- Output files use decimal points to denote decimal symbols.
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1
- No p-y curves to be computed and reported for user-specified depths
- Print using wide report formats

Pier drilled shaft_row1

Number of pile sections defined = 2
Total length of pile = 16.000 ft
Depth of ground surface below top of pile = 0.0000 ft

Pile diameters used for p-y curve computations are defined using 4 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile. A summary of values of pile diameter vs. depth follows.

Point No.	Depth Below Pile Head feet	Pile Diameter inches
1	0.000	48.0000
2	6.000	48.0000
3	6.000	42.0000
4	16.000	42.0000

Input Structural Properties for Pile Sections:

Pile Section No. 1:

Section 1 is a round drilled shaft, bored pile, or CIDH pile
Length of section = 6.000000 ft
Shaft Diameter = 48.000000 in

Pile Section No. 2:

Section 2 is a round drilled shaft, bored pile, or CIDH pile
Length of section = 10.000000 ft
Shaft Diameter = 42.000000 in

Soil and Rock Layering Information

Pier drilled shaft_row1

The soil profile is modelled using 2 layers

Layer 1 is stiff clay without free water

Distance from top of pile to top of layer	=	0.0000	ft
Distance from top of pile to bottom of layer	=	6.000000	ft
Effective unit weight at top of layer	=	122.000000	pcf
Effective unit weight at bottom of layer	=	122.000000	pcf
Undrained cohesion at top of layer	=	2000.	psf
Undrained cohesion at bottom of layer	=	2000.	psf
Epsilon-50 at top of layer	=	0.0000	
Epsilon-50 at bottom of layer	=	0.0000	

NOTE: Default values for Epsilon-50 will be computed for this layer.

Layer 2 is weak rock, p-y criteria by Reese, 1997

Distance from top of pile to top of layer	=	6.000000	ft
Distance from top of pile to bottom of layer	=	20.000000	ft
Effective unit weight at top of layer	=	87.600000	pcf
Effective unit weight at bottom of layer	=	87.600000	pcf
Uniaxial compressive strength at top of layer	=	4380.	psi
Uniaxial compressive strength at bottom of layer	=	4380.	psi
Initial modulus of rock at top of layer	=	394200.	psi
Initial modulus of rock at bottom of layer	=	394200.	psi
RQD of rock at top of layer	=	74.000000	%
RQD of rock at bottom of layer	=	74.000000	%
k _{rm} of rock at top of layer	=	0.0000500	
k _{rm} of rock at bottom of layer	=	0.0000500	

(Depth of the lowest soil layer extends 4.000 ft below the pile tip)

Summary of Input Soil Properties

Pier drilled shaft_row1

Layer Num.	Soil Type Name (p-y Curve Type)	Layer Depth ft	Effective Unit Wt. pcf	Cohesion psf	Uniaxial qu psi	RQD %	E50 or krm	Rock Mass Modulus psi
1	Stiff Clay	0.00	122.0000	2000.	--	--	default	--
	w/o Free Water	6.0000	122.0000	2000.	--	--	default	--
2	Weak	6.0000	87.6000	--	4380.	74.0000	5.00E-05	394200.
	Rock	20.0000	87.6000	--	4380.	74.0000	5.00E-05	394200.

Modification Factors for p-y Curves

Distribution of p-y modifiers with depth defined using 3 points

Point No.	Depth X ft	p-mult	y-mult
1	0.000	0.9200	1.0000
2	6.000	0.9200	1.0000
3	16.000	0.9200	1.0000

Static Loading Type

Static loading criteria were used when computing p-y curves for all analyses.

Pier drilled shaft_row1

 Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 6

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length	Run Analysis
1	1	V = 19020. lbs	M = 3836400. in-lbs	848900.	No	Yes
2	1	V = 23990. lbs	M = 5025600. in-lbs	1102000.	No	Yes
3	1	V = 10160. lbs	M = 4451400. in-lbs	1018000.	No	Yes
4	1	V = 13670. lbs	M = 5995200. in-lbs	1326000.	No	Yes
5	1	V = 17850. lbs	M = 8383200. in-lbs	846000.	No	Yes
6	1	V = 23130. lbs	M = 10959840. in-lbs	1091000.	No	Yes

V = shear force applied normal to pile axis

M = bending moment applied to pile head

y = lateral deflection normal to pile axis

S = pile slope relative to original pile batter angle

R = rotational stiffness applied to pile head

Values of top y vs. pile lengths can be computed only for load types with specified shear loading (Load Types 1, 2, and 3).

Thrust force is assumed to be acting axially for all pile batter angles.

 Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 2

Pile Section No. 1:

Pier drilled shaft_row1

Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section	=	6.000000	ft
Shaft Diameter	=	48.000000	in
Concrete Cover Thickness (to edge of trans. reinf.)	=	3.000000	in
Number of Reinforcing Bars	=	16	bars
Yield Stress of Reinforcing Bars	=	50000.	psi
Modulus of Elasticity of Reinforcing Bars	=	29000000.	psi
Gross Area of Shaft	=	1810.	sq. in.
Total Area of Reinforcing Steel	=	16.000000	sq. in.
Area Ratio of Steel Reinforcement	=	0.88	percent
Edge-to-Edge Bar Spacing	=	6.601869	in
Maximum Concrete Aggregate Size	=	0.750000	in
Ratio of Bar Spacing to Aggregate Size	=	8.80	
Offset of Center of Rebar Cage from Center of Pile	=	0.0000	in
Transverse Reinforcement			
Type: Spiral			
Number of Transverse Reinf. (per spacing)	=	1	
Spacing of Transverse Reinf.	=	4.500000	in
Yield Stress of Transverse Reinf.	=	50000.	psi
Diameter of Transverse Reinf.	=	0.625000	in

Axial Structural Capacities:

Nom. Axial Structural Capacity = $0.85 F_c A_c + F_y A_s$	=	6898.095	kips
Tensile Load for Cracking of Concrete	=	-799.490	kips
Nominal Axial Tensile Capacity	=	-800.000	kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
-----	-----	-----	-----	-----
1	1.128000	1.000000	19.811000	0.000000
2	1.128000	1.000000	18.302977	7.581341
3	1.128000	1.000000	14.008492	14.008492

			Pier drilled shaft_row1	
4	1.128000	1.000000	7.581341	18.302977
5	1.128000	1.000000	0.000000	19.811000
6	1.128000	1.000000	-7.58134	18.302977
7	1.128000	1.000000	-14.00849	14.008492
8	1.128000	1.000000	-18.30298	7.581341
9	1.128000	1.000000	-19.81100	0.000000
10	1.128000	1.000000	-18.30298	-7.58134
11	1.128000	1.000000	-14.00849	-14.00849
12	1.128000	1.000000	-7.58134	-18.30298
13	1.128000	1.000000	0.000000	-19.81100
14	1.128000	1.000000	7.581341	-18.30298
15	1.128000	1.000000	14.008492	-14.00849
16	1.128000	1.000000	18.302977	-7.58134

NOTE: The positions of the above rebars were computed by LPILE

Minimum spacing between any two bars not equal to zero = 6.602 inches
between bars 11 and 12.

Ratio of bar spacing to maximum aggregate size = 8.80

Concrete Properties:

Compressive Strength of Concrete	=	4000. psi
Modulus of Elasticity of Concrete	=	3604997. psi
Modulus of Rupture of Concrete	=	-474.34165 psi
Compression Strain at Peak Stress	=	0.001886
Tensile Strain at Fracture of Concrete	=	-0.0001154
Maximum Coarse Aggregate Size	=	0.750000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 6

Number	Axial Thrust Force kips
----- 1	----- 846.000

Pier drilled shaft_row1

2	848.900
3	1018.000
4	1091.000
5	1102.000
6	1326.000

Definitions of Run Messages and Notes:

- C = concrete in section has cracked in tension.
- Y = stress in reinforcing steel has reached yield stress.
- T = ACI 318 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than 0.003. See ACI 318-14, Section 21.2.3.
- Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
 Position of neutral axis is measured from edge of compression side of pile.
 Compressive stresses and strains are positive in sign.
 Tensile stresses and strains are negative in sign.

Axial Thrust Force = 846.000 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in ²	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	700.4440834	1120710533.	196.3781960	0.0001227	0.00009274	0.5030158	3.4941048	
0.00000125	1401.	1120691217.	110.2246384	0.0001378	0.00007778	0.5618309	3.8651431	
0.00000188	2101.	1120650488.	81.5225806	0.0001529	0.00006285	0.6202626	4.2370403	
0.00000250	2801.	1120591544.	67.1833992	0.0001680	0.00004796	0.6783081	4.6097964	
0.00000313	3502.	1120515025.	58.5893698	0.0001831	0.00003309	0.7359642	4.9834116	
0.00000375	4202.	1120421140.	52.8679182	0.0001983	0.00001825	0.7932281	5.3578861	
0.00000438	4901.	1120309975.	48.7879414	0.0002134	0.00000345	0.8500968	5.7332201	
0.00000500	5601.	1120172036.	45.7338334	0.0002287	-0.00001133	0.9065662	6.1094059	
0.00000563	6300.	1119911337.	43.3630448	0.0002439	-0.00002608	0.9626212	6.4863467	
0.00000625	6996.	1119433463.	41.4697561	0.0002592	-0.00004081	1.0182400	6.8638933	

Pier drilled shaft_row1

0.00000688	7691.	1118711360.	39.9231369	0.0002745	-0.00005553	1.0734057	7.2419254
0.00000750	8383.	1117751174.	38.6360958	0.0002898	-0.00007023	1.1281050	7.6203507
0.00000813	9072.	1116573479.	37.5484407	0.0003051	-0.00008492	1.1823282	7.9991013
0.00000875	9758.	1115203467.	36.6172506	0.0003204	-0.00009960	1.2360681	8.3781273
0.00000938	10441.	1113665325.	35.8110922	0.0003357	-0.000114	1.2893192	8.7573907
0.00001000	10441.	1044061242.	33.6474340	0.0003365	-0.000144	1.2913974	8.7137559 C
0.00001063	10441.	982645875.	32.8130916	0.0003486	-0.000161	1.3331669	9.0012839 C
0.00001125	10441.	928054437.	32.0517125	0.0003606	-0.000179	1.3738487	9.2823712 C
0.00001188	10441.	879209467.	31.3548640	0.0003723	-0.000198	1.4135855	9.5580813 C
0.00001250	10441.	835248994.	30.7132084	0.0003839	-0.000216	1.4524062	9.8285379 C
0.00001313	10591.	806914774.	30.1207487	0.0003953	-0.000235	1.4904082	10.0944600 C
0.00001375	10832.	787809864.	29.5711600	0.0004066	-0.000253	1.5276207	10.3560000 C
0.00001438	11065.	769713923.	29.0593298	0.0004177	-0.000272	1.5640780	10.6133581 C
0.00001500	11288.	752559702.	28.5810558	0.0004287	-0.000291	1.5998164	10.8667593 C
0.00001563	11505.	736289323.	28.1328677	0.0004396	-0.000310	1.6348739	11.1164557 C
0.00001625	11714.	720852372.	27.7118906	0.0004503	-0.000330	1.6692914	11.3627285 C
0.00001688	11917.	706204347.	27.3157398	0.0004610	-0.000349	1.7031119	11.6058902 C
0.00001750	12115.	692305477.	26.9424376	0.0004715	-0.000369	1.7363810	11.8462871 C
0.00001813	12309.	679119785.	26.5903493	0.0004820	-0.000388	1.7691473	12.0843024 C
0.00001875	12497.	666522728.	26.2558989	0.0004923	-0.000408	1.8013307	12.3191451 C
0.00001938	12681.	654518360.	25.9385214	0.0005026	-0.000427	1.8330079	12.5514568 C
0.00002000	12863.	643128198.	25.6384267	0.0005128	-0.000447	1.8642970	12.7822875 C
0.00002063	13039.	632191041.	25.3512037	0.0005229	-0.000467	1.8950212	13.0099388 C
0.00002125	13213.	621778766.	25.0784271	0.0005329	-0.000487	1.9253639	13.2360808 C
0.00002188	13384.	611822109.	24.8181810	0.0005429	-0.000507	1.9552834	13.4602830 C
0.00002250	13551.	602279818.	24.5691163	0.0005528	-0.000527	1.9847638	13.6823483 C
0.00002313	13717.	593162483.	24.3315845	0.0005627	-0.000547	2.0138968	13.9031189 C
0.00002375	13880.	584407414.	24.1036397	0.0005725	-0.000568	2.0426122	14.1218819 C
0.00002438	14041.	576021764.	23.8855997	0.0005822	-0.000588	2.0709904	-14.501117 C
0.00002563	14356.	560234410.	23.4753945	0.0006016	-0.000628	2.1266765	-15.549598 C
0.00002688	14664.	545654776.	23.0968920	0.0006207	-0.000669	2.1810508	-16.603110 C
0.00002813	14967.	532162970.	22.7469581	0.0006398	-0.000710	2.2342221	-17.660762 C
0.00002938	15263.	519586658.	22.4203249	0.0006586	-0.000751	2.2860761	-18.723936 C
0.00003063	15553.	507866742.	22.1156807	0.0006773	-0.000793	2.3367659	-19.791261 C
0.00003188	15841.	496969880.	21.8330727	0.0006959	-0.000834	2.3865353	-20.860303 C
0.00003313	16122.	486695964.	21.5651698	0.0007143	-0.000876	2.4349667	-21.935709 C
0.00003438	16401.	477119261.	21.3163686	0.0007328	-0.000917	2.4826257	-23.011495 C
0.00003563	16675.	468068088.	21.0800406	0.0007510	-0.000959	2.5290910	-24.092433 C
0.00003688	16948.	459598431.	20.8599580	0.0007692	-0.001001	2.5748546	-25.173132 C
0.00003813	17215.	451548387.	20.6491806	0.0007873	-0.001043	2.6194081	-26.259500 C

Pier drilled shaft_row1

0.00003938	17482.	443991326.	20.4525581	0.0008053	-0.001085	2.6633285	-27.344985	C
0.00004063	17745.	436804101.	20.2644643	0.0008232	-0.001127	2.7061891	-28.434678	C
0.00004188	18006.	430000212.	20.0866912	0.0008411	-0.001169	2.7482611	-29.525474	C
0.00004313	18267.	423574513.	19.9199179	0.0008590	-0.001211	2.7897074	-30.615403	C
0.00004438	18522.	417408205.	19.7578708	0.0008768	-0.001253	2.8299807	-31.711340	C
0.00004563	18778.	411564967.	19.6053520	0.0008945	-0.001296	2.8696394	-32.806419	C
0.00004688	19032.	406018810.	19.4616028	0.0009123	-0.001338	2.9086802	-33.900634	C
0.00004813	19283.	400687583.	19.3219032	0.0009299	-0.001380	2.9466770	-34.999619	C
0.00004938	19533.	395602284.	19.1891497	0.0009475	-0.001423	2.9839871	-36.098787	C
0.00005063	19782.	390754983.	19.0635371	0.0009651	-0.001465	3.0206866	-37.197094	C
0.00005188	20030.	386120938.	18.9439852	0.0009827	-0.001507	3.0567118	-38.295392	C
0.00005313	20275.	381645538.	18.8270009	0.0010002	-0.001550	3.0917336	-39.398402	C
0.00005438	20519.	377363928.	18.7159396	0.0010177	-0.001592	3.1261516	-40.500553	C
0.00005563	20763.	373262977.	18.6104055	0.0010352	-0.001635	3.1599628	-41.601839	C
0.00005688	21006.	369330643.	18.5100377	0.0010528	-0.001677	3.1931639	-42.702256	C
0.00005813	21246.	365527472.	18.4119892	0.0010702	-0.001720	3.2254790	-43.806041	C
0.00005938	21486.	361861071.	18.3174718	0.0010876	-0.001762	3.2570689	-44.910853	C
0.00006063	21724.	358335186.	18.2273494	0.0011050	-0.001805	3.2880549	-46.014792	C
0.00006188	21962.	354941244.	18.1413589	0.0011225	-0.001848	3.3184342	-47.117849	C
0.00006313	22199.	351671287.	18.0592584	0.0011400	-0.001890	3.3482035	-48.220020	C
0.00006438	22435.	348510527.	17.9800535	0.0011575	-0.001933	3.3772764	-49.322737	C
0.00006563	22668.	345411487.	17.9016791	0.0011748	-0.001975	3.4054515	-50.000000	CY
0.00006688	22887.	342236913.	17.8241168	0.0011920	-0.002018	3.4327481	-50.000000	CY
0.00006813	23090.	338942371.	17.7465714	0.0012090	-0.002061	3.4591027	-50.000000	CY
0.00006938	23286.	335652173.	17.6706915	0.0012259	-0.002104	3.4847114	-50.000000	CY
0.00007063	23452.	332064045.	17.5917889	0.0012424	-0.002148	3.5091001	-50.000000	CY
0.00007188	23589.	328198274.	17.5095811	0.0012585	-0.002191	3.5322671	-50.000000	CY
0.00007313	23723.	324420948.	17.4274017	0.0012744	-0.002236	3.5545864	-50.000000	CY
0.00007438	23857.	320764914.	17.3483381	0.0012903	-0.002280	3.5763963	-50.000000	CY
0.00007938	24387.	307238214.	17.0603383	0.0013542	-0.002456	3.6584913	-50.000000	CY
0.00008438	24803.	293956224.	16.7777992	0.0014156	-0.002634	3.7290885	-50.000000	CY
0.00008938	25119.	281046421.	16.5078405	0.0014754	-0.002815	3.7898701	-50.000000	CY
0.00009438	25422.	269370708.	16.2613464	0.0015347	-0.002995	3.8425328	-50.000000	CY
0.00009938	25719.	258805739.	16.0417557	0.0015941	-0.003176	3.8877601	-50.000000	CY
0.0001044	26004.	249143182.	15.8386654	0.0016532	-0.003357	3.9250744	-50.000000	CY
0.0001094	26258.	240075472.	15.6506858	0.0017118	-0.003538	3.9547036	-50.000000	CY
0.0001144	26418.	230974764.	15.4523566	0.0017674	-0.003723	3.9759186	-50.000000	CY
0.0001194	26565.	222536414.	15.2693760	0.0018228	-0.003907	3.9904558	-50.000000	CY
0.0001244	26708.	214740970.	15.1031454	0.0018785	-0.004092	3.9984049	-50.000000	CY
0.0001294	26841.	207467178.	14.9441064	0.0019334	-0.004277	3.9976183	-50.000000	CY

Pier drilled shaft_row1

0.0001344	26970.	200705471.	14.7999540	0.0019887	-0.004461	3.9982057	-50.000000	CY
0.0001394	27094.	194399193.	14.6692123	0.0020445	-0.004645	3.9999090	-50.000000	CY
0.0001444	27211.	188472358.	14.5441970	0.0020998	-0.004830	3.9990544	-50.000000	CY
0.0001494	27322.	182910874.	14.4283074	0.0021552	-0.005015	3.9967590	-50.000000	CY
0.0001544	27431.	177688668.	14.3224417	0.0022110	-0.005199	3.9999150	-50.000000	CY
0.0001594	27536.	172772854.	14.2257733	0.0022672	-0.005383	3.9982202	-50.000000	CY
0.0001644	27636.	168130409.	14.1352336	0.0023235	-0.005567	3.9989785	50.000000	CY
0.0001694	27728.	163709379.	14.0474176	0.0023793	-0.005751	3.9985880	50.000000	CY
0.0001744	27796.	159401296.	13.9573910	0.0024338	-0.005936	3.9989029	50.000000	CY
0.0001794	27840.	155205897.	13.8699268	0.0024879	-0.006122	3.9978133	50.000000	CY
0.0001844	27877.	151199230.	13.7862752	0.0025418	-0.006308	3.9999248	50.000000	CY
0.0001894	27911.	147386920.	13.7088787	0.0025961	-0.006494	3.9955660	50.000000	CY
0.0001944	27941.	143745795.	13.6338775	0.0026501	-0.006680	3.9990391	50.000000	CY
0.0001994	27967.	140275153.	13.5611763	0.0027038	-0.006866	3.9987338	50.000000	CY
0.0002044	27993.	136966375.	13.4937061	0.0027578	-0.007052	3.9958926	50.000000	CY
0.0002094	28016.	133809032.	13.4309783	0.0028121	-0.007238	3.9990604	50.000000	CY
0.0002144	28039.	130795096.	13.3721605	0.0028667	-0.007423	3.9991109	50.000000	CY
0.0002194	28061.	127912012.	13.3174805	0.0029215	-0.007608	3.9944284	50.000000	CY
0.0002244	28079.	125144588.	13.2681261	0.0029770	-0.007793	3.9981936	50.000000	CY
0.0002294	28095.	122485087.	13.2237901	0.0030332	-0.007977	3.9999066	50.000000	CYT
0.0002344	28109.	119930328.	13.1806074	0.0030892	-0.008161	3.9932016	50.000000	CYT
0.0002394	28121.	117474928.	13.1374840	0.0031448	-0.008345	3.9955612	50.000000	CYT
0.0002444	28131.	115112423.	13.0982997	0.0032009	-0.008529	3.9986755	50.000000	CYT
0.0002494	28138.	112834055.	13.0636760	0.0032578	-0.008712	3.9999711	50.000000	CYT
0.0002544	28144.	110640590.	13.0317715	0.0033150	-0.008895	3.9923074	50.000000	CYT
0.0002594	28150.	108529308.	13.0018968	0.0033724	-0.009078	3.9944671	50.000000	CYT
0.0002644	28155.	106495995.	12.9738320	0.0034300	-0.009260	3.9979633	50.000000	CYT
0.0002694	28159.	104536170.	12.9475200	0.0034877	-0.009442	3.9997543	50.000000	CYT
0.0002744	28163.	102644646.	12.9231859	0.0035458	-0.009624	3.9958370	50.000000	CYT
0.0003044	28163.	92527720.	12.8643283	0.0039156	-0.010694	3.9910668	50.000000	CYT

Axial Thrust Force = 848.900 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	700.3066391	1120490622.	196.9858798	0.0001231	0.00009312	0.5045218	3.5051191	
0.00000125	1401.	1120471324.	110.5284874	0.0001382	0.00007816	0.5633242	3.8761577	

Pier drilled shaft_row1

0.00000188	2101.	1120430593.	81.7251545	0.0001532	0.00006323	0.6217432	4.2480553
0.00000250	2801.	1120371642.	67.3353379	0.0001683	0.00004834	0.6797760	4.6208120
0.00000313	3501.	1120295109.	58.7109294	0.0001835	0.00003347	0.7374194	4.9944280
0.00000375	4201.	1120201206.	52.9692266	0.0001986	0.00001863	0.7946706	5.3689034
0.00000438	4900.	1120090021.	48.8747859	0.0002138	0.00000383	0.8515266	5.7442385
0.00000500	5600.	1119953110.	45.8098374	0.0002290	-0.00001095	0.9079834	6.1204264
0.00000563	6298.	1119697395.	43.4306441	0.0002443	-0.00002570	0.9640263	6.4973738
0.00000625	6995.	1119227024.	41.5306567	0.0002596	-0.00004043	1.0196336	6.8749316
0.00000688	7690.	1118513536.	39.9785767	0.0002749	-0.00005515	1.0747882	7.2529787
0.00000750	8382.	1117562201.	38.6869999	0.0002902	-0.00006985	1.1294768	7.6314223
0.00000813	9071.	1116393169.	37.5955185	0.0003055	-0.00008454	1.1836896	8.0101940
0.00000875	9757.	1115031351.	36.6610573	0.0003208	-0.00009922	1.2374193	8.3892433
0.00000938	10439.	1113500887.	35.8520711	0.0003361	-0.000114	1.2906603	8.7685319
0.00001000	10439.	1043907082.	33.6982573	0.0003370	-0.000143	1.2931708	8.7284946 C
0.00001063	10439.	982500783.	32.8625045	0.0003492	-0.000161	1.3349847	9.0165092 C
0.00001125	10439.	927917406.	32.0991811	0.0003611	-0.000179	1.3756835	9.2978579 C
0.00001188	10439.	879079648.	31.4013693	0.0003729	-0.000197	1.4154685	9.5740966 C
0.00001250	10439.	835125665.	30.7581970	0.0003845	-0.000216	1.4543093	9.8448463 C
0.00001313	10608.	808197211.	30.1644065	0.0003959	-0.000234	1.4923327	10.1110773 C
0.00001375	10850.	789076978.	29.6136428	0.0004072	-0.000253	1.5295681	10.3729401 C
0.00001438	11083.	770967246.	29.1007749	0.0004183	-0.000272	1.5660495	10.6306355 C
0.00001500	11307.	753800531.	28.6215852	0.0004293	-0.000291	1.6018132	10.8843895 C
0.00001563	11524.	737518788.	28.1725907	0.0004402	-0.000310	1.6368977	11.1344552 C
0.00001625	11734.	722071420.	27.7509061	0.0004510	-0.000329	1.6713435	11.3811146 C
0.00001688	11938.	707413792.	27.3541378	0.0004616	-0.000348	1.7051939	11.6246812 C
0.00001750	12136.	693506013.	26.9803009	0.0004722	-0.000368	1.7384945	11.8655027 C
0.00001813	12331.	680311997.	26.6277542	0.0004826	-0.000387	1.7712941	12.1039634 C
0.00001875	12519.	667672594.	26.2920743	0.0004930	-0.000407	1.8034630	12.3388155 C
0.00001938	12703.	655662095.	25.9743630	0.0005033	-0.000427	1.8351751	12.5715953 C
0.00002000	12885.	644266092.	25.6739963	0.0005135	-0.000447	1.8665010	12.8029179 C
0.00002063	13062.	633292228.	25.3857134	0.0005236	-0.000466	1.8972105	13.0305799 C
0.00002125	13236.	622875654.	25.1127622	0.0005336	-0.000486	1.9275918	13.2572398 C
0.00002188	13407.	612885653.	24.8515532	0.0005436	-0.000506	1.9574965	13.4814541 C
0.00002250	13575.	603340142.	24.6023955	0.0005536	-0.000526	1.9870173	13.7040630 C
0.00002313	13741.	594192283.	24.3639826	0.0005634	-0.000547	2.0161352	13.9248459 C
0.00002375	13904.	585433927.	24.1359871	0.0005732	-0.000567	2.0448908	14.1441612 C
0.00002438	14065.	577020235.	23.9171364	0.0005830	-0.000587	2.0732538	-14.478824 C
0.00002563	14381.	561204457.	23.5061949	0.0006023	-0.000628	2.1289666	-15.526709 C
0.00002688	14690.	546599742.	23.1270980	0.0006215	-0.000668	2.1833718	-16.579568 C
0.00002813	14993.	533084966.	22.7766719	0.0006406	-0.000709	2.2365762	-17.636527 C

Pier drilled shaft_row1

0.00002938	15289.	520466793.	22.4488128	0.0006594	-0.000751	2.2883985	-18.699667	C
0.00003063	15580.	508728285.	22.1438363	0.0006782	-0.000792	2.3391232	-19.766255	C
0.00003188	15867.	497799934.	21.8603636	0.0006968	-0.000833	2.3888776	-20.835076	C
0.00003313	16149.	487506053.	21.5920557	0.0007152	-0.000875	2.4373284	-21.909881	C
0.00003438	16428.	477914875.	21.3431148	0.0007337	-0.000916	2.4850264	-22.984832	C
0.00003563	16702.	468833771.	21.1058889	0.0007519	-0.000958	2.5314584	-24.065728	C
0.00003688	16975.	460348364.	20.8855874	0.0007702	-0.001000	2.5772461	-25.145725	C
0.00003813	17243.	452275268.	20.6741830	0.0007882	-0.001042	2.6217821	-26.231856	C
0.00003938	17510.	444693335.	20.4768074	0.0008063	-0.001084	2.6656684	-27.317295	C
0.00004063	17773.	437496691.	20.2887821	0.0008242	-0.001126	2.7085709	-28.406029	C
0.00004188	18034.	430670466.	20.1103249	0.0008421	-0.001168	2.7506079	-29.496774	C
0.00004313	18295.	424223762.	19.9429102	0.0008600	-0.001210	2.7920195	-30.586648	C
0.00004438	18551.	418049975.	19.7810164	0.0008778	-0.001252	2.8323354	-31.681555	C
0.00004563	18806.	412187618.	19.6279060	0.0008955	-0.001294	2.8719581	-32.776578	C
0.00004688	19060.	406623402.	19.4835972	0.0009133	-0.001337	2.9109630	-33.870735	C
0.00004813	19312.	401286132.	19.3441269	0.0009309	-0.001379	2.9490034	-34.968603	C
0.00004938	19562.	396184294.	19.2108542	0.0009485	-0.001421	2.9862764	-36.067709	C
0.00005063	19811.	391321257.	19.0847487	0.0009662	-0.001464	3.0229388	-37.165953	C
0.00005188	20059.	386679607.	18.9652957	0.0009838	-0.001506	3.0589873	-38.263333	C
0.00005313	20304.	382192244.	18.8480450	0.0010013	-0.001549	3.0939916	-39.365981	C
0.00005438	20548.	377896800.	18.7365444	0.0010188	-0.001591	3.1283711	-40.468062	C
0.00005563	20792.	373782624.	18.6305912	0.0010363	-0.001634	3.1621437	-41.569277	C
0.00005688	21035.	369837641.	18.5298233	0.0010539	-0.001676	3.1953060	-42.669623	C
0.00005813	21276.	366030812.	18.4321374	0.0010714	-0.001719	3.2276631	-43.772078	C
0.00005938	21515.	362352641.	18.3372418	0.0010888	-0.001761	3.2592129	-44.876812	C
0.00006063	21753.	358815465.	18.2467572	0.0011062	-0.001804	3.2901587	-45.980671	C
0.00006188	21991.	355410673.	18.1604197	0.0011237	-0.001846	3.3204974	-47.083647	C
0.00006313	22228.	352130292.	18.0779865	0.0011412	-0.001889	3.3502259	-48.185736	C
0.00006438	22465.	348966697.	17.9992028	0.0011587	-0.001931	3.3793376	-49.286988	C
0.00006563	22697.	345860100.	17.9205420	0.0011760	-0.001974	3.4074738	-50.000000	CY
0.00006688	22917.	342684443.	17.8427913	0.0011932	-0.002017	3.4347410	-50.000000	CY
0.00006813	23121.	339386301.	17.7650281	0.0012102	-0.002060	3.4610619	-50.000000	CY
0.00006938	23316.	336089499.	17.6888932	0.0012272	-0.002103	3.4866317	-50.000000	CY
0.00007063	23483.	332507733.	17.6099328	0.0012437	-0.002146	3.5110021	-50.000000	CY
0.00007188	23622.	328650831.	17.5280808	0.0012598	-0.002190	3.5341936	-50.000000	CY
0.00007313	23756.	324868543.	17.4459712	0.0012757	-0.002234	3.5565061	-50.000000	CY
0.00007438	23890.	321204162.	17.3666321	0.0012916	-0.002278	3.5782721	-50.000000	CY
0.00007938	24419.	307646661.	17.0776214	0.0013555	-0.002454	3.6601892	-50.000000	CY
0.00008438	24837.	294370149.	16.7954440	0.0014171	-0.002633	3.7307292	-50.000000	CY
0.00008938	25154.	281441712.	16.5254202	0.0014770	-0.002813	3.7913946	-50.000000	CY

Pier drilled shaft_row1

0.00009438	25457.	269742657.	16.2781204	0.0015362	-0.002994	3.8438621	-50.000000	CY
0.00009938	25754.	259162818.	16.0586367	0.0015958	-0.003174	3.8889487	-50.000000	CY
0.0001044	26040.	249480933.	15.8548738	0.0016549	-0.003355	3.9260532	-50.000000	CY
0.0001094	26295.	240412111.	15.6667727	0.0017136	-0.003536	3.9554942	-50.000000	CY
0.0001144	26455.	231303174.	15.4688295	0.0017692	-0.003721	3.9765346	-50.000000	CY
0.0001194	26603.	222849243.	15.2852772	0.0018247	-0.003905	3.9908450	-50.000000	CY
0.0001244	26746.	215045261.	15.1195063	0.0018805	-0.004090	3.9985726	-50.000000	CY
0.0001294	26879.	207757849.	14.9599769	0.0019354	-0.004275	3.9978261	-50.000000	CY
0.0001344	27007.	200983421.	14.8153829	0.0019908	-0.004459	3.9975557	-50.000000	CY
0.0001394	27132.	194665649.	14.6842139	0.0020466	-0.004643	3.9999463	-50.000000	CY
0.0001444	27248.	188732636.	14.5598470	0.0021021	-0.004828	3.9991960	-50.000000	CY
0.0001494	27360.	183160752.	14.4435969	0.0021575	-0.005012	3.9970289	-50.000000	CY
0.0001544	27468.	177929225.	14.3373643	0.0022133	-0.005197	3.9999541	-50.000000	CY
0.0001594	27573.	173004349.	14.2403842	0.0022696	-0.005380	3.9984225	-50.000000	CY
0.0001644	27674.	168357191.	14.1507551	0.0023260	-0.005564	3.9981786	50.000000	CY
0.0001694	27766.	163933157.	14.0629263	0.0023819	-0.005748	3.9987896	50.000000	CY
0.0001744	27833.	159617642.	13.9727492	0.0024365	-0.005934	3.9980633	50.000000	CY
0.0001794	27878.	155419734.	13.8854905	0.0024907	-0.006119	3.9980814	50.000000	CY
0.0001844	27916.	151406893.	13.8015491	0.0025447	-0.006305	3.9999677	50.000000	CY
0.0001894	27949.	147587051.	13.7240526	0.0025990	-0.006491	3.9959625	50.000000	CY
0.0001944	27979.	143944044.	13.6501934	0.0026533	-0.006677	3.9992362	50.000000	CY
0.0001994	28006.	140467400.	13.5772637	0.0027070	-0.006863	3.9977282	50.000000	CY
0.0002044	28031.	137152974.	13.5095815	0.0027610	-0.007049	3.9963217	50.000000	CY
0.0002094	28054.	133990631.	13.4465814	0.0028154	-0.007235	3.9992608	50.000000	CY
0.0002144	28077.	130971526.	13.3875782	0.0028700	-0.007420	3.9980746	50.000000	CY
0.0002194	28098.	128083963.	13.3326430	0.0029248	-0.007605	3.9949425	50.000000	CY
0.0002244	28116.	125309806.	13.2835657	0.0029805	-0.007789	3.9984923	50.000000	CY
0.0002294	28132.	122646197.	13.2390114	0.0030367	-0.007973	3.9999645	50.000000	CYT
0.0002344	28146.	120089921.	13.1974861	0.0030932	-0.008157	3.9919613	50.000000	CYT
0.0002394	28158.	117630770.	13.1541375	0.0031488	-0.008341	3.9961066	50.000000	CYT
0.0002444	28167.	115262480.	13.1153297	0.0032051	-0.008525	3.9989772	50.000000	CYT
0.0002494	28175.	112980631.	13.0805196	0.0032620	-0.008708	3.9999992	50.000000	CYT
0.0002544	28181.	110783461.	13.0485297	0.0033192	-0.008891	3.9909709	50.000000	CYT
0.0002594	28186.	108669027.	13.0184744	0.0033767	-0.009073	3.9951245	50.000000	CYT
0.0002644	28191.	106632670.	12.9902410	0.0034343	-0.009256	3.9983573	50.000000	CYT
0.0002694	28195.	104669883.	12.9637785	0.0034921	-0.009438	3.9998783	50.000000	CYT
0.0002744	28199.	102775146.	12.9393993	0.0035502	-0.009620	3.9944422	50.000000	CYT
0.0003044	28199.	92645358.	12.8800567	0.0039204	-0.010690	3.9920005	50.000000	CYT

Pier drilled shaft_row1

Axial Thrust Force = 1018.000 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	692.2439673	1107590348.	232.6334373	0.0001454	0.0001154	0.5922959	4.1512311	
0.00000125	1384.	1107572075.	128.3526895	0.0001604	0.0001004	0.6503542	4.5222850	
0.00000188	2077.	1107531278.	93.6084263	0.0001755	0.00008552	0.7080291	4.8942082	
0.00000250	2769.	1107471834.	76.2482857	0.0001906	0.00007062	0.7653174	5.2670007	
0.00000313	3461.	1107394515.	65.8417958	0.0002058	0.00005576	0.8222161	5.6406628	
0.00000375	4152.	1107299577.	58.9121329	0.0002209	0.00004092	0.8787224	6.0151945	
0.00000438	4844.	1107187127.	53.9692302	0.0002361	0.00002612	0.9348331	6.3905961	
0.00000500	5535.	1107057213.	50.2680544	0.0002513	0.00001134	0.9905453	6.7668679	
0.00000563	6226.	1106909741.	47.3946979	0.0002666	-0.00000340	1.0458559	7.1440101	
0.00000625	6917.	1106717375.	45.1006557	0.0002819	-0.00001812	1.1007583	7.5219939	
0.00000688	7606.	1106395645.	43.2273645	0.0002972	-0.00003281	1.1552355	7.9007058	
0.00000750	8294.	1105890063.	41.6690765	0.0003125	-0.00004748	1.2092701	8.2800242	
0.00000813	8980.	1105183784.	40.3526809	0.0003279	-0.00006213	1.2628481	8.6598505	
0.00000875	9662.	1104278854.	39.2260300	0.0003432	-0.00007677	1.3159581	9.0401051	
0.00000938	10342.	1103187246.	38.2509463	0.0003586	-0.00009140	1.3685912	9.4207258	
0.00001000	11019.	1101925197.	37.3988458	0.0003740	-0.000106	1.4207405	9.8016652	
0.00001063	11019.	1037106068.	35.6170228	0.0003784	-0.000132	1.4353383	9.8652451	C
0.00001125	11019.	979489064.	34.7717188	0.0003912	-0.000149	1.4779530	10.1697733	C
0.00001188	11019.	927937008.	33.9964631	0.0004037	-0.000166	1.5194600	10.4677820	C
0.00001250	11200.	895977042.	33.2839059	0.0004160	-0.000184	1.5600086	10.7604159	C
0.00001313	11496.	875909097.	32.6245913	0.0004282	-0.000202	1.5995927	11.0474851	C
0.00001375	11780.	856722544.	32.0137032	0.0004402	-0.000220	1.6383373	11.3299642	C
0.00001438	12052.	838388098.	31.4455602	0.0004520	-0.000238	1.6762845	11.6081179	C
0.00001500	12312.	820823791.	30.9145980	0.0004637	-0.000256	1.7134356	11.8818502	C
0.00001563	12563.	804050742.	30.4176074	0.0004753	-0.000275	1.7498645	12.1517283	C
0.00001625	12806.	788033147.	29.9511729	0.0004867	-0.000293	1.7856074	12.4179901	C
0.00001688	13040.	772738505.	29.5124315	0.0004980	-0.000312	1.8207019	12.6808962	C
0.00001750	13266.	758074978.	29.0978053	0.0005092	-0.000331	1.8551235	12.9401361	C
0.00001813	13486.	744049313.	28.7057794	0.0005203	-0.000350	1.8889363	13.1962253	C
0.00001875	13700.	730648768.	28.3348251	0.0005313	-0.000369	1.9221903	13.4495611	C
0.00001938	13908.	717853678.	27.9835432	0.0005422	-0.000388	1.9549300	13.7005034	C
0.00002000	14112.	705594869.	27.6496769	0.0005530	-0.000407	1.9871366	13.9488127	C
0.00002063	14310.	693796712.	27.3307934	0.0005637	-0.000426	2.0187643	14.1939809	C
0.00002125	14504.	682542152.	27.0281413	0.0005743	-0.000446	2.0499825	14.4375921	C

Pier drilled shaft_row1

0.00002188	14694.	671720634.	26.7387968	0.0005849	-0.000465	2.0806966	14.6786743	C
0.00002250	14880.	661319441.	26.4619705	0.0005954	-0.000485	2.1109337	14.9174358	C
0.00002313	15063.	651378177.	26.1984051	0.0006058	-0.000504	2.1408169	15.1550555	C
0.00002375	15242.	641750115.	25.9441214	0.0006162	-0.000524	2.1701491	15.3895137	C
0.00002438	15419.	632570483.	25.7024412	0.0006265	-0.000544	2.1992178	15.6236632	C
0.00002563	15763.	615135105.	25.2452264	0.0006469	-0.000583	2.2559952	16.0851089	C
0.00002688	16096.	598937351.	24.8222406	0.0006671	-0.000623	2.3112483	16.5400839	C
0.00002813	16421.	583864675.	24.4298966	0.0006871	-0.000663	2.3650815	16.9893845	C
0.00002938	16739.	569825848.	24.0654859	0.0007069	-0.000703	2.4176151	17.4340359	C
0.00003063	17050.	556738293.	23.7267519	0.0007266	-0.000743	2.4689638	-18.360428	C
0.00003188	17354.	544432393.	23.4083602	0.0007461	-0.000784	2.5189534	-19.404147	C
0.00003313	17652.	532900894.	23.1104605	0.0007655	-0.000824	2.5678160	-20.451264	C
0.00003438	17947.	522090667.	22.8319273	0.0007848	-0.000865	2.6156618	-21.500672	C
0.00003563	18235.	511847203.	22.5673506	0.0008040	-0.000906	2.6622064	-22.555856	C
0.00003688	18521.	502252487.	22.3208004	0.0008231	-0.000947	2.7079630	-23.610944	C
0.00003813	18800.	493102918.	22.0844491	0.0008420	-0.000988	2.7523845	-24.672631	C
0.00003938	19078.	484512067.	21.8639582	0.0008609	-0.001029	2.7961072	-25.733343	C
0.00004063	19350.	476306697.	21.6522187	0.0008796	-0.001070	2.8386029	-26.799730	C
0.00004188	19621.	468556292.	21.4532303	0.0008984	-0.001112	2.8803453	-27.865983	C
0.00004313	19888.	461176376.	21.2635622	0.0009170	-0.001153	2.9211134	-28.935008	C
0.00004438	20152.	454138084.	21.0825120	0.0009355	-0.001194	2.9609271	-30.006692	C
0.00004563	20416.	447467644.	20.9121159	0.0009541	-0.001236	3.0000633	-31.077406	C
0.00004688	20675.	441058449.	20.7472413	0.0009725	-0.001277	3.0381006	-32.152969	C
0.00004813	20932.	434947556.	20.5906056	0.0009909	-0.001319	3.0753684	-33.228986	C
0.00004938	21188.	429129968.	20.4425730	0.0010094	-0.001361	3.1119662	-34.304041	C
0.00005063	21441.	423529002.	20.2991372	0.0010276	-0.001402	3.1475561	-35.383079	C
0.00005188	21692.	418160277.	20.1618500	0.0010459	-0.001444	3.1823421	-36.463267	C
0.00005313	21942.	413029559.	20.0316447	0.0010642	-0.001486	3.2164655	-37.542497	C
0.00005438	22191.	408114032.	19.9076070	0.0010825	-0.001528	3.2498797	-38.621442	C
0.00005563	22436.	403349837.	19.7859198	0.0011006	-0.001569	3.2822436	-39.705588	C
0.00005688	22681.	398781675.	19.6701609	0.0011187	-0.001611	3.3139517	-40.788780	C
0.00005813	22924.	394396831.	19.5599516	0.0011369	-0.001653	3.3450006	-41.871006	C
0.00005938	23167.	390183547.	19.4549452	0.0011551	-0.001695	3.3753864	-42.952266	C
0.00006063	23407.	386090126.	19.3516231	0.0011732	-0.001737	3.4047882	-44.038178	C
0.00006188	23645.	382143029.	19.2524769	0.0011912	-0.001779	3.4334813	-45.124087	C
0.00006313	23883.	378340274.	19.1577885	0.0012093	-0.001821	3.4615178	-46.209023	C
0.00006438	24120.	374673313.	19.0673019	0.0012275	-0.001863	3.4888940	-47.292981	C
0.00006563	24356.	371134295.	18.9807810	0.0012456	-0.001904	3.5156063	-48.375951	C
0.00006688	24589.	367688860.	18.8955670	0.0012636	-0.001946	3.5414167	-49.462659	C
0.00006813	24819.	364317806.	18.8127520	0.0012816	-0.001988	3.5664511	-50.000000	CY

Pier drilled shaft_row1

0.00006938	25036.	360878528.	18.7309110	0.0012995	-0.002031	3.5905937	-50.000000	CY
0.00007063	25238.	357352052.	18.6496208	0.0013171	-0.002073	3.6138264	-50.000000	CY
0.00007188	25433.	353845504.	18.5702704	0.0013347	-0.002115	3.6362989	-50.000000	CY
0.00007313	25601.	350100968.	18.4888960	0.0013520	-0.002158	3.6576681	-50.000000	CY
0.00007438	25740.	346088112.	18.4021909	0.0013687	-0.002201	3.6776686	-50.000000	CY
0.00007938	26276.	331033199.	18.0821229	0.0014353	-0.002375	3.7516041	-50.000000	CY
0.00008438	26790.	317516234.	17.7957993	0.0015015	-0.002548	3.8155993	-50.000000	CY
0.00008938	27148.	303754836.	17.5113753	0.0015651	-0.002725	3.8680126	-50.000000	CY
0.00009438	27457.	290931760.	17.2429764	0.0016273	-0.002903	3.9108414	-50.000000	CY
0.00009938	27758.	279322286.	17.0044062	0.0016898	-0.003080	3.9454352	-50.000000	CY
0.0001044	28044.	268687371.	16.7836890	0.0017518	-0.003258	3.9713911	-50.000000	CY
0.0001094	28325.	258968425.	16.5874271	0.0018142	-0.003436	3.9891432	-50.000000	CY
0.0001144	28570.	249791988.	16.3984666	0.0018756	-0.003614	3.9983641	-50.000000	CY
0.0001194	28730.	240668815.	16.2070573	0.0019347	-0.003795	3.9984188	-50.000000	CY
0.0001244	28873.	232144629.	16.0296863	0.0019937	-0.003976	3.9980330	-50.000000	CY
0.0001294	29005.	224194059.	15.8627518	0.0020522	-0.004158	3.9970325	-50.000000	CY
0.0001344	29132.	216799606.	15.7117286	0.0021113	-0.004339	3.9999994	-50.000000	CY
0.0001394	29254.	209891559.	15.5732914	0.0021705	-0.004519	3.9996829	-50.000000	CY
0.0001444	29365.	203397038.	15.4404749	0.0022292	-0.004701	3.9983593	-50.000000	CY
0.0001494	29473.	197308173.	15.3197997	0.0022884	-0.004882	3.9975626	50.000000	CY
0.0001544	29576.	191586220.	15.2100317	0.0023480	-0.005062	3.9995560	50.000000	CY
0.0001594	29672.	186175124.	15.1115127	0.0024084	-0.005242	3.9970040	50.000000	CY
0.0001644	29760.	181047277.	15.0152893	0.0024681	-0.005422	3.9998902	50.000000	CY
0.0001694	29842.	176189466.	14.9288726	0.0025286	-0.005601	3.9973290	50.000000	CY
0.0001744	29922.	171594882.	14.8496035	0.0025894	-0.005781	3.9999222	50.000000	CY
0.0001794	29997.	167228175.	14.7769367	0.0026506	-0.005959	3.9967692	50.000000	CY
0.0001844	30058.	163025958.	14.7056618	0.0027114	-0.006139	3.9997241	50.000000	CY
0.0001894	30107.	158978472.	14.6359299	0.0027717	-0.006318	3.9946411	50.000000	CY
0.0001944	30127.	154995498.	14.5619638	0.0028305	-0.006500	3.9985881	50.000000	CY
0.0001994	30146.	151204082.	14.4926108	0.0028895	-0.006681	3.9999969	50.000000	CY
0.0002044	30163.	147585690.	14.4282267	0.0029488	-0.006861	3.9951544	50.000000	CY
0.0002094	30174.	144115893.	14.3718075	0.0030091	-0.007041	3.9987814	50.000000	CYT
0.0002144	30185.	140802353.	14.3193533	0.0030697	-0.007220	3.9999716	50.000000	CYT
0.0002194	30193.	137631529.	14.2710928	0.0031307	-0.007399	3.9942044	50.000000	CYT
0.0002244	30201.	134598356.	14.2259599	0.0031919	-0.007578	3.9981495	50.000000	CYT
0.0002294	30207.	131693714.	14.1837768	0.0032534	-0.007757	3.9999066	50.000000	CYT
0.0002344	30212.	128904138.	14.1429818	0.0033148	-0.007935	3.9930271	50.000000	CYT
0.0002394	30215.	126223412.	14.1021672	0.0033757	-0.008114	3.9957182	50.000000	CYT
0.0002444	30217.	123649892.	14.0638415	0.0034369	-0.008293	3.9987780	50.000000	CYT
0.0002494	30219.	121177053.	14.0278773	0.0034982	-0.008472	3.9999818	50.000000	CYT

Pier drilled shaft_row1

0.0002544	30219.	118796275.	13.9947996	0.0035599	-0.008650	3.9920659	50.0000000	CYT
0.0002594	30219.	116506226.	13.9637955	0.0036219	-0.008828	3.9945445	50.0000000	CYT
0.0002644	30219.	114302799.	13.9346560	0.0036840	-0.009006	3.9979840	50.0000000	CYT
0.0002694	30219.	112181169.	13.9072959	0.0037463	-0.009184	3.9997523	50.0000000	CYT
0.0002744	30219.	110136865.	13.8819801	0.0038089	-0.009361	3.9959407	50.0000000	CYT

Axial Thrust Force = 1091.000 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	688.7335084	1101973613.	248.1542538	0.0001551	0.0001251	0.6301637	4.4325459	
0.00000125	1377.	1101955787.	136.1132852	0.0001701	0.0001101	0.6878980	4.8036066	
0.00000188	2066.	1101914957.	98.7823651	0.0001852	0.00009522	0.7452488	5.1755411	
0.00000250	2755.	1101855293.	80.1289586	0.0002003	0.00008032	0.8022130	5.5483495	
0.00000313	3443.	1101777625.	68.9465591	0.0002155	0.00006546	0.8587876	5.9220319	
0.00000375	4131.	1101682228.	61.4996650	0.0002306	0.00005062	0.9149695	6.2965886	
0.00000438	4819.	1101569217.	56.1873472	0.0002458	0.00003582	0.9707557	6.6720197	
0.00000500	5507.	1101438645.	52.2091414	0.0002610	0.00002105	1.0261432	7.0483255	
0.00000563	6195.	1101290539.	49.1203457	0.0002763	0.00000630	1.0811291	7.4255064	
0.00000625	6882.	1101122939.	46.6541275	0.0002916	-0.00000841	1.1357099	7.8035606	
0.00000688	7569.	1100891359.	44.6404256	0.0003069	-0.00002310	1.1898761	8.1824349	
0.00000750	8254.	1100522910.	42.9655738	0.0003222	-0.00003776	1.2436106	8.5620123	
0.00000813	8937.	1099978773.	41.5509118	0.0003376	-0.00005240	1.2968977	8.9421836	
0.00000875	9618.	1099247759.	40.3403355	0.0003530	-0.00006702	1.3497249	9.3228601	
0.00000938	10297.	1098332531.	39.2927599	0.0003684	-0.00008163	1.4020818	9.7039691	
0.00001000	10972.	1097243515.	38.3774235	0.0003838	-0.00009623	1.4539600	10.0854529	
0.00001063	11645.	1095994620.	37.5708431	0.0003992	-0.000111	1.5053531	10.4672659	
0.00001125	11645.	1035106030.	35.8697728	0.0004035	-0.000136	1.5193829	10.5280132	C
0.00001188	11645.	980626765.	35.0632288	0.0004164	-0.000154	1.5615884	10.8351494	C
0.00001250	11645.	931595427.	34.3223701	0.0004290	-0.000171	1.6028175	11.1368592	C
0.00001313	11821.	900663960.	33.6361172	0.0004415	-0.000189	1.6430134	11.4324971	C
0.00001375	12124.	881750020.	33.0006171	0.0004538	-0.000206	1.6823531	11.7234961	C
0.00001438	12414.	863571038.	32.4095650	0.0004659	-0.000224	1.7208641	12.0099875	C
0.00001500	12690.	846025870.	31.8566582	0.0004778	-0.000242	1.7585235	12.2916464	C
0.00001563	12957.	829218609.	31.3393951	0.0004897	-0.000260	1.7954466	12.5694134	C
0.00001625	13213.	813129809.	30.8542523	0.0005014	-0.000279	1.8316740	12.8435663	C
0.00001688	13461.	797715691.	30.3978771	0.0005130	-0.000297	1.8672265	13.1142110	C

Pier drilled shaft_row1

0.00001750	13702.	782950214.	29.9676389	0.0005244	-0.000316	1.9021380	13.3815767	C
0.00001813	13934.	768768664.	29.5605666	0.0005358	-0.000334	1.9364021	13.6455228	C
0.00001875	14159.	755141156.	29.1745241	0.0005470	-0.000353	1.9700381	13.9061475	C
0.00001938	14378.	742088885.	28.8086147	0.0005582	-0.000372	2.0031206	14.1640904	C
0.00002000	14592.	729597919.	28.4615678	0.0005692	-0.000391	2.0356931	14.4197094	C
0.00002063	14801.	717601649.	28.1312150	0.0005802	-0.000410	2.0677340	14.6727330	C
0.00002125	15003.	706027970.	27.8152338	0.0005911	-0.000429	2.0991970	14.9226378	C
0.00002188	15202.	694967419.	27.5149523	0.0006019	-0.000448	2.1302523	15.1710479	C
0.00002250	15397.	684302594.	27.2273432	0.0006126	-0.000467	2.1607924	15.4168415	C
0.00002313	15587.	674039255.	26.9520188	0.0006233	-0.000487	2.1908658	15.6604476	C
0.00002375	15775.	664203485.	26.6893356	0.0006339	-0.000506	2.2205671	15.9027800	C
0.00002438	15958.	654668515.	26.4358886	0.0006444	-0.000526	2.2497330	16.1421188	C
0.00002563	16315.	636690646.	25.9605090	0.0006652	-0.000565	2.3069475	16.6166533	C
0.00002688	16662.	619969344.	25.5210531	0.0006859	-0.000604	2.3626063	17.0847209	C
0.00002813	16998.	604390089.	25.1136566	0.0007063	-0.000644	2.4168093	17.5470762	C
0.00002938	17327.	589842695.	24.7348325	0.0007266	-0.000683	2.4696299	18.0042350	C
0.00003063	17645.	576167022.	24.3795323	0.0007466	-0.000723	2.5209700	18.4548221	C
0.00003188	17958.	563372984.	24.0481213	0.0007665	-0.000763	2.5711129	18.9017322	C
0.00003313	18265.	551397478.	23.7390019	0.0007864	-0.000804	2.6201665	-19.847471	C
0.00003438	18565.	540062332.	23.4463553	0.0008060	-0.000844	2.6678578	-20.888165	C
0.00003563	18860.	529416273.	23.1723090	0.0008255	-0.000884	2.7145447	-21.930858	C
0.00003688	19151.	519349219.	22.9134190	0.0008449	-0.000925	2.7601007	-22.977212	C
0.00003813	19437.	509824891.	22.6686957	0.0008642	-0.000966	2.8045864	-24.026673	C
0.00003938	19719.	500804935.	22.4372911	0.0008835	-0.001007	2.8480606	-25.078668	C
0.00004063	19998.	492248790.	22.2179901	0.0009026	-0.001047	2.8905357	-26.133180	C
0.00004188	20272.	484105749.	22.0092653	0.0009216	-0.001088	2.9319820	-27.190748	C
0.00004313	20545.	476396565.	21.8126276	0.0009407	-0.001129	2.9726382	-28.248332	C
0.00004438	20812.	468996767.	21.6228236	0.0009595	-0.001170	3.0121085	-29.311379	C
0.00004563	21078.	461983452.	21.4441874	0.0009784	-0.001212	3.0508780	-30.373409	C
0.00004688	21341.	455272976.	21.2730698	0.0009972	-0.001253	3.0886809	-31.438171	C
0.00004813	21601.	448843718.	21.1089518	0.0010159	-0.001294	3.1255352	-32.505569	C
0.00004938	21859.	442722803.	20.9538464	0.0010346	-0.001335	3.1616962	-33.571961	C
0.00005063	22115.	436844403.	20.8046097	0.0010532	-0.001377	3.1969215	-34.640982	C
0.00005188	22368.	431192061.	20.6608446	0.0010718	-0.001418	3.2312247	-35.712592	C
0.00005313	22620.	425790074.	20.5244943	0.0010904	-0.001460	3.2648420	-36.783201	C
0.00005438	22871.	420618307.	20.3948766	0.0011090	-0.001501	3.2977525	-37.853079	C
0.00005563	23118.	415598982.	20.2675181	0.0011274	-0.001543	3.3295650	-38.928710	C
0.00005688	23363.	410786007.	20.1463629	0.0011458	-0.001584	3.3606985	-40.003343	C
0.00005813	23608.	406165917.	20.0310147	0.0011643	-0.001626	3.3911492	-41.076971	C
0.00005938	23853.	401726403.	19.9211108	0.0011828	-0.001667	3.4209131	-42.149587	C

Pier drilled shaft_row1

0.00006063	24093.	397403609.	19.8124857	0.0012011	-0.001709	3.4496210	-43.227924	C
0.00006188	24332.	393241941.	19.7087715	0.0012195	-0.001751	3.4776485	-44.305324	C
0.00006313	24570.	389232283.	19.6097190	0.0012379	-0.001792	3.5049959	-45.381708	C
0.00006438	24808.	385365611.	19.5150605	0.0012563	-0.001834	3.5316591	-46.457071	C
0.00006563	25044.	381626475.	19.4239531	0.0012747	-0.001875	3.5575791	-47.532539	C
0.00006688	25278.	377981527.	19.3340038	0.0012930	-0.001917	3.5825554	-48.612366	C
0.00006813	25510.	374458566.	19.2478769	0.0013113	-0.001959	3.6068532	-49.691164	C
0.00006938	25739.	371006995.	19.1647711	0.0013296	-0.002000	3.6304152	-50.000000	CY
0.00007063	25952.	367463641.	19.0823039	0.0013477	-0.002042	3.6530460	-50.000000	CY
0.00007188	26152.	363857984.	19.0007274	0.0013657	-0.002084	3.6747900	-50.000000	CY
0.00007313	26345.	360273363.	18.9197525	0.0013835	-0.002126	3.6956433	-50.000000	CY
0.00007438	26507.	356402353.	18.8345530	0.0014008	-0.002169	3.7152213	-50.000000	CY
0.00007938	27049.	340770967.	18.5045204	0.0014688	-0.002341	3.7857754	-50.000000	CY
0.00008438	27569.	326746927.	18.2078040	0.0015363	-0.002514	3.8458965	-50.000000	CY
0.00008938	27976.	313013631.	17.9237170	0.0016019	-0.002688	3.8948777	-50.000000	CY
0.00009438	28289.	299749218.	17.6494017	0.0016657	-0.002864	3.9334745	-50.000000	CY
0.00009938	28590.	287699067.	17.4017711	0.0017293	-0.003041	3.9632426	-50.000000	CY
0.0001044	28879.	276685822.	17.1765773	0.0017928	-0.003217	3.9842092	-50.000000	CY
0.0001094	29158.	266590791.	16.9730791	0.0018564	-0.003394	3.9964631	-50.000000	CY
0.0001144	29422.	257241386.	16.7843141	0.0019197	-0.003570	3.9981235	-50.000000	CY
0.0001194	29613.	248066736.	16.5986826	0.0019815	-0.003749	3.9974040	-50.000000	CY
0.0001244	29754.	239229916.	16.4145774	0.0020416	-0.003928	3.9981056	-50.000000	CY
0.0001294	29887.	231011248.	16.2461974	0.0021019	-0.004108	3.9999965	-50.000000	CY
0.0001344	30015.	223364565.	16.0940941	0.0021626	-0.004287	3.9997835	-50.000000	CY
0.0001394	30131.	216187373.	15.9482669	0.0022228	-0.004467	3.9988894	-50.000000	CY
0.0001444	30242.	209465853.	15.8155185	0.0022834	-0.004647	3.9967996	50.000000	CY
0.0001494	30347.	203158865.	15.6954229	0.0023445	-0.004825	3.9999313	50.000000	CY
0.0001544	30444.	197206632.	15.5873491	0.0024063	-0.005004	3.9985653	50.000000	CY
0.0001594	30532.	191573215.	15.4827117	0.0024676	-0.005182	3.9976372	50.000000	CY
0.0001644	30615.	186251095.	15.3882353	0.0025294	-0.005361	3.9991511	50.000000	CY
0.0001694	30695.	181224901.	15.3018142	0.0025917	-0.005538	3.9954778	50.000000	CY
0.0001744	30771.	176465976.	15.2231181	0.0026545	-0.005715	3.9991871	50.000000	CY
0.0001794	30844.	171954993.	15.1512491	0.0027178	-0.005892	3.9957566	50.000000	CY
0.0001844	30906.	167623563.	15.0866833	0.0027816	-0.006068	3.9987070	50.000000	CY
0.0001894	30957.	163468030.	15.0214242	0.0028447	-0.006245	3.9987580	50.000000	CY
0.0001944	30991.	159439576.	14.9587606	0.0029076	-0.006422	3.9970053	50.000000	CY
0.0001994	31009.	155529218.	14.8963919	0.0029700	-0.006600	3.9996807	50.000000	CY
0.0002044	31020.	151781770.	14.8367906	0.0030323	-0.006778	3.9944042	50.000000	CYT
0.0002094	31030.	148200878.	14.7810216	0.0030948	-0.006955	3.9974373	50.000000	CYT
0.0002144	31038.	144782404.	14.7289857	0.0031575	-0.007132	3.9997472	50.000000	CYT

Pier drilled shaft_row1

0.0002194	31044.	141512918.	14.6808401	0.0032206	-0.007309	3.9943288	50.0000000	CYT
0.0002244	31050.	138382691.	14.6357040	0.0032839	-0.007486	3.9964322	50.0000000	CYT
0.0002294	31052.	135378015.	14.5889047	0.0033463	-0.007664	3.9992229	50.0000000	CYT
0.0002344	31054.	132497862.	14.5451641	0.0034090	-0.007841	3.9987453	50.0000000	CYT
0.0002394	31055.	129731981.	14.5048386	0.0034721	-0.008018	3.9927644	50.0000000	CYT
0.0002444	31055.	127077619.	14.4669606	0.0035354	-0.008195	3.9969884	50.0000000	CYT
0.0002494	31055.	124529696.	14.4314041	0.0035988	-0.008371	3.9994006	50.0000000	CYT
0.0002544	31055.	122081938.	14.3982137	0.0036625	-0.008547	3.9981738	50.0000000	CYT
0.0002594	31055.	119728551.	14.3676563	0.0037266	-0.008723	3.9910128	50.0000000	CYT
0.0002644	31055.	117464182.	14.3389263	0.0037909	-0.008899	3.9956272	50.0000000	CYT
0.0002694	31055.	115283872.	14.3682485	0.0038704	-0.009060	3.9995515	50.0000000	CYT

Axial Thrust Force = 1102.000 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	688.2029476	1101124716.	250.5000255	0.0001566	0.0001266	0.6358685	4.4750630	
0.00000125	1376.	1101106957.	137.2861995	0.0001716	0.0001116	0.6935539	4.8461247	
0.00000188	2064.	1101066122.	99.5643397	0.0001867	0.00009668	0.7508557	5.2180610	
0.00000250	2753.	1101006424.	80.7154728	0.0002018	0.00008179	0.8077709	5.5908718	
0.00000313	3440.	1100928703.	69.4158047	0.0002169	0.00006692	0.8642964	5.9645573	
0.00000375	4128.	1100833237.	61.8907378	0.0002321	0.00005209	0.9204293	6.3391178	
0.00000438	4816.	1100720140.	56.5225878	0.0002473	0.00003729	0.9761665	6.7145533	
0.00000500	5503.	1100589468.	52.5025126	0.0002625	0.00002251	1.0315050	7.0908643	
0.00000563	6190.	1100441248.	49.3811560	0.0002778	0.00000777	1.0864417	7.4680511	
0.00000625	6877.	1100274458.	46.8888985	0.0002931	-0.00000694	1.1409735	7.8461129	
0.00000688	7563.	1100051968.	44.8539464	0.0003084	-0.00002163	1.1950920	8.2250056	
0.00000750	8248.	1099700685.	43.1614526	0.0003237	-0.00003629	1.2487803	8.6046160	
0.00000813	8931.	1099178526.	41.7319194	0.0003391	-0.00005093	1.3020228	8.9848335	
0.00000875	9612.	1098471949.	40.5086430	0.0003545	-0.00006555	1.3548066	9.3655682	
0.00000938	10290.	1097582166.	39.4500995	0.0003698	-0.00008016	1.4071210	9.7467458	
0.00001000	10965.	1096518544.	38.5251974	0.0003853	-0.00009475	1.4589578	10.1283073	
0.00001063	11638.	1095294297.	37.7102010	0.0004007	-0.000109	1.5103099	10.5102055	
0.00001125	11638.	1034444614.	36.0325858	0.0004054	-0.000135	1.5254967	10.5811311	C
0.00001188	11638.	980000161.	35.2220532	0.0004183	-0.000152	1.5678299	10.8898446	C
0.00001250	11638.	931000153.	34.4755936	0.0004309	-0.000169	1.6091018	11.1924027	C
0.00001313	11868.	904208963.	33.7867442	0.0004435	-0.000187	1.6494453	11.4898295	C

Pier drilled shaft_row1

0.00001375	12173.	885291113.	33.1468115	0.0004558	-0.000204	1.6888381	11.7817911	C
0.00001438	12465.	867110119.	32.5518131	0.0004679	-0.000222	1.7274057	12.0692871	C
0.00001500	12745.	849636283.	31.9964561	0.0004799	-0.000240	1.7651761	12.3524581	C
0.00001563	13013.	832863297.	31.4766254	0.0004918	-0.000258	1.8021927	12.6315959	C
0.00001625	13273.	816777191.	30.9887873	0.0005036	-0.000276	1.8384952	12.9069661	C
0.00001688	13523.	801336796.	30.5295375	0.0005152	-0.000295	1.8741016	13.1786424	C
0.00001750	13764.	786518020.	30.0961891	0.0005267	-0.000313	1.9090419	13.4468160	C
0.00001813	13998.	772304336.	29.6865631	0.0005381	-0.000332	1.9433530	13.7117497	C
0.00001875	14225.	758680523.	29.2988301	0.0005494	-0.000351	1.9770739	13.9737389	C
0.00001938	14447.	745632062.	28.9314539	0.0005605	-0.000369	2.0102462	14.2331107	C
0.00002000	14662.	733120967.	28.5826686	0.0005717	-0.000388	2.0428850	14.4899478	C
0.00002063	14871.	721030537.	28.2491703	0.0005826	-0.000407	2.0748987	14.7432849	C
0.00002125	15076.	709464232.	27.9322703	0.0005936	-0.000426	2.1064613	14.9947616	C
0.00002188	15277.	698379789.	27.6305614	0.0006044	-0.000446	2.1375782	15.2443874	C
0.00002250	15472.	687640980.	27.3404647	0.0006152	-0.000465	2.1681049	15.4906533	C
0.00002313	15665.	677387022.	27.0646684	0.0006259	-0.000484	2.1982884	15.7359933	C
0.00002375	15852.	667454701.	26.7990812	0.0006365	-0.000504	2.2279325	15.9783672	C
0.00002438	16037.	657930899.	26.5454012	0.0006470	-0.000523	2.2572138	16.2195305	C
0.00002563	16397.	639876117.	26.0673250	0.0006680	-0.000562	2.3144916	16.6960310	C
0.00002688	16745.	623085060.	25.6255610	0.0006887	-0.000601	2.3702187	17.1661717	C
0.00002813	17084.	607428247.	25.2157984	0.0007092	-0.000641	2.4244651	17.6303856	C
0.00002938	17412.	592752668.	24.8331427	0.0007295	-0.000681	2.4771964	18.0879835	C
0.00003063	17733.	579026731.	24.4764347	0.0007496	-0.000720	2.5286136	18.5408835	C
0.00003188	18047.	566183057.	24.1437740	0.0007696	-0.000760	2.5788310	18.9901512	C
0.00003313	18355.	554106718.	23.8317225	0.0007894	-0.000801	2.6278066	-19.758402	C
0.00003438	18656.	542715713.	23.5376864	0.0008091	-0.000841	2.6755309	-20.797119	C
0.00003563	18954.	532033932.	23.2630950	0.0008287	-0.000881	2.7223089	-21.837066	C
0.00003688	19244.	521869337.	23.0012646	0.0008482	-0.000922	2.7677378	-22.883273	C
0.00003813	19532.	512315677.	22.7563177	0.0008676	-0.000962	2.8123192	-23.929796	C
0.00003938	19814.	503208548.	22.5222711	0.0008868	-0.001003	2.8556637	-24.981632	C
0.00004063	20094.	494627799.	22.3030180	0.0009061	-0.001044	2.8982379	-26.033007	C
0.00004188	20368.	486406268.	22.0918981	0.0009251	-0.001085	2.9395518	-27.090401	C
0.00004313	20641.	478640616.	21.8938451	0.0009442	-0.001126	2.9801527	-28.146760	C
0.00004438	20910.	471205146.	21.7035566	0.0009631	-0.001167	3.0196450	-29.207485	C
0.00004563	21176.	464124545.	21.5228538	0.0009820	-0.001208	3.0582785	-30.269324	C
0.00004688	21441.	457398221.	21.3522969	0.0010009	-0.001249	3.0961834	-31.330471	C
0.00004813	21700.	450907423.	21.1862713	0.0010196	-0.001290	3.1328985	-32.397660	C
0.00004938	21958.	444728049.	21.0293570	0.0010383	-0.001332	3.1689195	-33.463839	C
0.00005063	22216.	438836860.	20.8808832	0.0010571	-0.001373	3.2042426	-34.529003	C
0.00005188	22469.	433131160.	20.7354640	0.0010757	-0.001414	3.2384051	-35.600337	C

Pier drilled shaft_row1

0.00005313	22720.	427677812.	20.5975108	0.0010942	-0.001456	3.2718779	-36.670710	C
0.00005438	22971.	422459723.	20.4665409	0.0011129	-0.001497	3.3046602	-37.740073	C
0.00005563	23220.	417429241.	20.3400315	0.0011314	-0.001539	3.3365503	-38.811737	C
0.00005688	23465.	412570670.	20.2174412	0.0011499	-0.001580	3.3675345	-39.886109	C
0.00005813	23710.	407906941.	20.1007217	0.0011684	-0.001622	3.3978350	-40.959471	C
0.00005938	23953.	403425577.	19.9895064	0.0011869	-0.001663	3.4274479	-42.031819	C
0.00006063	24195.	399096706.	19.8821061	0.0012054	-0.001705	3.4562410	-43.105522	C
0.00006188	24434.	394895875.	19.7771499	0.0012237	-0.001746	3.4841128	-44.182627	C
0.00006313	24672.	390848551.	19.6769067	0.0012421	-0.001788	3.5113034	-45.258713	C
0.00006438	24910.	386945651.	19.5811060	0.0012605	-0.001829	3.5378089	-46.333773	C
0.00006563	25146.	383178811.	19.4894979	0.0012790	-0.001871	3.5636254	-47.407799	C
0.00006688	25381.	379522686.	19.4003716	0.0012974	-0.001913	3.5886143	-48.483654	C
0.00006813	25613.	375966836.	19.3131982	0.0013157	-0.001954	3.6127479	-49.562113	C
0.00006938	25842.	372490894.	19.2291853	0.0013340	-0.001996	3.6361537	-50.000000	CY
0.00007063	26057.	368944660.	19.1461266	0.0013522	-0.002038	3.6586534	-50.000000	CY
0.00007188	26258.	365327659.	19.0638617	0.0013702	-0.002080	3.6802544	-50.000000	CY
0.00007313	26452.	361739319.	18.9836677	0.0013882	-0.002122	3.7010866	-50.000000	CY
0.00007438	26619.	357902792.	18.8993049	0.0014056	-0.002164	3.7206452	-50.000000	CY
0.00007938	27163.	342205678.	18.5663963	0.0014737	-0.002336	3.7905689	-50.000000	CY
0.00008438	27684.	328111040.	18.2691655	0.0015415	-0.002509	3.8501763	-50.000000	CY
0.00008938	28100.	314404034.	17.9867018	0.0016076	-0.002682	3.8987125	-50.000000	CY
0.00009438	28412.	301054782.	17.7095445	0.0016713	-0.002859	3.9365427	-50.000000	CY
0.00009938	28715.	288954619.	17.4623473	0.0017353	-0.003035	3.9656493	-50.000000	CY
0.0001044	29003.	277870811.	17.2347927	0.0017989	-0.003211	3.9857869	-50.000000	CY
0.0001094	29283.	267734399.	17.0322335	0.0018629	-0.003387	3.9972320	-50.000000	CY
0.0001144	29549.	258349598.	16.8422912	0.0019263	-0.003564	3.9979900	-50.000000	CY
0.0001194	29742.	249150087.	16.6558312	0.0019883	-0.003742	3.9980888	-50.000000	CY
0.0001244	29886.	240289275.	16.4734606	0.0020489	-0.003921	3.9975864	-50.000000	CY
0.0001294	30018.	232021272.	16.3033783	0.0021092	-0.004101	3.9982353	-50.000000	CY
0.0001344	30144.	224330018.	16.1496447	0.0021701	-0.004280	3.9999538	-50.000000	CY
0.0001394	30262.	217128960.	16.0059907	0.0022308	-0.004459	3.9993852	50.000000	CY
0.0001444	30372.	210366790.	15.8719285	0.0022915	-0.004638	3.9977020	50.000000	CY
0.0001494	30475.	204017527.	15.7510534	0.0023528	-0.004817	3.9998456	50.000000	CY
0.0001544	30572.	198034631.	15.6426719	0.0024148	-0.004995	3.9991693	50.000000	CY
0.0001594	30660.	192377048.	15.5406155	0.0024768	-0.005173	3.9959884	50.000000	CY
0.0001644	30742.	187026203.	15.4448996	0.0025388	-0.005351	3.9996290	50.000000	CY
0.0001694	30821.	181969428.	15.3577142	0.0026012	-0.005529	3.9962949	50.000000	CY
0.0001744	30897.	177185343.	15.2779184	0.0026641	-0.005706	3.9996622	50.000000	CY
0.0001794	30967.	172637533.	15.2066112	0.0027277	-0.005882	3.9955895	50.000000	CY
0.0001844	31029.	168291965.	15.1439329	0.0027922	-0.006058	3.9993866	50.000000	CY

Pier drilled shaft_row1

0.0001894	31083.	164137077.	15.0817784	0.0028561	-0.006234	3.9951746	50.0000000	CY
0.0001944	31115.	160078649.	15.0197032	0.0029195	-0.006411	3.9982222	50.0000000	CY
0.0001994	31136.	156167590.	14.9581855	0.0029823	-0.006588	3.9999769	50.0000000	CY
0.0002044	31147.	152400243.	14.8979167	0.0030448	-0.006765	3.9948384	50.0000000	CYT
0.0002094	31156.	148803107.	14.8413466	0.0031074	-0.006943	3.9986138	50.0000000	CYT
0.0002144	31163.	145368080.	14.7884369	0.0031703	-0.007120	3.9999943	50.0000000	CYT
0.0002194	31169.	142081280.	14.7397427	0.0032335	-0.007296	3.9937954	50.0000000	CYT
0.0002244	31174.	138936999.	14.6942424	0.0032970	-0.007473	3.9979019	50.0000000	CYT
0.0002294	31178.	135926115.	14.6516999	0.0033607	-0.007649	3.9998411	50.0000000	CYT
0.0002344	31179.	133032516.	14.6090144	0.0034240	-0.007826	3.9940534	50.0000000	CYT
0.0002394	31179.	130253769.	14.5679038	0.0034872	-0.008003	3.9952313	50.0000000	CYT
0.0002444	31179.	127588730.	14.5292939	0.0035506	-0.008179	3.9985002	50.0000000	CYT
0.0002494	31179.	125030560.	14.4930565	0.0036142	-0.008356	3.9999331	50.0000000	CYT
0.0002544	31179.	122572957.	14.4596378	0.0036782	-0.008532	3.9932751	50.0000000	CYT
0.0002594	31179.	120210105.	14.4284137	0.0037424	-0.008708	3.9939017	50.0000000	CYT
0.0002644	31179.	117936627.	14.3990611	0.0038068	-0.008883	3.9975724	50.0000000	CYT

Axial Thrust Force = 1326.000 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	677.3063282	1083690125.	298.6773062	0.0001867	0.0001567	0.7519648	5.3482762	
0.00000125	1355.	1083673741.	161.3754355	0.0002017	0.0001417	0.8086446	5.7193595	
0.00000188	2032.	1083632790.	115.6244920	0.0002168	0.0001268	0.8649405	6.0913318	
0.00000250	2709.	1083572388.	92.7612820	0.0002319	0.0001119	0.9208496	6.4641929	
0.00000313	3386.	1083493555.	79.0531670	0.0002470	0.00009704	0.9763687	6.8379433	
0.00000375	4063.	1083396627.	69.9226014	0.0002622	0.00008221	1.0314947	7.2125829	
0.00000438	4739.	1083281748.	63.4077802	0.0002774	0.00006741	1.0862247	7.5881121	
0.00000500	5416.	1083148983.	58.5278014	0.0002926	0.00005264	1.1405554	7.9645312	
0.00000563	6092.	1082998367.	54.7377194	0.0003079	0.00003790	1.1944839	8.3418405	
0.00000625	6768.	1082829916.	51.7105674	0.0003232	0.00002319	1.2480070	8.7200404	
0.00000688	7443.	1082643637.	49.2382757	0.0003385	0.00000851	1.3011216	9.0991312	
0.00000750	8118.	1082439112.	47.1821288	0.0003539	-0.00000613	1.3538247	9.4791130	
0.00000813	8793.	1082194450.	45.4459630	0.0003692	-0.00002075	1.4061094	9.8599551	
0.00000875	9466.	1081858144.	43.9608561	0.0003847	-0.00003534	1.4579622	10.2415673	
0.00000938	10138.	1081392996.	42.6762421	0.0004001	-0.00004991	1.5093692	10.6238533	
0.00001000	10808.	1080781169.	41.5542413	0.0004155	-0.00006446	1.5603186	11.0067300	

Pier drilled shaft_row1

0.00001063	11475.	1080017715.	40.5659329	0.0004310	-0.00007899	1.6108004	11.3901281
0.00001125	12140.	1079104391.	39.6888526	0.0004465	-0.00009350	1.6608061	11.7739882
0.00001188	12802.	1078047495.	38.9052964	0.0004620	-0.000108	1.7103286	12.1582615
0.00001250	12802.	1024145121.	37.4953758	0.0004687	-0.000131	1.7312719	12.2870737 C
0.00001313	12802.	975376305.	36.7281418	0.0004821	-0.000148	1.7732844	12.6093990 C
0.00001375	13008.	946064709.	36.0157230	0.0004952	-0.000165	1.8142605	12.9257696 C
0.00001438	13359.	929352740.	35.3542539	0.0005082	-0.000182	1.8543650	13.2375546 C
0.00001500	13694.	912940542.	34.7366631	0.0005210	-0.000199	1.8935791	13.5444485 C
0.00001563	14014.	896878783.	34.1581377	0.0005337	-0.000216	1.9319388	13.8466562 C
0.00001625	14321.	881267809.	33.6154435	0.0005463	-0.000234	1.9695203	14.1447778 C
0.00001688	14616.	866112522.	33.1049138	0.0005586	-0.000251	2.0063512	14.4389673 C
0.00001750	14900.	851416851.	32.6234513	0.0005709	-0.000269	2.0424608	14.7294016 C
0.00001813	15174.	837183723.	32.1684321	0.0005831	-0.000287	2.0778801	15.0162822 C
0.00001875	15439.	823422757.	31.7377489	0.0005951	-0.000305	2.1126484	15.2999010 C
0.00001938	15697.	810143078.	31.3296435	0.0006070	-0.000323	2.1468081	15.5805935 C
0.00002000	15947.	797343912.	30.9425099	0.0006189	-0.000341	2.1803965	15.8586558 C
0.00002063	16189.	784907754.	30.5729726	0.0006306	-0.000359	2.2133347	16.1332093 C
0.00002125	16424.	772898343.	30.2208553	0.0006422	-0.000378	2.2457143	16.4051021 C
0.00002188	16654.	761334725.	29.8855220	0.0006537	-0.000396	2.2775947	16.6748776 C
0.00002250	16879.	750166302.	29.5652305	0.0006652	-0.000415	2.3089602	16.9423128 C
0.00002313	17096.	739306471.	29.2575091	0.0006766	-0.000433	2.3397378	17.2065671 C
0.00002375	17311.	728877176.	28.9640842	0.0006879	-0.000452	2.3701106	17.4695131 C
0.00002438	17520.	718748954.	28.6818593	0.0006991	-0.000471	2.3999514	17.7297392 C
0.00002563	17925.	699516926.	28.1514837	0.0007214	-0.000509	2.4583185	18.2448214 C
0.00002688	18315.	681490339.	27.6606932	0.0007434	-0.000547	2.5149238	18.7523028 C
0.00002813	18691.	664568615.	27.2048942	0.0007651	-0.000585	2.5698547	19.2527419 C
0.00002938	19055.	648666298.	26.7803622	0.0007867	-0.000623	2.6232006	19.7467712 C
0.00003063	19407.	633709800.	26.3840723	0.0008080	-0.000662	2.6750531	20.2351043 C
0.00003188	19751.	619634911.	26.0135701	0.0008292	-0.000701	2.7255064	20.7185439 C
0.00003313	20086.	606384873.	25.6668732	0.0008502	-0.000740	2.7746572	21.1979901 C
0.00003438	20412.	593790341.	25.3386998	0.0008710	-0.000779	2.8223122	21.6707665 C
0.00003563	20730.	581904551.	25.0303862	0.0008917	-0.000818	2.8687674	22.1402679 C
0.00003688	21044.	570682281.	24.7407082	0.0009123	-0.000858	2.9141031	22.6073442 C
0.00003813	21348.	559960475.	24.4643143	0.0009327	-0.000897	2.9580404	23.0681075 C
0.00003938	21650.	549848510.	24.2050930	0.0009531	-0.000937	3.0010390	23.5284407 C
0.00004063	21944.	540171227.	23.9571398	0.0009733	-0.000977	3.0427368	-24.084245 C
0.00004188	22236.	531019394.	23.7240045	0.0009934	-0.001017	3.0835470	-25.108412 C
0.00004313	22521.	522237367.	23.5001376	0.0010134	-0.001057	3.1231045	-26.137891 C
0.00004438	22805.	513925441.	23.2898092	0.0010335	-0.001097	3.1618692	-27.166177 C
0.00004563	23082.	505908568.	23.0862152	0.0010533	-0.001137	3.1993430	-28.200801 C

Pier drilled shaft_row1

0.00004688	23357.	498289799.	22.8940623	0.0010732	-0.001177	3.2360103	-29.234634	C
0.00004813	23629.	490984002.	22.7099978	0.0010929	-0.001217	3.2716533	-30.271109	C
0.00004938	23896.	483965191.	22.5332696	0.0011126	-0.001257	3.3062720	-31.310424	C
0.00005063	24162.	477272308.	22.3660607	0.0011323	-0.001298	3.3401168	-32.348577	C
0.00005188	24423.	470807846.	22.2040286	0.0011518	-0.001338	3.3728643	-33.391064	C
0.00005313	24682.	464599577.	22.0489430	0.0011714	-0.001379	3.4047194	-34.434597	C
0.00005438	24940.	458657842.	21.9017207	0.0011909	-0.001419	3.4358077	-35.476974	C
0.00005563	25193.	452916066.	21.7591918	0.0012104	-0.001460	3.4658966	-36.522454	C
0.00005688	25444.	447372492.	21.6216342	0.0012297	-0.001500	3.4950501	-37.570067	C
0.00005813	25694.	442050003.	21.4906766	0.0012491	-0.001541	3.5234436	-38.616528	C
0.00005938	25943.	436934453.	21.3659067	0.0012686	-0.001581	3.5510724	-39.661829	C
0.00006063	26187.	431947396.	21.2429557	0.0012879	-0.001622	3.5775983	-40.712978	C
0.00006188	26429.	427142563.	21.1254157	0.0013071	-0.001663	3.6033532	-41.763332	C
0.00006313	26671.	422512190.	21.0131651	0.0013265	-0.001704	3.6283497	-42.812524	C
0.00006438	26912.	418045949.	20.9059005	0.0013458	-0.001744	3.6525833	-43.860547	C
0.00006563	27149.	413693095.	20.8005162	0.0013650	-0.001785	3.6758251	-44.912768	C
0.00006688	27384.	409474863.	20.6987586	0.0013842	-0.001826	3.6982379	-45.965595	C
0.00006813	27618.	405396887.	20.6013311	0.0014035	-0.001867	3.7198936	-47.017245	C
0.00006938	27851.	401451440.	20.5080041	0.0014227	-0.001907	3.7407871	-48.067709	C
0.00007063	28083.	397631334.	20.4185647	0.0014421	-0.001948	3.7609137	-49.116977	C
0.00007188	28311.	393887629.	20.3300889	0.0014612	-0.001989	3.7800736	-50.000000	CY
0.00007313	28531.	390160727.	20.2432755	0.0014803	-0.002030	3.7983384	-50.000000	CY
0.00007438	28735.	386352255.	20.1571960	0.0014992	-0.002071	3.8156638	-50.000000	CY
0.00007938	29411.	370528188.	19.8167715	0.0015730	-0.002237	3.8758115	-50.000000	CY
0.00008438	29941.	354853721.	19.4921923	0.0016447	-0.002405	3.9229072	-50.000000	CY
0.00008938	30447.	340667750.	19.2000673	0.0017160	-0.002574	3.9586797	-50.000000	CY
0.00009438	30835.	326725698.	18.9197017	0.0017855	-0.002744	3.9828881	-50.000000	CY
0.00009938	31140.	313358088.	18.6500809	0.0018534	-0.002917	3.9963769	-50.000000	CY
0.0001044	31433.	301150400.	18.4084797	0.0019214	-0.003089	3.9981980	-50.000000	CY
0.0001094	31707.	289894590.	18.1869124	0.0019892	-0.003261	3.9990979	-50.000000	CY
0.0001144	31971.	279530848.	17.9899395	0.0020576	-0.003432	3.9995126	-50.000000	CY
0.0001194	32217.	269884795.	17.8054590	0.0021255	-0.003604	3.9996113	-50.000000	CY
0.0001244	32433.	260765045.	17.6354961	0.0021934	-0.003777	3.9994944	50.000000	CY
0.0001294	32573.	251773199.	17.4643290	0.0022594	-0.003951	3.9989560	50.000000	CY
0.0001344	32686.	243243079.	17.3028280	0.0023251	-0.004125	3.9977282	50.000000	CY
0.0001394	32791.	235269193.	17.1581496	0.0023914	-0.004299	3.9989352	50.000000	CY
0.0001444	32888.	227798221.	17.0270156	0.0024583	-0.004472	3.9996734	50.000000	CY
0.0001494	32975.	220752011.	16.9009013	0.0025246	-0.004645	3.9979359	50.000000	CY
0.0001544	33054.	214117569.	16.7879240	0.0025916	-0.004818	3.9995564	50.000000	CY
0.0001594	33124.	207836821.	16.6887577	0.0026598	-0.004990	3.9990050	50.000000	CY

Pier drilled shaft_row1							
0.0001644	33187.	201897331.	16.6004154	0.0027287	-0.005161	3.9956193	50.0000000 CY
0.0001694	33240.	196253249.	16.5195698	0.0027980	-0.005332	3.9993939	50.0000000 CY
0.0001744	33289.	190905867.	16.4428308	0.0028672	-0.005503	3.9952059	50.0000000 CY
0.0001794	33335.	185839793.	16.3728416	0.0029369	-0.005673	3.9992608	50.0000000 CY
0.0001844	33378.	181034181.	16.3088642	0.0030069	-0.005843	3.9954771	50.0000000 CYT
0.0001894	33418.	176467288.	16.2505709	0.0030775	-0.006013	3.9985455	50.0000000 CYT
0.0001944	33457.	172125091.	16.1970226	0.0031483	-0.006182	3.9992239	50.0000000 CYT
0.0001994	33492.	167984952.	16.1486081	0.0032196	-0.006350	3.9966862	50.0000000 CYT
0.0002044	33525.	164035654.	16.1036837	0.0032912	-0.006519	3.9996545	50.0000000 CYT
0.0002094	33554.	160259351.	16.0609588	0.0033628	-0.006687	3.9939671	50.0000000 CYT
0.0002144	33571.	156597166.	16.0141263	0.0034330	-0.006857	3.9973890	50.0000000 CYT
0.0002194	33582.	153082184.	15.9689498	0.0035032	-0.007027	3.9997391	50.0000000 CYT
0.0002244	33584.	149676372.	15.9224531	0.0035726	-0.007197	3.9946765	50.0000000 CYT
0.0002294	33584.	146413672.	15.8771700	0.0036418	-0.007368	3.9958037	50.0000000 CYT
0.0002344	33584.	143290180.	15.8345213	0.0037112	-0.007539	3.9988983	50.0000000 CYT
0.0002394	33584.	140297174.	15.7943081	0.0037808	-0.007709	3.9999979	50.0000000 CYT
0.0002444	33584.	137426643.	15.8134546	0.0038644	-0.007866	3.9937422	50.0000000 CYT

Summary of Results for Nominal Moment Capacity for Section 1

Moment values interpolated at maximum compressive strain = 0.003
or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain	Max. Tens. Strain
1	846.000	28085.735	0.00300000	-0.00786812
2	848.900	28121.795	0.00300000	-0.00785328
3	1018.000	30172.540	0.00300000	-0.00701381
4	1091.000	31014.307	0.00300000	-0.00668569
5	1102.000	31139.000	0.00300000	-0.00663804
6	1326.000	33373.898	0.00300000	-0.00582621

Note that the values of moment capacity in the table above are not factored by a strength reduction factor (phi-factor).

In ACI 318, the value of the strength reduction factor depends on whether

Pier drilled shaft_row1

the transverse reinforcing steel bars are tied hoops (Ø.65) or spirals (Ø.75).

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318, or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Load No.	Resist. Factor	Nominal Ax. Thrust kips	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in ²
1	0.65	846.000000	28086.	549.900000	18256.	423844057.
2	0.65	848.900000	28122.	551.785000	18279.	424607186.
3	0.65	1018.	30173.	661.700000	19612.	468803644.
4	0.65	1091.	31014.	709.150000	20159.	487449050.
5	0.65	1102.	31139.	716.300000	20240.	490244250.
6	0.65	1326.	33374.	861.900000	21693.	548442224.
1	0.75	846.000000	28086.	634.500000	21064.	368404030.
2	0.75	848.900000	28122.	636.675000	21091.	368940042.
3	0.75	1018.	30173.	763.500000	22629.	399740696.
4	0.75	1091.	31014.	818.250000	23261.	412797744.
5	0.75	1102.	31139.	826.500000	23354.	414762020.
6	0.75	1326.	33374.	994.500000	25030.	456602422.
1	0.90	846.000000	28086.	761.400000	25277.	274940297.
2	0.90	848.900000	28122.	764.010000	25310.	275429793.
3	0.90	1018.	30173.	916.200000	27155.	303455755.
4	0.90	1091.	31014.	981.900000	27913.	315133396.
5	0.90	1102.	31139.	991.800000	28025.	316870386.
6	0.90	1326.	33374.	1193.	30037.	352172122.

Pile Section No. 2:

Dimensions and Properties of Drilled Shaft (Bored Pile):

Pier drilled shaft_row1

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Length of Section                = 10.000000 ft
Shaft Diameter                  = 42.000000 in
Concrete Cover Thickness (to edge of trans. reinf.) = 3.000000 in
Number of Reinforcing Bars      = 16 bars
Yield Stress of Reinforcing Bars = 60000. psi
Modulus of Elasticity of Reinforcing Bars = 29000000. psi
Gross Area of Shaft             = 1385. sq. in.
Total Area of Reinforcing Steel = 16.000000 sq. in.
Area Ratio of Steel Reinforcement = 1.15 percent
Edge-to-Edge Bar Spacing       = 5.431327 in
Maximum Concrete Aggregate Size = 0.750000 in
Ratio of Bar Spacing to Aggregate Size = 7.24
Offset of Center of Rebar Cage from Center of Pile = 0.0000 in
Transverse Reinforcement
Type: Spiral
Number of Transverse Reinf. (per spacing) = 1
Spacing of Transverse Reinf. = 4.500000 in
Yield Stress of Transverse Reinf. = 60000. psi
Diameter of Transverse Reinf. = 0.625000 in

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Axial Structural Capacities:

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Nom. Axial Structural Capacity =  $0.85 F_c A_c + F_y A_s$  = 5616.104 kips
Tensile Load for Cracking of Concrete = -623.096 kips
Nominal Axial Tensile Capacity = -960.000 kips

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Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.128000	1.000000	16.811000	0.000000
2	1.128000	1.000000	15.531339	6.433291
3	1.128000	1.000000	11.887172	11.887172
4	1.128000	1.000000	6.433291	15.531339
5	1.128000	1.000000	0.000000	16.811000

			Pier drilled shaft_row1	
6	1.128000	1.000000	-6.43329	15.531339
7	1.128000	1.000000	-11.88717	11.887172
8	1.128000	1.000000	-15.53134	6.433291
9	1.128000	1.000000	-16.81100	0.000000
10	1.128000	1.000000	-15.53134	-6.43329
11	1.128000	1.000000	-11.88717	-11.88717
12	1.128000	1.000000	-6.43329	-15.53134
13	1.128000	1.000000	0.00000	-16.81100
14	1.128000	1.000000	6.433291	-15.53134
15	1.128000	1.000000	11.887172	-11.88717
16	1.128000	1.000000	15.531339	-6.43329

NOTE: The positions of the above rebars were computed by LPILE

Minimum spacing between any two bars not equal to zero = 5.431 inches
between bars 11 and 12.

Ratio of bar spacing to maximum aggregate size = 7.24

Concrete Properties:

Compressive Strength of Concrete	=	4000. psi
Modulus of Elasticity of Concrete	=	3604997. psi
Modulus of Rupture of Concrete	=	-474.34165 psi
Compression Strain at Peak Stress	=	0.001886
Tensile Strain at Fracture of Concrete	=	-0.0001154
Maximum Coarse Aggregate Size	=	0.750000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 6

Number	Axial Thrust Force kips
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1	846.000
2	848.900
3	1018.000

Pier drilled shaft_row1

4 1091.000
 5 1102.000
 6 1326.000

Definitions of Run Messages and Notes:

- C = concrete in section has cracked in tension.
- Y = stress in reinforcing steel has reached yield stress.
- T = ACI 318 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than 0.003. See ACI 318-14, Section 21.2.3.
- Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
 Position of neutral axis is measured from edge of compression side of pile.
 Compressive stresses and strains are positive in sign.
 Tensile stresses and strains are negative in sign.

Axial Thrust Force = 846.000 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	410.4097665	656655626.	244.4948351	0.0001528	0.0001266	0.6213276	4.3667626	
0.00000125	820.8161393	656652911.	132.7745766	0.0001660	0.0001135	0.6719172	4.6836659	
0.00000188	1231.	656636689.	95.5465587	0.0001791	0.0001004	0.7222122	5.0012254	
0.00000250	1642.	656611346.	76.9416019	0.0001924	0.00008735	0.7722104	5.3194411	
0.00000313	2052.	656577760.	65.7858704	0.0002056	0.00007433	0.8219099	5.6383133	
0.00000375	2462.	656536221.	58.3547525	0.0002188	0.00006133	0.8713087	5.9578418	
0.00000438	2872.	656486853.	53.0519863	0.0002321	0.00004835	0.9204049	6.2780270	
0.00000500	3282.	656429717.	49.0794409	0.0002454	0.00003540	0.9691964	6.5988690	
0.00000563	3692.	656364847.	45.9937105	0.0002587	0.00002246	1.0176812	6.9203678	
0.00000625	4102.	656292260.	43.5287517	0.0002721	0.00000955	1.0658574	7.2425238	
0.00000688	4511.	656211911.	41.5152638	0.0002854	-0.00000333	1.1137230	7.5653370	
0.00000750	4921.	656114169.	39.8402969	0.0002988	-0.00001620	1.1612737	7.8887896	

Pier drilled shaft_row1

0.00000813	5330.	655968630.	38.4254367	0.0003122	-0.00002904	1.2084991	8.2128123
0.00000875	5738.	655751864.	37.2146340	0.0003256	-0.00004187	1.2553878	8.5373259
0.00000938	6145.	655453209.	36.1668286	0.0003391	-0.00005469	1.3019302	8.8622628
0.00001000	6551.	655070251.	35.2512683	0.0003525	-0.00006749	1.3481185	9.1875678
0.00001063	6955.	654604746.	34.4444658	0.0003660	-0.00008028	1.3939460	9.5131948
0.00001125	7358.	654060739.	33.7281770	0.0003794	-0.00009306	1.4394072	9.8391050
0.00001188	7760.	653443487.	33.0880188	0.0003929	-0.000106	1.4844977	10.1652676
0.00001250	7760.	620771313.	31.7324941	0.0003967	-0.000128	1.4966069	10.2089041 C
0.00001313	7760.	591210774.	31.0879162	0.0004080	-0.000143	1.5341824	10.4740068 C
0.00001375	7760.	564337557.	30.4916187	0.0004193	-0.000158	1.5710049	10.7349955 C
0.00001438	7885.	548549633.	29.9363313	0.0004303	-0.000173	1.6070392	10.9914644 C
0.00001500	8079.	538588415.	29.4182129	0.0004413	-0.000189	1.6423595	11.2439727 C
0.00001563	8265.	528950890.	28.9336066	0.0004521	-0.000204	1.6770164	11.4928843 C
0.00001625	8444.	519633627.	28.4789344	0.0004628	-0.000220	1.7110339	11.7383354 C
0.00001688	8617.	510633468.	28.0511877	0.0004734	-0.000235	1.7444374	11.9804813 C
0.00001750	8784.	501952482.	27.6479397	0.0004838	-0.000251	1.7772604	12.2195541 C
0.00001813	8946.	493594840.	27.2672102	0.0004942	-0.000267	1.8095419	12.4558458 C
0.00001875	9104.	485556090.	26.9071601	0.0005045	-0.000283	1.8413126	12.6895806 C
0.00001938	9258.	477826630.	26.5661073	0.0005147	-0.000299	1.8725975	12.9209377 C
0.00002000	9408.	470397353.	26.2426183	0.0005249	-0.000315	1.9034237	13.1501186 C
0.00002063	9553.	463189187.	25.9335655	0.0005349	-0.000331	1.9337000	13.3762076 C
0.00002125	9696.	456260242.	25.6395056	0.0005448	-0.000348	1.9635511	13.6003329 C
0.00002188	9835.	449612694.	25.3598001	0.0005547	-0.000364	1.9930241	13.8229045 C
0.00002250	9971.	443172208.	25.0917132	0.0005646	-0.000380	2.0220192	14.0429178 C
0.00002313	10105.	436966524.	24.8354083	0.0005743	-0.000397	2.0506178	14.2611145 C
0.00002375	10237.	431012839.	24.5910023	0.0005840	-0.000413	2.0788971	14.4782154 C
0.00002438	10365.	425214126.	24.3550569	0.0005937	-0.000430	2.1066802	14.6924371 C
0.00002563	10616.	414264434.	23.9128922	0.0006128	-0.000463	2.1612853	15.1173119 C
0.00002688	10859.	404042062.	23.5042227	0.0006317	-0.000497	2.2145099	15.5362349 C
0.00002813	11095.	394483716.	23.1252659	0.0006504	-0.000531	2.2664335	15.9497638 C
0.00002938	11325.	385535502.	22.7729617	0.0006690	-0.000565	2.3171385	16.3585230 C
0.00003063	11550.	377150899.	22.4448311	0.0006874	-0.000599	2.3667104	16.7632095 C
0.00003188	11770.	369239779.	22.1367253	0.0007056	-0.000633	2.4150552	17.1626168 C
0.00003313	11984.	361794450.	21.8479358	0.0007237	-0.000668	2.4623308	17.5582421 C
0.00003438	12196.	354799268.	21.5777720	0.0007417	-0.000702	2.5086790	17.9514975 C
0.00003563	12403.	348167897.	21.3223129	0.0007596	-0.000737	2.5539316	18.3403584 C
0.00003688	12608.	341907101.	21.0818743	0.0007774	-0.000771	2.5982742	18.7267607 C
0.00003813	12810.	335988877.	20.8553676	0.0007951	-0.000806	2.6417534	-19.430953 C
0.00003938	13008.	330361279.	20.6402476	0.0008127	-0.000841	2.6842608	-20.313673 C
0.00004063	13205.	325036481.	20.4375096	0.0008303	-0.000876	2.7260092	-21.197403 C

Pier drilled shaft_row1

0.00004188	13398.	319957235.	20.2441984	0.0008477	-0.000911	2.7668206	-22.084383	C
0.00004313	13590.	315129084.	20.0610077	0.0008651	-0.000946	2.8068591	-22.972721	C
0.00004438	13780.	310532158.	19.8870292	0.0008825	-0.000981	2.8461248	-23.862485	C
0.00004563	13967.	306126885.	19.7202051	0.0008997	-0.001017	2.8844906	-24.755397	C
0.00004688	14154.	301944970.	19.5628768	0.0009170	-0.001052	2.9222694	-25.647495	C
0.00004813	14337.	297918373.	19.4108846	0.0009341	-0.001087	2.9591021	-26.543553	C
0.00004938	14520.	294071287.	19.2662280	0.0009513	-0.001122	2.9952566	-27.440126	C
0.00005063	14702.	290403643.	19.1292637	0.0009684	-0.001158	3.0308301	-28.335893	C
0.00005188	14881.	286856824.	18.9960554	0.0009854	-0.001193	3.0654599	-29.235940	C
0.00005313	15059.	283459567.	18.8690727	0.0010024	-0.001229	3.0994551	-30.136054	C
0.00005438	15236.	280208882.	18.7484356	0.0010194	-0.001264	3.1328750	-31.035367	C
0.00005563	15412.	277073047.	18.6319376	0.0010364	-0.001300	3.1655248	-31.936749	C
0.00005688	15586.	274044451.	18.5192789	0.0010533	-0.001335	3.1974095	-32.840245	C
0.00005813	15760.	271137287.	18.4119386	0.0010702	-0.001371	3.2287244	-33.742945	C
0.00005938	15933.	268343816.	18.3095835	0.0010871	-0.001407	3.2594666	-34.644842	C
0.00006063	16104.	265636053.	18.2099983	0.0011040	-0.001442	3.2894264	-35.549290	C
0.00006188	16274.	263015869.	18.1136368	0.0011208	-0.001478	3.3186810	-36.455174	C
0.00006313	16444.	260491416.	18.0215297	0.0011376	-0.001514	3.3473679	-37.360256	C
0.00006438	16612.	258057055.	17.9334318	0.0011545	-0.001549	3.3754845	-38.264531	C
0.00006563	16781.	255707279.	17.8490865	0.0011713	-0.001585	3.4030247	-39.168051	C
0.00006688	16947.	253411192.	17.7655771	0.0011881	-0.001621	3.4296957	-40.076065	C
0.00006813	17112.	251191994.	17.6855428	0.0012048	-0.001656	3.4558010	-40.983269	C
0.00006938	17278.	249045486.	17.6087983	0.0012216	-0.001692	3.4813378	-41.889655	C
0.00007063	17442.	246967731.	17.5351718	0.0012384	-0.001728	3.5063031	-42.795220	C
0.00007188	17606.	244955091.	17.4645033	0.0012553	-0.001763	3.5306941	-43.699957	C
0.00007313	17769.	242994167.	17.3954509	0.0012720	-0.001799	3.5543845	-44.606391	C
0.00007438	17931.	241082376.	17.3279169	0.0012888	-0.001835	3.5773790	-45.514556	C
0.00007938	18572.	233973182.	17.0827141	0.0013559	-0.001978	3.6636238	-49.138784	C
0.00008438	19201.	227571370.	16.8669865	0.0014232	-0.002121	3.7400745	-52.761999	C
0.00008938	19821.	221775683.	16.6784540	0.0014906	-0.002263	3.8069378	-56.377288	C
0.00009438	20431.	216486388.	16.5122533	0.0015583	-0.002405	3.8640512	-59.986133	C
0.00009938	20985.	211174529.	16.3546654	0.0016252	-0.002549	3.9106641	-60.000000	CY
0.0001044	21416.	205184627.	16.1905797	0.0016899	-0.002694	3.9464264	-60.000000	CY
0.0001094	21750.	198858165.	16.0198993	0.0017522	-0.002842	3.9722667	-60.000000	CY
0.0001144	22076.	193017544.	15.8670670	0.0018148	-0.002989	3.9897481	-60.000000	CY
0.0001194	22387.	187536239.	15.7277541	0.0018775	-0.003136	3.9987127	-60.000000	CY
0.0001244	22605.	181750360.	15.5763946	0.0019373	-0.003286	3.9991613	-60.000000	CY
0.0001294	22786.	176122084.	15.4320647	0.0019965	-0.003437	3.9992637	-60.000000	CY
0.0001344	22960.	170867122.	15.3004974	0.0020560	-0.003588	3.9991313	-60.000000	CY
0.0001394	23127.	165931105.	15.1766722	0.0021152	-0.003739	3.9986665	-60.000000	CY

Pier drilled shaft_row1

0.0001444	23289.	161306336.	15.0645907	0.0021750	-0.003889	3.9977409	-60.000000	CY
0.0001494	23446.	156963475.	14.9629634	0.0022351	-0.004039	3.9988194	-60.000000	CY
0.0001544	23599.	152867249.	14.8685735	0.0022953	-0.004188	3.9998277	-60.000000	CY
0.0001594	23741.	148965837.	14.7783701	0.0023553	-0.004338	3.9987758	-60.000000	CY
0.0001644	23856.	145130102.	14.6875725	0.0024143	-0.004489	3.9967965	-60.000000	CY
0.0001694	23936.	141318485.	14.5937946	0.0024718	-0.004642	3.9995892	-60.000000	CY
0.0001744	24004.	137658543.	14.5040163	0.0025291	-0.004795	3.9968552	-60.000000	CY
0.0001794	24068.	134177950.	14.4163131	0.0025859	-0.004948	3.9997104	-60.000000	CY
0.0001844	24130.	130874418.	14.3341063	0.0026429	-0.005101	3.9964095	-60.000000	CY
0.0001894	24190.	127737923.	14.2576419	0.0027000	-0.005254	3.9994864	-60.000000	CY
0.0001944	24249.	124755861.	14.1864570	0.0027575	-0.005406	3.9956019	-60.000000	CY
0.0001994	24306.	121912999.	14.1206179	0.0028153	-0.005558	3.9987039	60.000000	CY
0.0002044	24362.	119202299.	14.0582166	0.0028731	-0.005711	3.9999999	60.000000	CY
0.0002094	24412.	116593130.	13.9984223	0.0029309	-0.005863	3.9966522	60.000000	CY
0.0002144	24460.	114097227.	13.9430224	0.0029890	-0.006015	3.9994205	60.000000	CY
0.0002194	24506.	111706213.	13.8918855	0.0030475	-0.006166	3.9970081	60.000000	CYT
0.0002244	24548.	109406182.	13.8458402	0.0031067	-0.006317	3.9969815	60.000000	CYT
0.0002294	24590.	107203412.	13.8025943	0.0031660	-0.006468	3.9995109	60.000000	CYT
0.0002344	24630.	105086280.	13.7629010	0.0032257	-0.006618	3.9967071	60.000000	CYT
0.0002394	24668.	103051103.	13.7262786	0.0032857	-0.006768	3.9961741	60.000000	CYT
0.0002444	24706.	101096677.	13.6918575	0.0033459	-0.006918	3.9990826	60.000000	CYT
0.0002494	24738.	99198359.	13.6630710	0.0034072	-0.007067	3.9992903	60.000000	CYT
0.0002544	24767.	97364078.	13.6361814	0.0034687	-0.007215	3.9939187	60.000000	CYT
0.0002594	24795.	95595328.	13.6095250	0.0035300	-0.007364	3.9977405	60.000000	CYT
0.0002644	24817.	93870959.	13.5870178	0.0035921	-0.007512	3.9997374	60.000000	CYT
0.0002694	24837.	92200801.	13.5678010	0.0036548	-0.007659	3.9953209	60.000000	CYT
0.0002744	24848.	90561917.	13.5456294	0.0037166	-0.007807	3.9943156	60.000000	CYT
0.0003044	24848.	81635896.	13.6591091	0.0041575	-0.008626	3.9901142	60.000000	CYT

Axial Thrust Force = 848.900 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	410.3047258	656487561.	245.2891961	0.0001533	0.0001271	0.6232625	4.3811604	
0.00000125	820.6060935	656484875.	133.1717642	0.0001665	0.0001140	0.6738376	4.6980640	
0.00000188	1231.	656468658.	95.8113584	0.0001796	0.0001009	0.7241181	5.0156239	
0.00000250	1641.	656443313.	77.1402099	0.0001929	0.00008785	0.7741018	5.3338402	

Pier drilled shaft_row1

0.00000313	2051.	656409721.	65.9447654	0.0002061	0.00007483	0.8237868	5.6527131
0.00000375	2461.	656368173.	58.4871737	0.0002193	0.00006183	0.8731711	5.9722426
0.00000438	2871.	656318794.	53.1654990	0.0002326	0.00004885	0.9222527	6.2924289
0.00000500	3281.	656261644.	49.1787734	0.0002459	0.00003589	0.9710296	6.6132722
0.00000563	3691.	656196757.	46.0820150	0.0002592	0.00002296	1.0194999	6.9347725
0.00000625	4101.	656124152.	43.6082348	0.0002726	0.00001005	1.0676616	7.2569301
0.00000688	4510.	656043808.	41.5875304	0.0002859	-0.00000284	1.1155126	7.5797451
0.00000750	4920.	655947019.	39.9065589	0.0002993	-0.00001570	1.1630490	7.9032016
0.00000813	5328.	655803864.	38.4866333	0.0003127	-0.00002855	1.2102605	8.2272317
0.00000875	5736.	655590524.	37.2715034	0.0003261	-0.00004137	1.2571357	8.5517565
0.00000938	6143.	655295885.	36.2199598	0.0003396	-0.00005419	1.3036650	8.8767079
0.00001000	6549.	654917239.	35.3011386	0.0003530	-0.00006699	1.3498404	9.2020302
0.00001063	6954.	654456178.	34.4914674	0.0003665	-0.00007978	1.3956553	9.5276772
0.00001125	7357.	653916602.	33.7726356	0.0003799	-0.00009256	1.4411042	9.8536099
0.00001188	7758.	653303719.	33.1302083	0.0003934	-0.000105	1.4861824	10.1797966
0.00001250	7758.	620638533.	31.7811877	0.0003973	-0.000128	1.4986487	10.2265556 C
0.00001313	7758.	591084317.	31.1356005	0.0004087	-0.000143	1.5362660	10.4921567 C
0.00001375	7758.	564216848.	30.5378069	0.0004199	-0.000158	1.5731034	10.7534130 C
0.00001438	7895.	549243163.	29.9818643	0.0004310	-0.000173	1.6091858	11.0104460 C
0.00001500	8089.	539285477.	29.4625452	0.0004419	-0.000188	1.6445243	11.2632572 C
0.00001563	8276.	529651485.	28.9768628	0.0004528	-0.000203	1.6792004	11.5124847 C
0.00001625	8455.	520337732.	28.5212260	0.0004635	-0.000219	1.7132382	11.7582653 C
0.00001688	8629.	511341034.	28.0926153	0.0004741	-0.000235	1.7466633	12.0007549 C
0.00001750	8797.	502662704.	27.6885782	0.0004846	-0.000250	1.7795083	12.2401782 C
0.00001813	8959.	494306664.	27.3071202	0.0004949	-0.000266	1.8118116	12.4768236 C
0.00001875	9118.	486269863.	26.9464271	0.0005052	-0.000282	1.8436059	12.7109321 C
0.00001938	9272.	478543470.	26.6048310	0.0005155	-0.000298	1.8749175	12.9426956 C
0.00002000	9422.	471094728.	26.2802855	0.0005256	-0.000314	1.9057363	13.1719656 C
0.00002063	9568.	463884871.	25.9706681	0.0005356	-0.000331	1.9360320	13.3983996 C
0.00002125	9710.	456959409.	25.6762384	0.0005456	-0.000347	1.9659126	13.6229694 C
0.00002188	9851.	450315145.	25.3962163	0.0005555	-0.000363	1.9954165	13.8460058 C
0.00002250	9987.	443853175.	25.1271340	0.0005654	-0.000380	2.0243954	14.0660299 C
0.00002313	10121.	437651134.	24.8705983	0.0005751	-0.000396	2.0530265	14.2847138 C
0.00002375	10252.	431677610.	24.6252825	0.0005849	-0.000413	2.0812894	14.5018259 C
0.00002438	10381.	425882781.	24.3891808	0.0005945	-0.000429	2.1091064	14.7165584 C
0.00002563	10632.	414918720.	23.9460888	0.0006136	-0.000463	2.1637305	15.1419811 C
0.00002688	10876.	404683320.	23.5366135	0.0006325	-0.000496	2.2169756	15.5614795 C
0.00002813	11113.	395113081.	23.1569587	0.0006513	-0.000530	2.2689213	15.9756133 C
0.00002938	11343.	386153936.	22.8040527	0.0006699	-0.000564	2.3196500	16.3850088 C
0.00003063	11569.	377756109.	22.4752801	0.0006883	-0.000598	2.3692366	16.7902520 C

Pier drilled shaft_row1

0.00003188	11788.	369821939.	22.1661382	0.0007065	-0.000632	2.4175571	17.1898053	C
0.00003313	12003.	362368590.	21.8769758	0.0007247	-0.000667	2.4648593	17.5861388	C
0.00003438	12216.	355365712.	21.6064992	0.0007427	-0.000701	2.5112352	17.9801349	C
0.00003563	12423.	348712504.	21.3500690	0.0007606	-0.000736	2.5564520	18.3690339	C
0.00003688	12628.	342444855.	21.1093945	0.0007784	-0.000770	2.6008209	18.7561901	C
0.00003813	12829.	336507203.	20.8820226	0.0007961	-0.000805	2.6442637	-19.401482	C
0.00003938	13028.	330873868.	20.6667552	0.0008138	-0.000840	2.6867984	-20.283405	C
0.00004063	13225.	325531643.	20.4632392	0.0008313	-0.000875	2.7285098	-21.167090	C
0.00004188	13419.	320448008.	20.2698844	0.0008488	-0.000910	2.7693522	-22.053190	C
0.00004313	13610.	315604100.	20.0859875	0.0008662	-0.000945	2.8093531	-22.941480	C
0.00004438	13801.	311003511.	19.9120384	0.0008836	-0.000980	2.8486514	-23.830302	C
0.00004563	13988.	306583901.	19.7445684	0.0009008	-0.001015	2.8869788	-24.723162	C
0.00004688	14174.	302388407.	19.5866291	0.0009181	-0.001051	2.9247191	-25.615207	C
0.00004813	14359.	298359074.	19.4347428	0.0009353	-0.001086	2.9615847	-26.510256	C
0.00004938	14541.	294499527.	19.2895221	0.0009524	-0.001121	2.9976999	-27.406772	C
0.00005063	14723.	290820033.	19.1520220	0.0009696	-0.001157	3.0332338	-28.302481	C
0.00005188	14902.	287271117.	19.0189841	0.0009866	-0.001192	3.0678966	-29.201447	C
0.00005313	15080.	283862910.	18.8915025	0.0010036	-0.001228	3.1018514	-30.101497	C
0.00005438	15258.	280601772.	18.7703901	0.0010206	-0.001263	3.1352307	-31.000747	C
0.00005563	15434.	277464269.	18.6541187	0.0010376	-0.001299	3.1679132	-31.900968	C
0.00005688	15608.	274425956.	18.5410144	0.0010545	-0.001334	3.1997563	-32.804395	C
0.00005813	15781.	271509487.	18.4332481	0.0010714	-0.001370	3.2310294	-33.707025	C
0.00005938	15954.	268707096.	18.3304854	0.0010884	-0.001405	3.2617297	-34.608851	C
0.00006063	16126.	265998158.	18.2311837	0.0011053	-0.001441	3.2917205	-35.512044	C
0.00006188	16296.	263369619.	18.1344371	0.0011221	-0.001477	3.3209318	-36.417851	C
0.00006313	16465.	260837146.	18.0419607	0.0011389	-0.001512	3.3495755	-37.322854	C
0.00006438	16634.	258395065.	17.9535082	0.0011558	-0.001548	3.3776485	-38.227050	C
0.00006563	16803.	256038150.	17.8688526	0.0011726	-0.001584	3.4051481	-39.130433	C
0.00006688	16969.	253741037.	17.7856501	0.0011894	-0.001619	3.4318435	-40.037136	C
0.00006813	17134.	251514831.	17.7052915	0.0012062	-0.001655	3.4579036	-40.944253	C
0.00006938	17299.	249361560.	17.6282349	0.0012230	-0.001691	3.4833950	-41.850551	C
0.00007063	17464.	247277276.	17.5543079	0.0012398	-0.001726	3.5083148	-42.756027	C
0.00007188	17628.	245258327.	17.4833498	0.0012566	-0.001762	3.5326599	-43.660674	C
0.00007313	17791.	243296876.	17.4146819	0.0012734	-0.001798	3.5563729	-44.565609	C
0.00007438	17953.	241379100.	17.3468704	0.0012902	-0.001834	3.5793201	-45.473675	C
0.00007938	18593.	234247788.	17.1006501	0.0013574	-0.001976	3.6653725	-49.097497	C
0.00008438	19223.	227830897.	16.8846779	0.0014246	-0.002119	3.7416859	-52.718711	C
0.00008938	19843.	222017462.	16.6953407	0.0014921	-0.002262	3.8083415	-56.333520	C
0.00009438	20453.	216715845.	16.5290770	0.0015599	-0.002404	3.8652898	-59.940088	C
0.00009938	21008.	211400158.	16.3710769	0.0016269	-0.002547	3.9116948	-60.000000	CY

Pier drilled shaft_row1

0.0001044	21440.	205417629.	16.2068836	0.0016916	-0.002692	3.9472584	-60.000000	CY
0.0001094	21775.	199084093.	16.0363688	0.0017540	-0.002840	3.9728993	-60.000000	CY
0.0001144	22101.	193231212.	15.8829866	0.0018166	-0.002987	3.9901354	-60.000000	CY
0.0001194	22412.	187745879.	15.7440353	0.0018794	-0.003134	3.9988563	-60.000000	CY
0.0001244	22632.	181964915.	15.5927059	0.0019393	-0.003284	3.9992813	-60.000000	CY
0.0001294	22812.	176326278.	15.4479144	0.0019986	-0.003435	3.9993770	-60.000000	CY
0.0001344	22987.	171065588.	15.3167610	0.0020582	-0.003586	3.9992625	-60.000000	CY
0.0001394	23153.	166120483.	15.1925335	0.0021175	-0.003736	3.9988322	-60.000000	CY
0.0001444	23315.	161487270.	15.0800819	0.0021772	-0.003887	3.9979607	-60.000000	CY
0.0001494	23472.	157136551.	14.9781136	0.0022374	-0.004036	3.9981099	-60.000000	CY
0.0001544	23625.	153036378.	14.8842202	0.0022978	-0.004186	3.9998884	-60.000000	CY
0.0001594	23768.	149130784.	14.7938533	0.0023578	-0.004336	3.9989520	-60.000000	CY
0.0001644	23883.	145294948.	14.7031101	0.0024168	-0.004487	3.9964409	-60.000000	CY
0.0001694	23964.	141482362.	14.6092640	0.0024744	-0.004639	3.9996941	-60.000000	CY
0.0001744	24032.	137816551.	14.5191910	0.0025318	-0.004792	3.9971620	-60.000000	CY
0.0001794	24096.	134333943.	14.4321425	0.0025888	-0.004945	3.9998038	-60.000000	CY
0.0001844	24158.	131025124.	14.3496613	0.0026457	-0.005098	3.9967646	-60.000000	CY
0.0001894	24218.	127883988.	14.2728907	0.0027029	-0.005251	3.9996158	-60.000000	CY
0.0001944	24277.	124897201.	14.2014634	0.0027604	-0.005403	3.9952950	-60.000000	CY
0.0001994	24334.	122049935.	14.1353811	0.0028182	-0.005556	3.9989189	60.000000	CY
0.0002044	24389.	119336968.	14.0735976	0.0028763	-0.005707	3.9990941	60.000000	CY
0.0002094	24439.	116723235.	14.0140292	0.0029342	-0.005860	3.9970411	60.000000	CY
0.0002144	24487.	114223786.	13.9583759	0.0029923	-0.006011	3.9995763	60.000000	CY
0.0002194	24532.	111827691.	13.9072734	0.0030509	-0.006163	3.9959498	60.000000	CYT
0.0002244	24575.	109524493.	13.8609961	0.0031101	-0.006314	3.9973647	60.000000	CYT
0.0002294	24616.	107318679.	13.8175318	0.0031694	-0.006464	3.9996584	60.000000	CYT
0.0002344	24656.	105197699.	13.7777970	0.0032292	-0.006615	3.9956125	60.000000	CYT
0.0002394	24694.	103159782.	13.7409709	0.0032892	-0.006765	3.9966215	60.000000	CYT
0.0002444	24731.	101202718.	13.7063580	0.0033495	-0.006914	3.9992960	60.000000	CYT
0.0002494	24763.	99299021.	13.6779177	0.0034109	-0.007063	3.9981295	60.000000	CYT
0.0002544	24792.	97463595.	13.6521000	0.0034728	-0.007211	3.9945699	60.000000	CYT
0.0002594	24820.	95693367.	13.6255819	0.0035341	-0.007360	3.9981408	60.000000	CYT
0.0002644	24842.	93964011.	13.6035208	0.0035964	-0.007507	3.9998659	60.000000	CYT
0.0002694	24861.	92291294.	13.5842605	0.0036593	-0.007654	3.9939308	60.000000	CYT
0.0002744	24873.	90653965.	13.5625772	0.0037212	-0.007803	3.9950348	60.000000	CYT
0.0003044	24873.	81718872.	13.6751518	0.0041624	-0.008621	3.9911170	60.000000	CYT

Axial Thrust Force = 1018.000 kips

Pier drilled shaft_row1

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	404.1314839	646610374.	291.9737911	0.0001825	0.0001562	0.7360048	5.2273187	
0.00000125	808.2616942	646609355.	156.5144861	0.0001956	0.0001431	0.7857273	5.5442376	
0.00000188	1212.	646593455.	111.3736446	0.0002088	0.0001301	0.8351549	5.8618232	
0.00000250	1616.	646567999.	88.8124198	0.0002220	0.0001170	0.8842855	6.1800754	
0.00000313	2020.	646534053.	75.2830426	0.0002353	0.0001040	0.9331172	6.4989945	
0.00000375	2424.	646491970.	66.2695903	0.0002485	0.00009101	0.9816479	6.8185805	
0.00000438	2828.	646441900.	59.8366676	0.0002618	0.00007804	1.0298757	7.1388335	
0.00000500	3232.	646383918.	55.0165769	0.0002751	0.00006508	1.0777984	7.4597537	
0.00000563	3636.	646318064.	51.2717087	0.0002884	0.00005215	1.1254141	7.7813413	
0.00000625	4039.	646244361.	48.2794975	0.0003017	0.00003925	1.1727208	8.1035964	
0.00000688	4442.	646162822.	45.8346742	0.0003151	0.00002636	1.2197164	8.4265194	
0.00000750	4846.	646073455.	43.8003932	0.0003285	0.00001350	1.2663989	8.7501105	
0.00000813	5249.	645976265.	42.0819151	0.0003419	6.65560E-07	1.3127663	9.0743700	
0.00000875	5651.	645868754.	40.6115473	0.0003554	-0.00001215	1.3588159	9.3992927	
0.00000938	6054.	645733482.	39.3395080	0.0003688	-0.00002494	1.4045405	9.7248350	
0.00001000	6456.	645550112.	38.2283824	0.0003823	-0.00003772	1.4499305	10.0509309	
0.00001063	6856.	645305594.	37.2495680	0.0003958	-0.00005047	1.4949768	10.3775169	
0.00001125	7256.	644993703.	36.3808465	0.0004093	-0.00006322	1.5396716	10.7045387	
0.00001188	7655.	644612712.	35.6047023	0.0004228	-0.00007594	1.5840085	11.0319506	
0.00001250	8052.	644163447.	34.9071408	0.0004363	-0.00008866	1.6279818	11.3597136	
0.00001313	8448.	643648061.	34.2768457	0.0004499	-0.000101	1.6715866	11.6877932	
0.00001375	8842.	643069848.	33.7045730	0.0004634	-0.000114	1.7148187	12.0161610	
0.00001438	8842.	615110289.	32.5326204	0.0004677	-0.000136	1.7279023	12.0737924	C
0.00001500	8842.	589480694.	31.9539633	0.0004793	-0.000151	1.7645820	12.3470240	C
0.00001563	8842.	565901466.	31.4134454	0.0004908	-0.000165	1.8005626	12.6165612	C
0.00001625	9032.	555825055.	30.9068253	0.0005022	-0.000180	1.8358619	12.8824790	C
0.00001688	9237.	547361182.	30.4302323	0.0005135	-0.000195	1.8704840	13.1447262	C
0.00001750	9434.	539060464.	29.9807680	0.0005247	-0.000210	1.9044555	13.4034648	C
0.00001813	9624.	530964060.	29.5563928	0.0005357	-0.000226	1.9378278	13.6590978	C
0.00001875	9808.	523080429.	29.1549047	0.0005467	-0.000241	1.9706261	13.9117920	C
0.00001938	9986.	515413176.	28.7743502	0.0005575	-0.000256	2.0028730	14.1616943	C
0.00002000	10159.	507929187.	28.4122652	0.0005682	-0.000272	2.0345456	14.4085139	C
0.00002063	10326.	500663173.	28.0678431	0.0005789	-0.000287	2.0657046	14.6527725	C
0.00002125	10490.	493623863.	27.7399872	0.0005895	-0.000303	2.0963849	14.8947545	C
0.00002188	10649.	486817865.	27.4277555	0.0006000	-0.000319	2.1266226	15.1347637	C
0.00002250	10805.	480221724.	27.1296448	0.0006104	-0.000335	2.1564092	15.3726683	C

Pier drilled shaft_row1

0.00002313	10957.	473796737.	26.8438069	0.0006208	-0.000350	2.1857033	15.6079962	C
0.00002375	11106.	467601042.	26.5709471	0.0006311	-0.000366	2.2146239	15.8419021	C
0.00002438	11251.	461591619.	26.3093716	0.0006413	-0.000382	2.2431266	16.0738933	C
0.00002563	11534.	450108159.	25.8171478	0.0006616	-0.000415	2.2989227	16.5324116	C
0.00002688	11806.	439278324.	25.3614443	0.0006816	-0.000447	2.3531408	16.9837070	C
0.00002813	12068.	429088961.	24.9389572	0.0007014	-0.000480	2.4059319	17.4290558	C
0.00002938	12323.	419492169.	24.5460459	0.0007210	-0.000513	2.4573693	17.8689692	C
0.00003063	12569.	410427836.	24.1790833	0.0007405	-0.000546	2.5074773	18.3034422	C
0.00003188	12809.	401850194.	23.8351703	0.0007597	-0.000579	2.5562924	18.7326169	C
0.00003313	13043.	393745584.	23.5128288	0.0007789	-0.000612	2.6039321	19.1575800	C
0.00003438	13272.	386087734.	23.2104335	0.0007979	-0.000646	2.6504764	19.5790572	C
0.00003563	13496.	378831506.	22.9257955	0.0008167	-0.000680	2.6959329	19.9969564	C
0.00003688	13714.	371911908.	22.6558314	0.0008354	-0.000713	2.7402048	20.4099111	C
0.00003813	13930.	365369600.	22.4019964	0.0008541	-0.000747	2.7835720	20.8211261	C
0.00003938	14141.	359125362.	22.1607861	0.0008726	-0.000781	2.8258636	21.2283540	C
0.00004063	14348.	353184857.	21.9322858	0.0008910	-0.000815	2.8672114	21.6330680	C
0.00004188	14553.	347525294.	21.7155329	0.0009093	-0.000849	2.9076421	22.0354805	C
0.00004313	14754.	342115958.	21.5090013	0.0009276	-0.000884	2.9471184	22.4349634	C
0.00004438	14952.	336953964.	21.3127115	0.0009458	-0.000918	2.9857360	22.8326520	C
0.00004563	15148.	332020470.	21.1257478	0.0009639	-0.000952	3.0234955	23.2284489	C
0.00004688	15342.	327289186.	20.9469082	0.0009819	-0.000987	3.0603606	-23.766078	C
0.00004813	15534.	322784664.	20.7777006	0.0009999	-0.001021	3.0965496	-24.635990	C
0.00004938	15722.	318426418.	20.6137130	0.0010178	-0.001056	3.1317014	-25.510696	C
0.00005063	15910.	314270879.	20.4584447	0.0010357	-0.001091	3.1662166	-26.384490	C
0.00005188	16096.	310276331.	20.3095703	0.0010536	-0.001125	3.1999246	-27.259923	C
0.00005313	16279.	306419429.	20.1658580	0.0010713	-0.001160	3.2327554	-28.138194	C
0.00005438	16461.	302728379.	20.0293267	0.0010891	-0.001195	3.2649549	-29.015562	C
0.00005563	16641.	299169784.	19.8979712	0.0011068	-0.001229	3.2963693	-29.894479	C
0.00005688	16819.	295723647.	19.7706516	0.0011245	-0.001264	3.3269256	-30.776263	C
0.00005813	16997.	292415193.	19.6493416	0.0011421	-0.001299	3.3568563	-31.657147	C
0.00005938	17173.	289235629.	19.5336648	0.0011598	-0.001334	3.3861582	-32.537127	C
0.00006063	17347.	286132962.	19.4199285	0.0011773	-0.001369	3.4144986	-33.422082	C
0.00006188	17520.	283144481.	19.3111775	0.0011949	-0.001404	3.4422074	-34.306337	C
0.00006313	17692.	280264738.	19.2072264	0.0012125	-0.001439	3.4692927	-35.189690	C
0.00006438	17863.	277486463.	19.1077273	0.0012301	-0.001474	3.4957441	-36.072268	C
0.00006563	18032.	274768859.	19.0094647	0.0012475	-0.001509	3.5212735	-36.959706	C
0.00006688	18200.	272143933.	18.9153413	0.0012650	-0.001544	3.5461843	-37.846241	C
0.00006813	18367.	269606504.	18.8251324	0.0012825	-0.001579	3.5704731	-38.731866	C
0.00006938	18534.	267151765.	18.7386293	0.0013000	-0.001614	3.5941365	-39.616576	C
0.00007063	18699.	264763014.	18.6544733	0.0013175	-0.001649	3.6170633	-40.502750	C

Pier drilled shaft_row1

0.00007188	18862.	262432355.	18.5720981	0.0013349	-0.001684	3.6392186	-41.391314	C
0.00007313	19025.	260173222.	18.4929734	0.0013523	-0.001719	3.6607530	-42.278957	C
0.00007438	19187.	257981938.	18.4169386	0.0013698	-0.001754	3.6816630	-43.165672	C
0.00007938	19827.	249788172.	18.1362251	0.0014396	-0.001894	3.7586094	-46.713733	C
0.00008438	20453.	242408760.	17.8904625	0.0015095	-0.002034	3.8250532	-50.257681	C
0.00008938	21065.	235694245.	17.6717797	0.0015794	-0.002174	3.8807975	-53.802712	C
0.00009438	21666.	229575270.	17.4808440	0.0016498	-0.002314	3.9261301	-57.335221	C
0.00009938	22252.	223922351.	17.3099421	0.0017202	-0.002454	3.9607022	-60.000000	CY
0.0001044	22768.	218136043.	17.1462381	0.0017896	-0.002594	3.9841998	-60.000000	CY
0.0001094	23162.	211764655.	16.9764334	0.0018568	-0.002737	3.9969082	-60.000000	CY
0.0001144	23480.	205289748.	16.8062511	0.0019222	-0.002882	3.9985339	-60.000000	CY
0.0001194	23790.	199288829.	16.6552082	0.0019882	-0.003026	3.9993845	-60.000000	CY
0.0001244	24083.	193634237.	16.5160869	0.0020542	-0.003170	3.9997499	-60.000000	CY
0.0001294	24301.	187830596.	16.3719796	0.0021181	-0.003316	3.9998197	-60.000000	CY
0.0001344	24469.	182094407.	16.2313983	0.0021811	-0.003463	3.9997270	-60.000000	CY
0.0001394	24630.	176714173.	16.1008428	0.0022441	-0.003610	3.9994202	-60.000000	CY
0.0001444	24783.	171659734.	15.9795173	0.0023070	-0.003757	3.9986997	-60.000000	CY
0.0001494	24933.	166915717.	15.8693348	0.0023705	-0.003903	3.9972944	-60.000000	CY
0.0001544	25079.	162453797.	15.7690960	0.0024344	-0.004049	3.9999896	-60.000000	CY
0.0001594	25218.	158231054.	15.6735696	0.0024980	-0.004196	3.9993415	-60.000000	CY
0.0001644	25354.	154242943.	15.5851245	0.0025618	-0.004342	3.9972610	-60.000000	CY
0.0001694	25480.	150437925.	15.5020964	0.0026257	-0.004488	3.9999360	-60.000000	CY
0.0001744	25582.	146707645.	15.4186557	0.0026886	-0.004635	3.9982126	-60.000000	CY
0.0001794	25655.	143026805.	15.3332560	0.0027504	-0.004783	3.9999943	60.000000	CY
0.0001844	25712.	139456543.	15.2457585	0.0028109	-0.004933	3.9978919	60.000000	CY
0.0001894	25764.	136049626.	15.1661233	0.0028721	-0.005082	3.9999206	60.000000	CY
0.0001944	25814.	132805754.	15.0926824	0.0029336	-0.005230	3.9966317	60.000000	CY
0.0001994	25860.	129703057.	15.0261810	0.0029958	-0.005378	3.9995098	60.000000	CY
0.0002044	25904.	126745326.	14.9643120	0.0030583	-0.005525	3.9958445	60.000000	CYT
0.0002094	25944.	123913988.	14.9076566	0.0031213	-0.005672	3.9981946	60.000000	CYT
0.0002144	25983.	121202100.	14.8505328	0.0031836	-0.005820	3.9999238	60.000000	CYT
0.0002194	26015.	118586255.	14.8008618	0.0032469	-0.005967	3.9948834	60.000000	CYT
0.0002244	26044.	116073726.	14.7559181	0.0033109	-0.006113	3.9985355	60.000000	CYT
0.0002294	26071.	113662871.	14.7146061	0.0033752	-0.006259	3.9999788	60.000000	CYT
0.0002344	26092.	111324272.	14.6807274	0.0034408	-0.006403	3.9945393	60.000000	CYT
0.0002394	26111.	109079628.	14.6492599	0.0035067	-0.006547	3.9983360	60.000000	CYT
0.0002444	26129.	106921398.	14.6203870	0.0035729	-0.006691	3.9999460	60.000000	CYT
0.0002494	26145.	104841188.	14.5946163	0.0036395	-0.006834	3.9928688	60.000000	CYT
0.0002544	26160.	102839294.	14.5708197	0.0037065	-0.006977	3.9972482	60.000000	CYT
0.0002594	26174.	100911831.	14.5487563	0.0037736	-0.007120	3.9995902	60.000000	CYT

Pier drilled shaft_row1

0.0002644 26187. 99053418. 14.5285964 0.0038410 -0.007263 3.9963724 60.0000000 CYT

Axial Thrust Force = 1091.000 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	401.4365026	642298404.	312.3543343	0.0001952	0.0001690	0.7846231	5.5967161	
0.00000125	802.8726413	642298113.	166.7049472	0.0002084	0.0001559	0.8339734	5.9136418	
0.00000188	1204.	642282348.	118.1674958	0.0002216	0.0001428	0.8830286	6.2312388	
0.00000250	1606.	642256840.	93.9080293	0.0002348	0.0001298	0.9317869	6.5495071	
0.00000313	2007.	642222734.	79.3597577	0.0002480	0.0001167	0.9802460	6.8684468	
0.00000375	2408.	642180411.	69.6670845	0.0002613	0.0001038	1.0284041	7.1880580	
0.00000438	2809.	642130032.	62.7490402	0.0002745	0.00009078	1.0762591	7.5083407	
0.00000500	3210.	642071678.	57.5651399	0.0002878	0.00007783	1.1238089	7.8292953	
0.00000563	3611.	642005392.	53.5373369	0.0003011	0.00006490	1.1710515	8.1509219	
0.00000625	4012.	641931198.	50.3188032	0.0003145	0.00005199	1.2179849	8.4732206	
0.00000688	4413.	641849112.	47.6888301	0.0003279	0.00003911	1.2646070	8.7961918	
0.00000750	4813.	641759142.	45.5002788	0.0003413	0.00002625	1.3109158	9.1198357	
0.00000813	5213.	641661292.	43.6512838	0.0003547	0.00001342	1.3569093	9.4441525	
0.00000875	5614.	641555565.	42.0690844	0.0003681	6.04488E-07	1.4025854	9.7691427	
0.00000938	6013.	641439833.	40.7003040	0.0003816	-0.00001218	1.4479415	10.0948014	
0.00001000	6413.	641299191.	39.5047897	0.0003950	-0.00002495	1.4929709	10.4210890	
0.00001063	6812.	641115670.	38.4517659	0.0004086	-0.00003770	1.5376647	10.7479442	
0.00001125	7210.	640877107.	37.5173010	0.0004221	-0.00005043	1.5820141	11.0753070	
0.00001188	7607.	640577005.	36.6825225	0.0004356	-0.00006315	1.6260119	11.4031250	
0.00001250	8003.	640212927.	35.9323541	0.0004492	-0.00007585	1.6696514	11.7313534	
0.00001313	8397.	639785076.	35.2546094	0.0004627	-0.00008853	1.7129274	12.0599545	
0.00001375	8790.	639294868.	34.6393276	0.0004763	-0.000101	1.7558348	12.3888944	
0.00001438	9182.	638744708.	34.0782916	0.0004899	-0.000114	1.7983696	12.7181441	
0.00001500	9182.	612130345.	32.9835323	0.0004948	-0.000135	1.8132785	12.7948866	C
0.00001563	9182.	587645131.	32.4189710	0.0005065	-0.000150	1.8496962	13.0721899	C
0.00001625	9225.	567679404.	31.8903344	0.0005182	-0.000164	1.8854322	13.3459577	C
0.00001688	9443.	559614648.	31.3936872	0.0005298	-0.000179	1.9204988	13.6162170	C
0.00001750	9654.	551661050.	30.9257836	0.0005412	-0.000194	1.9549151	13.8830602	C
0.00001813	9857.	543837017.	30.4838619	0.0005525	-0.000209	1.9887014	14.1465987	C
0.00001875	10053.	536158661.	30.0655632	0.0005637	-0.000224	2.0218798	14.4069626	C
0.00001938	10242.	528640031.	29.6688681	0.0005748	-0.000239	2.0544738	14.6643016	C

Pier drilled shaft_row1

0.00002000	10426.	521293307.	29.2920445	0.0005858	-0.000254	2.0865083	14.9187859	C
0.00002063	10604.	514128969.	28.9336063	0.0005968	-0.000269	2.1180097	15.1706071	C
0.00002125	10777.	507155942.	28.5922784	0.0006076	-0.000285	2.1490060	15.4199792	C
0.00002188	10946.	500381730.	28.2669693	0.0006183	-0.000300	2.1795268	15.6671400	C
0.00002250	11110.	493792053.	27.9562752	0.0006290	-0.000316	2.2095731	15.9120446	C
0.00002313	11270.	487344603.	27.6582059	0.0006396	-0.000332	2.2390980	16.1541527	C
0.00002375	11426.	481110302.	27.3735501	0.0006501	-0.000347	2.2682268	16.3946950	C
0.00002438	11580.	475084238.	27.1015218	0.0006606	-0.000363	2.2969797	16.6338445	C
0.00002563	11876.	463472439.	26.5881402	0.0006813	-0.000395	2.3531266	17.1053553	C
0.00002688	12161.	452513875.	26.1137403	0.0007018	-0.000427	2.4077013	17.5700270	C
0.00002813	12436.	442166393.	25.6737907	0.0007221	-0.000459	2.4607855	18.0284044	C
0.00002938	12701.	432387164.	25.2644230	0.0007421	-0.000492	2.5124485	18.4809366	C
0.00003063	12959.	423139382.	24.8824653	0.0007620	-0.000524	2.5627620	18.9281333	C
0.00003188	13209.	414390908.	24.5253109	0.0007817	-0.000557	2.6117994	19.3705656	C
0.00003313	13452.	406087653.	24.1899100	0.0008013	-0.000590	2.6595626	19.8080011	C
0.00003438	13688.	398191159.	23.8738699	0.0008207	-0.000623	2.7060726	20.2404204	C
0.00003563	13919.	390709194.	23.5767180	0.0008399	-0.000656	2.7514836	20.6694406	C
0.00003688	14146.	383622281.	23.2972848	0.0008591	-0.000690	2.7958752	21.0958653	C
0.00003813	14367.	376829386.	23.0311501	0.0008781	-0.000723	2.8390255	21.5167342	C
0.00003938	14584.	370385744.	22.7801741	0.0008970	-0.000757	2.8812350	21.9356177	C
0.00004063	14797.	364242861.	22.5422408	0.0009158	-0.000790	2.9224481	22.3516713	C
0.00004188	15006.	358363744.	22.3155096	0.0009345	-0.000824	2.9626162	22.7640784	C
0.00004313	15213.	352770228.	22.1009925	0.0009531	-0.000858	3.0019365	23.1753227	C
0.00004438	15416.	347393350.	21.8953767	0.0009716	-0.000892	3.0402035	23.5824693	C
0.00004563	15616.	342269371.	21.7005073	0.0009901	-0.000926	3.0776741	23.9889264	C
0.00004688	15813.	337344762.	21.5137116	0.0010085	-0.000960	3.1141818	24.3922327	C
0.00004813	16008.	332626954.	21.3355214	0.0010268	-0.000994	3.1498490	24.7940059	C
0.00004938	16201.	328113484.	21.1658902	0.0010451	-0.001029	3.1847394	25.1951154	C
0.00005063	16390.	323752667.	21.0021253	0.0010632	-0.001063	3.2186606	25.5925390	C
0.00005188	16579.	319588932.	20.8468899	0.0010814	-0.001097	3.2519216	-26.451591	C
0.00005313	16765.	315567231.	20.6971002	0.0010995	-0.001132	3.2842820	-27.319749	C
0.00005438	16948.	311693583.	20.5533121	0.0011176	-0.001166	3.3158425	-28.189302	C
0.00005563	17131.	307981994.	20.4165764	0.0011357	-0.001201	3.3467476	-29.057904	C
0.00005688	17312.	304384224.	20.2839551	0.0011536	-0.001235	3.3767580	-29.929633	C
0.00005813	17490.	300909948.	20.1562807	0.0011716	-0.001270	3.4059907	-30.802638	C
0.00005938	17668.	297570864.	20.0345320	0.0011896	-0.001304	3.4345734	-31.674696	C
0.00006063	17845.	294344994.	19.9173662	0.0012075	-0.001339	3.4624101	-32.547524	C
0.00006188	18018.	291204385.	19.8029572	0.0012253	-0.001373	3.4893589	-33.423900	C
0.00006313	18191.	288177900.	19.6935953	0.0012432	-0.001408	3.5156627	-34.299331	C
0.00006438	18364.	285258796.	19.5889896	0.0012610	-0.001443	3.5413182	-35.173811	C

Pier drilled shaft_row1

0.00006563	18534.	282424406.	19.4875480	0.0012789	-0.001477	3.5662002	-36.049854	C
0.00006688	18703.	279663696.	19.3885661	0.0012966	-0.001512	3.5902675	-36.928481	C
0.00006813	18870.	276994869.	19.2936983	0.0013144	-0.001547	3.6136913	-37.806156	C
0.00006938	19037.	274412873.	19.2027254	0.0013322	-0.001582	3.6364679	-38.682873	C
0.00007063	19204.	271913010.	19.1154439	0.0013500	-0.001616	3.6585937	-39.558625	C
0.00007188	19368.	269461915.	19.0290312	0.0013677	-0.001651	3.6798380	-40.438894	C
0.00007313	19531.	267083951.	18.9458510	0.0013854	-0.001686	3.7004235	-41.318573	C
0.00007438	19693.	264777273.	18.8659169	0.0014032	-0.001721	3.7203627	-42.197281	C
0.00007938	20332.	256155894.	18.5716013	0.0014741	-0.001860	3.7932719	-45.711551	C
0.00008438	20957.	248380725.	18.3133033	0.0015452	-0.001999	3.8552668	-49.223042	C
0.00008938	21566.	241301699.	18.0835405	0.0016162	-0.002138	3.9062188	-52.735479	C
0.00009438	22164.	234847913.	17.8828902	0.0016877	-0.002276	3.9463802	-56.234871	C
0.00009938	22746.	228895240.	17.7029094	0.0017592	-0.002415	3.9754040	-59.732884	C
0.0001044	23284.	223081563.	17.5377394	0.0018305	-0.002553	3.9932148	-60.000000	CY
0.0001094	23724.	216907343.	17.3723142	0.0019001	-0.002694	3.9999060	-60.000000	CY
0.0001144	24044.	210217651.	17.1979620	0.0019670	-0.002837	3.9982594	-60.000000	CY
0.0001194	24350.	203975763.	17.0424750	0.0020344	-0.002979	3.9991617	-60.000000	CY
0.0001244	24643.	198137724.	16.8993953	0.0021019	-0.003122	3.9995735	-60.000000	CY
0.0001294	24896.	192435258.	16.7623584	0.0021686	-0.003265	3.9996940	-60.000000	CY
0.0001344	25073.	186592945.	16.6217901	0.0022336	-0.003410	3.9995698	-60.000000	CY
0.0001394	25231.	181026069.	16.4868094	0.0022978	-0.003556	3.9991527	-60.000000	CY
0.0001444	25382.	175804835.	16.3628874	0.0023624	-0.003701	3.9982638	-60.000000	CY
0.0001494	25529.	170905141.	16.2502861	0.0024274	-0.003846	3.9975398	-60.000000	CY
0.0001544	25671.	166291262.	16.1465665	0.0024926	-0.003991	3.9998964	-60.000000	CY
0.0001594	25807.	161926719.	16.0476315	0.0025576	-0.004136	3.9988828	-60.000000	CY
0.0001644	25940.	157809674.	15.9570323	0.0026229	-0.004281	3.9963134	-60.000000	CY
0.0001694	26069.	153915498.	15.8742950	0.0026887	-0.004425	3.9997249	60.000000	CY
0.0001744	26188.	150180207.	15.7963233	0.0027545	-0.004569	3.9974895	60.000000	CY
0.0001794	26277.	146489414.	15.7171081	0.0028193	-0.004714	3.9999143	60.000000	CY
0.0001844	26337.	142847362.	15.6334815	0.0028824	-0.004861	3.9972727	60.000000	CY
0.0001894	26384.	139324007.	15.5551842	0.0029458	-0.005008	3.9997713	60.000000	CY
0.0001944	26430.	135973021.	15.4825403	0.0030094	-0.005154	3.9958720	60.000000	CYT
0.0001994	26472.	132774447.	15.4160558	0.0030736	-0.005300	3.9991872	60.000000	CYT
0.0002044	26513.	129726539.	15.3540615	0.0031380	-0.005446	3.9977829	60.000000	CYT
0.0002094	26544.	126779617.	15.2984617	0.0032031	-0.005591	3.9976018	60.000000	CYT
0.0002144	26574.	123958609.	15.2450920	0.0032682	-0.005736	3.9997894	60.000000	CYT
0.0002194	26597.	121241892.	15.1985094	0.0033342	-0.005880	3.9941125	60.000000	CYT
0.0002244	26617.	118626851.	15.1575639	0.0034010	-0.006023	3.9981822	60.000000	CYT
0.0002294	26635.	116121572.	15.1194841	0.0034680	-0.006166	3.9999315	60.000000	CYT
0.0002344	26651.	113711401.	15.0854796	0.0035357	-0.006308	3.9939650	60.000000	CYT

Pier drilled shaft_row1

0.0002394	26666.	111397735.	15.0539842	0.0036035	-0.006450	3.9980046	60.0000000	CYT
0.0002444	26680.	109175447.	15.0246972	0.0036717	-0.006592	3.9998697	60.0000000	CYT
0.0002494	26692.	107036873.	14.9979493	0.0037401	-0.006734	3.9934359	60.0000000	CYT
0.0002544	26704.	104978541.	14.9732934	0.0038088	-0.006875	3.9967299	60.0000000	CYT

Axial Thrust Force = 1102.000 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	401.0288033	641646085.	315.4375214	0.0001971	0.0001709	0.7919464	5.6525988	
0.00000125	802.0573802	641645904.	168.2465696	0.0002103	0.0001578	0.8412403	5.9695257	
0.00000188	1203.	641630160.	119.1952762	0.0002235	0.0001447	0.8902393	6.2871244	
0.00000250	1604.	641604644.	94.6788983	0.0002367	0.0001317	0.9389411	6.6053951	
0.00000313	2005.	641570513.	79.9764875	0.0002499	0.0001187	0.9873440	6.9243379	
0.00000375	2406.	641528153.	70.1810614	0.0002632	0.0001057	1.0354457	7.2439529	
0.00000438	2806.	641477727.	63.1896276	0.0002765	0.00009270	1.0832442	7.5642403	
0.00000500	3207.	641419316.	57.9506901	0.0002898	0.00007975	1.1307376	7.8852001	
0.00000563	3608.	641352964.	53.8800846	0.0003031	0.00006683	1.1779238	8.2068326	
0.00000625	4008.	641278696.	50.6273127	0.0003164	0.00005392	1.2248007	8.5291380	
0.00000688	4408.	641196526.	47.9693302	0.0003298	0.00004104	1.2713663	8.8521165	
0.00000750	4808.	641106464.	45.7574408	0.0003432	0.00002818	1.3176186	9.1757684	
0.00000813	5208.	641008514.	43.8887013	0.0003566	0.00001535	1.3635556	9.5000940	
0.00000875	5608.	640902677.	42.2895807	0.0003700	0.00000253	1.4091751	9.8250936	
0.00000938	6007.	640787786.	40.9061464	0.0003835	-0.00001025	1.4544748	10.1507648	
0.00001000	6407.	640651201.	39.6978429	0.0003970	-0.00002302	1.4994488	10.4770745	
0.00001063	6805.	640474827.	38.6335716	0.0004105	-0.00003577	1.5440883	10.8039630	
0.00001125	7203.	640245654.	37.6891427	0.0004240	-0.00004850	1.5883847	11.1313703	
0.00001188	7599.	639956481.	36.8454791	0.0004375	-0.00006121	1.6323303	11.4592431	
0.00001250	7995.	639604265.	36.0873397	0.0004511	-0.00007391	1.6759186	11.7875357	
0.00001313	8389.	639188812.	35.4024058	0.0004647	-0.00008659	1.7191441	12.1162095	
0.00001375	8782.	638711225.	34.7806078	0.0004782	-0.00009927	1.7620018	12.4452299	
0.00001438	9174.	638173776.	34.2136404	0.0004918	-0.000112	1.8044873	12.7745676	
0.00001500	9174.	611583202.	33.1361140	0.0004970	-0.000133	1.8204496	12.8612596	C
0.00001563	9174.	587119874.	32.5689132	0.0005089	-0.000147	1.8569754	13.1401326	C
0.00001625	9251.	569311922.	32.0367683	0.0005206	-0.000162	1.8927636	13.4149646	C
0.00001688	9472.	561291668.	31.5367363	0.0005322	-0.000177	1.9278741	13.6862216	C
0.00001750	9684.	553380778.	31.0657752	0.0005437	-0.000191	1.9623377	13.9541060	C

Pier drilled shaft_row1

0.00001813	9889.	545597746.	30.6210929	0.0005550	-0.000206	1.9961748	14.2187307	C
0.00001875	10087.	537958761.	30.2003045	0.0005663	-0.000221	2.0294077	14.4802281	C
0.00001938	10278.	530477940.	29.8013680	0.0005774	-0.000236	2.0620597	14.7387500	C
0.00002000	10463.	523167522.	29.4225324	0.0005885	-0.000252	2.0941561	14.9944688	C
0.00002063	10643.	516038039.	29.0622946	0.0005994	-0.000267	2.1257232	15.2475787	C
0.00002125	10818.	509098465.	28.7193654	0.0006103	-0.000282	2.1567893	15.4982965	C
0.00002188	10988.	502323224.	28.3919063	0.0006211	-0.000298	2.1873380	15.7463965	C
0.00002250	11153.	495702296.	28.0785090	0.0006318	-0.000313	2.2173684	15.9918019	C
0.00002313	11315.	489284607.	27.7792782	0.0006424	-0.000329	2.2469679	16.2353473	C
0.00002375	11473.	483075831.	27.4935446	0.0006530	-0.000345	2.2761706	16.4773414	C
0.00002438	11627.	476991011.	27.2184941	0.0006635	-0.000360	2.3048609	16.7165294	C
0.00002563	11926.	465410085.	26.7030886	0.0006843	-0.000392	2.3611328	17.1907765	C
0.00002688	12213.	454450118.	26.2262623	0.0007048	-0.000424	2.4157831	17.6577243	C
0.00002813	12490.	444079450.	25.7836249	0.0007252	-0.000456	2.4689019	18.1179874	C
0.00002938	12757.	434279281.	25.3719078	0.0007453	-0.000488	2.5206035	18.5725003	C
0.00003063	13016.	425012407.	24.9879047	0.0007653	-0.000521	2.5709594	19.0217767	C
0.00003188	13267.	416208363.	24.6277017	0.0007850	-0.000554	2.6199418	19.4652131	C
0.00003313	13510.	407862830.	24.2897883	0.0008046	-0.000587	2.6676731	19.9039468	C
0.00003438	13748.	399953845.	23.9724302	0.0008241	-0.000620	2.7142322	20.3386726	C
0.00003563	13981.	392460146.	23.6741709	0.0008434	-0.000653	2.7596963	20.7701217	C
0.00003688	14208.	385312574.	23.3918576	0.0008626	-0.000686	2.8039765	21.1969991	C
0.00003813	14430.	378503817.	23.1246562	0.0008816	-0.000720	2.8471567	21.6201168	C
0.00003938	14650.	372052069.	22.8730845	0.0009006	-0.000753	2.8894256	22.0417098	C
0.00004063	14863.	365850254.	22.6324224	0.0009194	-0.000787	2.9304977	22.4579165	C
0.00004188	15074.	359965322.	22.4053639	0.0009382	-0.000821	2.9707271	22.8731952	C
0.00004313	15280.	354318304.	22.1883748	0.0009569	-0.000854	3.0099039	23.2846051	C
0.00004438	15484.	348937318.	21.9826655	0.0009755	-0.000888	3.0482338	23.6947991	C
0.00004563	15684.	343764484.	21.7855399	0.0009940	-0.000922	3.0855583	24.1014363	C
0.00004688	15883.	338836614.	21.5988397	0.0010124	-0.000956	3.1221281	24.5079536	C
0.00004813	16077.	334073932.	21.4185770	0.0010308	-0.000990	3.1576463	24.9099202	C
0.00004938	16271.	329538307.	21.2481226	0.0010491	-0.001025	3.1924950	25.3128619	C
0.00005063	16461.	325154257.	21.0834592	0.0010674	-0.001059	3.2263597	25.7119475	C
0.00005188	16649.	320951116.	20.9264047	0.0010856	-0.001093	3.2594680	-26.331971	C
0.00005313	16837.	316927119.	20.7770208	0.0011038	-0.001127	3.2918788	-27.196621	C
0.00005438	17020.	313016904.	20.6315404	0.0011218	-0.001162	3.3232832	-28.065946	C
0.00005563	17203.	309270361.	20.4931905	0.0011399	-0.001196	3.3540314	-28.934316	C
0.00005688	17385.	305672784.	20.3612523	0.0011580	-0.001231	3.3840961	-29.802141	C
0.00005813	17563.	302165866.	20.2320645	0.0011760	-0.001265	3.4131683	-30.674895	C
0.00005938	17741.	298795478.	20.1088683	0.0011940	-0.001300	3.4415895	-31.546699	C
0.00006063	17918.	295553076.	19.9912961	0.0012120	-0.001334	3.4693563	-32.417546	C

Pier drilled shaft_row1

0.00006188	18092.	292400659.	19.8768016	0.0012299	-0.001369	3.4962592	-33.291395	C
0.00006313	18265.	289345922.	19.7661304	0.0012477	-0.001404	3.5223966	-34.166546	C
0.00006438	18437.	286399634.	19.6602683	0.0012656	-0.001438	3.5478845	-35.040743	C
0.00006563	18608.	283555503.	19.5589438	0.0012836	-0.001473	3.5727196	-35.913979	C
0.00006688	18777.	280780656.	19.4597020	0.0013014	-0.001507	3.5966995	-36.790522	C
0.00006813	18945.	278087071.	19.3636872	0.0013192	-0.001542	3.6199501	-37.667884	C
0.00006938	19112.	275481180.	19.2716109	0.0013370	-0.001577	3.6425524	-38.544284	C
0.00007063	19278.	272958240.	19.1832670	0.0013548	-0.001611	3.6645030	-39.419715	C
0.00007188	19443.	270509580.	19.0980758	0.0013727	-0.001646	3.6857648	-40.294979	C
0.00007313	19606.	268109685.	19.0138805	0.0013904	-0.001681	3.7061697	-41.174308	C
0.00007438	19768.	265781782.	18.9329676	0.0014081	-0.001716	3.7259269	-42.052662	C
0.00007938	20408.	257103414.	18.6373019	0.0014793	-0.001854	3.7982695	-45.560317	C
0.00008438	21031.	249257487.	18.3757841	0.0015505	-0.001993	3.8594887	-49.070159	C
0.00008938	21641.	242133240.	18.1454190	0.0016217	-0.002132	3.9097758	-52.575098	C
0.00009438	22237.	235621491.	17.9422083	0.0016933	-0.002270	3.9490939	-56.072525	C
0.00009938	22820.	229631164.	17.7622224	0.0017651	-0.002409	3.9773252	-59.561951	C
0.0001044	23360.	223805623.	17.5958187	0.0018366	-0.002547	3.9942324	-60.000000	CY
0.0001094	23807.	217663362.	17.4324121	0.0019067	-0.002687	3.9999926	-60.000000	CY
0.0001144	24127.	210945319.	17.2567333	0.0019737	-0.002830	3.9988033	-60.000000	CY
0.0001194	24431.	204661665.	17.0995172	0.0020413	-0.002972	3.9995277	-60.000000	CY
0.0001244	24726.	198799718.	16.9575413	0.0021091	-0.003115	3.9998314	-60.000000	CY
0.0001294	24983.	193103792.	16.8204297	0.0021761	-0.003258	3.9999093	-60.000000	CY
0.0001344	25162.	187250892.	16.6791723	0.0022413	-0.003402	3.9998421	-60.000000	CY
0.0001394	25320.	181667849.	16.5458204	0.0023061	-0.003548	3.9995843	-60.000000	CY
0.0001444	25470.	176416946.	16.4205314	0.0023707	-0.003693	3.9989213	-60.000000	CY
0.0001494	25616.	171489735.	16.3066635	0.0024358	-0.003838	3.9975724	-60.000000	CY
0.0001544	25759.	166857122.	16.2029450	0.0025013	-0.003982	3.9999991	-60.000000	CY
0.0001594	25895.	162476186.	16.1048274	0.0025667	-0.004127	3.9994355	-60.000000	CY
0.0001644	26027.	158336587.	16.0131637	0.0026322	-0.004272	3.9974057	-60.000000	CY
0.0001694	26155.	154421601.	15.9293889	0.0026980	-0.004416	3.9999552	60.000000	CY
0.0001744	26274.	150675472.	15.8509894	0.0027640	-0.004560	3.9984002	60.000000	CY
0.0001794	26366.	146988638.	15.7747642	0.0028296	-0.004704	3.9994956	60.000000	CY
0.0001844	26429.	143345329.	15.6937804	0.0028935	-0.004850	3.9983650	60.000000	CY
0.0001894	26476.	139806131.	15.6143482	0.0029570	-0.004997	3.9999895	60.000000	CY
0.0001944	26520.	136436066.	15.5411709	0.0030208	-0.005143	3.9972787	60.000000	CYT
0.0001994	26561.	133223406.	15.4736518	0.0030851	-0.005289	3.9997332	60.000000	CYT
0.0002044	26600.	130153433.	15.4119021	0.0031498	-0.005434	3.9949617	60.000000	CYT
0.0002094	26632.	127195227.	15.3583647	0.0032157	-0.005578	3.9987274	60.000000	CYT
0.0002144	26661.	124366806.	15.3065200	0.0032813	-0.005722	3.9999997	60.000000	CYT
0.0002194	26682.	121625421.	15.2612756	0.0033479	-0.005866	3.9961398	60.000000	CYT

Pier drilled shaft_row1

0.0002244	26701.	118999538.	15.2195329	0.0034149	-0.006009	3.9992220	60.0000000	CYT
0.0002294	26718.	116480950.	15.1812323	0.0034822	-0.006152	3.9980074	60.0000000	CYT
0.0002344	26733.	114060143.	15.1466732	0.0035500	-0.006294	3.9960965	60.0000000	CYT
0.0002394	26747.	111737133.	15.1144922	0.0036180	-0.006436	3.9991408	60.0000000	CYT
0.0002444	26760.	109505403.	15.0846592	0.0036863	-0.006577	3.9987815	60.0000000	CYT
0.0002494	26772.	107357239.	15.0575141	0.0037550	-0.006719	3.9946558	60.0000000	CYT
0.0002544	26783.	105290813.	15.0322514	0.0038238	-0.006860	3.9982957	60.0000000	CYT

Axial Thrust Force = 1326.000 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	392.6323225	628211716.	378.9350591	0.0002368	0.0002106	0.9409106	6.8034917	
0.00000125	785.2672513	628213801.	199.9959471	0.0002500	0.0001975	0.9890448	7.1204406	
0.00000188	1178.	628198469.	140.3622042	0.0002632	0.0001844	1.0368837	7.4380761	
0.00000250	1570.	628172772.	110.5548044	0.0002764	0.0001714	1.0844253	7.7563983	
0.00000313	1963.	628138122.	92.6779430	0.0002896	0.0001584	1.1316674	8.0754073	
0.00000375	2355.	628094985.	80.7663518	0.0003029	0.0001454	1.1786080	8.3951033	
0.00000438	2748.	628043563.	72.2634876	0.0003162	0.0001324	1.2252451	8.7154862	
0.00000500	3140.	627983954.	65.8910791	0.0003295	0.0001195	1.2715765	9.0365565	
0.00000563	3532.	627916211.	60.9389755	0.0003428	0.0001065	1.3176002	9.3583141	
0.00000625	3924.	627840366.	56.9810866	0.0003561	0.00009363	1.3633140	9.6807595	
0.00000688	4316.	627756437.	53.7462644	0.0003695	0.00008076	1.4087159	10.0038927	
0.00000750	4707.	627664435.	51.0537433	0.0003829	0.00006790	1.4538038	10.3277142	
0.00000813	5099.	627564365.	48.7783784	0.0003963	0.00005507	1.4985757	10.6522242	
0.00000875	5490.	627456232.	46.8307802	0.0004098	0.00004227	1.5430293	10.9774230	
0.00000938	5881.	627340036.	45.1453969	0.0004232	0.00002949	1.5871627	11.3033111	
0.00001000	6272.	627215776.	43.6730645	0.0004367	0.00001673	1.6309738	11.6298887	
0.00001063	6663.	627083451.	42.3761872	0.0004502	0.00000400	1.6744604	11.9571565	
0.00001125	7053.	626942633.	41.2255199	0.0004638	-0.00000871	1.7176203	12.2851134	
0.00001188	7443.	626786375.	40.1979142	0.0004774	-0.00002140	1.7604490	12.6137380	
0.00001250	7833.	626602336.	39.2747839	0.0004909	-0.00003407	1.8029394	12.9429842	
0.00001313	8221.	626380088.	38.4410715	0.0005045	-0.00004671	1.8450842	13.2728016	
0.00001375	8609.	626112489.	37.6844640	0.0005182	-0.00005934	1.8868765	13.6031426	
0.00001438	8996.	625795469.	36.9948033	0.0005318	-0.00007195	1.9283102	13.9339649	
0.00001500	9381.	625426990.	36.3636344	0.0005455	-0.00008455	1.9693799	14.2652310	
0.00001563	9766.	625006841.	35.7838685	0.0005591	-0.00009713	2.0100810	14.5969092	

Pier drilled shaft_row1

0.00001625	10149.	624535535.	35.2495125	0.0005728	-0.000110	2.0504091	14.9289703
0.00001688	10149.	601404589.	34.3584577	0.0005798	-0.000129	2.0706774	15.0671015 C
0.00001750	10160.	580573191.	33.8305356	0.0005920	-0.000143	2.1061654	15.3572218 C
0.00001813	10404.	574030722.	33.3318989	0.0006041	-0.000157	2.1409508	15.6435981 C
0.00001875	10640.	567460978.	32.8606444	0.0006161	-0.000171	2.1750989	15.9267878 C
0.00001938	10868.	560918861.	32.4146791	0.0006280	-0.000186	2.2086493	16.2071041 C
0.00002000	11088.	554417576.	31.9916654	0.0006398	-0.000200	2.2416116	16.4845660 C
0.00002063	11302.	547967739.	31.5895507	0.0006515	-0.000215	2.2739956	16.7591938 C
0.00002125	11509.	541589862.	31.2067329	0.0006631	-0.000229	2.3058230	17.0311367 C
0.00002188	11710.	535302257.	30.8418284	0.0006747	-0.000244	2.3371173	17.3005662 C
0.00002250	11904.	529085704.	30.4929604	0.0006861	-0.000259	2.3678617	17.5672318 C
0.00002313	12093.	522955425.	30.1590383	0.0006974	-0.000274	2.3980764	17.8312739 C
0.00002375	12278.	516948342.	29.8395949	0.0007087	-0.000289	2.4278133	18.0931836 C
0.00002438	12457.	511076585.	29.5338619	0.0007199	-0.000304	2.4571001	18.3532050 C
0.00002563	12803.	499632073.	28.9576908	0.0007420	-0.000334	2.5142220	18.8662278 C
0.00002688	13134.	488694087.	28.4257578	0.0007639	-0.000365	2.5696286	19.3719559 C
0.00002813	13450.	478235157.	27.9324688	0.0007856	-0.000396	2.6233780	19.8706387 C
0.00002938	13754.	468214158.	27.4727682	0.0008070	-0.000427	2.6754963	20.3621707 C
0.00003063	14047.	458668129.	27.0443000	0.0008282	-0.000458	2.7261477	20.8481126 C
0.00003188	14330.	449570803.	26.6437880	0.0008493	-0.000489	2.7753890	21.3288327 C
0.00003313	14604.	440879694.	26.2679437	0.0008701	-0.000521	2.8232362	21.8042121 C
0.00003438	14869.	432558158.	25.9139228	0.0008908	-0.000553	2.8697028	22.2740980 C
0.00003563	15127.	424611789.	25.5804425	0.0009113	-0.000585	2.9148949	22.7395384 C
0.00003688	15378.	417028439.	25.2660080	0.0009317	-0.000617	2.9588808	23.2011686 C
0.00003813	15623.	409796516.	24.9693869	0.0009520	-0.000649	3.0017300	23.6596973 C
0.00003938	15861.	402830114.	24.6868607	0.0009720	-0.000682	3.0432919	24.1128154 C
0.00004063	16095.	396175015.	24.4193379	0.0009920	-0.000714	3.0837737	24.5631262 C
0.00004188	16324.	389824973.	24.1662313	0.0010120	-0.000747	3.1232510	25.0115485 C
0.00004313	16546.	383684259.	23.9234486	0.0010317	-0.000780	3.1614949	25.4545318 C
0.00004438	16767.	377838457.	23.6940328	0.0010514	-0.000812	3.1988598	25.8971149 C
0.00004563	16981.	372183670.	23.4735695	0.0010710	-0.000845	3.2350669	26.3349105 C
0.00004688	17193.	366785753.	23.2645949	0.0010905	-0.000878	3.2704140	26.7723401 C
0.00004813	17400.	361560117.	23.0633617	0.0011099	-0.000911	3.3046599	27.2054230 C
0.00004938	17606.	356571941.	22.8726758	0.0011293	-0.000944	3.3381132	27.6390191 C
0.00005063	17806.	351720941.	22.6878612	0.0011486	-0.000978	3.3704399	28.0674101 C
0.00005188	18005.	347087266.	22.5127052	0.0011678	-0.001011	3.4020212	28.4969323 C
0.00005313	18200.	342588963.	22.3431689	0.0011870	-0.001044	3.4325673	28.9224135 C
0.00005438	18393.	338260173.	22.1810304	0.0012061	-0.001078	3.4622791	29.3472687 C
0.00005563	18584.	334098824.	22.0262249	0.0012252	-0.001111	3.4911958	29.7721980 C
0.00005688	18771.	330041295.	21.8753885	0.0012442	-0.001145	3.5190762	30.1924504 C

Pier drilled shaft_row1

0.00005813	18957.	326144100.	21.7316972	0.0012632	-0.001178	3.5462256	30.6138110	C
0.00005938	19141.	322379737.	21.5936851	0.0012821	-0.001212	3.5725558	31.0345323	C
0.00006063	19322.	318709664.	21.4591866	0.0013010	-0.001245	3.5979215	31.4514260	C
0.00006188	19501.	315174730.	21.3307375	0.0013198	-0.001279	3.6225611	31.8694235	C
0.00006313	19680.	311765867.	21.2079245	0.0013388	-0.001312	3.6464653	32.2884258	C
0.00006438	19855.	308425356.	21.0871552	0.0013575	-0.001346	3.6693736	32.7023393	C
0.00006563	20029.	305199857.	20.9715664	0.0013763	-0.001380	3.6915595	-33.225581	C
0.00006688	20202.	302082790.	20.8608715	0.0013951	-0.001414	3.7130185	-34.073128	C
0.00006813	20373.	299053355.	20.7537557	0.0014138	-0.001447	3.7336678	-34.921630	C
0.00006938	20541.	296093010.	20.6490220	0.0014325	-0.001481	3.7534383	-35.773105	C
0.00007063	20709.	293226099.	20.5485398	0.0014512	-0.001515	3.7724853	-36.623466	C
0.00007188	20876.	290447630.	20.4520912	0.0014700	-0.001549	3.7908042	-37.472704	C
0.00007313	21042.	287748660.	20.3591329	0.0014888	-0.001582	3.8083675	-38.321533	C
0.00007438	21204.	285097334.	20.2672637	0.0015074	-0.001616	3.8250265	-39.174754	C
0.00007938	21846.	275219212.	19.9331132	0.0015822	-0.001752	3.8843404	-42.577521	C
0.00008438	22465.	266252676.	19.6367130	0.0016568	-0.001887	3.9313335	-45.984824	C
0.00008938	23067.	258089798.	19.3754205	0.0017317	-0.002022	3.9662124	-49.387088	C
0.00009438	23652.	250618000.	19.1455825	0.0018069	-0.002157	3.9889313	-52.779040	C
0.00009938	24219.	243709511.	18.9396024	0.0018821	-0.002292	3.9992964	-56.168889	C
0.0001044	24770.	237314602.	18.7593315	0.0019580	-0.002426	3.9983886	-59.540655	C
0.0001094	25279.	231121515.	18.5942030	0.0020337	-0.002560	3.9998008	-60.000000	CY
0.0001144	25702.	224715992.	18.4324595	0.0021082	-0.002696	3.9981900	-60.000000	CY
0.0001194	26013.	217907189.	18.2679006	0.0021807	-0.002833	3.9988892	-60.000000	CY
0.0001244	26290.	211373501.	18.1106687	0.0022525	-0.002971	3.9992668	-60.000000	CY
0.0001294	26558.	205279869.	17.9705153	0.0023249	-0.003109	3.9993947	-60.000000	CY
0.0001344	26815.	199550297.	17.8440070	0.0023978	-0.003246	3.9993175	-60.000000	CY
0.0001394	27017.	193844497.	17.7134096	0.0024688	-0.003385	3.9988410	-60.000000	CY
0.0001444	27161.	188130435.	17.5810714	0.0025383	-0.003525	3.9976894	-60.000000	CY
0.0001494	27301.	182766207.	17.4605215	0.0026082	-0.003666	3.9998704	60.000000	CY
0.0001544	27431.	177693421.	17.3467629	0.0026779	-0.003806	3.9996013	60.000000	CY
0.0001594	27552.	172877210.	17.2437554	0.0027482	-0.003946	3.9980448	60.000000	CY
0.0001644	27666.	168311858.	17.1513674	0.0028193	-0.004084	3.9996931	60.000000	CY
0.0001694	27773.	163976375.	17.0686617	0.0028910	-0.004223	3.9991949	60.000000	CY
0.0001744	27875.	159856300.	16.9930524	0.0029632	-0.004361	3.9961804	60.000000	CY
0.0001794	27966.	155907986.	16.9233996	0.0030356	-0.004498	3.9996207	60.000000	CY
0.0001844	28049.	152132040.	16.8624715	0.0031090	-0.004635	3.9966028	60.000000	CYT
0.0001894	28116.	148465070.	16.8099085	0.0031834	-0.004770	3.9997381	60.000000	CYT
0.0001944	28167.	144908207.	16.7585988	0.0032575	-0.004906	3.9962863	60.000000	CYT
0.0001994	28199.	141437040.	16.7065668	0.0033309	-0.005043	3.9995134	60.000000	CYT
0.0002044	28214.	138050673.	16.6522607	0.0034033	-0.005180	3.9953352	60.000000	CYT

Pier drilled shaft_row1							
0.0002094	28227.	134817364.	16.6022174	0.0034761	-0.005318	3.9984588	60.0000000 CYT
0.0002144	28238.	131724092.	16.5526049	0.0035485	-0.005455	3.9999862	60.0000000 CYT
0.0002194	28247.	128761572.	16.5060793	0.0036210	-0.005593	3.9956881	60.0000000 CYT
0.0002244	28255.	125926713.	16.4627529	0.0036938	-0.005730	3.9989833	60.0000000 CYT
0.0002294	28262.	123211252.	16.4224141	0.0037669	-0.005867	3.9993607	60.0000000 CYT
0.0002344	28262.	120582745.	16.4296651	0.0038507	-0.005993	3.9967778	60.0000000 CYT

 Summary of Results for Nominal Moment Capacity for Section 2

Moment values interpolated at maximum compressive strain = 0.003
 or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain	Max. Tens. Strain
1	846.000	24468.207	0.00300000	-0.00604311
2	848.900	24492.681	0.00300000	-0.00603126
3	1018.000	25862.475	0.00300000	-0.00538771
4	1091.000	26423.057	0.00300000	-0.00513268
5	1102.000	26505.424	0.00300000	-0.00509529
6	1326.000	27921.224	0.00300000	-0.00443049

Note that the values of moment capacity in the table above are not factored by a strength reduction factor (phi-factor).

In ACI 318, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.75).

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318, or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Resist.	Nominal	Nominal	Ult. (Fac)	Ult. (Fac)	Bend. Stiff.
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Load No.	Factor	Pier drilled shaft_row1				at Ult Mom kip-in^2
		Ax. Thrust kips	Moment Cap in-kips	Ax. Thrust kips	Moment Cap in-kips	
1	0.65	846.000000	24468.	549.900000	15904.	268805135.
2	0.65	848.900000	24493.	551.785000	15920.	269261781.
3	0.65	1018.	25862.	661.700000	16811.	295891611.
4	0.65	1091.	26423.	709.150000	17175.	307114466.
5	0.65	1102.	26505.	716.300000	17229.	308768968.
6	0.65	1326.	27921.	861.900000	18149.	343771743.
1	0.75	846.000000	24468.	634.500000	18351.	236417865.
2	0.75	848.900000	24493.	636.675000	18370.	236739418.
3	0.75	1018.	25862.	763.500000	19397.	255298436.
4	0.75	1091.	26423.	818.250000	19817.	263099228.
5	0.75	1102.	26505.	826.500000	19879.	264269346.
6	0.75	1326.	27921.	994.500000	20941.	289388967.
1	0.90	846.000000	24468.	761.400000	22021.	194002021.
2	0.90	848.900000	24493.	764.010000	22043.	194261888.
3	0.90	1018.	25862.	916.200000	23276.	209435803.
4	0.90	1091.	26423.	981.900000	23781.	215723759.
5	0.90	1102.	26505.	991.800000	23855.	216656485.
6	0.90	1326.	27921.	1193.	25129.	232943601.

Layering Correction Equivalent Depths of Soil & Rock Layers

Layer No.	Top of Layer Below Pile Head ft	Equivalent Top Depth Below Grnd Surf ft	Same Layer Type As Layer Above	Layer is Rock or is Below Rock Layer	F0 Integral for Layer lbs	F1 Integral for Layer lbs
1	0.00	0.00	N.A.	No	0.00	265392.
2	6.0000	6.0000	No	Yes	N.A.	N.A.

Notes: The F0 integral of Layer n+1 equals the sum of the F0 and F1 integrals

Pier drilled shaft_row1

for Layer n. Layering correction equivalent depths are computed only for soil types with both shallow-depth and deep-depth expressions for peak lateral load transfer. These soil types are soft and stiff clays, non-liquefied sands, and cemented c-phi soil.

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 1

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 19020.0 lbs
 Applied moment at pile head = 3836400.0 in-lbs
 Axial thrust load on pile head = 848900.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	0.01785	3836400.	19020.	-3.70E-04	0.00	1.12E+12	-382.116	20556.	0.00
0.1600	0.01714	3872812.	18286.	-3.63E-04	0.00	1.12E+12	-382.044	42792.	0.00
0.3200	0.01645	3907804.	17553.	-3.57E-04	0.00	1.12E+12	-381.848	44567.	0.00
0.4800	0.01577	3941378.	16820.	-3.50E-04	0.00	1.12E+12	-381.526	46444.	0.00
0.6400	0.01511	3973534.	16088.	-3.43E-04	0.00	1.12E+12	-381.074	48432.	0.00
0.8000	0.01445	4004275.	15357.	-3.36E-04	0.00	1.12E+12	-380.489	50540.	0.00
0.9600	0.01382	4033602.	14627.	-3.29E-04	0.00	1.12E+12	-379.768	52778.	0.00
1.1200	0.01319	4061517.	13899.	-3.22E-04	0.00	1.12E+12	-378.908	55157.	0.00
1.2800	0.01258	4088024.	13172.	-3.15E-04	0.00	1.12E+12	-377.905	57689.	0.00
1.4400	0.01198	4113127.	12448.	-3.08E-04	0.00	1.12E+12	-376.755	60390.	0.00
1.6000	0.01139	4136829.	11726.	-3.01E-04	0.00	1.12E+12	-375.454	63274.	0.00
1.7600	0.01082	4159136.	11006.	-2.94E-04	0.00	1.12E+12	-373.998	66359.	0.00
1.9200	0.01026	4180053.	10290.	-2.87E-04	0.00	1.12E+12	-372.381	69665.	0.00
2.0800	0.00972	4199585.	9576.	-2.80E-04	0.00	1.12E+12	-370.598	73215.	0.00
2.2400	0.00919	4217739.	8867.	-2.73E-04	0.00	1.12E+12	-368.645	77035.	0.00
2.4000	0.00867	4234522.	8161.	-2.65E-04	0.00	1.12E+12	-366.515	81153.	0.00
2.5600	0.00817	4249943.	7460.	-2.58E-04	0.00	1.12E+12	-364.202	85604.	0.00

Pier drilled shaft_row1

2.7200	0.00768	4264008.	6763.	-2.51E-04	0.00	1.12E+12	-361.699	90426.	0.00
2.8800	0.00721	4276729.	6071.	-2.44E-04	0.00	1.12E+12	-358.997	95664.	0.00
3.0400	0.00674	4288114.	5384.	-2.36E-04	0.00	1.12E+12	-356.090	101371.	0.00
3.2000	0.00630	4298175.	4704.	-2.29E-04	0.00	1.12E+12	-352.966	107606.	0.00
3.3600	0.00587	4306923.	4029.	-2.22E-04	0.00	1.12E+12	-349.616	114442.	0.00
3.5200	0.00545	4314369.	3361.	-2.14E-04	0.00	1.12E+12	-346.029	121964.	0.00
3.6800	0.00504	4320528.	2701.	-2.07E-04	0.00	1.12E+12	-342.191	130273.	0.00
3.8400	0.00465	4325414.	2048.	-1.99E-04	0.00	1.12E+12	-338.088	139493.	0.00
4.0000	0.00428	4329041.	1403.	-1.92E-04	0.00	1.12E+12	-333.703	149771.	0.00
4.1600	0.00392	4331425.	766.4502	-1.84E-04	0.00	1.12E+12	-329.017	161291.	0.00
4.3200	0.00357	4332585.	139.5453	-1.77E-04	0.00	1.12E+12	-324.009	174280.	0.00
4.4800	0.00324	4332538.	-477.409	-1.70E-04	0.00	1.12E+12	-318.652	189022.	0.00
4.6400	0.00292	4331305.	-1084.	-1.62E-04	0.00	1.12E+12	-312.916	205882.	0.00
4.8000	0.00261	4328906.	-1679.	-1.55E-04	0.00	1.12E+12	-306.764	225332.	0.00
4.9600	0.00232	4325363.	-2261.	-1.47E-04	0.00	1.12E+12	-300.153	247996.	0.00
5.1200	0.00205	4320703.	-2831.	-1.40E-04	0.00	1.12E+12	-293.028	274715.	0.00
5.2800	0.00179	4314950.	-3386.	-1.33E-04	0.00	1.12E+12	-285.319	306659.	0.00
5.4400	0.00154	4308133.	-3926.	-1.25E-04	0.00	1.12E+12	-276.937	345499.	0.00
5.6000	0.00131	4300283.	-4449.	-1.18E-04	0.00	1.12E+12	-267.763	393718.	0.00
5.7600	0.00109	4291434.	-4953.	-1.10E-04	0.00	1.12E+12	-257.632	455190.	0.00
5.9200	8.82E-04	4281624.	-5422.	-1.03E-04	0.00	1.12E+12	-231.032	503071.	0.00
6.0800	6.91E-04	4270949.	-32586.	-9.32E-05	0.00	6.56E+11	-28065.	7.80E+07	0.00
6.2400	5.24E-04	4156797.	-81172.	-8.08E-05	0.00	6.56E+11	-22546.	8.26E+07	0.00
6.4000	3.81E-04	3959511.	-119411.	-6.89E-05	0.00	6.56E+11	-17286.	8.72E+07	0.00
6.5600	2.59E-04	3698484.	-147910.	-5.77E-05	0.00	6.56E+11	-12400.	9.18E+07	0.00
6.7200	1.59E-04	3391727.	-167471.	-4.74E-05	0.00	6.56E+11	-7976.	9.64E+07	0.00
6.8800	7.73E-05	3055551.	-179036.	-3.79E-05	0.00	6.56E+11	-4071.	1.01E+08	0.00
7.0400	1.31E-05	2704353.	-183635.	-2.95E-05	0.00	6.56E+11	-719.987	1.06E+08	0.00
7.2000	-3.60E-05	2350487.	-182342.	-2.21E-05	0.00	6.56E+11	2068.	1.10E+08	0.00
7.3600	-7.19E-05	2004232.	-176228.	-1.58E-05	0.00	6.56E+11	4301.	1.15E+08	0.00
7.5200	-9.65E-05	1673824.	-166333.	-1.04E-05	0.00	6.56E+11	6006.	1.20E+08	0.00
7.6800	-1.12E-04	1365549.	-153633.	-5.93E-06	0.00	6.56E+11	7222.	1.24E+08	0.00
7.8400	-1.19E-04	1083891.	-139023.	-2.35E-06	0.00	6.56E+11	7997.	1.29E+08	0.00
8.0000	-1.21E-04	831709.	-123296.	4.53E-07	0.00	6.56E+11	8385.	1.33E+08	0.00
8.1600	-1.18E-04	610435.	-107138.	2.56E-06	0.00	6.56E+11	8445.	1.38E+08	0.00
8.3200	-1.11E-04	420290.	-91125.	4.07E-06	0.00	6.56E+11	8235.	1.43E+08	0.00
8.4800	-1.02E-04	260502.	-75719.	5.06E-06	0.00	6.56E+11	7812.	1.47E+08	0.00
8.6400	-9.15E-05	129511.	-61278.	5.63E-06	0.00	6.56E+11	7231.	1.52E+08	0.00
8.8000	-8.03E-05	25175.	-48059.	5.86E-06	0.00	6.56E+11	6539.	1.56E+08	0.00
8.9600	-6.89E-05	-55055.	-36230.	5.82E-06	0.00	6.56E+11	5782.	1.61E+08	0.00

Pier drilled shaft_row1

9.1200	-5.79E-05	-113969.	-25881.	5.57E-06	0.00	6.56E+11	4998.	1.66E+08	0.00
9.2800	-4.76E-05	-154458.	-17035.	5.18E-06	0.00	6.56E+11	4217.	1.70E+08	0.00
9.4400	-3.80E-05	-179400.	-9660.	4.69E-06	0.00	6.56E+11	3465.	1.75E+08	0.00
9.6000	-2.95E-05	-191567.	-3681.	4.15E-06	0.00	6.56E+11	2762.	1.79E+08	0.00
9.7600	-2.21E-05	-193550.	1007.	3.58E-06	0.00	6.56E+11	2121.	1.84E+08	0.00
9.9200	-1.58E-05	-187711.	4534.	3.03E-06	0.00	6.56E+11	1552.	1.89E+08	0.00
10.0800	-1.05E-05	-176151.	7039.	2.49E-06	0.00	6.56E+11	1058.	1.93E+08	0.00
10.2400	-6.21E-06	-160691.	8669.	2.00E-06	0.00	6.56E+11	640.3328	1.98E+08	0.00
10.4000	-2.82E-06	-142869.	9569.	1.56E-06	0.00	6.56E+11	297.4655	2.03E+08	0.00
10.5600	-2.30E-07	-123950.	9879.	1.17E-06	0.00	6.56E+11	24.8623	2.07E+08	0.00
10.7200	1.66E-06	-104939.	9726.	8.33E-07	0.00	6.56E+11	-183.412	2.12E+08	0.00
10.8800	2.97E-06	-86604.	9229.	5.53E-07	0.00	6.56E+11	-334.371	2.16E+08	0.00
11.0400	3.78E-06	-69501.	8490.	3.24E-07	0.00	6.56E+11	-435.618	2.21E+08	0.00
11.2000	4.21E-06	-54003.	7597.	1.44E-07	0.00	6.56E+11	-494.935	2.26E+08	0.00
11.3600	4.34E-06	-40330.	6622.	5.69E-09	0.00	6.56E+11	-519.943	2.30E+08	0.00
11.5200	4.23E-06	-28573.	5626.	-9.51E-08	0.00	6.56E+11	-517.848	2.35E+08	0.00
11.6800	3.97E-06	-18725.	4654.	-1.64E-07	0.00	6.56E+11	-495.250	2.39E+08	0.00
11.8400	3.60E-06	-10703.	3738.	-2.07E-07	0.00	6.56E+11	-458.024	2.44E+08	0.00
12.0000	3.18E-06	-4369.	2904.	-2.29E-07	0.00	6.56E+11	-411.246	2.49E+08	0.00
12.1600	2.72E-06	449.4414	2164.	-2.35E-07	0.00	6.56E+11	-359.174	2.53E+08	0.00
12.3200	2.27E-06	3943.	1526.	-2.29E-07	0.00	6.56E+11	-305.267	2.58E+08	0.00
12.4800	1.84E-06	6312.	991.3014	-2.14E-07	0.00	6.56E+11	-252.225	2.63E+08	0.00
12.6400	1.45E-06	7751.	555.1888	-1.93E-07	0.00	6.56E+11	-202.059	2.67E+08	0.00
12.8000	1.10E-06	8444.	211.2926	-1.69E-07	0.00	6.56E+11	-156.166	2.72E+08	0.00
12.9600	8.02E-07	8563.	-49.433	-1.44E-07	0.00	6.56E+11	-115.423	2.76E+08	0.00
13.1200	5.48E-07	8255.	-237.295	-1.20E-07	0.00	6.56E+11	-80.267	2.81E+08	0.00
13.2800	3.41E-07	7652.	-363.109	-9.66E-08	0.00	6.56E+11	-50.789	2.86E+08	0.00
13.4400	1.77E-07	6861.	-437.603	-7.54E-08	0.00	6.56E+11	-26.810	2.90E+08	0.00
13.6000	5.18E-08	5972.	-470.980	-5.67E-08	0.00	6.56E+11	-7.958	2.95E+08	0.00
13.7600	-4.02E-08	5053.	-472.603	-4.05E-08	0.00	6.56E+11	6.2674	2.99E+08	0.00
13.9200	-1.04E-07	4157.	-450.802	-2.71E-08	0.00	6.56E+11	16.4420	3.04E+08	0.00
14.0800	-1.44E-07	3322.	-412.774	-1.61E-08	0.00	6.56E+11	23.1699	3.09E+08	0.00
14.2400	-1.66E-07	2572.	-364.565	-7.51E-09	0.00	6.56E+11	27.0480	3.13E+08	0.00
14.4000	-1.73E-07	1922.	-311.106	-9.42E-10	0.00	6.56E+11	28.6391	3.18E+08	0.00
14.5600	-1.69E-07	1377.	-256.298	3.88E-09	0.00	6.56E+11	28.4521	3.22E+08	0.00
14.7200	-1.58E-07	937.6308	-203.131	7.27E-09	0.00	6.56E+11	26.9302	3.27E+08	0.00
14.8800	-1.41E-07	597.2428	-153.812	9.51E-09	0.00	6.56E+11	24.4443	3.32E+08	0.00
15.0400	-1.22E-07	346.9634	-109.906	1.09E-08	0.00	6.56E+11	21.2912	3.36E+08	0.00
15.2000	-9.97E-08	175.1701	-72.478	1.17E-08	0.00	6.56E+11	17.6963	3.41E+08	0.00
15.3600	-7.68E-08	68.6115	-42.223	1.20E-08	0.00	6.56E+11	13.8191	3.46E+08	0.00

Pier drilled shaft_row1									
15.5200	-5.35E-08	12.9954	-19.585	1.21E-08	0.00	6.56E+11	9.7618	3.50E+08	0.00
15.6800	-3.02E-08	-6.635	-4.858	1.21E-08	0.00	6.56E+11	5.5792	3.55E+08	0.00
15.8400	-6.90E-09	-5.698	1.7381	1.21E-08	0.00	6.56E+11	1.2915	3.59E+08	0.00
16.0000	1.64E-08	0.00	0.00	1.21E-08	0.00	6.56E+11	-3.102	1.82E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 1:

Pile-head deflection = 0.01784551 inches
 Computed slope at pile head = -0.0003699 radians
 Maximum bending moment = 4332585. inch-lbs
 Maximum shear force = -183635. lbs
 Depth of maximum bending moment = 4.32000000 feet below pile head
 Depth of maximum shear force = 7.04000000 feet below pile head
 Number of iterations = 6
 Number of zero deflection points = 4

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 2

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 23990.0 lbs
 Applied moment at pile head = 5025600.0 in-lbs
 Axial thrust load on pile head = 1102000.0 lbs

Depth	Deflect.	Bending	Shear	Slope	Total	Bending	Soil Res.	Soil Spr.	Distrib.
X	y	Moment	Force	S	Stress	Stiffness	p	Es*H	Lat. Load
feet	inches	in-lbs	lbs	radians	psi*	lb-in^2	lb/inch	lb/inch	lb/inch

Pier drilled shaft_row1

0.00	0.02433	5025600.	23990.	-5.01E-04	0.00	1.10E+12	-412.877	16291.	0.00
0.1600	0.02338	5071950.	23197.	-4.92E-04	0.00	1.10E+12	-412.829	33906.	0.00
0.3200	0.02244	5116759.	22405.	-4.83E-04	0.00	1.10E+12	-412.648	35305.	0.00
0.4800	0.02152	5160029.	21613.	-4.74E-04	0.00	1.10E+12	-412.330	36784.	0.00
0.6400	0.02062	5201759.	20822.	-4.65E-04	0.00	1.10E+12	-411.873	38349.	0.00
0.8000	0.01974	5241951.	20031.	-4.56E-04	0.00	1.10E+12	-411.273	40009.	0.00
0.9600	0.01887	5280609.	19243.	-4.47E-04	0.00	1.10E+12	-410.526	41770.	0.00
1.1200	0.01802	5317733.	18455.	-4.37E-04	0.00	1.10E+12	-409.630	43642.	0.00
1.2800	0.01719	5353328.	17670.	-4.28E-04	0.00	1.10E+12	-408.579	45635.	0.00
1.4400	0.01638	5387396.	16886.	-4.19E-04	0.00	1.10E+12	-407.369	47759.	0.00
1.6000	0.01558	5419944.	16106.	-4.09E-04	0.00	1.10E+12	-405.997	50027.	0.00
1.7600	0.01481	5450974.	15327.	-4.00E-04	0.00	1.10E+12	-404.457	52452.	0.00
1.9200	0.01405	5480493.	14553.	-3.90E-04	0.00	1.10E+12	-402.743	55051.	0.00
2.0800	0.01331	5508508.	13781.	-3.81E-04	0.00	1.10E+12	-400.851	57841.	0.00
2.2400	0.01258	5535024.	13013.	-3.71E-04	0.00	1.10E+12	-398.774	60842.	0.00
2.4000	0.01188	5560050.	12250.	-3.61E-04	0.00	1.10E+12	-396.506	64077.	0.00
2.5600	0.01120	5583594.	11491.	-3.52E-04	0.00	1.10E+12	-394.040	67572.	0.00
2.7200	0.01053	5605665.	10737.	-3.42E-04	0.00	1.10E+12	-391.367	71359.	0.00
2.8800	0.00988	5626272.	9988.	-3.32E-04	0.00	1.10E+12	-388.480	75471.	0.00
3.0400	0.00925	5645426.	9246.	-3.22E-04	0.00	1.10E+12	-385.369	79950.	0.00
3.2000	0.00865	5663139.	8509.	-3.12E-04	0.00	1.10E+12	-382.024	84843.	0.00
3.3600	0.00805	5679422.	7779.	-3.03E-04	0.00	1.10E+12	-378.434	90207.	0.00
3.5200	0.00748	5694290.	7056.	-2.93E-04	0.00	1.10E+12	-374.586	96109.	0.00
3.6800	0.00693	5707756.	6341.	-2.83E-04	0.00	1.10E+12	-370.466	102628.	0.00
3.8400	0.00640	5719835.	5634.	-2.73E-04	0.00	1.10E+12	-366.059	109859.	0.00
4.0000	0.00588	5730543.	4935.	-2.63E-04	0.00	1.10E+12	-361.344	117921.	0.00
4.1600	0.00539	5739898.	4246.	-2.53E-04	0.00	1.10E+12	-356.303	126955.	0.00
4.3200	0.00491	5747919.	3567.	-2.43E-04	0.00	1.10E+12	-350.912	137141.	0.00
4.4800	0.00446	5754624.	2899.	-2.33E-04	0.00	1.10E+12	-345.141	148701.	0.00
4.6400	0.00402	5760036.	2242.	-2.23E-04	0.00	1.10E+12	-338.957	161921.	0.00
4.8000	0.00360	5764178.	1598.	-2.13E-04	0.00	1.10E+12	-332.322	177172.	0.00
4.9600	0.00320	5767073.	966.8547	-2.03E-04	0.00	1.10E+12	-325.187	194942.	0.00
5.1200	0.00282	5768748.	349.8819	-1.92E-04	0.00	1.10E+12	-317.493	215893.	0.00
5.2800	0.00246	5769231.	-251.708	-1.82E-04	0.00	1.10E+12	-309.163	240942.	0.00
5.4400	0.00212	5768553.	-836.601	-1.72E-04	0.00	1.10E+12	-300.101	271400.	0.00
5.6000	0.00180	5766748.	-1403.	-1.62E-04	0.00	1.10E+12	-290.177	309219.	0.00
5.7600	0.00150	5763851.	-1950.	-1.52E-04	0.00	1.10E+12	-279.213	357437.	0.00
5.9200	0.00122	5759904.	-2474.	-1.42E-04	0.00	1.10E+12	-266.949	421096.	0.00
6.0800	9.54E-04	5754952.	-39926.	-1.29E-04	0.00	6.41E+11	-38745.	7.80E+07	0.00

Pier drilled shaft_row1

6.2400	7.24E-04	5607134.	-107006.	-1.12E-04	0.00	6.41E+11	-31130.	8.26E+07	0.00
6.4000	5.26E-04	5344523.	-159810.	-9.51E-05	0.00	6.41E+11	-23874.	8.72E+07	0.00
6.5600	3.58E-04	4993867.	-199180.	-7.96E-05	0.00	6.41E+11	-17137.	9.18E+07	0.00
6.7200	2.20E-04	4580007.	-226228.	-6.53E-05	0.00	6.41E+11	-11038.	9.64E+07	0.00
6.8800	1.08E-04	4125426.	-242259.	-5.23E-05	0.00	6.41E+11	-5660.	1.01E+08	0.00
7.0400	1.90E-05	3649954.	-248698.	-4.06E-05	0.00	6.41E+11	-1048.	1.06E+08	0.00
7.2000	-4.85E-05	3170597.	-247031.	-3.04E-05	0.00	6.41E+11	2785.	1.10E+08	0.00
7.3600	-9.78E-05	2701485.	-238740.	-2.16E-05	0.00	6.41E+11	5851.	1.15E+08	0.00
7.5200	-1.32E-04	2253926.	-225262.	-1.42E-05	0.00	6.42E+11	8188.	1.20E+08	0.00
7.6800	-1.52E-04	1836538.	-207946.	-8.09E-06	0.00	6.42E+11	9850.	1.24E+08	0.00
7.8400	-1.63E-04	1455448.	-188021.	-3.17E-06	0.00	6.42E+11	10905.	1.29E+08	0.00
8.0000	-1.65E-04	1114549.	-166583.	6.76E-07	0.00	6.42E+11	11428.	1.33E+08	0.00
8.1600	-1.60E-04	815768.	-144573.	3.56E-06	0.00	6.42E+11	11500.	1.38E+08	0.00
8.3200	-1.51E-04	559374.	-122779.	5.62E-06	0.00	6.42E+11	11202.	1.43E+08	0.00
8.4800	-1.38E-04	344271.	-101837.	6.97E-06	0.00	6.42E+11	10614.	1.47E+08	0.00
8.6400	-1.24E-04	168292.	-82230.	7.74E-06	0.00	6.42E+11	9810.	1.52E+08	0.00
8.8000	-1.09E-04	28474.	-64310.	8.03E-06	0.00	6.42E+11	8857.	1.56E+08	0.00
8.9600	-9.32E-05	-78692.	-48302.	7.96E-06	0.00	6.42E+11	7818.	1.61E+08	0.00
9.1200	-7.82E-05	-157037.	-34323.	7.61E-06	0.00	6.42E+11	6743.	1.66E+08	0.00
9.2800	-6.40E-05	-210524.	-22401.	7.06E-06	0.00	6.42E+11	5676.	1.70E+08	0.00
9.4400	-5.11E-05	-243087.	-12488.	6.38E-06	0.00	6.42E+11	4650.	1.75E+08	0.00
9.6000	-3.95E-05	-258505.	-4478.	5.63E-06	0.00	6.42E+11	3694.	1.79E+08	0.00
9.7600	-2.94E-05	-260306.	1779.	4.85E-06	0.00	6.42E+11	2824.	1.84E+08	0.00
9.9200	-2.09E-05	-251695.	6460.	4.09E-06	0.00	6.42E+11	2052.	1.89E+08	0.00
10.0800	-1.38E-05	-235517.	9760.	3.36E-06	0.00	6.42E+11	1385.	1.93E+08	0.00
10.2400	-7.99E-06	-214231.	11881.	2.68E-06	0.00	6.42E+11	823.8474	1.98E+08	0.00
10.4000	-3.45E-06	-189906.	13022.	2.08E-06	0.00	6.42E+11	364.3634	2.03E+08	0.00
10.5600	-7.39E-09	-164236.	13372.	1.55E-06	0.00	6.42E+11	0.7969	2.07E+08	0.00
10.7200	2.50E-06	-138563.	13109.	1.10E-06	0.00	6.42E+11	-275.255	2.12E+08	0.00
10.8800	4.20E-06	-113903.	12390.	7.19E-07	0.00	6.42E+11	-473.613	2.16E+08	0.00
11.0400	5.25E-06	-90989.	11355.	4.12E-07	0.00	6.42E+11	-604.848	2.21E+08	0.00
11.2000	5.78E-06	-70303.	10121.	1.71E-07	0.00	6.42E+11	-679.713	2.26E+08	0.00
11.3600	5.91E-06	-52123.	8788.	-1.25E-08	0.00	6.42E+11	-708.689	2.30E+08	0.00
11.5200	5.74E-06	-36556.	7435.	-1.45E-07	0.00	6.42E+11	-701.641	2.35E+08	0.00
11.6800	5.35E-06	-23574.	6120.	-2.35E-07	0.00	6.42E+11	-667.565	2.39E+08	0.00
11.8400	4.83E-06	-13053.	4889.	-2.90E-07	0.00	6.42E+11	-614.428	2.44E+08	0.00
12.0000	4.24E-06	-4797.	3772.	-3.17E-07	0.00	6.42E+11	-549.083	2.49E+08	0.00
12.1600	3.62E-06	1434.	2787.	-3.22E-07	0.00	6.42E+11	-477.246	2.53E+08	0.00
12.3200	3.00E-06	5907.	1942.	-3.11E-07	0.00	6.42E+11	-403.528	2.58E+08	0.00
12.4800	2.42E-06	8891.	1236.	-2.89E-07	0.00	6.42E+11	-331.502	2.63E+08	0.00

Pier drilled shaft_row1									
12.6400	1.90E-06	10654.	664.5142	-2.59E-07	0.00	6.42E+11	-263.799	2.67E+08	0.00
12.8000	1.43E-06	11444.	217.1364	-2.26E-07	0.00	6.42E+11	-202.220	2.72E+08	0.00
12.9600	1.03E-06	11489.	-118.939	-1.92E-07	0.00	6.42E+11	-147.859	2.76E+08	0.00
13.1200	6.92E-07	10988.	-358.062	-1.58E-07	0.00	6.42E+11	-101.228	2.81E+08	0.00
13.2800	4.19E-07	10115.	-515.120	-1.27E-07	0.00	6.42E+11	-62.375	2.86E+08	0.00
13.4400	2.05E-07	9011.	-604.757	-9.81E-08	0.00	6.42E+11	-30.997	2.90E+08	0.00
13.6000	4.26E-08	7793.	-640.790	-7.30E-08	0.00	6.42E+11	-6.538	2.95E+08	0.00
13.7600	-7.52E-08	6551.	-635.815	-5.15E-08	0.00	6.42E+11	11.7199	2.99E+08	0.00
13.9200	-1.55E-07	5351.	-600.963	-3.37E-08	0.00	6.42E+11	24.5836	3.04E+08	0.00
14.0800	-2.05E-07	4243.	-545.789	-1.94E-08	0.00	6.42E+11	32.8896	3.09E+08	0.00
14.2400	-2.30E-07	3256.	-478.258	-8.13E-09	0.00	6.42E+11	37.4554	3.13E+08	0.00
14.4000	-2.36E-07	2406.	-404.818	3.37E-10	0.00	6.42E+11	39.0444	3.18E+08	0.00
14.5600	-2.28E-07	1701.	-330.528	6.48E-09	0.00	6.42E+11	38.3412	3.22E+08	0.00
14.7200	-2.11E-07	1137.	-259.221	1.07E-08	0.00	6.42E+11	35.9365	3.27E+08	0.00
14.8800	-1.87E-07	705.7454	-193.695	1.35E-08	0.00	6.42E+11	32.3197	3.32E+08	0.00
15.0400	-1.59E-07	393.3915	-135.906	1.51E-08	0.00	6.42E+11	27.8779	3.36E+08	0.00
15.2000	-1.29E-07	183.8042	-87.158	1.60E-08	0.00	6.42E+11	22.9006	3.41E+08	0.00
15.3600	-9.77E-08	58.6366	-48.289	1.64E-08	0.00	6.42E+11	17.5882	3.46E+08	0.00
15.5200	-6.61E-08	-1.694	-19.823	1.64E-08	0.00	6.42E+11	12.0642	3.50E+08	0.00
15.6800	-3.46E-08	-17.552	-2.106	1.64E-08	0.00	6.42E+11	6.3903	3.55E+08	0.00
15.8400	-3.12E-09	-9.852	4.5888	1.64E-08	0.00	6.42E+11	0.5836	3.59E+08	0.00
16.0000	2.83E-08	0.00	0.00	1.64E-08	0.00	6.42E+11	-5.364	1.82E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 2:

Pile-head deflection = 0.02433000 inches
 Computed slope at pile head = -0.0005007 radians
 Maximum bending moment = 5769231. inch-lbs
 Maximum shear force = -248698. lbs
 Depth of maximum bending moment = 5.28000000 feet below pile head
 Depth of maximum shear force = 7.04000000 feet below pile head
 Number of iterations = 6

Number of zero deflection points =

4

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 3

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 10160.0 lbs
 Applied moment at pile head = 4451400.0 in-lbs
 Axial thrust load on pile head = 1018000.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	0.01831	4451400.	10160.	-3.91E-04	0.00	1.11E+12	-384.575	20164.	0.00
0.1600	0.01757	4470956.	9422.	-3.84E-04	0.00	1.11E+12	-384.384	42016.	0.00
0.3200	0.01684	4489079.	8684.	-3.76E-04	0.00	1.11E+12	-384.069	43799.	0.00
0.4800	0.01612	4505772.	7947.	-3.68E-04	0.00	1.11E+12	-383.626	45686.	0.00
0.6400	0.01542	4521035.	7211.	-3.60E-04	0.00	1.11E+12	-383.053	47686.	0.00
0.8000	0.01474	4534870.	6476.	-3.52E-04	0.00	1.11E+12	-382.348	49807.	0.00
0.9600	0.01407	4547281.	5743.	-3.44E-04	0.00	1.11E+12	-381.506	52061.	0.00
1.1200	0.01342	4558270.	5011.	-3.37E-04	0.00	1.11E+12	-380.525	54457.	0.00
1.2800	0.01278	4567841.	4282.	-3.29E-04	0.00	1.11E+12	-379.401	57010.	0.00
1.4400	0.01215	4575998.	3555.	-3.21E-04	0.00	1.11E+12	-378.131	59734.	0.00
1.6000	0.01155	4582745.	2830.	-3.13E-04	0.00	1.11E+12	-376.709	62644.	0.00
1.7600	0.01095	4588088.	2108.	-3.05E-04	0.00	1.11E+12	-375.133	65759.	0.00
1.9200	0.01038	4592032.	1390.	-2.97E-04	0.00	1.11E+12	-373.397	69099.	0.00
2.0800	0.00981	4594585.	674.5889	-2.89E-04	0.00	1.11E+12	-371.496	72688.	0.00
2.2400	0.00927	4595752.	-36.694	-2.81E-04	0.00	1.11E+12	-369.424	76550.	0.00
2.4000	0.00873	4595542.	-743.832	-2.73E-04	0.00	1.11E+12	-367.177	80717.	0.00
2.5600	0.00822	4593963.	-1446.	-2.65E-04	0.00	1.11E+12	-364.748	85223.	0.00
2.7200	0.00772	4591024.	-2144.	-2.57E-04	0.00	1.11E+12	-362.129	90107.	0.00
2.8800	0.00723	4586734.	-2837.	-2.49E-04	0.00	1.11E+12	-359.314	95415.	0.00
3.0400	0.00676	4581104.	-3524.	-2.41E-04	0.00	1.11E+12	-356.293	101200.	0.00
3.2000	0.00630	4574145.	-4205.	-2.33E-04	0.00	1.11E+12	-353.058	107525.	0.00

Pier drilled shaft_row1

3.3600	0.00586	4565869.	-4879.	-2.25E-04	0.00	1.11E+12	-349.599	114463.	0.00
3.5200	0.00544	4556289.	-5547.	-2.17E-04	0.00	1.11E+12	-345.903	122101.	0.00
3.6800	0.00503	4545418.	-6207.	-2.09E-04	0.00	1.11E+12	-341.959	130543.	0.00
3.8400	0.00463	4533271.	-6860.	-2.02E-04	0.00	1.11E+12	-337.751	139916.	0.00
4.0000	0.00426	4519864.	-7504.	-1.94E-04	0.00	1.11E+12	-333.263	150371.	0.00
4.1600	0.00389	4505213.	-8139.	-1.86E-04	0.00	1.11E+12	-328.476	162097.	0.00
4.3200	0.00354	4489336.	-8765.	-1.78E-04	0.00	1.11E+12	-323.368	175326.	0.00
4.4800	0.00321	4472251.	-9381.	-1.70E-04	0.00	1.11E+12	-317.912	190352.	0.00
4.6400	0.00289	4453979.	-9986.	-1.63E-04	0.00	1.11E+12	-312.080	207551.	0.00
4.8000	0.00258	4434542.	-10579.	-1.55E-04	0.00	1.11E+12	-305.833	227409.	0.00
4.9600	0.00229	4413963.	-11160.	-1.47E-04	0.00	1.11E+12	-299.126	250572.	0.00
5.1200	0.00202	4392265.	-11727.	-1.40E-04	0.00	1.11E+12	-291.905	277914.	0.00
5.2800	0.00176	4369477.	-12280.	-1.32E-04	0.00	1.11E+12	-284.097	310649.	0.00
5.4400	0.00151	4345627.	-12817.	-1.24E-04	0.00	1.11E+12	-275.613	350522.	0.00
5.6000	0.00128	4320746.	-13337.	-1.17E-04	0.00	1.11E+12	-266.328	400139.	0.00
5.7600	0.00106	4294868.	-13839.	-1.09E-04	0.00	1.11E+12	-256.073	463581.	0.00
5.9200	8.58E-04	4268032.	-14300.	-1.02E-04	0.00	1.11E+12	-224.680	503071.	0.00
6.0800	6.69E-04	4240353.	-40591.	-9.21E-05	0.00	6.46E+11	-27162.	7.80E+07	0.00
6.2400	5.04E-04	4112522.	-87483.	-7.97E-05	0.00	6.46E+11	-21684.	8.26E+07	0.00
6.4000	3.63E-04	3904731.	-124120.	-6.77E-05	0.00	6.46E+11	-16480.	8.72E+07	0.00
6.5600	2.44E-04	3636167.	-151137.	-5.65E-05	0.00	6.46E+11	-11663.	9.18E+07	0.00
6.7200	1.46E-04	3324585.	-169358.	-4.62E-05	0.00	6.46E+11	-7317.	9.64E+07	0.00
6.8800	6.64E-05	2986012.	-179739.	-3.68E-05	0.00	6.46E+11	-3496.	1.01E+08	0.00
7.0400	4.23E-06	2634531.	-183319.	-2.85E-05	0.00	6.46E+11	-232.565	1.06E+08	0.00
7.2000	-4.30E-05	2282179.	-181173.	-2.12E-05	0.00	6.47E+11	2467.	1.10E+08	0.00
7.3600	-7.71E-05	1938908.	-174374.	-1.49E-05	0.00	6.47E+11	4615.	1.15E+08	0.00
7.5200	-1.00E-04	1612639.	-163954.	-9.64E-06	0.00	6.47E+11	6239.	1.20E+08	0.00
7.6800	-1.14E-04	1309361.	-150881.	-5.30E-06	0.00	6.47E+11	7379.	1.24E+08	0.00
7.8400	-1.21E-04	1033278.	-136034.	-1.83E-06	0.00	6.47E+11	8086.	1.29E+08	0.00
8.0000	-1.21E-04	786999.	-120192.	8.77E-07	0.00	6.47E+11	8415.	1.33E+08	0.00
8.1600	-1.17E-04	571736.	-104027.	2.89E-06	0.00	6.47E+11	8424.	1.38E+08	0.00
8.3200	-1.10E-04	387525.	-88095.	4.32E-06	0.00	6.47E+11	8172.	1.43E+08	0.00
8.4800	-1.01E-04	233436.	-72842.	5.24E-06	0.00	6.47E+11	7716.	1.47E+08	0.00
8.6400	-8.99E-05	107792.	-58609.	5.75E-06	0.00	6.47E+11	7110.	1.52E+08	0.00
8.8000	-7.86E-05	8357.	-45637.	5.92E-06	0.00	6.47E+11	6402.	1.56E+08	0.00
8.9600	-6.72E-05	-67477.	-34080.	5.83E-06	0.00	6.47E+11	5636.	1.61E+08	0.00
9.1200	-5.62E-05	-122534.	-24016.	5.55E-06	0.00	6.47E+11	4848.	1.66E+08	0.00
9.2800	-4.59E-05	-159719.	-15455.	5.13E-06	0.00	6.47E+11	4069.	1.70E+08	0.00
9.4400	-3.65E-05	-181902.	-8358.	4.62E-06	0.00	6.47E+11	3324.	1.75E+08	0.00
9.6000	-2.81E-05	-191831.	-2642.	4.07E-06	0.00	6.47E+11	2630.	1.79E+08	0.00

Pier drilled shaft_row1

9.7600	-2.09E-05	-192062.	1805.	3.50E-06	0.00	6.47E+11	2001.	1.84E+08	0.00
9.9200	-1.47E-05	-184914.	5114.	2.94E-06	0.00	6.47E+11	1445.	1.89E+08	0.00
10.0800	-9.59E-06	-172437.	7428.	2.41E-06	0.00	6.47E+11	965.6749	1.93E+08	0.00
10.2400	-5.46E-06	-156399.	8896.	1.92E-06	0.00	6.47E+11	562.8053	1.98E+08	0.00
10.4000	-2.22E-06	-138285.	9661.	1.48E-06	0.00	6.47E+11	234.1471	2.03E+08	0.00
10.5600	2.32E-07	-119307.	9861.	1.10E-06	0.00	6.47E+11	-25.015	2.07E+08	0.00
10.7200	2.00E-06	-100421.	9625.	7.73E-07	0.00	6.47E+11	-220.932	2.12E+08	0.00
10.8800	3.20E-06	-82349.	9067.	5.02E-07	0.00	6.47E+11	-360.836	2.16E+08	0.00
11.0400	3.93E-06	-65606.	8286.	2.82E-07	0.00	6.47E+11	-452.460	2.21E+08	0.00
11.2000	4.29E-06	-50531.	7368.	1.10E-07	0.00	6.47E+11	-503.637	2.26E+08	0.00
11.3600	4.35E-06	-37313.	6384.	-2.05E-08	0.00	6.47E+11	-521.975	2.30E+08	0.00
11.5200	4.21E-06	-26018.	5389.	-1.14E-07	0.00	6.47E+11	-514.616	2.35E+08	0.00
11.6800	3.91E-06	-16620.	4426.	-1.78E-07	0.00	6.47E+11	-488.058	2.39E+08	0.00
11.8400	3.52E-06	-9021.	3527.	-2.16E-07	0.00	6.47E+11	-448.042	2.44E+08	0.00
12.0000	3.08E-06	-3074.	2714.	-2.34E-07	0.00	6.47E+11	-399.496	2.49E+08	0.00
12.1600	2.63E-06	1400.	1998.	-2.36E-07	0.00	6.47E+11	-346.523	2.53E+08	0.00
12.3200	2.18E-06	4597.	1384.	-2.27E-07	0.00	6.47E+11	-292.422	2.58E+08	0.00
12.4800	1.75E-06	6716.	873.2339	-2.11E-07	0.00	6.47E+11	-239.744	2.63E+08	0.00
12.6400	1.37E-06	7951.	460.3370	-1.89E-07	0.00	6.47E+11	-190.357	2.67E+08	0.00
12.8000	1.03E-06	8484.	137.8805	-1.64E-07	0.00	6.47E+11	-145.535	2.72E+08	0.00
12.9600	7.37E-07	8481.	-103.634	-1.39E-07	0.00	6.47E+11	-106.042	2.76E+08	0.00
13.1200	4.94E-07	8087.	-274.769	-1.15E-07	0.00	6.47E+11	-72.224	2.81E+08	0.00
13.2800	2.96E-07	7426.	-386.435	-9.16E-08	0.00	6.47E+11	-44.095	2.86E+08	0.00
13.4400	1.42E-07	6603.	-449.328	-7.08E-08	0.00	6.47E+11	-21.418	2.90E+08	0.00
13.6000	2.46E-08	5701.	-473.517	-5.25E-08	0.00	6.47E+11	-3.779	2.95E+08	0.00
13.7600	-6.00E-08	4785.	-468.164	-3.70E-08	0.00	6.47E+11	9.3544	2.99E+08	0.00
13.9200	-1.17E-07	3904.	-441.353	-2.41E-08	0.00	6.47E+11	18.5739	3.04E+08	0.00
14.0800	-1.52E-07	3091.	-400.011	-1.37E-08	0.00	6.47E+11	24.4910	3.09E+08	0.00
14.2400	-1.70E-07	2368.	-349.906	-5.57E-09	0.00	6.47E+11	27.7018	3.13E+08	0.00
14.4000	-1.74E-07	1747.	-295.701	5.44E-10	0.00	6.47E+11	28.7614	3.18E+08	0.00
14.5600	-1.68E-07	1232.	-241.050	4.97E-09	0.00	6.47E+11	28.1670	3.22E+08	0.00
14.7200	-1.55E-07	821.3131	-188.717	8.02E-09	0.00	6.47E+11	26.3469	3.27E+08	0.00
14.8800	-1.37E-07	507.5219	-140.715	9.99E-09	0.00	6.47E+11	23.6551	3.32E+08	0.00
15.0400	-1.16E-07	280.9298	-98.449	1.12E-08	0.00	6.47E+11	20.3712	3.36E+08	0.00
15.2000	-9.41E-08	129.4323	-62.858	1.18E-08	0.00	6.47E+11	16.7037	3.41E+08	0.00
15.3600	-7.11E-08	39.5107	-34.537	1.20E-08	0.00	6.47E+11	12.7967	3.46E+08	0.00
15.5200	-4.79E-08	-3.237	-13.864	1.21E-08	0.00	6.47E+11	8.7382	3.50E+08	0.00
15.6800	-2.47E-08	-13.773	-1.086	1.20E-08	0.00	6.47E+11	4.5717	3.55E+08	0.00
15.8400	-1.65E-09	-7.455	3.5990	1.20E-08	0.00	6.47E+11	0.3086	3.59E+08	0.00
16.0000	2.14E-08	0.00	0.00	1.20E-08	0.00	6.47E+11	-4.057	1.82E+08	0.00

Pier drilled shaft_row1

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 3:

Pile-head deflection = 0.01830928 inches
 Computed slope at pile head = -0.0003913 radians
 Maximum bending moment = 4595752. inch-lbs
 Maximum shear force = -183319. lbs
 Depth of maximum bending moment = 2.24000000 feet below pile head
 Depth of maximum shear force = 7.04000000 feet below pile head
 Number of iterations = 6
 Number of zero deflection points = 4

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 4

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 13670.0 lbs
 Applied moment at pile head = 5995200.0 in-lbs
 Axial thrust load on pile head = 1326000.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in ²	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	0.02610	5995200.	13670.	-5.52E-04	0.00	1.08E+12	-420.182	15456.	0.00
0.1600	0.02505	6022063.	12863.	-5.41E-04	0.00	1.08E+12	-420.019	32194.	0.00
0.3200	0.02402	6047351.	12057.	-5.31E-04	0.00	1.08E+12	-419.721	33549.	0.00

Pier drilled shaft_row1

0.4800	0.02301	6071065.	11252.	-5.20E-04	0.00	1.08E+12	-419.285	34983.	0.00
0.6400	0.02202	6093205.	10447.	-5.09E-04	0.00	1.08E+12	-418.708	36501.	0.00
0.8000	0.02106	6113774.	9644.	-4.98E-04	0.00	1.08E+12	-417.986	38111.	0.00
0.9600	0.02011	6132775.	8842.	-4.87E-04	0.00	1.08E+12	-417.115	39821.	0.00
1.1200	0.01919	6150210.	8043.	-4.76E-04	0.00	1.08E+12	-416.093	41639.	0.00
1.2800	0.01828	6166084.	7245.	-4.66E-04	0.00	1.08E+12	-414.915	43575.	0.00
1.4400	0.01740	6180400.	6449.	-4.55E-04	0.00	1.08E+12	-413.577	45639.	0.00
1.6000	0.01654	6193164.	5657.	-4.44E-04	0.00	1.08E+12	-412.075	47845.	0.00
1.7600	0.01570	6204381.	4867.	-4.33E-04	0.00	1.08E+12	-410.403	50204.	0.00
1.9200	0.01488	6214057.	4081.	-4.22E-04	0.00	1.08E+12	-408.556	52733.	0.00
2.0800	0.01408	6222199.	3299.	-4.11E-04	0.00	1.08E+12	-406.529	55450.	0.00
2.2400	0.01330	6228814.	2520.	-4.00E-04	0.00	1.08E+12	-404.316	58373.	0.00
2.4000	0.01254	6233910.	1746.	-3.88E-04	0.00	1.08E+12	-401.910	61525.	0.00
2.5600	0.01181	6237497.	976.9708	-3.77E-04	0.00	1.08E+12	-399.305	64933.	0.00
2.7200	0.01109	6239584.	213.0056	-3.66E-04	0.00	1.08E+12	-396.492	68626.	0.00
2.8800	0.01040	6240181.	-545.352	-3.55E-04	0.00	1.08E+12	-393.463	72638.	0.00
3.0400	0.00973	6239299.	-1298.	-3.44E-04	0.00	1.08E+12	-390.209	77010.	0.00
3.2000	0.00908	6236950.	-2044.	-3.33E-04	0.00	1.08E+12	-386.720	81789.	0.00
3.3600	0.00845	6233148.	-2782.	-3.22E-04	0.00	1.08E+12	-382.983	87030.	0.00
3.5200	0.00784	6227906.	-3514.	-3.11E-04	0.00	1.08E+12	-378.987	92798.	0.00
3.6800	0.00725	6221239.	-4237.	-3.00E-04	0.00	1.08E+12	-374.718	99172.	0.00
3.8400	0.00669	6213162.	-4953.	-2.89E-04	0.00	1.08E+12	-370.158	106248.	0.00
4.0000	0.00614	6203692.	-5659.	-2.78E-04	0.00	1.08E+12	-365.290	114139.	0.00
4.1600	0.00562	6192848.	-6355.	-2.67E-04	0.00	1.08E+12	-360.093	122987.	0.00
4.3200	0.00512	6180649.	-7041.	-2.56E-04	0.00	1.08E+12	-354.542	132969.	0.00
4.4800	0.00464	6167115.	-7716.	-2.45E-04	0.00	1.08E+12	-348.608	144305.	0.00
4.6400	0.00418	6152267.	-8379.	-2.34E-04	0.00	1.08E+12	-342.258	157279.	0.00
4.8000	0.00374	6136131.	-9030.	-2.23E-04	0.00	1.08E+12	-335.451	172257.	0.00
4.9600	0.00332	6118730.	-9667.	-2.12E-04	0.00	1.08E+12	-328.138	189727.	0.00
5.1200	0.00292	6100091.	-10289.	-2.02E-04	0.00	1.08E+12	-320.257	210348.	0.00
5.2800	0.00255	6080245.	-10896.	-1.91E-04	0.00	1.08E+12	-311.730	235035.	0.00
5.4400	0.00219	6059222.	-11486.	-1.80E-04	0.00	1.08E+12	-302.457	265105.	0.00
5.6000	0.00186	6037057.	-12057.	-1.69E-04	0.00	1.08E+12	-292.302	302521.	0.00
5.7600	0.00154	6013786.	-12607.	-1.59E-04	0.00	1.08E+12	-281.078	350364.	0.00
5.9200	0.00125	5989453.	-13135.	-1.48E-04	0.00	1.08E+12	-268.513	413775.	0.00
6.0800	9.72E-04	5964103.	-51296.	-1.34E-04	0.00	6.27E+11	-39483.	7.80E+07	0.00
6.2400	7.33E-04	5793155.	-119478.	-1.16E-04	0.00	6.27E+11	-31539.	8.26E+07	0.00
6.4000	5.28E-04	5505896.	-172789.	-9.83E-05	0.00	6.27E+11	-23993.	8.72E+07	0.00
6.5600	3.56E-04	5130145.	-212152.	-8.20E-05	0.00	6.28E+11	-17010.	9.18E+07	0.00
6.7200	2.13E-04	4691649.	-238765.	-6.70E-05	0.00	6.28E+11	-10712.	9.64E+07	0.00

Pier drilled shaft_row1

6.8800	9.84E-05	4213628.	-254020.	-5.34E-05	0.00	6.28E+11	-5179.	1.01E+08	0.00
7.0400	8.29E-06	3716484.	-259430.	-4.12E-05	0.00	6.28E+11	-456.393	1.06E+08	0.00
7.2000	-6.00E-05	3217628.	-256560.	-3.06E-05	0.00	6.28E+11	3446.	1.10E+08	0.00
7.3600	-1.09E-04	2731449.	-246968.	-2.16E-05	0.00	6.28E+11	6546.	1.15E+08	0.00
7.5200	-1.43E-04	2269380.	-232154.	-1.39E-05	0.00	6.28E+11	8885.	1.20E+08	0.00
7.6800	-1.63E-04	1840047.	-213522.	-7.63E-06	0.00	6.28E+11	10524.	1.24E+08	0.00
7.8400	-1.72E-04	1449495.	-192346.	-2.60E-06	0.00	6.28E+11	11535.	1.29E+08	0.00
8.0000	-1.73E-04	1101453.	-169753.	1.30E-06	0.00	6.28E+11	11999.	1.33E+08	0.00
8.1600	-1.67E-04	797636.	-146711.	4.20E-06	0.00	6.28E+11	12003.	1.38E+08	0.00
8.3200	-1.57E-04	538060.	-124023.	6.24E-06	0.00	6.28E+11	11631.	1.43E+08	0.00
8.4800	-1.43E-04	321357.	-102328.	7.56E-06	0.00	6.28E+11	10968.	1.47E+08	0.00
8.6400	-1.28E-04	145081.	-82113.	8.27E-06	0.00	6.28E+11	10090.	1.52E+08	0.00
8.8000	-1.11E-04	5999.	-63722.	8.50E-06	0.00	6.28E+11	9068.	1.56E+08	0.00
8.9600	-9.50E-05	-99653.	-47370.	8.36E-06	0.00	6.28E+11	7965.	1.61E+08	0.00
9.1200	-7.92E-05	-175942.	-33162.	7.94E-06	0.00	6.28E+11	6835.	1.66E+08	0.00
9.2800	-6.45E-05	-227034.	-21110.	7.32E-06	0.00	6.28E+11	5720.	1.70E+08	0.00
9.4400	-5.11E-05	-257040.	-11150.	6.58E-06	0.00	6.28E+11	4655.	1.75E+08	0.00
9.6000	-3.92E-05	-269883.	-3160.	5.77E-06	0.00	6.28E+11	3667.	1.79E+08	0.00
9.7600	-2.89E-05	-269205.	3024.	4.95E-06	0.00	6.28E+11	2774.	1.84E+08	0.00
9.9200	-2.02E-05	-258296.	7595.	4.14E-06	0.00	6.28E+11	1987.	1.89E+08	0.00
10.0800	-1.30E-05	-240060.	10762.	3.38E-06	0.00	6.28E+11	1311.	1.93E+08	0.00
10.2400	-7.23E-06	-216989.	12735.	2.68E-06	0.00	6.28E+11	745.0701	1.98E+08	0.00
10.4000	-2.71E-06	-191169.	13725.	2.06E-06	0.00	6.28E+11	285.7516	2.03E+08	0.00
10.5600	6.88E-07	-164295.	13928.	1.52E-06	0.00	6.28E+11	-74.241	2.07E+08	0.00
10.7200	3.12E-06	-137693.	13526.	1.06E-06	0.00	6.28E+11	-344.215	2.12E+08	0.00
10.8800	4.75E-06	-112359.	12682.	6.74E-07	0.00	6.28E+11	-534.816	2.16E+08	0.00
11.0400	5.71E-06	-88996.	11538.	3.67E-07	0.00	6.28E+11	-657.329	2.21E+08	0.00
11.2000	6.15E-06	-68055.	10213.	1.27E-07	0.00	6.28E+11	-723.115	2.26E+08	0.00
11.3600	6.20E-06	-49780.	8805.	-5.33E-08	0.00	6.28E+11	-743.141	2.30E+08	0.00
11.5200	5.95E-06	-34243.	7393.	-1.82E-07	0.00	6.28E+11	-727.649	2.35E+08	0.00
11.6800	5.50E-06	-21389.	6036.	-2.67E-07	0.00	6.28E+11	-685.902	2.39E+08	0.00
11.8400	4.92E-06	-11063.	4777.	-3.16E-07	0.00	6.28E+11	-626.041	2.44E+08	0.00
12.0000	4.29E-06	-3044.	3643.	-3.38E-07	0.00	6.28E+11	-555.008	2.49E+08	0.00
12.1600	3.63E-06	2928.	2651.	-3.38E-07	0.00	6.28E+11	-478.545	2.53E+08	0.00
12.3200	2.99E-06	7136.	1806.	-3.23E-07	0.00	6.28E+11	-401.229	2.58E+08	0.00
12.4800	2.39E-06	9865.	1107.	-2.97E-07	0.00	6.28E+11	-326.561	2.63E+08	0.00
12.6400	1.85E-06	11390.	547.1694	-2.64E-07	0.00	6.28E+11	-257.071	2.67E+08	0.00
12.8000	1.37E-06	11967.	113.7165	-2.29E-07	0.00	6.28E+11	-194.443	2.72E+08	0.00
12.9600	9.70E-07	11828.	-207.008	-1.92E-07	0.00	6.28E+11	-139.645	2.76E+08	0.00
13.1200	6.36E-07	11174.	-430.410	-1.57E-07	0.00	6.28E+11	-93.066	2.81E+08	0.00

Pier drilled shaft_row1									
13.2800	3.67E-07	10176.	-572.201	-1.24E-07	0.00	6.28E+11	-54.633	2.86E+08	0.00
13.4400	1.58E-07	8977.	-647.625	-9.51E-08	0.00	6.28E+11	-23.934	2.90E+08	0.00
13.6000	2.09E-09	7690.	-670.909	-6.96E-08	0.00	6.28E+11	-0.320	2.95E+08	0.00
13.7600	-1.09E-07	6401.	-654.890	-4.81E-08	0.00	6.28E+11	17.0072	2.99E+08	0.00
13.9200	-1.83E-07	5175.	-610.799	-3.04E-08	0.00	6.28E+11	28.9208	3.04E+08	0.00
14.0800	-2.26E-07	4056.	-548.182	-1.63E-08	0.00	6.28E+11	36.3061	3.09E+08	0.00
14.2400	-2.45E-07	3070.	-474.912	-5.42E-09	0.00	6.28E+11	40.0160	3.13E+08	0.00
14.4000	-2.47E-07	2232.	-397.294	2.68E-09	0.00	6.28E+11	40.8365	3.18E+08	0.00
14.5600	-2.35E-07	1544.	-320.206	8.45E-09	0.00	6.28E+11	39.4636	3.22E+08	0.00
14.7200	-2.14E-07	1002.	-247.290	1.23E-08	0.00	6.28E+11	36.4904	3.27E+08	0.00
14.8800	-1.88E-07	594.8421	-181.154	1.48E-08	0.00	6.28E+11	32.4011	3.32E+08	0.00
15.0400	-1.57E-07	306.7081	-123.580	1.62E-08	0.00	6.28E+11	27.5724	3.36E+08	0.00
15.2000	-1.25E-07	120.2144	-75.722	1.68E-08	0.00	6.28E+11	22.2791	3.41E+08	0.00
15.3600	-9.28E-08	15.8497	-38.297	1.70E-08	0.00	6.28E+11	16.7055	3.46E+08	0.00
15.5200	-6.01E-08	-26.932	-11.740	1.70E-08	0.00	6.28E+11	10.9580	3.50E+08	0.00
15.6800	-2.75E-08	-29.318	3.6589	1.69E-08	0.00	6.28E+11	5.0824	3.55E+08	0.00
15.8400	4.90E-09	-12.968	7.6572	1.69E-08	0.00	6.28E+11	-0.918	3.59E+08	0.00
16.0000	3.72E-08	0.00	0.00	1.68E-08	0.00	6.28E+11	-7.059	1.82E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 4:

Pile-head deflection = 0.02609858 inches
 Computed slope at pile head = -0.0005519 radians
 Maximum bending moment = 6240181. inch-lbs
 Maximum shear force = -259430. lbs
 Depth of maximum bending moment = 2.88000000 feet below pile head
 Depth of maximum shear force = 7.04000000 feet below pile head
 Number of iterations = 6
 Number of zero deflection points = 4

Pier drilled shaft_row1

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 5

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 17850.0 lbs
 Applied moment at pile head = 8383200.0 in-lbs
 Axial thrust load on pile head = 846000.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in ²	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	0.03817	8383200.	17850.	-7.84E-04	0.00	1.12E+12	-462.089	11623.	0.00
0.1600	0.03667	8417881.	16963.	-7.69E-04	0.00	1.12E+12	-462.049	24189.	0.00
0.3200	0.03521	8450836.	16076.	-7.55E-04	0.00	1.12E+12	-461.865	25184.	0.00
0.4800	0.03378	8482064.	15189.	-7.40E-04	0.00	1.12E+12	-461.532	26235.	0.00
0.6400	0.03237	8511568.	14304.	-7.25E-04	0.00	1.12E+12	-461.049	27347.	0.00
0.8000	0.03099	8539347.	13419.	-7.11E-04	0.00	1.12E+12	-460.411	28524.	0.00
0.9600	0.02964	8565406.	12536.	-6.96E-04	0.00	1.12E+12	-459.614	29772.	0.00
1.1200	0.02832	8589747.	11654.	-6.81E-04	0.00	1.12E+12	-458.655	31098.	0.00
1.2800	0.02702	8612373.	10775.	-6.67E-04	0.00	1.12E+12	-457.529	32507.	0.00
1.4400	0.02576	8633288.	9898.	-6.52E-04	0.00	1.12E+12	-456.230	34007.	0.00
1.6000	0.02452	8652497.	9023.	-6.37E-04	0.00	1.12E+12	-454.755	35608.	0.00
1.7600	0.02331	8670006.	8152.	-6.22E-04	0.00	1.12E+12	-453.098	37318.	0.00
1.9200	0.02213	8685820.	7283.	-6.07E-04	0.00	1.12E+12	-451.253	39147.	0.00
2.0800	0.02098	8699946.	6419.	-5.92E-04	0.00	1.12E+12	-449.214	41109.	0.00
2.2400	0.01986	8712392.	5559.	-5.77E-04	0.00	1.12E+12	-446.975	43217.	0.00
2.4000	0.01876	8723167.	4703.	-5.62E-04	0.00	1.12E+12	-444.527	45486.	0.00
2.5600	0.01770	8732278.	3852.	-5.47E-04	0.00	1.12E+12	-441.863	47935.	0.00
2.7200	0.01666	8739735.	3006.	-5.32E-04	0.00	1.12E+12	-438.975	50583.	0.00
2.8800	0.01565	8745551.	2166.	-5.17E-04	0.00	1.12E+12	-435.853	53456.	0.00
3.0400	0.01468	8749735.	1333.	-5.02E-04	0.00	1.12E+12	-432.487	56580.	0.00
3.2000	0.01373	8752300.	505.8491	-4.87E-04	0.00	1.12E+12	-428.864	59989.	0.00
3.3600	0.01281	8753260.	-313.834	-4.72E-04	0.00	1.12E+12	-424.972	63720.	0.00
3.5200	0.01191	8752628.	-1126.	-4.57E-04	0.00	1.12E+12	-420.798	67818.	0.00
3.6800	0.01105	8750422.	-1929.	-4.42E-04	0.00	1.12E+12	-416.323	72338.	0.00
3.8400	0.01022	8746656.	-2724.	-4.27E-04	0.00	1.12E+12	-411.531	77345.	0.00

Pier drilled shaft_row1

4.0000	0.00941	8741348.	-3509.	-4.12E-04	0.00	1.12E+12	-406.400	82918.	0.00
4.1600	0.00863	8734518.	-4284.	-3.97E-04	0.00	1.12E+12	-400.906	89154.	0.00
4.3200	0.00789	8726186.	-5048.	-3.82E-04	0.00	1.12E+12	-395.021	96175.	0.00
4.4800	0.00717	8716373.	-5801.	-3.67E-04	0.00	1.12E+12	-388.711	104132.	0.00
4.6400	0.00648	8705102.	-6541.	-3.52E-04	0.00	1.12E+12	-381.938	113220.	0.00
4.8000	0.00582	8692400.	-7267.	-3.37E-04	0.00	1.12E+12	-374.655	123694.	0.00
4.9600	0.00518	8678292.	-7979.	-3.22E-04	0.00	1.12E+12	-366.802	135887.	0.00
5.1200	0.00458	8662808.	-8675.	-3.07E-04	0.00	1.12E+12	-358.310	150256.	0.00
5.2800	0.00400	8645978.	-9354.	-2.92E-04	0.00	1.12E+12	-349.084	167436.	0.00
5.4400	0.00346	8627838.	-10015.	-2.78E-04	0.00	1.12E+12	-339.008	188340.	0.00
5.6000	0.00294	8608424.	-10655.	-2.63E-04	0.00	1.12E+12	-327.918	214342.	0.00
5.7600	0.00245	8587777.	-11273.	-2.48E-04	0.00	1.12E+12	-315.592	247603.	0.00
5.9200	0.00199	8565943.	-11865.	-2.33E-04	0.00	1.12E+12	-301.700	291766.	0.00
6.0800	0.00155	8542972.	-51544.	-2.10E-04	0.00	5.15E+11	-41031.	5.08E+07	0.00
6.2400	0.00118	8368694.	-129991.	-1.79E-04	0.00	5.24E+11	-40685.	6.62E+07	0.00
6.4000	8.66E-04	8044385.	-206813.	-1.49E-04	0.00	5.41E+11	-39338.	8.72E+07	0.00
6.5600	6.07E-04	7575014.	-272464.	-1.24E-04	0.00	6.54E+11	-29048.	9.18E+07	0.00
6.7200	3.91E-04	6998526.	-319223.	-1.02E-04	0.00	6.55E+11	-19660.	9.64E+07	0.00
6.8800	2.15E-04	6349531.	-348953.	-8.26E-05	0.00	6.55E+11	-11309.	1.01E+08	0.00
7.0400	7.41E-05	5658814.	-363724.	-6.50E-05	0.00	6.56E+11	-4077.	1.06E+08	0.00
7.2000	-3.49E-05	4953042.	-365712.	-4.95E-05	0.00	6.56E+11	2006.	1.10E+08	0.00
7.3600	-1.16E-04	4254641.	-357118.	-3.60E-05	0.00	6.56E+11	6946.	1.15E+08	0.00
7.5200	-1.73E-04	3581827.	-340092.	-2.46E-05	0.00	6.56E+11	10789.	1.20E+08	0.00
7.6800	-2.10E-04	2948768.	-316672.	-1.50E-05	0.00	6.56E+11	13607.	1.24E+08	0.00
7.8400	-2.31E-04	2365855.	-288737.	-7.26E-06	0.00	6.57E+11	15492.	1.29E+08	0.00
8.0000	-2.38E-04	1840042.	-257972.	-1.11E-06	0.00	6.57E+11	16554.	1.33E+08	0.00
8.1600	-2.35E-04	1375246.	-225847.	3.59E-06	0.00	6.57E+11	16909.	1.38E+08	0.00
8.3200	-2.25E-04	972778.	-193605.	7.02E-06	0.00	6.57E+11	16676.	1.43E+08	0.00
8.4800	-2.08E-04	631779.	-162263.	9.37E-06	0.00	6.57E+11	15972.	1.47E+08	0.00
8.6400	-1.89E-04	349659.	-132615.	1.08E-05	0.00	6.57E+11	14911.	1.52E+08	0.00
8.8000	-1.67E-04	122503.	-105251.	1.15E-05	0.00	6.57E+11	13594.	1.56E+08	0.00
8.9600	-1.44E-04	-54542.	-80570.	1.16E-05	0.00	6.57E+11	12115.	1.61E+08	0.00
9.1200	-1.22E-04	-186925.	-58807.	1.12E-05	0.00	6.57E+11	10555.	1.66E+08	0.00
9.2800	-1.01E-04	-280398.	-40052.	1.06E-05	0.00	6.57E+11	8982.	1.70E+08	0.00
9.4400	-8.18E-05	-340760.	-24278.	9.65E-06	0.00	6.57E+11	7450.	1.75E+08	0.00
9.6000	-6.42E-05	-373655.	-11361.	8.60E-06	0.00	6.57E+11	6005.	1.79E+08	0.00
9.7600	-4.88E-05	-384413.	-1108.	7.50E-06	0.00	6.57E+11	4675.	1.84E+08	0.00
9.9200	-3.54E-05	-377934.	6725.	6.38E-06	0.00	6.57E+11	3484.	1.89E+08	0.00
10.0800	-2.43E-05	-358611.	12414.	5.31E-06	0.00	6.57E+11	2442.	1.93E+08	0.00
10.2400	-1.51E-05	-330283.	16250.	4.30E-06	0.00	6.57E+11	1554.	1.98E+08	0.00

Pier drilled shaft_row1									
10.4000	-7.75E-06	-296225.	18527.	3.38E-06	0.00	6.57E+11	817.4816	2.03E+08	0.00
10.5600	-2.09E-06	-259152.	19527.	2.57E-06	0.00	6.57E+11	225.1687	2.07E+08	0.00
10.7200	2.12E-06	-221248.	19519.	1.87E-06	0.00	6.57E+11	-233.882	2.12E+08	0.00
10.8800	5.09E-06	-184205.	18744.	1.28E-06	0.00	6.57E+11	-573.165	2.16E+08	0.00
11.0400	7.02E-06	-149274.	17419.	7.88E-07	0.00	6.57E+11	-807.665	2.21E+08	0.00
11.2000	8.11E-06	-117319.	15729.	3.98E-07	0.00	6.57E+11	-952.971	2.26E+08	0.00
11.3600	8.54E-06	-88877.	13830.	9.63E-08	0.00	6.57E+11	-1025.	2.30E+08	0.00
11.5200	8.48E-06	-64212.	11851.	-1.27E-07	0.00	6.57E+11	-1037.	2.35E+08	0.00
11.6800	8.05E-06	-43370.	9891.	-2.85E-07	0.00	6.57E+11	-1005.	2.39E+08	0.00
11.8400	7.39E-06	-26230.	8025.	-3.86E-07	0.00	6.57E+11	-938.951	2.44E+08	0.00
12.0000	6.57E-06	-12552.	6307.	-4.43E-07	0.00	6.57E+11	-851.048	2.49E+08	0.00
12.1600	5.68E-06	-2012.	4770.	-4.64E-07	0.00	6.57E+11	-749.928	2.53E+08	0.00
12.3200	4.79E-06	5765.	3432.	-4.59E-07	0.00	6.57E+11	-643.032	2.58E+08	0.00
12.4800	3.92E-06	11170.	2300.	-4.34E-07	0.00	6.57E+11	-536.249	2.63E+08	0.00
12.6400	3.12E-06	14599.	1369.	-3.97E-07	0.00	6.57E+11	-434.034	2.67E+08	0.00
12.8000	2.40E-06	16428.	626.1706	-3.51E-07	0.00	6.57E+11	-339.563	2.72E+08	0.00
12.9600	1.77E-06	17005.	55.4828	-3.02E-07	0.00	6.57E+11	-254.904	2.76E+08	0.00
13.1200	1.24E-06	16642.	-363.174	-2.53E-07	0.00	6.57E+11	-181.197	2.81E+08	0.00
13.2800	7.99E-07	15611.	-651.196	-2.06E-07	0.00	6.57E+11	-118.826	2.86E+08	0.00
13.4400	4.47E-07	14142.	-830.156	-1.62E-07	0.00	6.57E+11	-67.591	2.90E+08	0.00
13.6000	1.75E-07	12424.	-920.825	-1.24E-07	0.00	6.57E+11	-26.856	2.95E+08	0.00
13.7600	-2.76E-08	10606.	-942.468	-9.00E-08	0.00	6.57E+11	4.3105	2.99E+08	0.00
13.9200	-1.71E-07	8805.	-912.390	-6.16E-08	0.00	6.57E+11	27.0211	3.04E+08	0.00
14.0800	-2.64E-07	7103.	-845.676	-3.83E-08	0.00	6.57E+11	42.4726	3.09E+08	0.00
14.2400	-3.18E-07	5558.	-755.109	-1.98E-08	0.00	6.57E+11	51.8676	3.13E+08	0.00
14.4000	-3.40E-07	4203.	-651.215	-5.57E-09	0.00	6.57E+11	56.3550	3.18E+08	0.00
14.5600	-3.39E-07	3057.	-542.407	5.05E-09	0.00	6.57E+11	56.9869	3.22E+08	0.00
14.7200	-3.21E-07	2121.	-435.198	1.26E-08	0.00	6.57E+11	54.6896	3.27E+08	0.00
14.8800	-2.91E-07	1386.	-334.458	1.77E-08	0.00	6.57E+11	50.2478	3.32E+08	0.00
15.0400	-2.53E-07	836.2028	-243.694	2.10E-08	0.00	6.57E+11	44.2981	3.36E+08	0.00
15.2000	-2.10E-07	449.9250	-165.328	2.29E-08	0.00	6.57E+11	37.3325	3.41E+08	0.00
15.3600	-1.65E-07	201.2675	-100.970	2.38E-08	0.00	6.57E+11	29.7073	3.46E+08	0.00
15.5200	-1.19E-07	62.1221	-51.659	2.42E-08	0.00	6.57E+11	21.6590	3.50E+08	0.00
15.6800	-7.21E-08	2.8200	-18.075	2.43E-08	0.00	6.57E+11	13.3237	3.55E+08	0.00
15.8400	-2.54E-08	-7.366	-0.714	2.43E-08	0.00	6.57E+11	4.7612	3.59E+08	0.00
16.0000	2.12E-08	0.00	0.00	2.43E-08	0.00	6.57E+11	-4.018	1.82E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual

Pier drilled shaft_row1

stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 5:

Pile-head deflection = 0.03816545 inches
 Computed slope at pile head = -0.0007836 radians
 Maximum bending moment = 8753260. inch-lbs
 Maximum shear force = -365712. lbs
 Depth of maximum bending moment = 3.36000000 feet below pile head
 Depth of maximum shear force = 7.20000000 feet below pile head
 Number of iterations = 12
 Number of zero deflection points = 4

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 6

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 23130.0 lbs
 Applied moment at pile head = 10959840.0 in-lbs
 Axial thrust load on pile head = 1091000.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	0.05445	1.10E+07	23130.	-0.00109	0.00	1.10E+12	-505.001	8904.	0.00
0.1600	0.05238	1.10E+07	22160.	-0.00107	0.00	1.10E+12	-505.086	18516.	0.00
0.3200	0.05034	1.10E+07	21191.	-0.00105	0.00	1.10E+12	-505.018	19262.	0.00
0.4800	0.04834	1.11E+07	20221.	-0.00103	0.00	1.10E+12	-504.791	20050.	0.00
0.6400	0.04638	1.11E+07	19252.	-0.00101	0.00	1.10E+12	-504.404	20882.	0.00
0.8000	0.04445	1.12E+07	18284.	-9.92E-04	0.00	1.10E+12	-503.851	21762.	0.00
0.9600	0.04257	1.12E+07	17318.	-9.73E-04	0.00	1.10E+12	-503.129	22694.	0.00

Pier drilled shaft_row1

1.1200	0.04072	1.12E+07	16353.	-9.53E-04	0.00	1.10E+12	-502.234	23682.	0.00
1.2800	0.03891	1.13E+07	15389.	-9.34E-04	0.00	1.10E+12	-501.160	24731.	0.00
1.4400	0.03713	1.13E+07	14428.	-9.14E-04	0.00	1.10E+12	-499.902	25848.	0.00
1.6000	0.03540	1.13E+07	13470.	-8.94E-04	0.00	1.10E+12	-498.456	27036.	0.00
1.7600	0.03370	1.14E+07	12514.	-8.74E-04	0.00	1.10E+12	-496.815	28305.	0.00
1.9200	0.03204	1.14E+07	11562.	-8.54E-04	0.00	1.10E+12	-494.973	29660.	0.00
2.0800	0.03042	1.14E+07	10614.	-8.34E-04	0.00	1.10E+12	-492.923	31111.	0.00
2.2400	0.02884	1.14E+07	9670.	-8.14E-04	0.00	1.10E+12	-490.658	32667.	0.00
2.4000	0.02729	1.14E+07	8730.	-7.94E-04	0.00	1.10E+12	-488.171	34340.	0.00
2.5600	0.02579	1.15E+07	7795.	-7.74E-04	0.00	1.10E+12	-485.452	36143.	0.00
2.7200	0.02432	1.15E+07	6866.	-7.54E-04	0.00	1.10E+12	-482.493	38089.	0.00
2.8800	0.02289	1.15E+07	5943.	-7.34E-04	0.00	1.10E+12	-479.282	40197.	0.00
3.0400	0.02150	1.15E+07	5026.	-7.14E-04	0.00	1.10E+12	-475.810	42485.	0.00
3.2000	0.02015	1.15E+07	4116.	-6.94E-04	0.00	1.10E+12	-472.062	44976.	0.00
3.3600	0.01884	1.15E+07	3213.	-6.73E-04	0.00	1.10E+12	-468.025	47698.	0.00
3.5200	0.01757	1.15E+07	2319.	-6.53E-04	0.00	1.10E+12	-463.684	50682.	0.00
3.6800	0.01633	1.15E+07	1433.	-6.33E-04	0.00	1.10E+12	-459.020	53966.	0.00
3.8400	0.01514	1.15E+07	556.7424	-6.13E-04	0.00	1.10E+12	-454.014	57595.	0.00
4.0000	0.01398	1.15E+07	-309.808	-5.93E-04	0.00	1.10E+12	-448.643	61626.	0.00
4.1600	0.01286	1.15E+07	-1166.	-5.72E-04	0.00	1.10E+12	-442.881	66125.	0.00
4.3200	0.01178	1.15E+07	-2010.	-5.52E-04	0.00	1.10E+12	-436.696	71178.	0.00
4.4800	0.01074	1.15E+07	-2842.	-5.32E-04	0.00	1.10E+12	-430.054	76889.	0.00
4.6400	0.00974	1.15E+07	-3661.	-5.12E-04	0.00	1.10E+12	-422.911	83393.	0.00
4.8000	0.00877	1.15E+07	-4466.	-4.92E-04	0.00	1.10E+12	-415.217	90865.	0.00
4.9600	0.00785	1.15E+07	-5255.	-4.71E-04	0.00	1.10E+12	-406.908	99535.	0.00
5.1200	0.00696	1.15E+07	-6027.	-4.51E-04	0.00	1.10E+12	-397.907	109715.	0.00
5.2800	0.00612	1.15E+07	-6782.	-4.31E-04	0.00	1.10E+12	-388.115	121836.	0.00
5.4400	0.00531	1.15E+07	-7517.	-4.11E-04	0.00	1.10E+12	-377.404	136518.	0.00
5.6000	0.00454	1.15E+07	-8230.	-3.91E-04	0.00	1.10E+12	-365.602	154684.	0.00
5.7600	0.00381	1.15E+07	-8920.	-3.71E-04	0.00	1.10E+12	-352.471	177776.	0.00
5.9200	0.00311	1.14E+07	-9582.	-3.51E-04	0.00	1.10E+12	-337.664	208196.	0.00
6.0800	0.00246	1.14E+07	-54109.	-3.18E-04	0.00	4.82E+11	-46045.	3.59E+07	0.00
6.2400	0.00189	1.12E+07	-142282.	-2.73E-04	0.00	4.89E+11	-45802.	4.65E+07	0.00
6.4000	0.00141	1.09E+07	-229491.	-2.30E-04	0.00	5.03E+11	-45041.	6.13E+07	0.00
6.5600	0.00101	1.03E+07	-314681.	-1.91E-04	0.00	5.24E+11	-43698.	8.33E+07	0.00
6.7200	6.78E-04	9663181.	-389313.	-1.55E-04	0.00	5.51E+11	-34044.	9.64E+07	0.00
6.8800	4.12E-04	8853238.	-442832.	-1.25E-04	0.00	6.39E+11	-21705.	1.01E+08	0.00
7.0400	1.98E-04	7963228.	-474133.	-9.97E-05	0.00	6.40E+11	-10900.	1.06E+08	0.00
7.2000	2.96E-05	7032986.	-486228.	-7.72E-05	0.00	6.41E+11	-1699.	1.10E+08	0.00
7.3600	-9.84E-05	6096436.	-482204.	-5.76E-05	0.00	6.41E+11	5891.	1.15E+08	0.00

Pier drilled shaft_row1

7.5200	-1.91E-04	5181565.	-465110.	-4.07E-05	0.00	6.42E+11	11915.	1.20E+08	0.00
7.6800	-2.55E-04	4310586.	-437868.	-2.65E-05	0.00	6.42E+11	16462.	1.24E+08	0.00
7.8400	-2.93E-04	3500265.	-403198.	-1.48E-05	0.00	6.42E+11	19652.	1.29E+08	0.00
8.0000	-3.11E-04	2762367.	-363566.	-5.43E-06	0.00	6.42E+11	21631.	1.33E+08	0.00
8.1600	-3.14E-04	2104195.	-321143.	1.84E-06	0.00	6.42E+11	22559.	1.38E+08	0.00
8.3200	-3.04E-04	1529172.	-277787.	7.27E-06	0.00	6.42E+11	22602.	1.43E+08	0.00
8.4800	-2.86E-04	1037461.	-235039.	1.11E-05	0.00	6.42E+11	21927.	1.47E+08	0.00
8.6400	-2.62E-04	626575.	-194126.	1.36E-05	0.00	6.42E+11	20692.	1.52E+08	0.00
8.8000	-2.34E-04	291962.	-155976.	1.50E-05	0.00	6.42E+11	19047.	1.56E+08	0.00
8.9600	-2.04E-04	27562.	-121249.	1.54E-05	0.00	6.42E+11	17128.	1.61E+08	0.00
9.1200	-1.74E-04	-173697.	-90355.	1.52E-05	0.00	6.42E+11	15053.	1.66E+08	0.00
9.2800	-1.46E-04	-319466.	-63499.	1.45E-05	0.00	6.42E+11	12923.	1.70E+08	0.00
9.4400	-1.19E-04	-417593.	-40703.	1.34E-05	0.00	6.42E+11	10822.	1.75E+08	0.00
9.6000	-9.43E-05	-475823.	-21850.	1.21E-05	0.00	6.42E+11	8816.	1.79E+08	0.00
9.7600	-7.25E-05	-501549.	-6711.	1.06E-05	0.00	6.42E+11	6954.	1.84E+08	0.00
9.9200	-5.36E-05	-501636.	5025.	9.10E-06	0.00	6.42E+11	5271.	1.89E+08	0.00
10.0800	-3.76E-05	-482289.	13720.	7.63E-06	0.00	6.42E+11	3786.	1.93E+08	0.00
10.2400	-2.43E-05	-448984.	19764.	6.23E-06	0.00	6.42E+11	2510.	1.98E+08	0.00
10.4000	-1.37E-05	-406424.	23557.	4.95E-06	0.00	6.42E+11	1442.	2.03E+08	0.00
10.5600	-5.32E-06	-358547.	25491.	3.81E-06	0.00	6.42E+11	573.7546	2.07E+08	0.00
10.7200	9.71E-07	-308553.	25939.	2.81E-06	0.00	6.42E+11	-107.149	2.12E+08	0.00
10.8800	5.49E-06	-258952.	25242.	1.97E-06	0.00	6.42E+11	-618.686	2.16E+08	0.00
11.0400	8.52E-06	-211630.	23707.	1.26E-06	0.00	6.42E+11	-980.860	2.21E+08	0.00
11.2000	1.03E-05	-167923.	21599.	6.95E-07	0.00	6.42E+11	-1215.	2.26E+08	0.00
11.3600	1.12E-05	-128693.	19144.	2.52E-07	0.00	6.42E+11	-1342.	2.30E+08	0.00
11.5200	1.13E-05	-94410.	16528.	-8.13E-08	0.00	6.42E+11	-1383.	2.35E+08	0.00
11.6800	1.09E-05	-65224.	13898.	-3.20E-07	0.00	6.42E+11	-1357.	2.39E+08	0.00
11.8400	1.01E-05	-41040.	11365.	-4.79E-07	0.00	6.42E+11	-1281.	2.44E+08	0.00
12.0000	9.04E-06	-21579.	9011.	-5.72E-07	0.00	6.42E+11	-1171.	2.49E+08	0.00
12.1600	7.88E-06	-6434.	6889.	-6.14E-07	0.00	6.42E+11	-1040.	2.53E+08	0.00
12.3200	6.68E-06	4878.	5029.	-6.17E-07	0.00	6.42E+11	-897.721	2.58E+08	0.00
12.4800	5.51E-06	12880.	3444.	-5.90E-07	0.00	6.42E+11	-753.844	2.63E+08	0.00
12.6400	4.42E-06	18104.	2130.	-5.44E-07	0.00	6.42E+11	-614.632	2.67E+08	0.00
12.8000	3.43E-06	21061.	1074.	-4.85E-07	0.00	6.42E+11	-484.861	2.72E+08	0.00
12.9600	2.55E-06	22231.	255.8576	-4.20E-07	0.00	6.42E+11	-367.722	2.76E+08	0.00
13.1200	1.81E-06	22045.	-351.622	-3.54E-07	0.00	6.42E+11	-265.069	2.81E+08	0.00
13.2800	1.19E-06	20882.	-776.646	-2.90E-07	0.00	6.42E+11	-177.665	2.86E+08	0.00
13.4400	6.97E-07	19064.	-1048.	-2.30E-07	0.00	6.42E+11	-105.411	2.90E+08	0.00
13.6000	3.10E-07	16857.	-1195.	-1.77E-07	0.00	6.42E+11	-47.570	2.95E+08	0.00
13.7600	1.89E-08	14475.	-1244.	-1.30E-07	0.00	6.42E+11	-2.955	2.99E+08	0.00

Pier drilled shaft_row1									
13.9200	-1.89E-07	12082.	-1218.	-9.02E-08	0.00	6.42E+11	29.9015	3.04E+08	0.00
14.0800	-3.27E-07	9799.	-1139.	-5.75E-08	0.00	6.42E+11	52.6091	3.09E+08	0.00
14.2400	-4.09E-07	7710.	-1024.	-3.13E-08	0.00	6.42E+11	66.8058	3.13E+08	0.00
14.4000	-4.47E-07	5867.	-888.805	-1.10E-08	0.00	6.42E+11	74.0716	3.18E+08	0.00
14.5600	-4.52E-07	4297.	-744.867	4.20E-09	0.00	6.42E+11	75.8640	3.22E+08	0.00
14.7200	-4.31E-07	3006.	-601.501	1.51E-08	0.00	6.42E+11	73.4757	3.27E+08	0.00
14.8800	-3.94E-07	1987.	-465.677	2.26E-08	0.00	6.42E+11	68.0082	3.32E+08	0.00
15.0400	-3.45E-07	1218.	-342.441	2.74E-08	0.00	6.42E+11	60.3623	3.36E+08	0.00
15.2000	-2.89E-07	671.7513	-235.303	3.02E-08	0.00	6.42E+11	51.2393	3.41E+08	0.00
15.3600	-2.29E-07	314.3478	-146.607	3.17E-08	0.00	6.42E+11	41.1531	3.46E+08	0.00
15.5200	-1.67E-07	108.6491	-77.868	3.23E-08	0.00	6.42E+11	30.4501	3.50E+08	0.00
15.6800	-1.05E-07	15.2010	-30.074	3.25E-08	0.00	6.42E+11	19.3353	3.55E+08	0.00
15.8400	-4.22E-08	-6.970	-3.923	3.25E-08	0.00	6.42E+11	7.9047	3.59E+08	0.00
16.0000	2.01E-08	0.00	0.00	3.25E-08	0.00	6.42E+11	-3.818	1.82E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 6:

Pile-head deflection = 0.05444838 inches
 Computed slope at pile head = -0.0010893 radians
 Maximum bending moment = 11541227. inch-lbs
 Maximum shear force = -486228. lbs
 Depth of maximum bending moment = 4.00000000 feet below pile head
 Depth of maximum shear force = 7.20000000 feet below pile head
 Number of iterations = 13
 Number of zero deflection points = 4

 Summary of Pile-head Responses for Conventional Analyses

Definitions of Pile-head Loading Conditions:

Pier drilled shaft_row1

Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs
 Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
 Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.
 Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs
 Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians

Load Case No.	Load Type 1	Pile-head Load 1	Load Type 2	Pile-head Load 2	Axial Loading lbs	Pile-head Deflection inches	Pile-head Rotation radians	Max Shear in Pile lbs	Max Moment in Pile in-lbs
1	V, lb	19020.	M, in-lb	3836400.	848900.	0.01785	-3.70E-04	-183635.	4332585.
2	V, lb	23990.	M, in-lb	5025600.	1102000.	0.02433	-5.01E-04	-248698.	5769231.
3	V, lb	10160.	M, in-lb	4451400.	1018000.	0.01831	-3.91E-04	-183319.	4595752.
4	V, lb	13670.	M, in-lb	5995200.	1326000.	0.02610	-5.52E-04	-259430.	6240181.
5	V, lb	17850.	M, in-lb	8383200.	846000.	0.03817	-7.84E-04	-365712.	8753260.
6	V, lb	23130.	M, in-lb	1.10E+07	1091000.	0.05445	-0.00109	-486228.	1.15E+07

Maximum pile-head deflection = 0.0544483848 inches
 Maximum pile-head rotation = -0.0010893243 radians = -0.062414 deg.

 Summary of Warning Messages

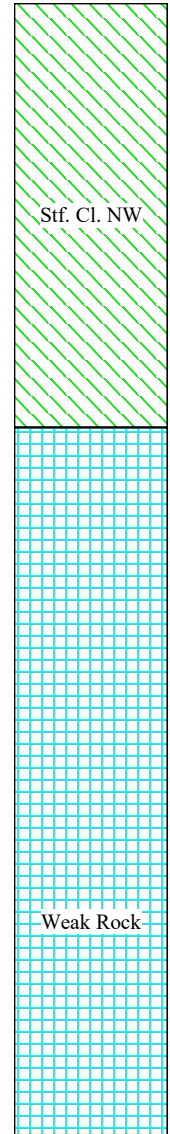
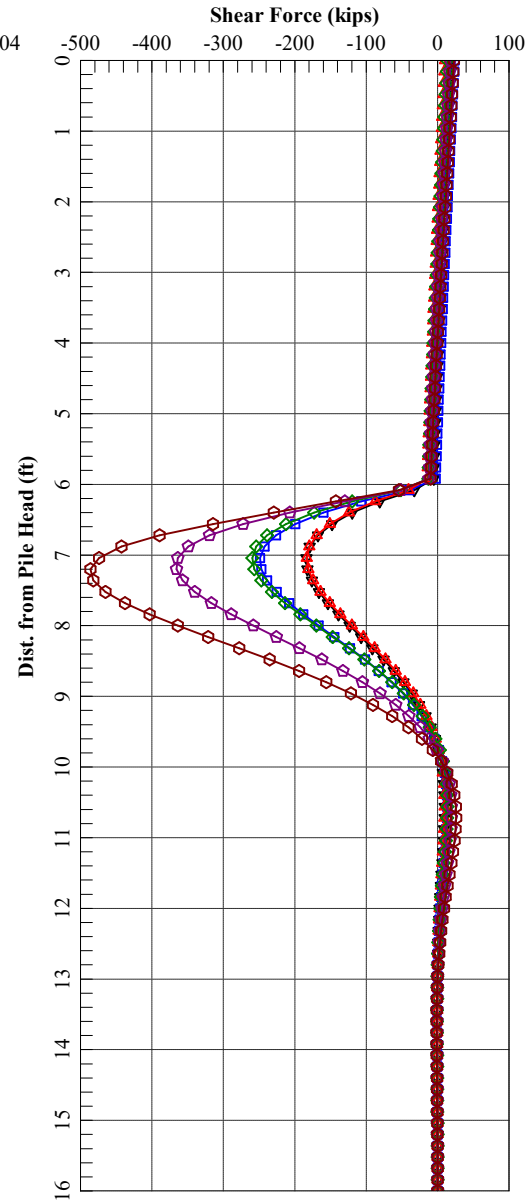
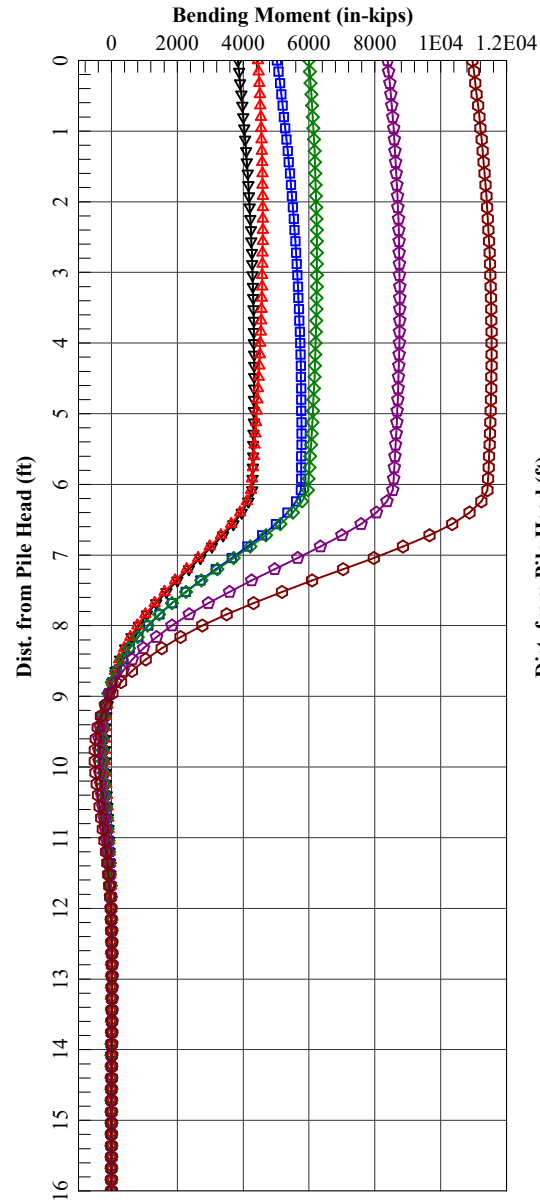
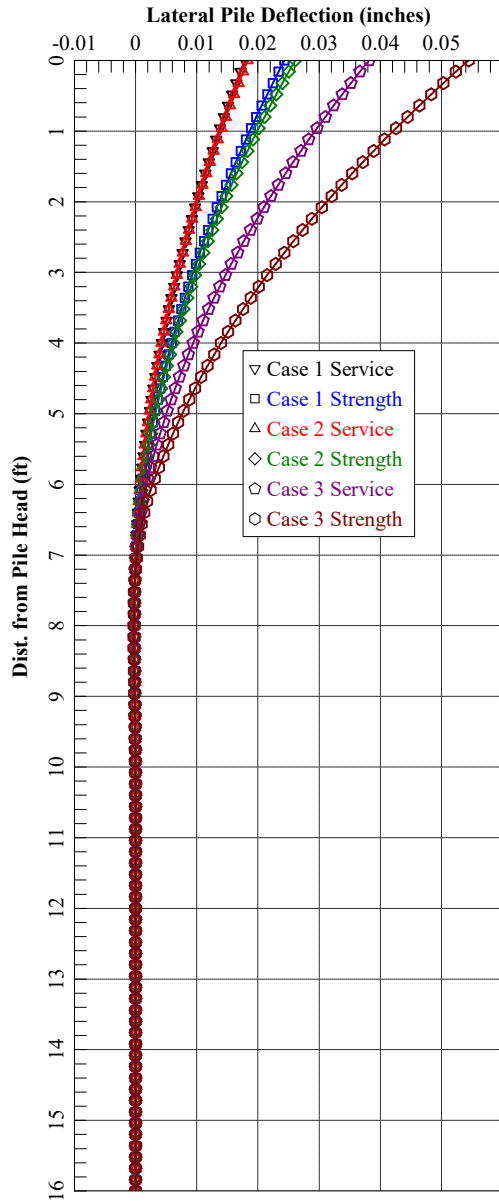
The following warning was reported 882 times

**** Warning ****

An unreasonable input value for unconfined compressive strength has been specified for a soil defined using the weak rock criteria. The input value is greater than 500 psi. Please check your input data for correctness.

The analysis ended normally.

MEG-33-19.21_Bowman's Run Bridge_Pier_Row1



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LPile for Windows, Version 2022-12.006

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method
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Files Used for Analysis

Path to file locations:

\\US0247-PPFSS01\shared_projects\173609140\119144\400-Engineering\Geotechnical\Analysis\Lpile\bridges\LPile
Analysis\Bowman's Run\pier\

Name of input data file:

Pier drilled shaft_row2.lp12d

Name of output report file:

Pier drilled shaft_row2.lp12o

Pier drilled shaft_row2

Name of plot output file:

Pier drilled shaft_row2.lp12p

Name of runtime message file:

Pier drilled shaft_row2.lp12r

Date and Time of Analysis

Date: August 28, 2024

Time: 14:57:41

Problem Title

Project Name: MEG-33-19.21

Job Number: 173609140

Client: ODOT

Engineer: G. Khatri

Description: Pier Drilled Shaft Lateral Load Analysis at Bowman's Run

Pier drilled shaft_row2
Program Options and Settings

Computational Options:

- Conventional Analysis

Engineering Units Used for Data Input and Computations:

- US Customary System Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed = 1000
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 100.0000 in
- Number of pile increments = 100

Loading Type and Number of Cycles of Loading:

- Static loading specified

- Analysis uses p-y modification factors for p-y curves
- Analysis uses layering correction (Method of Georgiadis)
- No distributed lateral loads are entered
- Loading by lateral soil movements acting on pile not selected
- Input of shear resistance at the pile tip not selected
- Input of moment resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:

- Output files use decimal points to denote decimal symbols.
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1
- No p-y curves to be computed and reported for user-specified depths
- Print using wide report formats

Pier drilled shaft_row2

Number of pile sections defined = 2
Total length of pile = 16.000 ft
Depth of ground surface below top of pile = 0.0000 ft

Pile diameters used for p-y curve computations are defined using 4 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile. A summary of values of pile diameter vs. depth follows.

Point No.	Depth Below Pile Head feet	Pile Diameter inches
1	0.000	48.0000
2	6.000	48.0000
3	6.000	42.0000
4	16.000	42.0000

Input Structural Properties for Pile Sections:

Pile Section No. 1:

Section 1 is a round drilled shaft, bored pile, or CIDH pile
Length of section = 6.000000 ft
Shaft Diameter = 48.000000 in

Pile Section No. 2:

Section 2 is a round drilled shaft, bored pile, or CIDH pile
Length of section = 10.000000 ft
Shaft Diameter = 42.000000 in

Soil and Rock Layering Information

Pier drilled shaft_row2

The soil profile is modelled using 2 layers

Layer 1 is stiff clay without free water

Distance from top of pile to top of layer	=	0.0000	ft
Distance from top of pile to bottom of layer	=	6.000000	ft
Effective unit weight at top of layer	=	122.000000	pcf
Effective unit weight at bottom of layer	=	122.000000	pcf
Undrained cohesion at top of layer	=	2000.	psf
Undrained cohesion at bottom of layer	=	2000.	psf
Epsilon-50 at top of layer	=	0.0000	
Epsilon-50 at bottom of layer	=	0.0000	

NOTE: Default values for Epsilon-50 will be computed for this layer.

Layer 2 is weak rock, p-y criteria by Reese, 1997

Distance from top of pile to top of layer	=	6.000000	ft
Distance from top of pile to bottom of layer	=	20.000000	ft
Effective unit weight at top of layer	=	87.600000	pcf
Effective unit weight at bottom of layer	=	87.600000	pcf
Uniaxial compressive strength at top of layer	=	4380.	psi
Uniaxial compressive strength at bottom of layer	=	4380.	psi
Initial modulus of rock at top of layer	=	394200.	psi
Initial modulus of rock at bottom of layer	=	394200.	psi
RQD of rock at top of layer	=	74.000000	%
RQD of rock at bottom of layer	=	74.000000	%
k _{rm} of rock at top of layer	=	0.0000500	
k _{rm} of rock at bottom of layer	=	0.0000500	

(Depth of the lowest soil layer extends 4.000 ft below the pile tip)

Summary of Input Soil Properties

Pier drilled shaft_row2

Layer Num.	Soil Type Name (p-y Curve Type)	Layer Depth ft	Effective Unit Wt. pcf	Cohesion psf	Uniaxial qu psi	RQD %	E50 or krm	Rock Mass Modulus psi
1	Stiff Clay	0.00	122.0000	2000.	--	--	default	--
	w/o Free Water	6.0000	122.0000	2000.	--	--	default	--
2	Weak	6.0000	87.6000	--	4380.	74.0000	5.00E-05	394200.
	Rock	20.0000	87.6000	--	4380.	74.0000	5.00E-05	394200.

Modification Factors for p-y Curves

Distribution of p-y modifiers with depth defined using 3 points

Point No.	Depth X ft	p-mult	y-mult
1	0.000	0.6700	1.0000
2	6.000	0.6700	1.0000
3	16.000	0.6700	1.0000

Static Loading Type

Static loading criteria were used when computing p-y curves for all analyses.

Pier drilled shaft_row2

 Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 6

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length	Run Analysis
1	1	V = 19020. lbs	M = 3836400. in-lbs	848900.	No	Yes
2	1	V = 23990. lbs	M = 5025600. in-lbs	1102000.	No	Yes
3	1	V = 10160. lbs	M = 4451400. in-lbs	1018000.	No	Yes
4	1	V = 13670. lbs	M = 5995200. in-lbs	1326000.	No	Yes
5	1	V = 17850. lbs	M = 8383200. in-lbs	846000.	No	Yes
6	1	V = 23130. lbs	M = 10959840. in-lbs	1091000.	No	Yes

V = shear force applied normal to pile axis

M = bending moment applied to pile head

y = lateral deflection normal to pile axis

S = pile slope relative to original pile batter angle

R = rotational stiffness applied to pile head

Values of top y vs. pile lengths can be computed only for load types with specified shear loading (Load Types 1, 2, and 3).

Thrust force is assumed to be acting axially for all pile batter angles.

 Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 2

Pile Section No. 1:

Pier drilled shaft_row2

Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section	=	6.000000	ft
Shaft Diameter	=	48.000000	in
Concrete Cover Thickness (to edge of trans. reinf.)	=	3.000000	in
Number of Reinforcing Bars	=	16	bars
Yield Stress of Reinforcing Bars	=	50000.	psi
Modulus of Elasticity of Reinforcing Bars	=	29000000.	psi
Gross Area of Shaft	=	1810.	sq. in.
Total Area of Reinforcing Steel	=	16.000000	sq. in.
Area Ratio of Steel Reinforcement	=	0.88	percent
Edge-to-Edge Bar Spacing	=	6.601869	in
Maximum Concrete Aggregate Size	=	0.750000	in
Ratio of Bar Spacing to Aggregate Size	=	8.80	
Offset of Center of Rebar Cage from Center of Pile	=	0.0000	in
Transverse Reinforcement			
Type: Spiral			
Number of Transverse Reinf. (per spacing)	=	1	
Spacing of Transverse Reinf.	=	4.500000	in
Yield Stress of Transverse Reinf.	=	50000.	psi
Diameter of Transverse Reinf.	=	0.625000	in

Axial Structural Capacities:

Nom. Axial Structural Capacity = $0.85 F_c A_c + F_y A_s$	=	6898.095	kips
Tensile Load for Cracking of Concrete	=	-799.490	kips
Nominal Axial Tensile Capacity	=	-800.000	kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
-----	-----	-----	-----	-----
1	1.128000	1.000000	19.811000	0.000000
2	1.128000	1.000000	18.302977	7.581341
3	1.128000	1.000000	14.008492	14.008492

			Pier drilled shaft_row2	
4	1.128000	1.000000	7.581341	18.302977
5	1.128000	1.000000	0.000000	19.811000
6	1.128000	1.000000	-7.58134	18.302977
7	1.128000	1.000000	-14.00849	14.008492
8	1.128000	1.000000	-18.30298	7.581341
9	1.128000	1.000000	-19.81100	0.000000
10	1.128000	1.000000	-18.30298	-7.58134
11	1.128000	1.000000	-14.00849	-14.00849
12	1.128000	1.000000	-7.58134	-18.30298
13	1.128000	1.000000	0.000000	-19.81100
14	1.128000	1.000000	7.581341	-18.30298
15	1.128000	1.000000	14.008492	-14.00849
16	1.128000	1.000000	18.302977	-7.58134

NOTE: The positions of the above rebars were computed by LPILE

Minimum spacing between any two bars not equal to zero = 6.602 inches
between bars 11 and 12.

Ratio of bar spacing to maximum aggregate size = 8.80

Concrete Properties:

Compressive Strength of Concrete	=	4000. psi
Modulus of Elasticity of Concrete	=	3604997. psi
Modulus of Rupture of Concrete	=	-474.34165 psi
Compression Strain at Peak Stress	=	0.001886
Tensile Strain at Fracture of Concrete	=	-0.0001154
Maximum Coarse Aggregate Size	=	0.750000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 6

Number	Axial Thrust Force kips
----- 1	----- 846.000

Pier drilled shaft_row2

2	848.900
3	1018.000
4	1091.000
5	1102.000
6	1326.000

Definitions of Run Messages and Notes:

- C = concrete in section has cracked in tension.
- Y = stress in reinforcing steel has reached yield stress.
- T = ACI 318 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than 0.003. See ACI 318-14, Section 21.2.3.
- Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
 Position of neutral axis is measured from edge of compression side of pile.
 Compressive stresses and strains are positive in sign.
 Tensile stresses and strains are negative in sign.

Axial Thrust Force = 846.000 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	700.4440834	1120710533.	196.3781960	0.0001227	0.00009274	0.5030158	3.4941048	
0.00000125	1401.	1120691217.	110.2246384	0.0001378	0.00007778	0.5618309	3.8651431	
0.00000188	2101.	1120650488.	81.5225806	0.0001529	0.00006285	0.6202626	4.2370403	
0.00000250	2801.	1120591544.	67.1833992	0.0001680	0.00004796	0.6783081	4.6097964	
0.00000313	3502.	1120515025.	58.5893698	0.0001831	0.00003309	0.7359642	4.9834116	
0.00000375	4202.	1120421140.	52.8679182	0.0001983	0.00001825	0.7932281	5.3578861	
0.00000438	4901.	1120309975.	48.7879414	0.0002134	0.00000345	0.8500968	5.7332201	
0.00000500	5601.	1120172036.	45.7338334	0.0002287	-0.00001133	0.9065662	6.1094059	
0.00000563	6300.	1119911337.	43.3630448	0.0002439	-0.00002608	0.9626212	6.4863467	
0.00000625	6996.	1119433463.	41.4697561	0.0002592	-0.00004081	1.0182400	6.8638933	

Pier drilled shaft_row2

0.00000688	7691.	1118711360.	39.9231369	0.0002745	-0.00005553	1.0734057	7.2419254
0.00000750	8383.	1117751174.	38.6360958	0.0002898	-0.00007023	1.1281050	7.6203507
0.00000813	9072.	1116573479.	37.5484407	0.0003051	-0.00008492	1.1823282	7.9991013
0.00000875	9758.	1115203467.	36.6172506	0.0003204	-0.00009960	1.2360681	8.3781273
0.00000938	10441.	1113665325.	35.8110922	0.0003357	-0.000114	1.2893192	8.7573907
0.00001000	10441.	1044061242.	33.6474340	0.0003365	-0.000144	1.2913974	8.7137559 C
0.00001063	10441.	982645875.	32.8130916	0.0003486	-0.000161	1.3331669	9.0012839 C
0.00001125	10441.	928054437.	32.0517125	0.0003606	-0.000179	1.3738487	9.2823712 C
0.00001188	10441.	879209467.	31.3548640	0.0003723	-0.000198	1.4135855	9.5580813 C
0.00001250	10441.	835248994.	30.7132084	0.0003839	-0.000216	1.4524062	9.8285379 C
0.00001313	10591.	806914774.	30.1207487	0.0003953	-0.000235	1.4904082	10.0944600 C
0.00001375	10832.	787809864.	29.5711600	0.0004066	-0.000253	1.5276207	10.3560000 C
0.00001438	11065.	769713923.	29.0593298	0.0004177	-0.000272	1.5640780	10.6133581 C
0.00001500	11288.	752559702.	28.5810558	0.0004287	-0.000291	1.5998164	10.8667593 C
0.00001563	11505.	736289323.	28.1328677	0.0004396	-0.000310	1.6348739	11.1164557 C
0.00001625	11714.	720852372.	27.7118906	0.0004503	-0.000330	1.6692914	11.3627285 C
0.00001688	11917.	706204347.	27.3157398	0.0004610	-0.000349	1.7031119	11.6058902 C
0.00001750	12115.	692305477.	26.9424376	0.0004715	-0.000369	1.7363810	11.8462871 C
0.00001813	12309.	679119785.	26.5903493	0.0004820	-0.000388	1.7691473	12.0843024 C
0.00001875	12497.	666522728.	26.2558989	0.0004923	-0.000408	1.8013307	12.3191451 C
0.00001938	12681.	654518360.	25.9385214	0.0005026	-0.000427	1.8330079	12.5514568 C
0.00002000	12863.	643128198.	25.6384267	0.0005128	-0.000447	1.8642970	12.7822875 C
0.00002063	13039.	632191041.	25.3512037	0.0005229	-0.000467	1.8950212	13.0099388 C
0.00002125	13213.	621778766.	25.0784271	0.0005329	-0.000487	1.9253639	13.2360808 C
0.00002188	13384.	611822109.	24.8181810	0.0005429	-0.000507	1.9552834	13.4602830 C
0.00002250	13551.	602279818.	24.5691163	0.0005528	-0.000527	1.9847638	13.6823483 C
0.00002313	13717.	593162483.	24.3315845	0.0005627	-0.000547	2.0138968	13.9031189 C
0.00002375	13880.	584407414.	24.1036397	0.0005725	-0.000568	2.0426122	14.1218819 C
0.00002438	14041.	576021764.	23.8855997	0.0005822	-0.000588	2.0709904	-14.501117 C
0.00002563	14356.	560234410.	23.4753945	0.0006016	-0.000628	2.1266765	-15.549598 C
0.00002688	14664.	545654776.	23.0968920	0.0006207	-0.000669	2.1810508	-16.603110 C
0.00002813	14967.	532162970.	22.7469581	0.0006398	-0.000710	2.2342221	-17.660762 C
0.00002938	15263.	519586658.	22.4203249	0.0006586	-0.000751	2.2860761	-18.723936 C
0.00003063	15553.	507866742.	22.1156807	0.0006773	-0.000793	2.3367659	-19.791261 C
0.00003188	15841.	496969880.	21.8330727	0.0006959	-0.000834	2.3865353	-20.860303 C
0.00003313	16122.	486695964.	21.5651698	0.0007143	-0.000876	2.4349667	-21.935709 C
0.00003438	16401.	477119261.	21.3163686	0.0007328	-0.000917	2.4826257	-23.011495 C
0.00003563	16675.	468068088.	21.0800406	0.0007510	-0.000959	2.5290910	-24.092433 C
0.00003688	16948.	459598431.	20.8599580	0.0007692	-0.001001	2.5748546	-25.173132 C
0.00003813	17215.	451548387.	20.6491806	0.0007873	-0.001043	2.6194081	-26.259500 C

Pier drilled shaft_row2

0.00003938	17482.	443991326.	20.4525581	0.0008053	-0.001085	2.6633285	-27.344985	C
0.00004063	17745.	436804101.	20.2644643	0.0008232	-0.001127	2.7061891	-28.434678	C
0.00004188	18006.	430000212.	20.0866912	0.0008411	-0.001169	2.7482611	-29.525474	C
0.00004313	18267.	423574513.	19.9199179	0.0008590	-0.001211	2.7897074	-30.615403	C
0.00004438	18522.	417408205.	19.7578708	0.0008768	-0.001253	2.8299807	-31.711340	C
0.00004563	18778.	411564967.	19.6053520	0.0008945	-0.001296	2.8696394	-32.806419	C
0.00004688	19032.	406018810.	19.4616028	0.0009123	-0.001338	2.9086802	-33.900634	C
0.00004813	19283.	400687583.	19.3219032	0.0009299	-0.001380	2.9466770	-34.999619	C
0.00004938	19533.	395602284.	19.1891497	0.0009475	-0.001423	2.9839871	-36.098787	C
0.00005063	19782.	390754983.	19.0635371	0.0009651	-0.001465	3.0206866	-37.197094	C
0.00005188	20030.	386120938.	18.9439852	0.0009827	-0.001507	3.0567118	-38.295392	C
0.00005313	20275.	381645538.	18.8270009	0.0010002	-0.001550	3.0917336	-39.398402	C
0.00005438	20519.	377363928.	18.7159396	0.0010177	-0.001592	3.1261516	-40.500553	C
0.00005563	20763.	373262977.	18.6104055	0.0010352	-0.001635	3.1599628	-41.601839	C
0.00005688	21006.	369330643.	18.5100377	0.0010528	-0.001677	3.1931639	-42.702256	C
0.00005813	21246.	365527472.	18.4119892	0.0010702	-0.001720	3.2254790	-43.806041	C
0.00005938	21486.	361861071.	18.3174718	0.0010876	-0.001762	3.2570689	-44.910853	C
0.00006063	21724.	358335186.	18.2273494	0.0011050	-0.001805	3.2880549	-46.014792	C
0.00006188	21962.	354941244.	18.1413589	0.0011225	-0.001848	3.3184342	-47.117849	C
0.00006313	22199.	351671287.	18.0592584	0.0011400	-0.001890	3.3482035	-48.220020	C
0.00006438	22435.	348510527.	17.9800535	0.0011575	-0.001933	3.3772764	-49.322737	C
0.00006563	22668.	345411487.	17.9016791	0.0011748	-0.001975	3.4054515	-50.000000	CY
0.00006688	22887.	342236913.	17.8241168	0.0011920	-0.002018	3.4327481	-50.000000	CY
0.00006813	23090.	338942371.	17.7465714	0.0012090	-0.002061	3.4591027	-50.000000	CY
0.00006938	23286.	335652173.	17.6706915	0.0012259	-0.002104	3.4847114	-50.000000	CY
0.00007063	23452.	332064045.	17.5917889	0.0012424	-0.002148	3.5091001	-50.000000	CY
0.00007188	23589.	328198274.	17.5095811	0.0012585	-0.002191	3.5322671	-50.000000	CY
0.00007313	23723.	324420948.	17.4274017	0.0012744	-0.002236	3.5545864	-50.000000	CY
0.00007438	23857.	320764914.	17.3483381	0.0012903	-0.002280	3.5763963	-50.000000	CY
0.00007938	24387.	307238214.	17.0603383	0.0013542	-0.002456	3.6584913	-50.000000	CY
0.00008438	24803.	293956224.	16.7777992	0.0014156	-0.002634	3.7290885	-50.000000	CY
0.00008938	25119.	281046421.	16.5078405	0.0014754	-0.002815	3.7898701	-50.000000	CY
0.00009438	25422.	269370708.	16.2613464	0.0015347	-0.002995	3.8425328	-50.000000	CY
0.00009938	25719.	258805739.	16.0417557	0.0015941	-0.003176	3.8877601	-50.000000	CY
0.0001044	26004.	249143182.	15.8386654	0.0016532	-0.003357	3.9250744	-50.000000	CY
0.0001094	26258.	240075472.	15.6506858	0.0017118	-0.003538	3.9547036	-50.000000	CY
0.0001144	26418.	230974764.	15.4523566	0.0017674	-0.003723	3.9759186	-50.000000	CY
0.0001194	26565.	222536414.	15.2693760	0.0018228	-0.003907	3.9904558	-50.000000	CY
0.0001244	26708.	214740970.	15.1031454	0.0018785	-0.004092	3.9984049	-50.000000	CY
0.0001294	26841.	207467178.	14.9441064	0.0019334	-0.004277	3.9976183	-50.000000	CY

Pier drilled shaft_row2

0.0001344	26970.	200705471.	14.7999540	0.0019887	-0.004461	3.9982057	-50.000000	CY
0.0001394	27094.	194399193.	14.6692123	0.0020445	-0.004645	3.9999090	-50.000000	CY
0.0001444	27211.	188472358.	14.5441970	0.0020998	-0.004830	3.9990544	-50.000000	CY
0.0001494	27322.	182910874.	14.4283074	0.0021552	-0.005015	3.9967590	-50.000000	CY
0.0001544	27431.	177688668.	14.3224417	0.0022110	-0.005199	3.9999150	-50.000000	CY
0.0001594	27536.	172772854.	14.2257733	0.0022672	-0.005383	3.9982202	-50.000000	CY
0.0001644	27636.	168130409.	14.1352336	0.0023235	-0.005567	3.9989785	50.000000	CY
0.0001694	27728.	163709379.	14.0474176	0.0023793	-0.005751	3.9985880	50.000000	CY
0.0001744	27796.	159401296.	13.9573910	0.0024338	-0.005936	3.9989029	50.000000	CY
0.0001794	27840.	155205897.	13.8699268	0.0024879	-0.006122	3.9978133	50.000000	CY
0.0001844	27877.	151199230.	13.7862752	0.0025418	-0.006308	3.9999248	50.000000	CY
0.0001894	27911.	147386920.	13.7088787	0.0025961	-0.006494	3.9955660	50.000000	CY
0.0001944	27941.	143745795.	13.6338775	0.0026501	-0.006680	3.9990391	50.000000	CY
0.0001994	27967.	140275153.	13.5611763	0.0027038	-0.006866	3.9987338	50.000000	CY
0.0002044	27993.	136966375.	13.4937061	0.0027578	-0.007052	3.9958926	50.000000	CY
0.0002094	28016.	133809032.	13.4309783	0.0028121	-0.007238	3.9990604	50.000000	CY
0.0002144	28039.	130795096.	13.3721605	0.0028667	-0.007423	3.9991109	50.000000	CY
0.0002194	28061.	127912012.	13.3174805	0.0029215	-0.007608	3.9944284	50.000000	CY
0.0002244	28079.	125144588.	13.2681261	0.0029770	-0.007793	3.9981936	50.000000	CY
0.0002294	28095.	122485087.	13.2237901	0.0030332	-0.007977	3.9999066	50.000000	CYT
0.0002344	28109.	119930328.	13.1806074	0.0030892	-0.008161	3.9932016	50.000000	CYT
0.0002394	28121.	117474928.	13.1374840	0.0031448	-0.008345	3.9955612	50.000000	CYT
0.0002444	28131.	115112423.	13.0982997	0.0032009	-0.008529	3.9986755	50.000000	CYT
0.0002494	28138.	112834055.	13.0636760	0.0032578	-0.008712	3.9999711	50.000000	CYT
0.0002544	28144.	110640590.	13.0317715	0.0033150	-0.008895	3.9923074	50.000000	CYT
0.0002594	28150.	108529308.	13.0018968	0.0033724	-0.009078	3.9944671	50.000000	CYT
0.0002644	28155.	106495995.	12.9738320	0.0034300	-0.009260	3.9979633	50.000000	CYT
0.0002694	28159.	104536170.	12.9475200	0.0034877	-0.009442	3.9997543	50.000000	CYT
0.0002744	28163.	102644646.	12.9231859	0.0035458	-0.009624	3.9958370	50.000000	CYT
0.0003044	28163.	92527720.	12.8643283	0.0039156	-0.010694	3.9910668	50.000000	CYT

Axial Thrust Force = 848.900 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	700.3066391	1120490622.	196.9858798	0.0001231	0.00009312	0.5045218	3.5051191	
0.00000125	1401.	1120471324.	110.5284874	0.0001382	0.00007816	0.5633242	3.8761577	

Pier drilled shaft_row2

0.00000188	2101.	1120430593.	81.7251545	0.0001532	0.00006323	0.6217432	4.2480553
0.00000250	2801.	1120371642.	67.3353379	0.0001683	0.00004834	0.6797760	4.6208120
0.00000313	3501.	1120295109.	58.7109294	0.0001835	0.00003347	0.7374194	4.9944280
0.00000375	4201.	1120201206.	52.9692266	0.0001986	0.00001863	0.7946706	5.3689034
0.00000438	4900.	1120090021.	48.8747859	0.0002138	0.00000383	0.8515266	5.7442385
0.00000500	5600.	1119953110.	45.8098374	0.0002290	-0.00001095	0.9079834	6.1204264
0.00000563	6298.	1119697395.	43.4306441	0.0002443	-0.00002570	0.9640263	6.4973738
0.00000625	6995.	1119227024.	41.5306567	0.0002596	-0.00004043	1.0196336	6.8749316
0.00000688	7690.	1118513536.	39.9785767	0.0002749	-0.00005515	1.0747882	7.2529787
0.00000750	8382.	1117562201.	38.6869999	0.0002902	-0.00006985	1.1294768	7.6314223
0.00000813	9071.	1116393169.	37.5955185	0.0003055	-0.00008454	1.1836896	8.0101940
0.00000875	9757.	1115031351.	36.6610573	0.0003208	-0.00009922	1.2374193	8.3892433
0.00000938	10439.	1113500887.	35.8520711	0.0003361	-0.000114	1.2906603	8.7685319
0.00001000	10439.	1043907082.	33.6982573	0.0003370	-0.000143	1.2931708	8.7284946 C
0.00001063	10439.	982500783.	32.8625045	0.0003492	-0.000161	1.3349847	9.0165092 C
0.00001125	10439.	927917406.	32.0991811	0.0003611	-0.000179	1.3756835	9.2978579 C
0.00001188	10439.	879079648.	31.4013693	0.0003729	-0.000197	1.4154685	9.5740966 C
0.00001250	10439.	835125665.	30.7581970	0.0003845	-0.000216	1.4543093	9.8448463 C
0.00001313	10608.	808197211.	30.1644065	0.0003959	-0.000234	1.4923327	10.1110773 C
0.00001375	10850.	789076978.	29.6136428	0.0004072	-0.000253	1.5295681	10.3729401 C
0.00001438	11083.	770967246.	29.1007749	0.0004183	-0.000272	1.5660495	10.6306355 C
0.00001500	11307.	753800531.	28.6215852	0.0004293	-0.000291	1.6018132	10.8843895 C
0.00001563	11524.	737518788.	28.1725907	0.0004402	-0.000310	1.6368977	11.1344552 C
0.00001625	11734.	722071420.	27.7509061	0.0004510	-0.000329	1.6713435	11.3811146 C
0.00001688	11938.	707413792.	27.3541378	0.0004616	-0.000348	1.7051939	11.6246812 C
0.00001750	12136.	693506013.	26.9803009	0.0004722	-0.000368	1.7384945	11.8655027 C
0.00001813	12331.	680311997.	26.6277542	0.0004826	-0.000387	1.7712941	12.1039634 C
0.00001875	12519.	667672594.	26.2920743	0.0004930	-0.000407	1.8034630	12.3388155 C
0.00001938	12703.	655662095.	25.9743630	0.0005033	-0.000427	1.8351751	12.5715953 C
0.00002000	12885.	644266092.	25.6739963	0.0005135	-0.000447	1.8665010	12.8029179 C
0.00002063	13062.	633292228.	25.3857134	0.0005236	-0.000466	1.8972105	13.0305799 C
0.00002125	13236.	622875654.	25.1127622	0.0005336	-0.000486	1.9275918	13.2572398 C
0.00002188	13407.	612885653.	24.8515532	0.0005436	-0.000506	1.9574965	13.4814541 C
0.00002250	13575.	603340142.	24.6023955	0.0005536	-0.000526	1.9870173	13.7040630 C
0.00002313	13741.	594192283.	24.3639826	0.0005634	-0.000547	2.0161352	13.9248459 C
0.00002375	13904.	585433927.	24.1359871	0.0005732	-0.000567	2.0448908	14.1441612 C
0.00002438	14065.	577020235.	23.9171364	0.0005830	-0.000587	2.0732538	-14.478824 C
0.00002563	14381.	561204457.	23.5061949	0.0006023	-0.000628	2.1289666	-15.526709 C
0.00002688	14690.	546599742.	23.1270980	0.0006215	-0.000668	2.1833718	-16.579568 C
0.00002813	14993.	533084966.	22.7766719	0.0006406	-0.000709	2.2365762	-17.636527 C

Pier drilled shaft_row2

0.00002938	15289.	520466793.	22.4488128	0.0006594	-0.000751	2.2883985	-18.699667	C
0.00003063	15580.	508728285.	22.1438363	0.0006782	-0.000792	2.3391232	-19.766255	C
0.00003188	15867.	497799934.	21.8603636	0.0006968	-0.000833	2.3888776	-20.835076	C
0.00003313	16149.	487506053.	21.5920557	0.0007152	-0.000875	2.4373284	-21.909881	C
0.00003438	16428.	477914875.	21.3431148	0.0007337	-0.000916	2.4850264	-22.984832	C
0.00003563	16702.	468833771.	21.1058889	0.0007519	-0.000958	2.5314584	-24.065728	C
0.00003688	16975.	460348364.	20.8855874	0.0007702	-0.001000	2.5772461	-25.145725	C
0.00003813	17243.	452275268.	20.6741830	0.0007882	-0.001042	2.6217821	-26.231856	C
0.00003938	17510.	444693335.	20.4768074	0.0008063	-0.001084	2.6656684	-27.317295	C
0.00004063	17773.	437496691.	20.2887821	0.0008242	-0.001126	2.7085709	-28.406029	C
0.00004188	18034.	430670466.	20.1103249	0.0008421	-0.001168	2.7506079	-29.496774	C
0.00004313	18295.	424223762.	19.9429102	0.0008600	-0.001210	2.7920195	-30.586648	C
0.00004438	18551.	418049975.	19.7810164	0.0008778	-0.001252	2.8323354	-31.681555	C
0.00004563	18806.	412187618.	19.6279060	0.0008955	-0.001294	2.8719581	-32.776578	C
0.00004688	19060.	406623402.	19.4835972	0.0009133	-0.001337	2.9109630	-33.870735	C
0.00004813	19312.	401286132.	19.3441269	0.0009309	-0.001379	2.9490034	-34.968603	C
0.00004938	19562.	396184294.	19.2108542	0.0009485	-0.001421	2.9862764	-36.067709	C
0.00005063	19811.	391321257.	19.0847487	0.0009662	-0.001464	3.0229388	-37.165953	C
0.00005188	20059.	386679607.	18.9652957	0.0009838	-0.001506	3.0589873	-38.263333	C
0.00005313	20304.	382192244.	18.8480450	0.0010013	-0.001549	3.0939916	-39.365981	C
0.00005438	20548.	377896800.	18.7365444	0.0010188	-0.001591	3.1283711	-40.468062	C
0.00005563	20792.	373782624.	18.6305912	0.0010363	-0.001634	3.1621437	-41.569277	C
0.00005688	21035.	369837641.	18.5298233	0.0010539	-0.001676	3.1953060	-42.669623	C
0.00005813	21276.	366030812.	18.4321374	0.0010714	-0.001719	3.2276631	-43.772078	C
0.00005938	21515.	362352641.	18.3372418	0.0010888	-0.001761	3.2592129	-44.876812	C
0.00006063	21753.	358815465.	18.2467572	0.0011062	-0.001804	3.2901587	-45.980671	C
0.00006188	21991.	355410673.	18.1604197	0.0011237	-0.001846	3.3204974	-47.083647	C
0.00006313	22228.	352130292.	18.0779865	0.0011412	-0.001889	3.3502259	-48.185736	C
0.00006438	22465.	348966697.	17.9992028	0.0011587	-0.001931	3.3793376	-49.286988	C
0.00006563	22697.	345860100.	17.9205420	0.0011760	-0.001974	3.4074738	-50.000000	CY
0.00006688	22917.	342684443.	17.8427913	0.0011932	-0.002017	3.4347410	-50.000000	CY
0.00006813	23121.	339386301.	17.7650281	0.0012102	-0.002060	3.4610619	-50.000000	CY
0.00006938	23316.	336089499.	17.6888932	0.0012272	-0.002103	3.4866317	-50.000000	CY
0.00007063	23483.	332507733.	17.6099328	0.0012437	-0.002146	3.5110021	-50.000000	CY
0.00007188	23622.	328650831.	17.5280808	0.0012598	-0.002190	3.5341936	-50.000000	CY
0.00007313	23756.	324868543.	17.4459712	0.0012757	-0.002234	3.5565061	-50.000000	CY
0.00007438	23890.	321204162.	17.3666321	0.0012916	-0.002278	3.5782721	-50.000000	CY
0.00007938	24419.	307646661.	17.0776214	0.0013555	-0.002454	3.6601892	-50.000000	CY
0.00008438	24837.	294370149.	16.7954440	0.0014171	-0.002633	3.7307292	-50.000000	CY
0.00008938	25154.	281441712.	16.5254202	0.0014770	-0.002813	3.7913946	-50.000000	CY

Pier drilled shaft_row2							
0.00009438	25457.	269742657.	16.2781204	0.0015362	-0.002994	3.8438621	-50.000000 CY
0.00009938	25754.	259162818.	16.0586367	0.0015958	-0.003174	3.8889487	-50.000000 CY
0.0001044	26040.	249480933.	15.8548738	0.0016549	-0.003355	3.9260532	-50.000000 CY
0.0001094	26295.	240412111.	15.6667727	0.0017136	-0.003536	3.9554942	-50.000000 CY
0.0001144	26455.	231303174.	15.4688295	0.0017692	-0.003721	3.9765346	-50.000000 CY
0.0001194	26603.	222849243.	15.2852772	0.0018247	-0.003905	3.9908450	-50.000000 CY
0.0001244	26746.	215045261.	15.1195063	0.0018805	-0.004090	3.9985726	-50.000000 CY
0.0001294	26879.	207757849.	14.9599769	0.0019354	-0.004275	3.9978261	-50.000000 CY
0.0001344	27007.	200983421.	14.8153829	0.0019908	-0.004459	3.9975557	-50.000000 CY
0.0001394	27132.	194665649.	14.6842139	0.0020466	-0.004643	3.9999463	-50.000000 CY
0.0001444	27248.	188732636.	14.5598470	0.0021021	-0.004828	3.9991960	-50.000000 CY
0.0001494	27360.	183160752.	14.4435969	0.0021575	-0.005012	3.9970289	-50.000000 CY
0.0001544	27468.	177929225.	14.3373643	0.0022133	-0.005197	3.9999541	-50.000000 CY
0.0001594	27573.	173004349.	14.2403842	0.0022696	-0.005380	3.9984225	-50.000000 CY
0.0001644	27674.	168357191.	14.1507551	0.0023260	-0.005564	3.9981786	50.0000000 CY
0.0001694	27766.	163933157.	14.0629263	0.0023819	-0.005748	3.9987896	50.0000000 CY
0.0001744	27833.	159617642.	13.9727492	0.0024365	-0.005934	3.9980633	50.0000000 CY
0.0001794	27878.	155419734.	13.8854905	0.0024907	-0.006119	3.9980814	50.0000000 CY
0.0001844	27916.	151406893.	13.8015491	0.0025447	-0.006305	3.9999677	50.0000000 CY
0.0001894	27949.	147587051.	13.7240526	0.0025990	-0.006491	3.9959625	50.0000000 CY
0.0001944	27979.	143944044.	13.6501934	0.0026533	-0.006677	3.9992362	50.0000000 CY
0.0001994	28006.	140467400.	13.5772637	0.0027070	-0.006863	3.9977282	50.0000000 CY
0.0002044	28031.	137152974.	13.5095815	0.0027610	-0.007049	3.9963217	50.0000000 CY
0.0002094	28054.	133990631.	13.4465814	0.0028154	-0.007235	3.9992608	50.0000000 CY
0.0002144	28077.	130971526.	13.3875782	0.0028700	-0.007420	3.9980746	50.0000000 CY
0.0002194	28098.	128083963.	13.3326430	0.0029248	-0.007605	3.9949425	50.0000000 CY
0.0002244	28116.	125309806.	13.2835657	0.0029805	-0.007789	3.9984923	50.0000000 CY
0.0002294	28132.	122646197.	13.2390114	0.0030367	-0.007973	3.9999645	50.0000000 CYT
0.0002344	28146.	120089921.	13.1974861	0.0030932	-0.008157	3.9919613	50.0000000 CYT
0.0002394	28158.	117630770.	13.1541375	0.0031488	-0.008341	3.9961066	50.0000000 CYT
0.0002444	28167.	115262480.	13.1153297	0.0032051	-0.008525	3.9989772	50.0000000 CYT
0.0002494	28175.	112980631.	13.0805196	0.0032620	-0.008708	3.9999992	50.0000000 CYT
0.0002544	28181.	110783461.	13.0485297	0.0033192	-0.008891	3.9909709	50.0000000 CYT
0.0002594	28186.	108669027.	13.0184744	0.0033767	-0.009073	3.9951245	50.0000000 CYT
0.0002644	28191.	106632670.	12.9902410	0.0034343	-0.009256	3.9983573	50.0000000 CYT
0.0002694	28195.	104669883.	12.9637785	0.0034921	-0.009438	3.9998783	50.0000000 CYT
0.0002744	28199.	102775146.	12.9393993	0.0035502	-0.009620	3.9944422	50.0000000 CYT
0.0003044	28199.	92645358.	12.8800567	0.0039204	-0.010690	3.9920005	50.0000000 CYT

Pier drilled shaft_row2

Axial Thrust Force = 1018.000 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	692.2439673	1107590348.	232.6334373	0.0001454	0.0001154	0.5922959	4.1512311	
0.00000125	1384.	1107572075.	128.3526895	0.0001604	0.0001004	0.6503542	4.5222850	
0.00000188	2077.	1107531278.	93.6084263	0.0001755	0.00008552	0.7080291	4.8942082	
0.00000250	2769.	1107471834.	76.2482857	0.0001906	0.00007062	0.7653174	5.2670007	
0.00000313	3461.	1107394515.	65.8417958	0.0002058	0.00005576	0.8222161	5.6406628	
0.00000375	4152.	1107299577.	58.9121329	0.0002209	0.00004092	0.8787224	6.0151945	
0.00000438	4844.	1107187127.	53.9692302	0.0002361	0.00002612	0.9348331	6.3905961	
0.00000500	5535.	1107057213.	50.2680544	0.0002513	0.00001134	0.9905453	6.7668679	
0.00000563	6226.	1106909741.	47.3946979	0.0002666	-0.00000340	1.0458559	7.1440101	
0.00000625	6917.	1106717375.	45.1006557	0.0002819	-0.00001812	1.1007583	7.5219939	
0.00000688	7606.	1106395645.	43.2273645	0.0002972	-0.00003281	1.1552355	7.9007058	
0.00000750	8294.	1105890063.	41.6690765	0.0003125	-0.00004748	1.2092701	8.2800242	
0.00000813	8980.	1105183784.	40.3526809	0.0003279	-0.00006213	1.2628481	8.6598505	
0.00000875	9662.	1104278854.	39.2260300	0.0003432	-0.00007677	1.3159581	9.0401051	
0.00000938	10342.	1103187246.	38.2509463	0.0003586	-0.00009140	1.3685912	9.4207258	
0.00001000	11019.	1101925197.	37.3988458	0.0003740	-0.000106	1.4207405	9.8016652	
0.00001063	11019.	1037106068.	35.6170228	0.0003784	-0.000132	1.4353383	9.8652451	C
0.00001125	11019.	979489064.	34.7717188	0.0003912	-0.000149	1.4779530	10.1697733	C
0.00001188	11019.	927937008.	33.9964631	0.0004037	-0.000166	1.5194600	10.4677820	C
0.00001250	11200.	895977042.	33.2839059	0.0004160	-0.000184	1.5600086	10.7604159	C
0.00001313	11496.	875909097.	32.6245913	0.0004282	-0.000202	1.5995927	11.0474851	C
0.00001375	11780.	856722544.	32.0137032	0.0004402	-0.000220	1.6383373	11.3299642	C
0.00001438	12052.	838388098.	31.4455602	0.0004520	-0.000238	1.6762845	11.6081179	C
0.00001500	12312.	820823791.	30.9145980	0.0004637	-0.000256	1.7134356	11.8818502	C
0.00001563	12563.	804050742.	30.4176074	0.0004753	-0.000275	1.7498645	12.1517283	C
0.00001625	12806.	788033147.	29.9511729	0.0004867	-0.000293	1.7856074	12.4179901	C
0.00001688	13040.	772738505.	29.5124315	0.0004980	-0.000312	1.8207019	12.6808962	C
0.00001750	13266.	758074978.	29.0978053	0.0005092	-0.000331	1.8551235	12.9401361	C
0.00001813	13486.	744049313.	28.7057794	0.0005203	-0.000350	1.8889363	13.1962253	C
0.00001875	13700.	730648768.	28.3348251	0.0005313	-0.000369	1.9221903	13.4495611	C
0.00001938	13908.	717853678.	27.9835432	0.0005422	-0.000388	1.9549300	13.7005034	C
0.00002000	14112.	705594869.	27.6496769	0.0005530	-0.000407	1.9871366	13.9488127	C
0.00002063	14310.	693796712.	27.3307934	0.0005637	-0.000426	2.0187643	14.1939809	C
0.00002125	14504.	682542152.	27.0281413	0.0005743	-0.000446	2.0499825	14.4375921	C

Pier drilled shaft_row2

0.00002188	14694.	671720634.	26.7387968	0.0005849	-0.000465	2.0806966	14.6786743	C
0.00002250	14880.	661319441.	26.4619705	0.0005954	-0.000485	2.1109337	14.9174358	C
0.00002313	15063.	651378177.	26.1984051	0.0006058	-0.000504	2.1408169	15.1550555	C
0.00002375	15242.	641750115.	25.9441214	0.0006162	-0.000524	2.1701491	15.3895137	C
0.00002438	15419.	632570483.	25.7024412	0.0006265	-0.000544	2.1992178	15.6236632	C
0.00002563	15763.	615135105.	25.2452264	0.0006469	-0.000583	2.2559952	16.0851089	C
0.00002688	16096.	598937351.	24.8222406	0.0006671	-0.000623	2.3112483	16.5400839	C
0.00002813	16421.	583864675.	24.4298966	0.0006871	-0.000663	2.3650815	16.9893845	C
0.00002938	16739.	569825848.	24.0654859	0.0007069	-0.000703	2.4176151	17.4340359	C
0.00003063	17050.	556738293.	23.7267519	0.0007266	-0.000743	2.4689638	-18.360428	C
0.00003188	17354.	544432393.	23.4083602	0.0007461	-0.000784	2.5189534	-19.404147	C
0.00003313	17652.	532900894.	23.1104605	0.0007655	-0.000824	2.5678160	-20.451264	C
0.00003438	17947.	522090667.	22.8319273	0.0007848	-0.000865	2.6156618	-21.500672	C
0.00003563	18235.	511847203.	22.5673506	0.0008040	-0.000906	2.6622064	-22.555856	C
0.00003688	18521.	502252487.	22.3208004	0.0008231	-0.000947	2.7079630	-23.610944	C
0.00003813	18800.	493102918.	22.0844491	0.0008420	-0.000988	2.7523845	-24.672631	C
0.00003938	19078.	484512067.	21.8639582	0.0008609	-0.001029	2.7961072	-25.733343	C
0.00004063	19350.	476306697.	21.6522187	0.0008796	-0.001070	2.8386029	-26.799730	C
0.00004188	19621.	468556292.	21.4532303	0.0008984	-0.001112	2.8803453	-27.865983	C
0.00004313	19888.	461176376.	21.2635622	0.0009170	-0.001153	2.9211134	-28.935008	C
0.00004438	20152.	454138084.	21.0825120	0.0009355	-0.001194	2.9609271	-30.006692	C
0.00004563	20416.	447467644.	20.9121159	0.0009541	-0.001236	3.0000633	-31.077406	C
0.00004688	20675.	441058449.	20.7472413	0.0009725	-0.001277	3.0381006	-32.152969	C
0.00004813	20932.	434947556.	20.5906056	0.0009909	-0.001319	3.0753684	-33.228986	C
0.00004938	21188.	429129968.	20.4425730	0.0010094	-0.001361	3.1119662	-34.304041	C
0.00005063	21441.	423529002.	20.2991372	0.0010276	-0.001402	3.1475561	-35.383079	C
0.00005188	21692.	418160277.	20.1618500	0.0010459	-0.001444	3.1823421	-36.463267	C
0.00005313	21942.	413029559.	20.0316447	0.0010642	-0.001486	3.2164655	-37.542497	C
0.00005438	22191.	408114032.	19.9076070	0.0010825	-0.001528	3.2498797	-38.621442	C
0.00005563	22436.	403349837.	19.7859198	0.0011006	-0.001569	3.2822436	-39.705588	C
0.00005688	22681.	398781675.	19.6701609	0.0011187	-0.001611	3.3139517	-40.788780	C
0.00005813	22924.	394396831.	19.5599516	0.0011369	-0.001653	3.3450006	-41.871006	C
0.00005938	23167.	390183547.	19.4549452	0.0011551	-0.001695	3.3753864	-42.952266	C
0.00006063	23407.	386090126.	19.3516231	0.0011732	-0.001737	3.4047882	-44.038178	C
0.00006188	23645.	382143029.	19.2524769	0.0011912	-0.001779	3.4334813	-45.124087	C
0.00006313	23883.	378340274.	19.1577885	0.0012093	-0.001821	3.4615178	-46.209023	C
0.00006438	24120.	374673313.	19.0673019	0.0012275	-0.001863	3.4888940	-47.292981	C
0.00006563	24356.	371134295.	18.9807810	0.0012456	-0.001904	3.5156063	-48.375951	C
0.00006688	24589.	367688860.	18.8955670	0.0012636	-0.001946	3.5414167	-49.462659	C
0.00006813	24819.	364317806.	18.8127520	0.0012816	-0.001988	3.5664511	-50.000000	CY

Pier drilled shaft_row2

0.00006938	25036.	360878528.	18.7309110	0.0012995	-0.002031	3.5905937	-50.000000	CY
0.00007063	25238.	357352052.	18.6496208	0.0013171	-0.002073	3.6138264	-50.000000	CY
0.00007188	25433.	353845504.	18.5702704	0.0013347	-0.002115	3.6362989	-50.000000	CY
0.00007313	25601.	350100968.	18.4888960	0.0013520	-0.002158	3.6576681	-50.000000	CY
0.00007438	25740.	346088112.	18.4021909	0.0013687	-0.002201	3.6776686	-50.000000	CY
0.00007938	26276.	331033199.	18.0821229	0.0014353	-0.002375	3.7516041	-50.000000	CY
0.00008438	26790.	317516234.	17.7957993	0.0015015	-0.002548	3.8155993	-50.000000	CY
0.00008938	27148.	303754836.	17.5113753	0.0015651	-0.002725	3.8680126	-50.000000	CY
0.00009438	27457.	290931760.	17.2429764	0.0016273	-0.002903	3.9108414	-50.000000	CY
0.00009938	27758.	279322286.	17.0044062	0.0016898	-0.003080	3.9454352	-50.000000	CY
0.0001044	28044.	268687371.	16.7836890	0.0017518	-0.003258	3.9713911	-50.000000	CY
0.0001094	28325.	258968425.	16.5874271	0.0018142	-0.003436	3.9891432	-50.000000	CY
0.0001144	28570.	249791988.	16.3984666	0.0018756	-0.003614	3.9983641	-50.000000	CY
0.0001194	28730.	240668815.	16.2070573	0.0019347	-0.003795	3.9984188	-50.000000	CY
0.0001244	28873.	232144629.	16.0296863	0.0019937	-0.003976	3.9980330	-50.000000	CY
0.0001294	29005.	224194059.	15.8627518	0.0020522	-0.004158	3.9970325	-50.000000	CY
0.0001344	29132.	216799606.	15.7117286	0.0021113	-0.004339	3.9999994	-50.000000	CY
0.0001394	29254.	209891559.	15.5732914	0.0021705	-0.004519	3.9996829	-50.000000	CY
0.0001444	29365.	203397038.	15.4404749	0.0022292	-0.004701	3.9983593	-50.000000	CY
0.0001494	29473.	197308173.	15.3197997	0.0022884	-0.004882	3.9975626	50.000000	CY
0.0001544	29576.	191586220.	15.2100317	0.0023480	-0.005062	3.9995560	50.000000	CY
0.0001594	29672.	186175124.	15.1115127	0.0024084	-0.005242	3.9970040	50.000000	CY
0.0001644	29760.	181047277.	15.0152893	0.0024681	-0.005422	3.9998902	50.000000	CY
0.0001694	29842.	176189466.	14.9288726	0.0025286	-0.005601	3.9973290	50.000000	CY
0.0001744	29922.	171594882.	14.8496035	0.0025894	-0.005781	3.9999222	50.000000	CY
0.0001794	29997.	167228175.	14.7769367	0.0026506	-0.005959	3.9967692	50.000000	CY
0.0001844	30058.	163025958.	14.7056618	0.0027114	-0.006139	3.9997241	50.000000	CY
0.0001894	30107.	158978472.	14.6359299	0.0027717	-0.006318	3.9946411	50.000000	CY
0.0001944	30127.	154995498.	14.5619638	0.0028305	-0.006500	3.9985881	50.000000	CY
0.0001994	30146.	151204082.	14.4926108	0.0028895	-0.006681	3.9999969	50.000000	CY
0.0002044	30163.	147585690.	14.4282267	0.0029488	-0.006861	3.9951544	50.000000	CY
0.0002094	30174.	144115893.	14.3718075	0.0030091	-0.007041	3.9987814	50.000000	CYT
0.0002144	30185.	140802353.	14.3193533	0.0030697	-0.007220	3.9999716	50.000000	CYT
0.0002194	30193.	137631529.	14.2710928	0.0031307	-0.007399	3.9942044	50.000000	CYT
0.0002244	30201.	134598356.	14.2259599	0.0031919	-0.007578	3.9981495	50.000000	CYT
0.0002294	30207.	131693714.	14.1837768	0.0032534	-0.007757	3.9999066	50.000000	CYT
0.0002344	30212.	128904138.	14.1429818	0.0033148	-0.007935	3.9930271	50.000000	CYT
0.0002394	30215.	126223412.	14.1021672	0.0033757	-0.008114	3.9957182	50.000000	CYT
0.0002444	30217.	123649892.	14.0638415	0.0034369	-0.008293	3.9987780	50.000000	CYT
0.0002494	30219.	121177053.	14.0278773	0.0034982	-0.008472	3.9999818	50.000000	CYT

Pier drilled shaft_row2

0.0002544	30219.	118796275.	13.9947996	0.0035599	-0.008650	3.9920659	50.0000000	CYT
0.0002594	30219.	116506226.	13.9637955	0.0036219	-0.008828	3.9945445	50.0000000	CYT
0.0002644	30219.	114302799.	13.9346560	0.0036840	-0.009006	3.9979840	50.0000000	CYT
0.0002694	30219.	112181169.	13.9072959	0.0037463	-0.009184	3.9997523	50.0000000	CYT
0.0002744	30219.	110136865.	13.8819801	0.0038089	-0.009361	3.9959407	50.0000000	CYT

Axial Thrust Force = 1091.000 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	688.7335084	1101973613.	248.1542538	0.0001551	0.0001251	0.6301637	4.4325459	
0.00000125	1377.	1101955787.	136.1132852	0.0001701	0.0001101	0.6878980	4.8036066	
0.00000188	2066.	1101914957.	98.7823651	0.0001852	0.00009522	0.7452488	5.1755411	
0.00000250	2755.	1101855293.	80.1289586	0.0002003	0.00008032	0.8022130	5.5483495	
0.00000313	3443.	1101777625.	68.9465591	0.0002155	0.00006546	0.8587876	5.9220319	
0.00000375	4131.	1101682228.	61.4996650	0.0002306	0.00005062	0.9149695	6.2965886	
0.00000438	4819.	1101569217.	56.1873472	0.0002458	0.00003582	0.9707557	6.6720197	
0.00000500	5507.	1101438645.	52.2091414	0.0002610	0.00002105	1.0261432	7.0483255	
0.00000563	6195.	1101290539.	49.1203457	0.0002763	0.00000630	1.0811291	7.4255064	
0.00000625	6882.	1101122939.	46.6541275	0.0002916	-0.00000841	1.1357099	7.8035606	
0.00000688	7569.	1100891359.	44.6404256	0.0003069	-0.00002310	1.1898761	8.1824349	
0.00000750	8254.	1100522910.	42.9655738	0.0003222	-0.00003776	1.2436106	8.5620123	
0.00000813	8937.	1099978773.	41.5509118	0.0003376	-0.00005240	1.2968977	8.9421836	
0.00000875	9618.	1099247759.	40.3403355	0.0003530	-0.00006702	1.3497249	9.3228601	
0.00000938	10297.	1098332531.	39.2927599	0.0003684	-0.00008163	1.4020818	9.7039691	
0.00001000	10972.	1097243515.	38.3774235	0.0003838	-0.00009623	1.4539600	10.0854529	
0.00001063	11645.	1095994620.	37.5708431	0.0003992	-0.000111	1.5053531	10.4672659	
0.00001125	11645.	1035106030.	35.8697728	0.0004035	-0.000136	1.5193829	10.5280132	C
0.00001188	11645.	980626765.	35.0632288	0.0004164	-0.000154	1.5615884	10.8351494	C
0.00001250	11645.	931595427.	34.3223701	0.0004290	-0.000171	1.6028175	11.1368592	C
0.00001313	11821.	900663960.	33.6361172	0.0004415	-0.000189	1.6430134	11.4324971	C
0.00001375	12124.	881750020.	33.0006171	0.0004538	-0.000206	1.6823531	11.7234961	C
0.00001438	12414.	863571038.	32.4095650	0.0004659	-0.000224	1.7208641	12.0099875	C
0.00001500	12690.	846025870.	31.8566582	0.0004778	-0.000242	1.7585235	12.2916464	C
0.00001563	12957.	829218609.	31.3393951	0.0004897	-0.000260	1.7954466	12.5694134	C
0.00001625	13213.	813129809.	30.8542523	0.0005014	-0.000279	1.8316740	12.8435663	C
0.00001688	13461.	797715691.	30.3978771	0.0005130	-0.000297	1.8672265	13.1142110	C

Pier drilled shaft_row2

0.00001750	13702.	782950214.	29.9676389	0.0005244	-0.000316	1.9021380	13.3815767	C
0.00001813	13934.	768768664.	29.5605666	0.0005358	-0.000334	1.9364021	13.6455228	C
0.00001875	14159.	755141156.	29.1745241	0.0005470	-0.000353	1.9700381	13.9061475	C
0.00001938	14378.	742088885.	28.8086147	0.0005582	-0.000372	2.0031206	14.1640904	C
0.00002000	14592.	729597919.	28.4615678	0.0005692	-0.000391	2.0356931	14.4197094	C
0.00002063	14801.	717601649.	28.1312150	0.0005802	-0.000410	2.0677340	14.6727330	C
0.00002125	15003.	706027970.	27.8152338	0.0005911	-0.000429	2.0991970	14.9226378	C
0.00002188	15202.	694967419.	27.5149523	0.0006019	-0.000448	2.1302523	15.1710479	C
0.00002250	15397.	684302594.	27.2273432	0.0006126	-0.000467	2.1607924	15.4168415	C
0.00002313	15587.	674039255.	26.9520188	0.0006233	-0.000487	2.1908658	15.6604476	C
0.00002375	15775.	664203485.	26.6893356	0.0006339	-0.000506	2.2205671	15.9027800	C
0.00002438	15958.	654668515.	26.4358886	0.0006444	-0.000526	2.2497330	16.1421188	C
0.00002563	16315.	636690646.	25.9605090	0.0006652	-0.000565	2.3069475	16.6166533	C
0.00002688	16662.	619969344.	25.5210531	0.0006859	-0.000604	2.3626063	17.0847209	C
0.00002813	16998.	604390089.	25.1136566	0.0007063	-0.000644	2.4168093	17.5470762	C
0.00002938	17327.	589842695.	24.7348325	0.0007266	-0.000683	2.4696299	18.0042350	C
0.00003063	17645.	576167022.	24.3795323	0.0007466	-0.000723	2.5209700	18.4548221	C
0.00003188	17958.	563372984.	24.0481213	0.0007665	-0.000763	2.5711129	18.9017322	C
0.00003313	18265.	551397478.	23.7390019	0.0007864	-0.000804	2.6201665	-19.847471	C
0.00003438	18565.	540062332.	23.4463553	0.0008060	-0.000844	2.6678578	-20.888165	C
0.00003563	18860.	529416273.	23.1723090	0.0008255	-0.000884	2.7145447	-21.930858	C
0.00003688	19151.	519349219.	22.9134190	0.0008449	-0.000925	2.7601007	-22.977212	C
0.00003813	19437.	509824891.	22.6686957	0.0008642	-0.000966	2.8045864	-24.026673	C
0.00003938	19719.	500804935.	22.4372911	0.0008835	-0.001007	2.8480606	-25.078668	C
0.00004063	19998.	492248790.	22.2179901	0.0009026	-0.001047	2.8905357	-26.133180	C
0.00004188	20272.	484105749.	22.0092653	0.0009216	-0.001088	2.9319820	-27.190748	C
0.00004313	20545.	476396565.	21.8126276	0.0009407	-0.001129	2.9726382	-28.248332	C
0.00004438	20812.	468996767.	21.6228236	0.0009595	-0.001170	3.0121085	-29.311379	C
0.00004563	21078.	461983452.	21.4441874	0.0009784	-0.001212	3.0508780	-30.373409	C
0.00004688	21341.	455272976.	21.2730698	0.0009972	-0.001253	3.0886809	-31.438171	C
0.00004813	21601.	448843718.	21.1089518	0.0010159	-0.001294	3.1255352	-32.505569	C
0.00004938	21859.	442722803.	20.9538464	0.0010346	-0.001335	3.1616962	-33.571961	C
0.00005063	22115.	436844403.	20.8046097	0.0010532	-0.001377	3.1969215	-34.640982	C
0.00005188	22368.	431192061.	20.6608446	0.0010718	-0.001418	3.2312247	-35.712592	C
0.00005313	22620.	425790074.	20.5244943	0.0010904	-0.001460	3.2648420	-36.783201	C
0.00005438	22871.	420618307.	20.3948766	0.0011090	-0.001501	3.2977525	-37.853079	C
0.00005563	23118.	415598982.	20.2675181	0.0011274	-0.001543	3.3295650	-38.928710	C
0.00005688	23363.	410786007.	20.1463629	0.0011458	-0.001584	3.3606985	-40.003343	C
0.00005813	23608.	406165917.	20.0310147	0.0011643	-0.001626	3.3911492	-41.076971	C
0.00005938	23853.	401726403.	19.9211108	0.0011828	-0.001667	3.4209131	-42.149587	C

Pier drilled shaft_row2

0.00006063	24093.	397403609.	19.8124857	0.0012011	-0.001709	3.4496210	-43.227924	C
0.00006188	24332.	393241941.	19.7087715	0.0012195	-0.001751	3.4776485	-44.305324	C
0.00006313	24570.	389232283.	19.6097190	0.0012379	-0.001792	3.5049959	-45.381708	C
0.00006438	24808.	385365611.	19.5150605	0.0012563	-0.001834	3.5316591	-46.457071	C
0.00006563	25044.	381626475.	19.4239531	0.0012747	-0.001875	3.5575791	-47.532539	C
0.00006688	25278.	377981527.	19.3340038	0.0012930	-0.001917	3.5825554	-48.612366	C
0.00006813	25510.	374458566.	19.2478769	0.0013113	-0.001959	3.6068532	-49.691164	C
0.00006938	25739.	371006995.	19.1647711	0.0013296	-0.002000	3.6304152	-50.000000	CY
0.00007063	25952.	367463641.	19.0823039	0.0013477	-0.002042	3.6530460	-50.000000	CY
0.00007188	26152.	363857984.	19.0007274	0.0013657	-0.002084	3.6747900	-50.000000	CY
0.00007313	26345.	360273363.	18.9197525	0.0013835	-0.002126	3.6956433	-50.000000	CY
0.00007438	26507.	356402353.	18.8345530	0.0014008	-0.002169	3.7152213	-50.000000	CY
0.00007938	27049.	340770967.	18.5045204	0.0014688	-0.002341	3.7857754	-50.000000	CY
0.00008438	27569.	326746927.	18.2078040	0.0015363	-0.002514	3.8458965	-50.000000	CY
0.00008938	27976.	313013631.	17.9237170	0.0016019	-0.002688	3.8948777	-50.000000	CY
0.00009438	28289.	299749218.	17.6494017	0.0016657	-0.002864	3.9334745	-50.000000	CY
0.00009938	28590.	287699067.	17.4017711	0.0017293	-0.003041	3.9632426	-50.000000	CY
0.0001044	28879.	276685822.	17.1765773	0.0017928	-0.003217	3.9842092	-50.000000	CY
0.0001094	29158.	266590791.	16.9730791	0.0018564	-0.003394	3.9964631	-50.000000	CY
0.0001144	29422.	257241386.	16.7843141	0.0019197	-0.003570	3.9981235	-50.000000	CY
0.0001194	29613.	248066736.	16.5986826	0.0019815	-0.003749	3.9974040	-50.000000	CY
0.0001244	29754.	239229916.	16.4145774	0.0020416	-0.003928	3.9981056	-50.000000	CY
0.0001294	29887.	231011248.	16.2461974	0.0021019	-0.004108	3.9999965	-50.000000	CY
0.0001344	30015.	223364565.	16.0940941	0.0021626	-0.004287	3.9997835	-50.000000	CY
0.0001394	30131.	216187373.	15.9482669	0.0022228	-0.004467	3.9988894	-50.000000	CY
0.0001444	30242.	209465853.	15.8155185	0.0022834	-0.004647	3.9967996	50.000000	CY
0.0001494	30347.	203158865.	15.6954229	0.0023445	-0.004825	3.9999313	50.000000	CY
0.0001544	30444.	197206632.	15.5873491	0.0024063	-0.005004	3.9985653	50.000000	CY
0.0001594	30532.	191573215.	15.4827117	0.0024676	-0.005182	3.9976372	50.000000	CY
0.0001644	30615.	186251095.	15.3882353	0.0025294	-0.005361	3.9991511	50.000000	CY
0.0001694	30695.	181224901.	15.3018142	0.0025917	-0.005538	3.9954778	50.000000	CY
0.0001744	30771.	176465976.	15.2231181	0.0026545	-0.005715	3.9991871	50.000000	CY
0.0001794	30844.	171954993.	15.1512491	0.0027178	-0.005892	3.9957566	50.000000	CY
0.0001844	30906.	167623563.	15.0866833	0.0027816	-0.006068	3.9987070	50.000000	CY
0.0001894	30957.	163468030.	15.0214242	0.0028447	-0.006245	3.9987580	50.000000	CY
0.0001944	30991.	159439576.	14.9587606	0.0029076	-0.006422	3.9970053	50.000000	CY
0.0001994	31009.	155529218.	14.8963919	0.0029700	-0.006600	3.9996807	50.000000	CY
0.0002044	31020.	151781770.	14.8367906	0.0030323	-0.006778	3.9944042	50.000000	CYT
0.0002094	31030.	148200878.	14.7810216	0.0030948	-0.006955	3.9974373	50.000000	CYT
0.0002144	31038.	144782404.	14.7289857	0.0031575	-0.007132	3.9997472	50.000000	CYT

Pier drilled shaft_row2

0.0002194	31044.	141512918.	14.6808401	0.0032206	-0.007309	3.9943288	50.0000000	CYT
0.0002244	31050.	138382691.	14.6357040	0.0032839	-0.007486	3.9964322	50.0000000	CYT
0.0002294	31052.	135378015.	14.5889047	0.0033463	-0.007664	3.9992229	50.0000000	CYT
0.0002344	31054.	132497862.	14.5451641	0.0034090	-0.007841	3.9987453	50.0000000	CYT
0.0002394	31055.	129731981.	14.5048386	0.0034721	-0.008018	3.9927644	50.0000000	CYT
0.0002444	31055.	127077619.	14.4669606	0.0035354	-0.008195	3.9969884	50.0000000	CYT
0.0002494	31055.	124529696.	14.4314041	0.0035988	-0.008371	3.9994006	50.0000000	CYT
0.0002544	31055.	122081938.	14.3982137	0.0036625	-0.008547	3.9981738	50.0000000	CYT
0.0002594	31055.	119728551.	14.3676563	0.0037266	-0.008723	3.9910128	50.0000000	CYT
0.0002644	31055.	117464182.	14.3389263	0.0037909	-0.008899	3.9956272	50.0000000	CYT
0.0002694	31055.	115283872.	14.3682485	0.0038704	-0.009060	3.9995515	50.0000000	CYT

Axial Thrust Force = 1102.000 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	688.2029476	1101124716.	250.5000255	0.0001566	0.0001266	0.6358685	4.4750630	
0.00000125	1376.	1101106957.	137.2861995	0.0001716	0.0001116	0.6935539	4.8461247	
0.00000188	2064.	1101066122.	99.5643397	0.0001867	0.00009668	0.7508557	5.2180610	
0.00000250	2753.	1101006424.	80.7154728	0.0002018	0.00008179	0.8077709	5.5908718	
0.00000313	3440.	1100928703.	69.4158047	0.0002169	0.00006692	0.8642964	5.9645573	
0.00000375	4128.	1100833237.	61.8907378	0.0002321	0.00005209	0.9204293	6.3391178	
0.00000438	4816.	1100720140.	56.5225878	0.0002473	0.00003729	0.9761665	6.7145533	
0.00000500	5503.	1100589468.	52.5025126	0.0002625	0.00002251	1.0315050	7.0908643	
0.00000563	6190.	1100441248.	49.3811560	0.0002778	0.00000777	1.0864417	7.4680511	
0.00000625	6877.	1100274458.	46.8888985	0.0002931	-0.00000694	1.1409735	7.8461129	
0.00000688	7563.	1100051968.	44.8539464	0.0003084	-0.00002163	1.1950920	8.2250056	
0.00000750	8248.	1099700685.	43.1614526	0.0003237	-0.00003629	1.2487803	8.6046160	
0.00000813	8931.	1099178526.	41.7319194	0.0003391	-0.00005093	1.3020228	8.9848335	
0.00000875	9612.	1098471949.	40.5086430	0.0003545	-0.00006555	1.3548066	9.3655682	
0.00000938	10290.	1097582166.	39.4500995	0.0003698	-0.00008016	1.4071210	9.7467458	
0.00001000	10965.	1096518544.	38.5251974	0.0003853	-0.00009475	1.4589578	10.1283073	
0.00001063	11638.	1095294297.	37.7102010	0.0004007	-0.000109	1.5103099	10.5102055	
0.00001125	11638.	1034444614.	36.0325858	0.0004054	-0.000135	1.5254967	10.5811311	C
0.00001188	11638.	980000161.	35.2220532	0.0004183	-0.000152	1.5678299	10.8898446	C
0.00001250	11638.	931000153.	34.4755936	0.0004309	-0.000169	1.6091018	11.1924027	C
0.00001313	11868.	904208963.	33.7867442	0.0004435	-0.000187	1.6494453	11.4898295	C

Pier drilled shaft_row2

0.00001375	12173.	885291113.	33.1468115	0.0004558	-0.000204	1.6888381	11.7817911	C
0.00001438	12465.	867110119.	32.5518131	0.0004679	-0.000222	1.7274057	12.0692871	C
0.00001500	12745.	849636283.	31.9964561	0.0004799	-0.000240	1.7651761	12.3524581	C
0.00001563	13013.	832863297.	31.4766254	0.0004918	-0.000258	1.8021927	12.6315959	C
0.00001625	13273.	816777191.	30.9887873	0.0005036	-0.000276	1.8384952	12.9069661	C
0.00001688	13523.	801336796.	30.5295375	0.0005152	-0.000295	1.8741016	13.1786424	C
0.00001750	13764.	786518020.	30.0961891	0.0005267	-0.000313	1.9090419	13.4468160	C
0.00001813	13998.	772304336.	29.6865631	0.0005381	-0.000332	1.9433530	13.7117497	C
0.00001875	14225.	758680523.	29.2988301	0.0005494	-0.000351	1.9770739	13.9737389	C
0.00001938	14447.	745632062.	28.9314539	0.0005605	-0.000369	2.0102462	14.2331107	C
0.00002000	14662.	733120967.	28.5826686	0.0005717	-0.000388	2.0428850	14.4899478	C
0.00002063	14871.	721030537.	28.2491703	0.0005826	-0.000407	2.0748987	14.7432849	C
0.00002125	15076.	709464232.	27.9322703	0.0005936	-0.000426	2.1064613	14.9947616	C
0.00002188	15277.	698379789.	27.6305614	0.0006044	-0.000446	2.1375782	15.2443874	C
0.00002250	15472.	687640980.	27.3404647	0.0006152	-0.000465	2.1681049	15.4906533	C
0.00002313	15665.	677387022.	27.0646684	0.0006259	-0.000484	2.1982884	15.7359933	C
0.00002375	15852.	667454701.	26.7990812	0.0006365	-0.000504	2.2279325	15.9783672	C
0.00002438	16037.	657930899.	26.5454012	0.0006470	-0.000523	2.2572138	16.2195305	C
0.00002563	16397.	639876117.	26.0673250	0.0006680	-0.000562	2.3144916	16.6960310	C
0.00002688	16745.	623085060.	25.6255610	0.0006887	-0.000601	2.3702187	17.1661717	C
0.00002813	17084.	607428247.	25.2157984	0.0007092	-0.000641	2.4244651	17.6303856	C
0.00002938	17412.	592752668.	24.8331427	0.0007295	-0.000681	2.4771964	18.0879835	C
0.00003063	17733.	579026731.	24.4764347	0.0007496	-0.000720	2.5286136	18.5408835	C
0.00003188	18047.	566183057.	24.1437740	0.0007696	-0.000760	2.5788310	18.9901512	C
0.00003313	18355.	554106718.	23.8317225	0.0007894	-0.000801	2.6278066	-19.758402	C
0.00003438	18656.	542715713.	23.5376864	0.0008091	-0.000841	2.6755309	-20.797119	C
0.00003563	18954.	532033932.	23.2630950	0.0008287	-0.000881	2.7223089	-21.837066	C
0.00003688	19244.	521869337.	23.0012646	0.0008482	-0.000922	2.7677378	-22.883273	C
0.00003813	19532.	512315677.	22.7563177	0.0008676	-0.000962	2.8123192	-23.929796	C
0.00003938	19814.	503208548.	22.5222711	0.0008868	-0.001003	2.8556637	-24.981632	C
0.00004063	20094.	494627799.	22.3030180	0.0009061	-0.001044	2.8982379	-26.033007	C
0.00004188	20368.	486406268.	22.0918981	0.0009251	-0.001085	2.9395518	-27.090401	C
0.00004313	20641.	478640616.	21.8938451	0.0009442	-0.001126	2.9801527	-28.146760	C
0.00004438	20910.	471205146.	21.7035566	0.0009631	-0.001167	3.0196450	-29.207485	C
0.00004563	21176.	464124545.	21.5228538	0.0009820	-0.001208	3.0582785	-30.269324	C
0.00004688	21441.	457398221.	21.3522969	0.0010009	-0.001249	3.0961834	-31.330471	C
0.00004813	21700.	450907423.	21.1862713	0.0010196	-0.001290	3.1328985	-32.397660	C
0.00004938	21958.	444728049.	21.0293570	0.0010383	-0.001332	3.1689195	-33.463839	C
0.00005063	22216.	438836860.	20.8808832	0.0010571	-0.001373	3.2042426	-34.529003	C
0.00005188	22469.	433131160.	20.7354640	0.0010757	-0.001414	3.2384051	-35.600337	C

Pier drilled shaft_row2

0.00005313	22720.	427677812.	20.5975108	0.0010942	-0.001456	3.2718779	-36.670710	C
0.00005438	22971.	422459723.	20.4665409	0.0011129	-0.001497	3.3046602	-37.740073	C
0.00005563	23220.	417429241.	20.3400315	0.0011314	-0.001539	3.3365503	-38.811737	C
0.00005688	23465.	412570670.	20.2174412	0.0011499	-0.001580	3.3675345	-39.886109	C
0.00005813	23710.	407906941.	20.1007217	0.0011684	-0.001622	3.3978350	-40.959471	C
0.00005938	23953.	403425577.	19.9895064	0.0011869	-0.001663	3.4274479	-42.031819	C
0.00006063	24195.	399096706.	19.8821061	0.0012054	-0.001705	3.4562410	-43.105522	C
0.00006188	24434.	394895875.	19.7771499	0.0012237	-0.001746	3.4841128	-44.182627	C
0.00006313	24672.	390848551.	19.6769067	0.0012421	-0.001788	3.5113034	-45.258713	C
0.00006438	24910.	386945651.	19.5811060	0.0012605	-0.001829	3.5378089	-46.333773	C
0.00006563	25146.	383178811.	19.4894979	0.0012790	-0.001871	3.5636254	-47.407799	C
0.00006688	25381.	379522686.	19.4003716	0.0012974	-0.001913	3.5886143	-48.483654	C
0.00006813	25613.	375966836.	19.3131982	0.0013157	-0.001954	3.6127479	-49.562113	C
0.00006938	25842.	372490894.	19.2291853	0.0013340	-0.001996	3.6361537	-50.000000	CY
0.00007063	26057.	368944660.	19.1461266	0.0013522	-0.002038	3.6586534	-50.000000	CY
0.00007188	26258.	365327659.	19.0638617	0.0013702	-0.002080	3.6802544	-50.000000	CY
0.00007313	26452.	361739319.	18.9836677	0.0013882	-0.002122	3.7010866	-50.000000	CY
0.00007438	26619.	357902792.	18.8993049	0.0014056	-0.002164	3.7206452	-50.000000	CY
0.00007938	27163.	342205678.	18.5663963	0.0014737	-0.002336	3.7905689	-50.000000	CY
0.00008438	27684.	328111040.	18.2691655	0.0015415	-0.002509	3.8501763	-50.000000	CY
0.00008938	28100.	314404034.	17.9867018	0.0016076	-0.002682	3.8987125	-50.000000	CY
0.00009438	28412.	301054782.	17.7095445	0.0016713	-0.002859	3.9365427	-50.000000	CY
0.00009938	28715.	288954619.	17.4623473	0.0017353	-0.003035	3.9656493	-50.000000	CY
0.0001044	29003.	277870811.	17.2347927	0.0017989	-0.003211	3.9857869	-50.000000	CY
0.0001094	29283.	267734399.	17.0322335	0.0018629	-0.003387	3.9972320	-50.000000	CY
0.0001144	29549.	258349598.	16.8422912	0.0019263	-0.003564	3.9979900	-50.000000	CY
0.0001194	29742.	249150087.	16.6558312	0.0019883	-0.003742	3.9980888	-50.000000	CY
0.0001244	29886.	240289275.	16.4734606	0.0020489	-0.003921	3.9975864	-50.000000	CY
0.0001294	30018.	232021272.	16.3033783	0.0021092	-0.004101	3.9982353	-50.000000	CY
0.0001344	30144.	224330018.	16.1496447	0.0021701	-0.004280	3.9999538	-50.000000	CY
0.0001394	30262.	217128960.	16.0059907	0.0022308	-0.004459	3.9993852	50.000000	CY
0.0001444	30372.	210366790.	15.8719285	0.0022915	-0.004638	3.9977020	50.000000	CY
0.0001494	30475.	204017527.	15.7510534	0.0023528	-0.004817	3.9998456	50.000000	CY
0.0001544	30572.	198034631.	15.6426719	0.0024148	-0.004995	3.9991693	50.000000	CY
0.0001594	30660.	192377048.	15.5406155	0.0024768	-0.005173	3.9959884	50.000000	CY
0.0001644	30742.	187026203.	15.4448996	0.0025388	-0.005351	3.9996290	50.000000	CY
0.0001694	30821.	181969428.	15.3577142	0.0026012	-0.005529	3.9962949	50.000000	CY
0.0001744	30897.	177185343.	15.2779184	0.0026641	-0.005706	3.9996622	50.000000	CY
0.0001794	30967.	172637533.	15.2066112	0.0027277	-0.005882	3.9955895	50.000000	CY
0.0001844	31029.	168291965.	15.1439329	0.0027922	-0.006058	3.9993866	50.000000	CY

Pier drilled shaft_row2

0.0001894	31083.	164137077.	15.0817784	0.0028561	-0.006234	3.9951746	50.0000000	CY
0.0001944	31115.	160078649.	15.0197032	0.0029195	-0.006411	3.9982222	50.0000000	CY
0.0001994	31136.	156167590.	14.9581855	0.0029823	-0.006588	3.9999769	50.0000000	CY
0.0002044	31147.	152400243.	14.8979167	0.0030448	-0.006765	3.9948384	50.0000000	CYT
0.0002094	31156.	148803107.	14.8413466	0.0031074	-0.006943	3.9986138	50.0000000	CYT
0.0002144	31163.	145368080.	14.7884369	0.0031703	-0.007120	3.9999943	50.0000000	CYT
0.0002194	31169.	142081280.	14.7397427	0.0032335	-0.007296	3.9937954	50.0000000	CYT
0.0002244	31174.	138936999.	14.6942424	0.0032970	-0.007473	3.9979019	50.0000000	CYT
0.0002294	31178.	135926115.	14.6516999	0.0033607	-0.007649	3.9998411	50.0000000	CYT
0.0002344	31179.	133032516.	14.6090144	0.0034240	-0.007826	3.9940534	50.0000000	CYT
0.0002394	31179.	130253769.	14.5679038	0.0034872	-0.008003	3.9952313	50.0000000	CYT
0.0002444	31179.	127588730.	14.5292939	0.0035506	-0.008179	3.9985002	50.0000000	CYT
0.0002494	31179.	125030560.	14.4930565	0.0036142	-0.008356	3.9999331	50.0000000	CYT
0.0002544	31179.	122572957.	14.4596378	0.0036782	-0.008532	3.9932751	50.0000000	CYT
0.0002594	31179.	120210105.	14.4284137	0.0037424	-0.008708	3.9939017	50.0000000	CYT
0.0002644	31179.	117936627.	14.3990611	0.0038068	-0.008883	3.9975724	50.0000000	CYT

Axial Thrust Force = 1326.000 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	677.3063282	1083690125.	298.6773062	0.0001867	0.0001567	0.7519648	5.3482762	
0.00000125	1355.	1083673741.	161.3754355	0.0002017	0.0001417	0.8086446	5.7193595	
0.00000188	2032.	1083632790.	115.6244920	0.0002168	0.0001268	0.8649405	6.0913318	
0.00000250	2709.	1083572388.	92.7612820	0.0002319	0.0001119	0.9208496	6.4641929	
0.00000313	3386.	1083493555.	79.0531670	0.0002470	0.00009704	0.9763687	6.8379433	
0.00000375	4063.	1083396627.	69.9226014	0.0002622	0.00008221	1.0314947	7.2125829	
0.00000438	4739.	1083281748.	63.4077802	0.0002774	0.00006741	1.0862247	7.5881121	
0.00000500	5416.	1083148983.	58.5278014	0.0002926	0.00005264	1.1405554	7.9645312	
0.00000563	6092.	1082998367.	54.7377194	0.0003079	0.00003790	1.1944839	8.3418405	
0.00000625	6768.	1082829916.	51.7105674	0.0003232	0.00002319	1.2480070	8.7200404	
0.00000688	7443.	1082643637.	49.2382757	0.0003385	0.00000851	1.3011216	9.0991312	
0.00000750	8118.	1082439112.	47.1821288	0.0003539	-0.00000613	1.3538247	9.4791130	
0.00000813	8793.	1082194450.	45.4459630	0.0003692	-0.00002075	1.4061094	9.8599551	
0.00000875	9466.	1081858144.	43.9608561	0.0003847	-0.00003534	1.4579622	10.2415673	
0.00000938	10138.	1081392996.	42.6762421	0.0004001	-0.00004991	1.5093692	10.6238533	
0.00001000	10808.	1080781169.	41.5542413	0.0004155	-0.00006446	1.5603186	11.0067300	

Pier drilled shaft_row2

0.00001063	11475.	1080017715.	40.5659329	0.0004310	-0.00007899	1.6108004	11.3901281
0.00001125	12140.	1079104391.	39.6888526	0.0004465	-0.00009350	1.6608061	11.7739882
0.00001188	12802.	1078047495.	38.9052964	0.0004620	-0.000108	1.7103286	12.1582615
0.00001250	12802.	1024145121.	37.4953758	0.0004687	-0.000131	1.7312719	12.2870737 C
0.00001313	12802.	975376305.	36.7281418	0.0004821	-0.000148	1.7732844	12.6093990 C
0.00001375	13008.	946064709.	36.0157230	0.0004952	-0.000165	1.8142605	12.9257696 C
0.00001438	13359.	929352740.	35.3542539	0.0005082	-0.000182	1.8543650	13.2375546 C
0.00001500	13694.	912940542.	34.7366631	0.0005210	-0.000199	1.8935791	13.5444485 C
0.00001563	14014.	896878783.	34.1581377	0.0005337	-0.000216	1.9319388	13.8466562 C
0.00001625	14321.	881267809.	33.6154435	0.0005463	-0.000234	1.9695203	14.1447778 C
0.00001688	14616.	866112522.	33.1049138	0.0005586	-0.000251	2.0063512	14.4389673 C
0.00001750	14900.	851416851.	32.6234513	0.0005709	-0.000269	2.0424608	14.7294016 C
0.00001813	15174.	837183723.	32.1684321	0.0005831	-0.000287	2.0778801	15.0162822 C
0.00001875	15439.	823422757.	31.7377489	0.0005951	-0.000305	2.1126484	15.2999010 C
0.00001938	15697.	810143078.	31.3296435	0.0006070	-0.000323	2.1468081	15.5805935 C
0.00002000	15947.	797343912.	30.9425099	0.0006189	-0.000341	2.1803965	15.8586558 C
0.00002063	16189.	784907754.	30.5729726	0.0006306	-0.000359	2.2133347	16.1332093 C
0.00002125	16424.	772898343.	30.2208553	0.0006422	-0.000378	2.2457143	16.4051021 C
0.00002188	16654.	761334725.	29.8855220	0.0006537	-0.000396	2.2775947	16.6748776 C
0.00002250	16879.	750166302.	29.5652305	0.0006652	-0.000415	2.3089602	16.9423128 C
0.00002313	17096.	739306471.	29.2575091	0.0006766	-0.000433	2.3397378	17.2065671 C
0.00002375	17311.	728877176.	28.9640842	0.0006879	-0.000452	2.3701106	17.4695131 C
0.00002438	17520.	718748954.	28.6818593	0.0006991	-0.000471	2.3999514	17.7297392 C
0.00002563	17925.	699516926.	28.1514837	0.0007214	-0.000509	2.4583185	18.2448214 C
0.00002688	18315.	681490339.	27.6606932	0.0007434	-0.000547	2.5149238	18.7523028 C
0.00002813	18691.	664568615.	27.2048942	0.0007651	-0.000585	2.5698547	19.2527419 C
0.00002938	19055.	648666298.	26.7803622	0.0007867	-0.000623	2.6232006	19.7467712 C
0.00003063	19407.	633709800.	26.3840723	0.0008080	-0.000662	2.6750531	20.2351043 C
0.00003188	19751.	619634911.	26.0135701	0.0008292	-0.000701	2.7255064	20.7185439 C
0.00003313	20086.	606384873.	25.6668732	0.0008502	-0.000740	2.7746572	21.1979901 C
0.00003438	20412.	593790341.	25.3386998	0.0008710	-0.000779	2.8223122	21.6707665 C
0.00003563	20730.	581904551.	25.0303862	0.0008917	-0.000818	2.8687674	22.1402679 C
0.00003688	21044.	570682281.	24.7407082	0.0009123	-0.000858	2.9141031	22.6073442 C
0.00003813	21348.	559960475.	24.4643143	0.0009327	-0.000897	2.9580404	23.0681075 C
0.00003938	21650.	549848510.	24.2050930	0.0009531	-0.000937	3.0010390	23.5284407 C
0.00004063	21944.	540171227.	23.9571398	0.0009733	-0.000977	3.0427368	-24.084245 C
0.00004188	22236.	531019394.	23.7240045	0.0009934	-0.001017	3.0835470	-25.108412 C
0.00004313	22521.	522237367.	23.5001376	0.0010134	-0.001057	3.1231045	-26.137891 C
0.00004438	22805.	513925441.	23.2898092	0.0010335	-0.001097	3.1618692	-27.166177 C
0.00004563	23082.	505908568.	23.0862152	0.0010533	-0.001137	3.1993430	-28.200801 C

Pier drilled shaft_row2

0.00004688	23357.	498289799.	22.8940623	0.0010732	-0.001177	3.2360103	-29.234634	C
0.00004813	23629.	490984002.	22.7099978	0.0010929	-0.001217	3.2716533	-30.271109	C
0.00004938	23896.	483965191.	22.5332696	0.0011126	-0.001257	3.3062720	-31.310424	C
0.00005063	24162.	477272308.	22.3660607	0.0011323	-0.001298	3.3401168	-32.348577	C
0.00005188	24423.	470807846.	22.2040286	0.0011518	-0.001338	3.3728643	-33.391064	C
0.00005313	24682.	464599577.	22.0489430	0.0011714	-0.001379	3.4047194	-34.434597	C
0.00005438	24940.	458657842.	21.9017207	0.0011909	-0.001419	3.4358077	-35.476974	C
0.00005563	25193.	452916066.	21.7591918	0.0012104	-0.001460	3.4658966	-36.522454	C
0.00005688	25444.	447372492.	21.6216342	0.0012297	-0.001500	3.4950501	-37.570067	C
0.00005813	25694.	442050003.	21.4906766	0.0012491	-0.001541	3.5234436	-38.616528	C
0.00005938	25943.	436934453.	21.3659067	0.0012686	-0.001581	3.5510724	-39.661829	C
0.00006063	26187.	431947396.	21.2429557	0.0012879	-0.001622	3.5775983	-40.712978	C
0.00006188	26429.	427142563.	21.1254157	0.0013071	-0.001663	3.6033532	-41.763332	C
0.00006313	26671.	422512190.	21.0131651	0.0013265	-0.001704	3.6283497	-42.812524	C
0.00006438	26912.	418045949.	20.9059005	0.0013458	-0.001744	3.6525833	-43.860547	C
0.00006563	27149.	413693095.	20.8005162	0.0013650	-0.001785	3.6758251	-44.912768	C
0.00006688	27384.	409474863.	20.6987586	0.0013842	-0.001826	3.6982379	-45.965595	C
0.00006813	27618.	405396887.	20.6013311	0.0014035	-0.001867	3.7198936	-47.017245	C
0.00006938	27851.	401451440.	20.5080041	0.0014227	-0.001907	3.7407871	-48.067709	C
0.00007063	28083.	397631334.	20.4185647	0.0014421	-0.001948	3.7609137	-49.116977	C
0.00007188	28311.	393887629.	20.3300889	0.0014612	-0.001989	3.7800736	-50.000000	CY
0.00007313	28531.	390160727.	20.2432755	0.0014803	-0.002030	3.7983384	-50.000000	CY
0.00007438	28735.	386352255.	20.1571960	0.0014992	-0.002071	3.8156638	-50.000000	CY
0.00007938	29411.	370528188.	19.8167715	0.0015730	-0.002237	3.8758115	-50.000000	CY
0.00008438	29941.	354853721.	19.4921923	0.0016447	-0.002405	3.9229072	-50.000000	CY
0.00008938	30447.	340667750.	19.2000673	0.0017160	-0.002574	3.9586797	-50.000000	CY
0.00009438	30835.	326725698.	18.9197017	0.0017855	-0.002744	3.9828881	-50.000000	CY
0.00009938	31140.	313358088.	18.6500809	0.0018534	-0.002917	3.9963769	-50.000000	CY
0.0001044	31433.	301150400.	18.4084797	0.0019214	-0.003089	3.9981980	-50.000000	CY
0.0001094	31707.	289894590.	18.1869124	0.0019892	-0.003261	3.9990979	-50.000000	CY
0.0001144	31971.	279530848.	17.9899395	0.0020576	-0.003432	3.9995126	-50.000000	CY
0.0001194	32217.	269884795.	17.8054590	0.0021255	-0.003604	3.9996113	-50.000000	CY
0.0001244	32433.	260765045.	17.6354961	0.0021934	-0.003777	3.9994944	50.000000	CY
0.0001294	32573.	251773199.	17.4643290	0.0022594	-0.003951	3.9989560	50.000000	CY
0.0001344	32686.	243243079.	17.3028280	0.0023251	-0.004125	3.9977282	50.000000	CY
0.0001394	32791.	235269193.	17.1581496	0.0023914	-0.004299	3.9989352	50.000000	CY
0.0001444	32888.	227798221.	17.0270156	0.0024583	-0.004472	3.9996734	50.000000	CY
0.0001494	32975.	220752011.	16.9009013	0.0025246	-0.004645	3.9979359	50.000000	CY
0.0001544	33054.	214117569.	16.7879240	0.0025916	-0.004818	3.9995564	50.000000	CY
0.0001594	33124.	207836821.	16.6887577	0.0026598	-0.004990	3.9990050	50.000000	CY

Pier drilled shaft_row2							
0.0001644	33187.	201897331.	16.6004154	0.0027287	-0.005161	3.9956193	50.0000000 CY
0.0001694	33240.	196253249.	16.5195698	0.0027980	-0.005332	3.9993939	50.0000000 CY
0.0001744	33289.	190905867.	16.4428308	0.0028672	-0.005503	3.9952059	50.0000000 CY
0.0001794	33335.	185839793.	16.3728416	0.0029369	-0.005673	3.9992608	50.0000000 CY
0.0001844	33378.	181034181.	16.3088642	0.0030069	-0.005843	3.9954771	50.0000000 CYT
0.0001894	33418.	176467288.	16.2505709	0.0030775	-0.006013	3.9985455	50.0000000 CYT
0.0001944	33457.	172125091.	16.1970226	0.0031483	-0.006182	3.9992239	50.0000000 CYT
0.0001994	33492.	167984952.	16.1486081	0.0032196	-0.006350	3.9966862	50.0000000 CYT
0.0002044	33525.	164035654.	16.1036837	0.0032912	-0.006519	3.9996545	50.0000000 CYT
0.0002094	33554.	160259351.	16.0609588	0.0033628	-0.006687	3.9939671	50.0000000 CYT
0.0002144	33571.	156597166.	16.0141263	0.0034330	-0.006857	3.9973890	50.0000000 CYT
0.0002194	33582.	153082184.	15.9689498	0.0035032	-0.007027	3.9997391	50.0000000 CYT
0.0002244	33584.	149676372.	15.9224531	0.0035726	-0.007197	3.9946765	50.0000000 CYT
0.0002294	33584.	146413672.	15.8771700	0.0036418	-0.007368	3.9958037	50.0000000 CYT
0.0002344	33584.	143290180.	15.8345213	0.0037112	-0.007539	3.9988983	50.0000000 CYT
0.0002394	33584.	140297174.	15.7943081	0.0037808	-0.007709	3.9999979	50.0000000 CYT
0.0002444	33584.	137426643.	15.8134546	0.0038644	-0.007866	3.9937422	50.0000000 CYT

Summary of Results for Nominal Moment Capacity for Section 1

Moment values interpolated at maximum compressive strain = 0.003
or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain	Max. Tens. Strain
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1	846.000	28085.735	0.00300000	-0.00786812
2	848.900	28121.795	0.00300000	-0.00785328
3	1018.000	30172.540	0.00300000	-0.00701381
4	1091.000	31014.307	0.00300000	-0.00668569
5	1102.000	31139.000	0.00300000	-0.00663804
6	1326.000	33373.898	0.00300000	-0.00582621

Note that the values of moment capacity in the table above are not factored by a strength reduction factor (phi-factor).

In ACI 318, the value of the strength reduction factor depends on whether

Pier drilled shaft_row2

the transverse reinforcing steel bars are tied hoops (Ø.65) or spirals (Ø.75).

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318, or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Load No.	Resist. Factor	Nominal Ax. Thrust kips	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in ²
1	0.65	846.000000	28086.	549.900000	18256.	423844057.
2	0.65	848.900000	28122.	551.785000	18279.	424607186.
3	0.65	1018.	30173.	661.700000	19612.	468803644.
4	0.65	1091.	31014.	709.150000	20159.	487449050.
5	0.65	1102.	31139.	716.300000	20240.	490244250.
6	0.65	1326.	33374.	861.900000	21693.	548442224.
1	0.75	846.000000	28086.	634.500000	21064.	368404030.
2	0.75	848.900000	28122.	636.675000	21091.	368940042.
3	0.75	1018.	30173.	763.500000	22629.	399740696.
4	0.75	1091.	31014.	818.250000	23261.	412797744.
5	0.75	1102.	31139.	826.500000	23354.	414762020.
6	0.75	1326.	33374.	994.500000	25030.	456602422.
1	0.90	846.000000	28086.	761.400000	25277.	274940297.
2	0.90	848.900000	28122.	764.010000	25310.	275429793.
3	0.90	1018.	30173.	916.200000	27155.	303455755.
4	0.90	1091.	31014.	981.900000	27913.	315133396.
5	0.90	1102.	31139.	991.800000	28025.	316870386.
6	0.90	1326.	33374.	1193.	30037.	352172122.

Pile Section No. 2:

 Dimensions and Properties of Drilled Shaft (Bored Pile):

Pier drilled shaft_row2

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Length of Section                = 10.000000 ft
Shaft Diameter                   = 42.000000 in
Concrete Cover Thickness (to edge of trans. reinf.) = 3.000000 in
Number of Reinforcing Bars      = 16 bars
Yield Stress of Reinforcing Bars = 60000. psi
Modulus of Elasticity of Reinforcing Bars = 29000000. psi
Gross Area of Shaft             = 1385. sq. in.
Total Area of Reinforcing Steel  = 16.000000 sq. in.
Area Ratio of Steel Reinforcement = 1.15 percent
Edge-to-Edge Bar Spacing       = 5.431327 in
Maximum Concrete Aggregate Size  = 0.750000 in
Ratio of Bar Spacing to Aggregate Size = 7.24
Offset of Center of Rebar Cage from Center of Pile = 0.0000 in
Transverse Reinforcement
Type: Spiral
Number of Transverse Reinf. (per spacing) = 1
Spacing of Transverse Reinf.         = 4.500000 in
Yield Stress of Transverse Reinf.    = 60000. psi
Diameter of Transverse Reinf.       = 0.625000 in

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Axial Structural Capacities:

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Nom. Axial Structural Capacity =  $0.85 F_c A_c + F_y A_s$  = 5616.104 kips
Tensile Load for Cracking of Concrete = -623.096 kips
Nominal Axial Tensile Capacity = -960.000 kips

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Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.128000	1.000000	16.811000	0.000000
2	1.128000	1.000000	15.531339	6.433291
3	1.128000	1.000000	11.887172	11.887172
4	1.128000	1.000000	6.433291	15.531339
5	1.128000	1.000000	0.000000	16.811000

			Pier drilled shaft_row2	
6	1.128000	1.000000	-6.43329	15.531339
7	1.128000	1.000000	-11.88717	11.887172
8	1.128000	1.000000	-15.53134	6.433291
9	1.128000	1.000000	-16.81100	0.000000
10	1.128000	1.000000	-15.53134	-6.43329
11	1.128000	1.000000	-11.88717	-11.88717
12	1.128000	1.000000	-6.43329	-15.53134
13	1.128000	1.000000	0.00000	-16.81100
14	1.128000	1.000000	6.433291	-15.53134
15	1.128000	1.000000	11.887172	-11.88717
16	1.128000	1.000000	15.531339	-6.43329

NOTE: The positions of the above rebars were computed by LPILE

Minimum spacing between any two bars not equal to zero = 5.431 inches
between bars 11 and 12.

Ratio of bar spacing to maximum aggregate size = 7.24

Concrete Properties:

Compressive Strength of Concrete	=	4000. psi
Modulus of Elasticity of Concrete	=	3604997. psi
Modulus of Rupture of Concrete	=	-474.34165 psi
Compression Strain at Peak Stress	=	0.001886
Tensile Strain at Fracture of Concrete	=	-0.0001154
Maximum Coarse Aggregate Size	=	0.750000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 6

Number	Axial Thrust Force kips
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1	846.000
2	848.900
3	1018.000

Pier drilled shaft_row2

4 1091.000
 5 1102.000
 6 1326.000

Definitions of Run Messages and Notes:

- C = concrete in section has cracked in tension.
- Y = stress in reinforcing steel has reached yield stress.
- T = ACI 318 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than 0.003. See ACI 318-14, Section 21.2.3.
- Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
 Position of neutral axis is measured from edge of compression side of pile.
 Compressive stresses and strains are positive in sign.
 Tensile stresses and strains are negative in sign.

Axial Thrust Force = 846.000 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	410.4097665	656655626.	244.4948351	0.0001528	0.0001266	0.6213276	4.3667626	
0.00000125	820.8161393	656652911.	132.7745766	0.0001660	0.0001135	0.6719172	4.6836659	
0.00000188	1231.	656636689.	95.5465587	0.0001791	0.0001004	0.7222122	5.0012254	
0.00000250	1642.	656611346.	76.9416019	0.0001924	0.00008735	0.7722104	5.3194411	
0.00000313	2052.	656577760.	65.7858704	0.0002056	0.00007433	0.8219099	5.6383133	
0.00000375	2462.	656536221.	58.3547525	0.0002188	0.00006133	0.8713087	5.9578418	
0.00000438	2872.	656486853.	53.0519863	0.0002321	0.00004835	0.9204049	6.2780270	
0.00000500	3282.	656429717.	49.0794409	0.0002454	0.00003540	0.9691964	6.5988690	
0.00000563	3692.	656364847.	45.9937105	0.0002587	0.00002246	1.0176812	6.9203678	
0.00000625	4102.	656292260.	43.5287517	0.0002721	0.00000955	1.0658574	7.2425238	
0.00000688	4511.	656211911.	41.5152638	0.0002854	-0.00000333	1.1137230	7.5653370	
0.00000750	4921.	656114169.	39.8402969	0.0002988	-0.00001620	1.1612737	7.8887896	

Pier drilled shaft_row2

0.00000813	5330.	655968630.	38.4254367	0.0003122	-0.00002904	1.2084991	8.2128123
0.00000875	5738.	655751864.	37.2146340	0.0003256	-0.00004187	1.2553878	8.5373259
0.00000938	6145.	655453209.	36.1668286	0.0003391	-0.00005469	1.3019302	8.8622628
0.00001000	6551.	655070251.	35.2512683	0.0003525	-0.00006749	1.3481185	9.1875678
0.00001063	6955.	654604746.	34.4444658	0.0003660	-0.00008028	1.3939460	9.5131948
0.00001125	7358.	654060739.	33.7281770	0.0003794	-0.00009306	1.4394072	9.8391050
0.00001188	7760.	653443487.	33.0880188	0.0003929	-0.000106	1.4844977	10.1652676
0.00001250	7760.	620771313.	31.7324941	0.0003967	-0.000128	1.4966069	10.2089041 C
0.00001313	7760.	591210774.	31.0879162	0.0004080	-0.000143	1.5341824	10.4740068 C
0.00001375	7760.	564337557.	30.4916187	0.0004193	-0.000158	1.5710049	10.7349955 C
0.00001438	7885.	548549633.	29.9363313	0.0004303	-0.000173	1.6070392	10.9914644 C
0.00001500	8079.	538588415.	29.4182129	0.0004413	-0.000189	1.6423595	11.2439727 C
0.00001563	8265.	528950890.	28.9336066	0.0004521	-0.000204	1.6770164	11.4928843 C
0.00001625	8444.	519633627.	28.4789344	0.0004628	-0.000220	1.7110339	11.7383354 C
0.00001688	8617.	510633468.	28.0511877	0.0004734	-0.000235	1.7444374	11.9804813 C
0.00001750	8784.	501952482.	27.6479397	0.0004838	-0.000251	1.7772604	12.2195541 C
0.00001813	8946.	493594840.	27.2672102	0.0004942	-0.000267	1.8095419	12.4558458 C
0.00001875	9104.	485556090.	26.9071601	0.0005045	-0.000283	1.8413126	12.6895806 C
0.00001938	9258.	477826630.	26.5661073	0.0005147	-0.000299	1.8725975	12.9209377 C
0.00002000	9408.	470397353.	26.2426183	0.0005249	-0.000315	1.9034237	13.1501186 C
0.00002063	9553.	463189187.	25.9335655	0.0005349	-0.000331	1.9337000	13.3762076 C
0.00002125	9696.	456260242.	25.6395056	0.0005448	-0.000348	1.9635511	13.6003329 C
0.00002188	9835.	449612694.	25.3598001	0.0005547	-0.000364	1.9930241	13.8229045 C
0.00002250	9971.	443172208.	25.0917132	0.0005646	-0.000380	2.0220192	14.0429178 C
0.00002313	10105.	436966524.	24.8354083	0.0005743	-0.000397	2.0506178	14.2611145 C
0.00002375	10237.	431012839.	24.5910023	0.0005840	-0.000413	2.0788971	14.4782154 C
0.00002438	10365.	425214126.	24.3550569	0.0005937	-0.000430	2.1066802	14.6924371 C
0.00002563	10616.	414264434.	23.9128922	0.0006128	-0.000463	2.1612853	15.1173119 C
0.00002688	10859.	404042062.	23.5042227	0.0006317	-0.000497	2.2145099	15.5362349 C
0.00002813	11095.	394483716.	23.1252659	0.0006504	-0.000531	2.2664335	15.9497638 C
0.00002938	11325.	385535502.	22.7729617	0.0006690	-0.000565	2.3171385	16.3585230 C
0.00003063	11550.	377150899.	22.4448311	0.0006874	-0.000599	2.3667104	16.7632095 C
0.00003188	11770.	369239779.	22.1367253	0.0007056	-0.000633	2.4150552	17.1626168 C
0.00003313	11984.	361794450.	21.8479358	0.0007237	-0.000668	2.4623308	17.5582421 C
0.00003438	12196.	354799268.	21.5777720	0.0007417	-0.000702	2.5086790	17.9514975 C
0.00003563	12403.	348167897.	21.3223129	0.0007596	-0.000737	2.5539316	18.3403584 C
0.00003688	12608.	341907101.	21.0818743	0.0007774	-0.000771	2.5982742	18.7267607 C
0.00003813	12810.	335988877.	20.8553676	0.0007951	-0.000806	2.6417534	-19.430953 C
0.00003938	13008.	330361279.	20.6402476	0.0008127	-0.000841	2.6842608	-20.313673 C
0.00004063	13205.	325036481.	20.4375096	0.0008303	-0.000876	2.7260092	-21.197403 C

Pier drilled shaft_row2

0.00004188	13398.	319957235.	20.2441984	0.0008477	-0.000911	2.7668206	-22.084383	C
0.00004313	13590.	315129084.	20.0610077	0.0008651	-0.000946	2.8068591	-22.972721	C
0.00004438	13780.	310532158.	19.8870292	0.0008825	-0.000981	2.8461248	-23.862485	C
0.00004563	13967.	306126885.	19.7202051	0.0008997	-0.001017	2.8844906	-24.755397	C
0.00004688	14154.	301944970.	19.5628768	0.0009170	-0.001052	2.9222694	-25.647495	C
0.00004813	14337.	297918373.	19.4108846	0.0009341	-0.001087	2.9591021	-26.543553	C
0.00004938	14520.	294071287.	19.2662280	0.0009513	-0.001122	2.9952566	-27.440126	C
0.00005063	14702.	290403643.	19.1292637	0.0009684	-0.001158	3.0308301	-28.335893	C
0.00005188	14881.	286856824.	18.9960554	0.0009854	-0.001193	3.0654599	-29.235940	C
0.00005313	15059.	283459567.	18.8690727	0.0010024	-0.001229	3.0994551	-30.136054	C
0.00005438	15236.	280208882.	18.7484356	0.0010194	-0.001264	3.1328750	-31.035367	C
0.00005563	15412.	277073047.	18.6319376	0.0010364	-0.001300	3.1655248	-31.936749	C
0.00005688	15586.	274044451.	18.5192789	0.0010533	-0.001335	3.1974095	-32.840245	C
0.00005813	15760.	271137287.	18.4119386	0.0010702	-0.001371	3.2287244	-33.742945	C
0.00005938	15933.	268343816.	18.3095835	0.0010871	-0.001407	3.2594666	-34.644842	C
0.00006063	16104.	265636053.	18.2099983	0.0011040	-0.001442	3.2894264	-35.549290	C
0.00006188	16274.	263015869.	18.1136368	0.0011208	-0.001478	3.3186810	-36.455174	C
0.00006313	16444.	260491416.	18.0215297	0.0011376	-0.001514	3.3473679	-37.360256	C
0.00006438	16612.	258057055.	17.9334318	0.0011545	-0.001549	3.3754845	-38.264531	C
0.00006563	16781.	255707279.	17.8490865	0.0011713	-0.001585	3.4030247	-39.168051	C
0.00006688	16947.	253411192.	17.7655771	0.0011881	-0.001621	3.4296957	-40.076065	C
0.00006813	17112.	251191994.	17.6855428	0.0012048	-0.001656	3.4558010	-40.983269	C
0.00006938	17278.	249045486.	17.6087983	0.0012216	-0.001692	3.4813378	-41.889655	C
0.00007063	17442.	246967731.	17.5351718	0.0012384	-0.001728	3.5063031	-42.795220	C
0.00007188	17606.	244955091.	17.4645033	0.0012553	-0.001763	3.5306941	-43.699957	C
0.00007313	17769.	242994167.	17.3954509	0.0012720	-0.001799	3.5543845	-44.606391	C
0.00007438	17931.	241082376.	17.3279169	0.0012888	-0.001835	3.5773790	-45.514556	C
0.00007938	18572.	233973182.	17.0827141	0.0013559	-0.001978	3.6636238	-49.138784	C
0.00008438	19201.	227571370.	16.8669865	0.0014232	-0.002121	3.7400745	-52.761999	C
0.00008938	19821.	221775683.	16.6784540	0.0014906	-0.002263	3.8069378	-56.377288	C
0.00009438	20431.	216486388.	16.5122533	0.0015583	-0.002405	3.8640512	-59.986133	C
0.00009938	20985.	211174529.	16.3546654	0.0016252	-0.002549	3.9106641	-60.000000	CY
0.0001044	21416.	205184627.	16.1905797	0.0016899	-0.002694	3.9464264	-60.000000	CY
0.0001094	21750.	198858165.	16.0198993	0.0017522	-0.002842	3.9722667	-60.000000	CY
0.0001144	22076.	193017544.	15.8670670	0.0018148	-0.002989	3.9897481	-60.000000	CY
0.0001194	22387.	187536239.	15.7277541	0.0018775	-0.003136	3.9987127	-60.000000	CY
0.0001244	22605.	181750360.	15.5763946	0.0019373	-0.003286	3.9991613	-60.000000	CY
0.0001294	22786.	176122084.	15.4320647	0.0019965	-0.003437	3.9992637	-60.000000	CY
0.0001344	22960.	170867122.	15.3004974	0.0020560	-0.003588	3.9991313	-60.000000	CY
0.0001394	23127.	165931105.	15.1766722	0.0021152	-0.003739	3.9986665	-60.000000	CY

Pier drilled shaft_row2

0.0001444	23289.	161306336.	15.0645907	0.0021750	-0.003889	3.9977409	-60.000000	CY
0.0001494	23446.	156963475.	14.9629634	0.0022351	-0.004039	3.9988194	-60.000000	CY
0.0001544	23599.	152867249.	14.8685735	0.0022953	-0.004188	3.9998277	-60.000000	CY
0.0001594	23741.	148965837.	14.7783701	0.0023553	-0.004338	3.9987758	-60.000000	CY
0.0001644	23856.	145130102.	14.6875725	0.0024143	-0.004489	3.9967965	-60.000000	CY
0.0001694	23936.	141318485.	14.5937946	0.0024718	-0.004642	3.9995892	-60.000000	CY
0.0001744	24004.	137658543.	14.5040163	0.0025291	-0.004795	3.9968552	-60.000000	CY
0.0001794	24068.	134177950.	14.4163131	0.0025859	-0.004948	3.9997104	-60.000000	CY
0.0001844	24130.	130874418.	14.3341063	0.0026429	-0.005101	3.9964095	-60.000000	CY
0.0001894	24190.	127737923.	14.2576419	0.0027000	-0.005254	3.9994864	-60.000000	CY
0.0001944	24249.	124755861.	14.1864570	0.0027575	-0.005406	3.9956019	-60.000000	CY
0.0001994	24306.	121912999.	14.1206179	0.0028153	-0.005558	3.9987039	60.000000	CY
0.0002044	24362.	119202299.	14.0582166	0.0028731	-0.005711	3.9999999	60.000000	CY
0.0002094	24412.	116593130.	13.9984223	0.0029309	-0.005863	3.9966522	60.000000	CY
0.0002144	24460.	114097227.	13.9430224	0.0029890	-0.006015	3.9994205	60.000000	CY
0.0002194	24506.	111706213.	13.8918855	0.0030475	-0.006166	3.9970081	60.000000	CYT
0.0002244	24548.	109406182.	13.8458402	0.0031067	-0.006317	3.9969815	60.000000	CYT
0.0002294	24590.	107203412.	13.8025943	0.0031660	-0.006468	3.9995109	60.000000	CYT
0.0002344	24630.	105086280.	13.7629010	0.0032257	-0.006618	3.9967071	60.000000	CYT
0.0002394	24668.	103051103.	13.7262786	0.0032857	-0.006768	3.9961741	60.000000	CYT
0.0002444	24706.	101096677.	13.6918575	0.0033459	-0.006918	3.9990826	60.000000	CYT
0.0002494	24738.	99198359.	13.6630710	0.0034072	-0.007067	3.9992903	60.000000	CYT
0.0002544	24767.	97364078.	13.6361814	0.0034687	-0.007215	3.9939187	60.000000	CYT
0.0002594	24795.	95595328.	13.6095250	0.0035300	-0.007364	3.9977405	60.000000	CYT
0.0002644	24817.	93870959.	13.5870178	0.0035921	-0.007512	3.9997374	60.000000	CYT
0.0002694	24837.	92200801.	13.5678010	0.0036548	-0.007659	3.9953209	60.000000	CYT
0.0002744	24848.	90561917.	13.5456294	0.0037166	-0.007807	3.9943156	60.000000	CYT
0.0003044	24848.	81635896.	13.6591091	0.0041575	-0.008626	3.9901142	60.000000	CYT

Axial Thrust Force = 848.900 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	410.3047258	656487561.	245.2891961	0.0001533	0.0001271	0.6232625	4.3811604	
0.00000125	820.6060935	656484875.	133.1717642	0.0001665	0.0001140	0.6738376	4.6980640	
0.00000188	1231.	656468658.	95.8113584	0.0001796	0.0001009	0.7241181	5.0156239	
0.00000250	1641.	656443313.	77.1402099	0.0001929	0.00008785	0.7741018	5.3338402	

Pier drilled shaft_row2

0.00000313	2051.	656409721.	65.9447654	0.0002061	0.00007483	0.8237868	5.6527131
0.00000375	2461.	656368173.	58.4871737	0.0002193	0.00006183	0.8731711	5.9722426
0.00000438	2871.	656318794.	53.1654990	0.0002326	0.00004885	0.9222527	6.2924289
0.00000500	3281.	656261644.	49.1787734	0.0002459	0.00003589	0.9710296	6.6132722
0.00000563	3691.	656196757.	46.0820150	0.0002592	0.00002296	1.0194999	6.9347725
0.00000625	4101.	656124152.	43.6082348	0.0002726	0.00001005	1.0676616	7.2569301
0.00000688	4510.	656043808.	41.5875304	0.0002859	-0.00000284	1.1155126	7.5797451
0.00000750	4920.	655947019.	39.9065589	0.0002993	-0.00001570	1.1630490	7.9032016
0.00000813	5328.	655803864.	38.4866333	0.0003127	-0.00002855	1.2102605	8.2272317
0.00000875	5736.	655590524.	37.2715034	0.0003261	-0.00004137	1.2571357	8.5517565
0.00000938	6143.	655295885.	36.2199598	0.0003396	-0.00005419	1.3036650	8.8767079
0.00001000	6549.	654917239.	35.3011386	0.0003530	-0.00006699	1.3498404	9.2020302
0.00001063	6954.	654456178.	34.4914674	0.0003665	-0.00007978	1.3956553	9.5276772
0.00001125	7357.	653916602.	33.7726356	0.0003799	-0.00009256	1.4411042	9.8536099
0.00001188	7758.	653303719.	33.1302083	0.0003934	-0.000105	1.4861824	10.1797966
0.00001250	7758.	620638533.	31.7811877	0.0003973	-0.000128	1.4986487	10.2265556 C
0.00001313	7758.	591084317.	31.1356005	0.0004087	-0.000143	1.5362660	10.4921567 C
0.00001375	7758.	564216848.	30.5378069	0.0004199	-0.000158	1.5731034	10.7534130 C
0.00001438	7895.	549243163.	29.9818643	0.0004310	-0.000173	1.6091858	11.0104460 C
0.00001500	8089.	539285477.	29.4625452	0.0004419	-0.000188	1.6445243	11.2632572 C
0.00001563	8276.	529651485.	28.9768628	0.0004528	-0.000203	1.6792004	11.5124847 C
0.00001625	8455.	520337732.	28.5212260	0.0004635	-0.000219	1.7132382	11.7582653 C
0.00001688	8629.	511341034.	28.0926153	0.0004741	-0.000235	1.7466633	12.0007549 C
0.00001750	8797.	502662704.	27.6885782	0.0004846	-0.000250	1.7795083	12.2401782 C
0.00001813	8959.	494306664.	27.3071202	0.0004949	-0.000266	1.8118116	12.4768236 C
0.00001875	9118.	486269863.	26.9464271	0.0005052	-0.000282	1.8436059	12.7109321 C
0.00001938	9272.	478543470.	26.6048310	0.0005155	-0.000298	1.8749175	12.9426956 C
0.00002000	9422.	471094728.	26.2802855	0.0005256	-0.000314	1.9057363	13.1719656 C
0.00002063	9568.	463884871.	25.9706681	0.0005356	-0.000331	1.9360320	13.3983996 C
0.00002125	9710.	456959409.	25.6762384	0.0005456	-0.000347	1.9659126	13.6229694 C
0.00002188	9851.	450315145.	25.3962163	0.0005555	-0.000363	1.9954165	13.8460058 C
0.00002250	9987.	443853175.	25.1271340	0.0005654	-0.000380	2.0243954	14.0660299 C
0.00002313	10121.	437651134.	24.8705983	0.0005751	-0.000396	2.0530265	14.2847138 C
0.00002375	10252.	431677610.	24.6252825	0.0005849	-0.000413	2.0812894	14.5018259 C
0.00002438	10381.	425882781.	24.3891808	0.0005945	-0.000429	2.1091064	14.7165584 C
0.00002563	10632.	414918720.	23.9460888	0.0006136	-0.000463	2.1637305	15.1419811 C
0.00002688	10876.	404683320.	23.5366135	0.0006325	-0.000496	2.2169756	15.5614795 C
0.00002813	11113.	395113081.	23.1569587	0.0006513	-0.000530	2.2689213	15.9756133 C
0.00002938	11343.	386153936.	22.8040527	0.0006699	-0.000564	2.3196500	16.3850088 C
0.00003063	11569.	377756109.	22.4752801	0.0006883	-0.000598	2.3692366	16.7902520 C

Pier drilled shaft_row2

0.00003188	11788.	369821939.	22.1661382	0.0007065	-0.000632	2.4175571	17.1898053	C
0.00003313	12003.	362368590.	21.8769758	0.0007247	-0.000667	2.4648593	17.5861388	C
0.00003438	12216.	355365712.	21.6064992	0.0007427	-0.000701	2.5112352	17.9801349	C
0.00003563	12423.	348712504.	21.3500690	0.0007606	-0.000736	2.5564520	18.3690339	C
0.00003688	12628.	342444855.	21.1093945	0.0007784	-0.000770	2.6008209	18.7561901	C
0.00003813	12829.	336507203.	20.8820226	0.0007961	-0.000805	2.6442637	-19.401482	C
0.00003938	13028.	330873868.	20.6667552	0.0008138	-0.000840	2.6867984	-20.283405	C
0.00004063	13225.	325531643.	20.4632392	0.0008313	-0.000875	2.7285098	-21.167090	C
0.00004188	13419.	320448008.	20.2698844	0.0008488	-0.000910	2.7693522	-22.053190	C
0.00004313	13610.	315604100.	20.0859875	0.0008662	-0.000945	2.8093531	-22.941480	C
0.00004438	13801.	311003511.	19.9120384	0.0008836	-0.000980	2.8486514	-23.830302	C
0.00004563	13988.	306583901.	19.7445684	0.0009008	-0.001015	2.8869788	-24.723162	C
0.00004688	14174.	302388407.	19.5866291	0.0009181	-0.001051	2.9247191	-25.615207	C
0.00004813	14359.	298359074.	19.4347428	0.0009353	-0.001086	2.9615847	-26.510256	C
0.00004938	14541.	294499527.	19.2895221	0.0009524	-0.001121	2.9976999	-27.406772	C
0.00005063	14723.	290820033.	19.1520220	0.0009696	-0.001157	3.0332338	-28.302481	C
0.00005188	14902.	287271117.	19.0189841	0.0009866	-0.001192	3.0678966	-29.201447	C
0.00005313	15080.	283862910.	18.8915025	0.0010036	-0.001228	3.1018514	-30.101497	C
0.00005438	15258.	280601772.	18.7703901	0.0010206	-0.001263	3.1352307	-31.000747	C
0.00005563	15434.	277464269.	18.6541187	0.0010376	-0.001299	3.1679132	-31.900968	C
0.00005688	15608.	274425956.	18.5410144	0.0010545	-0.001334	3.1997563	-32.804395	C
0.00005813	15781.	271509487.	18.4332481	0.0010714	-0.001370	3.2310294	-33.707025	C
0.00005938	15954.	268707096.	18.3304854	0.0010884	-0.001405	3.2617297	-34.608851	C
0.00006063	16126.	265998158.	18.2311837	0.0011053	-0.001441	3.2917205	-35.512044	C
0.00006188	16296.	263369619.	18.1344371	0.0011221	-0.001477	3.3209318	-36.417851	C
0.00006313	16465.	260837146.	18.0419607	0.0011389	-0.001512	3.3495755	-37.322854	C
0.00006438	16634.	258395065.	17.9535082	0.0011558	-0.001548	3.3776485	-38.227050	C
0.00006563	16803.	256038150.	17.8688526	0.0011726	-0.001584	3.4051481	-39.130433	C
0.00006688	16969.	253741037.	17.7856501	0.0011894	-0.001619	3.4318435	-40.037136	C
0.00006813	17134.	251514831.	17.7052915	0.0012062	-0.001655	3.4579036	-40.944253	C
0.00006938	17299.	249361560.	17.6282349	0.0012230	-0.001691	3.4833950	-41.850551	C
0.00007063	17464.	247277276.	17.5543079	0.0012398	-0.001726	3.5083148	-42.756027	C
0.00007188	17628.	245258327.	17.4833498	0.0012566	-0.001762	3.5326599	-43.660674	C
0.00007313	17791.	243296876.	17.4146819	0.0012734	-0.001798	3.5563729	-44.565609	C
0.00007438	17953.	241379100.	17.3468704	0.0012902	-0.001834	3.5793201	-45.473675	C
0.00007938	18593.	234247788.	17.1006501	0.0013574	-0.001976	3.6653725	-49.097497	C
0.00008438	19223.	227830897.	16.8846779	0.0014246	-0.002119	3.7416859	-52.718711	C
0.00008938	19843.	222017462.	16.6953407	0.0014921	-0.002262	3.8083415	-56.333520	C
0.00009438	20453.	216715845.	16.5290770	0.0015599	-0.002404	3.8652898	-59.940088	C
0.00009938	21008.	211400158.	16.3710769	0.0016269	-0.002547	3.9116948	-60.000000	CY

Pier drilled shaft_row2

0.0001044	21440.	205417629.	16.2068836	0.0016916	-0.002692	3.9472584	-60.000000	CY
0.0001094	21775.	199084093.	16.0363688	0.0017540	-0.002840	3.9728993	-60.000000	CY
0.0001144	22101.	193231212.	15.8829866	0.0018166	-0.002987	3.9901354	-60.000000	CY
0.0001194	22412.	187745879.	15.7440353	0.0018794	-0.003134	3.9988563	-60.000000	CY
0.0001244	22632.	181964915.	15.5927059	0.0019393	-0.003284	3.9992813	-60.000000	CY
0.0001294	22812.	176326278.	15.4479144	0.0019986	-0.003435	3.9993770	-60.000000	CY
0.0001344	22987.	171065588.	15.3167610	0.0020582	-0.003586	3.9992625	-60.000000	CY
0.0001394	23153.	166120483.	15.1925335	0.0021175	-0.003736	3.9988322	-60.000000	CY
0.0001444	23315.	161487270.	15.0800819	0.0021772	-0.003887	3.9979607	-60.000000	CY
0.0001494	23472.	157136551.	14.9781136	0.0022374	-0.004036	3.9981099	-60.000000	CY
0.0001544	23625.	153036378.	14.8842202	0.0022978	-0.004186	3.9998884	-60.000000	CY
0.0001594	23768.	149130784.	14.7938533	0.0023578	-0.004336	3.9989520	-60.000000	CY
0.0001644	23883.	145294948.	14.7031101	0.0024168	-0.004487	3.9964409	-60.000000	CY
0.0001694	23964.	141482362.	14.6092640	0.0024744	-0.004639	3.9996941	-60.000000	CY
0.0001744	24032.	137816551.	14.5191910	0.0025318	-0.004792	3.9971620	-60.000000	CY
0.0001794	24096.	134333943.	14.4321425	0.0025888	-0.004945	3.9998038	-60.000000	CY
0.0001844	24158.	131025124.	14.3496613	0.0026457	-0.005098	3.9967646	-60.000000	CY
0.0001894	24218.	127883988.	14.2728907	0.0027029	-0.005251	3.9996158	-60.000000	CY
0.0001944	24277.	124897201.	14.2014634	0.0027604	-0.005403	3.9952950	-60.000000	CY
0.0001994	24334.	122049935.	14.1353811	0.0028182	-0.005556	3.9989189	60.000000	CY
0.0002044	24389.	119336968.	14.0735976	0.0028763	-0.005707	3.9990941	60.000000	CY
0.0002094	24439.	116723235.	14.0140292	0.0029342	-0.005860	3.9970411	60.000000	CY
0.0002144	24487.	114223786.	13.9583759	0.0029923	-0.006011	3.9995763	60.000000	CY
0.0002194	24532.	111827691.	13.9072734	0.0030509	-0.006163	3.9959498	60.000000	CYT
0.0002244	24575.	109524493.	13.8609961	0.0031101	-0.006314	3.9973647	60.000000	CYT
0.0002294	24616.	107318679.	13.8175318	0.0031694	-0.006464	3.9996584	60.000000	CYT
0.0002344	24656.	105197699.	13.7777970	0.0032292	-0.006615	3.9956125	60.000000	CYT
0.0002394	24694.	103159782.	13.7409709	0.0032892	-0.006765	3.9966215	60.000000	CYT
0.0002444	24731.	101202718.	13.7063580	0.0033495	-0.006914	3.9992960	60.000000	CYT
0.0002494	24763.	99299021.	13.6779177	0.0034109	-0.007063	3.9981295	60.000000	CYT
0.0002544	24792.	97463595.	13.6521000	0.0034728	-0.007211	3.9945699	60.000000	CYT
0.0002594	24820.	95693367.	13.6255819	0.0035341	-0.007360	3.9981408	60.000000	CYT
0.0002644	24842.	93964011.	13.6035208	0.0035964	-0.007507	3.9998659	60.000000	CYT
0.0002694	24861.	92291294.	13.5842605	0.0036593	-0.007654	3.9939308	60.000000	CYT
0.0002744	24873.	90653965.	13.5625772	0.0037212	-0.007803	3.9950348	60.000000	CYT
0.0003044	24873.	81718872.	13.6751518	0.0041624	-0.008621	3.9911170	60.000000	CYT

Axial Thrust Force = 1018.000 kips

Pier drilled shaft_row2

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	404.1314839	646610374.	291.9737911	0.0001825	0.0001562	0.7360048	5.2273187	
0.00000125	808.2616942	646609355.	156.5144861	0.0001956	0.0001431	0.7857273	5.5442376	
0.00000188	1212.	646593455.	111.3736446	0.0002088	0.0001301	0.8351549	5.8618232	
0.00000250	1616.	646567999.	88.8124198	0.0002220	0.0001170	0.8842855	6.1800754	
0.00000313	2020.	646534053.	75.2830426	0.0002353	0.0001040	0.9331172	6.4989945	
0.00000375	2424.	646491970.	66.2695903	0.0002485	0.00009101	0.9816479	6.8185805	
0.00000438	2828.	646441900.	59.8366676	0.0002618	0.00007804	1.0298757	7.1388335	
0.00000500	3232.	646383918.	55.0165769	0.0002751	0.00006508	1.0777984	7.4597537	
0.00000563	3636.	646318064.	51.2717087	0.0002884	0.00005215	1.1254141	7.7813413	
0.00000625	4039.	646244361.	48.2794975	0.0003017	0.00003925	1.1727208	8.1035964	
0.00000688	4442.	646162822.	45.8346742	0.0003151	0.00002636	1.2197164	8.4265194	
0.00000750	4846.	646073455.	43.8003932	0.0003285	0.00001350	1.2663989	8.7501105	
0.00000813	5249.	645976265.	42.0819151	0.0003419	6.65560E-07	1.3127663	9.0743700	
0.00000875	5651.	645868754.	40.6115473	0.0003554	-0.00001215	1.3588159	9.3992927	
0.00000938	6054.	645733482.	39.3395080	0.0003688	-0.00002494	1.4045405	9.7248350	
0.00001000	6456.	645550112.	38.2283824	0.0003823	-0.00003772	1.4499305	10.0509309	
0.00001063	6856.	645305594.	37.2495680	0.0003958	-0.00005047	1.4949768	10.3775169	
0.00001125	7256.	644993703.	36.3808465	0.0004093	-0.00006322	1.5396716	10.7045387	
0.00001188	7655.	644612712.	35.6047023	0.0004228	-0.00007594	1.5840085	11.0319506	
0.00001250	8052.	644163447.	34.9071408	0.0004363	-0.00008866	1.6279818	11.3597136	
0.00001313	8448.	643648061.	34.2768457	0.0004499	-0.000101	1.6715866	11.6877932	
0.00001375	8842.	643069848.	33.7045730	0.0004634	-0.000114	1.7148187	12.0161610	
0.00001438	8842.	615110289.	32.5326204	0.0004677	-0.000136	1.7279023	12.0737924	C
0.00001500	8842.	589480694.	31.9539633	0.0004793	-0.000151	1.7645820	12.3470240	C
0.00001563	8842.	565901466.	31.4134454	0.0004908	-0.000165	1.8005626	12.6165612	C
0.00001625	9032.	555825055.	30.9068253	0.0005022	-0.000180	1.8358619	12.8824790	C
0.00001688	9237.	547361182.	30.4302323	0.0005135	-0.000195	1.8704840	13.1447262	C
0.00001750	9434.	539060464.	29.9807680	0.0005247	-0.000210	1.9044555	13.4034648	C
0.00001813	9624.	530964060.	29.5563928	0.0005357	-0.000226	1.9378278	13.6590978	C
0.00001875	9808.	523080429.	29.1549047	0.0005467	-0.000241	1.9706261	13.9117920	C
0.00001938	9986.	515413176.	28.7743502	0.0005575	-0.000256	2.0028730	14.1616943	C
0.00002000	10159.	507929187.	28.4122652	0.0005682	-0.000272	2.0345456	14.4085139	C
0.00002063	10326.	500663173.	28.0678431	0.0005789	-0.000287	2.0657046	14.6527725	C
0.00002125	10490.	493623863.	27.7399872	0.0005895	-0.000303	2.0963849	14.8947545	C
0.00002188	10649.	486817865.	27.4277555	0.0006000	-0.000319	2.1266226	15.1347637	C
0.00002250	10805.	480221724.	27.1296448	0.0006104	-0.000335	2.1564092	15.3726683	C

Pier drilled shaft_row2

0.00002313	10957.	473796737.	26.8438069	0.0006208	-0.000350	2.1857033	15.6079962	C
0.00002375	11106.	467601042.	26.5709471	0.0006311	-0.000366	2.2146239	15.8419021	C
0.00002438	11251.	461591619.	26.3093716	0.0006413	-0.000382	2.2431266	16.0738933	C
0.00002563	11534.	450108159.	25.8171478	0.0006616	-0.000415	2.2989227	16.5324116	C
0.00002688	11806.	439278324.	25.3614443	0.0006816	-0.000447	2.3531408	16.9837070	C
0.00002813	12068.	429088961.	24.9389572	0.0007014	-0.000480	2.4059319	17.4290558	C
0.00002938	12323.	419492169.	24.5460459	0.0007210	-0.000513	2.4573693	17.8689692	C
0.00003063	12569.	410427836.	24.1790833	0.0007405	-0.000546	2.5074773	18.3034422	C
0.00003188	12809.	401850194.	23.8351703	0.0007597	-0.000579	2.5562924	18.7326169	C
0.00003313	13043.	393745584.	23.5128288	0.0007789	-0.000612	2.6039321	19.1575800	C
0.00003438	13272.	386087734.	23.2104335	0.0007979	-0.000646	2.6504764	19.5790572	C
0.00003563	13496.	378831506.	22.9257955	0.0008167	-0.000680	2.6959329	19.9969564	C
0.00003688	13714.	371911908.	22.6558314	0.0008354	-0.000713	2.7402048	20.4099111	C
0.00003813	13930.	365369600.	22.4019964	0.0008541	-0.000747	2.7835720	20.8211261	C
0.00003938	14141.	359125362.	22.1607861	0.0008726	-0.000781	2.8258636	21.2283540	C
0.00004063	14348.	353184857.	21.9322858	0.0008910	-0.000815	2.8672114	21.6330680	C
0.00004188	14553.	347525294.	21.7155329	0.0009093	-0.000849	2.9076421	22.0354805	C
0.00004313	14754.	342115958.	21.5090013	0.0009276	-0.000884	2.9471184	22.4349634	C
0.00004438	14952.	336953964.	21.3127115	0.0009458	-0.000918	2.9857360	22.8326520	C
0.00004563	15148.	332020470.	21.1257478	0.0009639	-0.000952	3.0234955	23.2284489	C
0.00004688	15342.	327289186.	20.9469082	0.0009819	-0.000987	3.0603606	-23.766078	C
0.00004813	15534.	322784664.	20.7777006	0.0009999	-0.001021	3.0965496	-24.635990	C
0.00004938	15722.	318426418.	20.6137130	0.0010178	-0.001056	3.1317014	-25.510696	C
0.00005063	15910.	314270879.	20.4584447	0.0010357	-0.001091	3.1662166	-26.384490	C
0.00005188	16096.	310276331.	20.3095703	0.0010536	-0.001125	3.1999246	-27.259923	C
0.00005313	16279.	306419429.	20.1658580	0.0010713	-0.001160	3.2327554	-28.138194	C
0.00005438	16461.	302728379.	20.0293267	0.0010891	-0.001195	3.2649549	-29.015562	C
0.00005563	16641.	299169784.	19.8979712	0.0011068	-0.001229	3.2963693	-29.894479	C
0.00005688	16819.	295723647.	19.7706516	0.0011245	-0.001264	3.3269256	-30.776263	C
0.00005813	16997.	292415193.	19.6493416	0.0011421	-0.001299	3.3568563	-31.657147	C
0.00005938	17173.	289235629.	19.5336648	0.0011598	-0.001334	3.3861582	-32.537127	C
0.00006063	17347.	286132962.	19.4199285	0.0011773	-0.001369	3.4144986	-33.422082	C
0.00006188	17520.	283144481.	19.3111775	0.0011949	-0.001404	3.4422074	-34.306337	C
0.00006313	17692.	280264738.	19.2072264	0.0012125	-0.001439	3.4692927	-35.189690	C
0.00006438	17863.	277486463.	19.1077273	0.0012301	-0.001474	3.4957441	-36.072268	C
0.00006563	18032.	274768859.	19.0094647	0.0012475	-0.001509	3.5212735	-36.959706	C
0.00006688	18200.	272143933.	18.9153413	0.0012650	-0.001544	3.5461843	-37.846241	C
0.00006813	18367.	269606504.	18.8251324	0.0012825	-0.001579	3.5704731	-38.731866	C
0.00006938	18534.	267151765.	18.7386293	0.0013000	-0.001614	3.5941365	-39.616576	C
0.00007063	18699.	264763014.	18.6544733	0.0013175	-0.001649	3.6170633	-40.502750	C

Pier drilled shaft_row2

0.00007188	18862.	262432355.	18.5720981	0.0013349	-0.001684	3.6392186	-41.391314	C
0.00007313	19025.	260173222.	18.4929734	0.0013523	-0.001719	3.6607530	-42.278957	C
0.00007438	19187.	257981938.	18.4169386	0.0013698	-0.001754	3.6816630	-43.165672	C
0.00007938	19827.	249788172.	18.1362251	0.0014396	-0.001894	3.7586094	-46.713733	C
0.00008438	20453.	242408760.	17.8904625	0.0015095	-0.002034	3.8250532	-50.257681	C
0.00008938	21065.	235694245.	17.6717797	0.0015794	-0.002174	3.8807975	-53.802712	C
0.00009438	21666.	229575270.	17.4808440	0.0016498	-0.002314	3.9261301	-57.335221	C
0.00009938	22252.	223922351.	17.3099421	0.0017202	-0.002454	3.9607022	-60.000000	CY
0.0001044	22768.	218136043.	17.1462381	0.0017896	-0.002594	3.9841998	-60.000000	CY
0.0001094	23162.	211764655.	16.9764334	0.0018568	-0.002737	3.9969082	-60.000000	CY
0.0001144	23480.	205289748.	16.8062511	0.0019222	-0.002882	3.9985339	-60.000000	CY
0.0001194	23790.	199288829.	16.6552082	0.0019882	-0.003026	3.9993845	-60.000000	CY
0.0001244	24083.	193634237.	16.5160869	0.0020542	-0.003170	3.9997499	-60.000000	CY
0.0001294	24301.	187830596.	16.3719796	0.0021181	-0.003316	3.9998197	-60.000000	CY
0.0001344	24469.	182094407.	16.2313983	0.0021811	-0.003463	3.9997270	-60.000000	CY
0.0001394	24630.	176714173.	16.1008428	0.0022441	-0.003610	3.9994202	-60.000000	CY
0.0001444	24783.	171659734.	15.9795173	0.0023070	-0.003757	3.9986997	-60.000000	CY
0.0001494	24933.	166915717.	15.8693348	0.0023705	-0.003903	3.9972944	-60.000000	CY
0.0001544	25079.	162453797.	15.7690960	0.0024344	-0.004049	3.9999896	-60.000000	CY
0.0001594	25218.	158231054.	15.6735696	0.0024980	-0.004196	3.9993415	-60.000000	CY
0.0001644	25354.	154242943.	15.5851245	0.0025618	-0.004342	3.9972610	-60.000000	CY
0.0001694	25480.	150437925.	15.5020964	0.0026257	-0.004488	3.9999360	-60.000000	CY
0.0001744	25582.	146707645.	15.4186557	0.0026886	-0.004635	3.9982126	-60.000000	CY
0.0001794	25655.	143026805.	15.3332560	0.0027504	-0.004783	3.9999943	60.000000	CY
0.0001844	25712.	139456543.	15.2457585	0.0028109	-0.004933	3.9978919	60.000000	CY
0.0001894	25764.	136049626.	15.1661233	0.0028721	-0.005082	3.9999206	60.000000	CY
0.0001944	25814.	132805754.	15.0926824	0.0029336	-0.005230	3.9966317	60.000000	CY
0.0001994	25860.	129703057.	15.0261810	0.0029958	-0.005378	3.9995098	60.000000	CY
0.0002044	25904.	126745326.	14.9643120	0.0030583	-0.005525	3.9958445	60.000000	CYT
0.0002094	25944.	123913988.	14.9076566	0.0031213	-0.005672	3.9981946	60.000000	CYT
0.0002144	25983.	121202100.	14.8505328	0.0031836	-0.005820	3.9999238	60.000000	CYT
0.0002194	26015.	118586255.	14.8008618	0.0032469	-0.005967	3.9948834	60.000000	CYT
0.0002244	26044.	116073726.	14.7559181	0.0033109	-0.006113	3.9985355	60.000000	CYT
0.0002294	26071.	113662871.	14.7146061	0.0033752	-0.006259	3.9999788	60.000000	CYT
0.0002344	26092.	111324272.	14.6807274	0.0034408	-0.006403	3.9945393	60.000000	CYT
0.0002394	26111.	109079628.	14.6492599	0.0035067	-0.006547	3.9983360	60.000000	CYT
0.0002444	26129.	106921398.	14.6203870	0.0035729	-0.006691	3.9999460	60.000000	CYT
0.0002494	26145.	104841188.	14.5946163	0.0036395	-0.006834	3.9928688	60.000000	CYT
0.0002544	26160.	102839294.	14.5708197	0.0037065	-0.006977	3.9972482	60.000000	CYT
0.0002594	26174.	100911831.	14.5487563	0.0037736	-0.007120	3.9995902	60.000000	CYT

Pier drilled shaft_row2

0.0002644 26187. 99053418. 14.5285964 0.0038410 -0.007263 3.9963724 60.0000000 CYT

Axial Thrust Force = 1091.000 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	401.4365026	642298404.	312.3543343	0.0001952	0.0001690	0.7846231	5.5967161	
0.00000125	802.8726413	642298113.	166.7049472	0.0002084	0.0001559	0.8339734	5.9136418	
0.00000188	1204.	642282348.	118.1674958	0.0002216	0.0001428	0.8830286	6.2312388	
0.00000250	1606.	642256840.	93.9080293	0.0002348	0.0001298	0.9317869	6.5495071	
0.00000313	2007.	642222734.	79.3597577	0.0002480	0.0001167	0.9802460	6.8684468	
0.00000375	2408.	642180411.	69.6670845	0.0002613	0.0001038	1.0284041	7.1880580	
0.00000438	2809.	642130032.	62.7490402	0.0002745	0.00009078	1.0762591	7.5083407	
0.00000500	3210.	642071678.	57.5651399	0.0002878	0.00007783	1.1238089	7.8292953	
0.00000563	3611.	642005392.	53.5373369	0.0003011	0.00006490	1.1710515	8.1509219	
0.00000625	4012.	641931198.	50.3188032	0.0003145	0.00005199	1.2179849	8.4732206	
0.00000688	4413.	641849112.	47.6888301	0.0003279	0.00003911	1.2646070	8.7961918	
0.00000750	4813.	641759142.	45.5002788	0.0003413	0.00002625	1.3109158	9.1198357	
0.00000813	5213.	641661292.	43.6512838	0.0003547	0.00001342	1.3569093	9.4441525	
0.00000875	5614.	641555565.	42.0690844	0.0003681	6.04488E-07	1.4025854	9.7691427	
0.00000938	6013.	641439833.	40.7003040	0.0003816	-0.00001218	1.4479415	10.0948014	
0.00001000	6413.	641299191.	39.5047897	0.0003950	-0.00002495	1.4929709	10.4210890	
0.00001063	6812.	641115670.	38.4517659	0.0004086	-0.00003770	1.5376647	10.7479442	
0.00001125	7210.	640877107.	37.5173010	0.0004221	-0.00005043	1.5820141	11.0753070	
0.00001188	7607.	640577005.	36.6825225	0.0004356	-0.00006315	1.6260119	11.4031250	
0.00001250	8003.	640212927.	35.9323541	0.0004492	-0.00007585	1.6696514	11.7313534	
0.00001313	8397.	639785076.	35.2546094	0.0004627	-0.00008853	1.7129274	12.0599545	
0.00001375	8790.	639294868.	34.6393276	0.0004763	-0.000101	1.7558348	12.3888944	
0.00001438	9182.	638744708.	34.0782916	0.0004899	-0.000114	1.7983696	12.7181441	
0.00001500	9182.	612130345.	32.9835323	0.0004948	-0.000135	1.8132785	12.7948866	C
0.00001563	9182.	587645131.	32.4189710	0.0005065	-0.000150	1.8496962	13.0721899	C
0.00001625	9225.	567679404.	31.8903344	0.0005182	-0.000164	1.8854322	13.3459577	C
0.00001688	9443.	559614648.	31.3936872	0.0005298	-0.000179	1.9204988	13.6162170	C
0.00001750	9654.	551661050.	30.9257836	0.0005412	-0.000194	1.9549151	13.8830602	C
0.00001813	9857.	543837017.	30.4838619	0.0005525	-0.000209	1.9887014	14.1465987	C
0.00001875	10053.	536158661.	30.0655632	0.0005637	-0.000224	2.0218798	14.4069626	C
0.00001938	10242.	528640031.	29.6688681	0.0005748	-0.000239	2.0544738	14.6643016	C

Pier drilled shaft_row2

0.00002000	10426.	521293307.	29.2920445	0.0005858	-0.000254	2.0865083	14.9187859	C
0.00002063	10604.	514128969.	28.9336063	0.0005968	-0.000269	2.1180097	15.1706071	C
0.00002125	10777.	507155942.	28.5922784	0.0006076	-0.000285	2.1490060	15.4199792	C
0.00002188	10946.	500381730.	28.2669693	0.0006183	-0.000300	2.1795268	15.6671400	C
0.00002250	11110.	493792053.	27.9562752	0.0006290	-0.000316	2.2095731	15.9120446	C
0.00002313	11270.	487344603.	27.6582059	0.0006396	-0.000332	2.2390980	16.1541527	C
0.00002375	11426.	481110302.	27.3735501	0.0006501	-0.000347	2.2682268	16.3946950	C
0.00002438	11580.	475084238.	27.1015218	0.0006606	-0.000363	2.2969797	16.6338445	C
0.00002563	11876.	463472439.	26.5881402	0.0006813	-0.000395	2.3531266	17.1053553	C
0.00002688	12161.	452513875.	26.1137403	0.0007018	-0.000427	2.4077013	17.5700270	C
0.00002813	12436.	442166393.	25.6737907	0.0007221	-0.000459	2.4607855	18.0284044	C
0.00002938	12701.	432387164.	25.2644230	0.0007421	-0.000492	2.5124485	18.4809366	C
0.00003063	12959.	423139382.	24.8824653	0.0007620	-0.000524	2.5627620	18.9281333	C
0.00003188	13209.	414390908.	24.5253109	0.0007817	-0.000557	2.6117994	19.3705656	C
0.00003313	13452.	406087653.	24.1899100	0.0008013	-0.000590	2.6595626	19.8080011	C
0.00003438	13688.	398191159.	23.8738699	0.0008207	-0.000623	2.7060726	20.2404204	C
0.00003563	13919.	390709194.	23.5767180	0.0008399	-0.000656	2.7514836	20.6694406	C
0.00003688	14146.	383622281.	23.2972848	0.0008591	-0.000690	2.7958752	21.0958653	C
0.00003813	14367.	376829386.	23.0311501	0.0008781	-0.000723	2.8390255	21.5167342	C
0.00003938	14584.	370385744.	22.7801741	0.0008970	-0.000757	2.8812350	21.9356177	C
0.00004063	14797.	364242861.	22.5422408	0.0009158	-0.000790	2.9224481	22.3516713	C
0.00004188	15006.	358363744.	22.3155096	0.0009345	-0.000824	2.9626162	22.7640784	C
0.00004313	15213.	352770228.	22.1009925	0.0009531	-0.000858	3.0019365	23.1753227	C
0.00004438	15416.	347393350.	21.8953767	0.0009716	-0.000892	3.0402035	23.5824693	C
0.00004563	15616.	342269371.	21.7005073	0.0009901	-0.000926	3.0776741	23.9889264	C
0.00004688	15813.	337344762.	21.5137116	0.0010085	-0.000960	3.1141818	24.3922327	C
0.00004813	16008.	332626954.	21.3355214	0.0010268	-0.000994	3.1498490	24.7940059	C
0.00004938	16201.	328113484.	21.1658902	0.0010451	-0.001029	3.1847394	25.1951154	C
0.00005063	16390.	323752667.	21.0021253	0.0010632	-0.001063	3.2186606	25.5925390	C
0.00005188	16579.	319588932.	20.8468899	0.0010814	-0.001097	3.2519216	-26.451591	C
0.00005313	16765.	315567231.	20.6971002	0.0010995	-0.001132	3.2842820	-27.319749	C
0.00005438	16948.	311693583.	20.5533121	0.0011176	-0.001166	3.3158425	-28.189302	C
0.00005563	17131.	307981994.	20.4165764	0.0011357	-0.001201	3.3467476	-29.057904	C
0.00005688	17312.	304384224.	20.2839551	0.0011536	-0.001235	3.3767580	-29.929633	C
0.00005813	17490.	300909948.	20.1562807	0.0011716	-0.001270	3.4059907	-30.802638	C
0.00005938	17668.	297570864.	20.0345320	0.0011896	-0.001304	3.4345734	-31.674696	C
0.00006063	17845.	294344994.	19.9173662	0.0012075	-0.001339	3.4624101	-32.547524	C
0.00006188	18018.	291204385.	19.8029572	0.0012253	-0.001373	3.4893589	-33.423900	C
0.00006313	18191.	288177900.	19.6935953	0.0012432	-0.001408	3.5156627	-34.299331	C
0.00006438	18364.	285258796.	19.5889896	0.0012610	-0.001443	3.5413182	-35.173811	C

Pier drilled shaft_row2

0.00006563	18534.	282424406.	19.4875480	0.0012789	-0.001477	3.5662002	-36.049854	C
0.00006688	18703.	279663696.	19.3885661	0.0012966	-0.001512	3.5902675	-36.928481	C
0.00006813	18870.	276994869.	19.2936983	0.0013144	-0.001547	3.6136913	-37.806156	C
0.00006938	19037.	274412873.	19.2027254	0.0013322	-0.001582	3.6364679	-38.682873	C
0.00007063	19204.	271913010.	19.1154439	0.0013500	-0.001616	3.6585937	-39.558625	C
0.00007188	19368.	269461915.	19.0290312	0.0013677	-0.001651	3.6798380	-40.438894	C
0.00007313	19531.	267083951.	18.9458510	0.0013854	-0.001686	3.7004235	-41.318573	C
0.00007438	19693.	264777273.	18.8659169	0.0014032	-0.001721	3.7203627	-42.197281	C
0.00007938	20332.	256155894.	18.5716013	0.0014741	-0.001860	3.7932719	-45.711551	C
0.00008438	20957.	248380725.	18.3133033	0.0015452	-0.001999	3.8552668	-49.223042	C
0.00008938	21566.	241301699.	18.0835405	0.0016162	-0.002138	3.9062188	-52.735479	C
0.00009438	22164.	234847913.	17.8828902	0.0016877	-0.002276	3.9463802	-56.234871	C
0.00009938	22746.	228895240.	17.7029094	0.0017592	-0.002415	3.9754040	-59.732884	C
0.0001044	23284.	223081563.	17.5377394	0.0018305	-0.002553	3.9932148	-60.000000	CY
0.0001094	23724.	216907343.	17.3723142	0.0019001	-0.002694	3.9999060	-60.000000	CY
0.0001144	24044.	210217651.	17.1979620	0.0019670	-0.002837	3.9982594	-60.000000	CY
0.0001194	24350.	203975763.	17.0424750	0.0020344	-0.002979	3.9991617	-60.000000	CY
0.0001244	24643.	198137724.	16.8993953	0.0021019	-0.003122	3.9995735	-60.000000	CY
0.0001294	24896.	192435258.	16.7623584	0.0021686	-0.003265	3.9996940	-60.000000	CY
0.0001344	25073.	186592945.	16.6217901	0.0022336	-0.003410	3.9995698	-60.000000	CY
0.0001394	25231.	181026069.	16.4868094	0.0022978	-0.003556	3.9991527	-60.000000	CY
0.0001444	25382.	175804835.	16.3628874	0.0023624	-0.003701	3.9982638	-60.000000	CY
0.0001494	25529.	170905141.	16.2502861	0.0024274	-0.003846	3.9975398	-60.000000	CY
0.0001544	25671.	166291262.	16.1465665	0.0024926	-0.003991	3.9998964	-60.000000	CY
0.0001594	25807.	161926719.	16.0476315	0.0025576	-0.004136	3.9988828	-60.000000	CY
0.0001644	25940.	157809674.	15.9570323	0.0026229	-0.004281	3.9963134	-60.000000	CY
0.0001694	26069.	153915498.	15.8742950	0.0026887	-0.004425	3.9997249	60.000000	CY
0.0001744	26188.	150180207.	15.7963233	0.0027545	-0.004569	3.9974895	60.000000	CY
0.0001794	26277.	146489414.	15.7171081	0.0028193	-0.004714	3.9999143	60.000000	CY
0.0001844	26337.	142847362.	15.6334815	0.0028824	-0.004861	3.9972727	60.000000	CY
0.0001894	26384.	139324007.	15.5551842	0.0029458	-0.005008	3.9997713	60.000000	CY
0.0001944	26430.	135973021.	15.4825403	0.0030094	-0.005154	3.9958720	60.000000	CYT
0.0001994	26472.	132774447.	15.4160558	0.0030736	-0.005300	3.9991872	60.000000	CYT
0.0002044	26513.	129726539.	15.3540615	0.0031380	-0.005446	3.9977829	60.000000	CYT
0.0002094	26544.	126779617.	15.2984617	0.0032031	-0.005591	3.9976018	60.000000	CYT
0.0002144	26574.	123958609.	15.2450920	0.0032682	-0.005736	3.9997894	60.000000	CYT
0.0002194	26597.	121241892.	15.1985094	0.0033342	-0.005880	3.9941125	60.000000	CYT
0.0002244	26617.	118626851.	15.1575639	0.0034010	-0.006023	3.9981822	60.000000	CYT
0.0002294	26635.	116121572.	15.1194841	0.0034680	-0.006166	3.9999315	60.000000	CYT
0.0002344	26651.	113711401.	15.0854796	0.0035357	-0.006308	3.9939650	60.000000	CYT

Pier drilled shaft_row2

0.0002394	26666.	111397735.	15.0539842	0.0036035	-0.006450	3.9980046	60.0000000	CYT
0.0002444	26680.	109175447.	15.0246972	0.0036717	-0.006592	3.9998697	60.0000000	CYT
0.0002494	26692.	107036873.	14.9979493	0.0037401	-0.006734	3.9934359	60.0000000	CYT
0.0002544	26704.	104978541.	14.9732934	0.0038088	-0.006875	3.9967299	60.0000000	CYT

Axial Thrust Force = 1102.000 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	401.0288033	641646085.	315.4375214	0.0001971	0.0001709	0.7919464	5.6525988	
0.00000125	802.0573802	641645904.	168.2465696	0.0002103	0.0001578	0.8412403	5.9695257	
0.00000188	1203.	641630160.	119.1952762	0.0002235	0.0001447	0.8902393	6.2871244	
0.00000250	1604.	641604644.	94.6788983	0.0002367	0.0001317	0.9389411	6.6053951	
0.00000313	2005.	641570513.	79.9764875	0.0002499	0.0001187	0.9873440	6.9243379	
0.00000375	2406.	641528153.	70.1810614	0.0002632	0.0001057	1.0354457	7.2439529	
0.00000438	2806.	641477727.	63.1896276	0.0002765	0.00009270	1.0832442	7.5642403	
0.00000500	3207.	641419316.	57.9506901	0.0002898	0.00007975	1.1307376	7.8852001	
0.00000563	3608.	641352964.	53.8800846	0.0003031	0.00006683	1.1779238	8.2068326	
0.00000625	4008.	641278696.	50.6273127	0.0003164	0.00005392	1.2248007	8.5291380	
0.00000688	4408.	641196526.	47.9693302	0.0003298	0.00004104	1.2713663	8.8521165	
0.00000750	4808.	641106464.	45.7574408	0.0003432	0.00002818	1.3176186	9.1757684	
0.00000813	5208.	641008514.	43.8887013	0.0003566	0.00001535	1.3635556	9.5000940	
0.00000875	5608.	640902677.	42.2895807	0.0003700	0.00000253	1.4091751	9.8250936	
0.00000938	6007.	640787786.	40.9061464	0.0003835	-0.00001025	1.4544748	10.1507648	
0.00001000	6407.	640651201.	39.6978429	0.0003970	-0.00002302	1.4994488	10.4770745	
0.00001063	6805.	640474827.	38.6335716	0.0004105	-0.00003577	1.5440883	10.8039630	
0.00001125	7203.	640245654.	37.6891427	0.0004240	-0.00004850	1.5883847	11.1313703	
0.00001188	7599.	639956481.	36.8454791	0.0004375	-0.00006121	1.6323303	11.4592431	
0.00001250	7995.	639604265.	36.0873397	0.0004511	-0.00007391	1.6759186	11.7875357	
0.00001313	8389.	639188812.	35.4024058	0.0004647	-0.00008659	1.7191441	12.1162095	
0.00001375	8782.	638711225.	34.7806078	0.0004782	-0.00009927	1.7620018	12.4452299	
0.00001438	9174.	638173776.	34.2136404	0.0004918	-0.000112	1.8044873	12.7745676	
0.00001500	9174.	611583202.	33.1361140	0.0004970	-0.000133	1.8204496	12.8612596	C
0.00001563	9174.	587119874.	32.5689132	0.0005089	-0.000147	1.8569754	13.1401326	C
0.00001625	9251.	569311922.	32.0367683	0.0005206	-0.000162	1.8927636	13.4149646	C
0.00001688	9472.	561291668.	31.5367363	0.0005322	-0.000177	1.9278741	13.6862216	C
0.00001750	9684.	553380778.	31.0657752	0.0005437	-0.000191	1.9623377	13.9541060	C

Pier drilled shaft_row2

0.00001813	9889.	545597746.	30.6210929	0.0005550	-0.000206	1.9961748	14.2187307	C
0.00001875	10087.	537958761.	30.2003045	0.0005663	-0.000221	2.0294077	14.4802281	C
0.00001938	10278.	530477940.	29.8013680	0.0005774	-0.000236	2.0620597	14.7387500	C
0.00002000	10463.	523167522.	29.4225324	0.0005885	-0.000252	2.0941561	14.9944688	C
0.00002063	10643.	516038039.	29.0622946	0.0005994	-0.000267	2.1257232	15.2475787	C
0.00002125	10818.	509098465.	28.7193654	0.0006103	-0.000282	2.1567893	15.4982965	C
0.00002188	10988.	502323224.	28.3919063	0.0006211	-0.000298	2.1873380	15.7463965	C
0.00002250	11153.	495702296.	28.0785090	0.0006318	-0.000313	2.2173684	15.9918019	C
0.00002313	11315.	489284607.	27.7792782	0.0006424	-0.000329	2.2469679	16.2353473	C
0.00002375	11473.	483075831.	27.4935446	0.0006530	-0.000345	2.2761706	16.4773414	C
0.00002438	11627.	476991011.	27.2184941	0.0006635	-0.000360	2.3048609	16.7165294	C
0.00002563	11926.	465410085.	26.7030886	0.0006843	-0.000392	2.3611328	17.1907765	C
0.00002688	12213.	454450118.	26.2262623	0.0007048	-0.000424	2.4157831	17.6577243	C
0.00002813	12490.	444079450.	25.7836249	0.0007252	-0.000456	2.4689019	18.1179874	C
0.00002938	12757.	434279281.	25.3719078	0.0007453	-0.000488	2.5206035	18.5725003	C
0.00003063	13016.	425012407.	24.9879047	0.0007653	-0.000521	2.5709594	19.0217767	C
0.00003188	13267.	416208363.	24.6277017	0.0007850	-0.000554	2.6199418	19.4652131	C
0.00003313	13510.	407862830.	24.2897883	0.0008046	-0.000587	2.6676731	19.9039468	C
0.00003438	13748.	399953845.	23.9724302	0.0008241	-0.000620	2.7142322	20.3386726	C
0.00003563	13981.	392460146.	23.6741709	0.0008434	-0.000653	2.7596963	20.7701217	C
0.00003688	14208.	385312574.	23.3918576	0.0008626	-0.000686	2.8039765	21.1969991	C
0.00003813	14430.	378503817.	23.1246562	0.0008816	-0.000720	2.8471567	21.6201168	C
0.00003938	14650.	372052069.	22.8730845	0.0009006	-0.000753	2.8894256	22.0417098	C
0.00004063	14863.	365850254.	22.6324224	0.0009194	-0.000787	2.9304977	22.4579165	C
0.00004188	15074.	359965322.	22.4053639	0.0009382	-0.000821	2.9707271	22.8731952	C
0.00004313	15280.	354318304.	22.1883748	0.0009569	-0.000854	3.0099039	23.2846051	C
0.00004438	15484.	348937318.	21.9826655	0.0009755	-0.000888	3.0482338	23.6947991	C
0.00004563	15684.	343764484.	21.7855399	0.0009940	-0.000922	3.0855583	24.1014363	C
0.00004688	15883.	338836614.	21.5988397	0.0010124	-0.000956	3.1221281	24.5079536	C
0.00004813	16077.	334073932.	21.4185770	0.0010308	-0.000990	3.1576463	24.9099202	C
0.00004938	16271.	329538307.	21.2481226	0.0010491	-0.001025	3.1924950	25.3128619	C
0.00005063	16461.	325154257.	21.0834592	0.0010674	-0.001059	3.2263597	25.7119475	C
0.00005188	16649.	320951116.	20.9264047	0.0010856	-0.001093	3.2594680	-26.331971	C
0.00005313	16837.	316927119.	20.7770208	0.0011038	-0.001127	3.2918788	-27.196621	C
0.00005438	17020.	313016904.	20.6315404	0.0011218	-0.001162	3.3232832	-28.065946	C
0.00005563	17203.	309270361.	20.4931905	0.0011399	-0.001196	3.3540314	-28.934316	C
0.00005688	17385.	305672784.	20.3612523	0.0011580	-0.001231	3.3840961	-29.802141	C
0.00005813	17563.	302165866.	20.2320645	0.0011760	-0.001265	3.4131683	-30.674895	C
0.00005938	17741.	298795478.	20.1088683	0.0011940	-0.001300	3.4415895	-31.546699	C
0.00006063	17918.	295553076.	19.9912961	0.0012120	-0.001334	3.4693563	-32.417546	C

Pier drilled shaft_row2

0.00006188	18092.	292400659.	19.8768016	0.0012299	-0.001369	3.4962592	-33.291395	C
0.00006313	18265.	289345922.	19.7661304	0.0012477	-0.001404	3.5223966	-34.166546	C
0.00006438	18437.	286399634.	19.6602683	0.0012656	-0.001438	3.5478845	-35.040743	C
0.00006563	18608.	283555503.	19.5589438	0.0012836	-0.001473	3.5727196	-35.913979	C
0.00006688	18777.	280780656.	19.4597020	0.0013014	-0.001507	3.5966995	-36.790522	C
0.00006813	18945.	278087071.	19.3636872	0.0013192	-0.001542	3.6199501	-37.667884	C
0.00006938	19112.	275481180.	19.2716109	0.0013370	-0.001577	3.6425524	-38.544284	C
0.00007063	19278.	272958240.	19.1832670	0.0013548	-0.001611	3.6645030	-39.419715	C
0.00007188	19443.	270509580.	19.0980758	0.0013727	-0.001646	3.6857648	-40.294979	C
0.00007313	19606.	268109685.	19.0138805	0.0013904	-0.001681	3.7061697	-41.174308	C
0.00007438	19768.	265781782.	18.9329676	0.0014081	-0.001716	3.7259269	-42.052662	C
0.00007938	20408.	257103414.	18.6373019	0.0014793	-0.001854	3.7982695	-45.560317	C
0.00008438	21031.	249257487.	18.3757841	0.0015505	-0.001993	3.8594887	-49.070159	C
0.00008938	21641.	242133240.	18.1454190	0.0016217	-0.002132	3.9097758	-52.575098	C
0.00009438	22237.	235621491.	17.9422083	0.0016933	-0.002270	3.9490939	-56.072525	C
0.00009938	22820.	229631164.	17.7622224	0.0017651	-0.002409	3.9773252	-59.561951	C
0.0001044	23360.	223805623.	17.5958187	0.0018366	-0.002547	3.9942324	-60.000000	CY
0.0001094	23807.	217663362.	17.4324121	0.0019067	-0.002687	3.9999926	-60.000000	CY
0.0001144	24127.	210945319.	17.2567333	0.0019737	-0.002830	3.9988033	-60.000000	CY
0.0001194	24431.	204661665.	17.0995172	0.0020413	-0.002972	3.9995277	-60.000000	CY
0.0001244	24726.	198799718.	16.9575413	0.0021091	-0.003115	3.9998314	-60.000000	CY
0.0001294	24983.	193103792.	16.8204297	0.0021761	-0.003258	3.9999093	-60.000000	CY
0.0001344	25162.	187250892.	16.6791723	0.0022413	-0.003402	3.9998421	-60.000000	CY
0.0001394	25320.	181667849.	16.5458204	0.0023061	-0.003548	3.9995843	-60.000000	CY
0.0001444	25470.	176416946.	16.4205314	0.0023707	-0.003693	3.9989213	-60.000000	CY
0.0001494	25616.	171489735.	16.3066635	0.0024358	-0.003838	3.9975724	-60.000000	CY
0.0001544	25759.	166857122.	16.2029450	0.0025013	-0.003982	3.9999991	-60.000000	CY
0.0001594	25895.	162476186.	16.1048274	0.0025667	-0.004127	3.9994355	-60.000000	CY
0.0001644	26027.	158336587.	16.0131637	0.0026322	-0.004272	3.9974057	-60.000000	CY
0.0001694	26155.	154421601.	15.9293889	0.0026980	-0.004416	3.9999552	60.000000	CY
0.0001744	26274.	150675472.	15.8509894	0.0027640	-0.004560	3.9984002	60.000000	CY
0.0001794	26366.	146988638.	15.7747642	0.0028296	-0.004704	3.9994956	60.000000	CY
0.0001844	26429.	143345329.	15.6937804	0.0028935	-0.004850	3.9983650	60.000000	CY
0.0001894	26476.	139806131.	15.6143482	0.0029570	-0.004997	3.9999895	60.000000	CY
0.0001944	26520.	136436066.	15.5411709	0.0030208	-0.005143	3.9972787	60.000000	CYT
0.0001994	26561.	133223406.	15.4736518	0.0030851	-0.005289	3.9997332	60.000000	CYT
0.0002044	26600.	130153433.	15.4119021	0.0031498	-0.005434	3.9949617	60.000000	CYT
0.0002094	26632.	127195227.	15.3583647	0.0032157	-0.005578	3.9987274	60.000000	CYT
0.0002144	26661.	124366806.	15.3065200	0.0032813	-0.005722	3.9999997	60.000000	CYT
0.0002194	26682.	121625421.	15.2612756	0.0033479	-0.005866	3.9961398	60.000000	CYT

Pier drilled shaft_row2

0.0002244	26701.	118999538.	15.2195329	0.0034149	-0.006009	3.9992220	60.0000000	CYT
0.0002294	26718.	116480950.	15.1812323	0.0034822	-0.006152	3.9980074	60.0000000	CYT
0.0002344	26733.	114060143.	15.1466732	0.0035500	-0.006294	3.9960965	60.0000000	CYT
0.0002394	26747.	111737133.	15.1144922	0.0036180	-0.006436	3.9991408	60.0000000	CYT
0.0002444	26760.	109505403.	15.0846592	0.0036863	-0.006577	3.9987815	60.0000000	CYT
0.0002494	26772.	107357239.	15.0575141	0.0037550	-0.006719	3.9946558	60.0000000	CYT
0.0002544	26783.	105290813.	15.0322514	0.0038238	-0.006860	3.9982957	60.0000000	CYT

Axial Thrust Force = 1326.000 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	392.6323225	628211716.	378.9350591	0.0002368	0.0002106	0.9409106	6.8034917	
0.00000125	785.2672513	628213801.	199.9959471	0.0002500	0.0001975	0.9890448	7.1204406	
0.00000188	1178.	628198469.	140.3622042	0.0002632	0.0001844	1.0368837	7.4380761	
0.00000250	1570.	628172772.	110.5548044	0.0002764	0.0001714	1.0844253	7.7563983	
0.00000313	1963.	628138122.	92.6779430	0.0002896	0.0001584	1.1316674	8.0754073	
0.00000375	2355.	628094985.	80.7663518	0.0003029	0.0001454	1.1786080	8.3951033	
0.00000438	2748.	628043563.	72.2634876	0.0003162	0.0001324	1.2252451	8.7154862	
0.00000500	3140.	627983954.	65.8910791	0.0003295	0.0001195	1.2715765	9.0365565	
0.00000563	3532.	627916211.	60.9389755	0.0003428	0.0001065	1.3176002	9.3583141	
0.00000625	3924.	627840366.	56.9810866	0.0003561	0.00009363	1.3633140	9.6807595	
0.00000688	4316.	627756437.	53.7462644	0.0003695	0.00008076	1.4087159	10.0038927	
0.00000750	4707.	627664435.	51.0537433	0.0003829	0.00006790	1.4538038	10.3277142	
0.00000813	5099.	627564365.	48.7783784	0.0003963	0.00005507	1.4985757	10.6522242	
0.00000875	5490.	627456232.	46.8307802	0.0004098	0.00004227	1.5430293	10.9774230	
0.00000938	5881.	627340036.	45.1453969	0.0004232	0.00002949	1.5871627	11.3033111	
0.00001000	6272.	627215776.	43.6730645	0.0004367	0.00001673	1.6309738	11.6298887	
0.00001063	6663.	627083451.	42.3761872	0.0004502	0.00000400	1.6744604	11.9571565	
0.00001125	7053.	626942633.	41.2255199	0.0004638	-0.00000871	1.7176203	12.2851134	
0.00001188	7443.	626786375.	40.1979142	0.0004774	-0.00002140	1.7604490	12.6137380	
0.00001250	7833.	626602336.	39.2747839	0.0004909	-0.00003407	1.8029394	12.9429842	
0.00001313	8221.	626380088.	38.4410715	0.0005045	-0.00004671	1.8450842	13.2728016	
0.00001375	8609.	626112489.	37.6844640	0.0005182	-0.00005934	1.8868765	13.6031426	
0.00001438	8996.	625795469.	36.9948033	0.0005318	-0.00007195	1.9283102	13.9339649	
0.00001500	9381.	625426990.	36.3636344	0.0005455	-0.00008455	1.9693799	14.2652310	
0.00001563	9766.	625006841.	35.7838685	0.0005591	-0.00009713	2.0100810	14.5969092	

Pier drilled shaft_row2

0.00001625	10149.	624535535.	35.2495125	0.0005728	-0.000110	2.0504091	14.9289703
0.00001688	10149.	601404589.	34.3584577	0.0005798	-0.000129	2.0706774	15.0671015 C
0.00001750	10160.	580573191.	33.8305356	0.0005920	-0.000143	2.1061654	15.3572218 C
0.00001813	10404.	574030722.	33.3318989	0.0006041	-0.000157	2.1409508	15.6435981 C
0.00001875	10640.	567460978.	32.8606444	0.0006161	-0.000171	2.1750989	15.9267878 C
0.00001938	10868.	560918861.	32.4146791	0.0006280	-0.000186	2.2086493	16.2071041 C
0.00002000	11088.	554417576.	31.9916654	0.0006398	-0.000200	2.2416116	16.4845660 C
0.00002063	11302.	547967739.	31.5895507	0.0006515	-0.000215	2.2739956	16.7591938 C
0.00002125	11509.	541589862.	31.2067329	0.0006631	-0.000229	2.3058230	17.0311367 C
0.00002188	11710.	535302257.	30.8418284	0.0006747	-0.000244	2.3371173	17.3005662 C
0.00002250	11904.	529085704.	30.4929604	0.0006861	-0.000259	2.3678617	17.5672318 C
0.00002313	12093.	522955425.	30.1590383	0.0006974	-0.000274	2.3980764	17.8312739 C
0.00002375	12278.	516948342.	29.8395949	0.0007087	-0.000289	2.4278133	18.0931836 C
0.00002438	12457.	511076585.	29.5338619	0.0007199	-0.000304	2.4571001	18.3532050 C
0.00002563	12803.	499632073.	28.9576908	0.0007420	-0.000334	2.5142220	18.8662278 C
0.00002688	13134.	488694087.	28.4257578	0.0007639	-0.000365	2.5696286	19.3719559 C
0.00002813	13450.	478235157.	27.9324688	0.0007856	-0.000396	2.6233780	19.8706387 C
0.00002938	13754.	468214158.	27.4727682	0.0008070	-0.000427	2.6754963	20.3621707 C
0.00003063	14047.	458668129.	27.0443000	0.0008282	-0.000458	2.7261477	20.8481126 C
0.00003188	14330.	449570803.	26.6437880	0.0008493	-0.000489	2.7753890	21.3288327 C
0.00003313	14604.	440879694.	26.2679437	0.0008701	-0.000521	2.8232362	21.8042121 C
0.00003438	14869.	432558158.	25.9139228	0.0008908	-0.000553	2.8697028	22.2740980 C
0.00003563	15127.	424611789.	25.5804425	0.0009113	-0.000585	2.9148949	22.7395384 C
0.00003688	15378.	417028439.	25.2660080	0.0009317	-0.000617	2.9588808	23.2011686 C
0.00003813	15623.	409796516.	24.9693869	0.0009520	-0.000649	3.0017300	23.6596973 C
0.00003938	15861.	402830114.	24.6868607	0.0009720	-0.000682	3.0432919	24.1128154 C
0.00004063	16095.	396175015.	24.4193379	0.0009920	-0.000714	3.0837737	24.5631262 C
0.00004188	16324.	389824973.	24.1662313	0.0010120	-0.000747	3.1232510	25.0115485 C
0.00004313	16546.	383684259.	23.9234486	0.0010317	-0.000780	3.1614949	25.4545318 C
0.00004438	16767.	377838457.	23.6940328	0.0010514	-0.000812	3.1988598	25.8971149 C
0.00004563	16981.	372183670.	23.4735695	0.0010710	-0.000845	3.2350669	26.3349105 C
0.00004688	17193.	366785753.	23.2645949	0.0010905	-0.000878	3.2704140	26.7723401 C
0.00004813	17400.	361560117.	23.0633617	0.0011099	-0.000911	3.3046599	27.2054230 C
0.00004938	17606.	356571941.	22.8726758	0.0011293	-0.000944	3.3381132	27.6390191 C
0.00005063	17806.	351720941.	22.6878612	0.0011486	-0.000978	3.3704399	28.0674101 C
0.00005188	18005.	347087266.	22.5127052	0.0011678	-0.001011	3.4020212	28.4969323 C
0.00005313	18200.	342588963.	22.3431689	0.0011870	-0.001044	3.4325673	28.9224135 C
0.00005438	18393.	338260173.	22.1810304	0.0012061	-0.001078	3.4622791	29.3472687 C
0.00005563	18584.	334098824.	22.0262249	0.0012252	-0.001111	3.4911958	29.7721980 C
0.00005688	18771.	330041295.	21.8753885	0.0012442	-0.001145	3.5190762	30.1924504 C

Pier drilled shaft_row2

0.00005813	18957.	326144100.	21.7316972	0.0012632	-0.001178	3.5462256	30.6138110	C
0.00005938	19141.	322379737.	21.5936851	0.0012821	-0.001212	3.5725558	31.0345323	C
0.00006063	19322.	318709664.	21.4591866	0.0013010	-0.001245	3.5979215	31.4514260	C
0.00006188	19501.	315174730.	21.3307375	0.0013198	-0.001279	3.6225611	31.8694235	C
0.00006313	19680.	311765867.	21.2079245	0.0013388	-0.001312	3.6464653	32.2884258	C
0.00006438	19855.	308425356.	21.0871552	0.0013575	-0.001346	3.6693736	32.7023393	C
0.00006563	20029.	305199857.	20.9715664	0.0013763	-0.001380	3.6915595	-33.225581	C
0.00006688	20202.	302082790.	20.8608715	0.0013951	-0.001414	3.7130185	-34.073128	C
0.00006813	20373.	299053355.	20.7537557	0.0014138	-0.001447	3.7336678	-34.921630	C
0.00006938	20541.	296093010.	20.6490220	0.0014325	-0.001481	3.7534383	-35.773105	C
0.00007063	20709.	293226099.	20.5485398	0.0014512	-0.001515	3.7724853	-36.623466	C
0.00007188	20876.	290447630.	20.4520912	0.0014700	-0.001549	3.7908042	-37.472704	C
0.00007313	21042.	287748660.	20.3591329	0.0014888	-0.001582	3.8083675	-38.321533	C
0.00007438	21204.	285097334.	20.2672637	0.0015074	-0.001616	3.8250265	-39.174754	C
0.00007938	21846.	275219212.	19.9331132	0.0015822	-0.001752	3.8843404	-42.577521	C
0.00008438	22465.	266252676.	19.6367130	0.0016568	-0.001887	3.9313335	-45.984824	C
0.00008938	23067.	258089798.	19.3754205	0.0017317	-0.002022	3.9662124	-49.387088	C
0.00009438	23652.	250618000.	19.1455825	0.0018069	-0.002157	3.9889313	-52.779040	C
0.00009938	24219.	243709511.	18.9396024	0.0018821	-0.002292	3.9992964	-56.168889	C
0.0001044	24770.	237314602.	18.7593315	0.0019580	-0.002426	3.9983886	-59.540655	C
0.0001094	25279.	231121515.	18.5942030	0.0020337	-0.002560	3.9998008	-60.000000	CY
0.0001144	25702.	224715992.	18.4324595	0.0021082	-0.002696	3.9981900	-60.000000	CY
0.0001194	26013.	217907189.	18.2679006	0.0021807	-0.002833	3.9988892	-60.000000	CY
0.0001244	26290.	211373501.	18.1106687	0.0022525	-0.002971	3.9992668	-60.000000	CY
0.0001294	26558.	205279869.	17.9705153	0.0023249	-0.003109	3.9993947	-60.000000	CY
0.0001344	26815.	199550297.	17.8440070	0.0023978	-0.003246	3.9993175	-60.000000	CY
0.0001394	27017.	193844497.	17.7134096	0.0024688	-0.003385	3.9988410	-60.000000	CY
0.0001444	27161.	188130435.	17.5810714	0.0025383	-0.003525	3.9976894	-60.000000	CY
0.0001494	27301.	182766207.	17.4605215	0.0026082	-0.003666	3.9998704	60.000000	CY
0.0001544	27431.	177693421.	17.3467629	0.0026779	-0.003806	3.9996013	60.000000	CY
0.0001594	27552.	172877210.	17.2437554	0.0027482	-0.003946	3.9980448	60.000000	CY
0.0001644	27666.	168311858.	17.1513674	0.0028193	-0.004084	3.9996931	60.000000	CY
0.0001694	27773.	163976375.	17.0686617	0.0028910	-0.004223	3.9991949	60.000000	CY
0.0001744	27875.	159856300.	16.9930524	0.0029632	-0.004361	3.9961804	60.000000	CY
0.0001794	27966.	155907986.	16.9233996	0.0030356	-0.004498	3.9996207	60.000000	CY
0.0001844	28049.	152132040.	16.8624715	0.0031090	-0.004635	3.9966028	60.000000	CYT
0.0001894	28116.	148465070.	16.8099085	0.0031834	-0.004770	3.9997381	60.000000	CYT
0.0001944	28167.	144908207.	16.7585988	0.0032575	-0.004906	3.9962863	60.000000	CYT
0.0001994	28199.	141437040.	16.7065668	0.0033309	-0.005043	3.9995134	60.000000	CYT
0.0002044	28214.	138050673.	16.6522607	0.0034033	-0.005180	3.9953352	60.000000	CYT

			Pier drilled shaft_row2					
0.0002094	28227.	134817364.	16.6022174	0.0034761	-0.005318	3.9984588	60.0000000	CYT
0.0002144	28238.	131724092.	16.5526049	0.0035485	-0.005455	3.9999862	60.0000000	CYT
0.0002194	28247.	128761572.	16.5060793	0.0036210	-0.005593	3.9956881	60.0000000	CYT
0.0002244	28255.	125926713.	16.4627529	0.0036938	-0.005730	3.9989833	60.0000000	CYT
0.0002294	28262.	123211252.	16.4224141	0.0037669	-0.005867	3.9993607	60.0000000	CYT
0.0002344	28262.	120582745.	16.4296651	0.0038507	-0.005993	3.9967778	60.0000000	CYT

Summary of Results for Nominal Moment Capacity for Section 2

Moment values interpolated at maximum compressive strain = 0.003
or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain	Max. Tens. Strain
1	846.000	24468.207	0.00300000	-0.00604311
2	848.900	24492.681	0.00300000	-0.00603126
3	1018.000	25862.475	0.00300000	-0.00538771
4	1091.000	26423.057	0.00300000	-0.00513268
5	1102.000	26505.424	0.00300000	-0.00509529
6	1326.000	27921.224	0.00300000	-0.00443049

Note that the values of moment capacity in the table above are not factored by a strength reduction factor (phi-factor).

In ACI 318, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.75).

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318, or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Resist.	Nominal	Nominal	Ult. (Fac)	Ult. (Fac)	Bend. Stiff.
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Load No.	Factor	Pier drilled shaft_row2				at Ult Mom kip-in^2
		Ax. Thrust kips	Moment Cap in-kips	Ax. Thrust kips	Moment Cap in-kips	
1	0.65	846.000000	24468.	549.900000	15904.	268805135.
2	0.65	848.900000	24493.	551.785000	15920.	269261781.
3	0.65	1018.	25862.	661.700000	16811.	295891611.
4	0.65	1091.	26423.	709.150000	17175.	307114466.
5	0.65	1102.	26505.	716.300000	17229.	308768968.
6	0.65	1326.	27921.	861.900000	18149.	343771743.
1	0.75	846.000000	24468.	634.500000	18351.	236417865.
2	0.75	848.900000	24493.	636.675000	18370.	236739418.
3	0.75	1018.	25862.	763.500000	19397.	255298436.
4	0.75	1091.	26423.	818.250000	19817.	263099228.
5	0.75	1102.	26505.	826.500000	19879.	264269346.
6	0.75	1326.	27921.	994.500000	20941.	289388967.
1	0.90	846.000000	24468.	761.400000	22021.	194002021.
2	0.90	848.900000	24493.	764.010000	22043.	194261888.
3	0.90	1018.	25862.	916.200000	23276.	209435803.
4	0.90	1091.	26423.	981.900000	23781.	215723759.
5	0.90	1102.	26505.	991.800000	23855.	216656485.
6	0.90	1326.	27921.	1193.	25129.	232943601.

Layering Correction Equivalent Depths of Soil & Rock Layers

Layer No.	Top of Layer Below Pile Head ft	Equivalent Top Depth Below Grnd Surf ft	Same Layer Type As Layer Above	Layer is Rock or is Below Rock Layer	F0 Integral for Layer lbs	F1 Integral for Layer lbs
1	0.00	0.00	N.A.	No	0.00	265392.
2	6.0000	6.0000	No	Yes	N.A.	N.A.

Notes: The F0 integral of Layer n+1 equals the sum of the F0 and F1 integrals

Pier drilled shaft_row2

for Layer n. Layering correction equivalent depths are computed only for soil types with both shallow-depth and deep-depth expressions for peak lateral load transfer. These soil types are soft and stiff clays, non-liquefied sands, and cemented c-phi soil.

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 1

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 19020.0 lbs
 Applied moment at pile head = 3836400.0 in-lbs
 Axial thrust load on pile head = 848900.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in ²	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	0.01871	3836400.	19020.	-3.82E-04	0.00	1.12E+12	-281.555	14447.	0.00
0.1600	0.01798	3873017.	18479.	-3.76E-04	0.00	1.12E+12	-281.542	30063.	0.00
0.3200	0.01727	3908586.	17939.	-3.69E-04	0.00	1.12E+12	-281.438	31296.	0.00
0.4800	0.01656	3943106.	17399.	-3.62E-04	0.00	1.12E+12	-281.241	32600.	0.00
0.6400	0.01587	3976578.	16859.	-3.56E-04	0.00	1.12E+12	-280.949	33981.	0.00
0.8000	0.01520	4009004.	16320.	-3.49E-04	0.00	1.12E+12	-280.560	35443.	0.00
0.9600	0.01454	4040384.	15782.	-3.42E-04	0.00	1.12E+12	-280.071	36995.	0.00
1.1200	0.01389	4070721.	15245.	-3.35E-04	0.00	1.12E+12	-279.481	38644.	0.00
1.2800	0.01325	4100015.	14709.	-3.28E-04	0.00	1.12E+12	-278.785	40399.	0.00
1.4400	0.01263	4128271.	14174.	-3.21E-04	0.00	1.12E+12	-277.981	42270.	0.00
1.6000	0.01202	4155490.	13641.	-3.14E-04	0.00	1.12E+12	-277.066	44267.	0.00
1.7600	0.01142	4181677.	13110.	-3.07E-04	0.00	1.12E+12	-276.037	46402.	0.00
1.9200	0.01084	4206834.	12582.	-2.99E-04	0.00	1.12E+12	-274.890	48689.	0.00
2.0800	0.01027	4230966.	12055.	-2.92E-04	0.00	1.12E+12	-273.621	51143.	0.00
2.2400	0.00972	4254077.	11531.	-2.85E-04	0.00	1.12E+12	-272.226	53783.	0.00
2.4000	0.00918	4276173.	11010.	-2.78E-04	0.00	1.12E+12	-270.701	56628.	0.00
2.5600	0.00865	4297259.	10492.	-2.70E-04	0.00	1.12E+12	-269.040	59702.	0.00

Pier drilled shaft_row2

2.7200	0.00814	4317342.	9977.	-2.63E-04	0.00	1.12E+12	-267.239	63031.	0.00
2.8800	0.00764	4336427.	9466.	-2.55E-04	0.00	1.12E+12	-265.291	66645.	0.00
3.0400	0.00716	4354522.	8958.	-2.48E-04	0.00	1.12E+12	-263.191	70580.	0.00
3.2000	0.00669	4371635.	8455.	-2.41E-04	0.00	1.12E+12	-260.931	74879.	0.00
3.3600	0.00624	4387773.	7956.	-2.33E-04	0.00	1.12E+12	-258.503	79590.	0.00
3.5200	0.00580	4402947.	7463.	-2.25E-04	0.00	1.12E+12	-255.900	84772.	0.00
3.6800	0.00537	4417164.	6974.	-2.18E-04	0.00	1.12E+12	-253.111	90494.	0.00
3.8400	0.00496	4430437.	6491.	-2.10E-04	0.00	1.12E+12	-250.125	96840.	0.00
4.0000	0.00456	4442775.	6014.	-2.03E-04	0.00	1.12E+12	-246.931	103912.	0.00
4.1600	0.00418	4454190.	5543.	-1.95E-04	0.00	1.12E+12	-243.513	111835.	0.00
4.3200	0.00381	4464695.	5079.	-1.87E-04	0.00	1.12E+12	-239.856	120765.	0.00
4.4800	0.00346	4474303.	4622.	-1.80E-04	0.00	1.12E+12	-235.941	130895.	0.00
4.6400	0.00312	4483029.	4173.	-1.72E-04	0.00	1.12E+12	-231.745	142476.	0.00
4.8000	0.00280	4490889.	3732.	-1.64E-04	0.00	1.12E+12	-227.241	155828.	0.00
4.9600	0.00249	4497898.	3301.	-1.57E-04	0.00	1.12E+12	-222.396	171376.	0.00
5.1200	0.00220	4504074.	2879.	-1.49E-04	0.00	1.12E+12	-217.171	189696.	0.00
5.2800	0.00192	4509438.	2467.	-1.41E-04	0.00	1.12E+12	-211.515	211580.	0.00
5.4400	0.00166	4514009.	2067.	-1.34E-04	0.00	1.12E+12	-205.362	238163.	0.00
5.6000	0.00141	4517811.	1679.	-1.26E-04	0.00	1.12E+12	-198.625	271126.	0.00
5.7600	0.00117	4520867.	1305.	-1.18E-04	0.00	1.12E+12	-191.186	313081.	0.00
5.9200	9.53E-04	4523206.	946.8026	-1.10E-04	0.00	1.12E+12	-181.891	366367.	0.00
6.0800	7.49E-04	4524863.	-28431.	-9.98E-05	0.00	6.56E+11	-30420.	7.80E+07	0.00
6.2400	5.70E-04	4414356.	-81175.	-8.67E-05	0.00	6.56E+11	-24521.	8.26E+07	0.00
6.4000	4.16E-04	4213433.	-122849.	-7.41E-05	0.00	6.56E+11	-18889.	8.72E+07	0.00
6.5600	2.85E-04	3942856.	-154086.	-6.22E-05	0.00	6.56E+11	-13649.	9.18E+07	0.00
6.7200	1.77E-04	3621943.	-175729.	-5.11E-05	0.00	6.56E+11	-8895.	9.64E+07	0.00
6.8800	8.91E-05	3268224.	-188771.	-4.10E-05	0.00	6.56E+11	-4691.	1.01E+08	0.00
7.0400	1.95E-05	2897197.	-194306.	-3.20E-05	0.00	6.56E+11	-1075.	1.06E+08	0.00
7.2000	-3.38E-05	2522193.	-193475.	-2.41E-05	0.00	6.56E+11	1941.	1.10E+08	0.00
7.3600	-7.29E-05	2154333.	-187421.	-1.72E-05	0.00	6.56E+11	4365.	1.15E+08	0.00
7.5200	-1.00E-04	1802554.	-177255.	-1.15E-05	0.00	6.56E+11	6225.	1.20E+08	0.00
7.6800	-1.17E-04	1473713.	-164022.	-6.66E-06	0.00	6.56E+11	7559.	1.24E+08	0.00
7.8400	-1.26E-04	1172731.	-148681.	-2.79E-06	0.00	6.56E+11	8421.	1.29E+08	0.00
8.0000	-1.28E-04	902787.	-132085.	2.42E-07	0.00	6.56E+11	8866.	1.33E+08	0.00
8.1600	-1.25E-04	665523.	-114974.	2.54E-06	0.00	6.56E+11	8958.	1.38E+08	0.00
8.3200	-1.18E-04	461277.	-97969.	4.18E-06	0.00	6.56E+11	8757.	1.43E+08	0.00
8.4800	-1.09E-04	289310.	-81570.	5.28E-06	0.00	6.56E+11	8325.	1.47E+08	0.00
8.6400	-9.76E-05	148032.	-66166.	5.92E-06	0.00	6.56E+11	7720.	1.52E+08	0.00
8.8000	-8.59E-05	35213.	-52039.	6.19E-06	0.00	6.56E+11	6995.	1.56E+08	0.00
8.9600	-7.39E-05	-51819.	-39375.	6.16E-06	0.00	6.56E+11	6197.	1.61E+08	0.00

Pier drilled shaft_row2

9.1200	-6.22E-05	-116008.	-28276.	5.92E-06	0.00	6.56E+11	5366.	1.66E+08	0.00
9.2800	-5.12E-05	-160417.	-18770.	5.51E-06	0.00	6.56E+11	4536.	1.70E+08	0.00
9.4400	-4.10E-05	-188101.	-10828.	5.00E-06	0.00	6.56E+11	3736.	1.75E+08	0.00
9.6000	-3.19E-05	-202013.	-4375.	4.43E-06	0.00	6.56E+11	2986.	1.79E+08	0.00
9.7600	-2.40E-05	-204916.	699.7602	3.84E-06	0.00	6.56E+11	2301.	1.84E+08	0.00
9.9200	-1.72E-05	-199338.	4531.	3.25E-06	0.00	6.56E+11	1690.	1.89E+08	0.00
10.0800	-1.15E-05	-187528.	7268.	2.68E-06	0.00	6.56E+11	1160.	1.93E+08	0.00
10.2400	-6.90E-06	-171440.	9064.	2.16E-06	0.00	6.56E+11	711.2274	1.98E+08	0.00
10.4000	-3.24E-06	-152729.	10075.	1.68E-06	0.00	6.56E+11	341.6586	2.03E+08	0.00
10.5600	-4.36E-07	-132758.	10448.	1.27E-06	0.00	6.56E+11	47.0363	2.07E+08	0.00
10.7200	1.62E-06	-112613.	10321.	9.07E-07	0.00	6.56E+11	-178.827	2.12E+08	0.00
10.8800	3.05E-06	-93127.	9820.	6.06E-07	0.00	6.56E+11	-343.307	2.16E+08	0.00
11.0400	3.95E-06	-74905.	9054.	3.60E-07	0.00	6.56E+11	-454.440	2.21E+08	0.00
11.2000	4.43E-06	-58359.	8118.	1.65E-07	0.00	6.56E+11	-520.481	2.26E+08	0.00
11.3600	4.58E-06	-43731.	7091.	1.60E-08	0.00	6.56E+11	-549.539	2.30E+08	0.00
11.5200	4.49E-06	-31129.	6036.	-9.34E-08	0.00	6.56E+11	-549.298	2.35E+08	0.00
11.6800	4.22E-06	-20552.	5003.	-1.69E-07	0.00	6.56E+11	-526.815	2.39E+08	0.00
11.8400	3.84E-06	-11916.	4029.	-2.16E-07	0.00	6.56E+11	-488.379	2.44E+08	0.00
12.0000	3.39E-06	-5081.	3138.	-2.41E-07	0.00	6.56E+11	-439.440	2.49E+08	0.00
12.1600	2.92E-06	134.3240	2347.	-2.49E-07	0.00	6.56E+11	-384.579	2.53E+08	0.00
12.3200	2.44E-06	3932.	1663.	-2.43E-07	0.00	6.56E+11	-327.523	2.58E+08	0.00
12.4800	1.98E-06	6522.	1088.	-2.27E-07	0.00	6.56E+11	-271.195	2.63E+08	0.00
12.6400	1.57E-06	8112.	619.0814	-2.06E-07	0.00	6.56E+11	-217.777	2.67E+08	0.00
12.8000	1.19E-06	8900.	247.9706	-1.81E-07	0.00	6.56E+11	-168.797	2.72E+08	0.00
12.9600	8.70E-07	9065.	-34.285	-1.55E-07	0.00	6.56E+11	-125.220	2.76E+08	0.00
13.1200	5.98E-07	8769.	-238.535	-1.29E-07	0.00	6.56E+11	-87.541	2.81E+08	0.00
13.2800	3.76E-07	8150.	-376.221	-1.04E-07	0.00	6.56E+11	-55.881	2.86E+08	0.00
13.4400	1.99E-07	7324.	-458.733	-8.13E-08	0.00	6.56E+11	-30.069	2.90E+08	0.00
13.6000	6.33E-08	6388.	-496.933	-6.13E-08	0.00	6.56E+11	-9.723	2.95E+08	0.00
13.7600	-3.64E-08	5416.	-500.813	-4.40E-08	0.00	6.56E+11	5.6807	2.99E+08	0.00
13.9200	-1.06E-07	4465.	-479.283	-2.96E-08	0.00	6.56E+11	16.7469	3.04E+08	0.00
14.0800	-1.50E-07	3576.	-440.055	-1.78E-08	0.00	6.56E+11	24.1153	3.09E+08	0.00
14.2400	-1.74E-07	2776.	-389.621	-8.53E-09	0.00	6.56E+11	28.4200	3.13E+08	0.00
14.4000	-1.83E-07	2080.	-333.288	-1.43E-09	0.00	6.56E+11	30.2602	3.18E+08	0.00
14.5600	-1.80E-07	1496.	-275.266	3.80E-09	0.00	6.56E+11	30.1799	3.22E+08	0.00
14.7200	-1.68E-07	1023.	-218.786	7.48E-09	0.00	6.56E+11	28.6536	3.27E+08	0.00
14.8800	-1.51E-07	655.7019	-166.242	9.94E-09	0.00	6.56E+11	26.0796	3.32E+08	0.00
15.0400	-1.30E-07	384.5701	-119.338	1.15E-08	0.00	6.56E+11	22.7779	3.36E+08	0.00
15.2000	-1.07E-07	197.4048	-79.239	1.23E-08	0.00	6.56E+11	18.9921	3.41E+08	0.00
15.3600	-8.28E-08	80.2509	-46.707	1.27E-08	0.00	6.56E+11	14.8959	3.46E+08	0.00

Pier drilled shaft_row2									
15.5200	-5.81E-08	18.0089	-22.230	1.29E-08	0.00	6.56E+11	10.6013	3.50E+08	0.00
15.6800	-3.34E-08	-5.153	-6.130	1.29E-08	0.00	6.56E+11	6.1696	3.55E+08	0.00
15.8400	-8.68E-09	-5.570	1.3527	1.29E-08	0.00	6.56E+11	1.6244	3.59E+08	0.00
16.0000	1.60E-08	0.00	0.00	1.29E-08	0.00	6.56E+11	-3.034	1.82E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 1:

Pile-head deflection = 0.01870880 inches
 Computed slope at pile head = -0.0003824 radians
 Maximum bending moment = 4524863. inch-lbs
 Maximum shear force = -194306. lbs
 Depth of maximum bending moment = 6.08000000 feet below pile head
 Depth of maximum shear force = 7.04000000 feet below pile head
 Number of iterations = 6
 Number of zero deflection points = 4

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 2

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 23990.0 lbs
 Applied moment at pile head = 5025600.0 in-lbs
 Axial thrust load on pile head = 1102000.0 lbs

Depth	Deflect.	Bending	Shear	Slope	Total	Bending	Soil Res.	Soil Spr.	Distrib.
X	y	Moment	Force	S	Stress	Stiffness	p	Es*H	Lat. Load
feet	inches	in-lbs	lbs	radians	psi*	lb-in^2	lb/inch	lb/inch	lb/inch

Pier drilled shaft_row2

0.00	0.02576	5025600.	23990.	-5.20E-04	0.00	1.10E+12	-305.000	11366.	0.00
0.1600	0.02477	5072189.	23404.	-5.11E-04	0.00	1.10E+12	-305.023	23643.	0.00
0.3200	0.02380	5117635.	22819.	-5.02E-04	0.00	1.10E+12	-304.950	24604.	0.00
0.4800	0.02284	5161939.	22233.	-4.93E-04	0.00	1.10E+12	-304.778	25618.	0.00
0.6400	0.02190	5205099.	21649.	-4.84E-04	0.00	1.10E+12	-304.504	26692.	0.00
0.8000	0.02098	5247118.	21064.	-4.75E-04	0.00	1.10E+12	-304.127	27829.	0.00
0.9600	0.02008	5287996.	20481.	-4.66E-04	0.00	1.10E+12	-303.643	29034.	0.00
1.1200	0.01919	5327736.	19898.	-4.57E-04	0.00	1.10E+12	-303.049	30315.	0.00
1.2800	0.01833	5366338.	19317.	-4.47E-04	0.00	1.10E+12	-302.343	31676.	0.00
1.4400	0.01748	5403806.	18737.	-4.38E-04	0.00	1.10E+12	-301.522	33126.	0.00
1.6000	0.01664	5440143.	18159.	-4.28E-04	0.00	1.10E+12	-300.582	34673.	0.00
1.7600	0.01583	5475352.	17583.	-4.19E-04	0.00	1.10E+12	-299.519	36325.	0.00
1.9200	0.01504	5509436.	17009.	-4.09E-04	0.00	1.10E+12	-298.331	38095.	0.00
2.0800	0.01426	5542400.	16438.	-4.00E-04	0.00	1.10E+12	-297.011	39992.	0.00
2.2400	0.01350	5574249.	15869.	-3.90E-04	0.00	1.10E+12	-295.557	42031.	0.00
2.4000	0.01276	5604987.	15303.	-3.80E-04	0.00	1.10E+12	-293.963	44226.	0.00
2.5600	0.01204	5634622.	14740.	-3.70E-04	0.00	1.10E+12	-292.225	46596.	0.00
2.7200	0.01134	5663158.	14181.	-3.61E-04	0.00	1.10E+12	-290.336	49160.	0.00
2.8800	0.01066	5690603.	13626.	-3.51E-04	0.00	1.10E+12	-288.290	51941.	0.00
3.0400	0.00999	5716964.	13074.	-3.41E-04	0.00	1.10E+12	-286.080	54966.	0.00
3.2000	0.00935	5742250.	12527.	-3.31E-04	0.00	1.10E+12	-283.700	58267.	0.00
3.3600	0.00872	5766468.	11985.	-3.21E-04	0.00	1.10E+12	-281.140	61881.	0.00
3.5200	0.00812	5789629.	11448.	-3.11E-04	0.00	1.10E+12	-278.391	65852.	0.00
3.6800	0.00753	5811743.	10916.	-3.00E-04	0.00	1.10E+12	-275.444	70230.	0.00
3.8400	0.00696	5832819.	10390.	-2.90E-04	0.00	1.10E+12	-272.286	75080.	0.00
4.0000	0.00642	5852870.	9871.	-2.80E-04	0.00	1.10E+12	-268.905	80478.	0.00
4.1600	0.00589	5871908.	9358.	-2.70E-04	0.00	1.10E+12	-265.285	86515.	0.00
4.3200	0.00538	5889947.	8852.	-2.60E-04	0.00	1.10E+12	-261.409	93308.	0.00
4.4800	0.00489	5907000.	8354.	-2.49E-04	0.00	1.10E+12	-257.256	101001.	0.00
4.6400	0.00442	5923083.	7865.	-2.39E-04	0.00	1.10E+12	-252.803	109778.	0.00
4.8000	0.00397	5938212.	7384.	-2.29E-04	0.00	1.10E+12	-248.022	119875.	0.00
4.9600	0.00354	5952405.	6913.	-2.18E-04	0.00	1.10E+12	-242.878	131606.	0.00
5.1200	0.00313	5965681.	6452.	-2.08E-04	0.00	1.10E+12	-237.328	145388.	0.00
5.2800	0.00274	5978060.	6002.	-1.97E-04	0.00	1.10E+12	-231.320	161799.	0.00
5.4400	0.00238	5989564.	5564.	-1.87E-04	0.00	1.10E+12	-224.784	181660.	0.00
5.6000	0.00203	6000217.	5139.	-1.77E-04	0.00	1.10E+12	-217.632	206177.	0.00
5.7600	0.00170	6010046.	4729.	-1.66E-04	0.00	1.10E+12	-209.739	237208.	0.00
5.9200	0.00139	6019079.	4335.	-1.56E-04	0.00	1.10E+12	-200.929	277786.	0.00
6.0800	0.00110	6027350.	-22180.	-1.41E-04	0.00	6.41E+11	-27418.	4.79E+07	0.00

Pier drilled shaft_row2

6.2400	8.46E-04	5934507.	-83444.	-1.23E-04	0.00	6.41E+11	-36399.	8.26E+07	0.00
6.4000	6.26E-04	5707446.	-145692.	-1.06E-04	0.00	6.41E+11	-28442.	8.72E+07	0.00
6.5600	4.39E-04	5375498.	-193156.	-8.94E-05	0.00	6.41E+11	-20999.	9.18E+07	0.00
6.7200	2.83E-04	4966105.	-226956.	-7.39E-05	0.00	6.41E+11	-14210.	9.64E+07	0.00
6.8800	1.55E-04	4504298.	-248444.	-5.97E-05	0.00	6.41E+11	-8173.	1.01E+08	0.00
7.0400	5.36E-05	4012332.	-259121.	-4.70E-05	0.00	6.41E+11	-2949.	1.06E+08	0.00
7.2000	-2.51E-05	3509470.	-260571.	-3.57E-05	0.00	6.41E+11	1439.	1.10E+08	0.00
7.3600	-8.35E-05	3011892.	-254390.	-2.59E-05	0.00	6.41E+11	4998.	1.15E+08	0.00
7.5200	-1.25E-04	2532721.	-242142.	-1.76E-05	0.00	6.42E+11	7761.	1.20E+08	0.00
7.6800	-1.51E-04	2082143.	-225302.	-1.07E-05	0.00	6.42E+11	9780.	1.24E+08	0.00
7.8400	-1.66E-04	1667606.	-205233.	-5.13E-06	0.00	6.42E+11	11125.	1.29E+08	0.00
8.0000	-1.71E-04	1294071.	-183152.	-6.98E-07	0.00	6.42E+11	11875.	1.33E+08	0.00
8.1600	-1.69E-04	964305.	-160121.	2.68E-06	0.00	6.42E+11	12115.	1.38E+08	0.00
8.3200	-1.61E-04	679194.	-137036.	5.14E-06	0.00	6.42E+11	11932.	1.43E+08	0.00
8.4800	-1.49E-04	438065.	-114625.	6.81E-06	0.00	6.42E+11	11412.	1.47E+08	0.00
8.6400	-1.35E-04	239004.	-93458.	7.82E-06	0.00	6.42E+11	10636.	1.52E+08	0.00
8.8000	-1.19E-04	79152.	-73955.	8.30E-06	0.00	6.42E+11	9680.	1.56E+08	0.00
8.9600	-1.03E-04	-45018.	-56398.	8.35E-06	0.00	6.42E+11	8609.	1.61E+08	0.00
9.1200	-8.67E-05	-137450.	-40948.	8.08E-06	0.00	6.42E+11	7484.	1.66E+08	0.00
9.2800	-7.16E-05	-202293.	-27666.	7.57E-06	0.00	6.42E+11	6352.	1.70E+08	0.00
9.4400	-5.77E-05	-243720.	-16526.	6.90E-06	0.00	6.42E+11	5253.	1.75E+08	0.00
9.6000	-4.51E-05	-265781.	-7434.	6.14E-06	0.00	6.42E+11	4218.	1.79E+08	0.00
9.7600	-3.41E-05	-272291.	-246.285	5.34E-06	0.00	6.42E+11	3269.	1.84E+08	0.00
9.9200	-2.46E-05	-266749.	5216.	4.53E-06	0.00	6.42E+11	2421.	1.89E+08	0.00
10.0800	-1.67E-05	-252281.	9154.	3.75E-06	0.00	6.42E+11	1682.	1.93E+08	0.00
10.2400	-1.02E-05	-231613.	11780.	3.03E-06	0.00	6.42E+11	1054.	1.98E+08	0.00
10.4000	-5.07E-06	-207060.	13304.	2.37E-06	0.00	6.42E+11	534.7463	2.03E+08	0.00
10.5600	-1.11E-06	-180534.	13933.	1.79E-06	0.00	6.42E+11	119.5926	2.07E+08	0.00
10.7200	1.81E-06	-153566.	13855.	1.29E-06	0.00	6.42E+11	-200.188	2.12E+08	0.00
10.8800	3.86E-06	-127335.	13246.	8.73E-07	0.00	6.42E+11	-434.582	2.16E+08	0.00
11.0400	5.17E-06	-102706.	12258.	5.28E-07	0.00	6.42E+11	-594.575	2.21E+08	0.00
11.2000	5.88E-06	-80267.	11023.	2.55E-07	0.00	6.42E+11	-691.523	2.26E+08	0.00
11.3600	6.14E-06	-60377.	9652.	4.42E-08	0.00	6.42E+11	-736.630	2.30E+08	0.00
11.5200	6.05E-06	-43203.	8234.	-1.11E-07	0.00	6.42E+11	-740.550	2.35E+08	0.00
11.6800	5.72E-06	-28758.	6839.	-2.18E-07	0.00	6.42E+11	-713.088	2.39E+08	0.00
11.8400	5.22E-06	-16942.	5518.	-2.87E-07	0.00	6.42E+11	-663.004	2.44E+08	0.00
12.0000	4.62E-06	-7569.	4307.	-3.24E-07	0.00	6.42E+11	-597.900	2.49E+08	0.00
12.1600	3.97E-06	-400.917	3230.	-3.35E-07	0.00	6.42E+11	-524.179	2.53E+08	0.00
12.3200	3.33E-06	4835.	2298.	-3.29E-07	0.00	6.42E+11	-447.060	2.58E+08	0.00
12.4800	2.71E-06	8423.	1513.	-3.09E-07	0.00	6.42E+11	-370.638	2.63E+08	0.00

Pier drilled shaft_row2									
12.6400	2.14E-06	10645.	870.6614	-2.80E-07	0.00	6.42E+11	-297.982	2.67E+08	0.00
12.8000	1.63E-06	11767.	362.6015	-2.47E-07	0.00	6.42E+11	-231.247	2.72E+08	0.00
12.9600	1.19E-06	12038.	-24.327	-2.11E-07	0.00	6.42E+11	-171.803	2.76E+08	0.00
13.1200	8.22E-07	11675.	-304.809	-1.76E-07	0.00	6.42E+11	-120.365	2.81E+08	0.00
13.2800	5.18E-07	10868.	-494.395	-1.42E-07	0.00	6.42E+11	-77.121	2.86E+08	0.00
13.4400	2.77E-07	9777.	-608.610	-1.11E-07	0.00	6.42E+11	-41.853	2.90E+08	0.00
13.6000	9.15E-08	8532.	-662.276	-8.38E-08	0.00	6.42E+11	-14.049	2.95E+08	0.00
13.7600	-4.49E-08	7234.	-669.043	-6.02E-08	0.00	6.42E+11	7.0007	2.99E+08	0.00
13.9200	-1.40E-07	5963.	-641.083	-4.05E-08	0.00	6.42E+11	22.1246	3.04E+08	0.00
14.0800	-2.00E-07	4773.	-588.934	-2.44E-08	0.00	6.42E+11	32.1970	3.09E+08	0.00
14.2400	-2.33E-07	3701.	-521.462	-1.17E-08	0.00	6.42E+11	38.0865	3.13E+08	0.00
14.4000	-2.45E-07	2770.	-445.909	-2.04E-09	0.00	6.42E+11	40.6145	3.18E+08	0.00
14.5600	-2.41E-07	1989.	-368.014	5.08E-09	0.00	6.42E+11	40.5262	3.22E+08	0.00
14.7200	-2.26E-07	1357.	-292.176	1.01E-08	0.00	6.42E+11	38.4716	3.27E+08	0.00
14.8800	-2.03E-07	867.0792	-221.647	1.34E-08	0.00	6.42E+11	34.9956	3.32E+08	0.00
15.0400	-1.74E-07	505.9891	-158.738	1.55E-08	0.00	6.42E+11	30.5351	3.36E+08	0.00
15.2000	-1.43E-07	257.4604	-105.018	1.66E-08	0.00	6.42E+11	25.4227	3.41E+08	0.00
15.3600	-1.11E-07	102.6483	-61.514	1.71E-08	0.00	6.42E+11	19.8944	3.46E+08	0.00
15.5200	-7.73E-08	21.1742	-28.878	1.73E-08	0.00	6.42E+11	14.1017	3.50E+08	0.00
15.6800	-4.40E-08	-8.315	-7.538	1.74E-08	0.00	6.42E+11	8.1270	3.55E+08	0.00
15.8400	-1.07E-08	-7.846	2.1846	1.73E-08	0.00	6.42E+11	2.0009	3.59E+08	0.00
16.0000	2.26E-08	0.00	0.00	1.73E-08	0.00	6.42E+11	-4.277	1.82E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 2:

Pile-head deflection = 0.02576007 inches
 Computed slope at pile head = -0.0005199 radians
 Maximum bending moment = 6027350. inch-lbs
 Maximum shear force = -260571. lbs
 Depth of maximum bending moment = 6.08000000 feet below pile head
 Depth of maximum shear force = 7.20000000 feet below pile head
 Number of iterations = 7

Pier drilled shaft_row2
 Number of zero deflection points = 4

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 3

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 10160.0 lbs
 Applied moment at pile head = 4451400.0 in-lbs
 Axial thrust load on pile head = 1018000.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	0.01918	4451400.	10160.	-4.04E-04	0.00	1.11E+12	-283.330	14178.	0.00
0.1600	0.01842	4471167.	9616.	-3.96E-04	0.00	1.11E+12	-283.232	29528.	0.00
0.3200	0.01766	4489875.	9072.	-3.88E-04	0.00	1.11E+12	-283.043	30767.	0.00
0.4800	0.01692	4507524.	8529.	-3.81E-04	0.00	1.11E+12	-282.761	32077.	0.00
0.6400	0.01620	4524115.	7987.	-3.73E-04	0.00	1.11E+12	-282.385	33465.	0.00
0.8000	0.01549	4539651.	7445.	-3.65E-04	0.00	1.11E+12	-281.911	34936.	0.00
0.9600	0.01480	4554131.	6904.	-3.57E-04	0.00	1.11E+12	-281.337	36498.	0.00
1.1200	0.01412	4567559.	6365.	-3.49E-04	0.00	1.11E+12	-280.661	38159.	0.00
1.2800	0.01346	4579937.	5827.	-3.41E-04	0.00	1.11E+12	-279.881	39927.	0.00
1.4400	0.01281	4591268.	5290.	-3.33E-04	0.00	1.11E+12	-278.992	41812.	0.00
1.6000	0.01218	4601554.	4755.	-3.25E-04	0.00	1.11E+12	-277.993	43825.	0.00
1.7600	0.01156	4610801.	4223.	-3.17E-04	0.00	1.11E+12	-276.880	45979.	0.00
1.9200	0.01096	4619010.	3692.	-3.09E-04	0.00	1.11E+12	-275.649	48288.	0.00
2.0800	0.01037	4626189.	3164.	-3.01E-04	0.00	1.11E+12	-274.297	50766.	0.00
2.2400	0.00980	4632340.	2639.	-2.93E-04	0.00	1.11E+12	-272.819	53433.	0.00
2.4000	0.00925	4637470.	2117.	-2.85E-04	0.00	1.11E+12	-271.212	56309.	0.00
2.5600	0.00871	4641584.	1598.	-2.77E-04	0.00	1.11E+12	-269.470	59417.	0.00
2.7200	0.00818	4644689.	1082.	-2.69E-04	0.00	1.11E+12	-267.588	62784.	0.00
2.8800	0.00767	4646792.	570.4541	-2.61E-04	0.00	1.11E+12	-265.561	66442.	0.00
3.0400	0.00718	4647900.	62.6685	-2.53E-04	0.00	1.11E+12	-263.382	70427.	0.00
3.2000	0.00670	4648022.	-440.781	-2.45E-04	0.00	1.11E+12	-261.045	74782.	0.00

Pier drilled shaft_row2

3.3600	0.00624	4647165.	-939.583	-2.37E-04	0.00	1.11E+12	-258.541	79556.	0.00
3.5200	0.00579	4645340.	-1433.	-2.29E-04	0.00	1.11E+12	-255.862	84810.	0.00
3.6800	0.00536	4642556.	-1922.	-2.21E-04	0.00	1.11E+12	-252.999	90615.	0.00
3.8400	0.00494	4638823.	-2405.	-2.13E-04	0.00	1.11E+12	-249.940	97056.	0.00
4.0000	0.00454	4634154.	-2881.	-2.05E-04	0.00	1.11E+12	-246.674	104238.	0.00
4.1600	0.00416	4628559.	-3352.	-1.97E-04	0.00	1.11E+12	-243.186	112289.	0.00
4.3200	0.00379	4622052.	-3815.	-1.89E-04	0.00	1.11E+12	-239.459	121368.	0.00
4.4800	0.00343	4614646.	-4271.	-1.81E-04	0.00	1.11E+12	-235.476	131674.	0.00
4.6400	0.00309	4606357.	-4719.	-1.73E-04	0.00	1.11E+12	-231.212	143464.	0.00
4.8000	0.00277	4597200.	-5159.	-1.65E-04	0.00	1.11E+12	-226.641	157069.	0.00
4.9600	0.00246	4587192.	-5589.	-1.57E-04	0.00	1.11E+12	-221.730	172927.	0.00
5.1200	0.00217	4576351.	-6010.	-1.49E-04	0.00	1.11E+12	-216.438	191632.	0.00
5.2800	0.00189	4564697.	-6420.	-1.41E-04	0.00	1.11E+12	-210.713	214007.	0.00
5.4400	0.00163	4552250.	-6818.	-1.33E-04	0.00	1.11E+12	-204.489	241230.	0.00
5.6000	0.00138	4539034.	-7204.	-1.25E-04	0.00	1.11E+12	-197.675	275058.	0.00
5.7600	0.00115	4525074.	-7577.	-1.17E-04	0.00	1.11E+12	-190.149	318235.	0.00
5.9200	9.30E-04	4510398.	-7930.	-1.09E-04	0.00	1.11E+12	-177.396	366367.	0.00
6.0800	7.27E-04	4495052.	-36456.	-9.88E-05	0.00	6.46E+11	-29537.	7.80E+07	0.00
6.2400	5.50E-04	4370795.	-87538.	-8.56E-05	0.00	6.46E+11	-23674.	8.26E+07	0.00
6.4000	3.98E-04	4159240.	-127635.	-7.30E-05	0.00	6.46E+11	-18093.	8.72E+07	0.00
6.5600	2.70E-04	3880963.	-157405.	-6.10E-05	0.00	6.46E+11	-12917.	9.18E+07	0.00
6.7200	1.64E-04	3555045.	-177712.	-5.00E-05	0.00	6.46E+11	-8237.	9.64E+07	0.00
6.8800	7.82E-05	3198743.	-189569.	-3.99E-05	0.00	6.46E+11	-4114.	1.01E+08	0.00
7.0400	1.06E-05	2827256.	-194078.	-3.10E-05	0.00	6.46E+11	-582.834	1.06E+08	0.00
7.2000	-4.09E-05	2453605.	-192384.	-2.32E-05	0.00	6.46E+11	2347.	1.10E+08	0.00
7.3600	-7.83E-05	2088590.	-185632.	-1.64E-05	0.00	6.47E+11	4687.	1.15E+08	0.00
7.5200	-1.04E-04	1740841.	-174926.	-1.07E-05	0.00	6.47E+11	6465.	1.20E+08	0.00
7.6800	-1.19E-04	1416915.	-161304.	-6.03E-06	0.00	6.47E+11	7725.	1.24E+08	0.00
7.8400	-1.27E-04	1121457.	-145711.	-2.26E-06	0.00	6.47E+11	8518.	1.29E+08	0.00
8.0000	-1.28E-04	857392.	-128988.	6.74E-07	0.00	6.47E+11	8903.	1.33E+08	0.00
8.1600	-1.24E-04	626142.	-111856.	2.88E-06	0.00	6.47E+11	8942.	1.38E+08	0.00
8.3200	-1.17E-04	427853.	-94921.	4.44E-06	0.00	6.47E+11	8699.	1.43E+08	0.00
8.4800	-1.07E-04	261628.	-78667.	5.46E-06	0.00	6.47E+11	8233.	1.47E+08	0.00
8.6400	-9.62E-05	125752.	-63464.	6.04E-06	0.00	6.47E+11	7603.	1.52E+08	0.00
8.8000	-8.42E-05	17901.	-49581.	6.25E-06	0.00	6.47E+11	6860.	1.56E+08	0.00
8.9600	-7.21E-05	-64663.	-37187.	6.18E-06	0.00	6.47E+11	6051.	1.61E+08	0.00
9.1200	-6.05E-05	-124921.	-26371.	5.90E-06	0.00	6.47E+11	5216.	1.66E+08	0.00
9.2800	-4.95E-05	-165951.	-17152.	5.47E-06	0.00	6.47E+11	4388.	1.70E+08	0.00
9.4400	-3.94E-05	-190806.	-9490.	4.94E-06	0.00	6.47E+11	3593.	1.75E+08	0.00
9.6000	-3.05E-05	-202414.	-3303.	4.36E-06	0.00	6.47E+11	2852.	1.79E+08	0.00

Pier drilled shaft_row2

9.7600	-2.27E-05	-203507.	1526.	3.75E-06	0.00	6.47E+11	2178.	1.84E+08	0.00
9.9200	-1.61E-05	-196569.	5136.	3.16E-06	0.00	6.47E+11	1582.	1.89E+08	0.00
10.0800	-1.06E-05	-183799.	7677.	2.60E-06	0.00	6.47E+11	1066.	1.93E+08	0.00
10.2400	-6.13E-06	-167099.	9306.	2.07E-06	0.00	6.47E+11	631.4930	1.98E+08	0.00
10.4000	-2.62E-06	-148071.	10178.	1.61E-06	0.00	6.47E+11	276.2797	2.03E+08	0.00
10.5600	4.36E-08	-128023.	10439.	1.20E-06	0.00	6.47E+11	-4.700	2.07E+08	0.00
10.7200	1.98E-06	-107991.	10225.	8.46E-07	0.00	6.47E+11	-217.970	2.12E+08	0.00
10.8800	3.29E-06	-88762.	9659.	5.54E-07	0.00	6.47E+11	-371.137	2.16E+08	0.00
11.0400	4.10E-06	-70902.	8850.	3.17E-07	0.00	6.47E+11	-472.384	2.21E+08	0.00
11.2000	4.51E-06	-54782.	7887.	1.30E-07	0.00	6.47E+11	-530.029	2.26E+08	0.00
11.3600	4.60E-06	-40615.	6848.	-1.12E-08	0.00	6.47E+11	-552.177	2.30E+08	0.00
11.5200	4.47E-06	-28484.	5794.	-1.14E-07	0.00	6.47E+11	-546.456	2.35E+08	0.00
11.6800	4.17E-06	-18367.	4770.	-1.83E-07	0.00	6.47E+11	-519.822	2.39E+08	0.00
11.8400	3.76E-06	-10167.	3812.	-2.26E-07	0.00	6.47E+11	-478.438	2.44E+08	0.00
12.0000	3.30E-06	-3730.	2942.	-2.46E-07	0.00	6.47E+11	-427.603	2.49E+08	0.00
12.1600	2.82E-06	1131.	2174.	-2.50E-07	0.00	6.47E+11	-371.741	2.53E+08	0.00
12.3200	2.34E-06	4621.	1516.	-2.42E-07	0.00	6.47E+11	-314.422	2.58E+08	0.00
12.4800	1.89E-06	6952.	965.8343	-2.24E-07	0.00	6.47E+11	-258.412	2.63E+08	0.00
12.6400	1.48E-06	8331.	520.2391	-2.02E-07	0.00	6.47E+11	-205.750	2.67E+08	0.00
12.8000	1.12E-06	8951.	171.1970	-1.76E-07	0.00	6.47E+11	-157.835	2.72E+08	0.00
12.9600	8.03E-07	8989.	-91.222	-1.49E-07	0.00	6.47E+11	-115.518	2.76E+08	0.00
13.1200	5.41E-07	8601.	-278.150	-1.23E-07	0.00	6.47E+11	-79.198	2.81E+08	0.00
13.2800	3.29E-07	7921.	-401.141	-9.88E-08	0.00	6.47E+11	-48.917	2.86E+08	0.00
13.4400	1.62E-07	7061.	-471.564	-7.66E-08	0.00	6.47E+11	-24.440	2.90E+08	0.00
13.6000	3.48E-08	6111.	-500.155	-5.70E-08	0.00	6.47E+11	-5.342	2.95E+08	0.00
13.7600	-5.73E-08	5141.	-496.707	-4.03E-08	0.00	6.47E+11	8.9330	2.99E+08	0.00
13.9200	-1.20E-07	4204.	-469.883	-2.64E-08	0.00	6.47E+11	19.0093	3.04E+08	0.00
14.0800	-1.59E-07	3337.	-427.121	-1.53E-08	0.00	6.47E+11	25.5346	3.09E+08	0.00
14.2400	-1.79E-07	2564.	-374.630	-6.49E-09	0.00	6.47E+11	29.1427	3.13E+08	0.00
14.4000	-1.84E-07	1898.	-317.444	1.30E-10	0.00	6.47E+11	30.4262	3.18E+08	0.00
14.5600	-1.78E-07	1345.	-259.515	4.94E-09	0.00	6.47E+11	29.9169	3.22E+08	0.00
14.7200	-1.65E-07	901.3958	-203.843	8.28E-09	0.00	6.47E+11	28.0745	3.27E+08	0.00
14.8800	-1.46E-07	561.7452	-152.622	1.05E-08	0.00	6.47E+11	25.2802	3.32E+08	0.00
15.0400	-1.25E-07	315.2846	-107.391	1.18E-08	0.00	6.47E+11	21.8362	3.36E+08	0.00
15.2000	-1.01E-07	149.3191	-69.178	1.24E-08	0.00	6.47E+11	17.9689	3.41E+08	0.00
15.3600	-7.69E-08	49.5931	-38.646	1.27E-08	0.00	6.47E+11	13.8355	3.46E+08	0.00
15.5200	-5.23E-08	0.8702	-16.211	1.28E-08	0.00	6.47E+11	9.5338	3.50E+08	0.00
15.6800	-2.77E-08	-12.707	-2.150	1.28E-08	0.00	6.47E+11	5.1129	3.55E+08	0.00
15.8400	-3.14E-09	-7.436	3.3222	1.28E-08	0.00	6.47E+11	0.5874	3.59E+08	0.00
16.0000	2.14E-08	0.00	0.00	1.28E-08	0.00	6.47E+11	-4.048	1.82E+08	0.00

Pier drilled shaft_row2

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 3:

Pile-head deflection = 0.01918475 inches
 Computed slope at pile head = -0.0004040 radians
 Maximum bending moment = 4648022. inch-lbs
 Maximum shear force = -194078. lbs
 Depth of maximum bending moment = 3.20000000 feet below pile head
 Depth of maximum shear force = 7.04000000 feet below pile head
 Number of iterations = 6
 Number of zero deflection points = 4

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 4

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 13670.0 lbs
 Applied moment at pile head = 5995200.0 in-lbs
 Axial thrust load on pile head = 1326000.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in ²	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	0.02759	5995200.	13670.	-5.72E-04	0.00	1.08E+12	-310.270	10797.	0.00
0.1600	0.02650	6022317.	13074.	-5.61E-04	0.00	1.08E+12	-310.213	22476.	0.00
0.3200	0.02543	6048263.	12479.	-5.50E-04	0.00	1.08E+12	-310.058	23407.	0.00

Pier drilled shaft_row2

0.4800	0.02439	6073038.	11884.	-5.40E-04	0.00	1.08E+12	-309.802	24392.	0.00
0.6400	0.02336	6096645.	11289.	-5.29E-04	0.00	1.08E+12	-309.444	25434.	0.00
0.8000	0.02235	6119083.	10696.	-5.18E-04	0.00	1.08E+12	-308.981	26537.	0.00
0.9600	0.02137	6140354.	10103.	-5.07E-04	0.00	1.08E+12	-308.410	27708.	0.00
1.1200	0.02041	6160461.	9511.	-4.96E-04	0.00	1.08E+12	-307.728	28952.	0.00
1.2800	0.01946	6179405.	8921.	-4.85E-04	0.00	1.08E+12	-306.933	30276.	0.00
1.4400	0.01854	6197190.	8333.	-4.74E-04	0.00	1.08E+12	-306.022	31686.	0.00
1.6000	0.01764	6213819.	7746.	-4.63E-04	0.00	1.08E+12	-304.990	33190.	0.00
1.7600	0.01676	6229296.	7162.	-4.52E-04	0.00	1.08E+12	-303.836	34799.	0.00
1.9200	0.01591	6243625.	6580.	-4.41E-04	0.00	1.08E+12	-302.554	36521.	0.00
2.0800	0.01507	6256810.	6000.	-4.30E-04	0.00	1.08E+12	-301.140	38369.	0.00
2.2400	0.01425	6268856.	5424.	-4.19E-04	0.00	1.08E+12	-299.591	40355.	0.00
2.4000	0.01346	6279770.	4850.	-4.08E-04	0.00	1.08E+12	-297.901	42495.	0.00
2.5600	0.01269	6289557.	4280.	-3.97E-04	0.00	1.08E+12	-296.066	44805.	0.00
2.7200	0.01194	6298225.	3713.	-3.86E-04	0.00	1.08E+12	-294.078	47306.	0.00
2.8800	0.01121	6305780.	3151.	-3.75E-04	0.00	1.08E+12	-291.934	50019.	0.00
3.0400	0.01050	6312230.	2592.	-3.63E-04	0.00	1.08E+12	-289.624	52972.	0.00
3.2000	0.00981	6317585.	2039.	-3.52E-04	0.00	1.08E+12	-287.143	56196.	0.00
3.3600	0.00915	6321852.	1490.	-3.41E-04	0.00	1.08E+12	-284.481	59726.	0.00
3.5200	0.00850	6325042.	946.3962	-3.30E-04	0.00	1.08E+12	-281.630	63605.	0.00
3.6800	0.00788	6327165.	408.5961	-3.19E-04	0.00	1.08E+12	-278.579	67886.	0.00
3.8400	0.00728	6328233.	-123.142	-3.07E-04	0.00	1.08E+12	-275.315	72629.	0.00
4.0000	0.00670	6328257.	-648.399	-2.96E-04	0.00	1.08E+12	-271.827	77909.	0.00
4.1600	0.00614	6327251.	-1167.	-2.85E-04	0.00	1.08E+12	-268.099	83819.	0.00
4.3200	0.00561	6325227.	-1678.	-2.74E-04	0.00	1.08E+12	-264.112	90471.	0.00
4.4800	0.00509	6322202.	-2181.	-2.62E-04	0.00	1.08E+12	-259.847	98009.	0.00
4.6400	0.00460	6318190.	-2675.	-2.51E-04	0.00	1.08E+12	-255.279	106614.	0.00
4.8000	0.00413	6313208.	-3161.	-2.40E-04	0.00	1.08E+12	-250.379	116521.	0.00
4.9600	0.00368	6307275.	-3636.	-2.29E-04	0.00	1.08E+12	-245.111	128040.	0.00
5.1200	0.00325	6300410.	-4101.	-2.18E-04	0.00	1.08E+12	-239.433	141586.	0.00
5.2800	0.00284	6292634.	-4555.	-2.07E-04	0.00	1.08E+12	-233.289	157735.	0.00
5.4400	0.00245	6283970.	-4997.	-1.95E-04	0.00	1.08E+12	-226.609	177307.	0.00
5.6000	0.00209	6274441.	-5425.	-1.84E-04	0.00	1.08E+12	-219.298	201512.	0.00
5.7600	0.00175	6264076.	-5838.	-1.73E-04	0.00	1.08E+12	-211.229	232222.	0.00
5.9200	0.00142	6252904.	-6235.	-1.62E-04	0.00	1.08E+12	-202.216	272514.	0.00
6.0800	0.00112	6240959.	-32894.	-1.47E-04	0.00	6.27E+11	-27568.	4.71E+07	0.00
6.2400	8.61E-04	6127338.	-94902.	-1.28E-04	0.00	6.27E+11	-37023.	8.26E+07	0.00
6.4000	6.33E-04	5877187.	-158040.	-1.10E-04	0.00	6.27E+11	-28745.	8.72E+07	0.00
6.5600	4.40E-04	5521023.	-205819.	-9.22E-05	0.00	6.27E+11	-21025.	9.18E+07	0.00
6.7200	2.79E-04	5087311.	-239448.	-7.60E-05	0.00	6.28E+11	-14005.	9.64E+07	0.00

Pier drilled shaft_row2

6.8800	1.48E-04	4601931.	-260367.	-6.11E-05	0.00	6.28E+11	-7786.	1.01E+08	0.00
7.0400	4.41E-05	4087813.	-270169.	-4.78E-05	0.00	6.28E+11	-2425.	1.06E+08	0.00
7.2000	-3.58E-05	3564724.	-270524.	-3.61E-05	0.00	6.28E+11	2056.	1.10E+08	0.00
7.3600	-9.47E-05	3049187.	-263108.	-2.60E-05	0.00	6.28E+11	5668.	1.15E+08	0.00
7.5200	-1.36E-04	2554522.	-249554.	-1.75E-05	0.00	6.28E+11	8450.	1.20E+08	0.00
7.6800	-1.62E-04	2090987.	-231402.	-1.04E-05	0.00	6.28E+11	10459.	1.24E+08	0.00
7.8400	-1.76E-04	1665993.	-210061.	-4.62E-06	0.00	6.28E+11	11771.	1.29E+08	0.00
8.0000	-1.80E-04	1284377.	-186790.	-1.13E-07	0.00	6.28E+11	12469.	1.33E+08	0.00
8.1600	-1.76E-04	948719.	-162680.	3.30E-06	0.00	6.28E+11	12646.	1.38E+08	0.00
8.3200	-1.67E-04	659669.	-138644.	5.76E-06	0.00	6.28E+11	12391.	1.43E+08	0.00
8.4800	-1.54E-04	416295.	-115424.	7.40E-06	0.00	6.28E+11	11796.	1.47E+08	0.00
8.6400	-1.38E-04	216403.	-93591.	8.37E-06	0.00	6.28E+11	10946.	1.52E+08	0.00
8.8000	-1.22E-04	56861.	-73562.	8.79E-06	0.00	6.28E+11	9918.	1.56E+08	0.00
8.9600	-1.05E-04	-66120.	-55610.	8.77E-06	0.00	6.28E+11	8782.	1.61E+08	0.00
9.1200	-8.81E-05	-156727.	-39887.	8.43E-06	0.00	6.28E+11	7597.	1.66E+08	0.00
9.2800	-7.23E-05	-219327.	-26436.	7.86E-06	0.00	6.28E+11	6414.	1.70E+08	0.00
9.4400	-5.79E-05	-258281.	-15217.	7.13E-06	0.00	6.28E+11	5272.	1.75E+08	0.00
9.6000	-4.50E-05	-277797.	-6120.	6.31E-06	0.00	6.28E+11	4203.	1.79E+08	0.00
9.7600	-3.37E-05	-281816.	1014.	5.45E-06	0.00	6.28E+11	3228.	1.84E+08	0.00
9.9200	-2.40E-05	-273932.	6380.	4.60E-06	0.00	6.28E+11	2362.	1.89E+08	0.00
10.0800	-1.60E-05	-257341.	10193.	3.79E-06	0.00	6.28E+11	1610.	1.93E+08	0.00
10.2400	-9.47E-06	-234811.	12676.	3.04E-06	0.00	6.28E+11	976.1537	1.98E+08	0.00
10.4000	-4.32E-06	-208681.	14051.	2.36E-06	0.00	6.28E+11	456.0201	2.03E+08	0.00
10.5600	-4.01E-07	-180868.	14530.	1.77E-06	0.00	6.28E+11	43.2845	2.07E+08	0.00
10.7200	2.46E-06	-152894.	14311.	1.26E-06	0.00	6.28E+11	-271.228	2.12E+08	0.00
10.8800	4.42E-06	-125919.	13572.	8.30E-07	0.00	6.28E+11	-498.368	2.16E+08	0.00
11.0400	5.65E-06	-100780.	12470.	4.84E-07	0.00	6.28E+11	-649.888	2.21E+08	0.00
11.2000	6.28E-06	-78036.	11138.	2.10E-07	0.00	6.28E+11	-737.797	2.26E+08	0.00
11.3600	6.45E-06	-58011.	9687.	2.36E-09	0.00	6.28E+11	-773.837	2.30E+08	0.00
11.5200	6.29E-06	-40839.	8206.	-1.49E-07	0.00	6.28E+11	-769.078	2.35E+08	0.00
11.6800	5.88E-06	-26501.	6763.	-2.52E-07	0.00	6.28E+11	-733.635	2.39E+08	0.00
11.8400	5.32E-06	-14868.	5409.	-3.15E-07	0.00	6.28E+11	-676.475	2.44E+08	0.00
12.0000	4.67E-06	-5728.	4179.	-3.46E-07	0.00	6.28E+11	-605.321	2.49E+08	0.00
12.1600	3.99E-06	1181.	3092.	-3.53E-07	0.00	6.28E+11	-526.618	2.53E+08	0.00
12.3200	3.32E-06	6148.	2159.	-3.42E-07	0.00	6.28E+11	-445.569	2.58E+08	0.00
12.4800	2.68E-06	9472.	1379.	-3.18E-07	0.00	6.28E+11	-366.211	2.63E+08	0.00
12.6400	2.10E-06	11446.	748.0704	-2.86E-07	0.00	6.28E+11	-291.516	2.67E+08	0.00
12.8000	1.58E-06	12346.	253.6288	-2.50E-07	0.00	6.28E+11	-223.527	2.72E+08	0.00
12.9600	1.14E-06	12422.	-117.904	-2.12E-07	0.00	6.28E+11	-163.486	2.76E+08	0.00
13.1200	7.65E-07	11894.	-382.353	-1.75E-07	0.00	6.28E+11	-111.981	2.81E+08	0.00

Pier drilled shaft_row2									
13.2800	4.64E-07	10954.	-556.170	-1.40E-07	0.00	6.28E+11	-69.078	2.86E+08	0.00
13.4400	2.28E-07	9759.	-655.551	-1.08E-07	0.00	6.28E+11	-34.445	2.90E+08	0.00
13.6000	4.86E-08	8438.	-695.788	-8.05E-08	0.00	6.28E+11	-7.469	2.95E+08	0.00
13.7600	-8.11E-08	7088.	-690.816	-5.67E-08	0.00	6.28E+11	12.6474	2.99E+08	0.00
13.9200	-1.69E-07	5785.	-652.947	-3.71E-08	0.00	6.28E+11	26.8001	3.04E+08	0.00
14.0800	-2.23E-07	4581.	-592.736	-2.12E-08	0.00	6.28E+11	35.9191	3.09E+08	0.00
14.2400	-2.51E-07	3509.	-518.978	-8.86E-09	0.00	6.28E+11	40.9126	3.13E+08	0.00
14.4000	-2.57E-07	2588.	-438.779	4.54E-10	0.00	6.28E+11	42.6281	3.18E+08	0.00
14.5600	-2.49E-07	1824.	-357.704	7.20E-09	0.00	6.28E+11	41.8249	3.22E+08	0.00
14.7200	-2.30E-07	1214.	-279.961	1.18E-08	0.00	6.28E+11	39.1574	3.27E+08	0.00
14.8800	-2.04E-07	749.0873	-208.610	1.48E-08	0.00	6.28E+11	35.1664	3.32E+08	0.00
15.0400	-1.73E-07	413.3343	-145.782	1.66E-08	0.00	6.28E+11	30.2790	3.36E+08	0.00
15.2000	-1.40E-07	189.1988	-92.893	1.75E-08	0.00	6.28E+11	24.8135	3.41E+08	0.00
15.3600	-1.06E-07	56.5344	-50.843	1.79E-08	0.00	6.28E+11	18.9890	3.46E+08	0.00
15.5200	-7.09E-08	-6.129	-20.192	1.80E-08	0.00	6.28E+11	12.9395	3.50E+08	0.00
15.6800	-3.64E-08	-21.093	-1.308	1.79E-08	0.00	6.28E+11	6.7306	3.55E+08	0.00
15.8400	-2.02E-09	-11.245	5.5167	1.79E-08	0.00	6.28E+11	0.3789	3.59E+08	0.00
16.0000	3.23E-08	0.00	0.00	1.79E-08	0.00	6.28E+11	-6.126	1.82E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 4:

Pile-head deflection = 0.02758744 inches
 Computed slope at pile head = -0.0005718 radians
 Maximum bending moment = 6328257. inch-lbs
 Maximum shear force = -270524. lbs
 Depth of maximum bending moment = 4.00000000 feet below pile head
 Depth of maximum shear force = 7.20000000 feet below pile head
 Number of iterations = 7
 Number of zero deflection points = 4

Pier drilled shaft_row2

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 5

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 17850.0 lbs
 Applied moment at pile head = 8383200.0 in-lbs
 Axial thrust load on pile head = 846000.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in ²	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	0.04139	8383200.	17850.	-8.24E-04	0.00	1.12E+12	-343.411	7965.	0.00
0.1600	0.03982	8418166.	17191.	-8.10E-04	0.00	1.12E+12	-343.484	16561.	0.00
0.3200	0.03828	8451843.	16531.	-7.95E-04	0.00	1.12E+12	-343.454	17226.	0.00
0.4800	0.03677	8484229.	15872.	-7.81E-04	0.00	1.12E+12	-343.316	17928.	0.00
0.6400	0.03528	8515327.	15213.	-7.66E-04	0.00	1.12E+12	-343.070	18669.	0.00
0.8000	0.03383	8545136.	14555.	-7.51E-04	0.00	1.12E+12	-342.712	19453.	0.00
0.9600	0.03240	8573657.	13897.	-7.37E-04	0.00	1.12E+12	-342.239	20283.	0.00
1.1200	0.03100	8600894.	13240.	-7.22E-04	0.00	1.12E+12	-341.649	21162.	0.00
1.2800	0.02962	8626846.	12585.	-7.07E-04	0.00	1.12E+12	-340.938	22096.	0.00
1.4400	0.02828	8651518.	11931.	-6.92E-04	0.00	1.12E+12	-340.102	23090.	0.00
1.6000	0.02697	8674912.	11279.	-6.77E-04	0.00	1.12E+12	-339.139	24147.	0.00
1.7600	0.02568	8697032.	10629.	-6.63E-04	0.00	1.12E+12	-338.044	25275.	0.00
1.9200	0.02442	8717881.	9981.	-6.48E-04	0.00	1.12E+12	-336.813	26480.	0.00
2.0800	0.02319	8737464.	9336.	-6.33E-04	0.00	1.12E+12	-335.441	27769.	0.00
2.2400	0.02199	8755786.	8693.	-6.18E-04	0.00	1.12E+12	-333.924	29152.	0.00
2.4000	0.02082	8772852.	8054.	-6.02E-04	0.00	1.12E+12	-332.257	30638.	0.00
2.5600	0.01968	8788670.	7418.	-5.87E-04	0.00	1.12E+12	-330.432	32239.	0.00
2.7200	0.01857	8803245.	6785.	-5.72E-04	0.00	1.12E+12	-328.445	33967.	0.00
2.8800	0.01748	8816584.	6157.	-5.57E-04	0.00	1.12E+12	-326.288	35836.	0.00
3.0400	0.01643	8828696.	5532.	-5.42E-04	0.00	1.12E+12	-323.954	37866.	0.00
3.2000	0.01540	8839589.	4913.	-5.27E-04	0.00	1.12E+12	-321.434	40074.	0.00
3.3600	0.01440	8849272.	4298.	-5.12E-04	0.00	1.12E+12	-318.719	42486.	0.00
3.5200	0.01344	8857756.	3689.	-4.96E-04	0.00	1.12E+12	-315.798	45128.	0.00
3.6800	0.01250	8865051.	3086.	-4.81E-04	0.00	1.12E+12	-312.659	48034.	0.00
3.8400	0.01159	8871169.	2489.	-4.66E-04	0.00	1.12E+12	-309.290	51245.	0.00

Pier drilled shaft_row2

4.0000	0.01071	8876121.	1898.	-4.51E-04	0.00	1.12E+12	-305.675	54807.	0.00
4.1600	0.00986	8879922.	1315.	-4.35E-04	0.00	1.12E+12	-301.796	58780.	0.00
4.3200	0.00904	8882586.	739.7371	-4.20E-04	0.00	1.12E+12	-297.633	63238.	0.00
4.4800	0.00824	8884128.	172.5721	-4.05E-04	0.00	1.12E+12	-293.163	68271.	0.00
4.6400	0.00748	8884564.	-385.688	-3.90E-04	0.00	1.12E+12	-288.358	73997.	0.00
4.8000	0.00675	8883912.	-934.366	-3.74E-04	0.00	1.12E+12	-283.182	80565.	0.00
4.9600	0.00604	8882192.	-1473.	-3.59E-04	0.00	1.12E+12	-277.596	88173.	0.00
5.1200	0.00537	8879423.	-2000.	-3.44E-04	0.00	1.12E+12	-271.549	97088.	0.00
5.2800	0.00472	8875629.	-2515.	-3.28E-04	0.00	1.12E+12	-264.975	107678.	0.00
5.4400	0.00411	8870833.	-3017.	-3.13E-04	0.00	1.12E+12	-257.793	120466.	0.00
5.6000	0.00352	8865062.	-3504.	-2.98E-04	0.00	1.12E+12	-249.890	136228.	0.00
5.7600	0.00296	8858345.	-3976.	-2.83E-04	0.00	1.12E+12	-241.114	156164.	0.00
5.9200	0.00244	8850714.	-4429.	-2.68E-04	0.00	1.12E+12	-231.245	182250.	0.00
6.0800	0.00194	8842207.	-34972.	-2.43E-04	0.00	4.99E+11	-31585.	3.13E+07	0.00
6.2400	0.00150	8717210.	-95517.	-2.09E-04	0.00	5.06E+11	-31483.	4.02E+07	0.00
6.4000	0.00113	8476102.	-155545.	-1.77E-04	0.00	5.18E+11	-31047.	5.26E+07	0.00
6.5600	8.23E-04	8120491.	-223154.	-1.47E-04	0.00	5.37E+11	-39378.	9.18E+07	0.00
6.7200	5.69E-04	7619668.	-288405.	-1.21E-04	0.00	6.54E+11	-28592.	9.64E+07	0.00
6.8800	3.58E-04	7013409.	-333945.	-9.97E-05	0.00	6.55E+11	-18846.	1.01E+08	0.00
7.0400	1.86E-04	6337644.	-361885.	-8.01E-05	0.00	6.55E+11	-10259.	1.06E+08	0.00
7.2000	5.04E-05	5624031.	-374514.	-6.26E-05	0.00	6.56E+11	-2896.	1.10E+08	0.00
7.3600	-5.40E-05	4899716.	-374193.	-4.72E-05	0.00	6.56E+11	3230.	1.15E+08	0.00
7.5200	-1.31E-04	4187283.	-363275.	-3.39E-05	0.00	6.56E+11	8143.	1.20E+08	0.00
7.6800	-1.84E-04	3504848.	-344030.	-2.26E-05	0.00	6.56E+11	11905.	1.24E+08	0.00
7.8400	-2.18E-04	2866281.	-318583.	-1.33E-05	0.00	6.56E+11	14603.	1.29E+08	0.00
8.0000	-2.35E-04	2281532.	-288874.	-5.80E-06	0.00	6.57E+11	16345.	1.33E+08	0.00
8.1600	-2.40E-04	1757025.	-256622.	1.02E-07	0.00	6.57E+11	17251.	1.38E+08	0.00
8.3200	-2.35E-04	1296103.	-223312.	4.57E-06	0.00	6.57E+11	17447.	1.43E+08	0.00
8.4800	-2.23E-04	899491.	-190186.	7.78E-06	0.00	6.57E+11	17060.	1.47E+08	0.00
8.6400	-2.05E-04	565765.	-158241.	9.92E-06	0.00	6.57E+11	16215.	1.52E+08	0.00
8.8000	-1.84E-04	291812.	-128249.	1.12E-05	0.00	6.57E+11	15027.	1.56E+08	0.00
8.9600	-1.62E-04	73254.	-100764.	1.17E-05	0.00	6.57E+11	13603.	1.61E+08	0.00
9.1200	-1.40E-04	-95159.	-76151.	1.17E-05	0.00	6.57E+11	12036.	1.66E+08	0.00
9.2800	-1.17E-04	-219203.	-54605.	1.12E-05	0.00	6.57E+11	10407.	1.70E+08	0.00
9.4400	-9.64E-05	-304880.	-36181.	1.04E-05	0.00	6.57E+11	8785.	1.75E+08	0.00
9.6000	-7.72E-05	-358172.	-20815.	9.48E-06	0.00	6.57E+11	7221.	1.79E+08	0.00
9.7600	-6.01E-05	-384842.	-8355.	8.39E-06	0.00	6.57E+11	5758.	1.84E+08	0.00
9.9200	-4.50E-05	-390282.	1421.	7.26E-06	0.00	6.57E+11	4425.	1.89E+08	0.00
10.0800	-3.22E-05	-379408.	8780.	6.13E-06	0.00	6.57E+11	3241.	1.93E+08	0.00
10.2400	-2.15E-05	-356585.	14017.	5.06E-06	0.00	6.57E+11	2214.	1.98E+08	0.00

Pier drilled shaft_row2									
10.4000	-1.28E-05	-325601.	17434.	4.06E-06	0.00	6.57E+11	1347.	2.03E+08	0.00
10.5600	-5.88E-06	-289650.	19337.	3.16E-06	0.00	6.57E+11	634.8413	2.07E+08	0.00
10.7200	-6.29E-07	-251358.	20013.	2.37E-06	0.00	6.57E+11	69.3860	2.12E+08	0.00
10.8800	3.21E-06	-212809.	19731.	1.69E-06	0.00	6.57E+11	-362.284	2.16E+08	0.00
11.0400	5.86E-06	-175595.	18736.	1.12E-06	0.00	6.57E+11	-674.908	2.21E+08	0.00
11.2000	7.53E-06	-140868.	17239.	6.60E-07	0.00	6.57E+11	-884.423	2.26E+08	0.00
11.3600	8.40E-06	-109400.	15423.	2.94E-07	0.00	6.57E+11	-1007.	2.30E+08	0.00
11.5200	8.66E-06	-81645.	13440.	1.51E-08	0.00	6.57E+11	-1059.	2.35E+08	0.00
11.6800	8.46E-06	-57792.	11411.	-1.89E-07	0.00	6.57E+11	-1055.	2.39E+08	0.00
11.8400	7.93E-06	-37827.	9430.	-3.29E-07	0.00	6.57E+11	-1008.	2.44E+08	0.00
12.0000	7.19E-06	-21579.	7568.	-4.15E-07	0.00	6.57E+11	-931.894	2.49E+08	0.00
12.1600	6.34E-06	-8766.	5870.	-4.60E-07	0.00	6.57E+11	-835.965	2.53E+08	0.00
12.3200	5.43E-06	964.8580	4368.	-4.71E-07	0.00	6.57E+11	-729.301	2.58E+08	0.00
12.4800	4.53E-06	8008.	3073.	-4.58E-07	0.00	6.57E+11	-619.017	2.63E+08	0.00
12.6400	3.67E-06	12768.	1989.	-4.28E-07	0.00	6.57E+11	-510.654	2.67E+08	0.00
12.8000	2.88E-06	15646.	1107.	-3.86E-07	0.00	6.57E+11	-408.317	2.72E+08	0.00
12.9600	2.19E-06	17019.	412.4672	-3.38E-07	0.00	6.57E+11	-314.850	2.76E+08	0.00
13.1200	1.59E-06	17231.	-112.521	-2.88E-07	0.00	6.57E+11	-232.012	2.81E+08	0.00
13.2800	1.08E-06	16588.	-489.497	-2.39E-07	0.00	6.57E+11	-160.671	2.86E+08	0.00
13.4400	6.68E-07	15352.	-740.680	-1.92E-07	0.00	6.57E+11	-100.978	2.90E+08	0.00
13.6000	3.42E-07	13744.	-888.056	-1.50E-07	0.00	6.57E+11	-52.538	2.95E+08	0.00
13.7600	9.34E-08	11943.	-952.475	-1.12E-07	0.00	6.57E+11	-14.565	2.99E+08	0.00
13.9200	-8.83E-08	10087.	-953.032	-7.99E-08	0.00	6.57E+11	13.9855	3.04E+08	0.00
14.0800	-2.13E-07	8283.	-906.672	-5.30E-08	0.00	6.57E+11	34.3060	3.09E+08	0.00
14.2400	-2.92E-07	6606.	-828.004	-3.13E-08	0.00	6.57E+11	47.6403	3.13E+08	0.00
14.4000	-3.33E-07	5104.	-729.266	-1.42E-08	0.00	6.57E+11	55.2122	3.18E+08	0.00
14.5600	-3.46E-07	3806.	-620.418	-1.13E-09	0.00	6.57E+11	58.1708	3.22E+08	0.00
14.7200	-3.38E-07	2722.	-509.325	8.42E-09	0.00	6.57E+11	57.5513	3.27E+08	0.00
14.8800	-3.14E-07	1850.	-401.994	1.51E-08	0.00	6.57E+11	54.2511	3.32E+08	0.00
15.0400	-2.80E-07	1178.	-302.857	1.95E-08	0.00	6.57E+11	49.0175	3.36E+08	0.00
15.2000	-2.39E-07	686.7022	-215.052	2.23E-08	0.00	6.57E+11	42.4454	3.41E+08	0.00
15.3600	-1.94E-07	351.9997	-140.720	2.38E-08	0.00	6.57E+11	34.9835	3.46E+08	0.00
15.5200	-1.48E-07	146.2584	-81.268	2.45E-08	0.00	6.57E+11	26.9465	3.50E+08	0.00
15.6800	-1.00E-07	39.8521	-37.607	2.48E-08	0.00	6.57E+11	18.5338	3.55E+08	0.00
15.8400	-5.26E-08	1.7684	-10.357	2.48E-08	0.00	6.57E+11	9.8511	3.59E+08	0.00
16.0000	-4.95E-09	0.00	0.00	2.48E-08	0.00	6.57E+11	0.9375	1.82E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual

Pier drilled shaft_row2

stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 5:

Pile-head deflection = 0.04139052 inches
 Computed slope at pile head = -0.0008242 radians
 Maximum bending moment = 8884564. inch-lbs
 Maximum shear force = -374514. lbs
 Depth of maximum bending moment = 4.64000000 feet below pile head
 Depth of maximum shear force = 7.20000000 feet below pile head
 Number of iterations = 12
 Number of zero deflection points = 4

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 6

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 23130.0 lbs
 Applied moment at pile head = 10959840.0 in-lbs
 Axial thrust load on pile head = 1091000.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	0.06237	1.10E+07	23130.	-0.00120	0.00	1.10E+12	-380.474	5857.	0.00
0.1600	0.06008	1.10E+07	22399.	-0.00118	0.00	1.10E+12	-380.673	12166.	0.00
0.3200	0.05783	1.11E+07	21668.	-0.00116	0.00	1.10E+12	-380.759	12642.	0.00
0.4800	0.05561	1.11E+07	20937.	-0.00114	0.00	1.10E+12	-380.727	13145.	0.00
0.6400	0.05343	1.11E+07	20206.	-0.00112	0.00	1.10E+12	-380.576	13675.	0.00
0.8000	0.05129	1.12E+07	19476.	-0.00110	0.00	1.10E+12	-380.301	14235.	0.00
0.9600	0.04919	1.12E+07	18746.	-0.00109	0.00	1.10E+12	-379.900	14828.	0.00

Pier drilled shaft_row2

1.1200	0.04713	1.13E+07	18017.	-0.00107	0.00	1.10E+12	-379.368	15456.	0.00
1.2800	0.04510	1.13E+07	17290.	-0.00105	0.00	1.10E+12	-378.702	16122.	0.00
1.4400	0.04311	1.13E+07	16563.	-0.00103	0.00	1.10E+12	-377.898	16830.	0.00
1.6000	0.04116	1.14E+07	15839.	-0.00101	0.00	1.10E+12	-376.950	17583.	0.00
1.7600	0.03925	1.14E+07	15116.	-9.86E-04	0.00	1.10E+12	-375.854	18386.	0.00
1.9200	0.03738	1.14E+07	14395.	-9.66E-04	0.00	1.10E+12	-374.604	19244.	0.00
2.0800	0.03554	1.14E+07	13678.	-9.46E-04	0.00	1.10E+12	-373.195	20162.	0.00
2.2400	0.03374	1.15E+07	12963.	-9.26E-04	0.00	1.10E+12	-371.620	21146.	0.00
2.4000	0.03198	1.15E+07	12251.	-9.06E-04	0.00	1.10E+12	-369.873	22204.	0.00
2.5600	0.03026	1.15E+07	11542.	-8.86E-04	0.00	1.10E+12	-367.945	23343.	0.00
2.7200	0.02858	1.15E+07	10838.	-8.66E-04	0.00	1.10E+12	-365.828	24574.	0.00
2.8800	0.02694	1.16E+07	10138.	-8.45E-04	0.00	1.10E+12	-363.513	25908.	0.00
3.0400	0.02534	1.16E+07	9442.	-8.25E-04	0.00	1.10E+12	-360.989	27356.	0.00
3.2000	0.02377	1.16E+07	8752.	-8.05E-04	0.00	1.10E+12	-358.245	28935.	0.00
3.3600	0.02225	1.16E+07	8067.	-7.84E-04	0.00	1.10E+12	-355.268	30662.	0.00
3.5200	0.02076	1.16E+07	7388.	-7.64E-04	0.00	1.09E+12	-352.042	32558.	0.00
3.6800	0.01931	1.17E+07	6715.	-7.43E-04	0.00	1.04E+12	-348.551	34651.	0.00
3.8400	0.01791	1.17E+07	6050.	-7.21E-04	0.00	9.93E+11	-344.786	36967.	0.00
4.0000	0.01655	1.17E+07	5392.	-6.98E-04	0.00	9.52E+11	-340.738	39541.	0.00
4.1600	0.01523	1.17E+07	4742.	-6.74E-04	0.00	9.25E+11	-336.396	42414.	0.00
4.3200	0.01396	1.17E+07	4100.	-6.49E-04	0.00	9.21E+11	-331.744	45635.	0.00
4.4800	0.01273	1.17E+07	3468.	-6.25E-04	0.00	9.19E+11	-326.759	49268.	0.00
4.6400	0.01156	1.17E+07	2846.	-6.01E-04	0.00	9.17E+11	-321.410	53395.	0.00
4.8000	0.01043	1.17E+07	2234.	-5.76E-04	0.00	9.16E+11	-315.666	58121.	0.00
4.9600	0.00935	1.17E+07	1634.	-5.51E-04	0.00	9.15E+11	-309.484	63581.	0.00
5.1200	0.00831	1.17E+07	1046.	-5.27E-04	0.00	9.15E+11	-302.815	69959.	0.00
5.2800	0.00732	1.17E+07	471.6692	-5.02E-04	0.00	9.14E+11	-295.595	77501.	0.00
5.4400	0.00638	1.17E+07	-88.338	-4.77E-04	0.00	9.14E+11	-287.746	86559.	0.00
5.6000	0.00549	1.17E+07	-632.568	-4.53E-04	0.00	9.14E+11	-279.161	97637.	0.00
5.7600	0.00464	1.17E+07	-1159.	-4.28E-04	0.00	9.14E+11	-269.698	111503.	0.00
5.9200	0.00385	1.17E+07	-1667.	-4.03E-04	0.00	9.15E+11	-259.156	129386.	0.00
6.0800	0.00309	1.17E+07	-35999.	-3.67E-04	0.00	4.69E+11	-35503.	2.20E+07	0.00
6.2400	0.00244	1.16E+07	-104177.	-3.20E-04	0.00	4.74E+11	-35515.	2.80E+07	0.00
6.4000	0.00187	1.13E+07	-172039.	-2.74E-04	0.00	4.85E+11	-35173.	3.62E+07	0.00
6.5600	0.00139	1.09E+07	-238871.	-2.30E-04	0.00	5.00E+11	-34444.	4.77E+07	0.00
6.7200	9.84E-04	1.04E+07	-319382.	-1.90E-04	0.00	5.21E+11	-49421.	9.64E+07	0.00
6.8800	6.56E-04	9718421.	-399971.	-1.54E-04	0.00	5.49E+11	-34527.	1.01E+08	0.00
7.0400	3.93E-04	8887123.	-453898.	-1.23E-04	0.00	6.39E+11	-21647.	1.06E+08	0.00
7.2000	1.82E-04	7975968.	-484712.	-9.81E-05	0.00	6.40E+11	-10450.	1.10E+08	0.00
7.3600	1.65E-05	7026240.	-495690.	-7.57E-05	0.00	6.41E+11	-985.410	1.15E+08	0.00

Pier drilled shaft_row2

7.5200	-1.09E-04	6072835.	-490147.	-5.60E-05	0.00	6.41E+11	6759.	1.20E+08	0.00
7.6800	-1.99E-04	5144310.	-471324.	-3.93E-05	0.00	6.42E+11	12848.	1.24E+08	0.00
7.8400	-2.59E-04	4263115.	-442296.	-2.52E-05	0.00	6.42E+11	17389.	1.29E+08	0.00
8.0000	-2.95E-04	3445996.	-405904.	-1.37E-05	0.00	6.42E+11	20520.	1.33E+08	0.00
8.1600	-3.12E-04	2704502.	-364697.	-4.46E-06	0.00	6.42E+11	22404.	1.38E+08	0.00
8.3200	-3.13E-04	2045580.	-320906.	2.64E-06	0.00	6.42E+11	23212.	1.43E+08	0.00
8.4800	-3.02E-04	1472214.	-276422.	7.90E-06	0.00	6.42E+11	23125.	1.47E+08	0.00
8.6400	-2.82E-04	984085.	-232799.	1.16E-05	0.00	6.42E+11	22316.	1.52E+08	0.00
8.8000	-2.57E-04	578217.	-191259.	1.39E-05	0.00	6.42E+11	20955.	1.56E+08	0.00
8.9600	-2.29E-04	249593.	-152716.	1.51E-05	0.00	6.42E+11	19194.	1.61E+08	0.00
9.1200	-1.99E-04	-8275.	-117802.	1.55E-05	0.00	6.42E+11	17174.	1.66E+08	0.00
9.2800	-1.69E-04	-202832.	-86900.	1.52E-05	0.00	6.42E+11	15015.	1.70E+08	0.00
9.4400	-1.41E-04	-342035.	-60179.	1.44E-05	0.00	6.42E+11	12819.	1.75E+08	0.00
9.6000	-1.14E-04	-433979.	-37630.	1.32E-05	0.00	6.42E+11	10669.	1.79E+08	0.00
9.7600	-9.00E-05	-486589.	-19102.	1.18E-05	0.00	6.42E+11	8631.	1.84E+08	0.00
9.9200	-6.87E-05	-507380.	-4336.	1.04E-05	0.00	6.42E+11	6750.	1.89E+08	0.00
10.0800	-5.03E-05	-503283.	7003.	8.84E-06	0.00	6.42E+11	5061.	1.93E+08	0.00
10.2400	-3.47E-05	-480527.	15298.	7.37E-06	0.00	6.42E+11	3580.	1.98E+08	0.00
10.4000	-2.20E-05	-444569.	20959.	5.99E-06	0.00	6.42E+11	2316.	2.03E+08	0.00
10.5600	-1.17E-05	-400069.	24399.	4.73E-06	0.00	6.42E+11	1266.	2.07E+08	0.00
10.7200	-3.81E-06	-350898.	26018.	3.60E-06	0.00	6.42E+11	420.5125	2.12E+08	0.00
10.8800	2.10E-06	-300175.	26195.	2.63E-06	0.00	6.42E+11	-236.491	2.16E+08	0.00
11.0400	6.29E-06	-250321.	25273.	1.81E-06	0.00	6.42E+11	-723.591	2.21E+08	0.00
11.2000	9.04E-06	-203134.	23559.	1.13E-06	0.00	6.42E+11	-1062.	2.26E+08	0.00
11.3600	1.06E-05	-159860.	21317.	5.87E-07	0.00	6.42E+11	-1274.	2.30E+08	0.00
11.5200	1.13E-05	-121281.	18768.	1.67E-07	0.00	6.42E+11	-1381.	2.35E+08	0.00
11.6800	1.13E-05	-87792.	16094.	-1.46E-07	0.00	6.42E+11	-1405.	2.39E+08	0.00
11.8400	1.07E-05	-59480.	13436.	-3.66E-07	0.00	6.42E+11	-1364.	2.44E+08	0.00
12.0000	9.86E-06	-36197.	10901.	-5.09E-07	0.00	6.42E+11	-1277.	2.49E+08	0.00
12.1600	8.78E-06	-17620.	8563.	-5.89E-07	0.00	6.42E+11	-1158.	2.53E+08	0.00
12.3200	7.59E-06	-3311.	6473.	-6.21E-07	0.00	6.42E+11	-1020.	2.58E+08	0.00
12.4800	6.39E-06	7238.	4654.	-6.15E-07	0.00	6.42E+11	-874.020	2.63E+08	0.00
12.6400	5.23E-06	14565.	3117.	-5.82E-07	0.00	6.42E+11	-728.015	2.67E+08	0.00
12.8000	4.16E-06	19208.	1853.	-5.32E-07	0.00	6.42E+11	-588.268	2.72E+08	0.00
12.9600	3.19E-06	21682.	847.3077	-4.71E-07	0.00	6.42E+11	-459.217	2.76E+08	0.00
13.1200	2.35E-06	22464.	76.4723	-4.05E-07	0.00	6.42E+11	-343.736	2.81E+08	0.00
13.2800	1.64E-06	21978.	-487.167	-3.38E-07	0.00	6.42E+11	-243.389	2.86E+08	0.00
13.4400	1.05E-06	20594.	-873.155	-2.75E-07	0.00	6.42E+11	-158.682	2.90E+08	0.00
13.6000	5.82E-07	18626.	-1111.	-2.16E-07	0.00	6.42E+11	-89.307	2.95E+08	0.00
13.7600	2.20E-07	16328.	-1230.	-1.64E-07	0.00	6.42E+11	-34.354	2.99E+08	0.00

Pier drilled shaft_row2									
13.9200	-4.73E-08	13904.	-1256.	-1.19E-07	0.00	6.42E+11	7.4961	3.04E+08	0.00
14.0800	-2.35E-07	11507.	-1212.	-8.06E-08	0.00	6.42E+11	37.8038	3.09E+08	0.00
14.2400	-3.57E-07	9249.	-1120.	-4.96E-08	0.00	6.42E+11	58.2386	3.13E+08	0.00
14.4000	-4.26E-07	7206.	-996.474	-2.50E-08	0.00	6.42E+11	70.4700	3.18E+08	0.00
14.5600	-4.53E-07	5423.	-855.782	-6.13E-09	0.00	6.42E+11	76.0848	3.22E+08	0.00
14.7200	-4.49E-07	3920.	-709.273	7.83E-09	0.00	6.42E+11	76.5286	3.27E+08	0.00
14.8800	-4.23E-07	2699.	-565.661	1.77E-08	0.00	6.42E+11	73.0674	3.32E+08	0.00
15.0400	-3.81E-07	1748.	-431.420	2.44E-08	0.00	6.42E+11	66.7664	3.36E+08	0.00
15.2000	-3.29E-07	1042.	-311.180	2.85E-08	0.00	6.42E+11	58.4836	3.41E+08	0.00
15.3600	-2.72E-07	552.4856	-208.116	3.09E-08	0.00	6.42E+11	48.8753	3.46E+08	0.00
15.5200	-2.11E-07	242.9240	-124.321	3.21E-08	0.00	6.42E+11	38.4109	3.50E+08	0.00
15.6800	-1.48E-07	74.9590	-61.146	3.26E-08	0.00	6.42E+11	27.3961	3.55E+08	0.00
15.8400	-8.55E-08	7.9864	-19.485	3.27E-08	0.00	6.42E+11	16.0011	3.59E+08	0.00
16.0000	-2.27E-08	0.00	0.00	3.27E-08	0.00	6.42E+11	4.2957	1.82E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 6:

Pile-head deflection = 0.06236544 inches
 Computed slope at pile head = -0.0012015 radians
 Maximum bending moment = 11742891. inch-lbs
 Maximum shear force = -495690. lbs
 Depth of maximum bending moment = 5.60000000 feet below pile head
 Depth of maximum shear force = 7.36000000 feet below pile head
 Number of iterations = 43
 Number of zero deflection points = 4

 Summary of Pile-head Responses for Conventional Analyses

Definitions of Pile-head Loading Conditions:

Pier drilled shaft_row2

Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs
 Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
 Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.
 Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs
 Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians

Load Case No.	Load Type 1	Pile-head Load 1	Load Type 2	Pile-head Load 2	Axial Loading lbs	Pile-head Deflection inches	Pile-head Rotation radians	Max Shear in Pile lbs	Max Moment in Pile in-lbs
1	V, lb	19020.	M, in-lb	3836400.	848900.	0.01871	-3.82E-04	-194306.	4524863.
2	V, lb	23990.	M, in-lb	5025600.	1102000.	0.02576	-5.20E-04	-260571.	6027350.
3	V, lb	10160.	M, in-lb	4451400.	1018000.	0.01918	-4.04E-04	-194078.	4648022.
4	V, lb	13670.	M, in-lb	5995200.	1326000.	0.02759	-5.72E-04	-270524.	6328257.
5	V, lb	17850.	M, in-lb	8383200.	846000.	0.04139	-8.24E-04	-374514.	8884564.
6	V, lb	23130.	M, in-lb	1.10E+07	1091000.	0.06237	-0.00120	-495690.	1.17E+07

Maximum pile-head deflection = 0.0623654413 inches
 Maximum pile-head rotation = -0.0012015270 radians = -0.068842 deg.

 Summary of Warning Messages

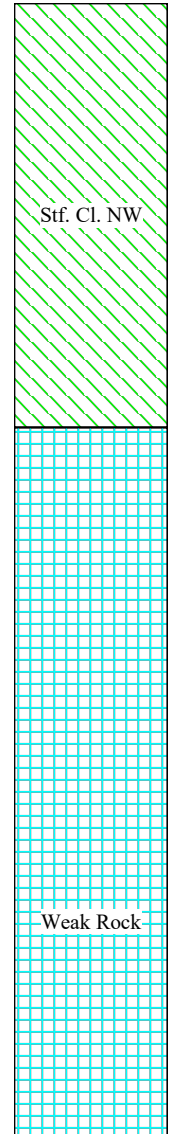
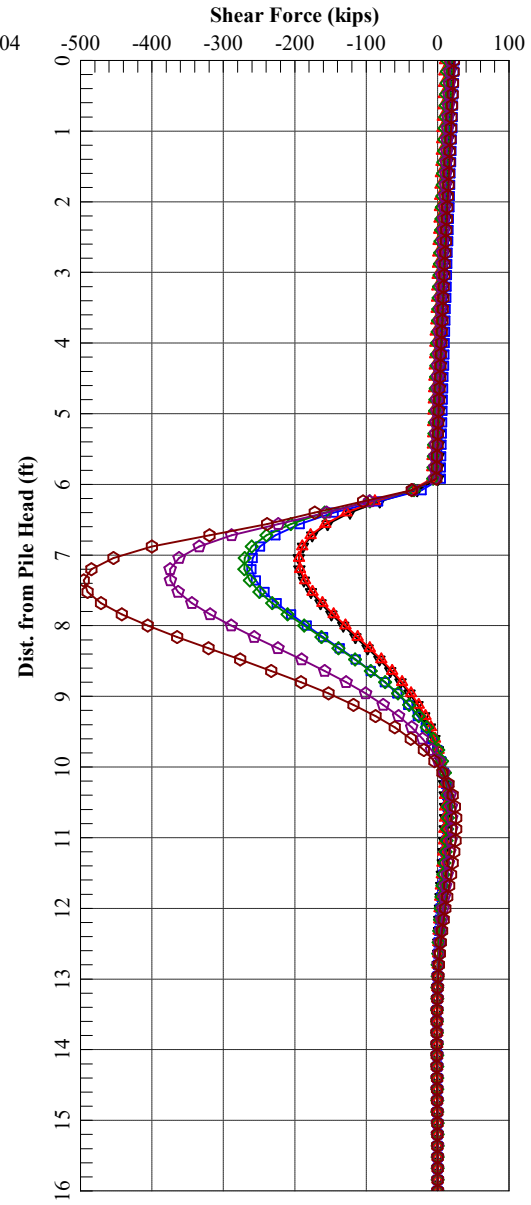
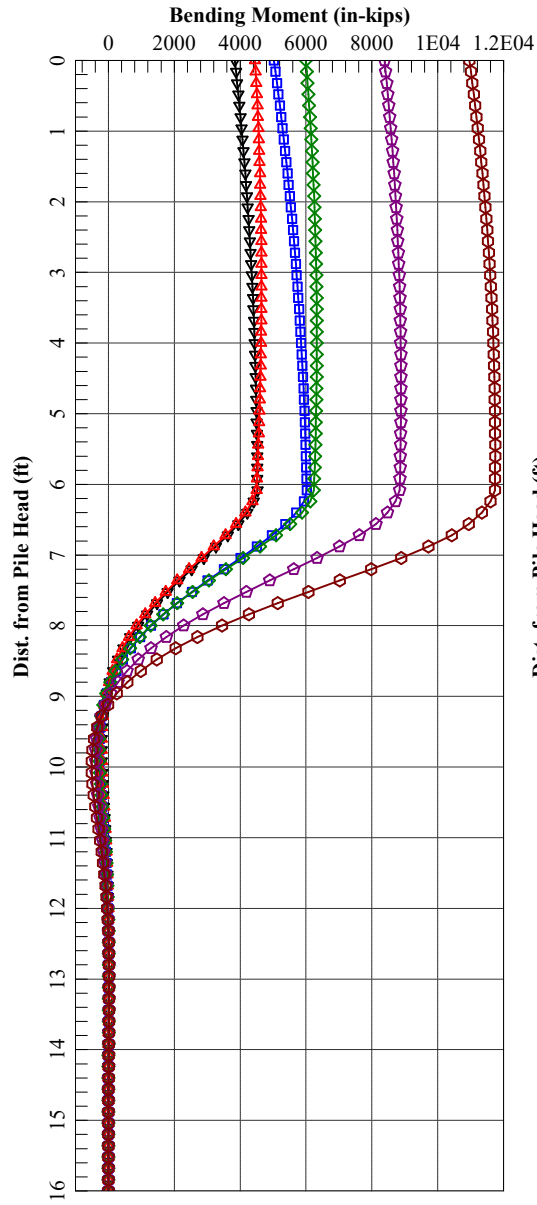
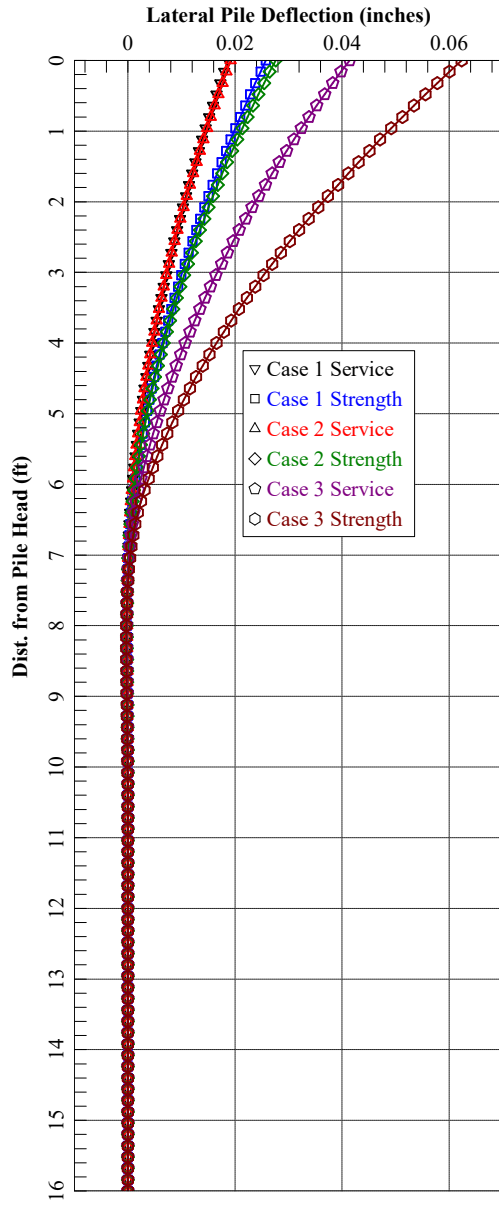
The following warning was reported 2772 times

**** Warning ****

An unreasonable input value for unconfined compressive strength has been specified for a soil defined using the weak rock criteria. The input value is greater than 500 psi. Please check your input data for correctness.

The analysis ended normally.

MEG-33-19.21_Bowman's Run Bridge_Pier_Row2



=====
LPile for Windows, Version 2022-12.006

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method
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Files Used for Analysis

Path to file locations:

\\US0247-PPFSS01\shared_projects\173609140\119144\400-Engineering\Geotechnical\Analysis\Lpile\bridges\LPile
Analysis\Bowman's Run\pier\

Name of input data file:

Pier drilled shaft_row3.lp12d

Name of output report file:

Pier drilled shaft_row3.lp12o

Pier drilled shaft_row3

Name of plot output file:

Pier drilled shaft_row3.lp12p

Name of runtime message file:

Pier drilled shaft_row3.lp12r

Date and Time of Analysis

Date: August 28, 2024

Time: 15:10:19

Problem Title

Project Name: MEG-33-19.21

Job Number: 173609140

Client: ODOT

Engineer: G. Khatri

Description: Pier Drilled Shaft Lateral Load Analysis at Bowman's Run

Pier drilled shaft_row3
Program Options and Settings

Computational Options:

- Conventional Analysis

Engineering Units Used for Data Input and Computations:

- US Customary System Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed = 1000
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 100.0000 in
- Number of pile increments = 100

Loading Type and Number of Cycles of Loading:

- Static loading specified

- Analysis uses p-y modification factors for p-y curves
- Analysis uses layering correction (Method of Georgiadis)
- No distributed lateral loads are entered
- Loading by lateral soil movements acting on pile not selected
- Input of shear resistance at the pile tip not selected
- Input of moment resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:

- Output files use decimal points to denote decimal symbols.
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1
- No p-y curves to be computed and reported for user-specified depths
- Print using wide report formats

Pier drilled shaft_row3

Number of pile sections defined = 2
Total length of pile = 16.000 ft
Depth of ground surface below top of pile = 0.0000 ft

Pile diameters used for p-y curve computations are defined using 4 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile. A summary of values of pile diameter vs. depth follows.

Point No.	Depth Below Pile Head feet	Pile Diameter inches
1	0.000	48.0000
2	6.000	48.0000
3	6.000	42.0000
4	16.000	42.0000

Input Structural Properties for Pile Sections:

Pile Section No. 1:

Section 1 is a round drilled shaft, bored pile, or CIDH pile
Length of section = 6.000000 ft
Shaft Diameter = 48.000000 in

Pile Section No. 2:

Section 2 is a round drilled shaft, bored pile, or CIDH pile
Length of section = 10.000000 ft
Shaft Diameter = 42.000000 in

Soil and Rock Layering Information

Pier drilled shaft_row3

The soil profile is modelled using 2 layers

Layer 1 is stiff clay without free water

Distance from top of pile to top of layer	=	0.0000	ft
Distance from top of pile to bottom of layer	=	6.000000	ft
Effective unit weight at top of layer	=	122.000000	pcf
Effective unit weight at bottom of layer	=	122.000000	pcf
Undrained cohesion at top of layer	=	2000.	psf
Undrained cohesion at bottom of layer	=	2000.	psf
Epsilon-50 at top of layer	=	0.0000	
Epsilon-50 at bottom of layer	=	0.0000	

NOTE: Default values for Epsilon-50 will be computed for this layer.

Layer 2 is weak rock, p-y criteria by Reese, 1997

Distance from top of pile to top of layer	=	6.000000	ft
Distance from top of pile to bottom of layer	=	20.000000	ft
Effective unit weight at top of layer	=	87.600000	pcf
Effective unit weight at bottom of layer	=	87.600000	pcf
Uniaxial compressive strength at top of layer	=	4380.	psi
Uniaxial compressive strength at bottom of layer	=	4380.	psi
Initial modulus of rock at top of layer	=	394200.	psi
Initial modulus of rock at bottom of layer	=	394200.	psi
RQD of rock at top of layer	=	74.000000	%
RQD of rock at bottom of layer	=	74.000000	%
k _{rm} of rock at top of layer	=	0.0000500	
k _{rm} of rock at bottom of layer	=	0.0000500	

(Depth of the lowest soil layer extends 4.000 ft below the pile tip)

Summary of Input Soil Properties

Pier drilled shaft_row3

Layer Num.	Soil Type Name (p-y Curve Type)	Layer Depth ft	Effective Unit Wt. pcf	Cohesion psf	Uniaxial qu psi	RQD %	E50 or krm	Rock Mass Modulus psi
1	Stiff Clay	0.00	122.0000	2000.	--	--	default	--
	w/o Free Water	6.0000	122.0000	2000.	--	--	default	--
2	Weak	6.0000	87.6000	--	4380.	74.0000	5.00E-05	394200.
	Rock	20.0000	87.6000	--	4380.	74.0000	5.00E-05	394200.

Modification Factors for p-y Curves

Distribution of p-y modifiers with depth defined using 3 points

Point No.	Depth X ft	p-mult	y-mult
1	0.000	0.5400	1.0000
2	6.000	0.5400	1.0000
3	16.000	0.5400	1.0000

Static Loading Type

Static loading criteria were used when computing p-y curves for all analyses.

Pier drilled shaft_row3

 Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 6

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length	Run Analysis
1	1	V = 19020. lbs	M = 3836400. in-lbs	848900.	No	Yes
2	1	V = 23990. lbs	M = 5025600. in-lbs	1102000.	No	Yes
3	1	V = 10160. lbs	M = 4451400. in-lbs	1018000.	No	Yes
4	1	V = 13670. lbs	M = 5995200. in-lbs	1326000.	No	Yes
5	1	V = 17850. lbs	M = 8383200. in-lbs	846000.	No	Yes
6	1	V = 23130. lbs	M = 10959840. in-lbs	1091000.	No	Yes

V = shear force applied normal to pile axis

M = bending moment applied to pile head

y = lateral deflection normal to pile axis

S = pile slope relative to original pile batter angle

R = rotational stiffness applied to pile head

Values of top y vs. pile lengths can be computed only for load types with specified shear loading (Load Types 1, 2, and 3).

Thrust force is assumed to be acting axially for all pile batter angles.

 Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 2

Pile Section No. 1:

Pier drilled shaft_row3

Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section	=	6.000000	ft
Shaft Diameter	=	48.000000	in
Concrete Cover Thickness (to edge of trans. reinf.)	=	3.000000	in
Number of Reinforcing Bars	=	16	bars
Yield Stress of Reinforcing Bars	=	50000.	psi
Modulus of Elasticity of Reinforcing Bars	=	29000000.	psi
Gross Area of Shaft	=	1810.	sq. in.
Total Area of Reinforcing Steel	=	16.000000	sq. in.
Area Ratio of Steel Reinforcement	=	0.88	percent
Edge-to-Edge Bar Spacing	=	6.601869	in
Maximum Concrete Aggregate Size	=	0.750000	in
Ratio of Bar Spacing to Aggregate Size	=	8.80	
Offset of Center of Rebar Cage from Center of Pile	=	0.0000	in
Transverse Reinforcement			
Type: Spiral			
Number of Transverse Reinf. (per spacing)	=	1	
Spacing of Transverse Reinf.	=	4.500000	in
Yield Stress of Transverse Reinf.	=	50000.	psi
Diameter of Transverse Reinf.	=	0.625000	in

Axial Structural Capacities:

Nom. Axial Structural Capacity = $0.85 F_c A_c + F_y A_s$	=	6898.095	kips
Tensile Load for Cracking of Concrete	=	-799.490	kips
Nominal Axial Tensile Capacity	=	-800.000	kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
-----	-----	-----	-----	-----
1	1.128000	1.000000	19.811000	0.000000
2	1.128000	1.000000	18.302977	7.581341
3	1.128000	1.000000	14.008492	14.008492

			Pier drilled shaft_row3	
4	1.128000	1.000000	7.581341	18.302977
5	1.128000	1.000000	0.000000	19.811000
6	1.128000	1.000000	-7.58134	18.302977
7	1.128000	1.000000	-14.00849	14.008492
8	1.128000	1.000000	-18.30298	7.581341
9	1.128000	1.000000	-19.81100	0.000000
10	1.128000	1.000000	-18.30298	-7.58134
11	1.128000	1.000000	-14.00849	-14.00849
12	1.128000	1.000000	-7.58134	-18.30298
13	1.128000	1.000000	0.000000	-19.81100
14	1.128000	1.000000	7.581341	-18.30298
15	1.128000	1.000000	14.008492	-14.00849
16	1.128000	1.000000	18.302977	-7.58134

NOTE: The positions of the above rebars were computed by LPILE

Minimum spacing between any two bars not equal to zero = 6.602 inches
between bars 11 and 12.

Ratio of bar spacing to maximum aggregate size = 8.80

Concrete Properties:

Compressive Strength of Concrete	=	4000. psi
Modulus of Elasticity of Concrete	=	3604997. psi
Modulus of Rupture of Concrete	=	-474.34165 psi
Compression Strain at Peak Stress	=	0.001886
Tensile Strain at Fracture of Concrete	=	-0.0001154
Maximum Coarse Aggregate Size	=	0.750000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 6

Number	Axial Thrust Force kips
-----	-----
1	846.000

Pier drilled shaft_row3

2	848.900
3	1018.000
4	1091.000
5	1102.000
6	1326.000

Definitions of Run Messages and Notes:

- C = concrete in section has cracked in tension.
- Y = stress in reinforcing steel has reached yield stress.
- T = ACI 318 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than 0.003. See ACI 318-14, Section 21.2.3.
- Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
 Position of neutral axis is measured from edge of compression side of pile.
 Compressive stresses and strains are positive in sign.
 Tensile stresses and strains are negative in sign.

Axial Thrust Force = 846.000 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in ²	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	700.4440834	1120710533.	196.3781960	0.0001227	0.00009274	0.5030158	3.4941048	
0.00000125	1401.	1120691217.	110.2246384	0.0001378	0.00007778	0.5618309	3.8651431	
0.00000188	2101.	1120650488.	81.5225806	0.0001529	0.00006285	0.6202626	4.2370403	
0.00000250	2801.	1120591544.	67.1833992	0.0001680	0.00004796	0.6783081	4.6097964	
0.00000313	3502.	1120515025.	58.5893698	0.0001831	0.00003309	0.7359642	4.9834116	
0.00000375	4202.	1120421140.	52.8679182	0.0001983	0.00001825	0.7932281	5.3578861	
0.00000438	4901.	1120309975.	48.7879414	0.0002134	0.00000345	0.8500968	5.7332201	
0.00000500	5601.	1120172036.	45.7338334	0.0002287	-0.00001133	0.9065662	6.1094059	
0.00000563	6300.	1119911337.	43.3630448	0.0002439	-0.00002608	0.9626212	6.4863467	
0.00000625	6996.	1119433463.	41.4697561	0.0002592	-0.00004081	1.0182400	6.8638933	

Pier drilled shaft_row3

0.00000688	7691.	1118711360.	39.9231369	0.0002745	-0.00005553	1.0734057	7.2419254
0.00000750	8383.	1117751174.	38.6360958	0.0002898	-0.00007023	1.1281050	7.6203507
0.00000813	9072.	1116573479.	37.5484407	0.0003051	-0.00008492	1.1823282	7.9991013
0.00000875	9758.	1115203467.	36.6172506	0.0003204	-0.00009960	1.2360681	8.3781273
0.00000938	10441.	1113665325.	35.8110922	0.0003357	-0.000114	1.2893192	8.7573907
0.00001000	10441.	1044061242.	33.6474340	0.0003365	-0.000144	1.2913974	8.7137559 C
0.00001063	10441.	982645875.	32.8130916	0.0003486	-0.000161	1.3331669	9.0012839 C
0.00001125	10441.	928054437.	32.0517125	0.0003606	-0.000179	1.3738487	9.2823712 C
0.00001188	10441.	879209467.	31.3548640	0.0003723	-0.000198	1.4135855	9.5580813 C
0.00001250	10441.	835248994.	30.7132084	0.0003839	-0.000216	1.4524062	9.8285379 C
0.00001313	10591.	806914774.	30.1207487	0.0003953	-0.000235	1.4904082	10.0944600 C
0.00001375	10832.	787809864.	29.5711600	0.0004066	-0.000253	1.5276207	10.3560000 C
0.00001438	11065.	769713923.	29.0593298	0.0004177	-0.000272	1.5640780	10.6133581 C
0.00001500	11288.	752559702.	28.5810558	0.0004287	-0.000291	1.5998164	10.8667593 C
0.00001563	11505.	736289323.	28.1328677	0.0004396	-0.000310	1.6348739	11.1164557 C
0.00001625	11714.	720852372.	27.7118906	0.0004503	-0.000330	1.6692914	11.3627285 C
0.00001688	11917.	706204347.	27.3157398	0.0004610	-0.000349	1.7031119	11.6058902 C
0.00001750	12115.	692305477.	26.9424376	0.0004715	-0.000369	1.7363810	11.8462871 C
0.00001813	12309.	679119785.	26.5903493	0.0004820	-0.000388	1.7691473	12.0843024 C
0.00001875	12497.	666522728.	26.2558989	0.0004923	-0.000408	1.8013307	12.3191451 C
0.00001938	12681.	654518360.	25.9385214	0.0005026	-0.000427	1.8330079	12.5514568 C
0.00002000	12863.	643128198.	25.6384267	0.0005128	-0.000447	1.8642970	12.7822875 C
0.00002063	13039.	632191041.	25.3512037	0.0005229	-0.000467	1.8950212	13.0099388 C
0.00002125	13213.	621778766.	25.0784271	0.0005329	-0.000487	1.9253639	13.2360808 C
0.00002188	13384.	611822109.	24.8181810	0.0005429	-0.000507	1.9552834	13.4602830 C
0.00002250	13551.	602279818.	24.5691163	0.0005528	-0.000527	1.9847638	13.6823483 C
0.00002313	13717.	593162483.	24.3315845	0.0005627	-0.000547	2.0138968	13.9031189 C
0.00002375	13880.	584407414.	24.1036397	0.0005725	-0.000568	2.0426122	14.1218819 C
0.00002438	14041.	576021764.	23.8855997	0.0005822	-0.000588	2.0709904	-14.501117 C
0.00002563	14356.	560234410.	23.4753945	0.0006016	-0.000628	2.1266765	-15.549598 C
0.00002688	14664.	545654776.	23.0968920	0.0006207	-0.000669	2.1810508	-16.603110 C
0.00002813	14967.	532162970.	22.7469581	0.0006398	-0.000710	2.2342221	-17.660762 C
0.00002938	15263.	519586658.	22.4203249	0.0006586	-0.000751	2.2860761	-18.723936 C
0.00003063	15553.	507866742.	22.1156807	0.0006773	-0.000793	2.3367659	-19.791261 C
0.00003188	15841.	496969880.	21.8330727	0.0006959	-0.000834	2.3865353	-20.860303 C
0.00003313	16122.	486695964.	21.5651698	0.0007143	-0.000876	2.4349667	-21.935709 C
0.00003438	16401.	477119261.	21.3163686	0.0007328	-0.000917	2.4826257	-23.011495 C
0.00003563	16675.	468068088.	21.0800406	0.0007510	-0.000959	2.5290910	-24.092433 C
0.00003688	16948.	459598431.	20.8599580	0.0007692	-0.001001	2.5748546	-25.173132 C
0.00003813	17215.	451548387.	20.6491806	0.0007873	-0.001043	2.6194081	-26.259500 C

Pier drilled shaft_row3

0.00003938	17482.	443991326.	20.4525581	0.0008053	-0.001085	2.6633285	-27.344985	C
0.00004063	17745.	436804101.	20.2644643	0.0008232	-0.001127	2.7061891	-28.434678	C
0.00004188	18006.	430000212.	20.0866912	0.0008411	-0.001169	2.7482611	-29.525474	C
0.00004313	18267.	423574513.	19.9199179	0.0008590	-0.001211	2.7897074	-30.615403	C
0.00004438	18522.	417408205.	19.7578708	0.0008768	-0.001253	2.8299807	-31.711340	C
0.00004563	18778.	411564967.	19.6053520	0.0008945	-0.001296	2.8696394	-32.806419	C
0.00004688	19032.	406018810.	19.4616028	0.0009123	-0.001338	2.9086802	-33.900634	C
0.00004813	19283.	400687583.	19.3219032	0.0009299	-0.001380	2.9466770	-34.999619	C
0.00004938	19533.	395602284.	19.1891497	0.0009475	-0.001423	2.9839871	-36.098787	C
0.00005063	19782.	390754983.	19.0635371	0.0009651	-0.001465	3.0206866	-37.197094	C
0.00005188	20030.	386120938.	18.9439852	0.0009827	-0.001507	3.0567118	-38.295392	C
0.00005313	20275.	381645538.	18.8270009	0.0010002	-0.001550	3.0917336	-39.398402	C
0.00005438	20519.	377363928.	18.7159396	0.0010177	-0.001592	3.1261516	-40.500553	C
0.00005563	20763.	373262977.	18.6104055	0.0010352	-0.001635	3.1599628	-41.601839	C
0.00005688	21006.	369330643.	18.5100377	0.0010528	-0.001677	3.1931639	-42.702256	C
0.00005813	21246.	365527472.	18.4119892	0.0010702	-0.001720	3.2254790	-43.806041	C
0.00005938	21486.	361861071.	18.3174718	0.0010876	-0.001762	3.2570689	-44.910853	C
0.00006063	21724.	358335186.	18.2273494	0.0011050	-0.001805	3.2880549	-46.014792	C
0.00006188	21962.	354941244.	18.1413589	0.0011225	-0.001848	3.3184342	-47.117849	C
0.00006313	22199.	351671287.	18.0592584	0.0011400	-0.001890	3.3482035	-48.220020	C
0.00006438	22435.	348510527.	17.9800535	0.0011575	-0.001933	3.3772764	-49.322737	C
0.00006563	22668.	345411487.	17.9016791	0.0011748	-0.001975	3.4054515	-50.000000	CY
0.00006688	22887.	342236913.	17.8241168	0.0011920	-0.002018	3.4327481	-50.000000	CY
0.00006813	23090.	338942371.	17.7465714	0.0012090	-0.002061	3.4591027	-50.000000	CY
0.00006938	23286.	335652173.	17.6706915	0.0012259	-0.002104	3.4847114	-50.000000	CY
0.00007063	23452.	332064045.	17.5917889	0.0012424	-0.002148	3.5091001	-50.000000	CY
0.00007188	23589.	328198274.	17.5095811	0.0012585	-0.002191	3.5322671	-50.000000	CY
0.00007313	23723.	324420948.	17.4274017	0.0012744	-0.002236	3.5545864	-50.000000	CY
0.00007438	23857.	320764914.	17.3483381	0.0012903	-0.002280	3.5763963	-50.000000	CY
0.00007938	24387.	307238214.	17.0603383	0.0013542	-0.002456	3.6584913	-50.000000	CY
0.00008438	24803.	293956224.	16.7777992	0.0014156	-0.002634	3.7290885	-50.000000	CY
0.00008938	25119.	281046421.	16.5078405	0.0014754	-0.002815	3.7898701	-50.000000	CY
0.00009438	25422.	269370708.	16.2613464	0.0015347	-0.002995	3.8425328	-50.000000	CY
0.00009938	25719.	258805739.	16.0417557	0.0015941	-0.003176	3.8877601	-50.000000	CY
0.0001044	26004.	249143182.	15.8386654	0.0016532	-0.003357	3.9250744	-50.000000	CY
0.0001094	26258.	240075472.	15.6506858	0.0017118	-0.003538	3.9547036	-50.000000	CY
0.0001144	26418.	230974764.	15.4523566	0.0017674	-0.003723	3.9759186	-50.000000	CY
0.0001194	26565.	222536414.	15.2693760	0.0018228	-0.003907	3.9904558	-50.000000	CY
0.0001244	26708.	214740970.	15.1031454	0.0018785	-0.004092	3.9984049	-50.000000	CY
0.0001294	26841.	207467178.	14.9441064	0.0019334	-0.004277	3.9976183	-50.000000	CY

Pier drilled shaft_row3

0.0001344	26970.	200705471.	14.7999540	0.0019887	-0.004461	3.9982057	-50.000000	CY
0.0001394	27094.	194399193.	14.6692123	0.0020445	-0.004645	3.9999090	-50.000000	CY
0.0001444	27211.	188472358.	14.5441970	0.0020998	-0.004830	3.9990544	-50.000000	CY
0.0001494	27322.	182910874.	14.4283074	0.0021552	-0.005015	3.9967590	-50.000000	CY
0.0001544	27431.	177688668.	14.3224417	0.0022110	-0.005199	3.9999150	-50.000000	CY
0.0001594	27536.	172772854.	14.2257733	0.0022672	-0.005383	3.9982202	-50.000000	CY
0.0001644	27636.	168130409.	14.1352336	0.0023235	-0.005567	3.9989785	50.000000	CY
0.0001694	27728.	163709379.	14.0474176	0.0023793	-0.005751	3.9985880	50.000000	CY
0.0001744	27796.	159401296.	13.9573910	0.0024338	-0.005936	3.9989029	50.000000	CY
0.0001794	27840.	155205897.	13.8699268	0.0024879	-0.006122	3.9978133	50.000000	CY
0.0001844	27877.	151199230.	13.7862752	0.0025418	-0.006308	3.9999248	50.000000	CY
0.0001894	27911.	147386920.	13.7088787	0.0025961	-0.006494	3.9955660	50.000000	CY
0.0001944	27941.	143745795.	13.6338775	0.0026501	-0.006680	3.9990391	50.000000	CY
0.0001994	27967.	140275153.	13.5611763	0.0027038	-0.006866	3.9987338	50.000000	CY
0.0002044	27993.	136966375.	13.4937061	0.0027578	-0.007052	3.9958926	50.000000	CY
0.0002094	28016.	133809032.	13.4309783	0.0028121	-0.007238	3.9990604	50.000000	CY
0.0002144	28039.	130795096.	13.3721605	0.0028667	-0.007423	3.9991109	50.000000	CY
0.0002194	28061.	127912012.	13.3174805	0.0029215	-0.007608	3.9944284	50.000000	CY
0.0002244	28079.	125144588.	13.2681261	0.0029770	-0.007793	3.9981936	50.000000	CY
0.0002294	28095.	122485087.	13.2237901	0.0030332	-0.007977	3.9999066	50.000000	CYT
0.0002344	28109.	119930328.	13.1806074	0.0030892	-0.008161	3.9932016	50.000000	CYT
0.0002394	28121.	117474928.	13.1374840	0.0031448	-0.008345	3.9955612	50.000000	CYT
0.0002444	28131.	115112423.	13.0982997	0.0032009	-0.008529	3.9986755	50.000000	CYT
0.0002494	28138.	112834055.	13.0636760	0.0032578	-0.008712	3.9999711	50.000000	CYT
0.0002544	28144.	110640590.	13.0317715	0.0033150	-0.008895	3.9923074	50.000000	CYT
0.0002594	28150.	108529308.	13.0018968	0.0033724	-0.009078	3.9944671	50.000000	CYT
0.0002644	28155.	106495995.	12.9738320	0.0034300	-0.009260	3.9979633	50.000000	CYT
0.0002694	28159.	104536170.	12.9475200	0.0034877	-0.009442	3.9997543	50.000000	CYT
0.0002744	28163.	102644646.	12.9231859	0.0035458	-0.009624	3.9958370	50.000000	CYT
0.0003044	28163.	92527720.	12.8643283	0.0039156	-0.010694	3.9910668	50.000000	CYT

Axial Thrust Force = 848.900 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	700.3066391	1120490622.	196.9858798	0.0001231	0.00009312	0.5045218	3.5051191	
0.00000125	1401.	1120471324.	110.5284874	0.0001382	0.00007816	0.5633242	3.8761577	

Pier drilled shaft_row3

0.00000188	2101.	1120430593.	81.7251545	0.0001532	0.00006323	0.6217432	4.2480553
0.00000250	2801.	1120371642.	67.3353379	0.0001683	0.00004834	0.6797760	4.6208120
0.00000313	3501.	1120295109.	58.7109294	0.0001835	0.00003347	0.7374194	4.9944280
0.00000375	4201.	1120201206.	52.9692266	0.0001986	0.00001863	0.7946706	5.3689034
0.00000438	4900.	1120090021.	48.8747859	0.0002138	0.00000383	0.8515266	5.7442385
0.00000500	5600.	1119953110.	45.8098374	0.0002290	-0.00001095	0.9079834	6.1204264
0.00000563	6298.	1119697395.	43.4306441	0.0002443	-0.00002570	0.9640263	6.4973738
0.00000625	6995.	1119227024.	41.5306567	0.0002596	-0.00004043	1.0196336	6.8749316
0.00000688	7690.	1118513536.	39.9785767	0.0002749	-0.00005515	1.0747882	7.2529787
0.00000750	8382.	1117562201.	38.6869999	0.0002902	-0.00006985	1.1294768	7.6314223
0.00000813	9071.	1116393169.	37.5955185	0.0003055	-0.00008454	1.1836896	8.0101940
0.00000875	9757.	1115031351.	36.6610573	0.0003208	-0.00009922	1.2374193	8.3892433
0.00000938	10439.	1113500887.	35.8520711	0.0003361	-0.000114	1.2906603	8.7685319
0.00001000	10439.	1043907082.	33.6982573	0.0003370	-0.000143	1.2931708	8.7284946 C
0.00001063	10439.	982500783.	32.8625045	0.0003492	-0.000161	1.3349847	9.0165092 C
0.00001125	10439.	927917406.	32.0991811	0.0003611	-0.000179	1.3756835	9.2978579 C
0.00001188	10439.	879079648.	31.4013693	0.0003729	-0.000197	1.4154685	9.5740966 C
0.00001250	10439.	835125665.	30.7581970	0.0003845	-0.000216	1.4543093	9.8448463 C
0.00001313	10608.	808197211.	30.1644065	0.0003959	-0.000234	1.4923327	10.1110773 C
0.00001375	10850.	789076978.	29.6136428	0.0004072	-0.000253	1.5295681	10.3729401 C
0.00001438	11083.	770967246.	29.1007749	0.0004183	-0.000272	1.5660495	10.6306355 C
0.00001500	11307.	753800531.	28.6215852	0.0004293	-0.000291	1.6018132	10.8843895 C
0.00001563	11524.	737518788.	28.1725907	0.0004402	-0.000310	1.6368977	11.1344552 C
0.00001625	11734.	722071420.	27.7509061	0.0004510	-0.000329	1.6713435	11.3811146 C
0.00001688	11938.	707413792.	27.3541378	0.0004616	-0.000348	1.7051939	11.6246812 C
0.00001750	12136.	693506013.	26.9803009	0.0004722	-0.000368	1.7384945	11.8655027 C
0.00001813	12331.	680311997.	26.6277542	0.0004826	-0.000387	1.7712941	12.1039634 C
0.00001875	12519.	667672594.	26.2920743	0.0004930	-0.000407	1.8034630	12.3388155 C
0.00001938	12703.	655662095.	25.9743630	0.0005033	-0.000427	1.8351751	12.5715953 C
0.00002000	12885.	644266092.	25.6739963	0.0005135	-0.000447	1.8665010	12.8029179 C
0.00002063	13062.	633292228.	25.3857134	0.0005236	-0.000466	1.8972105	13.0305799 C
0.00002125	13236.	622875654.	25.1127622	0.0005336	-0.000486	1.9275918	13.2572398 C
0.00002188	13407.	612885653.	24.8515532	0.0005436	-0.000506	1.9574965	13.4814541 C
0.00002250	13575.	603340142.	24.6023955	0.0005536	-0.000526	1.9870173	13.7040630 C
0.00002313	13741.	594192283.	24.3639826	0.0005634	-0.000547	2.0161352	13.9248459 C
0.00002375	13904.	585433927.	24.1359871	0.0005732	-0.000567	2.0448908	14.1441612 C
0.00002438	14065.	577020235.	23.9171364	0.0005830	-0.000587	2.0732538	-14.478824 C
0.00002563	14381.	561204457.	23.5061949	0.0006023	-0.000628	2.1289666	-15.526709 C
0.00002688	14690.	546599742.	23.1270980	0.0006215	-0.000668	2.1833718	-16.579568 C
0.00002813	14993.	533084966.	22.7766719	0.0006406	-0.000709	2.2365762	-17.636527 C

Pier drilled shaft_row3

0.00002938	15289.	520466793.	22.4488128	0.0006594	-0.000751	2.2883985	-18.699667	C
0.00003063	15580.	508728285.	22.1438363	0.0006782	-0.000792	2.3391232	-19.766255	C
0.00003188	15867.	497799934.	21.8603636	0.0006968	-0.000833	2.3888776	-20.835076	C
0.00003313	16149.	487506053.	21.5920557	0.0007152	-0.000875	2.4373284	-21.909881	C
0.00003438	16428.	477914875.	21.3431148	0.0007337	-0.000916	2.4850264	-22.984832	C
0.00003563	16702.	468833771.	21.1058889	0.0007519	-0.000958	2.5314584	-24.065728	C
0.00003688	16975.	460348364.	20.8855874	0.0007702	-0.001000	2.5772461	-25.145725	C
0.00003813	17243.	452275268.	20.6741830	0.0007882	-0.001042	2.6217821	-26.231856	C
0.00003938	17510.	444693335.	20.4768074	0.0008063	-0.001084	2.6656684	-27.317295	C
0.00004063	17773.	437496691.	20.2887821	0.0008242	-0.001126	2.7085709	-28.406029	C
0.00004188	18034.	430670466.	20.1103249	0.0008421	-0.001168	2.7506079	-29.496774	C
0.00004313	18295.	424223762.	19.9429102	0.0008600	-0.001210	2.7920195	-30.586648	C
0.00004438	18551.	418049975.	19.7810164	0.0008778	-0.001252	2.8323354	-31.681555	C
0.00004563	18806.	412187618.	19.6279060	0.0008955	-0.001294	2.8719581	-32.776578	C
0.00004688	19060.	406623402.	19.4835972	0.0009133	-0.001337	2.9109630	-33.870735	C
0.00004813	19312.	401286132.	19.3441269	0.0009309	-0.001379	2.9490034	-34.968603	C
0.00004938	19562.	396184294.	19.2108542	0.0009485	-0.001421	2.9862764	-36.067709	C
0.00005063	19811.	391321257.	19.0847487	0.0009662	-0.001464	3.0229388	-37.165953	C
0.00005188	20059.	386679607.	18.9652957	0.0009838	-0.001506	3.0589873	-38.263333	C
0.00005313	20304.	382192244.	18.8480450	0.0010013	-0.001549	3.0939916	-39.365981	C
0.00005438	20548.	377896800.	18.7365444	0.0010188	-0.001591	3.1283711	-40.468062	C
0.00005563	20792.	373782624.	18.6305912	0.0010363	-0.001634	3.1621437	-41.569277	C
0.00005688	21035.	369837641.	18.5298233	0.0010539	-0.001676	3.1953060	-42.669623	C
0.00005813	21276.	366030812.	18.4321374	0.0010714	-0.001719	3.2276631	-43.772078	C
0.00005938	21515.	362352641.	18.3372418	0.0010888	-0.001761	3.2592129	-44.876812	C
0.00006063	21753.	358815465.	18.2467572	0.0011062	-0.001804	3.2901587	-45.980671	C
0.00006188	21991.	355410673.	18.1604197	0.0011237	-0.001846	3.3204974	-47.083647	C
0.00006313	22228.	352130292.	18.0779865	0.0011412	-0.001889	3.3502259	-48.185736	C
0.00006438	22465.	348966697.	17.9992028	0.0011587	-0.001931	3.3793376	-49.286988	C
0.00006563	22697.	345860100.	17.9205420	0.0011760	-0.001974	3.4074738	-50.000000	CY
0.00006688	22917.	342684443.	17.8427913	0.0011932	-0.002017	3.4347410	-50.000000	CY
0.00006813	23121.	339386301.	17.7650281	0.0012102	-0.002060	3.4610619	-50.000000	CY
0.00006938	23316.	336089499.	17.6888932	0.0012272	-0.002103	3.4866317	-50.000000	CY
0.00007063	23483.	332507733.	17.6099328	0.0012437	-0.002146	3.5110021	-50.000000	CY
0.00007188	23622.	328650831.	17.5280808	0.0012598	-0.002190	3.5341936	-50.000000	CY
0.00007313	23756.	324868543.	17.4459712	0.0012757	-0.002234	3.5565061	-50.000000	CY
0.00007438	23890.	321204162.	17.3666321	0.0012916	-0.002278	3.5782721	-50.000000	CY
0.00007938	24419.	307646661.	17.0776214	0.0013555	-0.002454	3.6601892	-50.000000	CY
0.00008438	24837.	294370149.	16.7954440	0.0014171	-0.002633	3.7307292	-50.000000	CY
0.00008938	25154.	281441712.	16.5254202	0.0014770	-0.002813	3.7913946	-50.000000	CY

Pier drilled shaft_row3

0.00009438	25457.	269742657.	16.2781204	0.0015362	-0.002994	3.8438621	-50.000000	CY
0.00009938	25754.	259162818.	16.0586367	0.0015958	-0.003174	3.8889487	-50.000000	CY
0.0001044	26040.	249480933.	15.8548738	0.0016549	-0.003355	3.9260532	-50.000000	CY
0.0001094	26295.	240412111.	15.6667727	0.0017136	-0.003536	3.9554942	-50.000000	CY
0.0001144	26455.	231303174.	15.4688295	0.0017692	-0.003721	3.9765346	-50.000000	CY
0.0001194	26603.	222849243.	15.2852772	0.0018247	-0.003905	3.9908450	-50.000000	CY
0.0001244	26746.	215045261.	15.1195063	0.0018805	-0.004090	3.9985726	-50.000000	CY
0.0001294	26879.	207757849.	14.9599769	0.0019354	-0.004275	3.9978261	-50.000000	CY
0.0001344	27007.	200983421.	14.8153829	0.0019908	-0.004459	3.9975557	-50.000000	CY
0.0001394	27132.	194665649.	14.6842139	0.0020466	-0.004643	3.9999463	-50.000000	CY
0.0001444	27248.	188732636.	14.5598470	0.0021021	-0.004828	3.9991960	-50.000000	CY
0.0001494	27360.	183160752.	14.4435969	0.0021575	-0.005012	3.9970289	-50.000000	CY
0.0001544	27468.	177929225.	14.3373643	0.0022133	-0.005197	3.9999541	-50.000000	CY
0.0001594	27573.	173004349.	14.2403842	0.0022696	-0.005380	3.9984225	-50.000000	CY
0.0001644	27674.	168357191.	14.1507551	0.0023260	-0.005564	3.9981786	50.000000	CY
0.0001694	27766.	163933157.	14.0629263	0.0023819	-0.005748	3.9987896	50.000000	CY
0.0001744	27833.	159617642.	13.9727492	0.0024365	-0.005934	3.9980633	50.000000	CY
0.0001794	27878.	155419734.	13.8854905	0.0024907	-0.006119	3.9980814	50.000000	CY
0.0001844	27916.	151406893.	13.8015491	0.0025447	-0.006305	3.9999677	50.000000	CY
0.0001894	27949.	147587051.	13.7240526	0.0025990	-0.006491	3.9959625	50.000000	CY
0.0001944	27979.	143944044.	13.6501934	0.0026533	-0.006677	3.9992362	50.000000	CY
0.0001994	28006.	140467400.	13.5772637	0.0027070	-0.006863	3.9977282	50.000000	CY
0.0002044	28031.	137152974.	13.5095815	0.0027610	-0.007049	3.9963217	50.000000	CY
0.0002094	28054.	133990631.	13.4465814	0.0028154	-0.007235	3.9992608	50.000000	CY
0.0002144	28077.	130971526.	13.3875782	0.0028700	-0.007420	3.9980746	50.000000	CY
0.0002194	28098.	128083963.	13.3326430	0.0029248	-0.007605	3.9949425	50.000000	CY
0.0002244	28116.	125309806.	13.2835657	0.0029805	-0.007789	3.9984923	50.000000	CY
0.0002294	28132.	122646197.	13.2390114	0.0030367	-0.007973	3.9999645	50.000000	CYT
0.0002344	28146.	120089921.	13.1974861	0.0030932	-0.008157	3.9919613	50.000000	CYT
0.0002394	28158.	117630770.	13.1541375	0.0031488	-0.008341	3.9961066	50.000000	CYT
0.0002444	28167.	115262480.	13.1153297	0.0032051	-0.008525	3.9989772	50.000000	CYT
0.0002494	28175.	112980631.	13.0805196	0.0032620	-0.008708	3.9999992	50.000000	CYT
0.0002544	28181.	110783461.	13.0485297	0.0033192	-0.008891	3.9909709	50.000000	CYT
0.0002594	28186.	108669027.	13.0184744	0.0033767	-0.009073	3.9951245	50.000000	CYT
0.0002644	28191.	106632670.	12.9902410	0.0034343	-0.009256	3.9983573	50.000000	CYT
0.0002694	28195.	104669883.	12.9637785	0.0034921	-0.009438	3.9998783	50.000000	CYT
0.0002744	28199.	102775146.	12.9393993	0.0035502	-0.009620	3.9944422	50.000000	CYT
0.0003044	28199.	92645358.	12.8800567	0.0039204	-0.010690	3.9920005	50.000000	CYT

Pier drilled shaft_row3

Axial Thrust Force = 1018.000 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	692.2439673	1107590348.	232.6334373	0.0001454	0.0001154	0.5922959	4.1512311	
0.00000125	1384.	1107572075.	128.3526895	0.0001604	0.0001004	0.6503542	4.5222850	
0.00000188	2077.	1107531278.	93.6084263	0.0001755	0.00008552	0.7080291	4.8942082	
0.00000250	2769.	1107471834.	76.2482857	0.0001906	0.00007062	0.7653174	5.2670007	
0.00000313	3461.	1107394515.	65.8417958	0.0002058	0.00005576	0.8222161	5.6406628	
0.00000375	4152.	1107299577.	58.9121329	0.0002209	0.00004092	0.8787224	6.0151945	
0.00000438	4844.	1107187127.	53.9692302	0.0002361	0.00002612	0.9348331	6.3905961	
0.00000500	5535.	1107057213.	50.2680544	0.0002513	0.00001134	0.9905453	6.7668679	
0.00000563	6226.	1106909741.	47.3946979	0.0002666	-0.00000340	1.0458559	7.1440101	
0.00000625	6917.	1106717375.	45.1006557	0.0002819	-0.00001812	1.1007583	7.5219939	
0.00000688	7606.	1106395645.	43.2273645	0.0002972	-0.00003281	1.1552355	7.9007058	
0.00000750	8294.	1105890063.	41.6690765	0.0003125	-0.00004748	1.2092701	8.2800242	
0.00000813	8980.	1105183784.	40.3526809	0.0003279	-0.00006213	1.2628481	8.6598505	
0.00000875	9662.	1104278854.	39.2260300	0.0003432	-0.00007677	1.3159581	9.0401051	
0.00000938	10342.	1103187246.	38.2509463	0.0003586	-0.00009140	1.3685912	9.4207258	
0.00001000	11019.	1101925197.	37.3988458	0.0003740	-0.000106	1.4207405	9.8016652	
0.00001063	11019.	1037106068.	35.6170228	0.0003784	-0.000132	1.4353383	9.8652451	C
0.00001125	11019.	979489064.	34.7717188	0.0003912	-0.000149	1.4779530	10.1697733	C
0.00001188	11019.	927937008.	33.9964631	0.0004037	-0.000166	1.5194600	10.4677820	C
0.00001250	11200.	895977042.	33.2839059	0.0004160	-0.000184	1.5600086	10.7604159	C
0.00001313	11496.	875909097.	32.6245913	0.0004282	-0.000202	1.5995927	11.0474851	C
0.00001375	11780.	856722544.	32.0137032	0.0004402	-0.000220	1.6383373	11.3299642	C
0.00001438	12052.	838388098.	31.4455602	0.0004520	-0.000238	1.6762845	11.6081179	C
0.00001500	12312.	820823791.	30.9145980	0.0004637	-0.000256	1.7134356	11.8818502	C
0.00001563	12563.	804050742.	30.4176074	0.0004753	-0.000275	1.7498645	12.1517283	C
0.00001625	12806.	788033147.	29.9511729	0.0004867	-0.000293	1.7856074	12.4179901	C
0.00001688	13040.	772738505.	29.5124315	0.0004980	-0.000312	1.8207019	12.6808962	C
0.00001750	13266.	758074978.	29.0978053	0.0005092	-0.000331	1.8551235	12.9401361	C
0.00001813	13486.	744049313.	28.7057794	0.0005203	-0.000350	1.8889363	13.1962253	C
0.00001875	13700.	730648768.	28.3348251	0.0005313	-0.000369	1.9221903	13.4495611	C
0.00001938	13908.	717853678.	27.9835432	0.0005422	-0.000388	1.9549300	13.7005034	C
0.00002000	14112.	705594869.	27.6496769	0.0005530	-0.000407	1.9871366	13.9488127	C
0.00002063	14310.	693796712.	27.3307934	0.0005637	-0.000426	2.0187643	14.1939809	C
0.00002125	14504.	682542152.	27.0281413	0.0005743	-0.000446	2.0499825	14.4375921	C

Pier drilled shaft_row3

0.00002188	14694.	671720634.	26.7387968	0.0005849	-0.000465	2.0806966	14.6786743	C
0.00002250	14880.	661319441.	26.4619705	0.0005954	-0.000485	2.1109337	14.9174358	C
0.00002313	15063.	651378177.	26.1984051	0.0006058	-0.000504	2.1408169	15.1550555	C
0.00002375	15242.	641750115.	25.9441214	0.0006162	-0.000524	2.1701491	15.3895137	C
0.00002438	15419.	632570483.	25.7024412	0.0006265	-0.000544	2.1992178	15.6236632	C
0.00002563	15763.	615135105.	25.2452264	0.0006469	-0.000583	2.2559952	16.0851089	C
0.00002688	16096.	598937351.	24.8222406	0.0006671	-0.000623	2.3112483	16.5400839	C
0.00002813	16421.	583864675.	24.4298966	0.0006871	-0.000663	2.3650815	16.9893845	C
0.00002938	16739.	569825848.	24.0654859	0.0007069	-0.000703	2.4176151	17.4340359	C
0.00003063	17050.	556738293.	23.7267519	0.0007266	-0.000743	2.4689638	-18.360428	C
0.00003188	17354.	544432393.	23.4083602	0.0007461	-0.000784	2.5189534	-19.404147	C
0.00003313	17652.	532900894.	23.1104605	0.0007655	-0.000824	2.5678160	-20.451264	C
0.00003438	17947.	522090667.	22.8319273	0.0007848	-0.000865	2.6156618	-21.500672	C
0.00003563	18235.	511847203.	22.5673506	0.0008040	-0.000906	2.6622064	-22.555856	C
0.00003688	18521.	502252487.	22.3208004	0.0008231	-0.000947	2.7079630	-23.610944	C
0.00003813	18800.	493102918.	22.0844491	0.0008420	-0.000988	2.7523845	-24.672631	C
0.00003938	19078.	484512067.	21.8639582	0.0008609	-0.001029	2.7961072	-25.733343	C
0.00004063	19350.	476306697.	21.6522187	0.0008796	-0.001070	2.8386029	-26.799730	C
0.00004188	19621.	468556292.	21.4532303	0.0008984	-0.001112	2.8803453	-27.865983	C
0.00004313	19888.	461176376.	21.2635622	0.0009170	-0.001153	2.9211134	-28.935008	C
0.00004438	20152.	454138084.	21.0825120	0.0009355	-0.001194	2.9609271	-30.006692	C
0.00004563	20416.	447467644.	20.9121159	0.0009541	-0.001236	3.0000633	-31.077406	C
0.00004688	20675.	441058449.	20.7472413	0.0009725	-0.001277	3.0381006	-32.152969	C
0.00004813	20932.	434947556.	20.5906056	0.0009909	-0.001319	3.0753684	-33.228986	C
0.00004938	21188.	429129968.	20.4425730	0.0010094	-0.001361	3.1119662	-34.304041	C
0.00005063	21441.	423529002.	20.2991372	0.0010276	-0.001402	3.1475561	-35.383079	C
0.00005188	21692.	418160277.	20.1618500	0.0010459	-0.001444	3.1823421	-36.463267	C
0.00005313	21942.	413029559.	20.0316447	0.0010642	-0.001486	3.2164655	-37.542497	C
0.00005438	22191.	408114032.	19.9076070	0.0010825	-0.001528	3.2498797	-38.621442	C
0.00005563	22436.	403349837.	19.7859198	0.0011006	-0.001569	3.2822436	-39.705588	C
0.00005688	22681.	398781675.	19.6701609	0.0011187	-0.001611	3.3139517	-40.788780	C
0.00005813	22924.	394396831.	19.5599516	0.0011369	-0.001653	3.3450006	-41.871006	C
0.00005938	23167.	390183547.	19.4549452	0.0011551	-0.001695	3.3753864	-42.952266	C
0.00006063	23407.	386090126.	19.3516231	0.0011732	-0.001737	3.4047882	-44.038178	C
0.00006188	23645.	382143029.	19.2524769	0.0011912	-0.001779	3.4334813	-45.124087	C
0.00006313	23883.	378340274.	19.1577885	0.0012093	-0.001821	3.4615178	-46.209023	C
0.00006438	24120.	374673313.	19.0673019	0.0012275	-0.001863	3.4888940	-47.292981	C
0.00006563	24356.	371134295.	18.9807810	0.0012456	-0.001904	3.5156063	-48.375951	C
0.00006688	24589.	367688860.	18.8955670	0.0012636	-0.001946	3.5414167	-49.462659	C
0.00006813	24819.	364317806.	18.8127520	0.0012816	-0.001988	3.5664511	-50.000000	CY

Pier drilled shaft_row3

0.00006938	25036.	360878528.	18.7309110	0.0012995	-0.002031	3.5905937	-50.000000	CY
0.00007063	25238.	357352052.	18.6496208	0.0013171	-0.002073	3.6138264	-50.000000	CY
0.00007188	25433.	353845504.	18.5702704	0.0013347	-0.002115	3.6362989	-50.000000	CY
0.00007313	25601.	350100968.	18.4888960	0.0013520	-0.002158	3.6576681	-50.000000	CY
0.00007438	25740.	346088112.	18.4021909	0.0013687	-0.002201	3.6776686	-50.000000	CY
0.00007938	26276.	331033199.	18.0821229	0.0014353	-0.002375	3.7516041	-50.000000	CY
0.00008438	26790.	317516234.	17.7957993	0.0015015	-0.002548	3.8155993	-50.000000	CY
0.00008938	27148.	303754836.	17.5113753	0.0015651	-0.002725	3.8680126	-50.000000	CY
0.00009438	27457.	290931760.	17.2429764	0.0016273	-0.002903	3.9108414	-50.000000	CY
0.00009938	27758.	279322286.	17.0044062	0.0016898	-0.003080	3.9454352	-50.000000	CY
0.0001044	28044.	268687371.	16.7836890	0.0017518	-0.003258	3.9713911	-50.000000	CY
0.0001094	28325.	258968425.	16.5874271	0.0018142	-0.003436	3.9891432	-50.000000	CY
0.0001144	28570.	249791988.	16.3984666	0.0018756	-0.003614	3.9983641	-50.000000	CY
0.0001194	28730.	240668815.	16.2070573	0.0019347	-0.003795	3.9984188	-50.000000	CY
0.0001244	28873.	232144629.	16.0296863	0.0019937	-0.003976	3.9980330	-50.000000	CY
0.0001294	29005.	224194059.	15.8627518	0.0020522	-0.004158	3.9970325	-50.000000	CY
0.0001344	29132.	216799606.	15.7117286	0.0021113	-0.004339	3.9999994	-50.000000	CY
0.0001394	29254.	209891559.	15.5732914	0.0021705	-0.004519	3.9996829	-50.000000	CY
0.0001444	29365.	203397038.	15.4404749	0.0022292	-0.004701	3.9983593	-50.000000	CY
0.0001494	29473.	197308173.	15.3197997	0.0022884	-0.004882	3.9975626	50.000000	CY
0.0001544	29576.	191586220.	15.2100317	0.0023480	-0.005062	3.9995560	50.000000	CY
0.0001594	29672.	186175124.	15.1115127	0.0024084	-0.005242	3.9970040	50.000000	CY
0.0001644	29760.	181047277.	15.0152893	0.0024681	-0.005422	3.9998902	50.000000	CY
0.0001694	29842.	176189466.	14.9288726	0.0025286	-0.005601	3.9973290	50.000000	CY
0.0001744	29922.	171594882.	14.8496035	0.0025894	-0.005781	3.9999222	50.000000	CY
0.0001794	29997.	167228175.	14.7769367	0.0026506	-0.005959	3.9967692	50.000000	CY
0.0001844	30058.	163025958.	14.7056618	0.0027114	-0.006139	3.9997241	50.000000	CY
0.0001894	30107.	158978472.	14.6359299	0.0027717	-0.006318	3.9946411	50.000000	CY
0.0001944	30127.	154995498.	14.5619638	0.0028305	-0.006500	3.9985881	50.000000	CY
0.0001994	30146.	151204082.	14.4926108	0.0028895	-0.006681	3.9999969	50.000000	CY
0.0002044	30163.	147585690.	14.4282267	0.0029488	-0.006861	3.9951544	50.000000	CY
0.0002094	30174.	144115893.	14.3718075	0.0030091	-0.007041	3.9987814	50.000000	CYT
0.0002144	30185.	140802353.	14.3193533	0.0030697	-0.007220	3.9999716	50.000000	CYT
0.0002194	30193.	137631529.	14.2710928	0.0031307	-0.007399	3.9942044	50.000000	CYT
0.0002244	30201.	134598356.	14.2259599	0.0031919	-0.007578	3.9981495	50.000000	CYT
0.0002294	30207.	131693714.	14.1837768	0.0032534	-0.007757	3.9999066	50.000000	CYT
0.0002344	30212.	128904138.	14.1429818	0.0033148	-0.007935	3.9930271	50.000000	CYT
0.0002394	30215.	126223412.	14.1021672	0.0033757	-0.008114	3.9957182	50.000000	CYT
0.0002444	30217.	123649892.	14.0638415	0.0034369	-0.008293	3.9987780	50.000000	CYT
0.0002494	30219.	121177053.	14.0278773	0.0034982	-0.008472	3.9999818	50.000000	CYT

Pier drilled shaft_row3

0.0002544	30219.	118796275.	13.9947996	0.0035599	-0.008650	3.9920659	50.0000000	CYT
0.0002594	30219.	116506226.	13.9637955	0.0036219	-0.008828	3.9945445	50.0000000	CYT
0.0002644	30219.	114302799.	13.9346560	0.0036840	-0.009006	3.9979840	50.0000000	CYT
0.0002694	30219.	112181169.	13.9072959	0.0037463	-0.009184	3.9997523	50.0000000	CYT
0.0002744	30219.	110136865.	13.8819801	0.0038089	-0.009361	3.9959407	50.0000000	CYT

Axial Thrust Force = 1091.000 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	688.7335084	1101973613.	248.1542538	0.0001551	0.0001251	0.6301637	4.4325459	
0.00000125	1377.	1101955787.	136.1132852	0.0001701	0.0001101	0.6878980	4.8036066	
0.00000188	2066.	1101914957.	98.7823651	0.0001852	0.00009522	0.7452488	5.1755411	
0.00000250	2755.	1101855293.	80.1289586	0.0002003	0.00008032	0.8022130	5.5483495	
0.00000313	3443.	1101777625.	68.9465591	0.0002155	0.00006546	0.8587876	5.9220319	
0.00000375	4131.	1101682228.	61.4996650	0.0002306	0.00005062	0.9149695	6.2965886	
0.00000438	4819.	1101569217.	56.1873472	0.0002458	0.00003582	0.9707557	6.6720197	
0.00000500	5507.	1101438645.	52.2091414	0.0002610	0.00002105	1.0261432	7.0483255	
0.00000563	6195.	1101290539.	49.1203457	0.0002763	0.00000630	1.0811291	7.4255064	
0.00000625	6882.	1101122939.	46.6541275	0.0002916	-0.00000841	1.1357099	7.8035606	
0.00000688	7569.	1100891359.	44.6404256	0.0003069	-0.00002310	1.1898761	8.1824349	
0.00000750	8254.	1100522910.	42.9655738	0.0003222	-0.00003776	1.2436106	8.5620123	
0.00000813	8937.	1099978773.	41.5509118	0.0003376	-0.00005240	1.2968977	8.9421836	
0.00000875	9618.	1099247759.	40.3403355	0.0003530	-0.00006702	1.3497249	9.3228601	
0.00000938	10297.	1098332531.	39.2927599	0.0003684	-0.00008163	1.4020818	9.7039691	
0.00001000	10972.	1097243515.	38.3774235	0.0003838	-0.00009623	1.4539600	10.0854529	
0.00001063	11645.	1095994620.	37.5708431	0.0003992	-0.000111	1.5053531	10.4672659	
0.00001125	11645.	1035106030.	35.8697728	0.0004035	-0.000136	1.5193829	10.5280132	C
0.00001188	11645.	980626765.	35.0632288	0.0004164	-0.000154	1.5615884	10.8351494	C
0.00001250	11645.	931595427.	34.3223701	0.0004290	-0.000171	1.6028175	11.1368592	C
0.00001313	11821.	900663960.	33.6361172	0.0004415	-0.000189	1.6430134	11.4324971	C
0.00001375	12124.	881750020.	33.0006171	0.0004538	-0.000206	1.6823531	11.7234961	C
0.00001438	12414.	863571038.	32.4095650	0.0004659	-0.000224	1.7208641	12.0099875	C
0.00001500	12690.	846025870.	31.8566582	0.0004778	-0.000242	1.7585235	12.2916464	C
0.00001563	12957.	829218609.	31.3393951	0.0004897	-0.000260	1.7954466	12.5694134	C
0.00001625	13213.	813129809.	30.8542523	0.0005014	-0.000279	1.8316740	12.8435663	C
0.00001688	13461.	797715691.	30.3978771	0.0005130	-0.000297	1.8672265	13.1142110	C

Pier drilled shaft_row3

0.00001750	13702.	782950214.	29.9676389	0.0005244	-0.000316	1.9021380	13.3815767	C
0.00001813	13934.	768768664.	29.5605666	0.0005358	-0.000334	1.9364021	13.6455228	C
0.00001875	14159.	755141156.	29.1745241	0.0005470	-0.000353	1.9700381	13.9061475	C
0.00001938	14378.	742088885.	28.8086147	0.0005582	-0.000372	2.0031206	14.1640904	C
0.00002000	14592.	729597919.	28.4615678	0.0005692	-0.000391	2.0356931	14.4197094	C
0.00002063	14801.	717601649.	28.1312150	0.0005802	-0.000410	2.0677340	14.6727330	C
0.00002125	15003.	706027970.	27.8152338	0.0005911	-0.000429	2.0991970	14.9226378	C
0.00002188	15202.	694967419.	27.5149523	0.0006019	-0.000448	2.1302523	15.1710479	C
0.00002250	15397.	684302594.	27.2273432	0.0006126	-0.000467	2.1607924	15.4168415	C
0.00002313	15587.	674039255.	26.9520188	0.0006233	-0.000487	2.1908658	15.6604476	C
0.00002375	15775.	664203485.	26.6893356	0.0006339	-0.000506	2.2205671	15.9027800	C
0.00002438	15958.	654668515.	26.4358886	0.0006444	-0.000526	2.2497330	16.1421188	C
0.00002563	16315.	636690646.	25.9605090	0.0006652	-0.000565	2.3069475	16.6166533	C
0.00002688	16662.	619969344.	25.5210531	0.0006859	-0.000604	2.3626063	17.0847209	C
0.00002813	16998.	604390089.	25.1136566	0.0007063	-0.000644	2.4168093	17.5470762	C
0.00002938	17327.	589842695.	24.7348325	0.0007266	-0.000683	2.4696299	18.0042350	C
0.00003063	17645.	576167022.	24.3795323	0.0007466	-0.000723	2.5209700	18.4548221	C
0.00003188	17958.	563372984.	24.0481213	0.0007665	-0.000763	2.5711129	18.9017322	C
0.00003313	18265.	551397478.	23.7390019	0.0007864	-0.000804	2.6201665	-19.847471	C
0.00003438	18565.	540062332.	23.4463553	0.0008060	-0.000844	2.6678578	-20.888165	C
0.00003563	18860.	529416273.	23.1723090	0.0008255	-0.000884	2.7145447	-21.930858	C
0.00003688	19151.	519349219.	22.9134190	0.0008449	-0.000925	2.7601007	-22.977212	C
0.00003813	19437.	509824891.	22.6686957	0.0008642	-0.000966	2.8045864	-24.026673	C
0.00003938	19719.	500804935.	22.4372911	0.0008835	-0.001007	2.8480606	-25.078668	C
0.00004063	19998.	492248790.	22.2179901	0.0009026	-0.001047	2.8905357	-26.133180	C
0.00004188	20272.	484105749.	22.0092653	0.0009216	-0.001088	2.9319820	-27.190748	C
0.00004313	20545.	476396565.	21.8126276	0.0009407	-0.001129	2.9726382	-28.248332	C
0.00004438	20812.	468996767.	21.6228236	0.0009595	-0.001170	3.0121085	-29.311379	C
0.00004563	21078.	461983452.	21.4441874	0.0009784	-0.001212	3.0508780	-30.373409	C
0.00004688	21341.	455272976.	21.2730698	0.0009972	-0.001253	3.0886809	-31.438171	C
0.00004813	21601.	448843718.	21.1089518	0.0010159	-0.001294	3.1255352	-32.505569	C
0.00004938	21859.	442722803.	20.9538464	0.0010346	-0.001335	3.1616962	-33.571961	C
0.00005063	22115.	436844403.	20.8046097	0.0010532	-0.001377	3.1969215	-34.640982	C
0.00005188	22368.	431192061.	20.6608446	0.0010718	-0.001418	3.2312247	-35.712592	C
0.00005313	22620.	425790074.	20.5244943	0.0010904	-0.001460	3.2648420	-36.783201	C
0.00005438	22871.	420618307.	20.3948766	0.0011090	-0.001501	3.2977525	-37.853079	C
0.00005563	23118.	415598982.	20.2675181	0.0011274	-0.001543	3.3295650	-38.928710	C
0.00005688	23363.	410786007.	20.1463629	0.0011458	-0.001584	3.3606985	-40.003343	C
0.00005813	23608.	406165917.	20.0310147	0.0011643	-0.001626	3.3911492	-41.076971	C
0.00005938	23853.	401726403.	19.9211108	0.0011828	-0.001667	3.4209131	-42.149587	C

Pier drilled shaft_row3

0.00006063	24093.	397403609.	19.8124857	0.0012011	-0.001709	3.4496210	-43.227924	C
0.00006188	24332.	393241941.	19.7087715	0.0012195	-0.001751	3.4776485	-44.305324	C
0.00006313	24570.	389232283.	19.6097190	0.0012379	-0.001792	3.5049959	-45.381708	C
0.00006438	24808.	385365611.	19.5150605	0.0012563	-0.001834	3.5316591	-46.457071	C
0.00006563	25044.	381626475.	19.4239531	0.0012747	-0.001875	3.5575791	-47.532539	C
0.00006688	25278.	377981527.	19.3340038	0.0012930	-0.001917	3.5825554	-48.612366	C
0.00006813	25510.	374458566.	19.2478769	0.0013113	-0.001959	3.6068532	-49.691164	C
0.00006938	25739.	371006995.	19.1647711	0.0013296	-0.002000	3.6304152	-50.000000	CY
0.00007063	25952.	367463641.	19.0823039	0.0013477	-0.002042	3.6530460	-50.000000	CY
0.00007188	26152.	363857984.	19.0007274	0.0013657	-0.002084	3.6747900	-50.000000	CY
0.00007313	26345.	360273363.	18.9197525	0.0013835	-0.002126	3.6956433	-50.000000	CY
0.00007438	26507.	356402353.	18.8345530	0.0014008	-0.002169	3.7152213	-50.000000	CY
0.00007938	27049.	340770967.	18.5045204	0.0014688	-0.002341	3.7857754	-50.000000	CY
0.00008438	27569.	326746927.	18.2078040	0.0015363	-0.002514	3.8458965	-50.000000	CY
0.00008938	27976.	313013631.	17.9237170	0.0016019	-0.002688	3.8948777	-50.000000	CY
0.00009438	28289.	299749218.	17.6494017	0.0016657	-0.002864	3.9334745	-50.000000	CY
0.00009938	28590.	287699067.	17.4017711	0.0017293	-0.003041	3.9632426	-50.000000	CY
0.0001044	28879.	276685822.	17.1765773	0.0017928	-0.003217	3.9842092	-50.000000	CY
0.0001094	29158.	266590791.	16.9730791	0.0018564	-0.003394	3.9964631	-50.000000	CY
0.0001144	29422.	257241386.	16.7843141	0.0019197	-0.003570	3.9981235	-50.000000	CY
0.0001194	29613.	248066736.	16.5986826	0.0019815	-0.003749	3.9974040	-50.000000	CY
0.0001244	29754.	239229916.	16.4145774	0.0020416	-0.003928	3.9981056	-50.000000	CY
0.0001294	29887.	231011248.	16.2461974	0.0021019	-0.004108	3.9999965	-50.000000	CY
0.0001344	30015.	223364565.	16.0940941	0.0021626	-0.004287	3.9997835	-50.000000	CY
0.0001394	30131.	216187373.	15.9482669	0.0022228	-0.004467	3.9988894	-50.000000	CY
0.0001444	30242.	209465853.	15.8155185	0.0022834	-0.004647	3.9967996	50.000000	CY
0.0001494	30347.	203158865.	15.6954229	0.0023445	-0.004825	3.9999313	50.000000	CY
0.0001544	30444.	197206632.	15.5873491	0.0024063	-0.005004	3.9985653	50.000000	CY
0.0001594	30532.	191573215.	15.4827117	0.0024676	-0.005182	3.9976372	50.000000	CY
0.0001644	30615.	186251095.	15.3882353	0.0025294	-0.005361	3.9991511	50.000000	CY
0.0001694	30695.	181224901.	15.3018142	0.0025917	-0.005538	3.9954778	50.000000	CY
0.0001744	30771.	176465976.	15.2231181	0.0026545	-0.005715	3.9991871	50.000000	CY
0.0001794	30844.	171954993.	15.1512491	0.0027178	-0.005892	3.9957566	50.000000	CY
0.0001844	30906.	167623563.	15.0866833	0.0027816	-0.006068	3.9987070	50.000000	CY
0.0001894	30957.	163468030.	15.0214242	0.0028447	-0.006245	3.9987580	50.000000	CY
0.0001944	30991.	159439576.	14.9587606	0.0029076	-0.006422	3.9970053	50.000000	CY
0.0001994	31009.	155529218.	14.8963919	0.0029700	-0.006600	3.9996807	50.000000	CY
0.0002044	31020.	151781770.	14.8367906	0.0030323	-0.006778	3.9944042	50.000000	CYT
0.0002094	31030.	148200878.	14.7810216	0.0030948	-0.006955	3.9974373	50.000000	CYT
0.0002144	31038.	144782404.	14.7289857	0.0031575	-0.007132	3.9997472	50.000000	CYT

Pier drilled shaft_row3

0.0002194	31044.	141512918.	14.6808401	0.0032206	-0.007309	3.9943288	50.0000000	CYT
0.0002244	31050.	138382691.	14.6357040	0.0032839	-0.007486	3.9964322	50.0000000	CYT
0.0002294	31052.	135378015.	14.5889047	0.0033463	-0.007664	3.9992229	50.0000000	CYT
0.0002344	31054.	132497862.	14.5451641	0.0034090	-0.007841	3.9987453	50.0000000	CYT
0.0002394	31055.	129731981.	14.5048386	0.0034721	-0.008018	3.9927644	50.0000000	CYT
0.0002444	31055.	127077619.	14.4669606	0.0035354	-0.008195	3.9969884	50.0000000	CYT
0.0002494	31055.	124529696.	14.4314041	0.0035988	-0.008371	3.9994006	50.0000000	CYT
0.0002544	31055.	122081938.	14.3982137	0.0036625	-0.008547	3.9981738	50.0000000	CYT
0.0002594	31055.	119728551.	14.3676563	0.0037266	-0.008723	3.9910128	50.0000000	CYT
0.0002644	31055.	117464182.	14.3389263	0.0037909	-0.008899	3.9956272	50.0000000	CYT
0.0002694	31055.	115283872.	14.3682485	0.0038704	-0.009060	3.9995515	50.0000000	CYT

Axial Thrust Force = 1102.000 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	688.2029476	1101124716.	250.5000255	0.0001566	0.0001266	0.6358685	4.4750630	
0.00000125	1376.	1101106957.	137.2861995	0.0001716	0.0001116	0.6935539	4.8461247	
0.00000188	2064.	1101066122.	99.5643397	0.0001867	0.00009668	0.7508557	5.2180610	
0.00000250	2753.	1101006424.	80.7154728	0.0002018	0.00008179	0.8077709	5.5908718	
0.00000313	3440.	1100928703.	69.4158047	0.0002169	0.00006692	0.8642964	5.9645573	
0.00000375	4128.	1100833237.	61.8907378	0.0002321	0.00005209	0.9204293	6.3391178	
0.00000438	4816.	1100720140.	56.5225878	0.0002473	0.00003729	0.9761665	6.7145533	
0.00000500	5503.	1100589468.	52.5025126	0.0002625	0.00002251	1.0315050	7.0908643	
0.00000563	6190.	1100441248.	49.3811560	0.0002778	0.00000777	1.0864417	7.4680511	
0.00000625	6877.	1100274458.	46.8888985	0.0002931	-0.00000694	1.1409735	7.8461129	
0.00000688	7563.	1100051968.	44.8539464	0.0003084	-0.00002163	1.1950920	8.2250056	
0.00000750	8248.	1099700685.	43.1614526	0.0003237	-0.00003629	1.2487803	8.6046160	
0.00000813	8931.	1099178526.	41.7319194	0.0003391	-0.00005093	1.3020228	8.9848335	
0.00000875	9612.	1098471949.	40.5086430	0.0003545	-0.00006555	1.3548066	9.3655682	
0.00000938	10290.	1097582166.	39.4500995	0.0003698	-0.00008016	1.4071210	9.7467458	
0.00001000	10965.	1096518544.	38.5251974	0.0003853	-0.00009475	1.4589578	10.1283073	
0.00001063	11638.	1095294297.	37.7102010	0.0004007	-0.000109	1.5103099	10.5102055	
0.00001125	11638.	1034444614.	36.0325858	0.0004054	-0.000135	1.5254967	10.5811311	C
0.00001188	11638.	980000161.	35.2220532	0.0004183	-0.000152	1.5678299	10.8898446	C
0.00001250	11638.	931000153.	34.4755936	0.0004309	-0.000169	1.6091018	11.1924027	C
0.00001313	11868.	904208963.	33.7867442	0.0004435	-0.000187	1.6494453	11.4898295	C

Pier drilled shaft_row3

0.00001375	12173.	885291113.	33.1468115	0.0004558	-0.000204	1.6888381	11.7817911	C
0.00001438	12465.	867110119.	32.5518131	0.0004679	-0.000222	1.7274057	12.0692871	C
0.00001500	12745.	849636283.	31.9964561	0.0004799	-0.000240	1.7651761	12.3524581	C
0.00001563	13013.	832863297.	31.4766254	0.0004918	-0.000258	1.8021927	12.6315959	C
0.00001625	13273.	816777191.	30.9887873	0.0005036	-0.000276	1.8384952	12.9069661	C
0.00001688	13523.	801336796.	30.5295375	0.0005152	-0.000295	1.8741016	13.1786424	C
0.00001750	13764.	786518020.	30.0961891	0.0005267	-0.000313	1.9090419	13.4468160	C
0.00001813	13998.	772304336.	29.6865631	0.0005381	-0.000332	1.9433530	13.7117497	C
0.00001875	14225.	758680523.	29.2988301	0.0005494	-0.000351	1.9770739	13.9737389	C
0.00001938	14447.	745632062.	28.9314539	0.0005605	-0.000369	2.0102462	14.2331107	C
0.00002000	14662.	733120967.	28.5826686	0.0005717	-0.000388	2.0428850	14.4899478	C
0.00002063	14871.	721030537.	28.2491703	0.0005826	-0.000407	2.0748987	14.7432849	C
0.00002125	15076.	709464232.	27.9322703	0.0005936	-0.000426	2.1064613	14.9947616	C
0.00002188	15277.	698379789.	27.6305614	0.0006044	-0.000446	2.1375782	15.2443874	C
0.00002250	15472.	687640980.	27.3404647	0.0006152	-0.000465	2.1681049	15.4906533	C
0.00002313	15665.	677387022.	27.0646684	0.0006259	-0.000484	2.1982884	15.7359933	C
0.00002375	15852.	667454701.	26.7990812	0.0006365	-0.000504	2.2279325	15.9783672	C
0.00002438	16037.	657930899.	26.5454012	0.0006470	-0.000523	2.2572138	16.2195305	C
0.00002563	16397.	639876117.	26.0673250	0.0006680	-0.000562	2.3144916	16.6960310	C
0.00002688	16745.	623085060.	25.6255610	0.0006887	-0.000601	2.3702187	17.1661717	C
0.00002813	17084.	607428247.	25.2157984	0.0007092	-0.000641	2.4244651	17.6303856	C
0.00002938	17412.	592752668.	24.8331427	0.0007295	-0.000681	2.4771964	18.0879835	C
0.00003063	17733.	579026731.	24.4764347	0.0007496	-0.000720	2.5286136	18.5408835	C
0.00003188	18047.	566183057.	24.1437740	0.0007696	-0.000760	2.5788310	18.9901512	C
0.00003313	18355.	554106718.	23.8317225	0.0007894	-0.000801	2.6278066	-19.758402	C
0.00003438	18656.	542715713.	23.5376864	0.0008091	-0.000841	2.6755309	-20.797119	C
0.00003563	18954.	532033932.	23.2630950	0.0008287	-0.000881	2.7223089	-21.837066	C
0.00003688	19244.	521869337.	23.0012646	0.0008482	-0.000922	2.7677378	-22.883273	C
0.00003813	19532.	512315677.	22.7563177	0.0008676	-0.000962	2.8123192	-23.929796	C
0.00003938	19814.	503208548.	22.5222711	0.0008868	-0.001003	2.8556637	-24.981632	C
0.00004063	20094.	494627799.	22.3030180	0.0009061	-0.001044	2.8982379	-26.033007	C
0.00004188	20368.	486406268.	22.0918981	0.0009251	-0.001085	2.9395518	-27.090401	C
0.00004313	20641.	478640616.	21.8938451	0.0009442	-0.001126	2.9801527	-28.146760	C
0.00004438	20910.	471205146.	21.7035566	0.0009631	-0.001167	3.0196450	-29.207485	C
0.00004563	21176.	464124545.	21.5228538	0.0009820	-0.001208	3.0582785	-30.269324	C
0.00004688	21441.	457398221.	21.3522969	0.0010009	-0.001249	3.0961834	-31.330471	C
0.00004813	21700.	450907423.	21.1862713	0.0010196	-0.001290	3.1328985	-32.397660	C
0.00004938	21958.	444728049.	21.0293570	0.0010383	-0.001332	3.1689195	-33.463839	C
0.00005063	22216.	438836860.	20.8808832	0.0010571	-0.001373	3.2042426	-34.529003	C
0.00005188	22469.	433131160.	20.7354640	0.0010757	-0.001414	3.2384051	-35.600337	C

Pier drilled shaft_row3

0.00005313	22720.	427677812.	20.5975108	0.0010942	-0.001456	3.2718779	-36.670710	C
0.00005438	22971.	422459723.	20.4665409	0.0011129	-0.001497	3.3046602	-37.740073	C
0.00005563	23220.	417429241.	20.3400315	0.0011314	-0.001539	3.3365503	-38.811737	C
0.00005688	23465.	412570670.	20.2174412	0.0011499	-0.001580	3.3675345	-39.886109	C
0.00005813	23710.	407906941.	20.1007217	0.0011684	-0.001622	3.3978350	-40.959471	C
0.00005938	23953.	403425577.	19.9895064	0.0011869	-0.001663	3.4274479	-42.031819	C
0.00006063	24195.	399096706.	19.8821061	0.0012054	-0.001705	3.4562410	-43.105522	C
0.00006188	24434.	394895875.	19.7771499	0.0012237	-0.001746	3.4841128	-44.182627	C
0.00006313	24672.	390848551.	19.6769067	0.0012421	-0.001788	3.5113034	-45.258713	C
0.00006438	24910.	386945651.	19.5811060	0.0012605	-0.001829	3.5378089	-46.333773	C
0.00006563	25146.	383178811.	19.4894979	0.0012790	-0.001871	3.5636254	-47.407799	C
0.00006688	25381.	379522686.	19.4003716	0.0012974	-0.001913	3.5886143	-48.483654	C
0.00006813	25613.	375966836.	19.3131982	0.0013157	-0.001954	3.6127479	-49.562113	C
0.00006938	25842.	372490894.	19.2291853	0.0013340	-0.001996	3.6361537	-50.000000	CY
0.00007063	26057.	368944660.	19.1461266	0.0013522	-0.002038	3.6586534	-50.000000	CY
0.00007188	26258.	365327659.	19.0638617	0.0013702	-0.002080	3.6802544	-50.000000	CY
0.00007313	26452.	361739319.	18.9836677	0.0013882	-0.002122	3.7010866	-50.000000	CY
0.00007438	26619.	357902792.	18.8993049	0.0014056	-0.002164	3.7206452	-50.000000	CY
0.00007938	27163.	342205678.	18.5663963	0.0014737	-0.002336	3.7905689	-50.000000	CY
0.00008438	27684.	328111040.	18.2691655	0.0015415	-0.002509	3.8501763	-50.000000	CY
0.00008938	28100.	314404034.	17.9867018	0.0016076	-0.002682	3.8987125	-50.000000	CY
0.00009438	28412.	301054782.	17.7095445	0.0016713	-0.002859	3.9365427	-50.000000	CY
0.00009938	28715.	288954619.	17.4623473	0.0017353	-0.003035	3.9656493	-50.000000	CY
0.0001044	29003.	277870811.	17.2347927	0.0017989	-0.003211	3.9857869	-50.000000	CY
0.0001094	29283.	267734399.	17.0322335	0.0018629	-0.003387	3.9972320	-50.000000	CY
0.0001144	29549.	258349598.	16.8422912	0.0019263	-0.003564	3.9979900	-50.000000	CY
0.0001194	29742.	249150087.	16.6558312	0.0019883	-0.003742	3.9980888	-50.000000	CY
0.0001244	29886.	240289275.	16.4734606	0.0020489	-0.003921	3.9975864	-50.000000	CY
0.0001294	30018.	232021272.	16.3033783	0.0021092	-0.004101	3.9982353	-50.000000	CY
0.0001344	30144.	224330018.	16.1496447	0.0021701	-0.004280	3.9999538	-50.000000	CY
0.0001394	30262.	217128960.	16.0059907	0.0022308	-0.004459	3.9993852	50.000000	CY
0.0001444	30372.	210366790.	15.8719285	0.0022915	-0.004638	3.9977020	50.000000	CY
0.0001494	30475.	204017527.	15.7510534	0.0023528	-0.004817	3.9998456	50.000000	CY
0.0001544	30572.	198034631.	15.6426719	0.0024148	-0.004995	3.9991693	50.000000	CY
0.0001594	30660.	192377048.	15.5406155	0.0024768	-0.005173	3.9959884	50.000000	CY
0.0001644	30742.	187026203.	15.4448996	0.0025388	-0.005351	3.9996290	50.000000	CY
0.0001694	30821.	181969428.	15.3577142	0.0026012	-0.005529	3.9962949	50.000000	CY
0.0001744	30897.	177185343.	15.2779184	0.0026641	-0.005706	3.9996622	50.000000	CY
0.0001794	30967.	172637533.	15.2066112	0.0027277	-0.005882	3.9955895	50.000000	CY
0.0001844	31029.	168291965.	15.1439329	0.0027922	-0.006058	3.9993866	50.000000	CY

Pier drilled shaft_row3

0.0001894	31083.	164137077.	15.0817784	0.0028561	-0.006234	3.9951746	50.0000000	CY
0.0001944	31115.	160078649.	15.0197032	0.0029195	-0.006411	3.9982222	50.0000000	CY
0.0001994	31136.	156167590.	14.9581855	0.0029823	-0.006588	3.9999769	50.0000000	CY
0.0002044	31147.	152400243.	14.8979167	0.0030448	-0.006765	3.9948384	50.0000000	CYT
0.0002094	31156.	148803107.	14.8413466	0.0031074	-0.006943	3.9986138	50.0000000	CYT
0.0002144	31163.	145368080.	14.7884369	0.0031703	-0.007120	3.9999943	50.0000000	CYT
0.0002194	31169.	142081280.	14.7397427	0.0032335	-0.007296	3.9937954	50.0000000	CYT
0.0002244	31174.	138936999.	14.6942424	0.0032970	-0.007473	3.9979019	50.0000000	CYT
0.0002294	31178.	135926115.	14.6516999	0.0033607	-0.007649	3.9998411	50.0000000	CYT
0.0002344	31179.	133032516.	14.6090144	0.0034240	-0.007826	3.9940534	50.0000000	CYT
0.0002394	31179.	130253769.	14.5679038	0.0034872	-0.008003	3.9952313	50.0000000	CYT
0.0002444	31179.	127588730.	14.5292939	0.0035506	-0.008179	3.9985002	50.0000000	CYT
0.0002494	31179.	125030560.	14.4930565	0.0036142	-0.008356	3.9999331	50.0000000	CYT
0.0002544	31179.	122572957.	14.4596378	0.0036782	-0.008532	3.9932751	50.0000000	CYT
0.0002594	31179.	120210105.	14.4284137	0.0037424	-0.008708	3.9939017	50.0000000	CYT
0.0002644	31179.	117936627.	14.3990611	0.0038068	-0.008883	3.9975724	50.0000000	CYT

Axial Thrust Force = 1326.000 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	677.3063282	1083690125.	298.6773062	0.0001867	0.0001567	0.7519648	5.3482762	
0.00000125	1355.	1083673741.	161.3754355	0.0002017	0.0001417	0.8086446	5.7193595	
0.00000188	2032.	1083632790.	115.6244920	0.0002168	0.0001268	0.8649405	6.0913318	
0.00000250	2709.	1083572388.	92.7612820	0.0002319	0.0001119	0.9208496	6.4641929	
0.00000313	3386.	1083493555.	79.0531670	0.0002470	0.00009704	0.9763687	6.8379433	
0.00000375	4063.	1083396627.	69.9226014	0.0002622	0.00008221	1.0314947	7.2125829	
0.00000438	4739.	1083281748.	63.4077802	0.0002774	0.00006741	1.0862247	7.5881121	
0.00000500	5416.	1083148983.	58.5278014	0.0002926	0.00005264	1.1405554	7.9645312	
0.00000563	6092.	1082998367.	54.7377194	0.0003079	0.00003790	1.1944839	8.3418405	
0.00000625	6768.	1082829916.	51.7105674	0.0003232	0.00002319	1.2480070	8.7200404	
0.00000688	7443.	1082643637.	49.2382757	0.0003385	0.00000851	1.3011216	9.0991312	
0.00000750	8118.	1082439112.	47.1821288	0.0003539	-0.00000613	1.3538247	9.4791130	
0.00000813	8793.	1082194450.	45.4459630	0.0003692	-0.00002075	1.4061094	9.8599551	
0.00000875	9466.	1081858144.	43.9608561	0.0003847	-0.00003534	1.4579622	10.2415673	
0.00000938	10138.	1081392996.	42.6762421	0.0004001	-0.00004991	1.5093692	10.6238533	
0.00001000	10808.	1080781169.	41.5542413	0.0004155	-0.00006446	1.5603186	11.0067300	

Pier drilled shaft_row3

0.00001063	11475.	1080017715.	40.5659329	0.0004310	-0.00007899	1.6108004	11.3901281
0.00001125	12140.	1079104391.	39.6888526	0.0004465	-0.00009350	1.6608061	11.7739882
0.00001188	12802.	1078047495.	38.9052964	0.0004620	-0.000108	1.7103286	12.1582615
0.00001250	12802.	1024145121.	37.4953758	0.0004687	-0.000131	1.7312719	12.2870737 C
0.00001313	12802.	975376305.	36.7281418	0.0004821	-0.000148	1.7732844	12.6093990 C
0.00001375	13008.	946064709.	36.0157230	0.0004952	-0.000165	1.8142605	12.9257696 C
0.00001438	13359.	929352740.	35.3542539	0.0005082	-0.000182	1.8543650	13.2375546 C
0.00001500	13694.	912940542.	34.7366631	0.0005210	-0.000199	1.8935791	13.5444485 C
0.00001563	14014.	896878783.	34.1581377	0.0005337	-0.000216	1.9319388	13.8466562 C
0.00001625	14321.	881267809.	33.6154435	0.0005463	-0.000234	1.9695203	14.1447778 C
0.00001688	14616.	866112522.	33.1049138	0.0005586	-0.000251	2.0063512	14.4389673 C
0.00001750	14900.	851416851.	32.6234513	0.0005709	-0.000269	2.0424608	14.7294016 C
0.00001813	15174.	837183723.	32.1684321	0.0005831	-0.000287	2.0778801	15.0162822 C
0.00001875	15439.	823422757.	31.7377489	0.0005951	-0.000305	2.1126484	15.2999010 C
0.00001938	15697.	810143078.	31.3296435	0.0006070	-0.000323	2.1468081	15.5805935 C
0.00002000	15947.	797343912.	30.9425099	0.0006189	-0.000341	2.1803965	15.8586558 C
0.00002063	16189.	784907754.	30.5729726	0.0006306	-0.000359	2.2133347	16.1332093 C
0.00002125	16424.	772898343.	30.2208553	0.0006422	-0.000378	2.2457143	16.4051021 C
0.00002188	16654.	761334725.	29.8855220	0.0006537	-0.000396	2.2775947	16.6748776 C
0.00002250	16879.	750166302.	29.5652305	0.0006652	-0.000415	2.3089602	16.9423128 C
0.00002313	17096.	739306471.	29.2575091	0.0006766	-0.000433	2.3397378	17.2065671 C
0.00002375	17311.	728877176.	28.9640842	0.0006879	-0.000452	2.3701106	17.4695131 C
0.00002438	17520.	718748954.	28.6818593	0.0006991	-0.000471	2.3999514	17.7297392 C
0.00002563	17925.	699516926.	28.1514837	0.0007214	-0.000509	2.4583185	18.2448214 C
0.00002688	18315.	681490339.	27.6606932	0.0007434	-0.000547	2.5149238	18.7523028 C
0.00002813	18691.	664568615.	27.2048942	0.0007651	-0.000585	2.5698547	19.2527419 C
0.00002938	19055.	648666298.	26.7803622	0.0007867	-0.000623	2.6232006	19.7467712 C
0.00003063	19407.	633709800.	26.3840723	0.0008080	-0.000662	2.6750531	20.2351043 C
0.00003188	19751.	619634911.	26.0135701	0.0008292	-0.000701	2.7255064	20.7185439 C
0.00003313	20086.	606384873.	25.6668732	0.0008502	-0.000740	2.7746572	21.1979901 C
0.00003438	20412.	593790341.	25.3386998	0.0008710	-0.000779	2.8223122	21.6707665 C
0.00003563	20730.	581904551.	25.0303862	0.0008917	-0.000818	2.8687674	22.1402679 C
0.00003688	21044.	570682281.	24.7407082	0.0009123	-0.000858	2.9141031	22.6073442 C
0.00003813	21348.	559960475.	24.4643143	0.0009327	-0.000897	2.9580404	23.0681075 C
0.00003938	21650.	549848510.	24.2050930	0.0009531	-0.000937	3.0010390	23.5284407 C
0.00004063	21944.	540171227.	23.9571398	0.0009733	-0.000977	3.0427368	-24.084245 C
0.00004188	22236.	531019394.	23.7240045	0.0009934	-0.001017	3.0835470	-25.108412 C
0.00004313	22521.	522237367.	23.5001376	0.0010134	-0.001057	3.1231045	-26.137891 C
0.00004438	22805.	513925441.	23.2898092	0.0010335	-0.001097	3.1618692	-27.166177 C
0.00004563	23082.	505908568.	23.0862152	0.0010533	-0.001137	3.1993430	-28.200801 C

Pier drilled shaft_row3

0.00004688	23357.	498289799.	22.8940623	0.0010732	-0.001177	3.2360103	-29.234634	C
0.00004813	23629.	490984002.	22.7099978	0.0010929	-0.001217	3.2716533	-30.271109	C
0.00004938	23896.	483965191.	22.5332696	0.0011126	-0.001257	3.3062720	-31.310424	C
0.00005063	24162.	477272308.	22.3660607	0.0011323	-0.001298	3.3401168	-32.348577	C
0.00005188	24423.	470807846.	22.2040286	0.0011518	-0.001338	3.3728643	-33.391064	C
0.00005313	24682.	464599577.	22.0489430	0.0011714	-0.001379	3.4047194	-34.434597	C
0.00005438	24940.	458657842.	21.9017207	0.0011909	-0.001419	3.4358077	-35.476974	C
0.00005563	25193.	452916066.	21.7591918	0.0012104	-0.001460	3.4658966	-36.522454	C
0.00005688	25444.	447372492.	21.6216342	0.0012297	-0.001500	3.4950501	-37.570067	C
0.00005813	25694.	442050003.	21.4906766	0.0012491	-0.001541	3.5234436	-38.616528	C
0.00005938	25943.	436934453.	21.3659067	0.0012686	-0.001581	3.5510724	-39.661829	C
0.00006063	26187.	431947396.	21.2429557	0.0012879	-0.001622	3.5775983	-40.712978	C
0.00006188	26429.	427142563.	21.1254157	0.0013071	-0.001663	3.6033532	-41.763332	C
0.00006313	26671.	422512190.	21.0131651	0.0013265	-0.001704	3.6283497	-42.812524	C
0.00006438	26912.	418045949.	20.9059005	0.0013458	-0.001744	3.6525833	-43.860547	C
0.00006563	27149.	413693095.	20.8005162	0.0013650	-0.001785	3.6758251	-44.912768	C
0.00006688	27384.	409474863.	20.6987586	0.0013842	-0.001826	3.6982379	-45.965595	C
0.00006813	27618.	405396887.	20.6013311	0.0014035	-0.001867	3.7198936	-47.017245	C
0.00006938	27851.	401451440.	20.5080041	0.0014227	-0.001907	3.7407871	-48.067709	C
0.00007063	28083.	397631334.	20.4185647	0.0014421	-0.001948	3.7609137	-49.116977	C
0.00007188	28311.	393887629.	20.3300889	0.0014612	-0.001989	3.7800736	-50.000000	CY
0.00007313	28531.	390160727.	20.2432755	0.0014803	-0.002030	3.7983384	-50.000000	CY
0.00007438	28735.	386352255.	20.1571960	0.0014992	-0.002071	3.8156638	-50.000000	CY
0.00007938	29411.	370528188.	19.8167715	0.0015730	-0.002237	3.8758115	-50.000000	CY
0.00008438	29941.	354853721.	19.4921923	0.0016447	-0.002405	3.9229072	-50.000000	CY
0.00008938	30447.	340667750.	19.2000673	0.0017160	-0.002574	3.9586797	-50.000000	CY
0.00009438	30835.	326725698.	18.9197017	0.0017855	-0.002744	3.9828881	-50.000000	CY
0.00009938	31140.	313358088.	18.6500809	0.0018534	-0.002917	3.9963769	-50.000000	CY
0.0001044	31433.	301150400.	18.4084797	0.0019214	-0.003089	3.9981980	-50.000000	CY
0.0001094	31707.	289894590.	18.1869124	0.0019892	-0.003261	3.9990979	-50.000000	CY
0.0001144	31971.	279530848.	17.9899395	0.0020576	-0.003432	3.9995126	-50.000000	CY
0.0001194	32217.	269884795.	17.8054590	0.0021255	-0.003604	3.9996113	-50.000000	CY
0.0001244	32433.	260765045.	17.6354961	0.0021934	-0.003777	3.9994944	50.000000	CY
0.0001294	32573.	251773199.	17.4643290	0.0022594	-0.003951	3.9989560	50.000000	CY
0.0001344	32686.	243243079.	17.3028280	0.0023251	-0.004125	3.9977282	50.000000	CY
0.0001394	32791.	235269193.	17.1581496	0.0023914	-0.004299	3.9989352	50.000000	CY
0.0001444	32888.	227798221.	17.0270156	0.0024583	-0.004472	3.9996734	50.000000	CY
0.0001494	32975.	220752011.	16.9009013	0.0025246	-0.004645	3.9979359	50.000000	CY
0.0001544	33054.	214117569.	16.7879240	0.0025916	-0.004818	3.9995564	50.000000	CY
0.0001594	33124.	207836821.	16.6887577	0.0026598	-0.004990	3.9990050	50.000000	CY

Pier drilled shaft_row3							
0.0001644	33187.	201897331.	16.6004154	0.0027287	-0.005161	3.9956193	50.0000000 CY
0.0001694	33240.	196253249.	16.5195698	0.0027980	-0.005332	3.9993939	50.0000000 CY
0.0001744	33289.	190905867.	16.4428308	0.0028672	-0.005503	3.9952059	50.0000000 CY
0.0001794	33335.	185839793.	16.3728416	0.0029369	-0.005673	3.9992608	50.0000000 CY
0.0001844	33378.	181034181.	16.3088642	0.0030069	-0.005843	3.9954771	50.0000000 CYT
0.0001894	33418.	176467288.	16.2505709	0.0030775	-0.006013	3.9985455	50.0000000 CYT
0.0001944	33457.	172125091.	16.1970226	0.0031483	-0.006182	3.9992239	50.0000000 CYT
0.0001994	33492.	167984952.	16.1486081	0.0032196	-0.006350	3.9966862	50.0000000 CYT
0.0002044	33525.	164035654.	16.1036837	0.0032912	-0.006519	3.9996545	50.0000000 CYT
0.0002094	33554.	160259351.	16.0609588	0.0033628	-0.006687	3.9939671	50.0000000 CYT
0.0002144	33571.	156597166.	16.0141263	0.0034330	-0.006857	3.9973890	50.0000000 CYT
0.0002194	33582.	153082184.	15.9689498	0.0035032	-0.007027	3.9997391	50.0000000 CYT
0.0002244	33584.	149676372.	15.9224531	0.0035726	-0.007197	3.9946765	50.0000000 CYT
0.0002294	33584.	146413672.	15.8771700	0.0036418	-0.007368	3.9958037	50.0000000 CYT
0.0002344	33584.	143290180.	15.8345213	0.0037112	-0.007539	3.9988983	50.0000000 CYT
0.0002394	33584.	140297174.	15.7943081	0.0037808	-0.007709	3.9999979	50.0000000 CYT
0.0002444	33584.	137426643.	15.8134546	0.0038644	-0.007866	3.9937422	50.0000000 CYT

Summary of Results for Nominal Moment Capacity for Section 1

Moment values interpolated at maximum compressive strain = 0.003
or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain	Max. Tens. Strain
1	846.000	28085.735	0.00300000	-0.00786812
2	848.900	28121.795	0.00300000	-0.00785328
3	1018.000	30172.540	0.00300000	-0.00701381
4	1091.000	31014.307	0.00300000	-0.00668569
5	1102.000	31139.000	0.00300000	-0.00663804
6	1326.000	33373.898	0.00300000	-0.00582621

Note that the values of moment capacity in the table above are not factored by a strength reduction factor (phi-factor).

In ACI 318, the value of the strength reduction factor depends on whether

Pier drilled shaft_row3

the transverse reinforcing steel bars are tied hoops (Ø.65) or spirals (Ø.75).

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318, or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Load No.	Resist. Factor	Nominal Ax. Thrust kips	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in ²
1	0.65	846.000000	28086.	549.900000	18256.	423844057.
2	0.65	848.900000	28122.	551.785000	18279.	424607186.
3	0.65	1018.	30173.	661.700000	19612.	468803644.
4	0.65	1091.	31014.	709.150000	20159.	487449050.
5	0.65	1102.	31139.	716.300000	20240.	490244250.
6	0.65	1326.	33374.	861.900000	21693.	548442224.
1	0.75	846.000000	28086.	634.500000	21064.	368404030.
2	0.75	848.900000	28122.	636.675000	21091.	368940042.
3	0.75	1018.	30173.	763.500000	22629.	399740696.
4	0.75	1091.	31014.	818.250000	23261.	412797744.
5	0.75	1102.	31139.	826.500000	23354.	414762020.
6	0.75	1326.	33374.	994.500000	25030.	456602422.
1	0.90	846.000000	28086.	761.400000	25277.	274940297.
2	0.90	848.900000	28122.	764.010000	25310.	275429793.
3	0.90	1018.	30173.	916.200000	27155.	303455755.
4	0.90	1091.	31014.	981.900000	27913.	315133396.
5	0.90	1102.	31139.	991.800000	28025.	316870386.
6	0.90	1326.	33374.	1193.	30037.	352172122.

Pile Section No. 2:

Dimensions and Properties of Drilled Shaft (Bored Pile):

Pier drilled shaft_row3

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Length of Section                = 10.000000 ft
Shaft Diameter                  = 42.000000 in
Concrete Cover Thickness (to edge of trans. reinf.) = 3.000000 in
Number of Reinforcing Bars      = 16 bars
Yield Stress of Reinforcing Bars = 60000. psi
Modulus of Elasticity of Reinforcing Bars = 29000000. psi
Gross Area of Shaft             = 1385. sq. in.
Total Area of Reinforcing Steel = 16.000000 sq. in.
Area Ratio of Steel Reinforcement = 1.15 percent
Edge-to-Edge Bar Spacing       = 5.431327 in
Maximum Concrete Aggregate Size = 0.750000 in
Ratio of Bar Spacing to Aggregate Size = 7.24
Offset of Center of Rebar Cage from Center of Pile = 0.0000 in
Transverse Reinforcement
Type: Spiral
Number of Transverse Reinf. (per spacing) = 1
Spacing of Transverse Reinf. = 4.500000 in
Yield Stress of Transverse Reinf. = 60000. psi
Diameter of Transverse Reinf. = 0.625000 in

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Axial Structural Capacities:

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Nom. Axial Structural Capacity =  $0.85 F_c A_c + F_y A_s$  = 5616.104 kips
Tensile Load for Cracking of Concrete = -623.096 kips
Nominal Axial Tensile Capacity = -960.000 kips

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Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.128000	1.000000	16.811000	0.000000
2	1.128000	1.000000	15.531339	6.433291
3	1.128000	1.000000	11.887172	11.887172
4	1.128000	1.000000	6.433291	15.531339
5	1.128000	1.000000	0.000000	16.811000

			Pier drilled shaft_row3	
6	1.128000	1.000000	-6.43329	15.531339
7	1.128000	1.000000	-11.88717	11.887172
8	1.128000	1.000000	-15.53134	6.433291
9	1.128000	1.000000	-16.81100	0.000000
10	1.128000	1.000000	-15.53134	-6.43329
11	1.128000	1.000000	-11.88717	-11.88717
12	1.128000	1.000000	-6.43329	-15.53134
13	1.128000	1.000000	0.00000	-16.81100
14	1.128000	1.000000	6.433291	-15.53134
15	1.128000	1.000000	11.887172	-11.88717
16	1.128000	1.000000	15.531339	-6.43329

NOTE: The positions of the above rebars were computed by LPILE

Minimum spacing between any two bars not equal to zero = 5.431 inches
between bars 11 and 12.

Ratio of bar spacing to maximum aggregate size = 7.24

Concrete Properties:

Compressive Strength of Concrete	=	4000. psi
Modulus of Elasticity of Concrete	=	3604997. psi
Modulus of Rupture of Concrete	=	-474.34165 psi
Compression Strain at Peak Stress	=	0.001886
Tensile Strain at Fracture of Concrete	=	-0.0001154
Maximum Coarse Aggregate Size	=	0.750000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 6

Number	Axial Thrust Force kips
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1	846.000
2	848.900
3	1018.000

Pier drilled shaft_row3

4 1091.000
 5 1102.000
 6 1326.000

Definitions of Run Messages and Notes:

- C = concrete in section has cracked in tension.
- Y = stress in reinforcing steel has reached yield stress.
- T = ACI 318 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than 0.003. See ACI 318-14, Section 21.2.3.
- Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
 Position of neutral axis is measured from edge of compression side of pile.
 Compressive stresses and strains are positive in sign.
 Tensile stresses and strains are negative in sign.

Axial Thrust Force = 846.000 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	410.4097665	656655626.	244.4948351	0.0001528	0.0001266	0.6213276	4.3667626	
0.00000125	820.8161393	656652911.	132.7745766	0.0001660	0.0001135	0.6719172	4.6836659	
0.00000188	1231.	656636689.	95.5465587	0.0001791	0.0001004	0.7222122	5.0012254	
0.00000250	1642.	656611346.	76.9416019	0.0001924	0.00008735	0.7722104	5.3194411	
0.00000313	2052.	656577760.	65.7858704	0.0002056	0.00007433	0.8219099	5.6383133	
0.00000375	2462.	656536221.	58.3547525	0.0002188	0.00006133	0.8713087	5.9578418	
0.00000438	2872.	656486853.	53.0519863	0.0002321	0.00004835	0.9204049	6.2780270	
0.00000500	3282.	656429717.	49.0794409	0.0002454	0.00003540	0.9691964	6.5988690	
0.00000563	3692.	656364847.	45.9937105	0.0002587	0.00002246	1.0176812	6.9203678	
0.00000625	4102.	656292260.	43.5287517	0.0002721	0.00000955	1.0658574	7.2425238	
0.00000688	4511.	656211911.	41.5152638	0.0002854	-0.00000333	1.1137230	7.5653370	
0.00000750	4921.	656114169.	39.8402969	0.0002988	-0.00001620	1.1612737	7.8887896	

Pier drilled shaft_row3

0.00000813	5330.	655968630.	38.4254367	0.0003122	-0.00002904	1.2084991	8.2128123
0.00000875	5738.	655751864.	37.2146340	0.0003256	-0.00004187	1.2553878	8.5373259
0.00000938	6145.	655453209.	36.1668286	0.0003391	-0.00005469	1.3019302	8.8622628
0.00001000	6551.	655070251.	35.2512683	0.0003525	-0.00006749	1.3481185	9.1875678
0.00001063	6955.	654604746.	34.4444658	0.0003660	-0.00008028	1.3939460	9.5131948
0.00001125	7358.	654060739.	33.7281770	0.0003794	-0.00009306	1.4394072	9.8391050
0.00001188	7760.	653443487.	33.0880188	0.0003929	-0.000106	1.4844977	10.1652676
0.00001250	7760.	620771313.	31.7324941	0.0003967	-0.000128	1.4966069	10.2089041 C
0.00001313	7760.	591210774.	31.0879162	0.0004080	-0.000143	1.5341824	10.4740068 C
0.00001375	7760.	564337557.	30.4916187	0.0004193	-0.000158	1.5710049	10.7349955 C
0.00001438	7885.	548549633.	29.9363313	0.0004303	-0.000173	1.6070392	10.9914644 C
0.00001500	8079.	538588415.	29.4182129	0.0004413	-0.000189	1.6423595	11.2439727 C
0.00001563	8265.	528950890.	28.9336066	0.0004521	-0.000204	1.6770164	11.4928843 C
0.00001625	8444.	519633627.	28.4789344	0.0004628	-0.000220	1.7110339	11.7383354 C
0.00001688	8617.	510633468.	28.0511877	0.0004734	-0.000235	1.7444374	11.9804813 C
0.00001750	8784.	501952482.	27.6479397	0.0004838	-0.000251	1.7772604	12.2195541 C
0.00001813	8946.	493594840.	27.2672102	0.0004942	-0.000267	1.8095419	12.4558458 C
0.00001875	9104.	485556090.	26.9071601	0.0005045	-0.000283	1.8413126	12.6895806 C
0.00001938	9258.	477826630.	26.5661073	0.0005147	-0.000299	1.8725975	12.9209377 C
0.00002000	9408.	470397353.	26.2426183	0.0005249	-0.000315	1.9034237	13.1501186 C
0.00002063	9553.	463189187.	25.9335655	0.0005349	-0.000331	1.9337000	13.3762076 C
0.00002125	9696.	456260242.	25.6395056	0.0005448	-0.000348	1.9635511	13.6003329 C
0.00002188	9835.	449612694.	25.3598001	0.0005547	-0.000364	1.9930241	13.8229045 C
0.00002250	9971.	443172208.	25.0917132	0.0005646	-0.000380	2.0220192	14.0429178 C
0.00002313	10105.	436966524.	24.8354083	0.0005743	-0.000397	2.0506178	14.2611145 C
0.00002375	10237.	431012839.	24.5910023	0.0005840	-0.000413	2.0788971	14.4782154 C
0.00002438	10365.	425214126.	24.3550569	0.0005937	-0.000430	2.1066802	14.6924371 C
0.00002563	10616.	414264434.	23.9128922	0.0006128	-0.000463	2.1612853	15.1173119 C
0.00002688	10859.	404042062.	23.5042227	0.0006317	-0.000497	2.2145099	15.5362349 C
0.00002813	11095.	394483716.	23.1252659	0.0006504	-0.000531	2.2664335	15.9497638 C
0.00002938	11325.	385535502.	22.7729617	0.0006690	-0.000565	2.3171385	16.3585230 C
0.00003063	11550.	377150899.	22.4448311	0.0006874	-0.000599	2.3667104	16.7632095 C
0.00003188	11770.	369239779.	22.1367253	0.0007056	-0.000633	2.4150552	17.1626168 C
0.00003313	11984.	361794450.	21.8479358	0.0007237	-0.000668	2.4623308	17.5582421 C
0.00003438	12196.	354799268.	21.5777720	0.0007417	-0.000702	2.5086790	17.9514975 C
0.00003563	12403.	348167897.	21.3223129	0.0007596	-0.000737	2.5539316	18.3403584 C
0.00003688	12608.	341907101.	21.0818743	0.0007774	-0.000771	2.5982742	18.7267607 C
0.00003813	12810.	335988877.	20.8553676	0.0007951	-0.000806	2.6417534	-19.430953 C
0.00003938	13008.	330361279.	20.6402476	0.0008127	-0.000841	2.6842608	-20.313673 C
0.00004063	13205.	325036481.	20.4375096	0.0008303	-0.000876	2.7260092	-21.197403 C

Pier drilled shaft_row3

0.00004188	13398.	319957235.	20.2441984	0.0008477	-0.000911	2.7668206	-22.084383	C
0.00004313	13590.	315129084.	20.0610077	0.0008651	-0.000946	2.8068591	-22.972721	C
0.00004438	13780.	310532158.	19.8870292	0.0008825	-0.000981	2.8461248	-23.862485	C
0.00004563	13967.	306126885.	19.7202051	0.0008997	-0.001017	2.8844906	-24.755397	C
0.00004688	14154.	301944970.	19.5628768	0.0009170	-0.001052	2.9222694	-25.647495	C
0.00004813	14337.	297918373.	19.4108846	0.0009341	-0.001087	2.9591021	-26.543553	C
0.00004938	14520.	294071287.	19.2662280	0.0009513	-0.001122	2.9952566	-27.440126	C
0.00005063	14702.	290403643.	19.1292637	0.0009684	-0.001158	3.0308301	-28.335893	C
0.00005188	14881.	286856824.	18.9960554	0.0009854	-0.001193	3.0654599	-29.235940	C
0.00005313	15059.	283459567.	18.8690727	0.0010024	-0.001229	3.0994551	-30.136054	C
0.00005438	15236.	280208882.	18.7484356	0.0010194	-0.001264	3.1328750	-31.035367	C
0.00005563	15412.	277073047.	18.6319376	0.0010364	-0.001300	3.1655248	-31.936749	C
0.00005688	15586.	274044451.	18.5192789	0.0010533	-0.001335	3.1974095	-32.840245	C
0.00005813	15760.	271137287.	18.4119386	0.0010702	-0.001371	3.2287244	-33.742945	C
0.00005938	15933.	268343816.	18.3095835	0.0010871	-0.001407	3.2594666	-34.644842	C
0.00006063	16104.	265636053.	18.2099983	0.0011040	-0.001442	3.2894264	-35.549290	C
0.00006188	16274.	263015869.	18.1136368	0.0011208	-0.001478	3.3186810	-36.455174	C
0.00006313	16444.	260491416.	18.0215297	0.0011376	-0.001514	3.3473679	-37.360256	C
0.00006438	16612.	258057055.	17.9334318	0.0011545	-0.001549	3.3754845	-38.264531	C
0.00006563	16781.	255707279.	17.8490865	0.0011713	-0.001585	3.4030247	-39.168051	C
0.00006688	16947.	253411192.	17.7655771	0.0011881	-0.001621	3.4296957	-40.076065	C
0.00006813	17112.	251191994.	17.6855428	0.0012048	-0.001656	3.4558010	-40.983269	C
0.00006938	17278.	249045486.	17.6087983	0.0012216	-0.001692	3.4813378	-41.889655	C
0.00007063	17442.	246967731.	17.5351718	0.0012384	-0.001728	3.5063031	-42.795220	C
0.00007188	17606.	244955091.	17.4645033	0.0012553	-0.001763	3.5306941	-43.699957	C
0.00007313	17769.	242994167.	17.3954509	0.0012720	-0.001799	3.5543845	-44.606391	C
0.00007438	17931.	241082376.	17.3279169	0.0012888	-0.001835	3.5773790	-45.514556	C
0.00007938	18572.	233973182.	17.0827141	0.0013559	-0.001978	3.6636238	-49.138784	C
0.00008438	19201.	227571370.	16.8669865	0.0014232	-0.002121	3.7400745	-52.761999	C
0.00008938	19821.	221775683.	16.6784540	0.0014906	-0.002263	3.8069378	-56.377288	C
0.00009438	20431.	216486388.	16.5122533	0.0015583	-0.002405	3.8640512	-59.986133	C
0.00009938	20985.	211174529.	16.3546654	0.0016252	-0.002549	3.9106641	-60.000000	CY
0.0001044	21416.	205184627.	16.1905797	0.0016899	-0.002694	3.9464264	-60.000000	CY
0.0001094	21750.	198858165.	16.0198993	0.0017522	-0.002842	3.9722667	-60.000000	CY
0.0001144	22076.	193017544.	15.8670670	0.0018148	-0.002989	3.9897481	-60.000000	CY
0.0001194	22387.	187536239.	15.7277541	0.0018775	-0.003136	3.9987127	-60.000000	CY
0.0001244	22605.	181750360.	15.5763946	0.0019373	-0.003286	3.9991613	-60.000000	CY
0.0001294	22786.	176122084.	15.4320647	0.0019965	-0.003437	3.9992637	-60.000000	CY
0.0001344	22960.	170867122.	15.3004974	0.0020560	-0.003588	3.9991313	-60.000000	CY
0.0001394	23127.	165931105.	15.1766722	0.0021152	-0.003739	3.9986665	-60.000000	CY

Pier drilled shaft_row3

0.0001444	23289.	161306336.	15.0645907	0.0021750	-0.003889	3.9977409	-60.000000	CY
0.0001494	23446.	156963475.	14.9629634	0.0022351	-0.004039	3.9988194	-60.000000	CY
0.0001544	23599.	152867249.	14.8685735	0.0022953	-0.004188	3.9998277	-60.000000	CY
0.0001594	23741.	148965837.	14.7783701	0.0023553	-0.004338	3.9987758	-60.000000	CY
0.0001644	23856.	145130102.	14.6875725	0.0024143	-0.004489	3.9967965	-60.000000	CY
0.0001694	23936.	141318485.	14.5937946	0.0024718	-0.004642	3.9995892	-60.000000	CY
0.0001744	24004.	137658543.	14.5040163	0.0025291	-0.004795	3.9968552	-60.000000	CY
0.0001794	24068.	134177950.	14.4163131	0.0025859	-0.004948	3.9997104	-60.000000	CY
0.0001844	24130.	130874418.	14.3341063	0.0026429	-0.005101	3.9964095	-60.000000	CY
0.0001894	24190.	127737923.	14.2576419	0.0027000	-0.005254	3.9994864	-60.000000	CY
0.0001944	24249.	124755861.	14.1864570	0.0027575	-0.005406	3.9956019	-60.000000	CY
0.0001994	24306.	121912999.	14.1206179	0.0028153	-0.005558	3.9987039	60.000000	CY
0.0002044	24362.	119202299.	14.0582166	0.0028731	-0.005711	3.9999999	60.000000	CY
0.0002094	24412.	116593130.	13.9984223	0.0029309	-0.005863	3.9966522	60.000000	CY
0.0002144	24460.	114097227.	13.9430224	0.0029890	-0.006015	3.9994205	60.000000	CY
0.0002194	24506.	111706213.	13.8918855	0.0030475	-0.006166	3.9970081	60.000000	CYT
0.0002244	24548.	109406182.	13.8458402	0.0031067	-0.006317	3.9969815	60.000000	CYT
0.0002294	24590.	107203412.	13.8025943	0.0031660	-0.006468	3.9995109	60.000000	CYT
0.0002344	24630.	105086280.	13.7629010	0.0032257	-0.006618	3.9967071	60.000000	CYT
0.0002394	24668.	103051103.	13.7262786	0.0032857	-0.006768	3.9961741	60.000000	CYT
0.0002444	24706.	101096677.	13.6918575	0.0033459	-0.006918	3.9990826	60.000000	CYT
0.0002494	24738.	99198359.	13.6630710	0.0034072	-0.007067	3.9992903	60.000000	CYT
0.0002544	24767.	97364078.	13.6361814	0.0034687	-0.007215	3.9939187	60.000000	CYT
0.0002594	24795.	95595328.	13.6095250	0.0035300	-0.007364	3.9977405	60.000000	CYT
0.0002644	24817.	93870959.	13.5870178	0.0035921	-0.007512	3.9997374	60.000000	CYT
0.0002694	24837.	92200801.	13.5678010	0.0036548	-0.007659	3.9953209	60.000000	CYT
0.0002744	24848.	90561917.	13.5456294	0.0037166	-0.007807	3.9943156	60.000000	CYT
0.0003044	24848.	81635896.	13.6591091	0.0041575	-0.008626	3.9901142	60.000000	CYT

Axial Thrust Force = 848.900 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	410.3047258	656487561.	245.2891961	0.0001533	0.0001271	0.6232625	4.3811604	
0.00000125	820.6060935	656484875.	133.1717642	0.0001665	0.0001140	0.6738376	4.6980640	
0.00000188	1231.	656468658.	95.8113584	0.0001796	0.0001009	0.7241181	5.0156239	
0.00000250	1641.	656443313.	77.1402099	0.0001929	0.00008785	0.7741018	5.3338402	

Pier drilled shaft_row3

0.00000313	2051.	656409721.	65.9447654	0.0002061	0.00007483	0.8237868	5.6527131
0.00000375	2461.	656368173.	58.4871737	0.0002193	0.00006183	0.8731711	5.9722426
0.00000438	2871.	656318794.	53.1654990	0.0002326	0.00004885	0.9222527	6.2924289
0.00000500	3281.	656261644.	49.1787734	0.0002459	0.00003589	0.9710296	6.6132722
0.00000563	3691.	656196757.	46.0820150	0.0002592	0.00002296	1.0194999	6.9347725
0.00000625	4101.	656124152.	43.6082348	0.0002726	0.00001005	1.0676616	7.2569301
0.00000688	4510.	656043808.	41.5875304	0.0002859	-0.00000284	1.1155126	7.5797451
0.00000750	4920.	655947019.	39.9065589	0.0002993	-0.00001570	1.1630490	7.9032016
0.00000813	5328.	655803864.	38.4866333	0.0003127	-0.00002855	1.2102605	8.2272317
0.00000875	5736.	655590524.	37.2715034	0.0003261	-0.00004137	1.2571357	8.5517565
0.00000938	6143.	655295885.	36.2199598	0.0003396	-0.00005419	1.3036650	8.8767079
0.00001000	6549.	654917239.	35.3011386	0.0003530	-0.00006699	1.3498404	9.2020302
0.00001063	6954.	654456178.	34.4914674	0.0003665	-0.00007978	1.3956553	9.5276772
0.00001125	7357.	653916602.	33.7726356	0.0003799	-0.00009256	1.4411042	9.8536099
0.00001188	7758.	653303719.	33.1302083	0.0003934	-0.000105	1.4861824	10.1797966
0.00001250	7758.	620638533.	31.7811877	0.0003973	-0.000128	1.4986487	10.2265556 C
0.00001313	7758.	591084317.	31.1356005	0.0004087	-0.000143	1.5362660	10.4921567 C
0.00001375	7758.	564216848.	30.5378069	0.0004199	-0.000158	1.5731034	10.7534130 C
0.00001438	7895.	549243163.	29.9818643	0.0004310	-0.000173	1.6091858	11.0104460 C
0.00001500	8089.	539285477.	29.4625452	0.0004419	-0.000188	1.6445243	11.2632572 C
0.00001563	8276.	529651485.	28.9768628	0.0004528	-0.000203	1.6792004	11.5124847 C
0.00001625	8455.	520337732.	28.5212260	0.0004635	-0.000219	1.7132382	11.7582653 C
0.00001688	8629.	511341034.	28.0926153	0.0004741	-0.000235	1.7466633	12.0007549 C
0.00001750	8797.	502662704.	27.6885782	0.0004846	-0.000250	1.7795083	12.2401782 C
0.00001813	8959.	494306664.	27.3071202	0.0004949	-0.000266	1.8118116	12.4768236 C
0.00001875	9118.	486269863.	26.9464271	0.0005052	-0.000282	1.8436059	12.7109321 C
0.00001938	9272.	478543470.	26.6048310	0.0005155	-0.000298	1.8749175	12.9426956 C
0.00002000	9422.	471094728.	26.2802855	0.0005256	-0.000314	1.9057363	13.1719656 C
0.00002063	9568.	463884871.	25.9706681	0.0005356	-0.000331	1.9360320	13.3983996 C
0.00002125	9710.	456959409.	25.6762384	0.0005456	-0.000347	1.9659126	13.6229694 C
0.00002188	9851.	450315145.	25.3962163	0.0005555	-0.000363	1.9954165	13.8460058 C
0.00002250	9987.	443853175.	25.1271340	0.0005654	-0.000380	2.0243954	14.0660299 C
0.00002313	10121.	437651134.	24.8705983	0.0005751	-0.000396	2.0530265	14.2847138 C
0.00002375	10252.	431677610.	24.6252825	0.0005849	-0.000413	2.0812894	14.5018259 C
0.00002438	10381.	425882781.	24.3891808	0.0005945	-0.000429	2.1091064	14.7165584 C
0.00002563	10632.	414918720.	23.9460888	0.0006136	-0.000463	2.1637305	15.1419811 C
0.00002688	10876.	404683320.	23.5366135	0.0006325	-0.000496	2.2169756	15.5614795 C
0.00002813	11113.	395113081.	23.1569587	0.0006513	-0.000530	2.2689213	15.9756133 C
0.00002938	11343.	386153936.	22.8040527	0.0006699	-0.000564	2.3196500	16.3850088 C
0.00003063	11569.	377756109.	22.4752801	0.0006883	-0.000598	2.3692366	16.7902520 C

Pier drilled shaft_row3

0.00003188	11788.	369821939.	22.1661382	0.0007065	-0.000632	2.4175571	17.1898053	C
0.00003313	12003.	362368590.	21.8769758	0.0007247	-0.000667	2.4648593	17.5861388	C
0.00003438	12216.	355365712.	21.6064992	0.0007427	-0.000701	2.5112352	17.9801349	C
0.00003563	12423.	348712504.	21.3500690	0.0007606	-0.000736	2.5564520	18.3690339	C
0.00003688	12628.	342444855.	21.1093945	0.0007784	-0.000770	2.6008209	18.7561901	C
0.00003813	12829.	336507203.	20.8820226	0.0007961	-0.000805	2.6442637	-19.401482	C
0.00003938	13028.	330873868.	20.6667552	0.0008138	-0.000840	2.6867984	-20.283405	C
0.00004063	13225.	325531643.	20.4632392	0.0008313	-0.000875	2.7285098	-21.167090	C
0.00004188	13419.	320448008.	20.2698844	0.0008488	-0.000910	2.7693522	-22.053190	C
0.00004313	13610.	315604100.	20.0859875	0.0008662	-0.000945	2.8093531	-22.941480	C
0.00004438	13801.	311003511.	19.9120384	0.0008836	-0.000980	2.8486514	-23.830302	C
0.00004563	13988.	306583901.	19.7445684	0.0009008	-0.001015	2.8869788	-24.723162	C
0.00004688	14174.	302388407.	19.5866291	0.0009181	-0.001051	2.9247191	-25.615207	C
0.00004813	14359.	298359074.	19.4347428	0.0009353	-0.001086	2.9615847	-26.510256	C
0.00004938	14541.	294499527.	19.2895221	0.0009524	-0.001121	2.9976999	-27.406772	C
0.00005063	14723.	290820033.	19.1520220	0.0009696	-0.001157	3.0332338	-28.302481	C
0.00005188	14902.	287271117.	19.0189841	0.0009866	-0.001192	3.0678966	-29.201447	C
0.00005313	15080.	283862910.	18.8915025	0.0010036	-0.001228	3.1018514	-30.101497	C
0.00005438	15258.	280601772.	18.7703901	0.0010206	-0.001263	3.1352307	-31.000747	C
0.00005563	15434.	277464269.	18.6541187	0.0010376	-0.001299	3.1679132	-31.900968	C
0.00005688	15608.	274425956.	18.5410144	0.0010545	-0.001334	3.1997563	-32.804395	C
0.00005813	15781.	271509487.	18.4332481	0.0010714	-0.001370	3.2310294	-33.707025	C
0.00005938	15954.	268707096.	18.3304854	0.0010884	-0.001405	3.2617297	-34.608851	C
0.00006063	16126.	265998158.	18.2311837	0.0011053	-0.001441	3.2917205	-35.512044	C
0.00006188	16296.	263369619.	18.1344371	0.0011221	-0.001477	3.3209318	-36.417851	C
0.00006313	16465.	260837146.	18.0419607	0.0011389	-0.001512	3.3495755	-37.322854	C
0.00006438	16634.	258395065.	17.9535082	0.0011558	-0.001548	3.3776485	-38.227050	C
0.00006563	16803.	256038150.	17.8688526	0.0011726	-0.001584	3.4051481	-39.130433	C
0.00006688	16969.	253741037.	17.7856501	0.0011894	-0.001619	3.4318435	-40.037136	C
0.00006813	17134.	251514831.	17.7052915	0.0012062	-0.001655	3.4579036	-40.944253	C
0.00006938	17299.	249361560.	17.6282349	0.0012230	-0.001691	3.4833950	-41.850551	C
0.00007063	17464.	247277276.	17.5543079	0.0012398	-0.001726	3.5083148	-42.756027	C
0.00007188	17628.	245258327.	17.4833498	0.0012566	-0.001762	3.5326599	-43.660674	C
0.00007313	17791.	243296876.	17.4146819	0.0012734	-0.001798	3.5563729	-44.565609	C
0.00007438	17953.	241379100.	17.3468704	0.0012902	-0.001834	3.5793201	-45.473675	C
0.00007938	18593.	234247788.	17.1006501	0.0013574	-0.001976	3.6653725	-49.097497	C
0.00008438	19223.	227830897.	16.8846779	0.0014246	-0.002119	3.7416859	-52.718711	C
0.00008938	19843.	222017462.	16.6953407	0.0014921	-0.002262	3.8083415	-56.333520	C
0.00009438	20453.	216715845.	16.5290770	0.0015599	-0.002404	3.8652898	-59.940088	C
0.00009938	21008.	211400158.	16.3710769	0.0016269	-0.002547	3.9116948	-60.000000	CY

Pier drilled shaft_row3

0.0001044	21440.	205417629.	16.2068836	0.0016916	-0.002692	3.9472584	-60.000000	CY
0.0001094	21775.	199084093.	16.0363688	0.0017540	-0.002840	3.9728993	-60.000000	CY
0.0001144	22101.	193231212.	15.8829866	0.0018166	-0.002987	3.9901354	-60.000000	CY
0.0001194	22412.	187745879.	15.7440353	0.0018794	-0.003134	3.9988563	-60.000000	CY
0.0001244	22632.	181964915.	15.5927059	0.0019393	-0.003284	3.9992813	-60.000000	CY
0.0001294	22812.	176326278.	15.4479144	0.0019986	-0.003435	3.9993770	-60.000000	CY
0.0001344	22987.	171065588.	15.3167610	0.0020582	-0.003586	3.9992625	-60.000000	CY
0.0001394	23153.	166120483.	15.1925335	0.0021175	-0.003736	3.9988322	-60.000000	CY
0.0001444	23315.	161487270.	15.0800819	0.0021772	-0.003887	3.9979607	-60.000000	CY
0.0001494	23472.	157136551.	14.9781136	0.0022374	-0.004036	3.9981099	-60.000000	CY
0.0001544	23625.	153036378.	14.8842202	0.0022978	-0.004186	3.9998884	-60.000000	CY
0.0001594	23768.	149130784.	14.7938533	0.0023578	-0.004336	3.9989520	-60.000000	CY
0.0001644	23883.	145294948.	14.7031101	0.0024168	-0.004487	3.9964409	-60.000000	CY
0.0001694	23964.	141482362.	14.6092640	0.0024744	-0.004639	3.9996941	-60.000000	CY
0.0001744	24032.	137816551.	14.5191910	0.0025318	-0.004792	3.9971620	-60.000000	CY
0.0001794	24096.	134333943.	14.4321425	0.0025888	-0.004945	3.9998038	-60.000000	CY
0.0001844	24158.	131025124.	14.3496613	0.0026457	-0.005098	3.9967646	-60.000000	CY
0.0001894	24218.	127883988.	14.2728907	0.0027029	-0.005251	3.9996158	-60.000000	CY
0.0001944	24277.	124897201.	14.2014634	0.0027604	-0.005403	3.9952950	-60.000000	CY
0.0001994	24334.	122049935.	14.1353811	0.0028182	-0.005556	3.9989189	60.000000	CY
0.0002044	24389.	119336968.	14.0735976	0.0028763	-0.005707	3.9990941	60.000000	CY
0.0002094	24439.	116723235.	14.0140292	0.0029342	-0.005860	3.9970411	60.000000	CY
0.0002144	24487.	114223786.	13.9583759	0.0029923	-0.006011	3.9995763	60.000000	CY
0.0002194	24532.	111827691.	13.9072734	0.0030509	-0.006163	3.9959498	60.000000	CYT
0.0002244	24575.	109524493.	13.8609961	0.0031101	-0.006314	3.9973647	60.000000	CYT
0.0002294	24616.	107318679.	13.8175318	0.0031694	-0.006464	3.9996584	60.000000	CYT
0.0002344	24656.	105197699.	13.7777970	0.0032292	-0.006615	3.9956125	60.000000	CYT
0.0002394	24694.	103159782.	13.7409709	0.0032892	-0.006765	3.9966215	60.000000	CYT
0.0002444	24731.	101202718.	13.7063580	0.0033495	-0.006914	3.9992960	60.000000	CYT
0.0002494	24763.	99299021.	13.6779177	0.0034109	-0.007063	3.9981295	60.000000	CYT
0.0002544	24792.	97463595.	13.6521000	0.0034728	-0.007211	3.9945699	60.000000	CYT
0.0002594	24820.	95693367.	13.6255819	0.0035341	-0.007360	3.9981408	60.000000	CYT
0.0002644	24842.	93964011.	13.6035208	0.0035964	-0.007507	3.9998659	60.000000	CYT
0.0002694	24861.	92291294.	13.5842605	0.0036593	-0.007654	3.9939308	60.000000	CYT
0.0002744	24873.	90653965.	13.5625772	0.0037212	-0.007803	3.9950348	60.000000	CYT
0.0003044	24873.	81718872.	13.6751518	0.0041624	-0.008621	3.9911170	60.000000	CYT

Axial Thrust Force = 1018.000 kips

Pier drilled shaft_row3

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	404.1314839	646610374.	291.9737911	0.0001825	0.0001562	0.7360048	5.2273187	
0.00000125	808.2616942	646609355.	156.5144861	0.0001956	0.0001431	0.7857273	5.5442376	
0.00000188	1212.	646593455.	111.3736446	0.0002088	0.0001301	0.8351549	5.8618232	
0.00000250	1616.	646567999.	88.8124198	0.0002220	0.0001170	0.8842855	6.1800754	
0.00000313	2020.	646534053.	75.2830426	0.0002353	0.0001040	0.9331172	6.4989945	
0.00000375	2424.	646491970.	66.2695903	0.0002485	0.00009101	0.9816479	6.8185805	
0.00000438	2828.	646441900.	59.8366676	0.0002618	0.00007804	1.0298757	7.1388335	
0.00000500	3232.	646383918.	55.0165769	0.0002751	0.00006508	1.0777984	7.4597537	
0.00000563	3636.	646318064.	51.2717087	0.0002884	0.00005215	1.1254141	7.7813413	
0.00000625	4039.	646244361.	48.2794975	0.0003017	0.00003925	1.1727208	8.1035964	
0.00000688	4442.	646162822.	45.8346742	0.0003151	0.00002636	1.2197164	8.4265194	
0.00000750	4846.	646073455.	43.8003932	0.0003285	0.00001350	1.2663989	8.7501105	
0.00000813	5249.	645976265.	42.0819151	0.0003419	6.65560E-07	1.3127663	9.0743700	
0.00000875	5651.	645868754.	40.6115473	0.0003554	-0.00001215	1.3588159	9.3992927	
0.00000938	6054.	645733482.	39.3395080	0.0003688	-0.00002494	1.4045405	9.7248350	
0.00001000	6456.	645550112.	38.2283824	0.0003823	-0.00003772	1.4499305	10.0509309	
0.00001063	6856.	645305594.	37.2495680	0.0003958	-0.00005047	1.4949768	10.3775169	
0.00001125	7256.	644993703.	36.3808465	0.0004093	-0.00006322	1.5396716	10.7045387	
0.00001188	7655.	644612712.	35.6047023	0.0004228	-0.00007594	1.5840085	11.0319506	
0.00001250	8052.	644163447.	34.9071408	0.0004363	-0.00008866	1.6279818	11.3597136	
0.00001313	8448.	643648061.	34.2768457	0.0004499	-0.000101	1.6715866	11.6877932	
0.00001375	8842.	643069848.	33.7045730	0.0004634	-0.000114	1.7148187	12.0161610	
0.00001438	8842.	615110289.	32.5326204	0.0004677	-0.000136	1.7279023	12.0737924	C
0.00001500	8842.	589480694.	31.9539633	0.0004793	-0.000151	1.7645820	12.3470240	C
0.00001563	8842.	565901466.	31.4134454	0.0004908	-0.000165	1.8005626	12.6165612	C
0.00001625	9032.	555825055.	30.9068253	0.0005022	-0.000180	1.8358619	12.8824790	C
0.00001688	9237.	547361182.	30.4302323	0.0005135	-0.000195	1.8704840	13.1447262	C
0.00001750	9434.	539060464.	29.9807680	0.0005247	-0.000210	1.9044555	13.4034648	C
0.00001813	9624.	530964060.	29.5563928	0.0005357	-0.000226	1.9378278	13.6590978	C
0.00001875	9808.	523080429.	29.1549047	0.0005467	-0.000241	1.9706261	13.9117920	C
0.00001938	9986.	515413176.	28.7743502	0.0005575	-0.000256	2.0028730	14.1616943	C
0.00002000	10159.	507929187.	28.4122652	0.0005682	-0.000272	2.0345456	14.4085139	C
0.00002063	10326.	500663173.	28.0678431	0.0005789	-0.000287	2.0657046	14.6527725	C
0.00002125	10490.	493623863.	27.7399872	0.0005895	-0.000303	2.0963849	14.8947545	C
0.00002188	10649.	486817865.	27.4277555	0.0006000	-0.000319	2.1266226	15.1347637	C
0.00002250	10805.	480221724.	27.1296448	0.0006104	-0.000335	2.1564092	15.3726683	C

Pier drilled shaft_row3

0.00002313	10957.	473796737.	26.8438069	0.0006208	-0.000350	2.1857033	15.6079962	C
0.00002375	11106.	467601042.	26.5709471	0.0006311	-0.000366	2.2146239	15.8419021	C
0.00002438	11251.	461591619.	26.3093716	0.0006413	-0.000382	2.2431266	16.0738933	C
0.00002563	11534.	450108159.	25.8171478	0.0006616	-0.000415	2.2989227	16.5324116	C
0.00002688	11806.	439278324.	25.3614443	0.0006816	-0.000447	2.3531408	16.9837070	C
0.00002813	12068.	429088961.	24.9389572	0.0007014	-0.000480	2.4059319	17.4290558	C
0.00002938	12323.	419492169.	24.5460459	0.0007210	-0.000513	2.4573693	17.8689692	C
0.00003063	12569.	410427836.	24.1790833	0.0007405	-0.000546	2.5074773	18.3034422	C
0.00003188	12809.	401850194.	23.8351703	0.0007597	-0.000579	2.5562924	18.7326169	C
0.00003313	13043.	393745584.	23.5128288	0.0007789	-0.000612	2.6039321	19.1575800	C
0.00003438	13272.	386087734.	23.2104335	0.0007979	-0.000646	2.6504764	19.5790572	C
0.00003563	13496.	378831506.	22.9257955	0.0008167	-0.000680	2.6959329	19.9969564	C
0.00003688	13714.	371911908.	22.6558314	0.0008354	-0.000713	2.7402048	20.4099111	C
0.00003813	13930.	365369600.	22.4019964	0.0008541	-0.000747	2.7835720	20.8211261	C
0.00003938	14141.	359125362.	22.1607861	0.0008726	-0.000781	2.8258636	21.2283540	C
0.00004063	14348.	353184857.	21.9322858	0.0008910	-0.000815	2.8672114	21.6330680	C
0.00004188	14553.	347525294.	21.7155329	0.0009093	-0.000849	2.9076421	22.0354805	C
0.00004313	14754.	342115958.	21.5090013	0.0009276	-0.000884	2.9471184	22.4349634	C
0.00004438	14952.	336953964.	21.3127115	0.0009458	-0.000918	2.9857360	22.8326520	C
0.00004563	15148.	332020470.	21.1257478	0.0009639	-0.000952	3.0234955	23.2284489	C
0.00004688	15342.	327289186.	20.9469082	0.0009819	-0.000987	3.0603606	-23.766078	C
0.00004813	15534.	322784664.	20.7777006	0.0009999	-0.001021	3.0965496	-24.635990	C
0.00004938	15722.	318426418.	20.6137130	0.0010178	-0.001056	3.1317014	-25.510696	C
0.00005063	15910.	314270879.	20.4584447	0.0010357	-0.001091	3.1662166	-26.384490	C
0.00005188	16096.	310276331.	20.3095703	0.0010536	-0.001125	3.1999246	-27.259923	C
0.00005313	16279.	306419429.	20.1658580	0.0010713	-0.001160	3.2327554	-28.138194	C
0.00005438	16461.	302728379.	20.0293267	0.0010891	-0.001195	3.2649549	-29.015562	C
0.00005563	16641.	299169784.	19.8979712	0.0011068	-0.001229	3.2963693	-29.894479	C
0.00005688	16819.	295723647.	19.7706516	0.0011245	-0.001264	3.3269256	-30.776263	C
0.00005813	16997.	292415193.	19.6493416	0.0011421	-0.001299	3.3568563	-31.657147	C
0.00005938	17173.	289235629.	19.5336648	0.0011598	-0.001334	3.3861582	-32.537127	C
0.00006063	17347.	286132962.	19.4199285	0.0011773	-0.001369	3.4144986	-33.422082	C
0.00006188	17520.	283144481.	19.3111775	0.0011949	-0.001404	3.4422074	-34.306337	C
0.00006313	17692.	280264738.	19.2072264	0.0012125	-0.001439	3.4692927	-35.189690	C
0.00006438	17863.	277486463.	19.1077273	0.0012301	-0.001474	3.4957441	-36.072268	C
0.00006563	18032.	274768859.	19.0094647	0.0012475	-0.001509	3.5212735	-36.959706	C
0.00006688	18200.	272143933.	18.9153413	0.0012650	-0.001544	3.5461843	-37.846241	C
0.00006813	18367.	269606504.	18.8251324	0.0012825	-0.001579	3.5704731	-38.731866	C
0.00006938	18534.	267151765.	18.7386293	0.0013000	-0.001614	3.5941365	-39.616576	C
0.00007063	18699.	264763014.	18.6544733	0.0013175	-0.001649	3.6170633	-40.502750	C

Pier drilled shaft_row3

0.00007188	18862.	262432355.	18.5720981	0.0013349	-0.001684	3.6392186	-41.391314	C
0.00007313	19025.	260173222.	18.4929734	0.0013523	-0.001719	3.6607530	-42.278957	C
0.00007438	19187.	257981938.	18.4169386	0.0013698	-0.001754	3.6816630	-43.165672	C
0.00007938	19827.	249788172.	18.1362251	0.0014396	-0.001894	3.7586094	-46.713733	C
0.00008438	20453.	242408760.	17.8904625	0.0015095	-0.002034	3.8250532	-50.257681	C
0.00008938	21065.	235694245.	17.6717797	0.0015794	-0.002174	3.8807975	-53.802712	C
0.00009438	21666.	229575270.	17.4808440	0.0016498	-0.002314	3.9261301	-57.335221	C
0.00009938	22252.	223922351.	17.3099421	0.0017202	-0.002454	3.9607022	-60.000000	CY
0.0001044	22768.	218136043.	17.1462381	0.0017896	-0.002594	3.9841998	-60.000000	CY
0.0001094	23162.	211764655.	16.9764334	0.0018568	-0.002737	3.9969082	-60.000000	CY
0.0001144	23480.	205289748.	16.8062511	0.0019222	-0.002882	3.9985339	-60.000000	CY
0.0001194	23790.	199288829.	16.6552082	0.0019882	-0.003026	3.9993845	-60.000000	CY
0.0001244	24083.	193634237.	16.5160869	0.0020542	-0.003170	3.9997499	-60.000000	CY
0.0001294	24301.	187830596.	16.3719796	0.0021181	-0.003316	3.9998197	-60.000000	CY
0.0001344	24469.	182094407.	16.2313983	0.0021811	-0.003463	3.9997270	-60.000000	CY
0.0001394	24630.	176714173.	16.1008428	0.0022441	-0.003610	3.9994202	-60.000000	CY
0.0001444	24783.	171659734.	15.9795173	0.0023070	-0.003757	3.9986997	-60.000000	CY
0.0001494	24933.	166915717.	15.8693348	0.0023705	-0.003903	3.9972944	-60.000000	CY
0.0001544	25079.	162453797.	15.7690960	0.0024344	-0.004049	3.9999896	-60.000000	CY
0.0001594	25218.	158231054.	15.6735696	0.0024980	-0.004196	3.9993415	-60.000000	CY
0.0001644	25354.	154242943.	15.5851245	0.0025618	-0.004342	3.9972610	-60.000000	CY
0.0001694	25480.	150437925.	15.5020964	0.0026257	-0.004488	3.9999360	-60.000000	CY
0.0001744	25582.	146707645.	15.4186557	0.0026886	-0.004635	3.9982126	-60.000000	CY
0.0001794	25655.	143026805.	15.3332560	0.0027504	-0.004783	3.9999943	60.000000	CY
0.0001844	25712.	139456543.	15.2457585	0.0028109	-0.004933	3.9978919	60.000000	CY
0.0001894	25764.	136049626.	15.1661233	0.0028721	-0.005082	3.9999206	60.000000	CY
0.0001944	25814.	132805754.	15.0926824	0.0029336	-0.005230	3.9966317	60.000000	CY
0.0001994	25860.	129703057.	15.0261810	0.0029958	-0.005378	3.9995098	60.000000	CY
0.0002044	25904.	126745326.	14.9643120	0.0030583	-0.005525	3.9958445	60.000000	CYT
0.0002094	25944.	123913988.	14.9076566	0.0031213	-0.005672	3.9981946	60.000000	CYT
0.0002144	25983.	121202100.	14.8505328	0.0031836	-0.005820	3.9999238	60.000000	CYT
0.0002194	26015.	118586255.	14.8008618	0.0032469	-0.005967	3.9948834	60.000000	CYT
0.0002244	26044.	116073726.	14.7559181	0.0033109	-0.006113	3.9985355	60.000000	CYT
0.0002294	26071.	113662871.	14.7146061	0.0033752	-0.006259	3.9999788	60.000000	CYT
0.0002344	26092.	111324272.	14.6807274	0.0034408	-0.006403	3.9945393	60.000000	CYT
0.0002394	26111.	109079628.	14.6492599	0.0035067	-0.006547	3.9983360	60.000000	CYT
0.0002444	26129.	106921398.	14.6203870	0.0035729	-0.006691	3.9999460	60.000000	CYT
0.0002494	26145.	104841188.	14.5946163	0.0036395	-0.006834	3.9928688	60.000000	CYT
0.0002544	26160.	102839294.	14.5708197	0.0037065	-0.006977	3.9972482	60.000000	CYT
0.0002594	26174.	100911831.	14.5487563	0.0037736	-0.007120	3.9995902	60.000000	CYT

Pier drilled shaft_row3

0.0002644 26187. 99053418. 14.5285964 0.0038410 -0.007263 3.9963724 60.0000000 CYT

Axial Thrust Force = 1091.000 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	401.4365026	642298404.	312.3543343	0.0001952	0.0001690	0.7846231	5.5967161	
0.00000125	802.8726413	642298113.	166.7049472	0.0002084	0.0001559	0.8339734	5.9136418	
0.00000188	1204.	642282348.	118.1674958	0.0002216	0.0001428	0.8830286	6.2312388	
0.00000250	1606.	642256840.	93.9080293	0.0002348	0.0001298	0.9317869	6.5495071	
0.00000313	2007.	642222734.	79.3597577	0.0002480	0.0001167	0.9802460	6.8684468	
0.00000375	2408.	642180411.	69.6670845	0.0002613	0.0001038	1.0284041	7.1880580	
0.00000438	2809.	642130032.	62.7490402	0.0002745	0.00009078	1.0762591	7.5083407	
0.00000500	3210.	642071678.	57.5651399	0.0002878	0.00007783	1.1238089	7.8292953	
0.00000563	3611.	642005392.	53.5373369	0.0003011	0.00006490	1.1710515	8.1509219	
0.00000625	4012.	641931198.	50.3188032	0.0003145	0.00005199	1.2179849	8.4732206	
0.00000688	4413.	641849112.	47.6888301	0.0003279	0.00003911	1.2646070	8.7961918	
0.00000750	4813.	641759142.	45.5002788	0.0003413	0.00002625	1.3109158	9.1198357	
0.00000813	5213.	641661292.	43.6512838	0.0003547	0.00001342	1.3569093	9.4441525	
0.00000875	5614.	641555565.	42.0690844	0.0003681	6.04488E-07	1.4025854	9.7691427	
0.00000938	6013.	641439833.	40.7003040	0.0003816	-0.00001218	1.4479415	10.0948014	
0.00001000	6413.	641299191.	39.5047897	0.0003950	-0.00002495	1.4929709	10.4210890	
0.00001063	6812.	641115670.	38.4517659	0.0004086	-0.00003770	1.5376647	10.7479442	
0.00001125	7210.	640877107.	37.5173010	0.0004221	-0.00005043	1.5820141	11.0753070	
0.00001188	7607.	640577005.	36.6825225	0.0004356	-0.00006315	1.6260119	11.4031250	
0.00001250	8003.	640212927.	35.9323541	0.0004492	-0.00007585	1.6696514	11.7313534	
0.00001313	8397.	639785076.	35.2546094	0.0004627	-0.00008853	1.7129274	12.0599545	
0.00001375	8790.	639294868.	34.6393276	0.0004763	-0.000101	1.7558348	12.3888944	
0.00001438	9182.	638744708.	34.0782916	0.0004899	-0.000114	1.7983696	12.7181441	
0.00001500	9182.	612130345.	32.9835323	0.0004948	-0.000135	1.8132785	12.7948866	C
0.00001563	9182.	587645131.	32.4189710	0.0005065	-0.000150	1.8496962	13.0721899	C
0.00001625	9225.	567679404.	31.8903344	0.0005182	-0.000164	1.8854322	13.3459577	C
0.00001688	9443.	559614648.	31.3936872	0.0005298	-0.000179	1.9204988	13.6162170	C
0.00001750	9654.	551661050.	30.9257836	0.0005412	-0.000194	1.9549151	13.8830602	C
0.00001813	9857.	543837017.	30.4838619	0.0005525	-0.000209	1.9887014	14.1465987	C
0.00001875	10053.	536158661.	30.0655632	0.0005637	-0.000224	2.0218798	14.4069626	C
0.00001938	10242.	528640031.	29.6688681	0.0005748	-0.000239	2.0544738	14.6643016	C

Pier drilled shaft_row3

0.00002000	10426.	521293307.	29.2920445	0.0005858	-0.000254	2.0865083	14.9187859	C
0.00002063	10604.	514128969.	28.9336063	0.0005968	-0.000269	2.1180097	15.1706071	C
0.00002125	10777.	507155942.	28.5922784	0.0006076	-0.000285	2.1490060	15.4199792	C
0.00002188	10946.	500381730.	28.2669693	0.0006183	-0.000300	2.1795268	15.6671400	C
0.00002250	11110.	493792053.	27.9562752	0.0006290	-0.000316	2.2095731	15.9120446	C
0.00002313	11270.	487344603.	27.6582059	0.0006396	-0.000332	2.2390980	16.1541527	C
0.00002375	11426.	481110302.	27.3735501	0.0006501	-0.000347	2.2682268	16.3946950	C
0.00002438	11580.	475084238.	27.1015218	0.0006606	-0.000363	2.2969797	16.6338445	C
0.00002563	11876.	463472439.	26.5881402	0.0006813	-0.000395	2.3531266	17.1053553	C
0.00002688	12161.	452513875.	26.1137403	0.0007018	-0.000427	2.4077013	17.5700270	C
0.00002813	12436.	442166393.	25.6737907	0.0007221	-0.000459	2.4607855	18.0284044	C
0.00002938	12701.	432387164.	25.2644230	0.0007421	-0.000492	2.5124485	18.4809366	C
0.00003063	12959.	423139382.	24.8824653	0.0007620	-0.000524	2.5627620	18.9281333	C
0.00003188	13209.	414390908.	24.5253109	0.0007817	-0.000557	2.6117994	19.3705656	C
0.00003313	13452.	406087653.	24.1899100	0.0008013	-0.000590	2.6595626	19.8080011	C
0.00003438	13688.	398191159.	23.8738699	0.0008207	-0.000623	2.7060726	20.2404204	C
0.00003563	13919.	390709194.	23.5767180	0.0008399	-0.000656	2.7514836	20.6694406	C
0.00003688	14146.	383622281.	23.2972848	0.0008591	-0.000690	2.7958752	21.0958653	C
0.00003813	14367.	376829386.	23.0311501	0.0008781	-0.000723	2.8390255	21.5167342	C
0.00003938	14584.	370385744.	22.7801741	0.0008970	-0.000757	2.8812350	21.9356177	C
0.00004063	14797.	364242861.	22.5422408	0.0009158	-0.000790	2.9224481	22.3516713	C
0.00004188	15006.	358363744.	22.3155096	0.0009345	-0.000824	2.9626162	22.7640784	C
0.00004313	15213.	352770228.	22.1009925	0.0009531	-0.000858	3.0019365	23.1753227	C
0.00004438	15416.	347393350.	21.8953767	0.0009716	-0.000892	3.0402035	23.5824693	C
0.00004563	15616.	342269371.	21.7005073	0.0009901	-0.000926	3.0776741	23.9889264	C
0.00004688	15813.	337344762.	21.5137116	0.0010085	-0.000960	3.1141818	24.3922327	C
0.00004813	16008.	332626954.	21.3355214	0.0010268	-0.000994	3.1498490	24.7940059	C
0.00004938	16201.	328113484.	21.1658902	0.0010451	-0.001029	3.1847394	25.1951154	C
0.00005063	16390.	323752667.	21.0021253	0.0010632	-0.001063	3.2186606	25.5925390	C
0.00005188	16579.	319588932.	20.8468899	0.0010814	-0.001097	3.2519216	-26.451591	C
0.00005313	16765.	315567231.	20.6971002	0.0010995	-0.001132	3.2842820	-27.319749	C
0.00005438	16948.	311693583.	20.5533121	0.0011176	-0.001166	3.3158425	-28.189302	C
0.00005563	17131.	307981994.	20.4165764	0.0011357	-0.001201	3.3467476	-29.057904	C
0.00005688	17312.	304384224.	20.2839551	0.0011536	-0.001235	3.3767580	-29.929633	C
0.00005813	17490.	300909948.	20.1562807	0.0011716	-0.001270	3.4059907	-30.802638	C
0.00005938	17668.	297570864.	20.0345320	0.0011896	-0.001304	3.4345734	-31.674696	C
0.00006063	17845.	294344994.	19.9173662	0.0012075	-0.001339	3.4624101	-32.547524	C
0.00006188	18018.	291204385.	19.8029572	0.0012253	-0.001373	3.4893589	-33.423900	C
0.00006313	18191.	288177900.	19.6935953	0.0012432	-0.001408	3.5156627	-34.299331	C
0.00006438	18364.	285258796.	19.5889896	0.0012610	-0.001443	3.5413182	-35.173811	C

Pier drilled shaft_row3

0.00006563	18534.	282424406.	19.4875480	0.0012789	-0.001477	3.5662002	-36.049854	C
0.00006688	18703.	279663696.	19.3885661	0.0012966	-0.001512	3.5902675	-36.928481	C
0.00006813	18870.	276994869.	19.2936983	0.0013144	-0.001547	3.6136913	-37.806156	C
0.00006938	19037.	274412873.	19.2027254	0.0013322	-0.001582	3.6364679	-38.682873	C
0.00007063	19204.	271913010.	19.1154439	0.0013500	-0.001616	3.6585937	-39.558625	C
0.00007188	19368.	269461915.	19.0290312	0.0013677	-0.001651	3.6798380	-40.438894	C
0.00007313	19531.	267083951.	18.9458510	0.0013854	-0.001686	3.7004235	-41.318573	C
0.00007438	19693.	264777273.	18.8659169	0.0014032	-0.001721	3.7203627	-42.197281	C
0.00007938	20332.	256155894.	18.5716013	0.0014741	-0.001860	3.7932719	-45.711551	C
0.00008438	20957.	248380725.	18.3133033	0.0015452	-0.001999	3.8552668	-49.223042	C
0.00008938	21566.	241301699.	18.0835405	0.0016162	-0.002138	3.9062188	-52.735479	C
0.00009438	22164.	234847913.	17.8828902	0.0016877	-0.002276	3.9463802	-56.234871	C
0.00009938	22746.	228895240.	17.7029094	0.0017592	-0.002415	3.9754040	-59.732884	C
0.0001044	23284.	223081563.	17.5377394	0.0018305	-0.002553	3.9932148	-60.000000	CY
0.0001094	23724.	216907343.	17.3723142	0.0019001	-0.002694	3.9999060	-60.000000	CY
0.0001144	24044.	210217651.	17.1979620	0.0019670	-0.002837	3.9982594	-60.000000	CY
0.0001194	24350.	203975763.	17.0424750	0.0020344	-0.002979	3.9991617	-60.000000	CY
0.0001244	24643.	198137724.	16.8993953	0.0021019	-0.003122	3.9995735	-60.000000	CY
0.0001294	24896.	192435258.	16.7623584	0.0021686	-0.003265	3.9996940	-60.000000	CY
0.0001344	25073.	186592945.	16.6217901	0.0022336	-0.003410	3.9995698	-60.000000	CY
0.0001394	25231.	181026069.	16.4868094	0.0022978	-0.003556	3.9991527	-60.000000	CY
0.0001444	25382.	175804835.	16.3628874	0.0023624	-0.003701	3.9982638	-60.000000	CY
0.0001494	25529.	170905141.	16.2502861	0.0024274	-0.003846	3.9975398	-60.000000	CY
0.0001544	25671.	166291262.	16.1465665	0.0024926	-0.003991	3.9998964	-60.000000	CY
0.0001594	25807.	161926719.	16.0476315	0.0025576	-0.004136	3.9988828	-60.000000	CY
0.0001644	25940.	157809674.	15.9570323	0.0026229	-0.004281	3.9963134	-60.000000	CY
0.0001694	26069.	153915498.	15.8742950	0.0026887	-0.004425	3.9997249	60.000000	CY
0.0001744	26188.	150180207.	15.7963233	0.0027545	-0.004569	3.9974895	60.000000	CY
0.0001794	26277.	146489414.	15.7171081	0.0028193	-0.004714	3.9999143	60.000000	CY
0.0001844	26337.	142847362.	15.6334815	0.0028824	-0.004861	3.9972727	60.000000	CY
0.0001894	26384.	139324007.	15.5551842	0.0029458	-0.005008	3.9997713	60.000000	CY
0.0001944	26430.	135973021.	15.4825403	0.0030094	-0.005154	3.9958720	60.000000	CYT
0.0001994	26472.	132774447.	15.4160558	0.0030736	-0.005300	3.9991872	60.000000	CYT
0.0002044	26513.	129726539.	15.3540615	0.0031380	-0.005446	3.9977829	60.000000	CYT
0.0002094	26544.	126779617.	15.2984617	0.0032031	-0.005591	3.9976018	60.000000	CYT
0.0002144	26574.	123958609.	15.2450920	0.0032682	-0.005736	3.9997894	60.000000	CYT
0.0002194	26597.	121241892.	15.1985094	0.0033342	-0.005880	3.9941125	60.000000	CYT
0.0002244	26617.	118626851.	15.1575639	0.0034010	-0.006023	3.9981822	60.000000	CYT
0.0002294	26635.	116121572.	15.1194841	0.0034680	-0.006166	3.9999315	60.000000	CYT
0.0002344	26651.	113711401.	15.0854796	0.0035357	-0.006308	3.9939650	60.000000	CYT

Pier drilled shaft_row3

0.0002394	26666.	111397735.	15.0539842	0.0036035	-0.006450	3.9980046	60.0000000	CYT
0.0002444	26680.	109175447.	15.0246972	0.0036717	-0.006592	3.9998697	60.0000000	CYT
0.0002494	26692.	107036873.	14.9979493	0.0037401	-0.006734	3.9934359	60.0000000	CYT
0.0002544	26704.	104978541.	14.9732934	0.0038088	-0.006875	3.9967299	60.0000000	CYT

Axial Thrust Force = 1102.000 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	401.0288033	641646085.	315.4375214	0.0001971	0.0001709	0.7919464	5.6525988	
0.00000125	802.0573802	641645904.	168.2465696	0.0002103	0.0001578	0.8412403	5.9695257	
0.00000188	1203.	641630160.	119.1952762	0.0002235	0.0001447	0.8902393	6.2871244	
0.00000250	1604.	641604644.	94.6788983	0.0002367	0.0001317	0.9389411	6.6053951	
0.00000313	2005.	641570513.	79.9764875	0.0002499	0.0001187	0.9873440	6.9243379	
0.00000375	2406.	641528153.	70.1810614	0.0002632	0.0001057	1.0354457	7.2439529	
0.00000438	2806.	641477727.	63.1896276	0.0002765	0.00009270	1.0832442	7.5642403	
0.00000500	3207.	641419316.	57.9506901	0.0002898	0.00007975	1.1307376	7.8852001	
0.00000563	3608.	641352964.	53.8800846	0.0003031	0.00006683	1.1779238	8.2068326	
0.00000625	4008.	641278696.	50.6273127	0.0003164	0.00005392	1.2248007	8.5291380	
0.00000688	4408.	641196526.	47.9693302	0.0003298	0.00004104	1.2713663	8.8521165	
0.00000750	4808.	641106464.	45.7574408	0.0003432	0.00002818	1.3176186	9.1757684	
0.00000813	5208.	641008514.	43.8887013	0.0003566	0.00001535	1.3635556	9.5000940	
0.00000875	5608.	640902677.	42.2895807	0.0003700	0.00000253	1.4091751	9.8250936	
0.00000938	6007.	640787786.	40.9061464	0.0003835	-0.00001025	1.4544748	10.1507648	
0.00001000	6407.	640651201.	39.6978429	0.0003970	-0.00002302	1.4994488	10.4770745	
0.00001063	6805.	640474827.	38.6335716	0.0004105	-0.00003577	1.5440883	10.8039630	
0.00001125	7203.	640245654.	37.6891427	0.0004240	-0.00004850	1.5883847	11.1313703	
0.00001188	7599.	639956481.	36.8454791	0.0004375	-0.00006121	1.6323303	11.4592431	
0.00001250	7995.	639604265.	36.0873397	0.0004511	-0.00007391	1.6759186	11.7875357	
0.00001313	8389.	639188812.	35.4024058	0.0004647	-0.00008659	1.7191441	12.1162095	
0.00001375	8782.	638711225.	34.7806078	0.0004782	-0.00009927	1.7620018	12.4452299	
0.00001438	9174.	638173776.	34.2136404	0.0004918	-0.000112	1.8044873	12.7745676	
0.00001500	9174.	611583202.	33.1361140	0.0004970	-0.000133	1.8204496	12.8612596	C
0.00001563	9174.	587119874.	32.5689132	0.0005089	-0.000147	1.8569754	13.1401326	C
0.00001625	9251.	569311922.	32.0367683	0.0005206	-0.000162	1.8927636	13.4149646	C
0.00001688	9472.	561291668.	31.5367363	0.0005322	-0.000177	1.9278741	13.6862216	C
0.00001750	9684.	553380778.	31.0657752	0.0005437	-0.000191	1.9623377	13.9541060	C

Pier drilled shaft_row3

0.00001813	9889.	545597746.	30.6210929	0.0005550	-0.000206	1.9961748	14.2187307	C
0.00001875	10087.	537958761.	30.2003045	0.0005663	-0.000221	2.0294077	14.4802281	C
0.00001938	10278.	530477940.	29.8013680	0.0005774	-0.000236	2.0620597	14.7387500	C
0.00002000	10463.	523167522.	29.4225324	0.0005885	-0.000252	2.0941561	14.9944688	C
0.00002063	10643.	516038039.	29.0622946	0.0005994	-0.000267	2.1257232	15.2475787	C
0.00002125	10818.	509098465.	28.7193654	0.0006103	-0.000282	2.1567893	15.4982965	C
0.00002188	10988.	502323224.	28.3919063	0.0006211	-0.000298	2.1873380	15.7463965	C
0.00002250	11153.	495702296.	28.0785090	0.0006318	-0.000313	2.2173684	15.9918019	C
0.00002313	11315.	489284607.	27.7792782	0.0006424	-0.000329	2.2469679	16.2353473	C
0.00002375	11473.	483075831.	27.4935446	0.0006530	-0.000345	2.2761706	16.4773414	C
0.00002438	11627.	476991011.	27.2184941	0.0006635	-0.000360	2.3048609	16.7165294	C
0.00002563	11926.	465410085.	26.7030886	0.0006843	-0.000392	2.3611328	17.1907765	C
0.00002688	12213.	454450118.	26.2262623	0.0007048	-0.000424	2.4157831	17.6577243	C
0.00002813	12490.	444079450.	25.7836249	0.0007252	-0.000456	2.4689019	18.1179874	C
0.00002938	12757.	434279281.	25.3719078	0.0007453	-0.000488	2.5206035	18.5725003	C
0.00003063	13016.	425012407.	24.9879047	0.0007653	-0.000521	2.5709594	19.0217767	C
0.00003188	13267.	416208363.	24.6277017	0.0007850	-0.000554	2.6199418	19.4652131	C
0.00003313	13510.	407862830.	24.2897883	0.0008046	-0.000587	2.6676731	19.9039468	C
0.00003438	13748.	399953845.	23.9724302	0.0008241	-0.000620	2.7142322	20.3386726	C
0.00003563	13981.	392460146.	23.6741709	0.0008434	-0.000653	2.7596963	20.7701217	C
0.00003688	14208.	385312574.	23.3918576	0.0008626	-0.000686	2.8039765	21.1969991	C
0.00003813	14430.	378503817.	23.1246562	0.0008816	-0.000720	2.8471567	21.6201168	C
0.00003938	14650.	372052069.	22.8730845	0.0009006	-0.000753	2.8894256	22.0417098	C
0.00004063	14863.	365850254.	22.6324224	0.0009194	-0.000787	2.9304977	22.4579165	C
0.00004188	15074.	359965322.	22.4053639	0.0009382	-0.000821	2.9707271	22.8731952	C
0.00004313	15280.	354318304.	22.1883748	0.0009569	-0.000854	3.0099039	23.2846051	C
0.00004438	15484.	348937318.	21.9826655	0.0009755	-0.000888	3.0482338	23.6947991	C
0.00004563	15684.	343764484.	21.7855399	0.0009940	-0.000922	3.0855583	24.1014363	C
0.00004688	15883.	338836614.	21.5988397	0.0010124	-0.000956	3.1221281	24.5079536	C
0.00004813	16077.	334073932.	21.4185770	0.0010308	-0.000990	3.1576463	24.9099202	C
0.00004938	16271.	329538307.	21.2481226	0.0010491	-0.001025	3.1924950	25.3128619	C
0.00005063	16461.	325154257.	21.0834592	0.0010674	-0.001059	3.2263597	25.7119475	C
0.00005188	16649.	320951116.	20.9264047	0.0010856	-0.001093	3.2594680	-26.331971	C
0.00005313	16837.	316927119.	20.7770208	0.0011038	-0.001127	3.2918788	-27.196621	C
0.00005438	17020.	313016904.	20.6315404	0.0011218	-0.001162	3.3232832	-28.065946	C
0.00005563	17203.	309270361.	20.4931905	0.0011399	-0.001196	3.3540314	-28.934316	C
0.00005688	17385.	305672784.	20.3612523	0.0011580	-0.001231	3.3840961	-29.802141	C
0.00005813	17563.	302165866.	20.2320645	0.0011760	-0.001265	3.4131683	-30.674895	C
0.00005938	17741.	298795478.	20.1088683	0.0011940	-0.001300	3.4415895	-31.546699	C
0.00006063	17918.	295553076.	19.9912961	0.0012120	-0.001334	3.4693563	-32.417546	C

Pier drilled shaft_row3

0.00006188	18092.	292400659.	19.8768016	0.0012299	-0.001369	3.4962592	-33.291395	C
0.00006313	18265.	289345922.	19.7661304	0.0012477	-0.001404	3.5223966	-34.166546	C
0.00006438	18437.	286399634.	19.6602683	0.0012656	-0.001438	3.5478845	-35.040743	C
0.00006563	18608.	283555503.	19.5589438	0.0012836	-0.001473	3.5727196	-35.913979	C
0.00006688	18777.	280780656.	19.4597020	0.0013014	-0.001507	3.5966995	-36.790522	C
0.00006813	18945.	278087071.	19.3636872	0.0013192	-0.001542	3.6199501	-37.667884	C
0.00006938	19112.	275481180.	19.2716109	0.0013370	-0.001577	3.6425524	-38.544284	C
0.00007063	19278.	272958240.	19.1832670	0.0013548	-0.001611	3.6645030	-39.419715	C
0.00007188	19443.	270509580.	19.0980758	0.0013727	-0.001646	3.6857648	-40.294979	C
0.00007313	19606.	268109685.	19.0138805	0.0013904	-0.001681	3.7061697	-41.174308	C
0.00007438	19768.	265781782.	18.9329676	0.0014081	-0.001716	3.7259269	-42.052662	C
0.00007938	20408.	257103414.	18.6373019	0.0014793	-0.001854	3.7982695	-45.560317	C
0.00008438	21031.	249257487.	18.3757841	0.0015505	-0.001993	3.8594887	-49.070159	C
0.00008938	21641.	242133240.	18.1454190	0.0016217	-0.002132	3.9097758	-52.575098	C
0.00009438	22237.	235621491.	17.9422083	0.0016933	-0.002270	3.9490939	-56.072525	C
0.00009938	22820.	229631164.	17.7622224	0.0017651	-0.002409	3.9773252	-59.561951	C
0.0001044	23360.	223805623.	17.5958187	0.0018366	-0.002547	3.9942324	-60.000000	CY
0.0001094	23807.	217663362.	17.4324121	0.0019067	-0.002687	3.9999926	-60.000000	CY
0.0001144	24127.	210945319.	17.2567333	0.0019737	-0.002830	3.9988033	-60.000000	CY
0.0001194	24431.	204661665.	17.0995172	0.0020413	-0.002972	3.9995277	-60.000000	CY
0.0001244	24726.	198799718.	16.9575413	0.0021091	-0.003115	3.9998314	-60.000000	CY
0.0001294	24983.	193103792.	16.8204297	0.0021761	-0.003258	3.9999093	-60.000000	CY
0.0001344	25162.	187250892.	16.6791723	0.0022413	-0.003402	3.9998421	-60.000000	CY
0.0001394	25320.	181667849.	16.5458204	0.0023061	-0.003548	3.9995843	-60.000000	CY
0.0001444	25470.	176416946.	16.4205314	0.0023707	-0.003693	3.9989213	-60.000000	CY
0.0001494	25616.	171489735.	16.3066635	0.0024358	-0.003838	3.9975724	-60.000000	CY
0.0001544	25759.	166857122.	16.2029450	0.0025013	-0.003982	3.9999991	-60.000000	CY
0.0001594	25895.	162476186.	16.1048274	0.0025667	-0.004127	3.9994355	-60.000000	CY
0.0001644	26027.	158336587.	16.0131637	0.0026322	-0.004272	3.9974057	-60.000000	CY
0.0001694	26155.	154421601.	15.9293889	0.0026980	-0.004416	3.9999552	60.000000	CY
0.0001744	26274.	150675472.	15.8509894	0.0027640	-0.004560	3.9984002	60.000000	CY
0.0001794	26366.	146988638.	15.7747642	0.0028296	-0.004704	3.9994956	60.000000	CY
0.0001844	26429.	143345329.	15.6937804	0.0028935	-0.004850	3.9983650	60.000000	CY
0.0001894	26476.	139806131.	15.6143482	0.0029570	-0.004997	3.9999895	60.000000	CY
0.0001944	26520.	136436066.	15.5411709	0.0030208	-0.005143	3.9972787	60.000000	CYT
0.0001994	26561.	133223406.	15.4736518	0.0030851	-0.005289	3.9997332	60.000000	CYT
0.0002044	26600.	130153433.	15.4119021	0.0031498	-0.005434	3.9949617	60.000000	CYT
0.0002094	26632.	127195227.	15.3583647	0.0032157	-0.005578	3.9987274	60.000000	CYT
0.0002144	26661.	124366806.	15.3065200	0.0032813	-0.005722	3.9999997	60.000000	CYT
0.0002194	26682.	121625421.	15.2612756	0.0033479	-0.005866	3.9961398	60.000000	CYT

Pier drilled shaft_row3

0.0002244	26701.	118999538.	15.2195329	0.0034149	-0.006009	3.9992220	60.0000000	CYT
0.0002294	26718.	116480950.	15.1812323	0.0034822	-0.006152	3.9980074	60.0000000	CYT
0.0002344	26733.	114060143.	15.1466732	0.0035500	-0.006294	3.9960965	60.0000000	CYT
0.0002394	26747.	111737133.	15.1144922	0.0036180	-0.006436	3.9991408	60.0000000	CYT
0.0002444	26760.	109505403.	15.0846592	0.0036863	-0.006577	3.9987815	60.0000000	CYT
0.0002494	26772.	107357239.	15.0575141	0.0037550	-0.006719	3.9946558	60.0000000	CYT
0.0002544	26783.	105290813.	15.0322514	0.0038238	-0.006860	3.9982957	60.0000000	CYT

Axial Thrust Force = 1326.000 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	392.6323225	628211716.	378.9350591	0.0002368	0.0002106	0.9409106	6.8034917	
0.00000125	785.2672513	628213801.	199.9959471	0.0002500	0.0001975	0.9890448	7.1204406	
0.00000188	1178.	628198469.	140.3622042	0.0002632	0.0001844	1.0368837	7.4380761	
0.00000250	1570.	628172772.	110.5548044	0.0002764	0.0001714	1.0844253	7.7563983	
0.00000313	1963.	628138122.	92.6779430	0.0002896	0.0001584	1.1316674	8.0754073	
0.00000375	2355.	628094985.	80.7663518	0.0003029	0.0001454	1.1786080	8.3951033	
0.00000438	2748.	628043563.	72.2634876	0.0003162	0.0001324	1.2252451	8.7154862	
0.00000500	3140.	627983954.	65.8910791	0.0003295	0.0001195	1.2715765	9.0365565	
0.00000563	3532.	627916211.	60.9389755	0.0003428	0.0001065	1.3176002	9.3583141	
0.00000625	3924.	627840366.	56.9810866	0.0003561	0.00009363	1.3633140	9.6807595	
0.00000688	4316.	627756437.	53.7462644	0.0003695	0.00008076	1.4087159	10.0038927	
0.00000750	4707.	627664435.	51.0537433	0.0003829	0.00006790	1.4538038	10.3277142	
0.00000813	5099.	627564365.	48.7783784	0.0003963	0.00005507	1.4985757	10.6522242	
0.00000875	5490.	627456232.	46.8307802	0.0004098	0.00004227	1.5430293	10.9774230	
0.00000938	5881.	627340036.	45.1453969	0.0004232	0.00002949	1.5871627	11.3033111	
0.00001000	6272.	627215776.	43.6730645	0.0004367	0.00001673	1.6309738	11.6298887	
0.00001063	6663.	627083451.	42.3761872	0.0004502	0.00000400	1.6744604	11.9571565	
0.00001125	7053.	626942633.	41.2255199	0.0004638	-0.00000871	1.7176203	12.2851134	
0.00001188	7443.	626786375.	40.1979142	0.0004774	-0.00002140	1.7604490	12.6137380	
0.00001250	7833.	626602336.	39.2747839	0.0004909	-0.00003407	1.8029394	12.9429842	
0.00001313	8221.	626380088.	38.4410715	0.0005045	-0.00004671	1.8450842	13.2728016	
0.00001375	8609.	626112489.	37.6844640	0.0005182	-0.00005934	1.8868765	13.6031426	
0.00001438	8996.	625795469.	36.9948033	0.0005318	-0.00007195	1.9283102	13.9339649	
0.00001500	9381.	625426990.	36.3636344	0.0005455	-0.00008455	1.9693799	14.2652310	
0.00001563	9766.	625006841.	35.7838685	0.0005591	-0.00009713	2.0100810	14.5969092	

Pier drilled shaft_row3

0.00001625	10149.	624535535.	35.2495125	0.0005728	-0.000110	2.0504091	14.9289703
0.00001688	10149.	601404589.	34.3584577	0.0005798	-0.000129	2.0706774	15.0671015 C
0.00001750	10160.	580573191.	33.8305356	0.0005920	-0.000143	2.1061654	15.3572218 C
0.00001813	10404.	574030722.	33.3318989	0.0006041	-0.000157	2.1409508	15.6435981 C
0.00001875	10640.	567460978.	32.8606444	0.0006161	-0.000171	2.1750989	15.9267878 C
0.00001938	10868.	560918861.	32.4146791	0.0006280	-0.000186	2.2086493	16.2071041 C
0.00002000	11088.	554417576.	31.9916654	0.0006398	-0.000200	2.2416116	16.4845660 C
0.00002063	11302.	547967739.	31.5895507	0.0006515	-0.000215	2.2739956	16.7591938 C
0.00002125	11509.	541589862.	31.2067329	0.0006631	-0.000229	2.3058230	17.0311367 C
0.00002188	11710.	535302257.	30.8418284	0.0006747	-0.000244	2.3371173	17.3005662 C
0.00002250	11904.	529085704.	30.4929604	0.0006861	-0.000259	2.3678617	17.5672318 C
0.00002313	12093.	522955425.	30.1590383	0.0006974	-0.000274	2.3980764	17.8312739 C
0.00002375	12278.	516948342.	29.8395949	0.0007087	-0.000289	2.4278133	18.0931836 C
0.00002438	12457.	511076585.	29.5338619	0.0007199	-0.000304	2.4571001	18.3532050 C
0.00002563	12803.	499632073.	28.9576908	0.0007420	-0.000334	2.5142220	18.8662278 C
0.00002688	13134.	488694087.	28.4257578	0.0007639	-0.000365	2.5696286	19.3719559 C
0.00002813	13450.	478235157.	27.9324688	0.0007856	-0.000396	2.6233780	19.8706387 C
0.00002938	13754.	468214158.	27.4727682	0.0008070	-0.000427	2.6754963	20.3621707 C
0.00003063	14047.	458668129.	27.0443000	0.0008282	-0.000458	2.7261477	20.8481126 C
0.00003188	14330.	449570803.	26.6437880	0.0008493	-0.000489	2.7753890	21.3288327 C
0.00003313	14604.	440879694.	26.2679437	0.0008701	-0.000521	2.8232362	21.8042121 C
0.00003438	14869.	432558158.	25.9139228	0.0008908	-0.000553	2.8697028	22.2740980 C
0.00003563	15127.	424611789.	25.5804425	0.0009113	-0.000585	2.9148949	22.7395384 C
0.00003688	15378.	417028439.	25.2660080	0.0009317	-0.000617	2.9588808	23.2011686 C
0.00003813	15623.	409796516.	24.9693869	0.0009520	-0.000649	3.0017300	23.6596973 C
0.00003938	15861.	402830114.	24.6868607	0.0009720	-0.000682	3.0432919	24.1128154 C
0.00004063	16095.	396175015.	24.4193379	0.0009920	-0.000714	3.0837737	24.5631262 C
0.00004188	16324.	389824973.	24.1662313	0.0010120	-0.000747	3.1232510	25.0115485 C
0.00004313	16546.	383684259.	23.9234486	0.0010317	-0.000780	3.1614949	25.4545318 C
0.00004438	16767.	377838457.	23.6940328	0.0010514	-0.000812	3.1988598	25.8971149 C
0.00004563	16981.	372183670.	23.4735695	0.0010710	-0.000845	3.2350669	26.3349105 C
0.00004688	17193.	366785753.	23.2645949	0.0010905	-0.000878	3.2704140	26.7723401 C
0.00004813	17400.	361560117.	23.0633617	0.0011099	-0.000911	3.3046599	27.2054230 C
0.00004938	17606.	356571941.	22.8726758	0.0011293	-0.000944	3.3381132	27.6390191 C
0.00005063	17806.	351720941.	22.6878612	0.0011486	-0.000978	3.3704399	28.0674101 C
0.00005188	18005.	347087266.	22.5127052	0.0011678	-0.001011	3.4020212	28.4969323 C
0.00005313	18200.	342588963.	22.3431689	0.0011870	-0.001044	3.4325673	28.9224135 C
0.00005438	18393.	338260173.	22.1810304	0.0012061	-0.001078	3.4622791	29.3472687 C
0.00005563	18584.	334098824.	22.0262249	0.0012252	-0.001111	3.4911958	29.7721980 C
0.00005688	18771.	330041295.	21.8753885	0.0012442	-0.001145	3.5190762	30.1924504 C

Pier drilled shaft_row3

0.00005813	18957.	326144100.	21.7316972	0.0012632	-0.001178	3.5462256	30.6138110	C
0.00005938	19141.	322379737.	21.5936851	0.0012821	-0.001212	3.5725558	31.0345323	C
0.00006063	19322.	318709664.	21.4591866	0.0013010	-0.001245	3.5979215	31.4514260	C
0.00006188	19501.	315174730.	21.3307375	0.0013198	-0.001279	3.6225611	31.8694235	C
0.00006313	19680.	311765867.	21.2079245	0.0013388	-0.001312	3.6464653	32.2884258	C
0.00006438	19855.	308425356.	21.0871552	0.0013575	-0.001346	3.6693736	32.7023393	C
0.00006563	20029.	305199857.	20.9715664	0.0013763	-0.001380	3.6915595	-33.225581	C
0.00006688	20202.	302082790.	20.8608715	0.0013951	-0.001414	3.7130185	-34.073128	C
0.00006813	20373.	299053355.	20.7537557	0.0014138	-0.001447	3.7336678	-34.921630	C
0.00006938	20541.	296093010.	20.6490220	0.0014325	-0.001481	3.7534383	-35.773105	C
0.00007063	20709.	293226099.	20.5485398	0.0014512	-0.001515	3.7724853	-36.623466	C
0.00007188	20876.	290447630.	20.4520912	0.0014700	-0.001549	3.7908042	-37.472704	C
0.00007313	21042.	287748660.	20.3591329	0.0014888	-0.001582	3.8083675	-38.321533	C
0.00007438	21204.	285097334.	20.2672637	0.0015074	-0.001616	3.8250265	-39.174754	C
0.00007938	21846.	275219212.	19.9331132	0.0015822	-0.001752	3.8843404	-42.577521	C
0.00008438	22465.	266252676.	19.6367130	0.0016568	-0.001887	3.9313335	-45.984824	C
0.00008938	23067.	258089798.	19.3754205	0.0017317	-0.002022	3.9662124	-49.387088	C
0.00009438	23652.	250618000.	19.1455825	0.0018069	-0.002157	3.9889313	-52.779040	C
0.00009938	24219.	243709511.	18.9396024	0.0018821	-0.002292	3.9992964	-56.168889	C
0.0001044	24770.	237314602.	18.7593315	0.0019580	-0.002426	3.9983886	-59.540655	C
0.0001094	25279.	231121515.	18.5942030	0.0020337	-0.002560	3.9998008	-60.000000	CY
0.0001144	25702.	224715992.	18.4324595	0.0021082	-0.002696	3.9981900	-60.000000	CY
0.0001194	26013.	217907189.	18.2679006	0.0021807	-0.002833	3.9988892	-60.000000	CY
0.0001244	26290.	211373501.	18.1106687	0.0022525	-0.002971	3.9992668	-60.000000	CY
0.0001294	26558.	205279869.	17.9705153	0.0023249	-0.003109	3.9993947	-60.000000	CY
0.0001344	26815.	199550297.	17.8440070	0.0023978	-0.003246	3.9993175	-60.000000	CY
0.0001394	27017.	193844497.	17.7134096	0.0024688	-0.003385	3.9988410	-60.000000	CY
0.0001444	27161.	188130435.	17.5810714	0.0025383	-0.003525	3.9976894	-60.000000	CY
0.0001494	27301.	182766207.	17.4605215	0.0026082	-0.003666	3.9998704	60.000000	CY
0.0001544	27431.	177693421.	17.3467629	0.0026779	-0.003806	3.9996013	60.000000	CY
0.0001594	27552.	172877210.	17.2437554	0.0027482	-0.003946	3.9980448	60.000000	CY
0.0001644	27666.	168311858.	17.1513674	0.0028193	-0.004084	3.9996931	60.000000	CY
0.0001694	27773.	163976375.	17.0686617	0.0028910	-0.004223	3.9991949	60.000000	CY
0.0001744	27875.	159856300.	16.9930524	0.0029632	-0.004361	3.9961804	60.000000	CY
0.0001794	27966.	155907986.	16.9233996	0.0030356	-0.004498	3.9996207	60.000000	CY
0.0001844	28049.	152132040.	16.8624715	0.0031090	-0.004635	3.9966028	60.000000	CYT
0.0001894	28116.	148465070.	16.8099085	0.0031834	-0.004770	3.9997381	60.000000	CYT
0.0001944	28167.	144908207.	16.7585988	0.0032575	-0.004906	3.9962863	60.000000	CYT
0.0001994	28199.	141437040.	16.7065668	0.0033309	-0.005043	3.9995134	60.000000	CYT
0.0002044	28214.	138050673.	16.6522607	0.0034033	-0.005180	3.9953352	60.000000	CYT

Pier drilled shaft_row3							
0.0002094	28227.	134817364.	16.6022174	0.0034761	-0.005318	3.9984588	60.0000000 CYT
0.0002144	28238.	131724092.	16.5526049	0.0035485	-0.005455	3.9999862	60.0000000 CYT
0.0002194	28247.	128761572.	16.5060793	0.0036210	-0.005593	3.9956881	60.0000000 CYT
0.0002244	28255.	125926713.	16.4627529	0.0036938	-0.005730	3.9989833	60.0000000 CYT
0.0002294	28262.	123211252.	16.4224141	0.0037669	-0.005867	3.9993607	60.0000000 CYT
0.0002344	28262.	120582745.	16.4296651	0.0038507	-0.005993	3.9967778	60.0000000 CYT

Summary of Results for Nominal Moment Capacity for Section 2

Moment values interpolated at maximum compressive strain = 0.003
or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain	Max. Tens. Strain
1	846.000	24468.207	0.00300000	-0.00604311
2	848.900	24492.681	0.00300000	-0.00603126
3	1018.000	25862.475	0.00300000	-0.00538771
4	1091.000	26423.057	0.00300000	-0.00513268
5	1102.000	26505.424	0.00300000	-0.00509529
6	1326.000	27921.224	0.00300000	-0.00443049

Note that the values of moment capacity in the table above are not factored by a strength reduction factor (phi-factor).

In ACI 318, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.75).

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318, or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Resist.	Nominal	Nominal	Ult. (Fac)	Ult. (Fac)	Bend. Stiff.
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Load No.	Factor	Pier drilled shaft_row3				at Ult Mom kip-in^2
		Ax. Thrust kips	Moment Cap in-kips	Ax. Thrust kips	Moment Cap in-kips	
1	0.65	846.000000	24468.	549.900000	15904.	268805135.
2	0.65	848.900000	24493.	551.785000	15920.	269261781.
3	0.65	1018.	25862.	661.700000	16811.	295891611.
4	0.65	1091.	26423.	709.150000	17175.	307114466.
5	0.65	1102.	26505.	716.300000	17229.	308768968.
6	0.65	1326.	27921.	861.900000	18149.	343771743.
1	0.75	846.000000	24468.	634.500000	18351.	236417865.
2	0.75	848.900000	24493.	636.675000	18370.	236739418.
3	0.75	1018.	25862.	763.500000	19397.	255298436.
4	0.75	1091.	26423.	818.250000	19817.	263099228.
5	0.75	1102.	26505.	826.500000	19879.	264269346.
6	0.75	1326.	27921.	994.500000	20941.	289388967.
1	0.90	846.000000	24468.	761.400000	22021.	194002021.
2	0.90	848.900000	24493.	764.010000	22043.	194261888.
3	0.90	1018.	25862.	916.200000	23276.	209435803.
4	0.90	1091.	26423.	981.900000	23781.	215723759.
5	0.90	1102.	26505.	991.800000	23855.	216656485.
6	0.90	1326.	27921.	1193.	25129.	232943601.

Layering Correction Equivalent Depths of Soil & Rock Layers

Layer No.	Top of Layer Below Pile Head ft	Equivalent Top Depth Below Grnd Surf ft	Same Layer Type As Layer Above	Layer is Rock or is Below Rock Layer	F0 Integral for Layer lbs	F1 Integral for Layer lbs
1	0.00	0.00	N.A.	No	0.00	265392.
2	6.0000	6.0000	No	Yes	N.A.	N.A.

Notes: The F0 integral of Layer n+1 equals the sum of the F0 and F1 integrals

Pier drilled shaft_row3

for Layer n. Layering correction equivalent depths are computed only for soil types with both shallow-depth and deep-depth expressions for peak lateral load transfer. These soil types are soft and stiff clays, non-liquefied sands, and cemented c-phi soil.

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 1

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 19020.0 lbs
 Applied moment at pile head = 3836400.0 in-lbs
 Axial thrust load on pile head = 848900.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in ²	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	0.01917	3836400.	19020.	-3.89E-04	0.00	1.12E+12	-228.299	11434.	0.00
0.1600	0.01843	3873126.	18582.	-3.82E-04	0.00	1.12E+12	-228.304	23788.	0.00
0.3200	0.01770	3909000.	18143.	-3.76E-04	0.00	1.12E+12	-228.236	24759.	0.00
0.4800	0.01698	3944022.	17705.	-3.69E-04	0.00	1.12E+12	-228.092	25785.	0.00
0.6400	0.01628	3978191.	17268.	-3.62E-04	0.00	1.12E+12	-227.873	26870.	0.00
0.8000	0.01559	4011510.	16830.	-3.55E-04	0.00	1.12E+12	-227.574	28021.	0.00
0.9600	0.01492	4043978.	16394.	-3.48E-04	0.00	1.12E+12	-227.195	29241.	0.00
1.1200	0.01426	4075598.	15958.	-3.41E-04	0.00	1.12E+12	-226.733	30537.	0.00
1.2800	0.01361	4106370.	15523.	-3.34E-04	0.00	1.12E+12	-226.186	31917.	0.00
1.4400	0.01297	4136297.	15090.	-3.27E-04	0.00	1.12E+12	-225.552	33386.	0.00
1.6000	0.01235	4165381.	14657.	-3.20E-04	0.00	1.12E+12	-224.828	34955.	0.00
1.7600	0.01174	4193625.	14226.	-3.13E-04	0.00	1.12E+12	-224.011	36632.	0.00
1.9200	0.01115	4221031.	13797.	-3.06E-04	0.00	1.12E+12	-223.099	38428.	0.00
2.0800	0.01057	4247603.	13370.	-2.99E-04	0.00	1.12E+12	-222.087	40355.	0.00
2.2400	0.01000	4273344.	12944.	-2.91E-04	0.00	1.12E+12	-220.974	42427.	0.00
2.4000	0.00945	4298259.	12521.	-2.84E-04	0.00	1.12E+12	-219.755	44660.	0.00
2.5600	0.00891	4322351.	12101.	-2.77E-04	0.00	1.12E+12	-218.426	47071.	0.00

Pier drilled shaft_row3

2.7200	0.00839	4345627.	11683.	-2.69E-04	0.00	1.12E+12	-216.983	49682.	0.00
2.8800	0.00788	4368090.	11267.	-2.62E-04	0.00	1.12E+12	-215.420	52517.	0.00
3.0400	0.00738	4389747.	10855.	-2.54E-04	0.00	1.12E+12	-213.734	55603.	0.00
3.2000	0.00690	4410604.	10447.	-2.47E-04	0.00	1.12E+12	-211.918	58973.	0.00
3.3600	0.00643	4430667.	10042.	-2.39E-04	0.00	1.12E+12	-209.966	62666.	0.00
3.5200	0.00598	4449944.	9641.	-2.31E-04	0.00	1.12E+12	-207.871	66727.	0.00
3.6800	0.00554	4468442.	9244.	-2.24E-04	0.00	1.12E+12	-205.625	71211.	0.00
3.8400	0.00512	4486170.	8851.	-2.16E-04	0.00	1.12E+12	-203.219	76183.	0.00
4.0000	0.00471	4503136.	8464.	-2.08E-04	0.00	1.12E+12	-200.644	81722.	0.00
4.1600	0.00432	4519350.	8081.	-2.01E-04	0.00	1.12E+12	-197.886	87927.	0.00
4.3200	0.00394	4534821.	7704.	-1.93E-04	0.00	1.12E+12	-194.934	94918.	0.00
4.4800	0.00358	4549562.	7333.	-1.85E-04	0.00	1.12E+12	-191.772	102849.	0.00
4.6400	0.00323	4563582.	6968.	-1.77E-04	0.00	1.12E+12	-188.382	111912.	0.00
4.8000	0.00290	4576896.	6610.	-1.70E-04	0.00	1.12E+12	-184.741	122359.	0.00
4.9600	0.00258	4589516.	6259.	-1.62E-04	0.00	1.12E+12	-180.823	134521.	0.00
5.1200	0.00228	4601456.	5915.	-1.54E-04	0.00	1.12E+12	-176.596	148846.	0.00
5.2800	0.00199	4612732.	5581.	-1.46E-04	0.00	1.12E+12	-172.019	165953.	0.00
5.4400	0.00172	4623362.	5255.	-1.38E-04	0.00	1.12E+12	-167.039	186723.	0.00
5.6000	0.00146	4633362.	4940.	-1.30E-04	0.00	1.12E+12	-161.586	212463.	0.00
5.7600	0.00122	4642754.	4635.	-1.22E-04	0.00	1.12E+12	-155.563	245200.	0.00
5.9200	9.91E-04	4651560.	4343.	-1.14E-04	0.00	1.12E+12	-148.831	288274.	0.00
6.0800	7.80E-04	4659804.	-26207.	-1.03E-04	0.00	6.56E+11	-31674.	7.80E+07	0.00
6.2400	5.94E-04	4551263.	-81164.	-8.99E-05	0.00	6.56E+11	-25573.	8.26E+07	0.00
6.4000	4.35E-04	4348429.	-124667.	-7.69E-05	0.00	6.56E+11	-19743.	8.72E+07	0.00
6.5600	2.99E-04	4072792.	-157362.	-6.45E-05	0.00	6.56E+11	-14314.	9.18E+07	0.00
6.7200	1.87E-04	3744368.	-180113.	-5.31E-05	0.00	6.56E+11	-9384.	9.64E+07	0.00
6.8800	9.54E-05	3381331.	-193942.	-4.27E-05	0.00	6.56E+11	-5021.	1.01E+08	0.00
7.0400	2.30E-05	2999768.	-199976.	-3.33E-05	0.00	6.56E+11	-1264.	1.06E+08	0.00
7.2000	-3.26E-05	2613531.	-199392.	-2.51E-05	0.00	6.56E+11	1873.	1.10E+08	0.00
7.3600	-7.35E-05	2234185.	-193371.	-1.80E-05	0.00	6.56E+11	4399.	1.15E+08	0.00
7.5200	-1.02E-04	1871044.	-183062.	-1.20E-05	0.00	6.56E+11	6340.	1.20E+08	0.00
7.6800	-1.20E-04	1531267.	-169546.	-7.05E-06	0.00	6.56E+11	7738.	1.24E+08	0.00
7.8400	-1.29E-04	1220009.	-153818.	-3.03E-06	0.00	6.56E+11	8646.	1.29E+08	0.00
8.0000	-1.31E-04	940618.	-136761.	1.29E-07	0.00	6.56E+11	9122.	1.33E+08	0.00
8.1600	-1.28E-04	694848.	-119143.	2.52E-06	0.00	6.56E+11	9230.	1.38E+08	0.00
8.3200	-1.22E-04	483101.	-101609.	4.24E-06	0.00	6.56E+11	9034.	1.43E+08	0.00
8.4800	-1.12E-04	304655.	-84683.	5.40E-06	0.00	6.56E+11	8598.	1.47E+08	0.00
8.6400	-1.01E-04	157902.	-68767.	6.07E-06	0.00	6.56E+11	7981.	1.52E+08	0.00
8.8000	-8.88E-05	40570.	-54157.	6.36E-06	0.00	6.56E+11	7237.	1.56E+08	0.00
8.9600	-7.65E-05	-50083.	-41049.	6.35E-06	0.00	6.56E+11	6417.	1.61E+08	0.00

Pier drilled shaft_row3

9.1200	-6.45E-05	-117080.	-29550.	6.10E-06	0.00	6.56E+11	5561.	1.66E+08	0.00
9.2800	-5.31E-05	-163575.	-19693.	5.69E-06	0.00	6.56E+11	4706.	1.70E+08	0.00
9.4400	-4.26E-05	-192721.	-11450.	5.17E-06	0.00	6.56E+11	3880.	1.75E+08	0.00
9.6000	-3.32E-05	-207562.	-4745.	4.59E-06	0.00	6.56E+11	3105.	1.79E+08	0.00
9.7600	-2.50E-05	-210957.	535.4201	3.97E-06	0.00	6.56E+11	2396.	1.84E+08	0.00
9.9200	-1.79E-05	-205519.	4529.	3.37E-06	0.00	6.56E+11	1764.	1.89E+08	0.00
10.0800	-1.21E-05	-193576.	7389.	2.78E-06	0.00	6.56E+11	1215.	1.93E+08	0.00
10.2400	-7.27E-06	-177155.	9274.	2.24E-06	0.00	6.56E+11	748.9895	1.98E+08	0.00
10.4000	-3.46E-06	-157972.	10343.	1.75E-06	0.00	6.56E+11	365.2137	2.03E+08	0.00
10.5600	-5.46E-07	-137443.	10750.	1.32E-06	0.00	6.56E+11	58.8742	2.07E+08	0.00
10.7200	1.60E-06	-116695.	10638.	9.46E-07	0.00	6.56E+11	-176.351	2.12E+08	0.00
10.8800	3.09E-06	-96597.	10134.	6.34E-07	0.00	6.56E+11	-348.028	2.16E+08	0.00
11.0400	4.03E-06	-77781.	9354.	3.79E-07	0.00	6.56E+11	-464.425	2.21E+08	0.00
11.2000	4.54E-06	-60677.	8396.	1.77E-07	0.00	6.56E+11	-534.048	2.26E+08	0.00
11.3600	4.71E-06	-45542.	7340.	2.16E-08	0.00	6.56E+11	-565.264	2.30E+08	0.00
11.5200	4.63E-06	-32490.	6254.	-9.25E-08	0.00	6.56E+11	-566.014	2.35E+08	0.00
11.6800	4.36E-06	-21524.	5189.	-1.72E-07	0.00	6.56E+11	-543.595	2.39E+08	0.00
11.8400	3.97E-06	-12563.	4183.	-2.21E-07	0.00	6.56E+11	-504.520	2.44E+08	0.00
12.0000	3.51E-06	-5461.	3262.	-2.48E-07	0.00	6.56E+11	-454.434	2.49E+08	0.00
12.1600	3.02E-06	-34.029	2444.	-2.56E-07	0.00	6.56E+11	-398.090	2.53E+08	0.00
12.3200	2.53E-06	3925.	1736.	-2.50E-07	0.00	6.56E+11	-339.362	2.58E+08	0.00
12.4800	2.06E-06	6633.	1140.	-2.35E-07	0.00	6.56E+11	-281.287	2.63E+08	0.00
12.6400	1.63E-06	8304.	653.1172	-2.13E-07	0.00	6.56E+11	-226.140	2.67E+08	0.00
12.8000	1.24E-06	9142.	267.5255	-1.87E-07	0.00	6.56E+11	-175.518	2.72E+08	0.00
12.9600	9.06E-07	9332.	-26.188	-1.60E-07	0.00	6.56E+11	-130.434	2.76E+08	0.00
13.1200	6.25E-07	9042.	-239.161	-1.33E-07	0.00	6.56E+11	-91.414	2.81E+08	0.00
13.2800	3.94E-07	8414.	-383.168	-1.08E-07	0.00	6.56E+11	-58.593	2.86E+08	0.00
13.4400	2.10E-07	7571.	-469.950	-8.45E-08	0.00	6.56E+11	-31.805	2.90E+08	0.00
13.6000	6.94E-08	6610.	-510.721	-6.38E-08	0.00	6.56E+11	-10.664	2.95E+08	0.00
13.7600	-3.44E-08	5610.	-515.806	-4.59E-08	0.00	6.56E+11	5.3664	2.99E+08	0.00
13.9200	-1.07E-07	4630.	-494.424	-3.09E-08	0.00	6.56E+11	16.9073	3.04E+08	0.00
14.0800	-1.53E-07	3711.	-454.561	-1.87E-08	0.00	6.56E+11	24.6167	3.09E+08	0.00
14.2400	-1.79E-07	2884.	-402.946	-9.07E-09	0.00	6.56E+11	29.1485	3.13E+08	0.00
14.4000	-1.88E-07	2164.	-345.087	-1.69E-09	0.00	6.56E+11	31.1216	3.18E+08	0.00
14.5600	-1.85E-07	1559.	-285.356	3.75E-09	0.00	6.56E+11	31.0982	3.22E+08	0.00
14.7200	-1.74E-07	1068.	-227.115	7.59E-09	0.00	6.56E+11	29.5698	3.27E+08	0.00
14.8800	-1.56E-07	686.8296	-172.856	1.02E-08	0.00	6.56E+11	26.9492	3.32E+08	0.00
15.0400	-1.35E-07	404.6003	-124.359	1.18E-08	0.00	6.56E+11	23.5685	3.36E+08	0.00
15.2000	-1.11E-07	209.2521	-82.839	1.27E-08	0.00	6.56E+11	19.6814	3.41E+08	0.00
15.3600	-8.59E-08	86.4563	-49.095	1.31E-08	0.00	6.56E+11	15.4688	3.46E+08	0.00

Pier drilled shaft_row3									
15.5200	-6.06E-08	20.6844	-23.639	1.32E-08	0.00	6.56E+11	11.0481	3.50E+08	0.00
15.6800	-3.51E-08	-4.360	-6.808	1.33E-08	0.00	6.56E+11	6.4840	3.55E+08	0.00
15.8400	-9.63E-09	-5.501	1.1466	1.33E-08	0.00	6.56E+11	1.8020	3.59E+08	0.00
16.0000	1.58E-08	0.00	0.00	1.32E-08	0.00	6.56E+11	-2.996	1.82E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 1:

Pile-head deflection = 0.01916775 inches
 Computed slope at pile head = -0.0003890 radians
 Maximum bending moment = 4659804. inch-lbs
 Maximum shear force = -199976. lbs
 Depth of maximum bending moment = 6.08000000 feet below pile head
 Depth of maximum shear force = 7.04000000 feet below pile head
 Number of iterations = 6
 Number of zero deflection points = 4

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 2

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 23990.0 lbs
 Applied moment at pile head = 5025600.0 in-lbs
 Axial thrust load on pile head = 1102000.0 lbs

Depth	Deflect.	Bending	Shear	Slope	Total	Bending	Soil Res.	Soil Spr.	Distrib.
X	y	Moment	Force	S	Stress	Stiffness	p	Es*H	Lat. Load
feet	inches	in-lbs	lbs	radians	psi*	lb-in^2	lb/inch	lb/inch	lb/inch

Pier drilled shaft_row3

0.00	0.02649	5025600.	23990.	-5.30E-04	0.00	1.10E+12	-247.542	8972.	0.00
0.1600	0.02548	5072316.	23515.	-5.21E-04	0.00	1.10E+12	-247.584	18657.	0.00
0.3200	0.02449	5118101.	23039.	-5.12E-04	0.00	1.10E+12	-247.547	19409.	0.00
0.4800	0.02351	5162954.	22564.	-5.03E-04	0.00	1.10E+12	-247.430	20204.	0.00
0.6400	0.02256	5206876.	22089.	-4.94E-04	0.00	1.10E+12	-247.232	21045.	0.00
0.8000	0.02162	5249867.	21615.	-4.85E-04	0.00	1.10E+12	-246.950	21935.	0.00
0.9600	0.02069	5291929.	21141.	-4.76E-04	0.00	1.10E+12	-246.582	22878.	0.00
1.1200	0.01979	5333062.	20668.	-4.66E-04	0.00	1.10E+12	-246.126	23879.	0.00
1.2800	0.01890	5373268.	20196.	-4.57E-04	0.00	1.10E+12	-245.579	24944.	0.00
1.4400	0.01803	5412549.	19725.	-4.48E-04	0.00	1.10E+12	-244.939	26077.	0.00
1.6000	0.01718	5450907.	19256.	-4.38E-04	0.00	1.10E+12	-244.203	27285.	0.00
1.7600	0.01635	5488344.	18788.	-4.29E-04	0.00	1.10E+12	-243.368	28576.	0.00
1.9200	0.01554	5524865.	18321.	-4.19E-04	0.00	1.10E+12	-242.432	29957.	0.00
2.0800	0.01474	5560471.	17857.	-4.09E-04	0.00	1.10E+12	-241.389	31437.	0.00
2.2400	0.01397	5595167.	17394.	-4.00E-04	0.00	1.10E+12	-240.238	33027.	0.00
2.4000	0.01321	5628956.	16934.	-3.90E-04	0.00	1.10E+12	-238.974	34739.	0.00
2.5600	0.01247	5661844.	16477.	-3.80E-04	0.00	1.10E+12	-237.593	36585.	0.00
2.7200	0.01175	5693835.	16022.	-3.70E-04	0.00	1.10E+12	-236.091	38582.	0.00
2.8800	0.01105	5724935.	15570.	-3.60E-04	0.00	1.10E+12	-234.461	40747.	0.00
3.0400	0.01037	5755149.	15122.	-3.50E-04	0.00	1.10E+12	-232.699	43101.	0.00
3.2000	0.00970	5784484.	14677.	-3.40E-04	0.00	1.10E+12	-230.799	45668.	0.00
3.3600	0.00906	5812947.	14236.	-3.30E-04	0.00	1.10E+12	-228.754	48477.	0.00
3.5200	0.00844	5840545.	13799.	-3.20E-04	0.00	1.10E+12	-226.556	51560.	0.00
3.6800	0.00783	5867287.	13366.	-3.10E-04	0.00	1.10E+12	-224.198	54960.	0.00
3.8400	0.00725	5893180.	12938.	-2.99E-04	0.00	1.10E+12	-221.669	58722.	0.00
4.0000	0.00668	5918235.	12515.	-2.89E-04	0.00	1.10E+12	-218.960	62906.	0.00
4.1600	0.00614	5942460.	12097.	-2.79E-04	0.00	1.10E+12	-216.057	67583.	0.00
4.3200	0.00561	5965867.	11685.	-2.68E-04	0.00	1.10E+12	-212.947	72841.	0.00
4.4800	0.00511	5988467.	11280.	-2.58E-04	0.00	1.10E+12	-209.614	78791.	0.00
4.6400	0.00462	6010272.	10881.	-2.47E-04	0.00	1.10E+12	-206.039	85572.	0.00
4.8000	0.00416	6031296.	10489.	-2.37E-04	0.00	1.10E+12	-202.198	93365.	0.00
4.9600	0.00371	6051552.	10105.	-2.26E-04	0.00	1.10E+12	-198.065	102408.	0.00
5.1200	0.00329	6071055.	9729.	-2.16E-04	0.00	1.10E+12	-193.604	113019.	0.00
5.2800	0.00288	6089822.	9361.	-2.05E-04	0.00	1.10E+12	-188.775	125633.	0.00
5.4400	0.00250	6107871.	9004.	-1.94E-04	0.00	1.10E+12	-183.521	140871.	0.00
5.6000	0.00214	6125221.	8657.	-1.84E-04	0.00	1.10E+12	-177.773	159638.	0.00
5.7600	0.00180	6141892.	8322.	-1.73E-04	0.00	1.10E+12	-171.431	183325.	0.00
5.9200	0.00147	6157910.	8000.	-1.62E-04	0.00	1.10E+12	-164.358	214186.	0.00
6.0800	0.00117	6173298.	-13711.	-1.48E-04	0.00	6.41E+11	-22451.	3.68E+07	0.00

Pier drilled shaft_row3

6.2400	9.06E-04	6105883.	-72681.	-1.29E-04	0.00	6.41E+11	-38976.	8.26E+07	0.00
6.4000	6.75E-04	5894750.	-139538.	-1.11E-04	0.00	6.41E+11	-30667.	8.72E+07	0.00
6.5600	4.78E-04	5570530.	-190933.	-9.42E-05	0.00	6.41E+11	-22870.	9.18E+07	0.00
6.7200	3.13E-04	5161967.	-227996.	-7.81E-05	0.00	6.41E+11	-15737.	9.64E+07	0.00
6.8800	1.78E-04	4695357.	-252102.	-6.34E-05	0.00	6.41E+11	-9374.	1.01E+08	0.00
7.0400	6.99E-05	4194162.	-264794.	-5.01E-05	0.00	6.41E+11	-3847.	1.06E+08	0.00
7.2000	-1.42E-05	3678758.	-267706.	-3.83E-05	0.00	6.41E+11	814.5809	1.10E+08	0.00
7.3600	-7.71E-05	3166334.	-262493.	-2.80E-05	0.00	6.41E+11	4615.	1.15E+08	0.00
7.5200	-1.22E-04	2670903.	-250781.	-1.93E-05	0.00	6.41E+11	7585.	1.20E+08	0.00
7.6800	-1.51E-04	2203415.	-234113.	-1.20E-05	0.00	6.42E+11	9778.	1.24E+08	0.00
7.8400	-1.68E-04	1771959.	-213914.	-6.06E-06	0.00	6.42E+11	11263.	1.29E+08	0.00
8.0000	-1.75E-04	1382011.	-191465.	-1.34E-06	0.00	6.42E+11	12121.	1.33E+08	0.00
8.1600	-1.73E-04	1036738.	-167886.	2.28E-06	0.00	6.42E+11	12440.	1.38E+08	0.00
8.3200	-1.66E-04	737319.	-144125.	4.93E-06	0.00	6.42E+11	12311.	1.43E+08	0.00
8.4800	-1.54E-04	483277.	-120959.	6.76E-06	0.00	6.42E+11	11821.	1.47E+08	0.00
8.6400	-1.40E-04	272808.	-98997.	7.89E-06	0.00	6.42E+11	11056.	1.52E+08	0.00
8.8000	-1.24E-04	103094.	-78693.	8.45E-06	0.00	6.42E+11	10094.	1.56E+08	0.00
8.9600	-1.07E-04	-29411.	-60357.	8.56E-06	0.00	6.42E+11	9006.	1.61E+08	0.00
9.1200	-9.10E-05	-128715.	-44172.	8.32E-06	0.00	6.42E+11	7853.	1.66E+08	0.00
9.2800	-7.54E-05	-199068.	-30213.	7.83E-06	0.00	6.42E+11	6687.	1.70E+08	0.00
9.4400	-6.09E-05	-244767.	-18465.	7.17E-06	0.00	6.42E+11	5551.	1.75E+08	0.00
9.6000	-4.79E-05	-270003.	-8839.	6.40E-06	0.00	6.42E+11	4476.	1.79E+08	0.00
9.7600	-3.64E-05	-278736.	-1194.	5.58E-06	0.00	6.42E+11	3487.	1.84E+08	0.00
9.9200	-2.65E-05	-274611.	4650.	4.75E-06	0.00	6.42E+11	2601.	1.89E+08	0.00
10.0800	-1.81E-05	-260899.	8899.	3.95E-06	0.00	6.42E+11	1825.	1.93E+08	0.00
10.2400	-1.13E-05	-240456.	11769.	3.20E-06	0.00	6.42E+11	1164.	1.98E+08	0.00
10.4000	-5.84E-06	-215720.	13478.	2.52E-06	0.00	6.42E+11	616.0707	2.03E+08	0.00
10.5600	-1.63E-06	-188712.	14238.	1.91E-06	0.00	6.42E+11	175.5133	2.07E+08	0.00
10.7200	1.50E-06	-161056.	14247.	1.39E-06	0.00	6.42E+11	-165.703	2.12E+08	0.00
10.8800	3.71E-06	-134009.	13687.	9.47E-07	0.00	6.42E+11	-417.670	2.16E+08	0.00
11.0400	5.14E-06	-108501.	12718.	5.84E-07	0.00	6.42E+11	-591.605	2.21E+08	0.00
11.2000	5.95E-06	-85174.	11479.	2.95E-07	0.00	6.42E+11	-699.179	2.26E+08	0.00
11.3600	6.27E-06	-64423.	10086.	7.08E-08	0.00	6.42E+11	-751.968	2.30E+08	0.00
11.5200	6.22E-06	-46444.	8633.	-9.51E-08	0.00	6.42E+11	-761.029	2.35E+08	0.00
11.6800	5.91E-06	-31271.	7196.	-2.11E-07	0.00	6.42E+11	-736.574	2.39E+08	0.00
11.8400	5.41E-06	-18812.	5828.	-2.86E-07	0.00	6.42E+11	-687.764	2.44E+08	0.00
12.0000	4.81E-06	-8889.	4570.	-3.28E-07	0.00	6.42E+11	-622.572	2.49E+08	0.00
12.1600	4.15E-06	-1260.	3447.	-3.43E-07	0.00	6.42E+11	-547.743	2.53E+08	0.00
12.3200	3.49E-06	4349.	2471.	-3.38E-07	0.00	6.42E+11	-468.795	2.58E+08	0.00
12.4800	2.85E-06	8230.	1647.	-3.19E-07	0.00	6.42E+11	-390.081	2.63E+08	0.00

Pier drilled shaft_row3									
12.6400	2.26E-06	10673.	969.7460	-2.91E-07	0.00	6.42E+11	-314.886	2.67E+08	0.00
12.8000	1.73E-06	11955.	431.7428	-2.57E-07	0.00	6.42E+11	-245.534	2.72E+08	0.00
12.9600	1.28E-06	12332.	19.8406	-2.21E-07	0.00	6.42E+11	-183.530	2.76E+08	0.00
13.1200	8.86E-07	12032.	-280.847	-1.85E-07	0.00	6.42E+11	-129.685	2.81E+08	0.00
13.2800	5.66E-07	11254.	-486.228	-1.50E-07	0.00	6.42E+11	-84.254	2.86E+08	0.00
13.4400	3.11E-07	10166.	-612.288	-1.18E-07	0.00	6.42E+11	-47.059	2.90E+08	0.00
13.6000	1.15E-07	8903.	-674.366	-8.91E-08	0.00	6.42E+11	-17.606	2.95E+08	0.00
13.7600	-3.09E-08	7576.	-686.644	-6.45E-08	0.00	6.42E+11	4.8155	2.99E+08	0.00
13.9200	-1.33E-07	6267.	-661.820	-4.38E-08	0.00	6.42E+11	21.0429	3.04E+08	0.00
14.0800	-1.99E-07	5035.	-610.926	-2.68E-08	0.00	6.42E+11	31.9724	3.09E+08	0.00
14.2400	-2.36E-07	3921.	-543.273	-1.34E-08	0.00	6.42E+11	38.4990	3.13E+08	0.00
14.4000	-2.51E-07	2949.	-466.499	-3.16E-09	0.00	6.42E+11	41.4740	3.18E+08	0.00
14.5600	-2.48E-07	2130.	-386.678	4.44E-09	0.00	6.42E+11	41.6730	3.22E+08	0.00
14.7200	-2.33E-07	1464.	-308.487	9.81E-09	0.00	6.42E+11	39.7757	3.27E+08	0.00
14.8800	-2.10E-07	945.1970	-235.402	1.34E-08	0.00	6.42E+11	36.3548	3.32E+08	0.00
15.0400	-1.82E-07	560.2031	-169.904	1.57E-08	0.00	6.42E+11	31.8718	3.36E+08	0.00
15.2000	-1.50E-07	292.6979	-113.694	1.69E-08	0.00	6.42E+11	26.6805	3.41E+08	0.00
15.3600	-1.17E-07	123.5459	-67.888	1.76E-08	0.00	6.42E+11	21.0342	3.46E+08	0.00
15.5200	-8.28E-08	31.9334	-33.201	1.78E-08	0.00	6.42E+11	15.0980	3.50E+08	0.00
15.6800	-4.85E-08	-4.022	-10.102	1.78E-08	0.00	6.42E+11	8.9641	3.55E+08	0.00
15.8400	-1.43E-08	-6.932	1.0671	1.78E-08	0.00	6.42E+11	2.6699	3.59E+08	0.00
16.0000	1.99E-08	0.00	0.00	1.78E-08	0.00	6.42E+11	-3.781	1.82E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 2:

Pile-head deflection = 0.02648774 inches
 Computed slope at pile head = -0.0005297 radians
 Maximum bending moment = 6173298. inch-lbs
 Maximum shear force = -267706. lbs
 Depth of maximum bending moment = 6.08000000 feet below pile head
 Depth of maximum shear force = 7.20000000 feet below pile head
 Number of iterations = 6

Pier drilled shaft_row3
 Number of zero deflection points = 4

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 3

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 10160.0 lbs
 Applied moment at pile head = 4451400.0 in-lbs
 Axial thrust load on pile head = 1018000.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	0.01965	4451400.	10160.	-4.11E-04	0.00	1.11E+12	-229.722	11223.	0.00
0.1600	0.01887	4471279.	9719.	-4.03E-04	0.00	1.11E+12	-229.660	23369.	0.00
0.3200	0.01810	4490296.	9278.	-3.95E-04	0.00	1.11E+12	-229.525	24344.	0.00
0.4800	0.01735	4508452.	8838.	-3.87E-04	0.00	1.11E+12	-229.315	25375.	0.00
0.6400	0.01662	4525747.	8398.	-3.80E-04	0.00	1.11E+12	-229.027	26466.	0.00
0.8000	0.01589	4542183.	7958.	-3.72E-04	0.00	1.11E+12	-228.662	27623.	0.00
0.9600	0.01519	4557760.	7520.	-3.64E-04	0.00	1.11E+12	-228.215	28851.	0.00
1.1200	0.01450	4572481.	7082.	-3.56E-04	0.00	1.11E+12	-227.686	30156.	0.00
1.2800	0.01382	4586347.	6645.	-3.48E-04	0.00	1.11E+12	-227.072	31545.	0.00
1.4400	0.01316	4599360.	6210.	-3.40E-04	0.00	1.11E+12	-226.371	33025.	0.00
1.6000	0.01252	4611523.	5776.	-3.32E-04	0.00	1.11E+12	-225.580	34606.	0.00
1.7600	0.01189	4622838.	5344.	-3.24E-04	0.00	1.11E+12	-224.697	36297.	0.00
1.9200	0.01127	4633310.	4914.	-3.16E-04	0.00	1.11E+12	-223.718	38109.	0.00
2.0800	0.01067	4642942.	4485.	-3.08E-04	0.00	1.11E+12	-222.642	40054.	0.00
2.2400	0.01009	4651737.	4059.	-3.00E-04	0.00	1.11E+12	-221.463	42147.	0.00
2.4000	0.00952	4659699.	3635.	-2.92E-04	0.00	1.11E+12	-220.179	44402.	0.00
2.5600	0.00897	4666835.	3213.	-2.84E-04	0.00	1.11E+12	-218.786	46839.	0.00
2.7200	0.00843	4673147.	2795.	-2.76E-04	0.00	1.11E+12	-217.279	49479.	0.00
2.8800	0.00791	4678644.	2379.	-2.68E-04	0.00	1.11E+12	-215.654	52347.	0.00
3.0400	0.00740	4683329.	1967.	-2.59E-04	0.00	1.11E+12	-213.906	55469.	0.00
3.2000	0.00691	4687210.	1558.	-2.51E-04	0.00	1.11E+12	-212.029	58881.	0.00

Pier drilled shaft_row3

3.3600	0.00644	4690293.	1153.	-2.43E-04	0.00	1.11E+12	-210.017	62621.	0.00
3.5200	0.00598	4692586.	751.4708	-2.35E-04	0.00	1.11E+12	-207.862	66736.	0.00
3.6800	0.00554	4694097.	354.5878	-2.27E-04	0.00	1.11E+12	-205.558	71281.	0.00
3.8400	0.00511	4694835.	-37.718	-2.19E-04	0.00	1.11E+12	-203.094	76324.	0.00
4.0000	0.00470	4694807.	-425.132	-2.11E-04	0.00	1.11E+12	-200.462	81945.	0.00
4.1600	0.00430	4694025.	-807.318	-2.02E-04	0.00	1.11E+12	-197.649	88245.	0.00
4.3200	0.00392	4692499.	-1184.	-1.94E-04	0.00	1.11E+12	-194.642	95347.	0.00
4.4800	0.00355	4690239.	-1555.	-1.86E-04	0.00	1.11E+12	-191.426	103408.	0.00
4.6400	0.00320	4687257.	-1919.	-1.78E-04	0.00	1.11E+12	-187.982	112626.	0.00
4.8000	0.00287	4683567.	-2276.	-1.70E-04	0.00	1.11E+12	-184.289	123261.	0.00
4.9600	0.00255	4679181.	-2626.	-1.62E-04	0.00	1.11E+12	-180.319	135654.	0.00
5.1200	0.00225	4674115.	-2968.	-1.54E-04	0.00	1.11E+12	-176.039	150265.	0.00
5.2800	0.00196	4668383.	-3302.	-1.46E-04	0.00	1.11E+12	-171.408	167736.	0.00
5.4400	0.00169	4662005.	-3626.	-1.37E-04	0.00	1.11E+12	-166.371	188982.	0.00
5.6000	0.00143	4654997.	-3940.	-1.29E-04	0.00	1.11E+12	-160.857	215365.	0.00
5.7600	0.00119	4647380.	-4243.	-1.21E-04	0.00	1.11E+12	-154.765	249010.	0.00
5.9200	9.68E-04	4639177.	-4534.	-1.13E-04	0.00	1.11E+12	-147.953	293441.	0.00
6.0800	7.58E-04	4630413.	-34245.	-1.02E-04	0.00	6.46E+11	-30801.	7.80E+07	0.00
6.2400	5.75E-04	4508076.	-87558.	-8.88E-05	0.00	6.46E+11	-24733.	8.26E+07	0.00
6.4000	4.17E-04	4294537.	-129495.	-7.57E-05	0.00	6.46E+11	-18952.	8.72E+07	0.00
6.5600	2.84E-04	4011110.	-160730.	-6.34E-05	0.00	6.46E+11	-13584.	9.18E+07	0.00
6.7200	1.74E-04	3677582.	-182149.	-5.20E-05	0.00	6.46E+11	-8727.	9.64E+07	0.00
6.8800	8.44E-05	3311862.	-194792.	-4.16E-05	0.00	6.46E+11	-4443.	1.01E+08	0.00
7.0400	1.40E-05	2929744.	-199796.	-3.23E-05	0.00	6.46E+11	-769.601	1.06E+08	0.00
7.2000	-3.97E-05	2544773.	-198343.	-2.42E-05	0.00	6.46E+11	2283.	1.10E+08	0.00
7.3600	-7.89E-05	2168201.	-191617.	-1.72E-05	0.00	6.47E+11	4724.	1.15E+08	0.00
7.5200	-1.06E-04	1809032.	-180760.	-1.13E-05	0.00	6.47E+11	6585.	1.20E+08	0.00
7.6800	-1.22E-04	1474128.	-166846.	-6.42E-06	0.00	6.47E+11	7908.	1.24E+08	0.00
7.8400	-1.30E-04	1168368.	-150858.	-2.50E-06	0.00	6.47E+11	8747.	1.29E+08	0.00
8.0000	-1.32E-04	894845.	-133665.	5.65E-07	0.00	6.47E+11	9162.	1.33E+08	0.00
8.1600	-1.28E-04	655092.	-116020.	2.87E-06	0.00	6.47E+11	9218.	1.38E+08	0.00
8.3200	-1.21E-04	449316.	-98552.	4.51E-06	0.00	6.47E+11	8979.	1.43E+08	0.00
8.4800	-1.11E-04	276636.	-81765.	5.58E-06	0.00	6.47E+11	8508.	1.47E+08	0.00
8.6400	-9.95E-05	135317.	-66048.	6.20E-06	0.00	6.47E+11	7864.	1.52E+08	0.00
8.8000	-8.72E-05	22989.	-51679.	6.43E-06	0.00	6.47E+11	7103.	1.56E+08	0.00
8.9600	-7.48E-05	-63155.	-38840.	6.37E-06	0.00	6.47E+11	6271.	1.61E+08	0.00
9.1200	-6.27E-05	-126180.	-27625.	6.09E-06	0.00	6.47E+11	5411.	1.66E+08	0.00
9.2800	-5.14E-05	-169257.	-18055.	5.65E-06	0.00	6.47E+11	4557.	1.70E+08	0.00
9.4400	-4.10E-05	-195534.	-10094.	5.11E-06	0.00	6.47E+11	3736.	1.75E+08	0.00
9.6000	-3.18E-05	-208036.	-3656.	4.51E-06	0.00	6.47E+11	2970.	1.79E+08	0.00

Pier drilled shaft_row3

9.7600	-2.37E-05	-209590.	1377.	3.89E-06	0.00	6.47E+11	2273.	1.84E+08	0.00
9.9200	-1.68E-05	-202764.	5147.	3.28E-06	0.00	6.47E+11	1654.	1.89E+08	0.00
10.0800	-1.11E-05	-189840.	7809.	2.70E-06	0.00	6.47E+11	1119.	1.93E+08	0.00
10.2400	-6.48E-06	-172789.	9525.	2.16E-06	0.00	6.47E+11	668.0604	1.98E+08	0.00
10.4000	-2.83E-06	-153274.	10453.	1.67E-06	0.00	6.47E+11	298.7217	2.03E+08	0.00
10.5600	-5.69E-08	-132657.	10745.	1.25E-06	0.00	6.47E+11	6.1349	2.07E+08	0.00
10.7200	1.96E-06	-112017.	10543.	8.85E-07	0.00	6.47E+11	-216.366	2.12E+08	0.00
10.8800	3.34E-06	-92174.	9974.	5.82E-07	0.00	6.47E+11	-376.592	2.16E+08	0.00
11.0400	4.20E-06	-73718.	9149.	3.36E-07	0.00	6.47E+11	-482.960	2.21E+08	0.00
11.2000	4.63E-06	-57043.	8163.	1.41E-07	0.00	6.47E+11	-544.048	2.26E+08	0.00
11.3600	4.74E-06	-42372.	7095.	-6.21E-09	0.00	6.47E+11	-568.226	2.30E+08	0.00
11.5200	4.61E-06	-29797.	6009.	-1.13E-07	0.00	6.47E+11	-563.379	2.35E+08	0.00
11.6800	4.30E-06	-19297.	4953.	-1.86E-07	0.00	6.47E+11	-536.708	2.39E+08	0.00
11.8400	3.89E-06	-10777.	3963.	-2.31E-07	0.00	6.47E+11	-494.598	2.44E+08	0.00
12.0000	3.42E-06	-4079.	3063.	-2.53E-07	0.00	6.47E+11	-442.548	2.49E+08	0.00
12.1600	2.92E-06	987.2090	2269.	-2.58E-07	0.00	6.47E+11	-385.151	2.53E+08	0.00
12.3200	2.43E-06	4634.	1586.	-2.49E-07	0.00	6.47E+11	-326.121	2.58E+08	0.00
12.4800	1.96E-06	7078.	1015.	-2.32E-07	0.00	6.47E+11	-268.340	2.63E+08	0.00
12.6400	1.54E-06	8533.	552.1325	-2.09E-07	0.00	6.47E+11	-213.938	2.67E+08	0.00
12.8000	1.16E-06	9199.	188.9483	-1.82E-07	0.00	6.47E+11	-164.379	2.72E+08	0.00
12.9600	8.38E-07	9259.	-84.593	-1.55E-07	0.00	6.47E+11	-120.560	2.76E+08	0.00
13.1200	5.67E-07	8874.	-279.924	-1.28E-07	0.00	6.47E+11	-82.910	2.81E+08	0.00
13.2800	3.46E-07	8184.	-408.941	-1.03E-07	0.00	6.47E+11	-51.483	2.86E+08	0.00
13.4400	1.72E-07	7305.	-483.373	-7.97E-08	0.00	6.47E+11	-26.049	2.90E+08	0.00
13.6000	4.02E-08	6329.	-514.308	-5.94E-08	0.00	6.47E+11	-6.175	2.95E+08	0.00
13.7600	-5.58E-08	5330.	-511.877	-4.21E-08	0.00	6.47E+11	8.7072	2.99E+08	0.00
13.9200	-1.21E-07	4363.	-485.049	-2.77E-08	0.00	6.47E+11	19.2395	3.04E+08	0.00
14.0800	-1.62E-07	3467.	-441.534	-1.61E-08	0.00	6.47E+11	26.0884	3.09E+08	0.00
14.2400	-1.83E-07	2668.	-387.777	-6.99E-09	0.00	6.47E+11	29.9081	3.13E+08	0.00
14.4000	-1.89E-07	1978.	-329.007	-9.00E-11	0.00	6.47E+11	31.3108	3.18E+08	0.00
14.5600	-1.84E-07	1404.	-269.335	4.93E-09	0.00	6.47E+11	30.8470	3.22E+08	0.00
14.7200	-1.70E-07	944.0118	-211.889	8.42E-09	0.00	6.47E+11	28.9930	3.27E+08	0.00
14.8800	-1.51E-07	590.6054	-158.957	1.07E-08	0.00	6.47E+11	26.1443	3.32E+08	0.00
15.0400	-1.29E-07	333.5741	-112.148	1.21E-08	0.00	6.47E+11	22.6153	3.36E+08	0.00
15.2000	-1.05E-07	159.9098	-72.541	1.28E-08	0.00	6.47E+11	18.6417	3.41E+08	0.00
15.3600	-7.99E-08	54.9654	-40.833	1.31E-08	0.00	6.47E+11	14.3881	3.46E+08	0.00
15.5200	-5.46E-08	3.0610	-17.461	1.32E-08	0.00	6.47E+11	9.9571	3.50E+08	0.00
15.6800	-2.92E-08	-12.137	-2.717	1.32E-08	0.00	6.47E+11	5.4010	3.55E+08	0.00
15.8400	-3.93E-09	-7.425	3.1742	1.32E-08	0.00	6.47E+11	0.7360	3.59E+08	0.00
16.0000	2.13E-08	0.00	0.00	1.32E-08	0.00	6.47E+11	-4.042	1.82E+08	0.00

Pier drilled shaft_row3

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 3:

Pile-head deflection = 0.01965011 inches
 Computed slope at pile head = -0.0004107 radians
 Maximum bending moment = 4694835. inch-lbs
 Maximum shear force = -199796. lbs
 Depth of maximum bending moment = 3.84000000 feet below pile head
 Depth of maximum shear force = 7.04000000 feet below pile head
 Number of iterations = 6
 Number of zero deflection points = 4

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 4

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 13670.0 lbs
 Applied moment at pile head = 5995200.0 in-lbs
 Axial thrust load on pile head = 1326000.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in ²	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	0.02834	5995200.	13670.	-5.82E-04	0.00	1.08E+12	-251.751	8529.	0.00
0.1600	0.02723	6022450.	13187.	-5.71E-04	0.00	1.08E+12	-251.728	17750.	0.00
0.3200	0.02614	6048746.	12703.	-5.61E-04	0.00	1.08E+12	-251.626	18481.	0.00

Pier drilled shaft_row3

0.4800	0.02508	6074086.	12220.	-5.50E-04	0.00	1.08E+12	-251.443	19252.	0.00
0.6400	0.02403	6098472.	11738.	-5.39E-04	0.00	1.08E+12	-251.178	20068.	0.00
0.8000	0.02301	6121904.	11256.	-5.28E-04	0.00	1.08E+12	-250.827	20933.	0.00
0.9600	0.02200	6144385.	10775.	-5.17E-04	0.00	1.08E+12	-250.390	21850.	0.00
1.1200	0.02102	6165914.	10295.	-5.06E-04	0.00	1.08E+12	-249.864	22823.	0.00
1.2800	0.02006	6186495.	9815.	-4.95E-04	0.00	1.08E+12	-249.246	23859.	0.00
1.4400	0.01912	6206129.	9338.	-4.84E-04	0.00	1.08E+12	-248.535	24961.	0.00
1.6000	0.01820	6224818.	8861.	-4.73E-04	0.00	1.08E+12	-247.726	26137.	0.00
1.7600	0.01730	6242566.	8386.	-4.62E-04	0.00	1.08E+12	-246.818	27394.	0.00
1.9200	0.01642	6259377.	7914.	-4.51E-04	0.00	1.08E+12	-245.807	28739.	0.00
2.0800	0.01557	6275253.	7443.	-4.40E-04	0.00	1.08E+12	-244.690	30182.	0.00
2.2400	0.01473	6290198.	6974.	-4.29E-04	0.00	1.08E+12	-243.463	31732.	0.00
2.4000	0.01392	6304218.	6508.	-4.18E-04	0.00	1.08E+12	-242.123	33400.	0.00
2.5600	0.01313	6317316.	6044.	-4.07E-04	0.00	1.08E+12	-240.665	35202.	0.00
2.7200	0.01236	6329499.	5584.	-3.96E-04	0.00	1.08E+12	-239.084	37150.	0.00
2.8800	0.01161	6340772.	5126.	-3.84E-04	0.00	1.08E+12	-237.376	39263.	0.00
3.0400	0.01088	6351141.	4672.	-3.73E-04	0.00	1.08E+12	-235.535	41562.	0.00
3.2000	0.01018	6360614.	4222.	-3.62E-04	0.00	1.08E+12	-233.555	44070.	0.00
3.3600	0.00949	6369196.	3776.	-3.50E-04	0.00	1.08E+12	-231.429	46814.	0.00
3.5200	0.00883	6376897.	3334.	-3.39E-04	0.00	1.08E+12	-229.149	49829.	0.00
3.6800	0.00819	6383724.	2896.	-3.28E-04	0.00	1.08E+12	-226.708	53153.	0.00
3.8400	0.00757	6389687.	2463.	-3.17E-04	0.00	1.08E+12	-224.096	56834.	0.00
4.0000	0.00697	6394794.	2036.	-3.05E-04	0.00	1.08E+12	-221.301	60929.	0.00
4.1600	0.00640	6399057.	1614.	-2.94E-04	0.00	1.08E+12	-218.313	65509.	0.00
4.3200	0.00585	6402487.	1197.	-2.83E-04	0.00	1.08E+12	-215.115	70660.	0.00
4.4800	0.00531	6405094.	787.7318	-2.71E-04	0.00	1.08E+12	-211.693	76492.	0.00
4.6400	0.00480	6406892.	384.8024	-2.60E-04	0.00	1.08E+12	-208.025	83143.	0.00
4.8000	0.00432	6407895.	-10.829	-2.48E-04	0.00	1.08E+12	-204.090	90792.	0.00
4.9600	0.00385	6408116.	-398.620	-2.37E-04	0.00	1.08E+12	-199.859	99674.	0.00
5.1200	0.00341	6407571.	-777.968	-2.26E-04	0.00	1.08E+12	-195.296	110106.	0.00
5.2800	0.00298	6406278.	-1148.	-2.14E-04	0.00	1.08E+12	-190.358	122522.	0.00
5.4400	0.00258	6404254.	-1509.	-2.03E-04	0.00	1.08E+12	-184.990	137541.	0.00
5.6000	0.00220	6401519.	-1858.	-1.92E-04	0.00	1.08E+12	-179.116	156073.	0.00
5.7600	0.00185	6398095.	-2196.	-1.80E-04	0.00	1.08E+12	-172.635	179518.	0.00
5.9200	0.00151	6394005.	-2520.	-1.69E-04	0.00	1.08E+12	-165.400	210161.	0.00
6.0800	0.00120	6389277.	-24349.	-1.54E-04	0.00	6.27E+11	-22573.	3.62E+07	0.00
6.2400	9.22E-04	6301286.	-84082.	-1.34E-04	0.00	6.27E+11	-39649.	8.26E+07	0.00
6.4000	6.83E-04	6067085.	-151912.	-1.15E-04	0.00	6.27E+11	-31008.	8.72E+07	0.00
6.5600	4.79E-04	5718530.	-203687.	-9.71E-05	0.00	6.27E+11	-22924.	9.18E+07	0.00
6.7200	3.10E-04	5285421.	-240624.	-8.03E-05	0.00	6.28E+11	-15552.	9.64E+07	0.00

Pier drilled shaft_row3

6.8800	1.71E-04	4794941.	-264192.	-6.49E-05	0.00	6.28E+11	-8998.	1.01E+08	0.00
7.0400	6.05E-05	4271254.	-276025.	-5.10E-05	0.00	6.28E+11	-3328.	1.06E+08	0.00
7.2000	-2.49E-05	3735265.	-277845.	-3.88E-05	0.00	6.28E+11	1432.	1.10E+08	0.00
7.3600	-8.84E-05	3204528.	-271391.	-2.82E-05	0.00	6.28E+11	5291.	1.15E+08	0.00
7.5200	-1.33E-04	2693268.	-258360.	-1.91E-05	0.00	6.28E+11	8283.	1.20E+08	0.00
7.6800	-1.62E-04	2212522.	-240360.	-1.16E-05	0.00	6.28E+11	10468.	1.24E+08	0.00
7.8400	-1.78E-04	1770346.	-218867.	-5.56E-06	0.00	6.28E+11	11921.	1.29E+08	0.00
8.0000	-1.83E-04	1372101.	-195204.	-7.55E-07	0.00	6.28E+11	12728.	1.33E+08	0.00
8.1600	-1.81E-04	1020766.	-170521.	2.90E-06	0.00	6.28E+11	12983.	1.38E+08	0.00
8.3200	-1.72E-04	717286.	-145787.	5.56E-06	0.00	6.28E+11	12781.	1.43E+08	0.00
8.4800	-1.59E-04	460917.	-121790.	7.36E-06	0.00	6.28E+11	12216.	1.47E+08	0.00
8.6400	-1.44E-04	249576.	-99143.	8.44E-06	0.00	6.28E+11	11375.	1.52E+08	0.00
8.8000	-1.27E-04	80165.	-78297.	8.95E-06	0.00	6.28E+11	10340.	1.56E+08	0.00
8.9600	-1.10E-04	-51131.	-59554.	8.99E-06	0.00	6.28E+11	9184.	1.61E+08	0.00
9.1200	-9.24E-05	-148569.	-43085.	8.69E-06	0.00	6.28E+11	7971.	1.66E+08	0.00
9.2800	-7.61E-05	-216622.	-28951.	8.13E-06	0.00	6.28E+11	6752.	1.70E+08	0.00
9.4400	-6.12E-05	-259781.	-17119.	7.40E-06	0.00	6.28E+11	5572.	1.75E+08	0.00
9.6000	-4.77E-05	-282398.	-7487.	6.57E-06	0.00	6.28E+11	4462.	1.79E+08	0.00
9.7600	-3.59E-05	-288564.	104.5062	5.70E-06	0.00	6.28E+11	3446.	1.84E+08	0.00
9.9200	-2.58E-05	-282025.	5851.	4.83E-06	0.00	6.28E+11	2540.	1.89E+08	0.00
10.0800	-1.74E-05	-266121.	9972.	3.99E-06	0.00	6.28E+11	1752.	1.93E+08	0.00
10.2400	-1.05E-05	-243755.	12695.	3.21E-06	0.00	6.28E+11	1085.	1.98E+08	0.00
10.4000	-5.07E-06	-217389.	14250.	2.51E-06	0.00	6.28E+11	534.9961	2.03E+08	0.00
10.5600	-8.97E-07	-189049.	14856.	1.89E-06	0.00	6.28E+11	96.8129	2.07E+08	0.00
10.7200	2.17E-06	-160351.	14720.	1.35E-06	0.00	6.28E+11	-239.065	2.12E+08	0.00
10.8800	4.29E-06	-132533.	14026.	9.04E-07	0.00	6.28E+11	-483.622	2.16E+08	0.00
11.0400	5.64E-06	-106497.	12939.	5.38E-07	0.00	6.28E+11	-648.864	2.21E+08	0.00
11.2000	6.36E-06	-82851.	11598.	2.49E-07	0.00	6.28E+11	-747.138	2.26E+08	0.00
11.3600	6.59E-06	-61960.	10122.	2.76E-08	0.00	6.28E+11	-790.580	2.30E+08	0.00
11.5200	6.46E-06	-43982.	8604.	-1.34E-07	0.00	6.28E+11	-790.678	2.35E+08	0.00
11.6800	6.08E-06	-28919.	7118.	-2.46E-07	0.00	6.28E+11	-757.969	2.39E+08	0.00
11.8400	5.52E-06	-16649.	5716.	-3.15E-07	0.00	6.28E+11	-701.830	2.44E+08	0.00
12.0000	4.87E-06	-6967.	4437.	-3.51E-07	0.00	6.28E+11	-630.362	2.49E+08	0.00
12.1600	4.17E-06	391.3350	3304.	-3.61E-07	0.00	6.28E+11	-550.357	2.53E+08	0.00
12.3200	3.48E-06	5721.	2327.	-3.52E-07	0.00	6.28E+11	-467.319	2.58E+08	0.00
12.4800	2.82E-06	9328.	1508.	-3.29E-07	0.00	6.28E+11	-385.543	2.63E+08	0.00
12.6400	2.22E-06	11514.	842.0157	-2.97E-07	0.00	6.28E+11	-308.215	2.67E+08	0.00
12.8000	1.68E-06	12563.	318.0860	-2.60E-07	0.00	6.28E+11	-237.545	2.72E+08	0.00
12.9600	1.22E-06	12736.	-77.866	-2.22E-07	0.00	6.28E+11	-174.905	2.76E+08	0.00
13.1200	8.27E-07	12265.	-361.914	-1.84E-07	0.00	6.28E+11	-120.977	2.81E+08	0.00

Pier drilled shaft_row3									
13.2800	5.10E-07	11347.	-550.905	-1.47E-07	0.00	6.28E+11	-75.888	2.86E+08	0.00
13.4400	2.60E-07	10150.	-661.526	-1.15E-07	0.00	6.28E+11	-39.342	2.90E+08	0.00
13.6000	7.00E-08	8808.	-709.607	-8.57E-08	0.00	6.28E+11	-10.742	2.95E+08	0.00
13.7600	-6.87E-08	7426.	-709.634	-6.09E-08	0.00	6.28E+11	10.7133	2.99E+08	0.00
13.9200	-1.64E-07	6083.	-674.452	-4.02E-08	0.00	6.28E+11	25.9342	3.04E+08	0.00
14.0800	-2.23E-07	4836.	-615.117	-2.35E-08	0.00	6.28E+11	35.8735	3.09E+08	0.00
14.2400	-2.54E-07	3721.	-540.869	-1.05E-08	0.00	6.28E+11	41.4680	3.13E+08	0.00
14.4000	-2.63E-07	2759.	-459.208	-5.57E-10	0.00	6.28E+11	43.5961	3.18E+08	0.00
14.5600	-2.56E-07	1958.	-376.028	6.65E-09	0.00	6.28E+11	43.0488	3.22E+08	0.00
14.7200	-2.38E-07	1315.	-295.812	1.17E-08	0.00	6.28E+11	40.5104	3.27E+08	0.00
14.8800	-2.12E-07	821.8484	-221.834	1.49E-08	0.00	6.28E+11	36.5496	3.32E+08	0.00
15.0400	-1.80E-07	463.2539	-156.393	1.69E-08	0.00	6.28E+11	31.6179	3.36E+08	0.00
15.2000	-1.47E-07	221.2121	-101.028	1.79E-08	0.00	6.28E+11	26.0543	3.41E+08	0.00
15.3600	-1.12E-07	75.2153	-56.725	1.84E-08	0.00	6.28E+11	20.0948	3.46E+08	0.00
15.5200	-7.61E-08	3.2954	-24.103	1.85E-08	0.00	6.28E+11	13.8862	3.50E+08	0.00
15.6800	-4.06E-08	-17.434	-3.569	1.85E-08	0.00	6.28E+11	7.5034	3.55E+08	0.00
15.8400	-5.18E-09	-10.503	4.5647	1.84E-08	0.00	6.28E+11	0.9691	3.59E+08	0.00
16.0000	3.02E-08	0.00	0.00	1.84E-08	0.00	6.28E+11	-5.724	1.82E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 4:

Pile-head deflection = 0.02833593 inches
 Computed slope at pile head = -0.0005819 radians
 Maximum bending moment = 6408116. inch-lbs
 Maximum shear force = -277845. lbs
 Depth of maximum bending moment = 4.96000000 feet below pile head
 Depth of maximum shear force = 7.20000000 feet below pile head
 Number of iterations = 6
 Number of zero deflection points = 4

Pier drilled shaft_row3

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 5

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 17850.0 lbs
 Applied moment at pile head = 8383200.0 in-lbs
 Axial thrust load on pile head = 846000.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in ²	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	0.04343	8383200.	17850.	-8.50E-04	0.00	1.12E+12	-280.131	6192.	0.00
0.1600	0.04181	8418324.	17312.	-8.35E-04	0.00	1.12E+12	-280.238	12868.	0.00
0.3200	0.04022	8452392.	16774.	-8.21E-04	0.00	1.12E+12	-280.262	13378.	0.00
0.4800	0.03866	8485403.	16236.	-8.06E-04	0.00	1.12E+12	-280.200	13916.	0.00
0.6400	0.03713	8517357.	15698.	-7.92E-04	0.00	1.12E+12	-280.051	14483.	0.00
0.8000	0.03562	8548255.	15161.	-7.77E-04	0.00	1.12E+12	-279.811	15083.	0.00
0.9600	0.03414	8578098.	14624.	-7.62E-04	0.00	1.12E+12	-279.480	15717.	0.00
1.1200	0.03269	8606887.	14087.	-7.48E-04	0.00	1.12E+12	-279.055	16389.	0.00
1.2800	0.03127	8634623.	13552.	-7.33E-04	0.00	1.12E+12	-278.532	17101.	0.00
1.4400	0.02988	8661308.	13018.	-7.18E-04	0.00	1.12E+12	-277.909	17858.	0.00
1.6000	0.02851	8686944.	12485.	-7.03E-04	0.00	1.12E+12	-277.184	18664.	0.00
1.7600	0.02718	8711535.	11954.	-6.88E-04	0.00	1.12E+12	-276.352	19522.	0.00
1.9200	0.02587	8735082.	11424.	-6.73E-04	0.00	1.12E+12	-275.412	20438.	0.00
2.0800	0.02459	8757589.	10896.	-6.58E-04	0.00	1.12E+12	-274.358	21418.	0.00
2.2400	0.02335	8779061.	10371.	-6.43E-04	0.00	1.12E+12	-273.187	22467.	0.00
2.4000	0.02213	8799501.	9847.	-6.28E-04	0.00	1.12E+12	-271.894	23594.	0.00
2.5600	0.02094	8818915.	9327.	-6.13E-04	0.00	1.12E+12	-270.476	24806.	0.00
2.7200	0.01977	8837306.	8809.	-5.98E-04	0.00	1.12E+12	-268.926	26113.	0.00
2.8800	0.01864	8854682.	8294.	-5.82E-04	0.00	1.12E+12	-267.240	27526.	0.00
3.0400	0.01754	8871047.	7783.	-5.67E-04	0.00	1.12E+12	-265.411	29057.	0.00
3.2000	0.01646	8886410.	7275.	-5.52E-04	0.00	1.12E+12	-263.431	30722.	0.00
3.3600	0.01542	8900776.	6771.	-5.37E-04	0.00	1.12E+12	-261.295	32538.	0.00
3.5200	0.01440	8914155.	6272.	-5.21E-04	0.00	1.12E+12	-258.992	34525.	0.00
3.6800	0.01342	8926553.	5777.	-5.06E-04	0.00	1.12E+12	-256.514	36707.	0.00
3.8400	0.01246	8937982.	5287.	-4.91E-04	0.00	1.12E+12	-253.849	39114.	0.00

Pier drilled shaft_row3

4.0000	0.01153	8948449.	4802.	-4.75E-04	0.00	1.12E+12	-250.986	41782.	0.00
4.1600	0.01064	8957967.	4323.	-4.60E-04	0.00	1.12E+12	-247.910	44752.	0.00
4.3200	0.00977	8966545.	3851.	-4.44E-04	0.00	1.12E+12	-244.605	48078.	0.00
4.4800	0.00893	8974197.	3384.	-4.29E-04	0.00	1.12E+12	-241.052	51828.	0.00
4.6400	0.00812	8980934.	2925.	-4.13E-04	0.00	1.12E+12	-237.227	56085.	0.00
4.8000	0.00734	8986773.	2474.	-3.98E-04	0.00	1.12E+12	-233.105	60957.	0.00
4.9600	0.00659	8991727.	2030.	-3.83E-04	0.00	1.12E+12	-228.650	66589.	0.00
5.1200	0.00587	8995813.	1596.	-3.67E-04	0.00	1.12E+12	-223.823	73170.	0.00
5.2800	0.00518	8999048.	1171.	-3.52E-04	0.00	1.12E+12	-218.573	80966.	0.00
5.4400	0.00452	9001453.	757.2525	-3.36E-04	0.00	1.12E+12	-212.832	90349.	0.00
5.6000	0.00389	9003048.	354.6819	-3.21E-04	0.00	1.12E+12	-206.512	101868.	0.00
5.7600	0.00329	9003857.	-35.084	-3.05E-04	0.00	1.12E+12	-199.494	116370.	0.00
5.9200	0.00272	9003905.	-410.536	-2.90E-04	0.00	1.12E+12	-191.602	135232.	0.00
6.0800	0.00218	9003222.	-25764.	-2.64E-04	0.00	4.91E+11	-26218.	2.31E+07	0.00
6.2400	0.00171	8905830.	-76074.	-2.30E-04	0.00	4.96E+11	-26189.	2.95E+07	0.00
6.4000	0.00130	8711841.	-126068.	-1.96E-04	0.00	5.06E+11	-25888.	3.83E+07	0.00
6.5600	9.54E-04	8422365.	-194708.	-1.64E-04	0.00	5.21E+11	-45613.	9.18E+07	0.00
6.7200	6.69E-04	7964693.	-270770.	-1.34E-04	0.00	5.45E+11	-33618.	9.64E+07	0.00
6.8800	4.39E-04	7383046.	-325209.	-1.09E-04	0.00	6.54E+11	-23090.	1.01E+08	0.00
7.0400	2.50E-04	6716245.	-360570.	-8.86E-05	0.00	6.55E+11	-13744.	1.06E+08	0.00
7.2000	9.86E-05	5998745.	-379200.	-6.99E-05	0.00	6.56E+11	-5662.	1.10E+08	0.00
7.3600	-1.88E-05	5260344.	-383553.	-5.35E-05	0.00	6.56E+11	1128.	1.15E+08	0.00
7.5200	-1.07E-04	4526076.	-376094.	-3.91E-05	0.00	6.56E+11	6642.	1.20E+08	0.00
7.6800	-1.69E-04	3816269.	-359222.	-2.69E-05	0.00	6.56E+11	10934.	1.24E+08	0.00
7.8400	-2.10E-04	3146752.	-335199.	-1.67E-05	0.00	6.56E+11	14089.	1.29E+08	0.00
8.0000	-2.33E-04	2529158.	-306108.	-8.45E-06	0.00	6.57E+11	16214.	1.33E+08	0.00
8.1600	-2.43E-04	1971324.	-273810.	-1.87E-06	0.00	6.57E+11	17430.	1.38E+08	0.00
8.3200	-2.41E-04	1477735.	-239922.	3.17E-06	0.00	6.57E+11	17869.	1.43E+08	0.00
8.4800	-2.30E-04	1050012.	-205813.	6.87E-06	0.00	6.57E+11	17662.	1.47E+08	0.00
8.6400	-2.14E-04	687392.	-172595.	9.41E-06	0.00	6.57E+11	16940.	1.52E+08	0.00
8.8000	-1.94E-04	387216.	-141141.	1.10E-05	0.00	6.57E+11	15825.	1.56E+08	0.00
8.9600	-1.72E-04	145376.	-112093.	1.18E-05	0.00	6.57E+11	14433.	1.61E+08	0.00
9.1200	-1.49E-04	-43259.	-85889.	1.19E-05	0.00	6.57E+11	12863.	1.66E+08	0.00
9.2800	-1.26E-04	-184475.	-62783.	1.16E-05	0.00	6.57E+11	11205.	1.70E+08	0.00
9.4400	-1.05E-04	-284385.	-42877.	1.09E-05	0.00	6.57E+11	9531.	1.75E+08	0.00
9.6000	-8.45E-05	-349156.	-26140.	9.96E-06	0.00	6.57E+11	7903.	1.79E+08	0.00
9.7600	-6.64E-05	-384793.	-12442.	8.89E-06	0.00	6.57E+11	6366.	1.84E+08	0.00
9.9200	-5.04E-05	-396961.	-1575.	7.75E-06	0.00	6.57E+11	4954.	1.89E+08	0.00
10.0800	-3.66E-05	-390867.	6722.	6.60E-06	0.00	6.57E+11	3689.	1.93E+08	0.00
10.2400	-2.51E-05	-371171.	12745.	5.48E-06	0.00	6.57E+11	2585.	1.98E+08	0.00

Pier drilled shaft_row3

10.4000	-1.56E-05	-341946.	16804.	4.44E-06	0.00	6.57E+11	1644.	2.03E+08	0.00
10.5600	-8.02E-06	-306657.	19214.	3.49E-06	0.00	6.57E+11	865.7404	2.07E+08	0.00
10.7200	-2.18E-06	-268175.	20276.	2.65E-06	0.00	6.57E+11	240.6158	2.12E+08	0.00
10.8800	2.16E-06	-228804.	20274.	1.92E-06	0.00	6.57E+11	-242.908	2.16E+08	0.00
11.0400	5.21E-06	-190328.	19465.	1.31E-06	0.00	6.57E+11	-599.419	2.21E+08	0.00
11.2000	7.19E-06	-154061.	18079.	8.08E-07	0.00	6.57E+11	-845.040	2.26E+08	0.00
11.3600	8.31E-06	-120909.	16311.	4.06E-07	0.00	6.57E+11	-996.485	2.30E+08	0.00
11.5200	8.75E-06	-91429.	14327.	9.56E-08	0.00	6.57E+11	-1070.	2.35E+08	0.00
11.6800	8.68E-06	-65894.	12260.	-1.34E-07	0.00	6.57E+11	-1082.	2.39E+08	0.00
11.8400	8.23E-06	-44348.	10217.	-2.96E-07	0.00	6.57E+11	-1047.	2.44E+08	0.00
12.0000	7.54E-06	-26661.	8274.	-3.99E-07	0.00	6.57E+11	-976.851	2.49E+08	0.00
12.1600	6.70E-06	-12575.	6488.	-4.57E-07	0.00	6.57E+11	-883.926	2.53E+08	0.00
12.3200	5.79E-06	-1747.	4893.	-4.78E-07	0.00	6.57E+11	-777.474	2.58E+08	0.00
12.4800	4.87E-06	6215.	3508.	-4.71E-07	0.00	6.57E+11	-665.296	2.63E+08	0.00
12.6400	3.98E-06	11725.	2338.	-4.45E-07	0.00	6.57E+11	-553.542	2.67E+08	0.00
12.8000	3.16E-06	15193.	1377.	-4.06E-07	0.00	6.57E+11	-446.841	2.72E+08	0.00
12.9600	2.42E-06	17015.	613.7765	-3.59E-07	0.00	6.57E+11	-348.469	2.76E+08	0.00
13.1200	1.78E-06	17551.	29.1307	-3.08E-07	0.00	6.57E+11	-260.537	2.81E+08	0.00
13.2800	1.24E-06	17127.	-397.802	-2.57E-07	0.00	6.57E+11	-184.184	2.86E+08	0.00
13.4400	7.92E-07	16025.	-689.586	-2.09E-07	0.00	6.57E+11	-119.758	2.90E+08	0.00
13.6000	4.36E-07	14480.	-868.878	-1.64E-07	0.00	6.57E+11	-67.004	2.95E+08	0.00
13.7600	1.62E-07	12689.	-957.408	-1.25E-07	0.00	6.57E+11	-25.215	2.99E+08	0.00
13.9200	-4.18E-08	10804.	-975.267	-9.02E-08	0.00	6.57E+11	6.6125	3.04E+08	0.00
14.0800	-1.85E-07	8944.	-940.438	-6.13E-08	0.00	6.57E+11	29.6677	3.09E+08	0.00
14.2400	-2.77E-07	7193.	-868.549	-3.77E-08	0.00	6.57E+11	45.2167	3.13E+08	0.00
14.4000	-3.29E-07	5609.	-772.797	-1.90E-08	0.00	6.57E+11	54.5251	3.18E+08	0.00
14.5600	-3.50E-07	4225.	-664.009	-4.61E-09	0.00	6.57E+11	58.7955	3.22E+08	0.00
14.7200	-3.47E-07	3059.	-550.806	6.04E-09	0.00	6.57E+11	59.1241	3.27E+08	0.00
14.8800	-3.27E-07	2110.	-439.835	1.36E-08	0.00	6.57E+11	56.4712	3.32E+08	0.00
15.0400	-2.95E-07	1370.	-336.042	1.87E-08	0.00	6.57E+11	51.6460	3.36E+08	0.00
15.2000	-2.55E-07	819.9129	-242.973	2.19E-08	0.00	6.57E+11	45.3011	3.41E+08	0.00
15.3600	-2.11E-07	436.8657	-163.065	2.37E-08	0.00	6.57E+11	37.9370	3.46E+08	0.00
15.5200	-1.64E-07	193.6672	-97.929	2.46E-08	0.00	6.57E+11	29.9125	3.50E+08	0.00
15.6800	-1.16E-07	60.7373	-48.609	2.50E-08	0.00	6.57E+11	21.4624	3.55E+08	0.00
15.8400	-6.79E-08	6.9260	-15.796	2.51E-08	0.00	6.57E+11	12.7184	3.59E+08	0.00
16.0000	-1.97E-08	0.00	0.00	2.51E-08	0.00	6.57E+11	3.7355	1.82E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual

Pier drilled shaft_row3

stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 5:

Pile-head deflection = 0.04342979 inches
 Computed slope at pile head = -0.0008498 radians
 Maximum bending moment = 9003905. inch-lbs
 Maximum shear force = -383553. lbs
 Depth of maximum bending moment = 5.92000000 feet below pile head
 Depth of maximum shear force = 7.36000000 feet below pile head
 Number of iterations = 14
 Number of zero deflection points = 4

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 6

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 23130.0 lbs
 Applied moment at pile head = 10959840.0 in-lbs
 Axial thrust load on pile head = 1091000.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	0.06718	1.10E+07	23130.	-0.00127	0.00	1.10E+12	-312.403	4464.	0.00
0.1600	0.06477	1.10E+07	22530.	-0.00125	0.00	1.10E+12	-312.630	9267.	0.00
0.3200	0.06239	1.11E+07	21930.	-0.00123	0.00	1.10E+12	-312.764	9624.	0.00
0.4800	0.06006	1.11E+07	21329.	-0.00121	0.00	1.10E+12	-312.803	10000.	0.00
0.6400	0.05775	1.11E+07	20729.	-0.00119	0.00	1.10E+12	-312.745	10397.	0.00
0.8000	0.05549	1.12E+07	20128.	-0.00117	0.00	1.10E+12	-312.587	10816.	0.00
0.9600	0.05326	1.12E+07	19528.	-0.00115	0.00	1.10E+12	-312.325	11259.	0.00

Pier drilled shaft_row3

1.1200	0.05107	1.13E+07	18929.	-0.00113	0.00	1.10E+12	-311.958	11728.	0.00
1.2800	0.04892	1.13E+07	18330.	-0.00111	0.00	1.10E+12	-311.482	12225.	0.00
1.4400	0.04681	1.13E+07	17733.	-0.00109	0.00	1.10E+12	-310.892	12752.	0.00
1.6000	0.04473	1.14E+07	17137.	-0.00107	0.00	1.10E+12	-310.186	13314.	0.00
1.7600	0.04270	1.14E+07	16542.	-0.00105	0.00	1.10E+12	-309.358	13912.	0.00
1.9200	0.04070	1.14E+07	15949.	-0.00103	0.00	1.10E+12	-308.405	14550.	0.00
2.0800	0.03874	1.15E+07	15358.	-0.00101	0.00	1.10E+12	-307.321	15233.	0.00
2.2400	0.03681	1.15E+07	14769.	-9.91E-04	0.00	1.10E+12	-306.101	15964.	0.00
2.4000	0.03493	1.15E+07	14183.	-9.71E-04	0.00	1.10E+12	-304.739	16750.	0.00
2.5600	0.03309	1.16E+07	13599.	-9.50E-04	0.00	1.10E+12	-303.228	17596.	0.00
2.7200	0.03128	1.16E+07	13018.	-9.30E-04	0.00	1.10E+12	-301.562	18509.	0.00
2.8800	0.02951	1.16E+07	12441.	-9.10E-04	0.00	1.10E+12	-299.732	19498.	0.00
3.0400	0.02779	1.16E+07	11868.	-8.89E-04	0.00	1.10E+12	-297.729	20572.	0.00
3.2000	0.02610	1.17E+07	11298.	-8.69E-04	0.00	1.05E+12	-295.544	21742.	0.00
3.3600	0.02445	1.17E+07	10733.	-8.46E-04	0.00	9.82E+11	-293.171	23020.	0.00
3.5200	0.02285	1.17E+07	10172.	-8.23E-04	0.00	9.27E+11	-290.607	24420.	0.00
3.6800	0.02129	1.17E+07	9617.	-7.98E-04	0.00	9.17E+11	-287.850	25956.	0.00
3.8400	0.01978	1.17E+07	9067.	-7.74E-04	0.00	9.13E+11	-284.890	27650.	0.00
4.0000	0.01832	1.18E+07	8523.	-7.49E-04	0.00	9.10E+11	-281.712	29523.	0.00
4.1600	0.01691	1.18E+07	7986.	-7.24E-04	0.00	9.07E+11	-278.305	31606.	0.00
4.3200	0.01554	1.18E+07	7455.	-6.99E-04	0.00	9.04E+11	-274.651	33934.	0.00
4.4800	0.01422	1.18E+07	6931.	-6.74E-04	0.00	9.02E+11	-270.732	36551.	0.00
4.6400	0.01295	1.18E+07	6415.	-6.49E-04	0.00	9.00E+11	-266.527	39512.	0.00
4.8000	0.01173	1.18E+07	5908.	-6.24E-04	0.00	8.99E+11	-262.009	42888.	0.00
4.9600	0.01056	1.19E+07	5410.	-5.98E-04	0.00	8.98E+11	-257.148	46770.	0.00
5.1200	0.00943	1.19E+07	4921.	-5.73E-04	0.00	8.98E+11	-251.905	51279.	0.00
5.2800	0.00836	1.19E+07	4443.	-5.48E-04	0.00	8.97E+11	-246.234	56577.	0.00
5.4400	0.00733	1.19E+07	3976.	-5.22E-04	0.00	8.96E+11	-240.074	62890.	0.00
5.6000	0.00635	1.19E+07	3521.	-4.97E-04	0.00	8.96E+11	-233.348	70541.	0.00
5.7600	0.00542	1.19E+07	3081.	-4.71E-04	0.00	8.95E+11	-225.953	80010.	0.00
5.9200	0.00454	1.19E+07	2655.	-4.46E-04	0.00	8.95E+11	-217.747	92044.	0.00
6.0800	0.00371	1.19E+07	-26301.	-4.08E-04	0.00	4.62E+11	-29944.	1.55E+07	0.00
6.2400	0.00298	1.18E+07	-83934.	-3.59E-04	0.00	4.66E+11	-30091.	1.94E+07	0.00
6.4000	0.00233	1.16E+07	-141592.	-3.11E-04	0.00	4.75E+11	-29969.	2.47E+07	0.00
6.5600	0.00178	1.13E+07	-198735.	-2.66E-04	0.00	4.87E+11	-29556.	3.19E+07	0.00
6.7200	0.00131	1.08E+07	-254777.	-2.23E-04	0.00	5.05E+11	-28821.	4.22E+07	0.00
6.8800	9.24E-04	1.03E+07	-329156.	-1.83E-04	0.00	5.27E+11	-48657.	1.01E+08	0.00
7.0400	6.08E-04	9567758.	-408002.	-1.48E-04	0.00	5.55E+11	-33474.	1.06E+08	0.00
7.2000	3.56E-04	8722971.	-459742.	-1.19E-04	0.00	6.39E+11	-20422.	1.10E+08	0.00
7.3600	1.53E-04	7802847.	-488145.	-9.37E-05	0.00	6.40E+11	-9165.	1.15E+08	0.00

Pier drilled shaft_row3

7.5200	-4.31E-06	6848888.	-496686.	-7.18E-05	0.00	6.41E+11	268.0265	1.20E+08	0.00
7.6800	-1.22E-04	5895873.	-488833.	-5.27E-05	0.00	6.41E+11	7912.	1.24E+08	0.00
7.8400	-2.07E-04	4971988.	-467941.	-3.64E-05	0.00	6.42E+11	13851.	1.29E+08	0.00
8.0000	-2.62E-04	4099132.	-437161.	-2.28E-05	0.00	6.42E+11	18211.	1.33E+08	0.00
8.1600	-2.94E-04	3293385.	-399377.	-1.18E-05	0.00	6.42E+11	21147.	1.38E+08	0.00
8.3200	-3.07E-04	2565574.	-357156.	-3.03E-06	0.00	6.42E+11	22833.	1.43E+08	0.00
8.4800	-3.06E-04	1921918.	-312721.	3.68E-06	0.00	6.42E+11	23453.	1.47E+08	0.00
8.6400	-2.93E-04	1364709.	-267940.	8.59E-06	0.00	6.42E+11	23194.	1.52E+08	0.00
8.8000	-2.73E-04	892993.	-224327.	1.20E-05	0.00	6.42E+11	22236.	1.56E+08	0.00
8.9600	-2.47E-04	503242.	-183061.	1.41E-05	0.00	6.42E+11	20750.	1.61E+08	0.00
9.1200	-2.19E-04	189979.	-145005.	1.51E-05	0.00	6.42E+11	18892.	1.66E+08	0.00
9.2800	-1.89E-04	-53642.	-110741.	1.53E-05	0.00	6.42E+11	16801.	1.70E+08	0.00
9.4400	-1.60E-04	-235329.	-80600.	1.49E-05	0.00	6.42E+11	14596.	1.75E+08	0.00
9.6000	-1.32E-04	-363209.	-54707.	1.40E-05	0.00	6.42E+11	12377.	1.79E+08	0.00
9.7600	-1.07E-04	-445462.	-33011.	1.28E-05	0.00	6.42E+11	10224.	1.84E+08	0.00
9.9200	-8.34E-05	-490024.	-15326.	1.14E-05	0.00	6.42E+11	8198.	1.89E+08	0.00
10.0800	-6.30E-05	-504362.	-1366.	9.87E-06	0.00	6.42E+11	6344.	1.93E+08	0.00
10.2400	-4.55E-05	-495311.	9227.	8.38E-06	0.00	6.42E+11	4690.	1.98E+08	0.00
10.4000	-3.08E-05	-468967.	16851.	6.94E-06	0.00	6.42E+11	3252.	2.03E+08	0.00
10.5600	-1.89E-05	-430631.	21927.	5.59E-06	0.00	6.42E+11	2034.	2.07E+08	0.00
10.7200	-9.35E-06	-384792.	24870.	4.37E-06	0.00	6.42E+11	1032.	2.12E+08	0.00
10.8800	-2.06E-06	-335148.	26083.	3.30E-06	0.00	6.42E+11	231.9377	2.16E+08	0.00
11.0400	3.31E-06	-284647.	25940.	2.37E-06	0.00	6.42E+11	-381.325	2.21E+08	0.00
11.2000	7.05E-06	-235550.	24778.	1.59E-06	0.00	6.42E+11	-828.423	2.26E+08	0.00
11.3600	9.43E-06	-189505.	22897.	9.59E-07	0.00	6.42E+11	-1131.	2.30E+08	0.00
11.5200	1.07E-05	-147629.	20551.	4.55E-07	0.00	6.42E+11	-1313.	2.35E+08	0.00
11.6800	1.12E-05	-110593.	17951.	6.92E-08	0.00	6.42E+11	-1395.	2.39E+08	0.00
11.8400	1.10E-05	-78696.	15270.	-2.14E-07	0.00	6.42E+11	-1398.	2.44E+08	0.00
12.0000	1.04E-05	-51953.	12640.	-4.09E-07	0.00	6.42E+11	-1342.	2.49E+08	0.00
12.1600	9.43E-06	-30158.	10157.	-5.32E-07	0.00	6.42E+11	-1244.	2.53E+08	0.00
12.3200	8.32E-06	-12947.	7890.	-5.96E-07	0.00	6.42E+11	-1118.	2.58E+08	0.00
12.4800	7.14E-06	144.0720	5881.	-6.15E-07	0.00	6.42E+11	-976.028	2.63E+08	0.00
12.6400	5.96E-06	9637.	4148.	-6.01E-07	0.00	6.42E+11	-828.869	2.67E+08	0.00
12.8000	4.83E-06	16074.	2696.	-5.62E-07	0.00	6.42E+11	-683.863	2.72E+08	0.00
12.9600	3.80E-06	19991.	1514.	-5.08E-07	0.00	6.42E+11	-546.727	2.76E+08	0.00
13.1200	2.88E-06	21891.	584.8568	-4.46E-07	0.00	6.42E+11	-421.416	2.81E+08	0.00
13.2800	2.09E-06	22238.	-117.666	-3.80E-07	0.00	6.42E+11	-310.378	2.86E+08	0.00
13.4400	1.42E-06	21441.	-621.858	-3.15E-07	0.00	6.42E+11	-214.822	2.90E+08	0.00
13.6000	8.79E-07	19852.	-957.653	-2.53E-07	0.00	6.42E+11	-134.964	2.95E+08	0.00
13.7600	4.51E-07	17765.	-1155.	-1.97E-07	0.00	6.42E+11	-70.269	2.99E+08	0.00

Pier drilled shaft_row3									
13.9200	1.24E-07	15419.	-1241.	-1.47E-07	0.00	6.42E+11	-19.660	3.04E+08	0.00
14.0800	-1.14E-07	13000.	-1242.	-1.04E-07	0.00	6.42E+11	18.2903	3.09E+08	0.00
14.2400	-2.77E-07	10649.	-1181.	-6.91E-08	0.00	6.42E+11	45.2107	3.13E+08	0.00
14.4000	-3.79E-07	8464.	-1078.	-4.06E-08	0.00	6.42E+11	62.7974	3.18E+08	0.00
14.5600	-4.33E-07	6510.	-947.582	-1.82E-08	0.00	6.42E+11	72.7159	3.22E+08	0.00
14.7200	-4.49E-07	4825.	-804.310	-1.26E-09	0.00	6.42E+11	76.5261	3.27E+08	0.00
14.8800	-4.38E-07	3422.	-658.240	1.11E-08	0.00	6.42E+11	75.6298	3.32E+08	0.00
15.0400	-4.07E-07	2297.	-517.247	1.96E-08	0.00	6.42E+11	71.2382	3.36E+08	0.00
15.2000	-3.62E-07	1436.	-387.077	2.52E-08	0.00	6.42E+11	64.3558	3.41E+08	0.00
15.3600	-3.10E-07	810.9381	-271.748	2.86E-08	0.00	6.42E+11	55.7779	3.46E+08	0.00
15.5200	-2.53E-07	391.9288	-173.947	3.04E-08	0.00	6.42E+11	46.0987	3.50E+08	0.00
15.6800	-1.93E-07	142.8554	-95.392	3.12E-08	0.00	6.42E+11	35.7293	3.55E+08	0.00
15.8400	-1.33E-07	25.4935	-37.168	3.14E-08	0.00	6.42E+11	24.9209	3.59E+08	0.00
16.0000	-7.28E-08	0.00	0.00	3.14E-08	0.00	6.42E+11	13.7954	1.82E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 6:

Pile-head deflection = 0.06718475 inches
 Computed slope at pile head = -0.0012666 radians
 Maximum bending moment = 11913785. inch-lbs
 Maximum shear force = -496686. lbs
 Depth of maximum bending moment = 6.08000000 feet below pile head
 Depth of maximum shear force = 7.52000000 feet below pile head
 Number of iterations = 35
 Number of zero deflection points = 3

 Summary of Pile-head Responses for Conventional Analyses

Definitions of Pile-head Loading Conditions:

Pier drilled shaft_row3

Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs
 Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
 Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.
 Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs
 Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians

Load Case No.	Load Type 1	Pile-head Load 1	Load Type 2	Pile-head Load 2	Axial Loading lbs	Pile-head Deflection inches	Pile-head Rotation radians	Max Shear in Pile lbs	Max Moment in Pile in-lbs
1	V, lb	19020.	M, in-lb	3836400.	848900.	0.01917	-3.89E-04	-199976.	4659804.
2	V, lb	23990.	M, in-lb	5025600.	1102000.	0.02649	-5.30E-04	-267706.	6173298.
3	V, lb	10160.	M, in-lb	4451400.	1018000.	0.01965	-4.11E-04	-199796.	4694835.
4	V, lb	13670.	M, in-lb	5995200.	1326000.	0.02834	-5.82E-04	-277845.	6408116.
5	V, lb	17850.	M, in-lb	8383200.	846000.	0.04343	-8.50E-04	-383553.	9003905.
6	V, lb	23130.	M, in-lb	1.10E+07	1091000.	0.06718	-0.00127	-496686.	1.19E+07

Maximum pile-head deflection = 0.0671847542 inches
 Maximum pile-head rotation = -0.0012665832 radians = -0.072570 deg.

 Summary of Warning Messages

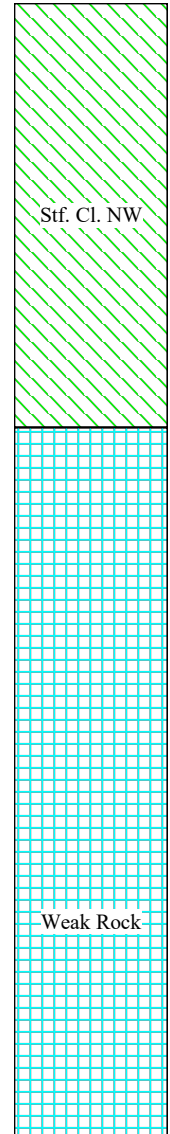
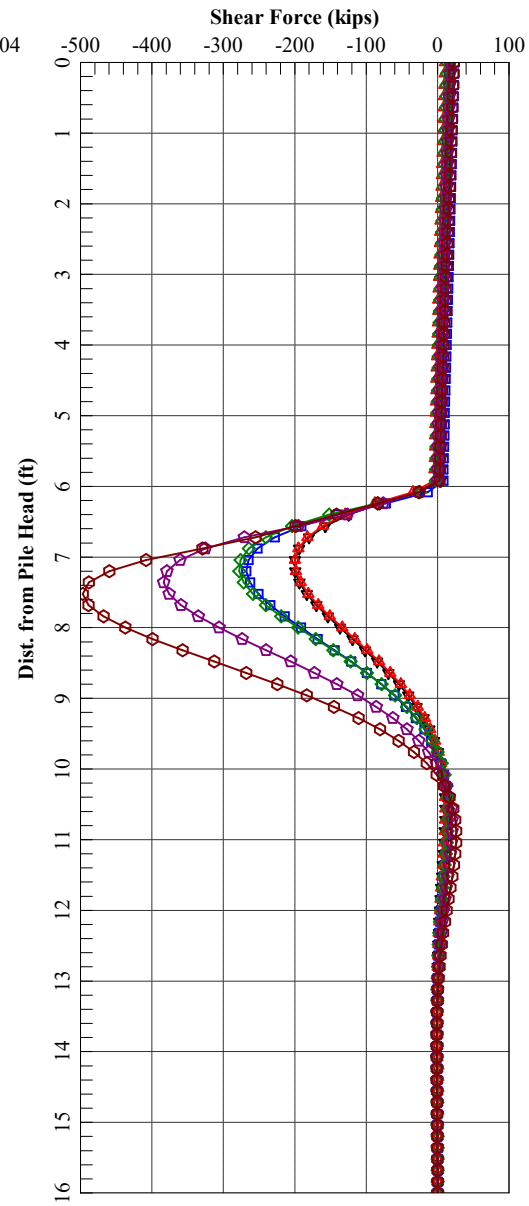
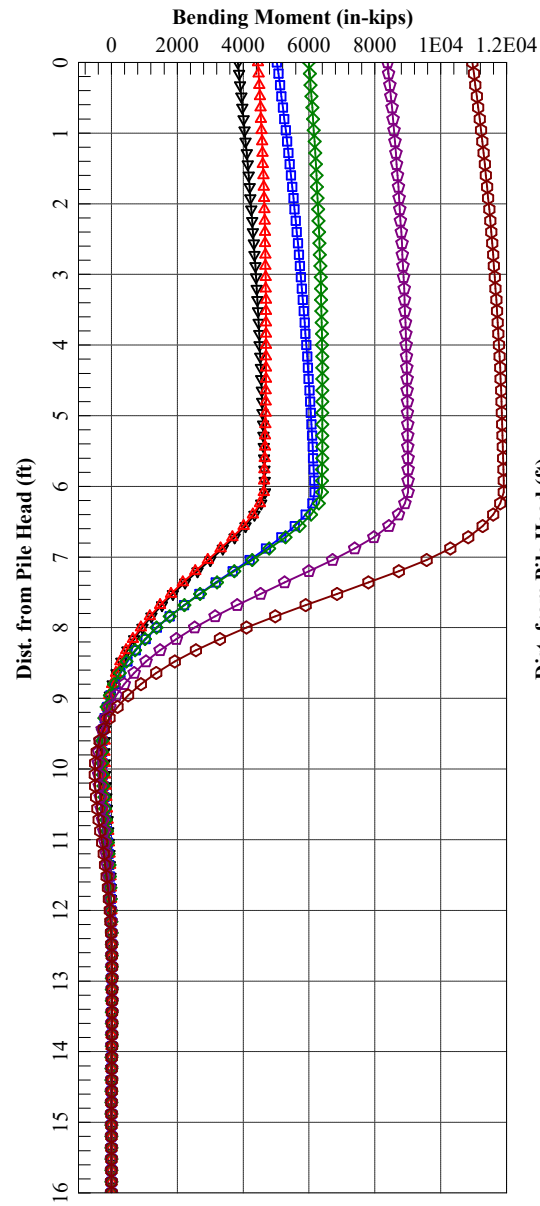
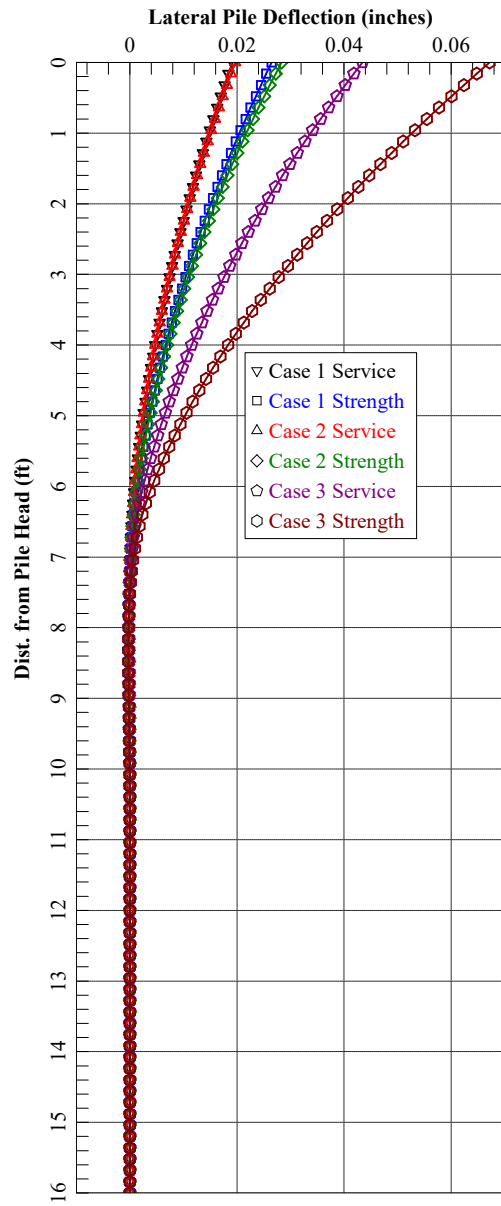
The following warning was reported 2268 times

**** Warning ****

An unreasonable input value for unconfined compressive strength has been specified for a soil defined using the weak rock criteria. The input value is greater than 500 psi. Please check your input data for correctness.

The analysis ended normally.

MEG-33-19.21_Bowman's Run Bridge_Pier_Row3



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LPile for Windows, Version 2022-12.006

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method
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Files Used for Analysis

Path to file locations:

\\US0247-PPFSS01\shared_projects\173609140\119144\400-Engineering\Geotechnical\Analysis\Lpile\bridges\LPile
Analysis\Bowman's Run\forward Abutment B-003\

Name of input data file:

MEG-33 forward abutment X direction row1.lp12d

Name of output report file:

MEG-33 forward abutment X direction row1.lp12o

MEG-33 forward abutment X direction row1

Name of plot output file:

MEG-33 forward abutment X direction row1.lp12p

Name of runtime message file:

MEG-33 forward abutment X direction row1.lp12r

Date and Time of Analysis

Date: June 28, 2024

Time: 15:20:07

Problem Title

Project Name: MEG-33-19.21

Job Number: 173609140

Client: ODOT

Engineer: G. Khatri

Description: Forward Abutment Lateral Load Analysis at Bowman's Run Bridge

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Program Options and Settings

Computational Options:

- Conventional Analysis

Engineering Units Used for Data Input and Computations:

- US Customary System Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed = 500
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 100.0000 in
- Number of pile increments = 100

Loading Type and Number of Cycles of Loading:

- Static loading specified

- Analysis uses p-y modification factors for p-y curves
- Analysis uses layering correction (Method of Georgiadis)
- No distributed lateral loads are entered
- Loading by lateral soil movements acting on pile not selected
- Input of shear resistance at the pile tip not selected
- Input of moment resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:

- Output files use decimal points to denote decimal symbols.
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1
- No p-y curves to be computed and reported for user-specified depths
- Print using wide report formats

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Number of pile sections defined = 1
Total length of pile = 10.000 ft
Depth of ground surface below top of pile = 0.0000 ft

Pile diameters used for p-y curve computations are defined using 2 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile. A summary of values of pile diameter vs. depth follows.

Point No.	Depth Below Pile Head feet	Pile Diameter inches
1	0.000	30.0000
2	10.000	30.0000

Input Structural Properties for Pile Sections:

Pile Section No. 1:

Section 1 is a round drilled shaft, bored pile, or CIDH pile
Length of section = 10.000000 ft
Shaft Diameter = 30.000000 in

Soil and Rock Layering Information

The soil profile is modelled using 1 layers

Layer 1 is weak rock, p-y criteria by Reese, 1997

Distance from top of pile to top of layer = 0.0000 ft
Distance from top of pile to bottom of layer = 15.000000 ft

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Effective unit weight at top of layer = 87.600000 pcf
 Effective unit weight at bottom of layer = 87.600000 pcf
 Uniaxial compressive strength at top of layer = 4380. psi
 Uniaxial compressive strength at bottom of layer = 4380. psi
 Initial modulus of rock at top of layer = 394200. psi
 Initial modulus of rock at bottom of layer = 394200. psi
 RQD of rock at top of layer = 81.000000 %
 RQD of rock at bottom of layer = 81.000000 %
 k rm of rock at top of layer = 0.0000500
 k rm of rock at bottom of layer = 0.0000500

(Depth of the lowest soil layer extends 5.000 ft below the pile tip)

 Summary of Input Soil Properties

Layer Num.	Soil Type Name (p-y Curve Type)	Layer Depth ft	Effective Unit Wt. pcf	Uniaxial qu psi	RQD %	E50 or krm	Rock Mass Modulus psi
1	Weak Rock	0.00 15.0000	87.6000 87.6000	4380. 4380.	81.0000 81.0000	5.00E-05 5.00E-05	394200. 394200.

 Modification Factors for p-y Curves

Distribution of p-y modifiers with depth defined using 4 points

Point No.	Depth X ft	p-mult	y-mult
1	0.000	1.0000	1.0000
2	10.000	1.0000	1.0000
3	10.000	1.0000	1.0000

4 10.000 1.0000 MEG-33 forward abutment X direction row1
1.0000

Static Loading Type

Static loading criteria were used when computing p-y curves for all analyses.

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 2

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length	Run Analysis
1	1	V = 3540. lbs	M = 1490400. in-lbs	751800.	No	Yes
2	1	V = 4770. lbs	M = 2012400. in-lbs	967800.	No	Yes

V = shear force applied normal to pile axis

M = bending moment applied to pile head

y = lateral deflection normal to pile axis

S = pile slope relative to original pile batter angle

R = rotational stiffness applied to pile head

Values of top y vs. pile lengths can be computed only for load types with specified shear loading (Load Types 1, 2, and 3).

Thrust force is assumed to be acting axially for all pile batter angles.

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

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Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 1

Pile Section No. 1:

Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section	=	10.000000	ft
Shaft Diameter	=	30.000000	in
Concrete Cover Thickness (to edge of trans. reinf.)	=	3.000000	in
Number of Reinforcing Bars	=	8	bars
Yield Stress of Reinforcing Bars	=	50000.	psi
Modulus of Elasticity of Reinforcing Bars	=	29000000.	psi
Gross Area of Shaft	=	706.858347	sq. in.
Total Area of Reinforcing Steel	=	8.000000	sq. in.
Area Ratio of Steel Reinforcement	=	1.13	percent
Edge-to-Edge Bar Spacing	=	7.242052	in
Maximum Concrete Aggregate Size	=	0.750000	in
Ratio of Bar Spacing to Aggregate Size	=	9.66	
Offset of Center of Rebar Cage from Center of Pile	=	0.0000	in
Transverse Reinforcement			
Type: Spiral			
Number of Transverse Reinf. (per spacing)	=	1	
Spacing of Transverse Reinf.	=	4.000000	in
Yield Stress of Transverse Reinf.	=	50000.	psi
Diameter of Transverse Reinf.	=	0.500000	in

Axial Structural Capacities:

Nom. Axial Structural Capacity = $0.85 F_c A_c + F_y A_s$	=	2776.118	kips
Tensile Load for Cracking of Concrete	=	-317.428	kips
Nominal Axial Tensile Capacity	=	-400.000	kips

Reinforcing Bar Dimensions and Positions Used in Computations:

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Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.128000	1.000000	10.936000	0.000000
2	1.128000	1.000000	7.732920	7.732920
3	1.128000	1.000000	0.000000	10.936000
4	1.128000	1.000000	-7.73292	7.732920
5	1.128000	1.000000	-10.93600	0.000000
6	1.128000	1.000000	-7.73292	-7.73292
7	1.128000	1.000000	0.000000	-10.93600
8	1.128000	1.000000	7.732920	-7.73292

NOTE: The positions of the above rebars were computed by LPILE

Minimum spacing between any two bars not equal to zero = 7.242 inches between bars 1 and 2.

Ratio of bar spacing to maximum aggregate size = 9.66

Concrete Properties:

Compressive Strength of Concrete	=	4000. psi
Modulus of Elasticity of Concrete	=	3604997. psi
Modulus of Rupture of Concrete	=	-474.34165 psi
Compression Strain at Peak Stress	=	0.001886
Tensile Strain at Fracture of Concrete	=	-0.0001154
Maximum Coarse Aggregate Size	=	0.750000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 2

Number	Axial Thrust Force kips
1	751.800
2	967.800

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Definitions of Run Messages and Notes:

- C = concrete in section has cracked in tension.
- Y = stress in reinforcing steel has reached yield stress.
- T = ACI 318 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than 0.003. See ACI 318-14, Section 21.2.3.
- Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
 Position of neutral axis is measured from edge of compression side of pile.
 Compressive stresses and strains are positive in sign.
 Tensile stresses and strains are negative in sign.

Axial Thrust Force = 751.800 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in ²	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
0.00000125	197.9570598	158365648.	215.5648630	0.0002695	0.0002320	1.0605021	7.6891638	
0.00000250	395.9073095	158362924.	115.3119932	0.0002883	0.0002133	1.1278688	8.1099945	
0.00000375	593.8249168	158353311.	81.9075073	0.0003072	0.0001947	1.1946294	8.5322539	
0.00000500	791.6935584	158338712.	65.2151194	0.0003261	0.0001761	1.2607780	8.9559423	
0.00000625	989.4969040	158319505.	55.2075729	0.0003450	0.0001575	1.3263083	9.3810601	
0.00000750	1187.	158295815.	48.5424497	0.0003641	0.0001391	1.3912141	9.8076078	
0.00000875	1385.	158267696.	43.7872851	0.0003831	0.0001206	1.4554892	10.2355861	
0.00001000	1582.	158235171.	40.2258474	0.0004023	0.0001023	1.5191275	10.6649958	
0.00001125	1780.	158198254.	37.4602303	0.0004214	0.00008393	1.5821228	11.0958377	
0.00001250	1977.	158156950.	35.2516904	0.0004406	0.00006565	1.6444688	11.5281128	
0.00001375	2174.	158111262.	33.4483005	0.0004599	0.00004741	1.7061593	11.9618224	
0.00001500	2371.	158061189.	31.9487758	0.0004792	0.00002923	1.7671881	12.3969675	
0.00001625	2568.	158006730.	30.6829966	0.0004986	0.00001110	1.8275489	12.8335497	
0.00001750	2764.	157947840.	29.6008765	0.0005180	-0.00000698	1.8872355	13.2715699	
0.00001875	2960.	157881930.	28.6656200	0.0005375	-0.00002502	1.9462377	13.7109934	
0.00002000	3156.	157802152.	27.8494965	0.0005570	-0.00004301	2.0045378	14.1517080	

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0.00002125	3351.	157702855.	27.1312744	0.0005765	-0.00006096	2.0621168	14.5935854
0.00002250	3546.	157580669.	26.4944559	0.0005961	-0.00007887	2.1189576	15.0365075
0.00002375	3739.	157434076.	25.9260397	0.0006157	-0.00009676	2.1750455	15.4803724
0.00002500	3751.	150052811.	25.2035097	0.0006301	-0.000120	2.2153754	15.7712946 C
0.00002625	3885.	148003404.	24.6824729	0.0006479	-0.000140	2.2649968	16.1632201 C
0.00002750	4012.	145883929.	24.2005634	0.0006655	-0.000159	2.3132946	16.5485743 C
0.00002875	4132.	143722765.	23.7529237	0.0006829	-0.000180	2.3603146	16.9275627 C
0.00003000	4247.	141553357.	23.3360361	0.0007001	-0.000200	2.4061438	17.3008515 C
0.00003125	4356.	139400977.	22.9469323	0.0007171	-0.000220	2.4508643	17.6690950 C
0.00003250	4461.	137262979.	22.5820384	0.0007339	-0.000241	2.4944646	18.0319463 C
0.00003375	4562.	135168257.	22.2398324	0.0007506	-0.000262	2.5370669	18.3905486 C
0.00003500	4659.	133115714.	21.9178298	0.0007671	-0.000283	2.5786825	18.7448473 C
0.00003625	4753.	131105103.	21.6139377	0.0007835	-0.000304	2.6193277	19.0948396 C
0.00003750	4843.	129139692.	21.3265475	0.0007997	-0.000325	2.6590372	19.4407455 C
0.00003875	4930.	127222376.	21.0542921	0.0008159	-0.000347	2.6978479	19.7828234 C
0.00004000	5014.	125355615.	20.7960054	0.0008318	-0.000368	2.7357981	20.1213664 C
0.00004125	5096.	123541275.	20.5506810	0.0008477	-0.000390	2.7729263	20.4566893 C
0.00004250	5175.	121763162.	20.3162749	0.0008634	-0.000412	2.8091557	20.7876834 C
0.00004375	5252.	120038260.	20.0930028	0.0008791	-0.000433	2.8446168	21.1158096 C
0.00004500	5327.	118367984.	19.8802555	0.0008946	-0.000455	2.8793521	21.4414836 C
0.00004625	5400.	116746163.	19.6769907	0.0009101	-0.000477	2.9133510	21.7644514 C
0.00004750	5470.	115160593.	19.4817170	0.0009254	-0.000500	2.9465463	22.0836892 C
0.00004875	5540.	113630873.	19.2953970	0.0009407	-0.000522	2.9791160	22.4014298 C
0.00005125	5673.	110691645.	18.9443995	0.0009709	-0.000567	3.0421229	23.0285500 C
0.00005375	5801.	107920753.	18.6205433	0.0010009	-0.000612	3.1025283	23.6470845 C
0.00005625	5923.	105305585.	18.3206047	0.0010305	-0.000657	3.1604344	24.2576740 C
0.00005875	6042.	102835400.	18.0419648	0.0010600	-0.000703	3.2159432	24.8610601 C
0.00006125	6156.	100500896.	17.7824914	0.0010892	-0.000748	3.2691563	25.4580881 C
0.00006375	6266.	98293892.	17.5404487	0.0011182	-0.000794	3.3201742	26.0497173 C
0.00006625	6373.	96193193.	17.3128621	0.0011470	-0.000841	3.3689211	26.6340241 C
0.00006875	6476.	94201892.	17.0994625	0.0011756	-0.000887	3.4155912	27.2136161 C
0.00007125	6578.	92316591.	16.8995613	0.0012041	-0.000933	3.4603047	27.7901562 C
0.00007375	6676.	90519586.	16.7108241	0.0012324	-0.000980	3.5029756	28.3615878 C
0.00007625	6772.	88807342.	16.5325591	0.0012606	-0.001027	3.5436815	28.9288091 C
0.00007875	6866.	87183076.	16.3651996	0.0012888	-0.001074	3.5826040	29.4950873 C
0.00008125	6957.	85622101.	16.2053121	0.0013167	-0.001121	3.6194913	30.0547044 C
0.00008375	7047.	84143133.	16.0556053	0.0013447	-0.001168	3.6547386	30.6158642 C
0.00008625	7134.	82716255.	15.9117219	0.0013724	-0.001215	3.6879816	31.1698822 C
0.00008875	7221.	81360982.	15.7767604	0.0014002	-0.001262	3.7196234	31.7259998 C
0.00009125	7305.	80054287.	15.6471672	0.0014278	-0.001310	3.7493776	32.2767540 C

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0.00009375	7388.	78805436.	15.5246490	0.0014554	-0.001357	3.7774785	32.8279506	C
0.00009625	7470.	77607615.	15.4081902	0.0014830	-0.001404	3.8038815	33.3782983	C
0.00009875	7550.	76451952.	15.2964090	0.0015105	-0.001452	3.8285119	33.9251538	C
0.0001013	7629.	75346617.	15.1910043	0.0015381	-0.001499	3.8515610	34.4745251	C
0.0001038	7706.	74279158.	15.0897771	0.0015656	-0.001547	3.8728766	35.0211798	C
0.0001063	7783.	73249736.	14.9929751	0.0015930	-0.001594	3.8925159	-35.610083	C
0.0001088	7858.	72261337.	14.9014356	0.0016205	-0.001642	3.9105643	-36.736660	C
0.0001113	7933.	71306223.	14.8137169	0.0016480	-0.001689	3.9269363	-37.864183	C
0.0001138	8006.	70380275.	14.7291166	0.0016754	-0.001737	3.9416116	-38.994139	C
0.0001163	8078.	69488223.	14.6489325	0.0017029	-0.001785	3.9546842	-40.121474	C
0.0001188	8150.	68627833.	14.5728954	0.0017305	-0.001832	3.9661381	-41.246154	C
0.0001213	8220.	67790591.	14.4990892	0.0017580	-0.001879	3.9758902	-42.374015	C
0.0001238	8289.	66978675.	14.4282774	0.0017855	-0.001927	3.9839904	-43.501833	C
0.0001263	8357.	66193337.	14.3610174	0.0018131	-0.001974	3.9904577	-44.626915	C
0.0001288	8424.	65432942.	14.2971129	0.0018408	-0.002022	3.9952750	-45.749219	C
0.0001313	8491.	64694289.	14.2358753	0.0018685	-0.002069	3.9984191	-46.870639	C
0.0001338	8556.	63972301.	14.1759826	0.0018960	-0.002116	3.9998808	-47.995720	C
0.0001363	8621.	63271040.	14.1190614	0.0019237	-0.002164	3.9993599	-49.117746	C
0.0001388	8684.	62588310.	14.0648740	0.0019515	-0.002211	3.9991244	-50.000000	CY
0.0001413	8746.	61915658.	14.0129011	0.0019793	-0.002258	3.9998133	-50.000000	CY
0.0001438	8802.	61232852.	13.9616298	0.0020070	-0.002306	3.9989730	-50.000000	CY
0.0001463	8852.	60527544.	13.9087424	0.0020342	-0.002353	3.9999637	-50.000000	CY
0.0001488	8897.	59813992.	13.8560628	0.0020611	-0.002401	3.9992404	-50.000000	CY
0.0001588	9065.	57102289.	13.6649894	0.0021693	-0.002593	3.9992095	-50.000000	CY
0.0001688	9220.	54639791.	13.4990392	0.0022780	-0.002785	3.9983232	-50.000000	CY
0.0001788	9364.	52383987.	13.3576561	0.0023877	-0.002975	3.9999276	50.000000	CY
0.0001888	9450.	50066193.	13.2115207	0.0024937	-0.003169	3.9978448	50.000000	CY
0.0001988	9491.	47752205.	13.0691211	0.0025975	-0.003365	3.9986931	50.000000	CY
0.0002088	9523.	45618274.	12.9422702	0.0027017	-0.003561	3.9989876	50.000000	CY
0.0002188	9551.	43661299.	12.8312881	0.0028068	-0.003756	3.9989204	50.000000	CY
0.0002288	9576.	41862025.	12.7331386	0.0029127	-0.003950	3.9984398	50.000000	CY
0.0002388	9597.	40197339.	12.6421080	0.0030183	-0.004144	3.9972141	50.000000	CY
0.0002488	9616.	38658187.	12.5617808	0.0031247	-0.004338	3.9977554	50.000000	CY
0.0002588	9633.	37230305.	12.4908845	0.0032320	-0.004530	3.9998189	50.000000	CY
0.0002688	9648.	35900591.	12.4265050	0.0033396	-0.004723	3.9983586	50.000000	CY
0.0002788	9661.	34658795.	12.3663757	0.0034471	-0.004915	3.9956753	50.000000	CY
0.0002888	9673.	33498127.	12.3129041	0.0035554	-0.005107	3.9995455	50.000000	CY
0.0002988	9683.	32410938.	12.2652759	0.0036643	-0.005298	3.9960424	50.000000	CY
0.0003088	9692.	31390776.	12.2226542	0.0037737	-0.005489	3.9998555	50.000000	CY
0.0003188	9692.	30405968.	12.2139701	0.0038932	-0.005669	3.9973002	50.000000	CY

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Axial Thrust Force = 967.800 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
0.00000125	189.2500043	151400003.	278.6282650	0.0003483	0.0003108	1.3401186	9.9752121	
0.00000250	378.4954793	151398192.	146.8450616	0.0003671	0.0002921	1.4041938	10.3961420	
0.00000375	567.7068020	151388481.	102.9310723	0.0003860	0.0002735	1.4676616	10.8185666	
0.00000500	756.8668932	151373379.	80.9843888	0.0004049	0.0002549	1.5305157	11.2424864	
0.00000625	945.9586689	151353387.	67.8246303	0.0004239	0.0002364	1.5927497	11.6679016	
0.00000750	1135.	151328670.	59.0583371	0.0004429	0.0002179	1.6543570	12.0948132	
0.00000875	1324.	151299298.	52.8025985	0.0004620	0.0001995	1.7153311	12.5232219	
0.00001000	1513.	151265304.	48.1159594	0.0004812	0.0001812	1.7756657	12.9531282	
0.00001125	1701.	151226704.	44.4753900	0.0005003	0.0001628	1.8353541	13.3845335	
0.00001250	1890.	151183508.	41.5670724	0.0005196	0.0001446	1.8943899	13.8174388	
0.00001375	2078.	151135718.	39.1913048	0.0005389	0.0001264	1.9527666	14.2518453	
0.00001500	2266.	151083336.	37.2149532	0.0005582	0.0001082	2.0104777	14.6877547	
0.00001625	2454.	151026360.	35.5458478	0.0005776	0.00009012	2.0675165	15.1251683	
0.00001750	2642.	150964787.	34.1181537	0.0005971	0.00007207	2.1238767	15.5640880	
0.00001875	2829.	150898614.	32.8835919	0.0006166	0.00005407	2.1795515	16.0045156	
0.00002000	3017.	150827836.	31.8059536	0.0006361	0.00003612	2.2345345	16.4464531	
0.00002125	3203.	150752448.	30.8575499	0.0006557	0.00001822	2.2888190	16.8899027	
0.00002250	3390.	150672443.	30.0168452	0.0006754	3.79016E-07	2.3423984	17.3348665	
0.00002375	3576.	150587380.	29.2668262	0.0006951	-0.00001741	2.3952654	17.7813391	
0.00002500	3762.	150494303.	28.5938104	0.0007148	-0.00003515	2.4474077	18.2292626	
0.00002625	3948.	150389382.	27.9866757	0.0007347	-0.00005285	2.4988106	18.6785444	
0.00002750	4132.	150269636.	27.4363191	0.0007545	-0.00007050	2.5494595	19.1290895	
0.00002875	4316.	150133064.	26.9352279	0.0007744	-0.00008811	2.5993408	19.5808088	
0.00003000	4499.	149978526.	26.4771526	0.0007943	-0.000106	2.6484425	20.0336228	
0.00003125	4528.	144902518.	25.9058409	0.0008096	-0.000128	2.6853042	20.3506059	C
0.00003250	4663.	143478308.	25.4773831	0.0008280	-0.000147	2.7293516	20.7608086	C
0.00003375	4793.	142002808.	25.0762057	0.0008463	-0.000166	2.7722952	21.1666489	C
0.00003500	4916.	140468799.	24.6986024	0.0008645	-0.000186	2.8140899	21.5673315	C
0.00003625	5035.	138900480.	24.3426144	0.0008824	-0.000205	2.8547966	21.9633610	C
0.00003750	5149.	137314925.	24.0064406	0.0009002	-0.000225	2.8944649	22.3551293	C
0.00003875	5259.	135720450.	23.6882613	0.0009179	-0.000245	2.9331205	22.7427462	C
0.00004000	5365.	134124532.	23.3865115	0.0009355	-0.000265	2.9707908	23.1263534	C

MEG-33 forward abutment X direction row1

0.00004125	5467.	132535284.	23.0999136	0.0009529	-0.000285	3.0075107	23.5062093	C
0.00004250	5566.	130961450.	22.8274494	0.0009702	-0.000305	3.0433235	23.8827065	C
0.00004375	5662.	129409686.	22.5681931	0.0009874	-0.000325	3.0782679	24.2562076	C
0.00004500	5755.	127883985.	22.3212511	0.0010045	-0.000346	3.1123743	24.6269828	C
0.00004625	5845.	126377222.	22.0852332	0.0010214	-0.000366	3.1456180	24.9945067	C
0.00004750	5932.	124888793.	21.8591887	0.0010383	-0.000387	3.1780037	25.3586575	C
0.00004875	6017.	123430471.	21.6430327	0.0010551	-0.000407	3.2096071	25.7204001	C
0.00005125	6180.	120591992.	21.2370073	0.0010884	-0.000449	3.2704593	26.4359398	C
0.00005375	6335.	117866669.	20.8628010	0.0011214	-0.000491	3.3283184	27.1422037	C
0.00005625	6482.	115241042.	20.5157254	0.0011540	-0.000533	3.3832130	27.8384648	C
0.00005875	6623.	112723883.	20.1933440	0.0011864	-0.000576	3.4353145	28.5264725	C
0.00006125	6757.	110314404.	19.8931793	0.0012185	-0.000619	3.4847350	29.2071973	C
0.00006375	6886.	108008776.	19.6129882	0.0012503	-0.000662	3.5315625	29.8813245	C
0.00006625	7009.	105803288.	19.3509008	0.0012820	-0.000706	3.5758814	30.5496056	C
0.00006875	7128.	103682214.	19.1042070	0.0013134	-0.000749	3.6176677	31.2105753	C
0.00007125	7243.	101652323.	18.8724340	0.0013447	-0.000793	3.6570759	31.8666043	C
0.00007375	7354.	99711210.	18.6545546	0.0013758	-0.000837	3.6941839	32.5187414	C
0.00007625	7462.	97856473.	18.4497399	0.0014068	-0.000881	3.7290646	33.1681748	C
0.00007875	7565.	96062412.	18.2546756	0.0014376	-0.000925	3.7615686	33.8101775	C
0.00008125	7666.	94348771.	18.0710452	0.0014683	-0.000969	3.7919516	34.4508380	C
0.00008375	7764.	92703323.	17.8972196	0.0014989	-0.001014	3.8201774	35.0886847	C
0.00008625	7859.	91116530.	17.7317246	0.0015294	-0.001058	3.8462212	35.7221634	C
0.00008875	7952.	89598097.	17.5756429	0.0015598	-0.001103	3.8702348	36.3558735	C
0.00009125	8042.	88126710.	17.4260256	0.0015901	-0.001147	3.8920783	36.9840579	C
0.00009375	8130.	86717991.	17.2849223	0.0016205	-0.001192	3.9119417	37.6136953	C
0.00009625	8215.	85352527.	17.1495272	0.0016506	-0.001237	3.9296988	38.2388055	C
0.00009875	8299.	84039473.	17.0211869	0.0016808	-0.001282	3.9454683	38.8644867	C
0.0001013	8381.	82771822.	16.8988304	0.0017110	-0.001326	3.9592224	39.4891284	C
0.0001038	8460.	81542880.	16.7814596	0.0017411	-0.001371	3.9709470	40.1110293	C
0.0001063	8538.	80362198.	16.6706975	0.0017713	-0.001416	3.9807229	40.7362744	C
0.0001088	8614.	79211433.	16.5634749	0.0018013	-0.001461	3.9884623	41.3566218	C
0.0001113	8689.	78099804.	16.4615056	0.0018313	-0.001506	3.9942341	41.9783702	C
0.0001138	8762.	77027995.	16.3650587	0.0018615	-0.001551	3.9980350	42.6035501	C
0.0001163	8833.	75980648.	16.2712869	0.0018915	-0.001596	3.9998335	43.2237637	C
0.0001188	8902.	74965780.	16.1820507	0.0019216	-0.001641	3.9996321	43.8460000	C
0.0001213	8970.	73983242.	16.0975717	0.0019518	-0.001686	3.9992760	44.4720242	C
0.0001238	9037.	73025971.	16.0164541	0.0019820	-0.001730	3.9990742	45.0978626	C
0.0001263	9101.	72090197.	15.9380657	0.0020122	-0.001775	3.9999502	45.7219308	C
0.0001288	9165.	71181840.	15.8637730	0.0020425	-0.001820	3.9996509	46.3499254	C
0.0001313	9227.	70299877.	15.7933026	0.0020729	-0.001865	3.9989907	46.9816940	C

MEG-33 forward abutment X direction row1

0.0001338	9288.	69439575.	15.7255773	0.0021033	-0.001909	3.9999849	47.6138952	C
0.0001363	9346.	68596955.	15.6598220	0.0021337	-0.001954	3.9996232	48.2440589	C
0.0001388	9404.	67778080.	15.5973128	0.0021641	-0.001998	3.9986750	48.8777498	C
0.0001413	9461.	66981140.	15.5379338	0.0021947	-0.002043	3.9999017	49.5151991	C
0.0001438	9517.	66204862.	15.4815484	0.0022255	-0.002087	3.9991584	50.0000000	CY
0.0001463	9571.	65445599.	15.4271869	0.0022562	-0.002131	3.9999900	50.0000000	CY
0.0001488	9624.	64699436.	15.3746880	0.0022870	-0.002176	3.9993937	50.0000000	CY
0.0001588	9814.	61818368.	15.1926204	0.0024118	-0.002351	3.9994494	50.0000000	CY
0.0001688	9945.	58933395.	15.0276317	0.0025359	-0.002527	3.9987160	50.0000000	CY
0.0001788	10054.	56246253.	14.8836571	0.0026605	-0.002702	3.9999872	50.0000000	CY
0.0001888	10154.	53794428.	14.7592471	0.0027858	-0.002877	3.9986404	50.0000000	CY
0.0001988	10246.	51553357.	14.6533758	0.0029124	-0.003050	3.9996616	50.0000000	CY
0.0002088	10321.	49443626.	14.5568590	0.0030387	-0.003224	3.9999583	50.0000000	CY
0.0002188	10361.	47365590.	14.4505506	0.0031611	-0.003401	3.9999730	50.0000000	CY
0.0002288	10376.	45361098.	14.3438581	0.0032812	-0.003581	3.9998401	50.0000000	CY
0.0002388	10387.	43507000.	14.2517558	0.0034026	-0.003760	3.9993738	50.0000000	CY
0.0002488	10390.	41769393.	14.1712586	0.0035251	-0.003937	3.9981802	50.0000000	CY
0.0002588	10390.	40155117.	14.1044718	0.0036495	-0.004113	3.9958269	50.0000000	CY
0.0002688	10390.	38660973.	14.0502870	0.0037760	-0.004286	3.9999725	50.0000000	CY
0.0002788	10390.	37274033.	14.1016728	0.0039308	-0.004432	3.9999798	50.0000000	CY

 Summary of Results for Nominal Moment Capacity for Section 1

Moment values interpolated at maximum compressive strain = 0.003
 or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain	Max. Tens. Strain
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1	751.800	9593.444	0.00300000	-0.00411050
2	967.800	10298.326	0.00300000	-0.00317053

Note that the values of moment capacity in the table above are not factored by a strength reduction factor (phi-factor).

In ACI 318, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.75).

MEG-33 forward abutment X direction row1

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318, or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Load No.	Resist. Factor	Nominal Ax. Thrust kips	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in ²
1	0.65	751.800000	9593.	488.670000	6236.	98902695.
2	0.65	967.800000	10298.	629.070000	6694.	111442505.
1	0.75	751.800000	9593.	563.850000	7195.	81763662.
2	0.75	967.800000	10298.	725.850000	7724.	93377145.
1	0.90	751.800000	9593.	676.620000	8634.	63126631.
2	0.90	967.800000	10298.	871.020000	9268.	69709634.

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 1

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 3540.0 lbs
 Applied moment at pile head = 1490400.0 in-lbs
 Axial thrust load on pile head = 751800.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in ²	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch

MEG-33 forward abutment X direction row1

0.00	5.78E-04	1490400.	3540.	-1.03E-04	0.00	1.58E+11	-22788.	2.37E+07	0.00
0.10000	4.62E-04	1478328.	-21636.	-9.13E-05	0.00	1.58E+11	-19173.	4.98E+07	0.00
0.2000	3.59E-04	1438637.	-42533.	-8.03E-05	0.00	1.58E+11	-15655.	5.23E+07	0.00
0.3000	2.69E-04	1376393.	-59309.	-6.96E-05	0.00	1.58E+11	-12304.	5.49E+07	0.00
0.4000	1.92E-04	1296422.	-72196.	-5.95E-05	0.00	1.58E+11	-9174.	5.74E+07	0.00
0.5000	1.26E-04	1203231.	-81485.	-5.00E-05	0.00	1.58E+11	-6308.	5.99E+07	0.00
0.6000	7.18E-05	1100948.	-87511.	-4.13E-05	0.00	1.58E+11	-3736.	6.24E+07	0.00
0.7000	2.73E-05	993278.	-90639.	-3.33E-05	0.00	1.58E+11	-1477.	6.50E+07	0.00
0.8000	-8.19E-06	883474.	-91249.	-2.62E-05	0.00	1.58E+11	460.6530	6.75E+07	0.00
0.9000	-3.56E-05	774328.	-89725.	-1.99E-05	0.00	1.58E+11	2079.	7.00E+07	0.00
1.0000	-5.60E-05	668169.	-86446.	-1.45E-05	0.00	1.58E+11	3387.	7.25E+07	0.00
1.1000	-7.04E-05	566884.	-81773.	-9.79E-06	0.00	1.58E+11	4401.	7.51E+07	0.00
1.2000	-7.95E-05	471932.	-76047.	-5.85E-06	0.00	1.58E+11	5142.	7.76E+07	0.00
1.3000	-8.44E-05	384381.	-69582.	-2.61E-06	0.00	1.58E+11	5635.	8.01E+07	0.00
1.4000	-8.58E-05	304941.	-62656.	2.01E-09	0.00	1.58E+11	5907.	8.26E+07	0.00
1.5000	-8.44E-05	234005.	-55518.	2.04E-06	0.00	1.58E+11	5989.	8.51E+07	0.00
1.6000	-8.09E-05	171693.	-48379.	3.58E-06	0.00	1.58E+11	5910.	8.77E+07	0.00
1.7000	-7.58E-05	117889.	-41414.	4.68E-06	0.00	1.58E+11	5698.	9.02E+07	0.00
1.8000	-6.97E-05	72290.	-34766.	5.40E-06	0.00	1.58E+11	5382.	9.27E+07	0.00
1.9000	-6.29E-05	34441.	-28543.	5.80E-06	0.00	1.58E+11	4989.	9.52E+07	0.00
2.0000	-5.57E-05	3775.	-22826.	5.95E-06	0.00	1.58E+11	4541.	9.78E+07	0.00
2.1000	-4.86E-05	-20352.	-17665.	5.89E-06	0.00	1.58E+11	4060.	1.00E+08	0.00
2.2000	-4.16E-05	-38633.	-13091.	5.66E-06	0.00	1.58E+11	3565.	1.03E+08	0.00
2.3000	-3.50E-05	-51780.	-9109.	5.32E-06	0.00	1.58E+11	3072.	1.05E+08	0.00
2.4000	-2.88E-05	-60503.	-5710.	4.89E-06	0.00	1.58E+11	2593.	1.08E+08	0.00
2.5000	-2.32E-05	-65493.	-2871.	4.42E-06	0.00	1.58E+11	2138.	1.10E+08	0.00
2.6000	-1.82E-05	-67402.	-558.355	3.91E-06	0.00	1.58E+11	1717.	1.13E+08	0.00
2.7000	-1.39E-05	-66840.	1271.	3.40E-06	0.00	1.58E+11	1333.	1.15E+08	0.00
2.8000	-1.01E-05	-64357.	2665.	2.91E-06	0.00	1.58E+11	990.4538	1.18E+08	0.00
2.9000	-6.88E-06	-60448.	3674.	2.43E-06	0.00	1.58E+11	690.8046	1.20E+08	0.00
3.0000	-4.23E-06	-55543.	4349.	1.99E-06	0.00	1.58E+11	434.0513	1.23E+08	0.00
3.1000	-2.09E-06	-50013.	4741.	1.59E-06	0.00	1.58E+11	218.9961	1.26E+08	0.00
3.2000	-4.07E-07	-44168.	4898.	1.24E-06	0.00	1.58E+11	43.4596	1.28E+08	0.00
3.3000	8.78E-07	-38259.	4867.	9.26E-07	0.00	1.58E+11	-95.473	1.31E+08	0.00
3.4000	1.81E-06	-32488.	4689.	6.58E-07	0.00	1.58E+11	-201.227	1.33E+08	0.00
3.5000	2.46E-06	-27006.	4402.	4.32E-07	0.00	1.58E+11	-277.539	1.36E+08	0.00
3.6000	2.85E-06	-21924.	4038.	2.47E-07	0.00	1.58E+11	-328.281	1.38E+08	0.00
3.7000	3.05E-06	-17314.	3627.	9.83E-08	0.00	1.58E+11	-357.323	1.41E+08	0.00
3.8000	3.09E-06	-13219.	3192.	-1.74E-08	0.00	1.58E+11	-368.408	1.43E+08	0.00
3.9000	3.01E-06	-9654.	2752.	-1.04E-07	0.00	1.58E+11	-365.064	1.46E+08	0.00

MEG-33 forward abutment X direction row1

4.0000	2.84E-06	-6615.	2322.	-1.66E-07	0.00	1.58E+11	-350.537	1.48E+08	0.00
4.1000	2.61E-06	-4081.	1915.	-2.06E-07	0.00	1.58E+11	-327.743	1.51E+08	0.00
4.2000	2.34E-06	-2018.	1539.	-2.29E-07	0.00	1.58E+11	-299.248	1.53E+08	0.00
4.3000	2.06E-06	-386.324	1199.	-2.38E-07	0.00	1.58E+11	-267.253	1.56E+08	0.00
4.4000	1.77E-06	860.4840	898.6680	-2.37E-07	0.00	1.58E+11	-233.598	1.58E+08	0.00
4.5000	1.49E-06	1771.	638.6407	-2.27E-07	0.00	1.58E+11	-199.781	1.61E+08	0.00
4.6000	1.23E-06	2394.	418.5851	-2.11E-07	0.00	1.58E+11	-166.978	1.63E+08	0.00
4.7000	9.84E-07	2776.	236.7533	-1.91E-07	0.00	1.58E+11	-136.075	1.66E+08	0.00
4.8000	7.67E-07	2962.	90.4921	-1.70E-07	0.00	1.58E+11	-107.694	1.68E+08	0.00
4.9000	5.77E-07	2993.	-23.467	-1.47E-07	0.00	1.58E+11	-82.238	1.71E+08	0.00
5.0000	4.15E-07	2906.	-108.761	-1.25E-07	0.00	1.58E+11	-59.917	1.73E+08	0.00
5.1000	2.78E-07	2733.	-169.183	-1.03E-07	0.00	1.58E+11	-40.787	1.76E+08	0.00
5.2000	1.67E-07	2500.	-208.522	-8.35E-08	0.00	1.58E+11	-24.778	1.78E+08	0.00
5.3000	7.78E-08	2232.	-230.428	-6.56E-08	0.00	1.58E+11	-11.731	1.81E+08	0.00
5.4000	9.24E-09	1947.	-238.314	-4.97E-08	0.00	1.58E+11	-1.414	1.84E+08	0.00
5.5000	-4.16E-08	1660.	-235.295	-3.61E-08	0.00	1.58E+11	6.4457	1.86E+08	0.00
5.6000	-7.73E-08	1383.	-224.140	-2.45E-08	0.00	1.58E+11	12.1460	1.89E+08	0.00
5.7000	-1.00E-07	1123.	-207.256	-1.50E-08	0.00	1.58E+11	15.9942	1.91E+08	0.00
5.8000	-1.13E-07	885.3371	-186.684	-7.43E-09	0.00	1.58E+11	18.2927	1.94E+08	0.00
5.9000	-1.18E-07	674.4912	-164.110	-1.52E-09	0.00	1.58E+11	19.3297	1.96E+08	0.00
6.0000	-1.17E-07	491.4755	-140.889	2.90E-09	0.00	1.58E+11	19.3719	1.99E+08	0.00
6.1000	-1.11E-07	336.3519	-118.070	6.04E-09	0.00	1.58E+11	18.6595	2.01E+08	0.00
6.2000	-1.03E-07	208.0957	-96.432	8.10E-09	0.00	1.58E+11	17.4038	2.04E+08	0.00
6.3000	-9.18E-08	104.8996	-76.518	9.29E-09	0.00	1.58E+11	15.7861	2.06E+08	0.00
6.4000	-8.02E-08	24.4347	-58.672	9.78E-09	0.00	1.58E+11	13.9575	2.09E+08	0.00
6.5000	-6.84E-08	-35.931	-43.073	9.73E-09	0.00	1.58E+11	12.0410	2.11E+08	0.00
6.6000	-5.69E-08	-78.958	-29.769	9.30E-09	0.00	1.58E+11	10.1329	2.14E+08	0.00
6.7000	-4.61E-08	-107.393	-18.706	8.59E-09	0.00	1.58E+11	8.3058	2.16E+08	0.00
6.8000	-3.62E-08	-123.867	-9.755	7.72E-09	0.00	1.58E+11	6.6114	2.19E+08	0.00
6.9000	-2.76E-08	-130.820	-2.738	6.75E-09	0.00	1.58E+11	5.0835	2.21E+08	0.00
7.0000	-2.00E-08	-130.452	2.5562	5.76E-09	0.00	1.58E+11	3.7409	2.24E+08	0.00
7.1000	-1.37E-08	-124.696	6.3551	4.79E-09	0.00	1.58E+11	2.5907	2.26E+08	0.00
7.2000	-8.54E-09	-115.208	8.8876	3.88E-09	0.00	1.58E+11	1.6302	2.29E+08	0.00
7.3000	-4.41E-09	-103.373	10.3757	3.06E-09	0.00	1.58E+11	0.8499	2.31E+08	0.00
7.4000	-1.21E-09	-90.312	11.0270	2.32E-09	0.00	1.58E+11	0.2356	2.34E+08	0.00
7.5000	1.17E-09	-76.912	11.0301	1.69E-09	0.00	1.58E+11	-0.230	2.37E+08	0.00
7.6000	2.85E-09	-63.843	10.5553	1.16E-09	0.00	1.58E+11	-0.561	2.37E+08	0.00
7.7000	3.94E-09	-51.581	9.7524	7.19E-10	0.00	1.58E+11	-0.777	2.37E+08	0.00
7.8000	4.57E-09	-40.439	8.7455	3.70E-10	0.00	1.58E+11	-0.901	2.37E+08	0.00
7.9000	4.83E-09	-30.593	7.6336	1.01E-10	0.00	1.58E+11	-0.952	2.37E+08	0.00

MEG-33 forward abutment X direction row1

8.0000	4.81E-09	-22.118	6.4930	-9.87E-11	0.00	1.58E+11	-0.949	2.37E+08	0.00
8.1000	4.59E-09	-15.010	5.3804	-2.39E-10	0.00	1.58E+11	-0.906	2.37E+08	0.00
8.2000	4.24E-09	-9.205	4.3358	-3.31E-10	0.00	1.58E+11	-0.835	2.37E+08	0.00
8.3000	3.80E-09	-4.603	3.3852	-3.83E-10	0.00	1.58E+11	-0.749	2.37E+08	0.00
8.4000	3.32E-09	-1.080	2.5434	-4.05E-10	0.00	1.58E+11	-0.654	2.37E+08	0.00
8.5000	2.83E-09	1.5017	1.8166	-4.03E-10	0.00	1.58E+11	-0.557	2.37E+08	0.00
8.6000	2.35E-09	3.2807	1.2042	-3.85E-10	0.00	1.58E+11	-0.463	2.37E+08	0.00
8.7000	1.90E-09	4.3925	0.7012	-3.56E-10	0.00	1.58E+11	-0.375	2.37E+08	0.00
8.8000	1.50E-09	4.9643	0.2993	-3.21E-10	0.00	1.58E+11	-0.295	2.37E+08	0.00
8.9000	1.13E-09	5.1115	-0.01150	-2.83E-10	0.00	1.58E+11	-0.223	2.37E+08	0.00
9.0000	8.17E-10	4.9372	-0.242	-2.45E-10	0.00	1.58E+11	-0.161	2.37E+08	0.00
9.1000	5.46E-10	4.5308	-0.403	-2.09E-10	0.00	1.58E+11	-0.108	2.37E+08	0.00
9.2000	3.16E-10	3.9695	-0.505	-1.76E-10	0.00	1.58E+11	-0.06237	2.37E+08	0.00
9.3000	1.23E-10	3.3182	-0.557	-1.49E-10	0.00	1.58E+11	-0.02420	2.37E+08	0.00
9.4000	-4.07E-11	2.6321	-0.567	-1.26E-10	0.00	1.58E+11	0.00803	2.37E+08	0.00
9.5000	-1.80E-10	1.9576	-0.541	-1.09E-10	0.00	1.58E+11	0.03554	2.37E+08	0.00
9.6000	-3.02E-10	1.3342	-0.484	-9.64E-11	0.00	1.58E+11	0.05954	2.37E+08	0.00
9.7000	-4.12E-10	0.7965	-0.399	-8.84E-11	0.00	1.58E+11	0.08115	2.37E+08	0.00
9.8000	-5.14E-10	0.3757	-0.290	-8.39E-11	0.00	1.58E+11	0.1013	2.37E+08	0.00
9.9000	-6.13E-10	0.1009	-0.157	-8.21E-11	0.00	1.58E+11	0.1208	2.37E+08	0.00
10.0000	-7.11E-10	0.00	0.00	-8.17E-11	0.00	1.58E+11	0.1402	1.18E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 1:

Pile-head deflection = 0.00057808 inches
 Computed slope at pile head = -0.0001026 radians
 Maximum bending moment = 1490400. inch-lbs
 Maximum shear force = -91249. lbs
 Depth of maximum bending moment = 0.000000 feet below pile head
 Depth of maximum shear force = 0.80000000 feet below pile head
 Number of iterations = 6
 Number of zero deflection points = 5

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 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 2

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 4770.0 lbs
 Applied moment at pile head = 2012400.0 in-lbs
 Axial thrust load on pile head = 967800.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	8.20E-04	2012400.	4770.	-1.45E-04	0.00	1.51E+11	-25984.	1.90E+07	0.00
0.10000	6.55E-04	1999575.	-26386.	-1.29E-04	0.00	1.51E+11	-25942.	4.75E+07	0.00
0.2000	5.09E-04	1949375.	-55276.	-1.14E-04	0.00	1.51E+11	-22208.	5.23E+07	0.00
0.3000	3.82E-04	1867177.	-79079.	-9.86E-05	0.00	1.51E+11	-17463.	5.49E+07	0.00
0.4000	2.73E-04	1759815.	-97377.	-8.42E-05	0.00	1.51E+11	-13034.	5.74E+07	0.00
0.5000	1.80E-04	1633667.	-110588.	-7.07E-05	0.00	1.51E+11	-8982.	5.99E+07	0.00
0.6000	1.03E-04	1494569.	-119187.	-5.83E-05	0.00	1.51E+11	-5350.	6.24E+07	0.00
0.7000	4.00E-05	1347753.	-123696.	-4.70E-05	0.00	1.51E+11	-2164.	6.50E+07	0.00
0.8000	-1.00E-05	1197809.	-124655.	-3.69E-05	0.00	1.51E+11	564.7313	6.75E+07	0.00
0.9000	-4.87E-05	1048666.	-122613.	-2.80E-05	0.00	1.51E+11	2839.	7.00E+07	0.00
1.0000	-7.73E-05	903602.	-118106.	-2.03E-05	0.00	1.51E+11	4672.	7.25E+07	0.00
1.1000	-9.73E-05	765258.	-111650.	-1.37E-05	0.00	1.51E+11	6088.	7.51E+07	0.00
1.2000	-1.10E-04	635674.	-103726.	-8.12E-06	0.00	1.51E+11	7118.	7.76E+07	0.00
1.3000	-1.17E-04	516335.	-94776.	-3.55E-06	0.00	1.51E+11	7798.	8.01E+07	0.00
1.4000	-1.19E-04	408219.	-85197.	1.14E-07	0.00	1.51E+11	8168.	8.26E+07	0.00
1.5000	-1.17E-04	311862.	-75334.	2.97E-06	0.00	1.51E+11	8270.	8.51E+07	0.00
1.6000	-1.12E-04	227411.	-65484.	5.10E-06	0.00	1.51E+11	8146.	8.77E+07	0.00
1.7000	-1.04E-04	154688.	-55893.	6.62E-06	0.00	1.51E+11	7839.	9.02E+07	0.00
1.8000	-9.56E-05	93253.	-46756.	7.60E-06	0.00	1.51E+11	7388.	9.27E+07	0.00
1.9000	-8.61E-05	42455.	-38226.	8.14E-06	0.00	1.51E+11	6830.	9.52E+07	0.00
2.0000	-7.61E-05	1492.	-30409.	8.31E-06	0.00	1.51E+11	6199.	9.78E+07	0.00
2.1000	-6.61E-05	-30545.	-23375.	8.20E-06	0.00	1.51E+11	5524.	1.00E+08	0.00

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2.2000	-5.64E-05	-54626.	-17160.	7.86E-06	0.00	1.51E+11	4833.	1.03E+08	0.00
2.3000	-4.72E-05	-71748.	-11773.	7.36E-06	0.00	1.51E+11	4146.	1.05E+08	0.00
2.4000	-3.87E-05	-82898.	-7195.	6.75E-06	0.00	1.51E+11	3483.	1.08E+08	0.00
2.5000	-3.10E-05	-89032.	-3392.	6.07E-06	0.00	1.51E+11	2856.	1.10E+08	0.00
2.6000	-2.42E-05	-91053.	-313.400	5.35E-06	0.00	1.51E+11	2276.	1.13E+08	0.00
2.7000	-1.82E-05	-89797.	2103.	4.64E-06	0.00	1.51E+11	1751.	1.15E+08	0.00
2.8000	-1.31E-05	-86018.	3924.	3.94E-06	0.00	1.51E+11	1284.	1.18E+08	0.00
2.9000	-8.75E-06	-80389.	5221.	3.28E-06	0.00	1.51E+11	878.3730	1.20E+08	0.00
3.0000	-5.20E-06	-73495.	6068.	2.67E-06	0.00	1.51E+11	532.6735	1.23E+08	0.00
3.1000	-2.34E-06	-65832.	6535.	2.12E-06	0.00	1.51E+11	245.1508	1.26E+08	0.00
3.2000	-1.17E-07	-57817.	6689.	1.63E-06	0.00	1.51E+11	12.4380	1.28E+08	0.00
3.3000	1.56E-06	-49782.	6595.	1.20E-06	0.00	1.51E+11	-169.811	1.31E+08	0.00
3.4000	2.76E-06	-41992.	6309.	8.37E-07	0.00	1.51E+11	-306.601	1.33E+08	0.00
3.5000	3.57E-06	-34643.	5883.	5.33E-07	0.00	1.51E+11	-403.320	1.36E+08	0.00
3.6000	4.04E-06	-27875.	5362.	2.85E-07	0.00	1.51E+11	-465.494	1.38E+08	0.00
3.7000	4.25E-06	-21776.	4783.	8.86E-08	0.00	1.51E+11	-498.591	1.41E+08	0.00
3.8000	4.26E-06	-16395.	4179.	-6.27E-08	0.00	1.51E+11	-507.859	1.43E+08	0.00
3.9000	4.10E-06	-11746.	3576.	-1.74E-07	0.00	1.51E+11	-498.205	1.46E+08	0.00
4.0000	3.84E-06	-7813.	2992.	-2.52E-07	0.00	1.51E+11	-474.108	1.48E+08	0.00
4.1000	3.50E-06	-4564.	2444.	-3.01E-07	0.00	1.51E+11	-439.562	1.51E+08	0.00
4.2000	3.12E-06	-1947.	1941.	-3.27E-07	0.00	1.51E+11	-398.046	1.53E+08	0.00
4.3000	2.72E-06	96.6908	1491.	-3.34E-07	0.00	1.51E+11	-352.517	1.56E+08	0.00
4.4000	2.32E-06	1633.	1096.	-3.27E-07	0.00	1.51E+11	-305.423	1.58E+08	0.00
4.5000	1.93E-06	2729.	757.8839	-3.10E-07	0.00	1.51E+11	-258.726	1.61E+08	0.00
4.6000	1.57E-06	3452.	474.2809	-2.85E-07	0.00	1.51E+11	-213.945	1.63E+08	0.00
4.7000	1.25E-06	3868.	242.5967	-2.56E-07	0.00	1.51E+11	-172.195	1.66E+08	0.00
4.8000	9.57E-07	4035.	58.7381	-2.25E-07	0.00	1.51E+11	-134.236	1.68E+08	0.00
4.9000	7.06E-07	4009.	-82.121	-1.93E-07	0.00	1.51E+11	-100.528	1.71E+08	0.00
5.0000	4.93E-07	3838.	-185.205	-1.62E-07	0.00	1.51E+11	-71.278	1.73E+08	0.00
5.1000	3.17E-07	3565.	-255.864	-1.33E-07	0.00	1.51E+11	-46.487	1.76E+08	0.00
5.2000	1.75E-07	3225.	-299.355	-1.06E-07	0.00	1.51E+11	-25.999	1.78E+08	0.00
5.3000	6.32E-08	2847.	-320.678	-8.17E-08	0.00	1.51E+11	-9.540	1.81E+08	0.00
5.4000	-2.12E-08	2455.	-324.454	-6.07E-08	0.00	1.51E+11	3.2473	1.84E+08	0.00
5.5000	-8.24E-08	2068.	-314.844	-4.27E-08	0.00	1.51E+11	12.7686	1.86E+08	0.00
5.6000	-1.24E-07	1700.	-295.510	-2.78E-08	0.00	1.51E+11	19.4553	1.89E+08	0.00
5.7000	-1.49E-07	1359.	-269.592	-1.57E-08	0.00	1.51E+11	23.7417	1.91E+08	0.00
5.8000	-1.61E-07	1053.	-239.718	-6.12E-09	0.00	1.51E+11	26.0484	1.94E+08	0.00
5.9000	-1.64E-07	783.8408	-208.026	1.16E-09	0.00	1.51E+11	26.7704	1.96E+08	0.00
6.0000	-1.59E-07	553.4790	-176.203	6.46E-09	0.00	1.51E+11	26.2678	1.99E+08	0.00
6.1000	-1.48E-07	360.9377	-145.526	1.01E-08	0.00	1.51E+11	24.8612	2.01E+08	0.00

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6.2000	-1.34E-07	204.1932	-116.912	1.23E-08	0.00	1.51E+11	22.8280	2.04E+08	0.00
6.3000	-1.19E-07	80.3192	-90.974	1.34E-08	0.00	1.51E+11	20.4030	2.06E+08	0.00
6.4000	-1.02E-07	-14.175	-68.065	1.37E-08	0.00	1.51E+11	17.7789	2.09E+08	0.00
6.5000	-8.58E-08	-83.068	-48.332	1.33E-08	0.00	1.51E+11	15.1090	2.11E+08	0.00
6.6000	-7.02E-08	-130.203	-31.760	1.25E-08	0.00	1.51E+11	12.5110	2.14E+08	0.00
6.7000	-5.59E-08	-159.321	-18.211	1.13E-08	0.00	1.51E+11	10.0708	2.16E+08	0.00
6.8000	-4.30E-08	-173.935	-7.461	1.00E-08	0.00	1.51E+11	7.8465	2.19E+08	0.00
6.9000	-3.18E-08	-177.249	0.7714	8.62E-09	0.00	1.51E+11	5.8734	2.21E+08	0.00
7.0000	-2.23E-08	-172.104	6.7962	7.23E-09	0.00	1.51E+11	4.1679	2.24E+08	0.00
7.1000	-1.45E-08	-160.955	10.9357	5.91E-09	0.00	1.51E+11	2.7313	2.26E+08	0.00
7.2000	-8.14E-09	-145.872	13.5067	4.70E-09	0.00	1.51E+11	1.5537	2.29E+08	0.00
7.3000	-3.20E-09	-128.550	14.8092	3.61E-09	0.00	1.51E+11	0.6171	2.31E+08	0.00
7.4000	5.22E-10	-110.338	15.1184	2.66E-09	0.00	1.51E+11	-0.102	2.34E+08	0.00
7.5000	3.19E-09	-92.272	14.6796	1.86E-09	0.00	1.51E+11	-0.630	2.37E+08	0.00
7.6000	4.99E-09	-75.112	13.7119	1.20E-09	0.00	1.51E+11	-0.983	2.37E+08	0.00
7.7000	6.07E-09	-59.366	12.4043	6.65E-10	0.00	1.51E+11	-1.196	2.37E+08	0.00
7.8000	6.58E-09	-45.343	10.9080	2.50E-10	0.00	1.51E+11	-1.298	2.37E+08	0.00
7.9000	6.67E-09	-33.188	9.3408	-6.15E-11	0.00	1.51E+11	-1.314	2.37E+08	0.00
8.0000	6.44E-09	-22.925	7.7911	-2.84E-10	0.00	1.51E+11	-1.269	2.37E+08	0.00
8.1000	5.99E-09	-14.488	6.3220	-4.32E-10	0.00	1.51E+11	-1.180	2.37E+08	0.00
8.2000	5.40E-09	-7.751	4.9755	-5.20E-10	0.00	1.51E+11	-1.064	2.37E+08	0.00
8.3000	4.74E-09	-2.546	3.7766	-5.61E-10	0.00	1.51E+11	-0.934	2.37E+08	0.00
8.4000	4.05E-09	1.3142	2.7370	-5.66E-10	0.00	1.51E+11	-0.799	2.37E+08	0.00
8.5000	3.38E-09	4.0241	1.8580	-5.45E-10	0.00	1.51E+11	-0.666	2.37E+08	0.00
8.6000	2.75E-09	5.7747	1.1336	-5.06E-10	0.00	1.51E+11	-0.541	2.37E+08	0.00
8.7000	2.17E-09	6.7460	0.5529	-4.56E-10	0.00	1.51E+11	-0.427	2.37E+08	0.00
8.8000	1.65E-09	7.1027	0.1016	-4.01E-10	0.00	1.51E+11	-0.325	2.37E+08	0.00
8.9000	1.20E-09	6.9909	-0.236	-3.46E-10	0.00	1.51E+11	-0.237	2.37E+08	0.00
9.0000	8.21E-10	6.5378	-0.475	-2.92E-10	0.00	1.51E+11	-0.162	2.37E+08	0.00
9.1000	5.01E-10	5.8518	-0.631	-2.43E-10	0.00	1.51E+11	-0.09883	2.37E+08	0.00
9.2000	2.38E-10	5.0233	-0.719	-2.00E-10	0.00	1.51E+11	-0.04687	2.37E+08	0.00
9.3000	2.20E-11	4.1274	-0.749	-1.64E-10	0.00	1.51E+11	-0.00433	2.37E+08	0.00
9.4000	-1.55E-10	3.2251	-0.734	-1.34E-10	0.00	1.51E+11	0.03047	2.37E+08	0.00
9.5000	-3.01E-10	2.3667	-0.680	-1.12E-10	0.00	1.51E+11	0.05923	2.37E+08	0.00
9.6000	-4.24E-10	1.5936	-0.594	-9.65E-11	0.00	1.51E+11	0.08355	2.37E+08	0.00
9.7000	-5.32E-10	0.9407	-0.481	-8.65E-11	0.00	1.51E+11	0.1049	2.37E+08	0.00
9.8000	-6.31E-10	0.4389	-0.344	-8.10E-11	0.00	1.51E+11	0.1245	2.37E+08	0.00
9.9000	-7.27E-10	0.1164	-0.183	-7.88E-11	0.00	1.51E+11	0.1432	2.37E+08	0.00
10.0000	-8.21E-10	0.00	0.00	-7.83E-11	0.00	1.51E+11	0.1617	1.18E+08	0.00

MEG-33 forward abutment X direction row1

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 2:

Pile-head deflection = 0.00081960 inches
 Computed slope at pile head = -0.0001453 radians
 Maximum bending moment = 2012400. inch-lbs
 Maximum shear force = -124655. lbs
 Depth of maximum bending moment = 0.000000 feet below pile head
 Depth of maximum shear force = 0.80000000 feet below pile head
 Number of iterations = 6
 Number of zero deflection points = 5

 Summary of Pile-head Responses for Conventional Analyses

Definitions of Pile-head Loading Conditions:

Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs
 Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
 Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.
 Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs
 Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians

Load Case No.	Load Type 1	Pile-head Load 1	Load Type 2	Pile-head Load 2	Axial Loading lbs	Pile-head Deflection inches	Pile-head Rotation radians	Max Shear in Pile lbs	Max Moment in Pile in-lbs
1	V, lb	3540.	M, in-lb	1490400.	751800.	5.78E-04	-1.03E-04	-91249.	1490400.
2	V, lb	4770.	M, in-lb	2012400.	967800.	8.20E-04	-1.45E-04	-124655.	2012400.

MEG-33 forward abutment X direction row1

Maximum pile-head deflection = 0.0008196019 inches

Maximum pile-head rotation = -0.0001453123 radians = -0.008326 deg.

Summary of Warning Messages

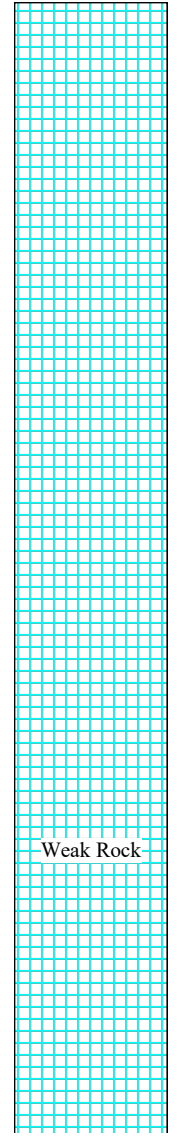
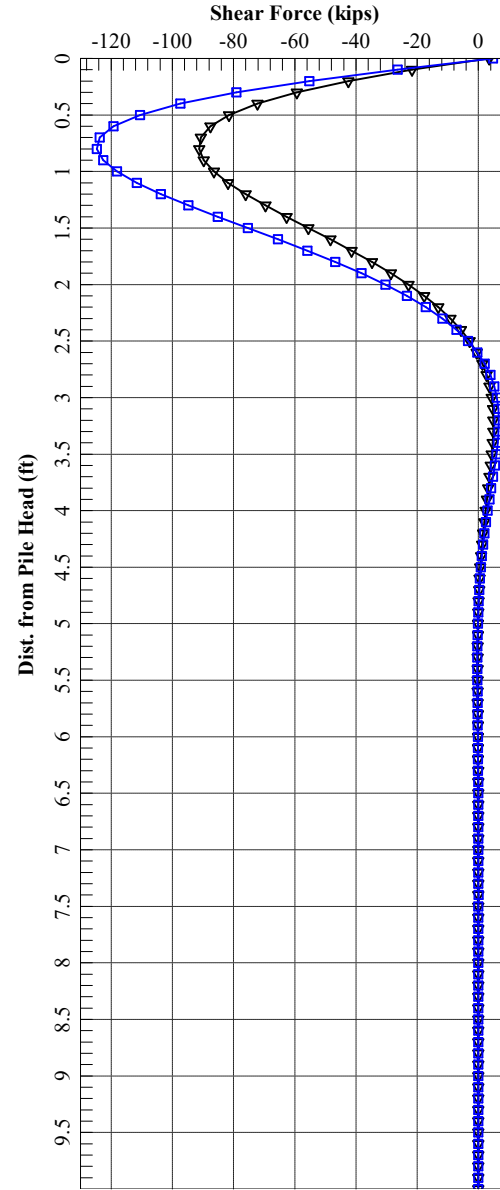
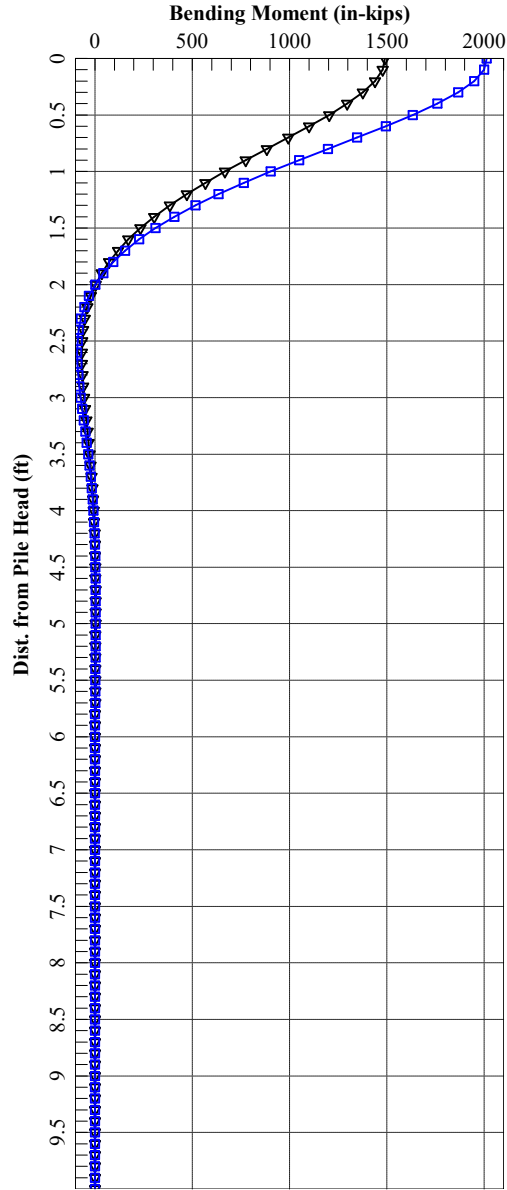
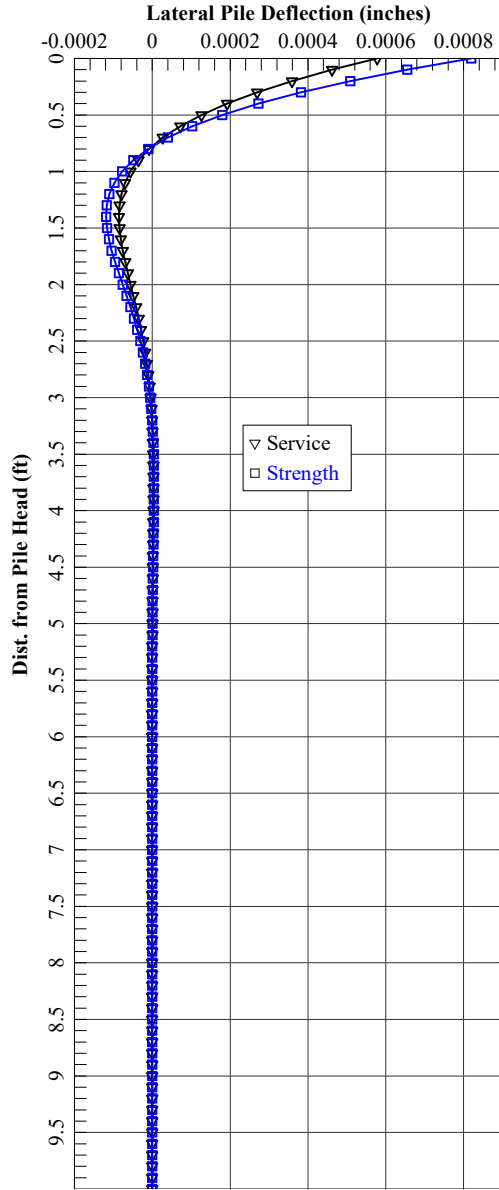
The following warning was reported 706 times

**** Warning ****

An unreasonable input value for unconfined compressive strength has been specified for a soil defined using the weak rock criteria. The input value is greater than 500 psi. Please check your input data for correctness.

The analysis ended normally.

MEG-33 Bowmans Run Bridge Forward Abutment X-Direction Row 1



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LPile for Windows, Version 2022-12.006

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method
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Files Used for Analysis

Path to file locations:

\\US0247-PPFSS01\shared_projects\173609140\119144\400-Engineering\Geotechnical\Analysis\Lpile\bridges\LPile
Analysis\Bowman's Run\forward Abutment B-003\

Name of input data file:

MEG-33 forward abutment X direction row2.lp12d

Name of output report file:

MEG-33 forward abutment X direction row2.lp12o

MEG-33 forward abutment X direction row2

Name of plot output file:

MEG-33 forward abutment X direction row2.lp12p

Name of runtime message file:

MEG-33 forward abutment X direction row2.lp12r

Date and Time of Analysis

Date: June 28, 2024

Time: 15:25:11

Problem Title

Project Name: MEG-33-19.21

Job Number: 173609140

Client: ODOT

Engineer: G. Khatri

Description: Forward Abutment Lateral Load Analysis at Bowman's Run Bridge

MEG-33 forward abutment X direction row2
Program Options and Settings

Computational Options:

- Conventional Analysis

Engineering Units Used for Data Input and Computations:

- US Customary System Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed = 500
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 100.0000 in
- Number of pile increments = 100

Loading Type and Number of Cycles of Loading:

- Static loading specified

- Analysis uses p-y modification factors for p-y curves
- Analysis uses layering correction (Method of Georgiadis)
- No distributed lateral loads are entered
- Loading by lateral soil movements acting on pile not selected
- Input of shear resistance at the pile tip not selected
- Input of moment resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:

- Output files use decimal points to denote decimal symbols.
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1
- No p-y curves to be computed and reported for user-specified depths
- Print using wide report formats

MEG-33 forward abutment X direction row2

Number of pile sections defined = 1
Total length of pile = 10.000 ft
Depth of ground surface below top of pile = 0.0000 ft

Pile diameters used for p-y curve computations are defined using 2 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile. A summary of values of pile diameter vs. depth follows.

Point No.	Depth Below Pile Head feet	Pile Diameter inches
1	0.000	30.0000
2	10.000	30.0000

Input Structural Properties for Pile Sections:

Pile Section No. 1:

Section 1 is a round drilled shaft, bored pile, or CIDH pile
Length of section = 10.000000 ft
Shaft Diameter = 30.000000 in

Soil and Rock Layering Information

The soil profile is modelled using 1 layers

Layer 1 is weak rock, p-y criteria by Reese, 1997

Distance from top of pile to top of layer = 0.0000 ft
Distance from top of pile to bottom of layer = 15.000000 ft

MEG-33 forward abutment X direction row2

Effective unit weight at top of layer = 87.600000 pcf
 Effective unit weight at bottom of layer = 87.600000 pcf
 Uniaxial compressive strength at top of layer = 4380. psi
 Uniaxial compressive strength at bottom of layer = 4380. psi
 Initial modulus of rock at top of layer = 394200. psi
 Initial modulus of rock at bottom of layer = 394200. psi
 RQD of rock at top of layer = 81.000000 %
 RQD of rock at bottom of layer = 81.000000 %
 k_{rm} of rock at top of layer = 0.0000500
 k_{rm} of rock at bottom of layer = 0.0000500

(Depth of the lowest soil layer extends 5.000 ft below the pile tip)

 Summary of Input Soil Properties

Layer Num.	Soil Type Name (p-y Curve Type)	Layer Depth ft	Effective Unit Wt. pcf	Uniaxial qu psi	RQD %	E50 or k _{rm}	Rock Mass Modulus psi
1	Weak Rock	0.00 15.0000	87.6000 87.6000	4380. 4380.	81.0000 81.0000	5.00E-05 5.00E-05	394200. 394200.

 Modification Factors for p-y Curves

Distribution of p-y modifiers with depth defined using 4 points

Point No.	Depth X ft	p-mult	y-mult
1	0.000	0.8500	1.0000
2	10.000	0.8500	1.0000
3	10.000	0.8500	1.0000

4 10.000 0.8500 MEG-33 forward abutment X direction row2
1.0000

Static Loading Type

Static loading criteria were used when computing p-y curves for all analyses.

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 2

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length	Run Analysis
1	1	V = 3540. lbs	M = 1490400. in-lbs	751800.	No	Yes
2	1	V = 4770. lbs	M = 2012400. in-lbs	967800.	No	Yes

V = shear force applied normal to pile axis

M = bending moment applied to pile head

y = lateral deflection normal to pile axis

S = pile slope relative to original pile batter angle

R = rotational stiffness applied to pile head

Values of top y vs. pile lengths can be computed only for load types with specified shear loading (Load Types 1, 2, and 3).

Thrust force is assumed to be acting axially for all pile batter angles.

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

MEG-33 forward abutment X direction row2

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 1

Pile Section No. 1:

Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section	=	10.000000	ft
Shaft Diameter	=	30.000000	in
Concrete Cover Thickness (to edge of trans. reinf.)	=	3.000000	in
Number of Reinforcing Bars	=	8	bars
Yield Stress of Reinforcing Bars	=	50000.	psi
Modulus of Elasticity of Reinforcing Bars	=	29000000.	psi
Gross Area of Shaft	=	706.858347	sq. in.
Total Area of Reinforcing Steel	=	8.000000	sq. in.
Area Ratio of Steel Reinforcement	=	1.13	percent
Edge-to-Edge Bar Spacing	=	7.242052	in
Maximum Concrete Aggregate Size	=	0.750000	in
Ratio of Bar Spacing to Aggregate Size	=	9.66	
Offset of Center of Rebar Cage from Center of Pile	=	0.0000	in
Transverse Reinforcement			
Type: Spiral			
Number of Transverse Reinf. (per spacing)	=	1	
Spacing of Transverse Reinf.	=	4.000000	in
Yield Stress of Transverse Reinf.	=	50000.	psi
Diameter of Transverse Reinf.	=	0.500000	in

Axial Structural Capacities:

Nom. Axial Structural Capacity = $0.85 F_c A_c + F_y A_s$	=	2776.118	kips
Tensile Load for Cracking of Concrete	=	-317.428	kips
Nominal Axial Tensile Capacity	=	-400.000	kips

Reinforcing Bar Dimensions and Positions Used in Computations:

MEG-33 forward abutment X direction row2

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.128000	1.000000	10.936000	0.000000
2	1.128000	1.000000	7.732920	7.732920
3	1.128000	1.000000	0.000000	10.936000
4	1.128000	1.000000	-7.73292	7.732920
5	1.128000	1.000000	-10.93600	0.000000
6	1.128000	1.000000	-7.73292	-7.73292
7	1.128000	1.000000	0.000000	-10.93600
8	1.128000	1.000000	7.732920	-7.73292

NOTE: The positions of the above rebars were computed by LPILE

Minimum spacing between any two bars not equal to zero = 7.242 inches between bars 1 and 2.

Ratio of bar spacing to maximum aggregate size = 9.66

Concrete Properties:

Compressive Strength of Concrete	=	4000. psi
Modulus of Elasticity of Concrete	=	3604997. psi
Modulus of Rupture of Concrete	=	-474.34165 psi
Compression Strain at Peak Stress	=	0.001886
Tensile Strain at Fracture of Concrete	=	-0.0001154
Maximum Coarse Aggregate Size	=	0.750000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 2

Number	Axial Thrust Force kips
1	751.800
2	967.800

MEG-33 forward abutment X direction row2

Definitions of Run Messages and Notes:

- C = concrete in section has cracked in tension.
- Y = stress in reinforcing steel has reached yield stress.
- T = ACI 318 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than 0.003. See ACI 318-14, Section 21.2.3.
- Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
 Position of neutral axis is measured from edge of compression side of pile.
 Compressive stresses and strains are positive in sign.
 Tensile stresses and strains are negative in sign.

Axial Thrust Force = 751.800 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
0.00000125	197.9570598	158365648.	215.5648630	0.0002695	0.0002320	1.0605021	7.6891638	
0.00000250	395.9073095	158362924.	115.3119932	0.0002883	0.0002133	1.1278688	8.1099945	
0.00000375	593.8249168	158353311.	81.9075073	0.0003072	0.0001947	1.1946294	8.5322539	
0.00000500	791.6935584	158338712.	65.2151194	0.0003261	0.0001761	1.2607780	8.9559423	
0.00000625	989.4969040	158319505.	55.2075729	0.0003450	0.0001575	1.3263083	9.3810601	
0.00000750	1187.	158295815.	48.5424497	0.0003641	0.0001391	1.3912141	9.8076078	
0.00000875	1385.	158267696.	43.7872851	0.0003831	0.0001206	1.4554892	10.2355861	
0.00001000	1582.	158235171.	40.2258474	0.0004023	0.0001023	1.5191275	10.6649958	
0.00001125	1780.	158198254.	37.4602303	0.0004214	0.00008393	1.5821228	11.0958377	
0.00001250	1977.	158156950.	35.2516904	0.0004406	0.00006565	1.6444688	11.5281128	
0.00001375	2174.	158111262.	33.4483005	0.0004599	0.00004741	1.7061593	11.9618224	
0.00001500	2371.	158061189.	31.9487758	0.0004792	0.00002923	1.7671881	12.3969675	
0.00001625	2568.	158006730.	30.6829966	0.0004986	0.00001110	1.8275489	12.8335497	
0.00001750	2764.	157947840.	29.6008765	0.0005180	-0.00000698	1.8872355	13.2715699	
0.00001875	2960.	157881930.	28.6656200	0.0005375	-0.00002502	1.9462377	13.7109934	
0.00002000	3156.	157802152.	27.8494965	0.0005570	-0.00004301	2.0045378	14.1517080	

MEG-33 forward abutment X direction row2

0.00002125	3351.	157702855.	27.1312744	0.0005765	-0.00006096	2.0621168	14.5935854
0.00002250	3546.	157580669.	26.4944559	0.0005961	-0.00007887	2.1189576	15.0365075
0.00002375	3739.	157434076.	25.9260397	0.0006157	-0.00009676	2.1750455	15.4803724
0.00002500	3751.	150052811.	25.2035097	0.0006301	-0.000120	2.2153754	15.7712946 C
0.00002625	3885.	148003404.	24.6824729	0.0006479	-0.000140	2.2649968	16.1632201 C
0.00002750	4012.	145883929.	24.2005634	0.0006655	-0.000159	2.3132946	16.5485743 C
0.00002875	4132.	143722765.	23.7529237	0.0006829	-0.000180	2.3603146	16.9275627 C
0.00003000	4247.	141553357.	23.3360361	0.0007001	-0.000200	2.4061438	17.3008515 C
0.00003125	4356.	139400977.	22.9469323	0.0007171	-0.000220	2.4508643	17.6690950 C
0.00003250	4461.	137262979.	22.5820384	0.0007339	-0.000241	2.4944646	18.0319463 C
0.00003375	4562.	135168257.	22.2398324	0.0007506	-0.000262	2.5370669	18.3905486 C
0.00003500	4659.	133115714.	21.9178298	0.0007671	-0.000283	2.5786825	18.7448473 C
0.00003625	4753.	131105103.	21.6139377	0.0007835	-0.000304	2.6193277	19.0948396 C
0.00003750	4843.	129139692.	21.3265475	0.0007997	-0.000325	2.6590372	19.4407455 C
0.00003875	4930.	127222376.	21.0542921	0.0008159	-0.000347	2.6978479	19.7828234 C
0.00004000	5014.	125355615.	20.7960054	0.0008318	-0.000368	2.7357981	20.1213664 C
0.00004125	5096.	123541275.	20.5506810	0.0008477	-0.000390	2.7729263	20.4566893 C
0.00004250	5175.	121763162.	20.3162749	0.0008634	-0.000412	2.8091557	20.7876834 C
0.00004375	5252.	120038260.	20.0930028	0.0008791	-0.000433	2.8446168	21.1158096 C
0.00004500	5327.	118367984.	19.8802555	0.0008946	-0.000455	2.8793521	21.4414836 C
0.00004625	5400.	116746163.	19.6769907	0.0009101	-0.000477	2.9133510	21.7644514 C
0.00004750	5470.	115160593.	19.4817170	0.0009254	-0.000500	2.9465463	22.0836892 C
0.00004875	5540.	113630873.	19.2953970	0.0009407	-0.000522	2.9791160	22.4014298 C
0.00005125	5673.	110691645.	18.9443995	0.0009709	-0.000567	3.0421229	23.0285500 C
0.00005375	5801.	107920753.	18.6205433	0.0010009	-0.000612	3.1025283	23.6470845 C
0.00005625	5923.	105305585.	18.3206047	0.0010305	-0.000657	3.1604344	24.2576740 C
0.00005875	6042.	102835400.	18.0419648	0.0010600	-0.000703	3.2159432	24.8610601 C
0.00006125	6156.	100500896.	17.7824914	0.0010892	-0.000748	3.2691563	25.4580881 C
0.00006375	6266.	98293892.	17.5404487	0.0011182	-0.000794	3.3201742	26.0497173 C
0.00006625	6373.	96193193.	17.3128621	0.0011470	-0.000841	3.3689211	26.6340241 C
0.00006875	6476.	94201892.	17.0994625	0.0011756	-0.000887	3.4155912	27.2136161 C
0.00007125	6578.	92316591.	16.8995613	0.0012041	-0.000933	3.4603047	27.7901562 C
0.00007375	6676.	90519586.	16.7108241	0.0012324	-0.000980	3.5029756	28.3615878 C
0.00007625	6772.	88807342.	16.5325591	0.0012606	-0.001027	3.5436815	28.9288091 C
0.00007875	6866.	87183076.	16.3651996	0.0012888	-0.001074	3.5826040	29.4950873 C
0.00008125	6957.	85622101.	16.2053121	0.0013167	-0.001121	3.6194913	30.0547044 C
0.00008375	7047.	84143133.	16.0556053	0.0013447	-0.001168	3.6547386	30.6158642 C
0.00008625	7134.	82716255.	15.9117219	0.0013724	-0.001215	3.6879816	31.1698822 C
0.00008875	7221.	81360982.	15.7767604	0.0014002	-0.001262	3.7196234	31.7259998 C
0.00009125	7305.	80054287.	15.6471672	0.0014278	-0.001310	3.7493776	32.2767540 C

MEG-33 forward abutment X direction row2

0.00009375	7388.	78805436.	15.5246490	0.0014554	-0.001357	3.7774785	32.8279506	C
0.00009625	7470.	77607615.	15.4081902	0.0014830	-0.001404	3.8038815	33.3782983	C
0.00009875	7550.	76451952.	15.2964090	0.0015105	-0.001452	3.8285119	33.9251538	C
0.0001013	7629.	75346617.	15.1910043	0.0015381	-0.001499	3.8515610	34.4745251	C
0.0001038	7706.	74279158.	15.0897771	0.0015656	-0.001547	3.8728766	35.0211798	C
0.0001063	7783.	73249736.	14.9929751	0.0015930	-0.001594	3.8925159	-35.610083	C
0.0001088	7858.	72261337.	14.9014356	0.0016205	-0.001642	3.9105643	-36.736660	C
0.0001113	7933.	71306223.	14.8137169	0.0016480	-0.001689	3.9269363	-37.864183	C
0.0001138	8006.	70380275.	14.7291166	0.0016754	-0.001737	3.9416116	-38.994139	C
0.0001163	8078.	69488223.	14.6489325	0.0017029	-0.001785	3.9546842	-40.121474	C
0.0001188	8150.	68627833.	14.5728954	0.0017305	-0.001832	3.9661381	-41.246154	C
0.0001213	8220.	67790591.	14.4990892	0.0017580	-0.001879	3.9758902	-42.374015	C
0.0001238	8289.	66978675.	14.4282774	0.0017855	-0.001927	3.9839904	-43.501833	C
0.0001263	8357.	66193337.	14.3610174	0.0018131	-0.001974	3.9904577	-44.626915	C
0.0001288	8424.	65432942.	14.2971129	0.0018408	-0.002022	3.9952750	-45.749219	C
0.0001313	8491.	64694289.	14.2358753	0.0018685	-0.002069	3.9984191	-46.870639	C
0.0001338	8556.	63972301.	14.1759826	0.0018960	-0.002116	3.9998808	-47.995720	C
0.0001363	8621.	63271040.	14.1190614	0.0019237	-0.002164	3.9993599	-49.117746	C
0.0001388	8684.	62588310.	14.0648740	0.0019515	-0.002211	3.9991244	-50.000000	CY
0.0001413	8746.	61915658.	14.0129011	0.0019793	-0.002258	3.9998133	-50.000000	CY
0.0001438	8802.	61232852.	13.9616298	0.0020070	-0.002306	3.9989730	-50.000000	CY
0.0001463	8852.	60527544.	13.9087424	0.0020342	-0.002353	3.9999637	-50.000000	CY
0.0001488	8897.	59813992.	13.8560628	0.0020611	-0.002401	3.9992404	-50.000000	CY
0.0001588	9065.	57102289.	13.6649894	0.0021693	-0.002593	3.9992095	-50.000000	CY
0.0001688	9220.	54639791.	13.4990392	0.0022780	-0.002785	3.9983232	-50.000000	CY
0.0001788	9364.	52383987.	13.3576561	0.0023877	-0.002975	3.9999276	50.000000	CY
0.0001888	9450.	50066193.	13.2115207	0.0024937	-0.003169	3.9978448	50.000000	CY
0.0001988	9491.	47752205.	13.0691211	0.0025975	-0.003365	3.9986931	50.000000	CY
0.0002088	9523.	45618274.	12.9422702	0.0027017	-0.003561	3.9989876	50.000000	CY
0.0002188	9551.	43661299.	12.8312881	0.0028068	-0.003756	3.9989204	50.000000	CY
0.0002288	9576.	41862025.	12.7331386	0.0029127	-0.003950	3.9984398	50.000000	CY
0.0002388	9597.	40197339.	12.6421080	0.0030183	-0.004144	3.9972141	50.000000	CY
0.0002488	9616.	38658187.	12.5617808	0.0031247	-0.004338	3.9977554	50.000000	CY
0.0002588	9633.	37230305.	12.4908845	0.0032320	-0.004530	3.9998189	50.000000	CY
0.0002688	9648.	35900591.	12.4265050	0.0033396	-0.004723	3.9983586	50.000000	CY
0.0002788	9661.	34658795.	12.3663757	0.0034471	-0.004915	3.9956753	50.000000	CY
0.0002888	9673.	33498127.	12.3129041	0.0035554	-0.005107	3.9995455	50.000000	CY
0.0002988	9683.	32410938.	12.2652759	0.0036643	-0.005298	3.9960424	50.000000	CY
0.0003088	9692.	31390776.	12.2226542	0.0037737	-0.005489	3.9998555	50.000000	CY
0.0003188	9692.	30405968.	12.2139701	0.0038932	-0.005669	3.9973002	50.000000	CY

MEG-33 forward abutment X direction row2

Axial Thrust Force = 967.800 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
0.00000125	189.2500043	151400003.	278.6282650	0.0003483	0.0003108	1.3401186	9.9752121	
0.00000250	378.4954793	151398192.	146.8450616	0.0003671	0.0002921	1.4041938	10.3961420	
0.00000375	567.7068020	151388481.	102.9310723	0.0003860	0.0002735	1.4676616	10.8185666	
0.00000500	756.8668932	151373379.	80.9843888	0.0004049	0.0002549	1.5305157	11.2424864	
0.00000625	945.9586689	151353387.	67.8246303	0.0004239	0.0002364	1.5927497	11.6679016	
0.00000750	1135.	151328670.	59.0583371	0.0004429	0.0002179	1.6543570	12.0948132	
0.00000875	1324.	151299298.	52.8025985	0.0004620	0.0001995	1.7153311	12.5232219	
0.00001000	1513.	151265304.	48.1159594	0.0004812	0.0001812	1.7756657	12.9531282	
0.00001125	1701.	151226704.	44.4753900	0.0005003	0.0001628	1.8353541	13.3845335	
0.00001250	1890.	151183508.	41.5670724	0.0005196	0.0001446	1.8943899	13.8174388	
0.00001375	2078.	151135718.	39.1913048	0.0005389	0.0001264	1.9527666	14.2518453	
0.00001500	2266.	151083336.	37.2149532	0.0005582	0.0001082	2.0104777	14.6877547	
0.00001625	2454.	151026360.	35.5458478	0.0005776	0.00009012	2.0675165	15.1251683	
0.00001750	2642.	150964787.	34.1181537	0.0005971	0.00007207	2.1238767	15.5640880	
0.00001875	2829.	150898614.	32.8835919	0.0006166	0.00005407	2.1795515	16.0045156	
0.00002000	3017.	150827836.	31.8059536	0.0006361	0.00003612	2.2345345	16.4464531	
0.00002125	3203.	150752448.	30.8575499	0.0006557	0.00001822	2.2888190	16.8899027	
0.00002250	3390.	150672443.	30.0168452	0.0006754	3.79016E-07	2.3423984	17.3348665	
0.00002375	3576.	150587380.	29.2668262	0.0006951	-0.00001741	2.3952654	17.7813391	
0.00002500	3762.	150494303.	28.5938104	0.0007148	-0.00003515	2.4474077	18.2292626	
0.00002625	3948.	150389382.	27.9866757	0.0007347	-0.00005285	2.4988106	18.6785444	
0.00002750	4132.	150269636.	27.4363191	0.0007545	-0.00007050	2.5494595	19.1290895	
0.00002875	4316.	150133064.	26.9352279	0.0007744	-0.00008811	2.5993408	19.5808088	
0.00003000	4499.	149978526.	26.4771526	0.0007943	-0.000106	2.6484425	20.0336228	
0.00003125	4528.	144902518.	25.9058409	0.0008096	-0.000128	2.6853042	20.3506059	C
0.00003250	4663.	143478308.	25.4773831	0.0008280	-0.000147	2.7293516	20.7608086	C
0.00003375	4793.	142002808.	25.0762057	0.0008463	-0.000166	2.7722952	21.1666489	C
0.00003500	4916.	140468799.	24.6986024	0.0008645	-0.000186	2.8140899	21.5673315	C
0.00003625	5035.	138900480.	24.3426144	0.0008824	-0.000205	2.8547966	21.9633610	C
0.00003750	5149.	137314925.	24.0064406	0.0009002	-0.000225	2.8944649	22.3551293	C
0.00003875	5259.	135720450.	23.6882613	0.0009179	-0.000245	2.9331205	22.7427462	C
0.00004000	5365.	134124532.	23.3865115	0.0009355	-0.000265	2.9707908	23.1263534	C

MEG-33 forward abutment X direction row2

0.00004125	5467.	132535284.	23.0999136	0.0009529	-0.000285	3.0075107	23.5062093	C
0.00004250	5566.	130961450.	22.8274494	0.0009702	-0.000305	3.0433235	23.8827065	C
0.00004375	5662.	129409686.	22.5681931	0.0009874	-0.000325	3.0782679	24.2562076	C
0.00004500	5755.	127883985.	22.3212511	0.0010045	-0.000346	3.1123743	24.6269828	C
0.00004625	5845.	126377222.	22.0852332	0.0010214	-0.000366	3.1456180	24.9945067	C
0.00004750	5932.	124888793.	21.8591887	0.0010383	-0.000387	3.1780037	25.3586575	C
0.00004875	6017.	123430471.	21.6430327	0.0010551	-0.000407	3.2096071	25.7204001	C
0.00005125	6180.	120591992.	21.2370073	0.0010884	-0.000449	3.2704593	26.4359398	C
0.00005375	6335.	117866669.	20.8628010	0.0011214	-0.000491	3.3283184	27.1422037	C
0.00005625	6482.	115241042.	20.5157254	0.0011540	-0.000533	3.3832130	27.8384648	C
0.00005875	6623.	112723883.	20.1933440	0.0011864	-0.000576	3.4353145	28.5264725	C
0.00006125	6757.	110314404.	19.8931793	0.0012185	-0.000619	3.4847350	29.2071973	C
0.00006375	6886.	108008776.	19.6129882	0.0012503	-0.000662	3.5315625	29.8813245	C
0.00006625	7009.	105803288.	19.3509008	0.0012820	-0.000706	3.5758814	30.5496056	C
0.00006875	7128.	103682214.	19.1042070	0.0013134	-0.000749	3.6176677	31.2105753	C
0.00007125	7243.	101652323.	18.8724340	0.0013447	-0.000793	3.6570759	31.8666043	C
0.00007375	7354.	99711210.	18.6545546	0.0013758	-0.000837	3.6941839	32.5187414	C
0.00007625	7462.	97856473.	18.4497399	0.0014068	-0.000881	3.7290646	33.1681748	C
0.00007875	7565.	96062412.	18.2546756	0.0014376	-0.000925	3.7615686	33.8101775	C
0.00008125	7666.	94348771.	18.0710452	0.0014683	-0.000969	3.7919516	34.4508380	C
0.00008375	7764.	92703323.	17.8972196	0.0014989	-0.001014	3.8201774	35.0886847	C
0.00008625	7859.	91116530.	17.7317246	0.0015294	-0.001058	3.8462212	35.7221634	C
0.00008875	7952.	89598097.	17.5756429	0.0015598	-0.001103	3.8702348	36.3558735	C
0.00009125	8042.	88126710.	17.4260256	0.0015901	-0.001147	3.8920783	36.9840579	C
0.00009375	8130.	86717991.	17.2849223	0.0016205	-0.001192	3.9119417	37.6136953	C
0.00009625	8215.	85352527.	17.1495272	0.0016506	-0.001237	3.9296988	38.2388055	C
0.00009875	8299.	84039473.	17.0211869	0.0016808	-0.001282	3.9454683	38.8644867	C
0.0001013	8381.	82771822.	16.8988304	0.0017110	-0.001326	3.9592224	39.4891284	C
0.0001038	8460.	81542880.	16.7814596	0.0017411	-0.001371	3.9709470	40.1110293	C
0.0001063	8538.	80362198.	16.6706975	0.0017713	-0.001416	3.9807229	40.7362744	C
0.0001088	8614.	79211433.	16.5634749	0.0018013	-0.001461	3.9884623	41.3566218	C
0.0001113	8689.	78099804.	16.4615056	0.0018313	-0.001506	3.9942341	41.9783702	C
0.0001138	8762.	77027995.	16.3650587	0.0018615	-0.001551	3.9980350	42.6035501	C
0.0001163	8833.	75980648.	16.2712869	0.0018915	-0.001596	3.9998335	43.2237637	C
0.0001188	8902.	74965780.	16.1820507	0.0019216	-0.001641	3.9996321	43.8460000	C
0.0001213	8970.	73983242.	16.0975717	0.0019518	-0.001686	3.9992760	44.4720242	C
0.0001238	9037.	73025971.	16.0164541	0.0019820	-0.001730	3.9990742	45.0978626	C
0.0001263	9101.	72090197.	15.9380657	0.0020122	-0.001775	3.9999502	45.7219308	C
0.0001288	9165.	71181840.	15.8637730	0.0020425	-0.001820	3.9996509	46.3499254	C
0.0001313	9227.	70299877.	15.7933026	0.0020729	-0.001865	3.9989907	46.9816940	C

MEG-33 forward abutment X direction row2

0.0001338	9288.	69439575.	15.7255773	0.0021033	-0.001909	3.9999849	47.6138952	C
0.0001363	9346.	68596955.	15.6598220	0.0021337	-0.001954	3.9996232	48.2440589	C
0.0001388	9404.	67778080.	15.5973128	0.0021641	-0.001998	3.9986750	48.8777498	C
0.0001413	9461.	66981140.	15.5379338	0.0021947	-0.002043	3.9999017	49.5151991	C
0.0001438	9517.	66204862.	15.4815484	0.0022255	-0.002087	3.9991584	50.0000000	CY
0.0001463	9571.	65445599.	15.4271869	0.0022562	-0.002131	3.9999900	50.0000000	CY
0.0001488	9624.	64699436.	15.3746880	0.0022870	-0.002176	3.9993937	50.0000000	CY
0.0001588	9814.	61818368.	15.1926204	0.0024118	-0.002351	3.9994494	50.0000000	CY
0.0001688	9945.	58933395.	15.0276317	0.0025359	-0.002527	3.9987160	50.0000000	CY
0.0001788	10054.	56246253.	14.8836571	0.0026605	-0.002702	3.9999872	50.0000000	CY
0.0001888	10154.	53794428.	14.7592471	0.0027858	-0.002877	3.9986404	50.0000000	CY
0.0001988	10246.	51553357.	14.6533758	0.0029124	-0.003050	3.9996616	50.0000000	CY
0.0002088	10321.	49443626.	14.5568590	0.0030387	-0.003224	3.9999583	50.0000000	CY
0.0002188	10361.	47365590.	14.4505506	0.0031611	-0.003401	3.9999730	50.0000000	CY
0.0002288	10376.	45361098.	14.3438581	0.0032812	-0.003581	3.9998401	50.0000000	CY
0.0002388	10387.	43507000.	14.2517558	0.0034026	-0.003760	3.9993738	50.0000000	CY
0.0002488	10390.	41769393.	14.1712586	0.0035251	-0.003937	3.9981802	50.0000000	CY
0.0002588	10390.	40155117.	14.1044718	0.0036495	-0.004113	3.9958269	50.0000000	CY
0.0002688	10390.	38660973.	14.0502870	0.0037760	-0.004286	3.9999725	50.0000000	CY
0.0002788	10390.	37274033.	14.1016728	0.0039308	-0.004432	3.9999798	50.0000000	CY

 Summary of Results for Nominal Moment Capacity for Section 1

Moment values interpolated at maximum compressive strain = 0.003
 or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain	Max. Tens. Strain
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1	751.800	9593.444	0.00300000	-0.00411050
2	967.800	10298.326	0.00300000	-0.00317053

Note that the values of moment capacity in the table above are not factored by a strength reduction factor (phi-factor).

In ACI 318, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.75).

MEG-33 forward abutment X direction row2

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318, or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Load No.	Resist. Factor	Nominal Ax. Thrust kips	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in ²
1	0.65	751.800000	9593.	488.670000	6236.	98902695.
2	0.65	967.800000	10298.	629.070000	6694.	111442505.
1	0.75	751.800000	9593.	563.850000	7195.	81763662.
2	0.75	967.800000	10298.	725.850000	7724.	93377145.
1	0.90	751.800000	9593.	676.620000	8634.	63126631.
2	0.90	967.800000	10298.	871.020000	9268.	69709634.

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 1

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 3540.0 lbs
 Applied moment at pile head = 1490400.0 in-lbs
 Axial thrust load on pile head = 751800.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in ²	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch

MEG-33 forward abutment X direction row2

0.00	5.78E-04	1490400.	3540.	-1.03E-04	0.00	1.58E+11	-22788.	2.37E+07	0.00
0.10000	4.62E-04	1478328.	-21636.	-9.13E-05	0.00	1.58E+11	-19173.	4.98E+07	0.00
0.2000	3.59E-04	1438637.	-42533.	-8.03E-05	0.00	1.58E+11	-15655.	5.23E+07	0.00
0.3000	2.69E-04	1376393.	-59309.	-6.96E-05	0.00	1.58E+11	-12304.	5.49E+07	0.00
0.4000	1.92E-04	1296422.	-72196.	-5.95E-05	0.00	1.58E+11	-9174.	5.74E+07	0.00
0.5000	1.26E-04	1203231.	-81485.	-5.00E-05	0.00	1.58E+11	-6308.	5.99E+07	0.00
0.6000	7.18E-05	1100948.	-87511.	-4.13E-05	0.00	1.58E+11	-3736.	6.24E+07	0.00
0.7000	2.73E-05	993278.	-90639.	-3.33E-05	0.00	1.58E+11	-1477.	6.50E+07	0.00
0.8000	-8.19E-06	883474.	-91249.	-2.62E-05	0.00	1.58E+11	460.6530	6.75E+07	0.00
0.9000	-3.56E-05	774328.	-89725.	-1.99E-05	0.00	1.58E+11	2079.	7.00E+07	0.00
1.0000	-5.60E-05	668169.	-86446.	-1.45E-05	0.00	1.58E+11	3387.	7.25E+07	0.00
1.1000	-7.04E-05	566884.	-81773.	-9.79E-06	0.00	1.58E+11	4401.	7.51E+07	0.00
1.2000	-7.95E-05	471932.	-76047.	-5.85E-06	0.00	1.58E+11	5142.	7.76E+07	0.00
1.3000	-8.44E-05	384381.	-69582.	-2.61E-06	0.00	1.58E+11	5635.	8.01E+07	0.00
1.4000	-8.58E-05	304941.	-62656.	2.01E-09	0.00	1.58E+11	5907.	8.26E+07	0.00
1.5000	-8.44E-05	234005.	-55518.	2.04E-06	0.00	1.58E+11	5989.	8.51E+07	0.00
1.6000	-8.09E-05	171693.	-48379.	3.58E-06	0.00	1.58E+11	5910.	8.77E+07	0.00
1.7000	-7.58E-05	117889.	-41414.	4.68E-06	0.00	1.58E+11	5698.	9.02E+07	0.00
1.8000	-6.97E-05	72290.	-34766.	5.40E-06	0.00	1.58E+11	5382.	9.27E+07	0.00
1.9000	-6.29E-05	34441.	-28543.	5.80E-06	0.00	1.58E+11	4989.	9.52E+07	0.00
2.0000	-5.57E-05	3775.	-22826.	5.95E-06	0.00	1.58E+11	4541.	9.78E+07	0.00
2.1000	-4.86E-05	-20352.	-17665.	5.89E-06	0.00	1.58E+11	4060.	1.00E+08	0.00
2.2000	-4.16E-05	-38633.	-13091.	5.66E-06	0.00	1.58E+11	3565.	1.03E+08	0.00
2.3000	-3.50E-05	-51780.	-9109.	5.32E-06	0.00	1.58E+11	3072.	1.05E+08	0.00
2.4000	-2.88E-05	-60503.	-5710.	4.89E-06	0.00	1.58E+11	2593.	1.08E+08	0.00
2.5000	-2.32E-05	-65493.	-2871.	4.42E-06	0.00	1.58E+11	2138.	1.10E+08	0.00
2.6000	-1.82E-05	-67402.	-558.355	3.91E-06	0.00	1.58E+11	1717.	1.13E+08	0.00
2.7000	-1.39E-05	-66840.	1271.	3.40E-06	0.00	1.58E+11	1333.	1.15E+08	0.00
2.8000	-1.01E-05	-64357.	2665.	2.91E-06	0.00	1.58E+11	990.4538	1.18E+08	0.00
2.9000	-6.88E-06	-60448.	3674.	2.43E-06	0.00	1.58E+11	690.8046	1.20E+08	0.00
3.0000	-4.23E-06	-55543.	4349.	1.99E-06	0.00	1.58E+11	434.0513	1.23E+08	0.00
3.1000	-2.09E-06	-50013.	4741.	1.59E-06	0.00	1.58E+11	218.9961	1.26E+08	0.00
3.2000	-4.07E-07	-44168.	4898.	1.24E-06	0.00	1.58E+11	43.4596	1.28E+08	0.00
3.3000	8.78E-07	-38259.	4867.	9.26E-07	0.00	1.58E+11	-95.473	1.31E+08	0.00
3.4000	1.81E-06	-32488.	4689.	6.58E-07	0.00	1.58E+11	-201.227	1.33E+08	0.00
3.5000	2.46E-06	-27006.	4402.	4.32E-07	0.00	1.58E+11	-277.539	1.36E+08	0.00
3.6000	2.85E-06	-21924.	4038.	2.47E-07	0.00	1.58E+11	-328.281	1.38E+08	0.00
3.7000	3.05E-06	-17314.	3627.	9.83E-08	0.00	1.58E+11	-357.323	1.41E+08	0.00
3.8000	3.09E-06	-13219.	3192.	-1.74E-08	0.00	1.58E+11	-368.408	1.43E+08	0.00
3.9000	3.01E-06	-9654.	2752.	-1.04E-07	0.00	1.58E+11	-365.064	1.46E+08	0.00

MEG-33 forward abutment X direction row2

4.0000	2.84E-06	-6615.	2322.	-1.66E-07	0.00	1.58E+11	-350.537	1.48E+08	0.00
4.1000	2.61E-06	-4081.	1915.	-2.06E-07	0.00	1.58E+11	-327.743	1.51E+08	0.00
4.2000	2.34E-06	-2018.	1539.	-2.29E-07	0.00	1.58E+11	-299.248	1.53E+08	0.00
4.3000	2.06E-06	-386.324	1199.	-2.38E-07	0.00	1.58E+11	-267.253	1.56E+08	0.00
4.4000	1.77E-06	860.4840	898.6680	-2.37E-07	0.00	1.58E+11	-233.598	1.58E+08	0.00
4.5000	1.49E-06	1771.	638.6407	-2.27E-07	0.00	1.58E+11	-199.781	1.61E+08	0.00
4.6000	1.23E-06	2394.	418.5851	-2.11E-07	0.00	1.58E+11	-166.978	1.63E+08	0.00
4.7000	9.84E-07	2776.	236.7533	-1.91E-07	0.00	1.58E+11	-136.075	1.66E+08	0.00
4.8000	7.67E-07	2962.	90.4921	-1.70E-07	0.00	1.58E+11	-107.694	1.68E+08	0.00
4.9000	5.77E-07	2993.	-23.467	-1.47E-07	0.00	1.58E+11	-82.238	1.71E+08	0.00
5.0000	4.15E-07	2906.	-108.761	-1.25E-07	0.00	1.58E+11	-59.917	1.73E+08	0.00
5.1000	2.78E-07	2733.	-169.183	-1.03E-07	0.00	1.58E+11	-40.787	1.76E+08	0.00
5.2000	1.67E-07	2500.	-208.522	-8.35E-08	0.00	1.58E+11	-24.778	1.78E+08	0.00
5.3000	7.78E-08	2232.	-230.428	-6.56E-08	0.00	1.58E+11	-11.731	1.81E+08	0.00
5.4000	9.24E-09	1947.	-238.314	-4.97E-08	0.00	1.58E+11	-1.414	1.84E+08	0.00
5.5000	-4.16E-08	1660.	-235.295	-3.61E-08	0.00	1.58E+11	6.4457	1.86E+08	0.00
5.6000	-7.73E-08	1383.	-224.140	-2.45E-08	0.00	1.58E+11	12.1460	1.89E+08	0.00
5.7000	-1.00E-07	1123.	-207.256	-1.50E-08	0.00	1.58E+11	15.9942	1.91E+08	0.00
5.8000	-1.13E-07	885.3371	-186.684	-7.43E-09	0.00	1.58E+11	18.2927	1.94E+08	0.00
5.9000	-1.18E-07	674.4912	-164.110	-1.52E-09	0.00	1.58E+11	19.3297	1.96E+08	0.00
6.0000	-1.17E-07	491.4755	-140.889	2.90E-09	0.00	1.58E+11	19.3719	1.99E+08	0.00
6.1000	-1.11E-07	336.3519	-118.070	6.04E-09	0.00	1.58E+11	18.6595	2.01E+08	0.00
6.2000	-1.03E-07	208.0957	-96.432	8.10E-09	0.00	1.58E+11	17.4038	2.04E+08	0.00
6.3000	-9.18E-08	104.8996	-76.518	9.29E-09	0.00	1.58E+11	15.7861	2.06E+08	0.00
6.4000	-8.02E-08	24.4347	-58.672	9.78E-09	0.00	1.58E+11	13.9575	2.09E+08	0.00
6.5000	-6.84E-08	-35.931	-43.073	9.73E-09	0.00	1.58E+11	12.0410	2.11E+08	0.00
6.6000	-5.69E-08	-78.958	-29.769	9.30E-09	0.00	1.58E+11	10.1329	2.14E+08	0.00
6.7000	-4.61E-08	-107.393	-18.706	8.59E-09	0.00	1.58E+11	8.3058	2.16E+08	0.00
6.8000	-3.62E-08	-123.867	-9.755	7.72E-09	0.00	1.58E+11	6.6114	2.19E+08	0.00
6.9000	-2.76E-08	-130.820	-2.738	6.75E-09	0.00	1.58E+11	5.0835	2.21E+08	0.00
7.0000	-2.00E-08	-130.452	2.5562	5.76E-09	0.00	1.58E+11	3.7409	2.24E+08	0.00
7.1000	-1.37E-08	-124.696	6.3551	4.79E-09	0.00	1.58E+11	2.5907	2.26E+08	0.00
7.2000	-8.54E-09	-115.208	8.8876	3.88E-09	0.00	1.58E+11	1.6302	2.29E+08	0.00
7.3000	-4.41E-09	-103.373	10.3757	3.06E-09	0.00	1.58E+11	0.8499	2.31E+08	0.00
7.4000	-1.21E-09	-90.312	11.0270	2.32E-09	0.00	1.58E+11	0.2356	2.34E+08	0.00
7.5000	1.17E-09	-76.912	11.0301	1.69E-09	0.00	1.58E+11	-0.230	2.37E+08	0.00
7.6000	2.85E-09	-63.843	10.5553	1.16E-09	0.00	1.58E+11	-0.561	2.37E+08	0.00
7.7000	3.94E-09	-51.581	9.7524	7.19E-10	0.00	1.58E+11	-0.777	2.37E+08	0.00
7.8000	4.57E-09	-40.439	8.7455	3.70E-10	0.00	1.58E+11	-0.901	2.37E+08	0.00
7.9000	4.83E-09	-30.593	7.6336	1.01E-10	0.00	1.58E+11	-0.952	2.37E+08	0.00

MEG-33 forward abutment X direction row2

8.0000	4.81E-09	-22.118	6.4930	-9.87E-11	0.00	1.58E+11	-0.949	2.37E+08	0.00
8.1000	4.59E-09	-15.010	5.3804	-2.39E-10	0.00	1.58E+11	-0.906	2.37E+08	0.00
8.2000	4.24E-09	-9.205	4.3358	-3.31E-10	0.00	1.58E+11	-0.835	2.37E+08	0.00
8.3000	3.80E-09	-4.603	3.3852	-3.83E-10	0.00	1.58E+11	-0.749	2.37E+08	0.00
8.4000	3.32E-09	-1.080	2.5434	-4.05E-10	0.00	1.58E+11	-0.654	2.37E+08	0.00
8.5000	2.83E-09	1.5017	1.8166	-4.03E-10	0.00	1.58E+11	-0.557	2.37E+08	0.00
8.6000	2.35E-09	3.2807	1.2042	-3.85E-10	0.00	1.58E+11	-0.463	2.37E+08	0.00
8.7000	1.90E-09	4.3925	0.7012	-3.56E-10	0.00	1.58E+11	-0.375	2.37E+08	0.00
8.8000	1.50E-09	4.9643	0.2993	-3.21E-10	0.00	1.58E+11	-0.295	2.37E+08	0.00
8.9000	1.13E-09	5.1115	-0.01150	-2.83E-10	0.00	1.58E+11	-0.223	2.37E+08	0.00
9.0000	8.17E-10	4.9372	-0.242	-2.45E-10	0.00	1.58E+11	-0.161	2.37E+08	0.00
9.1000	5.46E-10	4.5308	-0.403	-2.09E-10	0.00	1.58E+11	-0.108	2.37E+08	0.00
9.2000	3.16E-10	3.9695	-0.505	-1.76E-10	0.00	1.58E+11	-0.06237	2.37E+08	0.00
9.3000	1.23E-10	3.3182	-0.557	-1.49E-10	0.00	1.58E+11	-0.02420	2.37E+08	0.00
9.4000	-4.07E-11	2.6321	-0.567	-1.26E-10	0.00	1.58E+11	0.00803	2.37E+08	0.00
9.5000	-1.80E-10	1.9576	-0.541	-1.09E-10	0.00	1.58E+11	0.03554	2.37E+08	0.00
9.6000	-3.02E-10	1.3342	-0.484	-9.64E-11	0.00	1.58E+11	0.05954	2.37E+08	0.00
9.7000	-4.12E-10	0.7965	-0.399	-8.84E-11	0.00	1.58E+11	0.08115	2.37E+08	0.00
9.8000	-5.14E-10	0.3757	-0.290	-8.39E-11	0.00	1.58E+11	0.1013	2.37E+08	0.00
9.9000	-6.13E-10	0.1009	-0.157	-8.21E-11	0.00	1.58E+11	0.1208	2.37E+08	0.00
10.0000	-7.11E-10	0.00	0.00	-8.17E-11	0.00	1.58E+11	0.1402	1.18E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 1:

Pile-head deflection = 0.00057808 inches
 Computed slope at pile head = -0.0001026 radians
 Maximum bending moment = 1490400. inch-lbs
 Maximum shear force = -91249. lbs
 Depth of maximum bending moment = 0.000000 feet below pile head
 Depth of maximum shear force = 0.80000000 feet below pile head
 Number of iterations = 6
 Number of zero deflection points = 5

MEG-33 forward abutment X direction row2

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 2

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 4770.0 lbs
 Applied moment at pile head = 2012400.0 in-lbs
 Axial thrust load on pile head = 967800.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	8.53E-04	2012400.	4770.	-1.48E-04	0.00	1.51E+11	-22309.	1.57E+07	0.00
0.10000	6.85E-04	2002224.	-21995.	-1.32E-04	0.00	1.51E+11	-22299.	3.91E+07	0.00
0.2000	5.36E-04	1959919.	-49392.	-1.17E-04	0.00	1.51E+11	-23363.	5.23E+07	0.00
0.3000	4.05E-04	1883953.	-74520.	-1.01E-04	0.00	1.51E+11	-18517.	5.49E+07	0.00
0.4000	2.92E-04	1781306.	-94018.	-8.68E-05	0.00	1.51E+11	-13980.	5.74E+07	0.00
0.5000	1.97E-04	1658511.	-108295.	-7.32E-05	0.00	1.51E+11	-9816.	5.99E+07	0.00
0.6000	1.17E-04	1521567.	-117828.	-6.06E-05	0.00	1.51E+11	-6071.	6.24E+07	0.00
0.7000	5.13E-05	1375866.	-123135.	-4.91E-05	0.00	1.51E+11	-2775.	6.50E+07	0.00
0.8000	-1.06E-06	1226156.	-124764.	-3.87E-05	0.00	1.51E+11	59.8534	6.75E+07	0.00
0.9000	-4.17E-05	1076521.	-123268.	-2.96E-05	0.00	1.51E+11	2434.	7.00E+07	0.00
1.0000	-7.21E-05	930381.	-119192.	-2.17E-05	0.00	1.51E+11	4360.	7.25E+07	0.00
1.1000	-9.37E-05	790511.	-113060.	-1.48E-05	0.00	1.51E+11	5860.	7.51E+07	0.00
1.2000	-1.08E-04	659071.	-105365.	-9.09E-06	0.00	1.51E+11	6965.	7.76E+07	0.00
1.3000	-1.15E-04	537655.	-96561.	-4.34E-06	0.00	1.51E+11	7710.	8.01E+07	0.00
1.4000	-1.18E-04	427336.	-87054.	-5.20E-07	0.00	1.51E+11	8135.	8.26E+07	0.00
1.5000	-1.17E-04	328727.	-77202.	2.48E-06	0.00	1.51E+11	8284.	8.51E+07	0.00
1.6000	-1.12E-04	242044.	-67313.	4.74E-06	0.00	1.51E+11	8198.	8.77E+07	0.00
1.7000	-1.05E-04	167164.	-57643.	6.36E-06	0.00	1.51E+11	7920.	9.02E+07	0.00
1.8000	-9.69E-05	103687.	-48396.	7.43E-06	0.00	1.51E+11	7490.	9.27E+07	0.00
1.9000	-8.75E-05	50996.	-39734.	8.05E-06	0.00	1.51E+11	6947.	9.52E+07	0.00
2.0000	-7.76E-05	8307.	-31771.	8.28E-06	0.00	1.51E+11	6325.	9.78E+07	0.00
2.1000	-6.77E-05	-25275.	-24584.	8.21E-06	0.00	1.51E+11	5654.	1.00E+08	0.00

MEG-33 forward abutment X direction row2

2.2000	-5.79E-05	-50714.	-18215.	7.91E-06	0.00	1.51E+11	4962.	1.03E+08	0.00
2.3000	-4.87E-05	-69008.	-12675.	7.44E-06	0.00	1.51E+11	4271.	1.05E+08	0.00
2.4000	-4.01E-05	-81151.	-7951.	6.84E-06	0.00	1.51E+11	3601.	1.08E+08	0.00
2.5000	-3.22E-05	-88107.	-4012.	6.17E-06	0.00	1.51E+11	2965.	1.10E+08	0.00
2.6000	-2.52E-05	-90793.	-807.562	5.46E-06	0.00	1.51E+11	2375.	1.13E+08	0.00
2.7000	-1.91E-05	-90058.	1721.	4.75E-06	0.00	1.51E+11	1839.	1.15E+08	0.00
2.8000	-1.39E-05	-86674.	3642.	4.05E-06	0.00	1.51E+11	1362.	1.18E+08	0.00
2.9000	-9.41E-06	-81327.	5025.	3.38E-06	0.00	1.51E+11	944.5843	1.20E+08	0.00
3.0000	-5.74E-06	-74620.	5945.	2.76E-06	0.00	1.51E+11	588.1331	1.23E+08	0.00
3.1000	-2.78E-06	-67065.	6472.	2.20E-06	0.00	1.51E+11	290.4804	1.26E+08	0.00
3.2000	-4.54E-07	-59092.	6676.	1.70E-06	0.00	1.51E+11	48.4360	1.28E+08	0.00
3.3000	1.31E-06	-51048.	6619.	1.27E-06	0.00	1.51E+11	-142.228	1.31E+08	0.00
3.4000	2.58E-06	-43208.	6362.	8.92E-07	0.00	1.51E+11	-286.452	1.33E+08	0.00
3.5000	3.45E-06	-35781.	5957.	5.79E-07	0.00	1.51E+11	-389.599	1.36E+08	0.00
3.6000	3.97E-06	-28914.	5448.	3.22E-07	0.00	1.51E+11	-457.209	1.38E+08	0.00
3.7000	4.22E-06	-22705.	4877.	1.18E-07	0.00	1.51E+11	-494.791	1.41E+08	0.00
3.8000	4.25E-06	-17209.	4276.	-4.03E-08	0.00	1.51E+11	-507.656	1.43E+08	0.00
3.9000	4.12E-06	-12443.	3671.	-1.58E-07	0.00	1.51E+11	-500.789	1.46E+08	0.00
4.0000	3.88E-06	-8399.	3083.	-2.40E-07	0.00	1.51E+11	-478.755	1.48E+08	0.00
4.1000	3.55E-06	-5044.	2528.	-2.94E-07	0.00	1.51E+11	-445.642	1.51E+08	0.00
4.2000	3.17E-06	-2330.	2018.	-3.23E-07	0.00	1.51E+11	-405.020	1.53E+08	0.00
4.3000	2.77E-06	-199.876	1559.	-3.33E-07	0.00	1.51E+11	-359.938	1.56E+08	0.00
4.4000	2.37E-06	1412.	1155.	-3.28E-07	0.00	1.51E+11	-312.929	1.58E+08	0.00
4.5000	1.98E-06	2573.	807.8640	-3.12E-07	0.00	1.51E+11	-266.037	1.61E+08	0.00
4.6000	1.62E-06	3352.	515.7327	-2.89E-07	0.00	1.51E+11	-220.849	1.63E+08	0.00
4.7000	1.29E-06	3812.	276.0980	-2.60E-07	0.00	1.51E+11	-178.543	1.66E+08	0.00
4.8000	9.97E-07	4015.	85.0123	-2.29E-07	0.00	1.51E+11	-139.934	1.68E+08	0.00
4.9000	7.41E-07	4016.	-62.264	-1.98E-07	0.00	1.51E+11	-105.526	1.71E+08	0.00
5.0000	5.23E-07	3866.	-170.917	-1.66E-07	0.00	1.51E+11	-75.562	1.73E+08	0.00
5.1000	3.41E-07	3607.	-246.298	-1.37E-07	0.00	1.51E+11	-50.074	1.76E+08	0.00
5.2000	1.94E-07	3275.	-293.698	-1.10E-07	0.00	1.51E+11	-28.925	1.78E+08	0.00
5.3000	7.86E-08	2902.	-318.168	-8.50E-08	0.00	1.51E+11	-11.858	1.81E+08	0.00
5.4000	-9.64E-09	2512.	-324.397	-6.36E-08	0.00	1.51E+11	1.4752	1.84E+08	0.00
5.5000	-7.40E-08	2124.	-316.627	-4.52E-08	0.00	1.51E+11	11.4750	1.86E+08	0.00
5.6000	-1.18E-07	1752.	-298.599	-2.99E-08	0.00	1.51E+11	18.5713	1.89E+08	0.00
5.7000	-1.46E-07	1407.	-273.537	-1.73E-08	0.00	1.51E+11	23.1995	1.91E+08	0.00
5.8000	-1.60E-07	1096.	-244.147	-7.42E-09	0.00	1.51E+11	25.7839	1.94E+08	0.00
5.9000	-1.63E-07	821.1203	-212.642	1.72E-10	0.00	1.51E+11	26.7244	1.96E+08	0.00
6.0000	-1.59E-07	585.1877	-180.775	5.75E-09	0.00	1.51E+11	26.3874	1.99E+08	0.00
6.1000	-1.50E-07	387.2476	-149.882	9.60E-09	0.00	1.51E+11	25.0999	2.01E+08	0.00

MEG-33 forward abutment X direction row2

6.2000	-1.36E-07	225.4478	-120.934	1.20E-08	0.00	1.51E+11	23.1465	2.04E+08	0.00
6.3000	-1.21E-07	96.9769	-94.586	1.33E-08	0.00	1.51E+11	20.7683	2.06E+08	0.00
6.4000	-1.04E-07	-1.588	-71.226	1.37E-08	0.00	1.51E+11	18.1645	2.09E+08	0.00
6.5000	-8.80E-08	-73.997	-51.031	1.34E-08	0.00	1.51E+11	15.4943	2.11E+08	0.00
6.6000	-7.23E-08	-124.093	-34.006	1.26E-08	0.00	1.51E+11	12.8804	2.14E+08	0.00
6.7000	-5.78E-08	-155.640	-20.030	1.15E-08	0.00	1.51E+11	10.4133	2.16E+08	0.00
6.8000	-4.47E-08	-172.191	-8.889	1.02E-08	0.00	1.51E+11	8.1551	2.19E+08	0.00
6.9000	-3.33E-08	-176.997	-0.309	8.81E-09	0.00	1.51E+11	6.1441	2.21E+08	0.00
7.0000	-2.36E-08	-172.953	6.0170	7.42E-09	0.00	1.51E+11	4.3993	2.24E+08	0.00
7.1000	-1.55E-08	-162.573	10.4110	6.09E-09	0.00	1.51E+11	2.9240	2.26E+08	0.00
7.2000	-8.96E-09	-147.981	13.1913	4.86E-09	0.00	1.51E+11	1.7098	2.29E+08	0.00
7.3000	-3.83E-09	-130.925	14.6608	3.75E-09	0.00	1.51E+11	0.7395	2.31E+08	0.00
7.4000	4.87E-11	-112.804	15.0988	2.79E-09	0.00	1.51E+11	-0.00949	2.34E+08	0.00
7.5000	2.86E-09	-94.695	14.7551	1.97E-09	0.00	1.51E+11	-0.563	2.37E+08	0.00
7.6000	4.77E-09	-77.396	13.8534	1.28E-09	0.00	1.51E+11	-0.940	2.37E+08	0.00
7.7000	5.94E-09	-61.449	12.5872	7.34E-10	0.00	1.51E+11	-1.171	2.37E+08	0.00
7.8000	6.53E-09	-47.188	11.1129	3.03E-10	0.00	1.51E+11	-1.287	2.37E+08	0.00
7.9000	6.67E-09	-34.779	9.5524	-2.17E-11	0.00	1.51E+11	-1.314	2.37E+08	0.00
8.0000	6.48E-09	-24.262	7.9982	-2.56E-10	0.00	1.51E+11	-1.276	2.37E+08	0.00
8.1000	6.05E-09	-15.583	6.5164	-4.14E-10	0.00	1.51E+11	-1.193	2.37E+08	0.00
8.2000	5.48E-09	-8.622	5.1521	-5.09E-10	0.00	1.51E+11	-1.081	2.37E+08	0.00
8.3000	4.83E-09	-3.217	3.9324	-5.56E-10	0.00	1.51E+11	-0.952	2.37E+08	0.00
8.4000	4.15E-09	0.8172	2.8706	-5.66E-10	0.00	1.51E+11	-0.818	2.37E+08	0.00
8.5000	3.47E-09	3.6739	1.9694	-5.48E-10	0.00	1.51E+11	-0.684	2.37E+08	0.00
8.6000	2.83E-09	5.5450	1.2238	-5.12E-10	0.00	1.51E+11	-0.558	2.37E+08	0.00
8.7000	2.24E-09	6.6121	0.6234	-4.63E-10	0.00	1.51E+11	-0.442	2.37E+08	0.00
8.8000	1.72E-09	7.0421	0.1545	-4.09E-10	0.00	1.51E+11	-0.339	2.37E+08	0.00
8.9000	1.26E-09	6.9838	-0.198	-3.54E-10	0.00	1.51E+11	-0.249	2.37E+08	0.00
9.0000	8.71E-10	6.5671	-0.451	-3.00E-10	0.00	1.51E+11	-0.172	2.37E+08	0.00
9.1000	5.42E-10	5.9031	-0.618	-2.51E-10	0.00	1.51E+11	-0.107	2.37E+08	0.00
9.2000	2.70E-10	5.0851	-0.714	-2.07E-10	0.00	1.51E+11	-0.05318	2.37E+08	0.00
9.3000	4.56E-11	4.1904	-0.751	-1.70E-10	0.00	1.51E+11	-0.00898	2.37E+08	0.00
9.4000	-1.39E-10	3.2828	-0.740	-1.41E-10	0.00	1.51E+11	0.02737	2.37E+08	0.00
9.5000	-2.92E-10	2.4145	-0.689	-1.18E-10	0.00	1.51E+11	0.05756	2.37E+08	0.00
9.6000	-4.22E-10	1.6292	-0.605	-1.02E-10	0.00	1.51E+11	0.08323	2.37E+08	0.00
9.7000	-5.37E-10	0.9636	-0.491	-9.18E-11	0.00	1.51E+11	0.1058	2.37E+08	0.00
9.8000	-6.43E-10	0.4505	-0.352	-8.62E-11	0.00	1.51E+11	0.1266	2.37E+08	0.00
9.9000	-7.44E-10	0.1197	-0.188	-8.39E-11	0.00	1.51E+11	0.1466	2.37E+08	0.00
10.0000	-8.44E-10	0.00	0.00	-8.34E-11	0.00	1.51E+11	0.1663	1.18E+08	0.00

MEG-33 forward abutment X direction row2

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 2:

Pile-head deflection = 0.00085317 inches
 Computed slope at pile head = -0.0001483 radians
 Maximum bending moment = 2012400. inch-lbs
 Maximum shear force = -124764. lbs
 Depth of maximum bending moment = 0.000000 feet below pile head
 Depth of maximum shear force = 0.80000000 feet below pile head
 Number of iterations = 6
 Number of zero deflection points = 5

 Summary of Pile-head Responses for Conventional Analyses

Definitions of Pile-head Loading Conditions:

Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs
 Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
 Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.
 Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs
 Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians

Load Case No.	Load Type 1	Pile-head Load 1	Load Type 2	Pile-head Load 2	Axial Loading lbs	Pile-head Deflection inches	Pile-head Rotation radians	Max Shear in Pile lbs	Max Moment in Pile in-lbs
1	V, lb	3540.	M, in-lb	1490400.	751800.	5.78E-04	-1.03E-04	-91249.	1490400.
2	V, lb	4770.	M, in-lb	2012400.	967800.	8.53E-04	-1.48E-04	-124764.	2012400.

Maximum pile-head deflection = 0.0008531679 inches

Maximum pile-head rotation = -0.0001482796 radians = -0.008496 deg.

Summary of Warning Messages

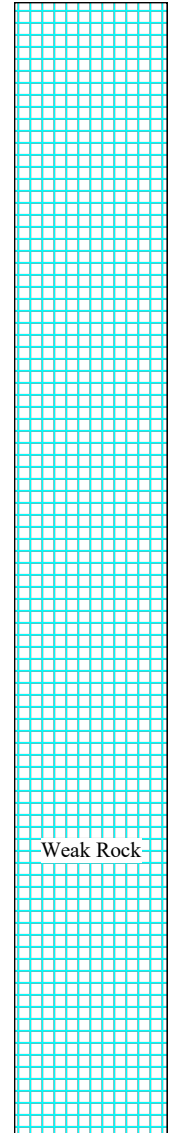
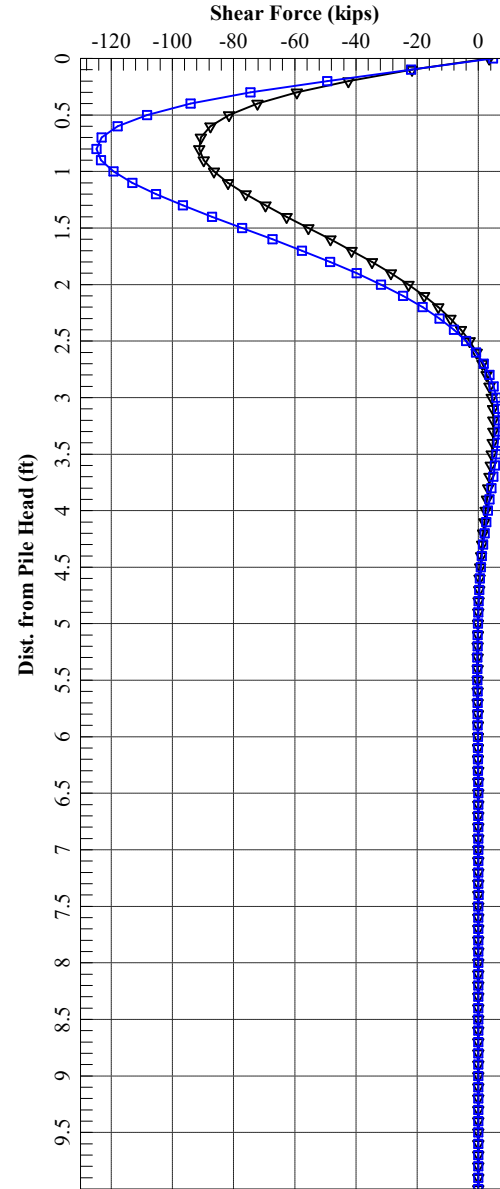
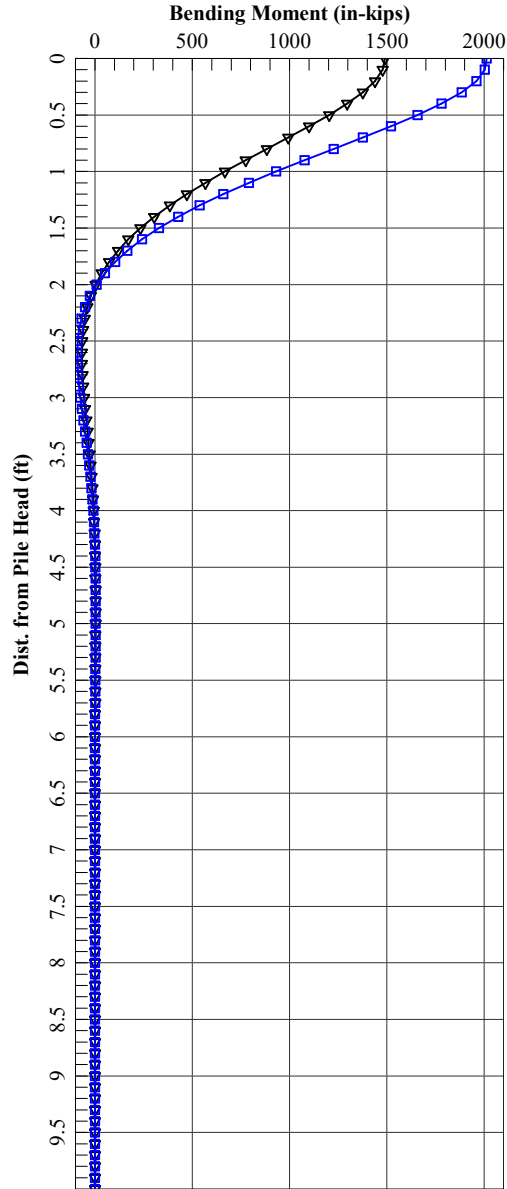
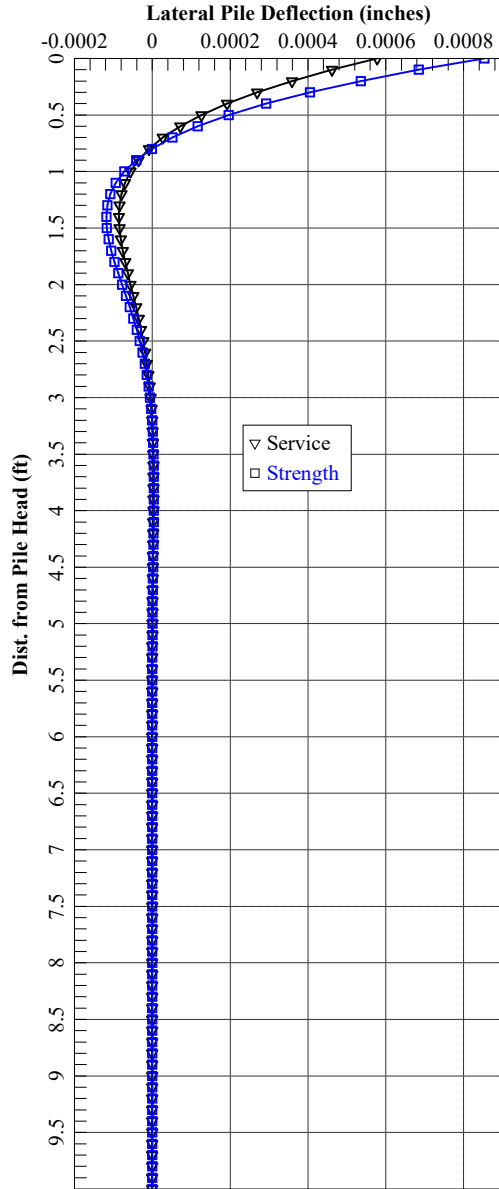
The following warning was reported 706 times

**** Warning ****

An unreasonable input value for unconfined compressive strength has been specified for a soil defined using the weak rock criteria. The input value is greater than 500 psi. Please check your input data for correctness.

The analysis ended normally.

MEG-33 Bowmans Run Bridge Forward Abutment X-Direction Row 2



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LPile for Windows, Version 2022-12.006

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method
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Files Used for Analysis

Path to file locations:

\\US0247-PPFSS01\shared_projects\173609140\119144\400-Engineering\Geotechnical\Analysis\Lpile\bridges\LPile
Analysis\Bowman's Run\forward Abutment B-003\

Name of input data file:

MEG-33 forward abutment X direction row3.lp12d

Name of output report file:

MEG-33 forward abutment X direction row3.lp12o

MEG-33 forward abutment X direction row3

Name of plot output file:

MEG-33 forward abutment X direction row3.lp12p

Name of runtime message file:

MEG-33 forward abutment X direction row3.lp12r

Date and Time of Analysis

Date: June 28, 2024

Time: 15:27:11

Problem Title

Project Name: MEG-33-19.21

Job Number: 173609140

Client: ODOT

Engineer: G. Khatri

Description: Forward Abutment Lateral Load Analysis at Bowman's Run Bridge

MEG-33 forward abutment X direction row3
Program Options and Settings

Computational Options:

- Conventional Analysis

Engineering Units Used for Data Input and Computations:

- US Customary System Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed = 500
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 100.0000 in
- Number of pile increments = 100

Loading Type and Number of Cycles of Loading:

- Static loading specified

- Analysis uses p-y modification factors for p-y curves
- Analysis uses layering correction (Method of Georgiadis)
- No distributed lateral loads are entered
- Loading by lateral soil movements acting on pile not selected
- Input of shear resistance at the pile tip not selected
- Input of moment resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:

- Output files use decimal points to denote decimal symbols.
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1
- No p-y curves to be computed and reported for user-specified depths
- Print using wide report formats

MEG-33 forward abutment X direction row3

Number of pile sections defined = 1
Total length of pile = 10.000 ft
Depth of ground surface below top of pile = 0.0000 ft

Pile diameters used for p-y curve computations are defined using 2 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile. A summary of values of pile diameter vs. depth follows.

Point No.	Depth Below Pile Head feet	Pile Diameter inches
1	0.000	30.0000
2	10.000	30.0000

Input Structural Properties for Pile Sections:

Pile Section No. 1:

Section 1 is a round drilled shaft, bored pile, or CIDH pile
Length of section = 10.000000 ft
Shaft Diameter = 30.000000 in

Soil and Rock Layering Information

The soil profile is modelled using 1 layers

Layer 1 is weak rock, p-y criteria by Reese, 1997

Distance from top of pile to top of layer = 0.0000 ft
Distance from top of pile to bottom of layer = 15.000000 ft

MEG-33 forward abutment X direction row3

Effective unit weight at top of layer = 87.600000 pcf
 Effective unit weight at bottom of layer = 87.600000 pcf
 Uniaxial compressive strength at top of layer = 4380. psi
 Uniaxial compressive strength at bottom of layer = 4380. psi
 Initial modulus of rock at top of layer = 394200. psi
 Initial modulus of rock at bottom of layer = 394200. psi
 RQD of rock at top of layer = 81.000000 %
 RQD of rock at bottom of layer = 81.000000 %
 k rm of rock at top of layer = 0.0000500
 k rm of rock at bottom of layer = 0.0000500

(Depth of the lowest soil layer extends 5.000 ft below the pile tip)

 Summary of Input Soil Properties

Layer Num.	Soil Type Name (p-y Curve Type)	Layer Depth ft	Effective Unit Wt. pcf	Uniaxial qu psi	RQD %	E50 or krm	Rock Mass Modulus psi
1	Weak Rock	0.00 15.0000	87.6000 87.6000	4380. 4380.	81.0000 81.0000	5.00E-05 5.00E-05	394200. 394200.

 Modification Factors for p-y Curves

Distribution of p-y modifiers with depth defined using 4 points

Point No.	Depth X ft	p-mult	y-mult
1	0.000	0.7000	1.0000
2	10.000	0.7000	1.0000
3	10.000	0.7000	1.0000

4 10.000 0.7000 MEG-33 forward abutment X direction row3 1.0000

Static Loading Type

Static loading criteria were used when computing p-y curves for all analyses.

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 2

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length	Run Analysis
1	1	V = 3540. lbs	M = 1490400. in-lbs	751800.	No	Yes
2	1	V = 4770. lbs	M = 2012400. in-lbs	967800.	No	Yes

V = shear force applied normal to pile axis

M = bending moment applied to pile head

y = lateral deflection normal to pile axis

S = pile slope relative to original pile batter angle

R = rotational stiffness applied to pile head

Values of top y vs. pile lengths can be computed only for load types with specified shear loading (Load Types 1, 2, and 3).

Thrust force is assumed to be acting axially for all pile batter angles.

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

MEG-33 forward abutment X direction row3

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 1

Pile Section No. 1:

Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section	=	10.000000	ft
Shaft Diameter	=	30.000000	in
Concrete Cover Thickness (to edge of trans. reinf.)	=	3.000000	in
Number of Reinforcing Bars	=	8	bars
Yield Stress of Reinforcing Bars	=	50000.	psi
Modulus of Elasticity of Reinforcing Bars	=	29000000.	psi
Gross Area of Shaft	=	706.858347	sq. in.
Total Area of Reinforcing Steel	=	8.000000	sq. in.
Area Ratio of Steel Reinforcement	=	1.13	percent
Edge-to-Edge Bar Spacing	=	7.242052	in
Maximum Concrete Aggregate Size	=	0.750000	in
Ratio of Bar Spacing to Aggregate Size	=	9.66	
Offset of Center of Rebar Cage from Center of Pile	=	0.0000	in
Transverse Reinforcement			
Type: Spiral			
Number of Transverse Reinf. (per spacing)	=	1	
Spacing of Transverse Reinf.	=	4.000000	in
Yield Stress of Transverse Reinf.	=	50000.	psi
Diameter of Transverse Reinf.	=	0.500000	in

Axial Structural Capacities:

Nom. Axial Structural Capacity = $0.85 F_c A_c + F_y A_s$	=	2776.118	kips
Tensile Load for Cracking of Concrete	=	-317.428	kips
Nominal Axial Tensile Capacity	=	-400.000	kips

Reinforcing Bar Dimensions and Positions Used in Computations:

MEG-33 forward abutment X direction row3

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.128000	1.000000	10.936000	0.000000
2	1.128000	1.000000	7.732920	7.732920
3	1.128000	1.000000	0.000000	10.936000
4	1.128000	1.000000	-7.73292	7.732920
5	1.128000	1.000000	-10.93600	0.000000
6	1.128000	1.000000	-7.73292	-7.73292
7	1.128000	1.000000	0.000000	-10.93600
8	1.128000	1.000000	7.732920	-7.73292

NOTE: The positions of the above rebars were computed by LPILE

Minimum spacing between any two bars not equal to zero = 7.242 inches between bars 1 and 2.

Ratio of bar spacing to maximum aggregate size = 9.66

Concrete Properties:

Compressive Strength of Concrete	=	4000. psi
Modulus of Elasticity of Concrete	=	3604997. psi
Modulus of Rupture of Concrete	=	-474.34165 psi
Compression Strain at Peak Stress	=	0.001886
Tensile Strain at Fracture of Concrete	=	-0.0001154
Maximum Coarse Aggregate Size	=	0.750000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 2

Number	Axial Thrust Force kips
1	751.800
2	967.800

MEG-33 forward abutment X direction row3

Definitions of Run Messages and Notes:

- C = concrete in section has cracked in tension.
- Y = stress in reinforcing steel has reached yield stress.
- T = ACI 318 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than 0.003. See ACI 318-14, Section 21.2.3.
- Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
 Position of neutral axis is measured from edge of compression side of pile.
 Compressive stresses and strains are positive in sign.
 Tensile stresses and strains are negative in sign.

Axial Thrust Force = 751.800 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
0.00000125	197.9570598	158365648.	215.5648630	0.0002695	0.0002320	1.0605021	7.6891638	
0.00000250	395.9073095	158362924.	115.3119932	0.0002883	0.0002133	1.1278688	8.1099945	
0.00000375	593.8249168	158353311.	81.9075073	0.0003072	0.0001947	1.1946294	8.5322539	
0.00000500	791.6935584	158338712.	65.2151194	0.0003261	0.0001761	1.2607780	8.9559423	
0.00000625	989.4969040	158319505.	55.2075729	0.0003450	0.0001575	1.3263083	9.3810601	
0.00000750	1187.	158295815.	48.5424497	0.0003641	0.0001391	1.3912141	9.8076078	
0.00000875	1385.	158267696.	43.7872851	0.0003831	0.0001206	1.4554892	10.2355861	
0.00001000	1582.	158235171.	40.2258474	0.0004023	0.0001023	1.5191275	10.6649958	
0.00001125	1780.	158198254.	37.4602303	0.0004214	0.00008393	1.5821228	11.0958377	
0.00001250	1977.	158156950.	35.2516904	0.0004406	0.00006565	1.6444688	11.5281128	
0.00001375	2174.	158111262.	33.4483005	0.0004599	0.00004741	1.7061593	11.9618224	
0.00001500	2371.	158061189.	31.9487758	0.0004792	0.00002923	1.7671881	12.3969675	
0.00001625	2568.	158006730.	30.6829966	0.0004986	0.00001110	1.8275489	12.8335497	
0.00001750	2764.	157947840.	29.6008765	0.0005180	-0.00000698	1.8872355	13.2715699	
0.00001875	2960.	157881930.	28.6656200	0.0005375	-0.00002502	1.9462377	13.7109934	
0.00002000	3156.	157802152.	27.8494965	0.0005570	-0.00004301	2.0045378	14.1517080	

MEG-33 forward abutment X direction row3

0.00002125	3351.	157702855.	27.1312744	0.0005765	-0.00006096	2.0621168	14.5935854
0.00002250	3546.	157580669.	26.4944559	0.0005961	-0.00007887	2.1189576	15.0365075
0.00002375	3739.	157434076.	25.9260397	0.0006157	-0.00009676	2.1750455	15.4803724
0.00002500	3751.	150052811.	25.2035097	0.0006301	-0.000120	2.2153754	15.7712946 C
0.00002625	3885.	148003404.	24.6824729	0.0006479	-0.000140	2.2649968	16.1632201 C
0.00002750	4012.	145883929.	24.2005634	0.0006655	-0.000159	2.3132946	16.5485743 C
0.00002875	4132.	143722765.	23.7529237	0.0006829	-0.000180	2.3603146	16.9275627 C
0.00003000	4247.	141553357.	23.3360361	0.0007001	-0.000200	2.4061438	17.3008515 C
0.00003125	4356.	139400977.	22.9469323	0.0007171	-0.000220	2.4508643	17.6690950 C
0.00003250	4461.	137262979.	22.5820384	0.0007339	-0.000241	2.4944646	18.0319463 C
0.00003375	4562.	135168257.	22.2398324	0.0007506	-0.000262	2.5370669	18.3905486 C
0.00003500	4659.	133115714.	21.9178298	0.0007671	-0.000283	2.5786825	18.7448473 C
0.00003625	4753.	131105103.	21.6139377	0.0007835	-0.000304	2.6193277	19.0948396 C
0.00003750	4843.	129139692.	21.3265475	0.0007997	-0.000325	2.6590372	19.4407455 C
0.00003875	4930.	127222376.	21.0542921	0.0008159	-0.000347	2.6978479	19.7828234 C
0.00004000	5014.	125355615.	20.7960054	0.0008318	-0.000368	2.7357981	20.1213664 C
0.00004125	5096.	123541275.	20.5506810	0.0008477	-0.000390	2.7729263	20.4566893 C
0.00004250	5175.	121763162.	20.3162749	0.0008634	-0.000412	2.8091557	20.7876834 C
0.00004375	5252.	120038260.	20.0930028	0.0008791	-0.000433	2.8446168	21.1158096 C
0.00004500	5327.	118367984.	19.8802555	0.0008946	-0.000455	2.8793521	21.4414836 C
0.00004625	5400.	116746163.	19.6769907	0.0009101	-0.000477	2.9133510	21.7644514 C
0.00004750	5470.	115160593.	19.4817170	0.0009254	-0.000500	2.9465463	22.0836892 C
0.00004875	5540.	113630873.	19.2953970	0.0009407	-0.000522	2.9791160	22.4014298 C
0.00005125	5673.	110691645.	18.9443995	0.0009709	-0.000567	3.0421229	23.0285500 C
0.00005375	5801.	107920753.	18.6205433	0.0010009	-0.000612	3.1025283	23.6470845 C
0.00005625	5923.	105305585.	18.3206047	0.0010305	-0.000657	3.1604344	24.2576740 C
0.00005875	6042.	102835400.	18.0419648	0.0010600	-0.000703	3.2159432	24.8610601 C
0.00006125	6156.	100500896.	17.7824914	0.0010892	-0.000748	3.2691563	25.4580881 C
0.00006375	6266.	98293892.	17.5404487	0.0011182	-0.000794	3.3201742	26.0497173 C
0.00006625	6373.	96193193.	17.3128621	0.0011470	-0.000841	3.3689211	26.6340241 C
0.00006875	6476.	94201892.	17.0994625	0.0011756	-0.000887	3.4155912	27.2136161 C
0.00007125	6578.	92316591.	16.8995613	0.0012041	-0.000933	3.4603047	27.7901562 C
0.00007375	6676.	90519586.	16.7108241	0.0012324	-0.000980	3.5029756	28.3615878 C
0.00007625	6772.	88807342.	16.5325591	0.0012606	-0.001027	3.5436815	28.9288091 C
0.00007875	6866.	87183076.	16.3651996	0.0012888	-0.001074	3.5826040	29.4950873 C
0.00008125	6957.	85622101.	16.2053121	0.0013167	-0.001121	3.6194913	30.0547044 C
0.00008375	7047.	84143133.	16.0556053	0.0013447	-0.001168	3.6547386	30.6158642 C
0.00008625	7134.	82716255.	15.9117219	0.0013724	-0.001215	3.6879816	31.1698822 C
0.00008875	7221.	81360982.	15.7767604	0.0014002	-0.001262	3.7196234	31.7259998 C
0.00009125	7305.	80054287.	15.6471672	0.0014278	-0.001310	3.7493776	32.2767540 C

MEG-33 forward abutment X direction row3

0.00009375	7388.	78805436.	15.5246490	0.0014554	-0.001357	3.7774785	32.8279506	C
0.00009625	7470.	77607615.	15.4081902	0.0014830	-0.001404	3.8038815	33.3782983	C
0.00009875	7550.	76451952.	15.2964090	0.0015105	-0.001452	3.8285119	33.9251538	C
0.0001013	7629.	75346617.	15.1910043	0.0015381	-0.001499	3.8515610	34.4745251	C
0.0001038	7706.	74279158.	15.0897771	0.0015656	-0.001547	3.8728766	35.0211798	C
0.0001063	7783.	73249736.	14.9929751	0.0015930	-0.001594	3.8925159	-35.610083	C
0.0001088	7858.	72261337.	14.9014356	0.0016205	-0.001642	3.9105643	-36.736660	C
0.0001113	7933.	71306223.	14.8137169	0.0016480	-0.001689	3.9269363	-37.864183	C
0.0001138	8006.	70380275.	14.7291166	0.0016754	-0.001737	3.9416116	-38.994139	C
0.0001163	8078.	69488223.	14.6489325	0.0017029	-0.001785	3.9546842	-40.121474	C
0.0001188	8150.	68627833.	14.5728954	0.0017305	-0.001832	3.9661381	-41.246154	C
0.0001213	8220.	67790591.	14.4990892	0.0017580	-0.001879	3.9758902	-42.374015	C
0.0001238	8289.	66978675.	14.4282774	0.0017855	-0.001927	3.9839904	-43.501833	C
0.0001263	8357.	66193337.	14.3610174	0.0018131	-0.001974	3.9904577	-44.626915	C
0.0001288	8424.	65432942.	14.2971129	0.0018408	-0.002022	3.9952750	-45.749219	C
0.0001313	8491.	64694289.	14.2358753	0.0018685	-0.002069	3.9984191	-46.870639	C
0.0001338	8556.	63972301.	14.1759826	0.0018960	-0.002116	3.9998808	-47.995720	C
0.0001363	8621.	63271040.	14.1190614	0.0019237	-0.002164	3.9993599	-49.117746	C
0.0001388	8684.	62588310.	14.0648740	0.0019515	-0.002211	3.9991244	-50.000000	CY
0.0001413	8746.	61915658.	14.0129011	0.0019793	-0.002258	3.9998133	-50.000000	CY
0.0001438	8802.	61232852.	13.9616298	0.0020070	-0.002306	3.9989730	-50.000000	CY
0.0001463	8852.	60527544.	13.9087424	0.0020342	-0.002353	3.9999637	-50.000000	CY
0.0001488	8897.	59813992.	13.8560628	0.0020611	-0.002401	3.9992404	-50.000000	CY
0.0001588	9065.	57102289.	13.6649894	0.0021693	-0.002593	3.9992095	-50.000000	CY
0.0001688	9220.	54639791.	13.4990392	0.0022780	-0.002785	3.9983232	-50.000000	CY
0.0001788	9364.	52383987.	13.3576561	0.0023877	-0.002975	3.9999276	50.000000	CY
0.0001888	9450.	50066193.	13.2115207	0.0024937	-0.003169	3.9978448	50.000000	CY
0.0001988	9491.	47752205.	13.0691211	0.0025975	-0.003365	3.9986931	50.000000	CY
0.0002088	9523.	45618274.	12.9422702	0.0027017	-0.003561	3.9989876	50.000000	CY
0.0002188	9551.	43661299.	12.8312881	0.0028068	-0.003756	3.9989204	50.000000	CY
0.0002288	9576.	41862025.	12.7331386	0.0029127	-0.003950	3.9984398	50.000000	CY
0.0002388	9597.	40197339.	12.6421080	0.0030183	-0.004144	3.9972141	50.000000	CY
0.0002488	9616.	38658187.	12.5617808	0.0031247	-0.004338	3.9977554	50.000000	CY
0.0002588	9633.	37230305.	12.4908845	0.0032320	-0.004530	3.9998189	50.000000	CY
0.0002688	9648.	35900591.	12.4265050	0.0033396	-0.004723	3.9983586	50.000000	CY
0.0002788	9661.	34658795.	12.3663757	0.0034471	-0.004915	3.9956753	50.000000	CY
0.0002888	9673.	33498127.	12.3129041	0.0035554	-0.005107	3.9995455	50.000000	CY
0.0002988	9683.	32410938.	12.2652759	0.0036643	-0.005298	3.9960424	50.000000	CY
0.0003088	9692.	31390776.	12.2226542	0.0037737	-0.005489	3.9998555	50.000000	CY
0.0003188	9692.	30405968.	12.2139701	0.0038932	-0.005669	3.9973002	50.000000	CY

MEG-33 forward abutment X direction row3

Axial Thrust Force = 967.800 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
0.00000125	189.2500043	151400003.	278.6282650	0.0003483	0.0003108	1.3401186	9.9752121	
0.00000250	378.4954793	151398192.	146.8450616	0.0003671	0.0002921	1.4041938	10.3961420	
0.00000375	567.7068020	151388481.	102.9310723	0.0003860	0.0002735	1.4676616	10.8185666	
0.00000500	756.8668932	151373379.	80.9843888	0.0004049	0.0002549	1.5305157	11.2424864	
0.00000625	945.9586689	151353387.	67.8246303	0.0004239	0.0002364	1.5927497	11.6679016	
0.00000750	1135.	151328670.	59.0583371	0.0004429	0.0002179	1.6543570	12.0948132	
0.00000875	1324.	151299298.	52.8025985	0.0004620	0.0001995	1.7153311	12.5232219	
0.00001000	1513.	151265304.	48.1159594	0.0004812	0.0001812	1.7756657	12.9531282	
0.00001125	1701.	151226704.	44.4753900	0.0005003	0.0001628	1.8353541	13.3845335	
0.00001250	1890.	151183508.	41.5670724	0.0005196	0.0001446	1.8943899	13.8174388	
0.00001375	2078.	151135718.	39.1913048	0.0005389	0.0001264	1.9527666	14.2518453	
0.00001500	2266.	151083336.	37.2149532	0.0005582	0.0001082	2.0104777	14.6877547	
0.00001625	2454.	151026360.	35.5458478	0.0005776	0.00009012	2.0675165	15.1251683	
0.00001750	2642.	150964787.	34.1181537	0.0005971	0.00007207	2.1238767	15.5640880	
0.00001875	2829.	150898614.	32.8835919	0.0006166	0.00005407	2.1795515	16.0045156	
0.00002000	3017.	150827836.	31.8059536	0.0006361	0.00003612	2.2345345	16.4464531	
0.00002125	3203.	150752448.	30.8575499	0.0006557	0.00001822	2.2888190	16.8899027	
0.00002250	3390.	150672443.	30.0168452	0.0006754	3.79016E-07	2.3423984	17.3348665	
0.00002375	3576.	150587380.	29.2668262	0.0006951	-0.00001741	2.3952654	17.7813391	
0.00002500	3762.	150494303.	28.5938104	0.0007148	-0.00003515	2.4474077	18.2292626	
0.00002625	3948.	150389382.	27.9866757	0.0007347	-0.00005285	2.4988106	18.6785444	
0.00002750	4132.	150269636.	27.4363191	0.0007545	-0.00007050	2.5494595	19.1290895	
0.00002875	4316.	150133064.	26.9352279	0.0007744	-0.00008811	2.5993408	19.5808088	
0.00003000	4499.	149978526.	26.4771526	0.0007943	-0.000106	2.6484425	20.0336228	
0.00003125	4528.	144902518.	25.9058409	0.0008096	-0.000128	2.6853042	20.3506059	C
0.00003250	4663.	143478308.	25.4773831	0.0008280	-0.000147	2.7293516	20.7608086	C
0.00003375	4793.	142002808.	25.0762057	0.0008463	-0.000166	2.7722952	21.1666489	C
0.00003500	4916.	140468799.	24.6986024	0.0008645	-0.000186	2.8140899	21.5673315	C
0.00003625	5035.	138900480.	24.3426144	0.0008824	-0.000205	2.8547966	21.9633610	C
0.00003750	5149.	137314925.	24.0064406	0.0009002	-0.000225	2.8944649	22.3551293	C
0.00003875	5259.	135720450.	23.6882613	0.0009179	-0.000245	2.9331205	22.7427462	C
0.00004000	5365.	134124532.	23.3865115	0.0009355	-0.000265	2.9707908	23.1263534	C

MEG-33 forward abutment X direction row3

0.00004125	5467.	132535284.	23.0999136	0.0009529	-0.000285	3.0075107	23.5062093	C
0.00004250	5566.	130961450.	22.8274494	0.0009702	-0.000305	3.0433235	23.8827065	C
0.00004375	5662.	129409686.	22.5681931	0.0009874	-0.000325	3.0782679	24.2562076	C
0.00004500	5755.	127883985.	22.3212511	0.0010045	-0.000346	3.1123743	24.6269828	C
0.00004625	5845.	126377222.	22.0852332	0.0010214	-0.000366	3.1456180	24.9945067	C
0.00004750	5932.	124888793.	21.8591887	0.0010383	-0.000387	3.1780037	25.3586575	C
0.00004875	6017.	123430471.	21.6430327	0.0010551	-0.000407	3.2096071	25.7204001	C
0.00005125	6180.	120591992.	21.2370073	0.0010884	-0.000449	3.2704593	26.4359398	C
0.00005375	6335.	117866669.	20.8628010	0.0011214	-0.000491	3.3283184	27.1422037	C
0.00005625	6482.	115241042.	20.5157254	0.0011540	-0.000533	3.3832130	27.8384648	C
0.00005875	6623.	112723883.	20.1933440	0.0011864	-0.000576	3.4353145	28.5264725	C
0.00006125	6757.	110314404.	19.8931793	0.0012185	-0.000619	3.4847350	29.2071973	C
0.00006375	6886.	108008776.	19.6129882	0.0012503	-0.000662	3.5315625	29.8813245	C
0.00006625	7009.	105803288.	19.3509008	0.0012820	-0.000706	3.5758814	30.5496056	C
0.00006875	7128.	103682214.	19.1042070	0.0013134	-0.000749	3.6176677	31.2105753	C
0.00007125	7243.	101652323.	18.8724340	0.0013447	-0.000793	3.6570759	31.8666043	C
0.00007375	7354.	99711210.	18.6545546	0.0013758	-0.000837	3.6941839	32.5187414	C
0.00007625	7462.	97856473.	18.4497399	0.0014068	-0.000881	3.7290646	33.1681748	C
0.00007875	7565.	96062412.	18.2546756	0.0014376	-0.000925	3.7615686	33.8101775	C
0.00008125	7666.	94348771.	18.0710452	0.0014683	-0.000969	3.7919516	34.4508380	C
0.00008375	7764.	92703323.	17.8972196	0.0014989	-0.001014	3.8201774	35.0886847	C
0.00008625	7859.	91116530.	17.7317246	0.0015294	-0.001058	3.8462212	35.7221634	C
0.00008875	7952.	89598097.	17.5756429	0.0015598	-0.001103	3.8702348	36.3558735	C
0.00009125	8042.	88126710.	17.4260256	0.0015901	-0.001147	3.8920783	36.9840579	C
0.00009375	8130.	86717991.	17.2849223	0.0016205	-0.001192	3.9119417	37.6136953	C
0.00009625	8215.	85352527.	17.1495272	0.0016506	-0.001237	3.9296988	38.2388055	C
0.00009875	8299.	84039473.	17.0211869	0.0016808	-0.001282	3.9454683	38.8644867	C
0.0001013	8381.	82771822.	16.8988304	0.0017110	-0.001326	3.9592224	39.4891284	C
0.0001038	8460.	81542880.	16.7814596	0.0017411	-0.001371	3.9709470	40.1110293	C
0.0001063	8538.	80362198.	16.6706975	0.0017713	-0.001416	3.9807229	40.7362744	C
0.0001088	8614.	79211433.	16.5634749	0.0018013	-0.001461	3.9884623	41.3566218	C
0.0001113	8689.	78099804.	16.4615056	0.0018313	-0.001506	3.9942341	41.9783702	C
0.0001138	8762.	77027995.	16.3650587	0.0018615	-0.001551	3.9980350	42.6035501	C
0.0001163	8833.	75980648.	16.2712869	0.0018915	-0.001596	3.9998335	43.2237637	C
0.0001188	8902.	74965780.	16.1820507	0.0019216	-0.001641	3.9996321	43.8460000	C
0.0001213	8970.	73983242.	16.0975717	0.0019518	-0.001686	3.9992760	44.4720242	C
0.0001238	9037.	73025971.	16.0164541	0.0019820	-0.001730	3.9990742	45.0978626	C
0.0001263	9101.	72090197.	15.9380657	0.0020122	-0.001775	3.9999502	45.7219308	C
0.0001288	9165.	71181840.	15.8637730	0.0020425	-0.001820	3.9996509	46.3499254	C
0.0001313	9227.	70299877.	15.7933026	0.0020729	-0.001865	3.9989907	46.9816940	C

MEG-33 forward abutment X direction row3

0.0001338	9288.	69439575.	15.7255773	0.0021033	-0.001909	3.9999849	47.6138952	C
0.0001363	9346.	68596955.	15.6598220	0.0021337	-0.001954	3.9996232	48.2440589	C
0.0001388	9404.	67778080.	15.5973128	0.0021641	-0.001998	3.9986750	48.8777498	C
0.0001413	9461.	66981140.	15.5379338	0.0021947	-0.002043	3.9999017	49.5151991	C
0.0001438	9517.	66204862.	15.4815484	0.0022255	-0.002087	3.9991584	50.0000000	CY
0.0001463	9571.	65445599.	15.4271869	0.0022562	-0.002131	3.9999900	50.0000000	CY
0.0001488	9624.	64699436.	15.3746880	0.0022870	-0.002176	3.9993937	50.0000000	CY
0.0001588	9814.	61818368.	15.1926204	0.0024118	-0.002351	3.9994494	50.0000000	CY
0.0001688	9945.	58933395.	15.0276317	0.0025359	-0.002527	3.9987160	50.0000000	CY
0.0001788	10054.	56246253.	14.8836571	0.0026605	-0.002702	3.9999872	50.0000000	CY
0.0001888	10154.	53794428.	14.7592471	0.0027858	-0.002877	3.9986404	50.0000000	CY
0.0001988	10246.	51553357.	14.6533758	0.0029124	-0.003050	3.9996616	50.0000000	CY
0.0002088	10321.	49443626.	14.5568590	0.0030387	-0.003224	3.9999583	50.0000000	CY
0.0002188	10361.	47365590.	14.4505506	0.0031611	-0.003401	3.9999730	50.0000000	CY
0.0002288	10376.	45361098.	14.3438581	0.0032812	-0.003581	3.9998401	50.0000000	CY
0.0002388	10387.	43507000.	14.2517558	0.0034026	-0.003760	3.9993738	50.0000000	CY
0.0002488	10390.	41769393.	14.1712586	0.0035251	-0.003937	3.9981802	50.0000000	CY
0.0002588	10390.	40155117.	14.1044718	0.0036495	-0.004113	3.9958269	50.0000000	CY
0.0002688	10390.	38660973.	14.0502870	0.0037760	-0.004286	3.9999725	50.0000000	CY
0.0002788	10390.	37274033.	14.1016728	0.0039308	-0.004432	3.9999798	50.0000000	CY

 Summary of Results for Nominal Moment Capacity for Section 1

Moment values interpolated at maximum compressive strain = 0.003
 or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain	Max. Tens. Strain
1	751.800	9593.444	0.00300000	-0.00411050
2	967.800	10298.326	0.00300000	-0.00317053

Note that the values of moment capacity in the table above are not factored by a strength reduction factor (phi-factor).

In ACI 318, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.75).

MEG-33 forward abutment X direction row3

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318, or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Load No.	Resist. Factor	Nominal Ax. Thrust kips	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in ²
1	0.65	751.800000	9593.	488.670000	6236.	98902695.
2	0.65	967.800000	10298.	629.070000	6694.	111442505.
1	0.75	751.800000	9593.	563.850000	7195.	81763662.
2	0.75	967.800000	10298.	725.850000	7724.	93377145.
1	0.90	751.800000	9593.	676.620000	8634.	63126631.
2	0.90	967.800000	10298.	871.020000	9268.	69709634.

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 1

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 3540.0 lbs
 Applied moment at pile head = 1490400.0 in-lbs
 Axial thrust load on pile head = 751800.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in ²	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch

MEG-33 forward abutment X direction row3

0.00	5.78E-04	1490400.	3540.	-1.03E-04	0.00	1.58E+11	-22788.	2.37E+07	0.00
0.10000	4.62E-04	1478328.	-21636.	-9.13E-05	0.00	1.58E+11	-19173.	4.98E+07	0.00
0.2000	3.59E-04	1438637.	-42533.	-8.03E-05	0.00	1.58E+11	-15655.	5.23E+07	0.00
0.3000	2.69E-04	1376393.	-59309.	-6.96E-05	0.00	1.58E+11	-12304.	5.49E+07	0.00
0.4000	1.92E-04	1296422.	-72196.	-5.95E-05	0.00	1.58E+11	-9174.	5.74E+07	0.00
0.5000	1.26E-04	1203231.	-81485.	-5.00E-05	0.00	1.58E+11	-6308.	5.99E+07	0.00
0.6000	7.18E-05	1100948.	-87511.	-4.13E-05	0.00	1.58E+11	-3736.	6.24E+07	0.00
0.7000	2.73E-05	993278.	-90639.	-3.33E-05	0.00	1.58E+11	-1477.	6.50E+07	0.00
0.8000	-8.19E-06	883474.	-91249.	-2.62E-05	0.00	1.58E+11	460.6530	6.75E+07	0.00
0.9000	-3.56E-05	774328.	-89725.	-1.99E-05	0.00	1.58E+11	2079.	7.00E+07	0.00
1.0000	-5.60E-05	668169.	-86446.	-1.45E-05	0.00	1.58E+11	3387.	7.25E+07	0.00
1.1000	-7.04E-05	566884.	-81773.	-9.79E-06	0.00	1.58E+11	4401.	7.51E+07	0.00
1.2000	-7.95E-05	471932.	-76047.	-5.85E-06	0.00	1.58E+11	5142.	7.76E+07	0.00
1.3000	-8.44E-05	384381.	-69582.	-2.61E-06	0.00	1.58E+11	5635.	8.01E+07	0.00
1.4000	-8.58E-05	304941.	-62656.	2.01E-09	0.00	1.58E+11	5907.	8.26E+07	0.00
1.5000	-8.44E-05	234005.	-55518.	2.04E-06	0.00	1.58E+11	5989.	8.51E+07	0.00
1.6000	-8.09E-05	171693.	-48379.	3.58E-06	0.00	1.58E+11	5910.	8.77E+07	0.00
1.7000	-7.58E-05	117889.	-41414.	4.68E-06	0.00	1.58E+11	5698.	9.02E+07	0.00
1.8000	-6.97E-05	72290.	-34766.	5.40E-06	0.00	1.58E+11	5382.	9.27E+07	0.00
1.9000	-6.29E-05	34441.	-28543.	5.80E-06	0.00	1.58E+11	4989.	9.52E+07	0.00
2.0000	-5.57E-05	3775.	-22826.	5.95E-06	0.00	1.58E+11	4541.	9.78E+07	0.00
2.1000	-4.86E-05	-20352.	-17665.	5.89E-06	0.00	1.58E+11	4060.	1.00E+08	0.00
2.2000	-4.16E-05	-38633.	-13091.	5.66E-06	0.00	1.58E+11	3565.	1.03E+08	0.00
2.3000	-3.50E-05	-51780.	-9109.	5.32E-06	0.00	1.58E+11	3072.	1.05E+08	0.00
2.4000	-2.88E-05	-60503.	-5710.	4.89E-06	0.00	1.58E+11	2593.	1.08E+08	0.00
2.5000	-2.32E-05	-65493.	-2871.	4.42E-06	0.00	1.58E+11	2138.	1.10E+08	0.00
2.6000	-1.82E-05	-67402.	-558.355	3.91E-06	0.00	1.58E+11	1717.	1.13E+08	0.00
2.7000	-1.39E-05	-66840.	1271.	3.40E-06	0.00	1.58E+11	1333.	1.15E+08	0.00
2.8000	-1.01E-05	-64357.	2665.	2.91E-06	0.00	1.58E+11	990.4538	1.18E+08	0.00
2.9000	-6.88E-06	-60448.	3674.	2.43E-06	0.00	1.58E+11	690.8046	1.20E+08	0.00
3.0000	-4.23E-06	-55543.	4349.	1.99E-06	0.00	1.58E+11	434.0513	1.23E+08	0.00
3.1000	-2.09E-06	-50013.	4741.	1.59E-06	0.00	1.58E+11	218.9961	1.26E+08	0.00
3.2000	-4.07E-07	-44168.	4898.	1.24E-06	0.00	1.58E+11	43.4596	1.28E+08	0.00
3.3000	8.78E-07	-38259.	4867.	9.26E-07	0.00	1.58E+11	-95.473	1.31E+08	0.00
3.4000	1.81E-06	-32488.	4689.	6.58E-07	0.00	1.58E+11	-201.227	1.33E+08	0.00
3.5000	2.46E-06	-27006.	4402.	4.32E-07	0.00	1.58E+11	-277.539	1.36E+08	0.00
3.6000	2.85E-06	-21924.	4038.	2.47E-07	0.00	1.58E+11	-328.281	1.38E+08	0.00
3.7000	3.05E-06	-17314.	3627.	9.83E-08	0.00	1.58E+11	-357.323	1.41E+08	0.00
3.8000	3.09E-06	-13219.	3192.	-1.74E-08	0.00	1.58E+11	-368.408	1.43E+08	0.00
3.9000	3.01E-06	-9654.	2752.	-1.04E-07	0.00	1.58E+11	-365.064	1.46E+08	0.00

MEG-33 forward abutment X direction row3

4.0000	2.84E-06	-6615.	2322.	-1.66E-07	0.00	1.58E+11	-350.537	1.48E+08	0.00
4.1000	2.61E-06	-4081.	1915.	-2.06E-07	0.00	1.58E+11	-327.743	1.51E+08	0.00
4.2000	2.34E-06	-2018.	1539.	-2.29E-07	0.00	1.58E+11	-299.248	1.53E+08	0.00
4.3000	2.06E-06	-386.324	1199.	-2.38E-07	0.00	1.58E+11	-267.253	1.56E+08	0.00
4.4000	1.77E-06	860.4840	898.6680	-2.37E-07	0.00	1.58E+11	-233.598	1.58E+08	0.00
4.5000	1.49E-06	1771.	638.6407	-2.27E-07	0.00	1.58E+11	-199.781	1.61E+08	0.00
4.6000	1.23E-06	2394.	418.5851	-2.11E-07	0.00	1.58E+11	-166.978	1.63E+08	0.00
4.7000	9.84E-07	2776.	236.7533	-1.91E-07	0.00	1.58E+11	-136.075	1.66E+08	0.00
4.8000	7.67E-07	2962.	90.4921	-1.70E-07	0.00	1.58E+11	-107.694	1.68E+08	0.00
4.9000	5.77E-07	2993.	-23.467	-1.47E-07	0.00	1.58E+11	-82.238	1.71E+08	0.00
5.0000	4.15E-07	2906.	-108.761	-1.25E-07	0.00	1.58E+11	-59.917	1.73E+08	0.00
5.1000	2.78E-07	2733.	-169.183	-1.03E-07	0.00	1.58E+11	-40.787	1.76E+08	0.00
5.2000	1.67E-07	2500.	-208.522	-8.35E-08	0.00	1.58E+11	-24.778	1.78E+08	0.00
5.3000	7.78E-08	2232.	-230.428	-6.56E-08	0.00	1.58E+11	-11.731	1.81E+08	0.00
5.4000	9.24E-09	1947.	-238.314	-4.97E-08	0.00	1.58E+11	-1.414	1.84E+08	0.00
5.5000	-4.16E-08	1660.	-235.295	-3.61E-08	0.00	1.58E+11	6.4457	1.86E+08	0.00
5.6000	-7.73E-08	1383.	-224.140	-2.45E-08	0.00	1.58E+11	12.1460	1.89E+08	0.00
5.7000	-1.00E-07	1123.	-207.256	-1.50E-08	0.00	1.58E+11	15.9942	1.91E+08	0.00
5.8000	-1.13E-07	885.3371	-186.684	-7.43E-09	0.00	1.58E+11	18.2927	1.94E+08	0.00
5.9000	-1.18E-07	674.4912	-164.110	-1.52E-09	0.00	1.58E+11	19.3297	1.96E+08	0.00
6.0000	-1.17E-07	491.4755	-140.889	2.90E-09	0.00	1.58E+11	19.3719	1.99E+08	0.00
6.1000	-1.11E-07	336.3519	-118.070	6.04E-09	0.00	1.58E+11	18.6595	2.01E+08	0.00
6.2000	-1.03E-07	208.0957	-96.432	8.10E-09	0.00	1.58E+11	17.4038	2.04E+08	0.00
6.3000	-9.18E-08	104.8996	-76.518	9.29E-09	0.00	1.58E+11	15.7861	2.06E+08	0.00
6.4000	-8.02E-08	24.4347	-58.672	9.78E-09	0.00	1.58E+11	13.9575	2.09E+08	0.00
6.5000	-6.84E-08	-35.931	-43.073	9.73E-09	0.00	1.58E+11	12.0410	2.11E+08	0.00
6.6000	-5.69E-08	-78.958	-29.769	9.30E-09	0.00	1.58E+11	10.1329	2.14E+08	0.00
6.7000	-4.61E-08	-107.393	-18.706	8.59E-09	0.00	1.58E+11	8.3058	2.16E+08	0.00
6.8000	-3.62E-08	-123.867	-9.755	7.72E-09	0.00	1.58E+11	6.6114	2.19E+08	0.00
6.9000	-2.76E-08	-130.820	-2.738	6.75E-09	0.00	1.58E+11	5.0835	2.21E+08	0.00
7.0000	-2.00E-08	-130.452	2.5562	5.76E-09	0.00	1.58E+11	3.7409	2.24E+08	0.00
7.1000	-1.37E-08	-124.696	6.3551	4.79E-09	0.00	1.58E+11	2.5907	2.26E+08	0.00
7.2000	-8.54E-09	-115.208	8.8876	3.88E-09	0.00	1.58E+11	1.6302	2.29E+08	0.00
7.3000	-4.41E-09	-103.373	10.3757	3.06E-09	0.00	1.58E+11	0.8499	2.31E+08	0.00
7.4000	-1.21E-09	-90.312	11.0270	2.32E-09	0.00	1.58E+11	0.2356	2.34E+08	0.00
7.5000	1.17E-09	-76.912	11.0301	1.69E-09	0.00	1.58E+11	-0.230	2.37E+08	0.00
7.6000	2.85E-09	-63.843	10.5553	1.16E-09	0.00	1.58E+11	-0.561	2.37E+08	0.00
7.7000	3.94E-09	-51.581	9.7524	7.19E-10	0.00	1.58E+11	-0.777	2.37E+08	0.00
7.8000	4.57E-09	-40.439	8.7455	3.70E-10	0.00	1.58E+11	-0.901	2.37E+08	0.00
7.9000	4.83E-09	-30.593	7.6336	1.01E-10	0.00	1.58E+11	-0.952	2.37E+08	0.00

MEG-33 forward abutment X direction row3

8.0000	4.81E-09	-22.118	6.4930	-9.87E-11	0.00	1.58E+11	-0.949	2.37E+08	0.00
8.1000	4.59E-09	-15.010	5.3804	-2.39E-10	0.00	1.58E+11	-0.906	2.37E+08	0.00
8.2000	4.24E-09	-9.205	4.3358	-3.31E-10	0.00	1.58E+11	-0.835	2.37E+08	0.00
8.3000	3.80E-09	-4.603	3.3852	-3.83E-10	0.00	1.58E+11	-0.749	2.37E+08	0.00
8.4000	3.32E-09	-1.080	2.5434	-4.05E-10	0.00	1.58E+11	-0.654	2.37E+08	0.00
8.5000	2.83E-09	1.5017	1.8166	-4.03E-10	0.00	1.58E+11	-0.557	2.37E+08	0.00
8.6000	2.35E-09	3.2807	1.2042	-3.85E-10	0.00	1.58E+11	-0.463	2.37E+08	0.00
8.7000	1.90E-09	4.3925	0.7012	-3.56E-10	0.00	1.58E+11	-0.375	2.37E+08	0.00
8.8000	1.50E-09	4.9643	0.2993	-3.21E-10	0.00	1.58E+11	-0.295	2.37E+08	0.00
8.9000	1.13E-09	5.1115	-0.01150	-2.83E-10	0.00	1.58E+11	-0.223	2.37E+08	0.00
9.0000	8.17E-10	4.9372	-0.242	-2.45E-10	0.00	1.58E+11	-0.161	2.37E+08	0.00
9.1000	5.46E-10	4.5308	-0.403	-2.09E-10	0.00	1.58E+11	-0.108	2.37E+08	0.00
9.2000	3.16E-10	3.9695	-0.505	-1.76E-10	0.00	1.58E+11	-0.06237	2.37E+08	0.00
9.3000	1.23E-10	3.3182	-0.557	-1.49E-10	0.00	1.58E+11	-0.02420	2.37E+08	0.00
9.4000	-4.07E-11	2.6321	-0.567	-1.26E-10	0.00	1.58E+11	0.00803	2.37E+08	0.00
9.5000	-1.80E-10	1.9576	-0.541	-1.09E-10	0.00	1.58E+11	0.03554	2.37E+08	0.00
9.6000	-3.02E-10	1.3342	-0.484	-9.64E-11	0.00	1.58E+11	0.05954	2.37E+08	0.00
9.7000	-4.12E-10	0.7965	-0.399	-8.84E-11	0.00	1.58E+11	0.08115	2.37E+08	0.00
9.8000	-5.14E-10	0.3757	-0.290	-8.39E-11	0.00	1.58E+11	0.1013	2.37E+08	0.00
9.9000	-6.13E-10	0.1009	-0.157	-8.21E-11	0.00	1.58E+11	0.1208	2.37E+08	0.00
10.0000	-7.11E-10	0.00	0.00	-8.17E-11	0.00	1.58E+11	0.1402	1.18E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 1:

Pile-head deflection = 0.00057808 inches
 Computed slope at pile head = -0.0001026 radians
 Maximum bending moment = 1490400. inch-lbs
 Maximum shear force = -91249. lbs
 Depth of maximum bending moment = 0.000000 feet below pile head
 Depth of maximum shear force = 0.80000000 feet below pile head
 Number of iterations = 6
 Number of zero deflection points = 5

MEG-33 forward abutment X direction row3

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 2

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 4770.0 lbs
 Applied moment at pile head = 2012400.0 in-lbs
 Axial thrust load on pile head = 967800.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	8.88E-04	2012400.	4770.	-1.51E-04	0.00	1.51E+11	-18555.	1.25E+07	0.00
0.10000	7.16E-04	2004931.	-17503.	-1.35E-04	0.00	1.51E+11	-18566.	3.11E+07	0.00
0.2000	5.63E-04	1970708.	-43370.	-1.20E-04	0.00	1.51E+11	-24545.	5.23E+07	0.00
0.3000	4.29E-04	1901122.	-69854.	-1.04E-04	0.00	1.51E+11	-19595.	5.49E+07	0.00
0.4000	3.13E-04	1803301.	-90579.	-8.95E-05	0.00	1.51E+11	-14947.	5.74E+07	0.00
0.5000	2.14E-04	1683940.	-105949.	-7.57E-05	0.00	1.51E+11	-10669.	5.99E+07	0.00
0.6000	1.31E-04	1549201.	-116436.	-6.29E-05	0.00	1.51E+11	-6810.	6.24E+07	0.00
0.7000	6.28E-05	1404641.	-122562.	-5.11E-05	0.00	1.51E+11	-3400.	6.50E+07	0.00
0.8000	8.13E-06	1255172.	-124876.	-4.06E-05	0.00	1.51E+11	-456.989	6.75E+07	0.00
0.9000	-3.46E-05	1105033.	-123939.	-3.12E-05	0.00	1.51E+11	2019.	7.00E+07	0.00
1.0000	-6.68E-05	957792.	-120303.	-2.31E-05	0.00	1.51E+11	4040.	7.25E+07	0.00
1.1000	-9.00E-05	816360.	-114503.	-1.60E-05	0.00	1.51E+11	5626.	7.51E+07	0.00
1.2000	-1.05E-04	683021.	-107043.	-1.01E-05	0.00	1.51E+11	6807.	7.76E+07	0.00
1.3000	-1.14E-04	559479.	-98387.	-5.16E-06	0.00	1.51E+11	7619.	8.01E+07	0.00
1.4000	-1.18E-04	446904.	-88955.	-1.17E-06	0.00	1.51E+11	8102.	8.26E+07	0.00
1.5000	-1.17E-04	345991.	-79115.	1.97E-06	0.00	1.51E+11	8298.	8.51E+07	0.00
1.6000	-1.13E-04	257024.	-69185.	4.36E-06	0.00	1.51E+11	8251.	8.77E+07	0.00
1.7000	-1.06E-04	179935.	-59434.	6.10E-06	0.00	1.51E+11	8002.	9.02E+07	0.00
1.8000	-9.83E-05	114369.	-50075.	7.26E-06	0.00	1.51E+11	7595.	9.27E+07	0.00
1.9000	-8.90E-05	59738.	-41278.	7.95E-06	0.00	1.51E+11	7067.	9.52E+07	0.00
2.0000	-7.92E-05	15283.	-33166.	8.25E-06	0.00	1.51E+11	6453.	9.78E+07	0.00
2.1000	-6.92E-05	-19880.	-25822.	8.23E-06	0.00	1.51E+11	5787.	1.00E+08	0.00

MEG-33 forward abutment X direction row3

2.2000	-5.95E-05	-46709.	-19294.	7.97E-06	0.00	1.51E+11	5094.	1.03E+08	0.00
2.3000	-5.01E-05	-66203.	-13598.	7.52E-06	0.00	1.51E+11	4399.	1.05E+08	0.00
2.4000	-4.14E-05	-79362.	-8725.	6.94E-06	0.00	1.51E+11	3722.	1.08E+08	0.00
2.5000	-3.35E-05	-87161.	-4646.	6.28E-06	0.00	1.51E+11	3077.	1.10E+08	0.00
2.6000	-2.63E-05	-90527.	-1313.	5.58E-06	0.00	1.51E+11	2477.	1.13E+08	0.00
2.7000	-2.01E-05	-90326.	1331.	4.86E-06	0.00	1.51E+11	1930.	1.15E+08	0.00
2.8000	-1.47E-05	-87344.	3353.	4.16E-06	0.00	1.51E+11	1441.	1.18E+08	0.00
2.9000	-1.01E-05	-82288.	4825.	3.49E-06	0.00	1.51E+11	1012.	1.20E+08	0.00
3.0000	-6.29E-06	-75772.	5819.	2.86E-06	0.00	1.51E+11	644.9051	1.23E+08	0.00
3.1000	-3.22E-06	-68328.	6409.	2.29E-06	0.00	1.51E+11	336.8831	1.26E+08	0.00
3.2000	-7.99E-07	-60397.	6662.	1.78E-06	0.00	1.51E+11	85.2867	1.28E+08	0.00
3.3000	1.05E-06	-52343.	6645.	1.33E-06	0.00	1.51E+11	-113.992	1.31E+08	0.00
3.4000	2.40E-06	-44453.	6417.	9.48E-07	0.00	1.51E+11	-265.825	1.33E+08	0.00
3.5000	3.32E-06	-36945.	6032.	6.26E-07	0.00	1.51E+11	-375.552	1.36E+08	0.00
3.6000	3.90E-06	-29978.	5537.	3.60E-07	0.00	1.51E+11	-448.727	1.38E+08	0.00
3.7000	4.19E-06	-23657.	4974.	1.48E-07	0.00	1.51E+11	-490.901	1.41E+08	0.00
3.8000	4.25E-06	-18042.	4375.	-1.74E-08	0.00	1.51E+11	-507.448	1.43E+08	0.00
3.9000	4.15E-06	-13158.	3768.	-1.41E-07	0.00	1.51E+11	-503.433	1.46E+08	0.00
4.0000	3.91E-06	-8998.	3176.	-2.29E-07	0.00	1.51E+11	-483.511	1.48E+08	0.00
4.1000	3.60E-06	-5535.	2615.	-2.86E-07	0.00	1.51E+11	-451.864	1.51E+08	0.00
4.2000	3.23E-06	-2723.	2096.	-3.19E-07	0.00	1.51E+11	-412.158	1.53E+08	0.00
4.3000	2.83E-06	-503.467	1628.	-3.32E-07	0.00	1.51E+11	-367.534	1.56E+08	0.00
4.4000	2.43E-06	1186.	1216.	-3.29E-07	0.00	1.51E+11	-320.614	1.58E+08	0.00
4.5000	2.04E-06	2415.	859.0263	-3.15E-07	0.00	1.51E+11	-273.520	1.61E+08	0.00
4.6000	1.67E-06	3249.	558.1653	-2.93E-07	0.00	1.51E+11	-227.915	1.63E+08	0.00
4.7000	1.34E-06	3755.	310.3923	-2.65E-07	0.00	1.51E+11	-185.040	1.66E+08	0.00
4.8000	1.04E-06	3994.	111.9087	-2.34E-07	0.00	1.51E+11	-145.766	1.68E+08	0.00
4.9000	7.77E-07	4024.	-41.936	-2.02E-07	0.00	1.51E+11	-110.642	1.71E+08	0.00
5.0000	5.53E-07	3894.	-156.290	-1.71E-07	0.00	1.51E+11	-79.948	1.73E+08	0.00
5.1000	3.67E-07	3649.	-236.506	-1.41E-07	0.00	1.51E+11	-53.746	1.76E+08	0.00
5.2000	2.15E-07	3327.	-287.906	-1.13E-07	0.00	1.51E+11	-31.921	1.78E+08	0.00
5.3000	9.43E-08	2959.	-315.597	-8.85E-08	0.00	1.51E+11	-14.231	1.81E+08	0.00
5.4000	2.22E-09	2570.	-324.339	-6.66E-08	0.00	1.51E+11	-0.339	1.84E+08	0.00
5.5000	-6.55E-08	2180.	-318.452	-4.78E-08	0.00	1.51E+11	10.1508	1.86E+08	0.00
5.6000	-1.12E-07	1805.	-301.761	-3.20E-08	0.00	1.51E+11	17.6663	1.89E+08	0.00
5.7000	-1.42E-07	1456.	-277.575	-1.90E-08	0.00	1.51E+11	22.6444	1.91E+08	0.00
5.8000	-1.58E-07	1139.	-248.680	-8.76E-09	0.00	1.51E+11	25.5130	1.94E+08	0.00
5.9000	-1.63E-07	859.2811	-217.366	-8.35E-10	0.00	1.51E+11	26.6773	1.96E+08	0.00
6.0000	-1.60E-07	617.6463	-185.454	5.02E-09	0.00	1.51E+11	26.5098	1.99E+08	0.00
6.1000	-1.51E-07	414.1798	-154.342	9.11E-09	0.00	1.51E+11	25.3443	2.01E+08	0.00

MEG-33 forward abutment X direction row3

6.2000	-1.38E-07	247.2054	-125.051	1.17E-08	0.00	1.51E+11	23.4725	2.04E+08	0.00
6.3000	-1.23E-07	114.0291	-98.283	1.32E-08	0.00	1.51E+11	21.1422	2.06E+08	0.00
6.4000	-1.07E-07	11.2965	-74.462	1.37E-08	0.00	1.51E+11	18.5592	2.09E+08	0.00
6.5000	-9.02E-08	-64.711	-53.793	1.34E-08	0.00	1.51E+11	15.8886	2.11E+08	0.00
6.6000	-7.44E-08	-117.838	-36.305	1.27E-08	0.00	1.51E+11	13.2585	2.14E+08	0.00
6.7000	-5.97E-08	-151.872	-21.891	1.17E-08	0.00	1.51E+11	10.7639	2.16E+08	0.00
6.8000	-4.64E-08	-170.405	-10.351	1.04E-08	0.00	1.51E+11	8.4710	2.19E+08	0.00
6.9000	-3.48E-08	-176.737	-1.415	9.00E-09	0.00	1.51E+11	6.4212	2.21E+08	0.00
7.0000	-2.48E-08	-173.822	5.2193	7.61E-09	0.00	1.51E+11	4.6362	2.24E+08	0.00
7.1000	-1.65E-08	-164.229	9.8738	6.27E-09	0.00	1.51E+11	3.1213	2.26E+08	0.00
7.2000	-9.80E-09	-150.139	12.8683	5.02E-09	0.00	1.51E+11	1.8695	2.29E+08	0.00
7.3000	-4.48E-09	-133.357	14.5089	3.90E-09	0.00	1.51E+11	0.8648	2.31E+08	0.00
7.4000	-4.36E-10	-115.327	15.0788	2.92E-09	0.00	1.51E+11	0.08503	2.34E+08	0.00
7.5000	2.51E-09	-97.174	14.8325	2.07E-09	0.00	1.51E+11	-0.496	2.37E+08	0.00
7.6000	4.54E-09	-79.734	13.9982	1.37E-09	0.00	1.51E+11	-0.895	2.37E+08	0.00
7.7000	5.81E-09	-63.582	12.7745	8.04E-10	0.00	1.51E+11	-1.145	2.37E+08	0.00
7.8000	6.47E-09	-49.077	11.3226	3.58E-10	0.00	1.51E+11	-1.275	2.37E+08	0.00
7.9000	6.67E-09	-36.408	9.7690	1.91E-11	0.00	1.51E+11	-1.314	2.37E+08	0.00
8.0000	6.52E-09	-25.631	8.2101	-2.27E-10	0.00	1.51E+11	-1.284	2.37E+08	0.00
8.1000	6.12E-09	-16.704	6.7155	-3.95E-10	0.00	1.51E+11	-1.207	2.37E+08	0.00
8.2000	5.57E-09	-9.513	5.3329	-4.98E-10	0.00	1.51E+11	-1.098	2.37E+08	0.00
8.3000	4.93E-09	-3.903	4.0918	-5.52E-10	0.00	1.51E+11	-0.971	2.37E+08	0.00
8.4000	4.25E-09	0.3084	3.0073	-5.66E-10	0.00	1.51E+11	-0.837	2.37E+08	0.00
8.5000	3.57E-09	3.3154	2.0834	-5.52E-10	0.00	1.51E+11	-0.703	2.37E+08	0.00
8.6000	2.92E-09	5.3098	1.3160	-5.17E-10	0.00	1.51E+11	-0.576	2.37E+08	0.00
8.7000	2.33E-09	6.4751	0.6955	-4.71E-10	0.00	1.51E+11	-0.458	2.37E+08	0.00
8.8000	1.79E-09	6.9801	0.2086	-4.17E-10	0.00	1.51E+11	-0.353	2.37E+08	0.00
8.9000	1.32E-09	6.9766	-0.160	-3.62E-10	0.00	1.51E+11	-0.261	2.37E+08	0.00
9.0000	9.23E-10	6.5971	-0.426	-3.08E-10	0.00	1.51E+11	-0.182	2.37E+08	0.00
9.1000	5.84E-10	5.9557	-0.604	-2.58E-10	0.00	1.51E+11	-0.115	2.37E+08	0.00
9.2000	3.03E-10	5.1483	-0.709	-2.14E-10	0.00	1.51E+11	-0.05964	2.37E+08	0.00
9.3000	6.97E-11	4.2550	-0.753	-1.77E-10	0.00	1.51E+11	-0.01374	2.37E+08	0.00
9.4000	-1.23E-10	3.3419	-0.747	-1.47E-10	0.00	1.51E+11	0.02419	2.37E+08	0.00
9.5000	-2.83E-10	2.4635	-0.699	-1.24E-10	0.00	1.51E+11	0.05585	2.37E+08	0.00
9.6000	-4.21E-10	1.6656	-0.615	-1.08E-10	0.00	1.51E+11	0.08289	2.37E+08	0.00
9.7000	-5.42E-10	0.9870	-0.501	-9.72E-11	0.00	1.51E+11	0.1068	2.37E+08	0.00
9.8000	-6.54E-10	0.4622	-0.360	-9.15E-11	0.00	1.51E+11	0.1289	2.37E+08	0.00
9.9000	-7.61E-10	0.1231	-0.193	-8.92E-11	0.00	1.51E+11	0.1501	2.37E+08	0.00
10.0000	-8.68E-10	0.00	0.00	-8.87E-11	0.00	1.51E+11	0.1711	1.18E+08	0.00

MEG-33 forward abutment X direction row3

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 2:

Pile-head deflection = 0.00088753 inches
 Computed slope at pile head = -0.0001513 radians
 Maximum bending moment = 2012400. inch-lbs
 Maximum shear force = -124876. lbs
 Depth of maximum bending moment = 0.000000 feet below pile head
 Depth of maximum shear force = 0.80000000 feet below pile head
 Number of iterations = 6
 Number of zero deflection points = 5

 Summary of Pile-head Responses for Conventional Analyses

Definitions of Pile-head Loading Conditions:

Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs
 Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
 Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.
 Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs
 Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians

Load Case No.	Load Type 1	Pile-head Load 1	Load Type 2	Pile-head Load 2	Axial Loading lbs	Pile-head Deflection inches	Pile-head Rotation radians	Max Shear in Pile lbs	Max Moment in Pile in-lbs
1	V, lb	3540.	M, in-lb	1490400.	751800.	5.78E-04	-1.03E-04	-91249.	1490400.
2	V, lb	4770.	M, in-lb	2012400.	967800.	8.88E-04	-1.51E-04	-124876.	2012400.

Maximum pile-head deflection = 0.0008875285 inches

Maximum pile-head rotation = -0.0001513171 radians = -0.008670 deg.

Summary of Warning Messages

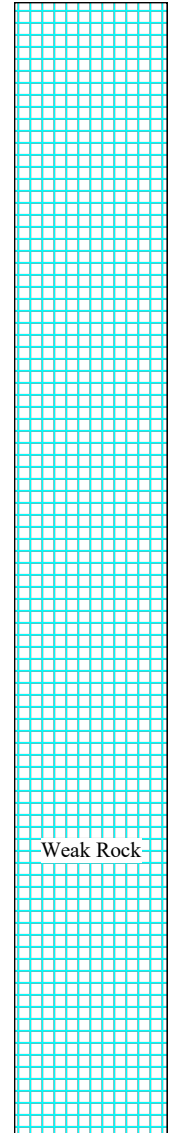
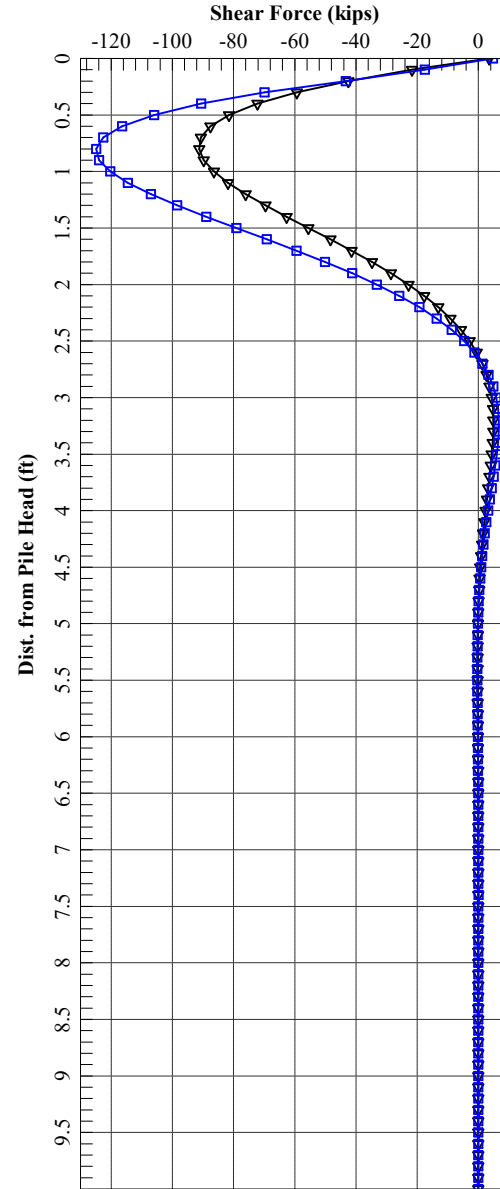
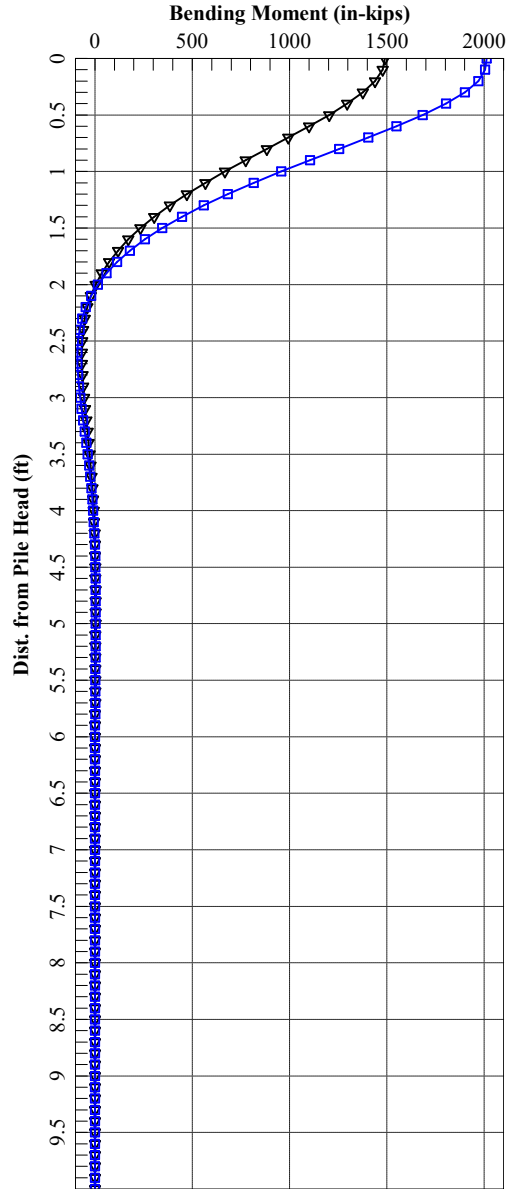
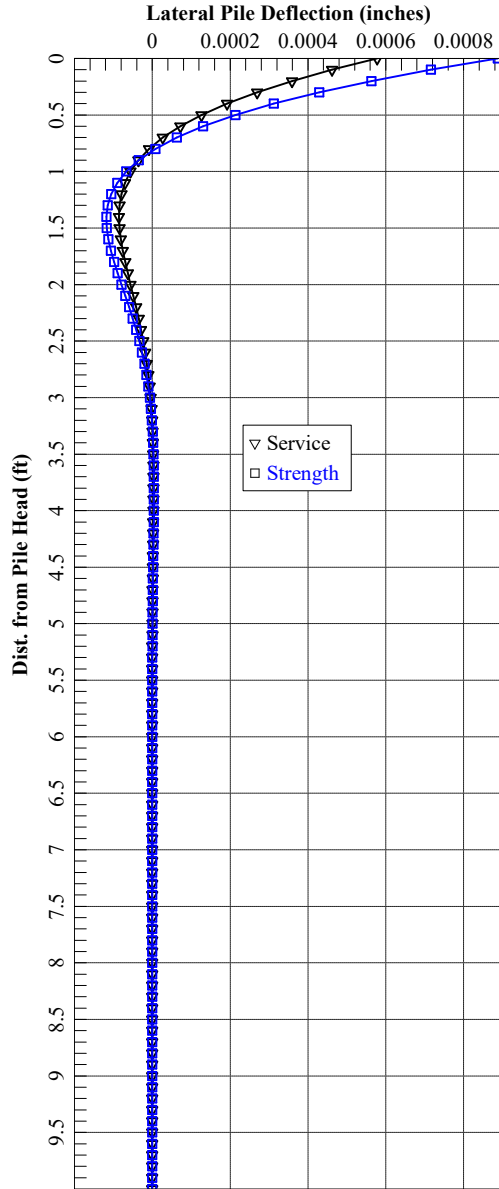
The following warning was reported 706 times

**** Warning ****

An unreasonable input value for unconfined compressive strength has been specified for a soil defined using the weak rock criteria. The input value is greater than 500 psi. Please check your input data for correctness.

The analysis ended normally.

MEG-33 Bowmans Run Bridge Forward Abutment X-Direction Row 3



MEG-33 forward abutment Z direction

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LPile for Windows, Version 2022-12.006

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method
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Files Used for Analysis

Path to file locations:

\\US0247-PPFSS01\shared_projects\173609140\119144\400-Engineering\Geotechnical\Analysis\Lpile\bridges\LPile
Analysis\Bowman's Run\forward Abutment B-003\

Name of input data file:

MEG-33 forward abutment Z direction.lp12d

Name of output report file:

MEG-33 forward abutment Z direction.lp12o

MEG-33 forward abutment Z direction

Name of plot output file:

MEG-33 forward abutment Z direction.lp12p

Name of runtime message file:

MEG-33 forward abutment Z direction.lp12r

Date and Time of Analysis

Date: June 28, 2024

Time: 15:10:14

Problem Title

Project Name: MEG-33-19.21

Job Number: 173609140

Client: ODOT

Engineer: G.Khatri

Description: Forward Abutment Lateral Load Analysis at Bowman's Run

MEG-33 forward abutment Z direction
Program Options and Settings

Computational Options:

- Conventional Analysis

Engineering Units Used for Data Input and Computations:

- US Customary System Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed = 500
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 100.0000 in
- Number of pile increments = 100

Loading Type and Number of Cycles of Loading:

- Static loading specified

- Analysis uses p-y modification factors for p-y curves
- Analysis uses layering correction (Method of Georgiadis)
- No distributed lateral loads are entered
- Loading by lateral soil movements acting on pile not selected
- Input of shear resistance at the pile tip not selected
- Input of moment resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:

- Output files use decimal points to denote decimal symbols.
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1
- No p-y curves to be computed and reported for user-specified depths
- Print using wide report formats

MEG-33 forward abutment Z direction

Number of pile sections defined = 1
Total length of pile = 10.000 ft
Depth of ground surface below top of pile = 0.0000 ft

Pile diameters used for p-y curve computations are defined using 2 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile. A summary of values of pile diameter vs. depth follows.

Point No.	Depth Below Pile Head feet	Pile Diameter inches
1	0.000	30.0000
2	10.000	30.0000

Input Structural Properties for Pile Sections:

Pile Section No. 1:

Section 1 is a round drilled shaft, bored pile, or CIDH pile
Length of section = 10.000000 ft
Shaft Diameter = 30.000000 in

Soil and Rock Layering Information

The soil profile is modelled using 1 layers

Layer 1 is weak rock, p-y criteria by Reese, 1997

Distance from top of pile to top of layer = 0.0000 ft
Distance from top of pile to bottom of layer = 15.000000 ft

MEG-33 forward abutment Z direction

Effective unit weight at top of layer = 87.600000 pcf
 Effective unit weight at bottom of layer = 87.600000 pcf
 Uniaxial compressive strength at top of layer = 4380. psi
 Uniaxial compressive strength at bottom of layer = 4380. psi
 Initial modulus of rock at top of layer = 394200. psi
 Initial modulus of rock at bottom of layer = 394200. psi
 RQD of rock at top of layer = 81.000000 %
 RQD of rock at bottom of layer = 81.000000 %
 k_{rm} of rock at top of layer = 0.0000500
 k_{rm} of rock at bottom of layer = 0.0000500

(Depth of the lowest soil layer extends 5.000 ft below the pile tip)

 Summary of Input Soil Properties

Layer Num.	Soil Type Name (p-y Curve Type)	Layer Depth ft	Effective Unit Wt. pcf	Uniaxial qu psi	RQD %	E50 or k _{rm}	Rock Mass Modulus psi
1	Weak Rock	0.00 15.0000	87.6000 87.6000	4380. 4380.	81.0000 81.0000	5.00E-05 5.00E-05	394200. 394200.

 Modification Factors for p-y Curves

Distribution of p-y modifiers with depth defined using 2 points

Point No.	Depth X ft	p-mult	y-mult
1	0.000	1.0000	1.0000
2	10.000	1.0000	1.0000

MEG-33 forward abutment Z direction

Static Loading Type

Static loading criteria were used when computing p-y curves for all analyses.

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 2

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length	Run Analysis
1	1	V = 63040. lbs	M = 0.0000 in-lbs	751800.	No	Yes
2	1	V = 85100. lbs	M = 0.0000 in-lbs	967800.	No	Yes

V = shear force applied normal to pile axis

M = bending moment applied to pile head

y = lateral deflection normal to pile axis

S = pile slope relative to original pile batter angle

R = rotational stiffness applied to pile head

Values of top y vs. pile lengths can be computed only for load types with specified shear loading (Load Types 1, 2, and 3).

Thrust force is assumed to be acting axially for all pile batter angles.

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

Axial thrust force values were determined from pile-head loading conditions

MEG-33 forward abutment Z direction

Number of Pile Sections Analyzed = 1

Pile Section No. 1:

Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section	=	10.000000	ft
Shaft Diameter	=	30.000000	in
Concrete Cover Thickness (to edge of trans. reinf.)	=	3.000000	in
Number of Reinforcing Bars	=	8	bars
Yield Stress of Reinforcing Bars	=	50000.	psi
Modulus of Elasticity of Reinforcing Bars	=	29000000.	psi
Gross Area of Shaft	=	706.858347	sq. in.
Total Area of Reinforcing Steel	=	8.000000	sq. in.
Area Ratio of Steel Reinforcement	=	1.13	percent
Edge-to-Edge Bar Spacing	=	7.242052	in
Maximum Concrete Aggregate Size	=	0.750000	in
Ratio of Bar Spacing to Aggregate Size	=	9.66	
Offset of Center of Rebar Cage from Center of Pile	=	0.0000	in
Transverse Reinforcement			
Type: Spiral			
Number of Transverse Reinf. (per spacing)	=	1	
Spacing of Transverse Reinf.	=	4.000000	in
Yield Stress of Transverse Reinf.	=	50000.	psi
Diameter of Transverse Reinf.	=	0.500000	in

Axial Structural Capacities:

Nom. Axial Structural Capacity = $0.85 F_c A_c + F_y A_s$	=	2776.118	kips
Tensile Load for Cracking of Concrete	=	-317.428	kips
Nominal Axial Tensile Capacity	=	-400.000	kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
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MEG-33 forward abutment Z direction

	-----	-----	-----	-----
1	1.128000	1.000000	10.936000	0.000000
2	1.128000	1.000000	7.732920	7.732920
3	1.128000	1.000000	0.000000	10.936000
4	1.128000	1.000000	-7.73292	7.732920
5	1.128000	1.000000	-10.93600	0.000000
6	1.128000	1.000000	-7.73292	-7.73292
7	1.128000	1.000000	0.000000	-10.93600
8	1.128000	1.000000	7.732920	-7.73292

NOTE: The positions of the above rebars were computed by LPILE

Minimum spacing between any two bars not equal to zero = 7.242 inches
between bars 1 and 2.

Ratio of bar spacing to maximum aggregate size = 9.66

Concrete Properties:

Compressive Strength of Concrete	=	4000. psi
Modulus of Elasticity of Concrete	=	3604997. psi
Modulus of Rupture of Concrete	=	-474.34165 psi
Compression Strain at Peak Stress	=	0.001886
Tensile Strain at Fracture of Concrete	=	-0.0001154
Maximum Coarse Aggregate Size	=	0.750000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 2

Number	Axial Thrust Force kips
-----	-----
1	751.800
2	967.800

Definitions of Run Messages and Notes:

MEG-33 forward abutment Z direction

-
- C = concrete in section has cracked in tension.
 - Y = stress in reinforcing steel has reached yield stress.
 - T = ACI 318 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than 0.003. See ACI 318-14, Section 21.2.3.
 - Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
 Position of neutral axis is measured from edge of compression side of pile.
 Compressive stresses and strains are positive in sign.
 Tensile stresses and strains are negative in sign.

Axial Thrust Force = 751.800 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in ²	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
0.00000125	197.9570598	158365648.	215.5648630	0.0002695	0.0002320	1.0605021	7.6891638	
0.00000250	395.9073095	158362924.	115.3119932	0.0002883	0.0002133	1.1278688	8.1099945	
0.00000375	593.8249168	158353311.	81.9075073	0.0003072	0.0001947	1.1946294	8.5322539	
0.00000500	791.6935584	158338712.	65.2151194	0.0003261	0.0001761	1.2607780	8.9559423	
0.00000625	989.4969040	158319505.	55.2075729	0.0003450	0.0001575	1.3263083	9.3810601	
0.00000750	1187.	158295815.	48.5424497	0.0003641	0.0001391	1.3912141	9.8076078	
0.00000875	1385.	158267696.	43.7872851	0.0003831	0.0001206	1.4554892	10.2355861	
0.00001000	1582.	158235171.	40.2258474	0.0004023	0.0001023	1.5191275	10.6649958	
0.00001125	1780.	158198254.	37.4602303	0.0004214	0.00008393	1.5821228	11.0958377	
0.00001250	1977.	158156950.	35.2516904	0.0004406	0.00006565	1.6444688	11.5281128	
0.00001375	2174.	158111262.	33.4483005	0.0004599	0.00004741	1.7061593	11.9618224	
0.00001500	2371.	158061189.	31.9487758	0.0004792	0.00002923	1.7671881	12.3969675	
0.00001625	2568.	158006730.	30.6829966	0.0004986	0.00001110	1.8275489	12.8335497	
0.00001750	2764.	157947840.	29.6008765	0.0005180	-0.00000698	1.8872355	13.2715699	
0.00001875	2960.	157881930.	28.6656200	0.0005375	-0.00002502	1.9462377	13.7109934	
0.00002000	3156.	157802152.	27.8494965	0.0005570	-0.00004301	2.0045378	14.1517080	
0.00002125	3351.	157702855.	27.1312744	0.0005765	-0.00006096	2.0621168	14.5935854	
0.00002250	3546.	157580669.	26.4944559	0.0005961	-0.00007887	2.1189576	15.0365075	

MEG-33 forward abutment Z direction

0.00002375	3739.	157434076.	25.9260397	0.0006157	-0.00009676	2.1750455	15.4803724
0.00002500	3751.	150052811.	25.2035097	0.0006301	-0.000120	2.2153754	15.7712946 C
0.00002625	3885.	148003404.	24.6824729	0.0006479	-0.000140	2.2649968	16.1632201 C
0.00002750	4012.	145883929.	24.2005634	0.0006655	-0.000159	2.3132946	16.5485743 C
0.00002875	4132.	143722765.	23.7529237	0.0006829	-0.000180	2.3603146	16.9275627 C
0.00003000	4247.	141553357.	23.3360361	0.0007001	-0.000200	2.4061438	17.3008515 C
0.00003125	4356.	139400977.	22.9469323	0.0007171	-0.000220	2.4508643	17.6690950 C
0.00003250	4461.	137262979.	22.5820384	0.0007339	-0.000241	2.4944646	18.0319463 C
0.00003375	4562.	135168257.	22.2398324	0.0007506	-0.000262	2.5370669	18.3905486 C
0.00003500	4659.	133115714.	21.9178298	0.0007671	-0.000283	2.5786825	18.7448473 C
0.00003625	4753.	131105103.	21.6139377	0.0007835	-0.000304	2.6193277	19.0948396 C
0.00003750	4843.	129139692.	21.3265475	0.0007997	-0.000325	2.6590372	19.4407455 C
0.00003875	4930.	127222376.	21.0542921	0.0008159	-0.000347	2.6978479	19.7828234 C
0.00004000	5014.	125355615.	20.7960054	0.0008318	-0.000368	2.7357981	20.1213664 C
0.00004125	5096.	123541275.	20.5506810	0.0008477	-0.000390	2.7729263	20.4566893 C
0.00004250	5175.	121763162.	20.3162749	0.0008634	-0.000412	2.8091557	20.7876834 C
0.00004375	5252.	120038260.	20.0930028	0.0008791	-0.000433	2.8446168	21.1158096 C
0.00004500	5327.	118367984.	19.8802555	0.0008946	-0.000455	2.8793521	21.4414836 C
0.00004625	5400.	116746163.	19.6769907	0.0009101	-0.000477	2.9133510	21.7644514 C
0.00004750	5470.	115160593.	19.4817170	0.0009254	-0.000500	2.9465463	22.0836892 C
0.00004875	5540.	113630873.	19.2953970	0.0009407	-0.000522	2.9791160	22.4014298 C
0.00005125	5673.	110691645.	18.9443995	0.0009709	-0.000567	3.0421229	23.0285500 C
0.00005375	5801.	107920753.	18.6205433	0.0010009	-0.000612	3.1025283	23.6470845 C
0.00005625	5923.	105305585.	18.3206047	0.0010305	-0.000657	3.1604344	24.2576740 C
0.00005875	6042.	102835400.	18.0419648	0.0010600	-0.000703	3.2159432	24.8610601 C
0.00006125	6156.	100500896.	17.7824914	0.0010892	-0.000748	3.2691563	25.4580881 C
0.00006375	6266.	98293892.	17.5404487	0.0011182	-0.000794	3.3201742	26.0497173 C
0.00006625	6373.	96193193.	17.3128621	0.0011470	-0.000841	3.3689211	26.6340241 C
0.00006875	6476.	94201892.	17.0994625	0.0011756	-0.000887	3.4155912	27.2136161 C
0.00007125	6578.	92316591.	16.8995613	0.0012041	-0.000933	3.4603047	27.7901562 C
0.00007375	6676.	90519586.	16.7108241	0.0012324	-0.000980	3.5029756	28.3615878 C
0.00007625	6772.	88807342.	16.5325591	0.0012606	-0.001027	3.5436815	28.9288091 C
0.00007875	6866.	87183076.	16.3651996	0.0012888	-0.001074	3.5826040	29.4950873 C
0.00008125	6957.	85622101.	16.2053121	0.0013167	-0.001121	3.6194913	30.0547044 C
0.00008375	7047.	84143133.	16.0556053	0.0013447	-0.001168	3.6547386	30.6158642 C
0.00008625	7134.	82716255.	15.9117219	0.0013724	-0.001215	3.6879816	31.1698822 C
0.00008875	7221.	81360982.	15.7767604	0.0014002	-0.001262	3.7196234	31.7259998 C
0.00009125	7305.	80054287.	15.6471672	0.0014278	-0.001310	3.7493776	32.2767540 C
0.00009375	7388.	78805436.	15.5246490	0.0014554	-0.001357	3.7774785	32.8279506 C
0.00009625	7470.	77607615.	15.4081902	0.0014830	-0.001404	3.8038815	33.3782983 C

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0.00009875	7550.	76451952.	15.2964090	0.0015105	-0.001452	3.8285119	33.9251538	C
0.0001013	7629.	75346617.	15.1910043	0.0015381	-0.001499	3.8515610	34.4745251	C
0.0001038	7706.	74279158.	15.0897771	0.0015656	-0.001547	3.8728766	35.0211798	C
0.0001063	7783.	73249736.	14.9929751	0.0015930	-0.001594	3.8925159	-35.610083	C
0.0001088	7858.	72261337.	14.9014356	0.0016205	-0.001642	3.9105643	-36.736660	C
0.0001113	7933.	71306223.	14.8137169	0.0016480	-0.001689	3.9269363	-37.864183	C
0.0001138	8006.	70380275.	14.7291166	0.0016754	-0.001737	3.9416116	-38.994139	C
0.0001163	8078.	69488223.	14.6489325	0.0017029	-0.001785	3.9546842	-40.121474	C
0.0001188	8150.	68627833.	14.5728954	0.0017305	-0.001832	3.9661381	-41.246154	C
0.0001213	8220.	67790591.	14.4990892	0.0017580	-0.001879	3.9758902	-42.374015	C
0.0001238	8289.	66978675.	14.4282774	0.0017855	-0.001927	3.9839904	-43.501833	C
0.0001263	8357.	66193337.	14.3610174	0.0018131	-0.001974	3.9904577	-44.626915	C
0.0001288	8424.	65432942.	14.2971129	0.0018408	-0.002022	3.9952750	-45.749219	C
0.0001313	8491.	64694289.	14.2358753	0.0018685	-0.002069	3.9984191	-46.870639	C
0.0001338	8556.	63972301.	14.1759826	0.0018960	-0.002116	3.9998808	-47.995720	C
0.0001363	8621.	63271040.	14.1190614	0.0019237	-0.002164	3.9993599	-49.117746	C
0.0001388	8684.	62588310.	14.0648740	0.0019515	-0.002211	3.9991244	-50.000000	CY
0.0001413	8746.	61915658.	14.0129011	0.0019793	-0.002258	3.9998133	-50.000000	CY
0.0001438	8802.	61232852.	13.9616298	0.0020070	-0.002306	3.9989730	-50.000000	CY
0.0001463	8852.	60527544.	13.9087424	0.0020342	-0.002353	3.9999637	-50.000000	CY
0.0001488	8897.	59813992.	13.8560628	0.0020611	-0.002401	3.9992404	-50.000000	CY
0.0001588	9065.	57102289.	13.6649894	0.0021693	-0.002593	3.9992095	-50.000000	CY
0.0001688	9220.	54639791.	13.4990392	0.0022780	-0.002785	3.9983232	-50.000000	CY
0.0001788	9364.	52383987.	13.3576561	0.0023877	-0.002975	3.9999276	50.000000	CY
0.0001888	9450.	50066193.	13.2115207	0.0024937	-0.003169	3.9978448	50.000000	CY
0.0001988	9491.	47752205.	13.0691211	0.0025975	-0.003365	3.9986931	50.000000	CY
0.0002088	9523.	45618274.	12.9422702	0.0027017	-0.003561	3.9989876	50.000000	CY
0.0002188	9551.	43661299.	12.8312881	0.0028068	-0.003756	3.9989204	50.000000	CY
0.0002288	9576.	41862025.	12.7331386	0.0029127	-0.003950	3.9984398	50.000000	CY
0.0002388	9597.	40197339.	12.6421080	0.0030183	-0.004144	3.9972141	50.000000	CY
0.0002488	9616.	38658187.	12.5617808	0.0031247	-0.004338	3.9977554	50.000000	CY
0.0002588	9633.	37230305.	12.4908845	0.0032320	-0.004530	3.9998189	50.000000	CY
0.0002688	9648.	35900591.	12.4265050	0.0033396	-0.004723	3.9983586	50.000000	CY
0.0002788	9661.	34658795.	12.3663757	0.0034471	-0.004915	3.9956753	50.000000	CY
0.0002888	9673.	33498127.	12.3129041	0.0035554	-0.005107	3.9995455	50.000000	CY
0.0002988	9683.	32410938.	12.2652759	0.0036643	-0.005298	3.9960424	50.000000	CY
0.0003088	9692.	31390776.	12.2226542	0.0037737	-0.005489	3.9998555	50.000000	CY
0.0003188	9692.	30405968.	12.2139701	0.0038932	-0.005669	3.9973002	50.000000	CY

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Axial Thrust Force = 967.800 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
0.00000125	189.2500043	151400003.	278.6282650	0.0003483	0.0003108	1.3401186	9.9752121	
0.00000250	378.4954793	151398192.	146.8450616	0.0003671	0.0002921	1.4041938	10.3961420	
0.00000375	567.7068020	151388481.	102.9310723	0.0003860	0.0002735	1.4676616	10.8185666	
0.00000500	756.8668932	151373379.	80.9843888	0.0004049	0.0002549	1.5305157	11.2424864	
0.00000625	945.9586689	151353387.	67.8246303	0.0004239	0.0002364	1.5927497	11.6679016	
0.00000750	1135.	151328670.	59.0583371	0.0004429	0.0002179	1.6543570	12.0948132	
0.00000875	1324.	151299298.	52.8025985	0.0004620	0.0001995	1.7153311	12.5232219	
0.00001000	1513.	151265304.	48.1159594	0.0004812	0.0001812	1.7756657	12.9531282	
0.00001125	1701.	151226704.	44.4753900	0.0005003	0.0001628	1.8353541	13.3845335	
0.00001250	1890.	151183508.	41.5670724	0.0005196	0.0001446	1.8943899	13.8174388	
0.00001375	2078.	151135718.	39.1913048	0.0005389	0.0001264	1.9527666	14.2518453	
0.00001500	2266.	151083336.	37.2149532	0.0005582	0.0001082	2.0104777	14.6877547	
0.00001625	2454.	151026360.	35.5458478	0.0005776	0.00009012	2.0675165	15.1251683	
0.00001750	2642.	150964787.	34.1181537	0.0005971	0.00007207	2.1238767	15.5640880	
0.00001875	2829.	150898614.	32.8835919	0.0006166	0.00005407	2.1795515	16.0045156	
0.00002000	3017.	150827836.	31.8059536	0.0006361	0.00003612	2.2345345	16.4464531	
0.00002125	3203.	150752448.	30.8575499	0.0006557	0.00001822	2.2888190	16.8899027	
0.00002250	3390.	150672443.	30.0168452	0.0006754	3.79016E-07	2.3423984	17.3348665	
0.00002375	3576.	150587380.	29.2668262	0.0006951	-0.00001741	2.3952654	17.7813391	
0.00002500	3762.	150494303.	28.5938104	0.0007148	-0.00003515	2.4474077	18.2292626	
0.00002625	3948.	150389382.	27.9866757	0.0007347	-0.00005285	2.4988106	18.6785444	
0.00002750	4132.	150269636.	27.4363191	0.0007545	-0.00007050	2.5494595	19.1290895	
0.00002875	4316.	150133064.	26.9352279	0.0007744	-0.00008811	2.5993408	19.5808088	
0.00003000	4499.	149978526.	26.4771526	0.0007943	-0.000106	2.6484425	20.0336228	
0.00003125	4528.	144902518.	25.9058409	0.0008096	-0.000128	2.6853042	20.3506059	C
0.00003250	4663.	143478308.	25.4773831	0.0008280	-0.000147	2.7293516	20.7608086	C
0.00003375	4793.	142002808.	25.0762057	0.0008463	-0.000166	2.7722952	21.1666489	C
0.00003500	4916.	140468799.	24.6986024	0.0008645	-0.000186	2.8140899	21.5673315	C
0.00003625	5035.	138900480.	24.3426144	0.0008824	-0.000205	2.8547966	21.9633610	C
0.00003750	5149.	137314925.	24.0064406	0.0009002	-0.000225	2.8944649	22.3551293	C
0.00003875	5259.	135720450.	23.6882613	0.0009179	-0.000245	2.9331205	22.7427462	C
0.00004000	5365.	134124532.	23.3865115	0.0009355	-0.000265	2.9707908	23.1263534	C
0.00004125	5467.	132535284.	23.0999136	0.0009529	-0.000285	3.0075107	23.5062093	C
0.00004250	5566.	130961450.	22.8274494	0.0009702	-0.000305	3.0433235	23.8827065	C

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0.00004375	5662.	129409686.	22.5681931	0.0009874	-0.000325	3.0782679	24.2562076	C
0.00004500	5755.	127883985.	22.3212511	0.0010045	-0.000346	3.1123743	24.6269828	C
0.00004625	5845.	126377222.	22.0852332	0.0010214	-0.000366	3.1456180	24.9945067	C
0.00004750	5932.	124888793.	21.8591887	0.0010383	-0.000387	3.1780037	25.3586575	C
0.00004875	6017.	123430471.	21.6430327	0.0010551	-0.000407	3.2096071	25.7204001	C
0.00005125	6180.	120591992.	21.2370073	0.0010884	-0.000449	3.2704593	26.4359398	C
0.00005375	6335.	117866669.	20.8628010	0.0011214	-0.000491	3.3283184	27.1422037	C
0.00005625	6482.	115241042.	20.5157254	0.0011540	-0.000533	3.3832130	27.8384648	C
0.00005875	6623.	112723883.	20.1933440	0.0011864	-0.000576	3.4353145	28.5264725	C
0.00006125	6757.	110314404.	19.8931793	0.0012185	-0.000619	3.4847350	29.2071973	C
0.00006375	6886.	108008776.	19.6129882	0.0012503	-0.000662	3.5315625	29.8813245	C
0.00006625	7009.	105803288.	19.3509008	0.0012820	-0.000706	3.5758814	30.5496056	C
0.00006875	7128.	103682214.	19.1042070	0.0013134	-0.000749	3.6176677	31.2105753	C
0.00007125	7243.	101652323.	18.8724340	0.0013447	-0.000793	3.6570759	31.8666043	C
0.00007375	7354.	99711210.	18.6545546	0.0013758	-0.000837	3.6941839	32.5187414	C
0.00007625	7462.	97856473.	18.4497399	0.0014068	-0.000881	3.7290646	33.1681748	C
0.00007875	7565.	96062412.	18.2546756	0.0014376	-0.000925	3.7615686	33.8101775	C
0.00008125	7666.	94348771.	18.0710452	0.0014683	-0.000969	3.7919516	34.4508380	C
0.00008375	7764.	92703323.	17.8972196	0.0014989	-0.001014	3.8201774	35.0886847	C
0.00008625	7859.	91116530.	17.7317246	0.0015294	-0.001058	3.8462212	35.7221634	C
0.00008875	7952.	89598097.	17.5756429	0.0015598	-0.001103	3.8702348	36.3558735	C
0.00009125	8042.	88126710.	17.4260256	0.0015901	-0.001147	3.8920783	36.9840579	C
0.00009375	8130.	86717991.	17.2849223	0.0016205	-0.001192	3.9119417	37.6136953	C
0.00009625	8215.	85352527.	17.1495272	0.0016506	-0.001237	3.9296988	38.2388055	C
0.00009875	8299.	84039473.	17.0211869	0.0016808	-0.001282	3.9454683	38.8644867	C
0.0001013	8381.	82771822.	16.8988304	0.0017110	-0.001326	3.9592224	39.4891284	C
0.0001038	8460.	81542880.	16.7814596	0.0017411	-0.001371	3.9709470	40.1110293	C
0.0001063	8538.	80362198.	16.6706975	0.0017713	-0.001416	3.9807229	40.7362744	C
0.0001088	8614.	79211433.	16.5634749	0.0018013	-0.001461	3.9884623	41.3566218	C
0.0001113	8689.	78099804.	16.4615056	0.0018313	-0.001506	3.9942341	41.9783702	C
0.0001138	8762.	77027995.	16.3650587	0.0018615	-0.001551	3.9980350	42.6035501	C
0.0001163	8833.	75980648.	16.2712869	0.0018915	-0.001596	3.9998335	43.2237637	C
0.0001188	8902.	74965780.	16.1820507	0.0019216	-0.001641	3.9996321	43.8460000	C
0.0001213	8970.	73983242.	16.0975717	0.0019518	-0.001686	3.9992760	44.4720242	C
0.0001238	9037.	73025971.	16.0164541	0.0019820	-0.001730	3.9990742	45.0978626	C
0.0001263	9101.	72090197.	15.9380657	0.0020122	-0.001775	3.9999502	45.7219308	C
0.0001288	9165.	71181840.	15.8637730	0.0020425	-0.001820	3.9996509	46.3499254	C
0.0001313	9227.	70299877.	15.7933026	0.0020729	-0.001865	3.9989907	46.9816940	C
0.0001338	9288.	69439575.	15.7255773	0.0021033	-0.001909	3.9999849	47.6138952	C
0.0001363	9346.	68596955.	15.6598220	0.0021337	-0.001954	3.9996232	48.2440589	C

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0.0001388	9404.	67778080.	15.5973128	0.0021641	-0.001998	3.9986750	48.8777498	C
0.0001413	9461.	66981140.	15.5379338	0.0021947	-0.002043	3.9999017	49.5151991	C
0.0001438	9517.	66204862.	15.4815484	0.0022255	-0.002087	3.9991584	50.0000000	CY
0.0001463	9571.	65445599.	15.4271869	0.0022562	-0.002131	3.9999900	50.0000000	CY
0.0001488	9624.	64699436.	15.3746880	0.0022870	-0.002176	3.9993937	50.0000000	CY
0.0001588	9814.	61818368.	15.1926204	0.0024118	-0.002351	3.9994494	50.0000000	CY
0.0001688	9945.	58933395.	15.0276317	0.0025359	-0.002527	3.9987160	50.0000000	CY
0.0001788	10054.	56246253.	14.8836571	0.0026605	-0.002702	3.9999872	50.0000000	CY
0.0001888	10154.	53794428.	14.7592471	0.0027858	-0.002877	3.9986404	50.0000000	CY
0.0001988	10246.	51553357.	14.6533758	0.0029124	-0.003050	3.9996616	50.0000000	CY
0.0002088	10321.	49443626.	14.5568590	0.0030387	-0.003224	3.9999583	50.0000000	CY
0.0002188	10361.	47365590.	14.4505506	0.0031611	-0.003401	3.9999730	50.0000000	CY
0.0002288	10376.	45361098.	14.3438581	0.0032812	-0.003581	3.9998401	50.0000000	CY
0.0002388	10387.	43507000.	14.2517558	0.0034026	-0.003760	3.9993738	50.0000000	CY
0.0002488	10390.	41769393.	14.1712586	0.0035251	-0.003937	3.9981802	50.0000000	CY
0.0002588	10390.	40155117.	14.1044718	0.0036495	-0.004113	3.9958269	50.0000000	CY
0.0002688	10390.	38660973.	14.0502870	0.0037760	-0.004286	3.9999725	50.0000000	CY
0.0002788	10390.	37274033.	14.1016728	0.0039308	-0.004432	3.9999798	50.0000000	CY

 Summary of Results for Nominal Moment Capacity for Section 1

Moment values interpolated at maximum compressive strain = 0.003
 or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain	Max. Tens. Strain
1	751.800	9593.444	0.00300000	-0.00411050
2	967.800	10298.326	0.00300000	-0.00317053

Note that the values of moment capacity in the table above are not factored by a strength reduction factor (phi-factor).

In ACI 318, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.75).

The above values should be multiplied by the appropriate strength reduction

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factor to compute ultimate moment capacity according to ACI 318,
or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Load No.	Resist. Factor	Nominal Ax. Thrust kips	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in ²
1	0.65	751.800000	9593.	488.670000	6236.	98902695.
2	0.65	967.800000	10298.	629.070000	6694.	111442505.
1	0.75	751.800000	9593.	563.850000	7195.	81763662.
2	0.75	967.800000	10298.	725.850000	7724.	93377145.
1	0.90	751.800000	9593.	676.620000	8634.	63126631.
2	0.90	967.800000	10298.	871.020000	9268.	69709634.

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 1

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 63040.0 lbs
 Applied moment at pile head = 0.0 in-lbs
 Axial thrust load on pile head = 751800.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in ²	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	2.55E-04	0.00	63040.	-2.38E-05	0.00	1.58E+11	-10044.	2.37E+07	0.00
0.10000	2.26E-04	68438.	51378.	-2.36E-05	0.00	1.58E+11	-9392.	4.98E+07	0.00

MEG-33 forward abutment Z direction

0.2000	1.98E-04	123351.	40555.	-2.29E-05	0.00	1.58E+11	-8646.	5.23E+07	0.00
0.3000	1.71E-04	165812.	30667.	-2.18E-05	0.00	1.58E+11	-7835.	5.49E+07	0.00
0.4000	1.46E-04	196990.	21777.	-2.04E-05	0.00	1.58E+11	-6982.	5.74E+07	0.00
0.5000	1.22E-04	218112.	13920.	-1.88E-05	0.00	1.58E+11	-6112.	5.99E+07	0.00
0.6000	1.01E-04	230432.	7105.	-1.71E-05	0.00	1.58E+11	-5246.	6.24E+07	0.00
0.7000	8.13E-05	235195.	1315.	-1.53E-05	0.00	1.58E+11	-4403.	6.50E+07	0.00
0.8000	6.40E-05	233616.	-3486.	-1.36E-05	0.00	1.58E+11	-3599.	6.75E+07	0.00
0.9000	4.88E-05	226854.	-7352.	-1.18E-05	0.00	1.58E+11	-2845.	7.00E+07	0.00
1.0000	3.56E-05	215993.	-10350.	-1.02E-05	0.00	1.58E+11	-2152.	7.25E+07	0.00
1.1000	2.44E-05	202032.	-12557.	-8.57E-06	0.00	1.58E+11	-1526.	7.51E+07	0.00
1.2000	1.50E-05	185873.	-14055.	-7.10E-06	0.00	1.58E+11	-972.133	7.76E+07	0.00
1.3000	7.37E-06	168312.	-14934.	-5.76E-06	0.00	1.58E+11	-491.644	8.01E+07	0.00
1.4000	1.22E-06	150042.	-15279.	-4.55E-06	0.00	1.58E+11	-84.272	8.26E+07	0.00
1.5000	-3.55E-06	131650.	-15179.	-3.48E-06	0.00	1.58E+11	252.1157	8.51E+07	0.00
1.6000	-7.13E-06	113620.	-14715.	-2.55E-06	0.00	1.58E+11	521.1338	8.77E+07	0.00
1.7000	-9.68E-06	96340.	-13965.	-1.76E-06	0.00	1.58E+11	727.5540	9.02E+07	0.00
1.8000	-1.14E-05	80106.	-13003.	-1.09E-06	0.00	1.58E+11	877.0003	9.27E+07	0.00
1.9000	-1.23E-05	65135.	-11891.	-5.39E-07	0.00	1.58E+11	975.6627	9.52E+07	0.00
2.0000	-1.26E-05	51569.	-10688.	-9.64E-08	0.00	1.58E+11	1030.	9.78E+07	0.00
2.1000	-1.25E-05	39485.	-9442.	2.49E-07	0.00	1.58E+11	1047.	1.00E+08	0.00
2.2000	-1.20E-05	28908.	-8194.	5.08E-07	0.00	1.58E+11	1032.	1.03E+08	0.00
2.3000	-1.13E-05	19818.	-6980.	6.92E-07	0.00	1.58E+11	992.4189	1.05E+08	0.00
2.4000	-1.04E-05	12156.	-5824.	8.13E-07	0.00	1.58E+11	933.4289	1.08E+08	0.00
2.5000	-9.35E-06	5838.	-4748.	8.82E-07	0.00	1.58E+11	860.4002	1.10E+08	0.00
2.6000	-8.27E-06	759.7532	-3765.	9.07E-07	0.00	1.58E+11	778.0402	1.13E+08	0.00
2.7000	-7.18E-06	-3199.	-2884.	8.97E-07	0.00	1.58E+11	690.4560	1.15E+08	0.00
2.8000	-6.12E-06	-6163.	-2109.	8.62E-07	0.00	1.58E+11	601.1414	1.18E+08	0.00
2.9000	-5.11E-06	-8261.	-1440.	8.07E-07	0.00	1.58E+11	512.9857	1.20E+08	0.00
3.0000	-4.18E-06	-9621.	-875.431	7.39E-07	0.00	1.58E+11	428.2977	1.23E+08	0.00
3.1000	-3.34E-06	-10363.	-409.146	6.64E-07	0.00	1.58E+11	348.8444	1.26E+08	0.00
3.2000	-2.59E-06	-10604.	-34.301	5.84E-07	0.00	1.58E+11	275.8980	1.28E+08	0.00
3.3000	-1.93E-06	-10447.	257.4126	5.05E-07	0.00	1.58E+11	210.2908	1.31E+08	0.00
3.4000	-1.37E-06	-9987.	475.0706	4.27E-07	0.00	1.58E+11	152.4726	1.33E+08	0.00
3.5000	-9.08E-07	-9307.	628.0961	3.54E-07	0.00	1.58E+11	102.5699	1.36E+08	0.00
3.6000	-5.25E-07	-8480.	725.9045	2.87E-07	0.00	1.58E+11	60.4442	1.38E+08	0.00
3.7000	-2.20E-07	-7566.	777.6196	2.26E-07	0.00	1.58E+11	25.7477	1.41E+08	0.00
3.8000	1.70E-08	-6614.	791.8531	1.72E-07	0.00	1.58E+11	-2.025	1.43E+08	0.00
3.9000	1.93E-07	-5665.	776.5430	1.26E-07	0.00	1.58E+11	-23.491	1.46E+08	0.00
4.0000	3.18E-07	-4751.	738.8462	8.62E-08	0.00	1.58E+11	-39.337	1.48E+08	0.00
4.1000	4.00E-07	-3892.	685.0756	5.34E-08	0.00	1.58E+11	-50.281	1.51E+08	0.00

MEG-33 forward abutment Z direction

4.2000	4.47E-07	-3107.	620.6776	2.69E-08	0.00	1.58E+11	-57.049	1.53E+08	0.00
4.3000	4.65E-07	-2403.	550.2414	6.02E-09	0.00	1.58E+11	-60.345	1.56E+08	0.00
4.4000	4.61E-07	-1786.	477.5338	-9.85E-09	0.00	1.58E+11	-60.835	1.58E+08	0.00
4.5000	4.41E-07	-1257.	405.5538	-2.14E-08	0.00	1.58E+11	-59.132	1.61E+08	0.00
4.6000	4.10E-07	-812.632	336.6004	-2.92E-08	0.00	1.58E+11	-55.790	1.63E+08	0.00
4.7000	3.71E-07	-448.851	272.3491	-3.40E-08	0.00	1.58E+11	-51.295	1.66E+08	0.00
4.8000	3.28E-07	-158.933	213.9335	-3.63E-08	0.00	1.58E+11	-46.064	1.68E+08	0.00
4.9000	2.84E-07	64.6545	162.0264	-3.67E-08	0.00	1.58E+11	-40.447	1.71E+08	0.00
5.0000	2.40E-07	229.9968	116.9202	-3.55E-08	0.00	1.58E+11	-34.729	1.73E+08	0.00
5.1000	1.99E-07	345.3271	78.6018	-3.34E-08	0.00	1.58E+11	-29.134	1.76E+08	0.00
5.2000	1.60E-07	418.7014	46.8222	-3.05E-08	0.00	1.58E+11	-23.832	1.78E+08	0.00
5.3000	1.26E-07	457.7554	21.1585	-2.71E-08	0.00	1.58E+11	-18.941	1.81E+08	0.00
5.4000	9.51E-08	469.5308	1.0686	-2.36E-08	0.00	1.58E+11	-14.542	1.84E+08	0.00
5.5000	6.89E-08	460.3627	-14.062	-2.01E-08	0.00	1.58E+11	-10.676	1.86E+08	0.00
5.6000	4.68E-08	435.8175	-24.883	-1.67E-08	0.00	1.58E+11	-7.358	1.89E+08	0.00
5.7000	2.88E-08	400.6734	-32.045	-1.35E-08	0.00	1.58E+11	-4.579	1.91E+08	0.00
5.8000	1.43E-08	358.9332	-36.179	-1.07E-08	0.00	1.58E+11	-2.311	1.94E+08	0.00
5.9000	3.16E-09	313.8625	-37.876	-8.11E-09	0.00	1.58E+11	-0.516	1.96E+08	0.00
6.0000	-5.15E-09	268.0461	-37.674	-5.91E-09	0.00	1.58E+11	0.8530	1.99E+08	0.00
6.1000	-1.10E-08	223.4562	-36.053	-4.05E-09	0.00	1.58E+11	1.8485	2.01E+08	0.00
6.2000	-1.49E-08	181.5266	-33.429	-2.51E-09	0.00	1.58E+11	2.5238	2.04E+08	0.00
6.3000	-1.71E-08	143.2301	-30.156	-1.28E-09	0.00	1.58E+11	2.9316	2.06E+08	0.00
6.4000	-1.79E-08	109.1540	-26.524	-3.27E-10	0.00	1.58E+11	3.1219	2.09E+08	0.00
6.5000	-1.78E-08	79.5728	-22.766	3.88E-10	0.00	1.58E+11	3.1413	2.11E+08	0.00
6.6000	-1.70E-08	54.5145	-19.063	8.96E-10	0.00	1.58E+11	3.0313	2.14E+08	0.00
6.7000	-1.57E-08	33.8209	-15.547	1.23E-09	0.00	1.58E+11	2.8285	2.16E+08	0.00
6.8000	-1.41E-08	17.2001	-12.311	1.42E-09	0.00	1.58E+11	2.5640	2.19E+08	0.00
6.9000	-1.23E-08	4.2714	-9.415	1.51E-09	0.00	1.58E+11	2.2638	2.21E+08	0.00
7.0000	-1.04E-08	-5.398	-6.887	1.50E-09	0.00	1.58E+11	1.9488	2.24E+08	0.00
7.1000	-8.67E-09	-12.260	-4.737	1.43E-09	0.00	1.58E+11	1.6354	2.26E+08	0.00
7.2000	-7.00E-09	-16.768	-2.954	1.32E-09	0.00	1.58E+11	1.3358	2.29E+08	0.00
7.3000	-5.49E-09	-19.352	-1.517	1.19E-09	0.00	1.58E+11	1.0586	2.31E+08	0.00
7.4000	-4.15E-09	-20.411	-0.396	1.04E-09	0.00	1.58E+11	0.8094	2.34E+08	0.00
7.5000	-3.00E-09	-20.305	0.4440	8.83E-10	0.00	1.58E+11	0.5911	2.37E+08	0.00
7.6000	-2.03E-09	-19.347	1.0390	7.33E-10	0.00	1.58E+11	0.4005	2.37E+08	0.00
7.7000	-1.24E-09	-17.812	1.4261	5.92E-10	0.00	1.58E+11	0.2446	2.37E+08	0.00
7.8000	-6.12E-10	-15.926	1.6452	4.64E-10	0.00	1.58E+11	0.1206	2.37E+08	0.00
7.9000	-1.27E-10	-13.865	1.7326	3.51E-10	0.00	1.58E+11	0.02509	2.37E+08	0.00
8.0000	2.31E-10	-11.768	1.7203	2.54E-10	0.00	1.58E+11	-0.04554	2.37E+08	0.00
8.1000	4.82E-10	-9.737	1.6359	1.73E-10	0.00	1.58E+11	-0.09507	2.37E+08	0.00

MEG-33 forward abutment Z direction

8.2000	6.45E-10	-7.842	1.5026	1.06E-10	0.00	1.58E+11	-0.127	2.37E+08	0.00
8.3000	7.37E-10	-6.131	1.3392	5.30E-11	0.00	1.58E+11	-0.145	2.37E+08	0.00
8.4000	7.72E-10	-4.628	1.1607	1.22E-11	0.00	1.58E+11	-0.152	2.37E+08	0.00
8.5000	7.66E-10	-3.345	0.9788	-1.80E-11	0.00	1.58E+11	-0.151	2.37E+08	0.00
8.6000	7.29E-10	-2.279	0.8020	-3.93E-11	0.00	1.58E+11	-0.144	2.37E+08	0.00
8.7000	6.72E-10	-1.420	0.6364	-5.33E-11	0.00	1.58E+11	-0.132	2.37E+08	0.00
8.8000	6.01E-10	-0.752	0.4858	-6.15E-11	0.00	1.58E+11	-0.119	2.37E+08	0.00
8.9000	5.24E-10	-0.254	0.3527	-6.53E-11	0.00	1.58E+11	-0.103	2.37E+08	0.00
9.0000	4.44E-10	0.09505	0.2382	-6.59E-11	0.00	1.58E+11	-0.08761	2.37E+08	0.00
9.1000	3.66E-10	0.3179	0.1424	-6.44E-11	0.00	1.58E+11	-0.07210	2.37E+08	0.00
9.2000	2.90E-10	0.4369	0.06483	-6.15E-11	0.00	1.58E+11	-0.05716	2.37E+08	0.00
9.3000	2.18E-10	0.4736	0.00473	-5.81E-11	0.00	1.58E+11	-0.04300	2.37E+08	0.00
9.4000	1.51E-10	0.4483	-0.03888	-5.46E-11	0.00	1.58E+11	-0.02969	2.37E+08	0.00
9.5000	8.72E-11	0.3804	-0.06701	-5.14E-11	0.00	1.58E+11	-0.01719	2.37E+08	0.00
9.6000	2.72E-11	0.2876	-0.08054	-4.89E-11	0.00	1.58E+11	-0.00537	2.37E+08	0.00
9.7000	-3.01E-11	0.1871	-0.08020	-4.71E-11	0.00	1.58E+11	0.00594	2.37E+08	0.00
9.8000	-8.58E-11	0.09522	-0.06649	-4.60E-11	0.00	1.58E+11	0.01691	2.37E+08	0.00
9.9000	-1.41E-10	0.02765	-0.03971	-4.56E-11	0.00	1.58E+11	0.02771	2.37E+08	0.00
10.0000	-1.95E-10	0.00	0.00	-4.55E-11	0.00	1.58E+11	0.03847	1.18E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 1:

Pile-head deflection = 0.00025480 inches
 Computed slope at pile head = -0.0000238 radians
 Maximum bending moment = 235195. inch-lbs
 Maximum shear force = 63040. lbs
 Depth of maximum bending moment = 0.70000000 feet below pile head
 Depth of maximum shear force = 0.000000 feet below pile head
 Number of iterations = 6
 Number of zero deflection points = 5

MEG-33 forward abutment Z direction

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 2

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 85100.0 lbs
 Applied moment at pile head = 0.0 in-lbs
 Axial thrust load on pile head = 967800.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in ²	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	3.48E-04	-5.70E-09	85100.	-3.29E-05	0.00	1.51E+11	-13727.	2.37E+07	0.00
0.1000	3.09E-04	92275.	69173.	-3.26E-05	0.00	1.51E+11	-12818.	4.98E+07	0.00
0.2000	2.70E-04	166090.	54413.	-3.15E-05	0.00	1.51E+11	-11781.	5.23E+07	0.00
0.3000	2.33E-04	222939.	40951.	-3.00E-05	0.00	1.51E+11	-10655.	5.49E+07	0.00
0.4000	1.98E-04	264443.	28875.	-2.81E-05	0.00	1.51E+11	-9473.	5.74E+07	0.00
0.5000	1.66E-04	292304.	18229.	-2.59E-05	0.00	1.51E+11	-8270.	5.99E+07	0.00
0.6000	1.36E-04	308252.	9021.	-2.35E-05	0.00	1.51E+11	-7076.	6.24E+07	0.00
0.7000	1.09E-04	314009.	1226.	-2.10E-05	0.00	1.51E+11	-5916.	6.50E+07	0.00
0.8000	8.55E-05	311244.	-5210.	-1.85E-05	0.00	1.51E+11	-4811.	6.75E+07	0.00
0.9000	6.48E-05	301548.	-10364.	-1.61E-05	0.00	1.51E+11	-3779.	7.00E+07	0.00
1.0000	4.69E-05	286408.	-14331.	-1.38E-05	0.00	1.51E+11	-2833.	7.25E+07	0.00
1.1000	3.17E-05	267185.	-17221.	-1.16E-05	0.00	1.51E+11	-1983.	7.51E+07	0.00
1.2000	1.91E-05	245105.	-19150.	-9.56E-06	0.00	1.51E+11	-1233.	7.76E+07	0.00
1.3000	8.76E-06	221247.	-20240.	-7.71E-06	0.00	1.51E+11	-584.871	8.01E+07	0.00
1.4000	5.63E-07	196546.	-20615.	-6.05E-06	0.00	1.51E+11	-38.777	8.26E+07	0.00
1.5000	-5.77E-06	171786.	-20392.	-4.59E-06	0.00	1.51E+11	409.1469	8.51E+07	0.00
1.6000	-1.05E-05	147615.	-19688.	-3.33E-06	0.00	1.51E+11	764.3146	8.77E+07	0.00
1.7000	-1.38E-05	124542.	-18610.	-2.25E-06	0.00	1.51E+11	1034.	9.02E+07	0.00
1.8000	-1.59E-05	102957.	-17254.	-1.35E-06	0.00	1.51E+11	1225.	9.27E+07	0.00
1.9000	-1.70E-05	83136.	-15710.	-6.10E-07	0.00	1.51E+11	1348.	9.52E+07	0.00
2.0000	-1.73E-05	65255.	-14054.	-2.22E-08	0.00	1.51E+11	1411.	9.78E+07	0.00
2.1000	-1.70E-05	49406.	-12353.	4.32E-07	0.00	1.51E+11	1424.	1.00E+08	0.00
2.2000	-1.63E-05	35607.	-10661.	7.69E-07	0.00	1.51E+11	1395.	1.03E+08	0.00
2.3000	-1.52E-05	23818.	-9023.	1.00E-06	0.00	1.51E+11	1334.	1.05E+08	0.00

MEG-33 forward abutment Z direction

2.4000	-1.39E-05	13948.	-7475.	1.15E-06	0.00	1.51E+11	1247.	1.08E+08	0.00
2.5000	-1.24E-05	5875.	-6041.	1.23E-06	0.00	1.51E+11	1143.	1.10E+08	0.00
2.6000	-1.09E-05	-552.531	-4739.	1.25E-06	0.00	1.51E+11	1027.	1.13E+08	0.00
2.7000	-9.42E-06	-5501.	-3579.	1.23E-06	0.00	1.51E+11	905.6380	1.15E+08	0.00
2.8000	-7.97E-06	-9145.	-2566.	1.17E-06	0.00	1.51E+11	782.9404	1.18E+08	0.00
2.9000	-6.60E-06	-11662.	-1699.	1.09E-06	0.00	1.51E+11	662.8792	1.20E+08	0.00
3.0000	-5.35E-06	-13225.	-971.773	9.91E-07	0.00	1.51E+11	548.4566	1.23E+08	0.00
3.1000	-4.23E-06	-13997.	-377.543	8.83E-07	0.00	1.51E+11	441.9263	1.26E+08	0.00
3.2000	-3.23E-06	-14133.	94.5320	7.71E-07	0.00	1.51E+11	344.8654	1.28E+08	0.00
3.3000	-2.37E-06	-13772.	456.4038	6.61E-07	0.00	1.51E+11	258.2542	1.31E+08	0.00
3.4000	-1.65E-06	-13039.	720.8921	5.55E-07	0.00	1.51E+11	182.5597	1.33E+08	0.00
3.5000	-1.04E-06	-12043.	901.1203	4.55E-07	0.00	1.51E+11	117.8205	1.36E+08	0.00
3.6000	-5.54E-07	-10877.	1010.	3.64E-07	0.00	1.51E+11	63.7283	1.38E+08	0.00
3.7000	-1.68E-07	-9620.	1060.	2.83E-07	0.00	1.51E+11	19.7060	1.41E+08	0.00
3.8000	1.26E-07	-8334.	1063.	2.12E-07	0.00	1.51E+11	-15.021	1.43E+08	0.00
3.9000	3.41E-07	-7069.	1029.	1.51E-07	0.00	1.51E+11	-41.360	1.46E+08	0.00
4.0000	4.88E-07	-5864.	968.0974	9.97E-08	0.00	1.51E+11	-60.298	1.48E+08	0.00
4.1000	5.80E-07	-4746.	888.2088	5.76E-08	0.00	1.51E+11	-72.850	1.51E+08	0.00
4.2000	6.27E-07	-3733.	796.4862	2.40E-08	0.00	1.51E+11	-80.022	1.53E+08	0.00
4.3000	6.38E-07	-2834.	698.8050	-1.98E-09	0.00	1.51E+11	-82.780	1.56E+08	0.00
4.4000	6.22E-07	-2056.	599.9191	-2.14E-08	0.00	1.51E+11	-82.029	1.58E+08	0.00
4.5000	5.86E-07	-1395.	503.5466	-3.50E-08	0.00	1.51E+11	-78.591	1.61E+08	0.00
4.6000	5.38E-07	-846.920	412.4725	-4.39E-08	0.00	1.51E+11	-73.199	1.63E+08	0.00
4.7000	4.81E-07	-404.602	328.6604	-4.89E-08	0.00	1.51E+11	-66.488	1.66E+08	0.00
4.8000	4.20E-07	-58.022	253.3684	-5.07E-08	0.00	1.51E+11	-58.999	1.68E+08	0.00
4.9000	3.59E-07	203.6003	187.2635	-5.01E-08	0.00	1.51E+11	-51.176	1.71E+08	0.00
5.0000	3.00E-07	391.5270	130.5321	-4.78E-08	0.00	1.51E+11	-43.376	1.73E+08	0.00
5.1000	2.45E-07	516.9882	82.9820	-4.42E-08	0.00	1.51E+11	-35.874	1.76E+08	0.00
5.2000	1.94E-07	590.7864	44.1360	-3.98E-08	0.00	1.51E+11	-28.869	1.78E+08	0.00
5.3000	1.49E-07	623.0071	13.3143	-3.50E-08	0.00	1.51E+11	-22.500	1.81E+08	0.00
5.4000	1.10E-07	622.8218	-10.295	-3.00E-08	0.00	1.51E+11	-16.848	1.84E+08	0.00
5.5000	7.71E-08	598.3692	-27.574	-2.52E-08	0.00	1.51E+11	-11.951	1.86E+08	0.00
5.6000	4.97E-08	556.7017	-39.430	-2.06E-08	0.00	1.51E+11	-7.809	1.89E+08	0.00
5.7000	2.76E-08	503.7842	-46.753	-1.64E-08	0.00	1.51E+11	-4.395	1.91E+08	0.00
5.8000	1.03E-08	444.5334	-50.386	-1.27E-08	0.00	1.51E+11	-1.661	1.94E+08	0.00
5.9000	-2.78E-09	382.8863	-51.111	-9.38E-09	0.00	1.51E+11	0.4541	1.96E+08	0.00
6.0000	-1.22E-08	321.8895	-49.625	-6.58E-09	0.00	1.51E+11	2.0214	1.99E+08	0.00
6.1000	-1.86E-08	263.8006	-46.544	-4.26E-09	0.00	1.51E+11	3.1151	2.01E+08	0.00
6.2000	-2.24E-08	210.1949	-42.389	-2.38E-09	0.00	1.51E+11	3.8096	2.04E+08	0.00
6.3000	-2.43E-08	162.0731	-37.597	-9.09E-10	0.00	1.51E+11	4.1767	2.06E+08	0.00

MEG-33 forward abutment Z direction

6.4000	-2.46E-08	119.9643	-32.521	2.09E-10	0.00	1.51E+11	4.2835	2.09E+08	0.00
6.5000	-2.38E-08	84.0227	-27.436	1.02E-09	0.00	1.51E+11	4.1907	2.11E+08	0.00
6.6000	-2.22E-08	54.1148	-22.551	1.56E-09	0.00	1.51E+11	3.9521	2.14E+08	0.00
6.7000	-2.00E-08	29.8975	-18.011	1.90E-09	0.00	1.51E+11	3.6138	2.16E+08	0.00
6.8000	-1.76E-08	10.8838	-13.914	2.06E-09	0.00	1.51E+11	3.2148	2.19E+08	0.00
6.9000	-1.51E-08	-3.501	-10.313	2.09E-09	0.00	1.51E+11	2.7864	2.21E+08	0.00
7.0000	-1.26E-08	-13.873	-7.229	2.02E-09	0.00	1.51E+11	2.3537	2.24E+08	0.00
7.1000	-1.03E-08	-20.855	-4.656	1.88E-09	0.00	1.51E+11	1.9354	2.26E+08	0.00
7.2000	-8.10E-09	-25.051	-2.567	1.70E-09	0.00	1.51E+11	1.5450	2.29E+08	0.00
7.3000	-6.18E-09	-27.021	-0.925	1.49E-09	0.00	1.51E+11	1.1915	2.31E+08	0.00
7.4000	-4.51E-09	-27.275	0.3175	1.28E-09	0.00	1.51E+11	0.8801	2.34E+08	0.00
7.5000	-3.11E-09	-26.262	1.2132	1.07E-09	0.00	1.51E+11	0.6128	2.37E+08	0.00
7.6000	-1.95E-09	-24.366	1.8120	8.66E-10	0.00	1.51E+11	0.3852	2.37E+08	0.00
7.7000	-1.03E-09	-21.915	2.1651	6.82E-10	0.00	1.51E+11	0.2033	2.37E+08	0.00
7.8000	-3.17E-10	-19.171	2.3246	5.19E-10	0.00	1.51E+11	0.06248	2.37E+08	0.00
7.9000	2.15E-10	-16.337	2.3366	3.79E-10	0.00	1.51E+11	-0.04240	2.37E+08	0.00
8.0000	5.92E-10	-13.564	2.2412	2.60E-10	0.00	1.51E+11	-0.117	2.37E+08	0.00
8.1000	8.40E-10	-10.959	2.0719	1.63E-10	0.00	1.51E+11	-0.165	2.37E+08	0.00
8.2000	9.83E-10	-8.592	1.8564	8.55E-11	0.00	1.51E+11	-0.194	2.37E+08	0.00
8.3000	1.04E-09	-6.504	1.6166	2.57E-11	0.00	1.51E+11	-0.206	2.37E+08	0.00
8.4000	1.04E-09	-4.712	1.3695	-1.88E-11	0.00	1.51E+11	-0.206	2.37E+08	0.00
8.5000	1.00E-09	-3.217	1.1278	-5.02E-11	0.00	1.51E+11	-0.197	2.37E+08	0.00
8.6000	9.24E-10	-2.005	0.9003	-7.09E-11	0.00	1.51E+11	-0.182	2.37E+08	0.00
8.7000	8.30E-10	-1.056	0.6929	-8.30E-11	0.00	1.51E+11	-0.164	2.37E+08	0.00
8.8000	7.25E-10	-0.342	0.5090	-8.86E-11	0.00	1.51E+11	-0.143	2.37E+08	0.00
8.9000	6.17E-10	0.1660	0.3503	-8.93E-11	0.00	1.51E+11	-0.122	2.37E+08	0.00
9.0000	5.11E-10	0.4989	0.2170	-8.66E-11	0.00	1.51E+11	-0.101	2.37E+08	0.00
9.1000	4.09E-10	0.6869	0.1082	-8.19E-11	0.00	1.51E+11	-0.08065	2.37E+08	0.00
9.2000	3.14E-10	0.7587	0.02263	-7.62E-11	0.00	1.51E+11	-0.06192	2.37E+08	0.00
9.3000	2.26E-10	0.7413	-0.04128	-7.02E-11	0.00	1.51E+11	-0.04461	2.37E+08	0.00
9.4000	1.46E-10	0.6598	-0.08526	-6.47E-11	0.00	1.51E+11	-0.02869	2.37E+08	0.00
9.5000	7.11E-11	0.5369	-0.111	-5.99E-11	0.00	1.51E+11	-0.01401	2.37E+08	0.00
9.6000	1.68E-12	0.3938	-0.119	-5.63E-11	0.00	1.51E+11	-3.30E-04	2.37E+08	0.00
9.7000	-6.40E-11	0.2502	-0.112	-5.37E-11	0.00	1.51E+11	0.01261	2.37E+08	0.00
9.8000	-1.27E-10	0.1249	-0.08950	-5.22E-11	0.00	1.51E+11	0.02508	2.37E+08	0.00
9.9000	-1.89E-10	0.03556	-0.05207	-5.16E-11	0.00	1.51E+11	0.03731	2.37E+08	0.00
10.0000	-2.51E-10	0.00	0.00	-5.14E-11	0.00	1.51E+11	0.04948	1.18E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses

MEG-33 forward abutment Z direction
 are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 2:

Pile-head deflection = 0.00034823 inches
 Computed slope at pile head = -0.0000329 radians
 Maximum bending moment = 314009. inch-lbs
 Maximum shear force = 85100. lbs
 Depth of maximum bending moment = 0.70000000 feet below pile head
 Depth of maximum shear force = 0.000000 feet below pile head
 Number of iterations = 6
 Number of zero deflection points = 5

 Summary of Pile-head Responses for Conventional Analyses

Definitions of Pile-head Loading Conditions:

Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs
 Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
 Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.
 Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs
 Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians

Load Case No.	Load Type 1	Pile-head Load 1	Load Type 2	Pile-head Load 2	Axial Loading lbs	Pile-head Deflection inches	Pile-head Rotation radians	Max Shear in Pile lbs	Max Moment in Pile in-lbs
1	V, lb	63040.	M, in-lb	0.00	751800.	2.55E-04	-2.38E-05	63040.	235195.
2	V, lb	85100.	M, in-lb	0.00	967800.	3.48E-04	-3.29E-05	85100.	314009.

Maximum pile-head deflection = 0.0003482264 inches

MEG-33 forward abutment Z direction

Maximum pile-head rotation = -0.0000329333 radians = -0.001887 deg.

Summary of Warning Messages

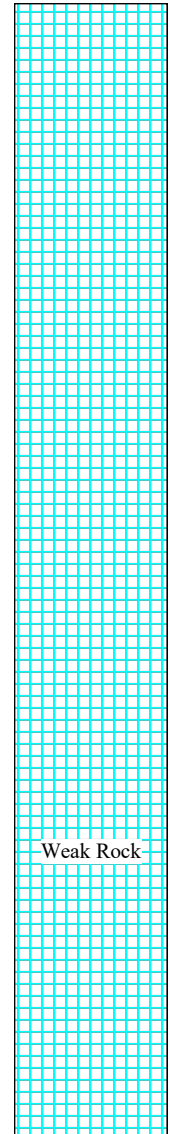
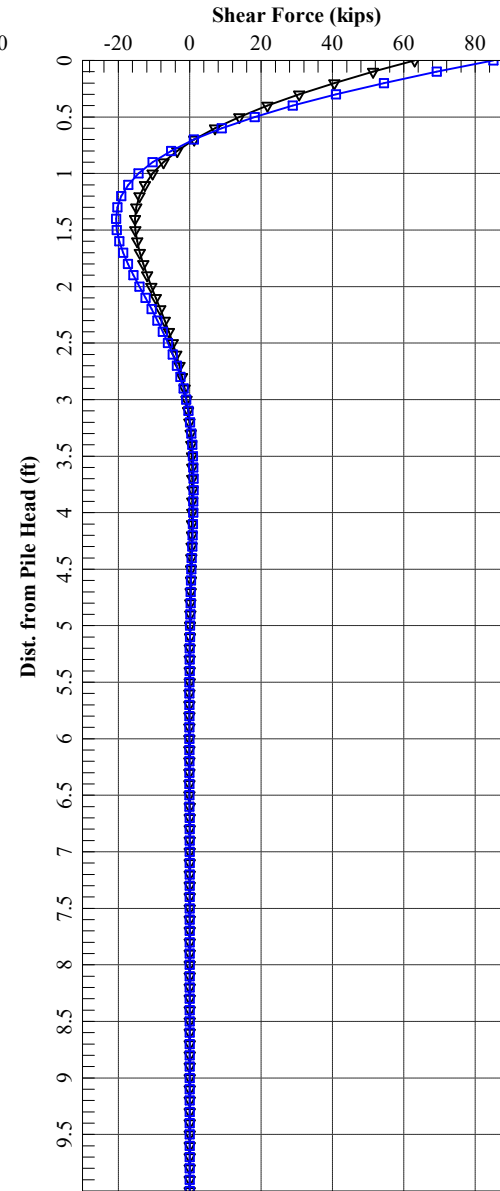
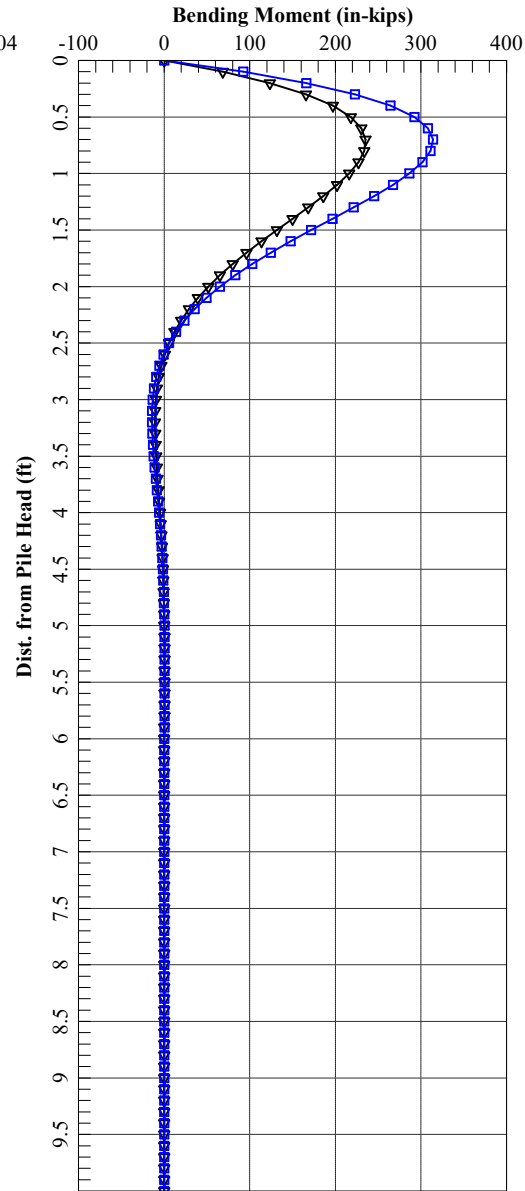
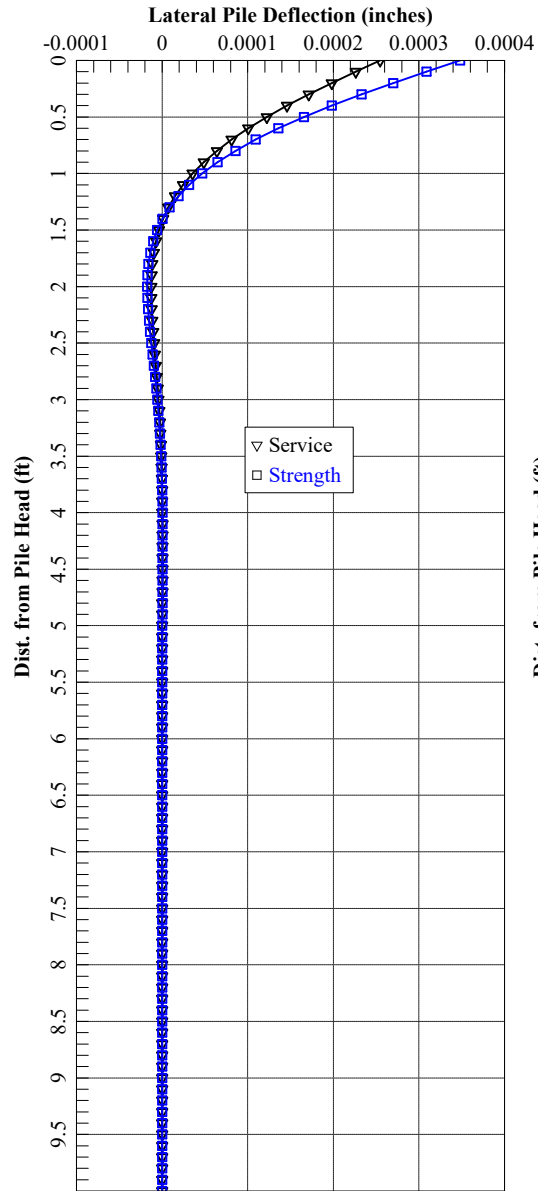
The following warning was reported 706 times

**** Warning ****

An unreasonable input value for unconfined compressive strength has been specified for a soil defined using the weak rock criteria. The input value is greater than 500 psi. Please check your input data for correctness.

The analysis ended normally.

MEG-33 Bowmans Run Bridge Forward Abutment Z-Direction



**OLDTOWN CREEK BRIDGE
LATERAL LOAD ANALYSIS**

MEG-33-19.21

Lateral Capacity Analyses for bridge at Oldtown Creek

Rear Abutment

Material Parameters

The following table presents the material parameters used for the lateral capacity analyses. The material parameters are based on information found in the Ohio Department of Transportation (ODOT) Geotechnical Design Manual (GDM) and boring logs (blow counts). The groundwater table depth at the pile head was assumed to be below the top of the rock.

Material Parameters

Material	Moist Unit Weight (pcf)	Undrained Cohesion (psf)	Friction Angle (degrees)	Compressive Strength (psi)	RQD (%)
Fill (mod stiff w/o free water)	125	2,500	-	-	-
Gravel and stone fragments with sand, silt and clay (sand)	122	-	32	-	-
Silt and Clay (mod stiff w/o free water)	125	2,500	-	-	-
Bedrock	145	-	-	3,820	77

Rear Abutment Loading

- The rear abutment loading provided from the structural team is provided in this appendix. Each abutment consists of 1 row of piles spaced at 16' c/c.
- The pile cap is assumed to be rigid; therefore, each pile experiences the same lateral load.
- X and Z represents lateral loads (Z direction being perpendicular to the single row of four piles) while Y represents axial load. The load combinations used in the LPile are as follows:

Load State	Load Direction	Lateral Force (kips)	Lateral Moment (kip-ft)	Axial Load (kips)
Service	X	-1.80	363.60	774.50
Service	Z	105.92	0.00	774.50
Strength	X	-2.42	490.80	996.60
Strength	Z	142.96	0.00	996.60

Performed By:	G. Khatri	Date:	8/29/2024
Checked By:	J. Samples	Date:	8/30/2024

- To take into account group effects, P-multipliers (P_m) were applied to the p-y curves in LPILE. The P-multipliers are provided in AASHTO LRFD 9th Edition Section 10.7.2.4 (presented in this appendix). From the structural engineer, the drilled shaft diameter (B) is 3 ft above the socket and 2.5 ft for the socket.
 - Spacing between rows laterally (Z) is 16' c/c, which is greater than 5B. P-multipliers are provided in AASHTO LRFD 9th edition section 10.7.2.7. Therefore, the P-multiplier at 16.00 ft is taken as same as 5B.
 - Row 1 → $P_m = 1$
 - Row 2 → $P_m = 0.85$
 - Row 3 → $P_m = 0.7$
 - Since there is only a single row of piles in the perpendicular (X) direction, $P_m = 1.0$ is only needed

Rear Abutment LPILE Results

The following table summarizes the LPILE results for each load and P_m combination discussed at the rear abutment:

LPILE Results

Abutment	Direction	Row	P_m	Deflection (in, Service Load)	Maximum Shear (kips, Strength Load)	Maximum Moment (kip-ft, Strength Load)
Rear	X	1	1.0	0.067	55.38	493.12
	X	2	0.85	0.078	48.03	493.31
	X	3 and up	0.7	0.095	36.41	493.55
	Z	1	1.0	0.40	194.24	757.32

Performed By:	G. Khatri	Date:	8/29/2024
Checked By:	J. Samples	Date:	8/30/2024

Forward Abutment

The forward abutment consists of the bedrock at the ground surface.

The material parameters are based on information found in the Ohio Department of Transportation (ODOT) Geotechnical Design Manual (GDM) and boring logs (blow counts). The groundwater table depth at the pile head was assumed to be below the top of the rock.

Material Parameters

Material	Moist Unit Weight (pcf)	Undrained Cohesion (psf)	Friction Angle (degrees)	Compressive Strength (psi)	RQD (%)
Bedrock	145	-	-	3,820	99

Forward Abutment Loading

- The forward abutment loading provided from the structural team is provided in this appendix. Each abutment consists of 1 row of piles spaced at 16' c/c.
- The pile cap is assumed to be rigid; therefore, each pile experiences the same lateral load.
- X and Z represents lateral loads (Z direction being perpendicular to the single row of four piles) while Y represents axial load. The load combinations used in the LPILE are as follows:

Load State	Load Direction	Lateral Force (kips)	Lateral Moment (kip-ft)	Axial Load (kips)
Service	X	-1.80	118.00	714.60
Service	Z	60.82	0.00	714.60
Strength	X	-2.42	160.00	921.40
Strength	Z	82.06	0.00	921.40

- To take into account group effects, P-multipliers (P_m) were applied to the p-y curves in LPILE. The P-multipliers are provided in AASHTO LRFD 9th Edition Section 10.7.2.4 (presented in this appendix). From the structural engineer, the drilled shaft diameter (B) is 3 ft above the socket and 2.5 ft for the socket.
 - Spacing between rows laterally (Z) is 16' c/c, which is greater than 5B. P-multipliers are provided in AASHTO LRFD 9th edition section 10.7.2.7. Therefore, the P-multiplier at 16.00 ft is taken same as 5B.
 - Row 1 → $P_m = 1$
 - Row 2 → $P_m = 0.85$
 - Row 3 → $P_m = 0.7$

Performed By:	G. Khatri	Date:	8/29/2024
Checked By:	J. Samples	Date:	8/30/2024

- Since there is only a single row of piles in the perpendicular (X) direction, $P_m = 1.0$ is only needed

LPile Results

Abutment	Direction	Row	P_m	Deflection (in, Service Load)	Maximum Shear (kips, Strength Load)	Maximum Moment (kip-ft, Strength Load)
Abutment	X	1	1.0	0.00063	114.21	160.00
	X	2	0.85	0.00062	113.97	160.00
	X	3 and up	0.7	0.00068	112.78	160.00
	Z	1	1.0	0.00027	82.06	26.15

Performed By:	G. Khatri	Date:	8/29/2024
Checked By:	J. Samples	Date:	8/30/2024

Pier

The material parameters are based on information found in the Ohio Department of Transportation (ODOT) Geotechnical Design Manual (GDM) and boring logs (blow counts). The groundwater table depth at the pile head was assumed to be below the top of the rock.

Material Parameters

Material	Moist Unit Weight (pcf)	Undrained Cohesion (psf)	Friction Angle (degrees)	Compressive Strength (psi)	RQD (%)
Sandy Silt (mod stiff w/o free water)	122	2,000	-	-	-
Bedrock	140	-	-	425	53

Pier Abutment Loading

- The pier abutment loading provided from the structural team is provided in this appendix. Each abutment consists of 1 row of piles spaced at 16' c/c.
- The pile cap is assumed to be rigid; therefore, each pile experiences the same lateral load.
- X and Z represents lateral loads (Z direction being perpendicular to the single row of four piles) while Y represents axial load. The load combinations used in the LPILE are as follows:

Load State	Case	Lateral Load (kips)	Lateral Moment (kip-ft)	Axial Load (kips)
Service	I	-18.61	-864.40	775.40
Strength		-24.30	-1133.00	995.70
Service	III	10.71	-475.10	1030.00
Strength		14.41	639.60	1340.00

- To take into account group effects, P-multipliers (P_m) were applied to the p-y curves in LPILE. The P-multipliers are provided in AASHTO LRFD 9th Edition Section 10.7.2.4 (presented in this appendix). From the structural engineer, the drilled shaft diameter (B) is 5 ft above the socket and 4.5 ft for the socket.
 - Spacing between rows laterally (Z) is 16' c/c, which is between the 3B and 5B. P-multipliers are provided in AASHTO LRFD 9th edition section 10.7.2.7. Therefore, the P-multiplier at 16.00 ft is calculated as follows:
 - Row 1 → $P_m = 0.82$
 - Row 2 → $P_m = 0.45$

Performed By:	G. Khatri	Date:	8/29/2024
Checked By:	J. Samples	Date:	8/30/2024

- Row 3 → $P_m = 0.34$

L Pile Results

Abutment	Direction	Row	P_m	Deflection (in, Service Load)	Maximum Shear (kips, Strength Load)	Maximum Moment (kip-ft, Strength Load)
Pier	X & Z	1	0.82	0.027	92.66	1183.33
	X	2	0.45	0.041	140.08	1208.33
	X	3 & up	0.34	0.052	177.43	1225

Performed By:	G. Khatri	Date:	8/29/2024
Checked By:	J. Samples	Date:	8/30/2024

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LPile for Windows, Version 2022-12.006

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method
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Files Used for Analysis

Path to file locations:

\\US0247-PPFSS01\shared_projects\173609140\119144\400-Engineering\Geotechnical\Analysis\Lpile\bridges\LPile
Analysis\Old Town Creek Bridge\Rear Abutment\

Name of input data file:

Rear Abutment X-direction row 1.lp12d

Name of output report file:

Rear Abutment X-direction row 1.lp12o

Name of plot output file:
Rear Abutment X-direction row 1.lp12p

Name of runtime message file:
Rear Abutment X-direction row 1.lp12r

Date and Time of Analysis

Date: July 1, 2024

Time: 9:10:55

Problem Title

-

Project Name: MEG-33-19.21

Job Number: 173604190

Client: ODOT

Engineer: G. Khatri

Description:Rear Abutment Lateral Load Analysis at Oldtown Creek Bridge

- Program Options and Settings

Performed by: Gokul Khatri 6/28/2024

Checked by: James Samples 7/1/2024

Computational Options:

- Conventional Analysis

Engineering Units Used for Data Input and Computations:

- US Customary System Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed = 500
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 100.0000 in
- Number of pile increments = 100

Loading Type and Number of Cycles of Loading:

- Static loading specified

- Analysis uses p-y modification factors for p-y curves
- Analysis uses layering correction (Method of Georgiadis)
- No distributed lateral loads are entered
- Loading by lateral soil movements acting on pile not selected
- Input of shear resistance at the pile tip not selected
- Input of moment resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:

- Output files use decimal points to denote decimal symbols.
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1
- No p-y curves to be computed and reported for user-specified depths
- Print using wide report formats

Pile Structural Properties and Geometry

Number of pile sections defined = 2

Total length of pile = 29.250 ft
 Depth of ground surface below top of pile = 0.0000 ft

Pile diameters used for p-y curve computations are defined using 4 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile. A summary of values of pile diameter vs. depth follows.

Point No.	Depth Below Pile Head feet	Pile Diameter inches
1	0.000	36.0000
2	19.250	36.0000
3	19.250	30.0000
4	29.250	30.0000

Input Structural Properties for Pile Sections:

Pile Section No. 1:

Section 1 is a round drilled shaft, bored pile, or CIDH pile
 Length of section = 19.250000 ft
 Shaft Diameter = 36.000000 in

Pile Section No. 2:

Section 2 is a round drilled shaft, bored pile, or CIDH pile
 Length of section = 10.000000 ft
 Shaft Diameter = 30.000000 in

Soil and Rock Layering Information

The soil profile is modelled using 4 layers

Layer 1 is stiff clay with user-defined k-value

Distance from top of pile to top of layer	=	0.0000	ft
Distance from top of pile to bottom of layer	=	5.000000	ft
Effective unit weight at top of layer	=	125.000000	pcf
Effective unit weight at bottom of layer	=	125.000000	pcf
Undrained cohesion at top of layer	=	2500.	psf
Undrained cohesion at bottom of layer	=	2500.	psf
Epsilon-50 at top of layer	=	0.0000	
Epsilon-50 at bottom of layer	=	0.0000	
Subgrade k at top of layer	=	0.0000	pci
Subgrade k at bottom of layer	=	0.0000	pci

NOTE: Default values for Epsilon-50 will be computed for this layer.

NOTE: Default values for subgrade k will be computed for this layer.

Layer 2 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer	=	5.000000	ft
Distance from top of pile to bottom of layer	=	18.000000	ft
Effective unit weight at top of layer	=	122.000000	pcf
Effective unit weight at bottom of layer	=	122.000000	pcf
Friction angle at top of layer	=	32.000000	deg.
Friction angle at bottom of layer	=	32.000000	deg.
Subgrade k at top of layer	=	0.0000	pci
Subgrade k at bottom of layer	=	0.0000	pci

NOTE: Default values for subgrade k will be computed for this layer.

Layer 3 is stiff clay with user-defined k-value

Distance from top of pile to top of layer	=	18.000000	ft
Distance from top of pile to bottom of layer	=	19.250000	ft
Effective unit weight at top of layer	=	125.000000	pcf
Effective unit weight at bottom of layer	=	125.000000	pcf
Undrained cohesion at top of layer	=	2500.	psf
Undrained cohesion at bottom of layer	=	2500.	psf
Epsilon-50 at top of layer	=	0.0000	
Epsilon-50 at bottom of layer	=	0.0000	
Subgrade k at top of layer	=	0.0000	pci
Subgrade k at bottom of layer	=	0.0000	pci

NOTE: Default values for Epsilon-50 will be computed for this layer.
 NOTE: Default values for subgrade k will be computed for this layer.

Layer 4 is weak rock, p-y criteria by Reese, 1997

Distance from top of pile to top of layer = 19.250000 ft
 Distance from top of pile to bottom of layer = 35.000000 ft
 Effective unit weight at top of layer = 82.600000 pcf
 Effective unit weight at bottom of layer = 82.600000 pcf
 Uniaxial compressive strength at top of layer = 3820. psi
 Uniaxial compressive strength at bottom of layer = 3820. psi
 Initial modulus of rock at top of layer = 343800. psi
 Initial modulus of rock at bottom of layer = 343800. psi
 RQD of rock at top of layer = 77.000000 %
 RQD of rock at bottom of layer = 77.000000 %
 k_{rm} of rock at top of layer = 0.0000500
 k_{rm} of rock at bottom of layer = 0.0000500

(Depth of the lowest soil layer extends 5.750 ft below the pile tip)

 Summary of Input Soil Properties

Layer Num.	Soil Type Name (p-y Curve Type)	Layer Depth ft	Effective Unit Wt. pcf	Cohesion psf	Angle of Friction deg.	Uniaxial qu psi	RQD %	E50 or krm
1 default	Stiff Clay w/o default	0.00	125.0000	2500.	--	--	--	--
default	Free Water, using k default	5.0000	125.0000	2500.	--	--	--	--
2	Sand	5.0000	122.0000	--	32.0000	--	--	--

default	--							
(Reese, et al.)		18.0000	122.0000	--	32.0000	--	--	--
default	--							
3	Stiff Clay w/o	18.0000	125.0000	2500.	--	--	--	--
default	default	--						
	Free Water, using k	19.2500	125.0000	2500.	--	--	--	--
default	default	--						
4	Weak	19.2500	82.6000	--	--	3820.	77.0000	
5.00E-05	--	343800.						
	Rock	35.0000	82.6000	--	--	3820.	77.0000	
5.00E-05	--	343800.						

 Modification Factors for p-y Curves

Distribution of p-y modifiers with depth defined using 4 points

Point No.	Depth X ft	p-mult	y-mult
1	0.000	1.0000	1.0000
2	5.000	1.0000	1.0000
3	19.250	1.0000	1.0000
4	33.000	1.0000	1.0000

 Static Loading Type

Static loading criteria were used when computing p-y curves for all analyses.

 Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 2

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length	Run Analysis
1	1	V = 1800. lbs	M = 4363200. in-lbs	774500.	No	Yes
2	1	V = 2420. lbs	M = 5889600. in-lbs	996600.	No	Yes

V = shear force applied normal to pile axis

M = bending moment applied to pile head

y = lateral deflection normal to pile axis

S = pile slope relative to original pile batter angle

R = rotational stiffness applied to pile head

Values of top y vs. pile lengths can be computed only for load types with specified shear loading (Load Types 1, 2, and 3).

Thrust force is assumed to be acting axially for all pile batter angles.

 Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 2

Pile Section No. 1:

Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section	=	19.250000 ft
Shaft Diameter	=	36.000000 in
Concrete Cover Thickness (to edge of trans. reinf.)	=	3.000000 in
Number of Reinforcing Bars	=	8 bars
Yield Stress of Reinforcing Bars	=	50000. psi
Modulus of Elasticity of Reinforcing Bars	=	29000000. psi
Gross Area of Shaft	=	1018. sq. in.

Total Area of Reinforcing Steel = 8.000000 sq. in.
 Area Ratio of Steel Reinforcement = 0.79 percent
 Edge-to-Edge Bar Spacing = 9.538153 in
 Maximum Concrete Aggregate Size = 0.750000 in
 Ratio of Bar Spacing to Aggregate Size = 12.72
 Offset of Center of Rebar Cage from Center of Pile = 0.0000 in
 Transverse Reinforcement
 Type: Spiral
 Number of Transverse Reinf. (per spacing) = 1
 Spacing of Transverse Reinf. = 4.000000 in
 Yield Stress of Transverse Reinf. = 50000. psi
 Diameter of Transverse Reinf. = 0.500000 in

Axial Structural Capacities:

Nom. Axial Structural Capacity = $0.85 F_c A_c + F_y A_s$ = 3833.578 kips
 Tensile Load for Cracking of Concrete = -446.783 kips
 Nominal Axial Tensile Capacity = -400.000 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
-----	-----	-----	-----	-----
1	1.128000	1.000000	13.936000	0.000000
2	1.128000	1.000000	9.854240	9.854240
3	1.128000	1.000000	0.000000	13.936000
4	1.128000	1.000000	-9.85424	9.854240
5	1.128000	1.000000	-13.93600	0.000000
6	1.128000	1.000000	-9.85424	-9.85424
7	1.128000	1.000000	0.000000	-13.93600
8	1.128000	1.000000	9.854240	-9.85424

NOTE: The positions of the above rebars were computed by LPILE

Minimum spacing between any two bars not equal to zero = 9.538 inches
between bars 3 and 4.

Ratio of bar spacing to maximum aggregate size = 12.72

Concrete Properties:

Compressive Strength of Concrete	=	4000. psi
Modulus of Elasticity of Concrete	=	3604997. psi
Modulus of Rupture of Concrete	=	-474.34165 psi
Compression Strain at Peak Stress	=	0.001886
Tensile Strain at Fracture of Concrete	=	-0.0001154
Maximum Coarse Aggregate Size	=	0.750000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 2

Number	Axial Thrust Force kips
-----	-----
1	774.500
2	996.600

Definitions of Run Messages and Notes:

C = concrete in section has cracked in tension.

Y = stress in reinforcing steel has reached yield stress.

T = ACI 318 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than 0.003. See ACI 318-14, Section 21.2.3.

Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.

Position of neutral axis is measured from edge of compression side of pile.

Compressive stresses and strains are positive in sign.

Tensile stresses and strains are negative in sign.

Axial Thrust Force = 774.500 kips

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Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	209.9768848	335963016.	305.4584133	0.0001909	0.0001684	0.7682850	5.4744462	
0.00000125	419.9544678	335963574.	161.7501720	0.0002022	0.0001572	0.8107029	5.7394687	
0.00000188	629.9200184	335957343.	113.8567412	0.0002135	0.0001460	0.8529062	6.0049978	
0.00000250	839.8675209	335947008.	89.9170136	0.0002248	0.0001348	0.8948938	6.2710335	
0.00000313	1050.	335933107.	75.5587678	0.0002361	0.0001236	0.9366642	6.5375758	
0.00000375	1260.	335915817.	65.9912635	0.0002475	0.0001125	0.9782161	6.8046249	
0.00000438	1470.	335895215.	59.1613265	0.0002588	0.0001013	1.0195483	7.0721808	
0.00000500	1679.	335871340.	54.0423696	0.0002702	0.00009021	1.0606595	7.3402436	
0.00000563	1889.	335844210.	50.0640668	0.0002816	0.00007911	1.1015482	7.6088134	
0.00000625	2099.	335813840.	46.8842227	0.0002930	0.00006803	1.1422132	7.8778904	
0.00000688	2308.	335780235.	44.2850763	0.0003045	0.00005696	1.1826533	8.1474746	
0.00000750	2518.	335743400.	42.1214541	0.0003159	0.00004591	1.2228669	8.4175663	
0.00000813	2728.	335703338.	40.2928511	0.0003274	0.00003488	1.2628530	8.6881656	
0.00000875	2937.	335660050.	38.7274782	0.0003389	0.00002387	1.3026100	8.9592726	
0.00000938	3146.	335613538.	37.3726902	0.0003504	0.00001287	1.3421368	9.2308877	
0.00001000	3356.	335563800.	36.1890031	0.0003619	0.00000189	1.3814319	9.5030109	
0.00001063	3565.	335510389.	35.1462171	0.0003734	-0.00000907	1.4204939	9.7756407	
0.00001125	3774.	335448762.	34.2207824	0.0003850	-0.00002002	1.4593189	10.0487553	
0.00001188	3983.	335372226.	33.3940570	0.0003966	-0.00003095	1.4979010	10.3223159	
0.00001250	4191.	335275605.	32.6511234	0.0004081	-0.00004186	1.5362345	10.5962823	
0.00001313	4399.	335155533.	31.9799128	0.0004197	-0.00005276	1.5743140	10.8706168	
0.00001375	4606.	335010258.	31.3705628	0.0004313	-0.00006365	1.6121349	11.1452870	
0.00001438	4813.	334839082.	30.8149356	0.0004430	-0.00007454	1.6496930	11.4202638	
0.00001500	5020.	334642016.	30.3062574	0.0004546	-0.00008541	1.6869847	11.6955220	
0.00001563	5225.	334419493.	29.8388439	0.0004662	-0.00009627	1.7240067	11.9710387	
0.00001625	5430.	334172355.	29.4078929	0.0004779	-0.000107	1.7607561	12.2467946	
0.00001688	5430.	321795601.	28.5379799	0.0004816	-0.000126	1.7721262	12.2921114	C
0.00001750	5430.	310302901.	28.0974528	0.0004917	-0.000138	1.8037114	12.5238073	C
0.00001813	5430.	299602801.	27.6819613	0.0005017	-0.000151	1.8347688	12.7526933	C
0.00001875	5531.	294985524.	27.2891744	0.0005117	-0.000163	1.8653149	12.9788637	C
0.00001938	5641.	291155897.	26.9168123	0.0005215	-0.000176	1.8953509	13.2022714	C
0.00002000	5747.	287367426.	26.5630245	0.0005313	-0.000189	1.9248871	13.4229543	C
0.00002063	5850.	283630097.	26.2263178	0.0005409	-0.000202	1.9539418	13.6410289	C
0.00002125	5949.	279952989.	25.9054090	0.0005505	-0.000215	1.9825350	13.8566334	C
0.00002188	6045.	276344121.	25.5991900	0.0005600	-0.000228	2.0106885	14.0699237	C
0.00002250	6138.	272810537.	25.3067051	0.0005694	-0.000241	2.0384250	14.2810751	C

Performed by: Gokul Khatri 6/28/2024

Checked by: James Samples 7/1/2024

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0.00002313	6229.	269354766.	25.0270116	0.0005787	-0.000254	2.0657610	14.4902022	C
0.00002375	6316.	265942885.	24.7580424	0.0005880	-0.000267	2.0926272	14.6965767	C
0.00002438	6401.	262617842.	24.5003905	0.0005972	-0.000280	2.1191300	14.9012011	C
0.00002563	6565.	256207897.	24.0156543	0.0006154	-0.000307	2.1710547	15.3051452	C
0.00002688	6721.	250098469.	23.5670604	0.0006334	-0.000334	2.2215727	15.7021153	C
0.00002813	6870.	244254957.	23.1494010	0.0006511	-0.000361	2.2706819	16.0917926	C
0.00002938	7012.	238695912.	22.7602946	0.0006686	-0.000389	2.3185388	16.4755131	C
0.00003063	7148.	233404965.	22.3966231	0.0006859	-0.000417	2.3651987	16.8536129	C
0.00003188	7279.	228367929.	22.0558068	0.0007030	-0.000444	2.4107192	17.2264740	C
0.00003313	7406.	223572305.	21.7357058	0.0007200	-0.000473	2.4551598	17.5945249	C
0.00003438	7528.	219000726.	21.4342263	0.0007368	-0.000501	2.4985542	17.9579319	C
0.00003563	7646.	214623746.	21.1488122	0.0007534	-0.000529	2.5408658	18.3160792	C
0.00003688	7760.	210452696.	20.8791882	0.0007699	-0.000558	2.5822412	18.6704193	C
0.00003813	7872.	206480017.	20.6243515	0.0007863	-0.000586	2.6227471	19.0215612	C
0.00003938	7981.	202681225.	20.3824550	0.0008026	-0.000615	2.6623531	19.3690034	C
0.00004063	8086.	199033263.	20.1516581	0.0008187	-0.000644	2.7010095	19.7119848	C
0.00004188	8189.	195561271.	19.9331840	0.0008347	-0.000673	2.7389539	20.0531980	C
0.00004313	8289.	192219340.	19.7239608	0.0008506	-0.000702	2.7759904	20.3901410	C
0.00004438	8388.	189023045.	19.5247335	0.0008664	-0.000731	2.8122913	20.7247790	C
0.00004563	8484.	185957571.	19.3344684	0.0008821	-0.000760	2.8478428	21.0568312	C
0.00004688	8579.	183009976.	19.1521150	0.0008978	-0.000790	2.8826191	21.3858440	C
0.00004813	8671.	180183193.	18.9778933	0.0009133	-0.000819	2.9167201	21.7129850	C
0.00004938	8762.	177462231.	18.8106265	0.0009288	-0.000849	2.9500925	22.0374535	C
0.00005063	8851.	174843367.	18.6500888	0.0009442	-0.000878	2.9827769	22.3596742	C
0.00005188	8940.	172330886.	18.4965996	0.0009595	-0.000908	3.0148693	22.6808592	C
0.00005313	9026.	169895579.	18.3478947	0.0009747	-0.000938	3.0461791	22.9982878	C
0.00005438	9111.	167567324.	18.2064765	0.0009900	-0.000968	3.0770331	23.3164253	C
0.00005563	9195.	165304549.	18.0688839	0.0010051	-0.000997	3.1070978	23.6304811	C
0.00005688	9278.	163128637.	17.9370674	0.0010202	-0.001027	3.1366342	-24.151687	C
0.00005813	9360.	161039166.	17.8110890	0.0010353	-0.001057	3.1656928	-24.894846	C
0.00005938	9441.	158999243.	17.6876492	0.0010502	-0.001087	3.1939414	-25.642766	C
0.00006063	9521.	157039251.	17.5696889	0.0010652	-0.001117	3.2217476	-26.390003	C
0.00006188	9600.	155153363.	17.4567824	0.0010801	-0.001147	3.2490985	-27.136723	C
0.00006313	9677.	153306251.	17.3455151	0.0010949	-0.001178	3.2756375	-27.888629	C
0.00006438	9755.	151527025.	17.2389300	0.0011098	-0.001208	3.3017402	-28.639860	C
0.00006563	9831.	149811768.	17.1367610	0.0011246	-0.001238	3.3274046	-29.390414	C
0.00006688	9907.	148138806.	17.0367871	0.0011393	-0.001268	3.3524030	-30.144118	C
0.00006813	9981.	146513241.	16.9396803	0.0011540	-0.001298	3.3768367	-30.899406	C
0.00006938	10055.	144942749.	16.8464048	0.0011687	-0.001329	3.4008383	-31.654027	C
0.00007063	10129.	143424375.	16.7567587	0.0011834	-0.001359	3.4244058	-32.407976	C
0.00007188	10202.	141935938.	16.6682277	0.0011980	-0.001389	3.4472735	-33.166100	C

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0.00007313	10273.	140490618.	16.5824943	0.0012126	-0.001420	3.4696518	-33.924710	C
0.00007438	10345.	139090673.	16.4999505	0.0012272	-0.001450	3.4916023	-34.682657	C
0.00007938	10625.	133853545.	16.1923301	0.0012853	-0.001572	3.5743872	-37.722367	C
0.00008438	10896.	129140113.	15.9182821	0.0013431	-0.001694	3.6495145	-40.769141	C
0.00008938	11161.	124874561.	15.6734988	0.0014008	-0.001817	3.7172113	-43.819538	C
0.00009438	11417.	120974705.	15.4508889	0.0014582	-0.001939	3.7772953	-46.880236	C
0.00009938	11668.	117417241.	15.2521788	0.0015157	-0.002062	3.8303422	-49.936615	C
0.0001044	11890.	113914359.	15.0627977	0.0015722	-0.002185	3.8754269	-50.000000	CY
0.0001094	12069.	110344880.	14.8790357	0.0016274	-0.002310	3.9127629	-50.000000	CY
0.0001144	12241.	107026803.	14.7093660	0.0016824	-0.002435	3.9433518	-50.000000	CY
0.0001194	12410.	103956083.	14.5559884	0.0017376	-0.002560	3.9674575	-50.000000	CY
0.0001244	12572.	101084173.	14.4126142	0.0017926	-0.002685	3.9848491	-50.000000	CY
0.0001294	12695.	98125119.	14.2688573	0.0018460	-0.002811	3.9954633	-50.000000	CY
0.0001344	12767.	95009372.	14.1158211	0.0018968	-0.002941	3.9997907	-50.000000	CY
0.0001394	12831.	92064345.	13.9725454	0.0019474	-0.003070	3.9997762	-50.000000	CY
0.0001444	12893.	89303118.	13.8408088	0.0019983	-0.003199	3.9996381	-50.000000	CY
0.0001494	12949.	86690220.	13.7146701	0.0020486	-0.003329	3.9992485	-50.000000	CY
0.0001544	13003.	84232838.	13.5990886	0.0020994	-0.003458	3.9984610	-50.000000	CY
0.0001594	13055.	81915774.	13.4925815	0.0021504	-0.003587	3.9981434	-50.000000	CY
0.0001644	13102.	79710991.	13.3892322	0.0022009	-0.003717	3.9998670	-50.000000	CY
0.0001694	13148.	77626074.	13.2940182	0.0022517	-0.003846	3.9989242	-50.000000	CY
0.0001744	13192.	75652068.	13.2060625	0.0023028	-0.003975	3.9973354	-50.000000	CY
0.0001794	13234.	73775867.	13.1240094	0.0023541	-0.004103	3.9996953	50.000000	CY
0.0001844	13272.	71983354.	13.0441488	0.0024050	-0.004232	3.9976784	50.000000	CY
0.0001894	13308.	70273741.	12.9710783	0.0024564	-0.004361	3.9999015	50.000000	CY
0.0001944	13342.	68639668.	12.9044654	0.0025083	-0.004489	3.9979475	50.000000	CY
0.0001994	13374.	67078440.	12.8433281	0.0025606	-0.004617	3.9999368	50.000000	CY
0.0002044	13403.	65579593.	12.7883122	0.0026136	-0.004744	3.9977035	50.000000	CY
0.0002094	13430.	64142683.	12.7338299	0.0026661	-0.004871	3.9998497	50.000000	CY
0.0002144	13454.	62761220.	12.6840448	0.0027191	-0.004998	3.9966434	50.000000	CY
0.0002194	13478.	61438678.	12.6377277	0.0027724	-0.005125	3.9994518	50.000000	CY
0.0002244	13501.	60171193.	12.5946489	0.0028259	-0.005252	3.9966324	50.000000	CY
0.0002294	13523.	58954625.	12.5547273	0.0028797	-0.005378	3.9983147	50.000000	CY
0.0002344	13544.	57787293.	12.5174048	0.0029338	-0.005504	3.9999419	50.000000	CY
0.0002394	13564.	56664472.	12.4829267	0.0029881	-0.005629	3.9957434	50.000000	CY
0.0002444	13584.	55584850.	12.4507779	0.0030427	-0.005755	3.9989004	50.000000	CY
0.0002494	13602.	54546262.	12.4207182	0.0030974	-0.005880	3.9999993	50.000000	CY
0.0002544	13620.	53542300.	12.3906280	0.0031519	-0.006006	3.9956446	50.000000	CY
0.0002594	13637.	52575216.	12.3623640	0.0032065	-0.006131	3.9987217	50.000000	CYT
0.0002644	13653.	51642979.	12.3358887	0.0032613	-0.006256	3.9999718	50.000000	CYT
0.0002694	13669.	50742250.	12.3115464	0.0033164	-0.006381	3.9940155	50.000000	CYT

MEG-33 Rear Abutment X direction row 1

0.0002744	13684.	49872618.	12.2888179	0.0033717	-0.006506	3.9976686	50.0000000	CYT
0.0003044	13737.	45130802.	12.1571075	0.0037003	-0.007257	3.9980997	50.0000000	CYT
0.0003344	13737.	41081683.	12.1330546	0.0040570	-0.007981	3.9964469	50.0000000	CYT

Axial Thrust Force = 996.600 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	203.6720076	325875212.	393.3150993	0.0002458	0.0002233	0.9742233	7.0668487	
0.00000125	407.3465994	325877280.	205.6791714	0.0002571	0.0002121	1.0152659	7.3318949	
0.00000188	611.0087820	325871350.	143.1434702	0.0002684	0.0002009	1.0560937	7.5974637	
0.00000250	814.6523513	325860941.	111.8828261	0.0002797	0.0001897	1.0967055	7.8635549	
0.00000313	1018.	325846753.	93.1322056	0.0002910	0.0001785	1.1370999	8.1301686	
0.00000375	1222.	325829021.	80.6365975	0.0003024	0.0001674	1.1772754	8.3973050	
0.00000438	1425.	325807845.	71.7152829	0.0003138	0.0001563	1.2172309	8.6649640	
0.00000500	1629.	325783275.	65.0279025	0.0003251	0.0001451	1.2569649	8.9331459	
0.00000563	1832.	325755337.	59.8298123	0.0003365	0.0001340	1.2964760	9.2018506	
0.00000625	2036.	325724047.	55.6742259	0.0003480	0.0001230	1.3357629	9.4710785	
0.00000688	2239.	325689416.	52.2768250	0.0003594	0.0001119	1.3748243	9.7408295	
0.00000750	2442.	325651449.	49.4480639	0.0003709	0.0001009	1.4136587	10.0111039	
0.00000813	2646.	325610150.	47.0567189	0.0003823	0.00008984	1.4522649	10.2819019	
0.00000875	2849.	325565521.	45.0090586	0.0003938	0.00007883	1.4906414	10.5532237	
0.00000938	3052.	325517564.	43.2363471	0.0004053	0.00006784	1.5287869	10.8250694	
0.00001000	3255.	325466278.	41.6870322	0.0004169	0.00005687	1.5667001	11.0974394	
0.00001063	3457.	325411664.	40.3216917	0.0004284	0.00004592	1.6043796	11.3703338	
0.00001125	3660.	325353721.	39.1096642	0.0004400	0.00003498	1.6418240	11.6437530	
0.00001188	3863.	325292448.	38.0267430	0.0004516	0.00002407	1.6790319	11.9176972	
0.00001250	4065.	325227844.	37.0535632	0.0004632	0.00001317	1.7160020	12.1921667	
0.00001313	4268.	325159908.	36.1744481	0.0004748	0.00000229	1.7527329	12.4671619	
0.00001375	4470.	325088447.	35.3765689	0.0004864	-0.00000857	1.7892231	12.7426819	
0.00001438	4672.	325011148.	34.6492954	0.0004981	-0.00001942	1.8254697	13.0187125	
0.00001500	4874.	324924161.	33.9837381	0.0005098	-0.00003024	1.8614683	13.2952261	
0.00001563	5075.	324824019.	33.3724230	0.0005214	-0.00004106	1.8972144	13.5721917	
0.00001625	5277.	324708100.	32.8090278	0.0005331	-0.00005185	1.9327036	13.8495794	
0.00001688	5477.	324574480.	32.2881692	0.0005449	-0.00006264	1.9679318	14.1273604	
0.00001750	5677.	324422050.	31.8052401	0.0005566	-0.00007341	2.0028952	14.4055094	
0.00001813	5877.	324250184.	31.3562727	0.0005683	-0.00008417	2.0375906	14.6840034	
0.00001875	6076.	324058684.	30.9378332	0.0005801	-0.00009492	2.0720149	14.9628218	

MEG-33 Rear Abutment X direction row 1

0.00001938	6275.	323847595.	30.5469333	0.0005918	-0.000106	2.1061653	15.2419457
0.00002000	6275.	313727358.	29.8819408	0.0005976	-0.000122	2.1227034	15.3479257 C
0.00002063	6275.	304220468.	29.4895899	0.0006082	-0.000134	2.1530051	15.5928735 C
0.00002125	6392.	300780522.	29.1161018	0.0006187	-0.000146	2.1828041	15.8352228 C
0.00002188	6516.	297891556.	28.7599702	0.0006291	-0.000158	2.2121136	16.0750436 C
0.00002250	6637.	294980129.	28.4198831	0.0006394	-0.000171	2.2409481	16.3124238 C
0.00002313	6754.	292064133.	28.0948053	0.0006497	-0.000183	2.2693305	16.5475413 C
0.00002375	6868.	289160289.	27.7838541	0.0006599	-0.000195	2.2972861	16.7806046 C
0.00002438	6978.	286280418.	27.4861810	0.0006700	-0.000208	2.3248355	17.0117818 C
0.00002563	7189.	280564272.	26.9257907	0.0006900	-0.000233	2.3786649	17.4677408 C
0.00002688	7390.	274969415.	26.4079593	0.0007097	-0.000258	2.4309321	17.9162408 C
0.00002813	7579.	269488118.	25.9266343	0.0007292	-0.000283	2.4816432	18.3569737 C
0.00002938	7760.	264174919.	25.4787630	0.0007484	-0.000309	2.5309543	18.7913088 C
0.00003063	7933.	259028630.	25.0604512	0.0007675	-0.000335	2.5789095	19.2194258 C
0.00003188	8098.	254048220.	24.6684549	0.0007863	-0.000361	2.6255543	19.6415406 C
0.00003313	8256.	249232699.	24.3000599	0.0008049	-0.000388	2.6709363	20.0579068 C
0.00003438	8407.	244581076.	23.9529870	0.0008234	-0.000414	2.7151046	20.4688215 C
0.00003563	8553.	240092228.	23.6253189	0.0008417	-0.000441	2.7581097	20.8746202 C
0.00003688	8694.	235764935.	23.3154412	0.0008598	-0.000468	2.8000038	21.2756875 C
0.00003813	8830.	231597809.	23.0219958	0.0008777	-0.000495	2.8408407	21.6724568 C
0.00003938	8961.	227589277.	22.7438439	0.0008955	-0.000522	2.8806758	22.0654134 C
0.00004063	9089.	223737597.	22.4800354	0.0009133	-0.000549	2.9195661	22.4551038 C
0.00004188	9213.	220001946.	22.2278097	0.0009308	-0.000577	2.9573910	22.8397338 C
0.00004313	9333.	216406804.	21.9876532	0.0009482	-0.000604	2.9943079	23.2211713 C
0.00004438	9450.	212959294.	21.7594669	0.0009656	-0.000632	3.0304148	23.6006016 C
0.00004563	9563.	209606744.	21.5399776	0.0009828	-0.000660	3.0655057	23.9749951 C
0.00004688	9674.	206387338.	21.3308238	0.0009999	-0.000688	3.0998206	24.3475262 C
0.00004813	9783.	203278756.	21.1305016	0.0010169	-0.000716	3.1333004	24.7172189 C
0.00004938	9888.	200270331.	20.9380480	0.0010338	-0.000744	3.1659283	25.0836550 C
0.00005063	9992.	197375102.	20.7540820	0.0010507	-0.000772	3.1978325	25.4485993 C
0.00005188	10093.	194563502.	20.5765351	0.0010674	-0.000800	3.2288782	25.8098625 C
0.00005313	10192.	191856337.	20.4066260	0.0010841	-0.000828	3.2592417	26.1700209 C
0.00005438	10289.	189229572.	20.2426153	0.0011007	-0.000857	3.2888092	26.5271615 C
0.00005563	10385.	186689367.	20.0848631	0.0011172	-0.000885	3.3176662	26.8825074 C
0.00005688	10478.	184237036.	19.9333571	0.0011337	-0.000914	3.3458584	27.2367184 C
0.00005813	10570.	181846021.	19.7861768	0.0011501	-0.000942	3.3732421	27.5872369 C
0.00005938	10661.	179549493.	19.6457033	0.0011665	-0.000971	3.4000901	27.9386331 C
0.00006063	10749.	177301967.	19.5084800	0.0011827	-0.001000	3.4261027	28.2855591 C
0.00006188	10836.	175130480.	19.3765917	0.0011989	-0.001029	3.4515185	28.6321094 C
0.00006313	10923.	173035897.	19.2501215	0.0012152	-0.001057	3.4763775	28.9790163 C
0.00006438	11007.	170977743.	19.1257826	0.0012312	-0.001086	3.5003918	29.3207331 C

MEG-33 Rear Abutment X direction row 1

0.00006563	11090.	168992672.	19.0066273	0.0012473	-0.001115	3.5238854	29.6633003	C
0.00006688	11173.	167073938.	18.8921379	0.0012634	-0.001144	3.5468333	30.0062777	C
0.00006813	11253.	165185772.	18.7792028	0.0012793	-0.001173	3.5689635	30.3440252	C
0.00006938	11333.	163360720.	18.6707551	0.0012953	-0.001202	3.5905790	30.6826130	C
0.00007063	11413.	161595374.	18.5665585	0.0013113	-0.001231	3.6116770	31.0220443	C
0.00007188	11490.	159863156.	18.4641413	0.0013271	-0.001260	3.6320464	31.3576317	C
0.00007313	11567.	158177405.	18.3648360	0.0013429	-0.001290	3.6518314	31.6923929	C
0.00007438	11643.	156543775.	18.2692566	0.0013588	-0.001319	3.6711048	32.0279906	C
0.00007938	11938.	150405227.	17.9127453	0.0014218	-0.001436	3.7423437	-33.762187	C
0.00008438	12221.	144847260.	17.5946245	0.0014845	-0.001553	3.8045928	-36.667341	C
0.00008938	12494.	139789419.	17.3096761	0.0015471	-0.001670	3.8580756	-39.578771	C
0.00009438	12756.	135167504.	17.0541400	0.0016095	-0.001788	3.9029762	-42.492338	C
0.00009938	13009.	130909214.	16.8222299	0.0016717	-0.001906	3.9392553	-45.411923	C
0.0001044	13253.	126978243.	16.6123948	0.0017339	-0.002024	3.9670729	-48.331945	C
0.0001094	13489.	123323654.	16.4227856	0.0017962	-0.002141	3.9864670	-50.000000	CY
0.0001144	13678.	119590994.	16.2365473	0.0018571	-0.002260	3.9972115	-50.000000	CY
0.0001194	13845.	115975525.	16.0626757	0.0019175	-0.002380	3.9987570	-50.000000	CY
0.0001244	14003.	112584181.	15.9019595	0.0019778	-0.002500	3.9995320	-50.000000	CY
0.0001294	14154.	109406740.	15.7561218	0.0020384	-0.002619	3.9998680	-50.000000	CY
0.0001344	14300.	106421553.	15.6235115	0.0020994	-0.002738	3.9999767	-50.000000	CY
0.0001394	14425.	103494347.	15.4941238	0.0021595	-0.002858	3.9999916	-50.000000	CY
0.0001444	14501.	100436626.	15.3594991	0.0022175	-0.002980	3.9999513	-50.000000	CY
0.0001494	14556.	97445487.	15.2274011	0.0022746	-0.003103	3.9997474	50.000000	CY
0.0001544	14605.	94605744.	15.1049129	0.0023318	-0.003226	3.9991903	50.000000	CY
0.0001594	14650.	91919826.	14.9939809	0.0023897	-0.003348	3.9980481	50.000000	CY
0.0001644	14688.	89359021.	14.8917096	0.0024478	-0.003470	3.9999996	50.000000	CY
0.0001694	14722.	86921425.	14.7957345	0.0025060	-0.003591	3.9995284	50.000000	CY
0.0001744	14754.	84609118.	14.7080370	0.0025647	-0.003713	3.9978757	50.000000	CY
0.0001794	14783.	82416202.	14.6272034	0.0026238	-0.003834	3.9999704	50.000000	CY
0.0001844	14810.	80327732.	14.5509839	0.0026828	-0.003955	3.9987667	50.000000	CY
0.0001894	14835.	78336022.	14.4773344	0.0027416	-0.004076	3.9990009	50.000000	CY
0.0001944	14858.	76438289.	14.4094217	0.0028008	-0.004197	3.9989813	50.000000	CY
0.0001994	14879.	74630341.	14.3463146	0.0028603	-0.004317	3.9984126	50.000000	CY
0.0002044	14900.	72903513.	14.2880562	0.0029201	-0.004437	3.9987767	50.000000	CY
0.0002094	14919.	71254889.	14.2337663	0.0029802	-0.004557	3.9996908	50.000000	CY
0.0002144	14936.	69671857.	14.1808282	0.0030400	-0.004677	3.9979724	50.000000	CY
0.0002194	14952.	68156154.	14.1303013	0.0030998	-0.004798	3.9998749	50.000000	CY
0.0002244	14967.	66703086.	14.0834512	0.0031600	-0.004918	3.9960754	50.000000	CY
0.0002294	14980.	65309790.	14.0397601	0.0032204	-0.005037	3.9990940	50.000000	CY
0.0002344	14994.	63973050.	13.9988940	0.0032810	-0.005157	3.9992060	50.000000	CY
0.0002394	15006.	62687492.	13.9611334	0.0033419	-0.005276	3.9969147	50.000000	CY

Performed by: Gokul Khatri 6/28/2024

Checked by: James Samples 7/1/2024

0.0002444	15017.	61452315.	13.9257186	0.0034031	-0.005394	3.9994189	50.0000000	CY
0.0002494	15028.	60263903.	13.8926652	0.0034645	-0.005513	3.9977583	50.0000000	CY
0.0002544	15038.	59118591.	13.8620804	0.0035262	-0.005631	3.9966924	50.0000000	CY
0.0002594	15047.	58013296.	13.8308588	0.0035874	-0.005750	3.9992206	50.0000000	CY
0.0002644	15056.	56947827.	13.8013813	0.0036487	-0.005869	3.9994570	50.0000000	CY
0.0002694	15063.	55918650.	13.7742126	0.0037104	-0.005987	3.9949752	50.0000000	CY
0.0002744	15070.	54925610.	13.7486536	0.0037723	-0.006105	3.9981926	50.0000000	CY
0.0003044	15070.	49511998.	13.9469650	0.0042451	-0.006712	3.9990675	50.0000000	CYT

Summary of Results for Nominal Moment Capacity for Section 1

Moment values interpolated at maximum compressive strain = 0.003
or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain	Max. Tens. Strain
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1	774.500	13568.309	0.00300000	-0.00565676
2	996.600	14924.592	0.00300000	-0.00459709

Note that the values of moment capacity in the table above are not factored by a strength reduction factor (phi-factor).

In ACI 318, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.75).

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318, or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Load No.	Resist. Factor	Nominal Ax. Thrust kips	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in^2
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MEG-33 Rear Abutment X direction row 1

1	0.65	774.500000	13568.	503.425000	8819.	175783680.
2	0.65	996.600000	14925.	647.790000	9701.	205625046.
1	0.75	774.500000	13568.	580.875000	10176.	142459141.
2	0.75	996.600000	14925.	747.450000	11193.	166594334.
1	0.90	774.500000	13568.	697.050000	12211.	107599265.
2	0.90	996.600000	14925.	896.940000	13432.	124199998.

Pile Section No. 2:

Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section	=	10.000000	ft
Shaft Diameter	=	30.000000	in
Concrete Cover Thickness (to edge of trans. reinf.)	=	3.000000	in
Number of Reinforcing Bars	=	8	bars
Yield Stress of Reinforcing Bars	=	50000.	psi
Modulus of Elasticity of Reinforcing Bars	=	29000000.	psi
Gross Area of Shaft	=	706.858347	sq. in.
Total Area of Reinforcing Steel	=	8.000000	sq. in.
Area Ratio of Steel Reinforcement	=	1.13	percent
Edge-to-Edge Bar Spacing	=	7.242052	in
Maximum Concrete Aggregate Size	=	0.750000	in
Ratio of Bar Spacing to Aggregate Size	=	9.66	
Offset of Center of Rebar Cage from Center of Pile	=	0.0000	in
Transverse Reinforcement			
Type: Spiral			
Number of Transverse Reinf. (per spacing)	=	1	
Spacing of Transverse Reinf.	=	4.000000	in
Yield Stress of Transverse Reinf.	=	50000.	psi
Diameter of Transverse Reinf.	=	0.500000	in

Axial Structural Capacities:

Nom. Axial Structural Capacity = $0.85 F_c A_c + F_y A_s$	=	2776.118	kips
Tensile Load for Cracking of Concrete	=	-317.428	kips

Nominal Axial Tensile Capacity = -400.000 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.128000	1.000000	10.936000	0.000000
2	1.128000	1.000000	7.732920	7.732920
3	1.128000	1.000000	0.000000	10.936000
4	1.128000	1.000000	-7.73292	7.732920
5	1.128000	1.000000	-10.93600	0.000000
6	1.128000	1.000000	-7.73292	-7.73292
7	1.128000	1.000000	0.000000	-10.93600
8	1.128000	1.000000	7.732920	-7.73292

NOTE: The positions of the above rebars were computed by LPILE

Minimum spacing between any two bars not equal to zero = 7.242 inches between bars 1 and 2.

Ratio of bar spacing to maximum aggregate size = 9.66

Concrete Properties:

Compressive Strength of Concrete	=	4000. psi
Modulus of Elasticity of Concrete	=	3604997. psi
Modulus of Rupture of Concrete	=	-474.34165 psi
Compression Strain at Peak Stress	=	0.001886
Tensile Strain at Fracture of Concrete	=	-0.0001154
Maximum Coarse Aggregate Size	=	0.750000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 2

Number	Axial Thrust Force
	kips

1	774.500
2	996.600

Definitions of Run Messages and Notes:

- C = concrete in section has cracked in tension.
 Y = stress in reinforcing steel has reached yield stress.
 T = ACI 318 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than 0.003. See ACI 318-14, Section 21.2.3.
 Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
 Position of neutral axis is measured from edge of compression side of pile.
 Compressive stresses and strains are positive in sign.
 Tensile stresses and strains are negative in sign.

Axial Thrust Force = 774.500 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in ²	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
0.00000125	197.0601972	157648158.	222.0606597	0.0002776	0.0002401	1.0899493	7.9246364	
0.00000250	394.1138216	157645529.	118.5600268	0.0002964	0.0002214	1.1569769	8.3454769	
0.00000375	591.1346542	157635908.	84.0730133	0.0003153	0.0002028	1.2233984	8.7677527	
0.00000500	788.1062969	157621259.	66.8394067	0.0003342	0.0001842	1.2892076	9.1914640	
0.00000625	985.0123447	157601975.	56.5071652	0.0003532	0.0001657	1.3543984	9.6166112	
0.00000750	1182.	157578184.	49.6256087	0.0003722	0.0001472	1.4189645	10.0431949	
0.00000875	1379.	157549941.	44.7158748	0.0003913	0.0001288	1.4828997	10.4712157	
0.00001000	1575.	157517272.	41.0385327	0.0004104	0.0001104	1.5461977	10.9006745	
0.00001125	1772.	157480188.	38.1827880	0.0004296	0.00009206	1.6088524	11.3315721	
0.00001250	1968.	157438697.	35.9021643	0.0004488	0.00007378	1.6708575	11.7639096	
0.00001375	2164.	157392801.	34.0398132	0.0004680	0.00005555	1.7322068	12.1976880	
0.00001500	2360.	157342500.	32.4911695	0.0004874	0.00003737	1.7928939	12.6329088	
0.00001625	2556.	157287792.	31.1838422	0.0005067	0.00001924	1.8529127	13.0695732	

MEG-33 Rear Abutment X direction row 1

0.00001750	2752.	157228675.	30.0661236	0.0005262	0.00000116	1.9122569	13.5076828
0.00001875	2947.	157164446.	29.1000771	0.0005456	-0.00001687	1.9709191	13.9472295
0.00002000	3142.	157089981.	28.2571291	0.0005651	-0.00003486	2.0288848	14.3881349
0.00002125	3336.	156999043.	27.5153565	0.0005847	-0.00005280	2.0861355	14.8302760
0.00002250	3530.	156887434.	26.8577127	0.0006043	-0.00007070	2.1426537	15.2735326
0.00002375	3723.	156752846.	26.2707579	0.0006239	-0.00008857	2.1984238	15.7177971
0.00002500	3915.	156594455.	25.7437631	0.0006436	-0.000106	2.2534323	16.1629784
0.00002625	3915.	149137576.	25.0368587	0.0006572	-0.000130	2.2908839	16.4329962 C
0.00002750	4033.	146649420.	24.5453819	0.0006750	-0.000150	2.3393091	16.8235672 C
0.00002875	4157.	144592151.	24.0896035	0.0006926	-0.000170	2.3864933	17.2082695 C
0.00003000	4275.	142501378.	23.6648231	0.0007099	-0.000190	2.4324413	17.5868962 C
0.00003125	4388.	140415182.	23.2684085	0.0007271	-0.000210	2.4772663	17.9604328 C
0.00003250	4496.	138329776.	22.8966067	0.0007441	-0.000231	2.5209482	18.3284269 C
0.00003375	4599.	136274891.	22.5477724	0.0007610	-0.000252	2.5636022	18.6919448 C
0.00003500	4699.	134259274.	22.2197918	0.0007777	-0.000272	2.6052760	19.0513388 C
0.00003625	4795.	132282335.	21.9104691	0.0007943	-0.000293	2.6459821	19.4065683 C
0.00003750	4888.	130344584.	21.6179695	0.0008107	-0.000314	2.6857390	19.7576670 C
0.00003875	4977.	128449428.	21.3408757	0.0008270	-0.000336	2.7245819	20.1048717 C
0.00004000	5064.	126599880.	21.0779814	0.0008431	-0.000357	2.7625479	20.4484585 C
0.00004125	5148.	124798507.	20.8282565	0.0008592	-0.000378	2.7996755	20.7887394 C
0.00004250	5229.	123036170.	20.5900901	0.0008751	-0.000400	2.8359331	21.1251612 C
0.00004375	5308.	121317239.	20.3628166	0.0008909	-0.000422	2.8713669	21.4581362 C
0.00004500	5384.	119649631.	20.1461797	0.0009066	-0.000443	2.9060545	21.7885147 C
0.00004625	5459.	118034813.	19.9396444	0.0009222	-0.000465	2.9400383	22.1167357 C
0.00004750	5531.	116449547.	19.7409583	0.0009377	-0.000487	2.9731774	22.4407939 C
0.00004875	5602.	114914948.	19.5510777	0.0009531	-0.000509	3.0056478	22.7628983 C
0.00005125	5739.	111972053.	19.1941534	0.0009837	-0.000554	3.0685042	23.3997482 C
0.00005375	5869.	109192162.	18.8647864	0.0010140	-0.000599	3.1287080	24.0277984 C
0.00005625	5994.	106563558.	18.5596701	0.0010440	-0.000644	3.1863601	24.6476493 C
0.00005875	6114.	104076249.	18.2761152	0.0010737	-0.000689	3.2415610	25.2599937 C
0.00006125	6230.	101721582.	18.0119282	0.0011032	-0.000734	3.2944107	25.8656249 C
0.00006375	6343.	99491943.	17.7653190	0.0011325	-0.000780	3.3450081	26.4654462 C
0.00006625	6451.	97380531.	17.5348307	0.0011617	-0.000826	3.3934508	27.0604811 C
0.00006875	6556.	95366369.	17.3175808	0.0011906	-0.000872	3.4396480	27.6484894 C
0.00007125	6659.	93453545.	17.1134941	0.0012193	-0.000918	3.4837896	28.2321949 C
0.00007375	6758.	91640611.	16.9221774	0.0012480	-0.000964	3.5260056	28.8136195 C
0.00007625	6855.	89904523.	16.7406104	0.0012765	-0.001011	3.5661234	29.3888625 C
0.00007875	6950.	88253220.	16.5695941	0.0013049	-0.001058	3.6043648	29.9618733 C
0.00008125	7043.	86677225.	16.4079047	0.0013331	-0.001104	3.6407187	30.5320631 C
0.00008375	7133.	85168310.	16.2543230	0.0013613	-0.001151	3.6751645	31.0984997 C
0.00008625	7222.	83727847.	16.1091455	0.0013894	-0.001198	3.7078255	31.6636880 C

MEG-33 Rear Abutment X direction row 1

0.00008875	7308.	82345955.	15.9709126	0.0014174	-0.001245	3.7386377	32.2256991	C
0.00009125	7393.	81021534.	15.8396010	0.0014454	-0.001292	3.7676724	32.7859818	C
0.00009375	7477.	79754049.	15.7152206	0.0014733	-0.001339	3.7949916	33.3460689	C
0.00009625	7559.	78529977.	15.5956665	0.0015011	-0.001386	3.8204612	33.9015919	C
0.00009875	7639.	77360672.	15.4830660	0.0015290	-0.001434	3.8443164	34.4596921	C
0.0001013	7718.	76230217.	15.3747014	0.0015567	-0.001481	3.8663680	35.0139045	C
0.0001038	7796.	75142382.	15.2714736	0.0015844	-0.001528	3.8867300	35.5678588	C
0.0001063	7873.	74099012.	15.1739535	0.0016122	-0.001575	3.9054687	36.1244321	C
0.0001088	7948.	73087021.	15.0796746	0.0016399	-0.001623	3.9224345	36.6770867	C
0.0001113	8022.	72110814.	14.9897588	0.0016676	-0.001670	3.9377310	-37.296228	C
0.0001138	8096.	71171201.	14.9046065	0.0016954	-0.001717	3.9513924	-38.415241	C
0.0001163	8168.	70262204.	14.8230900	0.0017232	-0.001764	3.9633628	-39.534345	C
0.0001188	8239.	69378396.	14.7441391	0.0017509	-0.001812	3.9736084	-40.656433	C
0.0001213	8309.	68525068.	14.6692263	0.0017786	-0.001859	3.9822043	-41.775770	C
0.0001238	8378.	67700276.	14.5981174	0.0018065	-0.001906	3.9891332	-42.892318	C
0.0001263	8446.	66899765.	14.5299236	0.0018344	-0.001953	3.9943638	-44.008504	C
0.0001288	8513.	66118767.	14.4635469	0.0018622	-0.002000	3.9978823	-45.127795	C
0.0001313	8579.	65361878.	14.4004577	0.0018901	-0.002047	3.9997158	-46.244196	C
0.0001338	8644.	64627304.	14.3405133	0.0019180	-0.002094	3.9990923	-47.357548	C
0.0001363	8708.	63913711.	14.2835531	0.0019461	-0.002141	3.9999976	-48.467799	C
0.0001388	8771.	63216737.	14.2287055	0.0019742	-0.002188	3.9997086	-49.577809	C
0.0001413	8833.	62531650.	14.1751241	0.0020022	-0.002235	3.9988237	-50.000000	CY
0.0001438	8890.	61846858.	14.1229803	0.0020302	-0.002282	3.9999444	-50.000000	CY
0.0001463	8943.	61151758.	14.0714715	0.0020580	-0.002330	3.9992542	-50.000000	CY
0.0001488	8992.	60447635.	14.0203885	0.0020855	-0.002377	3.9999973	-50.000000	CY
0.0001588	9158.	57685214.	13.8254824	0.0021948	-0.002568	3.9999988	-50.000000	CY
0.0001688	9312.	55182401.	13.6599124	0.0023051	-0.002757	3.9998520	-50.000000	CY
0.0001788	9453.	52883298.	13.5161075	0.0024160	-0.002946	3.9987512	50.000000	CY
0.0001888	9550.	50594807.	13.3816907	0.0025258	-0.003137	3.9998470	50.000000	CY
0.0001988	9592.	48263731.	13.2407117	0.0026316	-0.003331	3.9999975	50.000000	CY
0.0002088	9624.	46101908.	13.1152488	0.0027378	-0.003525	3.9980876	50.000000	CY
0.0002188	9651.	44118538.	13.0033048	0.0028445	-0.003718	3.9979183	50.000000	CY
0.0002288	9674.	42291530.	12.9015700	0.0029512	-0.003911	3.9996000	50.000000	CY
0.0002388	9695.	40607196.	12.8122433	0.0030589	-0.004104	3.9999057	50.000000	CY
0.0002488	9713.	39048206.	12.7323935	0.0031672	-0.004295	3.9992959	50.000000	CY
0.0002588	9729.	37598341.	12.6577607	0.0032752	-0.004487	3.9975020	50.000000	CY
0.0002688	9742.	36250539.	12.5914115	0.0033839	-0.004679	3.9980848	50.000000	CY
0.0002788	9754.	34993511.	12.5326120	0.0034935	-0.004869	3.9993795	50.000000	CY
0.0002888	9765.	33818876.	12.4802406	0.0036037	-0.005059	3.9961640	50.000000	CY
0.0002988	9774.	32717991.	12.4320667	0.0037141	-0.005248	3.9998985	50.000000	CY
0.0003088	9782.	31681255.	12.3877915	0.0038247	-0.005438	3.9968447	50.000000	CY

Axial Thrust Force = 996.600 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
0.00000125	188.0584437	150446755.	287.2584805	0.0003591	0.0003216	1.3772972	10.2880574	
0.00000250	376.1126663	150445067.	151.1603664	0.0003779	0.0003029	1.4409219	10.7090016	
0.00000375	564.1325191	150435338.	105.8081611	0.0003968	0.0002843	1.5039391	11.1314500	
0.00000500	752.1008139	150420163.	83.1424354	0.0004157	0.0002657	1.5663424	11.5554031	
0.00000625	940.0003549	150400057.	69.5513041	0.0004347	0.0002472	1.6281252	11.9808614	
0.00000750	1128.	150375192.	60.4974730	0.0004537	0.0002287	1.6892810	12.4078252	
0.00000875	1316.	150345639.	54.0363879	0.0004728	0.0002103	1.7498033	12.8362959	
0.00001000	1503.	150311432.	49.1957720	0.0004920	0.0001920	1.8096856	13.2662739	
0.00001125	1691.	150272590.	45.4354722	0.0005111	0.0001736	1.8689214	13.6977603	
0.00001250	1878.	150229121.	42.4313969	0.0005304	0.0001554	1.9275041	14.1307564	
0.00001375	2065.	150181028.	39.9773064	0.0005497	0.0001372	1.9854271	14.5652634	
0.00001500	2252.	150128313.	37.9357078	0.0005690	0.0001190	2.0426839	15.0012829	
0.00001625	2439.	150070974.	36.2114141	0.0005884	0.0001009	2.0992680	15.4388164	
0.00001750	2625.	150009009.	34.7364348	0.0006079	0.00008289	2.1551726	15.8778657	
0.00001875	2811.	149942413.	33.4609106	0.0006274	0.00006489	2.2103913	16.3184327	
0.00002000	2997.	149871182.	32.3474471	0.0006469	0.00004695	2.2649173	16.7605194	
0.00002125	3183.	149795310.	31.3674489	0.0006666	0.00002906	2.3187441	17.2041280	
0.00002250	3369.	149714791.	30.4986754	0.0006862	0.00001122	2.3718650	17.6492608	
0.00002375	3554.	149629604.	29.7235680	0.0007059	-0.00000657	2.4242732	18.0959200	
0.00002500	3738.	149538587.	29.0280487	0.0007257	-0.00002430	2.4759601	18.5440854	
0.00002625	3923.	149438346.	28.4006510	0.0007455	-0.00004198	2.5269122	18.9936831	
0.00002750	4106.	149325541.	27.8319705	0.0007654	-0.00005962	2.5771150	19.4446216	
0.00002875	4289.	149197700.	27.3142404	0.0007853	-0.00007722	2.6265546	19.8968105	
0.00003000	4472.	149053195.	26.8409957	0.0008052	-0.00009477	2.6752182	20.3501663	
0.00003125	4531.	144984016.	26.2871562	0.0008215	-0.000116	2.7141181	20.6961727	C
0.00003250	4669.	143672550.	25.8498607	0.0008401	-0.000135	2.7581238	21.1118688	C
0.00003375	4802.	142294136.	25.4404212	0.0008586	-0.000154	2.8010078	21.5231249	C
0.00003500	4930.	140866444.	25.0560113	0.0008770	-0.000173	2.8428018	21.9301016	C
0.00003625	5053.	139380748.	24.6932157	0.0008951	-0.000192	2.8834566	22.3319307	C
0.00003750	5170.	137867987.	24.3506783	0.0009132	-0.000212	2.9230603	22.7294878	C
0.00003875	5283.	136338829.	24.0265890	0.0009310	-0.000231	2.9616432	23.1229419	C
0.00004000	5392.	134801287.	23.7193268	0.0009488	-0.000251	2.9992314	23.5124192	C
0.00004125	5497.	133262579.	23.4274947	0.0009664	-0.000271	3.0358525	23.8980782	C

MEG-33 Rear Abutment X direction row 1

0.00004250	5599.	131730128.	23.1499346	0.0009839	-0.000291	3.0715397	24.2801695	C
0.00004375	5697.	130211933.	22.8857206	0.0010013	-0.000311	3.1063334	24.6590706	C
0.00004500	5792.	128715029.	22.6340584	0.0010185	-0.000331	3.1402745	25.0351963	C
0.00004625	5884.	127232039.	22.3935019	0.0010357	-0.000352	3.1733357	25.4079721	C
0.00004750	5974.	125769874.	22.1634899	0.0010528	-0.000372	3.2055588	25.7778324	C
0.00004875	6061.	124334580.	21.9435626	0.0010697	-0.000393	3.2369868	26.1452743	C
0.00005125	6229.	121533203.	21.5305112	0.0011034	-0.000434	3.2974499	26.8721592	C
0.00005375	6387.	118835766.	21.1499319	0.0011368	-0.000476	3.3548729	27.5897691	C
0.00005625	6538.	116224934.	20.7966832	0.0011698	-0.000518	3.4092523	28.2967760	C
0.00005875	6681.	113719442.	20.4688238	0.0012025	-0.000560	3.4608103	28.9958212	C
0.00006125	6818.	111315893.	20.1635554	0.0012350	-0.000602	3.5096351	29.6874529	C
0.00006375	6949.	109011250.	19.8785694	0.0012673	-0.000645	3.5558133	30.3723177	C
0.00006625	7076.	106802720.	19.6119588	0.0012993	-0.000688	3.5994299	31.0511632	C
0.00006875	7197.	104684745.	19.3618806	0.0013311	-0.000731	3.6405433	31.7243119	C
0.00007125	7313.	102645300.	19.1260719	0.0013627	-0.000775	3.6791504	32.3906837	C
0.00007375	7426.	100691852.	18.9042821	0.0013942	-0.000818	3.7154006	33.0528461	C
0.00007625	7535.	98822441.	18.6956452	0.0014255	-0.000862	3.7493658	33.7119330	C
0.00007875	7641.	97024114.	18.4982640	0.0014567	-0.000906	3.7810179	34.3664720	C
0.00008125	7742.	95292183.	18.3110700	0.0014878	-0.000950	3.8103873	35.0163961	C
0.00008375	7842.	93637182.	18.1349296	0.0015188	-0.000994	3.8376342	35.6660230	C
0.00008625	7938.	92032543.	17.9664266	0.0015496	-0.001038	3.8625943	36.3092123	C
0.00008875	8032.	90497415.	17.8076180	0.0015804	-0.001082	3.8854853	36.9529194	C
0.00009125	8122.	89011588.	17.6558293	0.0016111	-0.001126	3.9061923	37.5921760	C
0.00009375	8211.	87586116.	17.5123562	0.0016418	-0.001171	3.9248479	38.2320311	C
0.00009625	8297.	86203445.	17.3747470	0.0016723	-0.001215	3.9413589	38.8674503	C
0.00009875	8382.	84879026.	17.2451589	0.0017030	-0.001260	3.9558708	39.5058865	C
0.0001013	8463.	83586711.	17.1196877	0.0017334	-0.001304	3.9682360	40.1376207	C
0.0001038	8543.	82346422.	17.0014055	0.0017639	-0.001349	3.9786097	40.7727917	C
0.0001063	8621.	81143307.	16.8879757	0.0017943	-0.001393	3.9869208	41.4057629	C
0.0001088	8697.	79976792.	16.7793715	0.0018248	-0.001438	3.9931906	42.0375057	C
0.0001113	8772.	78853018.	16.6767408	0.0018553	-0.001482	3.9974452	42.6727728	C
0.0001138	8845.	77756933.	16.5774429	0.0018857	-0.001527	3.9996498	43.3041527	C
0.0001163	8916.	76693908.	16.4826934	0.0019161	-0.001571	3.9994324	43.9364679	C
0.0001188	8985.	75665508.	16.3930561	0.0019467	-0.001616	3.9990767	44.5726498	C
0.0001213	9053.	74662694.	16.3068232	0.0019772	-0.001660	4.0000000	45.2078051	C
0.0001238	9118.	73683503.	16.2238394	0.0020077	-0.001705	3.9999186	45.8421165	C
0.0001263	9183.	72733704.	16.1452271	0.0020383	-0.001749	3.9996205	46.4804006	C
0.0001288	9246.	71811895.	16.0707123	0.0020691	-0.001793	3.9990147	47.1225850	C
0.0001313	9307.	70909315.	15.9982619	0.0020998	-0.001838	3.9999895	47.7618221	C
0.0001338	9366.	70028928.	15.9288593	0.0021305	-0.001882	3.9996903	48.4023758	C
0.0001363	9425.	69173626.	15.8629301	0.0021613	-0.001926	3.9988838	49.0465873	C

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0.0001388	9482.	68341840.	15.8003106	0.0021923	-0.001970	3.9999573	49.6945611	C
0.0001413	9539.	67529947.	15.7406118	0.0022234	-0.002014	3.9994003	50.0000000	CY
0.0001438	9593.	66733493.	15.6820316	0.0022543	-0.002058	3.9995427	50.0000000	CY
0.0001463	9645.	65951153.	15.6271116	0.0022855	-0.002102	3.9996510	50.0000000	CY
0.0001488	9696.	65185728.	15.5752890	0.0023168	-0.002146	3.9983758	50.0000000	CY
0.0001588	9882.	62247449.	15.3961656	0.0024441	-0.002318	3.9984239	50.0000000	CY
0.0001688	10018.	59364223.	15.2340472	0.0025707	-0.002492	3.9996748	50.0000000	CY
0.0001788	10124.	56635834.	15.0873784	0.0026969	-0.002666	3.9995234	50.0000000	CY
0.0001888	10220.	54147854.	14.9609482	0.0028239	-0.002839	3.9989667	50.0000000	CY
0.0001988	10310.	51875197.	14.8548645	0.0029524	-0.003010	3.9984668	50.0000000	CY
0.0002088	10389.	49769752.	14.7589196	0.0030809	-0.003182	3.9992085	50.0000000	CY
0.0002188	10439.	47722512.	14.6613137	0.0032072	-0.003355	3.9993295	50.0000000	CY
0.0002288	10458.	45719330.	14.5619185	0.0033310	-0.003531	3.9989425	50.0000000	CY
0.0002388	10462.	43821915.	14.4717300	0.0034551	-0.003707	3.9979495	50.0000000	CY
0.0002488	10462.	42060230.	14.3969131	0.0035812	-0.003881	3.9961228	50.0000000	CY
0.0002588	10462.	40434714.	14.3359160	0.0037094	-0.004053	3.9999988	50.0000000	CY
0.0002688	10462.	38930166.	14.3211220	0.0038488	-0.004214	3.9998163	50.0000000	CY

 Summary of Results for Nominal Moment Capacity for Section 2

Moment values interpolated at maximum compressive strain = 0.003
 or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain	Max. Tens. Strain
1	774.500	9683.598	0.00300000	-0.00399835
2	996.600	10339.541	0.00300000	-0.00307360

Note that the values of moment capacity in the table above are not factored by a strength reduction factor (phi-factor).

In ACI 318, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.75).

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318, or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Load No.	Resist. Factor	Nominal Ax. Thrust kips	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in ²
1	0.65	774.500000	9684.	503.425000	6294.	100451525.
2	0.65	996.600000	10340.	647.790000	6721.	113023625.
1	0.75	774.500000	9684.	580.875000	7263.	83071448.
2	0.75	996.600000	10340.	747.450000	7755.	95090078.
1	0.90	774.500000	9684.	697.050000	8715.	63836425.
2	0.90	996.600000	10340.	896.940000	9306.	70927947.

Layering Correction Equivalent Depths of Soil & Rock Layers

Layer No.	Top of Layer Below Pile Head ft	Equivalent Top Depth Below Grnd Surf ft	Same Layer Type As Layer Above	Layer is Rock or Rock Layer	F0 Integral for Layer lbs	F1 Integral for Layer lbs
1	0.00	0.00	N.A.	No	0.00	132812.
2	5.0000	8.1014	No	No	132812.	925764.
3	18.0000	24.8456	No	No	1058577.	104929.
4	19.2500	19.2500	No	Yes	N.A.	N.A.

Notes: The F0 integral of Layer n+1 equals the sum of the F0 and F1 integrals for Layer n. Layering correction equivalent depths are computed only for soil types with both shallow-depth and deep-depth expressions for peak lateral load transfer. These soil types are soft and stiff clays, non-liquefied sands, and cemented c-phi soil.

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 1

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 1800.0 lbs
 Applied moment at pile head = 4363200.0 in-lbs
 Axial thrust load on pile head = 774500.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in ²	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	0.06679	4363200.	1800.	-0.00132	0.00	3.35E+11	0.00	0.00	0.00
0.2925	0.06223	4373046.	1417.	-0.00128	0.00	3.35E+11	-218.431	12320.	0.00
0.5850	0.05784	4380077.	320.7638	-0.00123	0.00	3.35E+11	-406.008	24640.	0.00
0.8775	0.05360	4381982.	-1382.	-0.00118	0.00	3.35E+11	-564.427	36960.	0.00
1.1700	0.04953	4376807.	-3401.	-0.00114	0.00	3.35E+11	-585.667	41505.	0.00
1.4625	0.04562	4364293.	-5455.	-0.00109	0.00	3.35E+11	-584.922	45007.	0.00
1.7550	0.04187	4344448.	-7506.	-0.00105	0.00	3.35E+11	-583.448	48917.	0.00
2.0475	0.03827	4317291.	-9550.	-0.00100	0.00	3.35E+11	-581.209	53302.	0.00
2.3400	0.03484	4282850.	-11584.	-9.56E-04	0.00	3.35E+11	-578.164	58248.	0.00
2.6325	0.03156	4241165.	-13607.	-9.11E-04	0.00	3.35E+11	-574.263	63860.	0.00
2.9250	0.02844	4192284.	-15614.	-8.67E-04	0.00	3.35E+11	-569.450	70271.	0.00
3.2175	0.02548	4136268.	-17603.	-8.23E-04	0.00	3.35E+11	-563.655	77653.	0.00
3.5100	0.02266	4073190.	-19569.	-7.80E-04	0.00	3.35E+11	-556.792	86232.	0.00
3.8025	0.02000	4003137.	-21509.	-7.38E-04	0.00	3.35E+11	-548.755	96310.	0.00
4.0950	0.01748	3926209.	-23419.	-6.97E-04	0.00	3.35E+11	-539.410	108302.	0.00
4.3875	0.01511	3842523.	-25293.	-6.56E-04	0.00	3.35E+11	-528.583	122798.	0.00
4.6800	0.01288	3752216.	-27127.	-6.16E-04	0.00	3.35E+11	-516.038	140663.	0.00
4.9725	0.01078	3655445.	-28912.	-5.78E-04	0.00	3.35E+11	-501.453	163234.	0.00
5.2650	0.00882	3552392.	-29874.	-5.40E-04	0.00	3.36E+11	-46.336	18434.	0.00
5.5575	0.00699	3448667.	-30023.	-5.03E-04	0.00	3.36E+11	-38.769	19458.	0.00
5.8500	0.00529	3344366.	-30145.	-4.68E-04	0.00	3.36E+11	-30.872	20483.	0.00
6.1425	0.00371	3239590.	-30239.	-4.33E-04	0.00	3.36E+11	-22.734	21507.	0.00
6.4350	0.00225	3134441.	-30305.	-4.00E-04	0.00	3.36E+11	-14.438	22531.	0.00

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6.7275	9.03E-04	3029026.	-30341.	-3.68E-04	0.00	3.36E+11	-6.061	23555.	0.00
7.0200	-3.32E-04	2923449.	-30347.	-3.37E-04	0.00	3.36E+11	2.3231	24579.	0.00
7.3125	-0.00146	2817819.	-30324.	-3.07E-04	0.00	3.36E+11	10.6449	25603.	0.00
7.6050	-0.00248	2712239.	-30273.	-2.78E-04	0.00	3.36E+11	18.8401	26627.	0.00
7.8975	-0.00341	2606814.	-30192.	-2.50E-04	0.00	3.36E+11	26.8489	27651.	0.00
8.1900	-0.00424	2501646.	-30085.	-2.23E-04	0.00	3.36E+11	34.6157	28676.	0.00
8.4825	-0.00497	2396834.	-29950.	-1.97E-04	0.00	3.36E+11	42.0895	29700.	0.00
8.7750	-0.00562	2292471.	-29790.	-1.73E-04	0.00	3.36E+11	49.2236	30724.	0.00
9.0675	-0.00619	2188651.	-29605.	-1.50E-04	0.00	3.36E+11	55.9759	31748.	0.00
9.3600	-0.00667	2085457.	-29397.	-1.27E-04	0.00	3.36E+11	62.3081	32772.	0.00
9.6525	-0.00708	1982972.	-29168.	-1.06E-04	0.00	3.36E+11	68.1866	33796.	0.00
9.9450	-0.00742	1881271.	-28920.	-8.58E-05	0.00	3.36E+11	73.5817	34820.	0.00
10.2375	-0.00768	1780422.	-28653.	-6.66E-05	0.00	3.36E+11	78.4678	35844.	0.00
10.5300	-0.00789	1680490.	-28370.	-4.86E-05	0.00	3.36E+11	82.8235	36869.	0.00
10.8225	-0.00802	1581531.	-28072.	-3.15E-05	0.00	3.36E+11	86.6312	37893.	0.00
11.1150	-0.00811	1483594.	-27763.	-1.55E-05	0.00	3.36E+11	89.8771	38917.	0.00
11.4075	-0.00813	1386722.	-27442.	-4.94E-07	0.00	3.36E+11	92.5514	39941.	0.00
11.7000	-0.00811	1290951.	-27114.	1.35E-05	0.00	3.36E+11	94.6479	40965.	0.00
11.9925	-0.00804	1196309.	-26779.	2.65E-05	0.00	3.36E+11	96.1643	41989.	0.00
12.2850	-0.00792	1102818.	-26440.	3.85E-05	0.00	3.36E+11	97.1015	43013.	0.00
12.5775	-0.00777	1010492.	-26098.	4.95E-05	0.00	3.36E+11	97.4642	44037.	0.00
12.8700	-0.00758	919338.	-25757.	5.96E-05	0.00	3.36E+11	97.2604	45062.	0.00
13.1625	-0.00735	829357.	-25417.	6.88E-05	0.00	3.36E+11	96.5017	46086.	0.00
13.4550	-0.00709	740540.	-25080.	7.70E-05	0.00	3.36E+11	95.2029	47110.	0.00
13.7475	-0.00681	652876.	-24749.	8.42E-05	0.00	3.36E+11	93.3819	48134.	0.00
14.0400	-0.00650	566343.	-24425.	9.06E-05	0.00	3.36E+11	91.0600	49158.	0.00
14.3325	-0.00617	480916.	-24111.	9.61E-05	0.00	3.36E+11	88.2617	50182.	0.00
14.6250	-0.00583	396563.	-23807.	1.01E-04	0.00	3.36E+11	85.0144	51206.	0.00
14.9175	-0.00547	313247.	-23515.	1.04E-04	0.00	3.36E+11	81.3488	52230.	0.00
15.2100	-0.00509	230923.	-23236.	1.07E-04	0.00	3.36E+11	77.2985	53255.	0.00
15.5025	-0.00471	149545.	-22973.	1.09E-04	0.00	3.36E+11	72.9001	54279.	0.00
15.7950	-0.00433	69061.	-22725.	1.10E-04	0.00	3.36E+11	68.1933	55303.	0.00
16.0875	-0.00394	-10585.	-22494.	1.11E-04	0.00	3.36E+11	63.2205	56327.	0.00
16.3800	-0.00355	-89451.	-22282.	1.10E-04	0.00	3.36E+11	58.0273	57351.	0.00
16.6725	-0.00317	-167600.	-22087.	1.09E-04	0.00	3.36E+11	52.6622	58375.	0.00
16.9650	-0.00279	-245096.	-21912.	1.07E-04	0.00	3.36E+11	47.1764	59399.	0.00
17.2575	-0.00242	-322003.	-21756.	1.04E-04	0.00	3.36E+11	41.6244	60423.	0.00
17.5500	-0.00206	-398389.	-21620.	9.99E-05	0.00	3.36E+11	36.0632	61448.	0.00
17.8425	-0.00172	-474318.	-21503.	9.53E-05	0.00	3.36E+11	30.5533	62472.	0.00
18.1350	-0.00139	-549858.	-20918.	9.00E-05	0.00	3.36E+11	302.6425	763846.	0.00
18.4275	-0.00108	-621654.	-19966.	8.39E-05	0.00	3.36E+11	239.9037	776166.	0.00

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18.7200	-8.02E-04	-690476.	-19229.	7.70E-05	0.00	3.36E+11	180.1394	788486.	0.00
19.0125	-5.44E-04	-757060.	-18695.	6.95E-05	0.00	3.36E+11	124.1655	800806.	0.00
19.3050	-3.14E-04	-822092.	1044.	5.63E-05	0.00	1.58E+11	11123.	1.24E+08	0.00
19.5975	-1.49E-04	-750036.	31197.	3.88E-05	0.00	1.58E+11	6058.	1.43E+08	0.00
19.8900	-4.16E-05	-603297.	45199.	2.38E-05	0.00	1.58E+11	1920.	1.62E+08	0.00
20.1825	1.82E-05	-432868.	46920.	1.22E-05	0.00	1.58E+11	-939.251	1.81E+08	0.00
20.4750	4.43E-05	-273984.	40853.	4.37E-06	0.00	1.58E+11	-2518.	2.00E+08	0.00
20.7675	4.89E-05	-146103.	31093.	-3.05E-07	0.00	1.58E+11	-3044.	2.18E+08	0.00
21.0600	4.22E-05	-55712.	20753.	-2.55E-06	0.00	1.58E+11	-2848.	2.37E+08	0.00
21.3525	3.10E-05	-405.913	11785.	-3.18E-06	0.00	1.58E+11	-2262.	2.56E+08	0.00
21.6450	1.98E-05	27032.	5087.	-2.88E-06	0.00	1.58E+11	-1554.	2.75E+08	0.00
21.9375	1.08E-05	35323.	775.1365	-2.19E-06	0.00	1.58E+11	-903.064	2.94E+08	0.00
22.2300	4.50E-06	32486.	-1513.	-1.43E-06	0.00	1.58E+11	-400.700	3.12E+08	0.00
22.5225	7.46E-07	24710.	-2340.	-7.95E-07	0.00	1.58E+11	-70.447	3.31E+08	0.00
22.8150	-1.08E-06	16064.	-2275.	-3.41E-07	0.00	1.58E+11	107.4640	3.50E+08	0.00
23.1075	-1.65E-06	8742.	-1783.	-6.46E-08	0.00	1.58E+11	172.9777	3.69E+08	0.00
23.4000	-1.53E-06	3550.	-1182.	7.23E-08	0.00	1.58E+11	169.1123	3.88E+08	0.00
23.6925	-1.14E-06	441.8052	-654.092	1.17E-07	0.00	1.58E+11	131.8747	4.07E+08	0.00
23.9850	-7.12E-07	-1042.	-271.294	1.10E-07	0.00	1.58E+11	86.2441	4.25E+08	0.00
24.2775	-3.66E-07	-1463.	-38.607	8.21E-08	0.00	1.58E+11	46.3413	4.44E+08	0.00
24.5700	-1.35E-07	-1313.	73.9960	5.12E-08	0.00	1.58E+11	17.8197	4.63E+08	0.00
24.8625	-6.64E-09	-944.103	106.8705	2.61E-08	0.00	1.58E+11	0.9122	4.82E+08	0.00
25.1550	4.80E-08	-563.410	96.4537	9.30E-09	0.00	1.58E+11	-6.848	5.01E+08	0.00
25.4475	5.86E-08	-267.048	69.2086	5.17E-11	0.00	1.58E+11	-8.677	5.20E+08	0.00
25.7400	4.84E-08	-77.566	40.9622	-3.78E-09	0.00	1.58E+11	-7.418	5.38E+08	0.00
26.0325	3.21E-08	20.5269	19.0140	-4.42E-09	0.00	1.58E+11	-5.088	5.57E+08	0.00
26.3250	1.73E-08	55.9363	5.0910	-3.57E-09	0.00	1.58E+11	-2.846	5.76E+08	0.00
26.6175	7.00E-09	56.2850	-1.985	-2.32E-09	0.00	1.58E+11	-1.186	5.95E+08	0.00
26.9100	1.06E-09	42.0147	-4.386	-1.22E-09	0.00	1.58E+11	-0.182	6.03E+08	0.00
27.2025	-1.60E-09	25.4985	-4.224	-4.73E-10	0.00	1.58E+11	0.2747	6.03E+08	0.00
27.4950	-2.26E-09	12.3650	-3.059	-5.17E-11	0.00	1.58E+11	0.3890	6.03E+08	0.00
27.7875	-1.96E-09	4.0227	-1.785	1.31E-10	0.00	1.58E+11	0.3371	6.03E+08	0.00
28.0800	-1.35E-09	-0.167	-0.788	1.74E-10	0.00	1.58E+11	0.2312	6.03E+08	0.00
28.3725	-7.42E-10	-1.508	-0.158	1.55E-10	0.00	1.58E+11	0.1276	6.03E+08	0.00
28.6650	-2.57E-10	-1.277	0.1433	1.24E-10	0.00	1.58E+11	0.04415	6.03E+08	0.00
28.9575	1.29E-10	-0.502	0.1820	1.04E-10	0.00	1.58E+11	-0.02210	6.03E+08	0.00
29.2500	4.75E-10	0.00	0.00	9.86E-11	0.00	1.58E+11	-0.08160	3.02E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual

stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 1:

Pile-head deflection = 0.06678681 inches
 Computed slope at pile head = -0.0013208 radians
 Maximum bending moment = 4381982. inch-lbs
 Maximum shear force = 46920. lbs
 Depth of maximum bending moment = 0.87750000 feet below pile head
 Depth of maximum shear force = 20.18250000 feet below pile head
 Number of iterations = 13
 Number of zero deflection points = 6

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 2

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 2420.0 lbs
 Applied moment at pile head = 5889600.0 in-lbs
 Axial thrust load on pile head = 996600.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in ²	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	0.1131	5889600.	2420.	-0.00198	0.00	3.24E+11	0.00	0.00	0.00
0.2925	0.1063	5904901.	1765.	-0.00191	0.00	3.24E+11	-372.969	12320.	0.00
0.5850	0.09965	5915383.	-65.529	-0.00185	0.00	3.24E+11	-670.317	23610.	0.00
0.8775	0.09327	5917382.	-2422.	-0.00179	0.00	3.24E+11	-672.685	25314.	0.00
1.1700	0.08712	5910870.	-4787.	-0.00172	0.00	3.24E+11	-674.439	27173.	0.00
1.4625	0.08119	5895825.	-7156.	-0.00166	0.00	3.24E+11	-675.563	29207.	0.00
1.7550	0.07548	5872234.	-9528.	-0.00159	0.00	3.24E+11	-676.041	31438.	0.00
2.0475	0.07000	5840092.	-11901.	-0.00153	0.00	3.24E+11	-675.852	33891.	0.00

MEG-33 Rear Abutment X direction row 1

2.3400	0.06473	5799401.	-14271.	-0.00147	0.00	3.24E+11	-674.974	36599.	0.00
2.6325	0.05969	5750176.	-16638.	-0.00141	0.00	3.24E+11	-673.384	39596.	0.00
2.9250	0.05487	5692437.	-18997.	-0.00134	0.00	3.24E+11	-671.054	42928.	0.00
3.2175	0.05026	5626214.	-21347.	-0.00128	0.00	3.24E+11	-667.952	46646.	0.00
3.5100	0.04587	5551550.	-23685.	-0.00122	0.00	3.25E+11	-664.044	50816.	0.00
3.8025	0.04169	5468494.	-26007.	-0.00116	0.00	3.25E+11	-659.288	55514.	0.00
4.0950	0.03771	5377110.	-28311.	-0.00110	0.00	3.25E+11	-653.634	60840.	0.00
4.3875	0.03394	5277468.	-30594.	-0.00105	0.00	3.25E+11	-647.024	66916.	0.00
4.6800	0.03037	5169656.	-32852.	-9.89E-04	0.00	3.25E+11	-639.388	73902.	0.00
4.9725	0.02699	5053772.	-35081.	-9.34E-04	0.00	3.25E+11	-630.638	82004.	0.00
5.2650	0.02381	4929926.	-36407.	-8.80E-04	0.00	3.25E+11	-125.049	18434.	0.00
5.5575	0.02081	4804354.	-36829.	-8.28E-04	0.00	3.25E+11	-115.386	19458.	0.00
5.8500	0.01800	4677179.	-37216.	-7.76E-04	0.00	3.25E+11	-105.038	20483.	0.00
6.1425	0.01536	4548532.	-37565.	-7.27E-04	0.00	3.25E+11	-94.134	21507.	0.00
6.4350	0.01290	4418555.	-37876.	-6.78E-04	0.00	3.25E+11	-82.798	22531.	0.00
6.7275	0.01060	4287390.	-38146.	-6.31E-04	0.00	3.25E+11	-71.148	23555.	0.00
7.0200	0.00847	4155187.	-38375.	-5.86E-04	0.00	3.25E+11	-59.295	24579.	0.00
7.3125	0.00649	4022097.	-38562.	-5.42E-04	0.00	3.25E+11	-47.345	25603.	0.00
7.6050	0.00467	3888271.	-38707.	-4.99E-04	0.00	3.25E+11	-35.397	26627.	0.00
7.8975	0.00299	3753862.	-38811.	-4.58E-04	0.00	3.25E+11	-23.544	27651.	0.00
8.1900	0.00145	3619022.	-38873.	-4.18E-04	0.00	3.25E+11	-11.874	28676.	0.00
8.4825	5.53E-05	3483899.	-38894.	-3.80E-04	0.00	3.25E+11	-0.468	29700.	0.00
8.7750	-0.00121	3348639.	-38877.	-3.43E-04	0.00	3.25E+11	10.6002	30724.	0.00
9.0675	-0.00235	3213383.	-38821.	-3.07E-04	0.00	3.25E+11	21.2603	31748.	0.00
9.3600	-0.00337	3078267.	-38728.	-2.73E-04	0.00	3.26E+11	31.4496	32772.	0.00
9.6525	-0.00427	2943423.	-38601.	-2.41E-04	0.00	3.26E+11	41.1112	33796.	0.00
9.9450	-0.00506	2808975.	-38441.	-2.10E-04	0.00	3.26E+11	50.1936	34820.	0.00
10.2375	-0.00574	2675039.	-38250.	-1.80E-04	0.00	3.26E+11	58.6516	35844.	0.00
10.5300	-0.00633	2541724.	-38030.	-1.52E-04	0.00	3.26E+11	66.4453	36869.	0.00
10.8225	-0.00681	2409133.	-37784.	-1.26E-04	0.00	3.26E+11	73.5407	37893.	0.00
11.1150	-0.00721	2277356.	-37515.	-1.00E-04	0.00	3.26E+11	79.9094	38917.	0.00
11.4075	-0.00752	2146479.	-37225.	-7.65E-05	0.00	3.26E+11	85.5284	39941.	0.00
11.7000	-0.00774	2016574.	-36916.	-5.40E-05	0.00	3.26E+11	90.3801	40965.	0.00
11.9925	-0.00790	1887706.	-36592.	-3.30E-05	0.00	3.26E+11	94.4522	41989.	0.00
12.2850	-0.00798	1759931.	-36254.	-1.33E-05	0.00	3.26E+11	97.7379	43013.	0.00
12.5775	-0.00799	1633294.	-35907.	4.93E-06	0.00	3.26E+11	100.2353	44037.	0.00
12.8700	-0.00794	1507831.	-35552.	2.19E-05	0.00	3.26E+11	101.9477	45062.	0.00
13.1625	-0.00784	1383566.	-35193.	3.74E-05	0.00	3.26E+11	102.8832	46086.	0.00
13.4550	-0.00768	1260517.	-34831.	5.17E-05	0.00	3.26E+11	103.0552	47110.	0.00
13.7475	-0.00747	1138690.	-34470.	6.46E-05	0.00	3.26E+11	102.4817	48134.	0.00
14.0400	-0.00722	1018082.	-34113.	7.62E-05	0.00	3.26E+11	101.1854	49158.	0.00

Performed by: Gokul Khatri 6/28/2024

Checked by: James Samples 7/1/2024

MEG-33 Rear Abutment X direction row 1

14.3325	-0.00694	898683.	-33761.	8.65E-05	0.00	3.26E+11	99.1939	50182.	0.00
14.6250	-0.00662	780472.	-33418.	9.56E-05	0.00	3.26E+11	96.5395	51206.	0.00
14.9175	-0.00627	663421.	-33085.	1.03E-04	0.00	3.26E+11	93.2587	52230.	0.00
15.2100	-0.00589	547494.	-32764.	1.10E-04	0.00	3.26E+11	89.3931	53255.	0.00
15.5025	-0.00550	432648.	-32458.	1.15E-04	0.00	3.26E+11	84.9883	54279.	0.00
15.7950	-0.00508	318832.	-32168.	1.19E-04	0.00	3.26E+11	80.0947	55303.	0.00
16.0875	-0.00466	205992.	-31897.	1.22E-04	0.00	3.26E+11	74.7671	56327.	0.00
16.3800	-0.00423	94064.	-31644.	1.24E-04	0.00	3.26E+11	69.0646	57351.	0.00
16.6725	-0.00379	-17016.	-31412.	1.24E-04	0.00	3.26E+11	63.0507	58375.	0.00
16.9650	-0.00336	-127318.	-31202.	1.23E-04	0.00	3.26E+11	56.7934	59399.	0.00
17.2575	-0.00293	-236916.	-31014.	1.21E-04	0.00	3.26E+11	50.3650	60423.	0.00
17.5500	-0.00250	-345885.	-30849.	1.18E-04	0.00	3.26E+11	43.8424	61448.	0.00
17.8425	-0.00210	-454301.	-30706.	1.14E-04	0.00	3.26E+11	37.3066	62472.	0.00
18.1350	-0.00170	-562239.	-29990.	1.08E-04	0.00	3.26E+11	371.0406	763846.	0.00
18.4275	-0.00134	-665586.	-28820.	1.02E-04	0.00	3.26E+11	295.2425	776166.	0.00
18.7200	-9.90E-04	-765270.	-27912.	9.41E-05	0.00	3.26E+11	222.5009	788486.	0.00
19.0125	-6.75E-04	-862183.	-27251.	8.53E-05	0.00	3.26E+11	153.9407	800806.	0.00
19.3050	-3.92E-04	-957168.	-2660.	6.95E-05	0.00	1.50E+11	13858.	1.24E+08	0.00
19.5975	-1.87E-04	-881346.	35024.	4.80E-05	0.00	1.50E+11	7615.	1.43E+08	0.00
19.8900	-5.43E-05	-711639.	52782.	2.95E-05	0.00	1.50E+11	2504.	1.62E+08	0.00
20.1825	1.99E-05	-511019.	55376.	1.52E-05	0.00	1.50E+11	-1027.	1.81E+08	0.00
20.4750	5.24E-05	-323009.	48350.	5.47E-06	0.00	1.50E+11	-2976.	2.00E+08	0.00
20.7675	5.83E-05	-171637.	36761.	-3.05E-07	0.00	1.50E+11	-3627.	2.18E+08	0.00
21.0600	5.02E-05	-64942.	24441.	-3.06E-06	0.00	1.50E+11	-3393.	2.37E+08	0.00
21.3525	3.68E-05	-41.388	13776.	-3.82E-06	0.00	1.50E+11	-2684.	2.56E+08	0.00
21.6450	2.34E-05	31796.	5854.	-3.45E-06	0.00	1.50E+11	-1830.	2.75E+08	0.00
21.9375	1.26E-05	41081.	798.0846	-2.60E-06	0.00	1.50E+11	-1051.	2.94E+08	0.00
22.2300	5.11E-06	37416.	-1844.	-1.69E-06	0.00	1.50E+11	-454.715	3.12E+08	0.00
22.5225	7.19E-07	28147.	-2761.	-9.22E-07	0.00	1.50E+11	-67.905	3.31E+08	0.00
22.8150	-1.36E-06	18039.	-2642.	-3.83E-07	0.00	1.50E+11	136.0633	3.50E+08	0.00
23.1075	-1.97E-06	9605.	-2039.	-6.07E-08	0.00	1.50E+11	207.1108	3.69E+08	0.00
23.4000	-1.79E-06	3723.	-1329.	9.48E-08	0.00	1.50E+11	197.7645	3.88E+08	0.00
23.6925	-1.31E-06	276.4231	-716.435	1.41E-07	0.00	1.50E+11	151.1702	4.07E+08	0.00
23.9850	-7.97E-07	-1308.	-281.549	1.29E-07	0.00	1.50E+11	96.6287	4.25E+08	0.00
24.2775	-3.97E-07	-1701.	-23.877	9.43E-08	0.00	1.50E+11	50.1926	4.44E+08	0.00
24.5700	-1.35E-07	-1476.	95.5114	5.73E-08	0.00	1.50E+11	17.8350	4.63E+08	0.00
24.8625	5.35E-09	-1031.	125.5236	2.80E-08	0.00	1.50E+11	-0.734	4.82E+08	0.00
25.1550	6.15E-08	-594.853	108.8477	9.05E-09	0.00	1.50E+11	-8.768	5.01E+08	0.00
25.4475	6.89E-08	-266.816	75.5702	-1.00E-09	0.00	1.50E+11	-10.194	5.20E+08	0.00
25.7400	5.44E-08	-64.343	43.0311	-4.87E-09	0.00	1.50E+11	-8.347	5.38E+08	0.00
26.0325	3.47E-08	35.2960	18.7123	-5.20E-09	0.00	1.50E+11	-5.510	5.57E+08	0.00

MEG-33 Rear Abutment X direction row 1

26.3250	1.79E-08	67.0539	3.8925	-4.01E-09	0.00	1.50E+11	-2.935	5.76E+08	0.00
26.6175	6.55E-09	62.6496	-3.206	-2.50E-09	0.00	1.50E+11	-1.110	5.95E+08	0.00
26.9100	3.47E-10	44.5642	-5.259	-1.25E-09	0.00	1.50E+11	-0.05973	6.03E+08	0.00
27.2025	-2.21E-09	25.7393	-4.698	-4.27E-10	0.00	1.50E+11	0.3792	6.03E+08	0.00
27.4950	-2.65E-09	11.5839	-3.233	8.20E-12	0.00	1.50E+11	0.4558	6.03E+08	0.00
27.7875	-2.15E-09	3.0425	-1.785	1.79E-10	0.00	1.50E+11	0.3693	6.03E+08	0.00
28.0800	-1.40E-09	-0.949	-0.716	2.03E-10	0.00	1.50E+11	0.2400	6.03E+08	0.00
28.3725	-7.22E-10	-1.985	-0.07711	1.69E-10	0.00	1.50E+11	0.1240	6.03E+08	0.00
28.6650	-2.10E-10	-1.492	0.2038	1.28E-10	0.00	1.50E+11	0.03602	6.03E+08	0.00
28.9575	1.80E-10	-0.555	0.2126	1.05E-10	0.00	1.50E+11	-0.03098	6.03E+08	0.00
29.2500	5.25E-10	0.00	0.00	9.81E-11	0.00	1.50E+11	-0.09017	3.02E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 2:

Pile-head deflection = 0.11308877 inches
 Computed slope at pile head = -0.0019777 radians
 Maximum bending moment = 5917382. inch-lbs
 Maximum shear force = 55376. lbs
 Depth of maximum bending moment = 0.87750000 feet below pile head
 Depth of maximum shear force = 20.18250000 feet below pile head
 Number of iterations = 15
 Number of zero deflection points = 6

 Summary of Pile-head Responses for Conventional Analyses

Definitions of Pile-head Loading Conditions:

Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs
 Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
 Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.

Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs

Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians

Load Case No.	Load Type 1	Pile-head Load 1	Load Type 2	Pile-head Load 2	Axial Loading lbs	Pile-head Deflection inches	Pile-head Rotation radians	Max Shear in Pile lbs	Max Moment in Pile in-lbs
1	V, lb	1800.	M, in-lb	4363200.	774500.	0.06679	-0.00132	46920.	4381982.
2	V, lb	2420.	M, in-lb	5889600.	996600.	0.1131	-0.00198	55376.	5917382.

Maximum pile-head deflection = 0.1130887666 inches

Maximum pile-head rotation = -0.0019776589 radians = -0.113312 deg.

 Summary of Warning Messages

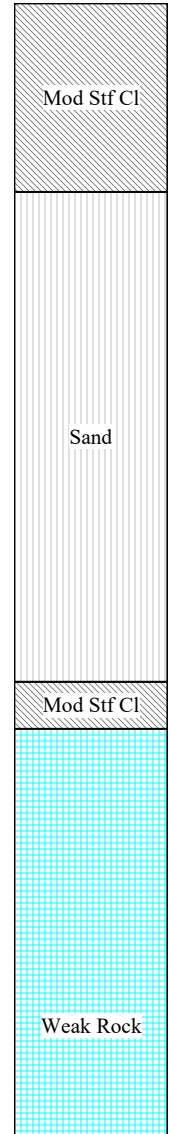
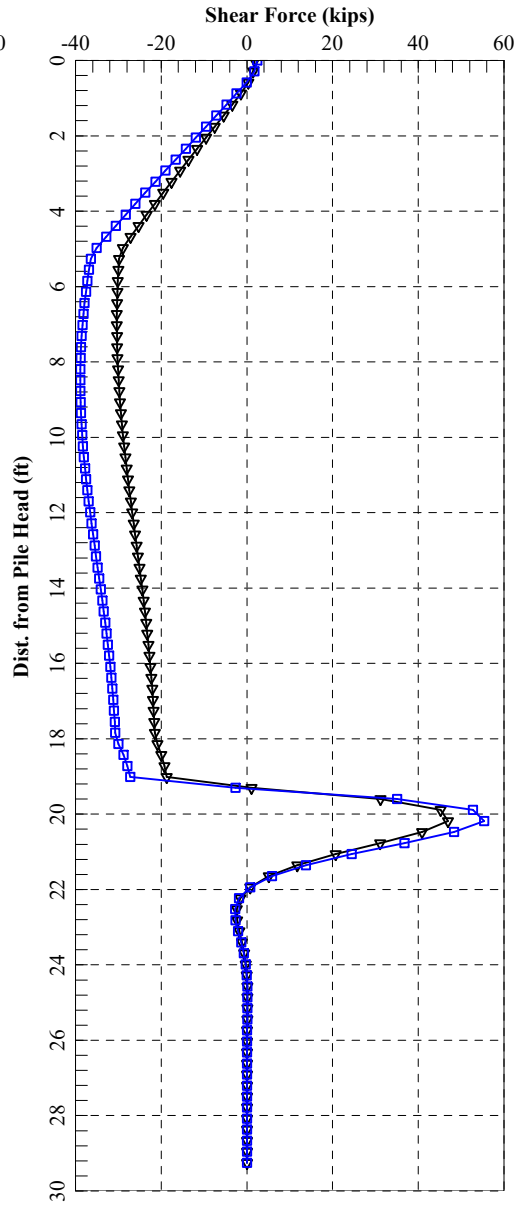
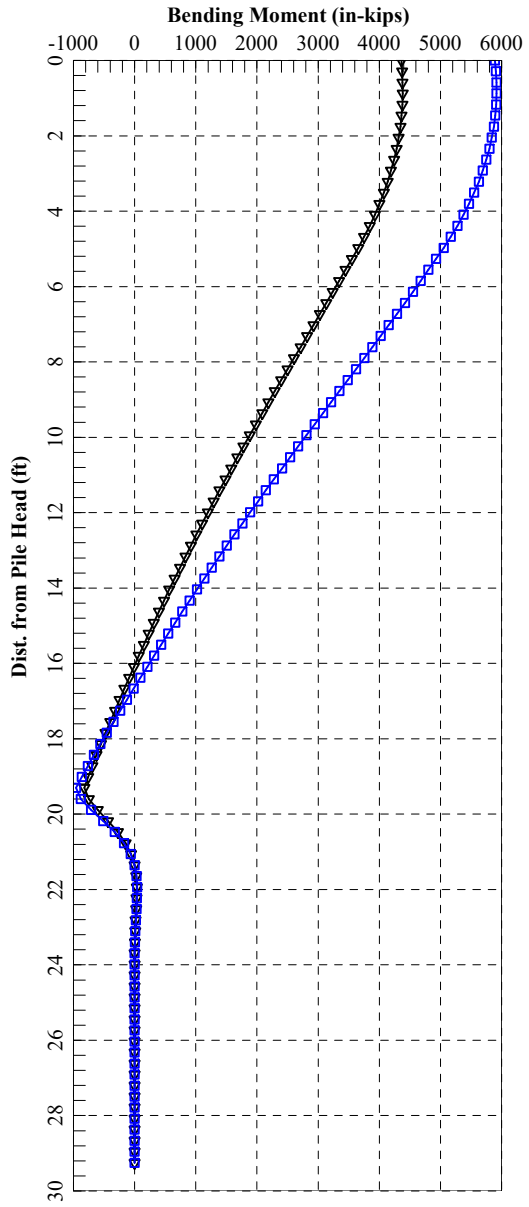
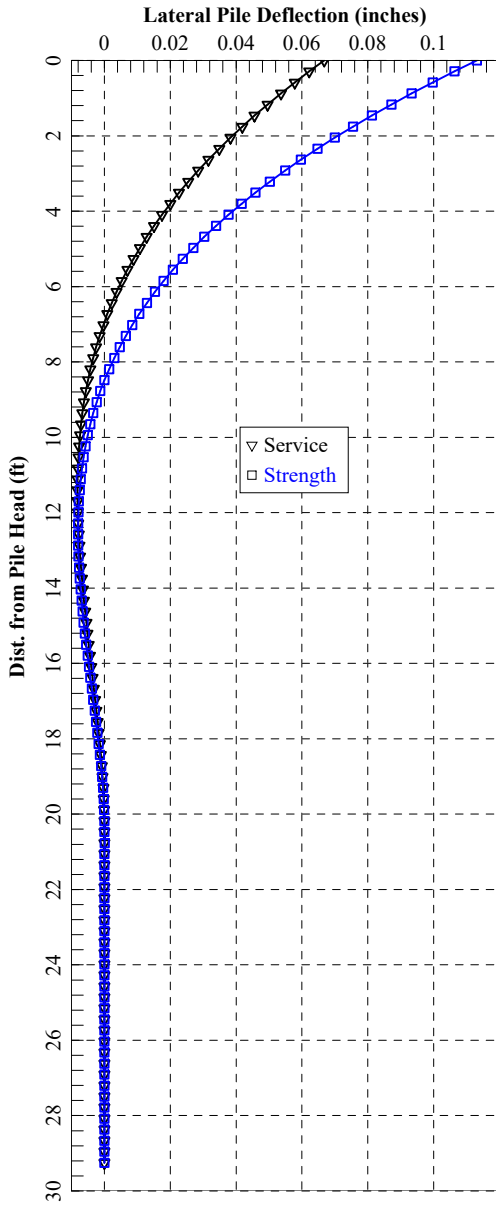
The following warning was reported 560 times

**** Warning ****

An unreasonable input value for unconfined compressive strength has been specified for a soil defined using the weak rock criteria. The input value is greater than 500 psi. Please check your input data for correctness.

The analysis ended normally.

MEG-33 Oldtown Creek Bridge Rear Abutment X Direction Row 1



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LPile for Windows, Version 2022-12.006

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method
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Files Used for Analysis

Path to file locations:

\\US0247-PPFSS01\shared_projects\173609140\119144\400-Engineering\Geotechnical\Analysis\Lpile\bridges\LPile
Analysis\Old Town Creek Bridge\Rear Abutment\

Name of input data file:

Rear Abutment X-direction row 2.lp12d

Name of output report file:

Rear Abutment X-direction row 2.lp12o

Name of plot output file:
Rear Abutment X-direction row 2.lp12p

Name of runtime message file:
Rear Abutment X-direction row 2.lp12r

Date and Time of Analysis

Date: July 1, 2024

Time: 9:14:15

Problem Title

-

Project Name: MEG-33-19.21

Job Number: 173604190

Client: ODOT

Engineer: G. Khatri

Description:Rear Abutment Lateral Load Analysis at Oldtown Creek Bridge

- Program Options and Settings

Performed by: Gokul Khatri 6/28/2024

Checked by: James Samples 7/1/2024

-

Computational Options:

- Conventional Analysis

Engineering Units Used for Data Input and Computations:

- US Customary System Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed = 500
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 100.0000 in
- Number of pile increments = 100

Loading Type and Number of Cycles of Loading:

- Static loading specified

- Analysis uses p-y modification factors for p-y curves
- Analysis uses layering correction (Method of Georgiadis)
- No distributed lateral loads are entered
- Loading by lateral soil movements acting on pile not selected
- Input of shear resistance at the pile tip not selected
- Input of moment resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:

- Output files use decimal points to denote decimal symbols.
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1
- No p-y curves to be computed and reported for user-specified depths
- Print using wide report formats

Pile Structural Properties and Geometry

Number of pile sections defined = 2

Total length of pile = 29.250 ft
 Depth of ground surface below top of pile = 0.0000 ft

Pile diameters used for p-y curve computations are defined using 4 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile. A summary of values of pile diameter vs. depth follows.

Point No.	Depth Below Pile Head feet	Pile Diameter inches
1	0.000	36.0000
2	19.250	36.0000
3	19.250	30.0000
4	29.250	30.0000

Input Structural Properties for Pile Sections:

Pile Section No. 1:

Section 1 is a round drilled shaft, bored pile, or CIDH pile

Length of section = 19.250000 ft
 Shaft Diameter = 36.000000 in

Pile Section No. 2:

Section 2 is a round drilled shaft, bored pile, or CIDH pile

Length of section = 10.000000 ft
 Shaft Diameter = 30.000000 in

Soil and Rock Layering Information

The soil profile is modelled using 4 layers

Layer 1 is stiff clay with user-defined k-value

Distance from top of pile to top of layer	=	0.0000	ft
Distance from top of pile to bottom of layer	=	5.000000	ft
Effective unit weight at top of layer	=	125.000000	pcf
Effective unit weight at bottom of layer	=	125.000000	pcf
Undrained cohesion at top of layer	=	2500.	psf
Undrained cohesion at bottom of layer	=	2500.	psf
Epsilon-50 at top of layer	=	0.0000	
Epsilon-50 at bottom of layer	=	0.0000	
Subgrade k at top of layer	=	0.0000	pci
Subgrade k at bottom of layer	=	0.0000	pci

NOTE: Default values for Epsilon-50 will be computed for this layer.

NOTE: Default values for subgrade k will be computed for this layer.

Layer 2 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer	=	5.000000	ft
Distance from top of pile to bottom of layer	=	18.000000	ft
Effective unit weight at top of layer	=	122.000000	pcf
Effective unit weight at bottom of layer	=	122.000000	pcf
Friction angle at top of layer	=	32.000000	deg.
Friction angle at bottom of layer	=	32.000000	deg.
Subgrade k at top of layer	=	0.0000	pci
Subgrade k at bottom of layer	=	0.0000	pci

NOTE: Default values for subgrade k will be computed for this layer.

Layer 3 is stiff clay with user-defined k-value

Distance from top of pile to top of layer	=	18.000000	ft
Distance from top of pile to bottom of layer	=	19.250000	ft
Effective unit weight at top of layer	=	125.000000	pcf
Effective unit weight at bottom of layer	=	125.000000	pcf
Undrained cohesion at top of layer	=	2500.	psf
Undrained cohesion at bottom of layer	=	2500.	psf
Epsilon-50 at top of layer	=	0.0000	
Epsilon-50 at bottom of layer	=	0.0000	
Subgrade k at top of layer	=	0.0000	pci
Subgrade k at bottom of layer	=	0.0000	pci

NOTE: Default values for Epsilon-50 will be computed for this layer.
 NOTE: Default values for subgrade k will be computed for this layer.

Layer 4 is weak rock, p-y criteria by Reese, 1997

Distance from top of pile to top of layer = 19.250000 ft
 Distance from top of pile to bottom of layer = 35.000000 ft
 Effective unit weight at top of layer = 82.600000 pcf
 Effective unit weight at bottom of layer = 82.600000 pcf
 Uniaxial compressive strength at top of layer = 3820. psi
 Uniaxial compressive strength at bottom of layer = 3820. psi
 Initial modulus of rock at top of layer = 343800. psi
 Initial modulus of rock at bottom of layer = 343800. psi
 RQD of rock at top of layer = 77.000000 %
 RQD of rock at bottom of layer = 77.000000 %
 k_{rm} of rock at top of layer = 0.0000500
 k_{rm} of rock at bottom of layer = 0.0000500

(Depth of the lowest soil layer extends 5.750 ft below the pile tip)

 Summary of Input Soil Properties

Layer Num.	Soil Type Name (p-y Curve Type)	Layer Depth ft	Effective Unit Wt. pcf	Cohesion psf	Angle of Friction deg.	Uniaxial qu psi	RQD %	E50 or krm
1 default	Stiff Clay w/o default	0.00	125.0000	2500.	--	--	--	--
default	Free Water, using k default	5.0000	125.0000	2500.	--	--	--	--
2	Sand	5.0000	122.0000	--	32.0000	--	--	--

default	--							
(Reese, et al.)		18.0000	122.0000	--	32.0000	--	--	--
default	--							
3	Stiff Clay w/o	18.0000	125.0000	2500.	--	--	--	--
default	default	--						
	Free Water, using k	19.2500	125.0000	2500.	--	--	--	--
default	default	--						
4	Weak	19.2500	82.6000	--	--	3820.	77.0000	
5.00E-05	--	343800.						
	Rock	35.0000	82.6000	--	--	3820.	77.0000	
5.00E-05	--	343800.						

 Modification Factors for p-y Curves

Distribution of p-y modifiers with depth defined using 4 points

Point No.	Depth X ft	p-mult	y-mult
1	0.000	0.8500	1.0000
2	5.000	0.8500	1.0000
3	19.250	0.8500	1.0000
4	33.000	0.8500	1.0000

 Static Loading Type

Static loading criteria were used when computing p-y curves for all analyses.

 Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 2

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length	Run Analysis
1	1	V = 1800. lbs	M = 4363200. in-lbs	774500.	No	Yes
2	1	V = 2420. lbs	M = 5889600. in-lbs	996600.	No	Yes

V = shear force applied normal to pile axis

M = bending moment applied to pile head

y = lateral deflection normal to pile axis

S = pile slope relative to original pile batter angle

R = rotational stiffness applied to pile head

Values of top y vs. pile lengths can be computed only for load types with specified shear loading (Load Types 1, 2, and 3).

Thrust force is assumed to be acting axially for all pile batter angles.

 Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 2

Pile Section No. 1:

Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section	=	19.250000 ft
Shaft Diameter	=	36.000000 in
Concrete Cover Thickness (to edge of trans. reinf.)	=	3.000000 in
Number of Reinforcing Bars	=	8 bars
Yield Stress of Reinforcing Bars	=	50000. psi
Modulus of Elasticity of Reinforcing Bars	=	29000000. psi
Gross Area of Shaft	=	1018. sq. in.

Total Area of Reinforcing Steel = 8.000000 sq. in.
 Area Ratio of Steel Reinforcement = 0.79 percent
 Edge-to-Edge Bar Spacing = 9.538153 in
 Maximum Concrete Aggregate Size = 0.750000 in
 Ratio of Bar Spacing to Aggregate Size = 12.72
 Offset of Center of Rebar Cage from Center of Pile = 0.0000 in
 Transverse Reinforcement
 Type: Spiral
 Number of Transverse Reinf. (per spacing) = 1
 Spacing of Transverse Reinf. = 4.000000 in
 Yield Stress of Transverse Reinf. = 50000. psi
 Diameter of Transverse Reinf. = 0.500000 in

Axial Structural Capacities:

Nom. Axial Structural Capacity = $0.85 F_c A_c + F_y A_s$ = 3833.578 kips
 Tensile Load for Cracking of Concrete = -446.783 kips
 Nominal Axial Tensile Capacity = -400.000 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
-----	-----	-----	-----	-----
1	1.128000	1.000000	13.936000	0.000000
2	1.128000	1.000000	9.854240	9.854240
3	1.128000	1.000000	0.000000	13.936000
4	1.128000	1.000000	-9.85424	9.854240
5	1.128000	1.000000	-13.93600	0.000000
6	1.128000	1.000000	-9.85424	-9.85424
7	1.128000	1.000000	0.000000	-13.93600
8	1.128000	1.000000	9.854240	-9.85424

NOTE: The positions of the above rebars were computed by LPILE

Minimum spacing between any two bars not equal to zero = 9.538 inches
between bars 3 and 4.

Ratio of bar spacing to maximum aggregate size = 12.72

Concrete Properties:

Compressive Strength of Concrete	=	4000. psi
Modulus of Elasticity of Concrete	=	3604997. psi
Modulus of Rupture of Concrete	=	-474.34165 psi
Compression Strain at Peak Stress	=	0.001886
Tensile Strain at Fracture of Concrete	=	-0.0001154
Maximum Coarse Aggregate Size	=	0.750000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 2

Number	Axial Thrust Force kips
-----	-----
1	774.500
2	996.600

Definitions of Run Messages and Notes:

C = concrete in section has cracked in tension.

Y = stress in reinforcing steel has reached yield stress.

T = ACI 318 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than 0.003. See ACI 318-14, Section 21.2.3.

Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.

Position of neutral axis is measured from edge of compression side of pile.

Compressive stresses and strains are positive in sign.

Tensile stresses and strains are negative in sign.

Axial Thrust Force = 774.500 kips

MEG-33 Rear Abutment X direction row 2

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	209.9768848	335963016.	305.4584133	0.0001909	0.0001684	0.7682850	5.4744462	
0.00000125	419.9544678	335963574.	161.7501720	0.0002022	0.0001572	0.8107029	5.7394687	
0.00000188	629.9200184	335957343.	113.8567412	0.0002135	0.0001460	0.8529062	6.0049978	
0.00000250	839.8675209	335947008.	89.9170136	0.0002248	0.0001348	0.8948938	6.2710335	
0.00000313	1050.	335933107.	75.5587678	0.0002361	0.0001236	0.9366642	6.5375758	
0.00000375	1260.	335915817.	65.9912635	0.0002475	0.0001125	0.9782161	6.8046249	
0.00000438	1470.	335895215.	59.1613265	0.0002588	0.0001013	1.0195483	7.0721808	
0.00000500	1679.	335871340.	54.0423696	0.0002702	0.00009021	1.0606595	7.3402436	
0.00000563	1889.	335844210.	50.0640668	0.0002816	0.00007911	1.1015482	7.6088134	
0.00000625	2099.	335813840.	46.8842227	0.0002930	0.00006803	1.1422132	7.8778904	
0.00000688	2308.	335780235.	44.2850763	0.0003045	0.00005696	1.1826533	8.1474746	
0.00000750	2518.	335743400.	42.1214541	0.0003159	0.00004591	1.2228669	8.4175663	
0.00000813	2728.	335703338.	40.2928511	0.0003274	0.00003488	1.2628530	8.6881656	
0.00000875	2937.	335660050.	38.7274782	0.0003389	0.00002387	1.3026100	8.9592726	
0.00000938	3146.	335613538.	37.3726902	0.0003504	0.00001287	1.3421368	9.2308877	
0.00001000	3356.	335563800.	36.1890031	0.0003619	0.00000189	1.3814319	9.5030109	
0.00001063	3565.	335510389.	35.1462171	0.0003734	-0.00000907	1.4204939	9.7756407	
0.00001125	3774.	335448762.	34.2207824	0.0003850	-0.00002002	1.4593189	10.0487553	
0.00001188	3983.	335372226.	33.3940570	0.0003966	-0.00003095	1.4979010	10.3223159	
0.00001250	4191.	335275605.	32.6511234	0.0004081	-0.00004186	1.5362345	10.5962823	
0.00001313	4399.	335155533.	31.9799128	0.0004197	-0.00005276	1.5743140	10.8706168	
0.00001375	4606.	335010258.	31.3705628	0.0004313	-0.00006365	1.6121349	11.1452870	
0.00001438	4813.	334839082.	30.8149356	0.0004430	-0.00007454	1.6496930	11.4202638	
0.00001500	5020.	334642016.	30.3062574	0.0004546	-0.00008541	1.6869847	11.6955220	
0.00001563	5225.	334419493.	29.8388439	0.0004662	-0.00009627	1.7240067	11.9710387	
0.00001625	5430.	334172355.	29.4078929	0.0004779	-0.000107	1.7607561	12.2467946	
0.00001688	5430.	321795601.	28.5379799	0.0004816	-0.000126	1.7721262	12.2921114	C
0.00001750	5430.	310302901.	28.0974528	0.0004917	-0.000138	1.8037114	12.5238073	C
0.00001813	5430.	299602801.	27.6819613	0.0005017	-0.000151	1.8347688	12.7526933	C
0.00001875	5531.	294985524.	27.2891744	0.0005117	-0.000163	1.8653149	12.9788637	C
0.00001938	5641.	291155897.	26.9168123	0.0005215	-0.000176	1.8953509	13.2022714	C
0.00002000	5747.	287367426.	26.5630245	0.0005313	-0.000189	1.9248871	13.4229543	C
0.00002063	5850.	283630097.	26.2263178	0.0005409	-0.000202	1.9539418	13.6410289	C
0.00002125	5949.	279952989.	25.9054090	0.0005505	-0.000215	1.9825350	13.8566334	C
0.00002188	6045.	276344121.	25.5991900	0.0005600	-0.000228	2.0106885	14.0699237	C
0.00002250	6138.	272810537.	25.3067051	0.0005694	-0.000241	2.0384250	14.2810751	C

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0.00002313	6229.	269354766.	25.0270116	0.0005787	-0.000254	2.0657610	14.4902022	C
0.00002375	6316.	265942885.	24.7580424	0.0005880	-0.000267	2.0926272	14.6965767	C
0.00002438	6401.	262617842.	24.5003905	0.0005972	-0.000280	2.1191300	14.9012011	C
0.00002563	6565.	256207897.	24.0156543	0.0006154	-0.000307	2.1710547	15.3051452	C
0.00002688	6721.	250098469.	23.5670604	0.0006334	-0.000334	2.2215727	15.7021153	C
0.00002813	6870.	244254957.	23.1494010	0.0006511	-0.000361	2.2706819	16.0917926	C
0.00002938	7012.	238695912.	22.7602946	0.0006686	-0.000389	2.3185388	16.4755131	C
0.00003063	7148.	233404965.	22.3966231	0.0006859	-0.000417	2.3651987	16.8536129	C
0.00003188	7279.	228367929.	22.0558068	0.0007030	-0.000444	2.4107192	17.2264740	C
0.00003313	7406.	223572305.	21.7357058	0.0007200	-0.000473	2.4551598	17.5945249	C
0.00003438	7528.	219000726.	21.4342263	0.0007368	-0.000501	2.4985542	17.9579319	C
0.00003563	7646.	214623746.	21.1488122	0.0007534	-0.000529	2.5408658	18.3160792	C
0.00003688	7760.	210452696.	20.8791882	0.0007699	-0.000558	2.5822412	18.6704193	C
0.00003813	7872.	206480017.	20.6243515	0.0007863	-0.000586	2.6227471	19.0215612	C
0.00003938	7981.	202681225.	20.3824550	0.0008026	-0.000615	2.6623531	19.3690034	C
0.00004063	8086.	199033263.	20.1516581	0.0008187	-0.000644	2.7010095	19.7119848	C
0.00004188	8189.	195561271.	19.9331840	0.0008347	-0.000673	2.7389539	20.0531980	C
0.00004313	8289.	192219340.	19.7239608	0.0008506	-0.000702	2.7759904	20.3901410	C
0.00004438	8388.	189023045.	19.5247335	0.0008664	-0.000731	2.8122913	20.7247790	C
0.00004563	8484.	185957571.	19.3344684	0.0008821	-0.000760	2.8478428	21.0568312	C
0.00004688	8579.	183009976.	19.1521150	0.0008978	-0.000790	2.8826191	21.3858440	C
0.00004813	8671.	180183193.	18.9778933	0.0009133	-0.000819	2.9167201	21.7129850	C
0.00004938	8762.	177462231.	18.8106265	0.0009288	-0.000849	2.9500925	22.0374535	C
0.00005063	8851.	174843367.	18.6500888	0.0009442	-0.000878	2.9827769	22.3596742	C
0.00005188	8940.	172330886.	18.4965996	0.0009595	-0.000908	3.0148693	22.6808592	C
0.00005313	9026.	169895579.	18.3478947	0.0009747	-0.000938	3.0461791	22.9982878	C
0.00005438	9111.	167567324.	18.2064765	0.0009900	-0.000968	3.0770331	23.3164253	C
0.00005563	9195.	165304549.	18.0688839	0.0010051	-0.000997	3.1070978	23.6304811	C
0.00005688	9278.	163128637.	17.9370674	0.0010202	-0.001027	3.1366342	-24.151687	C
0.00005813	9360.	161039166.	17.8110890	0.0010353	-0.001057	3.1656928	-24.894846	C
0.00005938	9441.	158999243.	17.6876492	0.0010502	-0.001087	3.1939414	-25.642766	C
0.00006063	9521.	157039251.	17.5696889	0.0010652	-0.001117	3.2217476	-26.390003	C
0.00006188	9600.	155153363.	17.4567824	0.0010801	-0.001147	3.2490985	-27.136723	C
0.00006313	9677.	153306251.	17.3455151	0.0010949	-0.001178	3.2756375	-27.888629	C
0.00006438	9755.	151527025.	17.2389300	0.0011098	-0.001208	3.3017402	-28.639860	C
0.00006563	9831.	149811768.	17.1367610	0.0011246	-0.001238	3.3274046	-29.390414	C
0.00006688	9907.	148138806.	17.0367871	0.0011393	-0.001268	3.3524030	-30.144118	C
0.00006813	9981.	146513241.	16.9396803	0.0011540	-0.001298	3.3768367	-30.899406	C
0.00006938	10055.	144942749.	16.8464048	0.0011687	-0.001329	3.4008383	-31.654027	C
0.00007063	10129.	143424375.	16.7567587	0.0011834	-0.001359	3.4244058	-32.407976	C
0.00007188	10202.	141935938.	16.6682277	0.0011980	-0.001389	3.4472735	-33.166100	C

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0.00007313	10273.	140490618.	16.5824943	0.0012126	-0.001420	3.4696518	-33.924710	C
0.00007438	10345.	139090673.	16.4999505	0.0012272	-0.001450	3.4916023	-34.682657	C
0.00007938	10625.	133853545.	16.1923301	0.0012853	-0.001572	3.5743872	-37.722367	C
0.00008438	10896.	129140113.	15.9182821	0.0013431	-0.001694	3.6495145	-40.769141	C
0.00008938	11161.	124874561.	15.6734988	0.0014008	-0.001817	3.7172113	-43.819538	C
0.00009438	11417.	120974705.	15.4508889	0.0014582	-0.001939	3.7772953	-46.880236	C
0.00009938	11668.	117417241.	15.2521788	0.0015157	-0.002062	3.8303422	-49.936615	C
0.0001044	11890.	113914359.	15.0627977	0.0015722	-0.002185	3.8754269	-50.000000	CY
0.0001094	12069.	110344880.	14.8790357	0.0016274	-0.002310	3.9127629	-50.000000	CY
0.0001144	12241.	107026803.	14.7093660	0.0016824	-0.002435	3.9433518	-50.000000	CY
0.0001194	12410.	103956083.	14.5559884	0.0017376	-0.002560	3.9674575	-50.000000	CY
0.0001244	12572.	101084173.	14.4126142	0.0017926	-0.002685	3.9848491	-50.000000	CY
0.0001294	12695.	98125119.	14.2688573	0.0018460	-0.002811	3.9954633	-50.000000	CY
0.0001344	12767.	95009372.	14.1158211	0.0018968	-0.002941	3.9997907	-50.000000	CY
0.0001394	12831.	92064345.	13.9725454	0.0019474	-0.003070	3.9997762	-50.000000	CY
0.0001444	12893.	89303118.	13.8408088	0.0019983	-0.003199	3.9996381	-50.000000	CY
0.0001494	12949.	86690220.	13.7146701	0.0020486	-0.003329	3.9992485	-50.000000	CY
0.0001544	13003.	84232838.	13.5990886	0.0020994	-0.003458	3.9984610	-50.000000	CY
0.0001594	13055.	81915774.	13.4925815	0.0021504	-0.003587	3.9981434	-50.000000	CY
0.0001644	13102.	79710991.	13.3892322	0.0022009	-0.003717	3.9998670	-50.000000	CY
0.0001694	13148.	77626074.	13.2940182	0.0022517	-0.003846	3.9989242	-50.000000	CY
0.0001744	13192.	75652068.	13.2060625	0.0023028	-0.003975	3.9973354	-50.000000	CY
0.0001794	13234.	73775867.	13.1240094	0.0023541	-0.004103	3.9996953	50.000000	CY
0.0001844	13272.	71983354.	13.0441488	0.0024050	-0.004232	3.9976784	50.000000	CY
0.0001894	13308.	70273741.	12.9710783	0.0024564	-0.004361	3.9999015	50.000000	CY
0.0001944	13342.	68639668.	12.9044654	0.0025083	-0.004489	3.9979475	50.000000	CY
0.0001994	13374.	67078440.	12.8433281	0.0025606	-0.004617	3.9999368	50.000000	CY
0.0002044	13403.	65579593.	12.7883122	0.0026136	-0.004744	3.9977035	50.000000	CY
0.0002094	13430.	64142683.	12.7338299	0.0026661	-0.004871	3.9998497	50.000000	CY
0.0002144	13454.	62761220.	12.6840448	0.0027191	-0.004998	3.9966434	50.000000	CY
0.0002194	13478.	61438678.	12.6377277	0.0027724	-0.005125	3.9994518	50.000000	CY
0.0002244	13501.	60171193.	12.5946489	0.0028259	-0.005252	3.9966324	50.000000	CY
0.0002294	13523.	58954625.	12.5547273	0.0028797	-0.005378	3.9983147	50.000000	CY
0.0002344	13544.	57787293.	12.5174048	0.0029338	-0.005504	3.9999419	50.000000	CY
0.0002394	13564.	56664472.	12.4829267	0.0029881	-0.005629	3.9957434	50.000000	CY
0.0002444	13584.	55584850.	12.4507779	0.0030427	-0.005755	3.9989004	50.000000	CY
0.0002494	13602.	54546262.	12.4207182	0.0030974	-0.005880	3.9999993	50.000000	CY
0.0002544	13620.	53542300.	12.3906280	0.0031519	-0.006006	3.9956446	50.000000	CY
0.0002594	13637.	52575216.	12.3623640	0.0032065	-0.006131	3.9987217	50.000000	CYT
0.0002644	13653.	51642979.	12.3358887	0.0032613	-0.006256	3.9999718	50.000000	CYT
0.0002694	13669.	50742250.	12.3115464	0.0033164	-0.006381	3.9940155	50.000000	CYT

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0.0002744	13684.	49872618.	12.2888179	0.0033717	-0.006506	3.9976686	50.0000000	CYT
0.0003044	13737.	45130802.	12.1571075	0.0037003	-0.007257	3.9980997	50.0000000	CYT
0.0003344	13737.	41081683.	12.1330546	0.0040570	-0.007981	3.9964469	50.0000000	CYT

Axial Thrust Force = 996.600 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	203.6720076	325875212.	393.3150993	0.0002458	0.0002233	0.9742233	7.0668487	
0.00000125	407.3465994	325877280.	205.6791714	0.0002571	0.0002121	1.0152659	7.3318949	
0.00000188	611.0087820	325871350.	143.1434702	0.0002684	0.0002009	1.0560937	7.5974637	
0.00000250	814.6523513	325860941.	111.8828261	0.0002797	0.0001897	1.0967055	7.8635549	
0.00000313	1018.	325846753.	93.1322056	0.0002910	0.0001785	1.1370999	8.1301686	
0.00000375	1222.	325829021.	80.6365975	0.0003024	0.0001674	1.1772754	8.3973050	
0.00000438	1425.	325807845.	71.7152829	0.0003138	0.0001563	1.2172309	8.6649640	
0.00000500	1629.	325783275.	65.0279025	0.0003251	0.0001451	1.2569649	8.9331459	
0.00000563	1832.	325755337.	59.8298123	0.0003365	0.0001340	1.2964760	9.2018506	
0.00000625	2036.	325724047.	55.6742259	0.0003480	0.0001230	1.3357629	9.4710785	
0.00000688	2239.	325689416.	52.2768250	0.0003594	0.0001119	1.3748243	9.7408295	
0.00000750	2442.	325651449.	49.4480639	0.0003709	0.0001009	1.4136587	10.0111039	
0.00000813	2646.	325610150.	47.0567189	0.0003823	0.00008984	1.4522649	10.2819019	
0.00000875	2849.	325565521.	45.0090586	0.0003938	0.00007883	1.4906414	10.5532237	
0.00000938	3052.	325517564.	43.2363471	0.0004053	0.00006784	1.5287869	10.8250694	
0.00001000	3255.	325466278.	41.6870322	0.0004169	0.00005687	1.5667001	11.0974394	
0.00001063	3457.	325411664.	40.3216917	0.0004284	0.00004592	1.6043796	11.3703338	
0.00001125	3660.	325353721.	39.1096642	0.0004400	0.00003498	1.6418240	11.6437530	
0.00001188	3863.	325292448.	38.0267430	0.0004516	0.00002407	1.6790319	11.9176972	
0.00001250	4065.	325227844.	37.0535632	0.0004632	0.00001317	1.7160020	12.1921667	
0.00001313	4268.	325159908.	36.1744481	0.0004748	0.00000229	1.7527329	12.4671619	
0.00001375	4470.	325088447.	35.3765689	0.0004864	-0.00000857	1.7892231	12.7426819	
0.00001438	4672.	325011148.	34.6492954	0.0004981	-0.00001942	1.8254697	13.0187125	
0.00001500	4874.	324924161.	33.9837381	0.0005098	-0.00003024	1.8614683	13.2952261	
0.00001563	5075.	324824019.	33.3724230	0.0005214	-0.00004106	1.8972144	13.5721917	
0.00001625	5277.	324708100.	32.8090278	0.0005331	-0.00005185	1.9327036	13.8495794	
0.00001688	5477.	324574480.	32.2881692	0.0005449	-0.00006264	1.9679318	14.1273604	
0.00001750	5677.	324422050.	31.8052401	0.0005566	-0.00007341	2.0028952	14.4055094	
0.00001813	5877.	324250184.	31.3562727	0.0005683	-0.00008417	2.0375906	14.6840034	
0.00001875	6076.	324058684.	30.9378332	0.0005801	-0.00009492	2.0720149	14.9628218	

MEG-33 Rear Abutment X direction row 2

0.00001938	6275.	323847595.	30.5469333	0.0005918	-0.000106	2.1061653	15.2419457
0.00002000	6275.	313727358.	29.8819408	0.0005976	-0.000122	2.1227034	15.3479257 C
0.00002063	6275.	304220468.	29.4895899	0.0006082	-0.000134	2.1530051	15.5928735 C
0.00002125	6392.	300780522.	29.1161018	0.0006187	-0.000146	2.1828041	15.8352228 C
0.00002188	6516.	297891556.	28.7599702	0.0006291	-0.000158	2.2121136	16.0750436 C
0.00002250	6637.	294980129.	28.4198831	0.0006394	-0.000171	2.2409481	16.3124238 C
0.00002313	6754.	292064133.	28.0948053	0.0006497	-0.000183	2.2693305	16.5475413 C
0.00002375	6868.	289160289.	27.7838541	0.0006599	-0.000195	2.2972861	16.7806046 C
0.00002438	6978.	286280418.	27.4861810	0.0006700	-0.000208	2.3248355	17.0117818 C
0.00002563	7189.	280564272.	26.9257907	0.0006900	-0.000233	2.3786649	17.4677408 C
0.00002688	7390.	274969415.	26.4079593	0.0007097	-0.000258	2.4309321	17.9162408 C
0.00002813	7579.	269488118.	25.9266343	0.0007292	-0.000283	2.4816432	18.3569737 C
0.00002938	7760.	264174919.	25.4787630	0.0007484	-0.000309	2.5309543	18.7913088 C
0.00003063	7933.	259028630.	25.0604512	0.0007675	-0.000335	2.5789095	19.2194258 C
0.00003188	8098.	254048220.	24.6684549	0.0007863	-0.000361	2.6255543	19.6415406 C
0.00003313	8256.	249232699.	24.3000599	0.0008049	-0.000388	2.6709363	20.0579068 C
0.00003438	8407.	244581076.	23.9529870	0.0008234	-0.000414	2.7151046	20.4688215 C
0.00003563	8553.	240092228.	23.6253189	0.0008417	-0.000441	2.7581097	20.8746202 C
0.00003688	8694.	235764935.	23.3154412	0.0008598	-0.000468	2.8000038	21.2756875 C
0.00003813	8830.	231597809.	23.0219958	0.0008777	-0.000495	2.8408407	21.6724568 C
0.00003938	8961.	227589277.	22.7438439	0.0008955	-0.000522	2.8806758	22.0654134 C
0.00004063	9089.	223737597.	22.4800354	0.0009133	-0.000549	2.9195661	22.4551038 C
0.00004188	9213.	220001946.	22.2278097	0.0009308	-0.000577	2.9573910	22.8397338 C
0.00004313	9333.	216406804.	21.9876532	0.0009482	-0.000604	2.9943079	23.2211713 C
0.00004438	9450.	212959294.	21.7594669	0.0009656	-0.000632	3.0304148	23.6006016 C
0.00004563	9563.	209606744.	21.5399776	0.0009828	-0.000660	3.0655057	23.9749951 C
0.00004688	9674.	206387338.	21.3308238	0.0009999	-0.000688	3.0998206	24.3475262 C
0.00004813	9783.	203278756.	21.1305016	0.0010169	-0.000716	3.1333004	24.7172189 C
0.00004938	9888.	200270331.	20.9380480	0.0010338	-0.000744	3.1659283	25.0836550 C
0.00005063	9992.	197375102.	20.7540820	0.0010507	-0.000772	3.1978325	25.4485993 C
0.00005188	10093.	194563502.	20.5765351	0.0010674	-0.000800	3.2288782	25.8098625 C
0.00005313	10192.	191856337.	20.4066260	0.0010841	-0.000828	3.2592417	26.1700209 C
0.00005438	10289.	189229572.	20.2426153	0.0011007	-0.000857	3.2888092	26.5271615 C
0.00005563	10385.	186689367.	20.0848631	0.0011172	-0.000885	3.3176662	26.8825074 C
0.00005688	10478.	184237036.	19.9333571	0.0011337	-0.000914	3.3458584	27.2367184 C
0.00005813	10570.	181846021.	19.7861768	0.0011501	-0.000942	3.3732421	27.5872369 C
0.00005938	10661.	179549493.	19.6457033	0.0011665	-0.000971	3.4000901	27.9386331 C
0.00006063	10749.	177301967.	19.5084800	0.0011827	-0.001000	3.4261027	28.2855591 C
0.00006188	10836.	175130480.	19.3765917	0.0011989	-0.001029	3.4515185	28.6321094 C
0.00006313	10923.	173035897.	19.2501215	0.0012152	-0.001057	3.4763775	28.9790163 C
0.00006438	11007.	170977743.	19.1257826	0.0012312	-0.001086	3.5003918	29.3207331 C

MEG-33 Rear Abutment X direction row 2

0.00006563	11090.	168992672.	19.0066273	0.0012473	-0.001115	3.5238854	29.6633003	C
0.00006688	11173.	167073938.	18.8921379	0.0012634	-0.001144	3.5468333	30.0062777	C
0.00006813	11253.	165185772.	18.7792028	0.0012793	-0.001173	3.5689635	30.3440252	C
0.00006938	11333.	163360720.	18.6707551	0.0012953	-0.001202	3.5905790	30.6826130	C
0.00007063	11413.	161595374.	18.5665585	0.0013113	-0.001231	3.6116770	31.0220443	C
0.00007188	11490.	159863156.	18.4641413	0.0013271	-0.001260	3.6320464	31.3576317	C
0.00007313	11567.	158177405.	18.3648360	0.0013429	-0.001290	3.6518314	31.6923929	C
0.00007438	11643.	156543775.	18.2692566	0.0013588	-0.001319	3.6711048	32.0279906	C
0.00007938	11938.	150405227.	17.9127453	0.0014218	-0.001436	3.7423437	-33.762187	C
0.00008438	12221.	144847260.	17.5946245	0.0014845	-0.001553	3.8045928	-36.667341	C
0.00008938	12494.	139789419.	17.3096761	0.0015471	-0.001670	3.8580756	-39.578771	C
0.00009438	12756.	135167504.	17.0541400	0.0016095	-0.001788	3.9029762	-42.492338	C
0.00009938	13009.	130909214.	16.8222299	0.0016717	-0.001906	3.9392553	-45.411923	C
0.0001044	13253.	126978243.	16.6123948	0.0017339	-0.002024	3.9670729	-48.331945	C
0.0001094	13489.	123323654.	16.4227856	0.0017962	-0.002141	3.9864670	-50.000000	CY
0.0001144	13678.	119590994.	16.2365473	0.0018571	-0.002260	3.9972115	-50.000000	CY
0.0001194	13845.	115975525.	16.0626757	0.0019175	-0.002380	3.9987570	-50.000000	CY
0.0001244	14003.	112584181.	15.9019595	0.0019778	-0.002500	3.9995320	-50.000000	CY
0.0001294	14154.	109406740.	15.7561218	0.0020384	-0.002619	3.9998680	-50.000000	CY
0.0001344	14300.	106421553.	15.6235115	0.0020994	-0.002738	3.9999767	-50.000000	CY
0.0001394	14425.	103494347.	15.4941238	0.0021595	-0.002858	3.9999916	-50.000000	CY
0.0001444	14501.	100436626.	15.3594991	0.0022175	-0.002980	3.9999513	-50.000000	CY
0.0001494	14556.	97445487.	15.2274011	0.0022746	-0.003103	3.9997474	50.000000	CY
0.0001544	14605.	94605744.	15.1049129	0.0023318	-0.003226	3.9991903	50.000000	CY
0.0001594	14650.	91919826.	14.9939809	0.0023897	-0.003348	3.9980481	50.000000	CY
0.0001644	14688.	89359021.	14.8917096	0.0024478	-0.003470	3.9999996	50.000000	CY
0.0001694	14722.	86921425.	14.7957345	0.0025060	-0.003591	3.9995284	50.000000	CY
0.0001744	14754.	84609118.	14.7080370	0.0025647	-0.003713	3.9978757	50.000000	CY
0.0001794	14783.	82416202.	14.6272034	0.0026238	-0.003834	3.9999704	50.000000	CY
0.0001844	14810.	80327732.	14.5509839	0.0026828	-0.003955	3.9987667	50.000000	CY
0.0001894	14835.	78336022.	14.4773344	0.0027416	-0.004076	3.9990009	50.000000	CY
0.0001944	14858.	76438289.	14.4094217	0.0028008	-0.004197	3.9989813	50.000000	CY
0.0001994	14879.	74630341.	14.3463146	0.0028603	-0.004317	3.9984126	50.000000	CY
0.0002044	14900.	72903513.	14.2880562	0.0029201	-0.004437	3.9987767	50.000000	CY
0.0002094	14919.	71254889.	14.2337663	0.0029802	-0.004557	3.9996908	50.000000	CY
0.0002144	14936.	69671857.	14.1808282	0.0030400	-0.004677	3.9979724	50.000000	CY
0.0002194	14952.	68156154.	14.1303013	0.0030998	-0.004798	3.9998749	50.000000	CY
0.0002244	14967.	66703086.	14.0834512	0.0031600	-0.004918	3.9960754	50.000000	CY
0.0002294	14980.	65309790.	14.0397601	0.0032204	-0.005037	3.9990940	50.000000	CY
0.0002344	14994.	63973050.	13.9988940	0.0032810	-0.005157	3.9992060	50.000000	CY
0.0002394	15006.	62687492.	13.9611334	0.0033419	-0.005276	3.9969147	50.000000	CY

0.0002444	15017.	61452315.	13.9257186	0.0034031	-0.005394	3.9994189	50.0000000	CY
0.0002494	15028.	60263903.	13.8926652	0.0034645	-0.005513	3.9977583	50.0000000	CY
0.0002544	15038.	59118591.	13.8620804	0.0035262	-0.005631	3.9966924	50.0000000	CY
0.0002594	15047.	58013296.	13.8308588	0.0035874	-0.005750	3.9992206	50.0000000	CY
0.0002644	15056.	56947827.	13.8013813	0.0036487	-0.005869	3.9994570	50.0000000	CY
0.0002694	15063.	55918650.	13.7742126	0.0037104	-0.005987	3.9949752	50.0000000	CY
0.0002744	15070.	54925610.	13.7486536	0.0037723	-0.006105	3.9981926	50.0000000	CY
0.0003044	15070.	49511998.	13.9469650	0.0042451	-0.006712	3.9990675	50.0000000	CYT

 Summary of Results for Nominal Moment Capacity for Section 1

Moment values interpolated at maximum compressive strain = 0.003
 or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain	Max. Tens. Strain
1	774.500	13568.309	0.00300000	-0.00565676
2	996.600	14924.592	0.00300000	-0.00459709

Note that the values of moment capacity in the table above are not factored by a strength reduction factor (phi-factor).

In ACI 318, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.75).

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318, or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Load No.	Resist. Factor	Nominal Ax. Thrust kips	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in^2
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MEG-33 Rear Abutment X direction row 2

1	0.65	774.500000	13568.	503.425000	8819.	175783680.
2	0.65	996.600000	14925.	647.790000	9701.	205625046.
1	0.75	774.500000	13568.	580.875000	10176.	142459141.
2	0.75	996.600000	14925.	747.450000	11193.	166594334.
1	0.90	774.500000	13568.	697.050000	12211.	107599265.
2	0.90	996.600000	14925.	896.940000	13432.	124199998.

Pile Section No. 2:

Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section	=	10.000000	ft
Shaft Diameter	=	30.000000	in
Concrete Cover Thickness (to edge of trans. reinf.)	=	3.000000	in
Number of Reinforcing Bars	=	8	bars
Yield Stress of Reinforcing Bars	=	50000.	psi
Modulus of Elasticity of Reinforcing Bars	=	29000000.	psi
Gross Area of Shaft	=	706.858347	sq. in.
Total Area of Reinforcing Steel	=	8.000000	sq. in.
Area Ratio of Steel Reinforcement	=	1.13	percent
Edge-to-Edge Bar Spacing	=	7.242052	in
Maximum Concrete Aggregate Size	=	0.750000	in
Ratio of Bar Spacing to Aggregate Size	=	9.66	
Offset of Center of Rebar Cage from Center of Pile	=	0.0000	in
Transverse Reinforcement			
Type: Spiral			
Number of Transverse Reinf. (per spacing)	=	1	
Spacing of Transverse Reinf.	=	4.000000	in
Yield Stress of Transverse Reinf.	=	50000.	psi
Diameter of Transverse Reinf.	=	0.500000	in

Axial Structural Capacities:

Nom. Axial Structural Capacity = $0.85 F_c A_c + F_y A_s$	=	2776.118	kips
Tensile Load for Cracking of Concrete	=	-317.428	kips

Nominal Axial Tensile Capacity = -400.000 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.128000	1.000000	10.936000	0.000000
2	1.128000	1.000000	7.732920	7.732920
3	1.128000	1.000000	0.000000	10.936000
4	1.128000	1.000000	-7.73292	7.732920
5	1.128000	1.000000	-10.93600	0.000000
6	1.128000	1.000000	-7.73292	-7.73292
7	1.128000	1.000000	0.000000	-10.93600
8	1.128000	1.000000	7.732920	-7.73292

NOTE: The positions of the above rebars were computed by LPILE

Minimum spacing between any two bars not equal to zero = 7.242 inches between bars 1 and 2.

Ratio of bar spacing to maximum aggregate size = 9.66

Concrete Properties:

Compressive Strength of Concrete	=	4000. psi
Modulus of Elasticity of Concrete	=	3604997. psi
Modulus of Rupture of Concrete	=	-474.34165 psi
Compression Strain at Peak Stress	=	0.001886
Tensile Strain at Fracture of Concrete	=	-0.0001154
Maximum Coarse Aggregate Size	=	0.750000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 2

Number	Axial Thrust Force
	kips

1	774.500
2	996.600

Definitions of Run Messages and Notes:

- C = concrete in section has cracked in tension.
 Y = stress in reinforcing steel has reached yield stress.
 T = ACI 318 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than 0.003. See ACI 318-14, Section 21.2.3.
 Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
 Position of neutral axis is measured from edge of compression side of pile.
 Compressive stresses and strains are positive in sign.
 Tensile stresses and strains are negative in sign.

Axial Thrust Force = 774.500 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in ²	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
0.00000125	197.0601972	157648158.	222.0606597	0.0002776	0.0002401	1.0899493	7.9246364	
0.00000250	394.1138216	157645529.	118.5600268	0.0002964	0.0002214	1.1569769	8.3454769	
0.00000375	591.1346542	157635908.	84.0730133	0.0003153	0.0002028	1.2233984	8.7677527	
0.00000500	788.1062969	157621259.	66.8394067	0.0003342	0.0001842	1.2892076	9.1914640	
0.00000625	985.0123447	157601975.	56.5071652	0.0003532	0.0001657	1.3543984	9.6166112	
0.00000750	1182.	157578184.	49.6256087	0.0003722	0.0001472	1.4189645	10.0431949	
0.00000875	1379.	157549941.	44.7158748	0.0003913	0.0001288	1.4828997	10.4712157	
0.00001000	1575.	157517272.	41.0385327	0.0004104	0.0001104	1.5461977	10.9006745	
0.00001125	1772.	157480188.	38.1827880	0.0004296	0.00009206	1.6088524	11.3315721	
0.00001250	1968.	157438697.	35.9021643	0.0004488	0.00007378	1.6708575	11.7639096	
0.00001375	2164.	157392801.	34.0398132	0.0004680	0.00005555	1.7322068	12.1976880	
0.00001500	2360.	157342500.	32.4911695	0.0004874	0.00003737	1.7928939	12.6329088	
0.00001625	2556.	157287792.	31.1838422	0.0005067	0.00001924	1.8529127	13.0695732	

MEG-33 Rear Abutment X direction row 2

0.00001750	2752.	157228675.	30.0661236	0.0005262	0.00000116	1.9122569	13.5076828
0.00001875	2947.	157164446.	29.1000771	0.0005456	-0.00001687	1.9709191	13.9472295
0.00002000	3142.	157089981.	28.2571291	0.0005651	-0.00003486	2.0288848	14.3881349
0.00002125	3336.	156999043.	27.5153565	0.0005847	-0.00005280	2.0861355	14.8302760
0.00002250	3530.	156887434.	26.8577127	0.0006043	-0.00007070	2.1426537	15.2735326
0.00002375	3723.	156752846.	26.2707579	0.0006239	-0.00008857	2.1984238	15.7177971
0.00002500	3915.	156594455.	25.7437631	0.0006436	-0.000106	2.2534323	16.1629784
0.00002625	3915.	149137576.	25.0368587	0.0006572	-0.000130	2.2908839	16.4329962 C
0.00002750	4033.	146649420.	24.5453819	0.0006750	-0.000150	2.3393091	16.8235672 C
0.00002875	4157.	144592151.	24.0896035	0.0006926	-0.000170	2.3864933	17.2082695 C
0.00003000	4275.	142501378.	23.6648231	0.0007099	-0.000190	2.4324413	17.5868962 C
0.00003125	4388.	140415182.	23.2684085	0.0007271	-0.000210	2.4772663	17.9604328 C
0.00003250	4496.	138329776.	22.8966067	0.0007441	-0.000231	2.5209482	18.3284269 C
0.00003375	4599.	136274891.	22.5477724	0.0007610	-0.000252	2.5636022	18.6919448 C
0.00003500	4699.	134259274.	22.2197918	0.0007777	-0.000272	2.6052760	19.0513388 C
0.00003625	4795.	132282335.	21.9104691	0.0007943	-0.000293	2.6459821	19.4065683 C
0.00003750	4888.	130344584.	21.6179695	0.0008107	-0.000314	2.6857390	19.7576670 C
0.00003875	4977.	128449428.	21.3408757	0.0008270	-0.000336	2.7245819	20.1048717 C
0.00004000	5064.	126599880.	21.0779814	0.0008431	-0.000357	2.7625479	20.4484585 C
0.00004125	5148.	124798507.	20.8282565	0.0008592	-0.000378	2.7996755	20.7887394 C
0.00004250	5229.	123036170.	20.5900901	0.0008751	-0.000400	2.8359331	21.1251612 C
0.00004375	5308.	121317239.	20.3628166	0.0008909	-0.000422	2.8713669	21.4581362 C
0.00004500	5384.	119649631.	20.1461797	0.0009066	-0.000443	2.9060545	21.7885147 C
0.00004625	5459.	118034813.	19.9396444	0.0009222	-0.000465	2.9400383	22.1167357 C
0.00004750	5531.	116449547.	19.7409583	0.0009377	-0.000487	2.9731774	22.4407939 C
0.00004875	5602.	114914948.	19.5510777	0.0009531	-0.000509	3.0056478	22.7628983 C
0.00005125	5739.	111972053.	19.1941534	0.0009837	-0.000554	3.0685042	23.3997482 C
0.00005375	5869.	109192162.	18.8647864	0.0010140	-0.000599	3.1287080	24.0277984 C
0.00005625	5994.	106563558.	18.5596701	0.0010440	-0.000644	3.1863601	24.6476493 C
0.00005875	6114.	104076249.	18.2761152	0.0010737	-0.000689	3.2415610	25.2599937 C
0.00006125	6230.	101721582.	18.0119282	0.0011032	-0.000734	3.2944107	25.8656249 C
0.00006375	6343.	99491943.	17.7653190	0.0011325	-0.000780	3.3450081	26.4654462 C
0.00006625	6451.	97380531.	17.5348307	0.0011617	-0.000826	3.3934508	27.0604811 C
0.00006875	6556.	95366369.	17.3175808	0.0011906	-0.000872	3.4396480	27.6484894 C
0.00007125	6659.	93453545.	17.1134941	0.0012193	-0.000918	3.4837896	28.2321949 C
0.00007375	6758.	91640611.	16.9221774	0.0012480	-0.000964	3.5260056	28.8136195 C
0.00007625	6855.	89904523.	16.7406104	0.0012765	-0.001011	3.5661234	29.3888625 C
0.00007875	6950.	88253220.	16.5695941	0.0013049	-0.001058	3.6043648	29.9618733 C
0.00008125	7043.	86677225.	16.4079047	0.0013331	-0.001104	3.6407187	30.5320631 C
0.00008375	7133.	85168310.	16.2543230	0.0013613	-0.001151	3.6751645	31.0984997 C
0.00008625	7222.	83727847.	16.1091455	0.0013894	-0.001198	3.7078255	31.6636880 C

MEG-33 Rear Abutment X direction row 2

0.00008875	7308.	82345955.	15.9709126	0.0014174	-0.001245	3.7386377	32.2256991	C
0.00009125	7393.	81021534.	15.8396010	0.0014454	-0.001292	3.7676724	32.7859818	C
0.00009375	7477.	79754049.	15.7152206	0.0014733	-0.001339	3.7949916	33.3460689	C
0.00009625	7559.	78529977.	15.5956665	0.0015011	-0.001386	3.8204612	33.9015919	C
0.00009875	7639.	77360672.	15.4830660	0.0015290	-0.001434	3.8443164	34.4596921	C
0.0001013	7718.	76230217.	15.3747014	0.0015567	-0.001481	3.8663680	35.0139045	C
0.0001038	7796.	75142382.	15.2714736	0.0015844	-0.001528	3.8867300	35.5678588	C
0.0001063	7873.	74099012.	15.1739535	0.0016122	-0.001575	3.9054687	36.1244321	C
0.0001088	7948.	73087021.	15.0796746	0.0016399	-0.001623	3.9224345	36.6770867	C
0.0001113	8022.	72110814.	14.9897588	0.0016676	-0.001670	3.9377310	-37.296228	C
0.0001138	8096.	71171201.	14.9046065	0.0016954	-0.001717	3.9513924	-38.415241	C
0.0001163	8168.	70262204.	14.8230900	0.0017232	-0.001764	3.9633628	-39.534345	C
0.0001188	8239.	69378396.	14.7441391	0.0017509	-0.001812	3.9736084	-40.656433	C
0.0001213	8309.	68525068.	14.6692263	0.0017786	-0.001859	3.9822043	-41.775770	C
0.0001238	8378.	67700276.	14.5981174	0.0018065	-0.001906	3.9891332	-42.892318	C
0.0001263	8446.	66899765.	14.5299236	0.0018344	-0.001953	3.9943638	-44.008504	C
0.0001288	8513.	66118767.	14.4635469	0.0018622	-0.002000	3.9978823	-45.127795	C
0.0001313	8579.	65361878.	14.4004577	0.0018901	-0.002047	3.9997158	-46.244196	C
0.0001338	8644.	64627304.	14.3405133	0.0019180	-0.002094	3.9990923	-47.357548	C
0.0001363	8708.	63913711.	14.2835531	0.0019461	-0.002141	3.9999976	-48.467799	C
0.0001388	8771.	63216737.	14.2287055	0.0019742	-0.002188	3.9997086	-49.577809	C
0.0001413	8833.	62531650.	14.1751241	0.0020022	-0.002235	3.9988237	-50.000000	CY
0.0001438	8890.	61846858.	14.1229803	0.0020302	-0.002282	3.9999444	-50.000000	CY
0.0001463	8943.	61151758.	14.0714715	0.0020580	-0.002330	3.9992542	-50.000000	CY
0.0001488	8992.	60447635.	14.0203885	0.0020855	-0.002377	3.9999973	-50.000000	CY
0.0001588	9158.	57685214.	13.8254824	0.0021948	-0.002568	3.9999988	-50.000000	CY
0.0001688	9312.	55182401.	13.6599124	0.0023051	-0.002757	3.9998520	-50.000000	CY
0.0001788	9453.	52883298.	13.5161075	0.0024160	-0.002946	3.9987512	50.000000	CY
0.0001888	9550.	50594807.	13.3816907	0.0025258	-0.003137	3.9998470	50.000000	CY
0.0001988	9592.	48263731.	13.2407117	0.0026316	-0.003331	3.9999975	50.000000	CY
0.0002088	9624.	46101908.	13.1152488	0.0027378	-0.003525	3.9980876	50.000000	CY
0.0002188	9651.	44118538.	13.0033048	0.0028445	-0.003718	3.9979183	50.000000	CY
0.0002288	9674.	42291530.	12.9015700	0.0029512	-0.003911	3.9996000	50.000000	CY
0.0002388	9695.	40607196.	12.8122433	0.0030589	-0.004104	3.9999057	50.000000	CY
0.0002488	9713.	39048206.	12.7323935	0.0031672	-0.004295	3.9992959	50.000000	CY
0.0002588	9729.	37598341.	12.6577607	0.0032752	-0.004487	3.9975020	50.000000	CY
0.0002688	9742.	36250539.	12.5914115	0.0033839	-0.004679	3.9980848	50.000000	CY
0.0002788	9754.	34993511.	12.5326120	0.0034935	-0.004869	3.9993795	50.000000	CY
0.0002888	9765.	33818876.	12.4802406	0.0036037	-0.005059	3.9961640	50.000000	CY
0.0002988	9774.	32717991.	12.4320667	0.0037141	-0.005248	3.9998985	50.000000	CY
0.0003088	9782.	31681255.	12.3877915	0.0038247	-0.005438	3.9968447	50.000000	CY

Axial Thrust Force = 996.600 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
0.00000125	188.0584437	150446755.	287.2584805	0.0003591	0.0003216	1.3772972	10.2880574	
0.00000250	376.1126663	150445067.	151.1603664	0.0003779	0.0003029	1.4409219	10.7090016	
0.00000375	564.1325191	150435338.	105.8081611	0.0003968	0.0002843	1.5039391	11.1314500	
0.00000500	752.1008139	150420163.	83.1424354	0.0004157	0.0002657	1.5663424	11.5554031	
0.00000625	940.0003549	150400057.	69.5513041	0.0004347	0.0002472	1.6281252	11.9808614	
0.00000750	1128.	150375192.	60.4974730	0.0004537	0.0002287	1.6892810	12.4078252	
0.00000875	1316.	150345639.	54.0363879	0.0004728	0.0002103	1.7498033	12.8362959	
0.00001000	1503.	150311432.	49.1957720	0.0004920	0.0001920	1.8096856	13.2662739	
0.00001125	1691.	150272590.	45.4354722	0.0005111	0.0001736	1.8689214	13.6977603	
0.00001250	1878.	150229121.	42.4313969	0.0005304	0.0001554	1.9275041	14.1307564	
0.00001375	2065.	150181028.	39.9773064	0.0005497	0.0001372	1.9854271	14.5652634	
0.00001500	2252.	150128313.	37.9357078	0.0005690	0.0001190	2.0426839	15.0012829	
0.00001625	2439.	150070974.	36.2114141	0.0005884	0.0001009	2.0992680	15.4388164	
0.00001750	2625.	150009009.	34.7364348	0.0006079	0.00008289	2.1551726	15.8778657	
0.00001875	2811.	149942413.	33.4609106	0.0006274	0.00006489	2.2103913	16.3184327	
0.00002000	2997.	149871182.	32.3474471	0.0006469	0.00004695	2.2649173	16.7605194	
0.00002125	3183.	149795310.	31.3674489	0.0006666	0.00002906	2.3187441	17.2041280	
0.00002250	3369.	149714791.	30.4986754	0.0006862	0.00001122	2.3718650	17.6492608	
0.00002375	3554.	149629604.	29.7235680	0.0007059	-0.00000657	2.4242732	18.0959200	
0.00002500	3738.	149538587.	29.0280487	0.0007257	-0.00002430	2.4759601	18.5440854	
0.00002625	3923.	149438346.	28.4006510	0.0007455	-0.00004198	2.5269122	18.9936831	
0.00002750	4106.	149325541.	27.8319705	0.0007654	-0.00005962	2.5771150	19.4446216	
0.00002875	4289.	149197700.	27.3142404	0.0007853	-0.00007722	2.6265546	19.8968105	
0.00003000	4472.	149053195.	26.8409957	0.0008052	-0.00009477	2.6752182	20.3501663	
0.00003125	4531.	144984016.	26.2871562	0.0008215	-0.000116	2.7141181	20.6961727	C
0.00003250	4669.	143672550.	25.8498607	0.0008401	-0.000135	2.7581238	21.1118688	C
0.00003375	4802.	142294136.	25.4404212	0.0008586	-0.000154	2.8010078	21.5231249	C
0.00003500	4930.	140866444.	25.0560113	0.0008770	-0.000173	2.8428018	21.9301016	C
0.00003625	5053.	139380748.	24.6932157	0.0008951	-0.000192	2.8834566	22.3319307	C
0.00003750	5170.	137867987.	24.3506783	0.0009132	-0.000212	2.9230603	22.7294878	C
0.00003875	5283.	136338829.	24.0265890	0.0009310	-0.000231	2.9616432	23.1229419	C
0.00004000	5392.	134801287.	23.7193268	0.0009488	-0.000251	2.9992314	23.5124192	C
0.00004125	5497.	133262579.	23.4274947	0.0009664	-0.000271	3.0358525	23.8980782	C

MEG-33 Rear Abutment X direction row 2

0.00004250	5599.	131730128.	23.1499346	0.0009839	-0.000291	3.0715397	24.2801695	C
0.00004375	5697.	130211933.	22.8857206	0.0010013	-0.000311	3.1063334	24.6590706	C
0.00004500	5792.	128715029.	22.6340584	0.0010185	-0.000331	3.1402745	25.0351963	C
0.00004625	5884.	127232039.	22.3935019	0.0010357	-0.000352	3.1733357	25.4079721	C
0.00004750	5974.	125769874.	22.1634899	0.0010528	-0.000372	3.2055588	25.7778324	C
0.00004875	6061.	124334580.	21.9435626	0.0010697	-0.000393	3.2369868	26.1452743	C
0.00005125	6229.	121533203.	21.5305112	0.0011034	-0.000434	3.2974499	26.8721592	C
0.00005375	6387.	118835766.	21.1499319	0.0011368	-0.000476	3.3548729	27.5897691	C
0.00005625	6538.	116224934.	20.7966832	0.0011698	-0.000518	3.4092523	28.2967760	C
0.00005875	6681.	113719442.	20.4688238	0.0012025	-0.000560	3.4608103	28.9958212	C
0.00006125	6818.	111315893.	20.1635554	0.0012350	-0.000602	3.5096351	29.6874529	C
0.00006375	6949.	109011250.	19.8785694	0.0012673	-0.000645	3.5558133	30.3723177	C
0.00006625	7076.	106802720.	19.6119588	0.0012993	-0.000688	3.5994299	31.0511632	C
0.00006875	7197.	104684745.	19.3618806	0.0013311	-0.000731	3.6405433	31.7243119	C
0.00007125	7313.	102645300.	19.1260719	0.0013627	-0.000775	3.6791504	32.3906837	C
0.00007375	7426.	100691852.	18.9042821	0.0013942	-0.000818	3.7154006	33.0528461	C
0.00007625	7535.	98822441.	18.6956452	0.0014255	-0.000862	3.7493658	33.7119330	C
0.00007875	7641.	97024114.	18.4982640	0.0014567	-0.000906	3.7810179	34.3664720	C
0.00008125	7742.	95292183.	18.3110700	0.0014878	-0.000950	3.8103873	35.0163961	C
0.00008375	7842.	93637182.	18.1349296	0.0015188	-0.000994	3.8376342	35.6660230	C
0.00008625	7938.	92032543.	17.9664266	0.0015496	-0.001038	3.8625943	36.3092123	C
0.00008875	8032.	90497415.	17.8076180	0.0015804	-0.001082	3.8854853	36.9529194	C
0.00009125	8122.	89011588.	17.6558293	0.0016111	-0.001126	3.9061923	37.5921760	C
0.00009375	8211.	87586116.	17.5123562	0.0016418	-0.001171	3.9248479	38.2320311	C
0.00009625	8297.	86203445.	17.3747470	0.0016723	-0.001215	3.9413589	38.8674503	C
0.00009875	8382.	84879026.	17.2451589	0.0017030	-0.001260	3.9558708	39.5058865	C
0.0001013	8463.	83586711.	17.1196877	0.0017334	-0.001304	3.9682360	40.1376207	C
0.0001038	8543.	82346422.	17.0014055	0.0017639	-0.001349	3.9786097	40.7727917	C
0.0001063	8621.	81143307.	16.8879757	0.0017943	-0.001393	3.9869208	41.4057629	C
0.0001088	8697.	79976792.	16.7793715	0.0018248	-0.001438	3.9931906	42.0375057	C
0.0001113	8772.	78853018.	16.6767408	0.0018553	-0.001482	3.9974452	42.6727728	C
0.0001138	8845.	77756933.	16.5774429	0.0018857	-0.001527	3.9996498	43.3041527	C
0.0001163	8916.	76693908.	16.4826934	0.0019161	-0.001571	3.9994324	43.9364679	C
0.0001188	8985.	75665508.	16.3930561	0.0019467	-0.001616	3.9990767	44.5726498	C
0.0001213	9053.	74662694.	16.3068232	0.0019772	-0.001660	4.0000000	45.2078051	C
0.0001238	9118.	73683503.	16.2238394	0.0020077	-0.001705	3.9999186	45.8421165	C
0.0001263	9183.	72733704.	16.1452271	0.0020383	-0.001749	3.9996205	46.4804006	C
0.0001288	9246.	71811895.	16.0707123	0.0020691	-0.001793	3.9990147	47.1225850	C
0.0001313	9307.	70909315.	15.9982619	0.0020998	-0.001838	3.9999895	47.7618221	C
0.0001338	9366.	70028928.	15.9288593	0.0021305	-0.001882	3.9996903	48.4023758	C
0.0001363	9425.	69173626.	15.8629301	0.0021613	-0.001926	3.9988838	49.0465873	C

MEG-33 Rear Abutment X direction row 2

0.0001388	9482.	68341840.	15.8003106	0.0021923	-0.001970	3.9999573	49.6945611	C
0.0001413	9539.	67529947.	15.7406118	0.0022234	-0.002014	3.9994003	50.0000000	CY
0.0001438	9593.	66733493.	15.6820316	0.0022543	-0.002058	3.9995427	50.0000000	CY
0.0001463	9645.	65951153.	15.6271116	0.0022855	-0.002102	3.9996510	50.0000000	CY
0.0001488	9696.	65185728.	15.5752890	0.0023168	-0.002146	3.9983758	50.0000000	CY
0.0001588	9882.	62247449.	15.3961656	0.0024441	-0.002318	3.9984239	50.0000000	CY
0.0001688	10018.	59364223.	15.2340472	0.0025707	-0.002492	3.9996748	50.0000000	CY
0.0001788	10124.	56635834.	15.0873784	0.0026969	-0.002666	3.9995234	50.0000000	CY
0.0001888	10220.	54147854.	14.9609482	0.0028239	-0.002839	3.9989667	50.0000000	CY
0.0001988	10310.	51875197.	14.8548645	0.0029524	-0.003010	3.9984668	50.0000000	CY
0.0002088	10389.	49769752.	14.7589196	0.0030809	-0.003182	3.9992085	50.0000000	CY
0.0002188	10439.	47722512.	14.6613137	0.0032072	-0.003355	3.9993295	50.0000000	CY
0.0002288	10458.	45719330.	14.5619185	0.0033310	-0.003531	3.9989425	50.0000000	CY
0.0002388	10462.	43821915.	14.4717300	0.0034551	-0.003707	3.9979495	50.0000000	CY
0.0002488	10462.	42060230.	14.3969131	0.0035812	-0.003881	3.9961228	50.0000000	CY
0.0002588	10462.	40434714.	14.3359160	0.0037094	-0.004053	3.9999988	50.0000000	CY
0.0002688	10462.	38930166.	14.3211220	0.0038488	-0.004214	3.9998163	50.0000000	CY

 Summary of Results for Nominal Moment Capacity for Section 2

Moment values interpolated at maximum compressive strain = 0.003
 or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain	Max. Tens. Strain
1	774.500	9683.598	0.00300000	-0.00399835
2	996.600	10339.541	0.00300000	-0.00307360

Note that the values of moment capacity in the table above are not factored by a strength reduction factor (phi-factor).

In ACI 318, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.75).

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318, or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Load No.	Resist. Factor	Nominal Ax. Thrust kips	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in ²
1	0.65	774.500000	9684.	503.425000	6294.	100451525.
2	0.65	996.600000	10340.	647.790000	6721.	113023625.
1	0.75	774.500000	9684.	580.875000	7263.	83071448.
2	0.75	996.600000	10340.	747.450000	7755.	95090078.
1	0.90	774.500000	9684.	697.050000	8715.	63836425.
2	0.90	996.600000	10340.	896.940000	9306.	70927947.

Layering Correction Equivalent Depths of Soil & Rock Layers

Layer No.	Top of Layer Below Pile Head ft	Equivalent Top Depth Below Grnd Surf ft	Same Layer Type As Layer Above	Layer is Rock or Rock Layer	F0 Integral for Layer lbs	F1 Integral for Layer lbs
1	0.00	0.00	N.A.	No	0.00	132812.
2	5.0000	8.1014	No	No	132812.	925764.
3	18.0000	24.8456	No	No	1058577.	104929.
4	19.2500	19.2500	No	Yes	N.A.	N.A.

Notes: The F0 integral of Layer n+1 equals the sum of the F0 and F1 integrals for Layer n. Layering correction equivalent depths are computed only for soil types with both shallow-depth and deep-depth expressions for peak lateral load transfer. These soil types are soft and stiff clays, non-liquefied sands, and cemented c-phi soil.

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 1

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 1800.0 lbs
 Applied moment at pile head = 4363200.0 in-lbs
 Axial thrust load on pile head = 774500.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in ²	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	0.07840	4363200.	1800.	-0.00140	0.00	3.35E+11	0.00	0.00	0.00
0.2925	0.07356	4373265.	1415.	-0.00136	0.00	3.35E+11	-219.480	10472.	0.00
0.5850	0.06889	4380502.	308.2357	-0.00131	0.00	3.35E+11	-411.049	20944.	0.00
0.8775	0.06437	4382550.	-1328.	-0.00126	0.00	3.35E+11	-521.169	28418.	0.00
1.1700	0.06002	4378052.	-3159.	-0.00122	0.00	3.35E+11	-522.296	30547.	0.00
1.4625	0.05582	4366995.	-4993.	-0.00117	0.00	3.35E+11	-522.914	32881.	0.00
1.7550	0.05179	4349371.	-6829.	-0.00113	0.00	3.35E+11	-523.007	35448.	0.00
2.0475	0.04791	4325180.	-8664.	-0.00108	0.00	3.35E+11	-522.558	38282.	0.00
2.3400	0.04420	4294428.	-10496.	-0.00104	0.00	3.35E+11	-521.547	41420.	0.00
2.6325	0.04064	4257128.	-12324.	-9.91E-04	0.00	3.35E+11	-519.952	44907.	0.00
2.9250	0.03724	4213301.	-14145.	-9.47E-04	0.00	3.35E+11	-517.748	48801.	0.00
3.2175	0.03399	4162975.	-15958.	-9.03E-04	0.00	3.35E+11	-514.907	53167.	0.00
3.5100	0.03090	4106188.	-17759.	-8.60E-04	0.00	3.35E+11	-511.394	58090.	0.00
3.8025	0.02796	4042983.	-19546.	-8.17E-04	0.00	3.35E+11	-507.170	63673.	0.00
4.0950	0.02516	3973414.	-21318.	-7.75E-04	0.00	3.35E+11	-502.188	70047.	0.00
4.3875	0.02252	3897546.	-23070.	-7.34E-04	0.00	3.35E+11	-496.392	77381.	0.00
4.6800	0.02001	3815451.	-24801.	-6.94E-04	0.00	3.35E+11	-489.710	85893.	0.00
4.9725	0.01765	3727214.	-26506.	-6.54E-04	0.00	3.35E+11	-482.057	95879.	0.00
5.2650	0.01542	3632932.	-27473.	-6.16E-04	0.00	3.35E+11	-68.837	15669.	0.00
5.5575	0.01333	3537699.	-27704.	-5.78E-04	0.00	3.36E+11	-62.793	16540.	0.00
5.8500	0.01136	3441591.	-27913.	-5.42E-04	0.00	3.36E+11	-56.356	17410.	0.00
6.1425	0.00952	3344692.	-28099.	-5.06E-04	0.00	3.36E+11	-49.602	18281.	0.00
6.4350	0.00781	3247086.	-28261.	-4.72E-04	0.00	3.36E+11	-42.606	19151.	0.00

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6.7275	0.00621	3148863.	-28398.	-4.38E-04	0.00	3.36E+11	-35.440	20022.	0.00
7.0200	0.00473	3050113.	-28510.	-4.06E-04	0.00	3.36E+11	-28.170	20892.	0.00
7.3125	0.00336	2950930.	-28596.	-3.74E-04	0.00	3.36E+11	-20.860	21763.	0.00
7.6050	0.00210	2851406.	-28656.	-3.44E-04	0.00	3.36E+11	-13.570	22633.	0.00
7.8975	9.49E-04	2751634.	-28691.	-3.15E-04	0.00	3.36E+11	-6.356	23504.	0.00
8.1900	-1.05E-04	2651706.	-28701.	-2.87E-04	0.00	3.36E+11	0.7299	24374.	0.00
8.4825	-0.00106	2551711.	-28686.	-2.59E-04	0.00	3.36E+11	7.6391	25245.	0.00
8.7750	-0.00193	2451737.	-28648.	-2.33E-04	0.00	3.36E+11	14.3262	26115.	0.00
9.0675	-0.00270	2351870.	-28586.	-2.08E-04	0.00	3.36E+11	20.7499	26986.	0.00
9.3600	-0.00339	2252193.	-28503.	-1.84E-04	0.00	3.36E+11	26.8724	27856.	0.00
9.6525	-0.00399	2152782.	-28398.	-1.61E-04	0.00	3.36E+11	32.6594	28727.	0.00
9.9450	-0.00452	2053712.	-28274.	-1.39E-04	0.00	3.36E+11	38.0802	29597.	0.00
10.2375	-0.00497	1955054.	-28132.	-1.18E-04	0.00	3.36E+11	43.1077	30468.	0.00
10.5300	-0.00534	1856870.	-27972.	-9.81E-05	0.00	3.36E+11	47.7181	31338.	0.00
10.8225	-0.00565	1759222.	-27797.	-7.92E-05	0.00	3.36E+11	51.8912	32209.	0.00
11.1150	-0.00590	1662164.	-27609.	-6.13E-05	0.00	3.36E+11	55.6101	33079.	0.00
11.4075	-0.00609	1565743.	-27408.	-4.45E-05	0.00	3.36E+11	58.8611	33950.	0.00
11.7000	-0.00621	1470003.	-27196.	-2.86E-05	0.00	3.36E+11	61.6341	34820.	0.00
11.9925	-0.00629	1374980.	-26976.	-1.37E-05	0.00	3.36E+11	63.9220	35691.	0.00
12.2850	-0.00631	1280706.	-26748.	1.27E-07	0.00	3.36E+11	65.7210	36561.	0.00
12.5775	-0.00629	1187205.	-26515.	1.30E-05	0.00	3.36E+11	67.0306	37432.	0.00
12.8700	-0.00622	1094496.	-26279.	2.49E-05	0.00	3.36E+11	67.8532	38302.	0.00
13.1625	-0.00611	1002592.	-26040.	3.59E-05	0.00	3.36E+11	68.1943	39173.	0.00
13.4550	-0.00597	911500.	-25801.	4.59E-05	0.00	3.36E+11	68.0625	40043.	0.00
13.7475	-0.00579	821221.	-25563.	5.49E-05	0.00	3.36E+11	67.4695	40914.	0.00
14.0400	-0.00558	731749.	-25328.	6.31E-05	0.00	3.36E+11	66.4298	41784.	0.00
14.3325	-0.00535	643075.	-25097.	7.02E-05	0.00	3.36E+11	64.9608	42655.	0.00
14.6250	-0.00509	555183.	-24873.	7.65E-05	0.00	3.36E+11	63.0830	43525.	0.00
14.9175	-0.00481	468053.	-24655.	8.18E-05	0.00	3.36E+11	60.8194	44396.	0.00
15.2100	-0.00451	381658.	-24446.	8.63E-05	0.00	3.36E+11	58.1963	45266.	0.00
15.5025	-0.00420	295970.	-24247.	8.98E-05	0.00	3.36E+11	55.2425	46137.	0.00
15.7950	-0.00388	210954.	-24059.	9.25E-05	0.00	3.36E+11	51.9896	47007.	0.00
16.0875	-0.00355	126572.	-23883.	9.42E-05	0.00	3.36E+11	48.4722	47878.	0.00
16.3800	-0.00322	42784.	-23719.	9.51E-05	0.00	3.36E+11	44.7273	48748.	0.00
16.6725	-0.00289	-40454.	-23569.	9.51E-05	0.00	3.36E+11	40.7951	49619.	0.00
16.9650	-0.00255	-123188.	-23433.	9.43E-05	0.00	3.36E+11	36.7181	50489.	0.00
17.2575	-0.00222	-205467.	-23312.	9.26E-05	0.00	3.36E+11	32.5421	51360.	0.00
17.5500	-0.00190	-287339.	-23205.	9.00E-05	0.00	3.36E+11	28.3151	52230.	0.00
17.8425	-0.00159	-368854.	-23113.	8.66E-05	0.00	3.36E+11	24.0882	53101.	0.00
18.1350	-0.00130	-450061.	-22650.	8.23E-05	0.00	3.36E+11	239.5785	649269.	0.00
18.4275	-0.00101	-528304.	-21895.	7.72E-05	0.00	3.36E+11	190.7082	659741.	0.00

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18.7200	-7.53E-04	-604183.	-21308.	7.13E-05	0.00	3.36E+11	143.8632	670213.	0.00
19.0125	-5.14E-04	-678272.	-20880.	6.46E-05	0.00	3.36E+11	99.7563	680686.	0.00
19.3050	-3.00E-04	-751113.	-2058.	5.27E-05	0.00	1.58E+11	10625.	1.24E+08	0.00
19.5975	-1.45E-04	-693006.	26945.	3.66E-05	0.00	1.58E+11	5901.	1.43E+08	0.00
19.8900	-4.35E-05	-562161.	40821.	2.26E-05	0.00	1.58E+11	2006.	1.62E+08	0.00
20.1825	1.38E-05	-406564.	43092.	1.18E-05	0.00	1.58E+11	-712.488	1.81E+08	0.00
20.4750	3.94E-05	-259719.	37910.	4.40E-06	0.00	1.58E+11	-2240.	2.00E+08	0.00
20.7675	4.47E-05	-140462.	29098.	-5.99E-08	0.00	1.58E+11	-2780.	2.18E+08	0.00
21.0600	3.90E-05	-55449.	19595.	-2.24E-06	0.00	1.58E+11	-2635.	2.37E+08	0.00
21.3525	2.90E-05	-2894.	11264.	-2.89E-06	0.00	1.58E+11	-2112.	2.56E+08	0.00
21.6450	1.87E-05	23637.	4986.	-2.66E-06	0.00	1.58E+11	-1465.	2.75E+08	0.00
21.9375	1.03E-05	32123.	904.4838	-2.04E-06	0.00	1.58E+11	-861.196	2.94E+08	0.00
22.2300	4.39E-06	29997.	-1293.	-1.35E-06	0.00	1.58E+11	-391.124	3.12E+08	0.00
22.5225	8.37E-07	23051.	-2118.	-7.57E-07	0.00	1.58E+11	-79.020	3.31E+08	0.00
22.8150	-9.18E-07	15130.	-2096.	-3.32E-07	0.00	1.58E+11	91.5437	3.50E+08	0.00
23.1075	-1.49E-06	8336.	-1661.	-7.03E-08	0.00	1.58E+11	156.6503	3.69E+08	0.00
23.4000	-1.41E-06	3471.	-1112.	6.11E-08	0.00	1.58E+11	155.9330	3.88E+08	0.00
23.6925	-1.06E-06	526.9677	-622.858	1.06E-07	0.00	1.58E+11	122.9497	4.07E+08	0.00
23.9850	-6.70E-07	-902.189	-264.540	1.01E-07	0.00	1.58E+11	81.2198	4.25E+08	0.00
24.2775	-3.49E-07	-1331.	-44.399	7.66E-08	0.00	1.58E+11	44.2164	4.44E+08	0.00
24.5700	-1.33E-07	-1214.	63.8980	4.82E-08	0.00	1.58E+11	17.4914	4.63E+08	0.00
24.8625	-1.07E-08	-882.353	97.1745	2.49E-08	0.00	1.58E+11	1.4695	4.82E+08	0.00
25.1550	4.22E-08	-532.259	89.1831	9.15E-09	0.00	1.58E+11	-6.023	5.01E+08	0.00
25.4475	5.36E-08	-256.337	64.7020	3.74E-10	0.00	1.58E+11	-7.926	5.20E+08	0.00
25.7400	4.48E-08	-78.053	38.7194	-3.35E-09	0.00	1.58E+11	-6.879	5.38E+08	0.00
26.0325	3.00E-08	15.4911	18.2777	-4.05E-09	0.00	1.58E+11	-4.769	5.57E+08	0.00
26.3250	1.65E-08	50.2781	5.1700	-3.31E-09	0.00	1.58E+11	-2.700	5.76E+08	0.00
26.6175	6.79E-09	51.8025	-1.586	-2.18E-09	0.00	1.58E+11	-1.150	5.95E+08	0.00
26.9100	1.17E-09	39.1538	-3.958	-1.16E-09	0.00	1.58E+11	-0.201	6.03E+08	0.00
27.2025	-1.38E-09	24.0219	-3.894	-4.61E-10	0.00	1.58E+11	0.2379	6.03E+08	0.00
27.4950	-2.06E-09	11.8194	-2.855	-6.16E-11	0.00	1.58E+11	0.3545	6.03E+08	0.00
27.7875	-1.82E-09	3.9833	-1.684	1.14E-10	0.00	1.58E+11	0.3122	6.03E+08	0.00
28.0800	-1.26E-09	-0.00621	-0.756	1.59E-10	0.00	1.58E+11	0.2165	6.03E+08	0.00
28.3725	-7.03E-10	-1.328	-0.164	1.44E-10	0.00	1.58E+11	0.1209	6.03E+08	0.00
28.6650	-2.51E-10	-1.161	0.1234	1.16E-10	0.00	1.58E+11	0.04308	6.03E+08	0.00
28.9575	1.11E-10	-0.463	0.1654	9.80E-11	0.00	1.58E+11	-0.01913	6.03E+08	0.00
29.2500	4.37E-10	0.00	0.00	9.28E-11	0.00	1.58E+11	-0.07513	3.02E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual

stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 1:

Pile-head deflection = 0.07840283 inches
 Computed slope at pile head = -0.0014013 radians
 Maximum bending moment = 4382550. inch-lbs
 Maximum shear force = 43092. lbs
 Depth of maximum bending moment = 0.87750000 feet below pile head
 Depth of maximum shear force = 20.18250000 feet below pile head
 Number of iterations = 14
 Number of zero deflection points = 6

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 2

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 2420.0 lbs
 Applied moment at pile head = 5889600.0 in-lbs
 Axial thrust load on pile head = 996600.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in ²	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	0.1326	5889600.	2420.	-0.00211	0.00	3.24E+11	0.00	0.00	0.00
0.2925	0.1253	5905367.	1764.	-0.00205	0.00	3.24E+11	-373.976	10472.	0.00
0.5850	0.1183	5916303.	63.6293	-0.00198	0.00	3.24E+11	-594.708	17649.	0.00
0.8775	0.1114	5919688.	-2029.	-0.00192	0.00	3.24E+11	-597.783	18831.	0.00
1.1700	0.1048	5915485.	-4132.	-0.00186	0.00	3.24E+11	-600.390	20108.	0.00
1.4625	0.09840	5903660.	-6243.	-0.00179	0.00	3.24E+11	-602.522	21492.	0.00
1.7550	0.09223	5884188.	-8361.	-0.00173	0.00	3.24E+11	-604.168	22993.	0.00
2.0475	0.08628	5857051.	-10483.	-0.00166	0.00	3.24E+11	-605.319	24626.	0.00

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2.3400	0.08055	5822234.	-12609.	-0.00160	0.00	3.24E+11	-605.963	26405.	0.00
2.6325	0.07504	5779731.	-14736.	-0.00154	0.00	3.24E+11	-606.089	28349.	0.00
2.9250	0.06976	5729542.	-16863.	-0.00148	0.00	3.24E+11	-605.683	30477.	0.00
3.2175	0.06469	5671674.	-18987.	-0.00141	0.00	3.24E+11	-604.732	32814.	0.00
3.5100	0.05983	5606142.	-21107.	-0.00135	0.00	3.24E+11	-603.220	35388.	0.00
3.8025	0.05519	5532965.	-23221.	-0.00129	0.00	3.25E+11	-601.129	38231.	0.00
4.0950	0.05076	5452173.	-25326.	-0.00123	0.00	3.25E+11	-598.439	41383.	0.00
4.3875	0.04653	5363802.	-27421.	-0.00117	0.00	3.25E+11	-595.127	44891.	0.00
4.6800	0.04251	5267896.	-29503.	-0.00112	0.00	3.25E+11	-591.168	48810.	0.00
4.9725	0.03869	5164508.	-31570.	-0.00106	0.00	3.25E+11	-586.530	53210.	0.00
5.2650	0.03506	5053698.	-32874.	-0.00101	0.00	3.25E+11	-156.534	15669.	0.00
5.5575	0.03163	4940769.	-33410.	-9.52E-04	0.00	3.25E+11	-149.051	16540.	0.00
5.8500	0.02838	4825817.	-33919.	-8.99E-04	0.00	3.25E+11	-140.793	17410.	0.00
6.1425	0.02532	4708948.	-34397.	-8.47E-04	0.00	3.25E+11	-131.878	18281.	0.00
6.4350	0.02244	4590276.	-34844.	-7.97E-04	0.00	3.25E+11	-122.417	19151.	0.00
6.7275	0.01973	4469922.	-35256.	-7.48E-04	0.00	3.25E+11	-112.518	20022.	0.00
7.0200	0.01718	4348014.	-35633.	-7.01E-04	0.00	3.25E+11	-102.282	20892.	0.00
7.3125	0.01481	4224681.	-35974.	-6.54E-04	0.00	3.25E+11	-91.808	21763.	0.00
7.6050	0.01259	4100058.	-36277.	-6.09E-04	0.00	3.25E+11	-81.186	22633.	0.00
7.8975	0.01053	3974279.	-36543.	-5.66E-04	0.00	3.25E+11	-70.505	23504.	0.00
8.1900	0.00862	3847482.	-36772.	-5.24E-04	0.00	3.25E+11	-59.847	24374.	0.00
8.4825	0.00685	3719803.	-36964.	-4.83E-04	0.00	3.25E+11	-49.290	25245.	0.00
8.7750	0.00523	3591375.	-37118.	-4.43E-04	0.00	3.25E+11	-38.904	26115.	0.00
9.0675	0.00374	3462333.	-37237.	-4.05E-04	0.00	3.25E+11	-28.759	26986.	0.00
9.3600	0.00238	3332806.	-37321.	-3.69E-04	0.00	3.25E+11	-18.916	27856.	0.00
9.6525	0.00115	3202921.	-37371.	-3.33E-04	0.00	3.25E+11	-9.432	28727.	0.00
9.9450	4.26E-05	3072798.	-37388.	-3.00E-04	0.00	3.26E+11	-0.360	29597.	0.00
10.2375	-9.51E-04	2942555.	-37374.	-2.67E-04	0.00	3.26E+11	8.2535	30468.	0.00
10.5300	-0.00183	2812302.	-37331.	-2.36E-04	0.00	3.26E+11	16.3651	31338.	0.00
10.8225	-0.00261	2682145.	-37260.	-2.07E-04	0.00	3.26E+11	23.9378	32209.	0.00
11.1150	-0.00328	2552182.	-37164.	-1.78E-04	0.00	3.26E+11	30.9387	33079.	0.00
11.4075	-0.00386	2422504.	-37044.	-1.52E-04	0.00	3.26E+11	37.3401	33950.	0.00
11.7000	-0.00435	2293194.	-36903.	-1.26E-04	0.00	3.26E+11	43.1189	34820.	0.00
11.9925	-0.00475	2164330.	-36742.	-1.02E-04	0.00	3.26E+11	48.2566	35691.	0.00
12.2850	-0.00506	2035978.	-36565.	-7.95E-05	0.00	3.26E+11	52.7396	36561.	0.00
12.5775	-0.00530	1908199.	-36373.	-5.82E-05	0.00	3.26E+11	56.5588	37432.	0.00
12.8700	-0.00547	1781045.	-36169.	-3.83E-05	0.00	3.26E+11	59.7097	38302.	0.00
13.1625	-0.00557	1654560.	-35955.	-1.98E-05	0.00	3.26E+11	62.1922	39173.	0.00
13.4550	-0.00561	1528778.	-35734.	-2.67E-06	0.00	3.26E+11	64.0110	40043.	0.00
13.7475	-0.00559	1403728.	-35507.	1.31E-05	0.00	3.26E+11	65.1749	40914.	0.00
14.0400	-0.00552	1279427.	-35277.	2.76E-05	0.00	3.26E+11	65.6972	41784.	0.00

Performed by: Gokul Khatri 6/28/2024

Checked by: James Samples 7/1/2024

MEG-33 Rear Abutment X direction row 2

14.3325	-0.00540	1155888.	-35047.	4.07E-05	0.00	3.26E+11	65.5955	42655.	0.00
14.6250	-0.00523	1033113.	-34818.	5.25E-05	0.00	3.26E+11	64.8919	43525.	0.00
14.9175	-0.00503	911099.	-34592.	6.30E-05	0.00	3.26E+11	63.6125	44396.	0.00
15.2100	-0.00479	789834.	-34372.	7.21E-05	0.00	3.26E+11	61.7879	45266.	0.00
15.5025	-0.00452	669301.	-34160.	8.00E-05	0.00	3.26E+11	59.4525	46137.	0.00
15.7950	-0.00423	549475.	-33956.	8.65E-05	0.00	3.26E+11	56.6453	47007.	0.00
16.0875	-0.00392	430326.	-33763.	9.18E-05	0.00	3.26E+11	53.4092	47878.	0.00
16.3800	-0.00359	311819.	-33582.	9.58E-05	0.00	3.26E+11	49.7914	48748.	0.00
16.6725	-0.00324	193914.	-33414.	9.85E-05	0.00	3.26E+11	45.8430	49619.	0.00
16.9650	-0.00289	76566.	-33260.	1.00E-04	0.00	3.26E+11	41.6194	50489.	0.00
17.2575	-0.00254	-40272.	-33122.	1.00E-04	0.00	3.26E+11	37.1801	51360.	0.00
17.5500	-0.00219	-156651.	-32999.	9.91E-05	0.00	3.26E+11	32.5886	52230.	0.00
17.8425	-0.00185	-272622.	-32893.	9.68E-05	0.00	3.26E+11	27.9127	53101.	0.00
18.1350	-0.00151	-388239.	-32354.	9.33E-05	0.00	3.26E+11	279.3831	649269.	0.00
18.4275	-0.00119	-500399.	-31471.	8.85E-05	0.00	3.26E+11	223.7421	659741.	0.00
18.7200	-8.89E-04	-609784.	-30780.	8.25E-05	0.00	3.26E+11	169.8040	670213.	0.00
19.0125	-6.11E-04	-717054.	-30274.	7.53E-05	0.00	3.26E+11	118.5401	680686.	0.00
19.3050	-3.60E-04	-822836.	-7686.	6.19E-05	0.00	1.50E+11	12752.	1.24E+08	0.00
19.5975	-1.77E-04	-771446.	27340.	4.33E-05	0.00	1.50E+11	7206.	1.43E+08	0.00
19.8900	-5.65E-05	-631215.	44558.	2.69E-05	0.00	1.50E+11	2605.	1.62E+08	0.00
20.1825	1.21E-05	-458838.	48032.	1.42E-05	0.00	1.50E+11	-625.238	1.81E+08	0.00
20.4750	4.32E-05	-294127.	42625.	5.42E-06	0.00	1.50E+11	-2456.	2.00E+08	0.00
20.7675	5.02E-05	-159648.	32837.	1.25E-07	0.00	1.50E+11	-3121.	2.18E+08	0.00
21.0600	4.41E-05	-63614.	22131.	-2.48E-06	0.00	1.50E+11	-2978.	2.37E+08	0.00
21.3525	3.28E-05	-4269.	12709.	-3.27E-06	0.00	1.50E+11	-2390.	2.56E+08	0.00
21.6450	2.11E-05	25629.	5613.	-3.02E-06	0.00	1.50E+11	-1653.	2.75E+08	0.00
21.9375	1.16E-05	35159.	1016.	-2.31E-06	0.00	1.50E+11	-966.656	2.94E+08	0.00
22.2300	4.87E-06	32776.	-1442.	-1.52E-06	0.00	1.50E+11	-433.939	3.12E+08	0.00
22.5225	8.78E-07	25044.	-2349.	-8.46E-07	0.00	1.50E+11	-82.894	3.31E+08	0.00
22.8150	-1.07E-06	16289.	-2308.	-3.64E-07	0.00	1.50E+11	106.4502	3.50E+08	0.00
23.1075	-1.68E-06	8844.	-1812.	-7.11E-08	0.00	1.50E+11	176.4559	3.69E+08	0.00
23.4000	-1.57E-06	3572.	-1198.	7.38E-08	0.00	1.50E+11	173.0134	3.88E+08	0.00
23.6925	-1.16E-06	431.7109	-658.592	1.20E-07	0.00	1.50E+11	134.4770	4.07E+08	0.00
23.9850	-7.20E-07	-1052.	-269.357	1.13E-07	0.00	1.50E+11	87.3096	4.25E+08	0.00
24.2775	-3.66E-07	-1460.	-34.837	8.39E-08	0.00	1.50E+11	46.3200	4.44E+08	0.00
24.5700	-1.31E-07	-1297.	76.8200	5.18E-08	0.00	1.50E+11	17.3019	4.63E+08	0.00
24.8625	-2.54E-09	-921.051	107.7960	2.59E-08	0.00	1.50E+11	0.3483	4.82E+08	0.00
25.1550	5.06E-08	-540.594	95.7270	8.85E-09	0.00	1.50E+11	-7.225	5.01E+08	0.00
25.4475	5.96E-08	-249.109	67.5735	-3.66E-10	0.00	1.50E+11	-8.817	5.20E+08	0.00
25.7400	4.81E-08	-66.225	39.1577	-4.04E-09	0.00	1.50E+11	-7.375	5.38E+08	0.00
26.0325	3.12E-08	25.8062	17.5299	-4.52E-09	0.00	1.50E+11	-4.949	5.57E+08	0.00

MEG-33 Rear Abutment X direction row 2

26.3250	1.64E-08	56.8662	4.1269	-3.55E-09	0.00	1.50E+11	-2.688	5.76E+08	0.00
26.6175	6.24E-09	54.8017	-2.448	-2.25E-09	0.00	1.50E+11	-1.058	5.95E+08	0.00
26.9100	5.96E-10	39.6947	-4.485	-1.15E-09	0.00	1.50E+11	-0.102	6.03E+08	0.00
27.2025	-1.80E-09	23.3228	-4.121	-4.11E-10	0.00	1.50E+11	0.3099	6.03E+08	0.00
27.4950	-2.29E-09	10.7666	-2.886	-1.36E-11	0.00	1.50E+11	0.3938	6.03E+08	0.00
27.7875	-1.90E-09	3.0615	-1.623	1.48E-10	0.00	1.50E+11	0.3262	6.03E+08	0.00
28.0800	-1.25E-09	-0.625	-0.672	1.76E-10	0.00	1.50E+11	0.2155	6.03E+08	0.00
28.3725	-6.61E-10	-1.656	-0.09419	1.50E-10	0.00	1.50E+11	0.1136	6.03E+08	0.00
28.6650	-2.04E-10	-1.287	0.1667	1.15E-10	0.00	1.50E+11	0.03502	6.03E+08	0.00
28.9575	1.48E-10	-0.487	0.1834	9.45E-11	0.00	1.50E+11	-0.02545	6.03E+08	0.00
29.2500	4.60E-10	0.00	0.00	8.89E-11	0.00	1.50E+11	-0.07908	3.02E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 2:

Pile-head deflection = 0.13264598 inches
 Computed slope at pile head = -0.0021110 radians
 Maximum bending moment = 5919688. inch-lbs
 Maximum shear force = 48032. lbs
 Depth of maximum bending moment = 0.87750000 feet below pile head
 Depth of maximum shear force = 20.18250000 feet below pile head
 Number of iterations = 14
 Number of zero deflection points = 6

 Summary of Pile-head Responses for Conventional Analyses

Definitions of Pile-head Loading Conditions:

Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs
 Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
 Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.

Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs

Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians

Load Case No.	Load Type	Load 1 Pile-head Load 1	Load Type 2	Load 2 Pile-head Load 2	Axial Loading lbs	Pile-head Deflection inches	Pile-head Rotation radians	Max Shear in Pile lbs	Max Moment in Pile in-lbs
1	V, lb	1800.	M, in-lb	4363200.	774500.	0.07840	-0.00140	43092.	4382550.
2	V, lb	2420.	M, in-lb	5889600.	996600.	0.1326	-0.00211	48032.	5919688.

Maximum pile-head deflection = 0.1326459757 inches

Maximum pile-head rotation = -0.0021110033 radians = -0.120952 deg.

 Summary of Warning Messages

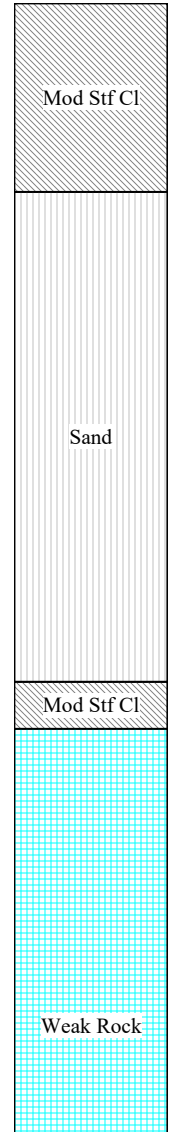
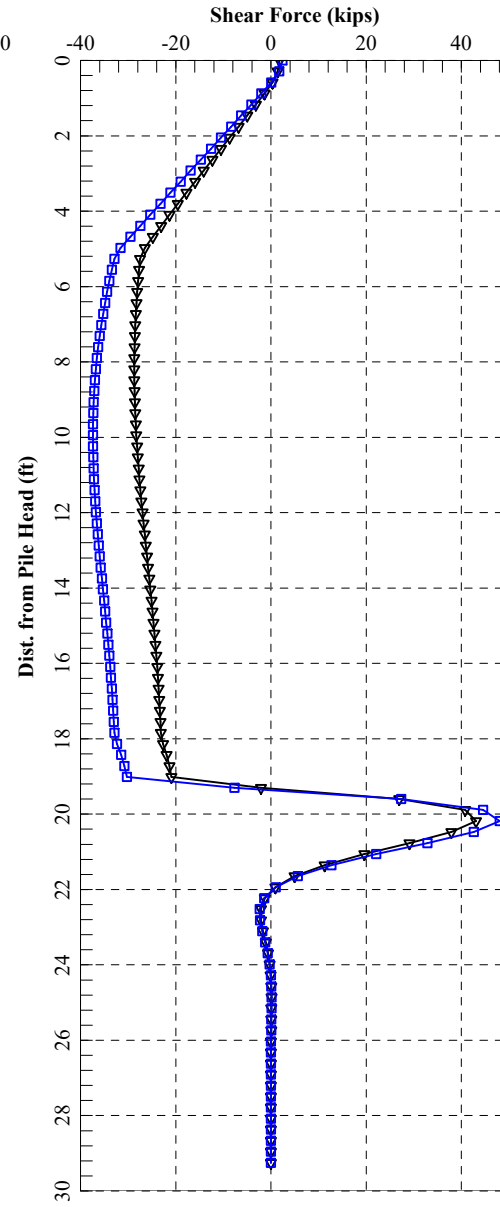
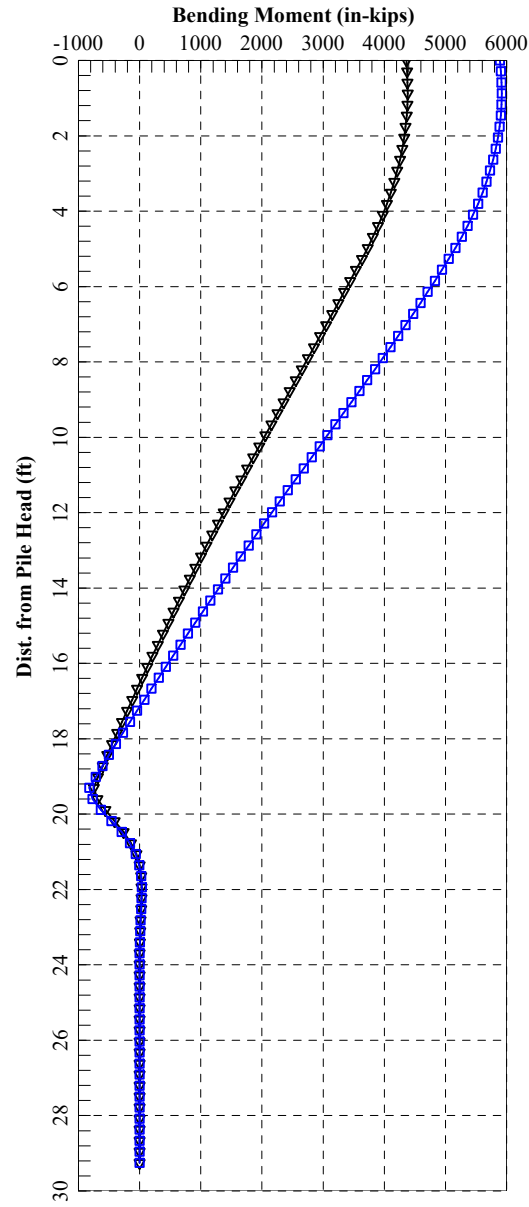
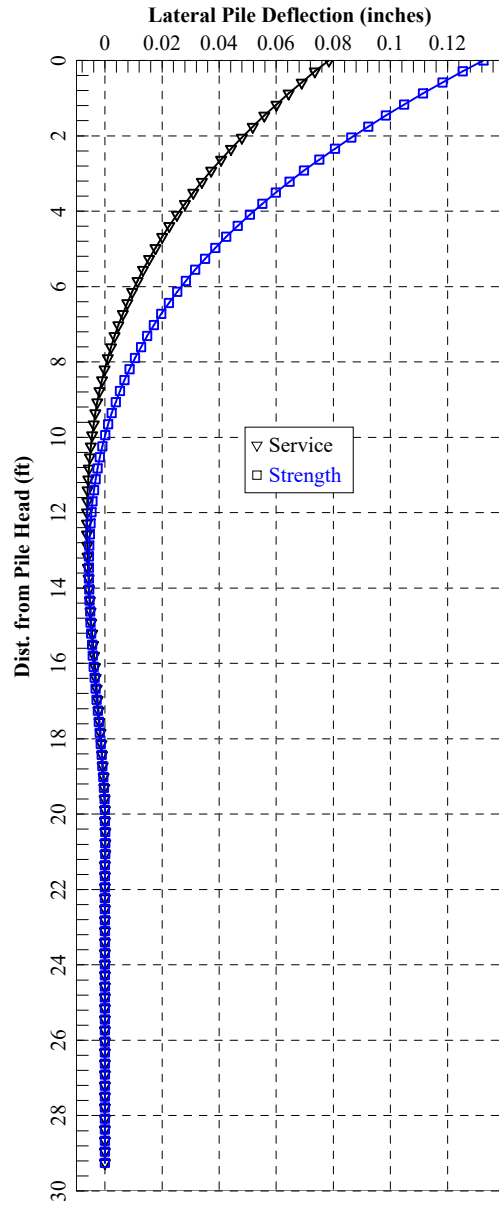
The following warning was reported 525 times

**** Warning ****

An unreasonable input value for unconfined compressive strength has been specified for a soil defined using the weak rock criteria. The input value is greater than 500 psi. Please check your input data for correctness.

The analysis ended normally.

MEG-33 Oldtown Creek Bridge Rear Abutment X Direction Row 2



=====
LPile for Windows, Version 2022-12.006

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method
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Files Used for Analysis

Path to file locations:

\\US0247-PPFSS01\shared_projects\173609140\119144\400-Engineering\Geotechnical\Analysis\Lpile\bridges\LPile
Analysis\Old Town Creek Bridge\Rear Abutment\

Name of input data file:

Rear Abutment X-direction row 3.lp12d

Name of output report file:

Rear Abutment X-direction row 3.lp12o

Name of plot output file:
Rear Abutment X-direction row 3.lp12p

Name of runtime message file:
Rear Abutment X-direction row 3.lp12r

Date and Time of Analysis

Date: July 1, 2024

Time: 9:17:36

Problem Title

-

Project Name: MEG-33-19.21

Job Number: 173604190

Client: ODOT

Engineer: G. Khatri

Description:Rear Abutment Lateral Load Analysis at Oldtown Creek Bridge

- Program Options and Settings

Performed by: Gokul Khatri 6/28/2024

Checked by: James Samples 7/1/2024

Computational Options:

- Conventional Analysis

Engineering Units Used for Data Input and Computations:

- US Customary System Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed = 500
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 100.0000 in
- Number of pile increments = 100

Loading Type and Number of Cycles of Loading:

- Static loading specified

- Analysis uses p-y modification factors for p-y curves
- Analysis uses layering correction (Method of Georgiadis)
- No distributed lateral loads are entered
- Loading by lateral soil movements acting on pile not selected
- Input of shear resistance at the pile tip not selected
- Input of moment resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:

- Output files use decimal points to denote decimal symbols.
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1
- No p-y curves to be computed and reported for user-specified depths
- Print using wide report formats

Pile Structural Properties and Geometry

Number of pile sections defined = 2

Total length of pile = 29.250 ft
 Depth of ground surface below top of pile = 0.0000 ft

Pile diameters used for p-y curve computations are defined using 4 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile. A summary of values of pile diameter vs. depth follows.

Point No.	Depth Below Pile Head feet	Pile Diameter inches
1	0.000	36.0000
2	19.250	36.0000
3	19.250	30.0000
4	29.250	30.0000

Input Structural Properties for Pile Sections:

Pile Section No. 1:

Section 1 is a round drilled shaft, bored pile, or CIDH pile

Length of section = 19.250000 ft
 Shaft Diameter = 36.000000 in

Pile Section No. 2:

Section 2 is a round drilled shaft, bored pile, or CIDH pile

Length of section = 10.000000 ft
 Shaft Diameter = 30.000000 in

Soil and Rock Layering Information

The soil profile is modelled using 4 layers

Layer 1 is stiff clay with user-defined k-value

Distance from top of pile to top of layer	=	0.0000	ft
Distance from top of pile to bottom of layer	=	5.000000	ft
Effective unit weight at top of layer	=	125.000000	pcf
Effective unit weight at bottom of layer	=	125.000000	pcf
Undrained cohesion at top of layer	=	2500.	psf
Undrained cohesion at bottom of layer	=	2500.	psf
Epsilon-50 at top of layer	=	0.0000	
Epsilon-50 at bottom of layer	=	0.0000	
Subgrade k at top of layer	=	0.0000	pci
Subgrade k at bottom of layer	=	0.0000	pci

NOTE: Default values for Epsilon-50 will be computed for this layer.

NOTE: Default values for subgrade k will be computed for this layer.

Layer 2 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer	=	5.000000	ft
Distance from top of pile to bottom of layer	=	18.000000	ft
Effective unit weight at top of layer	=	122.000000	pcf
Effective unit weight at bottom of layer	=	122.000000	pcf
Friction angle at top of layer	=	32.000000	deg.
Friction angle at bottom of layer	=	32.000000	deg.
Subgrade k at top of layer	=	0.0000	pci
Subgrade k at bottom of layer	=	0.0000	pci

NOTE: Default values for subgrade k will be computed for this layer.

Layer 3 is stiff clay with user-defined k-value

Distance from top of pile to top of layer	=	18.000000	ft
Distance from top of pile to bottom of layer	=	19.250000	ft
Effective unit weight at top of layer	=	125.000000	pcf
Effective unit weight at bottom of layer	=	125.000000	pcf
Undrained cohesion at top of layer	=	2500.	psf
Undrained cohesion at bottom of layer	=	2500.	psf
Epsilon-50 at top of layer	=	0.0000	
Epsilon-50 at bottom of layer	=	0.0000	
Subgrade k at top of layer	=	0.0000	pci
Subgrade k at bottom of layer	=	0.0000	pci

NOTE: Default values for Epsilon-50 will be computed for this layer.
 NOTE: Default values for subgrade k will be computed for this layer.

Layer 4 is weak rock, p-y criteria by Reese, 1997

Distance from top of pile to top of layer = 19.250000 ft
 Distance from top of pile to bottom of layer = 35.000000 ft
 Effective unit weight at top of layer = 82.600000 pcf
 Effective unit weight at bottom of layer = 82.600000 pcf
 Uniaxial compressive strength at top of layer = 3820. psi
 Uniaxial compressive strength at bottom of layer = 3820. psi
 Initial modulus of rock at top of layer = 343800. psi
 Initial modulus of rock at bottom of layer = 343800. psi
 RQD of rock at top of layer = 77.000000 %
 RQD of rock at bottom of layer = 77.000000 %
 k_{rm} of rock at top of layer = 0.0000500
 k_{rm} of rock at bottom of layer = 0.0000500

(Depth of the lowest soil layer extends 5.750 ft below the pile tip)

 Summary of Input Soil Properties

Layer Num.	Soil Type Name (p-y Curve Type)	Layer Depth ft	Effective Unit Wt. pcf	Cohesion psf	Angle of Friction deg.	Uniaxial qu psi	RQD %	E50 or krm
1 default	Stiff Clay w/o default	0.00	125.0000	2500.	--	--	--	--
default	Free Water, using k default	5.0000	125.0000	2500.	--	--	--	--
2	Sand	5.0000	122.0000	--	32.0000	--	--	--

default	--							
(Reese, et al.)		18.0000	122.0000	--	32.0000	--	--	--
default	--							
3	Stiff Clay w/o	18.0000	125.0000	2500.	--	--	--	--
default	default	--						
	Free Water, using k	19.2500	125.0000	2500.	--	--	--	--
default	default	--						
4	Weak	19.2500	82.6000	--	--	3820.	77.0000	
5.00E-05	--	343800.						
	Rock	35.0000	82.6000	--	--	3820.	77.0000	
5.00E-05	--	343800.						

 Modification Factors for p-y Curves

Distribution of p-y modifiers with depth defined using 4 points

Point No.	Depth X ft	p-mult	y-mult
1	0.000	0.7000	1.0000
2	5.000	0.7000	1.0000
3	19.250	0.7000	1.0000
4	33.000	0.7000	1.0000

 Static Loading Type

Static loading criteria were used when computing p-y curves for all analyses.

 Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 2

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length	Run Analysis
1	1	V = 1800. lbs	M = 4363200. in-lbs	774500.	No	Yes
2	1	V = 2420. lbs	M = 5889600. in-lbs	996600.	No	Yes

V = shear force applied normal to pile axis

M = bending moment applied to pile head

y = lateral deflection normal to pile axis

S = pile slope relative to original pile batter angle

R = rotational stiffness applied to pile head

Values of top y vs. pile lengths can be computed only for load types with specified shear loading (Load Types 1, 2, and 3).

Thrust force is assumed to be acting axially for all pile batter angles.

 Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 2

Pile Section No. 1:

Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section	=	19.250000 ft
Shaft Diameter	=	36.000000 in
Concrete Cover Thickness (to edge of trans. reinf.)	=	3.000000 in
Number of Reinforcing Bars	=	8 bars
Yield Stress of Reinforcing Bars	=	50000. psi
Modulus of Elasticity of Reinforcing Bars	=	29000000. psi
Gross Area of Shaft	=	1018. sq. in.

Total Area of Reinforcing Steel = 8.000000 sq. in.
 Area Ratio of Steel Reinforcement = 0.79 percent
 Edge-to-Edge Bar Spacing = 9.538153 in
 Maximum Concrete Aggregate Size = 0.750000 in
 Ratio of Bar Spacing to Aggregate Size = 12.72
 Offset of Center of Rebar Cage from Center of Pile = 0.0000 in
 Transverse Reinforcement
 Type: Spiral
 Number of Transverse Reinf. (per spacing) = 1
 Spacing of Transverse Reinf. = 4.000000 in
 Yield Stress of Transverse Reinf. = 50000. psi
 Diameter of Transverse Reinf. = 0.500000 in

Axial Structural Capacities:

Nom. Axial Structural Capacity = $0.85 F_c A_c + F_y A_s$ = 3833.578 kips
 Tensile Load for Cracking of Concrete = -446.783 kips
 Nominal Axial Tensile Capacity = -400.000 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.128000	1.000000	13.936000	0.000000
2	1.128000	1.000000	9.854240	9.854240
3	1.128000	1.000000	0.000000	13.936000
4	1.128000	1.000000	-9.85424	9.854240
5	1.128000	1.000000	-13.93600	0.000000
6	1.128000	1.000000	-9.85424	-9.85424
7	1.128000	1.000000	0.000000	-13.93600
8	1.128000	1.000000	9.854240	-9.85424

NOTE: The positions of the above rebars were computed by LPILE

Minimum spacing between any two bars not equal to zero = 9.538 inches
between bars 3 and 4.

Ratio of bar spacing to maximum aggregate size = 12.72

Concrete Properties:

Compressive Strength of Concrete	=	4000. psi
Modulus of Elasticity of Concrete	=	3604997. psi
Modulus of Rupture of Concrete	=	-474.34165 psi
Compression Strain at Peak Stress	=	0.001886
Tensile Strain at Fracture of Concrete	=	-0.0001154
Maximum Coarse Aggregate Size	=	0.750000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 2

Number	Axial Thrust Force kips
-----	-----
1	774.500
2	996.600

Definitions of Run Messages and Notes:

- C = concrete in section has cracked in tension.
- Y = stress in reinforcing steel has reached yield stress.
- T = ACI 318 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than 0.003. See ACI 318-14, Section 21.2.3.
- Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
 Position of neutral axis is measured from edge of compression side of pile.
 Compressive stresses and strains are positive in sign.
 Tensile stresses and strains are negative in sign.

Axial Thrust Force = 774.500 kips

MEG-33 Rear Abutment X direction row 3

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	209.9768848	335963016.	305.4584133	0.0001909	0.0001684	0.7682850	5.4744462	
0.00000125	419.9544678	335963574.	161.7501720	0.0002022	0.0001572	0.8107029	5.7394687	
0.00000188	629.9200184	335957343.	113.8567412	0.0002135	0.0001460	0.8529062	6.0049978	
0.00000250	839.8675209	335947008.	89.9170136	0.0002248	0.0001348	0.8948938	6.2710335	
0.00000313	1050.	335933107.	75.5587678	0.0002361	0.0001236	0.9366642	6.5375758	
0.00000375	1260.	335915817.	65.9912635	0.0002475	0.0001125	0.9782161	6.8046249	
0.00000438	1470.	335895215.	59.1613265	0.0002588	0.0001013	1.0195483	7.0721808	
0.00000500	1679.	335871340.	54.0423696	0.0002702	0.00009021	1.0606595	7.3402436	
0.00000563	1889.	335844210.	50.0640668	0.0002816	0.00007911	1.1015482	7.6088134	
0.00000625	2099.	335813840.	46.8842227	0.0002930	0.00006803	1.1422132	7.8778904	
0.00000688	2308.	335780235.	44.2850763	0.0003045	0.00005696	1.1826533	8.1474746	
0.00000750	2518.	335743400.	42.1214541	0.0003159	0.00004591	1.2228669	8.4175663	
0.00000813	2728.	335703338.	40.2928511	0.0003274	0.00003488	1.2628530	8.6881656	
0.00000875	2937.	335660050.	38.7274782	0.0003389	0.00002387	1.3026100	8.9592726	
0.00000938	3146.	335613538.	37.3726902	0.0003504	0.00001287	1.3421368	9.2308877	
0.00001000	3356.	335563800.	36.1890031	0.0003619	0.00000189	1.3814319	9.5030109	
0.00001063	3565.	335510389.	35.1462171	0.0003734	-0.00000907	1.4204939	9.7756407	
0.00001125	3774.	335448762.	34.2207824	0.0003850	-0.00002002	1.4593189	10.0487553	
0.00001188	3983.	335372226.	33.3940570	0.0003966	-0.00003095	1.4979010	10.3223159	
0.00001250	4191.	335275605.	32.6511234	0.0004081	-0.00004186	1.5362345	10.5962823	
0.00001313	4399.	335155533.	31.9799128	0.0004197	-0.00005276	1.5743140	10.8706168	
0.00001375	4606.	335010258.	31.3705628	0.0004313	-0.00006365	1.6121349	11.1452870	
0.00001438	4813.	334839082.	30.8149356	0.0004430	-0.00007454	1.6496930	11.4202638	
0.00001500	5020.	334642016.	30.3062574	0.0004546	-0.00008541	1.6869847	11.6955220	
0.00001563	5225.	334419493.	29.8388439	0.0004662	-0.00009627	1.7240067	11.9710387	
0.00001625	5430.	334172355.	29.4078929	0.0004779	-0.000107	1.7607561	12.2467946	
0.00001688	5430.	321795601.	28.5379799	0.0004816	-0.000126	1.7721262	12.2921114	C
0.00001750	5430.	310302901.	28.0974528	0.0004917	-0.000138	1.8037114	12.5238073	C
0.00001813	5430.	299602801.	27.6819613	0.0005017	-0.000151	1.8347688	12.7526933	C
0.00001875	5531.	294985524.	27.2891744	0.0005117	-0.000163	1.8653149	12.9788637	C
0.00001938	5641.	291155897.	26.9168123	0.0005215	-0.000176	1.8953509	13.2022714	C
0.00002000	5747.	287367426.	26.5630245	0.0005313	-0.000189	1.9248871	13.4229543	C
0.00002063	5850.	283630097.	26.2263178	0.0005409	-0.000202	1.9539418	13.6410289	C
0.00002125	5949.	279952989.	25.9054090	0.0005505	-0.000215	1.9825350	13.8566334	C
0.00002188	6045.	276344121.	25.5991900	0.0005600	-0.000228	2.0106885	14.0699237	C
0.00002250	6138.	272810537.	25.3067051	0.0005694	-0.000241	2.0384250	14.2810751	C

Performed by: Gokul Khatri 6/28/2024

Checked by: James Samples 7/1/2024

MEG-33 Rear Abutment X direction row 3

0.00002313	6229.	269354766.	25.0270116	0.0005787	-0.000254	2.0657610	14.4902022	C
0.00002375	6316.	265942885.	24.7580424	0.0005880	-0.000267	2.0926272	14.6965767	C
0.00002438	6401.	262617842.	24.5003905	0.0005972	-0.000280	2.1191300	14.9012011	C
0.00002563	6565.	256207897.	24.0156543	0.0006154	-0.000307	2.1710547	15.3051452	C
0.00002688	6721.	250098469.	23.5670604	0.0006334	-0.000334	2.2215727	15.7021153	C
0.00002813	6870.	244254957.	23.1494010	0.0006511	-0.000361	2.2706819	16.0917926	C
0.00002938	7012.	238695912.	22.7602946	0.0006686	-0.000389	2.3185388	16.4755131	C
0.00003063	7148.	233404965.	22.3966231	0.0006859	-0.000417	2.3651987	16.8536129	C
0.00003188	7279.	228367929.	22.0558068	0.0007030	-0.000444	2.4107192	17.2264740	C
0.00003313	7406.	223572305.	21.7357058	0.0007200	-0.000473	2.4551598	17.5945249	C
0.00003438	7528.	219000726.	21.4342263	0.0007368	-0.000501	2.4985542	17.9579319	C
0.00003563	7646.	214623746.	21.1488122	0.0007534	-0.000529	2.5408658	18.3160792	C
0.00003688	7760.	210452696.	20.8791882	0.0007699	-0.000558	2.5822412	18.6704193	C
0.00003813	7872.	206480017.	20.6243515	0.0007863	-0.000586	2.6227471	19.0215612	C
0.00003938	7981.	202681225.	20.3824550	0.0008026	-0.000615	2.6623531	19.3690034	C
0.00004063	8086.	199033263.	20.1516581	0.0008187	-0.000644	2.7010095	19.7119848	C
0.00004188	8189.	195561271.	19.9331840	0.0008347	-0.000673	2.7389539	20.0531980	C
0.00004313	8289.	192219340.	19.7239608	0.0008506	-0.000702	2.7759904	20.3901410	C
0.00004438	8388.	189023045.	19.5247335	0.0008664	-0.000731	2.8122913	20.7247790	C
0.00004563	8484.	185957571.	19.3344684	0.0008821	-0.000760	2.8478428	21.0568312	C
0.00004688	8579.	183009976.	19.1521150	0.0008978	-0.000790	2.8826191	21.3858440	C
0.00004813	8671.	180183193.	18.9778933	0.0009133	-0.000819	2.9167201	21.7129850	C
0.00004938	8762.	177462231.	18.8106265	0.0009288	-0.000849	2.9500925	22.0374535	C
0.00005063	8851.	174843367.	18.6500888	0.0009442	-0.000878	2.9827769	22.3596742	C
0.00005188	8940.	172330886.	18.4965996	0.0009595	-0.000908	3.0148693	22.6808592	C
0.00005313	9026.	169895579.	18.3478947	0.0009747	-0.000938	3.0461791	22.9982878	C
0.00005438	9111.	167567324.	18.2064765	0.0009900	-0.000968	3.0770331	23.3164253	C
0.00005563	9195.	165304549.	18.0688839	0.0010051	-0.000997	3.1070978	23.6304811	C
0.00005688	9278.	163128637.	17.9370674	0.0010202	-0.001027	3.1366342	-24.151687	C
0.00005813	9360.	161039166.	17.8110890	0.0010353	-0.001057	3.1656928	-24.894846	C
0.00005938	9441.	158999243.	17.6876492	0.0010502	-0.001087	3.1939414	-25.642766	C
0.00006063	9521.	157039251.	17.5696889	0.0010652	-0.001117	3.2217476	-26.390003	C
0.00006188	9600.	155153363.	17.4567824	0.0010801	-0.001147	3.2490985	-27.136723	C
0.00006313	9677.	153306251.	17.3455151	0.0010949	-0.001178	3.2756375	-27.888629	C
0.00006438	9755.	151527025.	17.2389300	0.0011098	-0.001208	3.3017402	-28.639860	C
0.00006563	9831.	149811768.	17.1367610	0.0011246	-0.001238	3.3274046	-29.390414	C
0.00006688	9907.	148138806.	17.0367871	0.0011393	-0.001268	3.3524030	-30.144118	C
0.00006813	9981.	146513241.	16.9396803	0.0011540	-0.001298	3.3768367	-30.899406	C
0.00006938	10055.	144942749.	16.8464048	0.0011687	-0.001329	3.4008383	-31.654027	C
0.00007063	10129.	143424375.	16.7567587	0.0011834	-0.001359	3.4244058	-32.407976	C
0.00007188	10202.	141935938.	16.6682277	0.0011980	-0.001389	3.4472735	-33.166100	C

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0.00007313	10273.	140490618.	16.5824943	0.0012126	-0.001420	3.4696518	-33.924710	C
0.00007438	10345.	139090673.	16.4999505	0.0012272	-0.001450	3.4916023	-34.682657	C
0.00007938	10625.	133853545.	16.1923301	0.0012853	-0.001572	3.5743872	-37.722367	C
0.00008438	10896.	129140113.	15.9182821	0.0013431	-0.001694	3.6495145	-40.769141	C
0.00008938	11161.	124874561.	15.6734988	0.0014008	-0.001817	3.7172113	-43.819538	C
0.00009438	11417.	120974705.	15.4508889	0.0014582	-0.001939	3.7772953	-46.880236	C
0.00009938	11668.	117417241.	15.2521788	0.0015157	-0.002062	3.8303422	-49.936615	C
0.0001044	11890.	113914359.	15.0627977	0.0015722	-0.002185	3.8754269	-50.000000	CY
0.0001094	12069.	110344880.	14.8790357	0.0016274	-0.002310	3.9127629	-50.000000	CY
0.0001144	12241.	107026803.	14.7093660	0.0016824	-0.002435	3.9433518	-50.000000	CY
0.0001194	12410.	103956083.	14.5559884	0.0017376	-0.002560	3.9674575	-50.000000	CY
0.0001244	12572.	101084173.	14.4126142	0.0017926	-0.002685	3.9848491	-50.000000	CY
0.0001294	12695.	98125119.	14.2688573	0.0018460	-0.002811	3.9954633	-50.000000	CY
0.0001344	12767.	95009372.	14.1158211	0.0018968	-0.002941	3.9997907	-50.000000	CY
0.0001394	12831.	92064345.	13.9725454	0.0019474	-0.003070	3.9997762	-50.000000	CY
0.0001444	12893.	89303118.	13.8408088	0.0019983	-0.003199	3.9996381	-50.000000	CY
0.0001494	12949.	86690220.	13.7146701	0.0020486	-0.003329	3.9992485	-50.000000	CY
0.0001544	13003.	84232838.	13.5990886	0.0020994	-0.003458	3.9984610	-50.000000	CY
0.0001594	13055.	81915774.	13.4925815	0.0021504	-0.003587	3.9981434	-50.000000	CY
0.0001644	13102.	79710991.	13.3892322	0.0022009	-0.003717	3.9998670	-50.000000	CY
0.0001694	13148.	77626074.	13.2940182	0.0022517	-0.003846	3.9989242	-50.000000	CY
0.0001744	13192.	75652068.	13.2060625	0.0023028	-0.003975	3.9973354	-50.000000	CY
0.0001794	13234.	73775867.	13.1240094	0.0023541	-0.004103	3.9996953	50.000000	CY
0.0001844	13272.	71983354.	13.0441488	0.0024050	-0.004232	3.9976784	50.000000	CY
0.0001894	13308.	70273741.	12.9710783	0.0024564	-0.004361	3.9999015	50.000000	CY
0.0001944	13342.	68639668.	12.9044654	0.0025083	-0.004489	3.9979475	50.000000	CY
0.0001994	13374.	67078440.	12.8433281	0.0025606	-0.004617	3.9999368	50.000000	CY
0.0002044	13403.	65579593.	12.7883122	0.0026136	-0.004744	3.9977035	50.000000	CY
0.0002094	13430.	64142683.	12.7338299	0.0026661	-0.004871	3.9998497	50.000000	CY
0.0002144	13454.	62761220.	12.6840448	0.0027191	-0.004998	3.9966434	50.000000	CY
0.0002194	13478.	61438678.	12.6377277	0.0027724	-0.005125	3.9994518	50.000000	CY
0.0002244	13501.	60171193.	12.5946489	0.0028259	-0.005252	3.9966324	50.000000	CY
0.0002294	13523.	58954625.	12.5547273	0.0028797	-0.005378	3.9983147	50.000000	CY
0.0002344	13544.	57787293.	12.5174048	0.0029338	-0.005504	3.9999419	50.000000	CY
0.0002394	13564.	56664472.	12.4829267	0.0029881	-0.005629	3.9957434	50.000000	CY
0.0002444	13584.	55584850.	12.4507779	0.0030427	-0.005755	3.9989004	50.000000	CY
0.0002494	13602.	54546262.	12.4207182	0.0030974	-0.005880	3.9999993	50.000000	CY
0.0002544	13620.	53542300.	12.3906280	0.0031519	-0.006006	3.9956446	50.000000	CY
0.0002594	13637.	52575216.	12.3623640	0.0032065	-0.006131	3.9987217	50.000000	CYT
0.0002644	13653.	51642979.	12.3358887	0.0032613	-0.006256	3.9999718	50.000000	CYT
0.0002694	13669.	50742250.	12.3115464	0.0033164	-0.006381	3.9940155	50.000000	CYT

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0.0002744	13684.	49872618.	12.2888179	0.0033717	-0.006506	3.9976686	50.0000000	CYT
0.0003044	13737.	45130802.	12.1571075	0.0037003	-0.007257	3.9980997	50.0000000	CYT
0.0003344	13737.	41081683.	12.1330546	0.0040570	-0.007981	3.9964469	50.0000000	CYT

Axial Thrust Force = 996.600 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	203.6720076	325875212.	393.3150993	0.0002458	0.0002233	0.9742233	7.0668487	
0.00000125	407.3465994	325877280.	205.6791714	0.0002571	0.0002121	1.0152659	7.3318949	
0.00000188	611.0087820	325871350.	143.1434702	0.0002684	0.0002009	1.0560937	7.5974637	
0.00000250	814.6523513	325860941.	111.8828261	0.0002797	0.0001897	1.0967055	7.8635549	
0.00000313	1018.	325846753.	93.1322056	0.0002910	0.0001785	1.1370999	8.1301686	
0.00000375	1222.	325829021.	80.6365975	0.0003024	0.0001674	1.1772754	8.3973050	
0.00000438	1425.	325807845.	71.7152829	0.0003138	0.0001563	1.2172309	8.6649640	
0.00000500	1629.	325783275.	65.0279025	0.0003251	0.0001451	1.2569649	8.9331459	
0.00000563	1832.	325755337.	59.8298123	0.0003365	0.0001340	1.2964760	9.2018506	
0.00000625	2036.	325724047.	55.6742259	0.0003480	0.0001230	1.3357629	9.4710785	
0.00000688	2239.	325689416.	52.2768250	0.0003594	0.0001119	1.3748243	9.7408295	
0.00000750	2442.	325651449.	49.4480639	0.0003709	0.0001009	1.4136587	10.0111039	
0.00000813	2646.	325610150.	47.0567189	0.0003823	0.00008984	1.4522649	10.2819019	
0.00000875	2849.	325565521.	45.0090586	0.0003938	0.00007883	1.4906414	10.5532237	
0.00000938	3052.	325517564.	43.2363471	0.0004053	0.00006784	1.5287869	10.8250694	
0.00001000	3255.	325466278.	41.6870322	0.0004169	0.00005687	1.5667001	11.0974394	
0.00001063	3457.	325411664.	40.3216917	0.0004284	0.00004592	1.6043796	11.3703338	
0.00001125	3660.	325353721.	39.1096642	0.0004400	0.00003498	1.6418240	11.6437530	
0.00001188	3863.	325292448.	38.0267430	0.0004516	0.00002407	1.6790319	11.9176972	
0.00001250	4065.	325227844.	37.0535632	0.0004632	0.00001317	1.7160020	12.1921667	
0.00001313	4268.	325159908.	36.1744481	0.0004748	0.00000229	1.7527329	12.4671619	
0.00001375	4470.	325088447.	35.3765689	0.0004864	-0.00000857	1.7892231	12.7426819	
0.00001438	4672.	325011148.	34.6492954	0.0004981	-0.00001942	1.8254697	13.0187125	
0.00001500	4874.	324924161.	33.9837381	0.0005098	-0.00003024	1.8614683	13.2952261	
0.00001563	5075.	324824019.	33.3724230	0.0005214	-0.00004106	1.8972144	13.5721917	
0.00001625	5277.	324708100.	32.8090278	0.0005331	-0.00005185	1.9327036	13.8495794	
0.00001688	5477.	324574480.	32.2881692	0.0005449	-0.00006264	1.9679318	14.1273604	
0.00001750	5677.	324422050.	31.8052401	0.0005566	-0.00007341	2.0028952	14.4055094	
0.00001813	5877.	324250184.	31.3562727	0.0005683	-0.00008417	2.0375906	14.6840034	
0.00001875	6076.	324058684.	30.9378332	0.0005801	-0.00009492	2.0720149	14.9628218	

MEG-33 Rear Abutment X direction row 3

0.00001938	6275.	323847595.	30.5469333	0.0005918	-0.000106	2.1061653	15.2419457
0.00002000	6275.	313727358.	29.8819408	0.0005976	-0.000122	2.1227034	15.3479257 C
0.00002063	6275.	304220468.	29.4895899	0.0006082	-0.000134	2.1530051	15.5928735 C
0.00002125	6392.	300780522.	29.1161018	0.0006187	-0.000146	2.1828041	15.8352228 C
0.00002188	6516.	297891556.	28.7599702	0.0006291	-0.000158	2.2121136	16.0750436 C
0.00002250	6637.	294980129.	28.4198831	0.0006394	-0.000171	2.2409481	16.3124238 C
0.00002313	6754.	292064133.	28.0948053	0.0006497	-0.000183	2.2693305	16.5475413 C
0.00002375	6868.	289160289.	27.7838541	0.0006599	-0.000195	2.2972861	16.7806046 C
0.00002438	6978.	286280418.	27.4861810	0.0006700	-0.000208	2.3248355	17.0117818 C
0.00002563	7189.	280564272.	26.9257907	0.0006900	-0.000233	2.3786649	17.4677408 C
0.00002688	7390.	274969415.	26.4079593	0.0007097	-0.000258	2.4309321	17.9162408 C
0.00002813	7579.	269488118.	25.9266343	0.0007292	-0.000283	2.4816432	18.3569737 C
0.00002938	7760.	264174919.	25.4787630	0.0007484	-0.000309	2.5309543	18.7913088 C
0.00003063	7933.	259028630.	25.0604512	0.0007675	-0.000335	2.5789095	19.2194258 C
0.00003188	8098.	254048220.	24.6684549	0.0007863	-0.000361	2.6255543	19.6415406 C
0.00003313	8256.	249232699.	24.3000599	0.0008049	-0.000388	2.6709363	20.0579068 C
0.00003438	8407.	244581076.	23.9529870	0.0008234	-0.000414	2.7151046	20.4688215 C
0.00003563	8553.	240092228.	23.6253189	0.0008417	-0.000441	2.7581097	20.8746202 C
0.00003688	8694.	235764935.	23.3154412	0.0008598	-0.000468	2.8000038	21.2756875 C
0.00003813	8830.	231597809.	23.0219958	0.0008777	-0.000495	2.8408407	21.6724568 C
0.00003938	8961.	227589277.	22.7438439	0.0008955	-0.000522	2.8806758	22.0654134 C
0.00004063	9089.	223737597.	22.4800354	0.0009133	-0.000549	2.9195661	22.4551038 C
0.00004188	9213.	220001946.	22.2278097	0.0009308	-0.000577	2.9573910	22.8397338 C
0.00004313	9333.	216406804.	21.9876532	0.0009482	-0.000604	2.9943079	23.2211713 C
0.00004438	9450.	212959294.	21.7594669	0.0009656	-0.000632	3.0304148	23.6006016 C
0.00004563	9563.	209606744.	21.5399776	0.0009828	-0.000660	3.0655057	23.9749951 C
0.00004688	9674.	206387338.	21.3308238	0.0009999	-0.000688	3.0998206	24.3475262 C
0.00004813	9783.	203278756.	21.1305016	0.0010169	-0.000716	3.1333004	24.7172189 C
0.00004938	9888.	200270331.	20.9380480	0.0010338	-0.000744	3.1659283	25.0836550 C
0.00005063	9992.	197375102.	20.7540820	0.0010507	-0.000772	3.1978325	25.4485993 C
0.00005188	10093.	194563502.	20.5765351	0.0010674	-0.000800	3.2288782	25.8098625 C
0.00005313	10192.	191856337.	20.4066260	0.0010841	-0.000828	3.2592417	26.1700209 C
0.00005438	10289.	189229572.	20.2426153	0.0011007	-0.000857	3.2888092	26.5271615 C
0.00005563	10385.	186689367.	20.0848631	0.0011172	-0.000885	3.3176662	26.8825074 C
0.00005688	10478.	184237036.	19.9333571	0.0011337	-0.000914	3.3458584	27.2367184 C
0.00005813	10570.	181846021.	19.7861768	0.0011501	-0.000942	3.3732421	27.5872369 C
0.00005938	10661.	179549493.	19.6457033	0.0011665	-0.000971	3.4000901	27.9386331 C
0.00006063	10749.	177301967.	19.5084800	0.0011827	-0.001000	3.4261027	28.2855591 C
0.00006188	10836.	175130480.	19.3765917	0.0011989	-0.001029	3.4515185	28.6321094 C
0.00006313	10923.	173035897.	19.2501215	0.0012152	-0.001057	3.4763775	28.9790163 C
0.00006438	11007.	170977743.	19.1257826	0.0012312	-0.001086	3.5003918	29.3207331 C

MEG-33 Rear Abutment X direction row 3

0.00006563	11090.	168992672.	19.0066273	0.0012473	-0.001115	3.5238854	29.6633003	C
0.00006688	11173.	167073938.	18.8921379	0.0012634	-0.001144	3.5468333	30.0062777	C
0.00006813	11253.	165185772.	18.7792028	0.0012793	-0.001173	3.5689635	30.3440252	C
0.00006938	11333.	163360720.	18.6707551	0.0012953	-0.001202	3.5905790	30.6826130	C
0.00007063	11413.	161595374.	18.5665585	0.0013113	-0.001231	3.6116770	31.0220443	C
0.00007188	11490.	159863156.	18.4641413	0.0013271	-0.001260	3.6320464	31.3576317	C
0.00007313	11567.	158177405.	18.3648360	0.0013429	-0.001290	3.6518314	31.6923929	C
0.00007438	11643.	156543775.	18.2692566	0.0013588	-0.001319	3.6711048	32.0279906	C
0.00007938	11938.	150405227.	17.9127453	0.0014218	-0.001436	3.7423437	-33.762187	C
0.00008438	12221.	144847260.	17.5946245	0.0014845	-0.001553	3.8045928	-36.667341	C
0.00008938	12494.	139789419.	17.3096761	0.0015471	-0.001670	3.8580756	-39.578771	C
0.00009438	12756.	135167504.	17.0541400	0.0016095	-0.001788	3.9029762	-42.492338	C
0.00009938	13009.	130909214.	16.8222299	0.0016717	-0.001906	3.9392553	-45.411923	C
0.0001044	13253.	126978243.	16.6123948	0.0017339	-0.002024	3.9670729	-48.331945	C
0.0001094	13489.	123323654.	16.4227856	0.0017962	-0.002141	3.9864670	-50.000000	CY
0.0001144	13678.	119590994.	16.2365473	0.0018571	-0.002260	3.9972115	-50.000000	CY
0.0001194	13845.	115975525.	16.0626757	0.0019175	-0.002380	3.9987570	-50.000000	CY
0.0001244	14003.	112584181.	15.9019595	0.0019778	-0.002500	3.9995320	-50.000000	CY
0.0001294	14154.	109406740.	15.7561218	0.0020384	-0.002619	3.9998680	-50.000000	CY
0.0001344	14300.	106421553.	15.6235115	0.0020994	-0.002738	3.9999767	-50.000000	CY
0.0001394	14425.	103494347.	15.4941238	0.0021595	-0.002858	3.9999916	-50.000000	CY
0.0001444	14501.	100436626.	15.3594991	0.0022175	-0.002980	3.9999513	-50.000000	CY
0.0001494	14556.	97445487.	15.2274011	0.0022746	-0.003103	3.9997474	50.000000	CY
0.0001544	14605.	94605744.	15.1049129	0.0023318	-0.003226	3.9991903	50.000000	CY
0.0001594	14650.	91919826.	14.9939809	0.0023897	-0.003348	3.9980481	50.000000	CY
0.0001644	14688.	89359021.	14.8917096	0.0024478	-0.003470	3.9999996	50.000000	CY
0.0001694	14722.	86921425.	14.7957345	0.0025060	-0.003591	3.9995284	50.000000	CY
0.0001744	14754.	84609118.	14.7080370	0.0025647	-0.003713	3.9978757	50.000000	CY
0.0001794	14783.	82416202.	14.6272034	0.0026238	-0.003834	3.9999704	50.000000	CY
0.0001844	14810.	80327732.	14.5509839	0.0026828	-0.003955	3.9987667	50.000000	CY
0.0001894	14835.	78336022.	14.4773344	0.0027416	-0.004076	3.9990009	50.000000	CY
0.0001944	14858.	76438289.	14.4094217	0.0028008	-0.004197	3.9989813	50.000000	CY
0.0001994	14879.	74630341.	14.3463146	0.0028603	-0.004317	3.9984126	50.000000	CY
0.0002044	14900.	72903513.	14.2880562	0.0029201	-0.004437	3.9987767	50.000000	CY
0.0002094	14919.	71254889.	14.2337663	0.0029802	-0.004557	3.9996908	50.000000	CY
0.0002144	14936.	69671857.	14.1808282	0.0030400	-0.004677	3.9979724	50.000000	CY
0.0002194	14952.	68156154.	14.1303013	0.0030998	-0.004798	3.9998749	50.000000	CY
0.0002244	14967.	66703086.	14.0834512	0.0031600	-0.004918	3.9960754	50.000000	CY
0.0002294	14980.	65309790.	14.0397601	0.0032204	-0.005037	3.9990940	50.000000	CY
0.0002344	14994.	63973050.	13.9988940	0.0032810	-0.005157	3.9992060	50.000000	CY
0.0002394	15006.	62687492.	13.9611334	0.0033419	-0.005276	3.9969147	50.000000	CY

0.0002444	15017.	61452315.	13.9257186	0.0034031	-0.005394	3.9994189	50.0000000	CY
0.0002494	15028.	60263903.	13.8926652	0.0034645	-0.005513	3.9977583	50.0000000	CY
0.0002544	15038.	59118591.	13.8620804	0.0035262	-0.005631	3.9966924	50.0000000	CY
0.0002594	15047.	58013296.	13.8308588	0.0035874	-0.005750	3.9992206	50.0000000	CY
0.0002644	15056.	56947827.	13.8013813	0.0036487	-0.005869	3.9994570	50.0000000	CY
0.0002694	15063.	55918650.	13.7742126	0.0037104	-0.005987	3.9949752	50.0000000	CY
0.0002744	15070.	54925610.	13.7486536	0.0037723	-0.006105	3.9981926	50.0000000	CY
0.0003044	15070.	49511998.	13.9469650	0.0042451	-0.006712	3.9990675	50.0000000	CYT

Summary of Results for Nominal Moment Capacity for Section 1

Moment values interpolated at maximum compressive strain = 0.003
or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain	Max. Tens. Strain
1	774.500	13568.309	0.00300000	-0.00565676
2	996.600	14924.592	0.00300000	-0.00459709

Note that the values of moment capacity in the table above are not factored by a strength reduction factor (phi-factor).

In ACI 318, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.75).

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318, or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Load No.	Resist. Factor	Nominal Ax. Thrust kips	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in^2
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MEG-33 Rear Abutment X direction row 3

1	0.65	774.500000	13568.	503.425000	8819.	175783680.
2	0.65	996.600000	14925.	647.790000	9701.	205625046.
1	0.75	774.500000	13568.	580.875000	10176.	142459141.
2	0.75	996.600000	14925.	747.450000	11193.	166594334.
1	0.90	774.500000	13568.	697.050000	12211.	107599265.
2	0.90	996.600000	14925.	896.940000	13432.	124199998.

Pile Section No. 2:

Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section	=	10.000000	ft
Shaft Diameter	=	30.000000	in
Concrete Cover Thickness (to edge of trans. reinf.)	=	3.000000	in
Number of Reinforcing Bars	=	8	bars
Yield Stress of Reinforcing Bars	=	50000.	psi
Modulus of Elasticity of Reinforcing Bars	=	29000000.	psi
Gross Area of Shaft	=	706.858347	sq. in.
Total Area of Reinforcing Steel	=	8.000000	sq. in.
Area Ratio of Steel Reinforcement	=	1.13	percent
Edge-to-Edge Bar Spacing	=	7.242052	in
Maximum Concrete Aggregate Size	=	0.750000	in
Ratio of Bar Spacing to Aggregate Size	=	9.66	
Offset of Center of Rebar Cage from Center of Pile	=	0.0000	in
Transverse Reinforcement			
Type: Spiral			
Number of Transverse Reinf. (per spacing)	=	1	
Spacing of Transverse Reinf.	=	4.000000	in
Yield Stress of Transverse Reinf.	=	50000.	psi
Diameter of Transverse Reinf.	=	0.500000	in

Axial Structural Capacities:

Nom. Axial Structural Capacity = $0.85 F_c A_c + F_y A_s$	=	2776.118	kips
Tensile Load for Cracking of Concrete	=	-317.428	kips

Nominal Axial Tensile Capacity = -400.000 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.128000	1.000000	10.936000	0.000000
2	1.128000	1.000000	7.732920	7.732920
3	1.128000	1.000000	0.000000	10.936000
4	1.128000	1.000000	-7.73292	7.732920
5	1.128000	1.000000	-10.93600	0.000000
6	1.128000	1.000000	-7.73292	-7.73292
7	1.128000	1.000000	0.000000	-10.93600
8	1.128000	1.000000	7.732920	-7.73292

NOTE: The positions of the above rebars were computed by LPILE

Minimum spacing between any two bars not equal to zero = 7.242 inches between bars 1 and 2.

Ratio of bar spacing to maximum aggregate size = 9.66

Concrete Properties:

Compressive Strength of Concrete	=	4000. psi
Modulus of Elasticity of Concrete	=	3604997. psi
Modulus of Rupture of Concrete	=	-474.34165 psi
Compression Strain at Peak Stress	=	0.001886
Tensile Strain at Fracture of Concrete	=	-0.0001154
Maximum Coarse Aggregate Size	=	0.750000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 2

Number	Axial Thrust Force
	kips

1	774.500
2	996.600

Definitions of Run Messages and Notes:

- C = concrete in section has cracked in tension.
 Y = stress in reinforcing steel has reached yield stress.
 T = ACI 318 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than 0.003. See ACI 318-14, Section 21.2.3.
 Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
 Position of neutral axis is measured from edge of compression side of pile.
 Compressive stresses and strains are positive in sign.
 Tensile stresses and strains are negative in sign.

Axial Thrust Force = 774.500 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in ²	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
0.00000125	197.0601972	157648158.	222.0606597	0.0002776	0.0002401	1.0899493	7.9246364	
0.00000250	394.1138216	157645529.	118.5600268	0.0002964	0.0002214	1.1569769	8.3454769	
0.00000375	591.1346542	157635908.	84.0730133	0.0003153	0.0002028	1.2233984	8.7677527	
0.00000500	788.1062969	157621259.	66.8394067	0.0003342	0.0001842	1.2892076	9.1914640	
0.00000625	985.0123447	157601975.	56.5071652	0.0003532	0.0001657	1.3543984	9.6166112	
0.00000750	1182.	157578184.	49.6256087	0.0003722	0.0001472	1.4189645	10.0431949	
0.00000875	1379.	157549941.	44.7158748	0.0003913	0.0001288	1.4828997	10.4712157	
0.00001000	1575.	157517272.	41.0385327	0.0004104	0.0001104	1.5461977	10.9006745	
0.00001125	1772.	157480188.	38.1827880	0.0004296	0.00009206	1.6088524	11.3315721	
0.00001250	1968.	157438697.	35.9021643	0.0004488	0.00007378	1.6708575	11.7639096	
0.00001375	2164.	157392801.	34.0398132	0.0004680	0.00005555	1.7322068	12.1976880	
0.00001500	2360.	157342500.	32.4911695	0.0004874	0.00003737	1.7928939	12.6329088	
0.00001625	2556.	157287792.	31.1838422	0.0005067	0.00001924	1.8529127	13.0695732	

MEG-33 Rear Abutment X direction row 3

0.00001750	2752.	157228675.	30.0661236	0.0005262	0.00000116	1.9122569	13.5076828
0.00001875	2947.	157164446.	29.1000771	0.0005456	-0.00001687	1.9709191	13.9472295
0.00002000	3142.	157089981.	28.2571291	0.0005651	-0.00003486	2.0288848	14.3881349
0.00002125	3336.	156999043.	27.5153565	0.0005847	-0.00005280	2.0861355	14.8302760
0.00002250	3530.	156887434.	26.8577127	0.0006043	-0.00007070	2.1426537	15.2735326
0.00002375	3723.	156752846.	26.2707579	0.0006239	-0.00008857	2.1984238	15.7177971
0.00002500	3915.	156594455.	25.7437631	0.0006436	-0.000106	2.2534323	16.1629784
0.00002625	3915.	149137576.	25.0368587	0.0006572	-0.000130	2.2908839	16.4329962 C
0.00002750	4033.	146649420.	24.5453819	0.0006750	-0.000150	2.3393091	16.8235672 C
0.00002875	4157.	144592151.	24.0896035	0.0006926	-0.000170	2.3864933	17.2082695 C
0.00003000	4275.	142501378.	23.6648231	0.0007099	-0.000190	2.4324413	17.5868962 C
0.00003125	4388.	140415182.	23.2684085	0.0007271	-0.000210	2.4772663	17.9604328 C
0.00003250	4496.	138329776.	22.8966067	0.0007441	-0.000231	2.5209482	18.3284269 C
0.00003375	4599.	136274891.	22.5477724	0.0007610	-0.000252	2.5636022	18.6919448 C
0.00003500	4699.	134259274.	22.2197918	0.0007777	-0.000272	2.6052760	19.0513388 C
0.00003625	4795.	132282335.	21.9104691	0.0007943	-0.000293	2.6459821	19.4065683 C
0.00003750	4888.	130344584.	21.6179695	0.0008107	-0.000314	2.6857390	19.7576670 C
0.00003875	4977.	128449428.	21.3408757	0.0008270	-0.000336	2.7245819	20.1048717 C
0.00004000	5064.	126599880.	21.0779814	0.0008431	-0.000357	2.7625479	20.4484585 C
0.00004125	5148.	124798507.	20.8282565	0.0008592	-0.000378	2.7996755	20.7887394 C
0.00004250	5229.	123036170.	20.5900901	0.0008751	-0.000400	2.8359331	21.1251612 C
0.00004375	5308.	121317239.	20.3628166	0.0008909	-0.000422	2.8713669	21.4581362 C
0.00004500	5384.	119649631.	20.1461797	0.0009066	-0.000443	2.9060545	21.7885147 C
0.00004625	5459.	118034813.	19.9396444	0.0009222	-0.000465	2.9400383	22.1167357 C
0.00004750	5531.	116449547.	19.7409583	0.0009377	-0.000487	2.9731774	22.4407939 C
0.00004875	5602.	114914948.	19.5510777	0.0009531	-0.000509	3.0056478	22.7628983 C
0.00005125	5739.	111972053.	19.1941534	0.0009837	-0.000554	3.0685042	23.3997482 C
0.00005375	5869.	109192162.	18.8647864	0.0010140	-0.000599	3.1287080	24.0277984 C
0.00005625	5994.	106563558.	18.5596701	0.0010440	-0.000644	3.1863601	24.6476493 C
0.00005875	6114.	104076249.	18.2761152	0.0010737	-0.000689	3.2415610	25.2599937 C
0.00006125	6230.	101721582.	18.0119282	0.0011032	-0.000734	3.2944107	25.8656249 C
0.00006375	6343.	99491943.	17.7653190	0.0011325	-0.000780	3.3450081	26.4654462 C
0.00006625	6451.	97380531.	17.5348307	0.0011617	-0.000826	3.3934508	27.0604811 C
0.00006875	6556.	95366369.	17.3175808	0.0011906	-0.000872	3.4396480	27.6484894 C
0.00007125	6659.	93453545.	17.1134941	0.0012193	-0.000918	3.4837896	28.2321949 C
0.00007375	6758.	91640611.	16.9221774	0.0012480	-0.000964	3.5260056	28.8136195 C
0.00007625	6855.	89904523.	16.7406104	0.0012765	-0.001011	3.5661234	29.3888625 C
0.00007875	6950.	88253220.	16.5695941	0.0013049	-0.001058	3.6043648	29.9618733 C
0.00008125	7043.	86677225.	16.4079047	0.0013331	-0.001104	3.6407187	30.5320631 C
0.00008375	7133.	85168310.	16.2543230	0.0013613	-0.001151	3.6751645	31.0984997 C
0.00008625	7222.	83727847.	16.1091455	0.0013894	-0.001198	3.7078255	31.6636880 C

MEG-33 Rear Abutment X direction row 3

0.00008875	7308.	82345955.	15.9709126	0.0014174	-0.001245	3.7386377	32.2256991	C
0.00009125	7393.	81021534.	15.8396010	0.0014454	-0.001292	3.7676724	32.7859818	C
0.00009375	7477.	79754049.	15.7152206	0.0014733	-0.001339	3.7949916	33.3460689	C
0.00009625	7559.	78529977.	15.5956665	0.0015011	-0.001386	3.8204612	33.9015919	C
0.00009875	7639.	77360672.	15.4830660	0.0015290	-0.001434	3.8443164	34.4596921	C
0.0001013	7718.	76230217.	15.3747014	0.0015567	-0.001481	3.8663680	35.0139045	C
0.0001038	7796.	75142382.	15.2714736	0.0015844	-0.001528	3.8867300	35.5678588	C
0.0001063	7873.	74099012.	15.1739535	0.0016122	-0.001575	3.9054687	36.1244321	C
0.0001088	7948.	73087021.	15.0796746	0.0016399	-0.001623	3.9224345	36.6770867	C
0.0001113	8022.	72110814.	14.9897588	0.0016676	-0.001670	3.9377310	-37.296228	C
0.0001138	8096.	71171201.	14.9046065	0.0016954	-0.001717	3.9513924	-38.415241	C
0.0001163	8168.	70262204.	14.8230900	0.0017232	-0.001764	3.9633628	-39.534345	C
0.0001188	8239.	69378396.	14.7441391	0.0017509	-0.001812	3.9736084	-40.656433	C
0.0001213	8309.	68525068.	14.6692263	0.0017786	-0.001859	3.9822043	-41.775770	C
0.0001238	8378.	67700276.	14.5981174	0.0018065	-0.001906	3.9891332	-42.892318	C
0.0001263	8446.	66899765.	14.5299236	0.0018344	-0.001953	3.9943638	-44.008504	C
0.0001288	8513.	66118767.	14.4635469	0.0018622	-0.002000	3.9978823	-45.127795	C
0.0001313	8579.	65361878.	14.4004577	0.0018901	-0.002047	3.9997158	-46.244196	C
0.0001338	8644.	64627304.	14.3405133	0.0019180	-0.002094	3.9990923	-47.357548	C
0.0001363	8708.	63913711.	14.2835531	0.0019461	-0.002141	3.9999976	-48.467799	C
0.0001388	8771.	63216737.	14.2287055	0.0019742	-0.002188	3.9997086	-49.577809	C
0.0001413	8833.	62531650.	14.1751241	0.0020022	-0.002235	3.9988237	-50.000000	CY
0.0001438	8890.	61846858.	14.1229803	0.0020302	-0.002282	3.9999444	-50.000000	CY
0.0001463	8943.	61151758.	14.0714715	0.0020580	-0.002330	3.9992542	-50.000000	CY
0.0001488	8992.	60447635.	14.0203885	0.0020855	-0.002377	3.9999973	-50.000000	CY
0.0001588	9158.	57685214.	13.8254824	0.0021948	-0.002568	3.9999988	-50.000000	CY
0.0001688	9312.	55182401.	13.6599124	0.0023051	-0.002757	3.9998520	-50.000000	CY
0.0001788	9453.	52883298.	13.5161075	0.0024160	-0.002946	3.9987512	50.000000	CY
0.0001888	9550.	50594807.	13.3816907	0.0025258	-0.003137	3.9998470	50.000000	CY
0.0001988	9592.	48263731.	13.2407117	0.0026316	-0.003331	3.9999975	50.000000	CY
0.0002088	9624.	46101908.	13.1152488	0.0027378	-0.003525	3.9980876	50.000000	CY
0.0002188	9651.	44118538.	13.0033048	0.0028445	-0.003718	3.9979183	50.000000	CY
0.0002288	9674.	42291530.	12.9015700	0.0029512	-0.003911	3.9996000	50.000000	CY
0.0002388	9695.	40607196.	12.8122433	0.0030589	-0.004104	3.9999057	50.000000	CY
0.0002488	9713.	39048206.	12.7323935	0.0031672	-0.004295	3.9992959	50.000000	CY
0.0002588	9729.	37598341.	12.6577607	0.0032752	-0.004487	3.9975020	50.000000	CY
0.0002688	9742.	36250539.	12.5914115	0.0033839	-0.004679	3.9980848	50.000000	CY
0.0002788	9754.	34993511.	12.5326120	0.0034935	-0.004869	3.9993795	50.000000	CY
0.0002888	9765.	33818876.	12.4802406	0.0036037	-0.005059	3.9961640	50.000000	CY
0.0002988	9774.	32717991.	12.4320667	0.0037141	-0.005248	3.9998985	50.000000	CY
0.0003088	9782.	31681255.	12.3877915	0.0038247	-0.005438	3.9968447	50.000000	CY

Axial Thrust Force = 996.600 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
0.00000125	188.0584437	150446755.	287.2584805	0.0003591	0.0003216	1.3772972	10.2880574	
0.00000250	376.1126663	150445067.	151.1603664	0.0003779	0.0003029	1.4409219	10.7090016	
0.00000375	564.1325191	150435338.	105.8081611	0.0003968	0.0002843	1.5039391	11.1314500	
0.00000500	752.1008139	150420163.	83.1424354	0.0004157	0.0002657	1.5663424	11.5554031	
0.00000625	940.0003549	150400057.	69.5513041	0.0004347	0.0002472	1.6281252	11.9808614	
0.00000750	1128.	150375192.	60.4974730	0.0004537	0.0002287	1.6892810	12.4078252	
0.00000875	1316.	150345639.	54.0363879	0.0004728	0.0002103	1.7498033	12.8362959	
0.00001000	1503.	150311432.	49.1957720	0.0004920	0.0001920	1.8096856	13.2662739	
0.00001125	1691.	150272590.	45.4354722	0.0005111	0.0001736	1.8689214	13.6977603	
0.00001250	1878.	150229121.	42.4313969	0.0005304	0.0001554	1.9275041	14.1307564	
0.00001375	2065.	150181028.	39.9773064	0.0005497	0.0001372	1.9854271	14.5652634	
0.00001500	2252.	150128313.	37.9357078	0.0005690	0.0001190	2.0426839	15.0012829	
0.00001625	2439.	150070974.	36.2114141	0.0005884	0.0001009	2.0992680	15.4388164	
0.00001750	2625.	150009009.	34.7364348	0.0006079	0.00008289	2.1551726	15.8778657	
0.00001875	2811.	149942413.	33.4609106	0.0006274	0.00006489	2.2103913	16.3184327	
0.00002000	2997.	149871182.	32.3474471	0.0006469	0.00004695	2.2649173	16.7605194	
0.00002125	3183.	149795310.	31.3674489	0.0006666	0.00002906	2.3187441	17.2041280	
0.00002250	3369.	149714791.	30.4986754	0.0006862	0.00001122	2.3718650	17.6492608	
0.00002375	3554.	149629604.	29.7235680	0.0007059	-0.00000657	2.4242732	18.0959200	
0.00002500	3738.	149538587.	29.0280487	0.0007257	-0.00002430	2.4759601	18.5440854	
0.00002625	3923.	149438346.	28.4006510	0.0007455	-0.00004198	2.5269122	18.9936831	
0.00002750	4106.	149325541.	27.8319705	0.0007654	-0.00005962	2.5771150	19.4446216	
0.00002875	4289.	149197700.	27.3142404	0.0007853	-0.00007722	2.6265546	19.8968105	
0.00003000	4472.	149053195.	26.8409957	0.0008052	-0.00009477	2.6752182	20.3501663	
0.00003125	4531.	144984016.	26.2871562	0.0008215	-0.000116	2.7141181	20.6961727	C
0.00003250	4669.	143672550.	25.8498607	0.0008401	-0.000135	2.7581238	21.1118688	C
0.00003375	4802.	142294136.	25.4404212	0.0008586	-0.000154	2.8010078	21.5231249	C
0.00003500	4930.	140866444.	25.0560113	0.0008770	-0.000173	2.8428018	21.9301016	C
0.00003625	5053.	139380748.	24.6932157	0.0008951	-0.000192	2.8834566	22.3319307	C
0.00003750	5170.	137867987.	24.3506783	0.0009132	-0.000212	2.9230603	22.7294878	C
0.00003875	5283.	136338829.	24.0265890	0.0009310	-0.000231	2.9616432	23.1229419	C
0.00004000	5392.	134801287.	23.7193268	0.0009488	-0.000251	2.9992314	23.5124192	C
0.00004125	5497.	133262579.	23.4274947	0.0009664	-0.000271	3.0358525	23.8980782	C

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0.00004250	5599.	131730128.	23.1499346	0.0009839	-0.000291	3.0715397	24.2801695	C
0.00004375	5697.	130211933.	22.8857206	0.0010013	-0.000311	3.1063334	24.6590706	C
0.00004500	5792.	128715029.	22.6340584	0.0010185	-0.000331	3.1402745	25.0351963	C
0.00004625	5884.	127232039.	22.3935019	0.0010357	-0.000352	3.1733357	25.4079721	C
0.00004750	5974.	125769874.	22.1634899	0.0010528	-0.000372	3.2055588	25.7778324	C
0.00004875	6061.	124334580.	21.9435626	0.0010697	-0.000393	3.2369868	26.1452743	C
0.00005125	6229.	121533203.	21.5305112	0.0011034	-0.000434	3.2974499	26.8721592	C
0.00005375	6387.	118835766.	21.1499319	0.0011368	-0.000476	3.3548729	27.5897691	C
0.00005625	6538.	116224934.	20.7966832	0.0011698	-0.000518	3.4092523	28.2967760	C
0.00005875	6681.	113719442.	20.4688238	0.0012025	-0.000560	3.4608103	28.9958212	C
0.00006125	6818.	111315893.	20.1635554	0.0012350	-0.000602	3.5096351	29.6874529	C
0.00006375	6949.	109011250.	19.8785694	0.0012673	-0.000645	3.5558133	30.3723177	C
0.00006625	7076.	106802720.	19.6119588	0.0012993	-0.000688	3.5994299	31.0511632	C
0.00006875	7197.	104684745.	19.3618806	0.0013311	-0.000731	3.6405433	31.7243119	C
0.00007125	7313.	102645300.	19.1260719	0.0013627	-0.000775	3.6791504	32.3906837	C
0.00007375	7426.	100691852.	18.9042821	0.0013942	-0.000818	3.7154006	33.0528461	C
0.00007625	7535.	98822441.	18.6956452	0.0014255	-0.000862	3.7493658	33.7119330	C
0.00007875	7641.	97024114.	18.4982640	0.0014567	-0.000906	3.7810179	34.3664720	C
0.00008125	7742.	95292183.	18.3110700	0.0014878	-0.000950	3.8103873	35.0163961	C
0.00008375	7842.	93637182.	18.1349296	0.0015188	-0.000994	3.8376342	35.6660230	C
0.00008625	7938.	92032543.	17.9664266	0.0015496	-0.001038	3.8625943	36.3092123	C
0.00008875	8032.	90497415.	17.8076180	0.0015804	-0.001082	3.8854853	36.9529194	C
0.00009125	8122.	89011588.	17.6558293	0.0016111	-0.001126	3.9061923	37.5921760	C
0.00009375	8211.	87586116.	17.5123562	0.0016418	-0.001171	3.9248479	38.2320311	C
0.00009625	8297.	86203445.	17.3747470	0.0016723	-0.001215	3.9413589	38.8674503	C
0.00009875	8382.	84879026.	17.2451589	0.0017030	-0.001260	3.9558708	39.5058865	C
0.0001013	8463.	83586711.	17.1196877	0.0017334	-0.001304	3.9682360	40.1376207	C
0.0001038	8543.	82346422.	17.0014055	0.0017639	-0.001349	3.9786097	40.7727917	C
0.0001063	8621.	81143307.	16.8879757	0.0017943	-0.001393	3.9869208	41.4057629	C
0.0001088	8697.	79976792.	16.7793715	0.0018248	-0.001438	3.9931906	42.0375057	C
0.0001113	8772.	78853018.	16.6767408	0.0018553	-0.001482	3.9974452	42.6727728	C
0.0001138	8845.	77756933.	16.5774429	0.0018857	-0.001527	3.9996498	43.3041527	C
0.0001163	8916.	76693908.	16.4826934	0.0019161	-0.001571	3.9994324	43.9364679	C
0.0001188	8985.	75665508.	16.3930561	0.0019467	-0.001616	3.9990767	44.5726498	C
0.0001213	9053.	74662694.	16.3068232	0.0019772	-0.001660	4.0000000	45.2078051	C
0.0001238	9118.	73683503.	16.2238394	0.0020077	-0.001705	3.9999186	45.8421165	C
0.0001263	9183.	72733704.	16.1452271	0.0020383	-0.001749	3.9996205	46.4804006	C
0.0001288	9246.	71811895.	16.0707123	0.0020691	-0.001793	3.9990147	47.1225850	C
0.0001313	9307.	70909315.	15.9982619	0.0020998	-0.001838	3.9999895	47.7618221	C
0.0001338	9366.	70028928.	15.9288593	0.0021305	-0.001882	3.9996903	48.4023758	C
0.0001363	9425.	69173626.	15.8629301	0.0021613	-0.001926	3.9988838	49.0465873	C

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0.0001388	9482.	68341840.	15.8003106	0.0021923	-0.001970	3.9999573	49.6945611	C
0.0001413	9539.	67529947.	15.7406118	0.0022234	-0.002014	3.9994003	50.0000000	CY
0.0001438	9593.	66733493.	15.6820316	0.0022543	-0.002058	3.9995427	50.0000000	CY
0.0001463	9645.	65951153.	15.6271116	0.0022855	-0.002102	3.9996510	50.0000000	CY
0.0001488	9696.	65185728.	15.5752890	0.0023168	-0.002146	3.9983758	50.0000000	CY
0.0001588	9882.	62247449.	15.3961656	0.0024441	-0.002318	3.9984239	50.0000000	CY
0.0001688	10018.	59364223.	15.2340472	0.0025707	-0.002492	3.9996748	50.0000000	CY
0.0001788	10124.	56635834.	15.0873784	0.0026969	-0.002666	3.9995234	50.0000000	CY
0.0001888	10220.	54147854.	14.9609482	0.0028239	-0.002839	3.9989667	50.0000000	CY
0.0001988	10310.	51875197.	14.8548645	0.0029524	-0.003010	3.9984668	50.0000000	CY
0.0002088	10389.	49769752.	14.7589196	0.0030809	-0.003182	3.9992085	50.0000000	CY
0.0002188	10439.	47722512.	14.6613137	0.0032072	-0.003355	3.9993295	50.0000000	CY
0.0002288	10458.	45719330.	14.5619185	0.0033310	-0.003531	3.9989425	50.0000000	CY
0.0002388	10462.	43821915.	14.4717300	0.0034551	-0.003707	3.9979495	50.0000000	CY
0.0002488	10462.	42060230.	14.3969131	0.0035812	-0.003881	3.9961228	50.0000000	CY
0.0002588	10462.	40434714.	14.3359160	0.0037094	-0.004053	3.9999988	50.0000000	CY
0.0002688	10462.	38930166.	14.3211220	0.0038488	-0.004214	3.9998163	50.0000000	CY

 Summary of Results for Nominal Moment Capacity for Section 2

Moment values interpolated at maximum compressive strain = 0.003
 or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain	Max. Tens. Strain
1	774.500	9683.598	0.00300000	-0.00399835
2	996.600	10339.541	0.00300000	-0.00307360

Note that the values of moment capacity in the table above are not factored by a strength reduction factor (phi-factor).

In ACI 318, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.75).

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318, or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Load No.	Resist. Factor	Nominal Ax. Thrust kips	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in ²
1	0.65	774.500000	9684.	503.425000	6294.	100451525.
2	0.65	996.600000	10340.	647.790000	6721.	113023625.
1	0.75	774.500000	9684.	580.875000	7263.	83071448.
2	0.75	996.600000	10340.	747.450000	7755.	95090078.
1	0.90	774.500000	9684.	697.050000	8715.	63836425.
2	0.90	996.600000	10340.	896.940000	9306.	70927947.

Layering Correction Equivalent Depths of Soil & Rock Layers

Layer No.	Top of Layer Below Pile Head ft	Equivalent Top Depth Below Grnd Surf ft	Same Layer Type As Layer Above	Layer is Rock or Rock Layer	F0 Integral for Layer lbs	F1 Integral for Layer lbs
1	0.00	0.00	N.A.	No	0.00	132812.
2	5.0000	8.1014	No	No	132812.	925764.
3	18.0000	24.8456	No	No	1058577.	104929.
4	19.2500	19.2500	No	Yes	N.A.	N.A.

Notes: The F0 integral of Layer n+1 equals the sum of the F0 and F1 integrals for Layer n. Layering correction equivalent depths are computed only for soil types with both shallow-depth and deep-depth expressions for peak lateral load transfer. These soil types are soft and stiff clays, non-liquefied sands, and cemented c-phi soil.

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 1

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 1800.0 lbs
 Applied moment at pile head = 4363200.0 in-lbs
 Axial thrust load on pile head = 774500.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in ²	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	0.09503	4363200.	1800.	-0.00151	0.00	3.35E+11	0.00	0.00	0.00
0.2925	0.08981	4373564.	1413.	-0.00147	0.00	3.35E+11	-220.659	8624.	0.00
0.5850	0.08475	4381085.	294.6371	-0.00142	0.00	3.35E+11	-416.439	17248.	0.00
0.8775	0.07984	4383350.	-1231.	-0.00137	0.00	3.35E+11	-452.932	19911.	0.00
1.1700	0.07510	4379911.	-2824.	-0.00133	0.00	3.35E+11	-454.916	21261.	0.00
1.4625	0.07052	4370742.	-4424.	-0.00128	0.00	3.35E+11	-456.540	22723.	0.00
1.7550	0.06610	4355824.	-6029.	-0.00124	0.00	3.35E+11	-457.797	24308.	0.00
2.0475	0.06184	4335142.	-7637.	-0.00119	0.00	3.35E+11	-458.681	26033.	0.00
2.3400	0.05774	4308686.	-9248.	-0.00115	0.00	3.35E+11	-459.181	27911.	0.00
2.6325	0.05380	4276449.	-10860.	-0.00110	0.00	3.35E+11	-459.291	29963.	0.00
2.9250	0.05002	4238433.	-12471.	-0.00106	0.00	3.35E+11	-458.999	32209.	0.00
3.2175	0.04639	4194641.	-14081.	-0.00101	0.00	3.35E+11	-458.296	34675.	0.00
3.5100	0.04292	4145083.	-15688.	-9.68E-04	0.00	3.35E+11	-457.169	37390.	0.00
3.8025	0.03959	4089776.	-17290.	-9.25E-04	0.00	3.35E+11	-455.606	40389.	0.00
4.0950	0.03642	4028738.	-18885.	-8.83E-04	0.00	3.35E+11	-453.591	43712.	0.00
4.3875	0.03340	3961998.	-20473.	-8.41E-04	0.00	3.35E+11	-451.107	47408.	0.00
4.6800	0.03052	3889587.	-22051.	-8.00E-04	0.00	3.35E+11	-448.135	51537.	0.00
4.9725	0.02779	3811545.	-23618.	-7.59E-04	0.00	3.35E+11	-444.652	56171.	0.00
5.2650	0.02519	3727916.	-24561.	-7.20E-04	0.00	3.35E+11	-92.608	12904.	0.00
5.5575	0.02273	3643040.	-24878.	-6.81E-04	0.00	3.35E+11	-88.213	13621.	0.00
5.8500	0.02041	3556973.	-25180.	-6.44E-04	0.00	3.36E+11	-83.360	14338.	0.00
6.1425	0.01821	3469779.	-25463.	-6.07E-04	0.00	3.36E+11	-78.117	15055.	0.00
6.4350	0.01615	3381523.	-25727.	-5.71E-04	0.00	3.36E+11	-72.551	15772.	0.00

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6.7275	0.01420	3292277.	-25972.	-5.36E-04	0.00	3.36E+11	-66.724	16488.	0.00
7.0200	0.01238	3202116.	-26195.	-5.02E-04	0.00	3.36E+11	-60.696	17205.	0.00
7.3125	0.01068	3111116.	-26398.	-4.69E-04	0.00	3.36E+11	-54.525	17922.	0.00
7.6050	0.00909	3019356.	-26578.	-4.37E-04	0.00	3.36E+11	-48.263	18639.	0.00
7.8975	0.00761	2926915.	-26736.	-4.06E-04	0.00	3.36E+11	-41.963	19356.	0.00
8.1900	0.00624	2833874.	-26873.	-3.76E-04	0.00	3.36E+11	-35.674	20073.	0.00
8.4825	0.00497	2740313.	-26987.	-3.47E-04	0.00	3.36E+11	-29.440	20790.	0.00
8.7750	0.00380	2646311.	-27079.	-3.19E-04	0.00	3.36E+11	-23.305	21507.	0.00
9.0675	0.00273	2551947.	-27151.	-2.91E-04	0.00	3.36E+11	-17.308	22224.	0.00
9.3600	0.00176	2457298.	-27201.	-2.65E-04	0.00	3.36E+11	-11.486	22940.	0.00
9.6525	8.71E-04	2362437.	-27232.	-2.40E-04	0.00	3.36E+11	-5.873	23657.	0.00
9.9450	7.19E-05	2267436.	-27243.	-2.16E-04	0.00	3.36E+11	-0.500	24374.	0.00
10.2375	-6.44E-04	2172365.	-27236.	-1.93E-04	0.00	3.36E+11	4.6054	25091.	0.00
10.5300	-0.00128	2077289.	-27211.	-1.70E-04	0.00	3.36E+11	9.4169	25808.	0.00
10.8225	-0.00184	1982270.	-27170.	-1.49E-04	0.00	3.36E+11	13.9125	26525.	0.00
11.1150	-0.00233	1887366.	-27114.	-1.29E-04	0.00	3.36E+11	18.0725	27242.	0.00
11.4075	-0.00275	1792630.	-27044.	-1.10E-04	0.00	3.36E+11	21.8803	27959.	0.00
11.7000	-0.00310	1698114.	-26961.	-9.16E-05	0.00	3.36E+11	25.3216	28676.	0.00
11.9925	-0.00339	1603861.	-26867.	-7.43E-05	0.00	3.36E+11	28.3854	29392.	0.00
12.2850	-0.00362	1509913.	-26763.	-5.80E-05	0.00	3.36E+11	31.0631	30109.	0.00
12.5775	-0.00380	1416304.	-26649.	-4.28E-05	0.00	3.36E+11	33.3489	30826.	0.00
12.8700	-0.00392	1323066.	-26529.	-2.84E-05	0.00	3.36E+11	35.2399	31543.	0.00
13.1625	-0.00400	1230225.	-26403.	-1.51E-05	0.00	3.36E+11	36.7355	32260.	0.00
13.4550	-0.00403	1137801.	-26272.	-2.74E-06	0.00	3.36E+11	37.8381	32977.	0.00
13.7475	-0.00402	1045811.	-26138.	8.67E-06	0.00	3.36E+11	38.5526	33694.	0.00
14.0400	-0.00397	954266.	-26002.	1.91E-05	0.00	3.36E+11	38.8865	34411.	0.00
14.3325	-0.00388	863173.	-25866.	2.86E-05	0.00	3.36E+11	38.8499	35128.	0.00
14.6250	-0.00377	772535.	-25730.	3.72E-05	0.00	3.36E+11	38.4554	35844.	0.00
14.9175	-0.00362	682348.	-25596.	4.48E-05	0.00	3.36E+11	37.7184	36561.	0.00
15.2100	-0.00345	592606.	-25466.	5.14E-05	0.00	3.36E+11	36.6565	37278.	0.00
15.5025	-0.00326	503300.	-25339.	5.71E-05	0.00	3.36E+11	35.2901	37995.	0.00
15.7950	-0.00305	414413.	-25218.	6.19E-05	0.00	3.36E+11	33.6420	38712.	0.00
16.0875	-0.00283	325930.	-25104.	6.58E-05	0.00	3.36E+11	31.7374	39429.	0.00
16.3800	-0.00259	237828.	-24996.	6.88E-05	0.00	3.36E+11	29.6043	40146.	0.00
16.6725	-0.00234	150084.	-24896.	7.08E-05	0.00	3.36E+11	27.2728	40863.	0.00
16.9650	-0.00209	62672.	-24805.	7.19E-05	0.00	3.36E+11	24.7758	41579.	0.00
17.2575	-0.00184	-24437.	-24722.	7.21E-05	0.00	3.36E+11	22.1485	42296.	0.00
17.5500	-0.00159	-111272.	-24649.	7.14E-05	0.00	3.36E+11	19.4286	43013.	0.00
17.8425	-0.00134	-197864.	-24586.	6.98E-05	0.00	3.36E+11	16.6564	43730.	0.00
18.1350	-0.00110	-284246.	-24264.	6.72E-05	0.00	3.36E+11	166.9086	534692.	0.00
18.4275	-8.65E-04	-368563.	-23736.	6.38E-05	0.00	3.36E+11	133.8713	543316.	0.00

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18.7200	-6.48E-04	-451221.	-23322.	5.96E-05	0.00	3.36E+11	101.8250	551940.	0.00
19.0125	-4.47E-04	-532611.	-23019.	5.44E-05	0.00	3.36E+11	71.3535	560565.	0.00
19.3050	-2.66E-04	-613107.	-6401.	4.48E-05	0.00	1.58E+11	9398.	1.24E+08	0.00
19.5975	-1.32E-04	-577787.	19550.	3.15E-05	0.00	1.58E+11	5389.	1.43E+08	0.00
19.8900	-4.41E-05	-476038.	32576.	1.98E-05	0.00	1.58E+11	2033.	1.62E+08	0.00
20.1825	6.86E-06	-349213.	35524.	1.06E-05	0.00	1.58E+11	-353.280	1.81E+08	0.00
20.4750	3.05E-05	-226718.	31859.	4.22E-06	0.00	1.58E+11	-1735.	2.00E+08	0.00
20.7675	3.65E-05	-125585.	24834.	2.95E-07	0.00	1.58E+11	-2268.	2.18E+08	0.00
21.0600	3.26E-05	-52388.	16988.	-1.69E-06	0.00	1.58E+11	-2202.	2.37E+08	0.00
21.3525	2.46E-05	-6317.	9972.	-2.34E-06	0.00	1.58E+11	-1796.	2.56E+08	0.00
21.6450	1.62E-05	17630.	4600.	-2.21E-06	0.00	1.58E+11	-1265.	2.75E+08	0.00
21.9375	9.08E-06	25985.	1046.	-1.73E-06	0.00	1.58E+11	-759.546	2.94E+08	0.00
22.2300	4.03E-06	24981.	-916.215	-1.16E-06	0.00	1.58E+11	-358.474	3.12E+08	0.00
22.5225	9.27E-07	19560.	-1699.	-6.65E-07	0.00	1.58E+11	-87.471	3.31E+08	0.00
22.8150	-6.45E-07	13059.	-1739.	-3.02E-07	0.00	1.58E+11	64.3145	3.50E+08	0.00
23.1075	-1.20E-06	7350.	-1406.	-7.51E-08	0.00	1.58E+11	125.6857	3.69E+08	0.00
23.4000	-1.17E-06	3189.	-958.166	4.22E-08	0.00	1.58E+11	129.5112	3.88E+08	0.00
23.6925	-9.00E-07	623.4010	-547.974	8.46E-08	0.00	1.58E+11	104.2166	4.07E+08	0.00
23.9850	-5.78E-07	-658.256	-242.060	8.42E-08	0.00	1.58E+11	70.0929	4.25E+08	0.00
24.2775	-3.08E-07	-1076.	-50.545	6.49E-08	0.00	1.58E+11	39.0329	4.44E+08	0.00
24.5700	-1.23E-07	-1013.	46.3444	4.17E-08	0.00	1.58E+11	16.1745	4.63E+08	0.00
24.8625	-1.60E-08	-751.210	78.5853	2.20E-08	0.00	1.58E+11	2.1964	4.82E+08	0.00
25.1550	3.19E-08	-461.882	74.4540	8.50E-09	0.00	1.58E+11	-4.550	5.01E+08	0.00
25.4475	4.37E-08	-228.589	55.1161	8.17E-10	0.00	1.58E+11	-6.468	5.20E+08	0.00
25.7400	3.76E-08	-74.972	33.6332	-2.56E-09	0.00	1.58E+11	-5.773	5.38E+08	0.00
26.0325	2.57E-08	7.5301	16.3383	-3.31E-09	0.00	1.58E+11	-4.082	5.57E+08	0.00
26.3250	1.44E-08	39.7414	5.0328	-2.79E-09	0.00	1.58E+11	-2.360	5.76E+08	0.00
26.6175	6.15E-09	42.8756	-0.939	-1.87E-09	0.00	1.58E+11	-1.043	5.95E+08	0.00
26.9100	1.28E-09	33.1615	-3.153	-1.02E-09	0.00	1.58E+11	-0.219	6.03E+08	0.00
27.2025	-1.01E-09	20.7445	-3.233	-4.20E-10	0.00	1.58E+11	0.1737	6.03E+08	0.00
27.4950	-1.67E-09	10.4660	-2.423	-7.28E-11	0.00	1.58E+11	0.2879	6.03E+08	0.00
27.7875	-1.52E-09	3.7339	-1.459	8.53E-11	0.00	1.58E+11	0.2615	6.03E+08	0.00
28.0800	-1.08E-09	0.2239	-0.675	1.29E-10	0.00	1.58E+11	0.1850	6.03E+08	0.00
28.3725	-6.14E-10	-1.007	-0.165	1.21E-10	0.00	1.58E+11	0.1055	6.03E+08	0.00
28.6650	-2.30E-10	-0.938	0.08893	9.90E-11	0.00	1.58E+11	0.03946	6.03E+08	0.00
28.9575	8.12E-11	-0.383	0.1337	8.43E-11	0.00	1.58E+11	-0.01395	6.03E+08	0.00
29.2500	3.62E-10	0.00	0.00	8.00E-11	0.00	1.58E+11	-0.06222	3.02E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual

stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 1:

Pile-head deflection = 0.09503208 inches
 Computed slope at pile head = -0.0015111 radians
 Maximum bending moment = 4383350. inch-lbs
 Maximum shear force = 35524. lbs
 Depth of maximum bending moment = 0.87750000 feet below pile head
 Depth of maximum shear force = 20.18250000 feet below pile head
 Number of iterations = 14
 Number of zero deflection points = 6

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 2

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 2420.0 lbs
 Applied moment at pile head = 5889600.0 in-lbs
 Axial thrust load on pile head = 996600.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in ²	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	0.1590	5889600.	2420.	-0.00228	0.00	3.24E+11	0.00	0.00	0.00
0.2925	0.1511	5905970.	1768.	-0.00222	0.00	3.24E+11	-371.335	8624.	0.00
0.5850	0.1435	5917541.	214.6194	-0.00216	0.00	3.24E+11	-513.958	12575.	0.00
0.8775	0.1360	5922556.	-1595.	-0.00209	0.00	3.24E+11	-517.427	13354.	0.00
1.1700	0.1288	5920972.	-3417.	-0.00203	0.00	3.24E+11	-520.551	14189.	0.00
1.4625	0.1218	5912751.	-5249.	-0.00196	0.00	3.24E+11	-523.324	15085.	0.00
1.7550	0.1150	5897858.	-7090.	-0.00190	0.00	3.24E+11	-525.742	16048.	0.00
2.0475	0.1084	5876265.	-8939.	-0.00184	0.00	3.24E+11	-527.798	17084.	0.00

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2.3400	0.1021	5847947.	-10795.	-0.00177	0.00	3.24E+11	-529.489	18202.	0.00
2.6325	0.09600	5812884.	-12656.	-0.00171	0.00	3.24E+11	-530.807	19408.	0.00
2.9250	0.09011	5771061.	-14520.	-0.00165	0.00	3.24E+11	-531.749	20713.	0.00
3.2175	0.08444	5722469.	-16388.	-0.00158	0.00	3.24E+11	-532.306	22127.	0.00
3.5100	0.07899	5667102.	-18256.	-0.00152	0.00	3.24E+11	-532.472	23661.	0.00
3.8025	0.07375	5604960.	-20125.	-0.00146	0.00	3.24E+11	-532.241	25330.	0.00
4.0950	0.06873	5536049.	-21992.	-0.00140	0.00	3.25E+11	-531.605	27149.	0.00
4.3875	0.06392	5460379.	-23856.	-0.00134	0.00	3.25E+11	-530.554	29136.	0.00
4.6800	0.05931	5377966.	-25716.	-0.00128	0.00	3.25E+11	-529.080	31311.	0.00
4.9725	0.05491	5288831.	-27570.	-0.00123	0.00	3.25E+11	-527.172	33699.	0.00
5.2650	0.05071	5193002.	-28822.	-0.00117	0.00	3.25E+11	-186.418	12904.	0.00
5.5575	0.04670	5094680.	-29467.	-0.00111	0.00	3.25E+11	-181.235	13621.	0.00
5.8500	0.04289	4993932.	-30093.	-0.00106	0.00	3.25E+11	-175.206	14338.	0.00
6.1425	0.03927	4890836.	-30696.	-0.00101	0.00	3.25E+11	-168.433	15055.	0.00
6.4350	0.03583	4785481.	-31274.	-9.53E-04	0.00	3.25E+11	-161.014	15772.	0.00
6.7275	0.03258	4677962.	-31825.	-9.02E-04	0.00	3.25E+11	-153.043	16488.	0.00
7.0200	0.02950	4568380.	-32347.	-8.52E-04	0.00	3.25E+11	-144.612	17205.	0.00
7.3125	0.02660	4456844.	-32840.	-8.03E-04	0.00	3.25E+11	-135.808	17922.	0.00
7.6050	0.02386	4343466.	-33300.	-7.56E-04	0.00	3.25E+11	-126.715	18639.	0.00
7.8975	0.02129	4228363.	-33729.	-7.10E-04	0.00	3.25E+11	-117.412	19356.	0.00
8.1900	0.01888	4111654.	-34124.	-6.65E-04	0.00	3.25E+11	-107.975	20073.	0.00
8.4825	0.01663	3993460.	-34487.	-6.21E-04	0.00	3.25E+11	-98.476	20790.	0.00
8.7750	0.01452	3873902.	-34816.	-5.78E-04	0.00	3.25E+11	-88.982	21507.	0.00
9.0675	0.01257	3753101.	-35111.	-5.37E-04	0.00	3.25E+11	-79.558	22224.	0.00
9.3600	0.01075	3631178.	-35374.	-4.97E-04	0.00	3.25E+11	-70.264	22940.	0.00
9.6525	0.00907	3508253.	-35605.	-4.59E-04	0.00	3.25E+11	-61.155	23657.	0.00
9.9450	0.00753	3384441.	-35804.	-4.22E-04	0.00	3.25E+11	-52.284	24374.	0.00
10.2375	0.00611	3259858.	-35973.	-3.86E-04	0.00	3.25E+11	-43.698	25091.	0.00
10.5300	0.00482	3134614.	-36111.	-3.51E-04	0.00	3.25E+11	-35.440	25808.	0.00
10.8225	0.00365	3008815.	-36222.	-3.18E-04	0.00	3.26E+11	-27.551	26525.	0.00
11.1150	0.00259	2882562.	-36306.	-2.87E-04	0.00	3.26E+11	-20.066	27242.	0.00
11.4075	0.00163	2755954.	-36364.	-2.56E-04	0.00	3.26E+11	-13.017	27959.	0.00
11.7000	7.87E-04	2629082.	-36398.	-2.27E-04	0.00	3.26E+11	-6.431	28676.	0.00
11.9925	3.97E-05	2502031.	-36410.	-1.99E-04	0.00	3.26E+11	-0.332	29392.	0.00
12.2850	-6.13E-04	2374882.	-36401.	-1.73E-04	0.00	3.26E+11	5.2598	30109.	0.00
12.5775	-0.00118	2247708.	-36374.	-1.48E-04	0.00	3.26E+11	10.3296	30826.	0.00
12.8700	-0.00165	2120576.	-36329.	-1.25E-04	0.00	3.26E+11	14.8652	31543.	0.00
13.1625	-0.00205	1993548.	-36270.	-1.03E-04	0.00	3.26E+11	18.8588	32260.	0.00
13.4550	-0.00237	1866677.	-36198.	-8.18E-05	0.00	3.26E+11	22.3065	32977.	0.00
13.7475	-0.00263	1740011.	-36115.	-6.24E-05	0.00	3.26E+11	25.2082	33694.	0.00
14.0400	-0.00281	1613589.	-36022.	-4.43E-05	0.00	3.26E+11	27.5676	34411.	0.00

MEG-33 Rear Abutment X direction row 3

14.3325	-0.00294	1487446.	-35922.	-2.76E-05	0.00	3.26E+11	29.3923	35128.	0.00
14.6250	-0.00301	1361610.	-35817.	-1.22E-05	0.00	3.26E+11	30.6936	35844.	0.00
14.9175	-0.00302	1236100.	-35707.	1.76E-06	0.00	3.26E+11	31.4867	36561.	0.00
15.2100	-0.00299	1110931.	-35596.	1.44E-05	0.00	3.26E+11	31.7904	37278.	0.00
15.5025	-0.00292	986112.	-35485.	2.57E-05	0.00	3.26E+11	31.6273	37995.	0.00
15.7950	-0.00281	861646.	-35375.	3.56E-05	0.00	3.26E+11	31.0238	38712.	0.00
16.0875	-0.00267	737530.	-35268.	4.43E-05	0.00	3.26E+11	30.0099	39429.	0.00
16.3800	-0.00250	613755.	-35165.	5.15E-05	0.00	3.26E+11	28.6193	40146.	0.00
16.6725	-0.00231	490310.	-35068.	5.75E-05	0.00	3.26E+11	26.8894	40863.	0.00
16.9650	-0.00210	367178.	-34977.	6.21E-05	0.00	3.26E+11	24.8613	41579.	0.00
17.2575	-0.00187	244338.	-34894.	6.54E-05	0.00	3.26E+11	22.5798	42296.	0.00
17.5500	-0.00164	121767.	-34819.	6.74E-05	0.00	3.26E+11	20.0931	43013.	0.00
17.8425	-0.00140	-560.707	-34753.	6.80E-05	0.00	3.26E+11	17.4535	43730.	0.00
18.1350	-0.00116	-122674.	-34411.	6.74E-05	0.00	3.26E+11	177.0388	534692.	0.00
18.4275	-9.28E-04	-242601.	-33849.	6.54E-05	0.00	3.26E+11	143.6590	543316.	0.00
18.7200	-7.03E-04	-360749.	-33402.	6.21E-05	0.00	3.26E+11	110.5712	551940.	0.00
19.0125	-4.92E-04	-477521.	-33071.	5.76E-05	0.00	3.26E+11	78.5562	560565.	0.00
19.3050	-2.99E-04	-593307.	-14384.	4.81E-05	0.00	1.50E+11	10569.	1.24E+08	0.00
19.5975	-1.54E-04	-578835.	15180.	3.45E-05	0.00	1.50E+11	6277.	1.43E+08	0.00
19.8900	-5.68E-05	-486987.	30791.	2.20E-05	0.00	1.50E+11	2619.	1.62E+08	0.00
20.1825	5.65E-07	-362838.	35335.	1.21E-05	0.00	1.50E+11	-29.067	1.81E+08	0.00
20.4750	2.82E-05	-239017.	32471.	5.09E-06	0.00	1.50E+11	-1603.	2.00E+08	0.00
20.7675	3.63E-05	-134926.	25699.	7.24E-07	0.00	1.50E+11	-2256.	2.18E+08	0.00
21.0600	3.33E-05	-58618.	17793.	-1.53E-06	0.00	1.50E+11	-2249.	2.37E+08	0.00
21.3525	2.55E-05	-10010.	10583.	-2.33E-06	0.00	1.50E+11	-1859.	2.56E+08	0.00
21.6450	1.69E-05	15690.	4998.	-2.27E-06	0.00	1.50E+11	-1323.	2.75E+08	0.00
21.9375	9.57E-06	25095.	1272.	-1.79E-06	0.00	1.50E+11	-800.734	2.94E+08	0.00
22.2300	4.31E-06	24632.	-806.002	-1.21E-06	0.00	1.50E+11	-383.371	3.12E+08	0.00
22.5225	1.06E-06	19445.	-1654.	-6.98E-07	0.00	1.50E+11	-99.921	3.31E+08	0.00
22.8150	-5.97E-07	13025.	-1725.	-3.20E-07	0.00	1.50E+11	59.5336	3.50E+08	0.00
23.1075	-1.19E-06	7337.	-1402.	-8.22E-08	0.00	1.50E+11	124.6329	3.69E+08	0.00
23.4000	-1.17E-06	3185.	-955.546	4.06E-08	0.00	1.50E+11	129.6701	3.88E+08	0.00
23.6925	-9.01E-07	629.0926	-544.805	8.50E-08	0.00	1.50E+11	104.3704	4.07E+08	0.00
23.9850	-5.77E-07	-640.569	-238.958	8.49E-08	0.00	1.50E+11	69.9011	4.25E+08	0.00
24.2775	-3.05E-07	-1049.	-48.552	6.52E-08	0.00	1.50E+11	38.5926	4.44E+08	0.00
24.5700	-1.19E-07	-981.861	46.7336	4.15E-08	0.00	1.50E+11	15.7013	4.63E+08	0.00
24.8625	-1.35E-08	-721.210	77.5443	2.16E-08	0.00	1.50E+11	1.8547	4.82E+08	0.00
25.1550	3.29E-08	-437.651	72.5534	8.13E-09	0.00	1.50E+11	-4.699	5.01E+08	0.00
25.4475	4.35E-08	-211.942	52.9963	5.49E-10	0.00	1.50E+11	-6.445	5.20E+08	0.00
25.7400	3.68E-08	-65.621	31.7810	-2.69E-09	0.00	1.50E+11	-5.643	5.38E+08	0.00
26.0325	2.47E-08	11.1794	15.0040	-3.32E-09	0.00	1.50E+11	-3.916	5.57E+08	0.00

MEG-33 Rear Abutment X direction row 3

26.3250	1.35E-08	39.7308	4.2540	-2.73E-09	0.00	1.50E+11	-2.209	5.76E+08	0.00
26.6175	5.51E-09	41.0614	-1.261	-1.79E-09	0.00	1.50E+11	-0.933	5.95E+08	0.00
26.9100	9.16E-10	30.8893	-3.176	-9.48E-10	0.00	1.50E+11	-0.157	6.03E+08	0.00
27.2025	-1.15E-09	18.7750	-3.106	-3.69E-10	0.00	1.50E+11	0.1971	6.03E+08	0.00
27.4950	-1.67E-09	9.0871	-2.256	-4.35E-11	0.00	1.50E+11	0.2873	6.03E+08	0.00
27.7875	-1.45E-09	2.9377	-1.314	9.68E-11	0.00	1.50E+11	0.2496	6.03E+08	0.00
28.0800	-9.92E-10	-0.137	-0.577	1.29E-10	0.00	1.50E+11	0.1705	6.03E+08	0.00
28.3725	-5.43E-10	-1.112	-0.114	1.15E-10	0.00	1.50E+11	0.09337	6.03E+08	0.00
28.6650	-1.86E-10	-0.936	0.1062	9.10E-11	0.00	1.50E+11	0.03189	6.03E+08	0.00
28.9575	9.55E-11	-0.367	0.1334	7.58E-11	0.00	1.50E+11	-0.01642	6.03E+08	0.00
29.2500	3.47E-10	0.00	0.00	7.15E-11	0.00	1.50E+11	-0.05957	3.02E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 2:

Pile-head deflection = 0.15903586 inches
 Computed slope at pile head = -0.0022833 radians
 Maximum bending moment = 5922556. inch-lbs
 Maximum shear force = -36410. lbs
 Depth of maximum bending moment = 0.87750000 feet below pile head
 Depth of maximum shear force = 11.99250000 feet below pile head
 Number of iterations = 14
 Number of zero deflection points = 6

 Summary of Pile-head Responses for Conventional Analyses

Definitions of Pile-head Loading Conditions:

Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs
 Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
 Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.

Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs

Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians

Load Case No.	Load Type 1	Pile-head Load 1	Load Type 2	Pile-head Load 2	Axial Loading lbs	Pile-head Deflection inches	Pile-head Rotation radians	Max Shear in Pile lbs	Max Moment in Pile in-lbs
1	V, lb	1800.	M, in-lb	4363200.	774500.	0.09503	-0.00151	35524.	4383350.
2	V, lb	2420.	M, in-lb	5889600.	996600.	0.1590	-0.00228	-36410.	5922556.

Maximum pile-head deflection = 0.1590358616 inches

Maximum pile-head rotation = -0.0022832952 radians = -0.130823 deg.

 Summary of Warning Messages

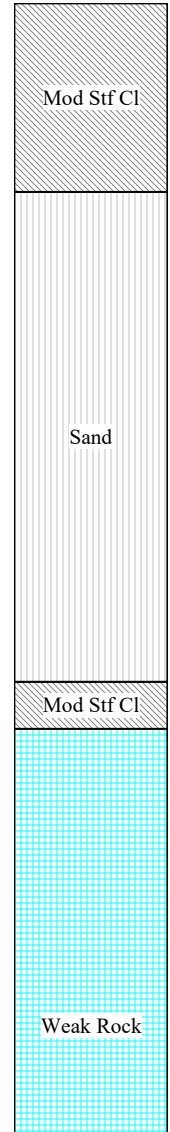
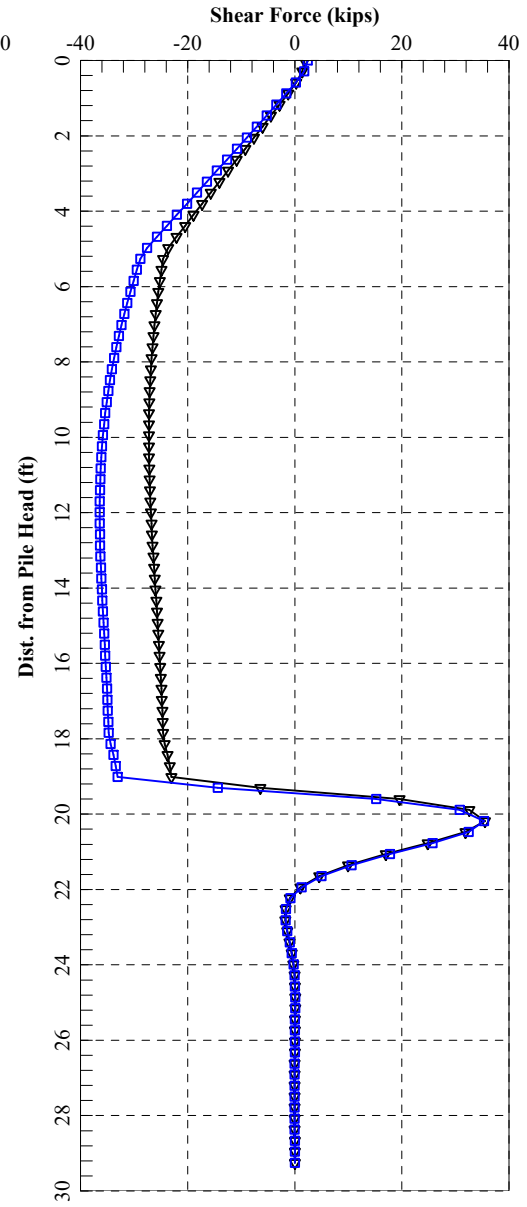
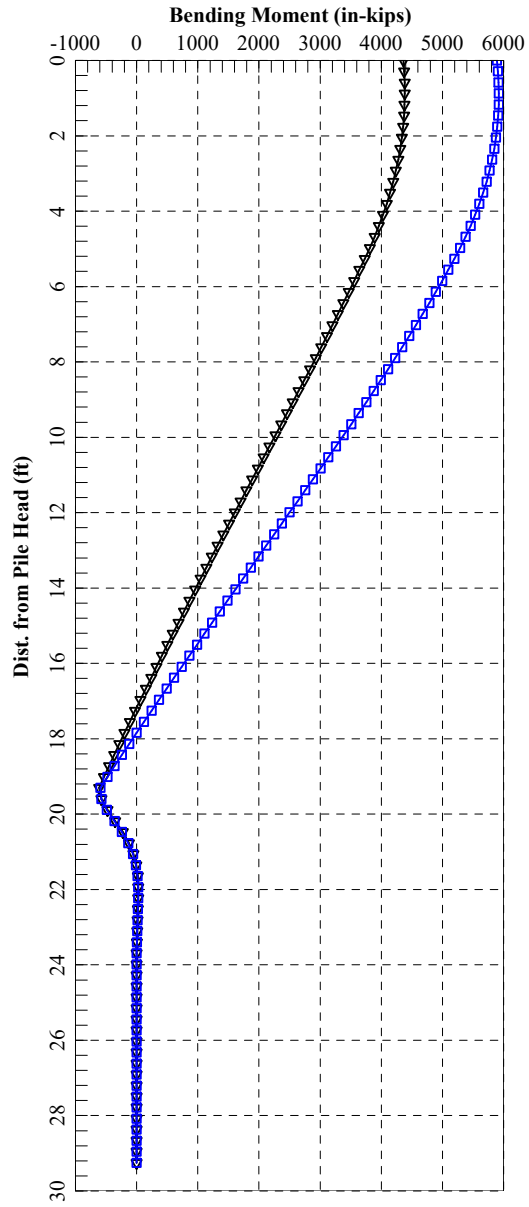
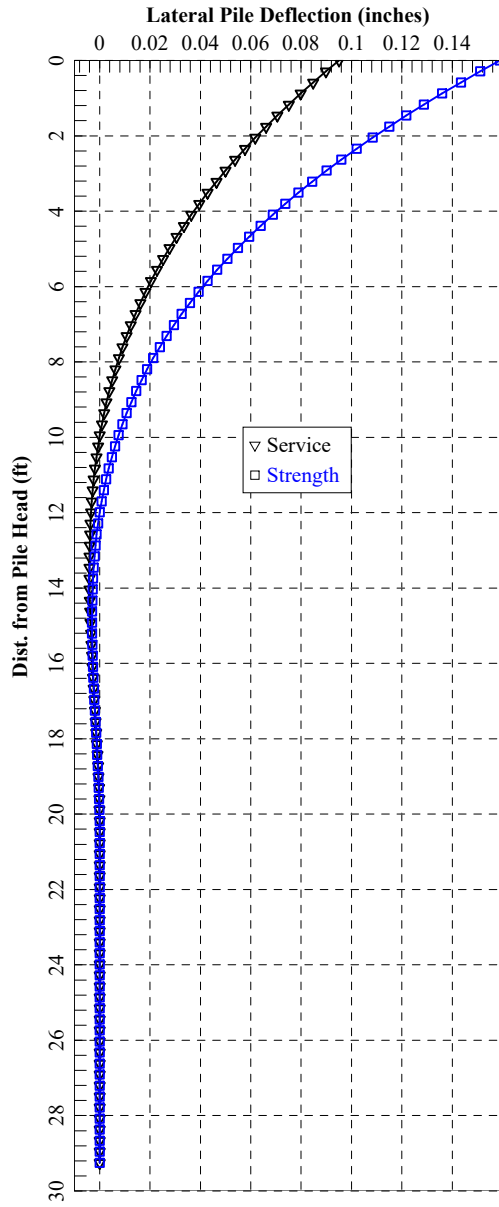
The following warning was reported 525 times

**** Warning ****

An unreasonable input value for unconfined compressive strength has been specified for a soil defined using the weak rock criteria. The input value is greater than 500 psi. Please check your input data for correctness.

The analysis ended normally.

MEG-33 Oldtown Creek Bridge Rear Abutment X direction Row 3



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LPile for Windows, Version 2022-12.006

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method
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Files Used for Analysis

Path to file locations:

\\US0247-PPFSS01\shared_projects\173609140\119144\400-Engineering\Geotechnical\Analysis\Lpile\bridges\LPile
Analysis\Old Town Creek Bridge\Rear Abutment\

Name of input data file:

Rear Abutment Z-direction.lp12d

Name of output report file:

Rear Abutment Z-direction.lp12o

Name of plot output file:
Rear Abutment Z-direction.lp12p

Name of runtime message file:
Rear Abutment Z-direction.lp12r

Date and Time of Analysis

Date: July 1, 2024

Time: 9:25:04

Problem Title

-

Project Name: MEG-33-19.21

Job Number: 173604190

Client: ODOT

Engineer: G. Khatri

Description:Rear Abutment Lateral Load Analysis at Oldtown Creek Bridge

- Program Options and Settings

Performed by: Gokul Khatri 6/28/2024

Checked by: James Samples 7/1/2024

-

Computational Options:

- Conventional Analysis

Engineering Units Used for Data Input and Computations:

- US Customary System Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed = 500
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 100.0000 in
- Number of pile increments = 100

Loading Type and Number of Cycles of Loading:

- Static loading specified

- Analysis uses p-y modification factors for p-y curves
- Analysis uses layering correction (Method of Georgiadis)
- No distributed lateral loads are entered
- Loading by lateral soil movements acting on pile not selected
- Input of shear resistance at the pile tip not selected
- Input of moment resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:

- Output files use decimal points to denote decimal symbols.
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1
- No p-y curves to be computed and reported for user-specified depths
- Print using wide report formats

Pile Structural Properties and Geometry

Number of pile sections defined = 2

Total length of pile = 29.250 ft
 Depth of ground surface below top of pile = 0.0000 ft

Pile diameters used for p-y curve computations are defined using 4 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile. A summary of values of pile diameter vs. depth follows.

Point No.	Depth Below Pile Head feet	Pile Diameter inches
1	0.000	36.0000
2	19.250	36.0000
3	19.250	30.0000
4	29.250	30.0000

Input Structural Properties for Pile Sections:

Pile Section No. 1:

Section 1 is a round drilled shaft, bored pile, or CIDH pile

Length of section = 19.250000 ft
 Shaft Diameter = 36.000000 in

Pile Section No. 2:

Section 2 is a round drilled shaft, bored pile, or CIDH pile

Length of section = 10.000000 ft
 Shaft Diameter = 30.000000 in

Soil and Rock Layering Information

The soil profile is modelled using 4 layers

Layer 1 is stiff clay with user-defined k-value

Distance from top of pile to top of layer	=	0.0000	ft
Distance from top of pile to bottom of layer	=	5.000000	ft
Effective unit weight at top of layer	=	125.000000	pcf
Effective unit weight at bottom of layer	=	125.000000	pcf
Undrained cohesion at top of layer	=	2500.	psf
Undrained cohesion at bottom of layer	=	2500.	psf
Epsilon-50 at top of layer	=	0.0000	
Epsilon-50 at bottom of layer	=	0.0000	
Subgrade k at top of layer	=	0.0000	pci
Subgrade k at bottom of layer	=	0.0000	pci

NOTE: Default values for Epsilon-50 will be computed for this layer.

NOTE: Default values for subgrade k will be computed for this layer.

Layer 2 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer	=	5.000000	ft
Distance from top of pile to bottom of layer	=	18.000000	ft
Effective unit weight at top of layer	=	122.000000	pcf
Effective unit weight at bottom of layer	=	122.000000	pcf
Friction angle at top of layer	=	32.000000	deg.
Friction angle at bottom of layer	=	32.000000	deg.
Subgrade k at top of layer	=	0.0000	pci
Subgrade k at bottom of layer	=	0.0000	pci

NOTE: Default values for subgrade k will be computed for this layer.

Layer 3 is stiff clay with user-defined k-value

Distance from top of pile to top of layer	=	18.000000	ft
Distance from top of pile to bottom of layer	=	19.250000	ft
Effective unit weight at top of layer	=	125.000000	pcf
Effective unit weight at bottom of layer	=	125.000000	pcf
Undrained cohesion at top of layer	=	2500.	psf
Undrained cohesion at bottom of layer	=	2500.	psf
Epsilon-50 at top of layer	=	0.0000	
Epsilon-50 at bottom of layer	=	0.0000	
Subgrade k at top of layer	=	0.0000	pci
Subgrade k at bottom of layer	=	0.0000	pci

NOTE: Default values for Epsilon-50 will be computed for this layer.
 NOTE: Default values for subgrade k will be computed for this layer.

Layer 4 is weak rock, p-y criteria by Reese, 1997

Distance from top of pile to top of layer = 19.250000 ft
 Distance from top of pile to bottom of layer = 35.000000 ft
 Effective unit weight at top of layer = 82.600000 pcf
 Effective unit weight at bottom of layer = 82.600000 pcf
 Uniaxial compressive strength at top of layer = 3820. psi
 Uniaxial compressive strength at bottom of layer = 3820. psi
 Initial modulus of rock at top of layer = 343800. psi
 Initial modulus of rock at bottom of layer = 343800. psi
 RQD of rock at top of layer = 77.000000 %
 RQD of rock at bottom of layer = 77.000000 %
 k_{rm} of rock at top of layer = 0.0000500
 k_{rm} of rock at bottom of layer = 0.0000500

(Depth of the lowest soil layer extends 5.750 ft below the pile tip)

 Summary of Input Soil Properties

Layer Num.	Soil Type Name (p-y Curve Type)	Layer Depth ft	Effective Unit Wt. pcf	Cohesion psf	Angle of Friction deg.	Uniaxial qu psi	RQD %	E50 or krm
1 default	Stiff Clay w/o default	0.00	125.0000	2500.	--	--	--	--
default	Free Water, using k default	5.0000	125.0000	2500.	--	--	--	--
2	Sand	5.0000	122.0000	--	32.0000	--	--	--

MEG-33 Rear Abutment Z direction

default	--							
(Reese, et al.)		18.0000	122.0000	--	32.0000	--	--	--
default	--							
3	Stiff Clay w/o	18.0000	125.0000	2500.	--	--	--	--
default	default	--						
	Free Water, using k	19.2500	125.0000	2500.	--	--	--	--
default	default	--						
4	Weak	19.2500	82.6000	--	--	3820.	77.0000	
5.00E-05	--	343800.						
	Rock	35.0000	82.6000	--	--	3820.	77.0000	
5.00E-05	--	343800.						

 Modification Factors for p-y Curves

Distribution of p-y modifiers with depth defined using 4 points

Point No.	Depth X ft	p-mult	y-mult
1	0.000	1.0000	1.0000
2	5.000	1.0000	1.0000
3	19.250	1.0000	1.0000
4	33.000	1.0000	1.0000

 Static Loading Type

Static loading criteria were used when computing p-y curves for all analyses.

 Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 2

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length	Run Analysis
1	1	V = 105920. lbs	M = 0.0000 in-lbs	774500.	No	Yes
2	1	V = 142960. lbs	M = 0.0000 in-lbs	996600.	No	Yes

V = shear force applied normal to pile axis

M = bending moment applied to pile head

y = lateral deflection normal to pile axis

S = pile slope relative to original pile batter angle

R = rotational stiffness applied to pile head

Values of top y vs. pile lengths can be computed only for load types with specified shear loading (Load Types 1, 2, and 3).

Thrust force is assumed to be acting axially for all pile batter angles.

 Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 2

Pile Section No. 1:

Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section = 19.250000 ft
 Shaft Diameter = 36.000000 in
 Concrete Cover Thickness (to edge of trans. reinf.) = 3.000000 in
 Number of Reinforcing Bars = 8 bars
 Yield Stress of Reinforcing Bars = 50000. psi
 Modulus of Elasticity of Reinforcing Bars = 29000000. psi
 Gross Area of Shaft = 1018. sq. in.

MEG-33 Rear Abutment Z direction

Total Area of Reinforcing Steel = 8.000000 sq. in.
 Area Ratio of Steel Reinforcement = 0.79 percent
 Edge-to-Edge Bar Spacing = 9.538153 in
 Maximum Concrete Aggregate Size = 0.750000 in
 Ratio of Bar Spacing to Aggregate Size = 12.72
 Offset of Center of Rebar Cage from Center of Pile = 0.0000 in
 Transverse Reinforcement
 Type: Spiral
 Number of Transverse Reinf. (per spacing) = 1
 Spacing of Transverse Reinf. = 4.000000 in
 Yield Stress of Transverse Reinf. = 50000. psi
 Diameter of Transverse Reinf. = 0.500000 in

Axial Structural Capacities:

Nom. Axial Structural Capacity = $0.85 F_c A_c + F_y A_s$ = 3833.578 kips
 Tensile Load for Cracking of Concrete = -446.783 kips
 Nominal Axial Tensile Capacity = -400.000 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.128000	1.000000	13.936000	0.000000
2	1.128000	1.000000	9.854240	9.854240
3	1.128000	1.000000	0.000000	13.936000
4	1.128000	1.000000	-9.854240	9.854240
5	1.128000	1.000000	-13.936000	0.000000
6	1.128000	1.000000	-9.854240	-9.854240
7	1.128000	1.000000	0.000000	-13.936000
8	1.128000	1.000000	9.854240	-9.854240

NOTE: The positions of the above rebars were computed by LPILE

Minimum spacing between any two bars not equal to zero = 9.538 inches between bars 3 and 4.

Ratio of bar spacing to maximum aggregate size = 12.72

Concrete Properties:

Compressive Strength of Concrete	=	4000. psi
Modulus of Elasticity of Concrete	=	3604997. psi
Modulus of Rupture of Concrete	=	-474.34165 psi
Compression Strain at Peak Stress	=	0.001886
Tensile Strain at Fracture of Concrete	=	-0.0001154
Maximum Coarse Aggregate Size	=	0.750000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 2

Number	Axial Thrust Force kips
-----	-----
1	774.500
2	996.600

Definitions of Run Messages and Notes:

- C = concrete in section has cracked in tension.
- Y = stress in reinforcing steel has reached yield stress.
- T = ACI 318 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than 0.003. See ACI 318-14, Section 21.2.3.
- Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
 Position of neutral axis is measured from edge of compression side of pile.
 Compressive stresses and strains are positive in sign.
 Tensile stresses and strains are negative in sign.

Axial Thrust Force = 774.500 kips

MEG-33 Rear Abutment Z direction

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	209.9768848	335963016.	305.4584133	0.0001909	0.0001684	0.7682850	5.4744462	
0.00000125	419.9544678	335963574.	161.7501720	0.0002022	0.0001572	0.8107029	5.7394687	
0.00000188	629.9200184	335957343.	113.8567412	0.0002135	0.0001460	0.8529062	6.0049978	
0.00000250	839.8675209	335947008.	89.9170136	0.0002248	0.0001348	0.8948938	6.2710335	
0.00000313	1050.	335933107.	75.5587678	0.0002361	0.0001236	0.9366642	6.5375758	
0.00000375	1260.	335915817.	65.9912635	0.0002475	0.0001125	0.9782161	6.8046249	
0.00000438	1470.	335895215.	59.1613265	0.0002588	0.0001013	1.0195483	7.0721808	
0.00000500	1679.	335871340.	54.0423696	0.0002702	0.00009021	1.0606595	7.3402436	
0.00000563	1889.	335844210.	50.0640668	0.0002816	0.00007911	1.1015482	7.6088134	
0.00000625	2099.	335813840.	46.8842227	0.0002930	0.00006803	1.1422132	7.8778904	
0.00000688	2308.	335780235.	44.2850763	0.0003045	0.00005696	1.1826533	8.1474746	
0.00000750	2518.	335743400.	42.1214541	0.0003159	0.00004591	1.2228669	8.4175663	
0.00000813	2728.	335703338.	40.2928511	0.0003274	0.00003488	1.2628530	8.6881656	
0.00000875	2937.	335660050.	38.7274782	0.0003389	0.00002387	1.3026100	8.9592726	
0.00000938	3146.	335613538.	37.3726902	0.0003504	0.00001287	1.3421368	9.2308877	
0.00001000	3356.	335563800.	36.1890031	0.0003619	0.00000189	1.3814319	9.5030109	
0.00001063	3565.	335510389.	35.1462171	0.0003734	-0.00000907	1.4204939	9.7756407	
0.00001125	3774.	335448762.	34.2207824	0.0003850	-0.00002002	1.4593189	10.0487553	
0.00001188	3983.	335372226.	33.3940570	0.0003966	-0.00003095	1.4979010	10.3223159	
0.00001250	4191.	335275605.	32.6511234	0.0004081	-0.00004186	1.5362345	10.5962823	
0.00001313	4399.	335155533.	31.9799128	0.0004197	-0.00005276	1.5743140	10.8706168	
0.00001375	4606.	335010258.	31.3705628	0.0004313	-0.00006365	1.6121349	11.1452870	
0.00001438	4813.	334839082.	30.8149356	0.0004430	-0.00007454	1.6496930	11.4202638	
0.00001500	5020.	334642016.	30.3062574	0.0004546	-0.00008541	1.6869847	11.6955220	
0.00001563	5225.	334419493.	29.8388439	0.0004662	-0.00009627	1.7240067	11.9710387	
0.00001625	5430.	334172355.	29.4078929	0.0004779	-0.000107	1.7607561	12.2467946	
0.00001688	5430.	321795601.	28.5379799	0.0004816	-0.000126	1.7721262	12.2921114	C
0.00001750	5430.	310302901.	28.0974528	0.0004917	-0.000138	1.8037114	12.5238073	C
0.00001813	5430.	299602801.	27.6819613	0.0005017	-0.000151	1.8347688	12.7526933	C
0.00001875	5531.	294985524.	27.2891744	0.0005117	-0.000163	1.8653149	12.9788637	C
0.00001938	5641.	291155897.	26.9168123	0.0005215	-0.000176	1.8953509	13.2022714	C
0.00002000	5747.	287367426.	26.5630245	0.0005313	-0.000189	1.9248871	13.4229543	C
0.00002063	5850.	283630097.	26.2263178	0.0005409	-0.000202	1.9539418	13.6410289	C
0.00002125	5949.	279952989.	25.9054090	0.0005505	-0.000215	1.9825350	13.8566334	C
0.00002188	6045.	276344121.	25.5991900	0.0005600	-0.000228	2.0106885	14.0699237	C
0.00002250	6138.	272810537.	25.3067051	0.0005694	-0.000241	2.0384250	14.2810751	C

MEG-33 Rear Abutment Z direction

0.00002313	6229.	269354766.	25.0270116	0.0005787	-0.000254	2.0657610	14.4902022	C
0.00002375	6316.	265942885.	24.7580424	0.0005880	-0.000267	2.0926272	14.6965767	C
0.00002438	6401.	262617842.	24.5003905	0.0005972	-0.000280	2.1191300	14.9012011	C
0.00002563	6565.	256207897.	24.0156543	0.0006154	-0.000307	2.1710547	15.3051452	C
0.00002688	6721.	250098469.	23.5670604	0.0006334	-0.000334	2.2215727	15.7021153	C
0.00002813	6870.	244254957.	23.1494010	0.0006511	-0.000361	2.2706819	16.0917926	C
0.00002938	7012.	238695912.	22.7602946	0.0006686	-0.000389	2.3185388	16.4755131	C
0.00003063	7148.	233404965.	22.3966231	0.0006859	-0.000417	2.3651987	16.8536129	C
0.00003188	7279.	228367929.	22.0558068	0.0007030	-0.000444	2.4107192	17.2264740	C
0.00003313	7406.	223572305.	21.7357058	0.0007200	-0.000473	2.4551598	17.5945249	C
0.00003438	7528.	219000726.	21.4342263	0.0007368	-0.000501	2.4985542	17.9579319	C
0.00003563	7646.	214623746.	21.1488122	0.0007534	-0.000529	2.5408658	18.3160792	C
0.00003688	7760.	210452696.	20.8791882	0.0007699	-0.000558	2.5822412	18.6704193	C
0.00003813	7872.	206480017.	20.6243515	0.0007863	-0.000586	2.6227471	19.0215612	C
0.00003938	7981.	202681225.	20.3824550	0.0008026	-0.000615	2.6623531	19.3690034	C
0.00004063	8086.	199033263.	20.1516581	0.0008187	-0.000644	2.7010095	19.7119848	C
0.00004188	8189.	195561271.	19.9331840	0.0008347	-0.000673	2.7389539	20.0531980	C
0.00004313	8289.	192219340.	19.7239608	0.0008506	-0.000702	2.7759904	20.3901410	C
0.00004438	8388.	189023045.	19.5247335	0.0008664	-0.000731	2.8122913	20.7247790	C
0.00004563	8484.	185957571.	19.3344684	0.0008821	-0.000760	2.8478428	21.0568312	C
0.00004688	8579.	183009976.	19.1521150	0.0008978	-0.000790	2.8826191	21.3858440	C
0.00004813	8671.	180183193.	18.9778933	0.0009133	-0.000819	2.9167201	21.7129850	C
0.00004938	8762.	177462231.	18.8106265	0.0009288	-0.000849	2.9500925	22.0374535	C
0.00005063	8851.	174843367.	18.6500888	0.0009442	-0.000878	2.9827769	22.3596742	C
0.00005188	8940.	172330886.	18.4965996	0.0009595	-0.000908	3.0148693	22.6808592	C
0.00005313	9026.	169895579.	18.3478947	0.0009747	-0.000938	3.0461791	22.9982878	C
0.00005438	9111.	167567324.	18.2064765	0.0009900	-0.000968	3.0770331	23.3164253	C
0.00005563	9195.	165304549.	18.0688839	0.0010051	-0.000997	3.1070978	23.6304811	C
0.00005688	9278.	163128637.	17.9370674	0.0010202	-0.001027	3.1366342	-24.151687	C
0.00005813	9360.	161039166.	17.8110890	0.0010353	-0.001057	3.1656928	-24.894846	C
0.00005938	9441.	158999243.	17.6876492	0.0010502	-0.001087	3.1939414	-25.642766	C
0.00006063	9521.	157039251.	17.5696889	0.0010652	-0.001117	3.2217476	-26.390003	C
0.00006188	9600.	155153363.	17.4567824	0.0010801	-0.001147	3.2490985	-27.136723	C
0.00006313	9677.	153306251.	17.3455151	0.0010949	-0.001178	3.2756375	-27.888629	C
0.00006438	9755.	151527025.	17.2389300	0.0011098	-0.001208	3.3017402	-28.639860	C
0.00006563	9831.	149811768.	17.1367610	0.0011246	-0.001238	3.3274046	-29.390414	C
0.00006688	9907.	148138806.	17.0367871	0.0011393	-0.001268	3.3524030	-30.144118	C
0.00006813	9981.	146513241.	16.9396803	0.0011540	-0.001298	3.3768367	-30.899406	C
0.00006938	10055.	144942749.	16.8464048	0.0011687	-0.001329	3.4008383	-31.654027	C
0.00007063	10129.	143424375.	16.7567587	0.0011834	-0.001359	3.4244058	-32.407976	C
0.00007188	10202.	141935938.	16.6682277	0.0011980	-0.001389	3.4472735	-33.166100	C

MEG-33 Rear Abutment Z direction

0.00007313	10273.	140490618.	16.5824943	0.0012126	-0.001420	3.4696518	-33.924710	C
0.00007438	10345.	139090673.	16.4999505	0.0012272	-0.001450	3.4916023	-34.682657	C
0.00007938	10625.	133853545.	16.1923301	0.0012853	-0.001572	3.5743872	-37.722367	C
0.00008438	10896.	129140113.	15.9182821	0.0013431	-0.001694	3.6495145	-40.769141	C
0.00008938	11161.	124874561.	15.6734988	0.0014008	-0.001817	3.7172113	-43.819538	C
0.00009438	11417.	120974705.	15.4508889	0.0014582	-0.001939	3.7772953	-46.880236	C
0.00009938	11668.	117417241.	15.2521788	0.0015157	-0.002062	3.8303422	-49.936615	C
0.0001044	11890.	113914359.	15.0627977	0.0015722	-0.002185	3.8754269	-50.000000	CY
0.0001094	12069.	110344880.	14.8790357	0.0016274	-0.002310	3.9127629	-50.000000	CY
0.0001144	12241.	107026803.	14.7093660	0.0016824	-0.002435	3.9433518	-50.000000	CY
0.0001194	12410.	103956083.	14.5559884	0.0017376	-0.002560	3.9674575	-50.000000	CY
0.0001244	12572.	101084173.	14.4126142	0.0017926	-0.002685	3.9848491	-50.000000	CY
0.0001294	12695.	98125119.	14.2688573	0.0018460	-0.002811	3.9954633	-50.000000	CY
0.0001344	12767.	95009372.	14.1158211	0.0018968	-0.002941	3.9997907	-50.000000	CY
0.0001394	12831.	92064345.	13.9725454	0.0019474	-0.003070	3.9997762	-50.000000	CY
0.0001444	12893.	89303118.	13.8408088	0.0019983	-0.003199	3.9996381	-50.000000	CY
0.0001494	12949.	86690220.	13.7146701	0.0020486	-0.003329	3.9992485	-50.000000	CY
0.0001544	13003.	84232838.	13.5990886	0.0020994	-0.003458	3.9984610	-50.000000	CY
0.0001594	13055.	81915774.	13.4925815	0.0021504	-0.003587	3.9981434	-50.000000	CY
0.0001644	13102.	79710991.	13.3892322	0.0022009	-0.003717	3.9998670	-50.000000	CY
0.0001694	13148.	77626074.	13.2940182	0.0022517	-0.003846	3.9989242	-50.000000	CY
0.0001744	13192.	75652068.	13.2060625	0.0023028	-0.003975	3.9973354	-50.000000	CY
0.0001794	13234.	73775867.	13.1240094	0.0023541	-0.004103	3.9996953	50.000000	CY
0.0001844	13272.	71983354.	13.0441488	0.0024050	-0.004232	3.9976784	50.000000	CY
0.0001894	13308.	70273741.	12.9710783	0.0024564	-0.004361	3.9999015	50.000000	CY
0.0001944	13342.	68639668.	12.9044654	0.0025083	-0.004489	3.9979475	50.000000	CY
0.0001994	13374.	67078440.	12.8433281	0.0025606	-0.004617	3.9999368	50.000000	CY
0.0002044	13403.	65579593.	12.7883122	0.0026136	-0.004744	3.9977035	50.000000	CY
0.0002094	13430.	64142683.	12.7338299	0.0026661	-0.004871	3.9998497	50.000000	CY
0.0002144	13454.	62761220.	12.6840448	0.0027191	-0.004998	3.9966434	50.000000	CY
0.0002194	13478.	61438678.	12.6377277	0.0027724	-0.005125	3.9994518	50.000000	CY
0.0002244	13501.	60171193.	12.5946489	0.0028259	-0.005252	3.9966324	50.000000	CY
0.0002294	13523.	58954625.	12.5547273	0.0028797	-0.005378	3.9983147	50.000000	CY
0.0002344	13544.	57787293.	12.5174048	0.0029338	-0.005504	3.9999419	50.000000	CY
0.0002394	13564.	56664472.	12.4829267	0.0029881	-0.005629	3.9957434	50.000000	CY
0.0002444	13584.	55584850.	12.4507779	0.0030427	-0.005755	3.9989004	50.000000	CY
0.0002494	13602.	54546262.	12.4207182	0.0030974	-0.005880	3.9999993	50.000000	CY
0.0002544	13620.	53542300.	12.3906280	0.0031519	-0.006006	3.9956446	50.000000	CY
0.0002594	13637.	52575216.	12.3623640	0.0032065	-0.006131	3.9987217	50.000000	CYT
0.0002644	13653.	51642979.	12.3358887	0.0032613	-0.006256	3.9999718	50.000000	CYT
0.0002694	13669.	50742250.	12.3115464	0.0033164	-0.006381	3.9940155	50.000000	CYT

MEG-33 Rear Abutment Z direction

0.0002744	13684.	49872618.	12.2888179	0.0033717	-0.006506	3.9976686	50.0000000	CYT
0.0003044	13737.	45130802.	12.1571075	0.0037003	-0.007257	3.9980997	50.0000000	CYT
0.0003344	13737.	41081683.	12.1330546	0.0040570	-0.007981	3.9964469	50.0000000	CYT

Axial Thrust Force = 996.600 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	203.6720076	325875212.	393.3150993	0.0002458	0.0002233	0.9742233	7.0668487	
0.00000125	407.3465994	325877280.	205.6791714	0.0002571	0.0002121	1.0152659	7.3318949	
0.00000188	611.0087820	325871350.	143.1434702	0.0002684	0.0002009	1.0560937	7.5974637	
0.00000250	814.6523513	325860941.	111.8828261	0.0002797	0.0001897	1.0967055	7.8635549	
0.00000313	1018.	325846753.	93.1322056	0.0002910	0.0001785	1.1370999	8.1301686	
0.00000375	1222.	325829021.	80.6365975	0.0003024	0.0001674	1.1772754	8.3973050	
0.00000438	1425.	325807845.	71.7152829	0.0003138	0.0001563	1.2172309	8.6649640	
0.00000500	1629.	325783275.	65.0279025	0.0003251	0.0001451	1.2569649	8.9331459	
0.00000563	1832.	325755337.	59.8298123	0.0003365	0.0001340	1.2964760	9.2018506	
0.00000625	2036.	325724047.	55.6742259	0.0003480	0.0001230	1.3357629	9.4710785	
0.00000688	2239.	325689416.	52.2768250	0.0003594	0.0001119	1.3748243	9.7408295	
0.00000750	2442.	325651449.	49.4480639	0.0003709	0.0001009	1.4136587	10.0111039	
0.00000813	2646.	325610150.	47.0567189	0.0003823	0.00008984	1.4522649	10.2819019	
0.00000875	2849.	325565521.	45.0090586	0.0003938	0.00007883	1.4906414	10.5532237	
0.00000938	3052.	325517564.	43.2363471	0.0004053	0.00006784	1.5287869	10.8250694	
0.00001000	3255.	325466278.	41.6870322	0.0004169	0.00005687	1.5667001	11.0974394	
0.00001063	3457.	325411664.	40.3216917	0.0004284	0.00004592	1.6043796	11.3703338	
0.00001125	3660.	325353721.	39.1096642	0.0004400	0.00003498	1.6418240	11.6437530	
0.00001188	3863.	325292448.	38.0267430	0.0004516	0.00002407	1.6790319	11.9176972	
0.00001250	4065.	325227844.	37.0535632	0.0004632	0.00001317	1.7160020	12.1921667	
0.00001313	4268.	325159908.	36.1744481	0.0004748	0.00000229	1.7527329	12.4671619	
0.00001375	4470.	325088447.	35.3765689	0.0004864	-0.00000857	1.7892231	12.7426819	
0.00001438	4672.	325011148.	34.6492954	0.0004981	-0.00001942	1.8254697	13.0187125	
0.00001500	4874.	324924161.	33.9837381	0.0005098	-0.00003024	1.8614683	13.2952261	
0.00001563	5075.	324824019.	33.3724230	0.0005214	-0.00004106	1.8972144	13.5721917	
0.00001625	5277.	324708100.	32.8090278	0.0005331	-0.00005185	1.9327036	13.8495794	
0.00001688	5477.	324574480.	32.2881692	0.0005449	-0.00006264	1.9679318	14.1273604	
0.00001750	5677.	324422050.	31.8052401	0.0005566	-0.00007341	2.0028952	14.4055094	
0.00001813	5877.	324250184.	31.3562727	0.0005683	-0.00008417	2.0375906	14.6840034	
0.00001875	6076.	324058684.	30.9378332	0.0005801	-0.00009492	2.0720149	14.9628218	

MEG-33 Rear Abutment Z direction

0.00001938	6275.	323847595.	30.5469333	0.0005918	-0.000106	2.1061653	15.2419457
0.00002000	6275.	313727358.	29.8819408	0.0005976	-0.000122	2.1227034	15.3479257 C
0.00002063	6275.	304220468.	29.4895899	0.0006082	-0.000134	2.1530051	15.5928735 C
0.00002125	6392.	300780522.	29.1161018	0.0006187	-0.000146	2.1828041	15.8352228 C
0.00002188	6516.	297891556.	28.7599702	0.0006291	-0.000158	2.2121136	16.0750436 C
0.00002250	6637.	294980129.	28.4198831	0.0006394	-0.000171	2.2409481	16.3124238 C
0.00002313	6754.	292064133.	28.0948053	0.0006497	-0.000183	2.2693305	16.5475413 C
0.00002375	6868.	289160289.	27.7838541	0.0006599	-0.000195	2.2972861	16.7806046 C
0.00002438	6978.	286280418.	27.4861810	0.0006700	-0.000208	2.3248355	17.0117818 C
0.00002563	7189.	280564272.	26.9257907	0.0006900	-0.000233	2.3786649	17.4677408 C
0.00002688	7390.	274969415.	26.4079593	0.0007097	-0.000258	2.4309321	17.9162408 C
0.00002813	7579.	269488118.	25.9266343	0.0007292	-0.000283	2.4816432	18.3569737 C
0.00002938	7760.	264174919.	25.4787630	0.0007484	-0.000309	2.5309543	18.7913088 C
0.00003063	7933.	259028630.	25.0604512	0.0007675	-0.000335	2.5789095	19.2194258 C
0.00003188	8098.	254048220.	24.6684549	0.0007863	-0.000361	2.6255543	19.6415406 C
0.00003313	8256.	249232699.	24.3000599	0.0008049	-0.000388	2.6709363	20.0579068 C
0.00003438	8407.	244581076.	23.9529870	0.0008234	-0.000414	2.7151046	20.4688215 C
0.00003563	8553.	240092228.	23.6253189	0.0008417	-0.000441	2.7581097	20.8746202 C
0.00003688	8694.	235764935.	23.3154412	0.0008598	-0.000468	2.8000038	21.2756875 C
0.00003813	8830.	231597809.	23.0219958	0.0008777	-0.000495	2.8408407	21.6724568 C
0.00003938	8961.	227589277.	22.7438439	0.0008955	-0.000522	2.8806758	22.0654134 C
0.00004063	9089.	223737597.	22.4800354	0.0009133	-0.000549	2.9195661	22.4551038 C
0.00004188	9213.	220001946.	22.2278097	0.0009308	-0.000577	2.9573910	22.8397338 C
0.00004313	9333.	216406804.	21.9876532	0.0009482	-0.000604	2.9943079	23.2211713 C
0.00004438	9450.	212959294.	21.7594669	0.0009656	-0.000632	3.0304148	23.6006016 C
0.00004563	9563.	209606744.	21.5399776	0.0009828	-0.000660	3.0655057	23.9749951 C
0.00004688	9674.	206387338.	21.3308238	0.0009999	-0.000688	3.0998206	24.3475262 C
0.00004813	9783.	203278756.	21.1305016	0.0010169	-0.000716	3.1333004	24.7172189 C
0.00004938	9888.	200270331.	20.9380480	0.0010338	-0.000744	3.1659283	25.0836550 C
0.00005063	9992.	197375102.	20.7540820	0.0010507	-0.000772	3.1978325	25.4485993 C
0.00005188	10093.	194563502.	20.5765351	0.0010674	-0.000800	3.2288782	25.8098625 C
0.00005313	10192.	191856337.	20.4066260	0.0010841	-0.000828	3.2592417	26.1700209 C
0.00005438	10289.	189229572.	20.2426153	0.0011007	-0.000857	3.2888092	26.5271615 C
0.00005563	10385.	186689367.	20.0848631	0.0011172	-0.000885	3.3176662	26.8825074 C
0.00005688	10478.	184237036.	19.9333571	0.0011337	-0.000914	3.3458584	27.2367184 C
0.00005813	10570.	181846021.	19.7861768	0.0011501	-0.000942	3.3732421	27.5872369 C
0.00005938	10661.	179549493.	19.6457033	0.0011665	-0.000971	3.4000901	27.9386331 C
0.00006063	10749.	177301967.	19.5084800	0.0011827	-0.001000	3.4261027	28.2855591 C
0.00006188	10836.	175130480.	19.3765917	0.0011989	-0.001029	3.4515185	28.6321094 C
0.00006313	10923.	173035897.	19.2501215	0.0012152	-0.001057	3.4763775	28.9790163 C
0.00006438	11007.	170977743.	19.1257826	0.0012312	-0.001086	3.5003918	29.3207331 C

MEG-33 Rear Abutment Z direction

0.00006563	11090.	168992672.	19.0066273	0.0012473	-0.001115	3.5238854	29.6633003	C
0.00006688	11173.	167073938.	18.8921379	0.0012634	-0.001144	3.5468333	30.0062777	C
0.00006813	11253.	165185772.	18.7792028	0.0012793	-0.001173	3.5689635	30.3440252	C
0.00006938	11333.	163360720.	18.6707551	0.0012953	-0.001202	3.5905790	30.6826130	C
0.00007063	11413.	161595374.	18.5665585	0.0013113	-0.001231	3.6116770	31.0220443	C
0.00007188	11490.	159863156.	18.4641413	0.0013271	-0.001260	3.6320464	31.3576317	C
0.00007313	11567.	158177405.	18.3648360	0.0013429	-0.001290	3.6518314	31.6923929	C
0.00007438	11643.	156543775.	18.2692566	0.0013588	-0.001319	3.6711048	32.0279906	C
0.00007938	11938.	150405227.	17.9127453	0.0014218	-0.001436	3.7423437	-33.762187	C
0.00008438	12221.	144847260.	17.5946245	0.0014845	-0.001553	3.8045928	-36.667341	C
0.00008938	12494.	139789419.	17.3096761	0.0015471	-0.001670	3.8580756	-39.578771	C
0.00009438	12756.	135167504.	17.0541400	0.0016095	-0.001788	3.9029762	-42.492338	C
0.00009938	13009.	130909214.	16.8222299	0.0016717	-0.001906	3.9392553	-45.411923	C
0.0001044	13253.	126978243.	16.6123948	0.0017339	-0.002024	3.9670729	-48.331945	C
0.0001094	13489.	123323654.	16.4227856	0.0017962	-0.002141	3.9864670	-50.000000	CY
0.0001144	13678.	119590994.	16.2365473	0.0018571	-0.002260	3.9972115	-50.000000	CY
0.0001194	13845.	115975525.	16.0626757	0.0019175	-0.002380	3.9987570	-50.000000	CY
0.0001244	14003.	112584181.	15.9019595	0.0019778	-0.002500	3.9995320	-50.000000	CY
0.0001294	14154.	109406740.	15.7561218	0.0020384	-0.002619	3.9998680	-50.000000	CY
0.0001344	14300.	106421553.	15.6235115	0.0020994	-0.002738	3.9999767	-50.000000	CY
0.0001394	14425.	103494347.	15.4941238	0.0021595	-0.002858	3.9999916	-50.000000	CY
0.0001444	14501.	100436626.	15.3594991	0.0022175	-0.002980	3.9999513	-50.000000	CY
0.0001494	14556.	97445487.	15.2274011	0.0022746	-0.003103	3.9997474	50.000000	CY
0.0001544	14605.	94605744.	15.1049129	0.0023318	-0.003226	3.9991903	50.000000	CY
0.0001594	14650.	91919826.	14.9939809	0.0023897	-0.003348	3.9980481	50.000000	CY
0.0001644	14688.	89359021.	14.8917096	0.0024478	-0.003470	3.9999996	50.000000	CY
0.0001694	14722.	86921425.	14.7957345	0.0025060	-0.003591	3.9995284	50.000000	CY
0.0001744	14754.	84609118.	14.7080370	0.0025647	-0.003713	3.9978757	50.000000	CY
0.0001794	14783.	82416202.	14.6272034	0.0026238	-0.003834	3.9999704	50.000000	CY
0.0001844	14810.	80327732.	14.5509839	0.0026828	-0.003955	3.9987667	50.000000	CY
0.0001894	14835.	78336022.	14.4773344	0.0027416	-0.004076	3.9990009	50.000000	CY
0.0001944	14858.	76438289.	14.4094217	0.0028008	-0.004197	3.9989813	50.000000	CY
0.0001994	14879.	74630341.	14.3463146	0.0028603	-0.004317	3.9984126	50.000000	CY
0.0002044	14900.	72903513.	14.2880562	0.0029201	-0.004437	3.9987767	50.000000	CY
0.0002094	14919.	71254889.	14.2337663	0.0029802	-0.004557	3.9996908	50.000000	CY
0.0002144	14936.	69671857.	14.1808282	0.0030400	-0.004677	3.9979724	50.000000	CY
0.0002194	14952.	68156154.	14.1303013	0.0030998	-0.004798	3.9998749	50.000000	CY
0.0002244	14967.	66703086.	14.0834512	0.0031600	-0.004918	3.9960754	50.000000	CY
0.0002294	14980.	65309790.	14.0397601	0.0032204	-0.005037	3.9990940	50.000000	CY
0.0002344	14994.	63973050.	13.9988940	0.0032810	-0.005157	3.9992060	50.000000	CY
0.0002394	15006.	62687492.	13.9611334	0.0033419	-0.005276	3.9969147	50.000000	CY

MEG-33 Rear Abutment Z direction

0.0002444	15017.	61452315.	13.9257186	0.0034031	-0.005394	3.9994189	50.0000000	CY
0.0002494	15028.	60263903.	13.8926652	0.0034645	-0.005513	3.9977583	50.0000000	CY
0.0002544	15038.	59118591.	13.8620804	0.0035262	-0.005631	3.9966924	50.0000000	CY
0.0002594	15047.	58013296.	13.8308588	0.0035874	-0.005750	3.9992206	50.0000000	CY
0.0002644	15056.	56947827.	13.8013813	0.0036487	-0.005869	3.9994570	50.0000000	CY
0.0002694	15063.	55918650.	13.7742126	0.0037104	-0.005987	3.9949752	50.0000000	CY
0.0002744	15070.	54925610.	13.7486536	0.0037723	-0.006105	3.9981926	50.0000000	CY
0.0003044	15070.	49511998.	13.9469650	0.0042451	-0.006712	3.9990675	50.0000000	CYT

 Summary of Results for Nominal Moment Capacity for Section 1

Moment values interpolated at maximum compressive strain = 0.003
 or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain	Max. Tens. Strain
1	774.500	13568.309	0.00300000	-0.00565676
2	996.600	14924.592	0.00300000	-0.00459709

Note that the values of moment capacity in the table above are not factored by a strength reduction factor (phi-factor).

In ACI 318, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.75).

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318, or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Load No.	Resist. Factor	Nominal Ax. Thrust kips	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in^2
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MEG-33 Rear Abutment Z direction

1	0.65	774.500000	13568.	503.425000	8819.	175783680.
2	0.65	996.600000	14925.	647.790000	9701.	205625046.
1	0.75	774.500000	13568.	580.875000	10176.	142459141.
2	0.75	996.600000	14925.	747.450000	11193.	166594334.
1	0.90	774.500000	13568.	697.050000	12211.	107599265.
2	0.90	996.600000	14925.	896.940000	13432.	124199998.

Pile Section No. 2:

Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section	=	10.000000	ft
Shaft Diameter	=	30.000000	in
Concrete Cover Thickness (to edge of trans. reinf.)	=	3.000000	in
Number of Reinforcing Bars	=	8	bars
Yield Stress of Reinforcing Bars	=	50000.	psi
Modulus of Elasticity of Reinforcing Bars	=	29000000.	psi
Gross Area of Shaft	=	706.858347	sq. in.
Total Area of Reinforcing Steel	=	8.000000	sq. in.
Area Ratio of Steel Reinforcement	=	1.13	percent
Edge-to-Edge Bar Spacing	=	7.242052	in
Maximum Concrete Aggregate Size	=	0.750000	in
Ratio of Bar Spacing to Aggregate Size	=	9.66	
Offset of Center of Rebar Cage from Center of Pile	=	0.0000	in
Transverse Reinforcement			
Type: Spiral			
Number of Transverse Reinf. (per spacing)	=	1	
Spacing of Transverse Reinf.	=	4.000000	in
Yield Stress of Transverse Reinf.	=	50000.	psi
Diameter of Transverse Reinf.	=	0.500000	in

Axial Structural Capacities:

Nom. Axial Structural Capacity = $0.85 F_c A_c + F_y A_s$	=	2776.118	kips
Tensile Load for Cracking of Concrete	=	-317.428	kips

Nominal Axial Tensile Capacity = -400.000 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.128000	1.000000	10.936000	0.000000
2	1.128000	1.000000	7.732920	7.732920
3	1.128000	1.000000	0.000000	10.936000
4	1.128000	1.000000	-7.732920	7.732920
5	1.128000	1.000000	-10.936000	0.000000
6	1.128000	1.000000	-7.732920	-7.732920
7	1.128000	1.000000	0.000000	-10.936000
8	1.128000	1.000000	7.732920	-7.732920

NOTE: The positions of the above rebars were computed by LPILE

Minimum spacing between any two bars not equal to zero = 7.242 inches between bars 1 and 2.

Ratio of bar spacing to maximum aggregate size = 9.66

Concrete Properties:

Compressive Strength of Concrete	=	4000. psi
Modulus of Elasticity of Concrete	=	3604997. psi
Modulus of Rupture of Concrete	=	-474.34165 psi
Compression Strain at Peak Stress	=	0.001886
Tensile Strain at Fracture of Concrete	=	-0.0001154
Maximum Coarse Aggregate Size	=	0.750000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 2

Number	Axial Thrust Force kips

1	774.500
2	996.600

Definitions of Run Messages and Notes:

- C = concrete in section has cracked in tension.
 Y = stress in reinforcing steel has reached yield stress.
 T = ACI 318 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than 0.003. See ACI 318-14, Section 21.2.3.
 Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
 Position of neutral axis is measured from edge of compression side of pile.
 Compressive stresses and strains are positive in sign.
 Tensile stresses and strains are negative in sign.

Axial Thrust Force = 774.500 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in ²	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
0.00000125	197.0601972	157648158.	222.0606597	0.0002776	0.0002401	1.0899493	7.9246364	
0.00000250	394.1138216	157645529.	118.5600268	0.0002964	0.0002214	1.1569769	8.3454769	
0.00000375	591.1346542	157635908.	84.0730133	0.0003153	0.0002028	1.2233984	8.7677527	
0.00000500	788.1062969	157621259.	66.8394067	0.0003342	0.0001842	1.2892076	9.1914640	
0.00000625	985.0123447	157601975.	56.5071652	0.0003532	0.0001657	1.3543984	9.6166112	
0.00000750	1182.	157578184.	49.6256087	0.0003722	0.0001472	1.4189645	10.0431949	
0.00000875	1379.	157549941.	44.7158748	0.0003913	0.0001288	1.4828997	10.4712157	
0.00001000	1575.	157517272.	41.0385327	0.0004104	0.0001104	1.5461977	10.9006745	
0.00001125	1772.	157480188.	38.1827880	0.0004296	0.00009206	1.6088524	11.3315721	
0.00001250	1968.	157438697.	35.9021643	0.0004488	0.00007378	1.6708575	11.7639096	
0.00001375	2164.	157392801.	34.0398132	0.0004680	0.00005555	1.7322068	12.1976880	
0.00001500	2360.	157342500.	32.4911695	0.0004874	0.00003737	1.7928939	12.6329088	
0.00001625	2556.	157287792.	31.1838422	0.0005067	0.00001924	1.8529127	13.0695732	

MEG-33 Rear Abutment Z direction

0.00001750	2752.	157228675.	30.0661236	0.0005262	0.00000116	1.9122569	13.5076828
0.00001875	2947.	157164446.	29.1000771	0.0005456	-0.00001687	1.9709191	13.9472295
0.00002000	3142.	157089981.	28.2571291	0.0005651	-0.00003486	2.0288848	14.3881349
0.00002125	3336.	156999043.	27.5153565	0.0005847	-0.00005280	2.0861355	14.8302760
0.00002250	3530.	156887434.	26.8577127	0.0006043	-0.00007070	2.1426537	15.2735326
0.00002375	3723.	156752846.	26.2707579	0.0006239	-0.00008857	2.1984238	15.7177971
0.00002500	3915.	156594455.	25.7437631	0.0006436	-0.000106	2.2534323	16.1629784
0.00002625	3915.	149137576.	25.0368587	0.0006572	-0.000130	2.2908839	16.4329962 C
0.00002750	4033.	146649420.	24.5453819	0.0006750	-0.000150	2.3393091	16.8235672 C
0.00002875	4157.	144592151.	24.0896035	0.0006926	-0.000170	2.3864933	17.2082695 C
0.00003000	4275.	142501378.	23.6648231	0.0007099	-0.000190	2.4324413	17.5868962 C
0.00003125	4388.	140415182.	23.2684085	0.0007271	-0.000210	2.4772663	17.9604328 C
0.00003250	4496.	138329776.	22.8966067	0.0007441	-0.000231	2.5209482	18.3284269 C
0.00003375	4599.	136274891.	22.5477724	0.0007610	-0.000252	2.5636022	18.6919448 C
0.00003500	4699.	134259274.	22.2197918	0.0007777	-0.000272	2.6052760	19.0513388 C
0.00003625	4795.	132282335.	21.9104691	0.0007943	-0.000293	2.6459821	19.4065683 C
0.00003750	4888.	130344584.	21.6179695	0.0008107	-0.000314	2.6857390	19.7576670 C
0.00003875	4977.	128449428.	21.3408757	0.0008270	-0.000336	2.7245819	20.1048717 C
0.00004000	5064.	126599880.	21.0779814	0.0008431	-0.000357	2.7625479	20.4484585 C
0.00004125	5148.	124798507.	20.8282565	0.0008592	-0.000378	2.7996755	20.7887394 C
0.00004250	5229.	123036170.	20.5900901	0.0008751	-0.000400	2.8359331	21.1251612 C
0.00004375	5308.	121317239.	20.3628166	0.0008909	-0.000422	2.8713669	21.4581362 C
0.00004500	5384.	119649631.	20.1461797	0.0009066	-0.000443	2.9060545	21.7885147 C
0.00004625	5459.	118034813.	19.9396444	0.0009222	-0.000465	2.9400383	22.1167357 C
0.00004750	5531.	116449547.	19.7409583	0.0009377	-0.000487	2.9731774	22.4407939 C
0.00004875	5602.	114914948.	19.5510777	0.0009531	-0.000509	3.0056478	22.7628983 C
0.00005125	5739.	111972053.	19.1941534	0.0009837	-0.000554	3.0685042	23.3997482 C
0.00005375	5869.	109192162.	18.8647864	0.0010140	-0.000599	3.1287080	24.0277984 C
0.00005625	5994.	106563558.	18.5596701	0.0010440	-0.000644	3.1863601	24.6476493 C
0.00005875	6114.	104076249.	18.2761152	0.0010737	-0.000689	3.2415610	25.2599937 C
0.00006125	6230.	101721582.	18.0119282	0.0011032	-0.000734	3.2944107	25.8656249 C
0.00006375	6343.	99491943.	17.7653190	0.0011325	-0.000780	3.3450081	26.4654462 C
0.00006625	6451.	97380531.	17.5348307	0.0011617	-0.000826	3.3934508	27.0604811 C
0.00006875	6556.	95366369.	17.3175808	0.0011906	-0.000872	3.4396480	27.6484894 C
0.00007125	6659.	93453545.	17.1134941	0.0012193	-0.000918	3.4837896	28.2321949 C
0.00007375	6758.	91640611.	16.9221774	0.0012480	-0.000964	3.5260056	28.8136195 C
0.00007625	6855.	89904523.	16.7406104	0.0012765	-0.001011	3.5661234	29.3888625 C
0.00007875	6950.	88253220.	16.5695941	0.0013049	-0.001058	3.6043648	29.9618733 C
0.00008125	7043.	86677225.	16.4079047	0.0013331	-0.001104	3.6407187	30.5320631 C
0.00008375	7133.	85168310.	16.2543230	0.0013613	-0.001151	3.6751645	31.0984997 C
0.00008625	7222.	83727847.	16.1091455	0.0013894	-0.001198	3.7078255	31.6636880 C

Performed by: Gokul Khatri 6/28/2024

Checked by: James Samples 7/1/2024

MEG-33 Rear Abutment Z direction

0.00008875	7308.	82345955.	15.9709126	0.0014174	-0.001245	3.7386377	32.2256991	C
0.00009125	7393.	81021534.	15.8396010	0.0014454	-0.001292	3.7676724	32.7859818	C
0.00009375	7477.	79754049.	15.7152206	0.0014733	-0.001339	3.7949916	33.3460689	C
0.00009625	7559.	78529977.	15.5956665	0.0015011	-0.001386	3.8204612	33.9015919	C
0.00009875	7639.	77360672.	15.4830660	0.0015290	-0.001434	3.8443164	34.4596921	C
0.0001013	7718.	76230217.	15.3747014	0.0015567	-0.001481	3.8663680	35.0139045	C
0.0001038	7796.	75142382.	15.2714736	0.0015844	-0.001528	3.8867300	35.5678588	C
0.0001063	7873.	74099012.	15.1739535	0.0016122	-0.001575	3.9054687	36.1244321	C
0.0001088	7948.	73087021.	15.0796746	0.0016399	-0.001623	3.9224345	36.6770867	C
0.0001113	8022.	72110814.	14.9897588	0.0016676	-0.001670	3.9377310	-37.296228	C
0.0001138	8096.	71171201.	14.9046065	0.0016954	-0.001717	3.9513924	-38.415241	C
0.0001163	8168.	70262204.	14.8230900	0.0017232	-0.001764	3.9633628	-39.534345	C
0.0001188	8239.	69378396.	14.7441391	0.0017509	-0.001812	3.9736084	-40.656433	C
0.0001213	8309.	68525068.	14.6692263	0.0017786	-0.001859	3.9822043	-41.775770	C
0.0001238	8378.	67700276.	14.5981174	0.0018065	-0.001906	3.9891332	-42.892318	C
0.0001263	8446.	66899765.	14.5299236	0.0018344	-0.001953	3.9943638	-44.008504	C
0.0001288	8513.	66118767.	14.4635469	0.0018622	-0.002000	3.9978823	-45.127795	C
0.0001313	8579.	65361878.	14.4004577	0.0018901	-0.002047	3.9997158	-46.244196	C
0.0001338	8644.	64627304.	14.3405133	0.0019180	-0.002094	3.9990923	-47.357548	C
0.0001363	8708.	63913711.	14.2835531	0.0019461	-0.002141	3.9999976	-48.467799	C
0.0001388	8771.	63216737.	14.2287055	0.0019742	-0.002188	3.9997086	-49.577809	C
0.0001413	8833.	62531650.	14.1751241	0.0020022	-0.002235	3.9988237	-50.000000	CY
0.0001438	8890.	61846858.	14.1229803	0.0020302	-0.002282	3.9999444	-50.000000	CY
0.0001463	8943.	61151758.	14.0714715	0.0020580	-0.002330	3.9992542	-50.000000	CY
0.0001488	8992.	60447635.	14.0203885	0.0020855	-0.002377	3.9999973	-50.000000	CY
0.0001588	9158.	57685214.	13.8254824	0.0021948	-0.002568	3.9999988	-50.000000	CY
0.0001688	9312.	55182401.	13.6599124	0.0023051	-0.002757	3.9998520	-50.000000	CY
0.0001788	9453.	52883298.	13.5161075	0.0024160	-0.002946	3.9987512	50.000000	CY
0.0001888	9550.	50594807.	13.3816907	0.0025258	-0.003137	3.9998470	50.000000	CY
0.0001988	9592.	48263731.	13.2407117	0.0026316	-0.003331	3.9999975	50.000000	CY
0.0002088	9624.	46101908.	13.1152488	0.0027378	-0.003525	3.9980876	50.000000	CY
0.0002188	9651.	44118538.	13.0033048	0.0028445	-0.003718	3.9979183	50.000000	CY
0.0002288	9674.	42291530.	12.9015700	0.0029512	-0.003911	3.9996000	50.000000	CY
0.0002388	9695.	40607196.	12.8122433	0.0030589	-0.004104	3.9999057	50.000000	CY
0.0002488	9713.	39048206.	12.7323935	0.0031672	-0.004295	3.9992959	50.000000	CY
0.0002588	9729.	37598341.	12.6577607	0.0032752	-0.004487	3.9975020	50.000000	CY
0.0002688	9742.	36250539.	12.5914115	0.0033839	-0.004679	3.9980848	50.000000	CY
0.0002788	9754.	34993511.	12.5326120	0.0034935	-0.004869	3.9993795	50.000000	CY
0.0002888	9765.	33818876.	12.4802406	0.0036037	-0.005059	3.9961640	50.000000	CY
0.0002988	9774.	32717991.	12.4320667	0.0037141	-0.005248	3.9998985	50.000000	CY
0.0003088	9782.	31681255.	12.3877915	0.0038247	-0.005438	3.9968447	50.000000	CY

MEG-33 Rear Abutment Z direction

Axial Thrust Force = 996.600 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
0.00000125	188.0584437	150446755.	287.2584805	0.0003591	0.0003216	1.3772972	10.2880574	
0.00000250	376.1126663	150445067.	151.1603664	0.0003779	0.0003029	1.4409219	10.7090016	
0.00000375	564.1325191	150435338.	105.8081611	0.0003968	0.0002843	1.5039391	11.1314500	
0.00000500	752.1008139	150420163.	83.1424354	0.0004157	0.0002657	1.5663424	11.5554031	
0.00000625	940.0003549	150400057.	69.5513041	0.0004347	0.0002472	1.6281252	11.9808614	
0.00000750	1128.	150375192.	60.4974730	0.0004537	0.0002287	1.6892810	12.4078252	
0.00000875	1316.	150345639.	54.0363879	0.0004728	0.0002103	1.7498033	12.8362959	
0.00001000	1503.	150311432.	49.1957720	0.0004920	0.0001920	1.8096856	13.2662739	
0.00001125	1691.	150272590.	45.4354722	0.0005111	0.0001736	1.8689214	13.6977603	
0.00001250	1878.	150229121.	42.4313969	0.0005304	0.0001554	1.9275041	14.1307564	
0.00001375	2065.	150181028.	39.9773064	0.0005497	0.0001372	1.9854271	14.5652634	
0.00001500	2252.	150128313.	37.9357078	0.0005690	0.0001190	2.0426839	15.0012829	
0.00001625	2439.	150070974.	36.2114141	0.0005884	0.0001009	2.0992680	15.4388164	
0.00001750	2625.	150009009.	34.7364348	0.0006079	0.00008289	2.1551726	15.8778657	
0.00001875	2811.	149942413.	33.4609106	0.0006274	0.00006489	2.2103913	16.3184327	
0.00002000	2997.	149871182.	32.3474471	0.0006469	0.00004695	2.2649173	16.7605194	
0.00002125	3183.	149795310.	31.3674489	0.0006666	0.00002906	2.3187441	17.2041280	
0.00002250	3369.	149714791.	30.4986754	0.0006862	0.00001122	2.3718650	17.6492608	
0.00002375	3554.	149629604.	29.7235680	0.0007059	-0.00000657	2.4242732	18.0959200	
0.00002500	3738.	149538587.	29.0280487	0.0007257	-0.00002430	2.4759601	18.5440854	
0.00002625	3923.	149438346.	28.4006510	0.0007455	-0.00004198	2.5269122	18.9936831	
0.00002750	4106.	149325541.	27.8319705	0.0007654	-0.00005962	2.5771150	19.4446216	
0.00002875	4289.	149197700.	27.3142404	0.0007853	-0.00007722	2.6265546	19.8968105	
0.00003000	4472.	149053195.	26.8409957	0.0008052	-0.00009477	2.6752182	20.3501663	
0.00003125	4531.	144984016.	26.2871562	0.0008215	-0.000116	2.7141181	20.6961727	C
0.00003250	4669.	143672550.	25.8498607	0.0008401	-0.000135	2.7581238	21.1118688	C
0.00003375	4802.	142294136.	25.4404212	0.0008586	-0.000154	2.8010078	21.5231249	C
0.00003500	4930.	140866444.	25.0560113	0.0008770	-0.000173	2.8428018	21.9301016	C
0.00003625	5053.	139380748.	24.6932157	0.0008951	-0.000192	2.8834566	22.3319307	C
0.00003750	5170.	137867987.	24.3506783	0.0009132	-0.000212	2.9230603	22.7294878	C
0.00003875	5283.	136338829.	24.0265890	0.0009310	-0.000231	2.9616432	23.1229419	C
0.00004000	5392.	134801287.	23.7193268	0.0009488	-0.000251	2.9992314	23.5124192	C
0.00004125	5497.	133262579.	23.4274947	0.0009664	-0.000271	3.0358525	23.8980782	C

MEG-33 Rear Abutment Z direction

0.00004250	5599.	131730128.	23.1499346	0.0009839	-0.000291	3.0715397	24.2801695	C
0.00004375	5697.	130211933.	22.8857206	0.0010013	-0.000311	3.1063334	24.6590706	C
0.00004500	5792.	128715029.	22.6340584	0.0010185	-0.000331	3.1402745	25.0351963	C
0.00004625	5884.	127232039.	22.3935019	0.0010357	-0.000352	3.1733357	25.4079721	C
0.00004750	5974.	125769874.	22.1634899	0.0010528	-0.000372	3.2055588	25.7778324	C
0.00004875	6061.	124334580.	21.9435626	0.0010697	-0.000393	3.2369868	26.1452743	C
0.00005125	6229.	121533203.	21.5305112	0.0011034	-0.000434	3.2974499	26.8721592	C
0.00005375	6387.	118835766.	21.1499319	0.0011368	-0.000476	3.3548729	27.5897691	C
0.00005625	6538.	116224934.	20.7966832	0.0011698	-0.000518	3.4092523	28.2967760	C
0.00005875	6681.	113719442.	20.4688238	0.0012025	-0.000560	3.4608103	28.9958212	C
0.00006125	6818.	111315893.	20.1635554	0.0012350	-0.000602	3.5096351	29.6874529	C
0.00006375	6949.	109011250.	19.8785694	0.0012673	-0.000645	3.5558133	30.3723177	C
0.00006625	7076.	106802720.	19.6119588	0.0012993	-0.000688	3.5994299	31.0511632	C
0.00006875	7197.	104684745.	19.3618806	0.0013311	-0.000731	3.6405433	31.7243119	C
0.00007125	7313.	102645300.	19.1260719	0.0013627	-0.000775	3.6791504	32.3906837	C
0.00007375	7426.	100691852.	18.9042821	0.0013942	-0.000818	3.7154006	33.0528461	C
0.00007625	7535.	98822441.	18.6956452	0.0014255	-0.000862	3.7493658	33.7119330	C
0.00007875	7641.	97024114.	18.4982640	0.0014567	-0.000906	3.7810179	34.3664720	C
0.00008125	7742.	95292183.	18.3110700	0.0014878	-0.000950	3.8103873	35.0163961	C
0.00008375	7842.	93637182.	18.1349296	0.0015188	-0.000994	3.8376342	35.6660230	C
0.00008625	7938.	92032543.	17.9664266	0.0015496	-0.001038	3.8625943	36.3092123	C
0.00008875	8032.	90497415.	17.8076180	0.0015804	-0.001082	3.8854853	36.9529194	C
0.00009125	8122.	89011588.	17.6558293	0.0016111	-0.001126	3.9061923	37.5921760	C
0.00009375	8211.	87586116.	17.5123562	0.0016418	-0.001171	3.9248479	38.2320311	C
0.00009625	8297.	86203445.	17.3747470	0.0016723	-0.001215	3.9413589	38.8674503	C
0.00009875	8382.	84879026.	17.2451589	0.0017030	-0.001260	3.9558708	39.5058865	C
0.0001013	8463.	83586711.	17.1196877	0.0017334	-0.001304	3.9682360	40.1376207	C
0.0001038	8543.	82346422.	17.0014055	0.0017639	-0.001349	3.9786097	40.7727917	C
0.0001063	8621.	81143307.	16.8879757	0.0017943	-0.001393	3.9869208	41.4057629	C
0.0001088	8697.	79976792.	16.7793715	0.0018248	-0.001438	3.9931906	42.0375057	C
0.0001113	8772.	78853018.	16.6767408	0.0018553	-0.001482	3.9974452	42.6727728	C
0.0001138	8845.	77756933.	16.5774429	0.0018857	-0.001527	3.9996498	43.3041527	C
0.0001163	8916.	76693908.	16.4826934	0.0019161	-0.001571	3.9994324	43.9364679	C
0.0001188	8985.	75665508.	16.3930561	0.0019467	-0.001616	3.9990767	44.5726498	C
0.0001213	9053.	74662694.	16.3068232	0.0019772	-0.001660	4.0000000	45.2078051	C
0.0001238	9118.	73683503.	16.2238394	0.0020077	-0.001705	3.9999186	45.8421165	C
0.0001263	9183.	72733704.	16.1452271	0.0020383	-0.001749	3.9996205	46.4804006	C
0.0001288	9246.	71811895.	16.0707123	0.0020691	-0.001793	3.9990147	47.1225850	C
0.0001313	9307.	70909315.	15.9982619	0.0020998	-0.001838	3.9999895	47.7618221	C
0.0001338	9366.	70028928.	15.9288593	0.0021305	-0.001882	3.9996903	48.4023758	C
0.0001363	9425.	69173626.	15.8629301	0.0021613	-0.001926	3.9988838	49.0465873	C

MEG-33 Rear Abutment Z direction

0.0001388	9482.	68341840.	15.8003106	0.0021923	-0.001970	3.9999573	49.6945611	C
0.0001413	9539.	67529947.	15.7406118	0.0022234	-0.002014	3.9994003	50.0000000	CY
0.0001438	9593.	66733493.	15.6820316	0.0022543	-0.002058	3.9995427	50.0000000	CY
0.0001463	9645.	65951153.	15.6271116	0.0022855	-0.002102	3.9996510	50.0000000	CY
0.0001488	9696.	65185728.	15.5752890	0.0023168	-0.002146	3.9983758	50.0000000	CY
0.0001588	9882.	62247449.	15.3961656	0.0024441	-0.002318	3.9984239	50.0000000	CY
0.0001688	10018.	59364223.	15.2340472	0.0025707	-0.002492	3.9996748	50.0000000	CY
0.0001788	10124.	56635834.	15.0873784	0.0026969	-0.002666	3.9995234	50.0000000	CY
0.0001888	10220.	54147854.	14.9609482	0.0028239	-0.002839	3.9989667	50.0000000	CY
0.0001988	10310.	51875197.	14.8548645	0.0029524	-0.003010	3.9984668	50.0000000	CY
0.0002088	10389.	49769752.	14.7589196	0.0030809	-0.003182	3.9992085	50.0000000	CY
0.0002188	10439.	47722512.	14.6613137	0.0032072	-0.003355	3.9993295	50.0000000	CY
0.0002288	10458.	45719330.	14.5619185	0.0033310	-0.003531	3.9989425	50.0000000	CY
0.0002388	10462.	43821915.	14.4717300	0.0034551	-0.003707	3.9979495	50.0000000	CY
0.0002488	10462.	42060230.	14.3969131	0.0035812	-0.003881	3.9961228	50.0000000	CY
0.0002588	10462.	40434714.	14.3359160	0.0037094	-0.004053	3.9999988	50.0000000	CY
0.0002688	10462.	38930166.	14.3211220	0.0038488	-0.004214	3.9998163	50.0000000	CY

 Summary of Results for Nominal Moment Capacity for Section 2

Moment values interpolated at maximum compressive strain = 0.003
 or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain	Max. Tens. Strain
1	774.500	9683.598	0.00300000	-0.00399835
2	996.600	10339.541	0.00300000	-0.00307360

Note that the values of moment capacity in the table above are not factored by a strength reduction factor (phi-factor).

In ACI 318, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.75).

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318, or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Load No.	Resist. Factor	Nominal Ax. Thrust kips	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in ²
1	0.65	774.500000	9684.	503.425000	6294.	100451525.
2	0.65	996.600000	10340.	647.790000	6721.	113023625.
1	0.75	774.500000	9684.	580.875000	7263.	83071448.
2	0.75	996.600000	10340.	747.450000	7755.	95090078.
1	0.90	774.500000	9684.	697.050000	8715.	63836425.
2	0.90	996.600000	10340.	896.940000	9306.	70927947.

Layering Correction Equivalent Depths of Soil & Rock Layers

Layer No.	Top of Layer Below Pile Head ft	Equivalent Top Depth Below Grnd Surf ft	Same Layer Type As Layer Above	Layer is Rock or Rock Layer	F0 Integral for Layer lbs	F1 Integral for Layer lbs
1	0.00	0.00	N.A.	No	0.00	132812.
2	5.0000	8.1014	No	No	132812.	925764.
3	18.0000	24.8456	No	No	1058577.	104929.
4	19.2500	19.2500	No	Yes	N.A.	N.A.

Notes: The F0 integral of Layer n+1 equals the sum of the F0 and F1 integrals for Layer n. Layering correction equivalent depths are computed only for soil types with both shallow-depth and deep-depth expressions for peak lateral load transfer. These soil types are soft and stiff clays, non-liquefied sands, and cemented c-phi soil.

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 1

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 105920.0 lbs
 Applied moment at pile head = 0.0 in-lbs
 Axial thrust load on pile head = 774500.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in ²	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	0.3972	-1.36E-05	105920.	-0.00325	0.00	3.36E+11	0.00	0.00	0.00
0.2925	0.3857	380621.	104303.	-0.00325	0.00	3.36E+11	-921.146	8382.	0.00
0.5850	0.3743	749883.	101049.	-0.00324	0.00	3.36E+11	-933.176	8750.	0.00
0.8775	0.3630	1107627.	97753.	-0.00323	0.00	3.36E+11	-944.774	9136.	0.00
1.1700	0.3516	1453699.	94418.	-0.00322	0.00	3.36E+11	-955.931	9542.	0.00
1.4625	0.3404	1787953.	91043.	-0.00320	0.00	3.36E+11	-966.639	9969.	0.00
1.7550	0.3291	2110247.	87633.	-0.00318	0.00	3.36E+11	-976.891	10418.	0.00
2.0475	0.3180	2420446.	84186.	-0.00316	0.00	3.36E+11	-986.678	10891.	0.00
2.3400	0.3069	2718420.	80707.	-0.00313	0.00	3.36E+11	-995.992	11389.	0.00
2.6325	0.2960	3004046.	77195.	-0.00310	0.00	3.36E+11	-1005.	11915.	0.00
2.9250	0.2852	3277207.	73654.	-0.00307	0.00	3.36E+11	-1013.	12471.	0.00
3.2175	0.2744	3537793.	70084.	-0.00304	0.00	3.36E+11	-1021.	13058.	0.00
3.5100	0.2639	3785699.	66487.	-0.00300	0.00	3.35E+11	-1028.	13680.	0.00
3.8025	0.2534	4020828.	62866.	-0.00296	0.00	3.35E+11	-1035.	14339.	0.00
4.0950	0.2431	4243089.	59221.	-0.00291	0.00	3.35E+11	-1041.	15037.	0.00
4.3875	0.2330	4452399.	55556.	-0.00287	0.00	3.35E+11	-1047.	15779.	0.00
4.6800	0.2230	4648680.	51871.	-0.00282	0.00	3.35E+11	-1052.	16567.	0.00
4.9725	0.2132	4831863.	48169.	-0.00277	0.00	3.35E+11	-1057.	17406.	0.00
5.2650	0.2035	5001884.	44438.	-0.00272	0.00	3.35E+11	-1069.	18434.	0.00
5.5575	0.1941	5158594.	40673.	-0.00267	0.00	3.34E+11	-1076.	19458.	0.00
5.8500	0.1848	5301902.	36892.	-0.00261	0.00	3.34E+11	-1078.	20483.	0.00
6.1425	0.1758	5431771.	33110.	-0.00255	0.00	3.34E+11	-1077.	21507.	0.00
6.4350	0.1669	5548217.	29340.	-0.00249	0.00	2.94E+11	-1071.	22531.	0.00

MEG-33 Rear Abutment Z direction

6.7275	0.1583	5651285.	25596.	-0.00243	0.00	2.91E+11	-1062.	23555.	0.00
7.0200	0.1499	5741084.	21890.	-0.00236	0.00	2.88E+11	-1049.	24579.	0.00
7.3125	0.1417	5817763.	18234.	-0.00228	0.00	2.85E+11	-1034.	25603.	0.00
7.6050	0.1338	5881511.	14638.	-0.00221	0.00	2.82E+11	-1015.	26627.	0.00
7.8975	0.1262	5932552.	11112.	-0.00214	0.00	2.81E+11	-994.090	27651.	0.00
8.1900	0.1188	5971145.	7664.	-0.00206	0.00	2.79E+11	-970.638	28676.	0.00
8.4825	0.1117	5997575.	4302.	-0.00199	0.00	2.78E+11	-945.111	29700.	0.00
8.7750	0.1048	6012155.	1052.	-0.00191	0.00	2.78E+11	-906.591	30350.	0.00
9.0675	0.09827	6015360.	-2081.	-0.00184	0.00	2.77E+11	-878.595	31383.	0.00
9.3600	0.09195	6007533.	-5130.	-0.00176	0.00	2.78E+11	-858.541	32772.	0.00
9.6525	0.08591	5988922.	-8088.	-0.00169	0.00	2.78E+11	-827.141	33796.	0.00
9.9450	0.08012	5959916.	-10935.	-0.00161	0.00	2.80E+11	-794.840	34820.	0.00
10.2375	0.07460	5920914.	-13667.	-0.00154	0.00	2.81E+11	-761.848	35844.	0.00
10.5300	0.06934	5872325.	-16282.	-0.00146	0.00	2.83E+11	-728.361	36869.	0.00
10.8225	0.06434	5814564.	-18779.	-0.00139	0.00	2.85E+11	-694.567	37893.	0.00
11.1150	0.05958	5748051.	-21158.	-0.00132	0.00	2.87E+11	-660.640	38917.	0.00
11.4075	0.05508	5673208.	-23417.	-0.00125	0.00	2.90E+11	-626.744	39941.	0.00
11.7000	0.05081	5590457.	-25558.	-0.00118	0.00	2.93E+11	-593.031	40965.	0.00
11.9925	0.04678	5500218.	-27581.	-0.00112	0.00	2.96E+11	-559.643	41989.	0.00
12.2850	0.04298	5402907.	-29487.	-0.00105	0.00	3.34E+11	-526.703	43013.	0.00
12.5775	0.03938	5298952.	-31279.	-9.99E-04	0.00	3.34E+11	-494.043	44037.	0.00
12.8700	0.03597	5188760.	-32956.	-9.44E-04	0.00	3.34E+11	-461.788	45062.	0.00
13.1625	0.03275	5072730.	-34521.	-8.90E-04	0.00	3.35E+11	-430.054	46086.	0.00
13.4550	0.02972	4951257.	-35976.	-8.37E-04	0.00	3.35E+11	-398.950	47110.	0.00
13.7475	0.02688	4824728.	-37323.	-7.86E-04	0.00	3.35E+11	-368.578	48134.	0.00
14.0400	0.02421	4693521.	-38565.	-7.36E-04	0.00	3.35E+11	-339.030	49158.	0.00
14.3325	0.02171	4558003.	-39705.	-6.88E-04	0.00	3.35E+11	-310.393	50182.	0.00
14.6250	0.01938	4418531.	-40746.	-6.41E-04	0.00	3.35E+11	-282.744	51206.	0.00
14.9175	0.01721	4275450.	-41692.	-5.95E-04	0.00	3.35E+11	-256.152	52230.	0.00
15.2100	0.01520	4129091.	-42546.	-5.51E-04	0.00	3.35E+11	-230.680	53255.	0.00
15.5025	0.01335	3979773.	-43313.	-5.09E-04	0.00	3.35E+11	-206.381	54279.	0.00
15.7950	0.01163	3827799.	-43997.	-4.68E-04	0.00	3.35E+11	-183.301	55303.	0.00
16.0875	0.01006	3673458.	-44602.	-4.28E-04	0.00	3.35E+11	-161.479	56327.	0.00
16.3800	0.00863	3517023.	-45133.	-3.91E-04	0.00	3.36E+11	-140.944	57351.	0.00
16.6725	0.00732	3358751.	-45594.	-3.55E-04	0.00	3.36E+11	-121.718	58375.	0.00
16.9650	0.00613	3198885.	-45990.	-3.21E-04	0.00	3.36E+11	-103.816	59399.	0.00
17.2575	0.00507	3037648.	-46325.	-2.88E-04	0.00	3.36E+11	-87.245	60423.	0.00
17.5500	0.00411	2875250.	-46604.	-2.57E-04	0.00	3.36E+11	-72.003	61448.	0.00
17.8425	0.00326	2711884.	-46833.	-2.28E-04	0.00	3.36E+11	-58.082	62472.	0.00
18.1350	0.00251	2547724.	-47894.	-2.00E-04	0.00	3.36E+11	-546.953	763846.	0.00
18.4275	0.00186	2376754.	-49575.	-1.75E-04	0.00	3.36E+11	-410.591	776166.	0.00

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18.7200	0.00129	2200658.	-50803.	-1.51E-04	0.00	3.36E+11	-289.211	788486.	0.00
19.0125	7.99E-04	2020936.	-51631.	-1.29E-04	0.00	3.36E+11	-182.254	800806.	0.00
19.3050	3.84E-04	1838911.	-75822.	-9.76E-05	0.00	1.57E+11	-13602.	1.24E+08	0.00
19.5975	1.14E-04	1489194.	-107832.	-6.05E-05	0.00	1.58E+11	-4637.	1.43E+08	0.00
19.8900	-4.03E-05	1082261.	-112704.	-3.19E-05	0.00	1.58E+11	1860.	1.62E+08	0.00
20.1825	-1.10E-04	698183.	-99515.	-1.20E-05	0.00	1.58E+11	5655.	1.81E+08	0.00
20.4750	-1.25E-04	383734.	-77141.	1.48E-08	0.00	1.58E+11	7094.	2.00E+08	0.00
20.7675	-1.10E-04	156656.	-52710.	6.03E-06	0.00	1.58E+11	6827.	2.18E+08	0.00
21.0600	-8.25E-05	13678.	-30950.	7.93E-06	0.00	1.58E+11	5572.	2.37E+08	0.00
21.3525	-5.41E-05	-60657.	-14247.	7.40E-06	0.00	1.58E+11	3946.	2.56E+08	0.00
21.6450	-3.05E-05	-86375.	-3133.	5.77E-06	0.00	1.58E+11	2387.	2.75E+08	0.00
21.9375	-1.36E-05	-82683.	3055.	3.89E-06	0.00	1.58E+11	1139.	2.94E+08	0.00
22.2300	-3.21E-06	-64951.	5556.	2.24E-06	0.00	1.58E+11	285.8610	3.12E+08	0.00
22.5225	2.12E-06	-43693.	5707.	1.03E-06	0.00	1.58E+11	-199.999	3.31E+08	0.00
22.8150	4.03E-06	-24897.	4649.	2.69E-07	0.00	1.58E+11	-402.433	3.50E+08	0.00
23.1075	4.00E-06	-11057.	3204.	-1.32E-07	0.00	1.58E+11	-420.903	3.69E+08	0.00
23.4000	3.11E-06	-2402.	1863.	-2.82E-07	0.00	1.58E+11	-343.589	3.88E+08	0.00
23.6925	2.03E-06	2020.	847.3105	-2.86E-07	0.00	1.58E+11	-234.940	4.07E+08	0.00
23.9850	1.10E-06	3548.	200.1334	-2.24E-07	0.00	1.58E+11	-133.821	4.25E+08	0.00
24.2775	4.57E-07	3426.	-136.306	-1.46E-07	0.00	1.58E+11	-57.882	4.44E+08	0.00
24.5700	7.83E-08	2592.	-256.019	-7.91E-08	0.00	1.58E+11	-10.331	4.63E+08	0.00
24.8625	-9.82E-08	1630.	-250.494	-3.21E-08	0.00	1.58E+11	13.4787	4.82E+08	0.00
25.1550	-1.47E-07	833.4442	-189.960	-4.72E-09	0.00	1.58E+11	21.0137	5.01E+08	0.00
25.4475	-1.31E-07	296.1192	-118.972	7.86E-09	0.00	1.58E+11	19.4350	5.20E+08	0.00
25.7400	-9.22E-08	-1.783	-60.057	1.11E-08	0.00	1.58E+11	14.1350	5.38E+08	0.00
26.0325	-5.32E-08	-125.541	-20.442	9.72E-09	0.00	1.58E+11	8.4373	5.57E+08	0.00
26.3250	-2.40E-08	-145.342	1.2645	6.70E-09	0.00	1.58E+11	3.9313	5.76E+08	0.00
26.6175	-6.12E-09	-116.700	9.9838	3.78E-09	0.00	1.58E+11	1.0370	5.95E+08	0.00
26.9100	2.60E-09	-75.276	11.0200	1.65E-09	0.00	1.58E+11	-0.447	6.03E+08	0.00
27.2025	5.43E-09	-39.348	8.5977	3.69E-10	0.00	1.58E+11	-0.934	6.03E+08	0.00
27.4950	5.19E-09	-14.922	5.3933	-2.35E-10	0.00	1.58E+11	-0.892	6.03E+08	0.00
27.7875	3.78E-09	-1.486	2.6862	-4.17E-10	0.00	1.58E+11	-0.650	6.03E+08	0.00
28.0800	2.26E-09	3.9373	0.8632	-3.90E-10	0.00	1.58E+11	-0.388	6.03E+08	0.00
28.3725	1.04E-09	4.5756	-0.133	-2.95E-10	0.00	1.58E+11	-0.179	6.03E+08	0.00
28.6650	1.85E-10	3.0032	-0.504	-2.11E-10	0.00	1.58E+11	-0.03189	6.03E+08	0.00
28.9575	-4.38E-10	1.0378	-0.428	-1.66E-10	0.00	1.58E+11	0.07530	6.03E+08	0.00
29.2500	-9.80E-10	0.00	0.00	-1.55E-10	0.00	1.58E+11	0.1685	3.02E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual

stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 1:

Pile-head deflection = 0.39716117 inches
 Computed slope at pile head = -0.0032525 radians
 Maximum bending moment = 6015360. inch-lbs
 Maximum shear force = -112704. lbs
 Depth of maximum bending moment = 9.06750000 feet below pile head
 Depth of maximum shear force = 19.89000000 feet below pile head
 Number of iterations = 19
 Number of zero deflection points = 5

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 2

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 142960.0 lbs
 Applied moment at pile head = 0.0 in-lbs
 Axial thrust load on pile head = 996600.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in ²	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	0.7302	-1.47E-05	142960.	-0.00586	0.00	3.26E+11	0.00	0.00	0.00
0.2925	0.7096	522273.	141077.	-0.00585	0.00	3.26E+11	-1073.	5306.	0.00
0.5850	0.6891	1031309.	137287.	-0.00584	0.00	3.26E+11	-1087.	5537.	0.00
0.8775	0.6686	1526915.	133448.	-0.00583	0.00	3.26E+11	-1101.	5778.	0.00
1.1700	0.6481	2008904.	129561.	-0.00581	0.00	3.26E+11	-1114.	6032.	0.00
1.4625	0.6278	2477095.	125630.	-0.00579	0.00	3.26E+11	-1126.	6298.	0.00
1.7550	0.6075	2931313.	121654.	-0.00576	0.00	3.26E+11	-1139.	6579.	0.00
2.0475	0.5874	3371393.	117637.	-0.00572	0.00	3.25E+11	-1150.	6874.	0.00

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2.3400	0.5673	3797175.	113581.	-0.00569	0.00	3.25E+11	-1161.	7185.	0.00
2.6325	0.5474	4208505.	109486.	-0.00564	0.00	3.25E+11	-1172.	7513.	0.00
2.9250	0.5277	4605241.	105356.	-0.00559	0.00	3.25E+11	-1182.	7860.	0.00
3.2175	0.5082	4987244.	101191.	-0.00554	0.00	3.25E+11	-1191.	8227.	0.00
3.5100	0.4888	5354384.	96996.	-0.00549	0.00	3.25E+11	-1200.	8615.	0.00
3.8025	0.4696	5706542.	92771.	-0.00543	0.00	3.24E+11	-1208.	9027.	0.00
4.0950	0.4507	6043604.	88518.	-0.00536	0.00	3.24E+11	-1215.	9464.	0.00
4.3875	0.4320	6365464.	84241.	-0.00529	0.00	3.02E+11	-1222.	9929.	0.00
4.6800	0.4135	6672010.	79941.	-0.00522	0.00	2.94E+11	-1228.	10424.	0.00
4.9725	0.3954	6963146.	75620.	-0.00513	0.00	2.87E+11	-1234.	10952.	0.00
5.2650	0.3775	7238785.	70676.	-0.00505	0.00	2.79E+11	-1583.	14722.	0.00
5.5575	0.3599	7494600.	65132.	-0.00495	0.00	2.72E+11	-1576.	15366.	0.00
5.8500	0.3427	7730663.	59628.	-0.00485	0.00	2.65E+11	-1560.	15980.	0.00
6.1425	0.3259	7947144.	54155.	-0.00475	0.00	2.59E+11	-1559.	16787.	0.00
6.4350	0.3094	8144046.	48692.	-0.00464	0.00	2.53E+11	-1554.	17634.	0.00
6.7275	0.2933	8321402.	43255.	-0.00452	0.00	2.47E+11	-1543.	18468.	0.00
7.0200	0.2777	8479331.	37870.	-0.00440	0.00	2.42E+11	-1525.	19280.	0.00
7.3125	0.2624	8618041.	32561.	-0.00428	0.00	2.38E+11	-1500.	20061.	0.00
7.6050	0.2476	8737828.	27354.	-0.00415	0.00	2.34E+11	-1467.	20800.	0.00
7.8975	0.2333	8839078.	22272.	-0.00401	0.00	2.31E+11	-1428.	21482.	0.00
8.1900	0.2195	8922266.	17342.	-0.00388	0.00	2.29E+11	-1381.	22095.	0.00
8.4825	0.2061	8987956.	12586.	-0.00374	0.00	2.27E+11	-1328.	22622.	0.00
8.7750	0.1932	9036796.	8029.	-0.00360	0.00	2.25E+11	-1268.	23046.	0.00
9.0675	0.1808	9069516.	3632.	-0.00346	0.00	2.24E+11	-1237.	24015.	0.00
9.3600	0.1689	9086500.	-691.943	-0.00332	0.00	2.24E+11	-1227.	25497.	0.00
9.6525	0.1575	9087870.	-4975.	-0.00318	0.00	2.24E+11	-1214.	27048.	0.00
9.9450	0.1466	9073788.	-9207.	-0.00303	0.00	2.24E+11	-1198.	28672.	0.00
10.2375	0.1362	9044455.	-13377.	-0.00289	0.00	2.25E+11	-1179.	30369.	0.00
10.5300	0.1263	9000108.	-17476.	-0.00275	0.00	2.26E+11	-1157.	32141.	0.00
10.8225	0.1169	8941024.	-21492.	-0.00261	0.00	2.28E+11	-1132.	33991.	0.00
11.1150	0.1080	8867511.	-25418.	-0.00248	0.00	2.30E+11	-1105.	35920.	0.00
11.4075	0.09952	8779912.	-29245.	-0.00234	0.00	2.33E+11	-1075.	37930.	0.00
11.7000	0.09153	8678602.	-32964.	-0.00221	0.00	2.36E+11	-1044.	40023.	0.00
11.9925	0.08399	8563983.	-36559.	-0.00208	0.00	2.40E+11	-1005.	41989.	0.00
12.2850	0.07689	8436547.	-39976.	-0.00196	0.00	2.44E+11	-942.267	43013.	0.00
12.5775	0.07022	8297077.	-43175.	-0.00184	0.00	2.48E+11	-881.001	44037.	0.00
12.8700	0.06396	8146342.	-46163.	-0.00173	0.00	2.53E+11	-821.136	45062.	0.00
13.1625	0.05810	7985094.	-48943.	-0.00162	0.00	2.57E+11	-762.836	46086.	0.00
13.4550	0.05262	7814068.	-51521.	-0.00151	0.00	2.63E+11	-706.245	47110.	0.00
13.7475	0.04751	7633975.	-53904.	-0.00141	0.00	2.68E+11	-651.486	48134.	0.00
14.0400	0.04275	7445505.	-56098.	-0.00131	0.00	2.73E+11	-598.661	49158.	0.00

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14.3325	0.03832	7249326.	-58110.	-0.00122	0.00	2.79E+11	-547.855	50182.	0.00
14.6250	0.03421	7046078.	-59947.	-0.00113	0.00	2.84E+11	-499.140	51206.	0.00
14.9175	0.03041	6836376.	-61617.	-0.00104	0.00	2.90E+11	-452.571	52230.	0.00
15.2100	0.02690	6620808.	-63128.	-9.61E-04	0.00	2.95E+11	-408.192	53255.	0.00
15.5025	0.02367	6399937.	-64487.	-8.84E-04	0.00	3.01E+11	-366.036	54279.	0.00
15.7950	0.02070	6174295.	-65702.	-8.13E-04	0.00	3.24E+11	-326.125	55303.	0.00
16.0875	0.01796	5944400.	-66780.	-7.47E-04	0.00	3.24E+11	-288.248	56327.	0.00
16.3800	0.01545	5710730.	-67729.	-6.84E-04	0.00	3.24E+11	-252.466	57351.	0.00
16.6725	0.01316	5473732.	-68556.	-6.24E-04	0.00	3.25E+11	-218.826	58375.	0.00
16.9650	0.01107	5233832.	-69269.	-5.66E-04	0.00	3.25E+11	-187.363	59399.	0.00
17.2575	0.00918	4991426.	-69875.	-5.11E-04	0.00	3.25E+11	-158.101	60423.	0.00
17.5500	0.00749	4746883.	-70383.	-4.58E-04	0.00	3.25E+11	-131.051	61448.	0.00
17.8425	0.00597	4500546.	-70799.	-4.08E-04	0.00	3.25E+11	-106.214	62472.	0.00
18.1350	0.00462	4252730.	-72450.	-3.61E-04	0.00	3.25E+11	-834.683	634141.	0.00
18.4275	0.00343	3994471.	-75248.	-3.16E-04	0.00	3.25E+11	-759.244	776166.	0.00
18.7200	0.00240	3726707.	-77526.	-2.75E-04	0.00	3.25E+11	-538.743	788486.	0.00
19.0125	0.00150	3452165.	-79073.	-2.36E-04	0.00	3.25E+11	-343.172	800806.	0.00
19.3050	7.41E-04	3173264.	-121965.	-1.80E-04	0.00	1.50E+11	-24097.	1.14E+08	0.00
19.5975	2.38E-04	2597229.	-181301.	-1.13E-04	0.00	1.50E+11	-9713.	1.43E+08	0.00
19.8900	-5.08E-05	1901322.	-194236.	-6.02E-05	0.00	1.50E+11	2342.	1.62E+08	0.00
20.1825	-1.84E-04	1234114.	-173504.	-2.35E-05	0.00	1.50E+11	9471.	1.81E+08	0.00
20.4750	-2.16E-04	683487.	-135331.	-1.16E-06	0.00	1.50E+11	12280.	2.00E+08	0.00
20.7675	-1.92E-04	284098.	-92804.	1.01E-05	0.00	1.50E+11	11952.	2.18E+08	0.00
21.0600	-1.45E-04	31931.	-54640.	1.38E-05	0.00	1.50E+11	9794.	2.37E+08	0.00
21.3525	-9.52E-05	-99569.	-25270.	1.30E-05	0.00	1.50E+11	6941.	2.56E+08	0.00
21.6450	-5.35E-05	-145552.	-5734.	1.02E-05	0.00	1.50E+11	4191.	2.75E+08	0.00
21.9375	-2.38E-05	-139891.	5117.	6.83E-06	0.00	1.50E+11	1992.	2.94E+08	0.00
22.2300	-5.55E-06	-109677.	9480.	3.92E-06	0.00	1.50E+11	493.8686	3.12E+08	0.00
22.5225	3.73E-06	-73370.	9728.	1.79E-06	0.00	1.50E+11	-352.362	3.31E+08	0.00
22.8150	7.01E-06	-41398.	7883.	4.49E-07	0.00	1.50E+11	-698.835	3.50E+08	0.00
23.1075	6.89E-06	-18032.	5386.	-2.44E-07	0.00	1.50E+11	-724.081	3.69E+08	0.00
23.4000	5.29E-06	-3586.	3089.	-4.96E-07	0.00	1.50E+11	-584.937	3.88E+08	0.00
23.6925	3.41E-06	3655.	1370.	-4.95E-07	0.00	1.50E+11	-394.684	4.07E+08	0.00
23.9850	1.82E-06	6032.	289.9702	-3.82E-07	0.00	1.50E+11	-220.457	4.25E+08	0.00
24.2775	7.25E-07	5693.	-257.887	-2.45E-07	0.00	1.50E+11	-91.713	4.44E+08	0.00
24.5700	9.65E-08	4223.	-441.191	-1.30E-07	0.00	1.50E+11	-12.734	4.63E+08	0.00
24.8625	-1.86E-07	2597.	-418.791	-5.01E-08	0.00	1.50E+11	25.4982	4.82E+08	0.00
25.1550	-2.55E-07	1284.	-310.118	-4.85E-09	0.00	1.50E+11	36.4233	5.01E+08	0.00
25.4475	-2.20E-07	419.7214	-189.101	1.50E-08	0.00	1.50E+11	32.5327	5.20E+08	0.00
25.7400	-1.50E-07	-43.688	-91.660	1.94E-08	0.00	1.50E+11	22.9890	5.38E+08	0.00
26.0325	-8.36E-08	-223.867	-28.037	1.63E-08	0.00	1.50E+11	13.2634	5.57E+08	0.00

Performed by: Gokul Khatri 6/28/2024

Checked by: James Samples 7/1/2024

MEG-33 Rear Abutment Z direction

26.3250	-3.56E-08	-240.620	5.4807	1.09E-08	0.00	1.50E+11	5.8348	5.76E+08	0.00
26.6175	-7.26E-09	-185.468	17.8808	5.90E-09	0.00	1.50E+11	1.2307	5.95E+08	0.00
26.9100	5.84E-09	-115.138	18.2779	2.39E-09	0.00	1.50E+11	-1.004	6.03E+08	0.00
27.2025	9.52E-09	-57.174	13.6434	3.80E-10	0.00	1.50E+11	-1.636	6.03E+08	0.00
27.4950	8.51E-09	-19.365	8.2031	-5.12E-10	0.00	1.50E+11	-1.463	6.03E+08	0.00
27.7875	5.92E-09	0.4155	3.8480	-7.33E-10	0.00	1.50E+11	-1.018	6.03E+08	0.00
28.0800	3.36E-09	7.6534	1.0462	-6.39E-10	0.00	1.50E+11	-0.578	6.03E+08	0.00
28.3725	1.43E-09	7.7645	-0.402	-4.59E-10	0.00	1.50E+11	-0.247	6.03E+08	0.00
28.6650	1.39E-10	4.8375	-0.876	-3.12E-10	0.00	1.50E+11	-0.02396	6.03E+08	0.00
28.9575	-7.59E-10	1.6148	-0.689	-2.37E-10	0.00	1.50E+11	0.1305	6.03E+08	0.00
29.2500	-1.53E-09	0.00	0.00	-2.18E-10	0.00	1.50E+11	0.2623	3.02E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 2:

Pile-head deflection = 0.73015222 inches
 Computed slope at pile head = -0.0058555 radians
 Maximum bending moment = 9087870. inch-lbs
 Maximum shear force = -194236. lbs
 Depth of maximum bending moment = 9.65250000 feet below pile head
 Depth of maximum shear force = 19.89000000 feet below pile head
 Number of iterations = 23
 Number of zero deflection points = 5

 Summary of Pile-head Responses for Conventional Analyses

Definitions of Pile-head Loading Conditions:

Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs
 Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
 Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.

MEG-33 Rear Abutment Z direction

Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs

Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians

Load Case No.	Load Type 1	Pile-head Load 1	Load Type 2	Pile-head Load 2	Axial Loading lbs	Pile-head Deflection inches	Pile-head Rotation radians	Max Shear in Pile lbs	Max Moment in Pile in-lbs
1	V, lb	105920.	M, in-lb	0.00	774500.	0.3972	-0.00325	-112704.	6015360.
2	V, lb	142960.	M, in-lb	0.00	996600.	0.7302	-0.00586	-194236.	9087870.

Maximum pile-head deflection = 0.7301522245 inches

Maximum pile-head rotation = -0.0058555498 radians = -0.335498 deg.

 Summary of Warning Messages

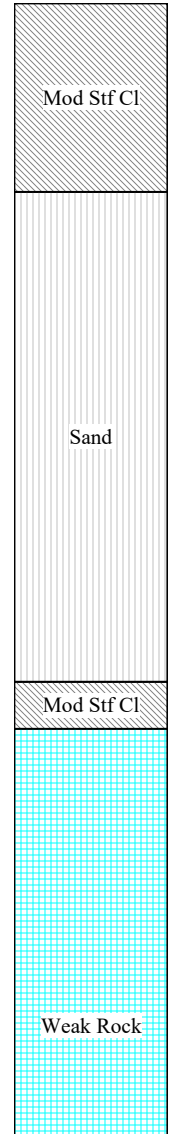
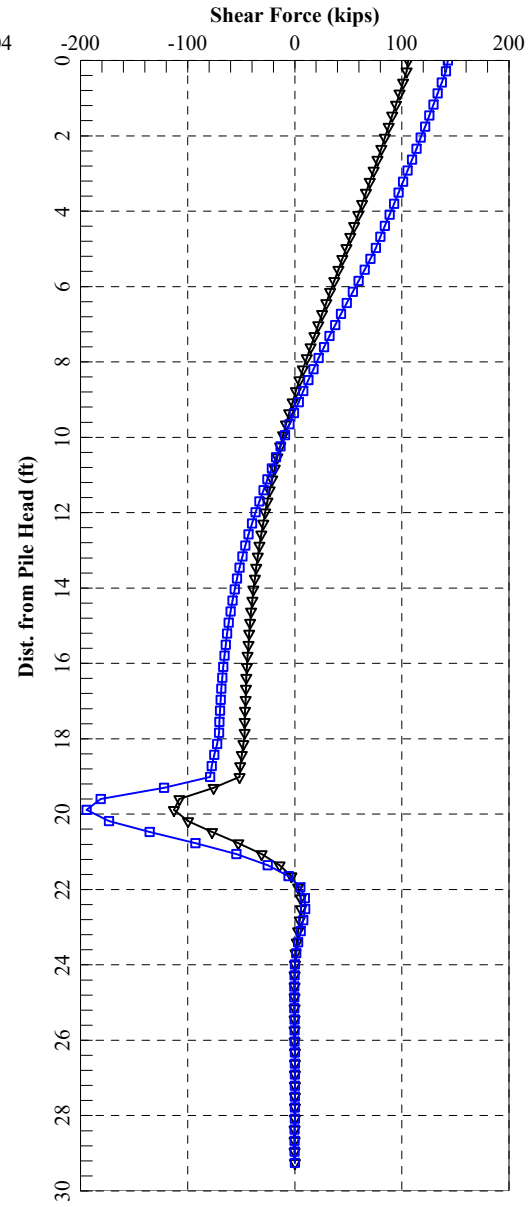
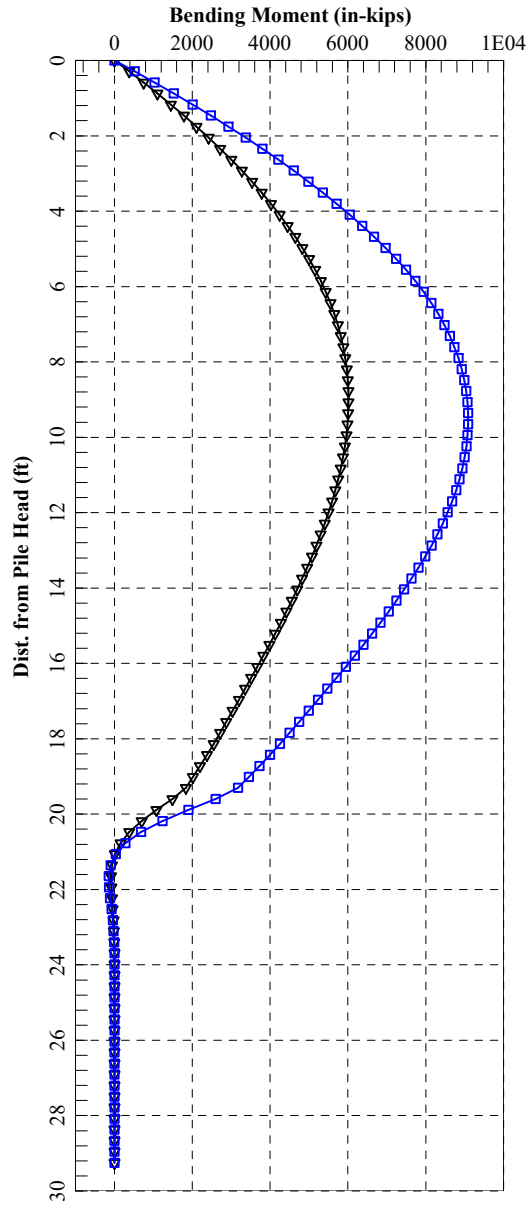
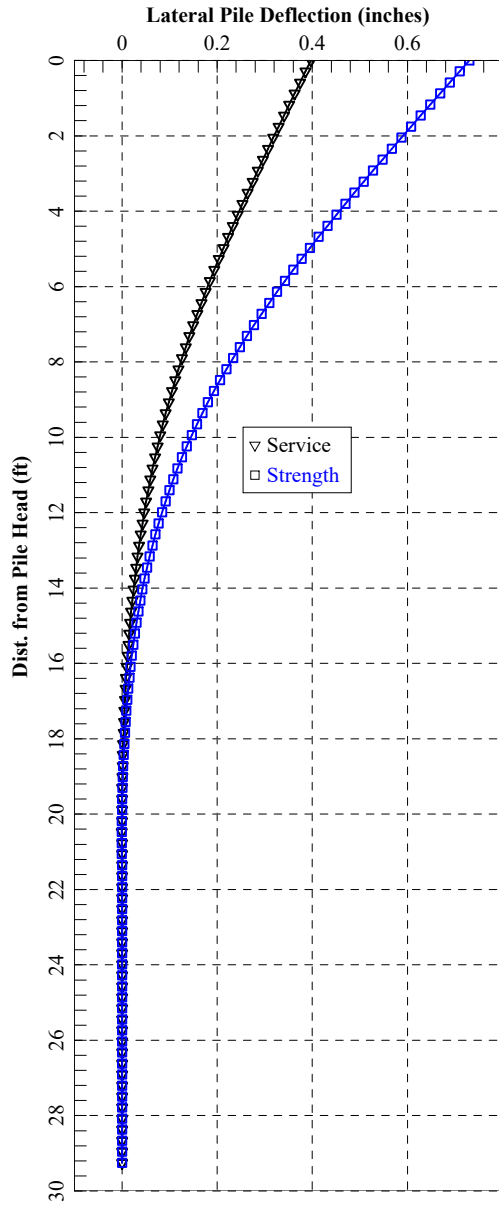
The following warning was reported 840 times

**** Warning ****

An unreasonable input value for unconfined compressive strength has been specified for a soil defined using the weak rock criteria. The input value is greater than 500 psi. Please check your input data for correctness.

The analysis ended normally.

MEG-33 Oldtown Creek Bridge Rear Abutment Z direction



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LPile for Windows, Version 2022-12.006

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method
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Files Used for Analysis

Path to file locations:

\\US0247-PPFSS01\shared_projects\173609140\119144\400-Engineering\Geotechnical\Analysis\Lpile\bridges\LPile
Analysis\Old Town Creek Bridge\forward abutment\

Name of input data file:

Forward Abutment X-direction row 1.lp12d

Name of output report file:

Forward Abutment X-direction row 1.lp12o

Name of plot output file:

Forward Abutment X-direction row 1.lp12p

Name of runtime message file:

Forward Abutment X-direction row 1.lp12r

Date and Time of Analysis

Date: June 28, 2024

Time: 14:45:59

Problem Title

-

Project Name: MEG-33-19.21

Job Number: 173609140

Client: ODOT

Engineer: G. Khatri

Description: Forward Abutment lateral Load Analysis at Oldtwon Creek

- Program Options and Settings

Performed by: Gokul Khatri 6/28/2024

Checked by: James Samples 7/1/2024

Computational Options:

- Conventional Analysis

Engineering Units Used for Data Input and Computations:

- US Customary System Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed = 500
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 100.0000 in
- Number of pile increments = 100

Loading Type and Number of Cycles of Loading:

- Static loading specified

- Analysis uses p-y modification factors for p-y curves
- Analysis uses layering correction (Method of Georgiadis)
- No distributed lateral loads are entered
- Loading by lateral soil movements acting on pile not selected
- Input of shear resistance at the pile tip not selected
- Input of moment resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:

- Output files use decimal points to denote decimal symbols.
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1
- No p-y curves to be computed and reported for user-specified depths
- Print using wide report formats

Pile Structural Properties and Geometry

Number of pile sections defined = 1

Total length of pile = 10.000 ft
 Depth of ground surface below top of pile = 0.0000 ft

Pile diameters used for p-y curve computations are defined using 2 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile. A summary of values of pile diameter vs. depth follows.

Point No.	Depth Below Pile Head feet	Pile Diameter inches
1	0.000	30.0000
2	10.000	30.0000

Input Structural Properties for Pile Sections:

Pile Section No. 1:

Section 1 is a round drilled shaft, bored pile, or CIDH pile
 Length of section = 10.000000 ft
 Shaft Diameter = 30.000000 in

 Soil and Rock Layering Information

The soil profile is modelled using 1 layers

Layer 1 is weak rock, p-y criteria by Reese, 1997

Distance from top of pile to top of layer = 0.0000 ft
 Distance from top of pile to bottom of layer = 15.000000 ft
 Effective unit weight at top of layer = 82.600000 pcf
 Effective unit weight at bottom of layer = 82.600000 pcf
 Uniaxial compressive strength at top of layer = 3820. psi
 Uniaxial compressive strength at bottom of layer = 3820. psi

Initial modulus of rock at top of layer = 343800. psi
 Initial modulus of rock at bottom of layer = 343800. psi
 RQD of rock at top of layer = 99.000000 %
 RQD of rock at bottom of layer = 99.000000 %
 k_{rm} of rock at top of layer = 0.0000500
 k_{rm} of rock at bottom of layer = 0.0000500

(Depth of the lowest soil layer extends 5.000 ft below the pile tip)

 Summary of Input Soil Properties

Layer Num.	Soil Type Name (p-y Curve Type)	Layer Depth ft	Effective Unit Wt. pcf	Uniaxial qu psi	RQD %	E50 or k _{rm}	Rock Mass Modulus psi
1	Weak Rock	0.00 15.0000	82.6000 82.6000	3820. 3820.	99.0000 99.0000	5.00E-05 5.00E-05	343800. 343800.

 Modification Factors for p-y Curves

Distribution of p-y modifiers with depth defined using 2 points

Point No.	Depth X ft	p-mult	y-mult
1	0.000	1.0000	1.0000
2	10.000	1.0000	1.0000

 Static Loading Type

 Static loading criteria were used when computing p-y curves for all analyses.

 Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 2

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length	Run Analysis
1	1	V = 1800. lbs	M = 1416000. in-lbs	714600.	No	Yes
2	1	V = 2420. lbs	M = 1920000. in-lbs	921400.	No	Yes

V = shear force applied normal to pile axis

M = bending moment applied to pile head

y = lateral deflection normal to pile axis

S = pile slope relative to original pile batter angle

R = rotational stiffness applied to pile head

Values of top y vs. pile lengths can be computed only for load types with specified shear loading (Load Types 1, 2, and 3).

Thrust force is assumed to be acting axially for all pile batter angles.

 Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 1

Pile Section No. 1:

Dimensions and Properties of Drilled Shaft (Bored Pile):


```

-----
Length of Section = 10.000000 ft
Shaft Diameter = 30.000000 in
Concrete Cover Thickness (to edge of trans. reinf.) = 3.000000 in
Number of Reinforcing Bars = 8 bars
Yield Stress of Reinforcing Bars = 50000. psi
Modulus of Elasticity of Reinforcing Bars = 29000000. psi
Gross Area of Shaft = 706.858347 sq. in.
Total Area of Reinforcing Steel = 8.000000 sq. in.
Area Ratio of Steel Reinforcement = 1.13 percent
Edge-to-Edge Bar Spacing = 7.242052 in
Maximum Concrete Aggregate Size = 0.750000 in
Ratio of Bar Spacing to Aggregate Size = 9.66
Offset of Center of Rebar Cage from Center of Pile = 0.0000 in
Transverse Reinforcement
Type: Spiral
Number of Transverse Reinf. (per spacing) = 1
Spacing of Transverse Reinf. = 4.000000 in
Yield Stress of Transverse Reinf. = 50000. psi
Diameter of Transverse Reinf. = 0.500000 in
    
```

Axial Structural Capacities:

```

-----
Nom. Axial Structural Capacity =  $0.85 F_c A_c + F_y A_s$  = 2776.118 kips
Tensile Load for Cracking of Concrete = -317.428 kips
Nominal Axial Tensile Capacity = -400.000 kips
    
```

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.128000	1.000000	10.936000	0.000000
2	1.128000	1.000000	7.732920	7.732920
3	1.128000	1.000000	0.000000	10.936000
4	1.128000	1.000000	-7.732920	7.732920
5	1.128000	1.000000	-10.936000	0.000000
6	1.128000	1.000000	-7.732920	-7.732920

7	1.128000	1.000000	0.000000	-10.93600
8	1.128000	1.000000	7.732920	-7.73292

NOTE: The positions of the above rebars were computed by LPILE

Minimum spacing between any two bars not equal to zero = 7.242 inches
between bars 1 and 2.

Ratio of bar spacing to maximum aggregate size = 9.66

Concrete Properties:

Compressive Strength of Concrete	=	4000. psi
Modulus of Elasticity of Concrete	=	3604997. psi
Modulus of Rupture of Concrete	=	-474.34165 psi
Compression Strain at Peak Stress	=	0.001886
Tensile Strain at Fracture of Concrete	=	-0.0001154
Maximum Coarse Aggregate Size	=	0.750000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 2

Number	Axial Thrust Force kips
-----	-----
1	714.600
2	921.400

Definitions of Run Messages and Notes:

C = concrete in section has cracked in tension.
Y = stress in reinforcing steel has reached yield stress.
T = ACI 318 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than 0.003. See ACI 318-14, Section 21.2.3.
Z = depth of tensile zone in concrete section is less than 10 percent of

section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.

Position of neutral axis is measured from edge of compression side of pile.

Compressive stresses and strains are positive in sign.

Tensile stresses and strains are negative in sign.

Axial Thrust Force = 714.600 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
0.00000125	199.4180428	159534434.	204.9832495	0.0002562	0.0002187	1.0122155	7.3055803	
0.00000250	398.8288884	159531555.	110.0209688	0.0002751	0.0002001	1.0801344	7.7263952	
0.00000375	598.2073321	159521955.	78.3799158	0.0002939	0.0001814	1.1474476	8.1486283	
0.00000500	797.5371707	159507434.	62.5691717	0.0003128	0.0001628	1.2141489	8.5722799	
0.00000625	996.8021944	159488351.	53.0905535	0.0003318	0.0001443	1.2802322	8.9973503	
0.00000750	1196.	159464825.	46.7780005	0.0003508	0.0001258	1.3456914	9.4238401	
0.00000875	1395.	159436904.	42.2746302	0.0003699	0.0001074	1.4105204	9.8517499	
0.00001000	1594.	159404613.	38.9020017	0.0003890	0.00008902	1.4747129	10.2810805	
0.00001125	1793.	159367964.	36.2832037	0.0004082	0.00007069	1.5382628	10.7118328	
0.00001250	1992.	159326960.	34.1920899	0.0004274	0.00005240	1.6011641	11.1440076	
0.00001375	2190.	159281606.	32.4847490	0.0004467	0.00003417	1.6634104	11.5776062	
0.00001500	2388.	159231901.	31.0652407	0.0004660	0.00001598	1.7249957	12.0126298	
0.00001625	2587.	159177842.	29.8671450	0.0004853	-0.00000216	1.7859136	12.4490796	
0.00001750	2785.	159117875.	28.8429800	0.0005048	-0.00002025	1.8461560	12.8869374	
0.00001875	2982.	159044956.	27.9577695	0.0005242	-0.00003829	1.9057055	13.3260997	
0.00002000	3179.	158952237.	27.1852249	0.0005437	-0.00005630	1.9645421	13.7664305	
0.00002125	3375.	158835622.	26.5052585	0.0005632	-0.00007426	2.0226475	14.2078031	
0.00002250	3571.	158693232.	25.9022725	0.0005828	-0.00009220	2.0800060	14.6501079	
0.00002375	3765.	158524829.	25.3639823	0.0006024	-0.000110	2.1366044	15.0932554	
0.00002500	3765.	150598588.	24.5996240	0.0006150	-0.000135	2.1723507	15.3334774	C
0.00002625	3849.	146644088.	24.0951796	0.0006325	-0.000155	2.2216680	15.7161430	C
0.00002750	3970.	144345851.	23.6281596	0.0006498	-0.000175	2.2696639	16.0920824	C
0.00002875	4084.	142043564.	23.1945524	0.0006668	-0.000196	2.3164339	16.4620206	C
0.00003000	4193.	139753523.	22.7904690	0.0006837	-0.000216	2.3620249	16.8262081	C
0.00003125	4297.	137509554.	22.4136466	0.0007004	-0.000237	2.4065664	17.1858049	C
0.00003250	4398.	135312799.	22.0609775	0.0007170	-0.000258	2.4500793	17.5408464	C
0.00003375	4494.	133153534.	21.7292649	0.0007334	-0.000279	2.4925358	17.8908306	C

MEG-33 forward abutment X direction row 1

0.00003500	4586.	131042698.	21.4167814	0.0007496	-0.000300	2.5340015	18.2362832	C
0.00003625	4676.	128986058.	21.1219089	0.0007657	-0.000322	2.5745274	18.5775943	C
0.00003750	4762.	126985689.	20.8431270	0.0007816	-0.000343	2.6141513	18.9150258	C
0.00003875	4845.	125035157.	20.5786295	0.0007974	-0.000365	2.6528637	19.2482975	C
0.00004000	4926.	123138590.	20.3274304	0.0008131	-0.000387	2.6907139	19.5778194	C
0.00004125	5004.	121299491.	20.0887105	0.0008287	-0.000409	2.7277540	19.9040573	C
0.00004250	5080.	119519095.	19.8616750	0.0008441	-0.000431	2.7640264	20.2273894	C
0.00004375	5154.	117798333.	19.6456528	0.0008595	-0.000453	2.7995750	20.5482347	C
0.00004500	5225.	116114329.	19.4383172	0.0008747	-0.000475	2.8342633	20.8647541	C
0.00004625	5295.	114488278.	19.2405890	0.0008899	-0.000498	2.8682761	21.1791268	C
0.00004750	5364.	112921255.	19.0521189	0.0009050	-0.000520	2.9016642	21.4919187	C
0.00004875	5430.	111384400.	18.8701880	0.0009199	-0.000543	2.9342188	21.8002909	C
0.00005125	5559.	108467759.	18.5297105	0.0009496	-0.000588	2.9975062	22.4122197	C
0.00005375	5683.	105722693.	18.2153524	0.0009791	-0.000633	3.0582424	23.0154929	C
0.00005625	5801.	103136041.	17.9240408	0.0010082	-0.000679	3.1165320	23.6107787	C
0.00005875	5916.	100696577.	17.6532831	0.0010371	-0.000725	3.1724793	24.1988437	C
0.00006125	6027.	98394571.	17.4010535	0.0010658	-0.000772	3.2261883	24.7805590	C
0.00006375	6134.	96221477.	17.1657072	0.0010943	-0.000818	3.2777624	25.3569137	C
0.00006625	6239.	94169672.	16.9459140	0.0011227	-0.000865	3.3273035	25.9290250	C
0.00006875	6340.	92213734.	16.7383110	0.0011508	-0.000912	3.3746471	26.4935703	C
0.00007125	6438.	90363684.	16.5437610	0.0011787	-0.000959	3.4200891	27.0549839	C
0.00007375	6535.	88612677.	16.3613927	0.0012067	-0.001006	3.4637016	27.6142414	C
0.00007625	6629.	86935736.	16.1878059	0.0012343	-0.001053	3.5052483	28.1664735	C
0.00007875	6721.	85350028.	16.0253352	0.0012620	-0.001101	3.5451307	28.7189220	C
0.00008125	6811.	83828854.	15.8702784	0.0012895	-0.001148	3.5830500	29.2652812	C
0.00008375	6900.	82386121.	15.7247513	0.0013169	-0.001196	3.6193491	29.8123025	C
0.00008625	6986.	80998611.	15.5853436	0.0013442	-0.001243	3.6537460	30.3535283	C
0.00008875	7072.	79681983.	15.4547125	0.0013716	-0.001291	3.6866116	30.8971285	C
0.00009125	7155.	78410457.	15.3287335	0.0013987	-0.001339	3.7175810	31.4340984	C
0.00009375	7237.	77199187.	15.2102173	0.0014260	-0.001387	3.7470141	31.9730910	C
0.00009625	7318.	76036211.	15.0972309	0.0014531	-0.001434	3.7747671	32.5103335	C
0.00009875	7398.	74916898.	14.9891503	0.0014802	-0.001482	3.8008320	-33.107383	C
0.0001013	7477.	73846539.	14.8872251	0.0015073	-0.001530	3.8253680	-34.244822	C
0.0001038	7554.	72813003.	14.7892399	0.0015344	-0.001578	3.8482084	-35.385187	C
0.0001063	7631.	71817016.	14.6955872	0.0015614	-0.001626	3.8694260	-36.526409	C
0.0001088	7706.	70860920.	14.6070155	0.0015885	-0.001674	3.8891065	-37.665187	C
0.0001113	7781.	69938221.	14.5223186	0.0016156	-0.001722	3.9071727	-38.804308	C
0.0001138	7854.	69042914.	14.4403308	0.0016426	-0.001770	3.9235660	-39.946773	C
0.0001163	7926.	68180586.	14.3626112	0.0016697	-0.001818	3.9384133	-41.086734	C
0.0001188	7998.	67349061.	14.2888993	0.0016968	-0.001866	3.9516994	-42.224165	C
0.0001213	8068.	66542258.	14.2178492	0.0017239	-0.001914	3.9633547	-43.362925	C

MEG-33 forward abutment X direction row 1

0.0001238	8138.	65757885.	14.1490642	0.0017509	-0.001962	3.9733772	-44.503858	C
0.0001263	8206.	64999389.	14.0837159	0.0017781	-0.002009	3.9818277	-45.642182	C
0.0001288	8274.	64265183.	14.0216138	0.0018053	-0.002057	3.9886901	-46.777862	C
0.0001313	8341.	63553797.	13.9625822	0.0018326	-0.002105	3.9939482	-47.910859	C
0.0001338	8407.	62858748.	13.9048098	0.0018598	-0.002153	3.9975623	-49.047531	C
0.0001363	8472.	62181936.	13.8493385	0.0018870	-0.002201	3.9995621	-50.000000	CY
0.0001388	8535.	61516354.	13.7960554	0.0019142	-0.002248	3.9986615	-50.000000	CY
0.0001413	8594.	60839141.	13.7434130	0.0019413	-0.002296	3.9999173	-50.000000	CY
0.0001438	8645.	60141546.	13.6907115	0.0019680	-0.002344	3.9992375	-50.000000	CY
0.0001463	8692.	59434679.	13.6380833	0.0019946	-0.002393	3.9999978	-50.000000	CY
0.0001488	8737.	58733203.	13.5856869	0.0020209	-0.002442	3.9994761	-50.000000	CY
0.0001588	8906.	56103651.	13.3981144	0.0021270	-0.002636	3.9994920	-50.000000	CY
0.0001688	9065.	53721061.	13.2369123	0.0022337	-0.002829	3.9988322	-50.000000	CY
0.0001788	9200.	51467700.	13.0910274	0.0023400	-0.003022	3.9999952	-50.000000	CY
0.0001888	9269.	49106716.	12.9318472	0.0024409	-0.003222	3.9982060	50.000000	CY
0.0001988	9314.	46861353.	12.7868617	0.0025414	-0.003421	3.9989494	50.000000	CY
0.0002088	9350.	44789994.	12.6594478	0.0026427	-0.003620	3.9992150	50.000000	CY
0.0002188	9380.	42880410.	12.5491621	0.0027451	-0.003817	3.9991756	50.000000	CY
0.0002288	9407.	41123490.	12.4533543	0.0028487	-0.004014	3.9988031	50.000000	CY
0.0002388	9430.	39496988.	12.3637902	0.0029519	-0.004211	3.9977634	50.000000	CY
0.0002488	9451.	37992737.	12.2845986	0.0030558	-0.004407	3.9959758	50.000000	CY
0.0002588	9470.	36597337.	12.2146634	0.0031605	-0.004602	3.9999519	50.000000	CY
0.0002688	9487.	35298838.	12.1529478	0.0032661	-0.004796	3.9989124	50.000000	CY
0.0002788	9501.	34084929.	12.0940980	0.0033712	-0.004991	3.9956640	50.000000	CY
0.0002888	9514.	32950314.	12.0415042	0.0034770	-0.005186	3.9998422	50.000000	CY
0.0002988	9526.	31887091.	11.9948434	0.0035835	-0.005379	3.9971331	50.000000	CY
0.0003088	9537.	30889589.	11.9530289	0.0036905	-0.005572	3.9999957	50.000000	CY
0.0003188	9547.	29950579.	11.9161078	0.0037983	-0.005764	3.9973747	50.000000	CY
0.0003288	9547.	29039534.	11.9110790	0.0039158	-0.005947	3.9975909	50.000000	CY

Axial Thrust Force = 921.400 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
0.00000125	191.1540359	152923229.	264.8377707	0.0003310	0.0002935	1.2801666	9.4753067	
0.00000250	382.3030479	152921219.	139.9495047	0.0003499	0.0002749	1.3449615	9.8962141	
0.00000375	573.4182496	152911533.	98.3336902	0.0003688	0.0002563	1.4091495	10.3186013	
0.00000500	764.4827347	152896547.	77.5359908	0.0003877	0.0002377	1.4727241	10.7424686	

MEG-33 forward abutment X direction row 1

0.00000625	955.4795844	152876734.	65.0655401	0.0004067	0.0002192	1.5356789	11.1678166
0.00000750	1146.	152852250.	56.7587163	0.0004257	0.0002007	1.5980075	11.5946457
0.00000875	1337.	152823162.	50.8311108	0.0004448	0.0001823	1.6597036	12.0229569
0.00001000	1528.	152789501.	46.3905198	0.0004639	0.0001639	1.7207607	12.4527507
0.00001125	1718.	152751283.	42.9412746	0.0004831	0.0001456	1.7811724	12.8840284
0.00001250	1909.	152708515.	40.1859748	0.0005023	0.0001273	1.8409323	13.3167909
0.00001375	2099.	152661202.	37.9353656	0.0005216	0.0001091	1.9000338	13.7510396
0.00001500	2289.	152609343.	36.0632776	0.0005409	0.00009095	1.9584706	14.1867758
0.00001625	2479.	152552937.	34.4823629	0.0005603	0.00007284	2.0162361	14.6240011
0.00001750	2669.	152491982.	33.1302307	0.0005798	0.00005478	2.0733240	15.0627171
0.00001875	2858.	152426474.	31.9611276	0.0005993	0.00003677	2.1297276	15.5029257
0.00002000	3047.	152356408.	30.9407390	0.0006188	0.00001881	2.1854406	15.9446287
0.00002125	3236.	152281779.	30.0428247	0.0006384	9.10024E-07	2.2404563	16.3878283
0.00002250	3425.	152202130.	29.2469636	0.0006581	-0.00001694	2.2947675	16.8325188
0.00002375	3613.	152114159.	28.5369538	0.0006778	-0.00003475	2.3483616	17.2786395
0.00002500	3800.	152013568.	27.8997815	0.0006975	-0.00005251	2.4012232	17.7260917
0.00002625	3987.	151897090.	27.3249094	0.0007173	-0.00007022	2.4533370	18.1747748
0.00002750	4173.	151762602.	26.8037248	0.0007371	-0.00008790	2.5046890	18.6245956
0.00002875	4359.	151608927.	26.3291243	0.0007570	-0.000106	2.5552667	19.0754700
0.00003000	4380.	146005325.	25.7294965	0.0007719	-0.000128	2.5925806	19.3831620 C
0.00003125	4515.	144472413.	25.2864932	0.0007902	-0.000147	2.6378229	19.7893221 C
0.00003250	4643.	142869638.	24.8718947	0.0008083	-0.000167	2.6818773	20.1901358 C
0.00003375	4767.	141230182.	24.4832588	0.0008263	-0.000186	2.7248239	20.5863021 C
0.00003500	4884.	139554894.	24.1173997	0.0008441	-0.000206	2.7666485	20.9774108 C
0.00003625	4997.	137859321.	23.7722019	0.0008617	-0.000226	2.8073921	21.3637149 C
0.00003750	5106.	136161548.	23.4460915	0.0008792	-0.000246	2.8471161	21.7457496 C
0.00003875	5211.	134469791.	23.1374015	0.0008966	-0.000266	2.8858535	22.1237176 C
0.00004000	5312.	132793663.	22.8448197	0.0009138	-0.000286	2.9236486	22.4979910 C
0.00004125	5410.	131140903.	22.5671909	0.0009309	-0.000307	2.9605437	22.8689397 C
0.00004250	5504.	129515586.	22.3033848	0.0009479	-0.000327	2.9965690	23.2367969 C
0.00004375	5596.	127919544.	22.0523293	0.0009648	-0.000348	3.0317467	23.6017054 C
0.00004500	5685.	126337176.	21.8120731	0.0009815	-0.000368	3.0660065	23.9625055 C
0.00004625	5771.	124785672.	21.5826573	0.0009982	-0.000389	3.0994494	24.3204267 C
0.00004750	5855.	123268364.	21.3634908	0.0010148	-0.000410	3.1321114	24.6758337 C
0.00004875	5937.	121787016.	21.1540002	0.0010313	-0.000431	3.1640223	25.0290304 C
0.00005125	6093.	118891397.	20.7588605	0.0010639	-0.000474	3.2253992	25.7252941 C
0.00005375	6242.	116125104.	20.3946037	0.0010962	-0.000516	3.2838698	26.4124012 C
0.00005625	6383.	113482423.	20.0574398	0.0011282	-0.000559	3.3395338	27.0908855 C
0.00005875	6519.	110957534.	19.7442119	0.0011600	-0.000603	3.3924841	27.7612637 C
0.00006125	6648.	108545369.	19.4523283	0.0011915	-0.000646	3.4428127	28.4241358 C
0.00006375	6773.	106241439.	19.1796558	0.0012227	-0.000690	3.4906103	29.0802014 C

MEG-33 forward abutment X direction row 1

0.00006625	6893.	104041679.	18.9244375	0.0012537	-0.000734	3.5359658	29.7302633	C
0.00006875	7009.	101942339.	18.6852292	0.0012846	-0.000778	3.5789656	30.3752384	C
0.00007125	7121.	99937417.	18.4605955	0.0013153	-0.000822	3.6196689	31.0156430	C
0.00007375	7228.	98008739.	18.2479213	0.0013458	-0.000867	3.6580045	31.6490537	C
0.00007625	7333.	96168734.	18.0479016	0.0013762	-0.000911	3.6941887	32.2796099	C
0.00007875	7435.	94412516.	17.8596763	0.0014064	-0.000956	3.7282713	32.9080983	C
0.00008125	7533.	92716062.	17.6800848	0.0014365	-0.001001	3.7600921	33.5296376	C
0.00008375	7630.	91099483.	17.5112522	0.0014666	-0.001046	3.7899348	34.1512665	C
0.00008625	7723.	89539807.	17.3501889	0.0014965	-0.001091	3.8176386	34.7678477	C
0.00008875	7814.	88047010.	17.1980016	0.0015263	-0.001136	3.8433694	35.3839192	C
0.00009125	7903.	86606561.	17.0527084	0.0015561	-0.001181	3.8670424	35.9961673	C
0.00009375	7990.	85226324.	16.9153342	0.0015858	-0.001227	3.8887883	36.6088777	C
0.00009625	8074.	83889237.	16.7834166	0.0016154	-0.001272	3.9084899	37.2168994	C
0.00009875	8158.	82610392.	16.6592631	0.0016451	-0.001317	3.9263339	37.8280276	C
0.0001013	8238.	81365430.	16.5390690	0.0016746	-0.001363	3.9421324	38.4327790	C
0.0001038	8318.	80169915.	16.4254424	0.0017041	-0.001408	3.9560623	39.0398627	C
0.0001063	8395.	79016218.	16.3171940	0.0017337	-0.001454	3.9680784	39.6470417	C
0.0001088	8471.	77894462.	16.2126856	0.0017631	-0.001499	3.9781369	40.2503200	C
0.0001113	8546.	76814733.	16.1138650	0.0017927	-0.001545	3.9863249	40.8567947	C
0.0001138	8619.	75769242.	16.0193975	0.0018222	-0.001590	3.9926009	41.4633002	C
0.0001163	8690.	74750665.	15.9279628	0.0018516	-0.001636	3.9969504	42.0663324	C
0.0001188	8760.	73767043.	15.8413330	0.0018812	-0.001681	3.9994092	42.6726532	C
0.0001213	8829.	72815841.	15.7592415	0.0019108	-0.001727	3.9989865	43.2823708	C
0.0001238	8896.	71884143.	15.6790788	0.0019403	-0.001772	3.9999969	43.8871045	C
0.0001263	8961.	70979166.	15.6028193	0.0019699	-0.001818	3.9998614	44.4945088	C
0.0001288	9026.	70101036.	15.5305132	0.0019996	-0.001863	3.9994606	45.1056162	C
0.0001313	9089.	69248448.	15.4619204	0.0020294	-0.001908	3.9986942	45.7203723	C
0.0001338	9150.	68412603.	15.3949921	0.0020591	-0.001953	3.9999324	46.3316384	C
0.0001363	9210.	67598428.	15.3310645	0.0020889	-0.001999	3.9994446	46.9450565	C
0.0001388	9269.	66807063.	15.2703006	0.0021188	-0.002044	3.9988883	47.5619351	C
0.0001413	9328.	66036395.	15.2126231	0.0021488	-0.002089	3.9998122	48.1826451	C
0.0001438	9385.	65286308.	15.1577862	0.0021789	-0.002134	3.9989351	48.8068340	C
0.0001463	9441.	64550972.	15.1040094	0.0022090	-0.002179	3.9999544	49.4275676	C
0.0001488	9495.	63833260.	15.0526347	0.0022391	-0.002223	3.9992103	50.0000000	CY
0.0001588	9686.	61013843.	14.8654846	0.0023599	-0.002403	3.9992142	50.0000000	CY
0.0001688	9817.	58175862.	14.6953826	0.0024798	-0.002583	3.9982692	50.0000000	CY
0.0001788	9932.	55562506.	14.5556553	0.0026018	-0.002761	3.9999210	50.0000000	CY
0.0001888	10036.	53172740.	14.4339500	0.0027244	-0.002938	3.9982415	50.0000000	CY
0.0001988	10131.	50971087.	14.3294039	0.0028480	-0.003115	3.9994502	50.0000000	CY
0.0002088	10189.	48808656.	14.2208676	0.0029686	-0.003294	3.9997920	50.0000000	CY
0.0002188	10214.	46690338.	14.1042804	0.0030853	-0.003477	3.9997463	50.0000000	CY

0.0002288	10231.	44725798.	13.9992652	0.0032023	-0.003660	3.9994496	50.0000000	CY
0.0002388	10245.	42911896.	13.9038954	0.0033196	-0.003843	3.9986206	50.0000000	CY
0.0002488	10255.	41227204.	13.8182188	0.0034373	-0.004025	3.9967910	50.0000000	CY
0.0002588	10262.	39660920.	13.7440900	0.0035563	-0.004206	3.9996630	50.0000000	CY
0.0002688	10264.	38189961.	13.6841784	0.0036776	-0.004385	3.9994202	50.0000000	CY
0.0002788	10264.	36819917.	13.6341225	0.0038005	-0.004562	3.9970820	50.0000000	CY

Summary of Results for Nominal Moment Capacity for Section 1

Moment values interpolated at maximum compressive strain = 0.003
or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain	Max. Tens. Strain
----	-----	-----	-----	-----
1	714.600	9439.535	0.00300000	-0.00430146
2	921.400	10195.452	0.00300000	-0.00334320

Note that the values of moment capacity in the table above are not factored by a strength reduction factor (phi-factor).

In ACI 318, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.75).

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318, or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Load No.	Resist. Factor	Nominal Ax. Thrust kips	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in^2
-----	-----	-----	-----	-----	-----	-----
1	0.65	714.600000	9440.	464.490000	6136.	96190522.
2	0.65	921.400000	10195.	598.910000	6627.	108942776.

1	0.75	714.600000	9440.	535.950000	7080.	79561599.
2	0.75	921.400000	10195.	691.050000	7647.	90814947.
1	0.90	714.600000	9440.	643.140000	8496.	61936266.
2	0.90	921.400000	10195.	829.260000	9176.	68064153.

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 1

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 1800.0 lbs
 Applied moment at pile head = 1416000.0 in-lbs
 Axial thrust load on pile head = 714600.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	6.03E-04	1416000.	1800.	-1.02E-04	0.00	1.59E+11	-15511.	1.54E+07	0.00
0.1000	4.87E-04	1407075.	-16824.	-9.11E-05	0.00	1.59E+11	-15530.	3.83E+07	0.00
0.2000	3.84E-04	1375778.	-34910.	-8.06E-05	0.00	1.59E+11	-14612.	4.57E+07	0.00
0.3000	2.94E-04	1323430.	-50701.	-7.04E-05	0.00	1.59E+11	-11707.	4.79E+07	0.00
0.4000	2.15E-04	1254216.	-63107.	-6.07E-05	0.00	1.59E+11	-8969.	5.01E+07	0.00
0.5000	1.48E-04	1172079.	-72349.	-5.16E-05	0.00	1.59E+11	-6435.	5.23E+07	0.00
0.6000	9.11E-05	1080667.	-78691.	-4.31E-05	0.00	1.59E+11	-4135.	5.45E+07	0.00
0.7000	4.42E-05	983294.	-82426.	-3.54E-05	0.00	1.59E+11	-2089.	5.67E+07	0.00
0.8000	6.23E-06	882907.	-83862.	-2.84E-05	0.00	1.59E+11	-305.627	5.89E+07	0.00
0.9000	-2.38E-05	782073.	-83319.	-2.21E-05	0.00	1.60E+11	1211.	6.11E+07	0.00
1.0000	-4.68E-05	682979.	-81112.	-1.66E-05	0.00	1.60E+11	2466.	6.33E+07	0.00
1.1000	-6.36E-05	587432.	-77551.	-1.18E-05	0.00	1.60E+11	3469.	6.55E+07	0.00
1.2000	-7.51E-05	496877.	-72929.	-7.72E-06	0.00	1.60E+11	4235.	6.77E+07	0.00
1.3000	-8.21E-05	412416.	-67520.	-4.30E-06	0.00	1.60E+11	4781.	6.99E+07	0.00
1.4000	-8.54E-05	334837.	-61573.	-1.49E-06	0.00	1.60E+11	5130.	7.21E+07	0.00
1.5000	-8.57E-05	264643.	-55313.	7.63E-07	0.00	1.60E+11	5304.	7.43E+07	0.00

MEG-33 forward abutment X direction row 1

1.6000	-8.36E-05	202085.	-48935.	2.52E-06	0.00	1.60E+11	5326.	7.65E+07	0.00
1.7000	-7.97E-05	147196.	-42606.	3.83E-06	0.00	1.60E+11	5222.	7.87E+07	0.00
1.8000	-7.44E-05	99825.	-36465.	4.76E-06	0.00	1.60E+11	5013.	8.09E+07	0.00
1.9000	-6.82E-05	59673.	-30623.	5.36E-06	0.00	1.60E+11	4723.	8.31E+07	0.00
2.0000	-6.15E-05	26321.	-25166.	5.68E-06	0.00	1.60E+11	4372.	8.53E+07	0.00
2.1000	-5.46E-05	-735.522	-20156.	5.78E-06	0.00	1.60E+11	3979.	8.75E+07	0.00
2.2000	-4.77E-05	-22062.	-15632.	5.70E-06	0.00	1.60E+11	3561.	8.97E+07	0.00
2.3000	-4.09E-05	-38262.	-11616.	5.47E-06	0.00	1.60E+11	3133.	9.19E+07	0.00
2.4000	-3.45E-05	-49950.	-8112.	5.14E-06	0.00	1.60E+11	2707.	9.41E+07	0.00
2.5000	-2.86E-05	-57739.	-5112.	4.73E-06	0.00	1.60E+11	2294.	9.63E+07	0.00
2.6000	-2.32E-05	-62226.	-2594.	4.28E-06	0.00	1.60E+11	1902.	9.85E+07	0.00
2.7000	-1.83E-05	-63973.	-531.178	3.81E-06	0.00	1.60E+11	1537.	1.01E+08	0.00
2.8000	-1.40E-05	-63507.	1113.	3.33E-06	0.00	1.60E+11	1204.	1.03E+08	0.00
2.9000	-1.03E-05	-61307.	2379.	2.86E-06	0.00	1.60E+11	905.1490	1.05E+08	0.00
3.0000	-7.19E-06	-57803.	3307.	2.41E-06	0.00	1.60E+11	642.3997	1.07E+08	0.00
3.1000	-4.56E-06	-53374.	3942.	1.99E-06	0.00	1.60E+11	415.6881	1.09E+08	0.00
3.2000	-2.41E-06	-48346.	4326.	1.61E-06	0.00	1.60E+11	224.1639	1.12E+08	0.00
3.3000	-6.97E-07	-42995.	4500.	1.26E-06	0.00	1.60E+11	66.1708	1.14E+08	0.00
3.4000	6.26E-07	-37548.	4503.	9.62E-07	0.00	1.60E+11	-60.563	1.16E+08	0.00
3.5000	1.61E-06	-32188.	4372.	6.99E-07	0.00	1.60E+11	-158.747	1.18E+08	0.00
3.6000	2.30E-06	-27057.	4138.	4.77E-07	0.00	1.60E+11	-231.375	1.20E+08	0.00
3.7000	2.75E-06	-22258.	3830.	2.91E-07	0.00	1.60E+11	-281.583	1.23E+08	0.00
3.8000	3.00E-06	-17865.	3474.	1.40E-07	0.00	1.60E+11	-312.534	1.25E+08	0.00
3.9000	3.09E-06	-13922.	3090.	2.07E-08	0.00	1.60E+11	-327.323	1.27E+08	0.00
4.0000	3.05E-06	-10450.	2696.	-7.10E-08	0.00	1.60E+11	-328.896	1.29E+08	0.00
4.1000	2.92E-06	-7452.	2307.	-1.38E-07	0.00	1.60E+11	-319.995	1.31E+08	0.00
4.2000	2.72E-06	-4914.	1933.	-1.85E-07	0.00	1.60E+11	-303.116	1.34E+08	0.00
4.3000	2.48E-06	-2813.	1583.	-2.14E-07	0.00	1.60E+11	-280.483	1.36E+08	0.00
4.4000	2.21E-06	-1116.	1262.	-2.29E-07	0.00	1.60E+11	-254.034	1.38E+08	0.00
4.5000	1.93E-06	215.6587	974.1547	-2.32E-07	0.00	1.60E+11	-225.419	1.40E+08	0.00
4.6000	1.65E-06	1223.	721.2962	-2.27E-07	0.00	1.60E+11	-196.012	1.42E+08	0.00
4.7000	1.38E-06	1947.	503.5394	-2.15E-07	0.00	1.60E+11	-166.916	1.45E+08	0.00
4.8000	1.14E-06	2431.	319.9925	-1.98E-07	0.00	1.60E+11	-138.995	1.47E+08	0.00
4.9000	9.09E-07	2715.	168.8626	-1.79E-07	0.00	1.60E+11	-112.888	1.49E+08	0.00
5.0000	7.06E-07	2837.	47.7071	-1.58E-07	0.00	1.60E+11	-89.038	1.51E+08	0.00
5.1000	5.30E-07	2830.	-46.348	-1.37E-07	0.00	1.60E+11	-67.721	1.53E+08	0.00
5.2000	3.78E-07	2726.	-116.423	-1.16E-07	0.00	1.60E+11	-49.070	1.56E+08	0.00
5.3000	2.52E-07	2551.	-165.725	-9.59E-08	0.00	1.60E+11	-33.101	1.58E+08	0.00
5.4000	1.48E-07	2328.	-197.428	-7.76E-08	0.00	1.60E+11	-19.739	1.60E+08	0.00
5.5000	6.54E-08	2077.	-214.575	-6.10E-08	0.00	1.60E+11	-8.839	1.62E+08	0.00
5.6000	1.51E-09	1814.	-220.002	-4.64E-08	0.00	1.60E+11	-0.206	1.64E+08	0.00

MEG-33 forward abutment X direction row 1

5.7000	-4.60E-08	1549.	-216.294	-3.37E-08	0.00	1.60E+11	6.3870	1.67E+08	0.00
5.8000	-7.95E-08	1294.	-205.750	-2.31E-08	0.00	1.60E+11	11.1863	1.69E+08	0.00
5.9000	-1.01E-07	1056.	-190.373	-1.42E-08	0.00	1.60E+11	14.4427	1.71E+08	0.00
6.0000	-1.14E-07	837.6119	-171.865	-7.09E-09	0.00	1.60E+11	16.4033	1.73E+08	0.00
6.1000	-1.18E-07	643.1877	-151.641	-1.52E-09	0.00	1.60E+11	17.3033	1.75E+08	0.00
6.2000	-1.17E-07	473.6762	-130.842	2.68E-09	0.00	1.60E+11	17.3611	1.78E+08	0.00
6.3000	-1.12E-07	329.1616	-110.361	5.70E-09	0.00	1.60E+11	16.7741	1.80E+08	0.00
6.4000	-1.04E-07	208.7995	-90.867	7.72E-09	0.00	1.60E+11	15.7166	1.82E+08	0.00
6.5000	-9.34E-08	111.0682	-72.833	8.92E-09	0.00	1.60E+11	14.3393	1.84E+08	0.00
6.6000	-8.22E-08	33.9846	-56.568	9.47E-09	0.00	1.60E+11	12.7687	1.86E+08	0.00
6.7000	-7.07E-08	-24.712	-42.242	9.50E-09	0.00	1.60E+11	11.1087	1.89E+08	0.00
6.8000	-5.94E-08	-67.413	-29.912	9.16E-09	0.00	1.60E+11	9.4420	1.91E+08	0.00
6.9000	-4.87E-08	-96.516	-19.547	8.54E-09	0.00	1.60E+11	7.8318	1.93E+08	0.00
7.0000	-3.89E-08	-114.341	-11.054	7.75E-09	0.00	1.60E+11	6.3242	1.95E+08	0.00
7.1000	-3.01E-08	-123.058	-4.289	6.85E-09	0.00	1.60E+11	4.9505	1.97E+08	0.00
7.2000	-2.24E-08	-124.646	0.9190	5.92E-09	0.00	1.60E+11	3.7293	2.00E+08	0.00
7.3000	-1.59E-08	-120.863	4.7582	5.00E-09	0.00	1.60E+11	2.6693	2.02E+08	0.00
7.4000	-1.04E-08	-113.235	7.4223	4.12E-09	0.00	1.60E+11	1.7709	2.04E+08	0.00
7.5000	-5.98E-09	-103.056	9.1018	3.31E-09	0.00	1.60E+11	1.0282	2.06E+08	0.00
7.6000	-2.48E-09	-91.396	9.9744	2.57E-09	0.00	1.60E+11	0.4262	2.06E+08	0.00
7.7000	1.97E-10	-79.122	10.2098	1.93E-09	0.00	1.60E+11	-0.03392	2.06E+08	0.00
7.8000	2.16E-09	-66.896	9.9666	1.38E-09	0.00	1.60E+11	-0.371	2.06E+08	0.00
7.9000	3.52E-09	-55.204	9.3810	9.25E-10	0.00	1.60E+11	-0.605	2.06E+08	0.00
8.0000	4.38E-09	-44.383	8.5664	5.50E-10	0.00	1.60E+11	-0.753	2.06E+08	0.00
8.1000	4.84E-09	-34.646	7.6157	2.53E-10	0.00	1.60E+11	-0.832	2.06E+08	0.00
8.2000	4.99E-09	-26.106	6.6024	2.44E-11	0.00	1.60E+11	-0.857	2.06E+08	0.00
8.3000	4.90E-09	-18.800	5.5830	-1.44E-10	0.00	1.60E+11	-0.842	2.06E+08	0.00
8.4000	4.64E-09	-12.707	4.5994	-2.63E-10	0.00	1.60E+11	-0.797	2.06E+08	0.00
8.5000	4.27E-09	-7.761	3.6809	-3.40E-10	0.00	1.60E+11	-0.733	2.06E+08	0.00
8.6000	3.82E-09	-3.872	2.8466	-3.84E-10	0.00	1.60E+11	-0.657	2.06E+08	0.00
8.7000	3.35E-09	-0.929	2.1072	-4.02E-10	0.00	1.60E+11	-0.575	2.06E+08	0.00
8.8000	2.86E-09	1.1860	1.4673	-4.01E-10	0.00	1.60E+11	-0.491	2.06E+08	0.00
8.9000	2.38E-09	2.5933	0.9266	-3.87E-10	0.00	1.60E+11	-0.410	2.06E+08	0.00
9.0000	1.93E-09	3.4106	0.4816	-3.64E-10	0.00	1.60E+11	-0.332	2.06E+08	0.00
9.1000	1.51E-09	3.7498	0.1268	-3.37E-10	0.00	1.60E+11	-0.260	2.06E+08	0.00
9.2000	1.12E-09	3.7154	-0.145	-3.09E-10	0.00	1.60E+11	-0.193	2.06E+08	0.00
9.3000	7.68E-10	3.4032	-0.340	-2.82E-10	0.00	1.60E+11	-0.132	2.06E+08	0.00
9.4000	4.45E-10	2.9008	-0.465	-2.59E-10	0.00	1.60E+11	-0.07644	2.06E+08	0.00
9.5000	1.48E-10	2.2883	-0.526	-2.39E-10	0.00	1.60E+11	-0.02536	2.06E+08	0.00
9.6000	-1.29E-10	1.6393	-0.528	-2.24E-10	0.00	1.60E+11	0.02217	2.06E+08	0.00
9.7000	-3.91E-10	1.0222	-0.474	-2.14E-10	0.00	1.60E+11	0.06715	2.06E+08	0.00

Performed by: Gokul Khatri 6/28/2024

Checked by: James Samples 7/1/2024

MEG-33 forward abutment X direction row 1

9.8000	-6.43E-10	0.5018	-0.367	-2.09E-10	0.00	1.60E+11	0.1106	2.06E+08	0.00
9.9000	-8.91E-10	0.1406	-0.209	-2.06E-10	0.00	1.60E+11	0.1532	2.06E+08	0.00
10.0000	-1.14E-09	0.00	0.00	-2.06E-10	0.00	1.60E+11	0.1956	1.03E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 1:

Pile-head deflection	=	0.00060263 inches
Computed slope at pile head	=	-0.0001017 radians
Maximum bending moment	=	1416000. inch-lbs
Maximum shear force	=	-83862. lbs
Depth of maximum bending moment	=	0.000000 feet below pile head
Depth of maximum shear force	=	0.80000000 feet below pile head
Number of iterations	=	6
Number of zero deflection points	=	5

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 2

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head	=	2420.0 lbs
Applied moment at pile head	=	1920000.0 in-lbs
Axial thrust load on pile head	=	921400.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	9.15E-04	1920000.	2420.	-1.49E-04	0.00	1.53E+11	-17227.	1.13E+07	0.00

MEG-33 forward abutment X direction row 1

0.10000	7.45E-04	1910657.	-18287.	-1.34E-04	0.00	1.53E+11	-17284.	2.78E+07	0.00
0.2000	5.94E-04	1876407.	-38975.	-1.19E-04	0.00	1.53E+11	-17197.	3.47E+07	0.00
0.3000	4.60E-04	1817379.	-59461.	-1.04E-04	0.00	1.53E+11	-16947.	4.42E+07	0.00
0.4000	3.43E-04	1733931.	-78220.	-9.05E-05	0.00	1.53E+11	-14317.	5.01E+07	0.00
0.5000	2.43E-04	1629851.	-93154.	-7.73E-05	0.00	1.53E+11	-10573.	5.23E+07	0.00
0.6000	1.58E-04	1510531.	-103793.	-6.49E-05	0.00	1.53E+11	-7159.	5.45E+07	0.00
0.7000	8.69E-05	1380890.	-110551.	-5.36E-05	0.00	1.53E+11	-4104.	5.67E+07	0.00
0.8000	2.91E-05	1245328.	-113870.	-4.33E-05	0.00	1.53E+11	-1428.	5.89E+07	0.00
0.9000	-1.70E-05	1107698.	-114209.	-3.40E-05	0.00	1.53E+11	863.2287	6.11E+07	0.00
1.0000	-5.26E-05	971302.	-112027.	-2.59E-05	0.00	1.53E+11	2773.	6.33E+07	0.00
1.1000	-7.91E-05	838890.	-107774.	-1.88E-05	0.00	1.53E+11	4315.	6.55E+07	0.00
1.2000	-9.77E-05	712685.	-101881.	-1.27E-05	0.00	1.53E+11	5508.	6.77E+07	0.00
1.3000	-1.10E-04	594405.	-94749.	-7.57E-06	0.00	1.53E+11	6379.	6.99E+07	0.00
1.4000	-1.16E-04	485305.	-86747.	-3.33E-06	0.00	1.53E+11	6957.	7.21E+07	0.00
1.5000	-1.18E-04	386218.	-78209.	8.99E-08	0.00	1.53E+11	7275.	7.43E+07	0.00
1.6000	-1.16E-04	297604.	-69423.	2.77E-06	0.00	1.53E+11	7368.	7.65E+07	0.00
1.7000	-1.11E-04	219597.	-60640.	4.80E-06	0.00	1.53E+11	7270.	7.87E+07	0.00
1.8000	-1.04E-04	152057.	-52069.	6.26E-06	0.00	1.53E+11	7015.	8.09E+07	0.00
1.9000	-9.59E-05	94617.	-43878.	7.23E-06	0.00	1.53E+11	6637.	8.31E+07	0.00
2.0000	-8.68E-05	46733.	-36198.	7.78E-06	0.00	1.53E+11	6164.	8.53E+07	0.00
2.1000	-7.72E-05	7725.	-29123.	8.00E-06	0.00	1.53E+11	5627.	8.75E+07	0.00
2.2000	-6.76E-05	-23180.	-22718.	7.94E-06	0.00	1.53E+11	5049.	8.97E+07	0.00
2.3000	-5.82E-05	-46815.	-17018.	7.66E-06	0.00	1.53E+11	4452.	9.19E+07	0.00
2.4000	-4.92E-05	-64040.	-12034.	7.23E-06	0.00	1.53E+11	3855.	9.41E+07	0.00
2.5000	-4.08E-05	-75712.	-7756.	6.68E-06	0.00	1.53E+11	3274.	9.63E+07	0.00
2.6000	-3.32E-05	-82669.	-4160.	6.06E-06	0.00	1.53E+11	2720.	9.85E+07	0.00
2.7000	-2.63E-05	-85709.	-1205.	5.40E-06	0.00	1.53E+11	2204.	1.01E+08	0.00
2.8000	-2.02E-05	-85574.	1156.	4.72E-06	0.00	1.53E+11	1732.	1.03E+08	0.00
2.9000	-1.49E-05	-82944.	2980.	4.06E-06	0.00	1.53E+11	1308.	1.05E+08	0.00
3.0000	-1.05E-05	-78430.	4325.	3.43E-06	0.00	1.53E+11	934.3337	1.07E+08	0.00
3.1000	-6.71E-06	-72571.	5253.	2.84E-06	0.00	1.53E+11	611.7697	1.09E+08	0.00
3.2000	-3.64E-06	-65829.	5824.	2.29E-06	0.00	1.53E+11	339.0579	1.12E+08	0.00
3.3000	-1.20E-06	-58599.	6095.	1.81E-06	0.00	1.53E+11	113.9338	1.14E+08	0.00
3.4000	6.90E-07	-51204.	6124.	1.38E-06	0.00	1.53E+11	-66.778	1.16E+08	0.00
3.5000	2.10E-06	-43905.	5959.	1.00E-06	0.00	1.53E+11	-206.905	1.18E+08	0.00
3.6000	3.09E-06	-36904.	5649.	6.85E-07	0.00	1.53E+11	-310.694	1.20E+08	0.00
3.7000	3.74E-06	-30349.	5233.	4.21E-07	0.00	1.53E+11	-382.611	1.23E+08	0.00
3.8000	4.11E-06	-24345.	4747.	2.06E-07	0.00	1.53E+11	-427.168	1.25E+08	0.00
3.9000	4.24E-06	-18957.	4222.	3.64E-08	0.00	1.53E+11	-448.777	1.27E+08	0.00
4.0000	4.19E-06	-14214.	3681.	-9.37E-08	0.00	1.53E+11	-451.645	1.29E+08	0.00
4.1000	4.01E-06	-10121.	3146.	-1.89E-07	0.00	1.53E+11	-439.683	1.31E+08	0.00

MEG-33 forward abutment X direction row 1

4.2000	3.74E-06	-6662.	2633.	-2.55E-07	0.00	1.53E+11	-416.446	1.34E+08	0.00
4.3000	3.40E-06	-3802.	2152.	-2.96E-07	0.00	1.53E+11	-385.099	1.36E+08	0.00
4.4000	3.03E-06	-1497.	1712.	-3.17E-07	0.00	1.53E+11	-348.396	1.38E+08	0.00
4.5000	2.64E-06	306.8770	1318.	-3.22E-07	0.00	1.53E+11	-308.676	1.40E+08	0.00
4.6000	2.26E-06	1666.	971.5919	-3.14E-07	0.00	1.53E+11	-267.879	1.42E+08	0.00
4.7000	1.89E-06	2639.	674.3258	-2.97E-07	0.00	1.53E+11	-227.564	1.45E+08	0.00
4.8000	1.54E-06	3285.	424.4240	-2.74E-07	0.00	1.53E+11	-188.939	1.47E+08	0.00
4.9000	1.23E-06	3659.	219.3235	-2.46E-07	0.00	1.53E+11	-152.895	1.49E+08	0.00
5.0000	9.52E-07	3812.	55.5581	-2.17E-07	0.00	1.53E+11	-120.047	1.51E+08	0.00
5.1000	7.10E-07	3792.	-70.931	-1.87E-07	0.00	1.53E+11	-90.768	1.53E+08	0.00
5.2000	5.03E-07	3642.	-164.532	-1.58E-07	0.00	1.53E+11	-65.233	1.56E+08	0.00
5.3000	3.30E-07	3398.	-229.742	-1.30E-07	0.00	1.53E+11	-43.451	1.58E+08	0.00
5.4000	1.90E-07	3091.	-270.995	-1.05E-07	0.00	1.53E+11	-25.304	1.60E+08	0.00
5.5000	7.82E-08	2748.	-292.524	-8.21E-08	0.00	1.53E+11	-10.578	1.62E+08	0.00
5.6000	-7.38E-09	2389.	-298.264	-6.20E-08	0.00	1.53E+11	1.0110	1.64E+08	0.00
5.7000	-7.05E-08	2032.	-291.785	-4.46E-08	0.00	1.53E+11	9.7888	1.67E+08	0.00
5.8000	-1.14E-07	1689.	-276.248	-3.00E-08	0.00	1.53E+11	16.1052	1.69E+08	0.00
5.9000	-1.43E-07	1369.	-254.396	-1.80E-08	0.00	1.53E+11	20.3154	1.71E+08	0.00
6.0000	-1.58E-07	1078.	-228.546	-8.41E-09	0.00	1.53E+11	22.7669	1.73E+08	0.00
6.1000	-1.63E-07	820.6302	-200.613	-9.57E-10	0.00	1.53E+11	23.7890	1.75E+08	0.00
6.2000	-1.60E-07	597.0203	-172.128	4.60E-09	0.00	1.53E+11	23.6854	1.78E+08	0.00
6.3000	-1.52E-07	407.5122	-144.280	8.55E-09	0.00	1.53E+11	22.7291	1.80E+08	0.00
6.4000	-1.39E-07	250.7304	-117.946	1.11E-08	0.00	1.53E+11	21.1599	1.82E+08	0.00
6.5000	-1.25E-07	124.4167	-93.740	1.26E-08	0.00	1.53E+11	19.1836	1.84E+08	0.00
6.6000	-1.09E-07	25.7264	-72.047	1.32E-08	0.00	1.53E+11	16.9719	1.86E+08	0.00
6.7000	-9.33E-08	-48.525	-53.065	1.31E-08	0.00	1.53E+11	14.6646	1.89E+08	0.00
6.8000	-7.78E-08	-101.658	-36.843	1.25E-08	0.00	1.53E+11	12.3714	1.91E+08	0.00
6.9000	-6.32E-08	-136.976	-23.315	1.16E-08	0.00	1.53E+11	10.1754	1.93E+08	0.00
7.0000	-5.00E-08	-157.640	-12.328	1.04E-08	0.00	1.53E+11	8.1360	1.95E+08	0.00
7.1000	-3.82E-08	-166.587	-3.671	9.15E-09	0.00	1.53E+11	6.2924	1.97E+08	0.00
7.2000	-2.80E-08	-166.472	2.9040	7.84E-09	0.00	1.53E+11	4.6666	2.00E+08	0.00
7.3000	-1.94E-08	-159.635	7.6643	6.56E-09	0.00	1.53E+11	3.2672	2.02E+08	0.00
7.4000	-1.23E-08	-148.092	10.8797	5.35E-09	0.00	1.53E+11	2.0918	2.04E+08	0.00
7.5000	-6.57E-09	-133.536	12.8127	4.25E-09	0.00	1.53E+11	1.1300	2.06E+08	0.00
7.6000	-2.10E-09	-117.351	13.7077	3.26E-09	0.00	1.53E+11	0.3618	2.06E+08	0.00
7.7000	1.26E-09	-100.644	13.7949	2.41E-09	0.00	1.53E+11	-0.216	2.06E+08	0.00
7.8000	3.68E-09	-84.248	13.2859	1.68E-09	0.00	1.53E+11	-0.632	2.06E+08	0.00
7.9000	5.30E-09	-68.762	12.3604	1.08E-09	0.00	1.53E+11	-0.911	2.06E+08	0.00
8.0000	6.27E-09	-54.586	11.1669	5.99E-10	0.00	1.53E+11	-1.078	2.06E+08	0.00
8.1000	6.73E-09	-41.963	9.8252	2.20E-10	0.00	1.53E+11	-1.158	2.06E+08	0.00
8.2000	6.80E-09	-31.006	8.4291	-6.65E-11	0.00	1.53E+11	-1.169	2.06E+08	0.00

MEG-33 forward abutment X direction row 1

8.3000	6.58E-09	-21.733	7.0494	-2.73E-10	0.00	1.53E+11	-1.130	2.06E+08	0.00
8.4000	6.14E-09	-14.087	5.7375	-4.14E-10	0.00	1.53E+11	-1.056	2.06E+08	0.00
8.5000	5.58E-09	-7.962	4.5280	-5.00E-10	0.00	1.53E+11	-0.959	2.06E+08	0.00
8.6000	4.94E-09	-3.218	3.4424	-5.44E-10	0.00	1.53E+11	-0.850	2.06E+08	0.00
8.7000	4.28E-09	0.3014	2.4916	-5.56E-10	0.00	1.53E+11	-0.735	2.06E+08	0.00
8.8000	3.61E-09	2.7628	1.6783	-5.44E-10	0.00	1.53E+11	-0.621	2.06E+08	0.00
8.9000	2.97E-09	4.3306	0.9997	-5.16E-10	0.00	1.53E+11	-0.511	2.06E+08	0.00
9.0000	2.37E-09	5.1631	0.4487	-4.79E-10	0.00	1.53E+11	-0.408	2.06E+08	0.00
9.1000	1.82E-09	5.4086	0.01627	-4.37E-10	0.00	1.53E+11	-0.313	2.06E+08	0.00
9.2000	1.32E-09	5.2031	-0.308	-3.96E-10	0.00	1.53E+11	-0.227	2.06E+08	0.00
9.3000	8.72E-10	4.6703	-0.534	-3.57E-10	0.00	1.53E+11	-0.150	2.06E+08	0.00
9.4000	4.66E-10	3.9217	-0.672	-3.23E-10	0.00	1.53E+11	-0.08007	2.06E+08	0.00
9.5000	9.65E-11	3.0576	-0.730	-2.96E-10	0.00	1.53E+11	-0.01659	2.06E+08	0.00
9.6000	-2.44E-10	2.1697	-0.715	-2.75E-10	0.00	1.53E+11	0.04194	2.06E+08	0.00
9.7000	-5.64E-10	1.3421	-0.632	-2.61E-10	0.00	1.53E+11	0.09696	2.06E+08	0.00
9.8000	-8.71E-10	0.6542	-0.484	-2.54E-10	0.00	1.53E+11	0.1498	2.06E+08	0.00
9.9000	-1.17E-09	0.1819	-0.273	-2.50E-10	0.00	1.53E+11	0.2016	2.06E+08	0.00
10.0000	-1.47E-09	0.00	0.00	-2.50E-10	0.00	1.53E+11	0.2531	1.03E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 2:

Pile-head deflection = 0.00091510 inches
 Computed slope at pile head = -0.0001489 radians
 Maximum bending moment = 1920000. inch-lbs
 Maximum shear force = -114209. lbs
 Depth of maximum bending moment = 0.000000 feet below pile head
 Depth of maximum shear force = 0.90000000 feet below pile head
 Number of iterations = 6
 Number of zero deflection points = 5

 Summary of Pile-head Responses for Conventional Analyses

Definitions of Pile-head Loading Conditions:

Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs
 Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
 Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.
 Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs
 Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians

Load Case No.	Load Type 1	Pile-head Load 1	Load Type 2	Pile-head Load 2	Axial Loading lbs	Pile-head Deflection inches	Pile-head Rotation radians	Max Shear in Pile lbs	Max Moment in Pile in-lbs
1	V, lb	1800.	M, in-lb	1416000.	714600.	6.03E-04	-1.02E-04	-83862.	1416000.
2	V, lb	2420.	M, in-lb	1920000.	921400.	9.15E-04	-1.49E-04	-114209.	1920000.

Maximum pile-head deflection = 0.0009150986 inches

Maximum pile-head rotation = -0.0001488881 radians = -0.008531 deg.

Summary of Warning Messages

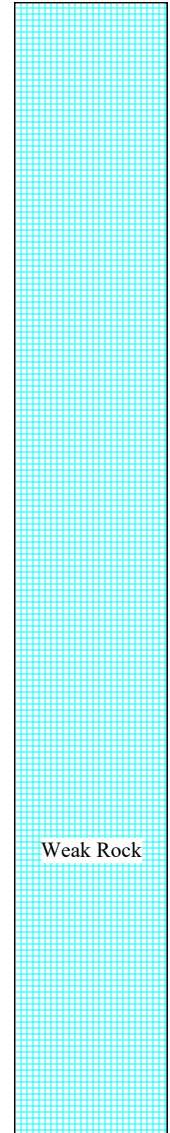
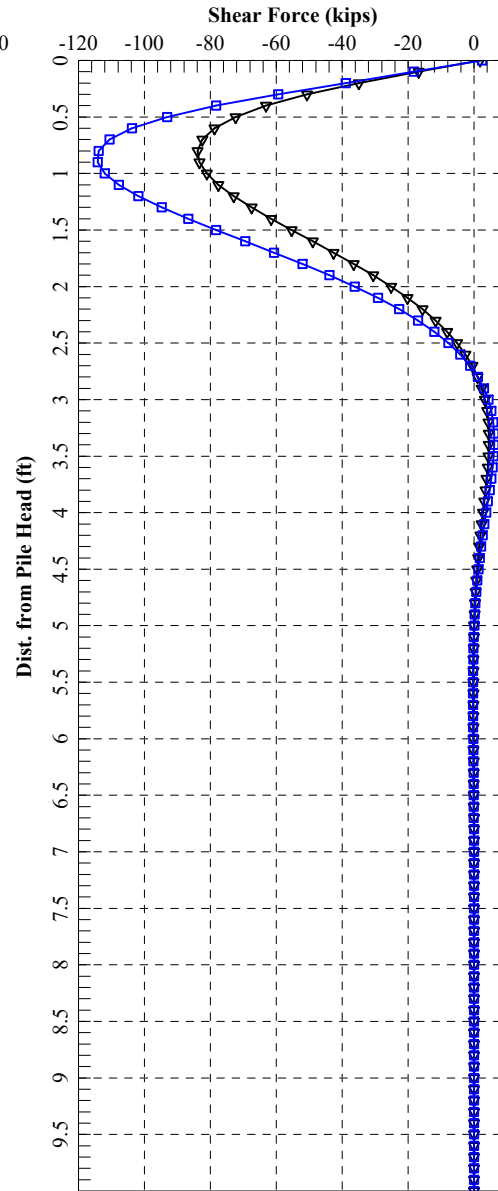
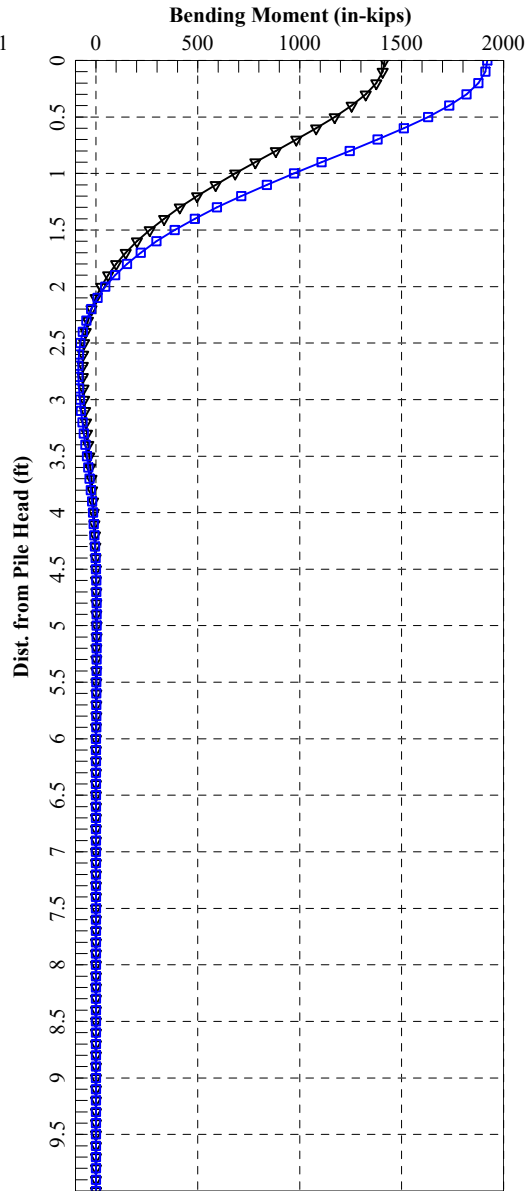
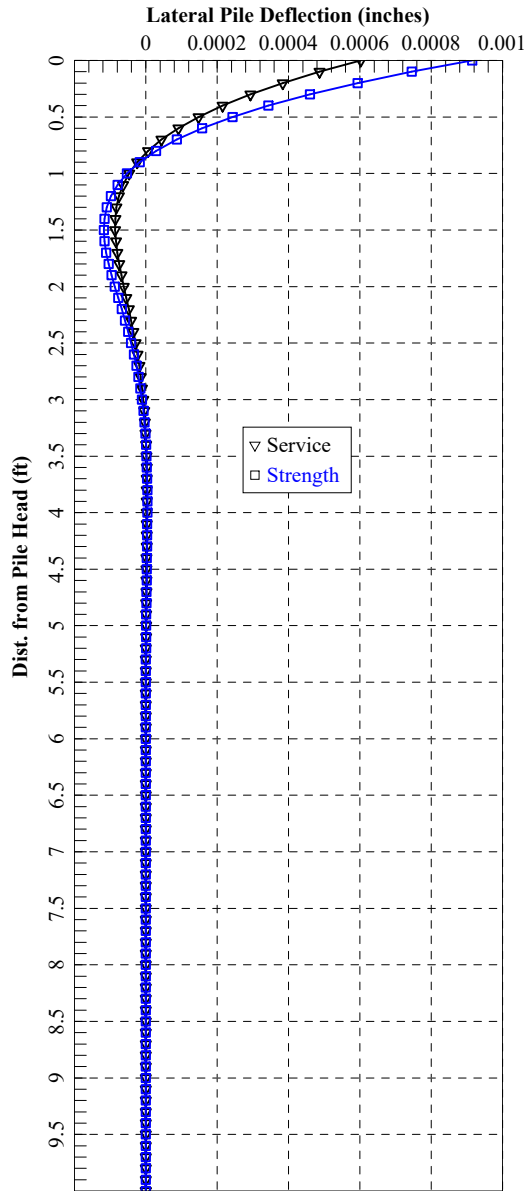
The following warning was reported 706 times

**** Warning ****

An unreasonable input value for unconfined compressive strength has been specified for a soil defined using the weak rock criteria. The input value is greater than 500 psi. Please check your input data for correctness.

The analysis ended normally.

MEG-33 oldtown Creek Bridge Forward Abutment X Direction Row 1



=====
LPile for Windows, Version 2022-12.006

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method
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Files Used for Analysis

Path to file locations:

\\US0247-PPFSS01\shared_projects\173609140\119144\400-Engineering\Geotechnical\Analysis\Lpile\bridges\LPile
Analysis\Old Town Creek Bridge\forward abutment\

Name of input data file:

Forward Abutment X-direction row 2.lp12d

Name of output report file:

Forward Abutment X-direction row 2.lp12o

Name of plot output file:
Forward Abutment X-direction row 2.lp12p

Name of runtime message file:
Forward Abutment X-direction row 2.lp12r

Date and Time of Analysis

Date: June 28, 2024

Time: 14:48:36

Problem Title

-

Project Name: MEG-33-19.21

Job Number: 173609140

Client: ODOT

Engineer: G. Khatri

Description: Forward Abutment lateral Load Analysis at Oldtwon Creek

- Program Options and Settings

Performed by: Gokul Khatri 6/28/2024

Checked by: James Samples 7/1/2024

Computational Options:

- Conventional Analysis

Engineering Units Used for Data Input and Computations:

- US Customary System Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed = 500
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 100.0000 in
- Number of pile increments = 100

Loading Type and Number of Cycles of Loading:

- Static loading specified

- Analysis uses p-y modification factors for p-y curves
- Analysis uses layering correction (Method of Georgiadis)
- No distributed lateral loads are entered
- Loading by lateral soil movements acting on pile not selected
- Input of shear resistance at the pile tip not selected
- Input of moment resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:

- Output files use decimal points to denote decimal symbols.
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1
- No p-y curves to be computed and reported for user-specified depths
- Print using wide report formats

Pile Structural Properties and Geometry

Number of pile sections defined = 1

Total length of pile = 10.000 ft
 Depth of ground surface below top of pile = 0.0000 ft

Pile diameters used for p-y curve computations are defined using 2 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile. A summary of values of pile diameter vs. depth follows.

Point No.	Depth Below Pile Head feet	Pile Diameter inches
1	0.000	30.0000
2	10.000	30.0000

Input Structural Properties for Pile Sections:

Pile Section No. 1:

Section 1 is a round drilled shaft, bored pile, or CIDH pile
 Length of section = 10.000000 ft
 Shaft Diameter = 30.000000 in

 Soil and Rock Layering Information

The soil profile is modelled using 1 layers

Layer 1 is weak rock, p-y criteria by Reese, 1997

Distance from top of pile to top of layer = 0.0000 ft
 Distance from top of pile to bottom of layer = 15.000000 ft
 Effective unit weight at top of layer = 82.600000 pcf
 Effective unit weight at bottom of layer = 82.600000 pcf
 Uniaxial compressive strength at top of layer = 3820. psi
 Uniaxial compressive strength at bottom of layer = 3820. psi

Initial modulus of rock at top of layer = 343800. psi
 Initial modulus of rock at bottom of layer = 343800. psi
 RQD of rock at top of layer = 99.000000 %
 RQD of rock at bottom of layer = 99.000000 %
 k_{rm} of rock at top of layer = 0.0000500
 k_{rm} of rock at bottom of layer = 0.0000500

(Depth of the lowest soil layer extends 5.000 ft below the pile tip)

 Summary of Input Soil Properties

Layer Num.	Soil Type Name (p-y Curve Type)	Layer Depth ft	Effective Unit Wt. pcf	Uniaxial qu psi	RQD %	E50 or k _{rm}	Rock Mass Modulus psi
1	Weak Rock	0.00 15.0000	82.6000 82.6000	3820. 3820.	99.0000 99.0000	5.00E-05 5.00E-05	343800. 343800.

 Modification Factors for p-y Curves

Distribution of p-y modifiers with depth defined using 2 points

Point No.	Depth X ft	p-mult	y-mult
1	0.000	0.8500	1.0000
2	10.000	0.8500	1.0000

 Static Loading Type

 Static loading criteria were used when computing p-y curves for all analyses.

 Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 2

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length	Run Analysis
1	1	V = 1800. lbs	M = 1416000. in-lbs	714600.	No	Yes
2	1	V = 2420. lbs	M = 1920000. in-lbs	921400.	No	Yes

V = shear force applied normal to pile axis

M = bending moment applied to pile head

y = lateral deflection normal to pile axis

S = pile slope relative to original pile batter angle

R = rotational stiffness applied to pile head

Values of top y vs. pile lengths can be computed only for load types with specified shear loading (Load Types 1, 2, and 3).

Thrust force is assumed to be acting axially for all pile batter angles.

 Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 1

Pile Section No. 1:

Dimensions and Properties of Drilled Shaft (Bored Pile):

```

-----
Length of Section = 10.000000 ft
Shaft Diameter = 30.000000 in
Concrete Cover Thickness (to edge of trans. reinf.) = 3.000000 in
Number of Reinforcing Bars = 8 bars
Yield Stress of Reinforcing Bars = 50000. psi
Modulus of Elasticity of Reinforcing Bars = 29000000. psi
Gross Area of Shaft = 706.858347 sq. in.
Total Area of Reinforcing Steel = 8.000000 sq. in.
Area Ratio of Steel Reinforcement = 1.13 percent
Edge-to-Edge Bar Spacing = 7.242052 in
Maximum Concrete Aggregate Size = 0.750000 in
Ratio of Bar Spacing to Aggregate Size = 9.66
Offset of Center of Rebar Cage from Center of Pile = 0.0000 in
Transverse Reinforcement
Type: Spiral
Number of Transverse Reinf. (per spacing) = 1
Spacing of Transverse Reinf. = 4.000000 in
Yield Stress of Transverse Reinf. = 50000. psi
Diameter of Transverse Reinf. = 0.500000 in
    
```

Axial Structural Capacities:

```

-----
Nom. Axial Structural Capacity =  $0.85 F_c A_c + F_y A_s$  = 2776.118 kips
Tensile Load for Cracking of Concrete = -317.428 kips
Nominal Axial Tensile Capacity = -400.000 kips
    
```

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.128000	1.000000	10.936000	0.000000
2	1.128000	1.000000	7.732920	7.732920
3	1.128000	1.000000	0.000000	10.936000
4	1.128000	1.000000	-7.732920	7.732920
5	1.128000	1.000000	-10.936000	0.000000
6	1.128000	1.000000	-7.732920	-7.732920

7	1.128000	1.000000	0.000000	-10.93600
8	1.128000	1.000000	7.732920	-7.73292

NOTE: The positions of the above rebars were computed by LPILE

Minimum spacing between any two bars not equal to zero = 7.242 inches
between bars 1 and 2.

Ratio of bar spacing to maximum aggregate size = 9.66

Concrete Properties:

Compressive Strength of Concrete	=	4000. psi
Modulus of Elasticity of Concrete	=	3604997. psi
Modulus of Rupture of Concrete	=	-474.34165 psi
Compression Strain at Peak Stress	=	0.001886
Tensile Strain at Fracture of Concrete	=	-0.0001154
Maximum Coarse Aggregate Size	=	0.750000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 2

Number	Axial Thrust Force kips
-----	-----
1	714.600
2	921.400

Definitions of Run Messages and Notes:

C = concrete in section has cracked in tension.
Y = stress in reinforcing steel has reached yield stress.
T = ACI 318 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than 0.003. See ACI 318-14, Section 21.2.3.
Z = depth of tensile zone in concrete section is less than 10 percent of

section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.

Position of neutral axis is measured from edge of compression side of pile.

Compressive stresses and strains are positive in sign.

Tensile stresses and strains are negative in sign.

Axial Thrust Force = 714.600 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
0.00000125	199.4180428	159534434.	204.9832495	0.0002562	0.0002187	1.0122155	7.3055803	
0.00000250	398.8288884	159531555.	110.0209688	0.0002751	0.0002001	1.0801344	7.7263952	
0.00000375	598.2073321	159521955.	78.3799158	0.0002939	0.0001814	1.1474476	8.1486283	
0.00000500	797.5371707	159507434.	62.5691717	0.0003128	0.0001628	1.2141489	8.5722799	
0.00000625	996.8021944	159488351.	53.0905535	0.0003318	0.0001443	1.2802322	8.9973503	
0.00000750	1196.	159464825.	46.7780005	0.0003508	0.0001258	1.3456914	9.4238401	
0.00000875	1395.	159436904.	42.2746302	0.0003699	0.0001074	1.4105204	9.8517499	
0.00001000	1594.	159404613.	38.9020017	0.0003890	0.00008902	1.4747129	10.2810805	
0.00001125	1793.	159367964.	36.2832037	0.0004082	0.00007069	1.5382628	10.7118328	
0.00001250	1992.	159326960.	34.1920899	0.0004274	0.00005240	1.6011641	11.1440076	
0.00001375	2190.	159281606.	32.4847490	0.0004467	0.00003417	1.6634104	11.5776062	
0.00001500	2388.	159231901.	31.0652407	0.0004660	0.00001598	1.7249957	12.0126298	
0.00001625	2587.	159177842.	29.8671450	0.0004853	-0.00000216	1.7859136	12.4490796	
0.00001750	2785.	159117875.	28.8429800	0.0005048	-0.00002025	1.8461560	12.8869374	
0.00001875	2982.	159044956.	27.9577695	0.0005242	-0.00003829	1.9057055	13.3260997	
0.00002000	3179.	158952237.	27.1852249	0.0005437	-0.00005630	1.9645421	13.7664305	
0.00002125	3375.	158835622.	26.5052585	0.0005632	-0.00007426	2.0226475	14.2078031	
0.00002250	3571.	158693232.	25.9022725	0.0005828	-0.00009220	2.0800060	14.6501079	
0.00002375	3765.	158524829.	25.3639823	0.0006024	-0.000110	2.1366044	15.0932554	
0.00002500	3765.	150598588.	24.5996240	0.0006150	-0.000135	2.1723507	15.3334774	C
0.00002625	3849.	146644088.	24.0951796	0.0006325	-0.000155	2.2216680	15.7161430	C
0.00002750	3970.	144345851.	23.6281596	0.0006498	-0.000175	2.2696639	16.0920824	C
0.00002875	4084.	142043564.	23.1945524	0.0006668	-0.000196	2.3164339	16.4620206	C
0.00003000	4193.	139753523.	22.7904690	0.0006837	-0.000216	2.3620249	16.8262081	C
0.00003125	4297.	137509554.	22.4136466	0.0007004	-0.000237	2.4065664	17.1858049	C
0.00003250	4398.	135312799.	22.0609775	0.0007170	-0.000258	2.4500793	17.5408464	C
0.00003375	4494.	133153534.	21.7292649	0.0007334	-0.000279	2.4925358	17.8908306	C

MEG-33 forward abutment X direction row 2

0.00003500	4586.	131042698.	21.4167814	0.0007496	-0.000300	2.5340015	18.2362832	C
0.00003625	4676.	128986058.	21.1219089	0.0007657	-0.000322	2.5745274	18.5775943	C
0.00003750	4762.	126985689.	20.8431270	0.0007816	-0.000343	2.6141513	18.9150258	C
0.00003875	4845.	125035157.	20.5786295	0.0007974	-0.000365	2.6528637	19.2482975	C
0.00004000	4926.	123138590.	20.3274304	0.0008131	-0.000387	2.6907139	19.5778194	C
0.00004125	5004.	121299491.	20.0887105	0.0008287	-0.000409	2.7277540	19.9040573	C
0.00004250	5080.	119519095.	19.8616750	0.0008441	-0.000431	2.7640264	20.2273894	C
0.00004375	5154.	117798333.	19.6456528	0.0008595	-0.000453	2.7995750	20.5482347	C
0.00004500	5225.	116114329.	19.4383172	0.0008747	-0.000475	2.8342633	20.8647541	C
0.00004625	5295.	114488278.	19.2405890	0.0008899	-0.000498	2.8682761	21.1791268	C
0.00004750	5364.	112921255.	19.0521189	0.0009050	-0.000520	2.9016642	21.4919187	C
0.00004875	5430.	111384400.	18.8701880	0.0009199	-0.000543	2.9342188	21.8002909	C
0.00005125	5559.	108467759.	18.5297105	0.0009496	-0.000588	2.9975062	22.4122197	C
0.00005375	5683.	105722693.	18.2153524	0.0009791	-0.000633	3.0582424	23.0154929	C
0.00005625	5801.	103136041.	17.9240408	0.0010082	-0.000679	3.1165320	23.6107787	C
0.00005875	5916.	100696577.	17.6532831	0.0010371	-0.000725	3.1724793	24.1988437	C
0.00006125	6027.	98394571.	17.4010535	0.0010658	-0.000772	3.2261883	24.7805590	C
0.00006375	6134.	96221477.	17.1657072	0.0010943	-0.000818	3.2777624	25.3569137	C
0.00006625	6239.	94169672.	16.9459140	0.0011227	-0.000865	3.3273035	25.9290250	C
0.00006875	6340.	92213734.	16.7383110	0.0011508	-0.000912	3.3746471	26.4935703	C
0.00007125	6438.	90363684.	16.5437610	0.0011787	-0.000959	3.4200891	27.0549839	C
0.00007375	6535.	88612677.	16.3613927	0.0012067	-0.001006	3.4637016	27.6142414	C
0.00007625	6629.	86935736.	16.1878059	0.0012343	-0.001053	3.5052483	28.1664735	C
0.00007875	6721.	85350028.	16.0253352	0.0012620	-0.001101	3.5451307	28.7189220	C
0.00008125	6811.	83828854.	15.8702784	0.0012895	-0.001148	3.5830500	29.2652812	C
0.00008375	6900.	82386121.	15.7247513	0.0013169	-0.001196	3.6193491	29.8123025	C
0.00008625	6986.	80998611.	15.5853436	0.0013442	-0.001243	3.6537460	30.3535283	C
0.00008875	7072.	79681983.	15.4547125	0.0013716	-0.001291	3.6866116	30.8971285	C
0.00009125	7155.	78410457.	15.3287335	0.0013987	-0.001339	3.7175810	31.4340984	C
0.00009375	7237.	77199187.	15.2102173	0.0014260	-0.001387	3.7470141	31.9730910	C
0.00009625	7318.	76036211.	15.0972309	0.0014531	-0.001434	3.7747671	32.5103335	C
0.00009875	7398.	74916898.	14.9891503	0.0014802	-0.001482	3.8008320	-33.107383	C
0.0001013	7477.	73846539.	14.8872251	0.0015073	-0.001530	3.8253680	-34.244822	C
0.0001038	7554.	72813003.	14.7892399	0.0015344	-0.001578	3.8482084	-35.385187	C
0.0001063	7631.	71817016.	14.6955872	0.0015614	-0.001626	3.8694260	-36.526409	C
0.0001088	7706.	70860920.	14.6070155	0.0015885	-0.001674	3.8891065	-37.665187	C
0.0001113	7781.	69938221.	14.5223186	0.0016156	-0.001722	3.9071727	-38.804308	C
0.0001138	7854.	69042914.	14.4403308	0.0016426	-0.001770	3.9235660	-39.946773	C
0.0001163	7926.	68180586.	14.3626112	0.0016697	-0.001818	3.9384133	-41.086734	C
0.0001188	7998.	67349061.	14.2888993	0.0016968	-0.001866	3.9516994	-42.224165	C
0.0001213	8068.	66542258.	14.2178492	0.0017239	-0.001914	3.9633547	-43.362925	C

MEG-33 forward abutment X direction row 2

0.0001238	8138.	65757885.	14.1490642	0.0017509	-0.001962	3.9733772	-44.503858	C
0.0001263	8206.	64999389.	14.0837159	0.0017781	-0.002009	3.9818277	-45.642182	C
0.0001288	8274.	64265183.	14.0216138	0.0018053	-0.002057	3.9886901	-46.777862	C
0.0001313	8341.	63553797.	13.9625822	0.0018326	-0.002105	3.9939482	-47.910859	C
0.0001338	8407.	62858748.	13.9048098	0.0018598	-0.002153	3.9975623	-49.047531	C
0.0001363	8472.	62181936.	13.8493385	0.0018870	-0.002201	3.9995621	-50.000000	CY
0.0001388	8535.	61516354.	13.7960554	0.0019142	-0.002248	3.9986615	-50.000000	CY
0.0001413	8594.	60839141.	13.7434130	0.0019413	-0.002296	3.9999173	-50.000000	CY
0.0001438	8645.	60141546.	13.6907115	0.0019680	-0.002344	3.9992375	-50.000000	CY
0.0001463	8692.	59434679.	13.6380833	0.0019946	-0.002393	3.9999978	-50.000000	CY
0.0001488	8737.	58733203.	13.5856869	0.0020209	-0.002442	3.9994761	-50.000000	CY
0.0001588	8906.	56103651.	13.3981144	0.0021270	-0.002636	3.9994920	-50.000000	CY
0.0001688	9065.	53721061.	13.2369123	0.0022337	-0.002829	3.9988322	-50.000000	CY
0.0001788	9200.	51467700.	13.0910274	0.0023400	-0.003022	3.9999952	-50.000000	CY
0.0001888	9269.	49106716.	12.9318472	0.0024409	-0.003222	3.9982060	50.000000	CY
0.0001988	9314.	46861353.	12.7868617	0.0025414	-0.003421	3.9989494	50.000000	CY
0.0002088	9350.	44789994.	12.6594478	0.0026427	-0.003620	3.9992150	50.000000	CY
0.0002188	9380.	42880410.	12.5491621	0.0027451	-0.003817	3.9991756	50.000000	CY
0.0002288	9407.	41123490.	12.4533543	0.0028487	-0.004014	3.9988031	50.000000	CY
0.0002388	9430.	39496988.	12.3637902	0.0029519	-0.004211	3.9977634	50.000000	CY
0.0002488	9451.	37992737.	12.2845986	0.0030558	-0.004407	3.9959758	50.000000	CY
0.0002588	9470.	36597337.	12.2146634	0.0031605	-0.004602	3.9999519	50.000000	CY
0.0002688	9487.	35298838.	12.1529478	0.0032661	-0.004796	3.9989124	50.000000	CY
0.0002788	9501.	34084929.	12.0940980	0.0033712	-0.004991	3.9956640	50.000000	CY
0.0002888	9514.	32950314.	12.0415042	0.0034770	-0.005186	3.9998422	50.000000	CY
0.0002988	9526.	31887091.	11.9948434	0.0035835	-0.005379	3.9971331	50.000000	CY
0.0003088	9537.	30889589.	11.9530289	0.0036905	-0.005572	3.9999957	50.000000	CY
0.0003188	9547.	29950579.	11.9161078	0.0037983	-0.005764	3.9973747	50.000000	CY
0.0003288	9547.	29039534.	11.9110790	0.0039158	-0.005947	3.9975909	50.000000	CY

Axial Thrust Force = 921.400 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
0.00000125	191.1540359	152923229.	264.8377707	0.0003310	0.0002935	1.2801666	9.4753067	
0.00000250	382.3030479	152921219.	139.9495047	0.0003499	0.0002749	1.3449615	9.8962141	
0.00000375	573.4182496	152911533.	98.3336902	0.0003688	0.0002563	1.4091495	10.3186013	
0.00000500	764.4827347	152896547.	77.5359908	0.0003877	0.0002377	1.4727241	10.7424686	

MEG-33 forward abutment X direction row 2

0.00000625	955.4795844	152876734.	65.0655401	0.0004067	0.0002192	1.5356789	11.1678166
0.00000750	1146.	152852250.	56.7587163	0.0004257	0.0002007	1.5980075	11.5946457
0.00000875	1337.	152823162.	50.8311108	0.0004448	0.0001823	1.6597036	12.0229569
0.00001000	1528.	152789501.	46.3905198	0.0004639	0.0001639	1.7207607	12.4527507
0.00001125	1718.	152751283.	42.9412746	0.0004831	0.0001456	1.7811724	12.8840284
0.00001250	1909.	152708515.	40.1859748	0.0005023	0.0001273	1.8409323	13.3167909
0.00001375	2099.	152661202.	37.9353656	0.0005216	0.0001091	1.9000338	13.7510396
0.00001500	2289.	152609343.	36.0632776	0.0005409	0.00009095	1.9584706	14.1867758
0.00001625	2479.	152552937.	34.4823629	0.0005603	0.00007284	2.0162361	14.6240011
0.00001750	2669.	152491982.	33.1302307	0.0005798	0.00005478	2.0733240	15.0627171
0.00001875	2858.	152426474.	31.9611276	0.0005993	0.00003677	2.1297276	15.5029257
0.00002000	3047.	152356408.	30.9407390	0.0006188	0.00001881	2.1854406	15.9446287
0.00002125	3236.	152281779.	30.0428247	0.0006384	9.10024E-07	2.2404563	16.3878283
0.00002250	3425.	152202130.	29.2469636	0.0006581	-0.00001694	2.2947675	16.8325188
0.00002375	3613.	152114159.	28.5369538	0.0006778	-0.00003475	2.3483616	17.2786395
0.00002500	3800.	152013568.	27.8997815	0.0006975	-0.00005251	2.4012232	17.7260917
0.00002625	3987.	151897090.	27.3249094	0.0007173	-0.00007022	2.4533370	18.1747748
0.00002750	4173.	151762602.	26.8037248	0.0007371	-0.00008790	2.5046890	18.6245956
0.00002875	4359.	151608927.	26.3291243	0.0007570	-0.000106	2.5552667	19.0754700
0.00003000	4380.	146005325.	25.7294965	0.0007719	-0.000128	2.5925806	19.3831620 C
0.00003125	4515.	144472413.	25.2864932	0.0007902	-0.000147	2.6378229	19.7893221 C
0.00003250	4643.	142869638.	24.8718947	0.0008083	-0.000167	2.6818773	20.1901358 C
0.00003375	4767.	141230182.	24.4832588	0.0008263	-0.000186	2.7248239	20.5863021 C
0.00003500	4884.	139554894.	24.1173997	0.0008441	-0.000206	2.7666485	20.9774108 C
0.00003625	4997.	137859321.	23.7722019	0.0008617	-0.000226	2.8073921	21.3637149 C
0.00003750	5106.	136161548.	23.4460915	0.0008792	-0.000246	2.8471161	21.7457496 C
0.00003875	5211.	134469791.	23.1374015	0.0008966	-0.000266	2.8858535	22.1237176 C
0.00004000	5312.	132793663.	22.8448197	0.0009138	-0.000286	2.9236486	22.4979910 C
0.00004125	5410.	131140903.	22.5671909	0.0009309	-0.000307	2.9605437	22.8689397 C
0.00004250	5504.	129515586.	22.3033848	0.0009479	-0.000327	2.9965690	23.2367969 C
0.00004375	5596.	127919544.	22.0523293	0.0009648	-0.000348	3.0317467	23.6017054 C
0.00004500	5685.	126337176.	21.8120731	0.0009815	-0.000368	3.0660065	23.9625055 C
0.00004625	5771.	124785672.	21.5826573	0.0009982	-0.000389	3.0994494	24.3204267 C
0.00004750	5855.	123268364.	21.3634908	0.0010148	-0.000410	3.1321114	24.6758337 C
0.00004875	5937.	121787016.	21.1540002	0.0010313	-0.000431	3.1640223	25.0290304 C
0.00005125	6093.	118891397.	20.7588605	0.0010639	-0.000474	3.2253992	25.7252941 C
0.00005375	6242.	116125104.	20.3946037	0.0010962	-0.000516	3.2838698	26.4124012 C
0.00005625	6383.	113482423.	20.0574398	0.0011282	-0.000559	3.3395338	27.0908855 C
0.00005875	6519.	110957534.	19.7442119	0.0011600	-0.000603	3.3924841	27.7612637 C
0.00006125	6648.	108545369.	19.4523283	0.0011915	-0.000646	3.4428127	28.4241358 C
0.00006375	6773.	106241439.	19.1796558	0.0012227	-0.000690	3.4906103	29.0802014 C

MEG-33 forward abutment X direction row 2

0.00006625	6893.	104041679.	18.9244375	0.0012537	-0.000734	3.5359658	29.7302633	C
0.00006875	7009.	101942339.	18.6852292	0.0012846	-0.000778	3.5789656	30.3752384	C
0.00007125	7121.	99937417.	18.4605955	0.0013153	-0.000822	3.6196689	31.0156430	C
0.00007375	7228.	98008739.	18.2479213	0.0013458	-0.000867	3.6580045	31.6490537	C
0.00007625	7333.	96168734.	18.0479016	0.0013762	-0.000911	3.6941887	32.2796099	C
0.00007875	7435.	94412516.	17.8596763	0.0014064	-0.000956	3.7282713	32.9080983	C
0.00008125	7533.	92716062.	17.6800848	0.0014365	-0.001001	3.7600921	33.5296376	C
0.00008375	7630.	91099483.	17.5112522	0.0014666	-0.001046	3.7899348	34.1512665	C
0.00008625	7723.	89539807.	17.3501889	0.0014965	-0.001091	3.8176386	34.7678477	C
0.00008875	7814.	88047010.	17.1980016	0.0015263	-0.001136	3.8433694	35.3839192	C
0.00009125	7903.	86606561.	17.0527084	0.0015561	-0.001181	3.8670424	35.9961673	C
0.00009375	7990.	85226324.	16.9153342	0.0015858	-0.001227	3.8887883	36.6088777	C
0.00009625	8074.	83889237.	16.7834166	0.0016154	-0.001272	3.9084899	37.2168994	C
0.00009875	8158.	82610392.	16.6592631	0.0016451	-0.001317	3.9263339	37.8280276	C
0.0001013	8238.	81365430.	16.5390690	0.0016746	-0.001363	3.9421324	38.4327790	C
0.0001038	8318.	80169915.	16.4254424	0.0017041	-0.001408	3.9560623	39.0398627	C
0.0001063	8395.	79016218.	16.3171940	0.0017337	-0.001454	3.9680784	39.6470417	C
0.0001088	8471.	77894462.	16.2126856	0.0017631	-0.001499	3.9781369	40.2503200	C
0.0001113	8546.	76814733.	16.1138650	0.0017927	-0.001545	3.9863249	40.8567947	C
0.0001138	8619.	75769242.	16.0193975	0.0018222	-0.001590	3.9926009	41.4633002	C
0.0001163	8690.	74750665.	15.9279628	0.0018516	-0.001636	3.9969504	42.0663324	C
0.0001188	8760.	73767043.	15.8413330	0.0018812	-0.001681	3.9994092	42.6726532	C
0.0001213	8829.	72815841.	15.7592415	0.0019108	-0.001727	3.9989865	43.2823708	C
0.0001238	8896.	71884143.	15.6790788	0.0019403	-0.001772	3.9999969	43.8871045	C
0.0001263	8961.	70979166.	15.6028193	0.0019699	-0.001818	3.9998614	44.4945088	C
0.0001288	9026.	70101036.	15.5305132	0.0019996	-0.001863	3.9994606	45.1056162	C
0.0001313	9089.	69248448.	15.4619204	0.0020294	-0.001908	3.9986942	45.7203723	C
0.0001338	9150.	68412603.	15.3949921	0.0020591	-0.001953	3.9999324	46.3316384	C
0.0001363	9210.	67598428.	15.3310645	0.0020889	-0.001999	3.9994446	46.9450565	C
0.0001388	9269.	66807063.	15.2703006	0.0021188	-0.002044	3.9988883	47.5619351	C
0.0001413	9328.	66036395.	15.2126231	0.0021488	-0.002089	3.9998122	48.1826451	C
0.0001438	9385.	65286308.	15.1577862	0.0021789	-0.002134	3.9989351	48.8068340	C
0.0001463	9441.	64550972.	15.1040094	0.0022090	-0.002179	3.9999544	49.4275676	C
0.0001488	9495.	63833260.	15.0526347	0.0022391	-0.002223	3.9992103	50.0000000	CY
0.0001588	9686.	61013843.	14.8654846	0.0023599	-0.002403	3.9992142	50.0000000	CY
0.0001688	9817.	58175862.	14.6953826	0.0024798	-0.002583	3.9982692	50.0000000	CY
0.0001788	9932.	55562506.	14.5556553	0.0026018	-0.002761	3.9999210	50.0000000	CY
0.0001888	10036.	53172740.	14.4339500	0.0027244	-0.002938	3.9982415	50.0000000	CY
0.0001988	10131.	50971087.	14.3294039	0.0028480	-0.003115	3.9994502	50.0000000	CY
0.0002088	10189.	48808656.	14.2208676	0.0029686	-0.003294	3.9997920	50.0000000	CY
0.0002188	10214.	46690338.	14.1042804	0.0030853	-0.003477	3.9997463	50.0000000	CY

0.0002288	10231.	44725798.	13.9992652	0.0032023	-0.003660	3.9994496	50.0000000	CY
0.0002388	10245.	42911896.	13.9038954	0.0033196	-0.003843	3.9986206	50.0000000	CY
0.0002488	10255.	41227204.	13.8182188	0.0034373	-0.004025	3.9967910	50.0000000	CY
0.0002588	10262.	39660920.	13.7440900	0.0035563	-0.004206	3.9996630	50.0000000	CY
0.0002688	10264.	38189961.	13.6841784	0.0036776	-0.004385	3.9994202	50.0000000	CY
0.0002788	10264.	36819917.	13.6341225	0.0038005	-0.004562	3.9970820	50.0000000	CY

 Summary of Results for Nominal Moment Capacity for Section 1

Moment values interpolated at maximum compressive strain = 0.003
 or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain	Max. Tens. Strain
----	-----	-----	-----	-----
1	714.600	9439.535	0.00300000	-0.00430146
2	921.400	10195.452	0.00300000	-0.00334320

Note that the values of moment capacity in the table above are not factored by a strength reduction factor (phi-factor).

In ACI 318, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.75).

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318, or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Load No.	Resist. Factor	Nominal Ax. Thrust kips	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in^2
----	-----	-----	-----	-----	-----	-----
1	0.65	714.600000	9440.	464.490000	6136.	96190522.
2	0.65	921.400000	10195.	598.910000	6627.	108942776.

1	0.75	714.600000	9440.	535.950000	7080.	79561599.
2	0.75	921.400000	10195.	691.050000	7647.	90814947.
1	0.90	714.600000	9440.	643.140000	8496.	61936266.
2	0.90	921.400000	10195.	829.260000	9176.	68064153.

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 1

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 1800.0 lbs
 Applied moment at pile head = 1416000.0 in-lbs
 Axial thrust load on pile head = 714600.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	6.24E-04	1416000.	1800.	-1.04E-04	0.00	1.59E+11	-13302.	1.28E+07	0.00
0.1000	5.07E-04	1408667.	-14179.	-9.29E-05	0.00	1.59E+11	-13331.	3.16E+07	0.00
0.2000	4.01E-04	1382129.	-31341.	-8.24E-05	0.00	1.59E+11	-15273.	4.57E+07	0.00
0.3000	3.09E-04	1333589.	-47893.	-7.22E-05	0.00	1.59E+11	-12314.	4.79E+07	0.00
0.4000	2.28E-04	1267309.	-60992.	-6.24E-05	0.00	1.59E+11	-9517.	5.01E+07	0.00
0.5000	1.59E-04	1187315.	-70857.	-5.32E-05	0.00	1.59E+11	-6924.	5.23E+07	0.00
0.6000	1.01E-04	1097343.	-77750.	-4.46E-05	0.00	1.59E+11	-4564.	5.45E+07	0.00
0.7000	5.20E-05	1000792.	-81962.	-3.67E-05	0.00	1.59E+11	-2457.	5.67E+07	0.00
0.8000	1.25E-05	900698.	-83805.	-2.95E-05	0.00	1.59E+11	-614.923	5.89E+07	0.00
0.9000	-1.88E-05	799712.	-83599.	-2.31E-05	0.00	1.60E+11	957.8526	6.11E+07	0.00
1.0000	-4.30E-05	700100.	-81665.	-1.75E-05	0.00	1.60E+11	2265.	6.33E+07	0.00
1.1000	-6.08E-05	603746.	-78317.	-1.26E-05	0.00	1.60E+11	3316.	6.55E+07	0.00
1.2000	-7.32E-05	512162.	-73852.	-8.38E-06	0.00	1.60E+11	4125.	6.77E+07	0.00
1.3000	-8.09E-05	426515.	-68551.	-4.85E-06	0.00	1.60E+11	4710.	6.99E+07	0.00
1.4000	-8.48E-05	347649.	-62669.	-1.94E-06	0.00	1.60E+11	5093.	7.21E+07	0.00
1.5000	-8.56E-05	276114.	-56436.	4.04E-07	0.00	1.60E+11	5295.	7.43E+07	0.00

MEG-33 forward abutment X direction row 2

1.6000	-8.38E-05	212202.	-50053.	2.24E-06	0.00	1.60E+11	5342.	7.65E+07	0.00
1.7000	-8.02E-05	155982.	-43694.	3.63E-06	0.00	1.60E+11	5257.	7.87E+07	0.00
1.8000	-7.51E-05	107330.	-37502.	4.62E-06	0.00	1.60E+11	5063.	8.09E+07	0.00
1.9000	-6.91E-05	65968.	-31594.	5.27E-06	0.00	1.60E+11	4784.	8.31E+07	0.00
2.0000	-6.25E-05	31494.	-26060.	5.63E-06	0.00	1.60E+11	4440.	8.53E+07	0.00
2.1000	-5.56E-05	3415.	-20965.	5.77E-06	0.00	1.60E+11	4052.	8.75E+07	0.00
2.2000	-4.87E-05	-18830.	-16352.	5.71E-06	0.00	1.60E+11	3636.	8.97E+07	0.00
2.3000	-4.19E-05	-35840.	-12247.	5.50E-06	0.00	1.60E+11	3207.	9.19E+07	0.00
2.4000	-3.55E-05	-48232.	-8655.	5.19E-06	0.00	1.60E+11	2779.	9.41E+07	0.00
2.5000	-2.94E-05	-56621.	-5570.	4.79E-06	0.00	1.60E+11	2362.	9.63E+07	0.00
2.6000	-2.40E-05	-61608.	-2974.	4.35E-06	0.00	1.60E+11	1965.	9.85E+07	0.00
2.7000	-1.90E-05	-63765.	-837.425	3.88E-06	0.00	1.60E+11	1595.	1.01E+08	0.00
2.8000	-1.47E-05	-63625.	873.2002	3.40E-06	0.00	1.60E+11	1256.	1.03E+08	0.00
2.9000	-1.09E-05	-61675.	2197.	2.92E-06	0.00	1.60E+11	951.1630	1.05E+08	0.00
3.0000	-7.63E-06	-58356.	3178.	2.47E-06	0.00	1.60E+11	682.2222	1.07E+08	0.00
3.1000	-4.93E-06	-54054.	3857.	2.05E-06	0.00	1.60E+11	449.4806	1.09E+08	0.00
3.2000	-2.71E-06	-49104.	4278.	1.66E-06	0.00	1.60E+11	252.2218	1.12E+08	0.00
3.3000	-9.37E-07	-43790.	4482.	1.31E-06	0.00	1.60E+11	88.8902	1.14E+08	0.00
3.4000	4.42E-07	-38349.	4510.	1.00E-06	0.00	1.60E+11	-42.715	1.16E+08	0.00
3.5000	1.47E-06	-32968.	4397.	7.36E-07	0.00	1.60E+11	-145.260	1.18E+08	0.00
3.6000	2.21E-06	-27797.	4177.	5.08E-07	0.00	1.60E+11	-221.717	1.20E+08	0.00
3.7000	2.69E-06	-22944.	3879.	3.17E-07	0.00	1.60E+11	-275.220	1.23E+08	0.00
3.8000	2.97E-06	-18488.	3528.	1.61E-07	0.00	1.60E+11	-308.947	1.25E+08	0.00
3.9000	3.08E-06	-14477.	3147.	3.71E-08	0.00	1.60E+11	-326.017	1.27E+08	0.00
4.0000	3.06E-06	-10935.	2754.	-5.85E-08	0.00	1.60E+11	-329.414	1.29E+08	0.00
4.1000	2.94E-06	-7867.	2363.	-1.29E-07	0.00	1.60E+11	-321.920	1.31E+08	0.00
4.2000	2.75E-06	-5263.	1986.	-1.79E-07	0.00	1.60E+11	-306.078	1.34E+08	0.00
4.3000	2.51E-06	-3099.	1632.	-2.10E-07	0.00	1.60E+11	-284.159	1.36E+08	0.00
4.4000	2.24E-06	-1345.	1307.	-2.27E-07	0.00	1.60E+11	-258.148	1.38E+08	0.00
4.5000	1.97E-06	37.8274	1014.	-2.32E-07	0.00	1.60E+11	-229.743	1.40E+08	0.00
4.6000	1.69E-06	1090.	756.1364	-2.27E-07	0.00	1.60E+11	-200.357	1.42E+08	0.00
4.7000	1.42E-06	1853.	533.2386	-2.16E-07	0.00	1.60E+11	-171.139	1.45E+08	0.00
4.8000	1.17E-06	2370.	344.7645	-2.01E-07	0.00	1.60E+11	-142.985	1.47E+08	0.00
4.9000	9.38E-07	2681.	189.0342	-1.82E-07	0.00	1.60E+11	-116.566	1.49E+08	0.00
5.0000	7.33E-07	2824.	63.6820	-1.61E-07	0.00	1.60E+11	-92.354	1.51E+08	0.00
5.1000	5.52E-07	2834.	-34.120	-1.40E-07	0.00	1.60E+11	-70.648	1.53E+08	0.00
5.2000	3.98E-07	2742.	-107.468	-1.19E-07	0.00	1.60E+11	-51.599	1.56E+08	0.00
5.3000	2.68E-07	2576.	-159.572	-9.86E-08	0.00	1.60E+11	-35.240	1.58E+08	0.00
5.4000	1.61E-07	2359.	-193.619	-8.00E-08	0.00	1.60E+11	-21.506	1.60E+08	0.00
5.5000	7.59E-08	2112.	-212.679	-6.32E-08	0.00	1.60E+11	-10.260	1.62E+08	0.00
5.6000	9.59E-09	1849.	-219.623	-4.83E-08	0.00	1.60E+11	-1.314	1.64E+08	0.00

MEG-33 forward abutment X direction row 2

5.7000	-4.00E-08	1585.	-217.078	-3.54E-08	0.00	1.60E+11	5.5568	1.67E+08	0.00
5.8000	-7.53E-08	1328.	-207.386	-2.44E-08	0.00	1.60E+11	10.5969	1.69E+08	0.00
5.9000	-9.86E-08	1087.	-192.593	-1.53E-08	0.00	1.60E+11	14.0575	1.71E+08	0.00
6.0000	-1.12E-07	865.8887	-174.446	-7.99E-09	0.00	1.60E+11	16.1869	1.73E+08	0.00
6.1000	-1.18E-07	668.2115	-154.401	-2.22E-09	0.00	1.60E+11	17.2230	1.75E+08	0.00
6.2000	-1.17E-07	495.3311	-133.635	2.16E-09	0.00	1.60E+11	17.3868	1.78E+08	0.00
6.3000	-1.13E-07	347.4845	-113.075	5.33E-09	0.00	1.60E+11	16.8791	1.80E+08	0.00
6.4000	-1.05E-07	223.9415	-93.421	7.48E-09	0.00	1.60E+11	15.8779	1.82E+08	0.00
6.5000	-9.47E-08	123.2614	-75.172	8.78E-09	0.00	1.60E+11	14.5371	1.84E+08	0.00
6.6000	-8.36E-08	43.5138	-58.658	9.41E-09	0.00	1.60E+11	12.9867	1.86E+08	0.00
6.7000	-7.21E-08	-17.533	-44.065	9.51E-09	0.00	1.60E+11	11.3340	1.89E+08	0.00
6.8000	-6.08E-08	-62.259	-31.466	9.21E-09	0.00	1.60E+11	9.6643	1.91E+08	0.00
6.9000	-5.00E-08	-93.068	-20.842	8.62E-09	0.00	1.60E+11	8.0434	1.93E+08	0.00
7.0000	-4.01E-08	-112.294	-12.104	7.85E-09	0.00	1.60E+11	6.5198	1.95E+08	0.00
7.1000	-3.12E-08	-122.130	-5.116	6.97E-09	0.00	1.60E+11	5.1266	1.97E+08	0.00
7.2000	-2.33E-08	-124.584	0.2906	6.04E-09	0.00	1.60E+11	3.8842	2.00E+08	0.00
7.3000	-1.67E-08	-121.443	4.3025	5.11E-09	0.00	1.60E+11	2.8022	2.02E+08	0.00
7.4000	-1.11E-08	-114.267	7.1132	4.23E-09	0.00	1.60E+11	1.8822	2.04E+08	0.00
7.5000	-6.51E-09	-104.379	8.9139	3.41E-09	0.00	1.60E+11	1.1190	2.06E+08	0.00
7.6000	-2.89E-09	-92.879	9.8838	2.66E-09	0.00	1.60E+11	0.4975	2.06E+08	0.00
7.7000	-1.17E-10	-80.662	10.1943	2.01E-09	0.00	1.60E+11	0.02004	2.06E+08	0.00
7.8000	1.93E-09	-68.416	10.0070	1.45E-09	0.00	1.60E+11	-0.332	2.06E+08	0.00
7.9000	3.36E-09	-56.648	9.4607	9.80E-10	0.00	1.60E+11	-0.578	2.06E+08	0.00
8.0000	4.28E-09	-45.712	8.6717	5.95E-10	0.00	1.60E+11	-0.737	2.06E+08	0.00
8.1000	4.79E-09	-35.837	7.7354	2.88E-10	0.00	1.60E+11	-0.824	2.06E+08	0.00
8.2000	4.98E-09	-27.148	6.7277	5.15E-11	0.00	1.60E+11	-0.856	2.06E+08	0.00
8.3000	4.92E-09	-19.691	5.7073	-1.25E-10	0.00	1.60E+11	-0.845	2.06E+08	0.00
8.4000	4.68E-09	-13.450	4.7177	-2.49E-10	0.00	1.60E+11	-0.804	2.06E+08	0.00
8.5000	4.32E-09	-8.368	3.7899	-3.31E-10	0.00	1.60E+11	-0.742	2.06E+08	0.00
8.6000	3.88E-09	-4.354	2.9440	-3.79E-10	0.00	1.60E+11	-0.667	2.06E+08	0.00
8.7000	3.41E-09	-1.301	2.1920	-4.00E-10	0.00	1.60E+11	-0.586	2.06E+08	0.00
8.8000	2.92E-09	0.9076	1.5391	-4.02E-10	0.00	1.60E+11	-0.502	2.06E+08	0.00
8.9000	2.44E-09	2.3933	0.9857	-3.89E-10	0.00	1.60E+11	-0.420	2.06E+08	0.00
9.0000	1.99E-09	3.2740	0.5287	-3.68E-10	0.00	1.60E+11	-0.342	2.06E+08	0.00
9.1000	1.56E-09	3.6628	0.1629	-3.42E-10	0.00	1.60E+11	-0.268	2.06E+08	0.00
9.2000	1.17E-09	3.6654	-0.118	-3.15E-10	0.00	1.60E+11	-0.200	2.06E+08	0.00
9.3000	8.05E-10	3.3794	-0.322	-2.88E-10	0.00	1.60E+11	-0.138	2.06E+08	0.00
9.4000	4.75E-10	2.8940	-0.454	-2.64E-10	0.00	1.60E+11	-0.08162	2.06E+08	0.00
9.5000	1.71E-10	2.2911	-0.520	-2.45E-10	0.00	1.60E+11	-0.02931	2.06E+08	0.00
9.6000	-1.13E-10	1.6459	-0.526	-2.30E-10	0.00	1.60E+11	0.01944	2.06E+08	0.00
9.7000	-3.82E-10	1.0287	-0.475	-2.20E-10	0.00	1.60E+11	0.06563	2.06E+08	0.00

Performed by: Gokul Khatri 6/28/2024

Checked by: James Samples 7/1/2024

MEG-33 forward abutment X direction row 2

9.8000	-6.41E-10	0.5061	-0.370	-2.14E-10	0.00	1.60E+11	0.1102	2.06E+08	0.00
9.9000	-8.96E-10	0.1421	-0.211	-2.12E-10	0.00	1.60E+11	0.1540	2.06E+08	0.00
10.0000	-1.15E-09	0.00	0.00	-2.11E-10	0.00	1.60E+11	0.1976	1.03E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 1:

Pile-head deflection	=	0.00062440 inches
Computed slope at pile head	=	-0.0001035 radians
Maximum bending moment	=	1416000. inch-lbs
Maximum shear force	=	-83805. lbs
Depth of maximum bending moment	=	0.000000 feet below pile head
Depth of maximum shear force	=	0.80000000 feet below pile head
Number of iterations	=	6
Number of zero deflection points	=	5

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 2

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head	=	2420.0 lbs
Applied moment at pile head	=	1920000.0 in-lbs
Axial thrust load on pile head	=	921400.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	9.83E-04	1920000.	2420.	-1.54E-04	0.00	1.53E+11	-14911.	9099176.	0.00

MEG-33 forward abutment X direction row 2

0.10000	8.07E-04	1912330.	-15520.	-1.39E-04	0.00	1.53E+11	-14990.	2.23E+07	0.00
0.2000	6.49E-04	1883059.	-33484.	-1.24E-04	0.00	1.53E+11	-14950.	2.76E+07	0.00
0.3000	5.09E-04	1832244.	-51321.	-1.10E-04	0.00	1.53E+11	-14779.	3.48E+07	0.00
0.4000	3.86E-04	1760131.	-69860.	-9.55E-05	0.00	1.53E+11	-16119.	5.01E+07	0.00
0.5000	2.80E-04	1664792.	-86851.	-8.20E-05	0.00	1.53E+11	-12200.	5.23E+07	0.00
0.6000	1.90E-04	1551871.	-99332.	-6.94E-05	0.00	1.53E+11	-8603.	5.45E+07	0.00
0.7000	1.14E-04	1426548.	-107713.	-5.77E-05	0.00	1.53E+11	-5365.	5.67E+07	0.00
0.8000	5.11E-05	1293488.	-112436.	-4.70E-05	0.00	1.53E+11	-2507.	5.89E+07	0.00
0.9000	8.06E-07	1156806.	-113965.	-3.74E-05	0.00	1.53E+11	-41.034	6.11E+07	0.00
1.0000	-3.86E-05	1020055.	-112768.	-2.88E-05	0.00	1.53E+11	2035.	6.33E+07	0.00
1.1000	-6.84E-05	886226.	-109308.	-2.14E-05	0.00	1.53E+11	3732.	6.55E+07	0.00
1.2000	-8.99E-05	757764.	-104028.	-1.49E-05	0.00	1.53E+11	5068.	6.77E+07	0.00
1.3000	-1.04E-04	636592.	-97348.	-9.44E-06	0.00	1.53E+11	6066.	6.99E+07	0.00
1.4000	-1.13E-04	524150.	-89654.	-4.88E-06	0.00	1.53E+11	6757.	7.21E+07	0.00
1.5000	-1.16E-04	421434.	-81295.	-1.17E-06	0.00	1.53E+11	7174.	7.43E+07	0.00
1.6000	-1.15E-04	329044.	-72581.	1.77E-06	0.00	1.53E+11	7349.	7.65E+07	0.00
1.7000	-1.12E-04	247235.	-63780.	4.03E-06	0.00	1.53E+11	7320.	7.87E+07	0.00
1.8000	-1.06E-04	175964.	-55116.	5.69E-06	0.00	1.53E+11	7120.	8.09E+07	0.00
1.9000	-9.80E-05	114945.	-46773.	6.83E-06	0.00	1.53E+11	6784.	8.31E+07	0.00
2.0000	-8.93E-05	63694.	-38897.	7.54E-06	0.00	1.53E+11	6342.	8.53E+07	0.00
2.1000	-7.99E-05	21575.	-31597.	7.87E-06	0.00	1.53E+11	5825.	8.75E+07	0.00
2.2000	-7.04E-05	-12157.	-24947.	7.91E-06	0.00	1.53E+11	5258.	8.97E+07	0.00
2.3000	-6.09E-05	-38316.	-18993.	7.71E-06	0.00	1.53E+11	4665.	9.19E+07	0.00
2.4000	-5.19E-05	-57756.	-13754.	7.33E-06	0.00	1.53E+11	4066.	9.41E+07	0.00
2.5000	-4.33E-05	-71340.	-9227.	6.83E-06	0.00	1.53E+11	3477.	9.63E+07	0.00
2.6000	-3.55E-05	-79917.	-5393.	6.23E-06	0.00	1.53E+11	2912.	9.85E+07	0.00
2.7000	-2.84E-05	-84298.	-2217.	5.59E-06	0.00	1.53E+11	2382.	1.01E+08	0.00
2.8000	-2.21E-05	-85250.	347.8630	4.92E-06	0.00	1.53E+11	1893.	1.03E+08	0.00
2.9000	-1.66E-05	-83474.	2355.	4.26E-06	0.00	1.53E+11	1452.	1.05E+08	0.00
3.0000	-1.19E-05	-79608.	3862.	3.62E-06	0.00	1.53E+11	1060.	1.07E+08	0.00
3.1000	-7.89E-06	-74215.	4929.	3.02E-06	0.00	1.53E+11	719.6941	1.09E+08	0.00
3.2000	-4.62E-06	-67784.	5619.	2.46E-06	0.00	1.53E+11	429.7910	1.12E+08	0.00
3.3000	-1.99E-06	-60734.	5990.	1.96E-06	0.00	1.53E+11	188.4595	1.14E+08	0.00
3.4000	7.45E-08	-53412.	6099.	1.51E-06	0.00	1.53E+11	-7.210	1.16E+08	0.00
3.5000	1.63E-06	-46100.	5998.	1.12E-06	0.00	1.53E+11	-160.867	1.18E+08	0.00
3.6000	2.76E-06	-39020.	5735.	7.83E-07	0.00	1.53E+11	-276.657	1.20E+08	0.00
3.7000	3.51E-06	-32337.	5354.	5.03E-07	0.00	1.53E+11	-359.008	1.23E+08	0.00
3.8000	3.96E-06	-26171.	4891.	2.74E-07	0.00	1.53E+11	-412.446	1.25E+08	0.00
3.9000	4.17E-06	-20599.	4379.	9.02E-08	0.00	1.53E+11	-441.445	1.27E+08	0.00
4.0000	4.18E-06	-15662.	3844.	-5.21E-08	0.00	1.53E+11	-450.301	1.29E+08	0.00
4.1000	4.04E-06	-11374.	3308.	-1.58E-07	0.00	1.53E+11	-443.041	1.31E+08	0.00

Performed by: Gokul Khatri 6/28/2024

Checked by: James Samples 7/1/2024

MEG-33 forward abutment X direction row 2

4.2000	3.80E-06	-7723.	2788.	-2.33E-07	0.00	1.53E+11	-423.351	1.34E+08	0.00
4.3000	3.48E-06	-4682.	2297.	-2.82E-07	0.00	1.53E+11	-394.535	1.36E+08	0.00
4.4000	3.12E-06	-2209.	1845.	-3.09E-07	0.00	1.53E+11	-359.487	1.38E+08	0.00
4.5000	2.74E-06	-253.813	1437.	-3.18E-07	0.00	1.53E+11	-320.687	1.40E+08	0.00
4.6000	2.36E-06	1240.	1076.	-3.15E-07	0.00	1.53E+11	-280.206	1.42E+08	0.00
4.7000	1.99E-06	2330.	764.2088	-3.01E-07	0.00	1.53E+11	-239.726	1.45E+08	0.00
4.8000	1.64E-06	3074.	500.0315	-2.79E-07	0.00	1.53E+11	-200.569	1.47E+08	0.00
4.9000	1.32E-06	3530.	281.4547	-2.53E-07	0.00	1.53E+11	-163.726	1.49E+08	0.00
5.0000	1.03E-06	3751.	105.2815	-2.25E-07	0.00	1.53E+11	-129.896	1.51E+08	0.00
5.1000	7.78E-07	3784.	-32.374	-1.95E-07	0.00	1.53E+11	-99.530	1.53E+08	0.00
5.2000	5.62E-07	3673.	-135.808	-1.66E-07	0.00	1.53E+11	-72.860	1.56E+08	0.00
5.3000	3.80E-07	3458.	-209.492	-1.38E-07	0.00	1.53E+11	-49.946	1.58E+08	0.00
5.4000	2.30E-07	3171.	-257.885	-1.12E-07	0.00	1.53E+11	-30.709	1.60E+08	0.00
5.5000	1.11E-07	2839.	-285.288	-8.85E-08	0.00	1.53E+11	-14.961	1.62E+08	0.00
5.6000	1.78E-08	2486.	-295.728	-6.76E-08	0.00	1.53E+11	-2.440	1.64E+08	0.00
5.7000	-5.16E-08	2130.	-292.890	-4.95E-08	0.00	1.53E+11	7.1705	1.67E+08	0.00
5.8000	-1.01E-07	1783.	-280.060	-3.41E-08	0.00	1.53E+11	14.2133	1.69E+08	0.00
5.9000	-1.34E-07	1458.	-260.106	-2.14E-08	0.00	1.53E+11	19.0429	1.71E+08	0.00
6.0000	-1.52E-07	1159.	-235.474	-1.12E-08	0.00	1.53E+11	22.0100	1.73E+08	0.00
6.1000	-1.60E-07	892.5230	-208.198	-3.11E-09	0.00	1.53E+11	23.4500	1.75E+08	0.00
6.2000	-1.60E-07	659.5686	-179.923	2.98E-09	0.00	1.53E+11	23.6748	1.78E+08	0.00
6.3000	-1.53E-07	460.7002	-151.938	7.37E-09	0.00	1.53E+11	22.9668	1.80E+08	0.00
6.4000	-1.42E-07	294.9000	-125.213	1.03E-08	0.00	1.53E+11	21.5762	1.82E+08	0.00
6.5000	-1.28E-07	160.1670	-100.436	1.21E-08	0.00	1.53E+11	19.7187	1.84E+08	0.00
6.6000	-1.13E-07	53.8274	-78.059	1.30E-08	0.00	1.53E+11	17.5762	1.86E+08	0.00
6.7000	-9.73E-08	-27.203	-58.334	1.31E-08	0.00	1.53E+11	15.2979	1.89E+08	0.00
6.8000	-8.17E-08	-86.204	-41.354	1.26E-08	0.00	1.53E+11	13.0024	1.91E+08	0.00
6.9000	-6.70E-08	-126.481	-27.085	1.18E-08	0.00	1.53E+11	10.7805	1.93E+08	0.00
7.0000	-5.35E-08	-151.233	-15.397	1.07E-08	0.00	1.53E+11	8.6983	1.95E+08	0.00
7.1000	-4.13E-08	-163.458	-6.098	9.46E-09	0.00	1.53E+11	6.8008	1.97E+08	0.00
7.2000	-3.07E-08	-165.889	1.0515	8.17E-09	0.00	1.53E+11	5.1149	2.00E+08	0.00
7.3000	-2.17E-08	-160.953	6.3122	6.89E-09	0.00	1.53E+11	3.6530	2.02E+08	0.00
7.4000	-1.42E-08	-150.755	9.9535	5.67E-09	0.00	1.53E+11	2.4158	2.04E+08	0.00
7.5000	-8.12E-09	-137.077	12.2400	4.54E-09	0.00	1.53E+11	1.3950	2.06E+08	0.00
7.6000	-3.32E-09	-121.389	13.4190	3.52E-09	0.00	1.53E+11	0.5701	2.06E+08	0.00
7.7000	3.39E-10	-104.879	13.7261	2.63E-09	0.00	1.53E+11	-0.05830	2.06E+08	0.00
7.8000	3.01E-09	-88.452	13.3810	1.88E-09	0.00	1.53E+11	-0.517	2.06E+08	0.00
7.9000	4.84E-09	-72.769	12.5713	1.24E-09	0.00	1.53E+11	-0.832	2.06E+08	0.00
8.0000	5.99E-09	-58.284	11.4538	7.30E-10	0.00	1.53E+11	-1.030	2.06E+08	0.00
8.1000	6.59E-09	-45.281	10.1557	3.23E-10	0.00	1.53E+11	-1.133	2.06E+08	0.00
8.2000	6.77E-09	-33.911	8.7775	1.26E-11	0.00	1.53E+11	-1.163	2.06E+08	0.00

Performed by: Gokul Khatri 6/28/2024

Checked by: James Samples 7/1/2024

MEG-33 forward abutment X direction row 2

8.3000	6.62E-09	-24.215	7.3963	-2.15E-10	0.00	1.53E+11	-1.139	2.06E+08	0.00
8.4000	6.25E-09	-16.159	6.0684	-3.74E-10	0.00	1.53E+11	-1.075	2.06E+08	0.00
8.5000	5.73E-09	-9.650	4.8330	-4.75E-10	0.00	1.53E+11	-0.984	2.06E+08	0.00
8.6000	5.11E-09	-4.559	3.7152	-5.31E-10	0.00	1.53E+11	-0.879	2.06E+08	0.00
8.7000	4.45E-09	-0.733	2.7289	-5.52E-10	0.00	1.53E+11	-0.765	2.06E+08	0.00
8.8000	3.79E-09	1.9917	1.8791	-5.47E-10	0.00	1.53E+11	-0.651	2.06E+08	0.00
8.9000	3.14E-09	3.7785	1.1646	-5.24E-10	0.00	1.53E+11	-0.540	2.06E+08	0.00
9.0000	2.53E-09	4.7879	0.5799	-4.90E-10	0.00	1.53E+11	-0.435	2.06E+08	0.00
9.1000	1.96E-09	5.1714	0.1166	-4.51E-10	0.00	1.53E+11	-0.337	2.06E+08	0.00
9.2000	1.45E-09	5.0688	-0.235	-4.11E-10	0.00	1.53E+11	-0.249	2.06E+08	0.00
9.3000	9.76E-10	4.6083	-0.485	-3.73E-10	0.00	1.53E+11	-0.168	2.06E+08	0.00
9.4000	5.50E-10	3.9062	-0.642	-3.40E-10	0.00	1.53E+11	-0.09453	2.06E+08	0.00
9.5000	1.60E-10	3.0679	-0.715	-3.12E-10	0.00	1.53E+11	-0.02759	2.06E+08	0.00
9.6000	-2.00E-10	2.1899	-0.711	-2.92E-10	0.00	1.53E+11	0.03439	2.06E+08	0.00
9.7000	-5.40E-10	1.3614	-0.635	-2.78E-10	0.00	1.53E+11	0.09282	2.06E+08	0.00
9.8000	-8.67E-10	0.6665	-0.490	-2.70E-10	0.00	1.53E+11	0.1490	2.06E+08	0.00
9.9000	-1.19E-09	0.1862	-0.278	-2.67E-10	0.00	1.53E+11	0.2042	2.06E+08	0.00
10.0000	-1.51E-09	0.00	0.00	-2.66E-10	0.00	1.53E+11	0.2590	1.03E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 2:

Pile-head deflection = 0.00098321 inches
 Computed slope at pile head = -0.0001541 radians
 Maximum bending moment = 1920000. inch-lbs
 Maximum shear force = -113965. lbs
 Depth of maximum bending moment = 0.000000 feet below pile head
 Depth of maximum shear force = 0.90000000 feet below pile head
 Number of iterations = 6
 Number of zero deflection points = 5

 Summary of Pile-head Responses for Conventional Analyses

Definitions of Pile-head Loading Conditions:

Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs
 Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
 Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.
 Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs
 Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians

Load Case No.	Load Type 1	Pile-head Load 1	Load Type 2	Pile-head Load 2	Axial Loading lbs	Pile-head Deflection inches	Pile-head Rotation radians	Max Shear in Pile lbs	Max Moment in Pile in-lbs
1	V, lb	1800.	M, in-lb	1416000.	714600.	6.24E-04	-1.04E-04	-83805.	1416000.
2	V, lb	2420.	M, in-lb	1920000.	921400.	9.83E-04	-1.54E-04	-113965.	1920000.

Maximum pile-head deflection = 0.0009832124 inches

Maximum pile-head rotation = -0.0001541471 radians = -0.008832 deg.

Summary of Warning Messages

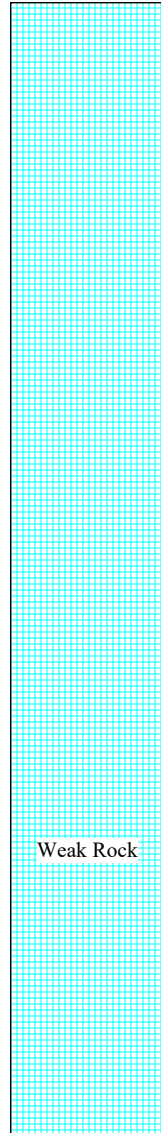
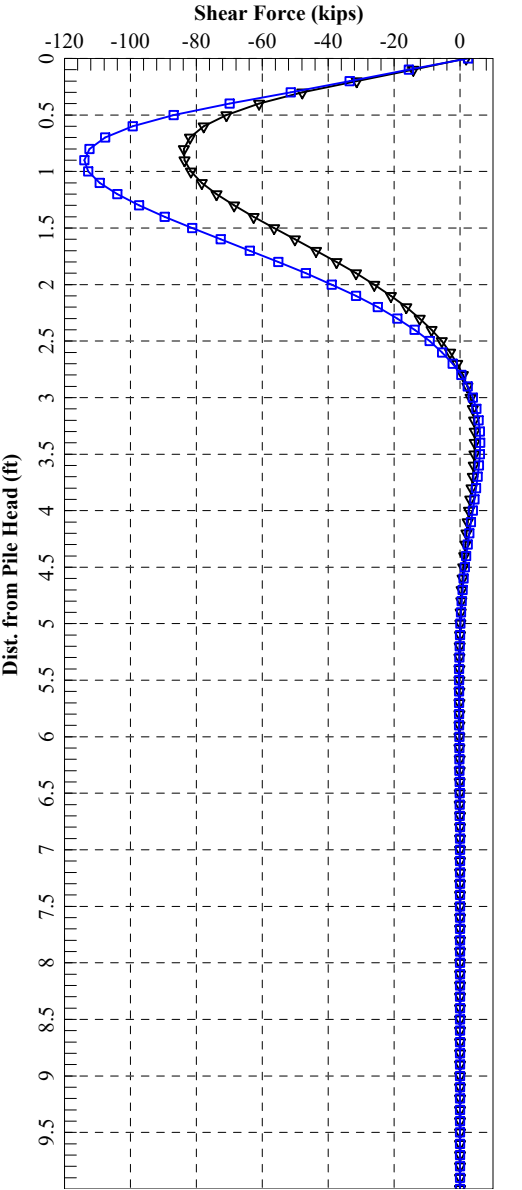
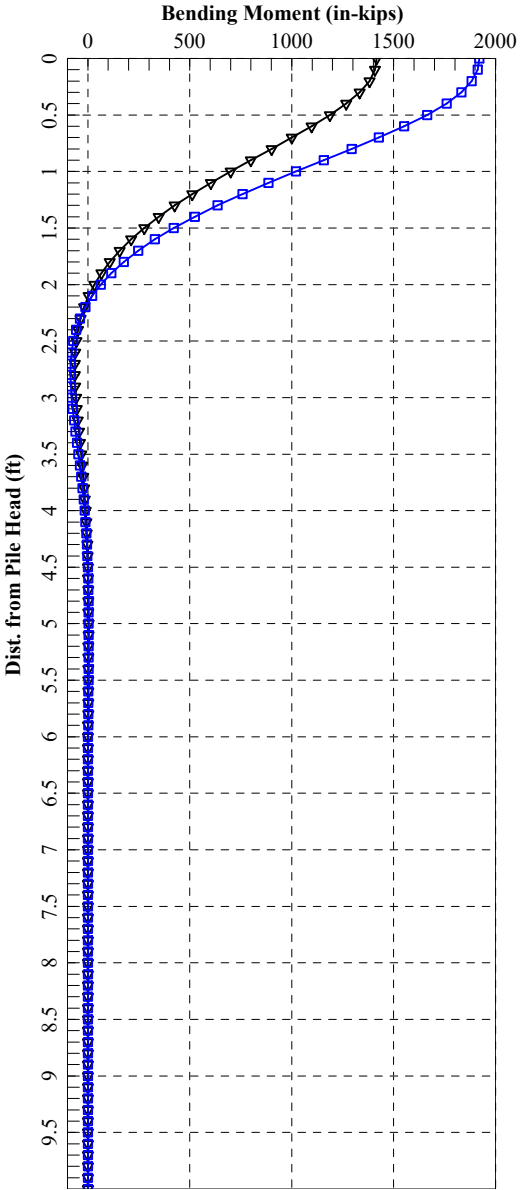
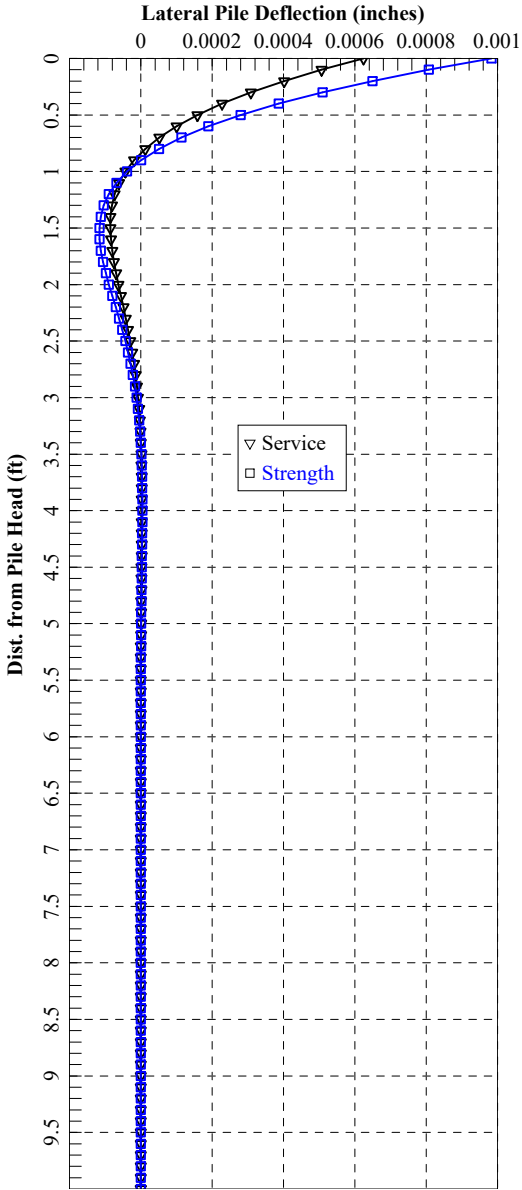
The following warning was reported 706 times

**** Warning ****

An unreasonable input value for unconfined compressive strength has been specified for a soil defined using the weak rock criteria. The input value is greater than 500 psi. Please check your input data for correctness.

The analysis ended normally.

MEG-33 Oldtown Creek Bridge Forward Abutment X Direction Row 2



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LPile for Windows, Version 2022-12.006

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method
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Files Used for Analysis

Path to file locations:

\\US0247-PPFSS01\shared_projects\173609140\119144\400-Engineering\Geotechnical\Analysis\Lpile\bridges\LPile
Analysis\Old Town Creek Bridge\forward abutment\

Name of input data file:

Forward Abutment X-direction row 3.lp12d

Name of output report file:

Forward Abutment X-direction row 3.lp12o

Name of plot output file:
Forward Abutment X-direction row 3.lp12p

Name of runtime message file:
Forward Abutment X-direction row 3.lp12r

Date and Time of Analysis

Date: June 28, 2024

Time: 14:52:02

Problem Title

-

Project Name: MEG-33-19.21

Job Number: 173609140

Client: ODOT

Engineer: G. Khatri

Description: Forward Abutment lateral Load Analysis at Oldtwon Creek

- Program Options and Settings

Performed by: Gokul Khatri 6/28/2024

Checked by: James Samples 7/1/2024

-

Computational Options:

- Conventional Analysis

Engineering Units Used for Data Input and Computations:

- US Customary System Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed = 500
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 100.0000 in
- Number of pile increments = 100

Loading Type and Number of Cycles of Loading:

- Static loading specified

- Analysis uses p-y modification factors for p-y curves
- Analysis uses layering correction (Method of Georgiadis)
- No distributed lateral loads are entered
- Loading by lateral soil movements acting on pile not selected
- Input of shear resistance at the pile tip not selected
- Input of moment resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:

- Output files use decimal points to denote decimal symbols.
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1
- No p-y curves to be computed and reported for user-specified depths
- Print using wide report formats

Pile Structural Properties and Geometry

Number of pile sections defined = 1

Total length of pile = 10.000 ft
 Depth of ground surface below top of pile = 0.0000 ft

Pile diameters used for p-y curve computations are defined using 2 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile. A summary of values of pile diameter vs. depth follows.

Point No.	Depth Below Pile Head feet	Pile Diameter inches
1	0.000	30.0000
2	10.000	30.0000

Input Structural Properties for Pile Sections:

Pile Section No. 1:

Section 1 is a round drilled shaft, bored pile, or CIDH pile
 Length of section = 10.000000 ft
 Shaft Diameter = 30.000000 in

 Soil and Rock Layering Information

The soil profile is modelled using 1 layers

Layer 1 is weak rock, p-y criteria by Reese, 1997

Distance from top of pile to top of layer = 0.0000 ft
 Distance from top of pile to bottom of layer = 15.000000 ft
 Effective unit weight at top of layer = 82.600000 pcf
 Effective unit weight at bottom of layer = 82.600000 pcf
 Uniaxial compressive strength at top of layer = 3820. psi
 Uniaxial compressive strength at bottom of layer = 3820. psi

Initial modulus of rock at top of layer = 343800. psi
 Initial modulus of rock at bottom of layer = 343800. psi
 RQD of rock at top of layer = 99.000000 %
 RQD of rock at bottom of layer = 99.000000 %
 k_{rm} of rock at top of layer = 0.0000500
 k_{rm} of rock at bottom of layer = 0.0000500

(Depth of the lowest soil layer extends 5.000 ft below the pile tip)

 Summary of Input Soil Properties

Layer Num.	Soil Type Name (p-y Curve Type)	Layer Depth ft	Effective Unit Wt. pcf	Uniaxial qu psi	RQD %	E50 or k _{rm}	Rock Mass Modulus psi
1	Weak Rock	0.00 15.0000	82.6000 82.6000	3820. 3820.	99.0000 99.0000	5.00E-05 5.00E-05	343800. 343800.

 Modification Factors for p-y Curves

Distribution of p-y modifiers with depth defined using 2 points

Point No.	Depth X ft	p-mult	y-mult
1	0.000	0.7000	1.0000
2	10.000	0.7000	1.0000

 Static Loading Type

 Static loading criteria were used when computing p-y curves for all analyses.

 Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 2

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length	Run Analysis
1	1	V = 1800. lbs	M = 1416000. in-lbs	714600.	No	Yes
2	1	V = 2420. lbs	M = 1920000. in-lbs	921400.	No	Yes

V = shear force applied normal to pile axis

M = bending moment applied to pile head

y = lateral deflection normal to pile axis

S = pile slope relative to original pile batter angle

R = rotational stiffness applied to pile head

Values of top y vs. pile lengths can be computed only for load types with specified shear loading (Load Types 1, 2, and 3).

Thrust force is assumed to be acting axially for all pile batter angles.

 Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 1

Pile Section No. 1:

Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section	=	10.000000	ft
Shaft Diameter	=	30.000000	in
Concrete Cover Thickness (to edge of trans. reinf.)	=	3.000000	in
Number of Reinforcing Bars	=	8	bars
Yield Stress of Reinforcing Bars	=	50000.	psi
Modulus of Elasticity of Reinforcing Bars	=	29000000.	psi
Gross Area of Shaft	=	706.858347	sq. in.
Total Area of Reinforcing Steel	=	8.000000	sq. in.
Area Ratio of Steel Reinforcement	=	1.13	percent
Edge-to-Edge Bar Spacing	=	7.242052	in
Maximum Concrete Aggregate Size	=	0.750000	in
Ratio of Bar Spacing to Aggregate Size	=	9.66	
Offset of Center of Rebar Cage from Center of Pile	=	0.0000	in
Transverse Reinforcement			
Type: Spiral			
Number of Transverse Reinf. (per spacing)	=	1	
Spacing of Transverse Reinf.	=	4.000000	in
Yield Stress of Transverse Reinf.	=	50000.	psi
Diameter of Transverse Reinf.	=	0.500000	in

Axial Structural Capacities:

Nom. Axial Structural Capacity = $0.85 F_c A_c + F_y A_s$	=	2776.118	kips
Tensile Load for Cracking of Concrete	=	-317.428	kips
Nominal Axial Tensile Capacity	=	-400.000	kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
-----	-----	-----	-----	-----
1	1.128000	1.000000	10.936000	0.000000
2	1.128000	1.000000	7.732920	7.732920
3	1.128000	1.000000	0.000000	10.936000
4	1.128000	1.000000	-7.732920	7.732920
5	1.128000	1.000000	-10.936000	0.000000
6	1.128000	1.000000	-7.732920	-7.732920

7	1.128000	1.000000	0.000000	-10.93600
8	1.128000	1.000000	7.732920	-7.73292

NOTE: The positions of the above rebars were computed by LPILE

Minimum spacing between any two bars not equal to zero = 7.242 inches
between bars 1 and 2.

Ratio of bar spacing to maximum aggregate size = 9.66

Concrete Properties:

Compressive Strength of Concrete	=	4000. psi
Modulus of Elasticity of Concrete	=	3604997. psi
Modulus of Rupture of Concrete	=	-474.34165 psi
Compression Strain at Peak Stress	=	0.001886
Tensile Strain at Fracture of Concrete	=	-0.0001154
Maximum Coarse Aggregate Size	=	0.750000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 2

Number	Axial Thrust Force kips
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1	714.600
2	921.400

Definitions of Run Messages and Notes:

C = concrete in section has cracked in tension.
Y = stress in reinforcing steel has reached yield stress.
T = ACI 318 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than 0.003. See ACI 318-14, Section 21.2.3.
Z = depth of tensile zone in concrete section is less than 10 percent of

section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.

Position of neutral axis is measured from edge of compression side of pile.

Compressive stresses and strains are positive in sign.

Tensile stresses and strains are negative in sign.

Axial Thrust Force = 714.600 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
0.00000125	199.4180428	159534434.	204.9832495	0.0002562	0.0002187	1.0122155	7.3055803	
0.00000250	398.8288884	159531555.	110.0209688	0.0002751	0.0002001	1.0801344	7.7263952	
0.00000375	598.2073321	159521955.	78.3799158	0.0002939	0.0001814	1.1474476	8.1486283	
0.00000500	797.5371707	159507434.	62.5691717	0.0003128	0.0001628	1.2141489	8.5722799	
0.00000625	996.8021944	159488351.	53.0905535	0.0003318	0.0001443	1.2802322	8.9973503	
0.00000750	1196.	159464825.	46.7780005	0.0003508	0.0001258	1.3456914	9.4238401	
0.00000875	1395.	159436904.	42.2746302	0.0003699	0.0001074	1.4105204	9.8517499	
0.00001000	1594.	159404613.	38.9020017	0.0003890	0.00008902	1.4747129	10.2810805	
0.00001125	1793.	159367964.	36.2832037	0.0004082	0.00007069	1.5382628	10.7118328	
0.00001250	1992.	159326960.	34.1920899	0.0004274	0.00005240	1.6011641	11.1440076	
0.00001375	2190.	159281606.	32.4847490	0.0004467	0.00003417	1.6634104	11.5776062	
0.00001500	2388.	159231901.	31.0652407	0.0004660	0.00001598	1.7249957	12.0126298	
0.00001625	2587.	159177842.	29.8671450	0.0004853	-0.00000216	1.7859136	12.4490796	
0.00001750	2785.	159117875.	28.8429800	0.0005048	-0.00002025	1.8461560	12.8869374	
0.00001875	2982.	159044956.	27.9577695	0.0005242	-0.00003829	1.9057055	13.3260997	
0.00002000	3179.	158952237.	27.1852249	0.0005437	-0.00005630	1.9645421	13.7664305	
0.00002125	3375.	158835622.	26.5052585	0.0005632	-0.00007426	2.0226475	14.2078031	
0.00002250	3571.	158693232.	25.9022725	0.0005828	-0.00009220	2.0800060	14.6501079	
0.00002375	3765.	158524829.	25.3639823	0.0006024	-0.000110	2.1366044	15.0932554	
0.00002500	3765.	150598588.	24.5996240	0.0006150	-0.000135	2.1723507	15.3334774	C
0.00002625	3849.	146644088.	24.0951796	0.0006325	-0.000155	2.2216680	15.7161430	C
0.00002750	3970.	144345851.	23.6281596	0.0006498	-0.000175	2.2696639	16.0920824	C
0.00002875	4084.	142043564.	23.1945524	0.0006668	-0.000196	2.3164339	16.4620206	C
0.00003000	4193.	139753523.	22.7904690	0.0006837	-0.000216	2.3620249	16.8262081	C
0.00003125	4297.	137509554.	22.4136466	0.0007004	-0.000237	2.4065664	17.1858049	C
0.00003250	4398.	135312799.	22.0609775	0.0007170	-0.000258	2.4500793	17.5408464	C
0.00003375	4494.	133153534.	21.7292649	0.0007334	-0.000279	2.4925358	17.8908306	C

MEG-33 forward abutment X direction row 3

0.00003500	4586.	131042698.	21.4167814	0.0007496	-0.000300	2.5340015	18.2362832	C
0.00003625	4676.	128986058.	21.1219089	0.0007657	-0.000322	2.5745274	18.5775943	C
0.00003750	4762.	126985689.	20.8431270	0.0007816	-0.000343	2.6141513	18.9150258	C
0.00003875	4845.	125035157.	20.5786295	0.0007974	-0.000365	2.6528637	19.2482975	C
0.00004000	4926.	123138590.	20.3274304	0.0008131	-0.000387	2.6907139	19.5778194	C
0.00004125	5004.	121299491.	20.0887105	0.0008287	-0.000409	2.7277540	19.9040573	C
0.00004250	5080.	119519095.	19.8616750	0.0008441	-0.000431	2.7640264	20.2273894	C
0.00004375	5154.	117798333.	19.6456528	0.0008595	-0.000453	2.7995750	20.5482347	C
0.00004500	5225.	116114329.	19.4383172	0.0008747	-0.000475	2.8342633	20.8647541	C
0.00004625	5295.	114488278.	19.2405890	0.0008899	-0.000498	2.8682761	21.1791268	C
0.00004750	5364.	112921255.	19.0521189	0.0009050	-0.000520	2.9016642	21.4919187	C
0.00004875	5430.	111384400.	18.8701880	0.0009199	-0.000543	2.9342188	21.8002909	C
0.00005125	5559.	108467759.	18.5297105	0.0009496	-0.000588	2.9975062	22.4122197	C
0.00005375	5683.	105722693.	18.2153524	0.0009791	-0.000633	3.0582424	23.0154929	C
0.00005625	5801.	103136041.	17.9240408	0.0010082	-0.000679	3.1165320	23.6107787	C
0.00005875	5916.	100696577.	17.6532831	0.0010371	-0.000725	3.1724793	24.1988437	C
0.00006125	6027.	98394571.	17.4010535	0.0010658	-0.000772	3.2261883	24.7805590	C
0.00006375	6134.	96221477.	17.1657072	0.0010943	-0.000818	3.2777624	25.3569137	C
0.00006625	6239.	94169672.	16.9459140	0.0011227	-0.000865	3.3273035	25.9290250	C
0.00006875	6340.	92213734.	16.7383110	0.0011508	-0.000912	3.3746471	26.4935703	C
0.00007125	6438.	90363684.	16.5437610	0.0011787	-0.000959	3.4200891	27.0549839	C
0.00007375	6535.	88612677.	16.3613927	0.0012067	-0.001006	3.4637016	27.6142414	C
0.00007625	6629.	86935736.	16.1878059	0.0012343	-0.001053	3.5052483	28.1664735	C
0.00007875	6721.	85350028.	16.0253352	0.0012620	-0.001101	3.5451307	28.7189220	C
0.00008125	6811.	83828854.	15.8702784	0.0012895	-0.001148	3.5830500	29.2652812	C
0.00008375	6900.	82386121.	15.7247513	0.0013169	-0.001196	3.6193491	29.8123025	C
0.00008625	6986.	80998611.	15.5853436	0.0013442	-0.001243	3.6537460	30.3535283	C
0.00008875	7072.	79681983.	15.4547125	0.0013716	-0.001291	3.6866116	30.8971285	C
0.00009125	7155.	78410457.	15.3287335	0.0013987	-0.001339	3.7175810	31.4340984	C
0.00009375	7237.	77199187.	15.2102173	0.0014260	-0.001387	3.7470141	31.9730910	C
0.00009625	7318.	76036211.	15.0972309	0.0014531	-0.001434	3.7747671	32.5103335	C
0.00009875	7398.	74916898.	14.9891503	0.0014802	-0.001482	3.8008320	-33.107383	C
0.0001013	7477.	73846539.	14.8872251	0.0015073	-0.001530	3.8253680	-34.244822	C
0.0001038	7554.	72813003.	14.7892399	0.0015344	-0.001578	3.8482084	-35.385187	C
0.0001063	7631.	71817016.	14.6955872	0.0015614	-0.001626	3.8694260	-36.526409	C
0.0001088	7706.	70860920.	14.6070155	0.0015885	-0.001674	3.8891065	-37.665187	C
0.0001113	7781.	69938221.	14.5223186	0.0016156	-0.001722	3.9071727	-38.804308	C
0.0001138	7854.	69042914.	14.4403308	0.0016426	-0.001770	3.9235660	-39.946773	C
0.0001163	7926.	68180586.	14.3626112	0.0016697	-0.001818	3.9384133	-41.086734	C
0.0001188	7998.	67349061.	14.2888993	0.0016968	-0.001866	3.9516994	-42.224165	C
0.0001213	8068.	66542258.	14.2178492	0.0017239	-0.001914	3.9633547	-43.362925	C

MEG-33 forward abutment X direction row 3

0.0001238	8138.	65757885.	14.1490642	0.0017509	-0.001962	3.9733772	-44.503858	C
0.0001263	8206.	64999389.	14.0837159	0.0017781	-0.002009	3.9818277	-45.642182	C
0.0001288	8274.	64265183.	14.0216138	0.0018053	-0.002057	3.9886901	-46.777862	C
0.0001313	8341.	63553797.	13.9625822	0.0018326	-0.002105	3.9939482	-47.910859	C
0.0001338	8407.	62858748.	13.9048098	0.0018598	-0.002153	3.9975623	-49.047531	C
0.0001363	8472.	62181936.	13.8493385	0.0018870	-0.002201	3.9995621	-50.000000	CY
0.0001388	8535.	61516354.	13.7960554	0.0019142	-0.002248	3.9986615	-50.000000	CY
0.0001413	8594.	60839141.	13.7434130	0.0019413	-0.002296	3.9999173	-50.000000	CY
0.0001438	8645.	60141546.	13.6907115	0.0019680	-0.002344	3.9992375	-50.000000	CY
0.0001463	8692.	59434679.	13.6380833	0.0019946	-0.002393	3.9999978	-50.000000	CY
0.0001488	8737.	58733203.	13.5856869	0.0020209	-0.002442	3.9994761	-50.000000	CY
0.0001588	8906.	56103651.	13.3981144	0.0021270	-0.002636	3.9994920	-50.000000	CY
0.0001688	9065.	53721061.	13.2369123	0.0022337	-0.002829	3.9988322	-50.000000	CY
0.0001788	9200.	51467700.	13.0910274	0.0023400	-0.003022	3.9999952	-50.000000	CY
0.0001888	9269.	49106716.	12.9318472	0.0024409	-0.003222	3.9982060	50.000000	CY
0.0001988	9314.	46861353.	12.7868617	0.0025414	-0.003421	3.9989494	50.000000	CY
0.0002088	9350.	44789994.	12.6594478	0.0026427	-0.003620	3.9992150	50.000000	CY
0.0002188	9380.	42880410.	12.5491621	0.0027451	-0.003817	3.9991756	50.000000	CY
0.0002288	9407.	41123490.	12.4533543	0.0028487	-0.004014	3.9988031	50.000000	CY
0.0002388	9430.	39496988.	12.3637902	0.0029519	-0.004211	3.9977634	50.000000	CY
0.0002488	9451.	37992737.	12.2845986	0.0030558	-0.004407	3.9959758	50.000000	CY
0.0002588	9470.	36597337.	12.2146634	0.0031605	-0.004602	3.9999519	50.000000	CY
0.0002688	9487.	35298838.	12.1529478	0.0032661	-0.004796	3.9989124	50.000000	CY
0.0002788	9501.	34084929.	12.0940980	0.0033712	-0.004991	3.9956640	50.000000	CY
0.0002888	9514.	32950314.	12.0415042	0.0034770	-0.005186	3.9998422	50.000000	CY
0.0002988	9526.	31887091.	11.9948434	0.0035835	-0.005379	3.9971331	50.000000	CY
0.0003088	9537.	30889589.	11.9530289	0.0036905	-0.005572	3.9999957	50.000000	CY
0.0003188	9547.	29950579.	11.9161078	0.0037983	-0.005764	3.9973747	50.000000	CY
0.0003288	9547.	29039534.	11.9110790	0.0039158	-0.005947	3.9975909	50.000000	CY

Axial Thrust Force = 921.400 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
0.00000125	191.1540359	152923229.	264.8377707	0.0003310	0.0002935	1.2801666	9.4753067	
0.00000250	382.3030479	152921219.	139.9495047	0.0003499	0.0002749	1.3449615	9.8962141	
0.00000375	573.4182496	152911533.	98.3336902	0.0003688	0.0002563	1.4091495	10.3186013	
0.00000500	764.4827347	152896547.	77.5359908	0.0003877	0.0002377	1.4727241	10.7424686	

MEG-33 forward abutment X direction row 3

0.00000625	955.4795844	152876734.	65.0655401	0.0004067	0.0002192	1.5356789	11.1678166
0.00000750	1146.	152852250.	56.7587163	0.0004257	0.0002007	1.5980075	11.5946457
0.00000875	1337.	152823162.	50.8311108	0.0004448	0.0001823	1.6597036	12.0229569
0.00001000	1528.	152789501.	46.3905198	0.0004639	0.0001639	1.7207607	12.4527507
0.00001125	1718.	152751283.	42.9412746	0.0004831	0.0001456	1.7811724	12.8840284
0.00001250	1909.	152708515.	40.1859748	0.0005023	0.0001273	1.8409323	13.3167909
0.00001375	2099.	152661202.	37.9353656	0.0005216	0.0001091	1.9000338	13.7510396
0.00001500	2289.	152609343.	36.0632776	0.0005409	0.00009095	1.9584706	14.1867758
0.00001625	2479.	152552937.	34.4823629	0.0005603	0.00007284	2.0162361	14.6240011
0.00001750	2669.	152491982.	33.1302307	0.0005798	0.00005478	2.0733240	15.0627171
0.00001875	2858.	152426474.	31.9611276	0.0005993	0.00003677	2.1297276	15.5029257
0.00002000	3047.	152356408.	30.9407390	0.0006188	0.00001881	2.1854406	15.9446287
0.00002125	3236.	152281779.	30.0428247	0.0006384	9.10024E-07	2.2404563	16.3878283
0.00002250	3425.	152202130.	29.2469636	0.0006581	-0.00001694	2.2947675	16.8325188
0.00002375	3613.	152114159.	28.5369538	0.0006778	-0.00003475	2.3483616	17.2786395
0.00002500	3800.	152013568.	27.8997815	0.0006975	-0.00005251	2.4012232	17.7260917
0.00002625	3987.	151897090.	27.3249094	0.0007173	-0.00007022	2.4533370	18.1747748
0.00002750	4173.	151762602.	26.8037248	0.0007371	-0.00008790	2.5046890	18.6245956
0.00002875	4359.	151608927.	26.3291243	0.0007570	-0.000106	2.5552667	19.0754700
0.00003000	4380.	146005325.	25.7294965	0.0007719	-0.000128	2.5925806	19.3831620 C
0.00003125	4515.	144472413.	25.2864932	0.0007902	-0.000147	2.6378229	19.7893221 C
0.00003250	4643.	142869638.	24.8718947	0.0008083	-0.000167	2.6818773	20.1901358 C
0.00003375	4767.	141230182.	24.4832588	0.0008263	-0.000186	2.7248239	20.5863021 C
0.00003500	4884.	139554894.	24.1173997	0.0008441	-0.000206	2.7666485	20.9774108 C
0.00003625	4997.	137859321.	23.7722019	0.0008617	-0.000226	2.8073921	21.3637149 C
0.00003750	5106.	136161548.	23.4460915	0.0008792	-0.000246	2.8471161	21.7457496 C
0.00003875	5211.	134469791.	23.1374015	0.0008966	-0.000266	2.8858535	22.1237176 C
0.00004000	5312.	132793663.	22.8448197	0.0009138	-0.000286	2.9236486	22.4979910 C
0.00004125	5410.	131140903.	22.5671909	0.0009309	-0.000307	2.9605437	22.8689397 C
0.00004250	5504.	129515586.	22.3033848	0.0009479	-0.000327	2.9965690	23.2367969 C
0.00004375	5596.	127919544.	22.0523293	0.0009648	-0.000348	3.0317467	23.6017054 C
0.00004500	5685.	126337176.	21.8120731	0.0009815	-0.000368	3.0660065	23.9625055 C
0.00004625	5771.	124785672.	21.5826573	0.0009982	-0.000389	3.0994494	24.3204267 C
0.00004750	5855.	123268364.	21.3634908	0.0010148	-0.000410	3.1321114	24.6758337 C
0.00004875	5937.	121787016.	21.1540002	0.0010313	-0.000431	3.1640223	25.0290304 C
0.00005125	6093.	118891397.	20.7588605	0.0010639	-0.000474	3.2253992	25.7252941 C
0.00005375	6242.	116125104.	20.3946037	0.0010962	-0.000516	3.2838698	26.4124012 C
0.00005625	6383.	113482423.	20.0574398	0.0011282	-0.000559	3.3395338	27.0908855 C
0.00005875	6519.	110957534.	19.7442119	0.0011600	-0.000603	3.3924841	27.7612637 C
0.00006125	6648.	108545369.	19.4523283	0.0011915	-0.000646	3.4428127	28.4241358 C
0.00006375	6773.	106241439.	19.1796558	0.0012227	-0.000690	3.4906103	29.0802014 C

MEG-33 forward abutment X direction row 3

0.00006625	6893.	104041679.	18.9244375	0.0012537	-0.000734	3.5359658	29.7302633	C
0.00006875	7009.	101942339.	18.6852292	0.0012846	-0.000778	3.5789656	30.3752384	C
0.00007125	7121.	99937417.	18.4605955	0.0013153	-0.000822	3.6196689	31.0156430	C
0.00007375	7228.	98008739.	18.2479213	0.0013458	-0.000867	3.6580045	31.6490537	C
0.00007625	7333.	96168734.	18.0479016	0.0013762	-0.000911	3.6941887	32.2796099	C
0.00007875	7435.	94412516.	17.8596763	0.0014064	-0.000956	3.7282713	32.9080983	C
0.00008125	7533.	92716062.	17.6800848	0.0014365	-0.001001	3.7600921	33.5296376	C
0.00008375	7630.	91099483.	17.5112522	0.0014666	-0.001046	3.7899348	34.1512665	C
0.00008625	7723.	89539807.	17.3501889	0.0014965	-0.001091	3.8176386	34.7678477	C
0.00008875	7814.	88047010.	17.1980016	0.0015263	-0.001136	3.8433694	35.3839192	C
0.00009125	7903.	86606561.	17.0527084	0.0015561	-0.001181	3.8670424	35.9961673	C
0.00009375	7990.	85226324.	16.9153342	0.0015858	-0.001227	3.8887883	36.6088777	C
0.00009625	8074.	83889237.	16.7834166	0.0016154	-0.001272	3.9084899	37.2168994	C
0.00009875	8158.	82610392.	16.6592631	0.0016451	-0.001317	3.9263339	37.8280276	C
0.0001013	8238.	81365430.	16.5390690	0.0016746	-0.001363	3.9421324	38.4327790	C
0.0001038	8318.	80169915.	16.4254424	0.0017041	-0.001408	3.9560623	39.0398627	C
0.0001063	8395.	79016218.	16.3171940	0.0017337	-0.001454	3.9680784	39.6470417	C
0.0001088	8471.	77894462.	16.2126856	0.0017631	-0.001499	3.9781369	40.2503200	C
0.0001113	8546.	76814733.	16.1138650	0.0017927	-0.001545	3.9863249	40.8567947	C
0.0001138	8619.	75769242.	16.0193975	0.0018222	-0.001590	3.9926009	41.4633002	C
0.0001163	8690.	74750665.	15.9279628	0.0018516	-0.001636	3.9969504	42.0663324	C
0.0001188	8760.	73767043.	15.8413330	0.0018812	-0.001681	3.9994092	42.6726532	C
0.0001213	8829.	72815841.	15.7592415	0.0019108	-0.001727	3.9989865	43.2823708	C
0.0001238	8896.	71884143.	15.6790788	0.0019403	-0.001772	3.9999969	43.8871045	C
0.0001263	8961.	70979166.	15.6028193	0.0019699	-0.001818	3.9998614	44.4945088	C
0.0001288	9026.	70101036.	15.5305132	0.0019996	-0.001863	3.9994606	45.1056162	C
0.0001313	9089.	69248448.	15.4619204	0.0020294	-0.001908	3.9986942	45.7203723	C
0.0001338	9150.	68412603.	15.3949921	0.0020591	-0.001953	3.9999324	46.3316384	C
0.0001363	9210.	67598428.	15.3310645	0.0020889	-0.001999	3.9994446	46.9450565	C
0.0001388	9269.	66807063.	15.2703006	0.0021188	-0.002044	3.9988883	47.5619351	C
0.0001413	9328.	66036395.	15.2126231	0.0021488	-0.002089	3.9998122	48.1826451	C
0.0001438	9385.	65286308.	15.1577862	0.0021789	-0.002134	3.9989351	48.8068340	C
0.0001463	9441.	64550972.	15.1040094	0.0022090	-0.002179	3.9999544	49.4275676	C
0.0001488	9495.	63833260.	15.0526347	0.0022391	-0.002223	3.9992103	50.0000000	CY
0.0001588	9686.	61013843.	14.8654846	0.0023599	-0.002403	3.9992142	50.0000000	CY
0.0001688	9817.	58175862.	14.6953826	0.0024798	-0.002583	3.9982692	50.0000000	CY
0.0001788	9932.	55562506.	14.5556553	0.0026018	-0.002761	3.9999210	50.0000000	CY
0.0001888	10036.	53172740.	14.4339500	0.0027244	-0.002938	3.9982415	50.0000000	CY
0.0001988	10131.	50971087.	14.3294039	0.0028480	-0.003115	3.9994502	50.0000000	CY
0.0002088	10189.	48808656.	14.2208676	0.0029686	-0.003294	3.9997920	50.0000000	CY
0.0002188	10214.	46690338.	14.1042804	0.0030853	-0.003477	3.9997463	50.0000000	CY

0.0002288	10231.	44725798.	13.9992652	0.0032023	-0.003660	3.9994496	50.0000000	CY
0.0002388	10245.	42911896.	13.9038954	0.0033196	-0.003843	3.9986206	50.0000000	CY
0.0002488	10255.	41227204.	13.8182188	0.0034373	-0.004025	3.9967910	50.0000000	CY
0.0002588	10262.	39660920.	13.7440900	0.0035563	-0.004206	3.9996630	50.0000000	CY
0.0002688	10264.	38189961.	13.6841784	0.0036776	-0.004385	3.9994202	50.0000000	CY
0.0002788	10264.	36819917.	13.6341225	0.0038005	-0.004562	3.9970820	50.0000000	CY

Summary of Results for Nominal Moment Capacity for Section 1

Moment values interpolated at maximum compressive strain = 0.003
or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain	Max. Tens. Strain
----	-----	-----	-----	-----
1	714.600	9439.535	0.00300000	-0.00430146
2	921.400	10195.452	0.00300000	-0.00334320

Note that the values of moment capacity in the table above are not factored by a strength reduction factor (phi-factor).

In ACI 318, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.75).

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318, or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Load No.	Resist. Factor	Nominal Ax. Thrust kips	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in^2
----	-----	-----	-----	-----	-----	-----
1	0.65	714.600000	9440.	464.490000	6136.	96190522.
2	0.65	921.400000	10195.	598.910000	6627.	108942776.

1	0.75	714.600000	9440.	535.950000	7080.	79561599.
2	0.75	921.400000	10195.	691.050000	7647.	90814947.
1	0.90	714.600000	9440.	643.140000	8496.	61936266.
2	0.90	921.400000	10195.	829.260000	9176.	68064153.

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 1

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 1800.0 lbs
 Applied moment at pile head = 1416000.0 in-lbs
 Axial thrust load on pile head = 714600.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	6.77E-04	1416000.	1800.	-1.08E-04	0.00	1.59E+11	-11190.	9918118.	0.00
0.1000	5.54E-04	1410191.	-11659.	-9.71E-05	0.00	1.59E+11	-11241.	2.43E+07	0.00
0.2000	4.44E-04	1388186.	-25124.	-8.65E-05	0.00	1.59E+11	-11201.	3.03E+07	0.00
0.3000	3.46E-04	1350042.	-40134.	-7.62E-05	0.00	1.59E+11	-13815.	4.79E+07	0.00
0.4000	2.61E-04	1291996.	-54956.	-6.63E-05	0.00	1.59E+11	-10889.	5.01E+07	0.00
0.5000	1.87E-04	1218261.	-66384.	-5.68E-05	0.00	1.59E+11	-8158.	5.23E+07	0.00
0.6000	1.25E-04	1132771.	-74672.	-4.80E-05	0.00	1.59E+11	-5655.	5.45E+07	0.00
0.7000	7.21E-05	1039130.	-80109.	-3.98E-05	0.00	1.59E+11	-3406.	5.67E+07	0.00
0.8000	2.90E-05	940578.	-83007.	-3.24E-05	0.00	1.59E+11	-1424.	5.89E+07	0.00
0.9000	-5.57E-06	839969.	-83691.	-2.57E-05	0.00	1.60E+11	283.3718	6.11E+07	0.00
1.0000	-3.26E-05	739763.	-82491.	-1.97E-05	0.00	1.60E+11	1718.	6.33E+07	0.00
1.1000	-5.29E-05	642026.	-79727.	-1.45E-05	0.00	1.60E+11	2888.	6.55E+07	0.00
1.2000	-6.75E-05	548443.	-75711.	-1.01E-05	0.00	1.60E+11	3805.	6.77E+07	0.00
1.3000	-7.71E-05	460336.	-70736.	-6.27E-06	0.00	1.60E+11	4488.	6.99E+07	0.00
1.4000	-8.25E-05	378688.	-65070.	-3.11E-06	0.00	1.60E+11	4956.	7.21E+07	0.00
1.5000	-8.46E-05	304174.	-58957.	-5.43E-07	0.00	1.60E+11	5232.	7.43E+07	0.00

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1.6000	-8.38E-05	237193.	-52612.	1.49E-06	0.00	1.60E+11	5342.	7.65E+07	0.00
1.7000	-8.10E-05	177902.	-46223.	3.05E-06	0.00	1.60E+11	5308.	7.87E+07	0.00
1.8000	-7.65E-05	126253.	-39945.	4.20E-06	0.00	1.60E+11	5155.	8.09E+07	0.00
1.9000	-7.09E-05	82027.	-33907.	4.98E-06	0.00	1.60E+11	4907.	8.31E+07	0.00
2.0000	-6.45E-05	44867.	-28211.	5.46E-06	0.00	1.60E+11	4586.	8.53E+07	0.00
2.1000	-5.78E-05	14311.	-22932.	5.68E-06	0.00	1.60E+11	4213.	8.75E+07	0.00
2.2000	-5.09E-05	-10179.	-18122.	5.70E-06	0.00	1.60E+11	3804.	8.97E+07	0.00
2.3000	-4.41E-05	-29190.	-13812.	5.55E-06	0.00	1.60E+11	3378.	9.19E+07	0.00
2.4000	-3.76E-05	-43338.	-10017.	5.28E-06	0.00	1.60E+11	2947.	9.41E+07	0.00
2.5000	-3.15E-05	-53241.	-6734.	4.91E-06	0.00	1.60E+11	2524.	9.63E+07	0.00
2.6000	-2.58E-05	-59508.	-3949.	4.49E-06	0.00	1.60E+11	2118.	9.85E+07	0.00
2.7000	-2.07E-05	-62726.	-1637.	4.03E-06	0.00	1.60E+11	1736.	1.01E+08	0.00
2.8000	-1.61E-05	-63444.	234.7117	3.55E-06	0.00	1.60E+11	1384.	1.03E+08	0.00
2.9000	-1.22E-05	-62169.	1704.	3.08E-06	0.00	1.60E+11	1065.	1.05E+08	0.00
3.0000	-8.75E-06	-59360.	2812.	2.62E-06	0.00	1.60E+11	781.7735	1.07E+08	0.00
3.1000	-5.86E-06	-55425.	3602.	2.19E-06	0.00	1.60E+11	534.9556	1.09E+08	0.00
3.2000	-3.48E-06	-50719.	4117.	1.79E-06	0.00	1.60E+11	324.1244	1.12E+08	0.00
3.3000	-1.56E-06	-45546.	4401.	1.43E-06	0.00	1.60E+11	148.0015	1.14E+08	0.00
3.4000	-4.74E-08	-40160.	4492.	1.11E-06	0.00	1.60E+11	4.5890	1.16E+08	0.00
3.5000	1.10E-06	-34767.	4430.	8.27E-07	0.00	1.60E+11	-108.643	1.18E+08	0.00
3.6000	1.94E-06	-29530.	4248.	5.86E-07	0.00	1.60E+11	-194.588	1.20E+08	0.00
3.7000	2.51E-06	-24573.	3977.	3.82E-07	0.00	1.60E+11	-256.351	1.23E+08	0.00
3.8000	2.86E-06	-19985.	3645.	2.15E-07	0.00	1.60E+11	-297.123	1.25E+08	0.00
3.9000	3.02E-06	-15825.	3275.	7.98E-08	0.00	1.60E+11	-320.067	1.27E+08	0.00
4.0000	3.05E-06	-12126.	2886.	-2.53E-08	0.00	1.60E+11	-328.237	1.29E+08	0.00
4.1000	2.96E-06	-8899.	2494.	-1.04E-07	0.00	1.60E+11	-324.506	1.31E+08	0.00
4.2000	2.80E-06	-6139.	2113.	-1.61E-07	0.00	1.60E+11	-311.515	1.34E+08	0.00
4.3000	2.58E-06	-3828.	1751.	-1.98E-07	0.00	1.60E+11	-291.644	1.36E+08	0.00
4.4000	2.32E-06	-1937.	1416.	-2.20E-07	0.00	1.60E+11	-266.987	1.38E+08	0.00
4.5000	2.05E-06	-430.511	1112.	-2.29E-07	0.00	1.60E+11	-239.350	1.40E+08	0.00
4.6000	1.77E-06	731.4725	842.0043	-2.28E-07	0.00	1.60E+11	-210.251	1.42E+08	0.00
4.7000	1.50E-06	1591.	607.2940	-2.19E-07	0.00	1.60E+11	-180.933	1.45E+08	0.00
4.8000	1.25E-06	2189.	407.3051	-2.05E-07	0.00	1.60E+11	-152.382	1.47E+08	0.00
4.9000	1.01E-06	2569.	240.6674	-1.87E-07	0.00	1.60E+11	-125.348	1.49E+08	0.00
5.0000	7.96E-07	2767.	105.2363	-1.67E-07	0.00	1.60E+11	-100.371	1.51E+08	0.00
5.1000	6.08E-07	2821.	-1.671	-1.46E-07	0.00	1.60E+11	-77.808	1.53E+08	0.00
5.2000	4.46E-07	2764.	-83.072	-1.25E-07	0.00	1.60E+11	-57.860	1.56E+08	0.00
5.3000	3.09E-07	2622.	-142.147	-1.05E-07	0.00	1.60E+11	-40.599	1.58E+08	0.00
5.4000	1.95E-07	2423.	-182.100	-8.57E-08	0.00	1.60E+11	-25.990	1.60E+08	0.00
5.5000	1.03E-07	2185.	-206.048	-6.84E-08	0.00	1.60E+11	-13.922	1.62E+08	0.00
5.6000	3.08E-08	1928.	-216.933	-5.29E-08	0.00	1.60E+11	-4.220	1.64E+08	0.00

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5.7000	-2.40E-08	1665.	-217.468	-3.94E-08	0.00	1.60E+11	3.3289	1.67E+08	0.00
5.8000	-6.37E-08	1406.	-210.092	-2.78E-08	0.00	1.60E+11	8.9639	1.69E+08	0.00
5.9000	-9.07E-08	1161.	-196.953	-1.82E-08	0.00	1.60E+11	12.9351	1.71E+08	0.00
6.0000	-1.07E-07	933.6356	-179.896	-1.03E-08	0.00	1.60E+11	15.4927	1.73E+08	0.00
6.1000	-1.15E-07	728.9209	-160.473	-4.04E-09	0.00	1.60E+11	16.8786	1.75E+08	0.00
6.2000	-1.17E-07	548.5069	-139.954	7.69E-10	0.00	1.60E+11	17.3203	1.78E+08	0.00
6.3000	-1.14E-07	393.0304	-119.346	4.31E-09	0.00	1.60E+11	17.0254	1.80E+08	0.00
6.4000	-1.07E-07	262.0680	-99.423	6.77E-09	0.00	1.60E+11	16.1799	1.82E+08	0.00
6.5000	-9.73E-08	154.4030	-80.748	8.34E-09	0.00	1.60E+11	14.9456	1.84E+08	0.00
6.6000	-8.66E-08	68.2587	-63.704	9.18E-09	0.00	1.60E+11	13.4606	1.86E+08	0.00
6.7000	-7.53E-08	1.4973	-48.524	9.44E-09	0.00	1.60E+11	11.8395	1.89E+08	0.00
6.8000	-6.40E-08	-48.215	-35.316	9.26E-09	0.00	1.60E+11	10.1747	1.91E+08	0.00
6.9000	-5.31E-08	-83.276	-24.088	8.77E-09	0.00	1.60E+11	8.5384	1.93E+08	0.00
7.0000	-4.29E-08	-106.041	-14.774	8.06E-09	0.00	1.60E+11	6.9844	1.95E+08	0.00
7.1000	-3.37E-08	-118.747	-7.253	7.21E-09	0.00	1.60E+11	5.5507	1.97E+08	0.00
7.2000	-2.56E-08	-123.460	-1.365	6.30E-09	0.00	1.60E+11	4.2617	2.00E+08	0.00
7.3000	-1.86E-08	-122.035	3.0699	5.38E-09	0.00	1.60E+11	3.1304	2.02E+08	0.00
7.4000	-1.27E-08	-116.101	6.2446	4.48E-09	0.00	1.60E+11	2.1607	2.04E+08	0.00
7.5000	-7.85E-09	-107.056	8.3507	3.64E-09	0.00	1.60E+11	1.3496	2.06E+08	0.00
7.6000	-3.96E-09	-96.066	9.5692	2.88E-09	0.00	1.60E+11	0.6812	2.06E+08	0.00
7.7000	-9.42E-10	-84.095	10.0751	2.20E-09	0.00	1.60E+11	0.1619	2.06E+08	0.00
7.8000	1.32E-09	-71.890	10.0361	1.61E-09	0.00	1.60E+11	-0.227	2.06E+08	0.00
7.9000	2.93E-09	-60.011	9.5974	1.12E-09	0.00	1.60E+11	-0.504	2.06E+08	0.00
8.0000	4.00E-09	-48.858	8.8819	7.09E-10	0.00	1.60E+11	-0.688	2.06E+08	0.00
8.1000	4.63E-09	-38.695	7.9909	3.80E-10	0.00	1.60E+11	-0.797	2.06E+08	0.00
8.2000	4.92E-09	-29.680	7.0059	1.23E-10	0.00	1.60E+11	-0.845	2.06E+08	0.00
8.3000	4.93E-09	-21.881	5.9905	-7.13E-11	0.00	1.60E+11	-0.847	2.06E+08	0.00
8.4000	4.74E-09	-15.303	4.9928	-2.11E-10	0.00	1.60E+11	-0.816	2.06E+08	0.00
8.5000	4.42E-09	-9.898	4.0474	-3.06E-10	0.00	1.60E+11	-0.760	2.06E+08	0.00
8.6000	4.01E-09	-5.588	3.1777	-3.64E-10	0.00	1.60E+11	-0.689	2.06E+08	0.00
8.7000	3.55E-09	-2.271	2.3982	-3.94E-10	0.00	1.60E+11	-0.610	2.06E+08	0.00
8.8000	3.07E-09	0.1680	1.7162	-4.02E-10	0.00	1.60E+11	-0.527	2.06E+08	0.00
8.9000	2.58E-09	1.8484	1.1336	-3.94E-10	0.00	1.60E+11	-0.444	2.06E+08	0.00
9.0000	2.12E-09	2.8892	0.6485	-3.76E-10	0.00	1.60E+11	-0.364	2.06E+08	0.00
9.1000	1.68E-09	3.4054	0.2566	-3.53E-10	0.00	1.60E+11	-0.289	2.06E+08	0.00
9.2000	1.27E-09	3.5056	-0.04804	-3.27E-10	0.00	1.60E+11	-0.219	2.06E+08	0.00
9.3000	8.97E-10	3.2907	-0.272	-3.01E-10	0.00	1.60E+11	-0.154	2.06E+08	0.00
9.4000	5.50E-10	2.8537	-0.421	-2.78E-10	0.00	1.60E+11	-0.09460	2.06E+08	0.00
9.5000	2.30E-10	2.2806	-0.502	-2.59E-10	0.00	1.60E+11	-0.03948	2.06E+08	0.00
9.6000	-7.04E-11	1.6505	-0.518	-2.44E-10	0.00	1.60E+11	0.01210	2.06E+08	0.00
9.7000	-3.56E-10	1.0379	-0.474	-2.34E-10	0.00	1.60E+11	0.06112	2.06E+08	0.00

Performed by: Gokul Khatri 6/28/2024

Checked by: James Samples 7/1/2024

9.8000	-6.31E-10	0.5133	-0.372	-2.28E-10	0.00	1.60E+11	0.1085	2.06E+08	0.00
9.9000	-9.03E-10	0.1449	-0.214	-2.25E-10	0.00	1.60E+11	0.1552	2.06E+08	0.00
10.0000	-1.17E-09	0.00	0.00	-2.25E-10	0.00	1.60E+11	0.2015	1.03E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 1:

Pile-head deflection	=	0.00067695 inches
Computed slope at pile head	=	-0.0001077 radians
Maximum bending moment	=	1416000. inch-lbs
Maximum shear force	=	-83691. lbs
Depth of maximum bending moment	=	0.000000 feet below pile head
Depth of maximum shear force	=	0.90000000 feet below pile head
Number of iterations	=	6
Number of zero deflection points	=	5

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 2

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head	=	2420.0 lbs
Applied moment at pile head	=	1920000.0 in-lbs
Axial thrust load on pile head	=	921400.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	0.00109	1920000.	2420.	-1.62E-04	0.00	1.53E+11	-12631.	6940177.	0.00

MEG-33 forward abutment X direction row 3

0.10000	9.07E-04	1913981.	-12800.	-1.47E-04	0.00	1.53E+11	-12735.	1.69E+07	0.00
0.2000	7.39E-04	1889606.	-28089.	-1.32E-04	0.00	1.53E+11	-12748.	2.07E+07	0.00
0.3000	5.90E-04	1846858.	-43334.	-1.17E-04	0.00	1.53E+11	-12659.	2.58E+07	0.00
0.4000	4.58E-04	1785864.	-58404.	-1.03E-04	0.00	1.53E+11	-12458.	3.27E+07	0.00
0.5000	3.42E-04	1706917.	-74822.	-8.94E-05	0.00	1.53E+11	-14907.	5.23E+07	0.00
0.6000	2.43E-04	1606489.	-90386.	-7.63E-05	0.00	1.53E+11	-11033.	5.45E+07	0.00
0.7000	1.59E-04	1490159.	-101512.	-6.42E-05	0.00	1.53E+11	-7510.	5.67E+07	0.00
0.8000	8.91E-05	1363002.	-108639.	-5.30E-05	0.00	1.53E+11	-4369.	5.89E+07	0.00
0.9000	3.19E-05	1229543.	-112234.	-4.28E-05	0.00	1.53E+11	-1624.	6.11E+07	0.00
1.0000	-1.37E-05	1093734.	-112776.	-3.37E-05	0.00	1.53E+11	720.4517	6.33E+07	0.00
1.1000	-4.89E-05	958954.	-110742.	-2.56E-05	0.00	1.53E+11	2669.	6.55E+07	0.00
1.2000	-7.52E-05	828009.	-106597.	-1.86E-05	0.00	1.53E+11	4239.	6.77E+07	0.00
1.3000	-9.36E-05	703161.	-100784.	-1.26E-05	0.00	1.53E+11	5450.	6.99E+07	0.00
1.4000	-1.05E-04	586155.	-93716.	-7.55E-06	0.00	1.53E+11	6331.	7.21E+07	0.00
1.5000	-1.12E-04	478260.	-85769.	-3.37E-06	0.00	1.53E+11	6914.	7.43E+07	0.00
1.6000	-1.14E-04	380318.	-77280.	-1.91E-09	0.00	1.53E+11	7233.	7.65E+07	0.00
1.7000	-1.12E-04	292788.	-68546.	2.64E-06	0.00	1.53E+11	7324.	7.87E+07	0.00
1.8000	-1.07E-04	215802.	-59818.	4.63E-06	0.00	1.53E+11	7223.	8.09E+07	0.00
1.9000	-1.01E-04	149215.	-51306.	6.07E-06	0.00	1.53E+11	6964.	8.31E+07	0.00
2.0000	-9.26E-05	92655.	-43178.	7.02E-06	0.00	1.53E+11	6581.	8.53E+07	0.00
2.1000	-8.38E-05	45571.	-35566.	7.56E-06	0.00	1.53E+11	6106.	8.75E+07	0.00
2.2000	-7.45E-05	7279.	-28564.	7.77E-06	0.00	1.53E+11	5566.	8.97E+07	0.00
2.3000	-6.51E-05	-22998.	-22232.	7.70E-06	0.00	1.53E+11	4986.	9.19E+07	0.00
2.4000	-5.60E-05	-46096.	-16607.	7.43E-06	0.00	1.53E+11	4389.	9.41E+07	0.00
2.5000	-4.73E-05	-62872.	-11697.	7.01E-06	0.00	1.53E+11	3794.	9.63E+07	0.00
2.6000	-3.92E-05	-74184.	-7491.	6.47E-06	0.00	1.53E+11	3215.	9.85E+07	0.00
2.7000	-3.18E-05	-80865.	-3963.	5.86E-06	0.00	1.53E+11	2665.	1.01E+08	0.00
2.8000	-2.51E-05	-83708.	-1071.	5.21E-06	0.00	1.53E+11	2154.	1.03E+08	0.00
2.9000	-1.93E-05	-83448.	1233.	4.56E-06	0.00	1.53E+11	1686.	1.05E+08	0.00
3.0000	-1.42E-05	-80760.	3005.	3.91E-06	0.00	1.53E+11	1268.	1.07E+08	0.00
3.1000	-9.87E-06	-76244.	4306.	3.30E-06	0.00	1.53E+11	900.3886	1.09E+08	0.00
3.2000	-6.27E-06	-70431.	5197.	2.72E-06	0.00	1.53E+11	583.7068	1.12E+08	0.00
3.3000	-3.34E-06	-63778.	5737.	2.20E-06	0.00	1.53E+11	316.7637	1.14E+08	0.00
3.4000	-1.00E-06	-56667.	5985.	1.72E-06	0.00	1.53E+11	97.1471	1.16E+08	0.00
3.5000	7.96E-07	-49416.	5997.	1.31E-06	0.00	1.53E+11	-78.438	1.18E+08	0.00
3.6000	2.13E-06	-42278.	5821.	9.47E-07	0.00	1.53E+11	-213.911	1.20E+08	0.00
3.7000	3.07E-06	-35447.	5505.	6.42E-07	0.00	1.53E+11	-313.584	1.23E+08	0.00
3.8000	3.67E-06	-29068.	5087.	3.88E-07	0.00	1.53E+11	-381.959	1.25E+08	0.00
3.9000	4.00E-06	-23238.	4604.	1.83E-07	0.00	1.53E+11	-423.561	1.27E+08	0.00
4.0000	4.11E-06	-18018.	4084.	2.14E-08	0.00	1.53E+11	-442.799	1.29E+08	0.00
4.1000	4.05E-06	-13436.	3552.	-1.02E-07	0.00	1.53E+11	-443.854	1.31E+08	0.00

MEG-33 forward abutment X direction row 3

4.2000	3.87E-06	-9492.	3028.	-1.92E-07	0.00	1.53E+11	-430.599	1.34E+08	0.00
4.3000	3.59E-06	-6169.	2525.	-2.53E-07	0.00	1.53E+11	-406.542	1.36E+08	0.00
4.4000	3.26E-06	-3431.	2057.	-2.91E-07	0.00	1.53E+11	-374.792	1.38E+08	0.00
4.5000	2.89E-06	-1232.	1629.	-3.09E-07	0.00	1.53E+11	-338.045	1.40E+08	0.00
4.6000	2.51E-06	479.2185	1247.	-3.12E-07	0.00	1.53E+11	-298.580	1.42E+08	0.00
4.7000	2.14E-06	1761.	912.8120	-3.04E-07	0.00	1.53E+11	-258.275	1.45E+08	0.00
4.8000	1.79E-06	2671.	626.6662	-2.86E-07	0.00	1.53E+11	-218.634	1.47E+08	0.00
4.9000	1.46E-06	3266.	386.9985	-2.63E-07	0.00	1.53E+11	-180.812	1.49E+08	0.00
5.0000	1.16E-06	3600.	191.1198	-2.36E-07	0.00	1.53E+11	-145.653	1.51E+08	0.00
5.1000	8.89E-07	3725.	35.4912	-2.07E-07	0.00	1.53E+11	-113.728	1.53E+08	0.00
5.2000	6.58E-07	3686.	-83.973	-1.78E-07	0.00	1.53E+11	-85.378	1.56E+08	0.00
5.3000	4.62E-07	3524.	-171.647	-1.50E-07	0.00	1.53E+11	-60.746	1.58E+08	0.00
5.4000	2.99E-07	3274.	-231.987	-1.23E-07	0.00	1.53E+11	-39.820	1.60E+08	0.00
5.5000	1.66E-07	2967.	-269.357	-9.87E-08	0.00	1.53E+11	-22.464	1.62E+08	0.00
5.6000	6.17E-08	2628.	-287.907	-7.67E-08	0.00	1.53E+11	-8.453	1.64E+08	0.00
5.7000	-1.80E-08	2276.	-291.476	-5.75E-08	0.00	1.53E+11	2.5052	1.67E+08	0.00
5.8000	-7.63E-08	1928.	-283.529	-4.10E-08	0.00	1.53E+11	10.7389	1.69E+08	0.00
5.9000	-1.16E-07	1596.	-267.127	-2.72E-08	0.00	1.53E+11	16.5975	1.71E+08	0.00
6.0000	-1.42E-07	1287.	-244.909	-1.59E-08	0.00	1.53E+11	20.4333	1.73E+08	0.00
6.1000	-1.54E-07	1008.	-219.096	-6.85E-09	0.00	1.53E+11	22.5884	1.75E+08	0.00
6.2000	-1.58E-07	761.5182	-191.511	9.59E-11	0.00	1.53E+11	23.3855	1.78E+08	0.00
6.3000	-1.54E-07	548.5387	-163.608	5.24E-09	0.00	1.53E+11	23.1204	1.80E+08	0.00
6.4000	-1.45E-07	368.8477	-136.501	8.84E-09	0.00	1.53E+11	22.0580	1.82E+08	0.00
6.5000	-1.33E-07	220.9172	-111.008	1.11E-08	0.00	1.53E+11	20.4297	1.84E+08	0.00
6.6000	-1.19E-07	102.4035	-87.691	1.24E-08	0.00	1.53E+11	18.4329	1.86E+08	0.00
6.7000	-1.03E-07	10.4323	-66.892	1.29E-08	0.00	1.53E+11	16.2316	1.89E+08	0.00
6.8000	-8.78E-08	-58.165	-48.778	1.27E-08	0.00	1.53E+11	13.9583	1.91E+08	0.00
6.9000	-7.28E-08	-106.663	-33.373	1.20E-08	0.00	1.53E+11	11.7163	1.93E+08	0.00
7.0000	-5.89E-08	-138.287	-20.593	1.11E-08	0.00	1.53E+11	9.5830	1.95E+08	0.00
7.1000	-4.63E-08	-156.111	-10.276	9.91E-09	0.00	1.53E+11	7.6129	1.97E+08	0.00
7.2000	-3.51E-08	-162.971	-2.203	8.66E-09	0.00	1.53E+11	5.8411	2.00E+08	0.00
7.3000	-2.55E-08	-161.419	3.8732	7.39E-09	0.00	1.53E+11	4.2866	2.02E+08	0.00
7.4000	-1.74E-08	-153.692	8.2184	6.15E-09	0.00	1.53E+11	2.9553	2.04E+08	0.00
7.5000	-1.07E-08	-141.708	11.0974	4.99E-09	0.00	1.53E+11	1.8430	2.06E+08	0.00
7.6000	-5.40E-09	-127.069	12.7602	3.94E-09	0.00	1.53E+11	0.9283	2.06E+08	0.00
7.7000	-1.28E-09	-111.093	13.4487	3.00E-09	0.00	1.53E+11	0.2193	2.06E+08	0.00
7.8000	1.80E-09	-94.799	13.3943	2.19E-09	0.00	1.53E+11	-0.310	2.06E+08	0.00
7.9000	3.99E-09	-78.951	12.7968	1.51E-09	0.00	1.53E+11	-0.686	2.06E+08	0.00
8.0000	5.43E-09	-64.090	11.8252	9.51E-10	0.00	1.53E+11	-0.934	2.06E+08	0.00
8.1000	6.27E-09	-50.573	10.6181	5.01E-10	0.00	1.53E+11	-1.078	2.06E+08	0.00
8.2000	6.63E-09	-38.608	9.2872	1.51E-10	0.00	1.53E+11	-1.140	2.06E+08	0.00

MEG-33 forward abutment X direction row 3

8.3000	6.63E-09	-28.284	7.9188	-1.12E-10	0.00	1.53E+11	-1.140	2.06E+08	0.00
8.4000	6.37E-09	-19.602	6.5781	-2.99E-10	0.00	1.53E+11	-1.094	2.06E+08	0.00
8.5000	5.91E-09	-12.496	5.3115	-4.25E-10	0.00	1.53E+11	-1.017	2.06E+08	0.00
8.6000	5.35E-09	-6.853	4.1502	-5.01E-10	0.00	1.53E+11	-0.919	2.06E+08	0.00
8.7000	4.71E-09	-2.534	3.1130	-5.38E-10	0.00	1.53E+11	-0.810	2.06E+08	0.00
8.8000	4.05E-09	0.6190	2.2090	-5.46E-10	0.00	1.53E+11	-0.697	2.06E+08	0.00
8.9000	3.40E-09	2.7688	1.4401	-5.32E-10	0.00	1.53E+11	-0.585	2.06E+08	0.00
9.0000	2.78E-09	4.0764	0.8029	-5.05E-10	0.00	1.53E+11	-0.477	2.06E+08	0.00
9.1000	2.19E-09	4.6969	0.2909	-4.71E-10	0.00	1.53E+11	-0.376	2.06E+08	0.00
9.2000	1.65E-09	4.7757	-0.105	-4.34E-10	0.00	1.53E+11	-0.283	2.06E+08	0.00
9.3000	1.15E-09	4.4471	-0.393	-3.98E-10	0.00	1.53E+11	-0.197	2.06E+08	0.00
9.4000	6.91E-10	3.8345	-0.582	-3.65E-10	0.00	1.53E+11	-0.119	2.06E+08	0.00
9.5000	2.71E-10	3.0508	-0.681	-3.38E-10	0.00	1.53E+11	-0.04652	2.06E+08	0.00
9.6000	-1.21E-10	2.2002	-0.697	-3.18E-10	0.00	1.53E+11	0.02078	2.06E+08	0.00
9.7000	-4.92E-10	1.3794	-0.634	-3.04E-10	0.00	1.53E+11	0.08451	2.06E+08	0.00
9.8000	-8.49E-10	0.6804	-0.495	-2.95E-10	0.00	1.53E+11	0.1460	2.06E+08	0.00
9.9000	-1.20E-09	0.1916	-0.284	-2.92E-10	0.00	1.53E+11	0.2064	2.06E+08	0.00
10.0000	-1.55E-09	0.00	0.00	-2.91E-10	0.00	1.53E+11	0.2665	1.03E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 2:

Pile-head deflection = 0.00109197 inches
 Computed slope at pile head = -0.0001620 radians
 Maximum bending moment = 1920000. inch-lbs
 Maximum shear force = -112776. lbs
 Depth of maximum bending moment = 0.000000 feet below pile head
 Depth of maximum shear force = 1.00000000 feet below pile head
 Number of iterations = 6
 Number of zero deflection points = 5

 Summary of Pile-head Responses for Conventional Analyses

Definitions of Pile-head Loading Conditions:

Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs
 Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
 Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.
 Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs
 Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians

Load Case No.	Load Type 1	Pile-head Load 1	Load Type 2	Pile-head Load 2	Axial Loading lbs	Pile-head Deflection inches	Pile-head Rotation radians	Max Shear in Pile lbs	Max Moment in Pile in-lbs
1	V, lb	1800.	M, in-lb	1416000.	714600.	6.77E-04	-1.08E-04	-83691.	1416000.
2	V, lb	2420.	M, in-lb	1920000.	921400.	0.00109	-1.62E-04	-112776.	1920000.

Maximum pile-head deflection = 0.0010919704 inches

Maximum pile-head rotation = -0.0001620412 radians = -0.009284 deg.

Summary of Warning Messages

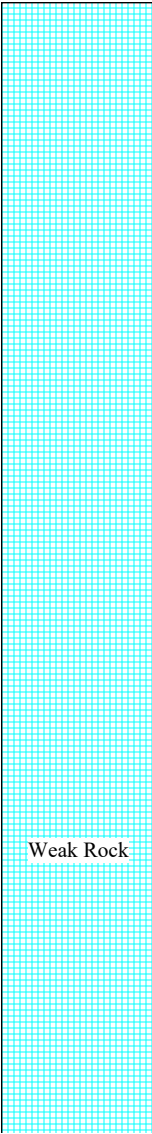
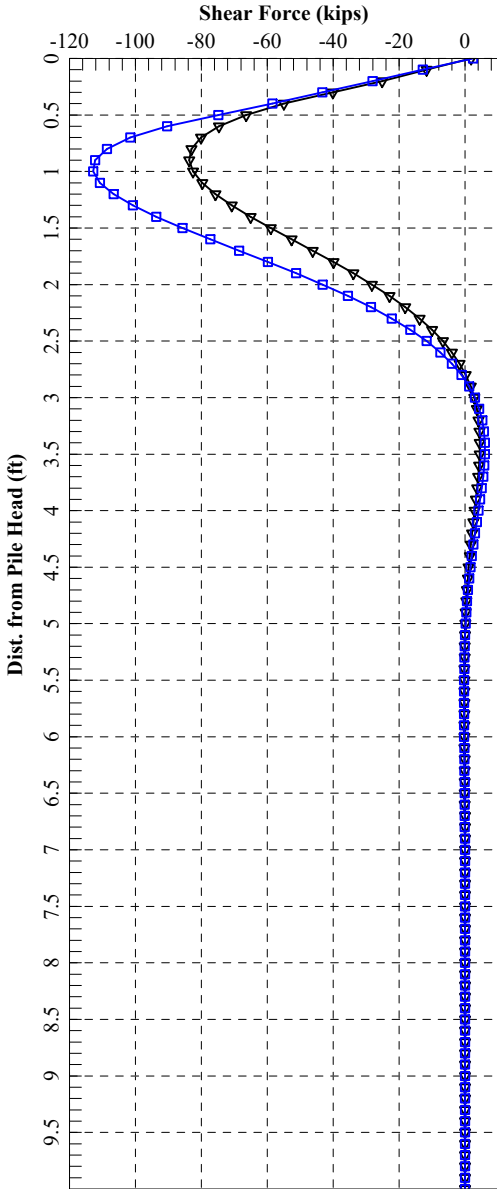
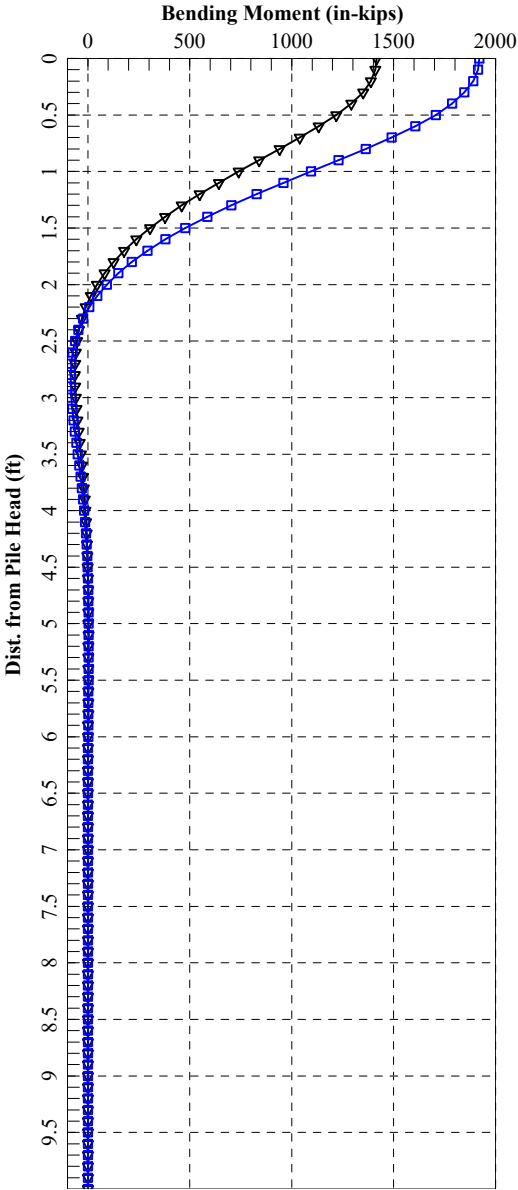
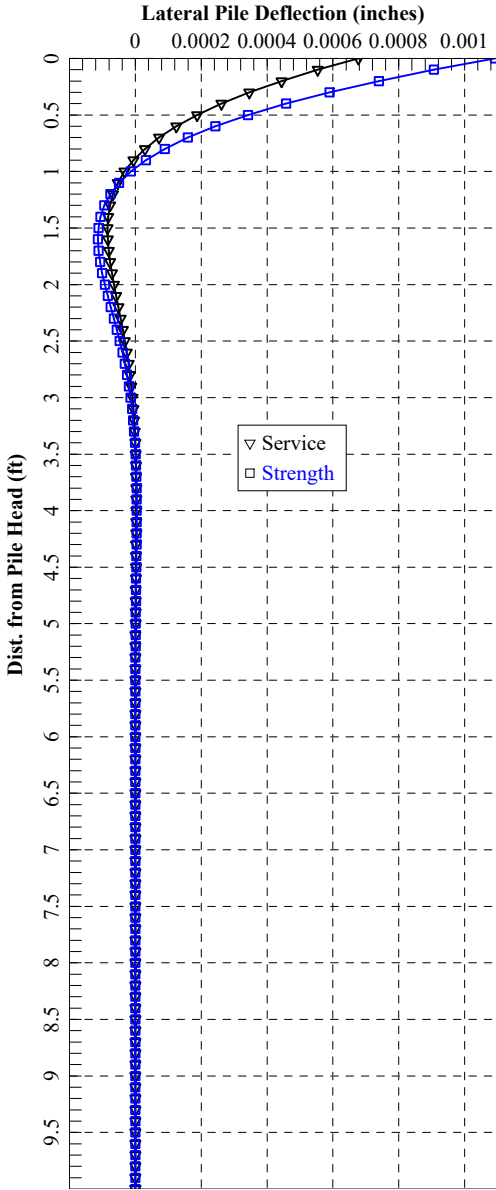
The following warning was reported 706 times

**** Warning ****

An unreasonable input value for unconfined compressive strength has been specified for a soil defined using the weak rock criteria. The input value is greater than 500 psi. Please check your input data for correctness.

The analysis ended normally.

MEG-33 Oldtown Creek Bridge Forward Abutment X Direction Row 3



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LPile for Windows, Version 2022-12.006

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method
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Files Used for Analysis

Path to file locations:

\\US0247-PPFSS01\shared_projects\173609140\119144\400-Engineering\Geotechnical\Analysis\Lpile\bridges\LPile
Analysis\Old Town Creek Bridge\forward abutment\

Name of input data file:

Forward Abutment Z-direction.lp12d

Name of output report file:

Forward Abutment Z-direction.lp12o

Name of plot output file:
Forward Abutment Z-direction.lp12p

Name of runtime message file:
Forward Abutment Z-direction.lp12r

Date and Time of Analysis

Date: June 28, 2024

Time: 14:32:42

Problem Title

-

Project Name: MEG-33-19.21

Job Number: 173609140

Client: ODOT

Engineer: G. Khatri

Description: Forward Abutment lateral Load Analysis at Oldtwon Creek

- Program Options and Settings

Performrd by: Gokul Khatri 6/28/2024

Checked by: James Samples 7/1/2024

-

Computational Options:

- Conventional Analysis

Engineering Units Used for Data Input and Computations:

- US Customary System Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed = 500
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 100.0000 in
- Number of pile increments = 100

Loading Type and Number of Cycles of Loading:

- Static loading specified

- Analysis uses p-y modification factors for p-y curves
- Analysis uses layering correction (Method of Georgiadis)
- No distributed lateral loads are entered
- Loading by lateral soil movements acting on pile not selected
- Input of shear resistance at the pile tip not selected
- Input of moment resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:

- Output files use decimal points to denote decimal symbols.
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1
- No p-y curves to be computed and reported for user-specified depths
- Print using wide report formats

Pile Structural Properties and Geometry

Number of pile sections defined = 1

Total length of pile = 10.000 ft
 Depth of ground surface below top of pile = 0.0000 ft

Pile diameters used for p-y curve computations are defined using 2 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile. A summary of values of pile diameter vs. depth follows.

Point No.	Depth Below Pile Head feet	Pile Diameter inches
1	0.000	30.0000
2	10.000	30.0000

Input Structural Properties for Pile Sections:

Pile Section No. 1:

Section 1 is a round drilled shaft, bored pile, or CIDH pile
 Length of section = 10.000000 ft
 Shaft Diameter = 30.000000 in

Soil and Rock Layering Information

The soil profile is modelled using 1 layers

Layer 1 is weak rock, p-y criteria by Reese, 1997

Distance from top of pile to top of layer = 0.0000 ft
 Distance from top of pile to bottom of layer = 15.000000 ft
 Effective unit weight at top of layer = 82.600000 pcf
 Effective unit weight at bottom of layer = 82.600000 pcf
 Uniaxial compressive strength at top of layer = 3820. psi
 Uniaxial compressive strength at bottom of layer = 3820. psi

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Initial modulus of rock at top of layer = 343800. psi
 Initial modulus of rock at bottom of layer = 343800. psi
 RQD of rock at top of layer = 99.000000 %
 RQD of rock at bottom of layer = 99.000000 %
 k_{rm} of rock at top of layer = 0.0000500
 k_{rm} of rock at bottom of layer = 0.0000500

(Depth of the lowest soil layer extends 5.000 ft below the pile tip)

 Summary of Input Soil Properties

Layer Num.	Soil Type Name (p-y Curve Type)	Layer Depth ft	Effective Unit Wt. pcf	Uniaxial q _u psi	RQD %	E50 or k _{rm}	Rock Mass Modulus psi
1	Weak Rock	0.00 15.0000	82.6000 82.6000	3820. 3820.	99.0000 99.0000	5.00E-05 5.00E-05	343800. 343800.

 Modification Factors for p-y Curves

Distribution of p-y modifiers with depth defined using 2 points

Point No.	Depth X ft	p-mult	y-mult
1	0.000	1.0000	1.0000
2	10.000	1.0000	1.0000

 Static Loading Type

 Static loading criteria were used when computing p-y curves for all analyses.

 Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 2

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length	Run Analysis
1	1	V = 60820. lbs	M = 0.0000 in-lbs	714600.	No	Yes
2	1	V = 82060. lbs	M = 0.0000 in-lbs	921400.	No	Yes

V = shear force applied normal to pile axis

M = bending moment applied to pile head

y = lateral deflection normal to pile axis

S = pile slope relative to original pile batter angle

R = rotational stiffness applied to pile head

Values of top y vs. pile lengths can be computed only for load types with specified shear loading (Load Types 1, 2, and 3).

Thrust force is assumed to be acting axially for all pile batter angles.

 Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 1

Pile Section No. 1:

Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section = 10.000000 ft
 Shaft Diameter = 30.000000 in
 Concrete Cover Thickness (to edge of trans. reinf.) = 3.000000 in
 Number of Reinforcing Bars = 8 bars
 Yield Stress of Reinforcing Bars = 50000. psi
 Modulus of Elasticity of Reinforcing Bars = 29000000. psi
 Gross Area of Shaft = 706.858347 sq. in.
 Total Area of Reinforcing Steel = 8.000000 sq. in.
 Area Ratio of Steel Reinforcement = 1.13 percent
 Edge-to-Edge Bar Spacing = 7.242052 in
 Maximum Concrete Aggregate Size = 0.750000 in
 Ratio of Bar Spacing to Aggregate Size = 9.66
 Offset of Center of Rebar Cage from Center of Pile = 0.0000 in
 Transverse Reinforcement
 Type: Spiral
 Number of Transverse Reinf. (per spacing) = 1
 Spacing of Transverse Reinf. = 4.000000 in
 Yield Stress of Transverse Reinf. = 50000. psi
 Diameter of Transverse Reinf. = 0.500000 in

Axial Structural Capacities:

Nom. Axial Structural Capacity = $0.85 F_c A_c + F_y A_s$ = 2776.118 kips
 Tensile Load for Cracking of Concrete = -317.428 kips
 Nominal Axial Tensile Capacity = -400.000 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.128000	1.000000	10.936000	0.000000
2	1.128000	1.000000	7.732920	7.732920
3	1.128000	1.000000	0.000000	10.936000
4	1.128000	1.000000	-7.732920	7.732920
5	1.128000	1.000000	-10.936000	0.000000
6	1.128000	1.000000	-7.732920	-7.732920

MEG-33 forward abutment Z direction

7	1.128000	1.000000	0.000000	-10.93600
8	1.128000	1.000000	7.732920	-7.73292

NOTE: The positions of the above rebars were computed by LPILE

Minimum spacing between any two bars not equal to zero = 7.242 inches between bars 1 and 2.

Ratio of bar spacing to maximum aggregate size = 9.66

Concrete Properties:

Compressive Strength of Concrete	=	4000. psi
Modulus of Elasticity of Concrete	=	3604997. psi
Modulus of Rupture of Concrete	=	-474.34165 psi
Compression Strain at Peak Stress	=	0.001886
Tensile Strain at Fracture of Concrete	=	-0.0001154
Maximum Coarse Aggregate Size	=	0.750000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 2

Number	Axial Thrust Force kips
1	714.600
2	921.400

Definitions of Run Messages and Notes:

- C = concrete in section has cracked in tension.
- Y = stress in reinforcing steel has reached yield stress.
- T = ACI 318 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than 0.003. See ACI 318-14, Section 21.2.3.
- Z = depth of tensile zone in concrete section is less than 10 percent of

section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.

Position of neutral axis is measured from edge of compression side of pile.

Compressive stresses and strains are positive in sign.

Tensile stresses and strains are negative in sign.

Axial Thrust Force = 714.600 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
0.00000125	199.4180428	159534434.	204.9832495	0.0002562	0.0002187	1.0122155	7.3055803	
0.00000250	398.8288884	159531555.	110.0209688	0.0002751	0.0002001	1.0801344	7.7263952	
0.00000375	598.2073321	159521955.	78.3799158	0.0002939	0.0001814	1.1474476	8.1486283	
0.00000500	797.5371707	159507434.	62.5691717	0.0003128	0.0001628	1.2141489	8.5722799	
0.00000625	996.8021944	159488351.	53.0905535	0.0003318	0.0001443	1.2802322	8.9973503	
0.00000750	1196.	159464825.	46.7780005	0.0003508	0.0001258	1.3456914	9.4238401	
0.00000875	1395.	159436904.	42.2746302	0.0003699	0.0001074	1.4105204	9.8517499	
0.00001000	1594.	159404613.	38.9020017	0.0003890	0.00008902	1.4747129	10.2810805	
0.00001125	1793.	159367964.	36.2832037	0.0004082	0.00007069	1.5382628	10.7118328	
0.00001250	1992.	159326960.	34.1920899	0.0004274	0.00005240	1.6011641	11.1440076	
0.00001375	2190.	159281606.	32.4847490	0.0004467	0.00003417	1.6634104	11.5776062	
0.00001500	2388.	159231901.	31.0652407	0.0004660	0.00001598	1.7249957	12.0126298	
0.00001625	2587.	159177842.	29.8671450	0.0004853	-0.00000216	1.7859136	12.4490796	
0.00001750	2785.	159117875.	28.8429800	0.0005048	-0.00002025	1.8461560	12.8869374	
0.00001875	2982.	159044956.	27.9577695	0.0005242	-0.00003829	1.9057055	13.3260997	
0.00002000	3179.	158952237.	27.1852249	0.0005437	-0.00005630	1.9645421	13.7664305	
0.00002125	3375.	158835622.	26.5052585	0.0005632	-0.00007426	2.0226475	14.2078031	
0.00002250	3571.	158693232.	25.9022725	0.0005828	-0.00009220	2.0800060	14.6501079	
0.00002375	3765.	158524829.	25.3639823	0.0006024	-0.000110	2.1366044	15.0932554	
0.00002500	3765.	150598588.	24.5996240	0.0006150	-0.000135	2.1723507	15.3334774	C
0.00002625	3849.	146644088.	24.0951796	0.0006325	-0.000155	2.2216680	15.7161430	C
0.00002750	3970.	144345851.	23.6281596	0.0006498	-0.000175	2.2696639	16.0920824	C
0.00002875	4084.	142043564.	23.1945524	0.0006668	-0.000196	2.3164339	16.4620206	C
0.00003000	4193.	139753523.	22.7904690	0.0006837	-0.000216	2.3620249	16.8262081	C
0.00003125	4297.	137509554.	22.4136466	0.0007004	-0.000237	2.4065664	17.1858049	C
0.00003250	4398.	135312799.	22.0609775	0.0007170	-0.000258	2.4500793	17.5408464	C
0.00003375	4494.	133153534.	21.7292649	0.0007334	-0.000279	2.4925358	17.8908306	C

MEG-33 forward abutment Z direction

0.00003500	4586.	131042698.	21.4167814	0.0007496	-0.000300	2.5340015	18.2362832	C
0.00003625	4676.	128986058.	21.1219089	0.0007657	-0.000322	2.5745274	18.5775943	C
0.00003750	4762.	126985689.	20.8431270	0.0007816	-0.000343	2.6141513	18.9150258	C
0.00003875	4845.	125035157.	20.5786295	0.0007974	-0.000365	2.6528637	19.2482975	C
0.00004000	4926.	123138590.	20.3274304	0.0008131	-0.000387	2.6907139	19.5778194	C
0.00004125	5004.	121299491.	20.0887105	0.0008287	-0.000409	2.7277540	19.9040573	C
0.00004250	5080.	119519095.	19.8616750	0.0008441	-0.000431	2.7640264	20.2273894	C
0.00004375	5154.	117798333.	19.6456528	0.0008595	-0.000453	2.7995750	20.5482347	C
0.00004500	5225.	116114329.	19.4383172	0.0008747	-0.000475	2.8342633	20.8647541	C
0.00004625	5295.	114488278.	19.2405890	0.0008899	-0.000498	2.8682761	21.1791268	C
0.00004750	5364.	112921255.	19.0521189	0.0009050	-0.000520	2.9016642	21.4919187	C
0.00004875	5430.	111384400.	18.8701880	0.0009199	-0.000543	2.9342188	21.8002909	C
0.00005125	5559.	108467759.	18.5297105	0.0009496	-0.000588	2.9975062	22.4122197	C
0.00005375	5683.	105722693.	18.2153524	0.0009791	-0.000633	3.0582424	23.0154929	C
0.00005625	5801.	103136041.	17.9240408	0.0010082	-0.000679	3.1165320	23.6107787	C
0.00005875	5916.	100696577.	17.6532831	0.0010371	-0.000725	3.1724793	24.1988437	C
0.00006125	6027.	98394571.	17.4010535	0.0010658	-0.000772	3.2261883	24.7805590	C
0.00006375	6134.	96221477.	17.1657072	0.0010943	-0.000818	3.2777624	25.3569137	C
0.00006625	6239.	94169672.	16.9459140	0.0011227	-0.000865	3.3273035	25.9290250	C
0.00006875	6340.	92213734.	16.7383110	0.0011508	-0.000912	3.3746471	26.4935703	C
0.00007125	6438.	90363684.	16.5437610	0.0011787	-0.000959	3.4200891	27.0549839	C
0.00007375	6535.	88612677.	16.3613927	0.0012067	-0.001006	3.4637016	27.6142414	C
0.00007625	6629.	86935736.	16.1878059	0.0012343	-0.001053	3.5052483	28.1664735	C
0.00007875	6721.	85350028.	16.0253352	0.0012620	-0.001101	3.5451307	28.7189220	C
0.00008125	6811.	83828854.	15.8702784	0.0012895	-0.001148	3.5830500	29.2652812	C
0.00008375	6900.	82386121.	15.7247513	0.0013169	-0.001196	3.6193491	29.8123025	C
0.00008625	6986.	80998611.	15.5853436	0.0013442	-0.001243	3.6537460	30.3535283	C
0.00008875	7072.	79681983.	15.4547125	0.0013716	-0.001291	3.6866116	30.8971285	C
0.00009125	7155.	78410457.	15.3287335	0.0013987	-0.001339	3.7175810	31.4340984	C
0.00009375	7237.	77199187.	15.2102173	0.0014260	-0.001387	3.7470141	31.9730910	C
0.00009625	7318.	76036211.	15.0972309	0.0014531	-0.001434	3.7747671	32.5103335	C
0.00009875	7398.	74916898.	14.9891503	0.0014802	-0.001482	3.8008320	-33.107383	C
0.0001013	7477.	73846539.	14.8872251	0.0015073	-0.001530	3.8253680	-34.244822	C
0.0001038	7554.	72813003.	14.7892399	0.0015344	-0.001578	3.8482084	-35.385187	C
0.0001063	7631.	71817016.	14.6955872	0.0015614	-0.001626	3.8694260	-36.526409	C
0.0001088	7706.	70860920.	14.6070155	0.0015885	-0.001674	3.8891065	-37.665187	C
0.0001113	7781.	69938221.	14.5223186	0.0016156	-0.001722	3.9071727	-38.804308	C
0.0001138	7854.	69042914.	14.4403308	0.0016426	-0.001770	3.9235660	-39.946773	C
0.0001163	7926.	68180586.	14.3626112	0.0016697	-0.001818	3.9384133	-41.086734	C
0.0001188	7998.	67349061.	14.2888993	0.0016968	-0.001866	3.9516994	-42.224165	C
0.0001213	8068.	66542258.	14.2178492	0.0017239	-0.001914	3.9633547	-43.362925	C

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0.0001238	8138.	65757885.	14.1490642	0.0017509	-0.001962	3.9733772	-44.503858	C
0.0001263	8206.	64999389.	14.0837159	0.0017781	-0.002009	3.9818277	-45.642182	C
0.0001288	8274.	64265183.	14.0216138	0.0018053	-0.002057	3.9886901	-46.777862	C
0.0001313	8341.	63553797.	13.9625822	0.0018326	-0.002105	3.9939482	-47.910859	C
0.0001338	8407.	62858748.	13.9048098	0.0018598	-0.002153	3.9975623	-49.047531	C
0.0001363	8472.	62181936.	13.8493385	0.0018870	-0.002201	3.9995621	-50.000000	CY
0.0001388	8535.	61516354.	13.7960554	0.0019142	-0.002248	3.9986615	-50.000000	CY
0.0001413	8594.	60839141.	13.7434130	0.0019413	-0.002296	3.9999173	-50.000000	CY
0.0001438	8645.	60141546.	13.6907115	0.0019680	-0.002344	3.9992375	-50.000000	CY
0.0001463	8692.	59434679.	13.6380833	0.0019946	-0.002393	3.9999978	-50.000000	CY
0.0001488	8737.	58733203.	13.5856869	0.0020209	-0.002442	3.9994761	-50.000000	CY
0.0001588	8906.	56103651.	13.3981144	0.0021270	-0.002636	3.9994920	-50.000000	CY
0.0001688	9065.	53721061.	13.2369123	0.0022337	-0.002829	3.9988322	-50.000000	CY
0.0001788	9200.	51467700.	13.0910274	0.0023400	-0.003022	3.9999952	-50.000000	CY
0.0001888	9269.	49106716.	12.9318472	0.0024409	-0.003222	3.9982060	50.000000	CY
0.0001988	9314.	46861353.	12.7868617	0.0025414	-0.003421	3.9989494	50.000000	CY
0.0002088	9350.	44789994.	12.6594478	0.0026427	-0.003620	3.9992150	50.000000	CY
0.0002188	9380.	42880410.	12.5491621	0.0027451	-0.003817	3.9991756	50.000000	CY
0.0002288	9407.	41123490.	12.4533543	0.0028487	-0.004014	3.9988031	50.000000	CY
0.0002388	9430.	39496988.	12.3637902	0.0029519	-0.004211	3.9977634	50.000000	CY
0.0002488	9451.	37992737.	12.2845986	0.0030558	-0.004407	3.9959758	50.000000	CY
0.0002588	9470.	36597337.	12.2146634	0.0031605	-0.004602	3.9999519	50.000000	CY
0.0002688	9487.	35298838.	12.1529478	0.0032661	-0.004796	3.9989124	50.000000	CY
0.0002788	9501.	34084929.	12.0940980	0.0033712	-0.004991	3.9956640	50.000000	CY
0.0002888	9514.	32950314.	12.0415042	0.0034770	-0.005186	3.9998422	50.000000	CY
0.0002988	9526.	31887091.	11.9948434	0.0035835	-0.005379	3.9971331	50.000000	CY
0.0003088	9537.	30889589.	11.9530289	0.0036905	-0.005572	3.9999957	50.000000	CY
0.0003188	9547.	29950579.	11.9161078	0.0037983	-0.005764	3.9973747	50.000000	CY
0.0003288	9547.	29039534.	11.9110790	0.0039158	-0.005947	3.9975909	50.000000	CY

Axial Thrust Force = 921.400 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
0.00000125	191.1540359	152923229.	264.8377707	0.0003310	0.0002935	1.2801666	9.4753067	
0.00000250	382.3030479	152921219.	139.9495047	0.0003499	0.0002749	1.3449615	9.8962141	
0.00000375	573.4182496	152911533.	98.3336902	0.0003688	0.0002563	1.4091495	10.3186013	
0.00000500	764.4827347	152896547.	77.5359908	0.0003877	0.0002377	1.4727241	10.7424686	

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0.00000625	955.4795844	152876734.	65.0655401	0.0004067	0.0002192	1.5356789	11.1678166
0.00000750	1146.	152852250.	56.7587163	0.0004257	0.0002007	1.5980075	11.5946457
0.00000875	1337.	152823162.	50.8311108	0.0004448	0.0001823	1.6597036	12.0229569
0.00001000	1528.	152789501.	46.3905198	0.0004639	0.0001639	1.7207607	12.4527507
0.00001125	1718.	152751283.	42.9412746	0.0004831	0.0001456	1.7811724	12.8840284
0.00001250	1909.	152708515.	40.1859748	0.0005023	0.0001273	1.8409323	13.3167909
0.00001375	2099.	152661202.	37.9353656	0.0005216	0.0001091	1.9000338	13.7510396
0.00001500	2289.	152609343.	36.0632776	0.0005409	0.00009095	1.9584706	14.1867758
0.00001625	2479.	152552937.	34.4823629	0.0005603	0.00007284	2.0162361	14.6240011
0.00001750	2669.	152491982.	33.1302307	0.0005798	0.00005478	2.0733240	15.0627171
0.00001875	2858.	152426474.	31.9611276	0.0005993	0.00003677	2.1297276	15.5029257
0.00002000	3047.	152356408.	30.9407390	0.0006188	0.00001881	2.1854406	15.9446287
0.00002125	3236.	152281779.	30.0428247	0.0006384	9.10024E-07	2.2404563	16.3878283
0.00002250	3425.	152202130.	29.2469636	0.0006581	-0.00001694	2.2947675	16.8325188
0.00002375	3613.	152114159.	28.5369538	0.0006778	-0.00003475	2.3483616	17.2786395
0.00002500	3800.	152013568.	27.8997815	0.0006975	-0.00005251	2.4012232	17.7260917
0.00002625	3987.	151897090.	27.3249094	0.0007173	-0.00007022	2.4533370	18.1747748
0.00002750	4173.	151762602.	26.8037248	0.0007371	-0.00008790	2.5046890	18.6245956
0.00002875	4359.	151608927.	26.3291243	0.0007570	-0.000106	2.5552667	19.0754700
0.00003000	4380.	146005325.	25.7294965	0.0007719	-0.000128	2.5925806	19.3831620 C
0.00003125	4515.	144472413.	25.2864932	0.0007902	-0.000147	2.6378229	19.7893221 C
0.00003250	4643.	142869638.	24.8718947	0.0008083	-0.000167	2.6818773	20.1901358 C
0.00003375	4767.	141230182.	24.4832588	0.0008263	-0.000186	2.7248239	20.5863021 C
0.00003500	4884.	139554894.	24.1173997	0.0008441	-0.000206	2.7666485	20.9774108 C
0.00003625	4997.	137859321.	23.7722019	0.0008617	-0.000226	2.8073921	21.3637149 C
0.00003750	5106.	136161548.	23.4460915	0.0008792	-0.000246	2.8471161	21.7457496 C
0.00003875	5211.	134469791.	23.1374015	0.0008966	-0.000266	2.8858535	22.1237176 C
0.00004000	5312.	132793663.	22.8448197	0.0009138	-0.000286	2.9236486	22.4979910 C
0.00004125	5410.	131140903.	22.5671909	0.0009309	-0.000307	2.9605437	22.8689397 C
0.00004250	5504.	129515586.	22.3033848	0.0009479	-0.000327	2.9965690	23.2367969 C
0.00004375	5596.	127919544.	22.0523293	0.0009648	-0.000348	3.0317467	23.6017054 C
0.00004500	5685.	126337176.	21.8120731	0.0009815	-0.000368	3.0660065	23.9625055 C
0.00004625	5771.	124785672.	21.5826573	0.0009982	-0.000389	3.0994494	24.3204267 C
0.00004750	5855.	123268364.	21.3634908	0.0010148	-0.000410	3.1321114	24.6758337 C
0.00004875	5937.	121787016.	21.1540002	0.0010313	-0.000431	3.1640223	25.0290304 C
0.00005125	6093.	118891397.	20.7588605	0.0010639	-0.000474	3.2253992	25.7252941 C
0.00005375	6242.	116125104.	20.3946037	0.0010962	-0.000516	3.2838698	26.4124012 C
0.00005625	6383.	113482423.	20.0574398	0.0011282	-0.000559	3.3395338	27.0908855 C
0.00005875	6519.	110957534.	19.7442119	0.0011600	-0.000603	3.3924841	27.7612637 C
0.00006125	6648.	108545369.	19.4523283	0.0011915	-0.000646	3.4428127	28.4241358 C
0.00006375	6773.	106241439.	19.1796558	0.0012227	-0.000690	3.4906103	29.0802014 C

MEG-33 forward abutment Z direction

0.00006625	6893.	104041679.	18.9244375	0.0012537	-0.000734	3.5359658	29.7302633	C
0.00006875	7009.	101942339.	18.6852292	0.0012846	-0.000778	3.5789656	30.3752384	C
0.00007125	7121.	99937417.	18.4605955	0.0013153	-0.000822	3.6196689	31.0156430	C
0.00007375	7228.	98008739.	18.2479213	0.0013458	-0.000867	3.6580045	31.6490537	C
0.00007625	7333.	96168734.	18.0479016	0.0013762	-0.000911	3.6941887	32.2796099	C
0.00007875	7435.	94412516.	17.8596763	0.0014064	-0.000956	3.7282713	32.9080983	C
0.00008125	7533.	92716062.	17.6800848	0.0014365	-0.001001	3.7600921	33.5296376	C
0.00008375	7630.	91099483.	17.5112522	0.0014666	-0.001046	3.7899348	34.1512665	C
0.00008625	7723.	89539807.	17.3501889	0.0014965	-0.001091	3.8176386	34.7678477	C
0.00008875	7814.	88047010.	17.1980016	0.0015263	-0.001136	3.8433694	35.3839192	C
0.00009125	7903.	86606561.	17.0527084	0.0015561	-0.001181	3.8670424	35.9961673	C
0.00009375	7990.	85226324.	16.9153342	0.0015858	-0.001227	3.8887883	36.6088777	C
0.00009625	8074.	83889237.	16.7834166	0.0016154	-0.001272	3.9084899	37.2168994	C
0.00009875	8158.	82610392.	16.6592631	0.0016451	-0.001317	3.9263339	37.8280276	C
0.0001013	8238.	81365430.	16.5390690	0.0016746	-0.001363	3.9421324	38.4327790	C
0.0001038	8318.	80169915.	16.4254424	0.0017041	-0.001408	3.9560623	39.0398627	C
0.0001063	8395.	79016218.	16.3171940	0.0017337	-0.001454	3.9680784	39.6470417	C
0.0001088	8471.	77894462.	16.2126856	0.0017631	-0.001499	3.9781369	40.2503200	C
0.0001113	8546.	76814733.	16.1138650	0.0017927	-0.001545	3.9863249	40.8567947	C
0.0001138	8619.	75769242.	16.0193975	0.0018222	-0.001590	3.9926009	41.4633002	C
0.0001163	8690.	74750665.	15.9279628	0.0018516	-0.001636	3.9969504	42.0663324	C
0.0001188	8760.	73767043.	15.8413330	0.0018812	-0.001681	3.9994092	42.6726532	C
0.0001213	8829.	72815841.	15.7592415	0.0019108	-0.001727	3.9989865	43.2823708	C
0.0001238	8896.	71884143.	15.6790788	0.0019403	-0.001772	3.9999969	43.8871045	C
0.0001263	8961.	70979166.	15.6028193	0.0019699	-0.001818	3.9998614	44.4945088	C
0.0001288	9026.	70101036.	15.5305132	0.0019996	-0.001863	3.9994606	45.1056162	C
0.0001313	9089.	69248448.	15.4619204	0.0020294	-0.001908	3.9986942	45.7203723	C
0.0001338	9150.	68412603.	15.3949921	0.0020591	-0.001953	3.9999324	46.3316384	C
0.0001363	9210.	67598428.	15.3310645	0.0020889	-0.001999	3.9994446	46.9450565	C
0.0001388	9269.	66807063.	15.2703006	0.0021188	-0.002044	3.9988883	47.5619351	C
0.0001413	9328.	66036395.	15.2126231	0.0021488	-0.002089	3.9998122	48.1826451	C
0.0001438	9385.	65286308.	15.1577862	0.0021789	-0.002134	3.9989351	48.8068340	C
0.0001463	9441.	64550972.	15.1040094	0.0022090	-0.002179	3.9999544	49.4275676	C
0.0001488	9495.	63833260.	15.0526347	0.0022391	-0.002223	3.9992103	50.0000000	CY
0.0001588	9686.	61013843.	14.8654846	0.0023599	-0.002403	3.9992142	50.0000000	CY
0.0001688	9817.	58175862.	14.6953826	0.0024798	-0.002583	3.9982692	50.0000000	CY
0.0001788	9932.	55562506.	14.5556553	0.0026018	-0.002761	3.9999210	50.0000000	CY
0.0001888	10036.	53172740.	14.4339500	0.0027244	-0.002938	3.9982415	50.0000000	CY
0.0001988	10131.	50971087.	14.3294039	0.0028480	-0.003115	3.9994502	50.0000000	CY
0.0002088	10189.	48808656.	14.2208676	0.0029686	-0.003294	3.9997920	50.0000000	CY
0.0002188	10214.	46690338.	14.1042804	0.0030853	-0.003477	3.9997463	50.0000000	CY

Performrd by: Gokul Khatri 6/28/2024

Checked by: James Samples 7/1/2024

MEG-33 forward abutment Z direction

0.0002288	10231.	44725798.	13.9992652	0.0032023	-0.003660	3.9994496	50.0000000	CY
0.0002388	10245.	42911896.	13.9038954	0.0033196	-0.003843	3.9986206	50.0000000	CY
0.0002488	10255.	41227204.	13.8182188	0.0034373	-0.004025	3.9967910	50.0000000	CY
0.0002588	10262.	39660920.	13.7440900	0.0035563	-0.004206	3.9996630	50.0000000	CY
0.0002688	10264.	38189961.	13.6841784	0.0036776	-0.004385	3.9994202	50.0000000	CY
0.0002788	10264.	36819917.	13.6341225	0.0038005	-0.004562	3.9970820	50.0000000	CY

 Summary of Results for Nominal Moment Capacity for Section 1

Moment values interpolated at maximum compressive strain = 0.003
 or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain	Max. Tens. Strain
----	-----	-----	-----	-----
1	714.600	9439.535	0.00300000	-0.00430146
2	921.400	10195.452	0.00300000	-0.00334320

Note that the values of moment capacity in the table above are not factored by a strength reduction factor (phi-factor).

In ACI 318, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.75).

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318, or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Load No.	Resist. Factor	Nominal Ax. Thrust kips	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in^2
-----	-----	-----	-----	-----	-----	-----
1	0.65	714.600000	9440.	464.490000	6136.	96190522.
2	0.65	921.400000	10195.	598.910000	6627.	108942776.

MEG-33 forward abutment Z direction

1	0.75	714.600000	9440.	535.950000	7080.	79561599.
2	0.75	921.400000	10195.	691.050000	7647.	90814947.
1	0.90	714.600000	9440.	643.140000	8496.	61936266.
2	0.90	921.400000	10195.	829.260000	9176.	68064153.

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 1

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 60820.0 lbs
 Applied moment at pile head = 0.0 in-lbs
 Axial thrust load on pile head = 714600.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	2.71E-04	7.21E-08	60820.	-2.45E-05	0.00	1.60E+11	-9317.	2.06E+07	0.00
0.1000	2.42E-04	66297.	49981.	-2.43E-05	0.00	1.60E+11	-8749.	4.35E+07	0.00
0.2000	2.13E-04	119996.	39874.	-2.36E-05	0.00	1.60E+11	-8095.	4.57E+07	0.00
0.3000	1.85E-04	162036.	30589.	-2.25E-05	0.00	1.60E+11	-7380.	4.79E+07	0.00
0.4000	1.59E-04	193448.	22187.	-2.12E-05	0.00	1.60E+11	-6624.	5.01E+07	0.00
0.5000	1.34E-04	215321.	14705.	-1.96E-05	0.00	1.60E+11	-5847.	5.23E+07	0.00
0.6000	1.12E-04	228773.	8155.	-1.80E-05	0.00	1.60E+11	-5069.	5.45E+07	0.00
0.7000	9.12E-05	234925.	2531.	-1.62E-05	0.00	1.60E+11	-4305.	5.67E+07	0.00
0.8000	7.28E-05	234875.	-2195.	-1.44E-05	0.00	1.60E+11	-3570.	5.89E+07	0.00
0.9000	5.65E-05	229683.	-6063.	-1.27E-05	0.00	1.60E+11	-2876.	6.11E+07	0.00
1.0000	4.23E-05	220347.	-9127.	-1.10E-05	0.00	1.60E+11	-2231.	6.33E+07	0.00
1.1000	3.01E-05	207796.	-11452.	-9.39E-06	0.00	1.60E+11	-1643.	6.55E+07	0.00
1.2000	1.98E-05	192878.	-13108.	-7.88E-06	0.00	1.60E+11	-1116.	6.77E+07	0.00
1.3000	1.12E-05	176352.	-14168.	-6.49E-06	0.00	1.60E+11	-652.217	6.99E+07	0.00
1.4000	4.21E-06	158885.	-14711.	-5.23E-06	0.00	1.60E+11	-252.521	7.21E+07	0.00
1.5000	-1.36E-06	141053.	-14812.	-4.11E-06	0.00	1.60E+11	84.0880	7.43E+07	0.00

MEG-33 forward abutment Z direction

1.6000	-5.65E-06	123342.	-14546.	-3.11E-06	0.00	1.60E+11	359.9773	7.65E+07	0.00
1.7000	-8.83E-06	106148.	-13983.	-2.25E-06	0.00	1.60E+11	578.6222	7.87E+07	0.00
1.8000	-1.10E-05	89787.	-13189.	-1.51E-06	0.00	1.60E+11	744.3565	8.09E+07	0.00
1.9000	-1.25E-05	74497.	-12225.	-8.94E-07	0.00	1.60E+11	862.1319	8.31E+07	0.00
2.0000	-1.32E-05	60449.	-11145.	-3.86E-07	0.00	1.60E+11	937.2962	8.53E+07	0.00
2.1000	-1.34E-05	47749.	-9998.	2.06E-08	0.00	1.60E+11	975.3931	8.75E+07	0.00
2.2000	-1.31E-05	36454.	-8823.	3.37E-07	0.00	1.60E+11	981.9861	8.97E+07	0.00
2.3000	-1.26E-05	26572.	-7657.	5.74E-07	0.00	1.60E+11	962.5093	9.19E+07	0.00
2.4000	-1.18E-05	18077.	-6526.	7.42E-07	0.00	1.60E+11	922.1443	9.41E+07	0.00
2.5000	-1.08E-05	10909.	-5453.	8.51E-07	0.00	1.60E+11	865.7233	9.63E+07	0.00
2.6000	-9.72E-06	4988.	-4455.	9.11E-07	0.00	1.60E+11	797.6574	9.85E+07	0.00
2.7000	-8.61E-06	214.8175	-3543.	9.31E-07	0.00	1.60E+11	721.8887	1.01E+08	0.00
2.8000	-7.49E-06	-3518.	-2725.	9.18E-07	0.00	1.60E+11	641.8622	1.03E+08	0.00
2.9000	-6.40E-06	-6327.	-2004.	8.81E-07	0.00	1.60E+11	560.5176	1.05E+08	0.00
3.0000	-5.37E-06	-8329.	-1379.	8.26E-07	0.00	1.60E+11	480.2959	1.07E+08	0.00
3.1000	-4.42E-06	-9639.	-849.203	7.58E-07	0.00	1.60E+11	403.1594	1.09E+08	0.00
3.2000	-3.55E-06	-10368.	-408.934	6.83E-07	0.00	1.60E+11	330.6220	1.12E+08	0.00
3.3000	-2.78E-06	-10622.	-52.289	6.04E-07	0.00	1.60E+11	263.7869	1.14E+08	0.00
3.4000	-2.10E-06	-10495.	228.0173	5.25E-07	0.00	1.60E+11	203.3901	1.16E+08	0.00
3.5000	-1.52E-06	-10075.	439.9591	4.47E-07	0.00	1.60E+11	149.8463	1.18E+08	0.00
3.6000	-1.03E-06	-9440.	591.8445	3.74E-07	0.00	1.60E+11	103.2961	1.20E+08	0.00
3.7000	-6.23E-07	-8655.	692.0144	3.06E-07	0.00	1.60E+11	63.6536	1.23E+08	0.00
3.8000	-2.95E-07	-7779.	748.5970	2.44E-07	0.00	1.60E+11	30.6508	1.25E+08	0.00
3.9000	-3.66E-08	-6859.	769.3156	1.89E-07	0.00	1.60E+11	3.8801	1.27E+08	0.00
4.0000	1.59E-07	-5933.	761.3436	1.41E-07	0.00	1.60E+11	-17.167	1.29E+08	0.00
4.1000	3.02E-07	-5032.	731.2043	9.98E-08	0.00	1.60E+11	-33.065	1.31E+08	0.00
4.2000	3.99E-07	-4179.	684.7094	6.51E-08	0.00	1.60E+11	-44.426	1.34E+08	0.00
4.3000	4.58E-07	-3389.	626.9300	3.67E-08	0.00	1.60E+11	-51.873	1.36E+08	0.00
4.4000	4.87E-07	-2674.	562.1962	1.39E-08	0.00	1.60E+11	-56.017	1.38E+08	0.00
4.5000	4.91E-07	-2040.	494.1189	-3.85E-09	0.00	1.60E+11	-57.445	1.40E+08	0.00
4.6000	4.78E-07	-1488.	425.6293	-1.71E-08	0.00	1.60E+11	-56.704	1.42E+08	0.00
4.7000	4.50E-07	-1018.	359.0309	-2.65E-08	0.00	1.60E+11	-54.293	1.45E+08	0.00
4.8000	4.14E-07	-626.440	296.0607	-3.27E-08	0.00	1.60E+11	-50.657	1.47E+08	0.00
4.9000	3.72E-07	-307.610	237.9552	-3.62E-08	0.00	1.60E+11	-46.185	1.49E+08	0.00
5.0000	3.27E-07	-55.285	185.5188	-3.76E-08	0.00	1.60E+11	-41.209	1.51E+08	0.00
5.1000	2.82E-07	137.6993	139.1911	-3.73E-08	0.00	1.60E+11	-36.004	1.53E+08	0.00
5.2000	2.37E-07	278.8374	99.1125	-3.57E-08	0.00	1.60E+11	-30.794	1.56E+08	0.00
5.3000	1.96E-07	375.6305	65.1844	-3.33E-08	0.00	1.60E+11	-25.753	1.58E+08	0.00
5.4000	1.58E-07	435.3369	37.1254	-3.02E-08	0.00	1.60E+11	-21.012	1.60E+08	0.00
5.5000	1.23E-07	464.7834	14.5212	-2.68E-08	0.00	1.60E+11	-16.662	1.62E+08	0.00
5.6000	9.31E-08	470.2338	-3.133	-2.33E-08	0.00	1.60E+11	-12.761	1.64E+08	0.00

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MEG-33 forward abutment Z direction

5.7000	6.72E-08	457.3054	-16.393	-1.98E-08	0.00	1.60E+11	-9.339	1.67E+08	0.00
5.8000	4.55E-08	430.9252	-25.839	-1.65E-08	0.00	1.60E+11	-6.404	1.69E+08	0.00
5.9000	2.77E-08	395.3210	-32.047	-1.34E-08	0.00	1.60E+11	-3.943	1.71E+08	0.00
6.0000	1.34E-08	354.0365	-35.571	-1.06E-08	0.00	1.60E+11	-1.932	1.73E+08	0.00
6.1000	2.30E-09	309.9678	-36.932	-8.07E-09	0.00	1.60E+11	-0.336	1.75E+08	0.00
6.2000	-5.99E-09	265.4136	-36.601	-5.91E-09	0.00	1.60E+11	0.8867	1.78E+08	0.00
6.3000	-1.19E-08	222.1347	-35.001	-4.07E-09	0.00	1.60E+11	1.7805	1.80E+08	0.00
6.4000	-1.58E-08	181.4182	-32.498	-2.55E-09	0.00	1.60E+11	2.3916	1.82E+08	0.00
6.5000	-1.80E-08	144.1445	-29.403	-1.33E-09	0.00	1.60E+11	2.7655	1.84E+08	0.00
6.6000	-1.90E-08	110.8522	-25.977	-3.71E-10	0.00	1.60E+11	2.9455	1.86E+08	0.00
6.7000	-1.89E-08	81.8008	-22.427	3.53E-10	0.00	1.60E+11	2.9716	1.89E+08	0.00
6.8000	-1.81E-08	57.0280	-18.915	8.76E-10	0.00	1.60E+11	2.8801	1.91E+08	0.00
6.9000	-1.68E-08	36.4022	-15.566	1.23E-09	0.00	1.60E+11	2.7028	1.93E+08	0.00
7.0000	-1.52E-08	19.6681	-12.464	1.44E-09	0.00	1.60E+11	2.4673	1.95E+08	0.00
7.1000	-1.33E-08	6.4868	-9.665	1.54E-09	0.00	1.60E+11	2.1965	1.97E+08	0.00
7.2000	-1.15E-08	-3.532	-7.202	1.55E-09	0.00	1.60E+11	1.9094	2.00E+08	0.00
7.3000	-9.63E-09	-10.800	-5.084	1.49E-09	0.00	1.60E+11	1.6207	2.02E+08	0.00
7.4000	-7.89E-09	-15.735	-3.306	1.39E-09	0.00	1.60E+11	1.3419	2.04E+08	0.00
7.5000	-6.29E-09	-18.738	-1.852	1.26E-09	0.00	1.60E+11	1.0811	2.06E+08	0.00
7.6000	-4.86E-09	-20.183	-0.703	1.12E-09	0.00	1.60E+11	0.8349	2.06E+08	0.00
7.7000	-3.61E-09	-20.427	0.1700	9.65E-10	0.00	1.60E+11	0.6200	2.06E+08	0.00
7.8000	-2.54E-09	-19.777	0.8041	8.14E-10	0.00	1.60E+11	0.4368	2.06E+08	0.00
7.9000	-1.65E-09	-18.498	1.2368	6.70E-10	0.00	1.60E+11	0.2843	2.06E+08	0.00
8.0000	-9.34E-10	-16.810	1.5037	5.37E-10	0.00	1.60E+11	0.1605	2.06E+08	0.00
8.1000	-3.65E-10	-14.890	1.6377	4.18E-10	0.00	1.60E+11	0.06280	2.06E+08	0.00
8.2000	6.87E-11	-12.880	1.6683	3.13E-10	0.00	1.60E+11	-0.01182	2.06E+08	0.00
8.3000	3.87E-10	-10.887	1.6213	2.24E-10	0.00	1.60E+11	-0.06644	2.06E+08	0.00
8.4000	6.06E-10	-8.989	1.5189	1.49E-10	0.00	1.60E+11	-0.104	2.06E+08	0.00
8.5000	7.44E-10	-7.242	1.3796	8.81E-11	0.00	1.60E+11	-0.128	2.06E+08	0.00
8.6000	8.17E-10	-5.678	1.2185	3.95E-11	0.00	1.60E+11	-0.141	2.06E+08	0.00
8.7000	8.39E-10	-4.317	1.0477	1.89E-12	0.00	1.60E+11	-0.144	2.06E+08	0.00
8.8000	8.22E-10	-3.164	0.8763	-2.62E-11	0.00	1.60E+11	-0.141	2.06E+08	0.00
8.9000	7.76E-10	-2.214	0.7115	-4.65E-11	0.00	1.60E+11	-0.133	2.06E+08	0.00
9.0000	7.10E-10	-1.456	0.5582	-6.03E-11	0.00	1.60E+11	-0.122	2.06E+08	0.00
9.1000	6.32E-10	-0.874	0.4198	-6.90E-11	0.00	1.60E+11	-0.109	2.06E+08	0.00
9.2000	5.45E-10	-0.449	0.2984	-7.40E-11	0.00	1.60E+11	-0.09364	2.06E+08	0.00
9.3000	4.54E-10	-0.158	0.1954	-7.63E-11	0.00	1.60E+11	-0.07803	2.06E+08	0.00
9.4000	3.62E-10	0.02042	0.1113	-7.68E-11	0.00	1.60E+11	-0.06216	2.06E+08	0.00
9.5000	2.70E-10	0.1093	0.04623	-7.63E-11	0.00	1.60E+11	-0.04633	2.06E+08	0.00
9.6000	1.78E-10	0.1315	2.89E-05	-7.54E-11	0.00	1.60E+11	-0.03067	2.06E+08	0.00
9.7000	8.85E-11	0.1095	-0.02750	-7.45E-11	0.00	1.60E+11	-0.01522	2.06E+08	0.00

Performrd by: Gokul Khatri 6/28/2024

Checked by: James Samples 7/1/2024

MEG-33 forward abutment Z direction

9.8000	0.00	0.06563	-0.03659	-7.39E-11	0.00	1.60E+11	7.04E-05	2.06E+08	0.00
9.9000	-8.87E-11	0.02183	-0.02740	-7.35E-11	0.00	1.60E+11	0.01526	2.06E+08	0.00
10.0000	-1.77E-10	0.00	0.00	-7.34E-11	0.00	1.60E+11	0.03041	1.03E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 1:

Pile-head deflection	=	0.00027099 inches
Computed slope at pile head	=	-0.0000245 radians
Maximum bending moment	=	234925. inch-lbs
Maximum shear force	=	60820. lbs
Depth of maximum bending moment	=	0.70000000 feet below pile head
Depth of maximum shear force	=	0.000000 feet below pile head
Number of iterations	=	6
Number of zero deflection points	=	5

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 2

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head	=	82060.0 lbs
Applied moment at pile head	=	0.0 in-lbs
Axial thrust load on pile head	=	921400.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in ²	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	3.70E-04	-5.18E-08	82060.	-3.38E-05	0.00	1.53E+11	-12717.	2.06E+07	0.00

MEG-33 forward abutment Z direction

0.10000	3.29E-04	89353.	67273.	-3.34E-05	0.00	1.53E+11	-11927.	4.35E+07	0.00
0.2000	2.90E-04	161530.	53504.	-3.25E-05	0.00	1.53E+11	-11021.	4.57E+07	0.00
0.3000	2.51E-04	217835.	40875.	-3.10E-05	0.00	1.53E+11	-10029.	4.79E+07	0.00
0.4000	2.15E-04	259698.	29468.	-2.91E-05	0.00	1.53E+11	-8983.	5.01E+07	0.00
0.5000	1.82E-04	288623.	19332.	-2.69E-05	0.00	1.53E+11	-7910.	5.23E+07	0.00
0.6000	1.51E-04	306155.	10483.	-2.46E-05	0.00	1.53E+11	-6838.	5.45E+07	0.00
0.7000	1.23E-04	313837.	2907.	-2.22E-05	0.00	1.53E+11	-5788.	5.67E+07	0.00
0.8000	9.75E-05	313181.	-3434.	-1.97E-05	0.00	1.53E+11	-4780.	5.89E+07	0.00
0.9000	7.53E-05	305639.	-8600.	-1.73E-05	0.00	1.53E+11	-3830.	6.11E+07	0.00
1.0000	5.60E-05	292578.	-12669.	-1.49E-05	0.00	1.53E+11	-2951.	6.33E+07	0.00
1.1000	3.94E-05	275267.	-15730.	-1.27E-05	0.00	1.53E+11	-2151.	6.55E+07	0.00
1.2000	2.55E-05	254855.	-17882.	-1.06E-05	0.00	1.53E+11	-1436.	6.77E+07	0.00
1.3000	1.39E-05	232374.	-19229.	-8.72E-06	0.00	1.53E+11	-809.777	6.99E+07	0.00
1.4000	4.54E-06	208725.	-19878.	-6.99E-06	0.00	1.53E+11	-272.653	7.21E+07	0.00
1.5000	-2.86E-06	184681.	-19936.	-5.45E-06	0.00	1.53E+11	177.2002	7.43E+07	0.00
1.6000	-8.53E-06	160891.	-19503.	-4.09E-06	0.00	1.53E+11	543.3962	7.65E+07	0.00
1.7000	-1.27E-05	137882.	-18679.	-2.92E-06	0.00	1.53E+11	831.0540	7.87E+07	0.00
1.8000	-1.55E-05	116069.	-17552.	-1.92E-06	0.00	1.53E+11	1046.	8.09E+07	0.00
1.9000	-1.73E-05	95761.	-16206.	-1.09E-06	0.00	1.53E+11	1197.	8.31E+07	0.00
2.0000	-1.81E-05	77176.	-14715.	-4.11E-07	0.00	1.53E+11	1289.	8.53E+07	0.00
2.1000	-1.83E-05	60446.	-13142.	1.29E-07	0.00	1.53E+11	1332.	8.75E+07	0.00
2.2000	-1.78E-05	45634.	-11543.	5.45E-07	0.00	1.53E+11	1333.	8.97E+07	0.00
2.3000	-1.70E-05	32741.	-9965.	8.53E-07	0.00	1.53E+11	1299.	9.19E+07	0.00
2.4000	-1.58E-05	21717.	-8443.	1.07E-06	0.00	1.53E+11	1238.	9.41E+07	0.00
2.5000	-1.44E-05	12476.	-7007.	1.20E-06	0.00	1.53E+11	1156.	9.63E+07	0.00
2.6000	-1.29E-05	4899.	-5678.	1.27E-06	0.00	1.53E+11	1059.	9.85E+07	0.00
2.7000	-1.14E-05	-1154.	-4470.	1.28E-06	0.00	1.53E+11	953.1721	1.01E+08	0.00
2.8000	-9.83E-06	-5833.	-3393.	1.26E-06	0.00	1.53E+11	842.4676	1.03E+08	0.00
2.9000	-8.35E-06	-9300.	-2449.	1.20E-06	0.00	1.53E+11	730.9450	1.05E+08	0.00
3.0000	-6.96E-06	-11713.	-1637.	1.11E-06	0.00	1.53E+11	621.8242	1.07E+08	0.00
3.1000	-5.67E-06	-13232.	-953.613	1.02E-06	0.00	1.53E+11	517.6602	1.09E+08	0.00
3.2000	-4.52E-06	-14004.	-390.783	9.09E-07	0.00	1.53E+11	420.3902	1.12E+08	0.00
3.3000	-3.49E-06	-14171.	60.2852	7.99E-07	0.00	1.53E+11	331.3899	1.14E+08	0.00
3.4000	-2.60E-06	-13861.	410.0414	6.89E-07	0.00	1.53E+11	251.5371	1.16E+08	0.00
3.5000	-1.84E-06	-13189.	669.7304	5.83E-07	0.00	1.53E+11	181.2779	1.18E+08	0.00
3.6000	-1.20E-06	-12255.	850.9139	4.83E-07	0.00	1.53E+11	120.6946	1.20E+08	0.00
3.7000	-6.81E-07	-11148.	965.0737	3.91E-07	0.00	1.53E+11	69.5718	1.23E+08	0.00
3.8000	-2.64E-07	-9940.	1023.	3.08E-07	0.00	1.53E+11	27.4591	1.25E+08	0.00
3.9000	5.92E-08	-8693.	1036.	2.35E-07	0.00	1.53E+11	-6.270	1.27E+08	0.00
4.0000	3.00E-07	-7454.	1013.	1.72E-07	0.00	1.53E+11	-32.367	1.29E+08	0.00
4.1000	4.72E-07	-6262.	962.4072	1.18E-07	0.00	1.53E+11	-51.659	1.31E+08	0.00

Performrd by: Gokul Khatri 6/28/2024

Checked by: James Samples 7/1/2024

MEG-33 forward abutment Z direction

4.2000	5.84E-07	-5145.	892.4063	7.32E-08	0.00	1.53E+11	-65.009	1.34E+08	0.00
4.3000	6.47E-07	-4121.	809.4293	3.69E-08	0.00	1.53E+11	-73.286	1.36E+08	0.00
4.4000	6.72E-07	-3202.	719.0592	8.14E-09	0.00	1.53E+11	-77.331	1.38E+08	0.00
4.5000	6.67E-07	-2395.	625.8946	-1.38E-08	0.00	1.53E+11	-77.943	1.40E+08	0.00
4.6000	6.39E-07	-1700.	533.6137	-2.99E-08	0.00	1.53E+11	-75.858	1.42E+08	0.00
4.7000	5.95E-07	-1114.	445.0536	-4.09E-08	0.00	1.53E+11	-71.742	1.45E+08	0.00
4.8000	5.41E-07	-631.622	362.3004	-4.78E-08	0.00	1.53E+11	-66.180	1.47E+08	0.00
4.9000	4.80E-07	-244.456	286.7839	-5.12E-08	0.00	1.53E+11	-59.681	1.49E+08	0.00
5.0000	4.18E-07	56.7727	219.3738	-5.19E-08	0.00	1.53E+11	-52.670	1.51E+08	0.00
5.1000	3.56E-07	282.1564	160.4737	-5.06E-08	0.00	1.53E+11	-45.497	1.53E+08	0.00
5.2000	2.96E-07	442.0216	110.1101	-4.78E-08	0.00	1.53E+11	-38.442	1.56E+08	0.00
5.3000	2.41E-07	546.5262	68.0148	-4.39E-08	0.00	1.53E+11	-31.717	1.58E+08	0.00
5.4000	1.91E-07	605.3542	33.6998	-3.94E-08	0.00	1.53E+11	-25.475	1.60E+08	0.00
5.5000	1.47E-07	627.4927	6.5223	-3.45E-08	0.00	1.53E+11	-19.821	1.62E+08	0.00
5.6000	1.08E-07	621.0842	-14.258	-2.96E-08	0.00	1.53E+11	-14.813	1.64E+08	0.00
5.7000	7.54E-08	593.3393	-29.432	-2.49E-08	0.00	1.53E+11	-10.477	1.67E+08	0.00
5.8000	4.84E-08	550.5026	-39.802	-2.04E-08	0.00	1.53E+11	-6.807	1.69E+08	0.00
5.9000	2.65E-08	497.8590	-46.153	-1.63E-08	0.00	1.53E+11	-3.777	1.71E+08	0.00
6.0000	9.31E-09	439.7719	-49.225	-1.26E-08	0.00	1.53E+11	-1.344	1.73E+08	0.00
6.1000	-3.74E-09	379.7459	-49.704	-9.38E-09	0.00	1.53E+11	0.5468	1.75E+08	0.00
6.2000	-1.32E-08	320.5040	-48.202	-6.63E-09	0.00	1.53E+11	1.9560	1.78E+08	0.00
6.3000	-1.97E-08	264.0759	-45.260	-4.34E-09	0.00	1.53E+11	2.9474	1.80E+08	0.00
6.4000	-2.36E-08	211.8899	-41.340	-2.47E-09	0.00	1.53E+11	3.5852	1.82E+08	0.00
6.5000	-2.56E-08	164.8647	-36.830	-9.95E-10	0.00	1.53E+11	3.9312	1.84E+08	0.00
6.6000	-2.60E-08	123.4990	-32.046	1.36E-10	0.00	1.53E+11	4.0431	1.86E+08	0.00
6.7000	-2.53E-08	87.9544	-27.236	9.66E-10	0.00	1.53E+11	3.9738	1.89E+08	0.00
6.8000	-2.37E-08	58.1312	-22.589	1.54E-09	0.00	1.53E+11	3.7699	1.91E+08	0.00
6.9000	-2.16E-08	33.7362	-18.244	1.90E-09	0.00	1.53E+11	3.4722	1.93E+08	0.00
7.0000	-1.91E-08	14.3409	-14.292	2.09E-09	0.00	1.53E+11	3.1151	1.95E+08	0.00
7.1000	-1.66E-08	-0.569	-10.787	2.14E-09	0.00	1.53E+11	2.7267	1.97E+08	0.00
7.2000	-1.40E-08	-11.552	-7.753	2.09E-09	0.00	1.53E+11	2.3299	2.00E+08	0.00
7.3000	-1.15E-08	-19.180	-5.190	1.97E-09	0.00	1.53E+11	1.9419	2.02E+08	0.00
7.4000	-9.26E-09	-24.012	-3.079	1.80E-09	0.00	1.53E+11	1.5756	2.04E+08	0.00
7.5000	-7.21E-09	-26.574	-1.390	1.61E-09	0.00	1.53E+11	1.2398	2.06E+08	0.00
7.6000	-5.41E-09	-27.351	-0.08803	1.39E-09	0.00	1.53E+11	0.9301	2.06E+08	0.00
7.7000	-3.87E-09	-26.789	0.8688	1.18E-09	0.00	1.53E+11	0.6646	2.06E+08	0.00
7.8000	-2.57E-09	-25.269	1.5331	9.78E-10	0.00	1.53E+11	0.4425	2.06E+08	0.00
7.9000	-1.52E-09	-23.112	1.9553	7.88E-10	0.00	1.53E+11	0.2613	2.06E+08	0.00
8.0000	-6.84E-10	-20.578	2.1826	6.16E-10	0.00	1.53E+11	0.1175	2.06E+08	0.00
8.1000	-4.08E-11	-17.875	2.2573	4.65E-10	0.00	1.53E+11	0.00702	2.06E+08	0.00
8.2000	4.34E-10	-15.161	2.2168	3.36E-10	0.00	1.53E+11	-0.07453	2.06E+08	0.00

Performrd by: Gokul Khatri 6/28/2024

Checked by: James Samples 7/1/2024

MEG-33 forward abutment Z direction

8.3000	7.65E-10	-12.555	2.0932	2.27E-10	0.00	1.53E+11	-0.132	2.06E+08	0.00
8.4000	9.79E-10	-10.138	1.9133	1.38E-10	0.00	1.53E+11	-0.168	2.06E+08	0.00
8.5000	1.10E-09	-7.963	1.6993	6.71E-11	0.00	1.53E+11	-0.189	2.06E+08	0.00
8.6000	1.14E-09	-6.060	1.4686	1.20E-11	0.00	1.53E+11	-0.196	2.06E+08	0.00
8.7000	1.13E-09	-4.438	1.2350	-2.91E-11	0.00	1.53E+11	-0.193	2.06E+08	0.00
8.8000	1.07E-09	-3.096	1.0086	-5.87E-11	0.00	1.53E+11	-0.184	2.06E+08	0.00
8.9000	9.85E-10	-2.018	0.7967	-7.88E-11	0.00	1.53E+11	-0.169	2.06E+08	0.00
9.0000	8.81E-10	-1.183	0.6043	-9.13E-11	0.00	1.53E+11	-0.151	2.06E+08	0.00
9.1000	7.65E-10	-0.567	0.4346	-9.82E-11	0.00	1.53E+11	-0.132	2.06E+08	0.00
9.2000	6.45E-10	-0.140	0.2891	-1.01E-10	0.00	1.53E+11	-0.111	2.06E+08	0.00
9.3000	5.23E-10	0.1270	0.1686	-1.01E-10	0.00	1.53E+11	-0.08992	2.06E+08	0.00
9.4000	4.02E-10	0.2647	0.07317	-9.95E-11	0.00	1.53E+11	-0.06918	2.06E+08	0.00
9.5000	2.84E-10	0.3028	0.00234	-9.73E-11	0.00	1.53E+11	-0.04887	2.06E+08	0.00
9.6000	1.69E-10	0.2705	-0.04442	-9.50E-11	0.00	1.53E+11	-0.02906	2.06E+08	0.00
9.7000	5.63E-11	0.1964	-0.06766	-9.32E-11	0.00	1.53E+11	-0.00967	2.06E+08	0.00
9.8000	-5.46E-11	0.1084	-0.06783	-9.20E-11	0.00	1.53E+11	0.00939	2.06E+08	0.00
9.9000	-1.64E-10	0.03382	-0.04523	-9.14E-11	0.00	1.53E+11	0.02828	2.06E+08	0.00
10.0000	-2.74E-10	0.00	0.00	-9.13E-11	0.00	1.53E+11	0.04711	1.03E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 2:

Pile-head deflection = 0.00036991 inches
 Computed slope at pile head = -0.0000338 radians
 Maximum bending moment = 313837. inch-lbs
 Maximum shear force = 82060. lbs
 Depth of maximum bending moment = 0.70000000 feet below pile head
 Depth of maximum shear force = 0.000000 feet below pile head
 Number of iterations = 6
 Number of zero deflection points = 5

 Summary of Pile-head Responses for Conventional Analyses

Performrd by: Gokul Khatri 6/28/2024
 Checked by: James Samples 7/1/2024

 Definitions of Pile-head Loading Conditions:

Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs
 Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
 Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.
 Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs
 Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians

Load Case No.	Load Type 1	Pile-head Load 1	Load Type 2	Pile-head Load 2	Axial Loading lbs	Pile-head Deflection inches	Pile-head Rotation radians	Max Shear in Pile lbs	Max Moment in Pile in-lbs
1	V, lb	60820.	M, in-lb	0.00	714600.	2.71E-04	-2.45E-05	60820.	234925.
2	V, lb	82060.	M, in-lb	0.00	921400.	3.70E-04	-3.38E-05	82060.	313837.

Maximum pile-head deflection = 0.0003699065 inches
 Maximum pile-head rotation = -0.0000337890 radians = -0.001936 deg.

 Summary of Warning Messages

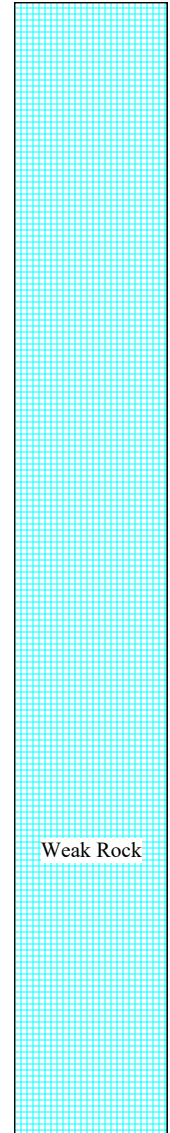
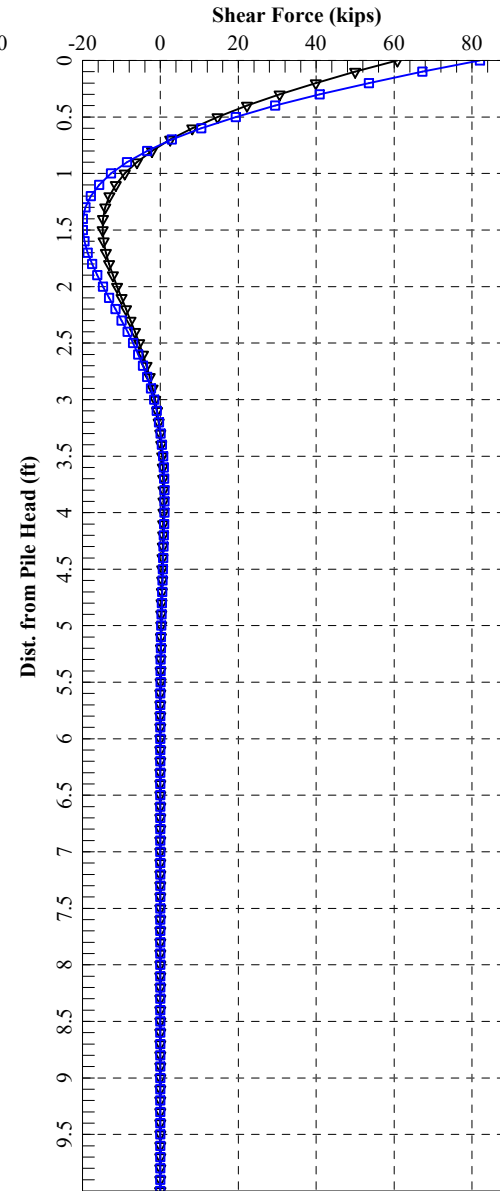
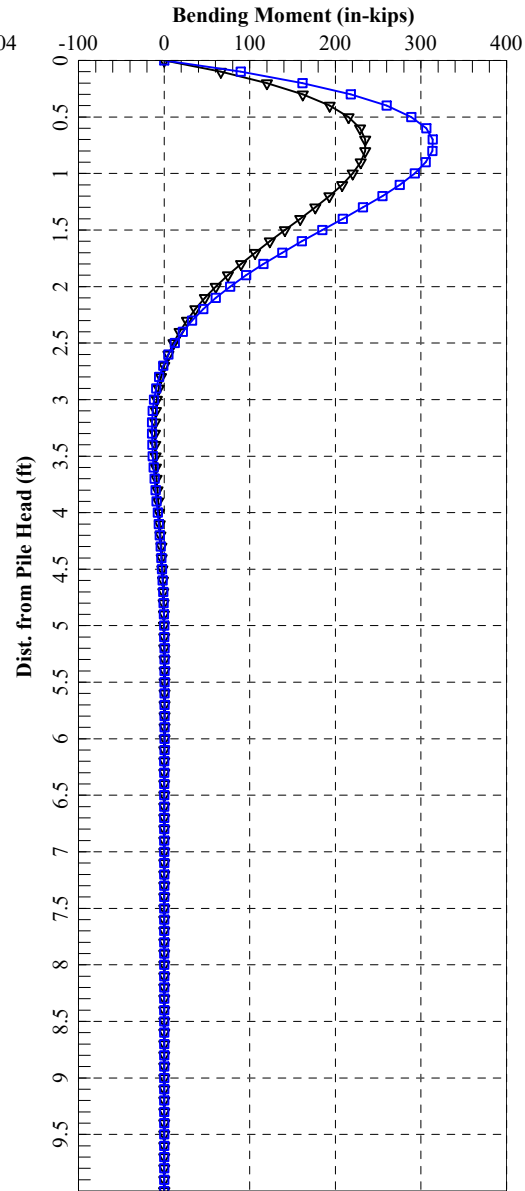
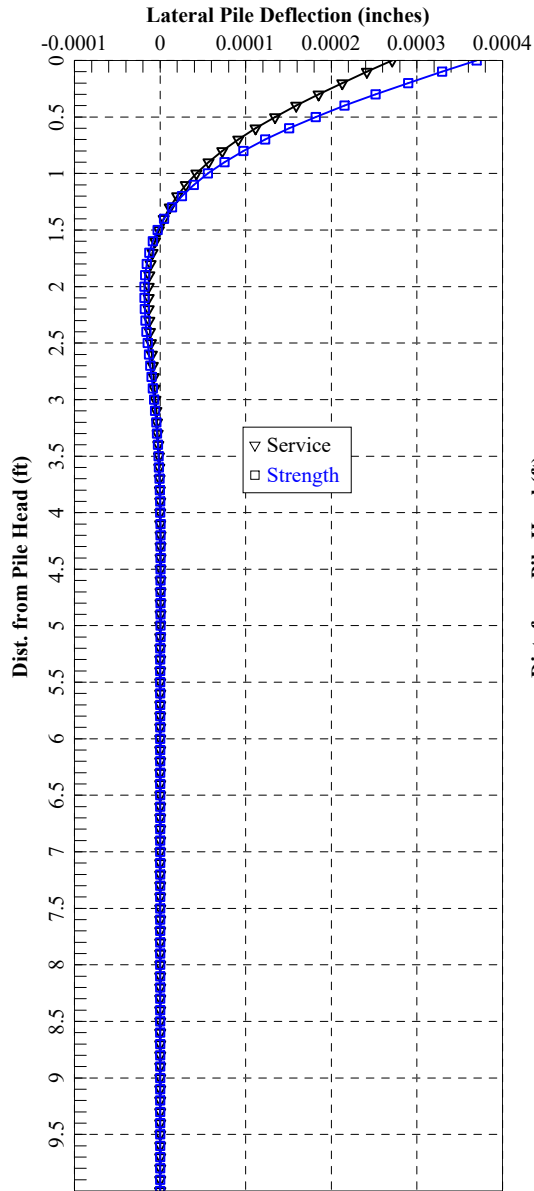
The following warning was reported 706 times

**** Warning ****

An unreasonable input value for unconfined compressive strength has been specified for a soil defined using the weak rock criteria. The input value is greater than 500 psi. Please check your input data for correctness.

The analysis ended normally.

MEG-33 Oldtown Creek Bridge Forward Abutment Z Direction



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LPIle for Windows, Version 2022-12.006

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method
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Files Used for Analysis

Path to file locations:

\\US0247-PPFSS01\shared_projects\173609140\119144\400-Engineering\Geotechnical\Analysis\Lpile\bridges\LPIle
Analysis\Old Town Creek Bridge\Pier DS\Case I & II\

Name of input data file:

Pier Drilled Shaft X-direction row 1.lp12d

Name of output report file:

Pier Drilled Shaft X-direction row 1.lp12o

Name of plot output file:
Pier Drilled Shaft X-direction row 1.lp12p

Name of runtime message file:
Pier Drilled Shaft X-direction row 1.lp12r

Date and Time of Analysis

Date: August 28, 2024

Time: 14:15:02

Problem Title

-

Project Name: MEG-33-19.21

Job Number: 173609140

Client: ODOT

Engineer: G. Khatri

Description: Pier Drilled Shaft Lateral Load Analysis at Oldtown Creek

- Program Options and Settings

-
Performed by: G. Khatri 8/29/2024
Checked by: J. Samples 8/30/2024

Computational Options:

- Conventional Analysis

Engineering Units Used for Data Input and Computations:

- US Customary System Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed = 500
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 100.0000 in
- Number of pile increments = 100

Loading Type and Number of Cycles of Loading:

- Static loading specified

- Analysis uses p-y modification factors for p-y curves
- Analysis uses layering correction (Method of Georgiadis)
- No distributed lateral loads are entered
- Loading by lateral soil movements acting on pile not selected
- Input of shear resistance at the pile tip not selected
- Input of moment resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:

- Output files use decimal points to denote decimal symbols.
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1
- No p-y curves to be computed and reported for user-specified depths
- Print using wide report formats

Pile Structural Properties and Geometry

Number of pile sections defined = 2

Total length of pile = 31.000 ft
 Depth of ground surface below top of pile = 0.0000 ft

Pile diameters used for p-y curve computations are defined using 4 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile. A summary of values of pile diameter vs. depth follows.

Point No.	Depth Below Pile Head feet	Pile Diameter inches
1	0.000	60.0000
2	21.000	60.0000
3	21.000	54.0000
4	31.000	54.0000

Input Structural Properties for Pile Sections:

Pile Section No. 1:

Section 1 is a round drilled shaft, bored pile, or CIDH pile
 Length of section = 21.000000 ft
 Shaft Diameter = 60.000000 in

Pile Section No. 2:

Section 2 is a round drilled shaft, bored pile, or CIDH pile
 Length of section = 10.000000 ft
 Shaft Diameter = 54.000000 in

 Soil and Rock Layering Information

The soil profile is modelled using 2 layers

Layer 1 is stiff clay with user-defined k-value

Distance from top of pile to top of layer	=	0.0000	ft
Distance from top of pile to bottom of layer	=	21.000000	ft
Effective unit weight at top of layer	=	122.000000	pcf
Effective unit weight at bottom of layer	=	122.000000	pcf
Undrained cohesion at top of layer	=	2000.	psf
Undrained cohesion at bottom of layer	=	2000.	psf
Epsilon-50 at top of layer	=	0.0000	
Epsilon-50 at bottom of layer	=	0.0000	
Subgrade k at top of layer	=	0.0000	pci
Subgrade k at bottom of layer	=	0.0000	pci

NOTE: Default values for Epsilon-50 will be computed for this layer.

NOTE: Default values for subgrade k will be computed for this layer.

Layer 2 is weak rock, p-y criteria by Reese, 1997

Distance from top of pile to top of layer	=	21.000000	ft
Distance from top of pile to bottom of layer	=	35.000000	ft
Effective unit weight at top of layer	=	77.600000	pcf
Effective unit weight at bottom of layer	=	77.600000	pcf
Uniaxial compressive strength at top of layer	=	425.000000	psi
Uniaxial compressive strength at bottom of layer	=	425.000000	psi
Initial modulus of rock at top of layer	=	38250.	psi
Initial modulus of rock at bottom of layer	=	38250.	psi
RQD of rock at top of layer	=	53.000000	%
RQD of rock at bottom of layer	=	53.000000	%
k _{rm} of rock at top of layer	=	0.0000500	
k _{rm} of rock at bottom of layer	=	0.0000500	

(Depth of the lowest soil layer extends 4.000 ft below the pile tip)

Summary of Input Soil Properties

Layer	Soil Type	Layer	Effective	Cohesion	Uniaxial	E50
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Performed by: G. Khatri 8/29/2024

Checked by: J. Samples 8/30/2024

Rock Mass Num.	Name	Depth	Unit Wt.	qu	RQD %	or	kpy
Modulus (p-y Curve Type) psi		ft	pcf	psf	psi	krm	pci
1 default	Stiff Clay w/o --	0.00	122.0000	2000.	--	--	default
default	Free Water, using k --	21.0000	122.0000	2000.	--	--	default
2	Weak 38250.	21.0000	77.6000	--	425.0000	53.0000	5.00E-05 --
	Rock 38250.	35.0000	77.6000	--	425.0000	53.0000	5.00E-05 --

Modification Factors for p-y Curves

Distribution of p-y modifiers with depth defined using 3 points

Point No.	Depth X ft	p-mult	y-mult
1	0.000	0.8200	1.0000
2	21.000	0.8200	1.0000
3	31.000	0.8200	1.0000

Static Loading Type

Static loading criteria were used when computing p-y curves for all analyses.

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 4

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length	Run Analysis
1	1	V = 18610. lbs	M = 10372800. in-lbs	775400.	No	Yes
2	1	V = 24300. lbs	M = 13596000. in-lbs	995700.	No	Yes
3	1	V = 10710. lbs	M = 5701200. in-lbs	1030000.	No	Yes
4	1	V = 14410. lbs	M = 7675200. in-lbs	1340000.	No	Yes

V = shear force applied normal to pile axis

M = bending moment applied to pile head

y = lateral deflection normal to pile axis

S = pile slope relative to original pile batter angle

R = rotational stiffness applied to pile head

Values of top y vs. pile lengths can be computed only for load types with specified shear loading (Load Types 1, 2, and 3).

Thrust force is assumed to be acting axially for all pile batter angles.

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 2

Pile Section No. 1:

Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section = 21.000000 ft
Shaft Diameter = 60.000000 in

Performed by: G. Khatri 8/29/2024

Checked by: J. Samples 8/30/2024

Concrete Cover Thickness (to edge of trans. reinf.) = 3.000000 in
 Number of Reinforcing Bars = 24 bars
 Yield Stress of Reinforcing Bars = 50000. psi
 Modulus of Elasticity of Reinforcing Bars = 29000000. psi
 Gross Area of Shaft = 2827. sq. in.
 Total Area of Reinforcing Steel = 24.000000 sq. in.
 Area Ratio of Steel Reinforcement = 0.85 percent
 Edge-to-Edge Bar Spacing = 5.610023 in
 Maximum Concrete Aggregate Size = 0.750000 in
 Ratio of Bar Spacing to Aggregate Size = 7.48
 Offset of Center of Rebar Cage from Center of Pile Transverse Reinforcement = 0.0000 in
 Type: Spiral
 Number of Transverse Reinf. (per spacing) = 1
 Spacing of Transverse Reinf. = 3.250000 in
 Yield Stress of Transverse Reinf. = 50000. psi
 Diameter of Transverse Reinf. = 0.625000 in

Axial Structural Capacities:

Nom. Axial Structural Capacity = $0.85 F_c A_c + F_y A_s$ = 10731.674 kips
 Tensile Load for Cracking of Concrete = -1246.273 kips
 Nominal Axial Tensile Capacity = -1200.000 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.128000	1.000000	25.811000	0.000000
2	1.128000	1.000000	24.931512	6.680378
3	1.128000	1.000000	22.352982	12.905500
4	1.128000	1.000000	18.251133	18.251133
5	1.128000	1.000000	12.905500	22.352982
6	1.128000	1.000000	6.680378	24.931512
7	1.128000	1.000000	0.000000	25.811000
8	1.128000	1.000000	-6.680378	24.931512
9	1.128000	1.000000	-12.905500	22.352982
10	1.128000	1.000000	-18.251133	18.251133

11	1.128000	1.000000	-22.35298	12.905500
12	1.128000	1.000000	-24.93151	6.680378
13	1.128000	1.000000	-25.81100	0.000000
14	1.128000	1.000000	-24.93151	-6.68038
15	1.128000	1.000000	-22.35298	-12.90550
16	1.128000	1.000000	-18.25113	-18.25113
17	1.128000	1.000000	-12.90550	-22.35298
18	1.128000	1.000000	-6.68038	-24.93151
19	1.128000	1.000000	0.00000	-25.81100
20	1.128000	1.000000	6.680378	-24.93151
21	1.128000	1.000000	12.905500	-22.35298
22	1.128000	1.000000	18.251133	-18.25113
23	1.128000	1.000000	22.352982	-12.90550
24	1.128000	1.000000	24.931512	-6.68038

NOTE: The positions of the above rebars were computed by LPile

Minimum spacing between any two bars not equal to zero = 5.610 inches
between bars 9 and 10.

Ratio of bar spacing to maximum aggregate size = 7.48

Concrete Properties:

Compressive Strength of Concrete	=	4000. psi
Modulus of Elasticity of Concrete	=	3604997. psi
Modulus of Rupture of Concrete	=	-474.34165 psi
Compression Strain at Peak Stress	=	0.001886
Tensile Strain at Fracture of Concrete	=	-0.0001154
Maximum Coarse Aggregate Size	=	0.750000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 4

Number	Axial Thrust Force kips
-----	-----
1	775.400

2	995.700
3	1030.000
4	1340.000

Definitions of Run Messages and Notes:

- C = concrete in section has cracked in tension.
- Y = stress in reinforcing steel has reached yield stress.
- T = ACI 318 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than 0.003. See ACI 318-14, Section 21.2.3.
- Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
 Position of neutral axis is measured from edge of compression side of pile.
 Compressive stresses and strains are positive in sign.
 Tensile stresses and strains are negative in sign.

Axial Thrust Force = 775.400 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
4.16667E-07	1170.	2807882912.	180.2399004	0.00007510	0.00005010	0.3116622	2.1307738	
8.33333E-07	2340.	2807848909.	105.1561645	0.00008763	0.00003763	0.3620105	2.4470240	
0.00000125	3510.	2807780733.	80.1443465	0.0001002	0.00002518	0.4120935	2.7638576	
0.00000167	4679.	2807682699.	67.6505090	0.0001128	0.00001275	0.4619097	3.0812746	
0.00000208	5849.	2807555665.	60.1638646	0.0001253	3.41385E-07	0.5114573	3.3992752	
0.00000250	7018.	2807309139.	55.1805532	0.0001380	-0.00001205	0.5607321	3.7178401	
0.00000292	8186.	2806530361.	51.6263117	0.0001506	-0.00002442	0.6097164	4.0368505	
0.00000333	9350.	2805038343.	48.9639277	0.0001632	-0.00003679	0.6583920	4.3561797	
0.00000375	10511.	2802870481.	46.8953199	0.0001759	-0.00004914	0.7067464	4.6757410	
0.00000417	11667.	2800125683.	45.2418873	0.0001885	-0.00006149	0.7547715	4.9954781	
0.00000458	12819.	2796904194.	43.8901127	0.0002012	-0.00007384	0.8024618	5.3153525	
0.00000500	13966.	2793292558.	42.7644002	0.0002138	-0.00008618	0.8498136	5.6353380	
0.00000542	15109.	2789361587.	41.8124648	0.0002265	-0.00009852	0.8968241	5.9554164	

0.00000583	15109.	2590121473.	38.1002239	0.0002223	-0.000128	0.8805235	5.7855379 C
0.00000625	15109.	2417446709.	37.0474332	0.0002315	-0.000143	0.9147747	6.0079723 C
0.00000667	15109.	2266356289.	36.0999229	0.0002407	-0.000159	0.9481869	6.2253184 C
0.00000708	15109.	2133041213.	35.2413276	0.0002496	-0.000175	0.9808285	6.4380310 C
0.00000750	15109.	2014538924.	34.4586116	0.0002584	-0.000192	1.0127581	6.6464980 C
0.00000792	15109.	1908510559.	33.7395553	0.0002671	-0.000208	1.0439772	6.8506646 C
0.00000833	15109.	1813085031.	33.0778766	0.0002756	-0.000224	1.0745933	7.0513202 C
0.00000875	15109.	1726747649.	32.4662697	0.0002841	-0.000241	1.1046413	7.2486910 C
0.00000917	15109.	1648259119.	31.8988532	0.0002924	-0.000258	1.1341587	7.4430285 C
0.00000958	15227.	1588943374.	31.3708685	0.0003006	-0.000274	1.1631858	7.6346122 C
0.00001000	15521.	1552130179.	30.8784543	0.0003088	-0.000291	1.1917655	7.8237517 C
0.00001042	15807.	1517470385.	30.4156325	0.0003168	-0.000308	1.2198397	8.0099307 C
0.00001083	16087.	1484933561.	29.9815234	0.0003248	-0.000325	1.2475102	-8.205555 C
0.00001125	16362.	1454408119.	29.5745262	0.0003327	-0.000342	1.2748437	-8.653936 C
0.00001167	16632.	1425619866.	29.1906828	0.0003406	-0.000359	1.3018003	-9.104319 C
0.00001208	16897.	1398369155.	28.8268836	0.0003483	-0.000377	1.3283537	-9.556955 C
0.00001250	17159.	1372758024.	28.4852010	0.0003561	-0.000394	1.3546837	-10.010365 C
0.00001292	17416.	1348307513.	28.1578629	0.0003637	-0.000411	1.3805420	-10.466659 C
0.00001333	17671.	1325295546.	27.8500509	0.0003713	-0.000429	1.4062309	-10.923314 C
0.00001375	17920.	1303300593.	27.5546684	0.0003789	-0.000446	1.4315022	-11.382451 C
0.00001417	18169.	1282551044.	27.2763754	0.0003864	-0.000464	1.4566361	-11.841706 C
0.00001458	18413.	1262628142.	27.0076065	0.0003939	-0.000481	1.4813334	-12.303658 C
0.00001500	18657.	1243798015.	26.7540959	0.0004013	-0.000499	1.5059266	-12.765468 C
0.00001542	18896.	1225717049.	26.5092654	0.0004087	-0.000516	1.5301410	-13.229524 C
0.00001583	19135.	1208504414.	26.2761458	0.0004160	-0.000534	1.5541757	-13.694120 C
0.00001625	19372.	1192103136.	26.0539492	0.0004234	-0.000552	1.5780375	-14.159201 C
0.00001708	19838.	1161237075.	25.6332269	0.0004379	-0.000587	1.6249164	-15.093747 C
0.00001792	20298.	1132888714.	25.2451228	0.0004523	-0.000623	1.6709591	-16.031680 C
0.00001875	20754.	1106854481.	24.8884238	0.0004667	-0.000658	1.7163654	-16.971295 C
0.00001958	21201.	1082623026.	24.5530914	0.0004808	-0.000694	1.7607660	-17.916015 C
0.00002042	21647.	1060273179.	24.2442376	0.0004950	-0.000730	1.8046733	-18.861266 C
0.00002125	22087.	1039380766.	23.9528807	0.0005090	-0.000766	1.8477011	-19.810662 C
0.00002208	22525.	1020016981.	23.6837690	0.0005230	-0.000802	1.8903205	-20.759895 C
0.00002292	22958.	1001789521.	23.4273384	0.0005369	-0.000838	1.9320321	-21.713706 C
0.00002375	23389.	984812462.	23.1896012	0.0005508	-0.000874	1.9733774	-22.667037 C
0.00002458	23817.	968833158.	22.9642851	0.0005645	-0.000910	2.0140336	-23.623003 C
0.00002542	24242.	953795724.	22.7516036	0.0005783	-0.000947	2.0541169	-24.580547 C
0.00002625	24667.	939687791.	22.5530480	0.0005920	-0.000983	2.0938395	-25.537617 C
0.00002708	25087.	926301992.	22.3625934	0.0006057	-0.001019	2.1328292	-26.497921 C
0.00002792	25506.	913646694.	22.1823141	0.0006193	-0.001056	2.1713204	-27.459193 C
0.00002875	25924.	901702588.	22.0130470	0.0006329	-0.001092	2.2094564	-28.419998 C

0.00002958	26340.	890370662.	21.8521629	0.0006465	-0.001129	2.2470949	-29.381790 C
0.00003042	26753.	879548919.	21.6966898	0.0006599	-0.001165	2.2840459	-30.346586 C
0.00003125	27165.	869284323.	21.5500208	0.0006734	-0.001202	2.3206473	-31.310919 C
0.00003208	27577.	859533344.	21.4114723	0.0006870	-0.001238	2.3568978	-32.274784 C
0.00003292	27987.	850241851.	21.2796808	0.0007005	-0.001275	2.3927299	-33.238896 C
0.00003375	28394.	841309708.	21.1508259	0.0007138	-0.001311	2.4278465	-34.206504 C
0.00003458	28801.	832790361.	21.0286447	0.0007272	-0.001348	2.4626174	-35.173647 C
0.00003542	29207.	824654571.	20.9126683	0.0007407	-0.001384	2.4970414	-36.140322 C
0.00003625	29612.	816875788.	20.8024709	0.0007541	-0.001421	2.5311173	-37.106527 C
0.00003708	30016.	809428241.	20.6975720	0.0007675	-0.001457	2.5648350	-38.072361 C
0.00003792	30418.	802224775.	20.5938170	0.0007808	-0.001494	2.5978311	-39.042007 C
0.00003875	30818.	795315618.	20.4949441	0.0007942	-0.001531	2.6304838	-40.011181 C
0.00003958	31219.	788682094.	20.4006471	0.0008075	-0.001567	2.6627919	-40.979882 C
0.00004042	31618.	782307067.	20.3106450	0.0008209	-0.001604	2.6947541	-41.948106 C
0.00004125	32017.	776174785.	20.2246797	0.0008343	-0.001641	2.7263693	-42.915852 C
0.00004208	32416.	770270743.	20.1425135	0.0008477	-0.001677	2.7576361	-43.883116 C
0.00004292	32812.	764559915.	20.0624210	0.0008610	-0.001714	2.7884024	-44.851770 C
0.00004375	33207.	759028372.	19.9840588	0.0008743	-0.001751	2.8186498	-45.822100 C
0.00004458	33602.	753690154.	19.9090028	0.0008876	-0.001787	2.8485530	-46.791943 C
0.00004542	33996.	748534542.	19.8370731	0.0009009	-0.001824	2.8781109	-47.761296 C
0.00004625	34389.	743551590.	19.7681029	0.0009143	-0.001861	2.9073221	-48.730157 C
0.00004708	34782.	738732054.	19.7019371	0.0009276	-0.001897	2.9361854	-49.698522 C
0.00004792	35160.	733780634.	19.6363340	0.0009409	-0.001934	2.9644825	-50.000000 CY
0.00004875	35503.	728271348.	19.5680141	0.0009539	-0.001971	2.9918835	-50.000000 CY
0.00004958	35793.	721874985.	19.4940654	0.0009666	-0.002008	3.0180915	-50.000000 CY
0.00005292	36822.	695850339.	19.1949422	0.0010157	-0.002159	3.1166667	-50.000000 CY
0.00005625	37634.	669048448.	18.9033654	0.0010633	-0.002312	3.2070674	-50.000000 CY
0.00005958	38349.	643615316.	18.6221461	0.0011096	-0.002465	3.2902210	-50.000000 CY
0.00006292	38911.	618445240.	18.3500651	0.0011545	-0.002620	3.3665779	-50.000000 CY
0.00006625	39459.	595607268.	18.0983209	0.0011990	-0.002776	3.4378490	-50.000000 CY
0.00006958	39962.	574306138.	17.8641601	0.0012430	-0.002932	3.5041888	-50.000000 CY
0.00007292	40332.	553121201.	17.6282576	0.0012854	-0.003090	3.5640042	-50.000000 CY
0.00007625	40683.	533546764.	17.4057630	0.0013272	-0.003248	3.6192562	-50.000000 CY
0.00007958	41031.	515572378.	17.2041727	0.0013692	-0.003406	3.6709855	-50.000000 CY
0.00008292	41372.	498955186.	17.0164475	0.0014109	-0.003564	3.7187211	-50.000000 CY
0.00008625	41698.	483455641.	16.8385703	0.0014523	-0.003723	3.7623017	-50.000000 CY
0.00008958	41938.	468147013.	16.6591606	0.0014924	-0.003883	3.8009664	-50.000000 CY
0.00009292	42149.	453618718.	16.4885350	0.0015321	-0.004043	3.8358751	-50.000000 CY
0.00009625	42348.	439975963.	16.3219243	0.0015710	-0.004204	3.8668398	-50.000000 CY
0.00009958	42544.	427223481.	16.1681550	0.0016101	-0.004365	3.8946862	-50.000000 CY
0.0001029	42739.	415274230.	16.0260028	0.0016493	-0.004526	3.9193725	-50.000000 CY

0.0001063	42930.	404048837.	15.8940016	0.0016887	-0.004686	3.9408343	-50.000000	CY
0.0001096	43112.	393416423.	15.7632840	0.0017274	-0.004848	3.9586634	-50.000000	CY
0.0001129	43291.	383391613.	15.6418181	0.0017662	-0.005009	3.9733643	-50.000000	CY
0.0001163	43468.	373921671.	15.5288333	0.0018052	-0.005170	3.9848936	-50.000000	CY
0.0001196	43613.	364709538.	15.4163875	0.0018435	-0.005331	3.9930541	-50.000000	CY
0.0001229	43728.	355754532.	15.3047041	0.0018812	-0.005494	3.9980223	-50.000000	CY
0.0001263	43825.	347130141.	15.1899912	0.0019177	-0.005657	3.9999538	-50.000000	CY
0.0001296	43920.	338930177.	15.0822865	0.0019544	-0.005821	3.9973574	-50.000000	CY
0.0001329	44012.	331128383.	14.9812359	0.0019913	-0.005984	3.9997590	-50.000000	CY
0.0001363	44103.	323692315.	14.8865484	0.0020283	-0.006147	3.9956291	-50.000000	CY
0.0001396	44192.	316597615.	14.7976598	0.0020655	-0.006309	3.9989788	-50.000000	CY
0.0001429	44279.	309822625.	14.7140344	0.0021029	-0.006472	3.9992993	-50.000000	CY
0.0001462	44359.	303308236.	14.6299046	0.0021396	-0.006635	3.9967494	-50.000000	CY
0.0001496	44437.	297069654.	14.5492578	0.0021763	-0.006799	3.9993487	-50.000000	CY
0.0001529	44513.	291093758.	14.4731566	0.0022132	-0.006962	3.9981844	-50.000000	CY
0.0001562	44588.	285360142.	14.4015887	0.0022502	-0.007125	3.9962315	-50.000000	CY
0.0001596	44661.	279859580.	14.3338145	0.0022874	-0.007288	3.9990078	-50.000000	CY
0.0001629	44733.	274577634.	14.2696135	0.0023248	-0.007450	3.9999978	-50.000000	CY
0.0001662	44804.	269495119.	14.2092706	0.0023623	-0.007613	3.9940737	-50.000000	CY
0.0001696	44871.	264597442.	14.1529234	0.0024001	-0.007775	3.9976422	50.000000	CY
0.0001729	44937.	259876636.	14.1000838	0.0024381	-0.007937	3.9996045	50.000000	CY
0.0001762	44998.	255308411.	14.0448978	0.0024754	-0.008100	3.9976431	50.000000	CY
0.0001796	45052.	250869412.	13.9907028	0.0025125	-0.008263	3.9938190	50.000000	CY
0.0001829	45098.	246550033.	13.9368733	0.0025493	-0.008426	3.9971489	50.000000	CY
0.0002029	45259.	223040971.	13.6505616	0.0027699	-0.009405	3.9990237	50.000000	CY
0.0002229	45348.	203430233.	13.4361753	0.0029951	-0.010380	3.9991187	50.000000	CY
0.0002429	45406.	186920605.	13.2601970	0.0032211	-0.011354	3.9972149	50.000000	CYT
0.0002629	45451.	172871445.	13.1242298	0.0034506	-0.012324	3.9904707	50.000000	CYT
0.0002829	45485.	160770161.	13.0183030	0.0036831	-0.013292	3.9954699	50.000000	CYT
0.0003029	45485.	150155350.	13.0074420	0.0039402	-0.014235	3.9985247	50.000000	CYT

Axial Thrust Force = 995.700 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
4.16667E-07	1159.	2782231413.	223.8132093	0.00009326	0.00006826	0.3852318	2.6572846	
8.33333E-07	2318.	2782199518.	126.9431621	0.0001058	0.00005579	0.4350748	2.9735431	
0.00000125	3478.	2782131507.	94.6693929	0.0001183	0.00004334	0.4846526	3.2903905	

Performed by: G. Khatri 8/29/2024

Checked by: J. Samples 8/30/2024

0.00000167	4637.	2782032948.	78.5446942	0.0001309	0.00003091	0.5339633	3.6078269
0.00000208	5796.	2781904954.	68.8796247	0.0001435	0.00001850	0.5830054	3.9258523
0.00000250	6954.	2781747892.	62.4443710	0.0001561	0.00000611	0.6317771	4.2444669
0.00000292	8113.	2781555363.	57.8547088	0.0001687	-0.00000626	0.6802766	4.5636691
0.00000333	9270.	2781148237.	54.4179987	0.0001814	-0.00001861	0.7284951	4.8834065
0.00000375	10426.	2780268184.	51.7488864	0.0001941	-0.00003094	0.7764163	5.2035664
0.00000417	11578.	2778833512.	49.6163023	0.0002067	-0.00004327	0.8240265	5.5240531
0.00000458	12727.	2776861439.	47.8733912	0.0002194	-0.00005558	0.8713158	5.8447966
0.00000500	13872.	2774406875.	46.4223889	0.0002321	-0.00006789	0.9182768	6.1657464
0.00000542	15012.	2771532291.	45.1956986	0.0002448	-0.00008019	0.9649044	6.4868660
0.00000583	16148.	2768296621.	44.1450927	0.0002575	-0.00009249	1.0111945	6.8081282
0.00000625	17280.	2764752074.	43.2352431	0.0002702	-0.000105	1.0571443	7.1295128
0.00000667	17280.	2591955069.	40.1297344	0.0002675	-0.000132	1.0468996	7.0044153 C
0.00000708	17280.	2439487124.	39.1419903	0.0002773	-0.000148	1.0817769	7.2392922 C
0.00000750	17280.	2303960061.	38.2409386	0.0002868	-0.000163	1.1158242	7.4691542 C
0.00000792	17280.	2182699005.	37.4150709	0.0002962	-0.000179	1.1491144	7.6945017 C
0.00000833	17280.	2073564055.	36.6535851	0.0003054	-0.000195	1.1816713	7.9154497 C
0.00000875	17280.	1974822910.	35.9504188	0.0003146	-0.000210	1.2136013	8.1327938 C
0.00000917	17280.	1885058232.	35.2980173	0.0003236	-0.000226	1.2449249	8.3466396 C
0.00000958	17337.	1809042118.	34.6903324	0.0003324	-0.000243	1.2756684	8.5571466 C
0.00001000	17680.	1768004413.	34.1225343	0.0003412	-0.000259	1.3058651	8.7645350 C
0.00001042	18013.	1729255303.	33.5906473	0.0003499	-0.000275	1.3355506	8.9690497 C
0.00001083	18337.	1692648884.	33.0913918	0.0003585	-0.000292	1.3647627	9.1709623 C
0.00001125	18653.	1658056561.	32.6220624	0.0003670	-0.000308	1.3935421	9.3705729 C
0.00001167	18961.	1625218071.	32.1786033	0.0003754	-0.000325	1.4218594	9.5675942 C
0.00001208	19261.	1594001013.	31.7585146	0.0003837	-0.000341	1.4497269	9.7620879 C
0.00001250	19556.	1564462941.	31.3620343	0.0003920	-0.000358	1.4772579	9.9549875 C
0.00001292	19845.	1536372878.	30.9858603	0.0004002	-0.000375	1.5044112	10.1459116 C
0.00001333	20127.	1509551240.	30.6271452	0.0004084	-0.000392	1.5311488	10.3344961 C
0.00001375	20407.	1484175277.	30.2883675	0.0004165	-0.000409	1.5576603	10.5223616 C
0.00001417	20680.	1459765870.	29.9624325	0.0004245	-0.000426	1.5836977	-10.738184 C
0.00001458	20951.	1436662097.	29.6544181	0.0004325	-0.000443	1.6095620	-11.184277 C
0.00001500	21216.	1414429668.	29.3577007	0.0004404	-0.000460	1.6350026	-11.632900 C
0.00001542	21481.	1393346406.	29.0767996	0.0004483	-0.000477	1.6602960	-12.081623 C
0.00001583	21739.	1372970539.	28.8045853	0.0004561	-0.000494	1.6851419	-12.533145 C
0.00001625	21996.	1353624178.	28.5466758	0.0004639	-0.000511	1.7098732	-12.984504 C
0.00001708	22500.	1317061777.	28.0578503	0.0004793	-0.000546	1.7583544	-13.892548 C
0.00001792	22994.	1283362973.	27.6065661	0.0004946	-0.000580	1.8058706	-14.804713 C
0.00001875	23480.	1252247321.	27.1894115	0.0005098	-0.000615	1.8525291	-15.720132 C
0.00001958	23957.	1223338757.	26.8007569	0.0005248	-0.000650	1.8982645	-16.639528 C
0.00002042	24427.	1196402075.	26.4372664	0.0005398	-0.000685	1.9431002	-17.562810 C

0.00002125	24893.	1171411983.	26.1004739	0.0005546	-0.000720	1.9873368	-18.487208 C
0.00002208	25349.	1147870162.	25.7805280	0.0005693	-0.000756	2.0305291	-19.417095 C
0.00002292	25804.	1125984456.	25.4841992	0.0005840	-0.000791	2.0732765	-20.346751 C
0.00002375	26250.	1105281636.	25.2012873	0.0005985	-0.000826	2.1150447	-21.281489 C
0.00002458	26696.	1085949333.	24.9383221	0.0006131	-0.000862	2.1564094	-22.215679 C
0.00002542	27135.	1067613800.	24.6866315	0.0006275	-0.000898	2.1968832	-23.154270 C
0.00002625	27572.	1050371006.	24.4504599	0.0006418	-0.000933	2.2368738	-24.093212 C
0.00002708	28006.	1034083352.	24.2271422	0.0006562	-0.000969	2.2762892	-25.033474 C
0.00002792	28436.	1018586736.	24.0130762	0.0006704	-0.001005	2.3149454	-25.977039 C
0.00002875	28864.	1003961934.	23.8120488	0.0006846	-0.001040	2.3532125	-26.920079 C
0.00002958	29289.	990058466.	23.6203546	0.0006988	-0.001076	2.3908815	-27.864829 C
0.00003042	29711.	976787115.	23.4361759	0.0007129	-0.001112	2.4278730	-28.812215 C
0.00003125	30131.	964199764.	23.2623908	0.0007269	-0.001148	2.4644812	-29.759084 C
0.00003208	30551.	952241427.	23.0981292	0.0007411	-0.001184	2.5006996	-30.705491 C
0.00003292	30966.	940725516.	22.9373970	0.0007550	-0.001220	2.5360813	-31.656468 C
0.00003375	31379.	929756869.	22.7851254	0.0007690	-0.001256	2.5710853	-32.606934 C
0.00003458	31792.	919295782.	22.6407053	0.0007830	-0.001292	2.6057100	-33.556885 C
0.00003542	32205.	909306398.	22.5035847	0.0007970	-0.001328	2.6399544	-34.506318 C
0.00003625	32612.	899645978.	22.3685420	0.0008109	-0.001364	2.6733987	-35.460195 C
0.00003708	33019.	890397714.	22.2399172	0.0008247	-0.001400	2.7064578	-36.413697 C
0.00003792	33425.	881537206.	22.1174135	0.0008386	-0.001436	2.7391420	-37.366686 C
0.00003875	33830.	873039378.	22.0006384	0.0008525	-0.001472	2.7714499	-38.319158 C
0.00003958	34235.	864872635.	21.8888154	0.0008664	-0.001509	2.8033416	-39.271589 C
0.00004042	34635.	856949026.	21.7783176	0.0008802	-0.001545	2.8345100	-40.227872 C
0.00004125	35035.	849328716.	21.6727158	0.0008940	-0.001581	2.8653072	-41.183639 C
0.00004208	35434.	841993584.	21.5717214	0.0009078	-0.001617	2.8957320	-42.138887 C
0.00004292	35832.	834926900.	21.4750683	0.0009216	-0.001653	2.9257828	-43.093613 C
0.00004375	36230.	828113229.	21.3825105	0.0009355	-0.001690	2.9554582	-44.047816 C
0.00004458	36627.	821533985.	21.2935705	0.0009493	-0.001726	2.9847331	-45.001813 C
0.00004542	37020.	815124656.	21.2050866	0.0009631	-0.001762	3.0133233	-45.959509 C
0.00004625	37413.	808931391.	21.1201848	0.0009768	-0.001798	3.0415429	-46.916677 C
0.00004708	37805.	802942627.	21.0386769	0.0009906	-0.001834	3.0693906	-47.873315 C
0.00004792	38197.	797147603.	20.9603882	0.0010044	-0.001871	3.0968648	-48.829419 C
0.00004875	38587.	791536293.	20.8851558	0.0010182	-0.001907	3.1239640	-49.784986 C
0.00004958	38962.	785795791.	20.8106761	0.0010319	-0.001943	3.1504783	-50.000000 CY
0.00005292	40140.	758545032.	20.4882173	0.0010842	-0.002091	3.2477974	-50.000000 CY
0.00005625	41047.	729725609.	20.1675236	0.0011344	-0.002241	3.3356587	-50.000000 CY
0.00005958	41851.	702398505.	19.8643207	0.0011836	-0.002391	3.4162911	-50.000000 CY
0.00006292	42494.	675394488.	19.5706558	0.0012313	-0.002544	3.4895577	-50.000000 CY
0.00006625	43053.	649859453.	19.2900031	0.0012780	-0.002697	3.5563664	-50.000000 CY
0.00006958	43604.	626646793.	19.0362427	0.0013246	-0.002850	3.6184914	-50.000000 CY

0.00007292	44084.	604583524.	18.7932416	0.0013703	-0.003005	3.6748363	-50.000000	CY
0.00007625	44450.	582950574.	18.5502059	0.0014145	-0.003161	3.7248796	-50.000000	CY
0.00007958	44809.	563043064.	18.3296633	0.0014587	-0.003316	3.7709161	-50.000000	CY
0.00008292	45153.	544561827.	18.1195092	0.0015024	-0.003473	3.8121812	-50.000000	CY
0.00008625	45492.	527444621.	17.9264406	0.0015462	-0.003629	3.8494117	-50.000000	CY
0.00008958	45826.	511548230.	17.7499418	0.0015901	-0.003785	3.8826770	-50.000000	CY
0.00009292	46082.	495951010.	17.5680627	0.0016324	-0.003943	3.9107368	-50.000000	CY
0.00009625	46289.	480926925.	17.3895994	0.0016737	-0.004101	3.9344888	-50.000000	CY
0.00009958	46493.	466878495.	17.2250775	0.0017153	-0.004260	3.9546638	-50.000000	CY
0.0001029	46693.	453693053.	17.0714231	0.0017569	-0.004418	3.9711436	-50.000000	CY
0.0001063	46881.	441232324.	16.9217109	0.0017979	-0.004577	3.9837534	-50.000000	CY
0.0001096	47066.	429502932.	16.7829506	0.0018391	-0.004736	3.9928024	-50.000000	CY
0.0001129	47249.	418439358.	16.6542039	0.0018805	-0.004894	3.9982363	-50.000000	CY
0.0001163	47428.	407983533.	16.5346482	0.0019222	-0.005053	3.9996843	-50.000000	CY
0.0001196	47598.	398035641.	16.4181426	0.0019633	-0.005212	3.9989501	-50.000000	CY
0.0001229	47763.	388584279.	16.3073175	0.0020044	-0.005371	3.9976344	-50.000000	CY
0.0001263	47896.	379372396.	16.1971223	0.0020449	-0.005530	3.9989363	-50.000000	CY
0.0001296	48003.	370443258.	16.0885736	0.0020848	-0.005690	3.9986941	-50.000000	CY
0.0001329	48098.	361864116.	15.9848200	0.0021246	-0.005850	3.9981334	-50.000000	CY
0.0001363	48190.	353684526.	15.8863130	0.0021645	-0.006010	3.9999301	-50.000000	CY
0.0001396	48272.	345831635.	15.7873161	0.0022036	-0.006171	3.9960200	-50.000000	CY
0.0001429	48353.	338333275.	15.6941374	0.0022430	-0.006332	3.9990420	-50.000000	CY
0.0001462	48433.	331166823.	15.6062762	0.0022824	-0.006493	3.9996012	-50.000000	CY
0.0001496	48509.	324291049.	15.5248363	0.0023223	-0.006653	3.9962650	50.000000	CY
0.0001529	48581.	317697490.	15.4486423	0.0023624	-0.006813	3.9990842	50.000000	CY
0.0001562	48653.	311376972.	15.3766408	0.0024026	-0.006972	3.9997792	50.000000	CY
0.0001596	48721.	305304081.	15.3092070	0.0024431	-0.007132	3.9951692	50.000000	CY
0.0001629	48780.	299419341.	15.2428553	0.0024833	-0.007292	3.9983482	50.000000	CY
0.0001662	48838.	293760625.	15.1791008	0.0025235	-0.007451	3.9998610	50.000000	CY
0.0001696	48893.	288314257.	15.1190344	0.0025639	-0.007611	3.9948926	50.000000	CY
0.0001729	48948.	283070099.	15.0622486	0.0026045	-0.007770	3.9959687	50.000000	CY
0.0001762	48995.	277985054.	15.0120221	0.0026459	-0.007929	3.9987363	50.000000	CY
0.0001796	49041.	273081110.	14.9646630	0.0026874	-0.008088	3.9999450	50.000000	CY
0.0001829	49085.	268345916.	14.9202456	0.0027292	-0.008246	3.9938030	50.000000	CY
0.0002029	49295.	242931420.	14.6918047	0.0029812	-0.009194	3.9957225	50.000000	CY
0.0002229	49359.	221422561.	14.4629932	0.0032240	-0.010151	3.9950129	50.000000	CYT
0.0002429	49396.	203346567.	14.2860560	0.0034703	-0.011105	3.9904691	50.000000	CYT
0.0002629	49414.	187947059.	14.1535848	0.0037212	-0.012054	3.9934732	50.000000	CYT
0.0002829	49414.	174660669.	14.1340409	0.0039988	-0.012976	3.9999009	50.000000	CYT

Axial Thrust Force = 1030.000 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
4.16667E-07	1158.	2778215654.	230.6346368	0.00009610	0.00007110	0.3966821	2.7397102	
8.33333E-07	2315.	2778184090.	130.3539302	0.0001086	0.00005863	0.4464460	3.0559700	
0.00000125	3473.	2778116103.	96.9432986	0.0001212	0.00004618	0.4959446	3.3728196	
0.00000167	4630.	2778017461.	80.2501868	0.0001338	0.00003375	0.5451763	3.6902590	
0.00000208	5787.	2777889314.	70.2440840	0.0001463	0.00002134	0.5941392	4.0082884	
0.00000250	6944.	2777732044.	63.5814868	0.0001590	0.00000895	0.6428318	4.3269078	
0.00000292	8101.	2777544990.	58.8294632	0.0001716	-0.00000341	0.6912522	4.6461171	
0.00000333	9257.	2777217668.	55.2712212	0.0001842	-0.00001576	0.7393946	4.9658847	
0.00000375	10412.	2776482858.	52.5078727	0.0001969	-0.00002810	0.7872437	5.2861062	
0.00000417	11563.	2775222028.	50.3001258	0.0002096	-0.00004042	0.8347852	5.6066819	
0.00000458	12712.	2773430601.	48.4958872	0.0002223	-0.00005273	0.8820084	5.9275366	
0.00000500	13856.	2771151578.	46.9939018	0.0002350	-0.00006503	0.9289054	6.2486158	
0.00000542	14996.	2768442732.	45.7241663	0.0002477	-0.00007733	0.9754705	6.5698795	
0.00000583	16131.	2765361089.	44.6367373	0.0002604	-0.00008962	1.0216994	6.8912981	
0.00000625	17262.	2761958296.	43.6950300	0.0002731	-0.000102	1.0675889	7.2128492	
0.00000667	18389.	2758279473.	42.8716346	0.0002858	-0.000114	1.1131365	7.5345160	
0.00000708	18389.	2596027739.	39.7148618	0.0002813	-0.000144	1.0964581	7.3569696	C
0.00000750	18389.	2451803976.	38.7969620	0.0002910	-0.000159	1.1308230	7.5900892	C
0.00000792	18389.	2322761661.	37.9548046	0.0003005	-0.000175	1.1643930	7.8184155	C
0.00000833	18389.	2206623578.	37.1790227	0.0003098	-0.000190	1.1972378	8.0424305	C
0.00000875	18389.	2101546265.	36.4624666	0.0003190	-0.000206	1.2294385	8.2627259	C
0.00000917	18389.	2006021435.	35.7978210	0.0003281	-0.000222	1.2610275	8.4795041	C
0.00000958	18389.	1918803111.	35.1786942	0.0003371	-0.000238	1.2920249	8.6928705	C
0.00001000	18389.	1838852982.	34.6000457	0.0003460	-0.000254	1.3224602	8.9030133	C
0.00001042	18389.	1765298863.	34.0577800	0.0003548	-0.000270	1.3523673	9.1101627	C
0.00001083	18659.	1722370911.	33.5485124	0.0003634	-0.000287	1.3817826	9.3145743	C
0.00001125	18981.	1687236850.	33.0694432	0.0003720	-0.000303	1.4107446	9.5165309	C
0.00001167	19296.	1653984280.	32.6182604	0.0003805	-0.000319	1.4392949	9.7163448	C
0.00001208	19603.	1622346693.	32.1909403	0.0003890	-0.000336	1.4673911	9.9136170	C
0.00001250	19903.	1592225417.	31.7854711	0.0003973	-0.000353	1.4950539	10.1084833	C
0.00001292	20198.	1563695787.	31.4024053	0.0004056	-0.000369	1.5224029	10.3019427	C
0.00001333	20486.	1536446561.	31.0373600	0.0004138	-0.000386	1.5493396	10.4931126	C
0.00001375	20769.	1510469760.	30.6898603	0.0004220	-0.000403	1.5759213	10.6824567	C
0.00001417	21048.	1485775705.	30.3600647	0.0004301	-0.000420	1.6022307	10.8706766	C
0.00001458	21322.	1462061758.	30.0433949	0.0004381	-0.000437	1.6281242	11.0564774	C

0.00001500	21593.	1439554012.	29.7433287	0.0004461	-0.000454	1.6538289	-11.465152 C
0.00001542	21859.	1417863548.	29.4538269	0.0004541	-0.000471	1.6791118	-11.913060 C
0.00001583	22123.	1397232931.	29.1788980	0.0004620	-0.000488	1.7042241	-12.361273 C
0.00001625	22382.	1377357443.	28.9135983	0.0004698	-0.000505	1.7289676	-12.811592 C
0.00001708	22894.	1340116312.	28.4167167	0.0004855	-0.000540	1.7777767	-13.714760 C
0.00001792	23394.	1305713983.	27.9570626	0.0005009	-0.000574	1.8255518	-14.622601 C
0.00001875	23884.	1273789786.	27.5292884	0.0005162	-0.000609	1.8722869	-15.535324 C
0.00001958	24366.	1244229866.	27.1328428	0.0005314	-0.000644	1.9182102	-16.450931 C
0.00002042	24842.	1216742749.	26.7636986	0.0005464	-0.000679	1.9633197	-17.369535 C
0.00002125	25309.	1190998615.	26.4162690	0.0005613	-0.000714	2.0074747	-18.292599 C
0.00002208	25773.	1167071087.	26.0940398	0.0005762	-0.000749	2.0510791	-19.216317 C
0.00002292	26227.	1144471042.	25.7871414	0.0005910	-0.000784	2.0936574	-20.145421 C
0.00002375	26681.	1123421113.	25.5025997	0.0006057	-0.000819	2.1358218	-21.073959 C
0.00002458	27126.	1103445251.	25.2298546	0.0006202	-0.000855	2.1769872	-22.007841 C
0.00002542	27571.	1084743985.	24.9756652	0.0006348	-0.000890	2.2177413	-22.941228 C
0.00002625	28009.	1067012690.	24.7330643	0.0006492	-0.000926	2.2577003	-23.878080 C
0.00002708	28445.	1050261447.	24.5037672	0.0006636	-0.000961	2.2970844	-24.816208 C
0.00002792	28879.	1034469597.	24.2884509	0.0006781	-0.000997	2.3360407	-25.754100 C
0.00002875	29307.	1019358381.	24.0798057	0.0006923	-0.001033	2.3740944	-26.696837 C
0.00002958	29733.	1005072351.	23.8835322	0.0007066	-0.001068	2.4117566	-27.639045 C
0.00003042	30159.	991542274.	23.6985692	0.0007208	-0.001104	2.4490224	-28.580762 C
0.00003125	30579.	978537876.	23.5181556	0.0007349	-0.001140	2.4854121	-29.527296 C
0.00003208	30998.	966185595.	23.3476758	0.0007491	-0.001176	2.5214164	-30.473309 C
0.00003292	31417.	954435830.	23.1863778	0.0007632	-0.001212	2.5570337	-31.418795 C
0.00003375	31832.	943183521.	23.0312659	0.0007773	-0.001248	2.5920656	-32.366023 C
0.00003458	32245.	932377699.	22.8812849	0.0007913	-0.001284	2.6264656	-33.315603 C
0.00003542	32656.	922059605.	22.7388684	0.0008053	-0.001320	2.6604841	-34.264663 C
0.00003625	33067.	912195533.	22.6034971	0.0008194	-0.001356	2.6941198	-35.213199 C
0.00003708	33476.	902732893.	22.4737509	0.0008334	-0.001392	2.7272871	-36.162229 C
0.00003792	33882.	893581947.	22.3464848	0.0008473	-0.001428	2.7597391	-37.114803 C
0.00003875	34286.	884806038.	22.2251554	0.0008612	-0.001464	2.7918138	-38.066857 C
0.00003958	34690.	876381351.	22.1093901	0.0008752	-0.001500	2.8235098	-39.018388 C
0.00004042	35093.	868286101.	21.9988469	0.0008891	-0.001536	2.8548257	-39.969393 C
0.00004125	35495.	860494842.	21.8929466	0.0009031	-0.001572	2.8857354	-40.920187 C
0.00004208	35894.	852920982.	21.7879743	0.0009169	-0.001608	2.9159187	-41.874968 C
0.00004292	36291.	845624764.	21.6875011	0.0009308	-0.001644	2.9457271	-42.829223 C
0.00004375	36688.	838590220.	21.5912721	0.0009446	-0.001680	2.9751592	-43.782948 C
0.00004458	37085.	831802565.	21.4990516	0.0009585	-0.001717	3.0042133	-44.736143 C
0.00004542	37480.	825248109.	21.4106212	0.0009724	-0.001753	3.0328880	-45.688803 C
0.00004625	37875.	818914212.	21.3257782	0.0009863	-0.001789	3.0611820	-46.640925 C
0.00004708	38267.	812750303.	21.2420559	0.0010001	-0.001825	3.0888765	-47.595618 C

0.00004792	38658.	806768783.	21.1606180	0.0010139	-0.001861	3.1160964	-48.551183 C
0.00004875	39048.	800977261.	21.0823475	0.0010278	-0.001897	3.1429402	-49.506206 C
0.00004958	39428.	795177218.	21.0057402	0.0010415	-0.001933	3.1692773	-50.000000 CY
0.00005292	40637.	767948917.	20.6843249	0.0010945	-0.002080	3.2667622	-50.000000 CY
0.00005625	41565.	738924891.	20.3564285	0.0011450	-0.002230	3.3538979	-50.000000 CY
0.00005958	42376.	711206119.	20.0523801	0.0011948	-0.002380	3.4343040	-50.000000 CY
0.00006292	43037.	684025505.	19.7529472	0.0012428	-0.002532	3.5067862	-50.000000 CY
0.00006625	43603.	658159196.	19.4728113	0.0012901	-0.002685	3.5733075	-50.000000 CY
0.00006958	44152.	634515603.	19.2112672	0.0013368	-0.002838	3.6342765	-50.000000 CY
0.00007292	44653.	612378461.	18.9695779	0.0013832	-0.002992	3.6901984	-50.000000 CY
0.00007625	45024.	590479406.	18.7239777	0.0014277	-0.003147	3.7394201	-50.000000 CY
0.00007958	45381.	570229221.	18.4970014	0.0014721	-0.003303	3.7842334	-50.000000 CY
0.00008292	45733.	551551164.	18.2903256	0.0015166	-0.003458	3.8249723	-50.000000 CY
0.00008625	46069.	534138621.	18.0915739	0.0015604	-0.003615	3.8609041	-50.000000 CY
0.00008958	46402.	517971392.	17.9098975	0.0016044	-0.003771	3.8928543	-50.000000 CY
0.00009292	46684.	502423802.	17.7347183	0.0016479	-0.003927	3.9202781	-50.000000 CY
0.00009625	46891.	487178732.	17.5534305	0.0016895	-0.004085	3.9427680	-50.000000 CY
0.00009958	47093.	472900239.	17.3842527	0.0017312	-0.004244	3.9615385	-50.000000 CY
0.0001029	47292.	459516404.	17.2280237	0.0017731	-0.004402	3.9766573	-50.000000 CY
0.0001063	47487.	446931998.	17.0824654	0.0018150	-0.004560	3.9880421	-50.000000 CY
0.0001096	47670.	435009891.	16.9397410	0.0018563	-0.004719	3.9955616	-50.000000 CY
0.0001129	47850.	423764686.	16.8072980	0.0018978	-0.004877	3.9994398	-50.000000 CY
0.0001163	48027.	413134718.	16.6843991	0.0019396	-0.005035	3.9970374	-50.000000 CY
0.0001196	48200.	403068579.	16.5702514	0.0019815	-0.005193	3.9998280	-50.000000 CY
0.0001229	48367.	393497313.	16.4616226	0.0020234	-0.005352	3.9974914	-50.000000 CY
0.0001263	48508.	384219545.	16.3507408	0.0020643	-0.005511	3.9998548	-50.000000 CY
0.0001296	48623.	375223263.	16.2419124	0.0021047	-0.005670	3.9967563	-50.000000 CY
0.0001329	48715.	366511106.	16.1350930	0.0021446	-0.005830	3.9995149	-50.000000 CY
0.0001363	48806.	358208368.	16.0349818	0.0021848	-0.005990	3.9961216	-50.000000 CY
0.0001396	48894.	350284507.	15.9411709	0.0022251	-0.006150	3.9983746	-50.000000 CY
0.0001429	48977.	342693405.	15.8487195	0.0022650	-0.006310	3.9999433	-50.000000 CY
0.0001462	49053.	335402263.	15.7592719	0.0023048	-0.006470	3.9953804	50.000000 CY
0.0001496	49125.	328412569.	15.6759990	0.0023449	-0.006630	3.9986206	50.000000 CY
0.0001529	49196.	321719375.	15.5973132	0.0023851	-0.006790	3.9999621	50.000000 CY
0.0001562	49265.	315297226.	15.5234156	0.0024255	-0.006949	3.9944736	50.000000 CY
0.0001596	49328.	309104325.	15.4562648	0.0024666	-0.007108	3.9980090	50.000000 CY
0.0001629	49389.	303155567.	15.3929166	0.0025078	-0.007267	3.9997833	50.000000 CY
0.0001662	49448.	297434423.	15.3332817	0.0025492	-0.007426	3.9954501	50.000000 CY
0.0001696	49504.	291916990.	15.2749074	0.0025904	-0.007585	3.9960831	50.000000 CY
0.0001729	49551.	286558488.	15.2201058	0.0026318	-0.007743	3.9988063	50.000000 CY
0.0001762	49596.	281397130.	15.1681649	0.0026734	-0.007902	3.9999594	50.000000 CY

0.0001796	49640.	276416939.	15.1194371	0.0027152	-0.008060	3.9934777	50.0000000	CY
0.0001829	49682.	271612354.	15.0733103	0.0027572	-0.008218	3.9956804	50.0000000	CY
0.0002029	49890.	245864963.	14.8406348	0.0030114	-0.009164	3.9988856	50.0000000	CYT
0.0002229	49968.	224156160.	14.6269091	0.0032606	-0.010114	3.9989839	50.0000000	CYT
0.0002429	49998.	205825369.	14.4428797	0.0035084	-0.011067	3.9967242	50.0000000	CYT
0.0002629	50003.	190184676.	14.3108522	0.0037626	-0.012012	3.9897287	50.0000000	CYT
0.0002829	50003.	176740104.	14.4337498	0.0040835	-0.012891	3.9899928	50.0000000	CYT

Axial Thrust Force = 1340.000 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
4.16667E-07	1142.	2741647292.	292.7520130	0.0001220	0.00009698	0.5001149	3.4902952	
8.33333E-07	2285.	2741618727.	161.4131204	0.0001345	0.00008451	0.5491586	3.8065671	
0.00000125	3427.	2741550952.	117.6499834	0.0001471	0.00007206	0.5979368	4.1234369	
0.00000167	4569.	2741451529.	95.7807863	0.0001596	0.00005963	0.6464479	4.4409047	
0.00000208	5711.	2741321967.	82.6691662	0.0001722	0.00004723	0.6946901	4.7589705	
0.00000250	6853.	2741162768.	73.9363359	0.0001848	0.00003484	0.7426618	5.0776344	
0.00000292	7995.	2740974141.	67.7056725	0.0001975	0.00002247	0.7903611	5.3968965	
0.00000333	9136.	2740756189.	63.0388647	0.0002101	0.00001013	0.8377865	5.7167569	
0.00000375	10277.	2740508868.	59.4146283	0.0002228	-0.00000220	0.8849360	6.0372158	
0.00000417	11417.	2740183305.	56.5200483	0.0002355	-0.00001450	0.9318059	6.3582558	
0.00000458	12557.	2739609096.	54.1555554	0.0002482	-0.00002679	0.9783847	6.6798009	
0.00000500	13693.	2738670406.	52.1880464	0.0002609	-0.00003906	1.0246603	7.0017667	
0.00000542	14827.	2737325738.	50.5254608	0.0002737	-0.00005132	1.0706226	7.3240828	
0.00000583	15958.	2735576439.	49.1021253	0.0002864	-0.00006357	1.1162636	7.6466929	
0.00000625	17084.	2733445160.	47.8699463	0.0002992	-0.00007581	1.1615771	7.9695527	
0.00000667	18206.	2730964254.	46.7929063	0.0003120	-0.00008805	1.2065581	8.2926285	
0.00000708	19325.	2728167832.	45.8434961	0.0003247	-0.000100	1.2512028	8.6158932	
0.00000750	20438.	2725088712.	45.0003441	0.0003375	-0.000112	1.2955079	8.9393249	
0.00000792	20438.	2581662990.	42.5333314	0.0003367	-0.000138	1.2923496	8.8695690	C
0.00000833	20438.	2452579840.	41.6353085	0.0003470	-0.000153	1.3275255	9.1193663	C
0.00000875	20438.	2335790324.	40.8038507	0.0003570	-0.000168	1.3618999	9.3643521	C
0.00000917	20438.	2229618037.	40.0333737	0.0003670	-0.000183	1.3955937	9.6054552	C
0.00000958	20438.	2132678122.	39.3163366	0.0003768	-0.000198	1.4286291	9.8427902	C
0.00001000	20438.	2043816534.	38.6455403	0.0003865	-0.000214	1.4609971	10.0762067	C
0.00001042	20843.	2000916983.	38.0172239	0.0003960	-0.000229	1.4927690	10.3062447	C
0.00001083	21247.	1961288150.	37.4273429	0.0004055	-0.000245	1.5239830	10.5331735	C

0.00001125	21639.	1923434994.	36.8722951	0.0004148	-0.000260	1.5546710	10.7572112	C
0.00001167	22018.	1887215894.	36.3483717	0.0004241	-0.000276	1.5848399	10.9783657	C
0.00001208	22385.	1852541879.	35.8526780	0.0004332	-0.000292	1.6145088	11.1967509	C
0.00001250	22743.	1819401030.	35.3834244	0.0004423	-0.000308	1.6437256	11.4127413	C
0.00001292	23092.	1787743256.	34.9388043	0.0004513	-0.000324	1.6725266	11.6266188	C
0.00001333	23433.	1757489135.	34.5169647	0.0004602	-0.000340	1.7009359	11.8385597	C
0.00001375	23764.	1728278771.	34.1130496	0.0004691	-0.000356	1.7288349	12.0474536	C
0.00001417	24089.	1700400498.	33.7293837	0.0004778	-0.000372	1.7564056	12.2549052	C
0.00001458	24408.	1673696043.	33.3636966	0.0004866	-0.000388	1.7836263	12.4606884	C
0.00001500	24719.	1647912062.	33.0124042	0.0004952	-0.000405	1.8104022	12.6638959	C
0.00001542	25027.	1623345009.	32.6787149	0.0005038	-0.000421	1.8369488	12.8664838	C
0.00001583	25325.	1599496852.	32.3561168	0.0005123	-0.000438	1.8630158	13.0661003	C
0.00001625	25622.	1576761084.	32.0493098	0.0005208	-0.000454	1.8888871	13.2653623	C
0.00001708	26200.	1533644509.	31.4696772	0.0005376	-0.000487	1.9395894	13.6584776	C
0.00001792	26760.	1493588902.	30.9331958	0.0005542	-0.000521	1.9890953	14.0459976	C
0.00001875	27305.	1456248777.	30.4342766	0.0005706	-0.000554	2.0374354	14.4280130	C
0.00001958	27837.	1421454107.	29.9702126	0.0005869	-0.000588	2.0847501	-14.839542	C
0.00002042	28359.	1388997810.	29.5380358	0.0006031	-0.000622	2.1311327	-15.726896	C
0.00002125	28871.	1358645971.	29.1344425	0.0006191	-0.000656	2.1766235	-16.617525	C
0.00002208	29371.	1330012369.	28.7531024	0.0006350	-0.000690	2.2210412	-17.513409	C
0.00002292	29865.	1303214704.	28.3968112	0.0006508	-0.000724	2.2647394	-18.411077	C
0.00002375	30350.	1277903360.	28.0598450	0.0006664	-0.000759	2.3075222	-19.312657	C
0.00002458	30829.	1254046133.	27.7421864	0.0006820	-0.000793	2.3495340	-20.216758	C
0.00002542	31301.	1231499968.	27.4418930	0.0006975	-0.000828	2.3907810	-21.123413	C
0.00002625	31767.	1210157163.	27.1573554	0.0007129	-0.000862	2.4312752	-22.032588	C
0.00002708	32227.	1189909437.	26.8871404	0.0007282	-0.000897	2.4710270	-22.944267	C
0.00002792	32683.	1170748531.	26.6317927	0.0007435	-0.000932	2.5101774	-23.856969	C
0.00002875	33133.	1152435781.	26.3865363	0.0007586	-0.000966	2.5484739	-24.773600	C
0.00002958	33581.	1135121702.	26.1558250	0.0007738	-0.001001	2.5863260	-25.689607	C
0.00003042	34022.	1118525161.	25.9332765	0.0007888	-0.001036	2.6233391	-26.609564	C
0.00003125	34460.	1102718457.	25.7215790	0.0008038	-0.001071	2.6597832	-27.530444	C
0.00003208	34897.	1087703207.	25.5215380	0.0008188	-0.001106	2.6957895	-28.450711	C
0.00003292	35327.	1073224088.	25.3266955	0.0008337	-0.001141	2.7309179	-29.375684	C
0.00003375	35755.	1059408950.	25.1414108	0.0008485	-0.001176	2.7655617	-30.300719	C
0.00003458	36182.	1046232824.	24.9656578	0.0008634	-0.001212	2.7997744	-31.225151	C
0.00003542	36605.	1033539781.	24.7952835	0.0008782	-0.001247	2.8332718	-32.152553	C
0.00003625	37023.	1021337085.	24.6311589	0.0008929	-0.001282	2.8661653	-33.081620	C
0.00003708	37442.	1009658616.	24.4749654	0.0009076	-0.001317	2.8986345	-34.010089	C
0.00003792	37859.	998469551.	24.3261825	0.0009224	-0.001353	2.9306772	-34.937960	C
0.00003875	38270.	987620273.	24.1802019	0.0009370	-0.001388	2.9619457	-35.869873	C
0.00003958	38680.	977180078.	24.0399893	0.0009516	-0.001423	2.9927184	-36.802221	C

Performed by: G. Khatri 8/29/2024

Checked by: J. Samples 8/30/2024

0.00004042	39089.	967148666.	23.9060653	0.0009662	-0.001459	3.0230710	-37.733974 C
0.00004125	39497.	957501034.	23.7780513	0.0009808	-0.001494	3.0530017	-38.665131 C
0.00004208	39902.	948173372.	23.6539901	0.0009954	-0.001530	3.0823713	-39.597651 C
0.00004292	40304.	939118710.	23.5325124	0.0010099	-0.001565	3.1110866	-40.532952 C
0.00004375	40705.	930389250.	23.4161309	0.0010245	-0.001601	3.1393856	-41.467659 C
0.00004458	41104.	921966682.	23.3045621	0.0010390	-0.001636	3.1672669	-42.401768 C
0.00004542	41503.	913833912.	23.1975435	0.0010536	-0.001671	3.1947284	-43.335277 C
0.00004625	41901.	905970843.	23.0946387	0.0010681	-0.001707	3.2217517	-44.268441 C
0.00004708	42294.	898289517.	22.9923108	0.0010826	-0.001742	3.2480484	-45.205791 C
0.00004792	42687.	890857570.	22.8939748	0.0010970	-0.001778	3.2739306	-46.142539 C
0.00004875	43079.	883662092.	22.7994284	0.0011115	-0.001814	3.2993966	-47.078684 C
0.00004958	43469.	876691089.	22.7084830	0.0011260	-0.001849	3.3244445	-48.014219 C
0.00005292	44954.	849520834.	22.3636573	0.0011834	-0.001992	3.4192486	-50.000000 CY
0.00005625	46067.	818974727.	22.0126939	0.0012382	-0.002137	3.5029431	-50.000000 CY
0.00005958	46936.	787731236.	21.6666505	0.0012910	-0.002284	3.5773117	-50.000000 CY
0.00006292	47745.	758865704.	21.3515317	0.0013434	-0.002432	3.6452010	-50.000000 CY
0.00006625	48390.	730413409.	21.0405429	0.0013939	-0.002581	3.7050504	-50.000000 CY
0.00006958	48961.	703624276.	20.7519814	0.0014440	-0.002731	3.7588416	-50.000000 CY
0.00007292	49511.	679012187.	20.4831115	0.0014936	-0.002881	3.8067674	-50.000000 CY
0.00007625	50033.	656169891.	20.2358221	0.0015430	-0.003032	3.8492684	-50.000000 CY
0.00007958	50418.	633520590.	19.9873889	0.0015907	-0.003184	3.8852515	-50.000000 CY
0.00008292	50776.	612377703.	19.7533582	0.0016379	-0.003337	3.9160512	-50.000000 CY
0.00008625	51130.	592806158.	19.5404277	0.0016854	-0.003490	3.9421802	-50.000000 CY
0.00008958	51466.	574508732.	19.3372985	0.0017323	-0.003643	3.9632319	-50.000000 CY
0.00009292	51795.	557437854.	19.1493923	0.0017793	-0.003796	3.9795571	-50.000000 CY
0.00009625	52117.	541474592.	18.9769479	0.0018265	-0.003948	3.9911720	-50.000000 CY
0.00009958	52359.	525777486.	18.8003015	0.0018722	-0.004103	3.9978285	-50.000000 CY
0.0001029	52559.	510698687.	18.6270575	0.0019170	-0.004258	4.0000000	-50.000000 CY
0.0001063	52755.	496518105.	18.4673442	0.0019622	-0.004413	3.9995619	-50.000000 CY
0.0001096	52946.	483155152.	18.3198966	0.0020076	-0.004567	3.9979125	-50.000000 CY
0.0001129	53123.	470459755.	18.1753414	0.0020523	-0.004723	3.9999874	-50.000000 CY
0.0001163	53293.	458436728.	18.0403211	0.0020972	-0.004878	3.9987602	-50.000000 CY
0.0001196	53460.	447053527.	17.9148542	0.0021423	-0.005033	3.9984568	-50.000000 CY
0.0001229	53622.	436249895.	17.7985339	0.0021877	-0.005187	3.9989604	-50.000000 CY
0.0001263	53778.	425965987.	17.6905213	0.0022334	-0.005342	3.9980303	50.000000 CY
0.0001296	53921.	416107952.	17.5841320	0.0022786	-0.005496	3.9986003	50.000000 CY
0.0001329	54060.	406722744.	17.4847816	0.0023240	-0.005651	3.9999991	50.000000 CY
0.0001363	54172.	397593031.	17.3913885	0.0023696	-0.005805	3.9974023	50.000000 CY
0.0001396	54269.	388790083.	17.3004441	0.0024149	-0.005960	3.9997196	50.000000 CY
0.0001429	54338.	380208647.	17.2106644	0.0024597	-0.006115	3.9949696	50.000000 CY
0.0001462	54398.	371955323.	17.1298860	0.0025052	-0.006270	3.9982769	50.000000 CY

0.0001496	54454.	364036012.	17.0496560	0.0025503	-0.006425	3.9999079	50.0000000	CY
0.0001529	54504.	356431436.	16.9719687	0.0025953	-0.006580	3.9943569	50.0000000	CY
0.0001562	54551.	349128933.	16.8998212	0.0026406	-0.006734	3.9979647	50.0000000	CY
0.0001596	54597.	342122946.	16.8317104	0.0026861	-0.006889	3.9997770	50.0000000	CY
0.0001629	54641.	335390961.	16.7677494	0.0027317	-0.007043	3.9954226	50.0000000	CY
0.0001662	54683.	328917678.	16.7075941	0.0027776	-0.007197	3.9964418	50.0000000	CY
0.0001696	54723.	322692103.	16.6506691	0.0028237	-0.007351	3.9990401	50.0000000	CY
0.0001729	54763.	316699800.	16.5968041	0.0028699	-0.007505	3.9999954	50.0000000	CY
0.0001762	54800.	310920286.	16.5464741	0.0029163	-0.007659	3.9927455	50.0000000	CY
0.0001796	54836.	305348925.	16.4986665	0.0029629	-0.007812	3.9966288	50.0000000	CY
0.0001829	54867.	299956284.	16.4486905	0.0030087	-0.007966	3.9989945	50.0000000	CYT
0.0002029	55023.	271158353.	16.2065948	0.0032886	-0.008886	3.9993127	50.0000000	CYT
0.0002229	55115.	247243383.	16.0503582	0.0035779	-0.009797	3.9938090	50.0000000	CYT
0.0002429	55115.	226887153.	16.0027004	0.0038873	-0.010688	3.9895199	50.0000000	CYT

Summary of Results for Nominal Moment Capacity for Section 1

Moment values interpolated at maximum compressive strain = 0.003
or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain	Max. Tens. Strain
1	775.400	45349.238	0.00300000	-0.01040077
2	995.700	49299.782	0.00300000	-0.00926784
3	1030.000	49880.777	0.00300000	-0.00912114
4	1340.000	54861.014	0.00300000	-0.00793688

Note that the values of moment capacity in the table above are not factored by a strength reduction factor (ϕ -factor).

In ACI 318, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.75).

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318, or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Load No.	Resist. Factor	Nominal Ax. Thrust kips	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in ²
1	0.65	775.400000	45349.	504.010000	29477.	819462295.
2	0.65	995.700000	49300.	647.205000	32045.	913176837.
3	0.65	1030.	49881.	669.500000	32423.	927920599.
4	0.65	1340.	54861.	871.000000	35660.	1.0625E+09
1	0.75	775.400000	45349.	581.550000	34012.	748332032.
2	0.75	995.700000	49300.	746.775000	36975.	815864231.
3	0.75	1030.	49881.	772.500000	37411.	826398868.
4	0.75	1340.	54861.	1005.	41146.	921122453.
1	0.90	775.400000	45349.	697.860000	40814.	526761798.
2	0.90	995.700000	49300.	896.130000	44370.	587692633.
3	0.90	1030.	49881.	927.000000	44893.	598223347.
4	0.90	1340.	54861.	1206.	49375.	685106985.

Pile Section No. 2:

Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section	=	10.000000 ft
Shaft Diameter	=	54.000000 in
Concrete Cover Thickness (to edge of trans. reinf.)	=	3.000000 in
Number of Reinforcing Bars	=	24 bars
Yield Stress of Reinforcing Bars	=	50000. psi
Modulus of Elasticity of Reinforcing Bars	=	29000000. psi
Gross Area of Shaft	=	2290. sq. in.
Total Area of Reinforcing Steel	=	24.000000 sq. in.
Area Ratio of Steel Reinforcement	=	1.05 percent
Edge-to-Edge Bar Spacing	=	4.826866 in
Maximum Concrete Aggregate Size	=	0.750000 in

Ratio of Bar Spacing to Aggregate Size = 6.44
 Offset of Center of Rebar Cage from Center of Pile = 0.0000 in
 Transverse Reinforcement
 Type: Spiral
 Number of Transverse Reinf. (per spacing) = 1
 Spacing of Transverse Reinf. = 3.250000 in
 Yield Stress of Transverse Reinf. = 50000. psi
 Diameter of Transverse Reinf. = 0.625000 in

Axial Structural Capacities:

Nom. Axial Structural Capacity = $0.85 F_c A_c + F_y A_s$ = 8905.152 kips
 Tensile Load for Cracking of Concrete = -1022.841 kips
 Nominal Axial Tensile Capacity = -1200.000 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.128000	1.000000	22.811000	0.000000
2	1.128000	1.000000	22.033734	5.903921
3	1.128000	1.000000	19.754905	11.405500
4	1.128000	1.000000	16.129813	16.129813
5	1.128000	1.000000	11.405500	19.754905
6	1.128000	1.000000	5.903921	22.033734
7	1.128000	1.000000	0.000000	22.811000
8	1.128000	1.000000	-5.90392	22.033734
9	1.128000	1.000000	-11.40550	19.754905
10	1.128000	1.000000	-16.12981	16.129813
11	1.128000	1.000000	-19.75491	11.405500
12	1.128000	1.000000	-22.03373	5.903921
13	1.128000	1.000000	-22.81100	0.000000
14	1.128000	1.000000	-22.03373	-5.90392
15	1.128000	1.000000	-19.75491	-11.40550
16	1.128000	1.000000	-16.12981	-16.12981
17	1.128000	1.000000	-11.40550	-19.75491
18	1.128000	1.000000	-5.90392	-22.03373
19	1.128000	1.000000	0.000000	-22.81100

20	1.128000	1.000000	5.903921	-22.03373
21	1.128000	1.000000	11.405500	-19.75491
22	1.128000	1.000000	16.129813	-16.12981
23	1.128000	1.000000	19.754905	-11.40550
24	1.128000	1.000000	22.033734	-5.90392

NOTE: The positions of the above rebars were computed by LPILE

Minimum spacing between any two bars not equal to zero = 4.827 inches
between bars 15 and 16.

Ratio of bar spacing to maximum aggregate size = 6.44

Concrete Properties:

Compressive Strength of Concrete	=	4000. psi
Modulus of Elasticity of Concrete	=	3604997. psi
Modulus of Rupture of Concrete	=	-474.34165 psi
Compression Strain at Peak Stress	=	0.001886
Tensile Strain at Fracture of Concrete	=	-0.0001154
Maximum Coarse Aggregate Size	=	0.750000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 4

Number	Axial Thrust Force kips
-----	-----
1	775.400
2	995.700
3	1030.000
4	1340.000

Definitions of Run Messages and Notes:

C = concrete in section has cracked in tension.

Y = stress in reinforcing steel has reached yield stress.
T = ACI 318 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than 0.003. See ACI 318-14, Section 21.2.3.
Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
Position of neutral axis is measured from edge of compression side of pile.
Compressive stresses and strains are positive in sign.
Tensile stresses and strains are negative in sign.

Axial Thrust Force = 775.400 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	1159.	1854211651.	149.7181425	0.00009357	0.00005982	0.3863388	2.6500226	
0.00000125	2318.	1854167834.	88.4027800	0.0001105	0.00004300	0.4535887	3.0773633	
0.00000188	3476.	1854085874.	67.9837513	0.0001275	0.00002622	0.5203511	3.5057602	
0.00000250	4635.	1853969118.	57.7888080	0.0001445	0.00000947	0.5866218	3.9352136	
0.00000313	5793.	1853810447.	51.6834711	0.0001615	-0.00000724	0.6523963	4.3657208	
0.00000375	6950.	1853336842.	47.6217972	0.0001786	-0.00002392	0.7176541	4.7971580	
0.00000438	8103.	1852205927.	44.7258255	0.0001957	-0.00004057	0.7823565	5.2292578	
0.00000500	9252.	1850400801.	42.5570623	0.0002128	-0.00005721	0.8464754	5.6618240	
0.00000563	10395.	1848018162.	40.8723450	0.0002299	-0.00007384	0.9099930	6.0947325	
0.00000625	11532.	1845166118.	39.5260211	0.0002470	-0.00009046	0.9728978	6.5279038	
0.00000688	12663.	1841937362.	38.4255362	0.0002642	-0.000107	1.0351821	6.9612850	
0.00000750	12663.	1688442582.	35.2020823	0.0002640	-0.000141	1.0339818	6.8930279	C
0.00000813	12663.	1558562383.	34.0832572	0.0002769	-0.000162	1.0803347	7.2038237	C
0.00000875	12663.	1447236499.	33.0926729	0.0002896	-0.000183	1.1253288	7.5066032	C
0.00000938	12663.	1350754066.	32.2083803	0.0003020	-0.000204	1.1691110	7.8023721	C
0.00001000	12663.	1266331936.	31.4120332	0.0003141	-0.000226	1.2117574	8.0915896	C
0.00001063	12663.	1191841823.	30.6911216	0.0003261	-0.000248	1.2533985	8.3751831	C
0.00001125	12981.	1153863311.	30.0350789	0.0003379	-0.000270	1.2941287	8.6538070	C
0.00001188	13320.	1121653390.	29.4344382	0.0003495	-0.000292	1.3339931	8.9277284	C
0.00001250	13648.	1091804176.	28.8815273	0.0003610	-0.000314	1.3730319	9.1971787	C
0.00001313	13966.	1064106875.	28.3709427	0.0003724	-0.000336	1.4113200	9.4626964	C
0.00001375	14277.	1038326983.	27.8973336	0.0003836	-0.000359	1.4488874	9.7244490	C

0.00001438	14581.	1014305383.	27.4570348	0.0003947	-0.000382	1.4857997	9.9829202 C
0.00001500	14879.	991905060.	27.0471187	0.0004057	-0.000404	1.5221271	10.2386467 C
0.00001563	15172.	970999889.	26.6650959	0.0004166	-0.000427	1.5579364	-10.795660 C
0.00001625	15459.	951350220.	26.3060356	0.0004275	-0.000450	1.5931416	-11.396693 C
0.00001688	15743.	932891535.	25.9686415	0.0004382	-0.000473	1.6278196	-12.000140 C
0.00001750	16023.	915609409.	25.6531602	0.0004489	-0.000496	1.6621217	-12.604696 C
0.00001813	16298.	899186045.	25.3523309	0.0004595	-0.000519	1.6957596	-13.212987 C
0.00001875	16571.	883796002.	25.0709730	0.0004701	-0.000542	1.7291187	-13.821596 C
0.00001938	16840.	869146516.	24.8021288	0.0004805	-0.000566	1.7618880	-14.433373 C
0.00002000	17108.	855376051.	24.5500231	0.0004910	-0.000589	1.7944151	-15.045187 C
0.00002063	17371.	842208205.	24.3075862	0.0005013	-0.000612	1.8263423	-15.660356 C
0.00002125	17633.	829799127.	24.0798468	0.0005117	-0.000636	1.8580656	-16.275257 C
0.00002188	17892.	817928762.	23.8608302	0.0005220	-0.000659	1.8892665	-16.892880 C
0.00002250	18150.	806659047.	23.6530356	0.0005322	-0.000683	1.9201734	-17.511119 C
0.00002313	18406.	795954721.	23.4558879	0.0005424	-0.000706	1.9508113	-18.129751 C
0.00002375	18659.	785662210.	23.2649442	0.0005525	-0.000730	1.9809232	-18.751257 C
0.00002438	18912.	775884588.	23.0841548	0.0005627	-0.000754	2.0108387	-19.372507 C
0.00002563	19412.	757553972.	22.7439877	0.0005828	-0.000801	2.0696190	-20.618755 C
0.00002688	19908.	740779901.	22.4330646	0.0006029	-0.000848	2.1273306	-21.866874 C
0.00002813	20398.	725247053.	22.1428821	0.0006228	-0.000896	2.1836120	-23.120618 C
0.00002938	20885.	710978728.	21.8778955	0.0006427	-0.000944	2.2390760	-24.373936 C
0.00003063	21366.	697662008.	21.6280718	0.0006624	-0.000991	2.2931312	-25.633000 C
0.00003188	21845.	685347869.	21.3986627	0.0006821	-0.001039	2.3464151	-26.891305 C
0.00003313	22321.	673833170.	21.1830006	0.0007017	-0.001087	2.3985370	-28.153036 C
0.00003438	22793.	663080519.	20.9819503	0.0007213	-0.001135	2.4497269	-29.415837 C
0.00003563	23265.	653050376.	20.7959515	0.0007409	-0.001183	2.5001725	-30.677664 C
0.00003688	23732.	643567176.	20.6178980	0.0007603	-0.001231	2.5493445	-31.944479 C
0.00003813	24197.	634673136.	20.4522121	0.0007797	-0.001279	2.5977631	-33.210530 C
0.00003938	24661.	626315255.	20.2979015	0.0007992	-0.001327	2.6454431	-34.475602 C
0.00004063	25122.	618388667.	20.1504704	0.0008186	-0.001375	2.6920406	-35.743758 C
0.00004188	25581.	610883173.	20.0110348	0.0008380	-0.001423	2.7377421	-37.012893 C
0.00004313	26038.	603787118.	19.8804701	0.0008573	-0.001471	2.7827103	-38.281044 C
0.00004438	26495.	597065737.	19.7580323	0.0008768	-0.001519	2.8269416	-39.548201 C
0.00004563	26949.	590653760.	19.6405541	0.0008961	-0.001568	2.8701744	-40.817673 C
0.00004688	27400.	584537151.	19.5283823	0.0009154	-0.001616	2.9124961	-42.088449 C
0.00004813	27851.	578715459.	19.4227595	0.0009347	-0.001664	2.9540853	-43.358217 C
0.00004938	28300.	573166089.	19.3231940	0.0009541	-0.001712	2.9949381	-44.626971 C
0.00005063	28748.	567868683.	19.2292427	0.0009735	-0.001760	3.0350506	-45.894701 C
0.00005188	29195.	562791809.	19.1393504	0.0009929	-0.001808	3.0742968	-47.163133 C
0.00005313	29639.	557907983.	19.0521618	0.0010121	-0.001857	3.1125662	-48.433919 C
0.00005438	30082.	553228403.	18.9696467	0.0010315	-0.001905	3.1500984	-49.703657 C

0.00005563	30519.	548652454.	18.8906640	0.0010508	-0.001953	3.1868009	-50.000000	CY
0.00005688	30913.	543533061.	18.8087030	0.0010697	-0.002002	3.2220074	-50.000000	CY
0.00005813	31247.	537577780.	18.7204971	0.0010881	-0.002051	3.2553960	-50.000000	CY
0.00005938	31558.	531508530.	18.6330078	0.0011063	-0.002100	3.2877338	-50.000000	CY
0.00006063	31859.	525501391.	18.5447497	0.0011243	-0.002149	3.3188895	-50.000000	CY
0.00006188	32119.	519097688.	18.4534536	0.0011418	-0.002199	3.3486494	-50.000000	CY
0.00006313	32351.	512492343.	18.3612137	0.0011591	-0.002250	3.3772629	-50.000000	CY
0.00006438	32580.	506089519.	18.2725009	0.0011763	-0.002300	3.4052279	-50.000000	CY
0.00006563	32807.	499920650.	18.1876086	0.0011936	-0.002350	3.4325968	-50.000000	CY
0.00006688	33034.	493972535.	18.1063256	0.0012109	-0.002400	3.4593665	-50.000000	CY
0.00006813	33252.	488101362.	18.0243280	0.0012279	-0.002451	3.4851061	-50.000000	CY
0.00006938	33439.	482001201.	17.9393703	0.0012445	-0.002502	3.5096088	-50.000000	CY
0.00007063	33599.	475738280.	17.8528182	0.0012609	-0.002553	3.5330433	-50.000000	CY
0.00007188	33757.	469659892.	17.7692841	0.0012772	-0.002604	3.5559049	-50.000000	CY
0.00007313	33914.	463782429.	17.6889691	0.0012935	-0.002655	3.5782292	-50.000000	CY
0.00007438	34071.	458095702.	17.6117132	0.0013099	-0.002706	3.6000138	-50.000000	CY
0.00007938	34683.	436951670.	17.3193919	0.0013747	-0.002912	3.6806505	-50.000000	CY
0.00008438	35171.	416837565.	17.0412096	0.0014379	-0.003118	3.7503897	-50.000000	CY
0.00008938	35564.	397917339.	16.7718044	0.0014990	-0.003327	3.8097051	-50.000000	CY
0.00009438	35950.	380922628.	16.5336576	0.0015604	-0.003536	3.8611883	-50.000000	CY
0.00009938	36322.	365503350.	16.3151226	0.0016213	-0.003745	3.9042843	-50.000000	CY
0.0001044	36649.	351124930.	16.1096280	0.0016814	-0.003955	3.9389621	-50.000000	CY
0.0001094	36879.	337180715.	15.9047732	0.0017396	-0.004167	3.9650900	-50.000000	CY
0.0001144	37095.	324324178.	15.7109226	0.0017969	-0.004379	3.9837531	-50.000000	CY
0.0001194	37305.	312506148.	15.5365262	0.0018547	-0.004592	3.9954197	-50.000000	CY
0.0001244	37511.	301595548.	15.3786140	0.0019127	-0.004804	3.9999427	-50.000000	CY
0.0001294	37704.	291430866.	15.2274720	0.0019701	-0.005016	3.9995037	-50.000000	CY
0.0001344	37892.	281984273.	15.0908122	0.0020278	-0.005228	3.9982148	-50.000000	CY
0.0001394	38074.	273177917.	14.9669064	0.0020860	-0.005440	3.9963677	-50.000000	CY
0.0001444	38220.	264730199.	14.8454441	0.0021433	-0.005653	3.9997183	-50.000000	CY
0.0001494	38321.	256540019.	14.7157685	0.0021982	-0.005868	3.9970662	-50.000000	CY
0.0001544	38414.	248836642.	14.5954281	0.0022532	-0.006083	3.9999238	-50.000000	CY
0.0001594	38504.	241593099.	14.4852766	0.0023086	-0.006298	3.9970732	50.000000	CY
0.0001644	38591.	234775527.	14.3837293	0.0023643	-0.006512	3.9998844	50.000000	CY
0.0001694	38673.	228329273.	14.2893428	0.0024203	-0.006726	3.9958824	50.000000	CY
0.0001744	38746.	222200493.	14.1977654	0.0024757	-0.006941	3.9994262	50.000000	CY
0.0001794	38817.	216401919.	14.1129863	0.0025315	-0.007155	3.9950965	50.000000	CY
0.0001844	38882.	210885896.	14.0370804	0.0025881	-0.007368	3.9977333	50.000000	CY
0.0001894	38942.	205635045.	13.9687982	0.0026453	-0.007581	3.9999299	50.000000	CY
0.0001944	39000.	200641999.	13.9058596	0.0027030	-0.007793	3.9935915	50.000000	CY
0.0001994	39053.	195877064.	13.8493763	0.0027612	-0.008005	3.9981848	50.000000	CY

0.0002044	39101.	191319462.	13.7994662	0.0028203	-0.008216	3.9999812	50.0000000	CY
0.0002094	39146.	186964398.	13.7519184	0.0028793	-0.008427	3.9926137	50.0000000	CY
0.0002144	39188.	182799203.	13.7044340	0.0029379	-0.008638	3.9973961	50.0000000	CY
0.0002194	39227.	178814789.	13.6605108	0.0029968	-0.008849	3.9997507	50.0000000	CY
0.0002244	39264.	174992728.	13.6191624	0.0030558	-0.009060	3.9942045	50.0000000	CYT
0.0002294	39287.	171278378.	13.5747253	0.0031137	-0.009273	3.9939886	50.0000000	CYT
0.0002344	39309.	167719467.	13.5329688	0.0031718	-0.009484	3.9978837	50.0000000	CYT
0.0002394	39325.	164282750.	13.4908121	0.0032294	-0.009697	3.9997745	50.0000000	CYT
0.0002444	39334.	160958414.	13.4485158	0.0032865	-0.009910	3.9954213	50.0000000	CYT
0.0002494	39342.	157763664.	13.4088866	0.0033438	-0.010122	3.9906804	50.0000000	CYT
0.0002544	39350.	154692691.	13.3713928	0.0034013	-0.010335	3.9953097	50.0000000	CYT
0.0002594	39357.	151738294.	13.3359220	0.0034590	-0.010547	3.9983779	50.0000000	CYT
0.0002644	39363.	148891597.	13.3029337	0.0035170	-0.010759	3.9998621	50.0000000	CYT
0.0002694	39367.	146142546.	13.2732746	0.0035755	-0.010971	3.9948586	50.0000000	CYT
0.0002744	39370.	143490950.	13.2454875	0.0036342	-0.011182	3.9878237	50.0000000	CYT
0.0003044	39370.	129348104.	13.1666841	0.0040076	-0.012429	3.9893008	50.0000000	CYT

Axial Thrust Force = 995.700 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	1146.	1833550096.	185.4677369	0.0001159	0.00008217	0.4758477	3.2979840	
0.00000125	2292.	1833507654.	106.2780848	0.0001328	0.00006535	0.5422581	3.7253431	
0.00000188	3438.	1833425370.	79.9011853	0.0001498	0.00004856	0.6081807	4.1537707	
0.00000250	4583.	1833307572.	66.7274759	0.0001668	0.00003182	0.6736113	4.5832670	
0.00000313	5729.	1833155118.	58.8350451	0.0001839	0.00001511	0.7385459	5.0138322	
0.00000375	6874.	1832968271.	53.5832559	0.0002009	-0.00000156	0.8029802	5.4454666	
0.00000438	8018.	1832666346.	49.8400805	0.0002181	-0.00001820	0.8669046	5.8781290	
0.00000500	9160.	1831963675.	47.0384269	0.0002352	-0.00003481	0.9302900	6.3116219	
0.00000563	10298.	1830731126.	44.8632276	0.0002524	-0.00005139	0.9931075	6.7457453	
0.00000625	11431.	1828976067.	43.1257448	0.0002695	-0.00006796	1.0553365	7.1803537	
0.00000688	12559.	1826755056.	41.7060948	0.0002867	-0.00008452	1.1169625	7.6153464	
0.00000750	13681.	1824134653.	40.5244948	0.0003039	-0.000101	1.1779754	8.0506526	
0.00000813	13681.	1683816602.	37.9304834	0.0003082	-0.000131	1.1925007	8.1103264	C
0.00000875	13681.	1563543988.	36.7872267	0.0003219	-0.000151	1.2403844	8.4440963	C
0.00000938	13681.	1459307722.	35.7663894	0.0003353	-0.000171	1.2868735	8.7697059	C
0.00001000	13787.	1378698687.	34.8481911	0.0003485	-0.000192	1.3321030	9.0880754	C
0.00001063	14221.	1338471353.	34.0145307	0.0003614	-0.000212	1.3760952	9.3992083	C

0.00001125	14637.	1301038339.	33.2566380	0.0003741	-0.000233	1.4190756	9.7048406 C
0.00001188	15034.	1265984351.	32.5617325	0.0003867	-0.000255	1.4610273	10.0046904 C
0.00001250	15415.	1233229182.	31.9227639	0.0003990	-0.000276	1.5020674	10.2996270 C
0.00001313	15784.	1202585451.	31.3328040	0.0004112	-0.000298	1.5422564	10.5900548 C
0.00001375	16141.	1173864013.	30.7858762	0.0004233	-0.000319	1.5816387	10.8762556 C
0.00001438	16487.	1146906398.	30.2771336	0.0004352	-0.000341	1.6202622	11.1585488 C
0.00001500	16824.	1121577411.	29.8026197	0.0004470	-0.000363	1.6581773	11.4372896 C
0.00001563	17153.	1097760242.	29.3590974	0.0004587	-0.000385	1.6954373	11.7128723 C
0.00001625	17473.	1075283863.	28.9426935	0.0004703	-0.000407	1.7320354	11.9851569 C
0.00001688	17786.	1054010560.	28.5501521	0.0004818	-0.000429	1.7679673	12.2540245 C
0.00001750	18094.	1033957808.	28.1812811	0.0004932	-0.000452	1.8033720	12.5206752 C
0.00001813	18397.	1015027282.	27.8340682	0.0005045	-0.000474	1.8382799	12.7853381 C
0.00001875	18693.	996967845.	27.5033018	0.0005157	-0.000497	1.8725197	13.0463578 C
0.00001938	18986.	979936425.	27.1920741	0.0005268	-0.000519	1.9063791	13.3063654 C
0.00002000	19274.	963698089.	26.8955646	0.0005379	-0.000542	1.9396787	-13.684772 C
0.00002063	19559.	948299420.	26.6147693	0.0005489	-0.000565	1.9725708	-14.280372 C
0.00002125	19839.	933615439.	26.3471325	0.0005599	-0.000588	2.0049845	-14.878042 C
0.00002188	20117.	919647807.	26.0927804	0.0005708	-0.000610	2.0370065	-15.476986 C
0.00002250	20391.	906275564.	25.8491098	0.0005816	-0.000633	2.0685406	-16.078181 C
0.00002313	20664.	893576309.	25.6182273	0.0005924	-0.000656	2.0997935	-16.679633 C
0.00002375	20932.	881330388.	25.3948090	0.0006031	-0.000679	2.1304687	-17.284313 C
0.00002438	21199.	869696622.	25.1832712	0.0006138	-0.000702	2.1609240	-17.888694 C
0.00002563	21724.	847766087.	24.7834441	0.0006351	-0.000749	2.2205255	-19.103184 C
0.00002688	22242.	827608935.	24.4161353	0.0006562	-0.000795	2.2787957	-20.321318 C
0.00002813	22753.	809004703.	24.0772852	0.0006772	-0.000842	2.3357734	-21.542870 C
0.00002938	23256.	791695390.	23.7608310	0.0006980	-0.000888	2.3912832	-22.769911 C
0.00003063	23756.	775695962.	23.4695750	0.0007188	-0.000935	2.4458001	-23.997515 C
0.00003188	24247.	760692374.	23.1947354	0.0007393	-0.000982	2.4988450	-25.231060 C
0.00003313	24737.	746772696.	22.9415257	0.0007599	-0.001029	2.5510439	-26.463753 C
0.00003438	25219.	733641618.	22.7006682	0.0007803	-0.001076	2.6017965	-27.702490 C
0.00003563	25700.	721394217.	22.4777657	0.0008008	-0.001123	2.6517368	-28.940139 C
0.00003688	26175.	709834802.	22.2664388	0.0008211	-0.001170	2.7004537	-30.181571 C
0.00003813	26647.	698950758.	22.0678746	0.0008413	-0.001217	2.7481750	-31.424213 C
0.00003938	27119.	688724169.	21.8828668	0.0008616	-0.001265	2.7950908	-32.665770 C
0.00004063	27584.	678981839.	21.7047391	0.0008818	-0.001312	2.8406927	-33.912636 C
0.00004188	28047.	669781773.	21.5377235	0.0009019	-0.001359	2.8854597	-35.158922 C
0.00004313	28509.	661084889.	21.3812572	0.0009221	-0.001407	2.9294273	-36.404121 C
0.00004438	28968.	652789026.	21.2312084	0.0009421	-0.001454	2.9722815	-37.652407 C
0.00004563	29423.	644889661.	21.0885613	0.0009622	-0.001502	3.0141815	-38.901779 C
0.00004688	29877.	637384239.	20.9543251	0.0009822	-0.001549	3.0552871	-40.150058 C
0.00004813	30330.	630241787.	20.8278506	0.0010023	-0.001596	3.0955939	-41.397237 C

0.00004938	30780.	623388693.	20.7056604	0.0010223	-0.001644	3.1348156	-42.647451 C
0.00005063	31227.	616828687.	20.5889843	0.0010423	-0.001691	3.1731171	-43.898429 C
0.00005188	31673.	610560195.	20.4786719	0.0010623	-0.001739	3.2106239	-45.148292 C
0.00005313	32117.	604562467.	20.3742800	0.0010824	-0.001786	3.2473315	-46.397031 C
0.00005438	32561.	598816559.	20.2754060	0.0011025	-0.001834	3.2832353	-47.644638 C
0.00005563	33001.	593270176.	20.1790568	0.0011225	-0.001881	3.3180748	-48.895340 C
0.00005688	33438.	587925289.	20.0866386	0.0011424	-0.001929	3.3520168	-50.000000 CY
0.00005813	33862.	582572552.	19.9968376	0.0011623	-0.001976	3.3849611	-50.000000 CY
0.00005938	34240.	576675741.	19.9042623	0.0011818	-0.002024	3.4164157	-50.000000 CY
0.00006063	34560.	570061710.	19.8068566	0.0012008	-0.002073	3.4462176	-50.000000 CY
0.00006188	34870.	563550764.	19.7124847	0.0012197	-0.002122	3.4751527	-50.000000 CY
0.00006313	35166.	557081170.	19.6171245	0.0012383	-0.002170	3.5028656	-50.000000 CY
0.00006438	35423.	550258121.	19.5194317	0.0012566	-0.002220	3.5292617	-50.000000 CY
0.00006563	35655.	543308435.	19.4218017	0.0012746	-0.002269	3.5545980	-50.000000 CY
0.00006688	35883.	536568424.	19.3278766	0.0012926	-0.002319	3.5792386	-50.000000 CY
0.00006813	36111.	530064239.	19.2378802	0.0013106	-0.002368	3.6032219	-50.000000 CY
0.00006938	36337.	523772283.	19.1507825	0.0013286	-0.002418	3.6264706	-50.000000 CY
0.00007063	36559.	517654099.	19.0643214	0.0013464	-0.002467	3.6488003	-50.000000 CY
0.00007188	36755.	511378054.	18.9766520	0.0013639	-0.002517	3.6700728	-50.000000 CY
0.00007313	36920.	504882373.	18.8867863	0.0013811	-0.002568	3.6902328	-50.000000 CY
0.00007438	37079.	498538975.	18.7995799	0.0013982	-0.002618	3.7097266	-50.000000 CY
0.00007938	37701.	474977822.	18.4746786	0.0014664	-0.002820	3.7810880	-50.000000 CY
0.00008438	38304.	453975793.	18.1864886	0.0015345	-0.003022	3.8422711	-50.000000 CY
0.00008938	38738.	433435114.	17.8983448	0.0015997	-0.003227	3.8914476	-50.000000 CY
0.00009438	39130.	414622873.	17.6355642	0.0016644	-0.003432	3.9311924	-50.000000 CY
0.00009938	39506.	397544822.	17.3957716	0.0017287	-0.003638	3.9617738	-50.000000 CY
0.0001044	39870.	381988107.	17.1792024	0.0017931	-0.003843	3.9834387	-50.000000 CY
0.0001094	40197.	367516830.	16.9789881	0.0018571	-0.004049	3.9961229	-50.000000 CY
0.0001144	40422.	353418085.	16.7714578	0.0019182	-0.004258	3.9996603	-50.000000 CY
0.0001194	40634.	340389779.	16.5839800	0.0019797	-0.004467	3.9999881	-50.000000 CY
0.0001244	40836.	328325794.	16.4120082	0.0020412	-0.004675	3.9998119	-50.000000 CY
0.0001294	41024.	317094067.	16.2501498	0.0021024	-0.004884	3.9990916	-50.000000 CY
0.0001344	41207.	306655360.	16.1038549	0.0021640	-0.005092	3.9973176	-50.000000 CY
0.0001394	41384.	296926259.	15.9713833	0.0022260	-0.005300	3.9996678	50.000000 CY
0.0001444	41550.	287795110.	15.8460957	0.0022878	-0.005508	3.9991631	50.000000 CY
0.0001494	41707.	279211038.	15.7305525	0.0023498	-0.005716	3.9958406	50.000000 CY
0.0001544	41825.	270932482.	15.6172096	0.0024109	-0.005925	3.9996666	50.000000 CY
0.0001594	41909.	262957436.	15.5075333	0.0024715	-0.006135	3.9959222	50.000000 CY
0.0001644	41980.	255394631.	15.4086447	0.0025328	-0.006343	3.9995858	50.000000 CY
0.0001694	42045.	248234216.	15.3114914	0.0025934	-0.006553	3.9944411	50.000000 CY
0.0001744	42097.	241418412.	15.2257023	0.0026550	-0.006761	3.9988724	50.000000 CY

0.0001794	42148.	234970831.	15.1464618	0.0027169	-0.006969	3.9977130	50.0000000	CY
0.0001844	42195.	228856257.	15.0738421	0.0027792	-0.007177	3.9968569	50.0000000	CY
0.0001894	42241.	223052901.	15.0068651	0.0028419	-0.007384	3.9997179	50.0000000	CY
0.0001944	42284.	217535826.	14.9451824	0.0029050	-0.007591	3.9932419	50.0000000	CY
0.0001994	42324.	212285611.	14.8881557	0.0029683	-0.007798	3.9973663	50.0000000	CY
0.0002044	42363.	207281713.	14.8334783	0.0030316	-0.008005	3.9997956	50.0000000	CYT
0.0002094	42398.	202497749.	14.7791770	0.0030944	-0.008212	3.9934276	50.0000000	CYT
0.0002144	42431.	197929833.	14.7287649	0.0031575	-0.008419	3.9959446	50.0000000	CYT
0.0002194	42462.	193559150.	14.6827492	0.0032210	-0.008625	3.9991460	50.0000000	CYT
0.0002244	42490.	189372103.	14.6409039	0.0032851	-0.008831	3.9983028	50.0000000	CYT
0.0002294	42517.	185358795.	14.6025581	0.0033495	-0.009037	3.9918602	50.0000000	CYT
0.0002344	42542.	181512993.	14.5667171	0.0034141	-0.009242	3.9966941	50.0000000	CYT
0.0002394	42564.	177814603.	14.5346195	0.0034792	-0.009447	3.9994142	50.0000000	CYT
0.0002444	42581.	174246161.	14.5079185	0.0035454	-0.009651	3.9969994	50.0000000	CYT
0.0002494	42597.	170813754.	14.4837828	0.0036119	-0.009854	3.9904180	50.0000000	CYT
0.0002544	42605.	167490416.	14.4581005	0.0036778	-0.010058	3.9955542	50.0000000	CYT
0.0002594	42609.	164276199.	14.4318056	0.0037432	-0.010263	3.9987107	50.0000000	CYT
0.0002644	42611.	161177944.	14.4079428	0.0038091	-0.010467	3.9999776	50.0000000	CYT

Axial Thrust Force = 1030.000 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	1144.	1830311529.	191.0712566	0.0001194	0.00008567	0.4897759	3.3995478	
0.00000125	2288.	1830269302.	109.0799253	0.0001363	0.00006885	0.5560547	3.8269098	
0.00000188	3432.	1830186965.	81.7691685	0.0001533	0.00005207	0.6218456	4.2553423	
0.00000250	4575.	1830069000.	68.1285575	0.0001703	0.00003532	0.6871446	4.6848454	
0.00000313	5718.	1829916298.	59.9560071	0.0001874	0.00001861	0.7519474	5.1154194	
0.00000375	6861.	1829729148.	54.5174897	0.0002044	0.00000194	0.8162499	5.5470645	
0.00000438	8004.	1829468809.	50.6411235	0.0002216	-0.00001470	0.8800454	5.9797613	
0.00000500	9144.	1828882477.	47.7399705	0.0002387	-0.00003130	0.9433087	6.4133457	
0.00000563	10281.	1827799667.	45.4876965	0.0002559	-0.00004788	1.0060102	6.8476118	
0.00000625	11414.	1826202572.	43.6887847	0.0002731	-0.00006445	1.0681280	7.2824046	
0.00000688	12541.	1824134701.	42.2190387	0.0002903	-0.00008099	1.1296462	7.7176146	
0.00000750	13662.	1821657648.	40.9958141	0.0003075	-0.00009753	1.1905539	8.1531646	
0.00000813	14778.	1818831390.	39.9619849	0.0003247	-0.000114	1.2508428	8.5889990	
0.00000875	14778.	1688914862.	37.3311937	0.0003266	-0.000146	1.2571262	8.5821279	C
0.00000938	14778.	1576320538.	36.2902581	0.0003402	-0.000166	1.3040012	8.9121327	C

Performed by: G. Khatri 8/29/2024

Checked by: J. Samples 8/30/2024

0.00001000	14778.	1477800504.	35.3541624	0.0003535	-0.000186	1.3495996	9.2348071	C
0.00001063	14778.	1390871063.	34.5043166	0.0003666	-0.000207	1.3939406	9.5501236	C
0.00001125	14866.	1321455307.	33.7318007	0.0003795	-0.000228	1.4372546	9.8598624	C
0.00001188	15272.	1286100881.	33.0224111	0.0003921	-0.000249	1.4794785	10.1633366	C
0.00001250	15664.	1253080427.	32.3709899	0.0004046	-0.000270	1.5208103	10.4621088	C
0.00001313	16041.	1222151541.	31.7696653	0.0004170	-0.000292	1.5612814	10.7563351	C
0.00001375	16405.	1193113497.	31.2120609	0.0004292	-0.000313	1.6009250	11.0461968	C
0.00001438	16759.	1165813537.	30.6931864	0.0004412	-0.000335	1.6397869	11.3319909	C
0.00001500	17102.	1140121870.	30.2089674	0.0004531	-0.000357	1.6779153	11.6140509	C
0.00001563	17436.	1115926387.	29.7560638	0.0004649	-0.000379	1.7153616	11.8927477	C
0.00001625	17763.	1093129018.	29.3317341	0.0004766	-0.000401	1.7521798	12.1684923	C
0.00001688	18083.	1071587221.	28.9327361	0.0004882	-0.000423	1.7883744	12.4412515	C
0.00001750	18395.	1051130651.	28.5553207	0.0004997	-0.000445	1.8238964	12.7105003	C
0.00001813	18702.	1031822476.	28.2001805	0.0005111	-0.000468	1.8589198	12.9777762	C
0.00001875	19004.	1013535277.	27.8647730	0.0005225	-0.000490	1.8934315	13.2429075	C
0.00001938	19299.	996088610.	27.5452653	0.0005337	-0.000513	1.9273234	13.5048147	C
0.00002000	19592.	979619127.	27.2444383	0.0005449	-0.000535	1.9608623	13.7659743	C
0.00002063	19879.	963832077.	26.9561064	0.0005560	-0.000558	1.9937723	-14.076210	C
0.00002125	20164.	948904403.	26.6841474	0.0005670	-0.000580	2.0263773	-14.670357	C
0.00002188	20444.	934576455.	26.4229121	0.0005780	-0.000603	2.0584039	-15.267559	C
0.00002250	20723.	921011462.	26.1763234	0.0005890	-0.000626	2.0901773	-15.864674	C
0.00002313	20996.	907921321.	25.9376819	0.0005998	-0.000649	2.1213269	-16.465398	C
0.00002375	21268.	895503159.	25.7120497	0.0006107	-0.000672	2.1522511	-17.065813	C
0.00002438	21536.	883546157.	25.4942773	0.0006214	-0.000695	2.1826600	-17.668851	C
0.00002563	22068.	861194056.	25.0880765	0.0006429	-0.000741	2.2425391	-18.876804	C
0.00002688	22589.	840514705.	24.7114049	0.0006641	-0.000787	2.3008018	-20.091192	C
0.00002813	23103.	821427721.	24.3638435	0.0006852	-0.000834	2.3577483	-21.309146	C
0.00002938	23611.	803791072.	24.0434728	0.0007063	-0.000880	2.4135368	-22.529135	C
0.00003063	24111.	787292022.	23.7421796	0.0007271	-0.000927	2.4677925	-23.755408	C
0.00003188	24608.	772009428.	23.4646121	0.0007479	-0.000973	2.5211121	-24.981593	C
0.00003313	25097.	757637700.	23.2019904	0.0007686	-0.001020	2.5729838	-26.213544	C
0.00003438	25584.	744270360.	22.9595874	0.0007892	-0.001067	2.6240251	-27.444380	C
0.00003563	26064.	731628386.	22.7284160	0.0008097	-0.001114	2.6736342	-28.681187	C
0.00003688	26543.	719799222.	22.5136630	0.0008302	-0.001161	2.7223984	-29.917195	C
0.00003813	27017.	708637266.	22.3108245	0.0008506	-0.001208	2.7700549	-31.155601	C
0.00003938	27487.	698076885.	22.1186283	0.0008709	-0.001255	2.8166025	-32.396561	C
0.00004063	27955.	688133320.	21.9391924	0.0008913	-0.001302	2.8623380	-33.636420	C
0.00004188	28420.	678682404.	21.7680062	0.0009115	-0.001350	2.9069436	-34.879271	C
0.00004313	28881.	669703504.	21.6053976	0.0009317	-0.001397	2.9505309	-36.123806	C
0.00004438	29341.	661200694.	21.4528059	0.0009520	-0.001444	2.9933123	-37.367239	C
0.00004563	29799.	653121875.	21.3087093	0.0009722	-0.001492	3.0352162	-38.610495	C

Performed by: G. Khatri 8/29/2024

Checked by: J. Samples 8/30/2024

0.00004688	30252.	645374695.	21.1691473	0.0009923	-0.001539	3.0759283	-39.858034 C
0.00004813	30704.	638002870.	21.0376305	0.0010124	-0.001586	3.1158390	-41.104464 C
0.00004938	31155.	630977705.	20.9135540	0.0010326	-0.001634	3.1549441	-42.349773 C
0.00005063	31604.	624273217.	20.7963726	0.0010528	-0.001681	3.1932386	-43.593957 C
0.00005188	32049.	617808307.	20.6818414	0.0010729	-0.001728	3.2303561	-44.842649 C
0.00005313	32492.	611619818.	20.5732190	0.0010930	-0.001776	3.2666495	-46.090541 C
0.00005438	32934.	605691760.	20.4703163	0.0011131	-0.001823	3.3021363	-47.337290 C
0.00005563	33375.	600006411.	20.3727538	0.0011332	-0.001871	3.3368119	-48.582883 C
0.00005688	33815.	594547488.	20.2801853	0.0011534	-0.001918	3.3706713	-49.827313 C
0.00005813	34245.	589163679.	20.1890271	0.0011735	-0.001965	3.4033989	-50.000000 CY
0.00005938	34634.	583317140.	20.0949416	0.0011931	-0.002013	3.4346122	-50.000000 CY
0.00006063	34966.	576762934.	19.9961929	0.0012123	-0.002061	3.4641833	-50.000000 CY
0.00006188	35276.	570113585.	19.8985861	0.0012312	-0.002110	3.4926941	-50.000000 CY
0.00006313	35580.	563636949.	19.8046322	0.0012502	-0.002159	3.5204057	-50.000000 CY
0.00006438	35852.	556930811.	19.7099220	0.0012688	-0.002207	3.5469343	-50.000000 CY
0.00006563	36087.	549896813.	19.6097226	0.0012869	-0.002257	3.5718803	-50.000000 CY
0.00006688	36314.	543020162.	19.5126989	0.0013049	-0.002306	3.5960686	-50.000000 CY
0.00006813	36541.	536384245.	19.4197228	0.0013230	-0.002356	3.6195969	-50.000000 CY
0.00006938	36767.	529975927.	19.3305790	0.0013411	-0.002405	3.6424616	-50.000000 CY
0.00007063	36992.	523783016.	19.2450671	0.0013592	-0.002455	3.6646590	-50.000000 CY
0.00007188	37200.	517560774.	19.1596809	0.0013771	-0.002504	3.6859020	-50.000000 CY
0.00007313	37375.	511112219.	19.0692506	0.0013944	-0.002554	3.7057804	-50.000000 CY
0.00007438	37534.	504664696.	18.9795053	0.0014116	-0.002605	3.7248142	-50.000000 CY
0.00007938	38161.	480762948.	18.6518610	0.0014805	-0.002806	3.7948195	-50.000000 CY
0.00008438	38762.	459398932.	18.3558437	0.0015488	-0.003007	3.8540759	-50.000000 CY
0.00008938	39222.	438844712.	18.0720764	0.0016152	-0.003211	3.9020251	-50.000000 CY
0.00009438	39610.	419711668.	17.8014594	0.0016800	-0.003416	3.9396258	-50.000000 CY
0.00009938	39991.	402424433.	17.5629057	0.0017453	-0.003621	3.9683499	-50.000000 CY
0.0001044	40352.	386608799.	17.3405326	0.0018099	-0.003826	3.9877152	-50.000000 CY
0.0001094	40687.	371995273.	17.1382614	0.0018745	-0.004032	3.9980820	-50.000000 CY
0.0001144	40928.	357836453.	16.9355705	0.0019370	-0.004239	3.9980255	-50.000000 CY
0.0001194	41136.	344593813.	16.7427655	0.0019987	-0.004448	3.9973272	-50.000000 CY
0.0001244	41337.	332360969.	16.5695340	0.0020608	-0.004655	3.9979123	-50.000000 CY
0.0001294	41529.	320994686.	16.4097055	0.0021230	-0.004863	3.9999319	-50.000000 CY
0.0001344	41708.	310385445.	16.2591553	0.0021848	-0.005071	3.9991200	-50.000000 CY
0.0001394	41881.	300494771.	16.1230183	0.0022471	-0.005279	3.9968338	50.000000 CY
0.0001444	42050.	291252961.	15.9994993	0.0023099	-0.005486	3.9999703	50.000000 CY
0.0001494	42204.	282537935.	15.8872468	0.0023732	-0.005693	3.9984258	50.000000 CY
0.0001544	42329.	274197157.	15.7736753	0.0024351	-0.005901	3.9978260	50.000000 CY
0.0001594	42415.	266132075.	15.6671689	0.0024970	-0.006109	3.9986397	50.000000 CY
0.0001644	42484.	258459346.	15.5648373	0.0025585	-0.006318	3.9979682	50.000000 CY

0.0001694	42544.	251180109.	15.4749526	0.0026211	-0.006525	3.9979567	50.0000000	CY
0.0001744	42599.	244294239.	15.3932101	0.0026842	-0.006732	3.9999932	50.0000000	CY
0.0001794	42646.	237750125.	15.3117932	0.0027466	-0.006940	3.9959647	50.0000000	CY
0.0001844	42691.	231546915.	15.2365275	0.0028092	-0.007147	3.9994115	50.0000000	CY
0.0001894	42734.	225659880.	15.1670181	0.0028723	-0.007354	3.9954572	50.0000000	CY
0.0001944	42775.	220064041.	15.1028986	0.0029356	-0.007561	3.9968716	50.0000000	CY
0.0001994	42814.	214741957.	15.0432410	0.0029992	-0.007767	3.9996565	50.0000000	CY
0.0002044	42851.	209670024.	14.9881754	0.0030632	-0.007973	3.9943154	50.0000000	CYT
0.0002094	42887.	204831435.	14.9372385	0.0031275	-0.008179	3.9960859	50.0000000	CYT
0.0002144	42919.	200204238.	14.8910823	0.0031923	-0.008384	3.9992825	50.0000000	CYT
0.0002194	42948.	195776326.	14.8488558	0.0032575	-0.008589	3.9972165	50.0000000	CYT
0.0002244	42974.	191528503.	14.8055608	0.0033220	-0.008794	3.9930184	50.0000000	CYT
0.0002294	42999.	187461995.	14.7650702	0.0033867	-0.009000	3.9974298	50.0000000	CYT
0.0002344	43019.	183548831.	14.7303988	0.0034524	-0.009204	3.9997170	50.0000000	CYT
0.0002394	43036.	179784125.	14.7002423	0.0035189	-0.009407	3.9947270	50.0000000	CYT
0.0002444	43051.	176165934.	14.6724720	0.0035856	-0.009611	3.9924076	50.0000000	CYT
0.0002494	43064.	172689063.	14.6466598	0.0036525	-0.009814	3.9969946	50.0000000	CYT
0.0002544	43077.	169344592.	14.6229356	0.0037197	-0.010017	3.9995063	50.0000000	CYT
0.0002594	43082.	166099524.	14.5992854	0.0037867	-0.010220	3.9969980	50.0000000	CYT
0.0002644	43082.	162958161.	14.5752258	0.0038533	-0.010423	3.9880727	50.0000000	CYT

Axial Thrust Force = 1340.000 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	1125.	1800769245.	242.1866816	0.0001514	0.0001176	0.6155559	4.3260149	
0.00000125	2251.	1800728963.	134.6383873	0.0001683	0.0001008	0.6806343	4.7534040	
0.00000188	3376.	1800646120.	98.8089759	0.0001853	0.00008402	0.7452245	5.1818818	
0.00000250	4501.	1800526603.	80.9092876	0.0002023	0.00006727	0.8093224	5.6114484	
0.00000313	5626.	1800371582.	70.1814909	0.0002193	0.00005057	0.8729236	6.0421039	
0.00000375	6751.	1800181441.	63.0396428	0.0002364	0.00003390	0.9360239	6.4738487	
0.00000438	7875.	1799956338.	57.9469110	0.0002535	0.00001727	0.9986192	6.9066831	
0.00000500	8998.	1799696342.	54.1348797	0.0002707	6.74399E-07	1.0607051	7.3406076	
0.00000563	10121.	1799374101.	51.1765403	0.0002879	-0.00001588	1.1222751	7.7756044	
0.00000625	11243.	1798828854.	48.8150660	0.0003051	-0.00003241	1.1833091	8.2115432	
0.00000688	12361.	1797932485.	46.8868387	0.0003223	-0.00004890	1.2437829	8.6482572	
0.00000750	13475.	1796643811.	45.2829165	0.0003396	-0.00006538	1.3036772	9.0856094	
0.00000813	14584.	1794968743.	43.9280080	0.0003569	-0.00008183	1.3629766	9.5234932	

Performed by: G. Khatri 8/29/2024

Checked by: J. Samples 8/30/2024

0.00000875	15688.	1792933961.	42.7684286	0.0003742	-0.00009828	1.4216694	9.9618261
0.00000938	16787.	1790575111.	41.7648875	0.0003915	-0.000115	1.4797468	10.4005475
0.00001000	16787.	1678664167.	39.6581932	0.0003966	-0.000143	1.4961061	10.4829761 C
0.00001063	16787.	1579919216.	38.6690933	0.0004109	-0.000163	1.5432239	10.8333957 C
0.00001125	16787.	1492145926.	37.7684723	0.0004249	-0.000183	1.5891008	11.1768266 C
0.00001188	17117.	1441425058.	36.9454928	0.0004387	-0.000203	1.6338805	11.5143479 C
0.00001250	17598.	1407842669.	36.1869425	0.0004523	-0.000223	1.6775187	11.8453917 C
0.00001313	18059.	1375928943.	35.4872790	0.0004658	-0.000243	1.7201895	12.1713518 C
0.00001375	18502.	1345566466.	34.8388859	0.0004790	-0.000263	1.7619266	12.4923933 C
0.00001438	18926.	1316568996.	34.2345100	0.0004921	-0.000284	1.8027195	12.8082801 C
0.00001500	19335.	1288993576.	33.6705858	0.0005051	-0.000305	1.8426740	13.1198547 C
0.00001563	19731.	1262776425.	33.1430431	0.0005179	-0.000326	1.8818409	13.4274725 C
0.00001625	20115.	1237866099.	32.6485864	0.0005305	-0.000347	1.9202765	13.7315587 C
0.00001688	20488.	1214121410.	32.1831942	0.0005431	-0.000368	1.9579736	14.0319444 C
0.00001750	20851.	1191474168.	31.7441146	0.0005555	-0.000389	1.9949617	14.3288131 C
0.00001813	21205.	1169910154.	31.3297198	0.0005679	-0.000411	2.0313100	14.6227402 C
0.00001875	21551.	1149387153.	30.9383126	0.0005801	-0.000432	2.0670694	14.9141450 C
0.00001938	21890.	1129786399.	30.5672145	0.0005922	-0.000454	2.1022213	15.2027724 C
0.00002000	22220.	1110979787.	30.2135386	0.0006043	-0.000476	2.1367164	15.4880525 C
0.00002063	22545.	1093090893.	29.8787316	0.0006162	-0.000498	2.1707434	15.7717976 C
0.00002125	22863.	1075919409.	29.5590118	0.0006281	-0.000519	2.2041787	16.0527036 C
0.00002188	23176.	1059478890.	29.2541343	0.0006399	-0.000541	2.2370944	16.3314352 C
0.00002250	23485.	1043768446.	28.9639183	0.0006517	-0.000563	2.2695628	16.6086817 C
0.00002313	23787.	1028629784.	28.6851156	0.0006633	-0.000585	2.3014563	16.8830620 C
0.00002375	24087.	1014177144.	28.4198392	0.0006750	-0.000608	2.3329786	17.1566518 C
0.00002438	24380.	1000221163.	28.1641813	0.0006865	-0.000630	2.3639421	17.4274245 C
0.00002563	24958.	973988911.	27.6854310	0.0007094	-0.000674	2.4246676	17.9653670 C
0.00002688	25524.	949714375.	27.2442228	0.0007322	-0.000719	2.4837542	18.4978600 C
0.00002813	26075.	927110909.	26.8343687	0.0007547	-0.000764	2.5411448	-19.294124 C
0.00002938	26616.	906080196.	26.4539890	0.0007771	-0.000809	2.5970294	-20.475677 C
0.00003063	27149.	886512699.	26.1012931	0.0007994	-0.000854	2.6515686	-21.660220 C
0.00003188	27673.	868166585.	25.7709525	0.0008214	-0.000900	2.7046184	-22.849669 C
0.00003313	28188.	850965779.	25.4616680	0.0008434	-0.000945	2.7563000	-24.042841 C
0.00003438	28698.	834851657.	25.1729776	0.0008653	-0.000991	2.8067784	-25.237907 C
0.00003563	29199.	819622716.	24.8997500	0.0008871	-0.001037	2.8558234	-26.437927 C
0.00003688	29696.	805323329.	24.6445161	0.0009088	-0.001082	2.9037959	-27.638514 C
0.00003813	30186.	791768156.	24.4021920	0.0009303	-0.001128	2.9504241	-28.843333 C
0.00003938	30672.	778967548.	24.1742356	0.0009519	-0.001174	2.9959537	-30.049313 C
0.00004063	31153.	766854186.	23.9592185	0.0009733	-0.001220	3.0403820	-31.256577 C
0.00004188	31629.	755308418.	23.7537912	0.0009947	-0.001267	3.0835289	-32.467783 C
0.00004313	32102.	744393697.	23.5612882	0.0010161	-0.001313	3.1257702	-33.677720 C

0.00004438	32570.	733968550.	23.3770195	0.0010374	-0.001359	3.1667906	-34.891017 C
0.00004563	33034.	724025159.	23.2015899	0.0010586	-0.001405	3.2067171	-36.105977 C
0.00004688	33496.	714577388.	23.0364508	0.0010798	-0.001451	3.2457439	-37.319668 C
0.00004813	33954.	705534694.	22.8784389	0.0011010	-0.001498	3.2836610	-38.535385 C
0.00004938	34407.	696856329.	22.7265155	0.0011221	-0.001544	3.3204353	-39.753840 C
0.00005063	34859.	688574924.	22.5829632	0.0011433	-0.001590	3.3563155	-40.971018 C
0.00005188	35309.	680661402.	22.4471837	0.0011644	-0.001637	3.3912959	-42.186912 C
0.00005313	35755.	673027040.	22.3153713	0.0011855	-0.001683	3.4250922	-43.406537 C
0.00005438	36197.	665690267.	22.1891745	0.0012065	-0.001730	3.4578855	-44.626865 C
0.00005563	36638.	658654598.	22.0694544	0.0012276	-0.001776	3.4897837	-45.845892 C
0.00005688	37077.	651899831.	21.9557909	0.0012487	-0.001823	3.5207811	-47.063611 C
0.00005813	37514.	645393842.	21.8469730	0.0012699	-0.001869	3.5508036	-48.281402 C
0.00005938	37946.	639084144.	21.7404564	0.0012908	-0.001915	3.5796688	-49.503121 C
0.00006063	38374.	632974999.	21.6387830	0.0013119	-0.001962	3.6076119	-50.000000 CY
0.00006188	38781.	626762427.	21.5389265	0.0013327	-0.002009	3.6344122	-50.000000 CY
0.00006313	39131.	619892130.	21.4353290	0.0013531	-0.002056	3.6596639	-50.000000 CY
0.00006438	39443.	612700565.	21.3308975	0.0013732	-0.002103	3.6836392	-50.000000 CY
0.00006563	39746.	605651873.	21.2267386	0.0013930	-0.002151	3.7064595	-50.000000 CY
0.00006688	40037.	598689983.	21.1253810	0.0014128	-0.002198	3.7283449	-50.000000 CY
0.00006813	40293.	591459265.	21.0228522	0.0014322	-0.002247	3.7490288	-50.000000 CY
0.00006938	40526.	584157165.	20.9211224	0.0014514	-0.002295	3.7686889	-50.000000 CY
0.00007063	40754.	577053243.	20.8230494	0.0014706	-0.002343	3.7875510	-50.000000 CY
0.00007188	40979.	570142106.	20.7263883	0.0014897	-0.002392	3.8054767	-50.000000 CY
0.00007313	41201.	563432728.	20.6322414	0.0015087	-0.002440	3.8225608	-50.000000 CY
0.00007438	41422.	556935306.	20.5417937	0.0015278	-0.002488	3.8388936	-50.000000 CY
0.00007938	42135.	530840375.	20.1847362	0.0016022	-0.002684	3.8950496	-50.000000 CY
0.00008438	42748.	506648415.	19.8537054	0.0016752	-0.002881	3.9384970	-50.000000 CY
0.00008938	43339.	484907765.	19.5591973	0.0017481	-0.003078	3.9703870	-50.000000 CY
0.00009438	43799.	464098183.	19.2758263	0.0018192	-0.003277	3.9903609	-50.000000 CY
0.00009938	44181.	444590907.	19.0083133	0.0018890	-0.003477	3.9993443	-50.000000 CY
0.0001044	44546.	426783315.	18.7672422	0.0019588	-0.003677	3.9998385	-50.000000 CY
0.0001094	44893.	410448642.	18.5498156	0.0020289	-0.003877	3.9999714	-50.000000 CY
0.0001144	45221.	395371255.	18.3499275	0.0020988	-0.004077	3.9999849	-50.000000 CY
0.0001194	45496.	381118369.	18.1632504	0.0021682	-0.004278	3.9999260	50.000000 CY
0.0001244	45690.	367360259.	17.9761889	0.0022358	-0.004480	3.9995559	50.000000 CY
0.0001294	45866.	354517739.	17.8058891	0.0023036	-0.004683	3.9984825	50.000000 CY
0.0001344	46025.	342513973.	17.6565452	0.0023726	-0.004884	3.9962323	50.000000 CY
0.0001394	46172.	331276553.	17.5221480	0.0024421	-0.005084	3.9999170	50.000000 CY
0.0001444	46294.	320652268.	17.3994081	0.0025120	-0.005284	3.9984682	50.000000 CY
0.0001494	46411.	310703960.	17.2882538	0.0025824	-0.005484	3.9966984	50.000000 CY
0.0001544	46522.	301358590.	17.1881542	0.0026534	-0.005683	3.9993089	50.000000 CY

0.0001594	46628.	292570824.	17.0972461	0.0027249	-0.005881	3.9952423	50.0000000	CYT
0.0001644	46730.	284289559.	17.0145641	0.0027968	-0.006079	3.9994799	50.0000000	CYT
0.0001694	46813.	276389307.	16.9294604	0.0028674	-0.006279	3.9943866	50.0000000	CYT
0.0001744	46875.	268815417.	16.8486893	0.0029380	-0.006478	3.9989092	50.0000000	CYT
0.0001794	46911.	261522694.	16.7661239	0.0030074	-0.006679	3.9977320	50.0000000	CYT
0.0001844	46941.	254594377.	16.6916869	0.0030775	-0.006879	3.9968095	50.0000000	CYT
0.0001894	46963.	247991827.	16.6265231	0.0031486	-0.007078	3.9997156	50.0000000	CYT
0.0001944	46983.	241714613.	16.5668634	0.0032202	-0.007276	3.9931395	50.0000000	CYT
0.0001994	47000.	235738634.	16.5123033	0.0032921	-0.007474	3.9974556	50.0000000	CYT
0.0002044	47014.	230037346.	16.4620838	0.0033644	-0.007672	3.9998454	50.0000000	CYT
0.0002094	47023.	224586699.	16.4116214	0.0034362	-0.007870	3.9926107	50.0000000	CYT
0.0002144	47030.	219382332.	16.3650725	0.0035083	-0.008068	3.9964030	50.0000000	CYT
0.0002194	47036.	214409534.	16.3218650	0.0035806	-0.008266	3.9993861	50.0000000	CYT
0.0002244	47040.	209650789.	16.2821180	0.0036533	-0.008463	3.9968105	50.0000000	CYT
0.0002294	47043.	205090402.	16.2458943	0.0037264	-0.008660	3.9928521	50.0000000	CYT
0.0002344	47044.	200720165.	16.2122541	0.0037997	-0.008857	3.9973835	50.0000000	CYT
0.0002394	47044.	196527577.	16.2439165	0.0038884	-0.009038	3.9999976	50.0000000	CYT

Summary of Results for Nominal Moment Capacity for Section 2

Moment values interpolated at maximum compressive strain = 0.003
or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain	Max. Tens. Strain
1	775.400	39229.489	0.00300000	-0.00886100
2	995.700	42343.847	0.00300000	-0.00790142
3	1030.000	42814.615	0.00300000	-0.00776943
4	1340.000	46906.790	0.00300000	-0.00665738

Note that the values of moment capacity in the table above are not factored by a strength reduction factor (phi-factor).

In ACI 318, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.75).

The above values should be multiplied by the appropriate strength reduction

factor to compute ultimate moment capacity according to ACI 318, or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Load No.	Resist. Factor	Nominal Ax. Thrust kips	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in ²
1	0.65	775.400000	39229.	504.010000	25499.	612217805.
2	0.65	995.700000	42344.	647.205000	27524.	680241444.
3	0.65	1030.	42815.	669.500000	27829.	690805006.
4	0.65	1340.	46907.	871.000000	30489.	783775715.
1	0.75	775.400000	39229.	581.550000	29422.	560291897.
2	0.75	995.700000	42344.	746.775000	31758.	609412442.
3	0.75	1030.	42815.	772.500000	32111.	616940998.
4	0.75	1340.	46907.	1005.	35180.	682932737.
1	0.90	775.400000	39229.	697.860000	35307.	410299551.
2	0.90	995.700000	42344.	896.130000	38109.	460760390.
3	0.90	1030.	42815.	927.000000	38533.	467523131.
4	0.90	1340.	46907.	1206.	42216.	527657306.

Layering Correction Equivalent Depths of Soil & Rock Layers

Layer No.	Top of Layer Below Pile Head ft	Equivalent Top Depth Below Grnd Surf ft	Same Layer Type As Layer Above	Layer is Rock or Rock Layer	F0 Integral for Layer lbs	F1 Integral for Layer lbs
1	0.00	0.00	N.A.	No	0.00	1039626.
2	21.0000	21.0000	No	Yes	N.A.	N.A.

Notes: The F0 integral of Layer n+1 equals the sum of the F0 and F1 integrals for Layer n. Layering correction equivalent depths are computed only for soil types with both shallow-depth and deep-depth expressions for peak lateral load transfer. These soil types are soft and stiff clays, non-liquefied sands, and cemented c-phi soil.

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 1

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 18610.0 lbs
 Applied moment at pile head = 10372800.0 in-lbs
 Axial thrust load on pile head = 775400.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	0.06176	1.04E+07	18610.	-6.66E-04	0.00	2.80E+12	0.00	0.00	0.00
0.3100	0.05931	1.04E+07	18274.	-6.52E-04	0.00	2.80E+12	-180.906	11347.	0.00
0.6200	0.05691	1.05E+07	17291.	-6.38E-04	0.00	2.80E+12	-347.172	22695.	0.00
0.9300	0.05456	1.06E+07	15717.	-6.24E-04	0.00	2.80E+12	-499.274	34042.	0.00
1.2400	0.05226	1.06E+07	13743.	-6.10E-04	0.00	2.80E+12	-561.739	39984.	0.00
1.5500	0.05002	1.07E+07	11649.	-5.96E-04	0.00	2.80E+12	-564.281	41966.	0.00
1.8600	0.04783	1.07E+07	9546.	-5.82E-04	0.00	2.80E+12	-566.572	44066.	0.00
2.1700	0.04569	1.08E+07	7434.	-5.67E-04	0.00	2.80E+12	-568.608	46293.	0.00
2.4800	0.04361	1.08E+07	5316.	-5.53E-04	0.00	2.80E+12	-570.387	48657.	0.00
2.7900	0.04158	1.08E+07	3191.	-5.39E-04	0.00	2.80E+12	-571.904	51169.	0.00
3.1000	0.03960	1.08E+07	1061.	-5.24E-04	0.00	2.80E+12	-573.156	53842.	0.00
3.4100	0.03768	1.08E+07	-1073.	-5.10E-04	0.00	2.80E+12	-574.139	56689.	0.00
3.7200	0.03580	1.08E+07	-3210.	-4.96E-04	0.00	2.80E+12	-574.849	59725.	0.00
4.0300	0.03399	1.08E+07	-5349.	-4.81E-04	0.00	2.80E+12	-575.282	62966.	0.00
4.3400	0.03222	1.08E+07	-7489.	-4.67E-04	0.00	2.80E+12	-575.434	66431.	0.00
4.6500	0.03051	1.07E+07	-9630.	-4.53E-04	0.00	2.80E+12	-575.301	70140.	0.00
4.9600	0.02885	1.07E+07	-11769.	-4.39E-04	0.00	2.80E+12	-574.877	74115.	0.00

5.2700	0.02725	1.07E+07	-13906.	-4.24E-04	0.00	2.80E+12	-574.158	78383.	0.00
5.5800	0.02570	1.06E+07	-16040.	-4.10E-04	0.00	2.80E+12	-573.140	82972.	0.00
5.8900	0.02420	1.05E+07	-18170.	-3.96E-04	0.00	2.80E+12	-571.816	87912.	0.00
6.2000	0.02275	1.05E+07	-20294.	-3.82E-04	0.00	2.80E+12	-570.181	93242.	0.00
6.5100	0.02135	1.04E+07	-22412.	-3.69E-04	0.00	2.80E+12	-568.230	99001.	0.00
6.8200	0.02001	1.03E+07	-24521.	-3.55E-04	0.00	2.80E+12	-565.956	105235.	0.00
7.1300	0.01871	1.02E+07	-26622.	-3.41E-04	0.00	2.80E+12	-563.353	111998.	0.00
7.4400	0.01747	1.01E+07	-28712.	-3.28E-04	0.00	2.80E+12	-560.413	119349.	0.00
7.7500	0.01627	9993112.	-30790.	-3.14E-04	0.00	2.80E+12	-557.129	127356.	0.00
8.0600	0.01513	9875605.	-32856.	-3.01E-04	0.00	2.80E+12	-553.493	136100.	0.00
8.3700	0.01403	9750400.	-34908.	-2.88E-04	0.00	2.80E+12	-549.496	145672.	0.00
8.6800	0.01298	9617553.	-36944.	-2.75E-04	0.00	2.80E+12	-545.127	156178.	0.00
8.9900	0.01198	9477127.	-38963.	-2.63E-04	0.00	2.80E+12	-540.377	167744.	0.00
9.3000	0.01103	9329186.	-40963.	-2.50E-04	0.00	2.81E+12	-535.234	180515.	0.00
9.6100	0.01012	9173802.	-42944.	-2.38E-04	0.00	2.81E+12	-529.684	194665.	0.00
9.9200	0.00926	9011054.	-44904.	-2.26E-04	0.00	2.81E+12	-523.713	210399.	0.00
10.2300	0.00844	8841023.	-46840.	-2.14E-04	0.00	2.81E+12	-517.305	227966.	0.00
10.5400	0.00767	8663800.	-48751.	-2.02E-04	0.00	2.81E+12	-510.440	247663.	0.00
10.8500	0.00694	8479481.	-50637.	-1.91E-04	0.00	2.81E+12	-503.097	269856.	0.00
11.1600	0.00625	8288167.	-52494.	-1.80E-04	0.00	2.81E+12	-495.252	294995.	0.00
11.4700	0.00560	8089967.	-54320.	-1.69E-04	0.00	2.81E+12	-486.874	323640.	0.00
11.7800	0.00499	7884999.	-56115.	-1.59E-04	0.00	2.81E+12	-477.930	356502.	0.00
12.0900	0.00442	7673388.	-57875.	-1.48E-04	0.00	2.81E+12	-468.377	394489.	0.00
12.4000	0.00388	7455265.	-59598.	-1.38E-04	0.00	2.81E+12	-458.166	438787.	0.00
12.7100	0.00339	7230774.	-61239.	-1.28E-04	0.00	2.81E+12	-423.796	465247.	0.00
13.0200	0.00293	7000390.	-62725.	-1.19E-04	0.00	2.81E+12	-375.190	476594.	0.00
13.3300	0.00250	6764787.	-64033.	-1.10E-04	0.00	2.81E+12	-328.302	487942.	0.00
13.6400	0.00211	6524616.	-65171.	-1.01E-04	0.00	2.81E+12	-283.295	499289.	0.00
13.9500	0.00175	6280499.	-66145.	-9.26E-05	0.00	2.81E+12	-240.308	510637.	0.00
14.2600	0.00142	6033032.	-66963.	-8.45E-05	0.00	2.81E+12	-199.470	521984.	0.00
14.5700	0.00112	5782783.	-67633.	-7.66E-05	0.00	2.81E+12	-160.887	533332.	0.00
14.8800	8.51E-04	5530284.	-68164.	-6.91E-05	0.00	2.81E+12	-124.650	544679.	0.00
15.1900	6.08E-04	5276040.	-68565.	-6.20E-05	0.00	2.81E+12	-90.836	556027.	0.00
15.5000	3.90E-04	5020519.	-68845.	-5.52E-05	0.00	2.81E+12	-59.502	567374.	0.00
15.8100	1.97E-04	4764154.	-69012.	-4.87E-05	0.00	2.81E+12	-30.690	578722.	0.00
16.1200	2.79E-05	4507347.	-69078.	-4.25E-05	0.00	2.81E+12	-4.426	590069.	0.00
16.4300	-1.19E-04	4250462.	-69050.	-3.67E-05	0.00	2.81E+12	19.2797	601417.	0.00
16.7400	-2.45E-04	3993827.	-68939.	-3.13E-05	0.00	2.81E+12	40.4323	612764.	0.00
17.0500	-3.52E-04	3737736.	-68754.	-2.62E-05	0.00	2.81E+12	59.0524	624112.	0.00
17.3600	-4.40E-04	3482448.	-68504.	-2.14E-05	0.00	2.81E+12	75.1754	635459.	0.00
17.6700	-5.11E-04	3228188.	-68199.	-1.69E-05	0.00	2.81E+12	88.8517	646807.	0.00

17.9800	-5.66E-04	2975144.	-67848.	-1.28E-05	0.00	2.81E+12	100.1458	658154.	0.00
18.2900	-6.06E-04	2723475.	-67458.	-9.05E-06	0.00	2.81E+12	109.1367	669502.	0.00
18.6000	-6.33E-04	2473306.	-67040.	-5.60E-06	0.00	2.81E+12	115.9171	680849.	0.00
18.9100	-6.48E-04	2224731.	-66600.	-2.49E-06	0.00	2.81E+12	120.5937	692197.	0.00
19.2200	-6.52E-04	1977817.	-66146.	2.92E-07	0.00	2.81E+12	123.2866	703544.	0.00
19.5300	-6.46E-04	1732601.	-65686.	2.75E-06	0.00	2.81E+12	124.1294	714892.	0.00
19.8400	-6.31E-04	1489097.	-65226.	4.88E-06	0.00	2.81E+12	123.2688	726239.	0.00
20.1500	-6.10E-04	1247292.	-64772.	6.70E-06	0.00	2.81E+12	120.8645	737587.	0.00
20.4600	-5.82E-04	1007156.	-64329.	8.19E-06	0.00	2.81E+12	117.0895	748934.	0.00
20.7700	-5.49E-04	768635.	-63903.	9.37E-06	0.00	2.81E+12	112.1292	760282.	0.00
21.0800	-5.12E-04	531664.	-59966.	1.04E-05	0.00	1.85E+12	2004.	1.46E+07	0.00
21.3900	-4.71E-04	322428.	-52498.	1.13E-05	0.00	1.85E+12	2011.	1.59E+07	0.00
21.7000	-4.28E-04	141013.	-45081.	1.17E-05	0.00	1.85E+12	1977.	1.72E+07	0.00
22.0100	-3.84E-04	-13044.	-37855.	1.19E-05	0.00	1.85E+12	1908.	1.85E+07	0.00
22.3200	-3.40E-04	-140698.	-30943.	1.17E-05	0.00	1.85E+12	1808.	1.98E+07	0.00
22.6300	-2.97E-04	-243327.	-24448.	1.13E-05	0.00	1.85E+12	1684.	2.11E+07	0.00
22.9400	-2.56E-04	-322655.	-18452.	1.08E-05	0.00	1.85E+12	1540.	2.24E+07	0.00
23.2500	-2.17E-04	-380672.	-13017.	1.00E-05	0.00	1.85E+12	1382.	2.37E+07	0.00
23.5600	-1.81E-04	-419559.	-8183.	9.24E-06	0.00	1.85E+12	1217.	2.50E+07	0.00
23.8700	-1.48E-04	-441606.	-3971.	8.38E-06	0.00	1.85E+12	1048.	2.63E+07	0.00
24.1800	-1.19E-04	-449149.	-383.733	7.49E-06	0.00	1.85E+12	880.5751	2.76E+07	0.00
24.4900	-9.24E-05	-444504.	2591.	6.59E-06	0.00	1.85E+12	718.5782	2.89E+07	0.00
24.8000	-6.95E-05	-429912.	4978.	5.71E-06	0.00	1.85E+12	565.1660	3.02E+07	0.00
25.1100	-4.99E-05	-407497.	6816.	4.87E-06	0.00	1.85E+12	422.9114	3.16E+07	0.00
25.4200	-3.32E-05	-379227.	8149.	4.08E-06	0.00	1.85E+12	293.7182	3.29E+07	0.00
25.7300	-1.95E-05	-346891.	9028.	3.36E-06	0.00	1.85E+12	178.8539	3.42E+07	0.00
26.0400	-8.28E-06	-312077.	9508.	2.69E-06	0.00	1.85E+12	78.9999	3.55E+07	0.00
26.3500	5.75E-07	-276168.	9644.	2.10E-06	0.00	1.85E+12	-5.684	3.68E+07	0.00
26.6600	7.37E-06	-240336.	9493.	1.59E-06	0.00	1.85E+12	-75.488	3.81E+07	0.00
26.9700	1.24E-05	-205548.	9109.	1.14E-06	0.00	1.85E+12	-131.070	3.94E+07	0.00
27.2800	1.58E-05	-172572.	8543.	7.60E-07	0.00	1.85E+12	-173.383	4.07E+07	0.00
27.5900	1.80E-05	-141994.	7842.	4.44E-07	0.00	1.85E+12	-203.588	4.20E+07	0.00
27.9000	1.91E-05	-114233.	7048.	1.87E-07	0.00	1.85E+12	-222.985	4.33E+07	0.00
28.2100	1.94E-05	-89558.	6200.	-1.74E-08	0.00	1.85E+12	-232.943	4.46E+07	0.00
28.5200	1.90E-05	-68105.	5330.	-1.76E-07	0.00	1.85E+12	-234.837	4.59E+07	0.00
28.8300	1.81E-05	-49901.	4465.	-2.94E-07	0.00	1.85E+12	-229.996	4.72E+07	0.00
29.1400	1.68E-05	-34880.	3629.	-3.79E-07	0.00	1.85E+12	-219.657	4.85E+07	0.00
29.4500	1.53E-05	-22899.	2839.	-4.37E-07	0.00	1.85E+12	-204.931	4.99E+07	0.00
29.7600	1.36E-05	-13753.	2111.	-4.74E-07	0.00	1.85E+12	-186.771	5.12E+07	0.00
30.0700	1.18E-05	-7192.	1455.	-4.95E-07	0.00	1.85E+12	-165.962	5.25E+07	0.00
30.3800	9.90E-06	-2927.	879.8319	-5.05E-07	0.00	1.85E+12	-143.102	5.38E+07	0.00

30.6900	8.01E-06	-642.959	393.0526	-5.08E-07	0.00	1.85E+12	-118.607	5.51E+07	0.00
31.0000	6.12E-06	0.00	0.00	-5.09E-07	0.00	1.85E+12	-92.712	2.82E+07	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 1:

Pile-head deflection	=	0.06175672 inches
Computed slope at pile head	=	-0.0006658 radians
Maximum bending moment	=	10810063. inch-lbs
Maximum shear force	=	-69078. lbs
Depth of maximum bending moment	=	3.41000000 feet below pile head
Depth of maximum shear force	=	16.12000000 feet below pile head
Number of iterations	=	12
Number of zero deflection points	=	2

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 2

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head	=	24300.0 lbs
Applied moment at pile head	=	13596000.0 in-lbs
Axial thrust load on pile head	=	995700.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	0.09584	1.36E+07	24300.	-9.52E-04	0.00	2.77E+12	0.00	0.00	0.00
0.3100	0.09233	1.37E+07	23776.	-9.34E-04	0.00	2.77E+12	-281.648	11347.	0.00

0.6200	0.08889	1.38E+07	22244.	-9.16E-04	0.00	2.77E+12	-542.303	22695.	0.00
0.9300	0.08552	1.39E+07	20072.	-8.97E-04	0.00	2.77E+12	-625.380	27204.	0.00
1.2400	0.08222	1.39E+07	17738.	-8.79E-04	0.00	2.77E+12	-629.065	28463.	0.00
1.5500	0.07898	1.40E+07	15392.	-8.60E-04	0.00	2.77E+12	-632.502	29791.	0.00
1.8600	0.07582	1.41E+07	13033.	-8.41E-04	0.00	2.77E+12	-635.687	31190.	0.00
2.1700	0.07272	1.41E+07	10663.	-8.22E-04	0.00	2.77E+12	-638.617	32667.	0.00
2.4800	0.06970	1.41E+07	8282.	-8.03E-04	0.00	2.77E+12	-641.290	34226.	0.00
2.7900	0.06675	1.42E+07	5892.	-7.84E-04	0.00	2.77E+12	-643.703	35875.	0.00
3.1000	0.06387	1.42E+07	3494.	-7.65E-04	0.00	2.77E+12	-645.852	37619.	0.00
3.4100	0.06105	1.42E+07	1088.	-7.46E-04	0.00	2.77E+12	-647.735	39466.	0.00
3.7200	0.05831	1.42E+07	-1325.	-7.27E-04	0.00	2.77E+12	-649.347	41423.	0.00
4.0300	0.05564	1.42E+07	-3743.	-7.08E-04	0.00	2.77E+12	-650.685	43500.	0.00
4.3400	0.05305	1.42E+07	-6166.	-6.89E-04	0.00	2.77E+12	-651.747	45705.	0.00
4.6500	0.05052	1.42E+07	-8592.	-6.70E-04	0.00	2.77E+12	-652.529	48050.	0.00
4.9600	0.04806	1.41E+07	-11020.	-6.51E-04	0.00	2.77E+12	-653.026	50545.	0.00
5.2700	0.04567	1.41E+07	-13450.	-6.32E-04	0.00	2.77E+12	-653.236	53204.	0.00
5.5800	0.04336	1.40E+07	-15879.	-6.13E-04	0.00	2.77E+12	-653.154	56039.	0.00
5.8900	0.04111	1.40E+07	-18308.	-5.95E-04	0.00	2.77E+12	-652.777	59067.	0.00
6.2000	0.03893	1.39E+07	-20736.	-5.76E-04	0.00	2.77E+12	-652.100	62305.	0.00
6.5100	0.03683	1.38E+07	-23160.	-5.57E-04	0.00	2.77E+12	-651.119	65772.	0.00
6.8200	0.03479	1.37E+07	-25579.	-5.39E-04	0.00	2.77E+12	-649.830	69488.	0.00
7.1300	0.03282	1.36E+07	-27994.	-5.20E-04	0.00	2.77E+12	-648.229	73478.	0.00
7.4400	0.03092	1.35E+07	-30402.	-5.02E-04	0.00	2.78E+12	-646.310	77768.	0.00
7.7500	0.02908	1.34E+07	-32802.	-4.84E-04	0.00	2.78E+12	-644.069	82388.	0.00
8.0600	0.02731	1.33E+07	-35193.	-4.66E-04	0.00	2.78E+12	-641.500	87371.	0.00
8.3700	0.02561	1.31E+07	-37574.	-4.49E-04	0.00	2.78E+12	-638.599	92755.	0.00
8.6800	0.02398	1.30E+07	-39943.	-4.31E-04	0.00	2.78E+12	-635.359	98582.	0.00
8.9900	0.02240	1.29E+07	-42300.	-4.14E-04	0.00	2.78E+12	-631.775	104901.	0.00
9.3000	0.02090	1.27E+07	-44643.	-3.97E-04	0.00	2.78E+12	-627.840	111767.	0.00
9.6100	0.01945	1.25E+07	-46971.	-3.80E-04	0.00	2.78E+12	-623.548	119242.	0.00
9.9200	0.01807	1.23E+07	-49282.	-3.63E-04	0.00	2.78E+12	-618.891	127399.	0.00
10.2300	0.01675	1.22E+07	-51575.	-3.47E-04	0.00	2.78E+12	-613.861	136321.	0.00
10.5400	0.01549	1.20E+07	-53848.	-3.31E-04	0.00	2.78E+12	-608.451	146104.	0.00
10.8500	0.01429	1.18E+07	-56101.	-3.15E-04	0.00	2.78E+12	-602.651	156859.	0.00
11.1600	0.01315	1.16E+07	-58331.	-2.99E-04	0.00	2.78E+12	-596.452	168718.	0.00
11.4700	0.01207	1.13E+07	-60538.	-2.84E-04	0.00	2.78E+12	-589.843	181831.	0.00
11.7800	0.01104	1.11E+07	-62719.	-2.69E-04	0.00	2.78E+12	-582.813	196381.	0.00
12.0900	0.01007	1.09E+07	-64873.	-2.54E-04	0.00	2.78E+12	-575.347	212581.	0.00
12.4000	0.00915	1.06E+07	-66998.	-2.40E-04	0.00	2.78E+12	-567.433	230686.	0.00
12.7100	0.00829	1.04E+07	-69094.	-2.26E-04	0.00	2.78E+12	-559.054	251007.	0.00
13.0200	0.00747	1.01E+07	-71157.	-2.12E-04	0.00	2.78E+12	-550.191	273917.	0.00

13.3300	0.00671	9843629.	-73186.	-1.99E-04	0.00	2.78E+12	-540.823	299874.	0.00
13.6400	0.00599	9568345.	-75180.	-1.86E-04	0.00	2.78E+12	-530.925	329449.	0.00
13.9500	0.00533	9285667.	-77135.	-1.73E-04	0.00	2.78E+12	-520.470	363352.	0.00
14.2600	0.00471	8995740.	-79051.	-1.61E-04	0.00	2.78E+12	-509.424	402485.	0.00
14.5700	0.00413	8698719.	-80924.	-1.49E-04	0.00	2.78E+12	-497.744	448012.	0.00
14.8800	0.00360	8394767.	-82753.	-1.37E-04	0.00	2.78E+12	-485.382	501453.	0.00
15.1900	0.00311	8084057.	-84520.	-1.26E-04	0.00	2.78E+12	-464.908	556027.	0.00
15.5000	0.00266	7766872.	-86140.	-1.16E-04	0.00	2.78E+12	-405.734	567374.	0.00
15.8100	0.00225	7444035.	-87545.	-1.06E-04	0.00	2.78E+12	-349.826	578722.	0.00
16.1200	0.00187	7116320.	-88749.	-9.59E-05	0.00	2.78E+12	-297.281	590069.	0.00
16.4300	0.00154	6784456.	-89763.	-8.66E-05	0.00	2.78E+12	-248.175	601417.	0.00
16.7400	0.00123	6449123.	-90602.	-7.78E-05	0.00	2.78E+12	-202.559	612764.	0.00
17.0500	9.56E-04	6110956.	-91277.	-6.94E-05	0.00	2.78E+12	-160.463	624112.	0.00
17.3600	7.14E-04	5770538.	-91802.	-6.14E-05	0.00	2.78E+12	-121.893	635459.	0.00
17.6700	4.99E-04	5428404.	-92190.	-5.39E-05	0.00	2.78E+12	-86.832	646807.	0.00
17.9800	3.12E-04	5085042.	-92454.	-4.69E-05	0.00	2.78E+12	-55.242	658154.	0.00
18.2900	1.50E-04	4740890.	-92608.	-4.03E-05	0.00	2.78E+12	-27.062	669502.	0.00
18.6000	1.21E-05	4396341.	-92662.	-3.42E-05	0.00	2.78E+12	-2.211	680849.	0.00
18.9100	-1.04E-04	4051739.	-92630.	-2.86E-05	0.00	2.78E+12	19.4141	692197.	0.00
19.2200	-2.01E-04	3707385.	-92523.	-2.34E-05	0.00	2.78E+12	37.9383	703544.	0.00
19.5300	-2.78E-04	3363538.	-92353.	-1.87E-05	0.00	2.78E+12	53.5059	714892.	0.00
19.8400	-3.40E-04	3020415.	-92130.	-1.44E-05	0.00	2.78E+12	66.2822	726239.	0.00
20.1500	-3.86E-04	2678195.	-91865.	-1.06E-05	0.00	2.78E+12	76.4523	737587.	0.00
20.4600	-4.18E-04	2337019.	-91566.	-7.24E-06	0.00	2.78E+12	84.2216	748934.	0.00
20.7700	-4.39E-04	1996996.	-91242.	-4.34E-06	0.00	2.78E+12	89.8150	760282.	0.00
21.0800	-4.51E-04	1658207.	-87793.	-1.33E-06	0.00	1.83E+12	1765.	1.46E+07	0.00
21.3900	-4.49E-04	1343825.	-80945.	1.72E-06	0.00	1.83E+12	1917.	1.59E+07	0.00
21.7000	-4.38E-04	1055964.	-73618.	4.15E-06	0.00	1.83E+12	2022.	1.72E+07	0.00
22.0100	-4.18E-04	796079.	-65989.	6.03E-06	0.00	1.83E+12	2079.	1.85E+07	0.00
22.3200	-3.93E-04	564965.	-58231.	7.41E-06	0.00	1.83E+12	2091.	1.98E+07	0.00
22.6300	-3.63E-04	362782.	-50509.	8.35E-06	0.00	1.83E+12	2061.	2.11E+07	0.00
22.9400	-3.31E-04	189112.	-42970.	8.91E-06	0.00	1.83E+12	1993.	2.24E+07	0.00
23.2500	-2.97E-04	43018.	-35742.	9.15E-06	0.00	1.83E+12	1893.	2.37E+07	0.00
23.5600	-2.63E-04	-76880.	-28934.	9.12E-06	0.00	1.83E+12	1767.	2.50E+07	0.00
23.8700	-2.29E-04	-172319.	-22630.	8.86E-06	0.00	1.83E+12	1622.	2.63E+07	0.00
24.1800	-1.97E-04	-245315.	-16894.	8.44E-06	0.00	1.83E+12	1462.	2.76E+07	0.00
24.4900	-1.66E-04	-298075.	-11767.	7.89E-06	0.00	1.83E+12	1294.	2.89E+07	0.00
24.8000	-1.38E-04	-332922.	-7271.	7.25E-06	0.00	1.83E+12	1123.	3.02E+07	0.00
25.1100	-1.12E-04	-352222.	-3407.	6.55E-06	0.00	1.83E+12	953.7655	3.16E+07	0.00
25.4200	-8.94E-05	-358321.	-164.549	5.83E-06	0.00	1.83E+12	789.6778	3.29E+07	0.00
25.7300	-6.90E-05	-353490.	2484.	5.11E-06	0.00	1.83E+12	634.2385	3.42E+07	0.00

26.0400	-5.14E-05	-339879.	4575.	4.41E-06	0.00	1.83E+12	489.9502	3.55E+07	0.00
26.3500	-3.63E-05	-319485.	6153.	3.74E-06	0.00	1.83E+12	358.6089	3.68E+07	0.00
26.6600	-2.36E-05	-294126.	7269.	3.11E-06	0.00	1.83E+12	241.3425	3.81E+07	0.00
26.9700	-1.31E-05	-265425.	7976.	2.55E-06	0.00	1.83E+12	138.6652	3.94E+07	0.00
27.2800	-4.62E-06	-234804.	8328.	2.04E-06	0.00	1.83E+12	50.5466	4.07E+07	0.00
27.5900	2.08E-06	-203481.	8378.	1.59E-06	0.00	1.83E+12	-23.512	4.20E+07	0.00
27.9000	7.25E-06	-172482.	8177.	1.21E-06	0.00	1.83E+12	-84.396	4.33E+07	0.00
28.2100	1.11E-05	-142650.	7773.	8.94E-07	0.00	1.83E+12	-133.292	4.46E+07	0.00
28.5200	1.39E-05	-114661.	7205.	6.33E-07	0.00	1.83E+12	-171.610	4.59E+07	0.00
28.8300	1.58E-05	-89046.	6513.	4.26E-07	0.00	1.83E+12	-200.897	4.72E+07	0.00
29.1400	1.71E-05	-66210.	5725.	2.69E-07	0.00	1.83E+12	-222.763	4.85E+07	0.00
29.4500	1.78E-05	-46457.	4866.	1.54E-07	0.00	1.83E+12	-238.811	4.99E+07	0.00
29.7600	1.82E-05	-30008.	3956.	7.69E-08	0.00	1.83E+12	-250.564	5.12E+07	0.00
30.0700	1.84E-05	-17026.	3007.	2.92E-08	0.00	1.83E+12	-259.403	5.25E+07	0.00
30.3800	1.84E-05	-7634.	2029.	4.18E-09	0.00	1.83E+12	-266.505	5.38E+07	0.00
30.6900	1.84E-05	-1929.	1026.	-5.52E-09	0.00	1.83E+12	-272.786	5.51E+07	0.00
31.0000	1.84E-05	0.00	0.00	-7.48E-09	0.00	1.83E+12	-278.837	2.82E+07	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 2:

Pile-head deflection = 0.09584082 inches
 Computed slope at pile head = -0.0009525 radians
 Maximum bending moment = 14205369. inch-lbs
 Maximum shear force = -92662. lbs
 Depth of maximum bending moment = 3.72000000 feet below pile head
 Depth of maximum shear force = 18.60000000 feet below pile head
 Number of iterations = 15
 Number of zero deflection points = 2

Computed Values of Pile Loading and Deflection

Performed by: G. Khatri 8/29/2024
 Checked by: J. Samples 8/30/2024

for Lateral Loading for Load Case Number 3

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 10710.0 lbs
 Applied moment at pile head = 5701200.0 in-lbs
 Axial thrust load on pile head = 1030000.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in ²	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	0.02686	5701200.	10710.	-3.30E-04	0.00	2.78E+12	0.00	0.00	0.00
0.3100	0.02565	5742289.	10564.	-3.22E-04	0.00	2.78E+12	-78.239	11347.	0.00
0.6200	0.02447	5782266.	10141.	-3.14E-04	0.00	2.78E+12	-149.261	22695.	0.00
0.9300	0.02331	5820148.	9467.	-3.06E-04	0.00	2.78E+12	-213.327	34042.	0.00
1.2400	0.02219	5855048.	8567.	-2.99E-04	0.00	2.78E+12	-270.705	45390.	0.00
1.5500	0.02109	5886172.	7465.	-2.91E-04	0.00	2.78E+12	-321.662	56737.	0.00
1.8600	0.02002	5912815.	6185.	-2.83E-04	0.00	2.78E+12	-366.468	68085.	0.00
2.1700	0.01899	5934355.	4749.	-2.75E-04	0.00	2.78E+12	-405.394	79432.	0.00
2.4800	0.01798	5950255.	3179.	-2.67E-04	0.00	2.78E+12	-438.712	90780.	0.00
2.7900	0.01700	5960054.	1513.	-2.59E-04	0.00	2.78E+12	-457.322	100076.	0.00
3.1000	0.01605	5963493.	-188.685	-2.51E-04	0.00	2.78E+12	-457.329	105992.	0.00
3.4100	0.01513	5960574.	-1889.	-2.43E-04	0.00	2.78E+12	-457.069	112364.	0.00
3.7200	0.01424	5951298.	-3589.	-2.35E-04	0.00	2.78E+12	-456.535	119238.	0.00
4.0300	0.01338	5935674.	-5286.	-2.27E-04	0.00	2.78E+12	-455.722	126670.	0.00
4.3400	0.01255	5913713.	-6979.	-2.19E-04	0.00	2.78E+12	-454.624	134718.	0.00
4.6500	0.01175	5885431.	-8667.	-2.11E-04	0.00	2.78E+12	-453.234	143454.	0.00
4.9600	0.01098	5850847.	-10350.	-2.03E-04	0.00	2.78E+12	-451.545	152954.	0.00
5.2700	0.01024	5809983.	-12026.	-1.96E-04	0.00	2.78E+12	-449.550	163312.	0.00
5.5800	0.00953	5762869.	-13694.	-1.88E-04	0.00	2.78E+12	-447.240	174633.	0.00
5.8900	0.00884	5709536.	-15353.	-1.80E-04	0.00	2.78E+12	-444.606	187040.	0.00
6.2000	0.00819	5650022.	-17002.	-1.73E-04	0.00	2.78E+12	-441.638	200677.	0.00
6.5100	0.00756	5584366.	-18638.	-1.65E-04	0.00	2.78E+12	-438.326	215711.	0.00
6.8200	0.00696	5512617.	-20262.	-1.58E-04	0.00	2.78E+12	-434.655	232345.	0.00
7.1300	0.00639	5434824.	-21872.	-1.50E-04	0.00	2.78E+12	-430.612	250816.	0.00
7.4400	0.00584	5351044.	-23465.	-1.43E-04	0.00	2.78E+12	-426.181	271412.	0.00
7.7500	0.00532	5261339.	-25013.	-1.36E-04	0.00	2.78E+12	-405.897	283687.	0.00
8.0600	0.00483	5165991.	-26480.	-1.29E-04	0.00	2.78E+12	-383.071	295035.	0.00
8.3700	0.00436	5065314.	-27861.	-1.22E-04	0.00	2.78E+12	-359.360	306382.	0.00

8.6800	0.00392	4959639.	-29153.	-1.15E-04	0.00	2.78E+12	-334.956	317730.	0.00
8.9900	0.00350	4849303.	-30352.	-1.09E-04	0.00	2.78E+12	-310.044	329077.	0.00
9.3000	0.00311	4734651.	-31459.	-1.02E-04	0.00	2.78E+12	-284.800	340425.	0.00
9.6100	0.00274	4616034.	-32471.	-9.61E-05	0.00	2.78E+12	-259.389	351772.	0.00
9.9200	0.00240	4493804.	-33389.	-9.00E-05	0.00	2.78E+12	-233.972	363120.	0.00
10.2300	0.00207	4368313.	-34212.	-8.41E-05	0.00	2.78E+12	-208.697	374467.	0.00
10.5400	0.00177	4239912.	-34942.	-7.83E-05	0.00	2.78E+12	-183.703	385815.	0.00
10.8500	0.00149	4108946.	-35579.	-7.27E-05	0.00	2.78E+12	-159.122	397162.	0.00
11.1600	0.00123	3975758.	-36127.	-6.73E-05	0.00	2.78E+12	-135.075	408510.	0.00
11.4700	9.89E-04	3840680.	-36586.	-6.21E-05	0.00	2.78E+12	-111.675	419857.	0.00
11.7800	7.68E-04	3704036.	-36959.	-5.70E-05	0.00	2.78E+12	-89.025	431205.	0.00
12.0900	5.65E-04	3566142.	-37250.	-5.22E-05	0.00	2.78E+12	-67.219	442552.	0.00
12.4000	3.80E-04	3427300.	-37461.	-4.75E-05	0.00	2.78E+12	-46.342	453900.	0.00
12.7100	2.12E-04	3287798.	-37596.	-4.30E-05	0.00	2.78E+12	-26.471	465247.	0.00
13.0200	5.99E-05	3147913.	-37660.	-3.87E-05	0.00	2.78E+12	-7.671	476594.	0.00
13.3300	-7.62E-05	3007906.	-37655.	-3.46E-05	0.00	2.78E+12	9.9974	487942.	0.00
13.6400	-1.97E-04	2868022.	-37588.	-3.06E-05	0.00	2.78E+12	26.4854	499289.	0.00
13.9500	-3.04E-04	2728490.	-37461.	-2.69E-05	0.00	2.78E+12	41.7512	510637.	0.00
14.2600	-3.97E-04	2589521.	-37279.	-2.33E-05	0.00	2.78E+12	55.7617	521984.	0.00
14.5700	-4.78E-04	2451311.	-37048.	-2.00E-05	0.00	2.78E+12	68.4917	533332.	0.00
14.8800	-5.46E-04	2314036.	-36772.	-1.68E-05	0.00	2.78E+12	79.9240	544679.	0.00
15.1900	-6.02E-04	2177855.	-36456.	-1.38E-05	0.00	2.78E+12	90.0491	556027.	0.00
15.5000	-6.48E-04	2042910.	-36105.	-1.09E-05	0.00	2.78E+12	98.8650	567374.	0.00
15.8100	-6.84E-04	1909321.	-35723.	-8.29E-06	0.00	2.78E+12	106.3769	578722.	0.00
16.1200	-7.10E-04	1777196.	-35315.	-5.82E-06	0.00	2.78E+12	112.5973	590069.	0.00
16.4300	-7.27E-04	1646619.	-34887.	-3.52E-06	0.00	2.78E+12	117.5455	601417.	0.00
16.7400	-7.36E-04	1517660.	-34443.	-1.41E-06	0.00	2.78E+12	121.2477	612764.	0.00
17.0500	-7.38E-04	1390371.	-33988.	5.41E-07	0.00	2.78E+12	123.7366	624112.	0.00
17.3600	-7.32E-04	1264788.	-33525.	2.32E-06	0.00	2.78E+12	125.0514	635459.	0.00
17.6700	-7.20E-04	1140929.	-33059.	3.93E-06	0.00	2.78E+12	125.2373	646807.	0.00
17.9800	-7.03E-04	1018797.	-32595.	5.37E-06	0.00	2.78E+12	124.3460	658154.	0.00
18.2900	-6.80E-04	898380.	-32136.	6.66E-06	0.00	2.78E+12	122.4348	669502.	0.00
18.6000	-6.53E-04	779653.	-31686.	7.78E-06	0.00	2.78E+12	119.5672	680849.	0.00
18.9100	-6.22E-04	662577.	-31248.	8.75E-06	0.00	2.78E+12	115.8122	692197.	0.00
19.2200	-5.88E-04	547100.	-30826.	9.56E-06	0.00	2.78E+12	111.2446	703544.	0.00
19.5300	-5.51E-04	433159.	-30422.	1.02E-05	0.00	2.78E+12	105.9447	714892.	0.00
19.8400	-5.12E-04	320683.	-30039.	1.07E-05	0.00	2.78E+12	99.9984	726239.	0.00
20.1500	-4.72E-04	209589.	-29679.	1.11E-05	0.00	2.78E+12	93.4970	737587.	0.00
20.4600	-4.30E-04	99787.	-29344.	1.13E-05	0.00	2.78E+12	86.5373	748934.	0.00
20.7700	-3.88E-04	-8818.	-29036.	1.13E-05	0.00	2.78E+12	79.2215	760282.	0.00
21.0800	-3.45E-04	-116326.	-26372.	1.12E-05	0.00	1.83E+12	1353.	1.46E+07	0.00

21.3900	-3.04E-04	-205114.	-21442.	1.09E-05	0.00	1.83E+12	1298.	1.59E+07	0.00
21.7000	-2.64E-04	-275940.	-16757.	1.04E-05	0.00	1.83E+12	1221.	1.72E+07	0.00
22.0100	-2.27E-04	-329863.	-12389.	9.79E-06	0.00	1.83E+12	1127.	1.85E+07	0.00
22.3200	-1.92E-04	-368188.	-8396.	9.08E-06	0.00	1.83E+12	1020.	1.98E+07	0.00
22.6300	-1.59E-04	-392399.	-4819.	8.30E-06	0.00	1.83E+12	903.3393	2.11E+07	0.00
22.9400	-1.30E-04	-404107.	-1684.	7.49E-06	0.00	1.83E+12	782.1587	2.24E+07	0.00
23.2500	-1.03E-04	-404988.	997.7531	6.67E-06	0.00	1.83E+12	659.7932	2.37E+07	0.00
23.5600	-8.02E-05	-396735.	3228.	5.86E-06	0.00	1.83E+12	539.5079	2.50E+07	0.00
23.8700	-5.99E-05	-381013.	5021.	5.07E-06	0.00	1.83E+12	424.0885	2.63E+07	0.00
24.1800	-4.25E-05	-359419.	6397.	4.31E-06	0.00	1.83E+12	315.8136	2.76E+07	0.00
24.4900	-2.78E-05	-333453.	7387.	3.61E-06	0.00	1.83E+12	216.4490	2.89E+07	0.00
24.8000	-1.57E-05	-304488.	8026.	2.96E-06	0.00	1.83E+12	127.2627	3.02E+07	0.00
25.1100	-5.78E-06	-273760.	8354.	2.37E-06	0.00	1.83E+12	49.0541	3.16E+07	0.00
25.4200	2.02E-06	-242351.	8412.	1.85E-06	0.00	1.83E+12	-17.803	3.29E+07	0.00
25.7300	7.98E-06	-211186.	8243.	1.39E-06	0.00	1.83E+12	-73.308	3.42E+07	0.00
26.0400	1.23E-05	-181034.	7887.	9.90E-07	0.00	1.83E+12	-117.776	3.55E+07	0.00
26.3500	1.53E-05	-152511.	7386.	6.51E-07	0.00	1.83E+12	-151.780	3.68E+07	0.00
26.6600	1.72E-05	-126087.	6776.	3.68E-07	0.00	1.83E+12	-176.085	3.81E+07	0.00
26.9700	1.81E-05	-102098.	6092.	1.36E-07	0.00	1.83E+12	-191.591	3.94E+07	0.00
27.2800	1.82E-05	-80761.	5365.	-4.94E-08	0.00	1.83E+12	-199.279	4.07E+07	0.00
27.5900	1.77E-05	-62180.	4622.	-1.95E-07	0.00	1.83E+12	-200.155	4.20E+07	0.00
27.9000	1.68E-05	-46368.	3887.	-3.05E-07	0.00	1.83E+12	-195.214	4.33E+07	0.00
28.2100	1.55E-05	-33258.	3179.	-3.86E-07	0.00	1.83E+12	-185.393	4.46E+07	0.00
28.5200	1.39E-05	-22713.	2515.	-4.43E-07	0.00	1.83E+12	-171.548	4.59E+07	0.00
28.8300	1.22E-05	-14542.	1909.	-4.81E-07	0.00	1.83E+12	-154.424	4.72E+07	0.00
29.1400	1.03E-05	-8507.	1371.	-5.04E-07	0.00	1.83E+12	-134.648	4.85E+07	0.00
29.4500	8.41E-06	-4336.	911.1090	-5.17E-07	0.00	1.83E+12	-112.716	4.99E+07	0.00
29.7600	6.47E-06	-1725.	535.9325	-5.23E-07	0.00	1.83E+12	-88.992	5.12E+07	0.00
30.0700	4.52E-06	-344.579	251.8849	-5.25E-07	0.00	1.83E+12	-63.722	5.25E+07	0.00
30.3800	2.56E-06	153.5440	64.4658	-5.26E-07	0.00	1.83E+12	-37.041	5.38E+07	0.00
30.6900	6.08E-07	139.0736	-21.179	-5.25E-07	0.00	1.83E+12	-9.004	5.51E+07	0.00
31.0000	-1.35E-06	0.00	0.00	-5.25E-07	0.00	1.83E+12	20.3904	2.82E+07	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 3:

Pile-head deflection = 0.02686068 inches
 Computed slope at pile head = -0.0003296 radians
 Maximum bending moment = 5963493. inch-lbs
 Maximum shear force = -37660. lbs
 Depth of maximum bending moment = 3.10000000 feet below pile head
 Depth of maximum shear force = 13.02000000 feet below pile head
 Number of iterations = 7
 Number of zero deflection points = 3

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 4

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 14410.0 lbs
 Applied moment at pile head = 7675200.0 in-lbs
 Axial thrust load on pile head = 1340000.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	0.04065	7675200.	14410.	-4.72E-04	0.00	2.74E+12	0.00	0.00	0.00
0.3100	0.03892	7731134.	14189.	-4.62E-04	0.00	2.74E+12	-118.713	11347.	0.00
0.6200	0.03722	7785373.	13546.	-4.51E-04	0.00	2.74E+12	-227.062	22695.	0.00
0.9300	0.03556	7836416.	12518.	-4.41E-04	0.00	2.74E+12	-325.408	34042.	0.00
1.2400	0.03394	7882904.	11143.	-4.30E-04	0.00	2.74E+12	-414.112	45390.	0.00
1.5500	0.03236	7923608.	9455.	-4.19E-04	0.00	2.74E+12	-493.540	56737.	0.00
1.8600	0.03082	7957428.	7593.	-4.09E-04	0.00	2.74E+12	-507.609	61271.	0.00
2.1700	0.02932	7984170.	5702.	-3.98E-04	0.00	2.74E+12	-508.902	64569.	0.00
2.4800	0.02786	8003816.	3807.	-3.87E-04	0.00	2.74E+12	-509.935	68090.	0.00
2.7900	0.02644	8016351.	1908.	-3.76E-04	0.00	2.74E+12	-510.704	71853.	0.00
3.1000	0.02506	8021764.	7.6935	-3.65E-04	0.00	2.74E+12	-511.206	75880.	0.00
3.4100	0.02372	8020049.	-1894.	-3.54E-04	0.00	2.74E+12	-511.435	80197.	0.00
3.7200	0.02243	8011202.	-3797.	-3.43E-04	0.00	2.74E+12	-511.386	84829.	0.00

4.0300	0.02117	7995224.	-5699.	-3.33E-04	0.00	2.74E+12	-511.055	89810.	0.00
4.3400	0.01995	7972119.	-7599.	-3.22E-04	0.00	2.74E+12	-510.436	95172.	0.00
4.6500	0.01877	7941898.	-9496.	-3.11E-04	0.00	2.74E+12	-509.524	100956.	0.00
4.9600	0.01764	7904571.	-11389.	-3.00E-04	0.00	2.74E+12	-508.312	107206.	0.00
5.2700	0.01654	7860157.	-13277.	-2.89E-04	0.00	2.74E+12	-506.795	113972.	0.00
5.5800	0.01548	7808676.	-15159.	-2.79E-04	0.00	2.74E+12	-504.965	121312.	0.00
5.8900	0.01447	7750155.	-17033.	-2.68E-04	0.00	2.74E+12	-502.816	129292.	0.00
6.2000	0.01349	7684623.	-18899.	-2.58E-04	0.00	2.74E+12	-500.338	137987.	0.00
6.5100	0.01255	7612115.	-20755.	-2.47E-04	0.00	2.74E+12	-497.525	147485.	0.00
6.8200	0.01165	7532671.	-22600.	-2.37E-04	0.00	2.74E+12	-494.366	157887.	0.00
7.1300	0.01078	7446334.	-24433.	-2.27E-04	0.00	2.74E+12	-490.851	169311.	0.00
7.4400	0.00996	7353155.	-26251.	-2.17E-04	0.00	2.74E+12	-486.968	181896.	0.00
7.7500	0.00917	7253187.	-28055.	-2.07E-04	0.00	2.74E+12	-482.706	195806.	0.00
8.0600	0.00842	7146490.	-29842.	-1.97E-04	0.00	2.74E+12	-478.049	211234.	0.00
8.3700	0.00770	7033129.	-31611.	-1.88E-04	0.00	2.74E+12	-472.982	228415.	0.00
8.6800	0.00702	6913175.	-33360.	-1.78E-04	0.00	2.74E+12	-467.486	247628.	0.00
8.9900	0.00638	6786706.	-35088.	-1.69E-04	0.00	2.74E+12	-461.541	269218.	0.00
9.3000	0.00577	6653803.	-36793.	-1.60E-04	0.00	2.74E+12	-455.121	293606.	0.00
9.6100	0.00519	6514557.	-38473.	-1.51E-04	0.00	2.74E+12	-448.198	321320.	0.00
9.9200	0.00464	6369065.	-40127.	-1.42E-04	0.00	2.74E+12	-440.737	353023.	0.00
10.2300	0.00413	6217431.	-41720.	-1.34E-04	0.00	2.74E+12	-415.925	374467.	0.00
10.5400	0.00365	6059999.	-43198.	-1.25E-04	0.00	2.74E+12	-378.635	385815.	0.00
10.8500	0.00320	5897286.	-44538.	-1.17E-04	0.00	2.74E+12	-341.677	397162.	0.00
11.1600	0.00278	5729805.	-45741.	-1.09E-04	0.00	2.74E+12	-305.240	408510.	0.00
11.4700	0.00239	5558061.	-46810.	-1.02E-04	0.00	2.74E+12	-269.501	419857.	0.00
11.7800	0.00202	5382551.	-47748.	-9.41E-05	0.00	2.74E+12	-234.624	431205.	0.00
12.0900	0.00169	5203756.	-48558.	-8.69E-05	0.00	2.74E+12	-200.760	442552.	0.00
12.4000	0.00138	5022149.	-49244.	-8.00E-05	0.00	2.74E+12	-168.049	453900.	0.00
12.7100	0.00109	4838182.	-49810.	-7.33E-05	0.00	2.74E+12	-136.615	465247.	0.00
13.0200	8.32E-04	4652292.	-50263.	-6.69E-05	0.00	2.74E+12	-106.571	476594.	0.00
13.3300	5.95E-04	4464895.	-50606.	-6.07E-05	0.00	2.74E+12	-78.019	487942.	0.00
13.6400	3.80E-04	4276389.	-50846.	-5.48E-05	0.00	2.74E+12	-51.045	499289.	0.00
13.9500	1.87E-04	4087148.	-50989.	-4.91E-05	0.00	2.74E+12	-25.727	510637.	0.00
14.2600	1.52E-05	3897522.	-51041.	-4.37E-05	0.00	2.74E+12	-2.126	521984.	0.00
14.5700	-1.37E-04	3707841.	-51008.	-3.85E-05	0.00	2.74E+12	19.7052	533332.	0.00
14.8800	-2.71E-04	3518408.	-50897.	-3.36E-05	0.00	2.74E+12	39.7269	544679.	0.00
15.1900	-3.87E-04	3329500.	-50716.	-2.90E-05	0.00	2.74E+12	57.9107	556027.	0.00
15.5000	-4.87E-04	3141372.	-50470.	-2.46E-05	0.00	2.74E+12	74.2398	567374.	0.00
15.8100	-5.70E-04	2954249.	-50167.	-2.04E-05	0.00	2.74E+12	88.7079	578722.	0.00
16.1200	-6.39E-04	2768334.	-49813.	-1.65E-05	0.00	2.74E+12	101.3198	590069.	0.00
16.4300	-6.93E-04	2583803.	-49416.	-1.29E-05	0.00	2.74E+12	112.0908	601417.	0.00

16.7400	-7.35E-04	2400805.	-48983.	-9.53E-06	0.00	2.74E+12	121.0464	612764.	0.00
17.0500	-7.64E-04	2219466.	-48519.	-6.40E-06	0.00	2.74E+12	128.2223	624112.	0.00
17.3600	-7.82E-04	2039886.	-48032.	-3.51E-06	0.00	2.74E+12	133.6640	635459.	0.00
17.6700	-7.90E-04	1862143.	-47528.	-8.63E-07	0.00	2.74E+12	137.4265	646807.	0.00
17.9800	-7.89E-04	1686288.	-47013.	1.54E-06	0.00	2.74E+12	139.5743	658154.	0.00
18.2900	-7.79E-04	1512354.	-46492.	3.71E-06	0.00	2.74E+12	140.1811	669502.	0.00
18.6000	-7.61E-04	1340349.	-45972.	5.65E-06	0.00	2.74E+12	139.3299	680849.	0.00
18.9100	-7.37E-04	1170263.	-45458.	7.35E-06	0.00	2.74E+12	137.1122	692197.	0.00
19.2200	-7.07E-04	1002067.	-44955.	8.83E-06	0.00	2.74E+12	133.6285	703544.	0.00
19.5300	-6.71E-04	835713.	-44466.	1.01E-05	0.00	2.74E+12	128.9879	714892.	0.00
19.8400	-6.32E-04	671138.	-43997.	1.11E-05	0.00	2.74E+12	123.3080	726239.	0.00
20.1500	-5.89E-04	508266.	-43550.	1.19E-05	0.00	2.74E+12	116.7151	737587.	0.00
20.4600	-5.43E-04	347005.	-43130.	1.25E-05	0.00	2.74E+12	109.3434	748934.	0.00
20.7700	-4.96E-04	187254.	-42738.	1.28E-05	0.00	2.74E+12	101.3361	760282.	0.00
21.0800	-4.48E-04	28905.	-39290.	1.30E-05	0.00	1.80E+12	1753.	1.46E+07	0.00
21.3900	-3.99E-04	-105190.	-32862.	1.29E-05	0.00	1.80E+12	1703.	1.59E+07	0.00
21.7000	-3.52E-04	-215716.	-26675.	1.26E-05	0.00	1.80E+12	1623.	1.72E+07	0.00
22.0100	-3.06E-04	-303775.	-20831.	1.20E-05	0.00	1.80E+12	1518.	1.85E+07	0.00
22.3200	-2.62E-04	-370819.	-15415.	1.14E-05	0.00	1.80E+12	1393.	1.98E+07	0.00
22.6300	-2.21E-04	-418578.	-10491.	1.05E-05	0.00	1.80E+12	1254.	2.11E+07	0.00
22.9400	-1.83E-04	-448981.	-6104.	9.64E-06	0.00	1.80E+12	1105.	2.24E+07	0.00
23.2500	-1.49E-04	-464085.	-2277.	8.70E-06	0.00	1.80E+12	952.0217	2.37E+07	0.00
23.5600	-1.19E-04	-466009.	979.5217	7.74E-06	0.00	1.80E+12	798.8676	2.50E+07	0.00
23.8700	-9.18E-05	-456874.	3674.	6.78E-06	0.00	1.80E+12	649.5795	2.63E+07	0.00
24.1800	-6.83E-05	-438745.	5826.	5.86E-06	0.00	1.80E+12	507.4104	2.76E+07	0.00
24.4900	-4.82E-05	-413590.	7467.	4.98E-06	0.00	1.80E+12	374.9769	2.89E+07	0.00
24.8000	-3.13E-05	-383241.	8637.	4.15E-06	0.00	1.80E+12	254.2607	3.02E+07	0.00
25.1100	-1.73E-05	-349370.	9383.	3.40E-06	0.00	1.80E+12	146.6334	3.16E+07	0.00
25.4200	-5.99E-06	-313466.	9754.	2.71E-06	0.00	1.80E+12	52.8997	3.29E+07	0.00
25.7300	2.90E-06	-276827.	9803.	2.10E-06	0.00	1.80E+12	-26.645	3.42E+07	0.00
26.0400	9.66E-06	-240554.	9582.	1.57E-06	0.00	1.80E+12	-92.148	3.55E+07	0.00
26.3500	1.46E-05	-205553.	9142.	1.11E-06	0.00	1.80E+12	-144.121	3.68E+07	0.00
26.6600	1.79E-05	-172545.	8533.	7.18E-07	0.00	1.80E+12	-183.373	3.81E+07	0.00
26.9700	1.99E-05	-142072.	7800.	3.93E-07	0.00	1.80E+12	-210.923	3.94E+07	0.00
27.2800	2.08E-05	-114517.	6984.	1.28E-07	0.00	1.80E+12	-227.936	4.07E+07	0.00
27.5900	2.09E-05	-90115.	6121.	-8.36E-08	0.00	1.80E+12	-235.655	4.20E+07	0.00
27.9000	2.02E-05	-68973.	5245.	-2.48E-07	0.00	1.80E+12	-235.334	4.33E+07	0.00
28.2100	1.90E-05	-51087.	4383.	-3.72E-07	0.00	1.80E+12	-228.192	4.46E+07	0.00
28.5200	1.74E-05	-36358.	3558.	-4.62E-07	0.00	1.80E+12	-215.369	4.59E+07	0.00
28.8300	1.56E-05	-24610.	2790.	-5.25E-07	0.00	1.80E+12	-197.888	4.72E+07	0.00
29.1400	1.35E-05	-15599.	2093.	-5.67E-07	0.00	1.80E+12	-176.632	4.85E+07	0.00

29.4500	1.14E-05	-9033.	1481.	-5.92E-07	0.00	1.80E+12	-152.331	4.99E+07	0.00
29.7600	9.13E-06	-4574.	964.1673	-6.06E-07	0.00	1.80E+12	-125.551	5.12E+07	0.00
30.0700	6.86E-06	-1853.	550.7735	-6.13E-07	0.00	1.80E+12	-96.704	5.25E+07	0.00
30.3800	4.57E-06	-470.600	248.0464	-6.15E-07	0.00	1.80E+12	-66.053	5.38E+07	0.00
30.6900	2.28E-06	-1.833	62.4276	-6.16E-07	0.00	1.80E+12	-33.742	5.51E+07	0.00
31.0000	-1.18E-08	0.00	0.00	-6.16E-07	0.00	1.80E+12	0.1787	2.82E+07	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 4:

Pile-head deflection = 0.04065499 inches
 Computed slope at pile head = -0.0004724 radians
 Maximum bending moment = 8021764. inch-lbs
 Maximum shear force = -51041. lbs
 Depth of maximum bending moment = 3.10000000 feet below pile head
 Depth of maximum shear force = 14.26000000 feet below pile head
 Number of iterations = 10
 Number of zero deflection points = 3

 Summary of Pile-head Responses for Conventional Analyses

Definitions of Pile-head Loading Conditions:

Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs
 Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
 Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.
 Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs
 Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians

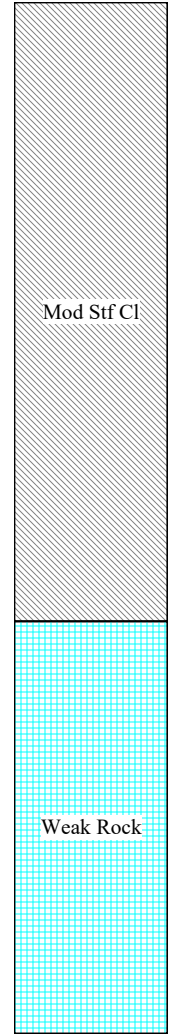
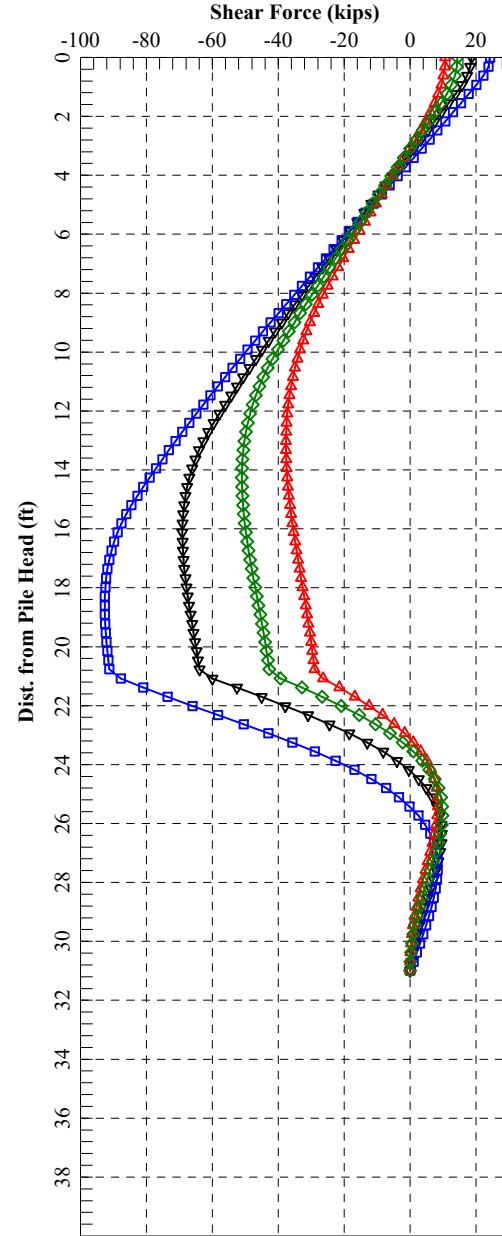
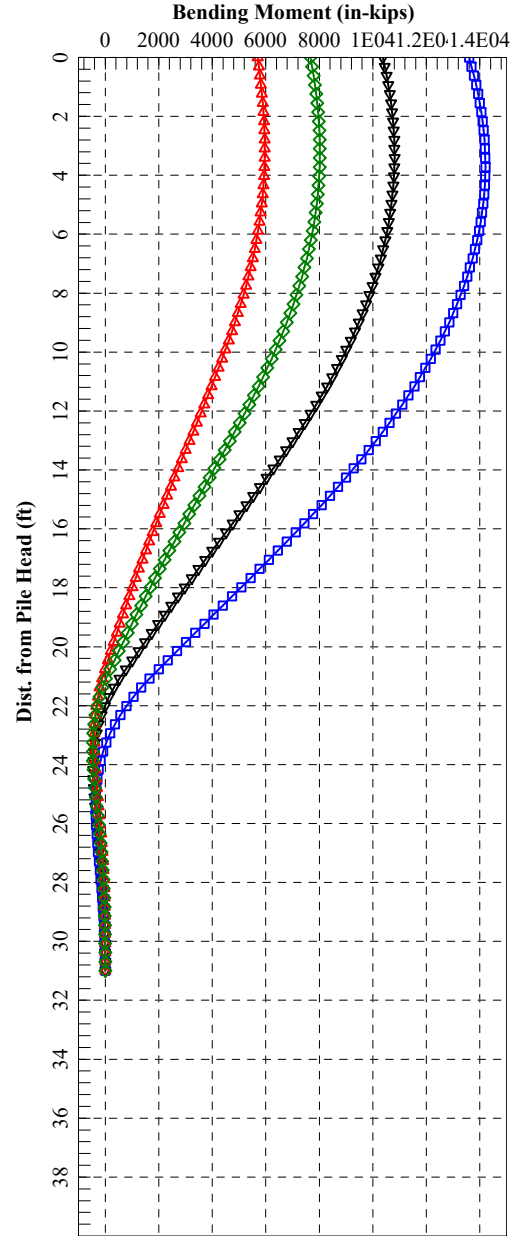
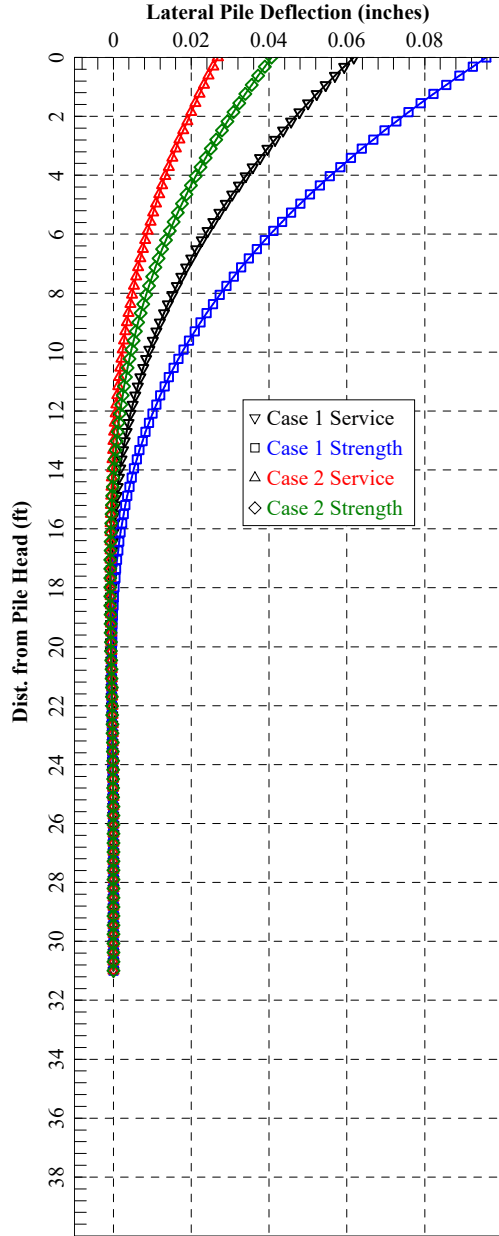
Load Load Load Axial Pile-head Pile-head Max Shear Max Moment

Case No.	Type 1	Pile-head Load 1	Type 2	Pile-head Load 2	Loading lbs	Deflection inches	Rotation radians	in Pile lbs	in Pile in-lbs
1	V, lb	18610.	M, in-lb	1.04E+07	775400.	0.06176	-6.66E-04	-69078.	1.08E+07
2	V, lb	24300.	M, in-lb	1.36E+07	995700.	0.09584	-9.52E-04	-92662.	1.42E+07
3	V, lb	10710.	M, in-lb	5701200.	1030000.	0.02686	-3.30E-04	-37660.	5963493.
4	V, lb	14410.	M, in-lb	7675200.	1340000.	0.04065	-4.72E-04	-51041.	8021764.

Maximum pile-head deflection = 0.0958408223 inches

Maximum pile-head rotation = -0.0009524695 radians = -0.054572 deg.

The analysis ended normally.



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LPIle for Windows, Version 2022-12.006

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method
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Files Used for Analysis

Path to file locations:

\\US0247-PPFSS01\shared_projects\173609140\119144\400-Engineering\Geotechnical\Analysis\Lpile\bridges\LPIle
Analysis\Old Town Creek Bridge\Pier DS\Case I & II\

Name of input data file:

Pier Drilled Shaft X-direction row 2.lp12d

Name of output report file:

Pier Drilled Shaft X-direction row 2.lp12o

Name of plot output file:
Pier Drilled Shaft X-direction row 2.lp12p

Name of runtime message file:
Pier Drilled Shaft X-direction row 2.lp12r

Date and Time of Analysis

Date: August 29, 2024

Time: 7:46:24

Problem Title

-

Project Name: MEG-33-19.21

Job Number: 173609140

Client: ODOT

Engineer: G. Khatri

Description: Pier Drilled Shaft Lateral Load Analysis at Oldtown Creek

- Program Options and Settings

Performed by: G. Khatri 8/29/2024
Checked by: J. Samples 8/30/2024

-

Computational Options:

- Conventional Analysis

Engineering Units Used for Data Input and Computations:

- US Customary System Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed = 500
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 100.0000 in
- Number of pile increments = 100

Loading Type and Number of Cycles of Loading:

- Static loading specified

- Analysis uses p-y modification factors for p-y curves
- Analysis uses layering correction (Method of Georgiadis)
- No distributed lateral loads are entered
- Loading by lateral soil movements acting on pile not selected
- Input of shear resistance at the pile tip not selected
- Input of moment resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:

- Output files use decimal points to denote decimal symbols.
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1
- No p-y curves to be computed and reported for user-specified depths
- Print using wide report formats

Pile Structural Properties and Geometry

Number of pile sections defined = 2

Total length of pile = 31.000 ft
Depth of ground surface below top of pile = 0.0000 ft

Pile diameters used for p-y curve computations are defined using 4 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile. A summary of values of pile diameter vs. depth follows.

Point No.	Depth Below Pile Head feet	Pile Diameter inches
1	0.000	60.0000
2	21.000	60.0000
3	21.000	54.0000
4	31.000	54.0000

Input Structural Properties for Pile Sections:

Pile Section No. 1:

Section 1 is a round drilled shaft, bored pile, or CIDH pile
Length of section = 21.000000 ft
Shaft Diameter = 60.000000 in

Pile Section No. 2:

Section 2 is a round drilled shaft, bored pile, or CIDH pile
Length of section = 10.000000 ft
Shaft Diameter = 54.000000 in

Soil and Rock Layering Information

The soil profile is modelled using 2 layers

Layer 1 is stiff clay with user-defined k-value

Distance from top of pile to top of layer	=	0.0000	ft
Distance from top of pile to bottom of layer	=	21.000000	ft
Effective unit weight at top of layer	=	122.000000	pcf
Effective unit weight at bottom of layer	=	122.000000	pcf
Undrained cohesion at top of layer	=	2000.	psf
Undrained cohesion at bottom of layer	=	2000.	psf
Epsilon-50 at top of layer	=	0.0000	
Epsilon-50 at bottom of layer	=	0.0000	
Subgrade k at top of layer	=	0.0000	pci
Subgrade k at bottom of layer	=	0.0000	pci

NOTE: Default values for Epsilon-50 will be computed for this layer.

NOTE: Default values for subgrade k will be computed for this layer.

Layer 2 is weak rock, p-y criteria by Reese, 1997

Distance from top of pile to top of layer	=	21.000000	ft
Distance from top of pile to bottom of layer	=	35.000000	ft
Effective unit weight at top of layer	=	77.600000	pcf
Effective unit weight at bottom of layer	=	77.600000	pcf
Uniaxial compressive strength at top of layer	=	425.000000	psi
Uniaxial compressive strength at bottom of layer	=	425.000000	psi
Initial modulus of rock at top of layer	=	38250.	psi
Initial modulus of rock at bottom of layer	=	38250.	psi
RQD of rock at top of layer	=	53.000000	%
RQD of rock at bottom of layer	=	53.000000	%
k _{rm} of rock at top of layer	=	0.0000500	
k _{rm} of rock at bottom of layer	=	0.0000500	

(Depth of the lowest soil layer extends 4.000 ft below the pile tip)

Summary of Input Soil Properties

Layer	Soil Type	Layer	Effective	Cohesion	Uniaxial	E50
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Performed by: G. Khatri 8/29/2024

Checked by: J. Samples 8/30/2024

Rock Mass Num.	Name	Depth	Unit Wt.	qu	RQD %	or	kpy
Modulus (p-y Curve Type) psi		ft	pcf	psf	psi	krm	pci
1 default	Stiff Clay w/o --	0.00	122.0000	2000.	--	--	default
default	Free Water, using k --	21.0000	122.0000	2000.	--	--	default
2	Weak 38250.	21.0000	77.6000	--	425.0000	53.0000	5.00E-05 --
	Rock 38250.	35.0000	77.6000	--	425.0000	53.0000	5.00E-05 --

Modification Factors for p-y Curves

Distribution of p-y modifiers with depth defined using 3 points

Point No.	Depth X ft	p-mult	y-mult
1	0.000	0.4500	1.0000
2	21.000	0.4500	1.0000
3	31.000	0.4500	1.0000

Static Loading Type

Static loading criteria were used when computing p-y curves for all analyses.

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 4

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length	Run Analysis
1	1	V = 18610. lbs	M = 10372800. in-lbs	775400.	No	Yes
2	1	V = 24300. lbs	M = 13596000. in-lbs	995700.	No	Yes
3	1	V = 10710. lbs	M = 5701200. in-lbs	1030000.	No	Yes
4	1	V = 14410. lbs	M = 7675200. in-lbs	1340000.	No	Yes

V = shear force applied normal to pile axis

M = bending moment applied to pile head

y = lateral deflection normal to pile axis

S = pile slope relative to original pile batter angle

R = rotational stiffness applied to pile head

Values of top y vs. pile lengths can be computed only for load types with specified shear loading (Load Types 1, 2, and 3).

Thrust force is assumed to be acting axially for all pile batter angles.

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 2

Pile Section No. 1:

Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section = 21.000000 ft
Shaft Diameter = 60.000000 in

Performed by: G. Khatri 8/29/2024

Checked by: J. Samples 8/30/2024

Concrete Cover Thickness (to edge of trans. reinf.) = 3.000000 in
 Number of Reinforcing Bars = 24 bars
 Yield Stress of Reinforcing Bars = 50000. psi
 Modulus of Elasticity of Reinforcing Bars = 29000000. psi
 Gross Area of Shaft = 2827. sq. in.
 Total Area of Reinforcing Steel = 24.000000 sq. in.
 Area Ratio of Steel Reinforcement = 0.85 percent
 Edge-to-Edge Bar Spacing = 5.610023 in
 Maximum Concrete Aggregate Size = 0.750000 in
 Ratio of Bar Spacing to Aggregate Size = 7.48
 Offset of Center of Rebar Cage from Center of Pile Transverse Reinforcement = 0.0000 in
 Type: Spiral
 Number of Transverse Reinf. (per spacing) = 1
 Spacing of Transverse Reinf. = 3.250000 in
 Yield Stress of Transverse Reinf. = 50000. psi
 Diameter of Transverse Reinf. = 0.625000 in

Axial Structural Capacities:

Nom. Axial Structural Capacity = $0.85 F_c A_c + F_y A_s$ = 10731.674 kips
 Tensile Load for Cracking of Concrete = -1246.273 kips
 Nominal Axial Tensile Capacity = -1200.000 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.128000	1.000000	25.811000	0.000000
2	1.128000	1.000000	24.931512	6.680378
3	1.128000	1.000000	22.352982	12.905500
4	1.128000	1.000000	18.251133	18.251133
5	1.128000	1.000000	12.905500	22.352982
6	1.128000	1.000000	6.680378	24.931512
7	1.128000	1.000000	0.000000	25.811000
8	1.128000	1.000000	-6.680378	24.931512
9	1.128000	1.000000	-12.905500	22.352982
10	1.128000	1.000000	-18.251133	18.251133

11	1.128000	1.000000	-22.35298	12.905500
12	1.128000	1.000000	-24.93151	6.680378
13	1.128000	1.000000	-25.81100	0.000000
14	1.128000	1.000000	-24.93151	-6.68038
15	1.128000	1.000000	-22.35298	-12.90550
16	1.128000	1.000000	-18.25113	-18.25113
17	1.128000	1.000000	-12.90550	-22.35298
18	1.128000	1.000000	-6.68038	-24.93151
19	1.128000	1.000000	0.00000	-25.81100
20	1.128000	1.000000	6.680378	-24.93151
21	1.128000	1.000000	12.905500	-22.35298
22	1.128000	1.000000	18.251133	-18.25113
23	1.128000	1.000000	22.352982	-12.90550
24	1.128000	1.000000	24.931512	-6.68038

NOTE: The positions of the above rebars were computed by LPile

Minimum spacing between any two bars not equal to zero = 5.610 inches
between bars 9 and 10.

Ratio of bar spacing to maximum aggregate size = 7.48

Concrete Properties:

Compressive Strength of Concrete	=	4000. psi
Modulus of Elasticity of Concrete	=	3604997. psi
Modulus of Rupture of Concrete	=	-474.34165 psi
Compression Strain at Peak Stress	=	0.001886
Tensile Strain at Fracture of Concrete	=	-0.0001154
Maximum Coarse Aggregate Size	=	0.750000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 4

Number	Axial Thrust Force kips
-----	-----
1	775.400

2	995.700
3	1030.000
4	1340.000

Definitions of Run Messages and Notes:

- C = concrete in section has cracked in tension.
- Y = stress in reinforcing steel has reached yield stress.
- T = ACI 318 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than 0.003. See ACI 318-14, Section 21.2.3.
- Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
 Position of neutral axis is measured from edge of compression side of pile.
 Compressive stresses and strains are positive in sign.
 Tensile stresses and strains are negative in sign.

Axial Thrust Force = 775.400 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
4.16667E-07	1170.	2807882912.	180.2399004	0.00007510	0.00005010	0.3116622	2.1307738	
8.33333E-07	2340.	2807848909.	105.1561645	0.00008763	0.00003763	0.3620105	2.4470240	
0.00000125	3510.	2807780733.	80.1443465	0.0001002	0.00002518	0.4120935	2.7638576	
0.00000167	4679.	2807682699.	67.6505090	0.0001128	0.00001275	0.4619097	3.0812746	
0.00000208	5849.	2807555665.	60.1638646	0.0001253	3.41385E-07	0.5114573	3.3992752	
0.00000250	7018.	2807309139.	55.1805532	0.0001380	-0.00001205	0.5607321	3.7178401	
0.00000292	8186.	2806530361.	51.6263117	0.0001506	-0.00002442	0.6097164	4.0368505	
0.00000333	9350.	2805038343.	48.9639277	0.0001632	-0.00003679	0.6583920	4.3561797	
0.00000375	10511.	2802870481.	46.8953199	0.0001759	-0.00004914	0.7067464	4.6757410	
0.00000417	11667.	2800125683.	45.2418873	0.0001885	-0.00006149	0.7547715	4.9954781	
0.00000458	12819.	2796904194.	43.8901127	0.0002012	-0.00007384	0.8024618	5.3153525	
0.00000500	13966.	2793292558.	42.7644002	0.0002138	-0.00008618	0.8498136	5.6353380	
0.00000542	15109.	2789361587.	41.8124648	0.0002265	-0.00009852	0.8968241	5.9554164	

0.00000583	15109.	2590121473.	38.1002239	0.0002223	-0.000128	0.8805235	5.7855379 C
0.00000625	15109.	2417446709.	37.0474332	0.0002315	-0.000143	0.9147747	6.0079723 C
0.00000667	15109.	2266356289.	36.0999229	0.0002407	-0.000159	0.9481869	6.2253184 C
0.00000708	15109.	2133041213.	35.2413276	0.0002496	-0.000175	0.9808285	6.4380310 C
0.00000750	15109.	2014538924.	34.4586116	0.0002584	-0.000192	1.0127581	6.6464980 C
0.00000792	15109.	1908510559.	33.7395553	0.0002671	-0.000208	1.0439772	6.8506646 C
0.00000833	15109.	1813085031.	33.0778766	0.0002756	-0.000224	1.0745933	7.0513202 C
0.00000875	15109.	1726747649.	32.4662697	0.0002841	-0.000241	1.1046413	7.2486910 C
0.00000917	15109.	1648259119.	31.8988532	0.0002924	-0.000258	1.1341587	7.4430285 C
0.00000958	15227.	1588943374.	31.3708685	0.0003006	-0.000274	1.1631858	7.6346122 C
0.00001000	15521.	1552130179.	30.8784543	0.0003088	-0.000291	1.1917655	7.8237517 C
0.00001042	15807.	1517470385.	30.4156325	0.0003168	-0.000308	1.2198397	8.0099307 C
0.00001083	16087.	1484933561.	29.9815234	0.0003248	-0.000325	1.2475102	-8.205555 C
0.00001125	16362.	1454408119.	29.5745262	0.0003327	-0.000342	1.2748437	-8.653936 C
0.00001167	16632.	1425619866.	29.1906828	0.0003406	-0.000359	1.3018003	-9.104319 C
0.00001208	16897.	1398369155.	28.8268836	0.0003483	-0.000377	1.3283537	-9.556955 C
0.00001250	17159.	1372758024.	28.4852010	0.0003561	-0.000394	1.3546837	-10.010365 C
0.00001292	17416.	1348307513.	28.1578629	0.0003637	-0.000411	1.3805420	-10.466659 C
0.00001333	17671.	1325295546.	27.8500509	0.0003713	-0.000429	1.4062309	-10.923314 C
0.00001375	17920.	1303300593.	27.5546684	0.0003789	-0.000446	1.4315022	-11.382451 C
0.00001417	18169.	1282551044.	27.2763754	0.0003864	-0.000464	1.4566361	-11.841706 C
0.00001458	18413.	1262628142.	27.0076065	0.0003939	-0.000481	1.4813334	-12.303658 C
0.00001500	18657.	1243798015.	26.7540959	0.0004013	-0.000499	1.5059266	-12.765468 C
0.00001542	18896.	1225717049.	26.5092654	0.0004087	-0.000516	1.5301410	-13.229524 C
0.00001583	19135.	1208504414.	26.2761458	0.0004160	-0.000534	1.5541757	-13.694120 C
0.00001625	19372.	1192103136.	26.0539492	0.0004234	-0.000552	1.5780375	-14.159201 C
0.00001708	19838.	1161237075.	25.6332269	0.0004379	-0.000587	1.6249164	-15.093747 C
0.00001792	20298.	1132888714.	25.2451228	0.0004523	-0.000623	1.6709591	-16.031680 C
0.00001875	20754.	1106854481.	24.8884238	0.0004667	-0.000658	1.7163654	-16.971295 C
0.00001958	21201.	1082623026.	24.5530914	0.0004808	-0.000694	1.7607660	-17.916015 C
0.00002042	21647.	1060273179.	24.2442376	0.0004950	-0.000730	1.8046733	-18.861266 C
0.00002125	22087.	1039380766.	23.9528807	0.0005090	-0.000766	1.8477011	-19.810662 C
0.00002208	22525.	1020016981.	23.6837690	0.0005230	-0.000802	1.8903205	-20.759895 C
0.00002292	22958.	1001789521.	23.4273384	0.0005369	-0.000838	1.9320321	-21.713706 C
0.00002375	23389.	984812462.	23.1896012	0.0005508	-0.000874	1.9733774	-22.667037 C
0.00002458	23817.	968833158.	22.9642851	0.0005645	-0.000910	2.0140336	-23.623003 C
0.00002542	24242.	953795724.	22.7516036	0.0005783	-0.000947	2.0541169	-24.580547 C
0.00002625	24667.	939687791.	22.5530480	0.0005920	-0.000983	2.0938395	-25.537617 C
0.00002708	25087.	926301992.	22.3625934	0.0006057	-0.001019	2.1328292	-26.497921 C
0.00002792	25506.	913646694.	22.1823141	0.0006193	-0.001056	2.1713204	-27.459193 C
0.00002875	25924.	901702588.	22.0130470	0.0006329	-0.001092	2.2094564	-28.419998 C

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0.00002958	26340.	890370662.	21.8521629	0.0006465	-0.001129	2.2470949	-29.381790 C
0.00003042	26753.	879548919.	21.6966898	0.0006599	-0.001165	2.2840459	-30.346586 C
0.00003125	27165.	869284323.	21.5500208	0.0006734	-0.001202	2.3206473	-31.310919 C
0.00003208	27577.	859533344.	21.4114723	0.0006870	-0.001238	2.3568978	-32.274784 C
0.00003292	27987.	850241851.	21.2796808	0.0007005	-0.001275	2.3927299	-33.238896 C
0.00003375	28394.	841309708.	21.1508259	0.0007138	-0.001311	2.4278465	-34.206504 C
0.00003458	28801.	832790361.	21.0286447	0.0007272	-0.001348	2.4626174	-35.173647 C
0.00003542	29207.	824654571.	20.9126683	0.0007407	-0.001384	2.4970414	-36.140322 C
0.00003625	29612.	816875788.	20.8024709	0.0007541	-0.001421	2.5311173	-37.106527 C
0.00003708	30016.	809428241.	20.6975720	0.0007675	-0.001457	2.5648350	-38.072361 C
0.00003792	30418.	802224775.	20.5938170	0.0007808	-0.001494	2.5978311	-39.042007 C
0.00003875	30818.	795315618.	20.4949441	0.0007942	-0.001531	2.6304838	-40.011181 C
0.00003958	31219.	788682094.	20.4006471	0.0008075	-0.001567	2.6627919	-40.979882 C
0.00004042	31618.	782307067.	20.3106450	0.0008209	-0.001604	2.6947541	-41.948106 C
0.00004125	32017.	776174785.	20.2246797	0.0008343	-0.001641	2.7263693	-42.915852 C
0.00004208	32416.	770270743.	20.1425135	0.0008477	-0.001677	2.7576361	-43.883116 C
0.00004292	32812.	764559915.	20.0624210	0.0008610	-0.001714	2.7884024	-44.851770 C
0.00004375	33207.	759028372.	19.9840588	0.0008743	-0.001751	2.8186498	-45.822100 C
0.00004458	33602.	753690154.	19.9090028	0.0008876	-0.001787	2.8485530	-46.791943 C
0.00004542	33996.	748534542.	19.8370731	0.0009009	-0.001824	2.8781109	-47.761296 C
0.00004625	34389.	743551590.	19.7681029	0.0009143	-0.001861	2.9073221	-48.730157 C
0.00004708	34782.	738732054.	19.7019371	0.0009276	-0.001897	2.9361854	-49.698522 C
0.00004792	35160.	733780634.	19.6363340	0.0009409	-0.001934	2.9644825	-50.000000 CY
0.00004875	35503.	728271348.	19.5680141	0.0009539	-0.001971	2.9918835	-50.000000 CY
0.00004958	35793.	721874985.	19.4940654	0.0009666	-0.002008	3.0180915	-50.000000 CY
0.00005292	36822.	695850339.	19.1949422	0.0010157	-0.002159	3.1166667	-50.000000 CY
0.00005625	37634.	669048448.	18.9033654	0.0010633	-0.002312	3.2070674	-50.000000 CY
0.00005958	38349.	643615316.	18.6221461	0.0011096	-0.002465	3.2902210	-50.000000 CY
0.00006292	38911.	618445240.	18.3500651	0.0011545	-0.002620	3.3665779	-50.000000 CY
0.00006625	39459.	595607268.	18.0983209	0.0011990	-0.002776	3.4378490	-50.000000 CY
0.00006958	39962.	574306138.	17.8641601	0.0012430	-0.002932	3.5041888	-50.000000 CY
0.00007292	40332.	553121201.	17.6282576	0.0012854	-0.003090	3.5640042	-50.000000 CY
0.00007625	40683.	533546764.	17.4057630	0.0013272	-0.003248	3.6192562	-50.000000 CY
0.00007958	41031.	515572378.	17.2041727	0.0013692	-0.003406	3.6709855	-50.000000 CY
0.00008292	41372.	498955186.	17.0164475	0.0014109	-0.003564	3.7187211	-50.000000 CY
0.00008625	41698.	483455641.	16.8385703	0.0014523	-0.003723	3.7623017	-50.000000 CY
0.00008958	41938.	468147013.	16.6591606	0.0014924	-0.003883	3.8009664	-50.000000 CY
0.00009292	42149.	453618718.	16.4885350	0.0015321	-0.004043	3.8358751	-50.000000 CY
0.00009625	42348.	439975963.	16.3219243	0.0015710	-0.004204	3.8668398	-50.000000 CY
0.00009958	42544.	427223481.	16.1681550	0.0016101	-0.004365	3.8946862	-50.000000 CY
0.0001029	42739.	415274230.	16.0260028	0.0016493	-0.004526	3.9193725	-50.000000 CY

0.0001063	42930.	404048837.	15.8940016	0.0016887	-0.004686	3.9408343	-50.000000	CY
0.0001096	43112.	393416423.	15.7632840	0.0017274	-0.004848	3.9586634	-50.000000	CY
0.0001129	43291.	383391613.	15.6418181	0.0017662	-0.005009	3.9733643	-50.000000	CY
0.0001163	43468.	373921671.	15.5288333	0.0018052	-0.005170	3.9848936	-50.000000	CY
0.0001196	43613.	364709538.	15.4163875	0.0018435	-0.005331	3.9930541	-50.000000	CY
0.0001229	43728.	355754532.	15.3047041	0.0018812	-0.005494	3.9980223	-50.000000	CY
0.0001263	43825.	347130141.	15.1899912	0.0019177	-0.005657	3.9999538	-50.000000	CY
0.0001296	43920.	338930177.	15.0822865	0.0019544	-0.005821	3.9973574	-50.000000	CY
0.0001329	44012.	331128383.	14.9812359	0.0019913	-0.005984	3.9997590	-50.000000	CY
0.0001363	44103.	323692315.	14.8865484	0.0020283	-0.006147	3.9956291	-50.000000	CY
0.0001396	44192.	316597615.	14.7976598	0.0020655	-0.006309	3.9989788	-50.000000	CY
0.0001429	44279.	309822625.	14.7140344	0.0021029	-0.006472	3.9992993	-50.000000	CY
0.0001462	44359.	303308236.	14.6299046	0.0021396	-0.006635	3.9967494	-50.000000	CY
0.0001496	44437.	297069654.	14.5492578	0.0021763	-0.006799	3.9993487	-50.000000	CY
0.0001529	44513.	291093758.	14.4731566	0.0022132	-0.006962	3.9981844	-50.000000	CY
0.0001562	44588.	285360142.	14.4015887	0.0022502	-0.007125	3.9962315	-50.000000	CY
0.0001596	44661.	279859580.	14.3338145	0.0022874	-0.007288	3.9990078	-50.000000	CY
0.0001629	44733.	274577634.	14.2696135	0.0023248	-0.007450	3.9999978	-50.000000	CY
0.0001662	44804.	269495119.	14.2092706	0.0023623	-0.007613	3.9940737	-50.000000	CY
0.0001696	44871.	264597442.	14.1529234	0.0024001	-0.007775	3.9976422	50.000000	CY
0.0001729	44937.	259876636.	14.1000838	0.0024381	-0.007937	3.9996045	50.000000	CY
0.0001762	44998.	255308411.	14.0448978	0.0024754	-0.008100	3.9976431	50.000000	CY
0.0001796	45052.	250869412.	13.9907028	0.0025125	-0.008263	3.9938190	50.000000	CY
0.0001829	45098.	246550033.	13.9368733	0.0025493	-0.008426	3.9971489	50.000000	CY
0.0002029	45259.	223040971.	13.6505616	0.0027699	-0.009405	3.9990237	50.000000	CY
0.0002229	45348.	203430233.	13.4361753	0.0029951	-0.010380	3.9991187	50.000000	CY
0.0002429	45406.	186920605.	13.2601970	0.0032211	-0.011354	3.9972149	50.000000	CYT
0.0002629	45451.	172871445.	13.1242298	0.0034506	-0.012324	3.9904707	50.000000	CYT
0.0002829	45485.	160770161.	13.0183030	0.0036831	-0.013292	3.9954699	50.000000	CYT
0.0003029	45485.	150155350.	13.0074420	0.0039402	-0.014235	3.9985247	50.000000	CYT

Axial Thrust Force = 995.700 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
4.16667E-07	1159.	2782231413.	223.8132093	0.00009326	0.00006826	0.3852318	2.6572846	
8.33333E-07	2318.	2782199518.	126.9431621	0.0001058	0.00005579	0.4350748	2.9735431	
0.00000125	3478.	2782131507.	94.6693929	0.0001183	0.00004334	0.4846526	3.2903905	

Performed by: G. Khatri 8/29/2024

Checked by: J. Samples 8/30/2024

0.00000167	4637.	2782032948.	78.5446942	0.0001309	0.00003091	0.5339633	3.6078269
0.00000208	5796.	2781904954.	68.8796247	0.0001435	0.00001850	0.5830054	3.9258523
0.00000250	6954.	2781747892.	62.4443710	0.0001561	0.00000611	0.6317771	4.2444669
0.00000292	8113.	2781555363.	57.8547088	0.0001687	-0.00000626	0.6802766	4.5636691
0.00000333	9270.	2781148237.	54.4179987	0.0001814	-0.00001861	0.7284951	4.8834065
0.00000375	10426.	2780268184.	51.7488864	0.0001941	-0.00003094	0.7764163	5.2035664
0.00000417	11578.	2778833512.	49.6163023	0.0002067	-0.00004327	0.8240265	5.5240531
0.00000458	12727.	2776861439.	47.8733912	0.0002194	-0.00005558	0.8713158	5.8447966
0.00000500	13872.	2774406875.	46.4223889	0.0002321	-0.00006789	0.9182768	6.1657464
0.00000542	15012.	2771532291.	45.1956986	0.0002448	-0.00008019	0.9649044	6.4868660
0.00000583	16148.	2768296621.	44.1450927	0.0002575	-0.00009249	1.0111945	6.8081282
0.00000625	17280.	2764752074.	43.2352431	0.0002702	-0.000105	1.0571443	7.1295128
0.00000667	17280.	2591955069.	40.1297344	0.0002675	-0.000132	1.0468996	7.0044153 C
0.00000708	17280.	2439487124.	39.1419903	0.0002773	-0.000148	1.0817769	7.2392922 C
0.00000750	17280.	2303960061.	38.2409386	0.0002868	-0.000163	1.1158242	7.4691542 C
0.00000792	17280.	2182699005.	37.4150709	0.0002962	-0.000179	1.1491144	7.6945017 C
0.00000833	17280.	2073564055.	36.6535851	0.0003054	-0.000195	1.1816713	7.9154497 C
0.00000875	17280.	1974822910.	35.9504188	0.0003146	-0.000210	1.2136013	8.1327938 C
0.00000917	17280.	1885058232.	35.2980173	0.0003236	-0.000226	1.2449249	8.3466396 C
0.00000958	17337.	1809042118.	34.6903324	0.0003324	-0.000243	1.2756684	8.5571466 C
0.00001000	17680.	1768004413.	34.1225343	0.0003412	-0.000259	1.3058651	8.7645350 C
0.00001042	18013.	1729255303.	33.5906473	0.0003499	-0.000275	1.3355506	8.9690497 C
0.00001083	18337.	1692648884.	33.0913918	0.0003585	-0.000292	1.3647627	9.1709623 C
0.00001125	18653.	1658056561.	32.6220624	0.0003670	-0.000308	1.3935421	9.3705729 C
0.00001167	18961.	1625218071.	32.1786033	0.0003754	-0.000325	1.4218594	9.5675942 C
0.00001208	19261.	1594001013.	31.7585146	0.0003837	-0.000341	1.4497269	9.7620879 C
0.00001250	19556.	1564462941.	31.3620343	0.0003920	-0.000358	1.4772579	9.9549875 C
0.00001292	19845.	1536372878.	30.9858603	0.0004002	-0.000375	1.5044112	10.1459116 C
0.00001333	20127.	1509551240.	30.6271452	0.0004084	-0.000392	1.5311488	10.3344961 C
0.00001375	20407.	1484175277.	30.2883675	0.0004165	-0.000409	1.5576603	10.5223616 C
0.00001417	20680.	1459765870.	29.9624325	0.0004245	-0.000426	1.5836977	-10.738184 C
0.00001458	20951.	1436662097.	29.6544181	0.0004325	-0.000443	1.6095620	-11.184277 C
0.00001500	21216.	1414429668.	29.3577007	0.0004404	-0.000460	1.6350026	-11.632900 C
0.00001542	21481.	1393346406.	29.0767996	0.0004483	-0.000477	1.6602960	-12.081623 C
0.00001583	21739.	1372970539.	28.8045853	0.0004561	-0.000494	1.6851419	-12.533145 C
0.00001625	21996.	1353624178.	28.5466758	0.0004639	-0.000511	1.7098732	-12.984504 C
0.00001708	22500.	1317061777.	28.0578503	0.0004793	-0.000546	1.7583544	-13.892548 C
0.00001792	22994.	1283362973.	27.6065661	0.0004946	-0.000580	1.8058706	-14.804713 C
0.00001875	23480.	1252247321.	27.1894115	0.0005098	-0.000615	1.8525291	-15.720132 C
0.00001958	23957.	1223338757.	26.8007569	0.0005248	-0.000650	1.8982645	-16.639528 C
0.00002042	24427.	1196402075.	26.4372664	0.0005398	-0.000685	1.9431002	-17.562810 C

0.00002125	24893.	1171411983.	26.1004739	0.0005546	-0.000720	1.9873368	-18.487208 C
0.00002208	25349.	1147870162.	25.7805280	0.0005693	-0.000756	2.0305291	-19.417095 C
0.00002292	25804.	1125984456.	25.4841992	0.0005840	-0.000791	2.0732765	-20.346751 C
0.00002375	26250.	1105281636.	25.2012873	0.0005985	-0.000826	2.1150447	-21.281489 C
0.00002458	26696.	1085949333.	24.9383221	0.0006131	-0.000862	2.1564094	-22.215679 C
0.00002542	27135.	1067613800.	24.6866315	0.0006275	-0.000898	2.1968832	-23.154270 C
0.00002625	27572.	1050371006.	24.4504599	0.0006418	-0.000933	2.2368738	-24.093212 C
0.00002708	28006.	1034083352.	24.2271422	0.0006562	-0.000969	2.2762892	-25.033474 C
0.00002792	28436.	1018586736.	24.0130762	0.0006704	-0.001005	2.3149454	-25.977039 C
0.00002875	28864.	1003961934.	23.8120488	0.0006846	-0.001040	2.3532125	-26.920079 C
0.00002958	29289.	990058466.	23.6203546	0.0006988	-0.001076	2.3908815	-27.864829 C
0.00003042	29711.	976787115.	23.4361759	0.0007129	-0.001112	2.4278730	-28.812215 C
0.00003125	30131.	964199764.	23.2623908	0.0007269	-0.001148	2.4644812	-29.759084 C
0.00003208	30551.	952241427.	23.0981292	0.0007411	-0.001184	2.5006996	-30.705491 C
0.00003292	30966.	940725516.	22.9373970	0.0007550	-0.001220	2.5360813	-31.656468 C
0.00003375	31379.	929756869.	22.7851254	0.0007690	-0.001256	2.5710853	-32.606934 C
0.00003458	31792.	919295782.	22.6407053	0.0007830	-0.001292	2.6057100	-33.556885 C
0.00003542	32205.	909306398.	22.5035847	0.0007970	-0.001328	2.6399544	-34.506318 C
0.00003625	32612.	899645978.	22.3685420	0.0008109	-0.001364	2.6733987	-35.460195 C
0.00003708	33019.	890397714.	22.2399172	0.0008247	-0.001400	2.7064578	-36.413697 C
0.00003792	33425.	881537206.	22.1174135	0.0008386	-0.001436	2.7391420	-37.366686 C
0.00003875	33830.	873039378.	22.0006384	0.0008525	-0.001472	2.7714499	-38.319158 C
0.00003958	34235.	864872635.	21.8888154	0.0008664	-0.001509	2.8033416	-39.271589 C
0.00004042	34635.	856949026.	21.7783176	0.0008802	-0.001545	2.8345100	-40.227872 C
0.00004125	35035.	849328716.	21.6727158	0.0008940	-0.001581	2.8653072	-41.183639 C
0.00004208	35434.	841993584.	21.5717214	0.0009078	-0.001617	2.8957320	-42.138887 C
0.00004292	35832.	834926900.	21.4750683	0.0009216	-0.001653	2.9257828	-43.093613 C
0.00004375	36230.	828113229.	21.3825105	0.0009355	-0.001690	2.9554582	-44.047816 C
0.00004458	36627.	821533985.	21.2935705	0.0009493	-0.001726	2.9847331	-45.001813 C
0.00004542	37020.	815124656.	21.2050866	0.0009631	-0.001762	3.0133233	-45.959509 C
0.00004625	37413.	808931391.	21.1201848	0.0009768	-0.001798	3.0415429	-46.916677 C
0.00004708	37805.	802942627.	21.0386769	0.0009906	-0.001834	3.0693906	-47.873315 C
0.00004792	38197.	797147603.	20.9603882	0.0010044	-0.001871	3.0968648	-48.829419 C
0.00004875	38587.	791536293.	20.8851558	0.0010182	-0.001907	3.1239640	-49.784986 C
0.00004958	38962.	785795791.	20.8106761	0.0010319	-0.001943	3.1504783	-50.000000 CY
0.00005292	40140.	758545032.	20.4882173	0.0010842	-0.002091	3.2477974	-50.000000 CY
0.00005625	41047.	729725609.	20.1675236	0.0011344	-0.002241	3.3356587	-50.000000 CY
0.00005958	41851.	702398505.	19.8643207	0.0011836	-0.002391	3.4162911	-50.000000 CY
0.00006292	42494.	675394488.	19.5706558	0.0012313	-0.002544	3.4895577	-50.000000 CY
0.00006625	43053.	649859453.	19.2900031	0.0012780	-0.002697	3.5563664	-50.000000 CY
0.00006958	43604.	626646793.	19.0362427	0.0013246	-0.002850	3.6184914	-50.000000 CY

0.00007292	44084.	604583524.	18.7932416	0.0013703	-0.003005	3.6748363	-50.000000	CY
0.00007625	44450.	582950574.	18.5502059	0.0014145	-0.003161	3.7248796	-50.000000	CY
0.00007958	44809.	563043064.	18.3296633	0.0014587	-0.003316	3.7709161	-50.000000	CY
0.00008292	45153.	544561827.	18.1195092	0.0015024	-0.003473	3.8121812	-50.000000	CY
0.00008625	45492.	527444621.	17.9264406	0.0015462	-0.003629	3.8494117	-50.000000	CY
0.00008958	45826.	511548230.	17.7499418	0.0015901	-0.003785	3.8826770	-50.000000	CY
0.00009292	46082.	495951010.	17.5680627	0.0016324	-0.003943	3.9107368	-50.000000	CY
0.00009625	46289.	480926925.	17.3895994	0.0016737	-0.004101	3.9344888	-50.000000	CY
0.00009958	46493.	466878495.	17.2250775	0.0017153	-0.004260	3.9546638	-50.000000	CY
0.0001029	46693.	453693053.	17.0714231	0.0017569	-0.004418	3.9711436	-50.000000	CY
0.0001063	46881.	441232324.	16.9217109	0.0017979	-0.004577	3.9837534	-50.000000	CY
0.0001096	47066.	429502932.	16.7829506	0.0018391	-0.004736	3.9928024	-50.000000	CY
0.0001129	47249.	418439358.	16.6542039	0.0018805	-0.004894	3.9982363	-50.000000	CY
0.0001163	47428.	407983533.	16.5346482	0.0019222	-0.005053	3.9996843	-50.000000	CY
0.0001196	47598.	398035641.	16.4181426	0.0019633	-0.005212	3.9989501	-50.000000	CY
0.0001229	47763.	388584279.	16.3073175	0.0020044	-0.005371	3.9976344	-50.000000	CY
0.0001263	47896.	379372396.	16.1971223	0.0020449	-0.005530	3.9989363	-50.000000	CY
0.0001296	48003.	370443258.	16.0885736	0.0020848	-0.005690	3.9986941	-50.000000	CY
0.0001329	48098.	361864116.	15.9848200	0.0021246	-0.005850	3.9981334	-50.000000	CY
0.0001363	48190.	353684526.	15.8863130	0.0021645	-0.006010	3.9999301	-50.000000	CY
0.0001396	48272.	345831635.	15.7873161	0.0022036	-0.006171	3.9960200	-50.000000	CY
0.0001429	48353.	338333275.	15.6941374	0.0022430	-0.006332	3.9990420	-50.000000	CY
0.0001462	48433.	331166823.	15.6062762	0.0022824	-0.006493	3.9996012	-50.000000	CY
0.0001496	48509.	324291049.	15.5248363	0.0023223	-0.006653	3.9962650	50.000000	CY
0.0001529	48581.	317697490.	15.4486423	0.0023624	-0.006813	3.9990842	50.000000	CY
0.0001562	48653.	311376972.	15.3766408	0.0024026	-0.006972	3.9997792	50.000000	CY
0.0001596	48721.	305304081.	15.3092070	0.0024431	-0.007132	3.9951692	50.000000	CY
0.0001629	48780.	299419341.	15.2428553	0.0024833	-0.007292	3.9983482	50.000000	CY
0.0001662	48838.	293760625.	15.1791008	0.0025235	-0.007451	3.9998610	50.000000	CY
0.0001696	48893.	288314257.	15.1190344	0.0025639	-0.007611	3.9948926	50.000000	CY
0.0001729	48948.	283070099.	15.0622486	0.0026045	-0.007770	3.9959687	50.000000	CY
0.0001762	48995.	277985054.	15.0120221	0.0026459	-0.007929	3.9987363	50.000000	CY
0.0001796	49041.	273081110.	14.9646630	0.0026874	-0.008088	3.9999450	50.000000	CY
0.0001829	49085.	268345916.	14.9202456	0.0027292	-0.008246	3.9938030	50.000000	CY
0.0002029	49295.	242931420.	14.6918047	0.0029812	-0.009194	3.9957225	50.000000	CY
0.0002229	49359.	221422561.	14.4629932	0.0032240	-0.010151	3.9950129	50.000000	CYT
0.0002429	49396.	203346567.	14.2860560	0.0034703	-0.011105	3.9904691	50.000000	CYT
0.0002629	49414.	187947059.	14.1535848	0.0037212	-0.012054	3.9934732	50.000000	CYT
0.0002829	49414.	174660669.	14.1340409	0.0039988	-0.012976	3.9999009	50.000000	CYT

Axial Thrust Force = 1030.000 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
4.16667E-07	1158.	2778215654.	230.6346368	0.00009610	0.00007110	0.3966821	2.7397102	
8.33333E-07	2315.	2778184090.	130.3539302	0.0001086	0.00005863	0.4464460	3.0559700	
0.00000125	3473.	2778116103.	96.9432986	0.0001212	0.00004618	0.4959446	3.3728196	
0.00000167	4630.	2778017461.	80.2501868	0.0001338	0.00003375	0.5451763	3.6902590	
0.00000208	5787.	2777889314.	70.2440840	0.0001463	0.00002134	0.5941392	4.0082884	
0.00000250	6944.	2777732044.	63.5814868	0.0001590	0.00000895	0.6428318	4.3269078	
0.00000292	8101.	2777544990.	58.8294632	0.0001716	-0.00000341	0.6912522	4.6461171	
0.00000333	9257.	2777217668.	55.2712212	0.0001842	-0.00001576	0.7393946	4.9658847	
0.00000375	10412.	2776482858.	52.5078727	0.0001969	-0.00002810	0.7872437	5.2861062	
0.00000417	11563.	2775222028.	50.3001258	0.0002096	-0.00004042	0.8347852	5.6066819	
0.00000458	12712.	2773430601.	48.4958872	0.0002223	-0.00005273	0.8820084	5.9275366	
0.00000500	13856.	2771151578.	46.9939018	0.0002350	-0.00006503	0.9289054	6.2486158	
0.00000542	14996.	2768442732.	45.7241663	0.0002477	-0.00007733	0.9754705	6.5698795	
0.00000583	16131.	2765361089.	44.6367373	0.0002604	-0.00008962	1.0216994	6.8912981	
0.00000625	17262.	2761958296.	43.6950300	0.0002731	-0.000102	1.0675889	7.2128492	
0.00000667	18389.	2758279473.	42.8716346	0.0002858	-0.000114	1.1131365	7.5345160	
0.00000708	18389.	2596027739.	39.7148618	0.0002813	-0.000144	1.0964581	7.3569696	C
0.00000750	18389.	2451803976.	38.7969620	0.0002910	-0.000159	1.1308230	7.5900892	C
0.00000792	18389.	2322761661.	37.9548046	0.0003005	-0.000175	1.1643930	7.8184155	C
0.00000833	18389.	2206623578.	37.1790227	0.0003098	-0.000190	1.1972378	8.0424305	C
0.00000875	18389.	2101546265.	36.4624666	0.0003190	-0.000206	1.2294385	8.2627259	C
0.00000917	18389.	2006021435.	35.7978210	0.0003281	-0.000222	1.2610275	8.4795041	C
0.00000958	18389.	1918803111.	35.1786942	0.0003371	-0.000238	1.2920249	8.6928705	C
0.00001000	18389.	1838852982.	34.6000457	0.0003460	-0.000254	1.3224602	8.9030133	C
0.00001042	18389.	1765298863.	34.0577800	0.0003548	-0.000270	1.3523673	9.1101627	C
0.00001083	18659.	1722370911.	33.5485124	0.0003634	-0.000287	1.3817826	9.3145743	C
0.00001125	18981.	1687236850.	33.0694432	0.0003720	-0.000303	1.4107446	9.5165309	C
0.00001167	19296.	1653984280.	32.6182604	0.0003805	-0.000319	1.4392949	9.7163448	C
0.00001208	19603.	1622346693.	32.1909403	0.0003890	-0.000336	1.4673911	9.9136170	C
0.00001250	19903.	1592225417.	31.7854711	0.0003973	-0.000353	1.4950539	10.1084833	C
0.00001292	20198.	1563695787.	31.4024053	0.0004056	-0.000369	1.5224029	10.3019427	C
0.00001333	20486.	1536446561.	31.0373600	0.0004138	-0.000386	1.5493396	10.4931126	C
0.00001375	20769.	1510469760.	30.6898603	0.0004220	-0.000403	1.5759213	10.6824567	C
0.00001417	21048.	1485775705.	30.3600647	0.0004301	-0.000420	1.6022307	10.8706766	C
0.00001458	21322.	1462061758.	30.0433949	0.0004381	-0.000437	1.6281242	11.0564774	C

0.00001500	21593.	1439554012.	29.7433287	0.0004461	-0.000454	1.6538289	-11.465152 C
0.00001542	21859.	1417863548.	29.4538269	0.0004541	-0.000471	1.6791118	-11.913060 C
0.00001583	22123.	1397232931.	29.1788980	0.0004620	-0.000488	1.7042241	-12.361273 C
0.00001625	22382.	1377357443.	28.9135983	0.0004698	-0.000505	1.7289676	-12.811592 C
0.00001708	22894.	1340116312.	28.4167167	0.0004855	-0.000540	1.7777767	-13.714760 C
0.00001792	23394.	1305713983.	27.9570626	0.0005009	-0.000574	1.8255518	-14.622601 C
0.00001875	23884.	1273789786.	27.5292884	0.0005162	-0.000609	1.8722869	-15.535324 C
0.00001958	24366.	1244229866.	27.1328428	0.0005314	-0.000644	1.9182102	-16.450931 C
0.00002042	24842.	1216742749.	26.7636986	0.0005464	-0.000679	1.9633197	-17.369535 C
0.00002125	25309.	1190998615.	26.4162690	0.0005613	-0.000714	2.0074747	-18.292599 C
0.00002208	25773.	1167071087.	26.0940398	0.0005762	-0.000749	2.0510791	-19.216317 C
0.00002292	26227.	1144471042.	25.7871414	0.0005910	-0.000784	2.0936574	-20.145421 C
0.00002375	26681.	1123421113.	25.5025997	0.0006057	-0.000819	2.1358218	-21.073959 C
0.00002458	27126.	1103445251.	25.2298546	0.0006202	-0.000855	2.1769872	-22.007841 C
0.00002542	27571.	1084743985.	24.9756652	0.0006348	-0.000890	2.2177413	-22.941228 C
0.00002625	28009.	1067012690.	24.7330643	0.0006492	-0.000926	2.2577003	-23.878080 C
0.00002708	28445.	1050261447.	24.5037672	0.0006636	-0.000961	2.2970844	-24.816208 C
0.00002792	28879.	1034469597.	24.2884509	0.0006781	-0.000997	2.3360407	-25.754100 C
0.00002875	29307.	1019358381.	24.0798057	0.0006923	-0.001033	2.3740944	-26.696837 C
0.00002958	29733.	1005072351.	23.8835322	0.0007066	-0.001068	2.4117566	-27.639045 C
0.00003042	30159.	991542274.	23.6985692	0.0007208	-0.001104	2.4490224	-28.580762 C
0.00003125	30579.	978537876.	23.5181556	0.0007349	-0.001140	2.4854121	-29.527296 C
0.00003208	30998.	966185595.	23.3476758	0.0007491	-0.001176	2.5214164	-30.473309 C
0.00003292	31417.	954435830.	23.1863778	0.0007632	-0.001212	2.5570337	-31.418795 C
0.00003375	31832.	943183521.	23.0312659	0.0007773	-0.001248	2.5920656	-32.366023 C
0.00003458	32245.	932377699.	22.8812849	0.0007913	-0.001284	2.6264656	-33.315603 C
0.00003542	32656.	922059605.	22.7388684	0.0008053	-0.001320	2.6604841	-34.264663 C
0.00003625	33067.	912195533.	22.6034971	0.0008194	-0.001356	2.6941198	-35.213199 C
0.00003708	33476.	902732893.	22.4737509	0.0008334	-0.001392	2.7272871	-36.162229 C
0.00003792	33882.	893581947.	22.3464848	0.0008473	-0.001428	2.7597391	-37.114803 C
0.00003875	34286.	884806038.	22.2251554	0.0008612	-0.001464	2.7918138	-38.066857 C
0.00003958	34690.	876381351.	22.1093901	0.0008752	-0.001500	2.8235098	-39.018388 C
0.00004042	35093.	868286101.	21.9988469	0.0008891	-0.001536	2.8548257	-39.969393 C
0.00004125	35495.	860494842.	21.8929466	0.0009031	-0.001572	2.8857354	-40.920187 C
0.00004208	35894.	852920982.	21.7879743	0.0009169	-0.001608	2.9159187	-41.874968 C
0.00004292	36291.	845624764.	21.6875011	0.0009308	-0.001644	2.9457271	-42.829223 C
0.00004375	36688.	838590220.	21.5912721	0.0009446	-0.001680	2.9751592	-43.782948 C
0.00004458	37085.	831802565.	21.4990516	0.0009585	-0.001717	3.0042133	-44.736143 C
0.00004542	37480.	825248109.	21.4106212	0.0009724	-0.001753	3.0328880	-45.688803 C
0.00004625	37875.	818914212.	21.3257782	0.0009863	-0.001789	3.0611820	-46.640925 C
0.00004708	38267.	812750303.	21.2420559	0.0010001	-0.001825	3.0888765	-47.595618 C

0.00004792	38658.	806768783.	21.1606180	0.0010139	-0.001861	3.1160964	-48.551183 C
0.00004875	39048.	800977261.	21.0823475	0.0010278	-0.001897	3.1429402	-49.506206 C
0.00004958	39428.	795177218.	21.0057402	0.0010415	-0.001933	3.1692773	-50.000000 CY
0.00005292	40637.	767948917.	20.6843249	0.0010945	-0.002080	3.2667622	-50.000000 CY
0.00005625	41565.	738924891.	20.3564285	0.0011450	-0.002230	3.3538979	-50.000000 CY
0.00005958	42376.	711206119.	20.0523801	0.0011948	-0.002380	3.4343040	-50.000000 CY
0.00006292	43037.	684025505.	19.7529472	0.0012428	-0.002532	3.5067862	-50.000000 CY
0.00006625	43603.	658159196.	19.4728113	0.0012901	-0.002685	3.5733075	-50.000000 CY
0.00006958	44152.	634515603.	19.2112672	0.0013368	-0.002838	3.6342765	-50.000000 CY
0.00007292	44653.	612378461.	18.9695779	0.0013832	-0.002992	3.6901984	-50.000000 CY
0.00007625	45024.	590479406.	18.7239777	0.0014277	-0.003147	3.7394201	-50.000000 CY
0.00007958	45381.	570229221.	18.4970014	0.0014721	-0.003303	3.7842334	-50.000000 CY
0.00008292	45733.	551551164.	18.2903256	0.0015166	-0.003458	3.8249723	-50.000000 CY
0.00008625	46069.	534138621.	18.0915739	0.0015604	-0.003615	3.8609041	-50.000000 CY
0.00008958	46402.	517971392.	17.9098975	0.0016044	-0.003771	3.8928543	-50.000000 CY
0.00009292	46684.	502423802.	17.7347183	0.0016479	-0.003927	3.9202781	-50.000000 CY
0.00009625	46891.	487178732.	17.5534305	0.0016895	-0.004085	3.9427680	-50.000000 CY
0.00009958	47093.	472900239.	17.3842527	0.0017312	-0.004244	3.9615385	-50.000000 CY
0.0001029	47292.	459516404.	17.2280237	0.0017731	-0.004402	3.9766573	-50.000000 CY
0.0001063	47487.	446931998.	17.0824654	0.0018150	-0.004560	3.9880421	-50.000000 CY
0.0001096	47670.	435009891.	16.9397410	0.0018563	-0.004719	3.9955616	-50.000000 CY
0.0001129	47850.	423764686.	16.8072980	0.0018978	-0.004877	3.9994398	-50.000000 CY
0.0001163	48027.	413134718.	16.6843991	0.0019396	-0.005035	3.9970374	-50.000000 CY
0.0001196	48200.	403068579.	16.5702514	0.0019815	-0.005193	3.9998280	-50.000000 CY
0.0001229	48367.	393497313.	16.4616226	0.0020234	-0.005352	3.9974914	-50.000000 CY
0.0001263	48508.	384219545.	16.3507408	0.0020643	-0.005511	3.9998548	-50.000000 CY
0.0001296	48623.	375223263.	16.2419124	0.0021047	-0.005670	3.9967563	-50.000000 CY
0.0001329	48715.	366511106.	16.1350930	0.0021446	-0.005830	3.9995149	-50.000000 CY
0.0001363	48806.	358208368.	16.0349818	0.0021848	-0.005990	3.9961216	-50.000000 CY
0.0001396	48894.	350284507.	15.9411709	0.0022251	-0.006150	3.9983746	-50.000000 CY
0.0001429	48977.	342693405.	15.8487195	0.0022650	-0.006310	3.9999433	-50.000000 CY
0.0001462	49053.	335402263.	15.7592719	0.0023048	-0.006470	3.9953804	50.000000 CY
0.0001496	49125.	328412569.	15.6759990	0.0023449	-0.006630	3.9986206	50.000000 CY
0.0001529	49196.	321719375.	15.5973132	0.0023851	-0.006790	3.9999621	50.000000 CY
0.0001562	49265.	315297226.	15.5234156	0.0024255	-0.006949	3.9944736	50.000000 CY
0.0001596	49328.	309104325.	15.4562648	0.0024666	-0.007108	3.9980090	50.000000 CY
0.0001629	49389.	303155567.	15.3929166	0.0025078	-0.007267	3.9997833	50.000000 CY
0.0001662	49448.	297434423.	15.3332817	0.0025492	-0.007426	3.9954501	50.000000 CY
0.0001696	49504.	291916990.	15.2749074	0.0025904	-0.007585	3.9960831	50.000000 CY
0.0001729	49551.	286558488.	15.2201058	0.0026318	-0.007743	3.9988063	50.000000 CY
0.0001762	49596.	281397130.	15.1681649	0.0026734	-0.007902	3.9999594	50.000000 CY

0.0001796	49640.	276416939.	15.1194371	0.0027152	-0.008060	3.9934777	50.0000000	CY
0.0001829	49682.	271612354.	15.0733103	0.0027572	-0.008218	3.9956804	50.0000000	CY
0.0002029	49890.	245864963.	14.8406348	0.0030114	-0.009164	3.9988856	50.0000000	CYT
0.0002229	49968.	224156160.	14.6269091	0.0032606	-0.010114	3.9989839	50.0000000	CYT
0.0002429	49998.	205825369.	14.4428797	0.0035084	-0.011067	3.9967242	50.0000000	CYT
0.0002629	50003.	190184676.	14.3108522	0.0037626	-0.012012	3.9897287	50.0000000	CYT
0.0002829	50003.	176740104.	14.4337498	0.0040835	-0.012891	3.9899928	50.0000000	CYT

Axial Thrust Force = 1340.000 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
4.16667E-07	1142.	2741647292.	292.7520130	0.0001220	0.00009698	0.5001149	3.4902952	
8.33333E-07	2285.	2741618727.	161.4131204	0.0001345	0.00008451	0.5491586	3.8065671	
0.00000125	3427.	2741550952.	117.6499834	0.0001471	0.00007206	0.5979368	4.1234369	
0.00000167	4569.	2741451529.	95.7807863	0.0001596	0.00005963	0.6464479	4.4409047	
0.00000208	5711.	2741321967.	82.6691662	0.0001722	0.00004723	0.6946901	4.7589705	
0.00000250	6853.	2741162768.	73.9363359	0.0001848	0.00003484	0.7426618	5.0776344	
0.00000292	7995.	2740974141.	67.7056725	0.0001975	0.00002247	0.7903611	5.3968965	
0.00000333	9136.	2740756189.	63.0388647	0.0002101	0.00001013	0.8377865	5.7167569	
0.00000375	10277.	2740508868.	59.4146283	0.0002228	-0.00000220	0.8849360	6.0372158	
0.00000417	11417.	2740183305.	56.5200483	0.0002355	-0.00001450	0.9318059	6.3582558	
0.00000458	12557.	2739609096.	54.1555554	0.0002482	-0.00002679	0.9783847	6.6798009	
0.00000500	13693.	2738670406.	52.1880464	0.0002609	-0.00003906	1.0246603	7.0017667	
0.00000542	14827.	2737325738.	50.5254608	0.0002737	-0.00005132	1.0706226	7.3240828	
0.00000583	15958.	2735576439.	49.1021253	0.0002864	-0.00006357	1.1162636	7.6466929	
0.00000625	17084.	2733445160.	47.8699463	0.0002992	-0.00007581	1.1615771	7.9695527	
0.00000667	18206.	2730964254.	46.7929063	0.0003120	-0.00008805	1.2065581	8.2926285	
0.00000708	19325.	2728167832.	45.8434961	0.0003247	-0.000100	1.2512028	8.6158932	
0.00000750	20438.	2725088712.	45.0003441	0.0003375	-0.000112	1.2955079	8.9393249	
0.00000792	20438.	2581662990.	42.5333314	0.0003367	-0.000138	1.2923496	8.8695690	C
0.00000833	20438.	2452579840.	41.6353085	0.0003470	-0.000153	1.3275255	9.1193663	C
0.00000875	20438.	2335790324.	40.8038507	0.0003570	-0.000168	1.3618999	9.3643521	C
0.00000917	20438.	2229618037.	40.0333737	0.0003670	-0.000183	1.3955937	9.6054552	C
0.00000958	20438.	2132678122.	39.3163366	0.0003768	-0.000198	1.4286291	9.8427902	C
0.00001000	20438.	2043816534.	38.6455403	0.0003865	-0.000214	1.4609971	10.0762067	C
0.00001042	20843.	2000916983.	38.0172239	0.0003960	-0.000229	1.4927690	10.3062447	C
0.00001083	21247.	1961288150.	37.4273429	0.0004055	-0.000245	1.5239830	10.5331735	C

Performed by: G. Khatri 8/29/2024

Checked by: J. Samples 8/30/2024

0.00001125	21639.	1923434994.	36.8722951	0.0004148	-0.000260	1.5546710	10.7572112	C
0.00001167	22018.	1887215894.	36.3483717	0.0004241	-0.000276	1.5848399	10.9783657	C
0.00001208	22385.	1852541879.	35.8526780	0.0004332	-0.000292	1.6145088	11.1967509	C
0.00001250	22743.	1819401030.	35.3834244	0.0004423	-0.000308	1.6437256	11.4127413	C
0.00001292	23092.	1787743256.	34.9388043	0.0004513	-0.000324	1.6725266	11.6266188	C
0.00001333	23433.	1757489135.	34.5169647	0.0004602	-0.000340	1.7009359	11.8385597	C
0.00001375	23764.	1728278771.	34.1130496	0.0004691	-0.000356	1.7288349	12.0474536	C
0.00001417	24089.	1700400498.	33.7293837	0.0004778	-0.000372	1.7564056	12.2549052	C
0.00001458	24408.	1673696043.	33.3636966	0.0004866	-0.000388	1.7836263	12.4606884	C
0.00001500	24719.	1647912062.	33.0124042	0.0004952	-0.000405	1.8104022	12.6638959	C
0.00001542	25027.	1623345009.	32.6787149	0.0005038	-0.000421	1.8369488	12.8664838	C
0.00001583	25325.	1599496852.	32.3561168	0.0005123	-0.000438	1.8630158	13.0661003	C
0.00001625	25622.	1576761084.	32.0493098	0.0005208	-0.000454	1.8888871	13.2653623	C
0.00001708	26200.	1533644509.	31.4696772	0.0005376	-0.000487	1.9395894	13.6584776	C
0.00001792	26760.	1493588902.	30.9331958	0.0005542	-0.000521	1.9890953	14.0459976	C
0.00001875	27305.	1456248777.	30.4342766	0.0005706	-0.000554	2.0374354	14.4280130	C
0.00001958	27837.	1421454107.	29.9702126	0.0005869	-0.000588	2.0847501	-14.839542	C
0.00002042	28359.	1388997810.	29.5380358	0.0006031	-0.000622	2.1311327	-15.726896	C
0.00002125	28871.	1358645971.	29.1344425	0.0006191	-0.000656	2.1766235	-16.617525	C
0.00002208	29371.	1330012369.	28.7531024	0.0006350	-0.000690	2.2210412	-17.513409	C
0.00002292	29865.	1303214704.	28.3968112	0.0006508	-0.000724	2.2647394	-18.411077	C
0.00002375	30350.	1277903360.	28.0598450	0.0006664	-0.000759	2.3075222	-19.312657	C
0.00002458	30829.	1254046133.	27.7421864	0.0006820	-0.000793	2.3495340	-20.216758	C
0.00002542	31301.	1231499968.	27.4418930	0.0006975	-0.000828	2.3907810	-21.123413	C
0.00002625	31767.	1210157163.	27.1573554	0.0007129	-0.000862	2.4312752	-22.032588	C
0.00002708	32227.	1189909437.	26.8871404	0.0007282	-0.000897	2.4710270	-22.944267	C
0.00002792	32683.	1170748531.	26.6317927	0.0007435	-0.000932	2.5101774	-23.856969	C
0.00002875	33133.	1152435781.	26.3865363	0.0007586	-0.000966	2.5484739	-24.773600	C
0.00002958	33581.	1135121702.	26.1558250	0.0007738	-0.001001	2.5863260	-25.689607	C
0.00003042	34022.	1118525161.	25.9332765	0.0007888	-0.001036	2.6233391	-26.609564	C
0.00003125	34460.	1102718457.	25.7215790	0.0008038	-0.001071	2.6597832	-27.530444	C
0.00003208	34897.	1087703207.	25.5215380	0.0008188	-0.001106	2.6957895	-28.450711	C
0.00003292	35327.	1073224088.	25.3266955	0.0008337	-0.001141	2.7309179	-29.375684	C
0.00003375	35755.	1059408950.	25.1414108	0.0008485	-0.001176	2.7655617	-30.300719	C
0.00003458	36182.	1046232824.	24.9656578	0.0008634	-0.001212	2.7997744	-31.225151	C
0.00003542	36605.	1033539781.	24.7952835	0.0008782	-0.001247	2.8332718	-32.152553	C
0.00003625	37023.	1021337085.	24.6311589	0.0008929	-0.001282	2.8661653	-33.081620	C
0.00003708	37442.	1009658616.	24.4749654	0.0009076	-0.001317	2.8986345	-34.010089	C
0.00003792	37859.	998469551.	24.3261825	0.0009224	-0.001353	2.9306772	-34.937960	C
0.00003875	38270.	987620273.	24.1802019	0.0009370	-0.001388	2.9619457	-35.869873	C
0.00003958	38680.	977180078.	24.0399893	0.0009516	-0.001423	2.9927184	-36.802221	C

Performed by: G. Khatri 8/29/2024

Checked by: J. Samples 8/30/2024

0.00004042	39089.	967148666.	23.9060653	0.0009662	-0.001459	3.0230710	-37.733974 C
0.00004125	39497.	957501034.	23.7780513	0.0009808	-0.001494	3.0530017	-38.665131 C
0.00004208	39902.	948173372.	23.6539901	0.0009954	-0.001530	3.0823713	-39.597651 C
0.00004292	40304.	939118710.	23.5325124	0.0010099	-0.001565	3.1110866	-40.532952 C
0.00004375	40705.	930389250.	23.4161309	0.0010245	-0.001601	3.1393856	-41.467659 C
0.00004458	41104.	921966682.	23.3045621	0.0010390	-0.001636	3.1672669	-42.401768 C
0.00004542	41503.	913833912.	23.1975435	0.0010536	-0.001671	3.1947284	-43.335277 C
0.00004625	41901.	905970843.	23.0946387	0.0010681	-0.001707	3.2217517	-44.268441 C
0.00004708	42294.	898289517.	22.9923108	0.0010826	-0.001742	3.2480484	-45.205791 C
0.00004792	42687.	890857570.	22.8939748	0.0010970	-0.001778	3.2739306	-46.142539 C
0.00004875	43079.	883662092.	22.7994284	0.0011115	-0.001814	3.2993966	-47.078684 C
0.00004958	43469.	876691089.	22.7084830	0.0011260	-0.001849	3.3244445	-48.014219 C
0.00005292	44954.	849520834.	22.3636573	0.0011834	-0.001992	3.4192486	-50.000000 CY
0.00005625	46067.	818974727.	22.0126939	0.0012382	-0.002137	3.5029431	-50.000000 CY
0.00005958	46936.	787731236.	21.6666505	0.0012910	-0.002284	3.5773117	-50.000000 CY
0.00006292	47745.	758865704.	21.3515317	0.0013434	-0.002432	3.6452010	-50.000000 CY
0.00006625	48390.	730413409.	21.0405429	0.0013939	-0.002581	3.7050504	-50.000000 CY
0.00006958	48961.	703624276.	20.7519814	0.0014440	-0.002731	3.7588416	-50.000000 CY
0.00007292	49511.	679012187.	20.4831115	0.0014936	-0.002881	3.8067674	-50.000000 CY
0.00007625	50033.	656169891.	20.2358221	0.0015430	-0.003032	3.8492684	-50.000000 CY
0.00007958	50418.	633520590.	19.9873889	0.0015907	-0.003184	3.8852515	-50.000000 CY
0.00008292	50776.	612377703.	19.7533582	0.0016379	-0.003337	3.9160512	-50.000000 CY
0.00008625	51130.	592806158.	19.5404277	0.0016854	-0.003490	3.9421802	-50.000000 CY
0.00008958	51466.	574508732.	19.3372985	0.0017323	-0.003643	3.9632319	-50.000000 CY
0.00009292	51795.	557437854.	19.1493923	0.0017793	-0.003796	3.9795571	-50.000000 CY
0.00009625	52117.	541474592.	18.9769479	0.0018265	-0.003948	3.9911720	-50.000000 CY
0.00009958	52359.	525777486.	18.8003015	0.0018722	-0.004103	3.9978285	-50.000000 CY
0.0001029	52559.	510698687.	18.6270575	0.0019170	-0.004258	4.0000000	-50.000000 CY
0.0001063	52755.	496518105.	18.4673442	0.0019622	-0.004413	3.9995619	-50.000000 CY
0.0001096	52946.	483155152.	18.3198966	0.0020076	-0.004567	3.9979125	-50.000000 CY
0.0001129	53123.	470459755.	18.1753414	0.0020523	-0.004723	3.9999874	-50.000000 CY
0.0001163	53293.	458436728.	18.0403211	0.0020972	-0.004878	3.9987602	-50.000000 CY
0.0001196	53460.	447053527.	17.9148542	0.0021423	-0.005033	3.9984568	-50.000000 CY
0.0001229	53622.	436249895.	17.7985339	0.0021877	-0.005187	3.9989604	-50.000000 CY
0.0001263	53778.	425965987.	17.6905213	0.0022334	-0.005342	3.9980303	50.000000 CY
0.0001296	53921.	416107952.	17.5841320	0.0022786	-0.005496	3.9986003	50.000000 CY
0.0001329	54060.	406722744.	17.4847816	0.0023240	-0.005651	3.9999991	50.000000 CY
0.0001363	54172.	397593031.	17.3913885	0.0023696	-0.005805	3.9974023	50.000000 CY
0.0001396	54269.	388790083.	17.3004441	0.0024149	-0.005960	3.9997196	50.000000 CY
0.0001429	54338.	380208647.	17.2106644	0.0024597	-0.006115	3.9949696	50.000000 CY
0.0001462	54398.	371955323.	17.1298860	0.0025052	-0.006270	3.9982769	50.000000 CY

0.0001496	54454.	364036012.	17.0496560	0.0025503	-0.006425	3.9999079	50.0000000	CY
0.0001529	54504.	356431436.	16.9719687	0.0025953	-0.006580	3.9943569	50.0000000	CY
0.0001562	54551.	349128933.	16.8998212	0.0026406	-0.006734	3.9979647	50.0000000	CY
0.0001596	54597.	342122946.	16.8317104	0.0026861	-0.006889	3.9997770	50.0000000	CY
0.0001629	54641.	335390961.	16.7677494	0.0027317	-0.007043	3.9954226	50.0000000	CY
0.0001662	54683.	328917678.	16.7075941	0.0027776	-0.007197	3.9964418	50.0000000	CY
0.0001696	54723.	322692103.	16.6506691	0.0028237	-0.007351	3.9990401	50.0000000	CY
0.0001729	54763.	316699800.	16.5968041	0.0028699	-0.007505	3.9999954	50.0000000	CY
0.0001762	54800.	310920286.	16.5464741	0.0029163	-0.007659	3.9927455	50.0000000	CY
0.0001796	54836.	305348925.	16.4986665	0.0029629	-0.007812	3.9966288	50.0000000	CY
0.0001829	54867.	299956284.	16.4486905	0.0030087	-0.007966	3.9989945	50.0000000	CYT
0.0002029	55023.	271158353.	16.2065948	0.0032886	-0.008886	3.9993127	50.0000000	CYT
0.0002229	55115.	247243383.	16.0503582	0.0035779	-0.009797	3.9938090	50.0000000	CYT
0.0002429	55115.	226887153.	16.0027004	0.0038873	-0.010688	3.9895199	50.0000000	CYT

Summary of Results for Nominal Moment Capacity for Section 1

Moment values interpolated at maximum compressive strain = 0.003
or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain	Max. Tens. Strain
1	775.400	45349.238	0.00300000	-0.01040077
2	995.700	49299.782	0.00300000	-0.00926784
3	1030.000	49880.777	0.00300000	-0.00912114
4	1340.000	54861.014	0.00300000	-0.00793688

Note that the values of moment capacity in the table above are not factored by a strength reduction factor (ϕ -factor).

In ACI 318, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.75).

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318, or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Load No.	Resist. Factor	Nominal Ax. Thrust kips	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in ²
1	0.65	775.400000	45349.	504.010000	29477.	819462295.
2	0.65	995.700000	49300.	647.205000	32045.	913176837.
3	0.65	1030.	49881.	669.500000	32423.	927920599.
4	0.65	1340.	54861.	871.000000	35660.	1.0625E+09
1	0.75	775.400000	45349.	581.550000	34012.	748332032.
2	0.75	995.700000	49300.	746.775000	36975.	815864231.
3	0.75	1030.	49881.	772.500000	37411.	826398868.
4	0.75	1340.	54861.	1005.	41146.	921122453.
1	0.90	775.400000	45349.	697.860000	40814.	526761798.
2	0.90	995.700000	49300.	896.130000	44370.	587692633.
3	0.90	1030.	49881.	927.000000	44893.	598223347.
4	0.90	1340.	54861.	1206.	49375.	685106985.

Pile Section No. 2:

Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section	=	10.000000 ft
Shaft Diameter	=	54.000000 in
Concrete Cover Thickness (to edge of trans. reinf.)	=	3.000000 in
Number of Reinforcing Bars	=	24 bars
Yield Stress of Reinforcing Bars	=	50000. psi
Modulus of Elasticity of Reinforcing Bars	=	29000000. psi
Gross Area of Shaft	=	2290. sq. in.
Total Area of Reinforcing Steel	=	24.000000 sq. in.
Area Ratio of Steel Reinforcement	=	1.05 percent
Edge-to-Edge Bar Spacing	=	4.826866 in
Maximum Concrete Aggregate Size	=	0.750000 in

Ratio of Bar Spacing to Aggregate Size = 6.44
 Offset of Center of Rebar Cage from Center of Pile = 0.0000 in
 Transverse Reinforcement
 Type: Spiral
 Number of Transverse Reinf. (per spacing) = 1
 Spacing of Transverse Reinf. = 3.250000 in
 Yield Stress of Transverse Reinf. = 50000. psi
 Diameter of Transverse Reinf. = 0.625000 in

Axial Structural Capacities:

Nom. Axial Structural Capacity = $0.85 F_c A_c + F_y A_s$ = 8905.152 kips
 Tensile Load for Cracking of Concrete = -1022.841 kips
 Nominal Axial Tensile Capacity = -1200.000 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.128000	1.000000	22.811000	0.000000
2	1.128000	1.000000	22.033734	5.903921
3	1.128000	1.000000	19.754905	11.405500
4	1.128000	1.000000	16.129813	16.129813
5	1.128000	1.000000	11.405500	19.754905
6	1.128000	1.000000	5.903921	22.033734
7	1.128000	1.000000	0.000000	22.811000
8	1.128000	1.000000	-5.90392	22.033734
9	1.128000	1.000000	-11.40550	19.754905
10	1.128000	1.000000	-16.12981	16.129813
11	1.128000	1.000000	-19.75491	11.405500
12	1.128000	1.000000	-22.03373	5.903921
13	1.128000	1.000000	-22.81100	0.000000
14	1.128000	1.000000	-22.03373	-5.90392
15	1.128000	1.000000	-19.75491	-11.40550
16	1.128000	1.000000	-16.12981	-16.12981
17	1.128000	1.000000	-11.40550	-19.75491
18	1.128000	1.000000	-5.90392	-22.03373
19	1.128000	1.000000	0.000000	-22.81100

20	1.128000	1.000000	5.903921	-22.03373
21	1.128000	1.000000	11.405500	-19.75491
22	1.128000	1.000000	16.129813	-16.12981
23	1.128000	1.000000	19.754905	-11.40550
24	1.128000	1.000000	22.033734	-5.90392

NOTE: The positions of the above rebars were computed by LPILE

Minimum spacing between any two bars not equal to zero = 4.827 inches
between bars 15 and 16.

Ratio of bar spacing to maximum aggregate size = 6.44

Concrete Properties:

Compressive Strength of Concrete	=	4000. psi
Modulus of Elasticity of Concrete	=	3604997. psi
Modulus of Rupture of Concrete	=	-474.34165 psi
Compression Strain at Peak Stress	=	0.001886
Tensile Strain at Fracture of Concrete	=	-0.0001154
Maximum Coarse Aggregate Size	=	0.750000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 4

Number	Axial Thrust Force kips
-----	-----
1	775.400
2	995.700
3	1030.000
4	1340.000

Definitions of Run Messages and Notes:

C = concrete in section has cracked in tension.

Y = stress in reinforcing steel has reached yield stress.
 T = ACI 318 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than 0.003. See ACI 318-14, Section 21.2.3.
 Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
 Position of neutral axis is measured from edge of compression side of pile.
 Compressive stresses and strains are positive in sign.
 Tensile stresses and strains are negative in sign.

Axial Thrust Force = 775.400 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	1159.	1854211651.	149.7181425	0.00009357	0.00005982	0.3863388	2.6500226	
0.00000125	2318.	1854167834.	88.4027800	0.0001105	0.00004300	0.4535887	3.0773633	
0.00000188	3476.	1854085874.	67.9837513	0.0001275	0.00002622	0.5203511	3.5057602	
0.00000250	4635.	1853969118.	57.7888080	0.0001445	0.00000947	0.5866218	3.9352136	
0.00000313	5793.	1853810447.	51.6834711	0.0001615	-0.00000724	0.6523963	4.3657208	
0.00000375	6950.	1853336842.	47.6217972	0.0001786	-0.00002392	0.7176541	4.7971580	
0.00000438	8103.	1852205927.	44.7258255	0.0001957	-0.00004057	0.7823565	5.2292578	
0.00000500	9252.	1850400801.	42.5570623	0.0002128	-0.00005721	0.8464754	5.6618240	
0.00000563	10395.	1848018162.	40.8723450	0.0002299	-0.00007384	0.9099930	6.0947325	
0.00000625	11532.	1845166118.	39.5260211	0.0002470	-0.00009046	0.9728978	6.5279038	
0.00000688	12663.	1841937362.	38.4255362	0.0002642	-0.000107	1.0351821	6.9612850	
0.00000750	12663.	1688442582.	35.2020823	0.0002640	-0.000141	1.0339818	6.8930279	C
0.00000813	12663.	1558562383.	34.0832572	0.0002769	-0.000162	1.0803347	7.2038237	C
0.00000875	12663.	1447236499.	33.0926729	0.0002896	-0.000183	1.1253288	7.5066032	C
0.00000938	12663.	1350754066.	32.2083803	0.0003020	-0.000204	1.1691110	7.8023721	C
0.00001000	12663.	1266331936.	31.4120332	0.0003141	-0.000226	1.2117574	8.0915896	C
0.00001063	12663.	1191841823.	30.6911216	0.0003261	-0.000248	1.2533985	8.3751831	C
0.00001125	12981.	1153863311.	30.0350789	0.0003379	-0.000270	1.2941287	8.6538070	C
0.00001188	13320.	1121653390.	29.4344382	0.0003495	-0.000292	1.3339931	8.9277284	C
0.00001250	13648.	1091804176.	28.8815273	0.0003610	-0.000314	1.3730319	9.1971787	C
0.00001313	13966.	1064106875.	28.3709427	0.0003724	-0.000336	1.4113200	9.4626964	C
0.00001375	14277.	1038326983.	27.8973336	0.0003836	-0.000359	1.4488874	9.7244490	C

0.00001438	14581.	1014305383.	27.4570348	0.0003947	-0.000382	1.4857997	9.9829202 C
0.00001500	14879.	991905060.	27.0471187	0.0004057	-0.000404	1.5221271	10.2386467 C
0.00001563	15172.	970999889.	26.6650959	0.0004166	-0.000427	1.5579364	-10.795660 C
0.00001625	15459.	951350220.	26.3060356	0.0004275	-0.000450	1.5931416	-11.396693 C
0.00001688	15743.	932891535.	25.9686415	0.0004382	-0.000473	1.6278196	-12.000140 C
0.00001750	16023.	915609409.	25.6531602	0.0004489	-0.000496	1.6621217	-12.604696 C
0.00001813	16298.	899186045.	25.3523309	0.0004595	-0.000519	1.6957596	-13.212987 C
0.00001875	16571.	883796002.	25.0709730	0.0004701	-0.000542	1.7291187	-13.821596 C
0.00001938	16840.	869146516.	24.8021288	0.0004805	-0.000566	1.7618880	-14.433373 C
0.00002000	17108.	855376051.	24.5500231	0.0004910	-0.000589	1.7944151	-15.045187 C
0.00002063	17371.	842208205.	24.3075862	0.0005013	-0.000612	1.8263423	-15.660356 C
0.00002125	17633.	829799127.	24.0798468	0.0005117	-0.000636	1.8580656	-16.275257 C
0.00002188	17892.	817928762.	23.8608302	0.0005220	-0.000659	1.8892665	-16.892880 C
0.00002250	18150.	806659047.	23.6530356	0.0005322	-0.000683	1.9201734	-17.511119 C
0.00002313	18406.	795954721.	23.4558879	0.0005424	-0.000706	1.9508113	-18.129751 C
0.00002375	18659.	785662210.	23.2649442	0.0005525	-0.000730	1.9809232	-18.751257 C
0.00002438	18912.	775884588.	23.0841548	0.0005627	-0.000754	2.0108387	-19.372507 C
0.00002563	19412.	757553972.	22.7439877	0.0005828	-0.000801	2.0696190	-20.618755 C
0.00002688	19908.	740779901.	22.4330646	0.0006029	-0.000848	2.1273306	-21.866874 C
0.00002813	20398.	725247053.	22.1428821	0.0006228	-0.000896	2.1836120	-23.120618 C
0.00002938	20885.	710978728.	21.8778955	0.0006427	-0.000944	2.2390760	-24.373936 C
0.00003063	21366.	697662008.	21.6280718	0.0006624	-0.000991	2.2931312	-25.633000 C
0.00003188	21845.	685347869.	21.3986627	0.0006821	-0.001039	2.3464151	-26.891305 C
0.00003313	22321.	673833170.	21.1830006	0.0007017	-0.001087	2.3985370	-28.153036 C
0.00003438	22793.	663080519.	20.9819503	0.0007213	-0.001135	2.4497269	-29.415837 C
0.00003563	23265.	653050376.	20.7959515	0.0007409	-0.001183	2.5001725	-30.677664 C
0.00003688	23732.	643567176.	20.6178980	0.0007603	-0.001231	2.5493445	-31.944479 C
0.00003813	24197.	634673136.	20.4522121	0.0007797	-0.001279	2.5977631	-33.210530 C
0.00003938	24661.	626315255.	20.2979015	0.0007992	-0.001327	2.6454431	-34.475602 C
0.00004063	25122.	618388667.	20.1504704	0.0008186	-0.001375	2.6920406	-35.743758 C
0.00004188	25581.	610883173.	20.0110348	0.0008380	-0.001423	2.7377421	-37.012893 C
0.00004313	26038.	603787118.	19.8804701	0.0008573	-0.001471	2.7827103	-38.281044 C
0.00004438	26495.	597065737.	19.7580323	0.0008768	-0.001519	2.8269416	-39.548201 C
0.00004563	26949.	590653760.	19.6405541	0.0008961	-0.001568	2.8701744	-40.817673 C
0.00004688	27400.	584537151.	19.5283823	0.0009154	-0.001616	2.9124961	-42.088449 C
0.00004813	27851.	578715459.	19.4227595	0.0009347	-0.001664	2.9540853	-43.358217 C
0.00004938	28300.	573166089.	19.3231940	0.0009541	-0.001712	2.9949381	-44.626971 C
0.00005063	28748.	567868683.	19.2292427	0.0009735	-0.001760	3.0350506	-45.894701 C
0.00005188	29195.	562791809.	19.1393504	0.0009929	-0.001808	3.0742968	-47.163133 C
0.00005313	29639.	557907983.	19.0521618	0.0010121	-0.001857	3.1125662	-48.433919 C
0.00005438	30082.	553228403.	18.9696467	0.0010315	-0.001905	3.1500984	-49.703657 C

0.00005563	30519.	548652454.	18.8906640	0.0010508	-0.001953	3.1868009	-50.000000	CY
0.00005688	30913.	543533061.	18.8087030	0.0010697	-0.002002	3.2220074	-50.000000	CY
0.00005813	31247.	537577780.	18.7204971	0.0010881	-0.002051	3.2553960	-50.000000	CY
0.00005938	31558.	531508530.	18.6330078	0.0011063	-0.002100	3.2877338	-50.000000	CY
0.00006063	31859.	525501391.	18.5447497	0.0011243	-0.002149	3.3188895	-50.000000	CY
0.00006188	32119.	519097688.	18.4534536	0.0011418	-0.002199	3.3486494	-50.000000	CY
0.00006313	32351.	512492343.	18.3612137	0.0011591	-0.002250	3.3772629	-50.000000	CY
0.00006438	32580.	506089519.	18.2725009	0.0011763	-0.002300	3.4052279	-50.000000	CY
0.00006563	32807.	499920650.	18.1876086	0.0011936	-0.002350	3.4325968	-50.000000	CY
0.00006688	33034.	493972535.	18.1063256	0.0012109	-0.002400	3.4593665	-50.000000	CY
0.00006813	33252.	488101362.	18.0243280	0.0012279	-0.002451	3.4851061	-50.000000	CY
0.00006938	33439.	482001201.	17.9393703	0.0012445	-0.002502	3.5096088	-50.000000	CY
0.00007063	33599.	475738280.	17.8528182	0.0012609	-0.002553	3.5330433	-50.000000	CY
0.00007188	33757.	469659892.	17.7692841	0.0012772	-0.002604	3.5559049	-50.000000	CY
0.00007313	33914.	463782429.	17.6889691	0.0012935	-0.002655	3.5782292	-50.000000	CY
0.00007438	34071.	458095702.	17.6117132	0.0013099	-0.002706	3.6000138	-50.000000	CY
0.00007938	34683.	436951670.	17.3193919	0.0013747	-0.002912	3.6806505	-50.000000	CY
0.00008438	35171.	416837565.	17.0412096	0.0014379	-0.003118	3.7503897	-50.000000	CY
0.00008938	35564.	397917339.	16.7718044	0.0014990	-0.003327	3.8097051	-50.000000	CY
0.00009438	35950.	380922628.	16.5336576	0.0015604	-0.003536	3.8611883	-50.000000	CY
0.00009938	36322.	365503350.	16.3151226	0.0016213	-0.003745	3.9042843	-50.000000	CY
0.0001044	36649.	351124930.	16.1096280	0.0016814	-0.003955	3.9389621	-50.000000	CY
0.0001094	36879.	337180715.	15.9047732	0.0017396	-0.004167	3.9650900	-50.000000	CY
0.0001144	37095.	324324178.	15.7109226	0.0017969	-0.004379	3.9837531	-50.000000	CY
0.0001194	37305.	312506148.	15.5365262	0.0018547	-0.004592	3.9954197	-50.000000	CY
0.0001244	37511.	301595548.	15.3786140	0.0019127	-0.004804	3.9999427	-50.000000	CY
0.0001294	37704.	291430866.	15.2274720	0.0019701	-0.005016	3.9995037	-50.000000	CY
0.0001344	37892.	281984273.	15.0908122	0.0020278	-0.005228	3.9982148	-50.000000	CY
0.0001394	38074.	273177917.	14.9669064	0.0020860	-0.005440	3.9963677	-50.000000	CY
0.0001444	38220.	264730199.	14.8454441	0.0021433	-0.005653	3.9997183	-50.000000	CY
0.0001494	38321.	256540019.	14.7157685	0.0021982	-0.005868	3.9970662	-50.000000	CY
0.0001544	38414.	248836642.	14.5954281	0.0022532	-0.006083	3.9999238	-50.000000	CY
0.0001594	38504.	241593099.	14.4852766	0.0023086	-0.006298	3.9970732	50.000000	CY
0.0001644	38591.	234775527.	14.3837293	0.0023643	-0.006512	3.9998844	50.000000	CY
0.0001694	38673.	228329273.	14.2893428	0.0024203	-0.006726	3.9958824	50.000000	CY
0.0001744	38746.	222200493.	14.1977654	0.0024757	-0.006941	3.9994262	50.000000	CY
0.0001794	38817.	216401919.	14.1129863	0.0025315	-0.007155	3.9950965	50.000000	CY
0.0001844	38882.	210885896.	14.0370804	0.0025881	-0.007368	3.9977333	50.000000	CY
0.0001894	38942.	205635045.	13.9687982	0.0026453	-0.007581	3.9999299	50.000000	CY
0.0001944	39000.	200641999.	13.9058596	0.0027030	-0.007793	3.9935915	50.000000	CY
0.0001994	39053.	195877064.	13.8493763	0.0027612	-0.008005	3.9981848	50.000000	CY

0.0002044	39101.	191319462.	13.7994662	0.0028203	-0.008216	3.9999812	50.0000000	CY
0.0002094	39146.	186964398.	13.7519184	0.0028793	-0.008427	3.9926137	50.0000000	CY
0.0002144	39188.	182799203.	13.7044340	0.0029379	-0.008638	3.9973961	50.0000000	CY
0.0002194	39227.	178814789.	13.6605108	0.0029968	-0.008849	3.9997507	50.0000000	CY
0.0002244	39264.	174992728.	13.6191624	0.0030558	-0.009060	3.9942045	50.0000000	CYT
0.0002294	39287.	171278378.	13.5747253	0.0031137	-0.009273	3.9939886	50.0000000	CYT
0.0002344	39309.	167719467.	13.5329688	0.0031718	-0.009484	3.9978837	50.0000000	CYT
0.0002394	39325.	164282750.	13.4908121	0.0032294	-0.009697	3.9997745	50.0000000	CYT
0.0002444	39334.	160958414.	13.4485158	0.0032865	-0.009910	3.9954213	50.0000000	CYT
0.0002494	39342.	157763664.	13.4088866	0.0033438	-0.010122	3.9906804	50.0000000	CYT
0.0002544	39350.	154692691.	13.3713928	0.0034013	-0.010335	3.9953097	50.0000000	CYT
0.0002594	39357.	151738294.	13.3359220	0.0034590	-0.010547	3.9983779	50.0000000	CYT
0.0002644	39363.	148891597.	13.3029337	0.0035170	-0.010759	3.9998621	50.0000000	CYT
0.0002694	39367.	146142546.	13.2732746	0.0035755	-0.010971	3.9948586	50.0000000	CYT
0.0002744	39370.	143490950.	13.2454875	0.0036342	-0.011182	3.9878237	50.0000000	CYT
0.0003044	39370.	129348104.	13.1666841	0.0040076	-0.012429	3.9893008	50.0000000	CYT

Axial Thrust Force = 995.700 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	1146.	1833550096.	185.4677369	0.0001159	0.00008217	0.4758477	3.2979840	
0.00000125	2292.	1833507654.	106.2780848	0.0001328	0.00006535	0.5422581	3.7253431	
0.00000188	3438.	1833425370.	79.9011853	0.0001498	0.00004856	0.6081807	4.1537707	
0.00000250	4583.	1833307572.	66.7274759	0.0001668	0.00003182	0.6736113	4.5832670	
0.00000313	5729.	1833155118.	58.8350451	0.0001839	0.00001511	0.7385459	5.0138322	
0.00000375	6874.	1832968271.	53.5832559	0.0002009	-0.00000156	0.8029802	5.4454666	
0.00000438	8018.	1832666346.	49.8400805	0.0002181	-0.00001820	0.8669046	5.8781290	
0.00000500	9160.	1831963675.	47.0384269	0.0002352	-0.00003481	0.9302900	6.3116219	
0.00000563	10298.	1830731126.	44.8632276	0.0002524	-0.00005139	0.9931075	6.7457453	
0.00000625	11431.	1828976067.	43.1257448	0.0002695	-0.00006796	1.0553365	7.1803537	
0.00000688	12559.	1826755056.	41.7060948	0.0002867	-0.00008452	1.1169625	7.6153464	
0.00000750	13681.	1824134653.	40.5244948	0.0003039	-0.000101	1.1779754	8.0506526	
0.00000813	13681.	1683816602.	37.9304834	0.0003082	-0.000131	1.1925007	8.1103264	C
0.00000875	13681.	1563543988.	36.7872267	0.0003219	-0.000151	1.2403844	8.4440963	C
0.00000938	13681.	1459307722.	35.7663894	0.0003353	-0.000171	1.2868735	8.7697059	C
0.00001000	13787.	1378698687.	34.8481911	0.0003485	-0.000192	1.3321030	9.0880754	C
0.00001063	14221.	1338471353.	34.0145307	0.0003614	-0.000212	1.3760952	9.3992083	C

Performed by: G. Khatri 8/29/2024

Checked by: J. Samples 8/30/2024

0.00001125	14637.	1301038339.	33.2566380	0.0003741	-0.000233	1.4190756	9.7048406 C
0.00001188	15034.	1265984351.	32.5617325	0.0003867	-0.000255	1.4610273	10.0046904 C
0.00001250	15415.	1233229182.	31.9227639	0.0003990	-0.000276	1.5020674	10.2996270 C
0.00001313	15784.	1202585451.	31.3328040	0.0004112	-0.000298	1.5422564	10.5900548 C
0.00001375	16141.	1173864013.	30.7858762	0.0004233	-0.000319	1.5816387	10.8762556 C
0.00001438	16487.	1146906398.	30.2771336	0.0004352	-0.000341	1.6202622	11.1585488 C
0.00001500	16824.	1121577411.	29.8026197	0.0004470	-0.000363	1.6581773	11.4372896 C
0.00001563	17153.	1097760242.	29.3590974	0.0004587	-0.000385	1.6954373	11.7128723 C
0.00001625	17473.	1075283863.	28.9426935	0.0004703	-0.000407	1.7320354	11.9851569 C
0.00001688	17786.	1054010560.	28.5501521	0.0004818	-0.000429	1.7679673	12.2540245 C
0.00001750	18094.	1033957808.	28.1812811	0.0004932	-0.000452	1.8033720	12.5206752 C
0.00001813	18397.	1015027282.	27.8340682	0.0005045	-0.000474	1.8382799	12.7853381 C
0.00001875	18693.	996967845.	27.5033018	0.0005157	-0.000497	1.8725197	13.0463578 C
0.00001938	18986.	979936425.	27.1920741	0.0005268	-0.000519	1.9063791	13.3063654 C
0.00002000	19274.	963698089.	26.8955646	0.0005379	-0.000542	1.9396787	-13.684772 C
0.00002063	19559.	948299420.	26.6147693	0.0005489	-0.000565	1.9725708	-14.280372 C
0.00002125	19839.	933615439.	26.3471325	0.0005599	-0.000588	2.0049845	-14.878042 C
0.00002188	20117.	919647807.	26.0927804	0.0005708	-0.000610	2.0370065	-15.476986 C
0.00002250	20391.	906275564.	25.8491098	0.0005816	-0.000633	2.0685406	-16.078181 C
0.00002313	20664.	893576309.	25.6182273	0.0005924	-0.000656	2.0997935	-16.679633 C
0.00002375	20932.	881330388.	25.3948090	0.0006031	-0.000679	2.1304687	-17.284313 C
0.00002438	21199.	869696622.	25.1832712	0.0006138	-0.000702	2.1609240	-17.888694 C
0.00002563	21724.	847766087.	24.7834441	0.0006351	-0.000749	2.2205255	-19.103184 C
0.00002688	22242.	827608935.	24.4161353	0.0006562	-0.000795	2.2787957	-20.321318 C
0.00002813	22753.	809004703.	24.0772852	0.0006772	-0.000842	2.3357734	-21.542870 C
0.00002938	23256.	791695390.	23.7608310	0.0006980	-0.000888	2.3912832	-22.769911 C
0.00003063	23756.	775695962.	23.4695750	0.0007188	-0.000935	2.4458001	-23.997515 C
0.00003188	24247.	760692374.	23.1947354	0.0007393	-0.000982	2.4988450	-25.231060 C
0.00003313	24737.	746772696.	22.9415257	0.0007599	-0.001029	2.5510439	-26.463753 C
0.00003438	25219.	733641618.	22.7006682	0.0007803	-0.001076	2.6017965	-27.702490 C
0.00003563	25700.	721394217.	22.4777657	0.0008008	-0.001123	2.6517368	-28.940139 C
0.00003688	26175.	709834802.	22.2664388	0.0008211	-0.001170	2.7004537	-30.181571 C
0.00003813	26647.	698950758.	22.0678746	0.0008413	-0.001217	2.7481750	-31.424213 C
0.00003938	27119.	688724169.	21.8828668	0.0008616	-0.001265	2.7950908	-32.665770 C
0.00004063	27584.	678981839.	21.7047391	0.0008818	-0.001312	2.8406927	-33.912636 C
0.00004188	28047.	669781773.	21.5377235	0.0009019	-0.001359	2.8854597	-35.158922 C
0.00004313	28509.	661084889.	21.3812572	0.0009221	-0.001407	2.9294273	-36.404121 C
0.00004438	28968.	652789026.	21.2312084	0.0009421	-0.001454	2.9722815	-37.652407 C
0.00004563	29423.	644889661.	21.0885613	0.0009622	-0.001502	3.0141815	-38.901779 C
0.00004688	29877.	637384239.	20.9543251	0.0009822	-0.001549	3.0552871	-40.150058 C
0.00004813	30330.	630241787.	20.8278506	0.0010023	-0.001596	3.0955939	-41.397237 C

0.00004938	30780.	623388693.	20.7056604	0.0010223	-0.001644	3.1348156	-42.647451 C
0.00005063	31227.	616828687.	20.5889843	0.0010423	-0.001691	3.1731171	-43.898429 C
0.00005188	31673.	610560195.	20.4786719	0.0010623	-0.001739	3.2106239	-45.148292 C
0.00005313	32117.	604562467.	20.3742800	0.0010824	-0.001786	3.2473315	-46.397031 C
0.00005438	32561.	598816559.	20.2754060	0.0011025	-0.001834	3.2832353	-47.644638 C
0.00005563	33001.	593270176.	20.1790568	0.0011225	-0.001881	3.3180748	-48.895340 C
0.00005688	33438.	587925289.	20.0866386	0.0011424	-0.001929	3.3520168	-50.000000 CY
0.00005813	33862.	582572552.	19.9968376	0.0011623	-0.001976	3.3849611	-50.000000 CY
0.00005938	34240.	576675741.	19.9042623	0.0011818	-0.002024	3.4164157	-50.000000 CY
0.00006063	34560.	570061710.	19.8068566	0.0012008	-0.002073	3.4462176	-50.000000 CY
0.00006188	34870.	563550764.	19.7124847	0.0012197	-0.002122	3.4751527	-50.000000 CY
0.00006313	35166.	557081170.	19.6171245	0.0012383	-0.002170	3.5028656	-50.000000 CY
0.00006438	35423.	550258121.	19.5194317	0.0012566	-0.002220	3.5292617	-50.000000 CY
0.00006563	35655.	543308435.	19.4218017	0.0012746	-0.002269	3.5545980	-50.000000 CY
0.00006688	35883.	536568424.	19.3278766	0.0012926	-0.002319	3.5792386	-50.000000 CY
0.00006813	36111.	530064239.	19.2378802	0.0013106	-0.002368	3.6032219	-50.000000 CY
0.00006938	36337.	523772283.	19.1507825	0.0013286	-0.002418	3.6264706	-50.000000 CY
0.00007063	36559.	517654099.	19.0643214	0.0013464	-0.002467	3.6488003	-50.000000 CY
0.00007188	36755.	511378054.	18.9766520	0.0013639	-0.002517	3.6700728	-50.000000 CY
0.00007313	36920.	504882373.	18.8867863	0.0013811	-0.002568	3.6902328	-50.000000 CY
0.00007438	37079.	498538975.	18.7995799	0.0013982	-0.002618	3.7097266	-50.000000 CY
0.00007938	37701.	474977822.	18.4746786	0.0014664	-0.002820	3.7810880	-50.000000 CY
0.00008438	38304.	453975793.	18.1864886	0.0015345	-0.003022	3.8422711	-50.000000 CY
0.00008938	38738.	433435114.	17.8983448	0.0015997	-0.003227	3.8914476	-50.000000 CY
0.00009438	39130.	414622873.	17.6355642	0.0016644	-0.003432	3.9311924	-50.000000 CY
0.00009938	39506.	397544822.	17.3957716	0.0017287	-0.003638	3.9617738	-50.000000 CY
0.0001044	39870.	381988107.	17.1792024	0.0017931	-0.003843	3.9834387	-50.000000 CY
0.0001094	40197.	367516830.	16.9789881	0.0018571	-0.004049	3.9961229	-50.000000 CY
0.0001144	40422.	353418085.	16.7714578	0.0019182	-0.004258	3.9996603	-50.000000 CY
0.0001194	40634.	340389779.	16.5839800	0.0019797	-0.004467	3.9999881	-50.000000 CY
0.0001244	40836.	328325794.	16.4120082	0.0020412	-0.004675	3.9998119	-50.000000 CY
0.0001294	41024.	317094067.	16.2501498	0.0021024	-0.004884	3.9990916	-50.000000 CY
0.0001344	41207.	306655360.	16.1038549	0.0021640	-0.005092	3.9973176	-50.000000 CY
0.0001394	41384.	296926259.	15.9713833	0.0022260	-0.005300	3.9996678	50.000000 CY
0.0001444	41550.	287795110.	15.8460957	0.0022878	-0.005508	3.9991631	50.000000 CY
0.0001494	41707.	279211038.	15.7305525	0.0023498	-0.005716	3.9958406	50.000000 CY
0.0001544	41825.	270932482.	15.6172096	0.0024109	-0.005925	3.9996666	50.000000 CY
0.0001594	41909.	262957436.	15.5075333	0.0024715	-0.006135	3.9959222	50.000000 CY
0.0001644	41980.	255394631.	15.4086447	0.0025328	-0.006343	3.9995858	50.000000 CY
0.0001694	42045.	248234216.	15.3114914	0.0025934	-0.006553	3.9944411	50.000000 CY
0.0001744	42097.	241418412.	15.2257023	0.0026550	-0.006761	3.9988724	50.000000 CY

0.0001794	42148.	234970831.	15.1464618	0.0027169	-0.006969	3.9977130	50.0000000	CY
0.0001844	42195.	228856257.	15.0738421	0.0027792	-0.007177	3.9968569	50.0000000	CY
0.0001894	42241.	223052901.	15.0068651	0.0028419	-0.007384	3.9997179	50.0000000	CY
0.0001944	42284.	217535826.	14.9451824	0.0029050	-0.007591	3.9932419	50.0000000	CY
0.0001994	42324.	212285611.	14.8881557	0.0029683	-0.007798	3.9973663	50.0000000	CY
0.0002044	42363.	207281713.	14.8334783	0.0030316	-0.008005	3.9997956	50.0000000	CYT
0.0002094	42398.	202497749.	14.7791770	0.0030944	-0.008212	3.9934276	50.0000000	CYT
0.0002144	42431.	197929833.	14.7287649	0.0031575	-0.008419	3.9959446	50.0000000	CYT
0.0002194	42462.	193559150.	14.6827492	0.0032210	-0.008625	3.9991460	50.0000000	CYT
0.0002244	42490.	189372103.	14.6409039	0.0032851	-0.008831	3.9983028	50.0000000	CYT
0.0002294	42517.	185358795.	14.6025581	0.0033495	-0.009037	3.9918602	50.0000000	CYT
0.0002344	42542.	181512993.	14.5667171	0.0034141	-0.009242	3.9966941	50.0000000	CYT
0.0002394	42564.	177814603.	14.5346195	0.0034792	-0.009447	3.9994142	50.0000000	CYT
0.0002444	42581.	174246161.	14.5079185	0.0035454	-0.009651	3.9969994	50.0000000	CYT
0.0002494	42597.	170813754.	14.4837828	0.0036119	-0.009854	3.9904180	50.0000000	CYT
0.0002544	42605.	167490416.	14.4581005	0.0036778	-0.010058	3.9955542	50.0000000	CYT
0.0002594	42609.	164276199.	14.4318056	0.0037432	-0.010263	3.9987107	50.0000000	CYT
0.0002644	42611.	161177944.	14.4079428	0.0038091	-0.010467	3.9999776	50.0000000	CYT

Axial Thrust Force = 1030.000 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	1144.	1830311529.	191.0712566	0.0001194	0.00008567	0.4897759	3.3995478	
0.00000125	2288.	1830269302.	109.0799253	0.0001363	0.00006885	0.5560547	3.8269098	
0.00000188	3432.	1830186965.	81.7691685	0.0001533	0.00005207	0.6218456	4.2553423	
0.00000250	4575.	1830069000.	68.1285575	0.0001703	0.00003532	0.6871446	4.6848454	
0.00000313	5718.	1829916298.	59.9560071	0.0001874	0.00001861	0.7519474	5.1154194	
0.00000375	6861.	1829729148.	54.5174897	0.0002044	0.00000194	0.8162499	5.5470645	
0.00000438	8004.	1829468809.	50.6411235	0.0002216	-0.00001470	0.8800454	5.9797613	
0.00000500	9144.	1828882477.	47.7399705	0.0002387	-0.00003130	0.9433087	6.4133457	
0.00000563	10281.	1827799667.	45.4876965	0.0002559	-0.00004788	1.0060102	6.8476118	
0.00000625	11414.	1826202572.	43.6887847	0.0002731	-0.00006445	1.0681280	7.2824046	
0.00000688	12541.	1824134701.	42.2190387	0.0002903	-0.00008099	1.1296462	7.7176146	
0.00000750	13662.	1821657648.	40.9958141	0.0003075	-0.00009753	1.1905539	8.1531646	
0.00000813	14778.	1818831390.	39.9619849	0.0003247	-0.000114	1.2508428	8.5889990	
0.00000875	14778.	1688914862.	37.3311937	0.0003266	-0.000146	1.2571262	8.5821279	C
0.00000938	14778.	1576320538.	36.2902581	0.0003402	-0.000166	1.3040012	8.9121327	C

Performed by: G. Khatri 8/29/2024

Checked by: J. Samples 8/30/2024

0.00001000	14778.	1477800504.	35.3541624	0.0003535	-0.000186	1.3495996	9.2348071 C
0.00001063	14778.	1390871063.	34.5043166	0.0003666	-0.000207	1.3939406	9.5501236 C
0.00001125	14866.	1321455307.	33.7318007	0.0003795	-0.000228	1.4372546	9.8598624 C
0.00001188	15272.	1286100881.	33.0224111	0.0003921	-0.000249	1.4794785	10.1633366 C
0.00001250	15664.	1253080427.	32.3709899	0.0004046	-0.000270	1.5208103	10.4621088 C
0.00001313	16041.	1222151541.	31.7696653	0.0004170	-0.000292	1.5612814	10.7563351 C
0.00001375	16405.	1193113497.	31.2120609	0.0004292	-0.000313	1.6009250	11.0461968 C
0.00001438	16759.	1165813537.	30.6931864	0.0004412	-0.000335	1.6397869	11.3319909 C
0.00001500	17102.	1140121870.	30.2089674	0.0004531	-0.000357	1.6779153	11.6140509 C
0.00001563	17436.	1115926387.	29.7560638	0.0004649	-0.000379	1.7153616	11.8927477 C
0.00001625	17763.	1093129018.	29.3317341	0.0004766	-0.000401	1.7521798	12.1684923 C
0.00001688	18083.	1071587221.	28.9327361	0.0004882	-0.000423	1.7883744	12.4412515 C
0.00001750	18395.	1051130651.	28.5553207	0.0004997	-0.000445	1.8238964	12.7105003 C
0.00001813	18702.	1031822476.	28.2001805	0.0005111	-0.000468	1.8589198	12.9777762 C
0.00001875	19004.	1013535277.	27.8647730	0.0005225	-0.000490	1.8934315	13.2429075 C
0.00001938	19299.	996088610.	27.5452653	0.0005337	-0.000513	1.9273234	13.5048147 C
0.00002000	19592.	979619127.	27.2444383	0.0005449	-0.000535	1.9608623	13.7659743 C
0.00002063	19879.	963832077.	26.9561064	0.0005560	-0.000558	1.9937723	-14.076210 C
0.00002125	20164.	948904403.	26.6841474	0.0005670	-0.000580	2.0263773	-14.670357 C
0.00002188	20444.	934576455.	26.4229121	0.0005780	-0.000603	2.0584039	-15.267559 C
0.00002250	20723.	921011462.	26.1763234	0.0005890	-0.000626	2.0901773	-15.864674 C
0.00002313	20996.	907921321.	25.9376819	0.0005998	-0.000649	2.1213269	-16.465398 C
0.00002375	21268.	895503159.	25.7120497	0.0006107	-0.000672	2.1522511	-17.065813 C
0.00002438	21536.	883546157.	25.4942773	0.0006214	-0.000695	2.1826600	-17.668851 C
0.00002563	22068.	861194056.	25.0880765	0.0006429	-0.000741	2.2425391	-18.876804 C
0.00002688	22589.	840514705.	24.7114049	0.0006641	-0.000787	2.3008018	-20.091192 C
0.00002813	23103.	821427721.	24.3638435	0.0006852	-0.000834	2.3577483	-21.309146 C
0.00002938	23611.	803791072.	24.0434728	0.0007063	-0.000880	2.4135368	-22.529135 C
0.00003063	24111.	787292022.	23.7421796	0.0007271	-0.000927	2.4677925	-23.755408 C
0.00003188	24608.	772009428.	23.4646121	0.0007479	-0.000973	2.5211121	-24.981593 C
0.00003313	25097.	757637700.	23.2019904	0.0007686	-0.001020	2.5729838	-26.213544 C
0.00003438	25584.	744270360.	22.9595874	0.0007892	-0.001067	2.6240251	-27.444380 C
0.00003563	26064.	731628386.	22.7284160	0.0008097	-0.001114	2.6736342	-28.681187 C
0.00003688	26543.	719799222.	22.5136630	0.0008302	-0.001161	2.7223984	-29.917195 C
0.00003813	27017.	708637266.	22.3108245	0.0008506	-0.001208	2.7700549	-31.155601 C
0.00003938	27487.	698076885.	22.1186283	0.0008709	-0.001255	2.8166025	-32.396561 C
0.00004063	27955.	688133320.	21.9391924	0.0008913	-0.001302	2.8623380	-33.636420 C
0.00004188	28420.	678682404.	21.7680062	0.0009115	-0.001350	2.9069436	-34.879271 C
0.00004313	28881.	669703504.	21.6053976	0.0009317	-0.001397	2.9505309	-36.123806 C
0.00004438	29341.	661200694.	21.4528059	0.0009520	-0.001444	2.9933123	-37.367239 C
0.00004563	29799.	653121875.	21.3087093	0.0009722	-0.001492	3.0352162	-38.610495 C

Performed by: G. Khatri 8/29/2024

Checked by: J. Samples 8/30/2024

0.00004688	30252.	645374695.	21.1691473	0.0009923	-0.001539	3.0759283	-39.858034 C
0.00004813	30704.	638002870.	21.0376305	0.0010124	-0.001586	3.1158390	-41.104464 C
0.00004938	31155.	630977705.	20.9135540	0.0010326	-0.001634	3.1549441	-42.349773 C
0.00005063	31604.	624273217.	20.7963726	0.0010528	-0.001681	3.1932386	-43.593957 C
0.00005188	32049.	617808307.	20.6818414	0.0010729	-0.001728	3.2303561	-44.842649 C
0.00005313	32492.	611619818.	20.5732190	0.0010930	-0.001776	3.2666495	-46.090541 C
0.00005438	32934.	605691760.	20.4703163	0.0011131	-0.001823	3.3021363	-47.337290 C
0.00005563	33375.	600006411.	20.3727538	0.0011332	-0.001871	3.3368119	-48.582883 C
0.00005688	33815.	594547488.	20.2801853	0.0011534	-0.001918	3.3706713	-49.827313 C
0.00005813	34245.	589163679.	20.1890271	0.0011735	-0.001965	3.4033989	-50.000000 CY
0.00005938	34634.	583317140.	20.0949416	0.0011931	-0.002013	3.4346122	-50.000000 CY
0.00006063	34966.	576762934.	19.9961929	0.0012123	-0.002061	3.4641833	-50.000000 CY
0.00006188	35276.	570113585.	19.8985861	0.0012312	-0.002110	3.4926941	-50.000000 CY
0.00006313	35580.	563636949.	19.8046322	0.0012502	-0.002159	3.5204057	-50.000000 CY
0.00006438	35852.	556930811.	19.7099220	0.0012688	-0.002207	3.5469343	-50.000000 CY
0.00006563	36087.	549896813.	19.6097226	0.0012869	-0.002257	3.5718803	-50.000000 CY
0.00006688	36314.	543020162.	19.5126989	0.0013049	-0.002306	3.5960686	-50.000000 CY
0.00006813	36541.	536384245.	19.4197228	0.0013230	-0.002356	3.6195969	-50.000000 CY
0.00006938	36767.	529975927.	19.3305790	0.0013411	-0.002405	3.6424616	-50.000000 CY
0.00007063	36992.	523783016.	19.2450671	0.0013592	-0.002455	3.6646590	-50.000000 CY
0.00007188	37200.	517560774.	19.1596809	0.0013771	-0.002504	3.6859020	-50.000000 CY
0.00007313	37375.	511112219.	19.0692506	0.0013944	-0.002554	3.7057804	-50.000000 CY
0.00007438	37534.	504664696.	18.9795053	0.0014116	-0.002605	3.7248142	-50.000000 CY
0.00007938	38161.	480762948.	18.6518610	0.0014805	-0.002806	3.7948195	-50.000000 CY
0.00008438	38762.	459398932.	18.3558437	0.0015488	-0.003007	3.8540759	-50.000000 CY
0.00008938	39222.	438844712.	18.0720764	0.0016152	-0.003211	3.9020251	-50.000000 CY
0.00009438	39610.	419711668.	17.8014594	0.0016800	-0.003416	3.9396258	-50.000000 CY
0.00009938	39991.	402424433.	17.5629057	0.0017453	-0.003621	3.9683499	-50.000000 CY
0.0001044	40352.	386608799.	17.3405326	0.0018099	-0.003826	3.9877152	-50.000000 CY
0.0001094	40687.	371995273.	17.1382614	0.0018745	-0.004032	3.9980820	-50.000000 CY
0.0001144	40928.	357836453.	16.9355705	0.0019370	-0.004239	3.9980255	-50.000000 CY
0.0001194	41136.	344593813.	16.7427655	0.0019987	-0.004448	3.9973272	-50.000000 CY
0.0001244	41337.	332360969.	16.5695340	0.0020608	-0.004655	3.9979123	-50.000000 CY
0.0001294	41529.	320994686.	16.4097055	0.0021230	-0.004863	3.9999319	-50.000000 CY
0.0001344	41708.	310385445.	16.2591553	0.0021848	-0.005071	3.9991200	-50.000000 CY
0.0001394	41881.	300494771.	16.1230183	0.0022471	-0.005279	3.9968338	50.000000 CY
0.0001444	42050.	291252961.	15.9994993	0.0023099	-0.005486	3.9999703	50.000000 CY
0.0001494	42204.	282537935.	15.8872468	0.0023732	-0.005693	3.9984258	50.000000 CY
0.0001544	42329.	274197157.	15.7736753	0.0024351	-0.005901	3.9978260	50.000000 CY
0.0001594	42415.	266132075.	15.6671689	0.0024970	-0.006109	3.9986397	50.000000 CY
0.0001644	42484.	258459346.	15.5648373	0.0025585	-0.006318	3.9979682	50.000000 CY

0.0001694	42544.	251180109.	15.4749526	0.0026211	-0.006525	3.9979567	50.0000000	CY
0.0001744	42599.	244294239.	15.3932101	0.0026842	-0.006732	3.9999932	50.0000000	CY
0.0001794	42646.	237750125.	15.3117932	0.0027466	-0.006940	3.9959647	50.0000000	CY
0.0001844	42691.	231546915.	15.2365275	0.0028092	-0.007147	3.9994115	50.0000000	CY
0.0001894	42734.	225659880.	15.1670181	0.0028723	-0.007354	3.9954572	50.0000000	CY
0.0001944	42775.	220064041.	15.1028986	0.0029356	-0.007561	3.9968716	50.0000000	CY
0.0001994	42814.	214741957.	15.0432410	0.0029992	-0.007767	3.9996565	50.0000000	CY
0.0002044	42851.	209670024.	14.9881754	0.0030632	-0.007973	3.9943154	50.0000000	CYT
0.0002094	42887.	204831435.	14.9372385	0.0031275	-0.008179	3.9960859	50.0000000	CYT
0.0002144	42919.	200204238.	14.8910823	0.0031923	-0.008384	3.9992825	50.0000000	CYT
0.0002194	42948.	195776326.	14.8488558	0.0032575	-0.008589	3.9972165	50.0000000	CYT
0.0002244	42974.	191528503.	14.8055608	0.0033220	-0.008794	3.9930184	50.0000000	CYT
0.0002294	42999.	187461995.	14.7650702	0.0033867	-0.009000	3.9974298	50.0000000	CYT
0.0002344	43019.	183548831.	14.7303988	0.0034524	-0.009204	3.9997170	50.0000000	CYT
0.0002394	43036.	179784125.	14.7002423	0.0035189	-0.009407	3.9947270	50.0000000	CYT
0.0002444	43051.	176165934.	14.6724720	0.0035856	-0.009611	3.9924076	50.0000000	CYT
0.0002494	43064.	172689063.	14.6466598	0.0036525	-0.009814	3.9969946	50.0000000	CYT
0.0002544	43077.	169344592.	14.6229356	0.0037197	-0.010017	3.9995063	50.0000000	CYT
0.0002594	43082.	166099524.	14.5992854	0.0037867	-0.010220	3.9969980	50.0000000	CYT
0.0002644	43082.	162958161.	14.5752258	0.0038533	-0.010423	3.9880727	50.0000000	CYT

Axial Thrust Force = 1340.000 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	1125.	1800769245.	242.1866816	0.0001514	0.0001176	0.6155559	4.3260149	
0.00000125	2251.	1800728963.	134.6383873	0.0001683	0.0001008	0.6806343	4.7534040	
0.00000188	3376.	1800646120.	98.8089759	0.0001853	0.00008402	0.7452245	5.1818818	
0.00000250	4501.	1800526603.	80.9092876	0.0002023	0.00006727	0.8093224	5.6114484	
0.00000313	5626.	1800371582.	70.1814909	0.0002193	0.00005057	0.8729236	6.0421039	
0.00000375	6751.	1800181441.	63.0396428	0.0002364	0.00003390	0.9360239	6.4738487	
0.00000438	7875.	1799956338.	57.9469110	0.0002535	0.00001727	0.9986192	6.9066831	
0.00000500	8998.	1799696342.	54.1348797	0.0002707	6.74399E-07	1.0607051	7.3406076	
0.00000563	10121.	1799374101.	51.1765403	0.0002879	-0.00001588	1.1222751	7.7756044	
0.00000625	11243.	1798828854.	48.8150660	0.0003051	-0.00003241	1.1833091	8.2115432	
0.00000688	12361.	1797932485.	46.8868387	0.0003223	-0.00004890	1.2437829	8.6482572	
0.00000750	13475.	1796643811.	45.2829165	0.0003396	-0.00006538	1.3036772	9.0856094	
0.00000813	14584.	1794968743.	43.9280080	0.0003569	-0.00008183	1.3629766	9.5234932	

Performed by: G. Khatri 8/29/2024

Checked by: J. Samples 8/30/2024

0.00000875	15688.	1792933961.	42.7684286	0.0003742	-0.00009828	1.4216694	9.9618261
0.00000938	16787.	1790575111.	41.7648875	0.0003915	-0.000115	1.4797468	10.4005475
0.00001000	16787.	1678664167.	39.6581932	0.0003966	-0.000143	1.4961061	10.4829761 C
0.00001063	16787.	1579919216.	38.6690933	0.0004109	-0.000163	1.5432239	10.8333957 C
0.00001125	16787.	1492145926.	37.7684723	0.0004249	-0.000183	1.5891008	11.1768266 C
0.00001188	17117.	1441425058.	36.9454928	0.0004387	-0.000203	1.6338805	11.5143479 C
0.00001250	17598.	1407842669.	36.1869425	0.0004523	-0.000223	1.6775187	11.8453917 C
0.00001313	18059.	1375928943.	35.4872790	0.0004658	-0.000243	1.7201895	12.1713518 C
0.00001375	18502.	1345566466.	34.8388859	0.0004790	-0.000263	1.7619266	12.4923933 C
0.00001438	18926.	1316568996.	34.2345100	0.0004921	-0.000284	1.8027195	12.8082801 C
0.00001500	19335.	1288993576.	33.6705858	0.0005051	-0.000305	1.8426740	13.1198547 C
0.00001563	19731.	1262776425.	33.1430431	0.0005179	-0.000326	1.8818409	13.4274725 C
0.00001625	20115.	1237866099.	32.6485864	0.0005305	-0.000347	1.9202765	13.7315587 C
0.00001688	20488.	1214121410.	32.1831942	0.0005431	-0.000368	1.9579736	14.0319444 C
0.00001750	20851.	1191474168.	31.7441146	0.0005555	-0.000389	1.9949617	14.3288131 C
0.00001813	21205.	1169910154.	31.3297198	0.0005679	-0.000411	2.0313100	14.6227402 C
0.00001875	21551.	1149387153.	30.9383126	0.0005801	-0.000432	2.0670694	14.9141450 C
0.00001938	21890.	1129786399.	30.5672145	0.0005922	-0.000454	2.1022213	15.2027724 C
0.00002000	22220.	1110979787.	30.2135386	0.0006043	-0.000476	2.1367164	15.4880525 C
0.00002063	22545.	1093090893.	29.8787316	0.0006162	-0.000498	2.1707434	15.7717976 C
0.00002125	22863.	1075919409.	29.5590118	0.0006281	-0.000519	2.2041787	16.0527036 C
0.00002188	23176.	1059478890.	29.2541343	0.0006399	-0.000541	2.2370944	16.3314352 C
0.00002250	23485.	1043768446.	28.9639183	0.0006517	-0.000563	2.2695628	16.6086817 C
0.00002313	23787.	1028629784.	28.6851156	0.0006633	-0.000585	2.3014563	16.8830620 C
0.00002375	24087.	1014177144.	28.4198392	0.0006750	-0.000608	2.3329786	17.1566518 C
0.00002438	24380.	1000221163.	28.1641813	0.0006865	-0.000630	2.3639421	17.4274245 C
0.00002563	24958.	973988911.	27.6854310	0.0007094	-0.000674	2.4246676	17.9653670 C
0.00002688	25524.	949714375.	27.2442228	0.0007322	-0.000719	2.4837542	18.4978600 C
0.00002813	26075.	927110909.	26.8343687	0.0007547	-0.000764	2.5411448	-19.294124 C
0.00002938	26616.	906080196.	26.4539890	0.0007771	-0.000809	2.5970294	-20.475677 C
0.00003063	27149.	886512699.	26.1012931	0.0007994	-0.000854	2.6515686	-21.660220 C
0.00003188	27673.	868166585.	25.7709525	0.0008214	-0.000900	2.7046184	-22.849669 C
0.00003313	28188.	850965779.	25.4616680	0.0008434	-0.000945	2.7563000	-24.042841 C
0.00003438	28698.	834851657.	25.1729776	0.0008653	-0.000991	2.8067784	-25.237907 C
0.00003563	29199.	819622716.	24.8997500	0.0008871	-0.001037	2.8558234	-26.437927 C
0.00003688	29696.	805323329.	24.6445161	0.0009088	-0.001082	2.9037959	-27.638514 C
0.00003813	30186.	791768156.	24.4021920	0.0009303	-0.001128	2.9504241	-28.843333 C
0.00003938	30672.	778967548.	24.1742356	0.0009519	-0.001174	2.9959537	-30.049313 C
0.00004063	31153.	766854186.	23.9592185	0.0009733	-0.001220	3.0403820	-31.256577 C
0.00004188	31629.	755308418.	23.7537912	0.0009947	-0.001267	3.0835289	-32.467783 C
0.00004313	32102.	744393697.	23.5612882	0.0010161	-0.001313	3.1257702	-33.677720 C

0.00004438	32570.	733968550.	23.3770195	0.0010374	-0.001359	3.1667906	-34.891017 C
0.00004563	33034.	724025159.	23.2015899	0.0010586	-0.001405	3.2067171	-36.105977 C
0.00004688	33496.	714577388.	23.0364508	0.0010798	-0.001451	3.2457439	-37.319668 C
0.00004813	33954.	705534694.	22.8784389	0.0011010	-0.001498	3.2836610	-38.535385 C
0.00004938	34407.	696856329.	22.7265155	0.0011221	-0.001544	3.3204353	-39.753840 C
0.00005063	34859.	688574924.	22.5829632	0.0011433	-0.001590	3.3563155	-40.971018 C
0.00005188	35309.	680661402.	22.4471837	0.0011644	-0.001637	3.3912959	-42.186912 C
0.00005313	35755.	673027040.	22.3153713	0.0011855	-0.001683	3.4250922	-43.406537 C
0.00005438	36197.	665690267.	22.1891745	0.0012065	-0.001730	3.4578855	-44.626865 C
0.00005563	36638.	658654598.	22.0694544	0.0012276	-0.001776	3.4897837	-45.845892 C
0.00005688	37077.	651899831.	21.9557909	0.0012487	-0.001823	3.5207811	-47.063611 C
0.00005813	37514.	645393842.	21.8469730	0.0012699	-0.001869	3.5508036	-48.281402 C
0.00005938	37946.	639084144.	21.7404564	0.0012908	-0.001915	3.5796688	-49.503121 C
0.00006063	38374.	632974999.	21.6387830	0.0013119	-0.001962	3.6076119	-50.000000 CY
0.00006188	38781.	626762427.	21.5389265	0.0013327	-0.002009	3.6344122	-50.000000 CY
0.00006313	39131.	619892130.	21.4353290	0.0013531	-0.002056	3.6596639	-50.000000 CY
0.00006438	39443.	612700565.	21.3308975	0.0013732	-0.002103	3.6836392	-50.000000 CY
0.00006563	39746.	605651873.	21.2267386	0.0013930	-0.002151	3.7064595	-50.000000 CY
0.00006688	40037.	598689983.	21.1253810	0.0014128	-0.002198	3.7283449	-50.000000 CY
0.00006813	40293.	591459265.	21.0228522	0.0014322	-0.002247	3.7490288	-50.000000 CY
0.00006938	40526.	584157165.	20.9211224	0.0014514	-0.002295	3.7686889	-50.000000 CY
0.00007063	40754.	577053243.	20.8230494	0.0014706	-0.002343	3.7875510	-50.000000 CY
0.00007188	40979.	570142106.	20.7263883	0.0014897	-0.002392	3.8054767	-50.000000 CY
0.00007313	41201.	563432728.	20.6322414	0.0015087	-0.002440	3.8225608	-50.000000 CY
0.00007438	41422.	556935306.	20.5417937	0.0015278	-0.002488	3.8388936	-50.000000 CY
0.00007938	42135.	530840375.	20.1847362	0.0016022	-0.002684	3.8950496	-50.000000 CY
0.00008438	42748.	506648415.	19.8537054	0.0016752	-0.002881	3.9384970	-50.000000 CY
0.00008938	43339.	484907765.	19.5591973	0.0017481	-0.003078	3.9703870	-50.000000 CY
0.00009438	43799.	464098183.	19.2758263	0.0018192	-0.003277	3.9903609	-50.000000 CY
0.00009938	44181.	444590907.	19.0083133	0.0018890	-0.003477	3.9993443	-50.000000 CY
0.0001044	44546.	426783315.	18.7672422	0.0019588	-0.003677	3.9998385	-50.000000 CY
0.0001094	44893.	410448642.	18.5498156	0.0020289	-0.003877	3.9999714	-50.000000 CY
0.0001144	45221.	395371255.	18.3499275	0.0020988	-0.004077	3.9999849	-50.000000 CY
0.0001194	45496.	381118369.	18.1632504	0.0021682	-0.004278	3.9999260	50.000000 CY
0.0001244	45690.	367360259.	17.9761889	0.0022358	-0.004480	3.9995559	50.000000 CY
0.0001294	45866.	354517739.	17.8058891	0.0023036	-0.004683	3.9984825	50.000000 CY
0.0001344	46025.	342513973.	17.6565452	0.0023726	-0.004884	3.9962323	50.000000 CY
0.0001394	46172.	331276553.	17.5221480	0.0024421	-0.005084	3.9999170	50.000000 CY
0.0001444	46294.	320652268.	17.3994081	0.0025120	-0.005284	3.9984682	50.000000 CY
0.0001494	46411.	310703960.	17.2882538	0.0025824	-0.005484	3.9966984	50.000000 CY
0.0001544	46522.	301358590.	17.1881542	0.0026534	-0.005683	3.9993089	50.000000 CY

0.0001594	46628.	292570824.	17.0972461	0.0027249	-0.005881	3.9952423	50.0000000	CYT
0.0001644	46730.	284289559.	17.0145641	0.0027968	-0.006079	3.9994799	50.0000000	CYT
0.0001694	46813.	276389307.	16.9294604	0.0028674	-0.006279	3.9943866	50.0000000	CYT
0.0001744	46875.	268815417.	16.8486893	0.0029380	-0.006478	3.9989092	50.0000000	CYT
0.0001794	46911.	261522694.	16.7661239	0.0030074	-0.006679	3.9977320	50.0000000	CYT
0.0001844	46941.	254594377.	16.6916869	0.0030775	-0.006879	3.9968095	50.0000000	CYT
0.0001894	46963.	247991827.	16.6265231	0.0031486	-0.007078	3.9997156	50.0000000	CYT
0.0001944	46983.	241714613.	16.5668634	0.0032202	-0.007276	3.9931395	50.0000000	CYT
0.0001994	47000.	235738634.	16.5123033	0.0032921	-0.007474	3.9974556	50.0000000	CYT
0.0002044	47014.	230037346.	16.4620838	0.0033644	-0.007672	3.9998454	50.0000000	CYT
0.0002094	47023.	224586699.	16.4116214	0.0034362	-0.007870	3.9926107	50.0000000	CYT
0.0002144	47030.	219382332.	16.3650725	0.0035083	-0.008068	3.9964030	50.0000000	CYT
0.0002194	47036.	214409534.	16.3218650	0.0035806	-0.008266	3.9993861	50.0000000	CYT
0.0002244	47040.	209650789.	16.2821180	0.0036533	-0.008463	3.9968105	50.0000000	CYT
0.0002294	47043.	205090402.	16.2458943	0.0037264	-0.008660	3.9928521	50.0000000	CYT
0.0002344	47044.	200720165.	16.2122541	0.0037997	-0.008857	3.9973835	50.0000000	CYT
0.0002394	47044.	196527577.	16.2439165	0.0038884	-0.009038	3.9999976	50.0000000	CYT

Summary of Results for Nominal Moment Capacity for Section 2

Moment values interpolated at maximum compressive strain = 0.003
or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain	Max. Tens. Strain
1	775.400	39229.489	0.00300000	-0.00886100
2	995.700	42343.847	0.00300000	-0.00790142
3	1030.000	42814.615	0.00300000	-0.00776943
4	1340.000	46906.790	0.00300000	-0.00665738

Note that the values of moment capacity in the table above are not factored by a strength reduction factor (phi-factor).

In ACI 318, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.75).

The above values should be multiplied by the appropriate strength reduction

factor to compute ultimate moment capacity according to ACI 318, or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Load No.	Resist. Factor	Nominal Ax. Thrust kips	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in ²
1	0.65	775.400000	39229.	504.010000	25499.	612217805.
2	0.65	995.700000	42344.	647.205000	27524.	680241444.
3	0.65	1030.	42815.	669.500000	27829.	690805006.
4	0.65	1340.	46907.	871.000000	30489.	783775715.
1	0.75	775.400000	39229.	581.550000	29422.	560291897.
2	0.75	995.700000	42344.	746.775000	31758.	609412442.
3	0.75	1030.	42815.	772.500000	32111.	616940998.
4	0.75	1340.	46907.	1005.	35180.	682932737.
1	0.90	775.400000	39229.	697.860000	35307.	410299551.
2	0.90	995.700000	42344.	896.130000	38109.	460760390.
3	0.90	1030.	42815.	927.000000	38533.	467523131.
4	0.90	1340.	46907.	1206.	42216.	527657306.

Layering Correction Equivalent Depths of Soil & Rock Layers

Layer No.	Top of Layer Below Pile Head ft	Equivalent Top Depth Below Grnd Surf ft	Same Layer Type As Layer Above	Layer is Rock or is Below Rock Layer	F0 Integral for Layer lbs	F1 Integral for Layer lbs
1	0.00	0.00	N.A.	No	0.00	1039626.
2	21.0000	21.0000	No	Yes	N.A.	N.A.

Notes: The F0 integral of Layer n+1 equals the sum of the F0 and F1 integrals for Layer n. Layering correction equivalent depths are computed only for soil types with both shallow-depth and deep-depth expressions for peak lateral load transfer. These soil types are soft and stiff clays, non-liquefied sands, and cemented c-phi soil.

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 1

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 18610.0 lbs
 Applied moment at pile head = 10372800.0 in-lbs
 Axial thrust load on pile head = 775400.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in ²	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	0.1040	1.04E+07	18610.	-8.67E-04	0.00	2.80E+12	0.00	0.00	0.00
0.3100	0.1008	1.04E+07	18296.	-8.53E-04	0.00	2.80E+12	-168.701	6227.	0.00
0.6200	0.09763	1.05E+07	17374.	-8.39E-04	0.00	2.80E+12	-326.866	12455.	0.00
0.9300	0.09454	1.06E+07	16112.	-8.25E-04	0.00	2.80E+12	-351.910	13848.	0.00
1.2400	0.09149	1.06E+07	14798.	-8.11E-04	0.00	2.80E+12	-354.575	14417.	0.00
1.5500	0.08850	1.07E+07	13474.	-7.97E-04	0.00	2.80E+12	-357.127	15011.	0.00
1.8600	0.08557	1.07E+07	12141.	-7.82E-04	0.00	2.80E+12	-359.565	15632.	0.00
2.1700	0.08268	1.08E+07	10799.	-7.68E-04	0.00	2.80E+12	-361.889	16282.	0.00
2.4800	0.07985	1.08E+07	9449.	-7.54E-04	0.00	2.80E+12	-364.097	16962.	0.00
2.7900	0.07707	1.09E+07	8090.	-7.39E-04	0.00	2.80E+12	-366.188	17674.	0.00
3.1000	0.07435	1.09E+07	6725.	-7.25E-04	0.00	2.80E+12	-368.160	18421.	0.00
3.4100	0.07168	1.09E+07	5352.	-7.11E-04	0.00	2.80E+12	-370.014	19203.	0.00
3.7200	0.06906	1.09E+07	3972.	-6.96E-04	0.00	2.80E+12	-371.746	20024.	0.00
4.0300	0.06650	1.10E+07	2586.	-6.81E-04	0.00	2.80E+12	-373.356	20885.	0.00
4.3400	0.06399	1.10E+07	1194.	-6.67E-04	0.00	2.80E+12	-374.844	21790.	0.00
4.6500	0.06154	1.10E+07	-202.567	-6.52E-04	0.00	2.80E+12	-376.207	22742.	0.00
4.9600	0.05914	1.10E+07	-1604.	-6.38E-04	0.00	2.80E+12	-377.444	23742.	0.00

5.2700	0.05679	1.10E+07	-3011.	-6.23E-04	0.00	2.80E+12	-378.554	24795.	0.00
5.5800	0.05450	1.09E+07	-4421.	-6.09E-04	0.00	2.80E+12	-379.536	25905.	0.00
5.8900	0.05226	1.09E+07	-5834.	-5.94E-04	0.00	2.80E+12	-380.389	27075.	0.00
6.2000	0.05008	1.09E+07	-7250.	-5.80E-04	0.00	2.80E+12	-381.110	28309.	0.00
6.5100	0.04795	1.09E+07	-8669.	-5.65E-04	0.00	2.80E+12	-381.699	29611.	0.00
6.8200	0.04588	1.08E+07	-10090.	-5.51E-04	0.00	2.80E+12	-382.154	30988.	0.00
7.1300	0.04385	1.08E+07	-11512.	-5.36E-04	0.00	2.80E+12	-382.473	32444.	0.00
7.4400	0.04188	1.08E+07	-12935.	-5.22E-04	0.00	2.80E+12	-382.656	33986.	0.00
7.7500	0.03997	1.07E+07	-14359.	-5.08E-04	0.00	2.80E+12	-382.700	35619.	0.00
8.0600	0.03811	1.07E+07	-15782.	-4.94E-04	0.00	2.80E+12	-382.605	37351.	0.00
8.3700	0.03630	1.06E+07	-17205.	-4.80E-04	0.00	2.80E+12	-382.367	39190.	0.00
8.6800	0.03454	1.05E+07	-18627.	-4.66E-04	0.00	2.80E+12	-381.987	41144.	0.00
8.9900	0.03283	1.05E+07	-20047.	-4.52E-04	0.00	2.80E+12	-381.461	43222.	0.00
9.3000	0.03118	1.04E+07	-21465.	-4.38E-04	0.00	2.80E+12	-380.788	45436.	0.00
9.6100	0.02957	1.03E+07	-22880.	-4.24E-04	0.00	2.80E+12	-379.967	47795.	0.00
9.9200	0.02802	1.02E+07	-24291.	-4.11E-04	0.00	2.80E+12	-378.995	50314.	0.00
10.2300	0.02652	1.01E+07	-25699.	-3.97E-04	0.00	2.80E+12	-377.871	53006.	0.00
10.5400	0.02507	1.00E+07	-27102.	-3.84E-04	0.00	2.80E+12	-376.592	55886.	0.00
10.8500	0.02367	9924611.	-28501.	-3.70E-04	0.00	2.80E+12	-375.155	58972.	0.00
11.1600	0.02231	9817042.	-29893.	-3.57E-04	0.00	2.80E+12	-373.560	62283.	0.00
11.4700	0.02101	9704266.	-31280.	-3.44E-04	0.00	2.80E+12	-371.804	65841.	0.00
11.7800	0.01975	9586307.	-32659.	-3.32E-04	0.00	2.80E+12	-369.883	69671.	0.00
12.0900	0.01854	9463194.	-34031.	-3.19E-04	0.00	2.80E+12	-367.796	73798.	0.00
12.4000	0.01738	9334954.	-35395.	-3.06E-04	0.00	2.81E+12	-365.539	78254.	0.00
12.7100	0.01626	9201621.	-36751.	-2.94E-04	0.00	2.81E+12	-363.109	83075.	0.00
13.0200	0.01519	9063227.	-38097.	-2.82E-04	0.00	2.81E+12	-360.504	88298.	0.00
13.3300	0.01416	8919810.	-39432.	-2.70E-04	0.00	2.81E+12	-357.720	93970.	0.00
13.6400	0.01318	8771408.	-40758.	-2.58E-04	0.00	2.81E+12	-354.753	100142.	0.00
13.9500	0.01224	8618064.	-42071.	-2.47E-04	0.00	2.81E+12	-351.598	106872.	0.00
14.2600	0.01134	8459821.	-43373.	-2.36E-04	0.00	2.81E+12	-348.253	114229.	0.00
14.5700	0.01049	8296726.	-44662.	-2.24E-04	0.00	2.81E+12	-344.711	122291.	0.00
14.8800	0.00967	8128830.	-45937.	-2.14E-04	0.00	2.81E+12	-340.967	131151.	0.00
15.1900	0.00890	7956184.	-47198.	-2.03E-04	0.00	2.81E+12	-337.016	140916.	0.00
15.5000	0.00816	7778844.	-48444.	-1.92E-04	0.00	2.81E+12	-332.851	151712.	0.00
15.8100	0.00746	7596868.	-49674.	-1.82E-04	0.00	2.81E+12	-328.464	163689.	0.00
16.1200	0.00681	7410317.	-50888.	-1.72E-04	0.00	2.81E+12	-323.846	177027.	0.00
16.4300	0.00618	7219257.	-52083.	-1.63E-04	0.00	2.81E+12	-318.988	191940.	0.00
16.7400	0.00560	7023755.	-53261.	-1.53E-04	0.00	2.81E+12	-313.879	208691.	0.00
17.0500	0.00504	6823882.	-54418.	-1.44E-04	0.00	2.81E+12	-308.504	227601.	0.00
17.3600	0.00452	6619714.	-55555.	-1.35E-04	0.00	2.81E+12	-302.849	249067.	0.00
17.6700	0.00404	6411330.	-56671.	-1.27E-04	0.00	2.81E+12	-296.893	273591.	0.00

17.9800	0.00358	6198813.	-57764.	-1.18E-04	0.00	2.81E+12	-290.615	301809.	0.00
18.2900	0.00316	5982250.	-58832.	-1.10E-04	0.00	2.81E+12	-283.985	334548.	0.00
18.6000	0.00276	5761735.	-59876.	-1.02E-04	0.00	2.81E+12	-276.968	372901.	0.00
18.9100	0.00240	5537365.	-60846.	-9.48E-05	0.00	2.81E+12	-244.728	379864.	0.00
19.2200	0.00206	5309587.	-61699.	-8.76E-05	0.00	2.81E+12	-213.547	386091.	0.00
19.5300	0.00174	5078833.	-62438.	-8.08E-05	0.00	2.81E+12	-183.991	392319.	0.00
19.8400	0.00146	4845515.	-63070.	-7.42E-05	0.00	2.81E+12	-156.069	398546.	0.00
20.1500	0.00119	4610017.	-63602.	-6.79E-05	0.00	2.81E+12	-129.782	404773.	0.00
20.4600	9.51E-04	4372707.	-64039.	-6.20E-05	0.00	2.81E+12	-105.121	411000.	0.00
20.7700	7.32E-04	4133924.	-64387.	-5.63E-05	0.00	2.81E+12	-82.070	417228.	0.00
21.0800	5.32E-04	3893991.	-68417.	-4.97E-05	0.00	1.85E+12	-2085.	1.46E+07	0.00
21.3900	3.62E-04	3625186.	-75169.	-4.21E-05	0.00	1.85E+12	-1545.	1.59E+07	0.00
21.7000	2.19E-04	3334980.	-79923.	-3.52E-05	0.00	1.85E+12	-1011.	1.72E+07	0.00
22.0100	1.01E-04	3030766.	-82732.	-2.88E-05	0.00	1.85E+12	-499.623	1.85E+07	0.00
22.3200	4.82E-06	2719620.	-83709.	-2.30E-05	0.00	1.85E+12	-25.640	1.98E+07	0.00
22.6300	-7.06E-05	2408104.	-83012.	-1.79E-05	0.00	1.85E+12	400.4633	2.11E+07	0.00
22.9400	-1.28E-04	2102115.	-80832.	-1.33E-05	0.00	1.85E+12	771.2982	2.24E+07	0.00
23.2500	-1.70E-04	1806788.	-77384.	-9.41E-06	0.00	1.85E+12	1082.	2.37E+07	0.00
23.5600	-1.98E-04	1526431.	-72893.	-6.07E-06	0.00	1.85E+12	1332.	2.50E+07	0.00
23.8700	-2.15E-04	1264501.	-67585.	-3.27E-06	0.00	1.85E+12	1521.	2.63E+07	0.00
24.1800	-2.22E-04	1023618.	-61682.	-9.74E-07	0.00	1.85E+12	1652.	2.76E+07	0.00
24.4900	-2.22E-04	805591.	-55394.	8.61E-07	0.00	1.85E+12	1729.	2.89E+07	0.00
24.8000	-2.16E-04	611484.	-48911.	2.28E-06	0.00	1.85E+12	1756.	3.02E+07	0.00
25.1100	-2.05E-04	441678.	-42407.	3.34E-06	0.00	1.85E+12	1741.	3.16E+07	0.00
25.4200	-1.91E-04	295959.	-36028.	4.08E-06	0.00	1.85E+12	1689.	3.29E+07	0.00
25.7300	-1.75E-04	173607.	-29899.	4.55E-06	0.00	1.85E+12	1606.	3.42E+07	0.00
26.0400	-1.57E-04	73482.	-24122.	4.80E-06	0.00	1.85E+12	1500.	3.55E+07	0.00
26.3500	-1.39E-04	-5885.	-18772.	4.87E-06	0.00	1.85E+12	1376.	3.68E+07	0.00
26.6600	-1.21E-04	-66208.	-13906.	4.79E-06	0.00	1.85E+12	1240.	3.81E+07	0.00
26.9700	-1.04E-04	-109372.	-9561.	4.62E-06	0.00	1.85E+12	1096.	3.94E+07	0.00
27.2800	-8.67E-05	-137365.	-5756.	4.37E-06	0.00	1.85E+12	949.1137	4.07E+07	0.00
27.5900	-7.10E-05	-152224.	-2500.	4.08E-06	0.00	1.85E+12	801.7910	4.20E+07	0.00
27.9000	-5.64E-05	-155986.	213.1203	3.77E-06	0.00	1.85E+12	656.6359	4.33E+07	0.00
28.2100	-4.29E-05	-150660.	2393.	3.46E-06	0.00	1.85E+12	515.1826	4.46E+07	0.00
28.5200	-3.06E-05	-138204.	4054.	3.17E-06	0.00	1.85E+12	378.1673	4.59E+07	0.00
28.8300	-1.93E-05	-120514.	5215.	2.91E-06	0.00	1.85E+12	245.5947	4.72E+07	0.00
29.1400	-8.95E-06	-99425.	5889.	2.69E-06	0.00	1.85E+12	116.8288	4.85E+07	0.00
29.4500	6.93E-07	-76718.	6089.	2.52E-06	0.00	1.85E+12	-9.292	4.99E+07	0.00
29.7600	9.77E-06	-54140.	5822.	2.38E-06	0.00	1.85E+12	-134.315	5.12E+07	0.00
30.0700	1.84E-05	-33419.	5088.	2.30E-06	0.00	1.85E+12	-260.015	5.25E+07	0.00
30.3800	2.69E-05	-16297.	3882.	2.25E-06	0.00	1.85E+12	-388.200	5.38E+07	0.00

30.6900	3.52E-05	-4547.	2192.	2.23E-06	0.00	1.85E+12	-520.501	5.51E+07	0.00
31.0000	4.34E-05	0.00	0.00	2.22E-06	0.00	1.85E+12	-658.118	2.82E+07	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 1:

Pile-head deflection	=	0.10397545 inches
Computed slope at pile head	=	-0.0008666 radians
Maximum bending moment	=	10963394. inch-lbs
Maximum shear force	=	-83709. lbs
Depth of maximum bending moment	=	4.65000000 feet below pile head
Depth of maximum shear force	=	22.32000000 feet below pile head
Number of iterations	=	14
Number of zero deflection points	=	2

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 2

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head	=	24300.0 lbs
Applied moment at pile head	=	13596000.0 in-lbs
Axial thrust load on pile head	=	995700.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	0.1595	1.36E+07	24300.	-0.00125	0.00	2.77E+12	0.00	0.00	0.00
0.3100	0.1549	1.37E+07	23818.	-0.00123	0.00	2.77E+12	-259.356	6227.	0.00

0.6200	0.1504	1.38E+07	22612.	-0.00121	0.00	2.77E+12	-388.950	9620.	0.00
0.9300	0.1459	1.39E+07	21159.	-0.00119	0.00	2.77E+12	-392.246	9999.	0.00
1.2400	0.1415	1.39E+07	19694.	-0.00117	0.00	2.77E+12	-395.426	10393.	0.00
1.5500	0.1372	1.40E+07	18217.	-0.00115	0.00	2.77E+12	-398.490	10804.	0.00
1.8600	0.1330	1.41E+07	16729.	-0.00113	0.00	2.77E+12	-401.435	11232.	0.00
2.1700	0.1288	1.42E+07	15231.	-0.00112	0.00	2.77E+12	-404.262	11679.	0.00
2.4800	0.1247	1.42E+07	13722.	-0.00110	0.00	2.77E+12	-406.967	12145.	0.00
2.7900	0.1206	1.43E+07	12203.	-0.00108	0.00	2.77E+12	-409.552	12632.	0.00
3.1000	0.1166	1.43E+07	10675.	-0.00106	0.00	2.77E+12	-412.013	13141.	0.00
3.4100	0.1127	1.44E+07	9138.	-0.00104	0.00	2.77E+12	-414.350	13673.	0.00
3.7200	0.1089	1.44E+07	7592.	-0.00102	0.00	2.77E+12	-416.562	14229.	0.00
4.0300	0.1051	1.44E+07	6039.	-0.00100	0.00	2.77E+12	-418.647	14812.	0.00
4.3400	0.1015	1.44E+07	4478.	-9.81E-04	0.00	2.77E+12	-420.603	15422.	0.00
4.6500	0.09784	1.45E+07	2910.	-9.62E-04	0.00	2.77E+12	-422.430	16061.	0.00
4.9600	0.09430	1.45E+07	1335.	-9.43E-04	0.00	2.77E+12	-424.127	16731.	0.00
5.2700	0.09083	1.45E+07	-245.531	-9.23E-04	0.00	2.77E+12	-425.691	17435.	0.00
5.5800	0.08743	1.45E+07	-1832.	-9.04E-04	0.00	2.77E+12	-427.121	18173.	0.00
5.8900	0.08411	1.45E+07	-3423.	-8.84E-04	0.00	2.77E+12	-428.416	18949.	0.00
6.2000	0.08085	1.45E+07	-5019.	-8.65E-04	0.00	2.77E+12	-429.574	19765.	0.00
6.5100	0.07767	1.44E+07	-6619.	-8.46E-04	0.00	2.77E+12	-430.593	20623.	0.00
6.8200	0.07456	1.44E+07	-8222.	-8.26E-04	0.00	2.77E+12	-431.473	21527.	0.00
7.1300	0.07152	1.44E+07	-9829.	-8.07E-04	0.00	2.77E+12	-432.211	22480.	0.00
7.4400	0.06856	1.43E+07	-11438.	-7.88E-04	0.00	2.77E+12	-432.805	23484.	0.00
7.7500	0.06566	1.43E+07	-13049.	-7.68E-04	0.00	2.77E+12	-433.254	24545.	0.00
8.0600	0.06284	1.43E+07	-14661.	-7.49E-04	0.00	2.77E+12	-433.557	25665.	0.00
8.3700	0.06009	1.42E+07	-16274.	-7.30E-04	0.00	2.77E+12	-433.710	26850.	0.00
8.6800	0.05741	1.41E+07	-17887.	-7.11E-04	0.00	2.77E+12	-433.713	28104.	0.00
8.9900	0.05480	1.41E+07	-19500.	-6.92E-04	0.00	2.77E+12	-433.563	29432.	0.00
9.3000	0.05226	1.40E+07	-21113.	-6.73E-04	0.00	2.77E+12	-433.257	30841.	0.00
9.6100	0.04979	1.39E+07	-22724.	-6.55E-04	0.00	2.77E+12	-432.795	32336.	0.00
9.9200	0.04739	1.38E+07	-24332.	-6.36E-04	0.00	2.77E+12	-432.173	33926.	0.00
10.2300	0.04506	1.37E+07	-25939.	-6.18E-04	0.00	2.77E+12	-431.390	35616.	0.00
10.5400	0.04279	1.36E+07	-27542.	-5.99E-04	0.00	2.77E+12	-430.442	37418.	0.00
10.8500	0.04060	1.35E+07	-29141.	-5.81E-04	0.00	2.78E+12	-429.327	39339.	0.00
11.1600	0.03847	1.34E+07	-30736.	-5.63E-04	0.00	2.78E+12	-428.043	41390.	0.00
11.4700	0.03641	1.33E+07	-32325.	-5.45E-04	0.00	2.78E+12	-426.585	43583.	0.00
11.7800	0.03442	1.32E+07	-33909.	-5.27E-04	0.00	2.78E+12	-424.952	45932.	0.00
12.0900	0.03249	1.31E+07	-35486.	-5.10E-04	0.00	2.78E+12	-423.140	48451.	0.00
12.4000	0.03062	1.29E+07	-37057.	-4.92E-04	0.00	2.78E+12	-421.146	51156.	0.00
12.7100	0.02883	1.28E+07	-38619.	-4.75E-04	0.00	2.78E+12	-418.965	54067.	0.00
13.0200	0.02709	1.27E+07	-40174.	-4.58E-04	0.00	2.78E+12	-416.594	57204.	0.00

Performed by: G. Khatri 8/29/2024

Checked by: J. Samples 8/30/2024

13.3300	0.02542	1.25E+07	-41719.	-4.41E-04	0.00	2.78E+12	-414.028	60591.	0.00
13.6400	0.02381	1.23E+07	-43254.	-4.24E-04	0.00	2.78E+12	-411.263	64255.	0.00
13.9500	0.02226	1.22E+07	-44778.	-4.08E-04	0.00	2.78E+12	-408.294	68227.	0.00
14.2600	0.02077	1.20E+07	-46291.	-3.92E-04	0.00	2.78E+12	-405.114	72542.	0.00
14.5700	0.01935	1.18E+07	-47792.	-3.76E-04	0.00	2.78E+12	-401.719	77242.	0.00
14.8800	0.01798	1.17E+07	-49279.	-3.60E-04	0.00	2.78E+12	-398.101	82373.	0.00
15.1900	0.01667	1.15E+07	-50753.	-3.45E-04	0.00	2.78E+12	-394.254	87991.	0.00
15.5000	0.01541	1.13E+07	-52212.	-3.29E-04	0.00	2.78E+12	-390.168	94159.	0.00
15.8100	0.01422	1.11E+07	-53655.	-3.14E-04	0.00	2.78E+12	-385.835	100953.	0.00
16.1200	0.01308	1.09E+07	-55082.	-3.00E-04	0.00	2.78E+12	-381.244	108463.	0.00
16.4300	0.01199	1.07E+07	-56491.	-2.85E-04	0.00	2.78E+12	-376.384	116796.	0.00
16.7400	0.01095	1.05E+07	-57882.	-2.71E-04	0.00	2.78E+12	-371.242	126079.	0.00
17.0500	0.00997	1.03E+07	-59253.	-2.57E-04	0.00	2.78E+12	-365.801	136471.	0.00
17.3600	0.00904	1.00E+07	-60603.	-2.44E-04	0.00	2.78E+12	-360.045	148161.	0.00
17.6700	0.00816	9806967.	-61931.	-2.30E-04	0.00	2.78E+12	-353.952	161388.	0.00
17.9800	0.00733	9574963.	-63236.	-2.17E-04	0.00	2.78E+12	-347.498	176450.	0.00
18.2900	0.00654	9338104.	-64516.	-2.05E-04	0.00	2.78E+12	-340.652	193729.	0.00
18.6000	0.00580	9096484.	-65769.	-1.92E-04	0.00	2.78E+12	-333.378	213719.	0.00
18.9100	0.00511	8850205.	-66995.	-1.80E-04	0.00	2.78E+12	-325.632	237072.	0.00
19.2200	0.00446	8599377.	-68191.	-1.69E-04	0.00	2.78E+12	-317.357	264671.	0.00
19.5300	0.00385	8344114.	-69355.	-1.57E-04	0.00	2.78E+12	-308.481	297742.	0.00
19.8400	0.00329	8084541.	-70485.	-1.46E-04	0.00	2.78E+12	-298.908	338043.	0.00
20.1500	0.00276	7820791.	-71577.	-1.36E-04	0.00	2.78E+12	-288.509	388195.	0.00
20.4600	0.00228	7553011.	-72582.	-1.26E-04	0.00	2.78E+12	-251.797	411000.	0.00
20.7700	0.00183	7281708.	-73433.	-1.16E-04	0.00	2.78E+12	-205.352	417228.	0.00
21.0800	0.00142	7007528.	-84150.	-1.04E-04	0.00	1.83E+12	-5556.	1.46E+07	0.00
21.3900	0.00106	6656403.	-102898.	-8.97E-05	0.00	1.83E+12	-4523.	1.59E+07	0.00
21.7000	7.51E-04	6242635.	-117764.	-7.67E-05	0.00	1.83E+12	-3470.	1.72E+07	0.00
22.0100	4.90E-04	5780804.	-128744.	-6.45E-05	0.00	1.83E+12	-2434.	1.85E+07	0.00
22.3200	2.72E-04	5285253.	-135960.	-5.32E-05	0.00	1.83E+12	-1446.	1.98E+07	0.00
22.6300	9.36E-05	4769655.	-139637.	-4.30E-05	0.00	1.83E+12	-531.180	2.11E+07	0.00
22.9400	-4.84E-05	4246670.	-140083.	-3.39E-05	0.00	1.83E+12	291.6952	2.24E+07	0.00
23.2500	-1.58E-04	3727690.	-137662.	-2.58E-05	0.00	1.83E+12	1010.	2.37E+07	0.00
23.5600	-2.40E-04	3222660.	-132776.	-1.87E-05	0.00	1.83E+12	1616.	2.50E+07	0.00
23.8700	-2.98E-04	2739974.	-125848.	-1.27E-05	0.00	1.83E+12	2108.	2.63E+07	0.00
24.1800	-3.35E-04	2286442.	-117302.	-7.59E-06	0.00	1.83E+12	2487.	2.76E+07	0.00
24.4900	-3.54E-04	1867307.	-107548.	-3.38E-06	0.00	1.83E+12	2757.	2.89E+07	0.00
24.8000	-3.60E-04	1486310.	-96977.	2.31E-08	0.00	1.83E+12	2926.	3.02E+07	0.00
25.1100	-3.54E-04	1145800.	-85945.	2.69E-06	0.00	1.83E+12	3005.	3.16E+07	0.00
25.4200	-3.40E-04	846859.	-74772.	4.71E-06	0.00	1.83E+12	3002.	3.29E+07	0.00
25.7300	-3.19E-04	589459.	-63736.	6.17E-06	0.00	1.83E+12	2931.	3.42E+07	0.00

26.0400	-2.94E-04	372618.	-53070.	7.15E-06	0.00	1.83E+12	2803.	3.55E+07	0.00
26.3500	-2.66E-04	194567.	-42965.	7.72E-06	0.00	1.83E+12	2630.	3.68E+07	0.00
26.6600	-2.36E-04	52903.	-33570.	7.97E-06	0.00	1.83E+12	2421.	3.81E+07	0.00
26.9700	-2.07E-04	-55253.	-24996.	7.97E-06	0.00	1.83E+12	2188.	3.94E+07	0.00
27.2800	-1.77E-04	-133128.	-17321.	7.78E-06	0.00	1.83E+12	1939.	4.07E+07	0.00
27.5900	-1.49E-04	-184176.	-10591.	7.46E-06	0.00	1.83E+12	1680.	4.20E+07	0.00
27.9000	-1.22E-04	-211980.	-4832.	7.06E-06	0.00	1.83E+12	1417.	4.33E+07	0.00
28.2100	-9.62E-05	-220176.	-49.530	6.62E-06	0.00	1.83E+12	1154.	4.46E+07	0.00
28.5200	-7.24E-05	-212398.	3761.	6.18E-06	0.00	1.83E+12	894.2900	4.59E+07	0.00
28.8300	-5.02E-05	-192242.	6611.	5.77E-06	0.00	1.83E+12	637.9881	4.72E+07	0.00
29.1400	-2.95E-05	-163256.	8514.	5.41E-06	0.00	1.83E+12	385.0314	4.85E+07	0.00
29.4500	-1.00E-05	-128941.	9479.	5.11E-06	0.00	1.83E+12	134.0172	4.99E+07	0.00
29.7600	8.53E-06	-92770.	9510.	4.89E-06	0.00	1.83E+12	-117.318	5.12E+07	0.00
30.0700	2.64E-05	-58222.	8600.	4.73E-06	0.00	1.83E+12	-371.798	5.25E+07	0.00
30.3800	4.38E-05	-28819.	6732.	4.65E-06	0.00	1.83E+12	-632.454	5.38E+07	0.00
30.6900	6.09E-05	-8168.	3878.	4.61E-06	0.00	1.83E+12	-902.110	5.51E+07	0.00
31.0000	7.80E-05	0.00	0.00	4.60E-06	0.00	1.83E+12	-1183.	2.82E+07	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 2:

Pile-head deflection = 0.15953387 inches
 Computed slope at pile head = -0.0012463 radians
 Maximum bending moment = 14475266. inch-lbs
 Maximum shear force = -140083. lbs
 Depth of maximum bending moment = 5.27000000 feet below pile head
 Depth of maximum shear force = 22.94000000 feet below pile head
 Number of iterations = 14
 Number of zero deflection points = 2

Computed Values of Pile Loading and Deflection

Performed by: G. Khatri 8/29/2024
 Checked by: J. Samples 8/30/2024

for Lateral Loading for Load Case Number 3

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 10710.0 lbs
 Applied moment at pile head = 5701200.0 in-lbs
 Axial thrust load on pile head = 1030000.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in ²	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	0.04136	5701200.	10710.	-4.06E-04	0.00	2.78E+12	0.00	0.00	0.00
0.3100	0.03987	5742583.	10586.	-3.98E-04	0.00	2.78E+12	-66.736	6227.	0.00
0.6200	0.03840	5783012.	10223.	-3.91E-04	0.00	2.78E+12	-128.558	12455.	0.00
0.9300	0.03696	5821633.	9638.	-3.83E-04	0.00	2.78E+12	-185.609	18682.	0.00
1.2400	0.03555	5857656.	8850.	-3.75E-04	0.00	2.78E+12	-238.037	24909.	0.00
1.5500	0.03417	5890354.	7884.	-3.67E-04	0.00	2.78E+12	-281.543	30652.	0.00
1.8600	0.03282	5919126.	6834.	-3.59E-04	0.00	2.78E+12	-282.999	32080.	0.00
2.1700	0.03149	5943951.	5779.	-3.51E-04	0.00	2.78E+12	-284.342	33585.	0.00
2.4800	0.03020	5964812.	4719.	-3.43E-04	0.00	2.78E+12	-285.573	35174.	0.00
2.7900	0.02894	5981689.	3654.	-3.35E-04	0.00	2.78E+12	-286.690	36852.	0.00
3.1000	0.02771	5994569.	2586.	-3.27E-04	0.00	2.78E+12	-287.691	38627.	0.00
3.4100	0.02650	6003436.	1514.	-3.19E-04	0.00	2.78E+12	-288.576	40504.	0.00
3.7200	0.02533	6008280.	438.9810	-3.11E-04	0.00	2.78E+12	-289.342	42493.	0.00
4.0300	0.02419	6009088.	-638.574	-3.03E-04	0.00	2.78E+12	-289.989	44601.	0.00
4.3400	0.02307	6005853.	-1718.	-2.95E-04	0.00	2.78E+12	-290.514	46837.	0.00
4.6500	0.02199	5998567.	-2800.	-2.87E-04	0.00	2.78E+12	-290.917	49213.	0.00
4.9600	0.02094	5987224.	-3883.	-2.79E-04	0.00	2.78E+12	-291.196	51739.	0.00
5.2700	0.01991	5971820.	-4966.	-2.71E-04	0.00	2.78E+12	-291.350	54427.	0.00
5.5800	0.01892	5952354.	-6050.	-2.63E-04	0.00	2.78E+12	-291.376	57292.	0.00
5.8900	0.01795	5928826.	-7134.	-2.55E-04	0.00	2.78E+12	-291.275	60348.	0.00
6.2000	0.01702	5901236.	-8217.	-2.47E-04	0.00	2.78E+12	-291.042	63611.	0.00
6.5100	0.01611	5869589.	-9299.	-2.39E-04	0.00	2.78E+12	-290.678	67101.	0.00
6.8200	0.01524	5833888.	-10379.	-2.32E-04	0.00	2.78E+12	-290.181	70837.	0.00
7.1300	0.01439	5794143.	-11457.	-2.24E-04	0.00	2.78E+12	-289.548	74843.	0.00
7.4400	0.01357	5750360.	-12533.	-2.16E-04	0.00	2.78E+12	-288.778	79143.	0.00
7.7500	0.01278	5702552.	-13606.	-2.08E-04	0.00	2.78E+12	-287.868	83766.	0.00
8.0600	0.01202	5650731.	-14675.	-2.01E-04	0.00	2.78E+12	-286.818	88744.	0.00
8.3700	0.01129	5594912.	-15739.	-1.93E-04	0.00	2.78E+12	-285.625	94112.	0.00

8.6800	0.01058	5535111.	-16799.	-1.86E-04	0.00	2.78E+12	-284.286	99911.	0.00
8.9900	0.00991	5471349.	-17854.	-1.78E-04	0.00	2.78E+12	-282.800	106186.	0.00
9.3000	0.00926	5403644.	-18903.	-1.71E-04	0.00	2.78E+12	-281.165	112988.	0.00
9.6100	0.00863	5332021.	-19946.	-1.64E-04	0.00	2.78E+12	-279.377	120375.	0.00
9.9200	0.00804	5256504.	-20981.	-1.57E-04	0.00	2.78E+12	-277.434	128414.	0.00
10.2300	0.00747	5177122.	-22010.	-1.50E-04	0.00	2.78E+12	-275.334	137182.	0.00
10.5400	0.00692	5093902.	-23030.	-1.43E-04	0.00	2.78E+12	-273.073	146765.	0.00
10.8500	0.00640	5006878.	-24041.	-1.36E-04	0.00	2.78E+12	-270.649	157264.	0.00
11.1600	0.00591	4916082.	-25043.	-1.30E-04	0.00	2.78E+12	-268.058	168796.	0.00
11.4700	0.00544	4821552.	-26035.	-1.23E-04	0.00	2.78E+12	-265.296	181497.	0.00
11.7800	0.00499	4723325.	-27016.	-1.17E-04	0.00	2.78E+12	-262.360	195525.	0.00
12.0900	0.00457	4621444.	-27987.	-1.10E-04	0.00	2.78E+12	-259.244	211067.	0.00
12.4000	0.00417	4515952.	-28945.	-1.04E-04	0.00	2.78E+12	-255.945	228343.	0.00
12.7100	0.00379	4406894.	-29890.	-9.84E-05	0.00	2.78E+12	-252.456	247615.	0.00
13.0200	0.00344	4294321.	-30810.	-9.26E-05	0.00	2.78E+12	-241.701	261546.	0.00
13.3300	0.00310	4178380.	-31675.	-8.69E-05	0.00	2.78E+12	-223.443	267773.	0.00
13.6400	0.00279	4059326.	-32473.	-8.14E-05	0.00	2.78E+12	-205.600	274000.	0.00
13.9500	0.00250	3937406.	-33205.	-7.60E-05	0.00	2.78E+12	-188.234	280228.	0.00
14.2600	0.00223	3812861.	-33874.	-7.08E-05	0.00	2.78E+12	-171.399	286455.	0.00
14.5700	0.00197	3685925.	-34482.	-6.58E-05	0.00	2.78E+12	-155.144	292682.	0.00
14.8800	0.00174	3556822.	-35030.	-6.10E-05	0.00	2.78E+12	-139.514	298909.	0.00
15.1900	0.00152	3425771.	-35521.	-5.63E-05	0.00	2.78E+12	-124.549	305137.	0.00
15.5000	0.00132	3292978.	-35958.	-5.18E-05	0.00	2.78E+12	-110.282	311364.	0.00
15.8100	0.00113	3158643.	-36343.	-4.75E-05	0.00	2.78E+12	-96.744	317591.	0.00
16.1200	9.65E-04	3022953.	-36679.	-4.33E-05	0.00	2.78E+12	-83.958	323819.	0.00
16.4300	8.11E-04	2886085.	-36969.	-3.94E-05	0.00	2.78E+12	-71.943	330046.	0.00
16.7400	6.72E-04	2748207.	-37216.	-3.56E-05	0.00	2.78E+12	-60.713	336273.	0.00
17.0500	5.46E-04	2609474.	-37422.	-3.20E-05	0.00	2.78E+12	-50.277	342500.	0.00
17.3600	4.34E-04	2470033.	-37591.	-2.86E-05	0.00	2.78E+12	-40.640	348728.	0.00
17.6700	3.33E-04	2330016.	-37726.	-2.54E-05	0.00	2.78E+12	-31.800	354955.	0.00
17.9800	2.45E-04	2189547.	-37829.	-2.24E-05	0.00	2.78E+12	-23.751	361182.	0.00
18.2900	1.67E-04	2048739.	-37904.	-1.95E-05	0.00	2.78E+12	-16.482	367410.	0.00
18.6000	9.93E-05	1907692.	-37953.	-1.69E-05	0.00	2.78E+12	-9.978	373637.	0.00
18.9100	4.13E-05	1766497.	-37980.	-1.44E-05	0.00	2.78E+12	-4.218	379864.	0.00
19.2200	-7.93E-06	1625234.	-37986.	-1.21E-05	0.00	2.78E+12	0.8230	386091.	0.00
19.5300	-4.91E-05	1483975.	-37975.	-1.01E-05	0.00	2.78E+12	5.1749	392319.	0.00
19.8400	-8.28E-05	1342779.	-37949.	-8.17E-06	0.00	2.78E+12	8.8727	398546.	0.00
20.1500	-1.10E-04	1201700.	-37910.	-6.47E-06	0.00	2.78E+12	11.9557	404773.	0.00
20.4600	-1.31E-04	1060780.	-37861.	-4.95E-06	0.00	2.78E+12	14.4680	411000.	0.00
20.7700	-1.47E-04	920054.	-37803.	-3.63E-06	0.00	2.78E+12	16.4582	417228.	0.00
21.0800	-1.58E-04	779552.	-36622.	-2.22E-06	0.00	1.83E+12	618.4737	1.46E+07	0.00

21.3900	-1.63E-04	647602.	-34176.	-7.70E-07	0.00	1.83E+12	696.6387	1.59E+07	0.00
21.7000	-1.64E-04	525288.	-31474.	4.22E-07	0.00	1.83E+12	755.9244	1.72E+07	0.00
22.0100	-1.60E-04	413430.	-28588.	1.38E-06	0.00	1.83E+12	795.7660	1.85E+07	0.00
22.3200	-1.53E-04	312581.	-25589.	2.11E-06	0.00	1.83E+12	816.4776	1.98E+07	0.00
22.6300	-1.44E-04	223028.	-22547.	2.66E-06	0.00	1.83E+12	819.0897	2.11E+07	0.00
22.9400	-1.34E-04	144809.	-19526.	3.03E-06	0.00	1.83E+12	805.1898	2.24E+07	0.00
23.2500	-1.22E-04	77731.	-16584.	3.26E-06	0.00	1.83E+12	776.7707	2.37E+07	0.00
23.5600	-1.09E-04	21402.	-13770.	3.36E-06	0.00	1.83E+12	736.0898	2.50E+07	0.00
23.8700	-9.69E-05	-24742.	-11125.	3.36E-06	0.00	1.83E+12	685.5419	2.63E+07	0.00
24.1800	-8.45E-05	-61398.	-8683.	3.27E-06	0.00	1.83E+12	627.5482	2.76E+07	0.00
24.4900	-7.25E-05	-89369.	-6466.	3.11E-06	0.00	1.83E+12	564.4623	2.89E+07	0.00
24.8000	-6.13E-05	-109529.	-4489.	2.91E-06	0.00	1.83E+12	498.4930	3.02E+07	0.00
25.1100	-5.09E-05	-122789.	-2759.	2.68E-06	0.00	1.83E+12	431.6455	3.16E+07	0.00
25.4200	-4.14E-05	-130075.	-1276.	2.42E-06	0.00	1.83E+12	365.6785	3.29E+07	0.00
25.7300	-3.29E-05	-132300.	-33.808	2.15E-06	0.00	1.83E+12	302.0763	3.42E+07	0.00
26.0400	-2.54E-05	-130343.	978.2405	1.89E-06	0.00	1.83E+12	242.0360	3.55E+07	0.00
26.3500	-1.89E-05	-125036.	1775.	1.63E-06	0.00	1.83E+12	186.4655	3.68E+07	0.00
26.6600	-1.33E-05	-117148.	2375.	1.38E-06	0.00	1.83E+12	135.9928	3.81E+07	0.00
26.9700	-8.59E-06	-107377.	2797.	1.15E-06	0.00	1.83E+12	90.9825	3.94E+07	0.00
27.2800	-4.71E-06	-96345.	3062.	9.45E-07	0.00	1.83E+12	51.5598	4.07E+07	0.00
27.5900	-1.56E-06	-84600.	3191.	7.61E-07	0.00	1.83E+12	17.6385	4.20E+07	0.00
27.9000	9.49E-07	-72610.	3203.	6.01E-07	0.00	1.83E+12	-11.048	4.33E+07	0.00
28.2100	2.91E-06	-60772.	3118.	4.66E-07	0.00	1.83E+12	-34.912	4.46E+07	0.00
28.5200	4.41E-06	-49417.	2952.	3.54E-07	0.00	1.83E+12	-54.482	4.59E+07	0.00
28.8300	5.54E-06	-38815.	2719.	2.64E-07	0.00	1.83E+12	-70.362	4.72E+07	0.00
29.1400	6.38E-06	-29187.	2434.	1.95E-07	0.00	1.83E+12	-83.205	4.85E+07	0.00
29.4500	6.99E-06	-20710.	2105.	1.44E-07	0.00	1.83E+12	-93.678	4.99E+07	0.00
29.7600	7.45E-06	-13529.	1740.	1.09E-07	0.00	1.83E+12	-102.428	5.12E+07	0.00
30.0700	7.80E-06	-7766.	1345.	8.76E-08	0.00	1.83E+12	-110.058	5.25E+07	0.00
30.3800	8.10E-06	-3525.	922.2183	7.62E-08	0.00	1.83E+12	-117.088	5.38E+07	0.00
30.6900	8.37E-06	-905.195	473.9195	7.17E-08	0.00	1.83E+12	-123.933	5.51E+07	0.00
31.0000	8.63E-06	0.00	0.00	7.08E-08	0.00	1.83E+12	-130.863	2.82E+07	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 3:

Pile-head deflection = 0.04136272 inches
 Computed slope at pile head = -0.0004061 radians
 Maximum bending moment = 6009088. inch-lbs
 Maximum shear force = -37986. lbs
 Depth of maximum bending moment = 4.03000000 feet below pile head
 Depth of maximum shear force = 19.22000000 feet below pile head
 Number of iterations = 11
 Number of zero deflection points = 2

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 4

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 14410.0 lbs
 Applied moment at pile head = 7675200.0 in-lbs
 Axial thrust load on pile head = 1340000.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	0.06688	7675200.	14410.	-6.04E-04	0.00	2.74E+12	0.00	0.00	0.00
0.3100	0.06465	7731788.	14209.	-5.93E-04	0.00	2.74E+12	-108.224	6227.	0.00
0.6200	0.06246	7786826.	13618.	-5.83E-04	0.00	2.74E+12	-209.125	12455.	0.00
0.9300	0.06031	7838918.	12666.	-5.72E-04	0.00	2.74E+12	-302.902	18682.	0.00
1.2400	0.05821	7886765.	11514.	-5.61E-04	0.00	2.74E+12	-316.689	20240.	0.00
1.5500	0.05614	7930176.	10332.	-5.51E-04	0.00	2.74E+12	-318.733	21121.	0.00
1.8600	0.05411	7969122.	9142.	-5.40E-04	0.00	2.74E+12	-320.666	22045.	0.00
2.1700	0.05212	8003578.	7946.	-5.29E-04	0.00	2.74E+12	-322.485	23016.	0.00
2.4800	0.05017	8033516.	6743.	-5.18E-04	0.00	2.74E+12	-324.190	24036.	0.00
2.7900	0.04827	8058914.	5534.	-5.07E-04	0.00	2.74E+12	-325.779	25108.	0.00
3.1000	0.04640	8079749.	4320.	-4.96E-04	0.00	2.74E+12	-327.252	26236.	0.00
3.4100	0.04458	8096001.	3100.	-4.85E-04	0.00	2.74E+12	-328.606	27424.	0.00
3.7200	0.04279	8107650.	1875.	-4.74E-04	0.00	2.74E+12	-329.842	28675.	0.00

4.0300	0.04105	8114680.	646.1091	-4.63E-04	0.00	2.74E+12	-330.957	29994.	0.00
4.3400	0.03934	8117076.	-586.897	-4.52E-04	0.00	2.74E+12	-331.950	31386.	0.00
4.6500	0.03768	8114822.	-1823.	-4.41E-04	0.00	2.74E+12	-332.820	32856.	0.00
4.9600	0.03606	8107909.	-3063.	-4.30E-04	0.00	2.74E+12	-333.565	34410.	0.00
5.2700	0.03448	8096324.	-4305.	-4.19E-04	0.00	2.74E+12	-334.185	36054.	0.00
5.5800	0.03294	8080060.	-5549.	-4.08E-04	0.00	2.74E+12	-334.678	37794.	0.00
5.8900	0.03144	8059110.	-6795.	-3.97E-04	0.00	2.74E+12	-335.042	39638.	0.00
6.2000	0.02999	8033469.	-8041.	-3.86E-04	0.00	2.74E+12	-335.276	41593.	0.00
6.5100	0.02857	8003134.	-9289.	-3.75E-04	0.00	2.74E+12	-335.379	43670.	0.00
6.8200	0.02719	7968104.	-10536.	-3.65E-04	0.00	2.74E+12	-335.350	45877.	0.00
7.1300	0.02586	7928379.	-11784.	-3.54E-04	0.00	2.74E+12	-335.186	48224.	0.00
7.4400	0.02456	7883962.	-13030.	-3.43E-04	0.00	2.74E+12	-334.886	50724.	0.00
7.7500	0.02330	7834857.	-14275.	-3.32E-04	0.00	2.74E+12	-334.449	53390.	0.00
8.0600	0.02209	7781071.	-15518.	-3.22E-04	0.00	2.74E+12	-333.873	56235.	0.00
8.3700	0.02091	7722612.	-16759.	-3.11E-04	0.00	2.74E+12	-333.156	59275.	0.00
8.6800	0.01977	7659491.	-17996.	-3.01E-04	0.00	2.74E+12	-332.298	62528.	0.00
8.9900	0.01867	7591719.	-19231.	-2.91E-04	0.00	2.74E+12	-331.295	66012.	0.00
9.3000	0.01761	7519312.	-20461.	-2.80E-04	0.00	2.74E+12	-330.147	69750.	0.00
9.6100	0.01658	7442285.	-21687.	-2.70E-04	0.00	2.74E+12	-328.851	73766.	0.00
9.9200	0.01560	7360656.	-22907.	-2.60E-04	0.00	2.74E+12	-327.405	78085.	0.00
10.2300	0.01465	7274447.	-24122.	-2.50E-04	0.00	2.74E+12	-325.808	82738.	0.00
10.5400	0.01374	7183681.	-25331.	-2.40E-04	0.00	2.74E+12	-324.058	87760.	0.00
10.8500	0.01286	7088381.	-26533.	-2.31E-04	0.00	2.74E+12	-322.152	93187.	0.00
11.1600	0.01202	6988575.	-27728.	-2.21E-04	0.00	2.74E+12	-320.089	99063.	0.00
11.4700	0.01121	6884293.	-28914.	-2.12E-04	0.00	2.74E+12	-317.865	105436.	0.00
11.7800	0.01044	6775565.	-30092.	-2.02E-04	0.00	2.74E+12	-315.480	112361.	0.00
12.0900	0.00971	6662425.	-31261.	-1.93E-04	0.00	2.74E+12	-312.929	119902.	0.00
12.4000	0.00901	6544910.	-32420.	-1.84E-04	0.00	2.74E+12	-310.210	128130.	0.00
12.7100	0.00834	6423058.	-33569.	-1.76E-04	0.00	2.74E+12	-307.321	137129.	0.00
13.0200	0.00770	6296910.	-34706.	-1.67E-04	0.00	2.74E+12	-304.258	146992.	0.00
13.3300	0.00709	6166508.	-35832.	-1.58E-04	0.00	2.74E+12	-301.018	157831.	0.00
13.6400	0.00652	6031900.	-36945.	-1.50E-04	0.00	2.74E+12	-297.597	169773.	0.00
13.9500	0.00598	5893132.	-38046.	-1.42E-04	0.00	2.74E+12	-293.992	182969.	0.00
14.2600	0.00546	5750256.	-39132.	-1.34E-04	0.00	2.74E+12	-290.198	197593.	0.00
14.5700	0.00498	5603325.	-40205.	-1.27E-04	0.00	2.74E+12	-286.210	213855.	0.00
14.8800	0.00452	5452396.	-41261.	-1.19E-04	0.00	2.74E+12	-282.024	232000.	0.00
15.1900	0.00409	5297527.	-42302.	-1.12E-04	0.00	2.74E+12	-277.633	252323.	0.00
15.5000	0.00369	5138780.	-43327.	-1.05E-04	0.00	2.74E+12	-273.029	275183.	0.00
15.8100	0.00331	4976220.	-44333.	-9.78E-05	0.00	2.74E+12	-268.206	301011.	0.00
16.1200	0.00296	4809915.	-45312.	-9.11E-05	0.00	2.74E+12	-257.958	323819.	0.00
16.4300	0.00264	4640008.	-46227.	-8.47E-05	0.00	2.74E+12	-233.916	330046.	0.00

16.7400	0.00233	4466832.	-47054.	-7.86E-05	0.00	2.74E+12	-210.896	336273.	0.00
17.0500	0.00205	4290707.	-47798.	-7.26E-05	0.00	2.74E+12	-188.935	342500.	0.00
17.3600	0.00179	4111939.	-48462.	-6.69E-05	0.00	2.74E+12	-168.065	348728.	0.00
17.6700	0.00155	3930818.	-49050.	-6.15E-05	0.00	2.74E+12	-148.307	354955.	0.00
17.9800	0.00134	3747617.	-49567.	-5.62E-05	0.00	2.74E+12	-129.677	361182.	0.00
18.2900	0.00114	3562597.	-50017.	-5.13E-05	0.00	2.74E+12	-112.184	367410.	0.00
18.6000	9.54E-04	3376000.	-50404.	-4.66E-05	0.00	2.74E+12	-95.828	373637.	0.00
18.9100	7.89E-04	3188054.	-50732.	-4.21E-05	0.00	2.74E+12	-80.603	379864.	0.00
19.2200	6.41E-04	2998971.	-51006.	-3.79E-05	0.00	2.74E+12	-66.497	386091.	0.00
19.5300	5.07E-04	2808948.	-51229.	-3.40E-05	0.00	2.74E+12	-53.489	392319.	0.00
19.8400	3.88E-04	2618166.	-51406.	-3.03E-05	0.00	2.74E+12	-41.554	398546.	0.00
20.1500	2.82E-04	2426790.	-51540.	-2.69E-05	0.00	2.74E+12	-30.657	404773.	0.00
20.4600	1.88E-04	2234974.	-51636.	-2.37E-05	0.00	2.74E+12	-20.758	411000.	0.00
20.7700	1.05E-04	2042856.	-51696.	-2.08E-05	0.00	2.74E+12	-11.811	417228.	0.00
21.0800	3.30E-05	1850560.	-51959.	-1.75E-05	0.00	1.80E+12	-129.346	1.46E+07	0.00
21.3900	-2.50E-05	1656456.	-52001.	-1.39E-05	0.00	1.80E+12	106.7465	1.59E+07	0.00
21.7000	-7.03E-05	1463811.	-51198.	-1.07E-05	0.00	1.80E+12	324.8388	1.72E+07	0.00
22.0100	-1.04E-04	1275647.	-49629.	-7.84E-06	0.00	1.80E+12	518.8716	1.85E+07	0.00
22.3200	-1.29E-04	1094650.	-47390.	-5.39E-06	0.00	1.80E+12	684.6831	1.98E+07	0.00
22.6300	-1.45E-04	923117.	-44592.	-3.31E-06	0.00	1.80E+12	819.8307	2.11E+07	0.00
22.9400	-1.53E-04	762919.	-41350.	-1.57E-06	0.00	1.80E+12	923.3884	2.24E+07	0.00
23.2500	-1.56E-04	615492.	-37780.	-1.44E-07	0.00	1.80E+12	995.7274	2.37E+07	0.00
23.5600	-1.54E-04	481837.	-33997.	9.90E-07	0.00	1.80E+12	1038.	2.50E+07	0.00
23.8700	-1.49E-04	362546.	-30106.	1.86E-06	0.00	1.80E+12	1053.	2.63E+07	0.00
24.1800	-1.41E-04	257828.	-26205.	2.50E-06	0.00	1.80E+12	1044.	2.76E+07	0.00
24.4900	-1.30E-04	167552.	-22380.	2.94E-06	0.00	1.80E+12	1013.	2.89E+07	0.00
24.8000	-1.19E-04	91294.	-18701.	3.21E-06	0.00	1.80E+12	964.5716	3.02E+07	0.00
25.1100	-1.06E-04	28383.	-15229.	3.33E-06	0.00	1.80E+12	901.9896	3.16E+07	0.00
25.4200	-9.38E-05	-22047.	-12010.	3.34E-06	0.00	1.80E+12	828.8448	3.29E+07	0.00
25.7300	-8.15E-05	-61006.	-9076.	3.25E-06	0.00	1.80E+12	748.4672	3.42E+07	0.00
26.0400	-6.96E-05	-89607.	-6449.	3.10E-06	0.00	1.80E+12	663.8907	3.55E+07	0.00
26.3500	-5.84E-05	-109020.	-4140.	2.89E-06	0.00	1.80E+12	577.7826	3.68E+07	0.00
26.6600	-4.81E-05	-120436.	-2149.	2.66E-06	0.00	1.80E+12	492.3964	3.81E+07	0.00
26.9700	-3.87E-05	-125037.	-471.675	2.40E-06	0.00	1.80E+12	409.5442	3.94E+07	0.00
27.2800	-3.02E-05	-123969.	904.9713	2.15E-06	0.00	1.80E+12	330.5885	4.07E+07	0.00
27.5900	-2.27E-05	-118325.	1997.	1.90E-06	0.00	1.80E+12	256.4492	4.20E+07	0.00
27.9000	-1.61E-05	-109131.	2823.	1.66E-06	0.00	1.80E+12	187.6256	4.33E+07	0.00
28.2100	-1.04E-05	-97340.	3403.	1.45E-06	0.00	1.80E+12	124.2283	4.46E+07	0.00
28.5200	-5.35E-06	-83828.	3757.	1.26E-06	0.00	1.80E+12	66.0225	4.59E+07	0.00
28.8300	-9.83E-07	-69402.	3903.	1.10E-06	0.00	1.80E+12	12.4780	4.72E+07	0.00
29.1400	2.85E-06	-54803.	3857.	9.73E-07	0.00	1.80E+12	-37.173	4.85E+07	0.00

29.4500	6.26E-06	-40717.	3632.	8.75E-07	0.00	1.80E+12	-83.872	4.99E+07	0.00
29.7600	9.36E-06	-27792.	3236.	8.04E-07	0.00	1.80E+12	-128.663	5.12E+07	0.00
30.0700	1.22E-05	-16646.	2676.	7.58E-07	0.00	1.80E+12	-172.619	5.25E+07	0.00
30.3800	1.50E-05	-7890.	1952.	7.33E-07	0.00	1.80E+12	-216.751	5.38E+07	0.00
30.6900	1.77E-05	-2133.	1061.	7.22E-07	0.00	1.80E+12	-261.922	5.51E+07	0.00
31.0000	2.04E-05	0.00	0.00	7.20E-07	0.00	1.80E+12	-308.738	2.82E+07	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 4:

Pile-head deflection = 0.06687587 inches
 Computed slope at pile head = -0.0006036 radians
 Maximum bending moment = 8117076. inch-lbs
 Maximum shear force = -52001. lbs
 Depth of maximum bending moment = 4.34000000 feet below pile head
 Depth of maximum shear force = 21.39000000 feet below pile head
 Number of iterations = 13
 Number of zero deflection points = 2

 Summary of Pile-head Responses for Conventional Analyses

Definitions of Pile-head Loading Conditions:

Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs
 Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
 Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.
 Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs
 Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians

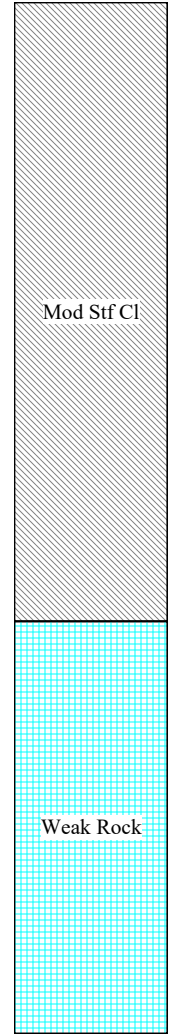
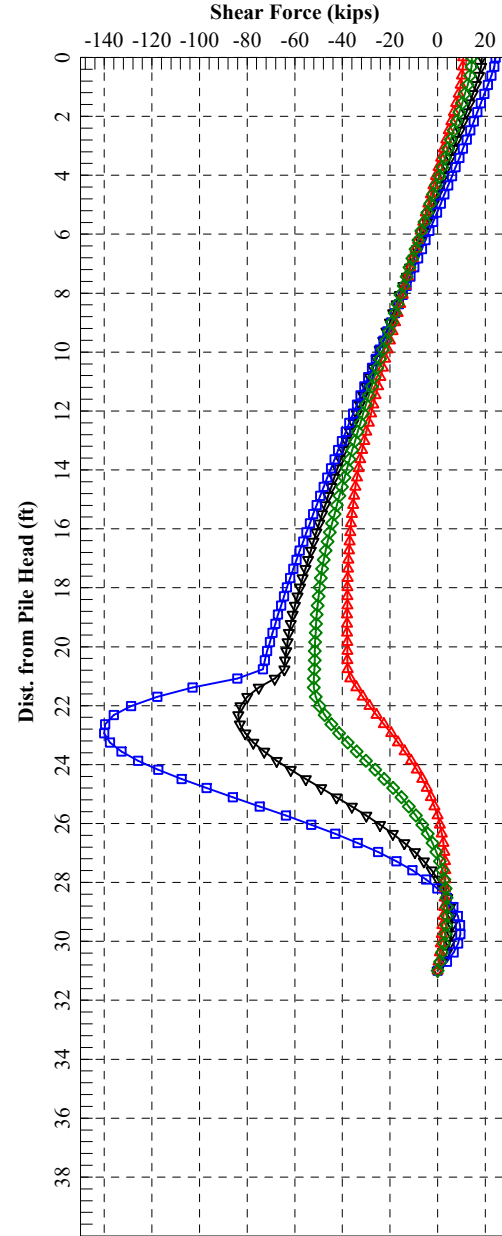
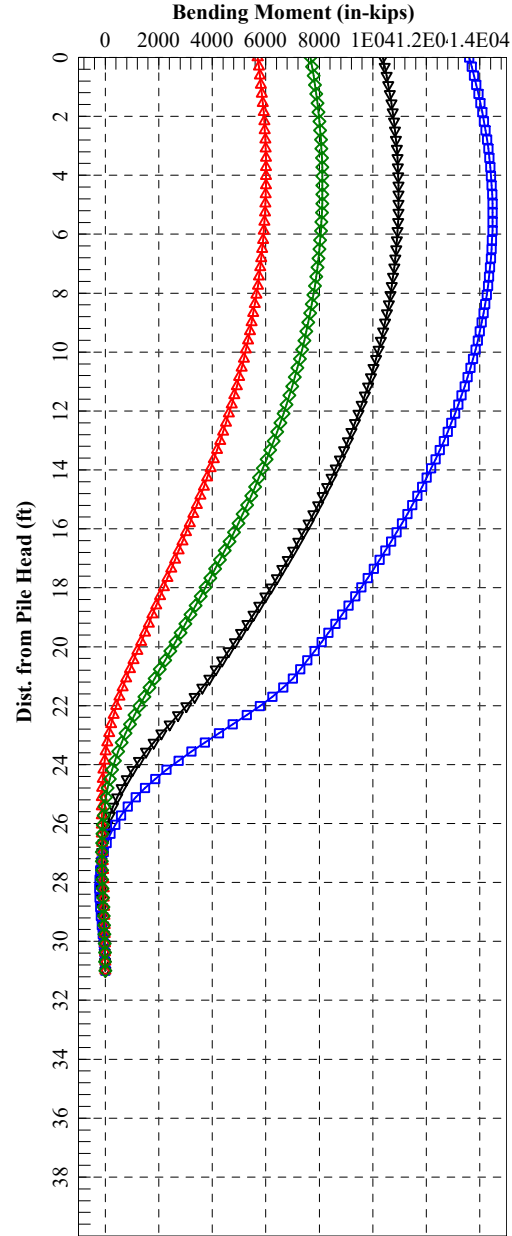
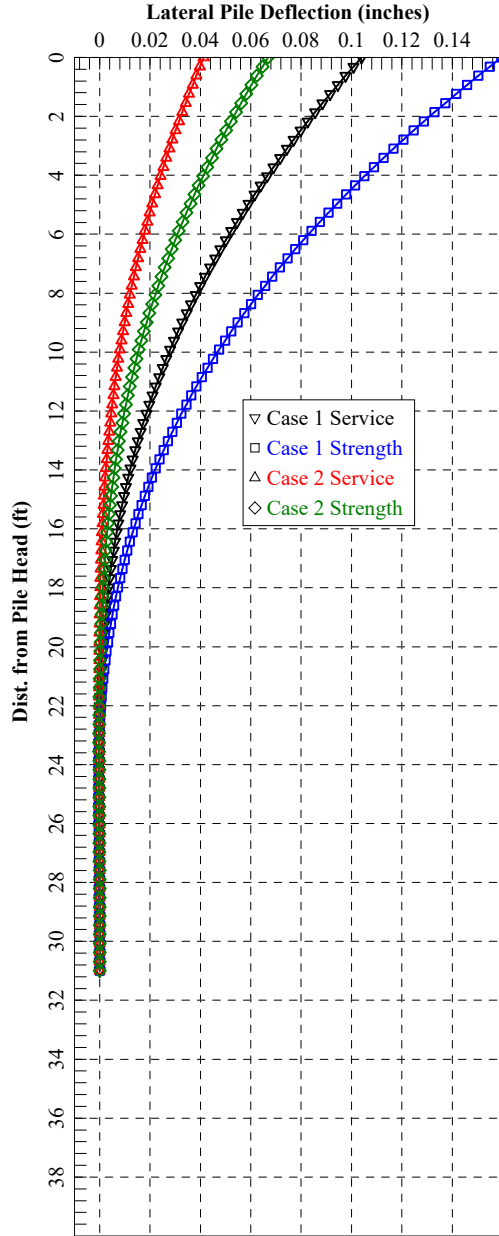
Load Load Load Axial Pile-head Pile-head Max Shear Max Moment

Case No.	Type 1	Pile-head Load 1	Type 2	Pile-head Load 2	Loading lbs	Deflection inches	Rotation radians	in Pile lbs	in Pile in-lbs
1	V, lb	18610.	M, in-lb	1.04E+07	775400.	0.1040	-8.67E-04	-83709.	1.10E+07
2	V, lb	24300.	M, in-lb	1.36E+07	995700.	0.1595	-0.00125	-140083.	1.45E+07
3	V, lb	10710.	M, in-lb	5701200.	1030000.	0.04136	-4.06E-04	-37986.	6009088.
4	V, lb	14410.	M, in-lb	7675200.	1340000.	0.06688	-6.04E-04	-52001.	8117076.

Maximum pile-head deflection = 0.1595338711 inches

Maximum pile-head rotation = -0.0012462636 radians = -0.071406 deg.

The analysis ended normally.



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LPile for Windows, Version 2022-12.006

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method
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Files Used for Analysis

Path to file locations:

\\US0247-PPFSS01\shared_projects\173609140\119144\400-Engineering\Geotechnical\Analysis\Lpile\bridges\LPile
Analysis\Old Town Creek Bridge\Pier DS\Case I & II\

Name of input data file:

Pier Drilled Shaft X-direction row 2.lp12d

Name of output report file:

Pier Drilled Shaft X-direction row 2.lp12o

Name of plot output file:
Pier Drilled Shaft X-direction row 2.lp12p

Name of runtime message file:
Pier Drilled Shaft X-direction row 2.lp12r

Date and Time of Analysis

Date: August 29, 2024

Time: 8:05:42

Problem Title

-

Project Name: MEG-33-19.21

Job Number: 173609140

Client: ODOT

Engineer: G. Khatri

Description: Pier Drilled Shaft Lateral Load Analysis at Oldtown Creek

- Program Options and Settings

Performed by: G. Khatri 8/29/2024

Checked by: J. Samples 8/30/2024

Computational Options:

- Conventional Analysis

Engineering Units Used for Data Input and Computations:

- US Customary System Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed = 500
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 100.0000 in
- Number of pile increments = 100

Loading Type and Number of Cycles of Loading:

- Static loading specified

- Analysis uses p-y modification factors for p-y curves
- Analysis uses layering correction (Method of Georgiadis)
- No distributed lateral loads are entered
- Loading by lateral soil movements acting on pile not selected
- Input of shear resistance at the pile tip not selected
- Input of moment resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:

- Output files use decimal points to denote decimal symbols.
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1
- No p-y curves to be computed and reported for user-specified depths
- Print using wide report formats

Pile Structural Properties and Geometry

Number of pile sections defined = 2

Total length of pile = 31.000 ft
Depth of ground surface below top of pile = 0.0000 ft

Pile diameters used for p-y curve computations are defined using 4 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile. A summary of values of pile diameter vs. depth follows.

Point No.	Depth Below Pile Head feet	Pile Diameter inches
1	0.000	60.0000
2	21.000	60.0000
3	21.000	54.0000
4	31.000	54.0000

Input Structural Properties for Pile Sections:

Pile Section No. 1:

Section 1 is a round drilled shaft, bored pile, or CIDH pile
Length of section = 21.000000 ft
Shaft Diameter = 60.000000 in

Pile Section No. 2:

Section 2 is a round drilled shaft, bored pile, or CIDH pile
Length of section = 10.000000 ft
Shaft Diameter = 54.000000 in

Soil and Rock Layering Information

The soil profile is modelled using 2 layers

Layer 1 is stiff clay with user-defined k-value

Distance from top of pile to top of layer	=	0.0000	ft
Distance from top of pile to bottom of layer	=	21.000000	ft
Effective unit weight at top of layer	=	122.000000	pcf
Effective unit weight at bottom of layer	=	122.000000	pcf
Undrained cohesion at top of layer	=	2000.	psf
Undrained cohesion at bottom of layer	=	2000.	psf
Epsilon-50 at top of layer	=	0.0000	
Epsilon-50 at bottom of layer	=	0.0000	
Subgrade k at top of layer	=	0.0000	pci
Subgrade k at bottom of layer	=	0.0000	pci

NOTE: Default values for Epsilon-50 will be computed for this layer.

NOTE: Default values for subgrade k will be computed for this layer.

Layer 2 is weak rock, p-y criteria by Reese, 1997

Distance from top of pile to top of layer	=	21.000000	ft
Distance from top of pile to bottom of layer	=	35.000000	ft
Effective unit weight at top of layer	=	77.600000	pcf
Effective unit weight at bottom of layer	=	77.600000	pcf
Uniaxial compressive strength at top of layer	=	425.000000	psi
Uniaxial compressive strength at bottom of layer	=	425.000000	psi
Initial modulus of rock at top of layer	=	38250.	psi
Initial modulus of rock at bottom of layer	=	38250.	psi
RQD of rock at top of layer	=	53.000000	%
RQD of rock at bottom of layer	=	53.000000	%
k _{rm} of rock at top of layer	=	0.0000500	
k _{rm} of rock at bottom of layer	=	0.0000500	

(Depth of the lowest soil layer extends 4.000 ft below the pile tip)

Summary of Input Soil Properties

Layer	Soil Type	Layer	Effective	Cohesion	Uniaxial	E50
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Rock Mass Num.	Name	Depth	Unit Wt.	qu	RQD %	or	kpy
Modulus (p-y Curve Type) psi		ft	pcf	psf	psi	krm	pci
1	Stiff Clay w/o	0.00	122.0000	2000.	--	--	default
default	--						
Free Water, using k		21.0000	122.0000	2000.	--	--	default
default	--						
2	Weak	21.0000	77.6000	--	425.0000	53.0000	5.00E-05
	38250.						--
	Rock	35.0000	77.6000	--	425.0000	53.0000	5.00E-05
	38250.						--

Modification Factors for p-y Curves

Distribution of p-y modifiers with depth defined using 3 points

Point No.	Depth X ft	p-mult	y-mult
1	0.000	0.3400	1.0000
2	21.000	0.3400	1.0000
3	31.000	0.3400	1.0000

Static Loading Type

Static loading criteria were used when computing p-y curves for all analyses.

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 4

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length	Run Analysis
1	1	V = 18610. lbs	M = 10372800. in-lbs	775400.	No	Yes
2	1	V = 24300. lbs	M = 13596000. in-lbs	995700.	No	Yes
3	1	V = 10710. lbs	M = 5701200. in-lbs	1030000.	No	Yes
4	1	V = 14410. lbs	M = 7675200. in-lbs	1340000.	No	Yes

V = shear force applied normal to pile axis

M = bending moment applied to pile head

y = lateral deflection normal to pile axis

S = pile slope relative to original pile batter angle

R = rotational stiffness applied to pile head

Values of top y vs. pile lengths can be computed only for load types with specified shear loading (Load Types 1, 2, and 3).

Thrust force is assumed to be acting axially for all pile batter angles.

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 2

Pile Section No. 1:

Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section = 21.000000 ft
Shaft Diameter = 60.000000 in

Performed by: G. Khatri 8/29/2024

Checked by: J. Samples 8/30/2024

Concrete Cover Thickness (to edge of trans. reinf.) = 3.000000 in
 Number of Reinforcing Bars = 24 bars
 Yield Stress of Reinforcing Bars = 50000. psi
 Modulus of Elasticity of Reinforcing Bars = 29000000. psi
 Gross Area of Shaft = 2827. sq. in.
 Total Area of Reinforcing Steel = 24.000000 sq. in.
 Area Ratio of Steel Reinforcement = 0.85 percent
 Edge-to-Edge Bar Spacing = 5.610023 in
 Maximum Concrete Aggregate Size = 0.750000 in
 Ratio of Bar Spacing to Aggregate Size = 7.48
 Offset of Center of Rebar Cage from Center of Pile Transverse Reinforcement = 0.0000 in
 Type: Spiral
 Number of Transverse Reinf. (per spacing) = 1
 Spacing of Transverse Reinf. = 3.250000 in
 Yield Stress of Transverse Reinf. = 50000. psi
 Diameter of Transverse Reinf. = 0.625000 in

Axial Structural Capacities:

Nom. Axial Structural Capacity = $0.85 F_c A_c + F_y A_s$ = 10731.674 kips
 Tensile Load for Cracking of Concrete = -1246.273 kips
 Nominal Axial Tensile Capacity = -1200.000 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.128000	1.000000	25.811000	0.000000
2	1.128000	1.000000	24.931512	6.680378
3	1.128000	1.000000	22.352982	12.905500
4	1.128000	1.000000	18.251133	18.251133
5	1.128000	1.000000	12.905500	22.352982
6	1.128000	1.000000	6.680378	24.931512
7	1.128000	1.000000	0.000000	25.811000
8	1.128000	1.000000	-6.680378	24.931512
9	1.128000	1.000000	-12.905500	22.352982
10	1.128000	1.000000	-18.251133	18.251133

11	1.128000	1.000000	-22.35298	12.905500
12	1.128000	1.000000	-24.93151	6.680378
13	1.128000	1.000000	-25.81100	0.000000
14	1.128000	1.000000	-24.93151	-6.68038
15	1.128000	1.000000	-22.35298	-12.90550
16	1.128000	1.000000	-18.25113	-18.25113
17	1.128000	1.000000	-12.90550	-22.35298
18	1.128000	1.000000	-6.68038	-24.93151
19	1.128000	1.000000	0.00000	-25.81100
20	1.128000	1.000000	6.680378	-24.93151
21	1.128000	1.000000	12.905500	-22.35298
22	1.128000	1.000000	18.251133	-18.25113
23	1.128000	1.000000	22.352982	-12.90550
24	1.128000	1.000000	24.931512	-6.68038

NOTE: The positions of the above rebars were computed by LPILE

Minimum spacing between any two bars not equal to zero = 5.610 inches
between bars 9 and 10.

Ratio of bar spacing to maximum aggregate size = 7.48

Concrete Properties:

Compressive Strength of Concrete	=	4000. psi
Modulus of Elasticity of Concrete	=	3604997. psi
Modulus of Rupture of Concrete	=	-474.34165 psi
Compression Strain at Peak Stress	=	0.001886
Tensile Strain at Fracture of Concrete	=	-0.0001154
Maximum Coarse Aggregate Size	=	0.750000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 4

Number	Axial Thrust Force kips
-----	-----
1	775.400

2	995.700
3	1030.000
4	1340.000

Definitions of Run Messages and Notes:

- C = concrete in section has cracked in tension.
- Y = stress in reinforcing steel has reached yield stress.
- T = ACI 318 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than 0.003. See ACI 318-14, Section 21.2.3.
- Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
 Position of neutral axis is measured from edge of compression side of pile.
 Compressive stresses and strains are positive in sign.
 Tensile stresses and strains are negative in sign.

Axial Thrust Force = 775.400 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
4.16667E-07	1170.	2807882912.	180.2399004	0.00007510	0.00005010	0.3116622	2.1307738	
8.33333E-07	2340.	2807848909.	105.1561645	0.00008763	0.00003763	0.3620105	2.4470240	
0.00000125	3510.	2807780733.	80.1443465	0.0001002	0.00002518	0.4120935	2.7638576	
0.00000167	4679.	2807682699.	67.6505090	0.0001128	0.00001275	0.4619097	3.0812746	
0.00000208	5849.	2807555665.	60.1638646	0.0001253	3.41385E-07	0.5114573	3.3992752	
0.00000250	7018.	2807309139.	55.1805532	0.0001380	-0.00001205	0.5607321	3.7178401	
0.00000292	8186.	2806530361.	51.6263117	0.0001506	-0.00002442	0.6097164	4.0368505	
0.00000333	9350.	2805038343.	48.9639277	0.0001632	-0.00003679	0.6583920	4.3561797	
0.00000375	10511.	2802870481.	46.8953199	0.0001759	-0.00004914	0.7067464	4.6757410	
0.00000417	11667.	2800125683.	45.2418873	0.0001885	-0.00006149	0.7547715	4.9954781	
0.00000458	12819.	2796904194.	43.8901127	0.0002012	-0.00007384	0.8024618	5.3153525	
0.00000500	13966.	2793292558.	42.7644002	0.0002138	-0.00008618	0.8498136	5.6353380	
0.00000542	15109.	2789361587.	41.8124648	0.0002265	-0.00009852	0.8968241	5.9554164	

0.00000583	15109.	2590121473.	38.1002239	0.0002223	-0.000128	0.8805235	5.7855379 C
0.00000625	15109.	2417446709.	37.0474332	0.0002315	-0.000143	0.9147747	6.0079723 C
0.00000667	15109.	2266356289.	36.0999229	0.0002407	-0.000159	0.9481869	6.2253184 C
0.00000708	15109.	2133041213.	35.2413276	0.0002496	-0.000175	0.9808285	6.4380310 C
0.00000750	15109.	2014538924.	34.4586116	0.0002584	-0.000192	1.0127581	6.6464980 C
0.00000792	15109.	1908510559.	33.7395553	0.0002671	-0.000208	1.0439772	6.8506646 C
0.00000833	15109.	1813085031.	33.0778766	0.0002756	-0.000224	1.0745933	7.0513202 C
0.00000875	15109.	1726747649.	32.4662697	0.0002841	-0.000241	1.1046413	7.2486910 C
0.00000917	15109.	1648259119.	31.8988532	0.0002924	-0.000258	1.1341587	7.4430285 C
0.00000958	15227.	1588943374.	31.3708685	0.0003006	-0.000274	1.1631858	7.6346122 C
0.00001000	15521.	1552130179.	30.8784543	0.0003088	-0.000291	1.1917655	7.8237517 C
0.00001042	15807.	1517470385.	30.4156325	0.0003168	-0.000308	1.2198397	8.0099307 C
0.00001083	16087.	1484933561.	29.9815234	0.0003248	-0.000325	1.2475102	-8.205555 C
0.00001125	16362.	1454408119.	29.5745262	0.0003327	-0.000342	1.2748437	-8.653936 C
0.00001167	16632.	1425619866.	29.1906828	0.0003406	-0.000359	1.3018003	-9.104319 C
0.00001208	16897.	1398369155.	28.8268836	0.0003483	-0.000377	1.3283537	-9.556955 C
0.00001250	17159.	1372758024.	28.4852010	0.0003561	-0.000394	1.3546837	-10.010365 C
0.00001292	17416.	1348307513.	28.1578629	0.0003637	-0.000411	1.3805420	-10.466659 C
0.00001333	17671.	1325295546.	27.8500509	0.0003713	-0.000429	1.4062309	-10.923314 C
0.00001375	17920.	1303300593.	27.5546684	0.0003789	-0.000446	1.4315022	-11.382451 C
0.00001417	18169.	1282551044.	27.2763754	0.0003864	-0.000464	1.4566361	-11.841706 C
0.00001458	18413.	1262628142.	27.0076065	0.0003939	-0.000481	1.4813334	-12.303658 C
0.00001500	18657.	1243798015.	26.7540959	0.0004013	-0.000499	1.5059266	-12.765468 C
0.00001542	18896.	1225717049.	26.5092654	0.0004087	-0.000516	1.5301410	-13.229524 C
0.00001583	19135.	1208504414.	26.2761458	0.0004160	-0.000534	1.5541757	-13.694120 C
0.00001625	19372.	1192103136.	26.0539492	0.0004234	-0.000552	1.5780375	-14.159201 C
0.00001708	19838.	1161237075.	25.6332269	0.0004379	-0.000587	1.6249164	-15.093747 C
0.00001792	20298.	1132888714.	25.2451228	0.0004523	-0.000623	1.6709591	-16.031680 C
0.00001875	20754.	1106854481.	24.8884238	0.0004667	-0.000658	1.7163654	-16.971295 C
0.00001958	21201.	1082623026.	24.5530914	0.0004808	-0.000694	1.7607660	-17.916015 C
0.00002042	21647.	1060273179.	24.2442376	0.0004950	-0.000730	1.8046733	-18.861266 C
0.00002125	22087.	1039380766.	23.9528807	0.0005090	-0.000766	1.8477011	-19.810662 C
0.00002208	22525.	1020016981.	23.6837690	0.0005230	-0.000802	1.8903205	-20.759895 C
0.00002292	22958.	1001789521.	23.4273384	0.0005369	-0.000838	1.9320321	-21.713706 C
0.00002375	23389.	984812462.	23.1896012	0.0005508	-0.000874	1.9733774	-22.667037 C
0.00002458	23817.	968833158.	22.9642851	0.0005645	-0.000910	2.0140336	-23.623003 C
0.00002542	24242.	953795724.	22.7516036	0.0005783	-0.000947	2.0541169	-24.580547 C
0.00002625	24667.	939687791.	22.5530480	0.0005920	-0.000983	2.0938395	-25.537617 C
0.00002708	25087.	926301992.	22.3625934	0.0006057	-0.001019	2.1328292	-26.497921 C
0.00002792	25506.	913646694.	22.1823141	0.0006193	-0.001056	2.1713204	-27.459193 C
0.00002875	25924.	901702588.	22.0130470	0.0006329	-0.001092	2.2094564	-28.419998 C

0.00002958	26340.	890370662.	21.8521629	0.0006465	-0.001129	2.2470949	-29.381790 C
0.00003042	26753.	879548919.	21.6966898	0.0006599	-0.001165	2.2840459	-30.346586 C
0.00003125	27165.	869284323.	21.5500208	0.0006734	-0.001202	2.3206473	-31.310919 C
0.00003208	27577.	859533344.	21.4114723	0.0006870	-0.001238	2.3568978	-32.274784 C
0.00003292	27987.	850241851.	21.2796808	0.0007005	-0.001275	2.3927299	-33.238896 C
0.00003375	28394.	841309708.	21.1508259	0.0007138	-0.001311	2.4278465	-34.206504 C
0.00003458	28801.	832790361.	21.0286447	0.0007272	-0.001348	2.4626174	-35.173647 C
0.00003542	29207.	824654571.	20.9126683	0.0007407	-0.001384	2.4970414	-36.140322 C
0.00003625	29612.	816875788.	20.8024709	0.0007541	-0.001421	2.5311173	-37.106527 C
0.00003708	30016.	809428241.	20.6975720	0.0007675	-0.001457	2.5648350	-38.072361 C
0.00003792	30418.	802224775.	20.5938170	0.0007808	-0.001494	2.5978311	-39.042007 C
0.00003875	30818.	795315618.	20.4949441	0.0007942	-0.001531	2.6304838	-40.011181 C
0.00003958	31219.	788682094.	20.4006471	0.0008075	-0.001567	2.6627919	-40.979882 C
0.00004042	31618.	782307067.	20.3106450	0.0008209	-0.001604	2.6947541	-41.948106 C
0.00004125	32017.	776174785.	20.2246797	0.0008343	-0.001641	2.7263693	-42.915852 C
0.00004208	32416.	770270743.	20.1425135	0.0008477	-0.001677	2.7576361	-43.883116 C
0.00004292	32812.	764559915.	20.0624210	0.0008610	-0.001714	2.7884024	-44.851770 C
0.00004375	33207.	759028372.	19.9840588	0.0008743	-0.001751	2.8186498	-45.822100 C
0.00004458	33602.	753690154.	19.9090028	0.0008876	-0.001787	2.8485530	-46.791943 C
0.00004542	33996.	748534542.	19.8370731	0.0009009	-0.001824	2.8781109	-47.761296 C
0.00004625	34389.	743551590.	19.7681029	0.0009143	-0.001861	2.9073221	-48.730157 C
0.00004708	34782.	738732054.	19.7019371	0.0009276	-0.001897	2.9361854	-49.698522 C
0.00004792	35160.	733780634.	19.6363340	0.0009409	-0.001934	2.9644825	-50.000000 CY
0.00004875	35503.	728271348.	19.5680141	0.0009539	-0.001971	2.9918835	-50.000000 CY
0.00004958	35793.	721874985.	19.4940654	0.0009666	-0.002008	3.0180915	-50.000000 CY
0.00005292	36822.	695850339.	19.1949422	0.0010157	-0.002159	3.1166667	-50.000000 CY
0.00005625	37634.	669048448.	18.9033654	0.0010633	-0.002312	3.2070674	-50.000000 CY
0.00005958	38349.	643615316.	18.6221461	0.0011096	-0.002465	3.2902210	-50.000000 CY
0.00006292	38911.	618445240.	18.3500651	0.0011545	-0.002620	3.3665779	-50.000000 CY
0.00006625	39459.	595607268.	18.0983209	0.0011990	-0.002776	3.4378490	-50.000000 CY
0.00006958	39962.	574306138.	17.8641601	0.0012430	-0.002932	3.5041888	-50.000000 CY
0.00007292	40332.	553121201.	17.6282576	0.0012854	-0.003090	3.5640042	-50.000000 CY
0.00007625	40683.	533546764.	17.4057630	0.0013272	-0.003248	3.6192562	-50.000000 CY
0.00007958	41031.	515572378.	17.2041727	0.0013692	-0.003406	3.6709855	-50.000000 CY
0.00008292	41372.	498955186.	17.0164475	0.0014109	-0.003564	3.7187211	-50.000000 CY
0.00008625	41698.	483455641.	16.8385703	0.0014523	-0.003723	3.7623017	-50.000000 CY
0.00008958	41938.	468147013.	16.6591606	0.0014924	-0.003883	3.8009664	-50.000000 CY
0.00009292	42149.	453618718.	16.4885350	0.0015321	-0.004043	3.8358751	-50.000000 CY
0.00009625	42348.	439975963.	16.3219243	0.0015710	-0.004204	3.8668398	-50.000000 CY
0.00009958	42544.	427223481.	16.1681550	0.0016101	-0.004365	3.8946862	-50.000000 CY
0.0001029	42739.	415274230.	16.0260028	0.0016493	-0.004526	3.9193725	-50.000000 CY

0.0001063	42930.	404048837.	15.8940016	0.0016887	-0.004686	3.9408343	-50.000000	CY
0.0001096	43112.	393416423.	15.7632840	0.0017274	-0.004848	3.9586634	-50.000000	CY
0.0001129	43291.	383391613.	15.6418181	0.0017662	-0.005009	3.9733643	-50.000000	CY
0.0001163	43468.	373921671.	15.5288333	0.0018052	-0.005170	3.9848936	-50.000000	CY
0.0001196	43613.	364709538.	15.4163875	0.0018435	-0.005331	3.9930541	-50.000000	CY
0.0001229	43728.	355754532.	15.3047041	0.0018812	-0.005494	3.9980223	-50.000000	CY
0.0001263	43825.	347130141.	15.1899912	0.0019177	-0.005657	3.9999538	-50.000000	CY
0.0001296	43920.	338930177.	15.0822865	0.0019544	-0.005821	3.9973574	-50.000000	CY
0.0001329	44012.	331128383.	14.9812359	0.0019913	-0.005984	3.9997590	-50.000000	CY
0.0001363	44103.	323692315.	14.8865484	0.0020283	-0.006147	3.9956291	-50.000000	CY
0.0001396	44192.	316597615.	14.7976598	0.0020655	-0.006309	3.9989788	-50.000000	CY
0.0001429	44279.	309822625.	14.7140344	0.0021029	-0.006472	3.9992993	-50.000000	CY
0.0001462	44359.	303308236.	14.6299046	0.0021396	-0.006635	3.9967494	-50.000000	CY
0.0001496	44437.	297069654.	14.5492578	0.0021763	-0.006799	3.9993487	-50.000000	CY
0.0001529	44513.	291093758.	14.4731566	0.0022132	-0.006962	3.9981844	-50.000000	CY
0.0001562	44588.	285360142.	14.4015887	0.0022502	-0.007125	3.9962315	-50.000000	CY
0.0001596	44661.	279859580.	14.3338145	0.0022874	-0.007288	3.9990078	-50.000000	CY
0.0001629	44733.	274577634.	14.2696135	0.0023248	-0.007450	3.9999978	-50.000000	CY
0.0001662	44804.	269495119.	14.2092706	0.0023623	-0.007613	3.9940737	-50.000000	CY
0.0001696	44871.	264597442.	14.1529234	0.0024001	-0.007775	3.9976422	50.000000	CY
0.0001729	44937.	259876636.	14.1000838	0.0024381	-0.007937	3.9996045	50.000000	CY
0.0001762	44998.	255308411.	14.0448978	0.0024754	-0.008100	3.9976431	50.000000	CY
0.0001796	45052.	250869412.	13.9907028	0.0025125	-0.008263	3.9938190	50.000000	CY
0.0001829	45098.	246550033.	13.9368733	0.0025493	-0.008426	3.9971489	50.000000	CY
0.0002029	45259.	223040971.	13.6505616	0.0027699	-0.009405	3.9990237	50.000000	CY
0.0002229	45348.	203430233.	13.4361753	0.0029951	-0.010380	3.9991187	50.000000	CY
0.0002429	45406.	186920605.	13.2601970	0.0032211	-0.011354	3.9972149	50.000000	CYT
0.0002629	45451.	172871445.	13.1242298	0.0034506	-0.012324	3.9904707	50.000000	CYT
0.0002829	45485.	160770161.	13.0183030	0.0036831	-0.013292	3.9954699	50.000000	CYT
0.0003029	45485.	150155350.	13.0074420	0.0039402	-0.014235	3.9985247	50.000000	CYT

Axial Thrust Force = 995.700 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
4.16667E-07	1159.	2782231413.	223.8132093	0.00009326	0.00006826	0.3852318	2.6572846	
8.33333E-07	2318.	2782199518.	126.9431621	0.0001058	0.00005579	0.4350748	2.9735431	
0.00000125	3478.	2782131507.	94.6693929	0.0001183	0.00004334	0.4846526	3.2903905	

Performed by: G. Khatri 8/29/2024

Checked by: J. Samples 8/30/2024

0.00000167	4637.	2782032948.	78.5446942	0.0001309	0.00003091	0.5339633	3.6078269
0.00000208	5796.	2781904954.	68.8796247	0.0001435	0.00001850	0.5830054	3.9258523
0.00000250	6954.	2781747892.	62.4443710	0.0001561	0.00000611	0.6317771	4.2444669
0.00000292	8113.	2781555363.	57.8547088	0.0001687	-0.00000626	0.6802766	4.5636691
0.00000333	9270.	2781148237.	54.4179987	0.0001814	-0.00001861	0.7284951	4.8834065
0.00000375	10426.	2780268184.	51.7488864	0.0001941	-0.00003094	0.7764163	5.2035664
0.00000417	11578.	2778833512.	49.6163023	0.0002067	-0.00004327	0.8240265	5.5240531
0.00000458	12727.	2776861439.	47.8733912	0.0002194	-0.00005558	0.8713158	5.8447966
0.00000500	13872.	2774406875.	46.4223889	0.0002321	-0.00006789	0.9182768	6.1657464
0.00000542	15012.	2771532291.	45.1956986	0.0002448	-0.00008019	0.9649044	6.4868660
0.00000583	16148.	2768296621.	44.1450927	0.0002575	-0.00009249	1.0111945	6.8081282
0.00000625	17280.	2764752074.	43.2352431	0.0002702	-0.000105	1.0571443	7.1295128
0.00000667	17280.	2591955069.	40.1297344	0.0002675	-0.000132	1.0468996	7.0044153 C
0.00000708	17280.	2439487124.	39.1419903	0.0002773	-0.000148	1.0817769	7.2392922 C
0.00000750	17280.	2303960061.	38.2409386	0.0002868	-0.000163	1.1158242	7.4691542 C
0.00000792	17280.	2182699005.	37.4150709	0.0002962	-0.000179	1.1491144	7.6945017 C
0.00000833	17280.	2073564055.	36.6535851	0.0003054	-0.000195	1.1816713	7.9154497 C
0.00000875	17280.	1974822910.	35.9504188	0.0003146	-0.000210	1.2136013	8.1327938 C
0.00000917	17280.	1885058232.	35.2980173	0.0003236	-0.000226	1.2449249	8.3466396 C
0.00000958	17337.	1809042118.	34.6903324	0.0003324	-0.000243	1.2756684	8.5571466 C
0.00001000	17680.	1768004413.	34.1225343	0.0003412	-0.000259	1.3058651	8.7645350 C
0.00001042	18013.	1729255303.	33.5906473	0.0003499	-0.000275	1.3355506	8.9690497 C
0.00001083	18337.	1692648884.	33.0913918	0.0003585	-0.000292	1.3647627	9.1709623 C
0.00001125	18653.	1658056561.	32.6220624	0.0003670	-0.000308	1.3935421	9.3705729 C
0.00001167	18961.	1625218071.	32.1786033	0.0003754	-0.000325	1.4218594	9.5675942 C
0.00001208	19261.	1594001013.	31.7585146	0.0003837	-0.000341	1.4497269	9.7620879 C
0.00001250	19556.	1564462941.	31.3620343	0.0003920	-0.000358	1.4772579	9.9549875 C
0.00001292	19845.	1536372878.	30.9858603	0.0004002	-0.000375	1.5044112	10.1459116 C
0.00001333	20127.	1509551240.	30.6271452	0.0004084	-0.000392	1.5311488	10.3344961 C
0.00001375	20407.	1484175277.	30.2883675	0.0004165	-0.000409	1.5576603	10.5223616 C
0.00001417	20680.	1459765870.	29.9624325	0.0004245	-0.000426	1.5836977	-10.738184 C
0.00001458	20951.	1436662097.	29.6544181	0.0004325	-0.000443	1.6095620	-11.184277 C
0.00001500	21216.	1414429668.	29.3577007	0.0004404	-0.000460	1.6350026	-11.632900 C
0.00001542	21481.	1393346406.	29.0767996	0.0004483	-0.000477	1.6602960	-12.081623 C
0.00001583	21739.	1372970539.	28.8045853	0.0004561	-0.000494	1.6851419	-12.533145 C
0.00001625	21996.	1353624178.	28.5466758	0.0004639	-0.000511	1.7098732	-12.984504 C
0.00001708	22500.	1317061777.	28.0578503	0.0004793	-0.000546	1.7583544	-13.892548 C
0.00001792	22994.	1283362973.	27.6065661	0.0004946	-0.000580	1.8058706	-14.804713 C
0.00001875	23480.	1252247321.	27.1894115	0.0005098	-0.000615	1.8525291	-15.720132 C
0.00001958	23957.	1223338757.	26.8007569	0.0005248	-0.000650	1.8982645	-16.639528 C
0.00002042	24427.	1196402075.	26.4372664	0.0005398	-0.000685	1.9431002	-17.562810 C

0.00002125	24893.	1171411983.	26.1004739	0.0005546	-0.000720	1.9873368	-18.487208 C
0.00002208	25349.	1147870162.	25.7805280	0.0005693	-0.000756	2.0305291	-19.417095 C
0.00002292	25804.	1125984456.	25.4841992	0.0005840	-0.000791	2.0732765	-20.346751 C
0.00002375	26250.	1105281636.	25.2012873	0.0005985	-0.000826	2.1150447	-21.281489 C
0.00002458	26696.	1085949333.	24.9383221	0.0006131	-0.000862	2.1564094	-22.215679 C
0.00002542	27135.	1067613800.	24.6866315	0.0006275	-0.000898	2.1968832	-23.154270 C
0.00002625	27572.	1050371006.	24.4504599	0.0006418	-0.000933	2.2368738	-24.093212 C
0.00002708	28006.	1034083352.	24.2271422	0.0006562	-0.000969	2.2762892	-25.033474 C
0.00002792	28436.	1018586736.	24.0130762	0.0006704	-0.001005	2.3149454	-25.977039 C
0.00002875	28864.	1003961934.	23.8120488	0.0006846	-0.001040	2.3532125	-26.920079 C
0.00002958	29289.	990058466.	23.6203546	0.0006988	-0.001076	2.3908815	-27.864829 C
0.00003042	29711.	976787115.	23.4361759	0.0007129	-0.001112	2.4278730	-28.812215 C
0.00003125	30131.	964199764.	23.2623908	0.0007269	-0.001148	2.4644812	-29.759084 C
0.00003208	30551.	952241427.	23.0981292	0.0007411	-0.001184	2.5006996	-30.705491 C
0.00003292	30966.	940725516.	22.9373970	0.0007550	-0.001220	2.5360813	-31.656468 C
0.00003375	31379.	929756869.	22.7851254	0.0007690	-0.001256	2.5710853	-32.606934 C
0.00003458	31792.	919295782.	22.6407053	0.0007830	-0.001292	2.6057100	-33.556885 C
0.00003542	32205.	909306398.	22.5035847	0.0007970	-0.001328	2.6399544	-34.506318 C
0.00003625	32612.	899645978.	22.3685420	0.0008109	-0.001364	2.6733987	-35.460195 C
0.00003708	33019.	890397714.	22.2399172	0.0008247	-0.001400	2.7064578	-36.413697 C
0.00003792	33425.	881537206.	22.1174135	0.0008386	-0.001436	2.7391420	-37.366686 C
0.00003875	33830.	873039378.	22.0006384	0.0008525	-0.001472	2.7714499	-38.319158 C
0.00003958	34235.	864872635.	21.8888154	0.0008664	-0.001509	2.8033416	-39.271589 C
0.00004042	34635.	856949026.	21.7783176	0.0008802	-0.001545	2.8345100	-40.227872 C
0.00004125	35035.	849328716.	21.6727158	0.0008940	-0.001581	2.8653072	-41.183639 C
0.00004208	35434.	841993584.	21.5717214	0.0009078	-0.001617	2.8957320	-42.138887 C
0.00004292	35832.	834926900.	21.4750683	0.0009216	-0.001653	2.9257828	-43.093613 C
0.00004375	36230.	828113229.	21.3825105	0.0009355	-0.001690	2.9554582	-44.047816 C
0.00004458	36627.	821533985.	21.2935705	0.0009493	-0.001726	2.9847331	-45.001813 C
0.00004542	37020.	815124656.	21.2050866	0.0009631	-0.001762	3.0133233	-45.959509 C
0.00004625	37413.	808931391.	21.1201848	0.0009768	-0.001798	3.0415429	-46.916677 C
0.00004708	37805.	802942627.	21.0386769	0.0009906	-0.001834	3.0693906	-47.873315 C
0.00004792	38197.	797147603.	20.9603882	0.0010044	-0.001871	3.0968648	-48.829419 C
0.00004875	38587.	791536293.	20.8851558	0.0010182	-0.001907	3.1239640	-49.784986 C
0.00004958	38962.	785795791.	20.8106761	0.0010319	-0.001943	3.1504783	-50.000000 CY
0.00005292	40140.	758545032.	20.4882173	0.0010842	-0.002091	3.2477974	-50.000000 CY
0.00005625	41047.	729725609.	20.1675236	0.0011344	-0.002241	3.3356587	-50.000000 CY
0.00005958	41851.	702398505.	19.8643207	0.0011836	-0.002391	3.4162911	-50.000000 CY
0.00006292	42494.	675394488.	19.5706558	0.0012313	-0.002544	3.4895577	-50.000000 CY
0.00006625	43053.	649859453.	19.2900031	0.0012780	-0.002697	3.5563664	-50.000000 CY
0.00006958	43604.	626646793.	19.0362427	0.0013246	-0.002850	3.6184914	-50.000000 CY

0.00007292	44084.	604583524.	18.7932416	0.0013703	-0.003005	3.6748363	-50.000000	CY
0.00007625	44450.	582950574.	18.5502059	0.0014145	-0.003161	3.7248796	-50.000000	CY
0.00007958	44809.	563043064.	18.3296633	0.0014587	-0.003316	3.7709161	-50.000000	CY
0.00008292	45153.	544561827.	18.1195092	0.0015024	-0.003473	3.8121812	-50.000000	CY
0.00008625	45492.	527444621.	17.9264406	0.0015462	-0.003629	3.8494117	-50.000000	CY
0.00008958	45826.	511548230.	17.7499418	0.0015901	-0.003785	3.8826770	-50.000000	CY
0.00009292	46082.	495951010.	17.5680627	0.0016324	-0.003943	3.9107368	-50.000000	CY
0.00009625	46289.	480926925.	17.3895994	0.0016737	-0.004101	3.9344888	-50.000000	CY
0.00009958	46493.	466878495.	17.2250775	0.0017153	-0.004260	3.9546638	-50.000000	CY
0.0001029	46693.	453693053.	17.0714231	0.0017569	-0.004418	3.9711436	-50.000000	CY
0.0001063	46881.	441232324.	16.9217109	0.0017979	-0.004577	3.9837534	-50.000000	CY
0.0001096	47066.	429502932.	16.7829506	0.0018391	-0.004736	3.9928024	-50.000000	CY
0.0001129	47249.	418439358.	16.6542039	0.0018805	-0.004894	3.9982363	-50.000000	CY
0.0001163	47428.	407983533.	16.5346482	0.0019222	-0.005053	3.9996843	-50.000000	CY
0.0001196	47598.	398035641.	16.4181426	0.0019633	-0.005212	3.9989501	-50.000000	CY
0.0001229	47763.	388584279.	16.3073175	0.0020044	-0.005371	3.9976344	-50.000000	CY
0.0001263	47896.	379372396.	16.1971223	0.0020449	-0.005530	3.9989363	-50.000000	CY
0.0001296	48003.	370443258.	16.0885736	0.0020848	-0.005690	3.9986941	-50.000000	CY
0.0001329	48098.	361864116.	15.9848200	0.0021246	-0.005850	3.9981334	-50.000000	CY
0.0001363	48190.	353684526.	15.8863130	0.0021645	-0.006010	3.9999301	-50.000000	CY
0.0001396	48272.	345831635.	15.7873161	0.0022036	-0.006171	3.9960200	-50.000000	CY
0.0001429	48353.	338333275.	15.6941374	0.0022430	-0.006332	3.9990420	-50.000000	CY
0.0001462	48433.	331166823.	15.6062762	0.0022824	-0.006493	3.9996012	-50.000000	CY
0.0001496	48509.	324291049.	15.5248363	0.0023223	-0.006653	3.9962650	50.000000	CY
0.0001529	48581.	317697490.	15.4486423	0.0023624	-0.006813	3.9990842	50.000000	CY
0.0001562	48653.	311376972.	15.3766408	0.0024026	-0.006972	3.9997792	50.000000	CY
0.0001596	48721.	305304081.	15.3092070	0.0024431	-0.007132	3.9951692	50.000000	CY
0.0001629	48780.	299419341.	15.2428553	0.0024833	-0.007292	3.9983482	50.000000	CY
0.0001662	48838.	293760625.	15.1791008	0.0025235	-0.007451	3.9998610	50.000000	CY
0.0001696	48893.	288314257.	15.1190344	0.0025639	-0.007611	3.9948926	50.000000	CY
0.0001729	48948.	283070099.	15.0622486	0.0026045	-0.007770	3.9959687	50.000000	CY
0.0001762	48995.	277985054.	15.0120221	0.0026459	-0.007929	3.9987363	50.000000	CY
0.0001796	49041.	273081110.	14.9646630	0.0026874	-0.008088	3.9999450	50.000000	CY
0.0001829	49085.	268345916.	14.9202456	0.0027292	-0.008246	3.9938030	50.000000	CY
0.0002029	49295.	242931420.	14.6918047	0.0029812	-0.009194	3.9957225	50.000000	CY
0.0002229	49359.	221422561.	14.4629932	0.0032240	-0.010151	3.9950129	50.000000	CYT
0.0002429	49396.	203346567.	14.2860560	0.0034703	-0.011105	3.9904691	50.000000	CYT
0.0002629	49414.	187947059.	14.1535848	0.0037212	-0.012054	3.9934732	50.000000	CYT
0.0002829	49414.	174660669.	14.1340409	0.0039988	-0.012976	3.9999009	50.000000	CYT

Axial Thrust Force = 1030.000 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
4.16667E-07	1158.	2778215654.	230.6346368	0.00009610	0.00007110	0.3966821	2.7397102	
8.33333E-07	2315.	2778184090.	130.3539302	0.0001086	0.00005863	0.4464460	3.0559700	
0.00000125	3473.	2778116103.	96.9432986	0.0001212	0.00004618	0.4959446	3.3728196	
0.00000167	4630.	2778017461.	80.2501868	0.0001338	0.00003375	0.5451763	3.6902590	
0.00000208	5787.	2777889314.	70.2440840	0.0001463	0.00002134	0.5941392	4.0082884	
0.00000250	6944.	2777732044.	63.5814868	0.0001590	0.00000895	0.6428318	4.3269078	
0.00000292	8101.	2777544990.	58.8294632	0.0001716	-0.00000341	0.6912522	4.6461171	
0.00000333	9257.	2777217668.	55.2712212	0.0001842	-0.00001576	0.7393946	4.9658847	
0.00000375	10412.	2776482858.	52.5078727	0.0001969	-0.00002810	0.7872437	5.2861062	
0.00000417	11563.	2775222028.	50.3001258	0.0002096	-0.00004042	0.8347852	5.6066819	
0.00000458	12712.	2773430601.	48.4958872	0.0002223	-0.00005273	0.8820084	5.9275366	
0.00000500	13856.	2771151578.	46.9939018	0.0002350	-0.00006503	0.9289054	6.2486158	
0.00000542	14996.	2768442732.	45.7241663	0.0002477	-0.00007733	0.9754705	6.5698795	
0.00000583	16131.	2765361089.	44.6367373	0.0002604	-0.00008962	1.0216994	6.8912981	
0.00000625	17262.	2761958296.	43.6950300	0.0002731	-0.000102	1.0675889	7.2128492	
0.00000667	18389.	2758279473.	42.8716346	0.0002858	-0.000114	1.1131365	7.5345160	
0.00000708	18389.	2596027739.	39.7148618	0.0002813	-0.000144	1.0964581	7.3569696	C
0.00000750	18389.	2451803976.	38.7969620	0.0002910	-0.000159	1.1308230	7.5900892	C
0.00000792	18389.	2322761661.	37.9548046	0.0003005	-0.000175	1.1643930	7.8184155	C
0.00000833	18389.	2206623578.	37.1790227	0.0003098	-0.000190	1.1972378	8.0424305	C
0.00000875	18389.	2101546265.	36.4624666	0.0003190	-0.000206	1.2294385	8.2627259	C
0.00000917	18389.	2006021435.	35.7978210	0.0003281	-0.000222	1.2610275	8.4795041	C
0.00000958	18389.	1918803111.	35.1786942	0.0003371	-0.000238	1.2920249	8.6928705	C
0.00001000	18389.	1838852982.	34.6000457	0.0003460	-0.000254	1.3224602	8.9030133	C
0.00001042	18389.	1765298863.	34.0577800	0.0003548	-0.000270	1.3523673	9.1101627	C
0.00001083	18659.	1722370911.	33.5485124	0.0003634	-0.000287	1.3817826	9.3145743	C
0.00001125	18981.	1687236850.	33.0694432	0.0003720	-0.000303	1.4107446	9.5165309	C
0.00001167	19296.	1653984280.	32.6182604	0.0003805	-0.000319	1.4392949	9.7163448	C
0.00001208	19603.	1622346693.	32.1909403	0.0003890	-0.000336	1.4673911	9.9136170	C
0.00001250	19903.	1592225417.	31.7854711	0.0003973	-0.000353	1.4950539	10.1084833	C
0.00001292	20198.	1563695787.	31.4024053	0.0004056	-0.000369	1.5224029	10.3019427	C
0.00001333	20486.	1536446561.	31.0373600	0.0004138	-0.000386	1.5493396	10.4931126	C
0.00001375	20769.	1510469760.	30.6898603	0.0004220	-0.000403	1.5759213	10.6824567	C
0.00001417	21048.	1485775705.	30.3600647	0.0004301	-0.000420	1.6022307	10.8706766	C
0.00001458	21322.	1462061758.	30.0433949	0.0004381	-0.000437	1.6281242	11.0564774	C

0.00001500	21593.	1439554012.	29.7433287	0.0004461	-0.000454	1.6538289	-11.465152 C
0.00001542	21859.	1417863548.	29.4538269	0.0004541	-0.000471	1.6791118	-11.913060 C
0.00001583	22123.	1397232931.	29.1788980	0.0004620	-0.000488	1.7042241	-12.361273 C
0.00001625	22382.	1377357443.	28.9135983	0.0004698	-0.000505	1.7289676	-12.811592 C
0.00001708	22894.	1340116312.	28.4167167	0.0004855	-0.000540	1.7777767	-13.714760 C
0.00001792	23394.	1305713983.	27.9570626	0.0005009	-0.000574	1.8255518	-14.622601 C
0.00001875	23884.	1273789786.	27.5292884	0.0005162	-0.000609	1.8722869	-15.535324 C
0.00001958	24366.	1244229866.	27.1328428	0.0005314	-0.000644	1.9182102	-16.450931 C
0.00002042	24842.	1216742749.	26.7636986	0.0005464	-0.000679	1.9633197	-17.369535 C
0.00002125	25309.	1190998615.	26.4162690	0.0005613	-0.000714	2.0074747	-18.292599 C
0.00002208	25773.	1167071087.	26.0940398	0.0005762	-0.000749	2.0510791	-19.216317 C
0.00002292	26227.	1144471042.	25.7871414	0.0005910	-0.000784	2.0936574	-20.145421 C
0.00002375	26681.	1123421113.	25.5025997	0.0006057	-0.000819	2.1358218	-21.073959 C
0.00002458	27126.	1103445251.	25.2298546	0.0006202	-0.000855	2.1769872	-22.007841 C
0.00002542	27571.	1084743985.	24.9756652	0.0006348	-0.000890	2.2177413	-22.941228 C
0.00002625	28009.	1067012690.	24.7330643	0.0006492	-0.000926	2.2577003	-23.878080 C
0.00002708	28445.	1050261447.	24.5037672	0.0006636	-0.000961	2.2970844	-24.816208 C
0.00002792	28879.	1034469597.	24.2884509	0.0006781	-0.000997	2.3360407	-25.754100 C
0.00002875	29307.	1019358381.	24.0798057	0.0006923	-0.001033	2.3740944	-26.696837 C
0.00002958	29733.	1005072351.	23.8835322	0.0007066	-0.001068	2.4117566	-27.639045 C
0.00003042	30159.	991542274.	23.6985692	0.0007208	-0.001104	2.4490224	-28.580762 C
0.00003125	30579.	978537876.	23.5181556	0.0007349	-0.001140	2.4854121	-29.527296 C
0.00003208	30998.	966185595.	23.3476758	0.0007491	-0.001176	2.5214164	-30.473309 C
0.00003292	31417.	954435830.	23.1863778	0.0007632	-0.001212	2.5570337	-31.418795 C
0.00003375	31832.	943183521.	23.0312659	0.0007773	-0.001248	2.5920656	-32.366023 C
0.00003458	32245.	932377699.	22.8812849	0.0007913	-0.001284	2.6264656	-33.315603 C
0.00003542	32656.	922059605.	22.7388684	0.0008053	-0.001320	2.6604841	-34.264663 C
0.00003625	33067.	912195533.	22.6034971	0.0008194	-0.001356	2.6941198	-35.213199 C
0.00003708	33476.	902732893.	22.4737509	0.0008334	-0.001392	2.7272871	-36.162229 C
0.00003792	33882.	893581947.	22.3464848	0.0008473	-0.001428	2.7597391	-37.114803 C
0.00003875	34286.	884806038.	22.2251554	0.0008612	-0.001464	2.7918138	-38.066857 C
0.00003958	34690.	876381351.	22.1093901	0.0008752	-0.001500	2.8235098	-39.018388 C
0.00004042	35093.	868286101.	21.9988469	0.0008891	-0.001536	2.8548257	-39.969393 C
0.00004125	35495.	860494842.	21.8929466	0.0009031	-0.001572	2.8857354	-40.920187 C
0.00004208	35894.	852920982.	21.7879743	0.0009169	-0.001608	2.9159187	-41.874968 C
0.00004292	36291.	845624764.	21.6875011	0.0009308	-0.001644	2.9457271	-42.829223 C
0.00004375	36688.	838590220.	21.5912721	0.0009446	-0.001680	2.9751592	-43.782948 C
0.00004458	37085.	831802565.	21.4990516	0.0009585	-0.001717	3.0042133	-44.736143 C
0.00004542	37480.	825248109.	21.4106212	0.0009724	-0.001753	3.0328880	-45.688803 C
0.00004625	37875.	818914212.	21.3257782	0.0009863	-0.001789	3.0611820	-46.640925 C
0.00004708	38267.	812750303.	21.2420559	0.0010001	-0.001825	3.0888765	-47.595618 C

0.00004792	38658.	806768783.	21.1606180	0.0010139	-0.001861	3.1160964	-48.551183 C
0.00004875	39048.	800977261.	21.0823475	0.0010278	-0.001897	3.1429402	-49.506206 C
0.00004958	39428.	795177218.	21.0057402	0.0010415	-0.001933	3.1692773	-50.000000 CY
0.00005292	40637.	767948917.	20.6843249	0.0010945	-0.002080	3.2667622	-50.000000 CY
0.00005625	41565.	738924891.	20.3564285	0.0011450	-0.002230	3.3538979	-50.000000 CY
0.00005958	42376.	711206119.	20.0523801	0.0011948	-0.002380	3.4343040	-50.000000 CY
0.00006292	43037.	684025505.	19.7529472	0.0012428	-0.002532	3.5067862	-50.000000 CY
0.00006625	43603.	658159196.	19.4728113	0.0012901	-0.002685	3.5733075	-50.000000 CY
0.00006958	44152.	634515603.	19.2112672	0.0013368	-0.002838	3.6342765	-50.000000 CY
0.00007292	44653.	612378461.	18.9695779	0.0013832	-0.002992	3.6901984	-50.000000 CY
0.00007625	45024.	590479406.	18.7239777	0.0014277	-0.003147	3.7394201	-50.000000 CY
0.00007958	45381.	570229221.	18.4970014	0.0014721	-0.003303	3.7842334	-50.000000 CY
0.00008292	45733.	551551164.	18.2903256	0.0015166	-0.003458	3.8249723	-50.000000 CY
0.00008625	46069.	534138621.	18.0915739	0.0015604	-0.003615	3.8609041	-50.000000 CY
0.00008958	46402.	517971392.	17.9098975	0.0016044	-0.003771	3.8928543	-50.000000 CY
0.00009292	46684.	502423802.	17.7347183	0.0016479	-0.003927	3.9202781	-50.000000 CY
0.00009625	46891.	487178732.	17.5534305	0.0016895	-0.004085	3.9427680	-50.000000 CY
0.00009958	47093.	472900239.	17.3842527	0.0017312	-0.004244	3.9615385	-50.000000 CY
0.0001029	47292.	459516404.	17.2280237	0.0017731	-0.004402	3.9766573	-50.000000 CY
0.0001063	47487.	446931998.	17.0824654	0.0018150	-0.004560	3.9880421	-50.000000 CY
0.0001096	47670.	435009891.	16.9397410	0.0018563	-0.004719	3.9955616	-50.000000 CY
0.0001129	47850.	423764686.	16.8072980	0.0018978	-0.004877	3.9994398	-50.000000 CY
0.0001163	48027.	413134718.	16.6843991	0.0019396	-0.005035	3.9970374	-50.000000 CY
0.0001196	48200.	403068579.	16.5702514	0.0019815	-0.005193	3.9998280	-50.000000 CY
0.0001229	48367.	393497313.	16.4616226	0.0020234	-0.005352	3.9974914	-50.000000 CY
0.0001263	48508.	384219545.	16.3507408	0.0020643	-0.005511	3.9998548	-50.000000 CY
0.0001296	48623.	375223263.	16.2419124	0.0021047	-0.005670	3.9967563	-50.000000 CY
0.0001329	48715.	366511106.	16.1350930	0.0021446	-0.005830	3.9995149	-50.000000 CY
0.0001363	48806.	358208368.	16.0349818	0.0021848	-0.005990	3.9961216	-50.000000 CY
0.0001396	48894.	350284507.	15.9411709	0.0022251	-0.006150	3.9983746	-50.000000 CY
0.0001429	48977.	342693405.	15.8487195	0.0022650	-0.006310	3.9999433	-50.000000 CY
0.0001462	49053.	335402263.	15.7592719	0.0023048	-0.006470	3.9953804	50.000000 CY
0.0001496	49125.	328412569.	15.6759990	0.0023449	-0.006630	3.9986206	50.000000 CY
0.0001529	49196.	321719375.	15.5973132	0.0023851	-0.006790	3.9999621	50.000000 CY
0.0001562	49265.	315297226.	15.5234156	0.0024255	-0.006949	3.9944736	50.000000 CY
0.0001596	49328.	309104325.	15.4562648	0.0024666	-0.007108	3.9980090	50.000000 CY
0.0001629	49389.	303155567.	15.3929166	0.0025078	-0.007267	3.9997833	50.000000 CY
0.0001662	49448.	297434423.	15.3332817	0.0025492	-0.007426	3.9954501	50.000000 CY
0.0001696	49504.	291916990.	15.2749074	0.0025904	-0.007585	3.9960831	50.000000 CY
0.0001729	49551.	286558488.	15.2201058	0.0026318	-0.007743	3.9988063	50.000000 CY
0.0001762	49596.	281397130.	15.1681649	0.0026734	-0.007902	3.9999594	50.000000 CY

0.0001796	49640.	276416939.	15.1194371	0.0027152	-0.008060	3.9934777	50.0000000	CY
0.0001829	49682.	271612354.	15.0733103	0.0027572	-0.008218	3.9956804	50.0000000	CY
0.0002029	49890.	245864963.	14.8406348	0.0030114	-0.009164	3.9988856	50.0000000	CYT
0.0002229	49968.	224156160.	14.6269091	0.0032606	-0.010114	3.9989839	50.0000000	CYT
0.0002429	49998.	205825369.	14.4428797	0.0035084	-0.011067	3.9967242	50.0000000	CYT
0.0002629	50003.	190184676.	14.3108522	0.0037626	-0.012012	3.9897287	50.0000000	CYT
0.0002829	50003.	176740104.	14.4337498	0.0040835	-0.012891	3.9899928	50.0000000	CYT

Axial Thrust Force = 1340.000 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
4.16667E-07	1142.	2741647292.	292.7520130	0.0001220	0.00009698	0.5001149	3.4902952	
8.33333E-07	2285.	2741618727.	161.4131204	0.0001345	0.00008451	0.5491586	3.8065671	
0.00000125	3427.	2741550952.	117.6499834	0.0001471	0.00007206	0.5979368	4.1234369	
0.00000167	4569.	2741451529.	95.7807863	0.0001596	0.00005963	0.6464479	4.4409047	
0.00000208	5711.	2741321967.	82.6691662	0.0001722	0.00004723	0.6946901	4.7589705	
0.00000250	6853.	2741162768.	73.9363359	0.0001848	0.00003484	0.7426618	5.0776344	
0.00000292	7995.	2740974141.	67.7056725	0.0001975	0.00002247	0.7903611	5.3968965	
0.00000333	9136.	2740756189.	63.0388647	0.0002101	0.00001013	0.8377865	5.7167569	
0.00000375	10277.	2740508868.	59.4146283	0.0002228	-0.00000220	0.8849360	6.0372158	
0.00000417	11417.	2740183305.	56.5200483	0.0002355	-0.00001450	0.9318059	6.3582558	
0.00000458	12557.	2739609096.	54.1555554	0.0002482	-0.00002679	0.9783847	6.6798009	
0.00000500	13693.	2738670406.	52.1880464	0.0002609	-0.00003906	1.0246603	7.0017667	
0.00000542	14827.	2737325738.	50.5254608	0.0002737	-0.00005132	1.0706226	7.3240828	
0.00000583	15958.	2735576439.	49.1021253	0.0002864	-0.00006357	1.1162636	7.6466929	
0.00000625	17084.	2733445160.	47.8699463	0.0002992	-0.00007581	1.1615771	7.9695527	
0.00000667	18206.	2730964254.	46.7929063	0.0003120	-0.00008805	1.2065581	8.2926285	
0.00000708	19325.	2728167832.	45.8434961	0.0003247	-0.000100	1.2512028	8.6158932	
0.00000750	20438.	2725088712.	45.0003441	0.0003375	-0.000112	1.2955079	8.9393249	
0.00000792	20438.	2581662990.	42.5333314	0.0003367	-0.000138	1.2923496	8.8695690	C
0.00000833	20438.	2452579840.	41.6353085	0.0003470	-0.000153	1.3275255	9.1193663	C
0.00000875	20438.	2335790324.	40.8038507	0.0003570	-0.000168	1.3618999	9.3643521	C
0.00000917	20438.	2229618037.	40.0333737	0.0003670	-0.000183	1.3955937	9.6054552	C
0.00000958	20438.	2132678122.	39.3163366	0.0003768	-0.000198	1.4286291	9.8427902	C
0.00001000	20438.	2043816534.	38.6455403	0.0003865	-0.000214	1.4609971	10.0762067	C
0.00001042	20843.	2000916983.	38.0172239	0.0003960	-0.000229	1.4927690	10.3062447	C
0.00001083	21247.	1961288150.	37.4273429	0.0004055	-0.000245	1.5239830	10.5331735	C

0.00001125	21639.	1923434994.	36.8722951	0.0004148	-0.000260	1.5546710	10.7572112	C
0.00001167	22018.	1887215894.	36.3483717	0.0004241	-0.000276	1.5848399	10.9783657	C
0.00001208	22385.	1852541879.	35.8526780	0.0004332	-0.000292	1.6145088	11.1967509	C
0.00001250	22743.	1819401030.	35.3834244	0.0004423	-0.000308	1.6437256	11.4127413	C
0.00001292	23092.	1787743256.	34.9388043	0.0004513	-0.000324	1.6725266	11.6266188	C
0.00001333	23433.	1757489135.	34.5169647	0.0004602	-0.000340	1.7009359	11.8385597	C
0.00001375	23764.	1728278771.	34.1130496	0.0004691	-0.000356	1.7288349	12.0474536	C
0.00001417	24089.	1700400498.	33.7293837	0.0004778	-0.000372	1.7564056	12.2549052	C
0.00001458	24408.	1673696043.	33.3636966	0.0004866	-0.000388	1.7836263	12.4606884	C
0.00001500	24719.	1647912062.	33.0124042	0.0004952	-0.000405	1.8104022	12.6638959	C
0.00001542	25027.	1623345009.	32.6787149	0.0005038	-0.000421	1.8369488	12.8664838	C
0.00001583	25325.	1599496852.	32.3561168	0.0005123	-0.000438	1.8630158	13.0661003	C
0.00001625	25622.	1576761084.	32.0493098	0.0005208	-0.000454	1.8888871	13.2653623	C
0.00001708	26200.	1533644509.	31.4696772	0.0005376	-0.000487	1.9395894	13.6584776	C
0.00001792	26760.	1493588902.	30.9331958	0.0005542	-0.000521	1.9890953	14.0459976	C
0.00001875	27305.	1456248777.	30.4342766	0.0005706	-0.000554	2.0374354	14.4280130	C
0.00001958	27837.	1421454107.	29.9702126	0.0005869	-0.000588	2.0847501	-14.839542	C
0.00002042	28359.	1388997810.	29.5380358	0.0006031	-0.000622	2.1311327	-15.726896	C
0.00002125	28871.	1358645971.	29.1344425	0.0006191	-0.000656	2.1766235	-16.617525	C
0.00002208	29371.	1330012369.	28.7531024	0.0006350	-0.000690	2.2210412	-17.513409	C
0.00002292	29865.	1303214704.	28.3968112	0.0006508	-0.000724	2.2647394	-18.411077	C
0.00002375	30350.	1277903360.	28.0598450	0.0006664	-0.000759	2.3075222	-19.312657	C
0.00002458	30829.	1254046133.	27.7421864	0.0006820	-0.000793	2.3495340	-20.216758	C
0.00002542	31301.	1231499968.	27.4418930	0.0006975	-0.000828	2.3907810	-21.123413	C
0.00002625	31767.	1210157163.	27.1573554	0.0007129	-0.000862	2.4312752	-22.032588	C
0.00002708	32227.	1189909437.	26.8871404	0.0007282	-0.000897	2.4710270	-22.944267	C
0.00002792	32683.	1170748531.	26.6317927	0.0007435	-0.000932	2.5101774	-23.856969	C
0.00002875	33133.	1152435781.	26.3865363	0.0007586	-0.000966	2.5484739	-24.773600	C
0.00002958	33581.	1135121702.	26.1558250	0.0007738	-0.001001	2.5863260	-25.689607	C
0.00003042	34022.	1118525161.	25.9332765	0.0007888	-0.001036	2.6233391	-26.609564	C
0.00003125	34460.	1102718457.	25.7215790	0.0008038	-0.001071	2.6597832	-27.530444	C
0.00003208	34897.	1087703207.	25.5215380	0.0008188	-0.001106	2.6957895	-28.450711	C
0.00003292	35327.	1073224088.	25.3266955	0.0008337	-0.001141	2.7309179	-29.375684	C
0.00003375	35755.	1059408950.	25.1414108	0.0008485	-0.001176	2.7655617	-30.300719	C
0.00003458	36182.	1046232824.	24.9656578	0.0008634	-0.001212	2.7997744	-31.225151	C
0.00003542	36605.	1033539781.	24.7952835	0.0008782	-0.001247	2.8332718	-32.152553	C
0.00003625	37023.	1021337085.	24.6311589	0.0008929	-0.001282	2.8661653	-33.081620	C
0.00003708	37442.	1009658616.	24.4749654	0.0009076	-0.001317	2.8986345	-34.010089	C
0.00003792	37859.	998469551.	24.3261825	0.0009224	-0.001353	2.9306772	-34.937960	C
0.00003875	38270.	987620273.	24.1802019	0.0009370	-0.001388	2.9619457	-35.869873	C
0.00003958	38680.	977180078.	24.0399893	0.0009516	-0.001423	2.9927184	-36.802221	C

Performed by: G. Khatri 8/29/2024

Checked by: J. Samples 8/30/2024

0.00004042	39089.	967148666.	23.9060653	0.0009662	-0.001459	3.0230710	-37.733974 C
0.00004125	39497.	957501034.	23.7780513	0.0009808	-0.001494	3.0530017	-38.665131 C
0.00004208	39902.	948173372.	23.6539901	0.0009954	-0.001530	3.0823713	-39.597651 C
0.00004292	40304.	939118710.	23.5325124	0.0010099	-0.001565	3.1110866	-40.532952 C
0.00004375	40705.	930389250.	23.4161309	0.0010245	-0.001601	3.1393856	-41.467659 C
0.00004458	41104.	921966682.	23.3045621	0.0010390	-0.001636	3.1672669	-42.401768 C
0.00004542	41503.	913833912.	23.1975435	0.0010536	-0.001671	3.1947284	-43.335277 C
0.00004625	41901.	905970843.	23.0946387	0.0010681	-0.001707	3.2217517	-44.268441 C
0.00004708	42294.	898289517.	22.9923108	0.0010826	-0.001742	3.2480484	-45.205791 C
0.00004792	42687.	890857570.	22.8939748	0.0010970	-0.001778	3.2739306	-46.142539 C
0.00004875	43079.	883662092.	22.7994284	0.0011115	-0.001814	3.2993966	-47.078684 C
0.00004958	43469.	876691089.	22.7084830	0.0011260	-0.001849	3.3244445	-48.014219 C
0.00005292	44954.	849520834.	22.3636573	0.0011834	-0.001992	3.4192486	-50.000000 CY
0.00005625	46067.	818974727.	22.0126939	0.0012382	-0.002137	3.5029431	-50.000000 CY
0.00005958	46936.	787731236.	21.6666505	0.0012910	-0.002284	3.5773117	-50.000000 CY
0.00006292	47745.	758865704.	21.3515317	0.0013434	-0.002432	3.6452010	-50.000000 CY
0.00006625	48390.	730413409.	21.0405429	0.0013939	-0.002581	3.7050504	-50.000000 CY
0.00006958	48961.	703624276.	20.7519814	0.0014440	-0.002731	3.7588416	-50.000000 CY
0.00007292	49511.	679012187.	20.4831115	0.0014936	-0.002881	3.8067674	-50.000000 CY
0.00007625	50033.	656169891.	20.2358221	0.0015430	-0.003032	3.8492684	-50.000000 CY
0.00007958	50418.	633520590.	19.9873889	0.0015907	-0.003184	3.8852515	-50.000000 CY
0.00008292	50776.	612377703.	19.7533582	0.0016379	-0.003337	3.9160512	-50.000000 CY
0.00008625	51130.	592806158.	19.5404277	0.0016854	-0.003490	3.9421802	-50.000000 CY
0.00008958	51466.	574508732.	19.3372985	0.0017323	-0.003643	3.9632319	-50.000000 CY
0.00009292	51795.	557437854.	19.1493923	0.0017793	-0.003796	3.9795571	-50.000000 CY
0.00009625	52117.	541474592.	18.9769479	0.0018265	-0.003948	3.9911720	-50.000000 CY
0.00009958	52359.	525777486.	18.8003015	0.0018722	-0.004103	3.9978285	-50.000000 CY
0.0001029	52559.	510698687.	18.6270575	0.0019170	-0.004258	4.0000000	-50.000000 CY
0.0001063	52755.	496518105.	18.4673442	0.0019622	-0.004413	3.9995619	-50.000000 CY
0.0001096	52946.	483155152.	18.3198966	0.0020076	-0.004567	3.9979125	-50.000000 CY
0.0001129	53123.	470459755.	18.1753414	0.0020523	-0.004723	3.9999874	-50.000000 CY
0.0001163	53293.	458436728.	18.0403211	0.0020972	-0.004878	3.9987602	-50.000000 CY
0.0001196	53460.	447053527.	17.9148542	0.0021423	-0.005033	3.9984568	-50.000000 CY
0.0001229	53622.	436249895.	17.7985339	0.0021877	-0.005187	3.9989604	-50.000000 CY
0.0001263	53778.	425965987.	17.6905213	0.0022334	-0.005342	3.9980303	50.000000 CY
0.0001296	53921.	416107952.	17.5841320	0.0022786	-0.005496	3.9986003	50.000000 CY
0.0001329	54060.	406722744.	17.4847816	0.0023240	-0.005651	3.9999991	50.000000 CY
0.0001363	54172.	397593031.	17.3913885	0.0023696	-0.005805	3.9974023	50.000000 CY
0.0001396	54269.	388790083.	17.3004441	0.0024149	-0.005960	3.9997196	50.000000 CY
0.0001429	54338.	380208647.	17.2106644	0.0024597	-0.006115	3.9949696	50.000000 CY
0.0001462	54398.	371955323.	17.1298860	0.0025052	-0.006270	3.9982769	50.000000 CY

0.0001496	54454.	364036012.	17.0496560	0.0025503	-0.006425	3.9999079	50.0000000	CY
0.0001529	54504.	356431436.	16.9719687	0.0025953	-0.006580	3.9943569	50.0000000	CY
0.0001562	54551.	349128933.	16.8998212	0.0026406	-0.006734	3.9979647	50.0000000	CY
0.0001596	54597.	342122946.	16.8317104	0.0026861	-0.006889	3.9997770	50.0000000	CY
0.0001629	54641.	335390961.	16.7677494	0.0027317	-0.007043	3.9954226	50.0000000	CY
0.0001662	54683.	328917678.	16.7075941	0.0027776	-0.007197	3.9964418	50.0000000	CY
0.0001696	54723.	322692103.	16.6506691	0.0028237	-0.007351	3.9990401	50.0000000	CY
0.0001729	54763.	316699800.	16.5968041	0.0028699	-0.007505	3.9999954	50.0000000	CY
0.0001762	54800.	310920286.	16.5464741	0.0029163	-0.007659	3.9927455	50.0000000	CY
0.0001796	54836.	305348925.	16.4986665	0.0029629	-0.007812	3.9966288	50.0000000	CY
0.0001829	54867.	299956284.	16.4486905	0.0030087	-0.007966	3.9989945	50.0000000	CYT
0.0002029	55023.	271158353.	16.2065948	0.0032886	-0.008886	3.9993127	50.0000000	CYT
0.0002229	55115.	247243383.	16.0503582	0.0035779	-0.009797	3.9938090	50.0000000	CYT
0.0002429	55115.	226887153.	16.0027004	0.0038873	-0.010688	3.9895199	50.0000000	CYT

Summary of Results for Nominal Moment Capacity for Section 1

Moment values interpolated at maximum compressive strain = 0.003
or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain	Max. Tens. Strain
1	775.400	45349.238	0.00300000	-0.01040077
2	995.700	49299.782	0.00300000	-0.00926784
3	1030.000	49880.777	0.00300000	-0.00912114
4	1340.000	54861.014	0.00300000	-0.00793688

Note that the values of moment capacity in the table above are not factored by a strength reduction factor (ϕ -factor).

In ACI 318, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.75).

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318, or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Load No.	Resist. Factor	Nominal Ax. Thrust kips	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in ²
1	0.65	775.400000	45349.	504.010000	29477.	819462295.
2	0.65	995.700000	49300.	647.205000	32045.	913176837.
3	0.65	1030.	49881.	669.500000	32423.	927920599.
4	0.65	1340.	54861.	871.000000	35660.	1.0625E+09
1	0.75	775.400000	45349.	581.550000	34012.	748332032.
2	0.75	995.700000	49300.	746.775000	36975.	815864231.
3	0.75	1030.	49881.	772.500000	37411.	826398868.
4	0.75	1340.	54861.	1005.	41146.	921122453.
1	0.90	775.400000	45349.	697.860000	40814.	526761798.
2	0.90	995.700000	49300.	896.130000	44370.	587692633.
3	0.90	1030.	49881.	927.000000	44893.	598223347.
4	0.90	1340.	54861.	1206.	49375.	685106985.

Pile Section No. 2:

Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section	=	10.000000 ft
Shaft Diameter	=	54.000000 in
Concrete Cover Thickness (to edge of trans. reinf.)	=	3.000000 in
Number of Reinforcing Bars	=	24 bars
Yield Stress of Reinforcing Bars	=	50000. psi
Modulus of Elasticity of Reinforcing Bars	=	29000000. psi
Gross Area of Shaft	=	2290. sq. in.
Total Area of Reinforcing Steel	=	24.000000 sq. in.
Area Ratio of Steel Reinforcement	=	1.05 percent
Edge-to-Edge Bar Spacing	=	4.826866 in
Maximum Concrete Aggregate Size	=	0.750000 in

Ratio of Bar Spacing to Aggregate Size = 6.44
 Offset of Center of Rebar Cage from Center of Pile = 0.0000 in
 Transverse Reinforcement
 Type: Spiral
 Number of Transverse Reinf. (per spacing) = 1
 Spacing of Transverse Reinf. = 3.250000 in
 Yield Stress of Transverse Reinf. = 50000. psi
 Diameter of Transverse Reinf. = 0.625000 in

Axial Structural Capacities:

Nom. Axial Structural Capacity = $0.85 F_c A_c + F_y A_s$ = 8905.152 kips
 Tensile Load for Cracking of Concrete = -1022.841 kips
 Nominal Axial Tensile Capacity = -1200.000 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.128000	1.000000	22.811000	0.000000
2	1.128000	1.000000	22.033734	5.903921
3	1.128000	1.000000	19.754905	11.405500
4	1.128000	1.000000	16.129813	16.129813
5	1.128000	1.000000	11.405500	19.754905
6	1.128000	1.000000	5.903921	22.033734
7	1.128000	1.000000	0.000000	22.811000
8	1.128000	1.000000	-5.90392	22.033734
9	1.128000	1.000000	-11.40550	19.754905
10	1.128000	1.000000	-16.12981	16.129813
11	1.128000	1.000000	-19.75491	11.405500
12	1.128000	1.000000	-22.03373	5.903921
13	1.128000	1.000000	-22.81100	0.000000
14	1.128000	1.000000	-22.03373	-5.90392
15	1.128000	1.000000	-19.75491	-11.40550
16	1.128000	1.000000	-16.12981	-16.12981
17	1.128000	1.000000	-11.40550	-19.75491
18	1.128000	1.000000	-5.90392	-22.03373
19	1.128000	1.000000	0.000000	-22.81100

20	1.128000	1.000000	5.903921	-22.03373
21	1.128000	1.000000	11.405500	-19.75491
22	1.128000	1.000000	16.129813	-16.12981
23	1.128000	1.000000	19.754905	-11.40550
24	1.128000	1.000000	22.033734	-5.90392

NOTE: The positions of the above rebars were computed by LPILE

Minimum spacing between any two bars not equal to zero = 4.827 inches
between bars 15 and 16.

Ratio of bar spacing to maximum aggregate size = 6.44

Concrete Properties:

Compressive Strength of Concrete	=	4000. psi
Modulus of Elasticity of Concrete	=	3604997. psi
Modulus of Rupture of Concrete	=	-474.34165 psi
Compression Strain at Peak Stress	=	0.001886
Tensile Strain at Fracture of Concrete	=	-0.0001154
Maximum Coarse Aggregate Size	=	0.750000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 4

Number	Axial Thrust Force kips
-----	-----
1	775.400
2	995.700
3	1030.000
4	1340.000

Definitions of Run Messages and Notes:

C = concrete in section has cracked in tension.

Y = stress in reinforcing steel has reached yield stress.
 T = ACI 318 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than 0.003. See ACI 318-14, Section 21.2.3.
 Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
 Position of neutral axis is measured from edge of compression side of pile.
 Compressive stresses and strains are positive in sign.
 Tensile stresses and strains are negative in sign.

Axial Thrust Force = 775.400 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in ²	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	1159.	1854211651.	149.7181425	0.00009357	0.00005982	0.3863388	2.6500226	
0.00000125	2318.	1854167834.	88.4027800	0.0001105	0.00004300	0.4535887	3.0773633	
0.00000188	3476.	1854085874.	67.9837513	0.0001275	0.00002622	0.5203511	3.5057602	
0.00000250	4635.	1853969118.	57.7888080	0.0001445	0.00000947	0.5866218	3.9352136	
0.00000313	5793.	1853810447.	51.6834711	0.0001615	-0.00000724	0.6523963	4.3657208	
0.00000375	6950.	1853336842.	47.6217972	0.0001786	-0.00002392	0.7176541	4.7971580	
0.00000438	8103.	1852205927.	44.7258255	0.0001957	-0.00004057	0.7823565	5.2292578	
0.00000500	9252.	1850400801.	42.5570623	0.0002128	-0.00005721	0.8464754	5.6618240	
0.00000563	10395.	1848018162.	40.8723450	0.0002299	-0.00007384	0.9099930	6.0947325	
0.00000625	11532.	1845166118.	39.5260211	0.0002470	-0.00009046	0.9728978	6.5279038	
0.00000688	12663.	1841937362.	38.4255362	0.0002642	-0.000107	1.0351821	6.9612850	
0.00000750	12663.	1688442582.	35.2020823	0.0002640	-0.000141	1.0339818	6.8930279	C
0.00000813	12663.	1558562383.	34.0832572	0.0002769	-0.000162	1.0803347	7.2038237	C
0.00000875	12663.	1447236499.	33.0926729	0.0002896	-0.000183	1.1253288	7.5066032	C
0.00000938	12663.	1350754066.	32.2083803	0.0003020	-0.000204	1.1691110	7.8023721	C
0.00001000	12663.	1266331936.	31.4120332	0.0003141	-0.000226	1.2117574	8.0915896	C
0.00001063	12663.	1191841823.	30.6911216	0.0003261	-0.000248	1.2533985	8.3751831	C
0.00001125	12981.	1153863311.	30.0350789	0.0003379	-0.000270	1.2941287	8.6538070	C
0.00001188	13320.	1121653390.	29.4344382	0.0003495	-0.000292	1.3339931	8.9277284	C
0.00001250	13648.	1091804176.	28.8815273	0.0003610	-0.000314	1.3730319	9.1971787	C
0.00001313	13966.	1064106875.	28.3709427	0.0003724	-0.000336	1.4113200	9.4626964	C
0.00001375	14277.	1038326983.	27.8973336	0.0003836	-0.000359	1.4488874	9.7244490	C

0.00001438	14581.	1014305383.	27.4570348	0.0003947	-0.000382	1.4857997	9.9829202 C
0.00001500	14879.	991905060.	27.0471187	0.0004057	-0.000404	1.5221271	10.2386467 C
0.00001563	15172.	970999889.	26.6650959	0.0004166	-0.000427	1.5579364	-10.795660 C
0.00001625	15459.	951350220.	26.3060356	0.0004275	-0.000450	1.5931416	-11.396693 C
0.00001688	15743.	932891535.	25.9686415	0.0004382	-0.000473	1.6278196	-12.000140 C
0.00001750	16023.	915609409.	25.6531602	0.0004489	-0.000496	1.6621217	-12.604696 C
0.00001813	16298.	899186045.	25.3523309	0.0004595	-0.000519	1.6957596	-13.212987 C
0.00001875	16571.	883796002.	25.0709730	0.0004701	-0.000542	1.7291187	-13.821596 C
0.00001938	16840.	869146516.	24.8021288	0.0004805	-0.000566	1.7618880	-14.433373 C
0.00002000	17108.	855376051.	24.5500231	0.0004910	-0.000589	1.7944151	-15.045187 C
0.00002063	17371.	842208205.	24.3075862	0.0005013	-0.000612	1.8263423	-15.660356 C
0.00002125	17633.	829799127.	24.0798468	0.0005117	-0.000636	1.8580656	-16.275257 C
0.00002188	17892.	817928762.	23.8608302	0.0005220	-0.000659	1.8892665	-16.892880 C
0.00002250	18150.	806659047.	23.6530356	0.0005322	-0.000683	1.9201734	-17.511119 C
0.00002313	18406.	795954721.	23.4558879	0.0005424	-0.000706	1.9508113	-18.129751 C
0.00002375	18659.	785662210.	23.2649442	0.0005525	-0.000730	1.9809232	-18.751257 C
0.00002438	18912.	775884588.	23.0841548	0.0005627	-0.000754	2.0108387	-19.372507 C
0.00002563	19412.	757553972.	22.7439877	0.0005828	-0.000801	2.0696190	-20.618755 C
0.00002688	19908.	740779901.	22.4330646	0.0006029	-0.000848	2.1273306	-21.866874 C
0.00002813	20398.	725247053.	22.1428821	0.0006228	-0.000896	2.1836120	-23.120618 C
0.00002938	20885.	710978728.	21.8778955	0.0006427	-0.000944	2.2390760	-24.373936 C
0.00003063	21366.	697662008.	21.6280718	0.0006624	-0.000991	2.2931312	-25.633000 C
0.00003188	21845.	685347869.	21.3986627	0.0006821	-0.001039	2.3464151	-26.891305 C
0.00003313	22321.	673833170.	21.1830006	0.0007017	-0.001087	2.3985370	-28.153036 C
0.00003438	22793.	663080519.	20.9819503	0.0007213	-0.001135	2.4497269	-29.415837 C
0.00003563	23265.	653050376.	20.7959515	0.0007409	-0.001183	2.5001725	-30.677664 C
0.00003688	23732.	643567176.	20.6178980	0.0007603	-0.001231	2.5493445	-31.944479 C
0.00003813	24197.	634673136.	20.4522121	0.0007797	-0.001279	2.5977631	-33.210530 C
0.00003938	24661.	626315255.	20.2979015	0.0007992	-0.001327	2.6454431	-34.475602 C
0.00004063	25122.	618388667.	20.1504704	0.0008186	-0.001375	2.6920406	-35.743758 C
0.00004188	25581.	610883173.	20.0110348	0.0008380	-0.001423	2.7377421	-37.012893 C
0.00004313	26038.	603787118.	19.8804701	0.0008573	-0.001471	2.7827103	-38.281044 C
0.00004438	26495.	597065737.	19.7580323	0.0008768	-0.001519	2.8269416	-39.548201 C
0.00004563	26949.	590653760.	19.6405541	0.0008961	-0.001568	2.8701744	-40.817673 C
0.00004688	27400.	584537151.	19.5283823	0.0009154	-0.001616	2.9124961	-42.088449 C
0.00004813	27851.	578715459.	19.4227595	0.0009347	-0.001664	2.9540853	-43.358217 C
0.00004938	28300.	573166089.	19.3231940	0.0009541	-0.001712	2.9949381	-44.626971 C
0.00005063	28748.	567868683.	19.2292427	0.0009735	-0.001760	3.0350506	-45.894701 C
0.00005188	29195.	562791809.	19.1393504	0.0009929	-0.001808	3.0742968	-47.163133 C
0.00005313	29639.	557907983.	19.0521618	0.0010121	-0.001857	3.1125662	-48.433919 C
0.00005438	30082.	553228403.	18.9696467	0.0010315	-0.001905	3.1500984	-49.703657 C

0.00005563	30519.	548652454.	18.8906640	0.0010508	-0.001953	3.1868009	-50.000000	CY
0.00005688	30913.	543533061.	18.8087030	0.0010697	-0.002002	3.2220074	-50.000000	CY
0.00005813	31247.	537577780.	18.7204971	0.0010881	-0.002051	3.2553960	-50.000000	CY
0.00005938	31558.	531508530.	18.6330078	0.0011063	-0.002100	3.2877338	-50.000000	CY
0.00006063	31859.	525501391.	18.5447497	0.0011243	-0.002149	3.3188895	-50.000000	CY
0.00006188	32119.	519097688.	18.4534536	0.0011418	-0.002199	3.3486494	-50.000000	CY
0.00006313	32351.	512492343.	18.3612137	0.0011591	-0.002250	3.3772629	-50.000000	CY
0.00006438	32580.	506089519.	18.2725009	0.0011763	-0.002300	3.4052279	-50.000000	CY
0.00006563	32807.	499920650.	18.1876086	0.0011936	-0.002350	3.4325968	-50.000000	CY
0.00006688	33034.	493972535.	18.1063256	0.0012109	-0.002400	3.4593665	-50.000000	CY
0.00006813	33252.	488101362.	18.0243280	0.0012279	-0.002451	3.4851061	-50.000000	CY
0.00006938	33439.	482001201.	17.9393703	0.0012445	-0.002502	3.5096088	-50.000000	CY
0.00007063	33599.	475738280.	17.8528182	0.0012609	-0.002553	3.5330433	-50.000000	CY
0.00007188	33757.	469659892.	17.7692841	0.0012772	-0.002604	3.5559049	-50.000000	CY
0.00007313	33914.	463782429.	17.6889691	0.0012935	-0.002655	3.5782292	-50.000000	CY
0.00007438	34071.	458095702.	17.6117132	0.0013099	-0.002706	3.6000138	-50.000000	CY
0.00007938	34683.	436951670.	17.3193919	0.0013747	-0.002912	3.6806505	-50.000000	CY
0.00008438	35171.	416837565.	17.0412096	0.0014379	-0.003118	3.7503897	-50.000000	CY
0.00008938	35564.	397917339.	16.7718044	0.0014990	-0.003327	3.8097051	-50.000000	CY
0.00009438	35950.	380922628.	16.5336576	0.0015604	-0.003536	3.8611883	-50.000000	CY
0.00009938	36322.	365503350.	16.3151226	0.0016213	-0.003745	3.9042843	-50.000000	CY
0.0001044	36649.	351124930.	16.1096280	0.0016814	-0.003955	3.9389621	-50.000000	CY
0.0001094	36879.	337180715.	15.9047732	0.0017396	-0.004167	3.9650900	-50.000000	CY
0.0001144	37095.	324324178.	15.7109226	0.0017969	-0.004379	3.9837531	-50.000000	CY
0.0001194	37305.	312506148.	15.5365262	0.0018547	-0.004592	3.9954197	-50.000000	CY
0.0001244	37511.	301595548.	15.3786140	0.0019127	-0.004804	3.9999427	-50.000000	CY
0.0001294	37704.	291430866.	15.2274720	0.0019701	-0.005016	3.9995037	-50.000000	CY
0.0001344	37892.	281984273.	15.0908122	0.0020278	-0.005228	3.9982148	-50.000000	CY
0.0001394	38074.	273177917.	14.9669064	0.0020860	-0.005440	3.9963677	-50.000000	CY
0.0001444	38220.	264730199.	14.8454441	0.0021433	-0.005653	3.9997183	-50.000000	CY
0.0001494	38321.	256540019.	14.7157685	0.0021982	-0.005868	3.9970662	-50.000000	CY
0.0001544	38414.	248836642.	14.5954281	0.0022532	-0.006083	3.9999238	-50.000000	CY
0.0001594	38504.	241593099.	14.4852766	0.0023086	-0.006298	3.9970732	50.000000	CY
0.0001644	38591.	234775527.	14.3837293	0.0023643	-0.006512	3.9998844	50.000000	CY
0.0001694	38673.	228329273.	14.2893428	0.0024203	-0.006726	3.9958824	50.000000	CY
0.0001744	38746.	222200493.	14.1977654	0.0024757	-0.006941	3.9994262	50.000000	CY
0.0001794	38817.	216401919.	14.1129863	0.0025315	-0.007155	3.9950965	50.000000	CY
0.0001844	38882.	210885896.	14.0370804	0.0025881	-0.007368	3.9977333	50.000000	CY
0.0001894	38942.	205635045.	13.9687982	0.0026453	-0.007581	3.9999299	50.000000	CY
0.0001944	39000.	200641999.	13.9058596	0.0027030	-0.007793	3.9935915	50.000000	CY
0.0001994	39053.	195877064.	13.8493763	0.0027612	-0.008005	3.9981848	50.000000	CY

0.0002044	39101.	191319462.	13.7994662	0.0028203	-0.008216	3.9999812	50.0000000	CY
0.0002094	39146.	186964398.	13.7519184	0.0028793	-0.008427	3.9926137	50.0000000	CY
0.0002144	39188.	182799203.	13.7044340	0.0029379	-0.008638	3.9973961	50.0000000	CY
0.0002194	39227.	178814789.	13.6605108	0.0029968	-0.008849	3.9997507	50.0000000	CY
0.0002244	39264.	174992728.	13.6191624	0.0030558	-0.009060	3.9942045	50.0000000	CYT
0.0002294	39287.	171278378.	13.5747253	0.0031137	-0.009273	3.9939886	50.0000000	CYT
0.0002344	39309.	167719467.	13.5329688	0.0031718	-0.009484	3.9978837	50.0000000	CYT
0.0002394	39325.	164282750.	13.4908121	0.0032294	-0.009697	3.9997745	50.0000000	CYT
0.0002444	39334.	160958414.	13.4485158	0.0032865	-0.009910	3.9954213	50.0000000	CYT
0.0002494	39342.	157763664.	13.4088866	0.0033438	-0.010122	3.9906804	50.0000000	CYT
0.0002544	39350.	154692691.	13.3713928	0.0034013	-0.010335	3.9953097	50.0000000	CYT
0.0002594	39357.	151738294.	13.3359220	0.0034590	-0.010547	3.9983779	50.0000000	CYT
0.0002644	39363.	148891597.	13.3029337	0.0035170	-0.010759	3.9998621	50.0000000	CYT
0.0002694	39367.	146142546.	13.2732746	0.0035755	-0.010971	3.9948586	50.0000000	CYT
0.0002744	39370.	143490950.	13.2454875	0.0036342	-0.011182	3.9878237	50.0000000	CYT
0.0003044	39370.	129348104.	13.1666841	0.0040076	-0.012429	3.9893008	50.0000000	CYT

Axial Thrust Force = 995.700 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	1146.	1833550096.	185.4677369	0.0001159	0.00008217	0.4758477	3.2979840	
0.00000125	2292.	1833507654.	106.2780848	0.0001328	0.00006535	0.5422581	3.7253431	
0.00000188	3438.	1833425370.	79.9011853	0.0001498	0.00004856	0.6081807	4.1537707	
0.00000250	4583.	1833307572.	66.7274759	0.0001668	0.00003182	0.6736113	4.5832670	
0.00000313	5729.	1833155118.	58.8350451	0.0001839	0.00001511	0.7385459	5.0138322	
0.00000375	6874.	1832968271.	53.5832559	0.0002009	-0.00000156	0.8029802	5.4454666	
0.00000438	8018.	1832666346.	49.8400805	0.0002181	-0.00001820	0.8669046	5.8781290	
0.00000500	9160.	1831963675.	47.0384269	0.0002352	-0.00003481	0.9302900	6.3116219	
0.00000563	10298.	1830731126.	44.8632276	0.0002524	-0.00005139	0.9931075	6.7457453	
0.00000625	11431.	1828976067.	43.1257448	0.0002695	-0.00006796	1.0553365	7.1803537	
0.00000688	12559.	1826755056.	41.7060948	0.0002867	-0.00008452	1.1169625	7.6153464	
0.00000750	13681.	1824134653.	40.5244948	0.0003039	-0.000101	1.1779754	8.0506526	
0.00000813	13681.	1683816602.	37.9304834	0.0003082	-0.000131	1.1925007	8.1103264	C
0.00000875	13681.	1563543988.	36.7872267	0.0003219	-0.000151	1.2403844	8.4440963	C
0.00000938	13681.	1459307722.	35.7663894	0.0003353	-0.000171	1.2868735	8.7697059	C
0.00001000	13787.	1378698687.	34.8481911	0.0003485	-0.000192	1.3321030	9.0880754	C
0.00001063	14221.	1338471353.	34.0145307	0.0003614	-0.000212	1.3760952	9.3992083	C

Performed by: G. Khatri 8/29/2024

Checked by: J. Samples 8/30/2024

0.00001125	14637.	1301038339.	33.2566380	0.0003741	-0.000233	1.4190756	9.7048406 C
0.00001188	15034.	1265984351.	32.5617325	0.0003867	-0.000255	1.4610273	10.0046904 C
0.00001250	15415.	1233229182.	31.9227639	0.0003990	-0.000276	1.5020674	10.2996270 C
0.00001313	15784.	1202585451.	31.3328040	0.0004112	-0.000298	1.5422564	10.5900548 C
0.00001375	16141.	1173864013.	30.7858762	0.0004233	-0.000319	1.5816387	10.8762556 C
0.00001438	16487.	1146906398.	30.2771336	0.0004352	-0.000341	1.6202622	11.1585488 C
0.00001500	16824.	1121577411.	29.8026197	0.0004470	-0.000363	1.6581773	11.4372896 C
0.00001563	17153.	1097760242.	29.3590974	0.0004587	-0.000385	1.6954373	11.7128723 C
0.00001625	17473.	1075283863.	28.9426935	0.0004703	-0.000407	1.7320354	11.9851569 C
0.00001688	17786.	1054010560.	28.5501521	0.0004818	-0.000429	1.7679673	12.2540245 C
0.00001750	18094.	1033957808.	28.1812811	0.0004932	-0.000452	1.8033720	12.5206752 C
0.00001813	18397.	1015027282.	27.8340682	0.0005045	-0.000474	1.8382799	12.7853381 C
0.00001875	18693.	996967845.	27.5033018	0.0005157	-0.000497	1.8725197	13.0463578 C
0.00001938	18986.	979936425.	27.1920741	0.0005268	-0.000519	1.9063791	13.3063654 C
0.00002000	19274.	963698089.	26.8955646	0.0005379	-0.000542	1.9396787	-13.684772 C
0.00002063	19559.	948299420.	26.6147693	0.0005489	-0.000565	1.9725708	-14.280372 C
0.00002125	19839.	933615439.	26.3471325	0.0005599	-0.000588	2.0049845	-14.878042 C
0.00002188	20117.	919647807.	26.0927804	0.0005708	-0.000610	2.0370065	-15.476986 C
0.00002250	20391.	906275564.	25.8491098	0.0005816	-0.000633	2.0685406	-16.078181 C
0.00002313	20664.	893576309.	25.6182273	0.0005924	-0.000656	2.0997935	-16.679633 C
0.00002375	20932.	881330388.	25.3948090	0.0006031	-0.000679	2.1304687	-17.284313 C
0.00002438	21199.	869696622.	25.1832712	0.0006138	-0.000702	2.1609240	-17.888694 C
0.00002563	21724.	847766087.	24.7834441	0.0006351	-0.000749	2.2205255	-19.103184 C
0.00002688	22242.	827608935.	24.4161353	0.0006562	-0.000795	2.2787957	-20.321318 C
0.00002813	22753.	809004703.	24.0772852	0.0006772	-0.000842	2.3357734	-21.542870 C
0.00002938	23256.	791695390.	23.7608310	0.0006980	-0.000888	2.3912832	-22.769911 C
0.00003063	23756.	775695962.	23.4695750	0.0007188	-0.000935	2.4458001	-23.997515 C
0.00003188	24247.	760692374.	23.1947354	0.0007393	-0.000982	2.4988450	-25.231060 C
0.00003313	24737.	746772696.	22.9415257	0.0007599	-0.001029	2.5510439	-26.463753 C
0.00003438	25219.	733641618.	22.7006682	0.0007803	-0.001076	2.6017965	-27.702490 C
0.00003563	25700.	721394217.	22.4777657	0.0008008	-0.001123	2.6517368	-28.940139 C
0.00003688	26175.	709834802.	22.2664388	0.0008211	-0.001170	2.7004537	-30.181571 C
0.00003813	26647.	698950758.	22.0678746	0.0008413	-0.001217	2.7481750	-31.424213 C
0.00003938	27119.	688724169.	21.8828668	0.0008616	-0.001265	2.7950908	-32.665770 C
0.00004063	27584.	678981839.	21.7047391	0.0008818	-0.001312	2.8406927	-33.912636 C
0.00004188	28047.	669781773.	21.5377235	0.0009019	-0.001359	2.8854597	-35.158922 C
0.00004313	28509.	661084889.	21.3812572	0.0009221	-0.001407	2.9294273	-36.404121 C
0.00004438	28968.	652789026.	21.2312084	0.0009421	-0.001454	2.9722815	-37.652407 C
0.00004563	29423.	644889661.	21.0885613	0.0009622	-0.001502	3.0141815	-38.901779 C
0.00004688	29877.	637384239.	20.9543251	0.0009822	-0.001549	3.0552871	-40.150058 C
0.00004813	30330.	630241787.	20.8278506	0.0010023	-0.001596	3.0955939	-41.397237 C

0.00004938	30780.	623388693.	20.7056604	0.0010223	-0.001644	3.1348156	-42.647451 C
0.00005063	31227.	616828687.	20.5889843	0.0010423	-0.001691	3.1731171	-43.898429 C
0.00005188	31673.	610560195.	20.4786719	0.0010623	-0.001739	3.2106239	-45.148292 C
0.00005313	32117.	604562467.	20.3742800	0.0010824	-0.001786	3.2473315	-46.397031 C
0.00005438	32561.	598816559.	20.2754060	0.0011025	-0.001834	3.2832353	-47.644638 C
0.00005563	33001.	593270176.	20.1790568	0.0011225	-0.001881	3.3180748	-48.895340 C
0.00005688	33438.	587925289.	20.0866386	0.0011424	-0.001929	3.3520168	-50.000000 CY
0.00005813	33862.	582572552.	19.9968376	0.0011623	-0.001976	3.3849611	-50.000000 CY
0.00005938	34240.	576675741.	19.9042623	0.0011818	-0.002024	3.4164157	-50.000000 CY
0.00006063	34560.	570061710.	19.8068566	0.0012008	-0.002073	3.4462176	-50.000000 CY
0.00006188	34870.	563550764.	19.7124847	0.0012197	-0.002122	3.4751527	-50.000000 CY
0.00006313	35166.	557081170.	19.6171245	0.0012383	-0.002170	3.5028656	-50.000000 CY
0.00006438	35423.	550258121.	19.5194317	0.0012566	-0.002220	3.5292617	-50.000000 CY
0.00006563	35655.	543308435.	19.4218017	0.0012746	-0.002269	3.5545980	-50.000000 CY
0.00006688	35883.	536568424.	19.3278766	0.0012926	-0.002319	3.5792386	-50.000000 CY
0.00006813	36111.	530064239.	19.2378802	0.0013106	-0.002368	3.6032219	-50.000000 CY
0.00006938	36337.	523772283.	19.1507825	0.0013286	-0.002418	3.6264706	-50.000000 CY
0.00007063	36559.	517654099.	19.0643214	0.0013464	-0.002467	3.6488003	-50.000000 CY
0.00007188	36755.	511378054.	18.9766520	0.0013639	-0.002517	3.6700728	-50.000000 CY
0.00007313	36920.	504882373.	18.8867863	0.0013811	-0.002568	3.6902328	-50.000000 CY
0.00007438	37079.	498538975.	18.7995799	0.0013982	-0.002618	3.7097266	-50.000000 CY
0.00007938	37701.	474977822.	18.4746786	0.0014664	-0.002820	3.7810880	-50.000000 CY
0.00008438	38304.	453975793.	18.1864886	0.0015345	-0.003022	3.8422711	-50.000000 CY
0.00008938	38738.	433435114.	17.8983448	0.0015997	-0.003227	3.8914476	-50.000000 CY
0.00009438	39130.	414622873.	17.6355642	0.0016644	-0.003432	3.9311924	-50.000000 CY
0.00009938	39506.	397544822.	17.3957716	0.0017287	-0.003638	3.9617738	-50.000000 CY
0.0001044	39870.	381988107.	17.1792024	0.0017931	-0.003843	3.9834387	-50.000000 CY
0.0001094	40197.	367516830.	16.9789881	0.0018571	-0.004049	3.9961229	-50.000000 CY
0.0001144	40422.	353418085.	16.7714578	0.0019182	-0.004258	3.9996603	-50.000000 CY
0.0001194	40634.	340389779.	16.5839800	0.0019797	-0.004467	3.9999881	-50.000000 CY
0.0001244	40836.	328325794.	16.4120082	0.0020412	-0.004675	3.9998119	-50.000000 CY
0.0001294	41024.	317094067.	16.2501498	0.0021024	-0.004884	3.9990916	-50.000000 CY
0.0001344	41207.	306655360.	16.1038549	0.0021640	-0.005092	3.9973176	-50.000000 CY
0.0001394	41384.	296926259.	15.9713833	0.0022260	-0.005300	3.9996678	50.000000 CY
0.0001444	41550.	287795110.	15.8460957	0.0022878	-0.005508	3.9991631	50.000000 CY
0.0001494	41707.	279211038.	15.7305525	0.0023498	-0.005716	3.9958406	50.000000 CY
0.0001544	41825.	270932482.	15.6172096	0.0024109	-0.005925	3.9996666	50.000000 CY
0.0001594	41909.	262957436.	15.5075333	0.0024715	-0.006135	3.9959222	50.000000 CY
0.0001644	41980.	255394631.	15.4086447	0.0025328	-0.006343	3.9995858	50.000000 CY
0.0001694	42045.	248234216.	15.3114914	0.0025934	-0.006553	3.9944411	50.000000 CY
0.0001744	42097.	241418412.	15.2257023	0.0026550	-0.006761	3.9988724	50.000000 CY

0.0001794	42148.	234970831.	15.1464618	0.0027169	-0.006969	3.9977130	50.0000000	CY
0.0001844	42195.	228856257.	15.0738421	0.0027792	-0.007177	3.9968569	50.0000000	CY
0.0001894	42241.	223052901.	15.0068651	0.0028419	-0.007384	3.9997179	50.0000000	CY
0.0001944	42284.	217535826.	14.9451824	0.0029050	-0.007591	3.9932419	50.0000000	CY
0.0001994	42324.	212285611.	14.8881557	0.0029683	-0.007798	3.9973663	50.0000000	CY
0.0002044	42363.	207281713.	14.8334783	0.0030316	-0.008005	3.9997956	50.0000000	CYT
0.0002094	42398.	202497749.	14.7791770	0.0030944	-0.008212	3.9934276	50.0000000	CYT
0.0002144	42431.	197929833.	14.7287649	0.0031575	-0.008419	3.9959446	50.0000000	CYT
0.0002194	42462.	193559150.	14.6827492	0.0032210	-0.008625	3.9991460	50.0000000	CYT
0.0002244	42490.	189372103.	14.6409039	0.0032851	-0.008831	3.9983028	50.0000000	CYT
0.0002294	42517.	185358795.	14.6025581	0.0033495	-0.009037	3.9918602	50.0000000	CYT
0.0002344	42542.	181512993.	14.5667171	0.0034141	-0.009242	3.9966941	50.0000000	CYT
0.0002394	42564.	177814603.	14.5346195	0.0034792	-0.009447	3.9994142	50.0000000	CYT
0.0002444	42581.	174246161.	14.5079185	0.0035454	-0.009651	3.9969994	50.0000000	CYT
0.0002494	42597.	170813754.	14.4837828	0.0036119	-0.009854	3.9904180	50.0000000	CYT
0.0002544	42605.	167490416.	14.4581005	0.0036778	-0.010058	3.9955542	50.0000000	CYT
0.0002594	42609.	164276199.	14.4318056	0.0037432	-0.010263	3.9987107	50.0000000	CYT
0.0002644	42611.	161177944.	14.4079428	0.0038091	-0.010467	3.9999776	50.0000000	CYT

Axial Thrust Force = 1030.000 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	1144.	1830311529.	191.0712566	0.0001194	0.00008567	0.4897759	3.3995478	
0.00000125	2288.	1830269302.	109.0799253	0.0001363	0.00006885	0.5560547	3.8269098	
0.00000188	3432.	1830186965.	81.7691685	0.0001533	0.00005207	0.6218456	4.2553423	
0.00000250	4575.	1830069000.	68.1285575	0.0001703	0.00003532	0.6871446	4.6848454	
0.00000313	5718.	1829916298.	59.9560071	0.0001874	0.00001861	0.7519474	5.1154194	
0.00000375	6861.	1829729148.	54.5174897	0.0002044	0.00000194	0.8162499	5.5470645	
0.00000438	8004.	1829468809.	50.6411235	0.0002216	-0.00001470	0.8800454	5.9797613	
0.00000500	9144.	1828882477.	47.7399705	0.0002387	-0.00003130	0.9433087	6.4133457	
0.00000563	10281.	1827799667.	45.4876965	0.0002559	-0.00004788	1.0060102	6.8476118	
0.00000625	11414.	1826202572.	43.6887847	0.0002731	-0.00006445	1.0681280	7.2824046	
0.00000688	12541.	1824134701.	42.2190387	0.0002903	-0.00008099	1.1296462	7.7176146	
0.00000750	13662.	1821657648.	40.9958141	0.0003075	-0.00009753	1.1905539	8.1531646	
0.00000813	14778.	1818831390.	39.9619849	0.0003247	-0.000114	1.2508428	8.5889990	
0.00000875	14778.	1688914862.	37.3311937	0.0003266	-0.000146	1.2571262	8.5821279	C
0.00000938	14778.	1576320538.	36.2902581	0.0003402	-0.000166	1.3040012	8.9121327	C

Performed by: G. Khatri 8/29/2024

Checked by: J. Samples 8/30/2024

0.00001000	14778.	1477800504.	35.3541624	0.0003535	-0.000186	1.3495996	9.2348071	C
0.00001063	14778.	1390871063.	34.5043166	0.0003666	-0.000207	1.3939406	9.5501236	C
0.00001125	14866.	1321455307.	33.7318007	0.0003795	-0.000228	1.4372546	9.8598624	C
0.00001188	15272.	1286100881.	33.0224111	0.0003921	-0.000249	1.4794785	10.1633366	C
0.00001250	15664.	1253080427.	32.3709899	0.0004046	-0.000270	1.5208103	10.4621088	C
0.00001313	16041.	1222151541.	31.7696653	0.0004170	-0.000292	1.5612814	10.7563351	C
0.00001375	16405.	1193113497.	31.2120609	0.0004292	-0.000313	1.6009250	11.0461968	C
0.00001438	16759.	1165813537.	30.6931864	0.0004412	-0.000335	1.6397869	11.3319909	C
0.00001500	17102.	1140121870.	30.2089674	0.0004531	-0.000357	1.6779153	11.6140509	C
0.00001563	17436.	1115926387.	29.7560638	0.0004649	-0.000379	1.7153616	11.8927477	C
0.00001625	17763.	1093129018.	29.3317341	0.0004766	-0.000401	1.7521798	12.1684923	C
0.00001688	18083.	1071587221.	28.9327361	0.0004882	-0.000423	1.7883744	12.4412515	C
0.00001750	18395.	1051130651.	28.5553207	0.0004997	-0.000445	1.8238964	12.7105003	C
0.00001813	18702.	1031822476.	28.2001805	0.0005111	-0.000468	1.8589198	12.9777762	C
0.00001875	19004.	1013535277.	27.8647730	0.0005225	-0.000490	1.8934315	13.2429075	C
0.00001938	19299.	996088610.	27.5452653	0.0005337	-0.000513	1.9273234	13.5048147	C
0.00002000	19592.	979619127.	27.2444383	0.0005449	-0.000535	1.9608623	13.7659743	C
0.00002063	19879.	963832077.	26.9561064	0.0005560	-0.000558	1.9937723	-14.076210	C
0.00002125	20164.	948904403.	26.6841474	0.0005670	-0.000580	2.0263773	-14.670357	C
0.00002188	20444.	934576455.	26.4229121	0.0005780	-0.000603	2.0584039	-15.267559	C
0.00002250	20723.	921011462.	26.1763234	0.0005890	-0.000626	2.0901773	-15.864674	C
0.00002313	20996.	907921321.	25.9376819	0.0005998	-0.000649	2.1213269	-16.465398	C
0.00002375	21268.	895503159.	25.7120497	0.0006107	-0.000672	2.1522511	-17.065813	C
0.00002438	21536.	883546157.	25.4942773	0.0006214	-0.000695	2.1826600	-17.668851	C
0.00002563	22068.	861194056.	25.0880765	0.0006429	-0.000741	2.2425391	-18.876804	C
0.00002688	22589.	840514705.	24.7114049	0.0006641	-0.000787	2.3008018	-20.091192	C
0.00002813	23103.	821427721.	24.3638435	0.0006852	-0.000834	2.3577483	-21.309146	C
0.00002938	23611.	803791072.	24.0434728	0.0007063	-0.000880	2.4135368	-22.529135	C
0.00003063	24111.	787292022.	23.7421796	0.0007271	-0.000927	2.4677925	-23.755408	C
0.00003188	24608.	772009428.	23.4646121	0.0007479	-0.000973	2.5211121	-24.981593	C
0.00003313	25097.	757637700.	23.2019904	0.0007686	-0.001020	2.5729838	-26.213544	C
0.00003438	25584.	744270360.	22.9595874	0.0007892	-0.001067	2.6240251	-27.444380	C
0.00003563	26064.	731628386.	22.7284160	0.0008097	-0.001114	2.6736342	-28.681187	C
0.00003688	26543.	719799222.	22.5136630	0.0008302	-0.001161	2.7223984	-29.917195	C
0.00003813	27017.	708637266.	22.3108245	0.0008506	-0.001208	2.7700549	-31.155601	C
0.00003938	27487.	698076885.	22.1186283	0.0008709	-0.001255	2.8166025	-32.396561	C
0.00004063	27955.	688133320.	21.9391924	0.0008913	-0.001302	2.8623380	-33.636420	C
0.00004188	28420.	678682404.	21.7680062	0.0009115	-0.001350	2.9069436	-34.879271	C
0.00004313	28881.	669703504.	21.6053976	0.0009317	-0.001397	2.9505309	-36.123806	C
0.00004438	29341.	661200694.	21.4528059	0.0009520	-0.001444	2.9933123	-37.367239	C
0.00004563	29799.	653121875.	21.3087093	0.0009722	-0.001492	3.0352162	-38.610495	C

Performed by: G. Khatri 8/29/2024

Checked by: J. Samples 8/30/2024

0.00004688	30252.	645374695.	21.1691473	0.0009923	-0.001539	3.0759283	-39.858034 C
0.00004813	30704.	638002870.	21.0376305	0.0010124	-0.001586	3.1158390	-41.104464 C
0.00004938	31155.	630977705.	20.9135540	0.0010326	-0.001634	3.1549441	-42.349773 C
0.00005063	31604.	624273217.	20.7963726	0.0010528	-0.001681	3.1932386	-43.593957 C
0.00005188	32049.	617808307.	20.6818414	0.0010729	-0.001728	3.2303561	-44.842649 C
0.00005313	32492.	611619818.	20.5732190	0.0010930	-0.001776	3.2666495	-46.090541 C
0.00005438	32934.	605691760.	20.4703163	0.0011131	-0.001823	3.3021363	-47.337290 C
0.00005563	33375.	600006411.	20.3727538	0.0011332	-0.001871	3.3368119	-48.582883 C
0.00005688	33815.	594547488.	20.2801853	0.0011534	-0.001918	3.3706713	-49.827313 C
0.00005813	34245.	589163679.	20.1890271	0.0011735	-0.001965	3.4033989	-50.000000 CY
0.00005938	34634.	583317140.	20.0949416	0.0011931	-0.002013	3.4346122	-50.000000 CY
0.00006063	34966.	576762934.	19.9961929	0.0012123	-0.002061	3.4641833	-50.000000 CY
0.00006188	35276.	570113585.	19.8985861	0.0012312	-0.002110	3.4926941	-50.000000 CY
0.00006313	35580.	563636949.	19.8046322	0.0012502	-0.002159	3.5204057	-50.000000 CY
0.00006438	35852.	556930811.	19.7099220	0.0012688	-0.002207	3.5469343	-50.000000 CY
0.00006563	36087.	549896813.	19.6097226	0.0012869	-0.002257	3.5718803	-50.000000 CY
0.00006688	36314.	543020162.	19.5126989	0.0013049	-0.002306	3.5960686	-50.000000 CY
0.00006813	36541.	536384245.	19.4197228	0.0013230	-0.002356	3.6195969	-50.000000 CY
0.00006938	36767.	529975927.	19.3305790	0.0013411	-0.002405	3.6424616	-50.000000 CY
0.00007063	36992.	523783016.	19.2450671	0.0013592	-0.002455	3.6646590	-50.000000 CY
0.00007188	37200.	517560774.	19.1596809	0.0013771	-0.002504	3.6859020	-50.000000 CY
0.00007313	37375.	511112219.	19.0692506	0.0013944	-0.002554	3.7057804	-50.000000 CY
0.00007438	37534.	504664696.	18.9795053	0.0014116	-0.002605	3.7248142	-50.000000 CY
0.00007938	38161.	480762948.	18.6518610	0.0014805	-0.002806	3.7948195	-50.000000 CY
0.00008438	38762.	459398932.	18.3558437	0.0015488	-0.003007	3.8540759	-50.000000 CY
0.00008938	39222.	438844712.	18.0720764	0.0016152	-0.003211	3.9020251	-50.000000 CY
0.00009438	39610.	419711668.	17.8014594	0.0016800	-0.003416	3.9396258	-50.000000 CY
0.00009938	39991.	402424433.	17.5629057	0.0017453	-0.003621	3.9683499	-50.000000 CY
0.0001044	40352.	386608799.	17.3405326	0.0018099	-0.003826	3.9877152	-50.000000 CY
0.0001094	40687.	371995273.	17.1382614	0.0018745	-0.004032	3.9980820	-50.000000 CY
0.0001144	40928.	357836453.	16.9355705	0.0019370	-0.004239	3.9980255	-50.000000 CY
0.0001194	41136.	344593813.	16.7427655	0.0019987	-0.004448	3.9973272	-50.000000 CY
0.0001244	41337.	332360969.	16.5695340	0.0020608	-0.004655	3.9979123	-50.000000 CY
0.0001294	41529.	320994686.	16.4097055	0.0021230	-0.004863	3.9999319	-50.000000 CY
0.0001344	41708.	310385445.	16.2591553	0.0021848	-0.005071	3.9991200	-50.000000 CY
0.0001394	41881.	300494771.	16.1230183	0.0022471	-0.005279	3.9968338	50.0000000 CY
0.0001444	42050.	291252961.	15.9994993	0.0023099	-0.005486	3.9999703	50.0000000 CY
0.0001494	42204.	282537935.	15.8872468	0.0023732	-0.005693	3.9984258	50.0000000 CY
0.0001544	42329.	274197157.	15.7736753	0.0024351	-0.005901	3.9978260	50.0000000 CY
0.0001594	42415.	266132075.	15.6671689	0.0024970	-0.006109	3.9986397	50.0000000 CY
0.0001644	42484.	258459346.	15.5648373	0.0025585	-0.006318	3.9979682	50.0000000 CY

0.0001694	42544.	251180109.	15.4749526	0.0026211	-0.006525	3.9979567	50.0000000	CY
0.0001744	42599.	244294239.	15.3932101	0.0026842	-0.006732	3.9999932	50.0000000	CY
0.0001794	42646.	237750125.	15.3117932	0.0027466	-0.006940	3.9959647	50.0000000	CY
0.0001844	42691.	231546915.	15.2365275	0.0028092	-0.007147	3.9994115	50.0000000	CY
0.0001894	42734.	225659880.	15.1670181	0.0028723	-0.007354	3.9954572	50.0000000	CY
0.0001944	42775.	220064041.	15.1028986	0.0029356	-0.007561	3.9968716	50.0000000	CY
0.0001994	42814.	214741957.	15.0432410	0.0029992	-0.007767	3.9996565	50.0000000	CY
0.0002044	42851.	209670024.	14.9881754	0.0030632	-0.007973	3.9943154	50.0000000	CYT
0.0002094	42887.	204831435.	14.9372385	0.0031275	-0.008179	3.9960859	50.0000000	CYT
0.0002144	42919.	200204238.	14.8910823	0.0031923	-0.008384	3.9992825	50.0000000	CYT
0.0002194	42948.	195776326.	14.8488558	0.0032575	-0.008589	3.9972165	50.0000000	CYT
0.0002244	42974.	191528503.	14.8055608	0.0033220	-0.008794	3.9930184	50.0000000	CYT
0.0002294	42999.	187461995.	14.7650702	0.0033867	-0.009000	3.9974298	50.0000000	CYT
0.0002344	43019.	183548831.	14.7303988	0.0034524	-0.009204	3.9997170	50.0000000	CYT
0.0002394	43036.	179784125.	14.7002423	0.0035189	-0.009407	3.9947270	50.0000000	CYT
0.0002444	43051.	176165934.	14.6724720	0.0035856	-0.009611	3.9924076	50.0000000	CYT
0.0002494	43064.	172689063.	14.6466598	0.0036525	-0.009814	3.9969946	50.0000000	CYT
0.0002544	43077.	169344592.	14.6229356	0.0037197	-0.010017	3.9995063	50.0000000	CYT
0.0002594	43082.	166099524.	14.5992854	0.0037867	-0.010220	3.9969980	50.0000000	CYT
0.0002644	43082.	162958161.	14.5752258	0.0038533	-0.010423	3.9880727	50.0000000	CYT

Axial Thrust Force = 1340.000 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	1125.	1800769245.	242.1866816	0.0001514	0.0001176	0.6155559	4.3260149	
0.00000125	2251.	1800728963.	134.6383873	0.0001683	0.0001008	0.6806343	4.7534040	
0.00000188	3376.	1800646120.	98.8089759	0.0001853	0.00008402	0.7452245	5.1818818	
0.00000250	4501.	1800526603.	80.9092876	0.0002023	0.00006727	0.8093224	5.6114484	
0.00000313	5626.	1800371582.	70.1814909	0.0002193	0.00005057	0.8729236	6.0421039	
0.00000375	6751.	1800181441.	63.0396428	0.0002364	0.00003390	0.9360239	6.4738487	
0.00000438	7875.	1799956338.	57.9469110	0.0002535	0.00001727	0.9986192	6.9066831	
0.00000500	8998.	1799696342.	54.1348797	0.0002707	6.74399E-07	1.0607051	7.3406076	
0.00000563	10121.	1799374101.	51.1765403	0.0002879	-0.00001588	1.1222751	7.7756044	
0.00000625	11243.	1798828854.	48.8150660	0.0003051	-0.00003241	1.1833091	8.2115432	
0.00000688	12361.	1797932485.	46.8868387	0.0003223	-0.00004890	1.2437829	8.6482572	
0.00000750	13475.	1796643811.	45.2829165	0.0003396	-0.00006538	1.3036772	9.0856094	
0.00000813	14584.	1794968743.	43.9280080	0.0003569	-0.00008183	1.3629766	9.5234932	

Performed by: G. Khatri 8/29/2024

Checked by: J. Samples 8/30/2024

0.00000875	15688.	1792933961.	42.7684286	0.0003742	-0.00009828	1.4216694	9.9618261
0.00000938	16787.	1790575111.	41.7648875	0.0003915	-0.000115	1.4797468	10.4005475
0.00001000	16787.	1678664167.	39.6581932	0.0003966	-0.000143	1.4961061	10.4829761 C
0.00001063	16787.	1579919216.	38.6690933	0.0004109	-0.000163	1.5432239	10.8333957 C
0.00001125	16787.	1492145926.	37.7684723	0.0004249	-0.000183	1.5891008	11.1768266 C
0.00001188	17117.	1441425058.	36.9454928	0.0004387	-0.000203	1.6338805	11.5143479 C
0.00001250	17598.	1407842669.	36.1869425	0.0004523	-0.000223	1.6775187	11.8453917 C
0.00001313	18059.	1375928943.	35.4872790	0.0004658	-0.000243	1.7201895	12.1713518 C
0.00001375	18502.	1345566466.	34.8388859	0.0004790	-0.000263	1.7619266	12.4923933 C
0.00001438	18926.	1316568996.	34.2345100	0.0004921	-0.000284	1.8027195	12.8082801 C
0.00001500	19335.	1288993576.	33.6705858	0.0005051	-0.000305	1.8426740	13.1198547 C
0.00001563	19731.	1262776425.	33.1430431	0.0005179	-0.000326	1.8818409	13.4274725 C
0.00001625	20115.	1237866099.	32.6485864	0.0005305	-0.000347	1.9202765	13.7315587 C
0.00001688	20488.	1214121410.	32.1831942	0.0005431	-0.000368	1.9579736	14.0319444 C
0.00001750	20851.	1191474168.	31.7441146	0.0005555	-0.000389	1.9949617	14.3288131 C
0.00001813	21205.	1169910154.	31.3297198	0.0005679	-0.000411	2.0313100	14.6227402 C
0.00001875	21551.	1149387153.	30.9383126	0.0005801	-0.000432	2.0670694	14.9141450 C
0.00001938	21890.	1129786399.	30.5672145	0.0005922	-0.000454	2.1022213	15.2027724 C
0.00002000	22220.	1110979787.	30.2135386	0.0006043	-0.000476	2.1367164	15.4880525 C
0.00002063	22545.	1093090893.	29.8787316	0.0006162	-0.000498	2.1707434	15.7717976 C
0.00002125	22863.	1075919409.	29.5590118	0.0006281	-0.000519	2.2041787	16.0527036 C
0.00002188	23176.	1059478890.	29.2541343	0.0006399	-0.000541	2.2370944	16.3314352 C
0.00002250	23485.	1043768446.	28.9639183	0.0006517	-0.000563	2.2695628	16.6086817 C
0.00002313	23787.	1028629784.	28.6851156	0.0006633	-0.000585	2.3014563	16.8830620 C
0.00002375	24087.	1014177144.	28.4198392	0.0006750	-0.000608	2.3329786	17.1566518 C
0.00002438	24380.	1000221163.	28.1641813	0.0006865	-0.000630	2.3639421	17.4274245 C
0.00002563	24958.	973988911.	27.6854310	0.0007094	-0.000674	2.4246676	17.9653670 C
0.00002688	25524.	949714375.	27.2442228	0.0007322	-0.000719	2.4837542	18.4978600 C
0.00002813	26075.	927110909.	26.8343687	0.0007547	-0.000764	2.5411448	-19.294124 C
0.00002938	26616.	906080196.	26.4539890	0.0007771	-0.000809	2.5970294	-20.475677 C
0.00003063	27149.	886512699.	26.1012931	0.0007994	-0.000854	2.6515686	-21.660220 C
0.00003188	27673.	868166585.	25.7709525	0.0008214	-0.000900	2.7046184	-22.849669 C
0.00003313	28188.	850965779.	25.4616680	0.0008434	-0.000945	2.7563000	-24.042841 C
0.00003438	28698.	834851657.	25.1729776	0.0008653	-0.000991	2.8067784	-25.237907 C
0.00003563	29199.	819622716.	24.8997500	0.0008871	-0.001037	2.8558234	-26.437927 C
0.00003688	29696.	805323329.	24.6445161	0.0009088	-0.001082	2.9037959	-27.638514 C
0.00003813	30186.	791768156.	24.4021920	0.0009303	-0.001128	2.9504241	-28.843333 C
0.00003938	30672.	778967548.	24.1742356	0.0009519	-0.001174	2.9959537	-30.049313 C
0.00004063	31153.	766854186.	23.9592185	0.0009733	-0.001220	3.0403820	-31.256577 C
0.00004188	31629.	755308418.	23.7537912	0.0009947	-0.001267	3.0835289	-32.467783 C
0.00004313	32102.	744393697.	23.5612882	0.0010161	-0.001313	3.1257702	-33.677720 C

0.00004438	32570.	733968550.	23.3770195	0.0010374	-0.001359	3.1667906	-34.891017 C
0.00004563	33034.	724025159.	23.2015899	0.0010586	-0.001405	3.2067171	-36.105977 C
0.00004688	33496.	714577388.	23.0364508	0.0010798	-0.001451	3.2457439	-37.319668 C
0.00004813	33954.	705534694.	22.8784389	0.0011010	-0.001498	3.2836610	-38.535385 C
0.00004938	34407.	696856329.	22.7265155	0.0011221	-0.001544	3.3204353	-39.753840 C
0.00005063	34859.	688574924.	22.5829632	0.0011433	-0.001590	3.3563155	-40.971018 C
0.00005188	35309.	680661402.	22.4471837	0.0011644	-0.001637	3.3912959	-42.186912 C
0.00005313	35755.	673027040.	22.3153713	0.0011855	-0.001683	3.4250922	-43.406537 C
0.00005438	36197.	665690267.	22.1891745	0.0012065	-0.001730	3.4578855	-44.626865 C
0.00005563	36638.	658654598.	22.0694544	0.0012276	-0.001776	3.4897837	-45.845892 C
0.00005688	37077.	651899831.	21.9557909	0.0012487	-0.001823	3.5207811	-47.063611 C
0.00005813	37514.	645393842.	21.8469730	0.0012699	-0.001869	3.5508036	-48.281402 C
0.00005938	37946.	639084144.	21.7404564	0.0012908	-0.001915	3.5796688	-49.503121 C
0.00006063	38374.	632974999.	21.6387830	0.0013119	-0.001962	3.6076119	-50.000000 CY
0.00006188	38781.	626762427.	21.5389265	0.0013327	-0.002009	3.6344122	-50.000000 CY
0.00006313	39131.	619892130.	21.4353290	0.0013531	-0.002056	3.6596639	-50.000000 CY
0.00006438	39443.	612700565.	21.3308975	0.0013732	-0.002103	3.6836392	-50.000000 CY
0.00006563	39746.	605651873.	21.2267386	0.0013930	-0.002151	3.7064595	-50.000000 CY
0.00006688	40037.	598689983.	21.1253810	0.0014128	-0.002198	3.7283449	-50.000000 CY
0.00006813	40293.	591459265.	21.0228522	0.0014322	-0.002247	3.7490288	-50.000000 CY
0.00006938	40526.	584157165.	20.9211224	0.0014514	-0.002295	3.7686889	-50.000000 CY
0.00007063	40754.	577053243.	20.8230494	0.0014706	-0.002343	3.7875510	-50.000000 CY
0.00007188	40979.	570142106.	20.7263883	0.0014897	-0.002392	3.8054767	-50.000000 CY
0.00007313	41201.	563432728.	20.6322414	0.0015087	-0.002440	3.8225608	-50.000000 CY
0.00007438	41422.	556935306.	20.5417937	0.0015278	-0.002488	3.8388936	-50.000000 CY
0.00007563	42135.	530840375.	20.1847362	0.0016022	-0.002684	3.8950496	-50.000000 CY
0.00008438	42748.	506648415.	19.8537054	0.0016752	-0.002881	3.9384970	-50.000000 CY
0.00008938	43339.	484907765.	19.5591973	0.0017481	-0.003078	3.9703870	-50.000000 CY
0.00009438	43799.	464098183.	19.2758263	0.0018192	-0.003277	3.9903609	-50.000000 CY
0.00009938	44181.	444590907.	19.0083133	0.0018890	-0.003477	3.9993443	-50.000000 CY
0.0001044	44546.	426783315.	18.7672422	0.0019588	-0.003677	3.9998385	-50.000000 CY
0.0001094	44893.	410448642.	18.5498156	0.0020289	-0.003877	3.9999714	-50.000000 CY
0.0001144	45221.	395371255.	18.3499275	0.0020988	-0.004077	3.9999849	-50.000000 CY
0.0001194	45496.	381118369.	18.1632504	0.0021682	-0.004278	3.9999260	50.000000 CY
0.0001244	45690.	367360259.	17.9761889	0.0022358	-0.004480	3.9995559	50.000000 CY
0.0001294	45866.	354517739.	17.8058891	0.0023036	-0.004683	3.9984825	50.000000 CY
0.0001344	46025.	342513973.	17.6565452	0.0023726	-0.004884	3.9962323	50.000000 CY
0.0001394	46172.	331276553.	17.5221480	0.0024421	-0.005084	3.9999170	50.000000 CY
0.0001444	46294.	320652268.	17.3994081	0.0025120	-0.005284	3.9984682	50.000000 CY
0.0001494	46411.	310703960.	17.2882538	0.0025824	-0.005484	3.9966984	50.000000 CY
0.0001544	46522.	301358590.	17.1881542	0.0026534	-0.005683	3.9993089	50.000000 CY

0.0001594	46628.	292570824.	17.0972461	0.0027249	-0.005881	3.9952423	50.0000000	CYT
0.0001644	46730.	284289559.	17.0145641	0.0027968	-0.006079	3.9994799	50.0000000	CYT
0.0001694	46813.	276389307.	16.9294604	0.0028674	-0.006279	3.9943866	50.0000000	CYT
0.0001744	46875.	268815417.	16.8486893	0.0029380	-0.006478	3.9989092	50.0000000	CYT
0.0001794	46911.	261522694.	16.7661239	0.0030074	-0.006679	3.9977320	50.0000000	CYT
0.0001844	46941.	254594377.	16.6916869	0.0030775	-0.006879	3.9968095	50.0000000	CYT
0.0001894	46963.	247991827.	16.6265231	0.0031486	-0.007078	3.9997156	50.0000000	CYT
0.0001944	46983.	241714613.	16.5668634	0.0032202	-0.007276	3.9931395	50.0000000	CYT
0.0001994	47000.	235738634.	16.5123033	0.0032921	-0.007474	3.9974556	50.0000000	CYT
0.0002044	47014.	230037346.	16.4620838	0.0033644	-0.007672	3.9998454	50.0000000	CYT
0.0002094	47023.	224586699.	16.4116214	0.0034362	-0.007870	3.9926107	50.0000000	CYT
0.0002144	47030.	219382332.	16.3650725	0.0035083	-0.008068	3.9964030	50.0000000	CYT
0.0002194	47036.	214409534.	16.3218650	0.0035806	-0.008266	3.9993861	50.0000000	CYT
0.0002244	47040.	209650789.	16.2821180	0.0036533	-0.008463	3.9968105	50.0000000	CYT
0.0002294	47043.	205090402.	16.2458943	0.0037264	-0.008660	3.9928521	50.0000000	CYT
0.0002344	47044.	200720165.	16.2122541	0.0037997	-0.008857	3.9973835	50.0000000	CYT
0.0002394	47044.	196527577.	16.2439165	0.0038884	-0.009038	3.9999976	50.0000000	CYT

Summary of Results for Nominal Moment Capacity for Section 2

Moment values interpolated at maximum compressive strain = 0.003
or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain	Max. Tens. Strain
1	775.400	39229.489	0.00300000	-0.00886100
2	995.700	42343.847	0.00300000	-0.00790142
3	1030.000	42814.615	0.00300000	-0.00776943
4	1340.000	46906.790	0.00300000	-0.00665738

Note that the values of moment capacity in the table above are not factored by a strength reduction factor (phi-factor).

In ACI 318, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.75).

The above values should be multiplied by the appropriate strength reduction

factor to compute ultimate moment capacity according to ACI 318, or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Load No.	Resist. Factor	Nominal Ax. Thrust kips	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in ²
1	0.65	775.400000	39229.	504.010000	25499.	612217805.
2	0.65	995.700000	42344.	647.205000	27524.	680241444.
3	0.65	1030.	42815.	669.500000	27829.	690805006.
4	0.65	1340.	46907.	871.000000	30489.	783775715.
1	0.75	775.400000	39229.	581.550000	29422.	560291897.
2	0.75	995.700000	42344.	746.775000	31758.	609412442.
3	0.75	1030.	42815.	772.500000	32111.	616940998.
4	0.75	1340.	46907.	1005.	35180.	682932737.
1	0.90	775.400000	39229.	697.860000	35307.	410299551.
2	0.90	995.700000	42344.	896.130000	38109.	460760390.
3	0.90	1030.	42815.	927.000000	38533.	467523131.
4	0.90	1340.	46907.	1206.	42216.	527657306.

Layering Correction Equivalent Depths of Soil & Rock Layers

Layer No.	Top of Layer Below Pile Head ft	Equivalent Top Depth Below Grnd Surf ft	Same Layer Type As Layer Above	Layer is Rock or is Below Rock Layer	F0 Integral for Layer lbs	F1 Integral for Layer lbs
1	0.00	0.00	N.A.	No	0.00	1039626.
2	21.0000	21.0000	No	Yes	N.A.	N.A.

Notes: The F0 integral of Layer n+1 equals the sum of the F0 and F1 integrals for Layer n. Layering correction equivalent depths are computed only for soil types with both shallow-depth and deep-depth expressions for peak lateral load transfer. These soil types are soft and stiff clays, non-liquefied sands, and cemented c-phi soil.

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 1

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 18610.0 lbs
 Applied moment at pile head = 10372800.0 in-lbs
 Axial thrust load on pile head = 775400.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in ²	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	0.1273	1.04E+07	18610.	-9.72E-04	0.00	2.80E+12	0.00	0.00	0.00
0.3100	0.1238	1.04E+07	18319.	-9.58E-04	0.00	2.80E+12	-156.529	4705.	0.00
0.6200	0.1202	1.05E+07	17511.	-9.44E-04	0.00	2.80E+12	-277.873	8598.	0.00
0.9300	0.1167	1.06E+07	16473.	-9.30E-04	0.00	2.80E+12	-280.277	8932.	0.00
1.2400	0.1133	1.06E+07	15426.	-9.16E-04	0.00	2.80E+12	-282.600	9279.	0.00
1.5500	0.1099	1.07E+07	14370.	-9.02E-04	0.00	2.80E+12	-284.843	9640.	0.00
1.8600	0.1066	1.08E+07	13307.	-8.88E-04	0.00	2.80E+12	-287.002	10017.	0.00
2.1700	0.1033	1.08E+07	12235.	-8.73E-04	0.00	2.80E+12	-289.079	10409.	0.00
2.4800	0.1001	1.09E+07	11156.	-8.59E-04	0.00	2.80E+12	-291.072	10818.	0.00
2.7900	0.09692	1.09E+07	10070.	-8.45E-04	0.00	2.80E+12	-292.980	11245.	0.00
3.1000	0.09380	1.09E+07	8976.	-8.30E-04	0.00	2.80E+12	-294.802	11691.	0.00
3.4100	0.09074	1.10E+07	7877.	-8.16E-04	0.00	2.80E+12	-296.537	12156.	0.00
3.7200	0.08774	1.10E+07	6770.	-8.01E-04	0.00	2.80E+12	-298.184	12643.	0.00
4.0300	0.08478	1.10E+07	5658.	-7.86E-04	0.00	2.80E+12	-299.744	13152.	0.00
4.3400	0.08189	1.10E+07	4540.	-7.72E-04	0.00	2.80E+12	-301.213	13684.	0.00
4.6500	0.07904	1.11E+07	3417.	-7.57E-04	0.00	2.80E+12	-302.592	14241.	0.00
4.9600	0.07625	1.11E+07	2289.	-7.42E-04	0.00	2.80E+12	-303.880	14825.	0.00

5.2700	0.07352	1.11E+07	1157.	-7.28E-04	0.00	2.80E+12	-305.074	15437.	0.00
5.5800	0.07084	1.11E+07	19.7932	-7.13E-04	0.00	2.80E+12	-306.176	16078.	0.00
5.8900	0.06821	1.11E+07	-1121.	-6.98E-04	0.00	2.80E+12	-307.182	16752.	0.00
6.2000	0.06564	1.11E+07	-2265.	-6.84E-04	0.00	2.80E+12	-308.093	17460.	0.00
6.5100	0.06313	1.11E+07	-3413.	-6.69E-04	0.00	2.80E+12	-308.907	18203.	0.00
6.8200	0.06067	1.11E+07	-4564.	-6.54E-04	0.00	2.80E+12	-309.623	18985.	0.00
7.1300	0.05826	1.10E+07	-5716.	-6.39E-04	0.00	2.80E+12	-310.239	19809.	0.00
7.4400	0.05591	1.10E+07	-6872.	-6.25E-04	0.00	2.80E+12	-310.755	20676.	0.00
7.7500	0.05361	1.10E+07	-8028.	-6.10E-04	0.00	2.80E+12	-311.168	21591.	0.00
8.0600	0.05137	1.10E+07	-9186.	-5.96E-04	0.00	2.80E+12	-311.479	22556.	0.00
8.3700	0.04918	1.09E+07	-10346.	-5.81E-04	0.00	2.80E+12	-311.685	23576.	0.00
8.6800	0.04705	1.09E+07	-11505.	-5.67E-04	0.00	2.80E+12	-311.785	24654.	0.00
8.9900	0.04496	1.08E+07	-12665.	-5.52E-04	0.00	2.80E+12	-311.778	25794.	0.00
9.3000	0.04294	1.08E+07	-13825.	-5.38E-04	0.00	2.80E+12	-311.661	27002.	0.00
9.6100	0.04096	1.07E+07	-14984.	-5.24E-04	0.00	2.80E+12	-311.434	28282.	0.00
9.9200	0.03904	1.07E+07	-16141.	-5.09E-04	0.00	2.80E+12	-311.094	29642.	0.00
10.2300	0.03717	1.06E+07	-17298.	-4.95E-04	0.00	2.80E+12	-310.640	31086.	0.00
10.5400	0.03536	1.06E+07	-18452.	-4.81E-04	0.00	2.80E+12	-310.070	32623.	0.00
10.8500	0.03359	1.05E+07	-19605.	-4.67E-04	0.00	2.80E+12	-309.382	34259.	0.00
11.1600	0.03188	1.04E+07	-20754.	-4.53E-04	0.00	2.80E+12	-308.574	36004.	0.00
11.4700	0.03022	1.03E+07	-21900.	-4.39E-04	0.00	2.80E+12	-307.644	37868.	0.00
11.7800	0.02861	1.03E+07	-23043.	-4.26E-04	0.00	2.80E+12	-306.589	39861.	0.00
12.0900	0.02705	1.02E+07	-24181.	-4.12E-04	0.00	2.80E+12	-305.407	41995.	0.00
12.4000	0.02555	1.01E+07	-25315.	-3.99E-04	0.00	2.80E+12	-304.096	44284.	0.00
12.7100	0.02409	9986969.	-26443.	-3.86E-04	0.00	2.80E+12	-302.652	46743.	0.00
13.0200	0.02268	9887599.	-27566.	-3.72E-04	0.00	2.80E+12	-301.073	49389.	0.00
13.3300	0.02132	9784025.	-28683.	-3.59E-04	0.00	2.80E+12	-299.355	52242.	0.00
13.6400	0.02000	9676271.	-29793.	-3.46E-04	0.00	2.80E+12	-297.495	55323.	0.00
13.9500	0.01874	9564364.	-30896.	-3.34E-04	0.00	2.80E+12	-295.489	58658.	0.00
14.2600	0.01752	9448330.	-31991.	-3.21E-04	0.00	2.80E+12	-293.333	62276.	0.00
14.5700	0.01635	9328201.	-33078.	-3.09E-04	0.00	2.81E+12	-291.023	66209.	0.00
14.8800	0.01523	9204009.	-34156.	-2.96E-04	0.00	2.81E+12	-288.553	70497.	0.00
15.1900	0.01415	9075789.	-35225.	-2.84E-04	0.00	2.81E+12	-285.918	75183.	0.00
15.5000	0.01311	8943577.	-36283.	-2.72E-04	0.00	2.81E+12	-283.112	80319.	0.00
15.8100	0.01212	8807413.	-37331.	-2.60E-04	0.00	2.81E+12	-280.129	85966.	0.00
16.1200	0.01117	8667339.	-38367.	-2.49E-04	0.00	2.81E+12	-276.960	92197.	0.00
16.4300	0.01027	8523400.	-39391.	-2.37E-04	0.00	2.81E+12	-273.598	99097.	0.00
16.7400	0.00941	8375641.	-40402.	-2.26E-04	0.00	2.81E+12	-270.032	106769.	0.00
17.0500	0.00859	8224114.	-41400.	-2.15E-04	0.00	2.81E+12	-266.252	115339.	0.00
17.3600	0.00781	8068870.	-42383.	-2.04E-04	0.00	2.81E+12	-262.244	124959.	0.00
17.6700	0.00707	7909967.	-43350.	-1.94E-04	0.00	2.81E+12	-257.993	135818.	0.00

17.9800	0.00636	7747464.	-44301.	-1.83E-04	0.00	2.81E+12	-253.482	148154.	0.00
18.2900	0.00570	7581423.	-45236.	-1.73E-04	0.00	2.81E+12	-248.690	162268.	0.00
18.6000	0.00508	7411911.	-46151.	-1.63E-04	0.00	2.81E+12	-243.591	178547.	0.00
18.9100	0.00449	7239000.	-47047.	-1.54E-04	0.00	2.81E+12	-238.153	197502.	0.00
19.2200	0.00393	7062766.	-47922.	-1.44E-04	0.00	2.81E+12	-232.338	219820.	0.00
19.5300	0.00341	6883290.	-48775.	-1.35E-04	0.00	2.81E+12	-226.096	246446.	0.00
19.8400	0.00293	6700659.	-49604.	-1.26E-04	0.00	2.81E+12	-219.363	278723.	0.00
20.1500	0.00248	6514966.	-50390.	-1.17E-04	0.00	2.81E+12	-203.531	305829.	0.00
20.4600	0.00206	6326432.	-51088.	-1.09E-04	0.00	2.81E+12	-171.607	310534.	0.00
20.7700	0.00167	6135499.	-51670.	-1.00E-04	0.00	2.81E+12	-141.263	315239.	0.00
21.0800	0.00131	5942588.	-61462.	-9.04E-05	0.00	1.85E+12	-5124.	1.46E+07	0.00
21.3900	9.94E-04	5678741.	-78884.	-7.88E-05	0.00	1.85E+12	-4243.	1.59E+07	0.00
21.7000	7.23E-04	5356147.	-92982.	-6.77E-05	0.00	1.85E+12	-3337.	1.72E+07	0.00
22.0100	4.91E-04	4987344.	-103725.	-5.73E-05	0.00	1.85E+12	-2439.	1.85E+07	0.00
22.3200	2.96E-04	4584760.	-111194.	-4.77E-05	0.00	1.85E+12	-1576.	1.98E+07	0.00
22.6300	1.36E-04	4160338.	-115559.	-3.89E-05	0.00	1.85E+12	-770.844	2.11E+07	0.00
22.9400	6.62E-06	3725224.	-117067.	-3.10E-05	0.00	1.85E+12	-39.863	2.24E+07	0.00
23.2500	-9.49E-05	3289536.	-116017.	-2.40E-05	0.00	1.85E+12	604.7032	2.37E+07	0.00
23.5600	-1.72E-04	2862198.	-112743.	-1.78E-05	0.00	1.85E+12	1155.	2.50E+07	0.00
23.8700	-2.27E-04	2450833.	-107601.	-1.25E-05	0.00	1.85E+12	1609.	2.63E+07	0.00
24.1800	-2.65E-04	2061719.	-100952.	-7.95E-06	0.00	1.85E+12	1966.	2.76E+07	0.00
24.4900	-2.86E-04	1699796.	-93150.	-4.18E-06	0.00	1.85E+12	2229.	2.89E+07	0.00
24.8000	-2.96E-04	1368708.	-84532.	-1.10E-06	0.00	1.85E+12	2404.	3.02E+07	0.00
25.1100	-2.95E-04	1070884.	-75411.	1.35E-06	0.00	1.85E+12	2500.	3.16E+07	0.00
25.4200	-2.86E-04	807644.	-66068.	3.23E-06	0.00	1.85E+12	2523.	3.29E+07	0.00
25.7300	-2.71E-04	579319.	-56751.	4.62E-06	0.00	1.85E+12	2486.	3.42E+07	0.00
26.0400	-2.51E-04	385389.	-47671.	5.59E-06	0.00	1.85E+12	2396.	3.55E+07	0.00
26.3500	-2.29E-04	224613.	-39003.	6.20E-06	0.00	1.85E+12	2264.	3.68E+07	0.00
26.6600	-2.05E-04	95171.	-30885.	6.52E-06	0.00	1.85E+12	2100.	3.81E+07	0.00
26.9700	-1.80E-04	-5213.	-23425.	6.62E-06	0.00	1.85E+12	1911.	3.94E+07	0.00
27.2800	-1.56E-04	-79149.	-16698.	6.53E-06	0.00	1.85E+12	1705.	4.07E+07	0.00
27.5900	-1.32E-04	-129485.	-10756.	6.32E-06	0.00	1.85E+12	1489.	4.20E+07	0.00
27.9000	-1.09E-04	-159211.	-5629.	6.03E-06	0.00	1.85E+12	1267.	4.33E+07	0.00
28.2100	-8.70E-05	-171400.	-1331.	5.70E-06	0.00	1.85E+12	1043.	4.46E+07	0.00
28.5200	-6.64E-05	-169147.	2135.	5.36E-06	0.00	1.85E+12	820.1363	4.59E+07	0.00
28.8300	-4.71E-05	-155543.	4774.	5.03E-06	0.00	1.85E+12	598.3554	4.72E+07	0.00
29.1400	-2.90E-05	-133659.	6590.	4.74E-06	0.00	1.85E+12	378.1612	4.85E+07	0.00
29.4500	-1.18E-05	-106540.	7588.	4.50E-06	0.00	1.85E+12	158.5882	4.99E+07	0.00
29.7600	4.52E-06	-77226.	7768.	4.32E-06	0.00	1.85E+12	-62.096	5.12E+07	0.00
30.0700	2.03E-05	-48771.	7120.	4.19E-06	0.00	1.85E+12	-286.138	5.25E+07	0.00
30.3800	3.57E-05	-24276.	5628.	4.12E-06	0.00	1.85E+12	-516.001	5.38E+07	0.00

30.6900	5.09E-05	-6921.	3266.	4.09E-06	0.00	1.85E+12	-754.008	5.51E+07	0.00
31.0000	6.61E-05	0.00	0.00	4.08E-06	0.00	1.85E+12	-1002.	2.82E+07	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 1:

Pile-head deflection	=	0.12734775 inches
Computed slope at pile head	=	-0.0009720 radians
Maximum bending moment	=	11083061. inch-lbs
Maximum shear force	=	-117067. lbs
Depth of maximum bending moment	=	5.58000000 feet below pile head
Depth of maximum shear force	=	22.94000000 feet below pile head
Number of iterations	=	13
Number of zero deflection points	=	2

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 2

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head	=	24300.0 lbs
Applied moment at pile head	=	13596000.0 in-lbs
Axial thrust load on pile head	=	995700.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	0.1947	1.36E+07	24300.	-0.00140	0.00	2.77E+12	0.00	0.00	0.00
0.3100	0.1895	1.37E+07	23854.	-0.00138	0.00	2.77E+12	-239.683	4705.	0.00

0.6200	0.1844	1.38E+07	22833.	-0.00136	0.00	2.77E+12	-309.241	6238.	0.00
0.9300	0.1794	1.39E+07	21678.	-0.00134	0.00	2.77E+12	-312.057	6471.	0.00
1.2400	0.1744	1.40E+07	20512.	-0.00132	0.00	2.77E+12	-314.790	6714.	0.00
1.5500	0.1695	1.40E+07	19336.	-0.00130	0.00	2.77E+12	-317.437	6965.	0.00
1.8600	0.1647	1.41E+07	18150.	-0.00129	0.00	2.77E+12	-319.999	7227.	0.00
2.1700	0.1600	1.42E+07	16955.	-0.00127	0.00	2.77E+12	-322.474	7499.	0.00
2.4800	0.1553	1.42E+07	15751.	-0.00125	0.00	2.77E+12	-324.861	7781.	0.00
2.7900	0.1507	1.43E+07	14538.	-0.00123	0.00	2.77E+12	-327.161	8076.	0.00
3.1000	0.1462	1.44E+07	13317.	-0.00121	0.00	2.77E+12	-329.370	8383.	0.00
3.4100	0.1417	1.44E+07	12088.	-0.00119	0.00	2.77E+12	-331.490	8702.	0.00
3.7200	0.1373	1.45E+07	10851.	-0.00117	0.00	2.77E+12	-333.518	9035.	0.00
4.0300	0.1330	1.45E+07	9607.	-0.00115	0.00	2.77E+12	-335.453	9383.	0.00
4.3400	0.1288	1.45E+07	8355.	-0.00113	0.00	2.77E+12	-337.296	9745.	0.00
4.6500	0.1246	1.46E+07	7097.	-0.00111	0.00	2.77E+12	-339.043	10124.	0.00
4.9600	0.1205	1.46E+07	5833.	-0.00109	0.00	2.77E+12	-340.696	10519.	0.00
5.2700	0.1165	1.46E+07	4563.	-0.00107	0.00	2.77E+12	-342.251	10933.	0.00
5.5800	0.1125	1.46E+07	3287.	-0.00105	0.00	2.77E+12	-343.709	11365.	0.00
5.8900	0.1086	1.47E+07	2006.	-0.00103	0.00	2.77E+12	-345.069	11818.	0.00
6.2000	0.1048	1.47E+07	719.8053	-0.00101	0.00	2.77E+12	-346.328	12292.	0.00
6.5100	0.1011	1.47E+07	-570.686	-9.94E-04	0.00	2.77E+12	-347.485	12789.	0.00
6.8200	0.09742	1.47E+07	-1865.	-9.74E-04	0.00	2.77E+12	-348.540	13309.	0.00
7.1300	0.09383	1.47E+07	-3164.	-9.55E-04	0.00	2.77E+12	-349.491	13856.	0.00
7.4400	0.09032	1.47E+07	-4465.	-9.35E-04	0.00	2.77E+12	-350.337	14430.	0.00
7.7500	0.08687	1.46E+07	-5770.	-9.15E-04	0.00	2.77E+12	-351.076	15033.	0.00
8.0600	0.08351	1.46E+07	-7077.	-8.96E-04	0.00	2.77E+12	-351.707	15668.	0.00
8.3700	0.08021	1.46E+07	-8386.	-8.76E-04	0.00	2.77E+12	-352.229	16336.	0.00
8.6800	0.07699	1.46E+07	-9697.	-8.57E-04	0.00	2.77E+12	-352.639	17039.	0.00
8.9900	0.07384	1.45E+07	-11010.	-8.37E-04	0.00	2.77E+12	-352.936	17781.	0.00
9.3000	0.07076	1.45E+07	-12323.	-8.18E-04	0.00	2.77E+12	-353.119	18564.	0.00
9.6100	0.06776	1.44E+07	-13637.	-7.98E-04	0.00	2.77E+12	-353.185	19391.	0.00
9.9200	0.06482	1.44E+07	-14951.	-7.79E-04	0.00	2.77E+12	-353.133	20266.	0.00
10.2300	0.06196	1.43E+07	-16264.	-7.60E-04	0.00	2.77E+12	-352.961	21191.	0.00
10.5400	0.05917	1.43E+07	-17576.	-7.40E-04	0.00	2.77E+12	-352.667	22172.	0.00
10.8500	0.05645	1.42E+07	-18888.	-7.21E-04	0.00	2.77E+12	-352.249	23212.	0.00
11.1600	0.05381	1.41E+07	-20197.	-7.02E-04	0.00	2.77E+12	-351.704	24316.	0.00
11.4700	0.05123	1.41E+07	-21504.	-6.83E-04	0.00	2.77E+12	-351.030	25491.	0.00
11.7800	0.04872	1.40E+07	-22808.	-6.65E-04	0.00	2.77E+12	-350.224	26741.	0.00
12.0900	0.04628	1.39E+07	-24109.	-6.46E-04	0.00	2.77E+12	-349.284	28073.	0.00
12.4000	0.04392	1.38E+07	-25407.	-6.27E-04	0.00	2.77E+12	-348.207	29496.	0.00
12.7100	0.04162	1.37E+07	-26700.	-6.09E-04	0.00	2.77E+12	-346.990	31016.	0.00
13.0200	0.03939	1.36E+07	-27988.	-5.90E-04	0.00	2.77E+12	-345.629	32644.	0.00

13.3300	0.03722	1.35E+07	-29271.	-5.72E-04	0.00	2.78E+12	-344.122	34390.	0.00
13.6400	0.03513	1.34E+07	-30548.	-5.54E-04	0.00	2.78E+12	-342.463	36266.	0.00
13.9500	0.03310	1.33E+07	-31819.	-5.36E-04	0.00	2.78E+12	-340.650	38284.	0.00
14.2600	0.03114	1.32E+07	-33082.	-5.19E-04	0.00	2.78E+12	-338.677	40461.	0.00
14.5700	0.02924	1.30E+07	-34338.	-5.01E-04	0.00	2.78E+12	-336.540	42814.	0.00
14.8800	0.02741	1.29E+07	-35586.	-4.84E-04	0.00	2.78E+12	-334.234	45362.	0.00
15.1900	0.02564	1.28E+07	-36824.	-4.66E-04	0.00	2.78E+12	-331.752	48128.	0.00
15.5000	0.02394	1.26E+07	-38054.	-4.49E-04	0.00	2.78E+12	-329.088	51139.	0.00
15.8100	0.02230	1.25E+07	-39273.	-4.33E-04	0.00	2.78E+12	-326.236	54425.	0.00
16.1200	0.02072	1.24E+07	-40480.	-4.16E-04	0.00	2.78E+12	-323.187	58023.	0.00
16.4300	0.01920	1.22E+07	-41677.	-4.00E-04	0.00	2.78E+12	-319.933	61975.	0.00
16.7400	0.01775	1.20E+07	-42860.	-3.83E-04	0.00	2.78E+12	-316.463	66331.	0.00
17.0500	0.01635	1.19E+07	-44031.	-3.67E-04	0.00	2.78E+12	-312.766	71152.	0.00
17.3600	0.01502	1.17E+07	-45187.	-3.51E-04	0.00	2.78E+12	-308.830	76510.	0.00
17.6700	0.01374	1.16E+07	-46328.	-3.36E-04	0.00	2.78E+12	-304.639	82493.	0.00
17.9800	0.01252	1.14E+07	-47453.	-3.20E-04	0.00	2.78E+12	-300.176	89211.	0.00
18.2900	0.01135	1.12E+07	-48561.	-3.05E-04	0.00	2.78E+12	-295.421	96799.	0.00
18.6000	0.01024	1.10E+07	-49650.	-2.91E-04	0.00	2.78E+12	-290.351	105428.	0.00
18.9100	0.00919	1.08E+07	-50720.	-2.76E-04	0.00	2.78E+12	-284.935	115317.	0.00
19.2200	0.00819	1.06E+07	-51769.	-2.61E-04	0.00	2.78E+12	-279.141	126751.	0.00
19.5300	0.00725	1.05E+07	-52796.	-2.47E-04	0.00	2.78E+12	-272.923	140111.	0.00
19.8400	0.00635	1.03E+07	-53799.	-2.34E-04	0.00	2.78E+12	-266.228	155915.	0.00
20.1500	0.00551	1.01E+07	-54776.	-2.20E-04	0.00	2.78E+12	-258.987	174889.	0.00
20.4600	0.00472	9851648.	-55725.	-2.07E-04	0.00	2.78E+12	-251.107	198088.	0.00
20.7700	0.00397	9643355.	-56643.	-1.94E-04	0.00	2.78E+12	-242.463	227104.	0.00
21.0800	0.00328	9431659.	-62142.	-1.78E-04	0.00	1.83E+12	-2714.	3082324.	0.00
21.3900	0.00265	9182335.	-72428.	-1.59E-04	0.00	1.83E+12	-2816.	3952603.	0.00
21.7000	0.00210	8893967.	-83031.	-1.40E-04	0.00	1.83E+12	-2884.	5120605.	0.00
22.0100	0.00161	8565623.	-103248.	-1.23E-04	0.00	1.83E+12	-7985.	1.85E+07	0.00
22.3200	0.00118	8126710.	-129811.	-1.06E-04	0.00	1.83E+12	-6296.	1.98E+07	0.00
22.6300	8.21E-04	7600609.	-150183.	-8.97E-05	0.00	1.83E+12	-4657.	2.11E+07	0.00
22.9400	5.16E-04	7010009.	-164628.	-7.48E-05	0.00	1.83E+12	-3109.	2.24E+07	0.00
23.2500	2.64E-04	6376335.	-173542.	-6.13E-05	0.00	1.83E+12	-1684.	2.37E+07	0.00
23.5600	6.04E-05	5719307.	-177430.	-4.90E-05	0.00	1.83E+12	-406.100	2.50E+07	0.00
23.8700	-1.00E-04	5056617.	-176866.	-3.80E-05	0.00	1.83E+12	709.5254	2.63E+07	0.00
24.1800	-2.23E-04	4403707.	-172469.	-2.84E-05	0.00	1.83E+12	1654.	2.76E+07	0.00
24.4900	-3.12E-04	3773659.	-164878.	-2.02E-05	0.00	1.83E+12	2427.	2.89E+07	0.00
24.8000	-3.73E-04	3177166.	-154728.	-1.31E-05	0.00	1.83E+12	3030.	3.02E+07	0.00
25.1100	-4.09E-04	2622582.	-142632.	-7.22E-06	0.00	1.83E+12	3473.	3.16E+07	0.00
25.4200	-4.26E-04	2116037.	-129167.	-2.41E-06	0.00	1.83E+12	3766.	3.29E+07	0.00
25.7300	-4.27E-04	1661598.	-114860.	1.42E-06	0.00	1.83E+12	3925.	3.42E+07	0.00

26.0400	-4.16E-04	1261466.	-100184.	4.39E-06	0.00	1.83E+12	3965.	3.55E+07	0.00
26.3500	-3.95E-04	916197.	-85549.	6.60E-06	0.00	1.83E+12	3903.	3.68E+07	0.00
26.6600	-3.67E-04	624930.	-71306.	8.16E-06	0.00	1.83E+12	3755.	3.81E+07	0.00
26.9700	-3.34E-04	385619.	-57743.	9.18E-06	0.00	1.83E+12	3537.	3.94E+07	0.00
27.2800	-2.98E-04	195256.	-45091.	9.77E-06	0.00	1.83E+12	3265.	4.07E+07	0.00
27.5900	-2.61E-04	50072.	-33530.	1.00E-05	0.00	1.83E+12	2951.	4.20E+07	0.00
27.9000	-2.24E-04	-54279.	-23194.	1.00E-05	0.00	1.83E+12	2606.	4.33E+07	0.00
28.2100	-1.87E-04	-122564.	-14180.	9.84E-06	0.00	1.83E+12	2240.	4.46E+07	0.00
28.5200	-1.51E-04	-159848.	-6554.	9.55E-06	0.00	1.83E+12	1860.	4.59E+07	0.00
28.8300	-1.16E-04	-171396.	-362.824	9.22E-06	0.00	1.83E+12	1469.	4.72E+07	0.00
29.1400	-8.20E-05	-162615.	4361.	8.88E-06	0.00	1.83E+12	1071.	4.85E+07	0.00
29.4500	-4.96E-05	-139018.	7589.	8.57E-06	0.00	1.83E+12	665.0745	4.99E+07	0.00
29.7600	-1.83E-05	-106216.	9293.	8.32E-06	0.00	1.83E+12	251.2087	5.12E+07	0.00
30.0700	1.23E-05	-69937.	9438.	8.14E-06	0.00	1.83E+12	-173.386	5.25E+07	0.00
30.3800	4.23E-05	-36057.	7978.	8.04E-06	0.00	1.83E+12	-611.824	5.38E+07	0.00
30.6900	7.21E-05	-10644.	4854.	7.99E-06	0.00	1.83E+12	-1067.	5.51E+07	0.00
31.0000	1.02E-04	0.00	0.00	7.98E-06	0.00	1.83E+12	-1543.	2.82E+07	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 2:

Pile-head deflection = 0.19466513 inches
 Computed slope at pile head = -0.0013968 radians
 Maximum bending moment = 14669473. inch-lbs
 Maximum shear force = -177430. lbs
 Depth of maximum bending moment = 6.51000000 feet below pile head
 Depth of maximum shear force = 23.56000000 feet below pile head
 Number of iterations = 14
 Number of zero deflection points = 2

Computed Values of Pile Loading and Deflection

Performed by: G. Khatri 8/29/2024
 Checked by: J. Samples 8/30/2024

for Lateral Loading for Load Case Number 3

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 10710.0 lbs
 Applied moment at pile head = 5701200.0 in-lbs
 Axial thrust load on pile head = 1030000.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in ²	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	0.05239	5701200.	10710.	-4.58E-04	0.00	2.78E+12	0.00	0.00	0.00
0.3100	0.05070	5742781.	10591.	-4.50E-04	0.00	2.78E+12	-64.120	4705.	0.00
0.6200	0.04904	5783446.	10241.	-4.43E-04	0.00	2.78E+12	-124.040	9410.	0.00
0.9300	0.04740	5822364.	9675.	-4.35E-04	0.00	2.78E+12	-179.867	14115.	0.00
1.2400	0.04580	5858764.	8922.	-4.27E-04	0.00	2.78E+12	-225.347	18303.	0.00
1.5500	0.04423	5892014.	8081.	-4.19E-04	0.00	2.78E+12	-226.871	19083.	0.00
1.8600	0.04268	5922096.	7234.	-4.11E-04	0.00	2.78E+12	-228.317	19899.	0.00
2.1700	0.04117	5948987.	6382.	-4.03E-04	0.00	2.78E+12	-229.687	20755.	0.00
2.4800	0.03968	5972669.	5525.	-3.95E-04	0.00	2.78E+12	-230.978	21653.	0.00
2.7900	0.03823	5993124.	4664.	-3.87E-04	0.00	2.78E+12	-232.190	22596.	0.00
3.1000	0.03680	6010335.	3798.	-3.79E-04	0.00	2.78E+12	-233.323	23586.	0.00
3.4100	0.03540	6024287.	2928.	-3.71E-04	0.00	2.78E+12	-234.374	24626.	0.00
3.7200	0.03404	6034964.	2054.	-3.63E-04	0.00	2.78E+12	-235.345	25720.	0.00
4.0300	0.03270	6042354.	1177.	-3.55E-04	0.00	2.78E+12	-236.233	26872.	0.00
4.3400	0.03140	6046443.	296.9352	-3.47E-04	0.00	2.78E+12	-237.038	28085.	0.00
4.6500	0.03012	6047222.	-586.187	-3.39E-04	0.00	2.78E+12	-237.759	29363.	0.00
4.9600	0.02888	6044679.	-1472.	-3.31E-04	0.00	2.78E+12	-238.395	30711.	0.00
5.2700	0.02766	6038806.	-2360.	-3.23E-04	0.00	2.78E+12	-238.946	32134.	0.00
5.5800	0.02648	6029595.	-3249.	-3.15E-04	0.00	2.78E+12	-239.410	33638.	0.00
5.8900	0.02532	6017040.	-4141.	-3.06E-04	0.00	2.78E+12	-239.786	35228.	0.00
6.2000	0.02420	6001137.	-5033.	-2.98E-04	0.00	2.78E+12	-240.074	36910.	0.00
6.5100	0.02310	5981880.	-5927.	-2.90E-04	0.00	2.78E+12	-240.273	38692.	0.00
6.8200	0.02204	5959268.	-6821.	-2.82E-04	0.00	2.78E+12	-240.381	40581.	0.00
7.1300	0.02100	5933298.	-7715.	-2.74E-04	0.00	2.78E+12	-240.398	42586.	0.00
7.4400	0.01999	5903971.	-8609.	-2.67E-04	0.00	2.78E+12	-240.323	44715.	0.00
7.7500	0.01902	5871289.	-9503.	-2.59E-04	0.00	2.78E+12	-240.155	46979.	0.00
8.0600	0.01807	5835252.	-10396.	-2.51E-04	0.00	2.78E+12	-239.892	49389.	0.00
8.3700	0.01715	5795867.	-11287.	-2.43E-04	0.00	2.78E+12	-239.534	51956.	0.00

8.6800	0.01626	5753136.	-12178.	-2.35E-04	0.00	2.78E+12	-239.080	54695.	0.00
8.9900	0.01540	5707068.	-13066.	-2.28E-04	0.00	2.78E+12	-238.528	57619.	0.00
9.3000	0.01457	5657670.	-13952.	-2.20E-04	0.00	2.78E+12	-237.877	60746.	0.00
9.6100	0.01376	5604950.	-14836.	-2.12E-04	0.00	2.78E+12	-237.127	64093.	0.00
9.9200	0.01299	5548921.	-15716.	-2.05E-04	0.00	2.78E+12	-236.275	67681.	0.00
10.2300	0.01224	5489593.	-16593.	-1.98E-04	0.00	2.78E+12	-235.321	71533.	0.00
10.5400	0.01152	5426981.	-17467.	-1.90E-04	0.00	2.78E+12	-234.264	75672.	0.00
10.8500	0.01082	5361099.	-18336.	-1.83E-04	0.00	2.78E+12	-233.101	80128.	0.00
11.1600	0.01015	5291963.	-19201.	-1.76E-04	0.00	2.78E+12	-231.833	84932.	0.00
11.4700	0.00951	5219593.	-20061.	-1.69E-04	0.00	2.78E+12	-230.456	90120.	0.00
11.7800	0.00890	5144006.	-20915.	-1.62E-04	0.00	2.78E+12	-228.970	95731.	0.00
12.0900	0.00831	5065225.	-21764.	-1.55E-04	0.00	2.78E+12	-227.374	101811.	0.00
12.4000	0.00774	4983271.	-22607.	-1.48E-04	0.00	2.78E+12	-225.664	108411.	0.00
12.7100	0.00720	4898168.	-23443.	-1.42E-04	0.00	2.78E+12	-223.840	115591.	0.00
13.0200	0.00669	4809943.	-24272.	-1.35E-04	0.00	2.78E+12	-221.900	123416.	0.00
13.3300	0.00620	4718623.	-25093.	-1.29E-04	0.00	2.78E+12	-219.841	131964.	0.00
13.6400	0.00573	4624236.	-25907.	-1.23E-04	0.00	2.78E+12	-217.662	141323.	0.00
13.9500	0.00528	4526813.	-26713.	-1.17E-04	0.00	2.78E+12	-215.359	151595.	0.00
14.2600	0.00486	4426387.	-27509.	-1.11E-04	0.00	2.78E+12	-212.931	162900.	0.00
14.5700	0.00446	4322991.	-28297.	-1.05E-04	0.00	2.78E+12	-210.374	175375.	0.00
14.8800	0.00408	4216662.	-29074.	-9.90E-05	0.00	2.78E+12	-207.684	189184.	0.00
15.1900	0.00373	4107438.	-29842.	-9.34E-05	0.00	2.78E+12	-204.859	204520.	0.00
15.5000	0.00339	3995357.	-30598.	-8.80E-05	0.00	2.78E+12	-201.895	221611.	0.00
15.8100	0.00307	3880462.	-31342.	-8.27E-05	0.00	2.78E+12	-198.145	239958.	0.00
16.1200	0.00277	3762805.	-32050.	-7.76E-05	0.00	2.78E+12	-182.437	244663.	0.00
16.4300	0.00249	3642604.	-32700.	-7.26E-05	0.00	2.78E+12	-167.232	249368.	0.00
16.7400	0.00223	3520070.	-33295.	-6.78E-05	0.00	2.78E+12	-152.560	254073.	0.00
17.0500	0.00199	3395407.	-33837.	-6.32E-05	0.00	2.78E+12	-138.447	258778.	0.00
17.3600	0.00176	3268811.	-34326.	-5.87E-05	0.00	2.78E+12	-124.917	263483.	0.00
17.6700	0.00155	3140469.	-34767.	-5.44E-05	0.00	2.78E+12	-111.987	268188.	0.00
17.9800	0.00136	3010561.	-35161.	-5.03E-05	0.00	2.78E+12	-99.672	272893.	0.00
18.2900	0.00118	2879259.	-35510.	-4.64E-05	0.00	2.78E+12	-87.985	277598.	0.00
18.6000	0.00101	2746724.	-35816.	-4.26E-05	0.00	2.78E+12	-76.931	282303.	0.00
18.9100	8.62E-04	2613111.	-36083.	-3.90E-05	0.00	2.78E+12	-66.515	287008.	0.00
19.2200	7.24E-04	2478563.	-36313.	-3.56E-05	0.00	2.78E+12	-56.735	291713.	0.00
19.5300	5.97E-04	2343218.	-36507.	-3.24E-05	0.00	2.78E+12	-47.589	296419.	0.00
19.8400	4.83E-04	2207203.	-36668.	-2.93E-05	0.00	2.78E+12	-39.069	301124.	0.00
20.1500	3.79E-04	2070635.	-36798.	-2.65E-05	0.00	2.78E+12	-31.162	305829.	0.00
20.4600	2.86E-04	1933625.	-36901.	-2.38E-05	0.00	2.78E+12	-23.855	310534.	0.00
20.7700	2.02E-04	1796276.	-36977.	-2.13E-05	0.00	2.78E+12	-17.127	315239.	0.00
21.0800	1.27E-04	1658680.	-37937.	-1.84E-05	0.00	1.83E+12	-498.873	1.46E+07	0.00

21.3900	6.52E-05	1514168.	-39382.	-1.52E-05	0.00	1.83E+12	-278.377	1.59E+07	0.00
21.7000	1.45E-05	1365791.	-40025.	-1.22E-05	0.00	1.83E+12	-67.072	1.72E+07	0.00
22.0100	-2.59E-05	1216476.	-39911.	-9.62E-06	0.00	1.83E+12	128.5512	1.85E+07	0.00
22.3200	-5.71E-05	1068930.	-39107.	-7.30E-06	0.00	1.83E+12	303.6158	1.98E+07	0.00
22.6300	-8.02E-05	925578.	-37696.	-5.27E-06	0.00	1.83E+12	454.7557	2.11E+07	0.00
22.9400	-9.63E-05	788511.	-35772.	-3.53E-06	0.00	1.83E+12	579.9813	2.24E+07	0.00
23.2500	-1.06E-04	659464.	-33431.	-2.06E-06	0.00	1.83E+12	678.5231	2.37E+07	0.00
23.5600	-1.12E-04	539802.	-30772.	-8.40E-07	0.00	1.83E+12	750.6604	2.50E+07	0.00
23.8700	-1.13E-04	430524.	-27893.	1.46E-07	0.00	1.83E+12	797.5413	2.63E+07	0.00
24.1800	-1.11E-04	332279.	-24882.	9.21E-07	0.00	1.83E+12	821.0020	2.76E+07	0.00
24.4900	-1.06E-04	245392.	-21824.	1.51E-06	0.00	1.83E+12	823.3911	2.89E+07	0.00
24.8000	-9.93E-05	169898.	-18790.	1.93E-06	0.00	1.83E+12	807.4023	3.02E+07	0.00
25.1100	-9.15E-05	105576.	-15845.	2.21E-06	0.00	1.83E+12	775.9222	3.16E+07	0.00
25.4200	-8.28E-05	51991.	-13041.	2.37E-06	0.00	1.83E+12	731.8932	3.29E+07	0.00
25.7300	-7.38E-05	8534.	-10418.	2.43E-06	0.00	1.83E+12	678.1955	3.42E+07	0.00
26.0400	-6.48E-05	-25539.	-8008.	2.41E-06	0.00	1.83E+12	617.5482	3.55E+07	0.00
26.3500	-5.59E-05	-51065.	-5832.	2.34E-06	0.00	1.83E+12	552.4307	3.68E+07	0.00
26.6600	-4.74E-05	-68946.	-3902.	2.21E-06	0.00	1.83E+12	485.0227	3.81E+07	0.00
26.9700	-3.94E-05	-80115.	-2224.	2.06E-06	0.00	1.83E+12	417.1631	3.94E+07	0.00
27.2800	-3.20E-05	-85510.	-796.685	1.90E-06	0.00	1.83E+12	350.3252	4.07E+07	0.00
27.5900	-2.53E-05	-86057.	386.1508	1.72E-06	0.00	1.83E+12	285.6082	4.20E+07	0.00
27.9000	-1.92E-05	-82651.	1334.	1.55E-06	0.00	1.83E+12	223.7416	4.33E+07	0.00
28.2100	-1.38E-05	-76147.	2057.	1.39E-06	0.00	1.83E+12	165.1023	4.46E+07	0.00
28.5200	-8.89E-06	-67359.	2568.	1.24E-06	0.00	1.83E+12	109.7418	4.59E+07	0.00
28.8300	-4.52E-06	-57051.	2879.	1.12E-06	0.00	1.83E+12	57.4230	4.72E+07	0.00
29.1400	-5.87E-07	-45948.	3000.	1.01E-06	0.00	1.83E+12	7.6657	4.85E+07	0.00
29.4500	3.00E-06	-34739.	2939.	9.29E-07	0.00	1.83E+12	-40.200	4.99E+07	0.00
29.7600	6.32E-06	-24085.	2703.	8.69E-07	0.00	1.83E+12	-86.975	5.12E+07	0.00
30.0700	9.47E-06	-14636.	2293.	8.30E-07	0.00	1.83E+12	-133.517	5.25E+07	0.00
30.3800	1.25E-05	-7033.	1708.	8.08E-07	0.00	1.83E+12	-180.667	5.38E+07	0.00
30.6900	1.55E-05	-1931.	946.1556	7.99E-07	0.00	1.83E+12	-229.160	5.51E+07	0.00
31.0000	1.84E-05	0.00	0.00	7.97E-07	0.00	1.83E+12	-279.525	2.82E+07	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 3:

Pile-head deflection = 0.05238553 inches
 Computed slope at pile head = -0.0004580 radians
 Maximum bending moment = 6047222. inch-lbs
 Maximum shear force = -40025. lbs
 Depth of maximum bending moment = 4.65000000 feet below pile head
 Depth of maximum shear force = 21.70000000 feet below pile head
 Number of iterations = 13
 Number of zero deflection points = 2

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 4

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 14410.0 lbs
 Applied moment at pile head = 7675200.0 in-lbs
 Axial thrust load on pile head = 1340000.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	0.08452	7675200.	14410.	-6.84E-04	0.00	2.74E+12	0.00	0.00	0.00
0.3100	0.08199	7732190.	14217.	-6.74E-04	0.00	2.74E+12	-103.702	4705.	0.00
0.6200	0.07950	7787693.	13650.	-6.63E-04	0.00	2.74E+12	-201.112	9410.	0.00
0.9300	0.07706	7840359.	12806.	-6.53E-04	0.00	2.74E+12	-252.645	12197.	0.00
1.2400	0.07465	7889477.	11863.	-6.42E-04	0.00	2.74E+12	-254.619	12689.	0.00
1.5500	0.07228	7935018.	10912.	-6.31E-04	0.00	2.74E+12	-256.515	13202.	0.00
1.8600	0.06995	7976955.	9954.	-6.20E-04	0.00	2.74E+12	-258.332	13738.	0.00
2.1700	0.06766	8015263.	8990.	-6.10E-04	0.00	2.74E+12	-260.069	14298.	0.00
2.4800	0.06542	8049919.	8020.	-5.99E-04	0.00	2.74E+12	-261.726	14883.	0.00
2.7900	0.06321	8080898.	7043.	-5.88E-04	0.00	2.74E+12	-263.300	15496.	0.00
3.1000	0.06104	8108178.	6061.	-5.77E-04	0.00	2.74E+12	-264.792	16136.	0.00
3.4100	0.05892	8131740.	5073.	-5.66E-04	0.00	2.74E+12	-266.201	16807.	0.00
3.7200	0.05683	8151562.	4080.	-5.55E-04	0.00	2.74E+12	-267.526	17510.	0.00

4.0300	0.05479	8167627.	3083.	-5.44E-04	0.00	2.74E+12	-268.765	18247.	0.00
4.3400	0.05279	8179918.	2081.	-5.33E-04	0.00	2.74E+12	-269.919	19020.	0.00
4.6500	0.05083	8188418.	1075.	-5.21E-04	0.00	2.74E+12	-270.986	19832.	0.00
4.9600	0.04891	8193113.	64.9584	-5.10E-04	0.00	2.74E+12	-271.965	20685.	0.00
5.2700	0.04703	8193989.	-948.409	-4.99E-04	0.00	2.74E+12	-272.856	21581.	0.00
5.5800	0.04520	8191033.	-1965.	-4.88E-04	0.00	2.74E+12	-273.657	22523.	0.00
5.8900	0.04340	8184236.	-2984.	-4.77E-04	0.00	2.74E+12	-274.368	23516.	0.00
6.2000	0.04165	8173585.	-4006.	-4.66E-04	0.00	2.74E+12	-274.987	24561.	0.00
6.5100	0.03994	8159075.	-5030.	-4.55E-04	0.00	2.74E+12	-275.513	25663.	0.00
6.8200	0.03827	8140696.	-6056.	-4.44E-04	0.00	2.74E+12	-275.946	26826.	0.00
7.1300	0.03664	8118444.	-7083.	-4.33E-04	0.00	2.74E+12	-276.284	28054.	0.00
7.4400	0.03505	8092313.	-8111.	-4.22E-04	0.00	2.74E+12	-276.527	29351.	0.00
7.7500	0.03350	8062301.	-9140.	-4.11E-04	0.00	2.74E+12	-276.672	30724.	0.00
8.0600	0.03199	8028406.	-10169.	-4.00E-04	0.00	2.74E+12	-276.720	32177.	0.00
8.3700	0.03052	7990627.	-11199.	-3.89E-04	0.00	2.74E+12	-276.669	33717.	0.00
8.6800	0.02910	7948965.	-12228.	-3.78E-04	0.00	2.74E+12	-276.517	35351.	0.00
8.9900	0.02771	7903423.	-13256.	-3.67E-04	0.00	2.74E+12	-276.264	37085.	0.00
9.3000	0.02637	7854004.	-14283.	-3.57E-04	0.00	2.74E+12	-275.908	38929.	0.00
9.6100	0.02506	7800715.	-15308.	-3.46E-04	0.00	2.74E+12	-275.447	40891.	0.00
9.9200	0.02379	7743560.	-16332.	-3.35E-04	0.00	2.74E+12	-274.881	42981.	0.00
10.2300	0.02256	7682550.	-17353.	-3.25E-04	0.00	2.74E+12	-274.208	45210.	0.00
10.5400	0.02137	7617692.	-18372.	-3.15E-04	0.00	2.74E+12	-273.426	47590.	0.00
10.8500	0.02022	7549000.	-19387.	-3.04E-04	0.00	2.74E+12	-272.534	50135.	0.00
11.1600	0.01911	7476485.	-20399.	-2.94E-04	0.00	2.74E+12	-271.530	52860.	0.00
11.4700	0.01803	7400162.	-21407.	-2.84E-04	0.00	2.74E+12	-270.412	55781.	0.00
11.7800	0.01700	7320047.	-22411.	-2.74E-04	0.00	2.74E+12	-269.179	58918.	0.00
12.0900	0.01599	7236157.	-23410.	-2.64E-04	0.00	2.74E+12	-267.828	62291.	0.00
12.4000	0.01503	7148512.	-24403.	-2.54E-04	0.00	2.74E+12	-266.358	65923.	0.00
12.7100	0.01410	7057132.	-25391.	-2.45E-04	0.00	2.74E+12	-264.766	69843.	0.00
13.0200	0.01321	6962041.	-26373.	-2.35E-04	0.00	2.74E+12	-263.049	74080.	0.00
13.3300	0.01235	6863263.	-27348.	-2.26E-04	0.00	2.74E+12	-261.206	78668.	0.00
13.6400	0.01153	6760823.	-28316.	-2.17E-04	0.00	2.74E+12	-259.234	83646.	0.00
13.9500	0.01074	6654751.	-29277.	-2.08E-04	0.00	2.74E+12	-257.128	89060.	0.00
14.2600	0.00998	6545075.	-30229.	-1.99E-04	0.00	2.74E+12	-254.887	94961.	0.00
14.5700	0.00926	6431828.	-31173.	-1.90E-04	0.00	2.74E+12	-252.507	101408.	0.00
14.8800	0.00857	6315043.	-32107.	-1.81E-04	0.00	2.74E+12	-249.983	108471.	0.00
15.1900	0.00792	6194755.	-33032.	-1.73E-04	0.00	2.74E+12	-247.311	116229.	0.00
15.5000	0.00729	6071004.	-33947.	-1.64E-04	0.00	2.74E+12	-244.487	124778.	0.00
15.8100	0.00669	5943828.	-34851.	-1.56E-04	0.00	2.74E+12	-241.504	134229.	0.00
16.1200	0.00613	5813270.	-35743.	-1.48E-04	0.00	2.74E+12	-238.356	144715.	0.00
16.4300	0.00559	5679374.	-36624.	-1.40E-04	0.00	2.74E+12	-235.037	156394.	0.00

16.7400	0.00508	5542187.	-37492.	-1.33E-04	0.00	2.74E+12	-231.538	169459.	0.00
17.0500	0.00460	5401759.	-38346.	-1.25E-04	0.00	2.74E+12	-227.849	184144.	0.00
17.3600	0.00415	5258141.	-39187.	-1.18E-04	0.00	2.74E+12	-223.959	200738.	0.00
17.6700	0.00372	5111388.	-40012.	-1.11E-04	0.00	2.74E+12	-219.854	219603.	0.00
17.9800	0.00332	4961558.	-40822.	-1.04E-04	0.00	2.74E+12	-215.519	241194.	0.00
18.2900	0.00295	4808712.	-41615.	-9.76E-05	0.00	2.74E+12	-210.934	266099.	0.00
18.6000	0.00260	4652915.	-42374.	-9.12E-05	0.00	2.74E+12	-197.148	282303.	0.00
18.9100	0.00227	4494358.	-43067.	-8.50E-05	0.00	2.74E+12	-175.170	287008.	0.00
19.2200	0.00197	4333346.	-43679.	-7.90E-05	0.00	2.74E+12	-154.143	291713.	0.00
19.5300	0.00168	4170172.	-44215.	-7.32E-05	0.00	2.74E+12	-134.089	296419.	0.00
19.8400	0.00142	4005114.	-44679.	-6.77E-05	0.00	2.74E+12	-115.023	301124.	0.00
20.1500	0.00118	3838438.	-45073.	-6.23E-05	0.00	2.74E+12	-96.956	305829.	0.00
20.4600	9.57E-04	3670394.	-45402.	-5.73E-05	0.00	2.74E+12	-79.896	310534.	0.00
20.7700	7.53E-04	3501219.	-45669.	-5.24E-05	0.00	2.74E+12	-63.843	315239.	0.00
21.0800	5.67E-04	3331137.	-49920.	-4.66E-05	0.00	1.80E+12	-2222.	1.46E+07	0.00
21.3900	4.07E-04	3130278.	-57282.	-3.99E-05	0.00	1.80E+12	-1736.	1.59E+07	0.00
21.7000	2.71E-04	2905360.	-62835.	-3.37E-05	0.00	1.80E+12	-1249.	1.72E+07	0.00
22.0100	1.56E-04	2663122.	-66605.	-2.79E-05	0.00	1.80E+12	-777.604	1.85E+07	0.00
22.3200	6.29E-05	2410097.	-68674.	-2.27E-05	0.00	1.80E+12	-334.591	1.98E+07	0.00
22.6300	-1.22E-05	2152416.	-69168.	-1.80E-05	0.00	1.80E+12	69.1241	2.11E+07	0.00
22.9400	-7.07E-05	1895669.	-68247.	-1.38E-05	0.00	1.80E+12	425.9486	2.24E+07	0.00
23.2500	-1.15E-04	1644798.	-66095.	-1.01E-05	0.00	1.80E+12	731.0269	2.37E+07	0.00
23.5600	-1.46E-04	1404025.	-62909.	-6.97E-06	0.00	1.80E+12	981.9726	2.50E+07	0.00
23.8700	-1.67E-04	1176828.	-58890.	-4.30E-06	0.00	1.80E+12	1179.	2.63E+07	0.00
24.1800	-1.78E-04	965927.	-54238.	-2.09E-06	0.00	1.80E+12	1322.	2.76E+07	0.00
24.4900	-1.82E-04	773316.	-49144.	-2.93E-07	0.00	1.80E+12	1417.	2.89E+07	0.00
24.8000	-1.80E-04	600300.	-43784.	1.13E-06	0.00	1.80E+12	1465.	3.02E+07	0.00
25.1100	-1.74E-04	447554.	-38318.	2.21E-06	0.00	1.80E+12	1473.	3.16E+07	0.00
25.4200	-1.64E-04	315193.	-32886.	3.00E-06	0.00	1.80E+12	1447.	3.29E+07	0.00
25.7300	-1.51E-04	202849.	-27609.	3.53E-06	0.00	1.80E+12	1391.	3.42E+07	0.00
26.0400	-1.37E-04	109748.	-22583.	3.85E-06	0.00	1.80E+12	1311.	3.55E+07	0.00
26.3500	-1.23E-04	34791.	-17887.	4.00E-06	0.00	1.80E+12	1214.	3.68E+07	0.00
26.6600	-1.08E-04	-23371.	-13578.	4.01E-06	0.00	1.80E+12	1103.	3.81E+07	0.00
26.9700	-9.29E-05	-66270.	-9698.	3.92E-06	0.00	1.80E+12	983.5092	3.94E+07	0.00
27.2800	-7.85E-05	-95559.	-6270.	3.75E-06	0.00	1.80E+12	859.2682	4.07E+07	0.00
27.5900	-6.49E-05	-112956.	-3308.	3.54E-06	0.00	1.80E+12	733.2474	4.20E+07	0.00
27.9000	-5.22E-05	-120205.	-813.559	3.30E-06	0.00	1.80E+12	607.7776	4.33E+07	0.00
28.2100	-4.04E-05	-119042.	1218.	3.05E-06	0.00	1.80E+12	484.4421	4.46E+07	0.00
28.5200	-2.95E-05	-111174.	2796.	2.81E-06	0.00	1.80E+12	364.1040	4.59E+07	0.00
28.8300	-1.94E-05	-98266.	3933.	2.60E-06	0.00	1.80E+12	246.9597	4.72E+07	0.00
29.1400	-1.02E-05	-81939.	4639.	2.41E-06	0.00	1.80E+12	132.6152	4.85E+07	0.00

29.4500	-1.51E-06	-63777.	4923.	2.26E-06	0.00	1.80E+12	20.1849	4.99E+07	0.00
29.7600	6.66E-06	-45334.	4790.	2.15E-06	0.00	1.80E+12	-91.587	5.12E+07	0.00
30.0700	1.45E-05	-28159.	4240.	2.07E-06	0.00	1.80E+12	-204.183	5.25E+07	0.00
30.3800	2.21E-05	-13809.	3267.	2.03E-06	0.00	1.80E+12	-319.143	5.38E+07	0.00
30.6900	2.96E-05	-3875.	1859.	2.01E-06	0.00	1.80E+12	-437.873	5.51E+07	0.00
31.0000	3.70E-05	0.00	0.00	2.01E-06	0.00	1.80E+12	-561.419	2.82E+07	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 4:

Pile-head deflection = 0.08451649 inches
 Computed slope at pile head = -0.0006842 radians
 Maximum bending moment = 8193989. inch-lbs
 Maximum shear force = -69168. lbs
 Depth of maximum bending moment = 5.27000000 feet below pile head
 Depth of maximum shear force = 22.63000000 feet below pile head
 Number of iterations = 13
 Number of zero deflection points = 2

Summary of Pile-head Responses for Conventional Analyses

Definitions of Pile-head Loading Conditions:

Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs
 Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
 Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.
 Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs
 Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians

Load	Load	Load	Axial	Pile-head	Pile-head	Max Shear	Max Moment
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Performed by: G. Khatri 8/29/2024

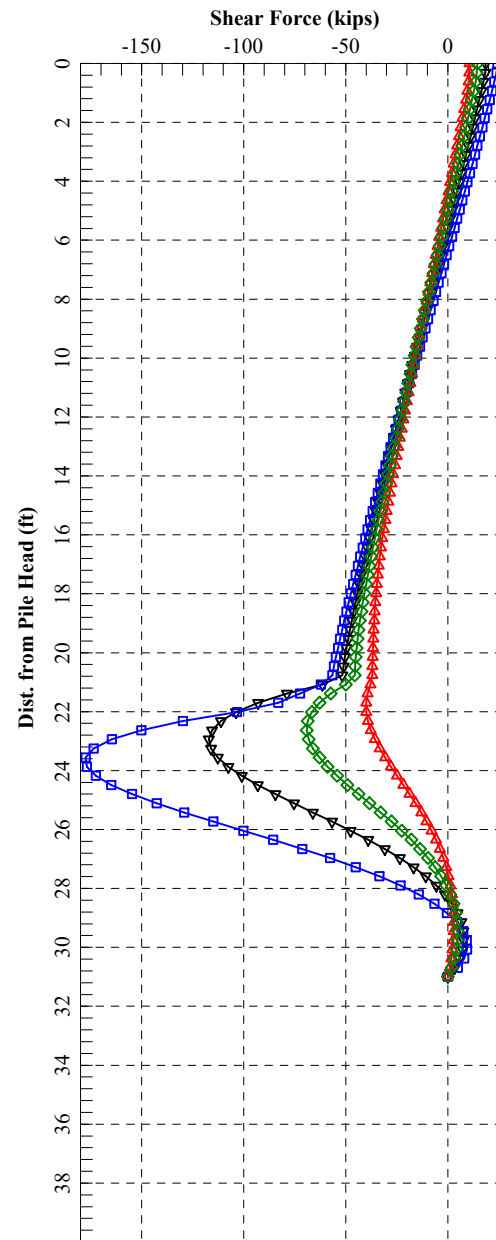
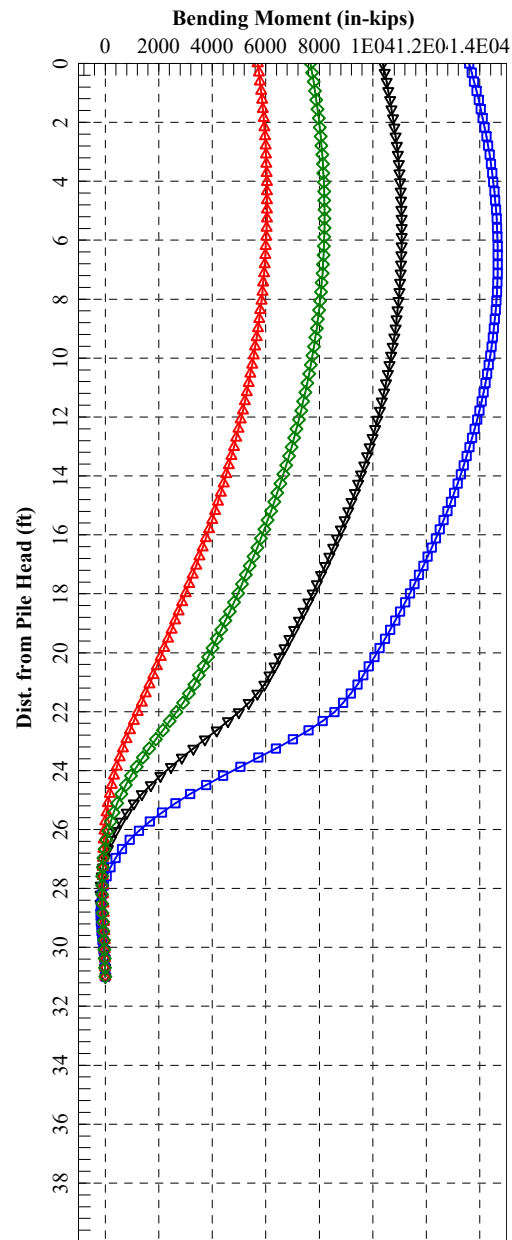
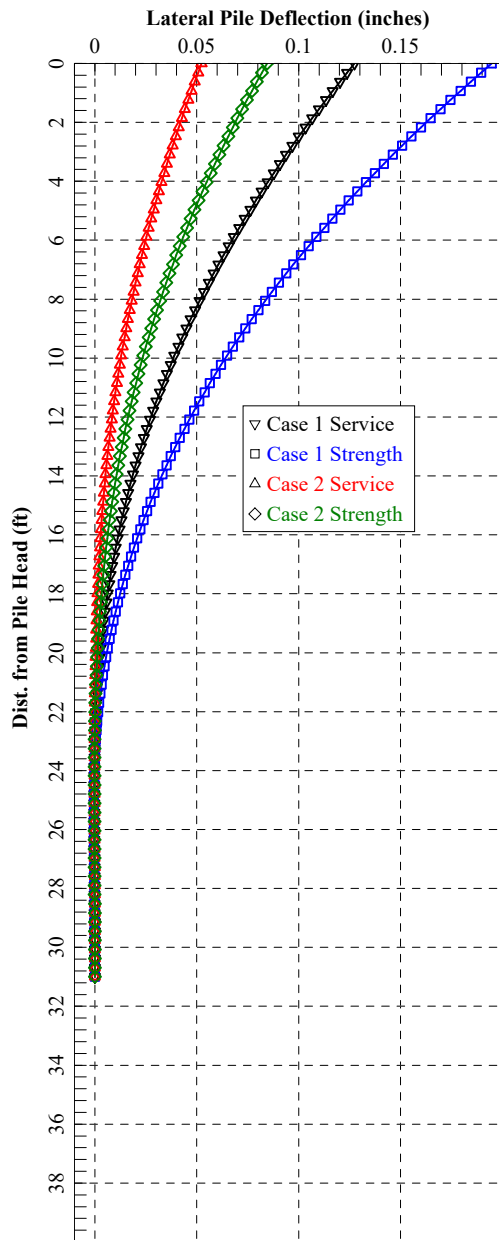
Checked by: J. Samples 8/30/2024

Case No.	Type 1	Pile-head Load 1	Type 2	Pile-head Load 2	Loading lbs	Deflection inches	Rotation radians	in Pile lbs	in Pile in-lbs
1	V, lb	18610.	M, in-lb	1.04E+07	775400.	0.1273	-9.72E-04	-117067.	1.11E+07
2	V, lb	24300.	M, in-lb	1.36E+07	995700.	0.1947	-0.00140	-177430.	1.47E+07
3	V, lb	10710.	M, in-lb	5701200.	1030000.	0.05239	-4.58E-04	-40025.	6047222.
4	V, lb	14410.	M, in-lb	7675200.	1340000.	0.08452	-6.84E-04	-69168.	8193989.

Maximum pile-head deflection = 0.1946651325 inches

Maximum pile-head rotation = -0.0013968439 radians = -0.080033 deg.

The analysis ended normally.



BRIDGE #3
LATERAL LOAD ANALYSIS

MEG-33-19.21

Lateral Capacity Analyses for bridge at Bridge 3

Rear Abutment

Material Parameters

The following table presents the material parameters used for the lateral capacity analyses. The material parameters are based on information found in the Ohio Department of Transportation (ODOT) Geotechnical Design Manual (GDM) and boring logs (blow counts). The groundwater table depth at the pile head was assumed to be below the top of the rock.

Material Parameters

Material	Moist Unit Weight (pcf)	Undrained Cohesion (psf)	Friction Angle (degrees)	Compressive Strength (psi)	RQD (%)
Sandy Silt (mod stiff w/o free water)	122	2,000	-	-	-
Bedrock	150	-	-	4,380	69

Rear Abutment Loading

- The rear abutment loading provided from the structural team is provided in this appendix. Each abutment consists of 1 row of piles spaced at 12.5' c/c.
- The pile cap is assumed to be rigid; therefore, each pile experiences the same lateral load.
- X and Z represents lateral loads (Z direction being perpendicular to the single row of four piles) while Y represents axial load. The load combinations used in the LPILE are as follows:

Rear Abutment Loads

Load State	Lateral Load (kips)	Lateral Moment (kip-ft)	Axial Load (kips)
Service	86.00	571.64	637.40
Strength	131.50	874.40	852.30

- To take into account group effects, P-multipliers (P_m) were applied to the p-y curves in LPILE. The P-multipliers are provided in AASHTO LRFD 9th Edition Section 10.7.2.4 (presented in this appendix). From the structural engineer, the drilled shaft diameter (B) is 4.5 ft above the socket and 4 ft for the socket.
 - Spacing between rows laterally (Z) is 12.25' c/c, which is less than 3B. P-multipliers are provided in AASHTO LRFD 9th edition section 10.7.2.7. Therefore, the P-multiplier at 12.25 ft is taken as same as 3B.

Performed By:	G. Khatri	Date:	9/16/2024
Checked By:	J. Samples	Date:	9/16/2024

- Row 1 → $P_m = 0.8$
- Row 2 → $P_m = 0.4$
- Row 3 → $P_m = 0.3$
- Since there is only a single row of piles in the perpendicular (X) direction, $P_m = 1.0$ is only needed

Rear Abutment LPile Results

The following table summarizes the LPile results for each load and P_m combination discussed at the rear abutment:

LPile Results

Abutment	Direction	Row	P_m	Deflection (in, Service Load)	Maximum Shear (kips, Strength Load)	Maximum Moment (kip-ft, Strength Load)
Rear	X	1	0.8	0.22	752.2	1716.7
	X	2	0.4	0.40	932.1	2216.7
	X	3 and up	0.3	0.48	923.0	2375.0
	Z	1	1.0	0.15	668.1	1591.7

Forward Abutment

The forward consists of the bedrock at the ground surface. The material parameters are based on information found in the Ohio Department of Transportation (ODOT) Geotechnical Design Manual (GDM) and boring logs (blow counts). The groundwater table depth at the pile head was assumed to be below the top of the rock.

Material Parameters

Material	Moist Unit Weight (pcf)	Undrained Cohesion (psf)	Friction Angle (degrees)	Compressive Strength (psi)	RQD (%)
Bedrock	150	-	-	4,380	69

Forward Abutment Loading

- The forward abutment loading provided from the structural team is provided in this appendix. Each abutment consists of 1 row of piles spaced at 17.25' c/c.
- The pile cap is assumed to be rigid; therefore, each pile experiences the same lateral load.
- X and Z represents lateral loads (Z direction being perpendicular to the single row of four piles) while Y represents axial load. The load combinations used in the LPile are as follows:

Performed By:	G. Khatri	Date:	9/16/2024
Checked By:	J. Samples	Date:	9/16/2024

Forward Abutment Loads

Load State	Lateral Load (kips)	Lateral Moment (kip-ft)	Axial Load (kips)
Service	26.70	62.27	756.20
Strength	41.63	97.14	1022.64

- To take into account group effects, P-multipliers (P_m) were applied to the p-y curves in LPILE. The P-multipliers are provided in AASHTO LRFD 9th Edition Section 10.7.2.4 (presented in this appendix). From the structural engineer, the drilled shaft diameter (B) is 3 ft above the socket and 2.5 ft for the socket.
 - Spacing between rows laterally (Z) is 17.25' c/c, which is greater than 5B. P-multipliers are provided in AASHTO LRFD 9th edition section 10.7.2.7. Therefore, the P-multiplier at 16.67 ft is taken same as 5B.
 - Row 1 → $P_m = 1$
 - Row 2 → $P_m = 0.85$
 - Row 3 → $P_m = 0.7$
 - Since there is only a single row of piles in the perpendicular (X) direction, $P_m = 1.0$ is only needed

LPile Results

Abutment	Direction	Row	P_m	Deflection (in, Service Load)	Maximum Shear (kips, Strength Load)	Maximum Moment (kip-ft, Strength Load)
Abutment	X & Z	1	1	0.0004	75.6	100.0
	X	2	0.85	0.0006	75.6	100.0
	X	3 and up	0.7	0.0006	75.6	100.0

Performed By:	G. Khatri	Date:	9/16/2024
Checked By:	J. Samples	Date:	9/16/2024

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LPile for Windows, Version 2022-12.006

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method
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Files Used for Analysis

Path to file locations:

\\US0247-PPFSS01\shared_projects\173609140\119144\400-Engineering\Geotechnical\Analysis\Lpile\bridges\LPile
Analysis\Bridge 3\rear abutment\

Name of input data file:

MEG-33 rear abutment X direction row 1.lp12d

Name of output report file:

MEG-33 rear abutment X direction row 1.lp12o

MEG-33 rear abutment X direction row 1

Name of plot output file:

MEG-33 rear abutment X direction row 1.lp12p

Name of runtime message file:

MEG-33 rear abutment X direction row 1.lp12r

Date and Time of Analysis

Date: September 16, 2024

Time: 9:41:21

Problem Title

Project Name: MEG-33-19.21

Job Number: 173609140

Client: ODOT

Engineer: G. Khatri

Description: Forward Abutment Lateral Load Analysis at Brdige 3

MEG-33 rear abutment X direction row 1
Program Options and Settings

Computational Options:

- Conventional Analysis

Engineering Units Used for Data Input and Computations:

- US Customary System Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed = 500
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 100.0000 in
- Number of pile increments = 100

Loading Type and Number of Cycles of Loading:

- Static loading specified

- Analysis uses p-y modification factors for p-y curves
- Analysis uses layering correction (Method of Georgiadis)
- No distributed lateral loads are entered
- Loading by lateral soil movements acting on pile not selected
- Input of shear resistance at the pile tip not selected
- Input of moment resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:

- Output files use decimal points to denote decimal symbols.
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1
- No p-y curves to be computed and reported for user-specified depths
- Print using wide report formats

Number of pile sections defined = 2
 Total length of pile = 25.000 ft
 Depth of ground surface below top of pile = 0.0000 ft

Pile diameters used for p-y curve computations are defined using 4 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile. A summary of values of pile diameter vs. depth follows.

Point No.	Depth Below Pile Head feet	Pile Diameter inches
1	0.000	54.0000
2	15.000	54.0000
3	15.000	48.0000
4	25.000	48.0000

Input Structural Properties for Pile Sections:

Pile Section No. 1:

Section 1 is a round drilled shaft, bored pile, or CIDH pile
 Length of section = 15.000000 ft
 Shaft Diameter = 54.000000 in

Pile Section No. 2:

Section 2 is a round drilled shaft, bored pile, or CIDH pile
 Length of section = 10.000000 ft
 Shaft Diameter = 48.000000 in

Soil and Rock Layering Information

The soil profile is modelled using 2 layers

Layer 1 is stiff clay with user-defined k-value

Distance from top of pile to top of layer	=	0.0000	ft
Distance from top of pile to bottom of layer	=	15.000000	ft
Effective unit weight at top of layer	=	122.000000	pcf
Effective unit weight at bottom of layer	=	122.000000	pcf
Undrained cohesion at top of layer	=	2000.	psf
Undrained cohesion at bottom of layer	=	2000.	psf
Epsilon-50 at top of layer	=	0.0000	
Epsilon-50 at bottom of layer	=	0.0000	
Subgrade k at top of layer	=	0.0000	pci
Subgrade k at bottom of layer	=	0.0000	pci

NOTE: Default values for Epsilon-50 will be computed for this layer.

NOTE: Default values for subgrade k will be computed for this layer.

Layer 2 is weak rock, p-y criteria by Reese, 1997

Distance from top of pile to top of layer	=	15.000000	ft
Distance from top of pile to bottom of layer	=	30.000000	ft
Effective unit weight at top of layer	=	87.600000	pcf
Effective unit weight at bottom of layer	=	87.600000	pcf
Uniaxial compressive strength at top of layer	=	4380.	psi
Uniaxial compressive strength at bottom of layer	=	4380.	psi
Initial modulus of rock at top of layer	=	394200.	psi
Initial modulus of rock at bottom of layer	=	394200.	psi
RQD of rock at top of layer	=	69.000000	%
RQD of rock at bottom of layer	=	69.000000	%
k _{rm} of rock at top of layer	=	0.0000500	
k _{rm} of rock at bottom of layer	=	0.0000500	

(Depth of the lowest soil layer extends 5.000 ft below the pile tip)

MEG-33 rear abutment X direction row 1

Summary of Input Soil Properties

Layer Rock Mass Num.	Soil Type Name (p-y Curve Type) Modulus psi	Layer Depth ft	Effective Unit Wt. pcf	Cohesion psf	Uniaxial qu psi	RQD %	E50 or krm	kpy pci
1	Stiff Clay w/o	0.00	122.0000	2000.	--	--	default	default
--	Free Water, using k	15.0000	122.0000	2000.	--	--	default	default
2	Weak	15.0000	87.6000	--	4380.	69.0000	5.00E-05	--
	394200. Rock	30.0000	87.6000	--	4380.	69.0000	5.00E-05	--
	394200.							

Modification Factors for p-y Curves

Distribution of p-y modifiers with depth defined using 3 points

Point No.	Depth X ft	p-mult	y-mult
1	0.000	0.8000	1.0000
2	15.000	0.8000	1.0000
3	25.000	0.8000	1.0000

Static Loading Type

 Static loading criteria were used when computing p-y curves for all analyses.

 Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 2

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length	Run Analysis
1	1	V = 86000. lbs	M = 6859680. in-lbs	637400.	No	Yes
2	1	V = 131500. lbs	M = 10492800. in-lbs	852300.	No	Yes

V = shear force applied normal to pile axis

M = bending moment applied to pile head

y = lateral deflection normal to pile axis

S = pile slope relative to original pile batter angle

R = rotational stiffness applied to pile head

Values of top y vs. pile lengths can be computed only for load types with specified shear loading (Load Types 1, 2, and 3).

Thrust force is assumed to be acting axially for all pile batter angles.

 Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 2

Pile Section No. 1:

Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section	=	15.000000	ft
Shaft Diameter	=	54.000000	in
Concrete Cover Thickness (to edge of trans. reinf.)	=	3.000000	in
Number of Reinforcing Bars	=	20	bars
Yield Stress of Reinforcing Bars	=	50000.	psi
Modulus of Elasticity of Reinforcing Bars	=	29000000.	psi
Gross Area of Shaft	=	2290.	sq. in.
Total Area of Reinforcing Steel	=	20.000000	sq. in.
Area Ratio of Steel Reinforcement	=	0.87	percent
Edge-to-Edge Bar Spacing	=	6.008853	in
Maximum Concrete Aggregate Size	=	0.750000	in
Ratio of Bar Spacing to Aggregate Size	=	8.01	
Offset of Center of Rebar Cage from Center of Pile	=	0.0000	in
Transverse Reinforcement			
Type: Spiral			
Number of Transverse Reinf. (per spacing)	=	1	
Spacing of Transverse Reinf.	=	3.750000	in
Yield Stress of Transverse Reinf.	=	50000.	psi
Diameter of Transverse Reinf.	=	0.625000	in

Axial Structural Capacities:

Nom. Axial Structural Capacity = $0.85 F_c A_c + F_y A_s$	=	8718.752	kips
Tensile Load for Cracking of Concrete	=	-1011.121	kips
Nominal Axial Tensile Capacity	=	-1000.000	kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
-----	-----	-----	-----	-----
1	1.128000	1.000000	22.811000	0.000000
2	1.128000	1.000000	21.694550	7.048987
3	1.128000	1.000000	18.454487	13.407969
4	1.128000	1.000000	13.407969	18.454487

MEG-33 rear abutment X direction row 1

5	1.128000	1.000000	7.048987	21.694550
6	1.128000	1.000000	0.000000	22.811000
7	1.128000	1.000000	-7.04899	21.694550
8	1.128000	1.000000	-13.40797	18.454487
9	1.128000	1.000000	-18.45449	13.407969
10	1.128000	1.000000	-21.69455	7.048987
11	1.128000	1.000000	-22.81100	0.000000
12	1.128000	1.000000	-21.69455	-7.04899
13	1.128000	1.000000	-18.45449	-13.40797
14	1.128000	1.000000	-13.40797	-18.45449
15	1.128000	1.000000	-7.04899	-21.69455
16	1.128000	1.000000	0.000000	-22.81100
17	1.128000	1.000000	7.048987	-21.69455
18	1.128000	1.000000	13.407969	-18.45449
19	1.128000	1.000000	18.454487	-13.40797
20	1.128000	1.000000	21.694550	-7.04899

NOTE: The positions of the above rebars were computed by LPILE

Minimum spacing between any two bars not equal to zero = 6.009 inches
between bars 12 and 13.

Ratio of bar spacing to maximum aggregate size = 8.01

Concrete Properties:

Compressive Strength of Concrete	=	4000. psi
Modulus of Elasticity of Concrete	=	3604997. psi
Modulus of Rupture of Concrete	=	-474.34165 psi
Compression Strain at Peak Stress	=	0.001886
Tensile Strain at Fracture of Concrete	=	-0.0001154
Maximum Coarse Aggregate Size	=	0.750000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 2

Number Axial Thrust Force

MEG-33 rear abutment X direction row 1

 kips

1 637.400
 2 852.300

Definitions of Run Messages and Notes:

- C = concrete in section has cracked in tension.
- Y = stress in reinforcing steel has reached yield stress.
- T = ACI 318 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than 0.003. See ACI 318-14, Section 21.2.3.
- Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
 Position of neutral axis is measured from edge of compression side of pile.
 Compressive stresses and strains are positive in sign.
 Tensile stresses and strains are negative in sign.

Axial Thrust Force = 637.400 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	1150.	1840433855.	128.5415643	0.00008034	0.00004659	0.3327881	2.2661971	
0.00000125	2300.	1840387479.	77.8147435	0.00009727	0.00002977	0.4005380	2.6935470	
0.00000188	3451.	1840304104.	60.9253415	0.0001142	0.00001299	0.4678024	3.1219592	
0.00000250	4600.	1840184601.	52.4952908	0.0001312	-0.00000376	0.5345768	3.5514336	
0.00000313	5749.	1839762091.	47.4478771	0.0001483	-0.00002048	0.6008438	3.9818701	
0.00000375	6895.	1838549162.	44.0889593	0.0001653	-0.00003717	0.6665585	4.4129618	
0.00000438	8035.	1836542828.	41.6931059	0.0001824	-0.00005384	0.7316884	4.8444816	
0.00000500	9169.	1833894124.	39.8982570	0.0001995	-0.00007051	0.7962145	5.2762973	
0.00000563	10298.	1830751404.	38.5036057	0.0002166	-0.00008717	0.8601255	5.7083319	
0.00000625	11420.	1827230225.	37.3888269	0.0002337	-0.000104	0.9234146	6.1405374	
0.00000688	11420.	1661118386.	33.6719402	0.0002315	-0.000140	0.9146513	6.0135368	C

MEG-33 rear abutment X direction row 1

0.00000750	11420.	1522691854.	32.5159436	0.0002439	-0.000161	0.9599502	6.3087928	C
0.00000813	11420.	1405561712.	31.5019784	0.0002560	-0.000183	1.0038460	6.5956099	C
0.00000875	11420.	1305164447.	30.6027385	0.0002678	-0.000205	1.0464620	6.8747824	C
0.00000938	11420.	1218153483.	29.7983706	0.0002794	-0.000227	1.0879237	7.1471508	C
0.00001000	11420.	1142018891.	29.0743057	0.0002907	-0.000249	1.1283650	7.4136487	C
0.00001063	11420.	1074841309.	28.4188309	0.0003020	-0.000272	1.1678943	7.6750336	C
0.00001125	11454.	1018113289.	27.8214082	0.0003130	-0.000295	1.2065604	7.9315968	C
0.00001188	11735.	988209535.	27.2738257	0.0003239	-0.000317	1.2444154	8.1836675	C
0.00001250	12008.	960666512.	26.7700294	0.0003346	-0.000340	1.2815327	-8.598489	C
0.00001313	12275.	935232741.	26.3048345	0.0003453	-0.000363	1.3179708	-9.205479	C
0.00001375	12536.	911685499.	25.8738284	0.0003558	-0.000387	1.3537787	-9.815698	C
0.00001438	12792.	889848305.	25.4737344	0.0003662	-0.000410	1.3890226	-10.428656	C
0.00001500	13044.	869571129.	25.1019788	0.0003765	-0.000433	1.4237748	-11.043789	C
0.00001563	13290.	850534738.	24.7514725	0.0003867	-0.000457	1.4578456	-11.662770	C
0.00001625	13533.	832797249.	24.4245412	0.0003969	-0.000481	1.4915048	-12.283347	C
0.00001688	13773.	816181922.	24.1176681	0.0004070	-0.000504	1.5247055	-12.905960	C
0.00001750	14009.	800540988.	23.8275688	0.0004170	-0.000528	1.5573865	-13.531184	C
0.00001813	14244.	785882184.	23.5556124	0.0004269	-0.000552	1.5897392	-14.157387	C
0.00001875	14475.	772007217.	23.2966976	0.0004368	-0.000576	1.6215641	-14.786358	C
0.00001938	14705.	758955262.	23.0531095	0.0004467	-0.000600	1.6530909	-15.416103	C
0.00002000	14932.	746592597.	22.8213696	0.0004564	-0.000624	1.6841894	-16.047806	C
0.00002063	15157.	734878944.	22.6011298	0.0004661	-0.000648	1.7149122	-16.681031	C
0.00002125	15381.	723828686.	22.3937369	0.0004759	-0.000672	1.7454226	-17.314322	C
0.00002188	15602.	713243577.	22.1929288	0.0004855	-0.000696	1.7753635	-17.950955	C
0.00002250	15823.	703235481.	22.0036305	0.0004951	-0.000720	1.8051293	-18.587357	C
0.00002313	16042.	693721041.	21.8234544	0.0005047	-0.000744	1.8346146	-19.224502	C
0.00002375	16259.	684594452.	21.6490102	0.0005142	-0.000768	1.8636243	-19.864232	C
0.00002438	16476.	675926034.	21.4838307	0.0005237	-0.000793	1.8924623	-20.503736	C
0.00002563	16905.	659714156.	21.1735075	0.0005426	-0.000841	1.9492286	-21.785818	C
0.00002688	17331.	644869291.	20.8885492	0.0005614	-0.000890	2.0049379	-23.070631	C
0.00002813	17752.	631196975.	20.6244947	0.0005801	-0.000939	2.0595125	-24.359053	C
0.00002938	18171.	618593311.	20.3808368	0.0005987	-0.000988	2.1131525	-25.649244	C
0.00003063	18587.	606930386.	20.1548892	0.0006172	-0.001037	2.1658491	-26.941370	C
0.00003188	19000.	596077772.	19.9434590	0.0006357	-0.001086	2.2175101	-28.236459	C
0.00003313	19412.	586017612.	19.7488842	0.0006542	-0.001135	2.2685162	-29.530685	C
0.00003438	19820.	576581590.	19.5643345	0.0006725	-0.001184	2.3183920	-30.829023	C
0.00003563	20227.	567762629.	19.3922858	0.0006909	-0.001233	2.3674955	-32.127826	C
0.00003688	20632.	559518171.	19.2327079	0.0007092	-0.001282	2.4159507	-33.425767	C
0.00003813	21035.	551744783.	19.0811058	0.0007275	-0.001331	2.4634266	-34.726459	C
0.00003938	21436.	544411461.	18.9376461	0.0007457	-0.001381	2.5100290	-36.028844	C

MEG-33 rear abutment X direction row 1

0.00004063	21836.	537508664.	18.8037500	0.0007639	-0.001430	2.5559899	-37.330363	C
0.00004188	22236.	530997678.	18.6785660	0.0007822	-0.001479	2.6013063	-38.631010	C
0.00004313	22632.	524810807.	18.5586017	0.0008003	-0.001528	2.6456833	-39.934205	C
0.00004438	23028.	518931429.	18.4442549	0.0008185	-0.001578	2.6892221	-41.238868	C
0.00004563	23422.	513355955.	18.3368406	0.0008366	-0.001627	2.7321222	-42.542649	C
0.00004688	23815.	508059932.	18.2358089	0.0008548	-0.001676	2.7743804	-43.845541	C
0.00004813	24208.	503021447.	18.1406671	0.0008730	-0.001726	2.8159937	-45.147538	C
0.00004938	24599.	498204277.	18.0493425	0.0008912	-0.001775	2.8567764	-46.450966	C
0.00005063	24988.	493588186.	17.9611410	0.0009093	-0.001824	2.8966879	-47.756431	C
0.00005188	25376.	489178528.	17.8777976	0.0009274	-0.001874	2.9359593	-49.060982	C
0.00005313	25762.	484940090.	17.7987684	0.0009456	-0.001923	2.9745637	-50.000000	CY
0.00005438	26129.	480527690.	17.7203594	0.0009635	-0.001973	3.0121095	-50.000000	CY
0.00005563	26450.	475502428.	17.6377331	0.0009811	-0.002023	3.0480644	-50.000000	CY
0.00005688	26715.	469710750.	17.5488267	0.0009981	-0.002073	3.0822078	-50.000000	CY
0.00005813	26963.	463884725.	17.4578090	0.0010147	-0.002124	3.1150397	-50.000000	CY
0.00005938	27211.	458294473.	17.3710721	0.0010314	-0.002175	3.1473257	-50.000000	CY
0.00006063	27456.	452878016.	17.2877850	0.0010481	-0.002226	3.1789969	-50.000000	CY
0.00006188	27661.	447047466.	17.2006506	0.0010643	-0.002277	3.2092275	-50.000000	CY
0.00006313	27831.	440888936.	17.1105031	0.0010801	-0.002329	3.2381359	-50.000000	CY
0.00006438	28001.	434962757.	17.0242307	0.0010959	-0.002380	3.2665498	-50.000000	CY
0.00006563	28168.	429220001.	16.9382578	0.0011116	-0.002432	3.2940745	-50.000000	CY
0.00006688	28334.	423678540.	16.8551839	0.0011272	-0.002484	3.3210361	-50.000000	CY
0.00006813	28499.	418334267.	16.7755091	0.0011428	-0.002536	3.3475135	-50.000000	CY
0.00006938	28664.	413176478.	16.6990517	0.0011585	-0.002588	3.3735047	-50.000000	CY
0.00007063	28829.	408195224.	16.6256428	0.0011742	-0.002640	3.3990074	-50.000000	CY
0.00007188	28982.	403232580.	16.5528537	0.0011897	-0.002692	3.4237565	-50.000000	CY
0.00007313	29112.	398109648.	16.4778664	0.0012049	-0.002744	3.4474451	-50.000000	CY
0.00007438	29217.	392836579.	16.3976732	0.0012196	-0.002797	3.4697495	-50.000000	CY
0.00007938	29625.	373232196.	16.1013472	0.0012780	-0.003008	3.5542813	-50.000000	CY
0.00008438	30025.	355850318.	15.8394290	0.0013365	-0.003220	3.6314003	-50.000000	CY
0.00008938	30413.	340284649.	15.6021947	0.0013944	-0.003432	3.7007204	-50.000000	CY
0.00009438	30747.	325795018.	15.3817131	0.0014516	-0.003645	3.7620082	-50.000000	CY
0.00009938	30966.	311603944.	15.1505835	0.0015056	-0.003861	3.8133042	-50.000000	CY
0.0001044	31181.	298739722.	14.9446438	0.0015598	-0.004076	3.8586352	-50.000000	CY
0.0001094	31388.	286978110.	14.7545209	0.0016138	-0.004292	3.8974486	-50.000000	CY
0.0001144	31588.	276175739.	14.5781214	0.0016674	-0.004509	3.9298600	-50.000000	CY
0.0001194	31784.	266249741.	14.4192337	0.0017213	-0.004725	3.9562787	-50.000000	CY
0.0001244	31974.	257079892.	14.2733469	0.0017752	-0.004941	3.9764920	-50.000000	CY
0.0001294	32156.	248550653.	14.1340926	0.0018286	-0.005158	3.9903592	-50.000000	CY
0.0001344	32307.	240420923.	13.9992019	0.0018811	-0.005375	3.9980723	-50.000000	CY

MEG-33 rear abutment X direction row 1

0.0001394	32410.	232535389.	13.8631348	0.0019322	-0.005594	3.9974064	-50.000000	CY
0.0001444	32501.	225115407.	13.7342956	0.0019829	-0.005813	3.9995355	-50.000000	CY
0.0001494	32585.	218139325.	13.6095744	0.0020329	-0.006033	3.9965996	-50.000000	CY
0.0001544	32666.	211599226.	13.4950062	0.0020833	-0.006253	3.9998543	-50.000000	CY
0.0001594	32744.	205451948.	13.3898452	0.0021340	-0.006472	3.9967842	-50.000000	CY
0.0001644	32820.	199665844.	13.2928625	0.0021850	-0.006691	3.9998401	-50.000000	CY
0.0001694	32892.	194197227.	13.2012721	0.0022360	-0.006910	3.9956943	-50.000000	CY
0.0001744	32959.	189012593.	13.1112567	0.0022863	-0.007130	3.9993671	-50.000000	CY
0.0001794	33024.	184106763.	13.0278755	0.0023369	-0.007349	3.9953840	-50.000000	CY
0.0001844	33087.	179455123.	12.9508410	0.0023878	-0.007568	3.9976156	50.000000	CY
0.0001894	33148.	175041253.	12.8792324	0.0024390	-0.007787	3.9998940	50.000000	CY
0.0001944	33208.	170844188.	12.8129435	0.0024905	-0.008006	3.9931583	50.000000	CY
0.0001994	33265.	166845444.	12.7519660	0.0025424	-0.008224	3.9978576	50.000000	CY
0.0002044	33319.	163026359.	12.6965378	0.0025949	-0.008441	3.9999135	50.000000	CY
0.0002094	33368.	159369650.	12.6403332	0.0026466	-0.008660	3.9920388	50.000000	CY
0.0002144	33416.	155877051.	12.5871105	0.0026984	-0.008878	3.9964583	50.000000	CY
0.0002194	33462.	152533036.	12.5384369	0.0027506	-0.009096	3.9993460	50.000000	CY
0.0002244	33501.	149310160.	12.4914202	0.0028028	-0.009313	3.9975630	50.000000	CY
0.0002294	33531.	146183800.	12.4434234	0.0028542	-0.009532	3.9918982	50.000000	CY
0.0002344	33560.	143188466.	12.3981397	0.0029058	-0.009750	3.9964444	50.000000	CY
0.0002394	33577.	140269130.	12.3506940	0.0029564	-0.009970	3.9990833	50.000000	CY
0.0002444	33587.	137441315.	12.3076112	0.0030077	-0.010189	3.9999999	50.000000	CYT
0.0002494	33596.	134721861.	12.2675631	0.0030592	-0.010407	3.9911205	50.000000	CYT
0.0002544	33605.	132106314.	12.2294342	0.0031109	-0.010625	3.9927415	50.000000	CYT
0.0002594	33612.	129589965.	12.1933004	0.0031626	-0.010844	3.9966941	50.000000	CYT
0.0002644	33620.	127167245.	12.1590717	0.0032146	-0.011062	3.9991211	50.000000	CYT
0.0002694	33624.	124822514.	12.1249030	0.0032661	-0.011280	3.9999954	50.000000	CYT
0.0002744	33626.	122554698.	12.0929101	0.0033180	-0.011498	3.9924197	50.000000	CYT
0.0003044	33630.	110488784.	11.9332098	0.0036322	-0.012804	3.9937002	50.000000	CYT
0.0003344	33630.	100575772.	11.8876146	0.0039749	-0.014081	3.9961808	50.000000	CYT

Axial Thrust Force = 852.300 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	1138.	1820164411.	163.5250119	0.0001022	0.00006845	0.4210411	2.9002721	
0.00000125	2275.	1820119032.	95.3069694	0.0001191	0.00005163	0.4879696	3.3276401	

MEG-33 rear abutment X direction row 1

0.00000188	3413.	1820035214.	72.5873833	0.0001361	0.00003485	0.5544122	3.7560827
0.00000250	4550.	1819916024.	61.2424135	0.0001531	0.00001811	0.6203648	4.1856000
0.00000313	5687.	1819762068.	54.4472925	0.0001701	0.00000140	0.6858231	4.6161921
0.00000375	6823.	1819508910.	49.9268372	0.0001872	-0.00001527	0.7507793	5.0478311
0.00000438	7957.	1818807611.	46.7045688	0.0002043	-0.00003192	0.8152023	5.4803109
0.00000500	9087.	1817485776.	44.2920643	0.0002215	-0.00004854	0.8790589	5.9133992
0.00000563	10213.	1815570393.	42.4184275	0.0002386	-0.00006515	0.9423263	6.3469372
0.00000625	11332.	1813144616.	40.9214146	0.0002558	-0.00008174	1.0049893	6.7808189
0.00000688	12446.	1810296023.	39.6979565	0.0002729	-0.00009833	1.0670378	7.2149739
0.00000750	13553.	1807101328.	38.6794461	0.0002901	-0.000115	1.1284648	7.6493544
0.00000813	13553.	1668093534.	35.5863762	0.0002891	-0.000150	1.1244197	7.5579962 C
0.00000875	13553.	1548943996.	34.5276289	0.0003021	-0.000170	1.1702952	7.8707232 C
0.00000938	13553.	1445681063.	33.5816980	0.0003148	-0.000191	1.2148613	8.1757428 C
0.00001000	13553.	1355325996.	32.7306041	0.0003273	-0.000213	1.2582520	8.4739752 C
0.00001063	13553.	1275600938.	31.9577631	0.0003396	-0.000234	1.3004922	8.7654670 C
0.00001125	13553.	1204734219.	31.2535031	0.0003516	-0.000256	1.3417321	9.0513179 C
0.00001188	13649.	1149399123.	30.6086594	0.0003635	-0.000278	1.3820549	9.3321008 C
0.00001250	13973.	1117808406.	30.0150303	0.0003752	-0.000300	1.4215047	9.6080735 C
0.00001313	14285.	1088365496.	29.4660604	0.0003867	-0.000322	1.4601283	9.8795255 C
0.00001375	14587.	1060871251.	28.9564728	0.0003982	-0.000344	1.4979750	10.1467811 C
0.00001438	14880.	1035157869.	28.4819980	0.0004094	-0.000367	1.5350974	10.4102017 C
0.00001500	15166.	1011082122.	28.0391718	0.0004206	-0.000389	1.5715513	10.6701898 C
0.00001563	15446.	988520290.	27.6251841	0.0004316	-0.000412	1.6073959	10.9271928 C
0.00001625	15720.	967365435.	27.2377868	0.0004426	-0.000435	1.6426960	11.1817196 C
0.00001688	15987.	947365984.	26.8717504	0.0004535	-0.000458	1.6773337	-11.558181 C
0.00001750	16250.	928547754.	26.5275511	0.0004642	-0.000481	1.7114732	-12.160943 C
0.00001813	16509.	910856514.	26.2043858	0.0004750	-0.000504	1.7452039	-12.765126 C
0.00001875	16762.	893997619.	25.8957132	0.0004855	-0.000527	1.7782663	-13.373143 C
0.00001938	17014.	878145963.	25.6059610	0.0004961	-0.000550	1.8110241	-13.981719 C
0.00002000	17260.	863014335.	25.3285471	0.0005066	-0.000573	1.8431791	-14.593643 C
0.00002063	17505.	848739606.	25.0672652	0.0005170	-0.000597	1.8750527	-15.205973 C
0.00002125	17745.	835071401.	24.8160517	0.0005273	-0.000620	1.9063435	-15.821571 C
0.00002188	17985.	822169571.	24.5796368	0.0005377	-0.000644	1.9374317	-16.436887 C
0.00002250	18219.	809753578.	24.3506261	0.0005479	-0.000667	1.9678977	-17.055941 C
0.00002313	18453.	797986066.	24.1341387	0.0005581	-0.000691	1.9981470	-17.674899 C
0.00002375	18685.	786727137.	23.9264540	0.0005683	-0.000714	2.0279862	-18.295642 C
0.00002438	18913.	775937352.	23.7268646	0.0005783	-0.000738	2.0574172	-18.918191 C
0.00002563	19367.	755779462.	23.3539237	0.0005984	-0.000785	2.1153939	-20.165497 C
0.00002688	19814.	737254765.	23.0104479	0.0006184	-0.000833	2.1720896	-21.416876 C
0.00002813	20253.	720114858.	22.6908272	0.0006382	-0.000881	2.2273893	-22.673701 C

MEG-33 rear abutment X direction row 1

0.00002938	20690.	704336785.	22.3974590	0.0006579	-0.000928	2.2817621	-23.931333	C
0.00003063	21119.	689597096.	22.1207865	0.0006774	-0.000976	2.3346802	-25.195408	C
0.00003188	21547.	675976833.	21.8667849	0.0006970	-0.001024	2.3868540	-26.458584	C
0.00003313	21968.	663171717.	21.6251922	0.0007163	-0.001072	2.4376038	-27.728256	C
0.00003438	22387.	651267100.	21.4021512	0.0007357	-0.001121	2.4876305	-28.996949	C
0.00003563	22803.	640070324.	21.1910229	0.0007549	-0.001169	2.5365015	-30.269506	C
0.00003688	23215.	629555793.	20.9927707	0.0007741	-0.001217	2.5844360	-31.543600	C
0.00003813	23626.	619703608.	20.8083969	0.0007933	-0.001265	2.6316556	-32.816722	C
0.00003938	24032.	610347262.	20.6310208	0.0008123	-0.001314	2.6776221	-34.095222	C
0.00004063	24437.	601530303.	20.4647530	0.0008314	-0.001362	2.7228220	-35.373495	C
0.00004188	24841.	593215560.	20.3092091	0.0008504	-0.001411	2.7673146	-36.650798	C
0.00004313	25241.	585307594.	20.1603139	0.0008694	-0.001459	2.8107822	-37.931064	C
0.00004438	25639.	577789577.	20.0185323	0.0008883	-0.001508	2.8533412	-39.212970	C
0.00004563	26036.	570661721.	19.8852535	0.0009073	-0.001556	2.8951993	-40.493906	C
0.00004688	26432.	563892672.	19.7598025	0.0009262	-0.001605	2.9363529	-41.773862	C
0.00004813	26826.	557417655.	19.6389913	0.0009451	-0.001654	2.9765317	-43.056439	C
0.00004938	27217.	551225350.	19.5232040	0.0009640	-0.001702	3.0158233	-44.340581	C
0.00005063	27607.	545319415.	19.4138071	0.0009828	-0.001751	3.0544161	-45.623736	C
0.00005188	27996.	539678975.	19.3103436	0.0010017	-0.001800	3.0923063	-46.905896	C
0.00005313	28384.	534285126.	19.2123996	0.0010207	-0.001848	3.1294901	-48.187055	C
0.00005438	28770.	529096063.	19.1175326	0.0010395	-0.001897	3.1657462	-49.470459	C
0.00005563	29151.	524062700.	19.0255099	0.0010583	-0.001945	3.2010814	-50.000000	CY
0.00005688	29503.	518730028.	18.9331096	0.0010768	-0.001994	3.2351856	-50.000000	CY
0.00005813	29812.	512895062.	18.8379197	0.0010950	-0.002044	3.2678328	-50.000000	CY
0.00005938	30071.	506464474.	18.7386296	0.0011126	-0.002094	3.2989133	-50.000000	CY
0.00006063	30322.	500159373.	18.6425902	0.0011302	-0.002144	3.3292308	-50.000000	CY
0.00006188	30570.	494053629.	18.5473988	0.0011476	-0.002194	3.3585598	-50.000000	CY
0.00006313	30813.	488129970.	18.4554219	0.0011650	-0.002244	3.3871749	-50.000000	CY
0.00006438	31023.	481909646.	18.3612913	0.0011820	-0.002294	3.4145391	-50.000000	CY
0.00006563	31197.	475382714.	18.2646720	0.0011986	-0.002345	3.4406463	-50.000000	CY
0.00006688	31368.	469053947.	18.1716169	0.0012152	-0.002396	3.4661532	-50.000000	CY
0.00006813	31538.	462945025.	18.0820212	0.0012318	-0.002447	3.4910693	-50.000000	CY
0.00006938	31705.	457002840.	17.9922955	0.0012482	-0.002498	3.5150461	-50.000000	CY
0.00007063	31870.	451263703.	17.9061344	0.0012646	-0.002549	3.5384838	-50.000000	CY
0.00007188	32036.	445716958.	17.8233543	0.0012811	-0.002600	3.5613799	-50.000000	CY
0.00007313	32201.	440352680.	17.7437841	0.0012975	-0.002651	3.5837314	-50.000000	CY
0.00007438	32365.	435161608.	17.6672643	0.0013140	-0.002702	3.6055357	-50.000000	CY
0.00007938	32840.	413738506.	17.3463679	0.0013769	-0.002909	3.6832113	-50.000000	CY
0.00008438	33252.	394098830.	17.0530731	0.0014389	-0.003117	3.7514491	-50.000000	CY
0.00008938	33647.	376468485.	16.7853977	0.0015002	-0.003326	3.8108273	-50.000000	CY

MEG-33 rear abutment X direction row 1

0.00009438	34034.	360619909.	16.5483233	0.0015617	-0.003535	3.8622796	-50.000000	CY
0.00009938	34360.	345756732.	16.3202970	0.0016218	-0.003744	3.9046213	-50.000000	CY
0.0001044	34582.	331324961.	16.0921013	0.0016796	-0.003957	3.9379999	-50.000000	CY
0.0001094	34798.	318148704.	15.8856098	0.0017375	-0.004169	3.9642546	-50.000000	CY
0.0001144	35000.	306009619.	15.6910359	0.0017947	-0.004382	3.9831324	-50.000000	CY
0.0001194	35198.	294849497.	15.5160619	0.0018522	-0.004594	3.9950624	-50.000000	CY
0.0001244	35389.	284534709.	15.3561687	0.0019099	-0.004806	3.9998892	-50.000000	CY
0.0001294	35569.	274925985.	15.2038866	0.0019670	-0.005019	3.9993491	-50.000000	CY
0.0001344	35743.	265994783.	15.0662493	0.0020245	-0.005232	3.9979068	-50.000000	CY
0.0001394	35912.	257667351.	14.9415053	0.0020825	-0.005444	3.9974776	-50.000000	CY
0.0001444	36042.	249641449.	14.8164101	0.0021391	-0.005657	3.9995494	-50.000000	CY
0.0001494	36126.	241851015.	14.6842457	0.0021935	-0.005873	3.9965005	-50.000000	CY
0.0001544	36206.	234533273.	14.5622274	0.0022480	-0.006088	3.9997994	-50.000000	CY
0.0001594	36282.	227653447.	14.4504448	0.0023030	-0.006303	3.9964017	50.000000	CY
0.0001644	36356.	221176298.	14.3475687	0.0023584	-0.006518	3.9997092	50.000000	CY
0.0001694	36423.	215042453.	14.2478311	0.0024132	-0.006733	3.9948701	50.000000	CY
0.0001744	36482.	209215618.	14.1548236	0.0024682	-0.006948	3.9989828	50.000000	CY
0.0001794	36539.	203703961.	14.0685795	0.0025236	-0.007163	3.9975939	50.000000	CY
0.0001844	36594.	198474344.	13.9894957	0.0025793	-0.007377	3.9967609	50.000000	CY
0.0001894	36645.	193502796.	13.9173405	0.0026356	-0.007591	3.9996500	50.000000	CY
0.0001944	36694.	188777143.	13.8505151	0.0026922	-0.007804	3.9941358	50.000000	CY
0.0001994	36740.	184277742.	13.7888105	0.0027491	-0.008017	3.9969299	50.000000	CY
0.0002044	36778.	179954900.	13.7317689	0.0028064	-0.008230	3.9996389	50.000000	CY
0.0002094	36814.	175826217.	13.6770540	0.0028636	-0.008443	3.9948798	50.000000	CY
0.0002144	36847.	171882980.	13.6263125	0.0029211	-0.008655	3.9952686	50.000000	CY
0.0002194	36879.	168108510.	13.5800998	0.0029791	-0.008867	3.9988103	50.000000	CY
0.0002244	36907.	164486304.	13.5390838	0.0030378	-0.009078	3.9998378	50.000000	CYT
0.0002294	36932.	161013200.	13.5016245	0.0030969	-0.009289	3.9909156	50.000000	CYT
0.0002344	36957.	157684714.	13.4666462	0.0031562	-0.009500	3.9960956	50.000000	CYT
0.0002394	36981.	154491688.	13.4340174	0.0032158	-0.009710	3.9991337	50.000000	CYT
0.0002444	37005.	151425213.	13.4037113	0.0032755	-0.009921	3.9988541	50.000000	CYT
0.0002494	37026.	148474819.	13.3761284	0.0033357	-0.010131	3.9889330	50.000000	CYT
0.0002544	37039.	145609791.	13.3462824	0.0033950	-0.010341	3.9943361	50.000000	CYT
0.0002594	37050.	142844094.	13.3169881	0.0034541	-0.010552	3.9979314	50.000000	CYT
0.0002644	37060.	140180695.	13.2894882	0.0035134	-0.010763	3.9997593	50.000000	CYT
0.0002694	37066.	137601257.	13.2622566	0.0035725	-0.010974	3.9957891	50.000000	CYT
0.0002744	37066.	135093717.	13.2330962	0.0036308	-0.011185	3.9872423	50.000000	CYT
0.0003044	37066.	121778525.	13.1353229	0.0039981	-0.012438	3.9871046	50.000000	CYT

 Summary of Results for Nominal Moment Capacity for Section 1

Moment values interpolated at maximum compressive strain = 0.003
 or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain	Max. Tens. Strain
1	637.400	33585.679	0.00300000	-0.01015581
2	852.300	36888.690	0.00300000	-0.00894223

Note that the values of moment capacity in the table above are not factored by a strength reduction factor (phi-factor).

In ACI 318, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.75).

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318, or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Load No.	Resist. Factor	Nominal Ax. Thrust kips	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in^2
1	0.65	637.400000	33586.	414.310000	21831.	537605250.
2	0.65	852.300000	36889.	553.995000	23978.	611608864.
1	0.75	637.400000	33586.	478.050000	25189.	491301122.
2	0.75	852.300000	36889.	639.225000	27667.	544453566.
1	0.90	637.400000	33586.	573.660000	30227.	347738359.
2	0.90	852.300000	36889.	767.070000	33200.	396592835.

Pile Section No. 2:

Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section	=	10.000000 ft
Shaft Diameter	=	48.000000 in
Concrete Cover Thickness (to edge of trans. reinf.)	=	3.000000 in
Number of Reinforcing Bars	=	20 bars
Yield Stress of Reinforcing Bars	=	50000. psi
Modulus of Elasticity of Reinforcing Bars	=	29000000. psi
Gross Area of Shaft	=	1810. sq. in.
Total Area of Reinforcing Steel	=	20.000000 sq. in.
Area Ratio of Steel Reinforcement	=	1.11 percent
Edge-to-Edge Bar Spacing	=	5.070246 in
Maximum Concrete Aggregate Size	=	0.750000 in
Ratio of Bar Spacing to Aggregate Size	=	6.76
Offset of Center of Rebar Cage from Center of Pile	=	0.0000 in
Transverse Reinforcement		
Type: Spiral		
Number of Transverse Reinf. (per spacing)	=	1
Spacing of Transverse Reinf.	=	3.750000 in
Yield Stress of Transverse Reinf.	=	50000. psi
Diameter of Transverse Reinf.	=	0.625000 in

Axial Structural Capacities:

Nom. Axial Structural Capacity = $0.85 F_c A_c + F_y A_s$	=	7084.495 kips
Tensile Load for Cracking of Concrete	=	-811.209 kips
Nominal Axial Tensile Capacity	=	-1000.000 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
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MEG-33 rear abutment X direction row 1

1	1.128000	1.000000	19.811000	0.000000
2	1.128000	1.000000	18.841381	6.121936
3	1.128000	1.000000	16.027436	11.644614
4	1.128000	1.000000	11.644614	16.027436
5	1.128000	1.000000	6.121936	18.841381
6	1.128000	1.000000	0.000000	19.811000
7	1.128000	1.000000	-6.12194	18.841381
8	1.128000	1.000000	-11.64461	16.027436
9	1.128000	1.000000	-16.02744	11.644614
10	1.128000	1.000000	-18.84138	6.121936
11	1.128000	1.000000	-19.81100	0.000000
12	1.128000	1.000000	-18.84138	-6.12194
13	1.128000	1.000000	-16.02744	-11.64461
14	1.128000	1.000000	-11.64461	-16.02744
15	1.128000	1.000000	-6.12194	-18.84138
16	1.128000	1.000000	0.000000	-19.81100
17	1.128000	1.000000	6.121936	-18.84138
18	1.128000	1.000000	11.644614	-16.02744
19	1.128000	1.000000	16.027436	-11.64461
20	1.128000	1.000000	18.841381	-6.12194

NOTE: The positions of the above rebars were computed by LPILE

Minimum spacing between any two bars not equal to zero = 5.070 inches
between bars 17 and 18.

Ratio of bar spacing to maximum aggregate size = 6.76

Concrete Properties:

Compressive Strength of Concrete	=	4000.	psi
Modulus of Elasticity of Concrete	=	3604997.	psi
Modulus of Rupture of Concrete	=	-474.34165	psi
Compression Strain at Peak Stress	=	0.001886	
Tensile Strain at Fracture of Concrete	=	-0.0001154	
Maximum Coarse Aggregate Size	=	0.750000	in

MEG-33 rear abutment X direction row 1

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 2

Number	Axial Thrust Force kips
1	637.400
2	852.300

Definitions of Run Messages and Notes:

-
- C = concrete in section has cracked in tension.
 - Y = stress in reinforcing steel has reached yield stress.
 - T = ACI 318 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than 0.003. See ACI 318-14, Section 21.2.3.
 - Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
 Position of neutral axis is measured from edge of compression side of pile.
 Compressive stresses and strains are positive in sign.
 Tensile stresses and strains are negative in sign.

Axial Thrust Force = 637.400 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	722.8640984	1156582557.	151.3482717	0.00009459	0.00006459	0.3905202	2.6779374	
0.00000125	1446.	1156563501.	87.7086063	0.0001096	0.00004964	0.4502725	3.0489370	
0.00000188	2168.	1156523991.	66.5107033	0.0001247	0.00003471	0.5096399	3.4207695	
0.00000250	2891.	1156466934.	55.9232421	0.0001398	0.00001981	0.5686194	3.7934351	
0.00000313	3614.	1156392908.	49.5799590	0.0001549	0.00000494	0.6272083	4.1669338	
0.00000375	4336.	1156289927.	45.3586987	0.0001701	-0.00000990	0.6854026	4.5412585	
0.00000438	5058.	1156004285.	42.3490875	0.0001853	-0.00002472	0.7431838	4.9162905	

MEG-33 rear abutment X direction row 1

0.00000500	5777.	1155402202.	40.0954776	0.0002005	-0.00003952	0.8005252	5.2918442
0.00000563	6494.	1154474396.	38.3450350	0.0002157	-0.00005431	0.8574074	5.6677838
0.00000625	7208.	1153257200.	36.9463041	0.0002309	-0.00006909	0.9138172	6.0440176
0.00000688	7919.	1151795193.	35.8030477	0.0002461	-0.00008385	0.9697455	6.4204827
0.00000750	8626.	1150130142.	34.8512003	0.0002614	-0.00009862	1.0251861	6.7971361
0.00000813	8626.	1061658593.	32.2802641	0.0002623	-0.000128	1.0279036	6.7577873 C
0.00000875	8626.	985825836.	31.3195090	0.0002740	-0.000146	1.0702274	7.0338254 C
0.00000938	8626.	920104114.	30.4618892	0.0002856	-0.000164	1.1114043	7.3030761 C
0.00001000	8626.	862597607.	29.6892738	0.0002969	-0.000183	1.1514953	7.5658894 C
0.00001063	8626.	811856571.	28.9911617	0.0003080	-0.000202	1.1906871	7.8236516 C
0.00001125	8781.	780561242.	28.3538785	0.0003190	-0.000221	1.2289427	8.0759529 C
0.00001188	9016.	759252756.	27.7710273	0.0003298	-0.000240	1.2664094	8.3238976 C
0.00001250	9243.	739426842.	27.2350635	0.0003404	-0.000260	1.3031249	8.5677105 C
0.00001313	9462.	720936533.	26.7399497	0.0003510	-0.000279	1.3391295	8.8076434 C
0.00001375	9675.	703659572.	26.2808189	0.0003614	-0.000299	1.3744655	9.0439766 C
0.00001438	9883.	687492868.	25.8537251	0.0003716	-0.000318	1.4091784	9.2770217 C
0.00001500	10085.	672348342.	25.4554571	0.0003818	-0.000338	1.4433161	9.5071239 C
0.00001563	10284.	658149765.	25.0833984	0.0003919	-0.000358	1.4769300	9.7346650 C
0.00001625	10478.	644817224.	24.7350616	0.0004019	-0.000378	1.5100552	9.9598977 C
0.00001688	10668.	632192275.	24.4057822	0.0004118	-0.000398	1.5425831	10.1818297 C
0.00001750	10856.	620331100.	24.0969258	0.0004217	-0.000418	1.5747181	10.4021899 C
0.00001813	11041.	609151181.	23.8062393	0.0004315	-0.000439	1.6064555	-10.824595 C
0.00001875	11222.	598530163.	23.5300024	0.0004412	-0.000459	1.6376826	-11.348061 C
0.00001938	11403.	588542415.	23.2707492	0.0004509	-0.000479	1.6686521	-11.871998 C
0.00002000	11580.	578986271.	23.0221300	0.0004604	-0.000500	1.6990590	-12.399165 C
0.00002063	11756.	569990652.	22.7886784	0.0004700	-0.000520	1.7292729	-12.926272 C
0.00002125	11929.	561358078.	22.5638417	0.0004795	-0.000541	1.7589418	-13.456533 C
0.00002188	12101.	553209313.	22.3522098	0.0004890	-0.000561	1.7884403	-13.986567 C
0.00002250	12271.	545384194.	22.1481588	0.0004983	-0.000582	1.8174490	-14.519326 C
0.00002313	12440.	537951545.	21.9546437	0.0005077	-0.000602	1.8462306	-15.052417 C
0.00002375	12608.	530854837.	21.7697356	0.0005170	-0.000623	1.8747054	-15.586595 C
0.00002438	12773.	524039676.	21.5915988	0.0005263	-0.000644	1.9027877	-16.122689 C
0.00002563	13103.	511320209.	21.2594694	0.0005448	-0.000685	1.9582425	-17.196307 C
0.00002688	13427.	499619019.	20.9533311	0.0005631	-0.000727	2.0125603	-18.273747 C
0.00002813	13748.	488804796.	20.6694112	0.0005813	-0.000769	2.0657316	-19.355262 C
0.00002938	14066.	478844491.	20.4086502	0.0005995	-0.000810	2.1180962	-20.437631 C
0.00003063	14380.	469539468.	20.1631233	0.0006175	-0.000853	2.1692103	-21.525376 C
0.00003188	14692.	460937146.	19.9374860	0.0006355	-0.000894	2.2196778	-22.612536 C
0.00003313	15001.	452858551.	19.7237641	0.0006533	-0.000937	2.2689673	-23.704609 C
0.00003438	15309.	445338357.	19.5258783	0.0006712	-0.000979	2.3175926	-24.796390 C

MEG-33 rear abutment X direction row 1

0.00003563	15614.	438276699.	19.3395100	0.0006890	-0.001021	2.3652963	-25.890619	C
0.00003688	15917.	431634611.	19.1639367	0.0007067	-0.001063	2.4121326	-26.986816	C
0.00003813	16219.	425410155.	19.0005925	0.0007244	-0.001106	2.4583601	-28.082220	C
0.00003938	16518.	419510997.	18.8445825	0.0007420	-0.001148	2.5035945	-29.181092	C
0.00004063	16816.	413940551.	18.6975712	0.0007596	-0.001190	2.5480929	-30.280674	C
0.00004188	17114.	408686672.	18.5599878	0.0007772	-0.001233	2.5919883	-31.379465	C
0.00004313	17410.	403700904.	18.4293396	0.0007948	-0.001275	2.6350987	-32.479557	C
0.00004438	17703.	398949167.	18.3040903	0.0008122	-0.001318	2.6773266	-33.582174	C
0.00004563	17996.	394443362.	18.1863039	0.0008298	-0.001360	2.7189565	-34.683997	C
0.00004688	18289.	390163736.	18.0753872	0.0008473	-0.001403	2.7599860	-35.785020	C
0.00004813	18580.	386081789.	17.9698082	0.0008648	-0.001445	2.8003002	-36.886636	C
0.00004938	18869.	382166952.	17.8676912	0.0008822	-0.001488	2.8397358	-37.990950	C
0.00005063	19158.	378432543.	17.7711668	0.0008997	-0.001530	2.8785748	-39.094456	C
0.00005188	19446.	374865420.	17.6798345	0.0009171	-0.001573	2.9168146	-40.197149	C
0.00005313	19733.	371453681.	17.5933314	0.0009346	-0.001615	2.9544521	-41.299025	C
0.00005438	20020.	368183710.	17.5110143	0.0009522	-0.001658	2.9914485	-42.400569	C
0.00005563	20305.	365025912.	17.4303844	0.0009696	-0.001700	3.0275443	-43.505361	C
0.00005688	20588.	361995429.	17.3538036	0.0009870	-0.001743	3.0630413	-44.609320	C
0.00005813	20872.	359083960.	17.2810144	0.0010045	-0.001786	3.0979366	-45.712440	C
0.00005938	21154.	356283900.	17.2117810	0.0010219	-0.001828	3.1322273	-46.814715	C
0.00006063	21436.	353588273.	17.1458872	0.0010395	-0.001871	3.1659104	-47.916138	C
0.00006188	21718.	350990666.	17.0831342	0.0010570	-0.001913	3.1989830	-49.016703	C
0.00006313	21997.	348472845.	17.0225786	0.0010746	-0.001955	3.2313529	-50.000000	CY
0.00006438	22267.	345889777.	16.9612477	0.0010919	-0.001998	3.2626887	-50.000000	CY
0.00006563	22514.	343076254.	16.8981638	0.0011089	-0.002041	3.2928938	-50.000000	CY
0.00006688	22731.	339903505.	16.8312315	0.0011256	-0.002084	3.3217426	-50.000000	CY
0.00006813	22918.	336406474.	16.7607324	0.0011418	-0.002128	3.3492887	-50.000000	CY
0.00006938	23098.	332948946.	16.6919491	0.0011580	-0.002172	3.3761681	-50.000000	CY
0.00007063	23279.	329607180.	16.6259603	0.0011742	-0.002216	3.4025222	-50.000000	CY
0.00007188	23458.	326372326.	16.5625775	0.0011904	-0.002260	3.4283434	-50.000000	CY
0.00007313	23625.	323078084.	16.4967926	0.0012063	-0.002304	3.4530703	-50.000000	CY
0.00007438	23763.	319506083.	16.4269200	0.0012218	-0.002348	3.4765321	-50.000000	CY
0.00007938	24249.	305503141.	16.1584804	0.0012826	-0.002527	3.5640191	-50.000000	CY
0.00008438	24725.	293032524.	15.9189415	0.0013432	-0.002707	3.6432005	-50.000000	CY
0.00008938	25110.	280951580.	15.6872374	0.0014020	-0.002888	3.7125296	-50.000000	CY
0.00009438	25403.	269171330.	15.4575744	0.0014588	-0.003071	3.7722315	-50.000000	CY
0.00009938	25689.	258505094.	15.2504203	0.0015155	-0.003254	3.8249392	-50.000000	CY
0.0001044	25969.	248802448.	15.0634814	0.0015723	-0.003438	3.8707500	-50.000000	CY
0.0001094	26240.	239908502.	14.8904194	0.0016286	-0.003621	3.9094006	-50.000000	CY
0.0001144	26463.	231366793.	14.7230896	0.0016840	-0.003806	3.9406489	-50.000000	CY

MEG-33 rear abutment X direction row 1

0.0001194	26621.	223005308.	14.5520405	0.0017371	-0.003993	3.9644717	-50.000000	CY
0.0001244	26769.	215229956.	14.3915301	0.0017899	-0.004180	3.9821024	-50.000000	CY
0.0001294	26914.	208032535.	14.2459291	0.0018431	-0.004367	3.9938015	-50.000000	CY
0.0001344	27054.	201332662.	14.1106047	0.0018961	-0.004554	3.9994355	-50.000000	CY
0.0001394	27187.	195064376.	13.9823677	0.0019488	-0.004741	3.9983913	-50.000000	CY
0.0001444	27317.	189207732.	13.8654950	0.0020018	-0.004928	3.9963600	-50.000000	CY
0.0001494	27443.	183720678.	13.7589169	0.0020552	-0.005115	3.9998811	-50.000000	CY
0.0001544	27566.	178562036.	13.6603711	0.0021088	-0.005301	3.9984774	-50.000000	CY
0.0001594	27680.	173680630.	13.5643303	0.0021618	-0.005488	3.9975563	-50.000000	CY
0.0001644	27775.	168972509.	13.4699008	0.0022141	-0.005676	3.9991679	-50.000000	CY
0.0001694	27846.	164405959.	13.3750099	0.0022654	-0.005865	3.9958391	-50.000000	CY
0.0001744	27903.	160018168.	13.2827011	0.0023162	-0.006054	3.9989576	-50.000000	CY
0.0001794	27957.	155859482.	13.1961865	0.0023671	-0.006243	3.9977285	-50.000000	CY
0.0001844	28005.	151890985.	13.1100808	0.0024172	-0.006433	3.9977888	50.000000	CY
0.0001894	28051.	148126726.	13.0296417	0.0024675	-0.006623	3.9998957	50.000000	CY
0.0001944	28096.	144547787.	12.9548838	0.0025181	-0.006812	3.9948145	50.000000	CY
0.0001994	28138.	141129538.	12.8871825	0.0025694	-0.007001	3.9986511	50.000000	CY
0.0002044	28178.	137874370.	12.8237332	0.0026209	-0.007189	3.9999985	50.000000	CY
0.0002094	28217.	134766989.	12.7647793	0.0026726	-0.007377	3.9948176	50.000000	CY
0.0002144	28252.	131788328.	12.7105223	0.0027248	-0.007565	3.9985347	50.000000	CY
0.0002194	28284.	128930785.	12.6560633	0.0027764	-0.007754	3.9999730	50.000000	CY
0.0002244	28315.	126194866.	12.6053315	0.0028283	-0.007942	3.9926058	50.000000	CY
0.0002294	28345.	123575149.	12.5576259	0.0028804	-0.008130	3.9969816	50.000000	CY
0.0002344	28370.	121045703.	12.5168292	0.0029336	-0.008316	3.9994857	50.000000	CY
0.0002394	28394.	118618216.	12.4786947	0.0029871	-0.008503	3.9970947	50.000000	CY
0.0002444	28417.	116285591.	12.4432385	0.0030408	-0.008689	3.9933164	50.000000	CYT
0.0002494	28440.	114044351.	12.4098490	0.0030947	-0.008875	3.9973648	50.000000	CYT
0.0002544	28459.	111879786.	12.3806545	0.0031493	-0.009061	3.9995945	50.000000	CYT
0.0002594	28477.	109792650.	12.3541538	0.0032044	-0.009246	3.9966021	50.000000	CYT
0.0002644	28495.	107780719.	12.3296710	0.0032597	-0.009430	3.9916922	50.000000	CYT
0.0002694	28511.	105841609.	12.3066984	0.0033151	-0.009615	3.9962045	50.000000	CYT
0.0002744	28527.	103971295.	12.2851678	0.0033707	-0.009799	3.9989829	50.000000	CYT
0.0003044	28588.	93923153.	12.1612763	0.0037016	-0.010908	3.9998656	50.000000	CYT
0.0003344	28588.	85496403.	12.2050319	0.0040811	-0.011969	3.9912099	50.000000	CYT

Axial Thrust Force = 852.300 kips

Bending Curvature	Bending Moment	Bending Stiffness	Depth to N Axis	Max Comp Strain	Max Tens Strain	Max Conc Stress	Max Steel Stress	Run Msg
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MEG-33 rear abutment X direction row 1

rad/in.	in-kip	kip-in2	in	in/in	in/in	ksi	ksi
6.25000E-07	712.9161275	1140665804.	195.4637400	0.0001222	0.00009216	0.5007490	3.4775303
0.00000125	1426.	1140648415.	109.7668347	0.0001372	0.00007721	0.5595804	3.8485478
0.00000188	2139.	1140608986.	81.2167380	0.0001523	0.00006228	0.6180267	4.2204101
0.00000250	2851.	1140551434.	66.9533447	0.0001674	0.00004738	0.6760849	4.5931175
0.00000313	3564.	1140476540.	58.4046344	0.0001825	0.00003251	0.7337521	4.9666700
0.00000375	4276.	1140384563.	52.7132670	0.0001977	0.00001767	0.7910254	5.3410678
0.00000438	4989.	1140275610.	48.6546688	0.0002129	0.00000286	0.8479020	5.7163111
0.00000500	5701.	1140138376.	45.6164887	0.0002281	-0.00001192	0.9043775	6.0923909
0.00000563	6412.	1139872430.	43.2579706	0.0002433	-0.00002667	0.9604364	6.4692065
0.00000625	7121.	1139386248.	41.3744058	0.0002586	-0.00004141	1.0160574	6.8466111
0.00000688	7828.	1138654630.	39.8356697	0.0002739	-0.00005613	1.0712238	7.2244867
0.00000750	8533.	1137685665.	38.5551476	0.0002892	-0.00007084	1.1259228	7.6027445
0.00000813	9234.	1136500717.	37.4729719	0.0003045	-0.00008553	1.1801451	7.9813190
0.00000875	9932.	1135124449.	36.5464439	0.0003198	-0.000100	1.2338834	8.3601601
0.00000938	10627.	1133580955.	35.7442957	0.0003351	-0.000115	1.2871324	8.7392304
0.00001000	10627.	1062732146.	33.5960205	0.0003360	-0.000144	1.2896027	8.6988460 C
0.00001063	10627.	1000218490.	32.7693886	0.0003482	-0.000162	1.3315586	8.9878179 C
0.00001125	10627.	944650796.	32.0161329	0.0003602	-0.000180	1.3724730	9.2707634 C
0.00001188	10627.	894932333.	31.3261430	0.0003720	-0.000198	1.4124222	9.5481905 C
0.00001250	10627.	850185716.	30.6910984	0.0003836	-0.000216	1.4514707	9.8205230 C
0.00001313	10856.	827088961.	30.1051909	0.0003951	-0.000235	1.4897221	10.0885383 C
0.00001375	11113.	808234318.	29.5624686	0.0004065	-0.000254	1.5272222	10.3525343 C
0.00001438	11362.	790397217.	29.0575302	0.0004177	-0.000272	1.5639924	10.6126079 C
0.00001500	11603.	773500437.	28.5860314	0.0004288	-0.000291	1.6000615	10.8689237 C
0.00001563	11836.	757485977.	28.1445240	0.0004398	-0.000310	1.6354679	11.1217375 C
0.00001625	12062.	742303620.	27.7301590	0.0004506	-0.000329	1.6702524	11.3713375 C
0.00001688	12283.	727908905.	27.3405733	0.0004614	-0.000349	1.7044585	11.6180431 C
0.00001750	12500.	714261959.	26.9738073	0.0004720	-0.000368	1.7381321	11.8622072 C
0.00001813	12712.	701326568.	26.6282410	0.0004826	-0.000387	1.7713220	12.1042192 C
0.00001875	12918.	688939261.	26.2993802	0.0004931	-0.000407	1.8038935	12.3427881 C
0.00001938	13120.	677179797.	25.9884582	0.0005035	-0.000426	1.8360271	12.5795150 C
0.00002000	13320.	666019455.	25.6945071	0.0005139	-0.000446	1.8677715	12.8148142 C
0.00002063	13515.	655285283.	25.4127634	0.0005241	-0.000466	1.8989257	13.0467591 C
0.00002125	13709.	645111549.	25.1464846	0.0005344	-0.000486	1.9297789	13.2780212 C
0.00002188	13898.	635330958.	24.8910667	0.0005445	-0.000506	1.9601153	13.5065205 C
0.00002250	14086.	626022967.	24.6485530	0.0005546	-0.000525	1.9901407	13.7341807 C
0.00002313	14270.	617070005.	24.4155924	0.0005646	-0.000545	2.0196983	13.9594567 C
0.00002375	14453.	608542340.	24.1942005	0.0005746	-0.000565	2.0489882	14.1842557 C

MEG-33 rear abutment X direction row 1

0.00002438	14633.	600310809.	23.9805116	0.0005845	-0.000585	2.0777982	-14.434026	C
0.00002563	14988.	584891238.	23.5811213	0.0006043	-0.000626	2.1345317	-15.471029	C
0.00002688	15337.	570669853.	23.2135205	0.0006239	-0.000666	2.1900041	-16.512213	C
0.00002813	15679.	557472059.	22.8725638	0.0006433	-0.000707	2.2441627	-17.558315	C
0.00002938	16015.	545192652.	22.5552609	0.0006626	-0.000747	2.2970626	-18.608987	C
0.00003063	16348.	533798094.	22.2615291	0.0006818	-0.000788	2.3489589	-19.661729	C
0.00003188	16674.	523119176.	21.9857771	0.0007008	-0.000829	2.3996197	-20.719147	C
0.00003313	16998.	513148075.	21.7286835	0.0007198	-0.000870	2.4493027	-21.778633	C
0.00003438	17318.	503787944.	21.4873085	0.0007386	-0.000911	2.4979362	-22.841089	C
0.00003563	17634.	495000257.	21.2608928	0.0007574	-0.000953	2.5456146	-23.905590	C
0.00003688	17947.	486711447.	21.0471408	0.0007761	-0.000994	2.5922747	-24.972964	C
0.00003813	18259.	478925291.	20.8472528	0.0007948	-0.001035	2.6381597	-26.040506	C
0.00003938	18566.	471520501.	20.6560293	0.0008133	-0.001077	2.6828987	-27.112646	C
0.00004063	18872.	464551118.	20.4773398	0.0008319	-0.001118	2.7269649	-28.183884	C
0.00004188	19176.	457928484.	20.3071914	0.0008504	-0.001160	2.7700719	-29.257704	C
0.00004313	19477.	451630975.	20.1453009	0.0008688	-0.001201	2.8122763	-30.333534	C
0.00004438	19777.	445670065.	19.9932291	0.0008872	-0.001243	2.8538144	-31.408463	C
0.00004563	20074.	439982182.	19.8478614	0.0009056	-0.001284	2.8944474	-32.485548	C
0.00004688	20369.	434545299.	19.7086164	0.0009238	-0.001326	2.9341799	-33.564850	C
0.00004813	20664.	429374380.	19.5772480	0.0009422	-0.001368	2.9732517	-34.643253	C
0.00004938	20957.	424449060.	19.4531619	0.0009605	-0.001410	3.0116596	-35.720754	C
0.00005063	21247.	419702086.	19.3322358	0.0009787	-0.001451	3.0490247	-36.802611	C
0.00005188	21537.	415162943.	19.2173064	0.0009969	-0.001493	3.0856876	-37.884215	C
0.00005313	21825.	410822637.	19.1083741	0.0010151	-0.001535	3.1216920	-38.964911	C
0.00005438	22113.	406667300.	19.0050293	0.0010334	-0.001577	3.1570344	-40.044694	C
0.00005563	22398.	402661698.	18.9049969	0.0010516	-0.001618	3.1915098	-41.126627	C
0.00005688	22682.	398800130.	18.8083804	0.0010697	-0.001660	3.2251613	-42.210178	C
0.00005813	22965.	395091245.	18.7164664	0.0010879	-0.001702	3.2581555	-43.292807	C
0.00005938	23247.	391525321.	18.6289618	0.0011061	-0.001744	3.2904891	-44.374506	C
0.00006063	23528.	388093370.	18.5455979	0.0011243	-0.001786	3.3221586	-45.455270	C
0.00006188	23808.	384781958.	18.4656143	0.0011426	-0.001827	3.3531063	-46.536013	C
0.00006313	24086.	381565617.	18.3869917	0.0011607	-0.001869	3.3831411	-47.620063	C
0.00006438	24363.	378462057.	18.3119322	0.0011788	-0.001911	3.4125152	-48.703162	C
0.00006563	24640.	375464731.	18.2402362	0.0011970	-0.001953	3.4412253	-49.785301	C
0.00006688	24912.	372516091.	18.1710320	0.0012152	-0.001995	3.4691967	-50.000000	CY
0.00006813	25166.	369413364.	18.1014471	0.0012332	-0.002037	3.4961505	-50.000000	CY
0.00006938	25397.	366079635.	18.0302219	0.0012508	-0.002079	3.5219801	-50.000000	CY
0.00007063	25594.	362394578.	17.9539774	0.0012680	-0.002122	3.5463699	-50.000000	CY
0.00007188	25773.	358579836.	17.8761231	0.0012848	-0.002165	3.5696950	-50.000000	CY
0.00007313	25951.	354887896.	17.8013248	0.0013017	-0.002208	3.5924436	-50.000000	CY

MEG-33 rear abutment X direction row 1

0.00007438	26129.	351312502.	17.7294313	0.0013186	-0.002251	3.6146127	-50.000000	CY
0.00007938	26726.	336708483.	17.4431968	0.0013846	-0.002425	3.6951129	-50.000000	CY
0.00008438	27206.	322444006.	17.1671901	0.0014485	-0.002602	3.7641384	-50.000000	CY
0.00008938	27675.	309646188.	16.9215280	0.0015124	-0.002778	3.8242741	-50.000000	CY
0.00009438	28045.	297163557.	16.6811294	0.0015743	-0.002956	3.8741058	-50.000000	CY
0.00009938	28336.	285143588.	16.4483533	0.0016346	-0.003135	3.9146306	-50.000000	CY
0.0001044	28617.	274178550.	16.2362191	0.0016947	-0.003315	3.9472246	-50.000000	CY
0.0001094	28892.	264154684.	16.0454711	0.0017550	-0.003495	3.9720955	-50.000000	CY
0.0001144	29155.	254906906.	15.8674074	0.0018148	-0.003675	3.9890068	-50.000000	CY
0.0001194	29397.	246258505.	15.7035735	0.0018746	-0.003855	3.9981735	-50.000000	CY
0.0001244	29568.	237736243.	15.5359410	0.0019323	-0.004038	3.9978689	-50.000000	CY
0.0001294	29711.	229650713.	15.3734910	0.0019889	-0.004221	3.9970138	-50.000000	CY
0.0001344	29849.	222133837.	15.2263151	0.0020460	-0.004404	3.9999975	-50.000000	CY
0.0001394	29982.	215113959.	15.0910786	0.0021033	-0.004587	3.9996712	-50.000000	CY
0.0001444	30105.	208519351.	14.9615993	0.0021601	-0.004770	3.9983732	-50.000000	CY
0.0001494	30225.	202343339.	14.8433522	0.0022172	-0.004953	3.9973962	-50.000000	CY
0.0001544	30341.	196544015.	14.7353658	0.0022748	-0.005135	3.9995921	-50.000000	CY
0.0001594	30454.	191081041.	14.6369134	0.0023328	-0.005317	3.9971030	50.000000	CY
0.0001644	30559.	185907589.	14.5401420	0.0023900	-0.005500	3.9999072	50.000000	CY
0.0001694	30657.	180998458.	14.4535632	0.0024481	-0.005682	3.9974153	50.000000	CY
0.0001744	30751.	176348229.	14.3735401	0.0025064	-0.005864	3.9999345	50.000000	CY
0.0001794	30819.	171813792.	14.2941621	0.0025640	-0.006046	3.9967089	50.000000	CY
0.0001844	30871.	167437900.	14.2165146	0.0026212	-0.006229	3.9996615	50.000000	CY
0.0001894	30912.	163231382.	14.1393633	0.0026776	-0.006412	3.9941430	50.000000	CY
0.0001944	30942.	159184658.	14.0669923	0.0027343	-0.006596	3.9983466	50.000000	CY
0.0001994	30970.	155335007.	13.9995245	0.0027912	-0.006779	3.9999795	50.000000	CY
0.0002044	30997.	151665022.	13.9370528	0.0028484	-0.006962	3.9948114	50.000000	CY
0.0002094	31019.	148149699.	13.8815143	0.0029064	-0.007144	3.9986166	50.000000	CY
0.0002144	31040.	144791629.	13.8300240	0.0029648	-0.007325	3.9999959	50.000000	CY
0.0002194	31059.	141578699.	13.7825096	0.0030235	-0.007506	3.9938964	50.000000	CYT
0.0002244	31077.	138505222.	13.7380386	0.0030825	-0.007688	3.9979838	50.000000	CYT
0.0002294	31095.	135562210.	13.6963943	0.0031416	-0.007868	3.9998686	50.000000	CYT
0.0002344	31110.	132735061.	13.6552988	0.0032005	-0.008050	3.9935916	50.000000	CYT
0.0002394	31123.	130019539.	13.6151491	0.0032591	-0.008231	3.9954819	50.000000	CYT
0.0002444	31136.	127412709.	13.5773913	0.0033180	-0.008412	3.9986583	50.000000	CYT
0.0002494	31149.	124907946.	13.5419001	0.0033770	-0.008593	3.9999659	50.000000	CYT
0.0002544	31160.	122496772.	13.5091113	0.0034364	-0.008774	3.9925195	50.000000	CYT
0.0002594	31171.	120176081.	13.4783481	0.0034959	-0.008954	3.9943209	50.000000	CYT
0.0002644	31181.	117941290.	13.4493743	0.0035557	-0.009134	3.9978489	50.000000	CYT
0.0002694	31190.	115787568.	13.4221055	0.0036156	-0.009314	3.9997035	50.000000	CYT

MEG-33 rear abutment X direction row 1

0.0002744	31199.	113709340.	13.3967410	0.0036757	-0.009494	3.9963914	50.0000000	CYT
0.0003044	31199.	102501849.	13.4245928	0.0040861	-0.010524	3.9952924	50.0000000	CYT

 Summary of Results for Nominal Moment Capacity for Section 2

Moment values interpolated at maximum compressive strain = 0.003
 or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain	Max. Tens. Strain
1	637.400	28399.776	0.00300000	-0.00854768
2	852.300	31051.163	0.00300000	-0.00743381

Note that the values of moment capacity in the table above are not factored by a strength reduction factor (phi-factor).

In ACI 318, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.75).

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318, or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Load No.	Resist. Factor	Nominal Ax. Thrust kips	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in^2
1	0.65	637.400000	28400.	414.310000	18460.	387768204.
2	0.65	852.300000	31051.	553.995000	20183.	437972873.
1	0.75	637.400000	28400.	478.050000	21300.	354892971.
2	0.75	852.300000	31051.	639.225000	23288.	391018401.

MEG-33 rear abutment X direction row 1

1	0.90	637.400000	28400.	573.660000	25560.	263323189.
2	0.90	852.300000	31051.	767.070000	27946.	300493899.

 Layering Correction Equivalent Depths of Soil & Rock Layers

Layer No.	Top of Layer Below Pile Head ft	Equivalent Top Depth Below Grnd Surf ft	Same Layer Type As Layer Above	Layer is Rock or is Below Rock Layer	F0 Integral for Layer lbs	F1 Integral for Layer lbs
1	0.00	0.00	N.A.	No	0.00	910390.
2	15.0000	15.0000	No	Yes	N.A.	N.A.

Notes: The F0 integral of Layer n+1 equals the sum of the F0 and F1 integrals for Layer n. Layering correction equivalent depths are computed only for soil types with both shallow-depth and deep-depth expressions for peak lateral load transfer. These soil types are soft and stiff clays, non-liquefied sands, and cemented c-phi soil.

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 1

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 86000.0 lbs
 Applied moment at pile head = 6859680.0 in-lbs
 Axial thrust load on pile head = 637400.0 lbs

Depth Deflect. Bending Shear Slope Total Bending Soil Res. Soil Spr. Distrib.

MEG-33 rear abutment X direction row 1

X feet	y inches	Moment in-lbs	Force lbs	S radians	Stress psi*	Stiffness lb-in^2	p lb/inch	Es*H lb/inch	Lat. Load lb/inch
0.00	0.2201	6859680.	86000.	-0.00190	0.00	1.84E+12	0.00	0.00	0.00
0.2500	0.2144	7121309.	85228.	-0.00189	0.00	1.84E+12	-514.577	7200.	0.00
0.5000	0.2087	7378284.	83421.	-0.00188	0.00	1.84E+12	-690.430	9922.	0.00
0.7500	0.2031	7629023.	81342.	-0.00187	0.00	1.84E+12	-695.295	10269.	0.00
1.0000	0.1975	7873480.	79249.	-0.00186	0.00	1.84E+12	-699.960	10630.	0.00
1.2500	0.1920	8111613.	77143.	-0.00184	0.00	1.84E+12	-704.422	11007.	0.00
1.5000	0.1865	8343380.	75023.	-0.00183	0.00	1.84E+12	-708.675	11400.	0.00
1.7500	0.1810	8568744.	72891.	-0.00181	0.00	1.84E+12	-712.714	11811.	0.00
2.0000	0.1756	8787666.	70747.	-0.00180	0.00	1.83E+12	-716.534	12241.	0.00
2.2500	0.1702	9000112.	68592.	-0.00179	0.00	1.83E+12	-720.129	12692.	0.00
2.5000	0.1649	9206049.	66427.	-0.00177	0.00	1.83E+12	-723.493	13164.	0.00
2.7500	0.1596	9405446.	64251.	-0.00176	0.00	1.83E+12	-726.619	13659.	0.00
3.0000	0.1543	9598273.	62067.	-0.00174	0.00	1.83E+12	-729.501	14179.	0.00
3.2500	0.1491	9784505.	59875.	-0.00172	0.00	1.83E+12	-732.130	14726.	0.00
3.5000	0.1440	9964117.	57675.	-0.00171	0.00	1.83E+12	-734.501	15302.	0.00
3.7500	0.1389	1.01E+07	55468.	-0.00169	0.00	1.83E+12	-736.602	15910.	0.00
4.0000	0.1338	1.03E+07	53256.	-0.00168	0.00	1.83E+12	-738.427	16551.	0.00
4.2500	0.1288	1.05E+07	51038.	-0.00166	0.00	1.83E+12	-739.965	17229.	0.00
4.5000	0.1239	1.06E+07	48816.	-0.00164	0.00	1.83E+12	-741.204	17947.	0.00
4.7500	0.1190	1.08E+07	46591.	-0.00162	0.00	1.83E+12	-742.135	18709.	0.00
5.0000	0.1142	1.09E+07	44364.	-0.00161	0.00	1.83E+12	-742.744	19519.	0.00
5.2500	0.1094	1.10E+07	42135.	-0.00159	0.00	1.83E+12	-743.017	20381.	0.00
5.5000	0.1046	1.12E+07	39906.	-0.00157	0.00	1.83E+12	-742.940	21301.	0.00
5.7500	0.09995	1.13E+07	37678.	-0.00155	0.00	1.83E+12	-742.496	22286.	0.00
6.0000	0.09533	1.14E+07	35452.	-0.00153	0.00	1.83E+12	-741.667	23341.	0.00
6.2500	0.09076	1.15E+07	33229.	-0.00151	0.00	1.01E+12	-740.432	24475.	0.00
6.5000	0.08629	1.16E+07	31010.	-0.00147	0.00	1.00E+12	-738.868	25688.	0.00
6.7500	0.08193	1.17E+07	28796.	-0.00144	0.00	9.93E+11	-736.966	26986.	0.00
7.0000	0.07767	1.18E+07	26589.	-0.00140	0.00	9.84E+11	-734.720	28378.	0.00
7.2500	0.07352	1.19E+07	24388.	-0.00136	0.00	9.76E+11	-732.121	29874.	0.00
7.5000	0.06948	1.19E+07	22196.	-0.00133	0.00	9.69E+11	-729.163	31483.	0.00
7.7500	0.06555	1.20E+07	20014.	-0.00129	0.00	9.62E+11	-725.836	33218.	0.00
8.0000	0.06174	1.21E+07	17842.	-0.00125	0.00	9.56E+11	-722.131	35092.	0.00
8.2500	0.05803	1.21E+07	15682.	-0.00122	0.00	9.51E+11	-718.040	37120.	0.00
8.5000	0.05444	1.22E+07	13534.	-0.00118	0.00	9.47E+11	-713.552	39319.	0.00
8.7500	0.05097	1.22E+07	11401.	-0.00114	0.00	9.43E+11	-708.656	41710.	0.00
9.0000	0.04761	1.22E+07	9283.	-0.00110	0.00	9.40E+11	-703.342	44316.	0.00

MEG-33 rear abutment X direction row 1

9.2500	0.04437	1.23E+07	7182.	-0.00106	0.00	9.37E+11	-697.596	47164.	0.00
9.5000	0.04125	1.23E+07	5098.	-0.00102	0.00	9.36E+11	-691.406	50283.	0.00
9.7500	0.03825	1.23E+07	3034.	-9.82E-04	0.00	9.34E+11	-684.758	53712.	0.00
10.0000	0.03536	1.23E+07	990.2643	-9.42E-04	0.00	9.34E+11	-677.635	57491.	0.00
10.2500	0.03259	1.23E+07	-1031.	-9.03E-04	0.00	9.33E+11	-670.022	61672.	0.00
10.5000	0.02994	1.23E+07	-3029.	-8.63E-04	0.00	9.34E+11	-661.899	66313.	0.00
10.7500	0.02741	1.23E+07	-5002.	-8.24E-04	0.00	9.35E+11	-653.246	71487.	0.00
11.0000	0.02500	1.23E+07	-6948.	-7.84E-04	0.00	9.36E+11	-644.040	77280.	0.00
11.2500	0.02271	1.22E+07	-8865.	-7.45E-04	0.00	9.38E+11	-634.258	83795.	0.00
11.5000	0.02053	1.22E+07	-10752.	-7.06E-04	0.00	9.41E+11	-623.870	91162.	0.00
11.7500	0.01847	1.22E+07	-12607.	-6.67E-04	0.00	9.44E+11	-612.847	99538.	0.00
12.0000	0.01653	1.21E+07	-14428.	-6.29E-04	0.00	9.48E+11	-601.151	109123.	0.00
12.2500	0.01470	1.21E+07	-16213.	-5.90E-04	0.00	9.52E+11	-588.744	120166.	0.00
12.5000	0.01298	1.20E+07	-17960.	-5.53E-04	0.00	9.57E+11	-575.580	132990.	0.00
12.7500	0.01138	1.20E+07	-19666.	-5.15E-04	0.00	9.62E+11	-561.604	148011.	0.00
13.0000	0.00989	1.19E+07	-21328.	-4.78E-04	0.00	9.68E+11	-546.754	165782.	0.00
13.2500	0.00852	1.19E+07	-22945.	-4.41E-04	0.00	9.75E+11	-530.959	187042.	0.00
13.5000	0.00725	1.18E+07	-24512.	-4.05E-04	0.00	9.82E+11	-514.129	212811.	0.00
13.7500	0.00609	1.17E+07	-26028.	-3.69E-04	0.00	9.90E+11	-496.158	244522.	0.00
14.0000	0.00503	1.16E+07	-27487.	-3.34E-04	0.00	9.98E+11	-476.917	284249.	0.00
14.2500	0.00408	1.16E+07	-28887.	-2.99E-04	0.00	1.01E+12	-456.239	335098.	0.00
14.5000	0.00324	1.15E+07	-30222.	-2.65E-04	0.00	1.04E+12	-433.914	401910.	0.00
14.7500	0.00249	1.14E+07	-31403.	-2.39E-04	0.00	1.83E+12	-352.996	424800.	0.00
15.0000	0.00180	1.13E+07	-66788.	-2.21E-04	0.00	1.83E+12	-23237.	3.87E+07	0.00
15.2500	0.00117	1.10E+07	-176496.	-1.85E-04	0.00	6.13E+11	-49902.	1.28E+08	0.00
15.5000	6.95E-04	1.02E+07	-299307.	-1.35E-04	0.00	6.63E+11	-31972.	1.38E+08	0.00
15.7500	3.61E-04	9178837.	-373926.	-9.30E-05	0.00	7.45E+11	-17774.	1.48E+08	0.00
16.0000	1.37E-04	7977217.	-411400.	-6.41E-05	0.00	1.15E+12	-7208.	1.58E+08	0.00
16.2500	-2.41E-05	6710681.	-420196.	-4.50E-05	0.00	1.15E+12	1345.	1.68E+08	0.00
16.5000	-1.33E-04	5456215.	-406384.	-2.92E-05	0.00	1.16E+12	7863.	1.77E+08	0.00
16.7500	-1.99E-04	4272486.	-375924.	-1.66E-05	0.00	1.16E+12	12444.	1.87E+08	0.00
17.0000	-2.33E-04	3200734.	-334343.	-6.90E-06	0.00	1.16E+12	15277.	1.97E+08	0.00
17.2500	-2.41E-04	2266456.	-286514.	1.94E-07	0.00	1.16E+12	16609.	2.07E+08	0.00
17.5000	-2.31E-04	1481648.	-236520.	5.06E-06	0.00	1.16E+12	16720.	2.17E+08	0.00
17.7500	-2.10E-04	847316.	-187591.	8.08E-06	0.00	1.16E+12	15899.	2.27E+08	0.00
18.0000	-1.83E-04	356071.	-142112.	9.64E-06	0.00	1.16E+12	14420.	2.37E+08	0.00
18.2500	-1.53E-04	-5392.	-101681.	1.01E-05	0.00	1.16E+12	12533.	2.46E+08	0.00
18.5000	-1.22E-04	-254055.	-67205.	9.75E-06	0.00	1.16E+12	10451.	2.56E+08	0.00
18.7500	-9.41E-05	-408659.	-39012.	8.90E-06	0.00	1.16E+12	8345.	2.66E+08	0.00
19.0000	-6.90E-05	-488158.	-16976.	7.73E-06	0.00	1.16E+12	6346.	2.76E+08	0.00

MEG-33 rear abutment X direction row 1									
19.2500	-4.77E-05	-510543.	-642.062	6.44E-06	0.00	1.16E+12	4543.	2.86E+08	0.00
19.5000	-3.04E-05	-492035.	10662.	5.14E-06	0.00	1.16E+12	2993.	2.96E+08	0.00
19.7500	-1.69E-05	-446589.	17729.	3.92E-06	0.00	1.16E+12	1718.	3.06E+08	0.00
20.0000	-6.85E-06	-385675.	21387.	2.84E-06	0.00	1.16E+12	720.4641	3.15E+08	0.00
20.2500	1.65E-07	-318275.	22441.	1.93E-06	0.00	1.16E+12	-17.900	3.25E+08	0.00
20.5000	4.71E-06	-251035.	21626.	1.19E-06	0.00	1.16E+12	-525.759	3.35E+08	0.00
20.7500	7.30E-06	-188525.	19579.	6.18E-07	0.00	1.16E+12	-838.863	3.45E+08	0.00
21.0000	8.42E-06	-133564.	16827.	2.01E-07	0.00	1.16E+12	-995.485	3.55E+08	0.00
21.2500	8.50E-06	-87562.	13784.	-8.61E-08	0.00	1.16E+12	-1033.	3.65E+08	0.00
21.5000	7.90E-06	-50858.	10755.	-2.66E-07	0.00	1.16E+12	-986.303	3.74E+08	0.00
21.7500	6.91E-06	-23030.	7948.	-3.61E-07	0.00	1.16E+12	-884.817	3.84E+08	0.00
22.0000	5.73E-06	-3166.	5491.	-3.95E-07	0.00	1.16E+12	-753.248	3.94E+08	0.00
22.2500	4.53E-06	9919.	3446.	-3.87E-07	0.00	1.16E+12	-610.647	4.04E+08	0.00
22.5000	3.41E-06	17509.	1823.	-3.51E-07	0.00	1.16E+12	-470.822	4.14E+08	0.00
22.7500	2.43E-06	20861.	602.7881	-3.01E-07	0.00	1.16E+12	-342.874	4.24E+08	0.00
23.0000	1.60E-06	21127.	-259.398	-2.47E-07	0.00	1.16E+12	-231.917	4.34E+08	0.00
23.2500	9.46E-07	19305.	-817.058	-1.94E-07	0.00	1.16E+12	-139.856	4.43E+08	0.00
23.5000	4.38E-07	16225.	-1126.	-1.48E-07	0.00	1.16E+12	-66.170	4.53E+08	0.00
23.7500	5.59E-08	12549.	-1238.	-1.11E-07	0.00	1.16E+12	-8.638	4.63E+08	0.00
24.0000	-2.28E-07	8796.	-1197.	-8.34E-08	0.00	1.16E+12	36.0050	4.73E+08	0.00
24.2500	-4.44E-07	5366.	-1036.	-6.50E-08	0.00	1.16E+12	71.4989	4.83E+08	0.00
24.5000	-6.18E-07	2580.	-776.425	-5.47E-08	0.00	1.16E+12	101.5525	4.93E+08	0.00
24.7500	-7.72E-07	707.7172	-430.017	-5.04E-08	0.00	1.16E+12	129.3864	5.03E+08	0.00
25.0000	-9.21E-07	0.00	0.00	-4.95E-08	0.00	1.16E+12	157.2915	2.56E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 1:

Pile-head deflection = 0.22010017 inches
 Computed slope at pile head = -0.0019033 radians
 Maximum bending moment = 12294867. inch-lbs
 Maximum shear force = -420196. lbs
 Depth of maximum bending moment = 10.25000000 feet below pile head

MEG-33 rear abutment X direction row 1

Depth of maximum shear force = 16.25000000 feet below pile head
 Number of iterations = 88
 Number of zero deflection points = 3

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 2

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 131500.0 lbs
 Applied moment at pile head = 10492800.0 in-lbs
 Axial thrust load on pile head = 852300.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	0.5479	1.05E+07	131500.	-0.00459	0.00	1.81E+12	0.00	0.00	0.00
0.2500	0.5341	1.09E+07	130208.	-0.00457	0.00	1.81E+12	-861.025	4836.	0.00
0.5000	0.5204	1.13E+07	127616.	-0.00455	0.00	1.81E+12	-867.550	5001.	0.00
0.7500	0.5068	1.17E+07	125004.	-0.00454	0.00	1.81E+12	-873.827	5173.	0.00
1.0000	0.4932	1.21E+07	122373.	-0.00452	0.00	1.81E+12	-879.849	5352.	0.00
1.2500	0.4797	1.24E+07	119725.	-0.00450	0.00	1.81E+12	-885.610	5538.	0.00
1.5000	0.4663	1.28E+07	117060.	-0.00447	0.00	1.81E+12	-891.102	5734.	0.00
1.7500	0.4529	1.32E+07	114379.	-0.00445	0.00	1.81E+12	-896.316	5938.	0.00
2.0000	0.4395	1.35E+07	111682.	-0.00443	0.00	1.81E+12	-901.244	6151.	0.00
2.2500	0.4263	1.39E+07	108972.	-0.00440	0.00	1.13E+12	-905.877	6375.	0.00
2.5000	0.4131	1.42E+07	106247.	-0.00436	0.00	1.10E+12	-910.227	6610.	0.00
2.7500	0.4001	1.45E+07	103511.	-0.00432	0.00	1.07E+12	-914.290	6855.	0.00
3.0000	0.3872	1.48E+07	100762.	-0.00428	0.00	1.04E+12	-918.058	7113.	0.00
3.2500	0.3744	1.51E+07	98003.	-0.00424	0.00	1.01E+12	-921.527	7384.	0.00
3.5000	0.3618	1.55E+07	95233.	-0.00419	0.00	9.88E+11	-924.691	7668.	0.00
3.7500	0.3493	1.57E+07	92455.	-0.00414	0.00	9.66E+11	-927.543	7967.	0.00
4.0000	0.3369	1.60E+07	89669.	-0.00409	0.00	9.44E+11	-930.077	8282.	0.00
4.2500	0.3247	1.63E+07	86875.	-0.00404	0.00	9.25E+11	-932.288	8614.	0.00
4.5000	0.3127	1.66E+07	84075.	-0.00399	0.00	9.07E+11	-934.167	8963.	0.00

MEG-33 rear abutment X direction row 1

4.7500	0.3008	1.68E+07	81271.	-0.00393	0.00	8.90E+11	-935.709	9333.	0.00
5.0000	0.2891	1.71E+07	78462.	-0.00387	0.00	8.74E+11	-936.907	9723.	0.00
5.2500	0.2775	1.73E+07	75650.	-0.00382	0.00	8.60E+11	-937.752	10137.	0.00
5.5000	0.2662	1.75E+07	72836.	-0.00375	0.00	8.46E+11	-938.239	10575.	0.00
5.7500	0.2550	1.78E+07	70021.	-0.00369	0.00	8.34E+11	-938.359	11039.	0.00
6.0000	0.2440	1.80E+07	67206.	-0.00363	0.00	8.22E+11	-938.104	11533.	0.00
6.2500	0.2333	1.82E+07	64393.	-0.00356	0.00	8.11E+11	-937.466	12057.	0.00
6.5000	0.2227	1.84E+07	61582.	-0.00349	0.00	8.01E+11	-936.435	12616.	0.00
6.7500	0.2123	1.86E+07	58775.	-0.00342	0.00	7.92E+11	-935.004	13212.	0.00
7.0000	0.2021	1.88E+07	55973.	-0.00335	0.00	7.83E+11	-933.161	13849.	0.00
7.2500	0.1922	1.89E+07	53176.	-0.00328	0.00	7.75E+11	-930.897	14530.	0.00
7.5000	0.1825	1.91E+07	50388.	-0.00320	0.00	7.67E+11	-928.201	15260.	0.00
7.7500	0.1730	1.93E+07	47608.	-0.00313	0.00	7.61E+11	-925.061	16044.	0.00
8.0000	0.1637	1.94E+07	44838.	-0.00305	0.00	7.54E+11	-921.467	16886.	0.00
8.2500	0.1547	1.95E+07	42080.	-0.00297	0.00	7.48E+11	-917.404	17795.	0.00
8.5000	0.1459	1.97E+07	39334.	-0.00290	0.00	7.43E+11	-912.859	18775.	0.00
8.7500	0.1373	1.98E+07	36603.	-0.00282	0.00	7.38E+11	-907.818	19837.	0.00
9.0000	0.1290	1.99E+07	33888.	-0.00273	0.00	7.34E+11	-902.264	20988.	0.00
9.2500	0.1209	2.00E+07	31191.	-0.00265	0.00	7.30E+11	-896.181	22240.	0.00
9.5000	0.1131	2.01E+07	28512.	-0.00257	0.00	7.26E+11	-889.551	23606.	0.00
9.7500	0.1055	2.02E+07	25854.	-0.00249	0.00	7.22E+11	-882.354	25099.	0.00
10.0000	0.09813	2.03E+07	23219.	-0.00240	0.00	7.19E+11	-874.567	26737.	0.00
10.2500	0.09105	2.03E+07	20608.	-0.00232	0.00	7.17E+11	-866.168	28539.	0.00
10.5000	0.08422	2.04E+07	18023.	-0.00223	0.00	7.14E+11	-857.131	30530.	0.00
10.7500	0.07766	2.05E+07	15466.	-0.00215	0.00	7.12E+11	-847.426	32738.	0.00
11.0000	0.07135	2.05E+07	12939.	-0.00206	0.00	7.11E+11	-837.022	35195.	0.00
11.2500	0.06530	2.06E+07	10445.	-0.00197	0.00	7.09E+11	-825.883	37944.	0.00
11.5000	0.05951	2.06E+07	7985.	-0.00189	0.00	7.08E+11	-813.969	41035.	0.00
11.7500	0.05398	2.06E+07	5562.	-0.00180	0.00	7.07E+11	-801.235	44530.	0.00
12.0000	0.04871	2.06E+07	3179.	-0.00171	0.00	7.07E+11	-787.629	48505.	0.00
12.2500	0.04371	2.06E+07	837.8915	-0.00162	0.00	7.06E+11	-773.091	53058.	0.00
12.5000	0.03897	2.06E+07	-1458.	-0.00154	0.00	7.06E+11	-757.553	58314.	0.00
12.7500	0.03450	2.06E+07	-3706.	-0.00145	0.00	7.06E+11	-740.931	64436.	0.00
13.0000	0.03028	2.06E+07	-5902.	-0.00136	0.00	7.07E+11	-723.129	71638.	0.00
13.2500	0.02633	2.06E+07	-8043.	-0.00127	0.00	7.07E+11	-704.029	80211.	0.00
13.5000	0.02264	2.06E+07	-10124.	-0.00119	0.00	7.08E+11	-683.484	90557.	0.00
13.7500	0.01922	2.06E+07	-12141.	-0.00110	0.00	7.09E+11	-661.312	103246.	0.00
14.0000	0.01605	2.05E+07	-14089.	-0.00101	0.00	7.11E+11	-637.272	119121.	0.00
14.2500	0.01314	2.05E+07	-15961.	-9.26E-04	0.00	7.12E+11	-611.046	139478.	0.00
14.5000	0.01050	2.04E+07	-17751.	-8.40E-04	0.00	7.14E+11	-582.187	166416.	0.00

MEG-33 rear abutment X direction row 1

14.7500	0.00810	2.04E+07	-19450.	-7.54E-04	0.00	7.16E+11	-550.035	203592.	0.00
15.0000	0.00597	2.03E+07	-67297.	-6.69E-04	0.00	7.18E+11	-31348.	1.58E+07	0.00
15.2500	0.00409	2.00E+07	-198966.	-5.59E-04	0.00	4.42E+11	-56431.	4.14E+07	0.00
15.5000	0.00262	1.91E+07	-365417.	-4.28E-04	0.00	4.59E+11	-54536.	6.25E+07	0.00
15.7500	0.00152	1.78E+07	-523949.	-3.12E-04	0.00	4.91E+11	-51152.	1.01E+08	0.00
16.0000	7.49E-04	1.60E+07	-659694.	-2.14E-04	0.00	5.47E+11	-39345.	1.58E+08	0.00
16.2500	2.40E-04	1.38E+07	-738777.	-1.37E-04	0.00	6.39E+11	-13377.	1.68E+08	0.00
16.5000	-7.49E-05	1.15E+07	-752202.	-8.25E-05	0.00	7.77E+11	4427.	1.77E+08	0.00
16.7500	-2.56E-04	9309354.	-721631.	-4.80E-05	0.00	1.14E+12	15953.	1.87E+08	0.00
17.0000	-3.63E-04	7216341.	-661967.	-2.62E-05	0.00	1.14E+12	23823.	1.97E+08	0.00
17.2500	-4.13E-04	5337687.	-583537.	-9.64E-06	0.00	1.14E+12	28463.	2.07E+08	0.00
17.5000	-4.20E-04	3715166.	-495263.	2.27E-06	0.00	1.14E+12	30387.	2.17E+08	0.00
17.7500	-3.99E-04	2366100.	-404462.	1.03E-05	0.00	1.14E+12	30147.	2.27E+08	0.00
18.0000	-3.59E-04	1288341.	-316800.	1.51E-05	0.00	1.14E+12	28294.	2.37E+08	0.00
18.2500	-3.09E-04	465222.	-236344.	1.74E-05	0.00	1.14E+12	25343.	2.46E+08	0.00
18.5000	-2.55E-04	-129814.	-165708.	1.78E-05	0.00	1.14E+12	21748.	2.56E+08	0.00
18.7500	-2.02E-04	-529119.	-106253.	1.69E-05	0.00	1.14E+12	17889.	2.66E+08	0.00
19.0000	-1.53E-04	-767419.	-58320.	1.52E-05	0.00	1.14E+12	14066.	2.76E+08	0.00
19.2500	-1.10E-04	-879116.	-21470.	1.31E-05	0.00	1.14E+12	10500.	2.86E+08	0.00
19.5000	-7.45E-05	-896304.	5286.	1.07E-05	0.00	1.14E+12	7337.	2.96E+08	0.00
19.7500	-4.58E-05	-847453.	23280.	8.45E-06	0.00	1.14E+12	4659.	3.06E+08	0.00
20.0000	-2.37E-05	-756665.	34012.	6.34E-06	0.00	1.14E+12	2495.	3.15E+08	0.00
20.2500	-7.70E-06	-643412.	39007.	4.50E-06	0.00	1.14E+12	834.3493	3.25E+08	0.00
20.5000	3.27E-06	-522646.	39711.	2.97E-06	0.00	1.14E+12	-365.128	3.35E+08	0.00
20.7500	1.01E-05	-405163.	37419.	1.75E-06	0.00	1.14E+12	-1163.	3.45E+08	0.00
21.0000	1.38E-05	-298139.	33235.	8.23E-07	0.00	1.14E+12	-1627.	3.55E+08	0.00
21.2500	1.50E-05	-205755.	28051.	1.60E-07	0.00	1.14E+12	-1829.	3.65E+08	0.00
21.5000	1.47E-05	-129832.	22552.	-2.81E-07	0.00	1.14E+12	-1837.	3.74E+08	0.00
21.7500	1.34E-05	-70443.	17228.	-5.44E-07	0.00	1.14E+12	-1712.	3.84E+08	0.00
22.0000	1.15E-05	-26463.	12402.	-6.72E-07	0.00	1.14E+12	-1505.	3.94E+08	0.00
22.2500	9.33E-06	3973.	8259.	-7.01E-07	0.00	1.14E+12	-1257.	4.04E+08	0.00
22.5000	7.24E-06	23097.	4874.	-6.66E-07	0.00	1.14E+12	-999.569	4.14E+08	0.00
22.7500	5.34E-06	33224.	2244.	-5.92E-07	0.00	1.14E+12	-754.134	4.24E+08	0.00
23.0000	3.69E-06	36563.	311.6179	-5.00E-07	0.00	1.14E+12	-534.067	4.34E+08	0.00
23.2500	2.34E-06	35096.	-1008.	-4.06E-07	0.00	1.14E+12	-345.845	4.43E+08	0.00
23.5000	1.26E-06	30516.	-1813.	-3.19E-07	0.00	1.14E+12	-190.563	4.53E+08	0.00
23.7500	4.23E-07	24220.	-2197.	-2.47E-07	0.00	1.14E+12	-65.369	4.63E+08	0.00
24.0000	-2.23E-07	17337.	-2242.	-1.93E-07	0.00	1.14E+12	35.1955	4.73E+08	0.00
24.2500	-7.33E-07	10769.	-2012.	-1.56E-07	0.00	1.14E+12	117.9899	4.83E+08	0.00
24.5000	-1.16E-06	5264.	-1550.	-1.35E-07	0.00	1.14E+12	190.1772	4.93E+08	0.00

MEG-33 rear abutment X direction row 1									
24.7500	-1.54E-06	1470.	-877.428	-1.26E-07	0.00	1.14E+12	258.1975	5.03E+08	0.00
25.0000	-1.91E-06	0.00	0.00	-1.24E-07	0.00	1.14E+12	326.7547	2.56E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 2:

Pile-head deflection = 0.54787084 inches
 Computed slope at pile head = -0.0045901 radians
 Maximum bending moment = 20638556. inch-lbs
 Maximum shear force = -752202. lbs
 Depth of maximum bending moment = 12.50000000 feet below pile head
 Depth of maximum shear force = 16.50000000 feet below pile head
 Number of iterations = 26
 Number of zero deflection points = 3

 Summary of Pile-head Responses for Conventional Analyses

Definitions of Pile-head Loading Conditions:

Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs
 Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
 Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.
 Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs
 Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians

Load Case No.	Load Type 1	Load Type 2	Load Type 3	Load Type 4	Load Type 5	Axial Loading lbs	Pile-head Deflection inches	Pile-head Rotation radians	Max Shear in Pile lbs	Max Moment in Pile in-lbs
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MEG-33 rear abutment X direction row 1

1	V, lb	86000.	M, in-lb	6859680.	637400.	0.2201	-0.00190	-420196.	1.23E+07
2	V, lb	131500.	M, in-lb	1.05E+07	852300.	0.5479	-0.00459	-752202.	2.06E+07

Maximum pile-head deflection = 0.5478708378 inches

Maximum pile-head rotation = -0.0045901028 radians = -0.262994 deg.

Summary of Warning Messages

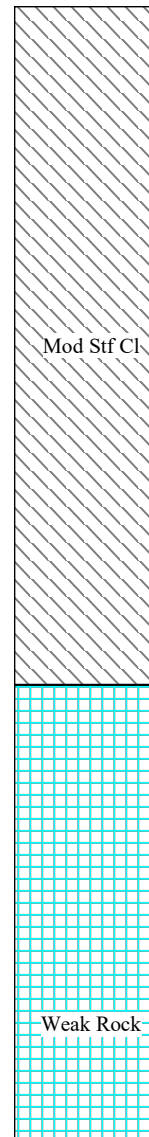
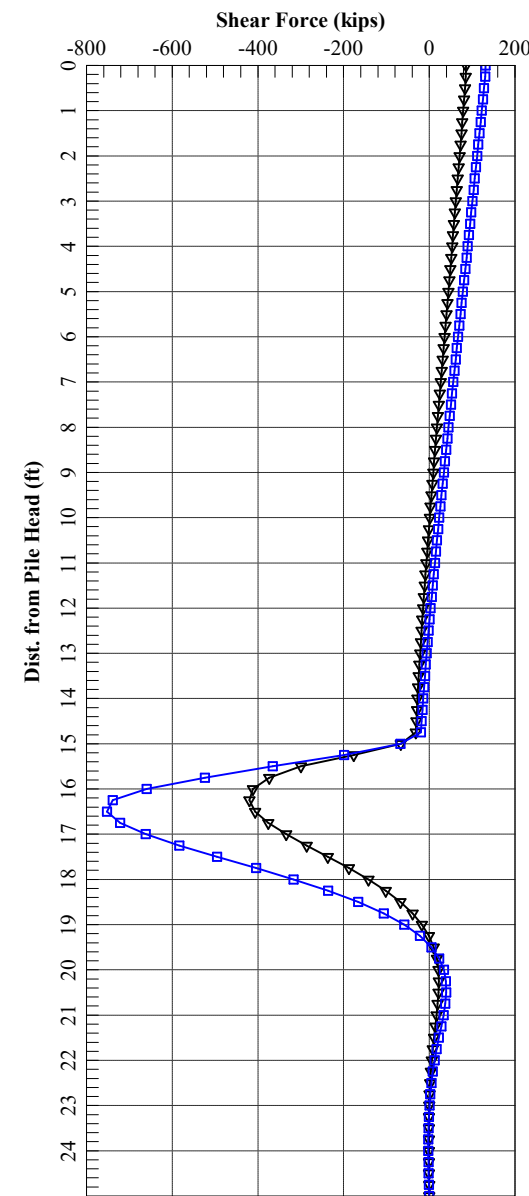
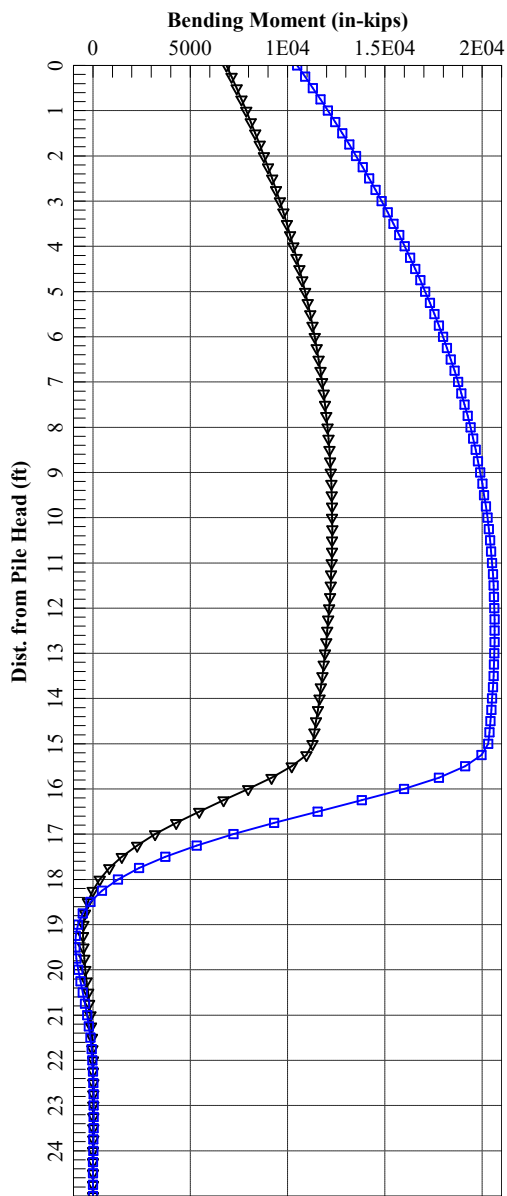
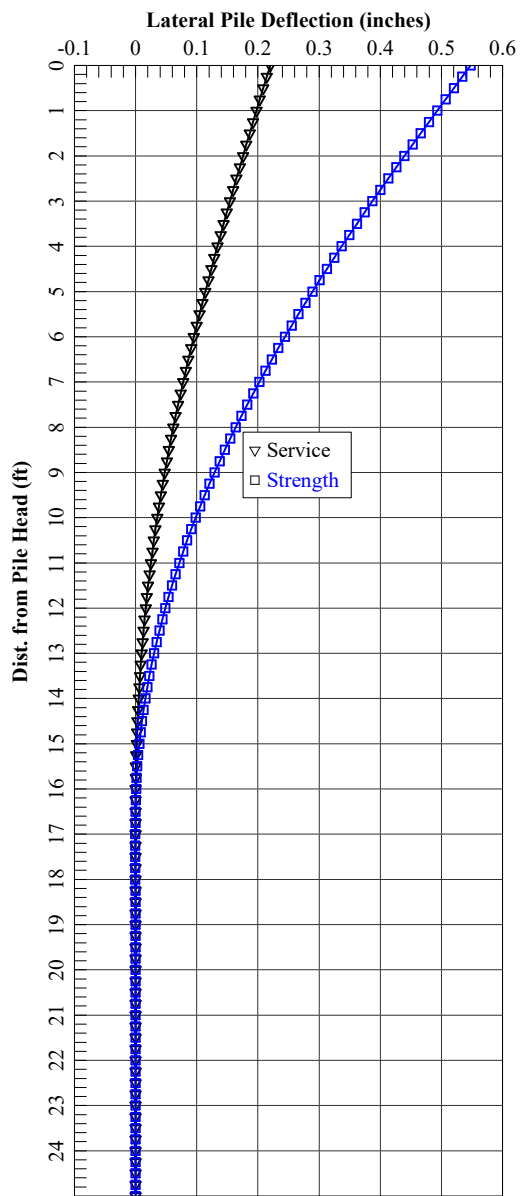
The following warning was reported 1080 times

**** Warning ****

An unreasonable input value for unconfined compressive strength has been specified for a soil defined using the weak rock criteria. The input value is greater than 500 psi. Please check your input data for correctness.

The analysis ended normally.

MEG-33 Bridge 3 Rear Abutment X-Direction Row 1



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LPile for Windows, Version 2022-12.006

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method
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Files Used for Analysis

Path to file locations:

\\US0247-PPFSS01\shared_projects\173609140\119144\400-Engineering\Geotechnical\Analysis\Lpile\bridges\LPile
Analysis\Bridge 3\rear abutment\

Name of input data file:

MEG-33 rear abutment X direction row 2.lp12d

Name of output report file:

MEG-33 rear abutment X direction row 2.lp12o

Name of plot output file:

MEG-33 rear abutment X direction row 2.lp12p

Name of runtime message file:

MEG-33 rear abutment X direction row 2.lp12r

Date and Time of Analysis

Date: September 16, 2024

Time: 9:43:59

Problem Title

Project Name: MEG-33-19.21

Job Number: 173609140

Client: ODOT

Engineer: G. Khatri

Description: Forward Abutment Lateral Load Analysis at Brdige 3

MEG-33 rear abutment X direction row 2
Program Options and Settings

Computational Options:

- Conventional Analysis

Engineering Units Used for Data Input and Computations:

- US Customary System Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed = 500
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 100.0000 in
- Number of pile increments = 100

Loading Type and Number of Cycles of Loading:

- Static loading specified

- Analysis uses p-y modification factors for p-y curves
- Analysis uses layering correction (Method of Georgiadis)
- No distributed lateral loads are entered
- Loading by lateral soil movements acting on pile not selected
- Input of shear resistance at the pile tip not selected
- Input of moment resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:

- Output files use decimal points to denote decimal symbols.
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1
- No p-y curves to be computed and reported for user-specified depths
- Print using wide report formats

Number of pile sections defined = 2
 Total length of pile = 25.000 ft
 Depth of ground surface below top of pile = 0.0000 ft

Pile diameters used for p-y curve computations are defined using 4 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile. A summary of values of pile diameter vs. depth follows.

Point No.	Depth Below Pile Head feet	Pile Diameter inches
1	0.000	54.0000
2	15.000	54.0000
3	15.000	48.0000
4	25.000	48.0000

Input Structural Properties for Pile Sections:

Pile Section No. 1:

Section 1 is a round drilled shaft, bored pile, or CIDH pile
 Length of section = 15.000000 ft
 Shaft Diameter = 54.000000 in

Pile Section No. 2:

Section 2 is a round drilled shaft, bored pile, or CIDH pile
 Length of section = 10.000000 ft
 Shaft Diameter = 48.000000 in

The soil profile is modelled using 2 layers

Layer 1 is stiff clay with user-defined k-value

Distance from top of pile to top of layer	=	0.0000	ft
Distance from top of pile to bottom of layer	=	15.000000	ft
Effective unit weight at top of layer	=	122.000000	pcf
Effective unit weight at bottom of layer	=	122.000000	pcf
Undrained cohesion at top of layer	=	2000.	psf
Undrained cohesion at bottom of layer	=	2000.	psf
Epsilon-50 at top of layer	=	0.0000	
Epsilon-50 at bottom of layer	=	0.0000	
Subgrade k at top of layer	=	0.0000	pci
Subgrade k at bottom of layer	=	0.0000	pci

NOTE: Default values for Epsilon-50 will be computed for this layer.

NOTE: Default values for subgrade k will be computed for this layer.

Layer 2 is weak rock, p-y criteria by Reese, 1997

Distance from top of pile to top of layer	=	15.000000	ft
Distance from top of pile to bottom of layer	=	30.000000	ft
Effective unit weight at top of layer	=	87.600000	pcf
Effective unit weight at bottom of layer	=	87.600000	pcf
Uniaxial compressive strength at top of layer	=	4380.	psi
Uniaxial compressive strength at bottom of layer	=	4380.	psi
Initial modulus of rock at top of layer	=	394200.	psi
Initial modulus of rock at bottom of layer	=	394200.	psi
RQD of rock at top of layer	=	69.000000	%
RQD of rock at bottom of layer	=	69.000000	%
k _{rm} of rock at top of layer	=	0.0000500	
k _{rm} of rock at bottom of layer	=	0.0000500	

(Depth of the lowest soil layer extends 5.000 ft below the pile tip)

MEG-33 rear abutment X direction row 2

Summary of Input Soil Properties

Layer Rock Mass Num.	Soil Type Name (p-y Curve Type) Modulus psi	Layer Depth ft	Effective Unit Wt. pcf	Cohesion psf	Uniaxial qu psi	RQD %	E50 or krm	kpy pci
1	Stiff Clay w/o	0.00	122.0000	2000.	--	--	default	default
--	Free Water, using k	15.0000	122.0000	2000.	--	--	default	default
2	Weak	15.0000	87.6000	--	4380.	69.0000	5.00E-05	--
	394200. Rock	30.0000	87.6000	--	4380.	69.0000	5.00E-05	--
	394200.							

Modification Factors for p-y Curves

Distribution of p-y modifiers with depth defined using 3 points

Point No.	Depth X ft	p-mult	y-mult
1	0.000	0.4000	1.0000
2	15.000	0.4000	1.0000
3	25.000	0.4000	1.0000

Static Loading Type

 Static loading criteria were used when computing p-y curves for all analyses.

 Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 2

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length	Run Analysis
1	1	V = 86000. lbs	M = 6859680. in-lbs	637400.	No	Yes
2	1	V = 131500. lbs	M = 10492800. in-lbs	852300.	No	Yes

V = shear force applied normal to pile axis

M = bending moment applied to pile head

y = lateral deflection normal to pile axis

S = pile slope relative to original pile batter angle

R = rotational stiffness applied to pile head

Values of top y vs. pile lengths can be computed only for load types with specified shear loading (Load Types 1, 2, and 3).

Thrust force is assumed to be acting axially for all pile batter angles.

 Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 2

Pile Section No. 1:

MEG-33 rear abutment X direction row 2

Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section	=	15.000000	ft
Shaft Diameter	=	54.000000	in
Concrete Cover Thickness (to edge of trans. reinf.)	=	3.000000	in
Number of Reinforcing Bars	=	20	bars
Yield Stress of Reinforcing Bars	=	50000.	psi
Modulus of Elasticity of Reinforcing Bars	=	29000000.	psi
Gross Area of Shaft	=	2290.	sq. in.
Total Area of Reinforcing Steel	=	20.000000	sq. in.
Area Ratio of Steel Reinforcement	=	0.87	percent
Edge-to-Edge Bar Spacing	=	6.008853	in
Maximum Concrete Aggregate Size	=	0.750000	in
Ratio of Bar Spacing to Aggregate Size	=	8.01	
Offset of Center of Rebar Cage from Center of Pile	=	0.0000	in
Transverse Reinforcement			
Type: Spiral			
Number of Transverse Reinf. (per spacing)	=	1	
Spacing of Transverse Reinf.	=	3.750000	in
Yield Stress of Transverse Reinf.	=	50000.	psi
Diameter of Transverse Reinf.	=	0.625000	in

Axial Structural Capacities:

Nom. Axial Structural Capacity = $0.85 F_c A_c + F_y A_s$	=	8718.752	kips
Tensile Load for Cracking of Concrete	=	-1011.121	kips
Nominal Axial Tensile Capacity	=	-1000.000	kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
-----	-----	-----	-----	-----
1	1.128000	1.000000	22.811000	0.000000
2	1.128000	1.000000	21.694550	7.048987
3	1.128000	1.000000	18.454487	13.407969
4	1.128000	1.000000	13.407969	18.454487

MEG-33 rear abutment X direction row 2

5	1.128000	1.000000	7.048987	21.694550
6	1.128000	1.000000	0.000000	22.811000
7	1.128000	1.000000	-7.04899	21.694550
8	1.128000	1.000000	-13.40797	18.454487
9	1.128000	1.000000	-18.45449	13.407969
10	1.128000	1.000000	-21.69455	7.048987
11	1.128000	1.000000	-22.81100	0.000000
12	1.128000	1.000000	-21.69455	-7.04899
13	1.128000	1.000000	-18.45449	-13.40797
14	1.128000	1.000000	-13.40797	-18.45449
15	1.128000	1.000000	-7.04899	-21.69455
16	1.128000	1.000000	0.000000	-22.81100
17	1.128000	1.000000	7.048987	-21.69455
18	1.128000	1.000000	13.407969	-18.45449
19	1.128000	1.000000	18.454487	-13.40797
20	1.128000	1.000000	21.694550	-7.04899

NOTE: The positions of the above rebars were computed by LPILE

Minimum spacing between any two bars not equal to zero = 6.009 inches
between bars 12 and 13.

Ratio of bar spacing to maximum aggregate size = 8.01

Concrete Properties:

Compressive Strength of Concrete	=	4000. psi
Modulus of Elasticity of Concrete	=	3604997. psi
Modulus of Rupture of Concrete	=	-474.34165 psi
Compression Strain at Peak Stress	=	0.001886
Tensile Strain at Fracture of Concrete	=	-0.0001154
Maximum Coarse Aggregate Size	=	0.750000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 2

Number Axial Thrust Force

MEG-33 rear abutment X direction row 2

 kips

1 637.400
 2 852.300

Definitions of Run Messages and Notes:

- C = concrete in section has cracked in tension.
- Y = stress in reinforcing steel has reached yield stress.
- T = ACI 318 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than 0.003. See ACI 318-14, Section 21.2.3.
- Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
 Position of neutral axis is measured from edge of compression side of pile.
 Compressive stresses and strains are positive in sign.
 Tensile stresses and strains are negative in sign.

Axial Thrust Force = 637.400 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in ²	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	1150.	1840433855.	128.5415643	0.00008034	0.00004659	0.3327881	2.2661971	
0.00000125	2300.	1840387479.	77.8147435	0.00009727	0.00002977	0.4005380	2.6935470	
0.00000188	3451.	1840304104.	60.9253415	0.0001142	0.00001299	0.4678024	3.1219592	
0.00000250	4600.	1840184601.	52.4952908	0.0001312	-0.00000376	0.5345768	3.5514336	
0.00000313	5749.	1839762091.	47.4478771	0.0001483	-0.00002048	0.6008438	3.9818701	
0.00000375	6895.	1838549162.	44.0889593	0.0001653	-0.00003717	0.6665585	4.4129618	
0.00000438	8035.	1836542828.	41.6931059	0.0001824	-0.00005384	0.7316884	4.8444816	
0.00000500	9169.	1833894124.	39.8982570	0.0001995	-0.00007051	0.7962145	5.2762973	
0.00000563	10298.	1830751404.	38.5036057	0.0002166	-0.00008717	0.8601255	5.7083319	
0.00000625	11420.	1827230225.	37.3888269	0.0002337	-0.000104	0.9234146	6.1405374	
0.00000688	11420.	1661118386.	33.6719402	0.0002315	-0.000140	0.9146513	6.0135368	C

MEG-33 rear abutment X direction row 2

0.00000750	11420.	1522691854.	32.5159436	0.0002439	-0.000161	0.9599502	6.3087928	C
0.00000813	11420.	1405561712.	31.5019784	0.0002560	-0.000183	1.0038460	6.5956099	C
0.00000875	11420.	1305164447.	30.6027385	0.0002678	-0.000205	1.0464620	6.8747824	C
0.00000938	11420.	1218153483.	29.7983706	0.0002794	-0.000227	1.0879237	7.1471508	C
0.00001000	11420.	1142018891.	29.0743057	0.0002907	-0.000249	1.1283650	7.4136487	C
0.00001063	11420.	1074841309.	28.4188309	0.0003020	-0.000272	1.1678943	7.6750336	C
0.00001125	11454.	1018113289.	27.8214082	0.0003130	-0.000295	1.2065604	7.9315968	C
0.00001188	11735.	988209535.	27.2738257	0.0003239	-0.000317	1.2444154	8.1836675	C
0.00001250	12008.	960666512.	26.7700294	0.0003346	-0.000340	1.2815327	-8.598489	C
0.00001313	12275.	935232741.	26.3048345	0.0003453	-0.000363	1.3179708	-9.205479	C
0.00001375	12536.	911685499.	25.8738284	0.0003558	-0.000387	1.3537787	-9.815698	C
0.00001438	12792.	889848305.	25.4737344	0.0003662	-0.000410	1.3890226	-10.428656	C
0.00001500	13044.	869571129.	25.1019788	0.0003765	-0.000433	1.4237748	-11.043789	C
0.00001563	13290.	850534738.	24.7514725	0.0003867	-0.000457	1.4578456	-11.662770	C
0.00001625	13533.	832797249.	24.4245412	0.0003969	-0.000481	1.4915048	-12.283347	C
0.00001688	13773.	816181922.	24.1176681	0.0004070	-0.000504	1.5247055	-12.905960	C
0.00001750	14009.	800540988.	23.8275688	0.0004170	-0.000528	1.5573865	-13.531184	C
0.00001813	14244.	785882184.	23.5556124	0.0004269	-0.000552	1.5897392	-14.157387	C
0.00001875	14475.	772007217.	23.2966976	0.0004368	-0.000576	1.6215641	-14.786358	C
0.00001938	14705.	758955262.	23.0531095	0.0004467	-0.000600	1.6530909	-15.416103	C
0.00002000	14932.	746592597.	22.8213696	0.0004564	-0.000624	1.6841894	-16.047806	C
0.00002063	15157.	734878944.	22.6011298	0.0004661	-0.000648	1.7149122	-16.681031	C
0.00002125	15381.	723828686.	22.3937369	0.0004759	-0.000672	1.7454226	-17.314322	C
0.00002188	15602.	713243577.	22.1929288	0.0004855	-0.000696	1.7753635	-17.950955	C
0.00002250	15823.	703235481.	22.0036305	0.0004951	-0.000720	1.8051293	-18.587357	C
0.00002313	16042.	693721041.	21.8234544	0.0005047	-0.000744	1.8346146	-19.224502	C
0.00002375	16259.	684594452.	21.6490102	0.0005142	-0.000768	1.8636243	-19.864232	C
0.00002438	16476.	675926034.	21.4838307	0.0005237	-0.000793	1.8924623	-20.503736	C
0.00002563	16905.	659714156.	21.1735075	0.0005426	-0.000841	1.9492286	-21.785818	C
0.00002688	17331.	644869291.	20.8885492	0.0005614	-0.000890	2.0049379	-23.070631	C
0.00002813	17752.	631196975.	20.6244947	0.0005801	-0.000939	2.0595125	-24.359053	C
0.00002938	18171.	618593311.	20.3808368	0.0005987	-0.000988	2.1131525	-25.649244	C
0.00003063	18587.	606930386.	20.1548892	0.0006172	-0.001037	2.1658491	-26.941370	C
0.00003188	19000.	596077772.	19.9434590	0.0006357	-0.001086	2.2175101	-28.236459	C
0.00003313	19412.	586017612.	19.7488842	0.0006542	-0.001135	2.2685162	-29.530685	C
0.00003438	19820.	576581590.	19.5643345	0.0006725	-0.001184	2.3183920	-30.829023	C
0.00003563	20227.	567762629.	19.3922858	0.0006909	-0.001233	2.3674955	-32.127826	C
0.00003688	20632.	559518171.	19.2327079	0.0007092	-0.001282	2.4159507	-33.425767	C
0.00003813	21035.	551744783.	19.0811058	0.0007275	-0.001331	2.4634266	-34.726459	C
0.00003938	21436.	544411461.	18.9376461	0.0007457	-0.001381	2.5100290	-36.028844	C

MEG-33 rear abutment X direction row 2

0.00004063	21836.	537508664.	18.8037500	0.0007639	-0.001430	2.5559899	-37.330363	C
0.00004188	22236.	530997678.	18.6785660	0.0007822	-0.001479	2.6013063	-38.631010	C
0.00004313	22632.	524810807.	18.5586017	0.0008003	-0.001528	2.6456833	-39.934205	C
0.00004438	23028.	518931429.	18.4442549	0.0008185	-0.001578	2.6892221	-41.238868	C
0.00004563	23422.	513355955.	18.3368406	0.0008366	-0.001627	2.7321222	-42.542649	C
0.00004688	23815.	508059932.	18.2358089	0.0008548	-0.001676	2.7743804	-43.845541	C
0.00004813	24208.	503021447.	18.1406671	0.0008730	-0.001726	2.8159937	-45.147538	C
0.00004938	24599.	498204277.	18.0493425	0.0008912	-0.001775	2.8567764	-46.450966	C
0.00005063	24988.	493588186.	17.9611410	0.0009093	-0.001824	2.8966879	-47.756431	C
0.00005188	25376.	489178528.	17.8777976	0.0009274	-0.001874	2.9359593	-49.060982	C
0.00005313	25762.	484940090.	17.7987684	0.0009456	-0.001923	2.9745637	-50.000000	CY
0.00005438	26129.	480527690.	17.7203594	0.0009635	-0.001973	3.0121095	-50.000000	CY
0.00005563	26450.	475502428.	17.6377331	0.0009811	-0.002023	3.0480644	-50.000000	CY
0.00005688	26715.	469710750.	17.5488267	0.0009981	-0.002073	3.0822078	-50.000000	CY
0.00005813	26963.	463884725.	17.4578090	0.0010147	-0.002124	3.1150397	-50.000000	CY
0.00005938	27211.	458294473.	17.3710721	0.0010314	-0.002175	3.1473257	-50.000000	CY
0.00006063	27456.	452878016.	17.2877850	0.0010481	-0.002226	3.1789969	-50.000000	CY
0.00006188	27661.	447047466.	17.2006506	0.0010643	-0.002277	3.2092275	-50.000000	CY
0.00006313	27831.	440888936.	17.1105031	0.0010801	-0.002329	3.2381359	-50.000000	CY
0.00006438	28001.	434962757.	17.0242307	0.0010959	-0.002380	3.2665498	-50.000000	CY
0.00006563	28168.	429220001.	16.9382578	0.0011116	-0.002432	3.2940745	-50.000000	CY
0.00006688	28334.	423678540.	16.8551839	0.0011272	-0.002484	3.3210361	-50.000000	CY
0.00006813	28499.	418334267.	16.7755091	0.0011428	-0.002536	3.3475135	-50.000000	CY
0.00006938	28664.	413176478.	16.6990517	0.0011585	-0.002588	3.3735047	-50.000000	CY
0.00007063	28829.	408195224.	16.6256428	0.0011742	-0.002640	3.3990074	-50.000000	CY
0.00007188	28982.	403232580.	16.5528537	0.0011897	-0.002692	3.4237565	-50.000000	CY
0.00007313	29112.	398109648.	16.4778664	0.0012049	-0.002744	3.4474451	-50.000000	CY
0.00007438	29217.	392836579.	16.3976732	0.0012196	-0.002797	3.4697495	-50.000000	CY
0.00007938	29625.	373232196.	16.1013472	0.0012780	-0.003008	3.5542813	-50.000000	CY
0.00008438	30025.	355850318.	15.8394290	0.0013365	-0.003220	3.6314003	-50.000000	CY
0.00008938	30413.	340284649.	15.6021947	0.0013944	-0.003432	3.7007204	-50.000000	CY
0.00009438	30747.	325795018.	15.3817131	0.0014516	-0.003645	3.7620082	-50.000000	CY
0.00009938	30966.	311603944.	15.1505835	0.0015056	-0.003861	3.8133042	-50.000000	CY
0.0001044	31181.	298739722.	14.9446438	0.0015598	-0.004076	3.8586352	-50.000000	CY
0.0001094	31388.	286978110.	14.7545209	0.0016138	-0.004292	3.8974486	-50.000000	CY
0.0001144	31588.	276175739.	14.5781214	0.0016674	-0.004509	3.9298600	-50.000000	CY
0.0001194	31784.	266249741.	14.4192337	0.0017213	-0.004725	3.9562787	-50.000000	CY
0.0001244	31974.	257079892.	14.2733469	0.0017752	-0.004941	3.9764920	-50.000000	CY
0.0001294	32156.	248550653.	14.1340926	0.0018286	-0.005158	3.9903592	-50.000000	CY
0.0001344	32307.	240420923.	13.9992019	0.0018811	-0.005375	3.9980723	-50.000000	CY

MEG-33 rear abutment X direction row 2

0.0001394	32410.	232535389.	13.8631348	0.0019322	-0.005594	3.9974064	-50.000000	CY
0.0001444	32501.	225115407.	13.7342956	0.0019829	-0.005813	3.9995355	-50.000000	CY
0.0001494	32585.	218139325.	13.6095744	0.0020329	-0.006033	3.9965996	-50.000000	CY
0.0001544	32666.	211599226.	13.4950062	0.0020833	-0.006253	3.9998543	-50.000000	CY
0.0001594	32744.	205451948.	13.3898452	0.0021340	-0.006472	3.9967842	-50.000000	CY
0.0001644	32820.	199665844.	13.2928625	0.0021850	-0.006691	3.9998401	-50.000000	CY
0.0001694	32892.	194197227.	13.2012721	0.0022360	-0.006910	3.9956943	-50.000000	CY
0.0001744	32959.	189012593.	13.1112567	0.0022863	-0.007130	3.9993671	-50.000000	CY
0.0001794	33024.	184106763.	13.0278755	0.0023369	-0.007349	3.9953840	-50.000000	CY
0.0001844	33087.	179455123.	12.9508410	0.0023878	-0.007568	3.9976156	50.000000	CY
0.0001894	33148.	175041253.	12.8792324	0.0024390	-0.007787	3.9998940	50.000000	CY
0.0001944	33208.	170844188.	12.8129435	0.0024905	-0.008006	3.9931583	50.000000	CY
0.0001994	33265.	166845444.	12.7519660	0.0025424	-0.008224	3.9978576	50.000000	CY
0.0002044	33319.	163026359.	12.6965378	0.0025949	-0.008441	3.9999135	50.000000	CY
0.0002094	33368.	159369650.	12.6403332	0.0026466	-0.008660	3.9920388	50.000000	CY
0.0002144	33416.	155877051.	12.5871105	0.0026984	-0.008878	3.9964583	50.000000	CY
0.0002194	33462.	152533036.	12.5384369	0.0027506	-0.009096	3.9993460	50.000000	CY
0.0002244	33501.	149310160.	12.4914202	0.0028028	-0.009313	3.9975630	50.000000	CY
0.0002294	33531.	146183800.	12.4434234	0.0028542	-0.009532	3.9918982	50.000000	CY
0.0002344	33560.	143188466.	12.3981397	0.0029058	-0.009750	3.9964444	50.000000	CY
0.0002394	33577.	140269130.	12.3506940	0.0029564	-0.009970	3.9990833	50.000000	CY
0.0002444	33587.	137441315.	12.3076112	0.0030077	-0.010189	3.9999999	50.000000	CYT
0.0002494	33596.	134721861.	12.2675631	0.0030592	-0.010407	3.9911205	50.000000	CYT
0.0002544	33605.	132106314.	12.2294342	0.0031109	-0.010625	3.9927415	50.000000	CYT
0.0002594	33612.	129589965.	12.1933004	0.0031626	-0.010844	3.9966941	50.000000	CYT
0.0002644	33620.	127167245.	12.1590717	0.0032146	-0.011062	3.9991211	50.000000	CYT
0.0002694	33624.	124822514.	12.1249030	0.0032661	-0.011280	3.9999954	50.000000	CYT
0.0002744	33626.	122554698.	12.0929101	0.0033180	-0.011498	3.9924197	50.000000	CYT
0.0003044	33630.	110488784.	11.9332098	0.0036322	-0.012804	3.9937002	50.000000	CYT
0.0003344	33630.	100575772.	11.8876146	0.0039749	-0.014081	3.9961808	50.000000	CYT

Axial Thrust Force = 852.300 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	1138.	1820164411.	163.5250119	0.0001022	0.00006845	0.4210411	2.9002721	
0.00000125	2275.	1820119032.	95.3069694	0.0001191	0.00005163	0.4879696	3.3276401	

MEG-33 rear abutment X direction row 2

0.00000188	3413.	1820035214.	72.5873833	0.0001361	0.00003485	0.5544122	3.7560827
0.00000250	4550.	1819916024.	61.2424135	0.0001531	0.00001811	0.6203648	4.1856000
0.00000313	5687.	1819762068.	54.4472925	0.0001701	0.00000140	0.6858231	4.6161921
0.00000375	6823.	1819508910.	49.9268372	0.0001872	-0.00001527	0.7507793	5.0478311
0.00000438	7957.	1818807611.	46.7045688	0.0002043	-0.00003192	0.8152023	5.4803109
0.00000500	9087.	1817485776.	44.2920643	0.0002215	-0.00004854	0.8790589	5.9133992
0.00000563	10213.	1815570393.	42.4184275	0.0002386	-0.00006515	0.9423263	6.3469372
0.00000625	11332.	1813144616.	40.9214146	0.0002558	-0.00008174	1.0049893	6.7808189
0.00000688	12446.	1810296023.	39.6979565	0.0002729	-0.00009833	1.0670378	7.2149739
0.00000750	13553.	1807101328.	38.6794461	0.0002901	-0.000115	1.1284648	7.6493544
0.00000813	13553.	1668093534.	35.5863762	0.0002891	-0.000150	1.1244197	7.5579962 C
0.00000875	13553.	1548943996.	34.5276289	0.0003021	-0.000170	1.1702952	7.8707232 C
0.00000938	13553.	1445681063.	33.5816980	0.0003148	-0.000191	1.2148613	8.1757428 C
0.00001000	13553.	1355325996.	32.7306041	0.0003273	-0.000213	1.2582520	8.4739752 C
0.00001063	13553.	1275600938.	31.9577631	0.0003396	-0.000234	1.3004922	8.7654670 C
0.00001125	13553.	1204734219.	31.2535031	0.0003516	-0.000256	1.3417321	9.0513179 C
0.00001188	13649.	1149399123.	30.6086594	0.0003635	-0.000278	1.3820549	9.3321008 C
0.00001250	13973.	1117808406.	30.0150303	0.0003752	-0.000300	1.4215047	9.6080735 C
0.00001313	14285.	1088365496.	29.4660604	0.0003867	-0.000322	1.4601283	9.8795255 C
0.00001375	14587.	1060871251.	28.9564728	0.0003982	-0.000344	1.4979750	10.1467811 C
0.00001438	14880.	1035157869.	28.4819980	0.0004094	-0.000367	1.5350974	10.4102017 C
0.00001500	15166.	1011082122.	28.0391718	0.0004206	-0.000389	1.5715513	10.6701898 C
0.00001563	15446.	988520290.	27.6251841	0.0004316	-0.000412	1.6073959	10.9271928 C
0.00001625	15720.	967365435.	27.2377868	0.0004426	-0.000435	1.6426960	11.1817196 C
0.00001688	15987.	947365984.	26.8717504	0.0004535	-0.000458	1.6773337	-11.558181 C
0.00001750	16250.	928547754.	26.5275511	0.0004642	-0.000481	1.7114732	-12.160943 C
0.00001813	16509.	910856514.	26.2043858	0.0004750	-0.000504	1.7452039	-12.765126 C
0.00001875	16762.	893997619.	25.8957132	0.0004855	-0.000527	1.7782663	-13.373143 C
0.00001938	17014.	878145963.	25.6059610	0.0004961	-0.000550	1.8110241	-13.981719 C
0.00002000	17260.	863014335.	25.3285471	0.0005066	-0.000573	1.8431791	-14.593643 C
0.00002063	17505.	848739606.	25.0672652	0.0005170	-0.000597	1.8750527	-15.205973 C
0.00002125	17745.	835071401.	24.8160517	0.0005273	-0.000620	1.9063435	-15.821571 C
0.00002188	17985.	822169571.	24.5796368	0.0005377	-0.000644	1.9374317	-16.436887 C
0.00002250	18219.	809753578.	24.3506261	0.0005479	-0.000667	1.9678977	-17.055941 C
0.00002313	18453.	797986066.	24.1341387	0.0005581	-0.000691	1.9981470	-17.674899 C
0.00002375	18685.	786727137.	23.9264540	0.0005683	-0.000714	2.0279862	-18.295642 C
0.00002438	18913.	775937352.	23.7268646	0.0005783	-0.000738	2.0574172	-18.918191 C
0.00002563	19367.	755779462.	23.3539237	0.0005984	-0.000785	2.1153939	-20.165497 C
0.00002688	19814.	737254765.	23.0104479	0.0006184	-0.000833	2.1720896	-21.416876 C
0.00002813	20253.	720114858.	22.6908272	0.0006382	-0.000881	2.2273893	-22.673701 C

MEG-33 rear abutment X direction row 2

0.00002938	20690.	704336785.	22.3974590	0.0006579	-0.000928	2.2817621	-23.931333	C
0.00003063	21119.	689597096.	22.1207865	0.0006774	-0.000976	2.3346802	-25.195408	C
0.00003188	21547.	675976833.	21.8667849	0.0006970	-0.001024	2.3868540	-26.458584	C
0.00003313	21968.	663171717.	21.6251922	0.0007163	-0.001072	2.4376038	-27.728256	C
0.00003438	22387.	651267100.	21.4021512	0.0007357	-0.001121	2.4876305	-28.996949	C
0.00003563	22803.	640070324.	21.1910229	0.0007549	-0.001169	2.5365015	-30.269506	C
0.00003688	23215.	629555793.	20.9927707	0.0007741	-0.001217	2.5844360	-31.543600	C
0.00003813	23626.	619703608.	20.8083969	0.0007933	-0.001265	2.6316556	-32.816722	C
0.00003938	24032.	610347262.	20.6310208	0.0008123	-0.001314	2.6776221	-34.095222	C
0.00004063	24437.	601530303.	20.4647530	0.0008314	-0.001362	2.7228220	-35.373495	C
0.00004188	24841.	593215560.	20.3092091	0.0008504	-0.001411	2.7673146	-36.650798	C
0.00004313	25241.	585307594.	20.1603139	0.0008694	-0.001459	2.8107822	-37.931064	C
0.00004438	25639.	577789577.	20.0185323	0.0008883	-0.001508	2.8533412	-39.212970	C
0.00004563	26036.	570661721.	19.8852535	0.0009073	-0.001556	2.8951993	-40.493906	C
0.00004688	26432.	563892672.	19.7598025	0.0009262	-0.001605	2.9363529	-41.773862	C
0.00004813	26826.	557417655.	19.6389913	0.0009451	-0.001654	2.9765317	-43.056439	C
0.00004938	27217.	551225350.	19.5232040	0.0009640	-0.001702	3.0158233	-44.340581	C
0.00005063	27607.	545319415.	19.4138071	0.0009828	-0.001751	3.0544161	-45.623736	C
0.00005188	27996.	539678975.	19.3103436	0.0010017	-0.001800	3.0923063	-46.905896	C
0.00005313	28384.	534285126.	19.2123996	0.0010207	-0.001848	3.1294901	-48.187055	C
0.00005438	28770.	529096063.	19.1175326	0.0010395	-0.001897	3.1657462	-49.470459	C
0.00005563	29151.	524062700.	19.0255099	0.0010583	-0.001945	3.2010814	-50.000000	CY
0.00005688	29503.	518730028.	18.9331096	0.0010768	-0.001994	3.2351856	-50.000000	CY
0.00005813	29812.	512895062.	18.8379197	0.0010950	-0.002044	3.2678328	-50.000000	CY
0.00005938	30071.	506464474.	18.7386296	0.0011126	-0.002094	3.2989133	-50.000000	CY
0.00006063	30322.	500159373.	18.6425902	0.0011302	-0.002144	3.3292308	-50.000000	CY
0.00006188	30570.	494053629.	18.5473988	0.0011476	-0.002194	3.3585598	-50.000000	CY
0.00006313	30813.	488129970.	18.4554219	0.0011650	-0.002244	3.3871749	-50.000000	CY
0.00006438	31023.	481909646.	18.3612913	0.0011820	-0.002294	3.4145391	-50.000000	CY
0.00006563	31197.	475382714.	18.2646720	0.0011986	-0.002345	3.4406463	-50.000000	CY
0.00006688	31368.	469053947.	18.1716169	0.0012152	-0.002396	3.4661532	-50.000000	CY
0.00006813	31538.	462945025.	18.0820212	0.0012318	-0.002447	3.4910693	-50.000000	CY
0.00006938	31705.	457002840.	17.9922955	0.0012482	-0.002498	3.5150461	-50.000000	CY
0.00007063	31870.	451263703.	17.9061344	0.0012646	-0.002549	3.5384838	-50.000000	CY
0.00007188	32036.	445716958.	17.8233543	0.0012811	-0.002600	3.5613799	-50.000000	CY
0.00007313	32201.	440352680.	17.7437841	0.0012975	-0.002651	3.5837314	-50.000000	CY
0.00007438	32365.	435161608.	17.6672643	0.0013140	-0.002702	3.6055357	-50.000000	CY
0.00007938	32840.	413738506.	17.3463679	0.0013769	-0.002909	3.6832113	-50.000000	CY
0.00008438	33252.	394098830.	17.0530731	0.0014389	-0.003117	3.7514491	-50.000000	CY
0.00008938	33647.	376468485.	16.7853977	0.0015002	-0.003326	3.8108273	-50.000000	CY

MEG-33 rear abutment X direction row 2

0.00009438	34034.	360619909.	16.5483233	0.0015617	-0.003535	3.8622796	-50.000000	CY
0.00009938	34360.	345756732.	16.3202970	0.0016218	-0.003744	3.9046213	-50.000000	CY
0.0001044	34582.	331324961.	16.0921013	0.0016796	-0.003957	3.9379999	-50.000000	CY
0.0001094	34798.	318148704.	15.8856098	0.0017375	-0.004169	3.9642546	-50.000000	CY
0.0001144	35000.	306009619.	15.6910359	0.0017947	-0.004382	3.9831324	-50.000000	CY
0.0001194	35198.	294849497.	15.5160619	0.0018522	-0.004594	3.9950624	-50.000000	CY
0.0001244	35389.	284534709.	15.3561687	0.0019099	-0.004806	3.9998892	-50.000000	CY
0.0001294	35569.	274925985.	15.2038866	0.0019670	-0.005019	3.9993491	-50.000000	CY
0.0001344	35743.	265994783.	15.0662493	0.0020245	-0.005232	3.9979068	-50.000000	CY
0.0001394	35912.	257667351.	14.9415053	0.0020825	-0.005444	3.9974776	-50.000000	CY
0.0001444	36042.	249641449.	14.8164101	0.0021391	-0.005657	3.9995494	-50.000000	CY
0.0001494	36126.	241851015.	14.6842457	0.0021935	-0.005873	3.9965005	-50.000000	CY
0.0001544	36206.	234533273.	14.5622274	0.0022480	-0.006088	3.9997994	-50.000000	CY
0.0001594	36282.	227653447.	14.4504448	0.0023030	-0.006303	3.9964017	50.000000	CY
0.0001644	36356.	221176298.	14.3475687	0.0023584	-0.006518	3.9997092	50.000000	CY
0.0001694	36423.	215042453.	14.2478311	0.0024132	-0.006733	3.9948701	50.000000	CY
0.0001744	36482.	209215618.	14.1548236	0.0024682	-0.006948	3.9989828	50.000000	CY
0.0001794	36539.	203703961.	14.0685795	0.0025236	-0.007163	3.9975939	50.000000	CY
0.0001844	36594.	198474344.	13.9894957	0.0025793	-0.007377	3.9967609	50.000000	CY
0.0001894	36645.	193502796.	13.9173405	0.0026356	-0.007591	3.9996500	50.000000	CY
0.0001944	36694.	188777143.	13.8505151	0.0026922	-0.007804	3.9941358	50.000000	CY
0.0001994	36740.	184277742.	13.7888105	0.0027491	-0.008017	3.9969299	50.000000	CY
0.0002044	36778.	179954900.	13.7317689	0.0028064	-0.008230	3.9996389	50.000000	CY
0.0002094	36814.	175826217.	13.6770540	0.0028636	-0.008443	3.9948798	50.000000	CY
0.0002144	36847.	171882980.	13.6263125	0.0029211	-0.008655	3.9952686	50.000000	CY
0.0002194	36879.	168108510.	13.5800998	0.0029791	-0.008867	3.9988103	50.000000	CY
0.0002244	36907.	164486304.	13.5390838	0.0030378	-0.009078	3.9998378	50.000000	CYT
0.0002294	36932.	161013200.	13.5016245	0.0030969	-0.009289	3.9909156	50.000000	CYT
0.0002344	36957.	157684714.	13.4666462	0.0031562	-0.009500	3.9960956	50.000000	CYT
0.0002394	36981.	154491688.	13.4340174	0.0032158	-0.009710	3.9991337	50.000000	CYT
0.0002444	37005.	151425213.	13.4037113	0.0032755	-0.009921	3.9988541	50.000000	CYT
0.0002494	37026.	148474819.	13.3761284	0.0033357	-0.010131	3.9889330	50.000000	CYT
0.0002544	37039.	145609791.	13.3462824	0.0033950	-0.010341	3.9943361	50.000000	CYT
0.0002594	37050.	142844094.	13.3169881	0.0034541	-0.010552	3.9979314	50.000000	CYT
0.0002644	37060.	140180695.	13.2894882	0.0035134	-0.010763	3.9997593	50.000000	CYT
0.0002694	37066.	137601257.	13.2622566	0.0035725	-0.010974	3.9957891	50.000000	CYT
0.0002744	37066.	135093717.	13.2330962	0.0036308	-0.011185	3.9872423	50.000000	CYT
0.0003044	37066.	121778525.	13.1353229	0.0039981	-0.012438	3.9871046	50.000000	CYT

MEG-33 rear abutment X direction row 2

 Summary of Results for Nominal Moment Capacity for Section 1

Moment values interpolated at maximum compressive strain = 0.003
 or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain	Max. Tens. Strain
1	637.400	33585.679	0.00300000	-0.01015581
2	852.300	36888.690	0.00300000	-0.00894223

Note that the values of moment capacity in the table above are not factored by a strength reduction factor (phi-factor).

In ACI 318, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.75).

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318, or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Load No.	Resist. Factor	Nominal Ax. Thrust kips	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in^2
1	0.65	637.400000	33586.	414.310000	21831.	537605250.
2	0.65	852.300000	36889.	553.995000	23978.	611608864.
1	0.75	637.400000	33586.	478.050000	25189.	491301122.
2	0.75	852.300000	36889.	639.225000	27667.	544453566.
1	0.90	637.400000	33586.	573.660000	30227.	347738359.
2	0.90	852.300000	36889.	767.070000	33200.	396592835.

Pile Section No. 2:

Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section	=	10.000000 ft
Shaft Diameter	=	48.000000 in
Concrete Cover Thickness (to edge of trans. reinf.)	=	3.000000 in
Number of Reinforcing Bars	=	20 bars
Yield Stress of Reinforcing Bars	=	50000. psi
Modulus of Elasticity of Reinforcing Bars	=	29000000. psi
Gross Area of Shaft	=	1810. sq. in.
Total Area of Reinforcing Steel	=	20.000000 sq. in.
Area Ratio of Steel Reinforcement	=	1.11 percent
Edge-to-Edge Bar Spacing	=	5.070246 in
Maximum Concrete Aggregate Size	=	0.750000 in
Ratio of Bar Spacing to Aggregate Size	=	6.76
Offset of Center of Rebar Cage from Center of Pile	=	0.0000 in
Transverse Reinforcement		
Type: Spiral		
Number of Transverse Reinf. (per spacing)	=	1
Spacing of Transverse Reinf.	=	3.750000 in
Yield Stress of Transverse Reinf.	=	50000. psi
Diameter of Transverse Reinf.	=	0.625000 in

Axial Structural Capacities:

Nom. Axial Structural Capacity = $0.85 F_c A_c + F_y A_s$	=	7084.495 kips
Tensile Load for Cracking of Concrete	=	-811.209 kips
Nominal Axial Tensile Capacity	=	-1000.000 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
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MEG-33 rear abutment X direction row 2

1	1.128000	1.000000	19.811000	0.000000
2	1.128000	1.000000	18.841381	6.121936
3	1.128000	1.000000	16.027436	11.644614
4	1.128000	1.000000	11.644614	16.027436
5	1.128000	1.000000	6.121936	18.841381
6	1.128000	1.000000	0.000000	19.811000
7	1.128000	1.000000	-6.12194	18.841381
8	1.128000	1.000000	-11.64461	16.027436
9	1.128000	1.000000	-16.02744	11.644614
10	1.128000	1.000000	-18.84138	6.121936
11	1.128000	1.000000	-19.81100	0.000000
12	1.128000	1.000000	-18.84138	-6.12194
13	1.128000	1.000000	-16.02744	-11.64461
14	1.128000	1.000000	-11.64461	-16.02744
15	1.128000	1.000000	-6.12194	-18.84138
16	1.128000	1.000000	0.000000	-19.81100
17	1.128000	1.000000	6.121936	-18.84138
18	1.128000	1.000000	11.644614	-16.02744
19	1.128000	1.000000	16.027436	-11.64461
20	1.128000	1.000000	18.841381	-6.12194

NOTE: The positions of the above rebars were computed by LPile

Minimum spacing between any two bars not equal to zero = 5.070 inches
between bars 17 and 18.

Ratio of bar spacing to maximum aggregate size = 6.76

Concrete Properties:

Compressive Strength of Concrete	=	4000.	psi
Modulus of Elasticity of Concrete	=	3604997.	psi
Modulus of Rupture of Concrete	=	-474.34165	psi
Compression Strain at Peak Stress	=	0.001886	
Tensile Strain at Fracture of Concrete	=	-0.0001154	
Maximum Coarse Aggregate Size	=	0.750000	in

MEG-33 rear abutment X direction row 2

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 2

Number	Axial Thrust Force kips
1	637.400
2	852.300

Definitions of Run Messages and Notes:

-
- C = concrete in section has cracked in tension.
 - Y = stress in reinforcing steel has reached yield stress.
 - T = ACI 318 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than 0.003. See ACI 318-14, Section 21.2.3.
 - Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
 Position of neutral axis is measured from edge of compression side of pile.
 Compressive stresses and strains are positive in sign.
 Tensile stresses and strains are negative in sign.

Axial Thrust Force = 637.400 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	722.8640984	1156582557.	151.3482717	0.00009459	0.00006459	0.3905202	2.6779374	
0.00000125	1446.	1156563501.	87.7086063	0.0001096	0.00004964	0.4502725	3.0489370	
0.00000188	2168.	1156523991.	66.5107033	0.0001247	0.00003471	0.5096399	3.4207695	
0.00000250	2891.	1156466934.	55.9232421	0.0001398	0.00001981	0.5686194	3.7934351	
0.00000313	3614.	1156392908.	49.5799590	0.0001549	0.00000494	0.6272083	4.1669338	
0.00000375	4336.	1156289927.	45.3586987	0.0001701	-0.00000990	0.6854026	4.5412585	
0.00000438	5058.	1156004285.	42.3490875	0.0001853	-0.00002472	0.7431838	4.9162905	

MEG-33 rear abutment X direction row 2

0.00000500	5777.	1155402202.	40.0954776	0.0002005	-0.00003952	0.8005252	5.2918442
0.00000563	6494.	1154474396.	38.3450350	0.0002157	-0.00005431	0.8574074	5.6677838
0.00000625	7208.	1153257200.	36.9463041	0.0002309	-0.00006909	0.9138172	6.0440176
0.00000688	7919.	1151795193.	35.8030477	0.0002461	-0.00008385	0.9697455	6.4204827
0.00000750	8626.	1150130142.	34.8512003	0.0002614	-0.00009862	1.0251861	6.7971361
0.00000813	8626.	1061658593.	32.2802641	0.0002623	-0.000128	1.0279036	6.7577873 C
0.00000875	8626.	985825836.	31.3195090	0.0002740	-0.000146	1.0702274	7.0338254 C
0.00000938	8626.	920104114.	30.4618892	0.0002856	-0.000164	1.1114043	7.3030761 C
0.00001000	8626.	862597607.	29.6892738	0.0002969	-0.000183	1.1514953	7.5658894 C
0.00001063	8626.	811856571.	28.9911617	0.0003080	-0.000202	1.1906871	7.8236516 C
0.00001125	8781.	780561242.	28.3538785	0.0003190	-0.000221	1.2289427	8.0759529 C
0.00001188	9016.	759252756.	27.7710273	0.0003298	-0.000240	1.2664094	8.3238976 C
0.00001250	9243.	739426842.	27.2350635	0.0003404	-0.000260	1.3031249	8.5677105 C
0.00001313	9462.	720936533.	26.7399497	0.0003510	-0.000279	1.3391295	8.8076434 C
0.00001375	9675.	703659572.	26.2808189	0.0003614	-0.000299	1.3744655	9.0439766 C
0.00001438	9883.	687492868.	25.8537251	0.0003716	-0.000318	1.4091784	9.2770217 C
0.00001500	10085.	672348342.	25.4554571	0.0003818	-0.000338	1.4433161	9.5071239 C
0.00001563	10284.	658149765.	25.0833984	0.0003919	-0.000358	1.4769300	9.7346650 C
0.00001625	10478.	644817224.	24.7350616	0.0004019	-0.000378	1.5100552	9.9598977 C
0.00001688	10668.	632192275.	24.4057822	0.0004118	-0.000398	1.5425831	10.1818297 C
0.00001750	10856.	620331100.	24.0969258	0.0004217	-0.000418	1.5747181	10.4021899 C
0.00001813	11041.	609151181.	23.8062393	0.0004315	-0.000439	1.6064555	-10.824595 C
0.00001875	11222.	598530163.	23.5300024	0.0004412	-0.000459	1.6376826	-11.348061 C
0.00001938	11403.	588542415.	23.2707492	0.0004509	-0.000479	1.6686521	-11.871998 C
0.00002000	11580.	578986271.	23.0221300	0.0004604	-0.000500	1.6990590	-12.399165 C
0.00002063	11756.	569990652.	22.7886784	0.0004700	-0.000520	1.7292729	-12.926272 C
0.00002125	11929.	561358078.	22.5638417	0.0004795	-0.000541	1.7589418	-13.456533 C
0.00002188	12101.	553209313.	22.3522098	0.0004890	-0.000561	1.7884403	-13.986567 C
0.00002250	12271.	545384194.	22.1481588	0.0004983	-0.000582	1.8174490	-14.519326 C
0.00002313	12440.	537951545.	21.9546437	0.0005077	-0.000602	1.8462306	-15.052417 C
0.00002375	12608.	530854837.	21.7697356	0.0005170	-0.000623	1.8747054	-15.586595 C
0.00002438	12773.	524039676.	21.5915988	0.0005263	-0.000644	1.9027877	-16.122689 C
0.00002563	13103.	511320209.	21.2594694	0.0005448	-0.000685	1.9582425	-17.196307 C
0.00002688	13427.	499619019.	20.9533311	0.0005631	-0.000727	2.0125603	-18.273747 C
0.00002813	13748.	488804796.	20.6694112	0.0005813	-0.000769	2.0657316	-19.355262 C
0.00002938	14066.	478844491.	20.4086502	0.0005995	-0.000810	2.1180962	-20.437631 C
0.00003063	14380.	469539468.	20.1631233	0.0006175	-0.000853	2.1692103	-21.525376 C
0.00003188	14692.	460937146.	19.9374860	0.0006355	-0.000894	2.2196778	-22.612536 C
0.00003313	15001.	452858551.	19.7237641	0.0006533	-0.000937	2.2689673	-23.704609 C
0.00003438	15309.	445338357.	19.5258783	0.0006712	-0.000979	2.3175926	-24.796390 C

MEG-33 rear abutment X direction row 2

0.00003563	15614.	438276699.	19.3395100	0.0006890	-0.001021	2.3652963	-25.890619	C
0.00003688	15917.	431634611.	19.1639367	0.0007067	-0.001063	2.4121326	-26.986816	C
0.00003813	16219.	425410155.	19.0005925	0.0007244	-0.001106	2.4583601	-28.082220	C
0.00003938	16518.	419510997.	18.8445825	0.0007420	-0.001148	2.5035945	-29.181092	C
0.00004063	16816.	413940551.	18.6975712	0.0007596	-0.001190	2.5480929	-30.280674	C
0.00004188	17114.	408686672.	18.5599878	0.0007772	-0.001233	2.5919883	-31.379465	C
0.00004313	17410.	403700904.	18.4293396	0.0007948	-0.001275	2.6350987	-32.479557	C
0.00004438	17703.	398949167.	18.3040903	0.0008122	-0.001318	2.6773266	-33.582174	C
0.00004563	17996.	394443362.	18.1863039	0.0008298	-0.001360	2.7189565	-34.683997	C
0.00004688	18289.	390163736.	18.0753872	0.0008473	-0.001403	2.7599860	-35.785020	C
0.00004813	18580.	386081789.	17.9698082	0.0008648	-0.001445	2.8003002	-36.886636	C
0.00004938	18869.	382166952.	17.8676912	0.0008822	-0.001488	2.8397358	-37.990950	C
0.00005063	19158.	378432543.	17.7711668	0.0008997	-0.001530	2.8785748	-39.094456	C
0.00005188	19446.	374865420.	17.6798345	0.0009171	-0.001573	2.9168146	-40.197149	C
0.00005313	19733.	371453681.	17.5933314	0.0009346	-0.001615	2.9544521	-41.299025	C
0.00005438	20020.	368183710.	17.5110143	0.0009522	-0.001658	2.9914485	-42.400569	C
0.00005563	20305.	365025912.	17.4303844	0.0009696	-0.001700	3.0275443	-43.505361	C
0.00005688	20588.	361995429.	17.3538036	0.0009870	-0.001743	3.0630413	-44.609320	C
0.00005813	20872.	359083960.	17.2810144	0.0010045	-0.001786	3.0979366	-45.712440	C
0.00005938	21154.	356283900.	17.2117810	0.0010219	-0.001828	3.1322273	-46.814715	C
0.00006063	21436.	353588273.	17.1458872	0.0010395	-0.001871	3.1659104	-47.916138	C
0.00006188	21718.	350990666.	17.0831342	0.0010570	-0.001913	3.1989830	-49.016703	C
0.00006313	21997.	348472845.	17.0225786	0.0010746	-0.001955	3.2313529	-50.000000	CY
0.00006438	22267.	345889777.	16.9612477	0.0010919	-0.001998	3.2626887	-50.000000	CY
0.00006563	22514.	343076254.	16.8981638	0.0011089	-0.002041	3.2928938	-50.000000	CY
0.00006688	22731.	339903505.	16.8312315	0.0011256	-0.002084	3.3217426	-50.000000	CY
0.00006813	22918.	336406474.	16.7607324	0.0011418	-0.002128	3.3492887	-50.000000	CY
0.00006938	23098.	332948946.	16.6919491	0.0011580	-0.002172	3.3761681	-50.000000	CY
0.00007063	23279.	329607180.	16.6259603	0.0011742	-0.002216	3.4025222	-50.000000	CY
0.00007188	23458.	326372326.	16.5625775	0.0011904	-0.002260	3.4283434	-50.000000	CY
0.00007313	23625.	323078084.	16.4967926	0.0012063	-0.002304	3.4530703	-50.000000	CY
0.00007438	23763.	319506083.	16.4269200	0.0012218	-0.002348	3.4765321	-50.000000	CY
0.00007938	24249.	305503141.	16.1584804	0.0012826	-0.002527	3.5640191	-50.000000	CY
0.00008438	24725.	293032524.	15.9189415	0.0013432	-0.002707	3.6432005	-50.000000	CY
0.00008938	25110.	280951580.	15.6872374	0.0014020	-0.002888	3.7125296	-50.000000	CY
0.00009438	25403.	269171330.	15.4575744	0.0014588	-0.003071	3.7722315	-50.000000	CY
0.00009938	25689.	258505094.	15.2504203	0.0015155	-0.003254	3.8249392	-50.000000	CY
0.0001044	25969.	248802448.	15.0634814	0.0015723	-0.003438	3.8707500	-50.000000	CY
0.0001094	26240.	239908502.	14.8904194	0.0016286	-0.003621	3.9094006	-50.000000	CY
0.0001144	26463.	231366793.	14.7230896	0.0016840	-0.003806	3.9406489	-50.000000	CY

MEG-33 rear abutment X direction row 2

0.0001194	26621.	223005308.	14.5520405	0.0017371	-0.003993	3.9644717	-50.000000	CY
0.0001244	26769.	215229956.	14.3915301	0.0017899	-0.004180	3.9821024	-50.000000	CY
0.0001294	26914.	208032535.	14.2459291	0.0018431	-0.004367	3.9938015	-50.000000	CY
0.0001344	27054.	201332662.	14.1106047	0.0018961	-0.004554	3.9994355	-50.000000	CY
0.0001394	27187.	195064376.	13.9823677	0.0019488	-0.004741	3.9983913	-50.000000	CY
0.0001444	27317.	189207732.	13.8654950	0.0020018	-0.004928	3.9963600	-50.000000	CY
0.0001494	27443.	183720678.	13.7589169	0.0020552	-0.005115	3.9998811	-50.000000	CY
0.0001544	27566.	178562036.	13.6603711	0.0021088	-0.005301	3.9984774	-50.000000	CY
0.0001594	27680.	173680630.	13.5643303	0.0021618	-0.005488	3.9975563	-50.000000	CY
0.0001644	27775.	168972509.	13.4699008	0.0022141	-0.005676	3.9991679	-50.000000	CY
0.0001694	27846.	164405959.	13.3750099	0.0022654	-0.005865	3.9958391	-50.000000	CY
0.0001744	27903.	160018168.	13.2827011	0.0023162	-0.006054	3.9989576	-50.000000	CY
0.0001794	27957.	155859482.	13.1961865	0.0023671	-0.006243	3.9977285	-50.000000	CY
0.0001844	28005.	151890985.	13.1100808	0.0024172	-0.006433	3.9977888	50.000000	CY
0.0001894	28051.	148126726.	13.0296417	0.0024675	-0.006623	3.9998957	50.000000	CY
0.0001944	28096.	144547787.	12.9548838	0.0025181	-0.006812	3.9948145	50.000000	CY
0.0001994	28138.	141129538.	12.8871825	0.0025694	-0.007001	3.9986511	50.000000	CY
0.0002044	28178.	137874370.	12.8237332	0.0026209	-0.007189	3.9999985	50.000000	CY
0.0002094	28217.	134766989.	12.7647793	0.0026726	-0.007377	3.9948176	50.000000	CY
0.0002144	28252.	131788328.	12.7105223	0.0027248	-0.007565	3.9985347	50.000000	CY
0.0002194	28284.	128930785.	12.6560633	0.0027764	-0.007754	3.9999730	50.000000	CY
0.0002244	28315.	126194866.	12.6053315	0.0028283	-0.007942	3.9926058	50.000000	CY
0.0002294	28345.	123575149.	12.5576259	0.0028804	-0.008130	3.9969816	50.000000	CY
0.0002344	28370.	121045703.	12.5168292	0.0029336	-0.008316	3.9994857	50.000000	CY
0.0002394	28394.	118618216.	12.4786947	0.0029871	-0.008503	3.9970947	50.000000	CY
0.0002444	28417.	116285591.	12.4432385	0.0030408	-0.008689	3.9933164	50.000000	CYT
0.0002494	28440.	114044351.	12.4098490	0.0030947	-0.008875	3.9973648	50.000000	CYT
0.0002544	28459.	111879786.	12.3806545	0.0031493	-0.009061	3.9995945	50.000000	CYT
0.0002594	28477.	109792650.	12.3541538	0.0032044	-0.009246	3.9966021	50.000000	CYT
0.0002644	28495.	107780719.	12.3296710	0.0032597	-0.009430	3.9916922	50.000000	CYT
0.0002694	28511.	105841609.	12.3066984	0.0033151	-0.009615	3.9962045	50.000000	CYT
0.0002744	28527.	103971295.	12.2851678	0.0033707	-0.009799	3.9989829	50.000000	CYT
0.0003044	28588.	93923153.	12.1612763	0.0037016	-0.010908	3.9998656	50.000000	CYT
0.0003344	28588.	85496403.	12.2050319	0.0040811	-0.011969	3.9912099	50.000000	CYT

Axial Thrust Force = 852.300 kips

Bending Curvature	Bending Moment	Bending Stiffness	Depth to N Axis	Max Comp Strain	Max Tens Strain	Max Conc Stress	Max Steel Stress	Run Msg
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MEG-33 rear abutment X direction row 2

rad/in.	in-kip	kip-in2	in	in/in	in/in	ksi	ksi
6.25000E-07	712.9161275	1140665804.	195.4637400	0.0001222	0.00009216	0.5007490	3.4775303
0.00000125	1426.	1140648415.	109.7668347	0.0001372	0.00007721	0.5595804	3.8485478
0.00000188	2139.	1140608986.	81.2167380	0.0001523	0.00006228	0.6180267	4.2204101
0.00000250	2851.	1140551434.	66.9533447	0.0001674	0.00004738	0.6760849	4.5931175
0.00000313	3564.	1140476540.	58.4046344	0.0001825	0.00003251	0.7337521	4.9666700
0.00000375	4276.	1140384563.	52.7132670	0.0001977	0.00001767	0.7910254	5.3410678
0.00000438	4989.	1140275610.	48.6546688	0.0002129	0.00000286	0.8479020	5.7163111
0.00000500	5701.	1140138376.	45.6164887	0.0002281	-0.00001192	0.9043775	6.0923909
0.00000563	6412.	1139872430.	43.2579706	0.0002433	-0.00002667	0.9604364	6.4692065
0.00000625	7121.	1139386248.	41.3744058	0.0002586	-0.00004141	1.0160574	6.8466111
0.00000688	7828.	1138654630.	39.8356697	0.0002739	-0.00005613	1.0712238	7.2244867
0.00000750	8533.	1137685665.	38.5551476	0.0002892	-0.00007084	1.1259228	7.6027445
0.00000813	9234.	1136500717.	37.4729719	0.0003045	-0.00008553	1.1801451	7.9813190
0.00000875	9932.	1135124449.	36.5464439	0.0003198	-0.000100	1.2338834	8.3601601
0.00000938	10627.	1133580955.	35.7442957	0.0003351	-0.000115	1.2871324	8.7392304
0.00001000	10627.	1062732146.	33.5960205	0.0003360	-0.000144	1.2896027	8.6988460 C
0.00001063	10627.	1000218490.	32.7693886	0.0003482	-0.000162	1.3315586	8.9878179 C
0.00001125	10627.	944650796.	32.0161329	0.0003602	-0.000180	1.3724730	9.2707634 C
0.00001188	10627.	894932333.	31.3261430	0.0003720	-0.000198	1.4124222	9.5481905 C
0.00001250	10627.	850185716.	30.6910984	0.0003836	-0.000216	1.4514707	9.8205230 C
0.00001313	10856.	827088961.	30.1051909	0.0003951	-0.000235	1.4897221	10.0885383 C
0.00001375	11113.	808234318.	29.5624686	0.0004065	-0.000254	1.5272222	10.3525343 C
0.00001438	11362.	790397217.	29.0575302	0.0004177	-0.000272	1.5639924	10.6126079 C
0.00001500	11603.	773500437.	28.5860314	0.0004288	-0.000291	1.6000615	10.8689237 C
0.00001563	11836.	757485977.	28.1445240	0.0004398	-0.000310	1.6354679	11.1217375 C
0.00001625	12062.	742303620.	27.7301590	0.0004506	-0.000329	1.6702524	11.3713375 C
0.00001688	12283.	727908905.	27.3405733	0.0004614	-0.000349	1.7044585	11.6180431 C
0.00001750	12500.	714261959.	26.9738073	0.0004720	-0.000368	1.7381321	11.8622072 C
0.00001813	12712.	701326568.	26.6282410	0.0004826	-0.000387	1.7713220	12.1042192 C
0.00001875	12918.	688939261.	26.2993802	0.0004931	-0.000407	1.8038935	12.3427881 C
0.00001938	13120.	677179797.	25.9884582	0.0005035	-0.000426	1.8360271	12.5795150 C
0.00002000	13320.	666019455.	25.6945071	0.0005139	-0.000446	1.8677715	12.8148142 C
0.00002063	13515.	655285283.	25.4127634	0.0005241	-0.000466	1.8989257	13.0467591 C
0.00002125	13709.	645111549.	25.1464846	0.0005344	-0.000486	1.9297789	13.2780212 C
0.00002188	13898.	635330958.	24.8910667	0.0005445	-0.000506	1.9601153	13.5065205 C
0.00002250	14086.	626022967.	24.6485530	0.0005546	-0.000525	1.9901407	13.7341807 C
0.00002313	14270.	617070005.	24.4155924	0.0005646	-0.000545	2.0196983	13.9594567 C
0.00002375	14453.	608542340.	24.1942005	0.0005746	-0.000565	2.0489882	14.1842557 C

MEG-33 rear abutment X direction row 2

0.00002438	14633.	600310809.	23.9805116	0.0005845	-0.000585	2.0777982	-14.434026	C
0.00002563	14988.	584891238.	23.5811213	0.0006043	-0.000626	2.1345317	-15.471029	C
0.00002688	15337.	570669853.	23.2135205	0.0006239	-0.000666	2.1900041	-16.512213	C
0.00002813	15679.	557472059.	22.8725638	0.0006433	-0.000707	2.2441627	-17.558315	C
0.00002938	16015.	545192652.	22.5552609	0.0006626	-0.000747	2.2970626	-18.608987	C
0.00003063	16348.	533798094.	22.2615291	0.0006818	-0.000788	2.3489589	-19.661729	C
0.00003188	16674.	523119176.	21.9857771	0.0007008	-0.000829	2.3996197	-20.719147	C
0.00003313	16998.	513148075.	21.7286835	0.0007198	-0.000870	2.4493027	-21.778633	C
0.00003438	17318.	503787944.	21.4873085	0.0007386	-0.000911	2.4979362	-22.841089	C
0.00003563	17634.	495000257.	21.2608928	0.0007574	-0.000953	2.5456146	-23.905590	C
0.00003688	17947.	486711447.	21.0471408	0.0007761	-0.000994	2.5922747	-24.972964	C
0.00003813	18259.	478925291.	20.8472528	0.0007948	-0.001035	2.6381597	-26.040506	C
0.00003938	18566.	471520501.	20.6560293	0.0008133	-0.001077	2.6828987	-27.112646	C
0.00004063	18872.	464551118.	20.4773398	0.0008319	-0.001118	2.7269649	-28.183884	C
0.00004188	19176.	457928484.	20.3071914	0.0008504	-0.001160	2.7700719	-29.257704	C
0.00004313	19477.	451630975.	20.1453009	0.0008688	-0.001201	2.8122763	-30.333534	C
0.00004438	19777.	445670065.	19.9932291	0.0008872	-0.001243	2.8538144	-31.408463	C
0.00004563	20074.	439982182.	19.8478614	0.0009056	-0.001284	2.8944474	-32.485548	C
0.00004688	20369.	434545299.	19.7086164	0.0009238	-0.001326	2.9341799	-33.564850	C
0.00004813	20664.	429374380.	19.5772480	0.0009422	-0.001368	2.9732517	-34.643253	C
0.00004938	20957.	424449060.	19.4531619	0.0009605	-0.001410	3.0116596	-35.720754	C
0.00005063	21247.	419702086.	19.3322358	0.0009787	-0.001451	3.0490247	-36.802611	C
0.00005188	21537.	415162943.	19.2173064	0.0009969	-0.001493	3.0856876	-37.884215	C
0.00005313	21825.	410822637.	19.1083741	0.0010151	-0.001535	3.1216920	-38.964911	C
0.00005438	22113.	406667300.	19.0050293	0.0010334	-0.001577	3.1570344	-40.044694	C
0.00005563	22398.	402661698.	18.9049969	0.0010516	-0.001618	3.1915098	-41.126627	C
0.00005688	22682.	398800130.	18.8083804	0.0010697	-0.001660	3.2251613	-42.210178	C
0.00005813	22965.	395091245.	18.7164664	0.0010879	-0.001702	3.2581555	-43.292807	C
0.00005938	23247.	391525321.	18.6289618	0.0011061	-0.001744	3.2904891	-44.374506	C
0.00006063	23528.	388093370.	18.5455979	0.0011243	-0.001786	3.3221586	-45.455270	C
0.00006188	23808.	384781958.	18.4656143	0.0011426	-0.001827	3.3531063	-46.536013	C
0.00006313	24086.	381565617.	18.3869917	0.0011607	-0.001869	3.3831411	-47.620063	C
0.00006438	24363.	378462057.	18.3119322	0.0011788	-0.001911	3.4125152	-48.703162	C
0.00006563	24640.	375464731.	18.2402362	0.0011970	-0.001953	3.4412253	-49.785301	C
0.00006688	24912.	372516091.	18.1710320	0.0012152	-0.001995	3.4691967	-50.000000	CY
0.00006813	25166.	369413364.	18.1014471	0.0012332	-0.002037	3.4961505	-50.000000	CY
0.00006938	25397.	366079635.	18.0302219	0.0012508	-0.002079	3.5219801	-50.000000	CY
0.00007063	25594.	362394578.	17.9539774	0.0012680	-0.002122	3.5463699	-50.000000	CY
0.00007188	25773.	358579836.	17.8761231	0.0012848	-0.002165	3.5696950	-50.000000	CY
0.00007313	25951.	354887896.	17.8013248	0.0013017	-0.002208	3.5924436	-50.000000	CY

MEG-33 rear abutment X direction row 2

0.00007438	26129.	351312502.	17.7294313	0.0013186	-0.002251	3.6146127	-50.000000	CY
0.00007938	26726.	336708483.	17.4431968	0.0013846	-0.002425	3.6951129	-50.000000	CY
0.00008438	27206.	322444006.	17.1671901	0.0014485	-0.002602	3.7641384	-50.000000	CY
0.00008938	27675.	309646188.	16.9215280	0.0015124	-0.002778	3.8242741	-50.000000	CY
0.00009438	28045.	297163557.	16.6811294	0.0015743	-0.002956	3.8741058	-50.000000	CY
0.00009938	28336.	285143588.	16.4483533	0.0016346	-0.003135	3.9146306	-50.000000	CY
0.0001044	28617.	274178550.	16.2362191	0.0016947	-0.003315	3.9472246	-50.000000	CY
0.0001094	28892.	264154684.	16.0454711	0.0017550	-0.003495	3.9720955	-50.000000	CY
0.0001144	29155.	254906906.	15.8674074	0.0018148	-0.003675	3.9890068	-50.000000	CY
0.0001194	29397.	246258505.	15.7035735	0.0018746	-0.003855	3.9981735	-50.000000	CY
0.0001244	29568.	237736243.	15.5359410	0.0019323	-0.004038	3.9978689	-50.000000	CY
0.0001294	29711.	229650713.	15.3734910	0.0019889	-0.004221	3.9970138	-50.000000	CY
0.0001344	29849.	222133837.	15.2263151	0.0020460	-0.004404	3.9999975	-50.000000	CY
0.0001394	29982.	215113959.	15.0910786	0.0021033	-0.004587	3.9996712	-50.000000	CY
0.0001444	30105.	208519351.	14.9615993	0.0021601	-0.004770	3.9983732	-50.000000	CY
0.0001494	30225.	202343339.	14.8433522	0.0022172	-0.004953	3.9973962	-50.000000	CY
0.0001544	30341.	196544015.	14.7353658	0.0022748	-0.005135	3.9995921	-50.000000	CY
0.0001594	30454.	191081041.	14.6369134	0.0023328	-0.005317	3.9971030	50.000000	CY
0.0001644	30559.	185907589.	14.5401420	0.0023900	-0.005500	3.9999072	50.000000	CY
0.0001694	30657.	180998458.	14.4535632	0.0024481	-0.005682	3.9974153	50.000000	CY
0.0001744	30751.	176348229.	14.3735401	0.0025064	-0.005864	3.9999345	50.000000	CY
0.0001794	30819.	171813792.	14.2941621	0.0025640	-0.006046	3.9967089	50.000000	CY
0.0001844	30871.	167437900.	14.2165146	0.0026212	-0.006229	3.9996615	50.000000	CY
0.0001894	30912.	163231382.	14.1393633	0.0026776	-0.006412	3.9941430	50.000000	CY
0.0001944	30942.	159184658.	14.0669923	0.0027343	-0.006596	3.9983466	50.000000	CY
0.0001994	30970.	155335007.	13.9995245	0.0027912	-0.006779	3.9999795	50.000000	CY
0.0002044	30997.	151665022.	13.9370528	0.0028484	-0.006962	3.9948114	50.000000	CY
0.0002094	31019.	148149699.	13.8815143	0.0029064	-0.007144	3.9986166	50.000000	CY
0.0002144	31040.	144791629.	13.8300240	0.0029648	-0.007325	3.9999959	50.000000	CY
0.0002194	31059.	141578699.	13.7825096	0.0030235	-0.007506	3.9938964	50.000000	CYT
0.0002244	31077.	138505222.	13.7380386	0.0030825	-0.007688	3.9979838	50.000000	CYT
0.0002294	31095.	135562210.	13.6963943	0.0031416	-0.007868	3.9998686	50.000000	CYT
0.0002344	31110.	132735061.	13.6552988	0.0032005	-0.008050	3.9935916	50.000000	CYT
0.0002394	31123.	130019539.	13.6151491	0.0032591	-0.008231	3.9954819	50.000000	CYT
0.0002444	31136.	127412709.	13.5773913	0.0033180	-0.008412	3.9986583	50.000000	CYT
0.0002494	31149.	124907946.	13.5419001	0.0033770	-0.008593	3.9999659	50.000000	CYT
0.0002544	31160.	122496772.	13.5091113	0.0034364	-0.008774	3.9925195	50.000000	CYT
0.0002594	31171.	120176081.	13.4783481	0.0034959	-0.008954	3.9943209	50.000000	CYT
0.0002644	31181.	117941290.	13.4493743	0.0035557	-0.009134	3.9978489	50.000000	CYT
0.0002694	31190.	115787568.	13.4221055	0.0036156	-0.009314	3.9997035	50.000000	CYT

MEG-33 rear abutment X direction row 2

0.0002744	31199.	113709340.	13.3967410	0.0036757	-0.009494	3.9963914	50.0000000 CYT
0.0003044	31199.	102501849.	13.4245928	0.0040861	-0.010524	3.9952924	50.0000000 CYT

 Summary of Results for Nominal Moment Capacity for Section 2

Moment values interpolated at maximum compressive strain = 0.003
 or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain	Max. Tens. Strain
1	637.400	28399.776	0.00300000	-0.00854768
2	852.300	31051.163	0.00300000	-0.00743381

Note that the values of moment capacity in the table above are not factored by a strength reduction factor (phi-factor).

In ACI 318, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.75).

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318, or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Load No.	Resist. Factor	Nominal Ax. Thrust kips	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in^2
1	0.65	637.400000	28400.	414.310000	18460.	387768204.
2	0.65	852.300000	31051.	553.995000	20183.	437972873.
1	0.75	637.400000	28400.	478.050000	21300.	354892971.
2	0.75	852.300000	31051.	639.225000	23288.	391018401.

MEG-33 rear abutment X direction row 2

1	0.90	637.400000	28400.	573.660000	25560.	263323189.
2	0.90	852.300000	31051.	767.070000	27946.	300493899.

 Layering Correction Equivalent Depths of Soil & Rock Layers

Layer No.	Top of Layer Below Pile Head ft	Equivalent Top Depth Below Grnd Surf ft	Same Layer Type As Layer Above	Layer is Rock or is Below Rock Layer	F0 Integral for Layer lbs	F1 Integral for Layer lbs
1	0.00	0.00	N.A.	No	0.00	910390.
2	15.0000	15.0000	No	Yes	N.A.	N.A.

Notes: The F0 integral of Layer n+1 equals the sum of the F0 and F1 integrals for Layer n. Layering correction equivalent depths are computed only for soil types with both shallow-depth and deep-depth expressions for peak lateral load transfer. These soil types are soft and stiff clays, non-liquefied sands, and cemented c-phi soil.

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 1

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 86000.0 lbs
 Applied moment at pile head = 6859680.0 in-lbs
 Axial thrust load on pile head = 637400.0 lbs

Depth Deflect. Bending Shear Slope Total Bending Soil Res. Soil Spr. Distrib.

MEG-33 rear abutment X direction row 2

X feet	y inches	Moment in-lbs	Force lbs	S radians	Stress psi*	Stiffness lb-in^2	p lb/inch	Es*H lb/inch	Lat. Load lb/inch
0.00	0.4020	6859680.	86000.	-0.00308	0.00	1.84E+12	0.00	0.00	0.00
0.2500	0.3928	7123564.	85402.	-0.00307	0.00	1.84E+12	-398.679	3045.	0.00
0.5000	0.3836	7383838.	84201.	-0.00306	0.00	1.84E+12	-401.929	3143.	0.00
0.7500	0.3745	7640472.	82991.	-0.00305	0.00	1.84E+12	-405.078	3245.	0.00
1.0000	0.3653	7893436.	81771.	-0.00303	0.00	1.84E+12	-408.123	3351.	0.00
1.2500	0.3562	8142702.	80542.	-0.00302	0.00	1.84E+12	-411.063	3462.	0.00
1.5000	0.3472	8388243.	79305.	-0.00301	0.00	1.84E+12	-413.894	3576.	0.00
1.7500	0.3382	8630033.	78059.	-0.00299	0.00	1.84E+12	-416.614	3696.	0.00
2.0000	0.3292	8868047.	76805.	-0.00298	0.00	1.83E+12	-419.220	3820.	0.00
2.2500	0.3203	9102259.	75544.	-0.00297	0.00	1.83E+12	-421.709	3950.	0.00
2.5000	0.3114	9332648.	74275.	-0.00295	0.00	1.83E+12	-424.077	4085.	0.00
2.7500	0.3026	9559191.	72999.	-0.00293	0.00	1.83E+12	-426.321	4226.	0.00
3.0000	0.2938	9781867.	71717.	-0.00292	0.00	1.83E+12	-428.436	4374.	0.00
3.2500	0.2851	1.00E+07	70429.	-0.00290	0.00	1.83E+12	-430.420	4529.	0.00
3.5000	0.2764	1.02E+07	69135.	-0.00289	0.00	1.83E+12	-432.267	4691.	0.00
3.7500	0.2678	1.04E+07	67836.	-0.00287	0.00	1.83E+12	-433.974	4862.	0.00
4.0000	0.2592	1.06E+07	66531.	-0.00285	0.00	1.83E+12	-435.535	5041.	0.00
4.2500	0.2507	1.08E+07	65223.	-0.00283	0.00	1.83E+12	-436.945	5229.	0.00
4.5000	0.2422	1.10E+07	63910.	-0.00282	0.00	1.83E+12	-438.198	5428.	0.00
4.7500	0.2338	1.12E+07	62594.	-0.00280	0.00	1.83E+12	-439.289	5637.	0.00
5.0000	0.2254	1.14E+07	61274.	-0.00278	0.00	1.82E+12	-440.211	5859.	0.00
5.2500	0.2171	1.16E+07	59953.	-0.00275	0.00	1.01E+12	-440.957	6093.	0.00
5.5000	0.2089	1.18E+07	58629.	-0.00272	0.00	9.82E+11	-441.543	6341.	0.00
5.7500	0.2008	1.20E+07	57304.	-0.00268	0.00	9.64E+11	-441.967	6603.	0.00
6.0000	0.1928	1.21E+07	55977.	-0.00264	0.00	9.47E+11	-442.224	6881.	0.00
6.2500	0.1849	1.23E+07	54651.	-0.00260	0.00	9.31E+11	-442.310	7175.	0.00
6.5000	0.1772	1.25E+07	53324.	-0.00256	0.00	9.16E+11	-442.220	7487.	0.00
6.7500	0.1696	1.26E+07	51997.	-0.00252	0.00	9.02E+11	-441.950	7819.	0.00
7.0000	0.1621	1.28E+07	50672.	-0.00248	0.00	8.89E+11	-441.496	8173.	0.00
7.2500	0.1547	1.30E+07	49349.	-0.00244	0.00	8.76E+11	-440.852	8550.	0.00
7.5000	0.1474	1.31E+07	48027.	-0.00239	0.00	8.64E+11	-440.013	8953.	0.00
7.7500	0.1403	1.33E+07	46709.	-0.00234	0.00	8.53E+11	-438.973	9384.	0.00
8.0000	0.1334	1.34E+07	45394.	-0.00230	0.00	8.42E+11	-437.726	9846.	0.00
8.2500	0.1266	1.35E+07	44083.	-0.00225	0.00	8.32E+11	-436.267	10342.	0.00
8.5000	0.1199	1.37E+07	42777.	-0.00220	0.00	8.23E+11	-434.587	10875.	0.00
8.7500	0.1134	1.38E+07	41476.	-0.00215	0.00	8.14E+11	-432.682	11451.	0.00
9.0000	0.1070	1.39E+07	40181.	-0.00210	0.00	8.06E+11	-430.541	12073.	0.00

MEG-33 rear abutment X direction row 2

9.2500	0.1008	1.41E+07	38893.	-0.00205	0.00	7.98E+11	-428.158	12746.	0.00
9.5000	0.09471	1.42E+07	37612.	-0.00199	0.00	7.90E+11	-425.523	13478.	0.00
9.7500	0.08882	1.43E+07	36340.	-0.00194	0.00	7.83E+11	-422.627	14275.	0.00
10.0000	0.08308	1.44E+07	35077.	-0.00188	0.00	7.77E+11	-419.460	15146.	0.00
10.2500	0.07752	1.45E+07	33824.	-0.00183	0.00	7.70E+11	-416.009	16100.	0.00
10.5000	0.07212	1.46E+07	32581.	-0.00177	0.00	7.64E+11	-412.263	17148.	0.00
10.7500	0.06690	1.47E+07	31351.	-0.00171	0.00	7.59E+11	-408.207	18305.	0.00
11.0000	0.06185	1.48E+07	30133.	-0.00165	0.00	7.54E+11	-403.827	19587.	0.00
11.2500	0.05698	1.49E+07	28928.	-0.00159	0.00	7.49E+11	-399.106	21014.	0.00
11.5000	0.05228	1.50E+07	27739.	-0.00153	0.00	7.44E+11	-394.025	22609.	0.00
11.7500	0.04777	1.51E+07	26565.	-0.00147	0.00	7.40E+11	-388.562	24401.	0.00
12.0000	0.04344	1.51E+07	25408.	-0.00141	0.00	7.35E+11	-382.694	26428.	0.00
12.2500	0.03930	1.52E+07	24269.	-0.00135	0.00	7.32E+11	-376.393	28733.	0.00
12.5000	0.03534	1.53E+07	23150.	-0.00129	0.00	7.28E+11	-369.626	31376.	0.00
12.7500	0.03157	1.54E+07	22052.	-0.00122	0.00	7.24E+11	-362.358	34429.	0.00
13.0000	0.02800	1.54E+07	20977.	-0.00116	0.00	7.21E+11	-354.543	37989.	0.00
13.2500	0.02461	1.55E+07	19926.	-0.00110	0.00	7.18E+11	-346.128	42186.	0.00
13.5000	0.02143	1.56E+07	18901.	-0.00103	0.00	7.15E+11	-337.050	47195.	0.00
13.7500	0.01843	1.56E+07	17905.	-9.65E-04	0.00	7.13E+11	-327.226	53262.	0.00
14.0000	0.01563	1.57E+07	16939.	-8.99E-04	0.00	7.10E+11	-316.555	60741.	0.00
14.2500	0.01304	1.57E+07	16007.	-8.33E-04	0.00	7.08E+11	-304.902	70164.	0.00
14.5000	0.01064	1.58E+07	15111.	-7.66E-04	0.00	7.06E+11	-292.080	82365.	0.00
14.7500	0.00844	1.58E+07	14256.	-6.99E-04	0.00	7.04E+11	-277.827	98736.	0.00
15.0000	0.00645	1.59E+07	-10126.	-6.31E-04	0.00	7.02E+11	-15977.	7435029.	0.00
15.2500	0.00466	1.58E+07	-77804.	-5.43E-04	0.00	4.35E+11	-29141.	1.88E+07	0.00
15.5000	0.00319	1.54E+07	-164484.	-4.36E-04	0.00	4.43E+11	-28646.	2.69E+07	0.00
15.7500	0.00204	1.48E+07	-248725.	-3.36E-04	0.00	4.59E+11	-27514.	4.05E+07	0.00
16.0000	0.00117	1.39E+07	-382511.	-2.45E-04	0.00	4.84E+11	-61677.	1.58E+08	0.00
16.2500	5.69E-04	1.25E+07	-522660.	-1.67E-04	0.00	5.36E+11	-31756.	1.68E+08	0.00
16.5000	1.73E-04	1.08E+07	-585652.	-1.06E-04	0.00	6.26E+11	-10239.	1.77E+08	0.00
16.7500	-6.75E-05	8962543.	-594688.	-6.26E-05	0.00	7.64E+11	4215.	1.87E+08	0.00
17.0000	-2.03E-04	7197531.	-568397.	-3.57E-05	0.00	1.15E+12	13313.	1.97E+08	0.00
17.2500	-2.82E-04	5552296.	-519294.	-1.91E-05	0.00	1.16E+12	19423.	2.07E+08	0.00
17.5000	-3.17E-04	4081842.	-455768.	-6.60E-06	0.00	1.16E+12	22927.	2.17E+08	0.00
17.7500	-3.21E-04	2817715.	-384979.	2.35E-06	0.00	1.16E+12	24265.	2.27E+08	0.00
18.0000	-3.03E-04	1771962.	-312730.	8.30E-06	0.00	1.16E+12	23900.	2.37E+08	0.00
18.2500	-2.71E-04	941304.	-243452.	1.18E-05	0.00	1.16E+12	22285.	2.46E+08	0.00
18.5000	-2.32E-04	311205.	-180273.	1.34E-05	0.00	1.16E+12	19834.	2.56E+08	0.00
18.7500	-1.91E-04	-140386.	-125153.	1.37E-05	0.00	1.16E+12	16912.	2.66E+08	0.00
19.0000	-1.50E-04	-439766.	-79058.	1.29E-05	0.00	1.16E+12	13818.	2.76E+08	0.00

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19.2500	-1.13E-04	-614784.	-42156.	1.15E-05	0.00	1.16E+12	10783.	2.86E+08	0.00
19.5000	-8.09E-05	-692748.	-14016.	9.85E-06	0.00	1.16E+12	7977.	2.96E+08	0.00
19.7500	-5.41E-05	-698915.	6212.	8.05E-06	0.00	1.16E+12	5508.	3.06E+08	0.00
20.0000	-3.27E-05	-655506.	19625.	6.29E-06	0.00	1.16E+12	3434.	3.15E+08	0.00
20.2500	-1.64E-05	-581187.	27435.	4.69E-06	0.00	1.16E+12	1772.	3.25E+08	0.00
20.5000	-4.55E-06	-490913.	30857.	3.30E-06	0.00	1.16E+12	508.7456	3.35E+08	0.00
20.7500	3.42E-06	-396058.	31030.	2.14E-06	0.00	1.16E+12	-393.271	3.45E+08	0.00
21.0000	8.31E-06	-304740.	28965.	1.24E-06	0.00	1.16E+12	-983.215	3.55E+08	0.00
21.2500	1.08E-05	-222269.	25515.	5.52E-07	0.00	1.16E+12	-1317.	3.65E+08	0.00
21.5000	1.16E-05	-151652.	21362.	6.75E-08	0.00	1.16E+12	-1452.	3.74E+08	0.00
21.7500	1.12E-05	-94098.	17024.	-2.51E-07	0.00	1.16E+12	-1440.	3.84E+08	0.00
22.0000	1.01E-05	-49505.	12869.	-4.37E-07	0.00	1.16E+12	-1330.	3.94E+08	0.00
22.2500	8.62E-06	-16882.	9133.	-5.24E-07	0.00	1.16E+12	-1161.	4.04E+08	0.00
22.5000	6.98E-06	5297.	5948.	-5.39E-07	0.00	1.16E+12	-963.066	4.14E+08	0.00
22.7500	5.39E-06	18808.	3362.	-5.07E-07	0.00	1.16E+12	-760.680	4.24E+08	0.00
23.0000	3.94E-06	25473.	1368.	-4.50E-07	0.00	1.16E+12	-568.968	4.34E+08	0.00
23.2500	2.69E-06	27017.	-81.153	-3.82E-07	0.00	1.16E+12	-397.040	4.43E+08	0.00
23.5000	1.65E-06	24987.	-1050.	-3.14E-07	0.00	1.16E+12	-248.664	4.53E+08	0.00
23.7500	8.00E-07	20720.	-1608.	-2.55E-07	0.00	1.16E+12	-123.474	4.63E+08	0.00
24.0000	1.15E-07	15341.	-1820.	-2.08E-07	0.00	1.16E+12	-18.150	4.73E+08	0.00
24.2500	-4.50E-07	9799.	-1739.	-1.76E-07	0.00	1.16E+12	72.4570	4.83E+08	0.00
24.5000	-9.39E-07	4908.	-1399.	-1.57E-07	0.00	1.16E+12	154.2535	4.93E+08	0.00
24.7500	-1.39E-06	1406.	-818.146	-1.48E-07	0.00	1.16E+12	232.8638	5.03E+08	0.00
25.0000	-1.83E-06	0.00	0.00	-1.47E-07	0.00	1.16E+12	312.5667	2.56E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 1:

Pile-head deflection = 0.40204030 inches
 Computed slope at pile head = -0.0030828 radians
 Maximum bending moment = 15856549. inch-lbs
 Maximum shear force = -594688. lbs
 Depth of maximum bending moment = 15.00000000 feet below pile head

MEG-33 rear abutment X direction row 2

Depth of maximum shear force = 16.75000000 feet below pile head
 Number of iterations = 43
 Number of zero deflection points = 3

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 2

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 131500.0 lbs
 Applied moment at pile head = 10492800.0 in-lbs
 Axial thrust load on pile head = 852300.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	0.8873	1.05E+07	131500.	-0.00669	0.00	1.81E+12	0.00	0.00	0.00
0.2500	0.8673	1.09E+07	130771.	-0.00667	0.00	1.81E+12	-485.973	1681.	0.00
0.5000	0.8473	1.13E+07	129307.	-0.00665	0.00	1.81E+12	-489.980	1735.	0.00
0.7500	0.8274	1.17E+07	127831.	-0.00663	0.00	1.81E+12	-493.864	1791.	0.00
1.0000	0.8075	1.21E+07	126344.	-0.00661	0.00	1.81E+12	-497.622	1849.	0.00
1.2500	0.7877	1.25E+07	124846.	-0.00659	0.00	1.81E+12	-501.250	1909.	0.00
1.5000	0.7679	1.29E+07	123337.	-0.00657	0.00	1.81E+12	-504.744	1972.	0.00
1.7500	0.7482	1.33E+07	121818.	-0.00655	0.00	1.81E+12	-508.100	2037.	0.00
2.0000	0.7286	1.37E+07	120288.	-0.00652	0.00	1.40E+12	-511.315	2105.	0.00
2.2500	0.7091	1.40E+07	118750.	-0.00649	0.00	1.11E+12	-514.389	2176.	0.00
2.5000	0.6897	1.44E+07	117202.	-0.00645	0.00	1.08E+12	-517.320	2250.	0.00
2.7500	0.6704	1.48E+07	115646.	-0.00641	0.00	1.04E+12	-520.107	2327.	0.00
3.0000	0.6512	1.51E+07	114082.	-0.00637	0.00	1.01E+12	-522.745	2408.	0.00
3.2500	0.6322	1.55E+07	112510.	-0.00632	0.00	9.85E+11	-525.233	2492.	0.00
3.5000	0.6133	1.58E+07	110931.	-0.00627	0.00	9.58E+11	-527.566	2581.	0.00
3.7500	0.5946	1.62E+07	109345.	-0.00622	0.00	9.33E+11	-529.741	2673.	0.00
4.0000	0.5760	1.65E+07	107753.	-0.00617	0.00	9.10E+11	-531.755	2770.	0.00
4.2500	0.5576	1.69E+07	106154.	-0.00611	0.00	8.87E+11	-533.604	2871.	0.00
4.5000	0.5393	1.72E+07	104551.	-0.00605	0.00	8.67E+11	-535.285	2978.	0.00

MEG-33 rear abutment X direction row 2

4.7500	0.5212	1.75E+07	102943.	-0.00599	0.00	8.48E+11	-536.793	3090.	0.00
5.0000	0.5033	1.78E+07	101331.	-0.00593	0.00	8.30E+11	-538.125	3207.	0.00
5.2500	0.4857	1.82E+07	99715.	-0.00586	0.00	8.13E+11	-539.277	3331.	0.00
5.5000	0.4682	1.85E+07	98095.	-0.00580	0.00	7.97E+11	-540.244	3462.	0.00
5.7500	0.4509	1.88E+07	96473.	-0.00573	0.00	7.82E+11	-541.022	3600.	0.00
6.0000	0.4338	1.91E+07	94849.	-0.00565	0.00	7.68E+11	-541.607	3745.	0.00
6.2500	0.4170	1.94E+07	93224.	-0.00558	0.00	7.55E+11	-541.993	3900.	0.00
6.5000	0.4004	1.97E+07	91598.	-0.00550	0.00	7.43E+11	-542.176	4063.	0.00
6.7500	0.3840	2.00E+07	89971.	-0.00542	0.00	7.32E+11	-542.150	4236.	0.00
7.0000	0.3678	2.02E+07	88345.	-0.00533	0.00	7.21E+11	-541.910	4420.	0.00
7.2500	0.3520	2.05E+07	86720.	-0.00525	0.00	7.11E+11	-541.450	4615.	0.00
7.5000	0.3364	2.08E+07	85097.	-0.00516	0.00	7.01E+11	-540.764	4823.	0.00
7.7500	0.3210	2.10E+07	83476.	-0.00507	0.00	6.92E+11	-539.846	5045.	0.00
8.0000	0.3059	2.13E+07	81858.	-0.00498	0.00	6.83E+11	-538.688	5283.	0.00
8.2500	0.2911	2.16E+07	80244.	-0.00488	0.00	6.75E+11	-537.284	5537.	0.00
8.5000	0.2766	2.18E+07	78635.	-0.00479	0.00	6.68E+11	-535.625	5809.	0.00
8.7500	0.2624	2.21E+07	77031.	-0.00469	0.00	6.60E+11	-533.704	6102.	0.00
9.0000	0.2485	2.23E+07	75433.	-0.00459	0.00	6.54E+11	-531.511	6417.	0.00
9.2500	0.2349	2.25E+07	73842.	-0.00448	0.00	6.47E+11	-529.038	6757.	0.00
9.5000	0.2216	2.28E+07	72259.	-0.00438	0.00	6.41E+11	-526.275	7125.	0.00
9.7500	0.2086	2.30E+07	70685.	-0.00427	0.00	6.35E+11	-523.209	7524.	0.00
10.0000	0.1960	2.32E+07	69120.	-0.00416	0.00	6.30E+11	-519.830	7958.	0.00
10.2500	0.1837	2.34E+07	67566.	-0.00405	0.00	6.24E+11	-516.125	8431.	0.00
10.5000	0.1717	2.36E+07	66024.	-0.00394	0.00	6.19E+11	-512.079	8948.	0.00
10.7500	0.1600	2.38E+07	64495.	-0.00382	0.00	6.15E+11	-507.678	9516.	0.00
11.0000	0.1488	2.40E+07	62979.	-0.00370	0.00	6.10E+11	-502.903	10142.	0.00
11.2500	0.1378	2.42E+07	61478.	-0.00358	0.00	6.06E+11	-497.738	10834.	0.00
11.5000	0.1273	2.44E+07	59993.	-0.00346	0.00	6.02E+11	-492.161	11602.	0.00
11.7500	0.1171	2.46E+07	58525.	-0.00334	0.00	5.98E+11	-486.148	12459.	0.00
12.0000	0.1072	2.48E+07	57077.	-0.00322	0.00	5.94E+11	-479.674	13421.	0.00
12.2500	0.09776	2.50E+07	55648.	-0.00309	0.00	5.90E+11	-472.708	14506.	0.00
12.5000	0.08868	2.52E+07	54241.	-0.00296	0.00	5.87E+11	-465.217	15737.	0.00
12.7500	0.07999	2.53E+07	52858.	-0.00283	0.00	5.84E+11	-457.160	17145.	0.00
13.0000	0.07169	2.55E+07	51499.	-0.00270	0.00	5.81E+11	-448.492	18768.	0.00
13.2500	0.06378	2.56E+07	50168.	-0.00257	0.00	5.78E+11	-439.158	20655.	0.00
13.5000	0.05628	2.58E+07	48865.	-0.00244	0.00	5.75E+11	-429.092	22874.	0.00
13.7500	0.04917	2.59E+07	47594.	-0.00230	0.00	5.72E+11	-418.213	25514.	0.00
14.0000	0.04248	2.61E+07	46357.	-0.00216	0.00	5.70E+11	-406.420	28703.	0.00
14.2500	0.03620	2.62E+07	45157.	-0.00202	0.00	5.67E+11	-393.585	32621.	0.00
14.5000	0.03033	2.64E+07	43998.	-0.00189	0.00	5.65E+11	-379.536	37541.	0.00

MEG-33 rear abutment X direction row 2

14.7500	0.02488	2.65E+07	42882.	-0.00174	0.00	5.63E+11	-364.042	43890.	0.00
15.0000	0.01986	2.66E+07	10585.	-0.00160	0.00	5.60E+11	-21168.	3197324.	0.00
15.2500	0.01527	2.66E+07	-79991.	-0.00141	0.00	3.40E+11	-39216.	7705956.	0.00
15.5000	0.01138	2.62E+07	-197865.	-0.00118	0.00	3.50E+11	-39367.	1.04E+07	0.00
15.7500	0.00816	2.54E+07	-315302.	-9.69E-04	0.00	3.66E+11	-38925.	1.43E+07	0.00
16.0000	0.00556	2.43E+07	-430428.	-7.69E-04	0.00	3.79E+11	-37826.	2.04E+07	0.00
16.2500	0.00355	2.28E+07	-541150.	-5.86E-04	0.00	3.97E+11	-35989.	3.04E+07	0.00
16.5000	0.00205	2.10E+07	-645049.	-4.25E-04	0.00	4.23E+11	-33277.	4.88E+07	0.00
16.7500	9.94E-04	1.90E+07	-788061.	-2.89E-04	0.00	4.63E+11	-62064.	1.87E+08	0.00
17.0000	3.11E-04	1.63E+07	-911762.	-1.82E-04	0.00	5.35E+11	-20403.	1.97E+08	0.00
17.2500	-9.89E-05	1.35E+07	-932138.	-1.06E-04	0.00	6.57E+11	6819.	2.07E+08	0.00
17.5000	-3.23E-04	1.07E+07	-886840.	-5.58E-05	0.00	8.41E+11	23379.	2.17E+08	0.00
17.7500	-4.33E-04	8164454.	-802652.	-2.59E-05	0.00	1.14E+12	32747.	2.27E+08	0.00
18.0000	-4.79E-04	5903896.	-696912.	-7.35E-06	0.00	1.14E+12	37746.	2.37E+08	0.00
18.2500	-4.78E-04	3983017.	-581468.	5.66E-06	0.00	1.14E+12	39217.	2.46E+08	0.00
18.5000	-4.45E-04	2415060.	-465652.	1.41E-05	0.00	1.14E+12	37994.	2.56E+08	0.00
18.7500	-3.93E-04	1189033.	-356361.	1.88E-05	0.00	1.14E+12	34866.	2.66E+08	0.00
19.0000	-3.32E-04	276795.	-258258.	2.07E-05	0.00	1.14E+12	30536.	2.76E+08	0.00
19.2500	-2.69E-04	-360623.	-174061.	2.06E-05	0.00	1.14E+12	25596.	2.86E+08	0.00
19.5000	-2.08E-04	-767677.	-104887.	1.91E-05	0.00	1.14E+12	20520.	2.96E+08	0.00
19.7500	-1.54E-04	-990045.	-50611.	1.68E-05	0.00	1.14E+12	15664.	3.06E+08	0.00
20.0000	-1.07E-04	-1071431.	-10208.	1.41E-05	0.00	1.14E+12	11272.	3.15E+08	0.00
20.2500	-6.91E-05	-1051363.	17935.	1.13E-05	0.00	1.14E+12	7490.	3.25E+08	0.00
20.5000	-3.93E-05	-963879.	35746.	8.68E-06	0.00	1.14E+12	4384.	3.35E+08	0.00
20.7500	-1.70E-05	-836934.	45256.	6.31E-06	0.00	1.14E+12	1956.	3.45E+08	0.00
21.0000	-1.38E-06	-692376.	48435.	4.30E-06	0.00	1.14E+12	163.5065	3.55E+08	0.00
21.2500	8.79E-06	-546343.	47079.	2.67E-06	0.00	1.14E+12	-1068.	3.65E+08	0.00
21.5000	1.46E-05	-409918.	42735.	1.41E-06	0.00	1.14E+12	-1828.	3.74E+08	0.00
21.7500	1.73E-05	-289943.	36674.	4.93E-07	0.00	1.14E+12	-2212.	3.84E+08	0.00
22.0000	1.76E-05	-189878.	29885.	-1.38E-07	0.00	1.14E+12	-2313.	3.94E+08	0.00
22.2500	1.64E-05	-110633.	23092.	-5.33E-07	0.00	1.14E+12	-2215.	4.04E+08	0.00
22.5000	1.44E-05	-51321.	16788.	-7.46E-07	0.00	1.14E+12	-1988.	4.14E+08	0.00
22.7500	1.20E-05	-9901.	11270.	-8.26E-07	0.00	1.14E+12	-1691.	4.24E+08	0.00
23.0000	9.45E-06	16302.	6684.	-8.18E-07	0.00	1.14E+12	-1366.	4.34E+08	0.00
23.2500	7.06E-06	30207.	3068.	-7.57E-07	0.00	1.14E+12	-1044.	4.43E+08	0.00
23.5000	4.91E-06	34715.	388.2597	-6.71E-07	0.00	1.14E+12	-742.422	4.53E+08	0.00
23.7500	3.04E-06	32540.	-1429.	-5.83E-07	0.00	1.14E+12	-468.805	4.63E+08	0.00
24.0000	1.42E-06	26146.	-2467.	-5.06E-07	0.00	1.14E+12	-223.343	4.73E+08	0.00
24.2500	2.75E-09	17742.	-2802.	-4.48E-07	0.00	1.14E+12	-0.443	4.83E+08	0.00
24.5000	-1.27E-06	9334.	-2490.	-4.12E-07	0.00	1.14E+12	208.7516	4.93E+08	0.00

MEG-33 rear abutment X direction row 2

24.7500	-2.47E-06	2804.	-1556.	-3.96E-07	0.00	1.14E+12	413.9768	5.03E+08	0.00
25.0000	-3.65E-06	0.00	0.00	-3.93E-07	0.00	1.14E+12	623.3071	2.56E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 2:

Pile-head deflection = 0.88729747 inches
 Computed slope at pile head = -0.0066876 radians
 Maximum bending moment = 26642318. inch-lbs
 Maximum shear force = -932138. lbs
 Depth of maximum bending moment = 15.00000000 feet below pile head
 Depth of maximum shear force = 17.25000000 feet below pile head
 Number of iterations = 38
 Number of zero deflection points = 3

 Summary of Pile-head Responses for Conventional Analyses

Definitions of Pile-head Loading Conditions:

Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs
 Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
 Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.
 Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs
 Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians

Load Case No.	Load Type 1	Load Type 2	Load Type 3	Load Type 4	Load Type 5	Axial Loading lbs	Pile-head Deflection inches	Pile-head Rotation radians	Max Shear in Pile lbs	Max Moment in Pile in-lbs
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MEG-33 rear abutment X direction row 2

1	V, lb	86000.	M, in-lb	6859680.	637400.	0.4020	-0.00308	-594688.	1.59E+07
2	V, lb	131500.	M, in-lb	1.05E+07	852300.	0.8873	-0.00669	-932138.	2.66E+07

Maximum pile-head deflection = 0.8872974679 inches
Maximum pile-head rotation = -0.0066875749 radians = -0.383170 deg.

Summary of Warning Messages

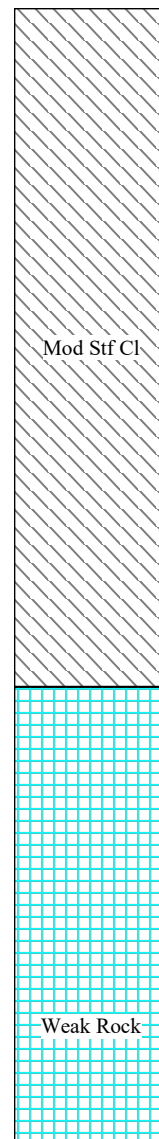
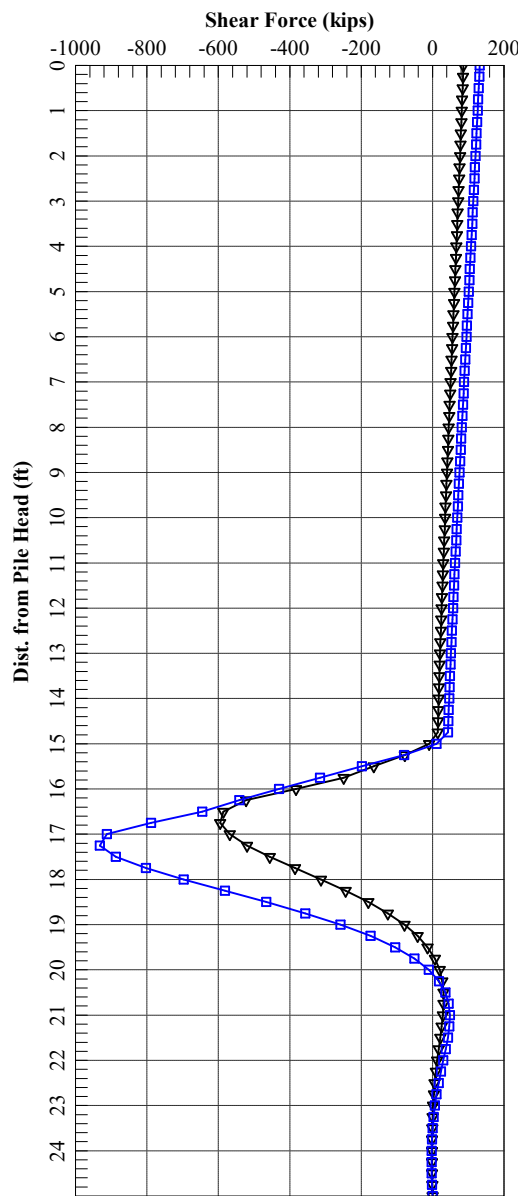
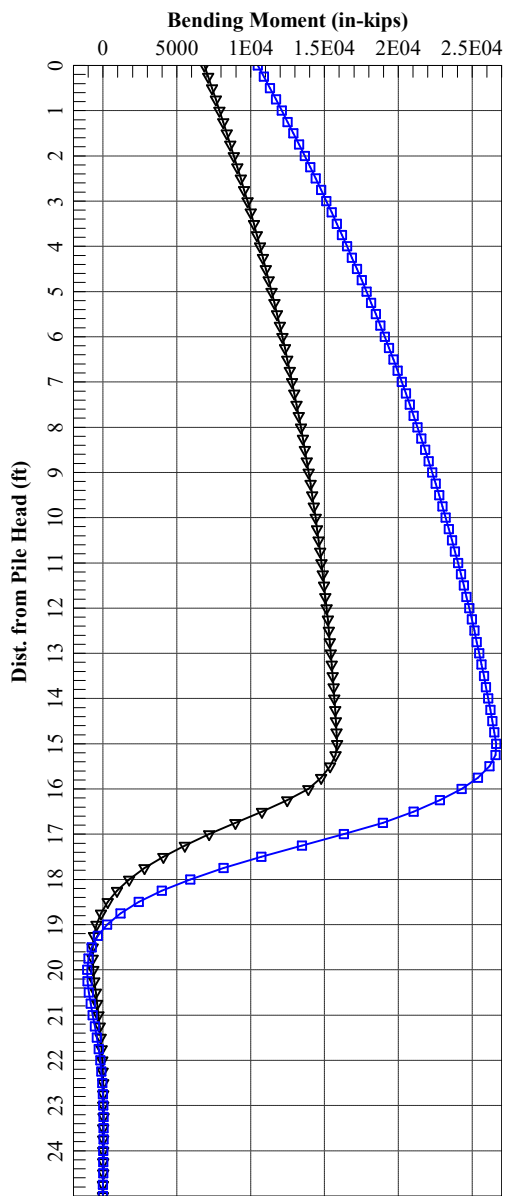
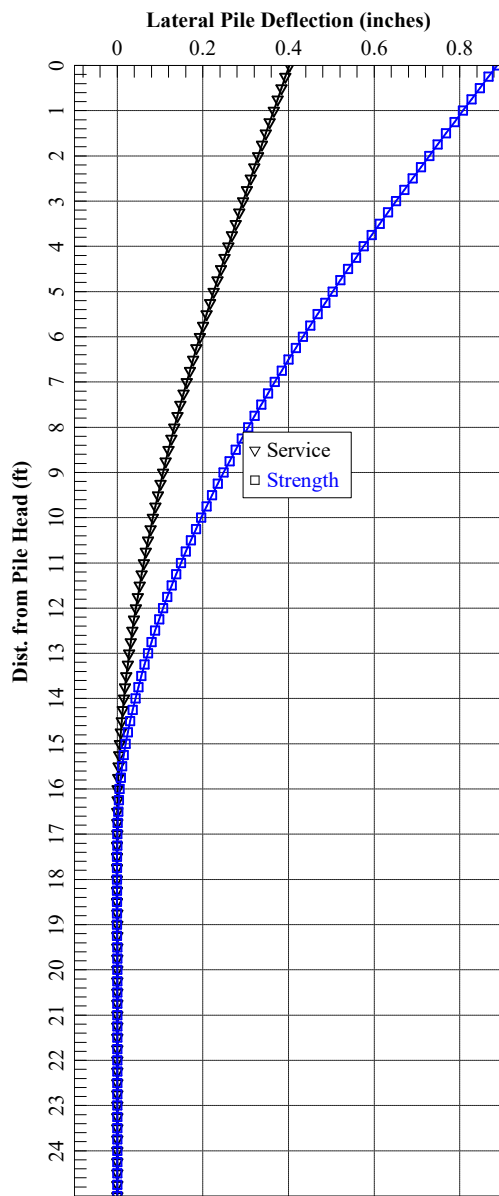
The following warning was reported 1560 times

**** Warning ****

An unreasonable input value for unconfined compressive strength has been specified for a soil defined using the weak rock criteria. The input value is greater than 500 psi. Please check your input data for correctness.

The analysis ended normally.

MEG-33 Bridge 3 Rear Abutment X-Direction Row 2



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LPile for Windows, Version 2022-12.006

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method
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Files Used for Analysis

Path to file locations:

\\US0247-PPFSS01\shared_projects\173609140\119144\400-Engineering\Geotechnical\Analysis\Lpile\bridges\LPile
Analysis\Bridge 3\rear abutment\

Name of input data file:

MEG-33 rear abutment X direction row 3.lp12d

Name of output report file:

MEG-33 rear abutment X direction row 3.lp12o

Name of plot output file:

MEG-33 rear abutment X direction row 3.lp12p

Name of runtime message file:

MEG-33 rear abutment X direction row 3.lp12r

Date and Time of Analysis

Date: September 16, 2024

Time: 9:49:24

Problem Title

Project Name: MEG-33-19.21

Job Number: 173609140

Client: ODOT

Engineer: G. Khatri

Description: Forward Abutment Lateral Load Analysis at Brdige 3

MEG-33 rear abutment X direction row 3
Program Options and Settings

Computational Options:

- Conventional Analysis

Engineering Units Used for Data Input and Computations:

- US Customary System Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed = 500
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 100.0000 in
- Number of pile increments = 100

Loading Type and Number of Cycles of Loading:

- Static loading specified

- Analysis uses p-y modification factors for p-y curves
- Analysis uses layering correction (Method of Georgiadis)
- No distributed lateral loads are entered
- Loading by lateral soil movements acting on pile not selected
- Input of shear resistance at the pile tip not selected
- Input of moment resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:

- Output files use decimal points to denote decimal symbols.
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1
- No p-y curves to be computed and reported for user-specified depths
- Print using wide report formats

Number of pile sections defined = 2
 Total length of pile = 25.000 ft
 Depth of ground surface below top of pile = 0.0000 ft

Pile diameters used for p-y curve computations are defined using 4 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile. A summary of values of pile diameter vs. depth follows.

Point No.	Depth Below Pile Head feet	Pile Diameter inches
1	0.000	54.0000
2	15.000	54.0000
3	15.000	48.0000
4	25.000	48.0000

Input Structural Properties for Pile Sections:

Pile Section No. 1:

Section 1 is a round drilled shaft, bored pile, or CIDH pile
 Length of section = 15.000000 ft
 Shaft Diameter = 54.000000 in

Pile Section No. 2:

Section 2 is a round drilled shaft, bored pile, or CIDH pile
 Length of section = 10.000000 ft
 Shaft Diameter = 48.000000 in

Soil and Rock Layering Information

The soil profile is modelled using 2 layers

Layer 1 is stiff clay with user-defined k-value

Distance from top of pile to top of layer	=	0.0000	ft
Distance from top of pile to bottom of layer	=	15.000000	ft
Effective unit weight at top of layer	=	122.000000	pcf
Effective unit weight at bottom of layer	=	122.000000	pcf
Undrained cohesion at top of layer	=	2000.	psf
Undrained cohesion at bottom of layer	=	2000.	psf
Epsilon-50 at top of layer	=	0.0000	
Epsilon-50 at bottom of layer	=	0.0000	
Subgrade k at top of layer	=	0.0000	pci
Subgrade k at bottom of layer	=	0.0000	pci

NOTE: Default values for Epsilon-50 will be computed for this layer.

NOTE: Default values for subgrade k will be computed for this layer.

Layer 2 is weak rock, p-y criteria by Reese, 1997

Distance from top of pile to top of layer	=	15.000000	ft
Distance from top of pile to bottom of layer	=	30.000000	ft
Effective unit weight at top of layer	=	87.600000	pcf
Effective unit weight at bottom of layer	=	87.600000	pcf
Uniaxial compressive strength at top of layer	=	4380.	psi
Uniaxial compressive strength at bottom of layer	=	4380.	psi
Initial modulus of rock at top of layer	=	394200.	psi
Initial modulus of rock at bottom of layer	=	394200.	psi
RQD of rock at top of layer	=	69.000000	%
RQD of rock at bottom of layer	=	69.000000	%
k _{rm} of rock at top of layer	=	0.0000500	
k _{rm} of rock at bottom of layer	=	0.0000500	

(Depth of the lowest soil layer extends 5.000 ft below the pile tip)

MEG-33 rear abutment X direction row 3

Summary of Input Soil Properties

Layer Rock Mass Num.	Soil Type Name (p-y Curve Type) Modulus psi	Layer Depth ft	Effective Unit Wt. pcf	Cohesion psf	Uniaxial qu psi	RQD %	E50 or krm	kpy pci
1	Stiff Clay w/o	0.00	122.0000	2000.	--	--	default	default
--	Free Water, using k	15.0000	122.0000	2000.	--	--	default	default
2	Weak 394200.	15.0000	87.6000	--	4380.	69.0000	5.00E-05	--
	Rock 394200.	30.0000	87.6000	--	4380.	69.0000	5.00E-05	--

Modification Factors for p-y Curves

Distribution of p-y modifiers with depth defined using 3 points

Point No.	Depth X ft	p-mult	y-mult
1	0.000	0.3000	1.0000
2	15.000	0.3000	1.0000
3	25.000	0.3000	1.0000

Static Loading Type

 Static loading criteria were used when computing p-y curves for all analyses.

 Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 2

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length	Run Analysis
1	1	V = 86000. lbs	M = 6859680. in-lbs	637400.	No	Yes
2	1	V = 131500. lbs	M = 10492800. in-lbs	852300.	No	Yes

V = shear force applied normal to pile axis

M = bending moment applied to pile head

y = lateral deflection normal to pile axis

S = pile slope relative to original pile batter angle

R = rotational stiffness applied to pile head

Values of top y vs. pile lengths can be computed only for load types with specified shear loading (Load Types 1, 2, and 3).

Thrust force is assumed to be acting axially for all pile batter angles.

 Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 2

Pile Section No. 1:

MEG-33 rear abutment X direction row 3

Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section	=	15.000000	ft
Shaft Diameter	=	54.000000	in
Concrete Cover Thickness (to edge of trans. reinf.)	=	3.000000	in
Number of Reinforcing Bars	=	20	bars
Yield Stress of Reinforcing Bars	=	50000.	psi
Modulus of Elasticity of Reinforcing Bars	=	29000000.	psi
Gross Area of Shaft	=	2290.	sq. in.
Total Area of Reinforcing Steel	=	20.000000	sq. in.
Area Ratio of Steel Reinforcement	=	0.87	percent
Edge-to-Edge Bar Spacing	=	6.008853	in
Maximum Concrete Aggregate Size	=	0.750000	in
Ratio of Bar Spacing to Aggregate Size	=	8.01	
Offset of Center of Rebar Cage from Center of Pile	=	0.0000	in
Transverse Reinforcement			
Type: Spiral			
Number of Transverse Reinf. (per spacing)	=	1	
Spacing of Transverse Reinf.	=	3.750000	in
Yield Stress of Transverse Reinf.	=	50000.	psi
Diameter of Transverse Reinf.	=	0.625000	in

Axial Structural Capacities:

Nom. Axial Structural Capacity = $0.85 F_c A_c + F_y A_s$	=	8718.752	kips
Tensile Load for Cracking of Concrete	=	-1011.121	kips
Nominal Axial Tensile Capacity	=	-1000.000	kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
-----	-----	-----	-----	-----
1	1.128000	1.000000	22.811000	0.000000
2	1.128000	1.000000	21.694550	7.048987
3	1.128000	1.000000	18.454487	13.407969
4	1.128000	1.000000	13.407969	18.454487

MEG-33 rear abutment X direction row 3

5	1.128000	1.000000	7.048987	21.694550
6	1.128000	1.000000	0.000000	22.811000
7	1.128000	1.000000	-7.04899	21.694550
8	1.128000	1.000000	-13.40797	18.454487
9	1.128000	1.000000	-18.45449	13.407969
10	1.128000	1.000000	-21.69455	7.048987
11	1.128000	1.000000	-22.81100	0.000000
12	1.128000	1.000000	-21.69455	-7.04899
13	1.128000	1.000000	-18.45449	-13.40797
14	1.128000	1.000000	-13.40797	-18.45449
15	1.128000	1.000000	-7.04899	-21.69455
16	1.128000	1.000000	0.000000	-22.81100
17	1.128000	1.000000	7.048987	-21.69455
18	1.128000	1.000000	13.407969	-18.45449
19	1.128000	1.000000	18.454487	-13.40797
20	1.128000	1.000000	21.694550	-7.04899

NOTE: The positions of the above rebars were computed by LPILE

Minimum spacing between any two bars not equal to zero = 6.009 inches
between bars 12 and 13.

Ratio of bar spacing to maximum aggregate size = 8.01

Concrete Properties:

Compressive Strength of Concrete	=	4000. psi
Modulus of Elasticity of Concrete	=	3604997. psi
Modulus of Rupture of Concrete	=	-474.34165 psi
Compression Strain at Peak Stress	=	0.001886
Tensile Strain at Fracture of Concrete	=	-0.0001154
Maximum Coarse Aggregate Size	=	0.750000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 2

Number Axial Thrust Force

MEG-33 rear abutment X direction row 3

 kips

1 637.400
 2 852.300

Definitions of Run Messages and Notes:

- C = concrete in section has cracked in tension.
- Y = stress in reinforcing steel has reached yield stress.
- T = ACI 318 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than 0.003. See ACI 318-14, Section 21.2.3.
- Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
 Position of neutral axis is measured from edge of compression side of pile.
 Compressive stresses and strains are positive in sign.
 Tensile stresses and strains are negative in sign.

Axial Thrust Force = 637.400 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in ²	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	1150.	1840433855.	128.5415643	0.00008034	0.00004659	0.3327881	2.2661971	
0.00000125	2300.	1840387479.	77.8147435	0.00009727	0.00002977	0.4005380	2.6935470	
0.00000188	3451.	1840304104.	60.9253415	0.0001142	0.00001299	0.4678024	3.1219592	
0.00000250	4600.	1840184601.	52.4952908	0.0001312	-0.00000376	0.5345768	3.5514336	
0.00000313	5749.	1839762091.	47.4478771	0.0001483	-0.00002048	0.6008438	3.9818701	
0.00000375	6895.	1838549162.	44.0889593	0.0001653	-0.00003717	0.6665585	4.4129618	
0.00000438	8035.	1836542828.	41.6931059	0.0001824	-0.00005384	0.7316884	4.8444816	
0.00000500	9169.	1833894124.	39.8982570	0.0001995	-0.00007051	0.7962145	5.2762973	
0.00000563	10298.	1830751404.	38.5036057	0.0002166	-0.00008717	0.8601255	5.7083319	
0.00000625	11420.	1827230225.	37.3888269	0.0002337	-0.000104	0.9234146	6.1405374	
0.00000688	11420.	1661118386.	33.6719402	0.0002315	-0.000140	0.9146513	6.0135368	C

MEG-33 rear abutment X direction row 3

0.00000750	11420.	1522691854.	32.5159436	0.0002439	-0.000161	0.9599502	6.3087928	C
0.00000813	11420.	1405561712.	31.5019784	0.0002560	-0.000183	1.0038460	6.5956099	C
0.00000875	11420.	1305164447.	30.6027385	0.0002678	-0.000205	1.0464620	6.8747824	C
0.00000938	11420.	1218153483.	29.7983706	0.0002794	-0.000227	1.0879237	7.1471508	C
0.00001000	11420.	1142018891.	29.0743057	0.0002907	-0.000249	1.1283650	7.4136487	C
0.00001063	11420.	1074841309.	28.4188309	0.0003020	-0.000272	1.1678943	7.6750336	C
0.00001125	11454.	1018113289.	27.8214082	0.0003130	-0.000295	1.2065604	7.9315968	C
0.00001188	11735.	988209535.	27.2738257	0.0003239	-0.000317	1.2444154	8.1836675	C
0.00001250	12008.	960666512.	26.7700294	0.0003346	-0.000340	1.2815327	-8.598489	C
0.00001313	12275.	935232741.	26.3048345	0.0003453	-0.000363	1.3179708	-9.205479	C
0.00001375	12536.	911685499.	25.8738284	0.0003558	-0.000387	1.3537787	-9.815698	C
0.00001438	12792.	889848305.	25.4737344	0.0003662	-0.000410	1.3890226	-10.428656	C
0.00001500	13044.	869571129.	25.1019788	0.0003765	-0.000433	1.4237748	-11.043789	C
0.00001563	13290.	850534738.	24.7514725	0.0003867	-0.000457	1.4578456	-11.662770	C
0.00001625	13533.	832797249.	24.4245412	0.0003969	-0.000481	1.4915048	-12.283347	C
0.00001688	13773.	816181922.	24.1176681	0.0004070	-0.000504	1.5247055	-12.905960	C
0.00001750	14009.	800540988.	23.8275688	0.0004170	-0.000528	1.5573865	-13.531184	C
0.00001813	14244.	785882184.	23.5556124	0.0004269	-0.000552	1.5897392	-14.157387	C
0.00001875	14475.	772007217.	23.2966976	0.0004368	-0.000576	1.6215641	-14.786358	C
0.00001938	14705.	758955262.	23.0531095	0.0004467	-0.000600	1.6530909	-15.416103	C
0.00002000	14932.	746592597.	22.8213696	0.0004564	-0.000624	1.6841894	-16.047806	C
0.00002063	15157.	734878944.	22.6011298	0.0004661	-0.000648	1.7149122	-16.681031	C
0.00002125	15381.	723828686.	22.3937369	0.0004759	-0.000672	1.7454226	-17.314322	C
0.00002188	15602.	713243577.	22.1929288	0.0004855	-0.000696	1.7753635	-17.950955	C
0.00002250	15823.	703235481.	22.0036305	0.0004951	-0.000720	1.8051293	-18.587357	C
0.00002313	16042.	693721041.	21.8234544	0.0005047	-0.000744	1.8346146	-19.224502	C
0.00002375	16259.	684594452.	21.6490102	0.0005142	-0.000768	1.8636243	-19.864232	C
0.00002438	16476.	675926034.	21.4838307	0.0005237	-0.000793	1.8924623	-20.503736	C
0.00002563	16905.	659714156.	21.1735075	0.0005426	-0.000841	1.9492286	-21.785818	C
0.00002688	17331.	644869291.	20.8885492	0.0005614	-0.000890	2.0049379	-23.070631	C
0.00002813	17752.	631196975.	20.6244947	0.0005801	-0.000939	2.0595125	-24.359053	C
0.00002938	18171.	618593311.	20.3808368	0.0005987	-0.000988	2.1131525	-25.649244	C
0.00003063	18587.	606930386.	20.1548892	0.0006172	-0.001037	2.1658491	-26.941370	C
0.00003188	19000.	596077772.	19.9434590	0.0006357	-0.001086	2.2175101	-28.236459	C
0.00003313	19412.	586017612.	19.7488842	0.0006542	-0.001135	2.2685162	-29.530685	C
0.00003438	19820.	576581590.	19.5643345	0.0006725	-0.001184	2.3183920	-30.829023	C
0.00003563	20227.	567762629.	19.3922858	0.0006909	-0.001233	2.3674955	-32.127826	C
0.00003688	20632.	559518171.	19.2327079	0.0007092	-0.001282	2.4159507	-33.425767	C
0.00003813	21035.	551744783.	19.0811058	0.0007275	-0.001331	2.4634266	-34.726459	C
0.00003938	21436.	544411461.	18.9376461	0.0007457	-0.001381	2.5100290	-36.028844	C

MEG-33 rear abutment X direction row 3

0.00004063	21836.	537508664.	18.8037500	0.0007639	-0.001430	2.5559899	-37.330363	C
0.00004188	22236.	530997678.	18.6785660	0.0007822	-0.001479	2.6013063	-38.631010	C
0.00004313	22632.	524810807.	18.5586017	0.0008003	-0.001528	2.6456833	-39.934205	C
0.00004438	23028.	518931429.	18.4442549	0.0008185	-0.001578	2.6892221	-41.238868	C
0.00004563	23422.	513355955.	18.3368406	0.0008366	-0.001627	2.7321222	-42.542649	C
0.00004688	23815.	508059932.	18.2358089	0.0008548	-0.001676	2.7743804	-43.845541	C
0.00004813	24208.	503021447.	18.1406671	0.0008730	-0.001726	2.8159937	-45.147538	C
0.00004938	24599.	498204277.	18.0493425	0.0008912	-0.001775	2.8567764	-46.450966	C
0.00005063	24988.	493588186.	17.9611410	0.0009093	-0.001824	2.8966879	-47.756431	C
0.00005188	25376.	489178528.	17.8777976	0.0009274	-0.001874	2.9359593	-49.060982	C
0.00005313	25762.	484940090.	17.7987684	0.0009456	-0.001923	2.9745637	-50.000000	CY
0.00005438	26129.	480527690.	17.7203594	0.0009635	-0.001973	3.0121095	-50.000000	CY
0.00005563	26450.	475502428.	17.6377331	0.0009811	-0.002023	3.0480644	-50.000000	CY
0.00005688	26715.	469710750.	17.5488267	0.0009981	-0.002073	3.0822078	-50.000000	CY
0.00005813	26963.	463884725.	17.4578090	0.0010147	-0.002124	3.1150397	-50.000000	CY
0.00005938	27211.	458294473.	17.3710721	0.0010314	-0.002175	3.1473257	-50.000000	CY
0.00006063	27456.	452878016.	17.2877850	0.0010481	-0.002226	3.1789969	-50.000000	CY
0.00006188	27661.	447047466.	17.2006506	0.0010643	-0.002277	3.2092275	-50.000000	CY
0.00006313	27831.	440888936.	17.1105031	0.0010801	-0.002329	3.2381359	-50.000000	CY
0.00006438	28001.	434962757.	17.0242307	0.0010959	-0.002380	3.2665498	-50.000000	CY
0.00006563	28168.	429220001.	16.9382578	0.0011116	-0.002432	3.2940745	-50.000000	CY
0.00006688	28334.	423678540.	16.8551839	0.0011272	-0.002484	3.3210361	-50.000000	CY
0.00006813	28499.	418334267.	16.7755091	0.0011428	-0.002536	3.3475135	-50.000000	CY
0.00006938	28664.	413176478.	16.6990517	0.0011585	-0.002588	3.3735047	-50.000000	CY
0.00007063	28829.	408195224.	16.6256428	0.0011742	-0.002640	3.3990074	-50.000000	CY
0.00007188	28982.	403232580.	16.5528537	0.0011897	-0.002692	3.4237565	-50.000000	CY
0.00007313	29112.	398109648.	16.4778664	0.0012049	-0.002744	3.4474451	-50.000000	CY
0.00007438	29217.	392836579.	16.3976732	0.0012196	-0.002797	3.4697495	-50.000000	CY
0.00007938	29625.	373232196.	16.1013472	0.0012780	-0.003008	3.5542813	-50.000000	CY
0.00008438	30025.	355850318.	15.8394290	0.0013365	-0.003220	3.6314003	-50.000000	CY
0.00008938	30413.	340284649.	15.6021947	0.0013944	-0.003432	3.7007204	-50.000000	CY
0.00009438	30747.	325795018.	15.3817131	0.0014516	-0.003645	3.7620082	-50.000000	CY
0.00009938	30966.	311603944.	15.1505835	0.0015056	-0.003861	3.8133042	-50.000000	CY
0.0001044	31181.	298739722.	14.9446438	0.0015598	-0.004076	3.8586352	-50.000000	CY
0.0001094	31388.	286978110.	14.7545209	0.0016138	-0.004292	3.8974486	-50.000000	CY
0.0001144	31588.	276175739.	14.5781214	0.0016674	-0.004509	3.9298600	-50.000000	CY
0.0001194	31784.	266249741.	14.4192337	0.0017213	-0.004725	3.9562787	-50.000000	CY
0.0001244	31974.	257079892.	14.2733469	0.0017752	-0.004941	3.9764920	-50.000000	CY
0.0001294	32156.	248550653.	14.1340926	0.0018286	-0.005158	3.9903592	-50.000000	CY
0.0001344	32307.	240420923.	13.9992019	0.0018811	-0.005375	3.9980723	-50.000000	CY

MEG-33 rear abutment X direction row 3

0.0001394	32410.	232535389.	13.8631348	0.0019322	-0.005594	3.9974064	-50.000000	CY
0.0001444	32501.	225115407.	13.7342956	0.0019829	-0.005813	3.9995355	-50.000000	CY
0.0001494	32585.	218139325.	13.6095744	0.0020329	-0.006033	3.9965996	-50.000000	CY
0.0001544	32666.	211599226.	13.4950062	0.0020833	-0.006253	3.9998543	-50.000000	CY
0.0001594	32744.	205451948.	13.3898452	0.0021340	-0.006472	3.9967842	-50.000000	CY
0.0001644	32820.	199665844.	13.2928625	0.0021850	-0.006691	3.9998401	-50.000000	CY
0.0001694	32892.	194197227.	13.2012721	0.0022360	-0.006910	3.9956943	-50.000000	CY
0.0001744	32959.	189012593.	13.1112567	0.0022863	-0.007130	3.9993671	-50.000000	CY
0.0001794	33024.	184106763.	13.0278755	0.0023369	-0.007349	3.9953840	-50.000000	CY
0.0001844	33087.	179455123.	12.9508410	0.0023878	-0.007568	3.9976156	50.000000	CY
0.0001894	33148.	175041253.	12.8792324	0.0024390	-0.007787	3.9998940	50.000000	CY
0.0001944	33208.	170844188.	12.8129435	0.0024905	-0.008006	3.9931583	50.000000	CY
0.0001994	33265.	166845444.	12.7519660	0.0025424	-0.008224	3.9978576	50.000000	CY
0.0002044	33319.	163026359.	12.6965378	0.0025949	-0.008441	3.9999135	50.000000	CY
0.0002094	33368.	159369650.	12.6403332	0.0026466	-0.008660	3.9920388	50.000000	CY
0.0002144	33416.	155877051.	12.5871105	0.0026984	-0.008878	3.9964583	50.000000	CY
0.0002194	33462.	152533036.	12.5384369	0.0027506	-0.009096	3.9993460	50.000000	CY
0.0002244	33501.	149310160.	12.4914202	0.0028028	-0.009313	3.9975630	50.000000	CY
0.0002294	33531.	146183800.	12.4434234	0.0028542	-0.009532	3.9918982	50.000000	CY
0.0002344	33560.	143188466.	12.3981397	0.0029058	-0.009750	3.9964444	50.000000	CY
0.0002394	33577.	140269130.	12.3506940	0.0029564	-0.009970	3.9990833	50.000000	CY
0.0002444	33587.	137441315.	12.3076112	0.0030077	-0.010189	3.9999999	50.000000	CYT
0.0002494	33596.	134721861.	12.2675631	0.0030592	-0.010407	3.9911205	50.000000	CYT
0.0002544	33605.	132106314.	12.2294342	0.0031109	-0.010625	3.9927415	50.000000	CYT
0.0002594	33612.	129589965.	12.1933004	0.0031626	-0.010844	3.9966941	50.000000	CYT
0.0002644	33620.	127167245.	12.1590717	0.0032146	-0.011062	3.9991211	50.000000	CYT
0.0002694	33624.	124822514.	12.1249030	0.0032661	-0.011280	3.9999954	50.000000	CYT
0.0002744	33626.	122554698.	12.0929101	0.0033180	-0.011498	3.9924197	50.000000	CYT
0.0003044	33630.	110488784.	11.9332098	0.0036322	-0.012804	3.9937002	50.000000	CYT
0.0003344	33630.	100575772.	11.8876146	0.0039749	-0.014081	3.9961808	50.000000	CYT

Axial Thrust Force = 852.300 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	1138.	1820164411.	163.5250119	0.0001022	0.00006845	0.4210411	2.9002721	
0.00000125	2275.	1820119032.	95.3069694	0.0001191	0.00005163	0.4879696	3.3276401	

MEG-33 rear abutment X direction row 3

0.00000188	3413.	1820035214.	72.5873833	0.0001361	0.00003485	0.5544122	3.7560827
0.00000250	4550.	1819916024.	61.2424135	0.0001531	0.00001811	0.6203648	4.1856000
0.00000313	5687.	1819762068.	54.4472925	0.0001701	0.00000140	0.6858231	4.6161921
0.00000375	6823.	1819508910.	49.9268372	0.0001872	-0.00001527	0.7507793	5.0478311
0.00000438	7957.	1818807611.	46.7045688	0.0002043	-0.00003192	0.8152023	5.4803109
0.00000500	9087.	1817485776.	44.2920643	0.0002215	-0.00004854	0.8790589	5.9133992
0.00000563	10213.	1815570393.	42.4184275	0.0002386	-0.00006515	0.9423263	6.3469372
0.00000625	11332.	1813144616.	40.9214146	0.0002558	-0.00008174	1.0049893	6.7808189
0.00000688	12446.	1810296023.	39.6979565	0.0002729	-0.00009833	1.0670378	7.2149739
0.00000750	13553.	1807101328.	38.6794461	0.0002901	-0.000115	1.1284648	7.6493544
0.00000813	13553.	1668093534.	35.5863762	0.0002891	-0.000150	1.1244197	7.5579962 C
0.00000875	13553.	1548943996.	34.5276289	0.0003021	-0.000170	1.1702952	7.8707232 C
0.00000938	13553.	1445681063.	33.5816980	0.0003148	-0.000191	1.2148613	8.1757428 C
0.00001000	13553.	1355325996.	32.7306041	0.0003273	-0.000213	1.2582520	8.4739752 C
0.00001063	13553.	1275600938.	31.9577631	0.0003396	-0.000234	1.3004922	8.7654670 C
0.00001125	13553.	1204734219.	31.2535031	0.0003516	-0.000256	1.3417321	9.0513179 C
0.00001188	13649.	1149399123.	30.6086594	0.0003635	-0.000278	1.3820549	9.3321008 C
0.00001250	13973.	1117808406.	30.0150303	0.0003752	-0.000300	1.4215047	9.6080735 C
0.00001313	14285.	1088365496.	29.4660604	0.0003867	-0.000322	1.4601283	9.8795255 C
0.00001375	14587.	1060871251.	28.9564728	0.0003982	-0.000344	1.4979750	10.1467811 C
0.00001438	14880.	1035157869.	28.4819980	0.0004094	-0.000367	1.5350974	10.4102017 C
0.00001500	15166.	1011082122.	28.0391718	0.0004206	-0.000389	1.5715513	10.6701898 C
0.00001563	15446.	988520290.	27.6251841	0.0004316	-0.000412	1.6073959	10.9271928 C
0.00001625	15720.	967365435.	27.2377868	0.0004426	-0.000435	1.6426960	11.1817196 C
0.00001688	15987.	947365984.	26.8717504	0.0004535	-0.000458	1.6773337	-11.558181 C
0.00001750	16250.	928547754.	26.5275511	0.0004642	-0.000481	1.7114732	-12.160943 C
0.00001813	16509.	910856514.	26.2043858	0.0004750	-0.000504	1.7452039	-12.765126 C
0.00001875	16762.	893997619.	25.8957132	0.0004855	-0.000527	1.7782663	-13.373143 C
0.00001938	17014.	878145963.	25.6059610	0.0004961	-0.000550	1.8110241	-13.981719 C
0.00002000	17260.	863014335.	25.3285471	0.0005066	-0.000573	1.8431791	-14.593643 C
0.00002063	17505.	848739606.	25.0672652	0.0005170	-0.000597	1.8750527	-15.205973 C
0.00002125	17745.	835071401.	24.8160517	0.0005273	-0.000620	1.9063435	-15.821571 C
0.00002188	17985.	822169571.	24.5796368	0.0005377	-0.000644	1.9374317	-16.436887 C
0.00002250	18219.	809753578.	24.3506261	0.0005479	-0.000667	1.9678977	-17.055941 C
0.00002313	18453.	797986066.	24.1341387	0.0005581	-0.000691	1.9981470	-17.674899 C
0.00002375	18685.	786727137.	23.9264540	0.0005683	-0.000714	2.0279862	-18.295642 C
0.00002438	18913.	775937352.	23.7268646	0.0005783	-0.000738	2.0574172	-18.918191 C
0.00002563	19367.	755779462.	23.3539237	0.0005984	-0.000785	2.1153939	-20.165497 C
0.00002688	19814.	737254765.	23.0104479	0.0006184	-0.000833	2.1720896	-21.416876 C
0.00002813	20253.	720114858.	22.6908272	0.0006382	-0.000881	2.2273893	-22.673701 C

MEG-33 rear abutment X direction row 3

0.00002938	20690.	704336785.	22.3974590	0.0006579	-0.000928	2.2817621	-23.931333	C
0.00003063	21119.	689597096.	22.1207865	0.0006774	-0.000976	2.3346802	-25.195408	C
0.00003188	21547.	675976833.	21.8667849	0.0006970	-0.001024	2.3868540	-26.458584	C
0.00003313	21968.	663171717.	21.6251922	0.0007163	-0.001072	2.4376038	-27.728256	C
0.00003438	22387.	651267100.	21.4021512	0.0007357	-0.001121	2.4876305	-28.996949	C
0.00003563	22803.	640070324.	21.1910229	0.0007549	-0.001169	2.5365015	-30.269506	C
0.00003688	23215.	629555793.	20.9927707	0.0007741	-0.001217	2.5844360	-31.543600	C
0.00003813	23626.	619703608.	20.8083969	0.0007933	-0.001265	2.6316556	-32.816722	C
0.00003938	24032.	610347262.	20.6310208	0.0008123	-0.001314	2.6776221	-34.095222	C
0.00004063	24437.	601530303.	20.4647530	0.0008314	-0.001362	2.7228220	-35.373495	C
0.00004188	24841.	593215560.	20.3092091	0.0008504	-0.001411	2.7673146	-36.650798	C
0.00004313	25241.	585307594.	20.1603139	0.0008694	-0.001459	2.8107822	-37.931064	C
0.00004438	25639.	577789577.	20.0185323	0.0008883	-0.001508	2.8533412	-39.212970	C
0.00004563	26036.	570661721.	19.8852535	0.0009073	-0.001556	2.8951993	-40.493906	C
0.00004688	26432.	563892672.	19.7598025	0.0009262	-0.001605	2.9363529	-41.773862	C
0.00004813	26826.	557417655.	19.6389913	0.0009451	-0.001654	2.9765317	-43.056439	C
0.00004938	27217.	551225350.	19.5232040	0.0009640	-0.001702	3.0158233	-44.340581	C
0.00005063	27607.	545319415.	19.4138071	0.0009828	-0.001751	3.0544161	-45.623736	C
0.00005188	27996.	539678975.	19.3103436	0.0010017	-0.001800	3.0923063	-46.905896	C
0.00005313	28384.	534285126.	19.2123996	0.0010207	-0.001848	3.1294901	-48.187055	C
0.00005438	28770.	529096063.	19.1175326	0.0010395	-0.001897	3.1657462	-49.470459	C
0.00005563	29151.	524062700.	19.0255099	0.0010583	-0.001945	3.2010814	-50.000000	CY
0.00005688	29503.	518730028.	18.9331096	0.0010768	-0.001994	3.2351856	-50.000000	CY
0.00005813	29812.	512895062.	18.8379197	0.0010950	-0.002044	3.2678328	-50.000000	CY
0.00005938	30071.	506464474.	18.7386296	0.0011126	-0.002094	3.2989133	-50.000000	CY
0.00006063	30322.	500159373.	18.6425902	0.0011302	-0.002144	3.3292308	-50.000000	CY
0.00006188	30570.	494053629.	18.5473988	0.0011476	-0.002194	3.3585598	-50.000000	CY
0.00006313	30813.	488129970.	18.4554219	0.0011650	-0.002244	3.3871749	-50.000000	CY
0.00006438	31023.	481909646.	18.3612913	0.0011820	-0.002294	3.4145391	-50.000000	CY
0.00006563	31197.	475382714.	18.2646720	0.0011986	-0.002345	3.4406463	-50.000000	CY
0.00006688	31368.	469053947.	18.1716169	0.0012152	-0.002396	3.4661532	-50.000000	CY
0.00006813	31538.	462945025.	18.0820212	0.0012318	-0.002447	3.4910693	-50.000000	CY
0.00006938	31705.	457002840.	17.9922955	0.0012482	-0.002498	3.5150461	-50.000000	CY
0.00007063	31870.	451263703.	17.9061344	0.0012646	-0.002549	3.5384838	-50.000000	CY
0.00007188	32036.	445716958.	17.8233543	0.0012811	-0.002600	3.5613799	-50.000000	CY
0.00007313	32201.	440352680.	17.7437841	0.0012975	-0.002651	3.5837314	-50.000000	CY
0.00007438	32365.	435161608.	17.6672643	0.0013140	-0.002702	3.6055357	-50.000000	CY
0.00007938	32840.	413738506.	17.3463679	0.0013769	-0.002909	3.6832113	-50.000000	CY
0.00008438	33252.	394098830.	17.0530731	0.0014389	-0.003117	3.7514491	-50.000000	CY
0.00008938	33647.	376468485.	16.7853977	0.0015002	-0.003326	3.8108273	-50.000000	CY

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0.00009438	34034.	360619909.	16.5483233	0.0015617	-0.003535	3.8622796	-50.000000	CY
0.00009938	34360.	345756732.	16.3202970	0.0016218	-0.003744	3.9046213	-50.000000	CY
0.0001044	34582.	331324961.	16.0921013	0.0016796	-0.003957	3.9379999	-50.000000	CY
0.0001094	34798.	318148704.	15.8856098	0.0017375	-0.004169	3.9642546	-50.000000	CY
0.0001144	35000.	306009619.	15.6910359	0.0017947	-0.004382	3.9831324	-50.000000	CY
0.0001194	35198.	294849497.	15.5160619	0.0018522	-0.004594	3.9950624	-50.000000	CY
0.0001244	35389.	284534709.	15.3561687	0.0019099	-0.004806	3.9998892	-50.000000	CY
0.0001294	35569.	274925985.	15.2038866	0.0019670	-0.005019	3.9993491	-50.000000	CY
0.0001344	35743.	265994783.	15.0662493	0.0020245	-0.005232	3.9979068	-50.000000	CY
0.0001394	35912.	257667351.	14.9415053	0.0020825	-0.005444	3.9974776	-50.000000	CY
0.0001444	36042.	249641449.	14.8164101	0.0021391	-0.005657	3.9995494	-50.000000	CY
0.0001494	36126.	241851015.	14.6842457	0.0021935	-0.005873	3.9965005	-50.000000	CY
0.0001544	36206.	234533273.	14.5622274	0.0022480	-0.006088	3.9997994	-50.000000	CY
0.0001594	36282.	227653447.	14.4504448	0.0023030	-0.006303	3.9964017	50.000000	CY
0.0001644	36356.	221176298.	14.3475687	0.0023584	-0.006518	3.9997092	50.000000	CY
0.0001694	36423.	215042453.	14.2478311	0.0024132	-0.006733	3.9948701	50.000000	CY
0.0001744	36482.	209215618.	14.1548236	0.0024682	-0.006948	3.9989828	50.000000	CY
0.0001794	36539.	203703961.	14.0685795	0.0025236	-0.007163	3.9975939	50.000000	CY
0.0001844	36594.	198474344.	13.9894957	0.0025793	-0.007377	3.9967609	50.000000	CY
0.0001894	36645.	193502796.	13.9173405	0.0026356	-0.007591	3.9996500	50.000000	CY
0.0001944	36694.	188777143.	13.8505151	0.0026922	-0.007804	3.9941358	50.000000	CY
0.0001994	36740.	184277742.	13.7888105	0.0027491	-0.008017	3.9969299	50.000000	CY
0.0002044	36778.	179954900.	13.7317689	0.0028064	-0.008230	3.9996389	50.000000	CY
0.0002094	36814.	175826217.	13.6770540	0.0028636	-0.008443	3.9948798	50.000000	CY
0.0002144	36847.	171882980.	13.6263125	0.0029211	-0.008655	3.9952686	50.000000	CY
0.0002194	36879.	168108510.	13.5800998	0.0029791	-0.008867	3.9988103	50.000000	CY
0.0002244	36907.	164486304.	13.5390838	0.0030378	-0.009078	3.9998378	50.000000	CYT
0.0002294	36932.	161013200.	13.5016245	0.0030969	-0.009289	3.9909156	50.000000	CYT
0.0002344	36957.	157684714.	13.4666462	0.0031562	-0.009500	3.9960956	50.000000	CYT
0.0002394	36981.	154491688.	13.4340174	0.0032158	-0.009710	3.9991337	50.000000	CYT
0.0002444	37005.	151425213.	13.4037113	0.0032755	-0.009921	3.9988541	50.000000	CYT
0.0002494	37026.	148474819.	13.3761284	0.0033357	-0.010131	3.9889330	50.000000	CYT
0.0002544	37039.	145609791.	13.3462824	0.0033950	-0.010341	3.9943361	50.000000	CYT
0.0002594	37050.	142844094.	13.3169881	0.0034541	-0.010552	3.9979314	50.000000	CYT
0.0002644	37060.	140180695.	13.2894882	0.0035134	-0.010763	3.9997593	50.000000	CYT
0.0002694	37066.	137601257.	13.2622566	0.0035725	-0.010974	3.9957891	50.000000	CYT
0.0002744	37066.	135093717.	13.2330962	0.0036308	-0.011185	3.9872423	50.000000	CYT
0.0003044	37066.	121778525.	13.1353229	0.0039981	-0.012438	3.9871046	50.000000	CYT

MEG-33 rear abutment X direction row 3

 Summary of Results for Nominal Moment Capacity for Section 1

Moment values interpolated at maximum compressive strain = 0.003
 or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain	Max. Tens. Strain
1	637.400	33585.679	0.00300000	-0.01015581
2	852.300	36888.690	0.00300000	-0.00894223

Note that the values of moment capacity in the table above are not factored by a strength reduction factor (phi-factor).

In ACI 318, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.75).

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318, or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Load No.	Resist. Factor	Nominal Ax. Thrust kips	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in^2
1	0.65	637.400000	33586.	414.310000	21831.	537605250.
2	0.65	852.300000	36889.	553.995000	23978.	611608864.
1	0.75	637.400000	33586.	478.050000	25189.	491301122.
2	0.75	852.300000	36889.	639.225000	27667.	544453566.
1	0.90	637.400000	33586.	573.660000	30227.	347738359.
2	0.90	852.300000	36889.	767.070000	33200.	396592835.

Pile Section No. 2:

 Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section	=	10.000000 ft
Shaft Diameter	=	48.000000 in
Concrete Cover Thickness (to edge of trans. reinf.)	=	3.000000 in
Number of Reinforcing Bars	=	20 bars
Yield Stress of Reinforcing Bars	=	50000. psi
Modulus of Elasticity of Reinforcing Bars	=	29000000. psi
Gross Area of Shaft	=	1810. sq. in.
Total Area of Reinforcing Steel	=	20.000000 sq. in.
Area Ratio of Steel Reinforcement	=	1.11 percent
Edge-to-Edge Bar Spacing	=	5.070246 in
Maximum Concrete Aggregate Size	=	0.750000 in
Ratio of Bar Spacing to Aggregate Size	=	6.76
Offset of Center of Rebar Cage from Center of Pile	=	0.0000 in
Transverse Reinforcement		
Type: Spiral		
Number of Transverse Reinf. (per spacing)	=	1
Spacing of Transverse Reinf.	=	3.750000 in
Yield Stress of Transverse Reinf.	=	50000. psi
Diameter of Transverse Reinf.	=	0.625000 in

Axial Structural Capacities:

Nom. Axial Structural Capacity = $0.85 F_c A_c + F_y A_s$	=	7084.495 kips
Tensile Load for Cracking of Concrete	=	-811.209 kips
Nominal Axial Tensile Capacity	=	-1000.000 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
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MEG-33 rear abutment X direction row 3

1	1.128000	1.000000	19.811000	0.000000
2	1.128000	1.000000	18.841381	6.121936
3	1.128000	1.000000	16.027436	11.644614
4	1.128000	1.000000	11.644614	16.027436
5	1.128000	1.000000	6.121936	18.841381
6	1.128000	1.000000	0.000000	19.811000
7	1.128000	1.000000	-6.12194	18.841381
8	1.128000	1.000000	-11.64461	16.027436
9	1.128000	1.000000	-16.02744	11.644614
10	1.128000	1.000000	-18.84138	6.121936
11	1.128000	1.000000	-19.81100	0.000000
12	1.128000	1.000000	-18.84138	-6.12194
13	1.128000	1.000000	-16.02744	-11.64461
14	1.128000	1.000000	-11.64461	-16.02744
15	1.128000	1.000000	-6.12194	-18.84138
16	1.128000	1.000000	0.000000	-19.81100
17	1.128000	1.000000	6.121936	-18.84138
18	1.128000	1.000000	11.644614	-16.02744
19	1.128000	1.000000	16.027436	-11.64461
20	1.128000	1.000000	18.841381	-6.12194

NOTE: The positions of the above rebars were computed by LPile

Minimum spacing between any two bars not equal to zero = 5.070 inches
between bars 17 and 18.

Ratio of bar spacing to maximum aggregate size = 6.76

Concrete Properties:

Compressive Strength of Concrete	=	4000. psi
Modulus of Elasticity of Concrete	=	3604997. psi
Modulus of Rupture of Concrete	=	-474.34165 psi
Compression Strain at Peak Stress	=	0.001886
Tensile Strain at Fracture of Concrete	=	-0.0001154
Maximum Coarse Aggregate Size	=	0.750000 in

MEG-33 rear abutment X direction row 3

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 2

Number	Axial Thrust Force kips
1	637.400
2	852.300

Definitions of Run Messages and Notes:

-
- C = concrete in section has cracked in tension.
 - Y = stress in reinforcing steel has reached yield stress.
 - T = ACI 318 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than 0.003. See ACI 318-14, Section 21.2.3.
 - Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
 Position of neutral axis is measured from edge of compression side of pile.
 Compressive stresses and strains are positive in sign.
 Tensile stresses and strains are negative in sign.

Axial Thrust Force = 637.400 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	722.8640984	1156582557.	151.3482717	0.00009459	0.00006459	0.3905202	2.6779374	
0.00000125	1446.	1156563501.	87.7086063	0.0001096	0.00004964	0.4502725	3.0489370	
0.00000188	2168.	1156523991.	66.5107033	0.0001247	0.00003471	0.5096399	3.4207695	
0.00000250	2891.	1156466934.	55.9232421	0.0001398	0.00001981	0.5686194	3.7934351	
0.00000313	3614.	1156392908.	49.5799590	0.0001549	0.00000494	0.6272083	4.1669338	
0.00000375	4336.	1156289927.	45.3586987	0.0001701	-0.00000990	0.6854026	4.5412585	
0.00000438	5058.	1156004285.	42.3490875	0.0001853	-0.00002472	0.7431838	4.9162905	

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0.00000500	5777.	1155402202.	40.0954776	0.0002005	-0.00003952	0.8005252	5.2918442
0.00000563	6494.	1154474396.	38.3450350	0.0002157	-0.00005431	0.8574074	5.6677838
0.00000625	7208.	1153257200.	36.9463041	0.0002309	-0.00006909	0.9138172	6.0440176
0.00000688	7919.	1151795193.	35.8030477	0.0002461	-0.00008385	0.9697455	6.4204827
0.00000750	8626.	1150130142.	34.8512003	0.0002614	-0.00009862	1.0251861	6.7971361
0.00000813	8626.	1061658593.	32.2802641	0.0002623	-0.000128	1.0279036	6.7577873 C
0.00000875	8626.	985825836.	31.3195090	0.0002740	-0.000146	1.0702274	7.0338254 C
0.00000938	8626.	920104114.	30.4618892	0.0002856	-0.000164	1.1114043	7.3030761 C
0.00001000	8626.	862597607.	29.6892738	0.0002969	-0.000183	1.1514953	7.5658894 C
0.00001063	8626.	811856571.	28.9911617	0.0003080	-0.000202	1.1906871	7.8236516 C
0.00001125	8781.	780561242.	28.3538785	0.0003190	-0.000221	1.2289427	8.0759529 C
0.00001188	9016.	759252756.	27.7710273	0.0003298	-0.000240	1.2664094	8.3238976 C
0.00001250	9243.	739426842.	27.2350635	0.0003404	-0.000260	1.3031249	8.5677105 C
0.00001313	9462.	720936533.	26.7399497	0.0003510	-0.000279	1.3391295	8.8076434 C
0.00001375	9675.	703659572.	26.2808189	0.0003614	-0.000299	1.3744655	9.0439766 C
0.00001438	9883.	687492868.	25.8537251	0.0003716	-0.000318	1.4091784	9.2770217 C
0.00001500	10085.	672348342.	25.4554571	0.0003818	-0.000338	1.4433161	9.5071239 C
0.00001563	10284.	658149765.	25.0833984	0.0003919	-0.000358	1.4769300	9.7346650 C
0.00001625	10478.	644817224.	24.7350616	0.0004019	-0.000378	1.5100552	9.9598977 C
0.00001688	10668.	632192275.	24.4057822	0.0004118	-0.000398	1.5425831	10.1818297 C
0.00001750	10856.	620331100.	24.0969258	0.0004217	-0.000418	1.5747181	10.4021899 C
0.00001813	11041.	609151181.	23.8062393	0.0004315	-0.000439	1.6064555	-10.824595 C
0.00001875	11222.	598530163.	23.5300024	0.0004412	-0.000459	1.6376826	-11.348061 C
0.00001938	11403.	588542415.	23.2707492	0.0004509	-0.000479	1.6686521	-11.871998 C
0.00002000	11580.	578986271.	23.0221300	0.0004604	-0.000500	1.6990590	-12.399165 C
0.00002063	11756.	569990652.	22.7886784	0.0004700	-0.000520	1.7292729	-12.926272 C
0.00002125	11929.	561358078.	22.5638417	0.0004795	-0.000541	1.7589418	-13.456533 C
0.00002188	12101.	553209313.	22.3522098	0.0004890	-0.000561	1.7884403	-13.986567 C
0.00002250	12271.	545384194.	22.1481588	0.0004983	-0.000582	1.8174490	-14.519326 C
0.00002313	12440.	537951545.	21.9546437	0.0005077	-0.000602	1.8462306	-15.052417 C
0.00002375	12608.	530854837.	21.7697356	0.0005170	-0.000623	1.8747054	-15.586595 C
0.00002438	12773.	524039676.	21.5915988	0.0005263	-0.000644	1.9027877	-16.122689 C
0.00002563	13103.	511320209.	21.2594694	0.0005448	-0.000685	1.9582425	-17.196307 C
0.00002688	13427.	499619019.	20.9533311	0.0005631	-0.000727	2.0125603	-18.273747 C
0.00002813	13748.	488804796.	20.6694112	0.0005813	-0.000769	2.0657316	-19.355262 C
0.00002938	14066.	478844491.	20.4086502	0.0005995	-0.000810	2.1180962	-20.437631 C
0.00003063	14380.	469539468.	20.1631233	0.0006175	-0.000853	2.1692103	-21.525376 C
0.00003188	14692.	460937146.	19.9374860	0.0006355	-0.000894	2.2196778	-22.612536 C
0.00003313	15001.	452858551.	19.7237641	0.0006533	-0.000937	2.2689673	-23.704609 C
0.00003438	15309.	445338357.	19.5258783	0.0006712	-0.000979	2.3175926	-24.796390 C

MEG-33 rear abutment X direction row 3

0.00003563	15614.	438276699.	19.3395100	0.0006890	-0.001021	2.3652963	-25.890619	C
0.00003688	15917.	431634611.	19.1639367	0.0007067	-0.001063	2.4121326	-26.986816	C
0.00003813	16219.	425410155.	19.0005925	0.0007244	-0.001106	2.4583601	-28.082220	C
0.00003938	16518.	419510997.	18.8445825	0.0007420	-0.001148	2.5035945	-29.181092	C
0.00004063	16816.	413940551.	18.6975712	0.0007596	-0.001190	2.5480929	-30.280674	C
0.00004188	17114.	408686672.	18.5599878	0.0007772	-0.001233	2.5919883	-31.379465	C
0.00004313	17410.	403700904.	18.4293396	0.0007948	-0.001275	2.6350987	-32.479557	C
0.00004438	17703.	398949167.	18.3040903	0.0008122	-0.001318	2.6773266	-33.582174	C
0.00004563	17996.	394443362.	18.1863039	0.0008298	-0.001360	2.7189565	-34.683997	C
0.00004688	18289.	390163736.	18.0753872	0.0008473	-0.001403	2.7599860	-35.785020	C
0.00004813	18580.	386081789.	17.9698082	0.0008648	-0.001445	2.8003002	-36.886636	C
0.00004938	18869.	382166952.	17.8676912	0.0008822	-0.001488	2.8397358	-37.990950	C
0.00005063	19158.	378432543.	17.7711668	0.0008997	-0.001530	2.8785748	-39.094456	C
0.00005188	19446.	374865420.	17.6798345	0.0009171	-0.001573	2.9168146	-40.197149	C
0.00005313	19733.	371453681.	17.5933314	0.0009346	-0.001615	2.9544521	-41.299025	C
0.00005438	20020.	368183710.	17.5110143	0.0009522	-0.001658	2.9914485	-42.400569	C
0.00005563	20305.	365025912.	17.4303844	0.0009696	-0.001700	3.0275443	-43.505361	C
0.00005688	20588.	361995429.	17.3538036	0.0009870	-0.001743	3.0630413	-44.609320	C
0.00005813	20872.	359083960.	17.2810144	0.0010045	-0.001786	3.0979366	-45.712440	C
0.00005938	21154.	356283900.	17.2117810	0.0010219	-0.001828	3.1322273	-46.814715	C
0.00006063	21436.	353588273.	17.1458872	0.0010395	-0.001871	3.1659104	-47.916138	C
0.00006188	21718.	350990666.	17.0831342	0.0010570	-0.001913	3.1989830	-49.016703	C
0.00006313	21997.	348472845.	17.0225786	0.0010746	-0.001955	3.2313529	-50.000000	CY
0.00006438	22267.	345889777.	16.9612477	0.0010919	-0.001998	3.2626887	-50.000000	CY
0.00006563	22514.	343076254.	16.8981638	0.0011089	-0.002041	3.2928938	-50.000000	CY
0.00006688	22731.	339903505.	16.8312315	0.0011256	-0.002084	3.3217426	-50.000000	CY
0.00006813	22918.	336406474.	16.7607324	0.0011418	-0.002128	3.3492887	-50.000000	CY
0.00006938	23098.	332948946.	16.6919491	0.0011580	-0.002172	3.3761681	-50.000000	CY
0.00007063	23279.	329607180.	16.6259603	0.0011742	-0.002216	3.4025222	-50.000000	CY
0.00007188	23458.	326372326.	16.5625775	0.0011904	-0.002260	3.4283434	-50.000000	CY
0.00007313	23625.	323078084.	16.4967926	0.0012063	-0.002304	3.4530703	-50.000000	CY
0.00007438	23763.	319506083.	16.4269200	0.0012218	-0.002348	3.4765321	-50.000000	CY
0.00007938	24249.	305503141.	16.1584804	0.0012826	-0.002527	3.5640191	-50.000000	CY
0.00008438	24725.	293032524.	15.9189415	0.0013432	-0.002707	3.6432005	-50.000000	CY
0.00008938	25110.	280951580.	15.6872374	0.0014020	-0.002888	3.7125296	-50.000000	CY
0.00009438	25403.	269171330.	15.4575744	0.0014588	-0.003071	3.7722315	-50.000000	CY
0.00009938	25689.	258505094.	15.2504203	0.0015155	-0.003254	3.8249392	-50.000000	CY
0.0001044	25969.	248802448.	15.0634814	0.0015723	-0.003438	3.8707500	-50.000000	CY
0.0001094	26240.	239908502.	14.8904194	0.0016286	-0.003621	3.9094006	-50.000000	CY
0.0001144	26463.	231366793.	14.7230896	0.0016840	-0.003806	3.9406489	-50.000000	CY

MEG-33 rear abutment X direction row 3

0.0001194	26621.	223005308.	14.5520405	0.0017371	-0.003993	3.9644717	-50.000000	CY
0.0001244	26769.	215229956.	14.3915301	0.0017899	-0.004180	3.9821024	-50.000000	CY
0.0001294	26914.	208032535.	14.2459291	0.0018431	-0.004367	3.9938015	-50.000000	CY
0.0001344	27054.	201332662.	14.1106047	0.0018961	-0.004554	3.9994355	-50.000000	CY
0.0001394	27187.	195064376.	13.9823677	0.0019488	-0.004741	3.9983913	-50.000000	CY
0.0001444	27317.	189207732.	13.8654950	0.0020018	-0.004928	3.9963600	-50.000000	CY
0.0001494	27443.	183720678.	13.7589169	0.0020552	-0.005115	3.9998811	-50.000000	CY
0.0001544	27566.	178562036.	13.6603711	0.0021088	-0.005301	3.9984774	-50.000000	CY
0.0001594	27680.	173680630.	13.5643303	0.0021618	-0.005488	3.9975563	-50.000000	CY
0.0001644	27775.	168972509.	13.4699008	0.0022141	-0.005676	3.9991679	-50.000000	CY
0.0001694	27846.	164405959.	13.3750099	0.0022654	-0.005865	3.9958391	-50.000000	CY
0.0001744	27903.	160018168.	13.2827011	0.0023162	-0.006054	3.9989576	-50.000000	CY
0.0001794	27957.	155859482.	13.1961865	0.0023671	-0.006243	3.9977285	-50.000000	CY
0.0001844	28005.	151890985.	13.1100808	0.0024172	-0.006433	3.9977888	50.000000	CY
0.0001894	28051.	148126726.	13.0296417	0.0024675	-0.006623	3.9998957	50.000000	CY
0.0001944	28096.	144547787.	12.9548838	0.0025181	-0.006812	3.9948145	50.000000	CY
0.0001994	28138.	141129538.	12.8871825	0.0025694	-0.007001	3.9986511	50.000000	CY
0.0002044	28178.	137874370.	12.8237332	0.0026209	-0.007189	3.9999985	50.000000	CY
0.0002094	28217.	134766989.	12.7647793	0.0026726	-0.007377	3.9948176	50.000000	CY
0.0002144	28252.	131788328.	12.7105223	0.0027248	-0.007565	3.9985347	50.000000	CY
0.0002194	28284.	128930785.	12.6560633	0.0027764	-0.007754	3.9999730	50.000000	CY
0.0002244	28315.	126194866.	12.6053315	0.0028283	-0.007942	3.9926058	50.000000	CY
0.0002294	28345.	123575149.	12.5576259	0.0028804	-0.008130	3.9969816	50.000000	CY
0.0002344	28370.	121045703.	12.5168292	0.0029336	-0.008316	3.9994857	50.000000	CY
0.0002394	28394.	118618216.	12.4786947	0.0029871	-0.008503	3.9970947	50.000000	CY
0.0002444	28417.	116285591.	12.4432385	0.0030408	-0.008689	3.9933164	50.000000	CYT
0.0002494	28440.	114044351.	12.4098490	0.0030947	-0.008875	3.9973648	50.000000	CYT
0.0002544	28459.	111879786.	12.3806545	0.0031493	-0.009061	3.9995945	50.000000	CYT
0.0002594	28477.	109792650.	12.3541538	0.0032044	-0.009246	3.9966021	50.000000	CYT
0.0002644	28495.	107780719.	12.3296710	0.0032597	-0.009430	3.9916922	50.000000	CYT
0.0002694	28511.	105841609.	12.3066984	0.0033151	-0.009615	3.9962045	50.000000	CYT
0.0002744	28527.	103971295.	12.2851678	0.0033707	-0.009799	3.9989829	50.000000	CYT
0.0003044	28588.	93923153.	12.1612763	0.0037016	-0.010908	3.9998656	50.000000	CYT
0.0003344	28588.	85496403.	12.2050319	0.0040811	-0.011969	3.9912099	50.000000	CYT

Axial Thrust Force = 852.300 kips

Bending Curvature	Bending Moment	Bending Stiffness	Depth to N Axis	Max Comp Strain	Max Tens Strain	Max Conc Stress	Max Steel Stress	Run Msg
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MEG-33 rear abutment X direction row 3

rad/in.	in-kip	kip-in2	in	in/in	in/in	ksi	ksi
6.25000E-07	712.9161275	1140665804.	195.4637400	0.0001222	0.00009216	0.5007490	3.4775303
0.00000125	1426.	1140648415.	109.7668347	0.0001372	0.00007721	0.5595804	3.8485478
0.00000188	2139.	1140608986.	81.2167380	0.0001523	0.00006228	0.6180267	4.2204101
0.00000250	2851.	1140551434.	66.9533447	0.0001674	0.00004738	0.6760849	4.5931175
0.00000313	3564.	1140476540.	58.4046344	0.0001825	0.00003251	0.7337521	4.9666700
0.00000375	4276.	1140384563.	52.7132670	0.0001977	0.00001767	0.7910254	5.3410678
0.00000438	4989.	1140275610.	48.6546688	0.0002129	0.00000286	0.8479020	5.7163111
0.00000500	5701.	1140138376.	45.6164887	0.0002281	-0.00001192	0.9043775	6.0923909
0.00000563	6412.	1139872430.	43.2579706	0.0002433	-0.00002667	0.9604364	6.4692065
0.00000625	7121.	1139386248.	41.3744058	0.0002586	-0.00004141	1.0160574	6.8466111
0.00000688	7828.	1138654630.	39.8356697	0.0002739	-0.00005613	1.0712238	7.2244867
0.00000750	8533.	1137685665.	38.5551476	0.0002892	-0.00007084	1.1259228	7.6027445
0.00000813	9234.	1136500717.	37.4729719	0.0003045	-0.00008553	1.1801451	7.9813190
0.00000875	9932.	1135124449.	36.5464439	0.0003198	-0.000100	1.2338834	8.3601601
0.00000938	10627.	1133580955.	35.7442957	0.0003351	-0.000115	1.2871324	8.7392304
0.00001000	10627.	1062732146.	33.5960205	0.0003360	-0.000144	1.2896027	8.6988460 C
0.00001063	10627.	1000218490.	32.7693886	0.0003482	-0.000162	1.3315586	8.9878179 C
0.00001125	10627.	944650796.	32.0161329	0.0003602	-0.000180	1.3724730	9.2707634 C
0.00001188	10627.	894932333.	31.3261430	0.0003720	-0.000198	1.4124222	9.5481905 C
0.00001250	10627.	850185716.	30.6910984	0.0003836	-0.000216	1.4514707	9.8205230 C
0.00001313	10856.	827088961.	30.1051909	0.0003951	-0.000235	1.4897221	10.0885383 C
0.00001375	11113.	808234318.	29.5624686	0.0004065	-0.000254	1.5272222	10.3525343 C
0.00001438	11362.	790397217.	29.0575302	0.0004177	-0.000272	1.5639924	10.6126079 C
0.00001500	11603.	773500437.	28.5860314	0.0004288	-0.000291	1.6000615	10.8689237 C
0.00001563	11836.	757485977.	28.1445240	0.0004398	-0.000310	1.6354679	11.1217375 C
0.00001625	12062.	742303620.	27.7301590	0.0004506	-0.000329	1.6702524	11.3713375 C
0.00001688	12283.	727908905.	27.3405733	0.0004614	-0.000349	1.7044585	11.6180431 C
0.00001750	12500.	714261959.	26.9738073	0.0004720	-0.000368	1.7381321	11.8622072 C
0.00001813	12712.	701326568.	26.6282410	0.0004826	-0.000387	1.7713220	12.1042192 C
0.00001875	12918.	688939261.	26.2993802	0.0004931	-0.000407	1.8038935	12.3427881 C
0.00001938	13120.	677179797.	25.9884582	0.0005035	-0.000426	1.8360271	12.5795150 C
0.00002000	13320.	666019455.	25.6945071	0.0005139	-0.000446	1.8677715	12.8148142 C
0.00002063	13515.	655285283.	25.4127634	0.0005241	-0.000466	1.8989257	13.0467591 C
0.00002125	13709.	645111549.	25.1464846	0.0005344	-0.000486	1.9297789	13.2780212 C
0.00002188	13898.	635330958.	24.8910667	0.0005445	-0.000506	1.9601153	13.5065205 C
0.00002250	14086.	626022967.	24.6485530	0.0005546	-0.000525	1.9901407	13.7341807 C
0.00002313	14270.	617070005.	24.4155924	0.0005646	-0.000545	2.0196983	13.9594567 C
0.00002375	14453.	608542340.	24.1942005	0.0005746	-0.000565	2.0489882	14.1842557 C

MEG-33 rear abutment X direction row 3

0.00002438	14633.	600310809.	23.9805116	0.0005845	-0.000585	2.0777982	-14.434026	C
0.00002563	14988.	584891238.	23.5811213	0.0006043	-0.000626	2.1345317	-15.471029	C
0.00002688	15337.	570669853.	23.2135205	0.0006239	-0.000666	2.1900041	-16.512213	C
0.00002813	15679.	557472059.	22.8725638	0.0006433	-0.000707	2.2441627	-17.558315	C
0.00002938	16015.	545192652.	22.5552609	0.0006626	-0.000747	2.2970626	-18.608987	C
0.00003063	16348.	533798094.	22.2615291	0.0006818	-0.000788	2.3489589	-19.661729	C
0.00003188	16674.	523119176.	21.9857771	0.0007008	-0.000829	2.3996197	-20.719147	C
0.00003313	16998.	513148075.	21.7286835	0.0007198	-0.000870	2.4493027	-21.778633	C
0.00003438	17318.	503787944.	21.4873085	0.0007386	-0.000911	2.4979362	-22.841089	C
0.00003563	17634.	495000257.	21.2608928	0.0007574	-0.000953	2.5456146	-23.905590	C
0.00003688	17947.	486711447.	21.0471408	0.0007761	-0.000994	2.5922747	-24.972964	C
0.00003813	18259.	478925291.	20.8472528	0.0007948	-0.001035	2.6381597	-26.040506	C
0.00003938	18566.	471520501.	20.6560293	0.0008133	-0.001077	2.6828987	-27.112646	C
0.00004063	18872.	464551118.	20.4773398	0.0008319	-0.001118	2.7269649	-28.183884	C
0.00004188	19176.	457928484.	20.3071914	0.0008504	-0.001160	2.7700719	-29.257704	C
0.00004313	19477.	451630975.	20.1453009	0.0008688	-0.001201	2.8122763	-30.333534	C
0.00004438	19777.	445670065.	19.9932291	0.0008872	-0.001243	2.8538144	-31.408463	C
0.00004563	20074.	439982182.	19.8478614	0.0009056	-0.001284	2.8944474	-32.485548	C
0.00004688	20369.	434545299.	19.7086164	0.0009238	-0.001326	2.9341799	-33.564850	C
0.00004813	20664.	429374380.	19.5772480	0.0009422	-0.001368	2.9732517	-34.643253	C
0.00004938	20957.	424449060.	19.4531619	0.0009605	-0.001410	3.0116596	-35.720754	C
0.00005063	21247.	419702086.	19.3322358	0.0009787	-0.001451	3.0490247	-36.802611	C
0.00005188	21537.	415162943.	19.2173064	0.0009969	-0.001493	3.0856876	-37.884215	C
0.00005313	21825.	410822637.	19.1083741	0.0010151	-0.001535	3.1216920	-38.964911	C
0.00005438	22113.	406667300.	19.0050293	0.0010334	-0.001577	3.1570344	-40.044694	C
0.00005563	22398.	402661698.	18.9049969	0.0010516	-0.001618	3.1915098	-41.126627	C
0.00005688	22682.	398800130.	18.8083804	0.0010697	-0.001660	3.2251613	-42.210178	C
0.00005813	22965.	395091245.	18.7164664	0.0010879	-0.001702	3.2581555	-43.292807	C
0.00005938	23247.	391525321.	18.6289618	0.0011061	-0.001744	3.2904891	-44.374506	C
0.00006063	23528.	388093370.	18.5455979	0.0011243	-0.001786	3.3221586	-45.455270	C
0.00006188	23808.	384781958.	18.4656143	0.0011426	-0.001827	3.3531063	-46.536013	C
0.00006313	24086.	381565617.	18.3869917	0.0011607	-0.001869	3.3831411	-47.620063	C
0.00006438	24363.	378462057.	18.3119322	0.0011788	-0.001911	3.4125152	-48.703162	C
0.00006563	24640.	375464731.	18.2402362	0.0011970	-0.001953	3.4412253	-49.785301	C
0.00006688	24912.	372516091.	18.1710320	0.0012152	-0.001995	3.4691967	-50.000000	CY
0.00006813	25166.	369413364.	18.1014471	0.0012332	-0.002037	3.4961505	-50.000000	CY
0.00006938	25397.	366079635.	18.0302219	0.0012508	-0.002079	3.5219801	-50.000000	CY
0.00007063	25594.	362394578.	17.9539774	0.0012680	-0.002122	3.5463699	-50.000000	CY
0.00007188	25773.	358579836.	17.8761231	0.0012848	-0.002165	3.5696950	-50.000000	CY
0.00007313	25951.	354887896.	17.8013248	0.0013017	-0.002208	3.5924436	-50.000000	CY

MEG-33 rear abutment X direction row 3

0.00007438	26129.	351312502.	17.7294313	0.0013186	-0.002251	3.6146127	-50.000000	CY
0.00007938	26726.	336708483.	17.4431968	0.0013846	-0.002425	3.6951129	-50.000000	CY
0.00008438	27206.	322444006.	17.1671901	0.0014485	-0.002602	3.7641384	-50.000000	CY
0.00008938	27675.	309646188.	16.9215280	0.0015124	-0.002778	3.8242741	-50.000000	CY
0.00009438	28045.	297163557.	16.6811294	0.0015743	-0.002956	3.8741058	-50.000000	CY
0.00009938	28336.	285143588.	16.4483533	0.0016346	-0.003135	3.9146306	-50.000000	CY
0.0001044	28617.	274178550.	16.2362191	0.0016947	-0.003315	3.9472246	-50.000000	CY
0.0001094	28892.	264154684.	16.0454711	0.0017550	-0.003495	3.9720955	-50.000000	CY
0.0001144	29155.	254906906.	15.8674074	0.0018148	-0.003675	3.9890068	-50.000000	CY
0.0001194	29397.	246258505.	15.7035735	0.0018746	-0.003855	3.9981735	-50.000000	CY
0.0001244	29568.	237736243.	15.5359410	0.0019323	-0.004038	3.9978689	-50.000000	CY
0.0001294	29711.	229650713.	15.3734910	0.0019889	-0.004221	3.9970138	-50.000000	CY
0.0001344	29849.	222133837.	15.2263151	0.0020460	-0.004404	3.9999975	-50.000000	CY
0.0001394	29982.	215113959.	15.0910786	0.0021033	-0.004587	3.9996712	-50.000000	CY
0.0001444	30105.	208519351.	14.9615993	0.0021601	-0.004770	3.9983732	-50.000000	CY
0.0001494	30225.	202343339.	14.8433522	0.0022172	-0.004953	3.9973962	-50.000000	CY
0.0001544	30341.	196544015.	14.7353658	0.0022748	-0.005135	3.9995921	-50.000000	CY
0.0001594	30454.	191081041.	14.6369134	0.0023328	-0.005317	3.9971030	50.000000	CY
0.0001644	30559.	185907589.	14.5401420	0.0023900	-0.005500	3.9999072	50.000000	CY
0.0001694	30657.	180998458.	14.4535632	0.0024481	-0.005682	3.9974153	50.000000	CY
0.0001744	30751.	176348229.	14.3735401	0.0025064	-0.005864	3.9999345	50.000000	CY
0.0001794	30819.	171813792.	14.2941621	0.0025640	-0.006046	3.9967089	50.000000	CY
0.0001844	30871.	167437900.	14.2165146	0.0026212	-0.006229	3.9996615	50.000000	CY
0.0001894	30912.	163231382.	14.1393633	0.0026776	-0.006412	3.9941430	50.000000	CY
0.0001944	30942.	159184658.	14.0669923	0.0027343	-0.006596	3.9983466	50.000000	CY
0.0001994	30970.	155335007.	13.9995245	0.0027912	-0.006779	3.9999795	50.000000	CY
0.0002044	30997.	151665022.	13.9370528	0.0028484	-0.006962	3.9948114	50.000000	CY
0.0002094	31019.	148149699.	13.8815143	0.0029064	-0.007144	3.9986166	50.000000	CY
0.0002144	31040.	144791629.	13.8300240	0.0029648	-0.007325	3.9999959	50.000000	CY
0.0002194	31059.	141578699.	13.7825096	0.0030235	-0.007506	3.9938964	50.000000	CYT
0.0002244	31077.	138505222.	13.7380386	0.0030825	-0.007688	3.9979838	50.000000	CYT
0.0002294	31095.	135562210.	13.6963943	0.0031416	-0.007868	3.9998686	50.000000	CYT
0.0002344	31110.	132735061.	13.6552988	0.0032005	-0.008050	3.9935916	50.000000	CYT
0.0002394	31123.	130019539.	13.6151491	0.0032591	-0.008231	3.9954819	50.000000	CYT
0.0002444	31136.	127412709.	13.5773913	0.0033180	-0.008412	3.9986583	50.000000	CYT
0.0002494	31149.	124907946.	13.5419001	0.0033770	-0.008593	3.9999659	50.000000	CYT
0.0002544	31160.	122496772.	13.5091113	0.0034364	-0.008774	3.9925195	50.000000	CYT
0.0002594	31171.	120176081.	13.4783481	0.0034959	-0.008954	3.9943209	50.000000	CYT
0.0002644	31181.	117941290.	13.4493743	0.0035557	-0.009134	3.9978489	50.000000	CYT
0.0002694	31190.	115787568.	13.4221055	0.0036156	-0.009314	3.9997035	50.000000	CYT

MEG-33 rear abutment X direction row 3

0.0002744	31199.	113709340.	13.3967410	0.0036757	-0.009494	3.9963914	50.0000000 CYT
0.0003044	31199.	102501849.	13.4245928	0.0040861	-0.010524	3.9952924	50.0000000 CYT

 Summary of Results for Nominal Moment Capacity for Section 2

Moment values interpolated at maximum compressive strain = 0.003
 or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain	Max. Tens. Strain
1	637.400	28399.776	0.00300000	-0.00854768
2	852.300	31051.163	0.00300000	-0.00743381

Note that the values of moment capacity in the table above are not factored by a strength reduction factor (phi-factor).

In ACI 318, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.75).

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318, or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Load No.	Resist. Factor	Nominal Ax. Thrust kips	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in^2
1	0.65	637.400000	28400.	414.310000	18460.	387768204.
2	0.65	852.300000	31051.	553.995000	20183.	437972873.
1	0.75	637.400000	28400.	478.050000	21300.	354892971.
2	0.75	852.300000	31051.	639.225000	23288.	391018401.

MEG-33 rear abutment X direction row 3

1	0.90	637.400000	28400.	573.660000	25560.	263323189.
2	0.90	852.300000	31051.	767.070000	27946.	300493899.

 Layering Correction Equivalent Depths of Soil & Rock Layers

Layer No.	Top of Layer Below Pile Head ft	Equivalent Top Depth Below Grnd Surf ft	Same Layer Type As Layer Above	Layer is Rock or is Below Rock Layer	F0 Integral for Layer lbs	F1 Integral for Layer lbs
1	0.00	0.00	N.A.	No	0.00	910390.
2	15.0000	15.0000	No	Yes	N.A.	N.A.

Notes: The F0 integral of Layer n+1 equals the sum of the F0 and F1 integrals for Layer n. Layering correction equivalent depths are computed only for soil types with both shallow-depth and deep-depth expressions for peak lateral load transfer. These soil types are soft and stiff clays, non-liquefied sands, and cemented c-phi soil.

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 1

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 86000.0 lbs
 Applied moment at pile head = 6859680.0 in-lbs
 Axial thrust load on pile head = 637400.0 lbs

Depth Deflect. Bending Shear Slope Total Bending Soil Res. Soil Spr. Distrib.

MEG-33 rear abutment X direction row 3

X feet	y inches	Moment in-lbs	Force lbs	S radians	Stress psi*	Stiffness lb-in^2	p lb/inch	Es*H lb/inch	Lat. Load lb/inch
0.00	0.4845	6859680.	86000.	-0.00358	0.00	1.84E+12	0.00	0.00	0.00
0.2500	0.4738	7124521.	85530.	-0.00357	0.00	1.84E+12	-313.348	1984.	0.00
0.5000	0.4631	7386520.	84586.	-0.00356	0.00	1.84E+12	-315.969	2047.	0.00
0.7500	0.4524	7645652.	83634.	-0.00355	0.00	1.84E+12	-318.514	2112.	0.00
1.0000	0.4418	7901893.	82675.	-0.00353	0.00	1.84E+12	-320.981	2180.	0.00
1.2500	0.4312	8155221.	81709.	-0.00352	0.00	1.84E+12	-323.369	2250.	0.00
1.5000	0.4206	8405613.	80735.	-0.00351	0.00	1.84E+12	-325.674	2323.	0.00
1.7500	0.4101	8653048.	79755.	-0.00349	0.00	1.84E+12	-327.895	2398.	0.00
2.0000	0.3997	8897505.	78768.	-0.00348	0.00	1.83E+12	-330.030	2477.	0.00
2.2500	0.3893	9138963.	77775.	-0.00347	0.00	1.83E+12	-332.076	2559.	0.00
2.5000	0.3789	9377405.	76775.	-0.00345	0.00	1.83E+12	-334.031	2645.	0.00
2.7500	0.3686	9612810.	75771.	-0.00343	0.00	1.83E+12	-335.892	2734.	0.00
3.0000	0.3583	9845163.	74760.	-0.00342	0.00	1.83E+12	-337.656	2827.	0.00
3.2500	0.3480	1.01E+07	73745.	-0.00340	0.00	1.83E+12	-339.321	2925.	0.00
3.5000	0.3379	1.03E+07	72724.	-0.00339	0.00	1.83E+12	-340.883	3027.	0.00
3.7500	0.3277	1.05E+07	71700.	-0.00337	0.00	1.83E+12	-342.339	3134.	0.00
4.0000	0.3177	1.07E+07	70671.	-0.00335	0.00	1.83E+12	-343.685	3246.	0.00
4.2500	0.3076	1.10E+07	69638.	-0.00333	0.00	1.83E+12	-344.917	3364.	0.00
4.5000	0.2977	1.12E+07	68601.	-0.00332	0.00	1.83E+12	-346.031	3488.	0.00
4.7500	0.2877	1.14E+07	67562.	-0.00330	0.00	1.83E+12	-347.023	3618.	0.00
5.0000	0.2779	1.16E+07	66519.	-0.00327	0.00	1.01E+12	-347.887	3756.	0.00
5.2500	0.2681	1.18E+07	65474.	-0.00323	0.00	9.82E+11	-348.635	3901.	0.00
5.5000	0.2585	1.20E+07	64428.	-0.00320	0.00	9.62E+11	-349.262	4054.	0.00
5.7500	0.2489	1.22E+07	63379.	-0.00316	0.00	9.43E+11	-349.767	4215.	0.00
6.0000	0.2395	1.24E+07	62329.	-0.00312	0.00	9.25E+11	-350.145	4386.	0.00
6.2500	0.2302	1.26E+07	61278.	-0.00308	0.00	9.08E+11	-350.394	4566.	0.00
6.5000	0.2210	1.28E+07	60227.	-0.00304	0.00	8.92E+11	-350.511	4757.	0.00
6.7500	0.2120	1.30E+07	59176.	-0.00299	0.00	8.77E+11	-350.491	4960.	0.00
7.0000	0.2031	1.31E+07	58124.	-0.00295	0.00	8.62E+11	-350.332	5176.	0.00
7.2500	0.1943	1.33E+07	57074.	-0.00290	0.00	8.49E+11	-350.029	5405.	0.00
7.5000	0.1857	1.35E+07	56024.	-0.00285	0.00	8.36E+11	-349.578	5649.	0.00
7.7500	0.1772	1.37E+07	54977.	-0.00281	0.00	8.24E+11	-348.975	5909.	0.00
8.0000	0.1688	1.38E+07	53931.	-0.00275	0.00	8.12E+11	-348.216	6188.	0.00
8.2500	0.1606	1.40E+07	52887.	-0.00270	0.00	8.01E+11	-347.296	6486.	0.00
8.5000	0.1526	1.42E+07	51847.	-0.00265	0.00	7.91E+11	-346.209	6806.	0.00
8.7500	0.1447	1.43E+07	50811.	-0.00260	0.00	7.81E+11	-344.950	7150.	0.00
9.0000	0.1370	1.45E+07	49778.	-0.00254	0.00	7.72E+11	-343.513	7521.	0.00

MEG-33 rear abutment X direction row 3

9.2500	0.1295	1.46E+07	48750.	-0.00248	0.00	7.63E+11	-341.893	7921.	0.00
9.5000	0.1221	1.48E+07	47727.	-0.00243	0.00	7.55E+11	-340.082	8354.	0.00
9.7500	0.1149	1.49E+07	46710.	-0.00237	0.00	7.47E+11	-338.073	8824.	0.00
10.0000	0.1079	1.51E+07	45699.	-0.00231	0.00	7.40E+11	-335.858	9336.	0.00
10.2500	0.1011	1.52E+07	44695.	-0.00224	0.00	7.33E+11	-333.429	9894.	0.00
10.5000	0.09447	1.53E+07	43698.	-0.00218	0.00	7.26E+11	-330.777	10505.	0.00
10.7500	0.08802	1.55E+07	42710.	-0.00212	0.00	7.19E+11	-327.890	11176.	0.00
11.0000	0.08176	1.56E+07	41731.	-0.00205	0.00	7.13E+11	-324.759	11916.	0.00
11.2500	0.07571	1.57E+07	40762.	-0.00199	0.00	7.07E+11	-321.371	12735.	0.00
11.5000	0.06985	1.59E+07	39804.	-0.00192	0.00	7.02E+11	-317.712	13646.	0.00
11.7500	0.06420	1.60E+07	38856.	-0.00185	0.00	6.96E+11	-313.766	14663.	0.00
12.0000	0.05875	1.61E+07	37921.	-0.00178	0.00	6.91E+11	-309.516	15806.	0.00
12.2500	0.05351	1.62E+07	37000.	-0.00171	0.00	6.87E+11	-304.942	17096.	0.00
12.5000	0.04848	1.63E+07	36092.	-0.00164	0.00	6.82E+11	-300.022	18564.	0.00
12.7500	0.04367	1.64E+07	35200.	-0.00157	0.00	6.77E+11	-294.728	20245.	0.00
13.0000	0.03908	1.65E+07	34325.	-0.00149	0.00	6.73E+11	-289.031	22186.	0.00
13.2500	0.03471	1.66E+07	33467.	-0.00142	0.00	6.69E+11	-282.894	24448.	0.00
13.5000	0.03057	1.67E+07	32628.	-0.00134	0.00	6.65E+11	-276.272	27115.	0.00
13.7500	0.02665	1.68E+07	31810.	-0.00127	0.00	6.62E+11	-269.112	30297.	0.00
14.0000	0.02296	1.69E+07	31014.	-0.00119	0.00	6.58E+11	-261.345	34153.	0.00
14.2500	0.01950	1.70E+07	30243.	-0.00111	0.00	6.55E+11	-252.884	38911.	0.00
14.5000	0.01627	1.71E+07	29498.	-0.00104	0.00	6.52E+11	-243.616	44914.	0.00
14.7500	0.01328	1.72E+07	28783.	-9.56E-04	0.00	6.49E+11	-233.379	52706.	0.00
15.0000	0.01053	1.73E+07	8110.	-8.76E-04	0.00	6.46E+11	-13548.	3858221.	0.00
15.2500	0.00803	1.73E+07	-49778.	-7.72E-04	0.00	4.06E+11	-25044.	9360682.	0.00
15.5000	0.00590	1.70E+07	-124930.	-6.46E-04	0.00	4.10E+11	-25056.	1.27E+07	0.00
15.7500	0.00415	1.65E+07	-199493.	-5.25E-04	0.00	4.19E+11	-24653.	1.78E+07	0.00
16.0000	0.00275	1.58E+07	-272154.	-4.11E-04	0.00	4.34E+11	-23788.	2.59E+07	0.00
16.2500	0.00168	1.49E+07	-341433.	-3.07E-04	0.00	4.56E+11	-22397.	4.00E+07	0.00
16.5000	9.06E-04	1.38E+07	-455429.	-2.16E-04	0.00	4.88E+11	-53600.	1.77E+08	0.00
16.7500	3.85E-04	1.22E+07	-571881.	-1.41E-04	0.00	5.50E+11	-24034.	1.87E+08	0.00
17.0000	6.25E-05	1.03E+07	-614095.	-8.38E-05	0.00	6.54E+11	-4108.	1.97E+08	0.00
17.2500	-1.18E-04	8477425.	-608066.	-4.91E-05	0.00	1.15E+12	8127.	2.07E+08	0.00
17.5000	-2.32E-04	6689870.	-570744.	-2.93E-05	0.00	1.15E+12	16754.	2.17E+08	0.00
17.7500	-2.94E-04	5053072.	-512329.	-1.41E-05	0.00	1.16E+12	22189.	2.27E+08	0.00
18.0000	-3.16E-04	3615952.	-441652.	-2.81E-06	0.00	1.16E+12	24929.	2.37E+08	0.00
18.2500	-3.11E-04	2403173.	-366000.	4.99E-06	0.00	1.16E+12	25505.	2.46E+08	0.00
18.5000	-2.86E-04	1419930.	-291072.	9.95E-06	0.00	1.16E+12	24447.	2.56E+08	0.00
18.7500	-2.51E-04	656705.	-221027.	1.26E-05	0.00	1.16E+12	22249.	2.66E+08	0.00
19.0000	-2.10E-04	93721.	-158629.	1.36E-05	0.00	1.16E+12	19349.	2.76E+08	0.00

MEG-33 rear abutment X direction row 3

19.2500	-1.69E-04	-295122.	-105436.	1.34E-05	0.00	1.16E+12	16113.	2.86E+08	0.00
19.5000	-1.30E-04	-538944.	-62017.	1.23E-05	0.00	1.16E+12	12833.	2.96E+08	0.00
19.7500	-9.55E-05	-667269.	-28182.	1.07E-05	0.00	1.16E+12	9724.	3.06E+08	0.00
20.0000	-6.59E-05	-708075.	-3197.	8.93E-06	0.00	1.16E+12	6933.	3.15E+08	0.00
20.2500	-4.19E-05	-686485.	14018.	7.12E-06	0.00	1.16E+12	4544.	3.25E+08	0.00
20.5000	-2.32E-05	-623993.	24727.	5.42E-06	0.00	1.16E+12	2595.	3.35E+08	0.00
20.7500	-9.40E-06	-538141.	30242.	3.91E-06	0.00	1.16E+12	1081.	3.45E+08	0.00
21.0000	2.39E-07	-442557.	31821.	2.64E-06	0.00	1.16E+12	-28.270	3.55E+08	0.00
21.2500	6.44E-06	-347224.	30605.	1.62E-06	0.00	1.16E+12	-782.528	3.65E+08	0.00
21.5000	9.94E-06	-258933.	27571.	8.30E-07	0.00	1.16E+12	-1240.	3.74E+08	0.00
21.7500	1.14E-05	-181802.	23516.	2.58E-07	0.00	1.16E+12	-1463.	3.84E+08	0.00
22.0000	1.15E-05	-117836.	19058.	-1.30E-07	0.00	1.16E+12	-1509.	3.94E+08	0.00
22.2500	1.06E-05	-67451.	14646.	-3.71E-07	0.00	1.16E+12	-1432.	4.04E+08	0.00
22.5000	9.26E-06	-29959.	10581.	-4.97E-07	0.00	1.16E+12	-1278.	4.14E+08	0.00
22.7500	7.65E-06	-3966.	7042.	-5.41E-07	0.00	1.16E+12	-1081.	4.24E+08	0.00
23.0000	6.02E-06	12295.	4116.	-5.30E-07	0.00	1.16E+12	-869.557	4.34E+08	0.00
23.2500	4.47E-06	20731.	1820.	-4.87E-07	0.00	1.16E+12	-661.292	4.43E+08	0.00
23.5000	3.09E-06	23215.	126.7205	-4.30E-07	0.00	1.16E+12	-467.269	4.53E+08	0.00
23.7500	1.89E-06	21493.	-1012.	-3.72E-07	0.00	1.16E+12	-292.063	4.63E+08	0.00
24.0000	8.58E-07	17142.	-1653.	-3.22E-07	0.00	1.16E+12	-135.340	4.73E+08	0.00
24.2500	-4.16E-08	11574.	-1846.	-2.85E-07	0.00	1.16E+12	6.7002	4.83E+08	0.00
24.5000	-8.52E-07	6065.	-1627.	-2.62E-07	0.00	1.16E+12	139.8603	4.93E+08	0.00
24.7500	-1.61E-06	1816.	-1011.	-2.52E-07	0.00	1.16E+12	270.4341	5.03E+08	0.00
25.0000	-2.36E-06	0.00	0.00	-2.50E-07	0.00	1.16E+12	403.6051	2.56E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 1:

Pile-head deflection = 0.48449243 inches
 Computed slope at pile head = -0.0035832 radians
 Maximum bending moment = 17306920. inch-lbs
 Maximum shear force = -614095. lbs
 Depth of maximum bending moment = 15.00000000 feet below pile head

MEG-33 rear abutment X direction row 3

Depth of maximum shear force = 17.00000000 feet below pile head
 Number of iterations = 47
 Number of zero deflection points = 3

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 2

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 131500.0 lbs
 Applied moment at pile head = 10492800.0 in-lbs
 Axial thrust load on pile head = 852300.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	1.0568	1.05E+07	131500.	-0.00766	0.00	1.81E+12	0.00	0.00	0.00
0.2500	1.0338	1.09E+07	130929.	-0.00764	0.00	1.81E+12	-380.844	1105.	0.00
0.5000	1.0109	1.13E+07	129781.	-0.00763	0.00	1.81E+12	-384.072	1140.	0.00
0.7500	0.9881	1.17E+07	128624.	-0.00761	0.00	1.81E+12	-387.207	1176.	0.00
1.0000	0.9653	1.21E+07	127458.	-0.00759	0.00	1.81E+12	-390.248	1213.	0.00
1.2500	0.9425	1.25E+07	126283.	-0.00757	0.00	1.81E+12	-393.191	1251.	0.00
1.5000	0.9199	1.29E+07	125099.	-0.00755	0.00	1.81E+12	-396.036	1292.	0.00
1.7500	0.8973	1.33E+07	123907.	-0.00752	0.00	1.81E+12	-398.777	1333.	0.00
2.0000	0.8747	1.37E+07	122707.	-0.00750	0.00	1.18E+12	-401.413	1377.	0.00
2.2500	0.8523	1.41E+07	121499.	-0.00746	0.00	1.11E+12	-403.946	1422.	0.00
2.5000	0.8300	1.45E+07	120283.	-0.00742	0.00	1.07E+12	-406.372	1469.	0.00
2.7500	0.8078	1.49E+07	119061.	-0.00738	0.00	1.04E+12	-408.690	1518.	0.00
3.0000	0.7857	1.52E+07	117831.	-0.00733	0.00	1.01E+12	-410.898	1569.	0.00
3.2500	0.7638	1.56E+07	116595.	-0.00729	0.00	9.77E+11	-412.993	1622.	0.00
3.5000	0.7420	1.60E+07	115353.	-0.00724	0.00	9.49E+11	-414.972	1678.	0.00
3.7500	0.7204	1.63E+07	114106.	-0.00719	0.00	9.23E+11	-416.833	1736.	0.00
4.0000	0.6989	1.67E+07	112853.	-0.00713	0.00	8.99E+11	-418.573	1797.	0.00
4.2500	0.6776	1.70E+07	111595.	-0.00707	0.00	8.77E+11	-420.190	1860.	0.00
4.5000	0.6564	1.74E+07	110332.	-0.00702	0.00	8.55E+11	-421.681	1927.	0.00

MEG-33 rear abutment X direction row 3

4.7500	0.6355	1.77E+07	109065.	-0.00695	0.00	8.36E+11	-423.043	1997.	0.00
5.0000	0.6147	1.81E+07	107794.	-0.00689	0.00	8.17E+11	-424.273	2071.	0.00
5.2500	0.5942	1.84E+07	106519.	-0.00682	0.00	8.00E+11	-425.368	2148.	0.00
5.5000	0.5738	1.88E+07	105242.	-0.00675	0.00	7.83E+11	-426.325	2229.	0.00
5.7500	0.5537	1.91E+07	103961.	-0.00668	0.00	7.68E+11	-427.141	2314.	0.00
6.0000	0.5337	1.94E+07	102679.	-0.00660	0.00	7.54E+11	-427.811	2405.	0.00
6.2500	0.5141	1.97E+07	101395.	-0.00652	0.00	7.40E+11	-428.332	2500.	0.00
6.5000	0.4946	2.01E+07	100109.	-0.00644	0.00	7.28E+11	-428.701	2600.	0.00
6.7500	0.4754	2.04E+07	98823.	-0.00636	0.00	7.16E+11	-428.914	2707.	0.00
7.0000	0.4565	2.07E+07	97536.	-0.00627	0.00	7.05E+11	-428.966	2819.	0.00
7.2500	0.4378	2.10E+07	96249.	-0.00618	0.00	6.94E+11	-428.853	2939.	0.00
7.5000	0.4194	2.13E+07	94963.	-0.00609	0.00	6.84E+11	-428.571	3066.	0.00
7.7500	0.4013	2.16E+07	93678.	-0.00599	0.00	6.75E+11	-428.114	3201.	0.00
8.0000	0.3834	2.19E+07	92395.	-0.00590	0.00	6.66E+11	-427.477	3345.	0.00
8.2500	0.3659	2.22E+07	91114.	-0.00580	0.00	6.57E+11	-426.655	3498.	0.00
8.5000	0.3486	2.25E+07	89835.	-0.00569	0.00	6.49E+11	-425.642	3663.	0.00
8.7500	0.3317	2.27E+07	88560.	-0.00559	0.00	6.42E+11	-424.432	3838.	0.00
9.0000	0.3151	2.30E+07	87289.	-0.00548	0.00	6.35E+11	-423.018	4027.	0.00
9.2500	0.2988	2.33E+07	86022.	-0.00537	0.00	6.28E+11	-421.393	4230.	0.00
9.5000	0.2829	2.36E+07	84761.	-0.00526	0.00	6.21E+11	-419.550	4449.	0.00
9.7500	0.2673	2.38E+07	83505.	-0.00514	0.00	6.15E+11	-417.479	4686.	0.00
10.0000	0.2520	2.41E+07	82256.	-0.00503	0.00	6.09E+11	-415.173	4942.	0.00
10.2500	0.2371	2.43E+07	81015.	-0.00491	0.00	6.03E+11	-412.622	5221.	0.00
10.5000	0.2226	2.46E+07	79781.	-0.00478	0.00	5.98E+11	-409.815	5524.	0.00
10.7500	0.2084	2.48E+07	78556.	-0.00466	0.00	5.93E+11	-406.739	5855.	0.00
11.0000	0.1946	2.51E+07	77341.	-0.00453	0.00	5.88E+11	-403.384	6218.	0.00
11.2500	0.1812	2.53E+07	76136.	-0.00440	0.00	5.83E+11	-399.734	6618.	0.00
11.5000	0.1682	2.56E+07	74943.	-0.00427	0.00	5.79E+11	-395.774	7059.	0.00
11.7500	0.1556	2.58E+07	73762.	-0.00414	0.00	5.75E+11	-391.486	7549.	0.00
12.0000	0.1434	2.60E+07	72595.	-0.00400	0.00	5.71E+11	-386.851	8095.	0.00
12.2500	0.1316	2.63E+07	71442.	-0.00387	0.00	5.67E+11	-381.846	8708.	0.00
12.5000	0.1202	2.65E+07	70304.	-0.00373	0.00	5.63E+11	-376.445	9398.	0.00
12.7500	0.1092	2.67E+07	69183.	-0.00358	0.00	5.59E+11	-370.619	10181.	0.00
13.0000	0.09867	2.69E+07	68081.	-0.00344	0.00	5.56E+11	-364.332	11077.	0.00
13.2500	0.08857	2.71E+07	66998.	-0.00329	0.00	5.53E+11	-357.543	12110.	0.00
13.5000	0.07892	2.73E+07	65937.	-0.00314	0.00	5.49E+11	-350.203	13313.	0.00
13.7500	0.06971	2.75E+07	64898.	-0.00299	0.00	5.46E+11	-342.252	14729.	0.00
14.0000	0.06096	2.77E+07	63884.	-0.00284	0.00	5.43E+11	-333.613	16419.	0.00
14.2500	0.05266	2.79E+07	62897.	-0.00269	0.00	5.40E+11	-324.191	18469.	0.00
14.5000	0.04483	2.81E+07	61940.	-0.00253	0.00	5.38E+11	-313.861	21003.	0.00

MEG-33 rear abutment X direction row 3

14.7500	0.03747	2.83E+07	61016.	-0.00237	0.00	5.35E+11	-302.452	24214.	0.00
15.0000	0.03059	2.85E+07	34034.	-0.00221	0.00	5.33E+11	-17686.	1734497.	0.00
15.2500	0.02419	2.85E+07	-41991.	-0.00198	0.00	2.77E+11	-32997.	4092535.	0.00
15.5000	0.01871	2.83E+07	-141643.	-0.00168	0.00	2.88E+11	-33437.	5360080.	0.00
15.7500	0.01412	2.77E+07	-242029.	-0.00140	0.00	3.09E+11	-33487.	7112332.	0.00
16.0000	0.01034	2.68E+07	-341945.	-0.00114	0.00	3.34E+11	-33124.	9608088.	0.00
16.2500	0.00728	2.57E+07	-440095.	-9.13E-04	0.00	3.61E+11	-32310.	1.33E+07	0.00
16.5000	0.00486	2.42E+07	-535040.	-7.11E-04	0.00	3.80E+11	-30986.	1.91E+07	0.00
16.7500	0.00302	2.24E+07	-625133.	-5.32E-04	0.00	4.02E+11	-29076.	2.89E+07	0.00
17.0000	0.00167	2.04E+07	-708420.	-3.77E-04	0.00	4.33E+11	-26449.	4.75E+07	0.00
17.2500	7.52E-04	1.82E+07	-825899.	-2.50E-04	0.00	4.80E+11	-51871.	2.07E+08	0.00
17.5000	1.73E-04	1.55E+07	-922426.	-1.52E-04	0.00	5.65E+11	-12481.	2.17E+08	0.00
17.7500	-1.60E-04	1.27E+07	-923049.	-8.38E-05	0.00	7.04E+11	12066.	2.27E+08	0.00
18.0000	-3.30E-04	9948967.	-865896.	-4.37E-05	0.00	1.14E+12	26036.	2.37E+08	0.00
18.2500	-4.22E-04	7468522.	-774868.	-2.07E-05	0.00	1.14E+12	34649.	2.46E+08	0.00
18.5000	-4.55E-04	5299866.	-664660.	-3.91E-06	0.00	1.14E+12	38823.	2.56E+08	0.00
18.7500	-4.45E-04	3480583.	-547172.	7.64E-06	0.00	1.14E+12	39502.	2.66E+08	0.00
19.0000	-4.09E-04	2016793.	-431530.	1.49E-05	0.00	1.14E+12	37593.	2.76E+08	0.00
19.2500	-3.56E-04	891328.	-324247.	1.87E-05	0.00	1.14E+12	33928.	2.86E+08	0.00
19.5000	-2.97E-04	71213.	-229518.	2.00E-05	0.00	1.14E+12	29225.	2.96E+08	0.00
19.7500	-2.36E-04	-485880.	-149572.	1.94E-05	0.00	1.14E+12	24072.	3.06E+08	0.00
20.0000	-1.80E-04	-826318.	-85072.	1.77E-05	0.00	1.14E+12	18928.	3.15E+08	0.00
20.2500	-1.30E-04	-996400.	-35500.	1.53E-05	0.00	1.14E+12	14120.	3.25E+08	0.00
20.5000	-8.83E-05	-1039395.	474.8268	1.26E-05	0.00	1.14E+12	9863.	3.35E+08	0.00
20.7500	-5.46E-05	-993615.	24679.	9.94E-06	0.00	1.14E+12	6273.	3.45E+08	0.00
21.0000	-2.87E-05	-891370.	39173.	7.46E-06	0.00	1.14E+12	3389.	3.55E+08	0.00
21.2500	-9.79E-06	-758616.	46041.	5.29E-06	0.00	1.14E+12	1189.	3.65E+08	0.00
21.5000	3.10E-06	-615153.	47244.	3.49E-06	0.00	1.14E+12	-386.945	3.74E+08	0.00
21.7500	1.11E-05	-475168.	44525.	2.05E-06	0.00	1.14E+12	-1426.	3.84E+08	0.00
22.0000	1.54E-05	-348015.	39347.	9.70E-07	0.00	1.14E+12	-2026.	3.94E+08	0.00
22.2500	1.70E-05	-239090.	32884.	1.98E-07	0.00	1.14E+12	-2283.	4.04E+08	0.00
22.5000	1.66E-05	-150713.	26023.	-3.15E-07	0.00	1.14E+12	-2291.	4.14E+08	0.00
22.7500	1.51E-05	-82952.	19394.	-6.22E-07	0.00	1.14E+12	-2128.	4.24E+08	0.00
23.0000	1.29E-05	-34343.	13411.	-7.76E-07	0.00	1.14E+12	-1861.	4.34E+08	0.00
23.2500	1.04E-05	-2479.	8313.	-8.25E-07	0.00	1.14E+12	-1539.	4.43E+08	0.00
23.5000	7.93E-06	15537.	4208.	-8.07E-07	0.00	1.14E+12	-1198.	4.53E+08	0.00
23.7500	5.56E-06	22774.	1123.	-7.57E-07	0.00	1.14E+12	-859.181	4.63E+08	0.00
24.0000	3.38E-06	22278.	-966.225	-6.98E-07	0.00	1.14E+12	-533.558	4.73E+08	0.00
24.2500	1.38E-06	16980.	-2099.	-6.46E-07	0.00	1.14E+12	-221.900	4.83E+08	0.00
24.5000	-4.93E-07	9685.	-2311.	-6.11E-07	0.00	1.14E+12	80.9276	4.93E+08	0.00

MEG-33 rear abutment X direction row 3

24.7500	-2.29E-06	3118.	-1615.	-5.94E-07	0.00	1.14E+12	383.2477	5.03E+08	0.00
25.0000	-4.06E-06	0.00	0.00	-5.90E-07	0.00	1.14E+12	693.1580	2.56E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 2:

Pile-head deflection = 1.05678914 inches
 Computed slope at pile head = -0.0076621 radians
 Maximum bending moment = 28539760. inch-lbs
 Maximum shear force = -923049. lbs
 Depth of maximum bending moment = 15.25000000 feet below pile head
 Depth of maximum shear force = 17.75000000 feet below pile head
 Number of iterations = 43
 Number of zero deflection points = 3

 Summary of Pile-head Responses for Conventional Analyses

Definitions of Pile-head Loading Conditions:

Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs
 Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
 Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.
 Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs
 Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians

Load Case No.	Load Type 1	Load Type 2	Load Type 3	Load Type 4	Load Type 5	Axial Loading lbs	Pile-head Deflection inches	Pile-head Rotation radians	Max Shear in Pile lbs	Max Moment in Pile in-lbs
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MEG-33 rear abutment X direction row 3

1	V, lb	86000.	M, in-lb	6859680.	637400.	0.4845	-0.00358	-614095.	1.73E+07
2	V, lb	131500.	M, in-lb	1.05E+07	852300.	1.0568	-0.00766	-923049.	2.85E+07

Maximum pile-head deflection = 1.0567891358 inches

Maximum pile-head rotation = -0.0076620585 radians = -0.439004 deg.

Summary of Warning Messages

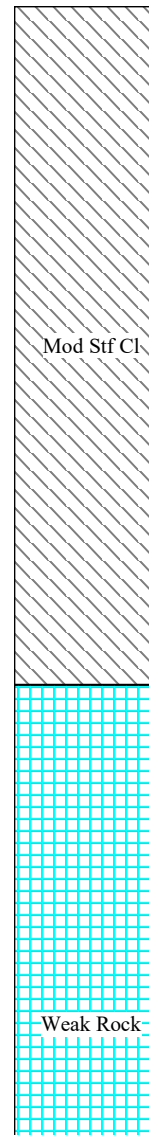
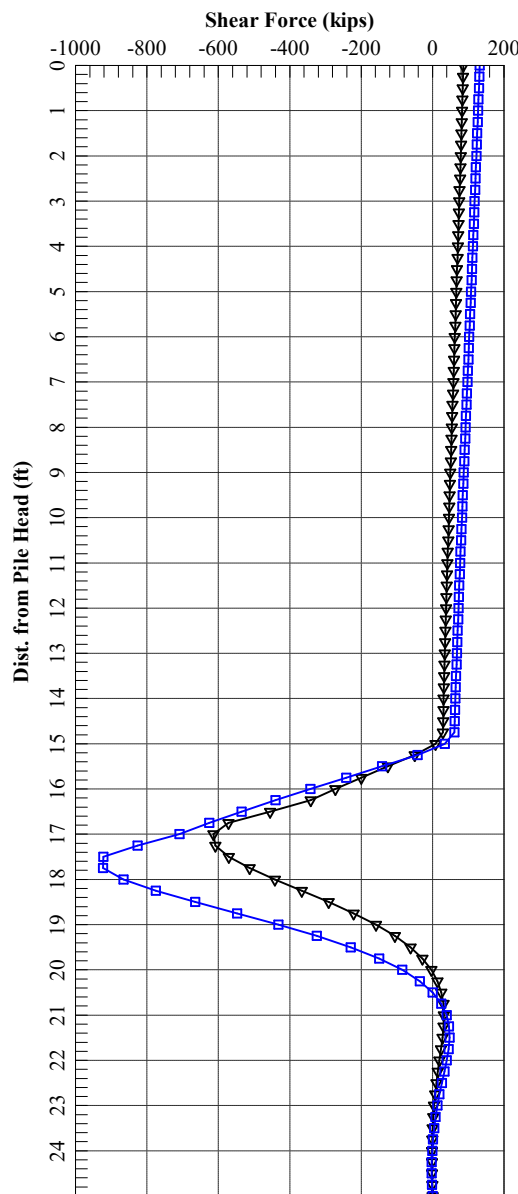
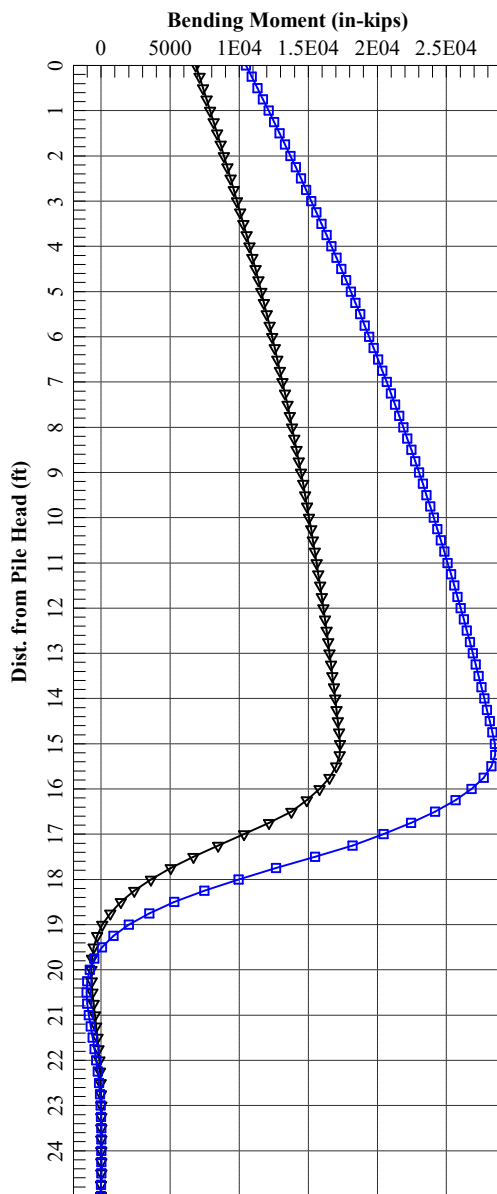
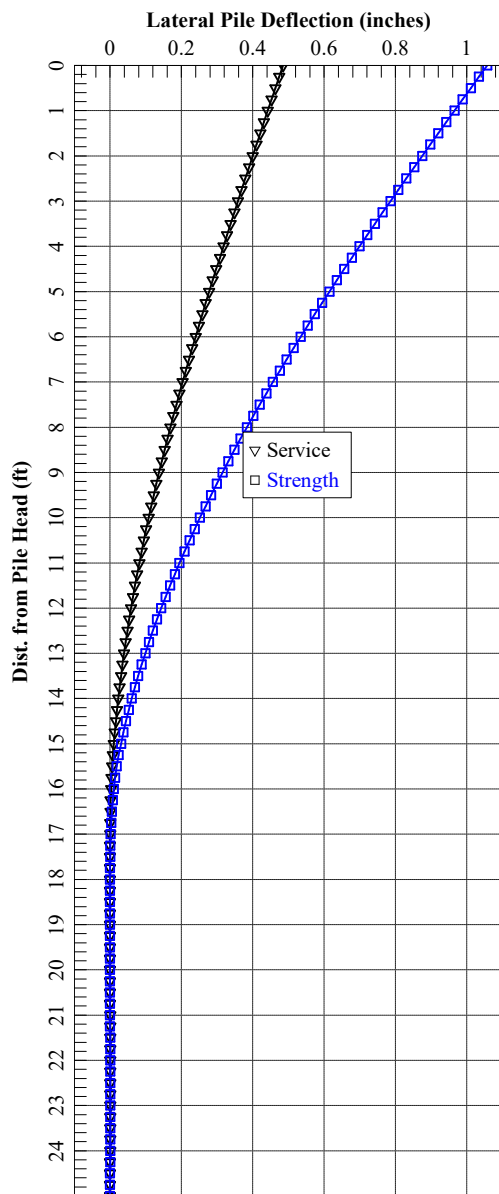
The following warning was reported 1760 times

**** Warning ****

An unreasonable input value for unconfined compressive strength has been specified for a soil defined using the weak rock criteria. The input value is greater than 500 psi. Please check your input data for correctness.

The analysis ended normally.

MEG-33 Bridge 3 Rear Abutment X-Direction Row 3



MEG-33 rear abutment Z direction

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LPile for Windows, Version 2022-12.006

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method
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Files Used for Analysis

Path to file locations:

\\US0247-PPFSS01\shared_projects\173609140\119144\400-Engineering\Geotechnical\Analysis\Lpile\bridges\LPile
Analysis\Bridge 3\rear abutment\

Name of input data file:

MEG-33 rear abutment Z direction.lp12d

Name of output report file:

MEG-33 rear abutment Z direction.lp12o

MEG-33 rear abutment Z direction

Name of plot output file:

MEG-33 rear abutment Z direction.lp12p

Name of runtime message file:

MEG-33 rear abutment Z direction.lp12r

Date and Time of Analysis

Date: September 16, 2024

Time: 9:07:01

Problem Title

Project Name: MEG-33-19.21

Job Number: 173609140

Client: ODOT

Engineer: G. Khatri

Description: Forward Abutment Lateral Load Analysis at Brdige 3

MEG-33 rear abutment Z direction
Program Options and Settings

Computational Options:

- Conventional Analysis

Engineering Units Used for Data Input and Computations:

- US Customary System Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed = 500
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 100.0000 in
- Number of pile increments = 100

Loading Type and Number of Cycles of Loading:

- Static loading specified

- Analysis uses p-y modification factors for p-y curves
- Analysis uses layering correction (Method of Georgiadis)
- No distributed lateral loads are entered
- Loading by lateral soil movements acting on pile not selected
- Input of shear resistance at the pile tip not selected
- Input of moment resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:

- Output files use decimal points to denote decimal symbols.
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1
- No p-y curves to be computed and reported for user-specified depths
- Print using wide report formats

MEG-33 rear abutment Z direction

Number of pile sections defined = 2
Total length of pile = 25.000 ft
Depth of ground surface below top of pile = 0.0000 ft

Pile diameters used for p-y curve computations are defined using 4 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile. A summary of values of pile diameter vs. depth follows.

Point No.	Depth Below Pile Head feet	Pile Diameter inches
1	0.000	54.0000
2	15.000	54.0000
3	15.000	48.0000
4	25.000	48.0000

Input Structural Properties for Pile Sections:

Pile Section No. 1:

Section 1 is a round drilled shaft, bored pile, or CIDH pile
Length of section = 15.000000 ft
Shaft Diameter = 54.000000 in

Pile Section No. 2:

Section 2 is a round drilled shaft, bored pile, or CIDH pile
Length of section = 10.000000 ft
Shaft Diameter = 48.000000 in

Soil and Rock Layering Information

MEG-33 rear abutment Z direction

The soil profile is modelled using 2 layers

Layer 1 is stiff clay with user-defined k-value

Distance from top of pile to top of layer	=	0.0000	ft
Distance from top of pile to bottom of layer	=	15.000000	ft
Effective unit weight at top of layer	=	122.000000	pcf
Effective unit weight at bottom of layer	=	122.000000	pcf
Undrained cohesion at top of layer	=	2000.	psf
Undrained cohesion at bottom of layer	=	2000.	psf
Epsilon-50 at top of layer	=	0.0000	
Epsilon-50 at bottom of layer	=	0.0000	
Subgrade k at top of layer	=	0.0000	pci
Subgrade k at bottom of layer	=	0.0000	pci

NOTE: Default values for Epsilon-50 will be computed for this layer.

NOTE: Default values for subgrade k will be computed for this layer.

Layer 2 is weak rock, p-y criteria by Reese, 1997

Distance from top of pile to top of layer	=	15.000000	ft
Distance from top of pile to bottom of layer	=	30.000000	ft
Effective unit weight at top of layer	=	87.600000	pcf
Effective unit weight at bottom of layer	=	87.600000	pcf
Uniaxial compressive strength at top of layer	=	4380.	psi
Uniaxial compressive strength at bottom of layer	=	4380.	psi
Initial modulus of rock at top of layer	=	394200.	psi
Initial modulus of rock at bottom of layer	=	394200.	psi
RQD of rock at top of layer	=	69.000000	%
RQD of rock at bottom of layer	=	69.000000	%
k _{rm} of rock at top of layer	=	0.0000500	
k _{rm} of rock at bottom of layer	=	0.0000500	

(Depth of the lowest soil layer extends 5.000 ft below the pile tip)

MEG-33 rear abutment Z direction

Summary of Input Soil Properties

Layer Rock Mass Num.	Soil Type Name (p-y Curve Type) Modulus psi	Layer Depth ft	Effective Unit Wt. pcf	Cohesion psf	Uniaxial qu psi	RQD %	E50 or krm	kpy pci
1	Stiff Clay w/o	0.00	122.0000	2000.	--	--	default	default
--	Free Water, using k	15.0000	122.0000	2000.	--	--	default	default
2	Weak	15.0000	87.6000	--	4380.	69.0000	5.00E-05	--
	394200. Rock	30.0000	87.6000	--	4380.	69.0000	5.00E-05	--
	394200.							

Modification Factors for p-y Curves

Distribution of p-y modifiers with depth defined using 3 points

Point No.	Depth X ft	p-mult	y-mult
1	0.000	1.0000	1.0000
2	15.000	1.0000	1.0000
3	25.000	1.0000	1.0000

Static Loading Type

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 Static loading criteria were used when computing p-y curves for all analyses.

 Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 2

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length	Run Analysis
1	1	V = 86000. lbs	M = 6859680. in-lbs	637400.	No	Yes
2	1	V = 131500. lbs	M = 10492800. in-lbs	852300.	No	Yes

V = shear force applied normal to pile axis

M = bending moment applied to pile head

y = lateral deflection normal to pile axis

S = pile slope relative to original pile batter angle

R = rotational stiffness applied to pile head

Values of top y vs. pile lengths can be computed only for load types with specified shear loading (Load Types 1, 2, and 3).

Thrust force is assumed to be acting axially for all pile batter angles.

 Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 2

Pile Section No. 1:

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Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section	=	15.000000	ft
Shaft Diameter	=	54.000000	in
Concrete Cover Thickness (to edge of trans. reinf.)	=	3.000000	in
Number of Reinforcing Bars	=	20	bars
Yield Stress of Reinforcing Bars	=	50000.	psi
Modulus of Elasticity of Reinforcing Bars	=	29000000.	psi
Gross Area of Shaft	=	2290.	sq. in.
Total Area of Reinforcing Steel	=	20.000000	sq. in.
Area Ratio of Steel Reinforcement	=	0.87	percent
Edge-to-Edge Bar Spacing	=	6.008853	in
Maximum Concrete Aggregate Size	=	0.750000	in
Ratio of Bar Spacing to Aggregate Size	=	8.01	
Offset of Center of Rebar Cage from Center of Pile	=	0.0000	in
Transverse Reinforcement			
Type: Spiral			
Number of Transverse Reinf. (per spacing)	=	1	
Spacing of Transverse Reinf.	=	3.750000	in
Yield Stress of Transverse Reinf.	=	50000.	psi
Diameter of Transverse Reinf.	=	0.625000	in

Axial Structural Capacities:

Nom. Axial Structural Capacity = $0.85 F_c A_c + F_y A_s$	=	8718.752	kips
Tensile Load for Cracking of Concrete	=	-1011.121	kips
Nominal Axial Tensile Capacity	=	-1000.000	kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
-----	-----	-----	-----	-----
1	1.128000	1.000000	22.811000	0.000000
2	1.128000	1.000000	21.694550	7.048987
3	1.128000	1.000000	18.454487	13.407969
4	1.128000	1.000000	13.407969	18.454487

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5	1.128000	1.000000	7.048987	21.694550
6	1.128000	1.000000	0.000000	22.811000
7	1.128000	1.000000	-7.04899	21.694550
8	1.128000	1.000000	-13.40797	18.454487
9	1.128000	1.000000	-18.45449	13.407969
10	1.128000	1.000000	-21.69455	7.048987
11	1.128000	1.000000	-22.81100	0.000000
12	1.128000	1.000000	-21.69455	-7.04899
13	1.128000	1.000000	-18.45449	-13.40797
14	1.128000	1.000000	-13.40797	-18.45449
15	1.128000	1.000000	-7.04899	-21.69455
16	1.128000	1.000000	0.000000	-22.81100
17	1.128000	1.000000	7.048987	-21.69455
18	1.128000	1.000000	13.407969	-18.45449
19	1.128000	1.000000	18.454487	-13.40797
20	1.128000	1.000000	21.694550	-7.04899

NOTE: The positions of the above rebars were computed by LPILE

Minimum spacing between any two bars not equal to zero = 6.009 inches
between bars 12 and 13.

Ratio of bar spacing to maximum aggregate size = 8.01

Concrete Properties:

Compressive Strength of Concrete	=	4000. psi
Modulus of Elasticity of Concrete	=	3604997. psi
Modulus of Rupture of Concrete	=	-474.34165 psi
Compression Strain at Peak Stress	=	0.001886
Tensile Strain at Fracture of Concrete	=	-0.0001154
Maximum Coarse Aggregate Size	=	0.750000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 2

Number Axial Thrust Force

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kips

1	637.400
2	852.300

Definitions of Run Messages and Notes:

- C = concrete in section has cracked in tension.
- Y = stress in reinforcing steel has reached yield stress.
- T = ACI 318 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than 0.003. See ACI 318-14, Section 21.2.3.
- Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
 Position of neutral axis is measured from edge of compression side of pile.
 Compressive stresses and strains are positive in sign.
 Tensile stresses and strains are negative in sign.

Axial Thrust Force = 637.400 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	1150.	1840433855.	128.5415643	0.00008034	0.00004659	0.3327881	2.2661971	
0.00000125	2300.	1840387479.	77.8147435	0.00009727	0.00002977	0.4005380	2.6935470	
0.00000188	3451.	1840304104.	60.9253415	0.0001142	0.00001299	0.4678024	3.1219592	
0.00000250	4600.	1840184601.	52.4952908	0.0001312	-0.00000376	0.5345768	3.5514336	
0.00000313	5749.	1839762091.	47.4478771	0.0001483	-0.00002048	0.6008438	3.9818701	
0.00000375	6895.	1838549162.	44.0889593	0.0001653	-0.00003717	0.6665585	4.4129618	
0.00000438	8035.	1836542828.	41.6931059	0.0001824	-0.00005384	0.7316884	4.8444816	
0.00000500	9169.	1833894124.	39.8982570	0.0001995	-0.00007051	0.7962145	5.2762973	
0.00000563	10298.	1830751404.	38.5036057	0.0002166	-0.00008717	0.8601255	5.7083319	
0.00000625	11420.	1827230225.	37.3888269	0.0002337	-0.000104	0.9234146	6.1405374	
0.00000688	11420.	1661118386.	33.6719402	0.0002315	-0.000140	0.9146513	6.0135368	C

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0.00000750	11420.	1522691854.	32.5159436	0.0002439	-0.000161	0.9599502	6.3087928	C
0.00000813	11420.	1405561712.	31.5019784	0.0002560	-0.000183	1.0038460	6.5956099	C
0.00000875	11420.	1305164447.	30.6027385	0.0002678	-0.000205	1.0464620	6.8747824	C
0.00000938	11420.	1218153483.	29.7983706	0.0002794	-0.000227	1.0879237	7.1471508	C
0.00001000	11420.	1142018891.	29.0743057	0.0002907	-0.000249	1.1283650	7.4136487	C
0.00001063	11420.	1074841309.	28.4188309	0.0003020	-0.000272	1.1678943	7.6750336	C
0.00001125	11454.	1018113289.	27.8214082	0.0003130	-0.000295	1.2065604	7.9315968	C
0.00001188	11735.	988209535.	27.2738257	0.0003239	-0.000317	1.2444154	8.1836675	C
0.00001250	12008.	960666512.	26.7700294	0.0003346	-0.000340	1.2815327	-8.598489	C
0.00001313	12275.	935232741.	26.3048345	0.0003453	-0.000363	1.3179708	-9.205479	C
0.00001375	12536.	911685499.	25.8738284	0.0003558	-0.000387	1.3537787	-9.815698	C
0.00001438	12792.	889848305.	25.4737344	0.0003662	-0.000410	1.3890226	-10.428656	C
0.00001500	13044.	869571129.	25.1019788	0.0003765	-0.000433	1.4237748	-11.043789	C
0.00001563	13290.	850534738.	24.7514725	0.0003867	-0.000457	1.4578456	-11.662770	C
0.00001625	13533.	832797249.	24.4245412	0.0003969	-0.000481	1.4915048	-12.283347	C
0.00001688	13773.	816181922.	24.1176681	0.0004070	-0.000504	1.5247055	-12.905960	C
0.00001750	14009.	800540988.	23.8275688	0.0004170	-0.000528	1.5573865	-13.531184	C
0.00001813	14244.	785882184.	23.5556124	0.0004269	-0.000552	1.5897392	-14.157387	C
0.00001875	14475.	772007217.	23.2966976	0.0004368	-0.000576	1.6215641	-14.786358	C
0.00001938	14705.	758955262.	23.0531095	0.0004467	-0.000600	1.6530909	-15.416103	C
0.00002000	14932.	746592597.	22.8213696	0.0004564	-0.000624	1.6841894	-16.047806	C
0.00002063	15157.	734878944.	22.6011298	0.0004661	-0.000648	1.7149122	-16.681031	C
0.00002125	15381.	723828686.	22.3937369	0.0004759	-0.000672	1.7454226	-17.314322	C
0.00002188	15602.	713243577.	22.1929288	0.0004855	-0.000696	1.7753635	-17.950955	C
0.00002250	15823.	703235481.	22.0036305	0.0004951	-0.000720	1.8051293	-18.587357	C
0.00002313	16042.	693721041.	21.8234544	0.0005047	-0.000744	1.8346146	-19.224502	C
0.00002375	16259.	684594452.	21.6490102	0.0005142	-0.000768	1.8636243	-19.864232	C
0.00002438	16476.	675926034.	21.4838307	0.0005237	-0.000793	1.8924623	-20.503736	C
0.00002563	16905.	659714156.	21.1735075	0.0005426	-0.000841	1.9492286	-21.785818	C
0.00002688	17331.	644869291.	20.8885492	0.0005614	-0.000890	2.0049379	-23.070631	C
0.00002813	17752.	631196975.	20.6244947	0.0005801	-0.000939	2.0595125	-24.359053	C
0.00002938	18171.	618593311.	20.3808368	0.0005987	-0.000988	2.1131525	-25.649244	C
0.00003063	18587.	606930386.	20.1548892	0.0006172	-0.001037	2.1658491	-26.941370	C
0.00003188	19000.	596077772.	19.9434590	0.0006357	-0.001086	2.2175101	-28.236459	C
0.00003313	19412.	586017612.	19.7488842	0.0006542	-0.001135	2.2685162	-29.530685	C
0.00003438	19820.	576581590.	19.5643345	0.0006725	-0.001184	2.3183920	-30.829023	C
0.00003563	20227.	567762629.	19.3922858	0.0006909	-0.001233	2.3674955	-32.127826	C
0.00003688	20632.	559518171.	19.2327079	0.0007092	-0.001282	2.4159507	-33.425767	C
0.00003813	21035.	551744783.	19.0811058	0.0007275	-0.001331	2.4634266	-34.726459	C
0.00003938	21436.	544411461.	18.9376461	0.0007457	-0.001381	2.5100290	-36.028844	C

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0.00004063	21836.	537508664.	18.8037500	0.0007639	-0.001430	2.5559899	-37.330363	C
0.00004188	22236.	530997678.	18.6785660	0.0007822	-0.001479	2.6013063	-38.631010	C
0.00004313	22632.	524810807.	18.5586017	0.0008003	-0.001528	2.6456833	-39.934205	C
0.00004438	23028.	518931429.	18.4442549	0.0008185	-0.001578	2.6892221	-41.238868	C
0.00004563	23422.	513355955.	18.3368406	0.0008366	-0.001627	2.7321222	-42.542649	C
0.00004688	23815.	508059932.	18.2358089	0.0008548	-0.001676	2.7743804	-43.845541	C
0.00004813	24208.	503021447.	18.1406671	0.0008730	-0.001726	2.8159937	-45.147538	C
0.00004938	24599.	498204277.	18.0493425	0.0008912	-0.001775	2.8567764	-46.450966	C
0.00005063	24988.	493588186.	17.9611410	0.0009093	-0.001824	2.8966879	-47.756431	C
0.00005188	25376.	489178528.	17.8777976	0.0009274	-0.001874	2.9359593	-49.060982	C
0.00005313	25762.	484940090.	17.7987684	0.0009456	-0.001923	2.9745637	-50.000000	CY
0.00005438	26129.	480527690.	17.7203594	0.0009635	-0.001973	3.0121095	-50.000000	CY
0.00005563	26450.	475502428.	17.6377331	0.0009811	-0.002023	3.0480644	-50.000000	CY
0.00005688	26715.	469710750.	17.5488267	0.0009981	-0.002073	3.0822078	-50.000000	CY
0.00005813	26963.	463884725.	17.4578090	0.0010147	-0.002124	3.1150397	-50.000000	CY
0.00005938	27211.	458294473.	17.3710721	0.0010314	-0.002175	3.1473257	-50.000000	CY
0.00006063	27456.	452878016.	17.2877850	0.0010481	-0.002226	3.1789969	-50.000000	CY
0.00006188	27661.	447047466.	17.2006506	0.0010643	-0.002277	3.2092275	-50.000000	CY
0.00006313	27831.	440888936.	17.1105031	0.0010801	-0.002329	3.2381359	-50.000000	CY
0.00006438	28001.	434962757.	17.0242307	0.0010959	-0.002380	3.2665498	-50.000000	CY
0.00006563	28168.	429220001.	16.9382578	0.0011116	-0.002432	3.2940745	-50.000000	CY
0.00006688	28334.	423678540.	16.8551839	0.0011272	-0.002484	3.3210361	-50.000000	CY
0.00006813	28499.	418334267.	16.7755091	0.0011428	-0.002536	3.3475135	-50.000000	CY
0.00006938	28664.	413176478.	16.6990517	0.0011585	-0.002588	3.3735047	-50.000000	CY
0.00007063	28829.	408195224.	16.6256428	0.0011742	-0.002640	3.3990074	-50.000000	CY
0.00007188	28982.	403232580.	16.5528537	0.0011897	-0.002692	3.4237565	-50.000000	CY
0.00007313	29112.	398109648.	16.4778664	0.0012049	-0.002744	3.4474451	-50.000000	CY
0.00007438	29217.	392836579.	16.3976732	0.0012196	-0.002797	3.4697495	-50.000000	CY
0.00007938	29625.	373232196.	16.1013472	0.0012780	-0.003008	3.5542813	-50.000000	CY
0.00008438	30025.	355850318.	15.8394290	0.0013365	-0.003220	3.6314003	-50.000000	CY
0.00008938	30413.	340284649.	15.6021947	0.0013944	-0.003432	3.7007204	-50.000000	CY
0.00009438	30747.	325795018.	15.3817131	0.0014516	-0.003645	3.7620082	-50.000000	CY
0.00009938	30966.	311603944.	15.1505835	0.0015056	-0.003861	3.8133042	-50.000000	CY
0.0001044	31181.	298739722.	14.9446438	0.0015598	-0.004076	3.8586352	-50.000000	CY
0.0001094	31388.	286978110.	14.7545209	0.0016138	-0.004292	3.8974486	-50.000000	CY
0.0001144	31588.	276175739.	14.5781214	0.0016674	-0.004509	3.9298600	-50.000000	CY
0.0001194	31784.	266249741.	14.4192337	0.0017213	-0.004725	3.9562787	-50.000000	CY
0.0001244	31974.	257079892.	14.2733469	0.0017752	-0.004941	3.9764920	-50.000000	CY
0.0001294	32156.	248550653.	14.1340926	0.0018286	-0.005158	3.9903592	-50.000000	CY
0.0001344	32307.	240420923.	13.9992019	0.0018811	-0.005375	3.9980723	-50.000000	CY

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0.0001394	32410.	232535389.	13.8631348	0.0019322	-0.005594	3.9974064	-50.000000	CY
0.0001444	32501.	225115407.	13.7342956	0.0019829	-0.005813	3.9995355	-50.000000	CY
0.0001494	32585.	218139325.	13.6095744	0.0020329	-0.006033	3.9965996	-50.000000	CY
0.0001544	32666.	211599226.	13.4950062	0.0020833	-0.006253	3.9998543	-50.000000	CY
0.0001594	32744.	205451948.	13.3898452	0.0021340	-0.006472	3.9967842	-50.000000	CY
0.0001644	32820.	199665844.	13.2928625	0.0021850	-0.006691	3.9998401	-50.000000	CY
0.0001694	32892.	194197227.	13.2012721	0.0022360	-0.006910	3.9956943	-50.000000	CY
0.0001744	32959.	189012593.	13.1112567	0.0022863	-0.007130	3.9993671	-50.000000	CY
0.0001794	33024.	184106763.	13.0278755	0.0023369	-0.007349	3.9953840	-50.000000	CY
0.0001844	33087.	179455123.	12.9508410	0.0023878	-0.007568	3.9976156	50.000000	CY
0.0001894	33148.	175041253.	12.8792324	0.0024390	-0.007787	3.9998940	50.000000	CY
0.0001944	33208.	170844188.	12.8129435	0.0024905	-0.008006	3.9931583	50.000000	CY
0.0001994	33265.	166845444.	12.7519660	0.0025424	-0.008224	3.9978576	50.000000	CY
0.0002044	33319.	163026359.	12.6965378	0.0025949	-0.008441	3.9999135	50.000000	CY
0.0002094	33368.	159369650.	12.6403332	0.0026466	-0.008660	3.9920388	50.000000	CY
0.0002144	33416.	155877051.	12.5871105	0.0026984	-0.008878	3.9964583	50.000000	CY
0.0002194	33462.	152533036.	12.5384369	0.0027506	-0.009096	3.9993460	50.000000	CY
0.0002244	33501.	149310160.	12.4914202	0.0028028	-0.009313	3.9975630	50.000000	CY
0.0002294	33531.	146183800.	12.4434234	0.0028542	-0.009532	3.9918982	50.000000	CY
0.0002344	33560.	143188466.	12.3981397	0.0029058	-0.009750	3.9964444	50.000000	CY
0.0002394	33577.	140269130.	12.3506940	0.0029564	-0.009970	3.9990833	50.000000	CY
0.0002444	33587.	137441315.	12.3076112	0.0030077	-0.010189	3.9999999	50.000000	CYT
0.0002494	33596.	134721861.	12.2675631	0.0030592	-0.010407	3.9911205	50.000000	CYT
0.0002544	33605.	132106314.	12.2294342	0.0031109	-0.010625	3.9927415	50.000000	CYT
0.0002594	33612.	129589965.	12.1933004	0.0031626	-0.010844	3.9966941	50.000000	CYT
0.0002644	33620.	127167245.	12.1590717	0.0032146	-0.011062	3.9991211	50.000000	CYT
0.0002694	33624.	124822514.	12.1249030	0.0032661	-0.011280	3.9999954	50.000000	CYT
0.0002744	33626.	122554698.	12.0929101	0.0033180	-0.011498	3.9924197	50.000000	CYT
0.0003044	33630.	110488784.	11.9332098	0.0036322	-0.012804	3.9937002	50.000000	CYT
0.0003344	33630.	100575772.	11.8876146	0.0039749	-0.014081	3.9961808	50.000000	CYT

Axial Thrust Force = 852.300 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	1138.	1820164411.	163.5250119	0.0001022	0.00006845	0.4210411	2.9002721	
0.00000125	2275.	1820119032.	95.3069694	0.0001191	0.00005163	0.4879696	3.3276401	

MEG-33 rear abutment Z direction

0.00000188	3413.	1820035214.	72.5873833	0.0001361	0.00003485	0.5544122	3.7560827
0.00000250	4550.	1819916024.	61.2424135	0.0001531	0.00001811	0.6203648	4.1856000
0.00000313	5687.	1819762068.	54.4472925	0.0001701	0.00000140	0.6858231	4.6161921
0.00000375	6823.	1819508910.	49.9268372	0.0001872	-0.00001527	0.7507793	5.0478311
0.00000438	7957.	1818807611.	46.7045688	0.0002043	-0.00003192	0.8152023	5.4803109
0.00000500	9087.	1817485776.	44.2920643	0.0002215	-0.00004854	0.8790589	5.9133992
0.00000563	10213.	1815570393.	42.4184275	0.0002386	-0.00006515	0.9423263	6.3469372
0.00000625	11332.	1813144616.	40.9214146	0.0002558	-0.00008174	1.0049893	6.7808189
0.00000688	12446.	1810296023.	39.6979565	0.0002729	-0.00009833	1.0670378	7.2149739
0.00000750	13553.	1807101328.	38.6794461	0.0002901	-0.000115	1.1284648	7.6493544
0.00000813	13553.	1668093534.	35.5863762	0.0002891	-0.000150	1.1244197	7.5579962 C
0.00000875	13553.	1548943996.	34.5276289	0.0003021	-0.000170	1.1702952	7.8707232 C
0.00000938	13553.	1445681063.	33.5816980	0.0003148	-0.000191	1.2148613	8.1757428 C
0.00001000	13553.	1355325996.	32.7306041	0.0003273	-0.000213	1.2582520	8.4739752 C
0.00001063	13553.	1275600938.	31.9577631	0.0003396	-0.000234	1.3004922	8.7654670 C
0.00001125	13553.	1204734219.	31.2535031	0.0003516	-0.000256	1.3417321	9.0513179 C
0.00001188	13649.	1149399123.	30.6086594	0.0003635	-0.000278	1.3820549	9.3321008 C
0.00001250	13973.	1117808406.	30.0150303	0.0003752	-0.000300	1.4215047	9.6080735 C
0.00001313	14285.	1088365496.	29.4660604	0.0003867	-0.000322	1.4601283	9.8795255 C
0.00001375	14587.	1060871251.	28.9564728	0.0003982	-0.000344	1.4979750	10.1467811 C
0.00001438	14880.	1035157869.	28.4819980	0.0004094	-0.000367	1.5350974	10.4102017 C
0.00001500	15166.	1011082122.	28.0391718	0.0004206	-0.000389	1.5715513	10.6701898 C
0.00001563	15446.	988520290.	27.6251841	0.0004316	-0.000412	1.6073959	10.9271928 C
0.00001625	15720.	967365435.	27.2377868	0.0004426	-0.000435	1.6426960	11.1817196 C
0.00001688	15987.	947365984.	26.8717504	0.0004535	-0.000458	1.6773337	-11.558181 C
0.00001750	16250.	928547754.	26.5275511	0.0004642	-0.000481	1.7114732	-12.160943 C
0.00001813	16509.	910856514.	26.2043858	0.0004750	-0.000504	1.7452039	-12.765126 C
0.00001875	16762.	893997619.	25.8957132	0.0004855	-0.000527	1.7782663	-13.373143 C
0.00001938	17014.	878145963.	25.6059610	0.0004961	-0.000550	1.8110241	-13.981719 C
0.00002000	17260.	863014335.	25.3285471	0.0005066	-0.000573	1.8431791	-14.593643 C
0.00002063	17505.	848739606.	25.0672652	0.0005170	-0.000597	1.8750527	-15.205973 C
0.00002125	17745.	835071401.	24.8160517	0.0005273	-0.000620	1.9063435	-15.821571 C
0.00002188	17985.	822169571.	24.5796368	0.0005377	-0.000644	1.9374317	-16.436887 C
0.00002250	18219.	809753578.	24.3506261	0.0005479	-0.000667	1.9678977	-17.055941 C
0.00002313	18453.	797986066.	24.1341387	0.0005581	-0.000691	1.9981470	-17.674899 C
0.00002375	18685.	786727137.	23.9264540	0.0005683	-0.000714	2.0279862	-18.295642 C
0.00002438	18913.	775937352.	23.7268646	0.0005783	-0.000738	2.0574172	-18.918191 C
0.00002563	19367.	755779462.	23.3539237	0.0005984	-0.000785	2.1153939	-20.165497 C
0.00002688	19814.	737254765.	23.0104479	0.0006184	-0.000833	2.1720896	-21.416876 C
0.00002813	20253.	720114858.	22.6908272	0.0006382	-0.000881	2.2273893	-22.673701 C

MEG-33 rear abutment Z direction

0.00002938	20690.	704336785.	22.3974590	0.0006579	-0.000928	2.2817621	-23.931333	C
0.00003063	21119.	689597096.	22.1207865	0.0006774	-0.000976	2.3346802	-25.195408	C
0.00003188	21547.	675976833.	21.8667849	0.0006970	-0.001024	2.3868540	-26.458584	C
0.00003313	21968.	663171717.	21.6251922	0.0007163	-0.001072	2.4376038	-27.728256	C
0.00003438	22387.	651267100.	21.4021512	0.0007357	-0.001121	2.4876305	-28.996949	C
0.00003563	22803.	640070324.	21.1910229	0.0007549	-0.001169	2.5365015	-30.269506	C
0.00003688	23215.	629555793.	20.9927707	0.0007741	-0.001217	2.5844360	-31.543600	C
0.00003813	23626.	619703608.	20.8083969	0.0007933	-0.001265	2.6316556	-32.816722	C
0.00003938	24032.	610347262.	20.6310208	0.0008123	-0.001314	2.6776221	-34.095222	C
0.00004063	24437.	601530303.	20.4647530	0.0008314	-0.001362	2.7228220	-35.373495	C
0.00004188	24841.	593215560.	20.3092091	0.0008504	-0.001411	2.7673146	-36.650798	C
0.00004313	25241.	585307594.	20.1603139	0.0008694	-0.001459	2.8107822	-37.931064	C
0.00004438	25639.	577789577.	20.0185323	0.0008883	-0.001508	2.8533412	-39.212970	C
0.00004563	26036.	570661721.	19.8852535	0.0009073	-0.001556	2.8951993	-40.493906	C
0.00004688	26432.	563892672.	19.7598025	0.0009262	-0.001605	2.9363529	-41.773862	C
0.00004813	26826.	557417655.	19.6389913	0.0009451	-0.001654	2.9765317	-43.056439	C
0.00004938	27217.	551225350.	19.5232040	0.0009640	-0.001702	3.0158233	-44.340581	C
0.00005063	27607.	545319415.	19.4138071	0.0009828	-0.001751	3.0544161	-45.623736	C
0.00005188	27996.	539678975.	19.3103436	0.0010017	-0.001800	3.0923063	-46.905896	C
0.00005313	28384.	534285126.	19.2123996	0.0010207	-0.001848	3.1294901	-48.187055	C
0.00005438	28770.	529096063.	19.1175326	0.0010395	-0.001897	3.1657462	-49.470459	C
0.00005563	29151.	524062700.	19.0255099	0.0010583	-0.001945	3.2010814	-50.000000	CY
0.00005688	29503.	518730028.	18.9331096	0.0010768	-0.001994	3.2351856	-50.000000	CY
0.00005813	29812.	512895062.	18.8379197	0.0010950	-0.002044	3.2678328	-50.000000	CY
0.00005938	30071.	506464474.	18.7386296	0.0011126	-0.002094	3.2989133	-50.000000	CY
0.00006063	30322.	500159373.	18.6425902	0.0011302	-0.002144	3.3292308	-50.000000	CY
0.00006188	30570.	494053629.	18.5473988	0.0011476	-0.002194	3.3585598	-50.000000	CY
0.00006313	30813.	488129970.	18.4554219	0.0011650	-0.002244	3.3871749	-50.000000	CY
0.00006438	31023.	481909646.	18.3612913	0.0011820	-0.002294	3.4145391	-50.000000	CY
0.00006563	31197.	475382714.	18.2646720	0.0011986	-0.002345	3.4406463	-50.000000	CY
0.00006688	31368.	469053947.	18.1716169	0.0012152	-0.002396	3.4661532	-50.000000	CY
0.00006813	31538.	462945025.	18.0820212	0.0012318	-0.002447	3.4910693	-50.000000	CY
0.00006938	31705.	457002840.	17.9922955	0.0012482	-0.002498	3.5150461	-50.000000	CY
0.00007063	31870.	451263703.	17.9061344	0.0012646	-0.002549	3.5384838	-50.000000	CY
0.00007188	32036.	445716958.	17.8233543	0.0012811	-0.002600	3.5613799	-50.000000	CY
0.00007313	32201.	440352680.	17.7437841	0.0012975	-0.002651	3.5837314	-50.000000	CY
0.00007438	32365.	435161608.	17.6672643	0.0013140	-0.002702	3.6055357	-50.000000	CY
0.00007938	32840.	413738506.	17.3463679	0.0013769	-0.002909	3.6832113	-50.000000	CY
0.00008438	33252.	394098830.	17.0530731	0.0014389	-0.003117	3.7514491	-50.000000	CY
0.00008938	33647.	376468485.	16.7853977	0.0015002	-0.003326	3.8108273	-50.000000	CY

MEG-33 rear abutment Z direction

0.00009438	34034.	360619909.	16.5483233	0.0015617	-0.003535	3.8622796	-50.000000	CY
0.00009938	34360.	345756732.	16.3202970	0.0016218	-0.003744	3.9046213	-50.000000	CY
0.0001044	34582.	331324961.	16.0921013	0.0016796	-0.003957	3.9379999	-50.000000	CY
0.0001094	34798.	318148704.	15.8856098	0.0017375	-0.004169	3.9642546	-50.000000	CY
0.0001144	35000.	306009619.	15.6910359	0.0017947	-0.004382	3.9831324	-50.000000	CY
0.0001194	35198.	294849497.	15.5160619	0.0018522	-0.004594	3.9950624	-50.000000	CY
0.0001244	35389.	284534709.	15.3561687	0.0019099	-0.004806	3.9998892	-50.000000	CY
0.0001294	35569.	274925985.	15.2038866	0.0019670	-0.005019	3.9993491	-50.000000	CY
0.0001344	35743.	265994783.	15.0662493	0.0020245	-0.005232	3.9979068	-50.000000	CY
0.0001394	35912.	257667351.	14.9415053	0.0020825	-0.005444	3.9974776	-50.000000	CY
0.0001444	36042.	249641449.	14.8164101	0.0021391	-0.005657	3.9995494	-50.000000	CY
0.0001494	36126.	241851015.	14.6842457	0.0021935	-0.005873	3.9965005	-50.000000	CY
0.0001544	36206.	234533273.	14.5622274	0.0022480	-0.006088	3.9997994	-50.000000	CY
0.0001594	36282.	227653447.	14.4504448	0.0023030	-0.006303	3.9964017	50.000000	CY
0.0001644	36356.	221176298.	14.3475687	0.0023584	-0.006518	3.9997092	50.000000	CY
0.0001694	36423.	215042453.	14.2478311	0.0024132	-0.006733	3.9948701	50.000000	CY
0.0001744	36482.	209215618.	14.1548236	0.0024682	-0.006948	3.9989828	50.000000	CY
0.0001794	36539.	203703961.	14.0685795	0.0025236	-0.007163	3.9975939	50.000000	CY
0.0001844	36594.	198474344.	13.9894957	0.0025793	-0.007377	3.9967609	50.000000	CY
0.0001894	36645.	193502796.	13.9173405	0.0026356	-0.007591	3.9996500	50.000000	CY
0.0001944	36694.	188777143.	13.8505151	0.0026922	-0.007804	3.9941358	50.000000	CY
0.0001994	36740.	184277742.	13.7888105	0.0027491	-0.008017	3.9969299	50.000000	CY
0.0002044	36778.	179954900.	13.7317689	0.0028064	-0.008230	3.9996389	50.000000	CY
0.0002094	36814.	175826217.	13.6770540	0.0028636	-0.008443	3.9948798	50.000000	CY
0.0002144	36847.	171882980.	13.6263125	0.0029211	-0.008655	3.9952686	50.000000	CY
0.0002194	36879.	168108510.	13.5800998	0.0029791	-0.008867	3.9988103	50.000000	CY
0.0002244	36907.	164486304.	13.5390838	0.0030378	-0.009078	3.9998378	50.000000	CYT
0.0002294	36932.	161013200.	13.5016245	0.0030969	-0.009289	3.9909156	50.000000	CYT
0.0002344	36957.	157684714.	13.4666462	0.0031562	-0.009500	3.9960956	50.000000	CYT
0.0002394	36981.	154491688.	13.4340174	0.0032158	-0.009710	3.9991337	50.000000	CYT
0.0002444	37005.	151425213.	13.4037113	0.0032755	-0.009921	3.9988541	50.000000	CYT
0.0002494	37026.	148474819.	13.3761284	0.0033357	-0.010131	3.9889330	50.000000	CYT
0.0002544	37039.	145609791.	13.3462824	0.0033950	-0.010341	3.9943361	50.000000	CYT
0.0002594	37050.	142844094.	13.3169881	0.0034541	-0.010552	3.9979314	50.000000	CYT
0.0002644	37060.	140180695.	13.2894882	0.0035134	-0.010763	3.9997593	50.000000	CYT
0.0002694	37066.	137601257.	13.2622566	0.0035725	-0.010974	3.9957891	50.000000	CYT
0.0002744	37066.	135093717.	13.2330962	0.0036308	-0.011185	3.9872423	50.000000	CYT
0.0003044	37066.	121778525.	13.1353229	0.0039981	-0.012438	3.9871046	50.000000	CYT

MEG-33 rear abutment Z direction

 Summary of Results for Nominal Moment Capacity for Section 1

Moment values interpolated at maximum compressive strain = 0.003
 or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain	Max. Tens. Strain
1	637.400	33585.679	0.00300000	-0.01015581
2	852.300	36888.690	0.00300000	-0.00894223

Note that the values of moment capacity in the table above are not factored by a strength reduction factor (phi-factor).

In ACI 318, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.75).

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318, or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Load No.	Resist. Factor	Nominal Ax. Thrust kips	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in^2
1	0.65	637.400000	33586.	414.310000	21831.	537605250.
2	0.65	852.300000	36889.	553.995000	23978.	611608864.
1	0.75	637.400000	33586.	478.050000	25189.	491301122.
2	0.75	852.300000	36889.	639.225000	27667.	544453566.
1	0.90	637.400000	33586.	573.660000	30227.	347738359.
2	0.90	852.300000	36889.	767.070000	33200.	396592835.

MEG-33 rear abutment Z direction

Pile Section No. 2:

Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section	=	10.000000 ft
Shaft Diameter	=	48.000000 in
Concrete Cover Thickness (to edge of trans. reinf.)	=	3.000000 in
Number of Reinforcing Bars	=	20 bars
Yield Stress of Reinforcing Bars	=	50000. psi
Modulus of Elasticity of Reinforcing Bars	=	29000000. psi
Gross Area of Shaft	=	1810. sq. in.
Total Area of Reinforcing Steel	=	20.000000 sq. in.
Area Ratio of Steel Reinforcement	=	1.11 percent
Edge-to-Edge Bar Spacing	=	5.070246 in
Maximum Concrete Aggregate Size	=	0.750000 in
Ratio of Bar Spacing to Aggregate Size	=	6.76
Offset of Center of Rebar Cage from Center of Pile	=	0.0000 in
Transverse Reinforcement		
Type: Spiral		
Number of Transverse Reinf. (per spacing)	=	1
Spacing of Transverse Reinf.	=	3.750000 in
Yield Stress of Transverse Reinf.	=	50000. psi
Diameter of Transverse Reinf.	=	0.625000 in

Axial Structural Capacities:

Nom. Axial Structural Capacity = $0.85 F_c A_c + F_y A_s$	=	7084.495 kips
Tensile Load for Cracking of Concrete	=	-811.209 kips
Nominal Axial Tensile Capacity	=	-1000.000 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
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MEG-33 rear abutment Z direction

1	1.128000	1.000000	19.811000	0.000000
2	1.128000	1.000000	18.841381	6.121936
3	1.128000	1.000000	16.027436	11.644614
4	1.128000	1.000000	11.644614	16.027436
5	1.128000	1.000000	6.121936	18.841381
6	1.128000	1.000000	0.000000	19.811000
7	1.128000	1.000000	-6.12194	18.841381
8	1.128000	1.000000	-11.64461	16.027436
9	1.128000	1.000000	-16.02744	11.644614
10	1.128000	1.000000	-18.84138	6.121936
11	1.128000	1.000000	-19.81100	0.000000
12	1.128000	1.000000	-18.84138	-6.12194
13	1.128000	1.000000	-16.02744	-11.64461
14	1.128000	1.000000	-11.64461	-16.02744
15	1.128000	1.000000	-6.12194	-18.84138
16	1.128000	1.000000	0.000000	-19.81100
17	1.128000	1.000000	6.121936	-18.84138
18	1.128000	1.000000	11.644614	-16.02744
19	1.128000	1.000000	16.027436	-11.64461
20	1.128000	1.000000	18.841381	-6.12194

NOTE: The positions of the above rebars were computed by LPILE

Minimum spacing between any two bars not equal to zero = 5.070 inches
between bars 17 and 18.

Ratio of bar spacing to maximum aggregate size = 6.76

Concrete Properties:

Compressive Strength of Concrete	=	4000.	psi
Modulus of Elasticity of Concrete	=	3604997.	psi
Modulus of Rupture of Concrete	=	-474.34165	psi
Compression Strain at Peak Stress	=	0.001886	
Tensile Strain at Fracture of Concrete	=	-0.0001154	
Maximum Coarse Aggregate Size	=	0.750000	in

MEG-33 rear abutment Z direction

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 2

Number	Axial Thrust Force kips
1	637.400
2	852.300

Definitions of Run Messages and Notes:

-
- C = concrete in section has cracked in tension.
 - Y = stress in reinforcing steel has reached yield stress.
 - T = ACI 318 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than 0.003. See ACI 318-14, Section 21.2.3.
 - Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
 Position of neutral axis is measured from edge of compression side of pile.
 Compressive stresses and strains are positive in sign.
 Tensile stresses and strains are negative in sign.

Axial Thrust Force = 637.400 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
6.25000E-07	722.8640984	1156582557.	151.3482717	0.00009459	0.00006459	0.3905202	2.6779374	
0.00000125	1446.	1156563501.	87.7086063	0.0001096	0.00004964	0.4502725	3.0489370	
0.00000188	2168.	1156523991.	66.5107033	0.0001247	0.00003471	0.5096399	3.4207695	
0.00000250	2891.	1156466934.	55.9232421	0.0001398	0.00001981	0.5686194	3.7934351	
0.00000313	3614.	1156392908.	49.5799590	0.0001549	0.00000494	0.6272083	4.1669338	
0.00000375	4336.	1156289927.	45.3586987	0.0001701	-0.00000990	0.6854026	4.5412585	
0.00000438	5058.	1156004285.	42.3490875	0.0001853	-0.00002472	0.7431838	4.9162905	

MEG-33 rear abutment Z direction

0.00000500	5777.	1155402202.	40.0954776	0.0002005	-0.00003952	0.8005252	5.2918442
0.00000563	6494.	1154474396.	38.3450350	0.0002157	-0.00005431	0.8574074	5.6677838
0.00000625	7208.	1153257200.	36.9463041	0.0002309	-0.00006909	0.9138172	6.0440176
0.00000688	7919.	1151795193.	35.8030477	0.0002461	-0.00008385	0.9697455	6.4204827
0.00000750	8626.	1150130142.	34.8512003	0.0002614	-0.00009862	1.0251861	6.7971361
0.00000813	8626.	1061658593.	32.2802641	0.0002623	-0.000128	1.0279036	6.7577873 C
0.00000875	8626.	985825836.	31.3195090	0.0002740	-0.000146	1.0702274	7.0338254 C
0.00000938	8626.	920104114.	30.4618892	0.0002856	-0.000164	1.1114043	7.3030761 C
0.00001000	8626.	862597607.	29.6892738	0.0002969	-0.000183	1.1514953	7.5658894 C
0.00001063	8626.	811856571.	28.9911617	0.0003080	-0.000202	1.1906871	7.8236516 C
0.00001125	8781.	780561242.	28.3538785	0.0003190	-0.000221	1.2289427	8.0759529 C
0.00001188	9016.	759252756.	27.7710273	0.0003298	-0.000240	1.2664094	8.3238976 C
0.00001250	9243.	739426842.	27.2350635	0.0003404	-0.000260	1.3031249	8.5677105 C
0.00001313	9462.	720936533.	26.7399497	0.0003510	-0.000279	1.3391295	8.8076434 C
0.00001375	9675.	703659572.	26.2808189	0.0003614	-0.000299	1.3744655	9.0439766 C
0.00001438	9883.	687492868.	25.8537251	0.0003716	-0.000318	1.4091784	9.2770217 C
0.00001500	10085.	672348342.	25.4554571	0.0003818	-0.000338	1.4433161	9.5071239 C
0.00001563	10284.	658149765.	25.0833984	0.0003919	-0.000358	1.4769300	9.7346650 C
0.00001625	10478.	644817224.	24.7350616	0.0004019	-0.000378	1.5100552	9.9598977 C
0.00001688	10668.	632192275.	24.4057822	0.0004118	-0.000398	1.5425831	10.1818297 C
0.00001750	10856.	620331100.	24.0969258	0.0004217	-0.000418	1.5747181	10.4021899 C
0.00001813	11041.	609151181.	23.8062393	0.0004315	-0.000439	1.6064555	-10.824595 C
0.00001875	11222.	598530163.	23.5300024	0.0004412	-0.000459	1.6376826	-11.348061 C
0.00001938	11403.	588542415.	23.2707492	0.0004509	-0.000479	1.6686521	-11.871998 C
0.00002000	11580.	578986271.	23.0221300	0.0004604	-0.000500	1.6990590	-12.399165 C
0.00002063	11756.	569990652.	22.7886784	0.0004700	-0.000520	1.7292729	-12.926272 C
0.00002125	11929.	561358078.	22.5638417	0.0004795	-0.000541	1.7589418	-13.456533 C
0.00002188	12101.	553209313.	22.3522098	0.0004890	-0.000561	1.7884403	-13.986567 C
0.00002250	12271.	545384194.	22.1481588	0.0004983	-0.000582	1.8174490	-14.519326 C
0.00002313	12440.	537951545.	21.9546437	0.0005077	-0.000602	1.8462306	-15.052417 C
0.00002375	12608.	530854837.	21.7697356	0.0005170	-0.000623	1.8747054	-15.586595 C
0.00002438	12773.	524039676.	21.5915988	0.0005263	-0.000644	1.9027877	-16.122689 C
0.00002563	13103.	511320209.	21.2594694	0.0005448	-0.000685	1.9582425	-17.196307 C
0.00002688	13427.	499619019.	20.9533311	0.0005631	-0.000727	2.0125603	-18.273747 C
0.00002813	13748.	488804796.	20.6694112	0.0005813	-0.000769	2.0657316	-19.355262 C
0.00002938	14066.	478844491.	20.4086502	0.0005995	-0.000810	2.1180962	-20.437631 C
0.00003063	14380.	469539468.	20.1631233	0.0006175	-0.000853	2.1692103	-21.525376 C
0.00003188	14692.	460937146.	19.9374860	0.0006355	-0.000894	2.2196778	-22.612536 C
0.00003313	15001.	452858551.	19.7237641	0.0006533	-0.000937	2.2689673	-23.704609 C
0.00003438	15309.	445338357.	19.5258783	0.0006712	-0.000979	2.3175926	-24.796390 C

MEG-33 rear abutment Z direction

0.00003563	15614.	438276699.	19.3395100	0.0006890	-0.001021	2.3652963	-25.890619	C
0.00003688	15917.	431634611.	19.1639367	0.0007067	-0.001063	2.4121326	-26.986816	C
0.00003813	16219.	425410155.	19.0005925	0.0007244	-0.001106	2.4583601	-28.082220	C
0.00003938	16518.	419510997.	18.8445825	0.0007420	-0.001148	2.5035945	-29.181092	C
0.00004063	16816.	413940551.	18.6975712	0.0007596	-0.001190	2.5480929	-30.280674	C
0.00004188	17114.	408686672.	18.5599878	0.0007772	-0.001233	2.5919883	-31.379465	C
0.00004313	17410.	403700904.	18.4293396	0.0007948	-0.001275	2.6350987	-32.479557	C
0.00004438	17703.	398949167.	18.3040903	0.0008122	-0.001318	2.6773266	-33.582174	C
0.00004563	17996.	394443362.	18.1863039	0.0008298	-0.001360	2.7189565	-34.683997	C
0.00004688	18289.	390163736.	18.0753872	0.0008473	-0.001403	2.7599860	-35.785020	C
0.00004813	18580.	386081789.	17.9698082	0.0008648	-0.001445	2.8003002	-36.886636	C
0.00004938	18869.	382166952.	17.8676912	0.0008822	-0.001488	2.8397358	-37.990950	C
0.00005063	19158.	378432543.	17.7711668	0.0008997	-0.001530	2.8785748	-39.094456	C
0.00005188	19446.	374865420.	17.6798345	0.0009171	-0.001573	2.9168146	-40.197149	C
0.00005313	19733.	371453681.	17.5933314	0.0009346	-0.001615	2.9544521	-41.299025	C
0.00005438	20020.	368183710.	17.5110143	0.0009522	-0.001658	2.9914485	-42.400569	C
0.00005563	20305.	365025912.	17.4303844	0.0009696	-0.001700	3.0275443	-43.505361	C
0.00005688	20588.	361995429.	17.3538036	0.0009870	-0.001743	3.0630413	-44.609320	C
0.00005813	20872.	359083960.	17.2810144	0.0010045	-0.001786	3.0979366	-45.712440	C
0.00005938	21154.	356283900.	17.2117810	0.0010219	-0.001828	3.1322273	-46.814715	C
0.00006063	21436.	353588273.	17.1458872	0.0010395	-0.001871	3.1659104	-47.916138	C
0.00006188	21718.	350990666.	17.0831342	0.0010570	-0.001913	3.1989830	-49.016703	C
0.00006313	21997.	348472845.	17.0225786	0.0010746	-0.001955	3.2313529	-50.000000	CY
0.00006438	22267.	345889777.	16.9612477	0.0010919	-0.001998	3.2626887	-50.000000	CY
0.00006563	22514.	343076254.	16.8981638	0.0011089	-0.002041	3.2928938	-50.000000	CY
0.00006688	22731.	339903505.	16.8312315	0.0011256	-0.002084	3.3217426	-50.000000	CY
0.00006813	22918.	336406474.	16.7607324	0.0011418	-0.002128	3.3492887	-50.000000	CY
0.00006938	23098.	332948946.	16.6919491	0.0011580	-0.002172	3.3761681	-50.000000	CY
0.00007063	23279.	329607180.	16.6259603	0.0011742	-0.002216	3.4025222	-50.000000	CY
0.00007188	23458.	326372326.	16.5625775	0.0011904	-0.002260	3.4283434	-50.000000	CY
0.00007313	23625.	323078084.	16.4967926	0.0012063	-0.002304	3.4530703	-50.000000	CY
0.00007438	23763.	319506083.	16.4269200	0.0012218	-0.002348	3.4765321	-50.000000	CY
0.00007938	24249.	305503141.	16.1584804	0.0012826	-0.002527	3.5640191	-50.000000	CY
0.00008438	24725.	293032524.	15.9189415	0.0013432	-0.002707	3.6432005	-50.000000	CY
0.00008938	25110.	280951580.	15.6872374	0.0014020	-0.002888	3.7125296	-50.000000	CY
0.00009438	25403.	269171330.	15.4575744	0.0014588	-0.003071	3.7722315	-50.000000	CY
0.00009938	25689.	258505094.	15.2504203	0.0015155	-0.003254	3.8249392	-50.000000	CY
0.0001044	25969.	248802448.	15.0634814	0.0015723	-0.003438	3.8707500	-50.000000	CY
0.0001094	26240.	239908502.	14.8904194	0.0016286	-0.003621	3.9094006	-50.000000	CY
0.0001144	26463.	231366793.	14.7230896	0.0016840	-0.003806	3.9406489	-50.000000	CY

MEG-33 rear abutment Z direction

0.0001194	26621.	223005308.	14.5520405	0.0017371	-0.003993	3.9644717	-50.000000	CY
0.0001244	26769.	215229956.	14.3915301	0.0017899	-0.004180	3.9821024	-50.000000	CY
0.0001294	26914.	208032535.	14.2459291	0.0018431	-0.004367	3.9938015	-50.000000	CY
0.0001344	27054.	201332662.	14.1106047	0.0018961	-0.004554	3.9994355	-50.000000	CY
0.0001394	27187.	195064376.	13.9823677	0.0019488	-0.004741	3.9983913	-50.000000	CY
0.0001444	27317.	189207732.	13.8654950	0.0020018	-0.004928	3.9963600	-50.000000	CY
0.0001494	27443.	183720678.	13.7589169	0.0020552	-0.005115	3.9998811	-50.000000	CY
0.0001544	27566.	178562036.	13.6603711	0.0021088	-0.005301	3.9984774	-50.000000	CY
0.0001594	27680.	173680630.	13.5643303	0.0021618	-0.005488	3.9975563	-50.000000	CY
0.0001644	27775.	168972509.	13.4699008	0.0022141	-0.005676	3.9991679	-50.000000	CY
0.0001694	27846.	164405959.	13.3750099	0.0022654	-0.005865	3.9958391	-50.000000	CY
0.0001744	27903.	160018168.	13.2827011	0.0023162	-0.006054	3.9989576	-50.000000	CY
0.0001794	27957.	155859482.	13.1961865	0.0023671	-0.006243	3.9977285	-50.000000	CY
0.0001844	28005.	151890985.	13.1100808	0.0024172	-0.006433	3.9977888	50.000000	CY
0.0001894	28051.	148126726.	13.0296417	0.0024675	-0.006623	3.9998957	50.000000	CY
0.0001944	28096.	144547787.	12.9548838	0.0025181	-0.006812	3.9948145	50.000000	CY
0.0001994	28138.	141129538.	12.8871825	0.0025694	-0.007001	3.9986511	50.000000	CY
0.0002044	28178.	137874370.	12.8237332	0.0026209	-0.007189	3.9999985	50.000000	CY
0.0002094	28217.	134766989.	12.7647793	0.0026726	-0.007377	3.9948176	50.000000	CY
0.0002144	28252.	131788328.	12.7105223	0.0027248	-0.007565	3.9985347	50.000000	CY
0.0002194	28284.	128930785.	12.6560633	0.0027764	-0.007754	3.9999730	50.000000	CY
0.0002244	28315.	126194866.	12.6053315	0.0028283	-0.007942	3.9926058	50.000000	CY
0.0002294	28345.	123575149.	12.5576259	0.0028804	-0.008130	3.9969816	50.000000	CY
0.0002344	28370.	121045703.	12.5168292	0.0029336	-0.008316	3.9994857	50.000000	CY
0.0002394	28394.	118618216.	12.4786947	0.0029871	-0.008503	3.9970947	50.000000	CY
0.0002444	28417.	116285591.	12.4432385	0.0030408	-0.008689	3.9933164	50.000000	CYT
0.0002494	28440.	114044351.	12.4098490	0.0030947	-0.008875	3.9973648	50.000000	CYT
0.0002544	28459.	111879786.	12.3806545	0.0031493	-0.009061	3.9995945	50.000000	CYT
0.0002594	28477.	109792650.	12.3541538	0.0032044	-0.009246	3.9966021	50.000000	CYT
0.0002644	28495.	107780719.	12.3296710	0.0032597	-0.009430	3.9916922	50.000000	CYT
0.0002694	28511.	105841609.	12.3066984	0.0033151	-0.009615	3.9962045	50.000000	CYT
0.0002744	28527.	103971295.	12.2851678	0.0033707	-0.009799	3.9989829	50.000000	CYT
0.0003044	28588.	93923153.	12.1612763	0.0037016	-0.010908	3.9998656	50.000000	CYT
0.0003344	28588.	85496403.	12.2050319	0.0040811	-0.011969	3.9912099	50.000000	CYT

Axial Thrust Force = 852.300 kips

Bending Curvature	Bending Moment	Bending Stiffness	Depth to N Axis	Max Comp Strain	Max Tens Strain	Max Conc Stress	Max Steel Stress	Run Msg
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MEG-33 rear abutment Z direction

rad/in.	in-kip	kip-in2	in	in/in	in/in	ksi	ksi
6.25000E-07	712.9161275	1140665804.	195.4637400	0.0001222	0.00009216	0.5007490	3.4775303
0.00000125	1426.	1140648415.	109.7668347	0.0001372	0.00007721	0.5595804	3.8485478
0.00000188	2139.	1140608986.	81.2167380	0.0001523	0.00006228	0.6180267	4.2204101
0.00000250	2851.	1140551434.	66.9533447	0.0001674	0.00004738	0.6760849	4.5931175
0.00000313	3564.	1140476540.	58.4046344	0.0001825	0.00003251	0.7337521	4.9666700
0.00000375	4276.	1140384563.	52.7132670	0.0001977	0.00001767	0.7910254	5.3410678
0.00000438	4989.	1140275610.	48.6546688	0.0002129	0.00000286	0.8479020	5.7163111
0.00000500	5701.	1140138376.	45.6164887	0.0002281	-0.00001192	0.9043775	6.0923909
0.00000563	6412.	1139872430.	43.2579706	0.0002433	-0.00002667	0.9604364	6.4692065
0.00000625	7121.	1139386248.	41.3744058	0.0002586	-0.00004141	1.0160574	6.8466111
0.00000688	7828.	1138654630.	39.8356697	0.0002739	-0.00005613	1.0712238	7.2244867
0.00000750	8533.	1137685665.	38.5551476	0.0002892	-0.00007084	1.1259228	7.6027445
0.00000813	9234.	1136500717.	37.4729719	0.0003045	-0.00008553	1.1801451	7.9813190
0.00000875	9932.	1135124449.	36.5464439	0.0003198	-0.000100	1.2338834	8.3601601
0.00000938	10627.	1133580955.	35.7442957	0.0003351	-0.000115	1.2871324	8.7392304
0.00001000	10627.	1062732146.	33.5960205	0.0003360	-0.000144	1.2896027	8.6988460 C
0.00001063	10627.	1000218490.	32.7693886	0.0003482	-0.000162	1.3315586	8.9878179 C
0.00001125	10627.	944650796.	32.0161329	0.0003602	-0.000180	1.3724730	9.2707634 C
0.00001188	10627.	894932333.	31.3261430	0.0003720	-0.000198	1.4124222	9.5481905 C
0.00001250	10627.	850185716.	30.6910984	0.0003836	-0.000216	1.4514707	9.8205230 C
0.00001313	10856.	827088961.	30.1051909	0.0003951	-0.000235	1.4897221	10.0885383 C
0.00001375	11113.	808234318.	29.5624686	0.0004065	-0.000254	1.5272222	10.3525343 C
0.00001438	11362.	790397217.	29.0575302	0.0004177	-0.000272	1.5639924	10.6126079 C
0.00001500	11603.	773500437.	28.5860314	0.0004288	-0.000291	1.6000615	10.8689237 C
0.00001563	11836.	757485977.	28.1445240	0.0004398	-0.000310	1.6354679	11.1217375 C
0.00001625	12062.	742303620.	27.7301590	0.0004506	-0.000329	1.6702524	11.3713375 C
0.00001688	12283.	727908905.	27.3405733	0.0004614	-0.000349	1.7044585	11.6180431 C
0.00001750	12500.	714261959.	26.9738073	0.0004720	-0.000368	1.7381321	11.8622072 C
0.00001813	12712.	701326568.	26.6282410	0.0004826	-0.000387	1.7713220	12.1042192 C
0.00001875	12918.	688939261.	26.2993802	0.0004931	-0.000407	1.8038935	12.3427881 C
0.00001938	13120.	677179797.	25.9884582	0.0005035	-0.000426	1.8360271	12.5795150 C
0.00002000	13320.	666019455.	25.6945071	0.0005139	-0.000446	1.8677715	12.8148142 C
0.00002063	13515.	655285283.	25.4127634	0.0005241	-0.000466	1.8989257	13.0467591 C
0.00002125	13709.	645111549.	25.1464846	0.0005344	-0.000486	1.9297789	13.2780212 C
0.00002188	13898.	635330958.	24.8910667	0.0005445	-0.000506	1.9601153	13.5065205 C
0.00002250	14086.	626022967.	24.6485530	0.0005546	-0.000525	1.9901407	13.7341807 C
0.00002313	14270.	617070005.	24.4155924	0.0005646	-0.000545	2.0196983	13.9594567 C
0.00002375	14453.	608542340.	24.1942005	0.0005746	-0.000565	2.0489882	14.1842557 C

MEG-33 rear abutment Z direction

0.00002438	14633.	600310809.	23.9805116	0.0005845	-0.000585	2.0777982	-14.434026	C
0.00002563	14988.	584891238.	23.5811213	0.0006043	-0.000626	2.1345317	-15.471029	C
0.00002688	15337.	570669853.	23.2135205	0.0006239	-0.000666	2.1900041	-16.512213	C
0.00002813	15679.	557472059.	22.8725638	0.0006433	-0.000707	2.2441627	-17.558315	C
0.00002938	16015.	545192652.	22.5552609	0.0006626	-0.000747	2.2970626	-18.608987	C
0.00003063	16348.	533798094.	22.2615291	0.0006818	-0.000788	2.3489589	-19.661729	C
0.00003188	16674.	523119176.	21.9857771	0.0007008	-0.000829	2.3996197	-20.719147	C
0.00003313	16998.	513148075.	21.7286835	0.0007198	-0.000870	2.4493027	-21.778633	C
0.00003438	17318.	503787944.	21.4873085	0.0007386	-0.000911	2.4979362	-22.841089	C
0.00003563	17634.	495000257.	21.2608928	0.0007574	-0.000953	2.5456146	-23.905590	C
0.00003688	17947.	486711447.	21.0471408	0.0007761	-0.000994	2.5922747	-24.972964	C
0.00003813	18259.	478925291.	20.8472528	0.0007948	-0.001035	2.6381597	-26.040506	C
0.00003938	18566.	471520501.	20.6560293	0.0008133	-0.001077	2.6828987	-27.112646	C
0.00004063	18872.	464551118.	20.4773398	0.0008319	-0.001118	2.7269649	-28.183884	C
0.00004188	19176.	457928484.	20.3071914	0.0008504	-0.001160	2.7700719	-29.257704	C
0.00004313	19477.	451630975.	20.1453009	0.0008688	-0.001201	2.8122763	-30.333534	C
0.00004438	19777.	445670065.	19.9932291	0.0008872	-0.001243	2.8538144	-31.408463	C
0.00004563	20074.	439982182.	19.8478614	0.0009056	-0.001284	2.8944474	-32.485548	C
0.00004688	20369.	434545299.	19.7086164	0.0009238	-0.001326	2.9341799	-33.564850	C
0.00004813	20664.	429374380.	19.5772480	0.0009422	-0.001368	2.9732517	-34.643253	C
0.00004938	20957.	424449060.	19.4531619	0.0009605	-0.001410	3.0116596	-35.720754	C
0.00005063	21247.	419702086.	19.3322358	0.0009787	-0.001451	3.0490247	-36.802611	C
0.00005188	21537.	415162943.	19.2173064	0.0009969	-0.001493	3.0856876	-37.884215	C
0.00005313	21825.	410822637.	19.1083741	0.0010151	-0.001535	3.1216920	-38.964911	C
0.00005438	22113.	406667300.	19.0050293	0.0010334	-0.001577	3.1570344	-40.044694	C
0.00005563	22398.	402661698.	18.9049969	0.0010516	-0.001618	3.1915098	-41.126627	C
0.00005688	22682.	398800130.	18.8083804	0.0010697	-0.001660	3.2251613	-42.210178	C
0.00005813	22965.	395091245.	18.7164664	0.0010879	-0.001702	3.2581555	-43.292807	C
0.00005938	23247.	391525321.	18.6289618	0.0011061	-0.001744	3.2904891	-44.374506	C
0.00006063	23528.	388093370.	18.5455979	0.0011243	-0.001786	3.3221586	-45.455270	C
0.00006188	23808.	384781958.	18.4656143	0.0011426	-0.001827	3.3531063	-46.536013	C
0.00006313	24086.	381565617.	18.3869917	0.0011607	-0.001869	3.3831411	-47.620063	C
0.00006438	24363.	378462057.	18.3119322	0.0011788	-0.001911	3.4125152	-48.703162	C
0.00006563	24640.	375464731.	18.2402362	0.0011970	-0.001953	3.4412253	-49.785301	C
0.00006688	24912.	372516091.	18.1710320	0.0012152	-0.001995	3.4691967	-50.000000	CY
0.00006813	25166.	369413364.	18.1014471	0.0012332	-0.002037	3.4961505	-50.000000	CY
0.00006938	25397.	366079635.	18.0302219	0.0012508	-0.002079	3.5219801	-50.000000	CY
0.00007063	25594.	362394578.	17.9539774	0.0012680	-0.002122	3.5463699	-50.000000	CY
0.00007188	25773.	358579836.	17.8761231	0.0012848	-0.002165	3.5696950	-50.000000	CY
0.00007313	25951.	354887896.	17.8013248	0.0013017	-0.002208	3.5924436	-50.000000	CY

MEG-33 rear abutment Z direction

0.00007438	26129.	351312502.	17.7294313	0.0013186	-0.002251	3.6146127	-50.000000	CY
0.00007938	26726.	336708483.	17.4431968	0.0013846	-0.002425	3.6951129	-50.000000	CY
0.00008438	27206.	322444006.	17.1671901	0.0014485	-0.002602	3.7641384	-50.000000	CY
0.00008938	27675.	309646188.	16.9215280	0.0015124	-0.002778	3.8242741	-50.000000	CY
0.00009438	28045.	297163557.	16.6811294	0.0015743	-0.002956	3.8741058	-50.000000	CY
0.00009938	28336.	285143588.	16.4483533	0.0016346	-0.003135	3.9146306	-50.000000	CY
0.0001044	28617.	274178550.	16.2362191	0.0016947	-0.003315	3.9472246	-50.000000	CY
0.0001094	28892.	264154684.	16.0454711	0.0017550	-0.003495	3.9720955	-50.000000	CY
0.0001144	29155.	254906906.	15.8674074	0.0018148	-0.003675	3.9890068	-50.000000	CY
0.0001194	29397.	246258505.	15.7035735	0.0018746	-0.003855	3.9981735	-50.000000	CY
0.0001244	29568.	237736243.	15.5359410	0.0019323	-0.004038	3.9978689	-50.000000	CY
0.0001294	29711.	229650713.	15.3734910	0.0019889	-0.004221	3.9970138	-50.000000	CY
0.0001344	29849.	222133837.	15.2263151	0.0020460	-0.004404	3.9999975	-50.000000	CY
0.0001394	29982.	215113959.	15.0910786	0.0021033	-0.004587	3.9996712	-50.000000	CY
0.0001444	30105.	208519351.	14.9615993	0.0021601	-0.004770	3.9983732	-50.000000	CY
0.0001494	30225.	202343339.	14.8433522	0.0022172	-0.004953	3.9973962	-50.000000	CY
0.0001544	30341.	196544015.	14.7353658	0.0022748	-0.005135	3.9995921	-50.000000	CY
0.0001594	30454.	191081041.	14.6369134	0.0023328	-0.005317	3.9971030	50.000000	CY
0.0001644	30559.	185907589.	14.5401420	0.0023900	-0.005500	3.9999072	50.000000	CY
0.0001694	30657.	180998458.	14.4535632	0.0024481	-0.005682	3.9974153	50.000000	CY
0.0001744	30751.	176348229.	14.3735401	0.0025064	-0.005864	3.9999345	50.000000	CY
0.0001794	30819.	171813792.	14.2941621	0.0025640	-0.006046	3.9967089	50.000000	CY
0.0001844	30871.	167437900.	14.2165146	0.0026212	-0.006229	3.9996615	50.000000	CY
0.0001894	30912.	163231382.	14.1393633	0.0026776	-0.006412	3.9941430	50.000000	CY
0.0001944	30942.	159184658.	14.0669923	0.0027343	-0.006596	3.9983466	50.000000	CY
0.0001994	30970.	155335007.	13.9995245	0.0027912	-0.006779	3.9999795	50.000000	CY
0.0002044	30997.	151665022.	13.9370528	0.0028484	-0.006962	3.9948114	50.000000	CY
0.0002094	31019.	148149699.	13.8815143	0.0029064	-0.007144	3.9986166	50.000000	CY
0.0002144	31040.	144791629.	13.8300240	0.0029648	-0.007325	3.9999959	50.000000	CY
0.0002194	31059.	141578699.	13.7825096	0.0030235	-0.007506	3.9938964	50.000000	CYT
0.0002244	31077.	138505222.	13.7380386	0.0030825	-0.007688	3.9979838	50.000000	CYT
0.0002294	31095.	135562210.	13.6963943	0.0031416	-0.007868	3.9998686	50.000000	CYT
0.0002344	31110.	132735061.	13.6552988	0.0032005	-0.008050	3.9935916	50.000000	CYT
0.0002394	31123.	130019539.	13.6151491	0.0032591	-0.008231	3.9954819	50.000000	CYT
0.0002444	31136.	127412709.	13.5773913	0.0033180	-0.008412	3.9986583	50.000000	CYT
0.0002494	31149.	124907946.	13.5419001	0.0033770	-0.008593	3.9999659	50.000000	CYT
0.0002544	31160.	122496772.	13.5091113	0.0034364	-0.008774	3.9925195	50.000000	CYT
0.0002594	31171.	120176081.	13.4783481	0.0034959	-0.008954	3.9943209	50.000000	CYT
0.0002644	31181.	117941290.	13.4493743	0.0035557	-0.009134	3.9978489	50.000000	CYT
0.0002694	31190.	115787568.	13.4221055	0.0036156	-0.009314	3.9997035	50.000000	CYT

MEG-33 rear abutment Z direction

0.0002744	31199.	113709340.	13.3967410	0.0036757	-0.009494	3.9963914	50.0000000	CYT
0.0003044	31199.	102501849.	13.4245928	0.0040861	-0.010524	3.9952924	50.0000000	CYT

 Summary of Results for Nominal Moment Capacity for Section 2

Moment values interpolated at maximum compressive strain = 0.003
 or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain	Max. Tens. Strain
1	637.400	28399.776	0.00300000	-0.00854768
2	852.300	31051.163	0.00300000	-0.00743381

Note that the values of moment capacity in the table above are not factored by a strength reduction factor (phi-factor).

In ACI 318, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.75).

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318, or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Load No.	Resist. Factor	Nominal Ax. Thrust kips	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in^2
1	0.65	637.400000	28400.	414.310000	18460.	387768204.
2	0.65	852.300000	31051.	553.995000	20183.	437972873.
1	0.75	637.400000	28400.	478.050000	21300.	354892971.
2	0.75	852.300000	31051.	639.225000	23288.	391018401.

MEG-33 rear abutment Z direction

1	0.90	637.400000	28400.	573.660000	25560.	263323189.
2	0.90	852.300000	31051.	767.070000	27946.	300493899.

 Layering Correction Equivalent Depths of Soil & Rock Layers

Layer No.	Top of Layer Below Pile Head ft	Equivalent Top Depth Below Grnd Surf ft	Same Layer Type As Layer Above	Layer is Rock or is Below Rock Layer	F0 Integral for Layer lbs	F1 Integral for Layer lbs
1	0.00	0.00	N.A.	No	0.00	910390.
2	15.0000	15.0000	No	Yes	N.A.	N.A.

Notes: The F0 integral of Layer n+1 equals the sum of the F0 and F1 integrals for Layer n. Layering correction equivalent depths are computed only for soil types with both shallow-depth and deep-depth expressions for peak lateral load transfer. These soil types are soft and stiff clays, non-liquefied sands, and cemented c-phi soil.

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 1

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 86000.0 lbs
 Applied moment at pile head = 6859680.0 in-lbs
 Axial thrust load on pile head = 637400.0 lbs

Depth Deflect. Bending Shear Slope Total Bending Soil Res. Soil Spr. Distrib.

X feet	y inches	Moment in-lbs	Force lbs	MEG-33 rear S radians	abutment Z Stress psi*	direction Stiffness lb-in^2	p lb/inch	Es*H lb/inch	Lat. Load lb/inch
0.00	0.1558	6859680.	86000.	-0.00145	0.00	1.84E+12	0.00	0.00	0.00
0.2500	0.1514	7120446.	85318.	-0.00144	0.00	1.84E+12	-454.341	9000.	0.00
0.5000	0.1471	7377101.	83451.	-0.00143	0.00	1.84E+12	-790.795	16123.	0.00
0.7500	0.1429	7626616.	81071.	-0.00142	0.00	1.84E+12	-795.940	16713.	0.00
1.0000	0.1386	7868944.	78676.	-0.00140	0.00	1.84E+12	-800.843	17329.	0.00
1.2500	0.1344	8104039.	76266.	-0.00139	0.00	1.84E+12	-805.498	17973.	0.00
1.5000	0.1303	8331859.	73843.	-0.00138	0.00	1.84E+12	-809.899	18648.	0.00
1.7500	0.1262	8552365.	71407.	-0.00136	0.00	1.84E+12	-814.041	19354.	0.00
2.0000	0.1221	8765517.	68959.	-0.00135	0.00	1.83E+12	-817.919	20094.	0.00
2.2500	0.1181	8971281.	66500.	-0.00134	0.00	1.83E+12	-821.525	20871.	0.00
2.5000	0.1141	9169623.	64030.	-0.00132	0.00	1.83E+12	-824.853	21687.	0.00
2.7500	0.1102	9360512.	61551.	-0.00131	0.00	1.83E+12	-827.897	22546.	0.00
3.0000	0.1063	9543921.	59063.	-0.00129	0.00	1.83E+12	-830.648	23449.	0.00
3.2500	0.1024	9719825.	56568.	-0.00127	0.00	1.83E+12	-833.100	24401.	0.00
3.5000	0.09863	9888200.	54065.	-0.00126	0.00	1.83E+12	-835.243	25406.	0.00
3.7500	0.09488	1.00E+07	51557.	-0.00124	0.00	1.83E+12	-837.069	26468.	0.00
4.0000	0.09118	1.02E+07	49043.	-0.00122	0.00	1.83E+12	-838.568	27591.	0.00
4.2500	0.08753	1.03E+07	46526.	-0.00121	0.00	1.83E+12	-839.729	28782.	0.00
4.5000	0.08393	1.05E+07	44005.	-0.00119	0.00	1.83E+12	-840.542	30045.	0.00
4.7500	0.08038	1.06E+07	41483.	-0.00117	0.00	1.83E+12	-840.994	31388.	0.00
5.0000	0.07689	1.07E+07	38960.	-0.00116	0.00	1.83E+12	-841.072	32818.	0.00
5.2500	0.07344	1.09E+07	36437.	-0.00114	0.00	1.83E+12	-840.762	34343.	0.00
5.5000	0.07005	1.10E+07	33916.	-0.00112	0.00	1.83E+12	-840.048	35974.	0.00
5.7500	0.06672	1.11E+07	31398.	-0.00110	0.00	1.83E+12	-838.913	37721.	0.00
6.0000	0.06344	1.12E+07	28883.	-0.00108	0.00	1.83E+12	-837.338	39597.	0.00
6.2500	0.06021	1.12E+07	26374.	-0.00107	0.00	1.83E+12	-835.302	41617.	0.00
6.5000	0.05704	1.13E+07	23872.	-0.00105	0.00	1.83E+12	-832.781	43797.	0.00
6.7500	0.05393	1.14E+07	21378.	-0.00103	0.00	1.83E+12	-829.750	46158.	0.00
7.0000	0.05087	1.14E+07	18895.	-0.00101	0.00	1.30E+12	-826.179	48722.	0.00
7.2500	0.04789	1.15E+07	16422.	-9.76E-04	0.00	1.01E+12	-822.135	51500.	0.00
7.5000	0.04501	1.16E+07	13962.	-9.42E-04	0.00	1.01E+12	-817.699	54496.	0.00
7.7500	0.04224	1.16E+07	11516.	-9.07E-04	0.00	1.00E+12	-812.871	57731.	0.00
8.0000	0.03957	1.16E+07	9086.	-8.72E-04	0.00	1.00E+12	-807.650	61230.	0.00
8.2500	0.03701	1.16E+07	6671.	-8.37E-04	0.00	9.97E+11	-802.038	65020.	0.00
8.5000	0.03455	1.17E+07	4274.	-8.02E-04	0.00	9.95E+11	-796.038	69128.	0.00
8.7500	0.03219	1.17E+07	1895.	-7.67E-04	0.00	9.94E+11	-789.653	73589.	0.00
9.0000	0.02994	1.17E+07	-463.341	-7.32E-04	0.00	9.94E+11	-782.891	78438.	0.00

MEG-33 rear abutment Z direction

9.2500	0.02780	1.17E+07	-2801.	-6.97E-04	0.00	9.94E+11	-775.760	83714.	0.00
9.5000	0.02576	1.17E+07	-5117.	-6.61E-04	0.00	9.95E+11	-768.271	89461.	0.00
9.7500	0.02383	1.17E+07	-7410.	-6.26E-04	0.00	9.97E+11	-760.440	95726.	0.00
10.0000	0.02201	1.16E+07	-9680.	-5.91E-04	0.00	9.99E+11	-752.286	102559.	0.00
10.2500	0.02028	1.16E+07	-11924.	-5.57E-04	0.00	1.00E+12	-743.834	110015.	0.00
10.5000	0.01867	1.16E+07	-14142.	-5.22E-04	0.00	1.01E+12	-735.115	118147.	0.00
10.7500	0.01715	1.15E+07	-16334.	-4.88E-04	0.00	1.01E+12	-726.168	127013.	0.00
11.0000	0.01574	1.15E+07	-18499.	-4.54E-04	0.00	1.05E+12	-717.040	136666.	0.00
11.2500	0.01443	1.14E+07	-20636.	-4.27E-04	0.00	1.61E+12	-707.755	147183.	0.00
11.5000	0.01318	1.13E+07	-22745.	-4.07E-04	0.00	1.83E+12	-697.925	158912.	0.00
11.7500	0.01198	1.13E+07	-24823.	-3.89E-04	0.00	1.83E+12	-687.429	172127.	0.00
12.0000	0.01084	1.12E+07	-26868.	-3.70E-04	0.00	1.83E+12	-676.218	187107.	0.00
12.2500	0.00976	1.11E+07	-28879.	-3.52E-04	0.00	1.83E+12	-664.239	204207.	0.00
12.5000	0.00873	1.10E+07	-30852.	-3.34E-04	0.00	1.83E+12	-651.427	223881.	0.00
12.7500	0.00775	1.09E+07	-32786.	-3.16E-04	0.00	1.83E+12	-637.704	246722.	0.00
13.0000	0.00683	1.08E+07	-34677.	-2.98E-04	0.00	1.83E+12	-622.974	273517.	0.00
13.2500	0.00596	1.07E+07	-36522.	-2.81E-04	0.00	1.83E+12	-607.119	305342.	0.00
13.5000	0.00515	1.06E+07	-38318.	-2.63E-04	0.00	1.83E+12	-589.987	343699.	0.00
13.7500	0.00439	1.05E+07	-40060.	-2.46E-04	0.00	1.83E+12	-571.381	390761.	0.00
14.0000	0.00368	1.04E+07	-41743.	-2.29E-04	0.00	1.83E+12	-551.036	449801.	0.00
14.2500	0.00301	1.02E+07	-43343.	-2.12E-04	0.00	1.83E+12	-515.510	513000.	0.00
14.5000	0.00240	1.01E+07	-44744.	-1.95E-04	0.00	1.83E+12	-418.380	522000.	0.00
14.7500	0.00184	9970618.	-45861.	-1.79E-04	0.00	1.83E+12	-326.381	531000.	0.00
15.0000	0.00133	9831891.	-86748.	-1.62E-04	0.00	1.83E+12	-26931.	6.06E+07	0.00
15.2500	8.69E-04	9450751.	-182824.	-1.35E-04	0.00	7.22E+11	-37119.	1.28E+08	0.00
15.5000	5.24E-04	8735462.	-274637.	-9.85E-05	0.00	7.89E+11	-24090.	1.38E+08	0.00
15.7500	2.78E-04	7803303.	-331320.	-7.18E-05	0.00	1.15E+12	-13699.	1.48E+08	0.00
16.0000	9.32E-05	6747816.	-359214.	-5.28E-05	0.00	1.15E+12	-4897.	1.58E+08	0.00
16.2500	-3.90E-05	5648221.	-363290.	-3.67E-05	0.00	1.16E+12	2180.	1.68E+08	0.00
16.5000	-1.27E-04	4568219.	-348733.	-2.35E-05	0.00	1.16E+12	7524.	1.77E+08	0.00
16.7500	-1.80E-04	3555914.	-320603.	-1.29E-05	0.00	1.16E+12	11229.	1.87E+08	0.00
17.0000	-2.05E-04	2644652.	-283567.	-4.90E-06	0.00	1.16E+12	13461.	1.97E+08	0.00
17.2500	-2.09E-04	1854528.	-241719.	9.39E-07	0.00	1.16E+12	14438.	2.07E+08	0.00
17.5000	-1.99E-04	1194336.	-198462.	4.89E-06	0.00	1.16E+12	14400.	2.17E+08	0.00
17.7500	-1.80E-04	663740.	-156469.	7.30E-06	0.00	1.16E+12	13595.	2.27E+08	0.00
18.0000	-1.55E-04	255494.	-117695.	8.49E-06	0.00	1.16E+12	12255.	2.37E+08	0.00
18.2500	-1.29E-04	-42459.	-83426.	8.77E-06	0.00	1.16E+12	10591.	2.46E+08	0.00
18.5000	-1.03E-04	-245093.	-54367.	8.40E-06	0.00	1.16E+12	8781.	2.56E+08	0.00
18.7500	-7.86E-05	-368695.	-30742.	7.60E-06	0.00	1.16E+12	6969.	2.66E+08	0.00
19.0000	-5.72E-05	-429574.	-12397.	6.57E-06	0.00	1.16E+12	5261.	2.76E+08	0.00

MEG-33 rear abutment Z direction									
19.2500	-3.92E-05	-443101.	1092.	5.44E-06	0.00	1.16E+12	3732.	2.86E+08	0.00
19.5000	-2.46E-05	-423041.	10324.	4.31E-06	0.00	1.16E+12	2423.	2.96E+08	0.00
19.7500	-1.33E-05	-381171.	15991.	3.27E-06	0.00	1.16E+12	1354.	3.06E+08	0.00
20.0000	-4.98E-06	-327111.	18806.	2.35E-06	0.00	1.16E+12	522.9872	3.15E+08	0.00
20.2500	8.03E-07	-268342.	19460.	1.58E-06	0.00	1.16E+12	-87.046	3.25E+08	0.00
20.5000	4.49E-06	-210355.	18577.	9.57E-07	0.00	1.16E+12	-501.821	3.35E+08	0.00
20.7500	6.55E-06	-156883.	16695.	4.81E-07	0.00	1.16E+12	-752.638	3.45E+08	0.00
21.0000	7.38E-06	-110185.	14258.	1.35E-07	0.00	1.16E+12	-872.573	3.55E+08	0.00
21.2500	7.35E-06	-71338.	11608.	-1.01E-07	0.00	1.16E+12	-893.763	3.65E+08	0.00
21.5000	6.77E-06	-40536.	8999.	-2.46E-07	0.00	1.16E+12	-845.492	3.74E+08	0.00
21.7500	5.88E-06	-17343.	6601.	-3.21E-07	0.00	1.16E+12	-752.997	3.84E+08	0.00
22.0000	4.85E-06	-926.328	4517.	-3.45E-07	0.00	1.16E+12	-636.886	3.94E+08	0.00
22.2500	3.81E-06	9758.	2792.	-3.33E-07	0.00	1.16E+12	-513.032	4.04E+08	0.00
22.5000	2.85E-06	15825.	1433.	-3.00E-07	0.00	1.16E+12	-392.837	4.14E+08	0.00
22.7500	2.01E-06	18357.	418.0695	-2.56E-07	0.00	1.16E+12	-283.717	4.24E+08	0.00
23.0000	1.31E-06	18335.	-292.106	-2.08E-07	0.00	1.16E+12	-189.733	4.34E+08	0.00
23.2500	7.59E-07	16605.	-745.108	-1.63E-07	0.00	1.16E+12	-112.268	4.43E+08	0.00
23.5000	3.35E-07	13865.	-989.549	-1.23E-07	0.00	1.16E+12	-50.693	4.53E+08	0.00
23.7500	1.94E-08	10668.	-1070.	-9.15E-08	0.00	1.16E+12	-2.990	4.63E+08	0.00
24.0000	-2.14E-07	7444.	-1024.	-6.80E-08	0.00	1.16E+12	33.7004	4.73E+08	0.00
24.2500	-3.89E-07	4524.	-879.561	-5.25E-08	0.00	1.16E+12	62.5976	4.83E+08	0.00
24.5000	-5.29E-07	2167.	-655.370	-4.38E-08	0.00	1.16E+12	86.8632	4.93E+08	0.00
24.7500	-6.52E-07	592.1431	-361.240	-4.03E-08	0.00	1.16E+12	109.2229	5.03E+08	0.00
25.0000	-7.70E-07	0.00	0.00	-3.95E-08	0.00	1.16E+12	131.6041	2.56E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 1:

Pile-head deflection = 0.15578703 inches
 Computed slope at pile head = -0.0014522 radians
 Maximum bending moment = 11681931. inch-lbs
 Maximum shear force = -363290. lbs
 Depth of maximum bending moment = 9.00000000 feet below pile head

MEG-33 rear abutment Z direction

Depth of maximum shear force = 16.25000000 feet below pile head
 Number of iterations = 91
 Number of zero deflection points = 3

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 2

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 131500.0 lbs
 Applied moment at pile head = 10492800.0 in-lbs
 Axial thrust load on pile head = 852300.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	0.4469	1.05E+07	131500.	-0.00393	0.00	1.81E+12	0.00	0.00	0.00
0.2500	0.4351	1.09E+07	129966.	-0.00391	0.00	1.81E+12	-1023.	7050.	0.00
0.5000	0.4234	1.13E+07	126888.	-0.00389	0.00	1.81E+12	-1030.	7298.	0.00
0.7500	0.4117	1.17E+07	123787.	-0.00388	0.00	1.81E+12	-1037.	7556.	0.00
1.0000	0.4001	1.21E+07	120666.	-0.00386	0.00	1.81E+12	-1044.	7826.	0.00
1.2500	0.3886	1.24E+07	117525.	-0.00384	0.00	1.81E+12	-1050.	8108.	0.00
1.5000	0.3771	1.28E+07	114365.	-0.00381	0.00	1.81E+12	-1056.	8403.	0.00
1.7500	0.3657	1.31E+07	111187.	-0.00379	0.00	1.81E+12	-1062.	8713.	0.00
2.0000	0.3544	1.35E+07	107993.	-0.00377	0.00	1.81E+12	-1067.	9037.	0.00
2.2500	0.3431	1.38E+07	104783.	-0.00374	0.00	1.14E+12	-1073.	9378.	0.00
2.5000	0.3319	1.41E+07	101558.	-0.00370	0.00	1.10E+12	-1077.	9736.	0.00
2.7500	0.3209	1.44E+07	98320.	-0.00367	0.00	1.08E+12	-1082.	10112.	0.00
3.0000	0.3099	1.47E+07	95070.	-0.00362	0.00	1.05E+12	-1085.	10507.	0.00
3.2500	0.2991	1.50E+07	91808.	-0.00358	0.00	1.02E+12	-1089.	10923.	0.00
3.5000	0.2884	1.53E+07	88536.	-0.00354	0.00	1.00E+12	-1092.	11360.	0.00
3.7500	0.2779	1.56E+07	85255.	-0.00349	0.00	9.79E+11	-1095.	11821.	0.00
4.0000	0.2675	1.58E+07	81967.	-0.00344	0.00	9.60E+11	-1097.	12308.	0.00
4.2500	0.2572	1.61E+07	78671.	-0.00339	0.00	9.41E+11	-1099.	12822.	0.00
4.5000	0.2472	1.63E+07	75371.	-0.00334	0.00	9.24E+11	-1101.	13365.	0.00

MEG-33 rear abutment Z direction

4.7500	0.2372	1.65E+07	72066.	-0.00328	0.00	9.09E+11	-1102.	13940.	0.00
5.0000	0.2274	1.68E+07	68758.	-0.00323	0.00	8.94E+11	-1103.	14549.	0.00
5.2500	0.2178	1.70E+07	65448.	-0.00317	0.00	8.81E+11	-1103.	15194.	0.00
5.5000	0.2084	1.72E+07	62138.	-0.00311	0.00	8.69E+11	-1103.	15880.	0.00
5.7500	0.1992	1.74E+07	58830.	-0.00305	0.00	8.57E+11	-1103.	16610.	0.00
6.0000	0.1901	1.75E+07	55523.	-0.00299	0.00	8.47E+11	-1102.	17386.	0.00
6.2500	0.1812	1.77E+07	52220.	-0.00293	0.00	8.37E+11	-1100.	18214.	0.00
6.5000	0.1725	1.79E+07	48923.	-0.00287	0.00	8.28E+11	-1098.	19097.	0.00
6.7500	0.1640	1.80E+07	45632.	-0.00280	0.00	8.21E+11	-1096.	20042.	0.00
7.0000	0.1557	1.82E+07	42349.	-0.00273	0.00	8.13E+11	-1093.	21054.	0.00
7.2500	0.1476	1.83E+07	39076.	-0.00267	0.00	8.06E+11	-1089.	22139.	0.00
7.5000	0.1397	1.84E+07	35814.	-0.00260	0.00	8.01E+11	-1085.	23304.	0.00
7.7500	0.1320	1.85E+07	32565.	-0.00253	0.00	7.95E+11	-1081.	24559.	0.00
8.0000	0.1245	1.86E+07	29330.	-0.00246	0.00	7.90E+11	-1076.	25912.	0.00
8.2500	0.1173	1.87E+07	26111.	-0.00239	0.00	7.86E+11	-1070.	27373.	0.00
8.5000	0.1102	1.88E+07	22910.	-0.00232	0.00	7.82E+11	-1064.	28956.	0.00
8.7500	0.1034	1.88E+07	19729.	-0.00224	0.00	7.79E+11	-1057.	30674.	0.00
9.0000	0.09677	1.89E+07	16568.	-0.00217	0.00	7.76E+11	-1050.	32542.	0.00
9.2500	0.09037	1.90E+07	13431.	-0.00210	0.00	7.74E+11	-1042.	34580.	0.00
9.5000	0.08419	1.90E+07	10320.	-0.00202	0.00	7.72E+11	-1033.	36809.	0.00
9.7500	0.07823	1.90E+07	7235.	-0.00195	0.00	7.70E+11	-1024.	39254.	0.00
10.0000	0.07249	1.91E+07	4179.	-0.00188	0.00	7.69E+11	-1014.	41943.	0.00
10.2500	0.06698	1.91E+07	1155.	-0.00180	0.00	7.69E+11	-1003.	44913.	0.00
10.5000	0.06169	1.91E+07	-1836.	-0.00173	0.00	7.69E+11	-991.172	48203.	0.00
10.7500	0.05662	1.91E+07	-4791.	-0.00165	0.00	7.69E+11	-978.842	51864.	0.00
11.0000	0.05178	1.90E+07	-7708.	-0.00158	0.00	7.70E+11	-965.690	55954.	0.00
11.2500	0.04715	1.90E+07	-10584.	-0.00150	0.00	7.71E+11	-951.676	60547.	0.00
11.5000	0.04276	1.90E+07	-13416.	-0.00143	0.00	7.72E+11	-936.753	65729.	0.00
11.7500	0.03858	1.90E+07	-16203.	-0.00136	0.00	7.74E+11	-920.870	71612.	0.00
12.0000	0.03462	1.89E+07	-18940.	-0.00128	0.00	7.76E+11	-903.965	78334.	0.00
12.2500	0.03088	1.88E+07	-21625.	-0.00121	0.00	7.79E+11	-885.969	86068.	0.00
12.5000	0.02736	1.88E+07	-24254.	-0.00114	0.00	7.82E+11	-866.801	95041.	0.00
12.7500	0.02406	1.87E+07	-26824.	-0.00107	0.00	7.86E+11	-846.363	105548.	0.00
13.0000	0.02097	1.86E+07	-29330.	-9.95E-04	0.00	7.90E+11	-824.540	117983.	0.00
13.2500	0.01809	1.85E+07	-31769.	-9.24E-04	0.00	7.94E+11	-801.187	132882.	0.00
13.5000	0.01542	1.84E+07	-34135.	-8.55E-04	0.00	7.99E+11	-776.127	150998.	0.00
13.7500	0.01296	1.83E+07	-36423.	-7.86E-04	0.00	8.04E+11	-749.133	173412.	0.00
14.0000	0.01071	1.82E+07	-38626.	-7.18E-04	0.00	8.10E+11	-719.904	201747.	0.00
14.2500	0.00865	1.81E+07	-40738.	-6.51E-04	0.00	8.16E+11	-688.031	238547.	0.00
14.5000	0.00680	1.80E+07	-42750.	-5.85E-04	0.00	8.22E+11	-652.929	288043.	0.00

MEG-33 rear abutment Z direction

14.7500	0.00514	1.79E+07	-44650.	-5.20E-04	0.00	8.29E+11	-613.708	357867.	0.00
15.0000	0.00368	1.77E+07	-97661.	-4.56E-04	0.00	8.37E+11	-34727.	2.83E+07	0.00
15.2500	0.00241	1.73E+07	-242464.	-3.72E-04	0.00	5.05E+11	-61809.	7.69E+07	0.00
15.5000	0.00145	1.63E+07	-423358.	-2.76E-04	0.00	5.37E+11	-58787.	1.22E+08	0.00
15.7500	7.57E-04	1.47E+07	-567514.	-1.93E-04	0.00	5.96E+11	-37317.	1.48E+08	0.00
16.0000	2.89E-04	1.29E+07	-646280.	-1.28E-04	0.00	6.92E+11	-15193.	1.58E+08	0.00
16.2500	-1.20E-05	1.09E+07	-668064.	-8.07E-05	0.00	8.27E+11	670.4083	1.68E+08	0.00
16.5000	-1.95E-04	8852756.	-649761.	-4.93E-05	0.00	1.14E+12	11532.	1.77E+08	0.00
16.7500	-3.08E-04	6955464.	-603629.	-2.85E-05	0.00	1.14E+12	19222.	1.87E+08	0.00
17.0000	-3.66E-04	5231125.	-538727.	-1.25E-05	0.00	1.14E+12	24046.	1.97E+08	0.00
17.2500	-3.83E-04	3723163.	-463056.	-6.78E-07	0.00	1.14E+12	26402.	2.07E+08	0.00
17.5000	-3.70E-04	2452791.	-383337.	7.44E-06	0.00	1.14E+12	26744.	2.17E+08	0.00
17.7500	-3.38E-04	1423102.	-304908.	1.25E-05	0.00	1.14E+12	25541.	2.27E+08	0.00
18.0000	-2.95E-04	623276.	-231732.	1.52E-05	0.00	1.14E+12	23243.	2.37E+08	0.00
18.2500	-2.47E-04	32633.	-166482.	1.61E-05	0.00	1.14E+12	20257.	2.46E+08	0.00
18.5000	-1.98E-04	-375701.	-110700.	1.56E-05	0.00	1.14E+12	16932.	2.56E+08	0.00
18.7500	-1.53E-04	-631646.	-64974.	1.43E-05	0.00	1.14E+12	13552.	2.66E+08	0.00
19.0000	-1.12E-04	-765621.	-29149.	1.25E-05	0.00	1.14E+12	10332.	2.76E+08	0.00
19.2500	-7.79E-05	-806605.	-2520.	1.04E-05	0.00	1.14E+12	7421.	2.86E+08	0.00
19.5000	-4.98E-05	-780794.	15979.	8.33E-06	0.00	1.14E+12	4912.	2.96E+08	0.00
19.7500	-2.79E-05	-710773.	27614.	6.37E-06	0.00	1.14E+12	2845.	3.06E+08	0.00
20.0000	-1.16E-05	-615141.	33718.	4.62E-06	0.00	1.14E+12	1224.	3.15E+08	0.00
20.2500	-2.08E-07	-508486.	35589.	3.14E-06	0.00	1.14E+12	22.5024	3.25E+08	0.00
20.5000	7.22E-06	-401625.	34413.	1.95E-06	0.00	1.14E+12	-806.310	3.35E+08	0.00
20.7500	1.15E-05	-302018.	31224.	1.02E-06	0.00	1.14E+12	-1320.	3.45E+08	0.00
21.0000	1.34E-05	-214286.	26876.	3.43E-07	0.00	1.14E+12	-1579.	3.55E+08	0.00
21.2500	1.35E-05	-140763.	22040.	-1.24E-07	0.00	1.14E+12	-1645.	3.65E+08	0.00
21.5000	1.26E-05	-82046.	17211.	-4.17E-07	0.00	1.14E+12	-1574.	3.74E+08	0.00
21.7500	1.10E-05	-37496.	12729.	-5.74E-07	0.00	1.14E+12	-1414.	3.84E+08	0.00
22.0000	9.17E-06	-5670.	8801.	-6.31E-07	0.00	1.14E+12	-1204.	3.94E+08	0.00
22.2500	7.25E-06	15316.	5530.	-6.18E-07	0.00	1.14E+12	-976.709	4.04E+08	0.00
22.5000	5.46E-06	27512.	2935.	-5.62E-07	0.00	1.14E+12	-753.074	4.14E+08	0.00
22.7500	3.88E-06	32929.	982.9876	-4.82E-07	0.00	1.14E+12	-548.318	4.24E+08	0.00
23.0000	2.57E-06	33412.	-395.626	-3.95E-07	0.00	1.14E+12	-370.758	4.34E+08	0.00
23.2500	1.51E-06	30558.	-1287.	-3.11E-07	0.00	1.14E+12	-223.518	4.43E+08	0.00
23.5000	7.00E-07	25691.	-1781.	-2.37E-07	0.00	1.14E+12	-105.792	4.53E+08	0.00
23.7500	9.09E-08	19873.	-1961.	-1.77E-07	0.00	1.14E+12	-14.030	4.63E+08	0.00
24.0000	-3.62E-07	13928.	-1896.	-1.32E-07	0.00	1.14E+12	57.0110	4.73E+08	0.00
24.2500	-7.04E-07	8496.	-1641.	-1.03E-07	0.00	1.14E+12	113.3356	4.83E+08	0.00
24.5000	-9.80E-07	4084.	-1229.	-8.65E-08	0.00	1.14E+12	160.9003	4.93E+08	0.00

MEG-33 rear abutment Z direction									
24.7500	-1.22E-06	1120.	-680.727	-7.96E-08	0.00	1.14E+12	204.8766	5.03E+08	0.00
25.0000	-1.46E-06	0.00	0.00	-7.81E-08	0.00	1.14E+12	248.9417	2.56E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 2:

Pile-head deflection = 0.44686920 inches
 Computed slope at pile head = -0.0039306 radians
 Maximum bending moment = 19069905. inch-lbs
 Maximum shear force = -668064. lbs
 Depth of maximum bending moment = 10.50000000 feet below pile head
 Depth of maximum shear force = 16.25000000 feet below pile head
 Number of iterations = 30
 Number of zero deflection points = 3

 Summary of Pile-head Responses for Conventional Analyses

Definitions of Pile-head Loading Conditions:

Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs
 Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
 Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.
 Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs
 Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians

Load Case No.	Load Type 1	Load Type 2	Load Type 3	Load Type 4	Load Type 5	Axial Loading lbs	Pile-head Deflection inches	Pile-head Rotation radians	Max Shear in Pile lbs	Max Moment in Pile in-lbs
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MEG-33 rear abutment Z direction									
1	V, lb	86000.	M, in-lb	6859680.	637400.	0.1558	-0.00145	-363290.	1.17E+07
2	V, lb	131500.	M, in-lb	1.05E+07	852300.	0.4469	-0.00393	-668064.	1.91E+07

Maximum pile-head deflection = 0.4468692009 inches
Maximum pile-head rotation = -0.0039306130 radians = -0.225208 deg.

Summary of Warning Messages

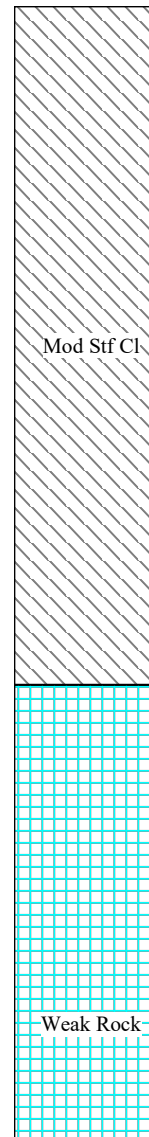
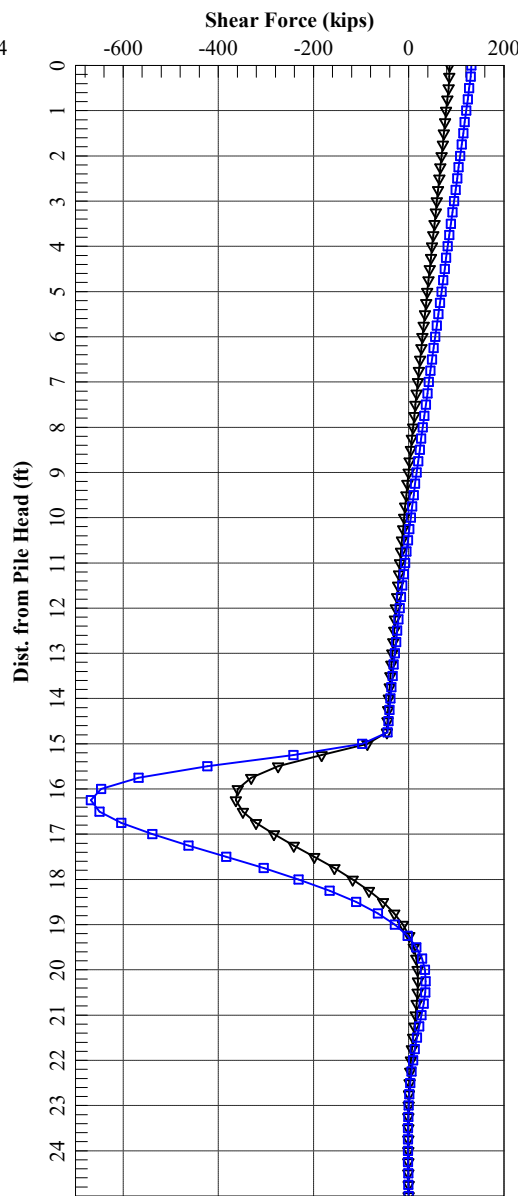
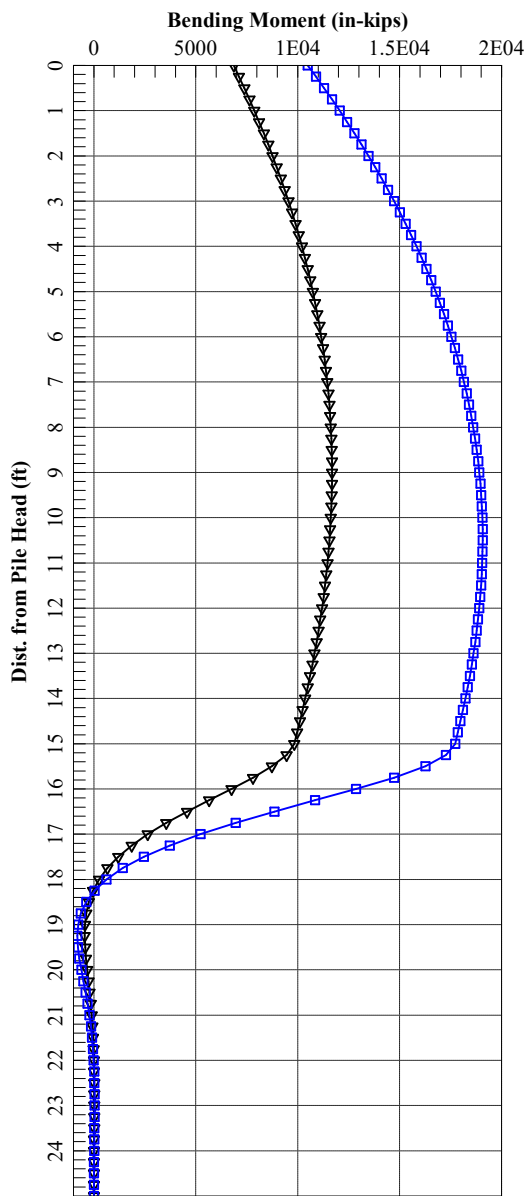
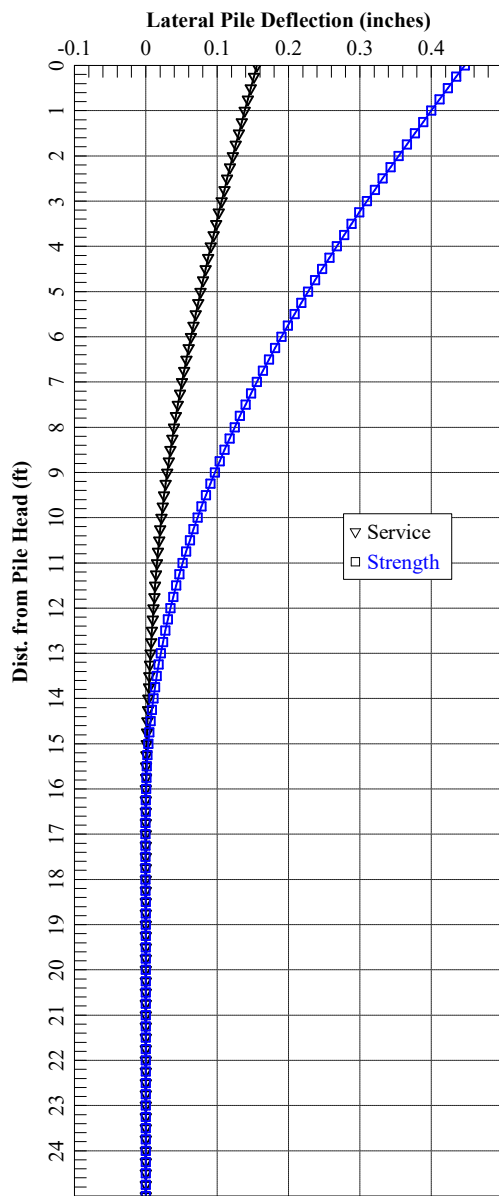
The following warning was reported 1240 times

**** Warning ****

An unreasonable input value for unconfined compressive strength has been specified for a soil defined using the weak rock criteria. The input value is greater than 500 psi. Please check your input data for correctness.

The analysis ended normally.

MEG-33 Bridge 3 Rear Abutment Z-Direction Row 1



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LPile for Windows, Version 2022-12.006

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method
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Files Used for Analysis

Path to file locations:

\\US0247-PPFSS01\shared_projects\173609140\119144\400-Engineering\Geotechnical\Analysis\Lpile\bridges\LPile
Analysis\Bridge 3\forward abutment\

Name of input data file:

MEG-33 forward abutment X&Z direction row 1.lp12d

Name of output report file:

MEG-33 forward abutment X&Z direction row 1.lp12o

MEG-33 forward abutment X&Z direction row 1

Name of plot output file:

MEG-33 forward abutment X&Z direction row 1.lp12p

Name of runtime message file:

MEG-33 forward abutment X&Z direction row 1.lp12r

Date and Time of Analysis

Date: September 16, 2024

Time: 9:55:40

Problem Title

Project Name: MEG-33-19.21

Job Number: 173609140

Client: ODOT

Engineer: G. Khatri

Description: Forward Abutment Lateral Load Analysis at Bridge 3

MEG-33 forward abutment X&Z direction row 1
Program Options and Settings

Computational Options:

- Conventional Analysis

Engineering Units Used for Data Input and Computations:

- US Customary System Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed = 500
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 100.0000 in
- Number of pile increments = 100

Loading Type and Number of Cycles of Loading:

- Static loading specified

- Analysis uses p-y modification factors for p-y curves
- Analysis uses layering correction (Method of Georgiadis)
- No distributed lateral loads are entered
- Loading by lateral soil movements acting on pile not selected
- Input of shear resistance at the pile tip not selected
- Input of moment resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:

- Output files use decimal points to denote decimal symbols.
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1
- No p-y curves to be computed and reported for user-specified depths
- Print using wide report formats

 Number of pile sections defined = 1
 Total length of pile = 10.000 ft
 Depth of ground surface below top of pile = 0.0000 ft

Pile diameters used for p-y curve computations are defined using 2 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile. A summary of values of pile diameter vs. depth follows.

Point No.	Depth Below Pile Head feet	Pile Diameter inches
1	0.000	30.0000
2	10.000	30.0000

Input Structural Properties for Pile Sections:

Pile Section No. 1:

Section 1 is a round drilled shaft, bored pile, or CIDH pile
 Length of section = 10.000000 ft
 Shaft Diameter = 30.000000 in

 Soil and Rock Layering Information

The soil profile is modelled using 1 layers

Layer 1 is weak rock, p-y criteria by Reese, 1997

Distance from top of pile to top of layer = 0.0000 ft
 Distance from top of pile to bottom of layer = 15.000000 ft

MEG-33 forward abutment X&Z direction row 1

Effective unit weight at top of layer = 87.600000 pcf
 Effective unit weight at bottom of layer = 87.600000 pcf
 Uniaxial compressive strength at top of layer = 4380. psi
 Uniaxial compressive strength at bottom of layer = 4380. psi
 Initial modulus of rock at top of layer = 394200. psi
 Initial modulus of rock at bottom of layer = 394200. psi
 RQD of rock at top of layer = 69.000000 %
 RQD of rock at bottom of layer = 69.000000 %
 k rm of rock at top of layer = 0.0000500
 k rm of rock at bottom of layer = 0.0000500

(Depth of the lowest soil layer extends 5.000 ft below the pile tip)

 Summary of Input Soil Properties

Layer Num.	Soil Type Name (p-y Curve Type)	Layer Depth ft	Effective Unit Wt. pcf	Uniaxial qu psi	RQD %	E50 or krm	Rock Mass Modulus psi
1	Weak Rock	0.00 15.0000	87.6000 87.6000	4380. 4380.	69.0000 69.0000	5.00E-05 5.00E-05	394200. 394200.

 Modification Factors for p-y Curves

Distribution of p-y modifiers with depth defined using 2 points

Point No.	Depth X ft	p-mult	y-mult
1	0.000	1.0000	1.0000
2	10.000	1.0000	1.0000

 Static Loading Type

Static loading criteria were used when computing p-y curves for all analyses.

 Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 2

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length	Run Analysis
1	1	V = 26700. lbs	M = 747240. in-lbs	756200.	No	Yes
2	1	V = 41630. lbs	M = 1165680. in-lbs	1022640.	No	Yes

V = shear force applied normal to pile axis

M = bending moment applied to pile head

y = lateral deflection normal to pile axis

S = pile slope relative to original pile batter angle

R = rotational stiffness applied to pile head

Values of top y vs. pile lengths can be computed only for load types with specified shear loading (Load Types 1, 2, and 3).

Thrust force is assumed to be acting axially for all pile batter angles.

 Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 1

Pile Section No. 1:

Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section	=	10.000000	ft
Shaft Diameter	=	30.000000	in
Concrete Cover Thickness (to edge of trans. reinf.)	=	3.000000	in
Number of Reinforcing Bars	=	8	bars
Yield Stress of Reinforcing Bars	=	50000.	psi
Modulus of Elasticity of Reinforcing Bars	=	29000000.	psi
Gross Area of Shaft	=	706.858347	sq. in.
Total Area of Reinforcing Steel	=	8.000000	sq. in.
Area Ratio of Steel Reinforcement	=	1.13	percent
Edge-to-Edge Bar Spacing	=	7.242052	in
Maximum Concrete Aggregate Size	=	0.750000	in
Ratio of Bar Spacing to Aggregate Size	=	9.66	
Offset of Center of Rebar Cage from Center of Pile	=	0.0000	in
Transverse Reinforcement			
Type: Spiral			
Number of Transverse Reinf. (per spacing)	=	1	
Spacing of Transverse Reinf.	=	4.000000	in
Yield Stress of Transverse Reinf.	=	50000.	psi
Diameter of Transverse Reinf.	=	0.500000	in

Axial Structural Capacities:

Nom. Axial Structural Capacity = $0.85 F_c A_c + F_y A_s$	=	2776.118	kips
Tensile Load for Cracking of Concrete	=	-317.428	kips
Nominal Axial Tensile Capacity	=	-400.000	kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
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MEG-33 forward abutment X&Z direction row 1

	-----	-----	-----	-----
1	1.128000	1.000000	10.936000	0.000000
2	1.128000	1.000000	7.732920	7.732920
3	1.128000	1.000000	0.000000	10.936000
4	1.128000	1.000000	-7.73292	7.732920
5	1.128000	1.000000	-10.93600	0.000000
6	1.128000	1.000000	-7.73292	-7.73292
7	1.128000	1.000000	0.000000	-10.93600
8	1.128000	1.000000	7.732920	-7.73292

NOTE: The positions of the above rebars were computed by LPILE

Minimum spacing between any two bars not equal to zero = 7.242 inches
between bars 1 and 2.

Ratio of bar spacing to maximum aggregate size = 9.66

Concrete Properties:

Compressive Strength of Concrete	=	4000. psi
Modulus of Elasticity of Concrete	=	3604997. psi
Modulus of Rupture of Concrete	=	-474.34165 psi
Compression Strain at Peak Stress	=	0.001886
Tensile Strain at Fracture of Concrete	=	-0.0001154
Maximum Coarse Aggregate Size	=	0.750000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 2

Number	Axial Thrust Force kips
-----	-----
1	756.200
2	1022.640

Definitions of Run Messages and Notes:

MEG-33 forward abutment X&Z direction row 1

-
- C = concrete in section has cracked in tension.
 - Y = stress in reinforcing steel has reached yield stress.
 - T = ACI 318 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than 0.003. See ACI 318-14, Section 21.2.3.
 - Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
 Position of neutral axis is measured from edge of compression side of pile.
 Compressive stresses and strains are positive in sign.
 Tensile stresses and strains are negative in sign.

Axial Thrust Force = 756.200 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in ²	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
0.00000125	197.7835380	158226830.	216.8216471	0.0002710	0.0002335	1.0662110	7.7347222	
0.00000250	395.5603117	158224125.	115.9404114	0.0002899	0.0002149	1.1335121	8.1555548	
0.00000375	593.3044144	158214511.	82.3264817	0.0003087	0.0001962	1.2002071	8.5778174	
0.00000500	790.9995080	158199902.	65.5293806	0.0003276	0.0001776	1.2662900	9.0015102	
0.00000625	988.6292481	158180680.	55.4590132	0.0003466	0.0001591	1.3317546	9.4266337	
0.00000750	1186.	158156971.	48.7520151	0.0003656	0.0001406	1.3965947	9.8531883	
0.00000875	1384.	158128828.	43.9669450	0.0003847	0.0001222	1.4608041	10.2811748	
0.00001000	1581.	158096275.	40.3830824	0.0004038	0.0001038	1.5243766	10.7105939	
0.00001125	1778.	158059326.	37.6000277	0.0004230	0.00008550	1.5873059	11.1414466	
0.00001250	1975.	158017986.	35.3775412	0.0004422	0.00006722	1.6495860	11.5737337	
0.00001375	2172.	157972257.	33.5627436	0.0004615	0.00004899	1.7112104	12.0074565	
0.00001500	2369.	157922140.	32.0537155	0.0004808	0.00003081	1.7721731	12.4426163	
0.00001625	2565.	157867633.	30.7798977	0.0005002	0.00001267	1.8324678	12.8792143	
0.00001750	2762.	157808717.	29.6908904	0.0005196	-0.00000541	1.8920881	13.3172519	
0.00001875	2958.	157743268.	28.7496802	0.0005391	-0.00002344	1.9510248	13.7567012	
0.00002000	3153.	157664678.	27.9283711	0.0005586	-0.00004143	2.0092605	14.1974553	
0.00002125	3348.	157567126.	27.2055963	0.0005781	-0.00005938	2.0667762	14.6393863	
0.00002250	3543.	157447100.	26.5647519	0.0005977	-0.00007729	2.1235549	15.0823757	

MEG-33 forward abutment X&Z direction row 1

0.00002375	3736.	157302916.	25.9927517	0.0006173	-0.00009517	2.1795816	15.5263203
0.00002500	3928.	157134288.	25.4791518	0.0006370	-0.000113	2.2348436	15.9711352
0.00002625	3928.	149651703.	24.7516627	0.0006497	-0.000138	2.2700663	16.2158908 C
0.00002750	4016.	146038292.	24.2674839	0.0006674	-0.000158	2.3183592	16.6019434 C
0.00002875	4137.	143905917.	23.8186515	0.0006848	-0.000178	2.3654418	16.9823632 C
0.00003000	4252.	141744274.	23.3999246	0.0007020	-0.000198	2.4112709	17.3564345 C
0.00003125	4362.	139599609.	23.0091814	0.0007190	-0.000218	2.4559943	17.7255082 C
0.00003250	4468.	137483342.	22.6435182	0.0007359	-0.000239	2.4996591	18.0898910 C
0.00003375	4570.	135393921.	22.2999289	0.0007526	-0.000260	2.5422645	18.4493680 C
0.00003500	4667.	133347501.	21.9767339	0.0007692	-0.000281	2.5838899	18.8046350 C
0.00003625	4761.	131342813.	21.6717758	0.0007856	-0.000302	2.6245470	19.1556419 C
0.00003750	4852.	129383096.	21.3834337	0.0008019	-0.000323	2.6642705	19.5026092 C
0.00003875	4940.	127471254.	21.1103317	0.0008180	-0.000344	2.7030974	19.8457978 C
0.00004000	5024.	125609387.	20.8512736	0.0008341	-0.000366	2.7410637	20.1854775 C
0.00004125	5106.	123785291.	20.6043394	0.0008499	-0.000388	2.7781202	20.5208786 C
0.00004250	5186.	122012431.	20.3693449	0.0008657	-0.000409	2.8143694	20.8530927 C
0.00004375	5263.	120292569.	20.1455640	0.0008814	-0.000431	2.8498525	21.1824970 C
0.00004500	5338.	118627126.	19.9323834	0.0008970	-0.000453	2.8846118	21.5095105 C
0.00004625	5411.	116996281.	19.7277549	0.0009124	-0.000475	2.9185348	21.8325389 C
0.00004750	5482.	115415504.	19.5321676	0.0009278	-0.000497	2.9517557	22.1531854 C
0.00004875	5552.	113890367.	19.3455994	0.0009431	-0.000519	2.9843530	22.4724037 C
0.00005125	5686.	110947381.	18.9932451	0.0009734	-0.000564	3.0473114	23.1011475 C
0.00005375	5814.	108173157.	18.6682145	0.0010034	-0.000609	3.1076685	23.7213921 C
0.00005625	5937.	105555015.	18.3672634	0.0010332	-0.000654	3.1655263	24.3337861 C
0.00005875	6056.	103082151.	18.0877563	0.0010627	-0.000700	3.2209866	24.9390775 C
0.00006125	6171.	100745209.	17.8275476	0.0010919	-0.000746	3.2741508	25.5381191 C
0.00006375	6281.	98528207.	17.5840653	0.0011210	-0.000792	3.3250272	26.1303535 C
0.00006625	6388.	96423728.	17.3557312	0.0011498	-0.000838	3.3736965	26.7163863 C
0.00006875	6492.	94430877.	17.1419119	0.0011785	-0.000884	3.4203126	27.2982492 C
0.00007125	6594.	92544102.	16.9416875	0.0012071	-0.000930	3.4649705	27.8771994 C
0.00007375	6692.	90737287.	16.7516319	0.0012354	-0.000977	3.5074647	28.4488654 C
0.00007625	6788.	89024019.	16.5731943	0.0012637	-0.001024	3.5481091	29.0186636 C
0.00007875	6882.	87390926.	16.4046572	0.0012919	-0.001071	3.5868502	29.5851987 C
0.00008125	6974.	85829252.	16.2447275	0.0013199	-0.001118	3.6236689	30.1475770 C
0.00008375	7064.	84342279.	16.0939601	0.0013479	-0.001165	3.6587296	30.7090183 C
0.00008625	7151.	82914932.	15.9501506	0.0013757	-0.001212	3.6918953	31.2660019 C
0.00008875	7238.	81552351.	15.8142265	0.0014035	-0.001259	3.7233446	31.8224282 C
0.00009125	7322.	80245338.	15.6848135	0.0014312	-0.001306	3.7530112	32.3763755 C
0.00009375	7405.	78989773.	15.5614161	0.0014589	-0.001354	3.7809132	32.9279104 C
0.00009625	7487.	77791471.	15.4451921	0.0014866	-0.001401	3.8072118	33.4815799 C

MEG-33 forward abutment X&Z direction row 1

0.00009875	7567.	76629614.	15.3326041	0.0015141	-0.001448	3.8316363	34.0288076	C
0.0001013	7646.	75518372.	15.2264355	0.0015417	-0.001496	3.8544775	34.5785589	C
0.0001038	7724.	74450450.	15.1255202	0.0015693	-0.001543	3.8756649	35.1287215	C
0.0001063	7800.	73415541.	15.0280130	0.0015967	-0.001591	3.8950885	35.6747527	C
0.0001088	7876.	72421890.	14.9358038	0.0016243	-0.001638	3.9129188	-36.628271	C
0.0001113	7951.	71466415.	14.8484995	0.0016519	-0.001686	3.9291375	-37.751966	C
0.0001138	8023.	70535553.	14.7632778	0.0016793	-0.001733	3.9435858	-38.881449	C
0.0001163	8096.	69638783.	14.6825022	0.0017068	-0.001781	3.9564288	-40.008302	C
0.0001188	8167.	68773855.	14.6059019	0.0017345	-0.001828	3.9676503	-41.132488	C
0.0001213	8237.	67936511.	14.5326589	0.0017621	-0.001875	3.9772118	-42.255976	C
0.0001238	8306.	67120311.	14.4613215	0.0017896	-0.001923	3.9850688	-43.383246	C
0.0001263	8374.	66330841.	14.3935603	0.0018172	-0.001970	3.9912898	-44.507767	C
0.0001288	8442.	65566454.	14.3291775	0.0018449	-0.002018	3.9958576	-45.629498	C
0.0001313	8508.	64825625.	14.2679908	0.0018727	-0.002065	3.9987545	-46.748399	C
0.0001338	8574.	64102049.	14.2083219	0.0019004	-0.002112	3.9999599	-47.870287	C
0.0001363	8638.	63396998.	14.1509838	0.0019281	-0.002159	3.9995720	-48.991612	C
0.0001388	8701.	62711123.	14.0964468	0.0019559	-0.002207	3.9986657	-50.000000	CY
0.0001413	8763.	62038767.	14.0443218	0.0019838	-0.002254	3.9999198	-50.000000	CY
0.0001438	8819.	61352447.	13.9926928	0.0020114	-0.002301	3.9992541	-50.000000	CY
0.0001463	8870.	60652088.	13.9409925	0.0020389	-0.002349	3.9999990	-50.000000	CY
0.0001488	8916.	59939006.	13.8882446	0.0020659	-0.002397	3.9994944	-50.000000	CY
0.0001588	9083.	57215815.	13.6958600	0.0021742	-0.002588	3.9994747	-50.000000	CY
0.0001688	9238.	54745700.	13.5300535	0.0022832	-0.002779	3.9987469	-50.000000	CY
0.0001788	9381.	52482914.	13.3878343	0.0023931	-0.002969	3.9999922	50.000000	CY
0.0001888	9470.	50170299.	13.2445514	0.0024999	-0.003163	3.9984149	50.000000	CY
0.0001988	9511.	47851809.	13.1020004	0.0026040	-0.003358	3.9991460	50.000000	CY
0.0002088	9543.	45713768.	12.9761377	0.0027088	-0.003554	3.9994084	50.000000	CY
0.0002188	9570.	43750453.	12.8641871	0.0028140	-0.003748	3.9993636	50.000000	CY
0.0002288	9595.	41946801.	12.7662171	0.0029203	-0.003942	3.9990093	50.000000	CY
0.0002388	9616.	40278182.	12.6754534	0.0030263	-0.004136	3.9980339	50.000000	CY
0.0002488	9635.	38734215.	12.5943805	0.0031329	-0.004330	3.9960392	50.000000	CY
0.0002588	9652.	37302323.	12.5226736	0.0032402	-0.004522	3.9999776	50.000000	CY
0.0002688	9667.	35970033.	12.4593402	0.0033484	-0.004714	3.9990292	50.000000	CY
0.0002788	9680.	34725057.	12.3993497	0.0034563	-0.004906	3.9958661	50.000000	CY
0.0002888	9691.	33561273.	12.3451904	0.0035647	-0.005098	3.9998692	50.000000	CY
0.0002988	9701.	32470865.	12.2970668	0.0036737	-0.005289	3.9972080	50.000000	CY
0.0003088	9710.	31448045.	12.2538480	0.0037834	-0.005479	3.9999967	50.000000	CY
0.0003188	9710.	30461440.	12.2454345	0.0039032	-0.005659	3.9982922	50.000000	CY

MEG-33 forward abutment X&Z direction row 1

Axial Thrust Force = 1022.640 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
0.00000125	186.9745022	149579602.	295.1092311	0.0003689	0.0003314	1.4108907	10.5726471	
0.00000250	373.9450630	149578025.	155.0859231	0.0003877	0.0003127	1.4741056	10.9936044	
0.00000375	560.8810535	149568281.	108.4254005	0.0004066	0.0002941	1.5367128	11.4160748	
0.00000500	747.7651855	149553037.	85.1055767	0.0004255	0.0002755	1.5987059	11.8400586	
0.00000625	934.5801626	149532826.	71.1220350	0.0004445	0.0002570	1.6600783	12.2655564	
0.00000750	1121.	149507824.	61.8066374	0.0004635	0.0002385	1.7208234	12.6925687	
0.00000875	1308.	149478104.	55.1587538	0.0004826	0.0002201	1.7809347	13.1210962	
0.00001000	1494.	149443702.	50.1780694	0.0005018	0.0002018	1.8404057	13.5511401	
0.00001125	1681.	149404637.	46.3088546	0.0005210	0.0001835	1.8992296	13.9827013	
0.00001250	1867.	149360916.	43.2176718	0.0005402	0.0001652	1.9574001	14.4157810	
0.00001375	2053.	149312544.	40.6923337	0.0005595	0.0001470	2.0149103	14.8503806	
0.00001500	2239.	149259523.	38.5913827	0.0005789	0.0001289	2.0717539	15.2865015	
0.00001625	2425.	149201849.	36.8168867	0.0005983	0.0001108	2.1279241	15.7241454	
0.00001750	2610.	149139522.	35.2988945	0.0006177	0.00009273	2.1834144	16.1633140	
0.00001875	2795.	149072537.	33.9861091	0.0006372	0.00007474	2.2382180	16.6040094	
0.00002000	2980.	149000889.	32.8400576	0.0006568	0.00005680	2.2923283	17.0462334	
0.00002125	3165.	148924572.	31.8313200	0.0006764	0.00003892	2.3457386	17.4899885	
0.00002250	3349.	148843580.	30.9370143	0.0006961	0.00002108	2.3984422	17.9352769	
0.00002375	3533.	148757907.	30.1390760	0.0007158	0.00000330	2.4504325	18.3821012	
0.00002500	3717.	148667345.	29.4230482	0.0007356	-0.00001442	2.5017023	18.8304601	
0.00002625	3900.	148569728.	28.7771723	0.0007554	-0.00003210	2.5522408	19.2803100	
0.00002750	4083.	148461686.	28.1917782	0.0007753	-0.00004973	2.6020340	19.7315682	
0.00002875	4265.	148340389.	27.6588700	0.0007952	-0.00006731	2.6510679	20.1841455	
0.00003000	4446.	148203807.	27.1717886	0.0008152	-0.00008485	2.6993293	20.6379562	
0.00003125	4627.	148050694.	26.7249494	0.0008352	-0.000102	2.7468062	21.0929229	
0.00003250	4671.	143734984.	26.1848620	0.0008510	-0.000124	2.7837197	21.4276075	C
0.00003375	4808.	142447037.	25.7678839	0.0008697	-0.000143	2.8265331	21.8436289	C
0.00003500	4939.	141105057.	25.3767065	0.0008882	-0.000162	2.8682649	22.2556072	C
0.00003625	5064.	139703486.	25.0079716	0.0009065	-0.000181	2.9088770	22.6628177	C
0.00003750	5185.	138260991.	24.6597096	0.0009247	-0.000200	2.9484120	23.0655593	C
0.00003875	5301.	136794765.	24.3302927	0.0009428	-0.000220	2.9869178	23.4642290	C
0.00004000	5413.	135313320.	24.0180480	0.0009607	-0.000239	3.0244192	23.8589358	C
0.00004125	5520.	133824360.	23.7215329	0.0009785	-0.000259	3.0609426	24.2498213	C
0.00004250	5624.	132334840.	23.4395015	0.0009962	-0.000279	3.0965158	24.6370607	C

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0.00004375	5725.	130851755.	23.1709154	0.0010137	-0.000299	3.1311712	25.0209116	C
0.00004500	5822.	129382514.	22.9149397	0.0010312	-0.000319	3.1649474	25.4017465	C
0.00004625	5917.	127928641.	22.6705784	0.0010485	-0.000339	3.1978588	25.7796010	C
0.00004750	6008.	126487797.	22.4367219	0.0010657	-0.000359	3.2299003	26.1542096	C
0.00004875	6097.	125071953.	22.2131880	0.0010829	-0.000380	3.2611403	26.5264572	C
0.00005125	6268.	122311968.	21.7940367	0.0011169	-0.000421	3.3212505	27.2638248	C
0.00005375	6430.	119634584.	21.4071399	0.0011506	-0.000462	3.3782054	27.9906920	C
0.00005625	6584.	117045783.	21.0486979	0.0011840	-0.000504	3.4321313	28.7078749	C
0.00005875	6730.	114555251.	20.7160120	0.0012171	-0.000545	3.4831864	29.4169680	C
0.00006125	6870.	112160551.	20.4062161	0.0012499	-0.000588	3.5314577	30.1184790	C
0.00006375	7004.	109859478.	20.1169434	0.0012825	-0.000630	3.5770309	30.8130114	C
0.00006625	7132.	107649968.	19.8462354	0.0013148	-0.000673	3.6199901	31.5012669	C
0.00006875	7255.	105530031.	19.5924725	0.0013470	-0.000716	3.6604164	32.1840542	C
0.00007125	7374.	103496673.	19.3542223	0.0013790	-0.000759	3.6983793	32.8620992	C
0.00007375	7488.	101532280.	19.1288162	0.0014108	-0.000802	3.7338257	33.5330683	C
0.00007625	7598.	99649407.	18.9166054	0.0014424	-0.000845	3.7669334	34.2005313	C
0.00007875	7705.	97846440.	18.7168669	0.0014740	-0.000889	3.7977679	34.8657075	C
0.00008125	7808.	96104416.	18.5270794	0.0015053	-0.000932	3.8262474	35.5253677	C
0.00008375	7909.	94430377.	18.3475140	0.0015366	-0.000976	3.8524910	36.1823373	C
0.00008625	8006.	92824104.	18.1779057	0.0015678	-0.001020	3.8765581	36.8381744	C
0.00008875	8100.	91267303.	18.0157420	0.0015989	-0.001064	3.8983566	37.4885781	C
0.00009125	8192.	89777830.	17.8630844	0.0016300	-0.001107	3.9180734	38.1406248	C
0.00009375	8281.	88328750.	17.7162667	0.0016609	-0.001152	3.9355502	38.7864128	C
0.00009625	8368.	86940780.	17.5779890	0.0016919	-0.001196	3.9509742	39.4347495	C
0.00009875	8452.	85591408.	17.4450137	0.0017227	-0.001240	3.9642246	40.0782206	C
0.0001013	8535.	84292431.	17.3190456	0.0017536	-0.001284	3.9754067	40.7229853	C
0.0001038	8615.	83035789.	17.1988473	0.0017844	-0.001328	3.9844911	41.3668445	C
0.0001063	8693.	81815443.	17.0835056	0.0018151	-0.001372	3.9914740	42.0082395	C
0.0001088	8770.	80640850.	16.9746117	0.0018460	-0.001417	3.9963992	42.6532446	C
0.0001113	8844.	79494850.	16.8692855	0.0018767	-0.001461	3.9992253	43.2939701	C
0.0001138	8916.	78385020.	16.7689766	0.0019075	-0.001505	3.9989891	43.9359745	C
0.0001163	8988.	77312219.	16.6741458	0.0019384	-0.001549	3.9999999	44.5819019	C
0.0001188	9056.	76262361.	16.5823493	0.0019692	-0.001593	3.9999571	45.2245283	C
0.0001213	9123.	75241429.	16.4947453	0.0020000	-0.001638	3.9997922	45.8685860	C
0.0001238	9189.	74251640.	16.4118165	0.0020310	-0.001682	3.9994374	46.5167195	C
0.0001263	9253.	73288879.	16.3326844	0.0020620	-0.001725	3.9988065	47.1667286	C
0.0001288	9314.	72345081.	16.2556630	0.0020929	-0.001770	3.9999623	47.8131445	C
0.0001313	9375.	71428284.	16.1826458	0.0021240	-0.001814	3.9996261	48.4636336	C
0.0001338	9434.	70537903.	16.1133339	0.0021552	-0.001857	3.9988452	49.1179067	C
0.0001363	9493.	69671886.	16.0474600	0.0021865	-0.001901	3.9999544	49.7757140	C

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0.0001388	9549.	68819778.	15.9828222	0.0022176	-0.001945	3.9994325	50.0000000	CY
0.0001413	9604.	67991072.	15.9213826	0.0022489	-0.001989	3.9992360	50.0000000	CY
0.0001438	9656.	67175405.	15.8639932	0.0022804	-0.002032	3.9997296	50.0000000	CY
0.0001463	9708.	66379393.	15.8096547	0.0023122	-0.002075	3.9986388	50.0000000	CY
0.0001488	9757.	65593918.	15.7591678	0.0023442	-0.002118	3.9998723	50.0000000	CY
0.0001588	9936.	62587970.	15.5783056	0.0024731	-0.002289	3.9999182	50.0000000	CY
0.0001688	10079.	59727713.	15.4211803	0.0026023	-0.002460	3.9996354	50.0000000	CY
0.0001788	10183.	56965310.	15.2715244	0.0027298	-0.002633	3.9980826	50.0000000	CY
0.0001888	10277.	54448074.	15.1453469	0.0028587	-0.002804	3.9996142	50.0000000	CY
0.0001988	10363.	52142314.	15.0341767	0.0029880	-0.002974	3.9999981	50.0000000	CY
0.0002088	10443.	50025253.	14.9400203	0.0031187	-0.003144	3.9970352	50.0000000	CY
0.0002188	10501.	48002762.	14.8528929	0.0032491	-0.003313	3.9973949	50.0000000	CY
0.0002288	10523.	46000954.	14.7613499	0.0033767	-0.003486	3.9967612	50.0000000	CY
0.0002388	10523.	44074293.	14.6763126	0.0035040	-0.003659	3.9980761	50.0000000	CY
0.0002488	10523.	42302462.	14.6072228	0.0036335	-0.003829	3.9999538	50.0000000	CY
0.0002588	10523.	40667584.	14.5528301	0.0037655	-0.003997	3.9994289	50.0000000	CY
0.0002688	10523.	39154372.	14.5974807	0.0039231	-0.004139	3.9995883	50.0000000	CY

 Summary of Results for Nominal Moment Capacity for Section 1

Moment values interpolated at maximum compressive strain = 0.003
 or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain	Max. Tens. Strain
1	756.200	9611.191	0.00300000	-0.00408816
2	1022.640	10370.558	0.00300000	-0.00298995

Note that the values of moment capacity in the table above are not factored by a strength reduction factor (phi-factor).

In ACI 318, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.75).

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318,

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or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Load No.	Resist. Factor	Nominal Ax. Thrust kips	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in ²
1	0.65	756.200000	9611.	491.530000	6247.	99208156.
2	0.65	1023.	10371.	664.716000	6741.	114371141.
1	0.75	756.200000	9611.	567.150000	7208.	82015882.
2	0.75	1023.	10371.	766.980000	7778.	96620983.
1	0.90	756.200000	9611.	680.580000	8650.	63264529.
2	0.90	1023.	10371.	920.376000	9334.	72056218.

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 1

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 26700.0 lbs
 Applied moment at pile head = 747240.0 in-lbs
 Axial thrust load on pile head = 756200.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in ²	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	3.91E-04	747240.	26700.	-6.09E-05	0.00	1.58E+11	-15401.	2.37E+07	0.00
0.10000	3.21E-04	768244.	9462.	-5.51E-05	0.00	1.58E+11	-13330.	4.98E+07	0.00
0.2000	2.58E-04	770048.	-5299.	-4.93E-05	0.00	1.58E+11	-11271.	5.23E+07	0.00

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0.3000	2.03E-04	755617.	-17622.	-4.35E-05	0.00	1.58E+11	-9268.	5.49E+07	0.00
0.4000	1.54E-04	727834.	-27600.	-3.79E-05	0.00	1.58E+11	-7361.	5.74E+07	0.00
0.5000	1.12E-04	689447.	-35364.	-3.25E-05	0.00	1.58E+11	-5579.	5.99E+07	0.00
0.6000	7.59E-05	643020.	-41080.	-2.75E-05	0.00	1.58E+11	-3947.	6.24E+07	0.00
0.7000	4.58E-05	590905.	-44936.	-2.28E-05	0.00	1.58E+11	-2481.	6.50E+07	0.00
0.8000	2.12E-05	535214.	-47139.	-1.85E-05	0.00	1.58E+11	-1190.	6.75E+07	0.00
0.9000	1.38E-06	477806.	-47901.	-1.47E-05	0.00	1.58E+11	-80.589	7.00E+07	0.00
1.0000	-1.41E-05	420278.	-47440.	-1.13E-05	0.00	1.58E+11	849.4786	7.25E+07	0.00
1.1000	-2.57E-05	363970.	-45967.	-8.30E-06	0.00	1.58E+11	1605.	7.51E+07	0.00
1.2000	-3.40E-05	309972.	-43687.	-5.74E-06	0.00	1.58E+11	2196.	7.76E+07	0.00
1.3000	-3.94E-05	259133.	-40790.	-3.58E-06	0.00	1.58E+11	2633.	8.01E+07	0.00
1.4000	-4.26E-05	212083.	-37452.	-1.79E-06	0.00	1.58E+11	2930.	8.26E+07	0.00
1.5000	-4.37E-05	169251.	-33831.	-3.48E-07	0.00	1.58E+11	3104.	8.51E+07	0.00
1.6000	-4.34E-05	130888.	-30067.	7.90E-07	0.00	1.58E+11	3170.	8.77E+07	0.00
1.7000	-4.19E-05	97089.	-26277.	1.65E-06	0.00	1.58E+11	3146.	9.02E+07	0.00
1.8000	-3.94E-05	67819.	-22563.	2.28E-06	0.00	1.58E+11	3046.	9.27E+07	0.00
1.9000	-3.64E-05	42935.	-19003.	2.70E-06	0.00	1.58E+11	2887.	9.52E+07	0.00
2.0000	-3.29E-05	22208.	-15660.	2.95E-06	0.00	1.58E+11	2684.	9.78E+07	0.00
2.1000	-2.93E-05	5346.	-12580.	3.05E-06	0.00	1.58E+11	2449.	1.00E+08	0.00
2.2000	-2.56E-05	-7990.	-9793.	3.04E-06	0.00	1.58E+11	2195.	1.03E+08	0.00
2.3000	-2.20E-05	-18164.	-7317.	2.94E-06	0.00	1.58E+11	1932.	1.05E+08	0.00
2.4000	-1.86E-05	-25556.	-5157.	2.78E-06	0.00	1.58E+11	1668.	1.08E+08	0.00
2.5000	-1.53E-05	-30546.	-3309.	2.56E-06	0.00	1.58E+11	1412.	1.10E+08	0.00
2.6000	-1.24E-05	-33503.	-1762.	2.32E-06	0.00	1.58E+11	1168.	1.13E+08	0.00
2.7000	-9.78E-06	-34778.	-496.795	2.06E-06	0.00	1.58E+11	940.4816	1.15E+08	0.00
2.8000	-7.46E-06	-34699.	507.5642	1.80E-06	0.00	1.58E+11	733.4501	1.18E+08	0.00
2.9000	-5.46E-06	-33563.	1277.	1.54E-06	0.00	1.58E+11	548.3841	1.20E+08	0.00
3.0000	-3.77E-06	-31637.	1837.	1.29E-06	0.00	1.58E+11	386.2159	1.23E+08	0.00
3.1000	-2.36E-06	-29156.	2217.	1.06E-06	0.00	1.58E+11	247.0391	1.26E+08	0.00
3.2000	-1.22E-06	-26318.	2444.	8.51E-07	0.00	1.58E+11	130.2598	1.28E+08	0.00
3.3000	-3.19E-07	-23292.	2543.	6.63E-07	0.00	1.58E+11	34.7416	1.31E+08	0.00
3.4000	3.70E-07	-20216.	2539.	4.98E-07	0.00	1.58E+11	-41.059	1.33E+08	0.00
3.5000	8.76E-07	-17199.	2455.	3.56E-07	0.00	1.58E+11	-98.967	1.36E+08	0.00
3.6000	1.22E-06	-14325.	2311.	2.37E-07	0.00	1.58E+11	-140.984	1.38E+08	0.00
3.7000	1.44E-06	-11654.	2125.	1.38E-07	0.00	1.58E+11	-169.188	1.41E+08	0.00
3.8000	1.56E-06	-9226.	1912.	5.89E-08	0.00	1.58E+11	-185.657	1.43E+08	0.00
3.9000	1.58E-06	-7065.	1685.	-2.92E-09	0.00	1.58E+11	-192.406	1.46E+08	0.00
4.0000	1.55E-06	-5181.	1455.	-4.94E-08	0.00	1.58E+11	-191.334	1.48E+08	0.00
4.1000	1.47E-06	-3573.	1230.	-8.26E-08	0.00	1.58E+11	-184.188	1.51E+08	0.00
4.2000	1.35E-06	-2230.	1016.	-1.05E-07	0.00	1.58E+11	-172.541	1.53E+08	0.00

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4.3000	1.22E-06	-1136.	817.3493	-1.17E-07	0.00	1.58E+11	-157.774	1.56E+08	0.00
4.4000	1.07E-06	-268.274	638.0407	-1.23E-07	0.00	1.58E+11	-141.073	1.58E+08	0.00
4.5000	9.21E-07	395.9140	479.3375	-1.22E-07	0.00	1.58E+11	-123.432	1.61E+08	0.00
4.6000	7.76E-07	882.3575	341.8843	-1.17E-07	0.00	1.58E+11	-105.657	1.63E+08	0.00
4.7000	6.39E-07	1217.	225.4605	-1.09E-07	0.00	1.58E+11	-88.383	1.66E+08	0.00
4.8000	5.14E-07	1424.	129.1781	-9.93E-08	0.00	1.58E+11	-72.088	1.68E+08	0.00
4.9000	4.01E-07	1527.	51.6597	-8.82E-08	0.00	1.58E+11	-57.110	1.71E+08	0.00
5.0000	3.02E-07	1548.	-8.806	-7.65E-08	0.00	1.58E+11	-43.666	1.73E+08	0.00
5.1000	2.17E-07	1506.	-54.129	-6.49E-08	0.00	1.58E+11	-31.872	1.76E+08	0.00
5.2000	1.46E-07	1418.	-86.308	-5.38E-08	0.00	1.58E+11	-21.761	1.78E+08	0.00
5.3000	8.82E-08	1299.	-107.343	-4.35E-08	0.00	1.58E+11	-13.297	1.81E+08	0.00
5.4000	4.18E-08	1160.	-119.160	-3.42E-08	0.00	1.58E+11	-6.397	1.84E+08	0.00
5.5000	6.06E-09	1013.	-123.562	-2.60E-08	0.00	1.58E+11	-0.940	1.86E+08	0.00
5.6000	-2.05E-08	863.9680	-122.194	-1.88E-08	0.00	1.58E+11	3.2195	1.89E+08	0.00
5.7000	-3.92E-08	719.6676	-116.519	-1.28E-08	0.00	1.58E+11	6.2380	1.91E+08	0.00
5.8000	-5.13E-08	584.3448	-107.810	-7.90E-09	0.00	1.58E+11	8.2782	1.94E+08	0.00
5.9000	-5.81E-08	460.9387	-97.143	-3.93E-09	0.00	1.58E+11	9.5001	1.96E+08	0.00
6.0000	-6.07E-08	351.2095	-85.409	-8.52E-10	0.00	1.58E+11	10.0562	1.99E+08	0.00
6.1000	-6.02E-08	255.9588	-73.323	1.45E-09	0.00	1.58E+11	10.0874	2.01E+08	0.00
6.2000	-5.73E-08	175.2322	-61.438	3.09E-09	0.00	1.58E+11	9.7207	2.04E+08	0.00
6.3000	-5.28E-08	108.5022	-50.165	4.16E-09	0.00	1.58E+11	9.0677	2.06E+08	0.00
6.4000	-4.73E-08	54.8289	-39.790	4.78E-09	0.00	1.58E+11	8.2239	2.09E+08	0.00
6.5000	-4.13E-08	12.9976	-30.494	5.04E-09	0.00	1.58E+11	7.2693	2.11E+08	0.00
6.6000	-3.52E-08	-18.366	-22.372	5.02E-09	0.00	1.58E+11	6.2683	2.14E+08	0.00
6.7000	-2.92E-08	-40.703	-15.447	4.79E-09	0.00	1.58E+11	5.2719	2.16E+08	0.00
6.8000	-2.37E-08	-55.448	-9.693	4.43E-09	0.00	1.58E+11	4.3180	2.19E+08	0.00
6.9000	-1.86E-08	-63.975	-5.042	3.98E-09	0.00	1.58E+11	3.4339	2.21E+08	0.00
7.0000	-1.41E-08	-67.557	-1.400	3.48E-09	0.00	1.58E+11	2.6371	2.24E+08	0.00
7.1000	-1.03E-08	-67.341	1.3450	2.97E-09	0.00	1.58E+11	1.9374	2.26E+08	0.00
7.2000	-7.02E-09	-64.334	3.3106	2.47E-09	0.00	1.58E+11	1.3385	2.29E+08	0.00
7.3000	-4.35E-09	-59.400	4.6169	2.00E-09	0.00	1.58E+11	0.8388	2.31E+08	0.00
7.4000	-2.22E-09	-53.257	5.3801	1.57E-09	0.00	1.58E+11	0.4333	2.34E+08	0.00
7.5000	-5.80E-10	-46.490	5.7087	1.19E-09	0.00	1.58E+11	0.1144	2.37E+08	0.00
7.6000	6.38E-10	-39.559	5.7018	8.65E-10	0.00	1.58E+11	-0.126	2.37E+08	0.00
7.7000	1.50E-09	-32.808	5.4493	5.91E-10	0.00	1.58E+11	-0.295	2.37E+08	0.00
7.8000	2.06E-09	-26.481	5.0290	3.66E-10	0.00	1.58E+11	-0.405	2.37E+08	0.00
7.9000	2.38E-09	-20.739	4.5047	1.87E-10	0.00	1.58E+11	-0.468	2.37E+08	0.00
8.0000	2.51E-09	-15.670	3.9274	4.91E-11	0.00	1.58E+11	-0.494	2.37E+08	0.00
8.1000	2.49E-09	-11.313	3.3360	-5.32E-11	0.00	1.58E+11	-0.492	2.37E+08	0.00
8.2000	2.38E-09	-7.664	2.7598	-1.25E-10	0.00	1.58E+11	-0.469	2.37E+08	0.00

MEG-33 forward abutment X&Z direction row 1

8.3000	2.19E-09	-4.689	2.2191	-1.72E-10	0.00	1.58E+11	-0.432	2.37E+08	0.00
8.4000	1.97E-09	-2.338	1.7272	-1.99E-10	0.00	1.58E+11	-0.387	2.37E+08	0.00
8.5000	1.72E-09	-0.544	1.2917	-2.10E-10	0.00	1.58E+11	-0.338	2.37E+08	0.00
8.6000	1.46E-09	0.7629	0.9156	-2.09E-10	0.00	1.58E+11	-0.288	2.37E+08	0.00
8.7000	1.22E-09	1.6542	0.5988	-2.00E-10	0.00	1.58E+11	-0.240	2.37E+08	0.00
8.8000	9.84E-10	2.2004	0.3387	-1.85E-10	0.00	1.58E+11	-0.194	2.37E+08	0.00
8.9000	7.72E-10	2.4673	0.1310	-1.67E-10	0.00	1.58E+11	-0.152	2.37E+08	0.00
9.0000	5.83E-10	2.5151	-0.02920	-1.48E-10	0.00	1.58E+11	-0.115	2.37E+08	0.00
9.1000	4.16E-10	2.3975	-0.147	-1.30E-10	0.00	1.58E+11	-0.08200	2.37E+08	0.00
9.2000	2.71E-10	2.1618	-0.229	-1.12E-10	0.00	1.58E+11	-0.05346	2.37E+08	0.00
9.3000	1.46E-10	1.8491	-0.278	-9.72E-11	0.00	1.58E+11	-0.02881	2.37E+08	0.00
9.4000	3.79E-11	1.4949	-0.300	-8.45E-11	0.00	1.58E+11	-0.00747	2.37E+08	0.00
9.5000	-5.67E-11	1.1300	-0.297	-7.46E-11	0.00	1.58E+11	0.01118	2.37E+08	0.00
9.6000	-1.41E-10	0.7811	-0.274	-6.73E-11	0.00	1.58E+11	0.02781	2.37E+08	0.00
9.7000	-2.18E-10	0.4723	-0.232	-6.26E-11	0.00	1.58E+11	0.04304	2.37E+08	0.00
9.8000	-2.91E-10	0.2255	-0.171	-5.99E-11	0.00	1.58E+11	0.05742	2.37E+08	0.00
9.9000	-3.62E-10	0.06134	-0.09400	-5.89E-11	0.00	1.58E+11	0.07140	2.37E+08	0.00
10.0000	-4.33E-10	0.00	0.00	-5.86E-11	0.00	1.58E+11	0.08526	1.18E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 1:

Pile-head deflection = 0.00039069 inches
 Computed slope at pile head = -0.0000609 radians
 Maximum bending moment = 770048. inch-lbs
 Maximum shear force = -47901. lbs
 Depth of maximum bending moment = 0.20000000 feet below pile head
 Depth of maximum shear force = 0.90000000 feet below pile head
 Number of iterations = 6
 Number of zero deflection points = 5

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 2

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 41630.0 lbs
 Applied moment at pile head = 1165680.0 in-lbs
 Axial thrust load on pile head = 1022640.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in ²	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	6.25E-04	1165680.	41630.	-9.89E-05	0.00	1.49E+11	-24634.	2.37E+07	0.00
0.1000	5.12E-04	1198015.	14098.	-8.94E-05	0.00	1.49E+11	-21253.	4.98E+07	0.00
0.2000	4.10E-04	1199735.	-9393.	-7.98E-05	0.00	1.49E+11	-17899.	5.23E+07	0.00
0.3000	3.20E-04	1175668.	-28921.	-7.03E-05	0.00	1.49E+11	-14647.	5.49E+07	0.00
0.4000	2.42E-04	1130498.	-44644.	-6.10E-05	0.00	1.50E+11	-11559.	5.74E+07	0.00
0.5000	1.74E-04	1068672.	-56789.	-5.22E-05	0.00	1.50E+11	-8683.	5.99E+07	0.00
0.6000	1.16E-04	994332.	-65633.	-4.39E-05	0.00	1.50E+11	-6058.	6.24E+07	0.00
0.7000	6.85E-05	911259.	-71494.	-3.63E-05	0.00	1.50E+11	-3710.	6.50E+07	0.00
0.8000	2.94E-05	822836.	-74712.	-2.93E-05	0.00	1.50E+11	-1653.	6.75E+07	0.00
0.9000	-1.80E-06	732024.	-75640.	-2.31E-05	0.00	1.50E+11	105.1299	7.00E+07	0.00
1.0000	-2.60E-05	641356.	-74636.	-1.76E-05	0.00	1.50E+11	1569.	7.25E+07	0.00
1.1000	-4.39E-05	552940.	-72046.	-1.28E-05	0.00	1.50E+11	2748.	7.51E+07	0.00
1.2000	-5.66E-05	468476.	-68203.	-8.66E-06	0.00	1.50E+11	3658.	7.76E+07	0.00
1.3000	-6.47E-05	389274.	-63416.	-5.22E-06	0.00	1.50E+11	4320.	8.01E+07	0.00
1.4000	-6.91E-05	316291.	-57968.	-2.39E-06	0.00	1.50E+11	4759.	8.26E+07	0.00
1.5000	-7.05E-05	250157.	-52112.	-1.22E-07	0.00	1.50E+11	5000.	8.51E+07	0.00
1.6000	-6.94E-05	191221.	-46069.	1.65E-06	0.00	1.50E+11	5071.	8.77E+07	0.00
1.7000	-6.65E-05	139586.	-40027.	2.98E-06	0.00	1.50E+11	4999.	9.02E+07	0.00
1.8000	-6.23E-05	95149.	-34141.	3.92E-06	0.00	1.50E+11	4811.	9.27E+07	0.00
1.9000	-5.71E-05	57638.	-28535.	4.53E-06	0.00	1.50E+11	4533.	9.52E+07	0.00
2.0000	-5.14E-05	26655.	-23303.	4.87E-06	0.00	1.50E+11	4187.	9.78E+07	0.00
2.1000	-4.54E-05	1700.	-18512.	4.98E-06	0.00	1.50E+11	3796.	1.00E+08	0.00
2.2000	-3.94E-05	-17788.	-14207.	4.92E-06	0.00	1.50E+11	3379.	1.03E+08	0.00
2.3000	-3.36E-05	-32409.	-10409.	4.72E-06	0.00	1.50E+11	2951.	1.05E+08	0.00
2.4000	-2.81E-05	-42781.	-7122.	4.41E-06	0.00	1.50E+11	2528.	1.08E+08	0.00

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2.5000	-2.30E-05	-49512.	-4334.	4.04E-06	0.00	1.50E+11	2118.	1.10E+08	0.00
2.6000	-1.84E-05	-53193.	-2024.	3.63E-06	0.00	1.50E+11	1733.	1.13E+08	0.00
2.7000	-1.43E-05	-54378.	-158.146	3.20E-06	0.00	1.50E+11	1377.	1.15E+08	0.00
2.8000	-1.07E-05	-53580.	1301.	2.77E-06	0.00	1.50E+11	1055.	1.18E+08	0.00
2.9000	-7.67E-06	-51263.	2396.	2.35E-06	0.00	1.50E+11	769.9033	1.20E+08	0.00
3.0000	-5.10E-06	-47836.	3171.	1.95E-06	0.00	1.50E+11	522.6138	1.23E+08	0.00
3.1000	-2.99E-06	-43657.	3672.	1.58E-06	0.00	1.50E+11	312.6852	1.26E+08	0.00
3.2000	-1.30E-06	-39027.	3943.	1.25E-06	0.00	1.50E+11	138.7292	1.28E+08	0.00
3.3000	1.34E-08	-34196.	4026.	9.57E-07	0.00	1.50E+11	-1.453	1.31E+08	0.00
3.4000	9.98E-07	-29368.	3958.	7.03E-07	0.00	1.50E+11	-110.650	1.33E+08	0.00
3.5000	1.70E-06	-24698.	3777.	4.86E-07	0.00	1.50E+11	-192.036	1.36E+08	0.00
3.6000	2.16E-06	-20305.	3512.	3.05E-07	0.00	1.50E+11	-249.005	1.38E+08	0.00
3.7000	2.43E-06	-16270.	3192.	1.58E-07	0.00	1.50E+11	-285.012	1.41E+08	0.00
3.8000	2.54E-06	-12645.	2839.	4.24E-08	0.00	1.50E+11	-303.461	1.43E+08	0.00
3.9000	2.53E-06	-9458.	2472.	-4.62E-08	0.00	1.50E+11	-307.599	1.46E+08	0.00
4.0000	2.43E-06	-6713.	2107.	-1.11E-07	0.00	1.50E+11	-300.449	1.48E+08	0.00
4.1000	2.27E-06	-4400.	1756.	-1.56E-07	0.00	1.50E+11	-284.758	1.51E+08	0.00
4.2000	2.06E-06	-2498.	1427.	-1.83E-07	0.00	1.50E+11	-262.959	1.53E+08	0.00
4.3000	1.83E-06	-974.227	1127.	-1.97E-07	0.00	1.50E+11	-237.163	1.56E+08	0.00
4.4000	1.59E-06	207.9646	859.4605	-2.00E-07	0.00	1.50E+11	-209.155	1.58E+08	0.00
4.5000	1.35E-06	1089.	625.7273	-1.95E-07	0.00	1.50E+11	-180.400	1.61E+08	0.00
4.6000	1.12E-06	1710.	426.2480	-1.84E-07	0.00	1.50E+11	-152.065	1.63E+08	0.00
4.7000	9.05E-07	2112.	259.9823	-1.69E-07	0.00	1.50E+11	-125.044	1.66E+08	0.00
4.8000	7.12E-07	2335.	124.9659	-1.51E-07	0.00	1.50E+11	-99.983	1.68E+08	0.00
4.9000	5.43E-07	2413.	18.5865	-1.32E-07	0.00	1.50E+11	-77.316	1.71E+08	0.00
5.0000	3.96E-07	2379.	-62.178	-1.12E-07	0.00	1.50E+11	-57.292	1.73E+08	0.00
5.1000	2.73E-07	2264.	-120.561	-9.39E-08	0.00	1.50E+11	-40.012	1.76E+08	0.00
5.2000	1.71E-07	2090.	-159.840	-7.64E-08	0.00	1.50E+11	-25.454	1.78E+08	0.00
5.3000	8.95E-08	1880.	-183.215	-6.05E-08	0.00	1.50E+11	-13.504	1.81E+08	0.00
5.4000	2.60E-08	1651.	-193.706	-4.63E-08	0.00	1.50E+11	-3.980	1.84E+08	0.00
5.5000	-2.16E-08	1416.	-194.085	-3.40E-08	0.00	1.50E+11	3.3476	1.86E+08	0.00
5.6000	-5.56E-08	1185.	-186.836	-2.36E-08	0.00	1.50E+11	8.7336	1.89E+08	0.00
5.7000	-7.81E-08	967.1940	-174.129	-1.49E-08	0.00	1.50E+11	12.4455	1.91E+08	0.00
5.8000	-9.14E-08	767.2137	-157.812	-7.97E-09	0.00	1.50E+11	14.7498	1.94E+08	0.00
5.9000	-9.73E-08	588.4656	-139.420	-2.54E-09	0.00	1.50E+11	15.9026	1.96E+08	0.00
6.0000	-9.75E-08	432.6114	-120.193	1.56E-09	0.00	1.50E+11	16.1422	1.99E+08	0.00
6.1000	-9.35E-08	299.9978	-101.097	4.50E-09	0.00	1.50E+11	15.6844	2.01E+08	0.00
6.2000	-8.67E-08	189.9667	-82.855	6.46E-09	0.00	1.50E+11	14.7196	2.04E+08	0.00
6.3000	-7.80E-08	101.1299	-65.976	7.63E-09	0.00	1.50E+11	13.4118	2.06E+08	0.00
6.4000	-6.84E-08	31.6052	-50.790	8.16E-09	0.00	1.50E+11	11.8981	2.09E+08	0.00

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6.5000	-5.84E-08	-20.787	-37.477	8.21E-09	0.00	1.50E+11	10.2903	2.11E+08	0.00
6.6000	-4.87E-08	-58.360	-26.097	7.89E-09	0.00	1.50E+11	8.6764	2.14E+08	0.00
6.7000	-3.95E-08	-83.439	-16.618	7.32E-09	0.00	1.50E+11	7.1227	2.16E+08	0.00
6.8000	-3.11E-08	-98.260	-8.938	6.59E-09	0.00	1.50E+11	5.6769	2.19E+08	0.00
6.9000	-2.37E-08	-104.906	-2.909	5.78E-09	0.00	1.50E+11	4.3704	2.21E+08	0.00
7.0000	-1.73E-08	-105.257	1.6454	4.93E-09	0.00	1.50E+11	3.2211	2.24E+08	0.00
7.1000	-1.18E-08	-100.969	4.9196	4.11E-09	0.00	1.50E+11	2.2359	2.26E+08	0.00
7.2000	-7.41E-09	-93.460	7.1092	3.33E-09	0.00	1.50E+11	1.4134	2.29E+08	0.00
7.3000	-3.87E-09	-83.915	8.4047	2.61E-09	0.00	1.50E+11	0.7458	2.31E+08	0.00
7.4000	-1.13E-09	-73.296	8.9847	1.98E-09	0.00	1.50E+11	0.2209	2.34E+08	0.00
7.5000	8.96E-10	-62.357	9.0113	1.44E-09	0.00	1.50E+11	-0.177	2.37E+08	0.00
7.6000	2.32E-09	-51.672	8.6306	9.83E-10	0.00	1.50E+11	-0.458	2.37E+08	0.00
7.7000	3.25E-09	-41.646	7.9711	6.08E-10	0.00	1.50E+11	-0.641	2.37E+08	0.00
7.8000	3.78E-09	-32.543	7.1388	3.11E-10	0.00	1.50E+11	-0.746	2.37E+08	0.00
7.9000	4.00E-09	-24.513	6.2184	8.19E-11	0.00	1.50E+11	-0.788	2.37E+08	0.00
8.0000	3.98E-09	-17.619	5.2748	-8.71E-11	0.00	1.50E+11	-0.784	2.37E+08	0.00
8.1000	3.79E-09	-11.854	4.3558	-2.05E-10	0.00	1.50E+11	-0.747	2.37E+08	0.00
8.2000	3.49E-09	-7.164	3.4952	-2.82E-10	0.00	1.50E+11	-0.687	2.37E+08	0.00
8.3000	3.11E-09	-3.465	2.7145	-3.24E-10	0.00	1.50E+11	-0.614	2.37E+08	0.00
8.4000	2.71E-09	-0.649	2.0258	-3.41E-10	0.00	1.50E+11	-0.534	2.37E+08	0.00
8.5000	2.30E-09	1.3983	1.4339	-3.38E-10	0.00	1.50E+11	-0.453	2.37E+08	0.00
8.6000	1.90E-09	2.7934	0.9378	-3.21E-10	0.00	1.50E+11	-0.374	2.37E+08	0.00
8.7000	1.53E-09	3.6499	0.5329	-2.95E-10	0.00	1.50E+11	-0.301	2.37E+08	0.00
8.8000	1.19E-09	4.0731	0.2117	-2.64E-10	0.00	1.50E+11	-0.235	2.37E+08	0.00
8.9000	8.92E-10	4.1585	-0.03457	-2.31E-10	0.00	1.50E+11	-0.176	2.37E+08	0.00
9.0000	6.35E-10	3.9907	-0.215	-1.98E-10	0.00	1.50E+11	-0.125	2.37E+08	0.00
9.1000	4.16E-10	3.6425	-0.340	-1.68E-10	0.00	1.50E+11	-0.08203	2.37E+08	0.00
9.2000	2.32E-10	3.1762	-0.416	-1.40E-10	0.00	1.50E+11	-0.04579	2.37E+08	0.00
9.3000	7.91E-11	2.6440	-0.453	-1.17E-10	0.00	1.50E+11	-0.01558	2.37E+08	0.00
9.4000	-4.88E-11	2.0892	-0.457	-9.81E-11	0.00	1.50E+11	0.00961	2.37E+08	0.00
9.5000	-1.56E-10	1.5483	-0.432	-8.35E-11	0.00	1.50E+11	0.03084	2.37E+08	0.00
9.6000	-2.49E-10	1.0518	-0.384	-7.31E-11	0.00	1.50E+11	0.04913	2.37E+08	0.00
9.7000	-3.32E-10	0.6260	-0.316	-6.64E-11	0.00	1.50E+11	0.06542	2.37E+08	0.00
9.8000	-4.09E-10	0.2944	-0.228	-6.27E-11	0.00	1.50E+11	0.08053	2.37E+08	0.00
9.9000	-4.82E-10	0.07874	-0.123	-6.12E-11	0.00	1.50E+11	0.09507	2.37E+08	0.00
10.0000	-5.55E-10	0.00	0.00	-6.09E-11	0.00	1.50E+11	0.1095	1.18E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual

MEG-33 forward abutment X&Z direction row 1
 stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 2:

Pile-head deflection = 0.00062491 inches
 Computed slope at pile head = -0.0000989 radians
 Maximum bending moment = 1199735. inch-lbs
 Maximum shear force = -75640. lbs
 Depth of maximum bending moment = 0.20000000 feet below pile head
 Depth of maximum shear force = 0.90000000 feet below pile head
 Number of iterations = 6
 Number of zero deflection points = 5

 Summary of Pile-head Responses for Conventional Analyses

Definitions of Pile-head Loading Conditions:

Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs
 Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
 Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.
 Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs
 Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians

Load Case No.	Load Type 1	Pile-head Load 1	Load Type 2	Pile-head Load 2	Axial Loading lbs	Pile-head Deflection inches	Pile-head Rotation radians	Max Shear in Pile lbs	Max Moment in Pile in-lbs
1	V, lb	26700.	M, in-lb	747240.	756200.	3.91E-04	-6.09E-05	-47901.	770048.
2	V, lb	41630.	M, in-lb	1165680.	1022640.	6.25E-04	-9.89E-05	-75640.	1199735.

Maximum pile-head deflection = 0.0006249093 inches
 Maximum pile-head rotation = -0.0000989082 radians = -0.005667 deg.

Summary of Warning Messages

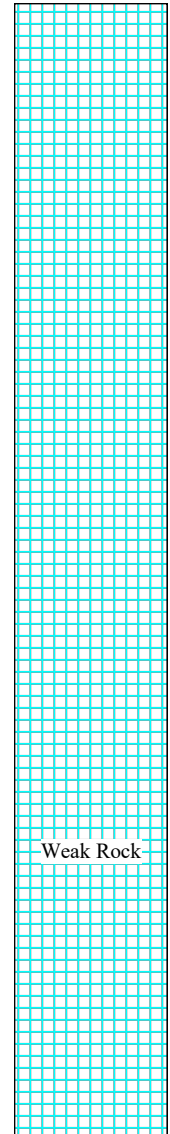
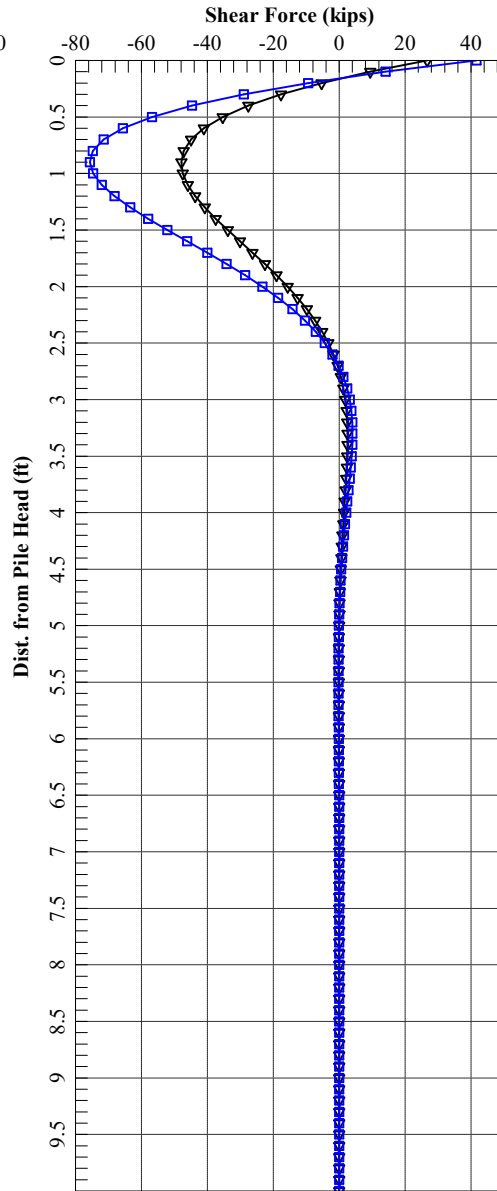
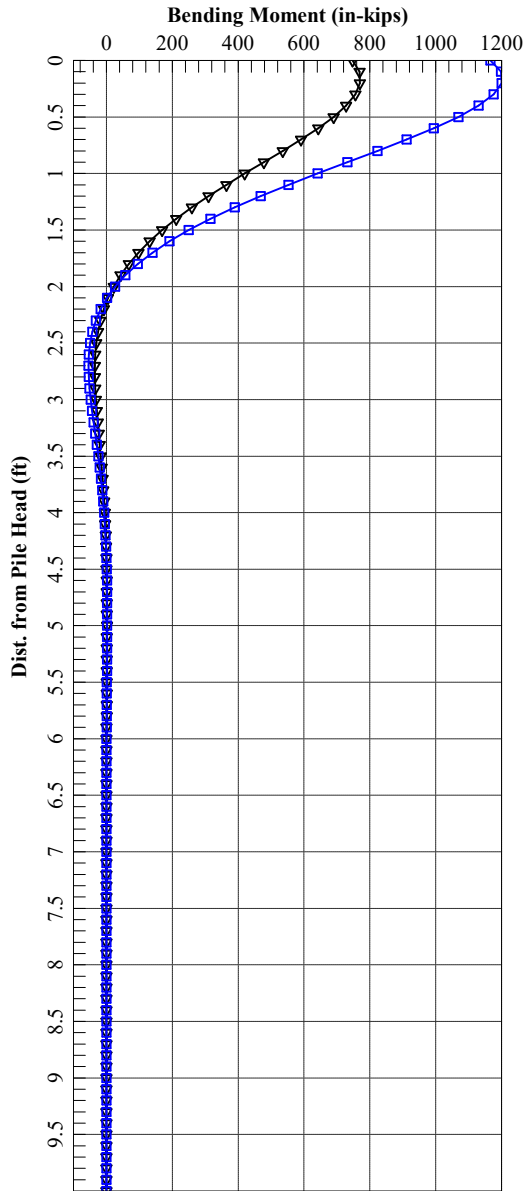
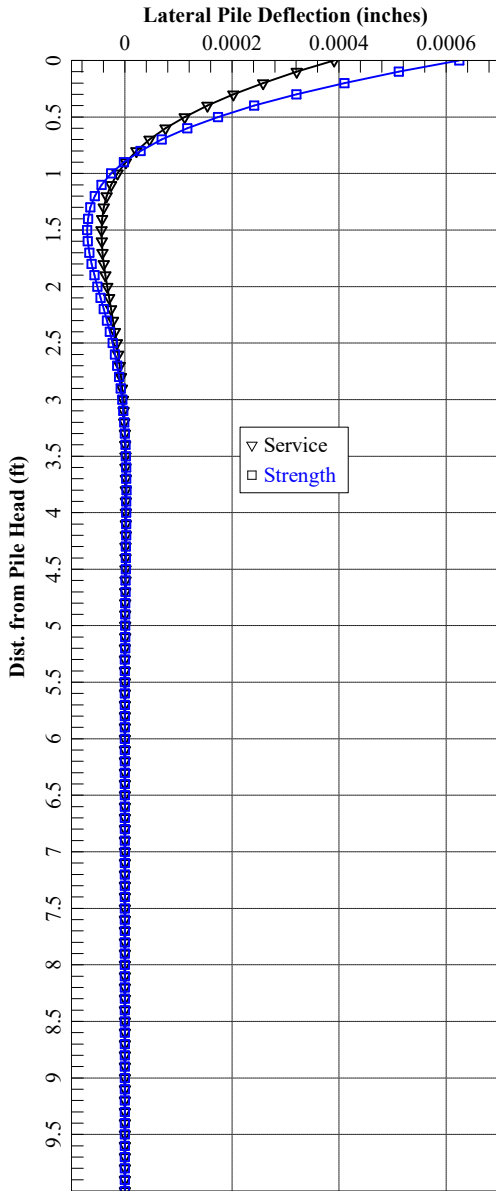
The following warning was reported 706 times

**** Warning ****

An unreasonable input value for unconfined compressive strength has been specified for a soil defined using the weak rock criteria. The input value is greater than 500 psi. Please check your input data for correctness.

The analysis ended normally.

MEG-33 Bridge 3 Rear Abutment X&Z-Direction Row 1



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LPile for Windows, Version 2022-12.006

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method
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Files Used for Analysis

Path to file locations:

\\US0247-PPFSS01\shared_projects\173609140\119144\400-Engineering\Geotechnical\Analysis\Lpile\bridges\LPile
Analysis\Bridge 3\forward abutment\

Name of input data file:

MEG-33 forward abutment X direction row 2.lp12d

Name of output report file:

MEG-33 forward abutment X direction row 2.lp12o

Name of plot output file:

MEG-33 forward abutment X direction row 2.lp12p

Name of runtime message file:

MEG-33 forward abutment X direction row 2.lp12r

Date and Time of Analysis

Date: September 16, 2024

Time: 10:05:41

Problem Title

Project Name: MEG-33-19.21

Job Number: 173609140

Client: ODOT

Engineer: G. Khatri

Description: Forward Abutment Lateral Load Analysis at Bridge 3

MEG-33 forward abutment X direction row 2
Program Options and Settings

Computational Options:

- Conventional Analysis

Engineering Units Used for Data Input and Computations:

- US Customary System Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed = 500
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 100.0000 in
- Number of pile increments = 100

Loading Type and Number of Cycles of Loading:

- Static loading specified

- Analysis uses p-y modification factors for p-y curves
- Analysis uses layering correction (Method of Georgiadis)
- No distributed lateral loads are entered
- Loading by lateral soil movements acting on pile not selected
- Input of shear resistance at the pile tip not selected
- Input of moment resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:

- Output files use decimal points to denote decimal symbols.
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1
- No p-y curves to be computed and reported for user-specified depths
- Print using wide report formats

Number of pile sections defined = 1
 Total length of pile = 10.000 ft
 Depth of ground surface below top of pile = 0.0000 ft

Pile diameters used for p-y curve computations are defined using 2 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile. A summary of values of pile diameter vs. depth follows.

Point No.	Depth Below Pile Head feet	Pile Diameter inches
1	0.000	30.0000
2	10.000	30.0000

Input Structural Properties for Pile Sections:

Pile Section No. 1:

Section 1 is a round drilled shaft, bored pile, or CIDH pile
 Length of section = 10.000000 ft
 Shaft Diameter = 30.000000 in

Soil and Rock Layering Information

The soil profile is modelled using 1 layers

Layer 1 is weak rock, p-y criteria by Reese, 1997

Distance from top of pile to top of layer = 0.0000 ft
 Distance from top of pile to bottom of layer = 15.000000 ft

MEG-33 forward abutment X direction row 2

Effective unit weight at top of layer = 87.600000 pcf
 Effective unit weight at bottom of layer = 87.600000 pcf
 Uniaxial compressive strength at top of layer = 4380. psi
 Uniaxial compressive strength at bottom of layer = 4380. psi
 Initial modulus of rock at top of layer = 394200. psi
 Initial modulus of rock at bottom of layer = 394200. psi
 RQD of rock at top of layer = 69.000000 %
 RQD of rock at bottom of layer = 69.000000 %
 k rm of rock at top of layer = 0.0000500
 k rm of rock at bottom of layer = 0.0000500

(Depth of the lowest soil layer extends 5.000 ft below the pile tip)

 Summary of Input Soil Properties

Layer Num.	Soil Type Name (p-y Curve Type)	Layer Depth ft	Effective Unit Wt. pcf	Uniaxial qu psi	RQD %	E50 or krm	Rock Mass Modulus psi
1	Weak Rock	0.00 15.0000	87.6000 87.6000	4380. 4380.	69.0000 69.0000	5.00E-05 5.00E-05	394200. 394200.

 Modification Factors for p-y Curves

Distribution of p-y modifiers with depth defined using 2 points

Point No.	Depth X ft	p-mult	y-mult
1	0.000	0.8500	1.0000
2	10.000	0.8500	1.0000

 Static Loading Type

Static loading criteria were used when computing p-y curves for all analyses.

 Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 2

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length	Run Analysis
1	1	V = 26700. lbs	M = 747240. in-lbs	756200.	No	Yes
2	1	V = 41630. lbs	M = 1165680. in-lbs	1022640.	No	Yes

V = shear force applied normal to pile axis

M = bending moment applied to pile head

y = lateral deflection normal to pile axis

S = pile slope relative to original pile batter angle

R = rotational stiffness applied to pile head

Values of top y vs. pile lengths can be computed only for load types with specified shear loading (Load Types 1, 2, and 3).

Thrust force is assumed to be acting axially for all pile batter angles.

 Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 1

Pile Section No. 1:

Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section	=	10.000000	ft
Shaft Diameter	=	30.000000	in
Concrete Cover Thickness (to edge of trans. reinf.)	=	3.000000	in
Number of Reinforcing Bars	=	8	bars
Yield Stress of Reinforcing Bars	=	50000.	psi
Modulus of Elasticity of Reinforcing Bars	=	29000000.	psi
Gross Area of Shaft	=	706.858347	sq. in.
Total Area of Reinforcing Steel	=	8.000000	sq. in.
Area Ratio of Steel Reinforcement	=	1.13	percent
Edge-to-Edge Bar Spacing	=	7.242052	in
Maximum Concrete Aggregate Size	=	0.750000	in
Ratio of Bar Spacing to Aggregate Size	=	9.66	
Offset of Center of Rebar Cage from Center of Pile	=	0.0000	in
Transverse Reinforcement			
Type: Spiral			
Number of Transverse Reinf. (per spacing)	=	1	
Spacing of Transverse Reinf.	=	4.000000	in
Yield Stress of Transverse Reinf.	=	50000.	psi
Diameter of Transverse Reinf.	=	0.500000	in

Axial Structural Capacities:

Nom. Axial Structural Capacity = $0.85 F_c A_c + F_y A_s$	=	2776.118	kips
Tensile Load for Cracking of Concrete	=	-317.428	kips
Nominal Axial Tensile Capacity	=	-400.000	kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
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MEG-33 forward abutment X direction row 2

	-----	-----	-----	-----
1	1.128000	1.000000	10.936000	0.000000
2	1.128000	1.000000	7.732920	7.732920
3	1.128000	1.000000	0.000000	10.936000
4	1.128000	1.000000	-7.73292	7.732920
5	1.128000	1.000000	-10.93600	0.000000
6	1.128000	1.000000	-7.73292	-7.73292
7	1.128000	1.000000	0.000000	-10.93600
8	1.128000	1.000000	7.732920	-7.73292

NOTE: The positions of the above rebars were computed by LPILE

Minimum spacing between any two bars not equal to zero = 7.242 inches
between bars 1 and 2.

Ratio of bar spacing to maximum aggregate size = 9.66

Concrete Properties:

Compressive Strength of Concrete	=	4000. psi
Modulus of Elasticity of Concrete	=	3604997. psi
Modulus of Rupture of Concrete	=	-474.34165 psi
Compression Strain at Peak Stress	=	0.001886
Tensile Strain at Fracture of Concrete	=	-0.0001154
Maximum Coarse Aggregate Size	=	0.750000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 2

Number	Axial Thrust Force kips
-----	-----
1	756.200
2	1022.640

Definitions of Run Messages and Notes:

MEG-33 forward abutment X direction row 2

-
- C = concrete in section has cracked in tension.
 - Y = stress in reinforcing steel has reached yield stress.
 - T = ACI 318 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than 0.003. See ACI 318-14, Section 21.2.3.
 - Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
 Position of neutral axis is measured from edge of compression side of pile.
 Compressive stresses and strains are positive in sign.
 Tensile stresses and strains are negative in sign.

Axial Thrust Force = 756.200 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in ²	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
0.00000125	197.7835380	158226830.	216.8216471	0.0002710	0.0002335	1.0662110	7.7347222	
0.00000250	395.5603117	158224125.	115.9404114	0.0002899	0.0002149	1.1335121	8.1555548	
0.00000375	593.3044144	158214511.	82.3264817	0.0003087	0.0001962	1.2002071	8.5778174	
0.00000500	790.9995080	158199902.	65.5293806	0.0003276	0.0001776	1.2662900	9.0015102	
0.00000625	988.6292481	158180680.	55.4590132	0.0003466	0.0001591	1.3317546	9.4266337	
0.00000750	1186.	158156971.	48.7520151	0.0003656	0.0001406	1.3965947	9.8531883	
0.00000875	1384.	158128828.	43.9669450	0.0003847	0.0001222	1.4608041	10.2811748	
0.00001000	1581.	158096275.	40.3830824	0.0004038	0.0001038	1.5243766	10.7105939	
0.00001125	1778.	158059326.	37.6000277	0.0004230	0.00008550	1.5873059	11.1414466	
0.00001250	1975.	158017986.	35.3775412	0.0004422	0.00006722	1.6495860	11.5737337	
0.00001375	2172.	157972257.	33.5627436	0.0004615	0.00004899	1.7112104	12.0074565	
0.00001500	2369.	157922140.	32.0537155	0.0004808	0.00003081	1.7721731	12.4426163	
0.00001625	2565.	157867633.	30.7798977	0.0005002	0.00001267	1.8324678	12.8792143	
0.00001750	2762.	157808717.	29.6908904	0.0005196	-0.00000541	1.8920881	13.3172519	
0.00001875	2958.	157743268.	28.7496802	0.0005391	-0.00002344	1.9510248	13.7567012	
0.00002000	3153.	157664678.	27.9283711	0.0005586	-0.00004143	2.0092605	14.1974553	
0.00002125	3348.	157567126.	27.2055963	0.0005781	-0.00005938	2.0667762	14.6393863	
0.00002250	3543.	157447100.	26.5647519	0.0005977	-0.00007729	2.1235549	15.0823757	

MEG-33 forward abutment X direction row 2

0.00002375	3736.	157302916.	25.9927517	0.0006173	-0.00009517	2.1795816	15.5263203
0.00002500	3928.	157134288.	25.4791518	0.0006370	-0.000113	2.2348436	15.9711352
0.00002625	3928.	149651703.	24.7516627	0.0006497	-0.000138	2.2700663	16.2158908 C
0.00002750	4016.	146038292.	24.2674839	0.0006674	-0.000158	2.3183592	16.6019434 C
0.00002875	4137.	143905917.	23.8186515	0.0006848	-0.000178	2.3654418	16.9823632 C
0.00003000	4252.	141744274.	23.3999246	0.0007020	-0.000198	2.4112709	17.3564345 C
0.00003125	4362.	139599609.	23.0091814	0.0007190	-0.000218	2.4559943	17.7255082 C
0.00003250	4468.	137483342.	22.6435182	0.0007359	-0.000239	2.4996591	18.0898910 C
0.00003375	4570.	135393921.	22.2999289	0.0007526	-0.000260	2.5422645	18.4493680 C
0.00003500	4667.	133347501.	21.9767339	0.0007692	-0.000281	2.5838899	18.8046350 C
0.00003625	4761.	131342813.	21.6717758	0.0007856	-0.000302	2.6245470	19.1556419 C
0.00003750	4852.	129383096.	21.3834337	0.0008019	-0.000323	2.6642705	19.5026092 C
0.00003875	4940.	127471254.	21.1103317	0.0008180	-0.000344	2.7030974	19.8457978 C
0.00004000	5024.	125609387.	20.8512736	0.0008341	-0.000366	2.7410637	20.1854775 C
0.00004125	5106.	123785291.	20.6043394	0.0008499	-0.000388	2.7781202	20.5208786 C
0.00004250	5186.	122012431.	20.3693449	0.0008657	-0.000409	2.8143694	20.8530927 C
0.00004375	5263.	120292569.	20.1455640	0.0008814	-0.000431	2.8498525	21.1824970 C
0.00004500	5338.	118627126.	19.9323834	0.0008970	-0.000453	2.8846118	21.5095105 C
0.00004625	5411.	116996281.	19.7277549	0.0009124	-0.000475	2.9185348	21.8325389 C
0.00004750	5482.	115415504.	19.5321676	0.0009278	-0.000497	2.9517557	22.1531854 C
0.00004875	5552.	113890367.	19.3455994	0.0009431	-0.000519	2.9843530	22.4724037 C
0.00005125	5686.	110947381.	18.9932451	0.0009734	-0.000564	3.0473114	23.1011475 C
0.00005375	5814.	108173157.	18.6682145	0.0010034	-0.000609	3.1076685	23.7213921 C
0.00005625	5937.	105555015.	18.3672634	0.0010332	-0.000654	3.1655263	24.3337861 C
0.00005875	6056.	103082151.	18.0877563	0.0010627	-0.000700	3.2209866	24.9390775 C
0.00006125	6171.	100745209.	17.8275476	0.0010919	-0.000746	3.2741508	25.5381191 C
0.00006375	6281.	98528207.	17.5840653	0.0011210	-0.000792	3.3250272	26.1303535 C
0.00006625	6388.	96423728.	17.3557312	0.0011498	-0.000838	3.3736965	26.7163863 C
0.00006875	6492.	94430877.	17.1419119	0.0011785	-0.000884	3.4203126	27.2982492 C
0.00007125	6594.	92544102.	16.9416875	0.0012071	-0.000930	3.4649705	27.8771994 C
0.00007375	6692.	90737287.	16.7516319	0.0012354	-0.000977	3.5074647	28.4488654 C
0.00007625	6788.	89024019.	16.5731943	0.0012637	-0.001024	3.5481091	29.0186636 C
0.00007875	6882.	87390926.	16.4046572	0.0012919	-0.001071	3.5868502	29.5851987 C
0.00008125	6974.	85829252.	16.2447275	0.0013199	-0.001118	3.6236689	30.1475770 C
0.00008375	7064.	84342279.	16.0939601	0.0013479	-0.001165	3.6587296	30.7090183 C
0.00008625	7151.	82914932.	15.9501506	0.0013757	-0.001212	3.6918953	31.2660019 C
0.00008875	7238.	81552351.	15.8142265	0.0014035	-0.001259	3.7233446	31.8224282 C
0.00009125	7322.	80245338.	15.6848135	0.0014312	-0.001306	3.7530112	32.3763755 C
0.00009375	7405.	78989773.	15.5614161	0.0014589	-0.001354	3.7809132	32.9279104 C
0.00009625	7487.	77791471.	15.4451921	0.0014866	-0.001401	3.8072118	33.4815799 C

MEG-33 forward abutment X direction row 2

0.00009875	7567.	76629614.	15.3326041	0.0015141	-0.001448	3.8316363	34.0288076	C
0.0001013	7646.	75518372.	15.2264355	0.0015417	-0.001496	3.8544775	34.5785589	C
0.0001038	7724.	74450450.	15.1255202	0.0015693	-0.001543	3.8756649	35.1287215	C
0.0001063	7800.	73415541.	15.0280130	0.0015967	-0.001591	3.8950885	35.6747527	C
0.0001088	7876.	72421890.	14.9358038	0.0016243	-0.001638	3.9129188	-36.628271	C
0.0001113	7951.	71466415.	14.8484995	0.0016519	-0.001686	3.9291375	-37.751966	C
0.0001138	8023.	70535553.	14.7632778	0.0016793	-0.001733	3.9435858	-38.881449	C
0.0001163	8096.	69638783.	14.6825022	0.0017068	-0.001781	3.9564288	-40.008302	C
0.0001188	8167.	68773855.	14.6059019	0.0017345	-0.001828	3.9676503	-41.132488	C
0.0001213	8237.	67936511.	14.5326589	0.0017621	-0.001875	3.9772118	-42.255976	C
0.0001238	8306.	67120311.	14.4613215	0.0017896	-0.001923	3.9850688	-43.383246	C
0.0001263	8374.	66330841.	14.3935603	0.0018172	-0.001970	3.9912898	-44.507767	C
0.0001288	8442.	65566454.	14.3291775	0.0018449	-0.002018	3.9958576	-45.629498	C
0.0001313	8508.	64825625.	14.2679908	0.0018727	-0.002065	3.9987545	-46.748399	C
0.0001338	8574.	64102049.	14.2083219	0.0019004	-0.002112	3.9999599	-47.870287	C
0.0001363	8638.	63396998.	14.1509838	0.0019281	-0.002159	3.9995720	-48.991612	C
0.0001388	8701.	62711123.	14.0964468	0.0019559	-0.002207	3.9986657	-50.000000	CY
0.0001413	8763.	62038767.	14.0443218	0.0019838	-0.002254	3.9999198	-50.000000	CY
0.0001438	8819.	61352447.	13.9926928	0.0020114	-0.002301	3.9992541	-50.000000	CY
0.0001463	8870.	60652088.	13.9409925	0.0020389	-0.002349	3.9999990	-50.000000	CY
0.0001488	8916.	59939006.	13.8882446	0.0020659	-0.002397	3.9994944	-50.000000	CY
0.0001588	9083.	57215815.	13.6958600	0.0021742	-0.002588	3.9994747	-50.000000	CY
0.0001688	9238.	54745700.	13.5300535	0.0022832	-0.002779	3.9987469	-50.000000	CY
0.0001788	9381.	52482914.	13.3878343	0.0023931	-0.002969	3.9999922	50.000000	CY
0.0001888	9470.	50170299.	13.2445514	0.0024999	-0.003163	3.9984149	50.000000	CY
0.0001988	9511.	47851809.	13.1020004	0.0026040	-0.003358	3.9991460	50.000000	CY
0.0002088	9543.	45713768.	12.9761377	0.0027088	-0.003554	3.9994084	50.000000	CY
0.0002188	9570.	43750453.	12.8641871	0.0028140	-0.003748	3.9993636	50.000000	CY
0.0002288	9595.	41946801.	12.7662171	0.0029203	-0.003942	3.9990093	50.000000	CY
0.0002388	9616.	40278182.	12.6754534	0.0030263	-0.004136	3.9980339	50.000000	CY
0.0002488	9635.	38734215.	12.5943805	0.0031329	-0.004330	3.9960392	50.000000	CY
0.0002588	9652.	37302323.	12.5226736	0.0032402	-0.004522	3.9999776	50.000000	CY
0.0002688	9667.	35970033.	12.4593402	0.0033484	-0.004714	3.9990292	50.000000	CY
0.0002788	9680.	34725057.	12.3993497	0.0034563	-0.004906	3.9958661	50.000000	CY
0.0002888	9691.	33561273.	12.3451904	0.0035647	-0.005098	3.9998692	50.000000	CY
0.0002988	9701.	32470865.	12.2970668	0.0036737	-0.005289	3.9972080	50.000000	CY
0.0003088	9710.	31448045.	12.2538480	0.0037834	-0.005479	3.9999967	50.000000	CY
0.0003188	9710.	30461440.	12.2454345	0.0039032	-0.005659	3.9982922	50.000000	CY

MEG-33 forward abutment X direction row 2

Axial Thrust Force = 1022.640 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
0.00000125	186.9745022	149579602.	295.1092311	0.0003689	0.0003314	1.4108907	10.5726471	
0.00000250	373.9450630	149578025.	155.0859231	0.0003877	0.0003127	1.4741056	10.9936044	
0.00000375	560.8810535	149568281.	108.4254005	0.0004066	0.0002941	1.5367128	11.4160748	
0.00000500	747.7651855	149553037.	85.1055767	0.0004255	0.0002755	1.5987059	11.8400586	
0.00000625	934.5801626	149532826.	71.1220350	0.0004445	0.0002570	1.6600783	12.2655564	
0.00000750	1121.	149507824.	61.8066374	0.0004635	0.0002385	1.7208234	12.6925687	
0.00000875	1308.	149478104.	55.1587538	0.0004826	0.0002201	1.7809347	13.1210962	
0.00001000	1494.	149443702.	50.1780694	0.0005018	0.0002018	1.8404057	13.5511401	
0.00001125	1681.	149404637.	46.3088546	0.0005210	0.0001835	1.8992296	13.9827013	
0.00001250	1867.	149360916.	43.2176718	0.0005402	0.0001652	1.9574001	14.4157810	
0.00001375	2053.	149312544.	40.6923337	0.0005595	0.0001470	2.0149103	14.8503806	
0.00001500	2239.	149259523.	38.5913827	0.0005789	0.0001289	2.0717539	15.2865015	
0.00001625	2425.	149201849.	36.8168867	0.0005983	0.0001108	2.1279241	15.7241454	
0.00001750	2610.	149139522.	35.2988945	0.0006177	0.00009273	2.1834144	16.1633140	
0.00001875	2795.	149072537.	33.9861091	0.0006372	0.00007474	2.2382180	16.6040094	
0.00002000	2980.	149000889.	32.8400576	0.0006568	0.00005680	2.2923283	17.0462334	
0.00002125	3165.	148924572.	31.8313200	0.0006764	0.00003892	2.3457386	17.4899885	
0.00002250	3349.	148843580.	30.9370143	0.0006961	0.00002108	2.3984422	17.9352769	
0.00002375	3533.	148757907.	30.1390760	0.0007158	0.00000330	2.4504325	18.3821012	
0.00002500	3717.	148667345.	29.4230482	0.0007356	-0.00001442	2.5017023	18.8304601	
0.00002625	3900.	148569728.	28.7771723	0.0007554	-0.00003210	2.5522408	19.2803100	
0.00002750	4083.	148461686.	28.1917782	0.0007753	-0.00004973	2.6020340	19.7315682	
0.00002875	4265.	148340389.	27.6588700	0.0007952	-0.00006731	2.6510679	20.1841455	
0.00003000	4446.	148203807.	27.1717886	0.0008152	-0.00008485	2.6993293	20.6379562	
0.00003125	4627.	148050694.	26.7249494	0.0008352	-0.000102	2.7468062	21.0929229	
0.00003250	4671.	143734984.	26.1848620	0.0008510	-0.000124	2.7837197	21.4276075	C
0.00003375	4808.	142447037.	25.7678839	0.0008697	-0.000143	2.8265331	21.8436289	C
0.00003500	4939.	141105057.	25.3767065	0.0008882	-0.000162	2.8682649	22.2556072	C
0.00003625	5064.	139703486.	25.0079716	0.0009065	-0.000181	2.9088770	22.6628177	C
0.00003750	5185.	138260991.	24.6597096	0.0009247	-0.000200	2.9484120	23.0655593	C
0.00003875	5301.	136794765.	24.3302927	0.0009428	-0.000220	2.9869178	23.4642290	C
0.00004000	5413.	135313320.	24.0180480	0.0009607	-0.000239	3.0244192	23.8589358	C
0.00004125	5520.	133824360.	23.7215329	0.0009785	-0.000259	3.0609426	24.2498213	C
0.00004250	5624.	132334840.	23.4395015	0.0009962	-0.000279	3.0965158	24.6370607	C

MEG-33 forward abutment X direction row 2

0.00004375	5725.	130851755.	23.1709154	0.0010137	-0.000299	3.1311712	25.0209116	C
0.00004500	5822.	129382514.	22.9149397	0.0010312	-0.000319	3.1649474	25.4017465	C
0.00004625	5917.	127928641.	22.6705784	0.0010485	-0.000339	3.1978588	25.7796010	C
0.00004750	6008.	126487797.	22.4367219	0.0010657	-0.000359	3.2299003	26.1542096	C
0.00004875	6097.	125071953.	22.2131880	0.0010829	-0.000380	3.2611403	26.5264572	C
0.00005125	6268.	122311968.	21.7940367	0.0011169	-0.000421	3.3212505	27.2638248	C
0.00005375	6430.	119634584.	21.4071399	0.0011506	-0.000462	3.3782054	27.9906920	C
0.00005625	6584.	117045783.	21.0486979	0.0011840	-0.000504	3.4321313	28.7078749	C
0.00005875	6730.	114555251.	20.7160120	0.0012171	-0.000545	3.4831864	29.4169680	C
0.00006125	6870.	112160551.	20.4062161	0.0012499	-0.000588	3.5314577	30.1184790	C
0.00006375	7004.	109859478.	20.1169434	0.0012825	-0.000630	3.5770309	30.8130114	C
0.00006625	7132.	107649968.	19.8462354	0.0013148	-0.000673	3.6199901	31.5012669	C
0.00006875	7255.	105530031.	19.5924725	0.0013470	-0.000716	3.6604164	32.1840542	C
0.00007125	7374.	103496673.	19.3542223	0.0013790	-0.000759	3.6983793	32.8620992	C
0.00007375	7488.	101532280.	19.1288162	0.0014108	-0.000802	3.7338257	33.5330683	C
0.00007625	7598.	99649407.	18.9166054	0.0014424	-0.000845	3.7669334	34.2005313	C
0.00007875	7705.	97846440.	18.7168669	0.0014740	-0.000889	3.7977679	34.8657075	C
0.00008125	7808.	96104416.	18.5270794	0.0015053	-0.000932	3.8262474	35.5253677	C
0.00008375	7909.	94430377.	18.3475140	0.0015366	-0.000976	3.8524910	36.1823373	C
0.00008625	8006.	92824104.	18.1779057	0.0015678	-0.001020	3.8765581	36.8381744	C
0.00008875	8100.	91267303.	18.0157420	0.0015989	-0.001064	3.8983566	37.4885781	C
0.00009125	8192.	89777830.	17.8630844	0.0016300	-0.001107	3.9180734	38.1406248	C
0.00009375	8281.	88328750.	17.7162667	0.0016609	-0.001152	3.9355502	38.7864128	C
0.00009625	8368.	86940780.	17.5779890	0.0016919	-0.001196	3.9509742	39.4347495	C
0.00009875	8452.	85591408.	17.4450137	0.0017227	-0.001240	3.9642246	40.0782206	C
0.0001013	8535.	84292431.	17.3190456	0.0017536	-0.001284	3.9754067	40.7229853	C
0.0001038	8615.	83035789.	17.1988473	0.0017844	-0.001328	3.9844911	41.3668445	C
0.0001063	8693.	81815443.	17.0835056	0.0018151	-0.001372	3.9914740	42.0082395	C
0.0001088	8770.	80640850.	16.9746117	0.0018460	-0.001417	3.9963992	42.6532446	C
0.0001113	8844.	79494850.	16.8692855	0.0018767	-0.001461	3.9992253	43.2939701	C
0.0001138	8916.	78385020.	16.7689766	0.0019075	-0.001505	3.9989891	43.9359745	C
0.0001163	8988.	77312219.	16.6741458	0.0019384	-0.001549	3.9999999	44.5819019	C
0.0001188	9056.	76262361.	16.5823493	0.0019692	-0.001593	3.9999571	45.2245283	C
0.0001213	9123.	75241429.	16.4947453	0.0020000	-0.001638	3.9997922	45.8685860	C
0.0001238	9189.	74251640.	16.4118165	0.0020310	-0.001682	3.9994374	46.5167195	C
0.0001263	9253.	73288879.	16.3326844	0.0020620	-0.001725	3.9988065	47.1667286	C
0.0001288	9314.	72345081.	16.2556630	0.0020929	-0.001770	3.9999623	47.8131445	C
0.0001313	9375.	71428284.	16.1826458	0.0021240	-0.001814	3.9996261	48.4636336	C
0.0001338	9434.	70537903.	16.1133339	0.0021552	-0.001857	3.9988452	49.1179067	C
0.0001363	9493.	69671886.	16.0474600	0.0021865	-0.001901	3.9999544	49.7757140	C

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0.0001388	9549.	68819778.	15.9828222	0.0022176	-0.001945	3.9994325	50.0000000	CY
0.0001413	9604.	67991072.	15.9213826	0.0022489	-0.001989	3.9992360	50.0000000	CY
0.0001438	9656.	67175405.	15.8639932	0.0022804	-0.002032	3.9997296	50.0000000	CY
0.0001463	9708.	66379393.	15.8096547	0.0023122	-0.002075	3.9986388	50.0000000	CY
0.0001488	9757.	65593918.	15.7591678	0.0023442	-0.002118	3.9998723	50.0000000	CY
0.0001588	9936.	62587970.	15.5783056	0.0024731	-0.002289	3.9999182	50.0000000	CY
0.0001688	10079.	59727713.	15.4211803	0.0026023	-0.002460	3.9996354	50.0000000	CY
0.0001788	10183.	56965310.	15.2715244	0.0027298	-0.002633	3.9980826	50.0000000	CY
0.0001888	10277.	54448074.	15.1453469	0.0028587	-0.002804	3.9996142	50.0000000	CY
0.0001988	10363.	52142314.	15.0341767	0.0029880	-0.002974	3.9999981	50.0000000	CY
0.0002088	10443.	50025253.	14.9400203	0.0031187	-0.003144	3.9970352	50.0000000	CY
0.0002188	10501.	48002762.	14.8528929	0.0032491	-0.003313	3.9973949	50.0000000	CY
0.0002288	10523.	46000954.	14.7613499	0.0033767	-0.003486	3.9967612	50.0000000	CY
0.0002388	10523.	44074293.	14.6763126	0.0035040	-0.003659	3.9980761	50.0000000	CY
0.0002488	10523.	42302462.	14.6072228	0.0036335	-0.003829	3.9999538	50.0000000	CY
0.0002588	10523.	40667584.	14.5528301	0.0037655	-0.003997	3.9994289	50.0000000	CY
0.0002688	10523.	39154372.	14.5974807	0.0039231	-0.004139	3.9995883	50.0000000	CY

 Summary of Results for Nominal Moment Capacity for Section 1

Moment values interpolated at maximum compressive strain = 0.003
 or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain	Max. Tens. Strain
1	756.200	9611.191	0.00300000	-0.00408816
2	1022.640	10370.558	0.00300000	-0.00298995

Note that the values of moment capacity in the table above are not factored by a strength reduction factor (phi-factor).

In ACI 318, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.75).

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318,

MEG-33 forward abutment X direction row 2

or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Load No.	Resist. Factor	Nominal Ax. Thrust kips	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in ²
1	0.65	756.200000	9611.	491.530000	6247.	99208156.
2	0.65	1023.	10371.	664.716000	6741.	114371141.
1	0.75	756.200000	9611.	567.150000	7208.	82015882.
2	0.75	1023.	10371.	766.980000	7778.	96620983.
1	0.90	756.200000	9611.	680.580000	8650.	63264529.
2	0.90	1023.	10371.	920.376000	9334.	72056218.

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 1

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 26700.0 lbs
 Applied moment at pile head = 747240.0 in-lbs
 Axial thrust load on pile head = 756200.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in ²	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	3.91E-04	747240.	26700.	-6.09E-05	0.00	1.58E+11	-15401.	2.37E+07	0.00
0.10000	3.21E-04	768244.	9462.	-5.51E-05	0.00	1.58E+11	-13330.	4.98E+07	0.00
0.2000	2.58E-04	770048.	-5299.	-4.93E-05	0.00	1.58E+11	-11271.	5.23E+07	0.00

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0.3000	2.03E-04	755617.	-17622.	-4.35E-05	0.00	1.58E+11	-9268.	5.49E+07	0.00
0.4000	1.54E-04	727834.	-27600.	-3.79E-05	0.00	1.58E+11	-7361.	5.74E+07	0.00
0.5000	1.12E-04	689447.	-35364.	-3.25E-05	0.00	1.58E+11	-5579.	5.99E+07	0.00
0.6000	7.59E-05	643020.	-41080.	-2.75E-05	0.00	1.58E+11	-3947.	6.24E+07	0.00
0.7000	4.58E-05	590905.	-44936.	-2.28E-05	0.00	1.58E+11	-2481.	6.50E+07	0.00
0.8000	2.12E-05	535214.	-47139.	-1.85E-05	0.00	1.58E+11	-1190.	6.75E+07	0.00
0.9000	1.38E-06	477806.	-47901.	-1.47E-05	0.00	1.58E+11	-80.589	7.00E+07	0.00
1.0000	-1.41E-05	420278.	-47440.	-1.13E-05	0.00	1.58E+11	849.4786	7.25E+07	0.00
1.1000	-2.57E-05	363970.	-45967.	-8.30E-06	0.00	1.58E+11	1605.	7.51E+07	0.00
1.2000	-3.40E-05	309972.	-43687.	-5.74E-06	0.00	1.58E+11	2196.	7.76E+07	0.00
1.3000	-3.94E-05	259133.	-40790.	-3.58E-06	0.00	1.58E+11	2633.	8.01E+07	0.00
1.4000	-4.26E-05	212083.	-37452.	-1.79E-06	0.00	1.58E+11	2930.	8.26E+07	0.00
1.5000	-4.37E-05	169251.	-33831.	-3.48E-07	0.00	1.58E+11	3104.	8.51E+07	0.00
1.6000	-4.34E-05	130888.	-30067.	7.90E-07	0.00	1.58E+11	3170.	8.77E+07	0.00
1.7000	-4.19E-05	97089.	-26277.	1.65E-06	0.00	1.58E+11	3146.	9.02E+07	0.00
1.8000	-3.94E-05	67819.	-22563.	2.28E-06	0.00	1.58E+11	3046.	9.27E+07	0.00
1.9000	-3.64E-05	42935.	-19003.	2.70E-06	0.00	1.58E+11	2887.	9.52E+07	0.00
2.0000	-3.29E-05	22208.	-15660.	2.95E-06	0.00	1.58E+11	2684.	9.78E+07	0.00
2.1000	-2.93E-05	5346.	-12580.	3.05E-06	0.00	1.58E+11	2449.	1.00E+08	0.00
2.2000	-2.56E-05	-7990.	-9793.	3.04E-06	0.00	1.58E+11	2195.	1.03E+08	0.00
2.3000	-2.20E-05	-18164.	-7317.	2.94E-06	0.00	1.58E+11	1932.	1.05E+08	0.00
2.4000	-1.86E-05	-25556.	-5157.	2.78E-06	0.00	1.58E+11	1668.	1.08E+08	0.00
2.5000	-1.53E-05	-30546.	-3309.	2.56E-06	0.00	1.58E+11	1412.	1.10E+08	0.00
2.6000	-1.24E-05	-33503.	-1762.	2.32E-06	0.00	1.58E+11	1168.	1.13E+08	0.00
2.7000	-9.78E-06	-34778.	-496.795	2.06E-06	0.00	1.58E+11	940.4816	1.15E+08	0.00
2.8000	-7.46E-06	-34699.	507.5642	1.80E-06	0.00	1.58E+11	733.4501	1.18E+08	0.00
2.9000	-5.46E-06	-33563.	1277.	1.54E-06	0.00	1.58E+11	548.3841	1.20E+08	0.00
3.0000	-3.77E-06	-31637.	1837.	1.29E-06	0.00	1.58E+11	386.2159	1.23E+08	0.00
3.1000	-2.36E-06	-29156.	2217.	1.06E-06	0.00	1.58E+11	247.0391	1.26E+08	0.00
3.2000	-1.22E-06	-26318.	2444.	8.51E-07	0.00	1.58E+11	130.2598	1.28E+08	0.00
3.3000	-3.19E-07	-23292.	2543.	6.63E-07	0.00	1.58E+11	34.7416	1.31E+08	0.00
3.4000	3.70E-07	-20216.	2539.	4.98E-07	0.00	1.58E+11	-41.059	1.33E+08	0.00
3.5000	8.76E-07	-17199.	2455.	3.56E-07	0.00	1.58E+11	-98.967	1.36E+08	0.00
3.6000	1.22E-06	-14325.	2311.	2.37E-07	0.00	1.58E+11	-140.984	1.38E+08	0.00
3.7000	1.44E-06	-11654.	2125.	1.38E-07	0.00	1.58E+11	-169.188	1.41E+08	0.00
3.8000	1.56E-06	-9226.	1912.	5.89E-08	0.00	1.58E+11	-185.657	1.43E+08	0.00
3.9000	1.58E-06	-7065.	1685.	-2.92E-09	0.00	1.58E+11	-192.406	1.46E+08	0.00
4.0000	1.55E-06	-5181.	1455.	-4.94E-08	0.00	1.58E+11	-191.334	1.48E+08	0.00
4.1000	1.47E-06	-3573.	1230.	-8.26E-08	0.00	1.58E+11	-184.188	1.51E+08	0.00
4.2000	1.35E-06	-2230.	1016.	-1.05E-07	0.00	1.58E+11	-172.541	1.53E+08	0.00

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4.3000	1.22E-06	-1136.	817.3493	-1.17E-07	0.00	1.58E+11	-157.774	1.56E+08	0.00
4.4000	1.07E-06	-268.274	638.0407	-1.23E-07	0.00	1.58E+11	-141.073	1.58E+08	0.00
4.5000	9.21E-07	395.9140	479.3375	-1.22E-07	0.00	1.58E+11	-123.432	1.61E+08	0.00
4.6000	7.76E-07	882.3575	341.8843	-1.17E-07	0.00	1.58E+11	-105.657	1.63E+08	0.00
4.7000	6.39E-07	1217.	225.4605	-1.09E-07	0.00	1.58E+11	-88.383	1.66E+08	0.00
4.8000	5.14E-07	1424.	129.1781	-9.93E-08	0.00	1.58E+11	-72.088	1.68E+08	0.00
4.9000	4.01E-07	1527.	51.6597	-8.82E-08	0.00	1.58E+11	-57.110	1.71E+08	0.00
5.0000	3.02E-07	1548.	-8.806	-7.65E-08	0.00	1.58E+11	-43.666	1.73E+08	0.00
5.1000	2.17E-07	1506.	-54.129	-6.49E-08	0.00	1.58E+11	-31.872	1.76E+08	0.00
5.2000	1.46E-07	1418.	-86.308	-5.38E-08	0.00	1.58E+11	-21.761	1.78E+08	0.00
5.3000	8.82E-08	1299.	-107.343	-4.35E-08	0.00	1.58E+11	-13.297	1.81E+08	0.00
5.4000	4.18E-08	1160.	-119.160	-3.42E-08	0.00	1.58E+11	-6.397	1.84E+08	0.00
5.5000	6.06E-09	1013.	-123.562	-2.60E-08	0.00	1.58E+11	-0.940	1.86E+08	0.00
5.6000	-2.05E-08	863.9680	-122.194	-1.88E-08	0.00	1.58E+11	3.2195	1.89E+08	0.00
5.7000	-3.92E-08	719.6676	-116.519	-1.28E-08	0.00	1.58E+11	6.2380	1.91E+08	0.00
5.8000	-5.13E-08	584.3448	-107.810	-7.90E-09	0.00	1.58E+11	8.2782	1.94E+08	0.00
5.9000	-5.81E-08	460.9387	-97.143	-3.93E-09	0.00	1.58E+11	9.5001	1.96E+08	0.00
6.0000	-6.07E-08	351.2095	-85.409	-8.52E-10	0.00	1.58E+11	10.0562	1.99E+08	0.00
6.1000	-6.02E-08	255.9588	-73.323	1.45E-09	0.00	1.58E+11	10.0874	2.01E+08	0.00
6.2000	-5.73E-08	175.2322	-61.438	3.09E-09	0.00	1.58E+11	9.7207	2.04E+08	0.00
6.3000	-5.28E-08	108.5022	-50.165	4.16E-09	0.00	1.58E+11	9.0677	2.06E+08	0.00
6.4000	-4.73E-08	54.8289	-39.790	4.78E-09	0.00	1.58E+11	8.2239	2.09E+08	0.00
6.5000	-4.13E-08	12.9976	-30.494	5.04E-09	0.00	1.58E+11	7.2693	2.11E+08	0.00
6.6000	-3.52E-08	-18.366	-22.372	5.02E-09	0.00	1.58E+11	6.2683	2.14E+08	0.00
6.7000	-2.92E-08	-40.703	-15.447	4.79E-09	0.00	1.58E+11	5.2719	2.16E+08	0.00
6.8000	-2.37E-08	-55.448	-9.693	4.43E-09	0.00	1.58E+11	4.3180	2.19E+08	0.00
6.9000	-1.86E-08	-63.975	-5.042	3.98E-09	0.00	1.58E+11	3.4339	2.21E+08	0.00
7.0000	-1.41E-08	-67.557	-1.400	3.48E-09	0.00	1.58E+11	2.6371	2.24E+08	0.00
7.1000	-1.03E-08	-67.341	1.3450	2.97E-09	0.00	1.58E+11	1.9374	2.26E+08	0.00
7.2000	-7.02E-09	-64.334	3.3106	2.47E-09	0.00	1.58E+11	1.3385	2.29E+08	0.00
7.3000	-4.35E-09	-59.400	4.6169	2.00E-09	0.00	1.58E+11	0.8388	2.31E+08	0.00
7.4000	-2.22E-09	-53.257	5.3801	1.57E-09	0.00	1.58E+11	0.4333	2.34E+08	0.00
7.5000	-5.80E-10	-46.490	5.7087	1.19E-09	0.00	1.58E+11	0.1144	2.37E+08	0.00
7.6000	6.38E-10	-39.559	5.7018	8.65E-10	0.00	1.58E+11	-0.126	2.37E+08	0.00
7.7000	1.50E-09	-32.808	5.4493	5.91E-10	0.00	1.58E+11	-0.295	2.37E+08	0.00
7.8000	2.06E-09	-26.481	5.0290	3.66E-10	0.00	1.58E+11	-0.405	2.37E+08	0.00
7.9000	2.38E-09	-20.739	4.5047	1.87E-10	0.00	1.58E+11	-0.468	2.37E+08	0.00
8.0000	2.51E-09	-15.670	3.9274	4.91E-11	0.00	1.58E+11	-0.494	2.37E+08	0.00
8.1000	2.49E-09	-11.313	3.3360	-5.32E-11	0.00	1.58E+11	-0.492	2.37E+08	0.00
8.2000	2.38E-09	-7.664	2.7598	-1.25E-10	0.00	1.58E+11	-0.469	2.37E+08	0.00

MEG-33 forward abutment X direction row 2

8.3000	2.19E-09	-4.689	2.2191	-1.72E-10	0.00	1.58E+11	-0.432	2.37E+08	0.00
8.4000	1.97E-09	-2.338	1.7272	-1.99E-10	0.00	1.58E+11	-0.387	2.37E+08	0.00
8.5000	1.72E-09	-0.544	1.2917	-2.10E-10	0.00	1.58E+11	-0.338	2.37E+08	0.00
8.6000	1.46E-09	0.7629	0.9156	-2.09E-10	0.00	1.58E+11	-0.288	2.37E+08	0.00
8.7000	1.22E-09	1.6542	0.5988	-2.00E-10	0.00	1.58E+11	-0.240	2.37E+08	0.00
8.8000	9.84E-10	2.2004	0.3387	-1.85E-10	0.00	1.58E+11	-0.194	2.37E+08	0.00
8.9000	7.72E-10	2.4673	0.1310	-1.67E-10	0.00	1.58E+11	-0.152	2.37E+08	0.00
9.0000	5.83E-10	2.5151	-0.02920	-1.48E-10	0.00	1.58E+11	-0.115	2.37E+08	0.00
9.1000	4.16E-10	2.3975	-0.147	-1.30E-10	0.00	1.58E+11	-0.08200	2.37E+08	0.00
9.2000	2.71E-10	2.1618	-0.229	-1.12E-10	0.00	1.58E+11	-0.05346	2.37E+08	0.00
9.3000	1.46E-10	1.8491	-0.278	-9.72E-11	0.00	1.58E+11	-0.02881	2.37E+08	0.00
9.4000	3.79E-11	1.4949	-0.300	-8.45E-11	0.00	1.58E+11	-0.00747	2.37E+08	0.00
9.5000	-5.67E-11	1.1300	-0.297	-7.46E-11	0.00	1.58E+11	0.01118	2.37E+08	0.00
9.6000	-1.41E-10	0.7811	-0.274	-6.73E-11	0.00	1.58E+11	0.02781	2.37E+08	0.00
9.7000	-2.18E-10	0.4723	-0.232	-6.26E-11	0.00	1.58E+11	0.04304	2.37E+08	0.00
9.8000	-2.91E-10	0.2255	-0.171	-5.99E-11	0.00	1.58E+11	0.05742	2.37E+08	0.00
9.9000	-3.62E-10	0.06134	-0.09400	-5.89E-11	0.00	1.58E+11	0.07140	2.37E+08	0.00
10.0000	-4.33E-10	0.00	0.00	-5.86E-11	0.00	1.58E+11	0.08526	1.18E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 1:

Pile-head deflection = 0.00039069 inches
 Computed slope at pile head = -0.0000609 radians
 Maximum bending moment = 770048. inch-lbs
 Maximum shear force = -47901. lbs
 Depth of maximum bending moment = 0.20000000 feet below pile head
 Depth of maximum shear force = 0.90000000 feet below pile head
 Number of iterations = 6
 Number of zero deflection points = 5

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 2

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 41630.0 lbs
 Applied moment at pile head = 1165680.0 in-lbs
 Axial thrust load on pile head = 1022640.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in ²	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	6.25E-04	1165680.	41630.	-9.89E-05	0.00	1.49E+11	-24634.	2.37E+07	0.00
0.1000	5.12E-04	1198015.	14098.	-8.94E-05	0.00	1.49E+11	-21253.	4.98E+07	0.00
0.2000	4.10E-04	1199735.	-9393.	-7.98E-05	0.00	1.49E+11	-17899.	5.23E+07	0.00
0.3000	3.20E-04	1175668.	-28921.	-7.03E-05	0.00	1.49E+11	-14647.	5.49E+07	0.00
0.4000	2.42E-04	1130498.	-44644.	-6.10E-05	0.00	1.50E+11	-11559.	5.74E+07	0.00
0.5000	1.74E-04	1068672.	-56789.	-5.22E-05	0.00	1.50E+11	-8683.	5.99E+07	0.00
0.6000	1.16E-04	994332.	-65633.	-4.39E-05	0.00	1.50E+11	-6058.	6.24E+07	0.00
0.7000	6.85E-05	911259.	-71494.	-3.63E-05	0.00	1.50E+11	-3710.	6.50E+07	0.00
0.8000	2.94E-05	822836.	-74712.	-2.93E-05	0.00	1.50E+11	-1653.	6.75E+07	0.00
0.9000	-1.80E-06	732024.	-75640.	-2.31E-05	0.00	1.50E+11	105.1299	7.00E+07	0.00
1.0000	-2.60E-05	641356.	-74636.	-1.76E-05	0.00	1.50E+11	1569.	7.25E+07	0.00
1.1000	-4.39E-05	552940.	-72046.	-1.28E-05	0.00	1.50E+11	2748.	7.51E+07	0.00
1.2000	-5.66E-05	468476.	-68203.	-8.66E-06	0.00	1.50E+11	3658.	7.76E+07	0.00
1.3000	-6.47E-05	389274.	-63416.	-5.22E-06	0.00	1.50E+11	4320.	8.01E+07	0.00
1.4000	-6.91E-05	316291.	-57968.	-2.39E-06	0.00	1.50E+11	4759.	8.26E+07	0.00
1.5000	-7.05E-05	250157.	-52112.	-1.22E-07	0.00	1.50E+11	5000.	8.51E+07	0.00
1.6000	-6.94E-05	191221.	-46069.	1.65E-06	0.00	1.50E+11	5071.	8.77E+07	0.00
1.7000	-6.65E-05	139586.	-40027.	2.98E-06	0.00	1.50E+11	4999.	9.02E+07	0.00
1.8000	-6.23E-05	95149.	-34141.	3.92E-06	0.00	1.50E+11	4811.	9.27E+07	0.00
1.9000	-5.71E-05	57638.	-28535.	4.53E-06	0.00	1.50E+11	4533.	9.52E+07	0.00
2.0000	-5.14E-05	26655.	-23303.	4.87E-06	0.00	1.50E+11	4187.	9.78E+07	0.00
2.1000	-4.54E-05	1700.	-18512.	4.98E-06	0.00	1.50E+11	3796.	1.00E+08	0.00
2.2000	-3.94E-05	-17788.	-14207.	4.92E-06	0.00	1.50E+11	3379.	1.03E+08	0.00
2.3000	-3.36E-05	-32409.	-10409.	4.72E-06	0.00	1.50E+11	2951.	1.05E+08	0.00
2.4000	-2.81E-05	-42781.	-7122.	4.41E-06	0.00	1.50E+11	2528.	1.08E+08	0.00

MEG-33 forward abutment X direction row 2

2.5000	-2.30E-05	-49512.	-4334.	4.04E-06	0.00	1.50E+11	2118.	1.10E+08	0.00
2.6000	-1.84E-05	-53193.	-2024.	3.63E-06	0.00	1.50E+11	1733.	1.13E+08	0.00
2.7000	-1.43E-05	-54378.	-158.146	3.20E-06	0.00	1.50E+11	1377.	1.15E+08	0.00
2.8000	-1.07E-05	-53580.	1301.	2.77E-06	0.00	1.50E+11	1055.	1.18E+08	0.00
2.9000	-7.67E-06	-51263.	2396.	2.35E-06	0.00	1.50E+11	769.9033	1.20E+08	0.00
3.0000	-5.10E-06	-47836.	3171.	1.95E-06	0.00	1.50E+11	522.6138	1.23E+08	0.00
3.1000	-2.99E-06	-43657.	3672.	1.58E-06	0.00	1.50E+11	312.6852	1.26E+08	0.00
3.2000	-1.30E-06	-39027.	3943.	1.25E-06	0.00	1.50E+11	138.7292	1.28E+08	0.00
3.3000	1.34E-08	-34196.	4026.	9.57E-07	0.00	1.50E+11	-1.453	1.31E+08	0.00
3.4000	9.98E-07	-29368.	3958.	7.03E-07	0.00	1.50E+11	-110.650	1.33E+08	0.00
3.5000	1.70E-06	-24698.	3777.	4.86E-07	0.00	1.50E+11	-192.036	1.36E+08	0.00
3.6000	2.16E-06	-20305.	3512.	3.05E-07	0.00	1.50E+11	-249.005	1.38E+08	0.00
3.7000	2.43E-06	-16270.	3192.	1.58E-07	0.00	1.50E+11	-285.012	1.41E+08	0.00
3.8000	2.54E-06	-12645.	2839.	4.24E-08	0.00	1.50E+11	-303.461	1.43E+08	0.00
3.9000	2.53E-06	-9458.	2472.	-4.62E-08	0.00	1.50E+11	-307.599	1.46E+08	0.00
4.0000	2.43E-06	-6713.	2107.	-1.11E-07	0.00	1.50E+11	-300.449	1.48E+08	0.00
4.1000	2.27E-06	-4400.	1756.	-1.56E-07	0.00	1.50E+11	-284.758	1.51E+08	0.00
4.2000	2.06E-06	-2498.	1427.	-1.83E-07	0.00	1.50E+11	-262.959	1.53E+08	0.00
4.3000	1.83E-06	-974.227	1127.	-1.97E-07	0.00	1.50E+11	-237.163	1.56E+08	0.00
4.4000	1.59E-06	207.9646	859.4605	-2.00E-07	0.00	1.50E+11	-209.155	1.58E+08	0.00
4.5000	1.35E-06	1089.	625.7273	-1.95E-07	0.00	1.50E+11	-180.400	1.61E+08	0.00
4.6000	1.12E-06	1710.	426.2480	-1.84E-07	0.00	1.50E+11	-152.065	1.63E+08	0.00
4.7000	9.05E-07	2112.	259.9823	-1.69E-07	0.00	1.50E+11	-125.044	1.66E+08	0.00
4.8000	7.12E-07	2335.	124.9659	-1.51E-07	0.00	1.50E+11	-99.983	1.68E+08	0.00
4.9000	5.43E-07	2413.	18.5865	-1.32E-07	0.00	1.50E+11	-77.316	1.71E+08	0.00
5.0000	3.96E-07	2379.	-62.178	-1.12E-07	0.00	1.50E+11	-57.292	1.73E+08	0.00
5.1000	2.73E-07	2264.	-120.561	-9.39E-08	0.00	1.50E+11	-40.012	1.76E+08	0.00
5.2000	1.71E-07	2090.	-159.840	-7.64E-08	0.00	1.50E+11	-25.454	1.78E+08	0.00
5.3000	8.95E-08	1880.	-183.215	-6.05E-08	0.00	1.50E+11	-13.504	1.81E+08	0.00
5.4000	2.60E-08	1651.	-193.706	-4.63E-08	0.00	1.50E+11	-3.980	1.84E+08	0.00
5.5000	-2.16E-08	1416.	-194.085	-3.40E-08	0.00	1.50E+11	3.3476	1.86E+08	0.00
5.6000	-5.56E-08	1185.	-186.836	-2.36E-08	0.00	1.50E+11	8.7336	1.89E+08	0.00
5.7000	-7.81E-08	967.1940	-174.129	-1.49E-08	0.00	1.50E+11	12.4455	1.91E+08	0.00
5.8000	-9.14E-08	767.2137	-157.812	-7.97E-09	0.00	1.50E+11	14.7498	1.94E+08	0.00
5.9000	-9.73E-08	588.4656	-139.420	-2.54E-09	0.00	1.50E+11	15.9026	1.96E+08	0.00
6.0000	-9.75E-08	432.6114	-120.193	1.56E-09	0.00	1.50E+11	16.1422	1.99E+08	0.00
6.1000	-9.35E-08	299.9978	-101.097	4.50E-09	0.00	1.50E+11	15.6844	2.01E+08	0.00
6.2000	-8.67E-08	189.9667	-82.855	6.46E-09	0.00	1.50E+11	14.7196	2.04E+08	0.00
6.3000	-7.80E-08	101.1299	-65.976	7.63E-09	0.00	1.50E+11	13.4118	2.06E+08	0.00
6.4000	-6.84E-08	31.6052	-50.790	8.16E-09	0.00	1.50E+11	11.8981	2.09E+08	0.00

MEG-33 forward abutment X direction row 2

6.5000	-5.84E-08	-20.787	-37.477	8.21E-09	0.00	1.50E+11	10.2903	2.11E+08	0.00
6.6000	-4.87E-08	-58.360	-26.097	7.89E-09	0.00	1.50E+11	8.6764	2.14E+08	0.00
6.7000	-3.95E-08	-83.439	-16.618	7.32E-09	0.00	1.50E+11	7.1227	2.16E+08	0.00
6.8000	-3.11E-08	-98.260	-8.938	6.59E-09	0.00	1.50E+11	5.6769	2.19E+08	0.00
6.9000	-2.37E-08	-104.906	-2.909	5.78E-09	0.00	1.50E+11	4.3704	2.21E+08	0.00
7.0000	-1.73E-08	-105.257	1.6454	4.93E-09	0.00	1.50E+11	3.2211	2.24E+08	0.00
7.1000	-1.18E-08	-100.969	4.9196	4.11E-09	0.00	1.50E+11	2.2359	2.26E+08	0.00
7.2000	-7.41E-09	-93.460	7.1092	3.33E-09	0.00	1.50E+11	1.4134	2.29E+08	0.00
7.3000	-3.87E-09	-83.915	8.4047	2.61E-09	0.00	1.50E+11	0.7458	2.31E+08	0.00
7.4000	-1.13E-09	-73.296	8.9847	1.98E-09	0.00	1.50E+11	0.2209	2.34E+08	0.00
7.5000	8.96E-10	-62.357	9.0113	1.44E-09	0.00	1.50E+11	-0.177	2.37E+08	0.00
7.6000	2.32E-09	-51.672	8.6306	9.83E-10	0.00	1.50E+11	-0.458	2.37E+08	0.00
7.7000	3.25E-09	-41.646	7.9711	6.08E-10	0.00	1.50E+11	-0.641	2.37E+08	0.00
7.8000	3.78E-09	-32.543	7.1388	3.11E-10	0.00	1.50E+11	-0.746	2.37E+08	0.00
7.9000	4.00E-09	-24.513	6.2184	8.19E-11	0.00	1.50E+11	-0.788	2.37E+08	0.00
8.0000	3.98E-09	-17.619	5.2748	-8.71E-11	0.00	1.50E+11	-0.784	2.37E+08	0.00
8.1000	3.79E-09	-11.854	4.3558	-2.05E-10	0.00	1.50E+11	-0.747	2.37E+08	0.00
8.2000	3.49E-09	-7.164	3.4952	-2.82E-10	0.00	1.50E+11	-0.687	2.37E+08	0.00
8.3000	3.11E-09	-3.465	2.7145	-3.24E-10	0.00	1.50E+11	-0.614	2.37E+08	0.00
8.4000	2.71E-09	-0.649	2.0258	-3.41E-10	0.00	1.50E+11	-0.534	2.37E+08	0.00
8.5000	2.30E-09	1.3983	1.4339	-3.38E-10	0.00	1.50E+11	-0.453	2.37E+08	0.00
8.6000	1.90E-09	2.7934	0.9378	-3.21E-10	0.00	1.50E+11	-0.374	2.37E+08	0.00
8.7000	1.53E-09	3.6499	0.5329	-2.95E-10	0.00	1.50E+11	-0.301	2.37E+08	0.00
8.8000	1.19E-09	4.0731	0.2117	-2.64E-10	0.00	1.50E+11	-0.235	2.37E+08	0.00
8.9000	8.92E-10	4.1585	-0.03457	-2.31E-10	0.00	1.50E+11	-0.176	2.37E+08	0.00
9.0000	6.35E-10	3.9907	-0.215	-1.98E-10	0.00	1.50E+11	-0.125	2.37E+08	0.00
9.1000	4.16E-10	3.6425	-0.340	-1.68E-10	0.00	1.50E+11	-0.08203	2.37E+08	0.00
9.2000	2.32E-10	3.1762	-0.416	-1.40E-10	0.00	1.50E+11	-0.04579	2.37E+08	0.00
9.3000	7.91E-11	2.6440	-0.453	-1.17E-10	0.00	1.50E+11	-0.01558	2.37E+08	0.00
9.4000	-4.88E-11	2.0892	-0.457	-9.81E-11	0.00	1.50E+11	0.00961	2.37E+08	0.00
9.5000	-1.56E-10	1.5483	-0.432	-8.35E-11	0.00	1.50E+11	0.03084	2.37E+08	0.00
9.6000	-2.49E-10	1.0518	-0.384	-7.31E-11	0.00	1.50E+11	0.04913	2.37E+08	0.00
9.7000	-3.32E-10	0.6260	-0.316	-6.64E-11	0.00	1.50E+11	0.06542	2.37E+08	0.00
9.8000	-4.09E-10	0.2944	-0.228	-6.27E-11	0.00	1.50E+11	0.08053	2.37E+08	0.00
9.9000	-4.82E-10	0.07874	-0.123	-6.12E-11	0.00	1.50E+11	0.09507	2.37E+08	0.00
10.0000	-5.55E-10	0.00	0.00	-6.09E-11	0.00	1.50E+11	0.1095	1.18E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual

MEG-33 forward abutment X direction row 2
 stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 2:

Pile-head deflection = 0.00062491 inches
 Computed slope at pile head = -0.0000989 radians
 Maximum bending moment = 1199735. inch-lbs
 Maximum shear force = -75640. lbs
 Depth of maximum bending moment = 0.20000000 feet below pile head
 Depth of maximum shear force = 0.90000000 feet below pile head
 Number of iterations = 6
 Number of zero deflection points = 5

 Summary of Pile-head Responses for Conventional Analyses

Definitions of Pile-head Loading Conditions:

Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs
 Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
 Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.
 Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs
 Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians

Load Case No.	Load Type 1	Pile-head Load 1	Load Type 2	Pile-head Load 2	Axial Loading lbs	Pile-head Deflection inches	Pile-head Rotation radians	Max Shear in Pile lbs	Max Moment in Pile in-lbs
1	V, lb	26700.	M, in-lb	747240.	756200.	3.91E-04	-6.09E-05	-47901.	770048.
2	V, lb	41630.	M, in-lb	1165680.	1022640.	6.25E-04	-9.89E-05	-75640.	1199735.

Maximum pile-head deflection = 0.0006249093 inches
 Maximum pile-head rotation = -0.0000989082 radians = -0.005667 deg.

Summary of Warning Messages

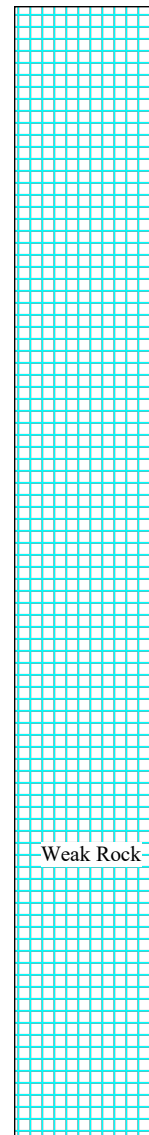
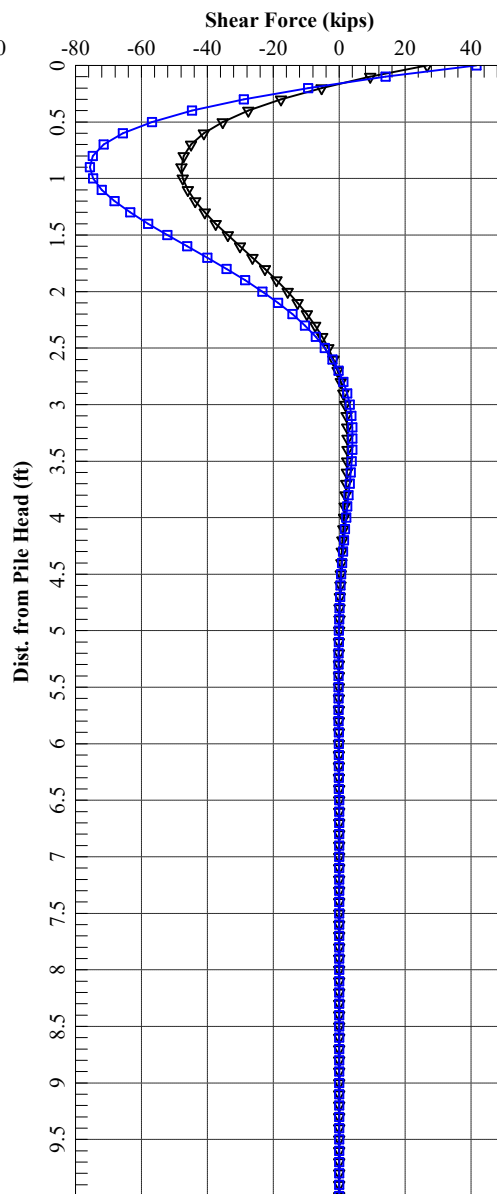
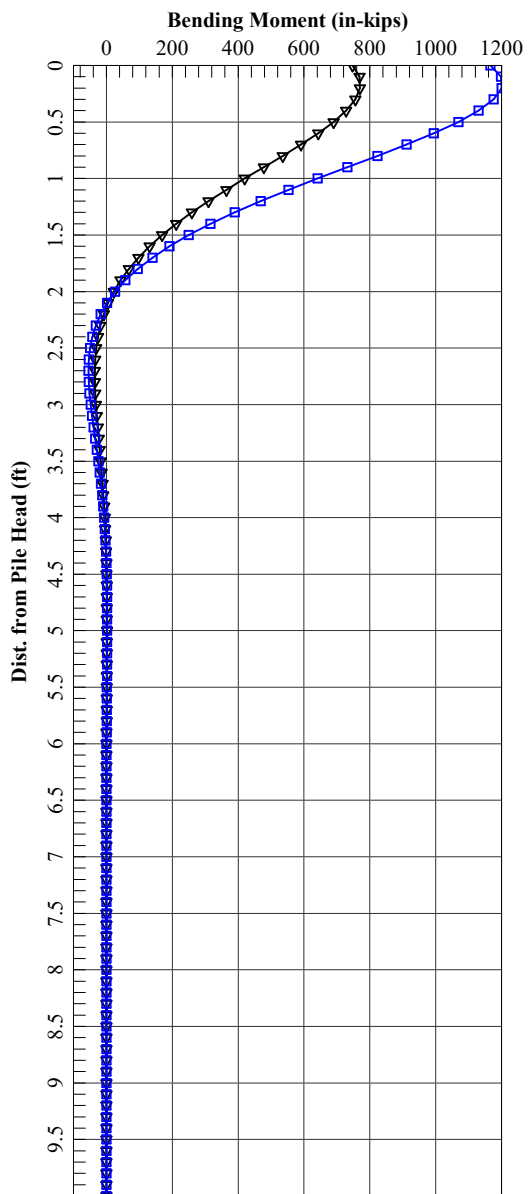
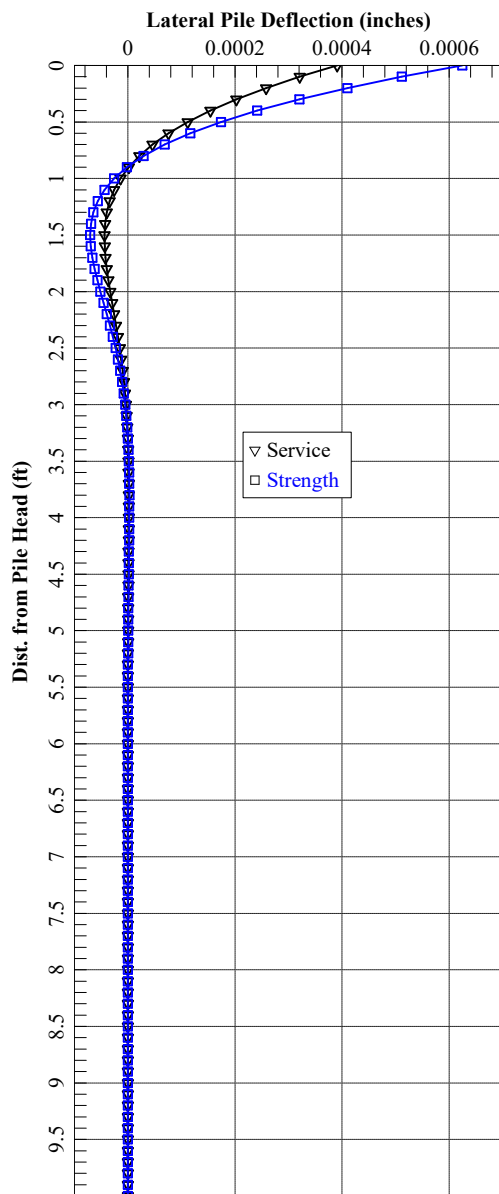
The following warning was reported 706 times

**** Warning ****

An unreasonable input value for unconfined compressive strength has been specified for a soil defined using the weak rock criteria. The input value is greater than 500 psi. Please check your input data for correctness.

The analysis ended normally.

MEG-33 Bridge 3 Rear Abutment X-Direction Row 2



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LPile for Windows, Version 2022-12.006

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method
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Files Used for Analysis

Path to file locations:

\\US0247-PPFSS01\shared_projects\173609140\119144\400-Engineering\Geotechnical\Analysis\Lpile\bridges\LPile
Analysis\Bridge 3\forward abutment\

Name of input data file:

MEG-33 forward abutment X direction row 3.lp12d

Name of output report file:

MEG-33 forward abutment X direction row 3.lp12o

Name of plot output file:

MEG-33 forward abutment X direction row 3.lp12p

Name of runtime message file:

MEG-33 forward abutment X direction row 3.lp12r

Date and Time of Analysis

Date: September 16, 2024

Time: 10:09:14

Problem Title

Project Name: MEG-33-19.21

Job Number: 173609140

Client: ODOT

Engineer: G. Khatri

Description: Forward Abutment Lateral Load Analysis at Bridge 3

MEG-33 forward abutment X direction row 3
Program Options and Settings

Computational Options:

- Conventional Analysis

Engineering Units Used for Data Input and Computations:

- US Customary System Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed = 500
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 100.0000 in
- Number of pile increments = 100

Loading Type and Number of Cycles of Loading:

- Static loading specified

- Analysis uses p-y modification factors for p-y curves
- Analysis uses layering correction (Method of Georgiadis)
- No distributed lateral loads are entered
- Loading by lateral soil movements acting on pile not selected
- Input of shear resistance at the pile tip not selected
- Input of moment resistance at the pile tip not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:

- Output files use decimal points to denote decimal symbols.
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1
- No p-y curves to be computed and reported for user-specified depths
- Print using wide report formats

 Number of pile sections defined = 1
 Total length of pile = 10.000 ft
 Depth of ground surface below top of pile = 0.0000 ft

Pile diameters used for p-y curve computations are defined using 2 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile. A summary of values of pile diameter vs. depth follows.

Point No.	Depth Below Pile Head feet	Pile Diameter inches
1	0.000	30.0000
2	10.000	30.0000

Input Structural Properties for Pile Sections:

Pile Section No. 1:

Section 1 is a round drilled shaft, bored pile, or CIDH pile
 Length of section = 10.000000 ft
 Shaft Diameter = 30.000000 in

 Soil and Rock Layering Information

The soil profile is modelled using 1 layers

Layer 1 is weak rock, p-y criteria by Reese, 1997

Distance from top of pile to top of layer = 0.0000 ft
 Distance from top of pile to bottom of layer = 15.000000 ft

MEG-33 forward abutment X direction row 3

Effective unit weight at top of layer = 87.600000 pcf
 Effective unit weight at bottom of layer = 87.600000 pcf
 Uniaxial compressive strength at top of layer = 4380. psi
 Uniaxial compressive strength at bottom of layer = 4380. psi
 Initial modulus of rock at top of layer = 394200. psi
 Initial modulus of rock at bottom of layer = 394200. psi
 RQD of rock at top of layer = 69.000000 %
 RQD of rock at bottom of layer = 69.000000 %
 k rm of rock at top of layer = 0.0000500
 k rm of rock at bottom of layer = 0.0000500

(Depth of the lowest soil layer extends 5.000 ft below the pile tip)

 Summary of Input Soil Properties

Layer Num.	Soil Type Name (p-y Curve Type)	Layer Depth ft	Effective Unit Wt. pcf	Uniaxial qu psi	RQD %	E50 or krm	Rock Mass Modulus psi
1	Weak Rock	0.00 15.0000	87.6000 87.6000	4380. 4380.	69.0000 69.0000	5.00E-05 5.00E-05	394200. 394200.

 Modification Factors for p-y Curves

Distribution of p-y modifiers with depth defined using 2 points

Point No.	Depth X ft	p-mult	y-mult
1	0.000	0.7000	1.0000
2	10.000	0.7000	1.0000

 Static Loading Type

Static loading criteria were used when computing p-y curves for all analyses.

 Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 2

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length	Run Analysis
1	1	V = 26700. lbs	M = 747240. in-lbs	756200.	No	Yes
2	1	V = 41630. lbs	M = 1165680. in-lbs	1022640.	No	Yes

V = shear force applied normal to pile axis

M = bending moment applied to pile head

y = lateral deflection normal to pile axis

S = pile slope relative to original pile batter angle

R = rotational stiffness applied to pile head

Values of top y vs. pile lengths can be computed only for load types with specified shear loading (Load Types 1, 2, and 3).

Thrust force is assumed to be acting axially for all pile batter angles.

 Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 1

Pile Section No. 1:

 Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section	=	10.000000	ft
Shaft Diameter	=	30.000000	in
Concrete Cover Thickness (to edge of trans. reinf.)	=	3.000000	in
Number of Reinforcing Bars	=	8	bars
Yield Stress of Reinforcing Bars	=	50000.	psi
Modulus of Elasticity of Reinforcing Bars	=	29000000.	psi
Gross Area of Shaft	=	706.858347	sq. in.
Total Area of Reinforcing Steel	=	8.000000	sq. in.
Area Ratio of Steel Reinforcement	=	1.13	percent
Edge-to-Edge Bar Spacing	=	7.242052	in
Maximum Concrete Aggregate Size	=	0.750000	in
Ratio of Bar Spacing to Aggregate Size	=	9.66	
Offset of Center of Rebar Cage from Center of Pile	=	0.0000	in
Transverse Reinforcement			
Type: Spiral			
Number of Transverse Reinf. (per spacing)	=	1	
Spacing of Transverse Reinf.	=	4.000000	in
Yield Stress of Transverse Reinf.	=	50000.	psi
Diameter of Transverse Reinf.	=	0.500000	in

Axial Structural Capacities:

Nom. Axial Structural Capacity = $0.85 F_c A_c + F_y A_s$	=	2776.118	kips
Tensile Load for Cracking of Concrete	=	-317.428	kips
Nominal Axial Tensile Capacity	=	-400.000	kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
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MEG-33 forward abutment X direction row 3

	-----	-----	-----	-----
1	1.128000	1.000000	10.936000	0.000000
2	1.128000	1.000000	7.732920	7.732920
3	1.128000	1.000000	0.000000	10.936000
4	1.128000	1.000000	-7.73292	7.732920
5	1.128000	1.000000	-10.93600	0.000000
6	1.128000	1.000000	-7.73292	-7.73292
7	1.128000	1.000000	0.000000	-10.93600
8	1.128000	1.000000	7.732920	-7.73292

NOTE: The positions of the above rebars were computed by LPILE

Minimum spacing between any two bars not equal to zero = 7.242 inches
between bars 1 and 2.

Ratio of bar spacing to maximum aggregate size = 9.66

Concrete Properties:

Compressive Strength of Concrete	= 4000. psi
Modulus of Elasticity of Concrete	= 3604997. psi
Modulus of Rupture of Concrete	= -474.34165 psi
Compression Strain at Peak Stress	= 0.001886
Tensile Strain at Fracture of Concrete	= -0.0001154
Maximum Coarse Aggregate Size	= 0.750000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 2

Number	Axial Thrust Force kips
-----	-----
1	756.200
2	1022.640

Definitions of Run Messages and Notes:

MEG-33 forward abutment X direction row 3

-
- C = concrete in section has cracked in tension.
 - Y = stress in reinforcing steel has reached yield stress.
 - T = ACI 318 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than 0.003. See ACI 318-14, Section 21.2.3.
 - Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
 Position of neutral axis is measured from edge of compression side of pile.
 Compressive stresses and strains are positive in sign.
 Tensile stresses and strains are negative in sign.

Axial Thrust Force = 756.200 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
0.00000125	197.7835380	158226830.	216.8216471	0.0002710	0.0002335	1.0662110	7.7347222	
0.00000250	395.5603117	158224125.	115.9404114	0.0002899	0.0002149	1.1335121	8.1555548	
0.00000375	593.3044144	158214511.	82.3264817	0.0003087	0.0001962	1.2002071	8.5778174	
0.00000500	790.9995080	158199902.	65.5293806	0.0003276	0.0001776	1.2662900	9.0015102	
0.00000625	988.6292481	158180680.	55.4590132	0.0003466	0.0001591	1.3317546	9.4266337	
0.00000750	1186.	158156971.	48.7520151	0.0003656	0.0001406	1.3965947	9.8531883	
0.00000875	1384.	158128828.	43.9669450	0.0003847	0.0001222	1.4608041	10.2811748	
0.00001000	1581.	158096275.	40.3830824	0.0004038	0.0001038	1.5243766	10.7105939	
0.00001125	1778.	158059326.	37.6000277	0.0004230	0.00008550	1.5873059	11.1414466	
0.00001250	1975.	158017986.	35.3775412	0.0004422	0.00006722	1.6495860	11.5737337	
0.00001375	2172.	157972257.	33.5627436	0.0004615	0.00004899	1.7112104	12.0074565	
0.00001500	2369.	157922140.	32.0537155	0.0004808	0.00003081	1.7721731	12.4426163	
0.00001625	2565.	157867633.	30.7798977	0.0005002	0.00001267	1.8324678	12.8792143	
0.00001750	2762.	157808717.	29.6908904	0.0005196	-0.00000541	1.8920881	13.3172519	
0.00001875	2958.	157743268.	28.7496802	0.0005391	-0.00002344	1.9510248	13.7567012	
0.00002000	3153.	157664678.	27.9283711	0.0005586	-0.00004143	2.0092605	14.1974553	
0.00002125	3348.	157567126.	27.2055963	0.0005781	-0.00005938	2.0667762	14.6393863	
0.00002250	3543.	157447100.	26.5647519	0.0005977	-0.00007729	2.1235549	15.0823757	

MEG-33 forward abutment X direction row 3

0.00002375	3736.	157302916.	25.9927517	0.0006173	-0.00009517	2.1795816	15.5263203
0.00002500	3928.	157134288.	25.4791518	0.0006370	-0.000113	2.2348436	15.9711352
0.00002625	3928.	149651703.	24.7516627	0.0006497	-0.000138	2.2700663	16.2158908 C
0.00002750	4016.	146038292.	24.2674839	0.0006674	-0.000158	2.3183592	16.6019434 C
0.00002875	4137.	143905917.	23.8186515	0.0006848	-0.000178	2.3654418	16.9823632 C
0.00003000	4252.	141744274.	23.3999246	0.0007020	-0.000198	2.4112709	17.3564345 C
0.00003125	4362.	139599609.	23.0091814	0.0007190	-0.000218	2.4559943	17.7255082 C
0.00003250	4468.	137483342.	22.6435182	0.0007359	-0.000239	2.4996591	18.0898910 C
0.00003375	4570.	135393921.	22.2999289	0.0007526	-0.000260	2.5422645	18.4493680 C
0.00003500	4667.	133347501.	21.9767339	0.0007692	-0.000281	2.5838899	18.8046350 C
0.00003625	4761.	131342813.	21.6717758	0.0007856	-0.000302	2.6245470	19.1556419 C
0.00003750	4852.	129383096.	21.3834337	0.0008019	-0.000323	2.6642705	19.5026092 C
0.00003875	4940.	127471254.	21.1103317	0.0008180	-0.000344	2.7030974	19.8457978 C
0.00004000	5024.	125609387.	20.8512736	0.0008341	-0.000366	2.7410637	20.1854775 C
0.00004125	5106.	123785291.	20.6043394	0.0008499	-0.000388	2.7781202	20.5208786 C
0.00004250	5186.	122012431.	20.3693449	0.0008657	-0.000409	2.8143694	20.8530927 C
0.00004375	5263.	120292569.	20.1455640	0.0008814	-0.000431	2.8498525	21.1824970 C
0.00004500	5338.	118627126.	19.9323834	0.0008970	-0.000453	2.8846118	21.5095105 C
0.00004625	5411.	116996281.	19.7277549	0.0009124	-0.000475	2.9185348	21.8325389 C
0.00004750	5482.	115415504.	19.5321676	0.0009278	-0.000497	2.9517557	22.1531854 C
0.00004875	5552.	113890367.	19.3455994	0.0009431	-0.000519	2.9843530	22.4724037 C
0.00005125	5686.	110947381.	18.9932451	0.0009734	-0.000564	3.0473114	23.1011475 C
0.00005375	5814.	108173157.	18.6682145	0.0010034	-0.000609	3.1076685	23.7213921 C
0.00005625	5937.	105555015.	18.3672634	0.0010332	-0.000654	3.1655263	24.3337861 C
0.00005875	6056.	103082151.	18.0877563	0.0010627	-0.000700	3.2209866	24.9390775 C
0.00006125	6171.	100745209.	17.8275476	0.0010919	-0.000746	3.2741508	25.5381191 C
0.00006375	6281.	98528207.	17.5840653	0.0011210	-0.000792	3.3250272	26.1303535 C
0.00006625	6388.	96423728.	17.3557312	0.0011498	-0.000838	3.3736965	26.7163863 C
0.00006875	6492.	94430877.	17.1419119	0.0011785	-0.000884	3.4203126	27.2982492 C
0.00007125	6594.	92544102.	16.9416875	0.0012071	-0.000930	3.4649705	27.8771994 C
0.00007375	6692.	90737287.	16.7516319	0.0012354	-0.000977	3.5074647	28.4488654 C
0.00007625	6788.	89024019.	16.5731943	0.0012637	-0.001024	3.5481091	29.0186636 C
0.00007875	6882.	87390926.	16.4046572	0.0012919	-0.001071	3.5868502	29.5851987 C
0.00008125	6974.	85829252.	16.2447275	0.0013199	-0.001118	3.6236689	30.1475770 C
0.00008375	7064.	84342279.	16.0939601	0.0013479	-0.001165	3.6587296	30.7090183 C
0.00008625	7151.	82914932.	15.9501506	0.0013757	-0.001212	3.6918953	31.2660019 C
0.00008875	7238.	81552351.	15.8142265	0.0014035	-0.001259	3.7233446	31.8224282 C
0.00009125	7322.	80245338.	15.6848135	0.0014312	-0.001306	3.7530112	32.3763755 C
0.00009375	7405.	78989773.	15.5614161	0.0014589	-0.001354	3.7809132	32.9279104 C
0.00009625	7487.	77791471.	15.4451921	0.0014866	-0.001401	3.8072118	33.4815799 C

MEG-33 forward abutment X direction row 3

0.00009875	7567.	76629614.	15.3326041	0.0015141	-0.001448	3.8316363	34.0288076	C
0.0001013	7646.	75518372.	15.2264355	0.0015417	-0.001496	3.8544775	34.5785589	C
0.0001038	7724.	74450450.	15.1255202	0.0015693	-0.001543	3.8756649	35.1287215	C
0.0001063	7800.	73415541.	15.0280130	0.0015967	-0.001591	3.8950885	35.6747527	C
0.0001088	7876.	72421890.	14.9358038	0.0016243	-0.001638	3.9129188	-36.628271	C
0.0001113	7951.	71466415.	14.8484995	0.0016519	-0.001686	3.9291375	-37.751966	C
0.0001138	8023.	70535553.	14.7632778	0.0016793	-0.001733	3.9435858	-38.881449	C
0.0001163	8096.	69638783.	14.6825022	0.0017068	-0.001781	3.9564288	-40.008302	C
0.0001188	8167.	68773855.	14.6059019	0.0017345	-0.001828	3.9676503	-41.132488	C
0.0001213	8237.	67936511.	14.5326589	0.0017621	-0.001875	3.9772118	-42.255976	C
0.0001238	8306.	67120311.	14.4613215	0.0017896	-0.001923	3.9850688	-43.383246	C
0.0001263	8374.	66330841.	14.3935603	0.0018172	-0.001970	3.9912898	-44.507767	C
0.0001288	8442.	65566454.	14.3291775	0.0018449	-0.002018	3.9958576	-45.629498	C
0.0001313	8508.	64825625.	14.2679908	0.0018727	-0.002065	3.9987545	-46.748399	C
0.0001338	8574.	64102049.	14.2083219	0.0019004	-0.002112	3.9999599	-47.870287	C
0.0001363	8638.	63396998.	14.1509838	0.0019281	-0.002159	3.9995720	-48.991612	C
0.0001388	8701.	62711123.	14.0964468	0.0019559	-0.002207	3.9986657	-50.000000	CY
0.0001413	8763.	62038767.	14.0443218	0.0019838	-0.002254	3.9999198	-50.000000	CY
0.0001438	8819.	61352447.	13.9926928	0.0020114	-0.002301	3.9992541	-50.000000	CY
0.0001463	8870.	60652088.	13.9409925	0.0020389	-0.002349	3.9999990	-50.000000	CY
0.0001488	8916.	59939006.	13.8882446	0.0020659	-0.002397	3.9994944	-50.000000	CY
0.0001588	9083.	57215815.	13.6958600	0.0021742	-0.002588	3.9994747	-50.000000	CY
0.0001688	9238.	54745700.	13.5300535	0.0022832	-0.002779	3.9987469	-50.000000	CY
0.0001788	9381.	52482914.	13.3878343	0.0023931	-0.002969	3.9999922	50.000000	CY
0.0001888	9470.	50170299.	13.2445514	0.0024999	-0.003163	3.9984149	50.000000	CY
0.0001988	9511.	47851809.	13.1020004	0.0026040	-0.003358	3.9991460	50.000000	CY
0.0002088	9543.	45713768.	12.9761377	0.0027088	-0.003554	3.9994084	50.000000	CY
0.0002188	9570.	43750453.	12.8641871	0.0028140	-0.003748	3.9993636	50.000000	CY
0.0002288	9595.	41946801.	12.7662171	0.0029203	-0.003942	3.9990093	50.000000	CY
0.0002388	9616.	40278182.	12.6754534	0.0030263	-0.004136	3.9980339	50.000000	CY
0.0002488	9635.	38734215.	12.5943805	0.0031329	-0.004330	3.9960392	50.000000	CY
0.0002588	9652.	37302323.	12.5226736	0.0032402	-0.004522	3.9999776	50.000000	CY
0.0002688	9667.	35970033.	12.4593402	0.0033484	-0.004714	3.9990292	50.000000	CY
0.0002788	9680.	34725057.	12.3993497	0.0034563	-0.004906	3.9958661	50.000000	CY
0.0002888	9691.	33561273.	12.3451904	0.0035647	-0.005098	3.9998692	50.000000	CY
0.0002988	9701.	32470865.	12.2970668	0.0036737	-0.005289	3.9972080	50.000000	CY
0.0003088	9710.	31448045.	12.2538480	0.0037834	-0.005479	3.9999967	50.000000	CY
0.0003188	9710.	30461440.	12.2454345	0.0039032	-0.005659	3.9982922	50.000000	CY

MEG-33 forward abutment X direction row 3

Axial Thrust Force = 1022.640 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
0.00000125	186.9745022	149579602.	295.1092311	0.0003689	0.0003314	1.4108907	10.5726471	
0.00000250	373.9450630	149578025.	155.0859231	0.0003877	0.0003127	1.4741056	10.9936044	
0.00000375	560.8810535	149568281.	108.4254005	0.0004066	0.0002941	1.5367128	11.4160748	
0.00000500	747.7651855	149553037.	85.1055767	0.0004255	0.0002755	1.5987059	11.8400586	
0.00000625	934.5801626	149532826.	71.1220350	0.0004445	0.0002570	1.6600783	12.2655564	
0.00000750	1121.	149507824.	61.8066374	0.0004635	0.0002385	1.7208234	12.6925687	
0.00000875	1308.	149478104.	55.1587538	0.0004826	0.0002201	1.7809347	13.1210962	
0.00001000	1494.	149443702.	50.1780694	0.0005018	0.0002018	1.8404057	13.5511401	
0.00001125	1681.	149404637.	46.3088546	0.0005210	0.0001835	1.8992296	13.9827013	
0.00001250	1867.	149360916.	43.2176718	0.0005402	0.0001652	1.9574001	14.4157810	
0.00001375	2053.	149312544.	40.6923337	0.0005595	0.0001470	2.0149103	14.8503806	
0.00001500	2239.	149259523.	38.5913827	0.0005789	0.0001289	2.0717539	15.2865015	
0.00001625	2425.	149201849.	36.8168867	0.0005983	0.0001108	2.1279241	15.7241454	
0.00001750	2610.	149139522.	35.2988945	0.0006177	0.00009273	2.1834144	16.1633140	
0.00001875	2795.	149072537.	33.9861091	0.0006372	0.00007474	2.2382180	16.6040094	
0.00002000	2980.	149000889.	32.8400576	0.0006568	0.00005680	2.2923283	17.0462334	
0.00002125	3165.	148924572.	31.8313200	0.0006764	0.00003892	2.3457386	17.4899885	
0.00002250	3349.	148843580.	30.9370143	0.0006961	0.00002108	2.3984422	17.9352769	
0.00002375	3533.	148757907.	30.1390760	0.0007158	0.00000330	2.4504325	18.3821012	
0.00002500	3717.	148667345.	29.4230482	0.0007356	-0.00001442	2.5017023	18.8304601	
0.00002625	3900.	148569728.	28.7771723	0.0007554	-0.00003210	2.5522408	19.2803100	
0.00002750	4083.	148461686.	28.1917782	0.0007753	-0.00004973	2.6020340	19.7315682	
0.00002875	4265.	148340389.	27.6588700	0.0007952	-0.00006731	2.6510679	20.1841455	
0.00003000	4446.	148203807.	27.1717886	0.0008152	-0.00008485	2.6993293	20.6379562	
0.00003125	4627.	148050694.	26.7249494	0.0008352	-0.000102	2.7468062	21.0929229	
0.00003250	4671.	143734984.	26.1848620	0.0008510	-0.000124	2.7837197	21.4276075	C
0.00003375	4808.	142447037.	25.7678839	0.0008697	-0.000143	2.8265331	21.8436289	C
0.00003500	4939.	141105057.	25.3767065	0.0008882	-0.000162	2.8682649	22.2556072	C
0.00003625	5064.	139703486.	25.0079716	0.0009065	-0.000181	2.9088770	22.6628177	C
0.00003750	5185.	138260991.	24.6597096	0.0009247	-0.000200	2.9484120	23.0655593	C
0.00003875	5301.	136794765.	24.3302927	0.0009428	-0.000220	2.9869178	23.4642290	C
0.00004000	5413.	135313320.	24.0180480	0.0009607	-0.000239	3.0244192	23.8589358	C
0.00004125	5520.	133824360.	23.7215329	0.0009785	-0.000259	3.0609426	24.2498213	C
0.00004250	5624.	132334840.	23.4395015	0.0009962	-0.000279	3.0965158	24.6370607	C

MEG-33 forward abutment X direction row 3

0.00004375	5725.	130851755.	23.1709154	0.0010137	-0.000299	3.1311712	25.0209116	C
0.00004500	5822.	129382514.	22.9149397	0.0010312	-0.000319	3.1649474	25.4017465	C
0.00004625	5917.	127928641.	22.6705784	0.0010485	-0.000339	3.1978588	25.7796010	C
0.00004750	6008.	126487797.	22.4367219	0.0010657	-0.000359	3.2299003	26.1542096	C
0.00004875	6097.	125071953.	22.2131880	0.0010829	-0.000380	3.2611403	26.5264572	C
0.00005125	6268.	122311968.	21.7940367	0.0011169	-0.000421	3.3212505	27.2638248	C
0.00005375	6430.	119634584.	21.4071399	0.0011506	-0.000462	3.3782054	27.9906920	C
0.00005625	6584.	117045783.	21.0486979	0.0011840	-0.000504	3.4321313	28.7078749	C
0.00005875	6730.	114555251.	20.7160120	0.0012171	-0.000545	3.4831864	29.4169680	C
0.00006125	6870.	112160551.	20.4062161	0.0012499	-0.000588	3.5314577	30.1184790	C
0.00006375	7004.	109859478.	20.1169434	0.0012825	-0.000630	3.5770309	30.8130114	C
0.00006625	7132.	107649968.	19.8462354	0.0013148	-0.000673	3.6199901	31.5012669	C
0.00006875	7255.	105530031.	19.5924725	0.0013470	-0.000716	3.6604164	32.1840542	C
0.00007125	7374.	103496673.	19.3542223	0.0013790	-0.000759	3.6983793	32.8620992	C
0.00007375	7488.	101532280.	19.1288162	0.0014108	-0.000802	3.7338257	33.5330683	C
0.00007625	7598.	99649407.	18.9166054	0.0014424	-0.000845	3.7669334	34.2005313	C
0.00007875	7705.	97846440.	18.7168669	0.0014740	-0.000889	3.7977679	34.8657075	C
0.00008125	7808.	96104416.	18.5270794	0.0015053	-0.000932	3.8262474	35.5253677	C
0.00008375	7909.	94430377.	18.3475140	0.0015366	-0.000976	3.8524910	36.1823373	C
0.00008625	8006.	92824104.	18.1779057	0.0015678	-0.001020	3.8765581	36.8381744	C
0.00008875	8100.	91267303.	18.0157420	0.0015989	-0.001064	3.8983566	37.4885781	C
0.00009125	8192.	89777830.	17.8630844	0.0016300	-0.001107	3.9180734	38.1406248	C
0.00009375	8281.	88328750.	17.7162667	0.0016609	-0.001152	3.9355502	38.7864128	C
0.00009625	8368.	86940780.	17.5779890	0.0016919	-0.001196	3.9509742	39.4347495	C
0.00009875	8452.	85591408.	17.4450137	0.0017227	-0.001240	3.9642246	40.0782206	C
0.0001013	8535.	84292431.	17.3190456	0.0017536	-0.001284	3.9754067	40.7229853	C
0.0001038	8615.	83035789.	17.1988473	0.0017844	-0.001328	3.9844911	41.3668445	C
0.0001063	8693.	81815443.	17.0835056	0.0018151	-0.001372	3.9914740	42.0082395	C
0.0001088	8770.	80640850.	16.9746117	0.0018460	-0.001417	3.9963992	42.6532446	C
0.0001113	8844.	79494850.	16.8692855	0.0018767	-0.001461	3.9992253	43.2939701	C
0.0001138	8916.	78385020.	16.7689766	0.0019075	-0.001505	3.9989891	43.9359745	C
0.0001163	8988.	77312219.	16.6741458	0.0019384	-0.001549	3.9999999	44.5819019	C
0.0001188	9056.	76262361.	16.5823493	0.0019692	-0.001593	3.9999571	45.2245283	C
0.0001213	9123.	75241429.	16.4947453	0.0020000	-0.001638	3.9997922	45.8685860	C
0.0001238	9189.	74251640.	16.4118165	0.0020310	-0.001682	3.9994374	46.5167195	C
0.0001263	9253.	73288879.	16.3326844	0.0020620	-0.001725	3.9988065	47.1667286	C
0.0001288	9314.	72345081.	16.2556630	0.0020929	-0.001770	3.9999623	47.8131445	C
0.0001313	9375.	71428284.	16.1826458	0.0021240	-0.001814	3.9996261	48.4636336	C
0.0001338	9434.	70537903.	16.1133339	0.0021552	-0.001857	3.9988452	49.1179067	C
0.0001363	9493.	69671886.	16.0474600	0.0021865	-0.001901	3.9999544	49.7757140	C

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0.0001388	9549.	68819778.	15.9828222	0.0022176	-0.001945	3.9994325	50.0000000	CY
0.0001413	9604.	67991072.	15.9213826	0.0022489	-0.001989	3.9992360	50.0000000	CY
0.0001438	9656.	67175405.	15.8639932	0.0022804	-0.002032	3.9997296	50.0000000	CY
0.0001463	9708.	66379393.	15.8096547	0.0023122	-0.002075	3.9986388	50.0000000	CY
0.0001488	9757.	65593918.	15.7591678	0.0023442	-0.002118	3.9998723	50.0000000	CY
0.0001588	9936.	62587970.	15.5783056	0.0024731	-0.002289	3.9999182	50.0000000	CY
0.0001688	10079.	59727713.	15.4211803	0.0026023	-0.002460	3.9996354	50.0000000	CY
0.0001788	10183.	56965310.	15.2715244	0.0027298	-0.002633	3.9980826	50.0000000	CY
0.0001888	10277.	54448074.	15.1453469	0.0028587	-0.002804	3.9996142	50.0000000	CY
0.0001988	10363.	52142314.	15.0341767	0.0029880	-0.002974	3.9999981	50.0000000	CY
0.0002088	10443.	50025253.	14.9400203	0.0031187	-0.003144	3.9970352	50.0000000	CY
0.0002188	10501.	48002762.	14.8528929	0.0032491	-0.003313	3.9973949	50.0000000	CY
0.0002288	10523.	46000954.	14.7613499	0.0033767	-0.003486	3.9967612	50.0000000	CY
0.0002388	10523.	44074293.	14.6763126	0.0035040	-0.003659	3.9980761	50.0000000	CY
0.0002488	10523.	42302462.	14.6072228	0.0036335	-0.003829	3.9999538	50.0000000	CY
0.0002588	10523.	40667584.	14.5528301	0.0037655	-0.003997	3.9994289	50.0000000	CY
0.0002688	10523.	39154372.	14.5974807	0.0039231	-0.004139	3.9995883	50.0000000	CY

 Summary of Results for Nominal Moment Capacity for Section 1

Moment values interpolated at maximum compressive strain = 0.003
 or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain	Max. Tens. Strain
1	756.200	9611.191	0.00300000	-0.00408816
2	1022.640	10370.558	0.00300000	-0.00298995

Note that the values of moment capacity in the table above are not factored by a strength reduction factor (phi-factor).

In ACI 318, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.75).

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318,

MEG-33 forward abutment X direction row 3

or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Load No.	Resist. Factor	Nominal Ax. Thrust kips	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in ²
1	0.65	756.200000	9611.	491.530000	6247.	99208156.
2	0.65	1023.	10371.	664.716000	6741.	114371141.
1	0.75	756.200000	9611.	567.150000	7208.	82015882.
2	0.75	1023.	10371.	766.980000	7778.	96620983.
1	0.90	756.200000	9611.	680.580000	8650.	63264529.
2	0.90	1023.	10371.	920.376000	9334.	72056218.

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 1

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 26700.0 lbs
 Applied moment at pile head = 747240.0 in-lbs
 Axial thrust load on pile head = 756200.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in ²	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	3.91E-04	747240.	26700.	-6.09E-05	0.00	1.58E+11	-15401.	2.37E+07	0.00
0.10000	3.21E-04	768244.	9462.	-5.51E-05	0.00	1.58E+11	-13330.	4.98E+07	0.00
0.2000	2.58E-04	770048.	-5299.	-4.93E-05	0.00	1.58E+11	-11271.	5.23E+07	0.00

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0.3000	2.03E-04	755617.	-17622.	-4.35E-05	0.00	1.58E+11	-9268.	5.49E+07	0.00
0.4000	1.54E-04	727834.	-27600.	-3.79E-05	0.00	1.58E+11	-7361.	5.74E+07	0.00
0.5000	1.12E-04	689447.	-35364.	-3.25E-05	0.00	1.58E+11	-5579.	5.99E+07	0.00
0.6000	7.59E-05	643020.	-41080.	-2.75E-05	0.00	1.58E+11	-3947.	6.24E+07	0.00
0.7000	4.58E-05	590905.	-44936.	-2.28E-05	0.00	1.58E+11	-2481.	6.50E+07	0.00
0.8000	2.12E-05	535214.	-47139.	-1.85E-05	0.00	1.58E+11	-1190.	6.75E+07	0.00
0.9000	1.38E-06	477806.	-47901.	-1.47E-05	0.00	1.58E+11	-80.589	7.00E+07	0.00
1.0000	-1.41E-05	420278.	-47440.	-1.13E-05	0.00	1.58E+11	849.4786	7.25E+07	0.00
1.1000	-2.57E-05	363970.	-45967.	-8.30E-06	0.00	1.58E+11	1605.	7.51E+07	0.00
1.2000	-3.40E-05	309972.	-43687.	-5.74E-06	0.00	1.58E+11	2196.	7.76E+07	0.00
1.3000	-3.94E-05	259133.	-40790.	-3.58E-06	0.00	1.58E+11	2633.	8.01E+07	0.00
1.4000	-4.26E-05	212083.	-37452.	-1.79E-06	0.00	1.58E+11	2930.	8.26E+07	0.00
1.5000	-4.37E-05	169251.	-33831.	-3.48E-07	0.00	1.58E+11	3104.	8.51E+07	0.00
1.6000	-4.34E-05	130888.	-30067.	7.90E-07	0.00	1.58E+11	3170.	8.77E+07	0.00
1.7000	-4.19E-05	97089.	-26277.	1.65E-06	0.00	1.58E+11	3146.	9.02E+07	0.00
1.8000	-3.94E-05	67819.	-22563.	2.28E-06	0.00	1.58E+11	3046.	9.27E+07	0.00
1.9000	-3.64E-05	42935.	-19003.	2.70E-06	0.00	1.58E+11	2887.	9.52E+07	0.00
2.0000	-3.29E-05	22208.	-15660.	2.95E-06	0.00	1.58E+11	2684.	9.78E+07	0.00
2.1000	-2.93E-05	5346.	-12580.	3.05E-06	0.00	1.58E+11	2449.	1.00E+08	0.00
2.2000	-2.56E-05	-7990.	-9793.	3.04E-06	0.00	1.58E+11	2195.	1.03E+08	0.00
2.3000	-2.20E-05	-18164.	-7317.	2.94E-06	0.00	1.58E+11	1932.	1.05E+08	0.00
2.4000	-1.86E-05	-25556.	-5157.	2.78E-06	0.00	1.58E+11	1668.	1.08E+08	0.00
2.5000	-1.53E-05	-30546.	-3309.	2.56E-06	0.00	1.58E+11	1412.	1.10E+08	0.00
2.6000	-1.24E-05	-33503.	-1762.	2.32E-06	0.00	1.58E+11	1168.	1.13E+08	0.00
2.7000	-9.78E-06	-34778.	-496.795	2.06E-06	0.00	1.58E+11	940.4816	1.15E+08	0.00
2.8000	-7.46E-06	-34699.	507.5642	1.80E-06	0.00	1.58E+11	733.4501	1.18E+08	0.00
2.9000	-5.46E-06	-33563.	1277.	1.54E-06	0.00	1.58E+11	548.3841	1.20E+08	0.00
3.0000	-3.77E-06	-31637.	1837.	1.29E-06	0.00	1.58E+11	386.2159	1.23E+08	0.00
3.1000	-2.36E-06	-29156.	2217.	1.06E-06	0.00	1.58E+11	247.0391	1.26E+08	0.00
3.2000	-1.22E-06	-26318.	2444.	8.51E-07	0.00	1.58E+11	130.2598	1.28E+08	0.00
3.3000	-3.19E-07	-23292.	2543.	6.63E-07	0.00	1.58E+11	34.7416	1.31E+08	0.00
3.4000	3.70E-07	-20216.	2539.	4.98E-07	0.00	1.58E+11	-41.059	1.33E+08	0.00
3.5000	8.76E-07	-17199.	2455.	3.56E-07	0.00	1.58E+11	-98.967	1.36E+08	0.00
3.6000	1.22E-06	-14325.	2311.	2.37E-07	0.00	1.58E+11	-140.984	1.38E+08	0.00
3.7000	1.44E-06	-11654.	2125.	1.38E-07	0.00	1.58E+11	-169.188	1.41E+08	0.00
3.8000	1.56E-06	-9226.	1912.	5.89E-08	0.00	1.58E+11	-185.657	1.43E+08	0.00
3.9000	1.58E-06	-7065.	1685.	-2.92E-09	0.00	1.58E+11	-192.406	1.46E+08	0.00
4.0000	1.55E-06	-5181.	1455.	-4.94E-08	0.00	1.58E+11	-191.334	1.48E+08	0.00
4.1000	1.47E-06	-3573.	1230.	-8.26E-08	0.00	1.58E+11	-184.188	1.51E+08	0.00
4.2000	1.35E-06	-2230.	1016.	-1.05E-07	0.00	1.58E+11	-172.541	1.53E+08	0.00

MEG-33 forward abutment X direction row 3

4.3000	1.22E-06	-1136.	817.3493	-1.17E-07	0.00	1.58E+11	-157.774	1.56E+08	0.00
4.4000	1.07E-06	-268.274	638.0407	-1.23E-07	0.00	1.58E+11	-141.073	1.58E+08	0.00
4.5000	9.21E-07	395.9140	479.3375	-1.22E-07	0.00	1.58E+11	-123.432	1.61E+08	0.00
4.6000	7.76E-07	882.3575	341.8843	-1.17E-07	0.00	1.58E+11	-105.657	1.63E+08	0.00
4.7000	6.39E-07	1217.	225.4605	-1.09E-07	0.00	1.58E+11	-88.383	1.66E+08	0.00
4.8000	5.14E-07	1424.	129.1781	-9.93E-08	0.00	1.58E+11	-72.088	1.68E+08	0.00
4.9000	4.01E-07	1527.	51.6597	-8.82E-08	0.00	1.58E+11	-57.110	1.71E+08	0.00
5.0000	3.02E-07	1548.	-8.806	-7.65E-08	0.00	1.58E+11	-43.666	1.73E+08	0.00
5.1000	2.17E-07	1506.	-54.129	-6.49E-08	0.00	1.58E+11	-31.872	1.76E+08	0.00
5.2000	1.46E-07	1418.	-86.308	-5.38E-08	0.00	1.58E+11	-21.761	1.78E+08	0.00
5.3000	8.82E-08	1299.	-107.343	-4.35E-08	0.00	1.58E+11	-13.297	1.81E+08	0.00
5.4000	4.18E-08	1160.	-119.160	-3.42E-08	0.00	1.58E+11	-6.397	1.84E+08	0.00
5.5000	6.06E-09	1013.	-123.562	-2.60E-08	0.00	1.58E+11	-0.940	1.86E+08	0.00
5.6000	-2.05E-08	863.9680	-122.194	-1.88E-08	0.00	1.58E+11	3.2195	1.89E+08	0.00
5.7000	-3.92E-08	719.6676	-116.519	-1.28E-08	0.00	1.58E+11	6.2380	1.91E+08	0.00
5.8000	-5.13E-08	584.3448	-107.810	-7.90E-09	0.00	1.58E+11	8.2782	1.94E+08	0.00
5.9000	-5.81E-08	460.9387	-97.143	-3.93E-09	0.00	1.58E+11	9.5001	1.96E+08	0.00
6.0000	-6.07E-08	351.2095	-85.409	-8.52E-10	0.00	1.58E+11	10.0562	1.99E+08	0.00
6.1000	-6.02E-08	255.9588	-73.323	1.45E-09	0.00	1.58E+11	10.0874	2.01E+08	0.00
6.2000	-5.73E-08	175.2322	-61.438	3.09E-09	0.00	1.58E+11	9.7207	2.04E+08	0.00
6.3000	-5.28E-08	108.5022	-50.165	4.16E-09	0.00	1.58E+11	9.0677	2.06E+08	0.00
6.4000	-4.73E-08	54.8289	-39.790	4.78E-09	0.00	1.58E+11	8.2239	2.09E+08	0.00
6.5000	-4.13E-08	12.9976	-30.494	5.04E-09	0.00	1.58E+11	7.2693	2.11E+08	0.00
6.6000	-3.52E-08	-18.366	-22.372	5.02E-09	0.00	1.58E+11	6.2683	2.14E+08	0.00
6.7000	-2.92E-08	-40.703	-15.447	4.79E-09	0.00	1.58E+11	5.2719	2.16E+08	0.00
6.8000	-2.37E-08	-55.448	-9.693	4.43E-09	0.00	1.58E+11	4.3180	2.19E+08	0.00
6.9000	-1.86E-08	-63.975	-5.042	3.98E-09	0.00	1.58E+11	3.4339	2.21E+08	0.00
7.0000	-1.41E-08	-67.557	-1.400	3.48E-09	0.00	1.58E+11	2.6371	2.24E+08	0.00
7.1000	-1.03E-08	-67.341	1.3450	2.97E-09	0.00	1.58E+11	1.9374	2.26E+08	0.00
7.2000	-7.02E-09	-64.334	3.3106	2.47E-09	0.00	1.58E+11	1.3385	2.29E+08	0.00
7.3000	-4.35E-09	-59.400	4.6169	2.00E-09	0.00	1.58E+11	0.8388	2.31E+08	0.00
7.4000	-2.22E-09	-53.257	5.3801	1.57E-09	0.00	1.58E+11	0.4333	2.34E+08	0.00
7.5000	-5.80E-10	-46.490	5.7087	1.19E-09	0.00	1.58E+11	0.1144	2.37E+08	0.00
7.6000	6.38E-10	-39.559	5.7018	8.65E-10	0.00	1.58E+11	-0.126	2.37E+08	0.00
7.7000	1.50E-09	-32.808	5.4493	5.91E-10	0.00	1.58E+11	-0.295	2.37E+08	0.00
7.8000	2.06E-09	-26.481	5.0290	3.66E-10	0.00	1.58E+11	-0.405	2.37E+08	0.00
7.9000	2.38E-09	-20.739	4.5047	1.87E-10	0.00	1.58E+11	-0.468	2.37E+08	0.00
8.0000	2.51E-09	-15.670	3.9274	4.91E-11	0.00	1.58E+11	-0.494	2.37E+08	0.00
8.1000	2.49E-09	-11.313	3.3360	-5.32E-11	0.00	1.58E+11	-0.492	2.37E+08	0.00
8.2000	2.38E-09	-7.664	2.7598	-1.25E-10	0.00	1.58E+11	-0.469	2.37E+08	0.00

MEG-33 forward abutment X direction row 3

8.3000	2.19E-09	-4.689	2.2191	-1.72E-10	0.00	1.58E+11	-0.432	2.37E+08	0.00
8.4000	1.97E-09	-2.338	1.7272	-1.99E-10	0.00	1.58E+11	-0.387	2.37E+08	0.00
8.5000	1.72E-09	-0.544	1.2917	-2.10E-10	0.00	1.58E+11	-0.338	2.37E+08	0.00
8.6000	1.46E-09	0.7629	0.9156	-2.09E-10	0.00	1.58E+11	-0.288	2.37E+08	0.00
8.7000	1.22E-09	1.6542	0.5988	-2.00E-10	0.00	1.58E+11	-0.240	2.37E+08	0.00
8.8000	9.84E-10	2.2004	0.3387	-1.85E-10	0.00	1.58E+11	-0.194	2.37E+08	0.00
8.9000	7.72E-10	2.4673	0.1310	-1.67E-10	0.00	1.58E+11	-0.152	2.37E+08	0.00
9.0000	5.83E-10	2.5151	-0.02920	-1.48E-10	0.00	1.58E+11	-0.115	2.37E+08	0.00
9.1000	4.16E-10	2.3975	-0.147	-1.30E-10	0.00	1.58E+11	-0.08200	2.37E+08	0.00
9.2000	2.71E-10	2.1618	-0.229	-1.12E-10	0.00	1.58E+11	-0.05346	2.37E+08	0.00
9.3000	1.46E-10	1.8491	-0.278	-9.72E-11	0.00	1.58E+11	-0.02881	2.37E+08	0.00
9.4000	3.79E-11	1.4949	-0.300	-8.45E-11	0.00	1.58E+11	-0.00747	2.37E+08	0.00
9.5000	-5.67E-11	1.1300	-0.297	-7.46E-11	0.00	1.58E+11	0.01118	2.37E+08	0.00
9.6000	-1.41E-10	0.7811	-0.274	-6.73E-11	0.00	1.58E+11	0.02781	2.37E+08	0.00
9.7000	-2.18E-10	0.4723	-0.232	-6.26E-11	0.00	1.58E+11	0.04304	2.37E+08	0.00
9.8000	-2.91E-10	0.2255	-0.171	-5.99E-11	0.00	1.58E+11	0.05742	2.37E+08	0.00
9.9000	-3.62E-10	0.06134	-0.09400	-5.89E-11	0.00	1.58E+11	0.07140	2.37E+08	0.00
10.0000	-4.33E-10	0.00	0.00	-5.86E-11	0.00	1.58E+11	0.08526	1.18E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 1:

Pile-head deflection = 0.00039069 inches
 Computed slope at pile head = -0.0000609 radians
 Maximum bending moment = 770048. inch-lbs
 Maximum shear force = -47901. lbs
 Depth of maximum bending moment = 0.20000000 feet below pile head
 Depth of maximum shear force = 0.90000000 feet below pile head
 Number of iterations = 6
 Number of zero deflection points = 5

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 2

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 41630.0 lbs
 Applied moment at pile head = 1165680.0 in-lbs
 Axial thrust load on pile head = 1022640.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in ²	Soil Res. p lb/inch	Soil Spr. Es*H lb/inch	Distrib. Lat. Load lb/inch
0.00	6.25E-04	1165680.	41630.	-9.89E-05	0.00	1.49E+11	-24634.	2.37E+07	0.00
0.1000	5.12E-04	1198015.	14098.	-8.94E-05	0.00	1.49E+11	-21253.	4.98E+07	0.00
0.2000	4.10E-04	1199735.	-9393.	-7.98E-05	0.00	1.49E+11	-17899.	5.23E+07	0.00
0.3000	3.20E-04	1175668.	-28921.	-7.03E-05	0.00	1.49E+11	-14647.	5.49E+07	0.00
0.4000	2.42E-04	1130498.	-44644.	-6.10E-05	0.00	1.50E+11	-11559.	5.74E+07	0.00
0.5000	1.74E-04	1068672.	-56789.	-5.22E-05	0.00	1.50E+11	-8683.	5.99E+07	0.00
0.6000	1.16E-04	994332.	-65633.	-4.39E-05	0.00	1.50E+11	-6058.	6.24E+07	0.00
0.7000	6.85E-05	911259.	-71494.	-3.63E-05	0.00	1.50E+11	-3710.	6.50E+07	0.00
0.8000	2.94E-05	822836.	-74712.	-2.93E-05	0.00	1.50E+11	-1653.	6.75E+07	0.00
0.9000	-1.80E-06	732024.	-75640.	-2.31E-05	0.00	1.50E+11	105.1299	7.00E+07	0.00
1.0000	-2.60E-05	641356.	-74636.	-1.76E-05	0.00	1.50E+11	1569.	7.25E+07	0.00
1.1000	-4.39E-05	552940.	-72046.	-1.28E-05	0.00	1.50E+11	2748.	7.51E+07	0.00
1.2000	-5.66E-05	468476.	-68203.	-8.66E-06	0.00	1.50E+11	3658.	7.76E+07	0.00
1.3000	-6.47E-05	389274.	-63416.	-5.22E-06	0.00	1.50E+11	4320.	8.01E+07	0.00
1.4000	-6.91E-05	316291.	-57968.	-2.39E-06	0.00	1.50E+11	4759.	8.26E+07	0.00
1.5000	-7.05E-05	250157.	-52112.	-1.22E-07	0.00	1.50E+11	5000.	8.51E+07	0.00
1.6000	-6.94E-05	191221.	-46069.	1.65E-06	0.00	1.50E+11	5071.	8.77E+07	0.00
1.7000	-6.65E-05	139586.	-40027.	2.98E-06	0.00	1.50E+11	4999.	9.02E+07	0.00
1.8000	-6.23E-05	95149.	-34141.	3.92E-06	0.00	1.50E+11	4811.	9.27E+07	0.00
1.9000	-5.71E-05	57638.	-28535.	4.53E-06	0.00	1.50E+11	4533.	9.52E+07	0.00
2.0000	-5.14E-05	26655.	-23303.	4.87E-06	0.00	1.50E+11	4187.	9.78E+07	0.00
2.1000	-4.54E-05	1700.	-18512.	4.98E-06	0.00	1.50E+11	3796.	1.00E+08	0.00
2.2000	-3.94E-05	-17788.	-14207.	4.92E-06	0.00	1.50E+11	3379.	1.03E+08	0.00
2.3000	-3.36E-05	-32409.	-10409.	4.72E-06	0.00	1.50E+11	2951.	1.05E+08	0.00
2.4000	-2.81E-05	-42781.	-7122.	4.41E-06	0.00	1.50E+11	2528.	1.08E+08	0.00

MEG-33 forward abutment X direction row 3

2.5000	-2.30E-05	-49512.	-4334.	4.04E-06	0.00	1.50E+11	2118.	1.10E+08	0.00
2.6000	-1.84E-05	-53193.	-2024.	3.63E-06	0.00	1.50E+11	1733.	1.13E+08	0.00
2.7000	-1.43E-05	-54378.	-158.146	3.20E-06	0.00	1.50E+11	1377.	1.15E+08	0.00
2.8000	-1.07E-05	-53580.	1301.	2.77E-06	0.00	1.50E+11	1055.	1.18E+08	0.00
2.9000	-7.67E-06	-51263.	2396.	2.35E-06	0.00	1.50E+11	769.9033	1.20E+08	0.00
3.0000	-5.10E-06	-47836.	3171.	1.95E-06	0.00	1.50E+11	522.6138	1.23E+08	0.00
3.1000	-2.99E-06	-43657.	3672.	1.58E-06	0.00	1.50E+11	312.6852	1.26E+08	0.00
3.2000	-1.30E-06	-39027.	3943.	1.25E-06	0.00	1.50E+11	138.7292	1.28E+08	0.00
3.3000	1.34E-08	-34196.	4026.	9.57E-07	0.00	1.50E+11	-1.453	1.31E+08	0.00
3.4000	9.98E-07	-29368.	3958.	7.03E-07	0.00	1.50E+11	-110.650	1.33E+08	0.00
3.5000	1.70E-06	-24698.	3777.	4.86E-07	0.00	1.50E+11	-192.036	1.36E+08	0.00
3.6000	2.16E-06	-20305.	3512.	3.05E-07	0.00	1.50E+11	-249.005	1.38E+08	0.00
3.7000	2.43E-06	-16270.	3192.	1.58E-07	0.00	1.50E+11	-285.012	1.41E+08	0.00
3.8000	2.54E-06	-12645.	2839.	4.24E-08	0.00	1.50E+11	-303.461	1.43E+08	0.00
3.9000	2.53E-06	-9458.	2472.	-4.62E-08	0.00	1.50E+11	-307.599	1.46E+08	0.00
4.0000	2.43E-06	-6713.	2107.	-1.11E-07	0.00	1.50E+11	-300.449	1.48E+08	0.00
4.1000	2.27E-06	-4400.	1756.	-1.56E-07	0.00	1.50E+11	-284.758	1.51E+08	0.00
4.2000	2.06E-06	-2498.	1427.	-1.83E-07	0.00	1.50E+11	-262.959	1.53E+08	0.00
4.3000	1.83E-06	-974.227	1127.	-1.97E-07	0.00	1.50E+11	-237.163	1.56E+08	0.00
4.4000	1.59E-06	207.9646	859.4605	-2.00E-07	0.00	1.50E+11	-209.155	1.58E+08	0.00
4.5000	1.35E-06	1089.	625.7273	-1.95E-07	0.00	1.50E+11	-180.400	1.61E+08	0.00
4.6000	1.12E-06	1710.	426.2480	-1.84E-07	0.00	1.50E+11	-152.065	1.63E+08	0.00
4.7000	9.05E-07	2112.	259.9823	-1.69E-07	0.00	1.50E+11	-125.044	1.66E+08	0.00
4.8000	7.12E-07	2335.	124.9659	-1.51E-07	0.00	1.50E+11	-99.983	1.68E+08	0.00
4.9000	5.43E-07	2413.	18.5865	-1.32E-07	0.00	1.50E+11	-77.316	1.71E+08	0.00
5.0000	3.96E-07	2379.	-62.178	-1.12E-07	0.00	1.50E+11	-57.292	1.73E+08	0.00
5.1000	2.73E-07	2264.	-120.561	-9.39E-08	0.00	1.50E+11	-40.012	1.76E+08	0.00
5.2000	1.71E-07	2090.	-159.840	-7.64E-08	0.00	1.50E+11	-25.454	1.78E+08	0.00
5.3000	8.95E-08	1880.	-183.215	-6.05E-08	0.00	1.50E+11	-13.504	1.81E+08	0.00
5.4000	2.60E-08	1651.	-193.706	-4.63E-08	0.00	1.50E+11	-3.980	1.84E+08	0.00
5.5000	-2.16E-08	1416.	-194.085	-3.40E-08	0.00	1.50E+11	3.3476	1.86E+08	0.00
5.6000	-5.56E-08	1185.	-186.836	-2.36E-08	0.00	1.50E+11	8.7336	1.89E+08	0.00
5.7000	-7.81E-08	967.1940	-174.129	-1.49E-08	0.00	1.50E+11	12.4455	1.91E+08	0.00
5.8000	-9.14E-08	767.2137	-157.812	-7.97E-09	0.00	1.50E+11	14.7498	1.94E+08	0.00
5.9000	-9.73E-08	588.4656	-139.420	-2.54E-09	0.00	1.50E+11	15.9026	1.96E+08	0.00
6.0000	-9.75E-08	432.6114	-120.193	1.56E-09	0.00	1.50E+11	16.1422	1.99E+08	0.00
6.1000	-9.35E-08	299.9978	-101.097	4.50E-09	0.00	1.50E+11	15.6844	2.01E+08	0.00
6.2000	-8.67E-08	189.9667	-82.855	6.46E-09	0.00	1.50E+11	14.7196	2.04E+08	0.00
6.3000	-7.80E-08	101.1299	-65.976	7.63E-09	0.00	1.50E+11	13.4118	2.06E+08	0.00
6.4000	-6.84E-08	31.6052	-50.790	8.16E-09	0.00	1.50E+11	11.8981	2.09E+08	0.00

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6.5000	-5.84E-08	-20.787	-37.477	8.21E-09	0.00	1.50E+11	10.2903	2.11E+08	0.00
6.6000	-4.87E-08	-58.360	-26.097	7.89E-09	0.00	1.50E+11	8.6764	2.14E+08	0.00
6.7000	-3.95E-08	-83.439	-16.618	7.32E-09	0.00	1.50E+11	7.1227	2.16E+08	0.00
6.8000	-3.11E-08	-98.260	-8.938	6.59E-09	0.00	1.50E+11	5.6769	2.19E+08	0.00
6.9000	-2.37E-08	-104.906	-2.909	5.78E-09	0.00	1.50E+11	4.3704	2.21E+08	0.00
7.0000	-1.73E-08	-105.257	1.6454	4.93E-09	0.00	1.50E+11	3.2211	2.24E+08	0.00
7.1000	-1.18E-08	-100.969	4.9196	4.11E-09	0.00	1.50E+11	2.2359	2.26E+08	0.00
7.2000	-7.41E-09	-93.460	7.1092	3.33E-09	0.00	1.50E+11	1.4134	2.29E+08	0.00
7.3000	-3.87E-09	-83.915	8.4047	2.61E-09	0.00	1.50E+11	0.7458	2.31E+08	0.00
7.4000	-1.13E-09	-73.296	8.9847	1.98E-09	0.00	1.50E+11	0.2209	2.34E+08	0.00
7.5000	8.96E-10	-62.357	9.0113	1.44E-09	0.00	1.50E+11	-0.177	2.37E+08	0.00
7.6000	2.32E-09	-51.672	8.6306	9.83E-10	0.00	1.50E+11	-0.458	2.37E+08	0.00
7.7000	3.25E-09	-41.646	7.9711	6.08E-10	0.00	1.50E+11	-0.641	2.37E+08	0.00
7.8000	3.78E-09	-32.543	7.1388	3.11E-10	0.00	1.50E+11	-0.746	2.37E+08	0.00
7.9000	4.00E-09	-24.513	6.2184	8.19E-11	0.00	1.50E+11	-0.788	2.37E+08	0.00
8.0000	3.98E-09	-17.619	5.2748	-8.71E-11	0.00	1.50E+11	-0.784	2.37E+08	0.00
8.1000	3.79E-09	-11.854	4.3558	-2.05E-10	0.00	1.50E+11	-0.747	2.37E+08	0.00
8.2000	3.49E-09	-7.164	3.4952	-2.82E-10	0.00	1.50E+11	-0.687	2.37E+08	0.00
8.3000	3.11E-09	-3.465	2.7145	-3.24E-10	0.00	1.50E+11	-0.614	2.37E+08	0.00
8.4000	2.71E-09	-0.649	2.0258	-3.41E-10	0.00	1.50E+11	-0.534	2.37E+08	0.00
8.5000	2.30E-09	1.3983	1.4339	-3.38E-10	0.00	1.50E+11	-0.453	2.37E+08	0.00
8.6000	1.90E-09	2.7934	0.9378	-3.21E-10	0.00	1.50E+11	-0.374	2.37E+08	0.00
8.7000	1.53E-09	3.6499	0.5329	-2.95E-10	0.00	1.50E+11	-0.301	2.37E+08	0.00
8.8000	1.19E-09	4.0731	0.2117	-2.64E-10	0.00	1.50E+11	-0.235	2.37E+08	0.00
8.9000	8.92E-10	4.1585	-0.03457	-2.31E-10	0.00	1.50E+11	-0.176	2.37E+08	0.00
9.0000	6.35E-10	3.9907	-0.215	-1.98E-10	0.00	1.50E+11	-0.125	2.37E+08	0.00
9.1000	4.16E-10	3.6425	-0.340	-1.68E-10	0.00	1.50E+11	-0.08203	2.37E+08	0.00
9.2000	2.32E-10	3.1762	-0.416	-1.40E-10	0.00	1.50E+11	-0.04579	2.37E+08	0.00
9.3000	7.91E-11	2.6440	-0.453	-1.17E-10	0.00	1.50E+11	-0.01558	2.37E+08	0.00
9.4000	-4.88E-11	2.0892	-0.457	-9.81E-11	0.00	1.50E+11	0.00961	2.37E+08	0.00
9.5000	-1.56E-10	1.5483	-0.432	-8.35E-11	0.00	1.50E+11	0.03084	2.37E+08	0.00
9.6000	-2.49E-10	1.0518	-0.384	-7.31E-11	0.00	1.50E+11	0.04913	2.37E+08	0.00
9.7000	-3.32E-10	0.6260	-0.316	-6.64E-11	0.00	1.50E+11	0.06542	2.37E+08	0.00
9.8000	-4.09E-10	0.2944	-0.228	-6.27E-11	0.00	1.50E+11	0.08053	2.37E+08	0.00
9.9000	-4.82E-10	0.07874	-0.123	-6.12E-11	0.00	1.50E+11	0.09507	2.37E+08	0.00
10.0000	-5.55E-10	0.00	0.00	-6.09E-11	0.00	1.50E+11	0.1095	1.18E+08	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual

MEG-33 forward abutment X direction row 3
 stresses in concrete and steel. Stresses in concrete and steel may be inter-
 polated from the output for nonlinear bending properties relative to the
 magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 2:

Pile-head deflection = 0.00062491 inches
 Computed slope at pile head = -0.0000989 radians
 Maximum bending moment = 1199735. inch-lbs
 Maximum shear force = -75640. lbs
 Depth of maximum bending moment = 0.20000000 feet below pile head
 Depth of maximum shear force = 0.90000000 feet below pile head
 Number of iterations = 6
 Number of zero deflection points = 5

 Summary of Pile-head Responses for Conventional Analyses

Definitions of Pile-head Loading Conditions:

Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs
 Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
 Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.
 Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs
 Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians

Load Case No.	Load Type 1	Pile-head Load 1	Load Type 2	Pile-head Load 2	Axial Loading lbs	Pile-head Deflection inches	Pile-head Rotation radians	Max Shear in Pile lbs	Max Moment in Pile in-lbs
1	V, lb	26700.	M, in-lb	747240.	756200.	3.91E-04	-6.09E-05	-47901.	770048.
2	V, lb	41630.	M, in-lb	1165680.	1022640.	6.25E-04	-9.89E-05	-75640.	1199735.

Maximum pile-head deflection = 0.0006249093 inches
 Maximum pile-head rotation = -0.0000989082 radians = -0.005667 deg.

Summary of Warning Messages

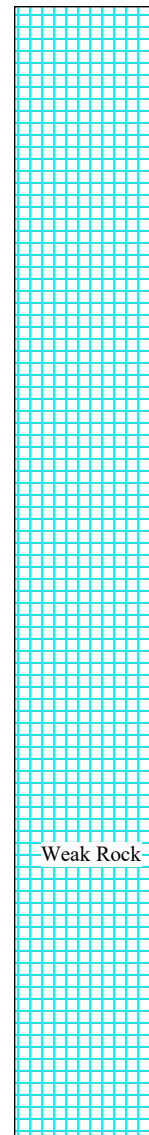
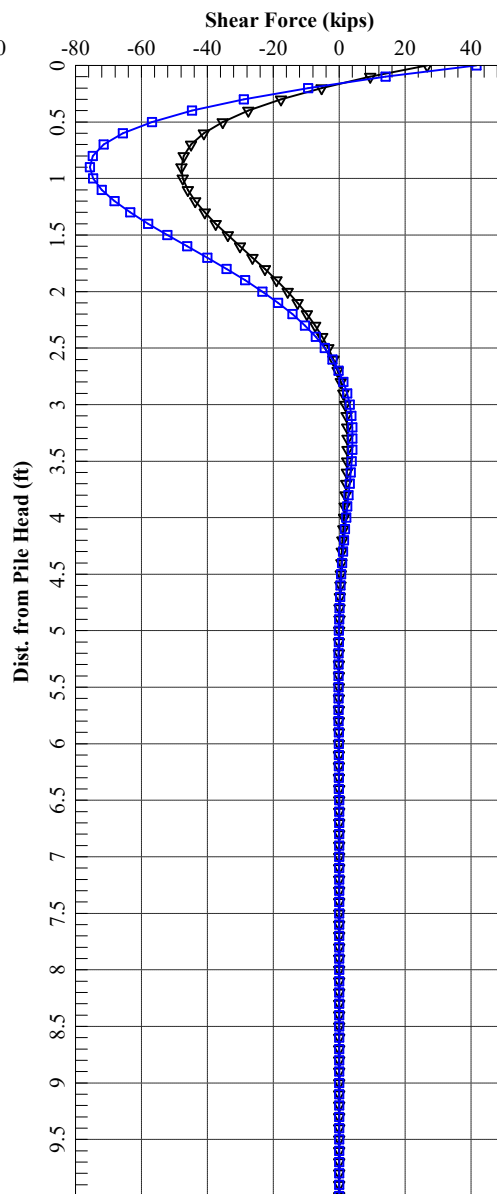
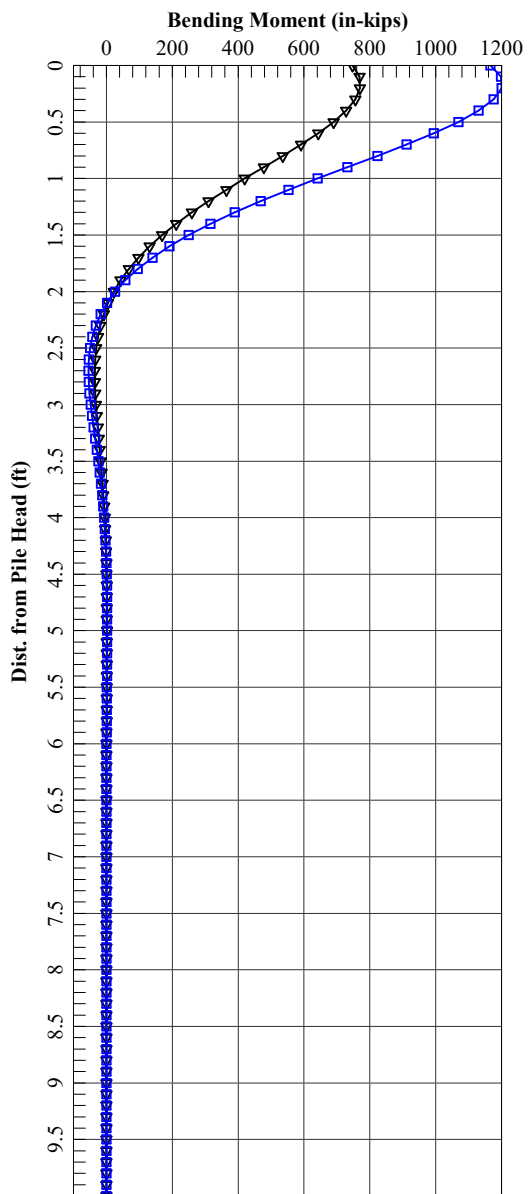
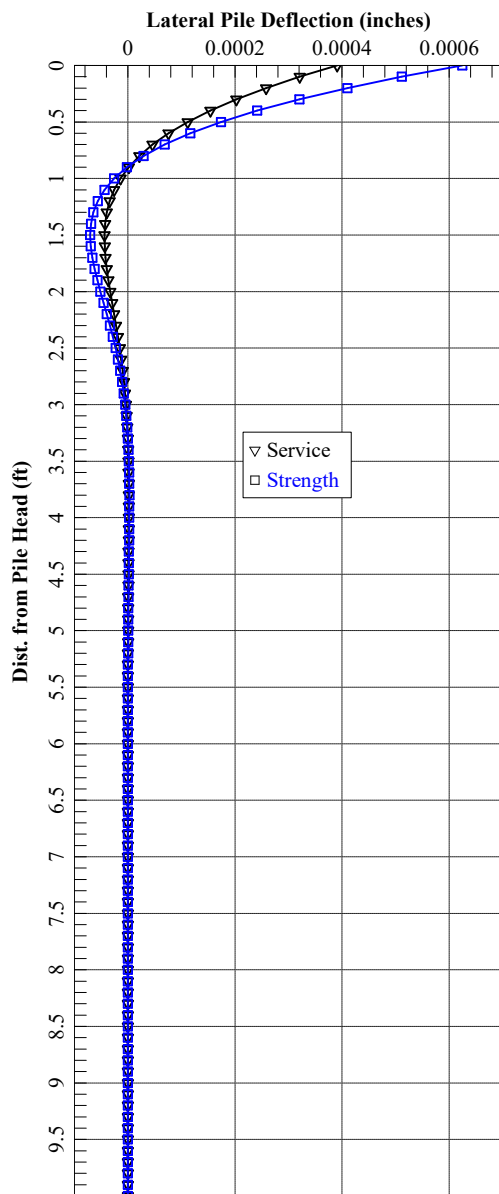
The following warning was reported 706 times

**** Warning ****

An unreasonable input value for unconfined compressive strength has been specified for a soil defined using the weak rock criteria. The input value is greater than 500 psi. Please check your input data for correctness.

The analysis ended normally.

MEG-33 Bridge 3 Rear Abutment X-Direction Row 3



APPENDIX G
SETTLEMENT ANALYSES

Settle3 Analysis Information

MEG-33 Bowman's Run Bridge

Project Settings

Document Name	Bowmans_Run_rear_abutment
Project Title	MEG-33 Bowman's Run Bridge
Analysis	Bowman's Run Rear Abutment
Author	J. Samples
Company	Stantec
Date Created	5/23/2024, 8:23:08 AM
Stress Computation Method	Boussinesq
Time-dependent Consolidation Analysis	
Time Units	days
Permeability Units	feet/day
Minimum settlement ratio for subgrade modulus	0.9
Use average properties to calculate layered stresses	
Improve consolidation accuracy	
Ignore negative effective stresses in settlement calculations	

Stage Settings

Stage #	Name	Time [days]
1	Stage 1	0
2	Stage 2	7
3	Stage 3	14
4	Stage 4	21
5	Stage 5	30
6	Stage 6	60
7	Stage 7	90
8	Stage 8	300
9	Stage 9	3650

Results

Time taken to compute: 0.162962 seconds

Stage: Stage 1 = 0 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0
Total Consolidation Settlement [in]	0	0
Virgin Consolidation Settlement [in]	0	0
Recompression Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress ZZ [ksf]	2.07495	2.375
Loading Stress XX [ksf]	1.17478	1.29151
Loading Stress YY [ksf]	0.868301	2.03349
Effective Stress ZZ [ksf]	0	0.3876
Effective Stress XX [ksf]	1.29151	1.57207
Effective Stress YY [ksf]	1.2559	2.03349
Total Stress ZZ [ksf]	2.375	2.83695
Total Stress XX [ksf]	3.66651	4.02142
Total Stress YY [ksf]	3.70525	4.40849
Modulus of Subgrade Reaction (Total) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Immediate) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Consolidation) [ksf/ft]	0	0
Total Strain	0	0
Pore Water Pressure [ksf]	2.375	2.48591
Excess Pore Water Pressure [ksf]	2.07495	2.375
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	9.2	9.2
Over-consolidation Ratio	23.7477	47471.6
Void Ratio	0.587	0.587
Permeability [ft/d]	7.14872e-05	0.142903
Coefficient of Consolidation [ft ² /d]	0.027	0.027
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0

Stage: Stage 2 = 7 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	1.3039
Total Consolidation Settlement [in]	0	1.3039
Virgin Consolidation Settlement [in]	0	0
Recompression Consolidation Settlement [in]	0	1.3039
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress ZZ [ksf]	2.07495	2.375
Loading Stress XX [ksf]	1.17478	1.29151
Loading Stress YY [ksf]	0.868301	2.03349
Effective Stress ZZ [ksf]	0.149301	2.46255
Effective Stress XX [ksf]	1.35743	3.66651
Effective Stress YY [ksf]	1.33573	4.40849
Total Stress ZZ [ksf]	2.375	2.83695
Total Stress XX [ksf]	3.66651	4.02142
Total Stress YY [ksf]	3.70525	4.40849
Modulus of Subgrade Reaction (Total) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Immediate) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Consolidation) [ksf/ft]	0	0
Total Strain	-2.96263e-05	0.154568
Pore Water Pressure [ksf]	0	2.48628
Excess Pore Water Pressure [ksf]	0	2.33022
Degree of Consolidation [%]	0	99.8054
Pre-consolidation Stress [ksf]	9.2	9.2
Over-consolidation Ratio	3.74938	59.4564
Void Ratio	0.3417	0.587047
Permeability [ft/d]	7.14872e-05	0.142903
Coefficient of Consolidation [ft ² /d]	0.027	0.027
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	20.9533	20.9533
Undrained Shear Strength	0	0

Stage: Stage 3 = 14 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	1.68208
Total Consolidation Settlement [in]	0	1.68208
Virgin Consolidation Settlement [in]	0	0
Recompression Consolidation Settlement [in]	0	1.68208
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress ZZ [ksf]	2.07495	2.375
Loading Stress XX [ksf]	1.17478	1.29151
Loading Stress YY [ksf]	0.868301	2.03349
Effective Stress ZZ [ksf]	0.199274	2.46255
Effective Stress XX [ksf]	1.39083	3.66656
Effective Stress YY [ksf]	1.37709	4.40849
Total Stress ZZ [ksf]	2.375	2.83695
Total Stress XX [ksf]	3.66651	4.02142
Total Stress YY [ksf]	3.70525	4.40849
Modulus of Subgrade Reaction (Total) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Immediate) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Consolidation) [ksf/ft]	0	0
Total Strain	0.000590951	0.154569
Pore Water Pressure [ksf]	0	2.48004
Excess Pore Water Pressure [ksf]	0	2.29098
Degree of Consolidation [%]	0	99.8569
Pre-consolidation Stress [ksf]	9.2	9.2
Over-consolidation Ratio	3.7458	45.0083
Void Ratio	0.3417	0.586062
Permeability [ft/d]	7.14872e-05	0.142903
Coefficient of Consolidation [ft ² /d]	0.027	0.027
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	29.1077	29.1077
Undrained Shear Strength	0	0

Stage: Stage 4 = 21 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	1.95588
Total Consolidation Settlement [in]	0	1.95588
Virgin Consolidation Settlement [in]	0	0
Recompression Consolidation Settlement [in]	0	1.95588
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress ZZ [ksf]	2.07495	2.375
Loading Stress XX [ksf]	1.17478	1.29151
Loading Stress YY [ksf]	0.868301	2.03349
Effective Stress ZZ [ksf]	0.250281	2.46255
Effective Stress XX [ksf]	1.43505	3.66658
Effective Stress YY [ksf]	1.42387	4.40849
Total Stress ZZ [ksf]	2.375	2.83695
Total Stress XX [ksf]	3.66651	4.02142
Total Stress YY [ksf]	3.70525	4.40849
Modulus of Subgrade Reaction (Total) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Immediate) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Consolidation) [ksf/ft]	0	0
Total Strain	0.00319063	0.154569
Pore Water Pressure [ksf]	0	2.4464
Excess Pore Water Pressure [ksf]	0	2.24223
Degree of Consolidation [%]	0	99.8793
Pre-consolidation Stress [ksf]	9.2	9.2
Over-consolidation Ratio	3.74425	35.718
Void Ratio	0.341699	0.581936
Permeability [ft/d]	7.14872e-05	0.142903
Coefficient of Consolidation [ft ² /d]	0.027	0.027
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	35.3309	35.3309
Undrained Shear Strength	0	0

Stage: Stage 5 = 30 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	2.22136
Total Consolidation Settlement [in]	0	2.22136
Virgin Consolidation Settlement [in]	0	0
Recompression Consolidation Settlement [in]	0	2.22136
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress ZZ [ksf]	2.07495	2.375
Loading Stress XX [ksf]	1.17478	1.29151
Loading Stress YY [ksf]	0.868301	2.03349
Effective Stress ZZ [ksf]	0.347911	2.46255
Effective Stress XX [ksf]	1.53039	3.66663
Effective Stress YY [ksf]	1.51343	4.40849
Total Stress ZZ [ksf]	2.375	2.83695
Total Stress XX [ksf]	3.66651	4.02142
Total Stress YY [ksf]	3.70525	4.40849
Modulus of Subgrade Reaction (Total) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Immediate) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Consolidation) [ksf/ft]	0	0
Total Strain	0.00804532	0.154569
Pore Water Pressure [ksf]	0	2.35105
Excess Pore Water Pressure [ksf]	0	2.14513
Degree of Consolidation [%]	0	99.8954
Pre-consolidation Stress [ksf]	9.2	9.2
Over-consolidation Ratio	3.74314	25.6514
Void Ratio	0.341699	0.574232
Permeability [ft/d]	7.14872e-05	0.142903
Coefficient of Consolidation [ft ² /d]	0.027	0.027
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	41.8976	41.8976
Undrained Shear Strength	0	0

Stage: Stage 6 = 60 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	2.7145
Total Consolidation Settlement [in]	0	2.7145
Virgin Consolidation Settlement [in]	0	0
Recompression Consolidation Settlement [in]	0	2.7145
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress ZZ [ksf]	2.07495	2.375
Loading Stress XX [ksf]	1.17478	1.29151
Loading Stress YY [ksf]	0.868301	2.03349
Effective Stress ZZ [ksf]	0.826136	2.46255
Effective Stress XX [ksf]	2.00513	3.66675
Effective Stress YY [ksf]	1.96095	4.40849
Total Stress ZZ [ksf]	2.375	2.83695
Total Stress XX [ksf]	3.66651	4.02142
Total Stress YY [ksf]	3.70525	4.40849
Modulus of Subgrade Reaction (Total) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Immediate) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Consolidation) [ksf/ft]	0	0
Total Strain	0.0204457	0.154569
Pore Water Pressure [ksf]	0	1.89063
Excess Pore Water Pressure [ksf]	0	1.66599
Degree of Consolidation [%]	0	99.9217
Pre-consolidation Stress [ksf]	9.2	9.2
Over-consolidation Ratio	3.74132	10.9613
Void Ratio	0.341699	0.554553
Permeability [ft/d]	7.14872e-05	0.142903
Coefficient of Consolidation [ft ² /d]	0.027	0.027
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	58.1406	58.1406
Undrained Shear Strength	0	0

Stage: Stage 7 = 90 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	2.95075
Total Consolidation Settlement [in]	0	2.95075
Virgin Consolidation Settlement [in]	0	0
Recompression Consolidation Settlement [in]	0	2.95075
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress ZZ [ksf]	2.07495	2.375
Loading Stress XX [ksf]	1.17478	1.29151
Loading Stress YY [ksf]	0.868301	2.03349
Effective Stress ZZ [ksf]	1.26249	2.46255
Effective Stress XX [ksf]	2.44148	3.66687
Effective Stress YY [ksf]	2.37304	4.40849
Total Stress ZZ [ksf]	2.375	2.83695
Total Stress XX [ksf]	3.66651	4.02142
Total Stress YY [ksf]	3.70525	4.40849
Modulus of Subgrade Reaction (Total) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Immediate) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Consolidation) [ksf/ft]	0	0
Total Strain	0.0262165	0.154569
Pore Water Pressure [ksf]	0	1.45959
Excess Pore Water Pressure [ksf]	0	1.22963
Degree of Consolidation [%]	0	99.9396
Pre-consolidation Stress [ksf]	9.2	9.2
Over-consolidation Ratio	3.74008	7.22835
Void Ratio	0.341699	0.545394
Permeability [ft/d]	7.14872e-05	0.142903
Coefficient of Consolidation [ft ² /d]	0.027	0.027
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	69.6552	69.6552
Undrained Shear Strength	0	0

Stage: Stage 8 = 300 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	3.3317
Total Consolidation Settlement [in]	0	3.3317
Virgin Consolidation Settlement [in]	0	0
Recompression Consolidation Settlement [in]	0	3.3317
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress ZZ [ksf]	2.07495	2.375
Loading Stress XX [ksf]	1.17478	1.29151
Loading Stress YY [ksf]	0.868301	2.03349
Effective Stress ZZ [ksf]	2.3645	2.46255
Effective Stress XX [ksf]	3.54108	3.67031
Effective Stress YY [ksf]	3.33081	4.40849
Total Stress ZZ [ksf]	2.375	2.83695
Total Stress XX [ksf]	3.66651	4.02142
Total Stress YY [ksf]	3.70525	4.40849
Modulus of Subgrade Reaction (Total) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Immediate) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Consolidation) [ksf/ft]	0	0
Total Strain	0.0303657	0.154569
Pore Water Pressure [ksf]	0	0.396646
Excess Pore Water Pressure [ksf]	0	0.125537
Degree of Consolidation [%]	0	99.9935
Pre-consolidation Stress [ksf]	9.2	9.2
Over-consolidation Ratio	3.73636	3.8893
Void Ratio	0.341699	0.53881
Permeability [ft/d]	7.14872e-05	0.142903
Coefficient of Consolidation [ft ² /d]	0.027	0.027
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	96.9317	96.9317
Undrained Shear Strength	0	0

Stage: Stage 9 = 3650 d

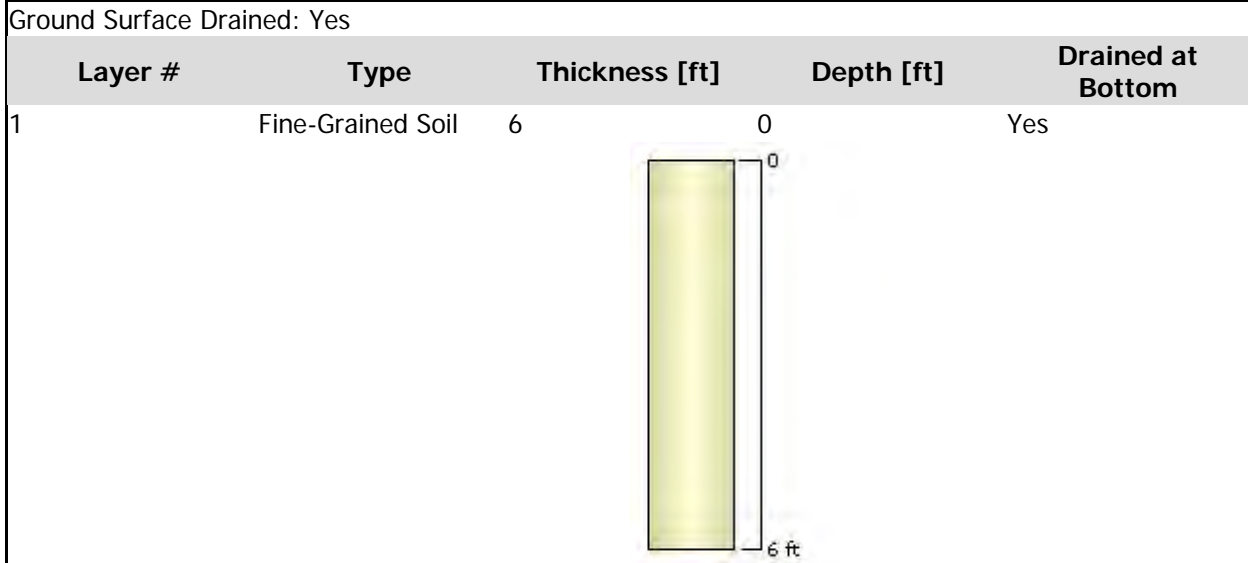
Data Type	Minimum	Maximum
Total Settlement [in]	0	3.36538
Total Consolidation Settlement [in]	0	3.36538
Virgin Consolidation Settlement [in]	0	0
Recompression Consolidation Settlement [in]	0	3.36538
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress ZZ [ksf]	2.07495	2.375
Loading Stress XX [ksf]	1.17478	1.29151
Loading Stress YY [ksf]	0.868301	2.03349
Effective Stress ZZ [ksf]	2.375	2.49304
Effective Stress XX [ksf]	3.64702	3.68818
Effective Stress YY [ksf]	3.33085	4.40849
Total Stress ZZ [ksf]	2.375	2.83695
Total Stress XX [ksf]	3.66651	4.02142
Total Stress YY [ksf]	3.70525	4.40849
Modulus of Subgrade Reaction (Total) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Immediate) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Consolidation) [ksf/ft]	0	0
Total Strain	0.0303677	0.154569
Pore Water Pressure [ksf]	0	0.3744
Excess Pore Water Pressure [ksf]	-1.15409e-17	6.24735e-18
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	9.2	9.2
Over-consolidation Ratio	3.69081	3.87337
Void Ratio	0.341699	0.538806
Permeability [ft/d]	7.14872e-05	0.142903
Coefficient of Consolidation [ft ² /d]	0.027	0.027
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	100	100
Undrained Shear Strength	0	0

Embankments


1. Embankment: "Embankment Load 1"

Label	Embankment Load 1		
Center Line	(0, 0) to (0, 30)		
Near End Angle	90 degrees		
Far End Angle	90 degrees		
Number of Zones	1		
Number of Sections	1		
	Zone	Name	Unit Weight (kips/ft3)
1	New Zone		0.125

Soil Layers



Soil Properties

Property	Fine-Grained Soil
Color	
Unit Weight [kips/ft3]	0.127
Saturated Unit Weight [kips/ft3]	0.127
K0	1
Primary Consolidation	Enabled
Material Type	Non-Linear
Cc	0.277
Cr	0.06
e0	0.587
Pc [ksf]	9.2
Cv [ft2/d]	0.027
Cvr [ft2/d]	0.027
B-bar	1
Undrained Su A [kips/ft2]	0
Undrained Su S	0.2
Undrained Su m	0.8
Piezo Line ID	1

Groundwater

Groundwater method
Water Unit Weight

Piezometric Lines
0.0624 kips/ft³

Piezometric Line Entities

ID	Depth (ft)
1	0 ft

Query Points

Point #	Query Point Name	(X,Y) Location	Number of Divisions
1	Query Point 1	0, 5	Auto: 31

Time Points

Point #	(X,Y) Location	Depth	Goal Type	Goal	Time Until Goal
1	0, 5	0 ft	Total Settlement	2.97 in	93.6541 d

Project Name MEG-33-19.11
 Source B-001-1-24, 4.2'-4.3'
 Description Sandy Lean Clay (CL), gray, moist, soft
 Specimen Type Undisturbed

Project No. 175578434
 Lab ID 454
 Date Received 11/07/2024

LL 25 Specific Gravity 2.72 ASTM D 854, Dry
 PL 17
 PI 8

Prepared Using Cutting Ring
 Test Method B - for 60 min.
 Test Condition Inundated at 0.05 tsf

Initial Specimen Conditions

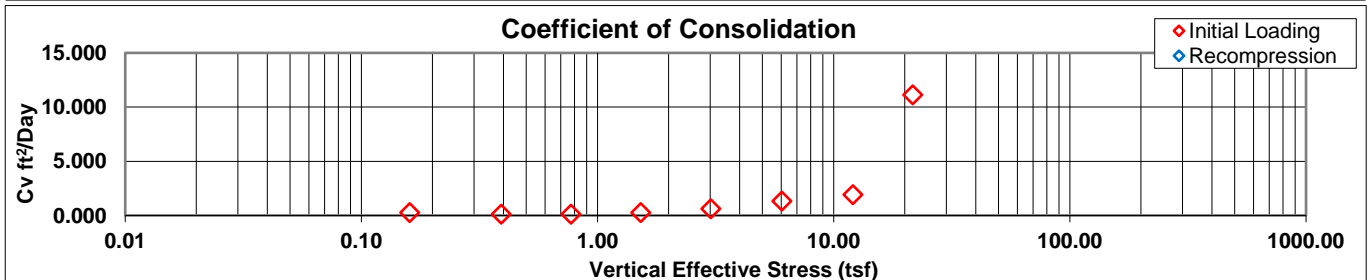
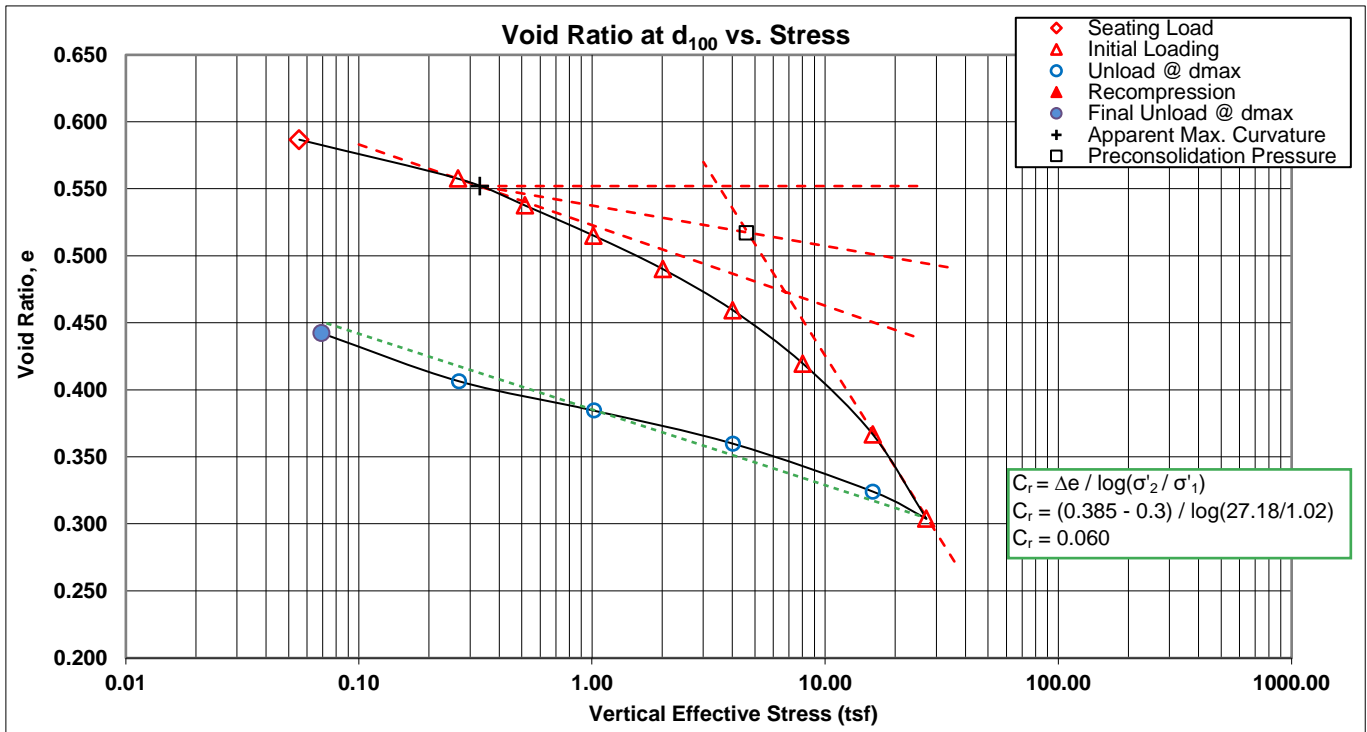
Moisture Content (%) 18.4
 Dry Unit Weight (pcf) 106.8
 Void Ratio 0.587
 Degree of Saturation (%) 85.2
 Initial Specimen Height (in) 1.0015

Final Specimen Conditions

Moisture Content (%) 15.8
 Dry Unit Weight (pcf) 117.5
 Void Ratio 0.442
 Degree of Saturation (%) 97.3
 Final Specimen Height (in) 0.9104

Equivalent Height of Solids (in) 0.631

Preconsolidation Pressure* (tsf) 4.6
 Void Ratio @ Preconsolidation Pressure 0.517



Comments Approx. Compression Index Value (C_c) = 0.277

 _____ Reviewed By _____

Project Name MEG-33-19.11
 Source B-001-1-24, 4.2'-4.3'
 Description Sandy Lean Clay (CL), gray, moist, soft
 Specimen Type Undisturbed

Project No. 175578434
 Lab ID 454
 Date Received 11/07/2024

Load Increment tsf σ_v	Specimen Height (in) @ d_0	Specimen Height (in) @ d_{100}	Void Ratio e @ d_{100}	Specimen Height (in) @ d_{max}	Void Ratio e @ d_{max}	Load At C_v tsf	Specimen Height (in) @ d_{50}	Fitting Time** (min)		C_v ft ² /day
								@ t_{50}	@ t_{90}	
0.06	1.0015	----	----	----	----	----	----	----	----	----
0.27	0.9889	0.9832	0.558	0.9803	0.553	0.16	0.9860		7.6	0.270
0.52	0.9744	0.9705	0.538	0.9677	0.533	0.39	0.9724		18.5	0.108
1.02	0.9604	0.9563	0.515	0.9539	0.511	0.77	0.9583		15.4	0.126
2.02	0.9457	0.9405	0.490	0.9385	0.487	1.52	0.9431		6.8	0.279
4.01	0.9270	0.9211	0.459	0.9177	0.454	3.01	0.9241		2.9	0.634
8.02	0.9049	0.8960	0.420	0.8917	0.413	6.02	0.9005		1.3	1.323
16.01	0.8734	0.8626	0.367	0.8557	0.356	12.02	0.8680		0.8	1.929
27.18	0.8270	0.8229	0.304	0.8207	0.300	21.60	0.8250		0.1	11.133
16.03	0.8299			0.8357	0.324					
4.02	0.8443			0.8583	0.360					
1.02	0.8628			0.8739	0.385					
0.27	0.8765			0.8877	0.406					
0.07	0.8900			0.9104	0.442					

Testing Details:

Consolidation Press ID <u>CON-5</u>	Initial MC from Trimmings (%) <u>18.8</u>	Test Start Date <u>11/09/2024</u>
Trimming Ring ID <u>GS-87</u>	Final Differential Height (in) <u>-0.026</u>	Technician <u>JMB</u>
		Test End Date <u>11/12/2024</u>
		Technician <u>JMB</u>

When available, all other tests performed in association with this specimen are reported separately.
 * When presented, The preconsolidation pressure evaluated using the Cassagrande Method, as per ASTM D 2435.
 ** C_v Computation Methods:
 @ t_{50} , C_v calculated using Log Time Method.
 @ t_{90} , C_v calculated using Square Root of Time Method.

Settle3 Analysis Information

MEG-33 Old Town Creek Bridge

Project Settings

Document Name	Old_Town_Creek_rear_abutment
Project Title	MEG-33 Old Town Creek Bridge
Analysis	Rear Abutment
Author	J. Samples
Company	Stantec
Date Created	5/23/2024, 8:23:08 AM
Stress Computation Method	Boussinesq
Time-dependent Consolidation Analysis	
Time Units	days
Permeability Units	feet/day
Minimum settlement ratio for subgrade modulus	0.9
Use average properties to calculate layered stresses	
Improve consolidation accuracy	
Ignore negative effective stresses in settlement calculations	

Stage Settings

Stage #	Name	Time [days]
1	Stage 1	0
2	Stage 2	30
3	Stage 3	60
4	Stage 4	90
5	Stage 5	365
6	Stage 6	3650

Results

Time taken to compute: 0.191159 seconds

Stage: Stage 1 = 0 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0
Total Consolidation Settlement [in]	0	0
Virgin Consolidation Settlement [in]	0	0
Recompression Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress ZZ [ksf]	1.54935	2.375
Loading Stress XX [ksf]	1.17485	1.36838
Loading Stress YY [ksf]	0.448925	2.03349
Effective Stress ZZ [ksf]	0	0.8765
Effective Stress XX [ksf]	1.29151	2.24488
Effective Stress YY [ksf]	1.21419	2.03349
Total Stress ZZ [ksf]	2.375	3.36185
Total Stress XX [ksf]	3.66651	4.73023
Total Stress YY [ksf]	3.64123	4.40849
Modulus of Subgrade Reaction (Total) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Immediate) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Consolidation) [ksf/ft]	0	0
Total Strain	0	0
Pore Water Pressure [ksf]	2.375	2.48605
Excess Pore Water Pressure [ksf]	1.54935	2.375
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	1.18	3.6
Over-consolidation Ratio	1.34809	9504.95
Void Ratio	0.542	0.802
Permeability [ft/d]	0.000399901	0.799003
Coefficient of Consolidation [ft ² /d]	0.4	2.1
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0

Stage: Stage 2 = 30 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	4.94576
Total Consolidation Settlement [in]	0	4.94576
Virgin Consolidation Settlement [in]	0	1.32695
Recompression Consolidation Settlement [in]	0	3.61881
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress ZZ [ksf]	1.54935	2.375
Loading Stress XX [ksf]	1.17485	1.36838
Loading Stress YY [ksf]	0.448925	2.03349
Effective Stress ZZ [ksf]	1.44383	2.42585
Effective Stress XX [ksf]	2.6516	3.79423
Effective Stress YY [ksf]	2.1697	4.40849
Total Stress ZZ [ksf]	2.375	3.36185
Total Stress XX [ksf]	3.66651	4.73023
Total Stress YY [ksf]	3.64123	4.40849
Modulus of Subgrade Reaction (Total) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Immediate) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Consolidation) [ksf/ft]	0	0
Total Strain	0.0123517	0.105893
Pore Water Pressure [ksf]	0	1.47153
Excess Pore Water Pressure [ksf]	-5.55516e-22	0.97365
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	2.42285	3.6
Over-consolidation Ratio	1	2.47811
Void Ratio	0.378713	0.713632
Permeability [ft/d]	0.000399901	0.799003
Coefficient of Consolidation [ft ² /d]	0.4	2.1
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.0994746

Stage: Stage 3 = 60 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	5.29279
Total Consolidation Settlement [in]	0	5.29279
Virgin Consolidation Settlement [in]	0	1.32695
Recompression Consolidation Settlement [in]	0	3.96584
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress ZZ [ksf]	1.54935	2.375
Loading Stress XX [ksf]	1.17485	1.36838
Loading Stress YY [ksf]	0.448925	2.03349
Effective Stress ZZ [ksf]	2.09043	2.42585
Effective Stress XX [ksf]	3.30395	3.79423
Effective Stress YY [ksf]	2.7786	4.40849
Total Stress ZZ [ksf]	2.375	3.36185
Total Stress XX [ksf]	3.66651	4.73023
Total Stress YY [ksf]	3.64123	4.40849
Modulus of Subgrade Reaction (Total) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Immediate) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Consolidation) [ksf/ft]	0	0
Total Strain	0.0140884	0.105893
Pore Water Pressure [ksf]	0	0.936
Excess Pore Water Pressure [ksf]	-4.82178e-22	0.321506
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	2.42285	3.6
Over-consolidation Ratio	1	1.71922
Void Ratio	0.378713	0.713632
Permeability [ft/d]	0.000399901	0.799003
Coefficient of Consolidation [ft ² /d]	0.4	2.1
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.0994746

Stage: Stage 4 = 90 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	5.38897
Total Consolidation Settlement [in]	0	5.38897
Virgin Consolidation Settlement [in]	0	1.32695
Recompression Consolidation Settlement [in]	0	4.06202
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress ZZ [ksf]	1.54935	2.375
Loading Stress XX [ksf]	1.17485	1.36838
Loading Stress YY [ksf]	0.448925	2.03349
Effective Stress ZZ [ksf]	2.30701	2.45453
Effective Stress XX [ksf]	3.52046	3.79423
Effective Stress YY [ksf]	2.87477	4.40849
Total Stress ZZ [ksf]	2.375	3.36185
Total Stress XX [ksf]	3.66651	4.73023
Total Stress YY [ksf]	3.64123	4.40849
Modulus of Subgrade Reaction (Total) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Immediate) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Consolidation) [ksf/ft]	0	0
Total Strain	0.0140935	0.105893
Pore Water Pressure [ksf]	0	0.936
Excess Pore Water Pressure [ksf]	-1.32206e-21	0.10493
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	2.42285	3.6
Over-consolidation Ratio	1	1.55945
Void Ratio	0.378713	0.713632
Permeability [ft/d]	0.000399901	0.799003
Coefficient of Consolidation [ft ² /d]	0.4	2.1
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.0994746

Stage: Stage 5 = 365 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	5.43304
Total Consolidation Settlement [in]	0	5.43304
Virgin Consolidation Settlement [in]	0	1.32695
Recompression Consolidation Settlement [in]	0	4.10609
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress ZZ [ksf]	1.54935	2.375
Loading Stress XX [ksf]	1.17485	1.36838
Loading Stress YY [ksf]	0.448925	2.03349
Effective Stress ZZ [ksf]	2.375	2.48043
Effective Stress XX [ksf]	3.6219	3.79423
Effective Stress YY [ksf]	2.87477	4.40849
Total Stress ZZ [ksf]	2.375	3.36185
Total Stress XX [ksf]	3.66651	4.73023
Total Stress YY [ksf]	3.64123	4.40849
Modulus of Subgrade Reaction (Total) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Immediate) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Consolidation) [ksf/ft]	0	0
Total Strain	0.014096	0.105893
Pore Water Pressure [ksf]	0	0.936
Excess Pore Water Pressure [ksf]	-4.16085e-22	3.51399e-06
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	2.42285	3.6
Over-consolidation Ratio	1	1.51555
Void Ratio	0.378713	0.713632
Permeability [ft/d]	0.000399901	0.799003
Coefficient of Consolidation [ft ² /d]	0.4	2.1
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.0994746

Stage: Stage 6 = 3650 d

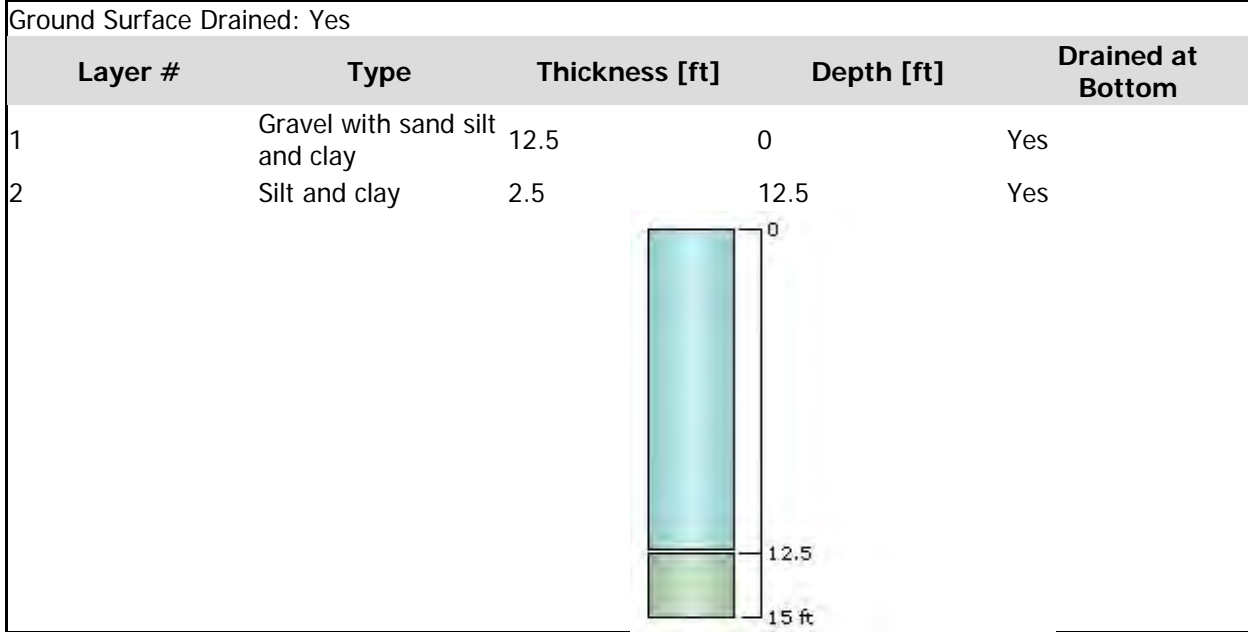
Data Type	Minimum	Maximum
Total Settlement [in]	0	5.43304
Total Consolidation Settlement [in]	0	5.43304
Virgin Consolidation Settlement [in]	0	1.32695
Recompression Consolidation Settlement [in]	0	4.1061
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress ZZ [ksf]	1.54935	2.375
Loading Stress XX [ksf]	1.17485	1.36838
Loading Stress YY [ksf]	0.448925	2.03349
Effective Stress ZZ [ksf]	2.375	2.48043
Effective Stress XX [ksf]	3.6219	3.79423
Effective Stress YY [ksf]	2.87477	4.40849
Total Stress ZZ [ksf]	2.375	3.36185
Total Stress XX [ksf]	3.66651	4.73023
Total Stress YY [ksf]	3.64123	4.40849
Modulus of Subgrade Reaction (Total) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Immediate) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Consolidation) [ksf/ft]	0	0
Total Strain	0.014096	0.105893
Pore Water Pressure [ksf]	0	0.936
Excess Pore Water Pressure [ksf]	-4.56664e-18	1.66584e-17
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	2.42285	3.6
Over-consolidation Ratio	1	1.51555
Void Ratio	0.378713	0.713632
Permeability [ft/d]	0.000399901	0.799003
Coefficient of Consolidation [ft ² /d]	0.4	2.1
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0.0994746

Embankments



1. Embankment: "Embankment Load 1"

Label	Embankment Load 1		
Center Line	(0, 0) to (0, 30)		
Near End Angle	90 degrees		
Far End Angle	90 degrees		
Number of Zones	1		
Number of Sections	1		
	Zone	Name	Unit Weight (kips/ft3)
1	New Zone		0.125

Soil Layers



Soil Properties

Property	Gravel with sand silt and clay	Silt and clay
Color		
Unit Weight [kips/ft3]	0.123	0.11
Saturated Unit Weight [kips/ft3]	0.123	0.11
K0	1	1
Primary Consolidation	Enabled	Enabled
Material Type	Non-Linear	Non-Linear
Cc	0.251	0.255
Cr	0.043	0.066
e0	0.542	0.802
Pc [ksf]	3.6	1.18
Cv [ft2/d]	0.4	2.1
Cvr [ft2/d]	0.4	2.1
B-bar	1	1
Undrained Su A [kips/ft2]	0	0
Undrained Su S	0.2	0.2
Undrained Su m	0.8	0.8
Piezo Line ID	1	1

Groundwater

Groundwater method
Water Unit Weight

Piezometric Lines
0.0624 kips/ft³

Piezometric Line Entities

ID	Depth (ft)
1	0 ft

Query Points

Point #	Query Point Name	(X,Y) Location	Number of Divisions
1	Query Point 1	0, 5	Auto: 41

Time Points

Point #	(X,Y) Location	Depth	Goal Type	Goal	Time Until Goal
1	0, 5	0 ft	Total Settlement	5.03 in	34.411 d

Project Name MEG-33-19.11
 Source B-007-1-24, 1.4'-1.5'
 Description Clayey Gravel with Sand (GC), brown, moist, hard
 Specimen Type Undisturbed

Project No. 175578434
 Lab ID 455
 Date Received 11/07/2024

LL 27 Specific Gravity 2.79 ASTM D 854, Dry
 PL 13
 PI 14

Prepared Using Cutting Ring
 Test Method B - for 60 min.
 Test Condition Inundated at 0.05 tsf

Initial Specimen Conditions

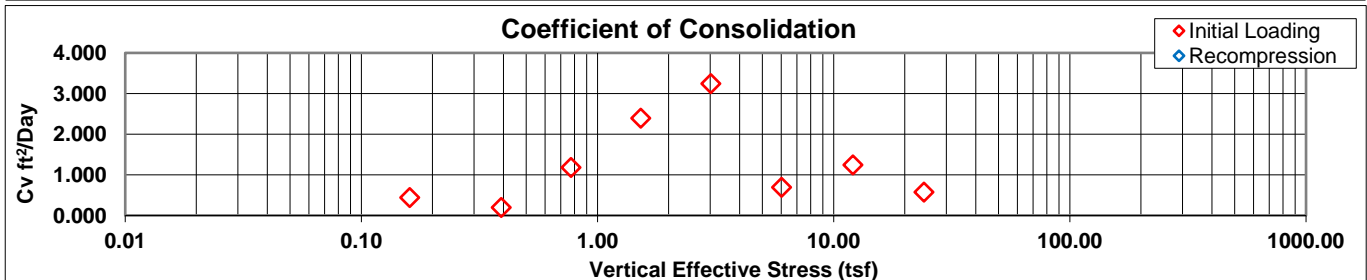
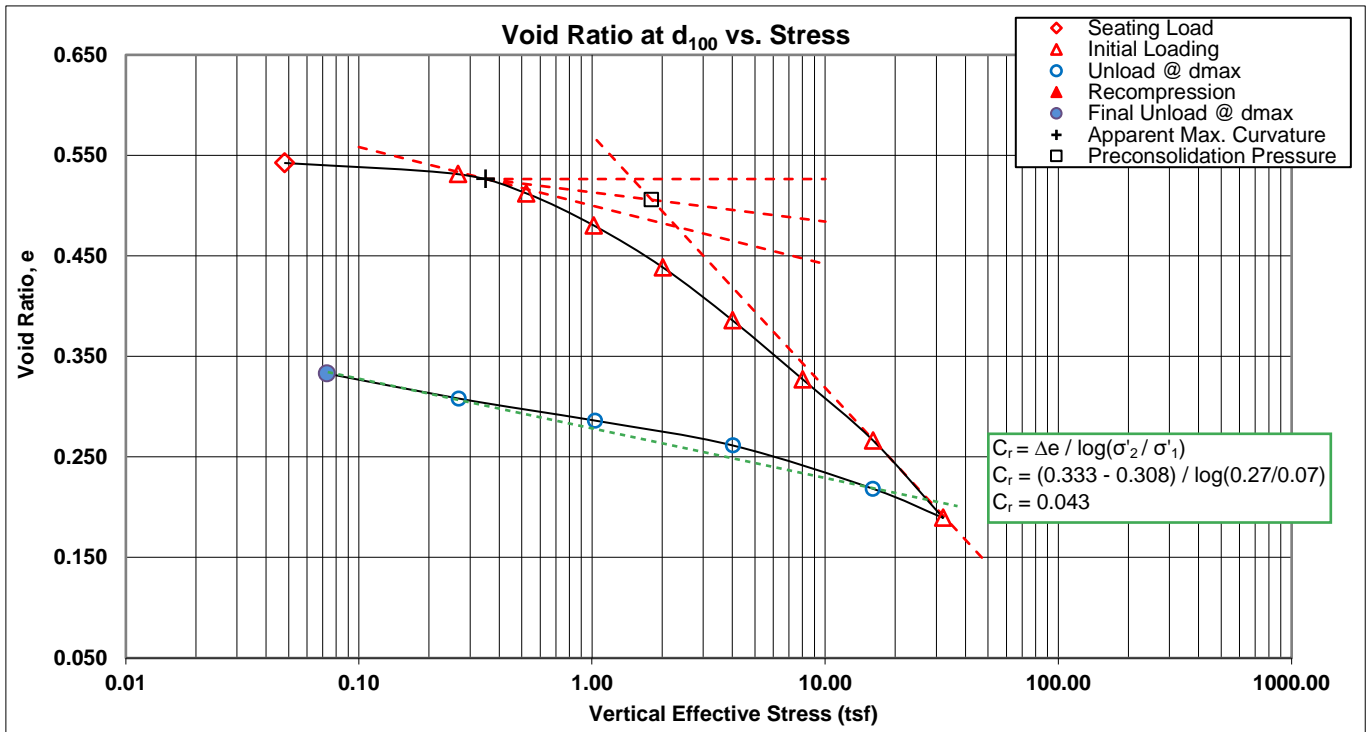
Moisture Content (%) 8.9
 Dry Unit Weight (pcf) 112.7
 Void Ratio 0.542
 Degree of Saturation (%) 45.8
 Initial Specimen Height (in) 1.0099

Final Specimen Conditions

Moisture Content (%) 11.7
 Dry Unit Weight (pcf) 130.4
 Void Ratio 0.333
 Degree of Saturation (%) 98.0
 Final Specimen Height (in) 0.8727

Equivalent Height of Solids (in) 0.655

Preconsolidation Pressure* (tsf) 1.8
 Void Ratio @ Preconsolidation Pressure 0.506



Comments Approx. Compression Index Value (C_c)= 0.251

 _____ Reviewed By _____



One Dimensional Consolidation of Soils Using Incremental Loading

ASTM D 2435

Project Name MEG-33-19.11
 Source B-007-1-24, 1.4'-1.5'
 Description Clayey Gravel with Sand (GC), brown, moist, hard
 Specimen Type Undisturbed

Project No. 175578434
 Lab ID 455
 Date Received 11/07/2024

Load Increment tsf σ_v	Specimen Height (in) @ d_0	Specimen Height (in) @ d_{100}	Void Ratio e @ d_{100}	Specimen Height (in) @ d_{max}	Void Ratio e @ d_{max}	Load At C_v tsf	Specimen Height (in) @ d_{50}	Fitting Time** (min)		C_v ft ² /day
								@ t_{50}	@ t_{90}	
0.05	1.0099	----	----	----	----	----	----	----	----	----
0.27	1.0036	1.0025	0.531	1.0014	0.530	0.16	1.0031		4.8	0.441
0.52	0.9938	0.9899	0.512	0.9875	0.508	0.39	0.9919		10.4	0.200
1.02	0.9740	0.9691	0.480	0.9641	0.473	0.77	0.9715		1.7	1.184
2.02	0.9510	0.9417	0.438	0.9369	0.431	1.52	0.9463		0.8	2.397
4.01	0.9230	0.9073	0.386	0.9015	0.377	3.01	0.9152		0.5	3.242
8.01	0.8780	0.8688	0.327	0.8656	0.322	6.01	0.8734		2.3	0.691
16.04	0.8392	0.8290	0.266	0.8246	0.259	12.02	0.8341		1.2	1.241
32.06	0.7870	0.7787	0.189	0.7740	0.182	24.05	0.7829		2.3	0.577
16.04	0.7857			0.7976	0.218					
4.03	0.8082			0.8258	0.261					
1.03	0.8300			0.8420	0.286					
0.27	0.8445			0.8564	0.308					
0.07	0.8579			0.8727	0.333					

Testing Details:

Consolidation Press ID <u>CON-6</u>	Initial MC from Trimmings (%) <u>7.0</u>	Test Start Date <u>11/09/2024</u>
Trimming Ring ID <u>GS-89</u>	Final Differential Height (in) <u>-0.021</u>	Technician <u>JMB</u>
		Test End Date <u>11/12/2024</u>
		Technician <u>JMB</u>

When available, all other tests performed in association with this specimen are reported separately.
 * When presented, The preconsolidation pressure evaluated using the Cassagrande Method, as per ASTM D 2435.
 ** C_v Computation Methods:
 @ t_{50} : C_v calculated using Log Time Method.
 @ t_{90} : C_v calculated using Square Root of Time Method.

Settle3 Analysis Information

MEG-33 Tributary of Old Town Creek Bridge

Project Settings

Document Name	Trib_Old_Town_Creek_rear_abutment
Project Title	MEG-33 Tributary of Old Town Creek Bridge
Analysis	Rear Abutment
Author	J. Samples
Company	Stantec
Date Created	5/23/2024, 8:23:08 AM
Stress Computation Method	Boussinesq
Time-dependent Consolidation Analysis	
Time Units	days
Permeability Units	feet/day
Minimum settlement ratio for subgrade modulus	0.9
Use average properties to calculate layered stresses	
Improve consolidation accuracy	
Ignore negative effective stresses in settlement calculations	

Stage Settings

Stage #	Name	Time [days]
1	Stage 1	0
2	Stage 2	30
3	Stage 3	60
4	Stage 4	90
5	Stage 5	365
6	Stage 6	3650

Results

Time taken to compute: 0.233381 seconds

Stage: Stage 1 = 0 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0
Total Consolidation Settlement [in]	0	0
Virgin Consolidation Settlement [in]	0	0
Recompression Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress ZZ [ksf]	1.09577	2.25
Loading Stress XX [ksf]	1.12822	1.46245
Loading Stress YY [ksf]	0.225429	1.92064
Effective Stress ZZ [ksf]	0	1.4178
Effective Stress XX [ksf]	1.22936	2.88025
Effective Stress YY [ksf]	1.0818	1.92064
Total Stress ZZ [ksf]	2.25	4.10477
Total Stress XX [ksf]	3.47936	5.56722
Total Stress YY [ksf]	3.41231	4.3302
Modulus of Subgrade Reaction (Total) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Immediate) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Consolidation) [ksf/ft]	0	0
Total Strain	0	0
Pore Water Pressure [ksf]	2.25	2.68697
Excess Pore Water Pressure [ksf]	1.09577	2.25
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	1.18	13.4
Over-consolidation Ratio	1	3541.42
Void Ratio	0.566	0.802
Permeability [ft/d]	8.28993e-05	0.298223
Coefficient of Consolidation [ft ² /d]	0.1	2.1
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0

Stage: Stage 2 = 30 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	12.5762
Total Consolidation Settlement [in]	0	12.5762
Virgin Consolidation Settlement [in]	0	8.42244
Recompression Consolidation Settlement [in]	0	4.15372
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress ZZ [ksf]	1.09577	2.25
Loading Stress XX [ksf]	1.12822	1.46245
Loading Stress YY [ksf]	0.225429	1.92064
Effective Stress ZZ [ksf]	0.919538	2.51357
Effective Stress XX [ksf]	2.16319	3.97602
Effective Stress YY [ksf]	1.46384	4.17064
Total Stress ZZ [ksf]	2.25	4.10477
Total Stress XX [ksf]	3.47936	5.56722
Total Stress YY [ksf]	3.41231	4.3302
Modulus of Subgrade Reaction (Total) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Immediate) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Consolidation) [ksf/ft]	0	0
Total Strain	0.00596255	0.169684
Pore Water Pressure [ksf]	0	2.05892
Excess Pore Water Pressure [ksf]	-0.0107317	1.35692
Degree of Consolidation [%]	0	99.9993
Pre-consolidation Stress [ksf]	2.23407	13.4
Over-consolidation Ratio	1	12.8638
Void Ratio	0.496229	0.738558
Permeability [ft/d]	8.28993e-05	24.1967
Coefficient of Consolidation [ft ² /d]	0.1	2.1
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	47.4974	100
Undrained Shear Strength	0	0.363084

Stage: Stage 3 = 60 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	12.8602
Total Consolidation Settlement [in]	0	12.8602
Virgin Consolidation Settlement [in]	0	8.42789
Recompression Consolidation Settlement [in]	0	4.43227
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress ZZ [ksf]	1.09577	2.25
Loading Stress XX [ksf]	1.12822	1.46245
Loading Stress YY [ksf]	0.225429	1.92064
Effective Stress ZZ [ksf]	1.38238	2.51357
Effective Stress XX [ksf]	2.62603	3.97602
Effective Stress YY [ksf]	1.92668	4.17064
Total Stress ZZ [ksf]	2.25	4.10477
Total Stress XX [ksf]	3.47936	5.56722
Total Stress YY [ksf]	3.41231	4.3302
Modulus of Subgrade Reaction (Total) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Immediate) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Consolidation) [ksf/ft]	0	0
Total Strain	0.00933237	0.169685
Pore Water Pressure [ksf]	0	1.59608
Excess Pore Water Pressure [ksf]	-0.00410903	0.894077
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	2.23426	13.4
Over-consolidation Ratio	1	9.08096
Void Ratio	0.496227	0.738558
Permeability [ft/d]	8.28993e-05	24.1967
Coefficient of Consolidation [ft ² /d]	0.1	2.1
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	66.222	99.9998
Undrained Shear Strength	0	0.363084

Stage: Stage 4 = 90 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	13.0041
Total Consolidation Settlement [in]	0	13.0041
Virgin Consolidation Settlement [in]	0	8.4279
Recompression Consolidation Settlement [in]	0	4.57623
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress ZZ [ksf]	1.09577	2.25
Loading Stress XX [ksf]	1.12822	1.46245
Loading Stress YY [ksf]	0.225429	1.92064
Effective Stress ZZ [ksf]	1.70066	2.51357
Effective Stress XX [ksf]	2.94431	3.97602
Effective Stress YY [ksf]	2.24496	4.17064
Total Stress ZZ [ksf]	2.25	4.10477
Total Stress XX [ksf]	3.47936	5.56722
Total Stress YY [ksf]	3.41231	4.3302
Modulus of Subgrade Reaction (Total) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Immediate) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Consolidation) [ksf/ft]	0	0
Total Strain	0.0109988	0.169685
Pore Water Pressure [ksf]	0	1.5912
Excess Pore Water Pressure [ksf]	-0.00417691	0.575795
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	2.23428	13.4
Over-consolidation Ratio	1	7.60543
Void Ratio	0.496227	0.738558
Permeability [ft/d]	8.28993e-05	24.1967
Coefficient of Consolidation [ft ² /d]	0.1	2.1
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	78.2258	100
Undrained Shear Strength	0	0.363084

Stage: Stage 5 = 365 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	13.2176
Total Consolidation Settlement [in]	0	13.2176
Virgin Consolidation Settlement [in]	0	8.42791
Recompression Consolidation Settlement [in]	0	4.7897
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress ZZ [ksf]	1.09577	2.25
Loading Stress XX [ksf]	1.12822	1.46245
Loading Stress YY [ksf]	0.225429	1.92064
Effective Stress ZZ [ksf]	2.22296	2.51357
Effective Stress XX [ksf]	3.37633	3.97602
Effective Stress YY [ksf]	2.73407	4.17064
Total Stress ZZ [ksf]	2.25	4.10477
Total Stress XX [ksf]	3.47936	5.56722
Total Stress YY [ksf]	3.41231	4.3302
Modulus of Subgrade Reaction (Total) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Immediate) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Consolidation) [ksf/ft]	0	0
Total Strain	0.0116229	0.169684
Pore Water Pressure [ksf]	0	1.5912
Excess Pore Water Pressure [ksf]	-0.00589214	0.0100644
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	2.2343	13.4
Over-consolidation Ratio	1	6.0174
Void Ratio	0.496229	0.738558
Permeability [ft/d]	8.28993e-05	24.1967
Coefficient of Consolidation [ft ² /d]	0.1	2.1
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	99.6188	100
Undrained Shear Strength	0	0.363084

Stage: Stage 6 = 3650 d

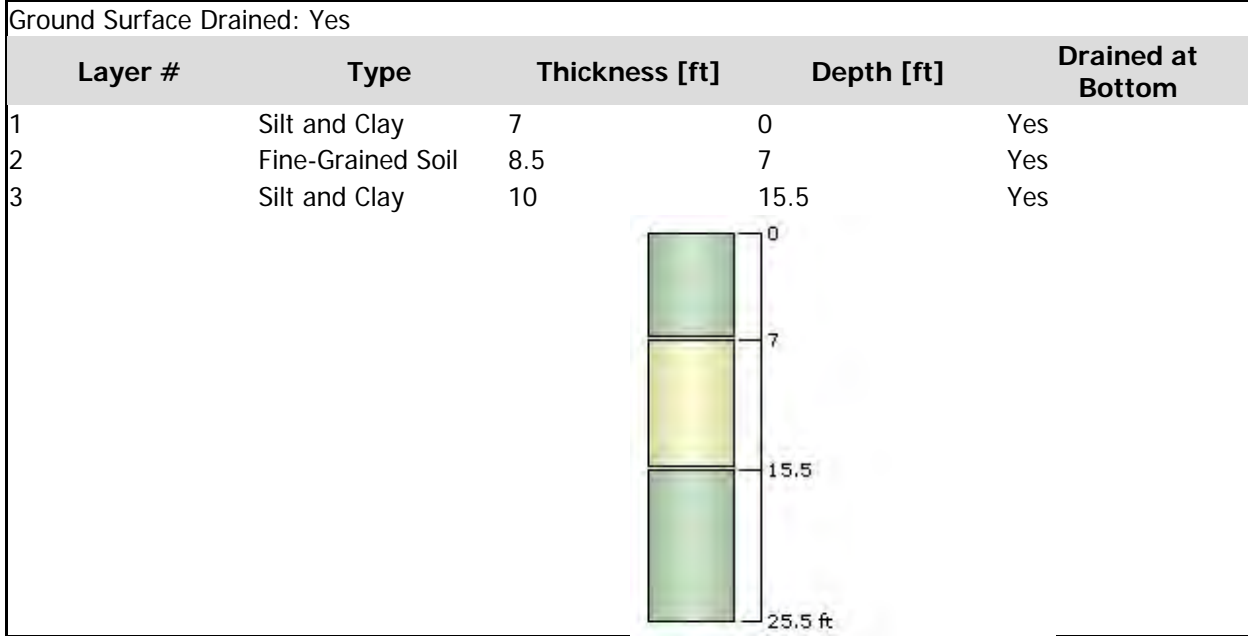
Data Type	Minimum	Maximum
Total Settlement [in]	0	13.221
Total Consolidation Settlement [in]	0	13.221
Virgin Consolidation Settlement [in]	0	8.42791
Recompression Consolidation Settlement [in]	0	4.79312
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress ZZ [ksf]	1.09577	2.25
Loading Stress XX [ksf]	1.12822	1.46245
Loading Stress YY [ksf]	0.225429	1.92064
Effective Stress ZZ [ksf]	2.22275	2.51357
Effective Stress XX [ksf]	3.37515	3.97602
Effective Stress YY [ksf]	2.73407	4.17064
Total Stress ZZ [ksf]	2.25	4.10477
Total Stress XX [ksf]	3.47936	5.56722
Total Stress YY [ksf]	3.41231	4.3302
Modulus of Subgrade Reaction (Total) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Immediate) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Consolidation) [ksf/ft]	0	0
Total Strain	0.0116233	0.169685
Pore Water Pressure [ksf]	0	1.5912
Excess Pore Water Pressure [ksf]	-0.00427804	0.00573895
Degree of Consolidation [%]	0	100
Pre-consolidation Stress [ksf]	2.2343	13.4
Over-consolidation Ratio	1	6.01719
Void Ratio	0.496227	0.738558
Permeability [ft/d]	8.28993e-05	24.1967
Coefficient of Consolidation [ft ² /d]	0.1	2.1
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	99.9984	100
Undrained Shear Strength	0	0.363084

Embankments



1. Embankment: "Embankment Load 1"

Label	Embankment Load 1		
Center Line	(0, 0) to (0, 30)		
Near End Angle	90 degrees		
Far End Angle	90 degrees		
Number of Zones	1		
Number of Sections	1		
	Zone	Name	Unit Weight (kips/ft3)
1	New Zone		0.125

Soil Layers



Soil Properties

Property	Fine-Grained Soil	Silt and Clay
Color		
Unit Weight [kips/ft3]	0.134	0.11
Saturated Unit Weight [kips/ft3]	0.134	0.11
K0	1	1
Primary Consolidation	Enabled	Enabled
Material Type	Non-Linear	Non-Linear
Cc	0.206	0.255
Cr	0.045	0.066
e0	0.566	0.802
Pc [ksf]	13.4	1.18
Cv [ft2/d]	0.18	2.1
Cvr [ft2/d]	0.1	0.1
B-bar	1	1
Undrained Su A [kips/ft2]	0	0
Undrained Su S	0.2	0.2
Undrained Su m	0.8	0.8
Piezo Line ID	1	1

Groundwater

Groundwater method
Water Unit Weight

Piezometric Lines
0.0624 kips/ft³

Piezometric Line Entities

ID	Depth (ft)
1	0 ft

Query Points

Point #	Query Point Name	(X,Y) Location	Number of Divisions
1	Query Point 1	0, 5	Auto: 55

Time Points

Point #	(X,Y) Location	Depth	Goal Type	Goal	Time Until Goal
1	0, 5	0 ft	Total Settlement	12.82 in	61.0265 d

Project Name MEG-33-19.11
 Source B-010-1-24, 2.8'-2.9'
 Description Lean Clay with Sand (CL), brown, moist, firm
 Specimen Type Undisturbed

Project No. 175578434
 Lab ID 456
 Date Received 11/07/2024

LL 36 Specific Gravity 2.77 ASTM D 854, Dry
 PL 17
 PI 19

Prepared Using Cutting Ring
 Test Method B - for 120 min.
 Test Condition Inundated at 0.05 tsf

Initial Specimen Conditions

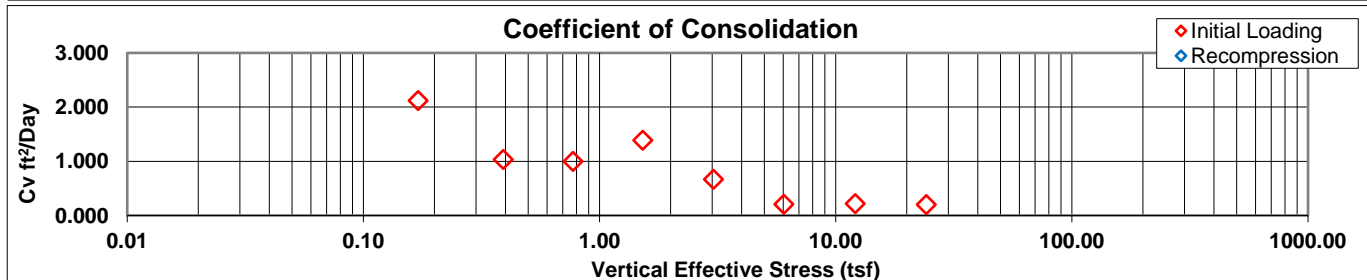
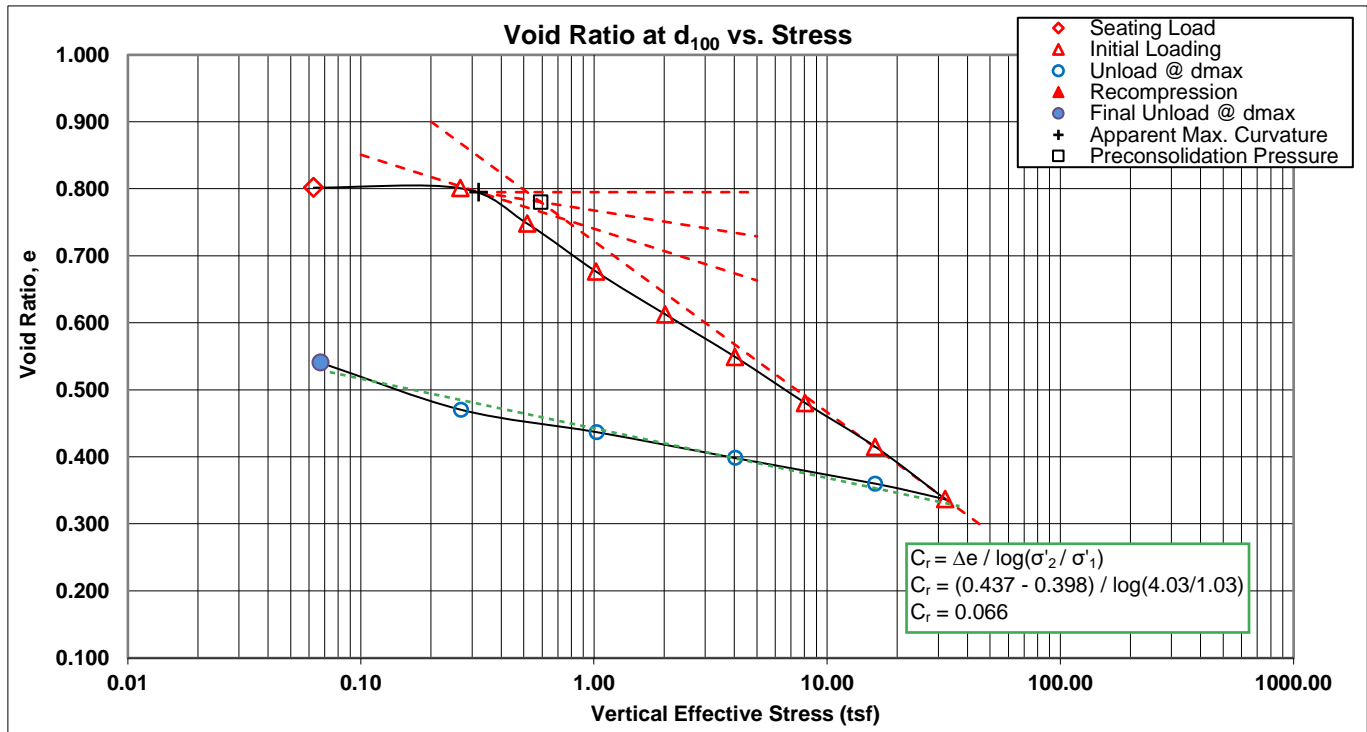
Moisture Content (%) 15.0
 Dry Unit Weight (pcf) 95.8
 Void Ratio 0.802
 Degree of Saturation (%) 51.8
 Initial Specimen Height (in) 0.9872

Final Specimen Conditions

Moisture Content (%) 21.0
 Dry Unit Weight (pcf) 112.0
 Void Ratio 0.541
 Degree of Saturation (%) 107.4
 Final Specimen Height (in) 0.8442

Equivalent Height of Solids (in) 0.548

Preconsolidation Pressure* (tsf) 0.59
 Void Ratio @ Preconsolidation Pressure 0.780



Comments Swelling of the test specimen was observed between the seating load and first load.

Approx. Cc Value = 0.255

Reviewed By _____



One Dimensional Consolidation of Soils Using Incremental Loading

ASTM D 2435

Project Name MEG-33-19.11
 Source B-010-1-24, 2.8'-2.9'
 Description Lean Clay with Sand (CL), brown, moist, firm
 Specimen Type Undisturbed

Project No. 175578434
 Lab ID 456
 Date Received 11/07/2024

Load Increment tsf σ_v	Specimen Height (in) @ d_0	Specimen Height (in) @ d_{100}	Void Ratio e @ d_{100}	Specimen Height (in) @ d_{max}	Void Ratio e @ d_{max}	Load At Cv tsf	Specimen Height (in) @ d_{50}	Fitting Time** (min)		Cv ft ² /day
								@ t_{50}	@ t_{90}	
0.06	0.9872	----	----	----	----	----	----	----	----	----
0.27	0.9935	0.9868	0.801	0.9834	0.795	0.17	0.9901		1.0	2.121
0.52	0.9680	0.9576	0.748	0.9539	0.741	0.39	0.9628		1.9	1.032
1.02	0.9330	0.9185	0.676	0.9136	0.667	0.77	0.9258		1.8	0.997
2.02	0.8950	0.8835	0.613	0.8773	0.601	1.52	0.8893		1.2	1.386
4.03	0.8590	0.8487	0.549	0.8431	0.539	3.03	0.8539		2.3	0.669
8.04	0.8230	0.8111	0.480	0.8084	0.476	6.03	0.8170		6.9	0.206
16.07	0.7888	0.7753	0.415	0.7718	0.409	12.06	0.7820		5.9	0.221
32.13	0.7499	0.7325	0.337	0.7295	0.331	24.10	0.7412		5.8	0.202
16.09	0.7354			0.7451	0.360					
4.03	0.7516			0.7662	0.398					
1.03	0.7699			0.7873	0.437					
0.27	0.7902			0.8056	0.470					
0.07	0.8081			0.8442	0.541					

Testing Details:

Consolidation Press ID <u>CON-7</u>	Initial MC from Trimmings (%) <u>14.1</u>	Test Start Date <u>11/09/2024</u>
Trimming Ring ID <u>GS-85</u>		Technician <u>JMB</u>
	Final Differential Height (in) <u>-0.034</u>	
		Test End Date <u>11/12/2024</u>
		Technician <u>JMB</u>

When available, all other tests performed in association with this specimen are reported separately.
 * When presented, The preconsolidation pressure evaluated using the Cassagrande Method, as per ASTM D 2435.
 ** Cv Computation Methods:
 @ t_{50} : Cv calculated using Log Time Method.
 @ t_{90} : Cv calculated using Square Root of Time Method.

Project Name MEG-33-19.11
 Source B-010-1-24, 11.0'-11.1'
 Description Lean Clay with Sand (CL), brown, moist, firm
 Specimen Type Undisturbed

Project No. 175578434
 Lab ID 457
 Date Received 11/07/2024

LL 34 Specific Gravity 2.88 ASTM D 854, Dry
 PL 17
 PI 17

Prepared Using Cutting Ring
 Test Method B - for 60 min.
 Test Condition Inundated at 0.05 tsf

Initial Specimen Conditions

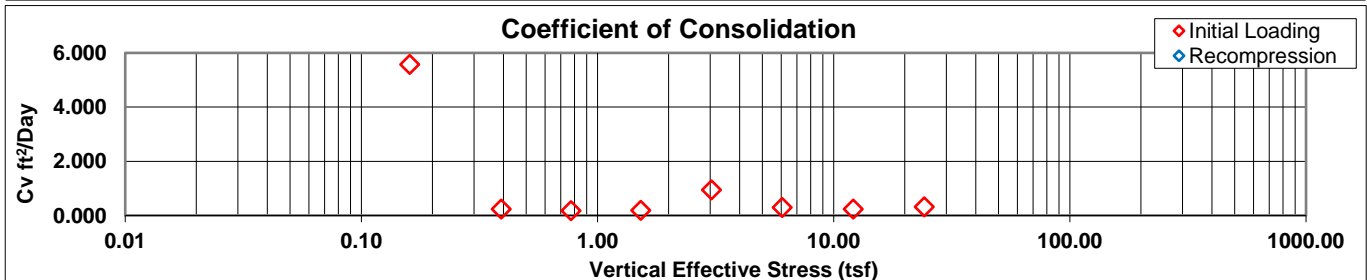
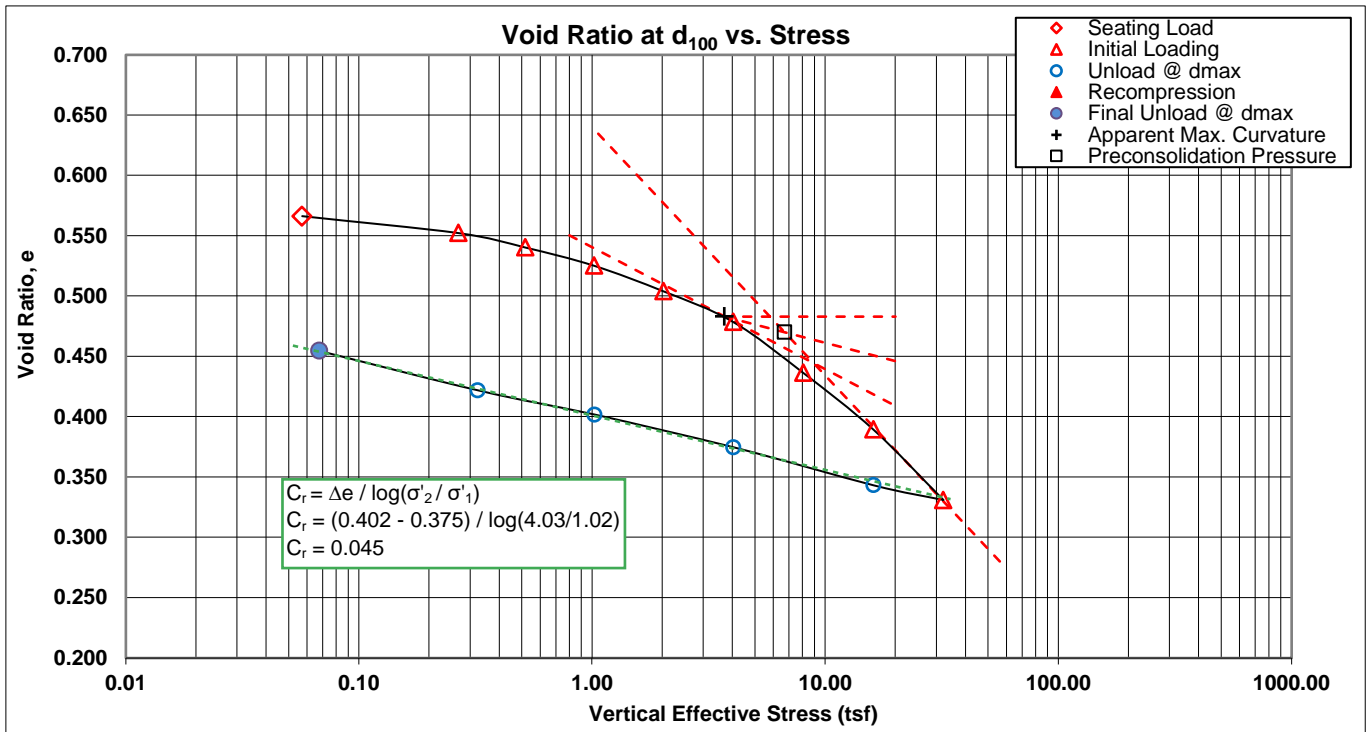
Moisture Content (%) 16.7
 Dry Unit Weight (pcf) 114.6
 Void Ratio 0.566
 Degree of Saturation (%) 85.0
 Initial Specimen Height (in) 0.9963

Final Specimen Conditions

Moisture Content (%) 16.3
 Dry Unit Weight (pcf) 123.3
 Void Ratio 0.455
 Degree of Saturation (%) 103.2
 Final Specimen Height (in) 0.9253

Equivalent Height of Solids (in) 0.636

Preconsolidation Pressure* (tsf) 6.7
 Void Ratio @ Preconsolidation Pressure 0.470



Comments Approx. Compression Index Value (C_c) = 0.206

 _____ Reviewed By _____

Project Name MEG-33-19.11
 Source B-010-1-24, 11.0'-11.1'
 Description Lean Clay with Sand (CL), brown, moist, firm
 Specimen Type Undisturbed

 Project No. 175578434
 Lab ID 457
 Date Received 11/07/2024

Load Increment tsf σ_v	Specimen Height (in) @ d_0	Specimen Height (in) @ d_{100}	Void Ratio e @ d_{100}	Specimen Height (in) @ d_{max}	Void Ratio e @ d_{max}	Load At Cv tsf	Specimen Height (in) @ d_{50}	Fitting Time** (min)		Cv ft ² /day
								@ t_{50}	@ t_{90}	
0.06	0.9963	----	----	----	----	----	----	----	----	----
0.27	0.9900	0.9874	0.552	0.9871	0.552	0.16	0.9887		0.4	5.569
0.52	0.9814	0.9798	0.540	0.9783	0.538	0.39	0.9806		8.7	0.234
1.02	0.9726	0.9702	0.525	0.9687	0.523	0.77	0.9714		11.0	0.183
2.02	0.9620	0.9567	0.504	0.9557	0.502	1.52	0.9593		10.4	0.188
4.03	0.9474	0.9405	0.479	0.9373	0.474	3.03	0.9439		2.0	0.950
8.05	0.9250	0.9137	0.436	0.9118	0.433	6.04	0.9193		6.0	0.301
16.10	0.8970	0.8838	0.389	0.8807	0.385	12.08	0.8904		7.3	0.231
32.13	0.8627	0.8465	0.331	0.8391	0.319	24.12	0.8546		4.9	0.317
16.09	0.8446			0.8544	0.343					
4.03	0.8603			0.8744	0.375					
1.02	0.8777			0.8916	0.402					
0.32	0.8935			0.9044	0.422					
0.07	0.9063			0.9253	0.455					

 Testing Details:
 Consolidation Press ID CON-8 Initial MC from Trimmings (%) 16.9 Test Start Date 11/09/2024
 Trimming Ring ID GS-86 Final Differential Height (in) -0.024 Technician JMB
 Test End Date 11/12/2024
 Technician JMB

When available, all other tests performed in association with this specimen are reported separately.
 * When presented, The preconsolidation pressure evaluated using the Cassagrande Method, as per ASTM D 2435.
 ** Cv Computation Methods:
 @ t_{50} , Cv calculated using Log Time Method.
 @ t_{90} , Cv calculated using Square Root of Time Method.

APPENDIX **H**
ROCK**F**FALL ANALYSES

RocFall Analysis Information

MEG-33-19.21

Project Summary

File Name Station 967+78_radius_1.fal6
 File Version 6.011

Project Title MEG-33-19.21
 Analysis Station 967+78 - Rock Radius - 1 ft
 Author Jim Swindler, PE
 Company Stantec Consulting Services, Inc.
 Date Created 9/17/2024, 4:12:08 PM

Project Settings

General Settings:

Engine Lump Mass
 Units Imperial Foot-Pounds (ft, lb, ft-lb)
 Rock Throw Mode Number of rocks controlled by seeder

Engine Conditions:

Friction Angle Use friction angle from material editor
 Consider Angular Velocity Yes
 Maximum time per rock 5s
 Maximum steps per rock 20000
 Normal velocity cutoff 0.33ft/s
 Stopped velocity cutoff 0.33ft/s
 Maximum timestep 0.01s
 Switch Velocity -3.3e-009ft/s

Random Number Generation:

Sampling Method Monte-Carlo
 Random Seed Pseudo-random seed: 12345234

Slope Geometry

Vertex	X	Y	X Std.Dev.	Y Std.Dev.
1	-138.1	720.9		
2	-106.3	704.9		
3	-81.8	680.5		
4	-71.8	680.5		
5	-64.8	682.3		
6	-64.8	681.1		
7	-42	681.8		


Slope Material Assignment

Material	From Vertex	To Vertex
Bedrock Outcrops	1	6
Asphalt	6	7

Material Properties


Bedrock Outcrops

"Bedrock Outcrops" Properties

Color					
	Mean	Distribution	Std.Dev.	Rel. Min	Rel. Max
Normal Restitution	0.3	Normal	0.04	0.12	0.12
Tangential Restitution	0.85	Normal	0.04	0.12	0.12
Friction Angle (°)	30	None			
Slope Roughness (°)		None			

Asphalt

"Asphalt" Properties

Color					
	Mean	Distribution	Std.Dev.	Rel. Min	Rel. Max
Normal Restitution	0.4	Normal	0.04	0.12	0.12
Tangential Restitution	0.9	Normal	0.03	0.09	0.09
Friction Angle (°)	30	None			
Slope Roughness (°)		None			

Seeders

Seeder 1

Seeder Properties

Name	Seeder 1
Location	(-138.1, 720.9), (-106.3, 704.9)

Rocks to Throw

Number of Rocks	500 Overall
Rock Types	Group 1

Initial Conditions

	Mean	Distribution	Std.Dev.	Rel. Min	Rel. Max
Horizontal Velocity (ft/s)	10	None			
Vertical Velocity (ft/s)	10	None			
Rotational Velocity (°/s)	0	None			
Initial Rotation (°/s)	0	Uniform		0	360

Rock Types

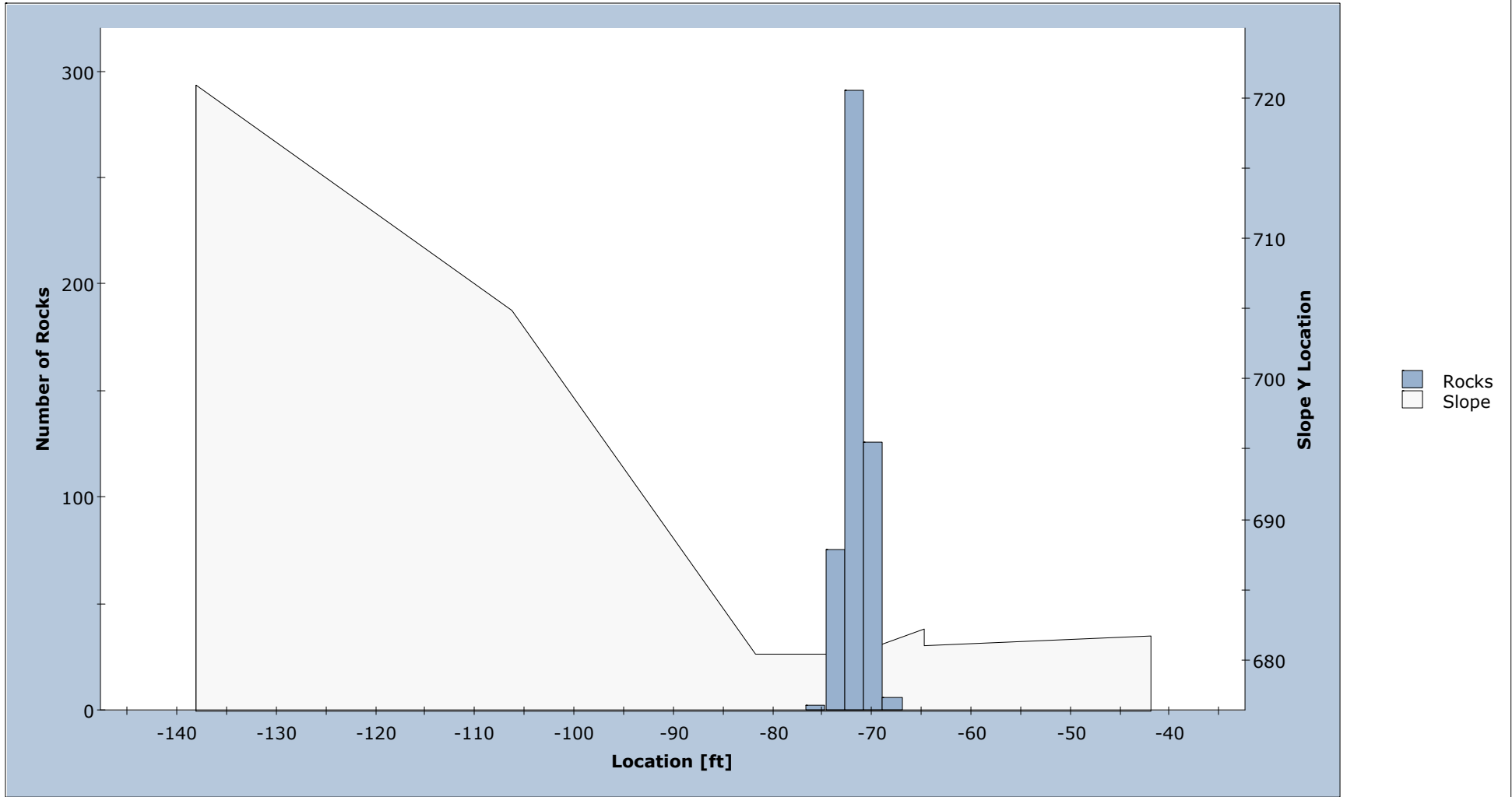
Group 1

Properties

Name Group 1
Color 

	Mean	Distribution	Std.Dev.	Rel. Min	Rel. Max
Mass (lb)	706.1	None			
Density (lb/ft ³)	168.56	None			

Distribution of Rock Path End Locations



Total number of rock paths: 500



ROCFALL 6.011

<i>Project</i>	MEG-33-19.21		
<i>Analysis Description</i>	Station 967+78 - Rock Radius - 1 ft		
<i>Drawn By</i>	Jim Swindler, PE	<i>Company</i>	Stantec Consulting Services, Inc.
<i>Date</i>	9/17/2024, 4:12:08 PM	<i>File Name</i>	Station 967+78_radius_1.fal6

RocFall Analysis Information

MEG-33-19.21

Project Summary

File Name Station 1223+70_radius_1.fal6
File Version 6.011

Project Title MEG-33-19.21
Analysis Station 967+78 - Rock Radius - 1 ft
Author Jim Swindler, PE
Company Stantec Consulting Services, Inc.
Date Created 9/17/2024, 4:12:08 PM

Project Settings

General Settings:

Engine Lump Mass
Units Imperial Foot-Pounds (ft, lb, ft-lb)
Rock Throw Mode Number of rocks controlled by seeder

Engine Conditions:

Friction Angle Use friction angle from material editor
Consider Angular Velocity Yes
Maximum time per rock 5s
Maximum steps per rock 20000
Normal velocity cutoff 0.33ft/s
Stopped velocity cutoff 0.33ft/s
Maximum timestep 0.01s
Switch Velocity -3.3e-009ft/s

Random Number Generation:

Sampling Method Monte-Carlo
Random Seed Pseudo-random seed: 12345234

Slope Geometry

Vertex	X	Y	X Std.Dev.	Y Std.Dev.
1	-513.1	795.9		
2	-426.7	752.6		
3	-411.7	752		
4	-288.8	690.6		
5	-273.8	690		
6	-175.1	640.7		
7	-160	640		
8	-89.1	604.55		
9	-83.2	604.55		
10	-64.9	606.9		
11	-64.9	605.1		
12	-56.5	605.8		


Slope Material Assignment

Material	From Vertex	To Vertex
Bedrock Outcrops	1	10
Asphalt	10	12

Material Properties


Bedrock Outcrops

"Bedrock Outcrops" Properties

Color					
	Mean	Distribution	Std.Dev.	Rel. Min	Rel. Max
Normal Restitution	0.3	Normal	0.04	0.12	0.12
Tangential Restitution	0.85	Normal	0.04	0.12	0.12
Friction Angle (°)	30	None			
Slope Roughness (°)		None			

Asphalt

"Asphalt" Properties

Color					
	Mean	Distribution	Std.Dev.	Rel. Min	Rel. Max
Normal Restitution	0.4	Normal	0.04	0.12	0.12
Tangential Restitution	0.9	Normal	0.03	0.09	0.09
Friction Angle (°)	30	None			
Slope Roughness (°)		None			

Seeders

Seeder 1

Seeder Properties

Name Seeder 1
 Location (-513.1, 795.9), (-426.7, 752.6)

Rocks to Throw

Number of Rocks 500 Overall
 Rock Types Group 1

Initial Conditions

	Mean	Distribution	Std.Dev.	Rel. Min	Rel. Max
Horizontal Velocity (ft/s)	10	None			
Vertical Velocity (ft/s)	10	None			
Rotational Velocity (°/s)	0	None			
Initial Rotation (°/s)	0	Uniform		0	360

Seeder 2

Seeder Properties

Name Seeder 2
 Location (-411.7, 752), (-288.8, 690.6)

Rocks to Throw

Number of Rocks 500 Overall
 Rock Types Group 1

Initial Conditions

	Mean	Distribution	Std.Dev.	Rel. Min	Rel. Max
Horizontal Velocity (ft/s)	10	None			
Vertical Velocity (ft/s)	10	None			
Rotational Velocity (°/s)	0	None			
Initial Rotation (°/s)	0	Uniform		0	360

Seeder 3

Seeder Properties

Name Seeder 3
 Location (-273.8, 690), (-175.1, 640.7)

Rocks to Throw

Number of Rocks 500 Overall
 Rock Types Group 1

Initial Conditions

	Mean	Distribution	Std.Dev.	Rel. Min	Rel. Max
Horizontal Velocity (ft/s)	10	None			
Vertical Velocity (ft/s)	10	None			
Rotational Velocity (°/s)	0	None			
Initial Rotation (°/s)	0	Uniform		0	360

Seeder 4

Seeder Properties

Name Seeder 4
 Location (-160, 640), (-89.1, 604.55)

Rocks to Throw

Number of Rocks 500 Overall
 Rock Types Group 1

Initial Conditions

	Mean	Distribution	Std.Dev.	Rel. Min	Rel. Max
Horizontal Velocity (ft/s)	10	None			
Vertical Velocity (ft/s)	10	None			
Rotational Velocity (°/s)	0	None			
Initial Rotation (°/s)	0	Uniform		0	360

Rock Types

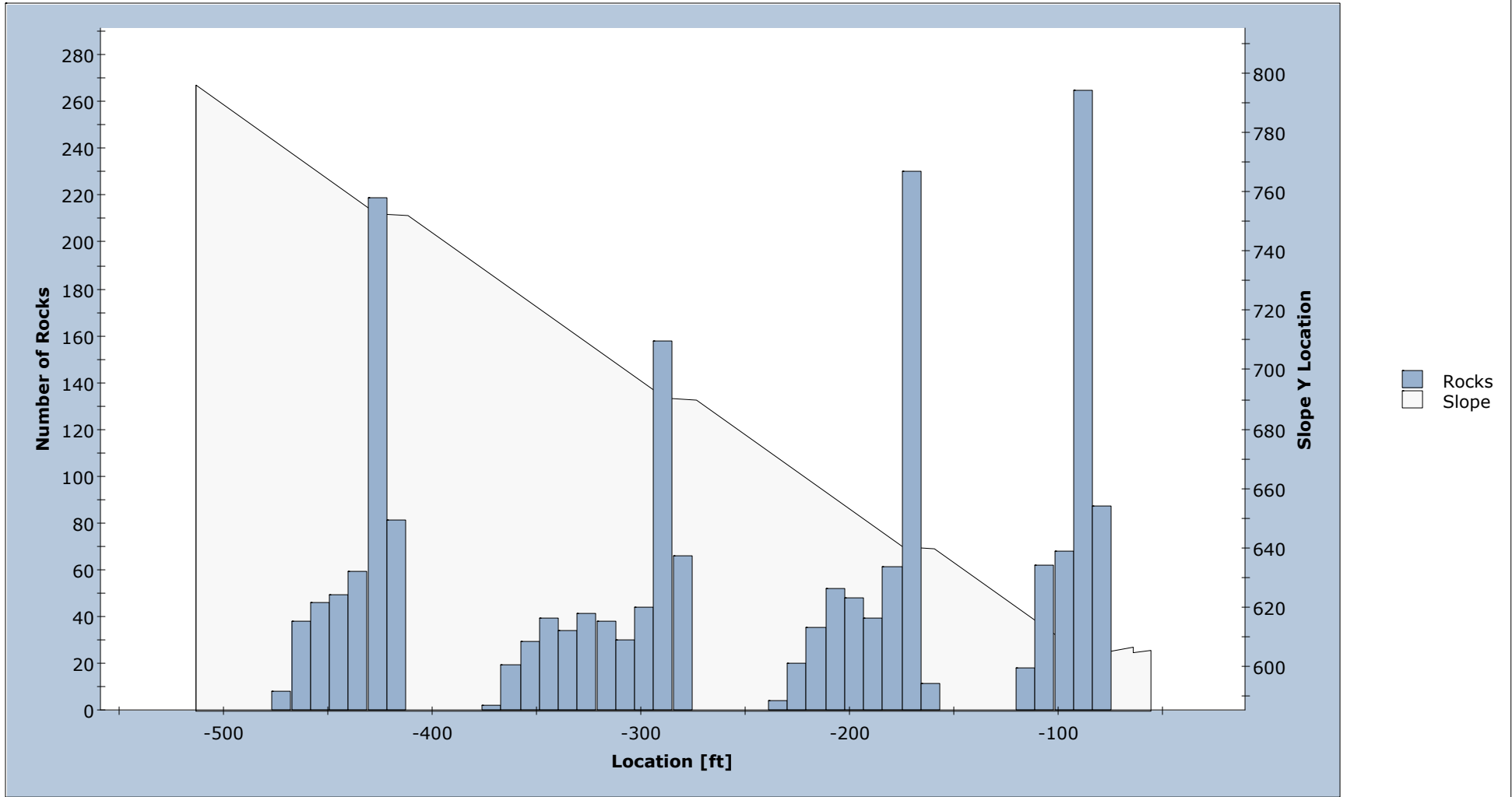
Group 1

Properties

Name Group 1
 Color 

	Mean	Distribution	Std.Dev.	Rel. Min	Rel. Max
Mass (lb)	706.1	None			
Density (lb/ft ³)	168.56	None			

Distribution of Rock Path End Locations



Total number of rock paths: 2000



<i>Project</i>	MEG-33-19.21		
<i>Analysis Description</i>	Station 967+78 - Rock Radius - 1 ft		
<i>Drawn By</i>	Jim Swindler, PE	<i>Company</i>	Stantec Consulting Services, Inc.
<i>Date</i>	9/17/2024, 4:12:08 PM	<i>File Name</i>	Station 1223+70_radius_1.fal6

RocFall Analysis Information

MEG-33-19.21

Project Summary

File Name Station 1236+64_radius_1.fal6
File Version 6.011

Project Title MEG-33-19.21
Analysis Station 1236+64 - Rock Radius - 1 ft
Author Jim Swindler, PE
Company Stantec Consulting Services, Inc.
Date Created 9/17/2024, 4:12:08 PM

Project Settings

General Settings:

Engine Lump Mass
Units Imperial Foot-Pounds (ft, lb, ft-lb)
Rock Throw Mode Number of rocks controlled by seeder

Engine Conditions:

Friction Angle Use friction angle from material editor
Consider Angular Velocity Yes
Maximum time per rock 5s
Maximum steps per rock 20000
Normal velocity cutoff 0.33ft/s
Stopped velocity cutoff 0.33ft/s
Maximum timestep 0.01s
Switch Velocity -3.3e-009ft/s

Random Number Generation:

Sampling Method Monte-Carlo
Random Seed Pseudo-random seed: 12345234

Slope Geometry


Vertex	X	Y	X Std.Dev.	Y Std.Dev.
1	-456.4	785.6		
2	-285.7	700.4		
3	-275.7	700		
4	-204.6	664.4		
5	-193.7	664		
6	-86.1	610.2		
7	-80.1	610.2		
8	-64.9	612.1		
9	-64.9	610.5		
10	-56.5	611		

Slope Material Assignment


Material	From Vertex	To Vertex
Bedrock Outcrops	1	6
Asphalt	6	10

Material Properties

Bedrock Outcrops

"Bedrock Outcrops" Properties						
Color						
	Mean	Distribution	Std.Dev.	Rel. Min	Rel. Max	
Normal Restitution	0.3	Normal	0.04	0.12	0.12	
Tangential Restitution	0.85	Normal	0.04	0.12	0.12	
Friction Angle (°)	30	None				
Slope Roughness (°)		None				

Asphalt

"Asphalt" Properties						
Color						
	Mean	Distribution	Std.Dev.	Rel. Min	Rel. Max	
Normal Restitution	0.4	Normal	0.04	0.12	0.12	
Tangential Restitution	0.9	Normal	0.03	0.09	0.09	
Friction Angle (°)	30	None				
Slope Roughness (°)		None				

Seeders

Seeder 1

Seeder Properties

Name Seeder 1
 Location (-456.4, 785.6), (-285.7, 700.4)

Rocks to Throw

Number of Rocks 500 Overall
 Rock Types Group 1

Initial Conditions

	Mean	Distribution	Std.Dev.	Rel. Min	Rel. Max
Horizontal Velocity (ft/s)	10	None			
Vertical Velocity (ft/s)	10	None			
Rotational Velocity (°/s)	0	None			
Initial Rotation (°/s)	0	Uniform		0	360

Seeder 2

Seeder Properties

Name Seeder 2
 Location (-275.7, 700), (-204.6, 664.4)

Rocks to Throw

Number of Rocks 500 Overall
 Rock Types Group 1

Initial Conditions

	Mean	Distribution	Std.Dev.	Rel. Min	Rel. Max
Horizontal Velocity (ft/s)	10	None			
Vertical Velocity (ft/s)	10	None			
Rotational Velocity (°/s)	0	None			
Initial Rotation (°/s)	0	Uniform		0	360

Seeder 3

Seeder Properties

Name Seeder 3
 Location (-193.7, 664), (-86.1, 610.2)

Rocks to Throw

Number of Rocks 500 Overall
 Rock Types Group 1

Initial Conditions

	Mean	Distribution	Std.Dev.	Rel. Min	Rel. Max
Horizontal Velocity (ft/s)	10	None			
Vertical Velocity (ft/s)	10	None			
Rotational Velocity (°/s)	0	None			
Initial Rotation (°/s)	0	Uniform		0	360

Rock Types

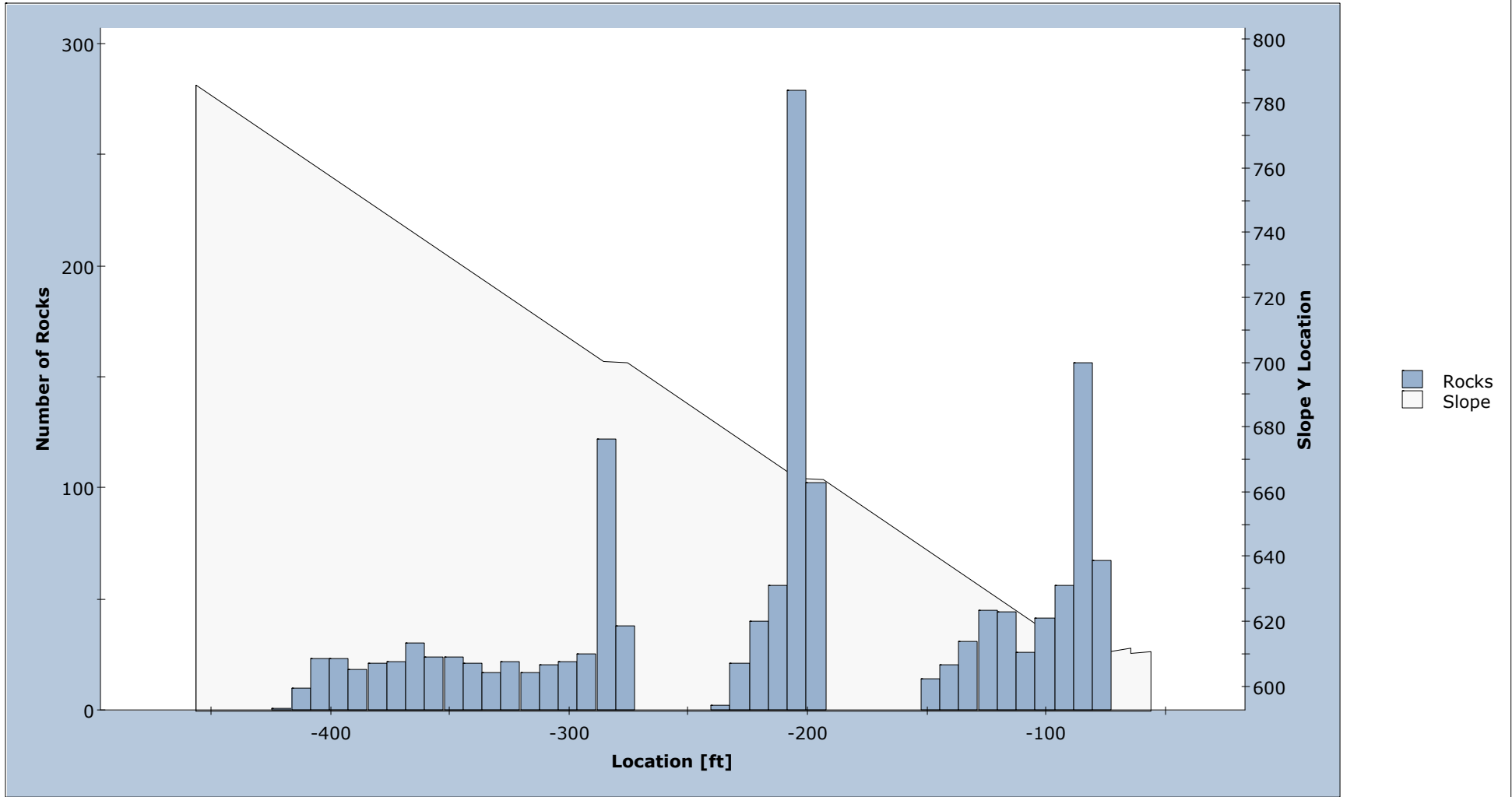
Group 1

Properties

Name Group 1
Color 

	Mean	Distribution	Std.Dev.	Rel. Min	Rel. Max
Mass (lb)	706.1	None			
Density (lb/ft ³)	168.56	None			

Distribution of Rock Path End Locations



Total number of rock paths: 1500



Project	MEG-33-19.21		
Analysis Description	Station 1236+64 - Rock Radius - 1 ft		
Drawn By	Jim Swindler, PE	Company	Stantec Consulting Services, Inc.
Date	9/17/2024, 4:12:08 PM	File Name	Station 1236+64_radius_1.fal6

RocFall Analysis Information

MEG-33-19.21

Project Summary

File Name Station 1269+80_radius_1.fal6
File Version 6.011

Project Title MEG-33-19.21
Analysis Station 1269+80 - Rock Radius - 1 ft
Author Jim Swindler, PE
Company Stantec Consulting Services, Inc.
Date Created 9/17/2024, 4:12:08 PM

Project Settings

General Settings:

Engine Lump Mass
Units Imperial Foot-Pounds (ft, lb, ft-lb)
Rock Throw Mode Number of rocks controlled by seeder

Engine Conditions:

Friction Angle Use friction angle from material editor
Consider Angular Velocity Yes
Maximum time per rock 5s
Maximum steps per rock 20000
Normal velocity cutoff 0.33ft/s
Stopped velocity cutoff 0.33ft/s
Maximum timestep 0.01s
Switch Velocity -3.3e-009ft/s

Random Number Generation:

Sampling Method Monte-Carlo
Random Seed Pseudo-random seed: 12345234

Slope Geometry

Vertex	X	Y	X Std.Dev.	Y Std.Dev.
1	-391.1	827.1		
2	-328.3	795.7		
3	-313.3	795		
4	-200.7	738.6		
5	-185.7	737.9		
6	-122.9	706.6		
7	-108	705.9		
8	-84.7	694.4		
9	-78.7	694.4		
10	-64.9	696.1		
11	-64.9	694.4		
12	-27.9	697.7		


Slope Material Assignment

Material	From Vertex	To Vertex
Bedrock Outcrops	1	10
Asphalt	10	12

Material Properties


Bedrock Outcrops

"Bedrock Outcrops" Properties

Color					
	Mean	Distribution	Std.Dev.	Rel. Min	Rel. Max
Normal Restitution	0.3	Normal	0.04	0.12	0.12
Tangential Restitution	0.85	Normal	0.04	0.12	0.12
Friction Angle (°)	30	None			
Slope Roughness (°)		None			

Asphalt

"Asphalt" Properties

Color					
	Mean	Distribution	Std.Dev.	Rel. Min	Rel. Max
Normal Restitution	0.4	Normal	0.04	0.12	0.12
Tangential Restitution	0.9	Normal	0.03	0.09	0.09
Friction Angle (°)	30	None			
Slope Roughness (°)		None			

Seeders

Seeder 1

Seeder Properties

Name Seeder 1
 Location (-391.1, 827.1), (-328.3, 795.7)

Rocks to Throw

Number of Rocks 500 Overall
 Rock Types Group 1

Initial Conditions

	Mean	Distribution	Std.Dev.	Rel. Min	Rel. Max
Horizontal Velocity (ft/s)	10	None			
Vertical Velocity (ft/s)	10	None			
Rotational Velocity (°/s)	0	None			
Initial Rotation (°/s)	0	Uniform		0	360

Seeder 2

Seeder Properties

Name Seeder 2
 Location (-313.3, 795), (-200.7, 738.6)

Rocks to Throw

Number of Rocks 500 Overall
 Rock Types Group 1

Initial Conditions

	Mean	Distribution	Std.Dev.	Rel. Min	Rel. Max
Horizontal Velocity (ft/s)	10	None			
Vertical Velocity (ft/s)	10	None			
Rotational Velocity (°/s)	0	None			
Initial Rotation (°/s)	0	Uniform		0	360

Seeder 3

Seeder Properties

Name Seeder 3
 Location (-185.7, 737.9), (-122.9, 706.6)

Rocks to Throw

Number of Rocks 500 Overall
 Rock Types Group 1

Initial Conditions

	Mean	Distribution	Std.Dev.	Rel. Min	Rel. Max
Horizontal Velocity (ft/s)	10	None			
Vertical Velocity (ft/s)	10	None			
Rotational Velocity (°/s)	0	None			
Initial Rotation (°/s)	0	Uniform		0	360

Seeder 4

Seeder Properties

Name Seeder 4
 Location (-108, 705.9), (-84.7, 694.4)

Rocks to Throw

Number of Rocks 500 Overall
 Rock Types Group 1

Initial Conditions

	Mean	Distribution	Std.Dev.	Rel. Min	Rel. Max
Horizontal Velocity (ft/s)	10	None			
Vertical Velocity (ft/s)	10	None			
Rotational Velocity (°/s)	0	None			
Initial Rotation (°/s)	0	Uniform		0	360

Rock Types

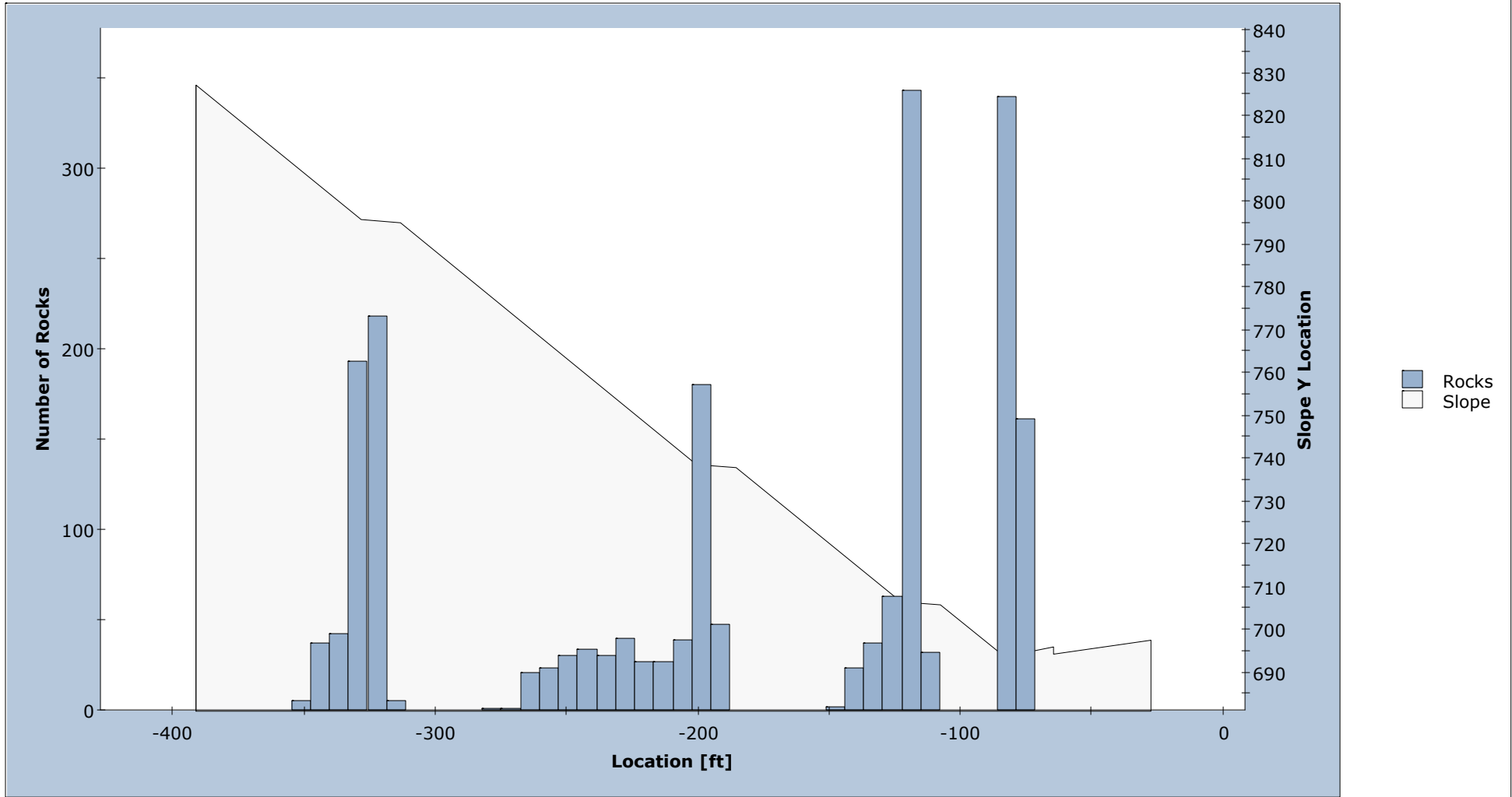
Group 1

Properties

Name Group 1
 Color 

	Mean	Distribution	Std.Dev.	Rel. Min	Rel. Max
Mass (lb)	706.1	None			
Density (lb/ft ³)	168.56	None			

Distribution of Rock Path End Locations



Total number of rock paths: 2000



<i>Project</i>	MEG-33-19.21		
<i>Analysis Description</i>	Station 1269+80 - Rock Radius - 1 ft		
<i>Drawn By</i>	Jim Swindler, PE	<i>Company</i>	Stantec Consulting Services, Inc.
<i>Date</i>	9/17/2024, 4:12:08 PM	<i>File Name</i>	Station 1269+80_radius_1.fal6

APPENDIX I
EMBANKMENT STABILITY ANALYSES

MEG-33-19.11

ODOT District 10

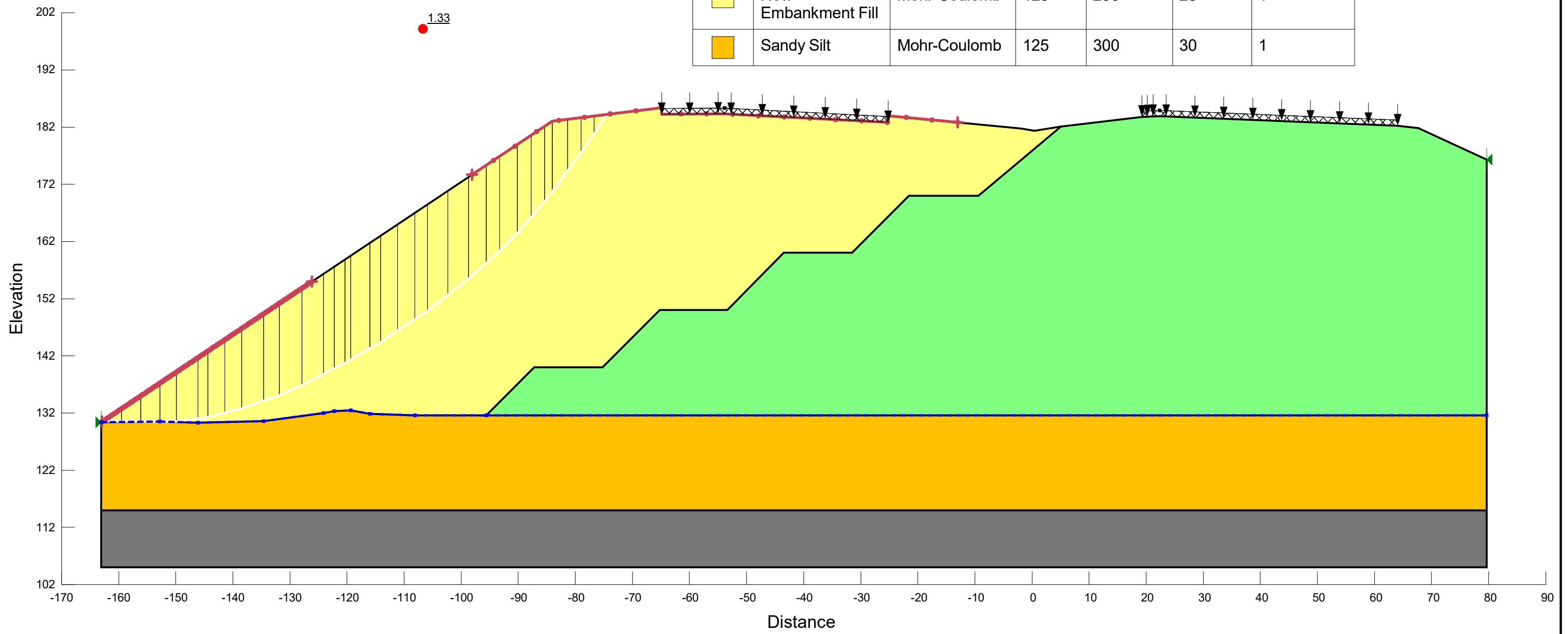
Analysis Cross-Section-1019+50

Slope Stability Analysis - FS = 1.33

Slope Stability (drained) 2:1 Embankment - Soil Properties per Table 500-2 of GDM

Note: The results of the analysis shown here are based on available subsurface information, laboratory test results and approximate soil properties. The drawing depicts approximate subsurface conditions based on historical drawings or specific borings at the time of drilling. No warranties can be made regarding the continuity of subsurface conditions.

Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)	Piezometric Surface
Grey	Bedrock [shale]	Mohr-Coulomb	140	8,465	0	1
Light Green	Existing Embankment Fill	Mohr-Coulomb	125	200	20	1
Light Yellow	New Embankment Fill	Mohr-Coulomb	125	250	28	1
Orange	Sandy Silt	Mohr-Coulomb	125	300	30	1



MEG-33-19.11

ODOT District 10

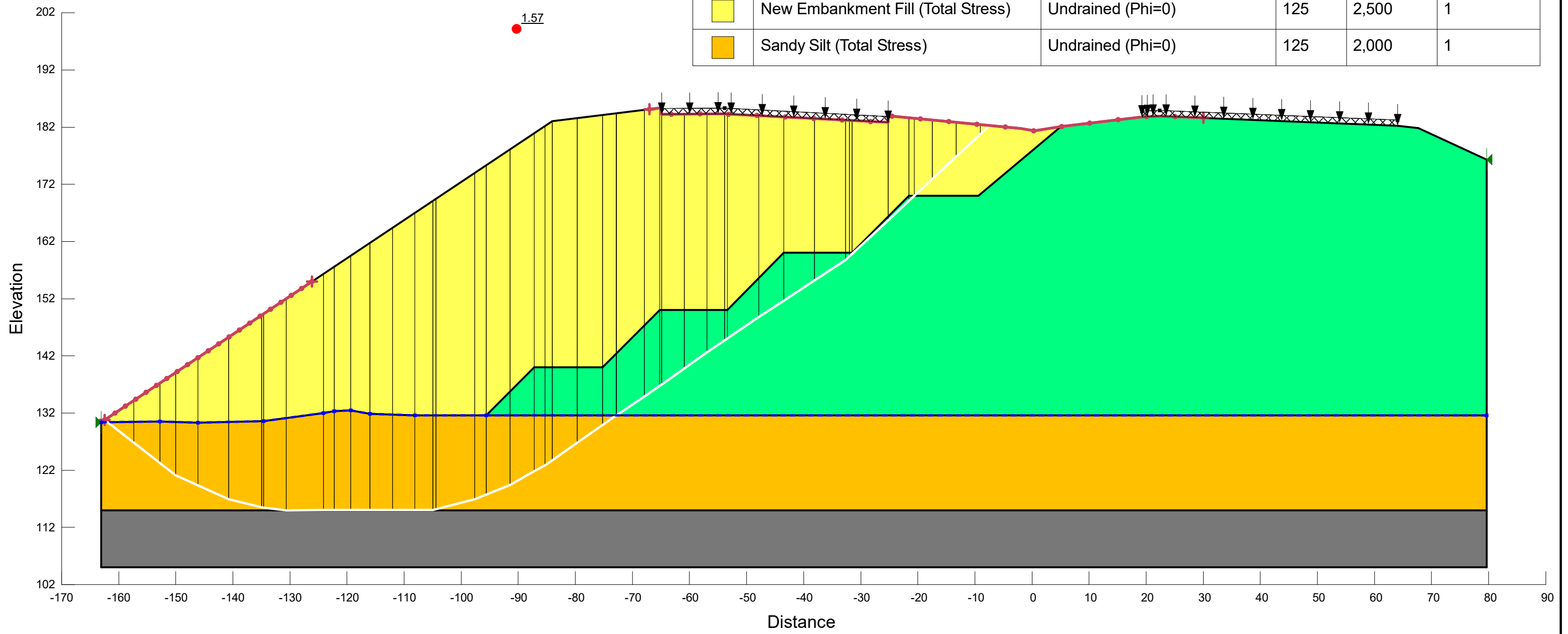
Analysis Cross-Section-1019+50

Slope Stability Analysis - FS = 1.57

Slope Stability (undrained) 2:1 Embankment - Soil Properties per Table 500-2 of GDM

Note: The results of the analysis shown here are based on available subsurface information, laboratory test results and approximate soil properties. The drawing depicts approximate subsurface conditions based on historical drawings or specific borings at the time of drilling. No warranties can be made regarding the continuity of subsurface conditions.

Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Total Cohesion (psf)	Piezometric Surface
Grey	Bedrock [Shale] (Total Stress)	Undrained (Phi=0)	140	8,465	1
Green	Existing Embankment Fill (Total Stress)	Undrained (Phi=0)	125	1,500	1
Yellow	New Embankment Fill (Total Stress)	Undrained (Phi=0)	125	2,500	1
Orange	Sandy Silt (Total Stress)	Undrained (Phi=0)	125	2,000	1



MEG-33-19.11

ODOT District 10

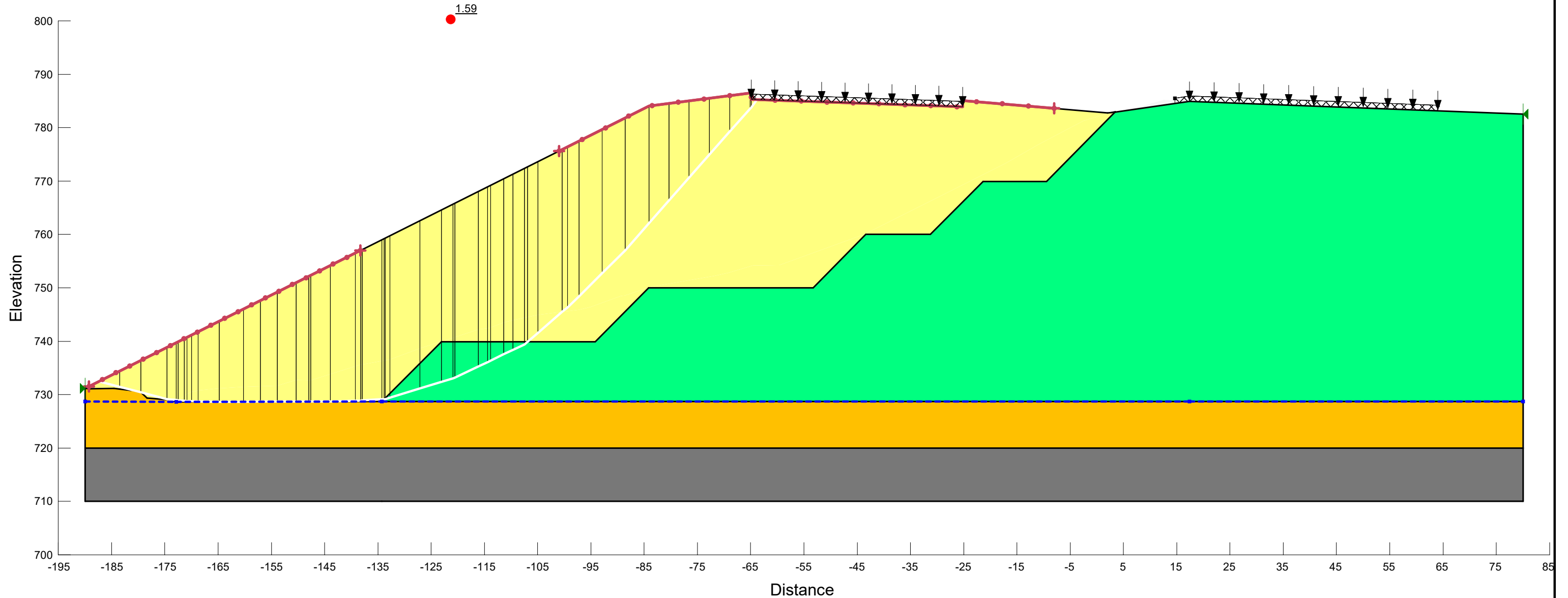
Analysis Cross-Section-1022+00

Slope Stability Analysis - FS = 1.59

Slope Stability (drained) 2:1 Embankment - Soil Properties per Table 500-2 of GDM

Note: The results of the analysis shown here are based on available subsurface information, laboratory test results and approximate soil properties. The drawing depicts approximate subsurface conditions based on historical drawings or specific borings at the time of drilling. No warranties can be made regarding the continuity of subsurface conditions.

Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)	Piezometric Surface
■	Bedrock [Shale]	Mohr-Coulomb	140	8,465	0	1
■	Existing Embankment Fill	Mohr-Coulomb	125	200	20	1
■	New Embankment Fill	Mohr-Coulomb	125	250	28	1
■	Sandy Silt	Mohr-Coulomb	125	300	30	1



MEG-33-19.11

ODOT District 10

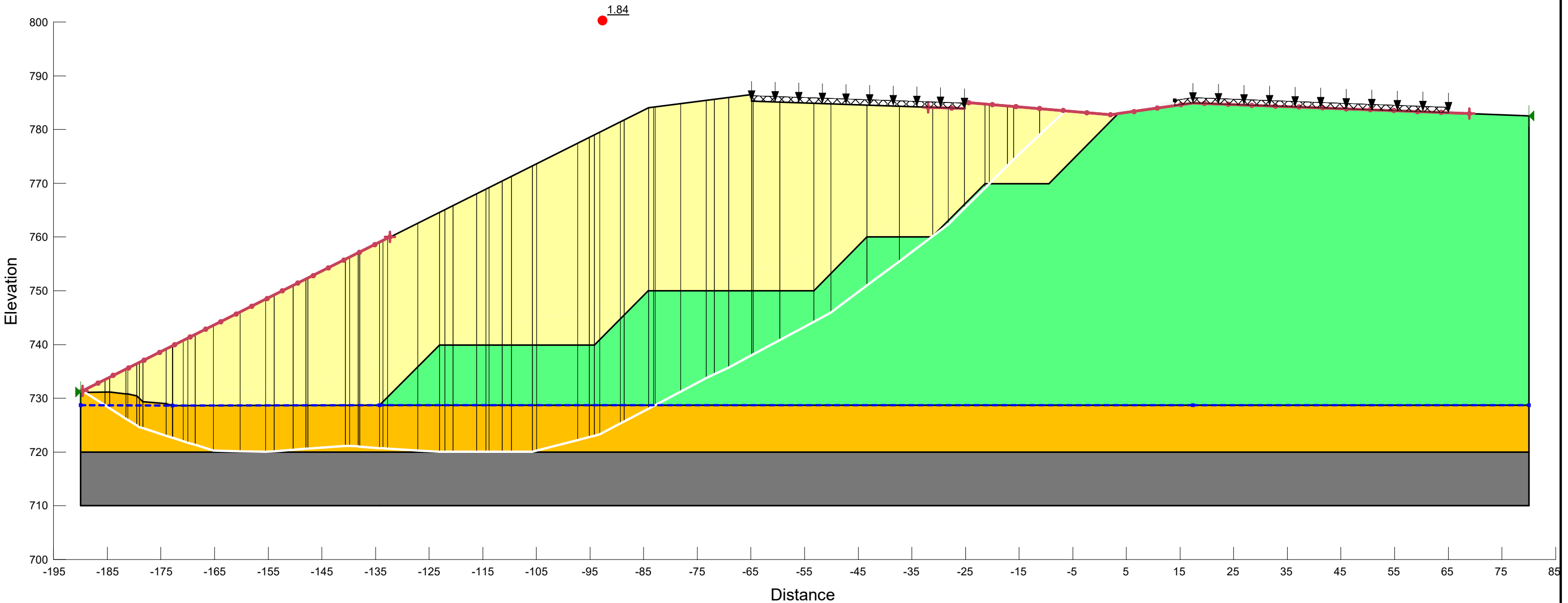
Analysis Cross-Section-1022+00

Slope Stability Analysis - FS = 1.84

Slope Stability (undrained) 2:1 Embankment - Soil Properties per Table 500-2 of GDM

Note: The results of the analysis shown here are based on available subsurface information, laboratory test results and approximate soil properties. The drawing depicts approximate subsurface conditions based on historical drawings or specific borings at the time of drilling. No warranties can be made regarding the continuity of subsurface conditions.

Color	Name	Slope Stability Material Model	Unit Weight (pcf)	Total Cohesion (psf)	Piezometric Surface
Grey	Bedrock [Shale] (Total Stress)	Undrained (Phi=0)	140	8,465	1
Green	Existing Embankment Fill [Total Stress]	Undrained (Phi=0)	125	1,500	1
Yellow	New Embankment Fill [Total Stress]	Undrained (Phi=0)	125	2,500	1
Orange	Sandy Silt [Total Stress]	Undrained (Phi=0)	125	2,000	1



MEG-33-19.11

ODOT District 10

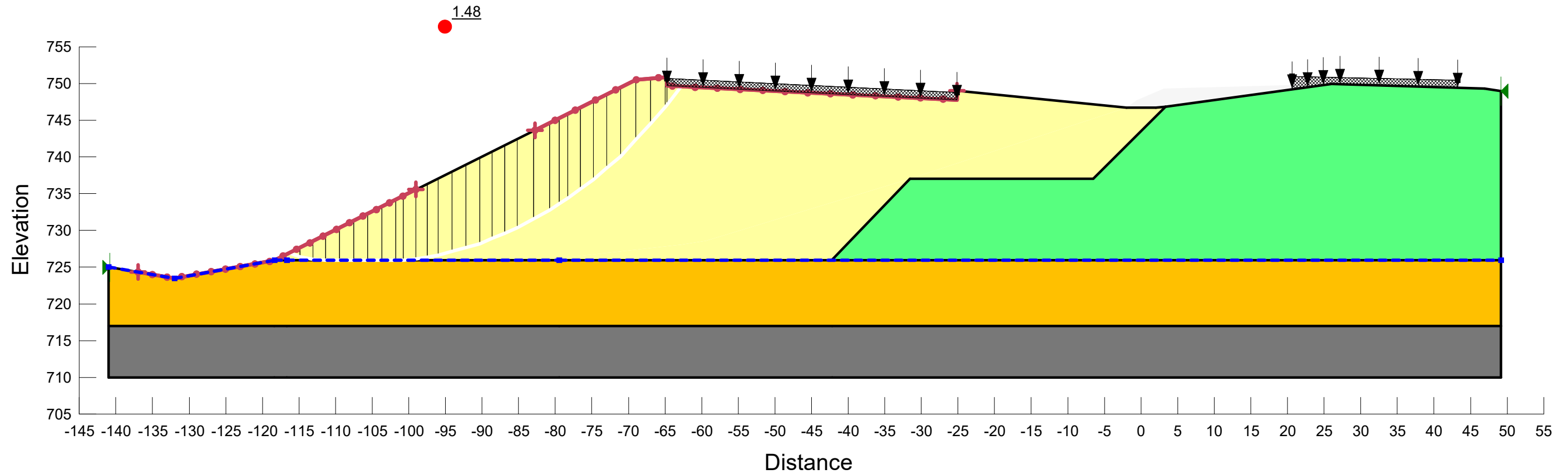
Analysis Cross-Section-1053+00

Slope Stability Analysis - FS = 1.48

Slope Stability (drained)

Note: The results of the analysis shown here are based on available subsurface information, laboratory test results and approximate soil properties. The drawing depicts approximate subsurface conditions based on historical drawings or specific borings at the time of drilling. No warranties can be made regarding the continuity of subsurface conditions.

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
Grey	Bedrock [Shale]	Mohr-Coulomb	140	8,465	0
Green	Existing Embankment Fill	Mohr-Coulomb	125	200	20
Yellow	New Embankment Fill	Mohr-Coulomb	125	200	20
Orange	Sandy Silt [A-4a]	Mohr-Coulomb	125	300	30



MEG-33-19.11

ODOT District 10

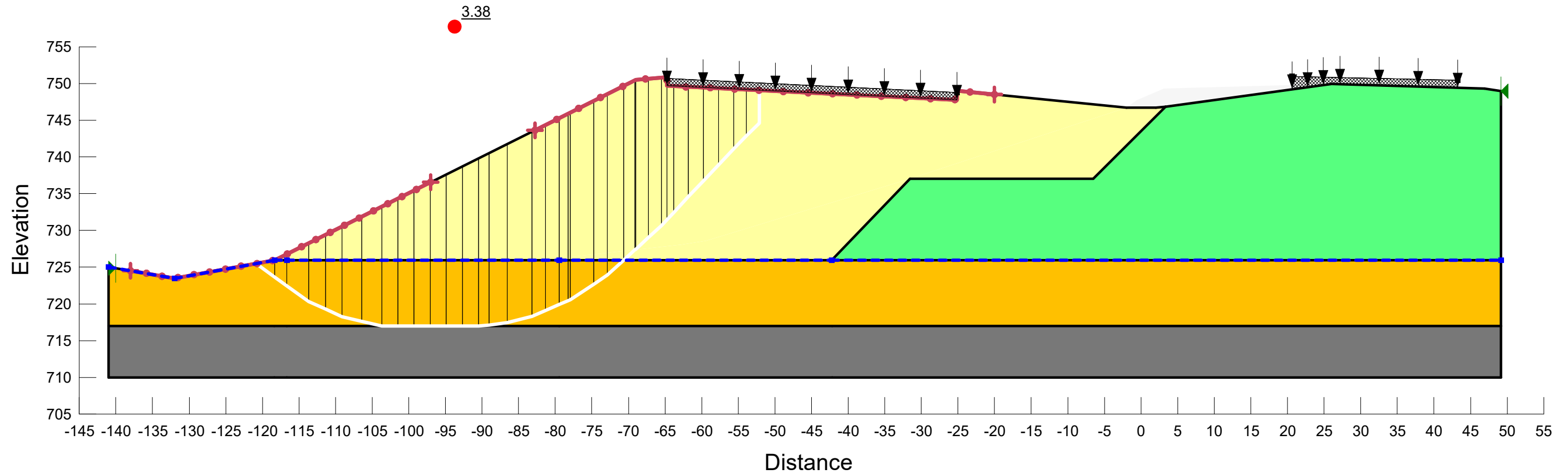
Analysis Cross-Section-1053+00

Slope Stability Analysis - FS = 3.38

Slope Stability (undrained)

Note: The results of the analysis shown here are based on available subsurface information, laboratory test results and approximate soil properties. The drawing depicts approximate subsurface conditions based on historical drawings or specific borings at the time of drilling. No warranties can be made regarding the continuity of subsurface conditions.

Color	Name	Model	Unit Weight (pcf)	Cohesion (psf)
Grey	Bedrock [Shale] (Total Stress)	Undrained (Phi=0)	140	8,465
Green	Existing Embankment Fill (Total Stress)	Undrained (Phi=0)	125	1,500
Yellow	New Embankment Fill (Total Stress)	Undrained (Phi=0)	125	1,500
Orange	Sandy Silt [A-4a] (Total Stress)	Undrained (Phi=0)	125	2,000



MEG-33-19.11

ODOT District 10

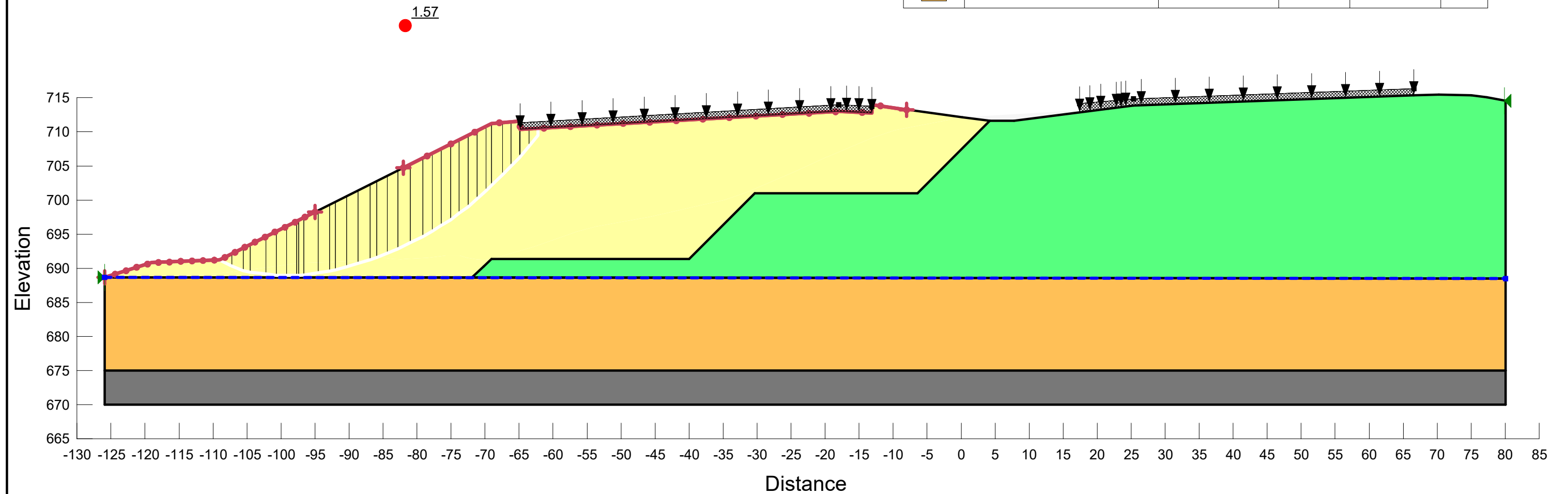
Analysis Cross-Section-1076+50

Slope Stability Analysis - FS = 1.57

Slope Stability (drained)

Note: The results of the analysis shown here are based on available subsurface information, laboratory test results and approximate soil properties. The drawing depicts approximate subsurface conditions based on historical drawings or specific borings at the time of drilling. No warranties can be made regarding the continuity of subsurface conditions.

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
■	Bedrock [Shale]	Mohr-Coulomb	140	8,465	0
■	Existing Embankment Fill	Mohr-Coulomb	125	200	20
■	New Embankment Fill	Mohr-Coulomb	125	200	20
■	Sandy Silt [A-4a]	Mohr-Coulomb	125	300	30



MEG-33-19.11

ODOT District 10

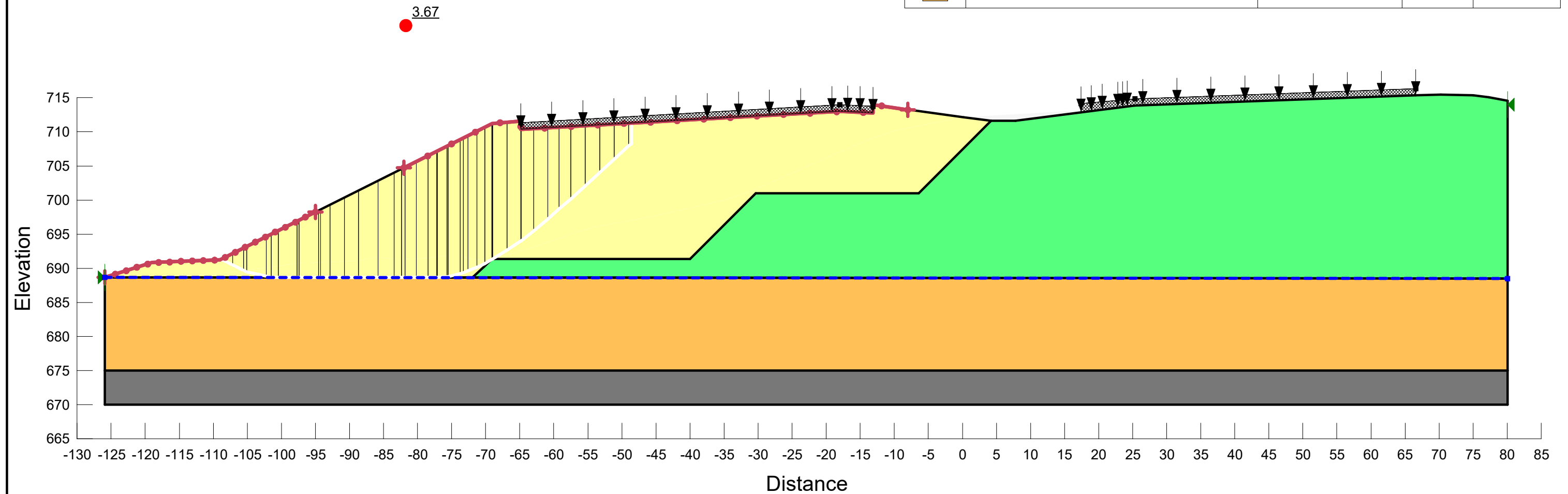
Analysis Cross-Section-1076+50

Slope Stability Analysis - FS = 3.67

Slope Stability (undrained)

Note: The results of the analysis shown here are based on available subsurface information, laboratory test results and approximate soil properties. The drawing depicts approximate subsurface conditions based on historical drawings or specific borings at the time of drilling. No warranties can be made regarding the continuity of subsurface conditions.

Color	Name	Model	Unit Weight (pcf)	Cohesion (psf)
■	Bedrock [Shale] (Total Stress)	Undrained (Phi=0)	140	8,465
■	Existing Embankment Fill (Total Stress)	Undrained (Phi=0)	125	1,500
■	New Embankment Fill (Total Stress)	Undrained (Phi=0)	125	1,500
■	Sandy Silt [A-4a] (Total Stress)	Undrained (Phi=0)	125	2,000



MEG-33-19.11

ODOT District 10

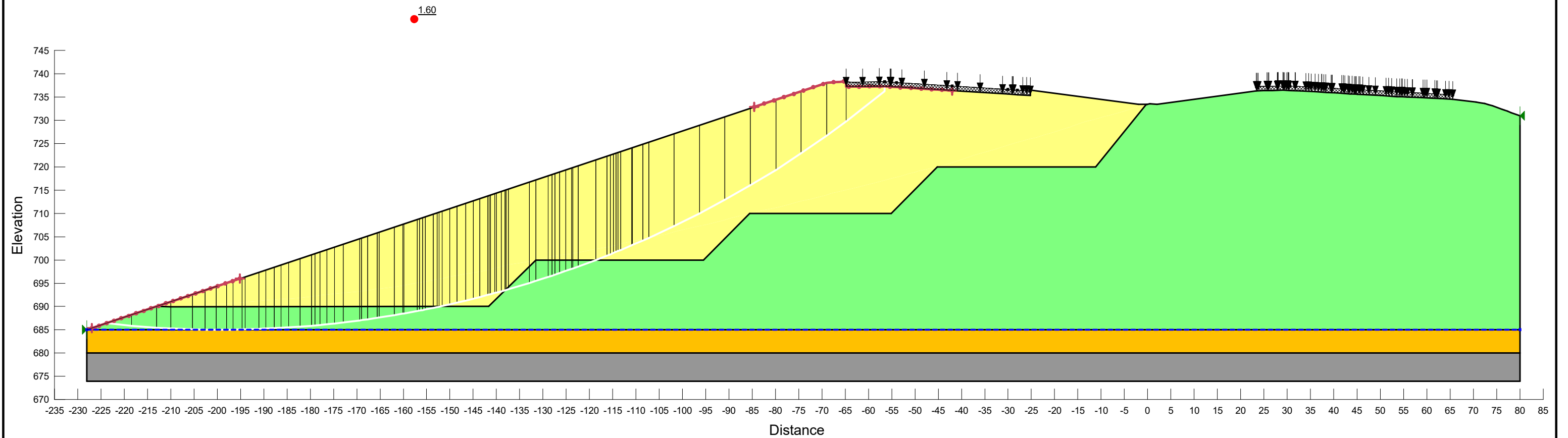
Analysis Cross-Section-1155+00

Slope Stability Analysis - FS = 1.60

Slope Stability (drained)

Note: The results of the analysis shown here are based on available subsurface information, laboratory test results and approximate soil properties. The drawing depicts approximate subsurface conditions based on historical drawings or specific borings at the time of drilling. No warranties can be made regarding the continuity of subsurface conditions.

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
Grey	Bedrock [Shale]	Mohr-Coulomb	140	8,465	0
Light Green	Existing Embankment Fill	Mohr-Coulomb	125	200	20
Yellow	New Emankment Fill	Mohr-Coulomb	125	200	20
Orange	Sandy Silt [A-4a]	Mohr-Coulomb	125	300	30



MEG-33-19.11

ODOT District 10

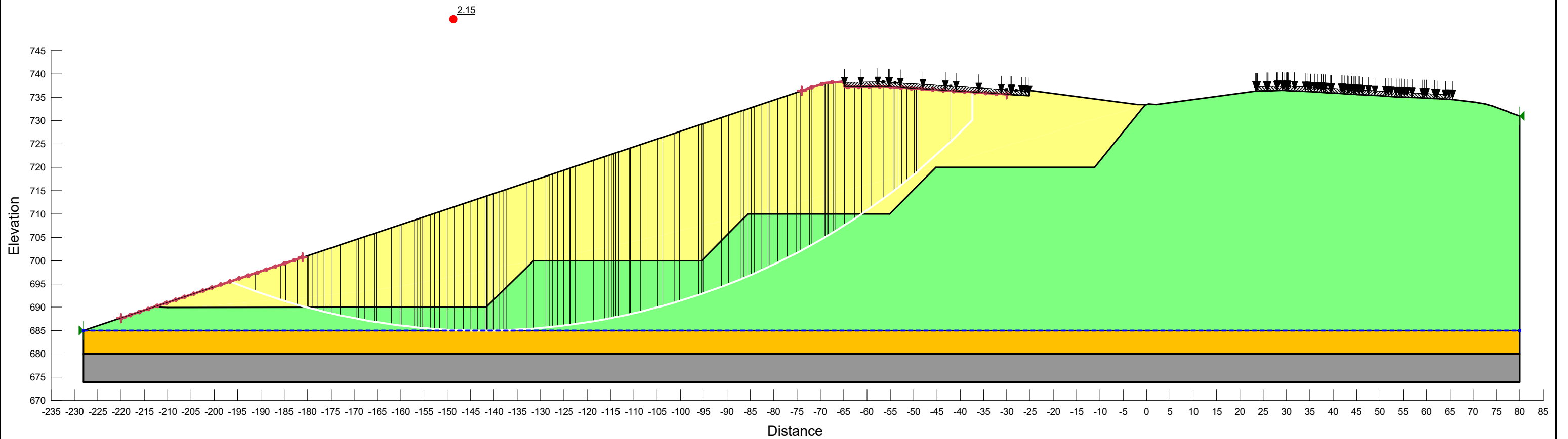
Analysis Cross-Section-1155+00

Slope Stability Analysis - FS = 2.15

Slope Stability (undrained)

Note: The results of the analysis shown here are based on available subsurface information, laboratory test results and approximate soil properties. The drawing depicts approximate subsurface conditions based on historical drawings or specific borings at the time of drilling. No warranties can be made regarding the continuity of subsurface conditions.

Color	Name	Model	Unit Weight (pcf)	Cohesion (psf)
Grey	Bedrock [Shale] (Total Stress)	Undrained (Phi=0)	140	8,465
Light Green	Existing Embankment Fill (Total Stress)	Undrained (Phi=0)	125	1,500
Yellow	New Emankment Fill (Total Stress)	Undrained (Phi=0)	125	1,500
Orange	Sandy Silt [A-4a] (Total Stress)	Undrained (Phi=0)	125	2,000



MEG-33-19.11

ODOT District 10

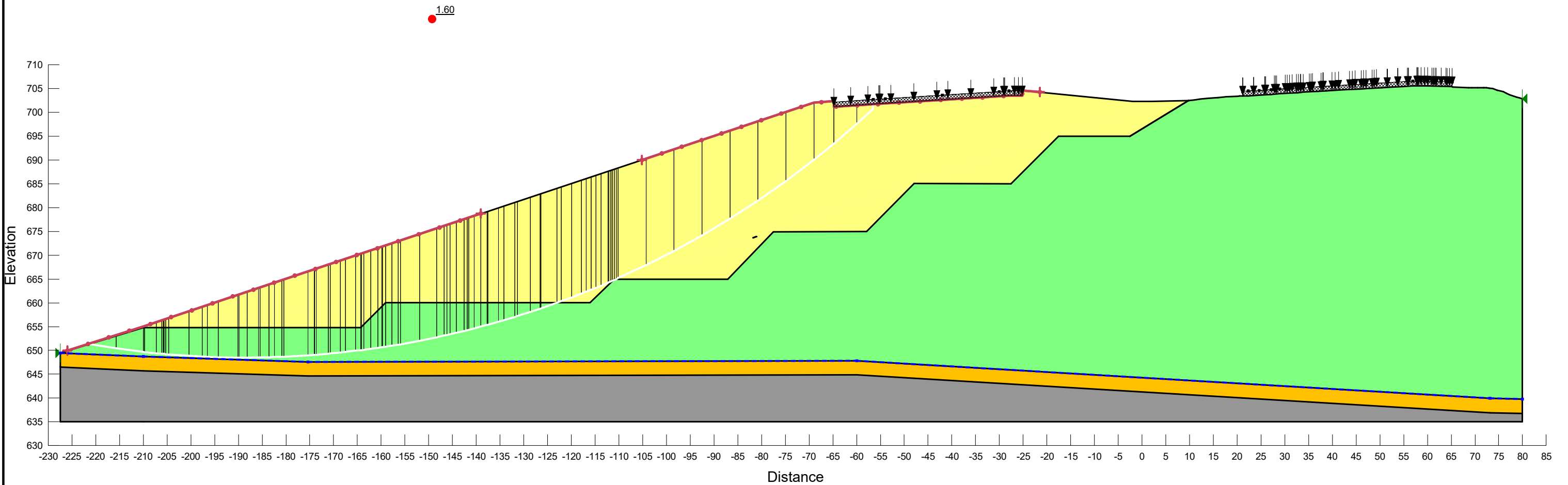
Analysis Cross-Section-1178+50

Slope Stability Analysis - FS = 1.60

Slope Stability (drained)

Note: The results of the analysis shown here are based on available subsurface information, laboratory test results and approximate soil properties. The drawing depicts approximate subsurface conditions based on historical drawings or specific borings at the time of drilling. No warranties can be made regarding the continuity of subsurface conditions.

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
Grey	Bedrock [Shale]	Mohr-Coulomb	140	8,465	0
Light Green	Existing Embankment Fill	Mohr-Coulomb	125	200	20
Yellow	New Embankment Fill	Mohr-Coulomb	125	200	20
Orange	Silt and Clay [A-6a]	Mohr-Coulomb	125	300	30



MEG-33-19.11

ODOT District 10

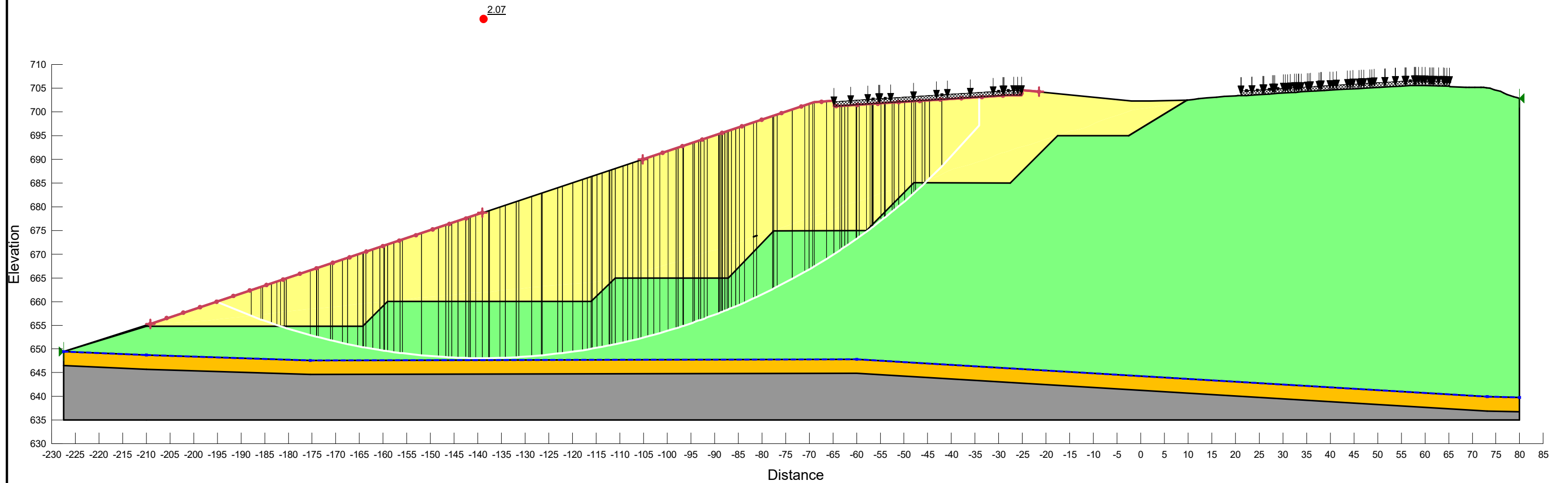
Analysis Cross-Section-1178+50

Slope Stability Analysis - FS = 2.07

Slope Stability (undrained)

Note: The results of the analysis shown here are based on available subsurface information, laboratory test results and approximate soil properties. The drawing depicts approximate subsurface conditions based on historical drawings or specific borings at the time of drilling. No warranties can be made regarding the continuity of subsurface conditions.

Color	Name	Model	Unit Weight (pcf)	Cohesion (psf)
Grey	Bedrock [Shale] (Total Stress)	Undrained (Phi=0)	140	8,465
Light Green	Existing Embankment Fill (Total Stress)	Undrained (Phi=0)	125	1,500
Yellow	New Embankment Fill (Total Stress)	Undrained (Phi=0)	125	1,500
Orange	Silty Clay [A-6a] (Total Stress)	Undrained (Phi=0)	125	2,000



MEG-33-19.11

ODOT District 10

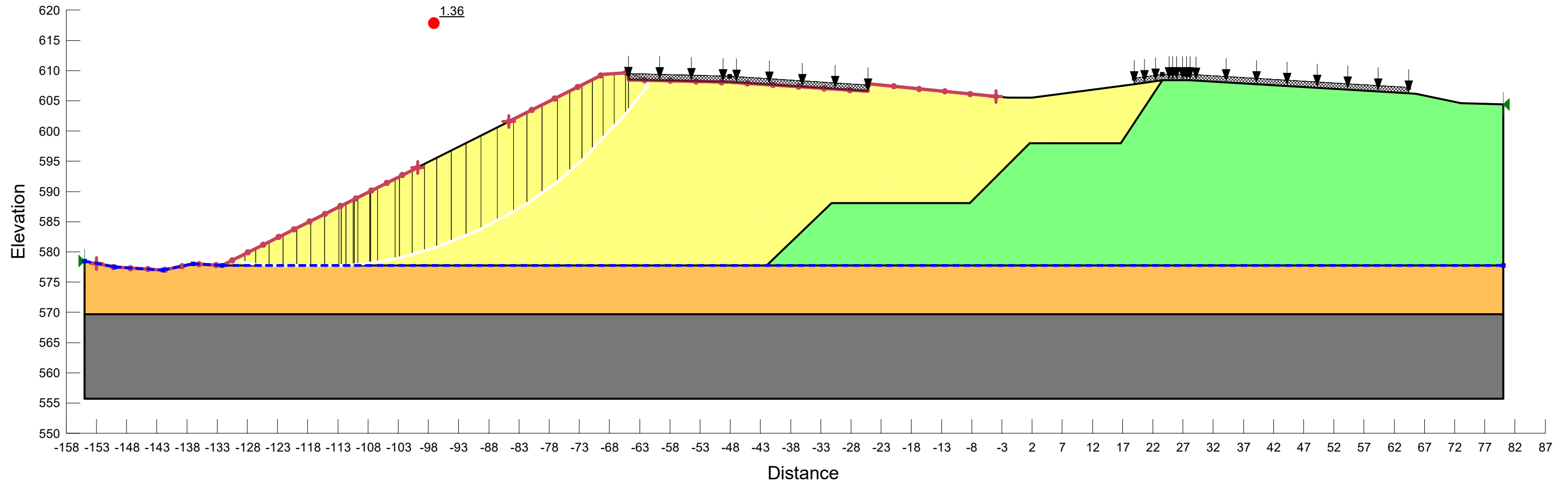
Analysis Cross-Section-1230+50

Slope Stability Analysis - FS = 1.36

Slope Stability (drained)

Note: The results of the analysis shown here are based on available subsurface information, laboratory test results and approximate soil properties. The drawing depicts approximate subsurface conditions based on historical drawings or specific borings at the time of drilling. No warranties can be made regarding the continuity of subsurface conditions.

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
■	Bedrock [Sandstone & Shale]	Mohr-Coulomb	140	8,465	0
■	Existing Embankment Fill	Mohr-Coulomb	125	200	20
■	New Embankment Fill	Mohr-Coulomb	125	200	20
■	Silt and Clay [A-6a]	Mohr-Coulomb	125	300	30



MEG-33-19.11

ODOT District 10

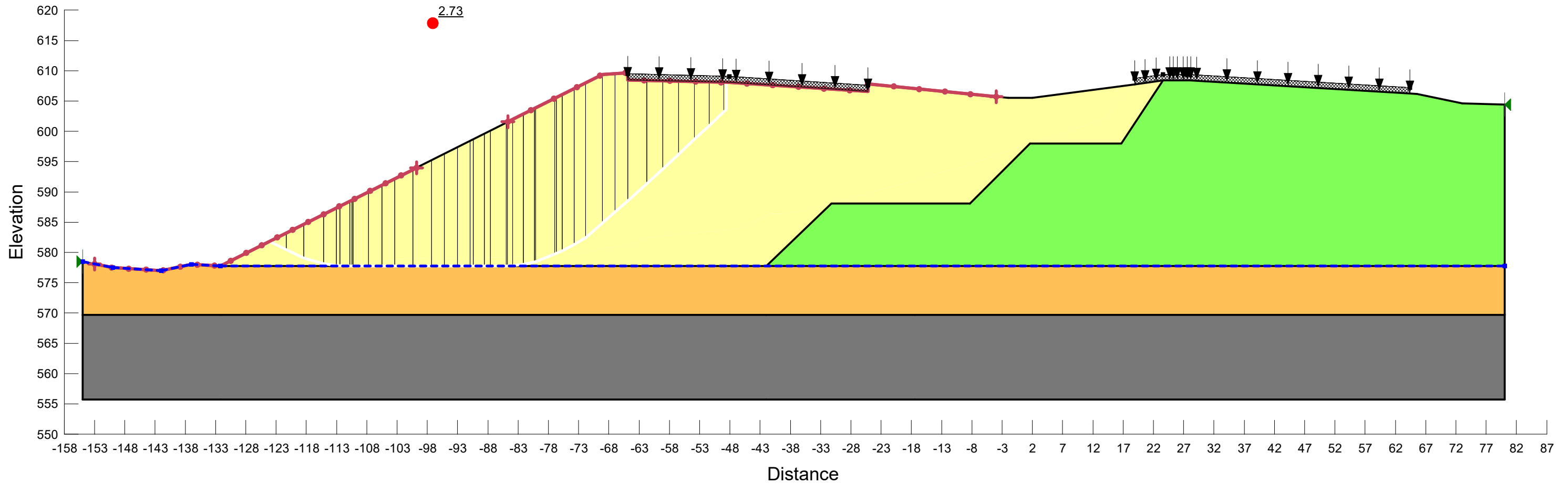
Analysis Cross-Section-1230+50

Slope Stability Analysis - FS = 2.73

Slope Stability (undrained)

Note: The results of the analysis shown here are based on available subsurface information, laboratory test results and approximate soil properties. The drawing depicts approximate subsurface conditions based on historical drawings or specific borings at the time of drilling. No warranties can be made regarding the continuity of subsurface conditions.

Color	Name	Model	Unit Weight (pcf)	Cohesion (psf)
Grey	Bedrock [Sandstone & Shale] (Total Stress)	Undrained (Phi=0)	140	8,465
Light Green	Existing Embankment Fill (Total Stress)	Undrained (Phi=0)	125	1,500
Light Yellow	New Embankment Fill (Total Stress)	Undrained (Phi=0)	125	1,500
Orange	Silt and Clay [A-6a] (Total Stress)	Undrained (Phi=0)	125	2,000



MEG-33-19.11

ODOT District 10

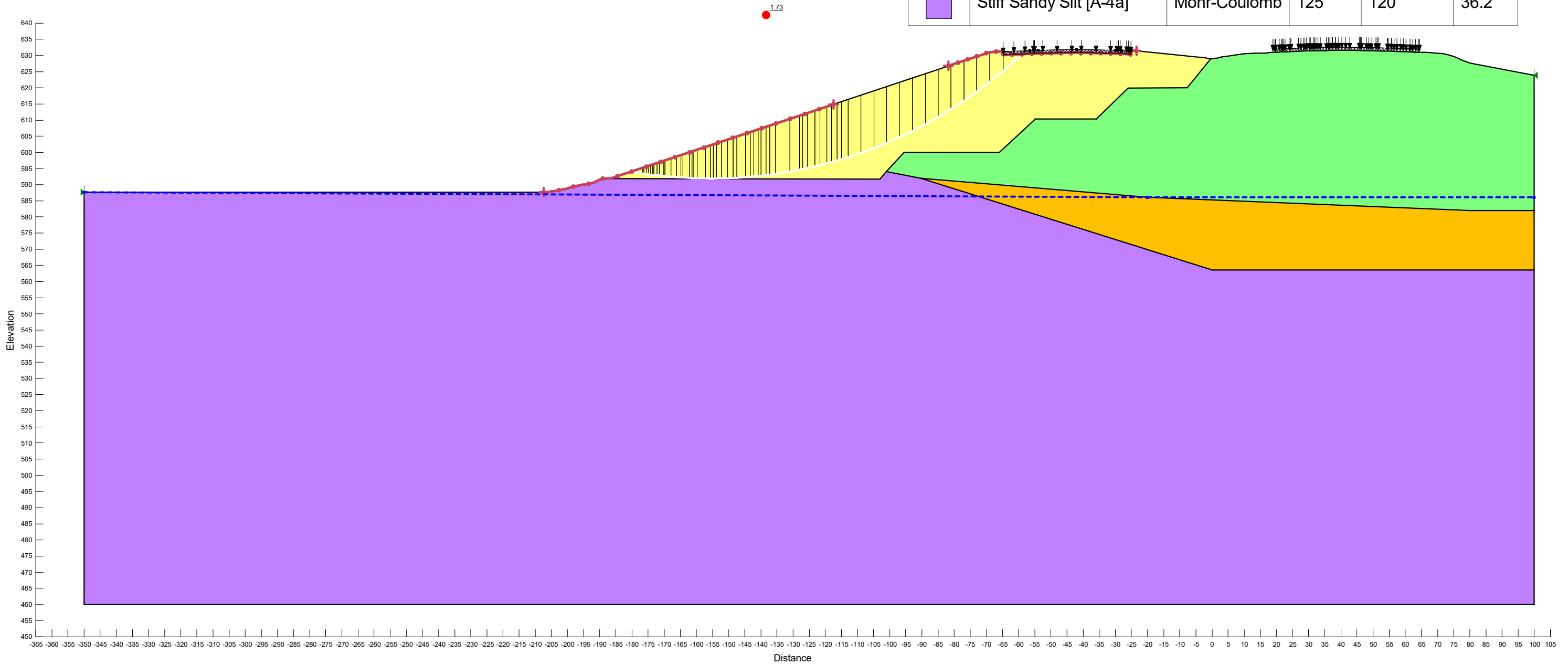
Analysis Cross-Section-1341+50

Slope Stability Analysis - FS = 1.73

Slope Stability (drained)

Note: The results of the analysis shown here are based on available subsurface information, laboratory test results and approximate soil properties. The drawing depicts approximate subsurface conditions based on historical drawings or specific borings at the time of drilling. No warranties can be made regarding the continuity of subsurface conditions.

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
Green	Existing Embankment Fill	Mohr-Coulomb	125	200	20
Yellow	New Embankment Fill	Mohr-Coulomb	125	200	20
Orange	Soft Sandy Silt [A-4a]	Mohr-Coulomb	125	120	36.2
Purple	Stiff Sandy Silt [A-4a]	Mohr-Coulomb	125	120	36.2



MEG-33-19.11

ODOT District 10

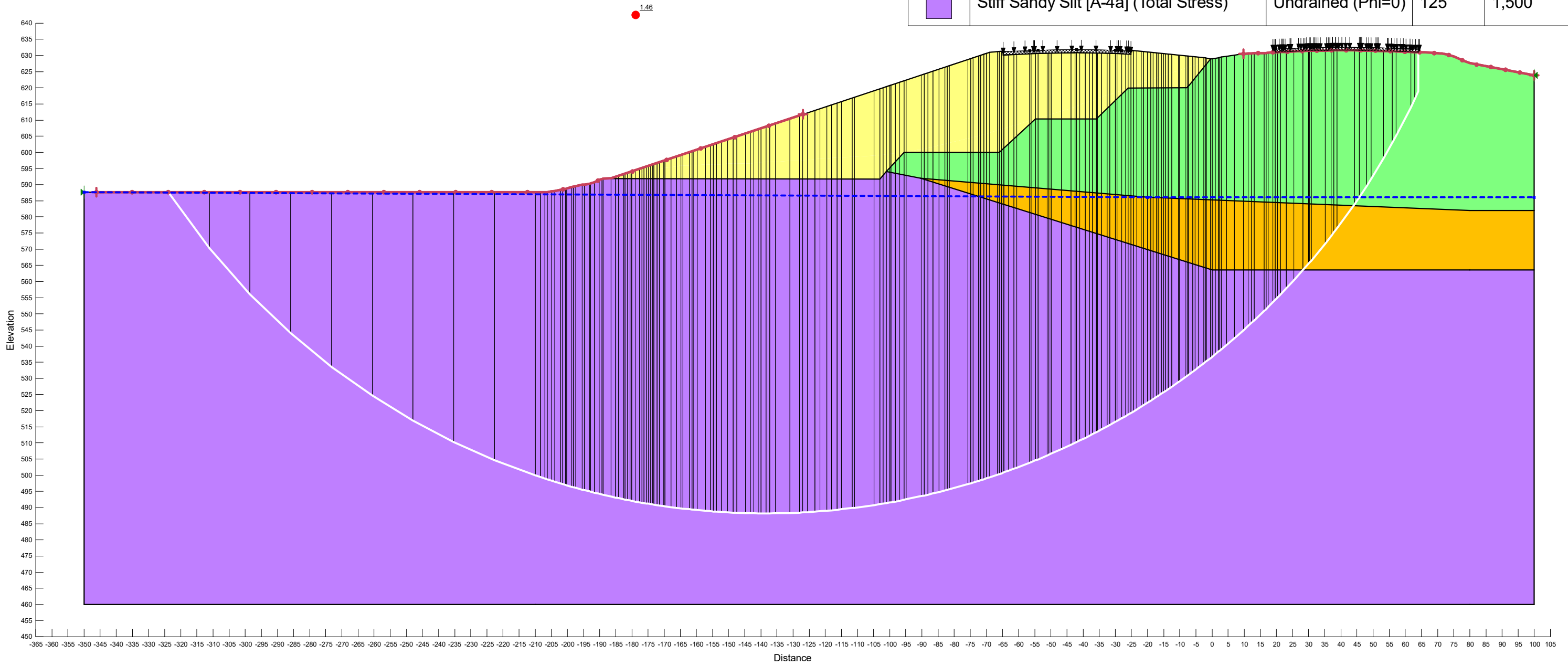
Analysis Cross-Section-1341+50

Slope Stability Analysis - FS = 1.46

Slope Stability (undrained)

Note: The results of the analysis shown here are based on available subsurface information, laboratory test results and approximate soil properties. The drawing depicts approximate subsurface conditions based on historical drawings or specific borings at the time of drilling. No warranties can be made regarding the continuity of subsurface conditions.

Color	Name	Model	Unit Weight (pcf)	Cohesion (psf)
Green	Existing Embankment Fill (Total Stress)	Undrained (Phi=0)	125	1,500
Yellow	New Embankment Fill (Total Stress)	Undrained (Phi=0)	125	1,500
Orange	Soft Sandy Silt [A-4a] (Total Stress)	Undrained (Phi=0)	125	500
Purple	Stiff Sandy Silt [A-4a] (Total Stress)	Undrained (Phi=0)	125	1,500



MEG-33-19.11

ODOT District 10

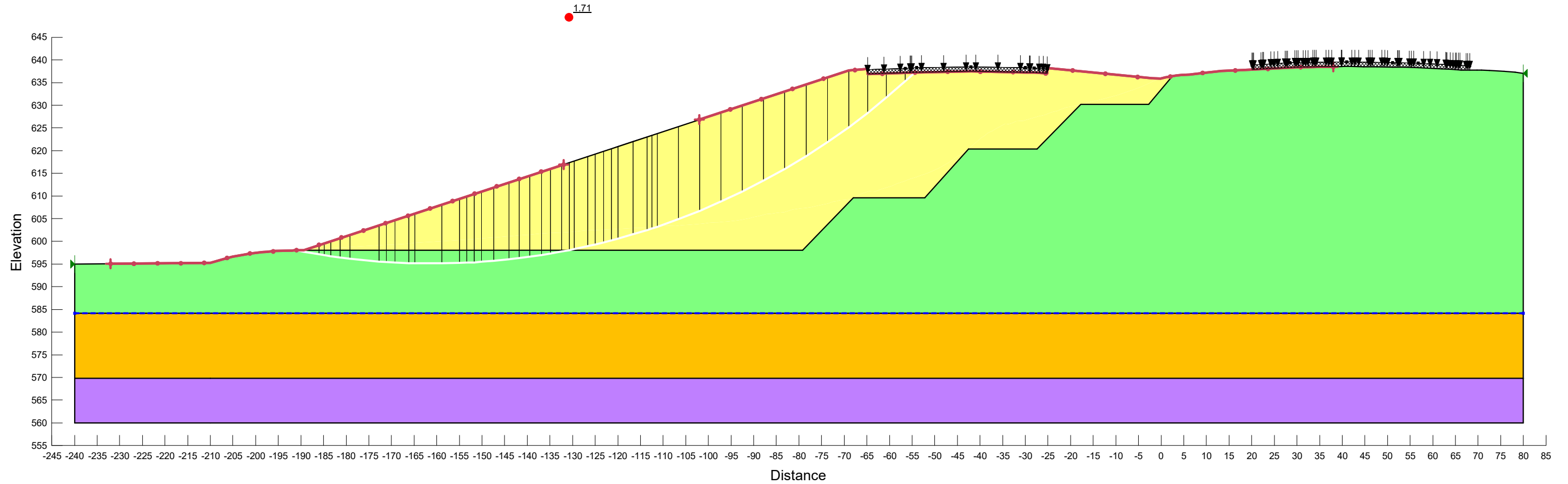
Analysis Cross-Section - 1353+00

Slope Stability Analysis - FS = 1.71

Slope Stability (drained)

Note: The results of the analysis shown here are based on available subsurface information, laboratory test results and approximate soil properties. The drawing depicts approximate subsurface conditions based on historical drawings or specific borings at the time of drilling. No warranties can be made regarding the continuity of subsurface conditions.

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
Light Green	Existing Embankment Fill	Mohr-Coulomb	125	200	20
Light Yellow	New Embankment Fill	Mohr-Coulomb	125	200	20
Orange	Sandy Silt with Clay [A-4a]	Mohr-Coulomb	125	140	31.4
Purple	Silty Clay [A-6b]	Mohr-Coulomb	125	800	28



MEG-33-19.11

ODOT District 10

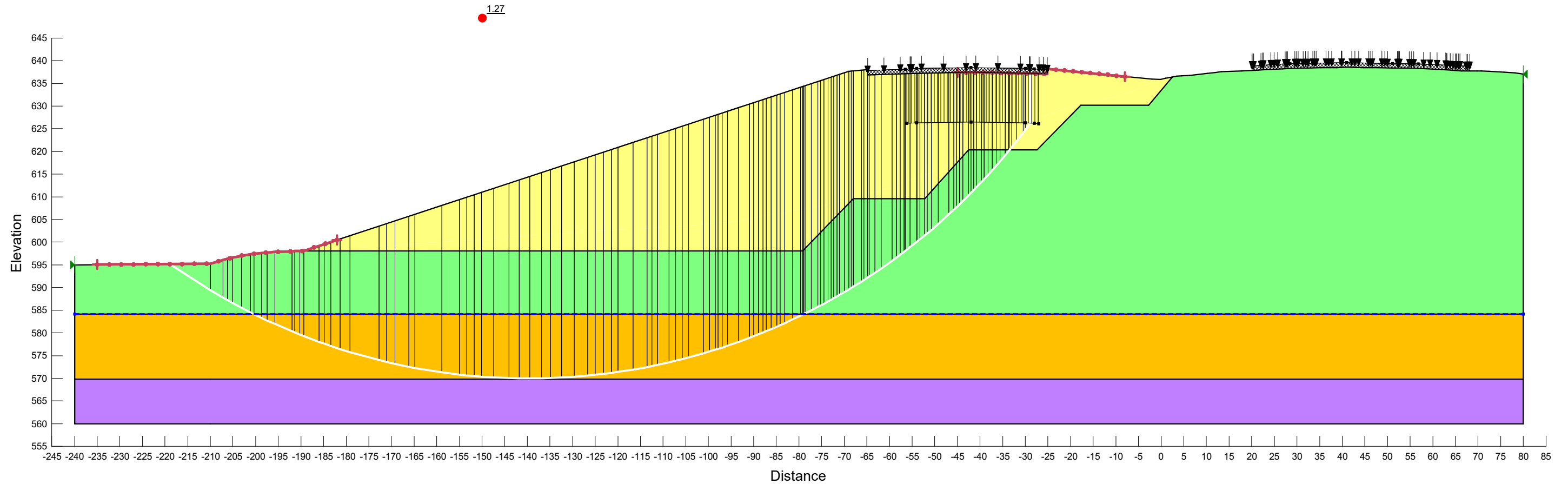
Analysis Cross-Section - 1353+00

Slope Stability Analysis - FS = 1.27

Slope Stability (undrained)

Note: The results of the analysis shown here are based on available subsurface information, laboratory test results and approximate soil properties. The drawing depicts approximate subsurface conditions based on historical drawings or specific borings at the time of drilling. No warranties can be made regarding the continuity of subsurface conditions.

Color	Name	Model	Unit Weight (pcf)	Cohesion (psf)
Light Green	Existing Embankment Fill (Total Stress)	Undrained (Phi=0)	125	1,500
Light Yellow	New Embankment Fill (Total Stress)	Undrained (Phi=0)	125	1,500
Orange	Sandy Silt with Clay [A-4a] (Total Stress)	Undrained (Phi=0)	125	720
Purple	Silty Clay [A-6b] (Total Stress)	Undrained (Phi=0)	125	2,000



MEG-33-19.11

ODOT District 10

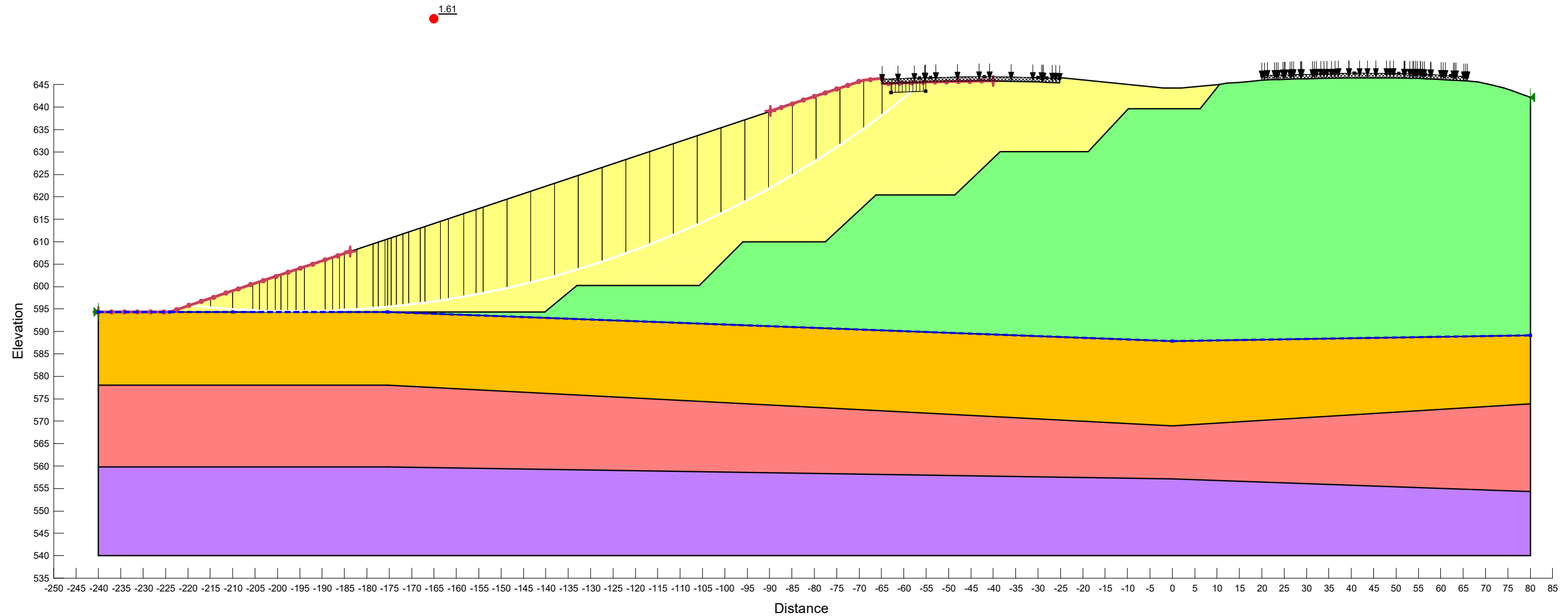
Analysis Cross-Section-1367+50

Slope Stability Analysis - FS = 1.61

Slope Stability (drained)

Note: The results of the analysis shown here are based on available subsurface information, laboratory test results and approximate soil properties. The drawing depicts approximate subsurface conditions based on historical drawings or specific borings at the time of drilling. No warranties can be made regarding the continuity of subsurface conditions.

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
Red	Coarse and Fine Sand [A-3a]	Mohr-Coulomb	130	0	30
Green	Existing Embankment Fill	Mohr-Coulomb	125	200	20
Yellow	New Embankment Fill	Mohr-Coulomb	125	200	20
Orange	Sandy Silt [A-4a]	Mohr-Coulomb	125	140	31.4
Purple	Silty [A-4b]	Mohr-Coulomb	125	0	30



MEG-33-19.11

ODOT District 10

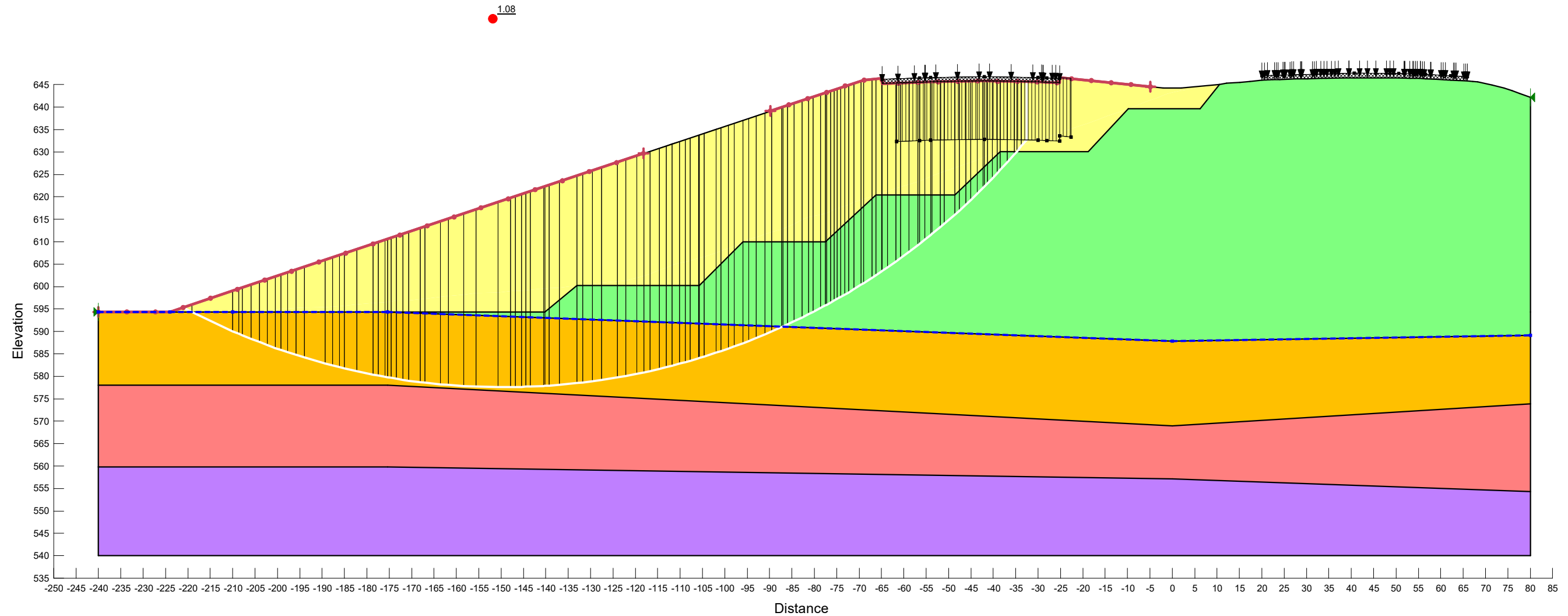
Analysis Cross-Section-1367+50

Slope Stability Analysis - FS = 1.08

Slope Stability (undrained)

Note: The results of the analysis shown here are based on available subsurface information, laboratory test results and approximate soil properties based on historical drawings or specific borings at the time of drilling. No warranties can be made regarding the continuity of subsurface conditions.

Color	Name	Model	Unit Weight (pcf)	Cohesion (psf)	Cohesion' (psf)	Phi' (°)
Red	Coarse and Fine Sand [A-3a] (Total Stress)	Mohr-Coulomb	130		0	30
Green	Existing Embankment Fill (Total Stress)	Undrained (Phi=0)	125	1,500		
Yellow	New Embankment Fill (Total Stress)	Undrained (Phi=0)	125	1,500		
Orange	Sandy Silt [A-4a] (Total Stress)	Undrained (Phi=0)	125	720		
Purple	Silty [A-4b] (Total Stress)	Mohr-Coulomb	125		0	30





Project	MEG-33-19.11		
Sheet No.	1	of	1
Scale	NTS		
Calculated By	GK		Date
Checked By	JS		Date
			6/11/2024
			6/15/2024

Construction Rate Analysis - Station 1353+00

Because the short-term factor of safety was less than the ODOT required minimum of 1.3, a controlled rate of fill should be used. Assume that the percent consolidation (U) is directly proportional to the ratio of short term and long term factors of safety.

$$U_{req} = [(FS_{req} - FS_{ST}) / (FS_{LT} - FS_{ST})] \times 100\%$$

- where: U_{req} = required percent consolidation
 $FS_{required}$ = required short term factor of safety = 1.30
 $FS_{short\ term}$ = calculated short term factor of safety = 1.27
 $FS_{long\ term}$ = calculated short term factor of safety = 1.71

$$U_{req} = [(FS_{req} - FS_{ST}) / (FS_{LT} - FS_{ST})] \times 100\% = 6.82\ \text{percent}$$

Estimate the time required for the required percent consolidation to occur.

$$t_v = T_v(D_p)^2 / C_v$$

- where: t_v = time for required consolidation to occur
 T_v = time factor for required % consolidation = 0.0039
 D_p = drainage path (feet) = 14.28 assuming one-way drainage
 C_v = coefficient of consolidation (ft²/day) = 0.7 based on average LL
Average LL = 22

$$t_v = T_v(D_p)^2 / C_v = 1.12\ \text{days}$$

Estimate the permissible construction rate.

$$\text{Permissible Construction Rate} = \frac{\text{Fill Height} \times 7\ \text{days per week}}{t_v}$$

where: Fill Height = 27 feet

$$\text{Permissible Construction Rate} = 169\ \text{feet per week}$$

Reference: Das, Principles of Geotechnical Engineering, 3rd Edition, 1994.



Project	MEG-33-19.11		
Sheet No.	1	of	1
Scale	NTS		
Calculated By	GK		Date
Checked By	JS		Date
			6/11/2024
			6/15/2024

Construction Rate Analysis - Station 1367+50

Because the short-term factor of safety was less than the ODOT required minimum of 1.3, a controlled rate of fill should be used. Assume that the percent consolidation (U) is directly proportional to the ratio of short term and long term factors of safety.

$$U_{req} = [(FS_{req} - FS_{ST}) / (FS_{LT} - FS_{ST})] \times 100\%$$

- where: U_{req} = required percent consolidation
 $FS_{required}$ = required short term factor of safety = 1.30
 $FS_{short\ term}$ = calculated short term factor of safety = 1.08
 $FS_{long\ term}$ = calculated short term factor of safety = 1.61

$$U_{req} = [(FS_{req} - FS_{ST}) / (FS_{LT} - FS_{ST})] \times 100\% = 41.5\ \text{percent}$$

Estimate the time required for the required percent consolidation to occur.

$$t_v = T_v(D_p)^2 / C_v$$

- where: t_v = time for required consolidation to occur
 T_v = time factor for required % consolidation = 0.1350
 D_p = drainage path (feet) = 16.25 assuming one-way drainage
 C_v = coefficient of consolidation (ft²/day) = 0.6 based on average LL
Average LL = 23

$$t_v = T_v(D_p)^2 / C_v = 59.4\ \text{days}$$

Estimate the permissible construction rate.

$$\text{Permissible Construction Rate} = \frac{\text{Fill Height} \times 7\ \text{days per week}}{t_v}$$

where: Fill Height = 29 feet

$$\text{Permissible Construction Rate} = 3.4\ \text{feet per week}$$

Reference: Das, Principles of Geotechnical Engineering, 3rd Edition, 1994.

EMBANKMENT STABILITY SECTIONS

NEW & EXISTING EMBANKMENT FILL

Assumed A-7-6 soil compacted per ODOT specifications.

References:

- Table 500-2 of ODOT GDM
- 1999 Historic Geotechnical Analysis

Unit Weight: 125 pcf

Drained Properties:

- c' : 200 psf (Table 500-2); 200 psf (Historic Analysis) – Choose 200 psf
- ϕ' : 26 degrees (Table 500-2); 20 degrees (Historic Analysis) – Choose 20 degrees

Undrained Properties:

- c : 2,000 psf (Table 500-2); 1,500 psf (Historic Analysis) – Choose 1,500 psf
- ϕ : 0 degrees (Table 500-2 & Historic Analysis); – Choose 0 degrees

IN SITU MATERIAL

2023 Drilling Program – Very Stiff Sandy Silt (A-4a)

Historic Analysis – Silty Clay (A-6b)

References:

- Section 404.1 & 405 of ODOT GDM
- 1999 Historic Geotechnical Analysis
- Appendix A of ODOT SGE
- GB-7 of ODOT

Unit Weight: 125 pcf (Table 400-4, ODOT GDM)

Drained Properties:

- For undrained shear strength greater than 2,000 psf, use the following per Section 404.1 of GDM:

$$c' = 0.4S_u^{0.8} - \frac{S_u}{100} + 45$$

Average pocket penetrometer: 3.50 tsf – $S_u = 1.75$ tsf or 3,500 psf (Appendix A.1 of ODOT SGE)
 c' : 350 psf

Calculated by: J. Swindler 3/27/2024

Reviewed by: E. Kistner 3/27/2024

Alternatively: Historic Analysis: c' : 300 psf

Choose: $c'=300$ psf

- ϕ' : 25 degrees (ODOT GB-7, Table 2)
 ϕ' : 30 degrees (Historic Analysis)

Choose: $f'=30$ degrees

Undrained Properties:

- For N_{60} less than 52, multiply N_{60} by 125 (GDM, Section 404.1)
 $c: 125 * 22 = 2,750$ psf
 $c=2,000$ psf (Historic Analysis)
Choose $c=2,000$ psf
- ϕ : 0 degrees

BEDROCK

2023 Drilling Program – Shale (Augered)

References:

- Section 406 of ODOT GDM
- Appendix A of ODOT SGE

Unit Weight: 140 pcf (Table 400-4, ODOT GDM)

For undrained shear strength greater than 2,000 psf, use the following per Section 404.1 of GDM:

$$UCS (ksf) = 0.092 \times (N_{rate})^{90} (bpf).$$

Rig Efficiency = 90.00%

$$\begin{aligned} N_{90} &= 92 \text{ bpf} \\ Q_u(ksf) &= 0.092 * 92 \text{ bpf} = 8.46 \text{ ksf or } 16,930 \text{ psf} \\ c (psf) &= \frac{16,930 \text{ psf}}{2} = 8,465 \text{ psf} \end{aligned}$$

Settle3 Analysis Information

MEG-33-19.11 Roadway Settlement

Project Settings

Document Name	Station 1367+50
Project Title	MEG-33-19.11 Roadway Settlement
Analysis	Station 1367+50
Author	J. Samples
Company	Stantec
Date Created	11/27/2024, 11:30:22 AM
Stress Computation Method	Boussinesq
Time-dependent Consolidation Analysis	
Time Units	days
Permeability Units	feet/day
Minimum settlement ratio for subgrade modulus	0.9
Use average properties to calculate layered stresses	
Improve consolidation accuracy	
Ignore negative effective stresses in settlement calculations	

Stage Settings

Stage #	Name	Time [days]
1	Stage 1	0
2	Stage 2	10958
3	Stage 3	10960
4	Stage 4	10967
5	Stage 5	10974
6	Stage 6	10990
7	Stage 7	11050
8	Stage 8	11325
9	Stage 9	14610

Results (relative to Stage: Stage 3 = 10960 d)

Time taken to compute: 0.218356 seconds

Stage: Stage 1 = 0 d

Data Type	Minimum	Maximum
Total Settlement [in]	-12.1459	0
Total Consolidation Settlement [in]	-12.1459	0
Virgin Consolidation Settlement [in]	0	0
Recompression Consolidation Settlement [in]	-12.1459	0
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress ZZ [ksf]	-2.80603	-1.68988
Loading Stress XX [ksf]	-1.64267	-1.50079
Loading Stress YY [ksf]	-2.42765	-0.250102
Effective Stress ZZ [ksf]	-3.00647	-1.92009
Effective Stress XX [ksf]	-4.52382	-3.56276
Effective Stress YY [ksf]	-5.43412	-2.17019
Total Stress ZZ [ksf]	-2.80603	-1.68988
Total Stress XX [ksf]	-4.32314	-3.33255
Total Stress YY [ksf]	-5.23369	-1.93998
Modulus of Subgrade Reaction (Total) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Immediate) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Consolidation) [ksf/ft]	0	0
Total Strain	-0.130669	-0.0106538
Pore Water Pressure [ksf]	0.200431	0.230209
Excess Pore Water Pressure [ksf]	0.200431	0.230209
Degree of Consolidation [%]	-75.3429	0
Pre-consolidation Stress [ksf]	0	0
Over-consolidation Ratio	2.08834	8742.19
Void Ratio	0.0169076	0.207372
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft ² /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	-8.61145	-8.61145
Undrained Shear Strength	0	0

Stage: Stage 2 = 10958 d

Data Type	Minimum	Maximum
Total Settlement [in]	-3.55271e-14	0
Total Consolidation Settlement [in]	-3.55271e-14	0
Virgin Consolidation Settlement [in]	0	0
Recompression Consolidation Settlement [in]	-3.55271e-14	0
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress ZZ [ksf]	-2.80603	-1.68988
Loading Stress XX [ksf]	-1.64267	-1.50079
Loading Stress YY [ksf]	-2.42765	-0.250102
Effective Stress ZZ [ksf]	-2.75335e-14	4.44089e-16
Effective Stress XX [ksf]	-1.64267	-1.50079
Effective Stress YY [ksf]	-2.42765	-0.250102
Total Stress ZZ [ksf]	-2.80603	-1.68988
Total Stress XX [ksf]	-4.32314	-3.33255
Total Stress YY [ksf]	-5.23369	-1.93998
Modulus of Subgrade Reaction (Total) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Immediate) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Consolidation) [ksf/ft]	0	0
Total Strain	-1.21431e-16	0
Pore Water Pressure [ksf]	-2.80603	-1.68988
Excess Pore Water Pressure [ksf]	-2.80603	-1.68988
Degree of Consolidation [%]	0	35.0894
Pre-consolidation Stress [ksf]	0	0
Over-consolidation Ratio	-4.44089e-16	1.77636e-14
Void Ratio	0	2.22045e-16
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft ² /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	91.3885	91.3885
Undrained Shear Strength	0	0

Stage: Stage 3 = 10960 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0
Total Consolidation Settlement [in]	0	0
Virgin Consolidation Settlement [in]	0	0
Recompression Consolidation Settlement [in]	0	0
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress ZZ [ksf]	0	0
Loading Stress XX [ksf]	0	0
Loading Stress YY [ksf]	0	0
Effective Stress ZZ [ksf]	0	0
Effective Stress XX [ksf]	0	0
Effective Stress YY [ksf]	0	0
Total Stress ZZ [ksf]	0	0
Total Stress XX [ksf]	0	0
Total Stress YY [ksf]	0	0
Modulus of Subgrade Reaction (Total) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Immediate) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Consolidation) [ksf/ft]	0	0
Total Strain	0	0
Pore Water Pressure [ksf]	0	0
Excess Pore Water Pressure [ksf]	0	0
Degree of Consolidation [%]	0	0
Pre-consolidation Stress [ksf]	0	0
Over-consolidation Ratio	0	0
Void Ratio	0	0
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft ² /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	0	0
Undrained Shear Strength	0	0

Stage: Stage 4 = 10967 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.478128
Total Consolidation Settlement [in]	0	0.478128
Virgin Consolidation Settlement [in]	0	0
Recompression Consolidation Settlement [in]	0	0.478128
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress ZZ [ksf]	0	0
Loading Stress XX [ksf]	0	0
Loading Stress YY [ksf]	0	0
Effective Stress ZZ [ksf]	-0.00320888	2.80603
Effective Stress XX [ksf]	-0.00320888	2.80603
Effective Stress YY [ksf]	-0.00320888	2.80603
Total Stress ZZ [ksf]	-8.88178e-16	1.77636e-15
Total Stress XX [ksf]	-1.77636e-15	1.77636e-15
Total Stress YY [ksf]	-1.77636e-15	1.77636e-15
Modulus of Subgrade Reaction (Total) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Immediate) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Consolidation) [ksf/ft]	0	0
Total Strain	-1.36671e-05	0.0108209
Pore Water Pressure [ksf]	-2.80603	0.00320888
Excess Pore Water Pressure [ksf]	-2.80603	0.00320888
Degree of Consolidation [%]	0	34.8218
Pre-consolidation Stress [ksf]	0	0
Over-consolidation Ratio	-1.47642	0.00200788
Void Ratio	-0.0171728	2.16898e-05
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft ² /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	9.41573	9.41573
Undrained Shear Strength	0	0

Stage: Stage 5 = 10974 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.651937
Total Consolidation Settlement [in]	0	0.651937
Virgin Consolidation Settlement [in]	0	0
Recompression Consolidation Settlement [in]	0	0.651937
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress ZZ [ksf]	0	0
Loading Stress XX [ksf]	0	0
Loading Stress YY [ksf]	0	0
Effective Stress ZZ [ksf]	-0.00618458	2.80603
Effective Stress XX [ksf]	-0.00618458	2.80603
Effective Stress YY [ksf]	-0.00618458	2.80603
Total Stress ZZ [ksf]	-1.77636e-15	1.77636e-15
Total Stress XX [ksf]	-1.77636e-15	1.77636e-15
Total Stress YY [ksf]	-1.77636e-15	1.77636e-15
Modulus of Subgrade Reaction (Total) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Immediate) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Consolidation) [ksf/ft]	0	0
Total Strain	-2.5934e-05	0.0108213
Pore Water Pressure [ksf]	-2.80603	0.00618458
Excess Pore Water Pressure [ksf]	-2.80603	0.00618458
Degree of Consolidation [%]	0	34.8952
Pre-consolidation Stress [ksf]	0	0
Over-consolidation Ratio	-1.47645	0.00384011
Void Ratio	-0.0171734	4.11573e-05
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft ² /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	13.003	13.003
Undrained Shear Strength	0	0

Stage: Stage 6 = 10990 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	0.920973
Total Consolidation Settlement [in]	0	0.920973
Virgin Consolidation Settlement [in]	0	0
Recompression Consolidation Settlement [in]	0	0.920973
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress ZZ [ksf]	0	0
Loading Stress XX [ksf]	0	0
Loading Stress YY [ksf]	0	0
Effective Stress ZZ [ksf]	-0.0113418	2.80603
Effective Stress XX [ksf]	-0.0113418	2.80603
Effective Stress YY [ksf]	-0.0113418	2.80603
Total Stress ZZ [ksf]	-1.77636e-15	1.77636e-15
Total Stress XX [ksf]	-1.77636e-15	1.77636e-15
Total Stress YY [ksf]	-3.55271e-15	1.77636e-15
Modulus of Subgrade Reaction (Total) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Immediate) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Consolidation) [ksf/ft]	0	0
Total Strain	-4.80762e-05	0.0108215
Pore Water Pressure [ksf]	-2.80603	0.0113418
Excess Pore Water Pressure [ksf]	-2.80603	0.0113418
Degree of Consolidation [%]	0	34.9517
Pre-consolidation Stress [ksf]	0	0
Over-consolidation Ratio	-1.47647	0.00717708
Void Ratio	-0.0171737	7.62969e-05
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft ² /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	18.4605	18.4605
Undrained Shear Strength	0	0

Stage: Stage 7 = 11050 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	1.52952
Total Consolidation Settlement [in]	0	1.52952
Virgin Consolidation Settlement [in]	0	0
Recompression Consolidation Settlement [in]	0	1.52952
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress ZZ [ksf]	0	0
Loading Stress XX [ksf]	0	0
Loading Stress YY [ksf]	0	0
Effective Stress ZZ [ksf]	0.00774512	2.80603
Effective Stress XX [ksf]	0.00774512	2.80603
Effective Stress YY [ksf]	0.00774512	2.80603
Total Stress ZZ [ksf]	-1.77636e-15	1.77636e-15
Total Stress XX [ksf]	-1.77636e-15	1.77636e-15
Total Stress YY [ksf]	-3.55271e-15	1.77636e-15
Modulus of Subgrade Reaction (Total) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Immediate) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Consolidation) [ksf/ft]	0	0
Total Strain	6.03072e-05	0.0108216
Pore Water Pressure [ksf]	-2.80603	-0.00774512
Excess Pore Water Pressure [ksf]	-2.80603	-0.00774512
Degree of Consolidation [%]	0	34.9993
Pre-consolidation Stress [ksf]	0	0
Over-consolidation Ratio	-1.47649	-0.00895939
Void Ratio	-0.0171739	-9.57075e-05
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft ² /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	30.8795	30.8795
Undrained Shear Strength	0	0

Stage: Stage 8 = 11325 d

Data Type	Minimum	Maximum
Total Settlement [in]	0	2.84042
Total Consolidation Settlement [in]	0	2.84042
Virgin Consolidation Settlement [in]	0	0
Recompression Consolidation Settlement [in]	0	2.84042
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress ZZ [ksf]	0	0
Loading Stress XX [ksf]	0	0
Loading Stress YY [ksf]	0	0
Effective Stress ZZ [ksf]	0.816294	2.80603
Effective Stress XX [ksf]	0.816294	2.80603
Effective Stress YY [ksf]	0.816294	2.80603
Total Stress ZZ [ksf]	-2.66454e-15	1.77636e-15
Total Stress XX [ksf]	-3.55271e-15	1.77636e-15
Total Stress YY [ksf]	-3.55271e-15	1.77636e-15
Modulus of Subgrade Reaction (Total) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Immediate) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Consolidation) [ksf/ft]	0	0
Total Strain	0.00322639	0.0108217
Pore Water Pressure [ksf]	-2.80603	-0.816294
Excess Pore Water Pressure [ksf]	-2.80603	-0.816294
Degree of Consolidation [%]	0	35.0363
Pre-consolidation Stress [ksf]	0	0
Over-consolidation Ratio	-1.47649	-0.430156
Void Ratio	-0.017174	-0.00512029
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft ² /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	59.9925	59.9925
Undrained Shear Strength	0	0

Stage: Stage 9 = 14610 d

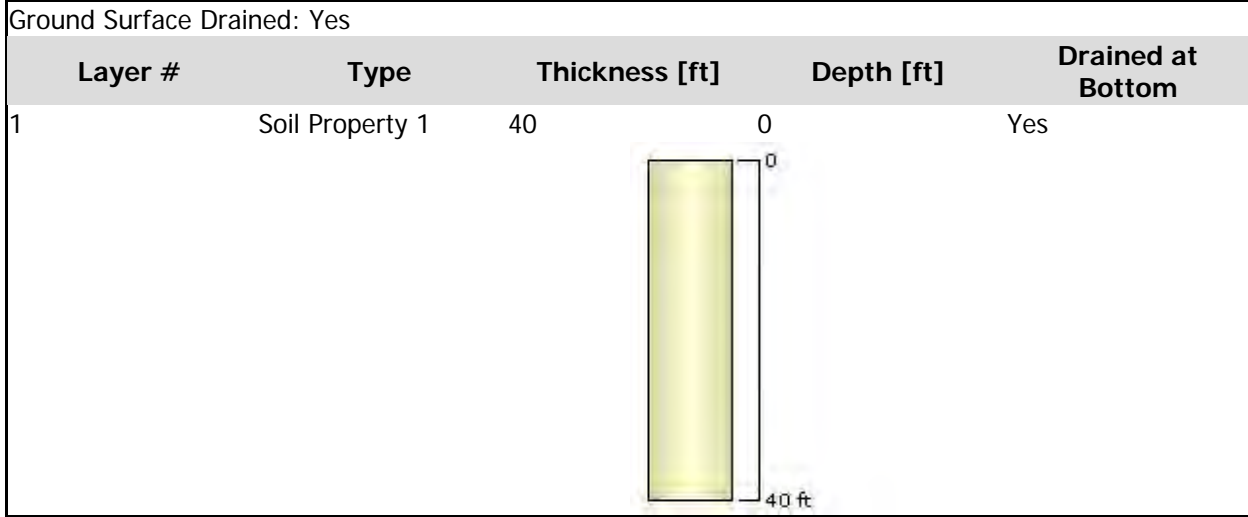
Data Type	Minimum	Maximum
Total Settlement [in]	0	3.97461
Total Consolidation Settlement [in]	0	3.97461
Virgin Consolidation Settlement [in]	0	0
Recompression Consolidation Settlement [in]	0	3.97461
Immediate Settlement [in]	0	0
Secondary Settlement [in]	0	0
Loading Stress ZZ [ksf]	0	0
Loading Stress XX [ksf]	0	0
Loading Stress YY [ksf]	0	0
Effective Stress ZZ [ksf]	1.68988	2.80603
Effective Stress XX [ksf]	1.68988	2.80603
Effective Stress YY [ksf]	1.68988	2.80603
Total Stress ZZ [ksf]	-2.66454e-15	1.77636e-15
Total Stress XX [ksf]	-1.77636e-15	1.77636e-15
Total Stress YY [ksf]	-3.55271e-15	1.77636e-15
Modulus of Subgrade Reaction (Total) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Immediate) [ksf/ft]	0	0
Modulus of Subgrade Reaction (Consolidation) [ksf/ft]	0	0
Total Strain	0.00575925	0.0108217
Pore Water Pressure [ksf]	-2.80603	-1.68988
Excess Pore Water Pressure [ksf]	-2.80603	-1.68988
Degree of Consolidation [%]	0	35.0894
Pre-consolidation Stress [ksf]	0	0
Over-consolidation Ratio	-1.47649	-0.676443
Void Ratio	-0.017174	-0.00913993
Permeability [ft/d]	0	0
Coefficient of Consolidation [ft ² /d]	0	0
Hydroconsolidation Settlement [in]	0	0
Average Degree of Consolidation [%]	91.3789	91.3789
Undrained Shear Strength	0	0

Embankments


1. Embankment: "Embankment Load 1"

Label	Embankment Load 1		
Center Line	(0, 0) to (0, 50)		
Near End Angle	90 degrees		
Far End Angle	90 degrees		
Number of Zones	2		
Number of Sections	2		
	Zone	Name	Unit Weight (kips/ft3)
1		New Zone	0.125
2		New Zone 2	0.125

Soil Layers



Soil Properties

Property	Soil Property 1
Color	
Unit Weight [kips/ft3]	0.115
Saturated Unit Weight [kips/ft3]	0.115
K0	1
Primary Consolidation	Enabled
Material Type	Non-Linear
Cc	0.277
Cr	0.06
e0	0.587
Pc [ksf]	9.2
Cv [ft2/d]	0.27
Cvr [ft2/d]	0.27
B-bar	1
Undrained Su A [kips/ft2]	0
Undrained Su S	0.2
Undrained Su m	0.8
Piezo Line ID	1

Groundwater

Groundwater method

Piezometric Lines

Water Unit Weight

0.0624 kips/ft³

Piezometric Line Entities

ID	Depth (ft)
1	0 ft

Query Points

Point #	Query Point Name	(X,Y) Location	Number of Divisions
1	Query Point 1	75, 25	Auto: 31

Time Points

Point #	(X,Y) Location	Depth	Goal Type	Goal	Time Until Goal
1	75, 25	0 ft	Total Settlement	13.12 in	34.5635 d

APPENDIX J
REINFORCED SOIL SLOPE ANALYSES

MEG-33-19.11_1019+50

ReSSA+: Update #0.180

Report created by ReSSA+: Copyright (c) 2001-2024, ADAMA Engineering, Inc.

PROJECT IDENTIFICATION

Title: MEG-33-19.11_1019+50
 Project Number: 173609140 -
 Client: ODOT
 Designer: GK

Description:

Company's information:

Name: Stantec Consulting Services Inc
 Street: 10200 Alliance Rd
 Suite 300
 Blue Ash, OH

Telephone #:
 Fax #:
 E-Mail:

File path and name: \\US0247-P lysis\1019+50\ReSSA station 1019+50_long term.MSEp
 Original date and time of creating this file: Fri Jun 07 07:55:22 2024

PROGRAM MODE: Analysis of a Simplified Slope using GEOSYNTHETIC as reinforcing material.

INPUT DATA (EXCLUDING REINFORCEMENT LAYOUT)

SOIL DATA

Soil Layer #:	Unit weight, γ [lb/ft ³]	Internal angle of friction, ϕ [deg.]	Cohesion, c [lb/ft ²]
REINFORCED SOIL.....	125.0	20.0	200.0
RETAINED SOIL.....	125.0	20.0	200.0
FOUNDATION SOIL.....	125.0	30.0	300.0

REINFORCEMENT

Reinforcement Type #	Geosynthetic Designated Name	Ultimate Strength, Tult [lb/ft]	Reduction Factor for Installation Damage, RFid	Reduction Factor for Durability, RFd	Reduction Factor for Creep, RFC	Additional Reduction Factor, RFa	Coverage Ratio, Rc
3	P3	2500.00	1.00	1.00	1.00	1.00	1.00

Interaction Parameters Type #	Geosynthetic Designated Name	== Direct Sliding == Cds-phi	Cds-c	==== Pullout ==== Ci	Alpha
3	P3	0.67	0.67	0.67	1.00

Relative Orientation of Reinforcement Force, ROR = 0.00. Assigned Factor of Safety to resist pullout, Fs-po = 1.50
 Design method for Global Stability: Comprehensive Bishop.

WATER

Unit weight of water = 62.45 [lb/ft³]
 Water pressure is defined by phreatic surface in Effective Stress Analysis.

SEISMICITY

Not Applicable

DRAWING OF SPECIFIED GEOMETRY - SIMPLE

GEOMETRY

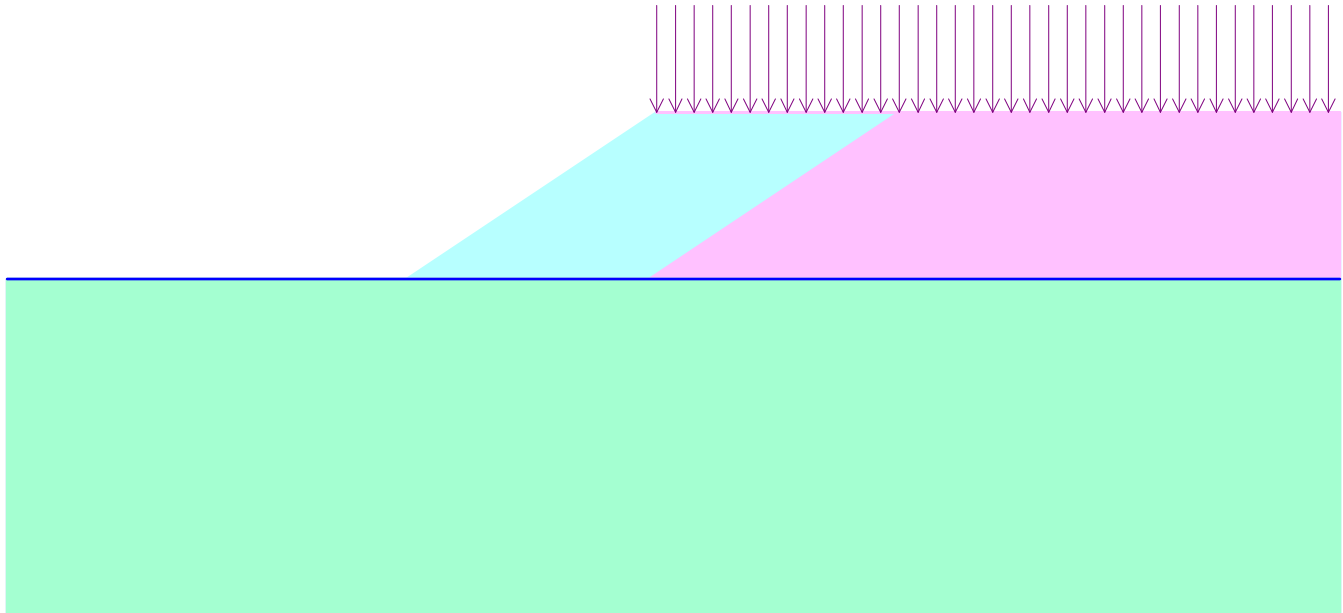
Height of slope, H	55.00 [ft]
Slope angle, i	33.69 [deg.]
Horizontal crest length, A	0.00 [ft]
Horizontal crest length, B	0.00 [ft]
Backslope angle, β	0.00 [deg.]
Sloping angle, α	0.00 [deg.]

WATER GEOMETRY Coordinates of water line in [ft]

#	1	Xw =	0.00	Yw =	0.00
#	2	Xw =	16.40	Yw =	0.00
#	3	Xw =	26.25	Yw =	0.00
#	4	Xw =	32.81	Yw =	0.00

UNIFORM SURCHARGE

Surcharge load over A, Q1	0.00 [lb/ft ²]
Surcharge load over backslope B, Q2	0.00 [lb/ft ²]
Surcharge load away from backslope, Q3	250.00 [lb/ft ²]

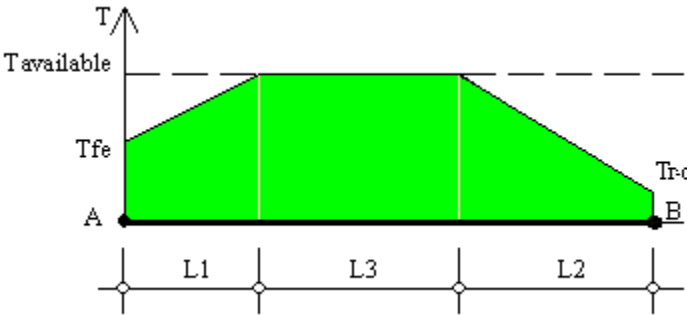


SCALE:

0.5112230 [ft]



DISTRIBUTION OF AVAILABLE STRENGTH ALONG EACH REINFORCEMENT LAYER



A = Front-end of reinforcement (at face of slope)
 B = Rear-end of reinforcement
 AB = L1 + L2 + L3 = Embedded length of reinforcement

Tavailable = Long-term strength of reinforcement
 Tfe = Available front-end strength (e.g., connection to facing)
 Tr-o = Pullout resistance at rear-end

L1 = Front-end 'pullout' length
 L2 = Rear-end pullout length
 Tavailable prevails along L3

Factor of safety on resistance to pullout on either end of reinforcement, $F_s-po = 1.50$

Reinforcement Layer #	Designated Name	Height Relative to Toe [ft]	L [ft]	L1 [ft]	L2 [ft]	L3 [ft]	Tfe [lb/ft]	Tr-o [lb/ft]	Tavailable [lb/ft]
1	P3	1.00	80.00	8.50	1.08	70.42	0.00	0.00	2500.00
2	P3	2.00	80.00	8.50	1.08	70.42	0.00	0.00	2500.00
3	P3	3.00	75.00	8.50	1.15	65.35	0.00	0.00	2500.00
4	P3	4.00	75.00	8.50	1.15	65.35	0.00	0.00	2500.00
5	P3	5.00	75.00	8.50	1.15	65.35	0.00	0.00	2500.00
6	P3	8.00	75.00	8.50	1.21	65.29	0.00	0.00	2500.00
7	P3	11.00	75.00	8.50	1.28	65.22	0.00	0.00	2500.00
8	P3	14.00	75.00	8.50	1.38	65.12	0.00	0.00	2500.00
9	P3	17.00	70.00	8.50	1.48	60.03	0.00	0.00	2500.00
10	P3	23.00	70.00	8.50	1.71	59.80	0.00	0.00	2500.00
11	P3	29.00	70.00	8.50	2.03	59.47	0.00	0.00	2500.00
12	P3	35.00	70.00	8.50	2.53	58.98	0.00	0.00	2500.00
13	P3	41.00	60.00	8.50	3.35	48.16	0.00	0.00	2500.00
14	P3	47.00	60.00	8.50	4.99	46.52	0.00	0.00	2500.00
15	P3	53.00	60.00	10.10	9.65	40.25	0.00	0.00	2500.00

RESULTS OF ROTATIONAL STABILITY ANALYSIS

Results in the tables below represent critical circles identified between specified points on entry and exit. (Theta-exit set to 50.00 deg.)
 The most critical circle is obtained from a search considering all the combinations of input entry and exit points.

Critical circles for each entry point (considering all specified exit points)									
Entry Point #	Entry Point (X, Y) [ft]		Exit Point (X, Y) [ft]		Critical Circle (Xc, Yc, R) [ft]			Fs	STATUS
1	82.00	54.67	9.67	6.74	23.38	64.61	59.46	1.48	
2	88.80	55.00	7.60	5.78	17.71	80.69	75.59	1.38	
3	95.60	55.00	7.76	5.76	18.75	89.13	84.09	1.32	
4	102.40	55.00	7.92	5.73	18.49	100.69	95.55	1.31	OK
5	109.20	55.00	8.09	5.71	19.53	110.60	105.51	1.32	
6	116.00	55.00	8.26	5.69	20.63	121.04	116.01	1.35	
7	122.80	55.00	8.43	5.67	19.93	136.27	131.10	1.39	
8	129.60	55.00	7.26	5.78	20.98	148.33	143.21	1.44	
9	136.40	55.00	7.38	5.77	22.08	160.92	155.84	1.44	
10	143.20	55.00	1.80	1.77	24.26	156.51	156.37	1.45	
11	150.00	55.00	7.64	5.79	31.30	167.87	163.80	1.47	

Note: In the 'Status' column, OK means the critical circle was identified within the specified search domain. 'On extreme X-entry' means that the critical result is on the edge of the search domain; a lower Fs may result if the search domain is expanded.

Results in the tables below represent critical circles identified between specified points on entry and exit. (Theta-exit set to 50.00 deg.)
 The most critical circle is obtained from a search considering all the combinations of input entry and exit points.

Critical circles for each exit point (considering all specified entry points)									
Exit Point #	Exit Point (X, Y) [ft]		Entry Point (X, Y) [ft]		Critical Circle (Xc, Yc, R) [ft]			Fs	STATUS
1	-6.18	0.07	109.20	55.00	1.90	131.73	131.91	1.48	
2	-3.94	0.02	109.20	55.00	3.27	129.11	129.28	1.47	
3	-3.00	0.04	109.20	55.00	2.56	130.69	130.77	1.46	
4	-0.75	0.01	109.20	55.00	3.97	127.99	128.07	1.45	
5	0.25	0.75	109.20	55.00	12.73	112.22	112.17	1.42	
6	1.74	1.75	109.20	55.00	14.09	111.89	110.83	1.40	
7	3.23	2.75	109.20	55.00	15.45	111.56	109.50	1.38	
8	5.01	3.72	102.40	55.00	15.77	101.40	98.28	1.36	
9	6.87	4.68	102.40	55.00	17.13	101.05	96.91	1.34	
10	7.92	5.73	102.40	55.00	18.49	100.69	95.55	1.31	OK
11	9.03	6.86	102.40	55.00	25.94	88.68	83.55	1.32	

Note: In the 'Status' column, OK means the critical circle was identified within the specified search domain. 'On extreme X-exit' means that the critical result is on the edge of the search domain; a lower Fs may result if the search domain is expanded.

CRITICAL RESULTS OF ROTATIONAL AND TRANSLATIONAL STABILITY ANALYSES

Rotational (Circular Arc; Bishop) Stability Analysis

Minimum Factor of Safety = 1.31

Critical Circle: $X_c = 18.49$ [ft], $Y_c = 100.69$ [ft], $R = 95.55$ [ft]. (Number of slices used = 61)

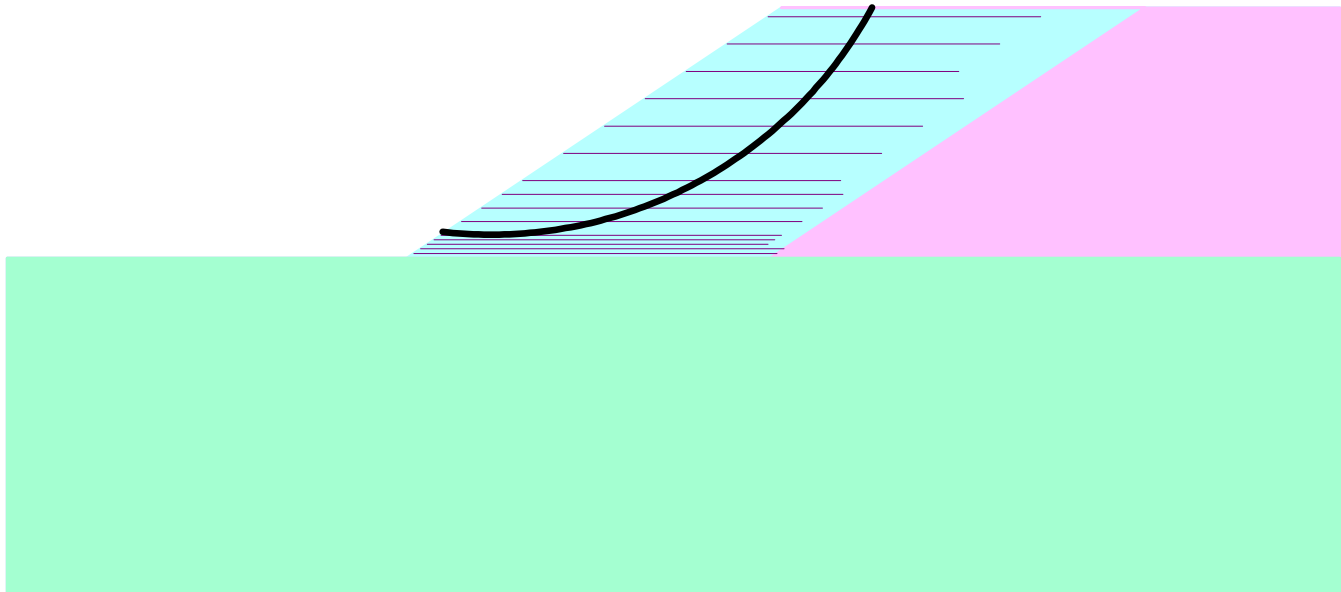
Translational (2-Part Wedge; Spencer), Direct Sliding, Stability Analysis

NOT CONDUCTED

Three-Part Wedge Stability Analysis

NOT CONDUCTED

REINFORCEMENT LAYOUT: DRAWING



SCALE:

0 5 10 20 30 [ft]





REINFORCEMENT LAYOUT: TABULATED DATA & QUANTITIES

Layer #	Reinf. Type #	Geosynthetic Designated Name	Height Relative to Toe [ft]	Embedded Length [ft]	Covergae Ratio, Rc	(X, Y) front [ft]	(X, Y) rear [ft]	Lsv * [ft]	Lre [ft]		
1	3	P3	1.00	80.00	1.00	1.50	1.00	81.50	1.00	0.00	0.00
2	3	P3	2.00	80.00	1.00	3.00	2.00	83.00	2.00	0.00	0.00
3	3	P3	3.00	75.00	1.00	4.50	3.00	79.50	3.00	0.00	0.00
4	3	P3	4.00	75.00	1.00	6.00	4.00	81.00	4.00	0.00	0.00
5	3	P3	5.00	75.00	1.00	7.50	5.00	82.50	5.00	0.00	0.00
6	3	P3	8.00	75.00	1.00	12.00	8.00	87.00	8.00	0.00	0.00
7	3	P3	11.00	75.00	1.00	16.50	11.00	91.50	11.00	0.00	0.00
8	3	P3	14.00	75.00	1.00	21.00	14.00	96.00	14.00	0.00	0.00
9	3	P3	17.00	70.00	1.00	25.50	17.00	95.50	17.00	0.00	0.00
10	3	P3	23.00	70.00	1.00	34.50	23.00	104.50	23.00	0.00	0.00
11	3	P3	29.00	70.00	1.00	43.50	29.00	113.50	29.00	0.00	0.00
12	3	P3	35.00	70.00	1.00	52.50	35.00	122.50	35.00	0.00	0.00
13	3	P3	41.00	60.00	1.00	61.50	41.00	121.50	41.00	0.00	0.00
14	3	P3	47.00	60.00	1.00	70.50	47.00	130.50	47.00	0.00	0.00
15	3	P3	53.00	60.00	1.00	79.50	53.00	139.50	53.00	0.00	0.00

* Vertical distance between layers.

QUANTITIES

Reinf. Type #	Designated Name	Coverage Ratio	Area of reinforcemnt [ft ²] / length of slope [ft]
3	P3	1.00	1070.00

MEG-33-19.11_1019+50 Short Term

ReSSA+: Update #0.180

Report created by ReSSA+: Copyright (c) 2001-2024, ADAMA Engineering, Inc.

PROJECT IDENTIFICATION

Title: MEG-33-19.11_1019+50 Short Term
Project Number: 173609140 -
Client: ODOT
Designer: GK

Description:

Company's information:

Name: Stantec Consulting Services Inc
Street: 10200 Alliance Rd
Suite 300
Blue Ash, OH

Telephone #:
Fax #:
E-Mail:

File path and name:

Original date and time of creating this file: Fri Jun 07 09:59:04 2024

PROGRAM MODE: Analysis of a Simplified Slope using GEOSYNTHETIC as reinforcing material.

INPUT DATA (EXCLUDING REINFORCEMENT LAYOUT)

SOIL DATA

Soil Layer #:	Unit weight, γ [lb/ft ³]	Internal angle of friction, ϕ [deg.]	Cohesion, c [lb/ft ²]
REINFORCED SOIL.....	125.0	0.0	1500.0
RETAINED SOIL.....	125.0	0.0	1500.0
FOUNDATION SOIL.....	125.0	0.0	2000.0

REINFORCEMENT

Reinforcement Type #	Geosynthetic Designated Name	Ultimate Strength, Tult [lb/ft]	Reduction Factor for Installation Damage, RFid	Reduction Factor for Durability, RFd	Reduction Factor for Creep, RFc	Additional Reduction Factor, RFa	Coverage Ratio, Rc
3	P3	2500.00	1.00	1.00	1.00	1.00	1.00

Interaction Parameters Type #	Geosynthetic Designated Name	== Direct Sliding == Cds-phi	Cds-c	==== Pullout ==== Ci	Alpha
3	P3	0.67	0.67	0.67	1.00

Relative Orientation of Reinforcement Force, ROR = 0.00. Assigned Factor of Safety to resist pullout, Fs-po = 1.50
 Design method for Global Stability: Comprehensive Bishop.

WATER

Unit weight of water = 62.45 [lb/ft³]
 Water ponding is defined by 'phreatic surface' in Total Stress Analysis.

SEISMICITY

Not Applicable

DRAWING OF SPECIFIED GEOMETRY - SIMPLE

GEOMETRY

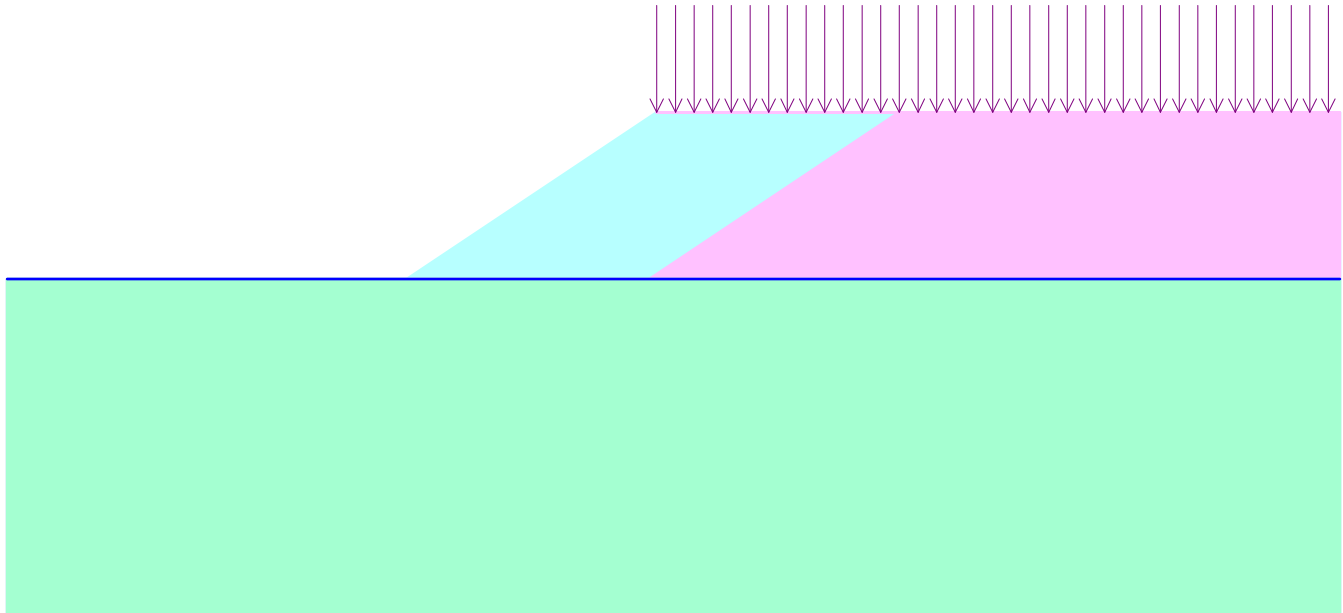
Height of slope, H	55.00 [ft]
Slope angle, i	33.69 [deg.]
Horizontal crest length, A	0.00 [ft]
Horizontal crest length, B	0.00 [ft]
Backslope angle, β	0.00 [deg.]
Sloping angle, α	0.00 [deg.]

WATER GEOMETRY Coordinates of water line in [ft]

#	1	Xw =	0.00	Yw =	0.00
#	2	Xw =	16.40	Yw =	0.00
#	3	Xw =	26.25	Yw =	0.00
#	4	Xw =	32.81	Yw =	0.00

UNIFORM SURCHARGE

Surcharge load over A, Q1	0.00 [lb/ft ²]
Surcharge load over backslope B, Q2	0.00 [lb/ft ²]
Surcharge load away from backslope, Q3	250.00 [lb/ft ²]

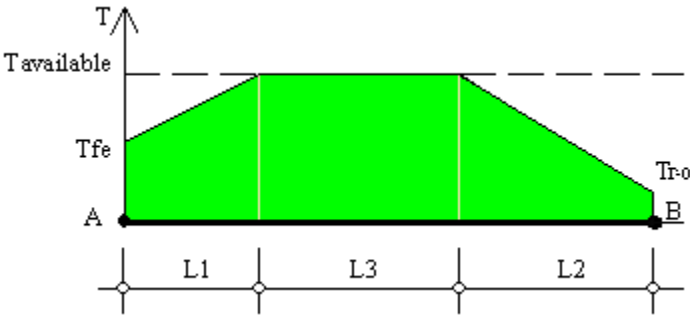


SCALE:

0.5112230 [ft]



DISTRIBUTION OF AVAILABLE STRENGTH ALONG EACH REINFORCEMENT LAYER



A = Front-end of reinforcement (at face of slope)
 B = Rear-end of reinforcement
 AB = L1 + L2 + L3 = Embedded length of reinforcement

Tavailable = Long-term strength of reinforcement
 Tfe = Available front-end strength (e.g., connection to facing)
 Tr-o = Pullout resistance at rear-end

L1 = Front-end 'pullout' length
 L2 = Rear-end pullout length
 Tavailable prevails along L3

Factor of safety on resistance to pullout on either end of reinforcement, $F_{s-po} = 1.50$

Reinforcement Layer #	Designated Name	Height Relative to Toe [ft]	L [ft]	L1 [ft]	L2 [ft]	L3 [ft]	Tfe [lb/ft]	Tr-o [lb/ft]	Tavailable [lb/ft]
1	P3	1.00	80.00	1.87	1.87	76.26	0.00	0.00	2500.00
2	P3	2.00	80.00	1.87	1.87	76.26	0.00	0.00	2500.00
3	P3	3.00	75.00	1.87	1.87	71.26	0.00	0.00	2500.00
4	P3	4.00	75.00	1.87	1.87	71.26	0.00	0.00	2500.00
5	P3	5.00	75.00	1.87	1.87	71.26	0.00	0.00	2500.00
6	P3	8.00	75.00	1.87	1.87	71.26	0.00	0.00	2500.00
7	P3	11.00	75.00	1.87	1.87	71.26	0.00	0.00	2500.00
8	P3	14.00	75.00	1.87	1.87	71.26	0.00	0.00	2500.00
9	P3	17.00	70.00	1.87	1.87	66.26	0.00	0.00	2500.00
10	P3	23.00	70.00	1.87	1.87	66.26	0.00	0.00	2500.00
11	P3	29.00	70.00	1.87	1.87	66.26	0.00	0.00	2500.00
12	P3	35.00	70.00	1.87	1.87	66.26	0.00	0.00	2500.00
13	P3	41.00	60.00	1.87	1.87	56.26	0.00	0.00	2500.00
14	P3	47.00	60.00	1.87	1.87	56.26	0.00	0.00	2500.00
15	P3	53.00	60.00	1.87	1.87	56.26	0.00	0.00	2500.00

RESULTS OF ROTATIONAL STABILITY ANALYSIS

Results in the tables below represent critical circles identified between specified points on entry and exit. (Theta-exit set to 50.00 deg.)
 The most critical circle is obtained from a search considering all the combinations of input entry and exit points.

Critical circles for each entry point (considering all specified exit points)									
Entry Point #	Entry Point (X, Y) [ft]		Exit Point (X, Y) [ft]		Critical Circle (Xc, Yc, R) [ft]			Fs	STATUS
1	82.00	54.67	-27.42	0.68	13.67	55.29	68.34	2.74	
2	93.80	55.00	-5.83	0.21	28.90	55.04	64.91	2.13	
3	105.60	55.00	-16.95	0.84	32.17	55.42	73.43	1.76	
4	117.40	55.00	-6.86	0.87	37.48	68.78	81.10	1.63	
5	129.20	55.00	-16.09	0.07	39.25	73.32	91.80	1.58	
6	141.00	55.00	-27.14	0.54	40.19	79.47	103.74	1.55	
7	152.80	55.00	-37.42	0.40	41.48	84.16	115.08	1.54	
8	164.60	55.00	-58.78	0.88	38.60	86.98	129.99	1.54	
9	176.40	55.00	-69.37	1.05	39.73	90.82	141.29	1.53	
10	188.20	55.00	-79.55	0.66	39.75	99.64	155.02	1.53	OK
11	200.00	55.00	-100.05	0.06	34.37	112.75	175.41	1.53	

Note: In the 'Status' column, OK means the critical circle was identified within the specified search domain. 'On extreme X-entry' means that the critical result is on the edge of the search domain; a lower Fs may result if the search domain is expanded.

Results in the tables below represent critical circles identified between specified points on entry and exit. (Theta-exit set to 50.00 deg.)
 The most critical circle is obtained from a search considering all the combinations of input entry and exit points.

Critical circles for each exit point (considering all specified entry points)									
Exit Point #	Exit Point (X, Y) [ft]		Entry Point (X, Y) [ft]		Critical Circle (Xc, Yc, R) [ft]			Fs	STATUS
1	-100.05	0.06	200.00	55.00	34.37	112.75	175.41	1.53	
2	-90.45	1.15	188.20	55.00	34.23	103.82	161.52	1.53	
3	-79.55	0.66	188.20	55.00	39.75	99.64	155.02	1.53	OK
4	-69.37	1.05	176.40	55.00	39.73	90.82	141.29	1.53	
5	-58.02	0.03	176.40	55.00	45.31	86.69	134.86	1.53	
6	-48.89	1.46	164.60	55.00	43.02	87.41	125.83	1.54	
7	-38.57	1.49	164.60	55.00	46.79	89.85	122.86	1.54	
8	-26.57	0.06	152.80	55.00	45.33	85.60	111.74	1.55	
9	-17.21	0.86	141.00	55.00	42.74	83.90	102.42	1.55	
10	-6.65	0.62	141.00	55.00	43.49	92.13	104.34	1.55	
11	3.78	3.89	141.00	55.00	46.99	97.64	103.23	1.60	

Note: In the 'Status' column, OK means the critical circle was identified within the specified search domain. 'On extreme X-exit' means that the critical result is on the edge of the search domain; a lower Fs may result if the search domain is expanded.

CRITICAL RESULTS OF ROTATIONAL AND TRANSLATIONAL STABILITY ANALYSES

Rotational (Circular Arc; Bishop) Stability Analysis

Minimum Factor of Safety = 1.53

Critical Circle: $X_c = 39.75[ft]$, $Y_c = 99.64[ft]$, $R = 155.02[ft]$. (Number of slices used = 65)

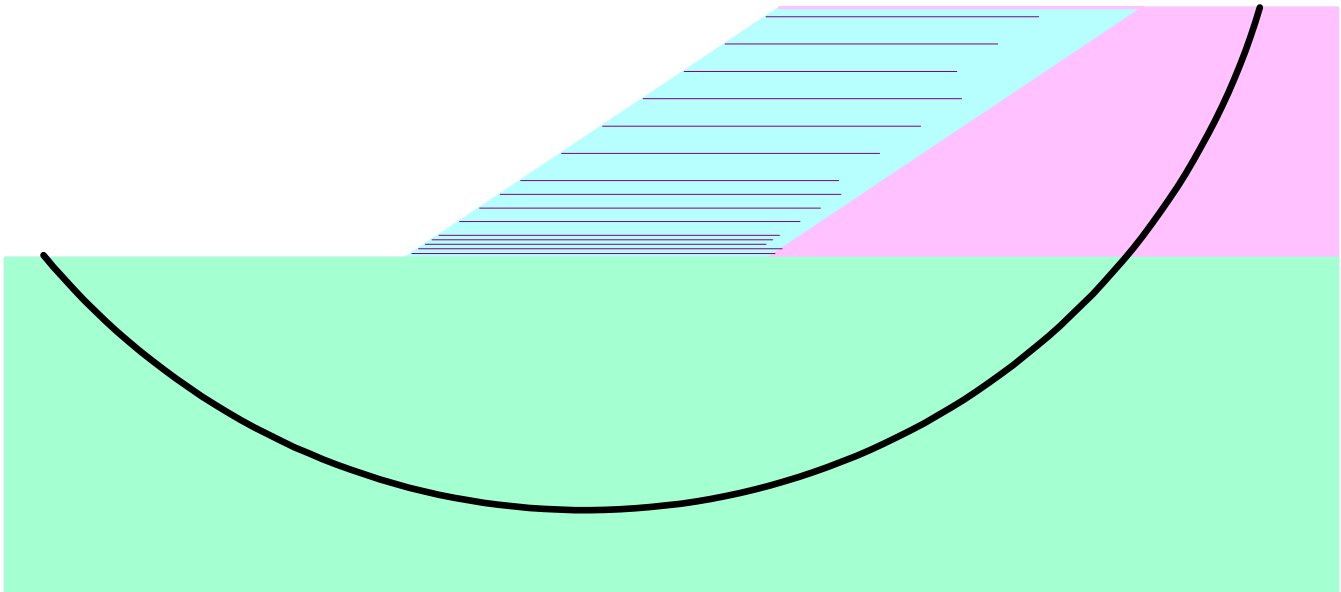
Translational (2-Part Wedge; Spencer), Direct Sliding, Stability Analysis

NOT CONDUCTED

Three-Part Wedge Stability Analysis

NOT CONDUCTED

REINFORCEMENT LAYOUT: DRAWING



SCALE:

0 5 1(1:2)(2:30)[ft]





REINFORCEMENT LAYOUT: TABULATED DATA & QUANTITIES

Layer #	Reinf. Type #	Geosynthetic Designated Name	Height Relative to Toe [ft]	Embedded Length [ft]	Covergae Ratio, Rc	(X, Y) front [ft]	(X, Y) rear [ft]	Lsv * [ft]	Lre [ft]		
1	3	P3	1.00	80.00	1.00	1.50	1.00	81.50	1.00	0.00	0.00
2	3	P3	2.00	80.00	1.00	3.00	2.00	83.00	2.00	0.00	0.00
3	3	P3	3.00	75.00	1.00	4.50	3.00	79.50	3.00	0.00	0.00
4	3	P3	4.00	75.00	1.00	6.00	4.00	81.00	4.00	0.00	0.00
5	3	P3	5.00	75.00	1.00	7.50	5.00	82.50	5.00	0.00	0.00
6	3	P3	8.00	75.00	1.00	12.00	8.00	87.00	8.00	0.00	0.00
7	3	P3	11.00	75.00	1.00	16.50	11.00	91.50	11.00	0.00	0.00
8	3	P3	14.00	75.00	1.00	21.00	14.00	96.00	14.00	0.00	0.00
9	3	P3	17.00	70.00	1.00	25.50	17.00	95.50	17.00	0.00	0.00
10	3	P3	23.00	70.00	1.00	34.50	23.00	104.50	23.00	0.00	0.00
11	3	P3	29.00	70.00	1.00	43.50	29.00	113.50	29.00	0.00	0.00
12	3	P3	35.00	70.00	1.00	52.50	35.00	122.50	35.00	0.00	0.00
13	3	P3	41.00	60.00	1.00	61.50	41.00	121.50	41.00	0.00	0.00
14	3	P3	47.00	60.00	1.00	70.50	47.00	130.50	47.00	0.00	0.00
15	3	P3	53.00	60.00	1.00	79.50	53.00	139.50	53.00	0.00	0.00

* Vertical distance between layers.

QUANTITIES

Reinf. Type #	Designated Name	Coverage Ratio	Area of reinforcemnt [ft ²] / length of slope [ft]
3	P3	1.00	1070.00

MEG-33-19.11_1022+00 (Short Term)

ReSSA+: Update #0.180

Report created by ReSSA+: Copyright (c) 2001-2024, ADAMA Engineering, Inc.

PROJECT IDENTIFICATION

Title: MEG-33-19.11_1022+00 (Short Term)
 Project Number: 173609140 -
 Client: ODOT
 Designer: GK

Description:

Company's information:

Name: Stantec Consulting Services Inc
 Street: 10200 Alliance Rd
 Suite 300
 Blue Ash, OH

Telephone #:
 Fax #:
 E-Mail:

File path and name: \\US0247-P s\1022+00\ReSSA stataion 1022+00 (Short Term).MSEp
 Original date and time of creating this file: Tue Apr 23 15:02:28 2024

PROGRAM MODE: Analysis of a Simplified Slope using GEOSYNTHETIC as reinforcing material.

INPUT DATA (EXCLUDING REINFORCEMENT LAYOUT)

SOIL DATA

Soil Layer #:	Unit weight, γ [lb/ft ³]	Internal angle of friction, ϕ [deg.]	Cohesion, c [lb/ft ²]
REINFORCED SOIL.....	125.0	0.0	1500.0
RETAINED SOIL.....	125.0	0.0	1500.0
FOUNDATION SOIL.....	125.0	0.0	2000.0

REINFORCEMENT

Reinforcement Type #	Geosynthetic Designated Name	Ultimate Strength, Tult [lb/ft]	Reduction Factor for Installation Damage, RFid	Reduction Factor for Durability, RFd	Reduction Factor for Creep, RFC	Additional Reduction Factor, RFa	Coverage Ratio, Rc
1	P1	1300.00	1.00	1.00	1.00	1.00	1.00

Interaction Parameters Type #	Geosynthetic Designated Name	== Direct Sliding == Cds-phi	Cds-c	==== Pullout ==== Ci	Alpha
1	P1	0.67	0.67	0.67	1.00

Relative Orientation of Reinforcement Force, ROR = 0.00. Assigned Factor of Safety to resist pullout, Fs-po = 1.50
 Design method for Global Stability: Comprehensive Bishop.

WATER

Unit weight of water = 62.45 [lb/ft³]
 Water ponding is defined by 'phreatic surface' in Total Stress Analysis.

SEISMICITY

Not Applicable

DRAWING OF SPECIFIED GEOMETRY - SIMPLE

GEOMETRY

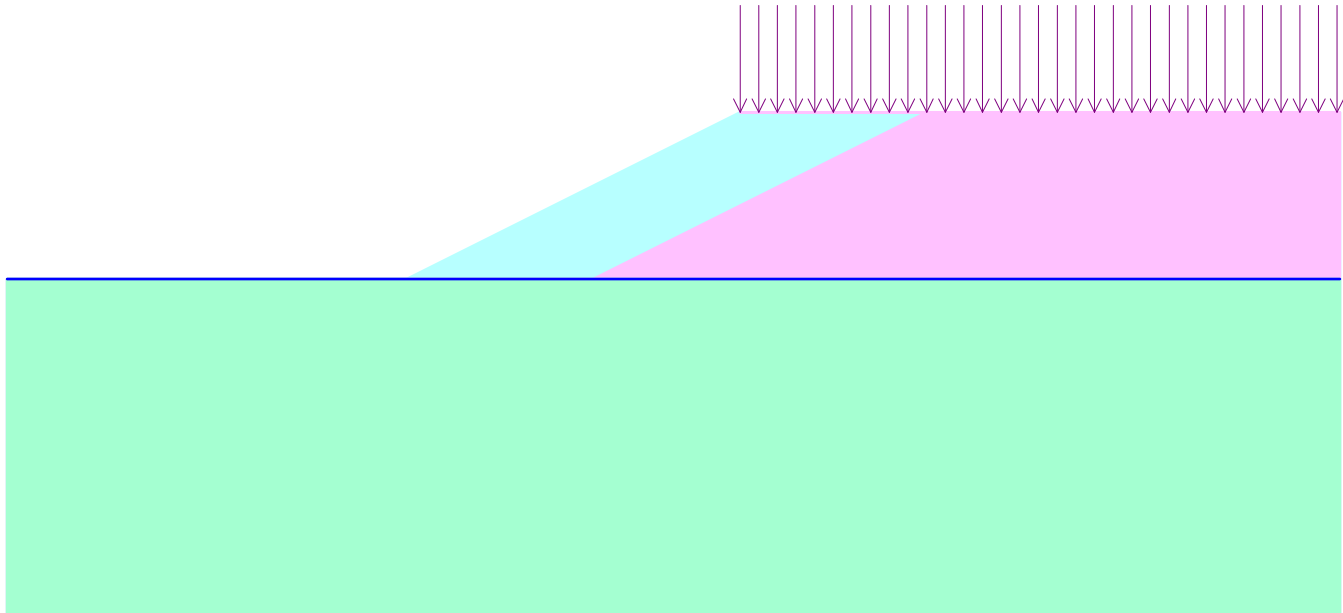
Height of slope, H	58.00 [ft]
Slope angle, i	26.56 [deg.]
Horizontal crest length, A	0.00 [ft]
Horizontal crest length, B	0.00 [ft]
Backslope angle, β	0.00 [deg.]
Sloping angle, α	0.00 [deg.]

WATER GEOMETRY Coordinates of water line in [ft]

#	1	Xw =	0.00	Yw =	0.00
#	2	Xw =	16.40	Yw =	0.00
#	3	Xw =	26.25	Yw =	0.00
#	4	Xw =	32.81	Yw =	0.00

UNIFORM SURCHARGE

Surcharge load over A, Q1	0.00 [lb/ft ²]
Surcharge load over backslope B, Q2	0.00 [lb/ft ²]
Surcharge load away from backslope, Q3	250.00 [lb/ft ²]

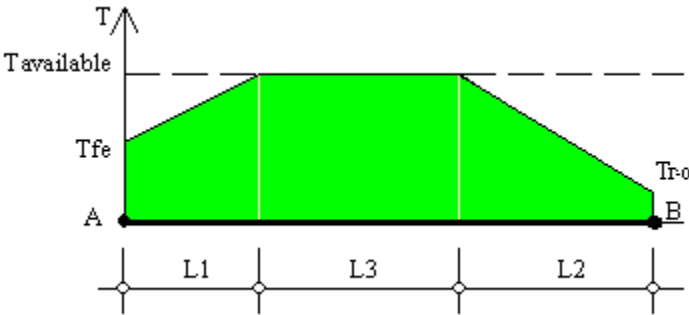


SCALE:

05112230[ft]



DISTRIBUTION OF AVAILABLE STRENGTH ALONG EACH REINFORCEMENT LAYER



A = Front-end of reinforcement (at face of slope)
 B = Rear-end of reinforcement
 AB = L1 + L2 + L3 = Embedded length of reinforcement

Tavailable = Long-term strength of reinforcement
 Tfe = Available front-end strength (e.g., connection to facing)
 Tr-o = Pullout resistance at rear-end

L1 = Front-end 'pullout' length
 L2 = Rear-end pullout length
 Tavailable prevails along L3

Factor of safety on resistance to pullout on either end of reinforcement, $F_s-po = 1.50$

Reinforcement Layer #	Designated Name	Height Relative to Toe [ft]	L [ft]	L1 [ft]	L2 [ft]	L3 [ft]	Tfe [lb/ft]	Tr-o [lb/ft]	Tavailable [lb/ft]
1	P1	1.00	65.00	0.98	0.98	63.03	0.00	0.00	1300.00
2	P1	2.00	65.00	0.98	0.98	63.03	0.00	0.00	1300.00
3	P1	3.00	60.00	0.98	0.98	58.03	0.00	0.00	1300.00
4	P1	4.00	60.00	0.98	0.98	58.03	0.00	0.00	1300.00
5	P1	5.00	60.00	0.98	0.98	58.03	0.00	0.00	1300.00
6	P1	8.00	60.00	0.98	0.98	58.03	0.00	0.00	1300.00
7	P1	11.00	60.00	0.98	0.98	58.03	0.00	0.00	1300.00
8	P1	14.00	60.00	0.98	0.98	58.03	0.00	0.00	1300.00
9	P1	17.00	60.00	0.98	0.98	58.03	0.00	0.00	1300.00
10	P1	23.00	60.00	0.98	0.98	58.03	0.00	0.00	1300.00
11	P1	29.00	60.00	0.98	0.98	58.03	0.00	0.00	1300.00
12	P1	35.00	50.00	0.98	0.98	48.03	0.00	0.00	1300.00
13	P1	41.00	50.00	0.98	0.98	48.03	0.00	0.00	1300.00
14	P1	47.00	50.00	0.98	0.98	48.03	0.00	0.00	1300.00
15	P1	53.00	50.00	0.98	0.98	48.03	0.00	0.00	1300.00

RESULTS OF ROTATIONAL STABILITY ANALYSIS

Results in the tables below represent critical circles identified between specified points on entry and exit. (Theta-exit set to 50.00 deg.)
 The most critical circle is obtained from a search considering all the combinations of input entry and exit points.

Critical circles for each entry point (considering all specified exit points)									
Entry Point #	Entry Point (X, Y) [ft]		Exit Point (X, Y) [ft]		Critical Circle (Xc, Yc, R) [ft]			Fs	STATUS
1	115.00	57.49	-15.19	0.17	37.12	57.88	77.89	2.07	
2	133.50	58.00	-16.18	1.29	47.73	58.50	85.77	1.75	
3	152.00	58.00	-15.53	0.47	51.86	76.91	101.91	1.62	
4	170.50	58.00	-30.59	0.59	54.26	84.26	119.17	1.55	
5	189.00	58.00	-46.02	1.15	56.53	91.42	136.62	1.52	
6	207.50	58.00	-60.35	0.42	58.48	99.42	154.67	1.50	
7	226.00	58.00	-75.98	1.17	59.36	112.74	175.40	1.49	
8	244.50	58.00	-91.08	1.29	60.40	126.20	196.33	1.48	
9	263.00	58.00	-105.66	0.79	61.55	139.75	217.41	1.48	OK
10	281.50	58.00	-135.14	0.17	55.08	159.49	248.13	1.48	
11	300.00	58.00	-121.33	1.59	71.78	160.92	250.35	1.49	

Note: In the 'Status' column, OK means the critical circle was identified within the specified search domain. 'On extreme X-entry' means that the critical result is on the edge of the search domain; a lower Fs may result if the search domain is expanded.

Results in the tables below represent critical circles identified between specified points on entry and exit. (Theta-exit set to 50.00 deg.)
 The most critical circle is obtained from a search considering all the combinations of input entry and exit points.

Critical circles for each exit point (considering all specified entry points)									
Exit Point #	Exit Point (X, Y) [ft]		Entry Point (X, Y) [ft]		Critical Circle (Xc, Yc, R) [ft]			Fs	STATUS
1	-150.29	0.34	281.50	58.00	47.39	165.63	257.67	1.49	
2	-135.14	0.17	281.50	58.00	55.08	159.49	248.13	1.48	
3	-121.44	1.73	263.00	58.00	53.81	145.84	226.89	1.48	
4	-105.66	0.79	263.00	58.00	61.55	139.75	217.41	1.48	OK
5	-91.08	1.29	244.50	58.00	60.40	126.20	196.33	1.48	
6	-75.98	1.17	226.00	58.00	59.36	112.74	175.40	1.49	
7	-61.45	1.76	226.00	58.00	67.23	106.76	166.09	1.49	
8	-45.07	0.07	207.50	58.00	65.79	96.31	146.80	1.51	
9	-30.96	0.97	207.50	58.00	71.13	101.14	143.03	1.53	
10	-16.37	1.17	189.00	58.00	67.34	98.14	128.11	1.55	
11	-0.00	0.00	170.50	58.00	62.42	96.12	114.61	1.59	

Note: In the 'Status' column, OK means the critical circle was identified within the specified search domain. 'On extreme X-exit' means that the critical result is on the edge of the search domain; a lower Fs may result if the search domain is expanded.

CRITICAL RESULTS OF ROTATIONAL AND TRANSLATIONAL STABILITY ANALYSES

Rotational (Circular Arc; Bishop) Stability Analysis

Minimum Factor of Safety = 1.48

Critical Circle: $X_c = 61.55[ft]$, $Y_c = 139.75[ft]$, $R = 217.41[ft]$. (Number of slices used = 65)

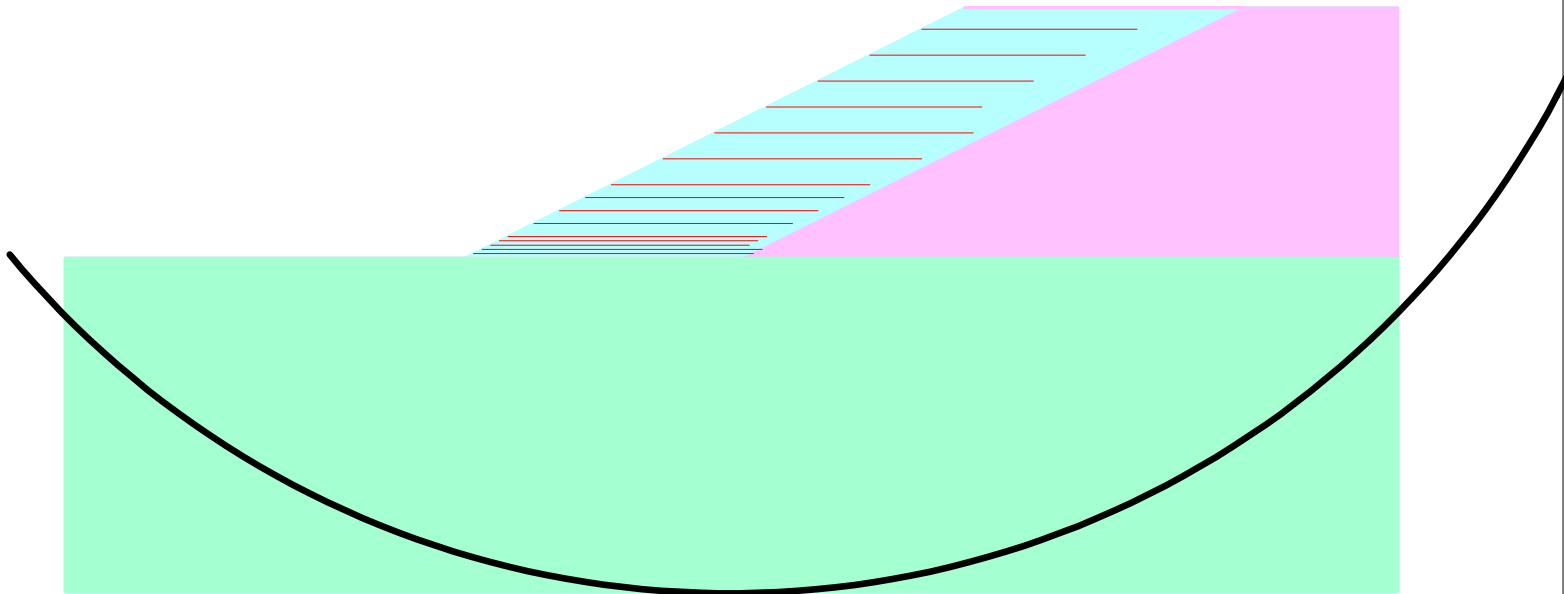
Translational (2-Part Wedge; Spencer), Direct Sliding, Stability Analysis

NOT CONDUCTED

Three-Part Wedge Stability Analysis

NOT CONDUCTED

REINFORCEMENT LAYOUT: DRAWING



SCALE:

0 5 1(1:2(2:30[ft)



REINFORCEMENT LAYOUT: TABULATED DATA & QUANTITIES



Layer #	Reinf. Type #	Geosynthetic Designated Name	Height Relative to Toe [ft]	Embedded Length [ft]	Covergae Ratio, Rc	(X, Y) front [ft]	(X, Y) rear [ft]	Lsv * [ft]	Lre [ft]		
1	1	P1	1.00	65.00	1.00	2.00	1.00	67.00	1.00	0.00	0.00
2	1	P1	2.00	65.00	1.00	4.00	2.00	69.00	2.00	0.00	0.00
3	1	P1	3.00	60.00	1.00	6.00	3.00	66.00	3.00	0.00	0.00
4	1	P1	4.00	60.00	1.00	8.00	4.00	68.00	4.00	0.00	0.00
5	1	P1	5.00	60.00	1.00	10.00	5.00	70.00	5.00	0.00	0.00
6	1	P1	8.00	60.00	1.00	16.00	8.00	76.00	8.00	0.00	0.00
7	1	P1	11.00	60.00	1.00	22.00	11.00	82.00	11.00	0.00	0.00
8	1	P1	14.00	60.00	1.00	28.01	14.00	88.01	14.00	0.00	0.00
9	1	P1	17.00	60.00	1.00	34.01	17.00	94.01	17.00	0.00	0.00
10	1	P1	23.00	60.00	1.00	46.01	23.00	106.01	23.00	0.00	0.00
11	1	P1	29.00	60.00	1.00	58.01	29.00	118.01	29.00	0.00	0.00
12	1	P1	35.00	50.00	1.00	70.02	35.00	120.02	35.00	0.00	0.00
13	1	P1	41.00	50.00	1.00	82.02	41.00	132.02	41.00	0.00	0.00
14	1	P1	47.00	50.00	1.00	94.02	47.00	144.02	47.00	0.00	0.00
15	1	P1	53.00	50.00	1.00	106.02	53.00	156.02	53.00	0.00	0.00

* Vertical distance between layers.

QUANTITIES

Reinf. Type #	Designated Name	Coverage Ratio	Area of reinforcemnt [ft ²] / length of slope [ft]
1	P1	1.00	870.00

MEG-33-19.11_1022+00

ReSSA+: Update #0.180

Report created by ReSSA+: Copyright (c) 2001-2024, ADAMA Engineering, Inc.

PROJECT IDENTIFICATION

Title: MEG-33-19.11_1022+00
 Project Number: 173609140 -
 Client: ODOT
 Designer: GK

Description:

Company's information:

Name: Stantec Consulting Services Inc
 Street: 10200 Alliance Rd
 Suite 300
 Blue Ash, OH

Telephone #:
 Fax #:
 E-Mail:

File path and name: \\US0247-P sis\1022+00\ReSSA_station 1022+00 (Long Term).MSEp
 Original date and time of creating this file: Tue Apr 23 14:08:13 2024

PROGRAM MODE: Analysis of a Simplified Slope using GEOSYNTHETIC as reinforcing material.

INPUT DATA (EXCLUDING REINFORCEMENT LAYOUT)

SOIL DATA

Soil Layer #:	Unit weight, γ [lb/ft ³]	Internal angle of friction, ϕ [deg.]	Cohesion, c [lb/ft ²]
REINFORCED SOIL.....	125.0	20.0	200.0
RETAINED SOIL.....	125.0	20.0	200.0
FOUNDATION SOIL.....	125.0	30.0	300.0

REINFORCEMENT

Reinforcement Type #	Geosynthetic Designated Name	Ultimate Strength, Tult [lb/ft]	Reduction Factor for Installation Damage, RFid	Reduction Factor for Durability, RFd	Reduction Factor for Creep, RFC	Additional Reduction Factor, RFa	Coverage Ratio, Rc
1	P1	1300.00	1.00	1.00	1.00	1.00	1.00

Interaction Parameters Type #	Geosynthetic Designated Name	== Direct Sliding == Cds-phi	Cds-c	==== Pullout ==== Ci	Alpha
1	P1	0.67	0.67	0.67	1.00

Relative Orientation of Reinforcement Force, ROR = 0.00. Assigned Factor of Safety to resist pullout, Fs-po = 1.50
Design method for Global Stability: Comprehensive Bishop.

WATER

Unit weight of water = 62.45 [lb/ft³]
Water pressure is defined by phreatic surface in Effective Stress Analysis.

SEISMICITY

Not Applicable

DRAWING OF SPECIFIED GEOMETRY - SIMPLE

GEOMETRY

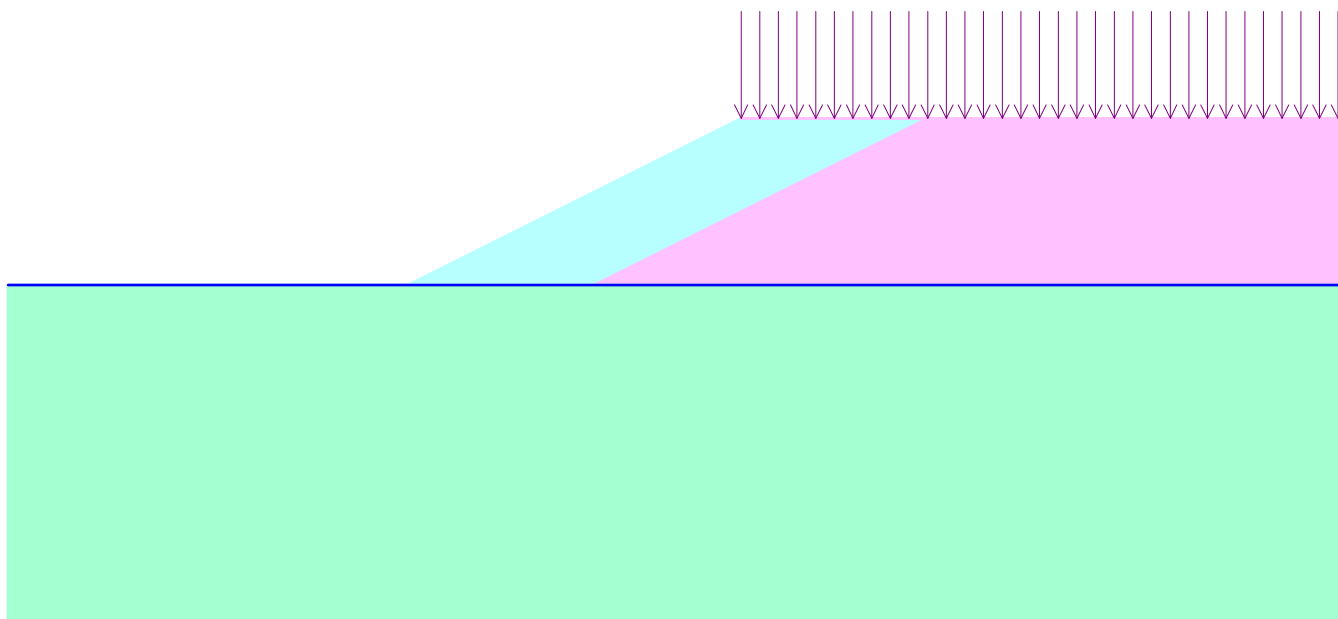
Height of slope, H	58.00 [ft]
Slope angle, i	26.56 [deg.]
Horizontal crest length, A	0.00 [ft]
Horizontal crest length, B	0.00 [ft]
Backslope angle, β	0.00 [deg.]
Sloping angle, α	0.00 [deg.]

WATER GEOMETRY Coordinates of water line in [ft]

#	1	Xw =	0.00	Yw =	0.00
#	2	Xw =	16.40	Yw =	0.00
#	3	Xw =	26.25	Yw =	0.00
#	4	Xw =	32.81	Yw =	0.00

UNIFORM SURCHARGE

Surcharge load over A, Q1	0.00 [lb/ft ²]
Surcharge load over backslope B, Q2	0.00 [lb/ft ²]
Surcharge load away from backslope, Q3	250.00 [lb/ft ²]

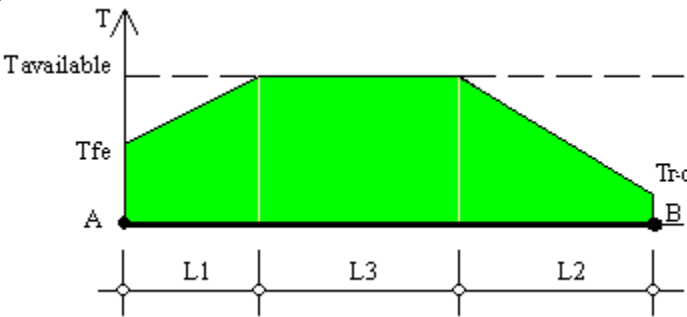


SCALE:

05112230[ft]



DISTRIBUTION OF AVAILABLE STRENGTH ALONG EACH REINFORCEMENT LAYER



A = Front-end of reinforcement (at face of slope)
 B = Rear-end of reinforcement
 AB = L1 + L2 + L3 = Embedded length of reinforcement

Tavailable = Long-term strength of reinforcement
 Tfe = Available front-end strength (e.g., connection to facing)
 Tr-o = Pullout resistance at rear-end

L1 = Front-end 'pullout' length
 L2 = Rear-end pullout length
 Tavailable prevails along L3

Factor of safety on resistance to pullout on either end of reinforcement, $F_s-po = 1.50$

Reinforcement Layer #	Designated Name	Height Relative to Toe [ft]	L [ft]	L1 [ft]	L2 [ft]	L3 [ft]	Tfe [lb/ft]	Tr-o [lb/ft]	Tavailable [lb/ft]
1	P1	1.00	65.00	5.54	0.89	58.57	0.00	0.00	1300.00
2	P1	2.00	65.00	5.54	0.89	58.57	0.00	0.00	1300.00
3	P1	3.00	60.00	5.54	0.95	53.50	0.00	0.00	1300.00
4	P1	4.00	60.00	5.54	0.95	53.50	0.00	0.00	1300.00
5	P1	5.00	60.00	5.54	0.95	53.50	0.00	0.00	1300.00
6	P1	8.00	60.00	5.54	0.95	53.50	0.00	0.00	1300.00
7	P1	11.00	60.00	5.54	0.95	53.50	0.00	0.00	1300.00
8	P1	14.00	60.00	5.54	0.95	53.50	0.00	0.00	1300.00
9	P1	17.00	60.00	5.54	0.95	53.50	0.00	0.00	1300.00
10	P1	23.00	60.00	5.54	0.95	53.50	0.00	0.00	1300.00
11	P1	29.00	60.00	5.54	0.98	53.47	0.00	0.00	1300.00
12	P1	35.00	50.00	5.54	1.18	43.27	0.00	0.00	1300.00
13	P1	41.00	50.00	5.54	1.51	42.95	0.00	0.00	1300.00
14	P1	47.00	50.00	5.54	2.10	42.36	0.00	0.00	1300.00
15	P1	53.00	50.00	5.54	3.41	41.04	0.00	0.00	1300.00

RESULTS OF ROTATIONAL STABILITY ANALYSIS

Results in the tables below represent critical circles identified between specified points on entry and exit. (Theta-exit set to 50.00 deg.)
 The most critical circle is obtained from a search considering all the combinations of input entry and exit points.

Critical circles for each entry point (considering all specified exit points)									
Entry Point #	Entry Point (X, Y) [ft]		Exit Point (X, Y) [ft]		Critical Circle (Xc, Yc, R) [ft]			Fs	STATUS
1	115.00	57.49	12.51	6.59	29.62	100.77	95.72	1.44	
2	123.50	58.00	12.58	6.57	30.06	114.20	109.04	1.36	
3	132.00	58.00	12.66	6.55	31.93	126.00	120.99	1.34	
4	140.50	58.00	5.37	3.14	32.85	129.31	129.13	1.31	
5	149.00	58.00	5.59	3.08	33.56	144.76	144.41	1.30	OK
6	157.50	58.00	5.82	3.04	35.90	156.81	156.69	1.31	
7	166.00	58.00	12.96	6.50	35.76	191.89	186.79	1.36	
8	174.50	58.00	4.45	3.22	34.06	202.65	201.61	1.39	
9	183.00	58.00	4.60	3.18	33.49	226.85	225.54	1.45	
10	191.50	58.00	4.77	3.20	41.13	224.82	224.59	1.51	
11	200.00	58.00	4.92	3.13	37.67	260.93	259.87	1.57	

Note: In the 'Status' column, OK means the critical circle was identified within the specified search domain. 'On extreme X-entry' means that the critical result is on the edge of the search domain; a lower Fs may result if the search domain is expanded.

Results in the tables below represent critical circles identified between specified points on entry and exit. (Theta-exit set to 50.00 deg.)
 The most critical circle is obtained from a search considering all the combinations of input entry and exit points.

Critical circles for each exit point (considering all specified entry points)									
Exit Point #	Exit Point (X, Y) [ft]		Entry Point (X, Y) [ft]		Critical Circle (Xc, Yc, R) [ft]			Fs	STATUS
1	-51.20	0.39	149.00	58.00	6.91	175.14	184.16	1.50	
2	-43.57	0.19	149.00	58.00	11.29	167.08	175.68	1.49	
3	-37.26	0.29	157.50	58.00	9.88	198.72	203.95	1.48	
4	-29.87	0.22	149.00	58.00	13.68	171.17	176.41	1.45	
5	-23.61	0.38	149.00	58.00	16.61	167.24	171.64	1.43	
6	-15.28	0.06	149.00	58.00	19.63	162.94	166.58	1.42	
7	-8.39	0.03	157.50	58.00	10.56	212.16	212.97	1.41	
8	-1.50	0.03	157.50	58.00	10.26	214.81	215.11	1.38	
9	5.59	3.08	149.00	58.00	33.56	144.76	144.41	1.30	OK
10	12.81	6.54	149.00	58.00	42.45	134.06	130.91	1.31	
11	19.58	10.13	140.50	58.00	51.36	106.52	101.49	1.33	

Note: In the 'Status' column, OK means the critical circle was identified within the specified search domain. 'On extreme X-exit' means that the critical result is on the edge of the search domain; a lower Fs may result if the search domain is expanded.

CRITICAL RESULTS OF ROTATIONAL AND TRANSLATIONAL STABILITY ANALYSES

Rotational (Circular Arc; Bishop) Stability Analysis

Minimum Factor of Safety = 1.30

Critical Circle: $X_c = 33.56[ft]$, $Y_c = 144.76[ft]$, $R = 144.41[ft]$. (Number of slices used = 63)

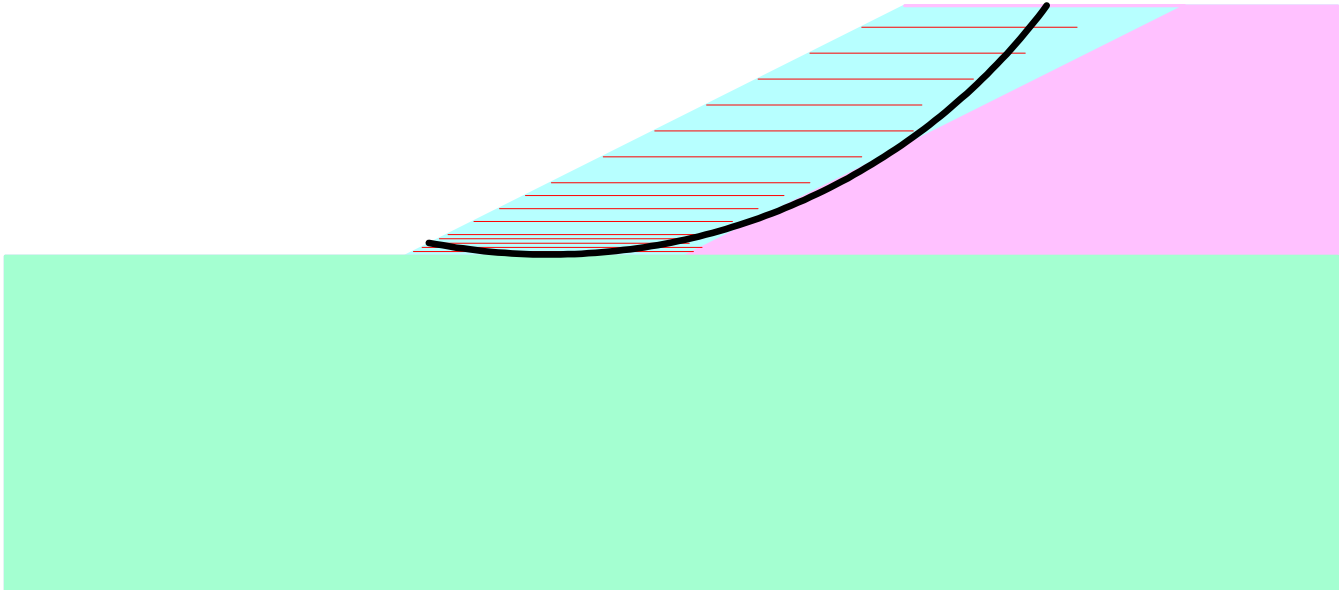
Translational (2-Part Wedge; Spencer), Direct Sliding, Stability Analysis

NOT CONDUCTED

Three-Part Wedge Stability Analysis

NOT CONDUCTED

REINFORCEMENT LAYOUT: DRAWING



SCALE:

0 5 1(1:2(2:30[ft]



REINFORCEMENT LAYOUT: TABULATED DATA & QUANTITIES



Layer #	Reinf. Type #	Geosynthetic Designated Name	Height Relative to Toe [ft]	Embedded Length [ft]	Covergae Ratio, Rc	(X, Y) front [ft]	(X, Y) rear [ft]	Lsv * [ft]	Lre [ft]		
1	1	P1	1.00	65.00	1.00	2.00	1.00	67.00	1.00	0.00	0.00
2	1	P1	2.00	65.00	1.00	4.00	2.00	69.00	2.00	0.00	0.00
3	1	P1	3.00	60.00	1.00	6.00	3.00	66.00	3.00	0.00	0.00
4	1	P1	4.00	60.00	1.00	8.00	4.00	68.00	4.00	0.00	0.00
5	1	P1	5.00	60.00	1.00	10.00	5.00	70.00	5.00	0.00	0.00
6	1	P1	8.00	60.00	1.00	16.00	8.00	76.00	8.00	0.00	0.00
7	1	P1	11.00	60.00	1.00	22.00	11.00	82.00	11.00	0.00	0.00
8	1	P1	14.00	60.00	1.00	28.01	14.00	88.01	14.00	0.00	0.00
9	1	P1	17.00	60.00	1.00	34.01	17.00	94.01	17.00	0.00	0.00
10	1	P1	23.00	60.00	1.00	46.01	23.00	106.01	23.00	0.00	0.00
11	1	P1	29.00	60.00	1.00	58.01	29.00	118.01	29.00	0.00	0.00
12	1	P1	35.00	50.00	1.00	70.02	35.00	120.02	35.00	0.00	0.00
13	1	P1	41.00	50.00	1.00	82.02	41.00	132.02	41.00	0.00	0.00
14	1	P1	47.00	50.00	1.00	94.02	47.00	144.02	47.00	0.00	0.00
15	1	P1	53.00	50.00	1.00	106.02	53.00	156.02	53.00	0.00	0.00

* Vertical distance between layers.

QUANTITIES

Reinf. Type #	Designated Name	Coverage Ratio	Area of reinforcemnt [ft²] / length of slope [ft]
1	P1	1.00	870.00

APPENDIX K
SUBGRADE STABILITY ANALYSES

OHIO DEPARTMENT OF TRANSPORTATION**OFFICE OF GEOTECHNICAL ENGINEERING****PLAN SUBGRADES****Geotechnical Design Manual Section 600**

Instructions: Enter data in the shaded cells only.

(Enter state route number, project description, county, consultant's name, prepared by name, and date prepared. This information will be transferred to all other sheets. The date prepared must be entered in the appropriate cell on this sheet to remove these instructions prior to printing.)

MEG-33-19.11**119144**

Convert 14.78 miles of existing 2-lane road into 4-lane divided highway by adding a median and 2 lanes north of the existing alignment.

Stantec Consulting Services, Inc.

Prepared By: Jim Swindler
Date prepared: Wednesday, March 27, 2024

Jim Swindler
10200 Alliance Road
Suite 300
Cincinnati, Ohio 45242
513-842-8200
jim.swindlerjr@stantec.com

NO. OF BORINGS: 13

#	Boring ID	Alignment	Station	Offset	Dir	Drill Rig	ER	Boring EL.	Proposed Subgrade EL	Cut Fill
1	D-024-0-23	US 33	1000+02	30	LT.	SIMCO 255		744.0	744.4	0.4 F
2	D-027-0-23	US 33	1027+98	13	RT.	SIMCO 255		783.6	783.1	0.5 C
3	D-030-0-23	US 33	1059+92	7	RT.	SIMCO 255		739.8	736.7	3.1 C
4	D-033-0-23	US 33	1093+88	16	LT.	SIMCO 255		681.3	682.1	0.8 F
5	D-036-0-23	US 33	1126+00	8	LT.	SIMCO 255		696.3	698.3	2.0 F
6	D-039-0-23	US 33	1157+99	6	RT.	SIMCO 255		733.7	733.7	0.0
7	D-042-0-23	US 33	1187+01	26	LT.	SIMCO 255		676.3	678.6	2.3 F
8	D-045-0-23	US 33	1274+98	13	LT.	SIMCO 255		695.3	697.0	1.7 F
9	D-048-0-23	US 33	1306+98	12	RT.	SIMCO 255		646.4	645.8	0.6 C
10	D-051-0-23	US 33	1341+02	11	RT.	SIMCO 255		629.5	629.5	0.0
11	D-054-0-23	US 33	1370+00	13	RT.	SIMCO 255		646.2	646.2	0.0
12	D-057-0-23	US 33	1400+02	10	RT.	SIMCO 255		635.6	635.6	0.0
13	D-060-0-23	US 33	1429+99	12	RT.	SIMCO 255		623.3	623.3	0.0

PID: 119144

County-Route-Section: MEG-33-19.11

No. of Borings: 13

Geotechnical Consultant: Stantec Consulting Services, Inc.

Prepared By: Jim Swindler

Date prepared: 3/27/2024

Chemical Stabilization Options		
320	Rubblize & Roll	Option
206	Cement Stabilization	Option
	Lime Stabilization	No
206	Depth	NA

Excavate and Replace Stabilization Options	
Global Geotextile Average(N60L): Average(HP):	0" 0"
Global Geogrid Average(N60L): Average(HP):	0" 0"

Design CBR	7
-----------------------	----------

% Samples within 3 feet of subgrade			
$N_{60} \leq 5$	0%	$HP \leq 0.5$	0%
$N_{60} < 12$	17%	$0.5 < HP \leq 1$	0%
$12 \leq N_{60} < 15$	8%	$1 < HP \leq 2$	0%
$N_{60} \geq 20$	42%	$HP > 2$	0%
M+	13%		
Rock	0%		
Unsuitable Soil	0%		

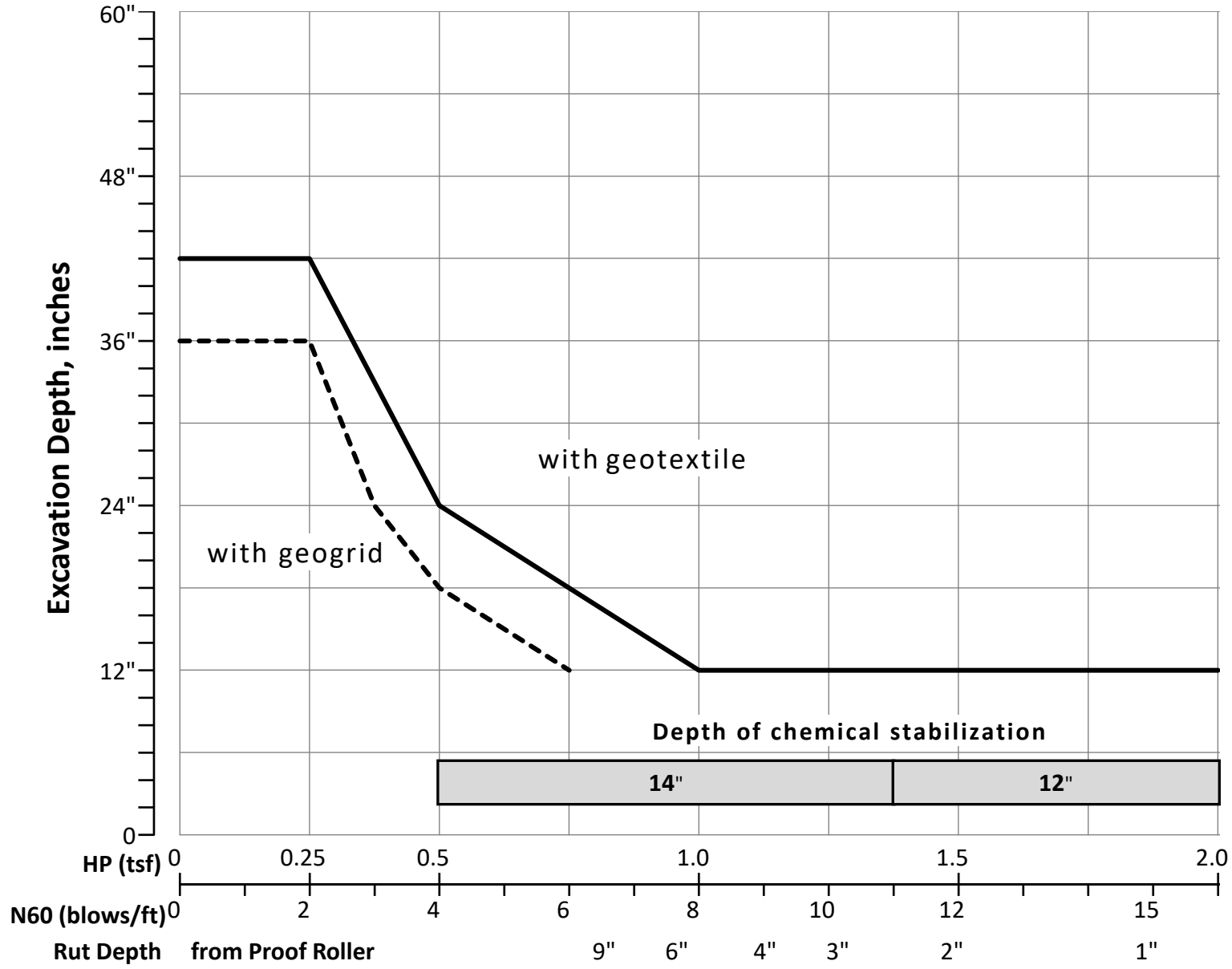
Excavate and Replace at Surface	
Average	0"
Maximum	0"
Minimum	0"

% Proposed Subgrade Surface	
Unstable & Unsuitable	27%
Unstable	27%
Unsuitable (Soil & Rock)	0%

	N_{60}	N_{60L}	HP	LL	PL	PI	Silt	Clay	P 200	M_C	M_{OPT}	GI
Average	24	19	NP	33	18	15	34	36	70	14	14	8
Maximum	53	30	NP	39	21	20	45	54	91	25	16	12
Minimum	9	9	NP	25	17	7	7	7	14	5	10	0

Classification Counts by Sample																				
ODOT Class	UCF	Rock	A-1-a	A-1-b	A-2-4	A-2-5	A-2-6	A-2-7	A-3	A-3a	A-4a	A-4b	A-5	A-6a	A-6b	A-7-5	A-7-6	A-8a	A-8b	Totals
Count	0	0	0	0	2	0	2	0	0	0	2	0	0	8	10	0	0	0	0	24
Percent	0%	0%	0%	0%	8%	0%	8%	0%	0%	0%	8%	0%	0%	33%	42%	0%	0%	0%	0%	100%
% Rock Granular Cohesive	0%	0%	25%						75%						100%					
Surface Class Count	0	0	0	0	2	0	2	0	0	0	1	0	0	7	10	0	0	0	0	22
Surface Class Percent	0%	0%	0%	0%	9%	0%	9%	0%	0%	0%	5%	0%	0%	32%	45%	0%	0%	0%	0%	100%

Fig. 600-1 – Subgrade Stabilization



OVERRIDE TABLE

Calculated Average	New Values	Check to Override
NP	0.50	<input type="checkbox"/> HP
19.08	6.00	<input type="checkbox"/> N60L

Average HP —
 Average N_{60L} —



DCP TEST DATA

Project: MEG-33-13.96\19.11
 Exploration ID: D-008-0-23
 Elevation: 762.2
 Lat / Long: 39.03257, -81.946158

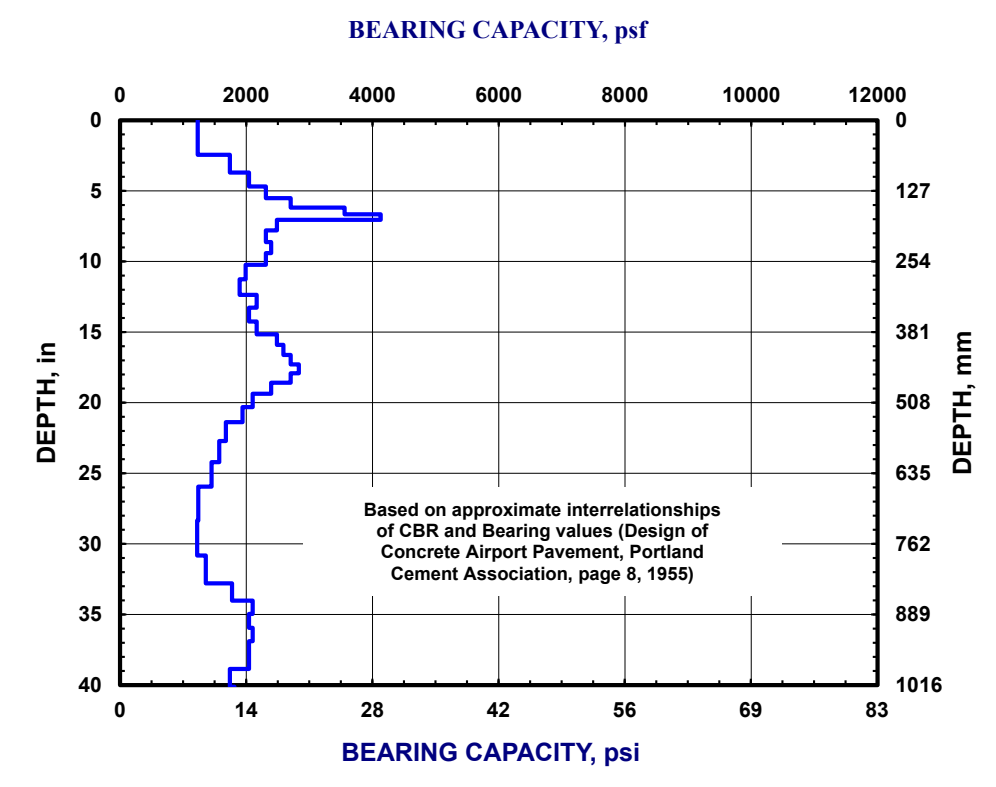
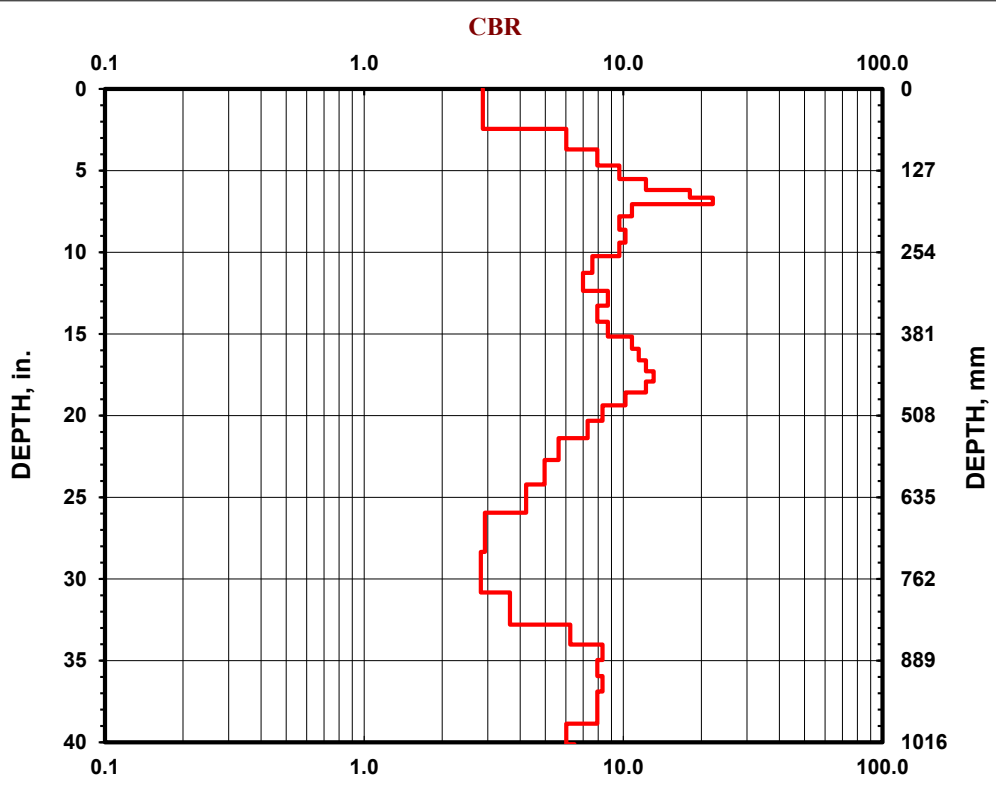
PID: 119143
 Date: 4/24/2023
 Surface Materials: 2" Topsoil
 Test Starting Depth (ft): 0.0

Hammer
 10.1 lbs.
 17.6 lbs.
 Both hammers used

Office of Geotechnical Engineering
 Geology, Exploration, and Laboratory Section
<http://www.dot.state.oh.us/Divisions/Engineering/Geotechnical>

Soil Type
 CH
 CL
 All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
1	62	1
1	94	1
1	119	1
1	140	1
1	157	1
1	169	1
1	179	1
1	198	1
1	219	1
1	239	1
1	260	1
1	286	1
1	314	1
1	337	1
1	362	1
1	385	1
1	404	1
1	422	1
1	439	1
1	455	1
1	472	1
1	492	1
1	516	1
1	543	1
1	577	1
1	615	1
1	659	1
1	720	1
1	783	1
1	833	1
1	864	1
1	888	1
1	913	1
1	937	1
1	962	1
1	987	1
1	1019	1
1	1049	1
1	1076	1
1	1101	1



NOTES: Latitude, Longitude & Elevation from OGE GPS unit utilizing the ODOT VRS network.



DCP TEST DATA

Project: MEG-33-13.96\19.11
 Exploration ID: D-009-0-23
 Elevation: 725.9
 Lat / Long: 39.030223, -81.941841

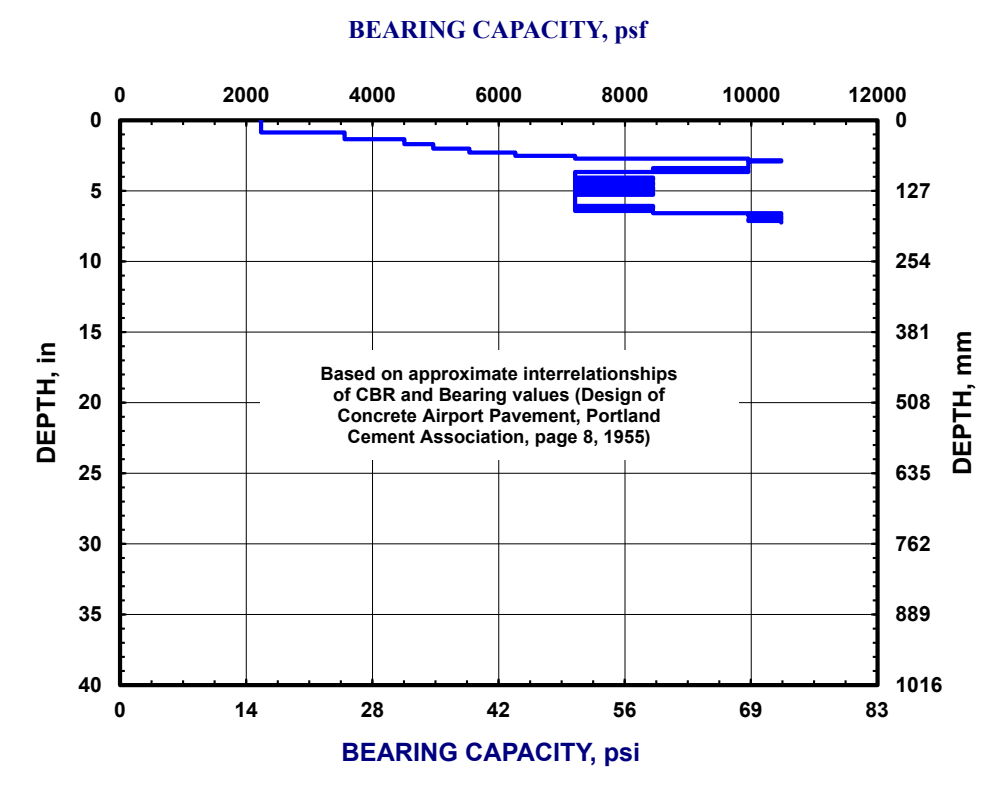
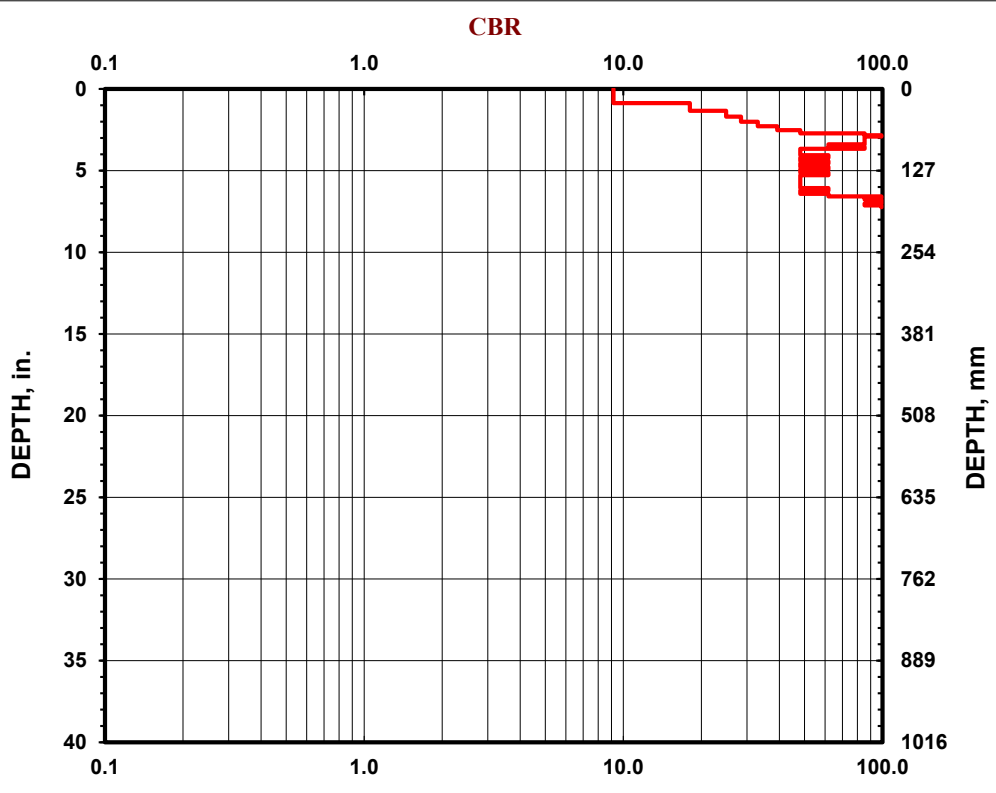
PID: 119143
 Date: 4/20/2023
 Surface Materials: 2" Topsoil
 Test Starting Depth (ft): 0.0

Hammer
 10.1 lbs.
 17.6 lbs.
 Both hammers used

Office of Geotechnical Engineering
 Geology, Exploration, and Laboratory Section
<http://www.dot.state.oh.us/Divisions/Engineering/Geotechnical>

Soil Type
 CH
 CL
 All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
1	22	1
1	34	1
1	43	1
1	51	1
1	58	1
1	64	1
1	69	1
1	72	1
1	74	1
1	77	1
1	80	1
1	83	1
1	86	1
1	90	1
1	93	1
1	98	1
1	103	1
1	107	1
1	112	1
1	116	1
1	121	1
1	125	1
1	130	1
1	134	1
1	139	1
1	144	1
1	149	1
1	154	1
1	158	1
1	163	1
1	167	1
1	169	1
1	172	1
1	174	1
1	176	1
1	178	1
1	181	1
1	182	1
1	184	1



NOTES: Latitude, Longitude & Elevation from OGE GPS unit utilizing the ODOT VRS network.
 Sounding terminated at refusal.



DCP TEST DATA

Project: MEG-33-13.96\19.11
 Exploration ID: D-010-0-23
 Elevation: 732.6
 Lat / Long: 39.029215, -81.940162

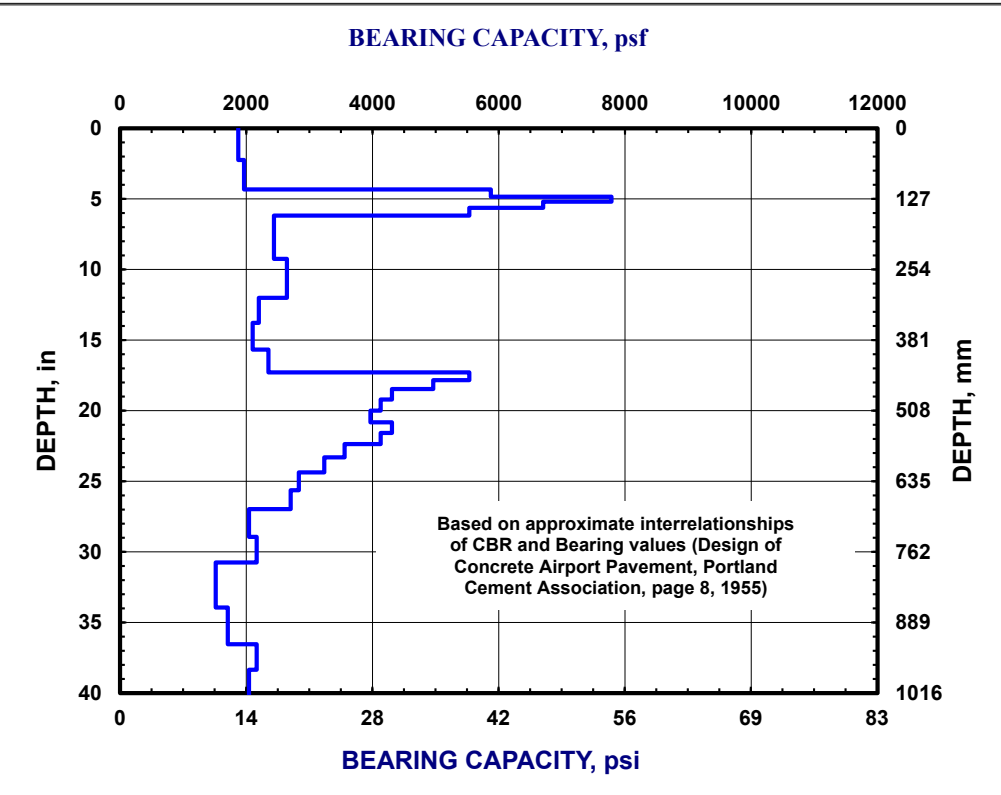
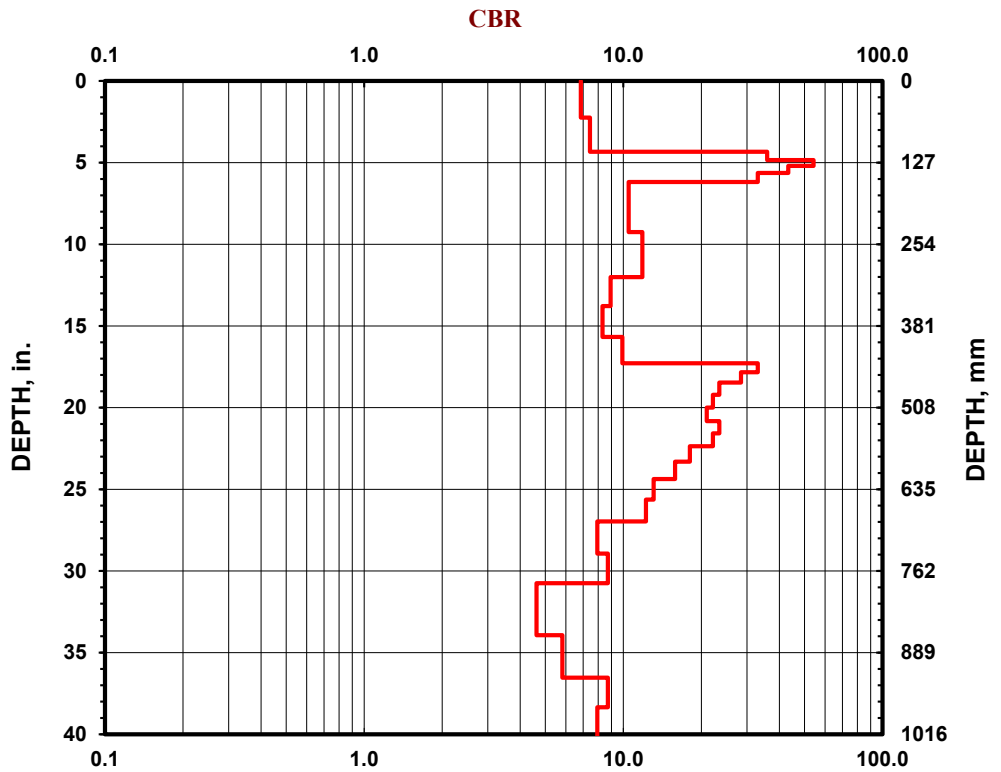
PID: 119143
 Date: 4/24/2023
 Surface Materials: 2" Topsoil
 Test Starting Depth (ft): 0.0

Hammer
 10.1 lbs.
 17.6 lbs.
 Both hammers used

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Soil Type
 CH
 CL
 All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
2	57	1
2	110	1
2	123	1
2	132	1
2	143	1
2	157	1
2	196	1
2	235	1
2	270	1
2	305	1
2	350	1
2	398	1
2	439	1
2	453	1
2	469	1
2	488	1
2	508	1
2	529	1
2	548	1
2	568	1
2	592	1
2	619	1
2	651	1
2	685	1
2	735	1
2	781	1
2	862	1
2	928	1
2	974	1
2	1024	1
2	1040	1
2	1051	1
2	1064	1
2	1086	1
2	1103	1



NOTES: Latitude, Longitude & Elevation from OGE GPS unit utilizing the ODOT VRS network.



DCP TEST DATA

Project: MEG-33-13.96\19.11
 Exploration ID: D-012-0-23
 Elevation: 796.5
 Lat / Long: 39.025402, -81.93284

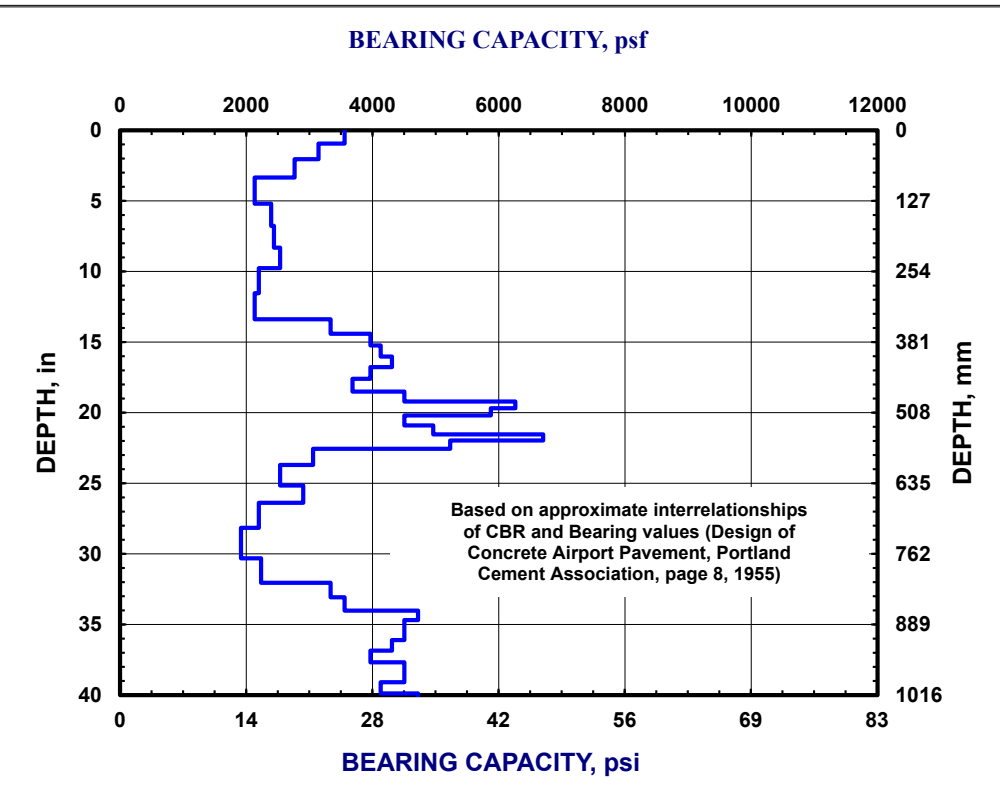
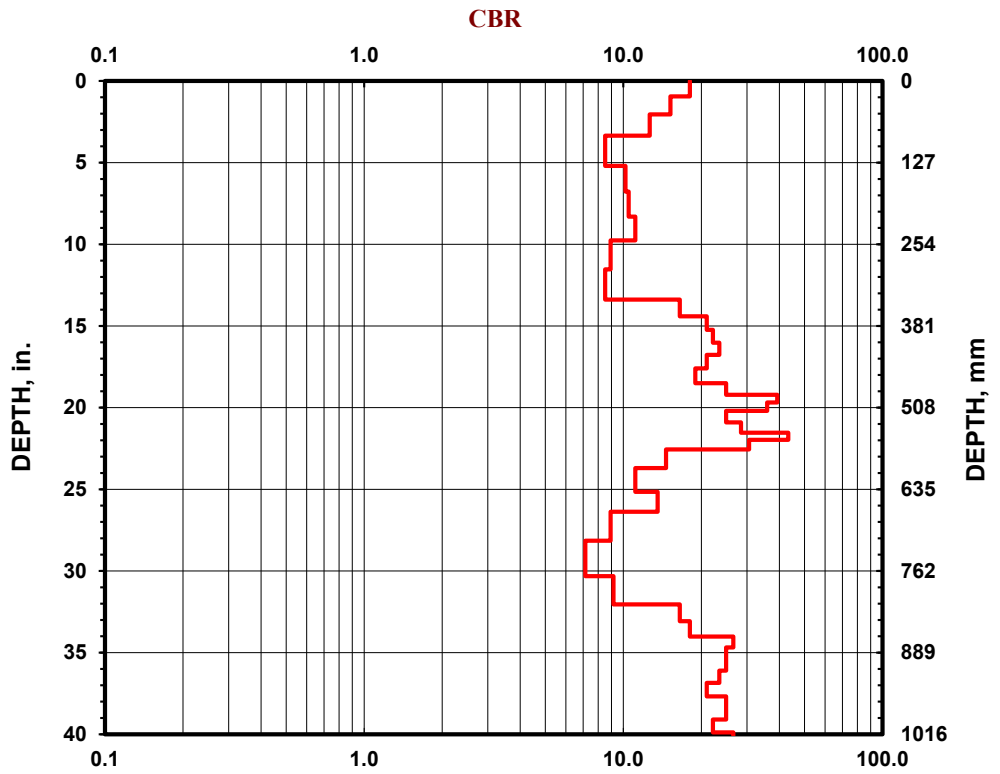
PID: 119143
 Date: 4/20/2023
 Surface Materials: 2" Topsoil
 Test Starting Depth (ft): 0.0

Hammer
 10.1 lbs.
 17.6 lbs.
 Both hammers used

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Soil Type
 CH
 CL
 All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
2	24	1
2	52	1
2	85	1
2	132	1
2	172	1
2	211	1
2	248	1
2	293	1
2	340	1
2	366	1
2	387	1
2	407	1
2	426	1
2	447	1
2	470	1
2	488	1
2	500	1
2	513	1
2	531	1
2	547	1
2	558	1
2	573	1
2	602	1
2	639	1
2	670	1
2	715	1
2	770	1
2	814	1
2	840	1
2	864	1
2	881	1
2	899	1
2	917	1
2	936	1
2	957	1
2	975	1
2	993	1
2	1013	1
2	1030	1
2	1042	1
2	1045	1
2	1048	1



NOTES: Latitude, Longitude & Elevation from OGE GPS unit utilizing the ODOT VRS network.
 Sounding terminated at refusal.



DCP TEST DATA

Project: MEG-33-13.96\19.11
 Exploration ID: D-017-0-23
 Elevation: 713.8
 Lat / Long: 39.014563, -81.913851

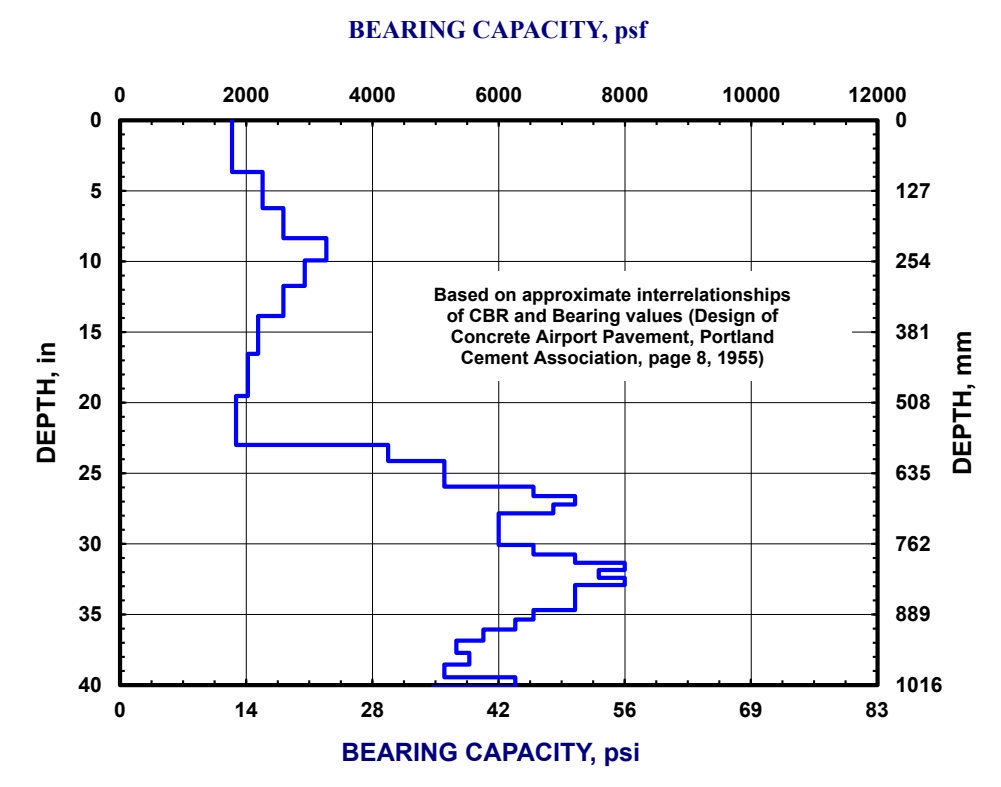
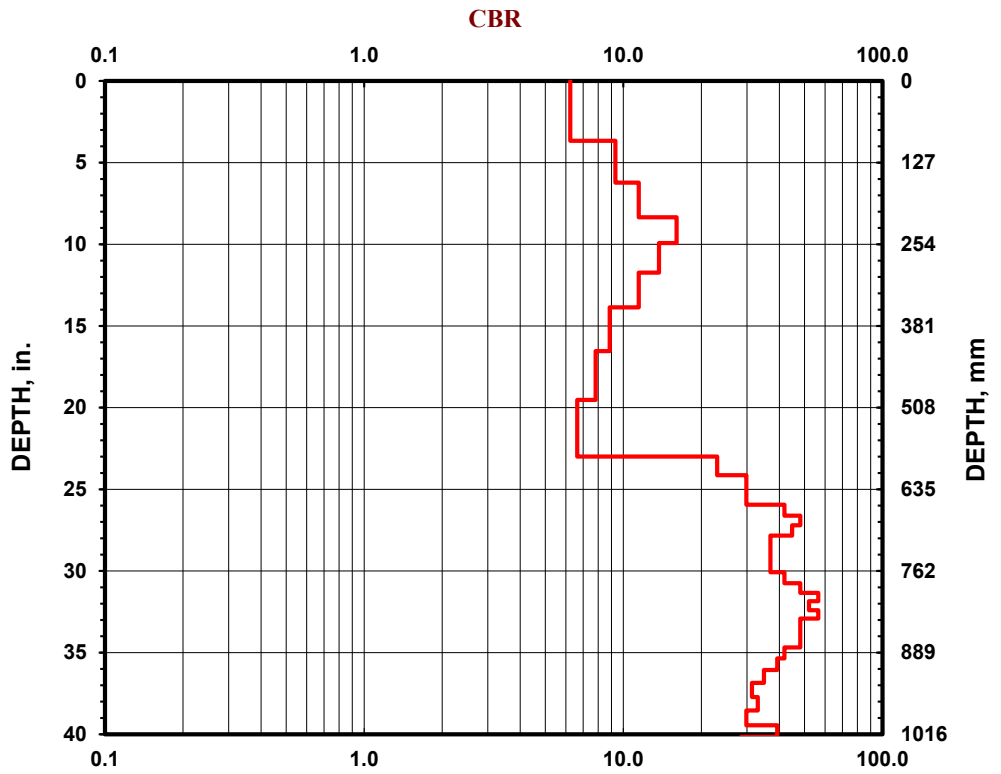
PID: 119143
 Date: 4/24/2023
 Surface Materials: 4" Topsoil
 Test Starting Depth (ft): 0.0

Hammer
 10.1 lbs.
 17.6 lbs.
 Both hammers used

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Soil Type
 CH
 CL
 All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
3	93	1
3	158	1
3	212	1
3	252	1
3	298	1
3	352	1
3	420	1
3	496	1
3	584	1
3	613	1
3	636	1
3	659	1
3	676	1
3	691	1
3	707	1
3	726	1
3	745	1
3	764	1
3	781	1
3	796	1
3	809	1
3	823	1
3	836	1
3	851	1
3	866	1
3	881	1
3	898	1
3	916	1
3	936	1
3	958	1
3	979	1
3	1002	1
3	1020	1
3	1044	1
3	1059	1
3	1076	1
3	1096	1



NOTES: Latitude, Longitude & Elevation from OGE GPS unit utilizing the ODOT VRS network.



DCP TEST DATA

Project: MEG-33-13.96\19.11
 Exploration ID: D-021-0-23
 Elevation: 719.4
 Lat / Long: 39.005536, -81.89923

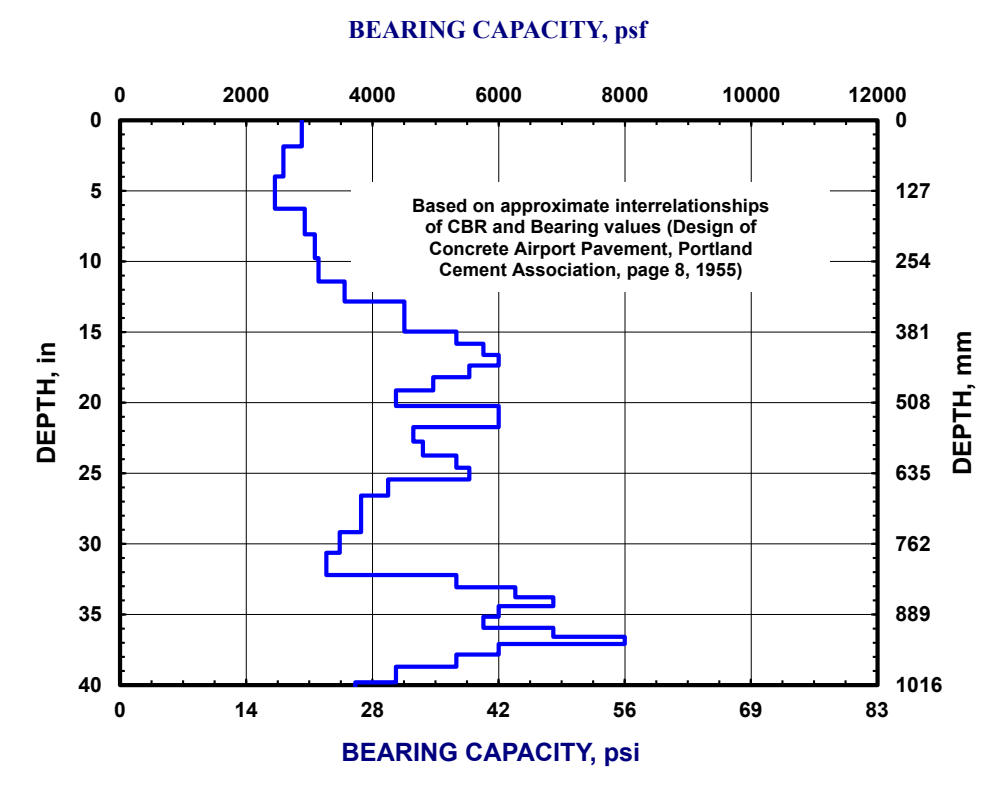
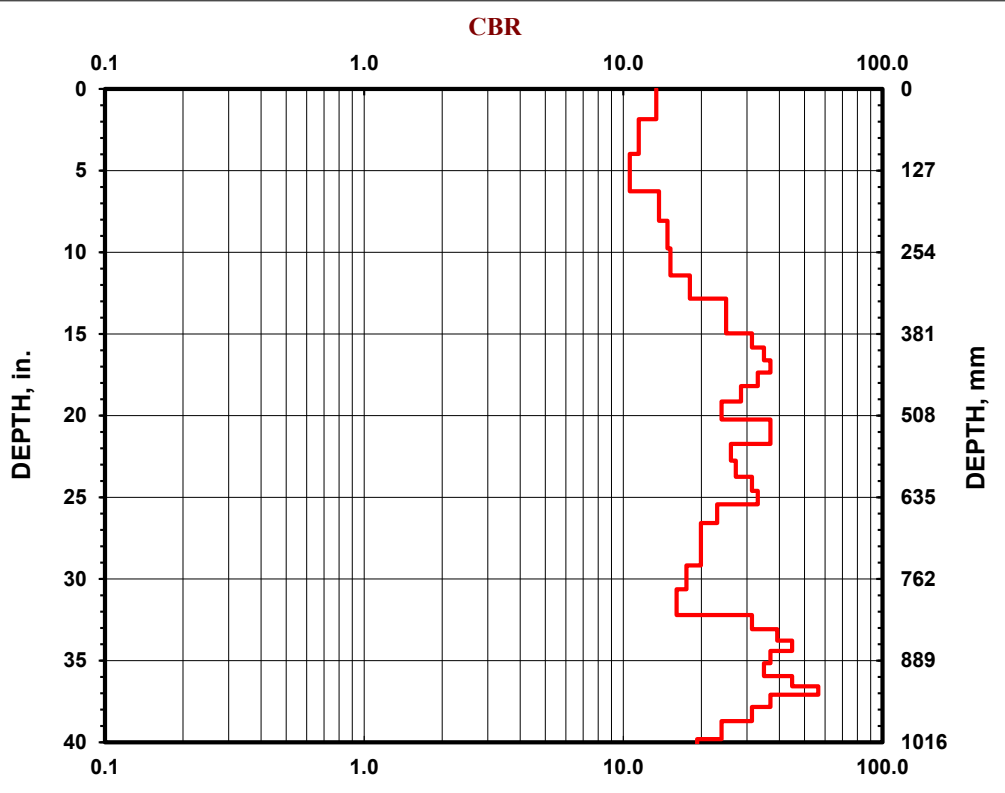
PID: 119143
 Date: 4/20/2023
 Surface Materials: 2" Topsoil
 Test Starting Depth (ft): 0.0

Hammer
 10.1 lbs.
 17.6 lbs.
 Both hammers used

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Soil Type
 CH
 CL
 All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
3	47	1
3	101	1
3	159	1
3	205	1
3	248	1
3	290	1
3	326	1
3	353	1
3	380	1
3	402	1
3	422	1
3	441	1
3	462	1
3	486	1
3	514	1
3	533	1
3	552	1
3	578	1
3	603	1
3	625	1
3	646	1
3	675	1
3	708	1
3	741	1
3	778	1
3	818	1
3	840	1
3	858	1
3	874	1
3	893	1
3	913	1
3	929	1
3	942	1
3	961	1
3	983	1
3	1011	1
3	1045	1
3	1070	1
3	1092	1



NOTES: Latitude, Longitude & Elevation from OGE GPS unit utilizing the ODOT VRS network.



DCP TEST DATA

Project: MEG-33-13.96\19.11
 Exploration ID: D-024-0-23
 Elevation: 744.0
 Lat / Long: 38.999151, -81.879972

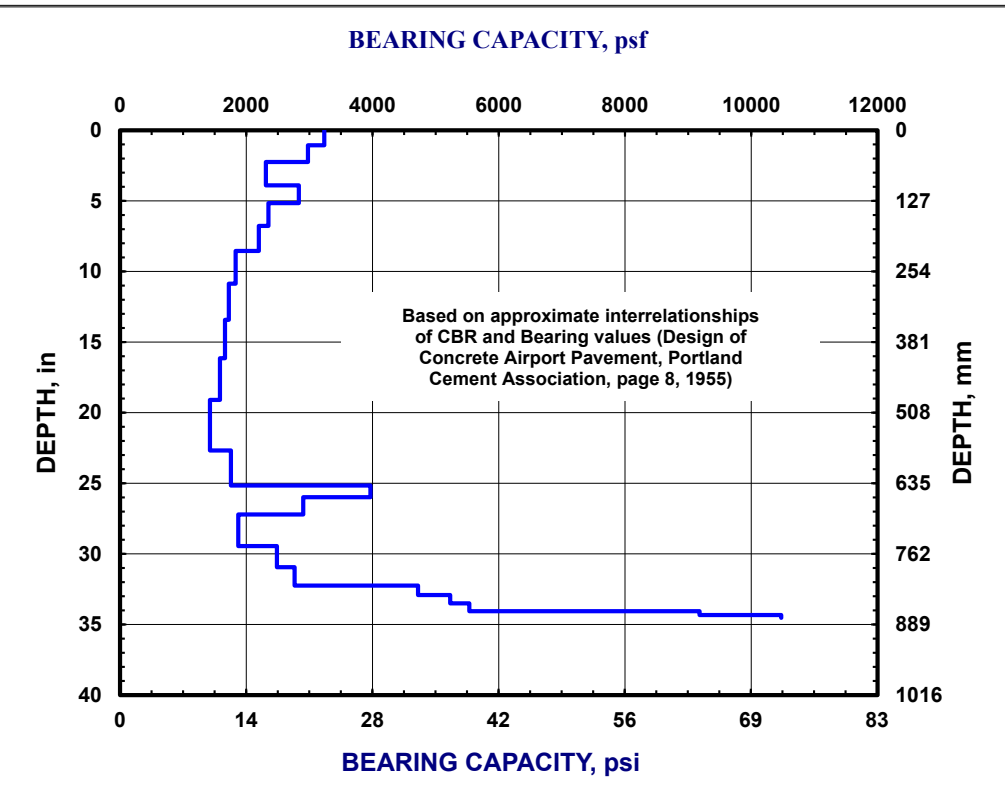
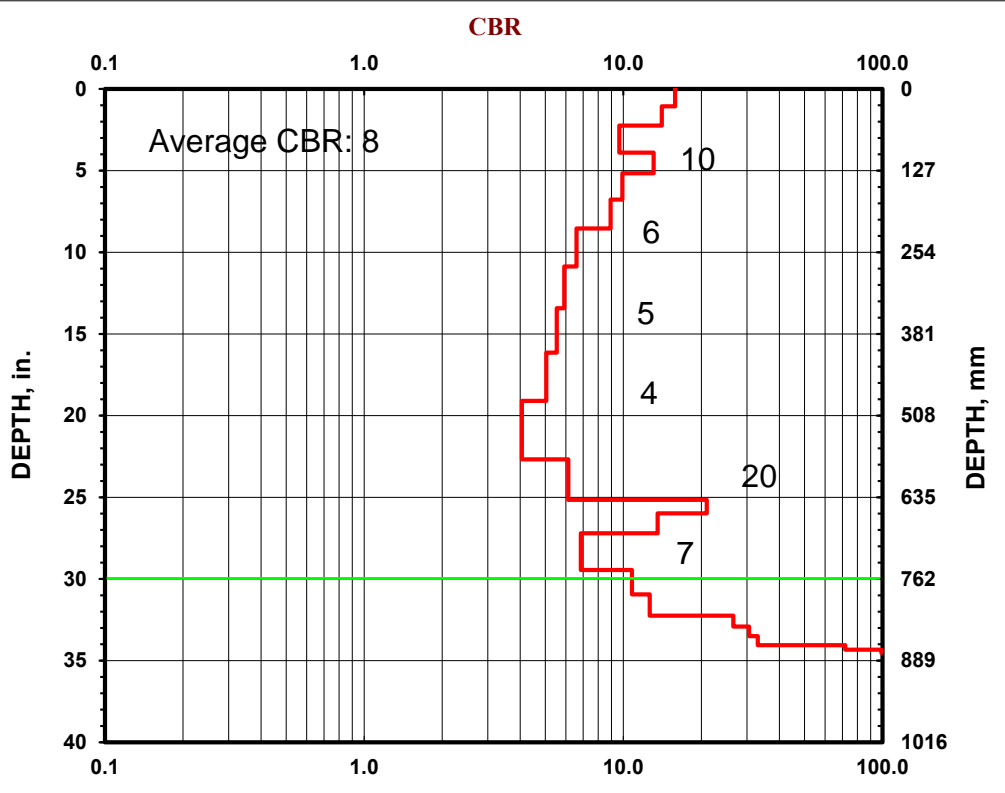
PID: 119143
 Date: 4/20/2023
 Surface Materials: 4" Topsoil
 Test Starting Depth (ft): 0.0

Hammer
 10.1 lbs.
 17.6 lbs.
 Both hammers used

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Soil Type
 CH
 CL
 All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
2	27	1
2	57	1
2	99	1
2	131	1
2	172	1
2	217	1
2	276	1
2	341	1
2	410	1
2	485	1
2	576	1
2	639	1
2	660	1
2	691	1
2	748	1
2	786	1
2	819	1
2	836	1
2	851	1
2	865	1
2	872	1
2	874	1
2	877	1



NOTES: Latitude, Longitude & Elevation from OGE GPS unit utilizing the ODOT VRS network.
 Sounding terminated at refusal.



DCP TEST DATA

Project: MEG-33-13.96\19.11
 Exploration ID: D-026-0-23
 Elevation: 783.1
 Lat / Long: 38.99735, -81.873418

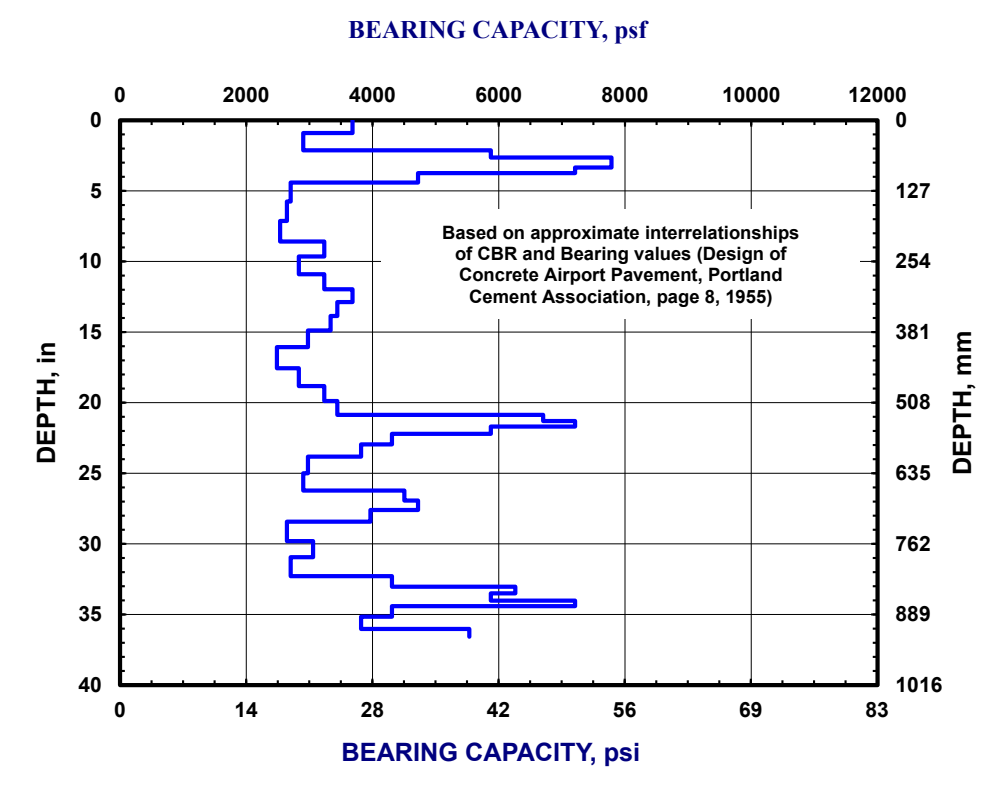
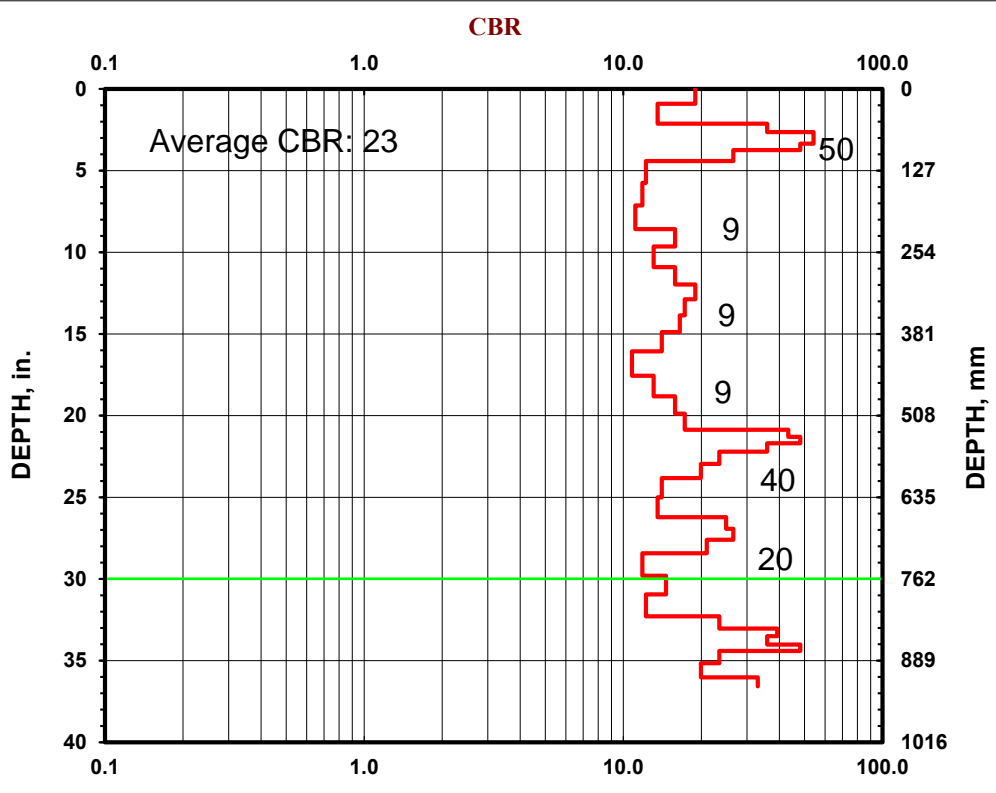
PID: 119144
 Date: 4/20/2023
 Surface Materials: 1" Topsoil
 Test Starting Depth (ft): 0.0

Hammer
 10.1 lbs.
 17.6 lbs.
 Both hammers used

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Soil Type
 CH
 CL
 All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
2	23	1
2	54	1
2	67	1
2	76	1
2	85	1
2	95	1
2	112	1
2	146	1
2	181	1
2	218	1
2	245	1
2	277	1
2	304	1
2	327	1
2	352	1
2	378	1
2	408	1
2	446	1
2	478	1
2	505	1
2	530	1
2	541	1
2	551	1
2	564	1
2	583	1
2	605	1
2	635	1
2	666	1
2	684	1
2	701	1
2	722	1
2	757	1
2	786	1
2	820	1
2	839	1
2	851	1
2	864	1
2	874	1
2	893	1
2	915	1
2	929	1



NOTES: Latitude, Longitude & Elevation from OGE GPS unit utilizing the ODOT VRS network.
 Sounding terminated at refusal.



DCP TEST DATA

Project: MEG-33-13.96\19.11
 Exploration ID: D-027-0-23
 Elevation: 783.6
 Lat / Long: 38.995897, -81.871344

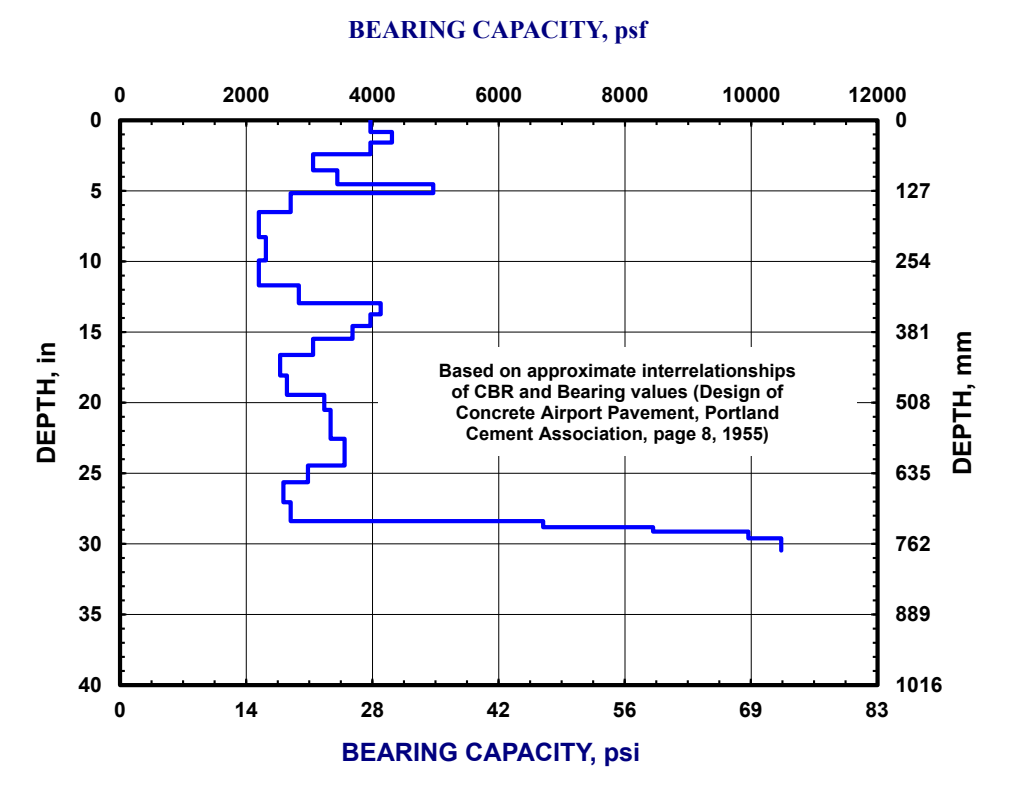
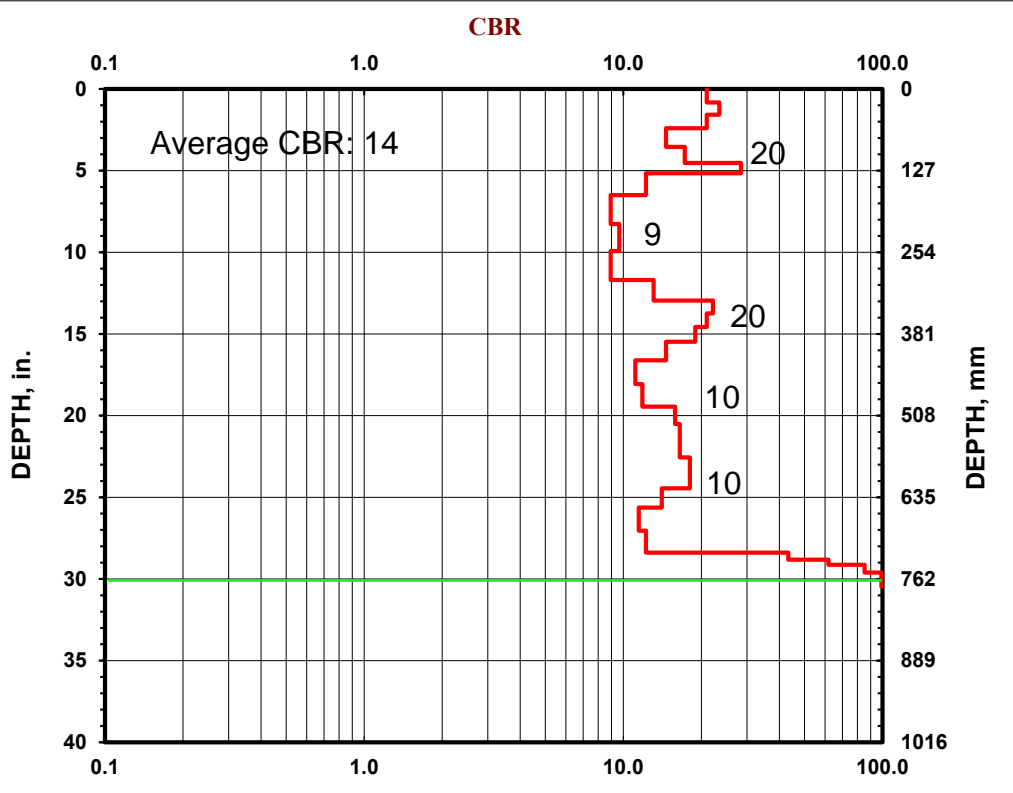
PID: 119144
 Date: 4/20/2023
 Surface Materials: 2" Topsoil
 Test Starting Depth (ft): 0.0

Hammer
 10.1 lbs.
 17.6 lbs.
 Both hammers used

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Soil Type
 CH
 CL
 All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
2	21	1
2	40	1
2	61	1
2	90	1
2	115	1
2	131	1
2	165	1
2	210	1
2	252	1
2	297	1
2	329	1
2	349	1
2	370	1
2	393	1
2	422	1
2	459	1
2	494	1
2	521	1
2	547	1
2	573	1
2	597	1
2	621	1
2	651	1
2	687	1
2	721	1
2	732	1
2	740	1
2	746	1
2	752	1
2	757	1
2	762	1
2	767	1
2	771	1
2	774	1



NOTES: Latitude, Longitude & Elevation from OGE GPS unit utilizing the ODOT VRS network.
 Sounding terminated at refusal.



DCP TEST DATA

Project: MEG-33-13.96\19.11
 Exploration ID: D-028-0-23
 Elevation: 766.4
 Lat / Long: 38.992906, -81.868867

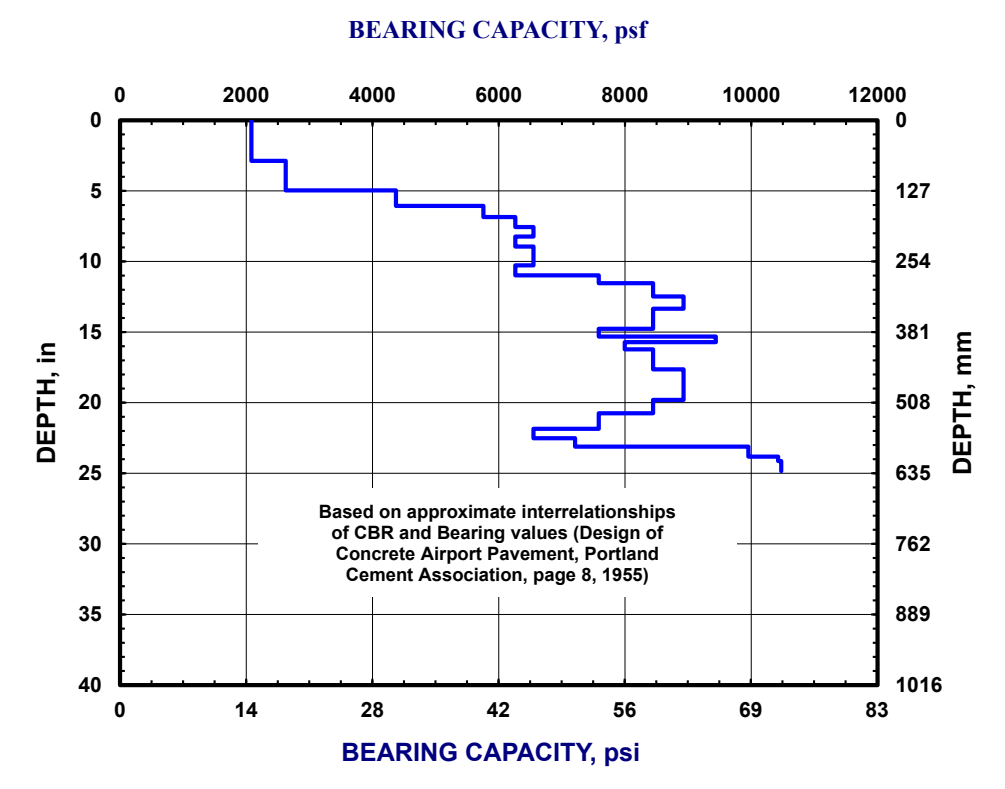
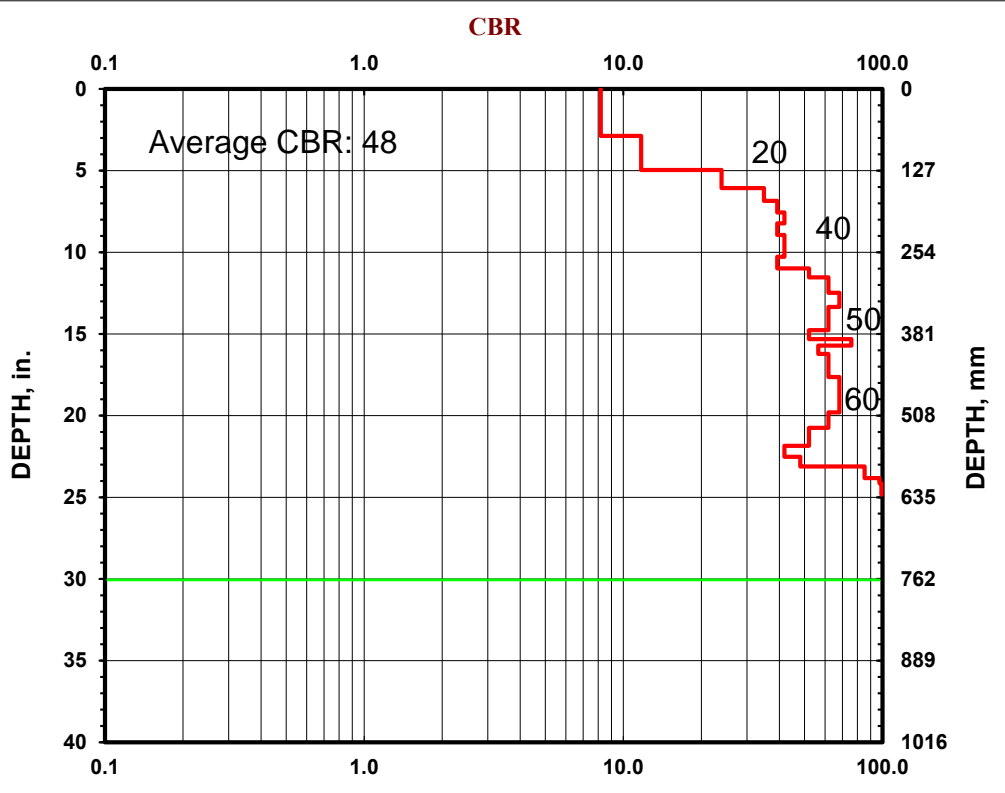
PID: 119144
 Date: 4/20/2023
 Surface Materials: 1" Topsoil
 Test Starting Depth (ft): 0.0

Hammer
 10.1 lbs.
 17.6 lbs.
 Both hammers used

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Soil Type
 CH
 CL
 All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
3	73	1
3	126	1
3	154	1
3	174	1
3	192	1
3	209	1
3	227	1
3	244	1
3	261	1
3	279	1
3	293	1
3	305	1
3	317	1
3	328	1
3	339	1
3	351	1
3	363	1
3	375	1
3	389	1
3	399	1
3	412	1
3	424	1
3	436	1
3	448	1
3	459	1
3	470	1
3	481	1
3	492	1
3	503	1
3	515	1
3	527	1
3	541	1
3	555	1
3	572	1
3	587	1
3	596	1
3	605	1
3	613	1
3	619	1
3	626	1
3	631	1
3	637	1



NOTES: Latitude, Longitude & Elevation from OGE GPS unit utilizing the ODOT VRS network.
 Sounding terminated at refusal.



DCP TEST DATA

Project: MEG-33-13.96\19.11
 Exploration ID: D-030-0-23
 Elevation: 738.5
 Lat / Long: 38.988094, -81.866642

PID: 119144
 Date: 4/19/2023
 Surface Materials: 1" Topsoil
 Test Starting Depth (ft): 0.0

Hammer

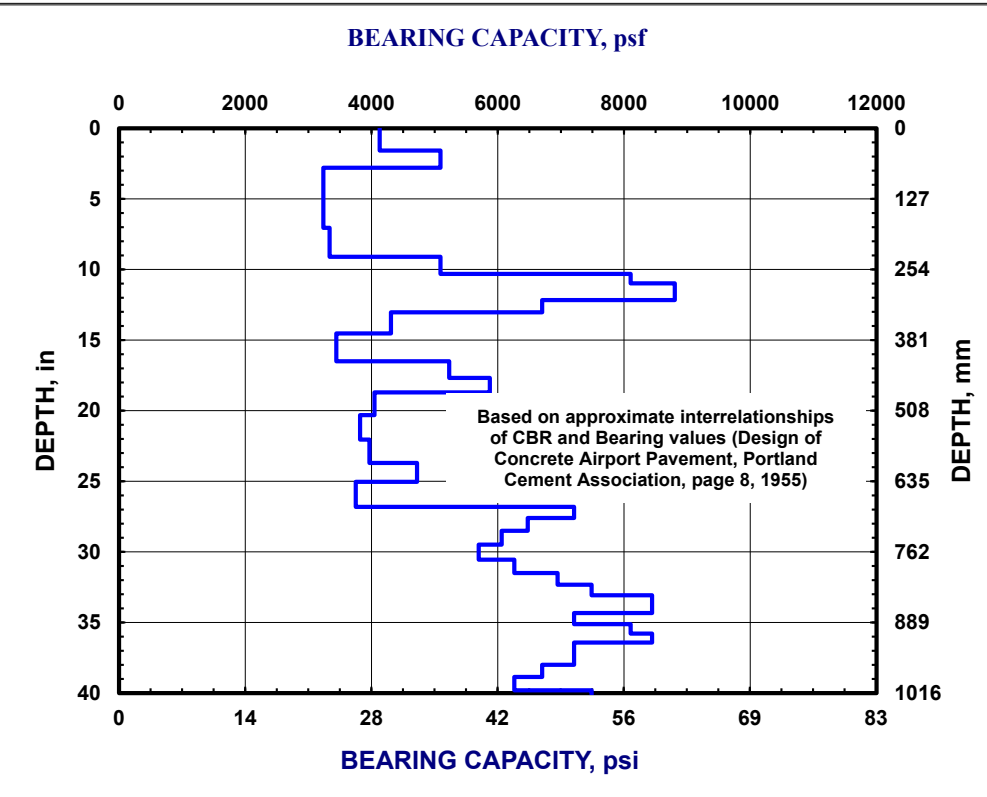
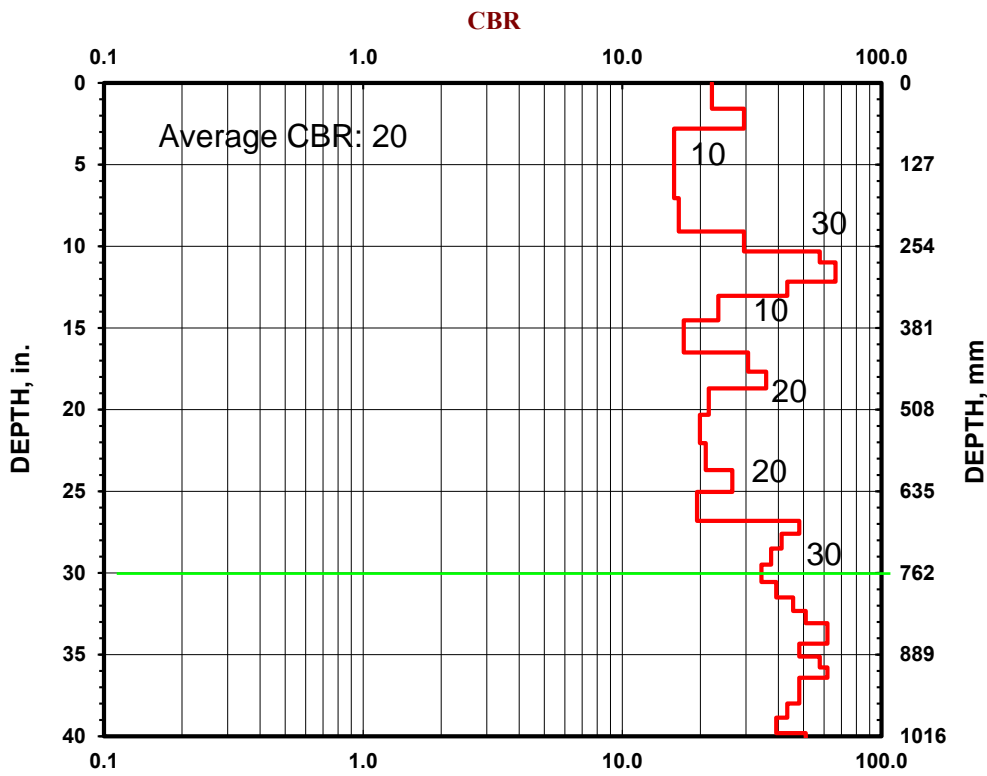
- 10.1 lbs.
- 17.6 lbs.
- Both hammers used

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Soil Type

- CH
- CL
- All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
4	40	1
4	71	1
4	125	1
4	179	1
4	231	1
4	262	1
4	279	1
4	294	1
4	309	1
4	331	1
4	369	1
4	419	1
4	449	1
4	475	1
4	516	1
4	560	1
4	602	1
4	636	1
4	681	1
4	701	1
4	724	1
4	749	1
4	776	1
4	800	1
4	821	1
4	840	1
4	856	1
4	872	1
4	892	1
4	909	1
4	925	1
4	945	1
4	965	1
4	987	1
4	1011	1
4	1030	1
4	1055	1
4	1080	1



NOTES: Latitude & Longitude from OGE handheld GPS unit. Elevation from USGS 3DEP map service.



DCP TEST DATA

Project: MEG-33-13.96\19.11
Exploration ID: D-031-0-23
Elevation: 723.5
Lat / Long: 38.98539, -81.86721

PID: 119144
Date: 4/19/2023
Surface Materials: 1" Topsoil
Test Starting Depth (ft): 0.0

Hammer

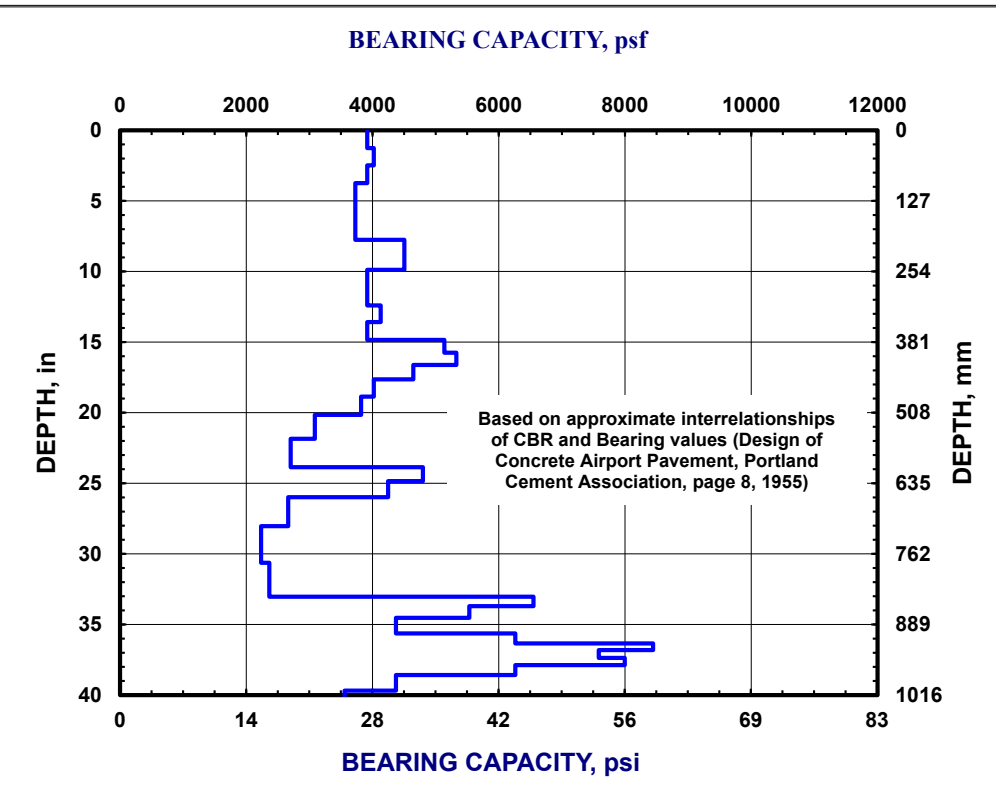
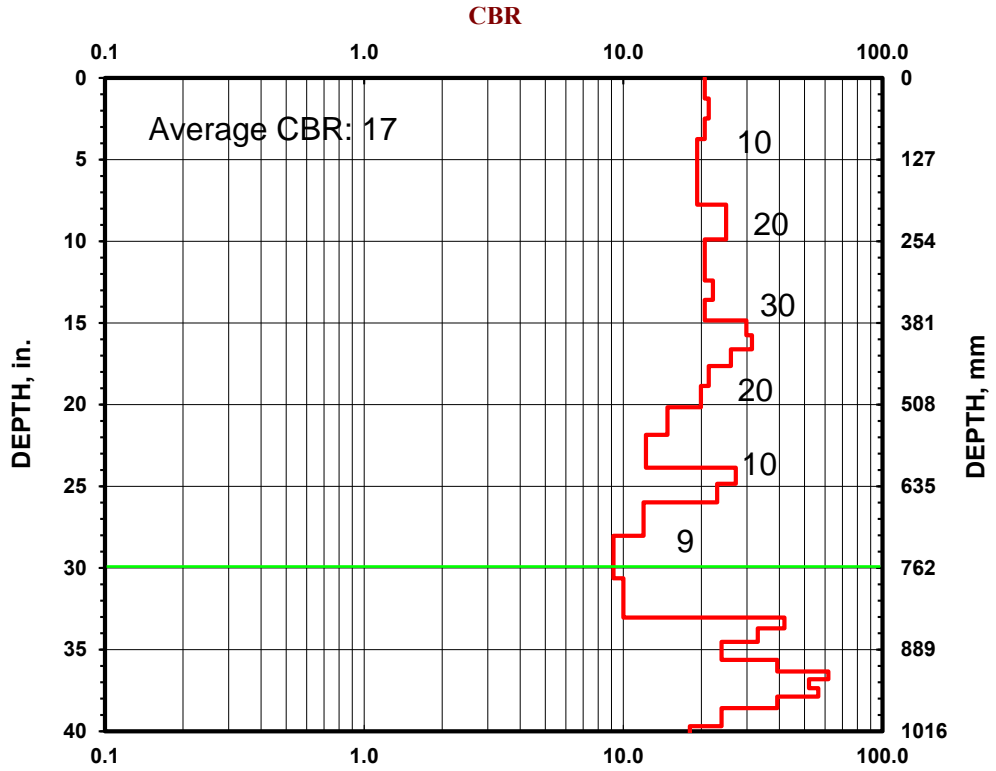
- 10.1 lbs.
- 17.6 lbs.
- Both hammers used

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Soil Type

- CH
- CL
- All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
3	32	1
3	63	1
3	95	1
3	129	1
3	163	1
3	197	1
3	224	1
3	251	1
3	283	1
3	315	1
3	345	1
3	377	1
3	400	1
3	422	1
3	448	1
3	479	1
3	512	1
3	555	1
3	606	1
3	631	1
3	660	1
3	712	1
3	778	1
3	839	1
3	856	1
3	877	1
3	905	1
3	923	1
3	935	1
3	949	1
3	962	1
3	980	1
3	1008	1
3	1044	1
3	1080	1
3	1100	1



NOTES: Latitude & Longitude from OGE handheld GPS unit. Elevation from USGS 3DEP map service.



DCP TEST DATA

Project: MEG-33-13.96\19.11
 Exploration ID: D-032-0-23
 Elevation: 708.7
 Lat / Long: 38.982973, -81.867894

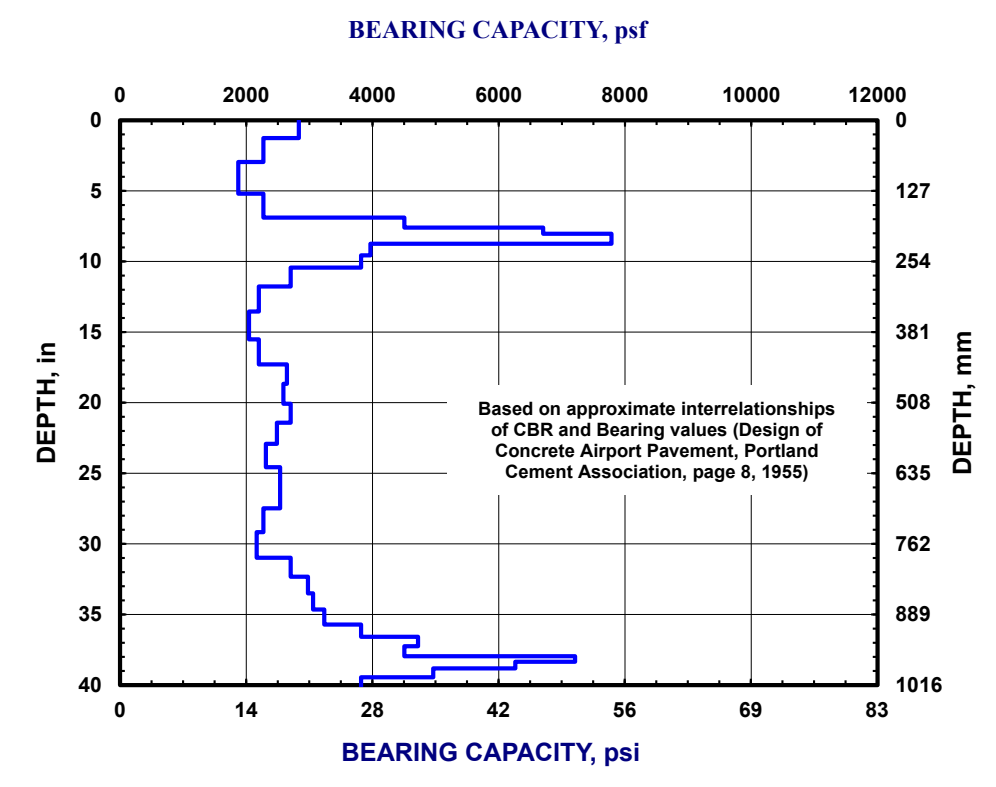
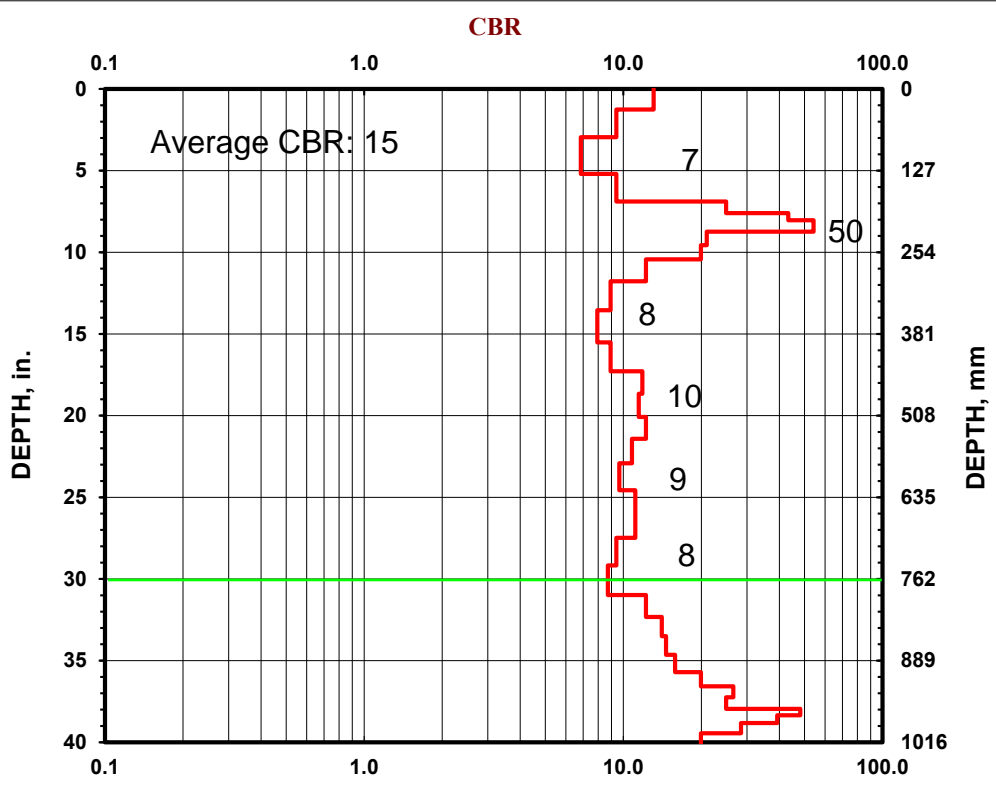
PID: 119144
 Date: 4/19/2023
 Surface Materials: 1" Topsoil
 Test Starting Depth (ft): 0.0

Hammer
 10.1 lbs.
 17.6 lbs.
 Both hammers used

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Soil Type
 CH
 CL
 All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
2	32	1
2	75	1
2	132	1
2	175	1
2	193	1
2	204	1
2	213	1
2	222	1
2	243	1
2	265	1
2	299	1
2	344	1
2	394	1
2	439	1
2	474	1
2	510	1
2	544	1
2	582	1
2	624	1
2	661	1
2	698	1
2	741	1
2	787	1
2	821	1
2	851	1
2	880	1
2	907	1
2	929	1
2	946	1
2	964	1
2	974	1
2	986	1
2	1002	1
2	1024	1
2	1045	1
2	1058	1
2	1073	1
2	1091	1
2	1115	1



NOTES: Latitude & Longitude from OGE handheld GPS unit. Elevation from USGS 3DEP map service.



DCP TEST DATA

Project: MEG-33-13.96\19.11
 Exploration ID: D-033-0-23
 Elevation: 686.0
 Lat / Long: 38.978986, -81.867078

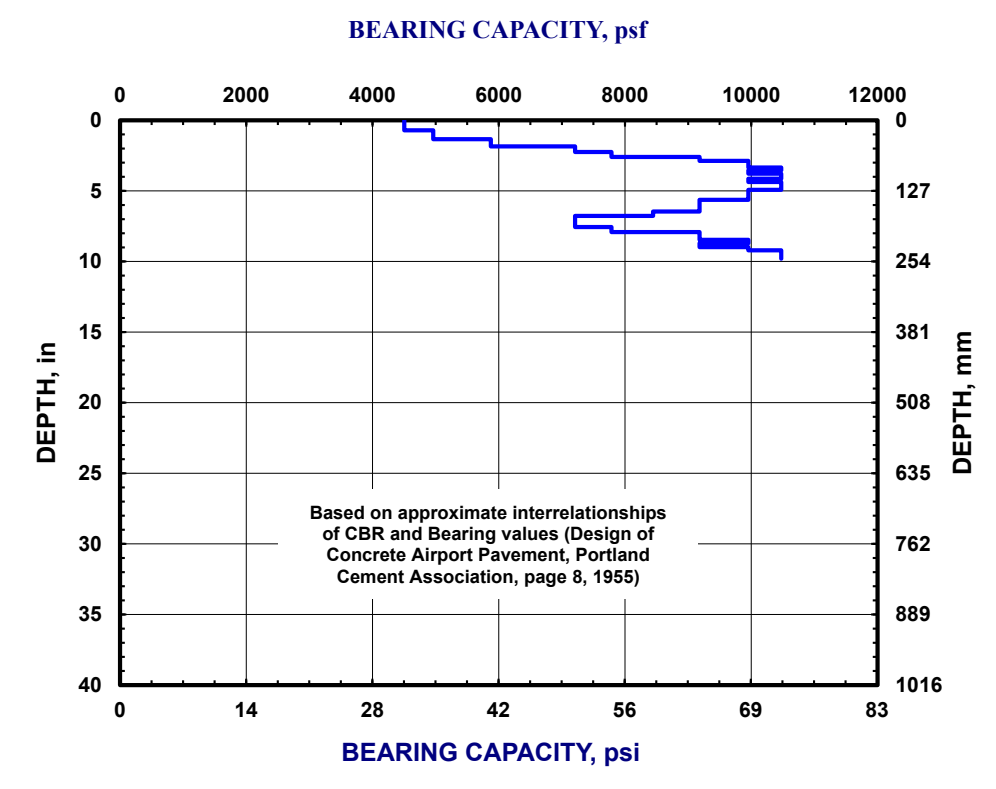
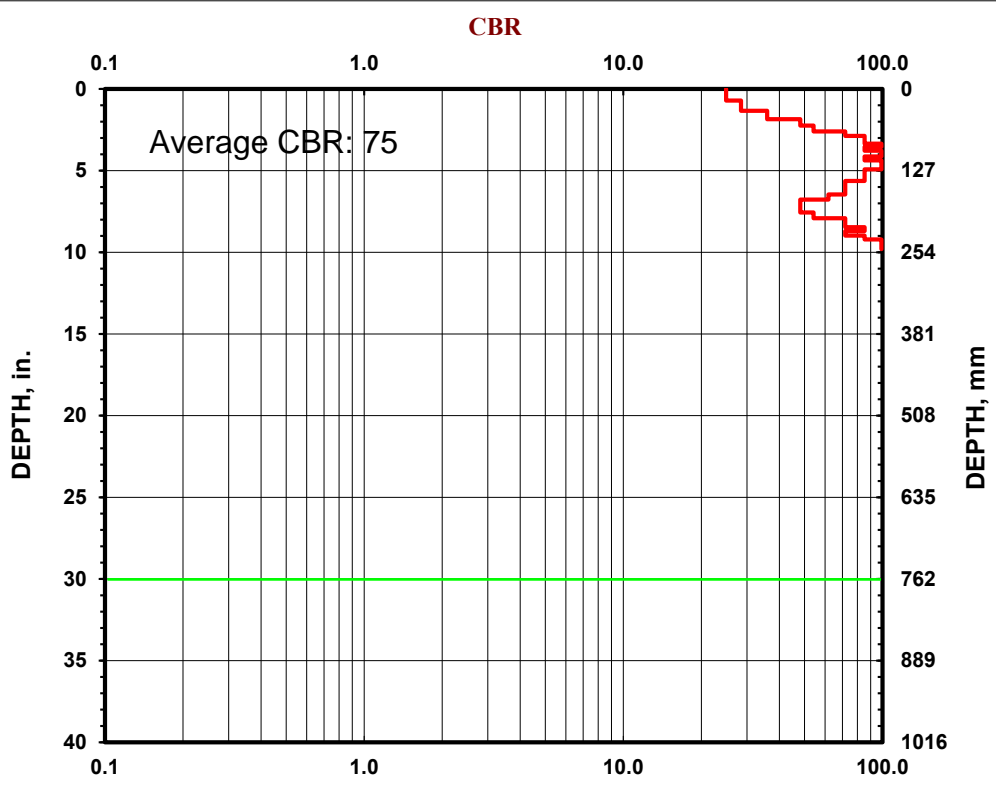
PID: 119144
 Date: 4/19/2023
 Surface Materials: 1" Topsoil
 Test Starting Depth (ft): 0.0

- Hammer
- 10.1 lbs.
 - 17.6 lbs.
 - Both hammers used

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- Soil Type
- CH
 - CL
 - All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
2	18	1
2	34	1
2	47	1
2	57	1
2	66	1
2	73	1
2	79	1
2	85	1
2	90	1
2	96	1
2	101	1
2	105	1
2	111	1
2	116	1
2	120	1
2	125	1
2	131	1
2	137	1
2	143	1
2	150	1
2	157	1
2	164	1
2	172	1
2	182	1
2	192	1
2	201	1
2	208	1
2	215	1
2	221	1
2	228	1
2	234	1
2	238	1
2	242	1
2	245	1
2	249	1



NOTES: Latitude & Longitude from OGE handheld GPS unit. Elevation from USGS 3DEP map service.
 Sounding terminated at refusal.



DCP TEST DATA

Project: MEG-33-13.96\19.11
 Exploration ID: D-034-0-23
 Elevation: 676.1
 Lat / Long: 38.977541, -81.866049

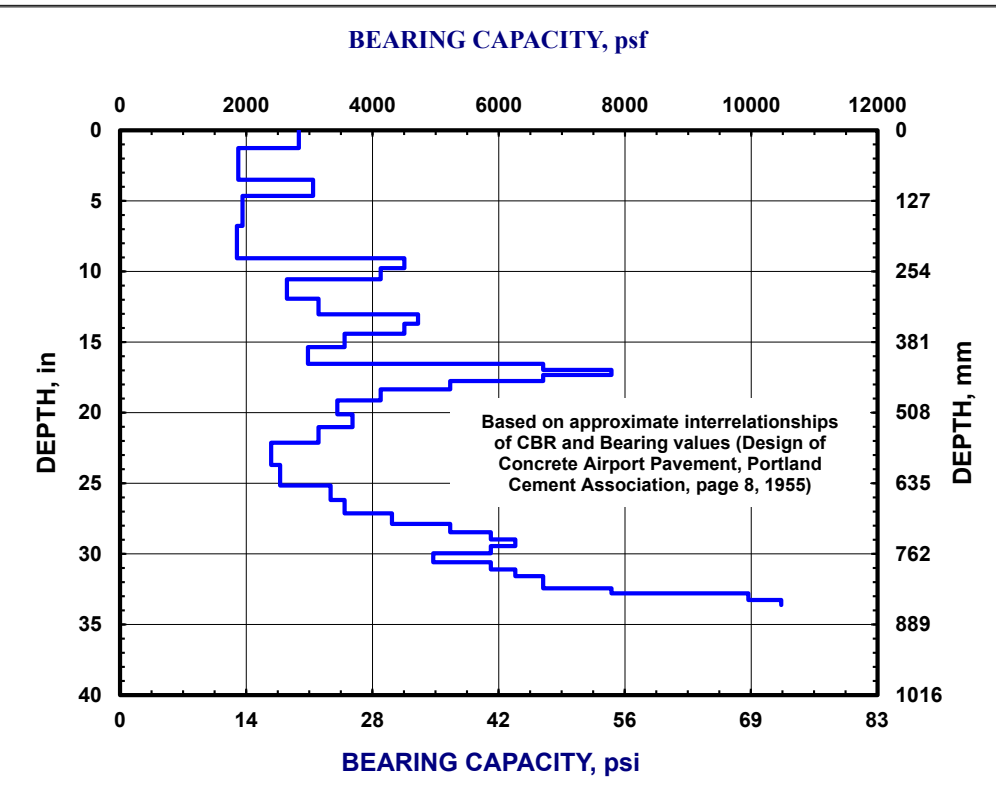
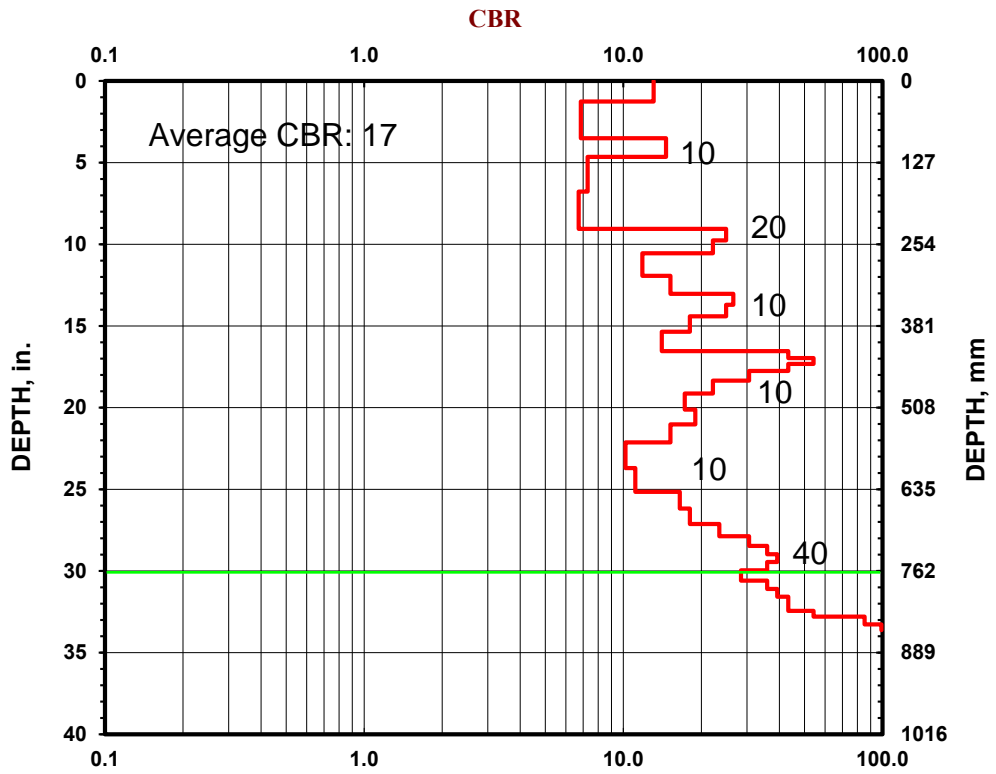
PID: 119144
 Date: 4/19/2023
 Surface Materials: 2" Topsoil
 Test Starting Depth (ft): 0.0

Hammer
 10.1 lbs.
 17.6 lbs.
 Both hammers used

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Soil Type
 CH
 CL
 All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
2	32	1
2	89	1
2	118	1
2	172	1
2	230	1
2	248	1
2	268	1
2	303	1
2	331	1
2	348	1
2	366	1
2	390	1
2	420	1
2	431	1
2	440	1
2	451	1
2	466	1
2	486	1
2	511	1
2	534	1
2	562	1
2	602	1
2	639	1
2	665	1
2	689	1
2	708	1
2	723	1
2	736	1
2	748	1
2	761	1
2	777	1
2	790	1
2	813	1
2	824	1
2	833	1
2	839	1
2	845	1
2	850	1
2	854	1



NOTES: Latitude & Longitude from OGE handheld GPS unit. Elevation from USGS 3DEP map service.
 Sounding terminated at refusal.



DCP TEST DATA

Project: MEG-33-13.96\19.11
 Exploration ID: D-042-0-23
 Elevation: 677.1
 Lat / Long: 38.966392, -81.839909

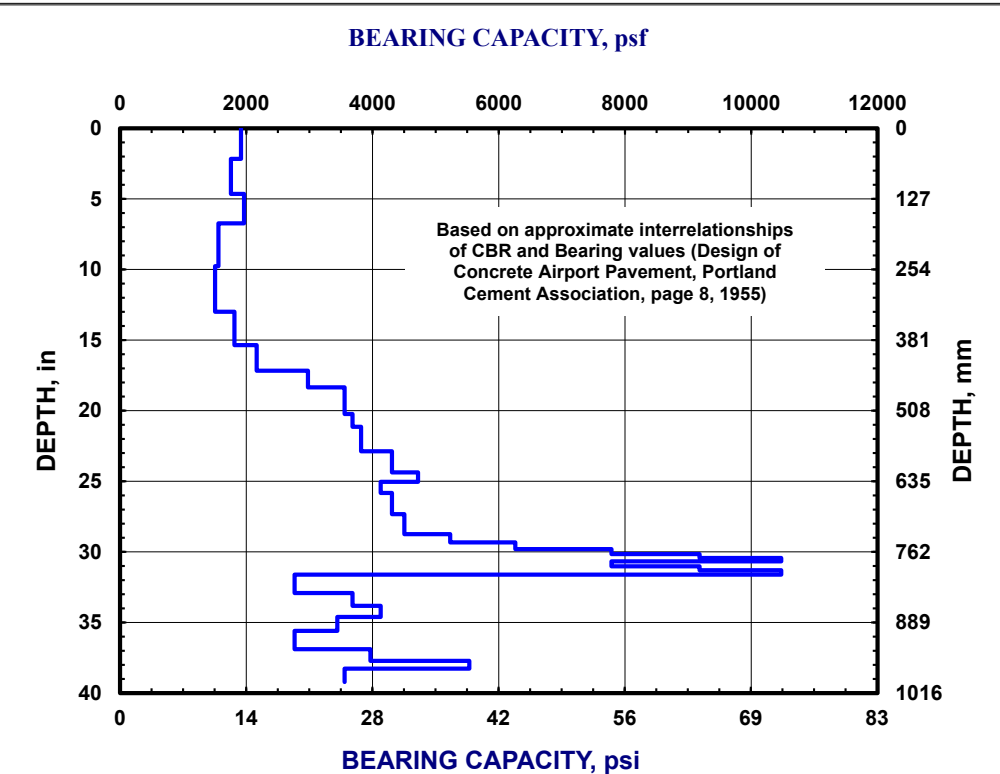
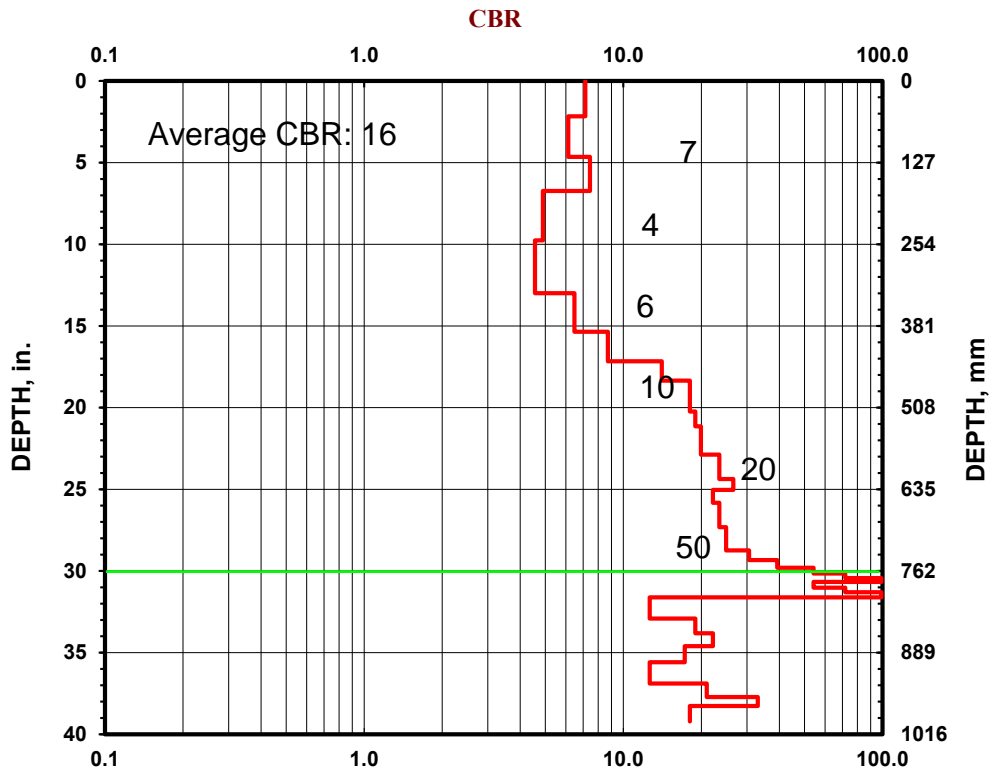
PID: 119144
 Date: 4/19/2023
 Surface Materials: 4" Topsoil
 Test Starting Depth (ft): 0.0

Hammer
 10.1 lbs.
 17.6 lbs.
 Both hammers used

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Soil Type
 CH
 CL
 All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
2	55	1
2	118	1
2	171	1
2	248	1
2	330	1
2	390	1
2	436	1
2	466	1
2	490	1
2	514	1
2	537	1
2	559	1
2	581	1
2	600	1
2	619	1
2	636	1
2	656	1
2	675	1
2	694	1
2	712	1
2	730	1
2	745	1
2	757	1
2	766	1
2	773	1
2	777	1
2	779	1
2	788	1
2	795	1
2	800	1
2	803	1
2	836	1
2	859	1
2	879	1
2	904	1
2	937	1
2	958	1
2	972	1
2	996	1



NOTES: Latitude & Longitude from OGE handheld GPS unit. Elevation from USGS 3DEP map service.
 Sounding terminated at refusal.



DCP TEST DATA

Project: MEG-33-13.96\19.11
 Exploration ID: D-043-0-23
 Elevation: 632.1
 Lat / Long: 38.965996, -81.834647

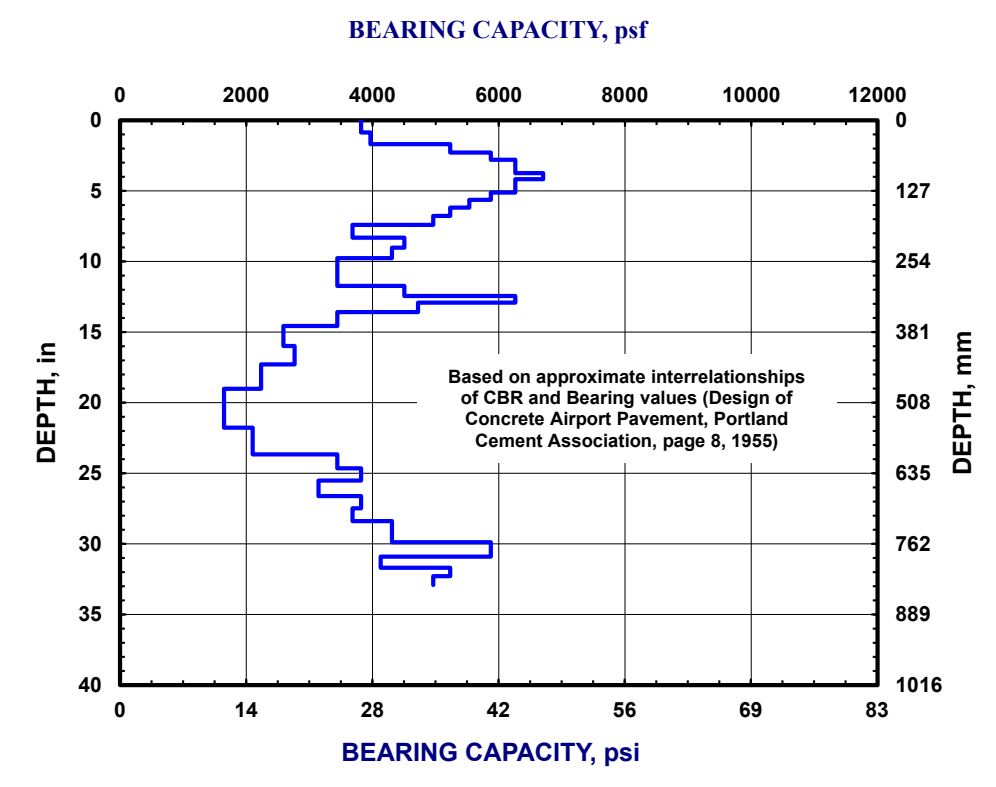
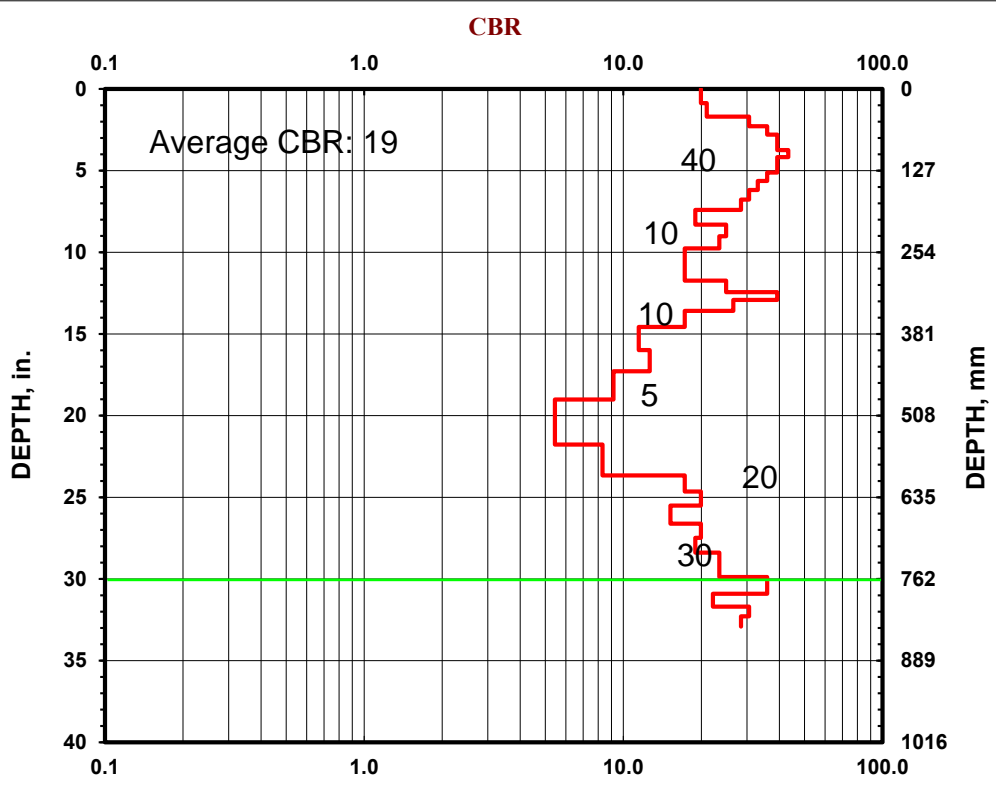
PID: 119144
 Date: 4/19/2023
 Surface Materials: 2" Topsoil
 Test Starting Depth (ft): 0.0

Hammer
 10.1 lbs.
 17.6 lbs.
 Both hammers used

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Soil Type
 CH
 CL
 All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
2	22	1
2	43	1
2	58	1
2	71	1
2	83	1
2	95	1
2	106	1
2	118	1
2	130	1
2	143	1
2	157	1
2	172	1
2	188	1
2	211	1
2	229	1
2	248	1
2	273	1
2	298	1
2	316	1
2	328	1
2	345	1
2	370	1
2	406	1
2	439	1
2	483	1
2	553	1
2	601	1
2	626	1
2	648	1
2	676	1
2	698	1
2	721	1
2	740	1
2	759	1
2	772	1
2	785	1
2	805	1
2	820	1
2	836	1



NOTES: Latitude, Longitude & Elevation from OGE GPS unit utilizing the ODOT VRS network.
 Sounding terminated at refusal.



DCP TEST DATA

Project: MEG-33-13.96\19.11
 Exploration ID: D-044-0-23
 Elevation: 626.7
 Lat / Long: 38.962001, -81.821665

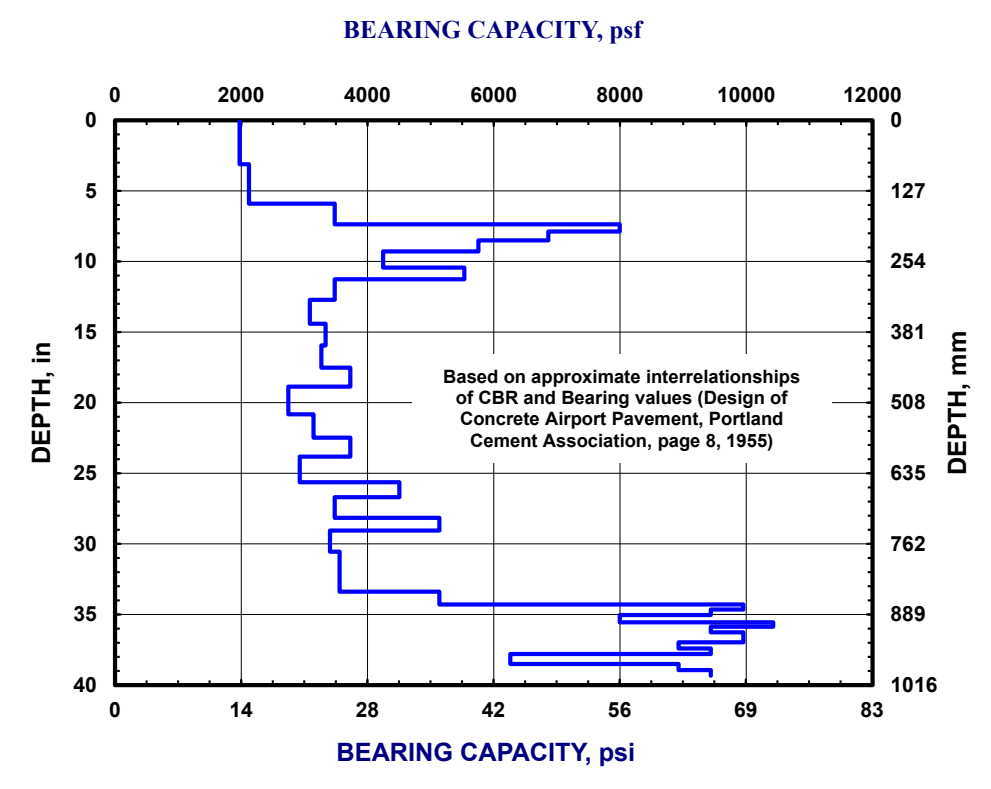
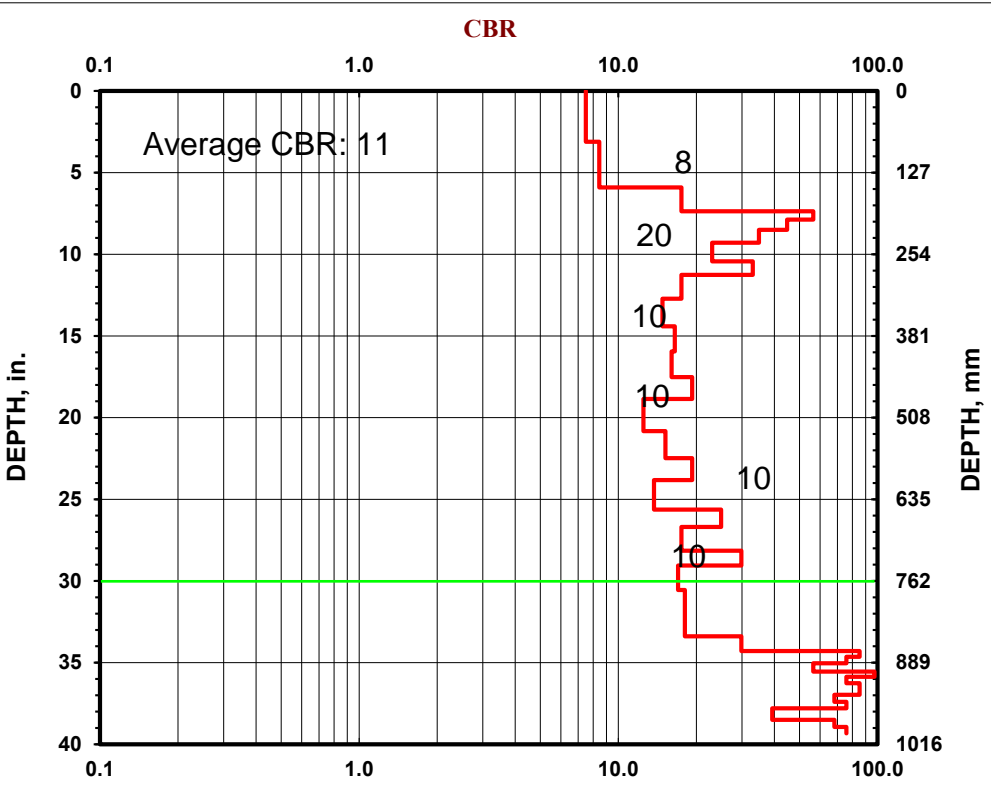
PID: 119144
 Date: 4/19/2023
 Surface Materials: 4" Topsoil
 Test Starting Depth (ft): 0.0

- Hammer
- 10.1 lbs.
 - 17.6 lbs.
 - Both hammers used

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- Soil Type
- CH
 - CL
 - All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
3	79	1
3	150	1
3	187	1
3	200	1
3	216	1
3	236	1
3	265	1
3	286	1
3	323	1
3	366	1
3	405	1
3	445	1
3	479	1
3	529	1
3	571	1
3	605	1
3	651	1
3	678	1
3	715	1
3	738	1
3	776	1
3	812	1
3	848	1
3	871	1
3	880	1
3	890	1
3	903	1
3	911	1
3	921	1
3	930	1
3	939	1
3	950	1
3	960	1
3	978	1
3	989	1
3	999	1



NOTES: Latitude, Longitude & Elevation from OGE GPS unit utilizing the ODOT VRS network.
 Sounding terminated at refusal.



DCP TEST DATA

Project: MEG-33-13.96\19.11
 Exploration ID: D-045-0-23
 Elevation: 695.3
 Lat / Long: 38.955064, -81.816374

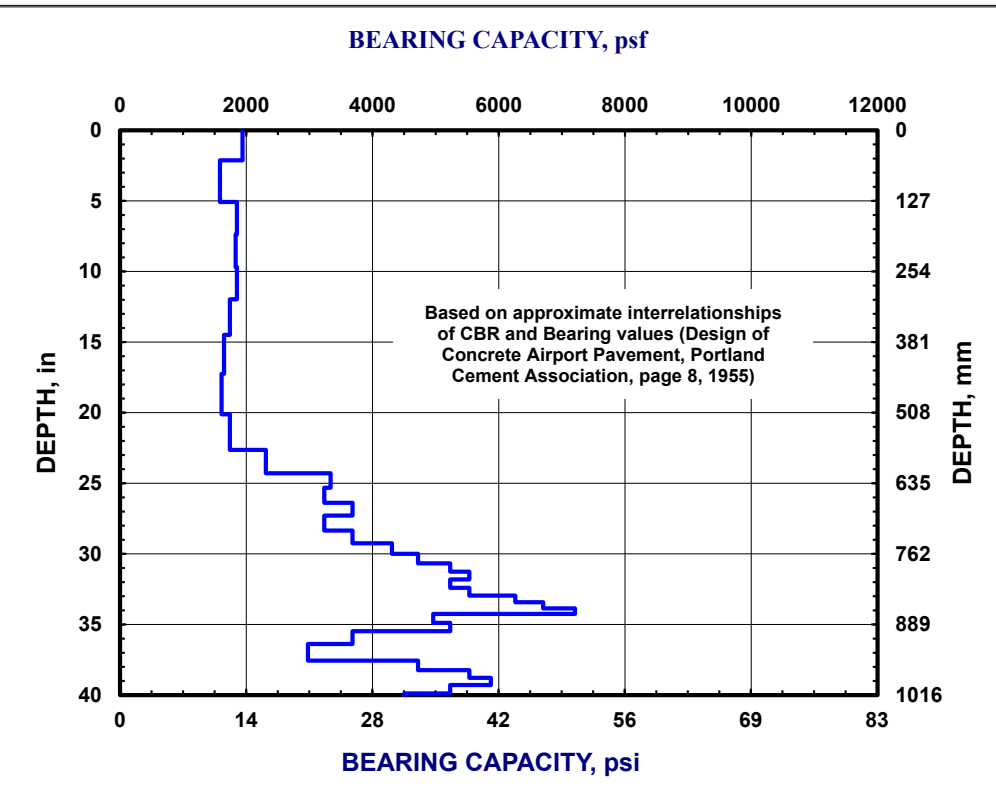
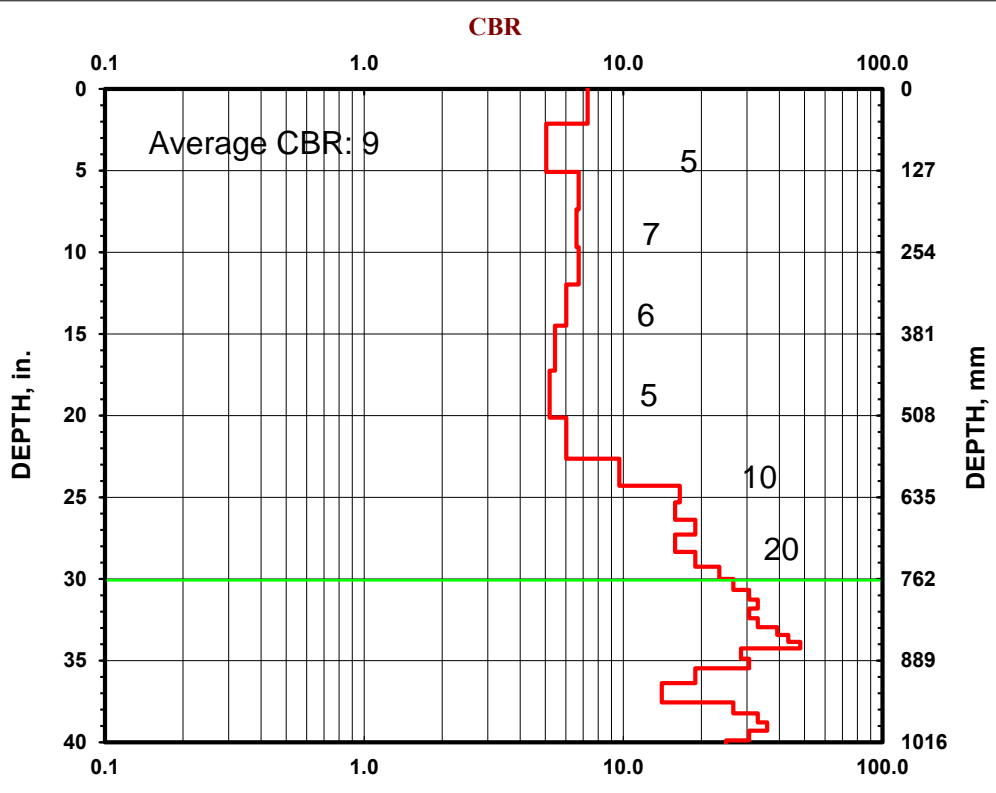
PID: 119144
 Date: 4/19/2023
 Surface Materials: 4" Topsoil
 Test Starting Depth (ft): 0.0

Hammer
 10.1 lbs.
 17.6 lbs.
 Both hammers used

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Soil Type
 CH
 CL
 All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
2	54	1
2	129	1
2	187	1
2	246	1
2	304	1
2	368	1
2	438	1
2	511	1
2	575	1
2	617	1
2	643	1
2	670	1
2	693	1
2	720	1
2	743	1
2	762	1
2	779	1
2	794	1
2	808	1
2	823	1
2	837	1
2	849	1
2	860	1
2	870	1
2	886	1
2	901	1
2	924	1
2	954	1
2	971	1
2	985	1
2	998	1
2	1013	1
2	1031	1
2	1044	1
2	1054	1
2	1065	1
2	1075	1
2	1087	1
2	1098	1



NOTES: Latitude, Longitude & Elevation from OGE GPS unit utilizing the ODOT VRS network.



DCP TEST DATA

Project: MEG-33-13.96\19.11
Exploration ID: D-047-0-23
Elevation: 668.0
Lat / Long: 38.954602, -81.811518

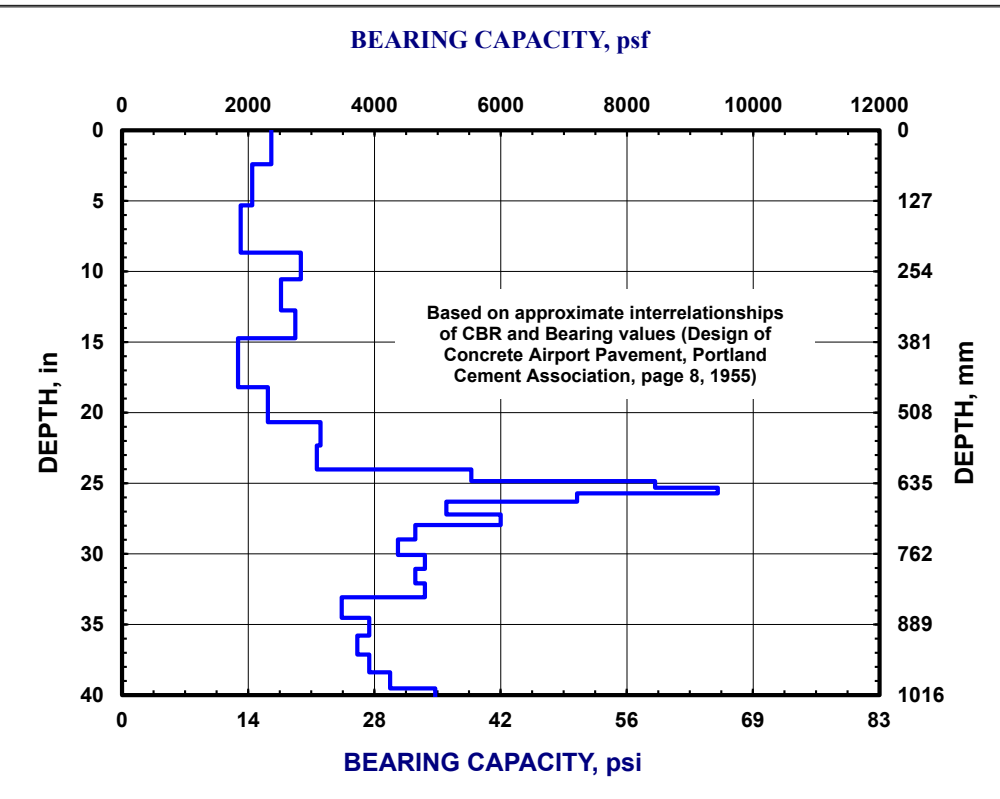
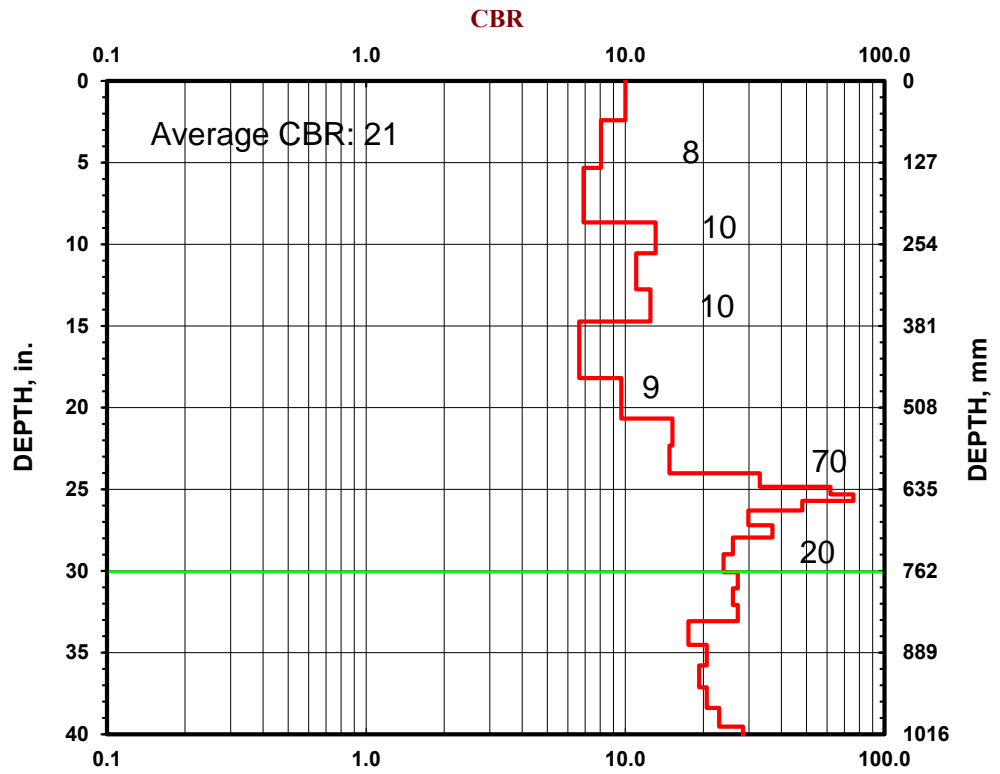
PID: 119144
Date: 4/19/2023
Surface Materials: 3" Topsoil
Test Starting Depth (ft): 0.0

Hammer
 10.1 lbs.
 17.6 lbs.
 Both hammers used

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Soil Type
 CH
 CL
 All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
3	61	1
3	135	1
3	220	1
3	268	1
3	324	1
3	374	1
3	462	1
3	525	1
3	567	1
3	610	1
3	631	1
3	643	1
3	653	1
3	668	1
3	691	1
3	710	1
3	736	1
3	764	1
3	789	1
3	815	1
3	840	1
3	877	1
3	909	1
3	943	1
3	975	1
3	1004	1
3	1028	1
3	1064	1
3	1100	1



NOTES: Latitude, Longitude & Elevation from OGE GPS unit utilizing the ODOT VRS network.



DCP TEST DATA

Project: MEG-33-13.96\19.11
Exploration ID: D-055-0-23
Elevation: 643.6
Lat / Long: 38.939029, -81.789095

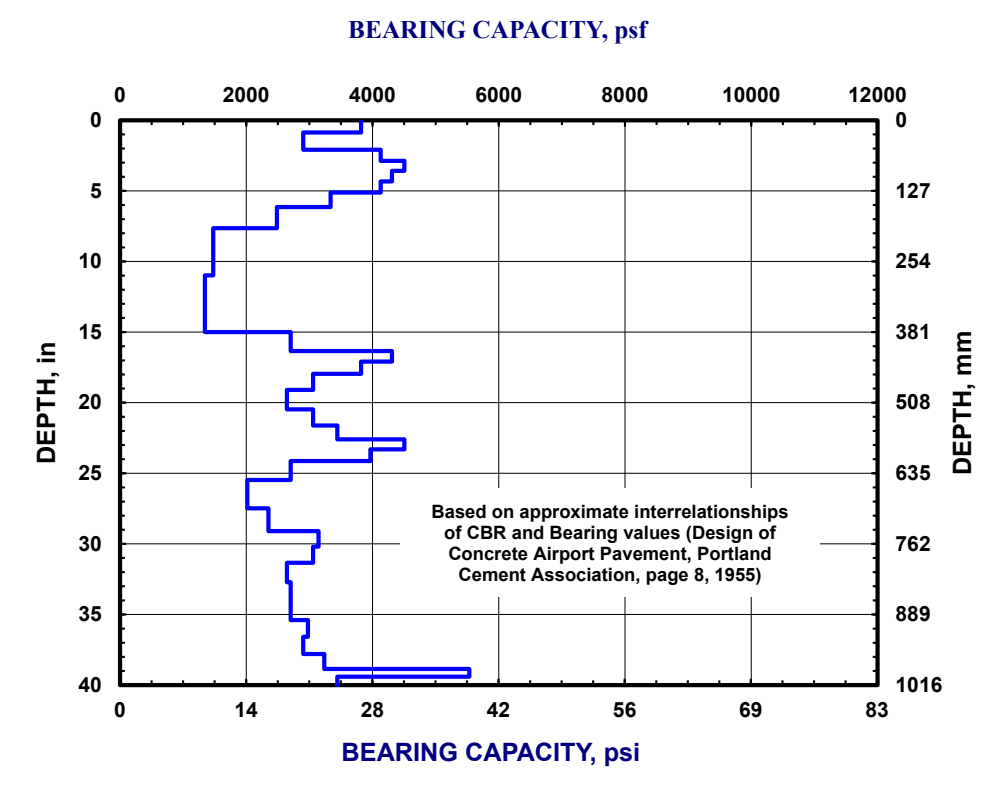
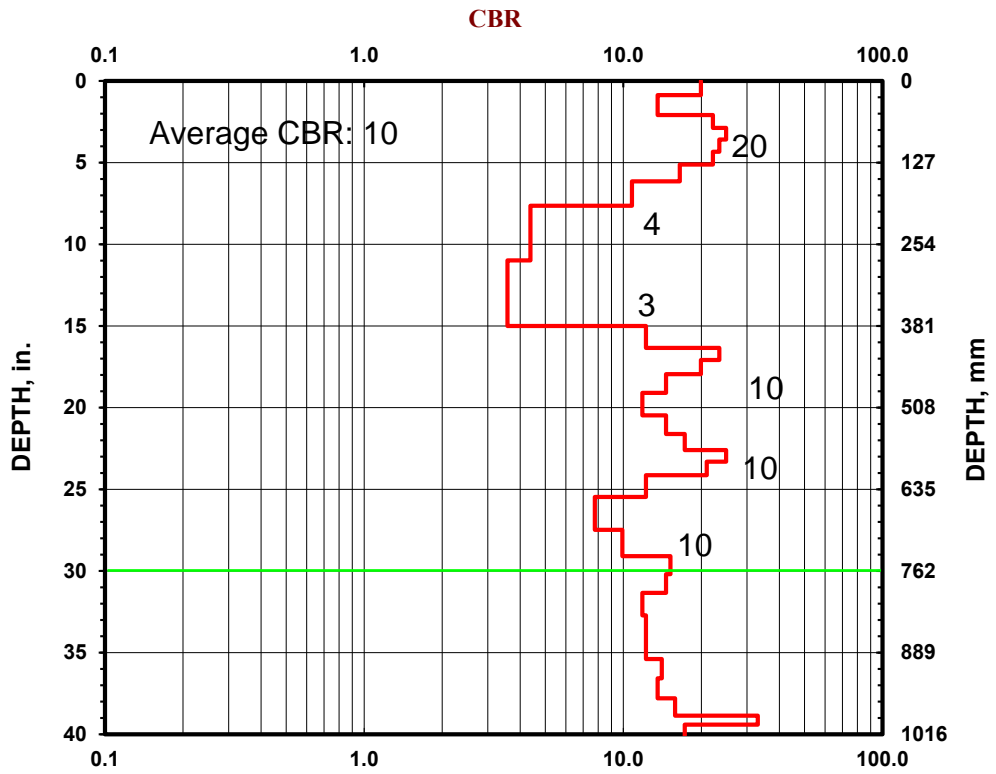
PID: 119144
Date: 4/18/2023
Surface Materials: 4" Topsoil
Test Starting Depth (ft): 0.0

- Hammer**
- 10.1 lbs.
 - 17.6 lbs.
 - Both hammers used

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- Soil Type**
- CH
 - CL
 - All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
2	22	1
2	53	1
2	73	1
2	91	1
2	110	1
2	130	1
2	156	1
2	194	1
2	279	1
2	381	1
2	415	1
2	434	1
2	456	1
2	485	1
2	520	1
2	549	1
2	574	1
2	592	1
2	613	1
2	647	1
2	698	1
2	739	1
2	767	1
2	796	1
2	831	1
2	865	1
2	899	1
2	929	1
2	960	1
2	987	1
2	1001	1
2	1026	1
2	1058	1
2	1090	1
2	1111	1



NOTES: Latitude, Longitude & Elevation from OGE GPS unit utilizing the ODOT VRS network.



DCP TEST DATA

Project: MEG-33-13.96\19.11
 Exploration ID: D-058-0-23
 Elevation: 630.4
 Lat / Long: 38.933435, -81.781129

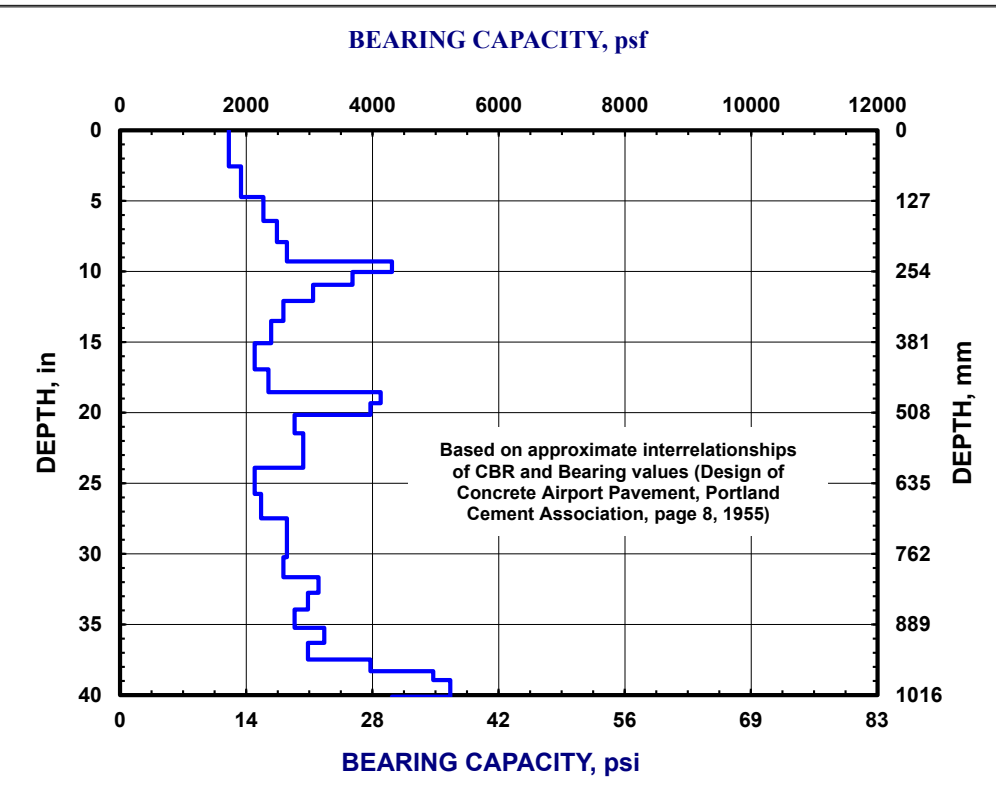
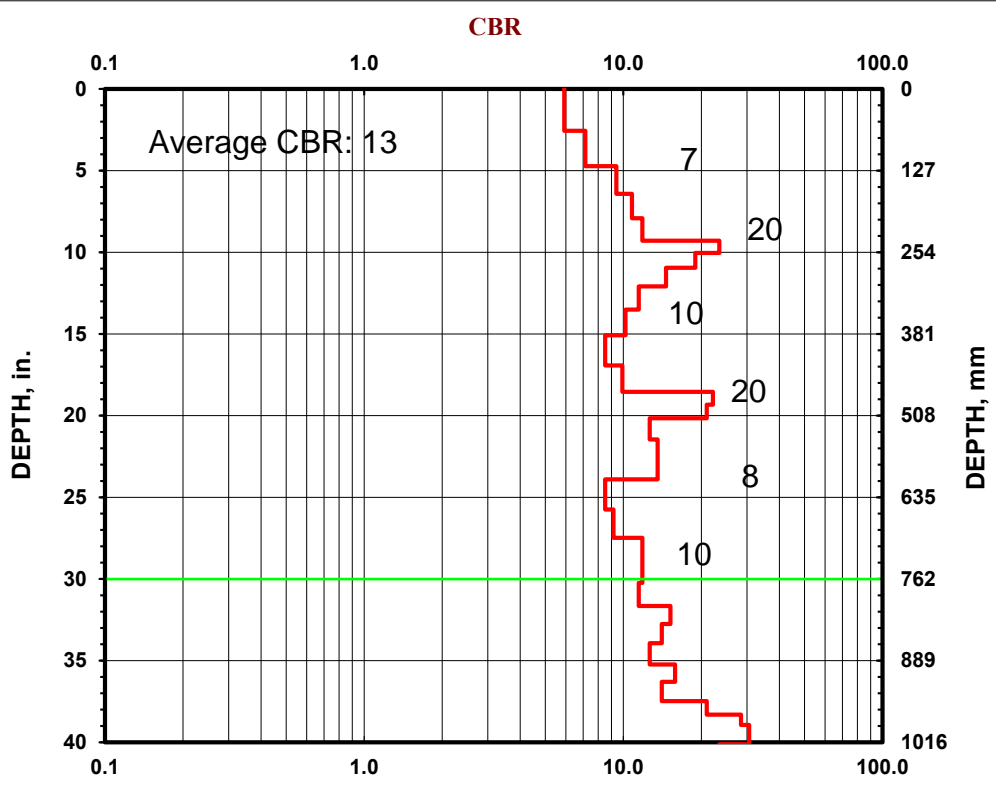
PID: 119144
 Date: 4/18/2023
 Surface Materials: 3" Topsoil
 Test Starting Depth (ft): 0.0

Hammer
 10.1 lbs.
 17.6 lbs.
 Both hammers used

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<http://www.dot.state.oh.us/Divisions/Engineering/Geotechnical>

Soil Type
 CH
 CL
 All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
2	65	1
2	120	1
2	163	1
2	201	1
2	236	1
2	255	1
2	278	1
2	307	1
2	343	1
2	383	1
2	430	1
2	471	1
2	491	1
2	512	1
2	545	1
2	576	1
2	607	1
2	654	1
2	698	1
2	733	1
2	768	1
2	804	1
2	832	1
2	862	1
2	895	1
2	922	1
2	952	1
2	973	1
2	989	1
2	1004	1
2	1019	1
2	1038	1
2	1055	1
2	1070	1
2	1092	1



NOTES: Latitude, Longitude & Elevation from OGE GPS unit utilizing the ODOT VRS network.



DCP TEST DATA

Project: MEG-33-13.96\19.11
 Exploration ID: D-059-0-23
 Elevation: 627.6
 Lat / Long: 38.932629, -81.778133

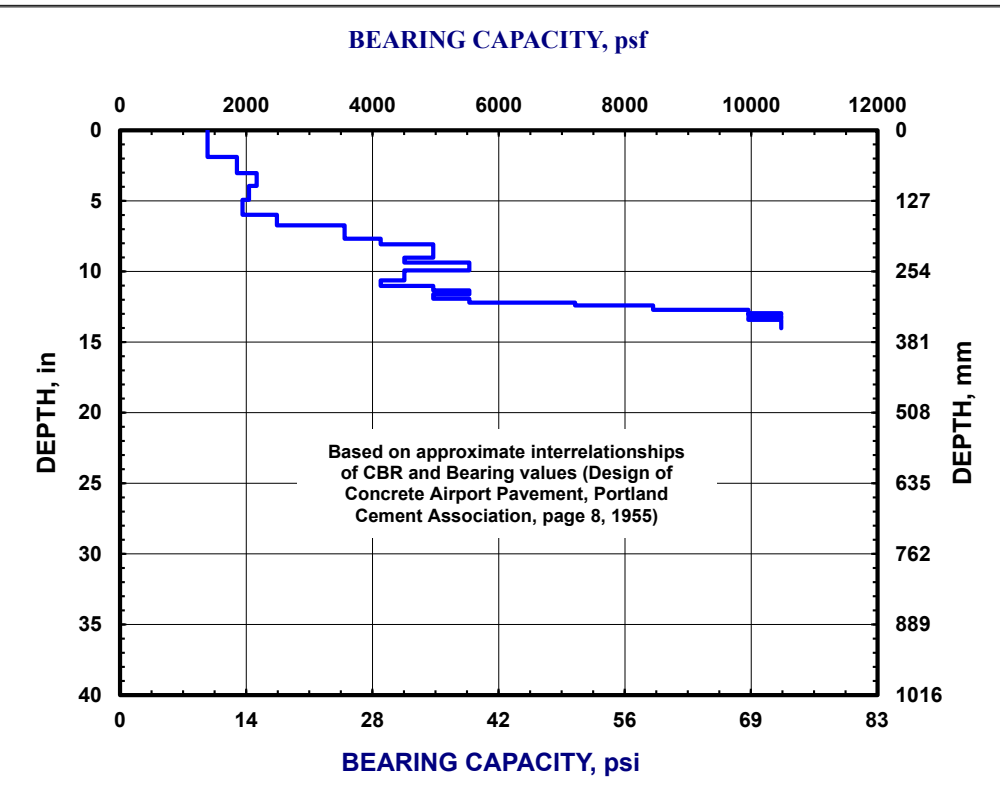
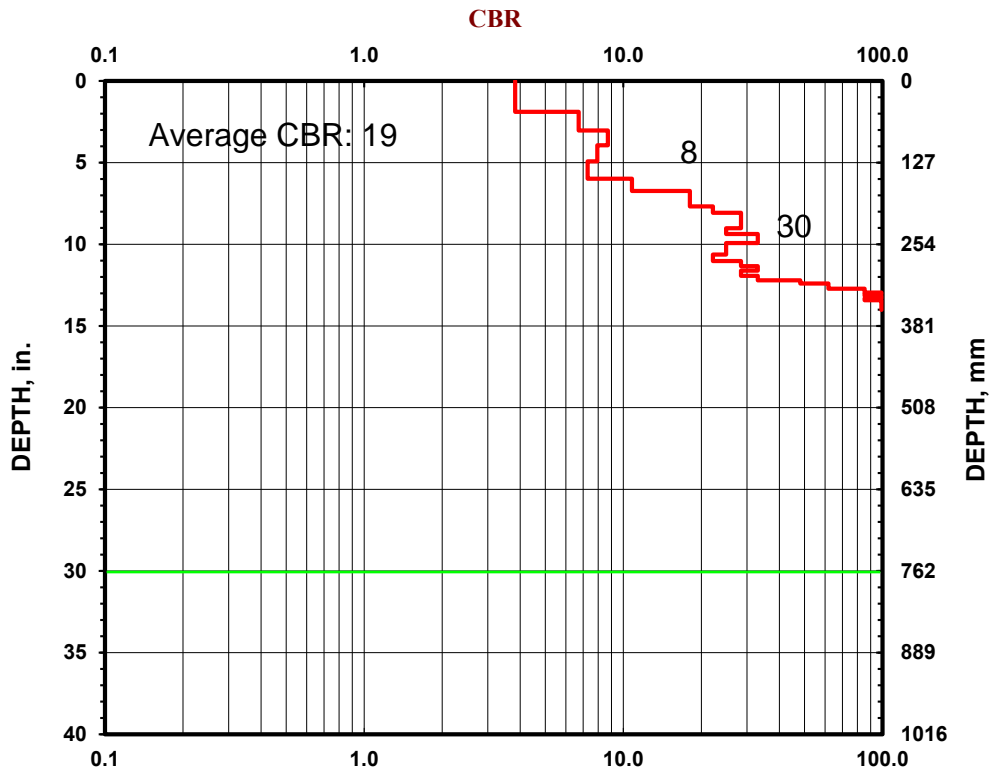
PID: 119144
 Date: 4/18/2023
 Surface Materials: 2" Topsoil
 Test Starting Depth (ft): 0.0

Hammer
 10.1 lbs.
 17.6 lbs.
 Both hammers used

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Soil Type
 CH
 CL
 All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
1	48	1
1	77	1
1	100	1
1	125	1
1	152	1
1	171	1
1	183	1
1	195	1
1	205	1
1	213	1
1	221	1
1	229	1
1	238	1
1	245	1
1	252	1
1	261	1
1	270	1
1	280	1
1	288	1
1	295	1
1	303	1
1	310	1
1	315	1
1	319	1
1	323	1
1	326	1
1	329	1
1	331	1
1	334	1
1	336	1
1	338	1
1	341	1
1	343	1
1	345	1
1	346	1
1	348	1
1	350	1
1	352	1
1	354	1
1	356	1



NOTES: Latitude, Longitude & Elevation from OGE GPS unit utilizing the ODOT VRS network.
 Sounding terminated at refusal.



DCP TEST DATA

Project: MEG-33-13.96\19.11
 Exploration ID: D-061-0-23
 Elevation: 619.5
 Lat / Long: 38.93265, -81.771146

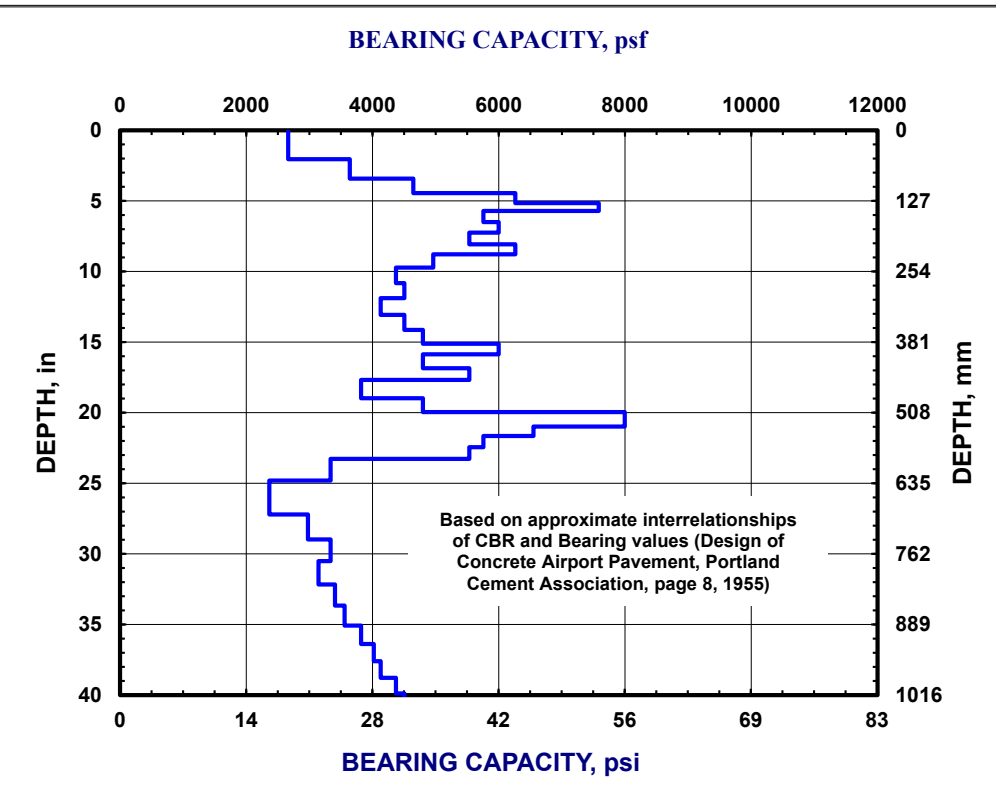
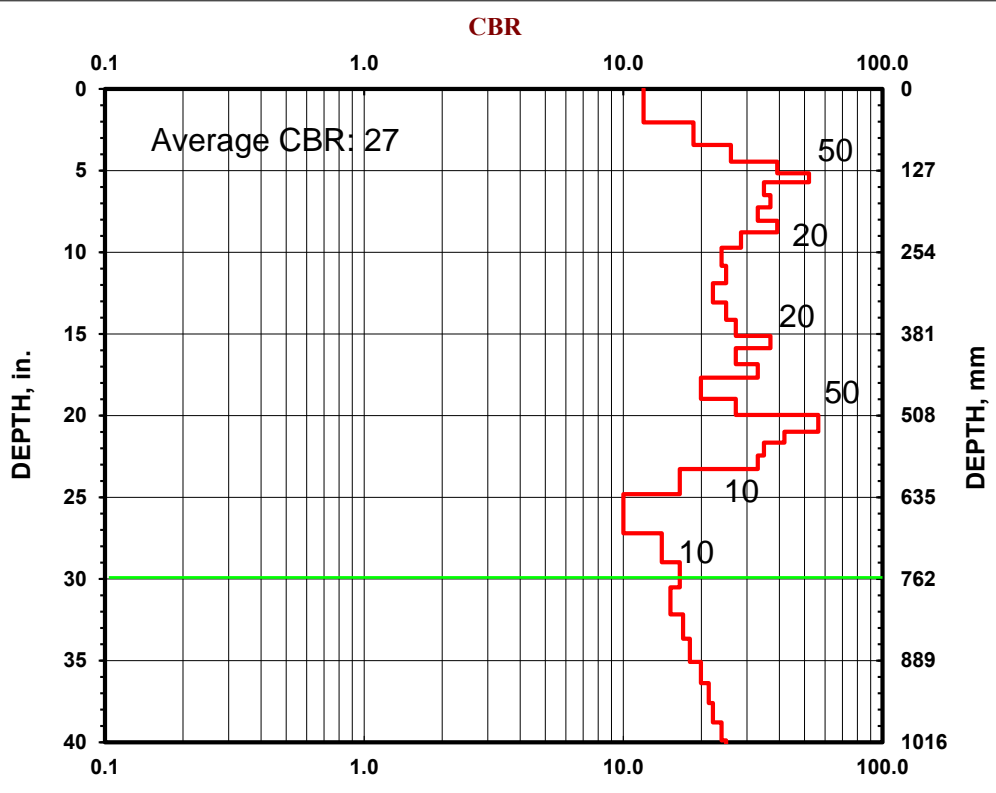
PID: 119144
 Date: 4/18/2023
 Surface Materials: 4" Topsoil
 Test Starting Depth (ft): 0.0

Hammer
 10.1 lbs.
 17.6 lbs.
 Both hammers used

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Soil Type
 CH
 CL
 All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
3	52	1
3	87	1
3	113	1
3	131	1
3	145	1
3	165	1
3	184	1
3	205	1
3	223	1
3	247	1
3	275	1
3	302	1
3	332	1
3	359	1
3	384	1
3	403	1
3	428	1
3	449	1
3	482	1
3	507	1
3	520	1
3	533	1
3	550	1
3	570	1
3	591	1
3	630	1
3	691	1
3	736	1
3	775	1
3	817	1
3	855	1
3	891	1
3	924	1
3	955	1
3	985	1
3	1013	1
3	1040	1
3	1065	1
3	1090	1



NOTES: Latitude, Longitude & Elevation from OGE GPS unit utilizing the ODOT VRS network.



DCP TEST DATA

Project: MEG-33-13.96\19.11
 Exploration ID: D-062-0-23
 Elevation: 616.2
 Lat / Long: 38.933543, -81.76783

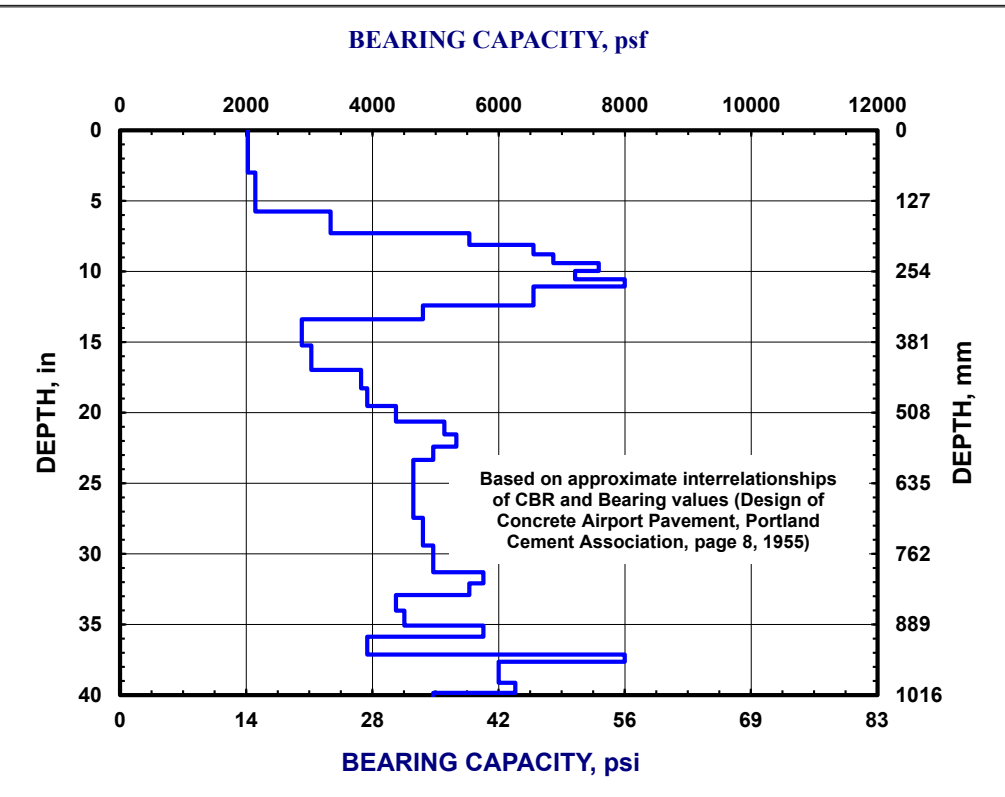
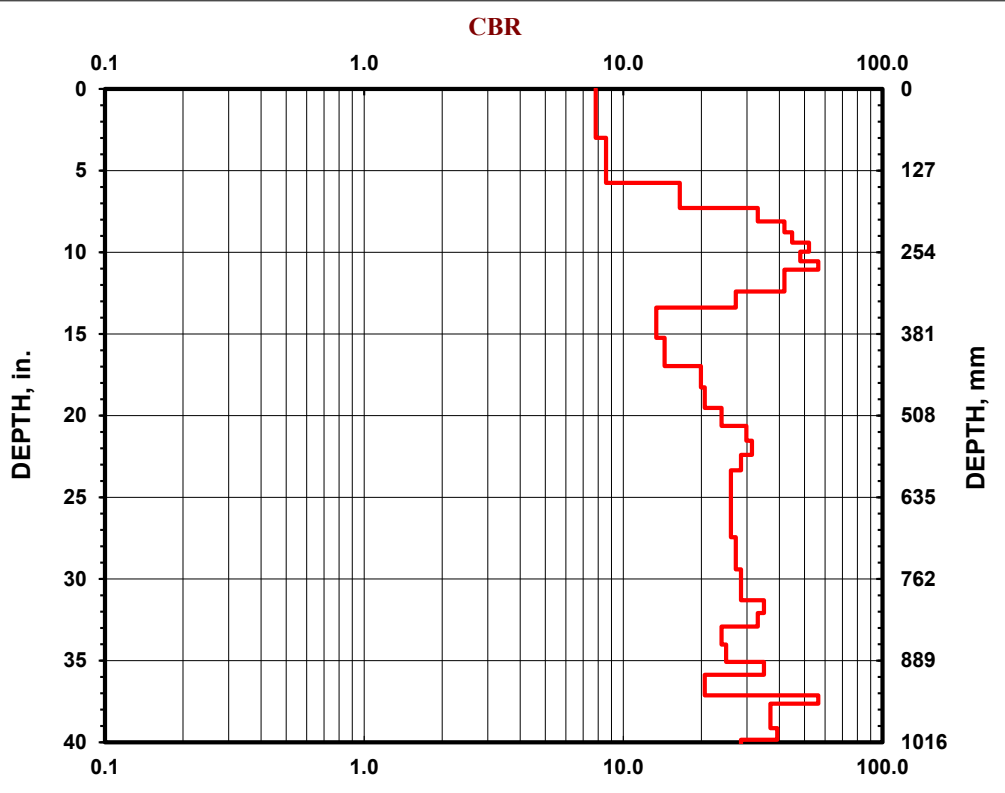
PID: 119144
 Date: 4/18/2023
 Surface Materials: 6" Topsoil
 Test Starting Depth (ft): 0.0

Hammer
 10.1 lbs.
 17.6 lbs.
 Both hammers used

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Soil Type
 CH
 CL
 All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
3	76	1
3	146	1
3	185	1
3	206	1
3	223	1
3	239	1
3	253	1
3	268	1
3	281	1
3	298	1
3	315	1
3	340	1
3	387	1
3	431	1
3	464	1
3	496	1
3	524	1
3	547	1
3	569	1
3	593	1
3	619	1
3	645	1
3	671	1
3	697	1
3	722	1
3	747	1
3	771	1
3	795	1
3	815	1
3	836	1
3	864	1
3	891	1
3	911	1
3	943	1
3	956	1
3	975	1
3	994	1
3	1012	1
3	1036	1
3	1064	1



NOTES: Latitude, Longitude & Elevation from OGE GPS unit utilizing the ODOT VRS network.

PROJECT: <u>MEG-33-13.96</u>	DRILLING FIRM / OPERATOR: <u>ODOT / BINKLEY</u>	DRILL RIG: <u>SIMCO 255</u>	STATION / OFFSET: _____	EXPLORATION ID <u>D-001-0-23</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>ODOT / BINKLEY</u>	HAMMER: _____	ALIGNMENT: <u>US 33</u>	PAGE 1 OF 1
PID: <u>119143</u> SFN: _____	DRILLING METHOD: <u>3.5" SSA</u>	CALIBRATION DATE: <u>N/A</u>	ELEVATION: <u>791.8 (ft)</u> EOB: <u>2.5 ft.</u>	
START: <u>4/20/23</u> END: <u>4/20/23</u>	SAMPLING METHOD: <u>CUTTINGS</u>	ENERGY RATIO (%): _____	LAT / LONG: <u>39.047207, -81.961727</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
TOPSOIL (2")	791.8																	<< << <<
YELLOWISH BROWN, SANDY SILT, SOME CLAY, DAMP	791.6																	<< << <<
		1			-	AS-1	-	0	13	41	23	23	26	21	5	11	A-4a (2)	<< << <<
		2			-	AS-2	-	0	6	41	24	29	29	20	9	13	A-4a (4)	<< << <<
	789.3	EOB																<< << <<

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT.GDT - 5/3/23 12:39 - X:\GINT\PROJECTS\601057.GPJ

NOTES: LAT/LONG/ELEV FROM OGE HANDHELD GPS UNIT. HOLE DRY UPON COMPLETION.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>MEG-33-13.96</u>	DRILLING FIRM / OPERATOR: <u>ODOT / BINKLEY</u>	DRILL RIG: <u>SIMCO 255</u>	STATION / OFFSET: _____	EXPLORATION ID <u>D-003-0-23</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>ODOT / BINKLEY</u>	HAMMER: _____	ALIGNMENT: <u>US 33</u>	
PID: <u>119143</u> SFN: _____	DRILLING METHOD: <u>3.5" SSA</u>	CALIBRATION DATE: <u>N/A</u>	ELEVATION: <u>798.2 (ft)</u> EOB: <u>2.5 ft.</u>	PAGE 1 OF 1
START: <u>4/20/23</u> END: <u>4/20/23</u>	SAMPLING METHOD: <u>CUTTINGS</u>	ENERGY RATIO (%): _____	LAT / LONG: <u>39.044429, -81.957397</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	798.2	DEPTH	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
									GR	CS	FS	SI	CL	LL	PL	PI			
TOPSOIL (5")																			<<< << <<
OLIVE BROWN, SANDY SILT , LITTLE CLAY, TRACE GRAVEL, DAMP		797.7																	<<< << <<
			1			-	AS-1	-	1	33	27	20	19	23	16	7	9	A-4a (1)	<<< << <<
OLIVE BROWN AND YELLOWISH BROWN, COARSE AND FINE SAND , LITTLE SILT, LITTLE CLAY, DAMP		796.7																	<<< << <<
			2			-	AS-2	-	0	40	31	15	14	17	14	3	9	A-3a (0)	<<< << <<
		795.7																	<<< << <<
			EOB																

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT.GDT - 5/3/23 12:39 - X:\GINT\PROJECTS\601057.GPJ

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NOTES: LAT/LONG/ELEV FROM OGE HANDHELD GPS UNIT. HOLE DRY UPON COMPLETION.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>MEG-33-13.96</u>	DRILLING FIRM / OPERATOR: <u>ODOT / BINKLEY</u>	DRILL RIG: <u>SIMCO 255</u>	STATION / OFFSET: _____	EXPLORATION ID D-006-0-23
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>ODOT / BINKLEY</u>	HAMMER: _____	ALIGNMENT: <u>US 33</u>	
PID: <u>119143</u> SFN: _____	DRILLING METHOD: <u>3.5" SSA</u>	CALIBRATION DATE: <u>N/A</u>	ELEVATION: <u>792.8 (ft)</u> EOB: <u>2.5 ft.</u>	PAGE 1 OF 1
START: <u>4/20/23</u> END: <u>4/20/23</u>	SAMPLING METHOD: <u>CUTTINGS</u>	ENERGY RATIO (%): _____	LAT / LONG: <u>39.037100, -81.951217</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
TOPSOIL (2")	792.8																<< << <<	
YELLOWISH BROWN, SANDY SILT , SOME CLAY, LITTLE GRAVEL, DAMP	792.6																<< << <<	
		1			-	AS-1	-	11	9	21	38	21	30	22	8	10	A-4a (5)	<< << <<
@1.5'; LITTLE CLAY, TRACE GRAVEL		2			-	AS-2	-	7	13	25	36	19	30	22	8	11	A-4a (4)	<< << <<
	790.3	EOB															<< << <<	

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT.GDT - 5/3/23 12:39 - X:\GINT\PROJECTS\601057.GPJ

NOTES: LAT/LONG/ELEV FROM OGE HANDHELD GPS UNIT. HOLE DRY UPON COMPLETION.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>MEG-33-13.96</u>	DRILLING FIRM / OPERATOR: <u>ODOT / BINKLEY</u>	DRILL RIG: <u>SIMCO 255</u>	STATION / OFFSET: _____	EXPLORATION ID <u>D-009-0-23</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>ODOT / BINKLEY</u>	HAMMER: _____	ALIGNMENT: <u>US 33</u>	
PID: <u>119143</u> SFN: _____	DRILLING METHOD: <u>3.5" SSA</u>	CALIBRATION DATE: <u>N/A</u>	ELEVATION: <u>726.1 (ft)</u> EOB: <u>2.5 ft.</u>	PAGE 1 OF 1
START: <u>4/20/23</u> END: <u>4/20/23</u>	SAMPLING METHOD: <u>CUTTINGS</u>	ENERGY RATIO (%): _____	LAT / LONG: <u>39.030221, -81.941839</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTH	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
TOPSOIL (2")	726.1																	
LIGHT YELLOWISH BROWN, SANDY SILT, LITTLE CLAY, LITTLE GRAVEL, DAMP	726.0																<< << <<	
		1			-	AS-1	-	14	16	11	40	19	30	22	8	6	A-4a (5)	<< << <<
@1.5'; SOME CLAY		2			-	AS-2	-	14	9	10	45	22	29	22	7	6	A-4a (6)	<< << <<
	723.6	EOB																

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT.GDT - 5/3/23 12:40 - X:\GINT\PROJECTS\601057.GPJ

NOTES: LAT/LONG/ELEV FROM OGE HANDHELD GPS UNIT. HOLE DRY UPON COMPLETION.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>MEG-33-13.96</u>	DRILLING FIRM / OPERATOR: <u>ODOT / BINKLEY</u>	DRILL RIG: <u>SIMCO 255</u>	STATION / OFFSET: _____	EXPLORATION ID <u>D-012-0-23</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>ODOT / BINKLEY</u>	HAMMER: _____	ALIGNMENT: <u>US 33</u>	PAGE 1 OF 1
PID: <u>119143</u> SFN: _____	DRILLING METHOD: <u>3.5" SSA</u>	CALIBRATION DATE: <u>N/A</u>	ELEVATION: <u>796.5 (ft)</u> EOB: <u>2.5 ft.</u>	
START: <u>4/20/23</u> END: <u>4/20/23</u>	SAMPLING METHOD: <u>CUTTINGS</u>	ENERGY RATIO (%): _____	LAT / LONG: <u>39.025402, -81.932840</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
TOPSOIL (2")	796.5																	<< << <<
REDDISH BROWN AND BROWN, SILT AND CLAY , SOME SAND, TRACE STONE FRAGMENTS, DAMP	796.3																	<< << <<
		1			-	AS-1	-	1	3	22	37	37	30	19	11	14	A-6a (8)	<< << <<
	795.0																	<< << <<
BROWN, SANDY SILT , LITTLE CLAY, DAMP		2			-	AS-2	-	0	2	58	20	20	21	17	4	13	A-4a (1)	<< << <<
	794.0																	<< << <<
		EOB																<< << <<

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT.GDT - 5/3/23 12:40 - X:\GINT\PROJECTS\601057.GPJ

NOTES: LAT/LONG/ELEV FROM OGE HANDHELD GPS UNIT. HOLE DRY UPON COMPLETION.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>MEG-33-13.96</u>	DRILLING FIRM / OPERATOR: <u>ODOT / BINKLEY</u>	DRILL RIG: <u>SIMCO 255</u>	STATION / OFFSET: _____	EXPLORATION ID <u>D-015-0-23</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>ODOT / BINKLEY</u>	HAMMER: _____	ALIGNMENT: <u>US 33</u>	PAGE 1 OF 1
PID: <u>119143</u> SFN: _____	DRILLING METHOD: <u>3.5" SSA</u>	CALIBRATION DATE: <u>N/A</u>	ELEVATION: <u>761.4 (ft)</u> EOB: <u>2.5 ft.</u>	
START: <u>4/20/23</u> END: <u>4/20/23</u>	SAMPLING METHOD: <u>CUTTINGS</u>	ENERGY RATIO (%): _____	LAT / LONG: <u>39.020905, -81.924020</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
TOPSOIL (2")	761.4																	<< << <<
LIGHT BROWN, SANDY SILT , SOME CLAY, SOME GRAVEL, DAMP	761.2																	<< << <<
		1			-	AS-1	-	23	5	28	20	24	24	17	7	11	A-4a (2)	<< << <<
@1.5'; TRACE GRAVEL		2			-	AS-2	-	4	4	30	32	30	28	19	9	16	A-4a (5)	<< << <<
	758.9	EOB																<< << <<

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT.GDT - 5/3/23 12:40 - X:\GINT\PROJECTS\601057.GPJ

NOTES: LAT/LONG/ELEV FROM OGE HANDHELD GPS UNIT. HOLE DRY UPON COMPLETION.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>MEG-33-13.96</u>	DRILLING FIRM / OPERATOR: <u>ODOT / BINKLEY</u>	DRILL RIG: <u>SIMCO 255</u>	STATION / OFFSET: _____	EXPLORATION ID <u>D-018-0-23</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>ODOT / BINKLEY</u>	HAMMER: _____	ALIGNMENT: <u>US 33</u>	PAGE 1 OF 1
PID: <u>119143</u> SFN: _____	DRILLING METHOD: <u>3.5" SSA</u>	CALIBRATION DATE: <u>N/A</u>	ELEVATION: <u>728.6 (ft)</u> EOB: <u>2.5 ft.</u>	
START: <u>4/20/23</u> END: <u>4/20/23</u>	SAMPLING METHOD: <u>CUTTINGS</u>	ENERGY RATIO (%): _____	LAT / LONG: <u>39.012296, -81.910795</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
TOPSOIL (2")	728.6																	<< << << >> >> >>
REDDISH BROWN AND GRAY, SILT AND CLAY, LITTLE SAND, TRACE GRAVEL, DAMP	728.5																	<< << << >> >> >>
		1			-	AS-1	-	4	5	7	41	43	34	21	13	12	A-6a (9)	<< << << >> >> >>
@1.5'; GRAY AND RED		2			-	AS-2	-	10	5	12	42	31	30	19	11	8	A-6a (8)	<< << << >> >> >>
	726.1	EOB																<< << << >> >> >>

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT.GDT - 5/3/23 12:41 - X:\GINT\PROJECTS\601057.GPJ

NOTES: LAT/LONG/ELEV FROM OGE HANDHELD GPS UNIT. HOLE DRY UPON COMPLETION.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>MEG-33-13.96</u>	DRILLING FIRM / OPERATOR: <u>ODOT / BINKLEY</u>	DRILL RIG: <u>SIMCO 255</u>	STATION / OFFSET: _____	EXPLORATION ID <u>D-021-0-23</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>ODOT / BINKLEY</u>	HAMMER: _____	ALIGNMENT: <u>US 33</u>	PAGE 1 OF 1
PID: <u>119143</u> SFN: _____	DRILLING METHOD: <u>3.5" SSA</u>	CALIBRATION DATE: <u>N/A</u>	ELEVATION: <u>719.4 (ft)</u> EOB: <u>2.5 ft.</u>	
START: <u>4/20/23</u> END: <u>4/20/23</u>	SAMPLING METHOD: <u>CUTTINGS</u>	ENERGY RATIO (%): _____	LAT / LONG: <u>39.005536, -81.899230</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
TOPSOIL (2")	719.4																	<< << <<
REDDISH BROWN, SILT AND CLAY, TRACE SAND, TRACE GRAVEL, DAMP	719.3																	<< << <<
@1.5'; LITTLE SAND		1			-	AS-1	-	9	4	5	35	47	34	22	12	10	A-6a (9)	<< << <<
		2			-	AS-2	-	6	9	9	35	41	33	20	13	9	A-6a (9)	<< << <<
	716.9	EOB																<< << <<

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT.GDT - 5/3/23 12:41 - X:\GINT\PROJECTS\601057.GPJ

NOTES: LAT/LONG/ELEV FROM OGE HANDHELD GPS UNIT. HOLE DRY UPON COMPLETION.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>MEG-33-13.96</u>	DRILLING FIRM / OPERATOR: <u>ODOT / BINKLEY</u>	DRILL RIG: <u>SIMCO 255</u>	STATION / OFFSET: _____	EXPLORATION ID <u>D-024-0-23</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>ODOT / BINKLEY</u>	HAMMER: _____	ALIGNMENT: <u>US 33</u>	PAGE <u>1 OF 1</u>
PID: <u>119143</u> SFN: _____	DRILLING METHOD: <u>3.5" SSA</u>	CALIBRATION DATE: <u>N/A</u>	ELEVATION: <u>744.0 (ft)</u> EOB: <u>2.5 ft.</u>	
START: <u>4/20/23</u> END: <u>4/20/23</u>	SAMPLING METHOD: <u>CUTTINGS</u>	ENERGY RATIO (%): _____	LAT / LONG: <u>38.999151, -81.879972</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV. 744.0	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			ODOT CLASS (GI)	BACK FILL	
								GR	CS	FS	SI	CL	LL	PL	PI			WC
TOPSOIL (4")																	<><><>	
RED, SILTY CLAY, TRACE SAND, DAMP	743.7																<><><>	
@1.5'; LITTLE SAND		1			-	AS-1	-	0	2	7	39	52	37	21	16	15	A-6b (10)	<><><>
		2			-	AS-2	-	0	3	13	36	48	37	21	16	17	A-6b (10)	<><><>
	741.5	EOB															<><><>	

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT.GDT - 5/3/23 12:41 - X:\GINT\PROJECTS\601057.GPJ

NOTES: LAT/LONG/ELEV FROM OGE HANDHELD GPS UNIT. HOLE DRY UPON COMPLETION.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>MEG-33-19.11</u>	DRILLING FIRM / OPERATOR: <u>ODOT / BINKLEY</u>	DRILL RIG: <u>SIMCO 255</u>	STATION / OFFSET: _____	EXPLORATION ID <u>D-027-0-23</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>ODOT / BINKLEY</u>	HAMMER: _____	ALIGNMENT: <u>US 33</u>	PAGE 1 OF 1
PID: <u>119144</u> SFN: _____	DRILLING METHOD: <u>3.5" SSA</u>	CALIBRATION DATE: <u>N/A</u>	ELEVATION: <u>783.6 (ft)</u> EOB: <u>2.5 ft.</u>	
START: <u>4/20/23</u> END: <u>4/20/23</u>	SAMPLING METHOD: <u>CUTTINGS</u>	ENERGY RATIO (%): _____	LAT / LONG: <u>38.995897, -81.871344</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV. 783.6	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
TOPSOIL (2")	783.4																<< << <<	
RED, SILTY CLAY , LITTLE SAND, DAMP																	<< << <<	
		1			-	AS-1	-	0	5	10	41	44	37	18	19	12	A-6b (12)	<< << <<
		2			-	AS-2	-	0	6	10	37	47	37	18	19	12	A-6b (12)	<< << <<
	781.1	EOB															<< << <<	

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT.GDT - 5/2/23 09:04 - X:\GINT\PROJECTS\601058.GPJ

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>MEG-33-19.11</u>	DRILLING FIRM / OPERATOR: <u>ODOT / BINKLEY</u>	DRILL RIG: <u>SIMCO 255</u>	STATION / OFFSET: _____	EXPLORATION ID <u>D-030-0-23</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>ODOT / BINKLEY</u>	HAMMER: _____	ALIGNMENT: <u>US 33</u>	
PID: <u>119144</u> SFN: _____	DRILLING METHOD: <u>3.5" SSA</u>	CALIBRATION DATE: <u>N/A</u>	ELEVATION: <u>739.8 (ft)</u> EOB: <u>2.5 ft.</u>	PAGE 1 OF 1
START: <u>4/19/23</u> END: <u>4/19/23</u>	SAMPLING METHOD: <u>CUTTINGS</u>	ENERGY RATIO (%): _____	LAT / LONG: <u>38.988094, -81.866642</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV. 739.8	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
TOPSOIL (1") REDDISH BROWN, SILTY CLAY , LITTLE SAND, TRACE GRAVEL AND STONE FRAGMENTS, DAMP	739.7																<< < < <	
		1			-	AS-1	-	5	6	7	41	41	34	18	16	10	A-6b (10)	<< < < <
@1.5'; SOME GRAVEL AND STONE FRAGMENTS		2			-	AS-2	-	21	6	8	31	34	34	18	16	10	A-6b (8)	<< < < <
	737.3	EOB															<< < < <	

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT.GDT - 5/2/23 09:05 - X:\GINT\PROJECTS\601058.GPJ

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>MEG-33-19.11</u>	DRILLING FIRM / OPERATOR: <u>ODOT / BINKLEY</u>	DRILL RIG: <u>SIMCO 255</u>	STATION / OFFSET: _____	EXPLORATION ID <u>D-036-0-23</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>ODOT / BINKLEY</u>	HAMMER: _____	ALIGNMENT: <u>US 33</u>	
PID: <u>119144</u> SFN: _____	DRILLING METHOD: <u>3.5" SSA</u>	CALIBRATION DATE: <u>N/A</u>	ELEVATION: <u>696.3 (ft)</u> EOB: <u>2.5 ft.</u>	PAGE 1 OF 1
START: <u>4/19/23</u> END: <u>4/19/23</u>	SAMPLING METHOD: <u>CUTTINGS</u>	ENERGY RATIO (%): _____	LAT / LONG: <u>38.972640, -81.859445</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV. 696.3	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			ODOT CLASS (GI)	BACK FILL	
								GR	CS	FS	SI	CL	LL	PL	PI			WC
TOPSOIL (4")																		<< << << >> >> >>
OLIVE GRAY, SANDY SILT , SOME CLAY, TRACE GRAVEL AND STONE FRAGMENTS, DAMP	696.0																	<< << << >> >> >>
		1			-	AS-1	-	8	4	22	38	28	28	18	10	14	A-4a (6)	<< << << >> >> >>
		2			-	AS-2	-	6	6	23	37	28	27	17	10	13	A-4a (6)	<< << << >> >> >>
	693.8	EOB																<< << << >> >> >>

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT.GDT - 5/2/23 09:05 - X:\GINT\PROJECTS\601058.GPJ

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>MEG-33-19.11</u>	DRILLING FIRM / OPERATOR: <u>ODOT / BINKLEY</u>	DRILL RIG: <u>SIMCO 255</u>	STATION / OFFSET: _____	EXPLORATION ID <u>D-039-0-23</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>ODOT / BINKLEY</u>	HAMMER: _____	ALIGNMENT: <u>US 33</u>	
PID: <u>119144</u> SFN: _____	DRILLING METHOD: <u>3.5" SSA</u>	CALIBRATION DATE: <u>N/A</u>	ELEVATION: <u>733.7 (ft)</u> EOB: <u>2.5 ft.</u>	PAGE 1 OF 1
START: <u>4/19/23</u> END: <u>4/19/23</u>	SAMPLING METHOD: <u>CUTTINGS</u>	ENERGY RATIO (%): _____	LAT / LONG: <u>38.969269, -81.849114</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV. 733.7	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
TOPSOIL (4")																		<< << << >> >> >>
REDDISH BROWN, SILT AND CLAY, SOME SAND, MOIST	733.4																	<< << << >> >> >>
		1			-	AS-1	-	0	2	23	40	35	29	18	11	24	A-6a (8)	<< << << >> >> >>
@1.5'; LITTLE SAND, TRACE GRAVEL AND STONE FRAGMENTS		2			-	AS-2	-	1	2	16	40	41	33	19	14	25	A-6a (10)	<< << << >> >> >>
	731.2	EOB																<< << << >> >> >>

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT.GDT - 5/2/23 09:05 - X:\GINT\PROJECTS\601058.GPJ

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>MEG-33-19.11</u>	DRILLING FIRM / OPERATOR: <u>ODOT / BINKLEY</u>	DRILL RIG: <u>SIMCO 255</u>	STATION / OFFSET: _____	EXPLORATION ID <u>D-042-0-23</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>ODOT / BINKLEY</u>	HAMMER: _____	ALIGNMENT: <u>US 33</u>	
PID: <u>119144</u> SFN: _____	DRILLING METHOD: <u>3.5" SSA</u>	CALIBRATION DATE: <u>N/A</u>	ELEVATION: <u>676.3 (ft)</u> EOB: <u>2.5 ft.</u>	PAGE 1 OF 1
START: <u>4/19/23</u> END: <u>4/19/23</u>	SAMPLING METHOD: <u>CUTTINGS</u>	ENERGY RATIO (%): _____	LAT / LONG: <u>38.966392, -81.839909</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV. 676.3	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			ODOT CLASS (GI)	BACK FILL	
								GR	CS	FS	SI	CL	LL	PL	PI			WC
TOPSOIL (4")																		
REDDISH BROWN, SILT AND CLAY , LITTLE SAND, TRACE GRAVEL AND STONE FRAGMENTS, DAMP	676.0																	
		1			-	AS-1	-	1	2	14	39	44	33	18	15	13	A-6a (10)	
REDDISH BROWN, SILTY CLAY , LITTLE SAND, TRACE GRAVEL AND STONE FRAGMENTS, DAMP	674.8																	
		2			-	AS-2	-	4	3	14	39	40	35	18	17	13	A-6b (11)	
	673.8	EOB																

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT.GDT - 5/2/23 09:05 - X:\GINT\PROJECTS\601058.GPJ

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>MEG-33-19.11</u>	DRILLING FIRM / OPERATOR: <u>ODOT / BINKLEY</u>	DRILL RIG: <u>SIMCO 255</u>	STATION / OFFSET: _____	EXPLORATION ID D-045-0-23
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>ODOT / BINKLEY</u>	HAMMER: _____	ALIGNMENT: <u>US 33</u>	
PID: <u>119144</u> SFN: _____	DRILLING METHOD: <u>3.5" SSA</u>	CALIBRATION DATE: <u>N/A</u>	ELEVATION: <u>695.3 (ft)</u> EOB: <u>2.5 ft.</u>	PAGE 1 OF 1
START: <u>4/19/23</u> END: <u>4/19/23</u>	SAMPLING METHOD: <u>CUTTINGS</u>	ENERGY RATIO (%): _____	LAT / LONG: <u>38.955064, -81.816374</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV. 695.3	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			ODOT CLASS (GI)	BACK FILL	
								GR	CS	FS	SI	CL	LL	PL	PI			WC
TOPSOIL (4")																	<><><>	
	695.0																<><><>	
BROWN, SILTY CLAY , LITTLE SAND, TRACE GRAVEL AND STONE FRAGMENTS, DAMP																	<><><>	
		1			-	AS-1	-	1	6	14	39	40	34	18	16	14	A-6b (10)	<><><>
		2			-	AS-2	-	4	5	11	38	42	36	18	18	17	A-6b (11)	<><><>
	692.8																<><><>	
		EOB															<><><>	

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT.GDT - 5/2/23 09:05 - X:\GINT\PROJECTS\601058.GPJ

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>MEG-33-19.11</u>	DRILLING FIRM / OPERATOR: <u>ODOT / BINKLEY</u>	DRILL RIG: <u>SIMCO 255</u>	STATION / OFFSET: _____	EXPLORATION ID <u>D-048-0-23</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>ODOT / BINKLEY</u>	HAMMER: _____	ALIGNMENT: <u>US 33</u>	PAGE 1 OF 1
PID: <u>119144</u> SFN: _____	DRILLING METHOD: <u>3.5" SSA</u>	CALIBRATION DATE: <u>N/A</u>	ELEVATION: <u>646.4 (ft)</u> EOB: <u>2.5 ft.</u>	
START: <u>4/18/23</u> END: <u>4/18/23</u>	SAMPLING METHOD: <u>CUTTINGS</u>	ENERGY RATIO (%): _____	LAT / LONG: <u>38.954123, -81.805234</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV. 646.4	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
TOPSOIL (6")																	<< << << >> >> >>	
REDDISH BROWN, SILTY CLAY , LITTLE SAND, TRACE GRAVEL AND STONE FRAGMENTS, DAMP	645.9	1			-	AS-1	-	5	6	12	35	42	35	18	17	17	A-6b (11) << << << >> >> >>	
	643.9	2			-	AS-2	-	9	6	11	32	42	35	18	17	16	A-6b (11) << << << >> >> >>	
		EOB															<< << << >> >> >>	

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NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>MEG-33-19.11</u>	DRILLING FIRM / OPERATOR: <u>ODOT / BINKLEY</u>	DRILL RIG: <u>SIMCO 255</u>	STATION / OFFSET: _____	EXPLORATION ID <u>D-051-0-23</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>ODOT / BINKLEY</u>	HAMMER: _____	ALIGNMENT: <u>US 33</u>	PAGE 1 OF 1
PID: <u>119144</u> SFN: _____	DRILLING METHOD: <u>3.5" SSA</u>	CALIBRATION DATE: <u>N/A</u>	ELEVATION: <u>629.5 (ft)</u> EOB: <u>2.5 ft.</u>	
START: <u>4/18/23</u> END: <u>4/18/23</u>	SAMPLING METHOD: <u>CUTTINGS</u>	ENERGY RATIO (%): _____	LAT / LONG: <u>38.948059, -81.797089</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
TOPSOIL (2")	629.5																	<< << <<
REDDISH BROWN, SILTY CLAY , LITTLE SAND, TRACE GRAVEL AND STONE FRAGMENTS, DAMP	629.3																	<< << <<
		1			-	AS-1	-	3	5	15	33	44	34	17	17	15	A-6b (11)	<< << <<
		2			-	AS-2	-	3	4	7	32	54	39	19	20	18	A-6b (12)	<< << <<
	627.0	EOB																<< << <<

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NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>MEG-33-19.11</u>	DRILLING FIRM / OPERATOR: <u>ODOT / BINKLEY</u>	DRILL RIG: <u>SIMCO 255</u>	STATION / OFFSET: _____	EXPLORATION ID <u>D-054-0-23</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>ODOT / BINKLEY</u>	HAMMER: _____	ALIGNMENT: <u>US 33</u>	PAGE 1 OF 1
PID: <u>119144</u> SFN: _____	DRILLING METHOD: <u>3.5" SSA</u>	CALIBRATION DATE: <u>N/A</u>	ELEVATION: <u>646.2 (ft)</u> EOB: <u>2.5 ft.</u>	
START: <u>4/18/23</u> END: <u>4/18/23</u>	SAMPLING METHOD: <u>CUTTINGS</u>	ENERGY RATIO (%): _____	LAT / LONG: <u>38.941283, -81.791100</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
TOPSOIL (2")	646.2																<< << <<	
BROWN AND GRAY, SILT AND CLAY, LITTLE SAND, TRACE GRAVEL AND STONE FRAGMENTS, DAMP	646.0																<< << <<	
		1			-	AS-1	-	6	7	10	45	32	31	18	13	10	A-6a (9)	<< << <<
		2			-	AS-2	-	5	5	11	43	36	32	17	15	11	A-6a (10)	<< << <<
	643.7	EOB															<< << <<	

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NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>MEG-33-19.11</u>	DRILLING FIRM / OPERATOR: <u>ODOT / BINKLEY</u>	DRILL RIG: <u>SIMCO 255</u>	STATION / OFFSET: _____	EXPLORATION ID <u>D-063-0-23</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>ODOT / BINKLEY</u>	HAMMER: _____	ALIGNMENT: <u>US 33</u>	
PID: <u>119144</u> SFN: _____	DRILLING METHOD: <u>3.5" SSA</u>	CALIBRATION DATE: <u>N/A</u>	ELEVATION: <u>609.8 (ft)</u> EOB: <u>2.5 ft.</u>	PAGE <u>1 OF 1</u>
START: <u>4/18/23</u> END: <u>4/18/23</u>	SAMPLING METHOD: <u>CUTTINGS</u>	ENERGY RATIO (%): _____	LAT / LONG: <u>38.934458, -81.764499</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV. 609.8	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
TOPSOIL (4")																	<< << <<	
GRAYISH BROWN, GRAVEL , "AND" SAND, TRACE SILT, TRACE CLAY, MOIST	609.5																<< << <<	
		1			-	AS-1	-	52	20	20	3	5	NP	NP	NP	6	A-1-a (0)	<< << <<
	608.3																<< << <<	
BROWN REDDISH BROWN, SILT AND CLAY , SOME SAND, SOME GRAVEL, MOIST		2			-	AS-2	-	27	13	17	19	24	27	15	12	17	A-6a (2)	<< << <<
	607.3																<< << <<	
		EOB															<< << <<	

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NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS