Roadway & Light Tower Exploration Report (Final)
TP 26 NE Ohio Site 8 BEL-70 Vacant Weigh Station
Belmont County, Ohio
S&ME Project No. 24170232B

PREPARED FOR:

ms consultants, inc.
333 East Federal Street
Youngstown, OH 44503

PREPARED BY:

S&ME, Inc.
6190 Enterprise Court
Dublin, OH 43016

June 30, 2026

June 30, 2026

ms consultants, inc.
333 East Federal Street
Youngstown, OH 44503

Attention: Mr. Brian Hughes, PE

Reference: **Roadway & Light Tower Exploration Report (Final)**
TP 26 NE Ohio Site 8 BEL-70 Vacant Weigh Station (PID 122878)
Belmont County, Ohio
S&ME Project No. 24170232B

Mr. Hughes:

In accordance with our revised proposal dated February 11, 2026, which was advanced authorized on February 16, 2026, and fully authorized on March 16, 2026, by an ms consultants, inc. (ms) Task Order Agreement, S&ME has completed a Geotechnical Exploration for a proposed truck parking facility at the vacant weigh station along IR 70 eastbound approximately 1.0 mile east of SR 9 in St. Clairsville, Belmont County, Ohio. The BEL-70 Vacant Weigh Station is known as Site 8 within the TP 26 NE Ohio project. The approximate location of this project is illustrated on the Vicinity Map included as Plate 1 in Appendix I of this report.

In accordance with Section 701 of the ODOT *Specifications for Geotechnical Explorations* (*SGE*), S&ME is herewith submitting a "final" version of our May 8, 2026 "draft" report. The ODOT Office of Geotechnical Engineering (OGE) indicated there were no comments on the draft report. Additionally, S&ME has prepared final Geotechnical Profile – Roadway sheets and will submit these drawings under separate cover.

We appreciate having been given the opportunity to be of service. Please do not hesitate to contact us if you have any further questions regarding this report.

Respectfully,

S&ME, Inc.

STATE OF OHIO
BRIAN KEITH
SEARS
74693
REGISTERED
PROFESSIONAL ENGINEER

Brian K. Sears, P.E.
Senior Engineer | Project Manager

Richard S. Weigand, P.E.
Principal Engineer | Senior Reviewer

Submitted:Email Copy (bhughes@msconsultants.com)

Table of Contents

Page

1.0 Executive Summary 1
2.0 Introduction 2
3.0 Geology and Observations of the Project 2
3.1 Geology 2
3.2 Reconnaissance 3
3.3 Available Information 3
4.0 Exploration 3
4.1 Field Investigation 3
4.2 Laboratory Testing 5
5.0 Findings 6
5.1 Existing Surficial Materials 6
5.2 Subsurface Stratigraphy 6
5.3 Groundwater Observations 7
5.4 Soil Sulfate Test Results 7
6.0 Analysis and Recommendations 8
6.1 General Discussion 8
6.2 Subgrade Assessment 8
6.2.1 Subgrade Support Parameters 8
6.2.2 Subgrade Remediation Assessment 9
6.2.3 Subgrade Remediation Recommendations 10
6.2.4 Additional Subgrade Remediation Considerations 11
6.3 General Roadway/Pavement Construction Considerations 11
6.3.1 Subgrade Preparation 11
6.3.2 "At-Grade"/"Cut" Soil Subgrade Areas 12
6.3.3 "Fill" Areas 12
6.3.4 Benching 12
6.3.5 Borrow Requirements and Compaction Criteria 13
6.3.6 Moisture Conditioning and Subgrade Protection 13
6.3.7 Final Subgrade Preparation 13
6.4 Groundwater Considerations for Subgrade/Embankment Construction 14

7.0 High Mast Light Towers Foundations 14
7.1 Foundation Design Approach 14
7.2 Lateral (LPILE) Analysis Parameters 15
7.3 Lateral Load Analysis Summary 15
7.4 Foundation Plan Notes 16
7.5 Groundwater Considerations for Light Tower Foundations 17
8.0 Limitations and Final Considerations 17

List of Tables

Table 4-1 – Summary of Project Borings 4
Table 5-1 – Existing Pavement or Rootmat Thicknesses 6
Table 5-2 – Summary of Encountered Bedrock Elevations 7
Table 6-1 – Estimated "Excavate and Replace" Subgrade Remediation Areas 10
Table 7-1 – Summary of Lateral Load Analysis Results 16

Appendices

Appendix I – General Information

Plate
Vicinity Map 1
Plan of Explorations 2A-2D
Explanation of Symbols and Terms Used on Boring Logs for Soil 3
Explanation of Symbols and Terms Used on Boring Logs for Rock 4A-4B
Boring Logs 5-18
Rock Core Photo 19
Rock Core Unconfined Compressive Strength Test Results 20-21
Sulfate Content Test Results 22
Pavement Core Photos 23-25
Important Information about Your Geotechnical Report 26

Appendix II – Subgrade Analysis Results

Plate
Subgrade Spreadsheet – Eastbound Parking Area 1-6

Appendix III – Light Tower Foundation Analysis Results

Plate
LPILE Soil Parameter Tables – Eastbound Parking Area Light Towers 1-3
Lateral Load Analysis (LPILE) Output – Eastbound Parking Area Light Towers 4-178

Appendix IV – OGE Geotechnical Checklists

Plate
OGE Geotechnical Checklists 1-8

1.0 Executive Summary

An overview of this project and the findings of this geotechnical exploration are presented below. This summary should not be used in place of the more detailed recommendations presented in the remainder of this report.

Category *(Section Reference)*	**Project Overview/Geotechnical Findings**
Project Description *(Section 2.0)*	Construct new truck parking areas at a vacant weigh station along IR 70, approximately 1.0 mile east of the SR 9 interchange. The project includes parking areas in the eastbound (EB) direction of IR 70, modifying existing entrance and exit ramps and reconstruction of the existing parking area.
Exploration Program *(Section 4.0)*	Thirteen (13) borings and five (5) pavement cores were performed for the truck parking area, ramps, and proposed light towers. See Table 4-1.
Subsurface Conditions *(Section 5.0)*	*Surface Materials*: Twelve (12) borings were advanced through existing pavement with existing concrete being cored at five (5) locations. Rootmat was encountered at Boring B-005-0-26. Table 5-1 summarizes the type and thicknesses of surficial materials encountered. *Overburden Soil*: All borings except B-001-0-26 encountered highly variable fill or possible fill consisting of stiff to hard cohesive soil (A-4a, A-6a, A-6b, A-7-6), or primarily medium dense to very dense granular soils (A-1-a, A-1-b, A-2-4, A-2-6). No soil was encountered between the bottom of the pavement and bedrock at Boring B-001-0-26, whereas Boring B-005-0-26 encountered a 0.7-foot-thick layer of very dense natural gravel (A-1-b) immediately above bedrock. *Bedrock*: SHALE and/or SANDSTONE bedrock was encountered in all borings except Borings B-008-0 and B-009-0. The elevation at which rock and auger refusal were encountered are summarized in Table 5-2. *Groundwater*: No groundwater was noted in 11 of the 13 borings. Variable amounts of free water were noted during or after drilling in Borings B-002-0-26 and B-007-0-26.
Subgrade Support Parameters *(Section 6.2.1)*	Average California Bearing Ratio (CBR) of 9%. Resilient Modulus (M_R) of 10,800 psi.
Subgrade Remediation *(Sections 6.2.2, 6.2.3 and 6.2.4)*	Two (2) of 13 borings encountered unstable soil that the ODOT Subgrade Analysis spreadsheet indicated may require subgrade remediation. As the spreadsheet indicates less than 30 percent of the subgrade area requires remediation, S&ME recommends an "excavate and replace" program be used to remediate these localized potentially unstable areas identified by the ODOT spreadsheet. Also, provisions for removal of shallow bedrock not encountered in the borings (ODOT *CMS* Item 204.05) should be considered.
Groundwater Considerations *(Sections 6.4 and 7.4)*	Significant groundwater issues are not anticipated in connection with the proposed ramps, parking area or light tower foundation construction. Construction surfaces should be graded to prevent pooling/ponding of water.
Light Tower Foundations *(Section 7.0)*	Light tower foundations are recommended to be 36 inches in diameter and 6 to 8 feet below proposed grade with reinforcement as detailed in ODOT SCD HL-20.21.

2.0 Introduction

This project includes the construction of a new truck parking area (Site 8) in the existing vacant weigh station along the eastbound (EB) direction of IR 70 approximately 1.0 mile east of the SR 9 interchange and approximately 0.15 miles west of Commons Mall Crossing Road in St. Clairsville, Belmont County, Ohio. Site improvements will include a new truck parking facility where full-depth asphalt pavement or reinforced concrete construction will be performed. New high mast light towers will surround the parking area and standard highway light poles will be installed along the ramps. The parking area is proposed to accommodate approximately 22 spaces (20 full size parking stalls and 2 cab only stalls).

This geotechnical exploration was performed in general accordance with the January 2026 ODOT *Specifications for Geotechnical Explorations* (*SGE*) and ODOT *Geotechnical Design Manual* (*GDM*), with the exception that the ODOT Office of Geotechnical Engineering (OGE) indicated that bedrock coring was only required in one of the four Light Tower borings.

3.0 Geology and Observations of the Project

3.1 Geology

This project lies within the Allegheny Plateau section of Ohio which is located within the Little Switzerland Plateau Physiographic Region. Overburden soil is generally composed of a relatively thin layer of silty clay colluvium over shallow bedrock.

Bedrock beneath most of the site is anticipated to consist of shale, sandstone, siltstone, and coal of the Dunkard Group (Permian-Pennsylvanian age). These materials will transition into shale, sandstone, limestone and coal of the Monongahela Group as the entrance ramp to the site decreases in elevation. No bedrock contour mapping is available at the site; however, the depth to bedrock on natural hillsides is shallow (typically less than 5 feet). Deep embankment fills are, however, known to be present on southern and eastern portions of the site. Bedrock was encountered in 11 of the borings 13 borings performed at the site, ranging from El. 1203.5 on the west end of the entrance ramp to El. 1115.3 in the southeast corner of the parking area.

The primary groundwater aquifer is anticipated to be within the interbedded shale and sandstone bedrock, with pumping rates for residential wells yielding from 5 to 8 gallons per minute (gpm).

A review of the ODNR resources indicates the site is not in an area known to contain karst bedrock features. The stie is within an area of the state subject to severe slope failure. The ODNR online "Mines of Ohio" tool indicates the site is in an area of coal-bearing rock with four abandoned surface or underground mines. Two abandoned underground mines overlap the site limits, including ramps, with mining performed on the Waynesburg #11, Washington #12, Pittsburgh #8 and Uniontown #10 coal beds.

Please refer to S&ME Desktop Study Report dated June 18, 2025, for a more detailed discussion of the site geology.

3.2 Reconnaissance

S&ME visited Site 8 on May 12, 2025, and returned to the site on February 18, 2026, to mark proposed boring locations. The following items were noted during our site visit. Additional observations and site photos are included in our Desktop Study Report dated June 18, 2025.

- An existing drainage swale adjacent to the outside shoulder of EB IR 70 was roughly 2 to 4 feet deep.
- Piles of construction materials (i.e., asphalt millings, steel piling, wood guardrail posts, etc.) predominantly along the south and west edges of the parking area, but also in the grass area between the parking area and thru drive. The pile of asphalt millings was approximately 10 to 12 feet high.
- Concrete pavement is present throughout the existing parking area and portions of the ramps. The concrete is weathered and cracked.
- No bedrock outcrops or areas of slope instability on the cut hillside above the entrance ramp were observed.
- Erosion, surficial sloughing, and multiple groundwater seeps were observed in the cut hillside above the southwest corner of the paved lot.
- Isolated bedrock outcrops were observed on the uphill slope to the south and west of the parking area.
- A few areas of surficial sloughing and bent trees were observed on the uphill slope on the south of the parking area.
- East of the southeast corner of the parking area, a steep ravine is present. Multiple bedrock outcrops were present on the south side of the ravine, whereas the north side of the ravine appeared to be existing fill embankment.
- The ravine was lined with large stones which appeared to have been at one point partially grouted or concreted in place, as several pockets of grout/concrete were still in place.
- An approximate 12-inch diameter corrugated metal pipe storm drain outlet was observed near the base of the ravine east of the site.

3.3 Available Information

S&ME searched the online ODOT Transportation Information Mapping System (TIMS) for historic soil boring information in the project vicinity. Within TIMS, soil profile sheets with borings performed for the original construction of IR 70 as well as borings performed for the existing weigh station were located. These borings generally encountered layers of cohesive soils (A-4a, A-6a, A-6b, A-7-6 classifications) with occasional, discontinuous layers of gravelly soils (A-1-b, A-2-4).

Based on the drawings for the original construction of IR 70, the weigh station is located on an approximate 70- to 80-foot-high embankment fill.

4.0 Exploration

4.1 Field Investigation

On March 10 and 11, 2026, a total of 13 explorations, identified as Borings B-001-0-26 through B-013-0-26, were performed at Site 8. Nine (9) of the borings were performed within the proposed ramp alignments and four (4) borings were drilled within the parking area and near the planned high mast light towers. An offset boring (B-005-1-26) was performed near Boring B-005-0-26 to obtain a bedrock core sample after the drill augers shifted and

became out of plumb after encountering auger refusal in Boring B-005-0-26. Table 4-1 summarizes the borings performed for Site 8, including their purpose and termination depth. For the remainder of this report, the borings will generally be referred to without the two-year designation (i.e., B-001-0).

Table 4-1 – Summary of Project Borings

Boring ID	Termination Depth (ft)	Purpose
B-001-0-26	2.9	Subgrade
B-002-0-26	7.2	Subgrade
B-003-0-26	6.9	Subgrade
B-004-0-26	5.8	Subgrade
B-005-0-26	7.0	Subgrade/Light Tower
B-005-1-26	11.2	Light Tower
B-006-0-26	2.5	Subgrade/Light Tower
B-007-0-26	12.6	Subgrade/Light Tower
B-008-0-26	24.3	Subgrade/Light Tower
B-009-0-26	9.5	Subgrade
B-010-0-26	6.4	Subgrade
B-011-0-26	6.3	Subgrade
B-012-0-26	6.2	Subgrade
B-013-0-26	7.5	Subgrade

The approximate locations of the borings performed at the site are shown on the Plans of Borings included as Plates 2A through 2D in Appendix I.

The borings were performed by a truck-mounted drilling rig using a 3¼-inch I.D. hollow-stem auger to advance the borings through the soil overburden. Disturbed but representative soil samples were obtained by lowering a 2-inch O.D. split-barrel sampler through the auger stem to the bottom of the boring, and then driving the sampler into the soil with blows from a 140-pound hammer freely falling 30 inches (AASHTO T206 - Standard Penetration Test). In each boring, six (6) feet of continuous sampling was performed below the proposed subgrade, followed by 2.5-foot sampling intervals in the four (4) borings drilled near proposed light towers. All borings except Borings B-008-0 and B-009-0 were terminated after encountering auger refusal on shale or sandstone bedrock. SPT samples were examined immediately after recovery and representative portions were preserved in airtight jars.

In offset Boring B-005-1, located adjacent to Boring B-005-0, five (5) feet of rock core were attempted using a NQ-size rock core barrel using water as a circulating fluid. The recovered bedrock core was measured to determine the percent recovery and the Rock Quality Designation (RQD) and then placed in a compartmented cardboard box. A photograph of the recovered bedrock core is included on Plate 19 of Appendix I.

In accordance with the ODOT *SGE*, the hammer system on the drill rig used for this exploration was calibrated in accordance with ASTM D4633 on December 30, 2024, and has a drill rod energy of 98.0%. In accordance with the ODOT *SGE*, the energy ratio has been limited to 90%.

On March 10, 2026, the existing concrete pavement at five (5) of the boring locations (B-004-0 and B-006-0 through B-009-0) was cored with a diamond-impregnated bit prior to performing SPT sampling. Photographs of the recovered cores were taken in the field and have been included as Plates 23 through 25 in Appendix I.

Groundwater observations were made as the borings were being advanced, and again after the completion of drilling. At the completion of drilling, all borings were backfilled with soil cuttings mixed with bentonite and, where advanced through existing pavement, the surface of the road was repaired with cold-patch asphalt or quickset concrete.

In the field, experienced S&ME personnel performed the following: 1) examined all samples recovered from the borings; 2) preserved representative portions of all soil samples in airtight jars and rock core samples in compartmented boxes; 3) prepared a log of each boring; 4) made seepage and groundwater observations; 5) made hand-penetrometer measurements in soil specimens exhibiting cohesion; and, 6) provided liaison between the field work and the Project Manager so the exploration program could be modified in the event unusual or unexpected subsurface conditions were encountered. All recovered samples were transported to the laboratory of S&ME for further examination and testing.

4.2 Laboratory Testing

In the laboratory, moisture-content testing was performed on all recovered soil samples. Classification testing (liquid/plastic limit determinations and/or grain-size analyses) was performed on a minimum of two (2) soil samples recovered from each boring. Sulfate content testing was performed on a representative specimen obtained from within 3 feet of the approximate proposed pavement subgrade level except at Boring B-006-0, as only 2 inches of soil were encountered prior to encountering bedrock. The results of these laboratory tests are recorded numerically on the individual boring logs. An unconfined compressive strength test was performed on a section of recovered rock core from Boring B-005-1. The results of this test are presented on Plates 20 and 21 in Appendix I.

Based upon the results of the laboratory testing program, the field logs were modified, if necessary, and copies of the laboratory-corrected boring logs are submitted as Plates 5 through 18 of Appendix I. Shown on these logs are: descriptions of the soil stratigraphy encountered; depths from which samples were preserved; sampling efforts (blow-counts) required to obtain the specimens in the borings; calculated N_{60} values; laboratory testing results; seepage and groundwater observations made at the time of drilling; and, values of hand-penetrometer measurements made in soil samples exhibiting cohesion. For your reference, hand-penetrometer values are roughly equivalent to the unconfined compressive strength of the cohesive fraction of the soil sample.

Soils have been classified in general accordance with Section 603 of the ODOT *SGE* and described in general accordance with Section 602. An explanation of the symbols and terms used on the boring logs, definitions of the special adjectives used to denote the minor soil components and information pertaining to sampling and identification are presented on Plate 3 of Appendix I. An explanation of the symbols and terms used on the boring logs related to bedrock are presented on Plates 4A and 4B of Appendix I. Group Indices determined from the results of the laboratory testing program are also provided on the boring logs.

5.0 Findings

5.1 Existing Surficial Materials

Existing pavement materials were encountered at all of the boring locations except Boring B-005-0, which was performed in a grassy area outside of the existing pavement. The thicknesses of these existing surficial materials are presented in Table 5-1.

Table 5-1 – Existing Pavement or Rootmat Thicknesses

Boring No.	Asphalt (in.)	Concrete (in.)	Granular Base (in.)	Rootmat (in.)
B-001-0-26	23	-	-	-
B-002-0-26	8	-	15	-
B-003-0-26	8	-	15	-
B-004-0-26	-	11¼ (3)	**	-
B-005-0-26	-	-	-	9
B-006-0-26	-	11 (3)	14	-
B-007-0-26	-	11¼ (1) (3)	5	-
B-008-0-26	-	10½ (1) (3)	**	-
B-009-0-26	-	9½ (3)	12	-
B-010-0-26	11	-	13	-
B-011-0-26	11	-	11	-
B-012-0-26	9	-	13	-
B-013-0-26	11	-	9	-

(1) Steel reinforcement was observed in the recovered pavement core.
(2) Gravel fill similar to a granular base material was encountered beneath the concrete.
(3) Photographs of the recovered cores are presented on Plates 23 – 25 of Appendix I.

5.2 Subsurface Stratigraphy

Beneath the surficial materials summarized in Table 5-1, all borings except Boring B-001-0 encountered existing fill or possible fill materials consisting variably of stiff to hard brown and/or gray SANDY SILT (A-4a), SILT AND CLAY (A-6a), SILTY CLAY (A-6b), and CLAY (A-7-6), or medium dense to very dense brown and/or gray GRAVEL (A-1-a), GRAVEL WITH SAND (A-1-b), GRAVEL WITH SAND AND SILT (A-2-4) and GRAVEL WITH SAND, SILT AND CLAY (A-2-6). A layer of very loose GRAVEL AND ROCK FRAGMENTS (A-1-a) was encountered beneath the pavement in Boring B-004-0. Fill was present to the top of bedrock in each boring, except Boring B-001-0, where rock was encountered immediately beneath the asphalt pavement and in Boring B-005-0 where a 0.7-foot-thick layer of very dense natural GRAVEL WITH SAND (A-1-b) was encountered immediately above bedrock.

SHALE and/or SANDSTONE bedrock were encountered in all borings except Borings B-008-0 and B-009-0, which were located in areas of deep existing fill. The elevations at which bedrock was encountered, or where auger refusal was encountered, are summarized in Table 5-2.

Table 5-2 – Summary of Encountered Bedrock Elevations

Boring ID	Elevation Bedrock Encountered	Elevation Auger Refusal
B-001-0-26	El. 1203.5	El. 1202.6
B-002-0-26	El. 1181.7	N/E
B-003-0-26	El. 1161.4	N/E
B-004-0-26	El. 1139.4	El. 1137.6
B-005-0-26	El. 1122.3	El. 1121.5
B-005-1-26	El. 1123.2	El. 1123.0
B-006-0-26	El. 1125.6	El. 1125.4
B-007-0-26	El. 1115.3	El. 1114.9
B-008-0-26	N/E	N/E
B-009-0-26	N/E	N/E
B-010-0-26	El. 1120.1	N/E
B-011-0-26	El. 1124.3	N/E
B-012-0-26	El. 1126.3	N/E
B-013-0-26	El. 1130.2	N/E

The sandstone and shale bedrock encountered during SPT sampling was typically brown and/or gray, highly weathered, and very weak to weak. Five (5) feet of rock was cored in Boring B-005-1, encountering a 2.2-foot-thick layer of gray SANDSTONE which was slightly to moderately weathered and moderately strong (Q_u = 6,500 psi), and then underlain by moderately to highly weathered interbedded SANDSTONE AND SHALE.

5.3 Groundwater Observations

During drilling, groundwater was not encountered in 11 of the 13 borings. Slight seepage was noted in Boring B-007-0 at a depth of 11.0 feet and water had accumulated in Boring B-002-0 to a depth of 3.0 feet after removing the augers. Please refer to the individual boring logs for more detailed descriptions of the quantity and depth(s) where groundwater was observed or measured in each exploration. Extended water level readings were not obtained at the boring locations.

5.4 Soil Sulfate Test Results

Sulfate content testing was performed in accordance with ODOT Supplement 1122 on samples of soil obtained from within 3 feet of the proposed subgrade level in each boring except Boring B-006-0. The results of these tests ranged from 120 parts per million (ppm) to 1173 ppm. These results are below the threshold value of 5,000 ppm that is identified in the ODOT *GDM* as the sulfate concentration above which chemical stabilization should not be performed. The results of these tests are reported on the individual boring logs and on Plates 22 in Appendix I.

6.0 Analysis and Recommendations

6.1 General Discussion

Based on a status set of Stage 3 plans dated May 4, 2026, the following improvements are being proposed at Site 8, BEL-70 Rest Area:

- Construction of an approximate 212-foot wide and 351-foot-long truck parking area with 22 spaces (20 full size parking stalls and 2 cab only stalls).
- Four (4), 45-foot-tall high mast light towers are proposed around the parking area.
- Reconstruction of the entrance/exit ramps, with portions of the existing ramps also being widened.
- Proposed profile information provided by ms indicates the vertical profile of the parking areas and entry/exit drives will be generally within 1 foot of the existing ground surface, except from approximately Sta. 116+50 to Sta. 123+50 where the profile will be lowered by as much as 4 feet.
- The proposed pavement section varies between full-depth asphalt and a composite section of concrete with asphalt overlay.
    - The full-depth asphalt section is proposed on each end of the ramps, including gore areas and taper zones. The asphalt section will consist of 9 inches of asphalt over 10 inches of aggregate base.
    - The composite pavement section will extend from the end of the gore area on each ramp to the parking area and in the northern portion of the parking area. The composite section will consist of 3 inches of asphalt over 10 inches of concrete with 6 inches of aggregate base.
    - The southern 187.25 feet of the existing concrete pavement will be left in place and overlain with 3 inches of asphalt.

6.2 Subgrade Assessment

6.2.1 Subgrade Support Parameters

Section 600 of the ODOT *GDM* provides a standard approach to performing explorations and assessing roadway subgrades. The associated spreadsheet (Ver. 14.85, updated 4/13/2026) created by the ODOT Office of Geotechnical Engineering (OGE) is used to estimate roadway subgrade support parameters and identify areas requiring remediation. The spreadsheet (see Plates 1 through 6 in Appendix II) summarizes the soil type (by ODOT/HRB classification), group indices, depth, blow-counts, Atterberg Limit, and sulfate content values of the proposed subgrade soils encountered in the borings drilled for this project. Using this data, this spreadsheet computes an average of the estimated values of the California Bearing Ratio (CBR) for the soils encountered at or below the anticipated subgrade level of the proposed roadway profile.

Based on the profile elevation data for the proposed ramp and parking area pavements, the following average CBR has been computed by an ODOT Subgrade Analysis spreadsheet for each parking for use during new pavement design at the parking area based on the anticipated subgrade soils encountered in the borings performed for this project.

CBR = 9%

Based on this average CBR value and Section 203.1 of the current ODOT *Pavement Design Manual* (*PDM*), the following value of Resilient Modulus (M_R) correlates to this average CBR value.

$$M_R = 10{,}800 \text{ psi}$$

These subgrade support values may be used during new pavement thickness design for this project provided that the entire proposed pavement subgrade is prepared in strict accordance with Item 204 of the ODOT *CMS*, and that all borrow soil placed within 3 feet of the final subgrade elevation of the new pavement provides average subgrade support parameters which meet or exceed the above values. This subgrade evaluation also assumes that the subgrade for the new roadway pavements is composed of the materials encountered in the borings. If, at the time of construction, it is determined that the subgrade consists of materials different than those encountered in the borings, the pavement design subgrade criteria should be reviewed and, if necessary, modified.

Additional discussions and recommendations pertaining to a proposed remediation program are presented in the following sections of this report.

6.2.2 Subgrade Remediation Assessment

The ODOT Subgrade Analysis spreadsheet also identifies subgrade soils which are "unsuitable" either by classification (A-4b, A-2-5, A-5, A-7-5, A-8a, A-8b) or if the Liquid Limit value is greater than 65%. The spreadsheet also determines if a subgrade soil may be potentially "unstable" and possibly require subgrade remediation if one or more of the following conditions exist: 1) the lab-measured moisture content exceeds the estimated optimum moisture content of the subgrade soil by more than 3%; 2) normalized blow-count (N_{60}) from the SPT sampling is less than 16 (not applicable to all soil types); and, 3) measured hand penetrometer value is less than 2.0 tsf.

Based on these comparisons and correlations, the Subgrade Analysis spreadsheet provides alternative approaches to remediate and establish a stable soil subgrade using either an "excavate and replace" (ODOT *CMS* Item 204) approach, or chemical stabilization (*CMS* Item 206 and Supplement 1120). However, soils with a sulfate content above 5,000 ppm are generally prohibited from being chemically stabilized.

The subgrade remediation depths identified by the Subgrade Analysis spreadsheet prepared for the parking area and presented in Appendix II (Plates 1 through 6) are based on the conditions encountered in the borings during this subsurface investigation. However, because the required amount of remediation is dependent on the moisture content of the subgrade soil at the time of construction, Section 600 of the ODOT *GDM* states that the ultimate decision on required remediation depths and limits should be based on observations during either proofrolling or test-rolling operations at the time of construction.

Based on the results of the borings and the Subgrade Analysis spreadsheet, two (2) borings (B-002-0 and B-005-0) in the proposed entrance ramp and western end of the parking area, respectively, encountered soil at or slightly below the proposed subgrade elevation which was identified as being potentially unstable (low N_{60} and high moisture content) and which may require remediation by the procedures recommended in the Subgrade Analysis.

It should also be noted that Borings B-001-0, B-006-0, and B-010-0 encountered shallow bedrock as shallow as 6 inches below the proposed subgrade. According to Section 600 of the ODOT GDM, when bedrock is within 6 inches of the proposed pavement subgrade, it is to be removed to a depth of 6 inches below the proposed subgrade elevation. Because the bedrock was encountered at or just below 6 inches from the subgrade elevation,

the ODOT Subgrade Analysis spreadsheet did not indicate that bedrock removal was required. However, because the bedrock just below the subgrade and also varies across the project site, S&ME recommends that consideration be given to including a contingency quantity of ODOT *CMS* Item 204.05 bedrock excavation in the project construction plans.

Typical options for subgrade soil remediation include Item 204 "Excavate and Replace", either with or without geogrid, or chemical stabilization. Because the percentage of the subgrade area that may require remediation is less than 30% at the site, "excavate and replace" remediation is recommended to address the potentially unstable soils encountered in the borings.

6.2.3 Subgrade Remediation Recommendations

Table 6-1 outlines the estimated limits of areas where the need for "excavate and replace" subgrade remediation may be required based on the results of the subgrade analysis.

Table 6-1 – Estimated "Excavate and Replace" Subgrade Remediation Areas

Approximate Station Range	Recommended Remediation*	Boring/Reason
EB Truck Ramp Sta. 102+00 to Sta. 106+00 Entire width of full depth pavement construction* (12' Lt. of Ramp Baseline to 18" behind curb)	Excavate and Replace – **12" with Geotextile Fabric**	Boring B-002-0 Unstable Soil
EB Truck Ramp & West Portion of Parking Area Sta. 114+15 to Sta. 117+00 Entire width of full depth pavement construction*	Excavate and Replace – **12" with Geotextile Fabric**	Boring B-005-0 / Unstable Soil

*Remediation should extend 18 inches beyond the edges of the pavement, including under new curbs or shoulders

In addition to the anticipated remediation areas presented in Table 6-1, and as discussed in the previous section of this report, bedrock was encountered as shallow as 6 inches below the proposed subgrade elevation in Borings B-001-0, B-006-0 and B-010-0. According to Section 600 of the ODOT *GDM* and *CMS* Item 204.05, bedrock is to be removed to a depth of 6 inches below the proposed subgrade when encountered within 6 inches of the proposed subgrade. Because shallow bedrock was encountered in these borings and because of the variability in the top of bedrock across the site, **we recommend that a contingency quantity of bedrock excavation should be considered to be included in the construction plans**. The horizontal limits of this bedrock excavation should extend to 12 inches beyond the edges of pavement or any curbs, gutters, or paved shoulders.

In accordance with Section 608 of ODOT *GDM*, Item 712.09 Geotextile Fabric Type D should be placed at the base of all undercuts, and be backfilled with Item 204 Granular Material, Type B or C. It is also recommended that all overexcavated subgrade areas that are backfilled with granular soil be drained to an underdrain, catch basin, or pipe, if possible.

Because of the variable nature of the wide spacing of the explorations, it is possible that additional areas of unstable/unsuitable soils or shallow bedrock may be encountered during earthwork and proofrolling operations. Visual observation of the proofrolling procedures by the Geotechnical Engineer of Record may potentially result in a reduction of overexcavation of unstable or unsuitable soils in these areas.

The estimated subgrade remediation depths are based on conditions encountered in the borings during this subsurface exploration. However, because the required amount of remediation is dependent on the materials encountered and moisture content of the subgrade soil at the time of construction, the ultimate decision on required remediation depths and limits should be based on observations during either proof rolling or test-rolling operations.

The depths of known or proposed utilities should be taken into consideration with the proposed remediation of existing subgrade soils within the project area. Utilities near the proposed bottom of subgrade stabilization depth should be removed/relocated prior to commencing subgrade remediation operations.

6.2.4 Additional Subgrade Remediation Considerations

All backfill and geotextile should be placed according to the specifications of ODOT Item 204. It should be noted, however, that ODOT *GDM* specifies that Item 204 Granular Material Type B without a geotextile fabric be utilized to backfill undercuts performed in the vicinity of any underdrains. As such, underdrains should be installed before placing geotextile and granular backfill. **As "excavate and replace" is recommended for subgrade remediation, Plan Note G121 from the ODOT *Location and Design Manual* (*L&D*), Vol. 3 should be included in the plans**.

6.3 General Roadway/Pavement Construction Considerations

Based on the status set Stage 3 plan and profile information provided to S&ME, we are providing the following recommendations for preparation and construction of the subgrade or embankment for this project.

6.3.1 Subgrade Preparation

Prior to the commencement of earthwork operations, it is recommended that all existing pavement, granular base, grass, topsoil, vegetation, and other miscellaneous materials be completely removed from the entire footprint of the proposed pavement subgrades. Following the removal of these materials, it is recommended that the entire exposed subgrade be examined by the Geotechnical Engineer of Record or their designated representative to identify any weak, wet, organic, or otherwise unsuitable soils that were not encountered during the subsurface exploration. Any such materials identified should be removed and replaced with suitable compacted fill (ODOT *Construction and Material Specifications*, *CMS*, Item 204, or Item 203 when more than 12 inches below the proposed subgrade). Test rolling (Item 206.04) of these areas prior to commencing fill placement may assist in identifying soft weak and wet areas.

Existing underground utilities are anticipated beneath the proposed pavement areas, and the type of material used and the relative compactness of backfill within any such utility trenches are unknown. S&ME recommends any planned utility relocation or removal be performed prior to final subgrade proofrolling. Some instability of utility trench backfill may occur during earthwork operations and/or proofrolling, and some recompaction of granular utility trench backfill may become necessary. Additionally, if water has accumulated within the utility backfill, the subgrade soil in the vicinity of any saturated utility trenches may have become sufficiently weak, soft,

and/or wet that proofrolling may identify these additional areas as requiring overexcavation and replacement. In any case, care should be taken not to disturb any shallow utilities during proofrolling or overexcavation activities.

6.3.2 "At-Grade"/"Cut" Soil Subgrade Areas

Once the desired soil subgrade elevation has been attained in all "at-grade" and "cut" subgrade areas, the subgrade soil beneath the entire new pavement areas should be scarified and recompacted to a depth of 12 inches below the subgrade level in accordance with ODOT *CMS* Item 204.03. During recompaction, the moisture content of the subgrade soil should be maintained or adjusted in accordance with ODOT *CMS* Item 203.07.A.

Following the completion of the scarification and recompaction of the subgrade in these "cut"/"at-grade" areas, it is strongly recommended that construction traffic be restricted from traveling on the compacted subgrade until final acceptance proofrolling has been performed. Additionally, the surface of the subgrade should be graded to drain, as cohesive subgrade soils which are subjected to repeated moisture fluctuations resulting from exposure to rainfall and/or surface water runoff, may exhibit subgrade instability.

6.3.3 "Fill" Areas

Prior to commencing fill placement in pavement areas to attain the proposed subgrade or perform embankment widening, S&ME recommends that consideration be given to performing Item 206.04 Test Rolling on all exposed embankment foundation areas beneath areas where new fill is required. Test rolling, performed in accordance with Item 204.06 of the ODOT *CMS* and Section 204 of the ODOT *Construction Administration Manual of Procedures*, would assist in identifying soft, wet, or weak zones, or areas of unsuitable, organic, or highly plastic soil that may be present. If any such zones of soft, wet, or weak soils are present, the materials contained in these zones should be scarified, dried, and thoroughly recompacted in place in accordance with ODOT *CMS* Item 203.07. If unsuitable or organic soils are encountered, these materials should be completely removed and the overexcavation filled in a controlled manner with compacted, suitable embankment material (*CMS* Item 203.02) which meet the additional requirements previously discussed in Section 6.2.1 and discussed later in Section 6.3.5.

Soft, weak, wet, or unsuitable soils that are not removed where only a thin layer of fill is required may result in difficulties achieving the compaction percentages required for the new fill (ODOT *CMS* Items 203.07 or 204.03) such that final subgrade acceptance proofrolling may require the removal of the new fill. Although the ODOT *CMS* Item 203.05 permits the use of a "bridge lift" to aid in spanning soft or wet foundation areas, S&ME recommends that this practice not be permitted unless more than 3 feet of new embankment fill placement is required.

6.3.4 Benching

After all unsuitable materials have been removed and prior to commencing fill placement, it is recommended that horizontal benches be cut into all existing sloping surfaces steeper than 8(H):1(V) to permit placement and compaction of new fill in horizontal lifts. Where new fill is to be placed on an existing ground surface with a slope between 8(H):1(V) and 4(H):1(V), S&ME recommends that benching of the existing ground be performed in accordance with Item 203.05 of the ODOT *CMS*. At locations where the existing ground surface is steeper than 4(H):1(V), S&ME recommends "Special Benching" procedures as outlined in Section 800 of the ODOT *GDM*. **If "Special Benching" is required, Plan Note G109 from the ODOT *L&D Manual, Vol. 3*, should be included in the General Notes**.

During any required Special Benching procedures, S&ME also recommends the following: 1) only one bench be exposed at any given time and that excavation of the next bench should not be permitted until embankment fill placement and compaction has been completed to the top of the backslope of the previous bench; and, 2) the length of any given bench that is exposed should not exceed the quantity of embankment fill which may be properly placed and compacted in one day. Additionally, S&ME recommends that the final, completed side slopes of embankments be constructed no steeper than 2(H):1(V).

6.3.5 Borrow Requirements and Compaction Criteria

Soil used as fill/backfill should consist of inorganic soil free of all miscellaneous materials, cobbles, and boulders, which is placed in uniform, thin layers and then compacted in accordance with

- *CMS* Item 203 when below 12 inches of the proposed subgrade level;
- *CMS* Item 204 when within 12 inches of the proposed subgrade level; and

Borrow materials should not be placed in a frozen condition or upon a frozen surface, and any sloping surfaces on which new fill is to be placed should first be benched in accordance with either ODOT *CMS* Item 203.05 or Section 800 of the ODOT *GDM*, depending on the slope of the existing ground surface at each location.

Borrow materials to be used as new fill or backfill within 3 feet of the proposed subgrade level should be tested in the laboratory to determine that the borrow materials exhibit subgrade support characteristics that are no less than the CBR value used during the pavement design (see Section 6.2.1).

Compaction requirements (based on the dry unit weight of the type of soil fill being placed as borrow) for the construction of embankment/subgrade materials are based on

- *CMS* Item 203.07.B when below 12 inches of the proposed subgrade level;
- *CMS* Item 204.03 when within 12 inches of the proposed subgrade level; and

S&ME also recommends that once the source of borrow for this project is determined, sampling and testing of this borrow material be performed prior to construction to verify that the borrow soils are suitable for the planned construction. Based on the findings of the exploration at the parking area, the majority of soils encountered may be considered suitable for use as embankment fill provided the materials meet the requirements of CMS Item 203.02.R and the recommendations provided in this report.

6.3.6 Moisture Conditioning and Subgrade Protection

Moisture conditioning and protection of pavement subgrade areas, before and after compaction, should be performed in accordance with *CMS* Item 203, including maintaining drainage as discussed in *CMS* Item 203.04.A. The predominantly cohesive soils encountered in the borings performed for this project are susceptible to absorbing additional moisture and weakening.

6.3.7 Final Subgrade Preparation

The subgrade should be proof rolled in accordance with *CMS* Item 204.06, with any weak or unstable areas being repaired. S&ME recommends that construction traffic be minimized once the required subgrade level has been attained.

6.4 Groundwater Considerations for Subgrade/Embankment Construction

Groundwater measurements obtained from the borings should be considered as temporary, short-term observations and should not be assumed to be representative of the long-term static groundwater level. Based upon observations made at the time of this investigation, significant groundwater problems are not anticipated in connection with the proposed construction. The new pavement subgrade should be graded to prevent surface runoff from pooling on the cohesive soils during construction as exposure of cohesive soils to moisture will result in a decrease in strength and an increase in compressibility. Soil softened by standing water or disturbed by construction activities should be removed before proceeding with construction.

In addition to proper subgrade preparation, we recommend that the pavement design and construction include surface and subsurface drainage measures. Water which infiltrates the pavement and remains trapped within the pavement components during traffic loading is one of the leading causes of premature pavement failure. Effective design measures include the use of perforated underdrain pipes or finger drains below pavements and/or the use of perimeter swales, perimeter edge drains, curbs, or a combination of these features to collect surface water runoff from areas adjacent to the pavement. Cohesive subgrade soils should be crowned or sloped to promote drainage of infiltrating water towards subsurface drainage collection systems.

7.0 High Mast Light Towers Foundations

We note that structure borings performed for this exploration were only drilled for proposed high mast light towers, and that the ODOT Office of Geotechnical Engineering (OGE) indicated that bedrock coring was only required in one of the four light tower borings. No borings were performed for standard light poles that are proposed to be installed along the existing ramps and no recommendations for light pole foundations are provided in this report.

7.1 Foundation Design Approach

The ODOT *Geotechnical Design Manual* (*GDM*) Section 1202 provides direction for performing analyses to determine the foundation/embedment length for light towers. Additional information is provided on ODOT's Standard Construction Drawing (SCD) HL-20.21 "Light Tower Foundations".

Based on information provided by ms on April 29, 2026, the high mast light towers proposed at the truck parking area are to be 45-foot-tall towers with a 36-inch diameter drilled shaft foundation. ODOT SCD HL-20.21 provides guidance on the type, size, and quantity of longitudinal and transverse reinforcement within each drilled shaft. The length (depth) of the drilled shaft foundation is based on meeting criteria given in the ODOT *GDM*. However, the ODOT *GDM* does not indicate a minimum foundation length for specific high mast light tower heights.

According to ODOT *GDM* Section 1202, drilled shaft foundations for high mast light towers are geotechnically acceptable with respect to the anticipated lateral loading provided the following conditions are true:

- Service Limit State Loading – The maximum resultant deflection at the top of the high mast light tower is less than 10% of the above ground height of the tower. The maximum resultant deflection is defined as the sum of the deflection at the top of the foundation (shaft head) plus the lateral rotation (in radians) at the top of the shaft (in radians) multiplied by the height of the high mast light tower above the top of the shaft. As all high mast light towers being proposed for this project have a height of 45 feet, the maximum Service Limit deflection is equal to 54 inches (45 feet = 540 inches).

- Extreme Limit State – LPILE does not calculate a very large deflection (typically around 100 inches) or an infinite or incalculable deflection (i.e., the program fails to converge on a solution).

7.2 Lateral (LPILE) Analysis Parameters

Section 1202 of the ODOT *GDM* indicates a design wind speed of 76 mph should be used for the Service Limit State and a speed of 115 mph at the Extreme Limit State. Based on these wind speeds and the height and weight of the proposed towers, ms provided the following load combinations for use in the lateral load (LPILE) analyses.

- Service Limit State Loading (LPILE Load Case 1):
  - Shear (V) = 1,000 lbs; Moment (M) = 315,600 in-lbs; Weight (W) = 4,200 lbs
- Extreme Limit State Loading (LPILE Load Case 2) (maximum weight):
  - Shear (V) = 2,250 lbs; Moment (M) = 724,800 in-lbs; Weight (W) = 4,600 lbs
- Strength Limit State Loading (LPILE Load Case 3) (minimum weight):
  - Shear (V) = 2,250 lbs; Moment (M) = 724,800 in-lbs; Weight (W) = 3,800 lbs

Lateral load analyses were performed using the software LPILE 2022 using the input parameters above and the soil parameters summarized in Appendix III on Plates 1 through 3 for high mast light towers. In accordance with Section 1201 of the ODOT *GDM*, the upper three feet of the soil profile in these analyses has been modeled as a soft clay to account for soils weakened by freeze-thaw or other disturbance.

The top elevation in each soil parameter table corresponds to the elevation at the proposed ground surface at each proposed high-mast light tower as provided by ms in their email dated April 29, 2026. However, per ODOT SCD HL-20.21, the drilled shaft foundation will rise 6 to 12 inches above the surrounding ground surface. As such, a stick-up height of 12 inches has been used in our analyses.

7.3 Lateral Load Analysis Summary

Table 7-1 provides a summary of the deflection, moment, and shear values calculated from the lateral loading analyses for the proposed 45-foot-tall high mast light towers. The deflection values calculated in the Service Limit State analyses meet the *GDM* criteria given above and the analyses for the Extreme Limit State achieved convergence. However, it should be noted the structural resistance of the drilled shaft foundations should be verified to ensure the foundations can withstand the maximum moment and shear forces computed by the LPILE program and which are summarized in Tables 7-1. Based on the results of our analyses, S&ME recommends a minimum 8-foot embedment length for high mast light tower foundations for Towers CM1-1 and CM1-3, and a minimum 6-foot embedment length for high mast light tower foundations for Towers CM1-2 and CM1-4 where rock was encountered at shallower depths. LPILE output from each analysis is provided in Appendix III.

Table 7-1 – Summary of Lateral Load Analysis Results

Light Tower Location & Boring ID	Limit State*	Embed-ment Depth (ft)	Lateral Deflection at Shaft Head (in)	Slope at Shaft Head (rad)	Lateral Deflection at Top of Pole (in)	Total Deflection (in)	Max. Moment (kip-in)	Max. Shear (kips)
CM1-1 (B-008-0-26)	SER-I	8	0.0084	0.000138	0.075	0.083	---	---
	EXT-I (+)		---	---	---	---	806.9	25.8
	EXT-I (-)		---	---	---	---	806.8	25.8
CM1-2 (B-005-0-26 & B-005-1-26)	SER-I	6	0.0064	0.000116	0.063	0.069	---	---
	EXT-I (+)		---	---	---	---	831.5	78.6
	EXT-I (-)		---	---	---	---	831.5	78.6
CM1-3 (B-007-0-26)	SER-I	8	0.0131	0.000211	0.114	0.127	---	---
	EXT-I (+)		---	---	---	---	801.1	24.0
	EXT-I (-)		---	---	---	---	800.9	24.0
CM1-4 (B-006-0-26 & B-005-1-26)	SER-I	6	0.0038	0.000083	0.045	0.49	---	---
	EXT-I (+)		---	---	---	---	832.0	53.9
	EXT-I (-)		---	---	---	---	831.0	53.9

* (+) indicates Extreme Limit State with maximum weight and (-) indicates Extreme Limit State with minimum weight

7.4 Foundation Plan Notes

Based on the results of our analyses and the conditions encountered in the borings, we recommend the following notes be provided in the project plans regarding the high-mast light tower foundations.

Light Tower Foundation, Misc.: 36" x 8' Deep, As Per Plan

For the 45-foot-tall High-Mast Light Towers, at Towers CM1-1 and CM1-3, perform drilled shaft foundation excavation and construction in accordance with ODOT *CMS* Item 524. Predominantly cohesive soils were encountered in the nearby project soil Borings B-007-0-26 and B-008-0-26. Based on the encountered soil conditions, foundation excavation by the Dry Construction Method, in accordance with *CMS* Item 524.04.A, may be anticipated. See the attached soil borings for specific details. At light towers CM1-1 and CM1-3, the drilled shafts shall be 36-inch diameter and penetrate 8 feet deep into the ground below finished grade (exclusive of any above-grade pedestal height for mounting). Steel reinforcement for the drilled shaft foundations shall be in accordance with standard construction drawing HL-20.21.

Light Tower Foundation, Misc.: 36" x 6' Deep, As Per Plan

For the 45-foot-tall High-Mast Light Towers, at Towers CM1-2 and CM1-4, perform drilled shaft foundation excavation and construction in accordance with ODOT *CMS* Item 524. Predominantly cohesive soils were encountered in the nearby project soil Borings B-005-0-26 and B-006-0-26 overlying interbedded sandstone and shale bedrock. However, granular seams were encountered above bedrock in both Borings B-005-0-26 and B-006-0-26. Based on the encountered soil conditions, foundation excavation by the Dry Construction

Method, in accordance with ODOT *CMS* Item 524.04.A, may be anticipated. See the attached soil borings for specific details. At light towers CM1-2 and CM1-4, the drilled shafts shall be 36-inch diameter and penetrate 6 feet deep into the ground below finished grade (exclusive of any above-grade pedestal height for mounting) which is estimated to include 2.5 feet and 1.9 feet of bedrock excavation at Towers CM1-2 and CM1-4, respectively. Steel reinforcement for the drilled shaft foundations shall be in accordance with standard construction drawing HL-20.21.

7.5 Groundwater Considerations for Light Tower Foundations

During this exploration, no significant sources of groundwater were encountered in the borings drilled for the light towers. Accordingly, no significant quantities of water are anticipated during excavation of the 6- to 8-foot-deep foundation at each of the light tower locations. Some water seepage may enter the foundation excavations through sand seams or desiccation cracks; however, the quantity of water is expected to be limited and may likely be controlled by bailing or using portable pumps.

It is recommended that groundwater (if encountered) should not be allowed to accumulate in the light tower foundation excavations, and that surface water runoff be directed away from the foundation excavations both during and after construction, as the cohesive soil in the walls and at the bottom of the light tower excavations will become soft and weaken when exposed to water. Additionally, the excavations should not be left open, as the excavation walls may exhibit instability in the presence of construction vibrations.

8.0 Limitations and Final Considerations

This report has been prepared in accordance with generally accepted geotechnical engineering practice for specific application to this project. The conclusions and recommendations contained in this report are based upon applicable standards of our practice in this geographic area at the time this report was prepared. No other representation or warranty, either express or implied, is made.

We relied on project information given to us to develop our conclusions and recommendations. If project information described in this report is not accurate, or if it changes during project development, we should be notified of the changes so we can modify our recommendations based on this additional information if necessary.

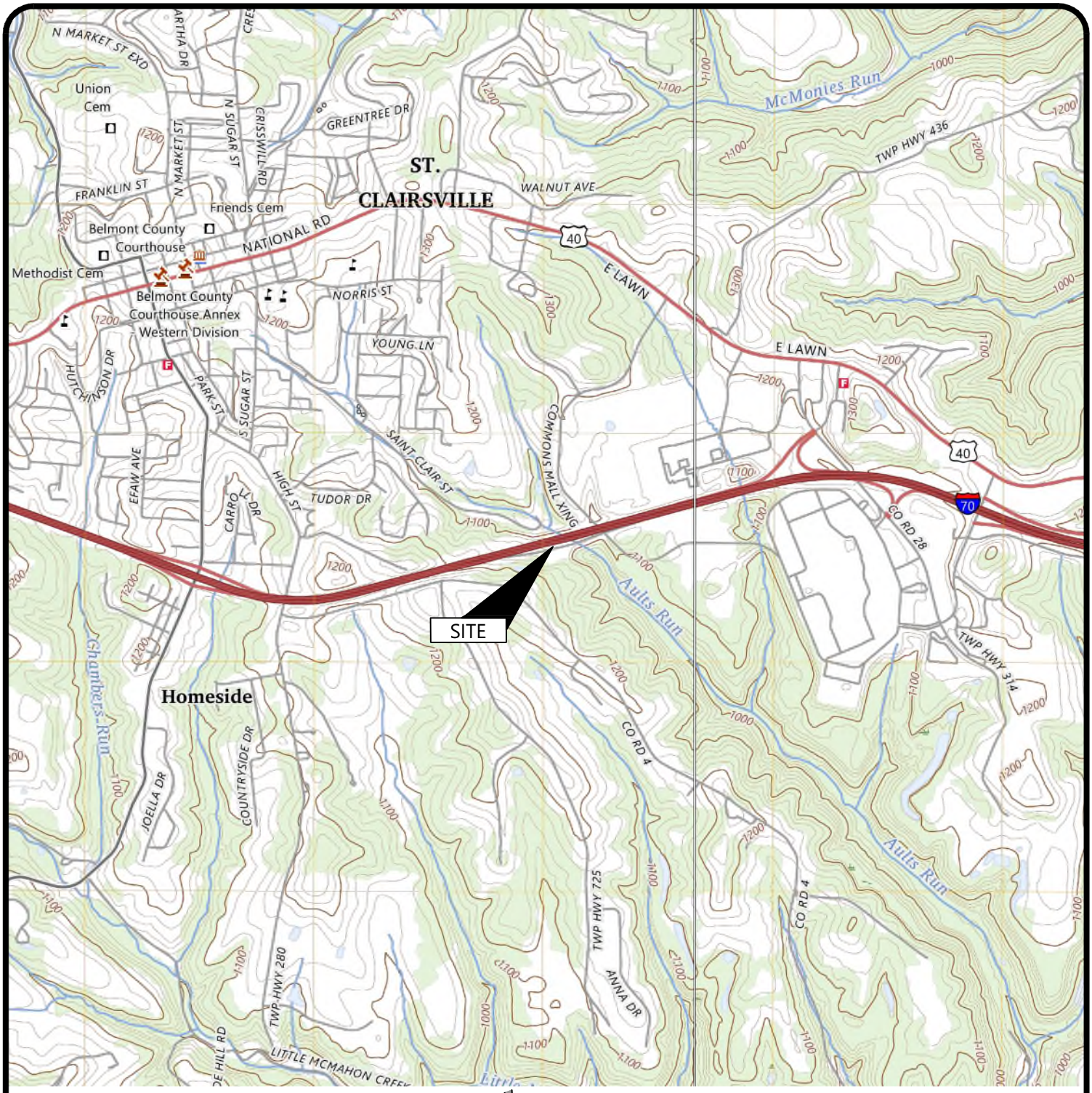
Our conclusions and recommendations are based on limited data from a field exploration program. Subsurface conditions can vary widely between explored areas. Some variations may not become evident until construction. If conditions are encountered which appear different than those described in our report, we should be notified. This report should not be construed to represent subsurface conditions for the entire site.

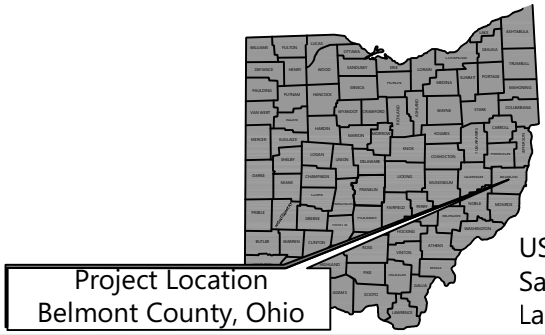
Unless specifically noted otherwise, our field exploration program did not include an assessment of regulatory compliance, environmental conditions or pollutants or presence of any biological materials (mold, fungi, bacteria). If there is a concern about these items, other studies should be performed. S&ME can provide a proposal and perform these services if requested.

S&ME should be retained to review the final plans and specifications to confirm that earthwork, foundation, and other recommendations are properly interpreted and implemented. The recommendations in this report are contingent on S&ME's review of final plans and specifications followed by our observation and monitoring of earthwork and foundation construction activities.

Appendices

Appendix I – General Information





N

USGS Mapping:
Saint Clairsville &
Lansing USGS Quads

0 2000 4000

GRAPHIC SCALE (IN FEET)

Vicinity Map

Subgrade & Structure Foundation Exploration
TP 26 NE Ohio Site 8 - BEL-70 Vacant Weigh Station
Belmont County, Ohio

SCALE:	FIGURE NO.
GRAPHIC	1
DATE:	
03-26-2026	
PROJECT NUMBER	
24170232B	

Drawing Path: T:\Columbus-1170\Projects\2024\24170232_ms_TP 26 NE Ohio\GEO\CAD\DWG\Site 8 BEL-70 VMAP.dwg

LEGEND

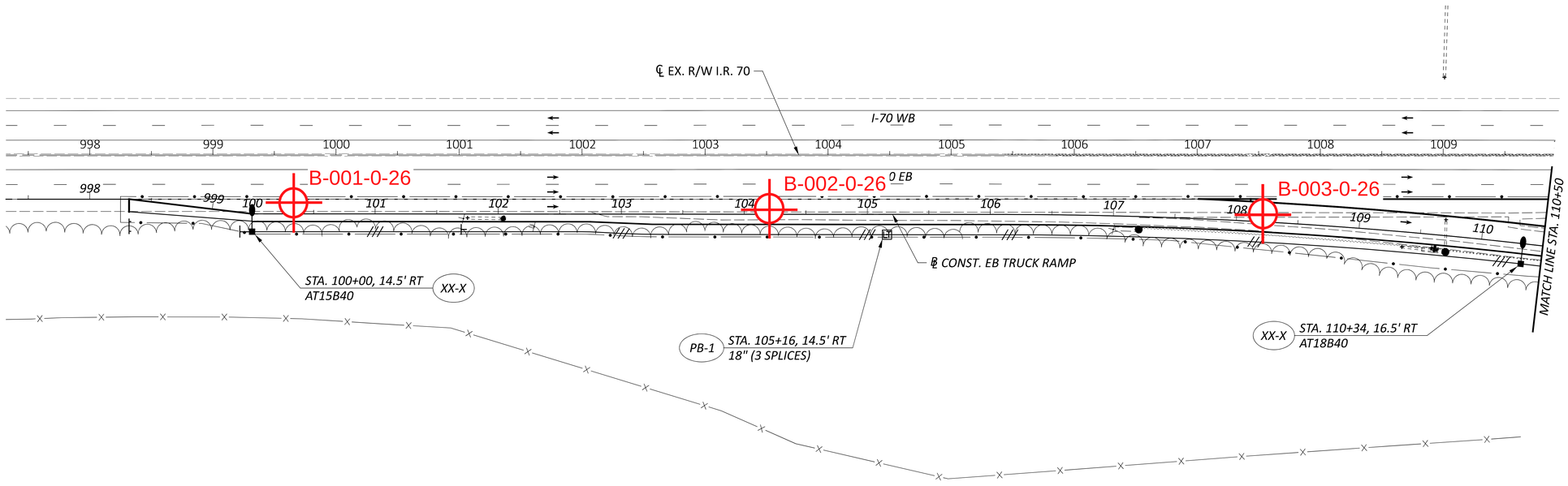
B-001-0-26

Soil Boring Location

PLAN LEGEND

- XX-X — *LIGHT POLE W/ LED LUMINAIRE*
- F — *FUTURE LIGHT POLE LOCATION*
- XX-X — *HIGH MAST LIGHT TOWER W/ 2-LED ASYMMETRIC LUMINAIRES*
- *PULL BOX (LIGHTING), 725.08 (BY SIZE)*
- *PROPOSED LIGHTING CONTROL CENTER*
- *3" CONDUIT, 725.04 W/ 3-WIRE NO. 4 AWG DISTRIBUTION CABLE*
- *1-1/2" DUCT CABLE W/ 3-WIRE NO. 4 AWG*
- *STUB & CAP CONDUIT ELL*

HORIZONTAL SCALE IN FEET: 0, 25, 50, 100



NOTES:

1. *OFFSETS TO PULL BOXES ARE FROM NEAREST ℄/℄.*
2. *OFFSETS TO LIGHT POLES/TOWERS ARE FROM NEAREST EOP.*

PLATE 2A

LIGHTING PLAN - EASTBOUND TRUCK PARKING
STA. 997+31.96 (EX. I.R. 70) TO STA. 110+50.00

BEL-IR 70 EB WEIGH STATION TP

MODEL: 122878_LP101 PAPERSIZE: 34x22 (in.) DATE: 3/25/2026 TIME: 1:31:44 PM PLTDRV: OHDOT_PDF.pltcfg PENTBL: OHDOT_Pen.tbl USER: spark@msconsultants.com WORKSPACE: OHDOTCEv02 WORKSET: 122878 PRODUCT: OpenRoadsDesigner 24.00.02.25
pw:\\ohiodot-pw.bentley.com:ohiodot-pw-02\Documents\01 Active Projects\District 11\Belmont\122878\401-Engineering_MSConsultants\Lighting\Sheets\122878_LP101.dgn

DESIGN AGENCY: ms consultants. inc.

DESIGNER	CLM
REVIEWER	KWR 03/27/26
PROJECT ID	122878
SHEET	P.81
TOTAL	84

LEGEND

B-001-0-26

Soil Boring Location

PB-3 STA. 114+70, 27.5' LT 18" (3 SPLICES)

PB-2 STA. 114+70, 14.5' RT 18" (3 SPLICES)

XX-X STA. 116+69, 10.0' LT BB45

XX-X STA. 118+39, 10.0' LT BB45

℄ EX. R/W I.R. 70

I-70 WB

I-70 EB

℄ CONST. EB TRUCK RAMP

MATCH LINE STA. 110+50

MATCH LINE STA. 123+00

B-004-0-26

B-005-0-26

B-005-1-26

B-006-0-26

B-007-0-26

B-008-0-26

B-009-0-26

XX-X STA. 111+69, 14.5' RT AT15B40

XX-X STA. 113+04, 14.5' RT AT15B40

XX-X STA. 114+40, 14.5' RT AT15B40

XX-X STA. 115+17, 12.5' RT AT12B40

XX-X STA. 116+57, 15.0' RT BB45

XX-X STA. 118+20, 15.0' RT BB45

XX-X STA. 120+36, 14.5' RT AT15B40

XX-X STA. 121+76, 14.5' RT AT15B40

NOTES:

1. FOR LIGHTING LEGEND, SEE SHEET P.79.

2. OFFSETS TO PULL BOXES ARE FROM NEAREST ℄.

3. OFFSETS TO LIGHT POLES/TOWERS ARE FROM NEAREST EOP.

HORIZONTAL SCALE IN FEET

0 50 100

LIGHTING PLAN - EASTBOUND TRUCK PARKING STA. 110+50.00 TO STA. 123+00.00

BEL-IR 70 EB WEIGH STATION TP

PLATE 2B

DESIGN AGENCY

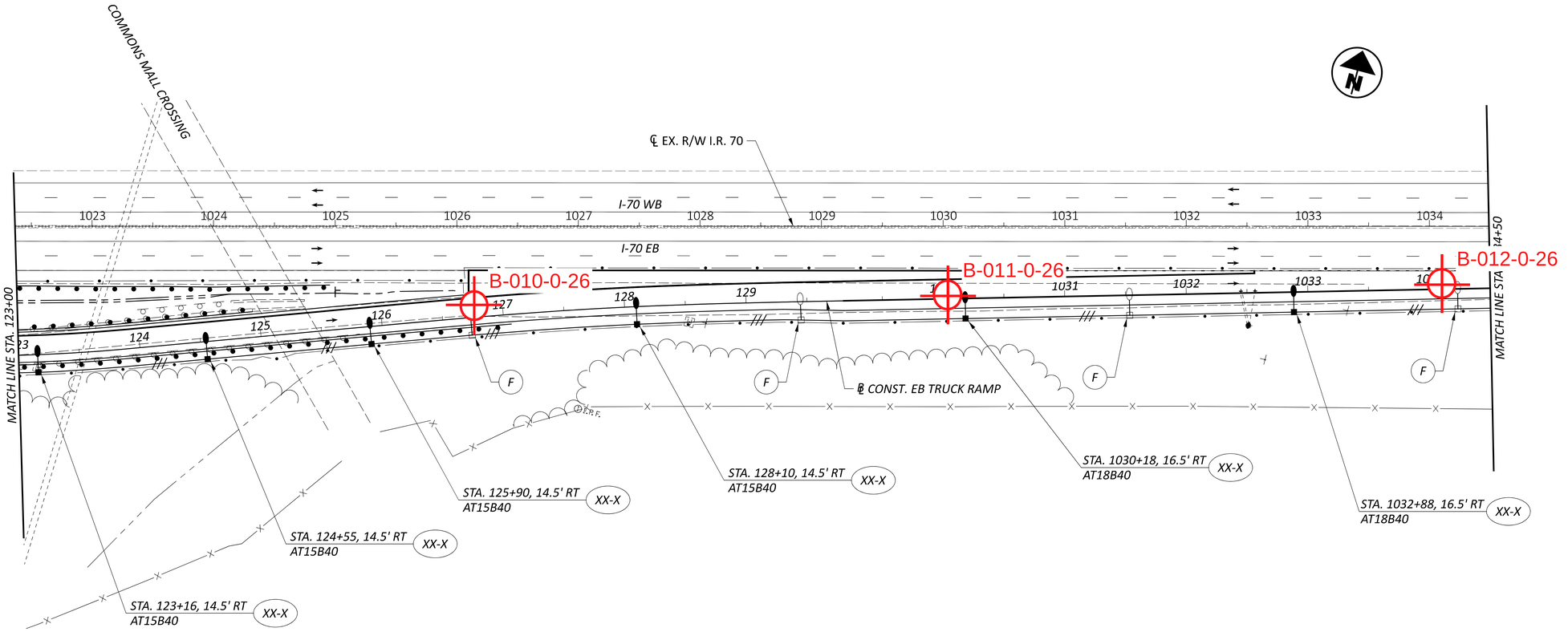
ms consultants, inc.

DESIGNER	CLM
REVIEWER	KWR 03/27/26
PROJECT ID	122878
SHEET	P.82
TOTAL	84

MODEL: 122878_LP102 PAPERSIZE: 34x22 (in.) DATE: 3/25/2026 TIME: 1:31:50 PM PLTDRV: OHDOT_PDF.pltcfg PENTBL: OHDOT_Pen.tbl USER: spark@msconsultants.com WORKSPACE: OHDOTCEv02 WORKSET: 122878 PRODUCT: OpenRoadsDesigner 24.00.02.25
pw:\\ohiodot-pw.bentley.com:ohiodot-pw-02\Documents\01 Active Projects\District 11\Belmont\122878\401-Engineering_MSConsultants\Lighting\Sheets\122878_LP102.dgn

LEGEND

B-001-0-26
Soil Boring Location



NOTES:

1. FOR LIGHTING LEGEND, SEE SHEET P.79.

2. OFFSETS TO PULL BOXES ARE FROM NEAREST ℄/℄.

3. OFFSETS TO LIGHT POLES/TOWERS ARE FROM NEAREST E

PLATE 2C

HORIZONTAL SCALE IN FEET
0 25 50 100

LIGHTING PLAN - EASTBOUND TRUCK PARKING
STA. 123+00.00 TO STA. 1034+50.00

DESIGN AGENCY
ms consultants. inc.

DESIGNER	CLM
REVIEWER	KWR 03/27/26
PROJECT ID	122878
SHEET	P.83
TOTAL	84

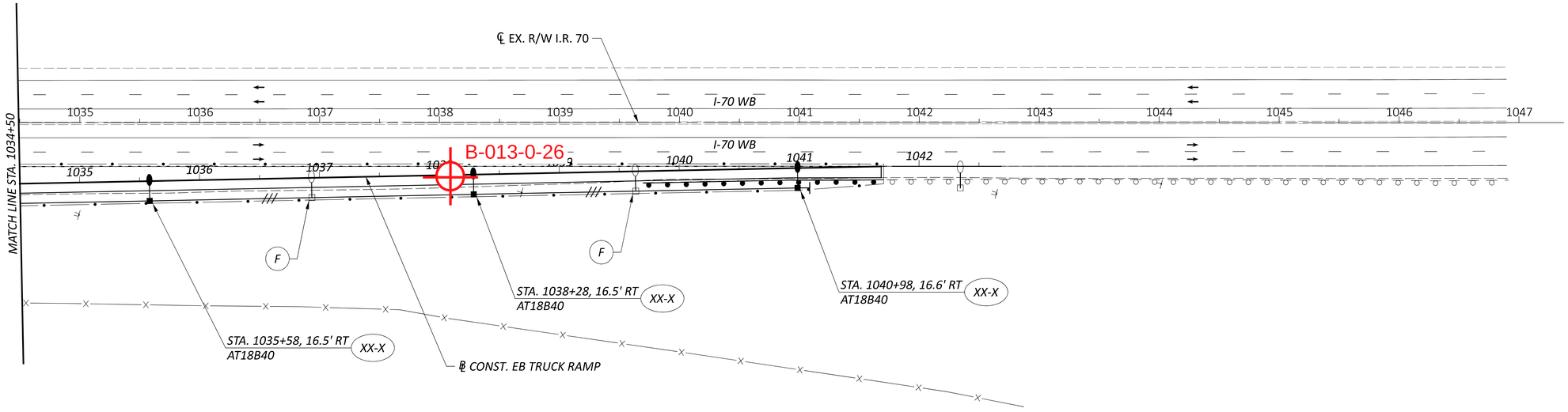
BEL-IR 70 EB WEIGH STATION TP

MODEL: 122878_LP103 PAPERSIZE: 34x22 (in.) DATE: 3/25/2026 TIME: 1:31:57 PM PLTDRV: OHDOT_PDF.pltcfg PENTBL: OHDOT_Pen.tbl USER: spark@msconsultants.com WORKSPACE: OHDOTCEv02 WORKSET: 122878 PRODUCT: OpenRoadsDesigner 24.00.02.25
pw:\\ohiodot-pw.bentley.com:ohiodot-pw-02\Documents\01 Active Projects\District 11\Belmont\122878\401-Engineering_MSConsultants\Lighting\Sheets\122878_LP103.dgn

LEGEND

B-001-0-26

Soil Boring Location



NOTES:

1. FOR LIGHTING LEGEND, SEE SHEET P.79.

2. OFFSETS TO PULL BOXES ARE FROM NEAREST ℄/℄.

3. OFFSETS TO LIGHT POLES/TOWERS ARE FROM NEAREST ℄

PLATE 2D

HORIZONTAL SCALE IN FEET
0 25 50 100

LIGHTING PLAN - EASTBOUND TRUCK PARKING
STA. 1034+50.00 TO STA. 1047+00.00

DESIGN AGENCY
ms consultants, inc.

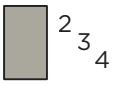
DESIGNER CLM
REVIEWER KWR 03/27/26
PROJECT ID 122878
SHEET P.84 TOTAL 84

BEL-IR 70 EB WEIGH STATION TP

MODEL: 122878_LP104 PAPERSIZE: 34x22 (in.) DATE: 3/25/2026 TIME: 1:32:03 PM PLTDRV: OHDOT_PDF.pltcfg PENTBL: OHDOT_Pen.tbl USER: spark@msconsultants.com WORKSPACE: OHDOTCEv02 WORKSET: 122878 PRODUCT: OpenRoadsDesigner 24.00.02.25
pw:\\ohiodot-pw.bentley.com:ohiodot-pw-02\Documents\01 Active Projects\District 11\Belmont\122878\401-Engineering_MSConsultants\Lighting\Sheets\122878_LP104.dgn

ODOT SOIL LOG LEGEND

The STANDARD PENETRATION TEST (SPT) as defined by AASHTO T206 (or ASTM D1586) is a method to obtain a disturbed soil sample for examination and testing and to obtain relative density and consistency information. A standard 1.4-inch I.D./2-inch O.D. split-barrel sampler is driven three 6-inch increments (see graphic at right) with a 140 lb. hammer freely falling 30 inches. The hammer can either be of a trip, free-fall design, or actuated by a rope and cathead. The SPT N Value is determined by adding the number of blows from the 2nd and 3rd 6-inch increments.



SPT BLOWCOUNT CORRECTION FOR HAMMER EFFICIENCY (N_{60}) is determined by the following equation: $N_{60} = N * [$ Drill Rod Energy Ratio (%) / 60], and where the drill rod energy ratio is determined in accordance with ASTM D4633. If the drill rod energy ratio exceeds 90%, it is limited to 90% to determine the N_{60} value and is shown on the log as 90*.

SHELBY TUBE (ST) samples are obtained by hydraulically pushing a thin-walled tube (typically 3-inches in diameter) to obtain a relatively undisturbed sample for testing of fine-grained soils to determine engineering properties such as strength, compressibility, permeability, and density. Shelby tubes are sampled in general accordance with ASTM D1587 (AASHTO T207).



DESCRIPTIVE ORDER OF SOIL STRATA: Consistency/Density, color, ODOT soil classification description, minor soil constituents with percentage modifiers, organic content, miscellaneous constituents or descriptions, relative moisture condition.

ODOT SOIL CLASSIFICATION DESCRIPTION AND SYMBOL

- **GRAVEL** (A-1-a)
- **GRAVEL WITH SAND** (A-1-B)
- **FINE SAND** (A-3)
- **COARSE AND FINE SAND** (A-3a)
- **GRAVEL WITH SAND AND SILT** (A-2-4 OR A-2-5)
- **GRAVEL WITH SAND, SILT AND CLAY** (A-2-6 OR A-2-7)
- **SANDY SILT** (A-4a)
- **SILT** (A-4b)
- **ELASTIC SILT AND CLAY** (A-5)
- **SILT AND CLAY** (A-6a)
- **SILTY CLAY** (A-6b)
- **ELASTIC CLAY** (A-7-5)
- **CLAY** (A-7-6)
- **ORGANIC SILT** (A-8a)
- **ORGANIC CLAY** (A-8b)
- **PEAT**
- **UNCONTROLLED FILL**
- **BOULDERY ZONE**
- **SOD/ROOTMAT/ TOPSOIL**
- **PAVEMENT OR BASE**
- **CONCRETE**

SOIL LOG SYMBOLS

SS - Split-Spoon Sample

ST - Shelby Tube Sample

TR - Top of Rock

REC - Sample Recovery, %

HP - Hand Penetrometer Value, tsf

LOI - Loss on Ignition Test, %

Qu - Unconfined Compressive Strength

γd - Dry Unit Weight, pcf

γm - Moist Unit Weight, pcf

GR - Gravel Content, %

CS - Coarse Sand Content, %

FS - Fine Sand Content, %

SI - Silt Content, %

CL - Clay Content, %

LL - Liquid Limit

PL - Plastic Limit

PI - Plasticity Index

WC - Natural Water Content, %

NOTE: Particle size contents are expressed % by weight.

PARTICLE SIZE

Particle	Size	US Sieve Size
Boulder	>300 mm (12 in.)	12 in.
Cobble	75 - 300 mm (3 - 12 in.)	3 - 12 in.
Coarse gravel	19 - 75 mm (3/4 - 3 in.)	3/4 - 3 in.
Fine gravel	2 - 19 mm (0.08 - 3/4 in.)	#10 - 3/4 in.
Coarse sand	0.42 - 2.0 mm	#40 - #10
Fine sand	0.074 - 0.42 mm	#200 - #40
Silt	0.005 - 0.074 mm	NA
Clay	< 0.005 mm	NA

FINE-GRAINED SOIL
(Relative Consistency)

	N_{60}	HP
Very soft	< 2 bpf	< 0.25 tsf
Soft	2 - 4 bpf	> 0.25 - 0.5 tsf
Medium stiff	5 - 8 bpf	> 0.5 - 1.0 tsf
Stiff	9 - 15 bpf	> 1.0 - 2.0 tsf
Very stiff	16 - 30 bpf	> 2.0 - 4.0 tsf
Hard	> 30 bpf	> 4.0 tsf

COARSE-GRAINED SOIL
(Relative Density)

	N_{60}
Very loose	< 5 bpf
Loose	5 - 10 bpf
Medium dense	11 - 30 bpf
Dense	31 - 50 bpf
Very dense	> 50 bpf

MINOR CONSTITUENTS
(% By Weight)

	Percentage
Trace	0% - 10%
Little	>10% - 20%
Some	>20% - 35%
"And"	≥ 35%

ORGANIC CONTENT OF SOIL
(Determined by ASTM D2974 or AASHTO T267)

Classification	Percentage
Slightly organic	2% - 4%
Moderately organic	>4% - 10%
Highly organic	> 10%

RELATIVE MOISTURE CONDITION

Dry	Cohesive - Powdery, WC well below PL Granular - No moisture present
Damp	Cohesive - Leaves very little moisture when pressed, WC < PL Granular - Internal moisture, little to no surface moisture
Moist	Cohesive - Leaves moisture when pressed, PL < WC < LL - 3 Granular - Free water on surface, shiny appearance
Wet	Cohesive - Mushy, WC near or above LL Granular - Voids filled with free water

W **At Time of Drilling**

Free water (seepage or groundwater) observation made anytime during the drilling process. Depending on time of reading and drilling methodologies, this value may be influenced by the drilling process.

At end of Drilling

Free water measurement soon after the drilling processes are complete, and the borehole is at final depth. Drilling fluids, if introduced during drilling, may influence this measurement.

24 hrs After Drilling

Free water measurements made in a borehole hours to days after drilling is complete including the time elapsed (i.e., "24 hrs" as shown at left). Depending on subsurface conditions, elapsed time, drilling process, etc. this observation may reflect a stabilized level.

REFERENCES:

Ohio Department of Transportation (ODOT), Specifications for Geotechnical Explorations (SGE)

ODOT ROCK CORE LOG LEGEND

DESCRIPTIVE ORDER FOR ROCK STRATA

Bedrock type, color, weathering, strength, texture, bedding, other descriptors, type and condition of discontinuities, unit RQD, unit recovery.

When alternating layers occur between two distinct rock types, describe the material as "Interbedded" with the major rock type first, with estimated percentage, and the secondary rock type second, with estimated percentage. Provide the unit RQD and unit recovery, then describe each rock type in detail.

For spread footings founded on or into bedrock, describe discontinuities using the modified Rock Mass Rating (RMR) system (degree of fracturing, aperture width and surface roughness). For drilled shafts extending into bedrock, describe discontinuities using the Geologic Strength Index (GSI) system (discontinuity structure and surface condition). For rock cut slopes, describe discontinuities using both the modified RMR and GSI systems.

COMMON OHIO BEDROCK TYPES AND SYMBOLS


SHALE


SILTSTONE


LIMESTONE



COAL


CLAYSTONE/ MUDSTONE


SANDSTONE


DOLOMITE


UNDERCLAY/ FIRECLAY

WEATHERING

Unweathered	No evidence of chemical or mechanical alternation of the rock mass. Mineral crystals have a bright appearance with no discoloration. Fractures show little or no staining on surfaces.
Slightly Weathered	Slight discoloration of the rock surface with minor alterations along discontinuities. Less than 10% of the rock volume presents alteration.
Moderately Weathered	Portions of the rock mass are discolored with a dull appearance. Surfaces may have a pitted appearance with weathering "halos". Isolated zones of varying rock strengths.
Highly Weathered	Entire rock mass appears discolored and dull. Some pockets of slightly to moderately weathered rock and some areas of severely weathered materials may be present.
Severely Weathered	Majority of the rock mass reduced to a soil-like state. Zones of more resistant rock may be present, but the material can generally be molded and crumbled by hand pressures.

STRENGTH

		APPROX. UNCONFINED COMPRESSIVE STRENGTH (PSI)
Extremely Strong	Cannot be scratched by a knife or sharp pick. Chipping off hand specimens requires hard repeated blows of a geologist's hammer.	> 30,000
Very Strong	Cannot be scratched by a knife or sharp pick. Breaking off hand specimens requires hard repeated blows of a geologist's hammer.	30,000 - 15,000
Strong	Can be scratched with a knife or pick with difficulty. Requires hard hammer blows to detach hand specimen.	15,000 - 7,500
Moderately Strong	Can be scratched with a knife or pick. Gouges ¼" deep can be excavated by a pick. Requires moderate hammer blows to detach specimen.	7,500 - 3,600
Slightly Strong	Can be gouged 0.05 inch deep by firm pressure with a knife or pick point. Can excavate small pieces (1-inch) by hard blows with a pick.	3,600 - 1,500
Weak	Can be gouged readily by a knife or pick or excavated in small fragments by moderate blows of a pick. Small, thin pieces can be broken by hand.	1,500 - 750
Very Weak	Can be carved with a knife and excavated readily with a pick. Pieces 1 inch or more thick can be broken by hand. Can be scratched by fingernail.	750 - 40

TEXTURE

Boulder	> 12 in.
Cobble	12 - 3 in.
Gravel	3 - 0.08 in.
Coarse Sand	0.08 - 0.02 in.
Medium Sand	0.02 - 0.01 in.
Fine Sand	0.01 - 0.005 in.
Very Fine Sand	0.005 - 0.003 in.

BEDDING

Very Thick Bedded	> 36 in.
Thick Bedded	36 in. - 18 in.
Medium Bedded	18 in. - 10 in.
Thin Bedded	10 in. - 2 in.
Very Thin Bedded	2 in. - 0.4 in.
Laminated	0.4 in. - 0.1 in.
Thinly Laminated	< 0.1 in.

REFERENCES: OHIO DEPARTMENT OF TRANSPORTATION (ODOT), SPECIFICATIONS FOR GEOTECHNICAL EXPLORATIONS (SGE).

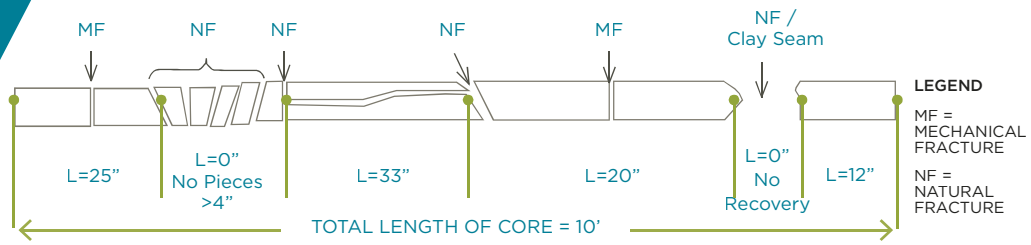
ODOT ROCK CORE LOG LEGEND

ROCK CORE RECOVERY

Recovery to be determined by core run and by rock unit (layer).

$$\text{REC}_{\text{(Recovery)}} = \frac{\text{Length of Rock Core Recovered}}{\text{Length of Core Run}} \times 100$$

ROCK QUALITY DESIGNATION (RQD)



$$\text{RQD}_{\text{(Equation)}} = \left(\frac{\Sigma \text{ Core with Length (L)} \geq 4"}{\text{Core Run or Interval Total Length}}\right) \times 100$$

$$\text{RQD}_{\text{(Example)}} = \left(\frac{25" + 33" + 20" + 12"}{120"}\right) \times 100 = 75\%$$

DESCRIPTORS

Arenaceous - Sandy

Argillaceous - Clayey

Brecciated - Contains angular gravel

Calcareous - Contains calcium carbonate

Carbonaceous - Contains carbon

Cherty - Contains chert

Conglomeritic - Contains rounded gravel

Crystalline - Contains crystalline structure

Dolomitic - Contains Ca/Mg carbonate

Ferriferous - Contains iron

Fissile - Thin planar partings

Fossiliferous - Contains fossils

Friable - Easily broken down

Micaceous - Contains mica

Pyritic - Contains pyrite

Siliceous - Contains silica

Stylolitic - Contains stylotites

Vuggy - Contains openings

DISCONTINUITIES IN BEDROCK

Fault	Fracture which expresses displacement parallel to the surface that does not result in a polished surface.
Joint	Planar fracture that does not express displacement. Generally occurs at regularly spaced intervals.
Shear	Fracture which expresses displacement parallel to the surface that results in polished surfaces or slickensides.
Bedding	A surface produced along a bedding plane.
Contact	A surface produced along a contact plane. (generally not seen in Ohio)

MODIFIED RMR DISCONTINUITY TERMS

DEGREE OF FRACTURING

Unfractured	>10 ft.
Intact	10 ft. – 3 ft.
Slightly Fractured	3 ft. – 1 ft.
Moderately Fractured	12 in. – 4 in.
Fractured	4 in. – 2 in.
Highly Fractured	< 2 in.

APERTURE WIDTH

Open	> 0.2 in.
Narrow	0.2 in. - 0.05 in.
Tight	< 0.05 in.

SURFACE ROUGHNESS

Very Rough	Near vertical steps and ridges occur on the discontinuity surface.
Slightly Rough	Asperities on the discontinuity surface are distinguishable and can be felt.
Slickensided	Surface has a smooth, glassy finish with visual evidence of striation.

GSI DISCONTINUITY TERMS

ROCK MASS STRUCTURE

Intact or Massive	Intact rock with few widely spaced discontinuities
Blocky	Well interlocked undisturbed rock mass, formed by 3 intersecting discontinuity sets
Very Blocky	Interlocked, partially disturbed mass formed by 4 or more joint sets
Blocky/ Disturbed/Seamy	Angular blocks formed by many intersecting discontinuity sets, bedding planes
Disintegrated	Poorly interlocked, heavily broken rock mass
Laminated/ Sheared	Lack of blockiness due to close spacing of weak shear planes

SURFACE CONDITION

Very Good	Very rough, fresh unweathered surfaces
Good	Rough, slightly weathered, iron stained surfaces
Fair	Smooth, moderately weathered and altered surfaces
Poor	Slickensided, high weathered surface with compact coatings
Very Poor	Slickensided, highly weathered surface with soft clay coatings

REFERENCES: OHIO DEPARTMENT OF TRANSPORTATION (ODOT), SPECIFICATIONS FOR GEOTECHNICAL EXPLORATIONS (SGE).

S&ME JOB: 24170232B

PROJECT: BEL-70 TRUCK PARKING	DRILLING FIRM / OPERATOR: OTB / C. SVITAK	DRILL RIG: OTB MOBILE B-57	STATION / OFFSET: 100+33, 12' LT
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: S&ME / M. ANSARI	HAMMER: AUTOMATIC HAMMER	ALIGNMENT: EB TRUCK RAMP BL
PID: 122878 BR ID: N/A	DRILLING METHOD: 3-1/4" HSA	CALIBRATION DATE: 12/30/24	ELEVATION: 1205.4 (MSL) EOB: 2.9 ft.
START: 3/11/26 END: 3/11/26	SAMPLING METHOD: SPT	ENERGY RATIO (%): 90*	COORD: 40.068665 N, 80.888214 W

EXPLORATION ID **B-001-0-26**

PAGE 1 OF 1

MATERIAL DESCRIPTION AND NOTES	ELEV. 1205.4	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
ASPHALT - 23 INCHES	1203.5	1																	
SHALE INTERBEDDED WITH SANDSTONE, gray and brown, highly weathered, very weak to weak.	1202.5	TR 2	7	-	75	SS-1A	-	-	-	-	-	-	-	-	-	-	Visual (V)	-	
			50/2"	-	50	SS-1B	-	-	-	-	-	-	-	-	-	14	Rock (V)	940	
		EOB	50/2"	-	50	SS-2	-	-	-	-	-	-	-	-	-	7	Rock (V)	-	
			50/1"	-	0	-	-	-	-	-	-	-	-	-	-	-		-	

NOTES:
- No water encountered.
- Borehole remained open after augers pulled.
- Auger refusal at 2.8 feet.

NOTES: SEE ABOVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: ASPHALT PATCH; SOIL CUTTINGS MIXED WITH BENTONITE

S&ME ODOT SULFATE (8.5X11) - SGE 01/2019 - OH DOT.GDT - 6/26/26 17:24 - R:\SERVICE LINES\CS-2557\COLUMBUS\GINTW\PROJECTS\24170232B_SITE 8_BEL-70.GPJ

PLATE 5

S&ME JOB: 24170232B

PROJECT: BEL-70 TRUCK PARKING	DRILLING FIRM / OPERATOR: OTB / C. SVITAK	DRILL RIG: OTB MOBILE B-57	STATION / OFFSET: 104+19, 4' LT
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: S&ME / M. ANSARI	HAMMER: AUTOMATIC HAMMER	ALIGNMENT: EB TRUCK RAMP BL
PID: 122878 BR ID: N/A	DRILLING METHOD: 3-1/4" HSA	CALIBRATION DATE: 12/30/24	ELEVATION: 1186.6 (MSL) EOB: 7.2 ft.
START: 3/11/26 END: 3/11/26	SAMPLING METHOD: SPT	ENERGY RATIO (%): 90*	COORD: 40.068911 N, 80.886872 W

EXPLORATION ID **B-002-0-26**

PAGE 1 OF 1

MATERIAL DESCRIPTION AND NOTES	ELEV. 1186.6	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
ASPHALT - 8 INCHES	1185.9																		
GRANULAR BASE - 15 INCHES	1184.7																		
Fill: Stiff gray **SILT AND CLAY**, some fine to coarse sand, some fine to coarse gravel, moist.	1183.6	1	4 2 5	11	61	SS-1A	-	-	-	-	-	-	-	-	-	-	A-1-a (V)	-	
		2				SS-1B	-	28	17	11	23	21	35	20	15	20	A-6a (3)	980	
Possible Fill: Medium dense gray **GRAVEL**, some fine to coarse sand, trace silt, trace clay, moist.	1181.7	3	10 9 4	20	100	SS-2	-	62	19	9	8	2	NP	NP	NP	17	A-1-a (0)	-	
		4				SS-3A	-	-	-	-	-	-	-	-	-	14	A-1-a (V)	-	
SHALE, gray, highly weathered, very weak.		TR 5	3 6 15	32	67	SS-3B	-	-	-	-	-	-	-	-	-	11	Rock (V)	-	
		6																	
	1179.4	EOB 7	15 38 50/2"	-	90	SS-4	-	-	-	-	-	-	-	-	-	9	Rock (V)	-	

NOTES:
- No water noted during drilling.
- After augers pulled, water accumulated to 3.0'.
- At Sta. 104+19, 7' LT of EB Truck Ramp BL, encountered refusal on concrete pavement beneath 9" of asphalt.

NOTES: SEE ABOVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: ASPHALT PATCH; SOIL CUTTINGS MIXED WITH BENTONITE

PLATE 6

S&ME ODOT SULFATE (8.5X11) - SGE 01/2019 - OH DOT.GDT - 6/26/26 17:24 - R:\SERVICE LINES\CS-2557\COLUMBUS\GINTW\PROJECTS\24170232B_SITE 8_BEL-70.GPJ

S&ME JOB: 24170232B

PROJECT: BEL-70 TRUCK PARKING	DRILLING FIRM / OPERATOR: OTB / C. SVITAK	DRILL RIG: OTB MOBILE B-57	STATION / OFFSET: 108+19, 6' LT
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: S&ME / M. ANSARI	HAMMER: AUTOMATIC HAMMER	ALIGNMENT: EB TRUCK RAMP BL
PID: 122878 BR ID: N/A	DRILLING METHOD: 3-1/4" HSA	CALIBRATION DATE: 12/30/24	ELEVATION: 1165.9 (MSL) EOB: 6.9 ft.
START: 3/11/26 END: 3/11/26	SAMPLING METHOD: SPT	ENERGY RATIO (%): 90*	COORD: 40.069177 N, 80.885484 W

EXPLORATION ID **B-003-0-26**

PAGE 1 OF 1

MATERIAL DESCRIPTION AND NOTES	ELEV. 1165.9	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
ASPHALT - 8 INCHES	1165.2																		
GRANULAR BASE - 15 INCHES	1164.0																		
Fill: Medium dense brown and gray **GRAVEL WITH SAND, SILT AND CLAY**, moist.	1163.5		4 7 12	29	94	SS-1A	-	-	-	-	-	-	-	-	-	-	A-1-a (V)	-	
						SS-1B	-	41	23	13	14	9	31	18	13	12	A-2-6 (0)	1120	
						SS-1C	-	-	-	-	-	-	-	-	-	13	A-1-a (V)	-	
Fill: Dense gray **GRAVEL**, some fine to coarse sand, trace silt, trace clay, few slag fragments, moist.	1161.4		10 12 12	36	100	SS-2	-	63	20	10	6	1	NP	NP	NP	11	A-1-a (0)	-	
SHALE, gray, highly weathered, very weak, carbonaceous.		TR	1 9 16	38	100	SS-3	-	-	-	-	-	-	-	-	-	10	Rock (V)	-	
	1159.0	EOB	22 50/5"	-	55	SS-4	-	-	-	-	-	-	-	-	-	6	Rock (V)	-	

NOTES:
- No water encountered.
- Borehole remained open after augers pulled.

NOTES: SEE ABOVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: ASPHALT PATCH; SOIL CUTTINGS MIXED WITH BENTONITE

PLATE 7

S&ME ODOT SULFATE (8.5X11) - SGE 01/2019 - OH DOT.GDT - 6/26/26 17:24 - R:\SERVICE LINES\CS-2557\COLUMBUS\GINT\WPROJECTS\24170232B_SITE 8_BEL-70.GPJ

S&ME JOB: 24170232B

PROJECT: BEL-70 TRUCK PARKING
TYPE: ROADWAY
PID: 122878 BR ID: N/A
START: 3/10/26 END: 3/10/26

DRILLING FIRM / OPERATOR: OTB / C. SVITAK
SAMPLING FIRM / LOGGER: S&ME / M. ANSARI
DRILLING METHOD: 3-1/4" HSA
SAMPLING METHOD: SPT

DRILL RIG: OTB MOBILE B-57
HAMMER: AUTOMATIC HAMMER
CALIBRATION DATE: 12/30/24
ENERGY RATIO (%): 90*

STATION / OFFSET: 112+17, 11' LT
ALIGNMENT: EB TRUCK RAMP BL
ELEVATION: 1143.4 (MSL) EOB: 5.8 ft.
COORD: 40.069358 N, 80.884081 W

EXPLORATION ID
B-004-0-26

PAGE 1 OF 1

MATERIAL DESCRIPTION AND NOTES	ELEV. 1143.4	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
CONCRETE - 11-1/4 INCHES	1142.5																		
Fill: Very loose gray **GRAVEL AND ROCK FRAGMENTS**, dry.	1141.6		3			SS-1A	-	-	-	-	-	-	-	-	-	3	A-1-a (V)	-	
Fill: Hard brown mottled with gray **SILT AND CLAY**, some fine to coarse sand, little fine gravel (shale fragments), damp.	1140.4		16 36	78	67	SS-1B	4.5+	12	15	14	32	27	32	20	12	12	A-6a (6)	1173	
Fill: Hard brown mottled with gray **SANDY SILT**, some clay, trace fine gravel, becoming similar to severely weathered shale, damp.	1139.4	TR	8 30 24	81	67	SS-2	-	1	10	16	46	27	30	20	10	9	A-4a (8)	-	
SHALE, dark gray becoming gray and brown, highly weathered, very weak.	1137.6	EOB	50/5"	-	60	SS-3	-	-	-	-	-	-	-	-	-	4	Rock (V)	-	
			50/3"	-	100	SS-4	-	-	-	-	-	-	-	-	-	1	Rock (V)	-	

NOTES:
- No water encountered.
- Borehole remained open after augers pulled.
- Encountered auger refusal at 5.8 feet.

NOTES: SEE ABOVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: CONCRETE PATCH; SOIL CUTTINGS MIXED WITH BENTONITE

S&ME ODOT SULFATE (8.5X11) - SGE 01/2019 - OH DOT.GDT - 6/26/26 17:24 - R:\SERVICE LINES\CS-2557\COLUMBUS\GINTW\PROJECTS\24170232B_SITE 8_BEL-70.GPJ

PLATE 8

S&ME JOB: 24170232B

PROJECT: BEL-70 TRUCK PARKING	DRILLING FIRM / OPERATOR: OTB / C. SVITAK	DRILL RIG: OTB MOBILE B-57	STATION / OFFSET: 116+20, 15' LT
TYPE: ROADWAY / LIGHT TOWER	SAMPLING FIRM / LOGGER: S&ME / M. ANSARI	HAMMER: AUTOMATIC HAMMER	ALIGNMENT: EB TRUCK RAMP BL
PID: 122878 BR ID: N/A	DRILLING METHOD: 3-1/4" HSA	CALIBRATION DATE: 12/30/24	ELEVATION: 1128.5 (MSL) EOB: 7.0 ft.
START: 3/10/26 END: 3/10/26	SAMPLING METHOD: SPT	ENERGY RATIO (%): 90*	COORD: 40.069616 N, 80.882688 W

EXPLORATION ID **B-005-0-26**

PAGE 1 OF 1

MATERIAL DESCRIPTION AND NOTES	ELEV. 1128.5	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
ROOTMAT - 9 INCHES	1127.7																		
Fill: Stiff brown **SILTY CLAY**, some fine to coarse sand, many iron oxide stains, slightly organic, damp.	1126.0	1	1 4 6	15	72	SS-1	1.7-2.0	0	4	24	35	37	40	21	19	19	A-6b (11)	140	
Fill: Stiff brown **CLAY**, some silt, little fine to coarse sand, trace fine gravel, damp to moist.	1123.0	2 3 4	3 4 6	15	100	SS-2	1.5-1.7	7	8	10	34	41	46	23	23	22	A-7-6 (14)	-	
		5	17 14 7	32	100	SS-3	1.2-1.7	-	-	-	-	-	-	-	-	22	A-7-6 (V)	-	
Very dense dark brown **GRAVEL WITH SAND**, little silt, trace clay, few sandstone fragments, cobbles, damp.	1122.3	TR 6	36 47 15	93	61	SS-4A	-	-	-	-	-	-	-	-	-	9	A-1-b (V)	-	
SANDSTONE, gray, highly weathered, very weak.	1121.5	EOB 7				SS-4B	-	-	-	-	-	-	-	-	-	-	Rock (V)	-	

NOTES:
- No water encountered.
- Upon encountering auger refusal at 7.0', the drilling string was no longer plumb and the rock core barrel could not be lowered through the HSA's to the bottom of the boring and had to be abandoned.
- A first offset was attempted 4.0' right of the original borehole but encountered auger refusal at 4.7' and was abandoned due to presumed refusal on cobbles/boulder.
- A second offset was attempted 5.5' right of the original borehole. Auger refusal was encountered at 6.2'. Rock coring was then commenced. See log of Boring B-005-1-26.

NOTES: SEE ABOVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: SOIL CUTTINGS MIXED WITH BENTONITE

S&ME ODOT SULFATE (8.5X11) - SGE 01/2019 - OH DOT.GDT - 6/26/26 17:24 - R:\SERVICE LINES\CS-2557\COLUMBUS\GINTW\PROJECTS\24170232B_SITE 8_BEL-70.GPJ

PLATE 9

S&ME JOB: 24170232B

PROJECT: BEL-70 TRUCK PARKING	DRILLING FIRM / OPERATOR: S&ME / C. SVITAK	DRILL RIG: OTB MOBILE B-57	STATION / OFFSET: 116+20, 10' LT
TYPE: ROADWAY / LIGHT TOWER	SAMPLING FIRM / LOGGER: S&ME / M. ANSARI	HAMMER: AUTOMATIC HAMMER	ALIGNMENT: EB TRUCK RAMP BL
PID: 122878 BR ID: N/A	DRILLING METHOD: 3-1/4" HSA / NQ	CALIBRATION DATE: 12/30/24	ELEVATION: 1129.2 (MSL) EOB: 11.2 ft.
START: 3/10/26 END: 3/10/26	SAMPLING METHOD: SPT / NQ	ENERGY RATIO (%): 90*	COORD: 40.069602 N, 80.882681 W

EXPLORATION ID **B-005-1-26**

PAGE 1 OF 1

MATERIAL DESCRIPTION AND NOTES	ELEV. 1129.2	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
- SEE BORING B-005-0-26 -		1 2 3 4 5																	
	1123.2	TR																	
SANDSTONE, gray, slightly to moderately weathered, moderately strong, laminated to thin bedded, iron oxide staining near 7.8', highly to moderately fractured, slightly rough, narrow, blocky, good surface condition, RQD = 83%, REC = 100%. - 6.4' to 6.8'; Qu = 6,500 psi; γ_d = 151.4 pcf		6	50/2"	-	50	SS-5	-	-	-	-	-	-	-	-	-	-	Rock (V)	-	
	1121.0	7 8 9	33		87	NQ-6											CORE		
INTERBEDDED SANDSTONE (63%) AND SHALE (37%), blocky/disturbed/seamy, poor to fair surface, RQD = 0%, REC = 77%. SANDSTONE, brown, moderately weathered, slightly strong, fractured, slightly rough surfaces, narrow to open. SHALE, brown, highly weathered, very weak to weak, highly fractured, slightly rough surfaces, open.	1118.0	EOB 10 11																	

NOTES:
- No water encountered prior to rock coring.
- Encountered auger refusal at 6.2'.

NOTES: SEE ABOVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: SOIL CUTTINGS MIXED WITH BENTONITE

S&ME ODOT SULFATE (8.5X11) - SGE 01/2019 - OH DOT.GDT - 6/26/26 17:24 - R:\SERVICE LINES\CS-2557\COLUMBUS\GINTW\PROJECTS\24170232B_SITE 8_BEL-70.GPJ

PLATE 10

S&ME JOB: 24170232B

PROJECT: BEL-70 TRUCK PARKING	DRILLING FIRM / OPERATOR: OTB / C. SVITAK	DRILL RIG: OTB MOBILE B-57	STATION / OFFSET: 116+55, 159' RT
TYPE: ROADWAY / LIGHT TOWER	SAMPLING FIRM / LOGGER: S&ME / M. ANSARI	HAMMER: AUTOMATIC HAMMER	ALIGNMENT: EB TRUCK RAMP BL
PID: 122878 BR ID: N/A	DRILLING METHOD: 3-1/4" HSA	CALIBRATION DATE: 12/30/24	ELEVATION: 1127.9 (MSL) EOB: 2.5 ft.
START: 3/10/26 END: 3/10/26	SAMPLING METHOD: SPT	ENERGY RATIO (%): 90*	COORD: 40.069178 N, 80.882410 W

EXPLORATION ID **B-006-0-26**

PAGE 1 OF 1

MATERIAL DESCRIPTION AND NOTES	ELEV. 1127.9	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
CONCRETE - 11 INCHES	1127.0																		
GRANULAR BASE - 14 INCHES	1125.8	1 2	3 50/3"	-	100	SS-1A	-	-	-	-	-	-	-	-	-	9	A-1-a (V)	-	
Fill: Hard brown and gray **SILT AND CLAY**, some fine to coarse sand, trace fine gravel, damp.	1125.6	TR				SS-1B	-	-	-	-	-	-	-	-	-	11	A-6a (V)	-	
SANDSTONE, gray, highly weathered, very weak to weak.	1125.4	EOB																	

NOTES:
- No water encountered.
- Auger refusal at 2.5 feet.
- Borehole remained open after augers pulled.

NOTES: SEE ABOVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: CONCRETE PATCH; SOIL CUTTINGS MIXED WITH BENTONITE

S&ME ODOT SULFATE (8.5X11) - SGE 01/2019 - OH DOT.GDT - 6/26/26 17:24 - R:\SERVICE LINES\CS-2557\COLUMBUS\GINTW\PROJECTS\24170232B_SITE 8_BEL-70.GPJ

PLATE 11

S&ME JOB: 24170232B

PROJECT: BEL-70 TRUCK PARKING	DRILLING FIRM / OPERATOR: OTB / C. SVITAK	DRILL RIG: OTB MOBILE B-57	STATION / OFFSET: 118+61, 157' RT
TYPE: ROADWAY / LIGHT TOWER	SAMPLING FIRM / LOGGER: S&ME / M. ANSARI	HAMMER: AUTOMATIC HAMMER	ALIGNMENT: EB TRUCK RAMP BL
PID: 122878 BR ID: N/A	DRILLING METHOD: 3-1/4" HSA	CALIBRATION DATE: 12/30/24	ELEVATION: 1127.5 (MSL) EOB: 12.6 ft.
START: 3/10/26 END: 3/10/26	SAMPLING METHOD: SPT	ENERGY RATIO (%): 90*	COORD: 40.069325 N, 80.881699 W

EXPLORATION ID **B-007-0-26**

PAGE 1 OF 1

MATERIAL DESCRIPTION AND NOTES	ELEV. 1127.5	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GR	CS	FS	SI	CL	LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
CONCRETE - 10-1/4 INCHES	1126.6																		
GRANULAR BASE - 5 INCHES	1126.2		4			SS-1A	-	-	-	-	-	-	-	-	-	-	A-1-a (V)	-	
Fill: Very stiff to hard brown **SILT AND CLAY**, "and" fine to coarse gravel, little fine to coarse sand, few sandstone fragments, damp.		1	10 20	45	72	SS-1B	3.7-4.5+	-	-	-	-	-	-	-	-	10	A-6a (V)	-	
		2	6																
		3	7 6	20	100	SS-2	4.5+	42	7	8	29	14	28	17	11	8	A-6a (2)	180	
		4	4																
		5	7 9	24	100	SS-3	4.5+	40	6	9	28	17	30	17	13	9	A-6a (3)	-	
		6	4																
		7	13 8	32	28	SS-4	4.5+	-	-	-	-	-	-	-	-	10	A-6a (V)	-	
	1119.5	8																	
Possible Fill: Very stiff brown and gray **SILT AND CLAY**, some to "and" fine to coarse gravel, little fine to coarse sand, few sandstone fragments, moist.			6																
W 1117.5		9	5 5	15	72	SS-5	-	-	-	-	-	-	-	-	-	15	A-6a (V)	-	
		10																	
		11	4																
	1115.3	12	5 50/2"	-	71	SS-6	2.2-3.0	-	-	-	-	-	-	-	-	13	A-6a (V)	-	
SANDSTONE, gray, highly weathered, very weak to weak.	1114.9	TR EOB																	

NOTES:
- Encountered slight seepage at 10.0'.
- Auger refusal at 12.6 feet.
- Dry inside augers at the completion of drilling.
- Borehole remained open after augers pulled.

NOTES: SEE ABOVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: CONCRETE PATCH; SOIL CUTTINGS MIXED WITH BENTONITE

S&ME ODOT SULFATE (8.5X11) - SGE 01/2019 - OH DOT.GDT - 6/26/26 17:24 - R:\SERVICE LINES\CS-2557\COLUMBUS\GINTW\PROJECTS\24170232B_SITE 8_BEL-70.GPJ

PLATE 12

S&ME JOB: 24170232B

PROJECT: BEL-70 TRUCK PARKING	DRILLING FIRM / OPERATOR: OTB / C. SVITAK	DRILL RIG: OTB MOBILE B-57	STATION / OFFSET: 118+72, 7' RT
TYPE: ROADWAY / LIGHT TOWER	SAMPLING FIRM / LOGGER: S&ME / M. ANSARI	HAMMER: AUTOMATIC HAMMER	ALIGNMENT: EB TRUCK RAMP BL
PID: 122878 BR ID: N/A	DRILLING METHOD: 3-1/4" HSA	CALIBRATION DATE: 12/30/24	ELEVATION: 1129.7 (MSL) EOB: 24.3 ft.
START: 3/10/26 END: 3/10/26	SAMPLING METHOD: SPT	ENERGY RATIO (%): 90*	COORD: 40.069733 N, 80.881797 W

EXPLORATION ID **B-008-0-26**

PAGE 1 OF 1

MATERIAL DESCRIPTION AND NOTES	ELEV. 1129.7	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
CONCRETE - 10-1/2 INCHES	1128.8																		
Fill: Medium dense brown **GRAVEL WITH SAND**, little silt, trace clay, damp.	1126.2	1 2 3	6 6 6	18	22	SS-1	-	-	-	-	-	-	-	-	-	9	A-1-b (V)	120	
Fill: Medium dense brown and gray **GRAVEL WITH SAND AND SILT**, trace clay, damp.	1124.2	4 5 6	5 4 6	15	100	SS-2	-	52	6	8	24	10	28	18	10	8	A-2-4 (0)	-	
Fill: Stiff (est.) brown **SILT AND CLAY**, "and" fine to coarse gravel, little fine to coarse sand, damp.	1122.7	6 7	4 5 6	17	56	SS-3	-	48	5	7	28	12	29	18	11	6	A-6a (1)	-	
Fill: Very stiff to hard brown **SILT AND CLAY**, some fine to coarse gravel, little fine to coarse sand, few stiff zones, few iron oxide stains, damp.	1119.2	8 9 10	2 4 7	17	100	SS-4	1.7-4.5+	-	-	-	-	-	-	-	-	14	A-6a (V)	-	
			4 5 6	17	100	SS-5	4.5+	-	-	-	-	-	-	-	-	11	A-6a (V)	-	
Fill: Hard brown becoming gray **SILT AND CLAY**, some fine to coarse gravel, little fine to coarse sand, damp.	1111.7	11 12 13 14 15 16 17	3 10 13	35	100	SS-6	4.5+	35	11	9	31	14	30	19	11	10	A-6a (2)	-	
			6 6 4	15	100	SS-7	-	-	-	-	-	-	-	-	-	7	A-6a (V)	-	
			5 7 7	21	100	SS-8	4.5+	-	-	-	-	-	-	-	-	10	A-6a (V)	-	
Fill: Very stiff brown and gray **SILT AND CLAY**, some fine to coarse sand, little fine to coarse gravel, damp.	1106.7	18 19 20 21 22	3 4 3	11	44	SS-9	2.3-2.7	19	15	12	36	18	29	18	11	13	A-6a (4)	-	
			3 6 5	17	100	SS-10	2.3-3.5	-	-	-	-	-	-	-	-	10	A-6a (V)	-	
Fill: Hard brown **SILT AND CLAY**, some fine to coarse sand, few iron oxide stains, moist.	1105.4	23 24 EOB	6 50/3"	-	56	SS-11	4.0-4.5	0	7	14	41	38	38	23	15	20	A-6a (10)	-	

NOTES:
- No water encountered.
- Borehole remained open after augers pulled.

NOTES: SEE ABOVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: CONCRETE PATCH; SOIL CUTTINGS MIXED WITH BENTONITE

S&ME ODOT SULFATE (8.5X11) - SGE 01/2019 - OH DOT.GDT - 6/26/26 17:24 - R:\SERVICE LINES\CS-2557\COLUMBUS\GINT\WPROJECTS\24170232B_SITE 8_BEL-70.GPJ

PLATE 13

S&ME JOB: 24170232B

PROJECT: BEL-70 TRUCK PARKING	DRILLING FIRM / OPERATOR: OTB / C. SVITAK	DRILL RIG: OTB MOBILE B-57	STATION / OFFSET: 122+71, 4' LT
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: S&ME / M. ANSARI	HAMMER: AUTOMATIC HAMMER	ALIGNMENT: EB TRUCK RAMP BL
PID: 122878 BR ID: N/A	DRILLING METHOD: 3-1/4" HSA	CALIBRATION DATE: 12/30/24	ELEVATION: 1125.0 (MSL) EOB: 9.5 ft.
START: 3/11/26 END: 3/11/26	SAMPLING METHOD: SPT	ENERGY RATIO (%): 90*	COORD: 40.070039 N, 80.880427 W

EXPLORATION ID **B-009-0-26**

PAGE 1 OF 1

MATERIAL DESCRIPTION AND NOTES	ELEV. 1125.0	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
CONCRETE - 9-1/2 INCHES	1124.2																		
GRANULAR BASE - 12 INCHES	1123.2																		
Fill: Very stiff brown and gray **SILT AND CLAY**, some fine to coarse sand, trace fine to coarse gravel, few cobbles, damp.	1122.0		4 4 10	21	56	SS-1A SS-1B	- 3.5-4.5+	- 10	- 11	- 12	- 39	- 28	- 34	- 19	- 15	- 16	A-1-a (V) A-6a (8)	- 220	
Fill: Light gray cobbles and boulders.	1120.4		40 50/2"	-	50	SS-2	-	-	-	-	-	-	-	-	-	2	Visual (V)	-	
Fill: Stiff to very stiff brown **SILTY CLAY**, some fine to coarse sand, little fine gravel, damp.	1118.5		2 4 5	14	100	SS-3	1.5-2.5	13	12	12	34	29	37	18	19	15	A-6b (9)	-	
Fill: Very stiff to hard gray **SILT AND CLAY**, some fine to coarse sand, trace fine gravel, damp.	1115.5		3 4 4	12	100	SS-4	3.2-3.7	-	-	-	-	-	-	-	-	10	A-6a (V)	-	
		EOB	3 4 7	17	28	SS-5	4.5	-	-	-	-	-	-	-	-	9	A-6a (V)	-	

NOTES:
- No water encountered.
- Borehole remained open after augers pulled.

NOTES: SEE ABOVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: CONCRETE PATCH; SOIL CUTTINGS MIXED WITH BENTONITE

S&ME ODOT SULFATE (8.5X11) - SGE 01/2019 - OH DOT.GDT - 6/26/26 17:24 - R:\SERVICE LINES\CS-2557\COLUMBUS\GINTW\PROJECTS\24170232B_SITE 8_BEL-70.GPJ

PLATE 14

S&ME JOB: 24170232B

PROJECT: BEL-70 TRUCK PARKING	DRILLING FIRM / OPERATOR: OTB / C. SVITAK	DRILL RIG: OTB MOBILE B-57	STATION / OFFSET: 126+76, 11' LT
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: S&ME / M. ANSARI	HAMMER: AUTOMATIC HAMMER	ALIGNMENT: EB TRUCK RAMP BL
PID: 122878 BR ID: N/A	DRILLING METHOD: 3-1/4" HSA	CALIBRATION DATE: 12/30/24	ELEVATION: 1123.6 (MSL) EOB: 6.4 ft.
START: 3/11/26 END: 3/11/26	SAMPLING METHOD: SPT	ENERGY RATIO (%): 90*	COORD: 40.070420 N, 80.879068 W

EXPLORATION ID **B-010-0-26**

PAGE 1 OF 1

MATERIAL DESCRIPTION AND NOTES	ELEV. 1123.6	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
ASPHALT - 11 INCHES	1122.7																		
GRANULAR BASE - 13 INCHES	1121.6																		
Fill: Hard brown and gray **SANDY SILT**, little fine to coarse gravel, little clay, damp.	1120.1		5 6 8	21	78	SS-1A	-	-	-	-	-	-	-	-	-	-	A-1-a (V)	-	
						SS-1B	4.5+	20	17	16	28	19	27	17	10	11	A-4a (2)	1100	
SHALE, gray, highly weathered, very weak.		TR	2 20 30	75	100	SS-2	-	-	-	-	-	-	-	-	-	6	Rock (V)	-	
			8 50/5"	-	55	SS-3	-	-	-	-	-	-	-	-	-	6	Rock (V)	-	
	1117.2	EOB	50/5"	-	80	SS-4	-	-	-	-	-	-	-	-	-	7	Rock (V)	-	

NOTES:
- No water encountered.
- Borehole remained open after augers pulled.

NOTES: SEE ABOVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: ASPHALT PATCH; SOIL CUTTINGS MIXED WITH BENTONITE

S&ME ODOT SULFATE (8.5X11) - SGE 01/2019 - OH DOT.GDT - 6/26/26 17:24 - R:\SERVICE LINES\CS-2557\COLUMBUS\GINT\WPROJECTS\24170232B_SITE 8_BEL-70.GPJ

PLATE 15

S&ME JOB: 24170232B

PROJECT: BEL-70 TRUCK PARKING	DRILLING FIRM / OPERATOR: OTB / C. SVITAK	DRILL RIG: OTB MOBILE B-57	STATION / OFFSET: 1030+03, 58' RT
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: S&ME / M. ANSARI	HAMMER: AUTOMATIC HAMMER	ALIGNMENT: IR 70 CL R/W
PID: 122878 BR ID: N/A	DRILLING METHOD: 3-1/4" HSA	CALIBRATION DATE: 12/30/24	ELEVATION: 1127.3 (MSL) EOB: 6.3 ft.
START: 3/11/26 END: 3/11/26	SAMPLING METHOD: SPT	ENERGY RATIO (%): 90*	COORD: 40.070707 N, 80.877728 W

EXPLORATION ID **B-011-0-26**

PAGE 1 OF 1

MATERIAL DESCRIPTION AND NOTES	ELEV. 1127.3	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
ASPHALT - 11 INCHES	1126.4																		
GRANULAR BASE - 11 INCHES	1125.5																		
Fill: Stiff (est.) gray and brown **SILT AND CLAY**, some fine to coarse sand, some fine to coarse gravel, moist.	1124.3		3 3 5	12	94	SS-1A	-	-	-	-	-	-	-	-	-	-	A-1-a (V)	-	
						SS-1B	-	23	16	12	29	20	30	17	13	14	A-6a (4)	1160	
SHALE, gray, highly weathered, very weak.		TR	19 50/3"	-	67	SS-2	-	-	-	-	-	-	-	-	-	3	Rock (V)	-	
			50/3"	-	67	SS-3	-	-	-	-	-	-	-	-	-	2	Rock (V)	-	
	1121.0	EOB	50/4"	-	75	SS-4	-	-	-	-	-	-	-	-	-	1	Rock (V)	-	

NOTES:
- No water encountered.
- Borehole remained open after augers pulled.

NOTES: SEE ABOVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: ASPHALT PATCH; SOIL CUTTINGS MIXED WITH BENTONITE

S&ME ODOT SULFATE (8.5X11) - SGE 01/2019 - OH DOT.GDT - 6/26/26 17:24 - R:\SERVICE LINES\CS-2557\COLUMBUS\GINTW\PROJECTS\24170232B_SITE 8_BEL-70.GPJ

PLATE 16

S&ME JOB: 24170232B

PROJECT: BEL-70 TRUCK PARKING	DRILLING FIRM / OPERATOR: OTB / C. SVITAK	DRILL RIG: OTB MOBILE B-57	STATION / OFFSET: 1034+10, 48' RT
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: S&ME / M. ANSARI	HAMMER: AUTOMATIC HAMMER	ALIGNMENT: IR 70 CL R/W
PID: 122878 BR ID: N/A	DRILLING METHOD: 3-1/4" HSA	CALIBRATION DATE: 12/30/24	ELEVATION: 1130.8 (MSL) EOB: 6.2 ft.
START: 3/11/26 END: 3/11/26	SAMPLING METHOD: SPT	ENERGY RATIO (%): 90*	COORD: 40.071015 N, 80.876329 W

EXPLORATION ID **B-012-0-26**

PAGE 1 OF 1

MATERIAL DESCRIPTION AND NOTES	ELEV. 1130.8	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
ASPHALT - 9 INCHES	1130.0																		
GRANULAR BASE - 13 INCHES	1129.0																		
Fill: Medium dense brown **GRAVEL WITH SAND**, little silt, trace clay, damp.			7 5 6	17	78	SS-1A	-	-	-	-	-	-	-	-	-	-	A-1-a (V)	-	
						SS-1B	-	34	27	20	13	6	NP	NP	NP	10	A-1-b (0)	800	
	1126.3		7 12 8	30	33	SS-2	-	44	14	18	18	6	NP	NP	NP	8	A-1-b (0)	-	
SANDSTONE, gray, highly weathered, very weak to weak.		TR	50/1"	-	0			-	-	-	-	-	-	-	-	-		-	
	1124.6	EOB	50/2"	-	50	SS-3	-	-	-	-	-	-	-	-	-	2	Rock (V)	-	

NOTES:
- No water encountered.
- Borehole remained open after augers pulled.

NOTES: SEE ABOVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: ASPHALT PATCH; SOIL CUTTINGS MIXED WITH BENTONITE

PLATE 17

S&ME ODOT SULFATE (8.5X11) - SGE 01/2019 - OH DOT.GDT - 6/26/26 17:24 - R:\SERVICE LINES\CS-2557\COLUMBUS\GINTW\PROJECTS\24170232B_SITE 8_BEL-70.GPJ

S&ME JOB: 24170232B

PROJECT: BEL-70 TRUCK PARKING	DRILLING FIRM / OPERATOR: OTB / C. SVITAK	DRILL RIG: OTB MOBILE B-57	STATION / OFFSET: 1038+08, 44' RT
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: S&ME / M. ANSARI	HAMMER: AUTOMATIC HAMMER	ALIGNMENT: IR 70 CL R/W
PID: 122878 BR ID: N/A	DRILLING METHOD: 3-1/4" HSA	CALIBRATION DATE: 12/30/24	ELEVATION: 1134.5 (MSL) EOB: 7.5 ft.
START: 3/11/26 END: 3/11/26	SAMPLING METHOD: SPT	ENERGY RATIO (%): 90*	COORD: 40.071301 N, 80.874957 W

EXPLORATION ID **B-013-0-26**

PAGE 1 OF 1

MATERIAL DESCRIPTION AND NOTES	ELEV. 1134.5	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GR	CS	FS	SI	CL	LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
ASPHALT - 11 INCHES	1133.6																		
GRANULAR BASE - 9 INCHES	1132.8																		
Fill: Very stiff to hard brown and gray **SILT AND CLAY**, some fine to coarse sand, little fine to coarse gravel, moist.	1131.5		4 3 5	12	100	SS-1A	-	-	-	-	-	-	-	-	-	-	A-1-a (V)	-	
						SS-1B	3.5-4.5+	20	12	10	33	25	29	18	11	13	A-6a (5)	1180	
Fill: Hard brown and gray **SANDY SILT**, some clay, trace fine gravel, damp.	1130.2	TR	6 8 14	33	100	SS-2A	4.5+	10	12	13	44	21	29	19	10	11	A-4a (6)	-	
						SS-2B	-	-	-	-	-	-	-	-	-	4	Rock (V)	-	
SHALE, gray, highly weathered, very weak, decomposed (similar to soi) from 6.0' to 7.5'.			17 35 50/3"	-	67	SS-3	-	-	-	-	-	-	-	-	-	4	Rock (V)	-	
	1127.0	EOB	12 5 5	15	100	SS-4	-	-	-	-	-	-	-	-	-	7	Rock (V)	-	

NOTES:
- No water encountered.
- Borehole remained open after augers pulled.

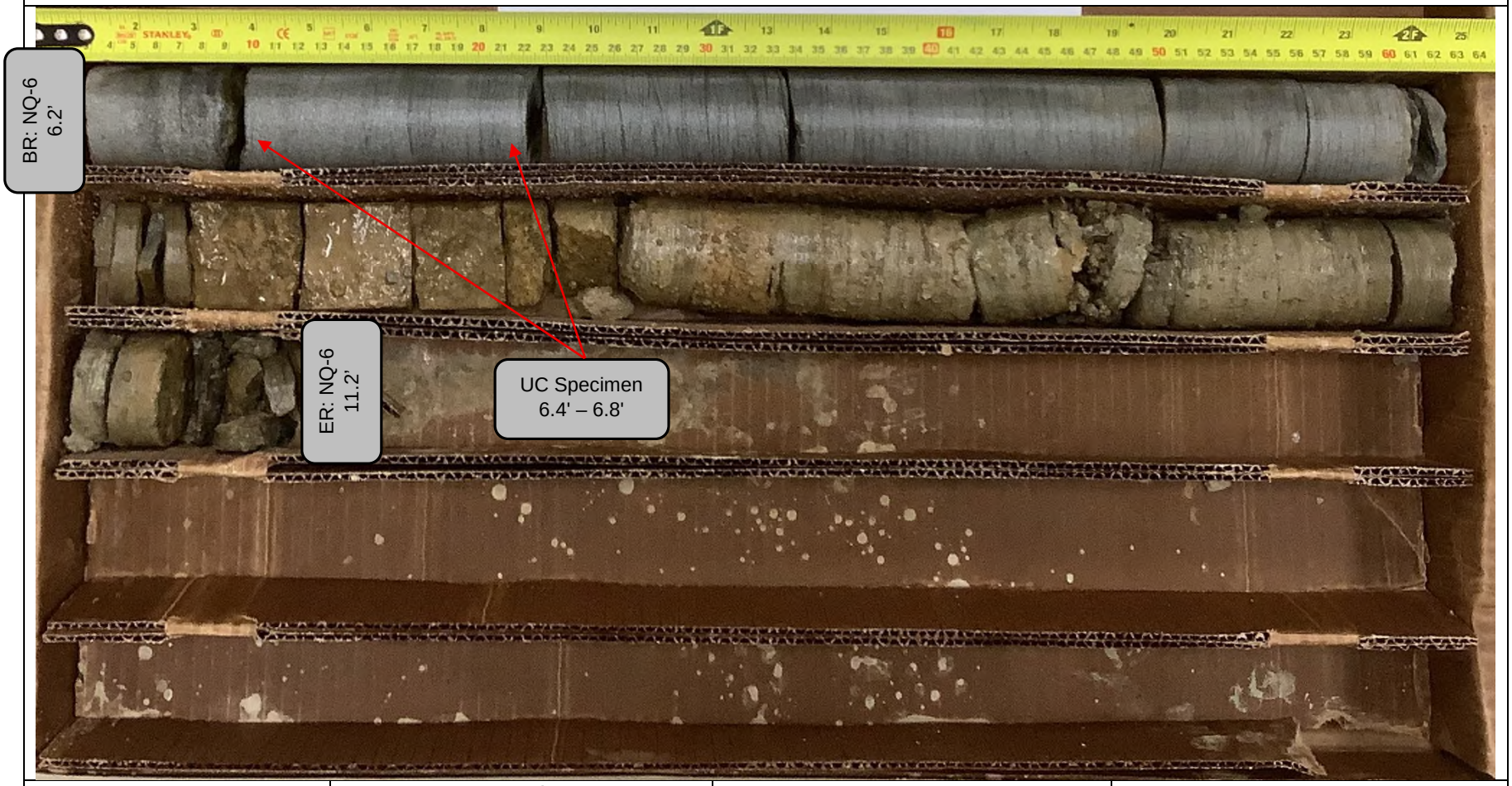
NOTES: SEE ABOVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: ASPHALT PATCH; SOIL CUTTINGS MIXED WITH BENTONITE

S&ME ODOT SULFATE (8.5X11) - SGE 01/2019 - OH DOT.GDT - 6/26/26 17:24 - R:\SERVICE LINES\CS-2557\COLUMBUS\GINT\WPROJECTS\24170232B_SITE 8_BEL-70.GPJ

PLATE 18

B-005-1-26



Run #:	Depth		Recovery		RQD	
NQ-6	6.2’	11.2’	52/60	87%	20/60	33%

TP 26 NE OHIO SITE 8 BEL-70 VACANT WEIGH STATION (PID 122878)

Form No. TR-D7012C-01
Revision No. : 1LexG
Revision Date: 03/04/26

UNIAXIAL COMPRESSIVE STRENGTH OF ROCK

ASTM D7012 Method C

Quality Assurance

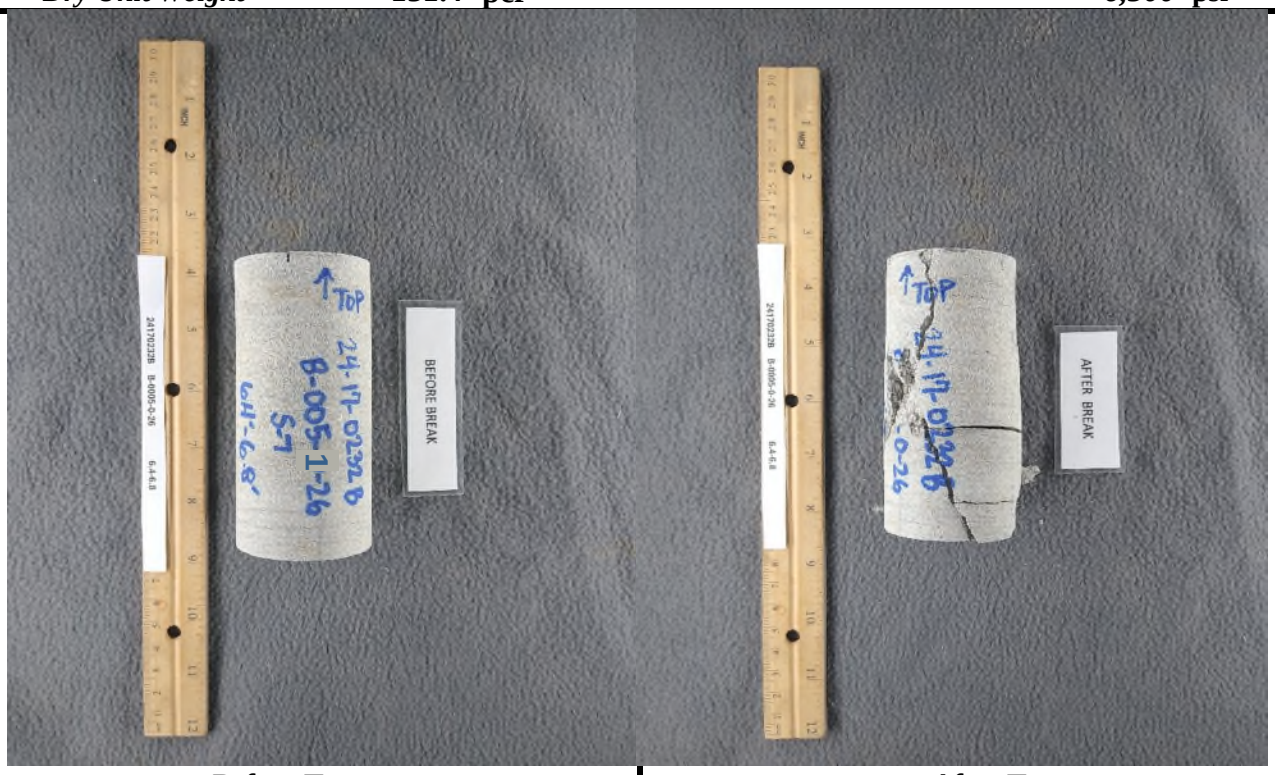
S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project No.:	24170232B	Report Date:	04/09/26
Project Name:	TP 26 Site 8 BEL-70	Test Date(s):	04/08/26
Client Name:	ms consultants, inc.		
Client Address:	2221 Schrock Road, Columbus, OH 43229	Received Date:	03/30/26
Location:	B-005-0-26	Depth, ft:	6.4 - 6.8
Sample Description:	sandstone		

Angle of load relative to lithology: Approximately perpendicular

Test Results

Moisture Content	***1.6*** **%**	***Compressive Strength***	***940*** **ksf**
Dry Unit Weight	***151.4*** **pcf**		***6,500*** **psi**



Before Test **After Test**

Strain rate: 0.015 in/min.

Notes / Deviations / References:

Jacob Folsom		Laboratory Services Manager	4/13/2026
Technical Responsibility	*Signature*	*Position*	*Date*

This report shall not be reproduced, except in full, without the written approval of S&ME, Inc.

Form No. TR-D7012C-01
Revision No. 1LexF
Devision Date: 01/12/26

UNIAXIAL COMPRESSIVE STRENGTH OF ROCK

ASTM D 7012 Method C

S&ME, Inc. - Lexington: 2020 Liberty Road, Suite 105, Lexington, KY 40505

Project Name: TP 26 Site 8 BEL-70 Location: B-005-0-26 Depth, feet: 6.4 - 6.8

Summary of Specimen Tolerances

Length/diameter target:	**MET**	Perpendicularity target:	**MET**
Side straightness target:	**MET**	Planeness target:	**MET**
Parallelism target:	**MET**		

*ASTM D4543-08 Standard Practice for Preparing Rock Core as Cylindrical Test Specimens and Verifying Conformance to Dimensional and Shape Tolerance, Section 1.2 - "Rock is a complex engineering material that can vary greatly as a function of lithology, stress history, weathering, moisture content, chemistry, and other natural geologic processes. As such, it is not always possible to obtain or prepare rock core specimens that satisfy the desirable tolerances given in this practice. Most commonly, this situation presents itself with weaker, more porous, and poorly cemented rock types and rock types containing significant or weak (or both) structural features. For these and other rock types which are difficult to prepare, all reasonable efforts shall be made to prepare a specimen in accordance with this practice and for the intended test procedure. However, when it has been determined by trial that this is not possible, the rock specimen will be prepared to the closest tolerance practicable and be considered the best effort and report it as such. If allowable or necessary for the intended test, capping the ends of the specimen as discussed in ASTM D7012 is permitted."

Length to Diameter Ratio

Length, inches: 4.56 Diameter, inches: 1.984

Ratio: 2.30 length to 1 diameter

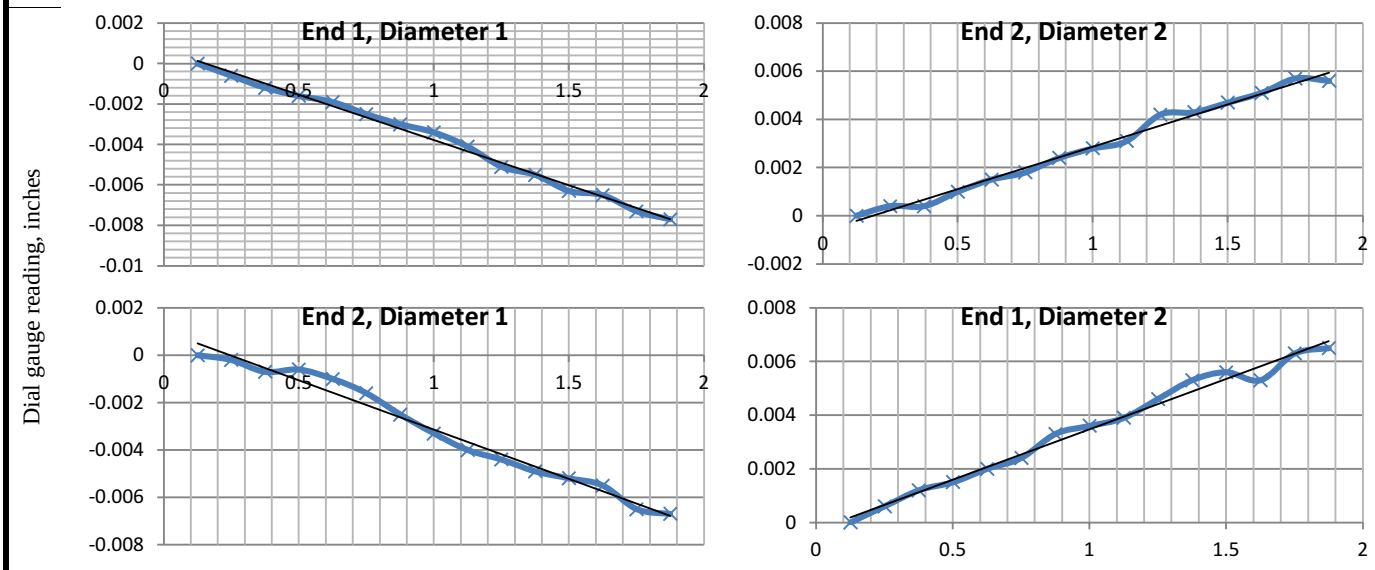
Target tolerance: L:D ratio between 2 to 1 and 2.5 to 1

Side Straightness

Maximum gap between side of core and reference plate, inches: < .02

Target tolerance: Maximum gap less than .02 inches

Planeness



Distance along diameter, inches

Maximum point-line deviation, inches: < .001

Target Tolerance: No individually measured point should deviate from the best fit line by more than .001 inches.

Parallelism

Slope difference, Diameter 1, degrees: 0.02

Slope difference, Diameter 2, degrees: 0.01

Target Tolerance: Difference between slopes on each end less than 0.25º

Perpendicularity

Maximum divergence from end surface perpendicularity to long axis: 0.20

Target Tolerance: Each diameter perpendicular to the long axis to within 0.25º

Note: specimens without straight sides cannot be machined to pass.

Test Information

Strain rate, in/min: 0.015

OR

Stress rate, lbs/sec:

Time to failure, min: 2.57

Temperature: room temperature

This report shall not be reproduced, except in full, without the written approval of S&ME, Inc.

Corporate Office
6350 Presidential Gateway
Columbus, Ohio 43231
Telephone: (614) 823-4949
Fax Number: (614) 823-4990

Cleveland Office
9885 Rockside Road
Cleveland, OH 44125
Telephone (216) 573-0955
Fax Number: (216) 573-0963

Cincinnati Office
4480 Lake Forest Drive
Cincinnati, Ohio 45242
Telephone (513) 769-6998
Fax Number: (513) 769-7055

PROJECT	TP-26 Site 8 BEL-70
JOB NO.	24-17-0232B
DATE TESTED	4/10/2026
TESTED BY	EM/KL

DETERMINING SULFATE CONTENT IN SOILS
COLORIMETRIC METHOD
ODOT SUPPLEMENT 1122

Boring	Sample/Depth	SAMPLE DATE	Geographic Coordinates		DEPTH	Soaking Time (hr)	Dilution Ratio	Replicate Sample Readings			Average Reading	Sulfate Content (ppm)
			Latitude	Longitude				1	2	3		
B-001-0-26	S-01X/1.9'-2.2'	3/11/26	40.068665	-80.888214	1.9'-2.2'	24	20	47	47	47	47.00	940
B-002-0-26	S-01X1.9'-3.0'	3/11/26	40.068911	-80.886872	1.9'-3.0'	24	20	49	49	49	49.00	980
B-003-0-26	S-01X/1.9'-2.4'	3/11/26	40.069177	-80.885484	1.9'-2.4'	24	20	56	56	56	56.00	1120
B-004-0-26	S-01X/1.8'-3.0'	3/10/26	40.069358	-80.884081	1.8'-3.0'	24	20	58	59	59	58.67	1173
B-005-0-26	S-01X/1.0'-2.5'	3/10/26	40.069616	-80.882688	1.0'-2.5'	24	20	7	7	7	7.00	140
B-007-0-26	S-01X/2.4'-4.0'	3/10/26	40.069325	-80.881699	2.4'-4.0'	24	20	9	9	9	9.00	180
B-008-0-26	S-01X/1.5'-3.0'	3/10/26	40.069733	-80.881797	1.5'-3.0'	24	20	6	6	6	6.00	120
B-009-0-26	S-01X/1.8'-3.0'	3/11/26	40.070039	-80.880427	1.8'-3.0'	24	20	11	11	11	11.00	220
B-010-0-26	S-01X/2.0'-3.0'	3/11/26	40.07042	-80.879068	2.0'-3.0'	24	20	55	55	55	55.00	1100
B-011-0-26	S-01X/1.8'-3.0'	3/11/26	40.070707	-80.877728	1.8'-3.0'	24	20	58	58	58	58.00	1160
B-012-0-26	S-01X/1.8'-3.0'	3/11/26	40.071015	-80.876329	1.8'-3.0'	24	20	40	40	40	40.00	800
B-013-0-26	S-01X/1.7'-3.0'	3/11/26	40.071301	-80.874957	1.7'-3.0'	24	20	59	59	59	59.00	1180



Date: 3/10/2026

Photographer: MSA

1	**Location / Orientation**	B-004-0-26
	Remarks	11¼" Concrete



Date: 3/10/2026

Photographer: MSA

2	**Location / Orientation**	B-006-0-26
	Remarks	11" Concrete



Date: 3/10/2026

Photographer: MSA

3	**Location / Orientation**	B-007-0-26
	Remarks	10¼" Concrete (with reinforcement)



Date: 3/10/2026

Photographer: MSA

4	**Location / Orientation**	B-008-0-26
	Remarks	10½" Concrete (with reinforcement)



Date: 3/10/2026

Photographer: MSA

5	**Location / Orientation**	B-009-0-26
	Remarks	9½" Concrete

Important Information About Your
Geotechnical Engineering Report

Variations in subsurface conditions can be a principal cause of construction delays, cost overruns and claims. The following information is provided to assist you in understanding and managing the risk of these variations.

Geotechnical Findings Are Professional Opinions

Geotechnical engineers cannot specify material properties as other design engineers do. Geotechnical material properties have a far broader range on a given site than any manufactured construction material, and some geotechnical material properties may change over time because of exposure to air and water, or human activity.

Site exploration identifies subsurface conditions at the time of exploration and only at the points where subsurface tests are performed or samples obtained. Geotechnical engineers review field and laboratory data and then apply their judgment to render professional opinions about site subsurface conditions. Their recommendations rely upon these professional opinions. Variations in the vertical and lateral extent of subsurface materials may be encountered during construction that significantly impact construction schedules, methods and material volumes. While higher levels of subsurface exploration can mitigate the risk of encountering unanticipated subsurface conditions, no level of subsurface exploration can eliminate this risk.

Scope of Geotechnical Services

Professional geotechnical engineering judgment is required to develop a geotechnical exploration scope to obtain information necessary to support design and construction. A number of unique project factors are considered in developing the scope of geotechnical services, such as the exploration objective; the location, type, size and weight of the proposed structure; proposed site grades and improvements; the construction schedule and sequence; and the site geology.

Geotechnical engineers apply their experience with construction methods, subsurface conditions and exploration methods to develop the exploration scope. The scope of each exploration is unique based on available project and site information. Incomplete project information or constraints on the scope of exploration increases the risk of variations in subsurface conditions not being identified and addressed in the geotechnical report.

Services Are Performed for Specific Projects

Because the scope of each geotechnical exploration is unique, each geotechnical report is unique. Subsurface conditions are explored and recommendations are made for a specific project.

Subsurface information and recommendations may not be adequate for other uses. Changes in a proposed structure location, foundation loads, grades, schedule, etc. may require additional geotechnical exploration, analyses, and consultation. The geotechnical engineer should be consulted to determine if additional services are required in response to changes in proposed construction, location, loads, grades, schedule, etc.

Geo-Environmental Issues

The equipment, techniques, and personnel used to perform a geo-environmental study differ significantly from those used for a geotechnical exploration. Indications of environmental contamination may be encountered incidental to performance of a geotechnical exploration but go unrecognized. Determination of the presence, type or extent of environmental contamination is beyond the scope of a geotechnical exploration.

Geotechnical Recommendations Are Not Final

Recommendations are developed based on the geotechnical engineer's understanding of the proposed construction and professional opinion of site subsurface conditions. Observations and tests must be performed during construction to confirm subsurface conditions exposed by construction excavations are consistent with those assumed in development of recommendations. It is advisable to retain the geotechnical engineer that performed the exploration and developed the geotechnical recommendations to conduct tests and observations during construction. This may reduce the risk that variations in subsurface conditions will not be addressed as recommended in the geotechnical report.

Portion obtained with permission from "Important Information About Your Geotechnical Engineering Report", ASFE, 2004
© S&ME, Inc. 2010

Appendix II – Subgrade Analyses

OHIO DEPARTMENT OF TRANSPORTATION

OFFICE OF GEOTECHNICAL ENGINEERING

PLAN SUBGRADES
Geotechnical Design Manual Section 600

TP 26 BEL-70 Vacant Weigh Station
122878
Truck parking area along Eastbound IR 70 in Saint Clairsville, approximately 1 mile east of SR 9

S&ME, Inc.

Prepared By: Brian K. Sears, PE
Date prepared: Tuesday, May 5, 2026

Brian K. Sears, PE
6190 Enterprise Court
Dublin, OH 43016

614-793-2226
bsears@smeinc.com

NO. OF BORINGS: 13

NO. OF DCPS: 0

OHIO DEPARTMENT OF TRANSPORTATION

Subgrade Analysis

V. 14.85 4/13/2026

Add DCP Test Data Worksheets

#	Boring ID	Alignment	Station	Offset	Dir	Drill Rig	ER	Boring EL.	Proposed Subgrade EL	Cut Fill
1	B-001-0-26	EB TRUCK RAMP BL	100+33	12	LT	OTB B57 Truck	90	1205.4	1204.1	1.3 C
2	B-002-0-26	EB TRUCK RAMP BL	104+19	4	LT	OTB B57 Truck	90	1186.6	1185.6	1.0 C
3	B-003-0-26	EB TRUCK RAMP BL	108+19	6	LT	OTB B57 Truck	90	1165.9	1164.8	1.2 C
4	B-004-0-26	EB TRUCK RAMP BL	112+17	11	LT	OTB B57 Truck	90	1143.4	1142.3	1.1 C
5	B-005-0-26	EB TRUCK RAMP BL	116+20	15	LT	OTB B57 Truck	90	1128.5	1127.9	0.6 C
6	B-006-0-26	EB TRUCK RAMP BL	116+55	159	RT	OTB B57 Truck	90	1127.9	1127.4	0.5 C
7	B-007-0-26	EB TRUCK RAMP BL	118+61	157	RT	OTB B57 Truck	90	1127.5	1126.7	0.8 C
8	B-008-0-26	EB TRUCK RAMP BL	118+72	7	RT	OTB B57 Truck	90	1129.7	1125.5	4.2 C
9	B-009-0-26	EB TRUCK RAMP BL	122+71	4	LT	OTB B57 Truck	90	1125.0	1121.3	3.7 C
10	B-010-0-26	EB TRUCK RAMP BL	126+76	11	LT	OTB B57 Truck	90	1123.6	1121.1	2.5 C
11	B-011-0-26	IR 70 CL R/W	1030+03	58	RT	OTB B57 Truck	90	1127.3	1126.4	0.9 C
12	B-012-0-26	IR 70 CL R/W	1034+10	48	RT	OTB B57 Truck	90	1130.8	1129.7	1.1 C
13	B-013-0-26	IR 70 CL R/W	1038+08	44	RT	OTB B57 Truck	90	1134.5	1133.4	1.0 C

OHIO DEPARTMENT OF TRANSPORTATION

Subgrade Analysis

V. 14.85 4/13/2026

#	Boring ID	Sample #	Sample Depth		Subgrade Depth		Standard Penetration		HP (tsf)	Physical Characteristics						Moisture		Ohio DOT		Sulfate Content (ppm)	Problem		Excavate and Replace (Item 204)		Recommendation (Enter depth in inches)
			From	To	From	To	N_{60}	N_{60L}		LL	PL	PI	% Silt	% Clay	P200	M_C	M_{OPT}	Class	GI		Unsuitable	Unstable	Unsuitable	Unstable	
1	B	1B	1.9	2.2	0.6	0.9	100									14	0	Rock	0	940	Rock				
	001-0	2	2.2	2.4	0.9	1.1	100									7	0	Rock	0						
	26																								
2	B	1B	1.9	3.0	0.9	2.0	11			35	20	15	23	21	44	20	15	A-6a	3	980		N_{60} & Mc		12"	Exc. & Repl. 12"
	002-0	2/3A	3.0	4.9	2.0	3.9	20			NP	NP	NP	8	2	10	17	6	A-1-a	0						204 Geotextile
	26	3B	4.9	6.0	3.9	5.0	32									11	6	A-1-a	0						
		4	6.0	7.2	5.0	6.2	90	11								9	0	Rock							
3	B	1B	1.9	2.4	0.7	1.2	29			31	18	13	14	9	23	12	10	A-2-6	0	1120					
	003-0	1C/2	2.4	4.5	1.2	3.3	36			NP	NP	NP	6	1	7	11	6	A-1-a	0						
	26	3	4.5	6.0	3.3	4.8	38									10	6	A-1-a	0						
		4	6.0	6.9	4.8	5.7	100	29								6	0	Rock	0						
4	B	1B	1.8	3.0	0.7	1.9	78		4.5	32	20	12	32	27	59	12	15	A-6a	6	1173					
	004-0	2	3.0	4.5	1.9	3.4	81			30	20	10	46	27	73	9	15	A-4a	8						
	26	3	4.5	4.9	3.4	3.8	100									4	0	Rock	0						
		4	5.5	5.8	4.4	4.7	100	30								1	0	Rock	0						
5	B	1	1.0	2.5	0.4	1.9	15		1.7	40	21	19	35	37	72	19	16	A-6b	11	140		HP & Mc		12"	Exc. & Repl. 12"
	005-0	2	2.5	4.0	1.9	3.4	15		1.5	46	23	23	34	41	75	22	20	A-7-6	14			HP			204 Geotextile
	26	3	4.0	5.5	3.4	4.9	32		1.2							22	18	A-7-6	16						
		4A	5.5	6.2	4.9	5.6	93	15								9	6	A-1-b	0						
6	B	1B	2.1	2.3	1.6	1.8	100										0	Rock	0		Rock				
	006-0	2	2.3	2.5	1.8	2.0	100										0	Rock	0						
	26																								
7	B	1B	1.3	2.5	0.5	1.7	72		3.7							10	14	A-6a	10						
	007-0	2	2.5	4.0	1.7	3.2	20		4.5	28	17	11	29	14	43	8	14	A-6a	2	180					
	26	3	4.0	5.5	3.2	4.7	24		4.5	30	17	13	28	17	45	9	14	A-6a	3						
		4	5.5	7.0	4.7	6.2	32	20	4.5							10	14	A-6a	10						
8	B	2	4.0	5.5	-0.2	1.3	15			28	18	10	24	10	34	8	10	A-2-4	0	120					
	008-0	3	5.5	7.0	1.3	2.8	17			29	18	11	28	12	40	6	14	A-6a	1						
	26	4	7.0	8.5	2.8	4.3	17		1.7							14	14	A-6a	10						
		5	8.5	10.0	4.3	5.8	17	15	4.5							11	14	A-6a	10						
9	B	2	3.5	4.2	-0.2	0.5	100									2	6	A-1-a	0	220					
	009-0	3	5.0	6.5	1.3	2.8	14		1.5	37	18	19	34	29	63	15	16	A-6b	9			HP			
	26	4	6.5	8.0	2.8	4.3	12		3.2							10	14	A-6a	10						
		5	8.0	9.5	4.3	5.8	17	12	4.5							9	14	A-6a	10						

OHIO DEPARTMENT OF TRANSPORTATION

Subgrade Analysis

V. 14.85 4/13/2026

#	Boring ID	Sample #	Sample Depth		Subgrade Depth		Standard Penetration		HP (tsf)	Physical Characteristics						Moisture		Ohio DOT		Sulfate Content (ppm)	Problem		Excavate and Replace (Item 204)		Recommendation (Enter depth in inches)
			From	To	From	To	N_{60}	N_{60L}		LL	PL	PI	% Silt	% Clay	P200	M_C	M_{OPT}	Class	GI		Unsuitable	Unstable	Unsuitable	Unstable	
10	B	1B	2.0	3.0	-0.5	0.5	21		4.5	27	17	10	28	19	47	11	12	A-4a	2	1100					
	010-0	2	3.0	4.5	0.5	2.0	75									6	0	Rock	0		Rock				
	26	3	4.5	5.4	2.0	2.9	100									6	0	Rock	0						
		4	6.0	6.4	3.5	3.9	100	21								7	0	Rock	0						
11	B	1B	1.8	3.0	0.9	2.1	94			30	17	13	29	20	49	14	14	A-6a	4	1160					
	011-0	2	3.0	3.8	2.1	2.9	100									3	0	Rock	0						
	26	3	4.5	4.8	3.6	3.9	100									2	0	Rock	0						
		4	6.0	6.3	5.1	5.4	100	30								1	0	Rock							
12	B	1B	1.8	3.0	0.7	1.9				NP	NP	NP	13	6	19	10	6	A-1-b	0	800					
	012-0	2	3.0	4.5	1.9	3.4	30			NP	NP	NP	18	6	24	8	6	A-1-b	0						
	26	3	6.0	6.2	4.9	5.1	100									2	0	Rock	0						
								30																	
13	B	1B	1.7	3.0	0.7	2.0	12		3.5	29	18	11	33	25	58	13	14	A-6a	5	1180					
	013-0	2A	3.0	4.3	2.0	3.3	33		4.5	29	19	10	44	21	65	11	14	A-4a	6						
	26	2B	4.3	4.5	3.3	3.5	33									4	0	Rock	0						
		3	4.5	5.8	3.5	4.8	100	12								4	0	Rock	0						

OHIO DEPARTMENT OF TRANSPORTATION

Subgrade Analysis

V. 14.85 4/13/2026

PID: ### ###

County-Route-Section: TP 26 BEL-70 Vacant Weigh Station
No. of Borings: ###

Geotechnical Consultant: S&ME, Inc.
Prepared By: Brian K. Sears, PE
Date prepared: ###

Chemical Stabilization Options		
320	Rubblize & Roll	Option
206	Cement Stabilization	Option
	Lime Stabilization	No
206	Depth	12"

Excavate and Replace Stabilization Options	
Global Geotextile Average(N60L):	0"
Average(HP):	0"
Global Geogrid Average(N60L):	0"
Average(HP):	0"

Design CBR	9

% Samples within 3 feet of subgrade			
$N_{60} \leq 5$	0%	HP ≤ 0.5	0%
$N_{60} < 12$	2%	0.5 < HP ≤ 1	0%
$12 \leq N_{60} < 15$	6%	1 < HP ≤ 2	9%
$N_{60} \geq 20$	40%	HP > 2	15%
M+	4%		
Rock	26%		
Unsuitable Soil	0%		

Excavate and Replace at Surface	
Average	0"
Maximum	0"
Minimum	0"

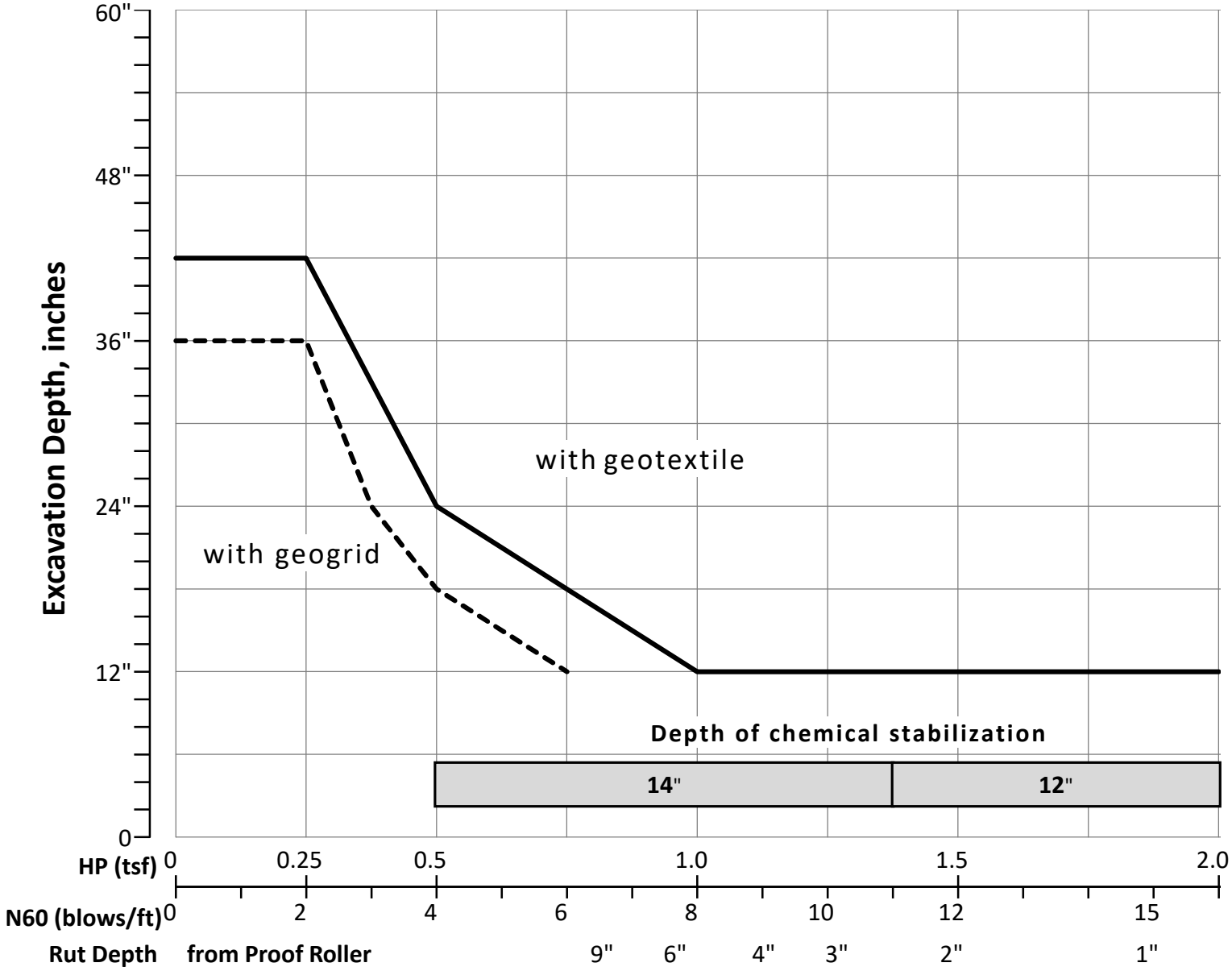
% Proposed Subgrade Surface	
Unstable & Unsuitable	26%
Unstable	15%
Unsuitable (Soil & Rock)	11%

	N_{60}	N_{60L}	HP	LL	PL	PI	Silt	Clay	P 200	M_C	M_{OPT}	GI
Average	57	20	3.38	32	19	13	27	18	45	10	8	3
Maximum	100	30	4.50	46	23	23	46	41	75	22	20	16
Minimum	11	11	1.20	27	17	10	6	1	7	1	0	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	17	5	3	1	0	1	0	0	0	3	0	0	13	2	0	2	0	0	47
Percent	0%	36%	11%	6%	2%	0%	2%	0%	0%	0%	6%	0%	0%	28%	4%	0%	4%	0%	0%	100%
% Rock|Granular|Cohesive	0%	36%	28%									36%								100%
Surface Class Count	0	7	3	2	1	0	1	0	0	0	3	0	0	7	2	0	1	0	0	27
Surface Class Percent	0%	26%	11%	7%	4%	0%	4%	0%	0%	0%	11%	0%	0%	26%	7%	0%	4%	0%	0%	100%

Fig. 600-1 – Subgrade Stabilization



OVERRIDE TABLE

Calculated Average	New Values	Check to Override
3.38		☐ HP
20.45		☐ N60L

Average HP
Average N_{60L}

PLATE 6

Appendix III – Light Tower Foundation Analyses

LATERAL LOAD (LPILE) ANALYSES
EASTBOUND PARKING AREA
LPILE SOIL PARAMETERS

LPILE Parameters for Lateral Analyses – BEL-70 Parking Area

The following tables include parameters used by S&ME to perform a lateral load (LPILE) analysis on the foundations of each light tower at the eastbound parking area. These tables include p-y models, soil/rock effective unit weights, friction angle and subgrade modulus value for granular, cohesion and strain values for cohesive soils, and unconfined compressive strength, poisson ratio, strain factor, as well as Initial Rock Mass Modulus for rock. These parameters are based on the soil encountered and lab data shown on the boring logs, and recommended values given in the LPile 2022 user's manual and guidance provided by ODOT Office of Geotechnical Engineering (OGE).

Table 1 – LPile Input Parameters at Light Tower CM1-1 (Boring B-008-0-26)

Stratum	Depth* Interval (ft.)	Elevation Range	p-y Soil Model	Effective Unit Weight	Subgrade Modulus, k	C (psf) or ϕ (deg)	Strain ε_{50}
Disturbed Layer (per GDM Sec. 1201)	0.0 – 3.0	1,123.0 – 1,120.0	Soft Clay (Matlock)	98 pcf	---	250	0.02
Silt and Clay (A-6a)	3.0 – 3.8	1,120.0 – 1,119.2	Stiff Clay w/o Free Water	60 pcf	---	2,750	0.005
Silt and Clay (A-6a)	3.8 – 11.3	1,119.2 – 1,111.7	Stiff Clay w/o Free Water	60 pcf	---	4,500	0.004
Silt and Clay (A-6a)	11.3 – 16.3	1,111.7 – 1,106.7	Stiff Clay w/o Free Water	58 pcf	---	2,250	0.005
Silt and Clay (A-6a)	16.3 – 17.6	1,106.7 – 1,105.4	Stiff Clay w/o Free Water	66 pcf	---	4,000	0.005

*Below proposed ground surface at light tower, estimated to be at El. 1,122.96.

Table 2 – LPile Input Parameters at Light Tower CM1-2 (Borings B-005-0-26 & B-005-1-26)

Stratum	Depth* Interval (ft.)	Elevation Range	p-y Soil Model	Effective Unit Weight	Subgrade Modulus, k	C (psf) or ϕ (deg)	Strain ε_{50}
Disturbed Layer (per GDM Sec. 1201)	0.0 – 3.0	1,125.8 – 1,122.8	Soft Clay (Matlock)	98 pcf	---	250	0.02
Gravel with Sand (A-1-b)	3.0 – 3.5	1,122.8 – 1,122.3	Sand (Reese)	78 pcf	125 pci	36°	---

Rock Type	Depth* Interval (ft.)	Elevation Range	p-y Rock Model	Effective Unit Weight	Unconfined Compressive Strength	RQD	Strain Factor (ε_{rm})	Initial Rock Mass Modulus (psi)
Sandstone	3.5 – 4.3	1,122.3 – 1,121.5	Weak Rock	78 pcf	45 psi	0%	0.0005	4,000
Sandstone	4.3 – 4.8	1,121.5 – 1,121.0	Massive Rock	*See Next Sub-Table*				
Interbedded Sandstone and Shale	4.8 – 7.8	1,121.0 – 1,118.0	Weak Rock	80 pcf	1,300 psi	0%	0.0005	117,000

Rock Type	Depth* Interval (ft.)	Elevation Range	p-y Rock Model	Effective Unit Weight	Unconfined Compressive Strength	Poisson Ratio	GSI Value	Material Index	Initial Rock Mass Modulus (psi)
Sandstone	4.3 – 4.8	1,121.5 – 1,121.0	Massive Rock	89 pcf	6,500 psi	0.2	55	14	585,000

*Below proposed ground surface at light tower, estimated to be at El. 1,125.77.

Table 3 – LPile Input Parameters at Light Tower CM1-3 (Boring B-007-0-26)

Stratum	Depth* Interval (ft.)	Elevation Range	p-y Soil Model	Effective Unit Weight	Subgrade Modulus, k	C (psf) or ϕ (deg)	Strain ε_{50}
Disturbed Layer (per GDM Sec. 1201)	0.0 – 3.0	1,124.7 – 1,121.7	Soft Clay (Matlock)	98 pcf	---	250	0.02
Silt and Clay (A-6a)	3.0 – 5.2	1,121.7 – 1,119.5	Stiff Clay w/o Free Water	63 pcf	---	4,250	0.004
Silt and Clay (A-6a)	5.2 – 9.4	1,119.5 – 1,115.3	Stiff Clay w/o Free Water	68 pcf	---	2,250	0.005

*Below proposed ground surface at light tower, estimated to be at El. 1,124.66.

Table 4 – LPile Input Parameters at Light Tower CM1-4 (Borings B-006-0-26 & B-005-1-26)

Stratum	Depth* Interval (ft.)	Elevation Range	p-y Soil Model	Effective Unit Weight	Subgrade Modulus, k	C (psf) or ϕ (deg)	Strain ε_{50}
Disturbed Layer (per GDM Sec. 1201)	0.0 – 3.0	1,129.7 – 1,126.7	Soft Clay (Matlock)	98 pcf	---	250	0.02
Silt and Clay (A-6a)	3.0 – 4.1	1,126.7 – 1,125.6	Stiff Clay w/o Free Water	58 pcf	---	2,000	0.007

Rock Type	Depth* Interval (ft.)	Elevation Range	p-y Rock Model	Effective Unit Weight	Unconfined Compressive Strength	RQD	Strain Factor (ε_{rm})	Initial Rock Mass Modulus (psi)
Interbedded Sandstone and Shale	4.1 – 11.7	1,125.6 – 1,118.0	Weak Rock	80 pcf	1,300 psi	0%	0.0005	117,000

*Below proposed ground surface at light tower, estimated to be at El. 1,129.69.

LATERAL LOAD (LPILE) ANALYSES
EASTBOUND PARKING AREA
LIGHT TOWER CM1-1 (B-008-0-26)

TP 26 NE Ohio Site 8 BEL-70 Vacant Weigh Station - Eastbound Parking Area
Light Tower CM1-1 (Boring B-008-0-26) Lateral Load Analysis
36" Diameter, 8' Embedment Light Tower Drilled Shaft Foundation

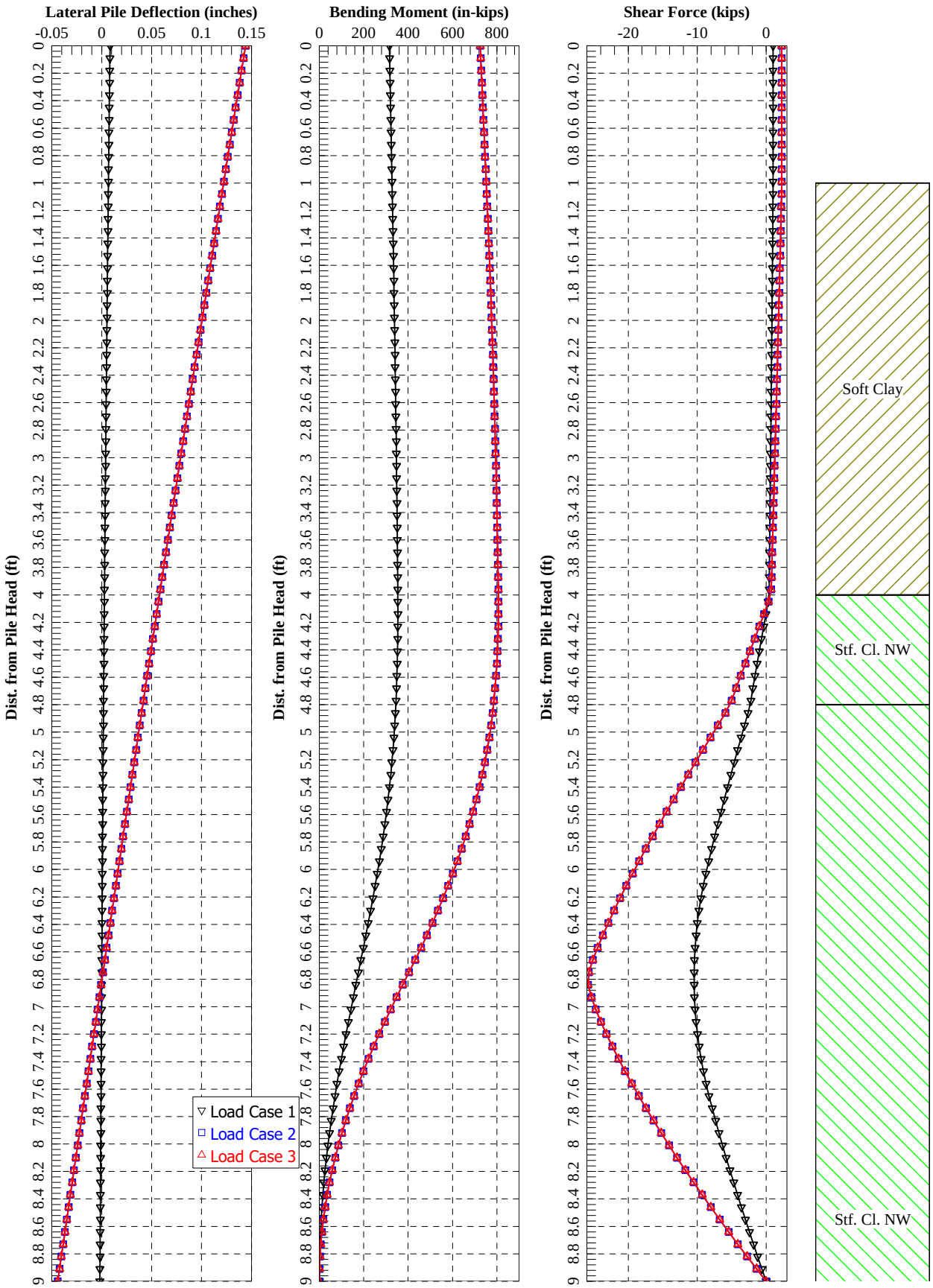


PLATE 4

```
==========================================================================

                        LPile for Version 2022-12.012

                          License ID : 228332755
                     License Type : (Single User License)

              Analysis of Individual Piles and Drilled Shafts
            Subjected to Lateral Loading Using the p-y Method
            © 1985-2024 by Ensoft, Inc.
                  All Rights Reserved

            This software is licensed for exclusive use by:
                              S&ME, Inc.
                            Valley View, OH

==========================================================================


This model was prepared by:
BSears




--------------------------------------------------------------------------
                          Files Used for Analysis
--------------------------------------------------------------------------

Path to file locations:
\Columbus-1170\Projects\2024\24170232_ms_TP 26 NE Ohio\GEO\Project Docs\Site
8_BEL-70 (ms)\Calcs\Light Towers\LPILE Files\

Name of input data file:
Tower CM1-1 (B-008-0-26).lp12d

Name of output report file:
Tower CM1-1 (B-008-0-26).lp12o

Name of plot output file:
Tower CM1-1 (B-008-0-26).lp12p

Name of runtime message file:
Tower CM1-1 (B-008-0-26).lp12r



--------------------------------------------------------------------------
                        Date and Time of Analysis
--------------------------------------------------------------------------
```

Date: May 1, 2026 Time: 15:38:59

Problem Title

Project Name: TP 26 NE Ohio Site 8 BEL-70 Vacant Rest Areas

Job Number: 24170232B

Client: ms consultants, inc.

Engineer: BKS

Description: Light Tower CM1-1 (B-008-0-26)

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

```
 - Use of p-y modification factors for p-y curves not selected
 - 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                                   =        9.000 ft
Depth of ground surface below top of pile              =       1.0000 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.

            Depth Below           Pile
Point        Pile Head          Diameter
 No.            feet             inches
-----      -------------     -------------
  1             0.000           36.0000
  2             9.000           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                                   =     9.000000 ft
   Shaft Diameter                                      =    36.000000 in
```

Soil and Rock Layering Information

The soil profile is modelled using 5 layers

Layer 1 is soft clay, p-y criteria by Matlock, 1970

Distance from top of pile to top of layer	=	1.000000 ft
Distance from top of pile to bottom of layer	=	4.000000 ft
Effective unit weight at top of layer	=	98.000000 pcf
Effective unit weight at bottom of layer	=	98.000000 pcf
Undrained cohesion at top of layer	=	250.000000 psf
Undrained cohesion at bottom of layer	=	250.000000 psf
Epsilon-50 at top of layer	=	0.020000
Epsilon-50 at bottom of layer	=	0.020000

Layer 2 is stiff clay without free water

Distance from top of pile to top of layer	=	4.000000 ft
Distance from top of pile to bottom of layer	=	4.800000 ft
Effective unit weight at top of layer	=	60.000000 pcf
Effective unit weight at bottom of layer	=	60.000000 pcf
Undrained cohesion at top of layer	=	2750. psf
Undrained cohesion at bottom of layer	=	2750. psf
Epsilon-50 at top of layer	=	0.005000
Epsilon-50 at bottom of layer	=	0.005000

Layer 3 is stiff clay without free water

Distance from top of pile to top of layer	=	4.800000 ft
Distance from top of pile to bottom of layer	=	12.300000 ft
Effective unit weight at top of layer	=	60.000000 pcf
Effective unit weight at bottom of layer	=	60.000000 pcf
Undrained cohesion at top of layer	=	4500. psf
Undrained cohesion at bottom of layer	=	4500. psf
Epsilon-50 at top of layer	=	0.004000
Epsilon-50 at bottom of layer	=	0.004000

Layer 4 is stiff clay without free water

Distance from top of pile to top of layer	=	12.300000 ft
Distance from top of pile to bottom of layer	=	17.300000 ft
Effective unit weight at top of layer	=	58.000000 pcf

```
   Effective unit weight at bottom of layer            =    58.000000 pcf
   Undrained cohesion at top of layer                  =        2250. psf
   Undrained cohesion at bottom of layer               =        2250. psf
   Epsilon-50 at top of layer                          =     0.005000
   Epsilon-50 at bottom of layer                       =     0.005000


Layer 5 is stiff clay without free water

   Distance from top of pile to top of layer           =    17.300000 ft
   Distance from top of pile to bottom of layer        =    18.600000 ft
   Effective unit weight at top of layer               =    66.000000 pcf
   Effective unit weight at bottom of layer            =    66.000000 pcf
   Undrained cohesion at top of layer                  =        4000. psf
   Undrained cohesion at bottom of layer               =        4000. psf
   Epsilon-50 at top of layer                          =     0.005000
   Epsilon-50 at bottom of layer                       =     0.005000


 (Depth of the lowest soil layer extends 9.600 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	E50 or krm
1	Soft Clay	1.0000 4.0000	98.0000 98.0000	250.0000 250.0000	0.02000 0.02000
2	Stiff Clay w/o Free Water	4.0000 4.8000	60.0000 60.0000	2750. 2750.	0.00500 0.00500
3	Stiff Clay w/o Free Water	4.8000 12.3000	60.0000 60.0000	4500. 4500.	0.00400 0.00400
4	Stiff Clay w/o Free Water	12.3000 17.3000	58.0000 58.0000	2250. 2250.	0.00500 0.00500
5	Stiff Clay w/o Free Water	17.3000 18.6000	66.0000 66.0000	4000. 4000.	0.00500 0.00500

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 = 3

Load    Load         Condition               Condition            Axial Thrust
Compute Top y     Run Analysis
 No.    Type             1                       2                 Force, lbs
vs. Pile Length
-----   ----   --------------------   -----------------------   ---------------
---------------    ------------
   1     1     V =  1000.000000 lbs   M =      315600. in-lbs             4200.
    Yes               Yes
   2     1     V =        2250. lbs   M =      724800. in-lbs             4600.
    Yes               Yes
   3     1     V =        2250. lbs   M =      724800. in-lbs             3800.
    Yes               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                                  =     9.000000 ft
Shaft Diameter                                     =    36.000000 in
Concrete Cover Thickness (to edge of trans. reinf.)=     3.500000 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	=	1018. sq. in.
Total Area of Reinforcing Steel	=	16.000000 sq. in.
Area Ratio of Steel Reinforcement	=	1.57 percent
Edge-to-Edge Bar Spacing	=	4.114467 in
Maximum Concrete Aggregate Size	=	0.750000 in
Ratio of Bar Spacing to Aggregate Size	=	5.49
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.	=	0.500000 in

Axial Structural Capacities:

Nom. Axial Structural Capacity = 0.85 Fc Ac + Fy As	=	4366.378 kips
Tensile Load for Cracking of Concrete	=	-470.222 kips
Nominal Axial Tensile Capacity	=	-960.000 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	13.436000	0.00000
2	1.128000	1.000000	12.413245	5.141735
3	1.128000	1.000000	9.500687	9.500687
4	1.128000	1.000000	5.141735	12.413245
5	1.128000	1.000000	0.00000	13.436000
6	1.128000	1.000000	-5.14173	12.413245
7	1.128000	1.000000	-9.50069	9.500687
8	1.128000	1.000000	-12.41325	5.141735
9	1.128000	1.000000	-13.43600	0.00000
10	1.128000	1.000000	-12.41325	-5.14173
11	1.128000	1.000000	-9.50069	-9.50069
12	1.128000	1.000000	-5.14173	-12.41325
13	1.128000	1.000000	0.00000	-13.43600
14	1.128000	1.000000	5.141735	-12.41325
15	1.128000	1.000000	9.500687	-9.50069
16	1.128000	1.000000	12.413245	-5.14173

NOTE: The positions of the above rebars were computed by LPile

Minimum spacing between any two bars not equal to zero = 4.114 inches
between bars 11 and 12.

Ratio of bar spacing to maximum aggregate size = 5.49

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 = 3

Number	Axial Thrust Force kips
1	3.800
2	4.200
3	4.600

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 = 3.800 kips

Bending Max Conc Curvature Stress rad/in. ksi	Bending Max Steel Moment Stress in-kip ksi	Bending Run Stiffness Msg kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in

TP 26 NE Ohio Site 8 BEL-70 Vacant Weigh Station - Eastbound Parking Area
Light Tower CM1-1 (Boring B-008-0-26) Lateral Load Analysis
36" Diameter, 8' Embedment Light Tower Drilled Shaft Foundation

6.25000E-07	240.5062135	384809942.	19.2929823	0.00001206	-0.00001044
0.0505030	0.2746478				
0.00000125	480.1472468	384117797.	18.6479768	0.00002331	-0.00002169
0.0973082	0.5259142				
0.00000188	718.9174733	383422652.	18.4329804	0.00003456	-0.00003294
0.1438345	0.7771808				
0.00000250	956.8168886	382726755.	18.3254857	0.00004581	-0.00004419
0.1900818	1.0284477				
0.00000313	1194.	382030558.	18.2609917	0.00005707	-0.00005543
0.2360502	1.2797149				
0.00000375	1430.	381334209.	18.2179981	0.00006832	-0.00006668
0.2817396	1.5309823				
0.00000438	1665.	380637775.	18.1872904	0.00007957	-0.00007793
0.3271500	1.7822500				
0.00000500	1900.	379941287.	18.1642614	0.00009082	-0.00008918
0.3722815	2.0335179				
0.00000563	2133.	379244764.	18.1463515	0.0001021	-0.000100
0.4171340	2.2847861				
0.00000625	2366.	378548215.	18.1320251	0.0001133	-0.000112
0.4617075	2.5360546				
0.00000688	2366.	344134741.	10.2494785	0.00007047	-0.000177
0.2882187	-4.308598 C				
0.00000750	2366.	315456846.	10.2198771	0.00007665	-0.000193
0.3129821	-4.706727 C				
0.00000813	2366.	291190934.	10.1952302	0.00008284	-0.000210
0.3376758	-5.104761 C				
0.00000875	2366.	270391582.	10.1744772	0.00008903	-0.000226
0.3622998	-5.502701 C				
0.00000938	2366.	252365477.	10.1568402	0.00009522	-0.000242
0.3868539	-5.900547 C				
0.00001000	2366.	236592634.	10.1417358	0.0001014	-0.000259
0.4113380	-6.298297 C				
0.00001063	2366.	222675420.	10.1287027	0.0001076	-0.000275
0.4357521	-6.695951 C				
0.00001125	2366.	210304564.	10.1174231	0.0001138	-0.000291
0.4600960	-7.093510 C				
0.00001188	2366.	199235903.	10.1076093	0.0001200	-0.000307
0.4843696	-7.490973 C				
0.00001250	2366.	189274107.	10.0990420	0.0001262	-0.000324
0.5085729	-7.888340 C				
0.00001313	2366.	180261055.	10.0915439	0.0001325	-0.000340
0.5327056	-8.285611 C				
0.00001375	2366.	172067370.	10.0849699	0.0001387	-0.000356
0.5567678	-8.682785 C				
0.00001438	2366.	164586180.	10.0792000	0.0001449	-0.000373
0.5807594	-9.079861 C				
0.00001500	2366.	157728423.	10.0741344	0.0001511	-0.000389
0.6046801	-9.476841 C				

```
0.00001563         2366.    151419286.    10.0696892     0.0001573     -0.000405
0.6285300     -9.873723 C
0.00001625         2366.    145595467.    10.0657933     0.0001636     -0.000421
0.6523089    -10.270507 C
0.00001688         2366.    140203043.    10.0623863     0.0001698     -0.000438
0.6760167    -10.667193 C
0.00001750         2366.    135195791.    10.0594163     0.0001760     -0.000454
0.6996534    -11.063781 C
0.00001813         2366.    130533867.    10.0568387     0.0001823     -0.000470
0.7232187    -11.460271 C
0.00001875         2366.    126182738.    10.0546147     0.0001885     -0.000486
0.7467127    -11.856661 C
0.00001938         2366.    122112327.    10.0527107     0.0001948     -0.000503
0.7701352    -12.252952 C
0.00002000         2366.    118296317.    10.0510970     0.0002010     -0.000519
0.7934860    -12.649144 C
0.00002063         2366.    114711580.    10.0497478     0.0002073     -0.000535
0.8167652    -13.045236 C
0.00002125         2366.    111337710.    10.0486401     0.0002135     -0.000551
0.8399726    -13.441228 C
0.00002188         2366.    108156633.    10.0477539     0.0002198     -0.000568
0.8631080    -13.837120 C
0.00002250         2366.    105152282.    10.0470709     0.0002261     -0.000584
0.8861714    -14.232911 C
0.00002313         2366.    102310328.    10.0465752     0.0002323     -0.000600
0.9091627    -14.628602 C
0.00002375         2366.     99617951.    10.0462524     0.0002386     -0.000616
0.9320817    -15.024191 C
0.00002438         2366.     97063645.    10.0460897     0.0002449     -0.000633
0.9549284    -15.419678 C
0.00002563         2429.     94800037.    10.0461990     0.0002574     -0.000665
1.0004043    -16.210348 C
0.00002688         2545.     94692477.    10.0468231     0.0002700     -0.000697
1.0455896    -17.000609 C
0.00002813         2660.     94589756.    10.0479254     0.0002826     -0.000730
1.0904832    -17.790458 C
0.00002938         2776.     94491232.    10.0493946     0.0002952     -0.000762
1.1350844    -18.579893 C
0.00003063         2891.     94396370.    10.0512127     0.0003078     -0.000795
1.1793922    -19.368912 C
0.00003188         3006.     94304718.    10.0533415     0.0003205     -0.000827
1.2234058    -20.157511 C
0.00003313         3121.     94215891.    10.0557483     0.0003331     -0.000859
1.2671243    -20.945689 C
0.00003438         3236.     94129561.    10.0584054     0.0003458     -0.000892
1.3105466    -21.733443 C
0.00003563         3350.     94045446.    10.0612887     0.0003584     -0.000924
1.3536720    -22.520771 C
0.00003688         3465.     93963300.    10.0643778     0.0003711     -0.000956
1.3964994    -23.307669 C
```

```
0.00003813         3579.     93882912.     10.0676547     0.0003838     -0.000989
1.4390279    -24.094136 C
0.00003938         3694.     93804096.     10.0711039     0.0003965     -0.001021
1.4812567    -24.880169 C
0.00004063         3808.     93726688.     10.0747116     0.0004093     -0.001053
1.5231846    -25.665765 C
0.00004188         3922.     93650546.     10.0784659     0.0004220     -0.001085
1.5648108    -26.450921 C
0.00004313         4035.     93575540.     10.0823562     0.0004348     -0.001118
1.6061342    -27.235635 C
0.00004438         4149.     93501560.     10.0863731     0.0004476     -0.001150
1.6471540    -28.019904 C
0.00004563         4263.     93428502.     10.0905084     0.0004604     -0.001182
1.6878690    -28.803725 C
0.00004688         4376.     93356279.     10.0947545     0.0004732     -0.001214
1.7282784    -29.587096 C
0.00004813         4489.     93284807.     10.0991050     0.0004860     -0.001246
1.7683810    -30.370013 C
0.00004938         4602.     93214014.     10.1035538     0.0004989     -0.001279
1.8081759    -31.152474 C
0.00005063         4715.     93143835.     10.1080956     0.0005117     -0.001311
1.8476620    -31.934476 C
0.00005188         4828.     93074209.     10.1127258     0.0005246     -0.001343
1.8868384    -32.716016 C
0.00005313         4941.     93005082.     10.1174399     0.0005375     -0.001375
1.9257039    -33.497091 C
0.00005438         5053.     92936405.     10.1222340     0.0005504     -0.001407
1.9642575    -34.277698 C
0.00005563         5166.     92868132.     10.1271047     0.0005633     -0.001439
2.0024981    -35.057833 C
0.00005688         5278.     92800222.     10.1320488     0.0005763     -0.001471
2.0404247    -35.837495 C
0.00005813         5390.     92732637.     10.1370633     0.0005892     -0.001503
2.0780361    -36.616679 C
0.00005938         5502.     92665342.     10.1421457     0.0006022     -0.001535
2.1153313    -37.395383 C
0.00006063         5614.     92598305.     10.1472935     0.0006152     -0.001567
2.1523092    -38.173604 C
0.00006188         5725.     92531497.     10.1525046     0.0006282     -0.001599
2.1889685    -38.951338 C
0.00006313         5837.     92464888.     10.1577769     0.0006412     -0.001631
2.2253083    -39.728581 C
0.00006438         5948.     92398455.     10.1631088     0.0006543     -0.001663
2.2613274    -40.505332 C
0.00006563         6059.     92332173.     10.1684984     0.0006673     -0.001695
2.2970245    -41.281586 C
0.00006688         6170.     92266020.     10.1739444     0.0006804     -0.001727
2.3323987    -42.057340 C
0.00006813         6281.     92199976.     10.1794453     0.0006935     -0.001759
2.3674485    -42.832591 C
```

```
0.00006938        6392.     92134020.    10.1849998     0.0007066     -0.001791
2.4021730    -43.607335 C
0.00007063        6502.     92068136.    10.1906070     0.0007197     -0.001823
2.4365708    -44.381568 C
0.00007188        6613.     92002305.    10.1962656     0.0007329     -0.001855
2.4706408    -45.155288 C
0.00007313        6723.     91936511.    10.2020028     0.0007460     -0.001886
2.5043818    -45.928490 C
0.00007438        6833.     91870742.    10.2077616     0.0007592     -0.001918
2.5377924    -46.701172 C
0.00007938        7271.     91607617.    10.2312788     0.0008121     -0.002045
2.6681070    -49.786612 C
0.00008438        7707.     91343844.    10.2555391     0.0008653     -0.002172
2.7930345    -52.863415 C
0.00008938        8140.     91079227.    10.2796933     0.0009187     -0.002299
2.9123325    -55.933382 C
0.00009438        8570.     90813004.    10.3043877     0.0009725     -0.002425
3.0260259    -58.995009 C
0.00009938        8979.     90357411.    10.3225581     0.0010258     -0.002552
3.1326575    -60.000000 CY
 0.0001044        9304.     89144470.    10.3110511     0.0010762     -0.002681
3.2276850    -60.000000 CY
 0.0001094        9546.     87273573.    10.2718035     0.0011235     -0.002814
3.3116704    -60.000000 CY
 0.0001144        9782.     85523680.    10.2357064     0.0011707     -0.002947
3.3907664    -60.000000 CY
 0.0001194       10004.     83800225.    10.1987328     0.0012175     -0.003080
3.4643165    -60.000000 CY
 0.0001244       10154.     81641326.    10.1374818     0.0012608     -0.003217
3.5282172    -60.000000 CY
 0.0001294       10287.     79513660.    10.0756441     0.0013035     -0.003354
3.5871212    -60.000000 CY
 0.0001344       10419.     77536664.    10.0197410     0.0013464     -0.003491
3.6423258    -60.000000 CY
 0.0001394       10550.     75693983.     9.9691573     0.0013895     -0.003628
3.6937845    -60.000000 CY
 0.0001444       10680.     73971519.     9.9233661     0.0014327     -0.003765
3.7414497    -60.000000 CY
 0.0001494       10808.     72355946.     9.8810316     0.0014760     -0.003902
3.7851328    -60.000000 CY
 0.0001544       10925.     70772035.     9.8368433     0.0015186     -0.004039
3.8241552    -60.000000 CY
 0.0001594       11008.     69072220.     9.7809580     0.0015588     -0.004179
3.8574366    -60.000000 CY
 0.0001644       11071.     67351790.     9.7204156     0.0015978     -0.004320
3.8862696    -60.000000 CY
 0.0001694       11131.     65719446.     9.6635689     0.0016368     -0.004461
3.9118664    -60.000000 CY
 0.0001744       11191.     64176802.     9.6094393     0.0016756     -0.004602
3.9342902    -60.000000 CY
```

```
 0.0001794        11250.     62716278.     9.5601863     0.0017149     -0.004743
3.9535015    -60.000000 CY
 0.0001844        11308.     61329164.     9.5136161     0.0017541     -0.004883
3.9693617    -60.000000 CY
 0.0001894        11364.     60009896.     9.4690774     0.0017932     -0.005024
3.9819050    -60.000000 CY
 0.0001944        11420.     58754909.     9.4280227     0.0018326     -0.005165
3.9911986    -60.000000 CY
 0.0001994        11476.     57559296.     9.3897594     0.0018721     -0.005305
3.9971986    -60.000000 CY
 0.0002044        11531.     56418622.     9.3531932     0.0019116     -0.005446
3.9998595    -60.000000 CY
 0.0002094        11584.     55328385.     9.3201259     0.0019514     -0.005586
3.9974517    -60.000000 CY
 0.0002144        11637.     54285454.     9.2909722     0.0019918     -0.005726
3.9998812    -60.000000 CY
 0.0002194        11690.     53285909.     9.2626721     0.0020320     -0.005866
3.9969940    -60.000000 CY
 0.0002244        11740.     52321336.     9.2356724     0.0020723     -0.006005
3.9997138    -60.000000 CY
 0.0002294        11786.     51384137.     9.2093226     0.0021124     -0.006145
3.9955528    -60.000000 CY
 0.0002344        11823.     50445667.     9.1796872     0.0021515     -0.006286
3.9989818    -60.000000 CY
 0.0002394        11855.     49524943.     9.1473565     0.0021896     -0.006428
3.9994466    -60.000000 CY
 0.0002444        11876.     48598228.     9.1109548     0.0022265     -0.006571
3.9965160    -60.000000 CY
 0.0002494        11895.     47701101.     9.0745971     0.0022630     -0.006715
3.9991770    -60.000000 CY
 0.0002544        11912.     46829816.     9.0405915     0.0022997     -0.006858
3.9995775    -60.000000 CY
 0.0002594        11929.     45990067.     9.0077660     0.0023364     -0.007001
3.9954763    -60.000000 CY
 0.0002644        11945.     45181124.     8.9766457     0.0023732     -0.007144
3.9984997    -60.000000 CY
 0.0002694        11961.     44401256.     8.9468563     0.0024101     -0.007287
3.9998981    -60.000000 CY
 0.0002744        11976.     43648250.     8.9191370     0.0024472     -0.007430
3.9944635    -60.000000 CY
 0.0003044        12062.     39628140.     8.7757363     0.0026711     -0.008286
3.9984635    -60.000000 CY
 0.0003344        12138.     36300180.     8.6628609     0.0028966     -0.009141
3.9998209    -60.000000 CY
 0.0003644        12207.     33502446.     8.5793723     0.0031261     -0.009991
3.9999551    -60.000000 CYT
 0.0003944        12272.     31117026.     8.5161103     0.0033585     -0.010839
3.9996166    -60.000000 CYT
 0.0004244        12331.     29056485.     8.4674428     0.0035934     -0.011684
3.9972132    -60.000000 CYT
```

```
    0.0004544        12377.     27238942.     8.4178614     0.0038249     -0.012533
   3.9873462    -60.000000 CYT


Axial Thrust Force =      4.200 kips

    Bending       Bending       Bending      Depth to      Max Comp      Max Tens
  Max Conc      Max Steel  Run
   Curvature      Moment       Stiffness      N Axis        Strain        Strain
   Stress        Stress    Msg
    rad/in.       in-kip        kip-in2         in           in/in         in/in
     ksi           ksi
------------ ------------ ------------ ------------ ------------ ------------
------------ ------------ ---
  6.25000E-07   240.5049676    384807948.    19.4290859    0.00001214   -0.00001036
   0.0508615     0.2771147
   0.00000125   480.1459926    384116794.    18.7161837    0.00002340   -0.00002160
   0.0976654     0.5283867
   0.00000188   718.9162127    383421980.    18.4785558    0.00003465   -0.00003285
   0.1441903     0.7796589
   0.00000250   956.8156222    382726249.    18.3597458    0.00004590   -0.00004410
   0.1904363     1.0309315
   0.00000313        1194.     382030150.    18.2884629    0.00005715   -0.00005535
   0.2364034     1.2822044
   0.00000375        1430.     381333869.    18.2409436    0.00006840   -0.00006660
   0.2820914     1.5334776
   0.00000438        1665.     380637482.    18.2070035    0.00007966   -0.00007784
   0.3275005     1.7847511
   0.00000500        1900.     379941029.    18.1815504    0.00009091   -0.00008909
   0.3726306     2.0360248
   0.00000563        2133.     379244533.    18.1617553     0.0001022     -0.000100
   0.4174818     2.2872988
   0.00000625        2366.     378548006.    18.1459208     0.0001134     -0.000112
   0.4620539     2.5385732
   0.00000688        2366.     344134551.    10.2895004    0.00007074     -0.000177
   0.2893429    -4.300617 C
   0.00000750        2366.     315456672.    10.2575513    0.00007693     -0.000193
   0.3141325    -4.698533 C
   0.00000813        2366.     291190774.    10.2300378    0.00008312     -0.000209
   0.3388235    -5.096560 C
   0.00000875        2366.     270391433.    10.2068278    0.00008931     -0.000226
   0.3634446    -5.494492 C
   0.00000938        2366.     252365338.    10.1870615    0.00009550     -0.000242
   0.3879959    -5.892330 C
   0.00001000        2366.     236592504.    10.1700940     0.0001017     -0.000258
   0.4124772    -6.290073 C
   0.00001063        2366.     222675298.    10.1554324     0.0001079     -0.000275
   0.4368884    -6.687720 C
   0.00001125        2366.     210304448.    10.1426931     0.0001141     -0.000291
   0.4612294    -7.085271 C
```

```
0.00001188         2366.    199235793.    10.1315564     0.0001203     -0.000307
0.4855002     -7.482727 C
0.00001250         2366.    189274003.    10.1218127     0.0001265     -0.000323
0.5097005     -7.880086 C
0.00001313         2366.    180260955.    10.1132503     0.0001327     -0.000340
0.5338304     -8.277349 C
0.00001375         2366.    172067276.    10.1057088     0.0001390     -0.000356
0.5578898     -8.674515 C
0.00001438         2366.    164586090.    10.0990556     0.0001452     -0.000372
0.5818784     -9.071585 C
0.00001500         2366.    157728336.    10.0931803     0.0001514     -0.000389
0.6057963     -9.468556 C
0.00001563         2366.    151419203.    10.0879903     0.0001576     -0.000405
0.6296433     -9.865431 C
0.00001625         2366.    145595387.    10.0834069     0.0001639     -0.000421
0.6534193    -10.262207 C
0.00001688         2366.    140202965.    10.0793634     0.0001701     -0.000437
0.6771242    -10.658886 C
0.00001750         2366.    135195717.    10.0758025     0.0001763     -0.000454
0.7007579    -11.055466 C
0.00001813         2366.    130533795.    10.0726747     0.0001826     -0.000470
0.7243204    -11.451947 C
0.00001875         2366.    126182669.    10.0699372     0.0001888     -0.000486
0.7478114    -11.848330 C
0.00001938         2366.    122112260.    10.0675528     0.0001951     -0.000502
0.7712309    -12.244613 C
0.00002000         2366.    118296252.    10.0654889     0.0002013     -0.000519
0.7945789    -12.640797 C
0.00002063         2366.    114711517.    10.0637168     0.0002076     -0.000535
0.8178551    -13.036882 C
0.00002125         2366.    111337649.    10.0622112     0.0002138     -0.000551
0.8410595    -13.432866 C
0.00002188         2366.    108156573.    10.0609497     0.0002201     -0.000567
0.8641920    -13.828750 C
0.00002250         2366.    105152224.    10.0599125     0.0002263     -0.000584
0.8872524    -14.224533 C
0.00002313         2366.    102310272.    10.0590817     0.0002326     -0.000600
0.9102407    -14.620215 C
0.00002375         2366.     99617896.    10.0584414     0.0002389     -0.000616
0.9331568    -15.015796 C
0.00002438         2366.     97063591.    10.0579776     0.0002452     -0.000632
0.9560005    -15.411276 C
0.00002563         2432.     94924068.    10.0575288     0.0002577     -0.000665
1.0014704    -16.201930 C
0.00002688         2548.     94810571.    10.0576469     0.0002703     -0.000697
1.0466496    -16.992174 C
0.00002813         2664.     94702439.    10.0582592     0.0002829     -0.000730
1.0915372    -17.782007 C
0.00002938         2779.     94598964.    10.0593353     0.0002955     -0.000762
1.1361324    -18.571425 C
```

```
0.00003063         2894.     94499555.     10.0607664     0.0003081     -0.000794
1.1804341    -19.360427 C
0.00003188         3009.     94403710.     10.0625387     0.0003207     -0.000827
1.2244416    -20.149010 C
0.00003313         3124.     94311007.     10.0646159     0.0003334     -0.000859
1.2681539    -20.937171 C
0.00003438         3239.     94221082.     10.0669675     0.0003461     -0.000891
1.3115700    -21.724908 C
0.00003563         3354.     94133623.     10.0695670     0.0003587     -0.000924
1.3546892    -22.512219 C
0.00003688         3468.     94048359.     10.0723915     0.0003714     -0.000956
1.3975103    -23.299100 C
0.00003813         3582.     93965057.     10.0754214     0.0003841     -0.000988
1.4400326    -24.085550 C
0.00003938         3697.     93883511.     10.0786392     0.0003968     -0.001021
1.4822550    -24.871565 C
0.00004063         3811.     93803541.     10.0820299     0.0004096     -0.001053
1.5241766    -25.657144 C
0.00004188         3925.     93724988.     10.0855803     0.0004223     -0.001085
1.5657965    -26.442282 C
0.00004313         4039.     93647711.     10.0892786     0.0004351     -0.001117
1.6071135    -27.226979 C
0.00004438         4152.     93571586.     10.0931145     0.0004479     -0.001150
1.6481268    -28.011230 C
0.00004563         4266.     93496502.     10.0970787     0.0004607     -0.001182
1.6888354    -28.795033 C
0.00004688         4379.     93422358.     10.1011630     0.0004735     -0.001214
1.7292383    -29.578385 C
0.00004813         4492.     93349066.     10.1053601     0.0004863     -0.001246
1.7693344    -30.361284 C
0.00004938         4606.     93276544.     10.1096634     0.0004992     -0.001278
1.8091228    -31.143727 C
0.00005063         4718.     93204721.     10.1140670     0.0005120     -0.001310
1.8486023    -31.925710 C
0.00005188         4831.     93133529.     10.1185657     0.0005249     -0.001343
1.8877721    -32.707231 C
0.00005313         4944.     93062909.     10.1231546     0.0005378     -0.001375
1.9266309    -33.488287 C
0.00005438         5056.     92992807.     10.1278294     0.0005507     -0.001407
1.9651778    -34.268875 C
0.00005563         5169.     92923173.     10.1325862     0.0005636     -0.001439
2.0034117    -35.048992 C
0.00005688         5281.     92853961.     10.1374215     0.0005766     -0.001471
2.0413316    -35.828634 C
0.00005813         5393.     92785130.     10.1423320     0.0005895     -0.001503
2.0789362    -36.607799 C
0.00005938         5505.     92716640.     10.1473148     0.0006025     -0.001535
2.1162246    -37.386484 C
0.00006063         5617.     92648458.     10.1523672     0.0006155     -0.001567
2.1531956    -38.164685 C
```

```
0.00006188         5728.     92580549.    10.1574868     0.0006285     -0.001599
2.1898481    -38.942399 C
0.00006313         5840.     92512883.    10.1626714     0.0006415     -0.001631
2.2261809    -39.719622 C
0.00006438         5951.     92445433.    10.1679189     0.0006546     -0.001663
2.2621930    -40.496353 C
0.00006563         6062.     92378172.    10.1732276     0.0006676     -0.001695
2.2978832    -41.272587 C
0.00006688         6173.     92311077.    10.1785957     0.0006807     -0.001727
2.3332503    -42.048320 C
0.00006813         6284.     92244124.    10.1840217     0.0006938     -0.001759
2.3682931    -42.823550 C
0.00006938         6395.     92177292.    10.1895041     0.0007069     -0.001791
2.4030104    -43.598274 C
0.00007063         6505.     92110561.    10.1950417     0.0007200     -0.001822
2.4374011    -44.372486 C
0.00007188         6616.     92043913.    10.2006608     0.0007332     -0.001854
2.4714639    -45.146185 C
0.00007313         6726.     91977331.    10.2063053     0.0007463     -0.001886
2.5051976    -45.919366 C
0.00007438         6836.     91910797.    10.2120017     0.0007595     -0.001918
2.5386010    -46.692026 C
0.00007938         7274.     91644853.    10.2352897     0.0008124     -0.002045
2.6688860    -49.777380 C
0.00008438         7710.     91378587.    10.2593338     0.0008656     -0.002172
2.7937834    -52.854093 C
0.00008938         8143.     91111830.    10.2831857     0.0009191     -0.002298
2.9130226    -55.924331 C
0.00009438         8573.     90843621.    10.3077273     0.0009728     -0.002425
3.0266854    -58.985869 C
0.00009938         8982.     90387473.    10.3258078     0.0010261     -0.002551
3.1332951    -60.000000 CY
 0.0001044         9308.     89176212.    10.3143071     0.0010766     -0.002681
3.2283182    -60.000000 CY
 0.0001094         9549.     87304848.    10.2749831     0.0011238     -0.002814
3.3122821    -60.000000 CY
 0.0001144         9785.     85553556.    10.2389100     0.0011711     -0.002946
3.3913727    -60.000000 CY
 0.0001194        10007.     83830919.    10.2019402     0.0012179     -0.003080
3.4649106    -60.000000 CY
 0.0001244        10158.     81671814.    10.1406407     0.0012612     -0.003216
3.5287895    -60.000000 CY
 0.0001294        10291.     79542859.    10.0787027     0.0013039     -0.003354
3.5876602    -60.000000 CY
 0.0001344        10423.     77564670.    10.0227059     0.0013468     -0.003491
3.6428308    -60.000000 CY
 0.0001394        10554.     75720878.     9.9720357     0.0013899     -0.003628
3.6942550    -60.000000 CY
 0.0001444        10683.     73997378.     9.9261646     0.0014331     -0.003764
3.7418850    -60.000000 CY
```

```
 0.0001494        10812.     72381005.     9.8838986     0.0014764     -0.003901
3.7855535    -60.000000 CY
 0.0001544        10929.     70796718.     9.8396771     0.0015190     -0.004038
3.8245440    -60.000000 CY
 0.0001594        11012.     69097838.     9.7838573     0.0015593     -0.004178
3.8578061    -60.000000 CY
 0.0001644        11075.     67376662.     9.7232508     0.0015983     -0.004319
3.8866026    -60.000000 CY
 0.0001694        11135.     65743511.     9.6663364     0.0016372     -0.004460
3.9121613    -60.000000 CY
 0.0001744        11195.     64200103.     9.6121495     0.0016761     -0.004601
3.9345463    -60.000000 CY
 0.0001794        11254.     62738857.     9.5628376     0.0017153     -0.004742
3.9537182    -60.000000 CY
 0.0001844        11312.     61351278.     9.5162917     0.0017546     -0.004883
3.9695496    -60.000000 CY
 0.0001894        11368.     60031354.     9.4717005     0.0017937     -0.005024
3.9820503    -60.000000 CY
 0.0001944        11425.     58775745.     9.4305957     0.0018331     -0.005164
3.9913005    -60.000000 CY
 0.0001994        11480.     57579537.     9.3922863     0.0018726     -0.005305
3.9972564    -60.000000 CY
 0.0002044        11535.     56438298.     9.3556780     0.0019121     -0.005445
3.9998723    -60.000000 CY
 0.0002094        11588.     55347517.     9.3241700     0.0019522     -0.005585
3.9975077    -60.000000 CY
 0.0002144        11641.     54304067.     9.2934428     0.0019923     -0.005725
3.9998931    -60.000000 CY
 0.0002194        11694.     53304015.     9.2651074     0.0020325     -0.005865
3.9970558    -60.000000 CY
 0.0002244        11744.     52339157.     9.2380944     0.0020728     -0.006005
3.9997330    -60.000000 CY
 0.0002294        11790.     51401489.     9.2117130     0.0021129     -0.006145
3.9956300    -60.000000 CY
 0.0002344        11827.     50463153.     9.1821360     0.0021521     -0.006285
3.9990203    -60.000000 CY
 0.0002394        11859.     49542728.     9.1500193     0.0021903     -0.006427
3.9992468    -60.000000 CY
 0.0002444        11880.     48615611.     9.1135780     0.0022271     -0.006570
3.9965958    -60.000000 CY
 0.0002494        11900.     47718283.     9.0771076     0.0022636     -0.006714
3.9992162    -60.000000 CY
 0.0002544        11917.     46846598.     9.0431776     0.0023004     -0.006857
3.9993713    -60.000000 CY
 0.0002594        11933.     46006491.     9.0103157     0.0023371     -0.007000
3.9955701    -60.000000 CY
 0.0002644        11949.     45197204.     8.9791598     0.0023739     -0.007144
3.9985538    -60.000000 CY
 0.0002694        11965.     44417005.     8.9493437     0.0024107     -0.007287
3.9999119    -60.000000 CY
```

```
   0.0002744        11980.     43663657.     8.9215934     0.0024479     -0.007430
  3.9942523    -60.000000 CY
   0.0003044        12066.     39641995.     8.7782176     0.0026719     -0.008286
  3.9985257    -60.000000 CY
   0.0003344        12142.     36312646.     8.6652203     0.0028974     -0.009140
  3.9998424    -60.000000 CY
   0.0003644        12212.     33513765.     8.5815911     0.0031269     -0.009991
  3.9999658    -60.000000 CYT
   0.0003944        12276.     31127384.     8.5182268     0.0033594     -0.010838
  3.9996505    -60.000000 CYT
   0.0004244        12335.     29066055.     8.4694819     0.0035942     -0.011683
  3.9973093    -60.000000 CYT
   0.0004544        12381.     27248100.     8.4201387     0.0038259     -0.012532
  3.9875919    -60.000000 CYT


Axial Thrust Force =      4.600 kips

    Bending       Bending       Bending      Depth to      Max Comp      Max Tens
  Max Conc      Max Steel  Run
   Curvature      Moment       Stiffness      N Axis        Strain        Strain
   Stress        Stress    Msg
    rad/in.       in-kip        kip-in2         in           in/in         in/in
     ksi           ksi
------------- ------------- ------------- ------------- ------------- -------------
------------- ------------- ---
  6.25000E-07   240.5035986    384805758.    19.5651901    0.00001223   -0.00001027
   0.0512199     0.2795816
   0.00000125   480.1446137    384115691.    18.7843907    0.00002348   -0.00002152
   0.0980225     0.5308592
   0.00000188   718.9148267    383421241.    18.5241312    0.00003473   -0.00003277
   0.1445462     0.7821371
   0.00000250   956.8142298    382725692.    18.3940059    0.00004599   -0.00004401
   0.1907908     1.0334154
   0.00000313        1194.     382029703.    18.3159341    0.00005724   -0.00005526
   0.2367565     1.2846940
   0.00000375        1430.     381333494.    18.2638891    0.00006849   -0.00006651
   0.2824433     1.5359729
   0.00000438        1665.     380637159.    18.2267166    0.00007974   -0.00007776
   0.3278510     1.7872522
   0.00000500        1900.     379940746.    18.1988394    0.00009099   -0.00008901
   0.3729798     2.0385317
   0.00000563        2133.     379244280.    18.1771590     0.0001022     -0.000100
   0.4178295     2.2898116
   0.00000625        2366.     378547777.    18.1598165     0.0001135     -0.000112
   0.4624003     2.5410917
   0.00000688        2366.     344134343.    10.3291778    0.00007101     -0.000176
   0.2904571    -4.292706 C
   0.00000750        2366.     315456481.    10.2940289    0.00007721     -0.000193
   0.3152465    -4.690597 C
```

```
0.00000813         2366.    291190598.    10.2646762    0.00008340     -0.000209
0.3399656     -5.088396 C
0.00000875         2366.    270391269.    10.2391817    0.00008959     -0.000225
0.3645893     -5.486283 C
0.00000938         2366.    252365185.    10.2172859    0.00009579     -0.000242
0.3891378     -5.884113 C
0.00001000         2366.    236592361.    10.1984552     0.0001020     -0.000258
0.4136162     -6.281848 C
0.00001063         2366.    222675163.    10.1821496     0.0001082     -0.000274
0.4380246     -6.679488 C
0.00001125         2366.    210304321.    10.1679490     0.0001144     -0.000291
0.4623628     -7.077032 C
0.00001188         2366.    199235672.    10.1555219     0.0001206     -0.000307
0.4866307     -7.474480 C
0.00001250         2366.    189273889.    10.1446030     0.0001268     -0.000323
0.5108282     -7.871831 C
0.00001313         2366.    180260846.    10.1349589     0.0001330     -0.000339
0.5349552     -8.269087 C
0.00001375         2366.    172067171.    10.1264498     0.0001392     -0.000356
0.5590117     -8.666245 C
0.00001438         2366.    164585990.    10.1189132     0.0001455     -0.000372
0.5829974     -9.063307 C
0.00001500         2366.    157728241.    10.1122282     0.0001517     -0.000388
0.6069124     -9.460271 C
0.00001563         2366.    151419111.    10.1062933     0.0001579     -0.000405
0.6307565     -9.857138 C
0.00001625         2366.    145595299.    10.1010224     0.0001641     -0.000421
0.6545296    -10.253907 C
0.00001688         2366.    140202880.    10.0963423     0.0001704     -0.000437
0.6782316    -10.650577 C
0.00001750         2366.    135195635.    10.0921903     0.0001766     -0.000453
0.7018624    -11.047150 C
0.00001813         2366.    130533716.    10.0885122     0.0001829     -0.000470
0.7254219    -11.443623 C
0.00001875         2366.    126182592.    10.0852613     0.0001891     -0.000486
0.7489100    -11.839998 C
0.00001938         2366.    122112186.    10.0823966     0.0001953     -0.000502
0.7723266    -12.236274 C
0.00002000         2366.    118296180.    10.0798824     0.0002016     -0.000518
0.7956716    -12.632450 C
0.00002063         2366.    114711448.    10.0776874     0.0002079     -0.000535
0.8189449    -13.028526 C
0.00002125         2366.    111337582.    10.0757837     0.0002141     -0.000551
0.8421464    -13.424502 C
0.00002188         2366.    108156508.    10.0741470     0.0002204     -0.000567
0.8652759    -13.820378 C
0.00002250         2366.    105152160.    10.0727554     0.0002266     -0.000583
0.8883333    -14.216153 C
0.00002313         2366.    102310210.    10.0715894     0.0002329     -0.000600
0.9113187    -14.611828 C
```

```
0.00002375         2366.     99617836.    10.0706317     0.0002392     -0.000616
0.9342318    -15.007401 C
0.00002438         2366.     97063533.    10.0698667     0.0002455     -0.000632
0.9570725    -15.402873 C
0.00002563         2436.     95048091.    10.0688598     0.0002580     -0.000664
1.0025364    -16.193510 C
0.00002688         2551.     94928657.    10.0684718     0.0002706     -0.000697
1.0477096    -16.983738 C
0.00002813         2667.     94815115.    10.0686232     0.0002832     -0.000729
1.0925912    -17.773555 C
0.00002938         2782.     94706690.    10.0692479     0.0002958     -0.000762
1.1371802    -18.562957 C
0.00003063         2897.     94602733.    10.0703211     0.0003084     -0.000794
1.1814759    -19.351942 C
0.00003188         3012.     94502697.    10.0717368     0.0003210     -0.000826
1.2254772    -20.140508 C
0.00003313         3127.     94406117.    10.0734845     0.0003337     -0.000859
1.2691834    -20.928652 C
0.00003438         3242.     94312597.    10.0755306     0.0003463     -0.000891
1.3125933    -21.716373 C
0.00003563         3357.     94221794.    10.0778462     0.0003590     -0.000923
1.3557063    -22.503666 C
0.00003688         3471.     94133413.    10.0804061     0.0003717     -0.000956
1.3985212    -23.290530 C
0.00003813         3586.     94047197.    10.0831888     0.0003844     -0.000988
1.4410372    -24.076963 C
0.00003938         3700.     93962921.    10.0861753     0.0003971     -0.001020
1.4832533    -24.862961 C
0.00004063         3814.     93880388.    10.0893491     0.0004099     -0.001053
1.5251686    -25.648521 C
0.00004188         3928.     93799425.    10.0926956     0.0004226     -0.001085
1.5667821    -26.433642 C
0.00004313         4042.     93719877.    10.0962019     0.0004354     -0.001117
1.6080927    -27.218321 C
0.00004438         4155.     93641609.    10.0998566     0.0004482     -0.001149
1.6490996    -28.002554 C
0.00004563         4269.     93564497.    10.1036497     0.0004610     -0.001182
1.6898018    -28.786339 C
0.00004688         4382.     93488434.    10.1075722     0.0004738     -0.001214
1.7301982    -29.569674 C
0.00004813         4496.     93413321.    10.1116159     0.0004866     -0.001246
1.7702878    -30.352554 C
0.00004938         4609.     93339070.    10.1157737     0.0004995     -0.001278
1.8100696    -31.134978 C
0.00005063         4722.     93265602.    10.1200391     0.0005123     -0.001310
1.8495425    -31.916943 C
0.00005188         4834.     93192845.    10.1244063     0.0005252     -0.001342
1.8887057    -32.698446 C
0.00005313         4947.     93120733.    10.1288700     0.0005381     -0.001374
1.9275579    -33.479483 C
```

```
0.00005438         5060.     93049206.    10.1334255     0.0005510     -0.001406
1.9660981    -34.260052 C
0.00005563         5172.     92978211.    10.1380684     0.0005639     -0.001439
2.0043253    -35.040149 C
0.00005688         5284.     92907697.    10.1427948     0.0005769     -0.001471
2.0422384    -35.819772 C
0.00005813         5396.     92837619.    10.1476012     0.0005898     -0.001503
2.0798362    -36.598918 C
0.00005938         5508.     92767935.    10.1524844     0.0006028     -0.001535
2.1171178    -37.377583 C
0.00006063         5620.     92698606.    10.1574414     0.0006158     -0.001567
2.1540819    -38.155764 C
0.00006188         5731.     92629597.    10.1624696     0.0006288     -0.001599
2.1907275    -38.933458 C
0.00006313         5843.     92560874.    10.1675664     0.0006418     -0.001631
2.2270535    -39.710662 C
0.00006438         5954.     92492407.    10.1727297     0.0006549     -0.001663
2.2630586    -40.487373 C
0.00006563         6065.     92424168.    10.1779574     0.0006679     -0.001695
2.2987417    -41.263586 C
0.00006688         6176.     92356130.    10.1832476     0.0006810     -0.001726
2.3341018    -42.039299 C
0.00006813         6287.     92288268.    10.1885986     0.0006941     -0.001758
2.3691375    -42.814509 C
0.00006938         6398.     92220560.    10.1940089     0.0007072     -0.001790
2.4038477    -43.589211 C
0.00007063         6508.     92152983.    10.1995039     0.0007203     -0.001822
2.4382312    -44.363403 C
0.00007188         6619.     92085519.    10.2050285     0.0007335     -0.001854
2.4722868    -45.137081 C
0.00007313         6729.     92018147.    10.2106084     0.0007467     -0.001886
2.5060133    -45.910241 C
0.00007438         6839.     91950850.    10.2162424     0.0007598     -0.001918
2.5394094    -46.682880 C
0.00007938         7277.     91682087.    10.2393011     0.0008127     -0.002045
2.6696649    -49.768146 C
0.00008438         7713.     91413389.    10.2630109     0.0008659     -0.002172
2.7945082    -52.845065 C
0.00008938         8146.     91144431.    10.2866786     0.0009194     -0.002298
2.9137126    -55.915279 C
0.00009438         8576.     90874234.    10.3110673     0.0009731     -0.002424
3.0273448    -58.976728 C
0.00009938         8985.     90417533.    10.3290580     0.0010265     -0.002551
3.1339327    -60.000000 CY
 0.0001044         9311.     89207952.    10.3175636     0.0010769     -0.002681
3.2289512    -60.000000 CY
 0.0001094         9552.     87336121.    10.2781631     0.0011242     -0.002813
3.3128936    -60.000000 CY
 0.0001144         9789.     85583430.    10.2421143     0.0011714     -0.002946
3.3919789    -60.000000 CY
```

```
 0.0001194        10011.     83861611.    10.2051482     0.0012182     -0.003079
3.4655044    -60.000000 CY
 0.0001244        10162.     81702300.    10.1438002     0.0012616     -0.003216
3.5293615    -60.000000 CY
 0.0001294        10295.     79572057.    10.0817619     0.0013043     -0.003353
3.5881988    -60.000000 CY
 0.0001344        10427.     77592674.    10.0256713     0.0013472     -0.003490
3.6433355    -60.000000 CY
 0.0001394        10557.     75747771.     9.9749147     0.0013903     -0.003627
3.6947252    -60.000000 CY
 0.0001444        10687.     74023236.     9.9289636     0.0014335     -0.003764
3.7423201    -60.000000 CY
 0.0001494        10816.     72406063.     9.8867661     0.0014768     -0.003901
3.7859739    -60.000000 CY
 0.0001544        10933.     70821400.     9.8425115     0.0015194     -0.004038
3.8249324    -60.000000 CY
 0.0001594        11017.     69123456.     9.7867573     0.0015598     -0.004178
3.8581753    -60.000000 CY
 0.0001644        11079.     67401534.     9.7260868     0.0015987     -0.004319
3.8869352    -60.000000 CY
 0.0001694        11139.     65767574.     9.6691048     0.0016377     -0.004460
3.9124557    -60.000000 CY
 0.0001744        11199.     64223403.     9.6148605     0.0016766     -0.004601
3.9348020    -60.000000 CY
 0.0001794        11258.     62761436.     9.5654896     0.0017158     -0.004742
3.9539345    -60.000000 CY
 0.0001844        11316.     61373390.     9.5189681     0.0017551     -0.004882
3.9697370    -60.000000 CY
 0.0001894        11373.     60052811.     9.4743244     0.0017942     -0.005023
3.9821950    -60.000000 CY
 0.0001944        11429.     58796578.     9.4331695     0.0018336     -0.005164
3.9914019    -60.000000 CY
 0.0001994        11484.     57599778.     9.3948139     0.0018731     -0.005304
3.9973136    -60.000000 CY
 0.0002044        11539.     56457972.     9.3581635     0.0019126     -0.005445
3.9998845    -60.000000 CY
 0.0002094        11592.     55366642.     9.3266817     0.0019528     -0.005585
3.9975630    -60.000000 CY
 0.0002144        11645.     54322678.     9.2959142     0.0019928     -0.005725
3.9999044    -60.000000 CY
 0.0002194        11698.     53322120.     9.2675435     0.0020331     -0.005864
3.9971169    -60.000000 CY
 0.0002244        11748.     52356977.     9.2405172     0.0020733     -0.006004
3.9997515    -60.000000 CY
 0.0002294        11794.     51418840.     9.2141042     0.0021135     -0.006144
3.9957066    -60.000000 CY
 0.0002344        11831.     50480617.     9.1845645     0.0021526     -0.006285
3.9990577    -60.000000 CY
 0.0002394        11864.     49560513.     9.1526832     0.0021909     -0.006427
3.9990468    -60.000000 CY
```

```
   0.0002444        11885.     48632992.     9.1162023     0.0022278     -0.006570
  3.9966747    -60.000000 CY
   0.0002494        11904.     47735462.     9.0796192     0.0022642     -0.006713
  3.9992545    -60.000000 CY
   0.0002544        11921.     46863378.     9.0457647     0.0023010     -0.006856
  3.9991650    -60.000000 CY
   0.0002594        11937.     46022914.     9.0128664     0.0023377     -0.007000
  3.9956629    -60.000000 CY
   0.0002644        11953.     45213284.     8.9816750     0.0023745     -0.007143
  3.9986069    -60.000000 CY
   0.0002694        11969.     44432753.     8.9518321     0.0024114     -0.007286
  3.9999247    -60.000000 CY
   0.0002744        11984.     43679063.     8.9240509     0.0024485     -0.007429
  3.9940409    -60.000000 CY
   0.0003044        12070.     39655848.     8.7807001     0.0026726     -0.008285
  3.9985866    -60.000000 CY
   0.0003344        12146.     36325110.     8.6675807     0.0028982     -0.009139
  3.9998625    -60.000000 CY
   0.0003644        12216.     33525083.     8.5838110     0.0031277     -0.009990
  3.9999751    -60.000000 CYT
   0.0003944        12280.     31137740.     8.5203443     0.0033602     -0.010837
  3.9996828    -60.000000 CYT
   0.0004244        12339.     29075625.     8.4715220     0.0035951     -0.011682
  3.9974037    -60.000000 CYT
   0.0004544        12385.     27257253.     8.4224181     0.0038269     -0.012531
  3.9878351    -60.000000 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           Axial Thrust        Nominal Mom. Cap.      Max. Comp.      Max.
Tens.
  No.              kips                 in-kip               Strain
Strain
 ----         ---------------     ------------------     ------------
------------
   1                3.800             12169.214          0.00300000
-0.00952396
   2                4.200             12173.120          0.00300000
-0.00952020
   3                4.600             12177.027          0.00300000
-0.00951645

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	3.800000	12169.	2.470000	7910.	91219895.
2	0.65	4.200000	12173.	2.730000	7913.	91253873.
3	0.65	4.600000	12177.	2.990000	7915.	91287886.
1	0.75	3.800000	12169.	2.850000	9127.	89806706.
2	0.75	4.200000	12173.	3.150000	9130.	89838295.
3	0.75	4.600000	12177.	3.450000	9133.	89869877.
1	0.90	3.800000	12169.	3.420000	10952.	70221645.
2	0.90	4.200000	12173.	3.780000	10956.	70254444.
3	0.90	4.600000	12177.	4.140000	10959.	70287179.

Layering Correction Equivalent Depths of Soil & Rock Layers

Layer	Top of Layer Below	Equivalent Top Depth Below	Same Layer Type As	Layer is Rock or	F0 Integral	F1 Integral

No.	Pile Head ft	Grnd Surf ft	Layer Above	is Below Rock Layer	for Layer lbs	for Layer lbs
1	1.0000	0.00	N.A.	No	0.00	8767.
2	4.0000	0.3501	No	No	8767.	20784.
3	4.8000	0.7138	Yes	No	29551.	199354.
4	12.3000	11.3000	No	No	228905.	0.00
5	17.3000	16.3000	No	No	0.00	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 = 1000.0 lbs
Applied moment at pile head = 315600.0 in-lbs
Axial thrust load on pile head = 4200.0 lbs

Depth X	Deflect. y	Bending Moment	Shear Force	Slope S	Total Stress	Bending Stiffness	Soil Res. Es*H	Soil Spr. Lat. Load	Distrib. p
feet	inches	in-lbs	lbs	radians	psi*	lb-in^2	lb/inch	lb/inch	lb/inch
0.00	0.00836	315600.	1000.0000	-1.38E-04	0.00	3.84E+11	0.00	0.00	0.00
0.09000	0.00821	316681.	1000.0000	-1.37E-04	0.00	3.84E+11	0.00	0.00	0.00
0.1800	0.00806	317761.	1000.	-1.36E-04	0.00	3.84E+11	0.00	0.00	0.00
0.2700	0.00791	318842.	1000.	-1.35E-04	0.00	3.84E+11	0.00	0.00	0.00
0.3600	0.00777	319922.	1000.	-1.34E-04	0.00	3.84E+11	0.00	0.00	0.00
0.4500	0.00762	321003.	1000.	-1.33E-04	0.00	3.84E+11	0.00	0.00	0.00
0.5400	0.00748	322084.	1000.	-1.32E-04	0.00	3.84E+11			

```
0.00       0.00       0.00
    0.6300    0.00734    323164.      1000.  -1.32E-04       0.00   3.84E+11
0.00       0.00       0.00
    0.7200    0.00720    324245.      1000.  -1.31E-04       0.00   3.84E+11
0.00       0.00       0.00
    0.8100    0.00705    325325.      1000.  -1.30E-04       0.00   3.84E+11
0.00       0.00       0.00
    0.9000    0.00692    326406.      1000.  -1.29E-04       0.00   3.84E+11
0.00       0.00       0.00
    0.9900    0.00678    327487.      1000.  -1.28E-04       0.00   3.84E+11
0.00       0.00       0.00
    1.0800    0.00664    328567.   992.0555  -1.27E-04       0.00   3.84E+11
-14.712      2393.       0.00
    1.1700    0.00650    329631.   976.0911  -1.26E-04       0.00   3.84E+11
-14.852      2467.       0.00
    1.2600    0.00637    330677.   959.9781  -1.25E-04       0.00   3.84E+11
-14.987      2542.       0.00
    1.3500    0.00623    331705.   943.7207  -1.24E-04       0.00   3.84E+11
-15.119      2620.       0.00
    1.4400    0.00610    332716.   927.3236  -1.23E-04       0.00   3.84E+11
-15.246      2700.       0.00
    1.5300    0.00597    333709.   910.7911  -1.22E-04       0.00   3.84E+11
-15.369      2782.       0.00
    1.6200    0.00583    334685.   894.1279  -1.21E-04       0.00   3.84E+11
-15.488      2867.       0.00
    1.7100    0.00570    335642.   877.3385  -1.20E-04       0.00   3.84E+11
-15.603      2955.       0.00
    1.8000    0.00557    336581.   860.4278  -1.20E-04       0.00   3.84E+11
-15.713      3045.       0.00
    1.8900    0.00545    337501.   843.4005  -1.19E-04       0.00   3.84E+11
-15.819      3137.       0.00
    1.9800    0.00532    338404.   826.2614  -1.18E-04       0.00   3.84E+11
-15.920      3233.       0.00
    2.0700    0.00519    339287.   809.0155  -1.17E-04       0.00   3.84E+11
-16.017      3332.       0.00
    2.1600    0.00507    340152.   791.6676  -1.16E-04       0.00   3.84E+11
-16.109      3434.       0.00
    2.2500    0.00494    340998.   774.2230  -1.15E-04       0.00   3.84E+11
-16.196      3540.       0.00
    2.3400    0.00482    341826.   756.6867  -1.14E-04       0.00   3.84E+11
-16.279      3649.       0.00
    2.4300    0.00470    342634.   739.0641  -1.13E-04       0.00   3.84E+11
-16.356      3762.       0.00
    2.5200    0.00457    343423.   721.3603  -1.12E-04       0.00   3.84E+11
-16.429      3879.       0.00
    2.6100    0.00445    344193.   703.5809  -1.11E-04       0.00   3.84E+11
-16.496      4000.       0.00
    2.7000    0.00433    344944.   685.7315  -1.10E-04       0.00   3.84E+11
-16.558      4126.       0.00
    2.7900    0.00422    345675.   667.8175  -1.09E-04       0.00   3.84E+11
```

```
-16.615      4256.       0.00
    2.8800    0.00410    346387.   649.8449  -1.08E-04       0.00   3.84E+11
-16.667      4391.       0.00
    2.9700    0.00398    347080.   631.8194  -1.07E-04       0.00   3.84E+11
-16.713      4532.       0.00
    3.0600    0.00387    347753.   613.7471  -1.06E-04       0.00   3.84E+11
-16.754      4678.       0.00
    3.1500    0.00375    348406.   595.6342  -1.05E-04       0.00   3.84E+11
-16.789      4830.       0.00
    3.2400    0.00364    349040.   577.4868  -1.04E-04       0.00   3.84E+11
-16.818      4988.       0.00
    3.3300    0.00353    349655.   559.3114  -1.03E-04       0.00   3.84E+11
-16.841      5153.       0.00
    3.4200    0.00342    350249.   541.1146  -1.02E-04       0.00   3.84E+11
-16.857      5326.       0.00
    3.5100    0.00331    350824.   522.9032  -1.01E-04       0.00   3.84E+11
-16.868      5506.       0.00
    3.6000    0.00320    351380.   504.6841  -1.00E-04       0.00   3.84E+11
-16.871      5694.       0.00
    3.6900    0.00309    351915.   486.4644  -9.92E-05       0.00   3.84E+11
-16.869      5891.       0.00
    3.7800    0.00299    352431.   468.2515  -9.82E-05       0.00   3.84E+11
-16.859      6098.       0.00
    3.8700    0.00288    352928.   450.0530  -9.72E-05       0.00   3.84E+11
-16.842      6315.       0.00
    3.9600    0.00278    353404.   431.8766  -9.62E-05       0.00   3.84E+11
-16.818      6543.       0.00
    4.0500    0.00267    353862.   263.8658  -9.52E-05       0.00   3.84E+11
-294.313    118924.       0.00
    4.1400    0.00257    353975.    -53.370  -9.42E-05       0.00   3.84E+11
-293.161    123172.       0.00
    4.2300    0.00247    353747.   -369.311  -9.32E-05       0.00   3.84E+11
-291.915    127674.       0.00
    4.3200    0.00237    353178.   -683.853  -9.22E-05       0.00   3.84E+11
-290.570    132456.       0.00
    4.4100    0.00227    352271.   -996.886  -9.12E-05       0.00   3.84E+11
-289.122    137546.       0.00
    4.5000    0.00217    351026.     -1308.  -9.02E-05       0.00   3.84E+11
-287.567    142976.       0.00
    4.5900    0.00208    349446.     -1618.  -8.92E-05       0.00   3.84E+11
-285.898    148785.       0.00
    4.6800    0.00198    347532.     -1926.  -8.83E-05       0.00   3.84E+11
-284.110    155014.       0.00
    4.7700    0.00188    345287.     -2232.  -8.73E-05       0.00   3.84E+11
-282.195    161713.       0.00
    4.8600    0.00179    342713.     -2638.  -8.63E-05       0.00   3.84E+11
-470.256    283589.       0.00
    4.9500    0.00170    339590.     -3144.  -8.54E-05       0.00   3.84E+11
-466.511    296689.       0.00
    5.0400    0.00161    335923.     -3645.  -8.44E-05       0.00   3.84E+11
```

```
-462.509    310929.       0.00
    5.1300    0.00152    331716.     -4143.  -8.35E-05       0.00   3.84E+11
-458.229    326475.       0.00
    5.2200    0.00143    326976.     -4635.  -8.26E-05       0.00   3.84E+11
-453.648    343528.       0.00
    5.3100    0.00134    321705.     -5122.  -8.16E-05       0.00   3.84E+11
-448.737    362333.       0.00
    5.4000    0.00125    315912.     -5604.  -8.07E-05       0.00   3.84E+11
-443.464    383196.       0.00
    5.4900    0.00116    309601.     -6080.  -7.99E-05       0.00   3.84E+11
-437.790    406498.       0.00
    5.5800    0.00108    302780.     -6550.  -7.90E-05       0.00   3.85E+11
-431.668    432729.       0.00
    5.6700   9.92E-04    295455.     -7012.  -7.82E-05       0.00   3.85E+11
-425.041    462520.       0.00
    5.7600   9.09E-04    287634.     -7467.  -7.73E-05       0.00   3.85E+11
-417.840    496708.       0.00
    5.8500   8.25E-04    279326.     -7914.  -7.66E-05       0.00   3.85E+11
-409.978    536427.       0.00
    5.9400   7.43E-04    270540.     -8352.  -7.58E-05       0.00   3.85E+11
-401.345    583250.       0.00
    6.0300   6.62E-04    261286.     -8767.  -7.50E-05       0.00   3.85E+11
-367.308    599471.       0.00
    6.1200   5.81E-04    251603.     -9141.  -7.43E-05       0.00   3.85E+11
-324.130    602411.       0.00
    6.2100   5.01E-04    241542.     -9468.  -7.36E-05       0.00   3.85E+11
-280.940    605348.       0.00
    6.3000   4.22E-04    231154.     -9748.  -7.30E-05       0.00   3.85E+11
-237.727    608284.       0.00
    6.3900   3.44E-04    220488.     -9981.  -7.23E-05       0.00   3.85E+11
-194.479    611219.       0.00
    6.4800   2.66E-04    209595.    -10168.  -7.17E-05       0.00   3.85E+11
-151.186    614152.       0.00
    6.5700   1.89E-04    198526.    -10308.  -7.11E-05       0.00   3.85E+11
-107.832    617084.       0.00
    6.6600   1.12E-04    187332.    -10401.  -7.06E-05       0.00   3.85E+11
-64.405    620014.       0.00
    6.7500   3.62E-05    176062.    -10447.  -7.01E-05       0.00   3.85E+11
-20.891    622943.       0.00
    6.8400  -3.92E-05    164767.    -10446.  -6.96E-05       0.00   3.85E+11
22.7268    625871.       0.00
    6.9300  -1.14E-04    153500.    -10398.  -6.92E-05       0.00   3.85E+11
66.4625    628798.       0.00
    7.0200  -1.89E-04    142309.    -10302.  -6.88E-05       0.00   3.85E+11
110.3320    631724.       0.00
    7.1100  -2.63E-04    131248.    -10159.  -6.84E-05       0.00   3.85E+11
154.3512    634648.       0.00
    7.2000  -3.36E-04    120366.     -9969.  -6.80E-05       0.00   3.85E+11
198.5363    637572.       0.00
    7.2900  -4.10E-04    109716.     -9730.  -6.77E-05       0.00   3.85E+11
```

```
242.9033    640495.       0.00
    7.3800  -4.83E-04     99350.     -9444.  -6.74E-05       0.00   3.85E+11
287.4685    643417.       0.00
    7.4700  -5.55E-04     89318.     -9109.  -6.71E-05       0.00   3.85E+11
332.2476    646338.       0.00
    7.5600  -6.28E-04     79675.     -8726.  -6.69E-05       0.00   3.85E+11
377.2565    649258.       0.00
    7.6500  -7.00E-04     70471.     -8294.  -6.67E-05       0.00   3.85E+11
422.5104    652177.       0.00
    7.7400  -7.72E-04     61760.     -7826.  -6.65E-05       0.00   3.85E+11
444.8662    622682.       0.00
    7.8300  -8.43E-04     53568.     -7339.  -6.63E-05       0.00   3.85E+11
456.8936    585121.       0.00
    7.9200  -9.15E-04     45909.     -6839.  -6.62E-05       0.00   3.85E+11
468.3639    552890.       0.00
    8.0100  -9.86E-04     38796.     -6327.  -6.61E-05       0.00   3.85E+11
479.3589    524890.       0.00
    8.1000   -0.00106     32242.     -5804.  -6.60E-05       0.00   3.85E+11
489.9435    500307.       0.00
    8.1900   -0.00113     26260.     -5269.  -6.59E-05       0.00   3.85E+11
500.1705    478530.       0.00
    8.2800   -0.00120     20861.     -4724.  -6.58E-05       0.00   3.85E+11
510.0833    459084.       0.00
    8.3700   -0.00127     16057.     -4168.  -6.58E-05       0.00   3.85E+11
519.7180    441601.       0.00
    8.4600   -0.00134     11860.     -3601.  -6.57E-05       0.00   3.85E+11
529.1050    425786.       0.00
    8.5500   -0.00141      8279.     -3025.  -6.57E-05       0.00   3.85E+11
538.2701    411401.       0.00
    8.6400   -0.00148      5326.     -2439.  -6.57E-05       0.00   3.85E+11
547.2352    398254.       0.00
    8.7300   -0.00155      3012.     -1843.  -6.57E-05       0.00   3.85E+11
556.0192    386184.       0.00
    8.8200   -0.00163      1346.     -1238.  -6.57E-05       0.00   3.85E+11
564.6385    375061.       0.00
    8.9100   -0.00170   338.7967   -623.454  -6.57E-05       0.00   3.85E+11
573.1073    364773.       0.00
    9.0000   -0.00177       0.00       0.00  -6.57E-05       0.00   3.85E+11
581.4380    177613.       0.00

* This analysis computed pile response using nonlinear moment-curvature rela-
  tionships. 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 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. 1:
```

```
Pile-head deflection              =     0.00835531 inches
Computed slope at pile head       =     -0.0001378 radians
Maximum bending moment            =        353975. inch-lbs
Maximum shear force               =        -10447. lbs
Depth of maximum bending moment   =     4.14000000 feet below pile head
Depth of maximum shear force      =     6.75000000 feet below pile head
Number of iterations              =             15
Number of zero deflection points  =              1
Pile deflection at ground         =     0.00676113 inches
```

Pile-head Deflection vs. Pile Length for Load Case 1

Boundary Condition Type 1, Shear and Moment

```
Shear      =           1000. lbs
Moment     =         315600. in-lbs
Axial Load =           4200. lbs
```

Pile Length feet	Pile Head Deflection inches	Maximum Moment ln-lbs	Maximum Shear lbs
9.00000	0.00835531	353975.	-10447.
8.55000	0.01425853	351217.	-11851.
8.10000	0.03169509	347645.	-13366.
7.65000	0.07831862	343115.	-14799.
7.20000	0.21064622	338695.	-16154.
6.75000	0.70076780	336048.	-17823.
6.30000	2.45480229	336010.	-19580.
5.85000	14.95373356	352198.	-23593.

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                          =       2250.0 lbs
Applied moment at pile head                       =     724800.0 in-lbs
Axial thrust load on pile head                    =       4600.0 lbs
```

```
   Depth    Deflect.    Bending     Shear      Slope      Total     Bending   Soil
Res.  Soil Spr.  Distrib.
```

TP 26 NE Ohio Site 8 BEL-70 Vacant Weigh Station - Eastbound Parking Area
Light Tower CM1-1 (Boring B-008-0-26) Lateral Load Analysis
36" Diameter, 8' Embedment Light Tower Drilled Shaft Foundation

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
0.00	0.1440	724800.	2250.	-0.00184	0.00	3.83E+11	0.00	0.00	0.00
0.09000	0.1420	727239.	2250.	-0.00184	0.00	3.83E+11	0.00	0.00	0.00
0.1800	0.1401	729678.	2250.	-0.00184	0.00	3.83E+11	0.00	0.00	0.00
0.2700	0.1381	732117.	2250.	-0.00184	0.00	3.83E+11	0.00	0.00	0.00
0.3600	0.1361	734557.	2250.	-0.00183	0.00	3.83E+11	0.00	0.00	0.00
0.4500	0.1341	736996.	2250.	-0.00183	0.00	3.83E+11	0.00	0.00	0.00
0.5400	0.1321	739435.	2250.	-0.00183	0.00	3.83E+11	0.00	0.00	0.00
0.6300	0.1302	741874.	2250.	-0.00183	0.00	3.83E+11	0.00	0.00	0.00
0.7200	0.1282	744313.	2250.	-0.00183	0.00	3.83E+11	0.00	0.00	0.00
0.8100	0.1262	746752.	2250.	-0.00182	0.00	3.83E+11	0.00	0.00	0.00
0.9000	0.1242	749191.	2250.	-0.00182	0.00	3.83E+11	0.00	0.00	0.00
0.9900	0.1223	751630.	2250.	-0.00182	0.00	3.83E+11	0.00	0.00	0.00
1.0800	0.1203	754069.	2229.	-0.00182	0.00	3.83E+11	-38.615	346.6274	0.00
1.1700	0.1184	756463.	2187.	-0.00182	0.00	3.83E+11	-39.039	356.2344	0.00
1.2600	0.1164	758812.	2145.	-0.00181	0.00	3.83E+11	-39.453	366.0734	0.00
1.3500	0.1144	761114.	2102.	-0.00181	0.00	3.83E+11	-39.857	376.1539	0.00
1.4400	0.1125	763370.	2059.	-0.00181	0.00	3.83E+11	-40.253	386.4864	0.00
1.5300	0.1105	765579.	2015.	-0.00181	0.00	3.83E+11	-40.638	397.0819	0.00
1.6200	0.1086	767740.	1971.	-0.00180	0.00	3.83E+11	-41.014	407.9519	0.00
1.7100	0.1066	769854.	1926.	-0.00180	0.00	3.83E+11	-41.380	419.1089	0.00
1.8000	0.1047	771919.	1882.	-0.00180	0.00	3.83E+11	-41.736	430.5660	0.00
1.8900	0.1027	773936.	1836.	-0.00180	0.00	3.83E+11	-42.081	442.3373	0.00

```
    1.9800     0.1008    775904.      1791.   -0.00180       0.00   3.83E+11
-42.415   454.4378       0.00
    2.0700    0.09886    777822.      1745.   -0.00179       0.00   3.83E+11
-42.739   466.8834       0.00
    2.1600    0.09693    779690.      1698.   -0.00179       0.00   3.83E+11
-43.052   479.6914       0.00
    2.2500    0.09499    781508.      1652.   -0.00179       0.00   3.83E+11
-43.353   492.8800       0.00
    2.3400    0.09306    783276.      1605.   -0.00179       0.00   3.83E+11
-43.642   506.4689       0.00
    2.4300    0.09113    784992.      1557.   -0.00178       0.00   3.83E+11
-43.920   520.4792       0.00
    2.5200    0.08921    786658.      1510.   -0.00178       0.00   3.83E+11
-44.185   534.9336       0.00
    2.6100    0.08728    788271.      1462.   -0.00178       0.00   3.83E+11
-44.438   549.8565       0.00
    2.7000    0.08536    789833.      1414.   -0.00178       0.00   3.83E+11
-44.679   565.2742       0.00
    2.7900    0.08344    791343.      1366.   -0.00178       0.00   3.83E+11
-44.906   581.2154       0.00
    2.8800    0.08153    792801.      1317.   -0.00177       0.00   3.83E+11
-45.119   597.7108       0.00
    2.9700    0.07961    794205.      1268.   -0.00177       0.00   3.83E+11
-45.319   614.7938       0.00
    3.0600    0.07770    795557.      1219.   -0.00177       0.00   3.83E+11
-45.504   632.5007       0.00
    3.1500    0.07579    796856.      1170.   -0.00177       0.00   3.83E+11
-45.675   650.8710       0.00
    3.2400    0.07388    798102.      1120.   -0.00176       0.00   3.83E+11
-45.831   669.9480       0.00
    3.3300    0.07198    799294.      1071.   -0.00176       0.00   3.83E+11
-45.971   689.7785       0.00
    3.4200    0.07008    800432.      1021.   -0.00176       0.00   3.83E+11
-46.095   710.4143       0.00
    3.5100    0.06818    801517.   971.2687   -0.00176       0.00   3.83E+11
-46.202   731.9120       0.00
    3.6000    0.06628    802547.   921.3218   -0.00176       0.00   3.83E+11
-46.292   754.3340       0.00
    3.6900    0.06438    803524.   871.2874   -0.00175       0.00   3.83E+11
-46.364   777.7492       0.00
    3.7800    0.06249    804447.   821.1848   -0.00175       0.00   3.83E+11
-46.418   802.2337       0.00
    3.8700    0.06060    805315.   771.0346   -0.00175       0.00   3.83E+11
-46.453   827.8721       0.00
    3.9600    0.05871    806130.   720.8578   -0.00175       0.00   3.83E+11
-46.467   854.7586       0.00
    4.0500    0.05683    806890.   354.8378   -0.00174       0.00   3.83E+11
-631.348     11999.        0.00
    4.1400    0.05494    806913.   -326.133   -0.00174       0.00   3.83E+11
-629.709     12378.        0.00
```

```
    4.2300    0.05306    806203.     -1005.   -0.00174       0.00   3.83E+11
-627.864     12779.       0.00
    4.3200    0.05119    804759.     -1682.   -0.00174       0.00   3.83E+11
-625.805     13204.       0.00
    4.4100    0.04931    802586.     -2357.   -0.00174       0.00   3.83E+11
-623.520     13656.       0.00
    4.5000    0.04744    799686.     -3029.   -0.00173       0.00   3.83E+11
-620.998     14138.       0.00
    4.5900    0.04557    796061.     -3698.   -0.00173       0.00   3.83E+11
-618.226     14653.       0.00
    4.6800    0.04370    791715.     -4364.   -0.00173       0.00   3.83E+11
-615.188     15204.       0.00
    4.7700    0.04183    786652.     -5027.   -0.00173       0.00   3.83E+11
-611.869     15797.       0.00
    4.8600    0.03997    780875.     -5908.   -0.00172       0.00   3.83E+11
-1021.     27588.       0.00
    4.9500    0.03811    773907.     -7008.   -0.00172       0.00   3.83E+11
-1014.     28744.       0.00
    5.0400    0.03625    765756.     -8099.   -0.00172       0.00   3.83E+11
-1007.     30000.       0.00
    5.1300    0.03439    756430.     -9182.   -0.00172       0.00   3.83E+11
-998.991     31369.       0.00
    5.2200    0.03254    745939.    -10256.   -0.00172       0.00   3.83E+11
-990.369     32870.       0.00
    5.3100    0.03069    734293.    -11321.   -0.00171       0.00   3.83E+11
-981.011     34524.       0.00
    5.4000    0.02884    721503.    -12375.   -0.00171       0.00   3.83E+11
-970.843     36358.       0.00
    5.4900    0.02699    707580.    -13418.   -0.00171       0.00   3.83E+11
-959.782     38403.       0.00
    5.5800    0.02515    692538.    -14448.   -0.00171       0.00   3.83E+11
-947.725     40703.       0.00
    5.6700    0.02330    676390.    -15464.   -0.00171       0.00   3.84E+11
-934.551     43312.       0.00
    5.7600    0.02146    659153.    -16466.   -0.00170       0.00   3.84E+11
-920.112     46301.       0.00
    5.8500    0.01962    640842.    -17451.   -0.00170       0.00   3.84E+11
-904.222     49765.       0.00
    5.9400    0.01779    621476.    -18418.   -0.00170       0.00   3.84E+11
-886.648     53838.       0.00
    6.0300    0.01595    601076.    -19365.   -0.00170       0.00   3.84E+11
-867.091     58707.       0.00
    6.1200    0.01412    579665.    -20289.   -0.00170       0.00   3.84E+11
-845.149     64652.       0.00
    6.2100    0.01229    557268.    -21189.   -0.00170       0.00   3.84E+11
-820.275     72103.       0.00
    6.3000    0.01046    533915.    -22059.   -0.00169       0.00   3.84E+11
-791.685     81767.       0.00
    6.3900    0.00863    509637.    -22896.   -0.00169       0.00   3.84E+11
-758.190     94900.       0.00
```

```
    6.4800    0.00680    484476.    -23693.   -0.00169       0.00   3.84E+11
-717.844    113979.       0.00
    6.5700    0.00498    458477.    -24441.   -0.00169       0.00   3.84E+11
-667.079    144763.       0.00
    6.6600    0.00315    431700.    -25124.   -0.00169       0.00   3.84E+11
-597.968    204828.       0.00
    6.7500    0.00133    404226.    -25709.   -0.00169       0.00   3.84E+11
-484.225    393077.       0.00
    6.8400  -4.91E-04    376187.    -25816.   -0.00169       0.00   3.84E+11
284.4341    625871.       0.00
    6.9300   -0.00231    348479.    -25360.   -0.00168       0.00   3.84E+11
561.1151    262234.       0.00
    7.0200   -0.00413    321426.    -24705.   -0.00168       0.00   3.84E+11
651.7926    170445.       0.00
    7.1100   -0.00595    295133.    -23965.   -0.00168       0.00   3.85E+11
717.3360    130248.       0.00
    7.2000   -0.00777    269677.    -23162.   -0.00168       0.00   3.85E+11
770.3072    107135.       0.00
    7.2900   -0.00958    245120.    -22306.   -0.00168       0.00   3.85E+11
815.5888     91930.       0.00
    7.3800   -0.01140    221514.    -21403.   -0.00168       0.00   3.85E+11
855.6345     81080.       0.00
    7.4700   -0.01321    198905.    -20460.   -0.00168       0.00   3.85E+11
891.8654     72904.       0.00
    7.5600   -0.01503    177337.    -19478.   -0.00168       0.00   3.85E+11
925.1841     66496.       0.00
    7.6500   -0.01684    156849.    -18463.   -0.00168       0.00   3.85E+11
956.2020     61323.       0.00
    7.7400   -0.01865    137475.    -17414.   -0.00168       0.00   3.85E+11
985.3540     57049.       0.00
    7.8300   -0.02047    119251.    -16335.   -0.00168       0.00   3.85E+11
1013.     53453.       0.00
    7.9200   -0.02228    102208.    -15227.   -0.00168       0.00   3.85E+11
1039.     50379.       0.00
    8.0100   -0.02409     86378.    -14091.   -0.00168       0.00   3.85E+11
1064.     47719.       0.00
    8.1000   -0.02590     71789.    -12928.   -0.00168       0.00   3.85E+11
1089.     45391.       0.00
    8.1900   -0.02772     58470.    -11740.   -0.00168       0.00   3.85E+11
1112.     43336.       0.00
    8.2800   -0.02953     46448.    -10526.   -0.00168       0.00   3.85E+11
1135.     41506.       0.00
    8.3700   -0.03134     35749.     -9289.   -0.00168       0.00   3.85E+11
1157.     39865.       0.00
    8.4600   -0.03315     26400.     -8028.   -0.00168       0.00   3.85E+11
1178.     38385.       0.00
    8.5500   -0.03496     18426.     -6744.   -0.00168       0.00   3.85E+11
1199.     37042.       0.00
    8.6400   -0.03677     11849.     -5438.   -0.00168       0.00   3.85E+11
1220.     35817.       0.00
```

```
    8.7300   -0.03858      6696.     -4110.   -0.00168       0.00   3.85E+11
1240.     34696.       0.00
    8.8200   -0.04039      2988.     -2761.   -0.00168       0.00   3.85E+11
1259.     33665.       0.00
    8.9100   -0.04221   748.2556     -1391.   -0.00168       0.00   3.85E+11
1278.     32713.       0.00
    9.0000   -0.04402       0.00       0.00   -0.00168       0.00   3.85E+11
1297.     15915.       0.00

* This analysis computed pile response using nonlinear moment-curvature rela-
  tionships. 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 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              =     0.14403349 inches
Computed slope at pile head       =     -0.0018425 radians
Maximum bending moment            =        806913. inch-lbs
Maximum shear force               =        -25816. lbs
Depth of maximum bending moment   =     4.14000000 feet below pile head
Depth of maximum shear force      =     6.84000000 feet below pile head
Number of iterations              =             34
Number of zero deflection points  =              1
Pile deflection at ground         =     0.12206153 inches



--------------------------------------------------------------------------------
            Pile-head Deflection vs. Pile Length for Load Case 2
--------------------------------------------------------------------------------

Boundary Condition Type 1, Shear and Moment

Shear      =           2250. lbs
Moment     =         724800. in-lbs
Axial Load =           4600. lbs


    Pile       Pile Head       Maximum       Maximum
   Length      Deflection      Moment         Shear
    feet         inches        ln-lbs          lbs
------------  ------------  ------------  ------------
    9.00000    0.14403349       806913.       -25816.
    8.55000    0.30089826       798592.       -27768.
    8.10000    0.73214426       789594.       -30368.
    7.65000    1.87334157       783462.       -33330.
```

```
    7.20000    5.25587538       780699.       -36800.
    6.75000   26.34520069       813283.       -45269.


--------------------------------------------------------------------------------
                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                              =       2250.0 lbs
Applied moment at pile head                           =     724800.0 in-lbs
Axial thrust load on pile head                        =       3800.0 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
---------- ---------- ---------- ---------- ---------- ---------- ----------
---------- ---------- ----------
      0.00     0.1439    724800.      2250.   -0.00184       0.00   3.83E+11
0.00       0.00       0.00
   0.09000     0.1420    727238.      2250.   -0.00184       0.00   3.83E+11
0.00       0.00       0.00
    0.1800     0.1400    729675.      2250.   -0.00184       0.00   3.83E+11
0.00       0.00       0.00
    0.2700     0.1380    732113.      2250.   -0.00184       0.00   3.83E+11
0.00       0.00       0.00
    0.3600     0.1360    734550.      2250.   -0.00183       0.00   3.83E+11
0.00       0.00       0.00
    0.4500     0.1340    736988.      2250.   -0.00183       0.00   3.83E+11
0.00       0.00       0.00
    0.5400     0.1321    739425.      2250.   -0.00183       0.00   3.83E+11
0.00       0.00       0.00
    0.6300     0.1301    741863.      2250.   -0.00183       0.00   3.83E+11
0.00       0.00       0.00
    0.7200     0.1281    744300.      2250.   -0.00182       0.00   3.83E+11
0.00       0.00       0.00
    0.8100     0.1261    746738.      2250.   -0.00182       0.00   3.83E+11
0.00       0.00       0.00
    0.9000     0.1242    749175.      2250.   -0.00182       0.00   3.83E+11
0.00       0.00       0.00
    0.9900     0.1222    751613.      2250.   -0.00182       0.00   3.83E+11
0.00       0.00       0.00
    1.0800     0.1202    754050.      2229.   -0.00182       0.00   3.83E+11
-38.607   346.7720       0.00
    1.1700     0.1183    756442.      2187.   -0.00181       0.00   3.83E+11
```

```
-39.031   356.3831       0.00
    1.2600     0.1163    758789.      2145.   -0.00181       0.00   3.83E+11
-39.444   366.2262       0.00
    1.3500     0.1144    761090.      2102.   -0.00181       0.00   3.83E+11
-39.849   376.3111       0.00
    1.4400     0.1124    763345.      2059.   -0.00181       0.00   3.83E+11
-40.244   386.6480       0.00
    1.5300     0.1105    765552.      2015.   -0.00181       0.00   3.83E+11
-40.630   397.2480       0.00
    1.6200     0.1085    767712.      1971.   -0.00180       0.00   3.83E+11
-41.006   408.1226       0.00
    1.7100     0.1066    769824.      1927.   -0.00180       0.00   3.83E+11
-41.371   419.2843       0.00
    1.8000     0.1046    771888.      1882.   -0.00180       0.00   3.83E+11
-41.727   430.7464       0.00
    1.8900     0.1027    773903.      1836.   -0.00180       0.00   3.83E+11
-42.072   442.5227       0.00
    1.9800     0.1007    775870.      1791.   -0.00179       0.00   3.83E+11
-42.406   454.6283       0.00
    2.0700    0.09880    777786.      1745.   -0.00179       0.00   3.83E+11
-42.730   467.0793       0.00
    2.1600    0.09687    779653.      1699.   -0.00179       0.00   3.83E+11
-43.042   479.8928       0.00
    2.2500    0.09493    781470.      1652.   -0.00179       0.00   3.83E+11
-43.344   493.0870       0.00
    2.3400    0.09300    783236.      1605.   -0.00179       0.00   3.83E+11
-43.633   506.6817       0.00
    2.4300    0.09108    784951.      1558.   -0.00178       0.00   3.83E+11
-43.911   520.6980       0.00
    2.5200    0.08915    786615.      1510.   -0.00178       0.00   3.83E+11
-44.176   535.1586       0.00
    2.6100    0.08723    788227.      1462.   -0.00178       0.00   3.83E+11
-44.429   550.0878       0.00
    2.7000    0.08531    789788.      1414.   -0.00178       0.00   3.83E+11
-44.669   565.5122       0.00
    2.7900    0.08339    791296.      1366.   -0.00177       0.00   3.83E+11
-44.896   581.4602       0.00
    2.8800    0.08147    792752.      1317.   -0.00177       0.00   3.83E+11
-45.110   597.9627       0.00
    2.9700    0.07956    794156.      1268.   -0.00177       0.00   3.83E+11
-45.309   615.0530       0.00
    3.0600    0.07765    795507.      1219.   -0.00177       0.00   3.83E+11
-45.495   632.7675       0.00
    3.1500    0.07574    796804.      1170.   -0.00177       0.00   3.83E+11
-45.666   651.1457       0.00
    3.2400    0.07384    798048.      1121.   -0.00176       0.00   3.83E+11
-45.821   670.2308       0.00
    3.3300    0.07193    799239.      1071.   -0.00176       0.00   3.83E+11
-45.961   690.0699       0.00
    3.4200    0.07003    800376.      1021.   -0.00176       0.00   3.83E+11
```

```
-46.085   710.7145       0.00
    3.5100    0.06813    801460.   971.5374   -0.00176       0.00   3.83E+11
-46.192   732.2215       0.00
    3.6000    0.06624    802489.   921.6011   -0.00175       0.00   3.83E+11
-46.282   754.6531       0.00
    3.6900    0.06434    803465.   871.5773   -0.00175       0.00   3.83E+11
-46.355   778.0783       0.00
    3.7800    0.06245    804386.   821.4853   -0.00175       0.00   3.83E+11
-46.408   802.5732       0.00
    3.8700    0.06056    805254.   771.3457   -0.00175       0.00   3.83E+11
-46.443   828.2227       0.00
    3.9600    0.05867    806067.   721.1796   -0.00175       0.00   3.83E+11
-46.457   855.1207       0.00
    4.0500    0.05679    806826.   355.2192   -0.00174       0.00   3.83E+11
-631.247     12005.       0.00
    4.1400    0.05491    806848.   -325.643   -0.00174       0.00   3.83E+11
-629.608     12384.       0.00
    4.2300    0.05303    806136.     -1005.   -0.00174       0.00   3.83E+11
-627.764     12785.       0.00
    4.3200    0.05115    804693.     -1681.   -0.00174       0.00   3.83E+11
-625.705     13211.       0.00
    4.4100    0.04928    802519.     -2356.   -0.00173       0.00   3.83E+11
-623.420     13663.       0.00
    4.5000    0.04741    799618.     -3028.   -0.00173       0.00   3.83E+11
-620.899     14145.       0.00
    4.5900    0.04554    795993.     -3697.   -0.00173       0.00   3.83E+11
-618.127     14660.       0.00
    4.6800    0.04367    791646.     -4363.   -0.00173       0.00   3.83E+11
-615.090     15211.       0.00
    4.7700    0.04181    786583.     -5025.   -0.00173       0.00   3.83E+11
-611.772     15804.       0.00
    4.8600    0.03994    780805.     -5907.   -0.00172       0.00   3.83E+11
-1021.     27602.       0.00
    4.9500    0.03808    773838.     -7006.   -0.00172       0.00   3.83E+11
-1014.     28758.       0.00
    5.0400    0.03623    765687.     -8097.   -0.00172       0.00   3.83E+11
-1007.     30014.       0.00
    5.1300    0.03437    756362.     -9180.   -0.00172       0.00   3.83E+11
-998.832     31384.       0.00
    5.2200    0.03252    745871.    -10254.   -0.00171       0.00   3.83E+11
-990.211     32886.       0.00
    5.3100    0.03067    734226.    -11319.   -0.00171       0.00   3.83E+11
-980.854     34541.       0.00
    5.4000    0.02882    721437.    -12373.   -0.00171       0.00   3.83E+11
-970.688     36375.       0.00
    5.4900    0.02697    707516.    -13415.   -0.00171       0.00   3.83E+11
-959.629     38422.       0.00
    5.5800    0.02513    692475.    -14445.   -0.00171       0.00   3.83E+11
-947.574     40723.       0.00
    5.6700    0.02329    676329.    -15461.   -0.00170       0.00   3.84E+11
```

```
-934.402     43333.       0.00
    5.7600    0.02145    659093.    -16462.   -0.00170       0.00   3.84E+11
-919.965     46323.       0.00
    5.8500    0.01961    640784.    -17447.   -0.00170       0.00   3.84E+11
-904.078     49789.       0.00
    5.9400    0.01778    621420.    -18414.   -0.00170       0.00   3.84E+11
-886.507     53863.       0.00
    6.0300    0.01594    601023.    -19361.   -0.00170       0.00   3.84E+11
-866.953     58735.       0.00
    6.1200    0.01411    579614.    -20286.   -0.00170       0.00   3.84E+11
-845.015     64683.       0.00
    6.2100    0.01228    557220.    -21185.   -0.00169       0.00   3.84E+11
-820.146     72137.       0.00
    6.3000    0.01045    533869.    -22055.   -0.00169       0.00   3.84E+11
-791.560     81806.       0.00
    6.3900    0.00862    509594.    -22892.   -0.00169       0.00   3.84E+11
-758.071     94944.       0.00
    6.4800    0.00680    484436.    -23689.   -0.00169       0.00   3.84E+11
-717.733    114032.       0.00
    6.5700    0.00497    458440.    -24437.   -0.00169       0.00   3.84E+11
-666.976    144830.       0.00
    6.6600    0.00315    431666.    -25120.   -0.00169       0.00   3.84E+11
-597.879    204919.       0.00
    6.7500    0.00133    404195.    -25704.   -0.00169       0.00   3.84E+11
-484.162    393230.       0.00
    6.8400  -4.90E-04    376160.    -25812.   -0.00168       0.00   3.84E+11
284.1517    625871.       0.00
    6.9300   -0.00231    348455.    -25356.   -0.00168       0.00   3.84E+11
561.0138    262376.       0.00
    7.0200   -0.00413    321405.    -24701.   -0.00168       0.00   3.84E+11
651.6802    170533.       0.00
    7.1100   -0.00594    295115.    -23962.   -0.00168       0.00   3.85E+11
717.2146    130314.       0.00
    7.2000   -0.00776    269662.    -23158.   -0.00168       0.00   3.85E+11
770.1780    107189.       0.00
    7.2900   -0.00958    245107.    -22302.   -0.00168       0.00   3.85E+11
815.4529     91976.       0.00
    7.3800   -0.01139    221503.    -21400.   -0.00168       0.00   3.85E+11
855.4925     81120.       0.00
    7.4700   -0.01320    198897.    -20456.   -0.00168       0.00   3.85E+11
891.7178     72940.       0.00
    7.5600   -0.01502    177332.    -19475.   -0.00168       0.00   3.85E+11
925.0313     66529.       0.00
    7.6500   -0.01683    156845.    -18459.   -0.00168       0.00   3.85E+11
956.0443     61353.       0.00
    7.7400   -0.01864    137473.    -17411.   -0.00168       0.00   3.85E+11
985.1917     57078.       0.00
    7.8300   -0.02045    119250.    -16332.   -0.00168       0.00   3.85E+11
1013.     53479.       0.00
    7.9200   -0.02226    102209.    -15224.   -0.00168       0.00   3.85E+11
```

```
1039.     50404.       0.00
    8.0100   -0.02408     86379.    -14088.   -0.00168       0.00   3.85E+11
1064.     47743.       0.00
    8.1000   -0.02589     71792.    -12926.   -0.00168       0.00   3.85E+11
1089.     45414.       0.00
    8.1900   -0.02770     58473.    -11738.   -0.00168       0.00   3.85E+11
1112.     43357.       0.00
    8.2800   -0.02951     46452.    -10525.   -0.00168       0.00   3.85E+11
1135.     41526.       0.00
    8.3700   -0.03132     35754.     -9287.   -0.00168       0.00   3.85E+11
1157.     39885.       0.00
    8.4600   -0.03313     26405.     -8027.   -0.00168       0.00   3.85E+11
1178.     38404.       0.00
    8.5500   -0.03494     18430.     -6743.   -0.00168       0.00   3.85E+11
1199.     37060.       0.00
    8.6400   -0.03675     11853.     -5437.   -0.00168       0.00   3.85E+11
1219.     35835.       0.00
    8.7300   -0.03856      6699.     -4110.   -0.00168       0.00   3.85E+11
1239.     34713.       0.00
    8.8200   -0.04037      2990.     -2761.   -0.00168       0.00   3.85E+11
1259.     33681.       0.00
    8.9100   -0.04218   749.5852     -1391.   -0.00168       0.00   3.85E+11
1278.     32729.       0.00
    9.0000   -0.04399      0.00       0.00   -0.00168       0.00   3.85E+11
1297.     15923.       0.00

* This analysis computed pile response using nonlinear moment-curvature rela-
  tionships. 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 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. 3:

Pile-head deflection             =     0.14394394 inches
Computed slope at pile head      =     -0.0018414 radians
Maximum bending moment           =        806848. inch-lbs
Maximum shear force              =        -25812. lbs
Depth of maximum bending moment  =     4.14000000 feet below pile head
Depth of maximum shear force     =     6.84000000 feet below pile head
Number of iterations             =             34
Number of zero deflection points =              1
Pile deflection at ground        =     0.12198519 inches


--------------------------------------------------------------------------------
            Pile-head Deflection vs. Pile Length for Load Case 3
```

Boundary Condition Type 1, Shear and Moment

Shear = 2250. lbs
Moment = 724800. in-lbs
Axial Load = 3800. lbs

Pile Length feet	Pile Head Deflection inches	Maximum Moment ln-lbs	Maximum Shear lbs
9.00000	0.14394394	806848.	-25812.
8.55000	0.30050073	798458.	-27758.
8.10000	0.72977716	789287.	-30342.
7.65000	1.85784884	782749.	-33257.
7.20000	5.13110312	778802.	-36568.
6.75000	21.14491909	795178.	-42823.

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	Load Type	Load 1	Load Type 2	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	1000.0000	M, in-lb	315600.	4200.	0.00836	-1.38E-04	-10447.	353975.
2	V, lb	2250.	M, in-lb	724800.	4600.	0.1440	-0.00184	-25816.	806913.
3	V, lb	2250.	M, in-lb	724800.	3800.	0.1439	-0.00184	-25812.	806848.

Maximum pile-head deflection = 0.1440334913 inches

```
Maximum pile-head rotation   = -0.0018424902 radians = -0.105567 deg.

The analysis ended normally.
```

LATERAL LOAD (LPILE) ANALYSES
EASTBOUND PARKING AREA
LIGHT TOWER CM1-2
(B-005-0-26 & B-005-1-26)

TP 26 NE Ohio Site 8 BEL-70 Vacant Weigh Station - Eastbound Parking Area
Light Tower CM1-2 (Boring B-005-0-26 & B-005-1-26) Lateral Load Analysis
36" Diameter, 6' Embedment Light Tower Drilled Shaft Foundation

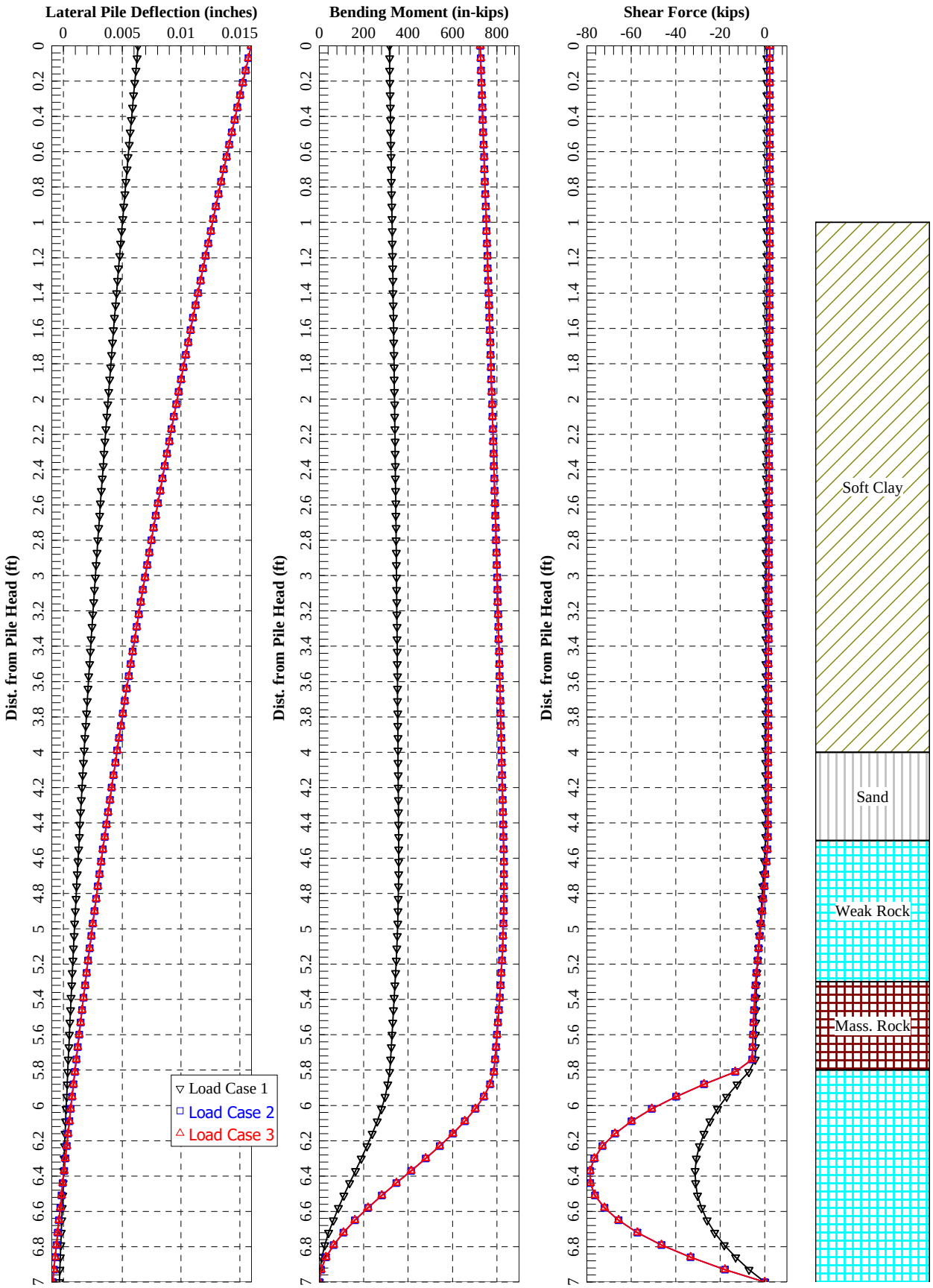


PLATE 48

==========

LPile for Version 2022-12.012

License ID : 228332755
License Type : (Single User License)

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method
© 1985-2024 by Ensoft, Inc.
All Rights Reserved

This software is licensed for exclusive use by:
S&ME, Inc.
Valley View, OH

==========

This model was prepared by:
BSears

Files Used for Analysis

Path to file locations:
\Columbus-1170\Projects\2024\24170232_ms_TP 26 NE Ohio\GEO\Project Docs\Site 8_BEL-70 (ms)\Calcs\Light Towers\LPILE Files\

Name of input data file:
Tower CM1-2 (B-005-0-26 & B-005-1-26).lp12d

Name of output report file:
Tower CM1-2 (B-005-0-26 & B-005-1-26).lp12o

Name of plot output file:
Tower CM1-2 (B-005-0-26 & B-005-1-26).lp12p

Name of runtime message file:
Tower CM1-2 (B-005-0-26 & B-005-1-26).lp12r

Date and Time of Analysis

Date: May 1, 2026 Time: 15:47:02

Problem Title

Project Name: TP 26 NE Ohio Site 8 BEL-70 Vacant Rest Areas

Job Number: 24170232B

Client: ms consultants, inc.

Engineer: BKS

Description: Light Tower CM1-2 (B-005-0-26 & B-005-1-26)

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

```
 - Use of p-y modification factors for p-y curves not selected
 - 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                                   =        7.000 ft
Depth of ground surface below top of pile              =       1.0000 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.

            Depth Below           Pile
Point        Pile Head          Diameter
 No.            feet             inches
-----      -------------     -------------
  1             0.000           36.0000
  2             7.000           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                                   =     7.000000 ft
   Shaft Diameter                                      =    36.000000 in
```

Soil and Rock Layering Information

The soil profile is modelled using 5 layers

Layer 1 is soft clay, p-y criteria by Matlock, 1970

Distance from top of pile to top of layer	=	1.000000 ft
Distance from top of pile to bottom of layer	=	4.000000 ft
Effective unit weight at top of layer	=	98.000000 pcf
Effective unit weight at bottom of layer	=	98.000000 pcf
Undrained cohesion at top of layer	=	250.000000 psf
Undrained cohesion at bottom of layer	=	250.000000 psf
Epsilon-50 at top of layer	=	0.020000
Epsilon-50 at bottom of layer	=	0.020000

Layer 2 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer	=	4.000000 ft
Distance from top of pile to bottom of layer	=	4.500000 ft
Effective unit weight at top of layer	=	78.000000 pcf
Effective unit weight at bottom of layer	=	78.000000 pcf
Friction angle at top of layer	=	36.000000 deg.
Friction angle at bottom of layer	=	36.000000 deg.
Subgrade k at top of layer	=	125.000000 pci
Subgrade k at bottom of layer	=	125.000000 pci

Layer 3 is weak rock, p-y criteria by Reese, 1997

Distance from top of pile to top of layer	=	4.500000 ft
Distance from top of pile to bottom of layer	=	5.300000 ft
Effective unit weight at top of layer	=	78.000000 pcf
Effective unit weight at bottom of layer	=	78.000000 pcf
Uniaxial compressive strength at top of layer	=	45.000000 psi
Uniaxial compressive strength at bottom of layer	=	45.000000 psi
Initial modulus of rock at top of layer	=	4000. psi
Initial modulus of rock at bottom of layer	=	4000. psi
RQD of rock at top of layer	=	0.0000 %
RQD of rock at bottom of layer	=	0.0000 %
k rm of rock at top of layer	=	0.0005000
k rm of rock at bottom of layer	=	0.0005000

Layer 4 is massive rock, p-y criteria by Liang et al., 2009

```
   Distance from top of pile to top of layer           =     5.300000 ft
   Distance from top of pile to bottom of layer        =     5.800000 ft
   Effective unit weight at top of layer               =    89.000000 pcf
   Effective unit weight at bottom of layer            =    89.000000 pcf
   Uniaxial compressive strength at top of layer       =        6500. psi
   Uniaxial compressive strength at bottom of layer    =        6500. psi
   Poisson's ratio at top of layer                     =     0.200000
   Poisson's ratio at bottom of layer                  =     0.200000
   Option 1: Intact rock modulus at top of layer       =      585000. psi
             Intact rock modulus at bottom of layer    =      585000. psi
   Option 1: Geologic Strength Index for layer         =    55.000000
   Option 2: Rock mass modulus at top of layer         =       0.0000 psi
             Rock mass modulus at bottom of layer      =       0.0000 psi
   Option 1 will be used to compute values of rock mass modulus for the p-y curve
            in massive rock.
   The rock type is (unclassified) User-defined Hoek-Brown Material Constant mi = 14


Layer 5 is weak rock, p-y criteria by Reese, 1997

   Distance from top of pile to top of layer           =     5.800000 ft
   Distance from top of pile to bottom of layer        =     8.800000 ft
   Effective unit weight at top of layer               =    80.000000 pcf
   Effective unit weight at bottom of layer            =    80.000000 pcf
   Uniaxial compressive strength at top of layer       =        1300. psi
   Uniaxial compressive strength at bottom of layer    =        1300. psi
   Initial modulus of rock at top of layer             =      117000. psi
   Initial modulus of rock at bottom of layer          =      117000. psi
   RQD of rock at top of layer                         =       0.0000 %
   RQD of rock at bottom of layer                      =       0.0000 %
   k rm of rock at top of layer                        =    0.0005000
   k rm of rock at bottom of layer                     =    0.0005000


 (Depth of the lowest soil layer extends 1.800 ft below the pile tip)


--------------------------------------------------------------------------------
                        Summary of Input Soil Properties
--------------------------------------------------------------------------------

Layer         Soil Type          Layer      Effective    Cohesion     Angle of
Uniaxial                     E50                     Rock Mass    Geologic     Int.
Rock   Hoek-Brown
 Num.           Name             Depth       Unit Wt.                 Friction
 qu          RQD %         or           kpy        Modulus     Strength      Modulus
    Material     Poisson's
          (p-y Curve Type)        ft           pcf          psf          deg.
```

psi		krm	pci	psi	Index	psi	Index, mi	Ratio			
1	Soft		1.0000	98.0000	250.0000	--	--	--	--	--	--
		0.02000	--	--	--	0.00	0.00	0.00			
	Clay		4.0000	98.0000	250.0000	--	--	--	--	--	--
		0.02000	--	--	--	0.00	0.00	0.00			
2	Sand		4.0000	78.0000	--	36.0000	--	--	--	--	--
		--	125.0000	--	--	0.00	0.00	0.00			
	(Reese, et al.)		4.5000	78.0000	--	36.0000	--	--	--	--	--
		--	125.0000	--	--	0.00	0.00	0.00			
3	Weak		4.5000	78.0000	--	--	45.0000	0.00	5.00E-04	--	4000.
--	0.00	0.00	0.00								
	Rock		5.3000	78.0000	--	--	45.0000	0.00	5.00E-04	--	4000.
--	0.00	0.00	0.00								
4	Massive		5.3000	89.0000	--	--	6500.	--	--	--	--
Internally	55.0000										
585000.	14.0000	0.2000									
	Rock		5.8000	89.0000	--	--	6500.	--	--	--	--
Computed	55.0000										
585000.	14.0000	0.2000									
5	Weak		5.8000	80.0000	--	--	1300.	0.00	5.00E-04	--	117000.
--	0.00	0.00	0.00								
	Rock		8.8000	80.0000	--	--	1300.	0.00	5.00E-04	--	117000.
--	0.00	0.00	0.00								

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 = 3

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length	Run Analysis
1	1	V = 1000.000000 lbs	M = 315600. in-lbs	4200.	Yes	Yes
2	1	V = 2250. lbs	M = 724800. in-lbs	4600.	Yes	Yes
3	1	V = 2250. lbs	M = 724800. in-lbs	3800.	Yes	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	=	7.000000 ft
Shaft Diameter	=	36.000000 in
Concrete Cover Thickness (to edge of trans. reinf.)	=	3.500000 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	=	1018. sq. in.
Total Area of Reinforcing Steel	=	16.000000 sq. in.
Area Ratio of Steel Reinforcement	=	1.57 percent
Edge-to-Edge Bar Spacing	=	4.114467 in
Maximum Concrete Aggregate Size	=	0.750000 in

```
Ratio of Bar Spacing to Aggregate Size                =         5.49
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.                         =     0.500000 in

Axial Structural Capacities:
----------------------------

Nom. Axial Structural Capacity = 0.85 Fc Ac + Fy As   =     4366.378 kips
Tensile Load for Cracking of Concrete                 =     -470.222 kips
Nominal Axial Tensile Capacity                        =     -960.000 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	13.436000	0.00000
2	1.128000	1.000000	12.413245	5.141735
3	1.128000	1.000000	9.500687	9.500687
4	1.128000	1.000000	5.141735	12.413245
5	1.128000	1.000000	0.00000	13.436000
6	1.128000	1.000000	-5.14173	12.413245
7	1.128000	1.000000	-9.50069	9.500687
8	1.128000	1.000000	-12.41325	5.141735
9	1.128000	1.000000	-13.43600	0.00000
10	1.128000	1.000000	-12.41325	-5.14173
11	1.128000	1.000000	-9.50069	-9.50069
12	1.128000	1.000000	-5.14173	-12.41325
13	1.128000	1.000000	0.00000	-13.43600
14	1.128000	1.000000	5.141735	-12.41325
15	1.128000	1.000000	9.500687	-9.50069
16	1.128000	1.000000	12.413245	-5.14173

```
NOTE: The positions of the above rebars were computed by LPile

Minimum spacing between any two bars not equal to zero =  4.114 inches
between bars 11 and 12.

Ratio of bar spacing to maximum aggregate size = 5.49


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 = 3

   Number     Axial Thrust Force
                      kips
   ------     ------------------
      1                3.800
      2                4.200
      3                4.600


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 =      3.800 kips

    Bending       Bending       Bending      Depth to      Max Comp      Max Tens
  Max Conc      Max Steel  Run
   Curvature      Moment       Stiffness      N Axis        Strain        Strain
   Stress        Stress    Msg
    rad/in.       in-kip        kip-in2         in           in/in         in/in
     ksi           ksi
------------ ------------ ------------ ------------ ------------ ------------
------------ ------------ ---
  6.25000E-07   240.5062135    384809942.    19.2929823    0.00001206   -0.00001044
   0.0505030     0.2746478
   0.00000125   480.1472468    384117797.    18.6479768    0.00002331   -0.00002169
   0.0973082     0.5259142
```

```
0.00000188   718.9174733    383422652.    18.4329804    0.00003456   -0.00003294
0.1438345     0.7771808
0.00000250   956.8168886    382726755.    18.3254857    0.00004581   -0.00004419
0.1900818     1.0284477
0.00000313        1194.     382030558.    18.2609917    0.00005707   -0.00005543
0.2360502     1.2797149
0.00000375        1430.     381334209.    18.2179981    0.00006832   -0.00006668
0.2817396     1.5309823
0.00000438        1665.     380637775.    18.1872904    0.00007957   -0.00007793
0.3271500     1.7822500
0.00000500        1900.     379941287.    18.1642614    0.00009082   -0.00008918
0.3722815     2.0335179
0.00000563        2133.     379244764.    18.1463515     0.0001021     -0.000100
0.4171340     2.2847861
0.00000625        2366.     378548215.    18.1320251     0.0001133     -0.000112
0.4617075     2.5360546
0.00000688        2366.     344134741.    10.2494785    0.00007047     -0.000177
0.2882187    -4.308598 C
0.00000750        2366.     315456846.    10.2198771    0.00007665     -0.000193
0.3129821    -4.706727 C
0.00000813        2366.     291190934.    10.1952302    0.00008284     -0.000210
0.3376758    -5.104761 C
0.00000875        2366.     270391582.    10.1744772    0.00008903     -0.000226
0.3622998    -5.502701 C
0.00000938        2366.     252365477.    10.1568402    0.00009522     -0.000242
0.3868539    -5.900547 C
0.00001000        2366.     236592634.    10.1417358     0.0001014     -0.000259
0.4113380    -6.298297 C
0.00001063        2366.     222675420.    10.1287027     0.0001076     -0.000275
0.4357521    -6.695951 C
0.00001125        2366.     210304564.    10.1174231     0.0001138     -0.000291
0.4600960    -7.093510 C
0.00001188        2366.     199235903.    10.1076093     0.0001200     -0.000307
0.4843696    -7.490973 C
0.00001250        2366.     189274107.    10.0990420     0.0001262     -0.000324
0.5085729    -7.888340 C
0.00001313        2366.     180261055.    10.0915439     0.0001325     -0.000340
0.5327056    -8.285611 C
0.00001375        2366.     172067370.    10.0849699     0.0001387     -0.000356
0.5567678    -8.682785 C
0.00001438        2366.     164586180.    10.0792000     0.0001449     -0.000373
0.5807594    -9.079861 C
0.00001500        2366.     157728423.    10.0741344     0.0001511     -0.000389
0.6046801    -9.476841 C
0.00001563        2366.     151419286.    10.0696892     0.0001573     -0.000405
0.6285300    -9.873723 C
0.00001625        2366.     145595467.    10.0657933     0.0001636     -0.000421
0.6523089   -10.270507 C
0.00001688        2366.     140203043.    10.0623863     0.0001698     -0.000438
0.6760167   -10.667193 C
```

```
0.00001750         2366.    135195791.    10.0594163     0.0001760     -0.000454
0.6996534    -11.063781 C
0.00001813         2366.    130533867.    10.0568387     0.0001823     -0.000470
0.7232187    -11.460271 C
0.00001875         2366.    126182738.    10.0546147     0.0001885     -0.000486
0.7467127    -11.856661 C
0.00001938         2366.    122112327.    10.0527107     0.0001948     -0.000503
0.7701352    -12.252952 C
0.00002000         2366.    118296317.    10.0510970     0.0002010     -0.000519
0.7934860    -12.649144 C
0.00002063         2366.    114711580.    10.0497478     0.0002073     -0.000535
0.8167652    -13.045236 C
0.00002125         2366.    111337710.    10.0486401     0.0002135     -0.000551
0.8399726    -13.441228 C
0.00002188         2366.    108156633.    10.0477539     0.0002198     -0.000568
0.8631080    -13.837120 C
0.00002250         2366.    105152282.    10.0470709     0.0002261     -0.000584
0.8861714    -14.232911 C
0.00002313         2366.    102310328.    10.0465752     0.0002323     -0.000600
0.9091627    -14.628602 C
0.00002375         2366.     99617951.    10.0462524     0.0002386     -0.000616
0.9320817    -15.024191 C
0.00002438         2366.     97063645.    10.0460897     0.0002449     -0.000633
0.9549284    -15.419678 C
0.00002563         2429.     94800037.    10.0461990     0.0002574     -0.000665
1.0004043    -16.210348 C
0.00002688         2545.     94692477.    10.0468231     0.0002700     -0.000697
1.0455896    -17.000609 C
0.00002813         2660.     94589756.    10.0479254     0.0002826     -0.000730
1.0904832    -17.790458 C
0.00002938         2776.     94491232.    10.0493946     0.0002952     -0.000762
1.1350844    -18.579893 C
0.00003063         2891.     94396370.    10.0512127     0.0003078     -0.000795
1.1793922    -19.368912 C
0.00003188         3006.     94304718.    10.0533415     0.0003205     -0.000827
1.2234058    -20.157511 C
0.00003313         3121.     94215891.    10.0557483     0.0003331     -0.000859
1.2671243    -20.945689 C
0.00003438         3236.     94129561.    10.0584054     0.0003458     -0.000892
1.3105466    -21.733443 C
0.00003563         3350.     94045446.    10.0612887     0.0003584     -0.000924
1.3536720    -22.520771 C
0.00003688         3465.     93963300.    10.0643778     0.0003711     -0.000956
1.3964994    -23.307669 C
0.00003813         3579.     93882912.    10.0676547     0.0003838     -0.000989
1.4390279    -24.094136 C
0.00003938         3694.     93804096.    10.0711039     0.0003965     -0.001021
1.4812567    -24.880169 C
0.00004063         3808.     93726688.    10.0747116     0.0004093     -0.001053
1.5231846    -25.665765 C
```

```
0.00004188        3922.     93650546.    10.0784659     0.0004220     -0.001085
1.5648108    -26.450921 C
0.00004313        4035.     93575540.    10.0823562     0.0004348     -0.001118
1.6061342    -27.235635 C
0.00004438        4149.     93501560.    10.0863731     0.0004476     -0.001150
1.6471540    -28.019904 C
0.00004563        4263.     93428502.    10.0905084     0.0004604     -0.001182
1.6878690    -28.803725 C
0.00004688        4376.     93356279.    10.0947545     0.0004732     -0.001214
1.7282784    -29.587096 C
0.00004813        4489.     93284807.    10.0991050     0.0004860     -0.001246
1.7683810    -30.370013 C
0.00004938        4602.     93214014.    10.1035538     0.0004989     -0.001279
1.8081759    -31.152474 C
0.00005063        4715.     93143835.    10.1080956     0.0005117     -0.001311
1.8476620    -31.934476 C
0.00005188        4828.     93074209.    10.1127258     0.0005246     -0.001343
1.8868384    -32.716016 C
0.00005313        4941.     93005082.    10.1174399     0.0005375     -0.001375
1.9257039    -33.497091 C
0.00005438        5053.     92936405.    10.1222340     0.0005504     -0.001407
1.9642575    -34.277698 C
0.00005563        5166.     92868132.    10.1271047     0.0005633     -0.001439
2.0024981    -35.057833 C
0.00005688        5278.     92800222.    10.1320488     0.0005763     -0.001471
2.0404247    -35.837495 C
0.00005813        5390.     92732637.    10.1370633     0.0005892     -0.001503
2.0780361    -36.616679 C
0.00005938        5502.     92665342.    10.1421457     0.0006022     -0.001535
2.1153313    -37.395383 C
0.00006063        5614.     92598305.    10.1472935     0.0006152     -0.001567
2.1523092    -38.173604 C
0.00006188        5725.     92531497.    10.1525046     0.0006282     -0.001599
2.1889685    -38.951338 C
0.00006313        5837.     92464888.    10.1577769     0.0006412     -0.001631
2.2253083    -39.728581 C
0.00006438        5948.     92398455.    10.1631088     0.0006543     -0.001663
2.2613274    -40.505332 C
0.00006563        6059.     92332173.    10.1684984     0.0006673     -0.001695
2.2970245    -41.281586 C
0.00006688        6170.     92266020.    10.1739444     0.0006804     -0.001727
2.3323987    -42.057340 C
0.00006813        6281.     92199976.    10.1794453     0.0006935     -0.001759
2.3674485    -42.832591 C
0.00006938        6392.     92134020.    10.1849998     0.0007066     -0.001791
2.4021730    -43.607335 C
0.00007063        6502.     92068136.    10.1906070     0.0007197     -0.001823
2.4365708    -44.381568 C
0.00007188        6613.     92002305.    10.1962656     0.0007329     -0.001855
2.4706408    -45.155288 C
```

```
0.00007313        6723.     91936511.    10.2020028     0.0007460     -0.001886
2.5043818    -45.928490 C
0.00007438        6833.     91870742.    10.2077616     0.0007592     -0.001918
2.5377924    -46.701172 C
0.00007938        7271.     91607617.    10.2312788     0.0008121     -0.002045
2.6681070    -49.786612 C
0.00008438        7707.     91343844.    10.2555391     0.0008653     -0.002172
2.7930345    -52.863415 C
0.00008938        8140.     91079227.    10.2796933     0.0009187     -0.002299
2.9123325    -55.933382 C
0.00009438        8570.     90813004.    10.3043877     0.0009725     -0.002425
3.0260259    -58.995009 C
0.00009938        8979.     90357411.    10.3225581     0.0010258     -0.002552
3.1326575    -60.000000 CY
 0.0001044        9304.     89144470.    10.3110511     0.0010762     -0.002681
3.2276850    -60.000000 CY
 0.0001094        9546.     87273573.    10.2718035     0.0011235     -0.002814
3.3116704    -60.000000 CY
 0.0001144        9782.     85523680.    10.2357064     0.0011707     -0.002947
3.3907664    -60.000000 CY
 0.0001194       10004.     83800225.    10.1987328     0.0012175     -0.003080
3.4643165    -60.000000 CY
 0.0001244       10154.     81641326.    10.1374818     0.0012608     -0.003217
3.5282172    -60.000000 CY
 0.0001294       10287.     79513660.    10.0756441     0.0013035     -0.003354
3.5871212    -60.000000 CY
 0.0001344       10419.     77536664.    10.0197410     0.0013464     -0.003491
3.6423258    -60.000000 CY
 0.0001394       10550.     75693983.     9.9691573     0.0013895     -0.003628
3.6937845    -60.000000 CY
 0.0001444       10680.     73971519.     9.9233661     0.0014327     -0.003765
3.7414497    -60.000000 CY
 0.0001494       10808.     72355946.     9.8810316     0.0014760     -0.003902
3.7851328    -60.000000 CY
 0.0001544       10925.     70772035.     9.8368433     0.0015186     -0.004039
3.8241552    -60.000000 CY
 0.0001594       11008.     69072220.     9.7809580     0.0015588     -0.004179
3.8574366    -60.000000 CY
 0.0001644       11071.     67351790.     9.7204156     0.0015978     -0.004320
3.8862696    -60.000000 CY
 0.0001694       11131.     65719446.     9.6635689     0.0016368     -0.004461
3.9118664    -60.000000 CY
 0.0001744       11191.     64176802.     9.6094393     0.0016756     -0.004602
3.9342902    -60.000000 CY
 0.0001794       11250.     62716278.     9.5601863     0.0017149     -0.004743
3.9535015    -60.000000 CY
 0.0001844       11308.     61329164.     9.5136161     0.0017541     -0.004883
3.9693617    -60.000000 CY
 0.0001894       11364.     60009896.     9.4690774     0.0017932     -0.005024
3.9819050    -60.000000 CY
```

```
 0.0001944        11420.     58754909.     9.4280227     0.0018326     -0.005165
3.9911986    -60.000000 CY
 0.0001994        11476.     57559296.     9.3897594     0.0018721     -0.005305
3.9971986    -60.000000 CY
 0.0002044        11531.     56418622.     9.3531932     0.0019116     -0.005446
3.9998595    -60.000000 CY
 0.0002094        11584.     55328385.     9.3201259     0.0019514     -0.005586
3.9974517    -60.000000 CY
 0.0002144        11637.     54285454.     9.2909722     0.0019918     -0.005726
3.9998812    -60.000000 CY
 0.0002194        11690.     53285909.     9.2626721     0.0020320     -0.005866
3.9969940    -60.000000 CY
 0.0002244        11740.     52321336.     9.2356724     0.0020723     -0.006005
3.9997138    -60.000000 CY
 0.0002294        11786.     51384137.     9.2093226     0.0021124     -0.006145
3.9955528    -60.000000 CY
 0.0002344        11823.     50445667.     9.1796872     0.0021515     -0.006286
3.9989818    -60.000000 CY
 0.0002394        11855.     49524943.     9.1473565     0.0021896     -0.006428
3.9994466    -60.000000 CY
 0.0002444        11876.     48598228.     9.1109548     0.0022265     -0.006571
3.9965160    -60.000000 CY
 0.0002494        11895.     47701101.     9.0745971     0.0022630     -0.006715
3.9991770    -60.000000 CY
 0.0002544        11912.     46829816.     9.0405915     0.0022997     -0.006858
3.9995775    -60.000000 CY
 0.0002594        11929.     45990067.     9.0077660     0.0023364     -0.007001
3.9954763    -60.000000 CY
 0.0002644        11945.     45181124.     8.9766457     0.0023732     -0.007144
3.9984997    -60.000000 CY
 0.0002694        11961.     44401256.     8.9468563     0.0024101     -0.007287
3.9998981    -60.000000 CY
 0.0002744        11976.     43648250.     8.9191370     0.0024472     -0.007430
3.9944635    -60.000000 CY
 0.0003044        12062.     39628140.     8.7757363     0.0026711     -0.008286
3.9984635    -60.000000 CY
 0.0003344        12138.     36300180.     8.6628609     0.0028966     -0.009141
3.9998209    -60.000000 CY
 0.0003644        12207.     33502446.     8.5793723     0.0031261     -0.009991
3.9999551    -60.000000 CYT
 0.0003944        12272.     31117026.     8.5161103     0.0033585     -0.010839
3.9996166    -60.000000 CYT
 0.0004244        12331.     29056485.     8.4674428     0.0035934     -0.011684
3.9972132    -60.000000 CYT
 0.0004544        12377.     27238942.     8.4178614     0.0038249     -0.012533
3.9873462    -60.000000 CYT


Axial Thrust Force =      4.200 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
6.25000E-07	240.5049676	384807948.	19.4290859	0.00001214	-0.00001036	0.0508615	0.2771147	
0.00000125	480.1459926	384116794.	18.7161837	0.00002340	-0.00002160	0.0976654	0.5283867	
0.00000188	718.9162127	383421980.	18.4785558	0.00003465	-0.00003285	0.1441903	0.7796589	
0.00000250	956.8156222	382726249.	18.3597458	0.00004590	-0.00004410	0.1904363	1.0309315	
0.00000313	1194.	382030150.	18.2884629	0.00005715	-0.00005535	0.2364034	1.2822044	
0.00000375	1430.	381333869.	18.2409436	0.00006840	-0.00006660	0.2820914	1.5334776	
0.00000438	1665.	380637482.	18.2070035	0.00007966	-0.00007784	0.3275005	1.7847511	
0.00000500	1900.	379941029.	18.1815504	0.00009091	-0.00008909	0.3726306	2.0360248	
0.00000563	2133.	379244533.	18.1617553	0.0001022	-0.000100	0.4174818	2.2872988	
0.00000625	2366.	378548006.	18.1459208	0.0001134	-0.000112	0.4620539	2.5385732	
0.00000688	2366.	344134551.	10.2895004	0.00007074	-0.000177	0.2893429	-4.300617	C
0.00000750	2366.	315456672.	10.2575513	0.00007693	-0.000193	0.3141325	-4.698533	C
0.00000813	2366.	291190774.	10.2300378	0.00008312	-0.000209	0.3388235	-5.096560	C
0.00000875	2366.	270391433.	10.2068278	0.00008931	-0.000226	0.3634446	-5.494492	C
0.00000938	2366.	252365338.	10.1870615	0.00009550	-0.000242	0.3879959	-5.892330	C
0.00001000	2366.	236592504.	10.1700940	0.0001017	-0.000258	0.4124772	-6.290073	C
0.00001063	2366.	222675298.	10.1554324	0.0001079	-0.000275	0.4368884	-6.687720	C
0.00001125	2366.	210304448.	10.1426931	0.0001141	-0.000291	0.4612294	-7.085271	C
0.00001188	2366.	199235793.	10.1315564	0.0001203	-0.000307	0.4855002	-7.482727	C
0.00001250	2366.	189274003.	10.1218127	0.0001265	-0.000323	0.5097005	-7.880086	C
0.00001313	2366.	180260955.	10.1132503	0.0001327	-0.000340	0.5338304	-8.277349	C

```
0.00001375         2366.    172067276.    10.1057088     0.0001390     -0.000356
0.5578898     -8.674515 C
0.00001438         2366.    164586090.    10.0990556     0.0001452     -0.000372
0.5818784     -9.071585 C
0.00001500         2366.    157728336.    10.0931803     0.0001514     -0.000389
0.6057963     -9.468556 C
0.00001563         2366.    151419203.    10.0879903     0.0001576     -0.000405
0.6296433     -9.865431 C
0.00001625         2366.    145595387.    10.0834069     0.0001639     -0.000421
0.6534193    -10.262207 C
0.00001688         2366.    140202965.    10.0793634     0.0001701     -0.000437
0.6771242    -10.658886 C
0.00001750         2366.    135195717.    10.0758025     0.0001763     -0.000454
0.7007579    -11.055466 C
0.00001813         2366.    130533795.    10.0726747     0.0001826     -0.000470
0.7243204    -11.451947 C
0.00001875         2366.    126182669.    10.0699372     0.0001888     -0.000486
0.7478114    -11.848330 C
0.00001938         2366.    122112260.    10.0675528     0.0001951     -0.000502
0.7712309    -12.244613 C
0.00002000         2366.    118296252.    10.0654889     0.0002013     -0.000519
0.7945789    -12.640797 C
0.00002063         2366.    114711517.    10.0637168     0.0002076     -0.000535
0.8178551    -13.036882 C
0.00002125         2366.    111337649.    10.0622112     0.0002138     -0.000551
0.8410595    -13.432866 C
0.00002188         2366.    108156573.    10.0609497     0.0002201     -0.000567
0.8641920    -13.828750 C
0.00002250         2366.    105152224.    10.0599125     0.0002263     -0.000584
0.8872524    -14.224533 C
0.00002313         2366.    102310272.    10.0590817     0.0002326     -0.000600
0.9102407    -14.620215 C
0.00002375         2366.     99617896.    10.0584414     0.0002389     -0.000616
0.9331568    -15.015796 C
0.00002438         2366.     97063591.    10.0579776     0.0002452     -0.000632
0.9560005    -15.411276 C
0.00002563         2432.     94924068.    10.0575288     0.0002577     -0.000665
1.0014704    -16.201930 C
0.00002688         2548.     94810571.    10.0576469     0.0002703     -0.000697
1.0466496    -16.992174 C
0.00002813         2664.     94702439.    10.0582592     0.0002829     -0.000730
1.0915372    -17.782007 C
0.00002938         2779.     94598964.    10.0593353     0.0002955     -0.000762
1.1361324    -18.571425 C
0.00003063         2894.     94499555.    10.0607664     0.0003081     -0.000794
1.1804341    -19.360427 C
0.00003188         3009.     94403710.    10.0625387     0.0003207     -0.000827
1.2244416    -20.149010 C
0.00003313         3124.     94311007.    10.0646159     0.0003334     -0.000859
1.2681539    -20.937171 C
```

```
0.00003438        3239.     94221082.    10.0669675     0.0003461     -0.000891
1.3115700    -21.724908 C
0.00003563        3354.     94133623.    10.0695670     0.0003587     -0.000924
1.3546892    -22.512219 C
0.00003688        3468.     94048359.    10.0723915     0.0003714     -0.000956
1.3975103    -23.299100 C
0.00003813        3582.     93965057.    10.0754214     0.0003841     -0.000988
1.4400326    -24.085550 C
0.00003938        3697.     93883511.    10.0786392     0.0003968     -0.001021
1.4822550    -24.871565 C
0.00004063        3811.     93803541.    10.0820299     0.0004096     -0.001053
1.5241766    -25.657144 C
0.00004188        3925.     93724988.    10.0855803     0.0004223     -0.001085
1.5657965    -26.442282 C
0.00004313        4039.     93647711.    10.0892786     0.0004351     -0.001117
1.6071135    -27.226979 C
0.00004438        4152.     93571586.    10.0931145     0.0004479     -0.001150
1.6481268    -28.011230 C
0.00004563        4266.     93496502.    10.0970787     0.0004607     -0.001182
1.6888354    -28.795033 C
0.00004688        4379.     93422358.    10.1011630     0.0004735     -0.001214
1.7292383    -29.578385 C
0.00004813        4492.     93349066.    10.1053601     0.0004863     -0.001246
1.7693344    -30.361284 C
0.00004938        4606.     93276544.    10.1096634     0.0004992     -0.001278
1.8091228    -31.143727 C
0.00005063        4718.     93204721.    10.1140670     0.0005120     -0.001310
1.8486023    -31.925710 C
0.00005188        4831.     93133529.    10.1185657     0.0005249     -0.001343
1.8877721    -32.707231 C
0.00005313        4944.     93062909.    10.1231546     0.0005378     -0.001375
1.9266309    -33.488287 C
0.00005438        5056.     92992807.    10.1278294     0.0005507     -0.001407
1.9651778    -34.268875 C
0.00005563        5169.     92923173.    10.1325862     0.0005636     -0.001439
2.0034117    -35.048992 C
0.00005688        5281.     92853961.    10.1374215     0.0005766     -0.001471
2.0413316    -35.828634 C
0.00005813        5393.     92785130.    10.1423320     0.0005895     -0.001503
2.0789362    -36.607799 C
0.00005938        5505.     92716640.    10.1473148     0.0006025     -0.001535
2.1162246    -37.386484 C
0.00006063        5617.     92648458.    10.1523672     0.0006155     -0.001567
2.1531956    -38.164685 C
0.00006188        5728.     92580549.    10.1574868     0.0006285     -0.001599
2.1898481    -38.942399 C
0.00006313        5840.     92512883.    10.1626714     0.0006415     -0.001631
2.2261809    -39.719622 C
0.00006438        5951.     92445433.    10.1679189     0.0006546     -0.001663
2.2621930    -40.496353 C
```

```
0.00006563        6062.     92378172.    10.1732276     0.0006676     -0.001695
2.2978832    -41.272587 C
0.00006688        6173.     92311077.    10.1785957     0.0006807     -0.001727
2.3332503    -42.048320 C
0.00006813        6284.     92244124.    10.1840217     0.0006938     -0.001759
2.3682931    -42.823550 C
0.00006938        6395.     92177292.    10.1895041     0.0007069     -0.001791
2.4030104    -43.598274 C
0.00007063        6505.     92110561.    10.1950417     0.0007200     -0.001822
2.4374011    -44.372486 C
0.00007188        6616.     92043913.    10.2006608     0.0007332     -0.001854
2.4714639    -45.146185 C
0.00007313        6726.     91977331.    10.2063053     0.0007463     -0.001886
2.5051976    -45.919366 C
0.00007438        6836.     91910797.    10.2120017     0.0007595     -0.001918
2.5386010    -46.692026 C
0.00007938        7274.     91644853.    10.2352897     0.0008124     -0.002045
2.6688860    -49.777380 C
0.00008438        7710.     91378587.    10.2593338     0.0008656     -0.002172
2.7937834    -52.854093 C
0.00008938        8143.     91111830.    10.2831857     0.0009191     -0.002298
2.9130226    -55.924331 C
0.00009438        8573.     90843621.    10.3077273     0.0009728     -0.002425
3.0266854    -58.985869 C
0.00009938        8982.     90387473.    10.3258078     0.0010261     -0.002551
3.1332951    -60.000000 CY
 0.0001044        9308.     89176212.    10.3143071     0.0010766     -0.002681
3.2283182    -60.000000 CY
 0.0001094        9549.     87304848.    10.2749831     0.0011238     -0.002814
3.3122821    -60.000000 CY
 0.0001144        9785.     85553556.    10.2389100     0.0011711     -0.002946
3.3913727    -60.000000 CY
 0.0001194       10007.     83830919.    10.2019402     0.0012179     -0.003080
3.4649106    -60.000000 CY
 0.0001244       10158.     81671814.    10.1406407     0.0012612     -0.003216
3.5287895    -60.000000 CY
 0.0001294       10291.     79542859.    10.0787027     0.0013039     -0.003354
3.5876602    -60.000000 CY
 0.0001344       10423.     77564670.    10.0227059     0.0013468     -0.003491
3.6428308    -60.000000 CY
 0.0001394       10554.     75720878.     9.9720357     0.0013899     -0.003628
3.6942550    -60.000000 CY
 0.0001444       10683.     73997378.     9.9261646     0.0014331     -0.003764
3.7418850    -60.000000 CY
 0.0001494       10812.     72381005.     9.8838986     0.0014764     -0.003901
3.7855535    -60.000000 CY
 0.0001544       10929.     70796718.     9.8396771     0.0015190     -0.004038
3.8245440    -60.000000 CY
 0.0001594       11012.     69097838.     9.7838573     0.0015593     -0.004178
3.8578061    -60.000000 CY
```

```
 0.0001644        11075.     67376662.     9.7232508     0.0015983     -0.004319
3.8866026    -60.000000 CY
 0.0001694        11135.     65743511.     9.6663364     0.0016372     -0.004460
3.9121613    -60.000000 CY
 0.0001744        11195.     64200103.     9.6121495     0.0016761     -0.004601
3.9345463    -60.000000 CY
 0.0001794        11254.     62738857.     9.5628376     0.0017153     -0.004742
3.9537182    -60.000000 CY
 0.0001844        11312.     61351278.     9.5162917     0.0017546     -0.004883
3.9695496    -60.000000 CY
 0.0001894        11368.     60031354.     9.4717005     0.0017937     -0.005024
3.9820503    -60.000000 CY
 0.0001944        11425.     58775745.     9.4305957     0.0018331     -0.005164
3.9913005    -60.000000 CY
 0.0001994        11480.     57579537.     9.3922863     0.0018726     -0.005305
3.9972564    -60.000000 CY
 0.0002044        11535.     56438298.     9.3556780     0.0019121     -0.005445
3.9998723    -60.000000 CY
 0.0002094        11588.     55347517.     9.3241700     0.0019522     -0.005585
3.9975077    -60.000000 CY
 0.0002144        11641.     54304067.     9.2934428     0.0019923     -0.005725
3.9998931    -60.000000 CY
 0.0002194        11694.     53304015.     9.2651074     0.0020325     -0.005865
3.9970558    -60.000000 CY
 0.0002244        11744.     52339157.     9.2380944     0.0020728     -0.006005
3.9997330    -60.000000 CY
 0.0002294        11790.     51401489.     9.2117130     0.0021129     -0.006145
3.9956300    -60.000000 CY
 0.0002344        11827.     50463153.     9.1821360     0.0021521     -0.006285
3.9990203    -60.000000 CY
 0.0002394        11859.     49542728.     9.1500193     0.0021903     -0.006427
3.9992468    -60.000000 CY
 0.0002444        11880.     48615611.     9.1135780     0.0022271     -0.006570
3.9965958    -60.000000 CY
 0.0002494        11900.     47718283.     9.0771076     0.0022636     -0.006714
3.9992162    -60.000000 CY
 0.0002544        11917.     46846598.     9.0431776     0.0023004     -0.006857
3.9993713    -60.000000 CY
 0.0002594        11933.     46006491.     9.0103157     0.0023371     -0.007000
3.9955701    -60.000000 CY
 0.0002644        11949.     45197204.     8.9791598     0.0023739     -0.007144
3.9985538    -60.000000 CY
 0.0002694        11965.     44417005.     8.9493437     0.0024107     -0.007287
3.9999119    -60.000000 CY
 0.0002744        11980.     43663657.     8.9215934     0.0024479     -0.007430
3.9942523    -60.000000 CY
 0.0003044        12066.     39641995.     8.7782176     0.0026719     -0.008286
3.9985257    -60.000000 CY
 0.0003344        12142.     36312646.     8.6652203     0.0028974     -0.009140
3.9998424    -60.000000 CY
```

```
    0.0003644        12212.     33513765.     8.5815911     0.0031269     -0.009991
   3.9999658    -60.000000 CYT
    0.0003944        12276.     31127384.     8.5182268     0.0033594     -0.010838
   3.9996505    -60.000000 CYT
    0.0004244        12335.     29066055.     8.4694819     0.0035942     -0.011683
   3.9973093    -60.000000 CYT
    0.0004544        12381.     27248100.     8.4201387     0.0038259     -0.012532
   3.9875919    -60.000000 CYT


Axial Thrust Force =      4.600 kips

    Bending       Bending       Bending      Depth to      Max Comp      Max Tens
  Max Conc      Max Steel  Run
   Curvature      Moment       Stiffness      N Axis        Strain        Strain
   Stress        Stress    Msg
    rad/in.       in-kip        kip-in2         in           in/in         in/in
     ksi           ksi
------------ ------------ ------------ ------------ ------------ ------------
------------ ------------ ---
  6.25000E-07   240.5035986    384805758.    19.5651901    0.00001223   -0.00001027
   0.0512199     0.2795816
   0.00000125   480.1446137    384115691.    18.7843907    0.00002348   -0.00002152
   0.0980225     0.5308592
   0.00000188   718.9148267    383421241.    18.5241312    0.00003473   -0.00003277
   0.1445462     0.7821371
   0.00000250   956.8142298    382725692.    18.3940059    0.00004599   -0.00004401
   0.1907908     1.0334154
   0.00000313        1194.    382029703.    18.3159341    0.00005724   -0.00005526
   0.2367565     1.2846940
   0.00000375        1430.    381333494.    18.2638891    0.00006849   -0.00006651
   0.2824433     1.5359729
   0.00000438        1665.    380637159.    18.2267166    0.00007974   -0.00007776
   0.3278510     1.7872522
   0.00000500        1900.    379940746.    18.1988394    0.00009099   -0.00008901
   0.3729798     2.0385317
   0.00000563        2133.    379244280.    18.1771590     0.0001022     -0.000100
   0.4178295     2.2898116
   0.00000625        2366.    378547777.    18.1598165     0.0001135     -0.000112
   0.4624003     2.5410917
   0.00000688        2366.    344134343.    10.3291778    0.00007101     -0.000176
   0.2904571    -4.292706 C
   0.00000750        2366.    315456481.    10.2940289    0.00007721     -0.000193
   0.3152465    -4.690597 C
   0.00000813        2366.    291190598.    10.2646762    0.00008340     -0.000209
   0.3399656    -5.088396 C
   0.00000875        2366.    270391269.    10.2391817    0.00008959     -0.000225
   0.3645893    -5.486283 C
   0.00000938        2366.    252365185.    10.2172859    0.00009579     -0.000242
   0.3891378    -5.884113 C
```

```
0.00001000         2366.    236592361.    10.1984552     0.0001020     -0.000258
0.4136162     -6.281848 C
0.00001063         2366.    222675163.    10.1821496     0.0001082     -0.000274
0.4380246     -6.679488 C
0.00001125         2366.    210304321.    10.1679490     0.0001144     -0.000291
0.4623628     -7.077032 C
0.00001188         2366.    199235672.    10.1555219     0.0001206     -0.000307
0.4866307     -7.474480 C
0.00001250         2366.    189273889.    10.1446030     0.0001268     -0.000323
0.5108282     -7.871831 C
0.00001313         2366.    180260846.    10.1349589     0.0001330     -0.000339
0.5349552     -8.269087 C
0.00001375         2366.    172067171.    10.1264498     0.0001392     -0.000356
0.5590117     -8.666245 C
0.00001438         2366.    164585990.    10.1189132     0.0001455     -0.000372
0.5829974     -9.063307 C
0.00001500         2366.    157728241.    10.1122282     0.0001517     -0.000388
0.6069124     -9.460271 C
0.00001563         2366.    151419111.    10.1062933     0.0001579     -0.000405
0.6307565     -9.857138 C
0.00001625         2366.    145595299.    10.1010224     0.0001641     -0.000421
0.6545296    -10.253907 C
0.00001688         2366.    140202880.    10.0963423     0.0001704     -0.000437
0.6782316    -10.650577 C
0.00001750         2366.    135195635.    10.0921903     0.0001766     -0.000453
0.7018624    -11.047150 C
0.00001813         2366.    130533716.    10.0885122     0.0001829     -0.000470
0.7254219    -11.443623 C
0.00001875         2366.    126182592.    10.0852613     0.0001891     -0.000486
0.7489100    -11.839998 C
0.00001938         2366.    122112186.    10.0823966     0.0001953     -0.000502
0.7723266    -12.236274 C
0.00002000         2366.    118296180.    10.0798824     0.0002016     -0.000518
0.7956716    -12.632450 C
0.00002063         2366.    114711448.    10.0776874     0.0002079     -0.000535
0.8189449    -13.028526 C
0.00002125         2366.    111337582.    10.0757837     0.0002141     -0.000551
0.8421464    -13.424502 C
0.00002188         2366.    108156508.    10.0741470     0.0002204     -0.000567
0.8652759    -13.820378 C
0.00002250         2366.    105152160.    10.0727554     0.0002266     -0.000583
0.8883333    -14.216153 C
0.00002313         2366.    102310210.    10.0715894     0.0002329     -0.000600
0.9113187    -14.611828 C
0.00002375         2366.     99617836.    10.0706317     0.0002392     -0.000616
0.9342318    -15.007401 C
0.00002438         2366.     97063533.    10.0698667     0.0002455     -0.000632
0.9570725    -15.402873 C
0.00002563         2436.     95048091.    10.0688598     0.0002580     -0.000664
1.0025364    -16.193510 C
```

```
0.00002688         2551.     94928657.     10.0684718     0.0002706     -0.000697
1.0477096    -16.983738 C
0.00002813         2667.     94815115.     10.0686232     0.0002832     -0.000729
1.0925912    -17.773555 C
0.00002938         2782.     94706690.     10.0692479     0.0002958     -0.000762
1.1371802    -18.562957 C
0.00003063         2897.     94602733.     10.0703211     0.0003084     -0.000794
1.1814759    -19.351942 C
0.00003188         3012.     94502697.     10.0717368     0.0003210     -0.000826
1.2254772    -20.140508 C
0.00003313         3127.     94406117.     10.0734845     0.0003337     -0.000859
1.2691834    -20.928652 C
0.00003438         3242.     94312597.     10.0755306     0.0003463     -0.000891
1.3125933    -21.716373 C
0.00003563         3357.     94221794.     10.0778462     0.0003590     -0.000923
1.3557063    -22.503666 C
0.00003688         3471.     94133413.     10.0804061     0.0003717     -0.000956
1.3985212    -23.290530 C
0.00003813         3586.     94047197.     10.0831888     0.0003844     -0.000988
1.4410372    -24.076963 C
0.00003938         3700.     93962921.     10.0861753     0.0003971     -0.001020
1.4832533    -24.862961 C
0.00004063         3814.     93880388.     10.0893491     0.0004099     -0.001053
1.5251686    -25.648521 C
0.00004188         3928.     93799425.     10.0926956     0.0004226     -0.001085
1.5667821    -26.433642 C
0.00004313         4042.     93719877.     10.0962019     0.0004354     -0.001117
1.6080927    -27.218321 C
0.00004438         4155.     93641609.     10.0998566     0.0004482     -0.001149
1.6490996    -28.002554 C
0.00004563         4269.     93564497.     10.1036497     0.0004610     -0.001182
1.6898018    -28.786339 C
0.00004688         4382.     93488434.     10.1075722     0.0004738     -0.001214
1.7301982    -29.569674 C
0.00004813         4496.     93413321.     10.1116159     0.0004866     -0.001246
1.7702878    -30.352554 C
0.00004938         4609.     93339070.     10.1157737     0.0004995     -0.001278
1.8100696    -31.134978 C
0.00005063         4722.     93265602.     10.1200391     0.0005123     -0.001310
1.8495425    -31.916943 C
0.00005188         4834.     93192845.     10.1244063     0.0005252     -0.001342
1.8887057    -32.698446 C
0.00005313         4947.     93120733.     10.1288700     0.0005381     -0.001374
1.9275579    -33.479483 C
0.00005438         5060.     93049206.     10.1334255     0.0005510     -0.001406
1.9660981    -34.260052 C
0.00005563         5172.     92978211.     10.1380684     0.0005639     -0.001439
2.0043253    -35.040149 C
0.00005688         5284.     92907697.     10.1427948     0.0005769     -0.001471
2.0422384    -35.819772 C
```

```
0.00005813        5396.     92837619.    10.1476012     0.0005898     -0.001503
2.0798362    -36.598918 C
0.00005938        5508.     92767935.    10.1524844     0.0006028     -0.001535
2.1171178    -37.377583 C
0.00006063        5620.     92698606.    10.1574414     0.0006158     -0.001567
2.1540819    -38.155764 C
0.00006188        5731.     92629597.    10.1624696     0.0006288     -0.001599
2.1907275    -38.933458 C
0.00006313        5843.     92560874.    10.1675664     0.0006418     -0.001631
2.2270535    -39.710662 C
0.00006438        5954.     92492407.    10.1727297     0.0006549     -0.001663
2.2630586    -40.487373 C
0.00006563        6065.     92424168.    10.1779574     0.0006679     -0.001695
2.2987417    -41.263586 C
0.00006688        6176.     92356130.    10.1832476     0.0006810     -0.001726
2.3341018    -42.039299 C
0.00006813        6287.     92288268.    10.1885986     0.0006941     -0.001758
2.3691375    -42.814509 C
0.00006938        6398.     92220560.    10.1940089     0.0007072     -0.001790
2.4038477    -43.589211 C
0.00007063        6508.     92152983.    10.1995039     0.0007203     -0.001822
2.4382312    -44.363403 C
0.00007188        6619.     92085519.    10.2050285     0.0007335     -0.001854
2.4722868    -45.137081 C
0.00007313        6729.     92018147.    10.2106084     0.0007467     -0.001886
2.5060133    -45.910241 C
0.00007438        6839.     91950850.    10.2162424     0.0007598     -0.001918
2.5394094    -46.682880 C
0.00007938        7277.     91682087.    10.2393011     0.0008127     -0.002045
2.6696649    -49.768146 C
0.00008438        7713.     91413389.    10.2630109     0.0008659     -0.002172
2.7945082    -52.845065 C
0.00008938        8146.     91144431.    10.2866786     0.0009194     -0.002298
2.9137126    -55.915279 C
0.00009438        8576.     90874234.    10.3110673     0.0009731     -0.002424
3.0273448    -58.976728 C
0.00009938        8985.     90417533.    10.3290580     0.0010265     -0.002551
3.1339327    -60.000000 CY
 0.0001044        9311.     89207952.    10.3175636     0.0010769     -0.002681
3.2289512    -60.000000 CY
 0.0001094        9552.     87336121.    10.2781631     0.0011242     -0.002813
3.3128936    -60.000000 CY
 0.0001144        9789.     85583430.    10.2421143     0.0011714     -0.002946
3.3919789    -60.000000 CY
 0.0001194       10011.     83861611.    10.2051482     0.0012182     -0.003079
3.4655044    -60.000000 CY
 0.0001244       10162.     81702300.    10.1438002     0.0012616     -0.003216
3.5293615    -60.000000 CY
 0.0001294       10295.     79572057.    10.0817619     0.0013043     -0.003353
3.5881988    -60.000000 CY
```

```
 0.0001344        10427.     77592674.    10.0256713     0.0013472     -0.003490
3.6433355    -60.000000 CY
 0.0001394        10557.     75747771.     9.9749147     0.0013903     -0.003627
3.6947252    -60.000000 CY
 0.0001444        10687.     74023236.     9.9289636     0.0014335     -0.003764
3.7423201    -60.000000 CY
 0.0001494        10816.     72406063.     9.8867661     0.0014768     -0.003901
3.7859739    -60.000000 CY
 0.0001544        10933.     70821400.     9.8425115     0.0015194     -0.004038
3.8249324    -60.000000 CY
 0.0001594        11017.     69123456.     9.7867573     0.0015598     -0.004178
3.8581753    -60.000000 CY
 0.0001644        11079.     67401534.     9.7260868     0.0015987     -0.004319
3.8869352    -60.000000 CY
 0.0001694        11139.     65767574.     9.6691048     0.0016377     -0.004460
3.9124557    -60.000000 CY
 0.0001744        11199.     64223403.     9.6148605     0.0016766     -0.004601
3.9348020    -60.000000 CY
 0.0001794        11258.     62761436.     9.5654896     0.0017158     -0.004742
3.9539345    -60.000000 CY
 0.0001844        11316.     61373390.     9.5189681     0.0017551     -0.004882
3.9697370    -60.000000 CY
 0.0001894        11373.     60052811.     9.4743244     0.0017942     -0.005023
3.9821950    -60.000000 CY
 0.0001944        11429.     58796578.     9.4331695     0.0018336     -0.005164
3.9914019    -60.000000 CY
 0.0001994        11484.     57599778.     9.3948139     0.0018731     -0.005304
3.9973136    -60.000000 CY
 0.0002044        11539.     56457972.     9.3581635     0.0019126     -0.005445
3.9998845    -60.000000 CY
 0.0002094        11592.     55366642.     9.3266817     0.0019528     -0.005585
3.9975630    -60.000000 CY
 0.0002144        11645.     54322678.     9.2959142     0.0019928     -0.005725
3.9999044    -60.000000 CY
 0.0002194        11698.     53322120.     9.2675435     0.0020331     -0.005864
3.9971169    -60.000000 CY
 0.0002244        11748.     52356977.     9.2405172     0.0020733     -0.006004
3.9997515    -60.000000 CY
 0.0002294        11794.     51418840.     9.2141042     0.0021135     -0.006144
3.9957066    -60.000000 CY
 0.0002344        11831.     50480617.     9.1845645     0.0021526     -0.006285
3.9990577    -60.000000 CY
 0.0002394        11864.     49560513.     9.1526832     0.0021909     -0.006427
3.9990468    -60.000000 CY
 0.0002444        11885.     48632992.     9.1162023     0.0022278     -0.006570
3.9966747    -60.000000 CY
 0.0002494        11904.     47735462.     9.0796192     0.0022642     -0.006713
3.9992545    -60.000000 CY
 0.0002544        11921.     46863378.     9.0457647     0.0023010     -0.006856
3.9991650    -60.000000 CY
```

```
   0.0002594        11937.     46022914.     9.0128664     0.0023377     -0.007000
3.9956629    -60.000000 CY
   0.0002644        11953.     45213284.     8.9816750     0.0023745     -0.007143
3.9986069    -60.000000 CY
   0.0002694        11969.     44432753.     8.9518321     0.0024114     -0.007286
3.9999247    -60.000000 CY
   0.0002744        11984.     43679063.     8.9240509     0.0024485     -0.007429
3.9940409    -60.000000 CY
   0.0003044        12070.     39655848.     8.7807001     0.0026726     -0.008285
3.9985866    -60.000000 CY
   0.0003344        12146.     36325110.     8.6675807     0.0028982     -0.009139
3.9998625    -60.000000 CY
   0.0003644        12216.     33525083.     8.5838110     0.0031277     -0.009990
3.9999751    -60.000000 CYT
   0.0003944        12280.     31137740.     8.5203443     0.0033602     -0.010837
3.9996828    -60.000000 CYT
   0.0004244        12339.     29075625.     8.4715220     0.0035951     -0.011682
3.9974037    -60.000000 CYT
   0.0004544        12385.     27257253.     8.4224181     0.0038269     -0.012531
3.9878351    -60.000000 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           Axial Thrust        Nominal Mom. Cap.      Max. Comp.      Max.
Tens.
  No.              kips                 in-kip               Strain
Strain
 ----         ----------------     ------------------     ------------
------------
   1                3.800             12169.214          0.00300000
-0.00952396
   2                4.200             12173.120          0.00300000
-0.00952020
   3                4.600             12177.027          0.00300000
-0.00951645

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	3.800000	12169.	2.470000	7910.	91219895.
2	0.65	4.200000	12173.	2.730000	7913.	91253873.
3	0.65	4.600000	12177.	2.990000	7915.	91287886.
1	0.75	3.800000	12169.	2.850000	9127.	89806706.
2	0.75	4.200000	12173.	3.150000	9130.	89838295.
3	0.75	4.600000	12177.	3.450000	9133.	89869877.
1	0.90	3.800000	12169.	3.420000	10952.	70221645.
2	0.90	4.200000	12173.	3.780000	10956.	70254444.
3	0.90	4.600000	12177.	4.140000	10959.	70287179.

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	1.0000	0.00	N.A.	No	0.00	8636.
2	4.0000	2.1572	No	No	8636.	4783.
3	4.5000	3.5000	No	Yes	N.A.	N.A.

4	5.3000	4.3000	No	Yes	N.A.	N.A.
5	5.8000	4.8000	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 = 1000.0 lbs
Applied moment at pile head = 315600.0 in-lbs
Axial thrust load on pile head = 4200.0 lbs

Depth X	Deflect. y	Bending Moment	Shear Force	Slope S	Total Stress	Bending Stiffness	Soil Res. Es*H	Soil Spr. Lat. Load	Distrib. p
feet	inches	in-lbs	lbs	radians	psi*	lb-in^2	lb/inch	lb/inch	lb/inch
0.00	0.00635	315600.	1000.0000	-1.16E-04	0.00	3.84E+11	0.00	0.00	0.00
0.07000	0.00625	316440.	1000.0000	-1.16E-04	0.00	3.84E+11	0.00	0.00	0.00
0.1400	0.00616	317281.	1000.	-1.15E-04	0.00	3.84E+11	0.00	0.00	0.00
0.2100	0.00606	318121.	1000.	-1.14E-04	0.00	3.84E+11	0.00	0.00	0.00
0.2800	0.00596	318962.	1000.	-1.14E-04	0.00	3.84E+11	0.00	0.00	0.00
0.3500	0.00587	319802.	1000.	-1.13E-04	0.00	3.84E+11	0.00	0.00	0.00
0.4200	0.00577	320642.	1000.0000	-1.12E-04	0.00	3.84E+11	0.00	0.00	0.00
0.4900	0.00568	321483.	1000.0000	-1.11E-04	0.00	3.84E+11	0.00	0.00	0.00
0.5600	0.00559	322323.	1000.0000	-1.11E-04	0.00	3.84E+11	0.00	0.00	0.00
0.6300	0.00549	323164.	1000.0000	-1.10E-04	0.00	3.84E+11			

```
0.00       0.00       0.00
    0.7000    0.00540    324004.      1000.  -1.09E-04       0.00   3.84E+11
0.00       0.00       0.00
    0.7700    0.00531    324844.      1000.  -1.09E-04       0.00   3.84E+11
0.00       0.00       0.00
    0.8400    0.00522    325685.      1000.  -1.08E-04       0.00   3.84E+11
0.00       0.00       0.00
    0.9100    0.00513    326525.      1000.  -1.07E-04       0.00   3.84E+11
0.00       0.00       0.00
    0.9800    0.00504    327366.      1000.  -1.07E-04       0.00   3.84E+11
0.00       0.00       0.00
    1.0500    0.00495    328206.   994.4317  -1.06E-04       0.00   3.84E+11
-13.258      2250.       0.00
    1.1200    0.00486    329037.   983.2572  -1.05E-04       0.00   3.84E+11
-13.348      2306.       0.00
    1.1900    0.00477    329858.   972.0075  -1.04E-04       0.00   3.84E+11
-13.437      2364.       0.00
    1.2600    0.00469    330671.   960.6847  -1.04E-04       0.00   3.84E+11
-13.522      2424.       0.00
    1.3300    0.00460    331473.   949.2911  -1.03E-04       0.00   3.84E+11
-13.605      2484.       0.00
    1.4000    0.00451    332266.   937.8287  -1.02E-04       0.00   3.84E+11
-13.686      2547.       0.00
    1.4700    0.00443    333049.   926.2997  -1.01E-04       0.00   3.84E+11
-13.764      2611.       0.00
    1.5400    0.00434    333823.   914.7063  -1.01E-04       0.00   3.84E+11
-13.839      2677.       0.00
    1.6100    0.00426    334587.   903.0507  -1.00E-04       0.00   3.84E+11
-13.912      2744.       0.00
    1.6800    0.00418    335341.   891.3351  -9.93E-05       0.00   3.84E+11
-13.982      2813.       0.00
    1.7500    0.00409    336085.   879.5618  -9.85E-05       0.00   3.84E+11
-14.049      2884.       0.00
    1.8200    0.00401    336819.   867.7331  -9.78E-05       0.00   3.84E+11
-14.114      2957.       0.00
    1.8900    0.00393    337543.   855.8513  -9.71E-05       0.00   3.84E+11
-14.176      3032.       0.00
    1.9600    0.00385    338258.   843.9188  -9.63E-05       0.00   3.84E+11
-14.235      3108.       0.00
    2.0300    0.00377    338962.   831.9378  -9.56E-05       0.00   3.84E+11
-14.291      3187.       0.00
    2.1000    0.00369    339656.   819.9108  -9.48E-05       0.00   3.84E+11
-14.344      3269.       0.00
    2.1700    0.00361    340340.   807.8403  -9.41E-05       0.00   3.84E+11
-14.395      3352.       0.00
    2.2400    0.00353    341014.   795.7287  -9.34E-05       0.00   3.84E+11
-14.442      3439.       0.00
    2.3100    0.00345    341678.   783.5785  -9.26E-05       0.00   3.84E+11
-14.487      3527.       0.00
    2.3800    0.00337    342331.   771.3922  -9.19E-05       0.00   3.84E+11
```

```
-14.528      3619.       0.00
    2.4500    0.00330    342974.   759.1725  -9.11E-05       0.00   3.84E+11
-14.566      3713.       0.00
    2.5200    0.00322    343607.   746.9218  -9.04E-05       0.00   3.84E+11
-14.602      3810.       0.00
    2.5900    0.00314    344230.   734.6430  -8.96E-05       0.00   3.84E+11
-14.634      3910.       0.00
    2.6600    0.00307    344842.   722.3386  -8.89E-05       0.00   3.84E+11
-14.662      4013.       0.00
    2.7300    0.00299    345444.   710.0115  -8.81E-05       0.00   3.84E+11
-14.688      4120.       0.00
    2.8000    0.00292    346035.   697.6644  -8.73E-05       0.00   3.84E+11
-14.710      4230.       0.00
    2.8700    0.00285    346616.   685.3000  -8.66E-05       0.00   3.84E+11
-14.729      4344.       0.00
    2.9400    0.00278    347187.   672.9214  -8.58E-05       0.00   3.84E+11
-14.744      4462.       0.00
    3.0100    0.00270    347748.   660.5315  -8.51E-05       0.00   3.84E+11
-14.756      4584.       0.00
    3.0800    0.00263    348298.   648.1332  -8.43E-05       0.00   3.84E+11
-14.764      4711.       0.00
    3.1500    0.00256    348837.   635.7296  -8.35E-05       0.00   3.84E+11
-14.768      4842.       0.00
    3.2200    0.00249    349366.   623.3238  -8.28E-05       0.00   3.84E+11
-14.769      4978.       0.00
    3.2900    0.00242    349885.   610.9189  -8.20E-05       0.00   3.84E+11
-14.766      5119.       0.00
    3.3600    0.00235    350393.   598.5183  -8.13E-05       0.00   3.84E+11
-14.759      5266.       0.00
    3.4300    0.00229    350891.   586.1253  -8.05E-05       0.00   3.84E+11
-14.748      5418.       0.00
    3.5000    0.00222    351378.   573.7432  -7.97E-05       0.00   3.84E+11
-14.733      5577.       0.00
    3.5700    0.00215    351855.   561.3755  -7.90E-05       0.00   3.84E+11
-14.714      5742.       0.00
    3.6400    0.00209    352322.   549.0258  -7.82E-05       0.00   3.84E+11
-14.690      5914.       0.00
    3.7100    0.00202    352778.   536.6978  -7.74E-05       0.00   3.84E+11
-14.662      6094.       0.00
    3.7800    0.00196    353224.   524.3951  -7.66E-05       0.00   3.84E+11
-14.630      6281.       0.00
    3.8500    0.00189    353660.   512.1217  -7.59E-05       0.00   3.84E+11
-14.593      6477.       0.00
    3.9200    0.00183    354085.   499.8816  -7.51E-05       0.00   3.84E+11
-14.551      6683.       0.00
    3.9900    0.00177    354500.   487.6788  -7.43E-05       0.00   3.84E+11
-14.504      6898.       0.00
    4.0600    0.00170    354905.   478.3020  -7.35E-05       0.00   3.84E+11
-7.822       3856.       0.00
    4.1300    0.00164    355304.   471.7777  -7.28E-05       0.00   3.84E+11
```

```
-7.712      3944.       0.00
    4.2000    0.00158    355698.   465.3495  -7.20E-05       0.00   3.84E+11
-7.593      4032.       0.00
    4.2700    0.00152    356086.   459.0255  -7.12E-05       0.00   3.84E+11
-7.464      4120.       0.00
    4.3400    0.00146    356470.   452.8139  -7.04E-05       0.00   3.84E+11
-7.326      4208.       0.00
    4.4100    0.00140    356848.   446.7222  -6.97E-05       0.00   3.84E+11
-7.178      4297.       0.00
    4.4800    0.00135    357221.   440.7581  -6.89E-05       0.00   3.84E+11
-7.022      4385.       0.00
    4.5500    0.00129    357589.   257.7555  -6.81E-05       0.00   3.84E+11
-428.699    279661.       0.00
    4.6200    0.00123    357654.   -106.013  -6.73E-05       0.00   3.84E+11
-437.416    298533.       0.00
    4.6900    0.00117    357411.   -476.924  -6.65E-05       0.00   3.84E+11
-445.707    318751.       0.00
    4.7600    0.00112    356853.   -854.613  -6.58E-05       0.00   3.84E+11
-453.553    340467.       0.00
    4.8300    0.00106    355976.     -1239.  -6.50E-05       0.00   3.84E+11
-460.932    363860.       0.00
    4.9000    0.00101    354773.     -1629.  -6.42E-05       0.00   3.84E+11
-467.819    389137.       0.00
    4.9700   9.56E-04    353240.     -2019.  -6.34E-05       0.00   3.84E+11
-462.397    406187.       0.00
    5.0400   9.03E-04    351381.     -2402.  -6.27E-05       0.00   3.84E+11
-448.032    416640.       0.00
    5.1100   8.51E-04    349205.     -2772.  -6.19E-05       0.00   3.84E+11
-432.677    427093.       0.00
    5.1800   7.99E-04    346725.     -3128.  -6.11E-05       0.00   3.84E+11
-416.354    437547.       0.00
    5.2500   7.48E-04    343950.     -3471.  -6.04E-05       0.00   3.84E+11
-399.085    448000.       0.00
    5.3200   6.98E-04    340894.     -3698.  -5.96E-05       0.00   3.84E+11
-141.915    170814.       0.00
    5.3900   6.48E-04    337738.     -3813.  -5.89E-05       0.00   3.84E+11
-131.960    171030.       0.00
    5.4600   5.99E-04    334488.     -3920.  -5.82E-05       0.00   3.84E+11
-122.039    171151.       0.00
    5.5300   5.50E-04    331153.     -4018.  -5.74E-05       0.00   3.84E+11
-112.190    171215.       0.00
    5.6000   5.02E-04    327738.     -4108.  -5.67E-05       0.00   3.84E+11
-102.458    171277.       0.00
    5.6700   4.55E-04    324251.     -4190.  -5.60E-05       0.00   3.84E+11
-92.840    171339.       0.00
    5.7400   4.08E-04    320699.     -4264.  -5.53E-05       0.00   3.84E+11
-83.337    171400.       0.00
    5.8100   3.62E-04    317088.     -7116.  -5.46E-05       0.00   3.84E+11
-6706.   1.56E+07       0.00
    5.8800   3.17E-04    308745.    -12444.  -5.39E-05       0.00   3.85E+11
```

```
-5978.   1.59E+07       0.00
    5.9500   2.72E-04    296183.    -17150.  -5.32E-05       0.00   3.85E+11
-5228.   1.62E+07       0.00
    6.0200   2.27E-04    279933.    -21217.  -5.26E-05       0.00   3.85E+11
-4455.   1.65E+07       0.00
    6.0900   1.83E-04    260539.    -24625.  -5.20E-05       0.00   3.85E+11
-3660.   1.68E+07       0.00
    6.1600   1.40E-04    238563.    -27357.  -5.15E-05       0.00   3.85E+11
-2843.   1.71E+07       0.00
    6.2300   9.68E-05    214580.    -29393.  -5.10E-05       0.00   3.85E+11
-2004.   1.74E+07       0.00
    6.3000   5.42E-05    189183.    -30714.  -5.05E-05       0.00   3.85E+11
-1141.   1.77E+07       0.00
    6.3700   1.19E-05    162981.    -31300.  -5.02E-05       0.00   3.85E+11
-255.138   1.80E+07       0.00
    6.4400  -3.01E-05    136599.    -31132.  -4.98E-05       0.00   3.85E+11
655.3296   1.83E+07       0.00
    6.5100  -7.18E-05    110679.    -30189.  -4.96E-05       0.00   3.85E+11
1591.   1.86E+07       0.00
    6.5800  -1.13E-04     85881.    -28449.  -4.94E-05       0.00   3.85E+11
2552.   1.89E+07       0.00
    6.6500  -1.55E-04     62885.    -25890.  -4.92E-05       0.00   3.85E+11
3540.   1.92E+07       0.00
    6.7200  -1.96E-04     42386.    -22490.  -4.91E-05       0.00   3.85E+11
4555.   1.95E+07       0.00
    6.7900  -2.37E-04     25102.    -18225.  -4.90E-05       0.00   3.85E+11
5599.   1.98E+07       0.00
    6.8600  -2.78E-04     11768.    -13072.  -4.90E-05       0.00   3.85E+11
6671.   2.01E+07       0.00
    6.9300  -3.19E-04      3142.     -7005.  -4.89E-05       0.00   3.85E+11
7773.   2.04E+07       0.00
    7.0000  -3.61E-04      0.00       0.00  -4.89E-05       0.00   3.85E+11
8905.   1.04E+07       0.00

* This analysis computed pile response using nonlinear moment-curvature rela-
  tionships. 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 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. 1:

Pile-head deflection              =     0.00635044 inches
Computed slope at pile head       =     -0.0001163 radians
Maximum bending moment            =        357654. inch-lbs
Maximum shear force               =        -31300. lbs
Depth of maximum bending moment   =     4.62000000 feet below pile head
Depth of maximum shear force      =     6.37000000 feet below pile head
```

```
Number of iterations             =              6
Number of zero deflection points =              1
Pile deflection at ground        =     0.00501426 inches
```

Pile-head Deflection vs. Pile Length for Load Case 1

Boundary Condition Type 1, Shear and Moment

```
Shear      =           1000. lbs
Moment     =         315600. in-lbs
Axial Load =           4200. lbs
```

Pile Length feet	Pile Head Deflection inches	Maximum Moment ln-lbs	Maximum Shear lbs
7.00000	0.00635044	357654.	-31300.
6.65000	0.01343516	353532.	-41501.
6.30000	0.06666864	343270.	-56319.
5.95000	0.45596978	336749.	-36471.
5.60000	7.05041946	340271.	-33278.

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                          =       2250.0 lbs
Applied moment at pile head                       =     724800.0 in-lbs
Axial thrust load on pile head                    =       4600.0 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. Es*H lb/inch	Soil Spr. Distrib. p Lat. Load lb/inch
0.00	0.01597	724800.	2250.	-2.86E-04	0.00	3.83E+11	0.00	0.00
0.07000	0.01573	726691.	2250.	-2.84E-04	0.00	3.83E+11		

```
0.00       0.00       0.00
    0.1400    0.01549    728582.      2250.  -2.82E-04       0.00   3.83E+11
0.00       0.00       0.00
    0.2100    0.01525    730473.      2250.  -2.81E-04       0.00   3.83E+11
0.00       0.00       0.00
    0.2800    0.01502    732364.      2250.  -2.79E-04       0.00   3.83E+11
0.00       0.00       0.00
    0.3500    0.01478    734255.      2250.  -2.78E-04       0.00   3.83E+11
0.00       0.00       0.00
    0.4200    0.01455    736147.      2250.  -2.76E-04       0.00   3.83E+11
0.00       0.00       0.00
    0.4900    0.01432    738038.      2250.  -2.74E-04       0.00   3.83E+11
0.00       0.00       0.00
    0.5600    0.01409    739929.      2250.  -2.73E-04       0.00   3.83E+11
0.00       0.00       0.00
    0.6300    0.01386    741820.      2250.  -2.71E-04       0.00   3.83E+11
0.00       0.00       0.00
    0.7000    0.01364    743711.      2250.  -2.69E-04       0.00   3.83E+11
0.00       0.00       0.00
    0.7700    0.01341    745602.      2250.  -2.68E-04       0.00   3.83E+11
0.00       0.00       0.00
    0.8400    0.01319    747493.      2250.  -2.66E-04       0.00   3.83E+11
0.00       0.00       0.00
    0.9100    0.01296    749384.      2250.  -2.65E-04       0.00   3.83E+11
0.00       0.00       0.00
    0.9800    0.01274    751275.      2250.  -2.63E-04       0.00   3.83E+11
0.00       0.00       0.00
    1.0500    0.01252    753166.      2242.  -2.61E-04       0.00   3.83E+11
-18.064      1212.       0.00
    1.1200    0.01230    755044.      2227.  -2.60E-04       0.00   3.83E+11
-18.190      1242.       0.00
    1.1900    0.01209    756910.      2212.  -2.58E-04       0.00   3.83E+11
-18.313      1273.       0.00
    1.2600    0.01187    758762.      2196.  -2.56E-04       0.00   3.83E+11
-18.432      1304.       0.00
    1.3300    0.01165    760602.      2181.  -2.55E-04       0.00   3.83E+11
-18.548      1337.       0.00
    1.4000    0.01144    762428.      2165.  -2.53E-04       0.00   3.83E+11
-18.661      1370.       0.00
    1.4700    0.01123    764241.      2150.  -2.51E-04       0.00   3.83E+11
-18.770      1404.       0.00
    1.5400    0.01102    766041.      2134.  -2.50E-04       0.00   3.83E+11
-18.876      1439.       0.00
    1.6100    0.01081    767828.      2118.  -2.48E-04       0.00   3.83E+11
-18.978      1475.       0.00
    1.6800    0.01060    769601.      2102.  -2.46E-04       0.00   3.83E+11
-19.076      1511.       0.00
    1.7500    0.01040    771361.      2086.  -2.45E-04       0.00   3.83E+11
-19.171      1549.       0.00
    1.8200    0.01019    773107.      2070.  -2.43E-04       0.00   3.83E+11
```

-19.262	1588.	0.00				
1.8900	0.00999	774840.	2053.	-2.41E-04	0.00	3.83E+11
-19.350	1627.	0.00				
1.9600	0.00979	776559.	2037.	-2.39E-04	0.00	3.83E+11
-19.433	1668.	0.00				
2.0300	0.00959	778264.	2021.	-2.38E-04	0.00	3.83E+11
-19.513	1710.	0.00				
2.1000	0.00939	779955.	2004.	-2.36E-04	0.00	3.83E+11
-19.589	1753.	0.00				
2.1700	0.00919	781633.	1988.	-2.34E-04	0.00	3.83E+11
-19.661	1797.	0.00				
2.2400	0.00899	783297.	1971.	-2.33E-04	0.00	3.83E+11
-19.729	1843.	0.00				
2.3100	0.00880	784947.	1955.	-2.31E-04	0.00	3.83E+11
-19.793	1890.	0.00				
2.3800	0.00861	786582.	1938.	-2.29E-04	0.00	3.83E+11
-19.853	1938.	0.00				
2.4500	0.00841	788204.	1921.	-2.27E-04	0.00	3.83E+11
-19.909	1988.	0.00				
2.5200	0.00822	789812.	1905.	-2.26E-04	0.00	3.83E+11
-19.960	2039.	0.00				
2.5900	0.00803	791406.	1888.	-2.24E-04	0.00	3.83E+11
-20.008	2092.	0.00				
2.6600	0.00785	792985.	1871.	-2.22E-04	0.00	3.83E+11
-20.050	2146.	0.00				
2.7300	0.00766	794551.	1854.	-2.21E-04	0.00	3.83E+11
-20.089	2203.	0.00				
2.8000	0.00748	796102.	1837.	-2.19E-04	0.00	3.83E+11
-20.123	2261.	0.00				
2.8700	0.00729	797639.	1820.	-2.17E-04	0.00	3.83E+11
-20.152	2321.	0.00				
2.9400	0.00711	799162.	1803.	-2.15E-04	0.00	3.83E+11
-20.177	2383.	0.00				
3.0100	0.00693	800671.	1786.	-2.14E-04	0.00	3.83E+11
-20.196	2447.	0.00				
3.0800	0.00675	802165.	1769.	-2.12E-04	0.00	3.83E+11
-20.211	2514.	0.00				
3.1500	0.00658	803645.	1753.	-2.10E-04	0.00	3.83E+11
-20.221	2583.	0.00				
3.2200	0.00640	805111.	1736.	-2.08E-04	0.00	3.83E+11
-20.226	2654.	0.00				
3.2900	0.00623	806562.	1719.	-2.06E-04	0.00	3.83E+11
-20.226	2729.	0.00				
3.3600	0.00605	808000.	1702.	-2.05E-04	0.00	3.83E+11
-20.220	2806.	0.00				
3.4300	0.00588	809422.	1685.	-2.03E-04	0.00	3.83E+11
-20.209	2886.	0.00				
3.5000	0.00571	810831.	1668.	-2.01E-04	0.00	3.83E+11
-20.192	2969.	0.00				
3.5700	0.00554	812226.	1651.	-1.99E-04	0.00	3.83E+11

-20.170	3056.	0.00				
3.6400	0.00538	813606.	1634.	-1.98E-04	0.00	3.83E+11
-20.142	3146.	0.00				
3.7100	0.00521	814972.	1617.	-1.96E-04	0.00	3.83E+11
-20.108	3240.	0.00				
3.7800	0.00505	816324.	1600.	-1.94E-04	0.00	3.83E+11
-20.067	3339.	0.00				
3.8500	0.00489	817661.	1583.	-1.92E-04	0.00	3.83E+11
-20.020	3441.	0.00				
3.9200	0.00473	818985.	1566.	-1.90E-04	0.00	3.83E+11
-19.967	3549.	0.00				
3.9900	0.00457	820294.	1550.	-1.89E-04	0.00	3.83E+11
-19.907	3662.	0.00				
4.0600	0.00441	821589.	1533.	-1.87E-04	0.00	3.83E+11
-20.237	3856.	0.00				
4.1300	0.00425	822870.	1516.	-1.85E-04	0.00	3.83E+11
-19.967	3944.	0.00				
4.2000	0.00410	824137.	1499.	-1.83E-04	0.00	3.83E+11
-19.671	4032.	0.00				
4.2700	0.00395	825390.	1483.	-1.81E-04	0.00	3.83E+11
-19.350	4120.	0.00				
4.3400	0.00379	826630.	1467.	-1.80E-04	0.00	3.83E+11
-19.005	4208.	0.00				
4.4100	0.00364	827856.	1451.	-1.78E-04	0.00	3.83E+11
-18.635	4297.	0.00				
4.4800	0.00349	829069.	1435.	-1.76E-04	0.00	3.83E+11
-18.242	4385.	0.00				
4.5500	0.00335	830269.	1199.	-1.74E-04	0.00	3.83E+11
-544.372	136597.	0.00				
4.6200	0.00320	831084.	737.1056	-1.72E-04	0.00	3.83E+11
-555.542	145735.	0.00				
4.6900	0.00306	831508.	265.9835	-1.71E-04	0.00	3.83E+11
-566.177	155519.	0.00				
4.7600	0.00292	831533.	-213.837	-1.69E-04	0.00	3.83E+11
-576.252	166021.	0.00				
4.8300	0.00277	831150.	-701.873	-1.67E-04	0.00	3.83E+11
-585.739	177326.	0.00				
4.9000	0.00264	830355.	-1198.	-1.65E-04	0.00	3.83E+11
-594.608	189533.	0.00				
4.9700	0.00250	829140.	-1701.	-1.63E-04	0.00	3.83E+11
-602.823	202760.	0.00				
5.0400	0.00236	827499.	-2210.	-1.61E-04	0.00	3.83E+11
-610.346	217146.	0.00				
5.1100	0.00223	825428.	-2726.	-1.60E-04	0.00	3.83E+11
-617.133	232858.	0.00				
5.1800	0.00209	822921.	-3247.	-1.58E-04	0.00	3.83E+11
-623.132	250097.	0.00				
5.2500	0.00196	819975.	-3772.	-1.56E-04	0.00	3.83E+11
-628.285	269111.	0.00				
5.3200	0.00183	816585.	-4191.	-1.54E-04	0.00	3.83E+11

```
-368.424    169035.       0.00
    5.3900    0.00170    812936.     -4490.  -1.52E-04       0.00   3.83E+11
-343.629    169587.       0.00
    5.4600    0.00157    809044.     -4768.  -1.51E-04       0.00   3.83E+11
-318.519    169899.       0.00
    5.5300    0.00145    804927.     -5025.  -1.49E-04       0.00   3.83E+11
-293.356    170061.       0.00
    5.6000    0.00132    800603.     -5261.  -1.47E-04       0.00   3.83E+11
-268.443    170221.       0.00
    5.6700    0.00120    796090.     -5476.  -1.45E-04       0.00   3.83E+11
-243.778    170379.       0.00
    5.7400    0.00108    791404.     -5670.  -1.44E-04       0.00   3.83E+11
-219.363    170535.       0.00
    5.8100   9.61E-04    786564.    -13231.  -1.42E-04       0.00   3.83E+11
-17783.   1.56E+07       0.00
    5.8800   8.42E-04    769177.    -27377.  -1.40E-04       0.00   3.83E+11
-15896.   1.59E+07       0.00
    5.9500   7.25E-04    740573.    -39912.  -1.39E-04       0.00   3.83E+11
-13951.   1.62E+07       0.00
    6.0200   6.09E-04    702125.    -50790.  -1.37E-04       0.00   3.83E+11
-11947.   1.65E+07       0.00
    6.0900   4.95E-04    655248.    -59959.  -1.35E-04       0.00   3.84E+11
-9885.   1.68E+07       0.00
    6.1600   3.82E-04    601395.    -67371.  -1.34E-04       0.00   3.84E+11
-7764.   1.71E+07       0.00
    6.2300   2.70E-04    542065.    -72977.  -1.33E-04       0.00   3.84E+11
-5583.   1.74E+07       0.00
    6.3000   1.59E-04    478794.    -76726.  -1.32E-04       0.00   3.84E+11
-3342.   1.77E+07       0.00
    6.3700   4.85E-05    413166.    -78566.  -1.31E-04       0.00   3.84E+11
-1039.   1.80E+07       0.00
    6.4400  -6.09E-05    346804.    -78445.  -1.30E-04       0.00   3.84E+11
1328.   1.83E+07       0.00
    6.5100  -1.70E-04    281380.    -76308.  -1.29E-04       0.00   3.85E+11
3760.   1.86E+07       0.00
    6.5800  -2.78E-04    218608.    -72099.  -1.29E-04       0.00   3.85E+11
6260.   1.89E+07       0.00
    6.6500  -3.86E-04    160254.    -65761.  -1.28E-04       0.00   3.85E+11
8830.   1.92E+07       0.00
    6.7200  -4.94E-04    108130.    -57235.  -1.28E-04       0.00   3.85E+11
11471.   1.95E+07       0.00
    6.7900  -6.01E-04     64100.    -46459.  -1.28E-04       0.00   3.85E+11
14186.   1.98E+07       0.00
    6.8600  -7.08E-04     30081.    -33370.  -1.28E-04       0.00   3.85E+11
16977.   2.01E+07       0.00
    6.9300  -8.15E-04      8039.    -17906.  -1.28E-04       0.00   3.85E+11
19844.   2.04E+07       0.00
    7.0000  -9.23E-04       0.00       0.00  -1.28E-04       0.00   3.85E+11
22789.   1.04E+07       0.00
```

```
* This analysis computed pile response using nonlinear moment-curvature rela-
  tionships. 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 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              =     0.01596743 inches
Computed slope at pile head       =     -0.0002856 radians
Maximum bending moment            =        831533. inch-lbs
Maximum shear force               =        -78566. lbs
Depth of maximum bending moment   =     4.76000000 feet below pile head
Depth of maximum shear force      =     6.37000000 feet below pile head
Number of iterations              =              6
Number of zero deflection points  =              1
Pile deflection at ground         =     0.01267870 inches



---------------------------------------------------------------------------
            Pile-head Deflection vs. Pile Length for Load Case 2
---------------------------------------------------------------------------

Boundary Condition Type 1, Shear and Moment

Shear      =           2250. lbs
Moment     =         724800. in-lbs
Axial Load =           4600. lbs


    Pile       Pile Head       Maximum       Maximum
   Length      Deflection      Moment         Shear
    feet         inches        ln-lbs          lbs
------------  ------------  ------------  ------------
    7.00000    0.01596743       831533.       -78566.
    6.65000    0.06293566       818307.      -113415.
    6.30000    0.56666718       791726.      -116678.
    5.95000    7.26762273       782393.      -112362.


---------------------------------------------------------------------------
                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                                =       2250.0 lbs
Applied moment at pile head                             =     724800.0 in-lbs
Axial thrust load on pile head                          =       3800.0 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
---------- ---------- ---------- ---------- ---------- ---------- ----------
---------- ---------- ----------
      0.00    0.01597    724800.      2250.  -2.86E-04       0.00   3.83E+11
0.00       0.00       0.00
   0.07000    0.01573    726691.      2250.  -2.84E-04       0.00   3.83E+11
0.00       0.00       0.00
    0.1400    0.01549    728582.      2250.  -2.82E-04       0.00   3.83E+11
0.00       0.00       0.00
    0.2100    0.01525    730473.      2250.  -2.81E-04       0.00   3.83E+11
0.00       0.00       0.00
    0.2800    0.01502    732364.      2250.  -2.79E-04       0.00   3.83E+11
0.00       0.00       0.00
    0.3500    0.01478    734254.      2250.  -2.78E-04       0.00   3.83E+11
0.00       0.00       0.00
    0.4200    0.01455    736145.      2250.  -2.76E-04       0.00   3.83E+11
0.00       0.00       0.00
    0.4900    0.01432    738036.      2250.  -2.74E-04       0.00   3.83E+11
0.00       0.00       0.00
    0.5600    0.01409    739927.      2250.  -2.73E-04       0.00   3.83E+11
0.00       0.00       0.00
    0.6300    0.01386    741818.      2250.  -2.71E-04       0.00   3.83E+11
0.00       0.00       0.00
    0.7000    0.01364    743709.      2250.  -2.69E-04       0.00   3.83E+11
0.00       0.00       0.00
    0.7700    0.01341    745600.      2250.  -2.68E-04       0.00   3.83E+11
0.00       0.00       0.00
    0.8400    0.01319    747491.      2250.  -2.66E-04       0.00   3.83E+11
0.00       0.00       0.00
    0.9100    0.01296    749381.      2250.  -2.65E-04       0.00   3.83E+11
0.00       0.00       0.00
    0.9800    0.01274    751272.      2250.  -2.63E-04       0.00   3.83E+11
0.00       0.00       0.00
    1.0500    0.01252    753163.      2242.  -2.61E-04       0.00   3.83E+11
-18.064      1212.       0.00
    1.1200    0.01230    755041.      2227.  -2.60E-04       0.00   3.83E+11
-18.190      1242.       0.00
    1.1900    0.01209    756906.      2212.  -2.58E-04       0.00   3.83E+11
-18.313      1273.       0.00
    1.2600    0.01187    758759.      2196.  -2.56E-04       0.00   3.83E+11
-18.432      1304.       0.00
```

1.3300	0.01165	760598.	2181.	-2.55E-04	0.00	3.83E+11	
-18.548	1337.	0.00					
1.4000	0.01144	762424.	2165.	-2.53E-04	0.00	3.83E+11	
-18.661	1370.	0.00					
1.4700	0.01123	764237.	2150.	-2.51E-04	0.00	3.83E+11	
-18.770	1404.	0.00					
1.5400	0.01102	766037.	2134.	-2.50E-04	0.00	3.83E+11	
-18.875	1439.	0.00					
1.6100	0.01081	767824.	2118.	-2.48E-04	0.00	3.83E+11	
-18.978	1475.	0.00					
1.6800	0.01060	769597.	2102.	-2.46E-04	0.00	3.83E+11	
-19.076	1511.	0.00					
1.7500	0.01040	771356.	2086.	-2.45E-04	0.00	3.83E+11	
-19.171	1549.	0.00					
1.8200	0.01019	773102.	2070.	-2.43E-04	0.00	3.83E+11	
-19.262	1588.	0.00					
1.8900	0.00999	774835.	2053.	-2.41E-04	0.00	3.83E+11	
-19.349	1627.	0.00					
1.9600	0.00979	776554.	2037.	-2.39E-04	0.00	3.83E+11	
-19.433	1668.	0.00					
2.0300	0.00959	778259.	2021.	-2.38E-04	0.00	3.83E+11	
-19.513	1710.	0.00					
2.1000	0.00939	779950.	2004.	-2.36E-04	0.00	3.83E+11	
-19.589	1753.	0.00					
2.1700	0.00919	781628.	1988.	-2.34E-04	0.00	3.83E+11	
-19.661	1797.	0.00					
2.2400	0.00899	783291.	1971.	-2.33E-04	0.00	3.83E+11	
-19.729	1843.	0.00					
2.3100	0.00880	784941.	1955.	-2.31E-04	0.00	3.83E+11	
-19.793	1890.	0.00					
2.3800	0.00861	786577.	1938.	-2.29E-04	0.00	3.83E+11	
-19.853	1938.	0.00					
2.4500	0.00841	788198.	1921.	-2.27E-04	0.00	3.83E+11	
-19.909	1988.	0.00					
2.5200	0.00822	789806.	1905.	-2.26E-04	0.00	3.83E+11	
-19.960	2039.	0.00					
2.5900	0.00803	791400.	1888.	-2.24E-04	0.00	3.83E+11	
-20.007	2092.	0.00					
2.6600	0.00785	792979.	1871.	-2.22E-04	0.00	3.83E+11	
-20.050	2146.	0.00					
2.7300	0.00766	794544.	1854.	-2.21E-04	0.00	3.83E+11	
-20.089	2203.	0.00					
2.8000	0.00748	796095.	1837.	-2.19E-04	0.00	3.83E+11	
-20.123	2261.	0.00					
2.8700	0.00729	797632.	1820.	-2.17E-04	0.00	3.83E+11	
-20.152	2321.	0.00					
2.9400	0.00711	799155.	1803.	-2.15E-04	0.00	3.83E+11	
-20.176	2383.	0.00					
3.0100	0.00693	800663.	1786.	-2.14E-04	0.00	3.83E+11	
-20.196	2447.	0.00					

```
    3.0800    0.00675    802158.      1769.  -2.12E-04       0.00   3.83E+11
-20.211      2514.       0.00
    3.1500    0.00658    803638.      1753.  -2.10E-04       0.00   3.83E+11
-20.221      2583.       0.00
    3.2200    0.00640    805103.      1736.  -2.08E-04       0.00   3.83E+11
-20.226      2654.       0.00
    3.2900    0.00623    806555.      1719.  -2.06E-04       0.00   3.83E+11
-20.226      2729.       0.00
    3.3600    0.00605    807992.      1702.  -2.05E-04       0.00   3.83E+11
-20.220      2806.       0.00
    3.4300    0.00588    809414.      1685.  -2.03E-04       0.00   3.83E+11
-20.209      2886.       0.00
    3.5000    0.00571    810823.      1668.  -2.01E-04       0.00   3.83E+11
-20.192      2969.       0.00
    3.5700    0.00554    812217.      1651.  -1.99E-04       0.00   3.83E+11
-20.170      3056.       0.00
    3.6400    0.00538    813597.      1634.  -1.98E-04       0.00   3.83E+11
-20.142      3146.       0.00
    3.7100    0.00521    814963.      1617.  -1.96E-04       0.00   3.83E+11
-20.108      3240.       0.00
    3.7800    0.00505    816315.      1600.  -1.94E-04       0.00   3.83E+11
-20.067      3339.       0.00
    3.8500    0.00489    817652.      1583.  -1.92E-04       0.00   3.83E+11
-20.020      3441.       0.00
    3.9200    0.00473    818976.      1566.  -1.90E-04       0.00   3.83E+11
-19.967      3549.       0.00
    3.9900    0.00457    820285.      1550.  -1.89E-04       0.00   3.83E+11
-19.907      3662.       0.00
    4.0600    0.00441    821580.      1533.  -1.87E-04       0.00   3.83E+11
-20.237      3856.       0.00
    4.1300    0.00425    822861.      1516.  -1.85E-04       0.00   3.83E+11
-19.967      3944.       0.00
    4.2000    0.00410    824128.      1499.  -1.83E-04       0.00   3.83E+11
-19.671      4032.       0.00
    4.2700    0.00394    825381.      1483.  -1.81E-04       0.00   3.83E+11
-19.350      4120.       0.00
    4.3400    0.00379    826620.      1467.  -1.80E-04       0.00   3.83E+11
-19.004      4208.       0.00
    4.4100    0.00364    827846.      1451.  -1.78E-04       0.00   3.83E+11
-18.635      4297.       0.00
    4.4800    0.00349    829059.      1435.  -1.76E-04       0.00   3.83E+11
-18.242      4385.       0.00
    4.5500    0.00335    830259.      1199.  -1.74E-04       0.00   3.83E+11
-544.370    136598.       0.00
    4.6200    0.00320    831074.   737.1144  -1.72E-04       0.00   3.83E+11
-555.540    145737.       0.00
    4.6900    0.00306    831498.   265.9944  -1.71E-04       0.00   3.83E+11
-566.175    155521.       0.00
    4.7600    0.00292    831522.   -213.824  -1.69E-04       0.00   3.83E+11
-576.250    166023.       0.00
```

```
    4.8300    0.00277    831140.   -701.858  -1.67E-04       0.00   3.83E+11
-585.737    177328.       0.00
    4.9000    0.00264    830344.     -1198.  -1.65E-04       0.00   3.83E+11
-594.605    189536.       0.00
    4.9700    0.00250    829129.     -1701.  -1.63E-04       0.00   3.83E+11
-602.821    202763.       0.00
    5.0400    0.00236    827488.     -2210.  -1.61E-04       0.00   3.83E+11
-610.344    217149.       0.00
    5.1100    0.00223    825417.     -2726.  -1.60E-04       0.00   3.83E+11
-617.130    232861.       0.00
    5.1800    0.00209    822910.     -3246.  -1.58E-04       0.00   3.83E+11
-623.129    250100.       0.00
    5.2500    0.00196    819964.     -3772.  -1.56E-04       0.00   3.83E+11
-628.282    269114.       0.00
    5.3200    0.00183    816574.     -4191.  -1.54E-04       0.00   3.83E+11
-368.419    169035.       0.00
    5.3900    0.00170    812925.     -4490.  -1.52E-04       0.00   3.83E+11
-343.625    169587.       0.00
    5.4600    0.00157    809032.     -4768.  -1.51E-04       0.00   3.83E+11
-318.514    169899.       0.00
    5.5300    0.00145    804916.     -5025.  -1.49E-04       0.00   3.83E+11
-293.352    170061.       0.00
    5.6000    0.00132    800592.     -5261.  -1.47E-04       0.00   3.83E+11
-268.439    170221.       0.00
    5.6700    0.00120    796078.     -5476.  -1.45E-04       0.00   3.83E+11
-243.775    170379.       0.00
    5.7400    0.00108    791393.     -5670.  -1.44E-04       0.00   3.83E+11
-219.360    170536.       0.00
    5.8100   9.61E-04    786553.    -13231.  -1.42E-04       0.00   3.83E+11
-17782.   1.56E+07       0.00
    5.8800   8.42E-04    769166.    -27376.  -1.40E-04       0.00   3.83E+11
-15896.   1.59E+07       0.00
    5.9500   7.25E-04    740562.    -39912.  -1.39E-04       0.00   3.83E+11
-13951.   1.62E+07       0.00
    6.0200   6.09E-04    702115.    -50789.  -1.37E-04       0.00   3.83E+11
-11947.   1.65E+07       0.00
    6.0900   4.95E-04    655238.    -59958.  -1.35E-04       0.00   3.84E+11
-9885.   1.68E+07       0.00
    6.1600   3.82E-04    601386.    -67370.  -1.34E-04       0.00   3.84E+11
-7764.   1.71E+07       0.00
    6.2300   2.70E-04    542057.    -72976.  -1.33E-04       0.00   3.84E+11
-5583.   1.74E+07       0.00
    6.3000   1.59E-04    478787.    -76725.  -1.32E-04       0.00   3.84E+11
-3342.   1.77E+07       0.00
    6.3700   4.85E-05    413160.    -78565.  -1.31E-04       0.00   3.84E+11
-1039.   1.80E+07       0.00
    6.4400  -6.09E-05    346799.    -78443.  -1.30E-04       0.00   3.84E+11
1328.   1.83E+07       0.00
    6.5100  -1.70E-04    281376.    -76307.  -1.29E-04       0.00   3.85E+11
3760.   1.86E+07       0.00
```

```
    6.5800  -2.78E-04    218605.    -72098.  -1.29E-04       0.00   3.85E+11
6260.   1.89E+07       0.00
    6.6500  -3.86E-04    160252.    -65760.  -1.28E-04       0.00   3.85E+11
8830.   1.92E+07       0.00
    6.7200  -4.94E-04    108129.    -57234.  -1.28E-04       0.00   3.85E+11
11471.   1.95E+07       0.00
    6.7900  -6.01E-04     64100.    -46458.  -1.28E-04       0.00   3.85E+11
14186.   1.98E+07       0.00
    6.8600  -7.08E-04     30080.    -33370.  -1.28E-04       0.00   3.85E+11
16976.   2.01E+07       0.00
    6.9300  -8.15E-04      8039.    -17905.  -1.28E-04       0.00   3.85E+11
19844.   2.04E+07       0.00
    7.0000  -9.23E-04       0.00       0.00  -1.28E-04       0.00   3.85E+11
22788.   1.04E+07       0.00

* This analysis computed pile response using nonlinear moment-curvature rela-
  tionships. 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 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. 3:

Pile-head deflection              =     0.01596717 inches
Computed slope at pile head       =     -0.0002856 radians
Maximum bending moment            =        831522. inch-lbs
Maximum shear force               =        -78565. lbs
Depth of maximum bending moment   =     4.76000000 feet below pile head
Depth of maximum shear force      =     6.37000000 feet below pile head
Number of iterations              =              6
Number of zero deflection points  =              1
Pile deflection at ground         =     0.01267849 inches



--------------------------------------------------------------------------------
            Pile-head Deflection vs. Pile Length for Load Case 3
--------------------------------------------------------------------------------

Boundary Condition Type 1, Shear and Moment

Shear      =           2250. lbs
Moment     =         724800. in-lbs
Axial Load =           3800. lbs


    Pile       Pile Head       Maximum       Maximum
   Length      Deflection      Moment         Shear
```

feet	inches	ln-lbs	lbs
7.00000	0.01596717	831522.	-78565.
6.65000	0.06292501	818272.	-113408.
6.30000	0.56585379	791452.	-116619.
5.95000	6.99023307	779737.	-111244.

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 1	Load Type 2	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	1000.0000	M, in-lb	315600.	4200.	0.00635	-1.16E-04	-31300.	357654.
2	V, lb	2250.	M, in-lb	724800.	4600.	0.01597	-2.86E-04	-78566.	831533.
3	V, lb	2250.	M, in-lb	724800.	3800.	0.01597	-2.86E-04	-78565.	831522.

Maximum pile-head deflection = 0.0159674269 inches
Maximum pile-head rotation = -0.0002855563 radians = -0.016361 deg.

Summary of Warning Messages

The following warning was reported 1860 times

**** Warning ****

An unreasonable input value for compressive strength has been specified
for a soil defined using the weak rock criteria. The input value is less

than 100 psi. Please check your input data for correctness.

The following warning was reported 960 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.

LATERAL LOAD (LPILE) ANALYSES
EASTBOUND PARKING AREA
LIGHT TOWER CM1-3 (B-007-0-26)

TP 26 NE Ohio Site 8 BEL-70 Vacant Weigh Station - Eastbound Parking Area
Light Tower CM1-3 (Boring B-007-0-26) Lateral Load Analysis
36" Diameter, 8' Embedment Light Tower Drilled Shaft Foundation

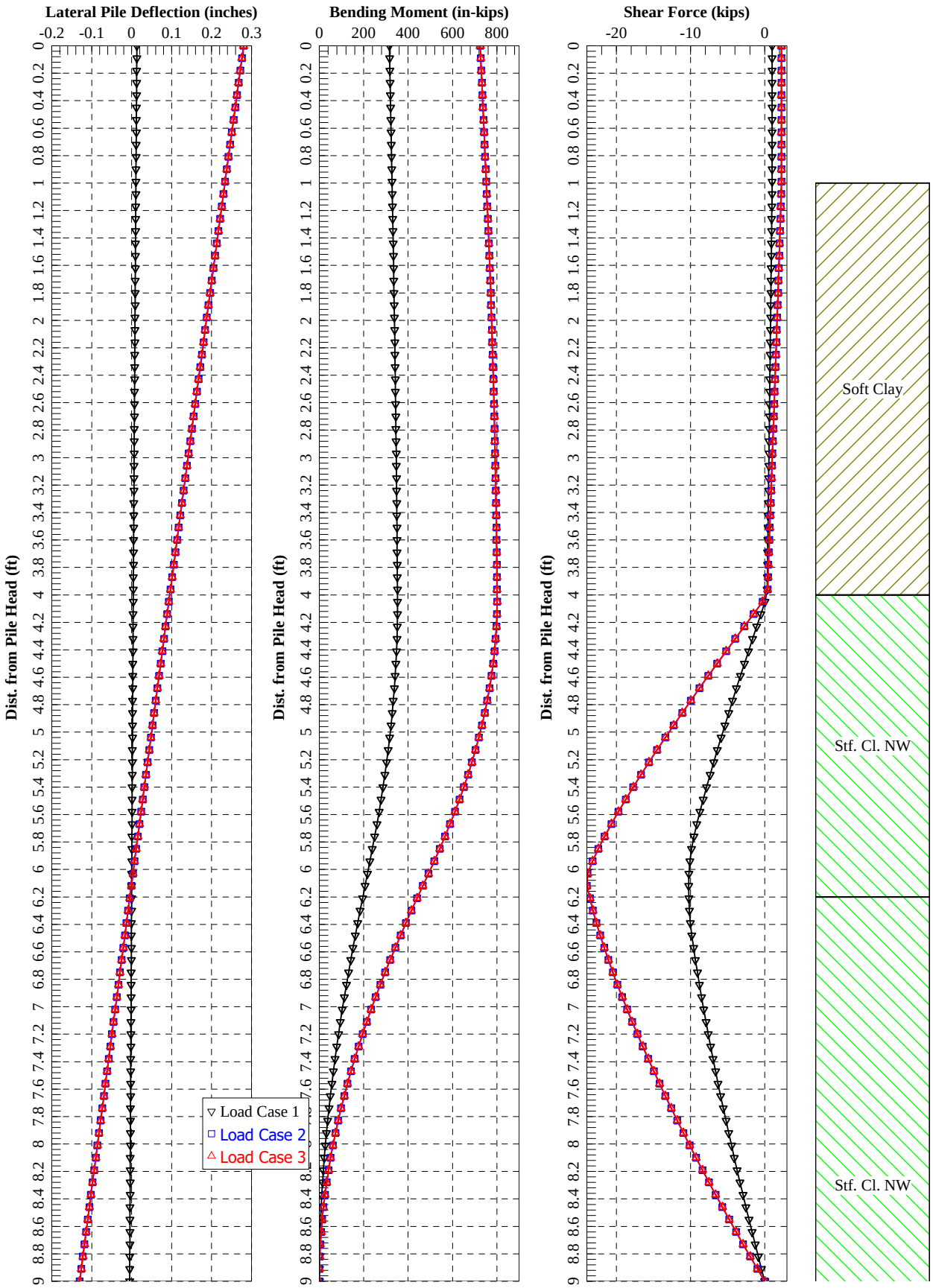


PLATE 93

```
================================================================================

                          LPile for Version 2022-12.012

                            License ID : 228332755
                       License Type : (Single User License)

                  Analysis of Individual Piles and Drilled Shafts
                 Subjected to Lateral Loading Using the p-y Method
                            © 1985-2024 by Ensoft, Inc.
                                All Rights Reserved

                 This software is licensed for exclusive use by:
                                  S&ME, Inc.
                                Valley View, OH

================================================================================


This model was prepared by:
BSears




--------------------------------------------------------------------------------
                           Files Used for Analysis
--------------------------------------------------------------------------------

Path to file locations:
\Columbus-1170\Projects\2024\24170232_ms_TP 26 NE Ohio\GEO\Project Docs\Site
8_BEL-70 (ms)\Calcs\Light Towers\LPILE Files\

Name of input data file:
Tower CM1-3 (B-007-0-26).lp12d

Name of output report file:
Tower CM1-3 (B-007-0-26).lp12o

Name of plot output file:
Tower CM1-3 (B-007-0-26).lp12p

Name of runtime message file:
Tower CM1-3 (B-007-0-26).lp12r



--------------------------------------------------------------------------------
                           Date and Time of Analysis
--------------------------------------------------------------------------------
```

Date: May 1, 2026 Time: 15:43:04

Problem Title

Project Name: TP 26 NE Ohio Site 8 BEL-70 Vacant Rest Areas

Job Number: 24170232B

Client: ms consultants, inc.

Engineer: BKS

Description: Light Tower CM1-3 (B-007-0-26)

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

```
 - Use of p-y modification factors for p-y curves not selected
 - 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                                   =        9.000 ft
Depth of ground surface below top of pile              =       1.0000 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.

            Depth Below           Pile
Point        Pile Head          Diameter
 No.            feet             inches
-----      -------------     -------------
  1             0.000           36.0000
  2             9.000           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                                   =     9.000000 ft
   Shaft Diameter                                      =    36.000000 in
```

Soil and Rock Layering Information

The soil profile is modelled using 3 layers

Layer 1 is soft clay, p-y criteria by Matlock, 1970

Distance from top of pile to top of layer	=	1.000000 ft
Distance from top of pile to bottom of layer	=	4.000000 ft
Effective unit weight at top of layer	=	98.000000 pcf
Effective unit weight at bottom of layer	=	98.000000 pcf
Undrained cohesion at top of layer	=	250.000000 psf
Undrained cohesion at bottom of layer	=	250.000000 psf
Epsilon-50 at top of layer	=	0.020000
Epsilon-50 at bottom of layer	=	0.020000

Layer 2 is stiff clay without free water

Distance from top of pile to top of layer	=	4.000000 ft
Distance from top of pile to bottom of layer	=	6.200000 ft
Effective unit weight at top of layer	=	63.000000 pcf
Effective unit weight at bottom of layer	=	63.000000 pcf
Undrained cohesion at top of layer	=	4250. psf
Undrained cohesion at bottom of layer	=	4250. psf
Epsilon-50 at top of layer	=	0.004000
Epsilon-50 at bottom of layer	=	0.004000

Layer 3 is stiff clay without free water

Distance from top of pile to top of layer	=	6.200000 ft
Distance from top of pile to bottom of layer	=	10.400000 ft
Effective unit weight at top of layer	=	68.000000 pcf
Effective unit weight at bottom of layer	=	68.000000 pcf
Undrained cohesion at top of layer	=	2250. psf
Undrained cohesion at bottom of layer	=	2250. psf
Epsilon-50 at top of layer	=	0.005000
Epsilon-50 at bottom of layer	=	0.005000

(Depth of the lowest soil layer extends 1.400 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	E50 or krm
1	Soft Clay	1.0000	98.0000	250.0000	0.02000
		4.0000	98.0000	250.0000	0.02000
2	Stiff Clay w/o Free Water	4.0000	63.0000	4250.	0.00400
		6.2000	63.0000	4250.	0.00400
3	Stiff Clay w/o Free Water	6.2000	68.0000	2250.	0.00500
		10.4000	68.0000	2250.	0.00500

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 = 3

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length	Run Analysis
1	1	V = 1000.000000 lbs	M = 315600. in-lbs	4200.	Yes	Yes
2	1	V = 2250. lbs	M = 724800. in-lbs	4600.	Yes	Yes
3	1	V = 2250. lbs	M = 724800. in-lbs	3800.	Yes	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                                    =     9.000000 ft
Shaft Diameter                                       =    36.000000 in
Concrete Cover Thickness (to edge of trans. reinf.)  =     3.500000 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                                  =        1018. sq. in.
Total Area of Reinforcing Steel                      =    16.000000 sq. in.
Area Ratio of Steel Reinforcement                    =         1.57 percent
Edge-to-Edge Bar Spacing                             =     4.114467 in
Maximum Concrete Aggregate Size                      =     0.750000 in
Ratio of Bar Spacing to Aggregate Size               =         5.49
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.                        =     0.500000 in

Axial Structural Capacities:
----------------------------

Nom. Axial Structural Capacity = 0.85 Fc Ac + Fy As  =     4366.378 kips
Tensile Load for Cracking of Concrete                =     -470.222 kips
Nominal Axial Tensile Capacity                       =     -960.000 kips


Reinforcing Bar Dimensions and Positions Used in Computations:

     Bar          Bar Diam.      Bar Area          X              Y
    Number         inches         sq. in.        inches         inches
  ----------     ----------     ----------     ----------     ----------
```

1	1.128000	1.000000	13.436000	0.00000
2	1.128000	1.000000	12.413245	5.141735
3	1.128000	1.000000	9.500687	9.500687
4	1.128000	1.000000	5.141735	12.413245
5	1.128000	1.000000	0.00000	13.436000
6	1.128000	1.000000	-5.14173	12.413245
7	1.128000	1.000000	-9.50069	9.500687
8	1.128000	1.000000	-12.41325	5.141735
9	1.128000	1.000000	-13.43600	0.00000
10	1.128000	1.000000	-12.41325	-5.14173
11	1.128000	1.000000	-9.50069	-9.50069
12	1.128000	1.000000	-5.14173	-12.41325
13	1.128000	1.000000	0.00000	-13.43600
14	1.128000	1.000000	5.141735	-12.41325
15	1.128000	1.000000	9.500687	-9.50069
16	1.128000	1.000000	12.413245	-5.14173

NOTE: The positions of the above rebars were computed by LPile

Minimum spacing between any two bars not equal to zero = 4.114 inches
between bars 11 and 12.

Ratio of bar spacing to maximum aggregate size = 5.49

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 = 3

Number	Axial Thrust Force kips
1	3.800
2	4.200
3	4.600

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 = 3.800 kips

Bending Max Conc Stress ksi	Bending Max Steel Stress ksi	Bending Run Msg	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in
6.25000E-07	240.5062135		384809942.	19.2929823	0.00001206	-0.00001044
0.0505030	0.2746478					
0.00000125	480.1472468		384117797.	18.6479768	0.00002331	-0.00002169
0.0973082	0.5259142					
0.00000188	718.9174733		383422652.	18.4329804	0.00003456	-0.00003294
0.1438345	0.7771808					
0.00000250	956.8168886		382726755.	18.3254857	0.00004581	-0.00004419
0.1900818	1.0284477					
0.00000313	1194.		382030558.	18.2609917	0.00005707	-0.00005543
0.2360502	1.2797149					
0.00000375	1430.		381334209.	18.2179981	0.00006832	-0.00006668
0.2817396	1.5309823					
0.00000438	1665.		380637775.	18.1872904	0.00007957	-0.00007793
0.3271500	1.7822500					
0.00000500	1900.		379941287.	18.1642614	0.00009082	-0.00008918
0.3722815	2.0335179					
0.00000563	2133.		379244764.	18.1463515	0.0001021	-0.000100
0.4171340	2.2847861					
0.00000625	2366.		378548215.	18.1320251	0.0001133	-0.000112
0.4617075	2.5360546					
0.00000688	2366.		344134741.	10.2494785	0.00007047	-0.000177
0.2882187	-4.308598	C				
0.00000750	2366.		315456846.	10.2198771	0.00007665	-0.000193
0.3129821	-4.706727	C				
0.00000813	2366.		291190934.	10.1952302	0.00008284	-0.000210
0.3376758	-5.104761	C				

```
0.00000875         2366.    270391582.    10.1744772    0.00008903     -0.000226
0.3622998     -5.502701 C
0.00000938         2366.    252365477.    10.1568402    0.00009522     -0.000242
0.3868539     -5.900547 C
0.00001000         2366.    236592634.    10.1417358     0.0001014     -0.000259
0.4113380     -6.298297 C
0.00001063         2366.    222675420.    10.1287027     0.0001076     -0.000275
0.4357521     -6.695951 C
0.00001125         2366.    210304564.    10.1174231     0.0001138     -0.000291
0.4600960     -7.093510 C
0.00001188         2366.    199235903.    10.1076093     0.0001200     -0.000307
0.4843696     -7.490973 C
0.00001250         2366.    189274107.    10.0990420     0.0001262     -0.000324
0.5085729     -7.888340 C
0.00001313         2366.    180261055.    10.0915439     0.0001325     -0.000340
0.5327056     -8.285611 C
0.00001375         2366.    172067370.    10.0849699     0.0001387     -0.000356
0.5567678     -8.682785 C
0.00001438         2366.    164586180.    10.0792000     0.0001449     -0.000373
0.5807594     -9.079861 C
0.00001500         2366.    157728423.    10.0741344     0.0001511     -0.000389
0.6046801     -9.476841 C
0.00001563         2366.    151419286.    10.0696892     0.0001573     -0.000405
0.6285300     -9.873723 C
0.00001625         2366.    145595467.    10.0657933     0.0001636     -0.000421
0.6523089    -10.270507 C
0.00001688         2366.    140203043.    10.0623863     0.0001698     -0.000438
0.6760167    -10.667193 C
0.00001750         2366.    135195791.    10.0594163     0.0001760     -0.000454
0.6996534    -11.063781 C
0.00001813         2366.    130533867.    10.0568387     0.0001823     -0.000470
0.7232187    -11.460271 C
0.00001875         2366.    126182738.    10.0546147     0.0001885     -0.000486
0.7467127    -11.856661 C
0.00001938         2366.    122112327.    10.0527107     0.0001948     -0.000503
0.7701352    -12.252952 C
0.00002000         2366.    118296317.    10.0510970     0.0002010     -0.000519
0.7934860    -12.649144 C
0.00002063         2366.    114711580.    10.0497478     0.0002073     -0.000535
0.8167652    -13.045236 C
0.00002125         2366.    111337710.    10.0486401     0.0002135     -0.000551
0.8399726    -13.441228 C
0.00002188         2366.    108156633.    10.0477539     0.0002198     -0.000568
0.8631080    -13.837120 C
0.00002250         2366.    105152282.    10.0470709     0.0002261     -0.000584
0.8861714    -14.232911 C
0.00002313         2366.    102310328.    10.0465752     0.0002323     -0.000600
0.9091627    -14.628602 C
0.00002375         2366.     99617951.    10.0462524     0.0002386     -0.000616
0.9320817    -15.024191 C
```

```
0.00002438         2366.     97063645.    10.0460897     0.0002449     -0.000633
0.9549284    -15.419678 C
0.00002563         2429.     94800037.    10.0461990     0.0002574     -0.000665
1.0004043    -16.210348 C
0.00002688         2545.     94692477.    10.0468231     0.0002700     -0.000697
1.0455896    -17.000609 C
0.00002813         2660.     94589756.    10.0479254     0.0002826     -0.000730
1.0904832    -17.790458 C
0.00002938         2776.     94491232.    10.0493946     0.0002952     -0.000762
1.1350844    -18.579893 C
0.00003063         2891.     94396370.    10.0512127     0.0003078     -0.000795
1.1793922    -19.368912 C
0.00003188         3006.     94304718.    10.0533415     0.0003205     -0.000827
1.2234058    -20.157511 C
0.00003313         3121.     94215891.    10.0557483     0.0003331     -0.000859
1.2671243    -20.945689 C
0.00003438         3236.     94129561.    10.0584054     0.0003458     -0.000892
1.3105466    -21.733443 C
0.00003563         3350.     94045446.    10.0612887     0.0003584     -0.000924
1.3536720    -22.520771 C
0.00003688         3465.     93963300.    10.0643778     0.0003711     -0.000956
1.3964994    -23.307669 C
0.00003813         3579.     93882912.    10.0676547     0.0003838     -0.000989
1.4390279    -24.094136 C
0.00003938         3694.     93804096.    10.0711039     0.0003965     -0.001021
1.4812567    -24.880169 C
0.00004063         3808.     93726688.    10.0747116     0.0004093     -0.001053
1.5231846    -25.665765 C
0.00004188         3922.     93650546.    10.0784659     0.0004220     -0.001085
1.5648108    -26.450921 C
0.00004313         4035.     93575540.    10.0823562     0.0004348     -0.001118
1.6061342    -27.235635 C
0.00004438         4149.     93501560.    10.0863731     0.0004476     -0.001150
1.6471540    -28.019904 C
0.00004563         4263.     93428502.    10.0905084     0.0004604     -0.001182
1.6878690    -28.803725 C
0.00004688         4376.     93356279.    10.0947545     0.0004732     -0.001214
1.7282784    -29.587096 C
0.00004813         4489.     93284807.    10.0991050     0.0004860     -0.001246
1.7683810    -30.370013 C
0.00004938         4602.     93214014.    10.1035538     0.0004989     -0.001279
1.8081759    -31.152474 C
0.00005063         4715.     93143835.    10.1080956     0.0005117     -0.001311
1.8476620    -31.934476 C
0.00005188         4828.     93074209.    10.1127258     0.0005246     -0.001343
1.8868384    -32.716016 C
0.00005313         4941.     93005082.    10.1174399     0.0005375     -0.001375
1.9257039    -33.497091 C
0.00005438         5053.     92936405.    10.1222340     0.0005504     -0.001407
1.9642575    -34.277698 C
```

```
0.00005563         5166.     92868132.    10.1271047     0.0005633     -0.001439
2.0024981    -35.057833 C
0.00005688         5278.     92800222.    10.1320488     0.0005763     -0.001471
2.0404247    -35.837495 C
0.00005813         5390.     92732637.    10.1370633     0.0005892     -0.001503
2.0780361    -36.616679 C
0.00005938         5502.     92665342.    10.1421457     0.0006022     -0.001535
2.1153313    -37.395383 C
0.00006063         5614.     92598305.    10.1472935     0.0006152     -0.001567
2.1523092    -38.173604 C
0.00006188         5725.     92531497.    10.1525046     0.0006282     -0.001599
2.1889685    -38.951338 C
0.00006313         5837.     92464888.    10.1577769     0.0006412     -0.001631
2.2253083    -39.728581 C
0.00006438         5948.     92398455.    10.1631088     0.0006543     -0.001663
2.2613274    -40.505332 C
0.00006563         6059.     92332173.    10.1684984     0.0006673     -0.001695
2.2970245    -41.281586 C
0.00006688         6170.     92266020.    10.1739444     0.0006804     -0.001727
2.3323987    -42.057340 C
0.00006813         6281.     92199976.    10.1794453     0.0006935     -0.001759
2.3674485    -42.832591 C
0.00006938         6392.     92134020.    10.1849998     0.0007066     -0.001791
2.4021730    -43.607335 C
0.00007063         6502.     92068136.    10.1906070     0.0007197     -0.001823
2.4365708    -44.381568 C
0.00007188         6613.     92002305.    10.1962656     0.0007329     -0.001855
2.4706408    -45.155288 C
0.00007313         6723.     91936511.    10.2020028     0.0007460     -0.001886
2.5043818    -45.928490 C
0.00007438         6833.     91870742.    10.2077616     0.0007592     -0.001918
2.5377924    -46.701172 C
0.00007938         7271.     91607617.    10.2312788     0.0008121     -0.002045
2.6681070    -49.786612 C
0.00008438         7707.     91343844.    10.2555391     0.0008653     -0.002172
2.7930345    -52.863415 C
0.00008938         8140.     91079227.    10.2796933     0.0009187     -0.002299
2.9123325    -55.933382 C
0.00009438         8570.     90813004.    10.3043877     0.0009725     -0.002425
3.0260259    -58.995009 C
0.00009938         8979.     90357411.    10.3225581     0.0010258     -0.002552
3.1326575    -60.000000 CY
 0.0001044         9304.     89144470.    10.3110511     0.0010762     -0.002681
3.2276850    -60.000000 CY
 0.0001094         9546.     87273573.    10.2718035     0.0011235     -0.002814
3.3116704    -60.000000 CY
 0.0001144         9782.     85523680.    10.2357064     0.0011707     -0.002947
3.3907664    -60.000000 CY
 0.0001194        10004.     83800225.    10.1987328     0.0012175     -0.003080
3.4643165    -60.000000 CY
```

```
 0.0001244        10154.     81641326.    10.1374818     0.0012608     -0.003217
3.5282172    -60.000000 CY
 0.0001294        10287.     79513660.    10.0756441     0.0013035     -0.003354
3.5871212    -60.000000 CY
 0.0001344        10419.     77536664.    10.0197410     0.0013464     -0.003491
3.6423258    -60.000000 CY
 0.0001394        10550.     75693983.     9.9691573     0.0013895     -0.003628
3.6937845    -60.000000 CY
 0.0001444        10680.     73971519.     9.9233661     0.0014327     -0.003765
3.7414497    -60.000000 CY
 0.0001494        10808.     72355946.     9.8810316     0.0014760     -0.003902
3.7851328    -60.000000 CY
 0.0001544        10925.     70772035.     9.8368433     0.0015186     -0.004039
3.8241552    -60.000000 CY
 0.0001594        11008.     69072220.     9.7809580     0.0015588     -0.004179
3.8574366    -60.000000 CY
 0.0001644        11071.     67351790.     9.7204156     0.0015978     -0.004320
3.8862696    -60.000000 CY
 0.0001694        11131.     65719446.     9.6635689     0.0016368     -0.004461
3.9118664    -60.000000 CY
 0.0001744        11191.     64176802.     9.6094393     0.0016756     -0.004602
3.9342902    -60.000000 CY
 0.0001794        11250.     62716278.     9.5601863     0.0017149     -0.004743
3.9535015    -60.000000 CY
 0.0001844        11308.     61329164.     9.5136161     0.0017541     -0.004883
3.9693617    -60.000000 CY
 0.0001894        11364.     60009896.     9.4690774     0.0017932     -0.005024
3.9819050    -60.000000 CY
 0.0001944        11420.     58754909.     9.4280227     0.0018326     -0.005165
3.9911986    -60.000000 CY
 0.0001994        11476.     57559296.     9.3897594     0.0018721     -0.005305
3.9971986    -60.000000 CY
 0.0002044        11531.     56418622.     9.3531932     0.0019116     -0.005446
3.9998595    -60.000000 CY
 0.0002094        11584.     55328385.     9.3201259     0.0019514     -0.005586
3.9974517    -60.000000 CY
 0.0002144        11637.     54285454.     9.2909722     0.0019918     -0.005726
3.9998812    -60.000000 CY
 0.0002194        11690.     53285909.     9.2626721     0.0020320     -0.005866
3.9969940    -60.000000 CY
 0.0002244        11740.     52321336.     9.2356724     0.0020723     -0.006005
3.9997138    -60.000000 CY
 0.0002294        11786.     51384137.     9.2093226     0.0021124     -0.006145
3.9955528    -60.000000 CY
 0.0002344        11823.     50445667.     9.1796872     0.0021515     -0.006286
3.9989818    -60.000000 CY
 0.0002394        11855.     49524943.     9.1473565     0.0021896     -0.006428
3.9994466    -60.000000 CY
 0.0002444        11876.     48598228.     9.1109548     0.0022265     -0.006571
3.9965160    -60.000000 CY
```

```
   0.0002494        11895.     47701101.     9.0745971     0.0022630     -0.006715
  3.9991770    -60.000000 CY
   0.0002544        11912.     46829816.     9.0405915     0.0022997     -0.006858
  3.9995775    -60.000000 CY
   0.0002594        11929.     45990067.     9.0077660     0.0023364     -0.007001
  3.9954763    -60.000000 CY
   0.0002644        11945.     45181124.     8.9766457     0.0023732     -0.007144
  3.9984997    -60.000000 CY
   0.0002694        11961.     44401256.     8.9468563     0.0024101     -0.007287
  3.9998981    -60.000000 CY
   0.0002744        11976.     43648250.     8.9191370     0.0024472     -0.007430
  3.9944635    -60.000000 CY
   0.0003044        12062.     39628140.     8.7757363     0.0026711     -0.008286
  3.9984635    -60.000000 CY
   0.0003344        12138.     36300180.     8.6628609     0.0028966     -0.009141
  3.9998209    -60.000000 CY
   0.0003644        12207.     33502446.     8.5793723     0.0031261     -0.009991
  3.9999551    -60.000000 CYT
   0.0003944        12272.     31117026.     8.5161103     0.0033585     -0.010839
  3.9996166    -60.000000 CYT
   0.0004244        12331.     29056485.     8.4674428     0.0035934     -0.011684
  3.9972132    -60.000000 CYT
   0.0004544        12377.     27238942.     8.4178614     0.0038249     -0.012533
  3.9873462    -60.000000 CYT


Axial Thrust Force =      4.200 kips

    Bending       Bending       Bending      Depth to      Max Comp      Max Tens
  Max Conc      Max Steel  Run
   Curvature      Moment       Stiffness      N Axis        Strain        Strain
   Stress        Stress    Msg
    rad/in.       in-kip        kip-in2         in           in/in         in/in
     ksi           ksi
------------- ------------- ------------- ------------- ------------- -------------
------------- ------------- ---
  6.25000E-07   240.5049676    384807948.    19.4290859    0.00001214   -0.00001036
   0.0508615     0.2771147
   0.00000125   480.1459926    384116794.    18.7161837    0.00002340   -0.00002160
   0.0976654     0.5283867
   0.00000188   718.9162127    383421980.    18.4785558    0.00003465   -0.00003285
   0.1441903     0.7796589
   0.00000250   956.8156222    382726249.    18.3597458    0.00004590   -0.00004410
   0.1904363     1.0309315
   0.00000313        1194.     382030150.    18.2884629    0.00005715   -0.00005535
   0.2364034     1.2822044
   0.00000375        1430.     381333869.    18.2409436    0.00006840   -0.00006660
   0.2820914     1.5334776
   0.00000438        1665.     380637482.    18.2070035    0.00007966   -0.00007784
   0.3275005     1.7847511
```

```
0.00000500         1900.    379941029.    18.1815504    0.00009091   -0.00008909
0.3726306     2.0360248
0.00000563         2133.    379244533.    18.1617553     0.0001022     -0.000100
0.4174818     2.2872988
0.00000625         2366.    378548006.    18.1459208     0.0001134     -0.000112
0.4620539     2.5385732
0.00000688         2366.    344134551.    10.2895004    0.00007074     -0.000177
0.2893429     -4.300617 C
0.00000750         2366.    315456672.    10.2575513    0.00007693     -0.000193
0.3141325     -4.698533 C
0.00000813         2366.    291190774.    10.2300378    0.00008312     -0.000209
0.3388235     -5.096560 C
0.00000875         2366.    270391433.    10.2068278    0.00008931     -0.000226
0.3634446     -5.494492 C
0.00000938         2366.    252365338.    10.1870615    0.00009550     -0.000242
0.3879959     -5.892330 C
0.00001000         2366.    236592504.    10.1700940     0.0001017     -0.000258
0.4124772     -6.290073 C
0.00001063         2366.    222675298.    10.1554324     0.0001079     -0.000275
0.4368884     -6.687720 C
0.00001125         2366.    210304448.    10.1426931     0.0001141     -0.000291
0.4612294     -7.085271 C
0.00001188         2366.    199235793.    10.1315564     0.0001203     -0.000307
0.4855002     -7.482727 C
0.00001250         2366.    189274003.    10.1218127     0.0001265     -0.000323
0.5097005     -7.880086 C
0.00001313         2366.    180260955.    10.1132503     0.0001327     -0.000340
0.5338304     -8.277349 C
0.00001375         2366.    172067276.    10.1057088     0.0001390     -0.000356
0.5578898     -8.674515 C
0.00001438         2366.    164586090.    10.0990556     0.0001452     -0.000372
0.5818784     -9.071585 C
0.00001500         2366.    157728336.    10.0931803     0.0001514     -0.000389
0.6057963     -9.468556 C
0.00001563         2366.    151419203.    10.0879903     0.0001576     -0.000405
0.6296433     -9.865431 C
0.00001625         2366.    145595387.    10.0834069     0.0001639     -0.000421
0.6534193    -10.262207 C
0.00001688         2366.    140202965.    10.0793634     0.0001701     -0.000437
0.6771242    -10.658886 C
0.00001750         2366.    135195717.    10.0758025     0.0001763     -0.000454
0.7007579    -11.055466 C
0.00001813         2366.    130533795.    10.0726747     0.0001826     -0.000470
0.7243204    -11.451947 C
0.00001875         2366.    126182669.    10.0699372     0.0001888     -0.000486
0.7478114    -11.848330 C
0.00001938         2366.    122112260.    10.0675528     0.0001951     -0.000502
0.7712309    -12.244613 C
0.00002000         2366.    118296252.    10.0654889     0.0002013     -0.000519
0.7945789    -12.640797 C
```

```
0.00002063         2366.    114711517.    10.0637168     0.0002076     -0.000535
0.8178551    -13.036882 C
0.00002125         2366.    111337649.    10.0622112     0.0002138     -0.000551
0.8410595    -13.432866 C
0.00002188         2366.    108156573.    10.0609497     0.0002201     -0.000567
0.8641920    -13.828750 C
0.00002250         2366.    105152224.    10.0599125     0.0002263     -0.000584
0.8872524    -14.224533 C
0.00002313         2366.    102310272.    10.0590817     0.0002326     -0.000600
0.9102407    -14.620215 C
0.00002375         2366.     99617896.    10.0584414     0.0002389     -0.000616
0.9331568    -15.015796 C
0.00002438         2366.     97063591.    10.0579776     0.0002452     -0.000632
0.9560005    -15.411276 C
0.00002563         2432.     94924068.    10.0575288     0.0002577     -0.000665
1.0014704    -16.201930 C
0.00002688         2548.     94810571.    10.0576469     0.0002703     -0.000697
1.0466496    -16.992174 C
0.00002813         2664.     94702439.    10.0582592     0.0002829     -0.000730
1.0915372    -17.782007 C
0.00002938         2779.     94598964.    10.0593353     0.0002955     -0.000762
1.1361324    -18.571425 C
0.00003063         2894.     94499555.    10.0607664     0.0003081     -0.000794
1.1804341    -19.360427 C
0.00003188         3009.     94403710.    10.0625387     0.0003207     -0.000827
1.2244416    -20.149010 C
0.00003313         3124.     94311007.    10.0646159     0.0003334     -0.000859
1.2681539    -20.937171 C
0.00003438         3239.     94221082.    10.0669675     0.0003461     -0.000891
1.3115700    -21.724908 C
0.00003563         3354.     94133623.    10.0695670     0.0003587     -0.000924
1.3546892    -22.512219 C
0.00003688         3468.     94048359.    10.0723915     0.0003714     -0.000956
1.3975103    -23.299100 C
0.00003813         3582.     93965057.    10.0754214     0.0003841     -0.000988
1.4400326    -24.085550 C
0.00003938         3697.     93883511.    10.0786392     0.0003968     -0.001021
1.4822550    -24.871565 C
0.00004063         3811.     93803541.    10.0820299     0.0004096     -0.001053
1.5241766    -25.657144 C
0.00004188         3925.     93724988.    10.0855803     0.0004223     -0.001085
1.5657965    -26.442282 C
0.00004313         4039.     93647711.    10.0892786     0.0004351     -0.001117
1.6071135    -27.226979 C
0.00004438         4152.     93571586.    10.0931145     0.0004479     -0.001150
1.6481268    -28.011230 C
0.00004563         4266.     93496502.    10.0970787     0.0004607     -0.001182
1.6888354    -28.795033 C
0.00004688         4379.     93422358.    10.1011630     0.0004735     -0.001214
1.7292383    -29.578385 C
```

```
0.00004813        4492.     93349066.    10.1053601     0.0004863     -0.001246
1.7693344    -30.361284 C
0.00004938        4606.     93276544.    10.1096634     0.0004992     -0.001278
1.8091228    -31.143727 C
0.00005063        4718.     93204721.    10.1140670     0.0005120     -0.001310
1.8486023    -31.925710 C
0.00005188        4831.     93133529.    10.1185657     0.0005249     -0.001343
1.8877721    -32.707231 C
0.00005313        4944.     93062909.    10.1231546     0.0005378     -0.001375
1.9266309    -33.488287 C
0.00005438        5056.     92992807.    10.1278294     0.0005507     -0.001407
1.9651778    -34.268875 C
0.00005563        5169.     92923173.    10.1325862     0.0005636     -0.001439
2.0034117    -35.048992 C
0.00005688        5281.     92853961.    10.1374215     0.0005766     -0.001471
2.0413316    -35.828634 C
0.00005813        5393.     92785130.    10.1423320     0.0005895     -0.001503
2.0789362    -36.607799 C
0.00005938        5505.     92716640.    10.1473148     0.0006025     -0.001535
2.1162246    -37.386484 C
0.00006063        5617.     92648458.    10.1523672     0.0006155     -0.001567
2.1531956    -38.164685 C
0.00006188        5728.     92580549.    10.1574868     0.0006285     -0.001599
2.1898481    -38.942399 C
0.00006313        5840.     92512883.    10.1626714     0.0006415     -0.001631
2.2261809    -39.719622 C
0.00006438        5951.     92445433.    10.1679189     0.0006546     -0.001663
2.2621930    -40.496353 C
0.00006563        6062.     92378172.    10.1732276     0.0006676     -0.001695
2.2978832    -41.272587 C
0.00006688        6173.     92311077.    10.1785957     0.0006807     -0.001727
2.3332503    -42.048320 C
0.00006813        6284.     92244124.    10.1840217     0.0006938     -0.001759
2.3682931    -42.823550 C
0.00006938        6395.     92177292.    10.1895041     0.0007069     -0.001791
2.4030104    -43.598274 C
0.00007063        6505.     92110561.    10.1950417     0.0007200     -0.001822
2.4374011    -44.372486 C
0.00007188        6616.     92043913.    10.2006608     0.0007332     -0.001854
2.4714639    -45.146185 C
0.00007313        6726.     91977331.    10.2063053     0.0007463     -0.001886
2.5051976    -45.919366 C
0.00007438        6836.     91910797.    10.2120017     0.0007595     -0.001918
2.5386010    -46.692026 C
0.00007938        7274.     91644853.    10.2352897     0.0008124     -0.002045
2.6688860    -49.777380 C
0.00008438        7710.     91378587.    10.2593338     0.0008656     -0.002172
2.7937834    -52.854093 C
0.00008938        8143.     91111830.    10.2831857     0.0009191     -0.002298
2.9130226    -55.924331 C
```

```
0.00009438        8573.     90843621.    10.3077273     0.0009728     -0.002425
3.0266854    -58.985869 C
0.00009938        8982.     90387473.    10.3258078     0.0010261     -0.002551
3.1332951    -60.000000 CY
 0.0001044        9308.     89176212.    10.3143071     0.0010766     -0.002681
3.2283182    -60.000000 CY
 0.0001094        9549.     87304848.    10.2749831     0.0011238     -0.002814
3.3122821    -60.000000 CY
 0.0001144        9785.     85553556.    10.2389100     0.0011711     -0.002946
3.3913727    -60.000000 CY
 0.0001194       10007.     83830919.    10.2019402     0.0012179     -0.003080
3.4649106    -60.000000 CY
 0.0001244       10158.     81671814.    10.1406407     0.0012612     -0.003216
3.5287895    -60.000000 CY
 0.0001294       10291.     79542859.    10.0787027     0.0013039     -0.003354
3.5876602    -60.000000 CY
 0.0001344       10423.     77564670.    10.0227059     0.0013468     -0.003491
3.6428308    -60.000000 CY
 0.0001394       10554.     75720878.     9.9720357     0.0013899     -0.003628
3.6942550    -60.000000 CY
 0.0001444       10683.     73997378.     9.9261646     0.0014331     -0.003764
3.7418850    -60.000000 CY
 0.0001494       10812.     72381005.     9.8838986     0.0014764     -0.003901
3.7855535    -60.000000 CY
 0.0001544       10929.     70796718.     9.8396771     0.0015190     -0.004038
3.8245440    -60.000000 CY
 0.0001594       11012.     69097838.     9.7838573     0.0015593     -0.004178
3.8578061    -60.000000 CY
 0.0001644       11075.     67376662.     9.7232508     0.0015983     -0.004319
3.8866026    -60.000000 CY
 0.0001694       11135.     65743511.     9.6663364     0.0016372     -0.004460
3.9121613    -60.000000 CY
 0.0001744       11195.     64200103.     9.6121495     0.0016761     -0.004601
3.9345463    -60.000000 CY
 0.0001794       11254.     62738857.     9.5628376     0.0017153     -0.004742
3.9537182    -60.000000 CY
 0.0001844       11312.     61351278.     9.5162917     0.0017546     -0.004883
3.9695496    -60.000000 CY
 0.0001894       11368.     60031354.     9.4717005     0.0017937     -0.005024
3.9820503    -60.000000 CY
 0.0001944       11425.     58775745.     9.4305957     0.0018331     -0.005164
3.9913005    -60.000000 CY
 0.0001994       11480.     57579537.     9.3922863     0.0018726     -0.005305
3.9972564    -60.000000 CY
 0.0002044       11535.     56438298.     9.3556780     0.0019121     -0.005445
3.9998723    -60.000000 CY
 0.0002094       11588.     55347517.     9.3241700     0.0019522     -0.005585
3.9975077    -60.000000 CY
 0.0002144       11641.     54304067.     9.2934428     0.0019923     -0.005725
3.9998931    -60.000000 CY
```

```
   0.0002194        11694.     53304015.     9.2651074     0.0020325     -0.005865
  3.9970558    -60.000000 CY
   0.0002244        11744.     52339157.     9.2380944     0.0020728     -0.006005
  3.9997330    -60.000000 CY
   0.0002294        11790.     51401489.     9.2117130     0.0021129     -0.006145
  3.9956300    -60.000000 CY
   0.0002344        11827.     50463153.     9.1821360     0.0021521     -0.006285
  3.9990203    -60.000000 CY
   0.0002394        11859.     49542728.     9.1500193     0.0021903     -0.006427
  3.9992468    -60.000000 CY
   0.0002444        11880.     48615611.     9.1135780     0.0022271     -0.006570
  3.9965958    -60.000000 CY
   0.0002494        11900.     47718283.     9.0771076     0.0022636     -0.006714
  3.9992162    -60.000000 CY
   0.0002544        11917.     46846598.     9.0431776     0.0023004     -0.006857
  3.9993713    -60.000000 CY
   0.0002594        11933.     46006491.     9.0103157     0.0023371     -0.007000
  3.9955701    -60.000000 CY
   0.0002644        11949.     45197204.     8.9791598     0.0023739     -0.007144
  3.9985538    -60.000000 CY
   0.0002694        11965.     44417005.     8.9493437     0.0024107     -0.007287
  3.9999119    -60.000000 CY
   0.0002744        11980.     43663657.     8.9215934     0.0024479     -0.007430
  3.9942523    -60.000000 CY
   0.0003044        12066.     39641995.     8.7782176     0.0026719     -0.008286
  3.9985257    -60.000000 CY
   0.0003344        12142.     36312646.     8.6652203     0.0028974     -0.009140
  3.9998424    -60.000000 CY
   0.0003644        12212.     33513765.     8.5815911     0.0031269     -0.009991
  3.9999658    -60.000000 CYT
   0.0003944        12276.     31127384.     8.5182268     0.0033594     -0.010838
  3.9996505    -60.000000 CYT
   0.0004244        12335.     29066055.     8.4694819     0.0035942     -0.011683
  3.9973093    -60.000000 CYT
   0.0004544        12381.     27248100.     8.4201387     0.0038259     -0.012532
  3.9875919    -60.000000 CYT


Axial Thrust Force =      4.600 kips

    Bending       Bending       Bending      Depth to      Max Comp      Max Tens
  Max Conc      Max Steel  Run
   Curvature      Moment       Stiffness      N Axis        Strain        Strain
   Stress        Stress    Msg
    rad/in.       in-kip        kip-in2         in           in/in         in/in
     ksi           ksi
------------- ------------- ------------- ------------- ------------- -------------
------------- ------------- ---
  6.25000E-07   240.5035986    384805758.    19.5651901    0.00001223   -0.00001027
   0.0512199     0.2795816
```

```
0.00000125   480.1446137    384115691.    18.7843907    0.00002348   -0.00002152
0.0980225     0.5308592
0.00000188   718.9148267    383421241.    18.5241312    0.00003473   -0.00003277
0.1445462     0.7821371
0.00000250   956.8142298    382725692.    18.3940059    0.00004599   -0.00004401
0.1907908     1.0334154
0.00000313        1194.     382029703.    18.3159341    0.00005724   -0.00005526
0.2367565     1.2846940
0.00000375        1430.     381333494.    18.2638891    0.00006849   -0.00006651
0.2824433     1.5359729
0.00000438        1665.     380637159.    18.2267166    0.00007974   -0.00007776
0.3278510     1.7872522
0.00000500        1900.     379940746.    18.1988394    0.00009099   -0.00008901
0.3729798     2.0385317
0.00000563        2133.     379244280.    18.1771590     0.0001022     -0.000100
0.4178295     2.2898116
0.00000625        2366.     378547777.    18.1598165     0.0001135     -0.000112
0.4624003     2.5410917
0.00000688        2366.     344134343.    10.3291778    0.00007101     -0.000176
0.2904571    -4.292706 C
0.00000750        2366.     315456481.    10.2940289    0.00007721     -0.000193
0.3152465    -4.690597 C
0.00000813        2366.     291190598.    10.2646762    0.00008340     -0.000209
0.3399656    -5.088396 C
0.00000875        2366.     270391269.    10.2391817    0.00008959     -0.000225
0.3645893    -5.486283 C
0.00000938        2366.     252365185.    10.2172859    0.00009579     -0.000242
0.3891378    -5.884113 C
0.00001000        2366.     236592361.    10.1984552     0.0001020     -0.000258
0.4136162    -6.281848 C
0.00001063        2366.     222675163.    10.1821496     0.0001082     -0.000274
0.4380246    -6.679488 C
0.00001125        2366.     210304321.    10.1679490     0.0001144     -0.000291
0.4623628    -7.077032 C
0.00001188        2366.     199235672.    10.1555219     0.0001206     -0.000307
0.4866307    -7.474480 C
0.00001250        2366.     189273889.    10.1446030     0.0001268     -0.000323
0.5108282    -7.871831 C
0.00001313        2366.     180260846.    10.1349589     0.0001330     -0.000339
0.5349552    -8.269087 C
0.00001375        2366.     172067171.    10.1264498     0.0001392     -0.000356
0.5590117    -8.666245 C
0.00001438        2366.     164585990.    10.1189132     0.0001455     -0.000372
0.5829974    -9.063307 C
0.00001500        2366.     157728241.    10.1122282     0.0001517     -0.000388
0.6069124    -9.460271 C
0.00001563        2366.     151419111.    10.1062933     0.0001579     -0.000405
0.6307565    -9.857138 C
0.00001625        2366.     145595299.    10.1010224     0.0001641     -0.000421
0.6545296   -10.253907 C
```

```
0.00001688         2366.    140202880.    10.0963423     0.0001704     -0.000437
0.6782316    -10.650577 C
0.00001750         2366.    135195635.    10.0921903     0.0001766     -0.000453
0.7018624    -11.047150 C
0.00001813         2366.    130533716.    10.0885122     0.0001829     -0.000470
0.7254219    -11.443623 C
0.00001875         2366.    126182592.    10.0852613     0.0001891     -0.000486
0.7489100    -11.839998 C
0.00001938         2366.    122112186.    10.0823966     0.0001953     -0.000502
0.7723266    -12.236274 C
0.00002000         2366.    118296180.    10.0798824     0.0002016     -0.000518
0.7956716    -12.632450 C
0.00002063         2366.    114711448.    10.0776874     0.0002079     -0.000535
0.8189449    -13.028526 C
0.00002125         2366.    111337582.    10.0757837     0.0002141     -0.000551
0.8421464    -13.424502 C
0.00002188         2366.    108156508.    10.0741470     0.0002204     -0.000567
0.8652759    -13.820378 C
0.00002250         2366.    105152160.    10.0727554     0.0002266     -0.000583
0.8883333    -14.216153 C
0.00002313         2366.    102310210.    10.0715894     0.0002329     -0.000600
0.9113187    -14.611828 C
0.00002375         2366.     99617836.    10.0706317     0.0002392     -0.000616
0.9342318    -15.007401 C
0.00002438         2366.     97063533.    10.0698667     0.0002455     -0.000632
0.9570725    -15.402873 C
0.00002563         2436.     95048091.    10.0688598     0.0002580     -0.000664
1.0025364    -16.193510 C
0.00002688         2551.     94928657.    10.0684718     0.0002706     -0.000697
1.0477096    -16.983738 C
0.00002813         2667.     94815115.    10.0686232     0.0002832     -0.000729
1.0925912    -17.773555 C
0.00002938         2782.     94706690.    10.0692479     0.0002958     -0.000762
1.1371802    -18.562957 C
0.00003063         2897.     94602733.    10.0703211     0.0003084     -0.000794
1.1814759    -19.351942 C
0.00003188         3012.     94502697.    10.0717368     0.0003210     -0.000826
1.2254772    -20.140508 C
0.00003313         3127.     94406117.    10.0734845     0.0003337     -0.000859
1.2691834    -20.928652 C
0.00003438         3242.     94312597.    10.0755306     0.0003463     -0.000891
1.3125933    -21.716373 C
0.00003563         3357.     94221794.    10.0778462     0.0003590     -0.000923
1.3557063    -22.503666 C
0.00003688         3471.     94133413.    10.0804061     0.0003717     -0.000956
1.3985212    -23.290530 C
0.00003813         3586.     94047197.    10.0831888     0.0003844     -0.000988
1.4410372    -24.076963 C
0.00003938         3700.     93962921.    10.0861753     0.0003971     -0.001020
1.4832533    -24.862961 C
```

```
0.00004063         3814.     93880388.     10.0893491     0.0004099     -0.001053
1.5251686    -25.648521 C
0.00004188         3928.     93799425.     10.0926956     0.0004226     -0.001085
1.5667821    -26.433642 C
0.00004313         4042.     93719877.     10.0962019     0.0004354     -0.001117
1.6080927    -27.218321 C
0.00004438         4155.     93641609.     10.0998566     0.0004482     -0.001149
1.6490996    -28.002554 C
0.00004563         4269.     93564497.     10.1036497     0.0004610     -0.001182
1.6898018    -28.786339 C
0.00004688         4382.     93488434.     10.1075722     0.0004738     -0.001214
1.7301982    -29.569674 C
0.00004813         4496.     93413321.     10.1116159     0.0004866     -0.001246
1.7702878    -30.352554 C
0.00004938         4609.     93339070.     10.1157737     0.0004995     -0.001278
1.8100696    -31.134978 C
0.00005063         4722.     93265602.     10.1200391     0.0005123     -0.001310
1.8495425    -31.916943 C
0.00005188         4834.     93192845.     10.1244063     0.0005252     -0.001342
1.8887057    -32.698446 C
0.00005313         4947.     93120733.     10.1288700     0.0005381     -0.001374
1.9275579    -33.479483 C
0.00005438         5060.     93049206.     10.1334255     0.0005510     -0.001406
1.9660981    -34.260052 C
0.00005563         5172.     92978211.     10.1380684     0.0005639     -0.001439
2.0043253    -35.040149 C
0.00005688         5284.     92907697.     10.1427948     0.0005769     -0.001471
2.0422384    -35.819772 C
0.00005813         5396.     92837619.     10.1476012     0.0005898     -0.001503
2.0798362    -36.598918 C
0.00005938         5508.     92767935.     10.1524844     0.0006028     -0.001535
2.1171178    -37.377583 C
0.00006063         5620.     92698606.     10.1574414     0.0006158     -0.001567
2.1540819    -38.155764 C
0.00006188         5731.     92629597.     10.1624696     0.0006288     -0.001599
2.1907275    -38.933458 C
0.00006313         5843.     92560874.     10.1675664     0.0006418     -0.001631
2.2270535    -39.710662 C
0.00006438         5954.     92492407.     10.1727297     0.0006549     -0.001663
2.2630586    -40.487373 C
0.00006563         6065.     92424168.     10.1779574     0.0006679     -0.001695
2.2987417    -41.263586 C
0.00006688         6176.     92356130.     10.1832476     0.0006810     -0.001726
2.3341018    -42.039299 C
0.00006813         6287.     92288268.     10.1885986     0.0006941     -0.001758
2.3691375    -42.814509 C
0.00006938         6398.     92220560.     10.1940089     0.0007072     -0.001790
2.4038477    -43.589211 C
0.00007063         6508.     92152983.     10.1995039     0.0007203     -0.001822
2.4382312    -44.363403 C
```

```
0.00007188        6619.     92085519.    10.2050285     0.0007335     -0.001854
2.4722868    -45.137081 C
0.00007313        6729.     92018147.    10.2106084     0.0007467     -0.001886
2.5060133    -45.910241 C
0.00007438        6839.     91950850.    10.2162424     0.0007598     -0.001918
2.5394094    -46.682880 C
0.00007938        7277.     91682087.    10.2393011     0.0008127     -0.002045
2.6696649    -49.768146 C
0.00008438        7713.     91413389.    10.2630109     0.0008659     -0.002172
2.7945082    -52.845065 C
0.00008938        8146.     91144431.    10.2866786     0.0009194     -0.002298
2.9137126    -55.915279 C
0.00009438        8576.     90874234.    10.3110673     0.0009731     -0.002424
3.0273448    -58.976728 C
0.00009938        8985.     90417533.    10.3290580     0.0010265     -0.002551
3.1339327    -60.000000 CY
 0.0001044        9311.     89207952.    10.3175636     0.0010769     -0.002681
3.2289512    -60.000000 CY
 0.0001094        9552.     87336121.    10.2781631     0.0011242     -0.002813
3.3128936    -60.000000 CY
 0.0001144        9789.     85583430.    10.2421143     0.0011714     -0.002946
3.3919789    -60.000000 CY
 0.0001194       10011.     83861611.    10.2051482     0.0012182     -0.003079
3.4655044    -60.000000 CY
 0.0001244       10162.     81702300.    10.1438002     0.0012616     -0.003216
3.5293615    -60.000000 CY
 0.0001294       10295.     79572057.    10.0817619     0.0013043     -0.003353
3.5881988    -60.000000 CY
 0.0001344       10427.     77592674.    10.0256713     0.0013472     -0.003490
3.6433355    -60.000000 CY
 0.0001394       10557.     75747771.     9.9749147     0.0013903     -0.003627
3.6947252    -60.000000 CY
 0.0001444       10687.     74023236.     9.9289636     0.0014335     -0.003764
3.7423201    -60.000000 CY
 0.0001494       10816.     72406063.     9.8867661     0.0014768     -0.003901
3.7859739    -60.000000 CY
 0.0001544       10933.     70821400.     9.8425115     0.0015194     -0.004038
3.8249324    -60.000000 CY
 0.0001594       11017.     69123456.     9.7867573     0.0015598     -0.004178
3.8581753    -60.000000 CY
 0.0001644       11079.     67401534.     9.7260868     0.0015987     -0.004319
3.8869352    -60.000000 CY
 0.0001694       11139.     65767574.     9.6691048     0.0016377     -0.004460
3.9124557    -60.000000 CY
 0.0001744       11199.     64223403.     9.6148605     0.0016766     -0.004601
3.9348020    -60.000000 CY
 0.0001794       11258.     62761436.     9.5654896     0.0017158     -0.004742
3.9539345    -60.000000 CY
 0.0001844       11316.     61373390.     9.5189681     0.0017551     -0.004882
3.9697370    -60.000000 CY
```

```
 0.0001894        11373.     60052811.     9.4743244     0.0017942     -0.005023
3.9821950    -60.000000 CY
 0.0001944        11429.     58796578.     9.4331695     0.0018336     -0.005164
3.9914019    -60.000000 CY
 0.0001994        11484.     57599778.     9.3948139     0.0018731     -0.005304
3.9973136    -60.000000 CY
 0.0002044        11539.     56457972.     9.3581635     0.0019126     -0.005445
3.9998845    -60.000000 CY
 0.0002094        11592.     55366642.     9.3266817     0.0019528     -0.005585
3.9975630    -60.000000 CY
 0.0002144        11645.     54322678.     9.2959142     0.0019928     -0.005725
3.9999044    -60.000000 CY
 0.0002194        11698.     53322120.     9.2675435     0.0020331     -0.005864
3.9971169    -60.000000 CY
 0.0002244        11748.     52356977.     9.2405172     0.0020733     -0.006004
3.9997515    -60.000000 CY
 0.0002294        11794.     51418840.     9.2141042     0.0021135     -0.006144
3.9957066    -60.000000 CY
 0.0002344        11831.     50480617.     9.1845645     0.0021526     -0.006285
3.9990577    -60.000000 CY
 0.0002394        11864.     49560513.     9.1526832     0.0021909     -0.006427
3.9990468    -60.000000 CY
 0.0002444        11885.     48632992.     9.1162023     0.0022278     -0.006570
3.9966747    -60.000000 CY
 0.0002494        11904.     47735462.     9.0796192     0.0022642     -0.006713
3.9992545    -60.000000 CY
 0.0002544        11921.     46863378.     9.0457647     0.0023010     -0.006856
3.9991650    -60.000000 CY
 0.0002594        11937.     46022914.     9.0128664     0.0023377     -0.007000
3.9956629    -60.000000 CY
 0.0002644        11953.     45213284.     8.9816750     0.0023745     -0.007143
3.9986069    -60.000000 CY
 0.0002694        11969.     44432753.     8.9518321     0.0024114     -0.007286
3.9999247    -60.000000 CY
 0.0002744        11984.     43679063.     8.9240509     0.0024485     -0.007429
3.9940409    -60.000000 CY
 0.0003044        12070.     39655848.     8.7807001     0.0026726     -0.008285
3.9985866    -60.000000 CY
 0.0003344        12146.     36325110.     8.6675807     0.0028982     -0.009139
3.9998625    -60.000000 CY
 0.0003644        12216.     33525083.     8.5838110     0.0031277     -0.009990
3.9999751    -60.000000 CYT
 0.0003944        12280.     31137740.     8.5203443     0.0033602     -0.010837
3.9996828    -60.000000 CYT
 0.0004244        12339.     29075625.     8.4715220     0.0035951     -0.011682
3.9974037    -60.000000 CYT
 0.0004544        12385.     27257253.     8.4224181     0.0038269     -0.012531
3.9878351    -60.000000 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	3.800	12169.214	0.00300000	-0.00952396
2	4.200	12173.120	0.00300000	-0.00952020
3	4.600	12177.027	0.00300000	-0.00951645

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.

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	3.800000	12169.	2.470000	7910.	91219895.
2	0.65	4.200000	12173.	2.730000	7913.	91253873.
3	0.65	4.600000	12177.	2.990000	7915.	91287886.
1	0.75	3.800000	12169.	2.850000	9127.	

```
89806706.
   2       0.75           4.200000        12173.      3.150000         9130.
89838295.
   3       0.75           4.600000        12177.      3.450000         9133.
89869877.

   1       0.90           3.800000        12169.      3.420000        10952.
70221645.
   2       0.90           4.200000        12173.      3.780000        10956.
70254444.
   3       0.90           4.600000        12177.      4.140000        10959.
70287179.
```

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	1.0000	0.00	N.A.	No	0.00	8846.
2	4.0000	0.2296	No	No	8846.	90923.
3	6.2000	4.2994	Yes	No	99769.	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 = 1000.0 lbs
Applied moment at pile head = 315600.0 in-lbs
Axial thrust load on pile head = 4200.0 lbs

Depth	Deflect.	Bending	Shear	Slope	Total	Bending	Soil

Res. X	Soil Spr. y	Distrib. 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					
0.00	0.01314	315600.	1000.0000	-2.11E-04	0.00	3.84E+11	
0.00	0.00	0.00					
0.09000	0.01291	316681.	1000.0000	-2.10E-04	0.00	3.84E+11	
0.00	0.00	0.00					
0.1800	0.01269	317762.	1000.	-2.09E-04	0.00	3.84E+11	
0.00	0.00	0.00					
0.2700	0.01246	318843.	1000.	-2.08E-04	0.00	3.84E+11	
0.00	0.00	0.00					
0.3600	0.01224	319924.	1000.	-2.07E-04	0.00	3.84E+11	
0.00	0.00	0.00					
0.4500	0.01201	321005.	1000.0000	-2.06E-04	0.00	3.84E+11	
0.00	0.00	0.00					
0.5400	0.01179	322086.	1000.0000	-2.06E-04	0.00	3.84E+11	
0.00	0.00	0.00					
0.6300	0.01157	323167.	1000.0000	-2.05E-04	0.00	3.84E+11	
0.00	0.00	0.00					
0.7200	0.01135	324248.	1000.0000	-2.04E-04	0.00	3.84E+11	
0.00	0.00	0.00					
0.8100	0.01113	325328.	1000.0000	-2.03E-04	0.00	3.84E+11	
0.00	0.00	0.00					
0.9000	0.01091	326409.	1000.	-2.02E-04	0.00	3.84E+11	
0.00	0.00	0.00					
0.9900	0.01069	327490.	1000.0000	-2.01E-04	0.00	3.84E+11	
0.00	0.00	0.00					
1.0800	0.01048	328571.	990.7542	-2.00E-04	0.00	3.84E+11	
-17.122	1765.	0.00					
1.1700	0.01026	329632.	972.1748	-1.99E-04	0.00	3.84E+11	
-17.284	1819.	0.00					
1.2600	0.01005	330673.	953.4225	-1.98E-04	0.00	3.84E+11	
-17.442	1875.	0.00					
1.3500	0.00983	331693.	934.5029	-1.97E-04	0.00	3.84E+11	
-17.594	1933.	0.00					
1.4400	0.00962	332693.	915.4215	-1.96E-04	0.00	3.84E+11	
-17.742	1992.	0.00					
1.5300	0.00941	333672.	896.1840	-1.95E-04	0.00	3.84E+11	
-17.883	2053.	0.00					
1.6200	0.00920	334631.	876.7963	-1.94E-04	0.00	3.84E+11	
-18.020	2116.	0.00					
1.7100	0.00899	335568.	857.2643	-1.93E-04	0.00	3.84E+11	
-18.151	2181.	0.00					
1.8000	0.00878	336484.	837.5941	-1.93E-04	0.00	3.84E+11	
-18.276	2248.	0.00					
1.8900	0.00857	337379.	817.7917	-1.92E-04	0.00	3.84E+11	

```
-18.395      2317.       0.00
    1.9800    0.00837    338252.   797.8636  -1.91E-04       0.00   3.84E+11
-18.509      2389.       0.00
    2.0700    0.00816    339104.   777.8162  -1.90E-04       0.00   3.84E+11
-18.616      2464.       0.00
    2.1600    0.00796    339934.   757.6560  -1.89E-04       0.00   3.84E+11
-18.717      2541.       0.00
    2.2500    0.00775    340742.   737.3899  -1.88E-04       0.00   3.84E+11
-18.812      2620.       0.00
    2.3400    0.00755    341529.   717.0247  -1.87E-04       0.00   3.84E+11
-18.901      2703.       0.00
    2.4300    0.00735    342293.   696.5676  -1.86E-04       0.00   3.84E+11
-18.983      2789.       0.00
    2.5200    0.00715    343035.   676.0257  -1.85E-04       0.00   3.84E+11
-19.058      2879.       0.00
    2.6100    0.00695    343755.   655.4067  -1.84E-04       0.00   3.84E+11
-19.126      2972.       0.00
    2.7000    0.00675    344452.   634.7182  -1.83E-04       0.00   3.84E+11
-19.186      3069.       0.00
    2.7900    0.00656    345127.   613.9681  -1.82E-04       0.00   3.84E+11
-19.240      3170.       0.00
    2.8800    0.00636    345780.   593.1645  -1.81E-04       0.00   3.84E+11
-19.285      3275.       0.00
    2.9700    0.00616    346410.   572.3158  -1.80E-04       0.00   3.84E+11
-19.323      3386.       0.00
    3.0600    0.00597    347018.   551.4308  -1.79E-04       0.00   3.84E+11
-19.353      3501.       0.00
    3.1500    0.00578    347603.   530.5183  -1.78E-04       0.00   3.84E+11
-19.374      3622.       0.00
    3.2400    0.00559    348165.   509.5877  -1.77E-04       0.00   3.84E+11
-19.386      3749.       0.00
    3.3300    0.00539    348705.   488.6486  -1.76E-04       0.00   3.84E+11
-19.390      3882.       0.00
    3.4200    0.00520    349223.   467.7110  -1.75E-04       0.00   3.84E+11
-19.384      4022.       0.00
    3.5100    0.00502    349717.   446.7852  -1.74E-04       0.00   3.84E+11
-19.368      4170.       0.00
    3.6000    0.00483    350189.   425.8821  -1.73E-04       0.00   3.84E+11
-19.342      4326.       0.00
    3.6900    0.00464    350639.   405.0129  -1.72E-04       0.00   3.84E+11
-19.305      4491.       0.00
    3.7800    0.00446    351066.   384.1895  -1.71E-04       0.00   3.84E+11
-19.257      4667.       0.00
    3.8700    0.00427    351470.   363.4242  -1.70E-04       0.00   3.84E+11
-19.197      4853.       0.00
    3.9600    0.00409    351852.   342.7300  -1.69E-04       0.00   3.84E+11
-19.125      5052.       0.00
    4.0500    0.00391    352212.    49.5851  -1.68E-04       0.00   3.84E+11
-523.736    144796.       0.00
    4.1400    0.00373    351961.   -514.265  -1.67E-04       0.00   3.84E+11
```

```
-520.432    150881.       0.00
    4.2300    0.00355    351103.     -1074.  -1.66E-04       0.00   3.84E+11
-516.859    157460.       0.00
    4.3200    0.00337    349642.     -1631.  -1.65E-04       0.00   3.84E+11
-513.000    164599.       0.00
    4.4100    0.00319    347582.     -2182.  -1.64E-04       0.00   3.84E+11
-508.830    172378.       0.00
    4.5000    0.00301    344929.     -2729.  -1.63E-04       0.00   3.84E+11
-504.326    180894.       0.00
    4.5900    0.00284    341688.     -3271.  -1.62E-04       0.00   3.84E+11
-499.456    190263.       0.00
    4.6800    0.00266    337864.     -3808.  -1.61E-04       0.00   3.84E+11
-494.187    200632.       0.00
    4.7700    0.00249    333464.     -4339.  -1.61E-04       0.00   3.84E+11
-488.478    212181.       0.00
    4.8600    0.00231    328494.     -4863.  -1.60E-04       0.00   3.84E+11
-482.280    225140.       0.00
    4.9500    0.00214    322962.     -5380.  -1.59E-04       0.00   3.84E+11
-475.533    239803.       0.00
    5.0400    0.00197    316875.     -5890.  -1.58E-04       0.00   3.84E+11
-468.168    256558.       0.00
    5.1300    0.00180    310241.     -6391.  -1.57E-04       0.00   3.84E+11
-460.094    275921.       0.00
    5.2200    0.00163    303072.     -6883.  -1.56E-04       0.00   3.85E+11
-451.201    298604.       0.00
    5.3100    0.00146    295376.     -7365.  -1.55E-04       0.00   3.85E+11
-441.344    325611.       0.00
    5.4000    0.00130    287165.     -7836.  -1.54E-04       0.00   3.85E+11
-430.335    358414.       0.00
    5.4900    0.00113    278452.     -8294.  -1.54E-04       0.00   3.85E+11
-417.913    399268.       0.00
    5.5800   9.65E-04    269251.     -8737.  -1.53E-04       0.00   3.85E+11
-403.713    451824.       0.00
    5.6700   8.00E-04    259580.     -9165.  -1.52E-04       0.00   3.85E+11
-387.184    522450.       0.00
    5.7600   6.37E-04    249457.     -9554.  -1.51E-04       0.00   3.85E+11
-334.864    568146.       0.00
    5.8500   4.73E-04    238944.     -9870.  -1.51E-04       0.00   3.85E+11
-250.302    570944.       0.00
    5.9400   3.11E-04    228139.    -10095.  -1.50E-04       0.00   3.85E+11
-165.280    573740.       0.00
    6.0300   1.49E-04    217140.    -10227.  -1.49E-04       0.00   3.85E+11
-79.786    576534.       0.00
    6.1200  -1.15E-05    206049.    -10267.  -1.49E-04       0.00   3.85E+11
6.1908    579327.       0.00
    6.2100  -1.72E-04    194965.    -10235.  -1.48E-04       0.00   3.85E+11
52.0795    327166.       0.00
    6.3000  -3.32E-04    183942.    -10153.  -1.48E-04       0.00   3.85E+11
100.9457    328670.       0.00
    6.3900  -4.91E-04    173036.    -10017.  -1.47E-04       0.00   3.85E+11
```

150.0864	330173.	0.00				
6.4800	-6.50E-04	162306.	-9829.	-1.47E-04	0.00	3.85E+11
199.5091	331677.	0.00				
6.5700	-8.08E-04	151808.	-9597.	-1.46E-04	0.00	3.85E+11
228.7464	305807.	0.00				
6.6600	-9.66E-04	141577.	-9344.	-1.46E-04	0.00	3.85E+11
240.2543	268718.	0.00				
6.7500	-0.00112	131626.	-9079.	-1.45E-04	0.00	3.85E+11
250.6118	241032.	0.00				
6.8400	-0.00128	121968.	-8803.	-1.45E-04	0.00	3.85E+11
260.0983	219484.	0.00				
6.9300	-0.00144	112613.	-8517.	-1.45E-04	0.00	3.85E+11
268.9012	202181.	0.00				
7.0200	-0.00159	103572.	-8223.	-1.44E-04	0.00	3.85E+11
277.1525	187945.	0.00				
7.1100	-0.00175	94853.	-7919.	-1.44E-04	0.00	3.85E+11
284.9492	176004.	0.00				
7.2000	-0.00190	86468.	-7607.	-1.44E-04	0.00	3.85E+11
292.3645	165826.	0.00				
7.2900	-0.00206	78423.	-7288.	-1.44E-04	0.00	3.85E+11
299.4553	157036.	0.00				
7.3800	-0.00221	70728.	-6961.	-1.44E-04	0.00	3.85E+11
306.2669	149359.	0.00				
7.4700	-0.00237	63389.	-6626.	-1.43E-04	0.00	3.85E+11
312.8354	142589.	0.00				
7.5600	-0.00252	56416.	-6285.	-1.43E-04	0.00	3.85E+11
319.1908	136569.	0.00				
7.6500	-0.00268	49815.	-5937.	-1.43E-04	0.00	3.85E+11
325.3578	131177.	0.00				
7.7400	-0.00283	43593.	-5582.	-1.43E-04	0.00	3.85E+11
331.3571	126316.	0.00				
7.8300	-0.00299	37758.	-5221.	-1.43E-04	0.00	3.85E+11
337.2063	121908.	0.00				
7.9200	-0.00314	32317.	-4854.	-1.43E-04	0.00	3.85E+11
342.9204	117891.	0.00				
8.0100	-0.00330	27275.	-4481.	-1.43E-04	0.00	3.85E+11
348.5123	114213.	0.00				
8.1000	-0.00345	22640.	-4101.	-1.43E-04	0.00	3.85E+11
353.9934	110832.	0.00				
8.1900	-0.00360	18417.	-3716.	-1.42E-04	0.00	3.85E+11
359.3733	107711.	0.00				
8.2800	-0.00376	14614.	-3325.	-1.42E-04	0.00	3.85E+11
364.6608	104821.	0.00				
8.3700	-0.00391	11236.	-2928.	-1.42E-04	0.00	3.85E+11
369.8634	102136.	0.00				
8.4600	-0.00406	8290.	-2526.	-1.42E-04	0.00	3.85E+11
374.9878	99634.	0.00				
8.5500	-0.00422	5781.	-2119.	-1.42E-04	0.00	3.85E+11
380.0401	97296.	0.00				
8.6400	-0.00437	3715.	-1705.	-1.42E-04	0.00	3.85E+11

```
385.0256     95107.       0.00
    8.7300   -0.00453      2098.     -1287.  -1.42E-04       0.00   3.85E+11
389.9490     93052.       0.00
    8.8200   -0.00468   936.5122   -863.167  -1.42E-04       0.00   3.85E+11
394.8148     91119.       0.00
    8.9100   -0.00483   235.1938   -434.168  -1.42E-04       0.00   3.85E+11
399.6267     89297.       0.00
    9.0000   -0.00499       0.00       0.00  -1.42E-04       0.00   3.85E+11
404.3884     43788.       0.00

* This analysis computed pile response using nonlinear moment-curvature rela-
  tionships. 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 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. 1:

Pile-head deflection             =     0.01313966 inches
Computed slope at pile head      =     -0.0002109 radians
Maximum bending moment           =        352212. inch-lbs
Maximum shear force              =        -10267. lbs
Depth of maximum bending moment  =     4.05000000 feet below pile head
Depth of maximum shear force     =     6.12000000 feet below pile head
Number of iterations             =             22
Number of zero deflection points =              1
Pile deflection at ground        =     0.01066889 inches



--------------------------------------------------------------------------------
            Pile-head Deflection vs. Pile Length for Load Case 1
--------------------------------------------------------------------------------

Boundary Condition Type 1, Shear and Moment

Shear      =           1000. lbs
Moment     =         315600. in-lbs
Axial Load =           4200. lbs


    Pile       Pile Head       Maximum       Maximum
   Length      Deflection      Moment         Shear
    feet         inches        ln-lbs          lbs
------------  ------------  ------------  ------------
    9.00000    0.01313966       352212.       -10267.
    8.55000    0.02407526       348971.       -11462.
    8.10000    0.05467184       344826.       -12983.
```

```
    7.65000    0.12660738       341245.       -14558.
    7.20000    0.28374205       337932.       -16141.
    6.75000    0.74300385       336082.       -18015.
    6.30000    1.62693992       335744.       -19675.
    5.85000    7.36693554       342571.       -23059.


--------------------------------------------------------------------------------
                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                              =       2250.0 lbs
Applied moment at pile head                           =     724800.0 in-lbs
Axial thrust load on pile head                        =       4600.0 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
---------- ---------- ---------- ---------- ---------- ---------- ----------
---------- ---------- ----------
      0.00     0.2802    724800.      2250.   -0.00390       0.00   3.83E+11
0.00       0.00       0.00
   0.09000     0.2760    727249.      2250.   -0.00390       0.00   3.83E+11
0.00       0.00       0.00
    0.1800     0.2718    729699.      2250.   -0.00389       0.00   3.83E+11
0.00       0.00       0.00
    0.2700     0.2676    732148.      2250.   -0.00389       0.00   3.83E+11
0.00       0.00       0.00
    0.3600     0.2634    734597.      2250.   -0.00389       0.00   3.83E+11
0.00       0.00       0.00
    0.4500     0.2592    737047.      2250.   -0.00389       0.00   3.83E+11
0.00       0.00       0.00
    0.5400     0.2550    739496.      2250.   -0.00389       0.00   3.83E+11
0.00       0.00       0.00
    0.6300     0.2508    741945.      2250.   -0.00388       0.00   3.83E+11
0.00       0.00       0.00
    0.7200     0.2466    744395.      2250.   -0.00388       0.00   3.83E+11
0.00       0.00       0.00
    0.8100     0.2424    746844.      2250.   -0.00388       0.00   3.83E+11
0.00       0.00       0.00
    0.9000     0.2382    749293.      2250.   -0.00388       0.00   3.83E+11
0.00       0.00       0.00
    0.9900     0.2340    751742.      2250.   -0.00388       0.00   3.83E+11
0.00       0.00       0.00
```

```
    1.0800     0.2298    754192.      2224.   -0.00387       0.00   3.83E+11
-47.912   225.1520       0.00
    1.1700     0.2256    756585.      2172.   -0.00387       0.00   3.83E+11
-48.406   231.6899       0.00
    1.2600     0.2215    758922.      2120.   -0.00387       0.00   3.83E+11
-48.886   238.4077       0.00
    1.3500     0.2173    761202.      2067.   -0.00387       0.00   3.83E+11
-49.353   245.3142       0.00
    1.4400     0.2131    763424.      2013.   -0.00387       0.00   3.83E+11
-49.807   252.4186       0.00
    1.5300     0.2089    765588.      1959.   -0.00386       0.00   3.83E+11
-50.246   259.7310       0.00
    1.6200     0.2048    767694.      1904.   -0.00386       0.00   3.83E+11
-50.671   267.2621       0.00
    1.7100     0.2006    769740.      1850.   -0.00386       0.00   3.83E+11
-51.081   275.0235       0.00
    1.8000     0.1964    771727.      1794.   -0.00386       0.00   3.83E+11
-51.475   283.0275       0.00
    1.8900     0.1923    773654.      1738.   -0.00385       0.00   3.83E+11
-51.854   291.2875       0.00
    1.9800     0.1881    775520.      1682.   -0.00385       0.00   3.83E+11
-52.218   299.8178       0.00
    2.0700     0.1839    777326.      1626.   -0.00385       0.00   3.83E+11
-52.565   308.6341       0.00
    2.1600     0.1798    779070.      1569.   -0.00385       0.00   3.83E+11
-52.895   317.7531       0.00
    2.2500     0.1756    780752.      1511.   -0.00385       0.00   3.83E+11
-53.207   327.1930       0.00
    2.3400     0.1715    782372.      1454.   -0.00384       0.00   3.83E+11
-53.502   336.9738       0.00
    2.4300     0.1673    783930.      1396.   -0.00384       0.00   3.83E+11
-53.779   347.1169       0.00
    2.5200     0.1632    785425.      1338.   -0.00384       0.00   3.83E+11
-54.037   357.6459       0.00
    2.6100     0.1590    786857.      1279.   -0.00384       0.00   3.83E+11
-54.275   368.5864       0.00
    2.7000     0.1549    788226.      1220.   -0.00383       0.00   3.83E+11
-54.493   379.9667       0.00
    2.7900     0.1507    789531.      1161.   -0.00383       0.00   3.83E+11
-54.691   391.8176       0.00
    2.8800     0.1466    790773.      1102.   -0.00383       0.00   3.83E+11
-54.867   404.1732       0.00
    2.9700     0.1425    791950.      1043.   -0.00383       0.00   3.83E+11
-55.021   417.0709       0.00
    3.0600     0.1383    793063.   983.3596   -0.00383       0.00   3.83E+11
-55.151   430.5524       0.00
    3.1500     0.1342    794112.   923.7382   -0.00382       0.00   3.83E+11
-55.258   444.6637       0.00
    3.2400     0.1301    795097.   864.0149   -0.00382       0.00   3.83E+11
-55.340   459.4563       0.00
```

```
    3.3300     0.1260    796016.   804.2170   -0.00382       0.00   3.83E+11
-55.396   474.9875       0.00
    3.4200     0.1218    796872.   744.3731   -0.00382       0.00   3.83E+11
-55.426   491.3216       0.00
    3.5100     0.1177    797662.   684.5129   -0.00381       0.00   3.83E+11
-55.427   508.5310       0.00
    3.6000     0.1136    798388.   624.6676   -0.00381       0.00   3.83E+11
-55.398   526.6975       0.00
    3.6900     0.1095    799049.   564.8699   -0.00381       0.00   3.83E+11
-55.339   545.9138       0.00
    3.7800     0.1054    799646.   505.1538   -0.00381       0.00   3.83E+11
-55.247   566.2858       0.00
    3.8700     0.1013    800178.   445.5555   -0.00381       0.00   3.83E+11
-55.121   587.9346       0.00
    3.9600    0.09714    800646.   386.1128   -0.00380       0.00   3.83E+11
-54.958   610.9997       0.00
    4.0500    0.09304    801050.   -268.047   -0.00380       0.00   3.83E+11
-1156.     13424.        0.00
    4.1400    0.08893     800105.     -1513.   -0.00380       0.00   3.83E+11
-1150.     13963.        0.00
    4.2300    0.08483     797819.     -2751.   -0.00380       0.00   3.83E+11
-1143.     14547.        0.00
    4.3200    0.08073     794200.     -3981.   -0.00379       0.00   3.83E+11
-1135.     15180.        0.00
    4.4100    0.07664     789257.     -5202.   -0.00379       0.00   3.83E+11
-1126.     15870.        0.00
    4.5000    0.07254     783001.     -6413.   -0.00379       0.00   3.83E+11
-1117.     16627.        0.00
    4.5900    0.06845     775442.     -7614.   -0.00379       0.00   3.83E+11
-1107.     17460.        0.00
    4.6800    0.06436     766593.     -8803.   -0.00379       0.00   3.83E+11
-1095.     18383.        0.00
    4.7700    0.06027     756466.     -9980.   -0.00378       0.00   3.83E+11
-1083.     19412.        0.00
    4.8600    0.05619     745075.    -11142.   -0.00378       0.00   3.83E+11
-1070.     20569.        0.00
    4.9500    0.05211     732436.    -12290.   -0.00378       0.00   3.83E+11
-1056.     21880.        0.00
    5.0400    0.04803     718565.    -13422.   -0.00378       0.00   3.83E+11
-1040.     23381.        0.00
    5.1300    0.04395     703482.    -14535.   -0.00378       0.00   3.83E+11
-1022.     25118.        0.00
    5.2200    0.03987     687207.    -15629.   -0.00377       0.00   3.83E+11
-1003.     27159.        0.00
    5.3100    0.03580     669762.    -16700.   -0.00377       0.00   3.84E+11
-980.979     29596.       0.00
    5.4000    0.03173     651173.    -17746.   -0.00377       0.00   3.84E+11
-956.628     32566.       0.00
    5.4900    0.02766     631468.    -18764.   -0.00377       0.00   3.84E+11
-929.005     36280.       0.00
```

```
    5.5800    0.02359    610679.    -19750.   -0.00377       0.00   3.84E+11
-897.247     41083.       0.00
    5.6700    0.01952    588844.    -20699.   -0.00376       0.00   3.84E+11
-860.053     47583.       0.00
    5.7600    0.01546    566006.    -21604.   -0.00376       0.00   3.84E+11
-815.310     56968.       0.00
    5.8500    0.01139    542217.    -22454.   -0.00376       0.00   3.84E+11
-759.181     71961.       0.00
    5.9400    0.00733    517542.    -23233.   -0.00376       0.00   3.84E+11
-683.306    100640.       0.00
    6.0300    0.00327    492070.    -23905.   -0.00376       0.00   3.84E+11
-561.244    185178.       0.00
    6.1200  -7.85E-04    465944.    -23995.   -0.00376       0.00   3.84E+11
394.6474    543175.       0.00
    6.2100   -0.00484    440277.    -23593.   -0.00376       0.00   3.84E+11
351.2352     78354.       0.00
    6.3000   -0.00890    415021.    -23181.   -0.00375       0.00   3.84E+11
410.8213     49872.       0.00
    6.3900   -0.01295    390244.    -22714.   -0.00375       0.00   3.84E+11
453.3161     37804.       0.00
    6.4800   -0.01700    365995.    -22206.   -0.00375       0.00   3.84E+11
487.4558     30962.       0.00
    6.5700   -0.02105    342315.    -21664.   -0.00375       0.00   3.84E+11
516.5401     26496.       0.00
    6.6600   -0.02511    319238.    -21092.   -0.00375       0.00   3.84E+11
542.2035     23325.       0.00
    6.7500   -0.02916    296793.    -20494.   -0.00375       0.00   3.85E+11
565.3849     20944.       0.00
    6.8400   -0.03320    275007.    -19872.   -0.00375       0.00   3.85E+11
586.6769     19082.       0.00
    6.9300   -0.03725    253906.    -19228.   -0.00375       0.00   3.85E+11
606.4793     17583.       0.00
    7.0200   -0.04130    233512.    -18563.   -0.00375       0.00   3.85E+11
625.0757     16346.       0.00
    7.1100   -0.04535    213847.    -17878.   -0.00375       0.00   3.85E+11
642.6746     15307.       0.00
    7.2000   -0.04939    194932.    -17175.   -0.00375       0.00   3.85E+11
659.4344     14419.       0.00
    7.2900   -0.05344    176786.    -16454.   -0.00375       0.00   3.85E+11
675.4782     13652.       0.00
    7.3800   -0.05748    159428.    -15717.   -0.00374       0.00   3.85E+11
690.9040     12981.       0.00
    7.4700   -0.06153    142876.    -14962.   -0.00374       0.00   3.85E+11
705.7907     12389.       0.00
    7.5600   -0.06557    127147.    -14192.   -0.00374       0.00   3.85E+11
720.2033     11863.       0.00
    7.6500   -0.06961    112258.    -13407.   -0.00374       0.00   3.85E+11
734.1955     11391.       0.00
    7.7400   -0.07366     98225.    -12607.   -0.00374       0.00   3.85E+11
747.8126     10965.       0.00
```

```
    7.8300   -0.07770     85064.    -11792.   -0.00374       0.00   3.85E+11
761.0931     10579.       0.00
    7.9200   -0.08174     72792.    -10963.   -0.00374       0.00   3.85E+11
774.0698     10227.       0.00
    8.0100   -0.08578     61422.    -10120.   -0.00374       0.00   3.85E+11
786.7712      9905.       0.00
    8.1000   -0.08983     50970.     -9264.   -0.00374       0.00   3.85E+11
799.2219      9609.       0.00
    8.1900   -0.09387     41450.     -8394.   -0.00374       0.00   3.85E+11
811.4436      9336.       0.00
    8.2800   -0.09791     32877.     -7511.   -0.00374       0.00   3.85E+11
823.4552      9083.       0.00
    8.3700     -0.102     25264.     -6615.   -0.00374       0.00   3.85E+11
835.2735      8848.       0.00
    8.4600     -0.106     18625.     -5707.   -0.00374       0.00   3.85E+11
846.9136      8630.       0.00
    8.5500     -0.110     12974.     -4786.   -0.00374       0.00   3.85E+11
858.3886      8425.       0.00
    8.6400     -0.114      8325.     -3853.   -0.00374       0.00   3.85E+11
869.7107      8234.       0.00
    8.7300     -0.118      4689.     -2907.   -0.00374       0.00   3.85E+11
880.8905      8054.       0.00
    8.8200     -0.122      2082.     -1950.   -0.00374       0.00   3.85E+11
891.9379      7886.       0.00
    8.9100     -0.126   514.2612   -980.927   -0.00374       0.00   3.85E+11
902.8615      7727.       0.00
    9.0000     -0.130       0.00       0.00   -0.00374       0.00   3.85E+11
913.6695      3788.       0.00

* This analysis computed pile response using nonlinear moment-curvature rela-
  tionships. 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 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             =     0.28019058 inches
Computed slope at pile head      =     -0.0038990 radians
Maximum bending moment           =        801050. inch-lbs
Maximum shear force              =        -23995. lbs
Depth of maximum bending moment  =     4.05000000 feet below pile head
Depth of maximum shear force     =     6.12000000 feet below pile head
Number of iterations             =             37
Number of zero deflection points =              1
Pile deflection at ground        =     0.23354091 inches
```

Pile-head Deflection vs. Pile Length for Load Case 2

Boundary Condition Type 1, Shear and Moment

Shear = 2250. lbs
Moment = 724800. in-lbs
Axial Load = 4600. lbs

Pile Length feet	Pile Head Deflection inches	Maximum Moment ln-lbs	Maximum Shear lbs
9.00000	0.28019058	801050.	-23995.
8.55000	0.55741911	792248.	-26307.
8.10000	1.32183688	785398.	-29379.
7.65000	3.16161191	782509.	-33144.
7.20000	7.60872731	783647.	-37488.

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 = 2250.0 lbs
Applied moment at pile head = 724800.0 in-lbs
Axial thrust load on pile head = 3800.0 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. Es*H lb/inch	Soil Spr. Lat. Load lb/inch	Distrib. p lb/inch
0.00	0.2798	724800.	2250.	-0.00389	0.00	3.83E+11	0.00	0.00	0.00
0.09000	0.2756	727246.	2250.	-0.00389	0.00	3.83E+11	0.00	0.00	0.00
0.1800	0.2714	729692.	2250.	-0.00389	0.00	3.83E+11	0.00	0.00	0.00
0.2700	0.2672	732138.	2250.	-0.00389	0.00	3.83E+11	0.00	0.00	0.00

```
    0.3600     0.2630    734584.      2250.   -0.00389       0.00   3.83E+11
0.00       0.00       0.00
    0.4500     0.2588    737030.      2250.   -0.00388       0.00   3.83E+11
0.00       0.00       0.00
    0.5400     0.2546    739476.      2250.   -0.00388       0.00   3.83E+11
0.00       0.00       0.00
    0.6300     0.2504    741922.      2250.   -0.00388       0.00   3.83E+11
0.00       0.00       0.00
    0.7200     0.2462    744368.      2250.   -0.00388       0.00   3.83E+11
0.00       0.00       0.00
    0.8100     0.2420    746813.      2250.   -0.00387       0.00   3.83E+11
0.00       0.00       0.00
    0.9000     0.2379    749259.      2250.   -0.00387       0.00   3.83E+11
0.00       0.00       0.00
    0.9900     0.2337    751705.      2250.   -0.00387       0.00   3.83E+11
0.00       0.00       0.00
    1.0800     0.2295    754151.      2224.   -0.00387       0.00   3.83E+11
-47.889   225.3644       0.00
    1.1700     0.2253    756541.      2172.   -0.00387       0.00   3.83E+11
-48.383   231.9085       0.00
    1.2600     0.2211    758875.      2120.   -0.00386       0.00   3.83E+11
-48.863   238.6327       0.00
    1.3500     0.2170    761151.      2067.   -0.00386       0.00   3.83E+11
-49.330   245.5457       0.00
    1.4400     0.2128    763370.      2013.   -0.00386       0.00   3.83E+11
-49.783   252.6569       0.00
    1.5300     0.2086    765531.      1959.   -0.00386       0.00   3.83E+11
-50.222   259.9762       0.00
    1.6200     0.2045    767634.      1905.   -0.00386       0.00   3.83E+11
-50.647   267.5145       0.00
    1.7100     0.2003    769677.      1850.   -0.00385       0.00   3.83E+11
-51.056   275.2832       0.00
    1.8000     0.1961    771661.      1794.   -0.00385       0.00   3.83E+11
-51.451   283.2948       0.00
    1.8900     0.1920    773584.      1739.   -0.00385       0.00   3.83E+11
-51.830   291.5626       0.00
    1.9800     0.1878    775448.      1682.   -0.00385       0.00   3.83E+11
-52.193   300.1010       0.00
    2.0700     0.1837    777250.      1626.   -0.00384       0.00   3.83E+11
-52.540   308.9256       0.00
    2.1600     0.1795    778991.      1569.   -0.00384       0.00   3.83E+11
-52.870   318.0533       0.00
    2.2500     0.1754    780670.      1512.   -0.00384       0.00   3.83E+11
-53.182   327.5022       0.00
    2.3400     0.1712    782288.      1454.   -0.00384       0.00   3.83E+11
-53.477   337.2922       0.00
    2.4300     0.1671    783843.      1396.   -0.00384       0.00   3.83E+11
-53.753   347.4449       0.00
    2.5200     0.1629    785335.      1338.   -0.00383       0.00   3.83E+11
-54.011   357.9839       0.00
```

```
    2.6100     0.1588    786764.      1280.   -0.00383       0.00   3.83E+11
-54.249   368.9348       0.00
    2.7000     0.1547    788130.      1221.   -0.00383       0.00   3.83E+11
-54.468   380.3258       0.00
    2.7900     0.1505    789432.      1162.   -0.00383       0.00   3.83E+11
-54.665   392.1879       0.00
    2.8800     0.1464    790671.      1103.   -0.00382       0.00   3.83E+11
-54.841   404.5551       0.00
    2.9700     0.1423    791846.      1043.   -0.00382       0.00   3.83E+11
-54.995   417.4650       0.00
    3.0600     0.1381    792956.   983.9575   -0.00382       0.00   3.83E+11
-55.125   430.9592       0.00
    3.1500     0.1340    794002.   924.3644   -0.00382       0.00   3.83E+11
-55.232   445.0839       0.00
    3.2400     0.1299    794984.   864.6693   -0.00382       0.00   3.83E+11
-55.314   459.8904       0.00
    3.3300     0.1258    795901.   804.8997   -0.00381       0.00   3.83E+11
-55.370   475.4362       0.00
    3.4200     0.1217    796754.   745.0840   -0.00381       0.00   3.83E+11
-55.399   491.7857       0.00
    3.5100     0.1175    797542.   685.2521   -0.00381       0.00   3.83E+11
-55.400   509.0113       0.00
    3.6000     0.1134    798265.   625.4351   -0.00381       0.00   3.83E+11
-55.372   527.1948       0.00
    3.6900     0.1093    798924.   565.6655   -0.00380       0.00   3.83E+11
-55.312   546.4292       0.00
    3.7800     0.1052    799519.   505.9777   -0.00380       0.00   3.83E+11
-55.221   566.8203       0.00
    3.8700     0.1011    800048.   446.4075   -0.00380       0.00   3.83E+11
-55.095   588.4893       0.00
    3.9600    0.09701    800514.   386.9929   -0.00380       0.00   3.83E+11
-54.933   611.5760       0.00
    4.0500    0.09291    800915.   -266.932   -0.00380       0.00   3.83E+11
-1156.     13438.       0.00
    4.1400    0.08881    799969.     -1512.   -0.00379       0.00   3.83E+11
-1149.     13978.       0.00
    4.2300    0.08471    797681.     -2749.   -0.00379       0.00   3.83E+11
-1142.     14562.       0.00
    4.3200    0.08062    794061.     -3979.   -0.00379       0.00   3.83E+11
-1134.     15196.       0.00
    4.4100    0.07653    789118.     -5199.   -0.00379       0.00   3.83E+11
-1126.     15887.       0.00
    4.5000    0.07244    782862.     -6410.   -0.00378       0.00   3.83E+11
-1116.     16644.       0.00
    4.5900    0.06835    775304.     -7610.   -0.00378       0.00   3.83E+11
-1106.     17478.       0.00
    4.6800    0.06427    766455.     -8799.   -0.00378       0.00   3.83E+11
-1095.     18402.       0.00
    4.7700    0.06019    756329.     -9975.   -0.00378       0.00   3.83E+11
-1083.     19433.       0.00
```

```
    4.8600    0.05611    744940.    -11138.   -0.00378       0.00   3.83E+11
-1070.     20591.       0.00
    4.9500    0.05203    732303.    -12285.   -0.00377       0.00   3.83E+11
-1055.     21903.       0.00
    5.0400    0.04796    718435.    -13416.   -0.00377       0.00   3.83E+11
-1039.     23405.       0.00
    5.1300    0.04389    703355.    -14529.   -0.00377       0.00   3.83E+11
-1022.     25145.       0.00
    5.2200    0.03982    687084.    -15622.   -0.00377       0.00   3.83E+11
-1002.     27188.       0.00
    5.3100    0.03575    669643.    -16693.   -0.00377       0.00   3.84E+11
-980.639     29627.       0.00
    5.4000    0.03168    651058.    -17739.   -0.00376       0.00   3.84E+11
-956.299     32599.       0.00
    5.4900    0.02762    631358.    -18757.   -0.00376       0.00   3.84E+11
-928.687     36317.       0.00
    5.5800    0.02356    610574.    -19743.   -0.00376       0.00   3.84E+11
-896.943     41125.       0.00
    5.6700    0.01949    588745.    -20691.   -0.00376       0.00   3.84E+11
-859.765     47630.       0.00
    5.7600    0.01544    565912.    -21596.   -0.00376       0.00   3.84E+11
-815.043     57024.       0.00
    5.8500    0.01138    542129.    -22446.   -0.00376       0.00   3.84E+11
-758.941     72030.       0.00
    5.9400    0.00732    517461.    -23224.   -0.00375       0.00   3.84E+11
-683.107    100728.       0.00
    6.0300    0.00327    491996.    -23896.   -0.00375       0.00   3.84E+11
-561.128    185292.       0.00
    6.1200  -7.82E-04    465876.    -23986.   -0.00375       0.00   3.84E+11
394.2513    544811.       0.00
    6.2100   -0.00483    440216.    -23584.   -0.00375       0.00   3.84E+11
351.0719     78464.       0.00
    6.3000   -0.00888    414966.    -23172.   -0.00375       0.00   3.84E+11
410.6498     49935.       0.00
    6.3900   -0.01293    390195.    -22706.   -0.00375       0.00   3.84E+11
453.1348     37849.       0.00
    6.4800   -0.01698    365952.    -22198.   -0.00375       0.00   3.84E+11
487.2654     30998.       0.00
    6.5700   -0.02102    342277.    -21656.   -0.00375       0.00   3.84E+11
516.3412     26526.       0.00
    6.6600   -0.02507    319205.    -21085.   -0.00374       0.00   3.84E+11
541.9969     23351.       0.00
    6.7500   -0.02911    296765.    -20487.   -0.00374       0.00   3.85E+11
565.1709     20967.       0.00
    6.8400   -0.03315    274984.    -19865.   -0.00374       0.00   3.85E+11
586.4561     19104.       0.00
    6.9300   -0.03720    253888.    -19221.   -0.00374       0.00   3.85E+11
606.2520     17603.       0.00
    7.0200   -0.04124    233498.    -18556.   -0.00374       0.00   3.85E+11
624.8422     16364.       0.00
```

```
    7.1100   -0.04528    213837.    -17872.   -0.00374       0.00   3.85E+11
642.4352     15324.       0.00
    7.2000   -0.04932    194926.    -17169.   -0.00374       0.00   3.85E+11
659.1894     14435.       0.00
    7.2900   -0.05336    176783.    -16448.   -0.00374       0.00   3.85E+11
675.2278     13667.       0.00
    7.3800   -0.05740    159428.    -15711.   -0.00374       0.00   3.85E+11
690.6482     12996.       0.00
    7.4700   -0.06143    142878.    -14957.   -0.00374       0.00   3.85E+11
705.5299     12403.       0.00
    7.5600   -0.06547    127152.    -14187.   -0.00374       0.00   3.85E+11
719.9374     11876.       0.00
    7.6500   -0.06951    112265.    -13402.   -0.00374       0.00   3.85E+11
733.9247     11403.       0.00
    7.7400   -0.07355     98234.    -12602.   -0.00374       0.00   3.85E+11
747.5371     10977.       0.00
    7.8300   -0.07758     85076.    -11787.   -0.00374       0.00   3.85E+11
760.8129     10591.       0.00
    7.9200   -0.08162     72804.    -10959.   -0.00374       0.00   3.85E+11
773.7851     10239.       0.00
    8.0100   -0.08566     61435.    -10116.   -0.00374       0.00   3.85E+11
786.4821      9916.       0.00
    8.1000   -0.08969     50984.     -9260.   -0.00374       0.00   3.85E+11
798.9284      9620.       0.00
    8.1900   -0.09373     41464.     -8391.   -0.00374       0.00   3.85E+11
811.1458      9346.       0.00
    8.2800   -0.09777     32891.     -7508.   -0.00374       0.00   3.85E+11
823.1531      9093.       0.00
    8.3700    -0.102      25277.     -6613.   -0.00374       0.00   3.85E+11
834.9673      8858.       0.00
    8.4600    -0.106      18638.     -5705.   -0.00374       0.00   3.85E+11
846.6032      8639.       0.00
    8.5500    -0.110      12986.     -4784.   -0.00374       0.00   3.85E+11
858.0742      8434.       0.00
    8.6400    -0.114       8334.     -3851.   -0.00374       0.00   3.85E+11
869.3922      8243.       0.00
    8.7300    -0.118       4697.     -2906.   -0.00374       0.00   3.85E+11
880.5681      8063.       0.00
    8.8200    -0.122       2087.     -1949.   -0.00374       0.00   3.85E+11
891.6115      7894.       0.00
    8.9100    -0.126   517.3218   -980.568   -0.00374       0.00   3.85E+11
902.5313      7735.       0.00
    9.0000    -0.130       0.00       0.00   -0.00374       0.00   3.85E+11
913.3354      3792.       0.00

* This analysis computed pile response using nonlinear moment-curvature rela-
  tionships. 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 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. 3:

Pile-head deflection	=	0.27979526 inches
Computed slope at pile head	=	-0.0038935 radians
Maximum bending moment	=	800915. inch-lbs
Maximum shear force	=	-23986. lbs
Depth of maximum bending moment	=	4.05000000 feet below pile head
Depth of maximum shear force	=	6.12000000 feet below pile head
Number of iterations	=	37
Number of zero deflection points	=	1
Pile deflection at ground	=	0.23321078 inches

Pile-head Deflection vs. Pile Length for Load Case 3

Boundary Condition Type 1, Shear and Moment

Shear	=	2250. lbs
Moment	=	724800. in-lbs
Axial Load	=	3800. lbs

Pile Length feet	Pile Head Deflection inches	Maximum Moment ln-lbs	Maximum Shear lbs
9.00000	0.27979526	800915.	-23986.
8.55000	0.55585180	791988.	-26287.
8.10000	1.31316012	784848.	-29327.
7.65000	3.11225765	781266.	-33006.
7.20000	7.31551833	780635.	-37101.
6.75000	27.02489436	807307.	-45287.

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	Load Type	Load Pile-head 1	Load Type 2	Load Pile-head 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	1000.0000	M, in-lb	315600.	4200.	0.01314	-2.11E-04	-10267.	352212.
2	V, lb	2250.	M, in-lb	724800.	4600.	0.2802	-0.00390	-23995.	801050.
3	V, lb	2250.	M, in-lb	724800.	3800.	0.2798	-0.00389	-23986.	800915.

Maximum pile-head deflection = 0.2801905798 inches
Maximum pile-head rotation = -0.0038989662 radians = -0.223394 deg.

The analysis ended normally.

LATERAL LOAD (LPILE) ANALYSES
EASTBOUND PARKING AREA
LIGHT TOWER CM1-4
(B-006-0-26 & B-005-1-26)

TP 26 NE Ohio Site 8 BEL-70 Vacant Weigh Station - Eastbound Parking Area
Light Tower CM1-4 (Boring B-006-0-26 & B-005-1-26) Lateral Load Analysis
36" Diameter, 6' Embedment Light Tower Drilled Shaft Foundation

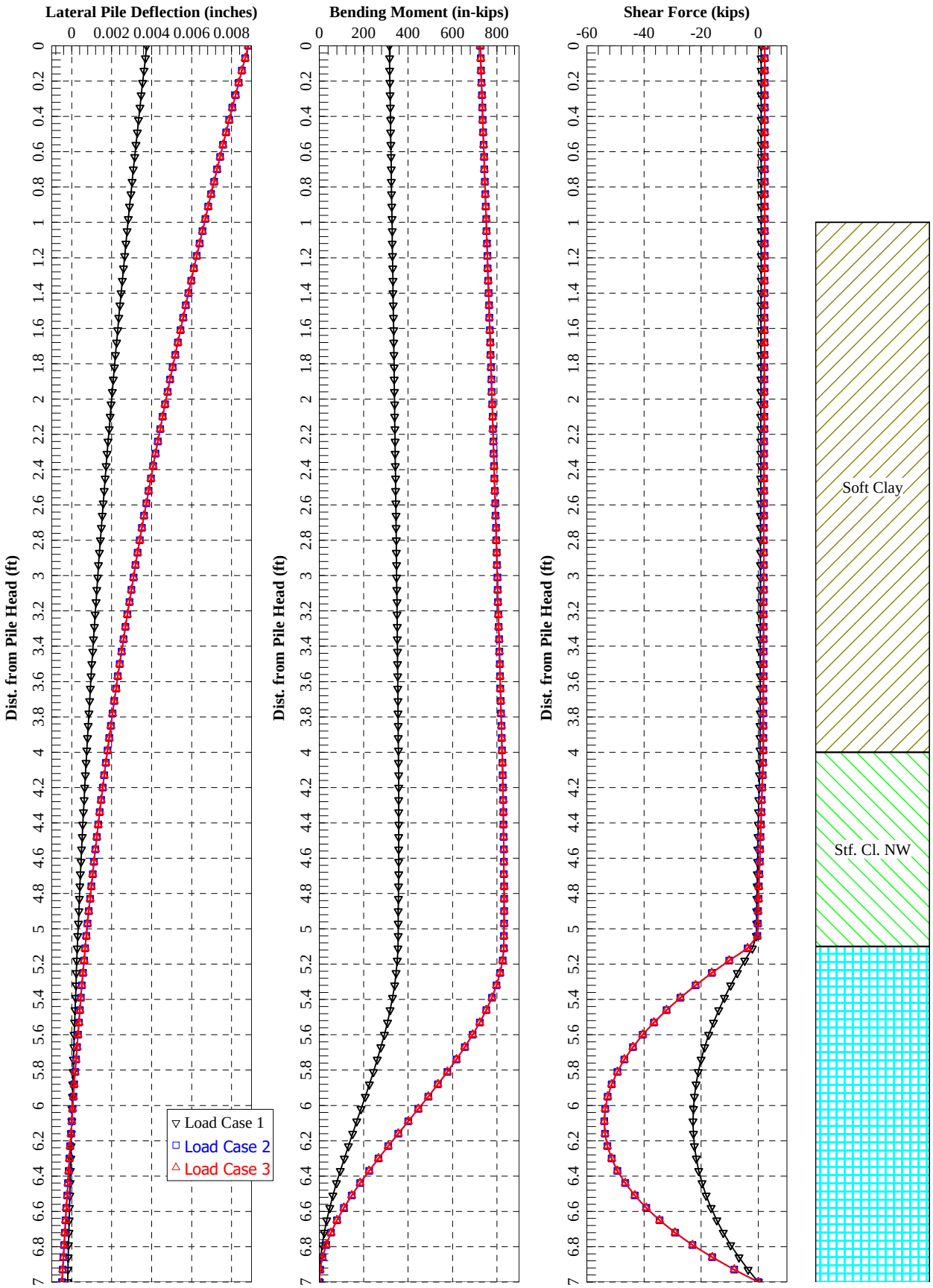


PLATE 136

```
================================================================================

                          LPile for Version 2022-12.012

                            License ID : 228332755
                       License Type : (Single User License)

                  Analysis of Individual Piles and Drilled Shafts
                 Subjected to Lateral Loading Using the p-y Method
                            © 1985-2024 by Ensoft, Inc.
                                All Rights Reserved

                 This software is licensed for exclusive use by:
                                  S&ME, Inc.
                                Valley View, OH

================================================================================


This model was prepared by:
BSears




--------------------------------------------------------------------------------
                           Files Used for Analysis
--------------------------------------------------------------------------------

Path to file locations:
\Columbus-1170\Projects\2024\24170232_ms_TP 26 NE Ohio\GEO\Project Docs\Site
8_BEL-70 (ms)\Calcs\Light Towers\LPILE Files\

Name of input data file:
Tower CM1-4 (B-006-0-26 & B-005-1-26).lp12d

Name of output report file:
Tower CM1-4 (B-006-0-26 & B-005-1-26).lp12o

Name of plot output file:
Tower CM1-4 (B-006-0-26 & B-005-1-26).lp12p

Name of runtime message file:
Tower CM1-4 (B-006-0-26 & B-005-1-26).lp12r



--------------------------------------------------------------------------------
                           Date and Time of Analysis
--------------------------------------------------------------------------------
```

Date: May 1, 2026 Time: 15:52:20

Problem Title

Project Name: TP 26 NE Ohio Site 8 BEL-70 Vacant Rest Areas

Job Number: 24170232B

Client: ms consultants, inc.

Engineer: BKS

Description: Light Tower CM1-4 (B-006-0-26 & B-005-1-26)

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

```
 - Use of p-y modification factors for p-y curves not selected
 - 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                                   =        7.000 ft
Depth of ground surface below top of pile              =       1.0000 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.

            Depth Below           Pile
Point        Pile Head          Diameter
 No.            feet             inches
-----      -------------     -------------
  1             0.000           36.0000
  2             7.000           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                                   =     7.000000 ft
   Shaft Diameter                                      =    36.000000 in
```

Soil and Rock Layering Information

The soil profile is modelled using 3 layers

Layer 1 is soft clay, p-y criteria by Matlock, 1970

Distance from top of pile to top of layer	=	1.000000 ft
Distance from top of pile to bottom of layer	=	4.000000 ft
Effective unit weight at top of layer	=	98.000000 pcf
Effective unit weight at bottom of layer	=	98.000000 pcf
Undrained cohesion at top of layer	=	250.000000 psf
Undrained cohesion at bottom of layer	=	250.000000 psf
Epsilon-50 at top of layer	=	0.020000
Epsilon-50 at bottom of layer	=	0.020000

Layer 2 is stiff clay without free water

Distance from top of pile to top of layer	=	4.000000 ft
Distance from top of pile to bottom of layer	=	5.100000 ft
Effective unit weight at top of layer	=	58.000000 pcf
Effective unit weight at bottom of layer	=	58.000000 pcf
Undrained cohesion at top of layer	=	2000. psf
Undrained cohesion at bottom of layer	=	2000. psf
Epsilon-50 at top of layer	=	0.007000
Epsilon-50 at bottom of layer	=	0.007000

Layer 3 is weak rock, p-y criteria by Reese, 1997

Distance from top of pile to top of layer	=	5.100000 ft
Distance from top of pile to bottom of layer	=	12.700000 ft
Effective unit weight at top of layer	=	80.000000 pcf
Effective unit weight at bottom of layer	=	80.000000 pcf
Uniaxial compressive strength at top of layer	=	1300. psi
Uniaxial compressive strength at bottom of layer	=	1300. psi
Initial modulus of rock at top of layer	=	117000. psi
Initial modulus of rock at bottom of layer	=	117000. psi
RQD of rock at top of layer	=	0.0000 %
RQD of rock at bottom of layer	=	0.0000 %
k rm of rock at top of layer	=	0.0005000
k rm of rock at bottom of layer	=	0.0005000

(Depth of the lowest soil layer extends 5.700 ft below the pile tip)

Summary of Input Soil Properties

Layer Num.	Soil Type Name or (p-y Curve Type)	Layer Depth ft	Effective Unit Wt. pcf	Cohesion psf	Uniaxial qu psi	RQD %	E50 Rock Mass Modulus krm psi
1	Soft Clay	1.0000	98.0000	250.0000	--	--	0.02000
		4.0000	98.0000	250.0000	--	--	0.02000
2	Stiff Clay w/o Free Water	4.0000	58.0000	2000.	--	--	0.00700
		5.1000	58.0000	2000.	--	--	0.00700
3	Weak Rock	5.1000	80.0000	--	1300.	0.00	5.00E-04
		12.7000	80.0000	--	1300.	0.00	5.00E-04

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 = 3

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length	Run Analysis
1	1	V = 1000.000000 lbs	M = 315600. in-lbs	4200.		

```
    Yes                Yes
   2     1     V =         2250. lbs    M =      724800. in-lbs             4600.
    Yes                Yes
   3     1     V =         2250. lbs    M =      724800. in-lbs             3800.
    Yes                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                                  =     7.000000 ft
Shaft Diameter                                     =    36.000000 in
Concrete Cover Thickness (to edge of trans. reinf.)=     3.500000 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                                =        1018. sq. in.
Total Area of Reinforcing Steel                    =    16.000000 sq. in.
Area Ratio of Steel Reinforcement                  =         1.57 percent
Edge-to-Edge Bar Spacing                           =     4.114467 in
Maximum Concrete Aggregate Size                    =     0.750000 in
Ratio of Bar Spacing to Aggregate Size             =         5.49
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.                      =     0.500000 in
```

Axial Structural Capacities:

Nom. Axial Structural Capacity = 0.85 Fc Ac + Fy As = 4366.378 kips
Tensile Load for Cracking of Concrete = -470.222 kips
Nominal Axial Tensile Capacity = -960.000 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	13.436000	0.00000
2	1.128000	1.000000	12.413245	5.141735
3	1.128000	1.000000	9.500687	9.500687
4	1.128000	1.000000	5.141735	12.413245
5	1.128000	1.000000	0.00000	13.436000
6	1.128000	1.000000	-5.14173	12.413245
7	1.128000	1.000000	-9.50069	9.500687
8	1.128000	1.000000	-12.41325	5.141735
9	1.128000	1.000000	-13.43600	0.00000
10	1.128000	1.000000	-12.41325	-5.14173
11	1.128000	1.000000	-9.50069	-9.50069
12	1.128000	1.000000	-5.14173	-12.41325
13	1.128000	1.000000	0.00000	-13.43600
14	1.128000	1.000000	5.141735	-12.41325
15	1.128000	1.000000	9.500687	-9.50069
16	1.128000	1.000000	12.413245	-5.14173

NOTE: The positions of the above rebars were computed by LPile

Minimum spacing between any two bars not equal to zero = 4.114 inches
between bars 11 and 12.

Ratio of bar spacing to maximum aggregate size = 5.49

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 = 3

Number	Axial Thrust Force kips
1	3.800
2	4.200
3	4.600

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 = 3.800 kips

Bending Max Conc Stress ksi	Bending Max Steel Stress ksi	Bending Curvature rad/in.	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Run Msg
6.25000E-07	240.5062135	384809942.	19.2929823	0.00001206	-0.00001044	0.0505030	0.2746478	
0.00000125	480.1472468	384117797.	18.6479768	0.00002331	-0.00002169	0.0973082	0.5259142	
0.00000188	718.9174733	383422652.	18.4329804	0.00003456	-0.00003294	0.1438345	0.7771808	
0.00000250	956.8168886	382726755.	18.3254857	0.00004581	-0.00004419	0.1900818	1.0284477	
0.00000313	1194.	382030558.	18.2609917	0.00005707	-0.00005543	0.2360502	1.2797149	
0.00000375	1430.	381334209.	18.2179981	0.00006832	-0.00006668	0.2817396	1.5309823	

```
0.00000438         1665.    380637775.    18.1872904    0.00007957   -0.00007793
0.3271500     1.7822500
0.00000500         1900.    379941287.    18.1642614    0.00009082   -0.00008918
0.3722815     2.0335179
0.00000563         2133.    379244764.    18.1463515     0.0001021     -0.000100
0.4171340     2.2847861
0.00000625         2366.    378548215.    18.1320251     0.0001133     -0.000112
0.4617075     2.5360546
0.00000688         2366.    344134741.    10.2494785    0.00007047     -0.000177
0.2882187     -4.308598 C
0.00000750         2366.    315456846.    10.2198771    0.00007665     -0.000193
0.3129821     -4.706727 C
0.00000813         2366.    291190934.    10.1952302    0.00008284     -0.000210
0.3376758     -5.104761 C
0.00000875         2366.    270391582.    10.1744772    0.00008903     -0.000226
0.3622998     -5.502701 C
0.00000938         2366.    252365477.    10.1568402    0.00009522     -0.000242
0.3868539     -5.900547 C
0.00001000         2366.    236592634.    10.1417358     0.0001014     -0.000259
0.4113380     -6.298297 C
0.00001063         2366.    222675420.    10.1287027     0.0001076     -0.000275
0.4357521     -6.695951 C
0.00001125         2366.    210304564.    10.1174231     0.0001138     -0.000291
0.4600960     -7.093510 C
0.00001188         2366.    199235903.    10.1076093     0.0001200     -0.000307
0.4843696     -7.490973 C
0.00001250         2366.    189274107.    10.0990420     0.0001262     -0.000324
0.5085729     -7.888340 C
0.00001313         2366.    180261055.    10.0915439     0.0001325     -0.000340
0.5327056     -8.285611 C
0.00001375         2366.    172067370.    10.0849699     0.0001387     -0.000356
0.5567678     -8.682785 C
0.00001438         2366.    164586180.    10.0792000     0.0001449     -0.000373
0.5807594     -9.079861 C
0.00001500         2366.    157728423.    10.0741344     0.0001511     -0.000389
0.6046801     -9.476841 C
0.00001563         2366.    151419286.    10.0696892     0.0001573     -0.000405
0.6285300     -9.873723 C
0.00001625         2366.    145595467.    10.0657933     0.0001636     -0.000421
0.6523089    -10.270507 C
0.00001688         2366.    140203043.    10.0623863     0.0001698     -0.000438
0.6760167    -10.667193 C
0.00001750         2366.    135195791.    10.0594163     0.0001760     -0.000454
0.6996534    -11.063781 C
0.00001813         2366.    130533867.    10.0568387     0.0001823     -0.000470
0.7232187    -11.460271 C
0.00001875         2366.    126182738.    10.0546147     0.0001885     -0.000486
0.7467127    -11.856661 C
0.00001938         2366.    122112327.    10.0527107     0.0001948     -0.000503
0.7701352    -12.252952 C
```

```
0.00002000         2366.    118296317.    10.0510970     0.0002010     -0.000519
0.7934860    -12.649144 C
0.00002063         2366.    114711580.    10.0497478     0.0002073     -0.000535
0.8167652    -13.045236 C
0.00002125         2366.    111337710.    10.0486401     0.0002135     -0.000551
0.8399726    -13.441228 C
0.00002188         2366.    108156633.    10.0477539     0.0002198     -0.000568
0.8631080    -13.837120 C
0.00002250         2366.    105152282.    10.0470709     0.0002261     -0.000584
0.8861714    -14.232911 C
0.00002313         2366.    102310328.    10.0465752     0.0002323     -0.000600
0.9091627    -14.628602 C
0.00002375         2366.     99617951.    10.0462524     0.0002386     -0.000616
0.9320817    -15.024191 C
0.00002438         2366.     97063645.    10.0460897     0.0002449     -0.000633
0.9549284    -15.419678 C
0.00002563         2429.     94800037.    10.0461990     0.0002574     -0.000665
1.0004043    -16.210348 C
0.00002688         2545.     94692477.    10.0468231     0.0002700     -0.000697
1.0455896    -17.000609 C
0.00002813         2660.     94589756.    10.0479254     0.0002826     -0.000730
1.0904832    -17.790458 C
0.00002938         2776.     94491232.    10.0493946     0.0002952     -0.000762
1.1350844    -18.579893 C
0.00003063         2891.     94396370.    10.0512127     0.0003078     -0.000795
1.1793922    -19.368912 C
0.00003188         3006.     94304718.    10.0533415     0.0003205     -0.000827
1.2234058    -20.157511 C
0.00003313         3121.     94215891.    10.0557483     0.0003331     -0.000859
1.2671243    -20.945689 C
0.00003438         3236.     94129561.    10.0584054     0.0003458     -0.000892
1.3105466    -21.733443 C
0.00003563         3350.     94045446.    10.0612887     0.0003584     -0.000924
1.3536720    -22.520771 C
0.00003688         3465.     93963300.    10.0643778     0.0003711     -0.000956
1.3964994    -23.307669 C
0.00003813         3579.     93882912.    10.0676547     0.0003838     -0.000989
1.4390279    -24.094136 C
0.00003938         3694.     93804096.    10.0711039     0.0003965     -0.001021
1.4812567    -24.880169 C
0.00004063         3808.     93726688.    10.0747116     0.0004093     -0.001053
1.5231846    -25.665765 C
0.00004188         3922.     93650546.    10.0784659     0.0004220     -0.001085
1.5648108    -26.450921 C
0.00004313         4035.     93575540.    10.0823562     0.0004348     -0.001118
1.6061342    -27.235635 C
0.00004438         4149.     93501560.    10.0863731     0.0004476     -0.001150
1.6471540    -28.019904 C
0.00004563         4263.     93428502.    10.0905084     0.0004604     -0.001182
1.6878690    -28.803725 C
```

```
0.00004688         4376.     93356279.     10.0947545     0.0004732     -0.001214
1.7282784    -29.587096 C
0.00004813         4489.     93284807.     10.0991050     0.0004860     -0.001246
1.7683810    -30.370013 C
0.00004938         4602.     93214014.     10.1035538     0.0004989     -0.001279
1.8081759    -31.152474 C
0.00005063         4715.     93143835.     10.1080956     0.0005117     -0.001311
1.8476620    -31.934476 C
0.00005188         4828.     93074209.     10.1127258     0.0005246     -0.001343
1.8868384    -32.716016 C
0.00005313         4941.     93005082.     10.1174399     0.0005375     -0.001375
1.9257039    -33.497091 C
0.00005438         5053.     92936405.     10.1222340     0.0005504     -0.001407
1.9642575    -34.277698 C
0.00005563         5166.     92868132.     10.1271047     0.0005633     -0.001439
2.0024981    -35.057833 C
0.00005688         5278.     92800222.     10.1320488     0.0005763     -0.001471
2.0404247    -35.837495 C
0.00005813         5390.     92732637.     10.1370633     0.0005892     -0.001503
2.0780361    -36.616679 C
0.00005938         5502.     92665342.     10.1421457     0.0006022     -0.001535
2.1153313    -37.395383 C
0.00006063         5614.     92598305.     10.1472935     0.0006152     -0.001567
2.1523092    -38.173604 C
0.00006188         5725.     92531497.     10.1525046     0.0006282     -0.001599
2.1889685    -38.951338 C
0.00006313         5837.     92464888.     10.1577769     0.0006412     -0.001631
2.2253083    -39.728581 C
0.00006438         5948.     92398455.     10.1631088     0.0006543     -0.001663
2.2613274    -40.505332 C
0.00006563         6059.     92332173.     10.1684984     0.0006673     -0.001695
2.2970245    -41.281586 C
0.00006688         6170.     92266020.     10.1739444     0.0006804     -0.001727
2.3323987    -42.057340 C
0.00006813         6281.     92199976.     10.1794453     0.0006935     -0.001759
2.3674485    -42.832591 C
0.00006938         6392.     92134020.     10.1849998     0.0007066     -0.001791
2.4021730    -43.607335 C
0.00007063         6502.     92068136.     10.1906070     0.0007197     -0.001823
2.4365708    -44.381568 C
0.00007188         6613.     92002305.     10.1962656     0.0007329     -0.001855
2.4706408    -45.155288 C
0.00007313         6723.     91936511.     10.2020028     0.0007460     -0.001886
2.5043818    -45.928490 C
0.00007438         6833.     91870742.     10.2077616     0.0007592     -0.001918
2.5377924    -46.701172 C
0.00007938         7271.     91607617.     10.2312788     0.0008121     -0.002045
2.6681070    -49.786612 C
0.00008438         7707.     91343844.     10.2555391     0.0008653     -0.002172
2.7930345    -52.863415 C
```

```
0.00008938        8140.     91079227.    10.2796933     0.0009187     -0.002299
2.9123325    -55.933382 C
0.00009438        8570.     90813004.    10.3043877     0.0009725     -0.002425
3.0260259    -58.995009 C
0.00009938        8979.     90357411.    10.3225581     0.0010258     -0.002552
3.1326575    -60.000000 CY
 0.0001044        9304.     89144470.    10.3110511     0.0010762     -0.002681
3.2276850    -60.000000 CY
 0.0001094        9546.     87273573.    10.2718035     0.0011235     -0.002814
3.3116704    -60.000000 CY
 0.0001144        9782.     85523680.    10.2357064     0.0011707     -0.002947
3.3907664    -60.000000 CY
 0.0001194       10004.     83800225.    10.1987328     0.0012175     -0.003080
3.4643165    -60.000000 CY
 0.0001244       10154.     81641326.    10.1374818     0.0012608     -0.003217
3.5282172    -60.000000 CY
 0.0001294       10287.     79513660.    10.0756441     0.0013035     -0.003354
3.5871212    -60.000000 CY
 0.0001344       10419.     77536664.    10.0197410     0.0013464     -0.003491
3.6423258    -60.000000 CY
 0.0001394       10550.     75693983.     9.9691573     0.0013895     -0.003628
3.6937845    -60.000000 CY
 0.0001444       10680.     73971519.     9.9233661     0.0014327     -0.003765
3.7414497    -60.000000 CY
 0.0001494       10808.     72355946.     9.8810316     0.0014760     -0.003902
3.7851328    -60.000000 CY
 0.0001544       10925.     70772035.     9.8368433     0.0015186     -0.004039
3.8241552    -60.000000 CY
 0.0001594       11008.     69072220.     9.7809580     0.0015588     -0.004179
3.8574366    -60.000000 CY
 0.0001644       11071.     67351790.     9.7204156     0.0015978     -0.004320
3.8862696    -60.000000 CY
 0.0001694       11131.     65719446.     9.6635689     0.0016368     -0.004461
3.9118664    -60.000000 CY
 0.0001744       11191.     64176802.     9.6094393     0.0016756     -0.004602
3.9342902    -60.000000 CY
 0.0001794       11250.     62716278.     9.5601863     0.0017149     -0.004743
3.9535015    -60.000000 CY
 0.0001844       11308.     61329164.     9.5136161     0.0017541     -0.004883
3.9693617    -60.000000 CY
 0.0001894       11364.     60009896.     9.4690774     0.0017932     -0.005024
3.9819050    -60.000000 CY
 0.0001944       11420.     58754909.     9.4280227     0.0018326     -0.005165
3.9911986    -60.000000 CY
 0.0001994       11476.     57559296.     9.3897594     0.0018721     -0.005305
3.9971986    -60.000000 CY
 0.0002044       11531.     56418622.     9.3531932     0.0019116     -0.005446
3.9998595    -60.000000 CY
 0.0002094       11584.     55328385.     9.3201259     0.0019514     -0.005586
3.9974517    -60.000000 CY
```

0.0002144	11637.	54285454.	9.2909722	0.0019918	-0.005726
3.9998812	-60.000000 CY				
0.0002194	11690.	53285909.	9.2626721	0.0020320	-0.005866
3.9969940	-60.000000 CY				
0.0002244	11740.	52321336.	9.2356724	0.0020723	-0.006005
3.9997138	-60.000000 CY				
0.0002294	11786.	51384137.	9.2093226	0.0021124	-0.006145
3.9955528	-60.000000 CY				
0.0002344	11823.	50445667.	9.1796872	0.0021515	-0.006286
3.9989818	-60.000000 CY				
0.0002394	11855.	49524943.	9.1473565	0.0021896	-0.006428
3.9994466	-60.000000 CY				
0.0002444	11876.	48598228.	9.1109548	0.0022265	-0.006571
3.9965160	-60.000000 CY				
0.0002494	11895.	47701101.	9.0745971	0.0022630	-0.006715
3.9991770	-60.000000 CY				
0.0002544	11912.	46829816.	9.0405915	0.0022997	-0.006858
3.9995775	-60.000000 CY				
0.0002594	11929.	45990067.	9.0077660	0.0023364	-0.007001
3.9954763	-60.000000 CY				
0.0002644	11945.	45181124.	8.9766457	0.0023732	-0.007144
3.9984997	-60.000000 CY				
0.0002694	11961.	44401256.	8.9468563	0.0024101	-0.007287
3.9998981	-60.000000 CY				
0.0002744	11976.	43648250.	8.9191370	0.0024472	-0.007430
3.9944635	-60.000000 CY				
0.0003044	12062.	39628140.	8.7757363	0.0026711	-0.008286
3.9984635	-60.000000 CY				
0.0003344	12138.	36300180.	8.6628609	0.0028966	-0.009141
3.9998209	-60.000000 CY				
0.0003644	12207.	33502446.	8.5793723	0.0031261	-0.009991
3.9999551	-60.000000 CYT				
0.0003944	12272.	31117026.	8.5161103	0.0033585	-0.010839
3.9996166	-60.000000 CYT				
0.0004244	12331.	29056485.	8.4674428	0.0035934	-0.011684
3.9972132	-60.000000 CYT				
0.0004544	12377.	27238942.	8.4178614	0.0038249	-0.012533
3.9873462	-60.000000 CYT				

Axial Thrust Force = 4.200 kips

Bending Max Conc Curvature Stress rad/in. ksi	Bending Max Steel Moment Stress in-kip ksi	Run	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in
0.0003944	12272.		31117026.	8.5161103	0.0033585	-0.010839
3.9996166	-60.000000 CYT					
0.0004244	12331.		29056485.	8.4674428	0.0035934	-0.011684
3.9972132	-60.000000 CYT					
0.0004544	12377.		27238942.	8.4178614	0.0038249	-0.012533
3.9873462	-60.000000 CYT					

```
6.25000E-07   240.5049676    384807948.    19.4290859    0.00001214   -0.00001036
 0.0508615     0.2771147
 0.00000125   480.1459926    384116794.    18.7161837    0.00002340   -0.00002160
 0.0976654     0.5283867
 0.00000188   718.9162127    383421980.    18.4785558    0.00003465   -0.00003285
 0.1441903     0.7796589
 0.00000250   956.8156222    382726249.    18.3597458    0.00004590   -0.00004410
 0.1904363     1.0309315
 0.00000313        1194.     382030150.    18.2884629    0.00005715   -0.00005535
 0.2364034     1.2822044
 0.00000375        1430.     381333869.    18.2409436    0.00006840   -0.00006660
 0.2820914     1.5334776
 0.00000438        1665.     380637482.    18.2070035    0.00007966   -0.00007784
 0.3275005     1.7847511
 0.00000500        1900.     379941029.    18.1815504    0.00009091   -0.00008909
 0.3726306     2.0360248
 0.00000563        2133.     379244533.    18.1617553     0.0001022     -0.000100
 0.4174818     2.2872988
 0.00000625        2366.     378548006.    18.1459208     0.0001134     -0.000112
 0.4620539     2.5385732
 0.00000688        2366.     344134551.    10.2895004    0.00007074     -0.000177
 0.2893429    -4.300617 C
 0.00000750        2366.     315456672.    10.2575513    0.00007693     -0.000193
 0.3141325    -4.698533 C
 0.00000813        2366.     291190774.    10.2300378    0.00008312     -0.000209
 0.3388235    -5.096560 C
 0.00000875        2366.     270391433.    10.2068278    0.00008931     -0.000226
 0.3634446    -5.494492 C
 0.00000938        2366.     252365338.    10.1870615    0.00009550     -0.000242
 0.3879959    -5.892330 C
 0.00001000        2366.     236592504.    10.1700940     0.0001017     -0.000258
 0.4124772    -6.290073 C
 0.00001063        2366.     222675298.    10.1554324     0.0001079     -0.000275
 0.4368884    -6.687720 C
 0.00001125        2366.     210304448.    10.1426931     0.0001141     -0.000291
 0.4612294    -7.085271 C
 0.00001188        2366.     199235793.    10.1315564     0.0001203     -0.000307
 0.4855002    -7.482727 C
 0.00001250        2366.     189274003.    10.1218127     0.0001265     -0.000323
 0.5097005    -7.880086 C
 0.00001313        2366.     180260955.    10.1132503     0.0001327     -0.000340
 0.5338304    -8.277349 C
 0.00001375        2366.     172067276.    10.1057088     0.0001390     -0.000356
 0.5578898    -8.674515 C
 0.00001438        2366.     164586090.    10.0990556     0.0001452     -0.000372
 0.5818784    -9.071585 C
 0.00001500        2366.     157728336.    10.0931803     0.0001514     -0.000389
 0.6057963    -9.468556 C
 0.00001563        2366.     151419203.    10.0879903     0.0001576     -0.000405
 0.6296433    -9.865431 C
```

```
0.00001625         2366.    145595387.    10.0834069     0.0001639     -0.000421
0.6534193    -10.262207 C
0.00001688         2366.    140202965.    10.0793634     0.0001701     -0.000437
0.6771242    -10.658886 C
0.00001750         2366.    135195717.    10.0758025     0.0001763     -0.000454
0.7007579    -11.055466 C
0.00001813         2366.    130533795.    10.0726747     0.0001826     -0.000470
0.7243204    -11.451947 C
0.00001875         2366.    126182669.    10.0699372     0.0001888     -0.000486
0.7478114    -11.848330 C
0.00001938         2366.    122112260.    10.0675528     0.0001951     -0.000502
0.7712309    -12.244613 C
0.00002000         2366.    118296252.    10.0654889     0.0002013     -0.000519
0.7945789    -12.640797 C
0.00002063         2366.    114711517.    10.0637168     0.0002076     -0.000535
0.8178551    -13.036882 C
0.00002125         2366.    111337649.    10.0622112     0.0002138     -0.000551
0.8410595    -13.432866 C
0.00002188         2366.    108156573.    10.0609497     0.0002201     -0.000567
0.8641920    -13.828750 C
0.00002250         2366.    105152224.    10.0599125     0.0002263     -0.000584
0.8872524    -14.224533 C
0.00002313         2366.    102310272.    10.0590817     0.0002326     -0.000600
0.9102407    -14.620215 C
0.00002375         2366.     99617896.    10.0584414     0.0002389     -0.000616
0.9331568    -15.015796 C
0.00002438         2366.     97063591.    10.0579776     0.0002452     -0.000632
0.9560005    -15.411276 C
0.00002563         2432.     94924068.    10.0575288     0.0002577     -0.000665
1.0014704    -16.201930 C
0.00002688         2548.     94810571.    10.0576469     0.0002703     -0.000697
1.0466496    -16.992174 C
0.00002813         2664.     94702439.    10.0582592     0.0002829     -0.000730
1.0915372    -17.782007 C
0.00002938         2779.     94598964.    10.0593353     0.0002955     -0.000762
1.1361324    -18.571425 C
0.00003063         2894.     94499555.    10.0607664     0.0003081     -0.000794
1.1804341    -19.360427 C
0.00003188         3009.     94403710.    10.0625387     0.0003207     -0.000827
1.2244416    -20.149010 C
0.00003313         3124.     94311007.    10.0646159     0.0003334     -0.000859
1.2681539    -20.937171 C
0.00003438         3239.     94221082.    10.0669675     0.0003461     -0.000891
1.3115700    -21.724908 C
0.00003563         3354.     94133623.    10.0695670     0.0003587     -0.000924
1.3546892    -22.512219 C
0.00003688         3468.     94048359.    10.0723915     0.0003714     -0.000956
1.3975103    -23.299100 C
0.00003813         3582.     93965057.    10.0754214     0.0003841     -0.000988
1.4400326    -24.085550 C
```

```
0.00003938        3697.     93883511.    10.0786392     0.0003968     -0.001021
1.4822550    -24.871565 C
0.00004063        3811.     93803541.    10.0820299     0.0004096     -0.001053
1.5241766    -25.657144 C
0.00004188        3925.     93724988.    10.0855803     0.0004223     -0.001085
1.5657965    -26.442282 C
0.00004313        4039.     93647711.    10.0892786     0.0004351     -0.001117
1.6071135    -27.226979 C
0.00004438        4152.     93571586.    10.0931145     0.0004479     -0.001150
1.6481268    -28.011230 C
0.00004563        4266.     93496502.    10.0970787     0.0004607     -0.001182
1.6888354    -28.795033 C
0.00004688        4379.     93422358.    10.1011630     0.0004735     -0.001214
1.7292383    -29.578385 C
0.00004813        4492.     93349066.    10.1053601     0.0004863     -0.001246
1.7693344    -30.361284 C
0.00004938        4606.     93276544.    10.1096634     0.0004992     -0.001278
1.8091228    -31.143727 C
0.00005063        4718.     93204721.    10.1140670     0.0005120     -0.001310
1.8486023    -31.925710 C
0.00005188        4831.     93133529.    10.1185657     0.0005249     -0.001343
1.8877721    -32.707231 C
0.00005313        4944.     93062909.    10.1231546     0.0005378     -0.001375
1.9266309    -33.488287 C
0.00005438        5056.     92992807.    10.1278294     0.0005507     -0.001407
1.9651778    -34.268875 C
0.00005563        5169.     92923173.    10.1325862     0.0005636     -0.001439
2.0034117    -35.048992 C
0.00005688        5281.     92853961.    10.1374215     0.0005766     -0.001471
2.0413316    -35.828634 C
0.00005813        5393.     92785130.    10.1423320     0.0005895     -0.001503
2.0789362    -36.607799 C
0.00005938        5505.     92716640.    10.1473148     0.0006025     -0.001535
2.1162246    -37.386484 C
0.00006063        5617.     92648458.    10.1523672     0.0006155     -0.001567
2.1531956    -38.164685 C
0.00006188        5728.     92580549.    10.1574868     0.0006285     -0.001599
2.1898481    -38.942399 C
0.00006313        5840.     92512883.    10.1626714     0.0006415     -0.001631
2.2261809    -39.719622 C
0.00006438        5951.     92445433.    10.1679189     0.0006546     -0.001663
2.2621930    -40.496353 C
0.00006563        6062.     92378172.    10.1732276     0.0006676     -0.001695
2.2978832    -41.272587 C
0.00006688        6173.     92311077.    10.1785957     0.0006807     -0.001727
2.3332503    -42.048320 C
0.00006813        6284.     92244124.    10.1840217     0.0006938     -0.001759
2.3682931    -42.823550 C
0.00006938        6395.     92177292.    10.1895041     0.0007069     -0.001791
2.4030104    -43.598274 C
```

```
0.00007063        6505.     92110561.    10.1950417     0.0007200     -0.001822
2.4374011    -44.372486 C
0.00007188        6616.     92043913.    10.2006608     0.0007332     -0.001854
2.4714639    -45.146185 C
0.00007313        6726.     91977331.    10.2063053     0.0007463     -0.001886
2.5051976    -45.919366 C
0.00007438        6836.     91910797.    10.2120017     0.0007595     -0.001918
2.5386010    -46.692026 C
0.00007938        7274.     91644853.    10.2352897     0.0008124     -0.002045
2.6688860    -49.777380 C
0.00008438        7710.     91378587.    10.2593338     0.0008656     -0.002172
2.7937834    -52.854093 C
0.00008938        8143.     91111830.    10.2831857     0.0009191     -0.002298
2.9130226    -55.924331 C
0.00009438        8573.     90843621.    10.3077273     0.0009728     -0.002425
3.0266854    -58.985869 C
0.00009938        8982.     90387473.    10.3258078     0.0010261     -0.002551
3.1332951    -60.000000 CY
 0.0001044        9308.     89176212.    10.3143071     0.0010766     -0.002681
3.2283182    -60.000000 CY
 0.0001094        9549.     87304848.    10.2749831     0.0011238     -0.002814
3.3122821    -60.000000 CY
 0.0001144        9785.     85553556.    10.2389100     0.0011711     -0.002946
3.3913727    -60.000000 CY
 0.0001194       10007.     83830919.    10.2019402     0.0012179     -0.003080
3.4649106    -60.000000 CY
 0.0001244       10158.     81671814.    10.1406407     0.0012612     -0.003216
3.5287895    -60.000000 CY
 0.0001294       10291.     79542859.    10.0787027     0.0013039     -0.003354
3.5876602    -60.000000 CY
 0.0001344       10423.     77564670.    10.0227059     0.0013468     -0.003491
3.6428308    -60.000000 CY
 0.0001394       10554.     75720878.     9.9720357     0.0013899     -0.003628
3.6942550    -60.000000 CY
 0.0001444       10683.     73997378.     9.9261646     0.0014331     -0.003764
3.7418850    -60.000000 CY
 0.0001494       10812.     72381005.     9.8838986     0.0014764     -0.003901
3.7855535    -60.000000 CY
 0.0001544       10929.     70796718.     9.8396771     0.0015190     -0.004038
3.8245440    -60.000000 CY
 0.0001594       11012.     69097838.     9.7838573     0.0015593     -0.004178
3.8578061    -60.000000 CY
 0.0001644       11075.     67376662.     9.7232508     0.0015983     -0.004319
3.8866026    -60.000000 CY
 0.0001694       11135.     65743511.     9.6663364     0.0016372     -0.004460
3.9121613    -60.000000 CY
 0.0001744       11195.     64200103.     9.6121495     0.0016761     -0.004601
3.9345463    -60.000000 CY
 0.0001794       11254.     62738857.     9.5628376     0.0017153     -0.004742
3.9537182    -60.000000 CY
```

```
 0.0001844        11312.     61351278.     9.5162917     0.0017546     -0.004883
3.9695496    -60.000000 CY
 0.0001894        11368.     60031354.     9.4717005     0.0017937     -0.005024
3.9820503    -60.000000 CY
 0.0001944        11425.     58775745.     9.4305957     0.0018331     -0.005164
3.9913005    -60.000000 CY
 0.0001994        11480.     57579537.     9.3922863     0.0018726     -0.005305
3.9972564    -60.000000 CY
 0.0002044        11535.     56438298.     9.3556780     0.0019121     -0.005445
3.9998723    -60.000000 CY
 0.0002094        11588.     55347517.     9.3241700     0.0019522     -0.005585
3.9975077    -60.000000 CY
 0.0002144        11641.     54304067.     9.2934428     0.0019923     -0.005725
3.9998931    -60.000000 CY
 0.0002194        11694.     53304015.     9.2651074     0.0020325     -0.005865
3.9970558    -60.000000 CY
 0.0002244        11744.     52339157.     9.2380944     0.0020728     -0.006005
3.9997330    -60.000000 CY
 0.0002294        11790.     51401489.     9.2117130     0.0021129     -0.006145
3.9956300    -60.000000 CY
 0.0002344        11827.     50463153.     9.1821360     0.0021521     -0.006285
3.9990203    -60.000000 CY
 0.0002394        11859.     49542728.     9.1500193     0.0021903     -0.006427
3.9992468    -60.000000 CY
 0.0002444        11880.     48615611.     9.1135780     0.0022271     -0.006570
3.9965958    -60.000000 CY
 0.0002494        11900.     47718283.     9.0771076     0.0022636     -0.006714
3.9992162    -60.000000 CY
 0.0002544        11917.     46846598.     9.0431776     0.0023004     -0.006857
3.9993713    -60.000000 CY
 0.0002594        11933.     46006491.     9.0103157     0.0023371     -0.007000
3.9955701    -60.000000 CY
 0.0002644        11949.     45197204.     8.9791598     0.0023739     -0.007144
3.9985538    -60.000000 CY
 0.0002694        11965.     44417005.     8.9493437     0.0024107     -0.007287
3.9999119    -60.000000 CY
 0.0002744        11980.     43663657.     8.9215934     0.0024479     -0.007430
3.9942523    -60.000000 CY
 0.0003044        12066.     39641995.     8.7782176     0.0026719     -0.008286
3.9985257    -60.000000 CY
 0.0003344        12142.     36312646.     8.6652203     0.0028974     -0.009140
3.9998424    -60.000000 CY
 0.0003644        12212.     33513765.     8.5815911     0.0031269     -0.009991
3.9999658    -60.000000 CYT
 0.0003944        12276.     31127384.     8.5182268     0.0033594     -0.010838
3.9996505    -60.000000 CYT
 0.0004244        12335.     29066055.     8.4694819     0.0035942     -0.011683
3.9973093    -60.000000 CYT
 0.0004544        12381.     27248100.     8.4201387     0.0038259     -0.012532
3.9875919    -60.000000 CYT
```

Axial Thrust Force = 4.600 kips

Bending Max Conc Curvature Stress rad/in. ksi	Bending Max Steel Stress Moment in-kip ksi	Run Msg	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in
6.25000E-07	240.5035986		384805758.	19.5651901	0.00001223	-0.00001027
0.0512199	0.2795816					
0.00000125	480.1446137		384115691.	18.7843907	0.00002348	-0.00002152
0.0980225	0.5308592					
0.00000188	718.9148267		383421241.	18.5241312	0.00003473	-0.00003277
0.1445462	0.7821371					
0.00000250	956.8142298		382725692.	18.3940059	0.00004599	-0.00004401
0.1907908	1.0334154					
0.00000313	1194.		382029703.	18.3159341	0.00005724	-0.00005526
0.2367565	1.2846940					
0.00000375	1430.		381333494.	18.2638891	0.00006849	-0.00006651
0.2824433	1.5359729					
0.00000438	1665.		380637159.	18.2267166	0.00007974	-0.00007776
0.3278510	1.7872522					
0.00000500	1900.		379940746.	18.1988394	0.00009099	-0.00008901
0.3729798	2.0385317					
0.00000563	2133.		379244280.	18.1771590	0.0001022	-0.000100
0.4178295	2.2898116					
0.00000625	2366.		378547777.	18.1598165	0.0001135	-0.000112
0.4624003	2.5410917					
0.00000688	2366.		344134343.	10.3291778	0.00007101	-0.000176
0.2904571	-4.292706	C				
0.00000750	2366.		315456481.	10.2940289	0.00007721	-0.000193
0.3152465	-4.690597	C				
0.00000813	2366.		291190598.	10.2646762	0.00008340	-0.000209
0.3399656	-5.088396	C				
0.00000875	2366.		270391269.	10.2391817	0.00008959	-0.000225
0.3645893	-5.486283	C				
0.00000938	2366.		252365185.	10.2172859	0.00009579	-0.000242
0.3891378	-5.884113	C				
0.00001000	2366.		236592361.	10.1984552	0.0001020	-0.000258
0.4136162	-6.281848	C				
0.00001063	2366.		222675163.	10.1821496	0.0001082	-0.000274
0.4380246	-6.679488	C				
0.00001125	2366.		210304321.	10.1679490	0.0001144	-0.000291
0.4623628	-7.077032	C				
0.00001188	2366.		199235672.	10.1555219	0.0001206	-0.000307
0.4866307	-7.474480	C				

```
0.00001250         2366.    189273889.    10.1446030     0.0001268     -0.000323
0.5108282     -7.871831 C
0.00001313         2366.    180260846.    10.1349589     0.0001330     -0.000339
0.5349552     -8.269087 C
0.00001375         2366.    172067171.    10.1264498     0.0001392     -0.000356
0.5590117     -8.666245 C
0.00001438         2366.    164585990.    10.1189132     0.0001455     -0.000372
0.5829974     -9.063307 C
0.00001500         2366.    157728241.    10.1122282     0.0001517     -0.000388
0.6069124     -9.460271 C
0.00001563         2366.    151419111.    10.1062933     0.0001579     -0.000405
0.6307565     -9.857138 C
0.00001625         2366.    145595299.    10.1010224     0.0001641     -0.000421
0.6545296    -10.253907 C
0.00001688         2366.    140202880.    10.0963423     0.0001704     -0.000437
0.6782316    -10.650577 C
0.00001750         2366.    135195635.    10.0921903     0.0001766     -0.000453
0.7018624    -11.047150 C
0.00001813         2366.    130533716.    10.0885122     0.0001829     -0.000470
0.7254219    -11.443623 C
0.00001875         2366.    126182592.    10.0852613     0.0001891     -0.000486
0.7489100    -11.839998 C
0.00001938         2366.    122112186.    10.0823966     0.0001953     -0.000502
0.7723266    -12.236274 C
0.00002000         2366.    118296180.    10.0798824     0.0002016     -0.000518
0.7956716    -12.632450 C
0.00002063         2366.    114711448.    10.0776874     0.0002079     -0.000535
0.8189449    -13.028526 C
0.00002125         2366.    111337582.    10.0757837     0.0002141     -0.000551
0.8421464    -13.424502 C
0.00002188         2366.    108156508.    10.0741470     0.0002204     -0.000567
0.8652759    -13.820378 C
0.00002250         2366.    105152160.    10.0727554     0.0002266     -0.000583
0.8883333    -14.216153 C
0.00002313         2366.    102310210.    10.0715894     0.0002329     -0.000600
0.9113187    -14.611828 C
0.00002375         2366.     99617836.    10.0706317     0.0002392     -0.000616
0.9342318    -15.007401 C
0.00002438         2366.     97063533.    10.0698667     0.0002455     -0.000632
0.9570725    -15.402873 C
0.00002563         2436.     95048091.    10.0688598     0.0002580     -0.000664
1.0025364    -16.193510 C
0.00002688         2551.     94928657.    10.0684718     0.0002706     -0.000697
1.0477096    -16.983738 C
0.00002813         2667.     94815115.    10.0686232     0.0002832     -0.000729
1.0925912    -17.773555 C
0.00002938         2782.     94706690.    10.0692479     0.0002958     -0.000762
1.1371802    -18.562957 C
0.00003063         2897.     94602733.    10.0703211     0.0003084     -0.000794
1.1814759    -19.351942 C
```

```
0.00003188        3012.     94502697.    10.0717368     0.0003210     -0.000826
1.2254772    -20.140508 C
0.00003313        3127.     94406117.    10.0734845     0.0003337     -0.000859
1.2691834    -20.928652 C
0.00003438        3242.     94312597.    10.0755306     0.0003463     -0.000891
1.3125933    -21.716373 C
0.00003563        3357.     94221794.    10.0778462     0.0003590     -0.000923
1.3557063    -22.503666 C
0.00003688        3471.     94133413.    10.0804061     0.0003717     -0.000956
1.3985212    -23.290530 C
0.00003813        3586.     94047197.    10.0831888     0.0003844     -0.000988
1.4410372    -24.076963 C
0.00003938        3700.     93962921.    10.0861753     0.0003971     -0.001020
1.4832533    -24.862961 C
0.00004063        3814.     93880388.    10.0893491     0.0004099     -0.001053
1.5251686    -25.648521 C
0.00004188        3928.     93799425.    10.0926956     0.0004226     -0.001085
1.5667821    -26.433642 C
0.00004313        4042.     93719877.    10.0962019     0.0004354     -0.001117
1.6080927    -27.218321 C
0.00004438        4155.     93641609.    10.0998566     0.0004482     -0.001149
1.6490996    -28.002554 C
0.00004563        4269.     93564497.    10.1036497     0.0004610     -0.001182
1.6898018    -28.786339 C
0.00004688        4382.     93488434.    10.1075722     0.0004738     -0.001214
1.7301982    -29.569674 C
0.00004813        4496.     93413321.    10.1116159     0.0004866     -0.001246
1.7702878    -30.352554 C
0.00004938        4609.     93339070.    10.1157737     0.0004995     -0.001278
1.8100696    -31.134978 C
0.00005063        4722.     93265602.    10.1200391     0.0005123     -0.001310
1.8495425    -31.916943 C
0.00005188        4834.     93192845.    10.1244063     0.0005252     -0.001342
1.8887057    -32.698446 C
0.00005313        4947.     93120733.    10.1288700     0.0005381     -0.001374
1.9275579    -33.479483 C
0.00005438        5060.     93049206.    10.1334255     0.0005510     -0.001406
1.9660981    -34.260052 C
0.00005563        5172.     92978211.    10.1380684     0.0005639     -0.001439
2.0043253    -35.040149 C
0.00005688        5284.     92907697.    10.1427948     0.0005769     -0.001471
2.0422384    -35.819772 C
0.00005813        5396.     92837619.    10.1476012     0.0005898     -0.001503
2.0798362    -36.598918 C
0.00005938        5508.     92767935.    10.1524844     0.0006028     -0.001535
2.1171178    -37.377583 C
0.00006063        5620.     92698606.    10.1574414     0.0006158     -0.001567
2.1540819    -38.155764 C
0.00006188        5731.     92629597.    10.1624696     0.0006288     -0.001599
2.1907275    -38.933458 C
```

```
0.00006313        5843.     92560874.    10.1675664     0.0006418     -0.001631
2.2270535    -39.710662 C
0.00006438        5954.     92492407.    10.1727297     0.0006549     -0.001663
2.2630586    -40.487373 C
0.00006563        6065.     92424168.    10.1779574     0.0006679     -0.001695
2.2987417    -41.263586 C
0.00006688        6176.     92356130.    10.1832476     0.0006810     -0.001726
2.3341018    -42.039299 C
0.00006813        6287.     92288268.    10.1885986     0.0006941     -0.001758
2.3691375    -42.814509 C
0.00006938        6398.     92220560.    10.1940089     0.0007072     -0.001790
2.4038477    -43.589211 C
0.00007063        6508.     92152983.    10.1995039     0.0007203     -0.001822
2.4382312    -44.363403 C
0.00007188        6619.     92085519.    10.2050285     0.0007335     -0.001854
2.4722868    -45.137081 C
0.00007313        6729.     92018147.    10.2106084     0.0007467     -0.001886
2.5060133    -45.910241 C
0.00007438        6839.     91950850.    10.2162424     0.0007598     -0.001918
2.5394094    -46.682880 C
0.00007938        7277.     91682087.    10.2393011     0.0008127     -0.002045
2.6696649    -49.768146 C
0.00008438        7713.     91413389.    10.2630109     0.0008659     -0.002172
2.7945082    -52.845065 C
0.00008938        8146.     91144431.    10.2866786     0.0009194     -0.002298
2.9137126    -55.915279 C
0.00009438        8576.     90874234.    10.3110673     0.0009731     -0.002424
3.0273448    -58.976728 C
0.00009938        8985.     90417533.    10.3290580     0.0010265     -0.002551
3.1339327    -60.000000 CY
 0.0001044        9311.     89207952.    10.3175636     0.0010769     -0.002681
3.2289512    -60.000000 CY
 0.0001094        9552.     87336121.    10.2781631     0.0011242     -0.002813
3.3128936    -60.000000 CY
 0.0001144        9789.     85583430.    10.2421143     0.0011714     -0.002946
3.3919789    -60.000000 CY
 0.0001194       10011.     83861611.    10.2051482     0.0012182     -0.003079
3.4655044    -60.000000 CY
 0.0001244       10162.     81702300.    10.1438002     0.0012616     -0.003216
3.5293615    -60.000000 CY
 0.0001294       10295.     79572057.    10.0817619     0.0013043     -0.003353
3.5881988    -60.000000 CY
 0.0001344       10427.     77592674.    10.0256713     0.0013472     -0.003490
3.6433355    -60.000000 CY
 0.0001394       10557.     75747771.     9.9749147     0.0013903     -0.003627
3.6947252    -60.000000 CY
 0.0001444       10687.     74023236.     9.9289636     0.0014335     -0.003764
3.7423201    -60.000000 CY
 0.0001494       10816.     72406063.     9.8867661     0.0014768     -0.003901
3.7859739    -60.000000 CY
```

```
 0.0001544        10933.     70821400.     9.8425115     0.0015194     -0.004038
3.8249324    -60.000000 CY
 0.0001594        11017.     69123456.     9.7867573     0.0015598     -0.004178
3.8581753    -60.000000 CY
 0.0001644        11079.     67401534.     9.7260868     0.0015987     -0.004319
3.8869352    -60.000000 CY
 0.0001694        11139.     65767574.     9.6691048     0.0016377     -0.004460
3.9124557    -60.000000 CY
 0.0001744        11199.     64223403.     9.6148605     0.0016766     -0.004601
3.9348020    -60.000000 CY
 0.0001794        11258.     62761436.     9.5654896     0.0017158     -0.004742
3.9539345    -60.000000 CY
 0.0001844        11316.     61373390.     9.5189681     0.0017551     -0.004882
3.9697370    -60.000000 CY
 0.0001894        11373.     60052811.     9.4743244     0.0017942     -0.005023
3.9821950    -60.000000 CY
 0.0001944        11429.     58796578.     9.4331695     0.0018336     -0.005164
3.9914019    -60.000000 CY
 0.0001994        11484.     57599778.     9.3948139     0.0018731     -0.005304
3.9973136    -60.000000 CY
 0.0002044        11539.     56457972.     9.3581635     0.0019126     -0.005445
3.9998845    -60.000000 CY
 0.0002094        11592.     55366642.     9.3266817     0.0019528     -0.005585
3.9975630    -60.000000 CY
 0.0002144        11645.     54322678.     9.2959142     0.0019928     -0.005725
3.9999044    -60.000000 CY
 0.0002194        11698.     53322120.     9.2675435     0.0020331     -0.005864
3.9971169    -60.000000 CY
 0.0002244        11748.     52356977.     9.2405172     0.0020733     -0.006004
3.9997515    -60.000000 CY
 0.0002294        11794.     51418840.     9.2141042     0.0021135     -0.006144
3.9957066    -60.000000 CY
 0.0002344        11831.     50480617.     9.1845645     0.0021526     -0.006285
3.9990577    -60.000000 CY
 0.0002394        11864.     49560513.     9.1526832     0.0021909     -0.006427
3.9990468    -60.000000 CY
 0.0002444        11885.     48632992.     9.1162023     0.0022278     -0.006570
3.9966747    -60.000000 CY
 0.0002494        11904.     47735462.     9.0796192     0.0022642     -0.006713
3.9992545    -60.000000 CY
 0.0002544        11921.     46863378.     9.0457647     0.0023010     -0.006856
3.9991650    -60.000000 CY
 0.0002594        11937.     46022914.     9.0128664     0.0023377     -0.007000
3.9956629    -60.000000 CY
 0.0002644        11953.     45213284.     8.9816750     0.0023745     -0.007143
3.9986069    -60.000000 CY
 0.0002694        11969.     44432753.     8.9518321     0.0024114     -0.007286
3.9999247    -60.000000 CY
 0.0002744        11984.     43679063.     8.9240509     0.0024485     -0.007429
3.9940409    -60.000000 CY
```

```
   0.0003044        12070.     39655848.     8.7807001     0.0026726     -0.008285
  3.9985866    -60.000000 CY
   0.0003344        12146.     36325110.     8.6675807     0.0028982     -0.009139
  3.9998625    -60.000000 CY
   0.0003644        12216.     33525083.     8.5838110     0.0031277     -0.009990
  3.9999751    -60.000000 CYT
   0.0003944        12280.     31137740.     8.5203443     0.0033602     -0.010837
  3.9996828    -60.000000 CYT
   0.0004244        12339.     29075625.     8.4715220     0.0035951     -0.011682
  3.9974037    -60.000000 CYT
   0.0004544        12385.     27257253.     8.4224181     0.0038269     -0.012531
  3.9878351    -60.000000 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           Axial Thrust        Nominal Mom. Cap.      Max. Comp.      Max.
Tens.
  No.              kips                 in-kip               Strain
Strain
 ----         ----------------     ------------------     ------------
------------
   1                 3.800            12169.214          0.00300000
-0.00952396
   2                 4.200            12173.120          0.00300000
-0.00952020
   3                 4.600            12177.027          0.00300000
-0.00951645

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.
```

Load No.	Factor	Ax. Thrust kips	Moment Cap in-kips	Ax. Thrust kips	Moment Cap in-kips	at Ult Mom kip-in^2
1	0.65	3.800000	12169.	2.470000	7910.	91219895.
2	0.65	4.200000	12173.	2.730000	7913.	91253873.
3	0.65	4.600000	12177.	2.990000	7915.	91287886.
1	0.75	3.800000	12169.	2.850000	9127.	89806706.
2	0.75	4.200000	12173.	3.150000	9130.	89838295.
3	0.75	4.600000	12177.	3.450000	9133.	89869877.
1	0.90	3.800000	12169.	3.420000	10952.	70221645.
2	0.90	4.200000	12173.	3.780000	10956.	70254444.
3	0.90	4.600000	12177.	4.140000	10959.	70287179.

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	1.0000	0.00	N.A.	No	0.00	8727.
2	4.0000	0.4767	No	No	8727.	24568.
3	5.1000	4.1000	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 = 1000.0 lbs
Applied moment at pile head = 315600.0 in-lbs
Axial thrust load on pile head = 4200.0 lbs

Depth X	Deflect. y	Bending Moment	Shear Force	Slope S	Total Stress	Bending Stiffness	Soil Res. Es*H	Soil Spr. Distrib. p Lat. Load
feet	inches	in-lbs	lbs	radians	psi*	lb-in^2	lb/inch	lb/inch
0.00	0.00375	315600.	1000.	-8.33E-05	0.00	3.84E+11	0.00	0.00
0.07000	0.00368	316440.	1000.	-8.26E-05	0.00	3.84E+11	0.00	0.00
0.1400	0.00361	317281.	1000.0000	-8.19E-05	0.00	3.84E+11	0.00	0.00
0.2100	0.00355	318121.	1000.0000	-8.12E-05	0.00	3.84E+11	0.00	0.00
0.2800	0.00348	318961.	1000.	-8.05E-05	0.00	3.84E+11	0.00	0.00
0.3500	0.00341	319801.	1000.	-7.98E-05	0.00	3.84E+11	0.00	0.00
0.4200	0.00334	320642.	1000.	-7.91E-05	0.00	3.84E+11	0.00	0.00
0.4900	0.00328	321482.	1000.	-7.84E-05	0.00	3.84E+11	0.00	0.00
0.5600	0.00321	322322.	1000.	-7.77E-05	0.00	3.84E+11	0.00	0.00
0.6300	0.00315	323163.	1000.0000	-7.70E-05	0.00	3.84E+11	0.00	0.00
0.7000	0.00308	324003.	1000.0000	-7.63E-05	0.00	3.84E+11	0.00	0.00
0.7700	0.00302	324843.	1000.0000	-7.56E-05	0.00	3.84E+11	0.00	0.00
0.8400	0.00296	325683.	1000.	-7.49E-05	0.00	3.84E+11	0.00	0.00
0.9100	0.00289	326524.	1000.	-7.42E-05	0.00	3.84E+11	0.00	0.00
0.9800	0.00283	327364.	1000.	-7.35E-05	0.00	3.84E+11		

```
0.00       0.00       0.00
    1.0500    0.00277    328204.   995.4117  -7.28E-05       0.00   3.84E+11
-10.924      3313.       0.00
    1.1200    0.00271    329037.   986.2102  -7.20E-05       0.00   3.84E+11
-10.984      3406.       0.00
    1.1900    0.00265    329861.   976.9597  -7.13E-05       0.00   3.84E+11
-11.041      3501.       0.00
    1.2600    0.00259    330678.   967.6623  -7.06E-05       0.00   3.84E+11
-11.096      3599.       0.00
    1.3300    0.00253    331488.   958.3203  -6.99E-05       0.00   3.84E+11
-11.147      3701.       0.00
    1.4000    0.00247    332289.   948.9356  -6.92E-05       0.00   3.84E+11
-11.197      3805.       0.00
    1.4700    0.00241    333082.   939.5105  -6.84E-05       0.00   3.84E+11
-11.244      3912.       0.00
    1.5400    0.00236    333868.   930.0472  -6.77E-05       0.00   3.84E+11
-11.288      4023.       0.00
    1.6100    0.00230    334645.   920.5478  -6.70E-05       0.00   3.84E+11
-11.330      4137.       0.00
    1.6800    0.00224    335415.   911.0146  -6.62E-05       0.00   3.84E+11
-11.369      4255.       0.00
    1.7500    0.00219    336176.   901.4497  -6.55E-05       0.00   3.84E+11
-11.405      4376.       0.00
    1.8200    0.00213    336930.   891.8556  -6.48E-05       0.00   3.84E+11
-11.438      4501.       0.00
    1.8900    0.00208    337675.   882.2344  -6.40E-05       0.00   3.84E+11
-11.469      4631.       0.00
    1.9600    0.00203    338412.   872.5886  -6.33E-05       0.00   3.84E+11
-11.497      4765.       0.00
    2.0300    0.00197    339141.   862.9204  -6.25E-05       0.00   3.84E+11
-11.522      4903.       0.00
    2.1000    0.00192    339862.   853.2321  -6.18E-05       0.00   3.84E+11
-11.545      5046.       0.00
    2.1700    0.00187    340575.   843.5263  -6.11E-05       0.00   3.84E+11
-11.564      5194.       0.00
    2.2400    0.00182    341280.   833.8053  -6.03E-05       0.00   3.84E+11
-11.581      5347.       0.00
    2.3100    0.00177    341977.   824.0716  -5.96E-05       0.00   3.84E+11
-11.595      5506.       0.00
    2.3800    0.00172    342665.   814.3277  -5.88E-05       0.00   3.84E+11
-11.605      5670.       0.00
    2.4500    0.00167    343345.   804.5761  -5.81E-05       0.00   3.84E+11
-11.613      5841.       0.00
    2.5200    0.00162    344017.   794.8194  -5.73E-05       0.00   3.84E+11
-11.617      6018.       0.00
    2.5900    0.00157    344681.   785.0601  -5.66E-05       0.00   3.84E+11
-11.619      6201.       0.00
    2.6600    0.00153    345336.   775.3009  -5.58E-05       0.00   3.84E+11
-11.617      6392.       0.00
    2.7300    0.00148    345984.   765.5444  -5.51E-05       0.00   3.84E+11
```

```
-11.612      6591.       0.00
    2.8000    0.00143    346623.   755.7933  -5.43E-05       0.00   3.84E+11
-11.604      6797.       0.00
    2.8700    0.00139    347254.   746.0505  -5.35E-05       0.00   3.84E+11
-11.593      7012.       0.00
    2.9400    0.00134    347877.   736.3186  -5.28E-05       0.00   3.84E+11
-11.578      7236.       0.00
    3.0100    0.00130    348491.   726.6006  -5.20E-05       0.00   3.84E+11
-11.560      7469.       0.00
    3.0800    0.00126    349098.   716.8992  -5.13E-05       0.00   3.84E+11
-11.538      7712.       0.00
    3.1500    0.00121    349696.   707.2175  -5.05E-05       0.00   3.84E+11
-11.513      7966.       0.00
    3.2200    0.00117    350286.   697.5584  -4.97E-05       0.00   3.84E+11
-11.485      8232.       0.00
    3.2900    0.00113    350868.   687.9250  -4.90E-05       0.00   3.84E+11
-11.452      8510.       0.00
    3.3600    0.00109    351442.   678.3203  -4.82E-05       0.00   3.84E+11
-11.416      8801.       0.00
    3.4300    0.00105    352008.   668.7476  -4.74E-05       0.00   3.84E+11
-11.376      9105.       0.00
    3.5000    0.00101    352566.   659.2101  -4.67E-05       0.00   3.84E+11
-11.332      9425.       0.00
    3.5700   9.71E-04    353116.   649.7111  -4.59E-05       0.00   3.84E+11
-11.284      9761.       0.00
    3.6400   9.33E-04    353658.   640.2540  -4.51E-05       0.00   3.84E+11
-11.233     10114.       0.00
    3.7100   8.95E-04    354192.   630.8421  -4.43E-05       0.00   3.84E+11
-11.177     10486.       0.00
    3.7800   8.58E-04    354718.   621.4792  -4.36E-05       0.00   3.84E+11
-11.116     10878.       0.00
    3.8500   8.22E-04    355236.   612.1688  -4.28E-05       0.00   3.84E+11
-11.051     11292.       0.00
    3.9200   7.86E-04    355747.   602.9147  -4.20E-05       0.00   3.84E+11
-10.982     11730.       0.00
    3.9900   7.51E-04    356249.   593.7207  -4.12E-05       0.00   3.84E+11
-10.908     12193.       0.00
    4.0600   7.17E-04    356744.   529.2270  -4.05E-05       0.00   3.84E+11
-142.648    167077.       0.00
    4.1300   6.84E-04    357139.   411.9431  -3.97E-05       0.00   3.84E+11
-136.599    167871.       0.00
    4.2000   6.51E-04    357437.   299.7127  -3.89E-05       0.00   3.84E+11
-130.616    168662.       0.00
    4.2700   6.18E-04    357643.   192.4792  -3.81E-05       0.00   3.84E+11
-124.702    169451.       0.00
    4.3400   5.86E-04    357760.    90.1842  -3.73E-05       0.00   3.84E+11
-118.858    170238.       0.00
    4.4100   5.55E-04    357794.     -7.233  -3.66E-05       0.00   3.84E+11
-113.087    171022.       0.00
    4.4800   5.25E-04    357748.    -99.834  -3.58E-05       0.00   3.84E+11
```

```
-107.391    171804.       0.00
    4.5500   4.95E-04    357627.   -187.682  -3.50E-05       0.00   3.84E+11
-101.773    172585.       0.00
    4.6200   4.66E-04    357433.   -270.845  -3.42E-05       0.00   3.84E+11
-96.234    173364.       0.00
    4.6900   4.38E-04    357172.   -349.389  -3.34E-05       0.00   3.84E+11
-90.776    174141.       0.00
    4.7600   4.10E-04    356847.   -423.383  -3.26E-05       0.00   3.84E+11
-85.401    174916.       0.00
    4.8300   3.83E-04    356461.   -492.898  -3.19E-05       0.00   3.84E+11
-80.111    175690.       0.00
    4.9000   3.57E-04    356019.   -558.006  -3.11E-05       0.00   3.84E+11
-74.908    176463.       0.00
    4.9700   3.31E-04    355524.   -618.782  -3.03E-05       0.00   3.84E+11
-69.795    177234.       0.00
    5.0400   3.06E-04    354979.   -675.299  -2.95E-05       0.00   3.84E+11
-64.771    178004.       0.00
    5.1100   2.81E-04    354389.     -2090.  -2.88E-05       0.00   3.84E+11
-3304.   9871680.       0.00
    5.1800   2.57E-04    351468.     -4788.  -2.80E-05       0.00   3.84E+11
-3118.   1.02E+07       0.00
    5.2500   2.34E-04    346346.     -7324.  -2.72E-05       0.00   3.84E+11
-2922.   1.05E+07       0.00
    5.3200   2.12E-04    339163.     -9693.  -2.65E-05       0.00   3.84E+11
-2718.   1.08E+07       0.00
    5.3900   1.90E-04    330062.    -11887.  -2.57E-05       0.00   3.84E+11
-2505.   1.11E+07       0.00
    5.4600   1.68E-04    319194.    -13898.  -2.50E-05       0.00   3.84E+11
-2285.   1.14E+07       0.00
    5.5300   1.48E-04    306713.    -15722.  -2.44E-05       0.00   3.85E+11
-2057.   1.17E+07       0.00
    5.6000   1.27E-04    292781.    -17351.  -2.37E-05       0.00   3.85E+11
-1822.   1.20E+07       0.00
    5.6700   1.08E-04    277564.    -18780.  -2.31E-05       0.00   3.85E+11
-1581.   1.23E+07       0.00
    5.7400   8.87E-05    261231.    -20003.  -2.25E-05       0.00   3.85E+11
-1332.   1.26E+07       0.00
    5.8100   7.00E-05    243958.    -21016.  -2.19E-05       0.00   3.85E+11
-1077.   1.29E+07       0.00
    5.8800   5.18E-05    225925.    -21811.  -2.14E-05       0.00   3.85E+11
-816.108   1.32E+07       0.00
    5.9500   3.40E-05    207316.    -22384.  -2.10E-05       0.00   3.85E+11
-548.199   1.35E+07       0.00
    6.0200   1.66E-05    188320.    -22729.  -2.05E-05       0.00   3.85E+11
-273.606   1.38E+07       0.00
    6.0900  -4.66E-07    169131.    -22841.  -2.01E-05       0.00   3.85E+11
7.8436   1.42E+07       0.00
    6.1600  -1.72E-05    149948.    -22713.  -1.98E-05       0.00   3.85E+11
296.3776   1.45E+07       0.00
    6.2300  -3.37E-05    130974.    -22340.  -1.95E-05       0.00   3.85E+11
```

```
592.2758   1.48E+07       0.00
    6.3000  -4.99E-05    112418.    -21715.  -1.92E-05       0.00   3.85E+11
895.8620   1.51E+07       0.00
    6.3700  -6.60E-05     94493.    -20831.  -1.90E-05       0.00   3.85E+11
1207.   1.54E+07       0.00
    6.4400  -8.18E-05     77421.    -19682.  -1.88E-05       0.00   3.85E+11
1528.   1.57E+07       0.00
    6.5100  -9.75E-05     61427.    -18261.  -1.86E-05       0.00   3.85E+11
1856.   1.60E+07       0.00
    6.5800  -1.13E-04     46743.    -16560.  -1.85E-05       0.00   3.85E+11
2195.   1.63E+07       0.00
    6.6500  -1.29E-04     33607.    -14570.  -1.84E-05       0.00   3.85E+11
2542.   1.66E+07       0.00
    6.7200  -1.44E-04     22265.    -12284.  -1.84E-05       0.00   3.85E+11
2900.   1.69E+07       0.00
    6.7900  -1.60E-04     12970.     -9693.  -1.83E-05       0.00   3.85E+11
3269.   1.72E+07       0.00
    6.8600  -1.75E-04      5981.     -6788.  -1.83E-05       0.00   3.85E+11
3648.   1.75E+07       0.00
    6.9300  -1.90E-04      1566.     -3560.  -1.83E-05       0.00   3.85E+11
4038.   1.78E+07       0.00
    7.0000  -2.06E-04      0.00       0.00  -1.83E-05       0.00   3.85E+11
4439.   9063600.       0.00

* This analysis computed pile response using nonlinear moment-curvature rela-
  tionships. 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 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. 1:

Pile-head deflection             =     0.00375370 inches
Computed slope at pile head      =     -0.0000833 radians
Maximum bending moment           =        357794. inch-lbs
Maximum shear force              =        -22841. lbs
Depth of maximum bending moment  =     4.41000000 feet below pile head
Depth of maximum shear force     =     6.09000000 feet below pile head
Number of iterations             =              6
Number of zero deflection points =              1
Pile deflection at ground        =     0.00281390 inches


--------------------------------------------------------------------------------
            Pile-head Deflection vs. Pile Length for Load Case 1
--------------------------------------------------------------------------------
```

Boundary Condition Type 1, Shear and Moment

Shear = 1000. lbs
Moment = 315600. in-lbs
Axial Load = 4200. lbs

Pile Length feet	Pile Head Deflection inches	Maximum Moment ln-lbs	Maximum Shear lbs
7.00000	0.00375370	357794.	-22841.
6.65000	0.00495653	356646.	-27738.
6.30000	0.00784984	354302.	-34641.
5.95000	0.02089825	349949.	-49189.
5.60000	0.78119234	335989.	-70225.

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 = 2250.0 lbs
Applied moment at pile head = 724800.0 in-lbs
Axial thrust load on pile head = 4600.0 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. Es*H lb/inch	Soil Spr. Lat. Load lb/inch	Distrib. p lb/inch
0.00	0.00884	724800.	2250.	-1.95E-04	0.00	3.83E+11	0.00	0.00	0.00
0.07000	0.00868	726691.	2250.	-1.93E-04	0.00	3.83E+11	0.00	0.00	0.00
0.1400	0.00851	728581.	2250.	-1.91E-04	0.00	3.83E+11	0.00	0.00	0.00
0.2100	0.00835	730472.	2250.	-1.90E-04	0.00	3.83E+11	0.00	0.00	0.00
0.2800	0.00820	732363.	2250.	-1.88E-04	0.00	3.83E+11	0.00	0.00	0.00
0.3500	0.00804	734254.	2250.	-1.87E-04	0.00	3.83E+11	0.00	0.00	0.00
0.4200	0.00788	736144.	2250.	-1.85E-04	0.00	3.83E+11			

```
0.00        0.00        0.00
    0.4900    0.00773    738035.      2250.  -1.83E-04       0.00   3.83E+11
0.00        0.00        0.00
    0.5600    0.00757    739926.      2250.  -1.82E-04       0.00   3.83E+11
0.00        0.00        0.00
    0.6300    0.00742    741817.      2250.  -1.80E-04       0.00   3.83E+11
0.00        0.00        0.00
    0.7000    0.00727    743707.      2250.  -1.79E-04       0.00   3.83E+11
0.00        0.00        0.00
    0.7700    0.00712    745598.      2250.  -1.77E-04       0.00   3.83E+11
0.00        0.00        0.00
    0.8400    0.00697    747489.      2250.  -1.75E-04       0.00   3.83E+11
0.00        0.00        0.00
    0.9100    0.00683    749379.      2250.  -1.74E-04       0.00   3.83E+11
0.00        0.00        0.00
    0.9800    0.00668    751270.      2250.  -1.72E-04       0.00   3.83E+11
0.00        0.00        0.00
    1.0500    0.00654    753161.      2244.  -1.70E-04       0.00   3.83E+11
-14.546      1869.       0.00
    1.1200    0.00640    755041.      2232.  -1.69E-04       0.00   3.83E+11
-14.626      1921.       0.00
    1.1900    0.00626    756911.      2219.  -1.67E-04       0.00   3.83E+11
-14.703      1974.       0.00
    1.2600    0.00612    758771.      2207.  -1.65E-04       0.00   3.83E+11
-14.776      2030.       0.00
    1.3300    0.00598    760620.      2194.  -1.64E-04       0.00   3.83E+11
-14.846      2086.       0.00
    1.4000    0.00584    762459.      2182.  -1.62E-04       0.00   3.83E+11
-14.913      2145.       0.00
    1.4700    0.00571    764287.      2169.  -1.60E-04       0.00   3.83E+11
-14.976      2205.       0.00
    1.5400    0.00557    766105.      2157.  -1.59E-04       0.00   3.83E+11
-15.036      2267.       0.00
    1.6100    0.00544    767912.      2144.  -1.57E-04       0.00   3.83E+11
-15.093      2331.       0.00
    1.6800    0.00531    769708.      2131.  -1.55E-04       0.00   3.83E+11
-15.146      2397.       0.00
    1.7500    0.00518    771494.      2119.  -1.54E-04       0.00   3.83E+11
-15.195      2465.       0.00
    1.8200    0.00505    773269.      2106.  -1.52E-04       0.00   3.83E+11
-15.241      2536.       0.00
    1.8900    0.00492    775033.      2093.  -1.50E-04       0.00   3.83E+11
-15.283      2608.       0.00
    1.9600    0.00480    776786.      2080.  -1.49E-04       0.00   3.83E+11
-15.321      2683.       0.00
    2.0300    0.00467    778529.      2067.  -1.47E-04       0.00   3.83E+11
-15.356      2761.       0.00
    2.1000    0.00455    780261.      2054.  -1.45E-04       0.00   3.83E+11
-15.387      2841.       0.00
    2.1700    0.00443    781982.      2042.  -1.43E-04       0.00   3.83E+11
```

-15.414	2924.	0.00				
2.2400	0.00431	783692.	2029.	-1.42E-04	0.00	3.83E+11
-15.437	3009.	0.00				
2.3100	0.00419	785391.	2016.	-1.40E-04	0.00	3.83E+11
-15.457	3098.	0.00				
2.3800	0.00407	787079.	2003.	-1.38E-04	0.00	3.83E+11
-15.472	3190.	0.00				
2.4500	0.00396	788756.	1990.	-1.37E-04	0.00	3.83E+11
-15.483	3286.	0.00				
2.5200	0.00384	790423.	1977.	-1.35E-04	0.00	3.83E+11
-15.491	3385.	0.00				
2.5900	0.00373	792078.	1964.	-1.33E-04	0.00	3.83E+11
-15.494	3487.	0.00				
2.6600	0.00362	793723.	1951.	-1.31E-04	0.00	3.83E+11
-15.493	3594.	0.00				
2.7300	0.00351	795356.	1938.	-1.30E-04	0.00	3.83E+11
-15.488	3705.	0.00				
2.8000	0.00340	796979.	1925.	-1.28E-04	0.00	3.83E+11
-15.478	3820.	0.00				
2.8700	0.00330	798590.	1912.	-1.26E-04	0.00	3.83E+11
-15.464	3941.	0.00				
2.9400	0.00319	800191.	1899.	-1.24E-04	0.00	3.83E+11
-15.446	4066.	0.00				
3.0100	0.00309	801781.	1886.	-1.23E-04	0.00	3.83E+11
-15.423	4196.	0.00				
3.0800	0.00299	803360.	1873.	-1.21E-04	0.00	3.83E+11
-15.396	4332.	0.00				
3.1500	0.00288	804928.	1860.	-1.19E-04	0.00	3.83E+11
-15.363	4474.	0.00				
3.2200	0.00279	806485.	1847.	-1.17E-04	0.00	3.83E+11
-15.326	4622.	0.00				
3.2900	0.00269	808032.	1834.	-1.16E-04	0.00	3.83E+11
-15.285	4777.	0.00				
3.3600	0.00259	809567.	1821.	-1.14E-04	0.00	3.83E+11
-15.238	4940.	0.00				
3.4300	0.00250	811092.	1808.	-1.12E-04	0.00	3.83E+11
-15.186	5110.	0.00				
3.5000	0.00240	812606.	1796.	-1.10E-04	0.00	3.83E+11
-15.129	5288.	0.00				
3.5700	0.00231	814110.	1783.	-1.08E-04	0.00	3.83E+11
-15.066	5476.	0.00				
3.6400	0.00222	815603.	1770.	-1.07E-04	0.00	3.83E+11
-14.999	5673.	0.00				
3.7100	0.00213	817085.	1758.	-1.05E-04	0.00	3.83E+11
-14.925	5880.	0.00				
3.7800	0.00204	818557.	1745.	-1.03E-04	0.00	3.83E+11
-14.846	6099.	0.00				
3.8500	0.00196	820018.	1733.	-1.01E-04	0.00	3.83E+11
-14.761	6330.	0.00				
3.9200	0.00187	821469.	1721.	-9.95E-05	0.00	3.83E+11

```
-14.670      6573.       0.00
    3.9900    0.00179    822909.      1708.  -9.76E-05       0.00   3.83E+11
-14.573      6831.       0.00
    4.0600    0.00171    824339.      1627.  -9.58E-05       0.00   3.83E+11
-177.799     87306.       0.00
    4.1300    0.00163    825644.      1479.  -9.40E-05       0.00   3.83E+11
-176.524     90919.       0.00
    4.2000    0.00155    826824.      1331.  -9.22E-05       0.00   3.83E+11
-175.190     94778.       0.00
    4.2700    0.00148    827881.      1184.  -9.04E-05       0.00   3.83E+11
-173.794     98909.       0.00
    4.3400    0.00140    828814.      1039.  -8.86E-05       0.00   3.83E+11
-172.333    103342.       0.00
    4.4100    0.00133    829627.   894.8383  -8.68E-05       0.00   3.83E+11
-170.805    108110.       0.00
    4.4800    0.00126    830318.   752.0334  -8.50E-05       0.00   3.83E+11
-169.206    113253.       0.00
    4.5500    0.00118    830891.   610.6029  -8.31E-05       0.00   3.83E+11
-167.533    118816.       0.00
    4.6200    0.00112    831345.   470.6117  -8.13E-05       0.00   3.83E+11
-165.780    124853.       0.00
    4.6900    0.00105    831682.   332.1282  -7.95E-05       0.00   3.83E+11
-163.943    131428.       0.00
    4.7600   9.82E-04    831903.   195.2255  -7.77E-05       0.00   3.83E+11
-162.016    138614.       0.00
    4.8300   9.17E-04    832011.    59.9816  -7.58E-05       0.00   3.83E+11
-159.993    146504.       0.00
    4.9000   8.54E-04    832005.    -73.519  -7.40E-05       0.00   3.83E+11
-157.867    155205.       0.00
    4.9700   7.93E-04    831888.   -205.187  -7.22E-05       0.00   3.83E+11
-155.628    164851.       0.00
    5.0400   7.33E-04    831661.   -334.922  -7.04E-05       0.00   3.83E+11
-153.266    175608.       0.00
    5.1100   6.75E-04    831325.     -3730.  -6.85E-05       0.00   3.83E+11
-7930.   9871680.       0.00
    5.1800   6.18E-04    825395.    -10205.  -6.67E-05       0.00   3.83E+11
-7487.   1.02E+07       0.00
    5.2500   5.63E-04    814181.    -16300.  -6.49E-05       0.00   3.83E+11
-7022.   1.05E+07       0.00
    5.3200   5.09E-04    798012.    -21994.  -6.32E-05       0.00   3.83E+11
-6536.   1.08E+07       0.00
    5.3900   4.57E-04    777231.    -27272.  -6.14E-05       0.00   3.83E+11
-6031.   1.11E+07       0.00
    5.4600   4.06E-04    752195.    -32118.  -5.98E-05       0.00   3.83E+11
-5506.   1.14E+07       0.00
    5.5300   3.56E-04    723274.    -36515.  -5.81E-05       0.00   3.83E+11
-4964.   1.17E+07       0.00
    5.6000   3.08E-04    690850.    -40450.  -5.66E-05       0.00   3.83E+11
-4405.   1.20E+07       0.00
    5.6700   2.61E-04    655318.    -43908.  -5.51E-05       0.00   3.84E+11
```

```
-3829.   1.23E+07       0.00
    5.7400   2.15E-04    617084.    -46876.  -5.37E-05       0.00   3.84E+11
-3237.   1.26E+07       0.00
    5.8100   1.71E-04    576565.    -49341.  -5.24E-05       0.00   3.84E+11
-2630.   1.29E+07       0.00
    5.8800   1.27E-04    534191.    -51288.  -5.12E-05       0.00   3.84E+11
-2007.   1.32E+07       0.00
    5.9500   8.49E-05    490401.    -52706.  -5.01E-05       0.00   3.84E+11
-1368.   1.35E+07       0.00
    6.0200   4.32E-05    445646.    -53580.  -4.91E-05       0.00   3.84E+11
-712.691   1.38E+07       0.00
    6.0900   2.44E-06    400388.    -53896.  -4.81E-05       0.00   3.84E+11
-41.051   1.42E+07       0.00
    6.1600  -3.76E-05    355101.    -53641.  -4.73E-05       0.00   3.84E+11
647.6366   1.45E+07       0.00
    6.2300  -7.70E-05    310271.    -52801.  -4.66E-05       0.00   3.84E+11
1354.   1.48E+07       0.00
    6.3000  -1.16E-04    266396.    -51359.  -4.59E-05       0.00   3.85E+11
2079.   1.51E+07       0.00
    6.3700  -1.54E-04    223989.    -49300.  -4.54E-05       0.00   3.85E+11
2823.   1.54E+07       0.00
    6.4400  -1.92E-04    183573.    -46607.  -4.50E-05       0.00   3.85E+11
3588.   1.57E+07       0.00
    6.5100  -2.30E-04    145688.    -43264.  -4.46E-05       0.00   3.85E+11
4373.   1.60E+07       0.00
    6.5800  -2.67E-04    110890.    -39251.  -4.43E-05       0.00   3.85E+11
5181.   1.63E+07       0.00
    6.6500  -3.04E-04     79747.    -34550.  -4.41E-05       0.00   3.85E+11
6012.   1.66E+07       0.00
    6.7200  -3.41E-04     52846.    -29141.  -4.40E-05       0.00   3.85E+11
6867.   1.69E+07       0.00
    6.7900  -3.78E-04     30791.    -23002.  -4.39E-05       0.00   3.85E+11
7747.   1.72E+07       0.00
    6.8600  -4.15E-04     14203.    -16114.  -4.38E-05       0.00   3.85E+11
8653.   1.75E+07       0.00
    6.9300  -4.52E-04      3720.     -8454.  -4.38E-05       0.00   3.85E+11
9585.   1.78E+07       0.00
    7.0000  -4.89E-04       0.00       0.00  -4.38E-05       0.00   3.85E+11
10544.   9063600.       0.00

* This analysis computed pile response using nonlinear moment-curvature rela-
  tionships. 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 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              =     0.00883898 inches
Computed slope at pile head       =     -0.0001946 radians
Maximum bending moment            =        832011. inch-lbs
Maximum shear force               =        -53896. lbs
Depth of maximum bending moment   =     4.83000000 feet below pile head
Depth of maximum shear force      =     6.09000000 feet below pile head
Number of iterations              =              6
Number of zero deflection points  =              1
Pile deflection at ground         =     0.00664122 inches
```

Pile-head Deflection vs. Pile Length for Load Case 2

Boundary Condition Type 1, Shear and Moment

```
Shear      =           2250. lbs
Moment     =         724800. in-lbs
Axial Load =           4600. lbs
```

Pile Length feet	Pile Head Deflection inches	Maximum Moment ln-lbs	Maximum Shear lbs
7.00000	0.00883898	832011.	-53896.
6.65000	0.01185640	829422.	-66178.
6.30000	0.02519203	822328.	-89501.
5.95000	0.35209534	798191.	-126482.

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                          =       2250.0 lbs
Applied moment at pile head                       =     724800.0 in-lbs
Axial thrust load on pile head                    =       3800.0 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. Es*H lb/inch	Soil Spr. Lat. Load lb/inch	Distrib. p lb/inch

0.00	0.00884	724800.	2250.	-1.95E-04	0.00	3.83E+11
0.00	0.00	0.00				
0.07000	0.00868	726691.	2250.	-1.93E-04	0.00	3.83E+11
0.00	0.00	0.00				
0.1400	0.00851	728581.	2250.	-1.91E-04	0.00	3.83E+11
0.00	0.00	0.00				
0.2100	0.00835	730472.	2250.	-1.90E-04	0.00	3.83E+11
0.00	0.00	0.00				
0.2800	0.00820	732362.	2250.	-1.88E-04	0.00	3.83E+11
0.00	0.00	0.00				
0.3500	0.00804	734253.	2250.	-1.87E-04	0.00	3.83E+11
0.00	0.00	0.00				
0.4200	0.00788	736144.	2250.	-1.85E-04	0.00	3.83E+11
0.00	0.00	0.00				
0.4900	0.00773	738034.	2250.	-1.83E-04	0.00	3.83E+11
0.00	0.00	0.00				
0.5600	0.00757	739925.	2250.	-1.82E-04	0.00	3.83E+11
0.00	0.00	0.00				
0.6300	0.00742	741815.	2250.	-1.80E-04	0.00	3.83E+11
0.00	0.00	0.00				
0.7000	0.00727	743706.	2250.	-1.79E-04	0.00	3.83E+11
0.00	0.00	0.00				
0.7700	0.00712	745597.	2250.	-1.77E-04	0.00	3.83E+11
0.00	0.00	0.00				
0.8400	0.00697	747487.	2250.	-1.75E-04	0.00	3.83E+11
0.00	0.00	0.00				
0.9100	0.00683	749378.	2250.	-1.74E-04	0.00	3.83E+11
0.00	0.00	0.00				
0.9800	0.00668	751268.	2250.	-1.72E-04	0.00	3.83E+11
0.00	0.00	0.00				
1.0500	0.00654	753159.	2244.	-1.70E-04	0.00	3.83E+11
-14.546	1869.	0.00				
1.1200	0.00640	755039.	2232.	-1.69E-04	0.00	3.83E+11
-14.626	1921.	0.00				
1.1900	0.00626	756909.	2219.	-1.67E-04	0.00	3.83E+11
-14.703	1974.	0.00				
1.2600	0.00612	758769.	2207.	-1.65E-04	0.00	3.83E+11
-14.776	2030.	0.00				
1.3300	0.00598	760618.	2194.	-1.64E-04	0.00	3.83E+11
-14.846	2086.	0.00				
1.4000	0.00584	762456.	2182.	-1.62E-04	0.00	3.83E+11
-14.913	2145.	0.00				
1.4700	0.00570	764284.	2169.	-1.60E-04	0.00	3.83E+11
-14.976	2205.	0.00				
1.5400	0.00557	766102.	2157.	-1.59E-04	0.00	3.83E+11
-15.036	2267.	0.00				
1.6100	0.00544	767909.	2144.	-1.57E-04	0.00	3.83E+11
-15.093	2331.	0.00				

```
    1.6800    0.00531    769705.      2131.  -1.55E-04       0.00   3.83E+11
-15.145      2397.       0.00
    1.7500    0.00518    771491.      2119.  -1.54E-04       0.00   3.83E+11
-15.195      2465.       0.00
    1.8200    0.00505    773266.      2106.  -1.52E-04       0.00   3.83E+11
-15.241      2536.       0.00
    1.8900    0.00492    775030.      2093.  -1.50E-04       0.00   3.83E+11
-15.283      2608.       0.00
    1.9600    0.00480    776783.      2080.  -1.49E-04       0.00   3.83E+11
-15.321      2683.       0.00
    2.0300    0.00467    778526.      2067.  -1.47E-04       0.00   3.83E+11
-15.356      2761.       0.00
    2.1000    0.00455    780257.      2054.  -1.45E-04       0.00   3.83E+11
-15.387      2841.       0.00
    2.1700    0.00443    781978.      2042.  -1.43E-04       0.00   3.83E+11
-15.414      2924.       0.00
    2.2400    0.00431    783688.      2029.  -1.42E-04       0.00   3.83E+11
-15.437      3009.       0.00
    2.3100    0.00419    785387.      2016.  -1.40E-04       0.00   3.83E+11
-15.456      3098.       0.00
    2.3800    0.00407    787075.      2003.  -1.38E-04       0.00   3.83E+11
-15.472      3190.       0.00
    2.4500    0.00396    788752.      1990.  -1.37E-04       0.00   3.83E+11
-15.483      3286.       0.00
    2.5200    0.00384    790419.      1977.  -1.35E-04       0.00   3.83E+11
-15.491      3385.       0.00
    2.5900    0.00373    792074.      1964.  -1.33E-04       0.00   3.83E+11
-15.494      3487.       0.00
    2.6600    0.00362    793718.      1951.  -1.31E-04       0.00   3.83E+11
-15.493      3594.       0.00
    2.7300    0.00351    795352.      1938.  -1.30E-04       0.00   3.83E+11
-15.488      3705.       0.00
    2.8000    0.00340    796974.      1925.  -1.28E-04       0.00   3.83E+11
-15.478      3821.       0.00
    2.8700    0.00330    798586.      1912.  -1.26E-04       0.00   3.83E+11
-15.464      3941.       0.00
    2.9400    0.00319    800187.      1899.  -1.24E-04       0.00   3.83E+11
-15.446      4066.       0.00
    3.0100    0.00309    801776.      1886.  -1.23E-04       0.00   3.83E+11
-15.423      4196.       0.00
    3.0800    0.00299    803355.      1873.  -1.21E-04       0.00   3.83E+11
-15.396      4332.       0.00
    3.1500    0.00288    804923.      1860.  -1.19E-04       0.00   3.83E+11
-15.363      4474.       0.00
    3.2200    0.00279    806480.      1847.  -1.17E-04       0.00   3.83E+11
-15.326      4622.       0.00
    3.2900    0.00269    808027.      1834.  -1.16E-04       0.00   3.83E+11
-15.285      4777.       0.00
    3.3600    0.00259    809562.      1821.  -1.14E-04       0.00   3.83E+11
-15.238      4940.       0.00
```

```
    3.4300    0.00250    811087.      1808.  -1.12E-04       0.00   3.83E+11
-15.186      5110.       0.00
    3.5000    0.00240    812601.      1796.  -1.10E-04       0.00   3.83E+11
-15.129      5288.       0.00
    3.5700    0.00231    814105.      1783.  -1.08E-04       0.00   3.83E+11
-15.066      5476.       0.00
    3.6400    0.00222    815597.      1770.  -1.07E-04       0.00   3.83E+11
-14.999      5673.       0.00
    3.7100    0.00213    817080.      1758.  -1.05E-04       0.00   3.83E+11
-14.925      5880.       0.00
    3.7800    0.00204    818551.      1745.  -1.03E-04       0.00   3.83E+11
-14.846      6099.       0.00
    3.8500    0.00196    820012.      1733.  -1.01E-04       0.00   3.83E+11
-14.761      6330.       0.00
    3.9200    0.00187    821463.      1721.  -9.95E-05       0.00   3.83E+11
-14.670      6573.       0.00
    3.9900    0.00179    822903.      1708.  -9.76E-05       0.00   3.83E+11
-14.573      6832.       0.00
    4.0600    0.00171    824334.      1627.  -9.58E-05       0.00   3.83E+11
-177.798     87307.       0.00
    4.1300    0.00163    825638.      1479.  -9.40E-05       0.00   3.83E+11
-176.523     90920.       0.00
    4.2000    0.00155    826818.      1331.  -9.22E-05       0.00   3.83E+11
-175.189     94779.       0.00
    4.2700    0.00148    827875.      1184.  -9.04E-05       0.00   3.83E+11
-173.793     98910.       0.00
    4.3400    0.00140    828808.      1039.  -8.86E-05       0.00   3.83E+11
-172.333    103343.       0.00
    4.4100    0.00133    829621.   894.8420  -8.68E-05       0.00   3.83E+11
-170.805    108111.       0.00
    4.4800    0.00125    830312.   752.0374  -8.50E-05       0.00   3.83E+11
-169.206    113254.       0.00
    4.5500    0.00118    830885.   610.6073  -8.31E-05       0.00   3.83E+11
-167.532    118817.       0.00
    4.6200    0.00112    831339.   470.6164  -8.13E-05       0.00   3.83E+11
-165.779    124854.       0.00
    4.6900    0.00105    831676.   332.1332  -7.95E-05       0.00   3.83E+11
-163.942    131429.       0.00
    4.7600   9.82E-04    831897.   195.2308  -7.77E-05       0.00   3.83E+11
-162.016    138615.       0.00
    4.8300   9.17E-04    832004.    59.9872  -7.58E-05       0.00   3.83E+11
-159.993    146505.       0.00
    4.9000   8.54E-04    831998.    -73.514  -7.40E-05       0.00   3.83E+11
-157.866    155206.       0.00
    4.9700   7.93E-04    831881.   -205.181  -7.22E-05       0.00   3.83E+11
-155.627    164852.       0.00
    5.0400   7.33E-04    831654.   -334.916  -7.04E-05       0.00   3.83E+11
-153.266    175609.       0.00
    5.1100   6.75E-04    831319.     -3730.  -6.85E-05       0.00   3.83E+11
-7930.   9871680.       0.00
```

```
    5.1800   6.18E-04    825388.    -10205.  -6.67E-05       0.00   3.83E+11
-7487.   1.02E+07       0.00
    5.2500   5.63E-04    814175.    -16299.  -6.49E-05       0.00   3.83E+11
-7022.   1.05E+07       0.00
    5.3200   5.09E-04    798006.    -21994.  -6.32E-05       0.00   3.83E+11
-6536.   1.08E+07       0.00
    5.3900   4.57E-04    777225.    -27272.  -6.14E-05       0.00   3.83E+11
-6031.   1.11E+07       0.00
    5.4600   4.06E-04    752189.    -32118.  -5.98E-05       0.00   3.83E+11
-5506.   1.14E+07       0.00
    5.5300   3.56E-04    723268.    -36515.  -5.81E-05       0.00   3.83E+11
-4964.   1.17E+07       0.00
    5.6000   3.08E-04    690844.    -40450.  -5.66E-05       0.00   3.83E+11
-4405.   1.20E+07       0.00
    5.6700   2.61E-04    655312.    -43908.  -5.51E-05       0.00   3.84E+11
-3829.   1.23E+07       0.00
    5.7400   2.15E-04    617079.    -46876.  -5.37E-05       0.00   3.84E+11
-3237.   1.26E+07       0.00
    5.8100   1.71E-04    576561.    -49340.  -5.24E-05       0.00   3.84E+11
-2630.   1.29E+07       0.00
    5.8800   1.27E-04    534187.    -51288.  -5.12E-05       0.00   3.84E+11
-2007.   1.32E+07       0.00
    5.9500   8.49E-05    490398.    -52705.  -5.01E-05       0.00   3.84E+11
-1368.   1.35E+07       0.00
    6.0200   4.32E-05    445643.    -53579.  -4.91E-05       0.00   3.84E+11
-712.687   1.38E+07       0.00
    6.0900   2.44E-06    400385.    -53896.  -4.81E-05       0.00   3.84E+11
-41.052   1.42E+07       0.00
    6.1600  -3.76E-05    355098.    -53641.  -4.73E-05       0.00   3.84E+11
647.6288   1.45E+07       0.00
    6.2300  -7.70E-05    310269.    -52800.  -4.66E-05       0.00   3.84E+11
1354.   1.48E+07       0.00
    6.3000  -1.16E-04    266394.    -51358.  -4.59E-05       0.00   3.85E+11
2079.   1.51E+07       0.00
    6.3700  -1.54E-04    223987.    -49300.  -4.54E-05       0.00   3.85E+11
2823.   1.54E+07       0.00
    6.4400  -1.92E-04    183572.    -46607.  -4.50E-05       0.00   3.85E+11
3588.   1.57E+07       0.00
    6.5100  -2.30E-04    145687.    -43264.  -4.46E-05       0.00   3.85E+11
4373.   1.60E+07       0.00
    6.5800  -2.67E-04    110889.    -39251.  -4.43E-05       0.00   3.85E+11
5181.   1.63E+07       0.00
    6.6500  -3.04E-04     79746.    -34550.  -4.41E-05       0.00   3.85E+11
6012.   1.66E+07       0.00
    6.7200  -3.41E-04     52846.    -29140.  -4.40E-05       0.00   3.85E+11
6867.   1.69E+07       0.00
    6.7900  -3.78E-04     30791.    -23002.  -4.39E-05       0.00   3.85E+11
7747.   1.72E+07       0.00
    6.8600  -4.15E-04     14203.    -16114.  -4.38E-05       0.00   3.85E+11
8653.   1.75E+07       0.00
```

```
    6.9300  -4.52E-04      3720.     -8454.  -4.38E-05       0.00   3.85E+11
9585.   1.78E+07       0.00
    7.0000  -4.89E-04       0.00       0.00  -4.38E-05       0.00   3.85E+11
10544.   9063600.       0.00

* This analysis computed pile response using nonlinear moment-curvature rela-
  tionships. 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 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. 3:

Pile-head deflection             =     0.00883889 inches
Computed slope at pile head      =     -0.0001946 radians
Maximum bending moment           =        832004. inch-lbs
Maximum shear force              =        -53896. lbs
Depth of maximum bending moment  =     4.83000000 feet below pile head
Depth of maximum shear force     =     6.09000000 feet below pile head
Number of iterations             =              6
Number of zero deflection points =              1
Pile deflection at ground        =     0.00664115 inches



--------------------------------------------------------------------------------
            Pile-head Deflection vs. Pile Length for Load Case 3
--------------------------------------------------------------------------------

Boundary Condition Type 1, Shear and Moment

Shear      =           2250. lbs
Moment     =         724800. in-lbs
Axial Load =           3800. lbs


    Pile       Pile Head       Maximum       Maximum
   Length      Deflection      Moment         Shear
    feet         inches        ln-lbs          lbs
------------  ------------  ------------  ------------
    7.00000    0.00883889       832004.       -53896.
    6.65000    0.01185625       829414.       -66177.
    6.30000    0.02519050       822312.       -89498.
    5.95000    0.35162535       798000.      -126438.

--------------------------------------------------------------------------------
            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 1	Load Type 2	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	1000.0000	M, in-lb	315600.	4200.	0.00375	-8.33E-05	-22841.	357794.
2	V, lb	2250.	M, in-lb	724800.	4600.	0.00884	-1.95E-04	-53896.	832011.
3	V, lb	2250.	M, in-lb	724800.	3800.	0.00884	-1.95E-04	-53896.	832004.

Maximum pile-head deflection = 0.0088389756 inches
Maximum pile-head rotation = -0.0001946422 radians = -0.011152 deg.

Summary of Warning Messages

The following warning was reported 1590 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.

Appendix IV – OGE Geotechnical Checklists

I. Geotechnical Design Checklists	
Project: BEL-70 Vacant Weigh Station	**PDP Path:**
PID: 122878	**Review Stage: Final**

Checklist	Included in This Submission
II. Reconnaissance and Planning	✓
III. A. Centerline Cuts III. B. Embankments III. C. Subgrade	✓
IV. A. Foundations of Structures IV. B. Retaining Wall	
V. A. Landslide Remediation V. B. Rockfall Remediation V. C. Wetland or Peat Remediation V. D. Underground Mine Remediation V. E. Surface Mine Remediation V. F. Karst Remediation	
VI. A. Geotechnical Profile VI. D. Geotechnical Reports	✓

II. Reconnaissance and Planning Checklist

C-R-S: BEL-70 Vacant Weigh Station	PID: 122878	Reviewer: BKS	Date: 6/30/2026

Reconnaissance		(Y/N/X)	Notes:
1	Based on Section 302.1 in the SGE, have the necessary plans been developed in the following areas prior to the commencement of the subsurface exploration reconnaissance:	Y	
	Roadway plans	✓	
	Structures plans		
	Geohazards plans		
2	Have the resources listed in Section 302.2.1 of the SGE been reviewed as part of the office reconnaissance?	Y	
3	Have all the features listed in Section 302.3 of the SGE been observed and evaluated during the field reconnaissance?	Y	
4	If notable features were discovered in the field reconnaissance, were the GPS coordinates of these features recorded?	X	

Planning - General		(Y/N/X)	Notes:
5	In planning the geotechnical exploration program for the project, have the specific geologic conditions, the proposed work, and historic subsurface exploration work been considered?	Y	
6	Has the ODOT Transportation Information Mapping System (TIMS) been accessed to find all available historic boring information and inventoried geohazards?	Y	TIMS was accessed and historic information was available at the site but was not able to be reused.
7	Have the borings been located to develop the maximum subsurface information while using a minimum number of borings, utilizing historic geotechnical explorations to the fullest extent possible?	Y	
8	Have the topography, geologic origin of materials, surface manifestation of soil conditions, and any other special design considerations been utilized in determining the spacing and depth of borings?	Y	
9	Have the borings been located so as to provide adequate overhead clearance for the equipment, clearance of underground utilities, minimize damage to private property, and minimize disruption of traffic, without compromising the quality of the exploration?	Y	

II. Reconnaissance and Planning Checklist

Planning - General	(Y/N/X)	Notes:
10 Have the scaled boring plans, showing all project and historic borings, and a schedule of borings in tabular format, been submitted to the District Geotechnical Engineer?	Y	
The schedule of borings should present the following information for each boring:		
a. exploration identification number	Y	
b. location by station and offset	Y	
c. estimated amount of rock and soil, including the total for each for the entire program.	Y	
Planning – Exploration Number	(Y/N/X)	Notes:
11 Have the coordinates, stations and offsets of all explorations (borings, soundings, test pits, etc.) been identified?	Y	
12 Has each exploration been assigned a unique identification number, in the following format X-ZZZ-W-YY, as per Section 303.2 of the SGE?	Y	
13 When referring to historic explorations that did not use the identification scheme in 12 above, have the historic explorations been assigned identification numbers according to Section 303.2 of the SGE?	X	

II. Reconnaissance and Planning Checklist

Planning – Boring Types		(Y/N/X)	Notes:
14	Based on Sections 303.3 to 303.7.6 of the SGE, have the location, depth, and sampling requirements for the following boring types been determined for the project?	Y	
	Check all boring types utilized for this project:		
	Existing Subgrades (Type A)	✓	
	Roadway Borings (Type B)		
	Embankment Foundations (Type B1)		
	Cut Sections (Type B2)		
	Sidehill Cut Sections (Type B3)		
	Sidehill Cut-Fill Sections (Type B4)		
	Sidehill Fill Sections on Unstable Slopes (Type B5)		
	Geohazard Borings (Type C)		
	Lakes, Ponds, and Low-Lying Areas (Type C1)		
	Peat Deposits, Compressible Soils, and Low Strength Soils (Type C2)		
	Uncontrolled Fills, Waste Pits, and Reclaimed Surface Mines (Type C3)		
	Underground Mines (C4)		
	Landslides (Type C5)		
	Rock Slope (Type C6)		
	Karst (Type C7)		
	Proposed Underground Utilities (Type D)		
	Structure Borings (Type E)		
	Bridges (Type E1)		
	Culverts (Type E2 a,b,c)		
	Retaining Walls (Type E3 a and b)		
	Noise Barrier (Type E4)		
	CCTV & High Mast Lighting Towers (Type E5)	✓	
	Buildings and Salt Domes (Type E6)		

III.C. Subgrade Checklist

C-R-S: BEL-70 Vacant Weigh Station	PID: 122878	Reviewer: BKS	Date: 6/30/2026

Use this Checklist in conjunction with the Subgrade design guidance in GDM Section 600
If you do not have any subgrade work on the project, you do not have to fill out this checklist.

Subgrade	(Y/N/X)	Notes:
1 Has the subsurface exploration adequately characterized the soil or rock according to GDM Section 600?	Y	
a. Has each sample been visually classified and inspected for the presence of gypsum? Has a moisture content been performed on each sample?	Y	
b. Has mechanical classification (Plastic Limit (PL), Liquid Limit (LL), and gradation testing) been done on at least two samples from each boring within six feet of the proposed subgrade?	Y	Shallow rock was encountered in some borings, limiting classification testing in some borings.
c. Has the sulfate content of at least one sample from each boring within 3 feet of the proposed subgrade been determined, per Supplement 1122, Determining Sulfate Content in Soils?	Y	
d. Has the sulfate content of all samples that exhibit gypsum crystals been determined?	X	
e. Have A-2-5, A-4b, A-5, A-7-5, A-8a, or A-8b soils within the top 3 feet of the proposed subgrade been mechanically classified?	X	
2 If soils classified as A-2-5, A-4b, A-5, A-7-5, A-8a, or A-8b, or having a LL>65, are present at the proposed subgrade (geotechnical profile), do the plans specify that these materials need to be removed and replaced or chemically stabilized?	X	
a. If these materials are to be removed and replaced, have the station limits, depth, and lateral limits for the planned removal been provided?	X	
3 If there is any rock, shale, or coal present at the proposed subgrade (C&MS 204.05), do the plans specify the removal of the material?	X	Rock is near the proposed subgrade at a few boring locations but is not within 6 inches of the proposed subgrade.
a. If removal of any rock, shale, or coal is required, have the station limits, depth, and lateral limits for the planned removal of the material at proposed subgrade been provided?	X	A contingency quantity of bedrock excavation is recommended to be included in the plans.

III.C. Subgrade Checklist

Subgrade	(Y/N/X)	Notes:
4 In accordance with GDM Section 600, do the SPT (N_{60})/HP values and existing moisture contents for the proposed subgrade soils indicate the need for subgrade stabilization?	Y	
a. If removal and replacement is applicable, has the detail of subgrade removal been shown on the plans, including depth of removal, station limits, lateral extent, replacement material, and plan notes (Item 204 - Subgrade Compaction and Proof Rolling)?	Y	Recommended subgrade remediation limits have been provided in the report.
b. If chemical stabilization is applicable, has the detail of this treatment been shown on the plans, including depth, percentage of chemical, station limits, lateral extent, and plan notes?	X	
Indicate type of chemcial stabilization specified:		
cement stabilization		
lime stabilization		
5 If removal and replacement has been specified, do the plans include Plan Note G121 from L&D3?	Y	Inclusion of this note has been recommended in our report.
6 If drainage or groundwater is an issue with the proposed subgrade, has an appropriate drainage system (e.g., pipe, underdrains) been provided?	Y	
7 Has an appropriate quantity of Proof Rolling (C&MS 204.06) and has Plan Note G111 from L&D3 been included in the plans?	X	To be determined by others.
8 Has a design CBR value been provided?	Y	

VI.B. Geotechnical Reports

C-R-S: BEL-70 Vacant Weigh Station	PID: 122878	Reviewer: BKS	Date: 6/30/2026

General		(Y/N/X)	Notes:
1	Has an electronic copy of all geotechnical submissions been provided to the District Geotechnical Engineer (DGE)?	Y	
2	Has the first complete version of a geotechnical report being submitted been labeled as 'Draft'?	Y	
3	Subsequent to ODOT's review and approval, has the complete version of the revised geotechnical report being submitted been labeled 'Final'?	Y	
4	Has the boring data been submitted in a native format that is DIGGS (Data Interchange for Geotechnical and Geoenvironmental) compatable? gINT files meet this demand?	Y	
5	Does the report cover format follow ODOT's Brand and Identity Guidelines Report Standards found at http://www.dot.state.oh.us/brand/Pages/default.aspx ?	Y	
6	Have all geotechnical reports being submitted been titled correctly as prescribed in Section 706.1 of the SGE?	Y	
Report Body		(Y/N/X)	Notes:
7	Do all geotechnical reports being submitted contain the following:	Y	
a.	an Executive Summary as described in Section 706.2 of the SGE?	Y	
b.	an Introduction as described in Section 706.3 of the SGE?	Y	
c.	a section titled "Geology and Observations of the Project," as described in Section 706.4 of the SGE?	Y	
d.	a section titled "Exploration," as described in Section 706.5 of the SGE?	Y	
e.	a section titled "Findings," as described in Section 706.6 of the SGE?	Y	
f.	a section titled "Analyses and Recommendations," as described in Section 706.7 of the SGE?	Y	
Appendices		(Y/N/X)	Notes:
8	Do all geotechnical reports being submitted contain all applicable Appendices as described in Section 706.8 of the SGE?	Y	
9	Do the Appendices present a site Boring Plan showing all boring locations as described in Section 706.8.1 of the SGE?	Y	

VI.B. Geotechnical Reports

Appendices		(Y/N/X)	Notes:
10	Do the Appendices include boring logs and color pictures of rock, if applicable, as described in Section 706.8.2 of the SGE?	Y	
11	Do the Appendices include reports of undisturbed test data as described in Section 706.8.3 of the SGE?	X	
12	Do the Appendices include calculations in a logical format to support recommendations as described in Section 706.8.4 of the SGE?	Y	