FINAL REPORT
ROADWAY EXPLORATION REPORT
CUY-14-6.93
CUYAHOGA COUNTY, OHIO
PID#: 104132

Prepared For:

AECOM
564 White Pond Drive
Akron, OH 44281

Prepared by:

NATIONAL ENGINEERING AND ARCHITECTURAL SERVICES INC.
2800 Corporate Exchange Drive, Suite 240
Columbus, Ohio 43231

NEAS PROJECT 18-0023

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1. INTRODUCTION

1.1. General

National Engineering & Architectural Services, Inc. (NEAS) presents our Roadway Exploration Report for the CUY-14-6.93 project (PID 104132) along portions of State Route 14 (SR-14) / Broadway Avenue (Ave), County Road 24 (CR-24) / Henry Street (St), Chaincraft Road (Rd) and Old Broadway Ave in the City of Garfield Heights, Cuyahoga County, Ohio. The overall project objective is to: 1) replace the existing bridge over Chaincraft Rd, Norfolk Southern Railway (Rwy) and Wheeling & Lake Erie Rwy (CUY-14-0693) with a new shortened structure on a new alignment; 2) remove the existing bridge (CUY-CR24-0062) over the existing culvert CUY-CR00240-00.610; and, 3) replace a segment of the existing culvert directing Mill Creek under the existing bridge CUY-CR24-0062 and Chaincraft Rd. This report presents a summary of the project encountered surficial and subsurface conditions and our recommendations for subgrade stabilization, pavement design parameters, and embankment stability for the realignment and/or full-depth replacement of SR-14, Henry St, Chaincraft Rd and Old Broadway Ave. In general, the pavement subgrade analysis and recommendations presented are in accordance with ODOT's *Geotechnical Bulletin 1* (GB1) (ODOT [1], 2022) and *Pavement Design Manual* (PDM) (ODOT PDM, 2021).

The exploration for the referenced project was conducted in general accordance with Barr Engineering, Inc. DBA National Engineering and Architectural Services Inc.'s (NEAS) proposal to AECOM, dated June 7, 2021 and with the provisions of ODOT's *Specifications for Geotechnical Explorations* (SGE) (ODOT, 2021).

The scope of work performed by NEAS as part of the referenced project included: a review of published geotechnical information; performing 22 total test borings; laboratory testing of soil samples in accordance with the SGE; performing geotechnical engineering analysis to assess subgrade stabilization requirements, pavement design parameters and embankment construction; and, development of this summary report.

2. GEOLOGY AND OBSERVATIONS OF THE PROJECT

2.1. Geology and Physiography

The project site is located within the Galion Glaciated Low Plateau (ODGS, 1998). This area is characterized as rolling upland mantled with thin to thick drift and is transitional between the gently rolling Till Plain and the hilly Glaciated Allegheny Plateau with the overall area ranging in elevation from 800 ft to 1400 ft, with moderate relief (100 ft). The geology is described as medium- to low-lime Wisconsinan-age till over Mississippian-age shales and sandstone.

The geology underlying the majority of the project site is mapped as up to 70 ft of Wisconsinan-age sand and gravel thinning to an average thickness of 40 ft near the eastern limits of the project site, all over Mississippian-age sandstone and shale bedrock (ODGS, 2002). A portion of the eastern part of the project site is mapped as an average of 40 ft of Wisconsinan-age till overlying the natural sand and gravel followed by about 10 ft of till then bedrock. On the southwestern part of the project (underlying Henry St), the geology is mapped as solely till, with an average thickness of 30 ft, overlying the bedrock. The sand and gravel soils mapped at the project site are generally described as interbedded, well to moderately sorted sand and gravel commonly containing thin, discontinuous layers of silt and clay. The sand and gravel are characterized as finely stratified to massive, may be cross-bedded and locally may contain organics. The

till at the project site is generally described as an unsorted mix of clay, silt, sand, gravel and boulders that may contain silt, sand and gravel lenses.

Bedrock underlying the project site has been mapped as Berea Sandstone and Bedford Shale, undivided, based on the Geologic Units Map of Ohio (USGS & ODGS, 2006). The sandstone at the site is described as brown, weathering light brown to reddish brown, thin to thick bedded with planar to lenticular bedding. The shale at the site is described as gray to brown in color, locally reddish brown, thin to medium bedded with planar to lenticular bedding as well. Based on the ODNR bedrock topography map of Ohio, the bedrock elevation at the project site can be expected at an approximate elevation of 800 ft above mean sea level (amsl), putting bedrock at depths between 15 ft and 50 ft below ground surface (bgs).

The soils underlying the project site have been mapped (Web Soil Survey) by the Natural Resources Conservation Service as being a combination of Urban land, Loudonville-Urban land complex and pits/quarry. Urban land is mapped underlying the existing Henry St as well as SR-14 east of Chaincraft Rd. The Loudonville-Urban land complex is mapped underlying the majority of the project area west of Chaincraft Rd as well as the area underlying the proposed bridge location, while pits/quarry are mapped underlying the northern most portion of the project encompassing the majority of the proposed RW-G site. Urban land is land that has been altered or obscured by urban work and structures. Soils within these areas can be non-native human-transported material, human-altered material, or minimally altered or intact native soils. Urban land soils are not rated for local roads. The Loudonville series is described as moderately deep, well drained soils with moderate permeability formed in loamy till and underlain by sandstone or siltstone. Soils in the Loudonville series classify as both cohesive and non-cohesive A-4 soils and cohesive A-6 and A-7 soils according to the AASHTO method of soil classification (USDA, 2019).

2.2. Hydrology/Hydrogeology

Groundwater elevations at the project site are anticipated to be near elevations consistent with that of the immediately adjacent Mill Creek (between approximate elevations 805 and 807 ft amsl) as it is the most dominant hydraulic influence in the vicinity of the project site. The water level of Mill Creek may be representative of the local groundwater table although perched groundwater systems may exist with the presence of fine-grained soils making it difficult for groundwater to permeate to the natural phreatic surface.

Areas in the eastern portion of the project are located within a 1% Annual Chance Flood Hazard area. Based on available mapping by the Federal Emergency Management Agency's (FEMA) National Flood Hazard mapping program (FEMA, 2016) the 1% Annual Chance Flood elevation is about 822 to 823 ft amsl within the flood hazard area).

2.3. Mining and Oil/Gas Production

No abandoned mines are noted on ODNR's Abandoned Underground Mine Locator within the immediate vicinity of the project site (ODNR [1], 2016).

No oil or gas wells are noted on ODNR's Ohio Oil & Gas Locator within the immediate vicinity of the project site (ODNR [2], 2016).

2.4. Historical Records and Previous Phases of Project Exploration

The following plans were available for review and evaluation for this report:

- Bridge Foundation Investigation sheets and boring logs as part of ODOT bridge rehabilitation project CUY-14-06.99 Broadway Avenue Bridge No. 123, prepared by the Mason, Sandefur & de Verteuil, Inc., dated August 23, 1983;

Historical soil borings associated with the above referenced plans were reviewed, however, were not utilized for our analysis, and therefore, are not referenced or presented within this report or soil profile sheets.

2.5. Field Reconnaissance

A field reconnaissance visit for the overall project area was conducted between August 6, 2021 and August 7, 2021 along SR-14, CR-24 (Henry St), and Chaincraft Rd. Site conditions, including the conditions of existing pavement, embankments and structures, were noted and photographed during the visit. Photographs of notable distress and a summary of our observations by roadway segment are provided below.

2.5.1. Land Use and Cover

The land use of most of the project area consists of recreational (park) and industrial properties. Industrial land uses of the area surrounding the project include: 1) a recycling facility; 2) a precast concrete facility; and, 3) a trucking/logistic facility.

2.5.2. State Route 14

A majority of the project portion of SR-14 is currently bridge deck (existing Bridge CUY-14-0693) with the exception of the first and last approximate 250 ft which is pavement supported on grade. The pavement condition along the portions of SR-14 supported on grade was observed to be fair to good condition with minor signs of weathering and surface wear (Photograph 1). Occasional low to moderate severity longitudinal, edge and transverse cracking was observed along these sections. The exception to this is the sections of pavement near existing utilities and manhole. Pavement in these areas was observed to be in poor condition with noted patching and pavement settlement. The first 250 ft of SR-14 is supported on embankments with side slopes of about 2 horizontal to 1 vertical (2H:1V). The referenced slopes were generally vegetated with small trees, brush and grass with no apparent signs of instability observed during the visit. With respect to drainage, the roadway appeared to be well-drained with no observable signs of ponding or standing water.

Photograph 1: SR-14 pavement condition at about STA 385+00 (end of project)

2.5.3. Henry Street

The condition of the pavement along the project portion of Henry St (approximately 240 ft of pavement) was observed to be poor with major signs of weathering and surface wear. Frequent, moderate to high severity longitudinal, edge and transverse cracking was observed along this section as well as high severity rutting, patching and crack sealing deficiencies. The project portion of Henry St is supported on an embankment however, due to heavy vegetation along the existing slope, the slope condition and grading were difficult to discern. In general, the pavement appeared to be well-drained with no observable signs of ponding or standing water on the roadway.

Photograph 2: Henry St pavement condition

2.5.4. Chaincraft Road

The pavement along Chaincraft Rd consists of both asphalt and concrete pavement sections which were generally observed to be in fair to poor condition with moderate signs of weathering and surface wear. Within the asphalt pavement areas, frequent low to moderate severity longitudinal and transverse cracking were observed as well as occasional low to moderate severity potholes and crack sealing deficiencies (Photograph 3). The concrete pavement areas were observed to have frequent, moderate severity edge cracking and joint separation (Photograph 4). With respect to drainage, both pavement appeared to be well-drained with no observable signs of ponding or standing water on the roadway with the exception of water observed within pavement cracks and potholes.

Photograph 3: Asphalt portion of Chaincraft Rd

Photograph 4: Concrete portion of Chaincraft Rd

3. GEOTECHNICAL EXPLORATION

3.1. Exploration Program

The subsurface exploration was conducted by NEAS between August 2, 2021 and September 13, 2021 and included 22 borings drilled to depths between 7.5 and 61.5 ft bgs. The boring locations were selected by NEAS in general accordance with the guidelines contained in the SGE and preliminary project plans available at the time of drilling with the intent to evaluate subsurface soil and groundwater conditions. Borings were typically located within the planned roadway/subgrade improvement areas and/or at or near proposed structure locations that were not restricted by underground utilities or dictated by terrain (i.e., steep embankment slopes). Target boring locations were located in the field by NEAS prior to drilling utilizing handheld GPS equipment. If the actual drilled location was relocated for drilling purposes, the as-drilled project boring location and corresponding ground surface elevation was again surveyed in the field following drilling. Each individual project boring log (included within Appendix B) includes the recorded boring latitude and longitude location (based on the surveyed Ohio State Plane North, NAD83, location) and the corresponding ground surface elevation. The boring locations are depicted on the Soil Profile Sheets provided in Appendix A. It should be noted that a number of borings were drilled for project structures but can serve as both structure and roadway borings.

Borings were drilled using either a CME 55, CME 75 or CME 55X truck- or track-mounted drilling rig utilizing 3.25-inch (inner diameter) hollow stem augers. Soil samples for subgrade borings were typically recovered continuously to a depth of 7.5 ft bgs, while samples for joint subgrade/structure borings were typically recovered continuously to a depth of 7.5-ft bgs, at 2.5-ft intervals to depths between 20 and 40 ft bgs and at 5.0-ft intervals thereafter. Each boring type was sampled using an 18-inch split spoon sampler (AASHTO T-206 “Standard Method for Penetration Test and Split Barrel Sampling of Soils.”). The soil samples obtained from the exploration program were visually observed in the field by the NEAS field representative and preserved for review by a Geologist for possible laboratory testing. Standard penetration tests (SPT) were conducted using a CME auto hammer that has been calibrated to be between 68.4% and 89% efficient as indicated on the boring logs (Appendix B).

Field boring logs were prepared by drilling personnel and included pavement description (where present), lithological description, SPT results recorded as blows per 6-inch increment of penetration and estimated unconfined shear strength values on specimens exhibiting cohesion (using a hand-penetrometer). Groundwater level observations were recorded both during and after the completion of drilling. These

groundwater level observations are included on the individual boring logs (provided in Appendix B). After completing the borings, the boreholes were backfilled with either auger cuttings, bentonite chips, or a combination of these materials and patched accordingly with cold patch asphalt and/or cement when drilling through the roadway.

3.2. Laboratory Testing Program

The laboratory testing program consisted of classification testing and moisture content. Data from the laboratory testing program were incorporated onto the boring logs (Appendix B). Soil samples are retained at the laboratory for 60 days following report submittal, after which time they will be discarded.

3.2.1. Classification Testing

Representative soil samples were selected for index property (Atterberg Limits) and gradation testing for classification purposes on approximately 37% of the samples. At each boring location utilized for roadway purposes, the upper two samples obtained below the proposed top of subgrade elevation were generally tested while additional samples in each boring were selected for testing with the intent of properly classifying the subsurface soil and groundwater conditions within the planned project limits. Soils not selected for testing were compared to laboratory tested samples/strata and classified visually. Moisture content testing was conducted on all samples. The laboratory testing was performed in general accordance with applicable AASHTO specifications and ODOT Supplements.

Final classification of soil strata in accordance with AASHTO M-145 “Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes,” as modified by ODOT “Classification of Soils” was made once laboratory test results became available. The results of the soil classification are presented on the boring logs in Appendix B.

3.2.2. Standard Penetration Test Results

Standard Penetration Tests (SPT) and split-barrel (commonly known as split-spoon) sampling of soils were performed at varying intervals (i.e., continuous, 2.5-ft, or 5.0-ft intervals) in the project borings performed. To account for the high efficiency (automatic) hammers used during SPT sampling, field SPT N-values were converted based on the calibrated efficiency (energy ratio) of the specific drill rig's hammer. Field N-values were converted to an equivalent rod energy of 60% (N_{60}) for use in analysis or for correlation purposes. The resulting N_{60} values are shown on the boring logs provided in Appendix B.

4. FINDINGS

The subsurface conditions encountered during NEAS’s explorations are described in the following subsections and/or on each boring log presented in Appendix B. The boring logs represent NEAS’s interpretation of the subsurface conditions encountered at each boring location based on our site observations, field logs, visual review of the soil samples by NEAS's geologist, and laboratory test results. The lines designating the interfaces between various soil strata on the boring logs represent the approximate interface location; the actual transition between strata may be gradual and indistinct. The subsurface soil and groundwater characterizations included herein, including summary test data, are based on the subsurface findings from the geotechnical explorations performed by NEAS as part of the referenced project. At the time of the composition of this report, proposed grade and pavement section information has been assumed to match the Stage 2 plan set provided by AECOM dated February 8, 2023. It should be noted that for the purposes of this report and our analysis, the term 'proposed subgrade' has been assumed

to represent soils and/or soil conditions extending to a depth of 6 ft below the bottom of proposed pavement section (i.e., top of subgrade).

4.1. Subgrade Conditions

The following subsections present a brief summary of the subsurface conditions by roadway segment.

4.1.1. State Route 14

The project portion of SR-14 is currently bridge deck (existing Bridge CUY 14 0693) with the exception of the first and last approximate 250 ft which is pavement supported on grade. SR-14 is planned for full depth pavement replacement where the majority of the new pavement will be supported on greater than 3 feet of new fill. At the beginning of the project, SR-14 from about STA. 366+40 to 368+85 will be supported by existing subgrade soils as will the portion of SR-14 from about STA. 382+00 to 385+40.

Along SR-14 from about STA. 366+40 to 368+85, one (1) of the samples taken along this portion of roadway were identified as non-cohesive soil and was comprised of Gravel and Stone Fragments with Sand (A-1-b) while another samples was classified as cohesive Sandy Silt (A-4a). With respect to the relative density of the non-cohesive soils, the sample can be described as loose correlating to an SPT-N value (N_{60}) of 10 blows per foot (bpf). Natural moisture contents of the non-cohesive soil sample was estimated to be 10 percent. With respect to the consistency of the cohesive soil at this location, the material is characterized as stiff correlating to an N_{60} value of 15 bpf. Natural moisture content of the cohesive material was 15 percent. Based on an Atterberg Limits test performed on a representative sample of the cohesive soil, the liquid and plastic limits were estimated to be 23 percent and 16 percent, respectively.

Along SR-14 from about STA. 382+00 to 385+40, one hundred percent (100%) of the samples taken along this portion of roadway were classified as fine-grained, cohesive soils and were comprised of Clay (A-7-6). With respect to the consistency of the cohesive soils, the descriptions varied from medium stiff to very stiff correlating to N_{60} values ranging from 8 to 11 bpf. Natural moisture contents ranged from 22 to 31 percent. Based on Atterberg Limits test performed on representative samples of the cohesive soils, the liquid and plastic limits were estimated to range from 42 to 56 percent and from 20 to 26 percent, respectively.

4.1.2. Henry Street

The project portion of Henry St is also planned for full depth pavement replacement. Along Henry St, one hundred percent (100%) of the samples taken along this portion of roadway were classified as non-cohesive soil and were comprised of Gravel and Stone Fragments with Sand (A-1-b). With respect to the relative density of the non-cohesive soil, the samples can be described as medium dense to dense correlating to N_{60} values ranging from 22 to 46 bpf. Natural moisture contents ranged from 4 to 10 percent.

4.1.3. Chaincraft Road

The project portion of Chaincraft Rd is planned for full depth pavement replacement. Along Chaincraft Rd, eighty-five percent (85%) of the samples taken along this portion of roadway were classified as non-cohesive soil and were comprised of: 1) Gravel and/or Stone Fragments with Sand (A-1-b, 31% of samples); 2) Coarse and Fine sand (A-3a, 31% of sample); and, 3) non-cohesive Sandy Silt (A-4a, 23% of samples). With respect to the relative density of the non-cohesive soil, the descriptions varied from very loose to medium dense correlating to N_{60} values between 1 and 27 bpf. Natural moisture contents ranged from 14 to 29 percent.

The remaining fifteen percent (15%) of the samples were identified as fine-grained, cohesive soils comprised of cohesive Sandy Silt (A-4a). With respect to the consistency of the cohesive soil, the

descriptions varied from medium stiff to stiff correlating to N_{60} values ranging from 8 to 11 bpf. Natural moisture contents ranged from 5 to 11 percent. Based on an Atterberg Limits test performed on a representative sample of the cohesive soil, the liquid and plastic limits were estimated to be 22 percent and 15 percent, respectively. Natural moisture contents ranged from 11 to 19 percent.

4.1.4. Groundwater

Groundwater measurements were taken during the boring drilling procedures and/or immediately following the completion of each borehole. Groundwater was not encountered within the subgrade depth (top 7.5 ft below proposed pavement) of the 22 project borings performed by NEAS for the referenced project with the exception of boring B-008-0-21 performed for Retaining Wall 1. In boring B-008-0-21, groundwater was encountered at a depth of 7 ft (elevation 808.0 ft amsl). Groundwater was encountered within 12 of the 22 borings performed at depths ranging from 7 to 38.2 ft bgs (802.9 ft amsl to 816.5 ft amsl).

It should be noted that groundwater is affected by many hydrologic characteristics in the area and may vary from those measured at the time of the exploration. The specific groundwater readings are included on the individual test boring logs located within Appendix B.

5. ANALYSES AND RECOMMENDATIONS

We understand that full depth pavement replacement of SR-14, Henry St, and Chaincraft Rd is planned as part of the CUY-14-6.93 project (PID 104132) to replace the existing bridge over Chaincraft Rd, Norfolk Southern Rwy and Wheeling & Lake Erie Rwy with a new shortened structure on a new alignment. It is also our understanding that the existing bridge (CUY-CR24-0062) along Henry St over culvert CUY-CR00240-00.610 will be removed and replaced with embankment fill. Therefore, full depth pavement replacement is planned where existing pavement is present while new pavement is planned atop embankment fill where existing bridges are either removed or shortened.

The following sub-sections present the analyses and recommendations for: 1) the subgrade stabilization and pavement design parameters for SR-14, Henry St, and Chaincraft Rd; and, 2) proposed embankment alterations and constriction. In general, the pavement subgrade analysis and recommendations presented are in accordance with ODOT's *Geotechnical Bulletin 1* (GB1) (ODOT [1], 2022) and *Pavement Design Manual* (PDM) (ODOT PDM, 2021).

5.1. Subgrade Analysis

A GB1 analysis was performed to identify the method, location, and dimensions (including depth) of required subgrade stabilization for the project. In addition to identifying stabilization recommendations, pavement design parameters are also determined to aid in pavement section design. The subsections below present the results of our GB1 analysis including pavement design parameters and unsuitable subgrade conditions identified within the project limits. GB1 analysis spreadsheets are provided in Appendix C.

Again, it should be noted that for the purposes of this report and our analysis, the term 'proposed subgrade' has been assumed to represent soils and/or soil conditions extending to a depth of 6 ft below the bottom of proposed pavement section (i.e., top of subgrade).

5.1.1. Pavement Design Recommendations

It is our understanding that pavement analysis and design is to be performed to determine the proposed pavement sections for the segments within the project limits to undergo full depth replacement. A GB1 analysis was performed using the subgrade soil data obtained during our field exploration program to

evaluate the soil characteristics to develop pavement parameters for use in pavement design. The subgrade analysis parameters recommended for use in pavement design are presented in Table 1 below. Provided in the table are ranges of maximum, minimum and average N_{60L} values for the indicated segments as well as the design CBR value recommended for use in pavement design.

Table 1: Pavement Design Values

Segment	Maximum N_{60L}	Minimum N_{60L}	Average N_{60L}	Average PI Values	Design CBR
SR-14 (382+00 to 385+40) / Old Broadway Ave	10	8	9	26	4
SR-14 (366+40 to 368+85)	10	10	10	7	13
Henry St	22	22	22	-	13
Chaincraft Rd	10	1	5	7	11

5.1.2. Unsuitable Subgrade

Per ODOT's GB1, the presence of select subgrade conditions are prohibited within the subgrade zone for new pavement construction. These unsuitable subgrade conditions generally include the presence of rock, specific soil types, weak soil conditions, and overly moist soil conditions. With respect to the proposed pavement construction and widening project these subgrade conditions are further discussed in the following subsections.

5.1.2.1. Rock

Rock was not encountered at or close to subgrade elevation at the boring locations performed within the project limits. Per ODOT's GB1, if rock is encountered within 24 inches of the bottom of the proposed asphalt or concrete pavement it is to be removed in accordance with 204.05 of the ODOT CMS and replaced with Item 204 Embankment.

5.1.2.2. Prohibited Soils

Prohibited soil types per the GB1, which include A-4b, A-2-5, A-5, A-7-5, A-8a, A-8b, and soils with liquid limits greater than 65, were not encountered within the proposed subgrade limits of the referenced project roadway segments.

5.1.2.3. Weak Soils

The GB1 recommends subgrade stabilization for soils in which the N_{60} value of a particular soil sample (SS) at a referenced boring location is less than 12 bpf and in some cases less than 15 bpf (i.e., where moisture content is greater than optimum plus 3 percent). Based on the specific N_{60} value at the subject boring, *Figure B - Subgrade Stabilization* within the GB1 recommends a depth of subgrade stabilization for ODOT standard stabilization methods. For the purposes of this report the term 'weak soils' has been assumed to represent subgrade soils of these conditions. It should be noted that although a soil sample's N_{60} value may meet the criteria to be considered a weak soil, the depth in which the weak soil is encountered in relation to the proposed subgrade is considered when each individual subgrade boring is analyzed. For example, if the GB1 recommends an excavate and replace of 12 inches within a weak soil underlying 18 inches of stable material, it would be unreasonable to recommend the removal of both the stable and unstable material for a total of 30 inches of excavate and replace.

Based on N_{60} values encountered within the project borings, our GB1 analysis suggests the need for 12 to 14 inches of either chemical treatment or excavate and replace along the referenced project roadway segments. A summary of the boring locations where weak soils were encountered and determined to have a potential impact on subgrade performance are shown in Table 2 below, per the roadway segment for

which they were encountered. Also included is the associated GB1 recommended remediation depth at that location.

Table 2: Weak Soil Locations Summary

Boring ID	Sample ID	N_{60}	Moisture Above Optimum (%)	Depth Below Subgrade (ft)	Remediation Depth (inches)		
					Excavate and Replace (Item 204 w/ Geotextile)	Excavate and Replace (Item 204 w/ Geogrid - SS 861)	Chemical Stabilization (Item 206)
Roadway Segment: SR-14 (382+00 to 385+40) / Old Broadway Ave							
B-018-0-21	SS-1	8	6	1.6 - 3.1	12	-	14
B-019-0-21	SS-2	11	7	0.0 - 0.3	12	-	12
B-019-0-21	SS-3	10	13	0.3 - 1.8	12	-	14
B-019-0-21	SS-4	10	10	1.8 - 3.3	12	-	14
Roadway Segment: Chaincraft Rd							
B-021-0-21	SS-1	11	1	1.7 - 3.2	12	-	12

It should be noted that *Figure B - Subgrade Stabilization* does not apply to soil types A-1-a, A-1-b, A-3, or A-3a, nor to soils with N_{60L} values of 15 or more. Per GB1 guidance, *these soils should be reworked to stabilize the subgrade.*

5.1.2.4. High Moisture Content Soils

High moisture content soils are defined by the GB1 as soils that exceed the estimated optimum moisture content (per *Figure A - Optimum Moisture Content* within the GB1) for a given classification by 3 percent or more. Per the GB1, soils determined to be above the identified moisture content levels are a likely indication of the presence of an unstable subgrade and may require some form of subgrade stabilization. Similar to our analysis of weak soils, although a soil sample's moisture content may meet the criteria to be considered high, the depth in which the high moisture soil is encountered in relation to the proposed subgrade is considered when each individual subgrade boring is analyzed for stabilization recommendations. Summaries of the boring locations where high moisture content conditions were encountered within the limits of each alignment are shown in Table 3 below.

Table 3: High Moisture Content Soil Locations

Boring ID	Moisture Content (%)	Optimum Moisture Content (%)	Depth Below Subgrade (ft)
SR-14 (382+00 to 385+40) / Old Broadway Ave			
B-018-0-21	24	18	1.6 - 3.1
B-019-0-21	30	23	0.0 - 0.3
B-019-0-21	31	18	0.3 - 1.8
B-019-0-21	28	18	1.8 - 3.3
Chaincraft Rd			
B-008-0-21	16	11	1.5 - 3.0

5.2. Stabilization Recommendations

5.2.1. Subgrade Stabilization

Unstable subgrade conditions that require stabilization per GB1 guidelines were encountered within the proposed roadway subgrade within the project limits. Unstable soils (i.e., weak soils), as previously indicated in Section 5.1. of this report, were encountered within the subgrade depths in various borings performed throughout the project. Based on our analyses, as unstable soils that require stabilization per GB1 guidelines were encountered, it is our opinion that these select areas along the project roadway segments should be stabilized via localized undercut consisting of 12 inches of Excavate and Replace (Item 204) with geotextile.

Actual depths and limits of undercuts should be determined in the field by the Project Engineer based on ODOT's Subgrade Compaction and Proof Rolling specifications (Item 204).

Based on: 1) the results of our GB1 analysis; 2) the review of the unstable subgrade conditions as described in Section 5.1. of this report; and, 3) the subsequent conclusions regarding recommended stabilization, Table 4 below presents our recommendations for subgrade stabilization depths for each roadway segment included within the project.

Table 4: Summary of Stabilization

Start Station	End Station	Excavate and Replace (Item 204 w/ Geotextile) (inches)	Chemical Stabilization (inches)	Unsuitable Subgrade Conditions	Remarks
SR-14 (382+00 to 385+40) / Old Broadway Ave					
382+00	385+40	12	14	N_{60L}	Areas of SR-14 where full depth pavement replacement is required and less than 12 inches of new fill is proposed.
SR-14 (366+40 to 368+85)					
366+40	368+85	-	-	N_{60L}	"Reworked" and prepared in accordance with typical Subgrade Compaction and Proof Rolling (Item 204) procedures and specifications.
Henry St					
Begin Work	End Work	-	-	-	"Reworked" and prepared in accordance with typical Subgrade Compaction and Proof Rolling (Item 204) procedures and specifications.
Chaincraft Rd					
Begin Work	End Work	-	-	-	"Reworked" and prepared in accordance with typical Subgrade Compaction and Proof Rolling (Item 204) procedures and specifications.

Subgrade stabilization is estimated to extend to the depths indicated within Table 4 with any excavated material being replaced with material in accordance with Section F "Excavate and Replace (Item 204)" of the ODOT GB1. Stabilization limits should extend 18-inches beyond the edge of the proposed paved roadway, shoulder or median.

5.3. Embankment Stability Analysis

For purposes of evaluating stability of the planned roadway embankments proposed as part of the project, NEAS reviewed cross-sections along the length of the project roadway segments to identify sections that were interpreted to represent conditions that posed the greatest potential for slope instability as a result of the planned construction. In general, cross-sections along each of the proposed roadway alignments were reviewed to identify planned alterations that may present a combination of existing subsurface conditions and planned site grading (i.e., cutting and/or filling) that would potentially be critical to the stability of the existing and/or proposed slopes at the site. Based on our review of the available information along the referenced alignments and the associated soil properties, two cross-sections were estimated to be most "critical" for the project and were analyzed for global stability. The cross-sections selected to be evaluated are the proposed cross-sections at approximate STA. 372+50 along the SR-14 alignment and STA. 18+50 along the Henry St alignment.

For the cross-sections, NEAS developed a representative cross-sectional model to use as the basis for global stability analyses. The model was developed from NEAS's interpretation of the available information which included: 1) the project's Stage 2 plan set dated February 8, 2023 provided by AECOM; 2) a live load surcharge of 250 pounds per square foot (psf) to account for traffic induced loads; and, 3) test borings and laboratory data developed as part of this report.

For analysis purposes, borings performed along or adjacent to the indicated proposed embankment section were reviewed and a generalized material profile was developed for analysis to represent worse case conditions at the cross-section location. Utilizing the generalized soil profile, engineering properties for each soil strata were estimated based on the field (i.e., SPT N_{60} Values, hand penetrometer values, etc.) and laboratory (i.e., Atterberg Limits, grain size, etc.) test results using correlations provided in published engineering manuals, research reports and guidance documents.

The referenced slope stability model was analyzed for long-term (Effective Stress) and short-term (Total Stress) slope stability utilizing the software entitled *Slide2* by Rocscience, Inc. Specifically, the Modified Bishop and Spencer analysis methods were used to calculate a factor of safety (FOS) for circular and block type slope failures, respectively. The FOS is the ratio of the resisting forces and the driving forces, with the desired safety factor being more than about 1.3 which equates to an AASHTO resistance factor less than 0.75 (per AASHTO's LRFD BDS the specified resistance factors are essentially the inverse of the FOS that should be targeted in slope stability programs). For this analysis, a resistance factor of 0.75 or lower is targeted as the slope does not contain or support a structural element.

Based on our slope stability analyses for the above referenced roadway embankment sections, the minimum slope stability safety factor is about 1.3 (0.75 resistance factor) for the section analyzed along SR-14 near STA. 372+50. The graphical output of the slope stability program (cross-sectional model, calculated safety factor, and critical failure plane) for the analyzed section is presented in Appendix D.

5.4. Embankment Construction Recommendations

As indicated above, the embankment cross-section analyzed for slope stability was determined to be stable (i.e., FOS greater than about 1.3) as proposed in the project's Stage 2 plans dated February 8, 2023 provided by AECOM. Therefore, the proposed embankment slopes can be constructed in accordance with Item 203 "Roadway Excavation and Embankment" of the ODOT CMS.

In areas where additional embankment material is proposed along existing slopes that are steeper than 8 Horizontal to 1 Vertical (8H:1V) but flatter than 4H:1V, it is recommended that the proposed embankment be benched into the existing slopes in accordance with Item 203.05 "Embankment Construction Methods" of the ODOT CMS. For areas where additional embankment material is proposed along existing slopes that are steeper than 4H:1V, it is recommended that the proposed embankment be designed and constructed in accordance with GB2. For sidehill fills planned on existing slopes steeper than 4H:1V, ODOT's GB2 recommends that *the embankment slopes be constructed utilizing special benching in order to blend the new embankment with the existing slope to prevent the development of a weak shear plane at the interface between the proposed fill and existing slope material* (ODOT [2], 2017). As the project embankment fill slopes were determined to be stable as-proposed based on our embankment stability analysis, a special benching scheme similar to that shown in Figure 1 of the ODOT GB2 can be used in areas where special benching is recommended. The height and width dimensions of the special benching scheme shown in Figure 1 should be arranged to minimize the required cut and fill quantities, though the height of a single bench shall not exceed 20 ft without a stability analysis and design per OSHA requirements. Additionally, it may be appropriate to adjust the bench slope shown from a 1H:1V to a 1.75H:1V slope if the existing slope is made up of primarily granular materials. The benched material should be replaced with compacted engineered fill per Item 203 of the ODOT CMS, while proper lift thicknesses and material density should be maintained in the proposed fill per Item 203.06 of the ODOT CMS. In situations where it is not practical to extend the final bench through the existing roadway due to maintenance of traffic concerns, a benching scheme similar to that shown in Figure 1a of the ODOT GB2 can be used in order to avoid impacting the existing roadway, guardrail or shoulder. This scheme results in the placement of a temporary over-steepened fill that can later be "shaved-off" to bring the slope to the final proposed grade.

6. QUALIFICATIONS

This investigation was performed in accordance with accepted geotechnical engineering practice for the purpose of characterizing the subsurface and groundwater conditions within the project limits. This report has been prepared for AECOM, ODOT and their design consultants to be used solely in evaluating the roadway subgrade soils within the project limits and presenting geotechnical engineering recommendations specific to this project. The assessment of general site environmental conditions or the presence of pollutants in the soil, rock and groundwater of the site was beyond the scope of this geotechnical exploration. Our recommendations are based on the results of our field explorations, laboratory tests results from representative soil samples, and geotechnical engineering analyses. The results of the field explorations and laboratory tests, which form the basis of our recommendations, are presented in the appendices as noted. This report does not reflect any variations that may occur between the borings or elsewhere on the site, or variations whose nature and extent may not become evident until a later stage of construction. In the event that any changes occur in the nature, design or location of the proposed roadway or structure foundation work, the conclusions and recommendations contained in this report should not be considered valid until they are reviewed, and have been modified or verified in writing by a geotechnical engineer.

It has been a pleasure to be of service to AECOM in performing this geotechnical exploration for the CUY-14-6.93 project. Please call if there are any questions, or if we can be of further service.

Respectfully Submitted,

Brendan P. Andrews, P.E.
Project Manager/Sr. Geotechnical Engineer

Kevin C. Arens, P.E.
Geotechnical Engineer

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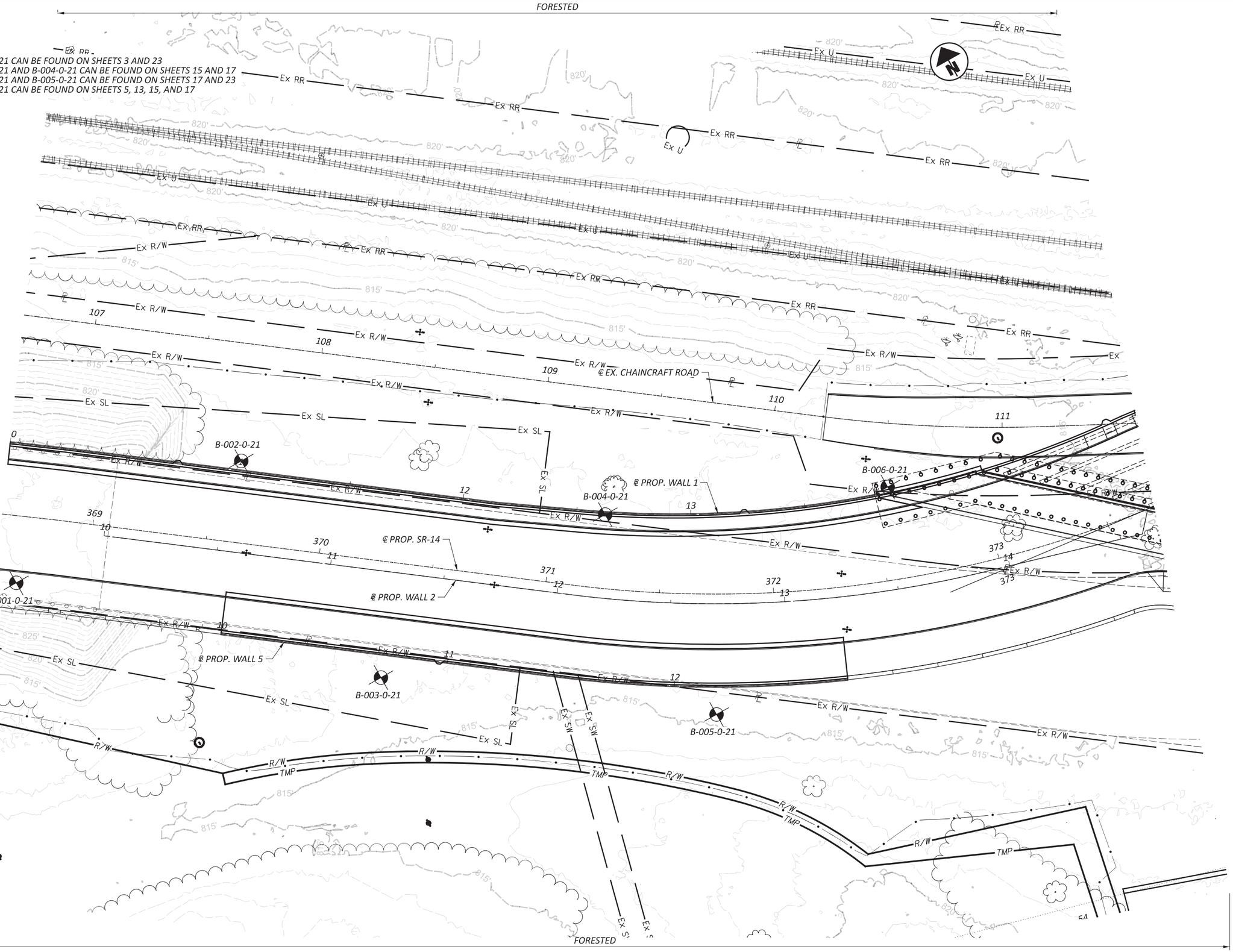
APPENDIX A

SOIL PROFILE SHEETS

INFORMATION FOR B-001-0-21 CAN BE FOUND ON SHEETS 3 AND 23
INFORMATION FOR B-002-0-21 AND B-004-0-21 CAN BE FOUND ON SHEETS 15 AND 17
INFORMATION FOR B-003-0-21 AND B-005-0-21 CAN BE FOUND ON SHEETS 17 AND 23
INFORMATION FOR B-006-0-21 CAN BE FOUND ON SHEETS 5, 13, 15, AND 17



HORIZONTAL SCALE IN FEET
0 10 20 40

GEOTECHNICAL PROFILE -ROADWAY
BEGIN TO END WALL 1

CUY-14-6.93

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REVIEWER	BPA 02/13/23
PROJECT ID	104132
SUBSET	TOTAL
14	51
SHEET	TOTAL
P.292	329

GEOTECHNICAL PROFILE -ROADWAY
BEGIN TO END WALL 2

HORIZONTAL SCALE IN FEET
0 10 20 40

INFORMATION FOR B-002-0-21 AND B-004-0-21 CAN BE FOUND ON SHEETS 15 AND 17
INFORMATION FOR B-003-0-21 AND B-005-0-21 CAN BE FOUND ON SHEETS 17 AND 23
INFORMATION FOR B-006-0-21 CAN BE FOUND ON SHEETS 5, 15, 17 AND 13
INFORMATION FOR B-007-0-21 CAN BE FOUND ON SHEETS 5, 13 AND 27
INFORMATION FOR B-008-0-21 AND B-009-0-21 CAN BE FOUND ON SHEETS 5 AND 13
INFORMATION FOR B-020-0-21 CAN BE FOUND ON SHEET 12
INFORMATION FOR B-021-0-21 CAN BE FOUND ON SHEETS 12, 13 AND 27

FORESTED
℄ PROP. OLD BROADWAY AVENUE
℄ EX. CHAINCRAFT ROAD
℄ PROP. WALL 1
℄ PROP. WALL 2
℄ PROP. WALL 5
℄ PROP. SR-14
℄ PROP. CULVERT
℄ PROP. HENRY STREET
℄ PROP. MILL CREEK
B-002-0-21
B-003-0-21
B-004-0-21
B-005-0-21
B-006-0-21
B-007-0-21
B-008-0-21
B-009-0-21
B-020-0-21
B-021-0-21
Ex R/W
Ex RR
Ex U
Ex SL
Ex SW
R/W
TMP
O.W.M.F.
820'
815'

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NEAS
National Engineering & Architectural Services Inc.
2800 CORPORATE EXCHANGE DR, SUITE 240
COLUMBUS, OH, 43231
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SHEET P.294 TOTAL 329

CUY-14-6.93

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INFORMATION FOR B-010-0-21 CAN BE FOUND ON SHEETS 7 AND 19
INFORMATION FOR B-011-0-21 AND B-013-0-21 CAN BE FOUND ON SHEETS 7, 21, AND 25
INFORMATION FOR B-012-0-21 AND B-014-0-21 CAN BE FOUND ON SHEETS 7, 19, AND 21
INFORMATION FOR B-015-0-21 CAN BE FOUND ON SHEETS 9, 21, AND 25
INFORMATION FOR B-016-0-21 CAN BE FOUND ON SHEETS 9, 19, 21

INDUSTRIAL

℄ PROP. OLD BROADWAY AVENUE 203

℄ PROP. WALL 3

℄ PROP. WALL 4

℄ PROP. SR 14

℄ PROP. WALL 6

B-010-0-21
B-011-0-21
B-012-0-21
B-013-0-21
B-014-0-21
B-015-0-21
B-016-0-21

Ex R/W
Ex RR
Ex A
Ex U
TMP
R/W
SH

201
202
204
205
379
380
381

HORIZONTAL SCALE IN FEET
0 10 20 40

GEOTECHNICAL PROFILE -ROADWAY
BEGIN TO END WALL 3

CUY-14-6.93

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2800 CORPORATE EXCHANGE DR, SUITE 240
COLUMBUS, OH, 43231
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SUBSET 18 TOTAL 51
SHEET P.296 TOTAL 329

INFORMATION FOR B-010-0-21 CAN BE FOUND ON SHEETS 7 AND 19
INFORMATION FOR B-011-0-21 AND B-013-0-21 CAN BE FOUND ON SHEETS 7, 21, AND 25
INFORMATION FOR B-012-0-21 AND B-014-0-21 CAN BE FOUND ON SHEETS 7, 19, AND 21
INFORMATION FOR B-015-0-21 CAN BE FOUND ON SHEETS 9, 21, AND 25
INFORMATION FOR B-016-0-21 CAN BE FOUND ON SHEETS 9, 19, 21

INDUSTRIAL

℄ PROP. OLD BROADWAY AVENUE

℄ PROP. WALL 4

℄ PROP. SR-14

℄ PROP. WALL 6

B-010-0-21
B-011-0-21
B-012-0-21
B-013-0-21
B-014-0-21
B-015-0-21
B-016-0-21

Ex R/W
Ex RR
Ex U
Ex A
Ex CH
TMP
R/W
SH
O.M.N.F.

200 201 202 203 204 205 377 378 379 380 381 382

10 11 12 13 14

HORIZONTAL SCALE IN FEET
0 10 20 40

GEOTECHNICAL PROFILE -ROADWAY
BEGIN TO END WALL 4

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NEAS
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2800 CORPORATE EXCHANGE DR, SUITE 240
COLUMBUS, OH, 43231
TEL:614.714.0299
WWW.NEASINC.COM

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PROJECT ID 104132
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SHEET P.298 TOTAL 329

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INFORMATION FOR B-003-0-21 AND B-005-0-21 CAN BE FOUND ON SHEETS 17 AND 23
INFORMATION FOR B-004-0-21 CAN BE FOUND ON SHEETS 15 AND 17
INFORMATION FOR B-006-0-21 CAN BE FOUND ON SHEETS 5, 13, 15 AND 17
INFORMATION FOR B-007-0-21 CAN BE FOUND ON SHEETS 5, 13 AND 27
INFORMATION FOR B-008-0-21 AND CAN BE FOUND ON SHEET 5 AND 13
INFORMATION FOR B-020-0-21 CAN BE FOUND ON SHEET 12

INDUSTRIAL
FORESTED
℄ EX. CHAINCRAFT ROAD
℄ PROP. WALL 1
℄ PROP. WALL 2
℄ PROP. WALL 5
℄ PROP. SR-14
℄ PROP. MILL CREEK
℄ PROP. HENRY STREET
B-003-0-21
B-004-0-21
B-005-0-21
B-006-0-21
B-007-0-21
B-008-0-21
B-020-0-21
Ex R/W
Ex SL
Ex RR
Ex U
Ex SW
R/W
TMP
820'
815'
108
109
110
111
112
12
13
370
11
371
372
373
14
374
19
50
54
53
52
51

HORIZONTAL SCALE IN FEET
0 10 20 40

GEOTECHNICAL PROFILE -ROADWAY
BEGIN TO END WALL 5

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REVIEWER	BPA 02/13/23
PROJECT ID	104132
SUBSET	22
TOTAL	51
SHEET	P.300
TOTAL	329

CUY-14-6.93

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INFORMATION FOR B-012-0-21 AND B-014-0-21 CAN BE FOUND ON SHEETS 7, 19 AND 21
INFORMATION FOR B-013-0-21 CAN BE FOUND ON SHEETS 7, 21, AND 25
INFORMATION FOR B-015-0-21 AND B-017-0-21 CAN BE FOUND ON SHEETS 9, 21, AND 25
INFORMATION FOR B-016-0-21 CAN BE FOUND ON SHEETS 9, 19, 21

INDUSTRIAL

℄ PROP. OLD BROADWAY AVENUE

℄ PROP. WALL 3

℄ PROP. WALL 4

℄ PROP. SR-14

℄ PROP. WALL 6

B-012-0-21
B-013-0-21
B-014-0-21
B-015-0-21
B-016-0-21
B-017-0-21

Ex R/W
R/W
TMP
Ex RR
Ex U
Ex A

HORIZONTAL SCALE IN FEET
0 10 20 40

GEOTECHNICAL PROFILE -ROADWAY
BEGIN TO END WALL 6

CUY-14-6.93

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2800 CORPORATE EXCHANGE DR, SUITE 240
COLUMBUS, OH, 43231
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REVIEWER BPA 02/13/23
PROJECT ID 104132
SUBSET 24 TOTAL 51
SHEET P.302 TOTAL 329

INFORMATION FOR B-007-0-21 CAN BE FOUND ON SHEETS 5, 13 AND 27
INFORMATION FOR B-008-0-21 AND B-009-0-21 CAN BE FOUND ON SHEETS 5 AI
INFORMATION FOR B-020-0-21 CAN BE FOUND ON SHEET 12
INFORMATION FOR B-021-0-21 CAN BE FOUND ON SHEETS 12, 13 AND 27
INFORMATION FOR B-022-0-21 CAN BE FOUND ON SHEETS 10 AND 27

HORIZONTAL SCALE IN FEET
0 10 20 40

GEOTECHNICAL PROFILE -ROADWAY
BEGIN TO END WALL 7

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NEAS
National Engineering & Architectural Services Inc.
2800 CORPORATE EXCHANGE DR, SUITE 240
COLUMBUS, OH, 43231
TEL:614.714.0299
WWW.NEASINC.COM

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MWJ/AI	
REVIEWER	
BPA 02/13/23	
PROJECT ID	
104132	
SUBSET	TOTAL
26	51
SHEET	TOTAL
P.304	329

CUY-14-6.93

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APPENDIX B

BORING LOGS

PROJECT: CUY-14-6.93	DRILLING FIRM / OPERATOR: NEAS / ASHBAUGH	DRILL RIG: CME 55T	STATION / OFFSET: 368+69, 29' RT.
TYPE: RETAINING WALL	SAMPLING FIRM / LOGGER: NEAS / ASHBAUGH	HAMMER: CME AUTOMATIC	ALIGNMENT: SR-14
PID: 104132 SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 12/5/19	ELEVATION: 831.3 (MSL) EOB: 61.5 ft.
START: 8/25/21 END: 8/25/21	SAMPLING METHOD: SPT	ENERGY RATIO (%): 68.4	LAT / LONG: 41.431969, -81.602477

EXPLORATION ID B-001-0-21

PAGE 1 OF 2

MATERIAL DESCRIPTION AND NOTES	ELEV. 831.3	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
7.0" ASPHALT AND 14.5" BASE (DRILLERS DESCRIPTION)	829.5	1																
LOOSE, BROWN, **GRAVEL AND STONE FRAGMENTS WITH SAND**, TRACE SILT, TRACE CLAY, CONTAINS SLAG, DAMP **(FILL)**	827.4	2 3 4	4 4 5	10	100	SS-1	-	-	-	-	-	-	-	-	-	10	A-1-b (V)	
HARD, BROWN, **SANDY SILT**, SOME CLAY, TRACE GRAVEL, DAMP	824.3	5 6 7	6 7 6	15	78	SS-2	4.25	4	8	21	46	21	23	16	7	15	A-4a (6)	
STIFF TO VERY STIFF, BROWN, **SILT AND CLAY**, SOME SAND, TRACE GRAVEL, DAMP TO MOIST		8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26	5 6 5	13	67	SS-3	3.50	-	-	-	-	-	-	-	-	17	A-6a (V)	
			4 5 6	13	67	SS-4	2.75	7	8	14	40	31	31	20	11	17	A-6a (8)	
			4 4 6	11	56	SS-5	2.75	-	-	-	-	-	-	-	-	18	A-6a (V)	
			4 3 4	8	44	SS-6	2.25	-	-	-	-	-	-	-	-	18	A-6a (V)	
			3 4 4	9	67	SS-7	2.25	6	10	17	38	29	30	19	11	17	A-6a (7)	
			3 5 5	11	78	SS-8	2.00	-	-	-	-	-	-	-	-	20	A-6a (V)	
@22.5' TO 26.5'; BECOMES GRAY MOTTLED WITH GRAY AND ORANGISH BROWN, CONTAINS IRON STAINING	804.3		6 8 7	17	78	SS-9	3.00	3	5	16	42	34	35	20	15	21	A-6a (10)	
			7 8 8	18	56	SS-10	2.50	-	-	-	-	-	-	-	-	22	A-6a (V)	
DENSE, DARK GRAY, **SANDY SILT**, LITTLE GRAVEL, TRACE CLAY, CONTAINS TRACE ROOTS AND HIGHLY WEATHERED WOOD FRAGMENTS, SLIGHTLY ORGANIC, WET	801.8	27 28 29	7 12 15	31	56	SS-11	-	19	9	33	31	8	NP	NP	NP	24	A-4a (1)	

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT.GDT - 2/20/24 09:28 - X:\ACTIVE PROJECTS\ACTIVE SOIL PROJECTS\1ARCHIVE BY YEAR\2021 ARCHIVE\CUY-14-6.93\GINT FILES\CUY-14

PID: 104132	SFN:	PROJECT: CUY-14-6.93	STATION / OFFSET: 368+69, 29' RT.	START: 8/25/21	END: 8/25/21	PG 2 OF 2	B-001-0-21

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
DENSE, GRAY AND LIGHT BROWN, **GRAVEL AND STONE FRAGMENTS WITH SAND**, TRACE SILT, TRACE CLAY, MOIST *(continued)*	801.3	31	10 19 21	46	56	SS-12	-	-	-	-	-	-	-	-	-	10	A-1-b (V)	
	799.3	32																
STIFF TO VERY STIFF, MAROONISH GRAY, **SANDY SILT**, "AND" CLAY, TRACE GRAVEL, CONTAINS 1.0" SILT SEAMS, MOIST TO DAMP		33	12 20 26	52	56	SS-13	1.75	10	3	3	48	36	26	17	9	21	A-4a (8)	
		34																
		35	17 24 31	63	44	SS-14	2.00	-	-	-	-	-	-	-	-	12	A-4a (V)	
	794.3	36																
VERY DENSE, GRAY, **GRAVEL AND STONE FRAGMENTS WITH SAND**, TRACE SILT, TRACE CLAY, WET TO MOIST		37																
W 793.1		38	17 20 27	54	50	SS-15	-	-	-	-	-	-	-	-	-	17	A-1-b (V)	
		39																
		40	15 21 24	51	61	SS-16	-	-	-	-	-	-	-	-	-	15	A-1-b (V)	
		41																
@42.5'; ENCOUNTERED A SILTSTONE COBBLE/BOULDER		42																
		43	50/4"	-	25	SS-17	-	-	-	-	-	-	-	-	-	3		
		44																
		45	17 22 31	60	67	SS-18	-	11	67	14	6	2	NP	NP	NP	15	A-1-b (0)	
		46																
		47																
		48																
		49																
		50	21 27 50	88	33	SS-19	-	-	-	-	-	-	-	-	-	14	A-1-b (V)	
		51																
		52																
		53																
		54																
		55	15 27 30	65	89	SS-20	-	-	-	-	-	-	-	-	-	16	A-1-b (V)	
		56																
		57																
		58																
		59																
		60	16 20 36	64	78	SS-21	-	-	-	-	-	-	-	-	-	9	A-1-b (V)	
		61																
		EOB																

NOTES: GROUNDWATER ENCOUNTERED AT 38.2' DURING DRILLING. HOLE DID NOT CAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; SHOVELED SOIL CUTTINGS

PROJECT: CUY-14-6.93	DRILLING FIRM / OPERATOR: NEAS / J. HODGES	DRILL RIG: CME 75T	STATION / OFFSET: 369+61, 36' LT.	EXPLORATION ID B-002-0-21
TYPE: RETAINING WALL	SAMPLING FIRM / LOGGER: NEAS / J. HODGES	HAMMER: CME AUTOMATIC	ALIGNMENT: SR-14	
PID: 104132 SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 5/1/19	ELEVATION: 813.0 (MSL) EOB: 40.0 ft.	PAGE 1 OF 2
START: 8/5/21 END: 8/5/21	SAMPLING METHOD: SPT	ENERGY RATIO (%): 89	LAT / LONG: 41.431962, -81.602068	

MATERIAL DESCRIPTION AND NOTES	ELEV. 813.0	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
VERY LOOSE, BROWN, **COARSE AND FINE SAND**, SOME SILT, TRACE TO LITTLE GRAVEL, TRACE CLAY, CONTAINS ROOTS AND TRACE IRON STAINING, WET			2 1 1	3	100	SS-1	-	-	-	-	-	-	-	-	-	18	A-3a (V)	
			1 1 1	3	100	SS-2	-	-	-	-	-	-	-	-	-	28	A-3a (V)	
	806.0																	
MEDIUM DENSE, BROWN, **GRAVEL WITH SAND AND SILT**, TRACE CLAY, CONTAINS ROOTS AND TRACE IRON STAINING, MOIST	803.5		4 5 4	13	100	SS-3	-	30	14	29	21	6	NP	NP	NP	17	A-2-4 (0)	
LOOSE TO DENSE, GRAY, **GRAVEL AND STONE FRAGMENTS WITH SAND**, TRACE TO LITTLE SILT, TRACE CLAY, MOIST TO WET			1 2 5	10	100	SS-4	-	-	-	-	-	-	-	-	-	20	A-1-b (V)	
			4 9 12	31	100	SS-5	-	-	-	-	-	-	-	-	-	14	A-1-b (V)	
			10 8 10	27	100	SS-6	-	27	37	26	8	2	NP	NP	NP	13	A-1-b (0)	
			8 11 13	36	39	SS-7	-	-	-	-	-	-	-	-	-	13	A-1-b (V)	
			5 11 20	46	28	SS-8	-	-	-	-	-	-	-	-	-	9	A-1-b (V)	
@22.5'; SS-9 BECOMES VERY DENSE			15 16 20	53	50	SS-9	-	-	-	-	-	-	-	-	-	10	A-1-b (V)	
			17 19 20	58	56	SS-10	-	38	39	15	6	2	NP	NP	NP	10	A-1-b (0)	

PID: 104132	SFN:	PROJECT: CUY-14-6.93	STATION / OFFSET: 369+61, 36' LT.	START: 8/5/21	END: 8/5/21	PG 2 OF 2	B-002-0-21

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
LOOSE TO DENSE, GRAY, **GRAVEL AND STONE FRAGMENTS WITH SAND**, TRACE TO LITTLE SILT, TRACE CLAY, MOIST TO WET *(continued)*	783.0	31	18 20 23	64	50	SS-11	-	-	-	-	-	-	-	-	-	15	A-1-b (V)	
		32																
		33																
		34																
		35	21 25 30	82	39	SS-12	-	-	-	-	-	-	-	-	-	11	A-1-b (V)	
		36																
		37																
		38																
		39	23 29 32	90	67	SS-13	-	42	41	10	6	1	NP	NP	NP	11	A-1-b (0)	
	773.0	EOB 40																

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE. RAN A SLURRY MIX AS CIRCULATING FLUID.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PUMPED 50 GAL. BENTONITE GROUT; SHOVELED SOIL CUTTINGS

PROJECT: CUY-14-6.93	DRILLING FIRM / OPERATOR: NEAS / J. HODGES	DRILL RIG: CME 75T	STATION / OFFSET: 370+98, 14' RT.	EXPLORATION ID B-003-0-21
TYPE: RETAINING WALL	SAMPLING FIRM / LOGGER: NEAS / J. HODGES	HAMMER: CME AUTOMATIC	ALIGNMENT: SR-14	
PID: 104132 SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 5/1/19	ELEVATION: 813.2 (MSL) EOB: 45.0 ft.	PAGE 1 OF 2
START: 8/2/21 END: 8/2/21	SAMPLING METHOD: SPT	ENERGY RATIO (%): 89	LAT / LONG: 41.431652, -81.602046	

MATERIAL DESCRIPTION AND NOTES	ELEV. 813.2	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
VERY LOOSE TO MEDIUM DENSE, BROWN, **COARSE AND FINE SAND**, SOME SILT, LITTLE TO SOME GRAVEL, TRACE CLAY, MOIST TO WET			2 4 4	12	83	SS-1	-	-	-	-	-	-	-	-	-	11	A-3a (V)	
			1 2 1	4	67	SS-2	-	-	-	-	-	-	-	-	-	18	A-3a (V)	
	803.7		1 1 1	3	78	SS-3	-	21	17	34	23	5	NP	NP	NP	17	A-3a (0)	
DENSE TO VERY DENSE, BROWN AND GRAY, **GRAVEL AND STONE FRAGMENTS**, LITTLE TO SOME SAND, TRACE SILT, TRACE CLAY, WET TO MOIST @11.0'; ENCOUNTERED POSSIBLE COBBLE		W 802.2	1 12 35	70	22	SS-4	-	-	-	-	-	-	-	-	-	14	A-1-a (V)	
			13 10 11	31	56	SS-5	-	-	-	-	-	-	-	-	-	12	A-1-a (V)	
	796.2		18 12 16	42	89	SS-6	-	-	-	-	-	-	-	-	-	8	A-1-a (V)	
DENSE, BROWN AND MAROONISH GRAY, **GRAVEL AND STONE FRAGMENTS WITH SAND AND SILT**, LITTLE CLAY, DAMP	794.3		13 11 10	31	89	SS-7	-	32	15	18	19	16	21	13	8	12	A-2-4 (0)	
DENSE, BROWN AND MAROONISH GRAY, **SANDY SILT**, LITTLE CLAY, TRACE TO LITTLE GRAVEL, DAMP			23 12 19	46	100	SS-8	-	17	10	30	28	15	NP	NP	NP	12	A-4a (2)	
	788.7		13 14 14	42	100	SS-9	-	4	14	26	39	17	NP	NP	NP	14	A-4a (4)	
STIFF, MAROONISH GRAY, **CLAY**, SOME SILT, TRACE SAND, TRACE GRAVEL, MOIST @25.0'; ENCOUNTERED HEAVE	787.7		10 9 16	37	100	SS-10A	1.50	-	-	-	-	-	-	-	-	21	A-7-6 (V)	
						SS-10B	-	-	-	-	-	-	-	-	-	18	A-3a (V)	
DENSE, GRAY, **COARSE AND FINE SAND**, TRACE GRAVEL, TRACE SILT, TRACE CLAY, WET	784.9																	
DENSE TO VERY DENSE, GRAY, **GRAVEL WITH SAND**, TRACE SILT, TRACE CLAY, MOIST																		

PID: 104132	SFN:	PROJECT: CUY-14-6.93	STATION / OFFSET: 370+98, 14' RT.	START: 8/2/21	END: 8/2/21	PG 2 OF 2	B-003-0-21

MATERIAL DESCRIPTION AND NOTES	ELEV. 783.2	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
DENSE TO VERY DENSE, GRAY, **GRAVEL WITH SAND**, TRACE SILT, TRACE CLAY, MOIST *(continued)* @30.0' TO 45.0'; DIFFICULT DRILLING DUE TO COBBLES AND/OR BOULDERS		31	10 17 15	47	100	SS-11	-	-	-	-	-	-	-	-	-	12	A-1-b (V)	
		32																
		33																
		34																
		35	24 20 25	67	100	SS-12	-	24	40	23	10	3	NP	NP	NP	13	A-1-b (0)	
		36																
		37																
		38																
		39																
@40.0'; SS-13 CONTAINS NO RECOVERY		40	11 21 26	70	0	SS-13	-	-	-	-	-	-	-	-	-	-		
		41																
		42																
		43																
		44	9 23 28	76	44	SS-14	-	-	-	-	-	-	-	-	-	9	A-1-b (V)	
		EOB 45																

NOTES: GROUNDWATER ENCOUNTERED AT 11.0' DURING DRILLING. HOLE DID NOT CAVE. ENCOUNTERED HEAVE AT 25.0', USED WATER AS CIRCULATION FLUID.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PUMPED 50 GAL. BENTONITE GROUT; SHOVELED SOIL CUTTINGS

PROJECT: CUY-14-6.93	DRILLING FIRM / OPERATOR: NEAS / J. HODGES	DRILL RIG: CME 75T	STATION / OFFSET: 371+23, 32' LT.	EXPLORATION ID B-004-0-21
TYPE: RETAINING WALL	SAMPLING FIRM / LOGGER: NEAS / J. HODGES	HAMMER: CME AUTOMATIC	ALIGNMENT: SR-14	
PID: 104132 SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 5/1/19	ELEVATION: 812.9 (MSL) EOB: 45.0 ft.	PAGE 1 OF 2
START: 8/5/21 END: 8/5/21	SAMPLING METHOD: SPT	ENERGY RATIO (%): 89	LAT / LONG: 41.431688, -81.601606	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
VERY LOOSE TO LOOSE, BROWN, **SANDY SILT**, LITTLE GRAVEL, TRACE CLAY, MOIST	812.9																	
			2 1 1	3	78	SS-1	-	16	9	36	30	9	NP	NP	NP	17	A-4a (1)	
			1 2 4	9	67	SS-2	-	-	-	-	-	-	-	-	-	16	A-4a (V)	
LOOSE, BROWN, **GRAVEL WITH SAND AND SILT**, TRACE CLAY, MOIST	805.9		2 2 2	6	33	SS-3	-	32	17	30	17	4	NP	NP	NP	14	A-2-4 (0)	
MEDIUM DENSE TO VERY DENSE, GRAY, **GRAVEL AND STONE FRAGMENTS WITH SAND**, TRACE SILT, TRACE CLAY, WET TO MOIST	803.4	W 802.9	8 10 11	31	56	SS-4	-	-	-	-	-	-	-	-	-	16	A-1-b (V)	
			3 9 14	34	100	SS-5	-	-	-	-	-	-	-	-	-	21	A-1-b (V)	
			9 9 10	28	100	SS-6	-	29	43	18	8	2	NP	NP	NP	14	A-1-b (0)	
			7 12 12	36	44	SS-7	-	-	-	-	-	-	-	-	-	14	A-1-b (V)	
			6 13 19	47	44	SS-8	-	-	-	-	-	-	-	-	-	9	A-1-b (V)	
			13 14 18	47	44	SS-9	-	-	-	-	-	-	-	-	-	10	A-1-b (V)	
@25.0'; DIFFICULT DRILLING DUE TO POSSIBLE ENCOUNTER WITH COBBLES AND/OR BOULDERS			12 16 21	55	33	SS-10	-	-	-	-	-	-	-	-	-	11	A-1-b (V)	

PID: 104132	SFN:	PROJECT: CUY-14-6.93	STATION / OFFSET: 371+23, 32' LT.	START: 8/5/21	END: 8/5/21	PG 2 OF 2	B-004-0-21

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
MEDIUM DENSE TO VERY DENSE, GRAY, **GRAVEL AND STONE FRAGMENTS WITH SAND**, TRACE SILT, TRACE CLAY, WET TO MOIST *(continued)*	782.9	31	15 16 19	52	39	SS-11	-	-	-	-	-	-	-	-	-	13	A-1-b (V)	
		32																
		33																
		34																
		35	19 22 29	76	44	SS-12	-	-	-	-	-	-	-	-	-	11	A-1-b (V)	
		36																
		37																
		38																
		39																
		40	25 31 38	102	89	SS-13	-	35	55	6	3	1	NP	NP	NP	13	A-1-b (0)	
		41																
		42																
		43																
	767.9	44	32 35 41	113	83	SS-14	-	-	-	-	-	-	-	-	-	10	A-1-b (V)	
		EOB 45																

NOTES: GROUNDWATER ENCOUNTERED AT 10.0' DURING DRILLING. HOLE DID NOT CAVE. RAN A SLURRY MIX AS CIRCULATING FLUID.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PUMPED 50 GAL. BENTONITE GROUT; SHOVELED SOIL CUTTINGS

PROJECT: CUY-14-6.93	DRILLING FIRM / OPERATOR: NEAS / J. HODGES	DRILL RIG: CME 75T	STATION / OFFSET: 372+69, 18' RT.	EXPLORATION ID B-005-0-21
TYPE: RETAINING WALL	SAMPLING FIRM / LOGGER: NEAS / J. HODGES	HAMMER: CME AUTOMATIC	ALIGNMENT: SR-14	
PID: 104132 SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 5/1/19	ELEVATION: 813.6 (MSL) EOB: 44.8 ft.	PAGE 1 OF 2
START: 8/3/21 END: 8/4/21	SAMPLING METHOD: SPT / ST	ENERGY RATIO (%): 89	LAT / LONG: 41.431413, -81.601611	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	HOLE SEALED
MEDIUM DENSE, BROWN, **GRAVEL AND STONE FRAGMENTS WITH SAND**, LITTLE SILT, TRACE CLAY, SS-1 CONTAINS A 1.5" LIMESTONE FRAGMENT, DAMP	813.6		5 6 5	16	44	SS-1	-	-	-	-	-	-	-	-	-	9	A-1-b (V)	
					75	ST-2	-	-	-	-	-	-	-	-	-	9	A-1-b (V)	
VERY LOOSE TO MEDIUM DENSE, BROWN, **GRAVEL WITH SAND AND SILT**, LITTLE CLAY, DAMP TO MOIST	806.6		1 4 4	12	100	SS-3	-	29	13	28	19	11	NP	NP	NP	12	A-2-4 (0)	
		W 803.1	1 1 2	4	17	SS-4	-	-	-	-	-	-	-	-	-	18	A-2-4 (V)	
MEDIUM DENSE TO DENSE, GRAY, **FINE SAND**, "AND" COARSE SAND, TRACE SILT, TRACE GRAVEL, TRACE CLAY, MOIST TO WET	801.6		6 13 14	40	67	SS-5	-	-	-	-	-	-	-	-	-	17	A-3 (V)	
			3 4 7	16	100	SS-6	-	3	43	44	8	2	NP	NP	NP	21	A-3 (0)	
@17.5'; ENCOUNTERED HEAVE. PULLED AUGERS AND REDRILLED WITH A SLURRY MIX TO COMBAT HEAVE.	794.1		14 12 13	37	100	SS-7	-	-	-	-	-	-	-	-	-	12	A-3 (V)	
DENSE TO VERY DENSE, GRAY, **GRAVEL AND STONE FRAGMENTS WITH SAND**, TRACE SILT, TRACE CLAY, MOIST	789.1		5 15 17	47	56	SS-8	-	-	-	-	-	-	-	-	-	12	A-1-b (V)	
			7 16 20	53	100	SS-9	-	-	-	-	-	-	-	-	-	10	A-1-b (V)	
STIFF, GRAY, **SANDY SILT**, "AND" CLAY, TRACE GRAVEL, CONTAINS A 2.0" SILT SEAM, MOIST	785.3		13 14 8	33	39	SS-10	1.75	8	6	12	38	36	26	17	9	21	A-4a (8)	
VERY DENSE, GRAY, **GRAVEL WITH SAND**, LITTLE SILT, TRACE CLAY, DAMP TO MOIST																		

PID: 104132	SFN:	PROJECT: CUY-14-6.93	STATION / OFFSET: 372+69, 18' RT.	START: 8/3/21	END: 8/4/21	PG 2 OF 2	B-005-0-21

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	HOLE SEALED
VERY DENSE, GRAY, **GRAVEL WITH SAND**, LITTLE SILT, TRACE CLAY, DAMP TO MOIST *(continued)* @30.0' TO 44.8'; DIFFICULT DRILLING DUE TO COBBLES AND/OR BOULDERS	783.6	31	11 23 25	71	100	SS-11	-	-	-	-	-	-	-	-	-	12	A-1-b (V)	
		32																
		33																
		34																
		35	22 34 42	113	100	SS-12	-	34	34	16	12	4	NP	NP	NP	9	A-1-b (0)	
		36																
		37																
		38																
		39																
		40	12 16 25	61	100	SS-13	-	-	-	-	-	-	-	-	-	10	A-1-b (V)	
	771.3	41																
VERY DENSE, GRAY, **STONE FRAGMENTS WITH SAND**, TRACE SILT, TRACE CLAY, STONE FRAGMENTS ARE LIMESTONE. POSSIBLE LIMESTONE COBBLE, MOIST		42																
		43																
	768.8	44 EOB	33 47 50/4"	-	44	SS-14	-	-	-	-	-	-	-	-	-	10	A-1-b (V)	

NOTES: GROUNDWATER ENCOUNTERED AT 10.5' DURING DRILLING. HOLE DID NOT CAVE. ENCOUNTERED HEAVE AT 17.5'.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PUMPED 75 GAL. BENTONITE GROUT; POURED 2 BAGS HOLE PLUG

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT.GDT - 2/20/24 09:28 - X:\ACTIVE PROJECTS\ACTIVE SOIL PROJECTS\1ARCHIVE BY YEAR\2021 ARCHIVE\CUY-14-6.93\GINT FILES\CUY-14

PROJECT: CUY-14-6.93	DRILLING FIRM / OPERATOR: NEAS / J. HODGES	DRILL RIG: CME 75T	STATION / OFFSET: 372+57, 41' LT.	EXPLORATION ID B-006-0-21
TYPE: BRIDGE	SAMPLING FIRM / LOGGER: NEAS / J. HODGES	HAMMER: CME AUTOMATIC	ALIGNMENT: SR-14	
PID: 104132 SFN: 1081085	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 5/1/19	ELEVATION: 812.9 (MSL) EOB: 49.4 ft.	PAGE 1 OF 2
START: 8/9/21 END: 8/9/21	SAMPLING METHOD: SPT	ENERGY RATIO (%): 89	LAT / LONG: 41.431548, -81.601193	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
LOOSE TO MEDIUM DENSE, BROWN, **COARSE AND FINE SAND**, SOME SILT, LITTLE GRAVEL, TRACE CLAY, CONTAINS ROOTS, MOIST TO WET	812.9																	
		1																
		2																
		3	3 5 3	12	22	SS-1	-	-	-	-	-	-	-	-	-	14	A-3a (V)	
		4																
		5																
		6	1 2 2	6	44	SS-2	-	-	-	-	-	-	-	-	-	19	A-3a (V)	
	805.9	7																
MEDIUM DENSE TO VERY DENSE, BROWN AND GRAY, **GRAVEL AND STONE FRAGMENTS WITH SAND**, LITTLE SILT, TRACE CLAY, CONTAINS 1.5" STONE FRAGMENTS, WET TO MOIST		8	1 4 5	13	39	SS-3	-	44	14	24	16	2	NP	NP	NP	14	A-1-b (0)	
		9																
	W 802.9	10																
@10.0' TO 49.4'; ENCOUNTERED COBBLES DURING DRILLING		11	6 16 35	76	100	SS-4	-	-	-	-	-	-	-	-	-	11	A-1-b (V)	
		12																
		13	8 34 15	73	100	SS-5	-	21	45	17	14	3	NP	NP	NP	11	A-1-b (0)	
	798.4	14																
DENSE, GRAY, **COARSE AND FINE SAND**, LITTLE SILT, TRACE GRAVEL, TRACE CLAY, WET		15																
		16	19 10 14	36	50	SS-6	-	-	-	-	-	-	-	-	-	18	A-3a (V)	
	795.9	17																
DENSE TO VERY DENSE, GRAY, **GRAVEL AND STONE FRAGMENTS WITH SAND**, TRACE SILT, TRACE CLAY, WET TO MOIST		18	12 17 16	49	78	SS-7	-	-	-	-	-	-	-	-	-	16	A-1-b (V)	
		19																
		20	7 16 22	56	100	SS-8	-	30	38	20	9	3	NP	NP	NP	11	A-1-b (0)	
	790.9	21																
VERY DENSE, GRAY, **COARSE AND FINE SAND**, LITTLE GRAVEL, TRACE SILT, TRACE CLAY, MOIST		22																
		23	9 17 20	55	89	SS-9	-	-	-	-	-	-	-	-	-	13	A-3a (V)	
	788.4	24																
		25																
		26	33 50	-	83	SS-10	-	58	14	10	15	3	NP	NP	NP	10	A-1-b (0)	
		27																
		28																
		29																

PID: 104132	SFN:	PROJECT: CUY-14-6.93	STATION / OFFSET: 372+57, 41' LT.	START: 8/9/21	END: 8/9/21	PG 2 OF 2	B-006-0-21

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
@10.0' TO 49.4'; ENCOUNTERED COBBLES DURING DRILLING *(continued)*	782.9																	
VERY DENSE, GRAY, **GRAVEL AND STONE FRAGMENTS WITH SAND**, LITTLE SILT, TRACE CLAY, DAMP TO MOIST		31	2 8 50/3"	-	80	SS-11	-	-	-	-	-	-	-	-	-	13	A-1-b (V)	
VERY DENSE, GRAY, **GRAVEL AND STONE FRAGMENTS WITH SAND**, LITTLE SILT, TRACE CLAY, DAMP TO MOIST *(continued)*	779.6	32 33 34																
VERY DENSE, GRAY, **GRAVEL AND STONE FRAGMENTS**, SOME TO "AND" SAND, LITTLE SILT, TRACE CLAY, DAMP TO MOIST		35 36	10 22 28	74	100	SS-12	-	51	23	13	11	2	NP	NP	NP	9	A-1-a (0)	
		37 38 39																
		40 41	18 23 31	80	89	SS-13	-	-	-	-	-	-	-	-	-	10	A-1-a (V)	
		42 43 44																
		45 46	17 26 27	79	89	SS-14	-	-	-	-	-	-	-	-	-	12	A-1-a (V)	
		47 48																
	763.5	EOB 49	38 50/5"	-	82	SS-15	-	-	-	-	-	-	-	-	-	8	A-1-a (V)	

NOTES: GROUNDWATER ENCOUNTERED AT 10.0' DURING DRILLING. HOLE DID NOT CAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: POURED 3 BAGS HOLE PLUG; SHOVELED SOIL CUTTINGS

PROJECT: CUY-14-6.93	DRILLING FIRM / OPERATOR: NEAS / J. HODGES	DRILL RIG: CME 75T	STATION / OFFSET: 374+39, 46' RT.	EXPLORATION ID B-007-0-21
TYPE: BRIDGE	SAMPLING FIRM / LOGGER: NEAS / J. HODGES	HAMMER: CME AUTOMATIC	ALIGNMENT: SR-14	
PID: 104132 SFN: 1081085	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 5/1/19	ELEVATION: 815.2 (MSL) EOB: 50.0 ft.	PAGE 1 OF 2
START: 8/10/21 END: 8/10/21	SAMPLING METHOD: SPT / ST	ENERGY RATIO (%): 89	LAT / LONG: 41.431220, -81.600616	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
VERY LOOSE, BROWN AND GRAY BECOMING GRAY, **GRAVEL AND STONE FRAGMENTS WITH SAND**, TRACE TO LITTLE SILT, TRACE CLAY, WET TO DAMP	815.2																	
		3	4 1 2	4	17	SS-1	-	-	-	-	-	-	-	-	-	18	A-1-b (V)	
		6	1 1 1	3	28	SS-2	-	-	-	-	-	-	-	-	-	16	A-1-b (V)	
		8			83	ST-3	-	-	-	-	-	-	-	-	-	12	A-1-b (V)	
@9.0'; BECOMES VERY DENSE. DIFFICULT DRILLING DUE TO COBBLES AND/OR BOULDERS	W 805.7	10	8 21 29	74	33	SS-4	-	37	23	23	13	4	NP	NP	NP	16	A-1-b (0)	
		13	6 25 33	86	67	SS-5	-	-	-	-	-	-	-	-	-	10	A-1-b (V)	
		16	27 24 29	79	100	SS-6	-	-	-	-	-	-	-	-	-	8	A-1-b (V)	
		18	20 21 26	70	100	SS-7	-	-	-	-	-	-	-	-	-	12	A-1-b (V)	
		21	15 17 22	58	39	SS-8	-	-	-	-	-	-	-	-	-	12	A-1-b (V)	
		23	18 24 25	73	44	SS-9	-	32	41	15	8	4	NP	NP	NP	10	A-1-b (0)	
		26	13 27 31	86	100	SS-10	-	-	-	-	-	-	-	-	-	10	A-1-b (V)	
	786.9	29																

PID: 104132	SFN:	PROJECT: CUY-14-6.93	STATION / OFFSET: 374+39, 46' RT.	START: 8/10/21	END: 8/10/21	PG 2 OF 2	B-007-0-21

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
@9.0'; BECOMES VERY DENSE. DIFFICULT DRILLING DUE TO COBBLES AND/OR BOULDERS *(continued)*	785.2																	
VERY DENSE, GRAY AND DARK GRAY, **STONE FRAGMENTS**, LITTLE SAND, TRACE SILT, TRACE CLAY, STONE FRAGMENTS ARE LIMESTONE, POSSIBLE LIMESTONE COBBLE/BOULDER, MOIST *(continued)*	781.9	31	21 50	-	31	SS-11	-	-	-	-	-	-	-	-	-	13	A-1-a (V)	
VERY DENSE, GRAY, **GRAVEL AND STONE FRAGMENTS WITH SAND**, TRACE SILT, TRACE CLAY, DAMP TO MOIST		32 33 34 35	24 25 50	111	78	SS-12	-	35	37	15	9	4	NP	NP	NP	9	A-1-b (0)	
		36 37 38 39 40	30 32 37	102	100	SS-13	-	29	38	17	10	6	NP	NP	NP	11	A-1-b (0)	
		41 42 43 44 45	26 29 35	95	83	SS-14	-	-	-	-	-	-	-	-	-	12	A-1-b (V)	
	765.2	46 47 48 49 EOB 50	21 32 35	99	100	SS-15	-	31	36	20	10	3	NP	NP	NP	9	A-1-b (0)	

NOTES: GROUNDWATER ENCOUNTERED AT 9.5' DURING DRILLING. HOLE DID NOT CAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: POURED 3 BAGS BENTONITE CHIPS; SHOVELED SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT.GDT - 2/20/24 09:28 - X:\ACTIVE PROJECTS\ACTIVE SOIL PROJECTS\1ARCHIVE BY YEAR\2021 ARCHIVE\CUY-14-6.93\GINT FILES\CUY-14

PROJECT: CUY-14-6.93	DRILLING FIRM / OPERATOR: NEAS / J. HODGES	DRILL RIG: CME 75T	STATION / OFFSET: 373+83, 41' LT.	EXPLORATION ID B-008-0-21	
TYPE: BRIDGE	SAMPLING FIRM / LOGGER: NEAS / J. HODGES	HAMMER: CME AUTOMATIC	ALIGNMENT: SR-14		
PID: 104132 SFN: 1081085	DRILLING METHOD: 3.25" HSA / NQ2	CALIBRATION DATE: 5/1/19	ELEVATION: 815.0 (MSL) EOB: 52.0 ft.	PAGE 1 OF 2	
START: 8/18/21 END: 8/19/21	SAMPLING METHOD: SPT / NQ2	ENERGY RATIO (%): 89	LAT / LONG: 41.431475, -81.600782		

MATERIAL DESCRIPTION AND NOTES	ELEV. 815.0	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	HOLE SEALED
MEDIUM DENSE, GRAYISH BROWN, **SANDY SILT**, LITTLE CLAY, TRACE GRAVEL, MOIST			20 13 5	27	33	SS-1	-	5	13	39	32	11	NP	NP	NP	16	A-4a (2)	
	810.5																	
LOOSE TO DENSE, GRAYISH BROWN, **COARSE AND FINE SAND**, LITTLE SILT, TRACE GRAVEL, TRACE CLAY, MOIST TO WET		W 808.0	7 3 4	10	22	SS-2	-	-	-	-	-	-	-	-	-	18	A-3a (V)	
			2 6 5	16	39	SS-3	-	-	-	-	-	-	-	-	-	24	A-3a (V)	
			7 11 17	42	44	SS-4	-	-	-	-	-	-	-	-	-	14	A-3a (V)	
			10 13 14	40	50	SS-5	-	7	29	48	12	4	NP	NP	NP	17	A-3a (0)	
			9 14 20	50	72	SS-6	-	-	-	-	-	-	-	-	-	13	A-3a (V)	
	798.0																	
VERY DENSE, GRAY, **GRAVEL AND STONE FRAGMENTS WITH SAND**, TRACE SILT, TRACE CLAY, MOIST TO WET @17.0' TO 52.0'; ENCOUNTERED COBBLES AND/OR BOULDERS DURING DRILLING			10 20 21	61	33	SS-7	-	-	-	-	-	-	-	-	-	13	A-1-b (V)	
			12 20 21	61	33	SS-8	-	44	21	22	10	3	NP	NP	NP	10	A-1-b (0)	
			11 17 19	53	28	SS-9	-	-	-	-	-	-	-	-	-	10	A-1-b (V)	
			12 22 25	70	22	SS-10	-	-	-	-	-	-	-	-	-	10	A-1-b (V)	
			11 29 33	92	44	SS-11	-	-	-	-	-	-	-	-	-	10	A-1-b (V)	

PID: 104132	SFN:	PROJECT: CUY-14-6.93	STATION / OFFSET: 373+83, 41' LT.	START: 8/18/21	END: 8/19/21	PG 2 OF 2	B-008-0-21

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	HOLE SEALED
VERY DENSE, GRAY, **GRAVEL AND STONE FRAGMENTS WITH SAND**, TRACE SILT, TRACE CLAY, MOIST TO WET *(continued)*	785.0	31	20 29 32	90	50	SS-12	-	47	20	23	8	2	NP	NP	NP	10	A-1b (0)	
		32																
		33	19 25 50/3"	-	40	SS-13	-	-	-	-	-	-	-	-	-	9	A-1b (V)	
		34																
		35																
		36	32 26 30	83	56	SS-14	-	-	-	-	-	-	-	-	-	11	A-1b (V)	
		37																
		38																
		39																
		40	35 50/2"	-	50	SS-15	-	-	-	-	-	-	-	-	-	15	A-1b (V)	
		41																
@42.0' - 52.0'; CORED THROUGH GRANITE AND SILTSTONE COBBLES AND BOULDERS		42																
		43																
		44																
		45																
		46																
		47			-	NQ2-1	-	-	-	-	-	-	-	-	-	-		
		48																
		49																
		50																
		51																
	763.0	EOB 52																

NOTES: GROUNDWATER ENCOUNTERED AT 7.0' DURING DRILLING. HOLE DID NOT CAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PUMPED 10 GAL. BENTONITE GROUT; POURED 3 BAGS HOLE PLUG; SHOVELED SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT.GDT - 2/20/24 09:29 - X:\ACTIVE PROJECTS\ACTIVE SOIL PROJECTS\1ARCHIVE BY YEAR\2021 ARCHIVE\CUY-14-6.93\GINT FILES\CUY-14

PROJECT: CUY-14-6.93	DRILLING FIRM / OPERATOR: NEAS / JL	DRILL RIG: CME 55T	STATION / OFFSET: 374+98, 51' RT.	EXPLORATION ID B-009-0-21
TYPE: BRIDGE	SAMPLING FIRM / LOGGER: NEAS / JL	HAMMER: CME AUTOMATIC	ALIGNMENT: SR-14	
PID: 104132 SFN: 1081085	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 12/5/19	ELEVATION: 814.9 (MSL) EOB: 49.8 ft.	PAGE 1 OF 2
START: 8/19/21 END: 8/20/21	SAMPLING METHOD: SPT	ENERGY RATIO (%): 68.4	LAT / LONG: 41.431188, -81.600404	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
LOOSE, BLACK, **GRAVEL AND STONE FRAGMENTS WITH SAND**, LITTLE SILT, TRACE CLAY, STONE FRAGMENTS ARE WEAK BLACK SHALE, CONTAINS SLAG, WET	814.9																	
	811.1	3	4 4 3	8	67	SS-1	-	-	-	-	-	-	-	-	-	20	A-1-b (V)	
VERY LOOSE TO MEDIUM DENSE, GRAY AND BROWN WITH TRACE BLACK STREAKS, **SANDY SILT**, TRACE CLAY, TRACE GRAVEL, SLIGHTLY ORGANIC, SS-3 CONTAINS A 1.5" SANDSTONE FRAGMENT, WET		6	0 0 1	1	100	SS-2	-	2	5	49	34	10	NP	NP	NP	29	A-4a (2)	
	805.4	8	1 5 5	11	72	SS-3	-	-	-	-	-	-	-	-	-	28	A-4a (V)	
DENSE TO VERY DENSE, BROWN AND GRAY, **GRAVEL AND STONE FRAGMENTS WITH SAND**, TRACE TO LITTLE SILT, TRACE CLAY, WET TO DAMP **@9.5' TO 49.8'; ENCOUNTERED COBBLES AND/OR BOULDERS DURING DRILLING**	W 804.9	11	2 23 18	47	28	SS-4	-	-	-	-	-	-	-	-	-	21	A-1-b (V)	
		13	9 16 31	54	100	SS-5	-	48	33	9	6	4	NP	NP	NP	12	A-1-b (0)	
		16	8 16 34	57	39	SS-6	-	-	-	-	-	-	-	-	-	14	A-1-b (V)	
		18	9 19 19	43	39	SS-7	-	-	-	-	-	-	-	-	-	9	A-1-b (V)	
	792.9	21	13 21 21	48	28	SS-8	-	-	-	-	-	-	-	-	-	11	A-1-b (V)	
		23	10 16 20	41	28	SS-9	-	-	-	-	-	-	-	-	-	10	A-1-a (V)	
		26	12 20 23	49	28	SS-10	-	-	-	-	-	-	-	-	-	11	A-1-a (V)	
		28	11 26 30	64	33	SS-11	-	60	28	8	3	1	NP	NP	NP	9	A-1-a (0)	

PID: 104132	SFN:	PROJECT: CUY-14-6.93	STATION / OFFSET: 374+98, 51' RT.	START: 8/19/21	END: 8/20/21	PG 2 OF 2	B-009-0-21

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
@9.5' TO 49.8'; ENCOUNTERED COBBLES AND/OR BOULDERS DURING DRILLING *(continued)*	784.9																	
DENSE TO VERY DENSE, GRAY, **GRAVEL AND STONE FRAGMENTS**, SOME TO "AND" SAND, TRACE SILT, TRACE CLAY, DAMP TO MOIST	782.9	31	16 27 29	64	44	SS-12	-	-	-	-	-	-	-	-	-	12	A-1-a (V)	
DENSE TO VERY DENSE, GRAY, **GRAVEL AND STONE FRAGMENTS**, SOME TO "AND" SAND, TRACE SILT, TRACE CLAY, DAMP TO MOIST *(continued)*		32																
		33	17 22 31	60	39	SS-13	-	49	30	14	6	1	NP	NP	NP	9	A-1-b (0)	
		34																
VERY DENSE, GRAY, **GRAVEL AND STONE FRAGMENTS WITH SAND**, TRACE SILT, TRACE CLAY, MOIST		35	25 27 31	66	50	SS-14	-	-	-	-	-	-	-	-	-	9	A-1-b (V)	
	776.6	36																
VERY DENSE, GRAY, **GRAVEL AND STONE FRAGMENTS WITH SAND AND SILT**, TRACE CLAY, DAMP		37																
		38																
		39																
		40	29 32 35	76	28	SS-15	-	35	19	11	26	9	NP	NP	NP	14	A-2-4 (0)	
	771.6	41																
VERY DENSE, GRAY, **GRAVEL AND STONE FRAGMENTS**, TRACE SAND, TRACE SILT, TRACE CLAY, DAMP		42																
		43																
		44																
		45	19 34 50/2"	-	21	SS-16	-	-	-	-	-	-	-	-	-	5	A-1-a (V)	
		46																
		47																
		48																
	765.1	49	24 38 50/3"	-	27	SS-17	-	-	-	-	-	-	-	-	-	3	A-1-a (V)	
		EOB																

NOTES: GROUNDWATER ENCOUNTERED AT 10.0' DURING DRILLING. HOLE DID NOT CAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: POURED 3 BAGS HOLE PLUG; SHOVELED SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT.GDT - 2/20/24 09:29 - X:\ACTIVE PROJECTS\ACTIVE SOIL PROJECTS\1ARCHIVE BY YEAR\2021 ARCHIVE\CUY-14-6.93\GINT FILES\CUY-14

PROJECT: CUY-14-6.93	DRILLING FIRM / OPERATOR: NEAS / JL	DRILL RIG: CME 55T	STATION / OFFSET: 378+05, 45' LT.	EXPLORATION ID B-010-0-21
TYPE: BRIDGE	SAMPLING FIRM / LOGGER: NEAS / JL	HAMMER: CME AUTOMATIC	ALIGNMENT: SR-14	
PID: 104132 SFN: 1081085	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 12/5/19	ELEVATION: 821.6 (MSL) EOB: 50.0 ft.	PAGE 1 OF 2
START: 8/24/21 END: 8/24/21	SAMPLING METHOD: SPT	ENERGY RATIO (%): 68.4	LAT / LONG: 41.431345, -81.599251	

MATERIAL DESCRIPTION AND NOTES	ELEV. 821.6	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
5.0" LIMESTONE #57 GRAVEL (DRILLERS DESCRIPTION)	821.2																	
VERY STIFF, BROWN, **SILTY CLAY**, SOME SAND, SOME GRAVEL, CONTAINS BRICK FRAGMENTS, DAMP **(FILL)**	817.1		7 3 4	8	44	SS-1	2.25	25	14	13	18	30	39	21	18	18	A-6b (5)	
VERY STIFF, BROWN, **CLAY**, SOME SILT, LITTLE SAND, TRACE GRAVEL, MOIST	814.6		3 3 3	7	50	SS-2	2.75	10	9	5	22	54	48	23	25	25	A-7-6 (16)	
MEDIUM STIFF TO VERY STIFF, BROWN AND GRAY, **SILT AND CLAY**, SOME SAND, TRACE GRAVEL, CONTAINS IRON STAINING, MOIST	809.6		0 2 2	5	78	SS-3	0.75	6	7	28	39	20	30	18	12	24	A-6a (6)	
			0 2 4	7	72	SS-4	2.25	-	-	-	-	-	-	-	-	25	A-6a (V)	
DENSE TO VERY DENSE, BROWN AND GRAY, **GRAVEL**, SOME SAND, LITTLE SILT, TRACE CLAY, MOIST TO WET		W 808.4	5 13 15	32	67	SS-5	-	-	-	-	-	-	-	-	-	17	A-1-a (V)	
			8 15 18	38	56	SS-6	-	55	19	11	12	3	NP	NP	NP	10	A-1-a (0)	
	802.1		9 21 26	54	61	SS-7	-	-	-	-	-	-	-	-	-	14	A-1-a (V)	
VERY DENSE, BROWN AND GRAY, **COARSE AND FINE SAND**, LITTLE GRAVEL, TRACE SILT, TRACE CLAY, MOIST	799.6		19 25 27	59	56	SS-8	-	-	-	-	-	-	-	-	-	14	A-3a (V)	
DENSE TO VERY DENSE, BROWN AND GRAY, **GRAVEL AND STONE FRAGMENTS WITH SAND**, TRACE TO LITTLE SILT, TRACE CLAY, DAMP TO WET			21 20 23	49	44	SS-9	-	-	-	-	-	-	-	-	-	11	A-1-b (V)	
			22 24 27	58	28	SS-10	-	-	-	-	-	-	-	-	-	9	A-1-b (V)	

PID: 104132	SFN:	PROJECT: CUY-14-6.93	STATION / OFFSET: 378+05, 45' LT.	START: 8/24/21	END: 8/24/21	PG 2 OF 2	B-010-0-21

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
DENSE TO VERY DENSE, BROWN AND GRAY, **GRAVEL AND STONE FRAGMENTS WITH SAND**, TRACE TO LITTLE SILT, TRACE CLAY, DAMP TO WET *(continued)*		31	10 22 25	54	33	SS-11	-	-	-	-	-	-	-	-	-	8	A-1-b (V)	
		32																
		33																
		34																
		35	15 28 33	70	39	SS-12	-	-	-	-	-	-	-	-	-	11	A-1-b (V)	
		36																
		37																
		38																
		39																
		40	15 26 32	66	72	SS-13	-	-	-	-	-	-	-	-	-	14	A-1-b (V)	
		41																
		42																
		43																
		44																
		45	29 31 36	76	94	SS-14	-	-	-	-	-	-	-	-	-	9	A-1-b (V)	
		46																
		47																
		48																
		49	35 20 31	58	56	SS-15	-	-	-	-	-	-	-	-	-	10	A-1-b (V)	
	771.6	EOB 50																

NOTES: GROUNDWATER ENCOUNTERED AT 13.2' DURING DRILLING. HOLE DID NOT CAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: SHOVELED SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT.GDT - 2/20/24 09:29 - X:\ACTIVE PROJECTS\ACTIVE SOIL PROJECTS\1ARCHIVE BY YEAR\2021 ARCHIVE\CUY-14-6.93\GINT FILES\CUY-14

PROJECT: CUY-14-6.93	DRILLING FIRM / OPERATOR: NEAS / J. HODGES	DRILL RIG: CME 55X	STATION / OFFSET: 378+84, 31' RT.	EXPLORATION ID B-011-0-21
TYPE: BRIDGE	SAMPLING FIRM / LOGGER: NEAS / J. HODGES	HAMMER: CME AUTOMATIC	ALIGNMENT: SR-14	
PID: 104132 SFN: 1081085	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 12/5/19	ELEVATION: 823.5 (MSL) EOB: 59.7 ft.	PAGE 1 OF 2
START: 8/30/21 END: 8/30/21	SAMPLING METHOD: SPT	ENERGY RATIO (%): 81.9	LAT / LONG: 41.431112, -81.598998	

MATERIAL DESCRIPTION AND NOTES	ELEV. 823.5	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	HOLE SEALED
VERY LOOSE, WHITE, **SANDY SILT**, TRACE CLAY, TRACE GRAVEL, **UNTESTABLE MATERIAL. RESEMBLES LIME**, MOIST **(FILL)**		1																
		2																
		3	0 0 0	0	100	SS-1	-	-	-	-	-	-	-	-	-	-	A-4a (V)	
	819.0	4																
MEDIUM DENSE TO DENSE, GRAY, **GRAVEL AND STONE FRAGMENTS WITH SAND**, TRACE TO LITTLE SILT, TRACE CLAY, DAMP TO MOIST		5																
		6	3 7 8	20	28	SS-2	-	-	-	-	-	-	-	-	-	11	A-1-b (V)	
		7																
		8	5 10 12	30	22	SS-3	-	-	-	-	-	-	-	-	-	10	A-1-b (V)	
		9																
		10	8 17 18	48	39	SS-4	-	18	33	31	14	4	NP	NP	NP	11	A-1-b (0)	
		11																
@12.5'; BECOMES VERY DENSE. DIFFICULT DRILLING DUE TO COBBLES AND/OR BOULDERS		12																
		13	8 20 28	66	22	SS-5	-	-	-	-	-	-	-	-	-	11	A-1-b (V)	
		14																
		15	7 13 29	57	39	SS-6	-	44	27	11	13	5	NP	NP	NP	11	A-1-b (0)	
		16																
		17																
		18	20 29 33	85	28	SS-7	-	-	-	-	-	-	-	-	-	10	A-1-b (V)	
		19																
		20	14 30 50/2"	-	64	SS-8	-	-	-	-	-	-	-	-	-	11	A-1-b (V)	
		21																
		22																
		23	15 37 49	117	22	SS-9	-	-	-	-	-	-	-	-	-	14	A-1-b (V)	
		24																
@25.0'; SS-10 CONTAINS NO RECOVERY		25	35 47 50/2"	-	0	SS-10	-	-	-	-	-	-	-	-	-	-		
		26																
		27																
		28																
		29																

PID: 104132	SFN:	PROJECT: CUY-14-6.93	STATION / OFFSET: 378+84, 31' RT.	START: 8/30/21	END: 8/30/21	PG 2 OF 2	B-011-0-21

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	HOLE SEALED
MEDIUM DENSE TO DENSE, GRAY, **GRAVEL AND STONE FRAGMENTS WITH SAND**, TRACE TO LITTLE SILT, TRACE CLAY, DAMP TO MOIST *(continued)*	793.5	31	43 50/5"	-	45	SS-11	-	-	-	-	-	-	-	-	-	11	A-1-b (V)	
		35	30 39 44	113	22	SS-12	-	-	-	-	-	-	-	-	-	10	A-1-b (V)	
		40	40 50/4"	-	30	SS-13	-	-	-	-	-	-	-	-	-	13	A-1-b (V)	
		45	35 42 50/2"	-	21	SS-14	-	-	-	-	-	-	-	-	-	15	A-1-b (V)	
		50	20 37 44	111	44	SS-15	-	48	29	12	8	3	NP	NP	NP	9	A-1-b (0)	
		55	33 50/4"	-	70	SS-16	-	-	-	-	-	-	-	-	-	8	A-1-b (V)	
	763.8	EOB 59	32 39 50/2"	-	29	SS-17	-	-	-	-	-	-	-	-	-	9	A-1-b (V)	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE. RAN A SLURRY MIX AT 10.0' TO COMBAT HEAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PUMPED 100 GAL. BENTONITE GROUT; POURED 1 BAG HOLE PLUG; SHOVELED SOIL CUTTINGS

PROJECT: CUY-14-6.93	DRILLING FIRM / OPERATOR: NEAS / J. HODGES	DRILL RIG: CME 75T	STATION / OFFSET: 379+12, 38' LT.	EXPLORATION ID B-012-0-21
TYPE: RETAINING WALL	SAMPLING FIRM / LOGGER: NEAS / J. HODGES	HAMMER: CME AUTOMATIC	ALIGNMENT: SR-14	
PID: 104132 SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 5/1/19	ELEVATION: 821.4 (MSL) EOB: 50.0 ft.	PAGE 1 OF 2
START: 8/17/21 END: 8/17/21	SAMPLING METHOD: SPT	ENERGY RATIO (%): 89	LAT / LONG: 41.431290, -81.598864	

MATERIAL DESCRIPTION AND NOTES	ELEV. 821.4	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
VERY DENSE, GRAY AND BROWN, **STONE FRAGMENTS WITH SAND**, LITTLE SILT, TRACE CLAY, CONTAINS 2.0" SLAG FRAGMENTS, WET TO MOIST **(FILL)**																		
		1																
		2																
		3	6 11 24	52	83	SS-1	-	48	20	12	11	9	NP	NP	NP	14	A-1b (0)	
		4																
@5.0'; CHANGES TO VERY LOOSE		5																
		6	6 1 1	3	17	SS-2	-	-	-	-	-	-	-	-	-	9	A-1b (V)	
	814.4	7																
STIFF, BROWN, **SILT AND CLAY**, LITTLE SAND, TRACE GRAVEL, MOIST		8	1 2 2	6	11	SS-3	1.75	-	-	-	-	-	-	-	-	20	A-6a (V)	
	811.9	9																
VERY LOOSE, GRAY AND BROWN, **COARSE AND FINE SAND**, LITTLE GRAVEL, LITTLE SILT, TRACE CLAY, WET		W 811.4 10	0 0 0	0	67	SS-4	-	-	-	-	-	-	-	-	-	25	A-3a (V)	
	809.4	11																
LOOSE, BROWN AND GRAY, **GRAVEL AND STONE FRAGMENTS WITH SAND**, LITTLE SILT, TRACE CLAY, WET TO DAMP		12																
@12.0' TO 50.0'; ENCOUNTERED COBBLES DURING DRILLING		13	1 3 4	10	44	SS-5	-	-	-	-	-	-	-	-	-	16	A-1b (V)	
		14																
@15.0' TO 29.0'; BECOMES DENSE TO VERY DENSE		15																
		16	4 15 15	45	28	SS-6	-	-	-	-	-	-	-	-	-	18	A-1b (V)	
		17																
		18	12 14 15	43	100	SS-7	-	46	24	11	15	4	NP	NP	NP	10	A-1b (0)	
		19																
		20	10 12 15	40	56	SS-8	-	-	-	-	-	-	-	-	-	12	A-1b (V)	
		21																
		22																
		23	20 16 19	52	39	SS-9	-	-	-	-	-	-	-	-	-	9	A-1b (V)	
		24																
		25																
		26	20 21 26	70	33	SS-10	-	-	-	-	-	-	-	-	-	9	A-1b (V)	
		27																
		28	15 19 21	59	33	SS-11	-	-	-	-	-	-	-	-	-	7	A-1b (V)	
	791.9	29																

PID: 104132	SFN:	PROJECT: CUY-14-6.93	STATION / OFFSET: 379+12, 38' LT.	START: 8/17/21	END: 8/17/21	PG 2 OF 2	B-012-0-21

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
@12.0' TO 50.0'; ENCOUNTERED COBBLES DURING DRILLING *(continued)* VERY DENSE, GRAY, **GRAVEL AND STONE FRAGMENTS**, SOME SAND, TRACE SILT, TRACE CLAY, DAMP *(continued)*	791.4	31	9 25 26	76	28	SS-12	-	67	17	9	6	1	NP	NP	NP	7	A-1-a (0)	
		32																
		33																
		34																
		35	11 32 35	99	56	SS-13	-	-	-	-	-	-	-	-	-	8	A-1-a (V)	
		36																
		37																
	783.1	38																
VERY DENSE, GRAY, **SANDY SILT**, TRACE GRAVEL, TRACE CLAY, WET		39																
		40	19 25 30	82	89	SS-14	-	7	20	36	35	2	NP	NP	NP	18	A-4a (0)	
	778.1	41																
VERY DENSE, GRAY, **GRAVEL AND STONE FRAGMENTS WITH SAND**, TRACE SILT, TRACE CLAY, MOIST		42																
		43																
		44																
		45	33 34 32	98	50	SS-15	-	42	26	24	7	1	NP	NP	NP	11	A-1-b (0)	
	774.1	46																
VERY DENSE, GRAY, **STONE FRAGMENTS**, TRACE SAND, TRACE SILT, TRACE CLAY, MOIST		47																
		48																
		49	37 26 30	83	44	SS-16	-	-	-	-	-	-	-	-	-	11	A-1-a (V)	
	771.4	EOB 50																

NOTES: GROUNDWATER ENCOUNTERED AT 10.0' DURING DRILLING. HOLE DID NOT CAVE. RAN A SLURRY MIX AS CIRCULATING FLUID.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: POURED 3 BAGS HOLE PLUG; SHOVELED SOIL CUTTINGS

PROJECT: CUY-14-6.93	DRILLING FIRM / OPERATOR: NEAS / J. HODGES	DRILL RIG: CME 75T	STATION / OFFSET: 380+32, 21' RT.	EXPLORATION ID B-013-0-21
TYPE: RETAINING WALL	SAMPLING FIRM / LOGGER: NEAS / J. HODGES	HAMMER: CME AUTOMATIC	ALIGNMENT: SR-14	
PID: 104132 SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 5/1/19	ELEVATION: 826.7 (MSL) EOB: 50.0 ft.	PAGE 1 OF 2
START: 8/12/21 END: 8/12/21	SAMPLING METHOD: SPT / ST	ENERGY RATIO (%): 89	LAT / LONG: 41.431063, -81.598479	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
MEDIUM DENSE TO VERY DENSE, BROWN AND BLACK, **SANDY SILT**, LITTLE GRAVEL, LITTLE CLAY, CONTAINS BRICK FRAGMENTS AND TRACE IRON STAINING, DAMP **(FILL)**	826.7																	
			9 17 22	58	72	SS-1	-	-	-	-	-	-	-	-	-	12	A-4a (V)	
			4 5 5	15	39	SS-2	-	20	19	20	21	20	23	16	7	14	A-4a (1)	
HARD, GRAYISH BROWN, **CLAY**, SOME SILT, TRACE GRAVEL, TRACE SAND, MOIST	819.2				79	ST-3	4.25	5	2	1	27	65	43	23	20	25	A-7-6 (13)	
VERY DENSE, BROWN, **STONE FRAGMENTS WITH SAND**, LITTLE SILT, TRACE CLAY, STONE FRAGMENTS ARE SANDSTONE, CONTAINS IRON STAINING, DAMP	817.2		11 24 22	68	44	SS-4	-	-	-	-	-	-	-	-	-	7	A-1-b (V)	
LOOSE, BROWN, **COARSE AND FINE SAND**, SOME SILT, TRACE CLAY, TRACE GRAVEL, CONTAINS TRACE IRON STAINING, WET	814.9		3 2 2	6	78	SS-5	-	-	-	-	-	-	-	-	-	17	A-3a (V)	
MEDIUM DENSE TO VERY DENSE, BROWN AND GRAY, **GRAVEL AND STONE FRAGMENTS WITH SAND**, TRACE TO LITTLE SILT, TRACE CLAY, MOIST TO WET	812.2	W 811.7	4 9 9	27	44	SS-6	-	-	-	-	-	-	-	-	-	11	A-1-b (V)	
@17.5' TO 50.0'; ENCOUNTERED COBBLES DURING DRILLING			7 15 21	53	100	SS-7	-	28	44	14	10	4	NP	NP	NP	12	A-1-b (0)	
			14 15 19	50	33	SS-8	-	-	-	-	-	-	-	-	-	14	A-1-b (V)	
			10 13 20	49	44	SS-9	-	-	-	-	-	-	-	-	-	12	A-1-b (V)	
			11 16 22	56	72	SS-10	-	-	-	-	-	-	-	-	-	8	A-1-b (V)	
			14 19 23	62	39	SS-11	-	-	-	-	-	-	-	-	-	13	A-1-b (V)	

PID: 104132	SFN:	PROJECT: CUY-14-6.93	STATION / OFFSET: 380+32, 21' RT.	START: 8/12/21	END: 8/12/21	PG 2 OF 2	B-013-0-21

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
MEDIUM DENSE TO VERY DENSE, BROWN AND GRAY, **GRAVEL AND STONE FRAGMENTS WITH SAND**, TRACE TO LITTLE SILT, TRACE CLAY, MOIST TO WET *(continued)*	796.7	31	15 21 26	70	50	SS-12	-	36	44	10	9	1	NP	NP	NP	12	A-1b (0)	
		32																
		33																
		34																
		35	17 28 29	85	33	SS-13	-	-	-	-	-	-	-	-	-	10	A-1b (V)	
		36																
		37																
		38																
		39																
		40	13 15 20	52	39	SS-14	-	-	-	-	-	-	-	-	-	11	A-1b (V)	
		41																
		42																
		43																
		44																
		45	19 20 22	62	50	SS-15	-	-	-	-	-	-	-	-	-	9	A-1b (V)	
		46																
	778.9	47																
VERY STIFF, GRAYISH BROWN AND MAROON, **SANDY SILT**, SOME CLAY, LITTLE GRAVEL, MOIST		48																
		49	14 15 33	71	50	SS-16	2.75	11	16	16	36	21	20	14	6	15	A-4a (4)	
	776.7	EOB 50																

NOTES: GROUNDWATER ENCOUNTERED AT 15.0' DURING DRILLING. HOLE DID NOT CAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: POURED 3 BAGS HOLE PLUG; SHOVELED SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT.GDT - 2/20/24 09:29 - X:\ACTIVE PROJECTS\ACTIVE SOIL PROJECTS\1ARCHIVE BY YEAR\2021 ARCHIVE\CUY-14-6.93\GINT FILES\CUY-14

PROJECT: CUY-14-6.93	DRILLING FIRM / OPERATOR: NEAS / J. HODGES	DRILL RIG: CME 75T	STATION / OFFSET: 380+40, 65' LT.	EXPLORATION ID B-014-0-21
TYPE: RETAINING WALL	SAMPLING FIRM / LOGGER: NEAS / J. HODGES	HAMMER: CME AUTOMATIC	ALIGNMENT: SR-14	
PID: 104132 SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 5/1/19	ELEVATION: 827.2 (MSL) EOB: 50.0 ft.	PAGE 1 OF 2
START: 8/13/21 END: 8/13/21	SAMPLING METHOD: SPT	ENERGY RATIO (%): 89	LAT / LONG: 41.431281, -81.598355	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
MEDIUM DENSE TO VERY DENSE, GRAY AND BROWN, **GRAVEL WITH SAND**, TRACE SILT, TRACE CLAY, WET TO MOIST	827.2	1	7 12 19	46	56	SS-1	-	41	21	27	8	3	NP	NP	NP	14	A-1-b (0)	
		2	6 10 14	36	44	SS-2	-	52	17	19	9	3	NP	NP	NP	12	A-1-b (0)	
		3 4	8 19 23	62	67	SS-3	-	-	-	-	-	-	-	-	-	13	A-1-b (V)	
	821.7	5	3 5 6	16	83	SS-4A	-	-	-	-	-	-	-	-	-	12	A-1-b (V)	
VERY STIFF, BROWN, **CLAY**, SOME SILT, TRACE SAND, TRACE GRAVEL, MOIST		6				SS-4B	2.75	-	-	-	-	-	-	-	-	29	A-7-6 (V)	
	820.2	7	4 4 3	10	78	SS-5A	3.00	3	3	4	29	61	45	21	24	23	A-7-6 (15)	
LOOSE, BROWN, **GRAVEL WITH SAND**, TRACE SILT, TRACE CLAY, DAMP	819.2					SS-5B	-	-	-	-	-	-	-	-	-	8	A-1-b (V)	
VERY DENSE, BROWN, **GRAVEL AND STONE FRAGMENTS**, TRACE SAND, TRACE SILT, TRACE CLAY, POSSIBLE ENCOUNTER WITH COBBLE, DAMP	816.7	8 9 10	10 18 20	56	56	SS-6	-	-	-	-	-	-	-	-	-	9	A-1-a (V)	
STIFF, BROWN AND ORANGISH BROWN, **SANDY SILT**, LITTLE CLAY, LITTLE GRAVEL, CONTAINS IRON STAINING, MOIST	813.6	11 12 13	5 6 6	18	56	SS-7	1.25	11	23	28	23	15	24	14	10	17	A-4a (1)	
MEDIUM DENSE, BROWN AND GRAY, **COARSE AND FINE SAND**, SOME SILT, LITTLE CLAY, LITTLE GRAVEL, MOIST	811.7	14 15	3 7 11	27	33	SS-8	-	-	-	-	-	-	-	-	-	10	A-3a (V)	
DENSE TO VERY DENSE, GRAY, **GRAVEL WITH SAND**, TRACE SILT, TRACE CLAY, MOIST TO WET @15.5' TO 50.0'; DIFFICULT DRILLING/ENCOUNTERED COBBLES DURING DRILLING		16 17 18	9 15 20	52	78	SS-9	-	-	-	-	-	-	-	-	-	11	A-1-b (V)	
		19 20 21	16 21 21	62	22	SS-10	-	-	-	-	-	-	-	-	-	18	A-1-b (V)	
		21 22 23	11 12 21	49	50	SS-11	-	13	60	15	8	4	NP	NP	NP	14	A-1-b (0)	
	799.7	24 25 26 27	10 18 20	56	56	SS-12	-	-	-	-	-	-	-	-	-	11	A-1-b (V)	
VERY DENSE, BROWN BECOMING GRAY, **GRAVEL AND STONE FRAGMENTS**, SOME SAND, TRACE SILT, TRACE CLAY, MOIST		28 29																

PID: 104132	SFN:	PROJECT: CUY-14-6.93	STATION / OFFSET: 380+40, 65' LT.	START: 8/13/21	END: 8/13/21	PG 2 OF 2	B-014-0-21

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
VERY DENSE, BROWN BECOMING GRAY, **GRAVEL AND STONE FRAGMENTS**, SOME SAND, TRACE SILT, TRACE CLAY, MOIST *(continued)*	797.2	31	15 19 20	58	28	SS-13	-	-	-	-	-	-	-	-	-	9	A-1-a (V)	
		32																
		33																
		34																
		35	18 22 27	73	39	SS-14	-	64	20	7	7	2	NP	NP	NP	8	A-1-a (0)	
		36																
		37																
		38																
		39																
		40	14 20 21	61	28	SS-15	-	-	-	-	-	-	-	-	-	11	A-1-a (V)	
		41																
		42																
		43																
		44																
		45	21 24 25	73	44	SS-16	-	-	-	-	-	-	-	-	-	10	A-1-a (V)	
	780.7	46																
VERY STIFF, MAROONISH GRAY, **CLAY**, SOME SILT, TRACE SAND, TRACE GRAVEL, DAMP		47																
		48																
	778.4	49	17			SS-17A	2.25	-	-	-	-	-	-	-	-	12	A-7-6 (V)	
VERY DENSE, GRAY, **COARSE AND FINE SAND**, TRACE GRAVEL, TRACE SILT, TRACE CLAY, MOIST	777.2	EOB 50	20 30	74	44	SS-17B	-	-	-	-	-	-	-	-	-	11	A-3a (V)	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE. RAN A SLURRY MIX AS CIRCULATING FLUID.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: POURED 3 BAGS HOLE PLUG; SHOVELED SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT.GDT - 2/20/24 09:29 - X:\ACTIVE PROJECTS\ACTIVE SOIL PROJECTS\1ARCHIVE BY YEAR\2021 ARCHIVE\CUY-14-6.93\GINT FILES\CUY-14

PROJECT: CUY-14-6.93	DRILLING FIRM / OPERATOR: NEAS / J. HODGES	DRILL RIG: CME 75T	STATION / OFFSET: 381+46, 28' RT.	EXPLORATION ID B-015-0-21
TYPE: RETAINING WALL	SAMPLING FIRM / LOGGER: NEAS / J. HODGES	HAMMER: CME AUTOMATIC	ALIGNMENT: SR-14	
PID: 104132 SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 5/1/19	ELEVATION: 829.0 (MSL) EOB: 45.0 ft.	PAGE 1 OF 2
START: 8/11/21 END: 8/11/21	SAMPLING METHOD: SPT	ENERGY RATIO (%): 89	LAT / LONG: 41.430932, -81.598114	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
VERY LOOSE TO MEDIUM DENSE, BROWN, **COARSE AND FINE SAND**, LITTLE GRAVEL, LITTLE SILT, TRACE CLAY, MOIST	829.0																	
		3	3 5 4	13	100	SS-1	-	-	-	-	-	-	-	-	-	8	A-3a (V)	
		6	1 1 2	4	89	SS-2	-	18	22	34	16	10	NP	NP	NP	11	A-3a (0)	
	822.0																	
VERY STIFF, BROWN, **CLAY**, "AND" SILT, LITTLE SAND, TRACE GRAVEL, MOIST		8	1 1 3	6	100	SS-3	3.50	-	-	-	-	-	-	-	-	27	A-7-6 (V)	
		11	1 2 3	7	100	SS-4	3.25	1	7	10	40	42	50	23	27	30	A-7-6 (17)	
	817.0																	
MEDIUM DENSE TO VERY DENSE, BROWN BECOMING GRAY, **GRAVEL AND STONE FRAGMENTS**, SOME SAND, TRACE SILT, TRACE CLAY, WET TO DAMP		W 816.5																
		13	14 19 20	58	44	SS-5	-	57	22	11	8	2	NP	NP	NP	8	A-1-a (0)	
@15.0' - 45.0'; ENCOUNTERED COBBLES DURING DRILLING		16	13 10 7	25	28	SS-6	-	-	-	-	-	-	-	-	-	17	A-1-a (V)	
		18	9 22 24	68	56	SS-7	-	-	-	-	-	-	-	-	-	16	A-1-a (V)	
		21	15 27 28	82	100	SS-8	-	-	-	-	-	-	-	-	-	8	A-1-a (V)	
		25	18 20 25	67	100	SS-9	-	64	19	9	6	2	NP	NP	NP	8	A-1-a (0)	

PID: 104132	SFN:	PROJECT: CUY-14-6.93	STATION / OFFSET: 381+46, 28' RT.	START: 8/11/21	END: 8/11/21	PG 2 OF 2	B-015-0-21

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
MEDIUM DENSE TO VERY DENSE, BROWN BECOMING GRAY, **GRAVEL AND STONE FRAGMENTS**, SOME SAND, TRACE SILT, TRACE CLAY, WET TO DAMP *(continued)*	799.0	31	17 23 21	65	100	SS-10	-	-	-	-	-	-	-	-	-	9	A-1-a (V)	
		32																
		33																
		34																
		35	21 50/2"	-	25	SS-11	-	-	-	-	-	-	-	-	-	2	A-1-a (V)	
		36																
		37																
		38																
		39																
		40	23 24 27	76	22	SS-12	-	-	-	-	-	-	-	-	-	11	A-1-a (V)	
		41																
		42																
		43																
		44	22 26 31	85	17	SS-13	-	-	-	-	-	-	-	-	-	11	A-1-a (V)	
	784.0	EOB 45																

NOTES: GROUNDWATER ENCOUNTERED AT 12.5' DURING DRILLING. HOLE DID NOT CAVE. RAN A SLURRY MIX AS CIRCULATING FLUID.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: POURED 3 BAGS HOLE PLUG; SHOVELED SOIL CUTTINGS

PROJECT: CUY-14-6.93	DRILLING FIRM / OPERATOR: NEAS / J. HODGES	DRILL RIG: CME 75T	STATION / OFFSET: 382+01, 13' LT.	EXPLORATION ID B-016-0-21
TYPE: RETAINING WALL	SAMPLING FIRM / LOGGER: NEAS / J. HODGES	HAMMER: CME AUTOMATIC	ALIGNMENT: SR-14	
PID: 104132 SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 5/1/19	ELEVATION: 831.0 (MSL) EOB: 35.0 ft.	PAGE 1 OF 2
START: 8/11/21 END: 8/11/21	SAMPLING METHOD: SPT / ST	ENERGY RATIO (%): 89	LAT / LONG: 41.430972, -81.597870	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
DENSE, BLACK AND BROWN, **GRAVEL WITH SAND**, LITTLE SILT, TRACE CLAY, SLIGHTLY ORGANIC, MOIST	831.0	1	6 14 11	37	83	SS-1	-	42	20	16	16	6	NP	NP	NP	11	A-1-b (0)	
	829.5																	
MEDIUM STIFF TO VERY STIFF, BROWN AND GRAY, **CLAY**, LITTLE TO "AND" SILT, TRACE TO LITTLE SAND, TRACE GRAVEL, CONTAINS IRON STAINING, MOIST TO DAMP		2	2 3 4	10	100	SS-2	2.75	5	8	7	37	43	49	22	27	24	A-7-6 (17)	
		3 4	1 2 3	7	56	SS-3	2.00	-	-	-	-	-	-	-	-	28	A-7-6 (V)	
		5	1 2 1	4	100	SS-4	0.75	3	2	2	21	72	52	24	28	29	A-7-6 (18)	
		6 7	1 1 2	4	100	SS-5	1.00	-	-	-	-	-	-	-	-	31	A-7-6 (V)	
@7.8' TO 8.3'; Qu = 1409 PSF @ 13.5%		8 9			77	ST-6	3.50	0	1	1	17	81	54	24	30	32	A-7-6 (19)	
		10	2 2 1	4	100	SS-7	2.00	-	-	-	-	-	-	-	-	27	A-7-6 (V)	
		11 12																
	816.5	13 14	3 5 6	16	100	SS-8	2.75	-	-	-	-	-	-	-	-	22	A-7-6 (V)	
MEDIUM DENSE, BROWN AND GRAY, **GRAVEL AND STONE FRAGMENTS WITH SAND AND SILT**, TRACE CLAY, CONTAINS IRON STAINING, DAMP		15	5 7 7	21	89	SS-9	-	51	18	10	13	8	26	18	8	11	A-2-4 (0)	
	814.0	16 17																
DENSE TO VERY DENSE, GRAY, **GRAVEL AND STONE FRAGMENTS**, "AND" SAND, TRACE SILT, TRACE CLAY, DAMP TO MOIST		18	6 13 17	45	72	SS-10	-	-	-	-	-	-	-	-	-	11	A-1-a (V)	
		19 20	5 19 21	59	83	SS-11	-	50	31	11	7	1	NP	NP	NP	9	A-1-a (0)	
		21 22 23 24																
		25	22 39 43	122	100	SS-12	-	-	-	-	-	-	-	-	-	8	A-1-a (V)	
		26 27 28 29																

PID: 104132	SFN:	PROJECT: CUY-14-6.93	STATION / OFFSET: 382+01, 13' LT.	START: 8/11/21	END: 8/11/21	PG 2 OF 2	B-016-0-21

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
DENSE TO VERY DENSE, GRAY, **GRAVEL AND STONE FRAGMENTS**, "AND" SAND, TRACE SILT, TRACE CLAY, DAMP TO MOIST *(continued)*	801.0	31	17 29 29	86	89	SS-13	-	-	-	-	-	-	-	-	-	7	A-1-a (V)	
		32																
		33																
		34	20 27 33	89	44	SS-14	-	-	-	-	-	-	-	-	-	7	A-1-a (V)	
	796.0	EOB 35																

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE. RAN A SLURRY MIX AS CIRCULATING FLUID.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: POURED 2 BAGS BENTONITE CHIPS; SHOVELED SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT.GDT - 2/20/24 09:29 - X:\ACTIVE PROJECTS\ACTIVE SOIL PROJECTS\1ARCHIVE BY YEAR\2021 ARCHIVE\CUY-14-6.93\GINT FILES\CUY-14

PROJECT: CUY-14-6.93	DRILLING FIRM / OPERATOR: NEAS / ASHBAUGH	DRILL RIG: CME 55T	STATION / OFFSET: 383+04, 46' RT.	EXPLORATION ID B-017-0-21
TYPE: RETAINING WALL	SAMPLING FIRM / LOGGER: NEAS / ASHBAUGH	HAMMER: CME AUTOMATIC	ALIGNMENT: SR-14	
PID: 104132 SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 12/5/19	ELEVATION: 845.8 (MSL) EOB: 41.5 ft.	PAGE 1 OF 2
START: 8/24/21 END: 8/24/21	SAMPLING METHOD: SPT	ENERGY RATIO (%): 68.4	LAT / LONG: 41.430711, -81.597615	

MATERIAL DESCRIPTION AND NOTES	ELEV. 845.8	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
7.0" ASPHALT AND 7.5" CONCRETE (DRILLERS DESCRIPTION)	844.6	1																
STIFF TO VERY STIFF, BROWN AND GRAY, **CLAY**, SOME SILT, TRACE TO LITTLE GRAVEL, TRACE TO LITTLE SAND, CONTAINS TRACE IRON STAINING, MOIST		2																
		3	3 3 4	8	44	SS-1	2.00	-	-	-	-	-	-	-	-	26	A-7-6 (V)	
		4																
		5																
		6	4 4 4	9	56	SS-2	2.25	-	-	-	-	-	-	-	-	27	A-7-6 (V)	
		7																
@7.5'; SS-3 CONTAINS A 2.0" STONE FRAGMENT		8	3 3 3	7	50	SS-3	3.00	16	2	4	26	52	45	20	25	26	A-7-6 (15)	
		9																
		10																
		11	3 2 3	6	56	SS-4	1.75	-	-	-	-	-	-	-	-	25	A-7-6 (V)	
	833.8	12																
MEDIUM DENSE, BROWN, **GRAVEL AND STONE FRAGMENTS WITH SAND**, LITTLE SILT, TRACE CLAY, DAMP		13	4 5 8	15	28	SS-5	-	43	23	17	11	6	NP	NP	NP	9	A-1-b (0)	
	831.3	14																
VERY DENSE, GRAY, **STONE FRAGMENTS**, TRACE SAND, TRACE SILT, TRACE CLAY, POSSIBLE COBBLE(S), DAMP TO DRY		15	50/3"	-	67	SS-6	-	-	-	-	-	-	-	-	-	5	A-1-a (V)	
		16																
		17																
		18	50/3"	-	67	SS-7	-	-	-	-	-	-	-	-	-	2	A-1-a (V)	
	826.3	19																
VERY STIFF TO HARD, GRAY AND BROWN, **CLAY**, SOME SILT, TRACE SAND, TRACE GRAVEL, DAMP TO MOIST		20																
		21	8 7 8	17	67	SS-8	2.50	-	-	-	-	-	-	-	-	22	A-7-6 (V)	
		22																
		23	8 9 12	24	72	SS-9	4.50	4	3	4	34	55	44	22	22	22	A-7-6 (14)	
		24																
		25																
		26	10 10 13	26	83	SS-10	4.50	-	-	-	-	-	-	-	-	20	A-7-6 (V)	
		27																
	817.8	28	9 11 14	29	56	SS-11A	2.50	-	-	-	-	-	-	-	-	23	A-7-6 (V)	
						SS-11B	-	-	-	-	-	-	-	-	-	12	A-1-b (V)	
		29																

PID: 104132	SFN:	PROJECT: CUY-14-6.93	STATION / OFFSET: 383+04, 46' RT.	START: 8/24/21	END: 8/24/21	PG 2 OF 2	B-017-0-21

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
MEDIUM DENSE TO VERY DENSE, BROWN AND GRAY, **GRAVEL AND STONE FRAGMENTS WITH SAND**, LITTLE SILT, TRACE CLAY, SS-11B CONTAINS TRACE IRON STAINING, DAMP TO MOIST *(continued)*	815.8	31	13 14 14	32	44	SS-12	-	-	-	-	-	-	-	-	-	12	A-1-b (V)	
		32																
		33	17 21 27	55	78	SS-13	-	43	22	18	14	3	NP	NP	NP	8	A-1-b (0)	
		34																
		35	15 22 29	58	67	SS-14	-	-	-	-	-	-	-	-	-	11	A-1-b (V)	
		36																
@37.5'; SS-15 CONTAINS NO RECOVERY		37	20 26 31	65	0	SS-15	-	-	-	-	-	-	-	-	-	-	A-1-b (V)	
		38																
		39	22 25 35	68	44	SS-16	-	-	-	-	-	-	-	-	-	10	A-1-b (V)	
	804.3	40 EOB																
		41																

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; POURED 2 BAGS HOLE PLUG; SHOVELED SOIL CUTTINGS

PROJECT: CUY-14-6.93	DRILLING FIRM / OPERATOR: NEAS / ASHBAUGH	DRILL RIG: CME 55T	STATION / OFFSET: 384+07, 19' LT.	EXPLORATION ID B-018-0-21
TYPE: RETAINING WALL	SAMPLING FIRM / LOGGER: NEAS / ASHBAUGH	HAMMER: CME AUTOMATIC	ALIGNMENT: SR-14	
PID: 104132 SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 12/5/19	ELEVATION: 843.8 (MSL) EOB: 22.8 ft.	PAGE 1 OF 1
START: 8/24/21 END: 8/24/21	SAMPLING METHOD: SPT	ENERGY RATIO (%): 68.4	LAT / LONG: 41.430756, -81.597174	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
12.0" ASPHALT AND 6.0" BASE (DRILLERS DESCRIPTION)	843.8																	
	842.3																	
STIFF TO VERY STIFF, BROWNISH GRAY AND BROWN, **CLAY**, SOME SILT, TRACE SAND, TRACE GRAVEL, SS-2 CONTAINS A 1.5" CONCRETE FRAGMENT, MOIST **(FILL)**		1																
		2																
		3	3 3 4	8	56	SS-1	4.00	5	3	5	35	52	42	20	22	24	A-7-6 (13)	
		4																
		5	4 3 4	8	22	SS-2	2.75	-	-	-	-	-	-	-	-	22	A-7-6 (V)	
		6																
		7																
		8	4 4 6	11	61	SS-3	2.25	4	4	6	29	57	44	20	24	25	A-7-6 (14)	
		9																
		10																
		11	5 5 5	11	78	SS-4	2.00	-	-	-	-	-	-	-	-	24	A-7-6 (V)	
	831.8	12																
STIFF TO HARD, BROWN, **SILT**, SOME SAND, LITTLE CLAY, TRACE GRAVEL, CONTAINS IRON STAINING, DAMP TO MOIST **(FILL)**		13	6 5 6	13	67	SS-5	4.50	-	-	-	-	-	-	-	-	13	A-4b (V)	
		14																
		15																
		16	2 2 3	6	56	SS-6	2.00	3	3	18	57	19	26	18	8	22	A-4b (8)	
		17																
		18	4 3 4	8	44	SS-7	1.75	-	-	-	-	-	-	-	-	20	A-4b (V)	
	824.3	19																
LOOSE, BROWN, **GRAVEL WITH SAND**, LITTLE SILT, TRACE CLAY, DAMP **(FILL)**		20																
		21	3 3 5	9	56	SS-8	-	-	-	-	-	-	-	-	-	8	A-1-b (V)	
	821.8	22																
VERY DENSE, RED, **STONE FRAGMENTS (BRICK)**, TRACE SAND, TRACE SILT, TRACE CLAY, CONTAINS A 2.0" BRICK FRAGMENT, DAMP **(FILL)**	821.0	EOB	50/4"	-	50	SS-9	-	-	-	-	-	-	-	-	-	5	A-1-a (V)	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE. BORING OFFSET 10.0' NE DUE TO UTILITIES.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; SHOVELED SOIL CUTTINGS

PROJECT: CUY-14-6.93	DRILLING FIRM / OPERATOR: NEAS / JL	DRILL RIG: CME 55T	STATION / OFFSET: 385+30, 53' LT.	EXPLORATION ID B-019-0-21
TYPE: SUBGRADE	SAMPLING FIRM / LOGGER: NEAS / JL	HAMMER: CME AUTOMATIC	ALIGNMENT: SR-14	
PID: 104132 SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 12/5/19	ELEVATION: 843.7 (MSL) EOB: 7.5 ft.	PAGE 1 OF 1
START: 9/13/21 END: 9/13/21	SAMPLING METHOD: SPT	ENERGY RATIO (%): 68.4	LAT / LONG: 41.430718, -81.596761	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
	843.7																	
3.5" TOPSOIL (DRILLERS DESCRIPTION)	843.4																	
VERY STIFF TO HARD, BROWN AND GRAY, **CLAY**, LITTLE SILT, TRACE GRAVEL, TRACE SAND, MOIST		1																
		2	3 4 6	11	61	SS-1	3.75	3	1	1	15	80	52	25	27	29	A-7-6 (17)	
		3	3 4 6	11	67	SS-2	3.75	1	0	0	20	79	56	26	30	30	A-7-6 (19)	
		4	3 5 4	10	72	SS-3	3.50	-	-	-	-	-	-	-	-	31	A-7-6 (V)	
		5	4 5 4	10	89	SS-4	4.25	-	-	-	-	-	-	-	-	28	A-7-6 (V)	
	836.2	6 EOB																
		7																

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: SHOVELED SOIL CUTTINGS

PROJECT: CUY-14-6.93	DRILLING FIRM / OPERATOR: NEAS / J. HODGES	DRILL RIG: CME 75T	STATION / OFFSET: 373+66, 148' RT.	EXPLORATION ID B-020-0-21
TYPE: RETAINING WALL	SAMPLING FIRM / LOGGER: NEAS / J. HODGES	HAMMER: CME AUTOMATIC	ALIGNMENT: SR-14	
PID: 104132 SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 5/1/19	ELEVATION: 816.2 (MSL) EOB: 45.0 ft.	PAGE 1 OF 2
START: 8/6/21 END: 8/6/21	SAMPLING METHOD: SPT	ENERGY RATIO (%): 89	LAT / LONG: 41.430969, -81.600935	

MATERIAL DESCRIPTION AND NOTES	ELEV. 816.2	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	HOLE SEALED
MEDIUM DENSE, BROWN AND GRAY, **GRAVEL WITH SAND AND SILT**, TRACE CLAY, DAMP			6 10 9	28	50	SS-1	-	33	25	16	18	8	NP	NP	NP	7	A-2-4 (0)	
	811.7																	
VERY LOOSE TO LOOSE, BROWN, **COARSE AND FINE SAND**, LITTLE SILT, LITTLE GRAVEL, TRACE CLAY, CONTAINS INTERBEDDED 1.0" SILTY CLAY SEAMS, WET			3 2 2	6	100	SS-2	-	-	-	-	-	-	-	-	-	16	A-3a (V)	
	806.7		2 2 1	4	89	SS-3	-	11	25	35	19	10	NP	NP	NP	18	A-3a (0)	
MEDIUM DENSE, BROWN, **STONE FRAGMENTS**, SOME SAND, LITTLE SILT, TRACE CLAY, MOIST TO WET @10.0' - 45.0'; ENCOUNTERED COBBLES DURING DRILLING		W 806.2	2 6 8	21	28	SS-4	-	-	-	-	-	-	-	-	-	12	A-1-a (V)	
	801.7		5 7 8	22	56	SS-5	-	59	14	12	12	3	NP	NP	NP	14	A-1-a (0)	
MEDIUM DENSE TO VERY DENSE, GRAY, **GRAVEL WITH SAND**, TRACE SILT, TRACE CLAY, WET TO MOIST			13 12 7	28	100	SS-6	-	-	-	-	-	-	-	-	-	16	A-1-b (V)	
			9 18 21	58	100	SS-7	-	-	-	-	-	-	-	-	-	13	A-1-b (V)	
			12 18 19	55	33	SS-8	-	-	-	-	-	-	-	-	-	11	A-1-b (V)	
			14 18 22	59	33	SS-9	-	-	-	-	-	-	-	-	-	10	A-1-b (V)	
			16 18 22	59	50	SS-10	-	36	36	15	10	3	NP	NP	NP	11	A-1-b (0)	
			18 21 22	64	28	SS-11	-	-	-	-	-	-	-	-	-	12	A-1-b (V)	

PID: 104132	SFN:	PROJECT: CUY-14-6.93	STATION / OFFSET: 373+66, 148' RT.	START: 8/6/21	END: 8/6/21	PG 2 OF 2	B-020-0-21

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	HOLE SEALED
MEDIUM DENSE TO VERY DENSE, GRAY, **GRAVEL WITH SAND**, TRACE SILT, TRACE CLAY, WET TO MOIST *(continued)*	786.2	31	16 22 31	79	44	SS-12	-	-	-	-	-	-	-	-	-	10	A-1-b (V)	
		32																
		33	17 20 29	73	61	SS-13	-	-	-	-	-	-	-	-	-	10	A-1-b (V)	
		34																
		35																
		36	13 19 24	64	28	SS-14	-	-	-	-	-	-	-	-	-	13	A-1-b (V)	
		37																
		38																
		39																
		40																
		41	9 21 22	64	33	SS-15	-	-	-	-	-	-	-	-	-	12	A-1-b (V)	
		42																
		43																
	771.2	44	25 28 39	99	100	SS-16	-	47	30	11	8	4	NP	NP	NP	9	A-1-b (0)	
		EOB 45																

NOTES: GROUNDWATER ENCOUNTERED AT 10.0' DURING DRILLING. HOLE DID NOT CAVE. RAN A SLURRY MIX AS CIRCULATING FLUID.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PUMPED 100 GAL. BENTONITE GROUT

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT.GDT - 2/20/24 09:29 - X:\ACTIVE PROJECTS\ACTIVE SOIL PROJECTS\1ARCHIVE BY YEAR\2021 ARCHIVE\CUY-14-6.93\GINT FILES\CUY-14

PROJECT: CUY-14-6.93	DRILLING FIRM / OPERATOR: NEAS / J. HODGES	DRILL RIG: CME 55X	STATION / OFFSET: 374+43, 176' RT.	EXPLORATION ID B-021-0-21
TYPE: CULVERT	SAMPLING FIRM / LOGGER: NEAS / J. HODGES	HAMMER: CME AUTOMATIC	ALIGNMENT: SR-14	
PID: 104132 SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 12/5/19	ELEVATION: 816.6 (MSL) EOB: 48.8 ft.	PAGE 1 OF 2
START: 8/31/21 END: 8/31/21	SAMPLING METHOD: SPT / ST	ENERGY RATIO (%): 81.9	LAT / LONG: 41.430865, -81.600658	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	HOLE SEALED
VERY STIFF, BROWN, **SANDY SILT**, LITTLE GRAVEL, LITTLE CLAY, CONTAINS IRON STAINING, DAMP TO MOIST	816.6																	
		1																
		2																
		3	7 4 4	11	100	SS-1	2.50	19	18	19	29	15	22	15	7	11	A-4a (2)	
		4																
		5	3 2 2	5	100	SS-2	3.00	-	-	-	-	-	-	-	-	19	A-4a (V)	
	809.6	6																
SOFT TO STIFF, BROWN, **SILT AND CLAY**, SOME SAND, SOME GRAVEL, DAMP	808.2	7																
@7.6' TO 8.1'; Qu = 582 PSF @ 3.5% @8.2'; CONTAINS A 3.0" BLACK ORGANIC SEAM CONTAINING WOOD FRAGMENTS	807.2	8			100	ST-3	1.25	23	18	16	22	21	28	17	11	15	A-6a (2)	
BROWNISH GRAY WITH TRACE BLACK STREAKS, **COARSE AND FINE SAND**, LITTLE SILT, TRACE GRAVEL, TRACE CLAY, SLIGHTLY ORGANIC, WET	804.8	9																
		10	5 15 17	44	100	SS-4	0.25	-	-	-	-	-	-	-	-	29	A-7-6 (V)	
SOFT, DARK GRAY, **CLAY**, SOME SILT, LITTLE SAND, TRACE GRAVEL, CONTAINS IRON STAINING, MOIST		11																
		12																
		13	6 18 31	67	100	SS-5	-	39	24	15	16	6	NP	NP	NP	9	A-1-b (0)	
VERY DENSE, GRAY, **GRAVEL AND STONE FRAGMENTS WITH SAND**, TRACE TO LITTLE SILT, TRACE CLAY, DAMP TO WET		14																
@11.8' TO 48.8'; ENCOUNTERED COBBLES AND/OR BOULDERS DURING DRILLING		15																
		16	9 15 32	64	39	SS-6	-	-	-	-	-	-	-	-	-	10	A-1-b (V)	
		17																
		18	25 36 34	96	44	SS-7	-	-	-	-	-	-	-	-	-	9	A-1-b (V)	
		19																
		20																
		21	7 28 41	94	56	SS-8	-	41	28	16	12	3	NP	NP	NP	10	A-1-b (0)	
		22																
		23	10 31 50/3"	-	20	SS-9	-	-	-	-	-	-	-	-	-	9	A-1-b (V)	
		24																
		25	40 50/4"	-	40	SS-10	-	-	-	-	-	-	-	-	-	15	A-1-b (V)	
		26																
		27																
		28	35 49 50/2"	-	29	SS-11	-	-	-	-	-	-	-	-	-	13	A-1-b (V)	
		29																

PID: 104132	SFN:	PROJECT: CUY-14-6.93	STATION / OFFSET: 374+43, 176' RT.	START: 8/31/21	END: 8/31/21	PG 2 OF 2	B-021-0-21

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	HOLE SEALED
VERY DENSE, GRAY, **GRAVEL AND STONE FRAGMENTS WITH SAND**, TRACE TO LITTLE SILT, TRACE CLAY, DAMP TO WET *(continued)*	786.6	31	36 50	-	25	SS-12	-	-	-	-	-	-	-	-	-	14	A-1-b (V)	
		33	33 40 50/2"	-	21	SS-13	-	-	-	-	-	-	-	-	-	14	A-1-b (V)	
		35	37 50/3"	-	22	SS-14	-	-	-	-	-	-	-	-	-	18	A-1-b (V)	
		40	29 38 42	109	28	SS-15	-	-	-	-	-	-	-	-	-	14	A-1-b (V)	
		45	39 50/4"	-	20	SS-16	-	-	-	-	-	-	-	-	-	17	A-1-b (V)	
	769.3																	
VERY DENSE, GRAY, **STONE FRAGMENTS**, TRACE SAND, TRACE SILT, TRACE CLAY, DAMP	767.8	EOB	50/4"	-	50	SS-17	-	-	-	-	-	-	-	-	-	4	A-1-a (V)	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE DID NOT CAVE. RAN A SLURRY MIX AT 10.0' TO COMBAT HEAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: POURED 1 BAG BENTONITE CHIPS; PUMPED 100 GAL. BENTONITE GROUT; SHOVELED SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT.GDT - 2/20/24 09:29 - X:\ACTIVE PROJECTS\ACTIVE SOIL PROJECTS\1ARCHIVE BY YEAR\2021 ARCHIVE\CUY-14-6.93\GINT FILES\CUY-14

PROJECT: CUY-14-6.93	DRILLING FIRM / OPERATOR: NEAS / ASHBAUGH	DRILL RIG: CME 55T	STATION / OFFSET: 374+00, 292' RT.	EXPLORATION ID B-022-0-21
TYPE: CULVERT	SAMPLING FIRM / LOGGER: NEAS / ASHBAUGH	HAMMER: CME AUTOMATIC	ALIGNMENT: SR-14	
PID: 104132 SFN:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 12/5/19	ELEVATION: 849.3 (MSL) EOB: 51.5 ft.	PAGE 1 OF 2
START: 8/26/21 END: 8/26/21	SAMPLING METHOD: SPT	ENERGY RATIO (%): 68.4	LAT / LONG: 41.430563, -81.600868	

MATERIAL DESCRIPTION AND NOTES	ELEV. 849.3	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
4.0" TOPSOIL (DRILLERS DESCRIPTION)	849.0	1	5 7 12	22	44	SS-1	-	39	26	21	11	3	NP	NP	NP	5	A-1-b (0)	
MEDIUM DENSE TO VERY DENSE, BROWN, **GRAVEL AND STONE FRAGMENTS WITH SAND**, LITTLE SILT, TRACE CLAY, SS-1 CONTAINS ROOT HAIRS, DAMP TO MOIST		2	8 10 11	24	44	SS-2	-	-	-	-	-	-	-	-	-	10	A-1-b (V)	
		3 4	12 14 11	29	28	SS-3	-	62	11	11	13	3	NP	NP	NP	4	A-1-b (0)	
		5	10 19 21	46	50	SS-4	-	-	-	-	-	-	-	-	-	5	A-1-b (V)	
		6 7	9 16 22	43	56	SS-5	-	-	-	-	-	-	-	-	-	5	A-1-b (V)	
		8	10 17 24	47	67	SS-6	-	29	38	15	14	4	NP	NP	NP	5	A-1-b (0)	
		9 10																
		11	18 22 26	55	56	SS-7	-	-	-	-	-	-	-	-	-	4	A-1-b (V)	
		12																
	834.8	13	15 21 25	52	61	SS-8	-	-	-	-	-	-	-	-	-	4	A-1-b (V)	
VERY DENSE, LIGHT BROWN, **COARSE AND FINE SAND**, TRACE GRAVEL, TRACE SILT, TRACE CLAY, DAMP		14 15																
	832.3	16	12 21 29	57	61	SS-9	-	-	-	-	-	-	-	-	-	5	A-3a (V)	
DENSE TO VERY DENSE, BROWN, **GRAVEL AND STONE FRAGMENTS**, SOME SAND, TRACE SILT, TRACE CLAY, DAMP		17 18	10 15 28	49	50	SS-10	-	52	18	16	10	4	NP	NP	NP	5	A-1-a (0)	
		19 20																
		21	20 34 40	84	33	SS-11	-	-	-	-	-	-	-	-	-	6	A-1-a (V)	
		22 23	20 29 40	79	22	SS-12	-	-	-	-	-	-	-	-	-	5	A-1-a (V)	
	824.8	24 25																
VERY DENSE, BROWN, **COARSE AND FINE SAND**, TRACE SILT, TRACE CLAY, TRACE GRAVEL, DAMP		26	12 21 30	58	50	SS-13	-	1	29	56	10	4	NP	NP	NP	6	A-3a (0)	
		27 28	15 20 26	52	56	SS-14	-	-	-	-	-	-	-	-	-	7	A-3a (V)	
	819.8	29																

PID: 104132	SFN:	PROJECT: CUY-14-6.93	STATION / OFFSET: 374+00, 292' RT.	START: 8/26/21	END: 8/26/21	PG 2 OF 2	B-022-0-21

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	BACK FILL
VERY DENSE, BROWN, **GRAVEL AND STONE FRAGMENTS WITH SAND**, TRACE SILT, TRACE CLAY, DAMP *(continued)*	819.3		12 50/2"	-	63	SS-15	-	-	-	-	-	-	-	-	-	5	A-1-b (V)	
DENSE TO VERY DENSE, BROWN, **COARSE AND FINE SAND**, TRACE GRAVEL, TRACE SILT, TRACE CLAY, DAMP	817.3		12 17 26	49	67	SS-16	-	-	-	-	-	-	-	-	-	6	A-3a (V)	
	811.0	W 811.1	14 21 30	58	83	SS-17	-	-	-	-	-	-	-	-	-	7	A-3a (V)	
VERY DENSE, BROWN, **GRAVEL AND STONE FRAGMENTS WITH SAND**, LITTLE SILT, TRACE CLAY, MOIST	806.0		16 24 31	63	50	SS-18	-	50	21	13	12	4	NP	NP	NP	9	A-1-b (0)	
VERY DENSE, BROWN, **GRAVEL**, "AND" SAND, TRACE SILT, TRACE CLAY, MOIST TO WET			14 23 30	60	67	SS-19	-	52	25	12	8	3	NP	NP	NP	9	A-1-a (0)	
	797.8	EOB	20 22 35	65	72	SS-20	-	-	-	-	-	-	-	-	-	13	A-1-a (V)	

NOTES: GROUNDWATER ENCOUNTERED AT 38.2' DURING DRILLING. HOLE DID NOT CAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: SHOVELED SOIL CUTTINGS

APPENDIX C

GEOTECHNICAL BULLETIN 1 (GB1) ANALYSIS SPREADSHEETS

OHIO DEPARTMENT OF TRANSPORTATION

OFFICE OF GEOTECHNICAL ENGINEERING

PLAN SUBGRADES
Geotechnical Bulletin GB1

CUY-14-6.93
104132
SR-14 (366+40 to 368+85)
(Replacement of existing Bridge CUY-14-0693)

NEAS Inc.

Prepared By: Brendan P Andrews, PE
Date prepared: Monday, February 13, 2023

Brendan P. Andrews
1329 East Kemper Road
Suite 4104B
Cincinnati, OH 45246
513.337.9823 Ext. 701
brendan.andrews@neasinc.com

NO. OF BORINGS: 1

#	Boring ID	Alignment	Station	Offset	Dir	Drill Rig	ER	Boring EL.	Proposed Subgrade EL	Cut Fill
1	B-001-0-21	SR-14	368+69	29	Right	CME 55T	68	831.3	832.2	0.9 F

OHIO DEPARTMENT OF TRANSPORTATION

Subgrade Analysis

V. 14.5 1/18/2019

#	Boring	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 001-0 21	SS-1	1.0	4.0	1.9	4.9	10									10	6	A-1-b	0						
		SS-2	5.0	6.5	5.9	7.4	15		4.25	23	16	7	46	21	67	15	11	A-4a							
								10																	

OHIO DEPARTMENT OF TRANSPORTATION

Subgrade Analysis

V. 14.5 1/18/2019

PID: 104132

County-Route-Section: CUY-14-6.93
No. of Borings: 1

Geotechnical Consultant: NEAS Inc.
Prepared By: Brendan P Andrews, PE
Date prepared: 2/13/2023

Chemical Stabilization Options		
320	Rubblize & Roll	No
206	Cement Stabilization	Option
	Lime Stabilization	No
206	Depth	14"

Excavate and Replace Stabilization Options	
Global Geotextile Average(N60L):	12"
Average(HP):	0"
Global Geogrid Average(N60L):	0"
Average(HP):	0"

Design CBR	13

% Samples within 6 feet of subgrade			
$N_{60} \leq 5$	0%	HP ≤ 0.5	0%
$N_{60} < 12$	50%	0.5 < HP ≤ 1	0%
$12 \leq N_{60} < 15$	0%	1 < HP ≤ 2	0%
$N_{60} \geq 20$	0%	HP > 2	50%
M+	0%		
Rock	0%		
Unsuitable	0%		

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

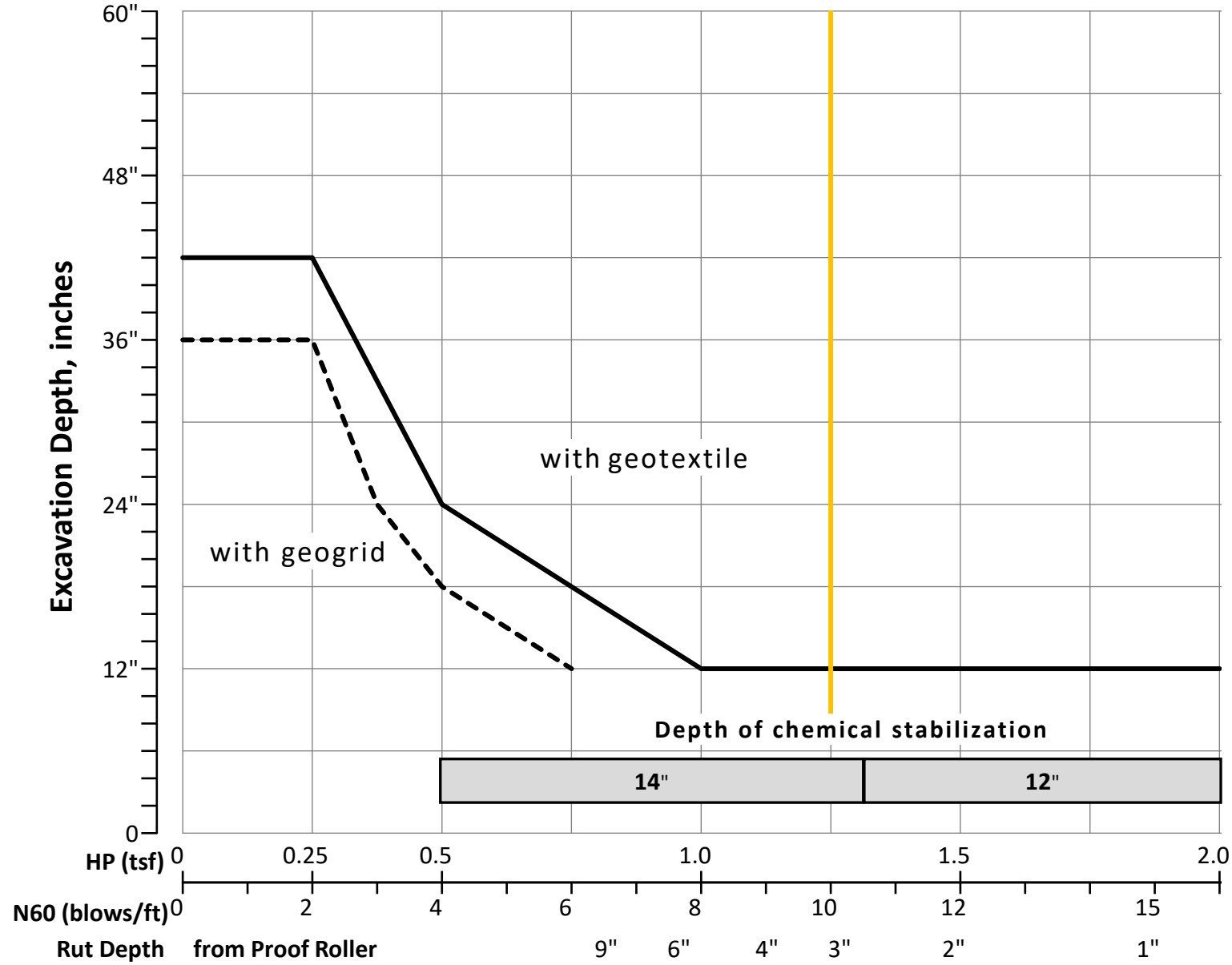
% Proposed Subgrade Surface	
Unstable & Unsuitable	0%
Unstable	0%
Unsuitable	0%

	N_{60}	N_{60L}	HP	LL	PL	PI	Silt	Clay	P 200	M_C	M_{OPT}	GI
Average	13	10	4.25	23	16	7	46	21	67	13	9	0
Maximum	15	10	4.25	23	16	7	46	21	67	15	11	0
Minimum	10	10	4.25	23	16	7	46	21	67	10	6	0

Classification Counts by Sample

ODOT Class	Rock	A-1-a	A-1-b	A-2-4	A-2-5	A-2-6	A-2-7	A-3	A-3a	A-4a	A-4b	A-5	A-6a	A-6b	A-7-5	A-7-6	A-8a	A-8b	Totals
Count	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2
Percent	0%	0%	50%	0%	0%	0%	0%	0%	0%	50%	0%	0%	0%	0%	0%	0%	0%	0%	100%
% Rock|Granular|Cohesive	0%	100%									0%								100%
Surface Class Count	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Surface Class Percent	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%

GB1 Figure B – Subgrade Stabilization



OVERRIDE TABLE

Calculated Average	New Values	Check to Override
4.25	0.50	☐ HP
10.00	6.00	☐ N60L

Average HP
Average N_{60L}

OHIO DEPARTMENT OF TRANSPORTATION

OFFICE OF GEOTECHNICAL ENGINEERING

PLAN SUBGRADES
Geotechnical Bulletin GB1

CUY-14-6.93
104132
SR-14 (382+00 to 385+40) / Old Broadway Ave
(Replacement of existing Bridge CUY-14-0693)

NEAS Inc.

Prepared By: Brendan P Andrews, PE
Date prepared: Monday, February 13, 2023

Brendan P. Andrews
1329 East Kemper Road
Suite 4104B
Cincinnati, OH 45246
513.337.9823 Ext. 701
brendan.andrews@neasinc.com

NO. OF BORINGS: 3

#	Boring ID	Alignment	Station	Offset	Dir	Drill Rig	ER	Boring EL.	Proposed Subgrade EL	Cut Fill
1	B-017-0-21	SR-14	383+04	46	Right	CME 55T	68	845.5	845.6	0.1 F
2	B-018-0-21	SR-14	384+07	19	Left	CME 55T	68	843.8	842.9	0.9 C
3	B-019-0-21	SR-14	385+30	53	Right	CME 55T	68	843.7	841.0	2.7 C

OHIO DEPARTMENT OF TRANSPORTATION

Subgrade Analysis

V. 14.5 1/18/2019

#	Boring	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 017-0 21	SS-1	2.5	4.0	2.6	4.1	8		2							26	18	A-7-6	16						
		SS-2	5.0	6.5	5.1	6.6	9		2.25							27	18	A-7-6							
								8																	
2	B 018-0 21	SS-1	2.5	4.0	1.6	3.1	8		4	42	20	22	35	52	87	24	18	A-7-6	13			N_{60} & Mc			
		SS-2	5.0	6.5	4.1	5.6	8		2.75							22	18	A-7-6	16						
								8																	
3	B 019-0 21	SS-1	1.5	3.0	-1.2	0.3	11		3.75	52	25	27	15	80	95	29	22	A-7-6	17			N_{60} & Mc		12"	
		SS-2	3.0	4.5	0.3	1.8	11		3.75	56	26	30	20	79	99	30	23	A-7-6	19			N_{60} & Mc		12"	
		SS-3	4.5	6.0	1.8	3.3	10		3.5							31	18	A-7-6	16			N_{60} & Mc			
		SS-4	6.0	7.5	3.3	4.8	10	10	4.25							28	18	A-7-6	16						

PID: 104132

County-Route-Section: CUY-14-6.93

No. of Borings: 3

Geotechnical Consultant: NEAS Inc.

Prepared By: Brendan P Andrews, PE

Date prepared: 2/13/2023

Chemical Stabilization Options		
320	Rubblize & Roll	No
206	Cement Stabilization	No
	Lime Stabilization	Option
206	Depth	14''

Excavate and Replace Stabilization Options	
Global Geotextile Average(N60L):	12''
Average(HP):	0''
Global Geogrid Average(N60L):	0''
Average(HP):	0''

Design CBR	4

% Samples within 6 feet of subgrade			
$N_{60} \leq 5$	0%	HP ≤ 0.5	0%
$N_{60} < 12$	100%	0.5 < HP ≤ 1	0%
$12 \leq N_{60} < 15$	0%	1 < HP ≤ 2	13%
$N_{60} \geq 20$	0%	HP > 2	88%
M+	50%		
Rock	0%		
Unsuitable	0%		

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

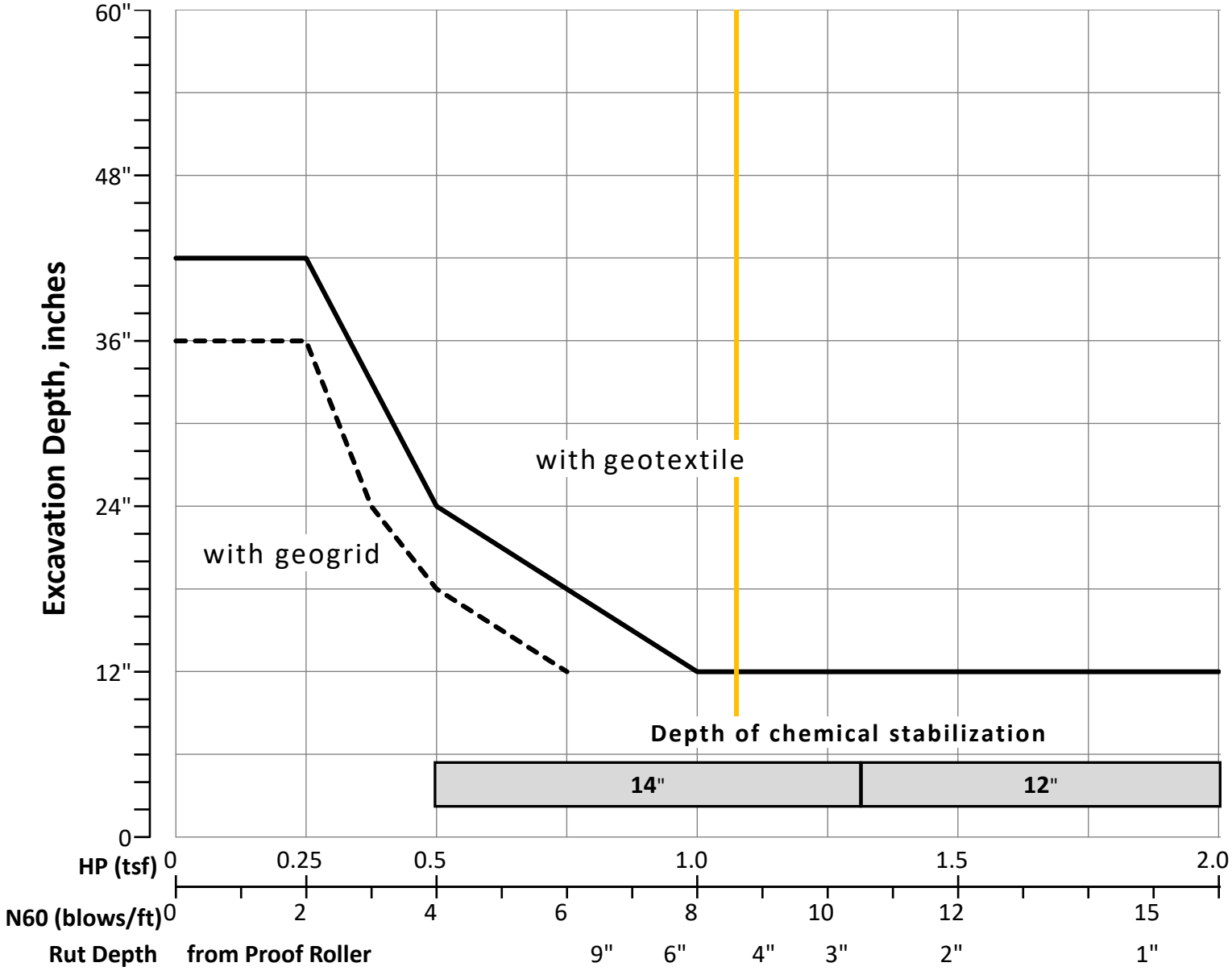
% Proposed Subgrade Surface	
Unstable & Unsuitable	80%
Unstable	80%
Unsuitable	0%

	N_{60}	N_{60L}	HP	LL	PL	PI	Silt	Clay	P 200	M_C	M_{OPT}	GI
Average	9	9	3.28	50	24	26	23	70	94	27	19	16
Maximum	11	10	4.25	56	26	30	35	80	99	31	23	19
Minimum	8	8	2.00	42	20	22	15	52	87	22	18	13

Classification Counts by Sample

ODOT Class	Rock	A-1-a	A-1-b	A-2-4	A-2-5	A-2-6	A-2-7	A-3	A-3a	A-4a	A-4b	A-5	A-6a	A-6b	A-7-5	A-7-6	A-8a	A-8b	Totals
Count	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	8
Percent	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	100%
% Rock|Granular|Cohesive	0%	0%					0%				100%								100%
Surface Class Count	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	5
Surface Class Percent	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	100%

GB1 Figure B – Subgrade Stabilization



OVERRIDE TABLE

Calculated Average	New Values	Check to Override
3.28	0.50	☐ HP
8.67	6.00	☐ N60L

Average HP
Average N_{60L}

OHIO DEPARTMENT OF TRANSPORTATION

OFFICE OF GEOTECHNICAL ENGINEERING

PLAN SUBGRADES
Geotechnical Bulletin GB1

CUY-14-6.93
104132
Henry St
(Replacement of existing Bridge CUY-14-0693)

NEAS Inc.

Prepared By: Brendan P Andrews, PE
Date prepared: Monday, February 13, 2023

Brendan P. Andrews
1329 East Kemper Road
Suite 4104B
Cincinnati, OH 45246
513.337.9823 Ext. 701
brendan.andrews@neasinc.com

NO. OF BORINGS: 1

#	Boring ID	Alignment	Station	Offset	Dir	Drill Rig	ER	Boring EL.	Proposed Subgrade EL	Cut Fill
1	B-022-0-21	Henry St	17+02	12	Right	CME 55T	68	849.3	848.1	1.2 C

OHIO DEPARTMENT OF TRANSPORTATION

Subgrade Analysis

V. 14.5 1/18/2019

#	Boring	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 022-0 21	SS-1	0.0	1.5	-1.2	0.3	22			NP	Np	NP	11	3	14	5	6	A-1-b	0						
		SS-2	1.5	3.0	0.3	1.8	24									10	6	A-1-b	0						
		SS-3	3.0	4.5	1.8	3.3	29			Np	NP	NP	13	3	16	4	6	A-1-b	0						
		SS-4	4.5	6.0	3.3	4.8	46	22								5	6	A-1-b	0						

OHIO DEPARTMENT OF TRANSPORTATION

Subgrade Analysis

V. 14.5 1/18/2019

PID: 104132

County-Route-Section: CUY-14-6.93
No. of Borings: 1

Geotechnical Consultant: NEAS Inc.
Prepared By: Brendan P Andrews, PE
Date prepared: 2/13/2023

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

Excavate and Replace Stabilization Options	
Global Geotextile Average(N60L): Average(HP):	#N/A
Global Geogrid Average(N60L): Average(HP):	#N/A

Design CBR	13

% Samples within 6 feet of subgrade			
$N_{60} \leq 5$	0%	HP ≤ 0.5	0%
$N_{60} < 12$	0%	0.5 < HP ≤ 1	0%
$12 \leq N_{60} < 15$	0%	1 < HP ≤ 2	0%
$N_{60} \geq 20$	100%	HP > 2	0%
M+	0%		
Rock	0%		
Unsuitable	0%		

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

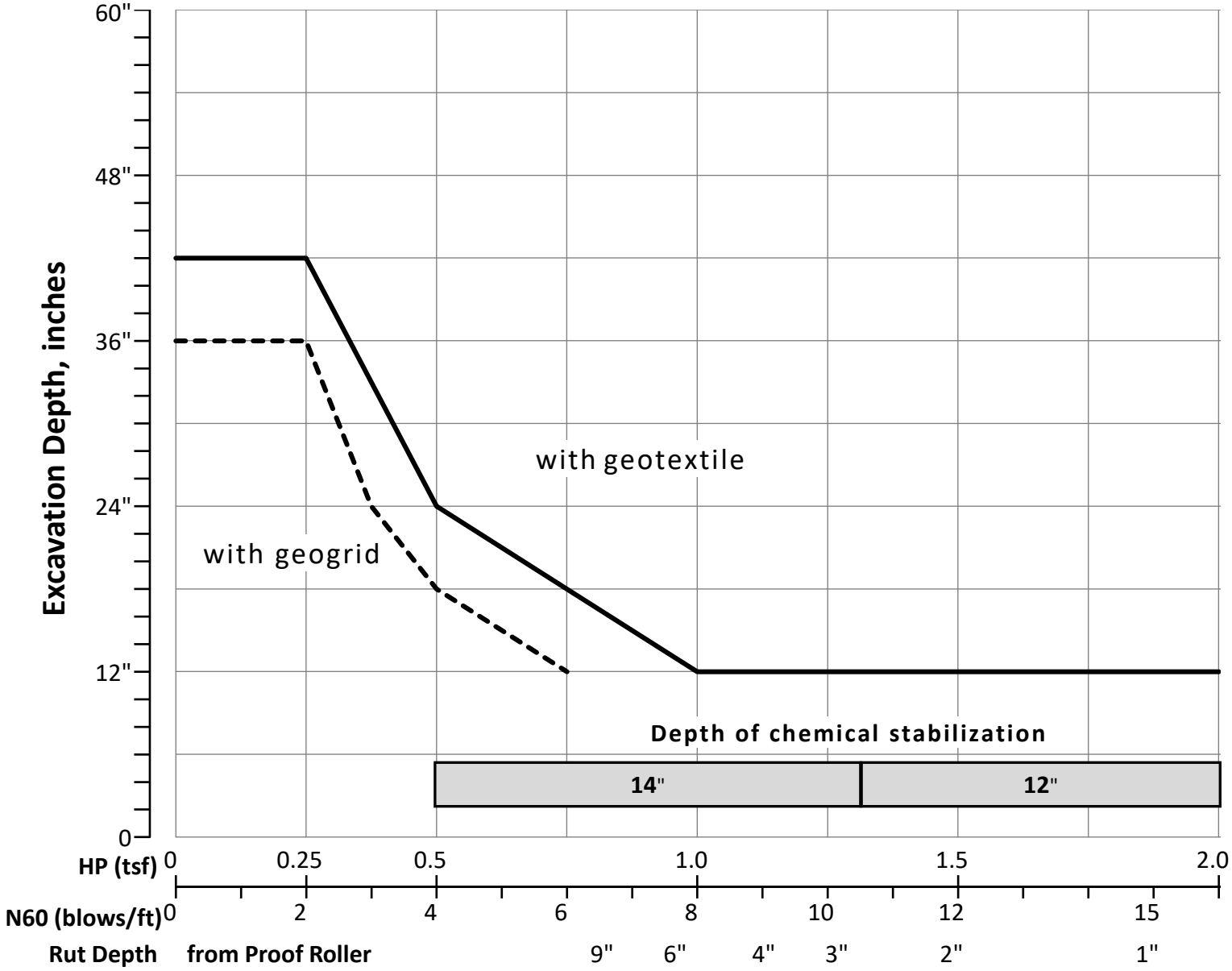
% Proposed Subgrade Surface	
Unstable & Unsuitable	0%
Unstable	0%
Unsuitable	0%

	N_{60}	N_{60L}	HP	LL	PL	PI	Silt	Clay	P 200	M_C	M_{OPT}	GI
Average	30	22					12	3	15	6	6	0
Maximum	46	22	0.00	0	0	0	13	3	16	10	6	0
Minimum	22	22	0.00	0	0	0	11	3	14	4	6	0

Classification Counts by Sample

ODOT Class	Rock	A-1-a	A-1-b	A-2-4	A-2-5	A-2-6	A-2-7	A-3	A-3a	A-4a	A-4b	A-5	A-6a	A-6b	A-7-5	A-7-6	A-8a	A-8b	Totals
Count	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Percent	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
% Rock|Granular|Cohesive	0%	100%									0%								100%
Surface Class Count	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Surface Class Percent	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%

GB1 Figure B – Subgrade Stabilization



OVERRIDE TABLE

Calculated Average	New Values	Check to Override
	4.50	☑ HP
22.00	6.00	☐ N60L

Average HP
Average N_{60L}

OHIO DEPARTMENT OF TRANSPORTATION

OFFICE OF GEOTECHNICAL ENGINEERING

PLAN SUBGRADES
Geotechnical Bulletin GB1

CUY-14-6.93
104132
Chaincraft Road
(Replacement of existing Bridge CUY-14-0693)

NEAS Inc.

Prepared By: Brendan P Andrews, PE
Date prepared: Monday, February 13, 2023

Brendan P. Andrews
1329 East Kemper Road
Suite 4104B
Cincinnati, OH 45246
513.337.9823 Ext. 701
brendan.andrews@neasinc.com

NO. OF BORINGS: 5

#	Boring ID	Alignment	Station	Offset	Dir	Drill Rig	ER	Boring EL.	Proposed Subgrade EL	Cut Fill
1	B-006-0-21	Chaincraft Rd	110+52	28	Right	CME 75T	89	812.9	812.2	0.7 C
2	B-008-0-21	Chaincraft Rd	111+61	5	Left	CME 75T	89	815.0	814.0	1.0 C
3	B-007-0-21	Chaincraft Rd	112+78	32	Right	CME 75T	89	815.2	814.9	0.4 C
4	B-009-0-21	Chaincraft Rd	113+00	23	Left	CME 55T	68	814.9	815.0	0.1 F
5	B-021-0-21	Chaincraft Rd	114+17	25	Right	CME 55X	82	816.6	815.8	0.8 C

OHIO DEPARTMENT OF TRANSPORTATION

Subgrade Analysis

V. 14.5 1/18/2019

#	Boring	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	SS-1	2.5	4.0	1.8	3.3	12									14	8	A-3a	0						
	006-0	SS-2	5.0	6.5	4.3	5.8	6									19	8	A-3a	0						
	21	SS-3	7.5	9.0	6.8	8.3	13			NP	NP	NP	16	2	18	14	6	A-1-b							
								6																	
2	B	SS-1	2.5	4.0	1.5	3.0	27			NP	NP	NP	32	11	43	16	11	A-4a	2			Mc			
	008-0	SS-2	5.0	6.5	4.0	5.5	10									18	8	A-3a	0						
	21	SS-3	7.5	9.0	6.5	8.0	16									24	8	A-3a							
								10																	
3	B	SS-1	2.5	4.0	2.1	3.7	4									18	6	A-1-b	0						
	007-0	SS-2	5.0	6.5	4.7	6.2	3									16	6	A-1-b	0						
	21																								
								3																	
4	B	SS-1	2.5	4.0	2.6	4.1	8									20	6	A-1-b	0						
	009-0	SS-2	5.0	6.5	5.1	6.6	1			NP	NP	NP	34	10	44	29	11	A-4a							
	21	SS-3	7.5	9.0	7.6	9.1	11									28	10	A-4a							
								1																	
5	B	SS-1	2.5	4.0	1.7	3.2	11		2.5	22	15	7	29	15	44	11	10	A-4a	2			N_{60}			
	021-0	SS-2	5.0	6.5	4.2	5.7	5		3							19	10	A-4a	8						
	21																								
								5																	

OHIO DEPARTMENT OF TRANSPORTATION

Subgrade Analysis

V. 14.5 1/18/2019

PID: 104132

County-Route-Section: CUY-14-6.93
No. of Borings: 5

Geotechnical Consultant: NEAS Inc.
Prepared By: Brendan P Andrews, PE
Date prepared: 2/13/2023

Chemical Stabilization Options		
320	Rubblize & Roll	No
206	Cement Stabilization	Option
	Lime Stabilization	No
206	Depth	14''

Excavate and Replace Stabilization Options	
Global Geotextile Average(N60L):	21''
Average(HP):	0''
Global Geogrid Average(N60L):	15''
Average(HP):	0''

Design CBR	11

% Samples within 6 feet of subgrade			
$N_{60} \leq 5$	40%	HP ≤ 0.5	0%
$N_{60} < 12$	80%	0.5 < HP ≤ 1	0%
$12 \leq N_{60} < 15$	10%	1 < HP ≤ 2	0%
$N_{60} \geq 20$	10%	HP > 2	20%
M+	10%		
Rock	0%		
Unsuitable	0%		

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

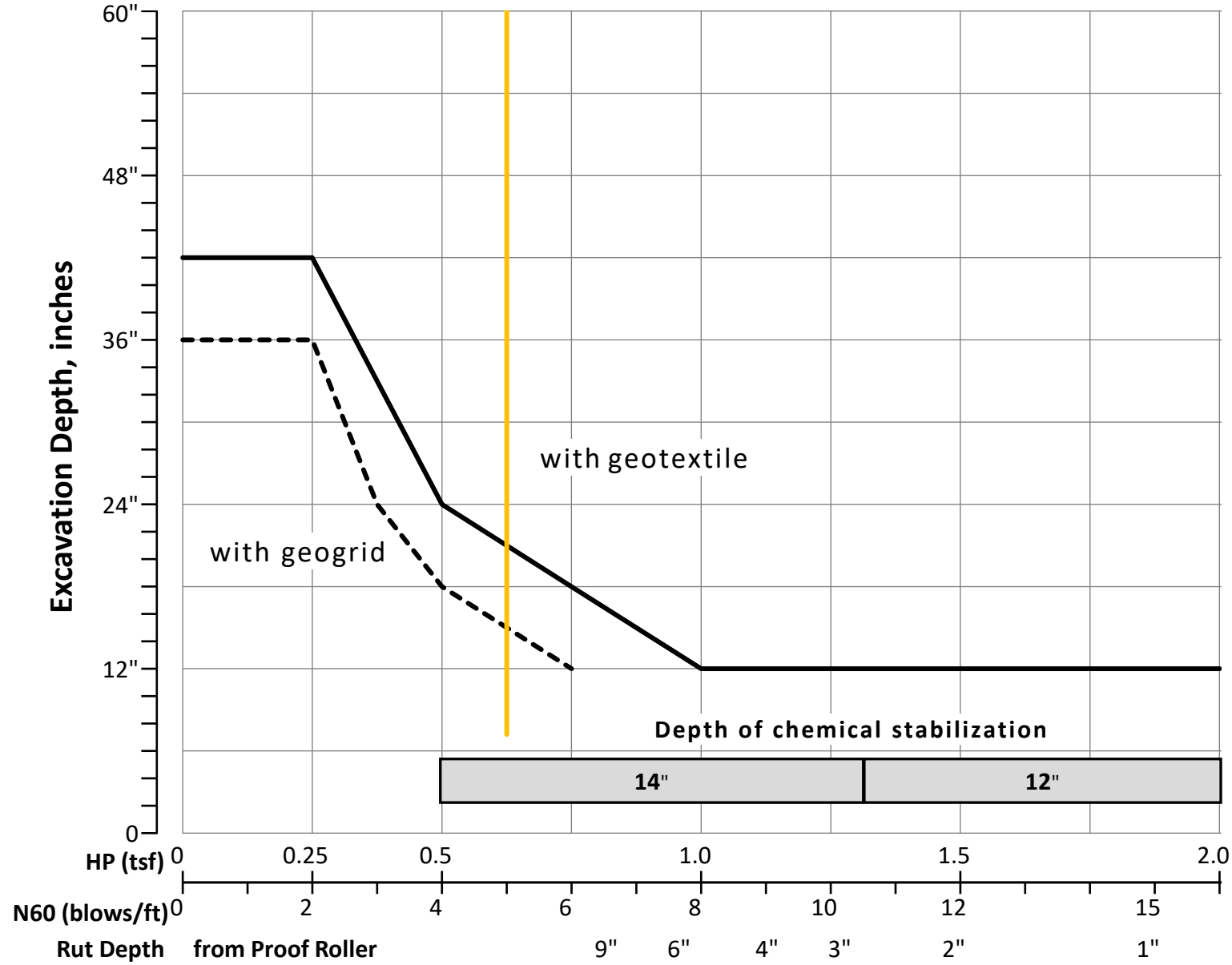
% Proposed Subgrade Surface	
Unstable & Unsuitable	40%
Unstable	40%
Unsuitable	0%

	N_{60}	N_{60L}	HP	LL	PL	PI	Silt	Clay	P 200	M_C	M_{OPT}	GI
Average	10	5	2.75	22	15	7	28	10	37	19	8	1
Maximum	27	10	3.00	22	15	7	34	15	44	29	11	8
Minimum	1	1	2.50	22	15	7	16	2	18	11	6	0

Classification Counts by Sample

ODOT Class	Rock	A-1-a	A-1-b	A-2-4	A-2-5	A-2-6	A-2-7	A-3	A-3a	A-4a	A-4b	A-5	A-6a	A-6b	A-7-5	A-7-6	A-8a	A-8b	Totals
Count	0	0	4	0	0	0	0	0	4	5	0	0	0	0	0	0	0	0	13
Percent	0%	0%	31%	0%	0%	0%	0%	0%	31%	38%	0%	0%	0%	0%	0%	0%	0%	0%	100%
% Rock|Granular|Cohesive	0%	100%									0%								100%
Surface Class Count	0	0	2	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	5
Surface Class Percent	0%	0%	40%	0%	0%	0%	0%	0%	20%	40%	0%	0%	0%	0%	0%	0%	0%	0%	100%

GB1 Figure B – Subgrade Stabilization



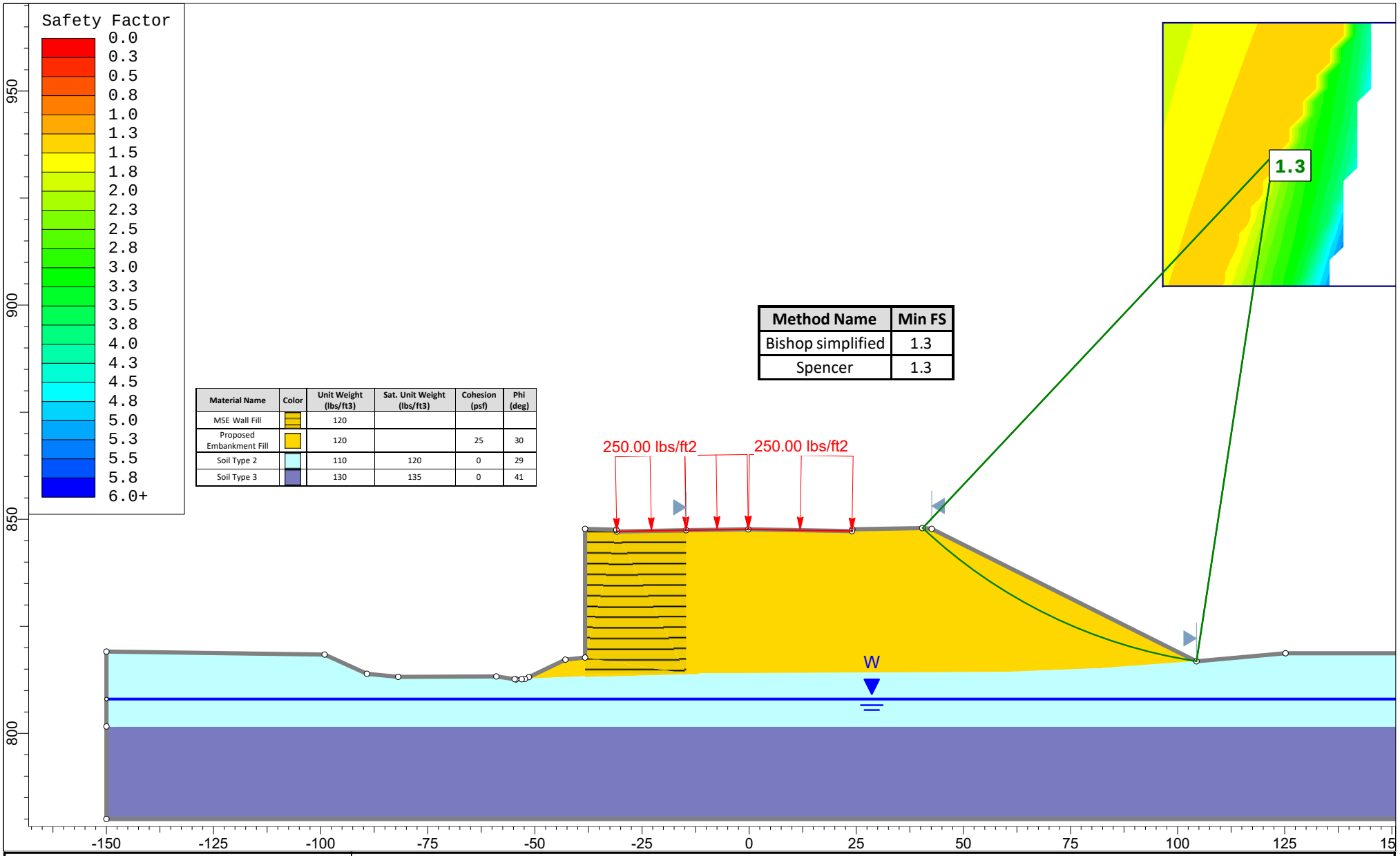
OVERRIDE TABLE

Calculated Average	New Values	Check to Override
2.75	0.50	☐ HP
5.00	6.00	☐ N60L

Average HP
Average N_{60L}

APPENDIX D

EMBANKMENT STABILITY OUTPUTS



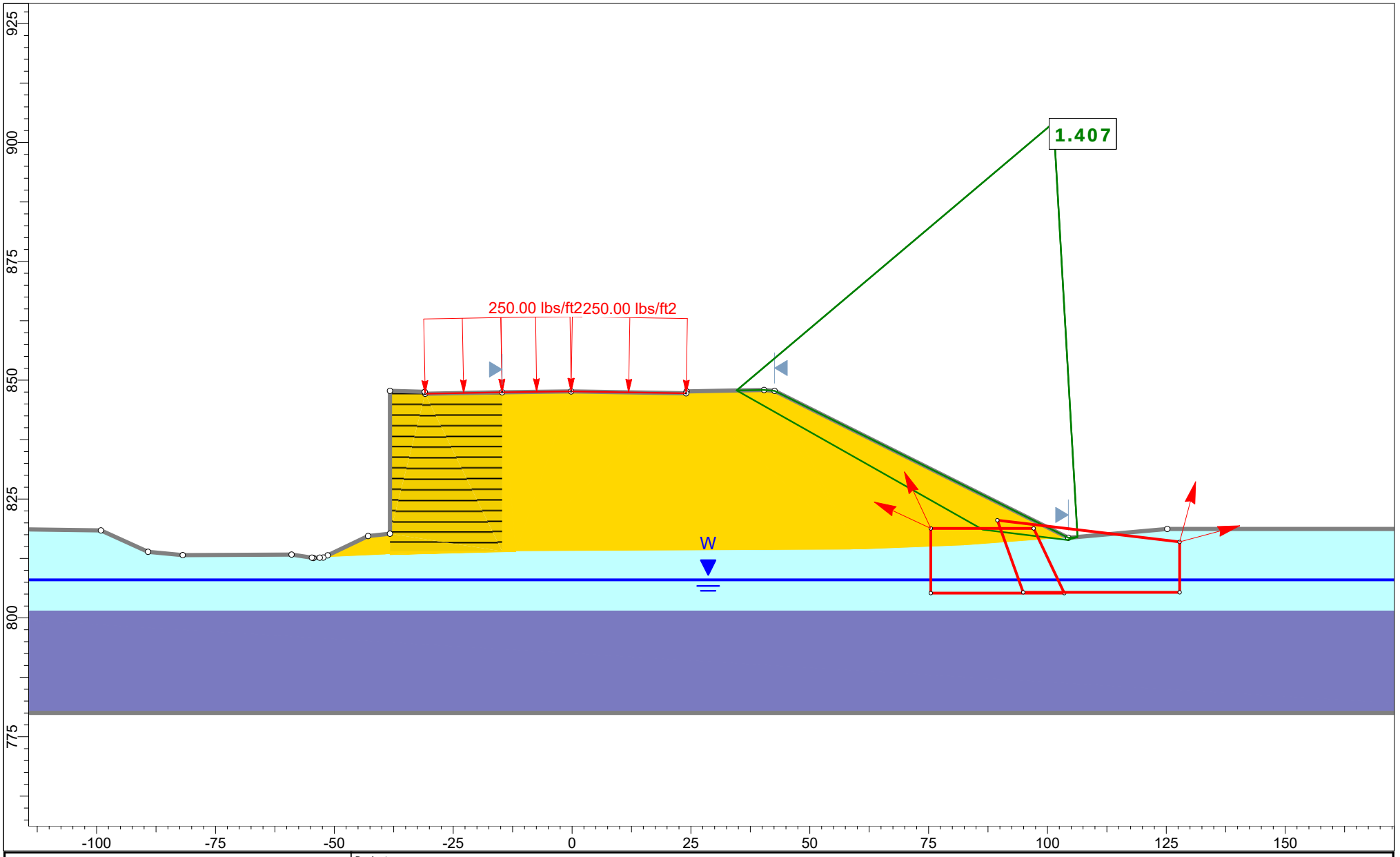
Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (deg)
MSE Wall Fill		120			
Proposed Embankment Fill		120		25	30
Soil Type 2		110	120	0	29
Soil Type 3		130	135	0	41

Method Name	Min FS
Bishop simplified	1.3
Spencer	1.3

rocscience

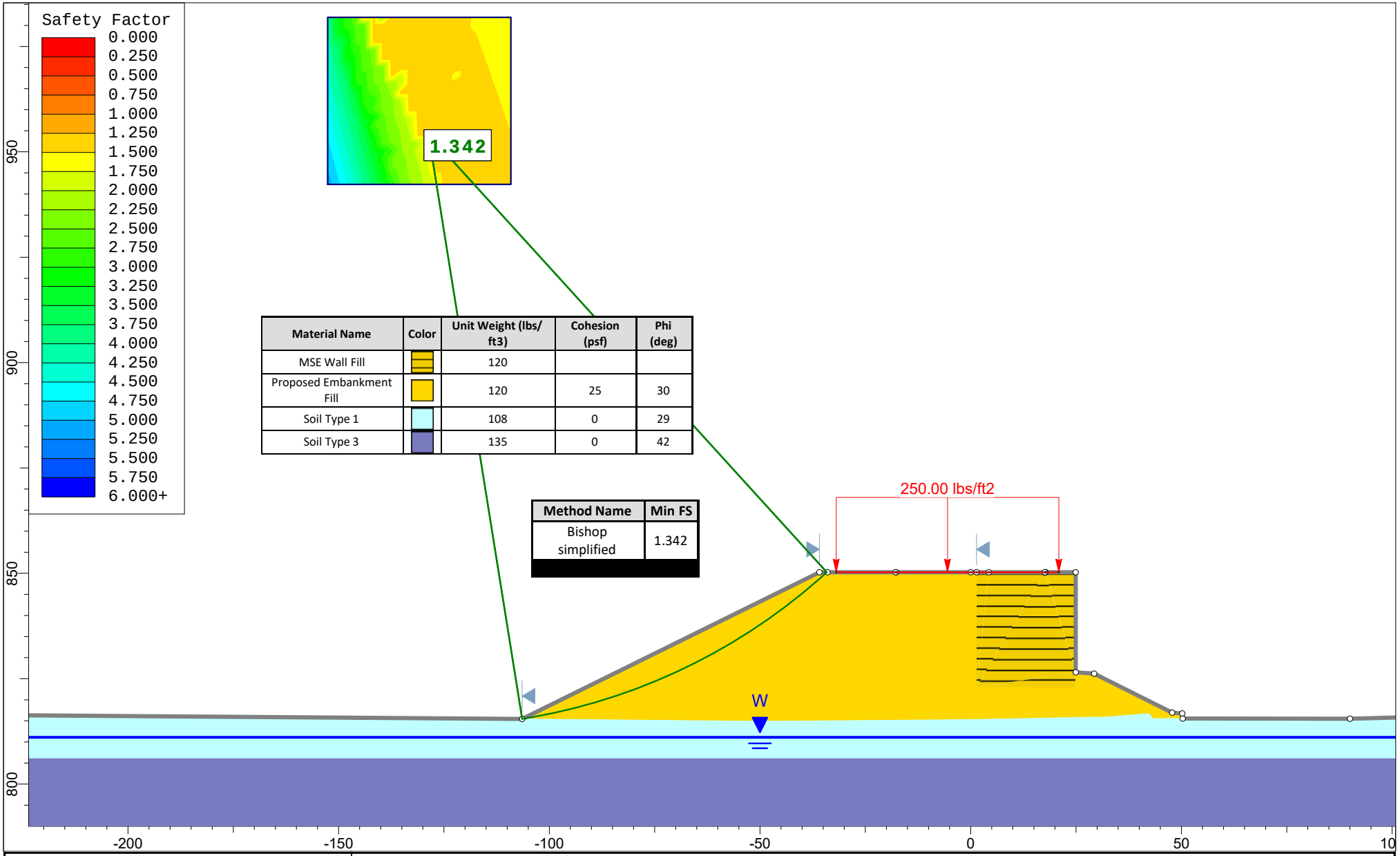
SLIDEINTERPRET 9.027

Project	CUY-14-6.93 - SR-14 Sta 372+50		
Group	372+43_EffCirc020923.slim	*Scenario*	372+43_EffCirc020923.slim
Drawn By	KCA/BPA	*Company*	NEAS Inc.
Date	2/13/2023	*File Name*	372+43_EffCirc020923.slim



rocscience	Project	CUY-14-6.93 - SR-14 Sta 372+50	
	Group	372+43_Eff-Tot_Block020923.slim	Scenario 372+43_Eff-Tot_Block020923.slim
	Drawn By	KCA/BPA	Company NEAS Inc.
	Date	2/13/2023	File Name 372+43_Eff-Tot_Block020923.slim

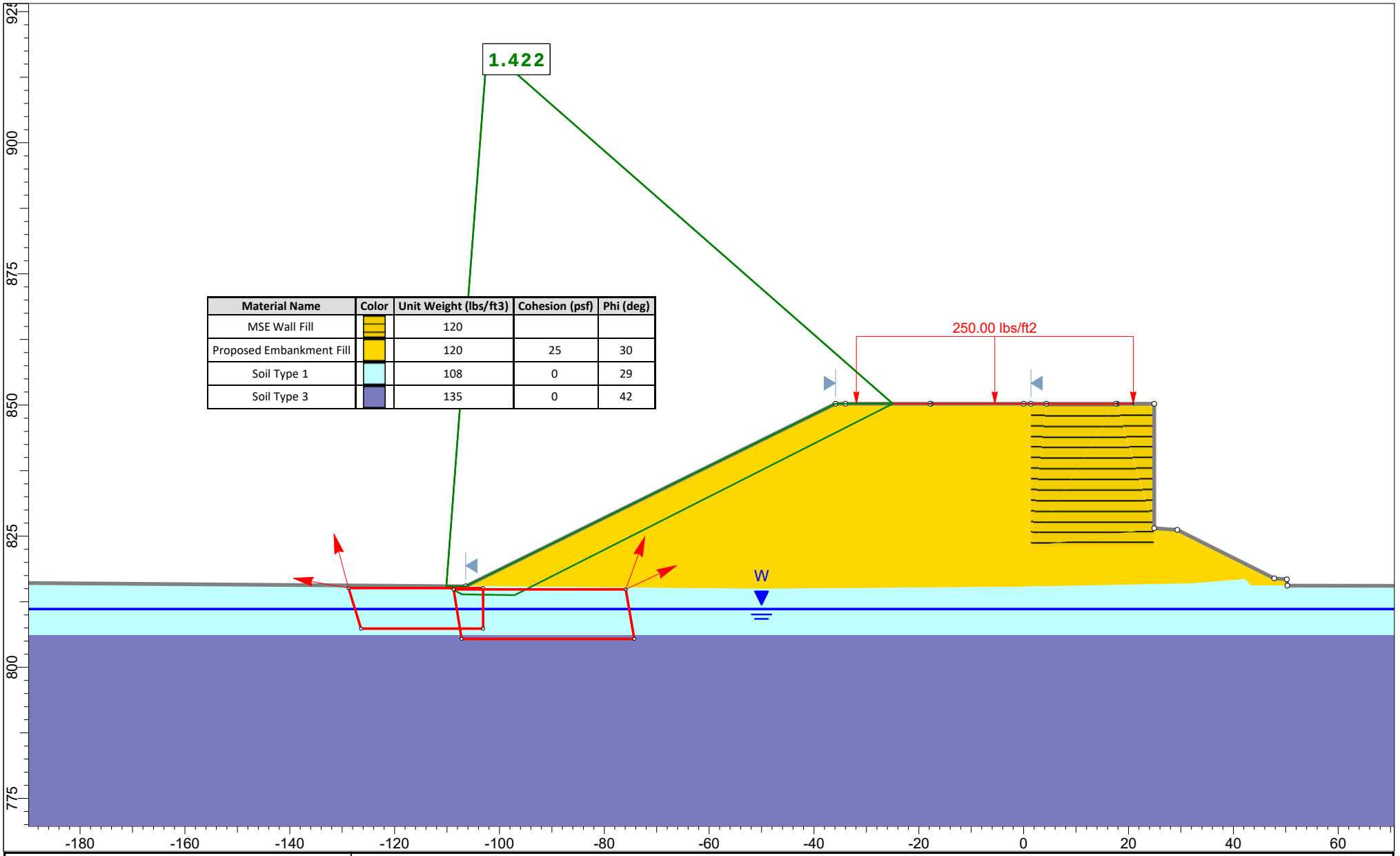
SLIDEINTERPRET 9.027



rocscience

SLIDEINTERPRET 9.027

Project	CUY-14-6.93 - Henry St - Sta. 18+50		
Group	18+50_Eff-Tot_Circ_021423.slim	Scenario	18+50_Eff-Tot_Circ_021423.slim
Drawn By	KCA/BPA	Company	NEAS Inc.
Date	2/14/2023	File Name	18+50_Eff-Tot_Circ_021423.slim



Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (deg)
MSE Wall Fill		120		
Proposed Embankment Fill		120	25	30
Soil Type 1		108	0	29
Soil Type 3		135	0	42

rocscience

SLIDEINTERPRET 9.027

Project	CUY-14-6.93 - Henry St - Sta. 18+50		
Group	18+50_Eff-Tot_Block_021423.slim	*Scenario*	18+50_Eff-Tot_Block_021423.slim
Drawn By	KCA/BPA	*Company*	NEAS Inc.
Date	2/14/2023	*File Name*	18+50_Eff-Tot_Block_021423.slim