ROADWAY EXPLORATION

Proposed Roadway Rehabilitation and New Headwalls

WOO-18-6.67, PID 116951

Wood County, Ohio



Submitted to ODOT District 2
DRAFT REPORT Date *May 2024*

Prepared by

CT consultants
engineers • architects • planners

Ohio Department of Transportation

May 19, 2024 CT Project No. 232350

Ms. Jorey Summersett, P.E.
ODOT District 2
317 East Poe Road
Bowling Green, Ohio 43402

Re: Roadway Exploration
WOO-18-6.67, PID 116951
Proposed Roadway Rehabilitation and New Headwalls
Wood County, Ohio

Dear Ms. Summersett:

Following is the report of our roadway exploration performed by CT Consultants, Inc. (CT) for the referenced project. This exploration was performed in accordance with CT Proposal No. 232350, dated October 30, 2023, and was authorized by ODOT District 2 on November 30, 2023 referencing Encumbrance Number 741995.

This report contains the results of our study, our engineering interpretation of the results with respect to the project characteristics, our recommendations for design and construction of pavements as well as potential modifications to subgrade soils. Subgrade evaluations were performed in accordance with ODOT Geotechnical Design Manual (GDM) Section 600 "Subgrade." In accordance with ODOT protocol, this report is being submitted as "Draft" pending questions and comments by ODOT. However, the report is considered complete and comprehensive with respect to the requested scope of work.

Should you have any questions regarding this report or require additional information, please contact our office.

Respectfully,
CT Consultants, Inc.

Rawad Khawam
Geotechnical Staff

Christopher P. Iott, P.E.
Chief Geotechnical Engineer

c.c.: Mr. Doug Rogers – ODOT District 2

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ROADWAY EXPLORATION
WOO-18-6.67, PID 116951
PROPOSED ROADWAY REHABILITATION AND NEW HEADWALLS
WOOD COUNTY, OHIO

FOR

ODOT DISTRICT 2
317 EAST POE ROAD
BOWLING GREEN, OHIO 43402

SUBMITTED

MAY 19, 2024
CT PROJECT NO. 232350

CT CONSULTANTS, INC.
1915 NORTH 12TH STREET
TOLEDO, OHIO 43604
(419) 324-2222

EXECUTIVE SUMMARY

This roadway exploration report has been prepared for the proposed roadway rehabilitation located along State Route 18 (SR18) and proposed replacement of three (3) full height headwalls near the intersection of SR 18 and Potter Road west of North Baltimore, in Wood County, Ohio. This exploration included 44 test borings for the evaluation of existing pavement sections and subgrade conditions in areas of proposed roadway improvements, as well as subsoil conditions for evaluation of new full-height headwalls. Subgrade evaluations were performed in accordance with the ODOT "Subgrade Analysis" worksheet (V14.6, 02/11/22). A summary of the conclusions and recommendations of this study are as follows:

1. The majority of the borings were performed through existing roadway pavements. The pavements consisted of asphalt underlain by aggregate base. Borings performed beyond the extents of asphalt pavements encountered predominantly topsoil mixed with aggregate.

2. Based on the results of our field and laboratory tests, the subsoils encountered underlying the surface materials predominantly consisted of native cohesive soils. The cohesive soils consisted of A-4a, A-6a, A-6b, and A-7-6. The cohesive soils generally exhibited stiff to very stiff consistency in the upper approximately 5 to 7½ feet, with zones of soils exhibiting medium stiff consistency. Below these depths the soils typically transition to very stiff to hard consistency.

3. In Boring B-006, stiff to very stiff cohesive fill materials (A-6b and A-7-6) extended to a depth of 3 feet where an approximately 3 inch zone of brick fragments was encountered. The brick fragments were underlain by native cohesive soils.

4. In Boring B-021, underlying 16 inches of aggregate surface materials, loose crushed stone fill (A-1-a) was encountered to a depth of 3 feet. The stone fill was underlain by native cohesive soils.

5. Based on the limited data available, such as the soil characteristics and the groundwater conditions encountered in the borings, it is our opinion that the "normal" groundwater level is anticipated to generally be encountered at depths of approximately 11 to 13 feet below existing grades. It should be noted that "perched" water may be encountered in fill materials, granular soils, or aggregate base materials that are underlain by relatively impermeable native cohesive soils. If construction does not occur during a particularly wet period, adequate control of groundwater seepage into excavations extending only a few feet below the "normal" groundwater level should be achievable by minor dewatering systems, such as pumping from prepared sumps.

6. The ODOT GDM Section 600 "Subgrade Analysis" worksheet (V14.6, 02/11/22) indicates options for "planned" subgrade modification of either global chemical stabilization to a depth of 14 inches using lime, or over-excavation of unsuitable subgrade soils and replacement with new granular engineered fill. Based on the ODOT GDM Section 600 analysis results with approximately 90 percent of the borings indicating planned modification, it is anticipated that global chemical stabilization will be more economical compared to over-excavation and replacement with new granular engineered fill, provided stabilization can be completed for the entire project alignment with one mobilization.

7. It is our understanding that recent projects in Northwest Ohio, which included similar cohesive soils to those at this project site, were planned to include global lime stabilization for subgrade modification. It was indicated that, for some of those projects, suitable strength could not be achieved with lime stabilization mix designs using a typical/economical lime percentage. Therefore, we recommend that mix design be performed using lime to evaluate potential issues with use of this method of stabilization. If it is found to be uneconomical to use lime stabilization, mix design may be performed using cement to evaluate this method of stabilization.

8. The ODOT "Subgrade Analysis" worksheet resulted in a CBR value of 6 percent for the project site. It should be noted that the CBR determination by the subgrade analysis spreadsheet is based on the average Group Index of all the evaluated samples, which was 11. Group indices for the tested samples ranged from 0 to 16, which would correlate with a CBR value of 4 to 12 percent. Much of the site is anticipated to include approximately ½ foot to 1 foot of remaining aggregate base with planned subgrade elevation 10 inches below existing grades. With this consideration, it does not appear to be unconservative to use the Subgrade Analysis design CBR value of 6 percent for new pavement sections throughout the project area, based on the average design value calculations.

9. ODOT standard full height headwalls are planned to be utilized for the replacements at the intersection of Potter Road with SR 18 as part of this project. The standard full height headwalls are indicated to be based on design using a minimum undrained shear strength (su), or cohesion (c), of 1,500 pounds per square foot (psf) when the walls are bearing on cohesive soils. The design su or c value for the very stiff to hard cohesive bearing soils encountered in Borings B-026, B-027, and B-028 are approximately 3,600 psf, 2,800 psf, and 2,600 psf, respectively. Each of these values meet the minimum required design value of 1,500 psf.

This executive summary highlights our evaluations and recommendations and should only be utilized in conjunction with the accompanying report, including the detailed findings, analysis and recommendations, and qualifications presented herein.

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1.0 INTRODUCTION

This roadway exploration report has been prepared for the proposed roadway rehabilitation located along State Route 18 (SR18) and proposed replacement of three (3) full height headwalls near the intersection of SR 18 and Potter Road west of North Baltimore, in Wood County, Ohio. This project has been designated as WOO-18-6.67, PID 116951. The general project area is shown on the attached Site Location Map (Plate 1.0).

This exploration was performed in accordance with CT Proposal No. 232350, dated October 30, 2023, and was authorized by ODOT District 2 on November 30, 2023, referencing Encumbrance Number 741995.

1.1 Purpose and Scope of Exploration

The purpose of this exploration was to evaluate the pavement conditions, subsurface conditions and laboratory data relative to the design and construction of pavements for the referenced project, as well as to evaluate soil properties with respect to new full height headwalls. To accomplish this, CT performed forty-four (44) test borings, laboratory soil testing, a geotechnical engineering evaluation of the test results, and review of available geologic and soils data for the project area.

This report summarizes our understanding of the proposed construction, describes the investigative and testing procedures utilized to evaluate the subsurface conditions at the site, and presents our findings from the field and laboratory testing. This report also presents our evaluations and conclusions in accordance with ODOT Geotechnical Design Manual (GDM) Section 600 "Subgrade" (January 2024), as well as provides our design and construction recommendations for pavements and full height headwalls.

This report includes:

- A description of the existing surface material, subsurface soils, and groundwater conditions encountered in the borings.
- Design recommendations for pavements and full height headwalls.
- Recommendations concerning soil and groundwater-related construction procedures such as subgrade preparation in accordance with ODOT GDM Section 600 criteria, earthwork, pavement construction, headwall installations, and related field testing.

Appendix C includes pertinent ODOT Geotechnical Engineering Design Checklists that apply to the scope of this report.

The scope of this study did not include an environmental assessment of the surface or subsurface materials at this site.

1.2 Proposed Construction

It is our understanding that the project includes pavement rehabilitation, including global chemical stabilization, along SR 18 from just east of S. Main Street (SLM 6.67) to just west of Liberty Hill Road (SLM 10.18) west of North Baltimore, in Wood County, Ohio. Additionally, replacement is planned of three (3) full height headwalls near the intersection of SR 18 and Potter Road.

Planned pavement rehabilitation is planned along differing sides of the road along the project alignment, as follows:

Table 1.2. Planned Pavement Rehabilitation Areas	
Extents of Rehabilitation	Planned Location of Rehabilitation
SLM 6.67 to SLM 7.11	North side of road
SLM 7.11 to SLM 7.26	Both sides of road
SLM 7.26 to SLM 8.05	North side of road
SLM 8.05 to SLM 8.17	Both sides of road
SLM 8.17 to SLM 9.43	South side of road
SLM 9.43 to SLM 9.58	Both sides of road
SLM 9.58 to SLM 10.06	None
SLM 10.06 to SLM 10.18	Both sides of road

We have assumed that final roadway grades will approximate existing roadway grades. It was requested that subgrade evaluations be considered 10 inches below top of pavement. As such, our evaluations in the "Subgrade Analysis" spreadsheet include an indicated 0.8 feet cut to top of subgrade elevation.

2.0 GEOLOGY AND OBSERVATIONS OF THE PROJECT

2.1 General Geology and Hydrogeology

Published geologic maps from the Ohio Department of Natural Resources (ODNR) indicate that the project corridor is located in the Maumee Lake Plains Region of the Huron-Erie Lake Plains Section. Within this region, Pleistocene-age silt, clay, and wave planed clayey till is present overlying Silurian and Devonian age carbonate bedrock and shale.

The USDA Natural Resource Conservation Service (NRCS) Web Soil Survey indicates that soils in the project area are predominantly mapped as Hoytville silty clay loam. These soils consist of glacial till formed on wave-worked till plains.

Bedrock in the project area is broadly mapped on the "Geologic Map of Ohio" as Monroe Limestone, and specific to this site bedrock is identified as dolomite. Based on published bedrock topography maps, bedrock in the project vicinity is mapped on the order of Elev. 620± to 680± which is approximately 30 to 90 feet below existing grades.

Review of the ODNR "Ohio Karst Areas" map indicated that the site is not located in an indicated area of probable karst.

A Review of the ODNR Map of Mines indicated no historic mining activity within the immediate site area. However, surface limestone quarry mines are mapped approximately 1½ miles northeast of the eastern extent of the project area.

2.2 Site Reconnaissance

CT performed site reconnaissance on January 14, 2024. The project area consisted of mainly agricultural land.

The pavements along SR18 were observed to be in generally poor to fair condition. Signs of distress were noticeable throughout much of the pavement areas. There were areas of observed longitudinal cracking down the center of the pavement, along with minor localized transverse cracking (generally spanning from edge to edge of pavement). Some cracks were sealed, but the majority were not sealed.

At the intersection of Potter Road and SR18, where replacement headwalls are planned for the ditch crossings, the ditchbottom was approximately 8 feet below existing pavement grades.

3.0 Exploration

3.1 Historic Borings

Review of ODOT records indicated that historic test borings were drilled within the western portion of the project area, at three different culvert locations.

About 1/3 mile west of Ridge Line Road, as part of WOO-18-07.19, PID 02722, two borings were performed for a culvert for Rader Creek. The borings were performed on October 26, 1982. Borings B-001-0-82 and B-002-0-82 were performed near the southwest corner of the culvert and northeast corner, respectively. These borings encountered predominantly medium stiff to stiff cohesive soils in the upper 6 to 8½ feet, transitioning to very stiff to hard cohesive soils to termination at a depth of 41½ feet below existing grade. The cohesive soils consisted of A-4a, A-6a, and A-6b. Free water was encountered at a depth of 40 feet in each boring.

Historic borings were also available for culverts along the west side of Range Line Road and approximately 2/3 mile east of Range Line Road, for crossings of Branches of Rader Creek. It should be noted that historic plans identify the eastern crossing as Rader Creek, although current designations indicate Rader Creek crosses west of Range Line Road. These borings were performed as part of WOO-18-(7.51)(8.13). At both culvert locations, boring designations of B-1 and B-2 were utilized. The borings were performed during the same year (1987). Therefore, for our reference, we are identifying the borings at the Range Line Road intersection as B-001-0-87 and B-002-0-87. The borings further east are identified as B-001-1-87 and B-002-1-87.

These historic borings encountered predominantly stiff to hard native cohesive soils to termination at depths of approximately 54½ feet below existing grade at SLM 7.51 (Range Line Road) and 49½ feet at SLM 8.13 (east of Range Line Road). The upper 5 feet in Boring B-001-0-87 was identified as fill with little organic matter. The cohesive soils consisted of predominantly A-4a, A-6a, and A-6b, although gradation and plasticity results for the uppermost sample in

Boring B-001-1-87 resulted in A-7-6 classification. Groundwater was encountered during drilling and observed upon completion of drilling in all four borings at depths ranging from approximately 6 to 7½ feet.

The approximate locations of the historic borings are shown on the Test Boring Location Plans (Plates 2.1 and 2.2).

3.2 Project Exploration Program

This exploration included 44 test borings. The borings were performed by CT during the period from February 16 through 27, 2024. The borings were generally extended through the existing State Route 18 (SR18) pavements, but also included borings performed beyond the existing pavement extents for potential widening. Some borings planned off the roadway needed to be moved to the roadway due to ditches. The borings were performed on alternating westbound and eastbound sides of the road based on the indicated planned rehabilitation locations presented in Table 1.2.

Test borings were designated as Borings B-001-0-23 through B-044-0-23. The borings are fully designated as in accordance with ODOT protocol, however the "-0-23" portion of the nomenclature is generally omitted for ease of identification in the discussions within this report. The borings were located in the field by CT in general accordance with plans provided with the proposal for this project. The approximate locations of the borings are shown on the Test Boring Location Plans (Plates 2.1 through 2.5).

Coordinates and ground surface elevations at the boring locations were obtained by CT using a handheld GPS unit. Stations and offsets were not provided. Upon receipt of the station and offset information, this information can be included in the boring logs as part of the final report preparation.

In accordance with the ODOT Specifications for Geotechnical Explorations (SGE), the roadway borings were performed as ODOT Type A borings, and were extended to a depth of 7 feet or 7.5 feet below existing grade, depending on depth of extension through surface materials or sampling intervals from surface in non-existing-pavement areas. The three headwall borings (B-026, B-027, and B-028) at the intersection of Potter Road and SR18 were performed as Type E2b borings, extended to termination at a depth of 20 feet below approximate invert depths, corresponding to 30 feet below existing grades.

Experience indicates that the actual surface and subsoil conditions at a site could vary from those generalized on the basis of test borings made at specific locations. Therefore, it is essential that a geotechnical engineer be retained to provide soil engineering services during the site preparation, excavation, and foundation phases of the proposed project. This is to observe compliance with the design concepts, specifications, and recommendations, and to allow design changes in the event subsurface conditions differ from those anticipated prior to the start of construction.

3.3 Boring Methods

The borings performed during this exploration were drilled with a CME 75 truck-mounted drill rig utilizing 3¼-inch inside diameter hollow-stem augers. For ODOT Type A borings, samples were obtained continuously using 18-inch split-spoon (SS) sample drives. For ODOT Type E2b borings, samples were generally obtained at 2½-foot intervals using 18-inch split-spoon (SS) sample drives. In headwall Boring B-028, which was performed in the SR18 roadway, the upper portion included continuous Type A soil sampling. The samples were sealed in jars and transported to our laboratory for further classification and testing.

Split-spoon soil samples were obtained by the Standard Penetration Test Method (ASTM D 1586). The Standard Penetration Test (SPT) consists of driving a 2-inch outside diameter split-spoon sampler into the soil with a 140-pound weight falling freely through a distance of 30 inches. The sampler was driven in three successive 6-inch increments, with the number of blows per increment being recorded. The number of blows per increment was recorded at each depth interval, and these data are presented under the "SPT" column on the Logs of Test Borings attached to this report. The sum of the number of blows required to advance the sampler the second and third 6-inch increments is termed the Standard Penetration Resistance, or Nm-value, and is typically reported in blows per foot (bpf). The Nm-values were corrected to an equivalent rod energy ratio of 60 percent, N60. The hammer/rod energy ratio for the truck-mounted CME 75 drill rig was 72.9 percent and was last calibrated on February 20, 2023. The N_{60}-values are presented on the attached Logs of Test Borings.

Pavement and soil conditions encountered in the test borings are presented in the Logs of Test Borings, along with information related to sample data, SPT results, water conditions observed in the borings, and laboratory test data. In conjunction with published data and typical correlations, the N_{60}-values can be evaluated as a measure of soil compactness/consistency as well as shear strength.

Field and laboratory data were incorporated into gINT™ software for presentation purposes. It should be noted that these logs have been prepared on the basis of laboratory classification and testing as well as field logs of the encountered soils.

3.4 Laboratory Testing Program

All samples were visually classified in accordance with the ODOT Soil Classification System. All recovered samples of the subsoils were also tested in our laboratory for moisture content (ASTM D 2216). Dry density determinations and unconfined compressive strength tests (ASTM D 2166)

were performed on three selected headwall boring samples from Borings B-026 (SS-8), B-027 (SS-12), and B-028 (SS-8). Unconfined compressive strength estimates were obtained for the remaining intact cohesive samples using a calibrated hand penetrometer. These test results are presented on the Logs of Test Borings.

Laboratory testing was performed in accordance with ODOT GDM Section 600 "Subgrade" criteria, including mechanical soil classification consisting of an Atterberg limits test (ASTM D 4318) and a particle size analysis (ASTM D 6913 and D 7928) for at least two samples from each boring within 6 feet of the proposed subgrade. These test results are presented on the Logs of Test Borings and Grain Size Distribution sheets.

Sulfate content determinations (ODOT Supplement 1122) were generally performed on one sample per roadway boring, within 3 feet of the proposed subgrade. These test results are presented on the Logs of Test Borings.

4.0 FINDINGS

4.1 General Site Conditions

The majority of the borings were performed through existing roadway pavements. The pavements consisted of asphalt generally on the order of 5 to 9 inches in thickness, underlain by aggregate base generally ranging in thickness from 7 to 14 inches in thickness.

Borings performed beyond the extents of asphalt pavements encountered predominantly topsoil mixed with aggregate with thickness varying from approximately 10 to 19 inches.

4.2 General Soil Conditions

Based on the results of our field and laboratory tests, the subsoils encountered underlying the surface materials predominantly consisted of native cohesive soils. The cohesive soils consisted of A-4a, A-6a, A-6b, and A-7-6. The cohesive soils generally exhibited stiff to very stiff consistency in the upper approximately 5 to 7½ feet, with zones of soils exhibiting medium stiff consistency. Below these depths the soils typically transition to very stiff to hard consistency.

In Boring B-006, stiff to very stiff cohesive fill materials (A-6b and A-7-6) extended to a depth of 3 feet where an approximately 3 inch zone of brick fragments was encountered. The brick fragments were underlain by native cohesive soils.

In Boring B-021, underlying 16 inches of aggregate surface materials, loose crushed stone fill (A-1-a) was encountered to a depth of 3 feet. The stone fill was underlain by native cohesive soils.

Descriptions of the stratigraphy encountered in the borings are presented on the Logs of Test Borings attached to this report. A summary of the subgrade soils encountered in the borings is also provided in tabular form in the Subgrade Analysis spreadsheet attached in Appendix A.

4.3 Groundwater Conditions

Groundwater was initially encountered during drilling operations in only 4 of the 44 test borings performed for this exploration, at depths ranging from approximately 1.7 to 7.2 feet below existing grades. Groundwater was observed upon completion of drilling in only two of these

borings at depths ranging from approximately 0.9 to 1.1 feet. The groundwater conditions encountered in the borings are summarized in the following table.

Table 4.3. Encountered Groundwater Conditions

Boring Number	Groundwater Initially Encountered During Drilling		Groundwater Observed At Completion of Drilling	
	Depth (ft)	Elev. (ft)	Depth (ft)	Elev. (ft)
B-021	7.0	699.3	N.E.	-
B-030	7.2	700.2	N.E.	-
B-041	1.8	709.0	0.9	709.9
B-044	1.7	711.0	1.1	711.0

N.E. = Not Encountered

It should be noted that each of the borings was drilled and backfilled within the same day. As such, stabilized water levels may not have occurred over this limited time period. Instrumentation was not installed to observe long-term groundwater levels.

Based on the limited data available, such as the soil characteristics and the groundwater conditions encountered in the borings, it is our opinion that the "normal" groundwater level is anticipated to generally be encountered at depths on the order of 11 to 13 feet below existing grades. This exploration did not include research of possible hydrological influences at the project site. It should be noted that groundwater elevations can fluctuate with seasonal and climatic influences. In particular, "perched" water may be encountered in fill materials, granular soils, or aggregate base materials that are underlain by relatively impermeable native cohesive soils. The groundwater encountered in Borings B-041 and B-044 likely reflect perched water in the aggregate base layer. Therefore, the groundwater conditions at the site may vary at different times of the year from those encountered during this investigation.

4.4 Remedial Measures

The ODOT GDM Section 600 "Subgrade Analysis" worksheet (V14.6, 02/11/22) indicates options for "planned" subgrade modification of either global chemical stabilization to a depth of 14 inches using lime, or over-excavation of unsuitable subgrade soils and replacement with new granular engineered fill.

Based on the ODOT GDM Section 600 analysis results with approximately 90 percent of the borings indicating planned modification, it is anticipated that global chemical stabilization will be more economical compared to over-excavation and replacement with new granular engineered fill, provided stabilization can be completed for the entire project alignment with one mobilization.

It is our understanding that recent projects in Northwest Ohio, which included similar cohesive soils to those at this project site, were planned to include global lime stabilization for subgrade modification. It was indicated that, for some of those projects, suitable strength could not be achieved with lime stabilization mix designs using a typical/economical lime percentage. Therefore, we recommend that mix design be performed using lime to evaluate potential issues with use of this method of stabilization. If it is found to be uneconomical to use lime stabilization, mix design may be performed using cement to evaluate this method of stabilization.

5.0 ANALYSES AND RECOMMENDATIONS

The following analyses and recommendations are based on our understanding of the proposed construction and upon the data obtained during our field exploration. If the project information or location as outlined is incorrect or should change significantly, a review of these recommendations should be made by CT.

5.1 Subgrade Evaluation

An evaluation of the subgrade soils was completed in general accordance with ODOT Geotechnical Design Manual (GDM) Section 600 "Subgrade" (January 2024). As part of this evaluation, the ODOT "Subgrade Analysis" worksheet (V14.6, 02/11/22) was completed and is attached to this report.

Final pavement grades are generally anticipated to approximate existing grades. As discussed in Section 1.2, we have evaluated subgrade elevation based on the ODOT prescribed depth of 10 inches for this project. This is represented by a "cut" of 0.8 feet in the Subgrade Analysis worksheet. It should be noted that the existing pavement cross section for much of the project area is greater than 10 inches in thickness. Therefore, new subgrade elevation typically falls within the existing aggregate base layer.

Based on ODOT GDM Section 600, soils classified as ODOT A-4b, A-2-5, A-5, A-7-5, A-8a, A-8b, or rock have been designated as being problematic with respect to pavement subgrade support. None of these soil types were encountered at planned subgrade elevations in the borings performed for this exploration.

Based on ODOT GDM Section 600 criteria, subgrade soils with moisture contents greater than 3 percent above optimum likely indicate the presence of unstable subgrade that may require some form of subgrade modification. For this site, approximately 80 percent of tested subgrade soil samples were greater than 3 percent above the optimum as determined using ODOT GDM Section 600 criteria.

It should be noted that 80 percent of the evaluated samples with moisture contents greater than 3 percent above optimum had moisture contents greater than or equal to 5 percent above optimum. Thus, where moisture contents were wet of optimum, they were more likely to be

appreciably wet of optimum. These data indicate that scarification and aeration methods may not be feasible to achieve satisfactory proof rolling and stabilization of the predominantly cohesive subgrades underlying the remaining aggregate base materials at the subgrade elevation.

The type and thickness of subgrade modification is determined by ODOT GDM Section 600 criteria based on the average, low SPT N60-value (N60L) of the subgrade soils in a particular portion of the project area, hand penetrometer values, soil type, and moisture content. Based on these criteria, 39 of the 42 evaluated borings contained subgrade soils which indicated subgrade modification is likely to be required, with only three of those borings including soils that are planned for reworking in-place. Possible alternatives for those areas where modification of the subgrade soils is indicated could include the following, using ODOT GDM Section 600 criteria based on the encountered conditions:

- undercut and replacement with granular engineered fill, or
- global chemical stabilization to a depth of 14 inches using lime.

ODOT GDM Section 600 indicates that, if it is determined that 30 percent or more of the subgrade area must be stabilized, consideration should be given to stabilizing the entire project (global chemical stabilization). With approximately 90 percent of the project alignment indicated for planned subgrade modification, global chemical stabilization is anticipated to be an economical solution for this project provided the stabilization equipment can treat the entire project area with one mobilization. Per ODOT GDM Section 600 criteria, a cost analysis of the various subgrade modifications options should be performed using bid tabs. It was indicated that global chemical stabilization is planned for this project.

Based on ODOT GDM Section 600 guidelines, 5 percent lime may be specified to estimate the quantity of lime required for the project. Based on the ODOT GDM Section 600 prescribed method (using a dry density of 115 pounds per cubic foot), the quantity of lime for a depth of 14 inches would be 60.375 pounds per square yard. When performing chemical stabilization design, use the dry density of the soil on the project as determined in the laboratory.

It is our understanding that recent projects in Northwest Ohio, which included similar cohesive soils to those at this project site, were planned to include global lime stabilization for subgrade

modification. It was indicated that, for some of those projects, suitable strength could not be achieved with lime stabilization mix designs using a typical/economical lime percentage. Therefore, we recommend that mix design be performed using lime to evaluate potential issues with use of this method of stabilization. If it is found to be uneconomical to use lime stabilization, mix design may be performed using cement to evaluate this method of stabilization.

As prescribed by ODOT GDM Section 600 criteria, chemical stabilization must extend 18 inches beyond the edge of the pavement surface (on both sides), and where appropriate, 18 inches beyond paved shoulders or paved medians, including under new curbs and gutters.

As required by ODOT GDM Section 600, sulfate content tests (ODOT Supplement 1122) were performed on a sample within the upper 3 feet of each boring. The sulfate content test results were 220 (mg/kg, or ppm) or less.

ODOT GDM Section 600 indicates that chemical stabilization cannot be utilized when sulfate contents for the majority of the samples exceed 3,000 parts per million (ppm), or individual soil samples exhibit sulfate contents of greater than 5,000 ppm. Based on the tested samples, sulfate content will not preclude the use of chemical stabilization for this project.

Along with the pay items for chemical stabilization and the chemical, provide the following additional pay items for chemical stabilization:

- Item 206 Curing Coat, estimated at the same number of square yards as the stabilized area.

- Item 204 Proof Rolling of the stabilized area, estimated in accordance with Section 607 of ODOT GDM, Using the same number of square yards as the stabilized area.

- Item 206 Mixture Design for Chemically Stabilized Soil as a lump sum item that requires the chemical stabilization to be designed according to Supplement 1120. This item should only be specified for projects with more than 40,000 square yards of chemically stabilized area. However, please see discussion above regarding potential uneconomical percentage of lime to achieve suitable stabilization that may warrant chemical stabilization design for cement.

Do not provide Item 204 Subgrade Compaction for areas that are being chemically stabilized. Minimum width for chemical stabilization is 8 feet.

5.2 Flexible (Asphalt) Pavement Design

Based on the ODOT GDM Section 600 analysis, a design CBR value of 6 percent was determined for the project. It should be noted that the CBR determination by the subgrade analysis spreadsheet is based on the average Group Index of all the evaluated samples, which was 11. Group indices for the tested samples ranged from 0 to 16, which would correlate with a CBR value of 4 to 12 percent. Much of the site is anticipated to include approximately ½ foot to 1 foot of remaining aggregate base with planned subgrade elevation 10 inches below existing grades. With this consideration, it does not appear to be unconservative to use the Subgrade Analysis design CBR value of 6 percent for new pavement sections throughout the project area, based on the average design value calculations.

Based on the ODOT Pavement Design Manual (PDM), the subgrade resilient modulus (Mr, in psi) is calculated by multiplying the CBR value by 1,200. Therefore, the Mr for this project would be 7,200 psi. If global chemical stabilization is utilized, the ODOT PDM indicates that the improved subgrade resilient modulus due to global chemical stabilization (MrGCS) is calculated by multiplying the Mr value by 1.36. Therefore, for this project, the MrGCS would be 9,790 psi.

All pavement design and paving operations should conform to ODOT specifications. The pavement and subgrade preparation procedures outlined in this report should result in a reasonably workable and satisfactory pavement. It should be recognized, however, that all pavements need repairs or overlays over time as a result of progressive yielding under repeated loading for a prolonged period.

It is recommended that placement of aggregate base, and placement of asphalt be performed within as short a time period as possible, after curing period has been completed for the chemical stabilization. Exposure of the aggregate base to rain, snow, or freezing conditions may lead to deterioration of the subgrade and/or base materials due to excessive moisture conditions and to difficulties in achieving the required compaction.

5.3 Rigid (Concrete) Pavement

The recommended CBR value of 6 percent, along with the associated Mr of 7,200 psi and the MrGCS of 9,790 psi presented in the previous section may be used for rigid (concrete) pavement design.

The concrete pavement section should consist of a minimum of 6 inches of reinforced, air-entrained concrete with a minimum compressive strength of 4,000 pounds per square inch (psi) underlain by a minimum of 6 inches of a dense-graded aggregate base (ODOT Item 304).

5.4 Soil Parameters for Headwall Support

It was indicated that ODOT standard full height headwalls are planned to be utilized for the replacements at the intersection of Potter Road with SR 18 as part of this project. Bottom of ditch was found to be approximately 8 feet below existing roadway grades in this area. As such, headwall footings are assumed to bear slightly deeper , corresponding to approximately 9½ to 10 feet below existing roadway grades. Full height headwall footings are on the order of 4½ to 6½ feet in width. Considering influence of 4B for wall-type foundations, influence may extend on the order of 17 to 25 feet below footing elevations. As such, soil evaluations were considered for retained material in the upper profile to the termination depth of 30 feet for the headwall borings.

Based on the conditions encountered in the headwall borings B-026, B-027, and B-028, the foundation soils for the full height headwalls are expected to consist of predominantly very stiff to hard native cohesive soils. These soils are considered generally suitable for support of standard headwall foundations.

The standard full height headwalls are indicated to be based on design using a minimum undrained shear strength (su), or cohesion (c), of 1,500 pounds per square foot (psf) when the walls are bearing on cohesive soils. The design su or c value for the very stiff to hard cohesive bearing soils encountered in Borings B-026, B-027, and B-028 are approximately 3,600 psf, 2,800 psf, and 2,600 psf, respectively. Each of these values meet the minimum required design value of 1,500 psf.

Headwall design is indicated to be based on retained backfill material with an internal angle of friction of at least 30 degrees and a total unit weight of 120 pounds per cubic foot (pcf). To maintain suitable design based on these values, granular soils should be utilized for backfill for the headwalls.

5.5 Site and Subgrade Preparation

Site and subgrade preparation activities should conform to ODOT Construction and Materials Specifications (CMS) specifications. Site preparation activities should include the removal of vegetation, topsoil, root mats, pavements, and other deleterious non-soil materials from all proposed construction areas. The actual amount of required stripping should be determined in the field by a geotechnical engineer or qualified representative. The topsoil mixed with aggregate present in many borings that were performed beyond the roadway extents extended to depths ranging from approximately 10 to 19 inches. With subgrade planned on the depth of 10 inches below existing grades, some additional removal of vegetation below planned subgrade elevations should be anticipated for widened pavement areas.

For global chemical stabilization, subgrade preparation should be completed per ODOT CMS Item 206.

5.6 Groundwater Control

As previously mentioned, groundwater was initially encountered during drilling operations in only 4 of the 44 test borings performed for this exploration, at depths ranging from approximately 1.7 to 7.2 feet below existing grades. Groundwater was observed upon completion of drilling in two of these borings at depths ranging from approximately 0.9 to 1.1 feet.

Based on the soil characteristics and moisture conditions encountered in the borings, it is our opinion that the "normal" groundwater level can generally be expected at depths on the order of 11 to 13 feet below existing grades. However, "perched" water may be encountered in fill materials, granular soils, or aggregate base materials are underlain by less permeable cohesive soils.

Based on the predominantly clayey soil profile at the site, adequate control of seasonal groundwater seepage, perched water, and surface water run-off into shallow excavations should be achievable by minor dewatering systems, such as pumping from prepared sumps.

5.7 Excavations and Slopes

The sides of temporary excavations for construction should be adequately sloped to provide stable sides and safe working conditions. Otherwise, the excavation must be properly braced against lateral movements. In any case, applicable Occupational Safety and Health Administration (OSHA) safety standards must be followed.

Excavation is anticipated for replacement headwalls at Potter Road. Based on the soils encountered in the upper approximately 10 to 12½ feet in Borings B-026, B-027, and B-028, predominantly very stiff to hard cohesive soils are anticipated to be encountered within the excavations. These soils may be considered as:

- In the upper approximately 6 feet, OSHA Type B soils (cohesive soils with unconfined compressive strengths greater than 1,000 psf (pounds per square foot) but less than or equal to 3,000 psf), and
- Deeper than approximately 6 feet, OSHA Type A soils (cohesive soils with unconfined compressive strengths of 3,000 psf or greater).

Temporary excavations in Type A, B, and C soils should be constructed no steeper than ¾ horizontal to 1 vertical (¾H:1V), 1H:1V, and 1½H:1V, respectively. For situations where a lower strength soil is encountered underlying a higher strength soil, the entire excavation should be sloped based on requirements for the lower strength soil. In all cases, flatter slopes may be required if lower strength soils or adverse seepage conditions are encountered during construction.

5.8 Fill

Material for engineered fill or backfill required to achieve design grades should meet ODOT Item 203 “Embankment Fill” placement and compaction requirements.

As discussed in Section 5.4, granular soils should be used for backfill materials for headwalls.

To maintain the recommended design CBR value, new engineered fill at subgrade elevations should consist of predominantly A-6a or better soils.

In general, suitable fills may consist of any non-organic soils having a maximum dry density as determined by the Standard Proctor (ASTM D 698) of 90 pounds per cubic foot (pcf) or greater. On-site soils may be used as engineered fill materials provided that they are free of organic matter, debris, excessive moisture, and rock or stone fragments larger than 3 inches in diameter. Depending on seasonal conditions, the on-site soils may be wet of optimum and may require scarification and aeration to achieve satisfactory compaction. If the construction schedule does not allow for scarification and aeration activities, it may be more practical or economical to utilize imported granular fill.

Fill should be placed in uniform layers not more than 8 inches thick (loose measure) and adequately keyed into stripped and scarified soils. All fill placed within pavement areas should be compacted to a dry density consistent with the requirements of ODOT Item 203, based on the maximum dry density as determined by ASTM D 698.

The on-site soils consist of predominantly cohesive soils. For the cohesive soils, a sheepsfoot roller should provide the most effective soil compaction. For existing remaining aggregate base, or granular fill, a vibratory smooth-drum roller would be required to provide effective compaction.

Scarified subgrade soils and all fill material should be within 3 percent of the optimum moisture content to facilitate compaction. Furthermore, fill material should not be frozen or placed on a frozen base. It is recommended that all earthwork and site preparation activities be conducted under adequate specifications and properly monitored in the field by a qualified geotechnical testing firm.

6.0 QUALIFICATION OF RECOMMENDATIONS

Our evaluation of roadway pavement and headwall design and construction conditions has been based on our understanding of the site and project information and the data obtained during our field investigation. The general subsurface conditions were based on interpretation of the subsurface data at specific boring locations. Regardless of the thoroughness of a subsurface investigation, there is the possibility that conditions between borings will differ from those at the boring locations, that conditions are not as anticipated by the designers, or that the construction process has altered the soil conditions. This potential is increased at previously developed sites. Therefore, experienced geotechnical engineers should observe earthwork construction to confirm that the conditions anticipated in design are noted. Otherwise, CT assumes no responsibility for construction compliance with the design concepts, specifications, or recommendations.

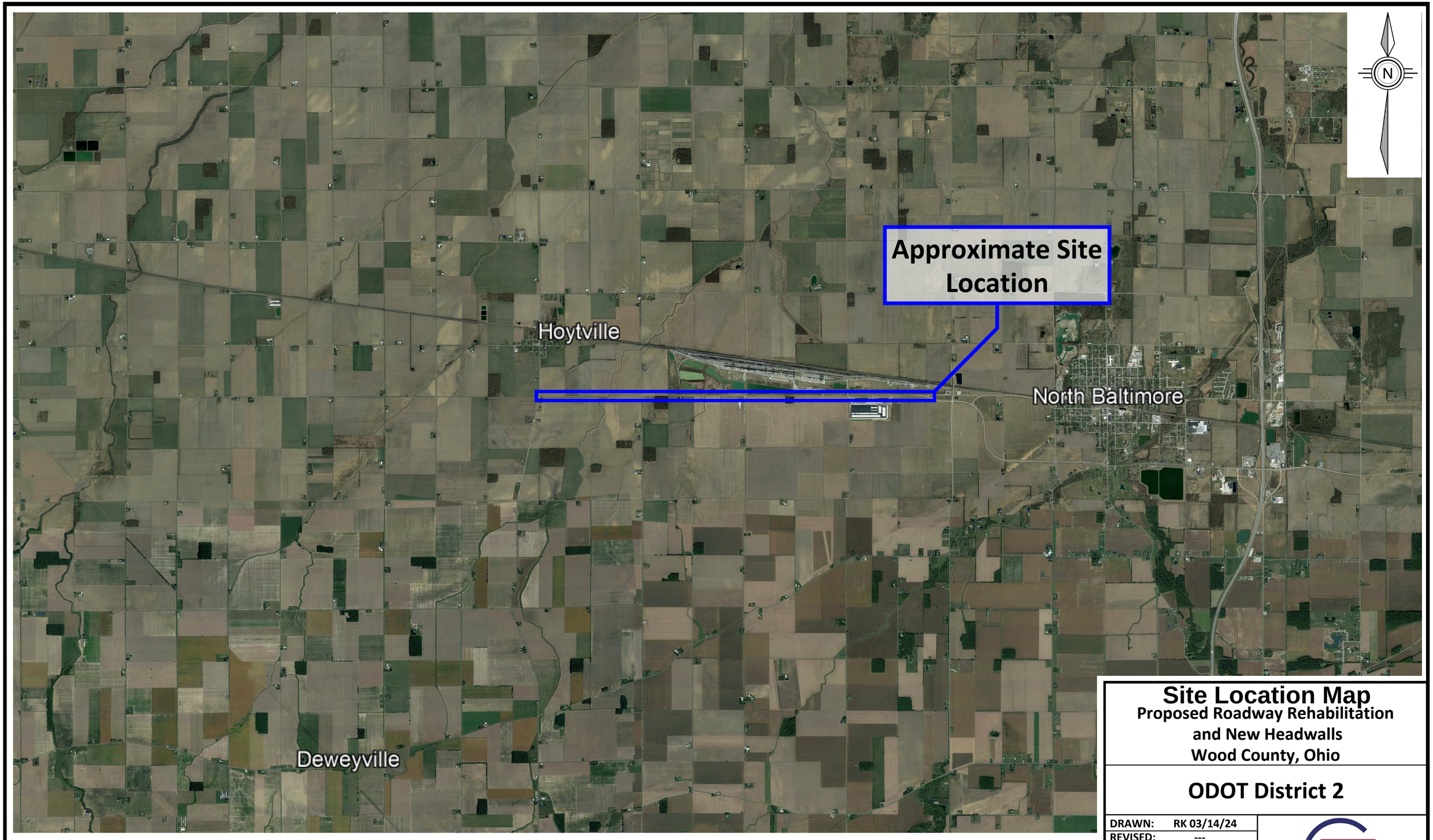
The design recommendations in this report have been developed on the basis of the previously described project characteristics and subsurface conditions. If project criteria or locations change, a qualified geotechnical engineer should be permitted to determine whether the recommendations must be modified. The findings of such a review will be presented in a supplemental report.

The nature and extent of variations between the borings may not become evident until the course of construction. If such variations are encountered, it will be necessary to reevaluate the recommendations of this report after on-site observations of the conditions.

Our professional services have been performed, our findings derived, and our recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices. This warranty is in lieu of all other warranties either expressed or implied. CT is not responsible for the conclusions, opinions, or recommendations of others based on this data.

Plates

Plate 1.0	**Site Location Map**
Plate 2.1	**Test Boring Location Plan – B-001 to B-012**
Plate 2.2	**Test Boring Location Plan - B-013 to B-024**
Plate 2.3	**Test Boring Location Plan - B-025 to B-037**
Plate 2.4	**Test Boring Location Plan - B-038 to B-044**
Plate 2.5	**Test Boring Location Plan - Headwalls**



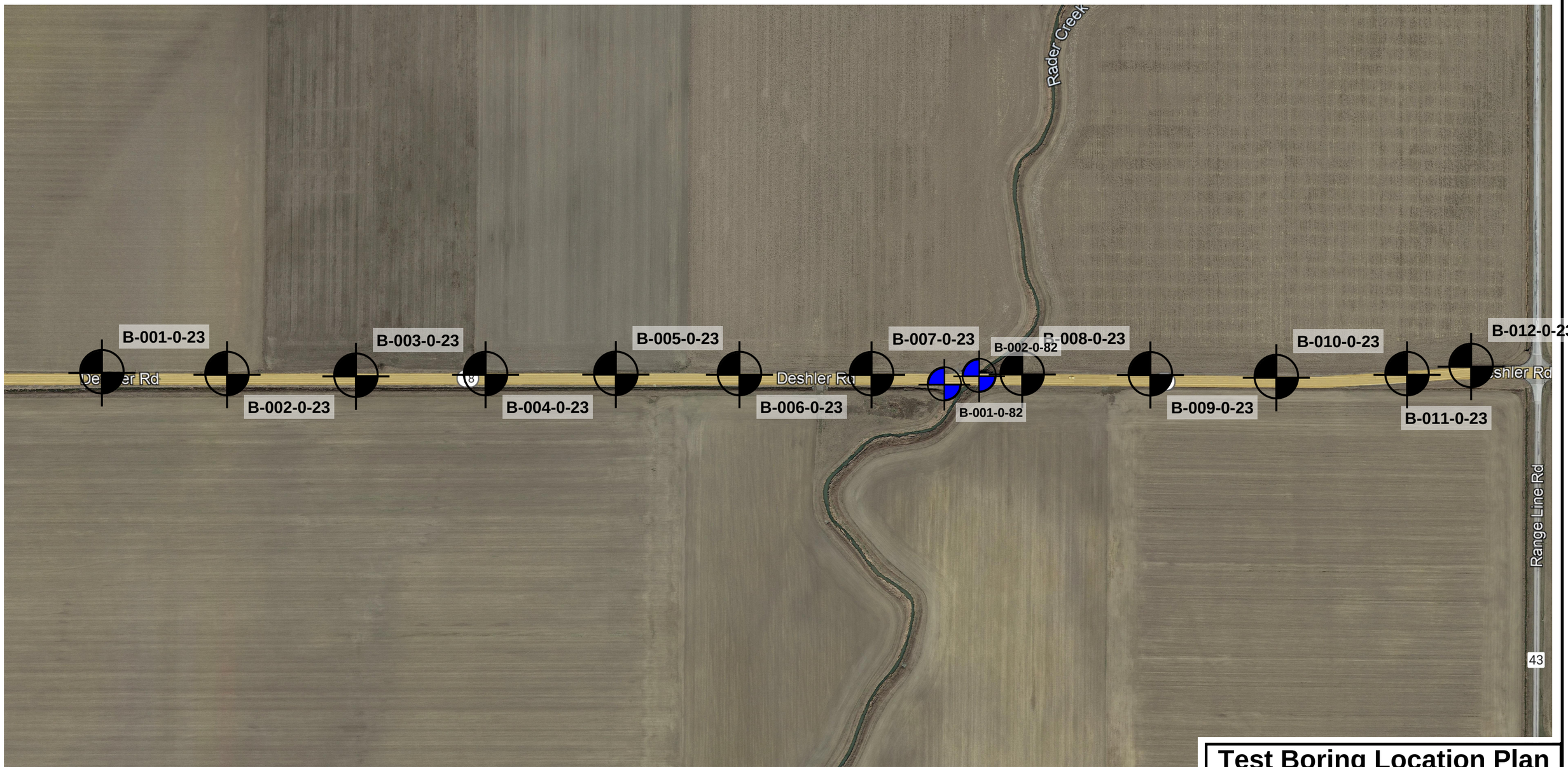
Notes: Aerial Basemap obtained From Google Earth and dated 03/20/2021.

Site Location Map

Proposed Roadway Rehabilitation and New Headwalls
Wood County, Ohio

ODOT District 2

DRAWN:	RK 03/14/24
REVISED:	---
Project No.:	232350
Drawing No.:	Plate 1.0



Legend:

B-001-0-23 Approximate Test Boring Location

B-001-0-82 APPROXIMATE HISTORIC BORING LOCATION

0' 300' 600'

N

Notes: Aerial Basemap obtained From Google Earth and dated 03/20/2021

Test Boring Location Plan

Proposed Roadway Rehabilitation and New Headwalls
Wood County, Ohio

ODOT District 2

DRAWN:	RK 03/14/24
REVISED:	---
Project No.:	232350
Drawing No.:	Plate 2.1



Legend:

B-013-0-23

Approximate Test Boring Location

B-001-0-87

APPROXIMATE HISTORIC BORING LOCATION

0' 300' 600'

N

Notes: Aerial Basemap obtained From Google Earth and dated 03/20/2021

Test Boring Location Plan

Proposed Roadway Rehabilitation and New Headwalls
Wood County, Ohio

ODOT District 2

DRAWN:	RK 03/14/24
REVISED:	---
Project No.:	232350
Drawing No.:	Plate 2.2



Legend:

B-025-0-23

Approximate Test Boring Location

0' 250' 500'

N

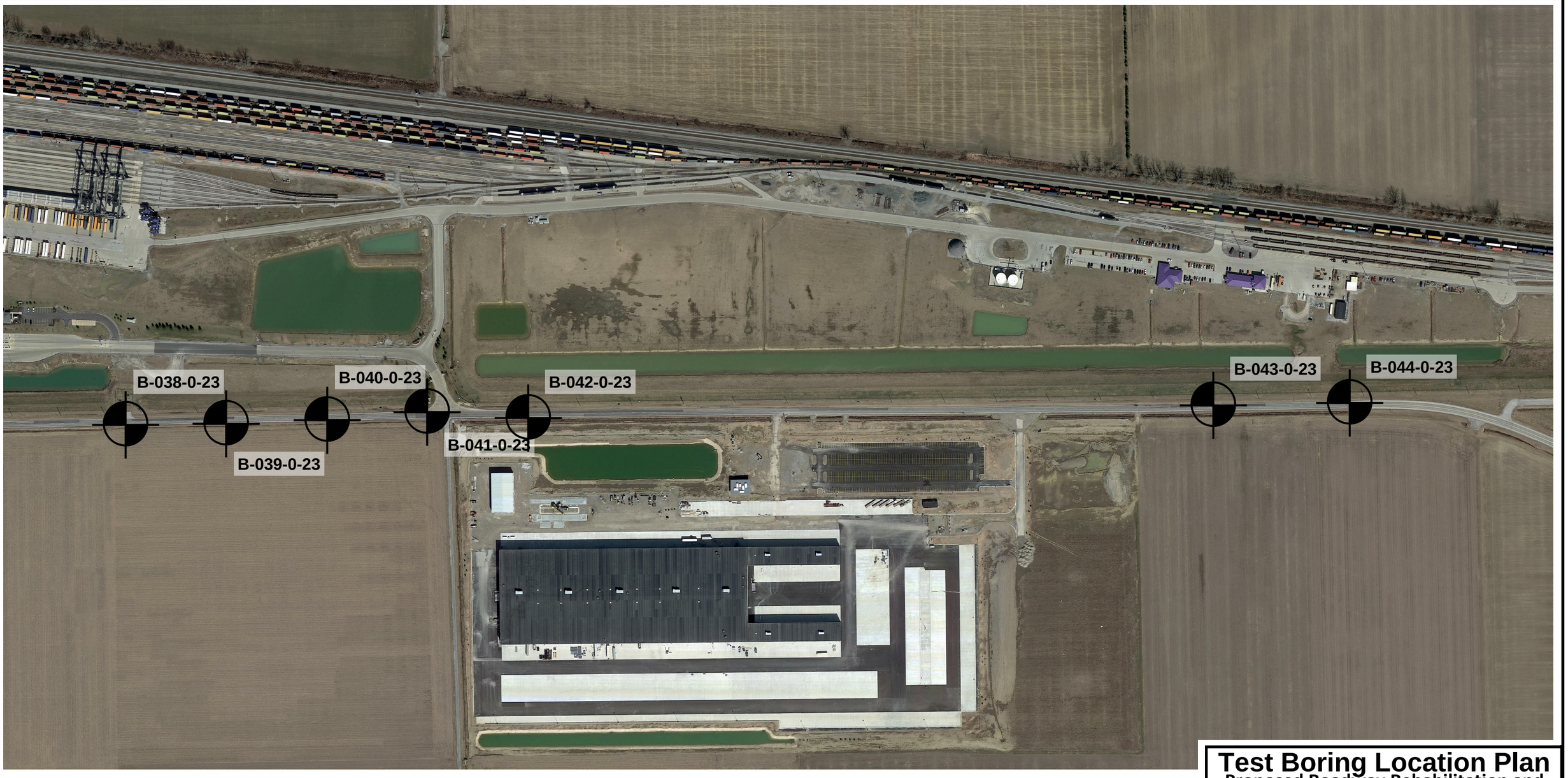
Notes: Aerial Basemap obtained From Google Earth and dated 03/20/2021

Test Boring Location Plan

Proposed Roadway Rehabilitation and New Headwalls
Wood County, Ohio

ODOT District 2

DRAWN:	RK 03/14/24
REVISED:	---
Project No.:	232350
Drawing No.:	Plate 2.3



Legend:

B-038-0-23

Approximate Test Boring Location

0' 350' 700'

N

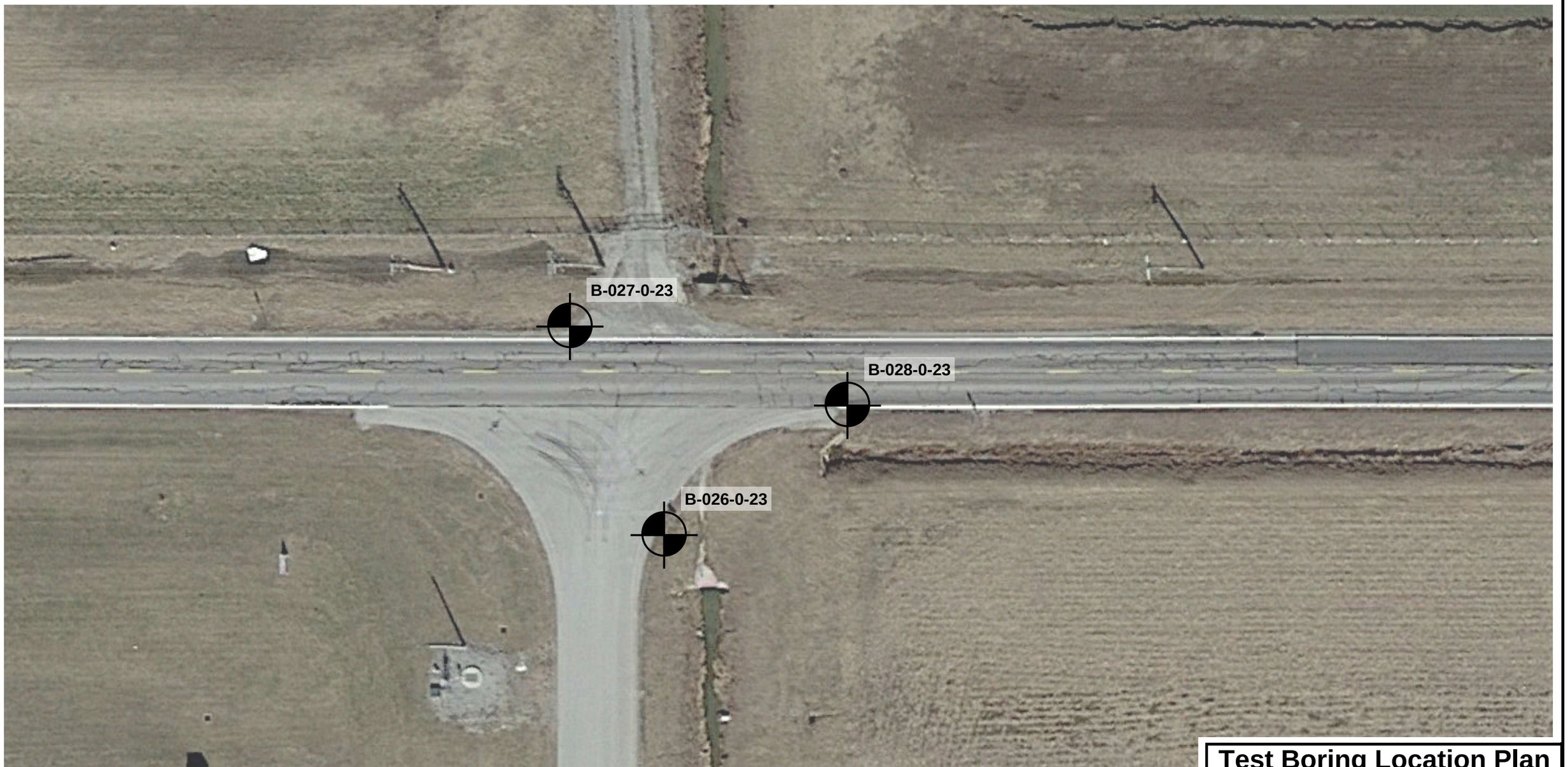
Notes: Aerial Basemap obtained From Google Earth and dated 03/20/2021

Test Boring Location Plan

Proposed Roadway Rehabilitation and New Headwalls
Wood County, Ohio

ODOT District 2

DRAWN:	RK 03/14/24
REVISED:	---
Project No.:	232350
Drawing No.:	Plate 2.4



Legend:

B-026-0-23

Approximate Test Boring Location

0' 30' 60'

N

Notes: Aerial Basemap obtained From Google Earth and dated 03/20/2021

Test Boring Location Plan

Proposed Roadway Rehabilitation and New Headwalls
Wood County, Ohio

ODOT District 2

DRAWN:	RK 03/14/24
REVISED:	---
Project No.:	232350
Drawing No.:	Plate 2.5

PROJECT: WOO-18-06.67	DRILLING FIRM / OPERATOR: CT CONSULTANTS / TB	DRILL RIG: CME 75 TRUCK 844	STATION / OFFSET:	EXPLORATION ID B-001-0-23
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: CT CONSULTANTS / KK	HAMMER: CME AUTOMATIC	ALIGNMENT: SR 18	
PID: 116951 SFN: N/A	DRILLING METHOD: SSA	CALIBRATION DATE: 2/20/23	ELEVATION: 709.7 (NAVD88) EOB: 7.5 ft.	PAGE 1 OF 1
START: 2/20/24 END: 2/20/24	SAMPLING METHOD: SPT	ENERGY RATIO (%): 72.9	LAT / LONG: 41.182819, -83.781363	

MATERIAL DESCRIPTION AND NOTES	ELEV. 709.7	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
ASPHALT - 9 INCHES	708.9																		
AGGREGATE BASE - 8 INCHES	708.3																		
VERY STIFF, DARK BROWN, **CLAY**, SOME SILT, LITTLE SAND, TRACE GRAVEL, DAMP (TRACE ORGANICS IN SS-1)		1 2	3 3 4	9	83	SS-1	2.50	7	4	14	26	49	43	22	21	21	A-7-6 (13)	200	
	705.5	3 4	7 9 11	24	100	SS-2A	2.50	1	4	8	20	67	41	20	21	20	A-7-6 (13)	-	
MEDIUM STIFF TO STIFF, BROWN, **SILTY CLAY**, LITTLE SAND, TRACE GRAVEL, MOIST						SS-2B	-	-	-	-	-	-	-	-	-	-	A-6b (V)	-	
		5	3 3 4	9	100	SS-3	1.00	-	-	-	-	-	-	-	-	22	A-6b (V)	-	
@6.5': GRAY/BROWN	702.2	6 7 EOB	7 7 7	17	100	SS-4	0.50	-	-	-	-	-	-	-	-	33	A-6b (V)	-	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.25 BAG ASPHALT PATCH; AUGER CUTTINGS MIXED WITH 0.25 BAG BENTONITE CHIPS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 5/16/24 15:39 - X:\PROJECTS\232350.GPJ

PROJECT: WOO-18-06.67	DRILLING FIRM / OPERATOR: CT CONSULTANTS / TB	DRILL RIG: CME 75 TRUCK 844	STATION / OFFSET:	EXPLORATION ID B-002-0-23	
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: CT CONSULTANTS / KK	HAMMER: CME AUTOMATIC	ALIGNMENT: SR 18		
PID: 116951 SFN: N/A	DRILLING METHOD: SSA	CALIBRATION DATE: 2/20/23	ELEVATION: 709.5 (NAVD88)	EOB: 7.5 ft.	PAGE 1 OF 1
START: 2/20/24 END: 2/20/24	SAMPLING METHOD: SPT	ENERGY RATIO (%): 72.9	LAT / LONG: 41.182821, -83.779911		

MATERIAL DESCRIPTION AND NOTES	ELEV. 709.5	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
TOPSOIL AND AGGREGATE BASE - 18 INCHES	708.0	1																	
MEDIUM STIFF, DARK BROWN, **SILTY CLAY**, SOME GRAVEL, SOME SAND, TRACE ORGANICS, DAMP	706.5	2	3 3 3	7	56	SS-1	-	31	11	11	16	31	38	20	18	12	A-6b (5)	210	
VERY STIFF, BROWN, **CLAY**, SOME SILT, LITTLE SAND, TRACE GRAVEL, MOIST	705.5	3	4 6 7	16	100	SS-2A	2.00	1	3	13	23	60	43	21	22	24	A-7-6 (13)	-	
VERY STIFF, BROWN, **SILTY CLAY**, LITTLE SAND, TRACE GRAVEL, DAMP	702.0	4				SS-2B	-	-	-	-	-	-	-	-	-	-	A-6b (V)	-	
		5	3 4 5	11	100	SS-3	2.75	-	-	-	-	-	-	-	-	19	A-6b (V)	-	
		6	6 8 10	22	100	SS-4	3.50	-	-	-	-	-	-	-	-	17	A-6b (V)	-	
		7 EOB																	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: AUGER CUTTINGS MIXED WITH 0.25 BAG BENTONITE CHIPS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 5/16/24 15:40 - X:\PROJECTS\232350.GPJ

PROJECT: WOO-18-06.67	DRILLING FIRM / OPERATOR: CT CONSULTANTS / TB	DRILL RIG: CME 75 TRUCK 844	STATION / OFFSET:	EXPLORATION ID B-003-0-23	
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: CT CONSULTANTS / KKC	HAMMER: CME AUTOMATIC	ALIGNMENT: SR 18		
PID: 116951 SFN: N/A	DRILLING METHOD: SSA	CALIBRATION DATE: 2/20/23	ELEVATION: 708.5 (NAVD88)	EOB: 7.5 ft.	PAGE 1 OF 1
START: 2/20/24 END: 2/20/24	SAMPLING METHOD: SPT	ENERGY RATIO (%): 72.9	LAT / LONG: 41.182843, -83.778449		

MATERIAL DESCRIPTION AND NOTES	ELEV. 708.5	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
ASPHALT - 8 INCHES	707.8																		
AGGREGATE BASE - 14 INCHES	706.7					SS-1A	-	-	-	-	-	-	-	-	-	-	A-1-a (V)	-	
MEDIUM STIFF TO STIFF, BROWN, **CLAY**, SOME SAND, SOME SILT, TRACE GRAVEL, DAMP (TRACE ORGANICS IN SS-1)			3 3 3	7	78	SS-1B	-	1	6	21	25	47	44	22	22	23	A-7-6 (13)	210	
			3 5 5	12	0	SS-2	-	1	5	17	25	52	46	23	23	27	A-7-6 (14)	-	
	703.5					SS-3A	-	-	-	-	-	-	-	-	-	-	A-7-6 (V)	-	
STIFF, BROWN, **SILTY CLAY**, LITTLE SAND, TRACE GRAVEL, MOIST			4 5 6	13	100	SS-3B	1.75	-	-	-	-	-	-	-	-	26	A-6b (V)	-	
@6': HARD, DAMP			6 8 11	23	100	SS-4	4.25	-	-	-	-	-	-	-	-	18	A-6b (V)	-	
	701.0	EOB																	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.25 BAG ASPHALT PATCH; AUGER CUTTINGS MIXED WITH 0.25 BAG BENTONITE CHIPS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 5/16/24 15:40 - X:\PROJECTS\232350.GPJ

PROJECT: WOO-18-06.67	DRILLING FIRM / OPERATOR: CT CONSULTANTS / TB	DRILL RIG: CME 75 TRUCK 844	STATION / OFFSET:	EXPLORATION ID B-004-0-23	
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: CT CONSULTANTS / KKC	HAMMER: CME AUTOMATIC	ALIGNMENT: SR 18		
PID: 116951 SFN: N/A	DRILLING METHOD: SSA	CALIBRATION DATE: 2/20/23	ELEVATION: 708.5 (NAVD88)	EOB: 7.5 ft.	PAGE 1 OF 1
START: 2/20/24 END: 2/20/24	SAMPLING METHOD: SPT	ENERGY RATIO (%): 72.9	LAT / LONG: 41.182852, -83.776992		

MATERIAL DESCRIPTION AND NOTES	ELEV. 708.5	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
AGGREGATE BASE - 17 INCHES	707.1	1																	
MEDIUM STIFF, BROWN, **SILT AND CLAY**, "AND" SAND, LITTLE GRAVEL, DAMP	705.4	2	3 2 2	5	83	SS-1	-	18	19	17	20	26	28	16	12	11	A-6a (3)	200	
STIFF TO VERY STIFF, BROWN, **CLAY**, SOME SILT, LITTLE SAND, TRACE GRAVEL, MOIST		3	3 6 8	17	100	SS-2	1.25	1	3	9	20	67	45	25	20	32	A-7-6 (13)	-	
		4																	
		5	3 4 5	11	56	SS-3	2.25	-	-	-	-	-	-	-	-	21	A-7-6 (V)	-	
		6																	
@7.3': GRAY/BROWN	701.0	7 EOB	5 6 7	16	56	SS-4	2.25	-	-	-	-	-	-	-	-	28	A-7-6 (V)	-	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: AUGER CUTTINGS MIXED WITH 0.25 BAG BENTONITE CHIPS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 5/16/24 15:40 - X:\PROJECTS\232350.GPJ

PROJECT: WOO-18-06.67	DRILLING FIRM / OPERATOR: CT CONSULTANTS / TB	DRILL RIG: CME 75 TRUCK 844	STATION / OFFSET:	EXPLORATION ID B-005-0-23	
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: CT CONSULTANTS / KK	CHAMMER: CME AUTOMATIC	ALIGNMENT: SR 18		
PID: 116951 SFN: N/A	DRILLING METHOD: SSA	CALIBRATION DATE: 2/20/23	ELEVATION: 708.6 (NAVD88)	EOB: 7.5 ft.	PAGE 1 OF 1
START: 2/20/24 END: 2/20/24	SAMPLING METHOD: SPT	ENERGY RATIO (%): 72.9	LAT / LONG: 41.182866, -83.775510		

MATERIAL DESCRIPTION AND NOTES	ELEV. 708.6	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
ASPHALT - 7 INCHES	708.0																		
AGGREGATE BASE - 8 INCHES	707.3																		
STIFF TO VERY STIFF, GRAY/BROWN, **SILTY CLAY**, SOME GRAVEL, SOME SAND, DAMP		1																	
		2	4 4 4	10	72	SS-1	-	29	12	11	22	26	36	19	17	12	A-6b (5)	210	
@3': GRAY/BROWN, SOME SAND, TRACE GRAVEL		3	4 8 8	19	0	SS-2	-	7	8	22	24	39	40	21	19	21	A-6b (9)	-	
		4																	
		5	3 5 7	15	100	SS-3	2.50	-	-	-	-	-	-	-	-	23	A-6b (V)	-	
	702.4	6																	
HARD, BROWN, **SILT AND CLAY**, SOME SAND, TRACE GRAVEL, DAMP		7	7 9 11	24	100	SS-4	4.50	-	-	-	-	-	-	-	-	17	A-6a (V)	-	
	701.1	EOB																	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.25 BAG ASPHALT PATCH; AUGER CUTTINGS MIXED WITH 0.25 BAG BENTONITE CHIPS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 5/16/24 15:40 - X:\PROJECTS\232350.GPJ

PROJECT: WOO-18-06.67	DRILLING FIRM / OPERATOR: CT CONSULTANTS / TB	DRILL RIG: CME 75 TRUCK 844	STATION / OFFSET:	EXPLORATION ID B-006-0-23
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: CT CONSULTANTS / KKC	HAMMER: CME AUTOMATIC	ALIGNMENT: SR 18	
PID: 116951 SFN: N/A	DRILLING METHOD: SSA	CALIBRATION DATE: 2/20/23	ELEVATION: 708.3 (NAVD88) EOB: 7.0 ft.	PAGE 1 OF 1
START: 2/20/24 END: 2/20/24	SAMPLING METHOD: SPT	ENERGY RATIO (%): 72.9	LAT / LONG: 41.182887, -83.774078	

MATERIAL DESCRIPTION AND NOTES	ELEV. 708.3	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
ASPHALT - 6.5 INCHES	707.8																		
AGGREGATE BASE - 5.5 INCHES	707.3																		
STIFF, BROWN, **SILTY CLAY**, SOME SAND, LITTLE GRAVEL, DAMP FILL	706.3	1	5 4 4	10	78	SS-1A	3.75	10	6	18	25	41	38	22	16	16	A-6b (9)	210	
VERY STIFF, BROWN, **CLAY**, SOME SAND, SOME SILT, TRACE GRAVEL, TRACE BRICK FRAGMENTS, MOIST FILL	705.3	2				SS-1B	-	-	-	-	-	-	-	-	-	-	A-7-6 (V)	-	
						SS-2A	2.75	2	5	21	25	47	46	23	23	24	A-7-6 (14)	-	
ORANGE, **BRICK FRAGMENTS** FILL	705.0	3	4 4 5	11	83	SS-2B	-	-	-	-	-	-	-	-	-	-	A-1-a (V)	-	
VERY STIFF, BROWN, **SILTY CLAY**, LITTLE SAND, TRACE GRAVEL, MOIST		4				SS-2C	-	-	-	-	-	-	-	-	-	-	A-6b (V)	-	
		5	4 4 5	11	100	SS-3	2.50	-	-	-	-	-	-	-	-	24	A-6b (V)	-	
		6	5 6 8	17	100	SS-4	2.50	-	-	-	-	-	-	-	-	24	A-6b (V)	-	
	701.3	EOB 7																	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.25 BAG ASPHALT PATCH; AUGER CUTTINGS MIXED WITH 0.25 BAG BENTONITE CHIPS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 5/16/24 15:40 - X:\PROJECTS\232350.GPJ

PROJECT: WOO-18-06.67	DRILLING FIRM / OPERATOR: CT CONSULTANTS / TB	DRILL RIG: CME 75 TRUCK 844	STATION / OFFSET:	EXPLORATION ID B-007-0-23	
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: CT CONSULTANTS / KKC	HAMMER: CME AUTOMATIC	ALIGNMENT: SR 18		
PID: 116951 SFN: N/A	DRILLING METHOD: SSA	CALIBRATION DATE: 2/20/23	ELEVATION: 707.9 (NAVD88)	EOB: 7.5 ft.	PAGE 1 OF 1
START: 2/20/24 END: 2/20/24	SAMPLING METHOD: SPT	ENERGY RATIO (%): 72.9	LAT / LONG: 41.182888, -83.772593		

MATERIAL DESCRIPTION AND NOTES	ELEV. 707.9	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
AGGREGATE BASE - 19 INCHES	706.3																		
VERY STIFF, BROWN, **SILTY CLAY**, LITTLE SAND, TRACE GRAVEL, MOIST	705.2		3 4 4	10	89	SS-1A	2.00	3	7	24	28	38	37	21	16	24	A-6b (9)	210	
						SS-1B	-	-	-	-	-	-	-	-	-	-	A-7-6 (V)	-	
STIFF TO VERY STIFF, BROWN, **CLAY**, SOME SILT, SOME SAND, TRACE GRAVEL, MOIST			3 5 5	12	100	SS-2	1.75	2	5	21	28	44	42	23	19	26	A-7-6 (11)	-	
@4.5': TRACE SAND, DAMP			4 6 6	15	100	SS-3	2.00	-	-	-	-	-	-	-	-	22	A-7-6 (V)	-	
@6.5': LITTLE SAND, MOIST	700.4	EOB	10 11 12	28	100	SS-4	2.75	-	-	-	-	-	-	-	-	24	A-7-6 (V)	-	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.25 BAG ASPHALT PATCH; AUGER CUTTINGS MIXED WITH 0.25 BAG BENTONITE CHIPS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 5/16/24 15:40 - X:\PROJECTS\232350.GPJ

PROJECT: WOO-18-06.67	DRILLING FIRM / OPERATOR: CT CONSULTANTS / TB	DRILL RIG: CME 75 TRUCK 844	STATION / OFFSET:	EXPLORATION ID B-008-0-23	
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: CT CONSULTANTS / KKC	HAMMER: CME AUTOMATIC	ALIGNMENT: SR 18		
PID: 116951 SFN: N/A	DRILLING METHOD: SSA	CALIBRATION DATE: 2/20/23	ELEVATION: 707.7 (NAVD88)	EOB: 7.5 ft.	PAGE 1 OF 1
START: 2/20/24 END: 2/20/24	SAMPLING METHOD: SPT	ENERGY RATIO (%): 72.9	LAT / LONG: 41.182902, -83.770975		

MATERIAL DESCRIPTION AND NOTES	ELEV. 707.7	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
ASPHALT - 8 INCHES	707.0																		
AGGREGATE BASE - 14 INCHES	705.9					SS-1A	-	-	-	-	-	-	-	-	-	-	A-1-a (V)	-	
STIFF, GRAY/BROWN, **SILT AND CLAY**, SOME SAND, SOME GRAVEL, DAMP			4 5 6	13	89	SS-1B	-	31	13	18	19	19	31	18	13	10	A-6a (1)	<100	
@3': SS-2A DESIGNATION BASED ON DRILLER DESCRIPTION OF FIELD CONDITIONS- NO RECOVERY IN SPLIT-SPOON FOR SS-2	704.2					SS-2A	-	-	-	-	-	-	-	-	-	-	A-6a (V)	-	
STIFF, DARK BROWN, **SILTY CLAY**, "AND" SAND, TRACE GRAVEL, TRACE ORGANICS, MOIST (NOTED AS AUGER SAMPLE)			6 7 8	18	0	SS-2B	-	3	9	28	27	33	35	19	16	21	A-6b (7)	-	
@4.5': BROWN/GRAY, LITTLE SAND			4 5 6	13	100	SS-3	1.50	-	-	-	-	-	-	-	-	28	A-6b (V)	-	
@6': GRAY/BROWN			7 9 8	21	100	SS-4	1.25	-	-	-	-	-	-	-	-	25	A-6b (V)	-	
	700.2	EOB																	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.25 BAG ASPHALT PATCH; AUGER CUTTINGS MIXED WITH 0.25 BAG BENTONITE CHIPS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 5/16/24 15:40 - X:\PROJECTS\232350.GPJ

PROJECT: WOO-18-06.67	DRILLING FIRM / OPERATOR: CT CONSULTANTS / TB	DRILL RIG: CME 75 TRUCK 844	STATION / OFFSET:	EXPLORATION ID B-009-0-23	
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: CT CONSULTANTS / KKC	HAMMER: CME AUTOMATIC	ALIGNMENT: SR 18		
PID: 116951 SFN: N/A	DRILLING METHOD: SSA	CALIBRATION DATE: 2/20/23	ELEVATION: 707.7 (NAVD88)	EOB: 7.0 ft.	PAGE 1 OF 1
START: 2/20/24 END: 2/20/24	SAMPLING METHOD: SPT	ENERGY RATIO (%): 72.9	LAT / LONG: 41.182906, -83.769405		

MATERIAL DESCRIPTION AND NOTES	ELEV. 707.7	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
AGGREGATE BASE - 18 INCHES	706.2	1				SS-1A	-	-	-	-	-	-	-	-	-	-	A-1-a (V)	-	
STIFF TO VERY STIFF, BROWN, **SILTY CLAY**, SOME SAND, LITTLE GRAVEL, MOIST (TRACE ORGANICS IN SS-1)		2	3 3 3	7	78	SS-1B	1.50	10	6	24	27	33	35	17	18	18	A-6b (8)	200	
@2.8': "AND"SAND		3	3 4 6	12	100	SS-2	2.00	1	4	35	26	34	39	18	21	20	A-6b (9)	-	
@4': LITTLE SAND		4 5	3 4 7	13	100	SS-3	1.75	-	-	-	-	-	-	-	-	23	A-6b (V)	-	
	700.7	6 EOB 7	7 11 11	27	100	SS-4	3.00	-	-	-	-	-	-	-	-	22	A-6b (V)	-	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: AUGER CUTTINGS MIXED WITH 0.25 BAG BENTONITE CHIPS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 5/16/24 15:40 - X:\PROJECTS\232350.GPJ

PROJECT: WOO-18-06.67	DRILLING FIRM / OPERATOR: CT CONSULTANTS / TB	DRILL RIG: CME 75 TRUCK 844	STATION / OFFSET:	EXPLORATION ID B-010-0-23	
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: CT CONSULTANTS / KKC	HAMMER: CME AUTOMATIC	ALIGNMENT: SR 18		
PID: 116951 SFN: N/A	DRILLING METHOD: SSA	CALIBRATION DATE: 2/20/23	ELEVATION: 707.7 (NAVD88)	EOB: 7.0 ft.	PAGE 1 OF 1
START: 2/20/24 END: 2/20/24	SAMPLING METHOD: SPT	ENERGY RATIO (%): 72.9	LAT / LONG: 41.182912, -83.767953		

MATERIAL DESCRIPTION AND NOTES	ELEV. 707.7	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
ASPHALT - 7 INCHES	707.1																		
AGGREGATE BASE - 11 INCHES	706.2	1				SS-1A	-	-	-	-	-	-	-	-	-	-	A-1-a (V)	-	
STIFF TO VERY STIFF, BROWN/GRAY, **CLAY**, SOME GRAVEL, SOME SILT, SOME SAND, MOIST		2	5 4 4	10	67	SS-1B	-	24	6	14	22	34	41	20	21	23	A-7-6 (9)	200	
@2.8': LITTLE SAND		3	5 6 11	21	100	SS-2	2.50	0	3	15	27	55	44	21	23	22	A-7-6 (14)	-	
@4': TRACE GRAVEL	702.2	4 5	3 4 5	11	100	SS-3	2.50	-	-	-	-	-	-	-	-	22	A-7-6 (V)	-	
HARD, BROWN, **SILT AND CLAY**, SOME SAND, TRACE GRAVEL, DAMP	700.7	6	5 7 9	19	100	SS-4	4.50	-	-	-	-	-	-	-	-	16	A-6b (V)	-	
		EOB 7																	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.25 BAG ASPHALT PATCH; AUGER CUTTINGS MIXED WITH 0.25 BAG BENTONITE CHIPS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 5/16/24 15:40 - X:\PROJECTS\232350.GPJ

PROJECT: WOO-18-06.67	DRILLING FIRM / OPERATOR: CT CONSULTANTS / TB	DRILL RIG: CME 75 TRUCK 844	STATION / OFFSET:	EXPLORATION ID B-011-0-23	
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: CT CONSULTANTS / KKC	HAMMER: CME AUTOMATIC	ALIGNMENT: SR 18		
PID: 116951 SFN: N/A	DRILLING METHOD: SSA	CALIBRATION DATE: 2/20/23	ELEVATION: 708.0 (NAVD88)	EOB: 7.0 ft.	PAGE 1 OF 1
START: 2/20/24 END: 2/20/24	SAMPLING METHOD: SPT	ENERGY RATIO (%): 72.9	LAT / LONG: 41.182948, -83.766503		

MATERIAL DESCRIPTION AND NOTES	ELEV. 708.0	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
TOPSOIL AND AGGREGATE BASE - 13 INCHES	706.9	1																	
VERY STIFF, GRAY, **CLAY**, SOME SILT, SOME SAND, LITTLE GRAVEL, MOIST		2	2 3 5	10	67	SS-1	2.50	15	6	16	22	41	46	22	24	25	A-7-6 (12)	210	
@2.7': LITTLE SAND		3	5 8 13	26	100	SS-2	2.75	0	3	15	24	58	43	21	22	23	A-7-6 (13)	-	
@4': TRACE GRAVEL	702.5	4 5	4 4 5	11	100	SS-3	2.75	-	-	-	-	-	-	-	-	23	A-7-6 (V)	-	
HARD, BROWN, **SANDY SILT**, LITTLE CLAY, TRACE GRAVEL, DAMP	701.0	6	8 12 16	34	100	SS-4	4.50	-	-	-	-	-	-	-	-	16	A-4a (V)	-	
	EOB	7																	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: AUGER CUTTINGS MIXED WITH 0.25 BAG BENTONITE CHIPS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 5/16/24 15:40 - X:\PROJECTS\232350.GPJ

PROJECT: WOO-18-06.67	DRILLING FIRM / OPERATOR: CT CONSULTANTS / TB	DRILL RIG: CME 75 TRUCK 844	STATION / OFFSET:	EXPLORATION ID B-012-0-23
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: CT CONSULTANTS / KKC	HAMMER: CME AUTOMATIC	ALIGNMENT: SR 18	
PID: 116951 SFN: N/A	DRILLING METHOD: SSA	CALIBRATION DATE: 2/20/23	ELEVATION: 708.6 (NAVD88) EOB: 7.0 ft.	PAGE 1 OF 1
START: 2/20/24 END: 2/20/24	SAMPLING METHOD: SPT	ENERGY RATIO (%): 72.9	LAT / LONG: 41.182996, -83.765905	

MATERIAL DESCRIPTION AND NOTES	ELEV. 708.6	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
ASPHALT - 6.5 INCHES	708.1																		
AGGREGATE BASE - 8.5 INCHES	707.3	1				SS-1A	-	-	-	-	-	-	-	-	-	-	A-1-a (V)	-	
VERY STIFF, BROWN/GRAY, **SILTY CLAY**, SOME GRAVEL, SOME SAND, MOIST	706.2	2	4 3 3	7	72	SS-1B	2.75	27	11	11	16	35	33	16	17	19	A-6b (6)	210	
VERY STIFF, GRAY/BROWN, **CLAY**, SOME SILT, LITTLE SAND, MOIST @4': BROWN, TRACE GRAVEL		3 4	4 6 10	19	100	SS-2	2.50	0	3	12	27	58	44	22	22	24	A-7-6 (14)	-	
@5.5': LITTLE GRAVEL, DAMP		5 6	4 5 6	13	100	SS-3	3.00	-	-	-	-	-	-	-	-	22	A-7-6 (V)	-	
	701.6	EOB 7	8 12 12	29	100	SS-4	3.75	-	-	-	-	-	-	-	-	18	A-7-6 (V)	-	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.25 BAG ASPHALT PATCH; AUGER CUTTINGS MIXED WITH 0.25 BAG BENTONITE CHIPS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 5/16/24 15:40 - X:\PROJECTS\232350.GPJ

PROJECT: WOO-18-06.67	DRILLING FIRM / OPERATOR: CT CONSULTANTS / TB	DRILL RIG: CME 75 TRUCK 844	STATION / OFFSET:	EXPLORATION ID B-013-0-23	
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: CT CONSULTANTS / KKC	HAMMER: CME AUTOMATIC	ALIGNMENT: SR 18		
PID: 116951 SFN: N/A	DRILLING METHOD: SSA	CALIBRATION DATE: 2/20/23	ELEVATION: 707.0 (NAVD88)	EOB: 7.0 ft.	PAGE 1 OF 1
START: 2/16/24 END: 2/16/24	SAMPLING METHOD: SPT	ENERGY RATIO (%): 72.9	LAT / LONG: 41.183009, -83.764512		

MATERIAL DESCRIPTION AND NOTES	ELEV. 707.0	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
TOPSOIL AND AGGREGATE BASE - 13 INCHES	705.9																		
STIFF, BROWN, **SILTY CLAY**, SOME SAND, LITTLE GRAVEL, TRACE ORGANICS, MOIST	705.0	1	4 4 5	11	83	SS-1	-	12	14	17	23	34	36	18	18	19	A-6b (8)	220	
VERY STIFF, BROWN, **CLAY**, SOME SILT, LITTLE SAND, MOIST		2				SS-1B	-	-	-	-	-	-	-	-	-	-	A-7-6 (V)	-	
		3	7 10 13	28	100	SS-2	3.00	0	3	8	21	68	43	20	23	22	A-7-6 (14)	-	
@4.5': STIFF, TRACE GRAVEL		4 5	7 7 8	18	100	SS-3	1.75	-	-	-	-	-	-	-	-	22	A-7-6 (V)	-	
@5.5': GRAY/BROWN, TRACE SAND	700.0	6 EOB 7	10 10 11	26	100	SS-4	1.00	-	-	-	-	-	-	-	-	33	A-7-6 (V)	-	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: AUGER CUTTINGS MIXED WITH 0.25 BAG BENTONITE CHIPS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 5/16/24 15:40 - X:\PROJECTS\232350.GPJ

PROJECT: WOO-18-06.67	DRILLING FIRM / OPERATOR: CT CONSULTANTS / TB	DRILL RIG: CME 75 TRUCK 844	STATION / OFFSET:	EXPLORATION ID B-014-0-23	
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: CT CONSULTANTS / KKC	HAMMER: CME AUTOMATIC	ALIGNMENT: SR 18		
PID: 116951 SFN: N/A	DRILLING METHOD: SSA	CALIBRATION DATE: 2/20/23	ELEVATION: 706.0 (NAVD88)	EOB: 7.0 ft.	PAGE 1 OF 1
START: 2/16/24 END: 2/16/24	SAMPLING METHOD: SPT	ENERGY RATIO (%): 72.9	LAT / LONG: 41.183005, -83.763053		

MATERIAL DESCRIPTION AND NOTES	ELEV. 706.0	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
ASPHALT - 5 INCHES	705.6																		
AGGREGATE BASE - 10 INCHES	704.7	1				SS-1A	-	-	-	-	-	-	-	-	-	-	A-1-a (V)	-	
STIFF TO VERY STIFF, GRAY, **CLAY**, SOME SILT, LITTLE SAND, TRACE GRAVEL, MOIST		2	3 4 5	11	78	SS-1B	4.00	7	7	9	20	57	42	20	22	23	A-7-6 (13)	210	
@2.5': BROWN		3	5 7 11	22	100	SS-2	2.50	1	5	7	20	67	44	21	23	24	A-7-6 (14)	-	
	701.0	4	5 6 7	16	100	SS-3A	1.50	-	-	-	-	-	-	-	-	23	A-7-6 (V)	-	
HARD, BROWN, **SANDY SILT**, LITLTE CLAY, TRACE GRAVEL, DAMP		5				SS-3B	-	-	-	-	-	-	-	-	-	-	A-4a (V)	-	
	699.0	6 EOB 7	7 11 18	35	100	SS-4	4.50	-	-	-	-	-	-	-	-	16	A-4a (V)	-	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.25 BAG ASPHALT PATCH; AUGER CUTTINGS MIXED WITH 0.25 BAG BENTONITE CHIPS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 5/16/24 15:40 - X:\PROJECTS\232350.GPJ

PROJECT: WOO-18-06.67	DRILLING FIRM / OPERATOR: CT CONSULTANTS / TB	DRILL RIG: CME 75 TRUCK 844	STATION / OFFSET:	EXPLORATION ID B-015-0-23	
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: CT CONSULTANTS / KKC	HAMMER: CME AUTOMATIC	ALIGNMENT: SR 18		
PID: 116951 SFN: N/A	DRILLING METHOD: SSA	CALIBRATION DATE: 2/20/23	ELEVATION: 706.1 (NAVD88)	EOB: 7.0 ft.	PAGE 1 OF 1
START: 2/16/24 END: 2/16/24	SAMPLING METHOD: SPT	ENERGY RATIO (%): 72.9	LAT / LONG: 41.183003, -83.761686		

MATERIAL DESCRIPTION AND NOTES	ELEV. 706.1	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
TOPSOIL AND AGGREGATE BASE - 13 INCHES	705.0																		
VERY STIFF, BROWN, **CLAY**, SOME SILT, SOME SAND, TRACE GRAVEL, TRACE ORGANICS, MOIST	703.9	1	3 4 7	13	72	SS-1A	2.50	6	8	15	23	48	46	22	24	27	A-7-6 (14)	210	
VERY STIFF, BROWN, **SILTY CLAY**, LITTLE SAND, TRACE GRAVEL, MOIST		2				SS-1B	-	-	-	-	-	-	-	-	-	-	A-6b (V)	-	
		3	7 9 11	24	100	SS-2	2.00	1	3	8	22	66	40	20	20	21	A-6b (12)	-	
		4																	
		5	5 7 9	19	100	SS-3	2.50	-	-	-	-	-	-	-	-	21	A-6b (V)	-	
	700.1	6				SS-4A	-	-	-	-	-	-	-	-	-	-	A-6b (V)	-	
HARD, BROWN, **SILT AND CLAY**, SOME SAND, TRACE GRAVEL, DAMP	699.1		11 14 20	41	100	SS-4B	4.50	-	-	-	-	-	-	-	-	16	A-6a (V)	-	
		EOB 7																	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: AUGER CUTTINGS MIXED WITH 0.25 BAG BENTONITE CHIPS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 5/16/24 15:40 - X:\PROJECTS\232350.GPJ

PROJECT: WOO-18-06.67	DRILLING FIRM / OPERATOR: CT CONSULTANTS / TB	DRILL RIG: CME 75 TRUCK 844	STATION / OFFSET:	EXPLORATION ID B-016-0-23
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: CT CONSULTANTS / KKC	HAMMER: CME AUTOMATIC	ALIGNMENT: SR 18	
PID: 116951 SFN: N/A	DRILLING METHOD: SSA	CALIBRATION DATE: 2/20/23	ELEVATION: 706.7 (NAVD88) EOB: 7.0 ft.	PAGE 1 OF 1
START: 2/16/24 END: 2/16/24	SAMPLING METHOD: SPT	ENERGY RATIO (%): 72.9	LAT / LONG: 41.182993, -83.760109	

MATERIAL DESCRIPTION AND NOTES	ELEV. 706.7	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
ASPHALT - 6 INCHES	706.2																		
AGGREGATE BASE - 7 INCHES	705.6																		
VERY STIFF, GRAY, **CLAY**, SOME SILT, LITTLE SAND, TRACE GRAVEL, TRACE ORGANICS, MOIST		1	5 5 7	15	83	SS-1	2.50	4	5	11	22	58	46	23	23	27	A-7-6 (14)	210	
@2.8': GRAY/BROWN	702.7	2 3	7 11 11	27	100	SS-2	2.00	0	2	8	23	67	47	23	24	27	A-7-6 (15)	-	
HARD, BROWN, **SILT AND CLAY**, LITTLE SAND, TRACE GRAVEL, DAMP		4 5	5 7 7	17	100	SS-3	4.50	-	-	-	-	-	-	-	-	17	A-6a (V)	-	
	699.7	6	12 12 12	29	100	SS-4	4.50	-	-	-	-	-	-	-	-	18	A-6a (V)	-	
		EOB 7																	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.25 BAG ASPHALT PATCH; AUGER CUTTINGS MIXED WITH 0.25 BAG BENTONITE CHIPS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 5/16/24 15:40 - X:\PROJECTS\232350.GPJ

PROJECT: WOO-18-06.67	DRILLING FIRM / OPERATOR: CT CONSULTANTS / TB	DRILL RIG: CME 75 TRUCK 844	STATION / OFFSET:	EXPLORATION ID B-017-0-23	
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: CT CONSULTANTS / KKC	HAMMER: CME AUTOMATIC	ALIGNMENT: SR 18		
PID: 116951 SFN: N/A	DRILLING METHOD: SSA	CALIBRATION DATE: 2/20/23	ELEVATION: 707.0 (NAVD88)	EOB: 7.0 ft.	PAGE 1 OF 1
START: 2/16/24 END: 2/16/24	SAMPLING METHOD: SPT	ENERGY RATIO (%): 72.9	LAT / LONG: 41.183002, -83.758646		

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)	SO4 ppm	BACK FILL
TOPSOIL AND AGGREGATE BASE - 13 INCHES	707.0																		
	705.9	1																	
STIFF, BROWN, **SANDY SILT**, LITTLE GRAVEL, TRACE CLAY, MOIST			3 3 4	9	78	SS-1	-	14	17	22	41	6	18	10	8	12	A-4a (2)	210	
	704.0	2				SS-2A	-	-	-	-	-	-	-	-	-	-	A-4a (V)	-	
STIFF TO VERY STIFF, BROWN, **CLAY**, SOME SILT, LITTLE SAND, TRACE GRAVEL, MOIST		3	5 7 7	17	100	SS-2B	2.25	2	3	16	24	55	43	20	23	22	A-7-6 (14)	-	
	701.5	4																	
HARD, BROWN, **SILT AND CLAY**, TRACE SAND, DAMP		5	4 5 6	13	100	SS-3	1.25	-	-	-	-	-	-	-	-	24	A-7-6 (V)	-	
	700.0	6	7 10 13	28	100	SS-4	4.50	-	-	-	-	-	-	-	-	17	A-6a (V)	-	
	EOB	7																	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: AUGER CUTTINGS MIXED WITH 0.25 BAG BENTONITE CHIPS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 5/16/24 15:40 - X:\PROJECTS\232350.GPJ

PROJECT: WOO-18-06.67	DRILLING FIRM / OPERATOR: CT CONSULTANTS / TB	DRILL RIG: CME 75 TRUCK 844	STATION / OFFSET:	EXPLORATION ID B-018-0-23	
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: CT CONSULTANTS / KKC	HAMMER: CME AUTOMATIC	ALIGNMENT: SR 18		
PID: 116951 SFN: N/A	DRILLING METHOD: SSA	CALIBRATION DATE: 2/20/23	ELEVATION: 706.8 (NAVD88)	EOB: 7.0 ft.	PAGE 1 OF 1
START: 2/16/24 END: 2/16/24	SAMPLING METHOD: SPT	ENERGY RATIO (%): 72.9	LAT / LONG: 41.182996, -83.757178		

MATERIAL DESCRIPTION AND NOTES	ELEV. 706.8	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
ASPHALT - 8 INCHES	706.1																		
AGGREGATE BASE - 7 INCHES	705.5	1				SS-1A	-	-	-	-	-	-	-	-	-	-	A-1-a (V)	-	
VERY STIFF, GRAY, **SILTY CLAY**, LITTLE SAND, TRACE GRAVEL, TRACE ORGANICS, MOIST @2': GRAY/BROWN	704.3	2	3 3 4	9	89	SS-1B	3.75	1	5	11	22	61	36	17	19	20	A-6b (12)	210	
VERY STIFF, BROWN/GRAY, **CLAY**, SOME SILT, LITTLE SAND, TRACE GRAVEL, MOIST @3.7': BROWN		3 4	8 13 13	32	100	SS-2	3.50	2	3	14	24	57	46	22	24	25	A-7-6 (15)	-	
@5.5': DAMP		5 6	4 6 8	17	100	SS-3	3.00	-	-	-	-	-	-	-	-	23	A-7-6 (V)	-	
	699.8	EOB 7	10 10 10	24	100	SS-4	2.00	-	-	-	-	-	-	-	-	20	A-7-6 (V)	-	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.25 BAG ASPHALT PATCH; AUGER CUTTINGS MIXED WITH 0.25 BAG BENTONITE CHIPS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 5/16/24 15:40 - X:\PROJECTS\232350.GPJ

PROJECT: WOO-18-06.67	DRILLING FIRM / OPERATOR: CT CONSULTANTS / TB	DRILL RIG: CME 75 TRUCK 844	STATION / OFFSET:	EXPLORATION ID B-019-0-23	
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: CT CONSULTANTS / KK	HAMMER: CME AUTOMATIC	ALIGNMENT: SR 18		
PID: 116951 SFN: N/A	DRILLING METHOD: SSA	CALIBRATION DATE: 2/20/23	ELEVATION: 706.4 (NAVD88)	EOB: 7.0 ft.	PAGE 1 OF 1
START: 2/16/24 END: 2/16/24	SAMPLING METHOD: SPT	ENERGY RATIO (%): 72.9	LAT / LONG: 41.182997, -83.755684		

MATERIAL DESCRIPTION AND NOTES	ELEV. 706.4	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
TOPSOIL AND AGGREGATE BASE - 13 INCHES	705.3	1																	
STIFF TO VERY STIFF, BROWN, **SILTY CLAY**, SOME SAND, TRACE GRAVEL, DAMP	703.9	2	2 3 3	7	83	SS-1	2.00	6	10	16	23	45	36	20	16	19	A-6b (9)	210	
STIFF TO VERY STIFF, BROWN, **CLAY**, SOME SILT, LITTLE SAND, MOIST	702.4	3	4 6 8	17	100	SS-2	2.00	0	3	11	25	61	45	21	24	23	A-7-6 (15)	-	
STIFF TO VERY STIFF, BROWN, **SILTY CLAY**, LITTLE SAND, TRACE GRAVEL, MOIST	699.4	4	2 3 3	7	100	SS-3	1.75	-	-	-	-	-	-	-	-	26	A-6b (V)	-	
EOB		5																	
		6	4 6 6	15	100	SS-4	2.25	-	-	-	-	-	-	-	-	23	A-6b (V)	-	
		7																	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: AUGER CUTTINGS MIXED WITH 0.25 BAG BENTONITE CHIPS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 5/16/24 15:40 - X:\PROJECTS\232350.GPJ

PROJECT: WOO-18-06.67	DRILLING FIRM / OPERATOR: CT CONSULTANTS / TB	DRILL RIG: CME 75 TRUCK 844	STATION / OFFSET:	EXPLORATION ID B-020-0-23	
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: CT CONSULTANTS / KKC	HAMMER: CME AUTOMATIC	ALIGNMENT: SR 18		
PID: 116951 SFN: N/A	DRILLING METHOD: SSA	CALIBRATION DATE: 2/20/23	ELEVATION: 705.9 (NAVD88)	EOB: 7.0 ft.	PAGE 1 OF 1
START: 2/16/24 END: 2/16/24	SAMPLING METHOD: SPT	ENERGY RATIO (%): 72.9	LAT / LONG: 41.182997, -83.754249		

MATERIAL DESCRIPTION AND NOTES	ELEV. 705.9	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
ASPHALT - 5.5 INCHES	705.4																		
AGGREGATE BASE - 8.5 INCHES	704.7																		
STIFF, GRAY/BROWN, **SILTY CLAY**, SOME GRAVEL, LITTLE SAND, DAMP		1	5 5 7	15	78	SS-1	-	20	13	6	19	42	36	20	16	17	A-6b (8)	200	
	702.9	2				SS-2A	-	-	-	-	-	-	-	-	-	-	A-6b (V)	-	
VERY STIFF, GRAY, **CLAY**, SOME SILT, LITTLE SAND, MOIST	701.9	3	5 8 12	24	100	SS-2B	2.50	0	3	7	22	68	49	24	25	31	A-7-6 (16)	-	
STIFF TO VERY STIFF, BROWN, **SILTY CLAY**, LITTLE SAND, TRACE GRAVEL, MOIST		4	3 4 4	10	100	SS-3	2.00	-	-	-	-	-	-	-	-	21	A-6b (V)	-	
	698.9	5	6 8 8	19	100	SS-4	3.00	-	-	-	-	-	-	-	-	22	A-6b (V)	-	
		EOB 6 7																	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.25 BAG ASPHALT PATCH; AUGER CUTTINGS MIXED WITH 0.25 BAG BENTONITE CHIPS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 5/16/24 15:40 - X:\PROJECTS\232350.GPJ

PROJECT: WOO-18-06.67	DRILLING FIRM / OPERATOR: CT CONSULTANTS / TB	DRILL RIG: CME 75 TRUCK 844	STATION / OFFSET:	EXPLORATION ID B-021-0-23	
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: CT CONSULTANTS / KK	HAMMER: CME AUTOMATIC	ALIGNMENT: SR 18		
PID: 116951 SFN: N/A	DRILLING METHOD: SSA	CALIBRATION DATE: 2/20/23	ELEVATION: 706.3 (NAVD88)	EOB: 7.5 ft.	PAGE 1 OF 1
START: 2/26/24 END: 2/26/24	SAMPLING METHOD: SPT	ENERGY RATIO (%): 72.9	LAT / LONG: 41.182932, -83.752761		

MATERIAL DESCRIPTION AND NOTES	ELEV. 706.3	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
AGGREGATE BASE - 16 INCHES	705.0																		
LOOSE, GRAY/DARK BROWN, **CRUSHED STONE**, SOME SAND, LITTLE SILT, TRACE CLAY, TRACE ORGANICS, DAMP FILL	703.3		5 4 4	10	89	SS-1	-	65	15	5	14	1	NP	NP	NP	6	A-1-a (0)	<100	
VERY STIFF, BROWN, **SILTY CLAY**, TRACE SAND, TRACE GRAVEL, MOIST			4 4 5	11	100	SS-2	2.50	1	2	6	24	67	38	19	19	22	A-6b (12)	-	
			5 4 6	12	100	SS-3	2.25	-	-	-	-	-	-	-	-	21	A-6b (V)	-	
@7': BROWN/GRAY, LITTLE SAND	698.8	W 699.3 EOB	5 5 5	12	100	SS-4	-	-	-	-	-	-	-	-	-	31	A-6b (V)	-	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: AUGER CUTTINGS MIXED WITH 0.25 BAG BENTONITE CHIPS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 5/16/24 15:40 - X:\PROJECTS\232350.GPJ

PROJECT: WOO-18-06.67	DRILLING FIRM / OPERATOR: CT CONSULTANTS / TB	DRILL RIG: CME 75 TRUCK 844	STATION / OFFSET:	EXPLORATION ID B-022-0-23	
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: CT CONSULTANTS / KK	HAMMER: CME AUTOMATIC	ALIGNMENT: SR 18		
PID: 116951 SFN: N/A	DRILLING METHOD: SSA	CALIBRATION DATE: 2/20/23	ELEVATION: 706.7 (NAVD88)	EOB: 7.5 ft.	PAGE 1 OF 1
START: 2/26/24 END: 2/26/24	SAMPLING METHOD: SPT	ENERGY RATIO (%): 72.9	LAT / LONG: 41.182932, -83.751211		

MATERIAL DESCRIPTION AND NOTES	ELEV. 706.7	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
ASPHALT - 6 INCHES	706.2																		
AGGREGATE BASE - 13 INCHES	705.1	1																	
VERY STIFF, GRAY/BROWN, **CLAY**, SOME SILT, TRACE SAND, TRACE GRAVEL, MOIST		2	4 5 5	12	89	SS-1	2.50	1	3	6	23	67	46	22	24	26	A-7-6 (15)	210	
@3': BROWN, LITTLE SAND	702.2	3 4	6 6 7	16	100	SS-2	3.00	0	2	8	22	68	46	23	23	26	A-7-6 (14)	-	
STIFF TO VERY STIFF, BROWN, **SILTY CLAY**, LITTLE SAND, TRACE GRAVEL, MOIST		5	4 4 4	10	100	SS-3	2.00	-	-	-	-	-	-	-	-	25	A-6b (V)	-	
		6	6 8 7	18	100	SS-4	2.50	-	-	-	-	-	-	-	-	22	A-6b (V)	-	
	699.2	7 EOB																	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.25 BAG ASPHALT PATCH; AUGER CUTTINGS MIXED WITH 0.25 BAG BENTONITE CHIPS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 5/16/24 15:40 - X:\PROJECTS\232350.GPJ

PROJECT: WOO-18-06.67	DRILLING FIRM / OPERATOR: CT CONSULTANTS / TB	DRILL RIG: CME 75 TRUCK 844	STATION / OFFSET:	EXPLORATION ID B-023-0-23	
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: CT CONSULTANTS / KKC	HAMMER: CME AUTOMATIC	ALIGNMENT: SR 18		
PID: 116951 SFN: N/A	DRILLING METHOD: SSA	CALIBRATION DATE: 2/20/23	ELEVATION: 707.4 (NAVD88)	EOB: 7.5 ft.	PAGE 1 OF 1
START: 2/26/24 END: 2/26/24	SAMPLING METHOD: SPT	ENERGY RATIO (%): 72.9	LAT / LONG: 41.182917, -83.749757		

MATERIAL DESCRIPTION AND NOTES	ELEV. 707.4	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
TOPSOIL AND AGGREGATE BASE - 13 INCHES	706.3	1																	
STIFF TO VERY STIFF, BROWN, **CLAY**, SOME SAND, SOME SILT, TRACE GRAVEL, MOIST		2	3 3 3	7	100	SS-1	2.00	9	13	11	22	45	49	24	25	30	A-7-6 (14)	210	
@3': LITTLE SAND		3	4 4 5	11	100	SS-2	2.00	1	4	7	21	67	43	20	23	24	A-7-6 (14)	-	
@4.5': SOME SAND, DAMP	701.4	4 5	4 4 5	11	100	SS-3	3.50	-	-	-	-	-	-	-	-	19	A-7-6 (V)	-	
VERY STIFF, BROWN, **SILT AND CLAY**, SOME SAND, TRACE GRAVEL, DAMP	699.9	6 7 EOB	9 10 11	26	100	SS-4	4.00	-	-	-	-	-	-	-	-	17	A-6a (V)	-	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: AUGER CUTTINGS MIXED WITH 0.25 BAG BENTONITE CHIPS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 5/16/24 15:40 - X:\PROJECTS\232350.GPJ

PROJECT: WOO-18-06.67	DRILLING FIRM / OPERATOR: CT CONSULTANTS / TB	DRILL RIG: CME 75 TRUCK 844	STATION / OFFSET:	EXPLORATION ID B-024-0-23	
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: CT CONSULTANTS / KKC	HAMMER: CME AUTOMATIC	ALIGNMENT: SR 18		
PID: 116951 SFN: N/A	DRILLING METHOD: SSA	CALIBRATION DATE: 2/20/23	ELEVATION: 707.1 (NAVD88)	EOB: 7.5 ft.	PAGE 1 OF 1
START: 2/26/24 END: 2/26/24	SAMPLING METHOD: SPT	ENERGY RATIO (%): 72.9	LAT / LONG: 41.182919, -83.748297		

MATERIAL DESCRIPTION AND NOTES	ELEV. 707.1	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
ASPHALT - 6 INCHES	706.6																		
AGGREGATE BASE - 14 INCHES	705.4	1				SS-1A	-	-	-	-	-	-	-	-	-	-	A-1-a (V)	-	
VERY STIFF, GRAY/BROWN, **CLAY**, LITTLE SILT, LITTLE SAND, LITTLE GRAVEL, MOIST		2	5 5 5	12	100	SS-1B	2.50	10	5	12	18	55	42	20	22	25	A-7-6 (13)	220	
	703.1	3	6 8 7	18	100	SS-2A	-	-	-	-	-	-	-	-	-	-	A-7-6 (V)	-	
STIFF TO VERY STIFF, BROWN, **SILTY CLAY**, LITTLE SAND, TRACE GRAVEL, MOIST		4				SS-2B	1.75	2	4	13	21	60	35	18	17	22	A-6b (11)	-	
	701.1	5	3 4 7	13	100	SS-3	2.25	-	-	-	-	-	-	-	-	24	A-6b (V)	-	
HARD, BROWN, **SILT AND CLAY**, LITTLE SAND, TRACE GRAVEL, DAMP		6	5 7 9	19	100	SS-4	4.50	-	-	-	-	-	-	-	-	16	A-6a (V)	-	
	699.6	7 EOB																	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.25 BAG ASPHALT PATCH; AUGER CUTTINGS MIXED WITH 0.25 BAG BENTONITE CHIPS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 5/16/24 15:40 - X:\PROJECTS\232350.GPJ

PROJECT: WOO-18-06.67	DRILLING FIRM / OPERATOR: CT CONSULTANTS / TB	DRILL RIG: CME 75 TRUCK 844	STATION / OFFSET:	EXPLORATION ID B-025-0-23	
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: CT CONSULTANTS / KKC	HAMMER: CME AUTOMATIC	ALIGNMENT: SR 18		
PID: 116951 SFN: N/A	DRILLING METHOD: SSA	CALIBRATION DATE: 2/20/23	ELEVATION: 707.3 (NAVD88)	EOB: 7.5 ft.	PAGE 1 OF 1
START: 2/26/24 END: 2/26/24	SAMPLING METHOD: SPT	ENERGY RATIO (%): 72.9	LAT / LONG: 41.182908, -83.746839		

MATERIAL DESCRIPTION AND NOTES	ELEV. 707.3	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
TOPSOIL AND AGGREGATE BASE - 10 INCHES	706.5																		
STIFF TO VERY STIFF, GRAY/BROWN, **CLAY**, SOME SAND, SOME SILT, TRACE GRAVEL, MOIST		1																	
		2	3 3 3	7	100	SS-1	2.25	7	8	20	23	42	49	24	25	31	A-7-6 (13)	210	
@3': BROWN, LITTLE SAND	702.8	3	4 4 4	10	100	SS-2	1.25	3	2	13	23	59	45	21	24	26	A-7-6 (15)	-	
VERY STIFF, BROWN, **SILTY CLAY**, SOME SAND, TRACE GRAVEL, DAMP	701.8	4	3 5 4	11	100	SS-3A	3.75	-	-	-	-	-	-	-	-	19	A-6b (V)	-	
HARD, BROWN, **SILT AND CLAY**, SOME SAND, TRACE GRAVEL, MOIST		5				SS-3B	-	-	-	-	-	-	-	-	-	-	A-6a (V)	-	
	699.8	6 7 EOB	8 8 8	19	100	SS-4	4.25	-	-	-	-	-	-	-	-	21	A-6a (V)	-	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: AUGER CUTTINGS MIXED WITH 0.25 BAG BENTONITE CHIPS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 5/16/24 15:40 - X:\PROJECTS\232350.GPJ

PROJECT: WOO-18-06.67	DRILLING FIRM / OPERATOR: CT CONSULTANTS / TB	DRILL RIG: CME 75 TRUCK 844	STATION / OFFSET:	EXPLORATION ID B-026-0-23	
TYPE: BRIDGE	SAMPLING FIRM / LOGGER: CT CONSULTANTS / KK	HAMMER: CME AUTOMATIC	ALIGNMENT: SR 18		
PID: 116951 SFN: N/A	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 2/20/23	ELEVATION: 707.1 (NAVD88)	EOB: 30.0 ft.	PAGE 1 OF 1
START: 2/21/24 END: 2/21/24	SAMPLING METHOD: SPT	ENERGY RATIO (%): 72.9	LAT / LONG: 41.182783, -83.745894		

MATERIAL DESCRIPTION AND NOTES	ELEV. 707.1	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	HOLE SEALED
TOPSOIL - 2 INCHES	706.9																		
AGGREGATE BASE - 6 INCHES	706.4																		
VERY STIFF TO HARD, BROWN, **SILT AND CLAY**, TRACE SAND, MOIST			2 3 4	9	100	SS-1	2.50	-	-	-	-	-	-	-	-	26	A-6a (V)	-	
@3': SOME SAND, TRACE GRAVEL			2 4 4	10	100	SS-2	3.50	4	8	26	27	35	30	16	14	19	A-6a (7)	-	
@6.2': SOME SAND, TRACE GRAVEL			6 9 12	26	100	SS-3	4.50	-	-	-	-	-	-	-	-	14	A-6a (V)	-	
@8.5': "AND" SAND			7 12 17	35	100	SS-4	4.50	7	23	13	23	34	27	14	13	16	A-6a (6)	-	
@11.5': GRAY, SOME SAND	694.1		8 14 19	40	100	SS-5	3.75	7	7	20	24	42	27	14	13	15	A-6a (7)	-	
VERY STIFF, GRAY, **SILTY CLAY**, SOME SAND, TRACE GRAVEL, MOIST			7 10 13	28	100	SS-6	3.75	-	-	-	-	-	-	-	-	16	A-6b (V)	-	
			6 9 12	26	100	SS-7	3.50	-	-	-	-	-	-	-	-	17	A-6b (V)	-	
@18.5': Qu - 37.1 PSI = 2.67 TSF	686.1		4 6 8	17	100	SS-8	3.00	9	5	17	25	44	30	14	16	15	A-6b (9)	-	
VERY STIFF TO HARD, GRAY, **SILT AND CLAY**, LITTLE SAND, TRACE GRAVEL, MOIST			8 12 16	34	100	SS-9	4.00	-	-	-	-	-	-	-	-	16	A-6a (V)	-	
			6 8 10	22	100	SS-10	4.50	-	-	-	-	-	-	-	-	18	A-6a (V)	-	
			10 15 20	43	78	SS-11	4.50	-	-	-	-	-	-	-	-	17	A-6a (V)	-	
@28': SOME SAND, DAMP	677.1	EOB	3 6 9	18	100	SS-12	3.50	-	-	-	-	-	-	-	-	12	A-6a (V)	-	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PUMPED 8 CF CEMENT-BENTONITE GROUT

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 5/16/24 15:40 - X:\PROJECTS\232350.GPJ

PROJECT: WOO-18-06.67	DRILLING FIRM / OPERATOR: CT CONSULTANTS / TB	DRILL RIG: CME 75 TRUCK 844	STATION / OFFSET:	EXPLORATION ID B-027-0-23	
TYPE: BRIDGE	SAMPLING FIRM / LOGGER: CT CONSULTANTS / KK	HAMMER: CME AUTOMATIC	ALIGNMENT: SR 18		
PID: 116951 SFN: N/A	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 2/20/23	ELEVATION: 708.0 (NAVD88)	EOB: 30.0 ft.	PAGE 1 OF 1
START: 2/21/24 END: 2/21/24	SAMPLING METHOD: SPT	ENERGY RATIO (%): 72.9	LAT / LONG: 41.182984, -83.746016		

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)	SO4 ppm	HOLE SEALED
TOPSOIL AND AGGREGATE BASE - 14 INCHES	708.0																		
	706.8																		
STIFF, BROWN, **SILTY CLAY**, LITTLE SAND, TRACE GRAVEL, MOIST	705.0	1	4 4 4	10	100	SS-1	2.00	-	-	-	-	-	-	-	-	31	A-6b (V)	-	
VERY STIFF TO HARD, BROWN, **SILTY CLAY**, SOME SAND, TRACE GRAVEL, MOIST		2 3 4 5	2 4 6	12	78	SS-2	2.50	-	-	-	-	-	-	-	-	23	A-6b (V)	-	
@6': GRAY/BROWN	700.0	6 7 8	6 10 13	28	100	SS-3	4.50	5	12	11	22	50	34	17	17	20	A-6b (10)	-	
VERY STIFF TO HARD, BROWN, **SILT AND CLAY**, SOME SAND, TRACE GRAVEL, MOIST		9 10	7 14 14	34	100	SS-4	4.50	4	5	19	26	46	30	15	15	17	A-6a (9)	-	
@11.8': GRAY		11 12 13	4 11 14	30	100	SS-5	4.50	-	-	-	-	-	-	-	-	18	A-6a (V)	-	
@16': LITTLE GRAVEL		14 15 16 17	8 9 10	23	100	SS-6	4.50	-	-	-	-	-	-	-	-	15	A-6a (V)	-	
@18': TRACE GRAVEL		18 19 20	4 7 10	21	100	SS-7	3.25	15	5	15	23	42	28	14	14	15	A-6a (8)	-	
		21 22 23	4 6 8	17	100	SS-8	4.00	-	-	-	-	-	-	-	-	16	A-6a (V)	-	
		24 25 26	7 12 14	32	100	SS-9	4.00	-	-	-	-	-	-	-	-	17	A-6a (V)	-	
	680.0	27 28	3 6 7	16	100	SS-10	3.00	-	-	-	-	-	-	-	-	20	A-6a (V)	-	
STIFF, GRAY, **SILTY CLAY**, SOME SAND, MOIST Qu - 17.3 PSI = 1.25 TSF	678.0	29 30 EOB	7 9 12	26	100	SS-11	4.50	-	-	-	-	-	-	-	-	20	A-6a (V)	-	
			2 3 4	9	100	SS-12	1.50	-	-	-	-	-	-	-	-	27	A-6b (V)	-	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PUMPED 8 CF CEMENT-BENTONITE GROUT

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 5/16/24 15:40 - X:\PROJECTS\232350.GPJ

PROJECT: WOO-18-06.67	DRILLING FIRM / OPERATOR: CT CONSULTANTS / TB	DRILL RIG: CME 75 TRUCK 844	STATION / OFFSET:	EXPLORATION ID B-028-0-23	
TYPE: BRIDGE	SAMPLING FIRM / LOGGER: CT CONSULTANTS / KK	HAMMER: CME AUTOMATIC	ALIGNMENT: SR 18		
PID: 116951 SFN: N/A	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 2/20/23	ELEVATION: 706.6 (NAVD88)	EOB: 30.0 ft.	PAGE 1 OF 1
START: 2/26/24 END: 2/26/24	SAMPLING METHOD: SPT	ENERGY RATIO (%): 72.9	LAT / LONG: 41.182914, -83.745661		

MATERIAL DESCRIPTION AND NOTES	ELEV. 706.6	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	HOLE SEALED
ASPHALT - 6 INCHES	706.1																		
AGGREGATE BASE - 11 INCHES	705.2																		
VERY STIFF, GRAY, **SILT AND CLAY**, LITTLE SAND, TRACE GRAVEL, MOIST	704.6		7 2 4	7	100	SS-1A	2.50	-	-	-	-	-	-	-	-	30	A-6a (V)	200	
						SS-1B	-	-	-	-	-	-	-	-	-	-	A-6b (V)	-	
VERY STIFF, BROWN, **SILTY CLAY**, LITTLE SAND, TRACE GRAVEL, MOIST			7 7 10	21	100	SS-2	3.00	-	-	-	-	-	-	-	-	22	A-6b (V)	-	
	701.4		2 4 5	11	100	SS-3A	-	-	-	-	-	-	-	-	-	-	A-6b (V)	-	
						SS-3B	4.00	-	-	-	-	-	-	-	-	18	A-6a (V)	-	
VERY STIFF TO HARD, BROWN, **SILT AND CLAY**, SOME SAND, TRACE GRAVEL, MOIST			3 4 7	13	100	SS-4	4.50	-	-	-	-	-	-	-	-	16	A-6a (V)	-	
@6': LITTLE SAND																			
@8.5': SOME SAND			5 11 14	30	100	SS-5	4.50	5	12	12	21	50	29	15	14	17	A-6a (9)	-	
@11': GRAY/BROWN, LITTLE SAND			5 7 9	19	100	SS-6	4.50	-	-	-	-	-	-	-	-	16	A-6a (V)	-	
@13': GRAY			4 5 8	16	100	SS-7	4.50	-	-	-	-	-	-	-	-	14	A-6a (V)	-	
@16': LITTLE GRAVEL, Qu - 36.5 PSI = 2.63 TSF			7 9 10	23	100	SS-8	3.75	11	6	12	22	49	28	14	14	15	A-6a (9)	-	
			4 5 7	15	100	SS-9	-	-	-	-	-	-	-	-	-	15	A-6a (V)	-	
			8 11 14	30	100	SS-10	4.50	-	-	-	-	-	-	-	-	17	A-6a (V)	-	
	683.1																		
VERY STIFF, GRAY, **SILTY CLAY**, LITTLE SAND, LITTLE GRAVEL, MOIST			4 4 8	15	100	SS-11	4.00	13	5	10	19	53	32	16	16	18	A-6b (10)	-	
			8 13 13	32	100	SS-12	4.00	-	-	-	-	-	-	-	-	18	A-6b (V)	-	
@28': TRACE GRAVEL			5 4 4	10	100	SS-13	3.00	-	-	-	-	-	-	-	-	21	A-6b (V)	-	
	676.6	EOB																	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.25 BAG ASPHALT PATCH; PUMPED 8 CF CEMENT-BENTONITE GROUT

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 5/16/24 15:40 - X:\PROJECTS\232350.GPJ

PROJECT: WOO-18-06.67	DRILLING FIRM / OPERATOR: CT CONSULTANTS / TB	DRILL RIG: CME 75 TRUCK 844	STATION / OFFSET:	EXPLORATION ID B-029-0-23
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: CT CONSULTANTS / KK	HAMMER: CME AUTOMATIC	ALIGNMENT: SR 18	
PID: 116951 SFN: N/A	DRILLING METHOD: SSA	CALIBRATION DATE: 2/20/23	ELEVATION: 706.5 (NAVD88) EOB: 7.5 ft.	PAGE 1 OF 1
START: 2/26/24 END: 2/26/24	SAMPLING METHOD: SPT	ENERGY RATIO (%): 72.9	LAT / LONG: 41.182914, -83.744145	

MATERIAL DESCRIPTION AND NOTES	ELEV. 706.5	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
TOPSOIL AND AGGREGATE BASE - 10 INCHES	705.7																		
STIFF TO VERY STIFF, BROWN, **CLAY**, SOME SILT, LITTLE SAND, TRACE GRAVEL, MOIST (TRACE ORGANICS IN SS-1)		1																	
		2	2 2 3	6	100	SS-1	2.00	6	5	11	23	55	46	22	24	26	A-7-6 (15)	210	
		3	4 7 9	19	100	SS-2	2.50	3	4	14	25	54	45	21	24	25	A-7-6 (15)	-	
	701.5					SS-3A	-	-	-	-	-	-	-	-	-	-	A-7-6 (V)	-	
HARD, BROWN, **SILT AND CLAY**, LITTLE SAND, TRACE GRAVEL, DAMP		5	5 5 5	12	100	SS-3B	4.50	-	-	-	-	-	-	-	-	18	A-6a (V)	-	
@6': SOME SAND		6																	
		7	5 7 9	19	100	SS-4	4.50	-	-	-	-	-	-	-	-	16	A-6a (V)	-	
	699.0	EOB																	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: AUGER CUTTINGS MIXED WITH 0.25 BAG BENTONITE CHIPS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 5/16/24 15:40 - X:\PROJECTS\232350.GPJ

PROJECT: WOO-18-06.67	DRILLING FIRM / OPERATOR: CT CONSULTANTS / TB	DRILL RIG: CME 75 TRUCK 844	STATION / OFFSET:	EXPLORATION ID B-030-0-23	
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: CT CONSULTANTS / KKC	HAMMER: CME AUTOMATIC	ALIGNMENT: SR 18		
PID: 116951 SFN: N/A	DRILLING METHOD: SSA	CALIBRATION DATE: 2/20/23	ELEVATION: 707.4 (NAVD88)	EOB: 7.5 ft.	PAGE 1 OF 1
START: 2/26/24 END: 2/26/24	SAMPLING METHOD: SPT	ENERGY RATIO (%): 72.9	LAT / LONG: 41.182914, -83.742715		

MATERIAL DESCRIPTION AND NOTES	ELEV. 707.4	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
ASPHALT - 5 INCHES	707.0																		
AGGREGATE BASE - 17 INCHES	705.6					SS-1A	-	-	-	-	-	-	-	-	-	-	A-1-a (V)	-	
STIFF TO VERY STIFF, BROWN, **SILTY CLAY**, SOME GRAVEL, LITTLE SAND, MOIST			4 2 4	7	100	SS-1B	2.50	24	3	10	19	44	40	21	19	24	A-6b (9)	220	
@3': TRACE GRAVEL			4 4 5	11	100	SS-2	2.00	1	4	12	26	57	39	20	19	23	A-6b (12)	-	
@4.5': TRACE SAND	701.4		3 4 4	10	100	SS-3	2.00	-	-	-	-	-	-	-	-	25	A-6b (V)	-	
MEDIUM STIFF, GRAY/BROWN, **SILTY CLAY**, LITTLE SAND, TRACE GRAVEL, MOIST		W 700.2	4 5 7	15	100	SS-4	0.75	-	-	-	-	-	-	-	-	29	A-6b (V)	-	
	699.9	EOB																	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.25 BAG ASPHALT PATCH; AUGER CUTTINGS MIXED WITH 0.25 BAG BENTONITE CHIPS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 5/16/24 15:40 - X:\PROJECTS\232350.GPJ

PROJECT: WOO-18-06.67	DRILLING FIRM / OPERATOR: CT CONSULTANTS / TB	DRILL RIG: CME 75 TRUCK 844	STATION / OFFSET:	EXPLORATION ID B-031-0-23	
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: CT CONSULTANTS / KK	HAMMER: CME AUTOMATIC	ALIGNMENT: SR 18		
PID: 116951 SFN: N/A	DRILLING METHOD: SSA	CALIBRATION DATE: 2/20/23	ELEVATION: 707.9 (NAVD88)	EOB: 7.5 ft.	PAGE 1 OF 1
START: 2/26/24 END: 2/26/24	SAMPLING METHOD: SPT	ENERGY RATIO (%): 72.9	LAT / LONG: 41.182905, -83.741303		

MATERIAL DESCRIPTION AND NOTES	ELEV. 707.9	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
TOPSOIL AND AGGREGATE BASE - 11 INCHES	707.0																		
MEDIUM STIFF TO STIFF, DARK BROWN, **CLAY**, SOME SAND, SOME SILT, LITTLE GRAVEL, TRACE ORGANICS, MOIST		1																	
		2	3 3 3	7	0	SS-1	-	11	13	15	21	40	45	21	24	24	A-7-6 (11)	210	
@3': BROWN, SOME GRAVEL, LITTLE SILT, TRACE SAND	703.4	3	3 3 4	9	100	SS-2	2.00	20	3	5	17	55	45	21	24	25	A-7-6 (14)	-	
VERY STIFF, BROWN, **SILTY CLAY**, LITTLE SAND, TRACE GRAVEL, MOIST	701.9	4 5	3 4 5	11	100	SS-3	3.00	-	-	-	-	-	-	-	-	23	A-6b (V)	-	
HARD, BROWN, **SILT AND CLAY**, LITTLE SAND, TRACE GRAVEL, DAMP	700.4	6 7	4 6 8	17	100	SS-4	4.50	-	-	-	-	-	-	-	-	18	A-6a (V)	-	
		EOB																	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: AUGER CUTTINGS MIXED WITH 0.25 BAG BENTONITE CHIPS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 5/16/24 15:40 - X:\PROJECTS\232350.GPJ

PROJECT: WOO-18-06.67	DRILLING FIRM / OPERATOR: CT CONSULTANTS / TB	DRILL RIG: CME 75 TRUCK 844	STATION / OFFSET:	EXPLORATION ID B-032-0-23	
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: CT CONSULTANTS / KKC	HAMMER: CME AUTOMATIC	ALIGNMENT: SR 18		
PID: 116951 SFN: N/A	DRILLING METHOD: SSA	CALIBRATION DATE: 2/20/23	ELEVATION: 707.9 (NAVD88)	EOB: 7.5 ft.	PAGE 1 OF 1
START: 2/26/24 END: 2/26/24	SAMPLING METHOD: SPT	ENERGY RATIO (%): 72.9	LAT / LONG: 41.182911, -83.739863		

MATERIAL DESCRIPTION AND NOTES	ELEV. 707.9	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
TOPSOIL AND AGGREGATE BASE - 7 INCHES	707.3																		
AGGREGATE BASE - 14 INCHES	706.1	1				SS-1A	-	-	-	-	-	-	-	-	-	-	A-1-a (V)	-	
VERY STIFF, BROWN, **SILTY CLAY**, LITTLE SAND, TRACE GRAVEL, MOIST		2	3 3 5	10	100	SS-1B	2.75	4	4	13	26	53	40	20	20	24	A-6b (12)	210	
		3	4 6 7	16	0	SS-2	-	7	7	11	21	54	39	20	19	23	A-6b (12)	-	
@4.5': STIFF		4																	
		5	5 4 4	10	100	SS-3	1.50	-	-	-	-	-	-	-	-	26	A-6b (V)	-	
@5.4': VERY STIFF		6																	
		7	5 5 8	16	100	SS-4	2.25	-	-	-	-	-	-	-	-	19	A-6b (V)	-	
	700.4	EOB																	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: AUGER CUTTINGS MIXED WITH 0.25 BAG BENTONITE CHIPS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 5/16/24 15:40 - X:\PROJECTS\232350.GPJ

PROJECT: WOO-18-06.67	DRILLING FIRM / OPERATOR: CT CONSULTANTS / TB	DRILL RIG: CME 75 TRUCK 844	STATION / OFFSET:	EXPLORATION ID B-033-0-23	
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: CT CONSULTANTS / KKC	HAMMER: CME AUTOMATIC	ALIGNMENT: SR 18		
PID: 116951 SFN: N/A	DRILLING METHOD: SSA	CALIBRATION DATE: 2/20/23	ELEVATION: 708.7 (NAVD88)	EOB: 7.5 ft.	PAGE 1 OF 1
START: 2/26/24 END: 2/26/24	SAMPLING METHOD: SPT	ENERGY RATIO (%): 72.9	LAT / LONG: 41.182906, -83.738584		

MATERIAL DESCRIPTION AND NOTES	ELEV. 708.7	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
ASPHALT - 7 INCHES	708.1																		
AGGREGATE BASE - 12 INCHES	707.1																		
STIFF TO VERY STIFF, BROWN, **CLAY**, SOME SILT, LITTLE SAND, TRACE GRAVEL, MOIST		1																	
		2	4 4 4	10	100	SS-1	2.50	6	3	11	23	57	41	20	21	24	A-7-6 (13)	210	
		3	5 6 6	15	100	SS-2	2.00	2	5	6	20	67	42	20	22	24	A-7-6 (13)	-	
		4																	
		5	5 5 5	12	100	SS-3	1.50	-	-	-	-	-	-	-	-	24	A-7-6 (V)	-	
	702.7	6																	
HARD, BROWN, **SILT AND CLAY**, LITTLE SAND, TRACE GRAVEL, DAMP		7	7 10 10	24	100	SS-4	4.50	-	-	-	-	-	-	-	-	17	A-6a (V)	-	
	701.2	EOB																	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.25 BAG ASPHALT PATCH; AUGER CUTTINGS MIXED WITH 0.25 BAG BENTONITE CHIPS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 5/16/24 15:40 - X:\PROJECTS\232350.GPJ

PROJECT: WOO-18-06.67	DRILLING FIRM / OPERATOR: CT CONSULTANTS / TB	DRILL RIG: CME 75 TRUCK 844	STATION / OFFSET:	EXPLORATION ID B-034-0-23
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: CT CONSULTANTS / KKC	HAMMER: CME AUTOMATIC	ALIGNMENT: SR 18	
PID: 116951 SFN: N/A	DRILLING METHOD: SSA	CALIBRATION DATE: 2/20/23	ELEVATION: 709.9 (NAVD88) EOB: 7.5 ft.	PAGE 1 OF 1
START: 2/27/24 END: 2/27/24	SAMPLING METHOD: SPT	ENERGY RATIO (%): 72.9	LAT / LONG: 41.182906, -83.736972	

MATERIAL DESCRIPTION AND NOTES	ELEV. 709.9	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
ASPHALT - 7 INCHES	709.3																		
AGGREGATE BASE - 11 INCHES	708.4	1																	
VERY STIFF, BROWN, **CLAY**, SOME SILT, LITTLE SAND, TRACE GRAVEL, MOIST	706.9	2	4 4 5	11	89	SS-1	2.50	5	4	7	20	64	47	22	25	26	A-7-6 (15)	210	
VERY STIFF, BROWN, **SILTY CLAY**, LITTLE SAND, TRACE GRAVEL, MOIST		3	6 10 9	23	100	SS-2	2.75	1	3	8	21	67	38	19	19	22	A-6b (12)	-	
@5.2': SOME GRAVEL	703.9	4 5	5 5 5	12	100	SS-3	2.50	-	-	-	-	-	-	-	-	18	A-6b (V)	-	
HARD, BROWN, **SILT AND CLAY**, SOME SAND, TRACE GRAVEL, DAMP	702.4	6 7	6 7 8	18	100	SS-4	4.50	-	-	-	-	-	-	-	-	18	A-6a (V)	-	
		EOB 7																	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.25 BAG ASPHALT PATCH; AUGER CUTTINGS MIXED WITH 0.25 BAG BENTONITE CHIPS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 5/16/24 15:40 - X:\PROJECTS\232350.GPJ

PROJECT: WOO-18-06.67	DRILLING FIRM / OPERATOR: CT CONSULTANTS / TB	DRILL RIG: CME 75 TRUCK 844	STATION / OFFSET:	EXPLORATION ID B-035-0-23	
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: CT CONSULTANTS / KKC	HAMMER: CME AUTOMATIC	ALIGNMENT: SR 18		
PID: 116951 SFN: N/A	DRILLING METHOD: SSA	CALIBRATION DATE: 2/20/23	ELEVATION: 709.9 (NAVD88)	EOB: 7.5 ft.	PAGE 1 OF 1
START: 2/27/24 END: 2/27/24	SAMPLING METHOD: SPT	ENERGY RATIO (%): 72.9	LAT / LONG: 41.182908, -83.735599		

MATERIAL DESCRIPTION AND NOTES	ELEV. 709.9	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
ASPHALT - 7 INCHES	709.3																		
AGGREGATE BASE - 10 INCHES	708.5	1																	
VERY STIFF, GRAY/BROWN, **CLAY**, SOME SILT, LITTLE SAND, TRACE GRAVEL, MOIST	706.9	2	4 4 6	12	100	SS-1	3.25	1	3	8	21	67	46	22	24	26	A-7-6 (15)	210	
VERY STIFF, BROWN, **SILTY CLAY**, LITTLE SAND, TRACE GRAVEL, MOIST	705.4	3	5 7 7	17	100	SS-2	3.00	5	4	7	20	64	39	19	20	21	A-6b (12)	-	
STIFF, BROWN, **SILT AND CLAY**, SOME SAND, TRACE GRAVEL, DAMP		4																	
		5	5 4 5	11	100	SS-3	1.75	-	-	-	-	-	-	-	-	14	A-6a (V)	-	
@6': HARD, LITTLE SAND		6																	
	702.4	7	7 7 8	18	100	SS-4	4.50	-	-	-	-	-	-	-	-	15	A-6a (V)	-	
		EOB																	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.25 BAG ASPHALT PATCH; AUGER CUTTINGS MIXED WITH 0.25 BAG BENTONITE CHIPS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 5/16/24 15:40 - X:\PROJECTS\232350.GPJ

PROJECT: WOO-18-06.67	DRILLING FIRM / OPERATOR: CT CONSULTANTS / TB	DRILL RIG: CME 75 TRUCK 844	STATION / OFFSET:	EXPLORATION ID B-036-0-23	
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: CT CONSULTANTS / KKC	HAMMER: CME AUTOMATIC	ALIGNMENT: SR 18		
PID: 116951 SFN: N/A	DRILLING METHOD: SSA	CALIBRATION DATE: 2/20/23	ELEVATION: 710.0 (NAVD88)	EOB: 7.5 ft.	PAGE 1 OF 1
START: 2/27/24 END: 2/27/24	SAMPLING METHOD: SPT	ENERGY RATIO (%): 72.9	LAT / LONG: 41.182918, -83.734219		

MATERIAL DESCRIPTION AND NOTES	ELEV. 710.0	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
ASPHALT - 6 INCHES	709.5																		
AGGREGATE BASE - 8 INCHES	708.8																		
VERY STIFF, BROWN, **CLAY**, SOME SILT, LITTLE SAND, TRACE GRAVEL, MOIST		1																	
		2	4 4 4	10	100	SS-1	2.75	1	2	8	21	68	49	23	26	31	A-7-6 (16)	200	
		3	5 6 6	15	100	SS-2	2.25	0	4	7	21	68	46	20	26	25	A-7-6 (16)	-	
	705.5	4																	
VERY STIFF, BROWN, **SILTY CLAY**, LITTLE SAND, TRACE GRAVEL, MOIST	704.8	5	5 5 3	10	100	SS-3A	2.25	-	-	-	-	-	-	-	-	20	A-6b (V)	-	
HARD, BROWN, **SILT AND CLAY**, LITTLE SAND, TRACE GRAVEL, DAMP						SS-3B	-	-	-	-	-	-	-	-	-	-	A-6a (V)	-	
		6	6 8 9	21	100	SS-4	4.50	-	-	-	-	-	-	-	-	16	A-6a (V)	-	
	702.5	7 EOB																	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.25 BAG ASPHALT PATCH; AUGER CUTTINGS MIXED WITH 0.25 BAG BENTONITE CHIPS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 5/16/24 15:40 - X:\PROJECTS\232350.GPJ

PROJECT: WOO-18-06.67	DRILLING FIRM / OPERATOR: CT CONSULTANTS / TB	DRILL RIG: CME 75 TRUCK 844	STATION / OFFSET:	EXPLORATION ID B-037-0-23	
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: CT CONSULTANTS / KKC	HAMMER: CME AUTOMATIC	ALIGNMENT: SR 18		
PID: 116951 SFN: N/A	DRILLING METHOD: SSA	CALIBRATION DATE: 2/20/23	ELEVATION: 710.3 (NAVD88)	EOB: 7.5 ft.	PAGE 1 OF 1
START: 2/27/24 END: 2/27/24	SAMPLING METHOD: SPT	ENERGY RATIO (%): 72.9	LAT / LONG: 41.182934, -83.732758		

MATERIAL DESCRIPTION AND NOTES	ELEV. 710.3	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
ASPHALT - 8 INCHES	709.6																		
AGGREGATE BASE - 8 INCHES	709.0																		
VERY STIFF, GRAY/BROWN, **CLAY**, LITTLE SILT, LITTLE SAND, LITTLE GRAVEL, MOIST	707.3	1	4 4 4	10	89	SS-1	2.50	10	3	7	19	61	45	20	25	25	A-7-6 (15)	200	
VERY STIFF TO HARD, BROWN, **SILTY CLAY**, LITTLE SAND, TRACE GRAVEL, MOIST		2	5 6 7	16	100	SS-2	3.25	2	3	13	22	60	38	18	20	20	A-6b (12)	-	
@4.5': SOME SAND		3	3 3 4	9	100	SS-3	4.50	-	-	-	-	-	-	-	-	19	A-6b (V)	-	
@5.4': GRAY/BROWN, LITTLE SAND		4																	
@6': STIFF		5	5 4 4	10	100	SS-4	1.50	-	-	-	-	-	-	-	-	26	A-6b (V)	-	
	702.8 EOB	6																	
		7																	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.25 BAG ASPHALT PATCH; AUGER CUTTINGS MIXED WITH 0.25 BAG BENTONITE CHIPS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 5/16/24 15:40 - X:\PROJECTS\232350.GPJ

PROJECT: WOO-18-06.67	DRILLING FIRM / OPERATOR: CT CONSULTANTS / TB	DRILL RIG: CME 75 TRUCK 844	STATION / OFFSET:	EXPLORATION ID B-038-0-23	
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: CT CONSULTANTS / KKC	HAMMER: CME AUTOMATIC	ALIGNMENT: SR 18		
PID: 116951 SFN: N/A	DRILLING METHOD: SSA	CALIBRATION DATE: 2/20/23	ELEVATION: 710.3 (NAVD88)	EOB: 7.5 ft.	PAGE 1 OF 1
START: 2/27/24 END: 2/27/24	SAMPLING METHOD: SPT	ENERGY RATIO (%): 72.9	LAT / LONG: 41.182947, -83.731337		

MATERIAL DESCRIPTION AND NOTES	ELEV. 710.3	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
TOPSOIL AND AGGREGATE BASE - 14 INCHES	709.1	1																	
STIFF, BROWN, **CLAY**, SOME SILT, LITTLE SAND, TRACE GRAVEL, MOIST	707.3	2	3 3 3	7	100	SS-1	1.50	5	5	14	26	50	46	22	24	27	A-7-6 (15)	200	
VERY STIFF, BROWN, **SILTY CLAY**, LITTLE SAND, TRACE GRAVEL, MOIST	705.8	3 4	4 4 4	10	100	SS-2	2.50	0	3	15	27	55	40	20	20	23	A-6b (12)	-	
VERY STIFF, BROWN, **SILT AND CLAY**, LITTLE SAND, LITTLE GRAVEL, MOIST	705.1	5	4 4 5	11	100	SS-3A	4.00	-	-	-	-	-	-	-	-	18	A-6a (V)	-	
VERY STIFF, GRAY/BROWN, **SILTY CLAY**, SOME SAND, TRACE GRAVEL, MOIST	702.8	6 7 EOB	7 7 8	18	100	SS-3B	-	-	-	-	-	-	-	-	-	-	A-6b (V)	-	
						SS-4	3.00	-	-	-	-	-	-	-	-	21	A-6b (V)	-	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: AUGER CUTTINGS MIXED WITH 0.25 BAG BENTONITE CHIPS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 5/16/24 15:40 - X:\PROJECTS\232350.GPJ

PROJECT: WOO-18-06.67	DRILLING FIRM / OPERATOR: CT CONSULTANTS / TB	DRILL RIG: CME 75 TRUCK 844	STATION / OFFSET:	EXPLORATION ID B-039-0-23	
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: CT CONSULTANTS / KKC	HAMMER: CME AUTOMATIC	ALIGNMENT: SR 18		
PID: 116951 SFN: N/A	DRILLING METHOD: SSA	CALIBRATION DATE: 2/20/23	ELEVATION: 710.1 (NAVD88)	EOB: 7.5 ft.	PAGE 1 OF 1
START: 2/27/24 END: 2/27/24	SAMPLING METHOD: SPT	ENERGY RATIO (%): 72.9	LAT / LONG: 41.182962, -83.729903		

MATERIAL DESCRIPTION AND NOTES	ELEV. 710.1	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
TOPSOIL AND AGGREGATE BASE - 17 INCHES	708.7	1																	
STIFF, GRAY, **CLAY**, SOME SAND, SOME SILT, TRACE GRAVEL, MOIST		2	2 2 3	6	89	SS-1	1.50	1	5	20	24	50	47	21	26	30	A-7-6 (16)	200	
@3.0': BROWN, LITTLE SAND		3 4	3 3 4	9	100	SS-2	2.00	1	4	13	24	58	44	21	23	25	A-7-6 (14)	-	
	704.1	5 6	2 2 3	6	100	SS-3	1.75	-	-	-	-	-	-	-	-	24	A-7-6 (V)	-	
STIFF, BROWN, **SILTY CLAY**, TRACE SAND, MOIST	702.6	7 EOB	5 5 5	12	100	SS-4	1.25	-	-	-	-	-	-	-	-	28	A-6b (V)	-	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: AUGER CUTTINGS MIXED WITH 0.25 BAG BENTONITE CHIPS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 5/16/24 15:40 - X:\PROJECTS\232350.GPJ

PROJECT: WOO-18-06.67	DRILLING FIRM / OPERATOR: CT CONSULTANTS / TB	DRILL RIG: CME 75 TRUCK 844	STATION / OFFSET:	EXPLORATION ID B-040-0-23	
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: CT CONSULTANTS / KKC	HAMMER: CME AUTOMATIC	ALIGNMENT: SR 18		
PID: 116951 SFN: N/A	DRILLING METHOD: SSA	CALIBRATION DATE: 2/20/23	ELEVATION: 710.5 (NAVD88)	EOB: 7.5 ft.	PAGE 1 OF 1
START: 2/27/24 END: 2/27/24	SAMPLING METHOD: SPT	ENERGY RATIO (%): 72.9	LAT / LONG: 41.182977, -83.728446		

MATERIAL DESCRIPTION AND NOTES	ELEV. 710.5	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
ASPHALT - 6 INCHES	710.0																		
AGGREGATE BASE - 10 INCHES	709.2																		
STIFF TO VERY STIFF, GRAY, **CLAY**, SOME SILT, SOME SAND, TRACE GRAVEL, TRACE ORGANICS, MOIST			4 4 5	11	0	SS-1	-	3	7	17	27	46	49	24	25	28	A-7-6 (15)	200	
@3': BROWN/GRAY	705.5		8 8 8	19	100	SS-2	3.00	0	5	16	24	55	49	23	26	29	A-7-6 (16)	-	
STIFF, BROWN, **SILTY CLAY**, LITTLE SAND, TRACE GRAVEL, MOIST	704.3		4 4 5	11	100	SS-3A	-	-	-	-	-	-	-	-	-	-	A-7-6 (V)	-	
						SS-3	2.00	-	-	-	-	-	-	-	-	24	A-6b (V)	-	
HARD, BROWN, **SILT AND CLAY**, SOME SAND, TRACE GRAVEL, DAMP	703.0	EOB	5 6 10	19	100	SS-4	4.50	-	-	-	-	-	-	-	-	17	A-6a (V)	-	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.25 BAG ASPHALT PATCH; AUGER CUTTINGS MIXED WITH 0.25 BAG BENTONITE CHIPS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 5/16/24 15:40 - X:\PROJECTS\232350.GPJ

PROJECT: WOO-18-06.67	DRILLING FIRM / OPERATOR: CT CONSULTANTS / TB	DRILL RIG: CME 75 TRUCK 844	STATION / OFFSET:	EXPLORATION ID B-041-0-23	
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: CT CONSULTANTS / KKC	HAMMER: CME AUTOMATIC	ALIGNMENT: SR 18		
PID: 116951 SFN: N/A	DRILLING METHOD: SSA	CALIBRATION DATE: 2/20/23	ELEVATION: 710.8 (NAVD88)	EOB: 7.5 ft.	PAGE 1 OF 1
START: 2/27/24 END: 2/27/24	SAMPLING METHOD: SPT	ENERGY RATIO (%): 72.9	LAT / LONG: 41.183065, -83.727072		

MATERIAL DESCRIPTION AND NOTES	ELEV. 710.8	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
ASPHALT - 11 INCHES	709.9																		
AGGREGATE BASE - 10 INCHES	709.0	W 709.0				SS-1A	-	-	-	-	-	-	-	-	-	-	A-1-a (V)	-	
STIFF TO VERY STIFF, GRAY, **CLAY**, SOME SAND, SOME SILT, TRACE GRAVEL, MOIST			4 4 5	11	100	SS-1B	3.00	9	12	13	22	44	49	23	26	31	A-7-6 (14)	190	
@4': LITTLE GRAVEL			2 2 3	6	100	SS-2	1.00	10	8	13	24	45	48	22	26	27	A-7-6 (15)	-	
@4.5': TRACE GRAVEL	704.8		3 3 3	7	100	SS-3	1.75	-	-	-	-	-	-	-	-	21	A-7-6 (V)	-	
VERY STIFF, BROWN, **SILT AND CLAY**, LITTLE SAND, TRACE GRAVEL, DAMP	703.3	EOB	4 5 7	15	100	SS-4	4.00	-	-	-	-	-	-	-	-	18	A-6a (V)	-	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.25 BAG ASPHALT PATCH; AUGER CUTTINGS MIXED WITH 0.25 BAG BENTONITE CHIPS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 5/16/24 15:40 - X:\PROJECTS\232350.GPJ

PROJECT: WOO-18-06.67	DRILLING FIRM / OPERATOR: CT CONSULTANTS / TB	DRILL RIG: CME 75 TRUCK 844	STATION / OFFSET:	EXPLORATION ID B-042-0-23	
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: CT CONSULTANTS / KKC	HAMMER: CME AUTOMATIC	ALIGNMENT: SR 18		
PID: 116951 SFN: N/A	DRILLING METHOD: SSA	CALIBRATION DATE: 2/20/23	ELEVATION: 710.6 (NAVD88)	EOB: 7.5 ft.	PAGE 1 OF 1
START: 2/27/24 END: 2/27/24	SAMPLING METHOD: SPT	ENERGY RATIO (%): 72.9	LAT / LONG: 41.182997, -83.725631		

MATERIAL DESCRIPTION AND NOTES	ELEV. 710.6	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
ASPHALT - 6 INCHES	710.1																		
AGGREGATE BASE - 8 INCHES	709.4																		
VERY STIFF TO HARD, BROWN, **SILTY CLAY**, LITTLE SAND, TRACE GRAVEL, MOIST		1																	
		2	4 4 4	10	100	SS-1	2.50	1	5	12	27	55	40	20	20	25	A-6b (12)	200	
@3.8': SOME SAND	706.1	3	4 6 8	17	100	SS-2	4.50	3	7	16	25	49	36	18	18	20	A-6b (11)	-	
VERY STIFF TO HARD, BROWN, **SILT AND CLAY**, LITTLE SAND, TRACE GRAVEL, MOIST		4																	
		5	3 3 4	9	100	SS-3	2.50	-	-	-	-	-	-	-	-	20	A-6a (V)	-	
@6': SOME SAND		6																	
	703.1	7	3 6 6	15	100	SS-4	4.50	-	-	-	-	-	-	-	-	17	A-6a (V)	-	
		EOB																	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.25 BAG ASPHALT PATCH; AUGER CUTTINGS MIXED WITH 0.25 BAG BENTONITE CHIPS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 5/16/24 15:40 - X:\PROJECTS\232350.GPJ

PROJECT: WOO-18-06.67	DRILLING FIRM / OPERATOR: CT CONSULTANTS / TB	DRILL RIG: CME 75 TRUCK 844	STATION / OFFSET:	EXPLORATION ID B-043-0-23	
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: CT CONSULTANTS / KKC	HAMMER: CME AUTOMATIC	ALIGNMENT: SR 18		
PID: 116951 SFN: N/A	DRILLING METHOD: SSA	CALIBRATION DATE: 2/20/23	ELEVATION: 712.9 (NAVD88)	EOB: 7.5 ft.	PAGE 1 OF 1
START: 2/27/24 END: 2/27/24	SAMPLING METHOD: SPT	ENERGY RATIO (%): 72.9	LAT / LONG: 41.183070, -83.715964		

MATERIAL DESCRIPTION AND NOTES	ELEV. 712.9	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
ASPHALT - 8 INCHES	712.2																		
AGGREGATE BASE - 10 INCHES	711.4																		
VERY STIFF, GRAY/BROWN, **CLAY**, SOME SILT, LITTLE SAND, LITTLE GRAVEL, MOIST	710.9					SS-1A	2.75	17	7	12	20	44	44	20	24	25	A-7-6 (12)	200	
VERY STIFF, BROWN, **SILTY CLAY**, LITTLE SAND, TRACE GRAVEL, MOIST		1	3 3 3	7	100	SS-1A	-	-	-	-	-	-	-	-	-	-	A-6b (V)	-	
		2	5 7 9	19	100	SS-2	2.50	2	5	12	24	57	38	19	19	21	A-6b (12)	-	
		3	5 5 5	12	100	SS-3	2.00	-	-	-	-	-	-	-	-	22	A-6b (V)	-	
		4	5 6 5	13	100	SS-4	2.00	-	-	-	-	-	-	-	-	22	A-6b (V)	-	
	705.4	5 EOB																	
		6																	
		7																	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.25 BAG ASPHALT PATCH; AUGER CUTTINGS MIXED WITH 0.25 BAG BENTONITE CHIPS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 5/16/24 15:40 - X:\PROJECTS\232350.GPJ

PROJECT: WOO-18-06.67	DRILLING FIRM / OPERATOR: CT CONSULTANTS / TB	DRILL RIG: CME 75 TRUCK 844	STATION / OFFSET:	EXPLORATION ID B-044-0-23
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: CT CONSULTANTS / KKC	HAMMER: CME AUTOMATIC	ALIGNMENT: SR 18	
PID: 116951 SFN: N/A	DRILLING METHOD: SSA	CALIBRATION DATE: 2/20/23	ELEVATION: 712.7 (NAVD88) EOB: 7.5 ft.	PAGE 1 OF 1
START: 2/27/24 END: 2/27/24	SAMPLING METHOD: SPT	ENERGY RATIO (%): 72.9	LAT / LONG: 41.183090, -83.713979	

MATERIAL DESCRIPTION AND NOTES	ELEV. 712.7	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%) GR	CS	FS	SI	CL	ATTERBERG LL	PL	PI	WC	ODOT CLASS (GI)	SO4 ppm	BACK FILL
ASPHALT - 13 INCHES	711.6																		
AGGREGATE BASE - 7 INCHES	711.0	▼ 711.0																	
STIFF, BROWN/GRAY, **CLAY**, SOME SILT, LITTLE SAND, MOIST	709.9	1	3 3 3	7	89	SS-1	2.00	0	3	15	24	58	45	21	24	26	A-7-6 (15)	200	
STIFF TO VERY STIFF, BROWN, **SILTY CLAY**, LITTLE SAND, TRACE GRAVEL, MOIST		2																	
		3	3 4 5	11	100	SS-2	2.50	1	4	8	23	64	40	20	20	24	A-6b (12)	-	
@4.5': SOME SAND		4																	
		5	3 4 5	11	100	SS-3	2.00	-	-	-	-	-	-	-	-	21	A-6b (V)	-	
@6': MEDIUM STIFF, WET		6																	
		7	2 3 3	7	100	SS-4	0.50	-	-	-	-	-	-	-	-	46	A-6b (V)	-	
	705.2	EOB																	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.25 BAG ASPHALT PATCH; AUGER CUTTINGS MIXED WITH 0.25 BAG BENTONITE CHIPS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 5/16/24 15:40 - X:\PROJECTS\232350.GPJ

KEY TO SYMBOLS

OHIO DEPARTMENT OF TRANSPORTION
OFFICE OF GEOTECHNICAL ENGINEERING

PROJECT WOO-18-06.67 **PID** 116951

OGE NUMBER N/A **PROJECT TYPE** ROADWAY

LITHOLOGIC SYMBOLS
(Unified Soil Classification System)


A-1-A: Ohio DOT: A-1-a, gravel and/or stone fragments


A-4A: Ohio DOT: A-4a, sandy silt


A-6A: Ohio DOT: A-6a, silt and clay


A-6B: Ohio DOT: A-6b, silty clay


A-7-6: Ohio DOT: A-7-6, clay


PAVEMENT OR BASE: Ohio DOT: Pavement or Aggregate base


TOPSOIL: Ohio DOT: Sod and Topsoil


UNCONTROLLED FILL: Ohio DOT: Uncontrolled Fill

SAMPLER SYMBOLS

WELL CONSTRUCTION SYMBOLS


Bentonite: Bottom of hole


Soil Cuttings Backfill mixed with Bentonite Pellets or Chips


Asphalt or Concrete Pavement Patch

ABBREVIATIONS

LL - LIQUID LIMIT (%)
PI - PLASTIC INDEX (%)
W - MOISTURE CONTENT (%)
DD - DRY DENSITY (PCF)
NP - NON PLASTIC
-200 - PERCENT PASSING NO. 200 SIEVE
PP - POCKET PENETROMETER (TSF)

TV - TORVANE
PID - PHOTOIONIZATION DETECTOR
UC - UNCONFINED COMPRESSION
ppm - PARTS PER MILLION


Water Level at Time Drilling, or as Shown


Water Level at End of Drilling, or as Shown


Water Level After 24 Hours, or as Shown

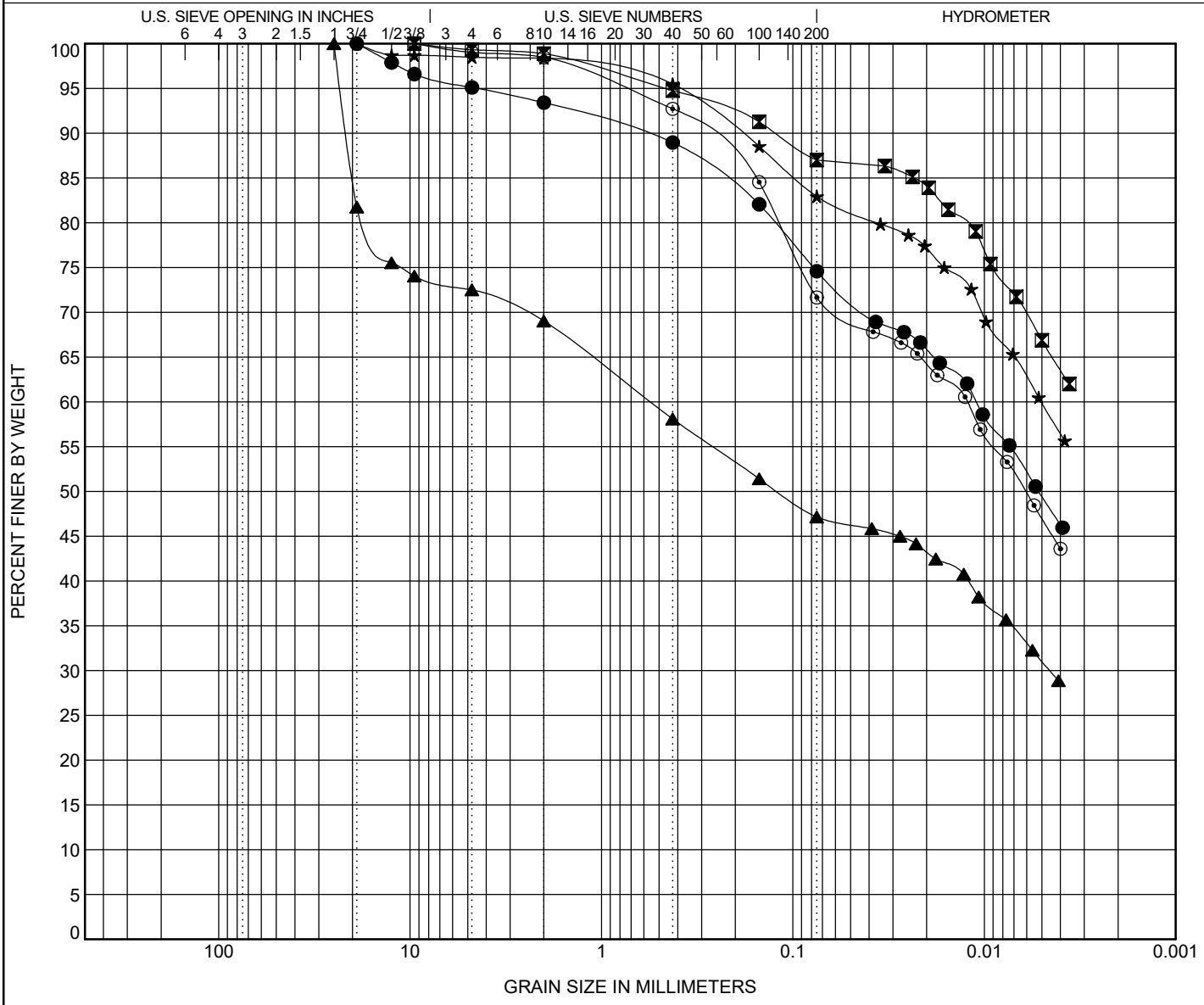
KEY TO SYMBOLS - OH DOT.GDT - 3/21/24 16:24 - \\TOL-DFS1.TTL.LOCAL\GINT\PROJECTS\232350.GPJ

GRAIN SIZE DISTRIBUTION

OHIO DEPARTMENT OF TRANSPORTION
OFFICE OF GEOTECHNICAL ENGINEERING

PROJECT WOO-18-06.67 **PID** 116951

OGE NUMBER N/A **PROJECT TYPE** ROADWAY



COBBLES	GRAVEL	SAND		SILT	CLAY
		coarse	fine		

Specimen Identification			ODOT (Modified AASHTO) ~ USCS Classification	LL	PL	PI
●	B-001-0-23	1.5	**A-7-6 ~ LEAN CLAY with SAND(CL)**	**43**	**22**	**21**
⊠	B-001-0-23	3.0	**A-7-6 ~ LEAN CLAY(CL)**	**41**	**20**	**21**
▲	B-002-0-23	1.5	**A-6b ~ CLAYEY GRAVEL with SAND(GC)**	**38**	**20**	**18**
★	B-002-0-23	3.0	**A-7-6 ~ LEAN CLAY with SAND(CL)**	**43**	**21**	**22**
⊙	B-003-0-23	1.8	**A-7-6 ~ LEAN CLAY with SAND(CL)**	**44**	**22**	**22**

Specimen Identification			D90	D50	D30	D10	%G	%CS	%FS	%M	%C	Cc	Cu
●	B-001-0-23	1.5	**0.611**	**0.005**			**7**	**4**	**14**	**26**	**49**		
⊠	B-001-0-23	3.0	**0.122**				**1**	**4**	**8**	**20**	**67**		
▲	B-002-0-23	1.5	**21.509**	**0.119**	**0.005**		**31**	**11**	**11**	**16**	**31**		
★	B-002-0-23	3.0	**0.187**				**1**	**3**	**13**	**23**	**60**		
⊙	B-003-0-23	1.8	**0.301**	**0.006**			**1**	**6**	**21**	**25**	**47**		

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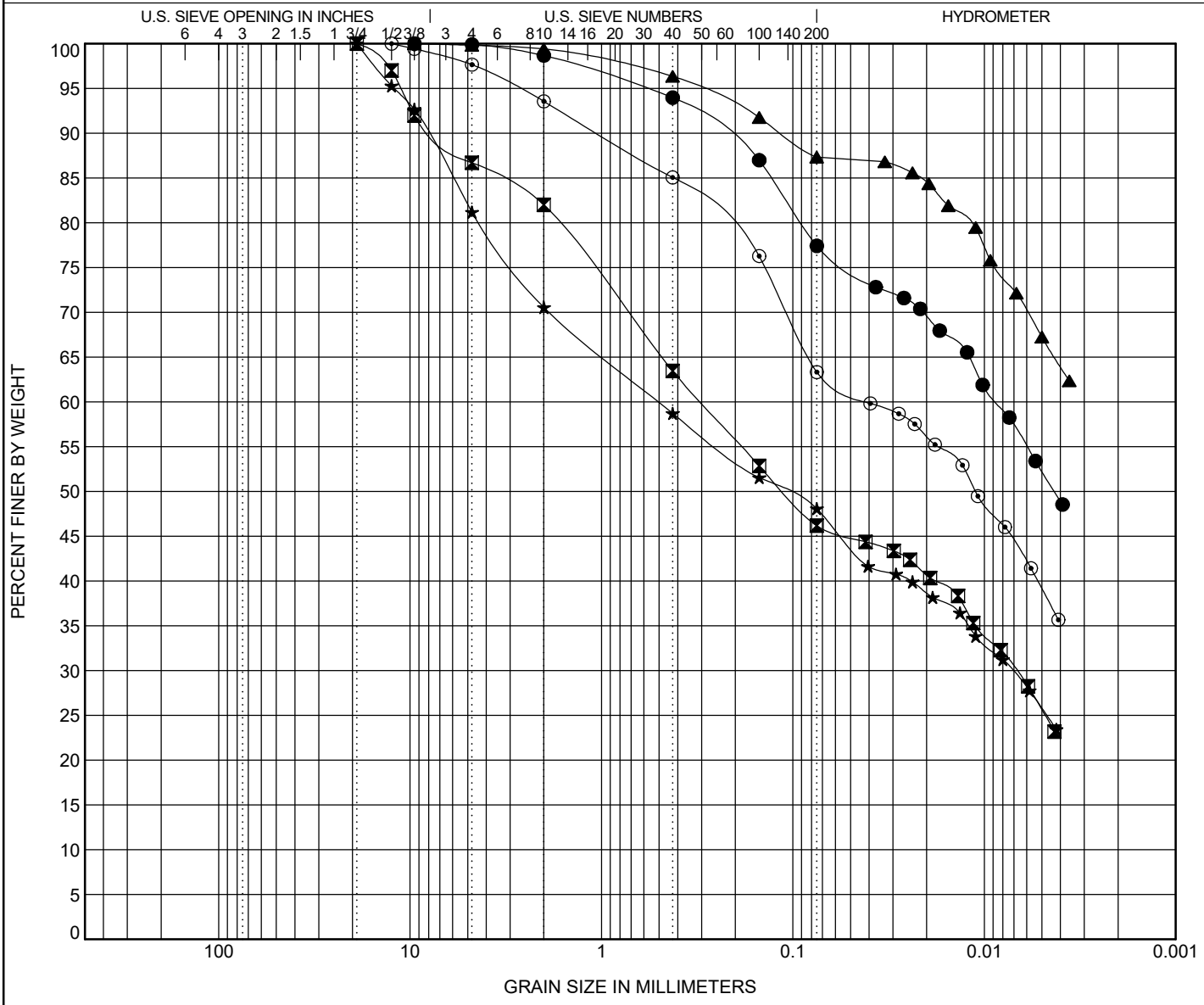

COBBLES	GRAVEL	SAND		SILT	CLAY
		coarse	fine		

Specimen Identification			ODOT (Modified AASHTO) ~ USCS Classification	LL	PL	PI
●	B-003-0-23	3.0	**A-7-6 ~ LEAN CLAY with SAND(CL)**	**46**	**23**	**23**
⊠	B-004-0-23	1.5	**A-6a ~ CLAYEY SAND(SC)**	**28**	**16**	**12**
▲	B-004-0-23	3.0	**A-7-6 ~ LEAN CLAY(CL)**	**45**	**25**	**20**
★	B-005-0-23	1.5	**A-6b ~ CLAYEY SAND with GRAVEL(SC)**	**36**	**19**	**17**
⊙	B-005-0-23	3.0	**A-6b ~ SANDY LEAN CLAY(CL)**	**40**	**21**	**19**

Specimen Identification			D90	D50	D30	D10	%G	%CS	%FS	%M	%C	Cc	Cu
●	B-003-0-23	3.0	**0.235**	**0.004**			**1**	**5**	**17**	**25**	**52**		
⊠	B-004-0-23	1.5	**7.343**	**0.112**	**0.007**		**18**	**19**	**17**	**20**	**26**		
▲	B-004-0-23	3.0	**0.114**				**1**	**3**	**9**	**20**	**67**		
★	B-005-0-23	1.5	**8.087**	**0.11**	**0.007**		**29**	**12**	**11**	**22**	**26**		
⊙	B-005-0-23	3.0	**1.046**	**0.011**			**7**	**8**	**22**	**24**	**39**		

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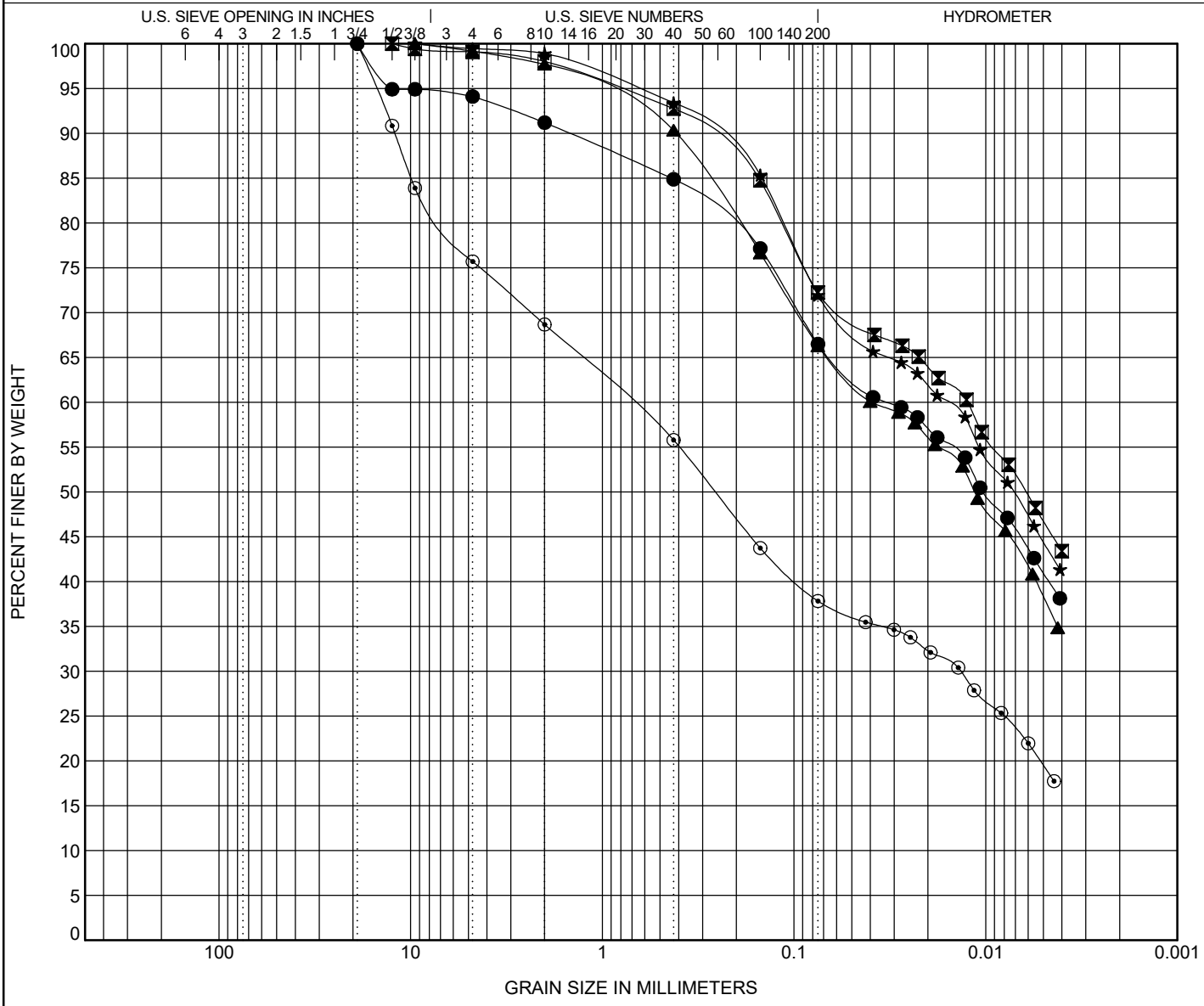

COBBLES	GRAVEL	SAND		SILT	CLAY
		coarse	fine		

Specimen Identification			ODOT (Modified AASHTO) ~ USCS Classification	LL	PL	PI
●	B-006-0-23	1.0	**A-6b ~ SANDY LEAN CLAY(CL)**	**38**	**22**	**16**
⊠	B-006-0-23	2.5	**A-7-6 ~ LEAN CLAY with SAND(CL)**	**46**	**23**	**23**
▲	B-007-0-23	1.5	**A-6b ~ SANDY LEAN CLAY(CL)**	**37**	**21**	**16**
★	B-007-0-23	3.0	**A-7-6 ~ LEAN CLAY with SAND(CL)**	**42**	**23**	**19**
⊙	B-008-0-23	1.8	**A-6a ~ CLAYEY SAND with GRAVEL(SC)**	**31**	**18**	**13**

Specimen Identification			D90	D50	D30	D10	%G	%CS	%FS	%M	%C	Cc	Cu
●	B-006-0-23	1.0	**1.494**	**0.01**			**10**	**6**	**18**	**25**	**41**		
⊠	B-006-0-23	2.5	**0.297**	**0.006**			**2**	**5**	**21**	**25**	**47**		
▲	B-007-0-23	1.5	**0.414**	**0.011**			**3**	**7**	**24**	**28**	**38**		
★	B-007-0-23	3.0	**0.273**	**0.007**			**2**	**5**	**21**	**28**	**44**		
⊙	B-008-0-23	1.8	**12.09**	**0.258**	**0.013**		**31**	**13**	**18**	**19**	**19**		

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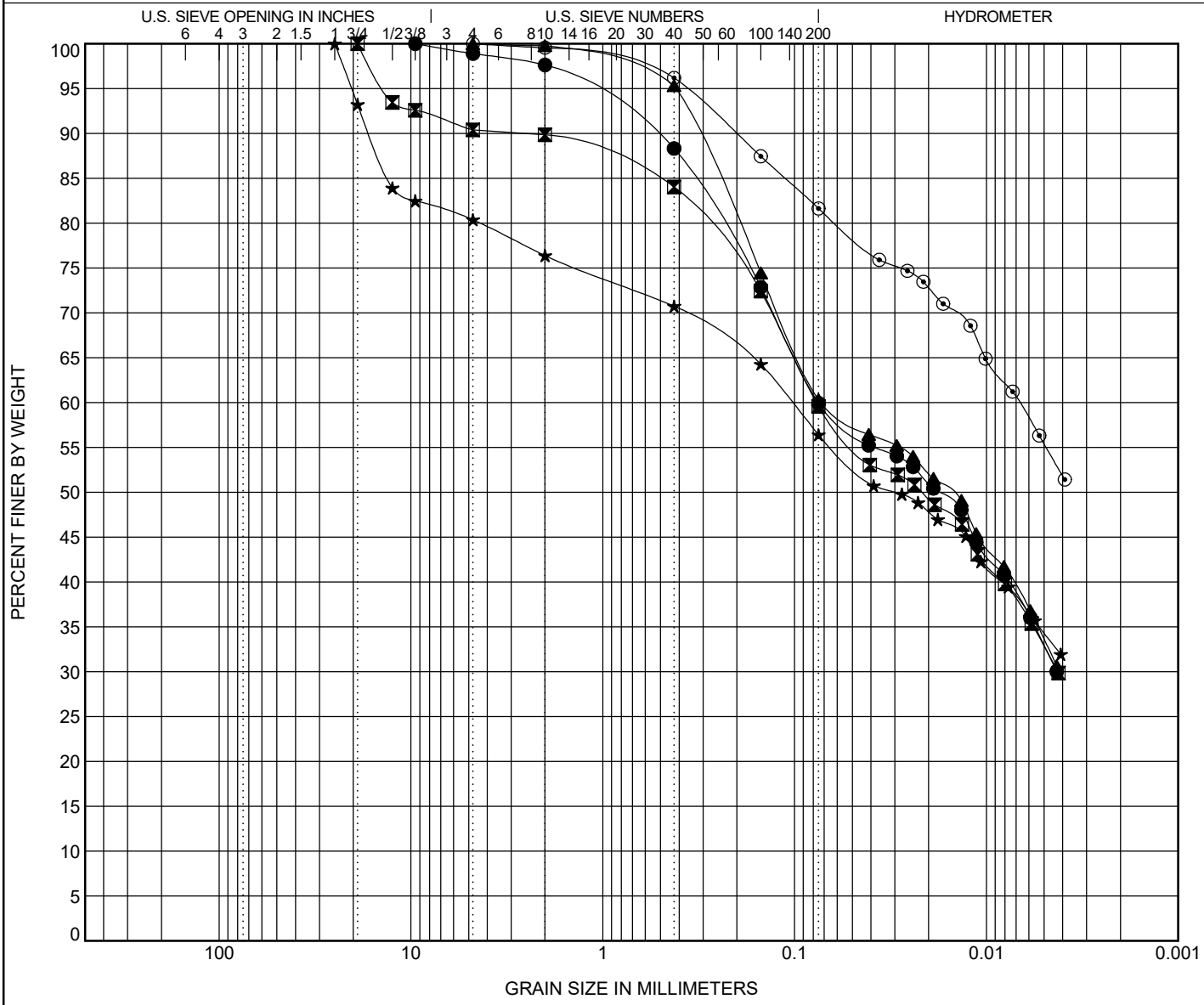

COBBLES	GRAVEL	SAND		SILT	CLAY
		coarse	fine		

Specimen Identification			ODOT (Modified AASHTO) ~ USCS Classification	LL	PL	PI
●	B-008-0-23	3.5	**A-6b ~ SANDY LEAN CLAY(CL)**	**35**	**19**	**16**
⊠	B-009-0-23	1.5	**A-6b ~ SANDY LEAN CLAY(CL)**	**35**	**17**	**18**
▲	B-009-0-23	2.5	**A-6b ~ SANDY LEAN CLAY(CL)**	**39**	**18**	**21**
★	B-010-0-23	1.5	**A-7-6 ~ SANDY LEAN CLAY with GRAVEL(CL)**	**41**	**20**	**21**
⊙	B-010-0-23	2.5	**A-7-6 ~ LEAN CLAY with SAND(CL)**	**44**	**21**	**23**

Specimen Identification			D90	D50	D30	D10	%G	%CS	%FS	%M	%C	Cc	Cu
●	B-008-0-23	3.5	**0.562**	**0.018**			**3**	**9**	**28**	**27**	**33**		
⊠	B-009-0-23	1.5	**2.555**	**0.022**	**0.004**		**10**	**6**	**24**	**27**	**33**		
▲	B-009-0-23	2.5	**0.326**	**0.015**			**1**	**4**	**35**	**26**	**34**		
★	B-010-0-23	1.5	**16.426**	**0.03**			**24**	**6**	**14**	**22**	**34**		
⊙	B-010-0-23	2.5	**0.203**				**0**	**3**	**15**	**27**	**55**		

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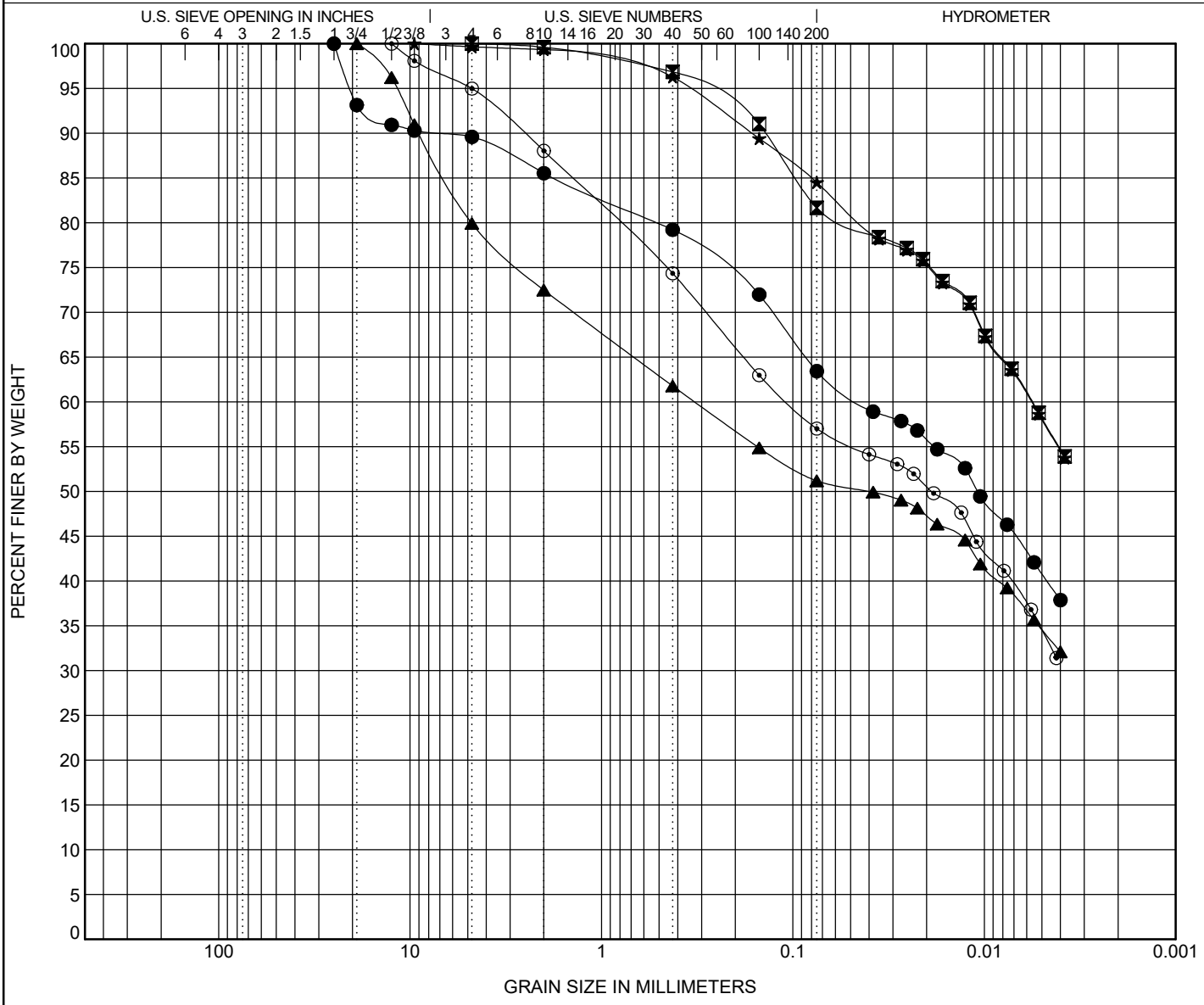

COBBLES	GRAVEL	SAND		SILT	CLAY
		coarse	fine		

Specimen Identification			ODOT (Modified AASHTO) ~ USCS Classification	LL	PL	PI
●	B-011-0-23	1.0	**A-7-6 ~ SANDY LEAN CLAY(CL)**	**46**	**22**	**24**
⊠	B-011-0-23	2.5	**A-7-6 ~ LEAN CLAY with SAND(CL)**	**43**	**21**	**22**
▲	B-012-0-23	1.3	**A-6b ~ SANDY LEAN CLAY with GRAVEL(CL)**	**33**	**16**	**17**
★	B-012-0-23	2.5	**A-7-6 ~ LEAN CLAY with SAND(CL)**	**44**	**22**	**22**
⊙	B-013-0-23	1.0	**A-6b ~ SANDY LEAN CLAY(CL)**	**36**	**18**	**18**

Specimen Identification			D90	D50	D30	D10	%G	%CS	%FS	%M	%C	Cc	Cu
●	B-011-0-23	1.0	**7.083**	**0.011**			**15**	**6**	**16**	**22**	**41**		
⊠	B-011-0-23	2.5	**0.139**				**0**	**3**	**15**	**24**	**58**		
▲	B-012-0-23	1.3	**8.957**	**0.04**			**27**	**11**	**11**	**16**	**35**		
★	B-012-0-23	2.5	**0.164**				**0**	**3**	**12**	**27**	**58**		
⊙	B-013-0-23	1.0	**2.556**	**0.019**			**12**	**14**	**17**	**23**	**34**		

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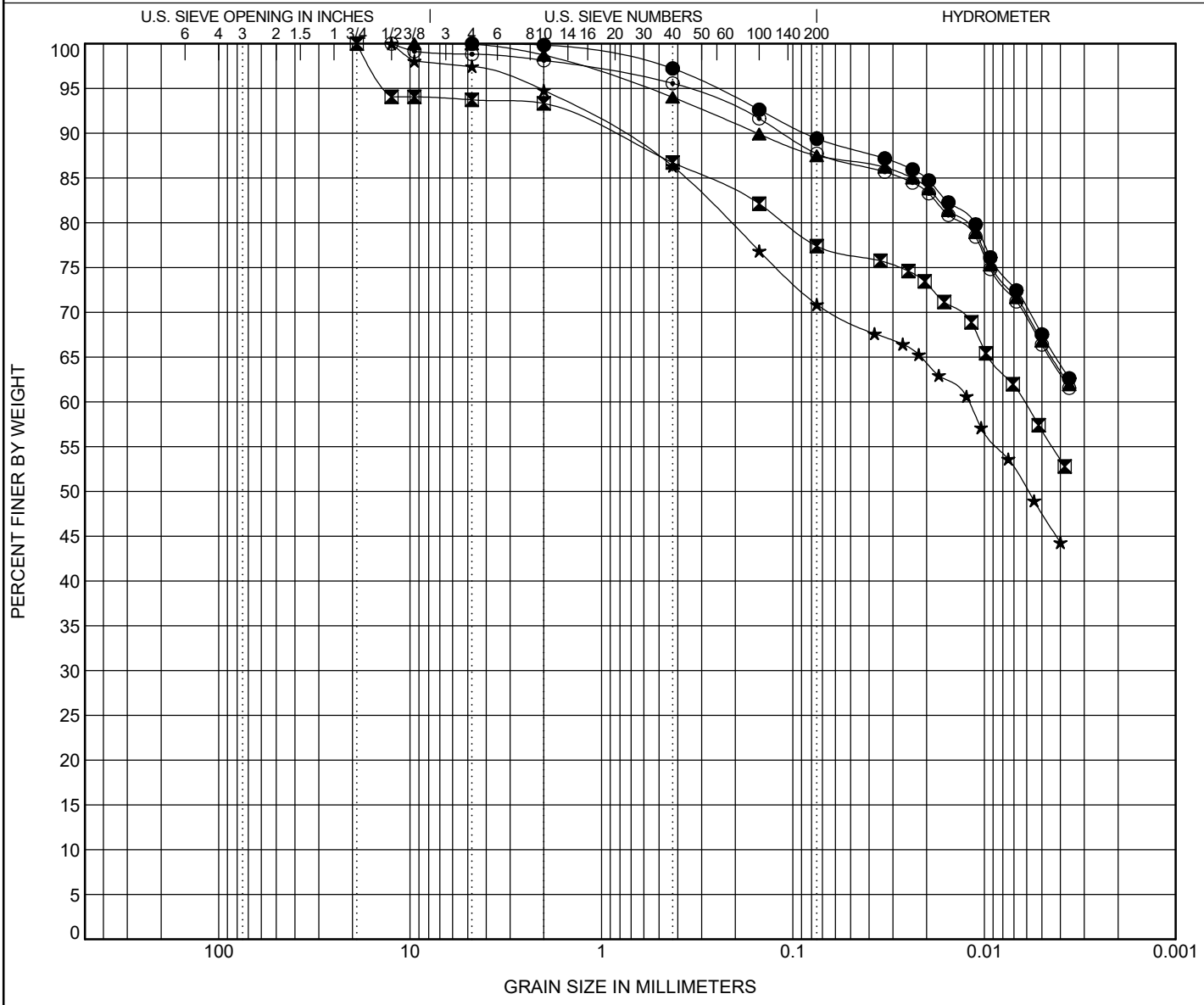
OGE NUMBER N/A **PROJECT TYPE** ROADWAY



COBBLES	GRAVEL	SAND		SILT	CLAY
		coarse	fine		

Specimen Identification			ODOT (Modified AASHTO) ~ USCS Classification	LL	PL	PI
●	**B-013-0-23**	**2.5**	**A-7-6 ~ LEAN CLAY(CL)**	**43**	**20**	**23**
⊠	**B-014-0-23**	**1.3**	**A-7-6 ~ LEAN CLAY with SAND(CL)**	**42**	**20**	**22**
▲	**B-014-0-23**	**2.5**	**A-7-6 ~ LEAN CLAY(CL)**	**44**	**21**	**23**
★	**B-015-0-23**	**1.0**	**A-7-6 ~ LEAN CLAY with SAND(CL)**	**46**	**22**	**24**
⊙	**B-015-0-23**	**2.5**	**A-6b ~ LEAN CLAY(CL)**	**40**	**20**	**20**

Specimen Identification			D90	D50	D30	D10	%G	%CS	%FS	%M	%C	Cc	Cu
●	**B-013-0-23**	**2.5**	**0.085**				**0**	**3**	**8**	**21**	**68**		
⊠	**B-014-0-23**	**1.3**	**0.917**				**7**	**7**	**9**	**20**	**57**		
▲	**B-014-0-23**	**2.5**	**0.154**				**1**	**5**	**7**	**20**	**67**		
★	**B-015-0-23**	**1.0**	**0.832**	**0.006**			**6**	**8**	**15**	**23**	**48**		
⊙	**B-015-0-23**	**2.5**	**0.112**				**1**	**3**	**8**	**22**	**66**		

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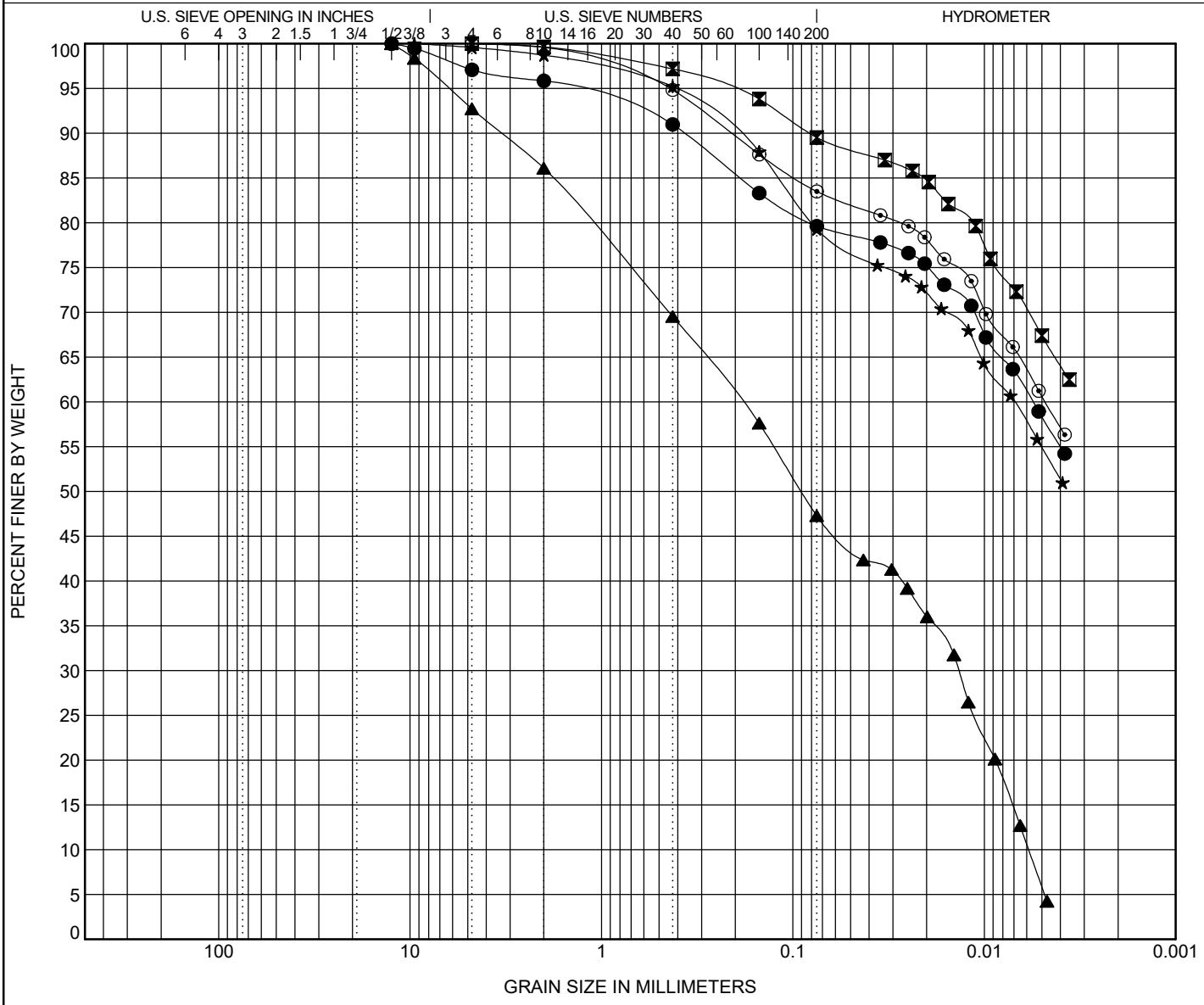

COBBLES	GRAVEL	SAND		SILT	CLAY
		coarse	fine		

Specimen Identification			ODOT (Modified AASHTO) ~ USCS Classification	LL	PL	PI
●	B-016-0-23	1.0	**A-7-6 ~ LEAN CLAY with SAND(CL)**	**46**	**23**	**23**
⊠	B-016-0-23	2.5	**A-7-6 ~ LEAN CLAY(CL)**	**47**	**23**	**24**
▲	B-017-0-23	1.0	**A-4a ~ CLAYEY SAND(SC)**	**18**	**10**	**8**
★	B-017-0-23	3.0	**A-7-6 ~ LEAN CLAY with SAND(CL)**	**43**	**20**	**23**
⊙	B-018-0-23	1.3	**A-6b ~ LEAN CLAY with SAND(CL)**	**36**	**17**	**19**

Specimen Identification			D90	D50	D30	D10	%G	%CS	%FS	%M	%C	Cc	Cu
●	B-016-0-23	1.0	**0.372**				**4**	**5**	**11**	**22**	**58**		
⊠	B-016-0-23	2.5	**0.081**				**0**	**2**	**8**	**23**	**67**		
▲	B-017-0-23	1.0	**3.329**	**0.09**	**0.014**	**0.006**	**14**	**17**	**22**	**41**	**6**	**0.17**	**31.53**
★	B-017-0-23	3.0	**0.201**				**2**	**3**	**16**	**24**	**55**		
⊙	B-018-0-23	1.3	**0.211**				**1**	**5**	**11**	**22**	**61**		

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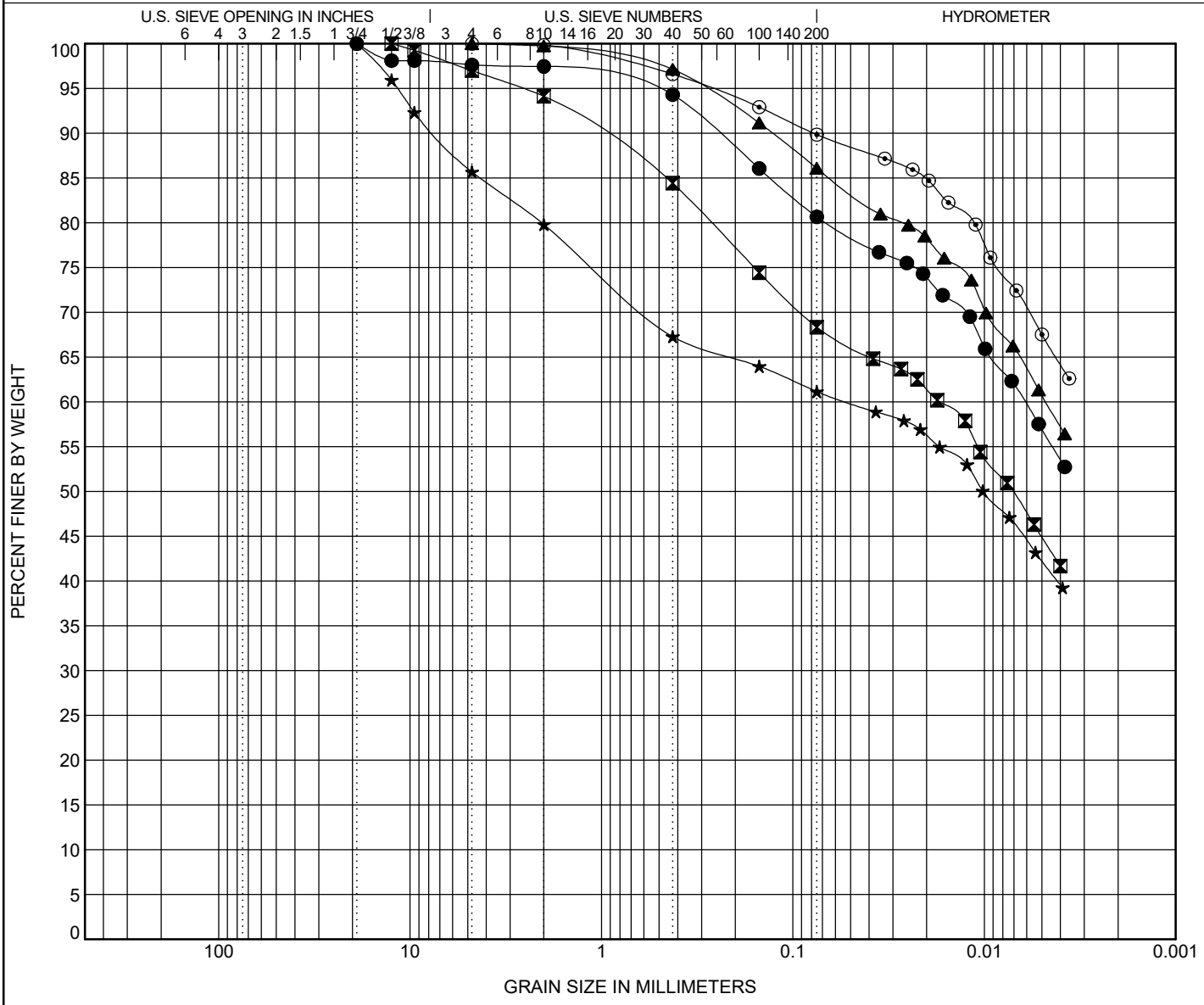

COBBLES	GRAVEL	SAND		SILT	CLAY
		coarse	fine		

Specimen Identification			ODOT (Modified AASHTO) ~ USCS Classification	LL	PL	PI
●	B-018-0-23	2.5	**A-7-6 ~ LEAN CLAY with SAND(CL)**	**46**	**22**	**24**
⊠	B-019-0-23	1.0	**A-6b ~ SANDY LEAN CLAY(CL)**	**36**	**20**	**16**
▲	B-019-0-23	2.5	**A-7-6 ~ LEAN CLAY(CL)**	**45**	**21**	**24**
★	B-020-0-23	1.0	**A-6b ~ SANDY LEAN CLAY(CL)**	**36**	**20**	**16**
⊙	B-020-0-23	3.0	**A-7-6 ~ LEAN CLAY(CL)**	**49**	**24**	**25**

Specimen Identification			D90	D50	D30	D10	%G	%CS	%FS	%M	%C	Cc	Cu
●	B-018-0-23	2.5	**0.247**				**2**	**3**	**14**	**24**	**57**		
⊠	B-019-0-23	1.0	**1.036**	**0.007**			**6**	**10**	**16**	**23**	**45**		
▲	B-019-0-23	2.5	**0.128**				**0**	**3**	**11**	**25**	**61**		
★	B-020-0-23	1.0	**7.457**	**0.01**			**20**	**13**	**6**	**19**	**42**		
⊙	B-020-0-23	3.0	**0.078**				**0**	**3**	**7**	**22**	**68**		

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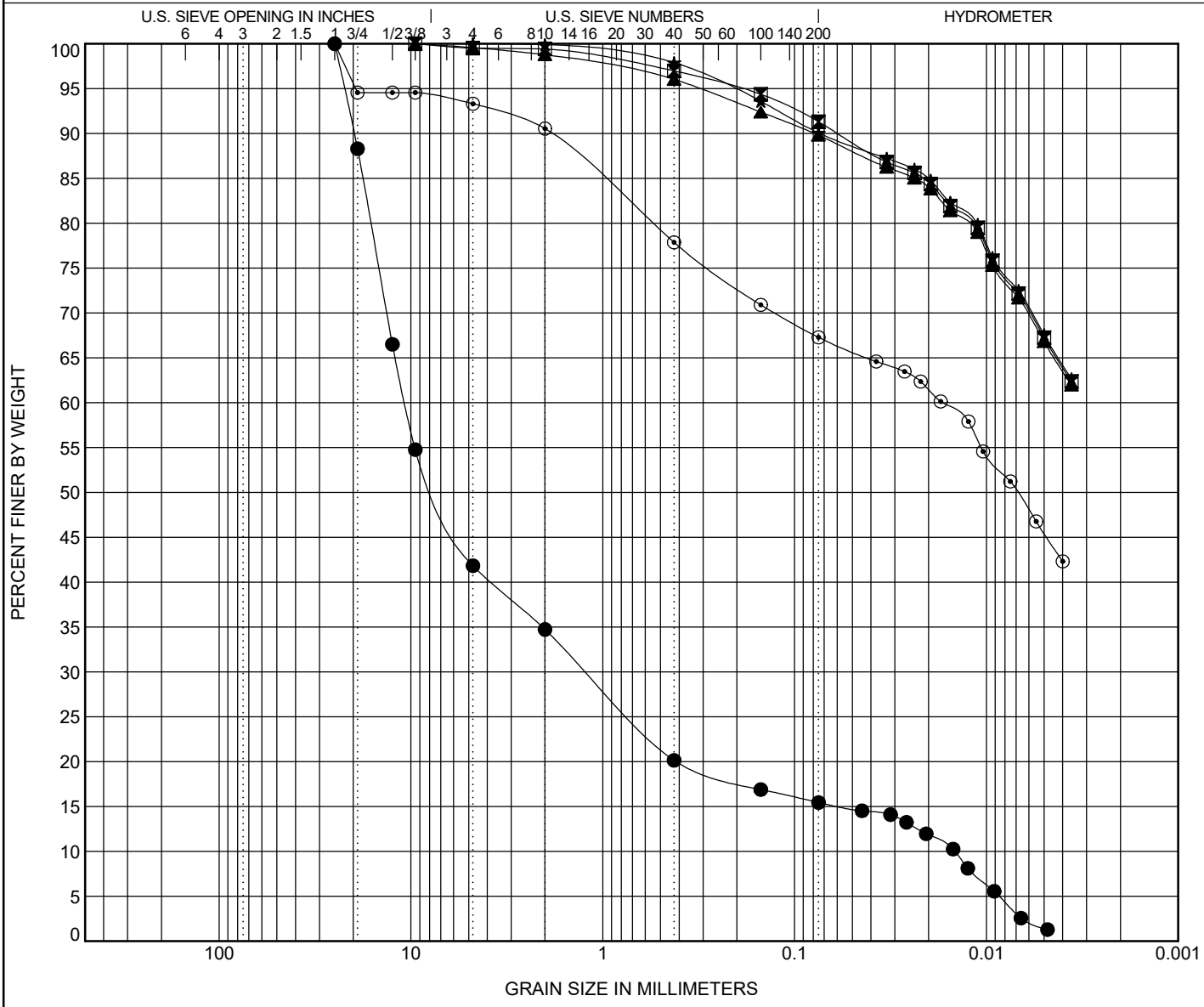

COBBLES	GRAVEL	SAND		SILT	CLAY
		coarse	fine		

Specimen Identification			ODOT (Modified AASHTO) ~ USCS Classification	LL	PL	PI
●	B-021-0-23	1.5	**A-1-a ~ SILTY GRAVEL with SAND(GM)**	**NP**	**NP**	**NP**
⊠	B-021-0-23	3.0	**A-6b ~ LEAN CLAY(CL)**	**38**	**19**	**19**
▲	B-022-0-23	1.5	**A-7-6 ~ LEAN CLAY(CL)**	**46**	**22**	**24**
★	B-022-0-23	3.0	**A-7-6 ~ LEAN CLAY(CL)**	**46**	**23**	**23**
⊙	B-023-0-23	1.5	**A-7-6 ~ SANDY LEAN CLAY(CL)**	**49**	**24**	**25**

Specimen Identification			D90	D50	D30	D10	%G	%CS	%FS	%M	%C	Cc	Cu
●	B-021-0-23	1.5	**19.773**	**7.359**	**1.21**	**0.015**	**65**	**15**	**5**	**14**	**1**	**9.35**	**735.58**
⊠	B-021-0-23	3.0	**0.059**				**1**	**2**	**6**	**24**	**67**		
▲	B-022-0-23	1.5	**0.079**				**1**	**3**	**6**	**23**	**67**		
★	B-022-0-23	3.0	**0.074**				**0**	**2**	**8**	**22**	**68**		
⊙	B-023-0-23	1.5	**1.871**	**0.007**			**9**	**13**	**11**	**22**	**45**		

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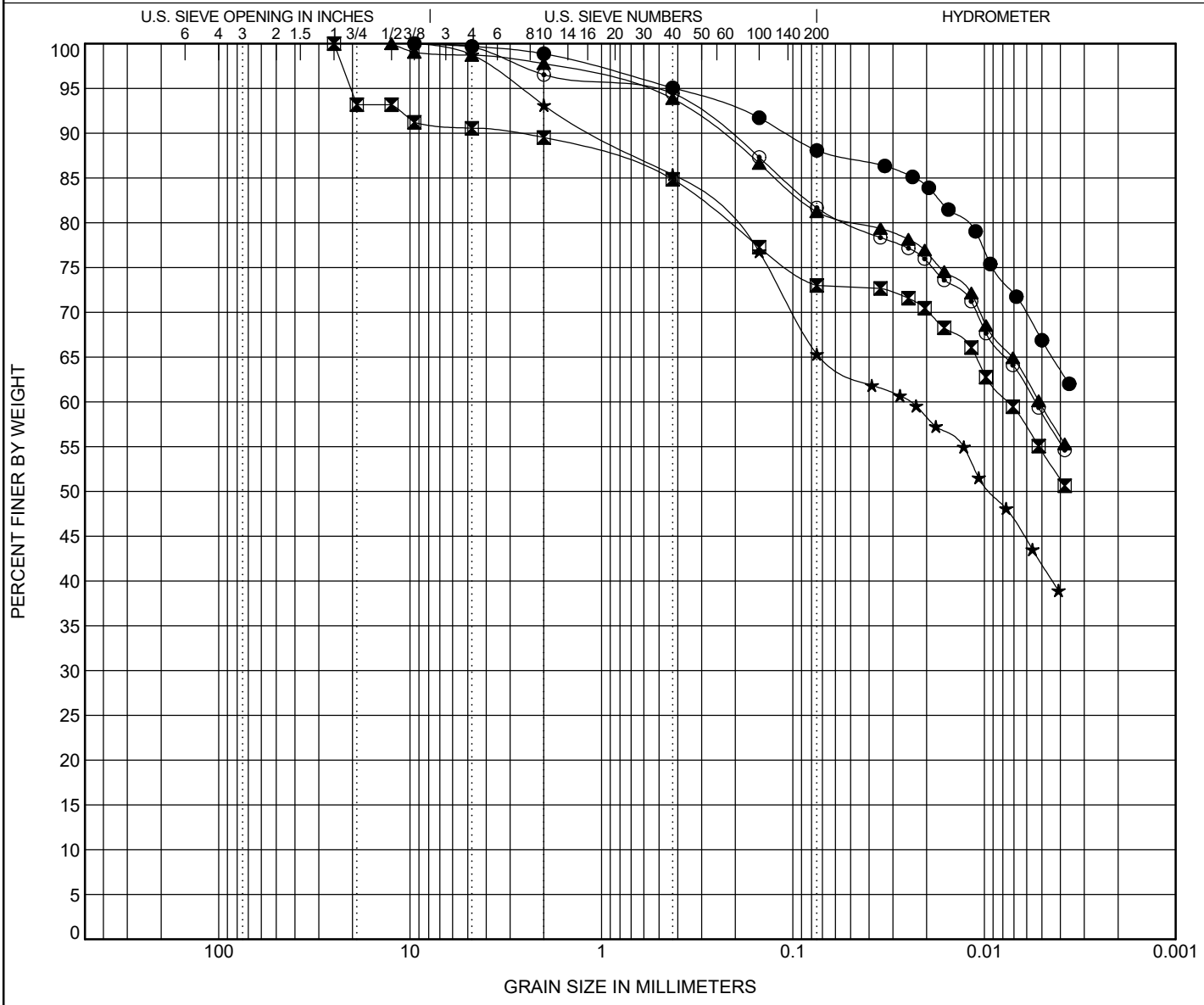

COBBLES	GRAVEL	SAND		SILT	CLAY
		coarse	fine		

Specimen Identification			ODOT (Modified AASHTO) ~ USCS Classification	LL	PL	PI
●	B-023-0-23	3.0	A-7-6 ~ LEAN CLAY(CL)	43	20	23
⊠	B-024-0-23	1.7	A-7-6 ~ LEAN CLAY with SAND(CL)	42	20	22
▲	B-024-0-23	4.0	A-6b ~ LEAN CLAY with SAND(CL)	35	18	17
★	B-025-0-23	1.5	A-7-6 ~ SANDY LEAN CLAY(CL)	49	24	25
⊙	B-025-0-23	3.0	A-7-6 ~ LEAN CLAY with SAND(CL)	45	21	24

Specimen Identification			D90	D50	D30	D10	%G	%CS	%FS	%M	%C	Cc	Cu
●	B-023-0-23	3.0	0.108				1	4	7	21	67		
⊠	B-024-0-23	1.7	2.98				10	5	12	18	55		
▲	B-024-0-23	4.0	0.244				2	4	13	21	60		
★	B-025-0-23	1.5	1.071	0.009			7	8	20	23	42		
⊙	B-025-0-23	3.0	0.222				3	2	13	23	59		

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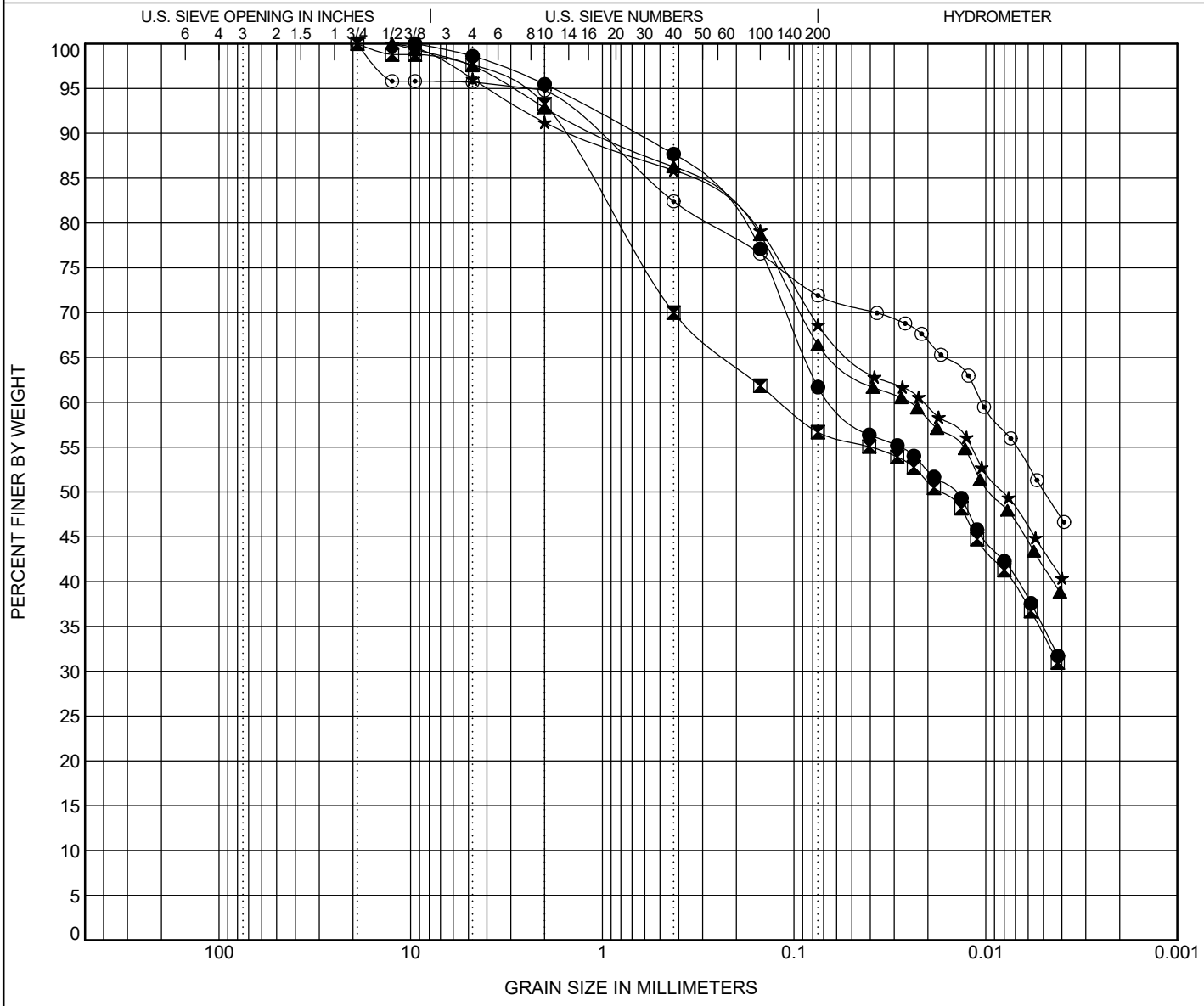

COBBLES	GRAVEL	SAND		SILT	CLAY
		coarse	fine		

Specimen Identification			ODOT (Modified AASHTO) ~ USCS Classification	LL	PL	PI
●	B-026-0-23	3.5	**A-6a ~ SANDY LEAN CLAY(CL)**	**30**	**16**	**14**
⊠	B-026-0-23	8.5	**A-6a ~ SANDY LEAN CLAY(CL)**	**27**	**14**	**13**
▲	B-026-0-23	11.0	**A-6a ~ SANDY LEAN CLAY(CL)**	**27**	**14**	**13**
★	B-026-0-23	18.5	**A-6b ~ SANDY LEAN CLAY(CL)**	**30**	**14**	**16**
⊙	B-027-0-23	6.0	**A-6b ~ LEAN CLAY with SAND(CL)**	**34**	**17**	**17**

Specimen Identification			D90	D50	D30	D10	%G	%CS	%FS	%M	%C	Cc	Cu
●	B-026-0-23	3.5	**0.673**	**0.015**			**4**	**8**	**26**	**27**	**35**		
⊠	B-026-0-23	8.5	**1.61**	**0.017**			**7**	**23**	**13**	**23**	**34**		
▲	B-026-0-23	11.0	**1.025**	**0.009**			**7**	**7**	**20**	**24**	**42**		
★	B-026-0-23	18.5	**1.407**	**0.008**			**9**	**5**	**17**	**25**	**44**		
⊙	B-027-0-23	6.0	**1.096**	**0.005**			**5**	**12**	**11**	**22**	**50**		

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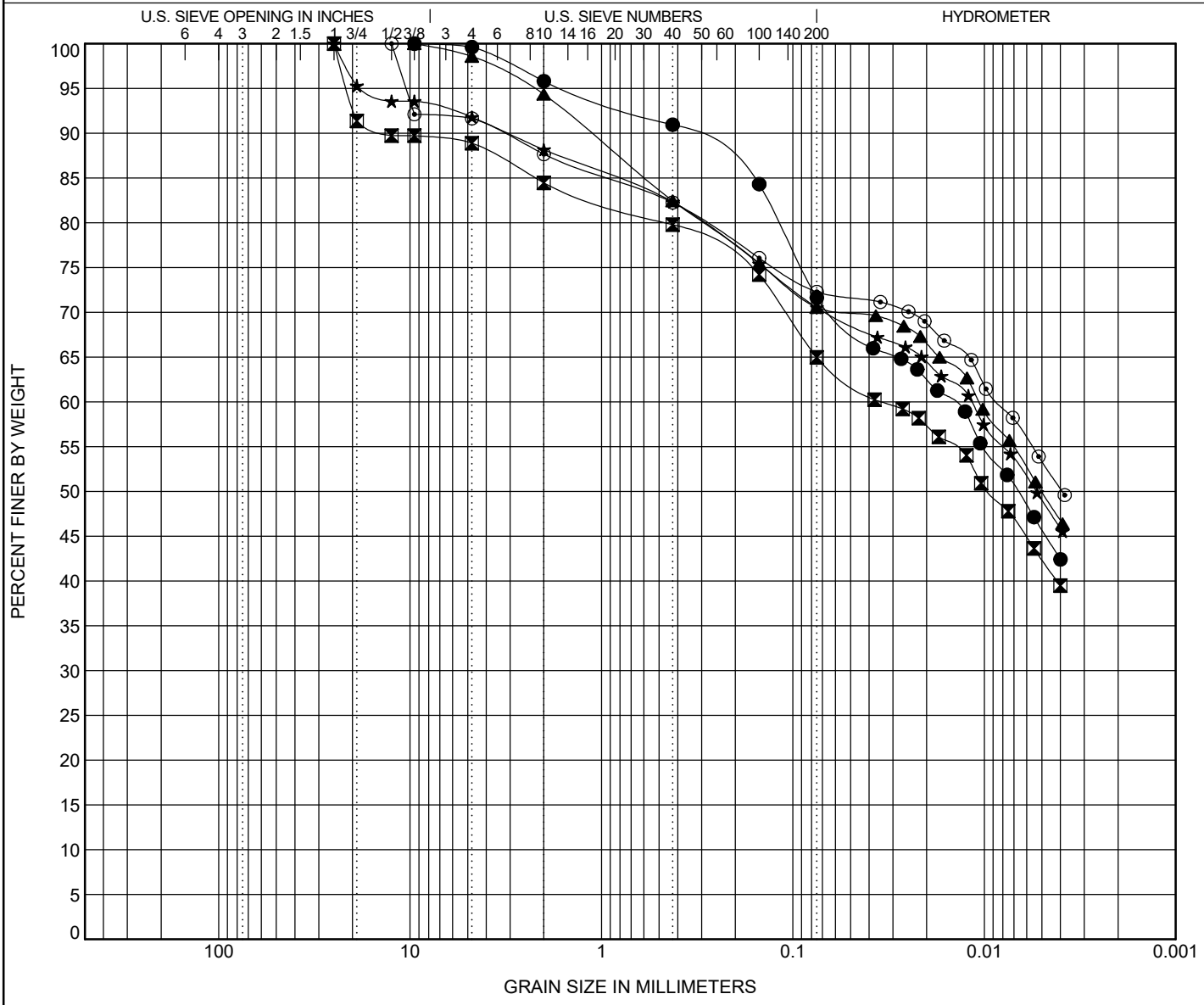
OHIO DEPARTMENT OF TRANSPORTION
OFFICE OF GEOTECHNICAL ENGINEERING

PROJECT WOO-18-06.67 **PID** 116951

OGE NUMBER N/A **PROJECT TYPE** ROADWAY



COBBLES	GRAVEL	SAND		SILT	CLAY
		coarse	fine		

Specimen Identification			ODOT (Modified AASHTO) ~ USCS Classification	LL	PL	PI
●	B-027-0-23	8.5	**A-6a ~ LEAN CLAY with SAND(CL)**	**30**	**15**	**15**
⊠	B-027-0-23	16.0	**A-6a ~ SANDY LEAN CLAY(CL)**	**28**	**14**	**14**
▲	B-028-0-23	8.5	**A-6a ~ LEAN CLAY with SAND(CL)**	**29**	**15**	**14**
★	B-028-0-23	16.0	**A-6a ~ LEAN CLAY with SAND(CL)**	**28**	**14**	**14**
⊙	B-028-0-23	23.5	**A-6b ~ LEAN CLAY with SAND(CL)**	**32**	**16**	**16**

Specimen Identification			D90	D50	D30	D10	%G	%CS	%FS	%M	%C	Cc	Cu
●	B-027-0-23	8.5	**0.366**	**0.007**			**4**	**5**	**19**	**26**	**46**		
⊠	B-027-0-23	16.0	**13.403**	**0.009**			**15**	**5**	**15**	**23**	**42**		
▲	B-028-0-23	8.5	**1.136**	**0.005**			**5**	**12**	**12**	**21**	**50**		
★	B-028-0-23	16.0	**3.096**	**0.005**			**11**	**6**	**12**	**22**	**49**		
⊙	B-028-0-23	23.5	**3.321**	**0.004**			**13**	**5**	**10**	**19**	**53**		

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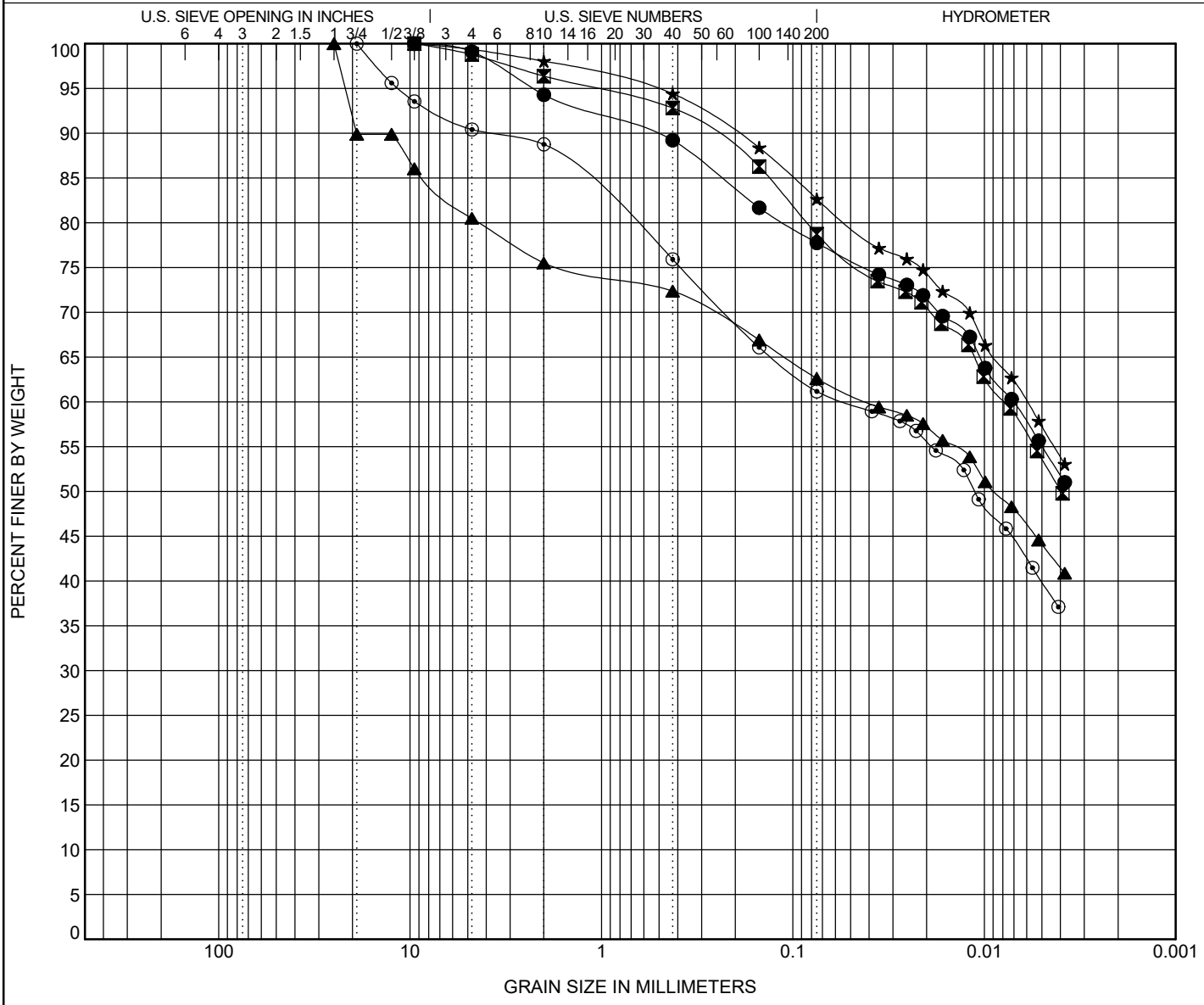
PROJECT WOO-18-06.67 **PID** 116951

OGE NUMBER N/A **PROJECT TYPE** ROADWAY



COBBLES	GRAVEL	SAND		SILT	CLAY
		coarse	fine		

Specimen Identification			ODOT (Modified AASHTO) ~ USCS Classification	LL	PL	PI
●	B-029-0-23	1.5	**A-7-6 ~ LEAN CLAY with SAND(CL)**	**46**	**22**	**24**
⊠	B-029-0-23	3.0	**A-7-6 ~ LEAN CLAY with SAND(CL)**	**45**	**21**	**24**
▲	B-030-0-23	1.8	**A-6b ~ GRAVELLY LEAN CLAY with SAND(CL)**	**40**	**21**	**19**
★	B-030-0-23	3.0	**A-6b ~ LEAN CLAY with SAND(CL)**	**39**	**20**	**19**
⊙	B-031-0-23	1.5	**A-7-6 ~ SANDY LEAN CLAY(CL)**	**45**	**21**	**24**

Specimen Identification			D90	D50	D30	D10	%G	%CS	%FS	%M	%C	Cc	Cu
●	B-029-0-23	1.5	**0.54**				**6**	**5**	**11**	**23**	**55**		
⊠	B-029-0-23	3.0	**0.271**	**0.004**			**3**	**4**	**14**	**25**	**54**		
▲	B-030-0-23	1.8	**19.064**	**0.009**			**24**	**3**	**10**	**19**	**44**		
★	B-030-0-23	3.0	**0.198**				**1**	**4**	**12**	**26**	**57**		
⊙	B-031-0-23	1.5	**3.82**	**0.011**			**11**	**13**	**15**	**21**	**40**		

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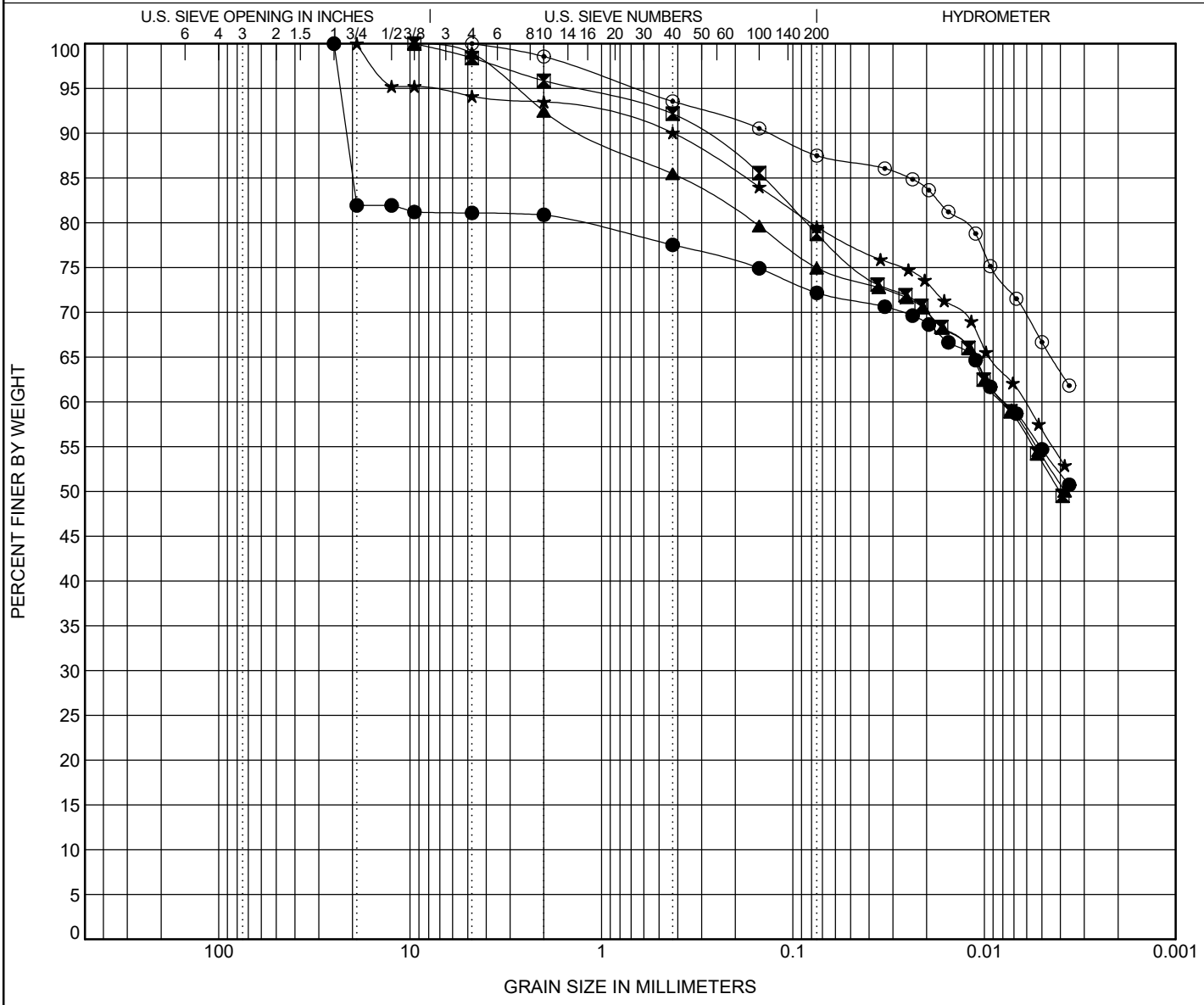
OFFICE OF GEOTECHNICAL ENGINEERING

PROJECT WOO-18-06.67 **PID** 116951

OGE NUMBER N/A **PROJECT TYPE** ROADWAY



COBBLES	GRAVEL	SAND		SILT	CLAY
		coarse	fine		

Specimen Identification			ODOT (Modified AASHTO) ~ USCS Classification	LL	PL	PI
●	B-031-0-23	3.0	A-7-6 ~ LEAN CLAY with GRAVEL(CL)	45	21	24
⊠	B-032-0-23	1.8	A-6b ~ LEAN CLAY with SAND(CL)	40	20	20
▲	B-032-0-23	3.0	A-6b ~ LEAN CLAY with SAND(CL)	39	20	19
★	B-033-0-23	1.5	A-7-6 ~ LEAN CLAY with SAND(CL)	41	20	21
⊙	B-033-0-23	3.0	A-7-6 ~ LEAN CLAY(CL)	42	20	22

Specimen Identification			D90	D50	D30	D10	%G	%CS	%FS	%M	%C	Cc	Cu
●	B-031-0-23	3.0	21.476				20	3	5	17	55		
⊠	B-032-0-23	1.8	0.302	0.004			4	4	13	26	53		
▲	B-032-0-23	3.0	1.163				7	7	11	21	54		
★	B-033-0-23	1.5	0.421				6	3	11	23	57		
⊙	B-033-0-23	3.0	0.133				2	5	6	20	67		

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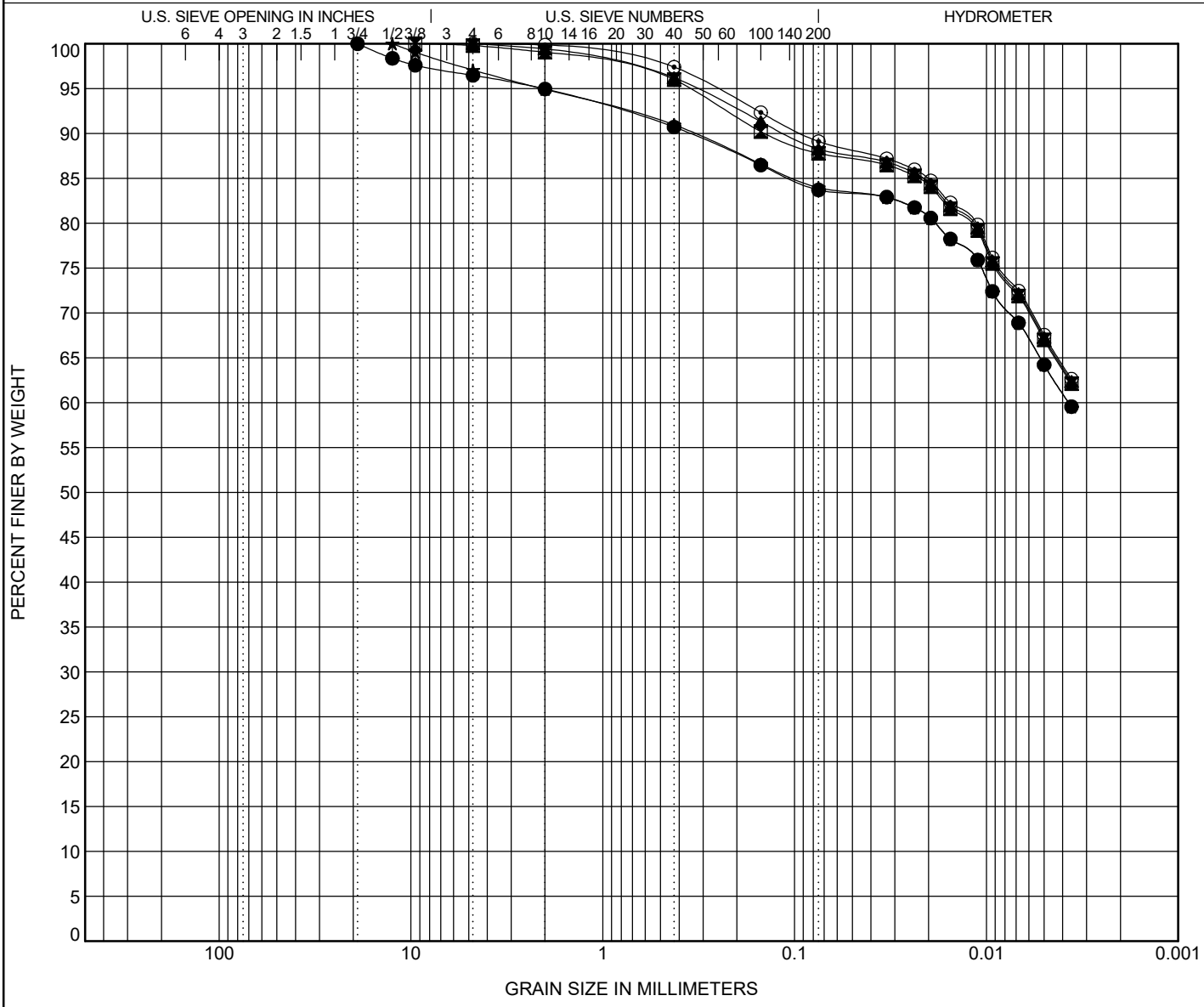
PROJECT WOO-18-06.67 **PID** 116951

OGE NUMBER N/A **PROJECT TYPE** ROADWAY



COBBLES	GRAVEL	SAND		SILT	CLAY
		coarse	fine		

Specimen Identification			ODOT (Modified AASHTO) ~ USCS Classification	LL	PL	PI
●	B-034-0-23	1.5	**A-7-6 ~ LEAN CLAY with SAND(CL)**	**47**	**22**	**25**
⊠	B-034-0-23	3.0	**A-6b ~ LEAN CLAY(CL)**	**38**	**19**	**19**
▲	B-035-0-23	1.5	**A-7-6 ~ LEAN CLAY(CL)**	**46**	**22**	**24**
★	B-035-0-23	3.0	**A-6b ~ LEAN CLAY with SAND(CL)**	**39**	**19**	**20**
⊙	B-036-0-23	1.5	**A-7-6 ~ LEAN CLAY(CL)**	**49**	**23**	**26**

Specimen Identification			D90	D50	D30	D10	%G	%CS	%FS	%M	%C	Cc	Cu
●	B-034-0-23	1.5	**0.356**				**5**	**4**	**7**	**20**	**64**		
⊠	B-034-0-23	3.0	**0.141**				**1**	**3**	**8**	**21**	**67**		
▲	B-035-0-23	1.5	**0.111**				**1**	**3**	**8**	**21**	**67**		
★	B-035-0-23	3.0	**0.337**				**5**	**4**	**7**	**20**	**64**		
⊙	B-036-0-23	1.5	**0.091**				**1**	**2**	**8**	**21**	**68**		

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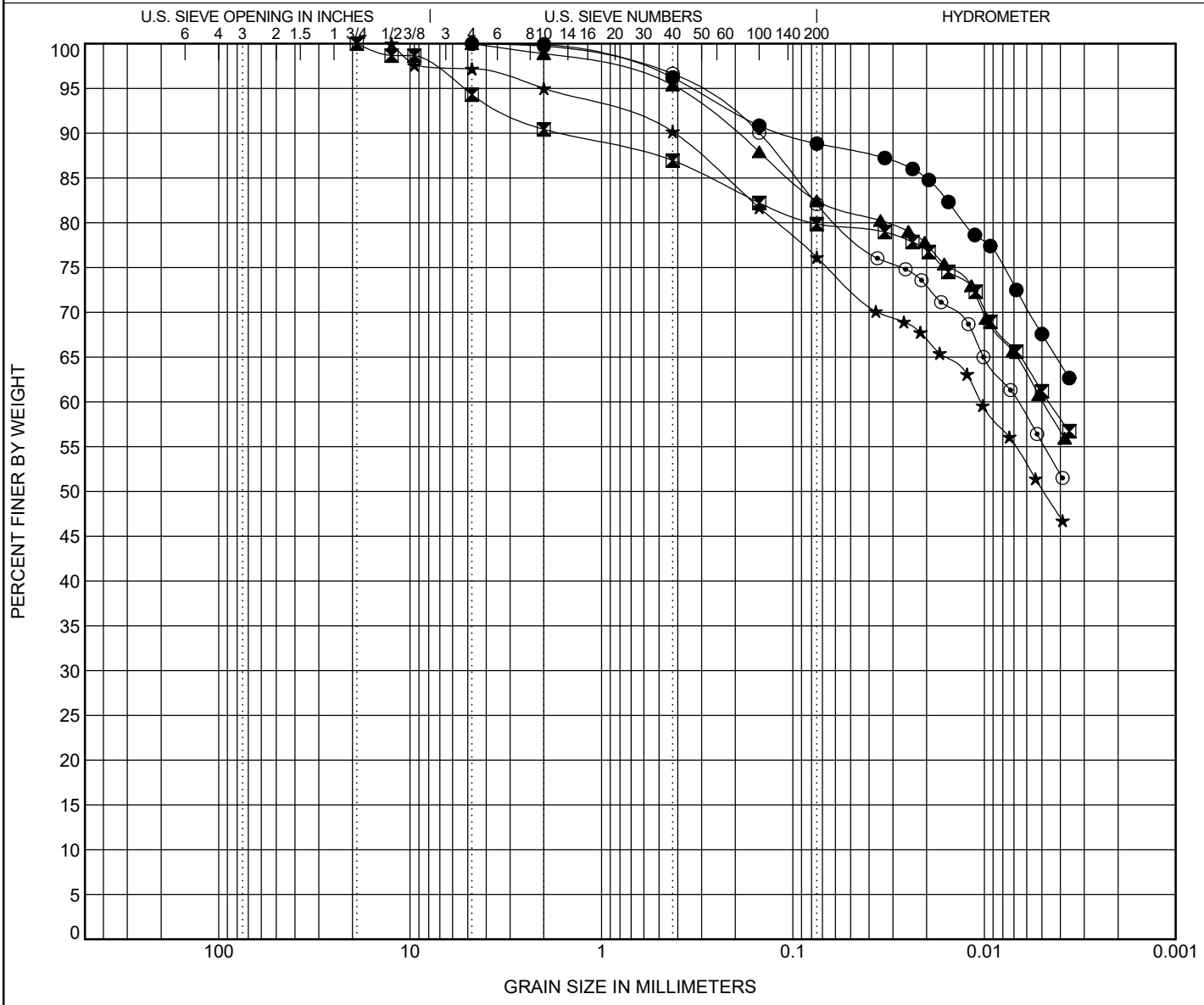
OFFICE OF GEOTECHNICAL ENGINEERING

PROJECT WOO-18-06.67 **PID** 116951

OGE NUMBER N/A **PROJECT TYPE** ROADWAY



COBBLES	GRAVEL	SAND		SILT	CLAY
		coarse	fine		

Specimen Identification			ODOT (Modified AASHTO) ~ USCS Classification	LL	PL	PI
●	B-036-0-23	3.0	**A-7-6 ~ LEAN CLAY(CL)**	**46**	**20**	**26**
⊠	B-037-0-23	1.5	**A-7-6 ~ LEAN CLAY with SAND(CL)**	**45**	**20**	**25**
▲	B-037-0-23	3.0	**A-6b ~ LEAN CLAY with SAND(CL)**	**38**	**18**	**20**
★	B-038-0-23	1.5	**A-7-6 ~ LEAN CLAY with SAND(CL)**	**46**	**22**	**24**
⊙	B-038-0-23	3.0	**A-6b ~ LEAN CLAY with SAND(CL)**	**40**	**20**	**20**

Specimen Identification			D90	D50	D30	D10	%G	%CS	%FS	%M	%C	Cc	Cu
●	B-036-0-23	3.0	**0.112**				**0**	**4**	**7**	**21**	**68**		
⊠	B-037-0-23	1.5	**1.651**				**10**	**3**	**7**	**19**	**61**		
▲	B-037-0-23	3.0	**0.2**				**2**	**3**	**13**	**22**	**60**		
★	B-038-0-23	1.5	**0.416**	**0.005**			**5**	**5**	**14**	**26**	**50**		
⊙	B-038-0-23	3.0	**0.149**				**0**	**3**	**15**	**27**	**55**		

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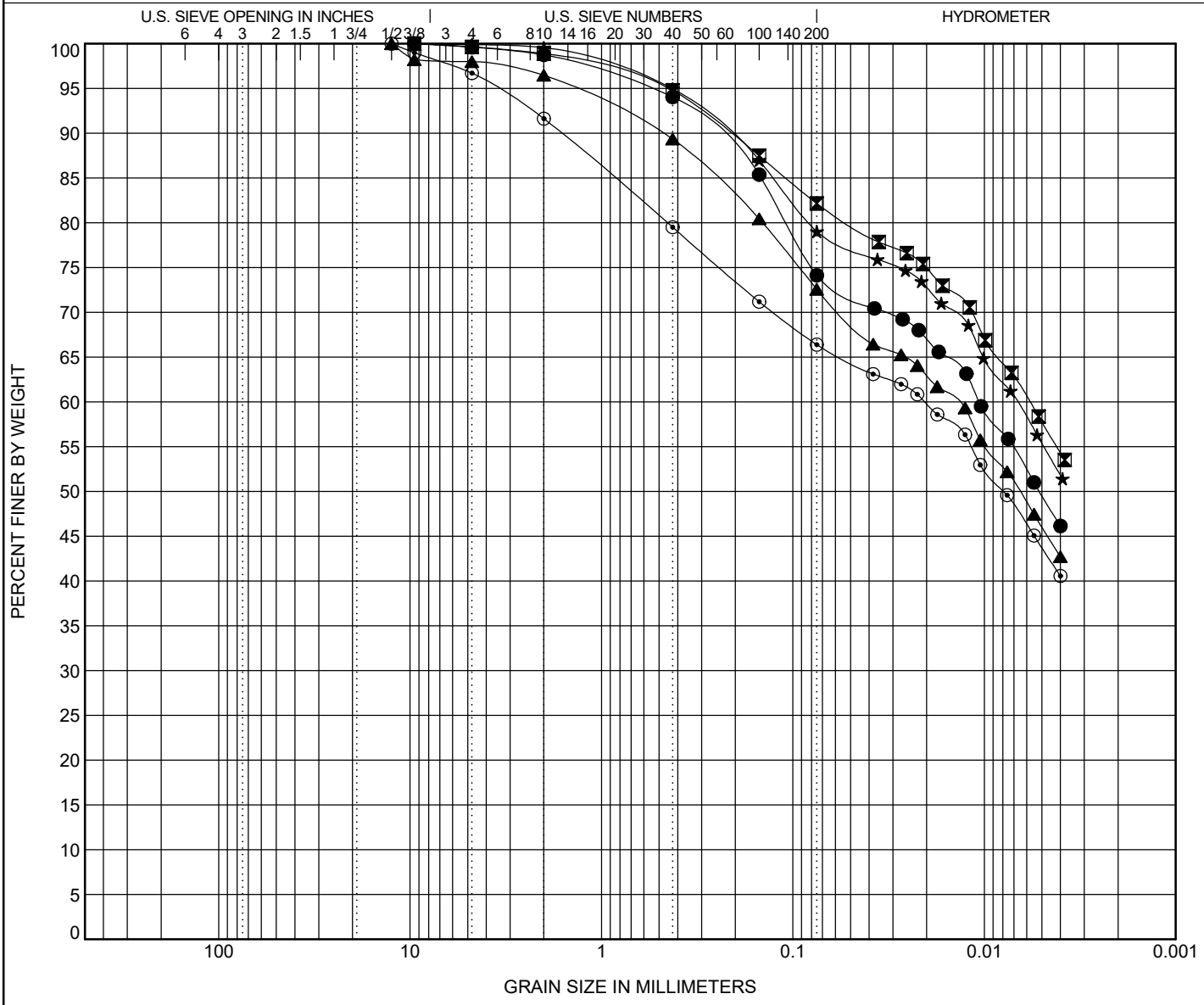
PROJECT WOO-18-06.67 **PID** 116951

OGE NUMBER N/A **PROJECT TYPE** ROADWAY



COBBLES	GRAVEL	SAND		SILT	CLAY
		coarse	fine		

	Specimen Identification		ODOT (Modified AASHTO) ~ USCS Classification	LL	PL	PI
●	**B-039-0-23**	**1.5**	**A-7-6 ~ LEAN CLAY with SAND(CL)**	**47**	**21**	**26**
⊠	**B-039-0-23**	**3.0**	**A-7-6 ~ LEAN CLAY with SAND(CL)**	**44**	**21**	**23**
▲	**B-040-0-23**	**1.5**	**A-7-6 ~ LEAN CLAY with SAND(CL)**	**49**	**24**	**25**
★	**B-040-0-23**	**3.0**	**A-7-6 ~ LEAN CLAY with SAND(CL)**	**49**	**23**	**26**
⊙	**B-041-0-23**	**1.8**	**A-7-6 ~ SANDY LEAN CLAY(CL)**	**49**	**23**	**26**

	Specimen Identification		D90	D50	D30	D10	%G	%CS	%FS	%M	%C	Cc	Cu
●	**B-039-0-23**	**1.5**	**0.262**	**0.005**			**1**	**5**	**20**	**24**	**50**		
⊠	**B-039-0-23**	**3.0**	**0.215**				**1**	**4**	**13**	**24**	**58**		
▲	**B-040-0-23**	**1.5**	**0.49**	**0.007**			**3**	**7**	**17**	**27**	**46**		
★	**B-040-0-23**	**3.0**	**0.222**				**0**	**5**	**16**	**24**	**55**		
⊙	**B-041-0-23**	**1.8**	**1.625**	**0.008**			**9**	**12**	**13**	**22**	**44**		

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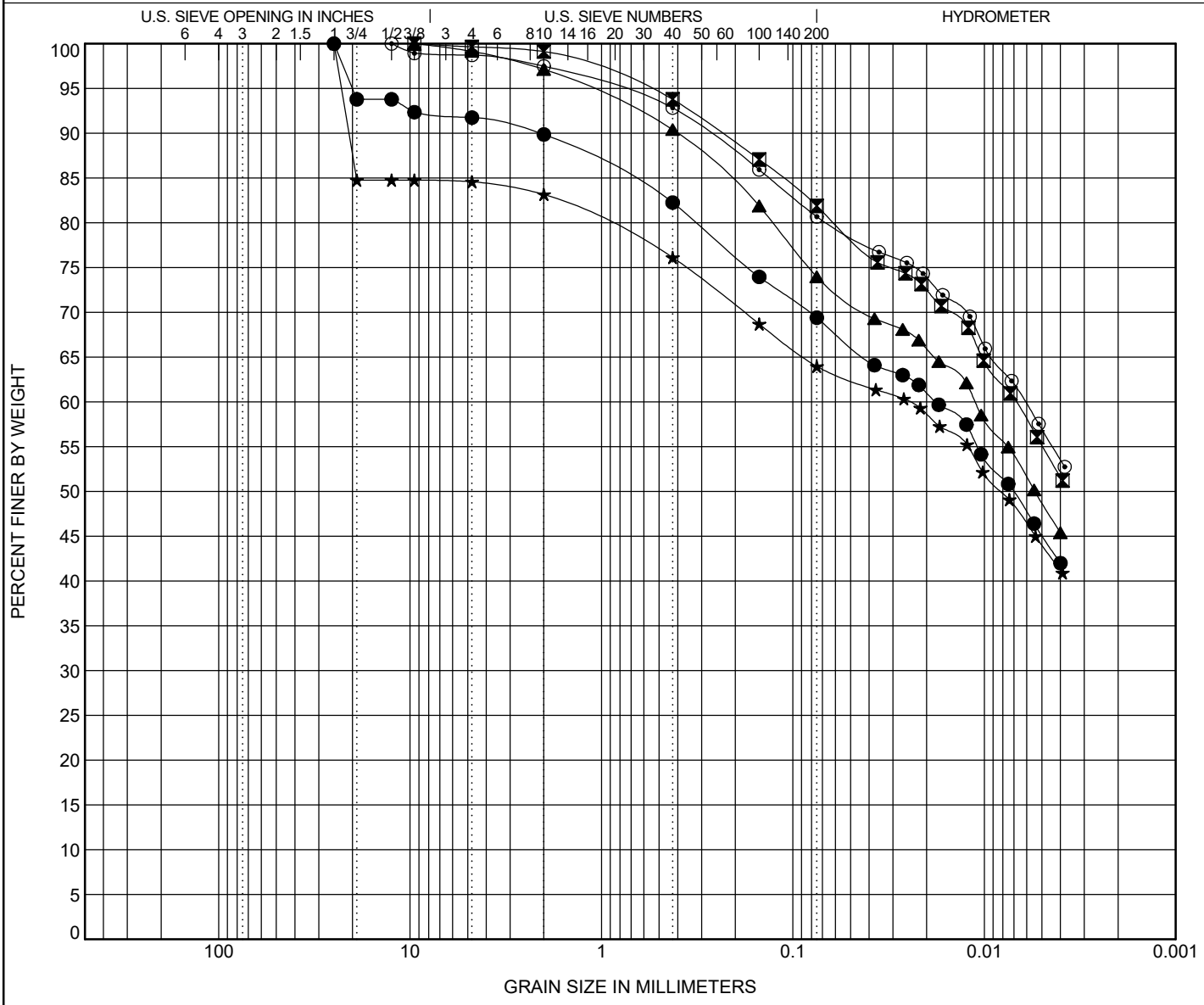
PROJECT WOO-18-06.67 **PID** 116951

OGE NUMBER N/A **PROJECT TYPE** ROADWAY



COBBLES	GRAVEL	SAND		SILT	CLAY
		coarse	fine		

Specimen Identification			ODOT (Modified AASHTO) ~ USCS Classification	LL	PL	PI
●	B-041-0-23	3.0	A-7-6 ~ SANDY LEAN CLAY(CL)	48	22	26
⊠	B-042-0-23	1.5	A-6b ~ LEAN CLAY with SAND(CL)	40	20	20
▲	B-042-0-23	3.0	A-6b ~ LEAN CLAY with SAND(CL)	36	18	18
★	B-043-0-23	1.5	A-7-6 ~ SANDY LEAN CLAY with GRAVEL(CL)	44	20	24
⊙	B-043-0-23	3.0	A-6b ~ LEAN CLAY with SAND(CL)	38	19	19

Specimen Identification			D90	D50	D30	D10	%G	%CS	%FS	%M	%C	Cc	Cu
●	B-041-0-23	3.0	2.136	0.007			10	8	13	24	45		
⊠	B-042-0-23	1.5	0.236				1	5	12	27	55		
▲	B-042-0-23	3.0	0.405	0.005			3	7	16	25	49		
★	B-043-0-23	1.5	20.88	0.008			17	7	12	20	44		
⊙	B-043-0-23	3.0	0.277				2	5	12	24	57		

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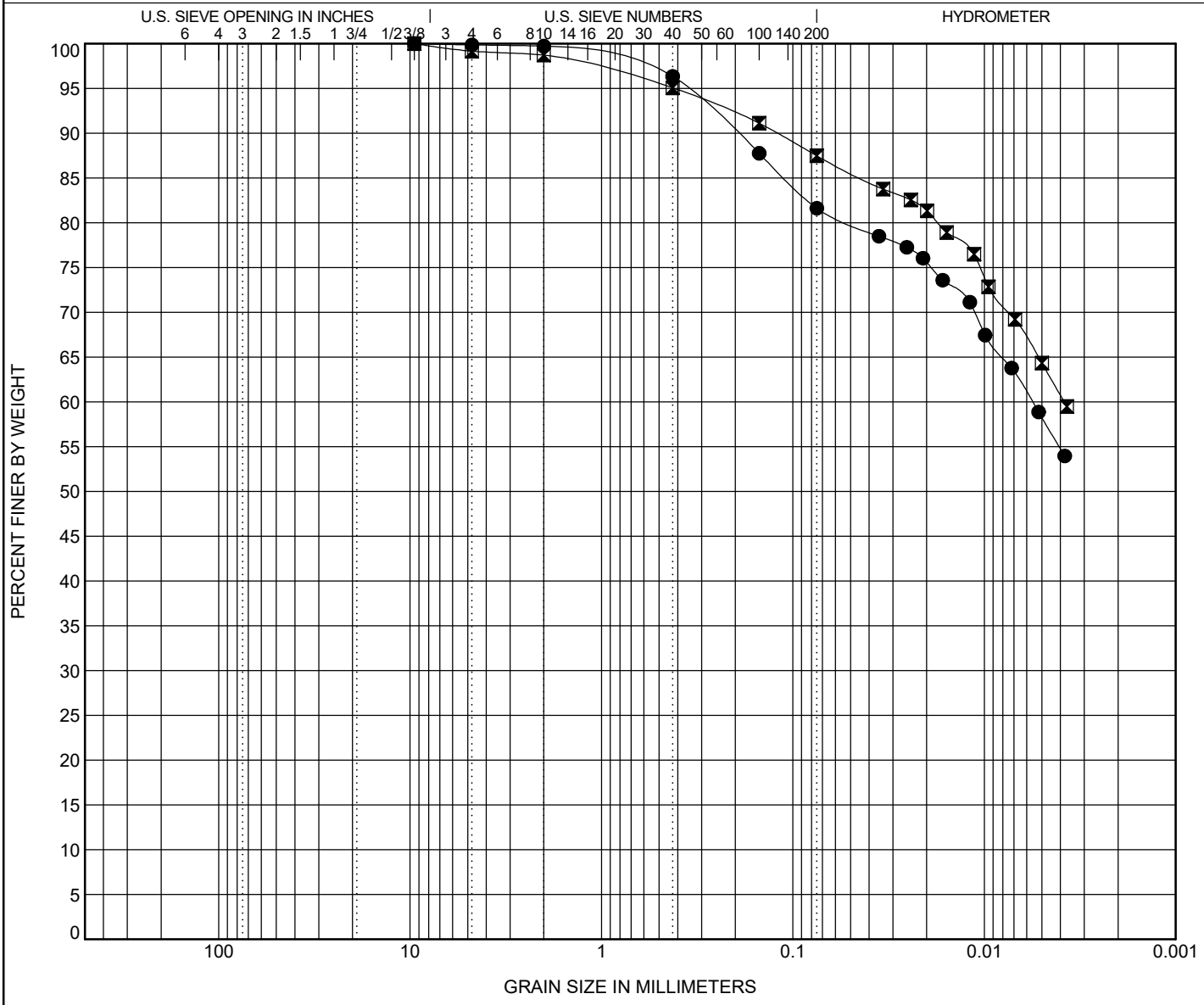
PROJECT WOO-18-06.67 **PID** 116951

OGE NUMBER N/A **PROJECT TYPE** ROADWAY



COBBLES	GRAVEL	SAND		SILT	CLAY
		coarse	fine		

Specimen Identification			ODOT (Modified AASHTO) ~ USCS Classification	LL	PL	PI
●	**B-044-0-23**	**1.5**	**A-7-6 ~ LEAN CLAY with SAND(CL)**	**45**	**21**	**24**
⊠	**B-044-0-23**	**3.0**	**A-6b ~ LEAN CLAY(CL)**	**40**	**20**	**20**

Specimen Identification			D90	D50	D30	D10	%G	%CS	%FS	%M	%C	Cc	Cu
●	**B-044-0-23**	**1.5**	**0.197**				**0**	**3**	**15**	**24**	**58**		
⊠	**B-044-0-23**	**3.0**	**0.121**				**1**	**4**	**8**	**23**	**64**		

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Appendix A

Engineering Calculations
(Including ODOT Subgrade Analysis Spreadsheets)

OHIO DEPARTMENT OF TRANSPORTATION

OFFICE OF GEOTECHNICAL ENGINEERING

PLAN SUBGRADES
Geotechnical Bulletin GB1

Instructions: Enter data in the shaded cells only.
(Enter state route number, project description,county, consultant's name, prepared by name, and date prepared. This information will be transferred to all other sheets. The date prepared must be entered in the appropriate cell on this sheet to remove these instructions prior to printing.)

WOO-18-6.67
116951

Proposed Roadway Rehabilitation along State Route 18

CT Constultants, Inc.

Prepared By: Rawad Khawam
Date prepared: Tuesday, May 14, 2024

Rawad Khawam
CT Consultants, Inc.
8150 Sterling Court
Mentor, Ohio 44060
216-316-2307
rkhawam@ctconsultants.com

NO. OF BORINGS: 42

#	Boring ID	Alignment	Station	Offset	Dir	Drill Rig	ER	Boring EL.	Proposed Subgrade EL	Cut Fill
1	B-001-0-23	SR18				CME 75 Truck 844	73	709.7	708.9	0.8 C
2	B-002-0-23	SR18				CME 75 Truck 844	73	709.5	708.7	0.8 C
3	B-003-0-23	SR18				CME 75 Truck 844	73	708.5	707.7	0.8 C
4	B-004-0-23	SR18				CME 75 Truck 844	73	708.5	707.7	0.8 C
5	B-005-0-23	SR18				CME 75 Truck 844	73	708.6	707.8	0.8 C
6	B-006-0-23	SR18				CME 75 Truck 844	73	708.3	707.5	0.8 C
7	B-007-0-23	SR18				CME 75 Truck 844	73	707.9	707.1	0.8 C
8	B-008-0-23	SR18				CME 75 Truck 844	73	707.7	706.9	0.8 C
9	B-009-0-23	SR18				CME 75 Truck 844	73	707.7	706.9	0.8 C
10	B-010-0-23	SR18				CME 75 Truck 844	73	707.7	706.9	0.8 C
11	B-011-0-23	SR18				CME 75 Truck 844	73	708.0	707.2	0.8 C
12	B-012-0-23	SR18				CME 75 Truck 844	73	708.6	707.8	0.8 C
13	B-013-0-23	SR18				CME 75 Truck 844	73	707.0	706.2	0.8 C
14	B-014-0-23	SR18				CME 75 Truck 844	73	706.0	705.2	0.8 C
15	B-015-0-23	SR18				CME 75 Truck 844	73	706.1	705.3	0.8 C
16	B-016-0-23	SR18				CME 75 Truck 844	73	706.7	705.9	0.8 C
17	B-017-0-23	SR18				CME 75 Truck 844	73	707.0	706.2	0.8 C
18	B-018-0-23	SR18				CME 75 Truck 844	73	706.8	706.0	0.8 C
19	B-019-0-23	SR18				CME 75 Truck 844	73	706.4	705.6	0.8 C
20	B-020-0-23	SR18				CME 75 Truck 844	73	705.9	705.1	0.8 C
21	B-021-0-23	SR18				CME 75 Truck 844	73	706.3	705.5	0.8 C
22	B-022-0-23	SR18				CME 75 Truck 844	73	706.7	705.9	0.8 C
23	B-023-0-23	SR18				CME 75 Truck 844	73	707.4	706.6	0.8 C
24	B-024-0-23	SR18				CME 75 Truck 844	73	707.1	706.3	0.8 C
25	B-025-0-23	SR18				CME 75 Truck 844	73	707.3	706.5	0.8 C
26	B-028-0-23	SR18				CME 75 Truck 844	73	706.6	705.8	0.8 C
27	B-029-0-23	SR18				CME 75 Truck 844	73	706.5	705.7	0.8 C
28	B-030-0-23	SR18				CME 75 Truck 844	73	707.4	706.6	0.8 C
29	B-031-0-23	SR18				CME 75 Truck 844	73	707.9	707.1	0.8 C
30	B-032-0-23	SR18				CME 75 Truck 844	73	707.9	707.1	0.8 C
31	B-033-0-23	SR18				CME 75 Truck 844	73	708.7	707.9	0.8 C
32	B-034-0-23	SR18				CME 75 Truck 844	73	709.9	709.1	0.8 C
33	B-035-0-23	SR18				CME 75 Truck 844	73	709.9	709.1	0.8 C
34	B-036-0-23	SR18				CME 75 Truck 844	73	710.0	709.2	0.8 C
35	B-037-0-23	SR18				CME 75 Truck 844	73	710.3	709.5	0.8 C
36	B-038-0-23	SR18				CME 75 Truck 844	73	710.3	709.5	0.8 C
37	B-039-0-23	SR18				CME 75 Truck 844	73	710.1	709.3	0.8 C
38	B-040-0-23	SR18				CME 75 Truck 844	73	710.5	709.7	0.8 C
39	B-041-0-23	SR18				CME 75 Truck 844	73	710.8	710.0	0.8 C
40	B-042-0-23	SR18				CME 75 Truck 844	73	710.6	709.8	0.8 C
41	B-043-0-23	SR18				CME 75 Truck 844	73	712.9	712.1	0.8 C
42	B-044-0-23	SR18				CME 75 Truck 844	73	712.7	711.9	0.8 C

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Subgrade Analysis

V. 14.6 2/11/2022

#	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	Visual	0.8	1.4	0.0	0.6											6	A-1-a	0						12''
	001-0	SS-1	1.4	3.0	0.6	2.2	9		2.5	43	22	21	26	49	75	21	19	A-7-6	13	200		N_{60}		12''	204 Geotextile
	23	SS-2A	3.0	4.2	2.2	3.4	24		2.5	41	20	21	20	67	87	20	18	A-7-6	13						
		SS-2B/3	4.2	6.0	3.4	5.2	9	9	1.0							22	16	A-6b	16						
2	B	SS-1	1.5	3.0	0.7	2.2	7			38	20	18	16	31	47	12	16	A-6b	5	210		N_{60}		15''	15''
	002-0	SS-2A	3.0	4.0	2.2	3.2	16		2.0	43	21	22	23	60	83	24	18	A-7-6	13			Mc			204 Geotextile
	23	SS-2B/3	4.0	6.0	3.2	5.2	11		2.75							19	16	A-6b	16						
		SS-4	6.0	7.5	5.2	6.7	22	7	3.5							17	16	A-6b							
3	B	SS-1A	0.7	1.8	-0.1	1.0	7										6	A-1-a	0						15''
	003-0	SS-1B	1.8	3.0	1.0	2.2	7			44	22	22	25	47	72	23	19	A-7-6	13	210		N_{60} & Mc		15''	204 Geotextile
	23	SS-2/3A	3.0	5.0	2.2	4.2	12			46	23	23	25	52	77	27	20	A-7-6	14						
		SS-3B	5.0	6.0	4.2	5.2	13	7	1.75							26	16	A-6b	16						
4	B	Visual	0.0	1.4	-0.8	0.6											6	A-1-a	0						21''
	004-0	SS-1	1.4	3.0	0.6	2.2	5			28	16	12	20	26	46	11	14	A-6a	3	200		N_{60}		21''	204 Geotextile
	23	SS-2	3.0	4.5	2.2	3.7	17		1.25	45	25	20	20	67	87	32	22	A-7-6	13						
		SS-3	4.5	6.0	3.7	5.2	11	5	2.25							21	18	A-7-6	16						
5	B	Visual	0.6	1.3	-0.2	0.5											6	A-1-a	0						12''
	005-0	SS-1	1.3	3.0	0.5	2.2	10			36	19	17	22	26	48	12	16	A-6b	5	210		N_{60}		12''	204 Geotextile
	23	SS-2	3.0	4.5	2.2	3.7	19			40	21	19	24	39	63	21	16	A-6b	9						
		SS-3	4.5	6.2	3.7	5.4	15	10	2.5							23	16	A-6b	16						
6	B	Visual	0.5	1.0	-0.3	0.2											6	A-1-a	0						12''
	006-0	SS-1A	1.0	2.0	0.2	1.2	10		3.75	38	22	16	25	41	66	16	17	A-6b	9	210		N_{60}		12''	204 Geotextile
	23	SS-1B/2A	2.0	3.0	1.2	2.2	11		2.75	46	23	23	25	47	72	24	20	A-7-6	14			N_{60} & Mc			
		SS-2B	3.0	3.3	2.2	2.5	11	10									6	A-1-a	0						
7	B	Visual	0.0	1.6	-0.8	0.8											6	A-1-a	0						12''
	007-0	SS-1A	1.6	2.7	0.8	1.9	10		2.0	37	21	16	28	38	66	24	16	A-6b	9	210		N_{60} & Mc		12''	204 Geotextile
	23	SS-1B/2	2.7	4.5	1.9	3.7	12		1.75	42	23	19	28	44	72	26	20	A-7-6	11						
		SS-3	4.5	6.0	3.7	5.2	15	10	2.0							22	18	A-7-6	16						
8	B	SS-1A	0.7	1.8	-0.1	1.0	10										6	A-1-a	0						Rework
	008-0	SS-1B/2A	1.8	3.5	1.0	2.7	13			31	18	13	19	19	38	10	14	A-6a	1	100					
	23	SS-2B	3.5	4.5	2.7	3.7	18			35	19	16	27	33	60	21	16	A-6b	7						
		SS-3	4.5	6.0	3.7	5.2	13	10	1.5							28	16	A-6b	16						
9	B	SS-1A	1.0	1.5	0.2	0.7	7										6	A-1-a	0						15''
	009-0	SS-1B	1.5	2.8	0.7	2.0	7		1.5	35	17	18	27	33	60	18	16	A-6b	8	200		N_{60}		15''	204 Geotextile
	23	SS-2	2.8	4.0	2.0	3.2	12		2.0	39	18	21	26	34	60	20	16	A-6b	9			N_{60} & Mc			
		SS-3	4.0	5.5	3.2	4.7	13	7	1.75							23	16	A-6b	16						

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Subgrade Analysis

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#	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	
10	B	SS-1A	0.6	1.5	-0.2	0.7	12										6	A-1-a	0						12''
	010-0	SS-1B	1.5	2.8	0.7	2.0	10			41	20	21	22	34	56	23	18	A-7-6	9	200		N_{60} & Mc		12''	204 Geotextile
	23	SS-2	2.8	4.0	2.0	3.2	21		2.5	44	21	23	27	55	82	22	18	A-7-6	14			Mc			
		SS-3	4.0	5.5	3.2	4.7	11	10	2.5							22	18	A-7-6	16						
11	B	SS-1	1.1	2.7	0.3	1.9	10		2.5	46	22	24	22	41	63	25	19	A-7-6	12	210		N_{60} & Mc		12''	12''
	011-0	SS-2	2.7	4.0	1.9	3.2	26		2.75	43	21	22	24	58	82	23	18	A-7-6	13			Mc			204 Geotextile
	23	SS-3	4.0	5.5	3.2	4.7	11		2.75							23	18	A-7-6	16						
		SS-4	5.5	7.0	4.7	6.2	34	10	4.5							16	10	A-4a	8						
12	B	SS-1A	0.5	1.3	-0.3	0.5	10										6	A-1-a	0						15''
	012-0	SS-1B	1.3	2.4	0.5	1.6	7		2.75	33	16	17	16	35	51	19	16	A-6b	6	210		N_{60} & Mc		15''	204 Geotextile
	23	SS-2	2.4	4.0	1.6	3.2	19		2.5	44	22	22	27	58	85	24	19	A-7-6	14			Mc			
		SS-3	4.0	5.5	3.2	4.7	13	7	3.0							22	18	A-7-6	16						
13	B	SS-1A	1.1	2.0	0.3	1.2	11			36	18	18	23	34	57	19	16	A-6b	8	220		N_{60} & Mc		12''	12''
	013-0	SS-1B/2	2.0	4.0	1.2	3.2	28		3.0	43	20	23	21	68	89	22	18	A-7-6	14			Mc			204 Geotextile
	23	SS-3	4.0	5.5	3.2	4.7	18		1.75							22	18	A-7-6	16						
		SS-4	5.5	7.0	4.7	6.2	26	11	1.0							33	18	A-7-6	16						
14	B	SS-1A	0.4	1.3	-0.4	0.5	7										6	A-1-a	0						12''
	014-0	SS-1B	1.3	2.5	0.5	1.7	11		4.0	42	20	22	20	57	77	23	18	A-7-6	13	210		N_{60} & Mc		12''	204 Geotextile
	23	SS-2	2.5	4.0	1.7	3.2	22		2.5	44	21	23	20	67	87	24	18	A-7-6	14			Mc			
		SS-3	4.0	5.0	3.2	4.2	16	7	1.5							23	18	A-7-6	16						
15	B	SS-1A	1.0	2.5	0.2	1.7	13		2.5	46	22	24	23	48	71	27	19	A-7-6	14	210		N_{60} & Mc		12''	12''
	015-0	SS-1B/2	2.5	4.0	1.7	3.2	24		2.0	40	20	20	22	66	88	21	16	A-6b	12			Mc			204 Geotextile
	23	SS-3/4A	4.0	6.0	3.2	5.2	19		2.5							21	16	A-6b	16						
		SS-4B	6.0	7.0	5.2	6.2	41	13	4.5							16	14	A-6a							
16	B	Visual	0.5	1.1	-0.3	0.3											6	A-1-a	0						None
	016-0	SS-1	1.1	2.8	0.3	2.0	15		2.5	46	23	23	22	58	80	27	20	A-7-6	14	210		Mc			
	23	SS-2	2.8	4.0	2.0	3.2	27		2.0	47	23	24	23	67	90	27	20	A-7-6	15			Mc			
		SS-3	4.0	5.5	3.2	4.7	17	15	4.5							17	14	A-6a	10						
17	B	SS-1/2A	1.1	3.0	0.3	2.2	9			18	10	8	41	6	47	12	10	A-4a	2	210		N_{60}		12''	12''
	017-0	SS-2B	3.0	4.0	2.2	3.2	17		2.25	43	20	23	24	55	79	22	18	A-7-6	14			Mc			204 Geotextile
	23	SS-3	4.0	5.5	3.2	4.7	13		1.25							24	18	A-7-6	16						
		SS-4	5.5	7.0	4.7	6.2	28	9	4.5							17	14	A-6a	10						
18	B	SS-1A	0.7	1.3	-0.1	0.5	7										6	A-1-a	0						12''
	018-0	SS-1B	1.3	2.5	0.5	1.7	9		3.75	36	17	19	22	61	83	20	16	A-6b	12	210		N_{60} & Mc		12''	204 Geotextile
	23	SS-2	2.5	3.7	1.7	2.9	32		3.5	46	22	24	24	57	81	25	19	A-7-6	15			Mc			
		SS-3	3.7	5.5	2.9	4.7	17	7	3.0							23	18	A-7-6	16						

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Subgrade Analysis

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#	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	
19	B	SS-1	1.1	2.5	0.3	1.7	7		2.0	36	20	16	23	45	68	19	16	A-6b	9	210		N_{60} & Mc		15''	15''
	019-0	SS-2	2.5	4.0	1.7	3.2	17		2.0	45	21	24	25	61	86	23	18	A-7-6	15			Mc			204 Geotextile
	23	SS-3	4.0	5.5	3.2	4.7	7		1.75							26	16	A-6b	16						
		SS-4	5.5	7.0	4.7	6.2	15	7	2.25							23	16	A-6b	16						
20	B	Visual	0.5	1.2	-0.3	0.4											6	A-1-a	0						None
	020-0	SS-1/2A	1.2	3.0	0.4	2.2	15			36	20	16	19	42	61	17	16	A-6b	8	200					
	23	SS-2B	3.0	4.0	2.2	3.2	24		2.5	49	24	25	22	68	90	31	21	A-7-6	16			Mc			
		SS-3	4.0	5.5	3.2	4.7	10	10	2.0							21	16	A-6b	16						
21	B	Visual	0.0	1.3	-0.8	0.5											6	A-1-a	0						None
	021-0	SS-1	1.3	3.0	0.5	2.2	10			NP	NP	NP	14	1	15	6	6	A-1-a	0	100					
	23	SS-2	3.0	4.5	2.2	3.7	11		2.5	38	19	19	24	67	91	22	16	A-6b	12						
		SS-3	4.5	6.0	3.7	5.2	12	10	2.25							21	16	A-6b	16						
22	B	Visual	0.5	1.6	-0.3	0.8											6	A-1-a	0						12''
	022-0	SS-1	1.6	3.0	0.8	2.2	12		2.5	46	22	24	23	67	90	26	19	A-7-6	15	210		N_{60} & Mc		12''	204 Geotextile
	23	SS-2	3.0	4.5	2.2	3.7	16		3.0	46	23	23	22	68	90	26	20	A-7-6	14						
		SS-3	4.5	6.0	3.7	5.2	10	10	2.0							25	16	A-6b	16						
23	B	SS-1	1.1	3.0	0.3	2.2	7		2.0	49	24	25	22	45	67	30	21	A-7-6	14	210		N_{60} & Mc		15''	15''
	023-0	SS-2	3.0	4.5	2.2	3.7	11		2.0	43	20	23	21	67	88	24	18	A-7-6	14						204 Geotextile
	23	SS-3	4.5	6.0	3.7	5.2	11		3.5							19	18	A-7-6	16						
		SS-4	6.0	7.5	5.2	6.7	26	7	4.0							17	14	A-6a							
24	B	SS-1A	0.5	1.7	-0.3	0.9	12										6	A-1-a	0						12''
	024-0	SS-1B/2A	1.7	3.5	0.9	2.7	12		2.5	42	20	22	18	55	73	25	18	A-7-6	13	220		N_{60} & Mc		12''	204 Geotextile
	23	SS-2B	3.5	4.5	2.7	3.7	18		1.75	35	18	17	21	60	81	22	16	A-6b	11						
		SS-3	4.5	6.0	3.7	5.2	13	12	2.25							24	16	A-6b	16						
25	B	SS-1	0.8	3.0	0.0	2.2	7		2.25	49	24	25	23	42	65	31	21	A-7-6	13	210		N_{60} & Mc		15''	15''
	025-0	SS-2	3.0	4.5	2.2	3.7	10		1.25	45	21	24	23	59	82	26	18	A-7-6	15						204 Geotextile
	23	SS-3A	4.5	5.5	3.7	4.7	11		3.75							19	16	A-6b	16						
		SS-3B/4	5.5	7.5	4.7	6.7	19	7	4.25							21	14	A-6a	10						
26	B	Visual	0.5	1.4	-0.3	0.6											6	A-1-a	0						14''
	028-0	SS-1A	1.4	2.0	0.6	1.2	7		2.5							30	14	A-6a	10	200		N_{60} & Mc		15''	204 Geotextile
	23	S-1B/2/3A	2.0	5.2	1.2	4.4	21		3							22	16	A-6b	16						
		SS-3B	5.2	6.0	4.4	5.2	11	7	4							18	14	A-6a	10						
27	B	SS-1	0.8	3.0	0.0	2.2	6		2.0	46	22	24	23	55	78	26	19	A-7-6	15	210		N_{60} & Mc		18''	18''
	029-0	SS-2/3A	3.0	5.0	2.2	4.2	19		2.5	45	21	24	25	54	79	25	18	A-7-6	15						204 Geotextile
	23	SS-3B	5.0	6.0	4.2	5.2	12		4.5							18	14	A-6a	10						
		SS-4	6.0	7.5	5.2	6.7	19	6	4.5							16	14	A-6a							

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Subgrade Analysis

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#	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	
28	B	SS-1A	0.4	1.8	-0.4	1.0	10										6	A-1-a	0						15''
	030-0	SS-1B	1.8	3.0	1.0	2.2	7		2.5	40	21	19	19	44	63	24	16	A-6b	9	220		N_{60} & Mc		15''	204 Geotextile
	23	SS-2	3.0	4.5	2.2	3.7	11		2.0	39	20	19	26	57	83	23	16	A-6b	12						
		SS-3	4.5	6.0	3.7	5.2	10	7	2.0							25	16	A-6b	16						
29	B	SS-1	0.9	3.0	0.1	2.2	7			45	21	24	21	40	61	24	18	A-7-6	11	210		N_{60} & Mc		15''	15''
	031-0	SS-2	3.0	4.5	2.2	3.7	9		2.0	45	21	24	17	55	72	25	18	A-7-6	14						204 Geotextile
	23	SS-3	4.5	6.0	3.7	5.2	11		3.0							23	16	A-6b	16						
		SS-4	6.0	7.5	5.2	6.7	17	7	4.5							18	14	A-6a							
30	B	SS-1A	0.6	1.8	-0.2	1.0	7										6	A-1-a	0						Rework
	032-0	SS-1B	1.8	3.0	1.0	2.2	10		2.75	40	20	20	26	53	79	24	16	A-6b	12	210		N_{60} & Mc		12''	
	23	SS-2	3.0	4.5	2.2	3.7	16			39	20	19	21	54	75	23	16	A-6b	12						
		SS-3	4.5	6.0	3.7	5.2	10	7	1.5							26	16	A-6b	16						
31	B	Visual	0.6	1.6	-0.2	0.8											6	A-1-a	0						12''
	033-0	SS-1	1.6	3.0	0.8	2.2	10		2.5	41	20	21	23	57	80	24	18	A-7-6	13	210		N_{60} & Mc		12''	204 Geotextile
	23	SS-2	3.0	4.5	2.2	3.7	15		2.0	42	20	22	20	67	87	24	18	A-7-6	13						
		SS-3	4.5	6.0	3.7	5.2	12	10	1.5							24	18	A-7-6	16						
32	B	Visual	0.6	1.5	-0.2	0.7											6	A-1-a	0						12''
	034-0	SS-1	1.5	3.0	0.7	2.2	11		2.5	47	22	25	20	64	84	26	19	A-7-6	15	210		N_{60} & Mc		12''	204 Geotextile
	23	SS-2	3.0	4.5	2.2	3.7	23		2.75	38	19	19	21	67	88	22	16	A-6b	12						
		SS-3	4.5	6.0	3.7	5.2	12	11	2.5							18	16	A-6b	16						
33	B	Visual	0.6	1.4	-0.2	0.6											6	A-1-a	0						12''
	035-0	SS-1	1.4	3.0	0.6	2.2	12		3.25	46	22	24	21	67	88	26	19	A-7-6	15	210		N_{60} & Mc		12''	204 Geotextile
	23	SS-2	3.0	4.5	2.2	3.7	17		3.0	39	19	20	20	64	84	21	16	A-6b	12						
		SS-3	4.5	6.0	3.7	5.2	11	11	1.75							14	14	A-6a	10						
34	B	Visual	0.5	1.2	-0.3	0.4											6	A-1-a	0						12''
	036-0	SS-1	1.2	3.0	0.4	2.2	10		2.75	49	23	26	21	68	89	31	20	A-7-6	16	200		N_{60} & Mc		12''	204 Geotextile
	23	SS-2	3.0	4.5	2.2	3.7	15		2.25	46	20	26	21	68	89	25	18	A-7-6	16						
		SS-3	4.5	5.2	3.7	4.4	12	10	2.25							20	16	A-6b	16						
35	B	Visual	0.7	1.3	-0.1	0.5											6	A-1-a	0						12''
	037-0	SS-1	1.3	3.0	0.5	2.2	10		2.5	45	20	25	19	61	80	25	18	A-7-6	15	200		N_{60} & Mc		12''	204 Geotextile
	23	SS-2	3.0	4.5	2.2	3.7	16		3.25	38	18	20	22	60	82	20	16	A-6b	12						
		SS-3	4.5	6.0	3.7	5.2	9	9	4.5							19	16	A-6b	16						
36	B	SS-1	1.2	3.0	0.4	2.2	7		1.5	46	22	24	26	50	76	27	19	A-7-6	15	200		N_{60} & Mc		15''	15''
	038-0	SS-2	3.0	4.5	2.2	3.7	10		2.5	40	20	20	27	55	82	23	16	A-6b	12						204 Geotextile
	23	SS-3A	4.5	5.2	3.7	4.4	11		4.0							18	14	A-6a	10						
		SS-3B/4	5.2	7.5	4.4	6.7	18	7	3.0							21	16	A-6b	16						

OHIO DEPARTMENT OF TRANSPORTATION

Subgrade Analysis

V. 14.6 2/11/2022

#	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	
37	B	SS-1	1.4	3.0	0.6	2.2	6		1.5	47	21	26	24	50	74	30	18	A-7-6	16	200		N_{60} & Mc		18''	18''
	039-0	SS-2	3.0	4.5	2.2	3.7	9		2.0	44	21	23	24	58	82	25	18	A-7-6	14						204 Geotextile
	23	SS-3	4.5	6.0	3.7	5.2	6		1.75							24	18	A-7-6	16						
		SS-4	6.0	7.5	5.2	6.7	12	6	1.25							28	16	A-6b							
38	B	Visual	0.5	1.3	-0.3	0.5											6	A-1-a	0						12''
	040-0	SS-1	1.3	3.0	0.5	2.2	11			49	24	25	27	46	73	28	21	A-7-6	15	200		N_{60} & Mc		12''	204 Geotextile
	23	SS-2/3A	3.0	5.0	2.2	4.2	19		3.0	49	23	26	24	55	79	29	20	A-7-6	16						
		SS-3B	5.0	6.2	4.2	5.4	11	11	2.0							24	16	A-6b	16						
39	B	SS-1A	0.9	1.8	0.1	1.0	10										6	A-1-a	0						Rework
	041-0	SS-1B	1.8	3.0	1.0	2.2	11		3.0	49	23	26	22	44	66	31	20	A-7-6	14	190		N_{60} & Mc		12''	
	23	SS-2	3.0	4.5	2.2	3.7	6		1.0	48	22	26	24	45	69	27	19	A-7-6	15						
		SS-3	4.5	6.0	3.7	5.2	7	6	1.75							21	18	A-7-6	16						
40	B	Visual	0.5	1.2	-0.3	0.4											6	A-1-a	0						12''
	042-0	SS-1	1.2	3.0	0.4	2.2	10		2.5	40	20	20	27	55	82	25	16	A-6b	12	200		N_{60} & Mc		12''	204 Geotextile
	23	SS-2	3.0	4.5	2.2	3.7	17		4.5	36	18	18	25	49	74	20	16	A-6b	11						
		SS-3	4.5	6.0	3.7	5.2	9	9	2.5							20	14	A-6a	10						
41	B	Visual	0.7	1.5	-0.1	0.7	7										6	A-1-a	0						15''
	043-0	SS-1A	1.5	2.0	0.7	1.2	7		2.75	44	20	24	20	44	64	25	18	A-7-6	12	200		N_{60} & Mc		15''	204 Geotextile
	23	SS-1B/2	2.0	4.5	1.2	3.7	19		2.5	38	19	19	24	57	81	21	16	A-6b	12						
		SS-3	4.5	6.0	3.7	5.2	12	7	2.0							22	16	A-6b	16						
42	B	Visual	1.1	1.7	0.3	0.9											6	A-1-a	0						15''
	044-0	SS-1	1.7	2.8	0.9	2.0	7		2.0	45	21	24	24	58	82	26	18	A-7-6	15	200		N_{60} & Mc		15''	204 Geotextile
	23	SS-2	2.8	4.5	2.0	3.7	11		2.5	40	20	20	23	64	87	24	16	A-6b	12						
		SS-3	4.5	6.0	3.7	5.2	11	7	2.0							21	16	A-6b	16						

OHIO DEPARTMENT OF TRANSPORTATION

Subgrade Analysis

V. 14.6 2/11/2022

PID: 116951

County-Route-Section: WOO-18-6.67
No. of Borings: 42

Geotechnical Consultant: CT Constultants, Inc.
Prepared By: Rawad Khawam
Date prepared: 5/14/2024

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	6

% Samples within 6 feet of subgrade			
$N_{60} \leq 5$	1%	HP ≤ 0.5	0%
$N_{60} < 12$	46%	0.5 < HP ≤ 1	0%
$12 \leq N_{60} < 15$	14%	1 < HP ≤ 2	1%
$N_{60} \geq 20$	10%	HP > 2	3%
M+	27%		
Rock	0%		
Unsuitable	0%		

Excavate and Replace at Surface	
Average	14''
Maximum	21''
Minimum	12''

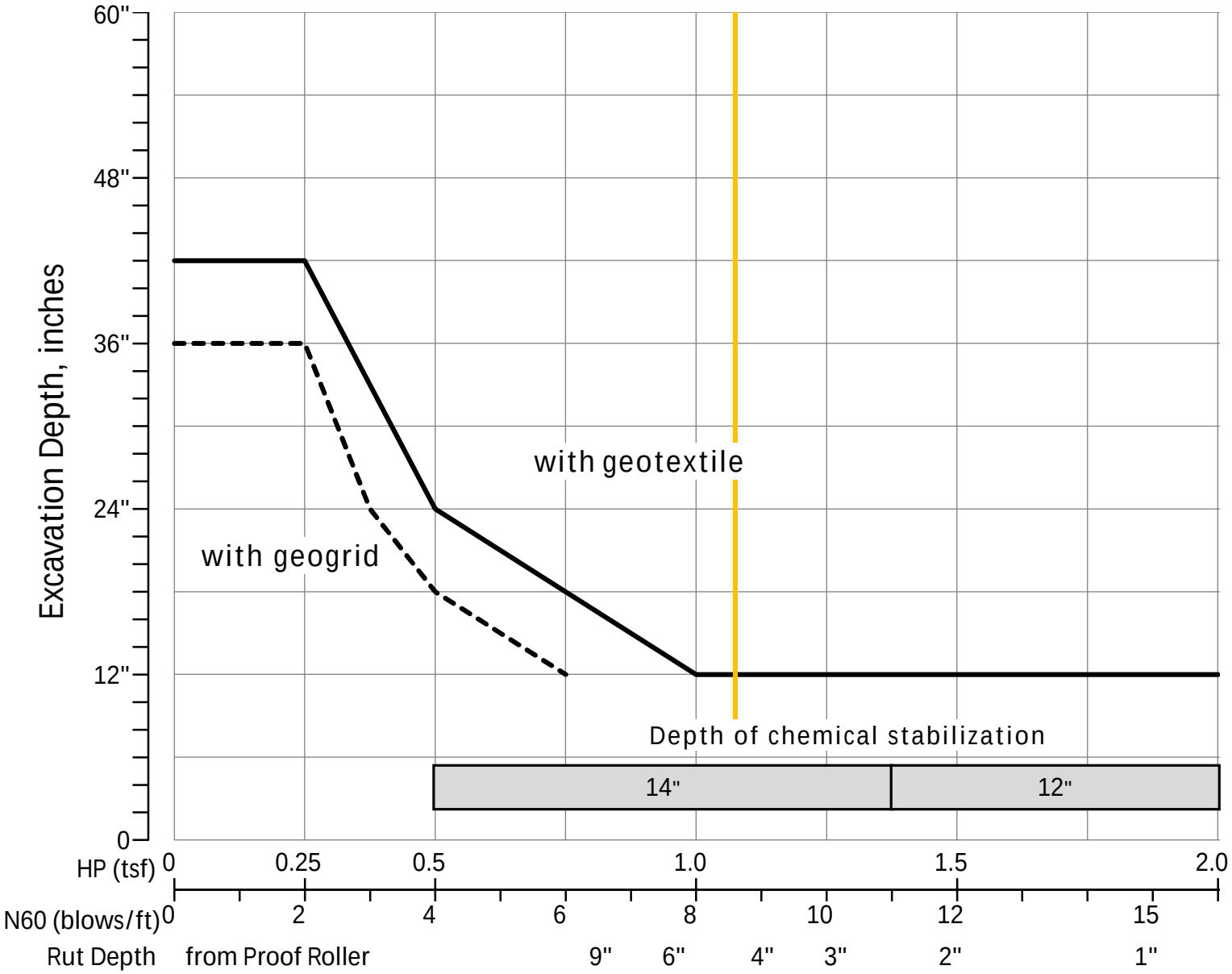
% Proposed Subgrade Surface	
Unstable & Unsuitable	46%
Unstable	46%
Unsuitable	0%

	N_{60}	N_{60L}	HP	LL	PL	PI	Silt	Clay	P 200	M_C	M_{OPT}	GI
Average	13	9	2.54	42	21	21	23	51	74	22	15	11
Maximum	41	15	4.00	49	25	26	41	68	91	33	22	16
Minimum	5	5	1.50	18	10	8	14	1	15	6	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	32	0	0	0	0	0	0	0	2	0	0	15	55	0	64	0	0	168
Percent	0%	19%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	9%	33%	0%	38%	0%	0%	100%
% Rock|Granular|Cohesive	0%	20%									80%								100%
Surface Class Count	0	32	0	0	0	0	0	0	0	1	0	0	3	29	0	50	0	0	115
Surface Class Percent	0%	28%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	3%	25%	0%	43%	0%	0%	100%

GB1 Figure B – Subgrade Stabilization

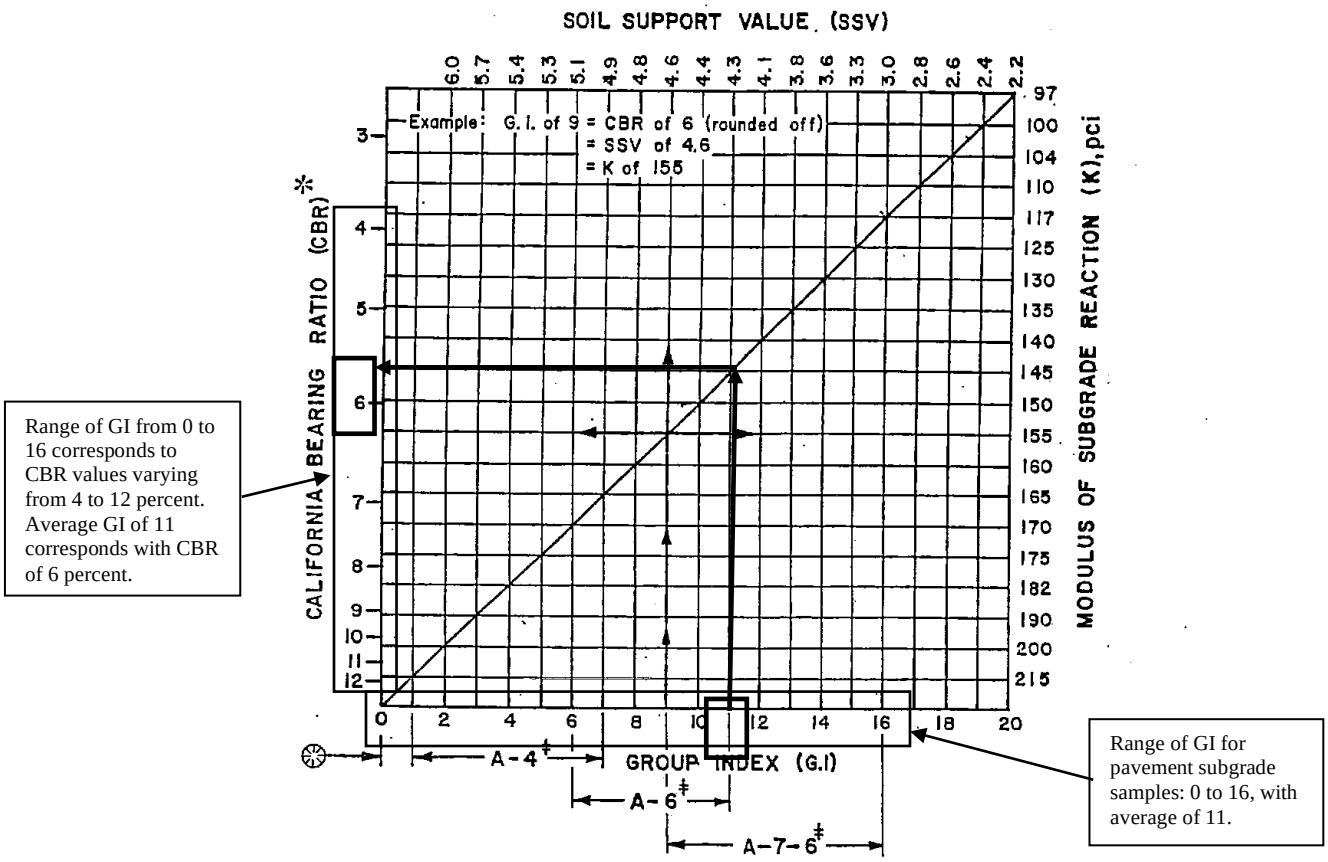


OVERRIDE TABLE

Calculated Average	New Values	Check to Override
2.54		☐ HP
8.69		☐ N60L

Average HP
Average N_{60L}

Fig.1301-3
Feb.1978



⊛ AASHTO Classes A-1, A-2 & A-3 lie below 0. SSV=6-10; K=200+.

‡ Usual range of AASHTO Classes.

* 5-1/2 Lb. hammer, 12" drop, 4 layers, 45 blows per layer, compacted at optimum moisture as determined by AASHTO T-99.

CORRELATION CHART FOR SUBGRADE STRENGTHS

Based on the ODOT GDM Section 600 analysis, a design CBR value of 6 percent was determined for the project. It should be noted that the CBR determination by the subgrade analysis spreadsheet is based on the average Group Index of all the evaluated samples, which was 11. Group indices for the tested samples ranged from 0 to 16, which would correlate with a CBR value of 4 to 12 percent. Much of the site is anticipated to include approximately ½ foot to 1 foot of remaining aggregate base with planned subgrade elevation 10 inches below existing grades. With this consideration, it does not appear to be unconservative to use the Subgrade Analysis design CBR value of 6 percent for new pavement sections throughout the project area, based on the average design value calculations.

Based on the ODOT Pavement Design Manual (PDM), the subgrade resilient modulus (Mr, in psi) is calculated by multiplying the CBR value by 1,200. Therefore, the Mr for this project would be 7,200 psi. With planned global chemical stabilization, the ODOT PDM indicates that the improved subgrade resilient modulus due to global chemical stabilization (MrGCS) is calculated by multiplying the Mr value by 1.36. Therefore, for this project, the MrGCS would be 9,790 psi.

CT Project No. 232350						
WOO-18.6.67, PID 116951						
Calculation By: RK 3/20/2024						
Reviewed By: CP 5/18/2024						
Cohesive Soil Strength Evaluations						
Evaluate average strength for foundation soils within 4B.						
Look at foundation about 9.5 to 10 ft below grade to termination at 30 feet.						
Predominantly Very stiff to hard cohesive soils						
Boring:	B-026-0-23					
Sample	Depth (ft)	N60	HP (tsf)			
SS-4	10.0	35	4.5			
SS-5	12.5	40	3.75			
SS-6	15.0	28	3.75			
SS-7	17.5	26	3.5			
SS-8	20.0	17	3.0			
SS-9	22.5	34	4.0			
SS-10	25.0	22	4.5			
SS-11	27.5	43	4.5			
SS-12	30.0	18	3.5			
Average:		29.2	3.89			
c (psf): N60x250/2=		3,653	psf			
c (psf)=			3,889	psf		
Average of Avg., c =		3,771	psf			
SS-8 incluced Qu						
c from Qu =		2,670	psf			
Say average su = c =		3,600	psf			
	Meets minimum 1,500 psf					

CT Project No. 232350						
WOO-18.6.67, PID 116951						
Calculation By: RK 3/20/2024						
Reviewed By: CP 5/18/2024						
Cohesive Soil Strength Evaluations						
Evaluate average strength for foundation soils within 4B.						
Look at foundation about 9.5 to 10 ft below grade to termination at 30 feet.						
Predominantly Very stiff to hard cohesive soils						
Boring:	B-027-0-23					
Sample	Depth (ft)	N60	HP (tsf)			
SS-4	10.0	34	4.5			
SS-5	12.5	30	4.5			
SS-6	15.0	23	4.5			
SS-7	17.5	21	3.25			
SS-8	20.0	17	4.0			
SS-9	22.5	32	4.0			
SS-10	25.0	16	3.0			
SS-11	27.5	26	4.5			
SS-12	30.0	9	1.5			
Average:		23.1	3.75			
c (psf): N60x250/2=		2,889	psf			
c (psf)=			3,750	psf		
Average of Avg., c =		3,319	psf			
SS-12 incluced Qu						
c from Qu =		1,250	psf			
Say average su = c =		2,800	psf			
	Meets minimum 1,500 psf					

CT Project No. 232350						
WOO-18.6.67, PID 116951						
Calculation By: RK 3/20/2024						
Reviewed By: CP 5/18/2024						
Cohesive Soil Strength Evaluations						
Evaluate average strength for foundation soils within 4B.						
Look at foundation about 9.5 to 10 ft below grade to termination at 30 feet.						
Predominantly Very stiff to hard cohesive soils						
Boring:	B-028-0-23					
Sample	Depth (ft)	N60	HP (tsf)			
SS-4	10.0	30	4.5			
SS-5	12.5	19	4.5			
SS-6	15.0	16	4.5			
SS-7	17.5	23	3.75			
SS-8	20.0	15				
SS-9	22.5	30	4.5			
SS-10	25.0	15	4.0			
SS-11	27.5	32	4.0			
SS-12	30.0	10	3.0			
Average:		21.1	4.09			
c (psf): N60x250/2=		2,639	psf			
c (psf)=			4,094	psf		
Average of Avg., c =		3,366	psf			
SS-8 incluced Qu						
c from Qu =		2,630	psf			
Say average su = c =		2,600	psf			
	Meets minimum 1,500 psf					

Appendix B

Historic Borings

1982	Year	009371

STORAGE DATA	
FOLDER	
Section File No.	Fes-201
Record Center No.	13-6-92
TRACINGS	
Section File No.	FeU-168
Record Center No.	13-6-42

02722	County	WOOD
Job No.	Bridge No.	WOO-18-0719
Changes	Section	WOO-18-7,19
		☒ Over ☐ Under
	Location	RADER CREEK

Topo Sheet	541-4-NE

Project code 3321

Site Plans	
Date Rec'd.	
Revisions	
No. Copies	

Design By _____

	RECON	AUGER	CORE	DRIVE ROD
By			C, E, G,	
Dates			10-26-82	
No. of Holes or Soundings			2	
Footage			83.0	
Samples Tested			24	

☒ Samples Accounted

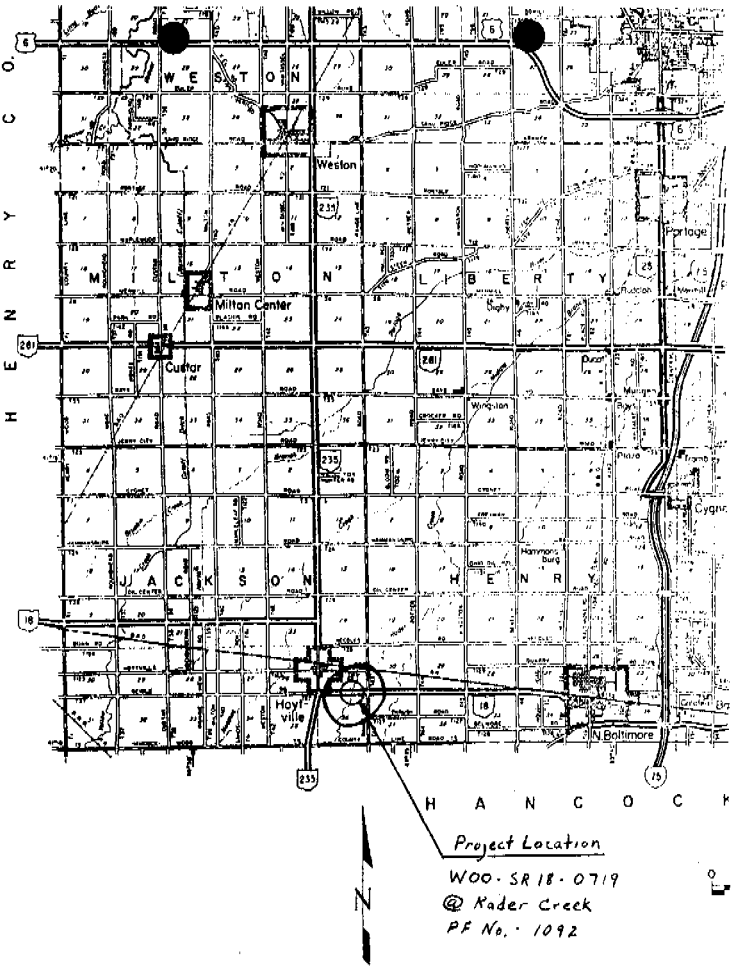
No. of Tracings	2

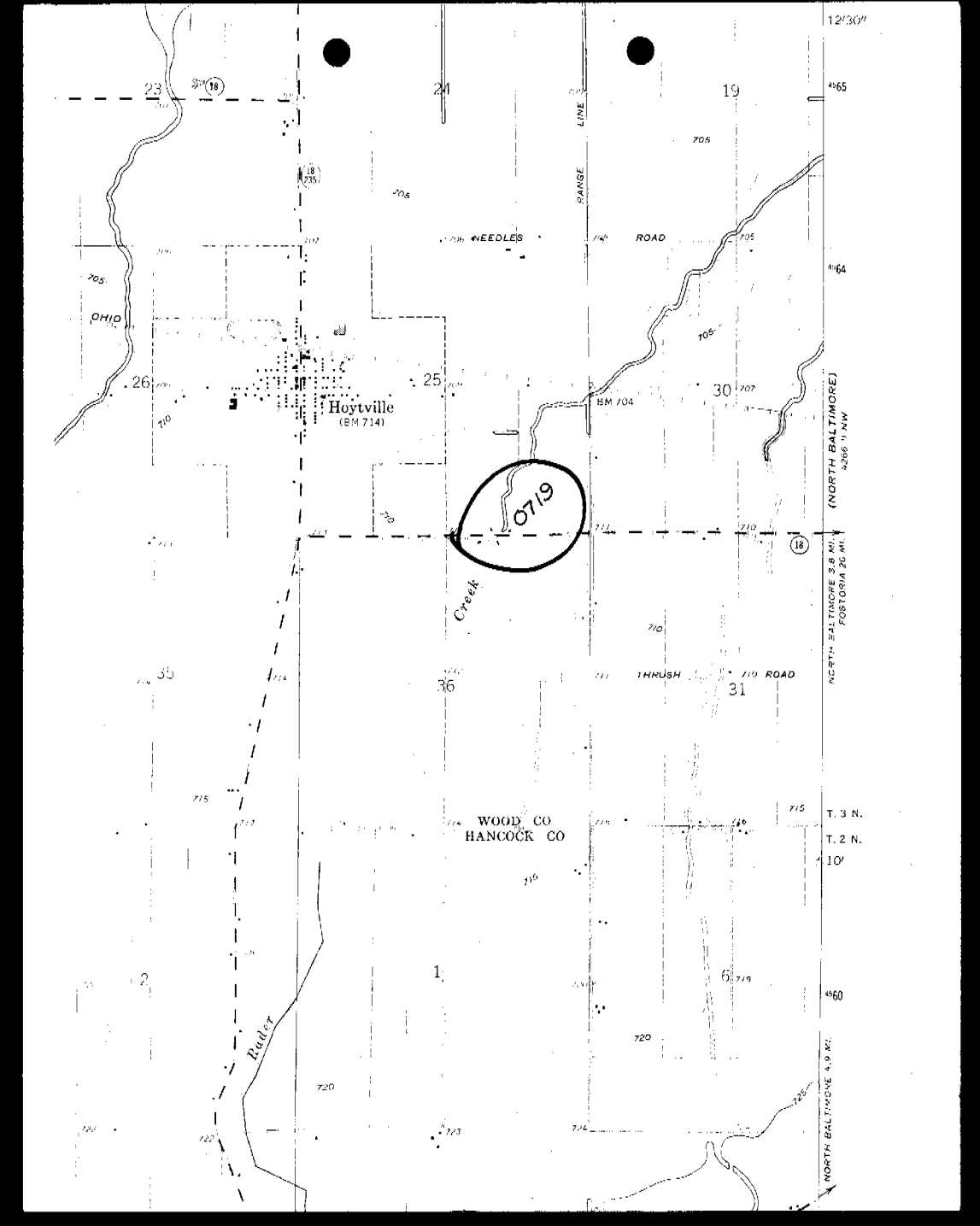
Remarks Box # FES-206
Record # 13-6-14
For design data folder, See

Transmittal Date 12-21-82 Revisions _____ Refer to _____

AUGER DATA			DRIVE ROD DATA		CORE DATA		
No. of Holes	Footage	Samples	No. of Soundings	Footage	No. of Holes	Footage	Samples
					2	83.0	24

Form TE-156


WESTON
Weston
MILTON
Milton Center
Custar
LIBERTY
Portage
Rudolph
Wingston
Pioneer
Cygnet
JACKSON
Hamlers Burg
HENRY
Hoytville
N. Baltimore
HANCOCK
Project Location
WOO-SR 18-0719
@ Rader Creek
PF No. 1092
N


12'30"
23
24
19
25
26
30
35
36
31
2
1
6
18
RANGE LINE
NEEDLES ROAD
OHIO
Hoytville
(BM 714)
BM 704
0719
Creek
THRUSH ROAD
WOOD CO
HANCOCK CO
Rader
(NORTH BALTIMORE)
NORTH BALTIMORE 3.8 MI.
FOSTORIA 20 MI.
NORTH BALTIMORE 4.9 MI.
T. 3 N.
T. 2 N.
10'
4265 II NW
4264
4260

GEOLOGY OF THE SITE

THE STRUCTURE SITE IS LOCATED IN THE RELATIVELY FLAT GLACIATED LAKE PLAIN REGION, IN AN AREA WHERE DEEP GLACIAL AND ALLUVIAL DEPOSITS OVERLIE BEDROCK, OF THE MONROE FORMATION.

EXPLORATION

THE EXPLORATION CONSISTED OF TWO DRIVE SAMPLE BORINGS MADE BY MEANS OF A MECHANICALLY-POWERED HOLLOW STEM AUGER MOUNTED ON A MOBILE PLATFORM, PERFORMED ON OCTOBER 26, 1982.

INVESTIGATIONAL FINDINGS AND OBSERVATIONS

THE BORINGS ENCOUNTERED INTERVALS OF LOOSE TO EXTREMELY DENSE UNSTRATIFIED BASIC SILTS AND CLAYS MODIFIED WITH SAND, GRAVEL AND VARYING AMOUNTS OF EACH OTHER THAT RAPIDLY INCREASE (ERRATIC AT TIMES) IN DENSITY WITH INCREASE IN DEPTH. BORING B-1 (IN THE VICINITY OF THE REAR ABUTMENT)PENETRATED TO A DEPTH OF 41.5 FEET, ELEVATION 669.5 FEET, AND WAS TERMINATED AFTER PENETRATING IN EXCESS OF 31.5 FEET OF MATERIAL REQUIRING IN EXCESS OF 30 BLOWS PER FOOT IN THE STANDARD PENETRATION TEST. BORING B-2 (IN THE VICINITY OF THE FORWARD ABUTMENT) PENETRATED TO A DEPTH OF 41.5 FEET, ELEVATION 669.5 FEET, AND WAS TERMINATED AFTER PENETRATING IN EXCESS OF 16.5 FEET OF MATERIAL REQUIRING IN EXCESS OF 30 BLOWS PER FOOT IN THE STANDARD PENETRATION TEST.

BEDROCK SURFACE WAS NOT ENCOUNTERED IN EITHER OF THE TEST BORINGS PERFORMED.

FREE WATER WAS OBSERVED AND MEASURED IN BORING B-1 AND B-2 AT 40.0-FOOT DEPTH, ELEVATION 671.0 FEET.

LEGEND

Auger Boring Location - Plan View.

Press and / or Drive Sample and / or Core Boring Location - Plan View.

Drive Rod Penetration Resistance Sounding Location - Plan View.

Capped Pile

Footing

Footing on Pile

TR Top of Rock

Horizontal Bar on Boring Log Indicates the Depth the Sample Was Taken.

X/Y/Z Figures Beside the Boring Log in Profile Indicate the Number of Blows for Standard Penetration Test.
X = Number of Blows for First 6 inches.
Y = Number of Blows for Second 6 inches.
Z = Number of Blows for Third 6 inches.

Drive Rod Penetration Resistance Sounding Log - Profile

Casing

Resistance "R" < 10,000 lbs.

Resistance "R" > 10,000 lbs.

Z Indicates Final Measurement of Penetration, in Inches.

W— Indicates Free Water Elevation.

Indicates Static Water Elevation.

SYMBOLS OF ROCK TYPES

Coal

Weathered Mudstone or Claystone

Mudstone or Claystone

Weathered Shale

Shale

Weathered Siltstone

Siltstone

Weathered Sandstone

Sandstone

Leached Dolomite

Dolomite

Leached Limestone

Limestone

Boulders or Cobbles

GENERAL INFORMATION

Drive Rod Penetration Sounding Tests

Drive rod penetration resistance tests constitute driving a 1.315-inch diameter steel rod, with a 45° cone point, into the ground, using a 122-pound drop-hammer with a free fall of five feet. At one or two-foot depth intervals, a measurement is taken to determine the amount of penetration achieved in three hammer drops. This reading is converted to an empirical value for capacity "R", in thousands of pounds (which is a measure of both the point resistance and frictional resistance on the rod), by using charts prepared by the Ohio Department of Highways, Bureau of Bridges, on the basis of correlation study of rod penetration with past performance of pile driving. For interpretation, a graph is prepared by plotting the value "R" against the depth at which the reading was taken, and connecting the plotted points. The curve so obtained reflects the density of subsurface materials in a manner that can be readily compared with data from similar tests at other locations on the structure site. From this comparison, the overall uniformity of subsurface condition may be evaluated.

Drive Sample Borings - Drive-Press Sample Borings

Drive sample borings are made by means of a rotary-type drill rig, employing a 2" O.D., 1-3/8" I.D. sampler, at 2-1/2 and / or 5-foot depth intervals, driven by means of a 140 - pound drop-hammer with a free fall of 30 inches. The number of blows required to drive the sampler 18 inches is considered the standard penetration test.

Drive-press sample borings are made by means of a rotary-type drill rig, employing a 2" O.D., 1-3/8" I.D. drive sampler, and 3" O.D. thin-wall press sampler. The press sampler is advanced by continuous uniform pressure, applied by the drill rig.

The boring log sheets show a graphic plot of the information obtained, including depth and elevation of the sample, number of blows for the standard penetration tests in three 6-inch increments, depth of press samples, field sample number, sample description - based on laboratory tests and the Casagrande AC classification system - and gradation, plasticity, and moisture content determinations. Results of strength and consolidation testing, if performed, appear on separate enclosures.

At depths where materials are bouldery or gravelly to the extent that the sampler can not be driven, a wash sample is procured for visual classification, in order to determine the general character of the material. These samples are not considered sufficiently representative to warrant laboratory testing.

Particle Size Definitions

Boulders	12"	Cobbles	3"	Gravel	2.0mm (No. 10 sieve)	Coarse Sand	0.42mm (No. 40 sieve)	Fine Sand	0.074mm (No. 200 sieve)	Silt	0.005mm	Clay

10-26-82 SS 1 3/8" 671.0'

Date Completed 10-26-82 Casing Length Dia

Boring No B-1 Station & Offset 379+25 12' RT. (REAR ABUTMENT) Surface Elev 711.0'

Elev	Depth	Std. Pen. (N)	Rec. ft.	Loss ft.	Description	Sample No	Physical Characteristics: % Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	Soil Class
711.0	0														
708.5	2														
	4	AUGERED			BROWN SILTY, SANDY GRAVEL	1	58	7	10	13	12	26	9	9	A-2-4
706.0	6	3/3/5			BROWN GRAVELLY SANDY CLAY	2	16	8	26	19	31	34	16	20	A-6b
703.5	8	6/9/15			BROWN SANDY, GRAVELLY CLAY	3	18	5	10	23	44	31	11	23	A-6a
701.0	10	11/18/26			BROWN SILTY AND CLAY	4	5	4	10	29	52	31	12	14	A-6a
698.5	12	11/16/26			GRAY GRAVELLY CLAY	5	12	3	7	24	54	33	14	15	A-6a
696.0	14	10/20/24			GRAY SANDY CLAY	6	6	5	11	28	50	30	12	14	A-6a
693.5	16	9/16/24			GRAY SANDY CLAY	7	10	5	10	26	49	30	12	16	A-6a
691.0	18	8/14/20			GRAY SANDY CLAY	8	9	5	12	27	47	30	12	15	A-6a
	20														
	22														
686.0	24														
	26	8/13/23			GRAY WITH BROWN SANDY CLAY	9	9	5	11	28	47	29	12	16	A-6a
	28														
681.0	30														
	32	7/16/30			GRAY SANDY SILT	10	9	7	16	35	33	23	8	10	A-4a
	34														
676.0	36	10/23/34			GRAY WITH BROWN CLAYEY SILT	11	4	5	9	32	50	23	7	17	A-4a
	38														
671.0					BOTTOM OF BORING										
669.5		13/21/34			GRAY WITH BROWN GRAVELLY SANDY SILT	12	15	9	17	32	27	20	6	9	A-4a

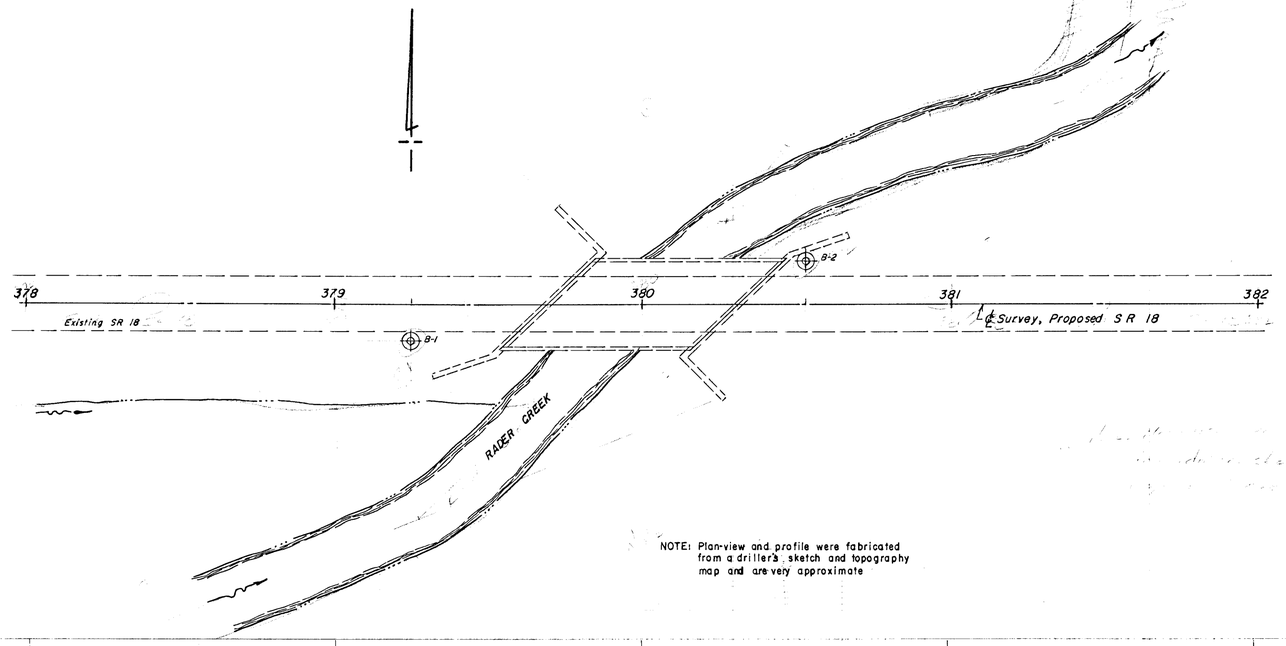
10-26-82 SS 1 3/8" 671.0'

Date Started 10-26-82 Casing Length ____ Dia ____

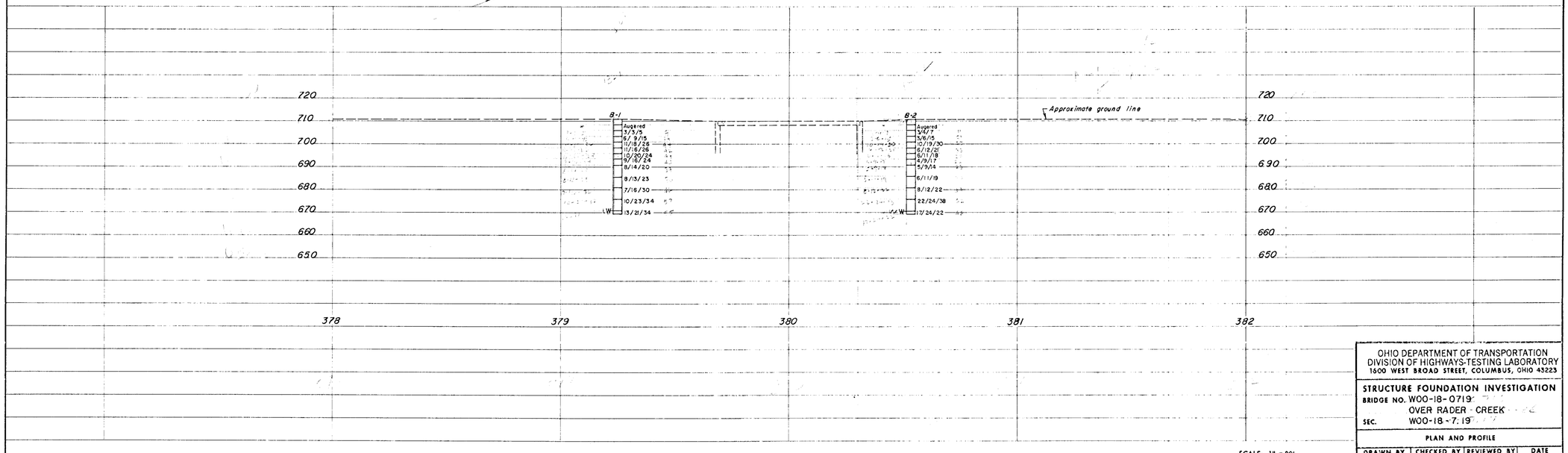
Boring No B-2 Station & Offset E 380453 14' LT. (FORWARD ABUTMENT) Surface Elev 711.0'

Elev	Depth	Std. Pen (N)	Rec ft	Loss ft	Description	Sample No	Physical Characteristics: % Agg	% C S	% F S	% Silt	% Clay	L L	P I	W C	Soil Class
711.0	0														
708.5	2														
	4	AUGERED			BROWN SANDY CLAY	13	46	9	24	23	39	43	21	23	A-7-6
706.0	6	3/4/7			BROWN SANDY SILT AND CLAY	14	77	8	37	20	28	-	-	17	VISUAL
703.5	8	3/6/15			BROWN SANDY CLAY	15	74	6	13	28	49	32	14	14	A-6a
701.0	10	10/19/30			BROWN WITH GRAY SANDY CLAY	16	77	6	12	29	46	31	13	15	A-6a
698.5	12	6/12/21			GRAY SANDY CLAY	17	77	6	13	27	47	28	17	14	A-6b
696.0	14	6/11/18			GRAY SANDY CLAY	18	73	5	10	25	47	29	12	15	A-6a
693.5	16	4/9/17			GRAY SANDY CLAY	19	70	5	12	27	46	29	12	15	A-6a
691.0	18	5/9/14			GRAY SANDY CLAY	20	77	6	12	29	46	28	11	16	A-6a
	20														
	22														
686.0	24														
	26	6/11/19			GRAY SANDY CLAY	21	74	5	10	28	53	30	13	16	A-6a
	28														
681.0	30														
	32	8/12/22			GRAY WITH BROWN SANDY SILT	22	70	8	16	34	32	21	6	10	A-4a
	34														
676.0	36	22/24/38			GRAY SANDY SILT	23	77	9	15	38	31	20	6	11	A-4a
	38														
671.0	40				BOTTOM OF BORING										
669.5		17/24/22			GRAY WITH BROWN SANDY SILT	24	72	8	18	33	29	20	5	10	A-4a

W00-18-7.19 (2/2)



NOTE: Plan-view and profile were fabricated from a driller's sketch and topography map and are very approximate



SCALE: 1" = 20'

OHIO DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS-TESTING LABORATORY
1600 WEST BROAD STREET, COLUMBUS, OHIO 43223

STRUCTURE FOUNDATION INVESTIGATION

BRIDGE NO. W00-18-0719
OVER RADER CREEK
SEC. W00-18-7.19

PLAN AND PROFILE

DRAWN BY	CHECKED BY	REVIEWED BY	DATE
A.F.	L.N.L.	R.D.R.	12/21/82

MICROFILMED
MAY 10 1993

FHWA REGION 5 | STATE OHIO | PROJECT
BS-396(14)

WOOD COUNTY
WOO-18-(7.51)(8.13)

WOO - 18 - 0752
SR. 18 OVER BRANCH OF RADER CREEK

GEOLOGY OF SITE

THE STRUCTURE IS LOCATED IN A GLACIAL GROUND MORAINE AREA OF NORTHWESTERN OHIO. SOILS CONSIST OF MOSTLY UNDIFFERENTIATED GLACIAL DRIFT OVERLYING DEVONIAN LIMESTONE BEDROCK DEPOSITS ASSOCIATED WITH THE DEVONIAN AGE.

EXPLORATION

TWO EXPLORATORY BORINGS WERE MADE BY MEANS OF A TRUCK MOUNTED DRILLING RIG UTILIZING A 4 INCH NOMINAL DIAMETER DRILLING BIT AND ROTARY WASH METHODS. THE BORINGS WERE DRILLED ON MAY 30 AND 31, 1987.

INVESTIGATIONAL FINDINGS AND OBSERVATIONS

THE PAVEMENT AND SUBSURFACE CONDITIONS AT THE SITE APPEAR TO BE GENERALLY UNIFORM. THE SITE IS BLANKETED WITH TOPSOIL, ASPHALT, CRUSHED STONE, AND FILL MATERIALS ABOUT 2.5 TO 5.5 FEET THICK. THE FILL CONSISTS OF STIFF DARK BROWN SILTY CLAY WITH LITTLE ORGANIC MATTER. UNDERLYING THE SURFACE MATERIALS IS A NATIVE SOIL LAYER OF STIFF TO HARD BROWN SILTY CLAY WITH LITTLE SAND AND TRACE OF GRAVEL WHICH WAS ENCOUNTERED DOWN TO AN 11 TO 13 FOOT DEPTH (ELEVATION 697.19 TO 695.19). BENEATH THIS LAYER IS A STRATA OF VERY STIFF TO HARD GREY SILTY CLAY WITH LITTLE SAND AND TRACE OF GRAVEL WHICH WAS FOUND DOWN TO AN 18 FOOT DEPTH (ELEVATION 692.19). NEXT IS A LAYER OF STIFF GREY SILTY CLAY WITH LITTLE SAND AND TRACE OF GRAVEL WHICH WAS ENCOUNTERED DOWN TO A 33 FOOT DEPTH (ELEVATION 678.19). UNDER THIS LAYER IS A STRATUM OF A... GREY SILTY CLAY WITH LITTLE SAND AND TRACE OF GRAVEL WHICH WAS FOUND DOWN TO A 43 FOOT DEPTH (ELEVATION 667.19). BELOW THIS STRATUM AND EXTENDING THROUGHOUT THE REMAINDER OF BOTH TEST BORINGS IS A HARDPAN DEPOSIT OF HARD TO VERY HARD GREY SILT AND CLAY WITH SOME SAND, TRACE OF GRAVEL AND OCCASIONAL COBBLES AND BOULDERS.

GROUNDWATER SEEPAGE WAS ENCOUNTERED IN BOTH TEST BORINGS AT A 7 TO 7.5 FOOT DEPTH (ELEVATION 703.19). GROUNDWATER LEVELS STABILIZED AT A 7 FOOT DEPTH (ELEVATION 703.19 TO 704.19) UPON COMPLETION OF THE DRILLING OPERATION.

WOO - 18 - 0814
SR. OVER RADER CREEK

GEOLOGY OF SITE

THE STRUCTURE IS LOCATED IN A GLACIAL GROUND MORAINE AREA OF NORTHWESTERN OHIO. SOILS CONSIST OF MOSTLY UNDIFFERENTIATED GLACIAL DRIFT OVERLYING DEVONIAN LIMESTONE BEDROCK DEPOSITS ASSOCIATED WITH THE DEVONIAN AGE.

EXPLORATION

TWO EXPLORATORY BORINGS WERE MADE BY MEANS OF A TRUCK MOUNTED DRILLING RIG UTILIZING 4 INCH NOMINAL DIAMETER DRILLING BIT AND ROTARY WASH METHODS. THE BORINGS WERE DRILLED ON JUNE 3 AND 4, 1987.

INVESTIGATIONAL FINDINGS AND OBSERVATIONS

THE SUBSURFACE CONDITIONS AT THE SITE APPEAR TO BE GENERALLY UNIFORM. THE SITE IS BLANKETED WITH TOPSOIL AND CRUSHED STONE ABOUT 12 INCHES THICK. UNDERLYING THE SURFACE MATERIALS IS A NATIVE COHESIVE SOIL LAYER OF STIFF TO VERY STIFF BROWN SILTY CLAY WITH LITTLE SAND AND TRACE OF GRAVEL WHICH WAS ENCOUNTERED DOWN TO AN 8 TO 8.5 FOOT DEPTH (ELEVATION 700.84 TO 701.84). BENEATH THIS LAYER IS A STRATA OF VERY STIFF TO HARD GREY SILTY CLAY WITH LITTLE SAND AND GRAVEL WHICH WAS FOUND DOWN TO A 32 TO 33 FOOT DEPTH (ELEVATION 676.84 TO 677.84). BELOW THIS STRATA AND EXTENDING THROUGHOUT THE REMAINDER OF EACH TEST BORING IS A HARDPAN DEPOSIT OF HARD TO VERY HARD GREY SILTY CLAY WITH SOME SAND, TRACE OF GRAVEL AND OCCASIONAL COBBLES AND BOULDERS.

GROUNDWATER WAS ENCOUNTERED IN BOTH TEST BORINGS AT A 7 FOOT DEPTH (ELEVATION 702.84). WATER LEVELS WERE FOUND TO RISE TO A 6 FOOT DEPTH (ELEVATION 703.84) UPON COMPLETION OF THE DRILLING OPERATION WHICH UTILIZED WATER TO ADVANCE THE BORINGS.

LEGEND

- AUGER BORING LOCATION - PLAN VIEW
- PRESS AND / OR DRIVE SAMPLE AND / OR CORE BORING LOCATION - PLAN VIEW
- TR — TOP OF ROCK
- CAPPED PILE
- FOOTING
- FOOTING ON PILE
- HORIZONTAL BAR ON BORING LOG INDICATES THE DEPTH THE SAMPLE WAS TAKEN
- X/Y/Z — FIGURES BESIDE THE BORING IN PROFILE INDICATE THE NUMBER OF BLOWS FOR STANDARD PENETRATION TEST
  - X - NUMBER OF BLOWS FOR FIRST 6 INCHES
  - Y - NUMBER OF BLOWS FOR SECOND 6 INCHES
  - Z - NUMBER OF BLOWS FOR THIRD 6 INCHES
- W — INDICATES FREE WATER ELEVATION
- ▼ — INDICATES STATIC WATER ELEVATION

SYMBOLS OF ROCK TYPES

- COAL
- WEATHERED MUDSTONE
- MUDSTONE
- WEATHERED SHALE
- SHALE
- CLAYSTONE
- SILTSTONE
- WEATHERED SANDSTONE
- SANDSTONE
- LEACHED DOLOMITE
- DOLOMITE
- LEACHED LIMESTONE
- LIMESTONE
- BOULDERS OR COBBLES

GENERAL INFORMATION

DRIVE SAMPLE/PRESS SAMPLE/CORE BORINGS

DRIVE SAMPLE BORINGS ARE MADE BY MEANS OF MECHANICALLY-POWERED ROTARY-TYPE DRILLING MACHINE, EMPLOYING A 2" O.D., 1-3/8" I.D. SPLIT SPOON SAMPLING DEVICE, AT 1-1/2 AND/OR 5-FOOT DEPTH INTERVALS, DRIVEN BY MEANS OF A 140-POUND DROP-HAMMER WITH A FREE FALL OF 30 INCHES, THE NUMBER OF BLOWS REQUIRED TO DRIVE THE SAMPLING DEVICES 18 INCHES IS CONSIDERED THE STANDARD PENETRATION TEST.

DRIVE/PRESS SAMPLE BORINGS ARE MADE BY MEANS OF A MECHANICALLY-POWERED ROTARY-TYPE DRILLING MACHINE, EMPLOYING A 2" O.D., 1-3/8" I.D. SPLIT SPOON SAMPLING DEVICE, AND 3" O.D. THIN WALL PRESS SAMPLING DEVICE. THE PRESS SAMPLER IS ADVANCED BY CONTINUOUS UNIFORM PRESSURE, APPLIED BY THE DRILLING MACHINE.

CORE BORINGS ARE MADE BY MEANS OF A MECHANICALLY-POWERED ROTARY-TYPE DRILLING MACHINE, EXPLOYING A NMC CORE BARREL WITH INDUSTRIAL DIAMOND CUTTING HEAD.

THE BORING LOG SHEETS DISPLAY A GRAPHIC PLOT OF THE INFORMATION OBTAINED, INCLUDING DEPTH AND ELEVATION OF THE SAMPLE, TYPE OF SAMPLE, THE STANDARD PENETRATION TEST READINGS IN THREE 6-INCH INCREMENTS, DEPTH AND ELEVATIONS OF PRESS SAMPLES, FIELD NUMBER ASSIGNED TO SAMPLE, SAMPLE DESCRIPTION-BASED ON LABORATORY TESTS UTILIZING THE CASAGRANDE AC CLASSIFICATION SYSTEM AND GRADATION, PLASTICITY AND MOISTURE CONTENT DETERMINATIONS. RESULTS OF STRENGTH AND CONSOLIDATION TESTING, IF PERFORMED ON UNDISTURBED SAMPLES, WILL APPEAR GRAPHICALLY ON SEPARATE ENCLOSURES. ROCK SAMPLES ARE DISPLAYED ON THE LOG SHEETS INCLUDING DEPTH AND ELEVATION OF THE SAMPLE, AMOUNT OF RECOVERY AND A VISUAL CLASSIFICATION BASED ON TYPE, COLOR, DEGREE OF HARDNESS, GRAIN SIZE, DETERIORATION, BEDDING, ACID REACTION AND OTHER QUALIFYING FACTORS.

AT DEPTHS WHERE MATERIALS ARE BOULDERY OR GRAVELLY TO THE EXTENT THAT THE SAMPLER CAN NOT BE UTILIZED, A WASH SAMPLE IS PROCURED AND VISUALLY CLASSIFIED, IN ORDER TO DETERMINE THE GENERAL CHARACTERISTICS OF THE MATERIAL. THESE SAMPLES ARE NOT CONSIDERED SUFFICIENTLY REPRESENTATIVE TO WARRENT LABORATORY TESTING.

PARTICLE SIZE DEFINITIONS

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

SFN 8700737

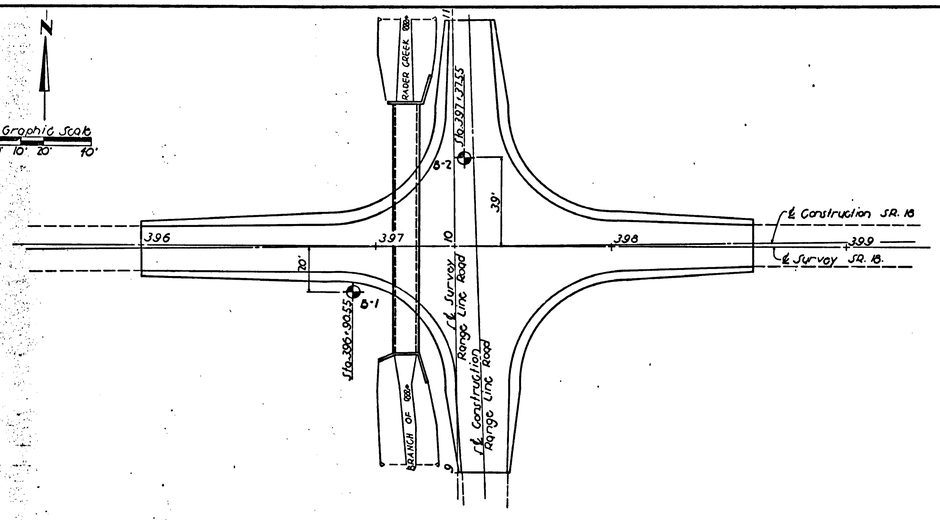
MANNIK & SMITH, INC.
CONSULTING ENGINEERS & SURVEYORS TOLEDO OHIO

STRUCTURE
FOUNDATION INVESTIGATION
Bridge No. WOO - 0752 - 0814
SR.18 Over Rader Creek
and Branch of Rader Creek
Wood County

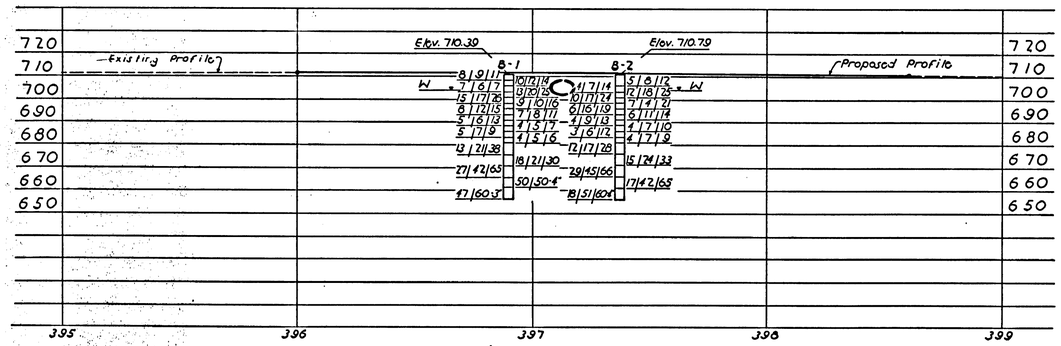
DESIGNED	DRAWN	CHECKED	REVISED DATE	REVISED
JTB	HJD-CAD	RWF	Jul 7 1989	

OHDE1 & OHD 5

MICROFILMED
MAY 10 1993



PLAN



PROFILE ALONG ℄ CONSTRUCTION

FHWA REGION	STATE	PROJECT	
5	OHIO		

WOOD COUNTY
WOO - 18 - (7.51) (6.13)

SFN 8700737

MANNIK & SMITH, INC.
CONSULTING ENGINEERS & SURVEYORS TOLEDO, OHIO

STRUCTURE
FOUNDATION INVESTIGATION

Bridge No. WOO-18-7.52
SR. 18 Over Branch Of Rader Creek
Wood County

DESIGNED	DRAWN	CHECKED	REVIEWED DATE	REVISED
GAS	BMG	JTB	Jeff 7-25-89	

OHDOT

MICROFILMED
MAY 10 1993

CALC BY DATE		OHIO	3 / 3
CHKD BY DATE		FHWA REGION 5	

WOOD COUNTY
WOO-18-(7.51)(8.13)

LOG OF BORING

DATE STARTED 5-30-87 SAMPLER TYPE SS DIA. 2" WATER ELEV. 702.89
DATE COMPLETED 5-30-87 CASTING: LENGTH 54.25' DIA. 4"
BORING NO. B-1 STATION & OFFSET 396+90.55, 20'Rt SURFACE ELEV. 710.39

ELEV.	DEPTH	BLW PER ft.	REC LOSS FT.	DESCRIPTION	SAMPLE NO.	% AGG	% CS	% FS	% SILT	% CLAY	% LL	% PI	% WC	SHTL CLASS
	0			Topsoil										
707.89	2	20			LS-1								16.2	
705.39	4	26		Fill: Stiff dark brown silty clay with little organic matter	LS-2								14.8	
702.89	6	13		Stiff to hard brown silty clay with little sand and trace of gravel	LS-3								19.0	
700.39	8	45			LS-4	6	7	13	30	44	32	14	14.7	A-6a(10)
697.89	10	43			LS-5								15.3	
695.39	12	26		Very stiff to hard grey silty clay with little sand and trace of gravel	LS-6	10	6	12	27	45	31	14	15.2	A-6a(9)
692.89	14	27			LS-7								14.8	
690.39	16	19			LS-8	5	6	11	31	47	32	13	23.3	A-6a(9)
687.89	18	19			LS-9								16.8	
685.39	20	12		Stiff grey silty clay with little sand and trace of gravel	LS-10								23.2	
682.89	22	16			LS-11								17.5	
680.39	24	11			LS-12	8	6	11	35	40	27	10	17.1	A-4a(8)
	26													
675.39	28	59			LS-13								19.4	
	30			Hard grey silty clay with little sand and trace of gravel										
670.39	32	51			LS-14								28.5	
	34													
665.39	36	107			LS-15	7	10	10	31	42	29	13	10.8	A-6a(9)
	38			Hardpan: Hard to very hard grey silt and clay with some sand, trace of gravel and occasional cobbles and boulders										
661.09	40	100/10"			LS-16	0	1	20	71	8	18	21	16.5	A-4b(8)
	42													
	44													
	46													
	48													
	50													
656.09	52	107/9"		Bottom of boring 54'-3"	LS-17								16.5	
	54													

LOG OF BORING

DATE STARTED 5-31-87 SAMPLER TYPE SS DIA. 2" WATER ELEV. 703.79
DATE COMPLETED 5-31-87 CASTING: LENGTH 54.67' DIA. 4"
BORING NO. B-2 STATION & OFFSET 397+37.55, 39'Lt SURFACE ELEV. 710.79

ELEV.	DEPTH	BLW PER ft.	REC LOSS FT.	DESCRIPTION	SAMPLE NO.	% AGG	% CS	% FS	% SILT	% CLAY	% LL	% PI	% WC	SHTL CLASS
	0			Asphalt										
	2			Crushed Stone										
	4			Top Soil										
705.79	6	20			LS-1	1	5	18	29	48	36	18	19.4	A-6a(10)
703.29	8	21		Stiff to hard brown silty clay with some sand and trace of gravel	LS-2								19.4	
700.79	10	43			LS-3								15.0	
698.29	12	41			LS-4	4	7	12	29	48	35	16	17.1	A-6a(10)
	14													
695.79	16	25		Very stiff to hard grey silty clay with little sand and trace of gravel	LS-5								18.6	
693.29	18	35			LS-6	5	6	11	31	47	31	14	15.6	A-6a(10)
690.79	20	25			LS-7								16.9	
688.29	22	22			LS-8								16.7	
685.79	24	17		Stiff grey silty clay with little sand and trace of gravel	LS-9	3	6	18	30	51	30	13	18.7	A-6a(10)
683.29	26	18			LS-10								17.6	
680.79	28	16			LS-11								25.6	
	30													
	32													
675.79	34	45			LS-12								18.5	
	36			Hard grey silty clay with trace of sand										
670.79	38	57			LS-13	0	2	2	33	63	36	15	18.8	A-6a(10)
	40													
	42													
665.79	44	111			LS-14								18.1	
	46			Hardpan: Hard to very hard grey clayey silt with some sand, trace of gravel and occasional cobbles and boulders										
	48													
660.79	50	107			LS-15								9.4	
	52													
656.09	54	111/10"		Bottom of boring 54'-8"	LS-16	10	12	15	34	29	26	9	10.4	A-4a(6)

SFN 8700737

MANNIK & SMITH, INC.
CONSULTING ENGINEERS & SURVEYORS TOLEDO OHIO

STRUCTURE
FOUNDATION INVESTIGATION
BRIDGE NO. WOO-18-07.52
S.R. 18 OVER BRANCH OF
RADER CREEK
WOOD COUNTY

DESIGNED	DRAWN	CHECKED	REVIEWED DATE	REVISED
GAS	GAS	JTB	7-15-89	

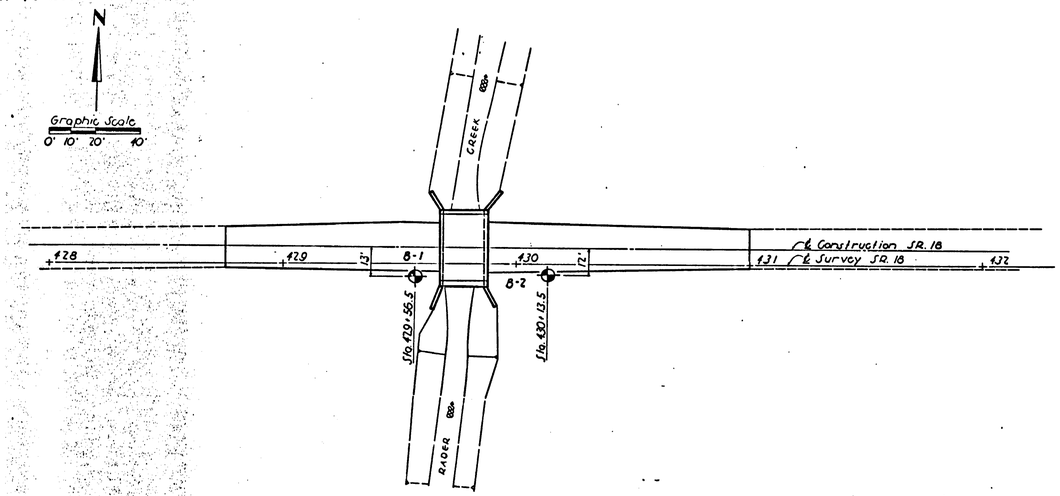
OH009

MICROFILMED
MAY 10 1993

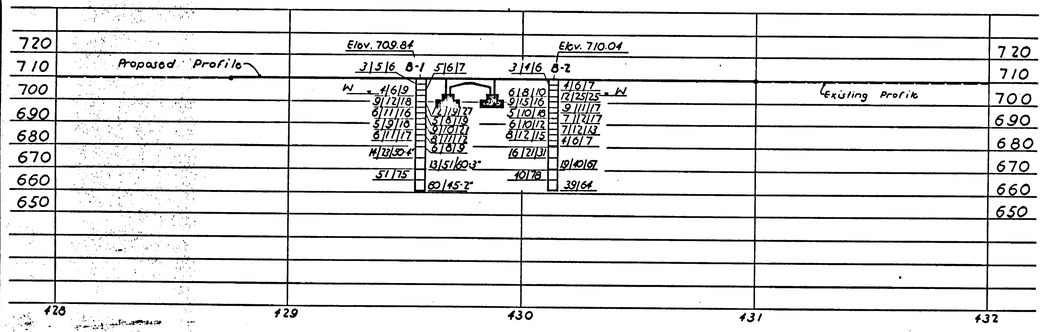
FHWA REGION	STATE	PROJECT	
5	OHIO		

4/5

WOOD COUNTY
WOO-18-17.51(8.13)



PLAN



PROFILE ALONG ℄ CONSTRUCTION

MANNIK & SMITH, INC.
CONSULTING ENGINEERS & SURVEYORS TOLEDO, OHIO

STRUCTURE
FOUNDATION INVESTIGATION

Bridge No WOO-18-08.14
SR. 18 Over Rader Creek
Wood County

DESIGNED	DRAWN	CHECKED	REVIEWED DATE	REVISED
GAS	BMG	JTS	Jul 7-25-89	

OH081

SFN 8700737

MICROFILMED
MAY 10 1993

CALC BY	DATE	CHKD BY	DATE

OHIO | FHWA REGION 5 | 5/5

WOOD COUNTY
WOO-18-07.61 X8.18)

LOG OF BORING

DATE STARTED 6-3-87 SAMPLER TYPE SS DIA. 2" WATER ELEV. 702.84
DATE COMPLETED 6-3-87 CASTING: LENGTH 49.17' DIA. 4"
BORING NO. B-1 STATION & OFFSET 429+56.5, 13'Rt SURFACE ELEV. 709.84

ELEV.	DEPTH	BLO PER FT.	REC LOSS FT.	DESCRIPTION	SAMPLE NO.	% AGG	% CS	% FS	% SILT	% CLAY	% LL	% PI	% WC	SHTL CLASS
	0			TOPSOIL										
707.34	2	11		STIFF BROWN SILTY CLAY WITH LITTLE SAND AND TRACE OF GRAVEL.	LS-1	7	4	13	26	50	41	21	19.5	A-7-6(13)
704.84	4	13			LS-2								22.5	
702.34	6	15			LS-3								14.5	
699.84	8	46			LS-4								14.9	
697.34	10	30		VERY STIFF TO HARD GREY SILTY CLAY WITH LITTLE SAND AND TRACE OF GRAVEL.	LS-5	6	7	13	30	44	28	10	14.7	A-4a(8)
694.84	12	27			LS-6								16.1	
692.34	14	27			LS-7	5	6	13	29	47	30	12	16.2	A-6a(9)
689.84	16	31			LS-8								16.9	
687.34	18	27			LS-9								21.2	
684.84	20	23			LS-10								15.9	
682.34	22	28			LS-11	8	4	8	31	49	31	12	15.0	A-6a(9)
679.84	24	17			LS-12								22.9	
	26													
674.84	28	23/10"		HARDPAN: VERY HARD GREY SILT AND CLAY WITH SOME SAND, TRACE OF GRAVEL AND OCCASIONAL COBBLES AND BOULDERS.	LS-13								19.2	
670.04	30	111/9"			LS-14								9.0	
665.34	32	128			LS-15	8	13	15	34	30	23	7	9.1	A-4a(6)
660.64	34	105/8"		BOTTOM OF BORING 49'-2"	LS-16								9.5	

LOG OF BORING

DATE STARTED 6-4-87 SAMPLER TYPE SS DIA. 2" WATER ELEV. 703.04
DATE COMPLETED 6-4-87 CASTING: LENGTH 49.5' DIA. 4"
BORING NO. B-2 STATION & OFFSET 430+13.5, 12'Rt SURFACE ELEV. 710.04

ELEV.	DEPTH	BLO PER FT.	REC LOSS FT.	DESCRIPTION	SAMPLE NO.	% AGG	% CS	% FS	% SILT	% CLAY	% LL	% PI	% WC	SHTL CLASS
	0			CRUSHED STONE										
707.54	2	10		STIFF TO VERY STIFF BROWN SILTY CLAY WITH LITTLE SAND AND TRACE OF GRAVEL.	LS-1								19.6	
705.04	4	13			LS-2								20.6	
702.54	6	18			LS-3	5	9	12	30	44	33	14	15.7	A-6a(10)
700.04	8	50			LS-4								15.0	
697.54	10	31		VERY STIFF TO HARD GREY SILTY CLAY WITH LITTLE SAND AND GRAVEL.	LS-5	21	7	10	25	37	28	12	11.1	A-6a(6)
695.04	12	28			LS-6								15.3	
692.54	14	28			LS-7								15.2	
690.04	16	29			LS-8	8	5	9	25	55	32	13	15.9	A-6a(9)
687.54	18	22			LS-9								19.1	
685.04	20	25			LS-10								15.8	
682.54	22	27			LS-11	4	4	8	25	59	36	16	16.6	A-6b(10)
680.04	24	13			LS-12								25.9	
	26													
675.04	28	52		HARDPAN: HARD TO VERY HARD GREY SILT AND CLAY WITH SOME SAND, TRACE OF GRAVEL AND OCCASIONAL COBBLES AND BOULDERS.	LS-13	6	10	13	36	35	24	8	13.8	A-6a(7)
670.04	30	107			LS-14								8.8	
665.54	32	118			LS-15								9.8	
660.54	34	103		BOTTOM OF BORING 49'-6"	LS-16	13	12	33	16	26	24	7	10.3	A-6a(1)

SFN 8700737

MANNIK & SMITH, INC.
CONSULTING ENGINEERS & SURVEYORS TOLEDO OHIO

STRUCTURE
FOUNDATION INVESTIGATION

BRIDGE NO. WOO-18-08.14
S.R. 18 OVER RADER CREEK
WOOD COUNTY

DESIGNED	DRAWN	CHECKED	REVIEWED DATE	REVISED
GAS	GAS	JTB	Jul 7 1989	

OHDE1

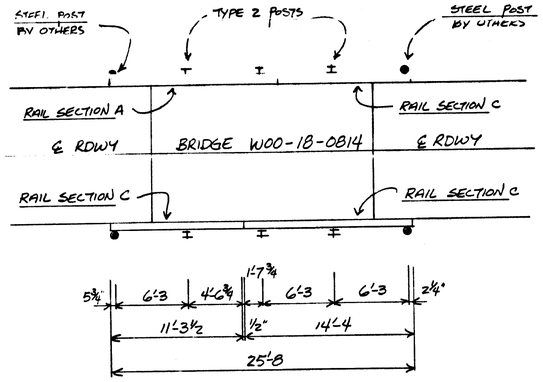
8700737

BRIDGE RATING INFORMATION
(LOAD CAPACITY SUMMARY)

1 of 1

DESIGN LOADING	LOAD RATINGS		
	INVENTORY	OPERATING	
DATE ANALYZED / CONTROL MEMBER(S)	HS	% LGL.	GROSS TONS
DATE ANALYZED / CONTROL MEMBER(S)	HS	% LGL.	GROSS TONS
DATE ANALYZED / CONTROL MEMBER(S)	HS	% LGL.	GROSS TONS
DATE ANALYZED / CONTROL MEMBER(S)	HS	% LGL.	GROSS TONS
DATE ANALYZED / CONTROL MEMBER(S)	HS	% LGL.	GROSS TONS

REMARKS



TUBULAR BACKUP LAYOUT

MATERIAL SCHEDULE	
QUANTITY	DESCRIPTION
2 PCS	RAIL SECTION A TS8x4x3/16 @ 14'-4 & 6'-0"
2 PCS	RAIL SECTION C TS8x4x3/16 @ 11'-3½ & 4'-6"
2 PCS	SPLICE CHANNEL WITH NUTS C7x9.8 @ 2'-6½"
6 PCS	TYPE 2 POST W6x25 @ 3'-5¾" PL ½"x7"x19⅝" PL ½"x7"x14⅞"
4 PCS	DEEP BEAM RAIL 12' 6" SECTION
32 PCS	⅝" DIA. x 1¼" GR BOLT WITH NUT A307
10 PCS	⅝" DIA. x 10" POST BOLT A307
28 PCS	⅝" DIA. x 1½" HEX HEAD BOLT A307
30 PCS	⅝" DIA. HEX NUT
58 PCS	⅝" DIA. FLAT WASHER
10 PCS	SPECIAL WASHER PL ¾"x1¾"x3" 1"/16x1" HOLE
	TYPE B ANCHORS (BY OTHERS)
	TYPE C ANCHORS (BY OTHERS)

NOTES

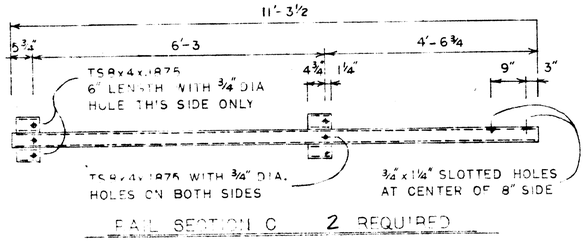
ALL TUBING A.S.T.M. A500 GRADE B

ALL OTHER STEEL A.S.T.M. A 36

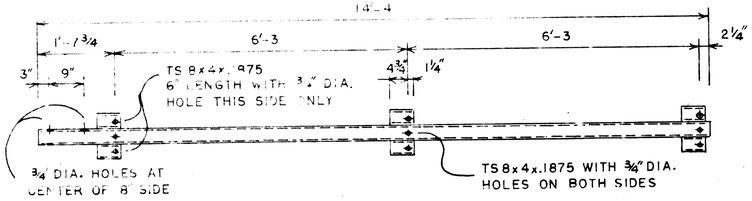
ALL GUARDRAIL, POSTS, TUBES, HARDWARE AND ACCESSORIES SHALL BE GALVANIZED

ALL GALVANIZING A.S.T.M. A123 OR A153

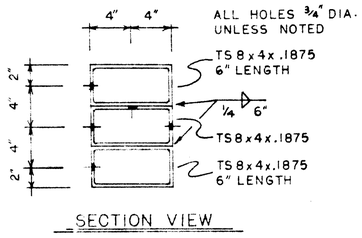
DROP WEIGHT TEAR TEST REQ'D FOR STEEL TUBING AS PER PROPOSAL.



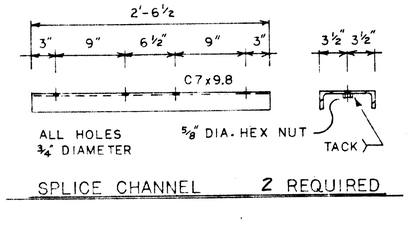
RAIL SECTION C 2 REQUIRED



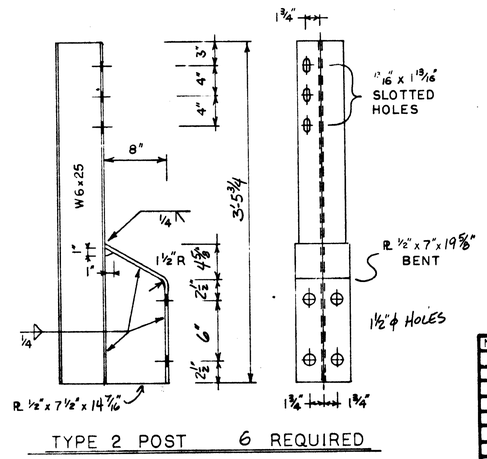
RAIL SECTION A 2 REQUIRED



SECTION VIEW



SPLICE CHANNEL 2 REQUIRED



TYPE 2 POST 6 REQUIRED

NOTE: DRAWINGS RELATIVE (DO NOT SCALE)

OCT 3, 1990

APPROVED — ENGINEER OF BRIDGES

REFERENCE NO. 56

NO	DATE	REVISIONS	BY

FABRICATION DRAWING ITEM 517
TUBULAR BACKUP BEAM AND TYPE 2 POSTS
PROJECT NO. 532(90) W00-18-0814
WOOD COUNTY, OHIO

DESIGN	DRAWN	DATE	DRAWING NO	SHEET
DLM	DLM	AUG 30, 1990	532(90)-56	1 OF 1
REVIEWED	FABRICATOR OHIO BRIDGE CO.			

Appendix C

Geotechnical Engineering Design Checklists

I. Geotechnical Design Checklists	
Project: WOO-18-6.67	PDP Path:
PID: 116951	Review Stage:

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

II. Reconnaissance and Planning Checklist

C-R-S:	WOO-18-6.67	PID:	116951	Reviewer:	CPI	Date:	5/19/2024

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

Planning - General		(Y/N/X)	Notes:
5	In planning the geotechnical exploration program for the project, have the specific geologic conditions, the proposed work, and historic subsurface exploration work been considered?	Y	
6	Has the ODOT Transportation Information Mapping System (TIMS) been accessed to find all available historic boring information and inventoried geohazards?	Y	
7	Have the borings been located to develop the maximum subsurface information while using a minimum number of borings, utilizing historic geotechnical explorations to the fullest extent possible?	Y	
8	Have the topography, geologic origin of materials, surface manifestation of soil conditions, and any other special design considerations been utilized in determining the spacing and depth of borings?	Y	
9	Have the borings been located so as to provide adequate overhead clearance for the equipment, clearance of underground utilities, minimize damage to private property, and minimize disruption of traffic, without compromising the quality of the exploration?	Y	

II. Reconnaissance and Planning Checklist

Planning - General	(Y/N/X)	Notes:
10 Have the scaled boring plans, showing all project and historic borings, and a schedule of borings in tabular format, been submitted to the District Geotechnical Engineer?	N	Requested scope provided by ODOT District 2 but not initially submitted to the DGE. Will do so in the future.
The schedule of borings should present the following information for each boring:		
a. exploration identification number	Y	
b. location by station and offset	N	No station/offset provided by ODOT District 2. Upon receipt, will incorporate into final report submittal.
c. estimated amount of rock and soil, including the total for each for the entire program.	Y	

Planning – Exploration Number	(Y/N/X)	Notes:
11 Have the coordinates, stations and offsets of all explorations (borings, soundings, test pits, etc.) been identified?	N	Station and offset to be incorporated in final report after receipt from ODOT D2.
12 Has each exploration been assigned a unique identification number, in the following format X-ZZZ-W-YY, as per Section 303.2 of the SGE?	Y	
13 When referring to historic explorations that did not use the identification scheme in 12 above, have the historic explorations been assigned identification numbers according to Section 303.2 of the SGE?	Y	

II. Reconnaissance and Planning Checklist

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

III.C. Subgrade Checklist

C-R-S:	WOO-18-6.67	PID:	116951	Reviewer:	CPI	Date:	5/19/2024

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

Subgrade	(Y/N/X)	Notes:
1 Has the subsurface exploration adequately characterized the soil or rock according to GDM Section 600?	Y	
a. Has each sample been visually classified and inspected for the presence of gypsum? Has a moisture content been performed on each sample?	Y	
b. Has mechanical classification (Plastic Limit (PL), Liquid Limit (LL), and gradation testing) been done on at least two samples from each boring within six feet of the proposed subgrade?	Y	
c. Has the sulfate content of at least one sample from each boring within 3 feet of the proposed subgrade been determined, per Supplement 1122, Determining Sulfate Content in Soils?	Y	
d. Has the sulfate content of all samples that exhibit gypsum crystals been determined?	X	
e. Have A-2-5, A-4b, A-5, A-7-5, A-8a, or A-8b soils within the top 3 feet of the proposed subgrade been mechanically classified?	X	
2 If soils classified as A-2-5, A-4b, A-5, A-7-5, A-8a, or A-8b, or having a LL>65, are present at the proposed subgrade (geotechnical profile), do the plans specify that these materials need to be removed and replaced or chemically stabilized?	X	
a. If these materials are to be removed and replaced, have the station limits, depth, and lateral limits for the planned removal been provided?	X	
3 If there is any rock, shale, or coal present at the proposed subgrade (C&MS 204.05), do the plans specify the removal of the material?	X	
a. If removal of any rock, shale, or coal is required, have the station limits, depth, and lateral limits for the planned removal of the material at proposed subgrade been provided?	X	

III.C. Subgrade Checklist

Subgrade	(Y/N/X)	Notes:
4 In accordance with GDM Section 600, do the SPT (N_{60})/HP values and existing moisture contents for the proposed subgrade soils indicate the need for subgrade stabilization?	Y	
a. If removal and replacement is applicable, has the detail of subgrade removal been shown on the plans, including depth of removal, station limits, lateral extent, replacement material, and plan notes (Item 204 - Subgrade Compaction and Proof Rolling)?	X	Global chemical stabilization is planned
b. If chemical stabilization is applicable, has the detail of this treatment been shown on the plans, including depth, percentage of chemical, station limits, lateral extent, and plan notes?	X	Plans to be prepared by others. Direction provided in the report. "Subgrade Analysis" spreadsheet indicates lime stabilization as an option, but not cement. However, based on experience in NW Ohio, the report indicates caution with use of lime and mix design is recommended using lime and then cement if lime appears to be uneconomical.
Indicate type of chemcial stabilization specified:		
cement stabilization	✓	
lime stabilization	✓	
5 If removal and replacement has been specified, do the plans include Plan Note G121 from L&D3?	X	
6 If drainage or groundwater is an issue with the proposed subgrade, has an appropriate drainage system (e.g., pipe, underdrains) been provided?	X	
7 Has an appropriate quantity of Proof Rolling (C&MS 204.06) and has Plan Note G111 from L&D3 been included in the plans?	X	Plans to be prepared by others. No proof rolling prior to chemical stabilization, but proof roll afterwards to confirm stability is achieved. Direction provided in the report.
8 Has a design CBR value been provided?	Y	

IV.A Foundations of Structures Checklist

C-R-S:	WOO-18-6.67	PID:	116951	Reviewer:	CPI	Date:	5/19/2024

Use this Checklist in conjunction with the bridge foundation design guidance in GDM Section 1300
If you do not have such a foundation or structure on the project, you do not have to fill out this checklist.

Soil and Bedrock Strength Data		(Y/N/X)	Notes:
1	Has the shear strength of the foundation soils been determined?	Y	
	Check method used:		
	laboratory shear tests	✓	
	estimation from SPT or field tests	✓	
2	Have sufficient soil shear strength, consolidation, and other parameters been determined so that the required allowable loads for the foundation/structure can be designed?	Y	
3	Has the shear strength of the foundation bedrock been determined?	X	
	Check method used:		
	laboratory shear tests		
	other (describe other methods)		

Spread Footings		(Y/N/X)	Notes:
4	Are there spread footings on the project? If no, go to Question 11	Y	
5	Have the recommended bottom of footing elevation and reason for this recommendation been provided?	X	ODOT Standard headwall, so depth is predetermined.
a.	Has the recommended bottom of footing elevation taken scour from streams or other water flow into account?	X	
6	Were representative sections analyzed for the entire length of the structure for the following:	X	ODOT Standard headwall, so just confirming minimum shear strength is met.
a.	factored bearing resistance?		
b.	factored sliding resistance?		
c.	eccentric load limitations (overturning)?		
d.	predicted settlement?		
e.	overall (global) stability?		
7	Has the need for a shear key been evaluated?	X	
a.	If needed, have the details been included in the plans?		
8	If special conditions exist (e.g. geometry, sloping rock, varying soil conditions), was the bottom of footing “stepped” to accommodate them?	X	
9	Have the Service I and Maximum Strength Limit States for bearing pressure on soil or rock been provided?	X	

IV.A Foundations of Structures Checklist

Spread Footings	(Y/N/X)	Notes:
10 If weak soil is present at the proposed foundation level, has the removal / treatment of this soil been developed and included in the plans?	X	
a. Have the procedure and quantities related to this removal / treatment been included in the plans?		
Pile Structures	**(Y/N/X)**	**Notes:**
11 Are there piles on the project? If no, go to Question 17	N	
12 Has an appropriate pile type been selected?		
Check the type selected:		
H-pile (driven)		
H-pile (prebored)		
Cast In-place Reinforced Concrete Pipe		
Micropile		
Continuous Flight Auger (CFA)		
other (describe other types)		
13 Have the estimated pile length or tip elevation and section (diameter) based on either the Ultimate Bearing Value (UBV) or the depth to top of bedrock been specified? Indicate method used.		
14 If scour is predicted, has pile resistance in the scour zone been neglected?		
15 Has a wave equation drivability analysis been performed as per BDM 305.3.1.2 to determine whether the pile can be driven to either the UBV, the pile tip elevation, or refusal on bedrock without overstressing the pile?		
16 If required for design, have sufficient soil parameters been provided and calculations performed to evaluate the:		
a. Nominal unit tip resistance and maximum settlement of the piles?		
b. Nominal unit side resistance for each contributing soil layer and maximum deflection of the piles?		
c. Downdrag load on piles driven through new embankment or compressible soil layers, as per BDM 305.3.2.2?		
d. Potential for and impact of lateral squeeze from soft foundation soils?		

IV.A Foundations of Structures Checklist

Pile Structures		(Y/N/X)	Notes:
17	If piles are to be driven to strong bedrock (Q_u >7.5 ksi) or through very dense granular soils or overburden containing boulders, have "pile points" been recommended in order to protect the tips of the steel piling, as per BDM 305.3.5.6?		
18	If subsurface obstacles exist, has preboring been recommended to avoid these obstructions?		
19	If piles will be driven through 15 feet or more of new embankment, has preboring been specified as per BDM 305.3.5.7?		

IV.A Foundations of Structures Checklist

Drilled Shafts	(Y/N/X)	Notes:
20 Are there drilled shafts on the project? If no, go to the next checklist.	N	
21 Have the drilled shaft diameter and embedment length been specified?		
22 Have the recommended drilled shaft diameter and embedment been developed based on the nominal unit side resistance and nominal unit tip resistance for vertical loading situations?		
23 For shafts undergoing lateral loading, have the following been determined:		
a. total factored lateral shear?		
b. total factored bending moment?		
c. maximum deflection?		
d. reinforcement design?		
24 If a bedrock socket is required, has a minimum rock socket length equal to 1.5 times the rock socket diameter been used, as per BDM 305.4.2?		
25 Generally, bedrock sockets are 6" smaller in diameter than the soil embedment section of the drilled shaft. Has this factor been accounted for in the drilled shaft design?		
26 If scour is predicted, has shaft resistance in the scour zone been neglected?		
27 Has the site been assessed for groundwater influence?		
a. If yes, and if artesian flow is a potential concern, does the design address control of groundwater flow during construction?		
28 Have all the proper items been included in the plans for integrity testing?		
29 If special construction features (e.g., slurry, casing, load tests) are required, have all the proper items been included in the plans?		
30 If necessary, have wet construction methods been specified?		
General	(Y/N/X)	Notes:
31 Has the need for load testing of the foundations been evaluated?	X	
a. If needed, have details and plan notes for load testing been included in the plans?		

VI.B. Geotechnical Reports

C-R-S:	WOO-18-6.67	PID:	116951	Reviewer:	CPI	Date:	4/1/2024

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

VI.B. Geotechnical Reports

Appendices		(Y/N/X)	Notes:
10	Do the Appendices include boring logs and color pictures of rock, if applicable, as described in Section 706.8.2 of the SGE?	Y	
11	Do the Appendices include reports of undisturbed test data as described in Section 706.8.3 of the SGE?	X	No undisturbed samples taken.
12	Do the Appendices include calculations in a logical format to support recommendations as described in Section 706.8.4 of the SGE?	y	