

**HAM-75-7.85
NOISE WALLS
PID NO. 77889
HAMILTON COUNTY, OHIO**

**DRAFT STRUCTURE
FOUNDATION EXPLORATION
REPORT**

***Prepared For:*
EMH&T
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***Prepared By:*
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Rii Project No. B-10-020

August, 2013





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August 8, 2013

Mr. Edward D. Kagel, P.E.
Director of Transportation
EMH&T
5500 New Albany Road
Columbus, Ohio 43054

**Re: Draft Structure Foundation Exploration
HAM-75-7.85
Noise Walls
PID No. 77889
Rii Project No. B-10-020**

Dear Mr. Kagel:

Resource International, Inc. (Rii) is pleased to submit this DRAFT structure foundation exploration report for the referenced project. Engineering logs have been prepared and are attached to this report along with the results of laboratory testing. This report includes recommendations for the design and construction of proposed noise walls NSA 1 and NSA 2 as part of the HAM-75-7.85 project. The proposed wall will be located north and south of the Towne Street and I-75 interchange on the north side of Cincinnati, in Hamilton County, Ohio.

We sincerely appreciate the opportunity to be of service to you on this project. If you have any questions regarding the structure foundation exploration or this report, please contact us.

Sincerely,

RESOURCE INTERNATIONAL, INC.

Brian R. Trenner, P.E.
Project Engineer

Jonathan P. Sterenberg, P.E.
Director of Geotechnical Services

Enclosure: DRAFT Structure Foundation Exploration Report

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EXECUTIVE SUMMARY

Resource International, Inc. (Rii) has completed a DRAFT structure foundation exploration for the design and construction of proposed noise walls NSA 1 and NSA 2 as part of the HAM-75-7.85 project. The proposed noise walls are located on the west side of I-75, starting on the north side Laidlaw Avenue, and continue to, and across, Towne Street and terminates just south of Seymour Avenue. Noise wall NSA 1 is split into three separate segments. The first segment, NSA 1A, is located between Laidlaw Avenue and the proposed HAM-75-0834 bridge structure carrying the relocated Norfolk and Southern railroad over I-75. The second segment, NSA 1B, is located between the HAM-75-0834 structure and the Towne Street bridge. Where the wall converges with proposed Retaining Wall H, the wall will be connected to the barrier of the retaining wall. The portion of NSA 1B that is not connected to the barrier of Wall H is referenced as NSA 1B-1, and the portion attached to the barrier is referenced as NSA 1B-2. The final segment, NSA 1C, is fixed to, and across the HAM-75-0857 Towne Street bridge over I-75. Noise wall NSA 2 is located on the north side of the HAM-75-0857 bridge structure and continues to the end of the alignment, just south of Seymour Avenue. The beginning portion of the wall will be connected to the barrier of proposed Retaining Wall I. The portion of NSA 2 that is attached to the barrier of Wall I is referenced as NSA 2A, and the portion that is not connected to the barrier is referenced as NSA 2B. The total wall length of NSA 1 is approximately 1,620 lineal feet, and the total length of NSA 2 is approximately 2,170 lineal feet.

Exploration and Findings

Between October 5 and November 30, 2011, a total of thirteen (13) borings, designated as noted in Table 1 of the full report, were drilled to depths ranging from 25.0 to 50.0 feet below the ground surface at the locations illustrated on the boring plan presented in Appendix II of the full report. Borings B-005 through B-007 were drilled for noise wall NSA 1A, borings B-009, B-010, B-011 and B-013 were drilled for noise wall NSA 1B-1 and borings B-024, B-026, B-028, B-030 and B-031 were drilled for noise wall NSA 2B.

All of the borings were drilled along the existing grass area adjacent to the I-75 southbound lanes and encountered 4.0 to 11.0 inches of topsoil at the existing ground surface, identified by the significant presence of organic matter and vegetation.

Beneath the surface material in borings B-004, B-005, B-010, B-011, B-013 and B-024, material identified as existing fill was encountered extending to a depths ranging from 8.0 to 18.0 feet below the ground surface. The fill material consisted of brown, dark brown, dark gray, brownish gray and black gravel and sand, gravel with sand and silt, fine sand, coarse and fine sand, sand silty, silt and clay and silty clay (ODOT A-1-b, A-2-4, A-3, A-3a, A-4a, A-6a, A-6b). The majority of the fill material contained asphalt, concrete, slag, coal and ceramic fragments.



Underlying the surface materials and fill material where present, natural soils were encountered consisting of both granular and cohesive material. The granular soils were generally described as brown, light brown and dark gray gravel, gravel and sand, gravel with sand and silt, fine sand, coarse and fine sand and sandy silt (ODOT A-1-a, A-1-b, A-2-4, A-3, A-3a, A-4a). The cohesive soils were generally described as gray, brown, brownish gray and dark brown sandy silt, silt, silt and clay, silty clay and clay (ODOT A-4a, A-4b, A-6a, A-6b, A-7-6) with lesser percentages of gravel and/or sand.

Bedrock was not encountered in any of the borings performed for this exploration.

Analyses and Recommendations

The required shaft embedment was determined in accordance with Section 802.1.2 of the ODOT Bridge Design Manual (BDM). Based on information provided by the Rii design team, panel heights will range from 5 to 16 feet, and panel spacing will range from 8 to 24 feet. Based on cross section information provided by the Rii design team and EMH&T, the transverse cross-slope along the majority of the alignment is 2:1 (H:V); therefore, this cross-slope inclination was utilized throughout the design. The calculations indicate that 2.5-foot diameter drilled shafts excavated to depths ranging from 7 to 12 feet will be required. The following table details the required minimum foundation depths along the planned noise barrier walls.

Noise Barrier Foundation Depth Requirements

Barrier No.	From Station ¹	To Station ¹	Length (feet)	Representative Boring(s)	Barrier Height (ft)	Shaft Depth (ft)
NSA 1A	10+00	10+96	96	B-005	5 – 11	7.0
	10+96	15+04	408	B-005 through B-007	11 – 12	12.0
NSA 1B-1	10+00	13+52	352	B-009 and B-010	11 – 15	12.0
	13+52	16+00	248	B-011	7 – 10	9.5
	16+00	17+52	152	B-013	11 – 16	7.0
NSA 1B-2	20+00	22+34	234	N/A	N/A	N/A
NSA 1C	30+00	31+29	129	N/A	N/A	N/A
NSA 2A	40+00	51+20	1,120	N/A	N/A	N/A
NSA 2B	60+00	61+25	125	B-024	14	12.0
	61+25	70+50	925	B-026, B-028, B-030 and B-031	7 – 13	7.0

1. Referenced to individual noise barrier stationing.

Please note that this executive summary does not contain all the information presented in the report. The unabridged subsurface exploration report should be read in its entirety to obtain a more complete understanding of the information presented.

1.0 INTRODUCTION

The overall purpose of this project is to provide detailed subsurface information and recommendations for the design and construction of the HAM-75-7.85 project in Hamilton County, Ohio. This project represents the northern portion of HAM-75-2.30 Mill Creek Expressway improvements. The project will consist of roadway improvements, several new retaining walls and bridge replacements along I-75 from Vine Street to State Route 126. The project site is located in the community limits of St. Bernard, Elmwood Place, Roselawn, and Cincinnati, in Hamilton County, Ohio.

This DRAFT report is a presentation of the structure foundation exploration performed for the design and construction of proposed noise walls NSA 1 and NSA 2 as part of the HAM-75-7.85 project. The proposed noise walls are located on the west side of I-75, starting on the north side Laidlaw Avenue and continues to, and across Towne Street and terminates just south of Seymour Avenue, as shown on the vicinity map and boring plan presented in Appendix II. Noise wall NSA 1 is split into three separate segments. The first segment, NSA 1A, is located between Laidlaw Avenue and the proposed HAM-75-0834 bridge structure carrying the relocated Norfolk and Southern railroad over I-75. The second segment, NSA 1B, is located between the HAM-75-0834 structure and the Towne Street bridge. Where the wall converges with proposed Retaining Wall H, the wall will be connected to the barrier of the retaining wall. The portion of NSA 1B that is not connected to the barrier of Wall H is referenced as NSA 1B-1, and the portion attached to the barrier is referenced as NSA 1B-2. The final segment, NSA 1C, is fixed to, and across the HAM-75-0857 Towne Street bridge over I-75. Noise wall NSA 2 is located on the north side of the HAM-75-0857 bridge structure and continues to the end of the alignment, just south of Seymour Avenue. The beginning portion of the wall will be connected to the barrier of proposed Retaining Wall I. The portion of NSA 2 that is attached to the barrier of Wall I is referenced as NSA 2A, and the portion that is not connected to the barrier is referenced as NSA 2B. The total wall length of NSA 1 is approximately 1,620 lineal feet, and the total length of NSA 2 is approximately 2,170 lineal feet.

2.0 GEOLOGY AND OBSERVATIONS OF THE PROJECT

2.1 Site Geology

Both the Illinoian and Wisconsinan glaciers advanced over two-thirds of the State of Ohio, leaving behind glacial features such as moraines, kame deposits, lacustrine deposits and outwash terraces. The glacial and non-glacial regions comprise five physiographic sections grouped by age, depositional process and geomorphic occurrence. Physiographically, the site lies within the Illinoian Till Plain of the Till Plains Section. This area is characterized by rolling ground moraine deposits with many buried valleys alternating between broad floodplains and bedrock gorges. The site area contains silty loam till deposited as ground moraine covered with loess and dissected by the modern day Mill Creek. Ground moraines are deposited during the retreat of a



glacier which results in an undifferentiated mixture of clay, silt, sand and gravel. The valley area also contains outwash and alluvium which eroded from hills and valleys with moderate relief. Outwash deposits consist of undifferentiated sand and gravel deposited by meltwater in front of glacial ice and often occurs as valley terraces or low plains. Alluvium and alluvial terrace deposits range in composition from silty clay size particles to cobbles, usually deposited in present and former floodplain areas.

Based on bedrock geology and topography maps of the area, from the Ohio Department of Natural Resources (ODNR), the underlying bedrock consists of the Ordovician-aged Point Pleasant Formation. The Point Pleasant Formation is comprised of interbedded limestone and shale, averaging 60 percent limestone and 40 percent shale, and ranges from 0 to 80 feet thick. The bedrock surface forms a valley roughly beneath, and following, the alignment of Mill Creek which is aligned northeast-to-southwest. I-75 is aligned roughly parallel to this main bedrock valley from the approximate intersection with State Route 126 to the approximate intersection with Regina Graeter Way, and lies just east of the bottom of the bedrock valley. Along the project alignment, the bedrock surface directly beneath I-75 lies along the slope of the bedrock valley and the bedrock surface ranges between approximate elevations of 385 to 425 feet msl. A smaller bedrock valley branches off to the southeast of the bedrock valley that follows Mill Creek just south of the interchange with State Route 562, and runs roughly parallel with Ross Run and generally beneath the SR 562 alignment. Overall, the bedrock surface along the majority of the project alignment slopes downward to the northwest. According to bedrock topography mapping, the depth to top of bedrock in the vicinity of the project ranges from approximately 120 to 170 feet below the existing ground surface. An illustration of the general geology of Ohio is presented in Appendix I.

2.2 Existing Conditions

The sites for the proposed noise wall structures are located along the west side of I-75, beginning on the north side of the HAM-75-0823 Laidlaw Avenue over I-75 bridge structure and terminates just of the HAM-561-7.01 Seymour Avenue over I-75 bridge structure. Overall, the project is located approximately 2.0 miles south of the Lockland split. The proposed NSA 1 begins at I-75 Sta. 435+00 and continues north to Sta. 452+53, and the proposed NSA 2 begins at I-75 Sta. 452+53 and continues north to Sta. 474+05. Where the noise walls are not fixed to the barrier of proposed Retaining Walls H and I, the wall alignments will run along the grass and tree covered slopes adjacent to the roadway. The existing I-75 roadway that runs adjacent to the proposed structures is currently a six-lane, asphalt paved roadway. The terrain west of I-75 is elevated from the existing roadway at the north and south portions of the noise wall alignments, and the existing I-75 mainline profile is elevated approximately 25 to 30 feet above the surrounding terrain in the vicinity of the HAM-75-0857 Towne Street over I-75 bridge structure.



3.0 EXPLORATION

Between October 5 and November 30, 2011, a total of thirteen (13) borings, designated as noted in Table 1 below, were drilled to depths ranging from 25.0 to 50.0 feet below the ground surface at the locations illustrated on the boring plan presented in Appendix II. Borings B-005 through B-007 were drilled for noise wall NSA 1A, borings B-009, B-010, B-011 and B-013 were drilled for noise wall NSA 1B-1 and borings B-024, B-026, B-028, B-030 and B-031 were drilled for noise wall NSA 2B.

Table 1. Test Boring Summary

Reference Centerline	Boring Number	Station	Offset	Latitude	Longitude	Ground Elevation (feet)	Boring Depth
PR CL I-75	B-004-0-11	432+99.54	73.2' Lt.	39.178967186° N	84.486701538° W	544.0	25.0
PR CL NSA 1A	B-005-0-11	11+34.24	45.0' Rt.	39.179809005° N	84.486258203° W	540.5	30.0
	B-006-0-11	13+06.30	56.9' Rt.	39.180237872° N	84.486000382° W	534.7	25.0
	B-007-0-11	14+82.57	62.7' Rt.	39.180681229° N	84.485747882° W	536.8	25.0
PR CL NSA 1B-1	B-009-0-11	10+99.25	36.9' Rt.	39.181374542° N	84.485479455° W	546.7	50.0
	B-010-0-11	13+07.37	63.8' Rt.	39.181888329° N	84.485095341° W	546.0	25.0
	B-011-0-11	14+99.05	40.7' Rt.	39.182370998° N	84.484923695° W	562.5	25.0
	B-013-0-11	16+77.30	29.9' Rt.	39.182780027° N	84.484608056° W	552.5	25.0
PR CL NSA 2B	B-024-0-11	60+84.44	9.4' Rt.	39.187003390° N	84.482605252° W	550.8	30.0
	B-026-0-11	62+41.18	7.4' Rt.	39.187408000° N	84.482456999° W	561.2	25.0
	B-028-0-11	63+51.11	19.5' Lt.	39.187718403° N	84.482421549° W	560.8	25.0
	B-030-0-11	66+47.44	4.1' Rt.	39.188474513° N	84.482026813° W	570.0	25.0
	B-031-0-11	68+28.46	13.2' Rt.	39.188931528° N	84.481780743° W	570.0	25.0

The boring locations were determined and located in the field by Rii representatives. Geographic latitude and longitude coordinates as well as ground surface elevations at the boring locations are included on the boring logs provided in Appendix IV.

The borings were drilled using an all terrain vehicle (ATV) mounted rotary drilling machine, utilizing a 4.25-inch inside diameter, hollow-stem auger to advance the holes. Standard penetration test (SPT) and split spoon sampling were performed in the borings at 2.5-foot increments of depth to 25.0 feet, with the exception of boring B-009 which was sampled at 2.5-foot increments to 30.0 feet, and at 5.0-foot increments thereafter to the boring termination depth. The SPT, per the American Society for Testing and Materials (ASTM) designation D1586, is conducted by letting a 140-pound hammer

falling 30.0 inches to drive a 2.0-inch outer diameter split spoon sampler 18.0 inches. Rii utilized a calibrated automatic drop hammer to generate consistent energy transfer to the sampler. Driving resistance is recorded on the boring logs in terms of blows per 6-inch interval of the driving distance. The second and third intervals are added to obtain the number of blows per foot (N). Standard penetration blow counts aid in determining soil properties applicable in foundation system design. Measured blow count (N) values are corrected to an equivalent (60%) energy ratio, N_{60} , by the following equation. Both values are represented on boring logs in Appendix IV.

$$N_{60} = N_m \cdot (ER/60)$$

Where:

N_m = measured N value

ER = drill rod energy ratio, expressed as a percent, for the system used

The hammer for the ATV-mounted drill rig used for this project was calibrated on May 6, 2011, and has a drill rod energy ratio of 77.1 percent.

During drilling, Rii personnel prepared field logs showing the encountered subsurface conditions. Soil samples obtained from the drilling operation were preserved and sealed in glass jars and delivered to the soil laboratory. In the laboratory, the soil samples were visually classified and select samples were tested, as noted in Table 2.

Table 2. Laboratory Test Schedule

Laboratory Test	Test Designation	Number of Tests Performed
Natural Moisture Content	ASTM D 2216	139
Plastic and Liquid Limits	AASHTO T89, T90	26
Sieve/Hydrometers	AASHTO T88	26

The tests performed are necessary to classify existing soil according to the Ohio Department of Transportation (ODOT) classification system and to estimate engineering properties of importance in determining foundation design and construction recommendations. Results of the laboratory testing are presented on the boring logs in Appendix IV. A description of the soil terms used throughout this report is presented in Appendix III.

Hand penetrometer readings, which provide a rough estimate of the unconfined compressive strength of the soil, were reported on the boring logs in units of tons per square foot (tsf) and were utilized to classify the consistency of the cohesive soil in each layer. An indirect estimate of the unconfined compressive strength of the cohesive split spoon samples can also be made from a correlation with the blow counts (N_{60}). Please

note that split spoon samples are considered to be disturbed and the laboratory determination of their shear strengths may vary from undisturbed conditions.

4.0 FINDINGS

Interpreted engineering logs have been prepared from the field logs, visual examination of samples, and laboratory testing. Classification follows the current version of the ODOT Specification for Geotechnical Exploration (SGE). The following is a summary of what was found in the test borings and what is represented on the boring logs.

4.1 Surficial Material

All of the borings were drilled along the existing grass area adjacent to the I-75 southbound lanes and encountered 4.0 to 11.0 inches of topsoil at the existing ground surface, identified by the significant presence of organic matter and vegetation.

4.2 Subsurface Soils

Beneath the surface material in borings B-004, B-005, B-010, B-011, B-013 and B-024, material identified as existing fill was encountered extending to a depths ranging from 8.0 to 18.0 feet below the ground surface. The fill material consisted of brown, dark brown, dark gray, brownish gray and black gravel and sand, gravel with sand and silt, fine sand, coarse and fine sand, sand silty, silt and clay and silty clay (ODOT A-1-b, A-2-4, A-3, A-3a, A-4a, A-6a, A-6b). The majority of the fill material contained asphalt, concrete, slag, coal and ceramic fragments.

Underlying the surface materials and fill material where present, natural soils were encountered consisting of both granular and cohesive material. The granular soils were generally described as brown, light brown and dark gray gravel, gravel and sand, gravel with sand and silt, fine sand, coarse and fine sand and sandy silt (ODOT A-1-a, A-1-b, A-2-4, A-3, A-3a, A-4a). The cohesive soils were generally described as gray, brown, brownish gray and dark brown sandy silt, silt, silt and clay, silty clay and clay (ODOT A-4a, A-4b, A-6a, A-6b, A-7-6) with lesser percentages of gravel and/or sand.

The relative density of granular soils is primarily derived from SPT blow counts (N_{60}). Based on the SPT blow counts obtained, the granular soil encountered ranged from very loose ($N_{60} < 5$ blows per foot [bpf]) to very dense ($N_{60} > 50$ bpf). Overall blow counts recorded from the SPT sampling ranged from 3 to 67 bpf. The shear strength and consistency of the cohesive soils are primarily derived from the hand penetrometer values (HP). The cohesive soil encountered ranged from soft ($0.25 < \text{HP} \leq 0.5$ tsf) to hard ($\text{HP} > 4.0$ tsf). The unconfined compressive strength of the cohesive soil samples tested, obtained from the hand penetrometer, ranged from 0.5 to over 4.5 tsf (limit of instrument).



Natural moisture contents of the soil samples tested ranged from 3 to 32 percent. The natural moisture content of the cohesive soil samples tested for plasticity index ranged from 7 percent below to 11 percent above their corresponding plastic limits. The moisture contents of the native soils are generally considered to be moderately below to significantly above optimum moisture levels.

4.3 Bedrock

Bedrock was not encountered in any of the borings performed for this exploration.

4.4 Groundwater

Groundwater was encountered initially during the drilling process in borings B-005 and B-006 at a depth of 26.0 and 24.0 feet below the ground surface, respectively. At the completion of drilling and prior to removing the augers at boring B-005, groundwater accumulated in the auger stems to a depth of 21.0 feet. The remaining borings were observed to be dry, meaning no measureable amount of water had accumulated within the boreholes during or at the completion of drilling. Please note that short-term water level readings, especially in cohesive soils, are not necessarily an accurate indication of the actual groundwater level. In addition, groundwater levels or the presence of groundwater are considered to be dependent on seasonal fluctuations in precipitation.

A more comprehensive description of what was encountered during the drilling process may be found on the boring logs in Appendix IV.

5.0 ANALYSES AND RECOMMENDATIONS

Data obtained from the drilling and testing program have been used to determine the foundation support capabilities and the settlement potential for the soil encountered at the site. These parameters have been used to provide guidelines for the design of foundation systems for the subject noise walls, as well as the construction specifications related to the placement of foundation systems and general earthwork recommendations, which are discussed in the following paragraphs.

5.1 Drilled Shaft Foundation Recommendations

The required shaft embedment was determined in accordance with Section 802.1.2 of the ODOT Bridge Design Manual (BDM). Per ODOT BDM Section 802.1.2, the required embedment depth for the drilled shafts is determined using corrected SPT values and selecting the required embedment depth based on either the average or limiting corrected SPT value from Table 802.1.2-1 for granular soils or 802.1.2-2 for cohesive soils. A copy of the design tables are provided in Appendix V. Based on information provided by the Rii design team, panel heights will range from 5 to 16 feet, and panel spacing will range from 8 to 24 feet. Based on cross section information provided by the



Rii design team and EMH&T, the transverse cross-slope along the majority of the alignment is 2:1 (H:V); therefore, this cross-slope inclination was utilized throughout the design. The calculations indicate that 2.5-foot diameter drilled shafts excavated to depths ranging from 7 to 12 feet will be required. The following table details the required minimum foundation depths along the planned noise barrier walls.

Table 3. Noise Barrier Foundation Depth Requirements

Barrier No.	From Station ¹	To Station ¹	Length (feet)	Representative Boring(s)	Barrier Height (ft)	Shaft Depth (ft)
NSA 1A	10+00	10+96	96	B-005	5 – 11	7.0
	10+96	15+04	408	B-005 through B-007	11 – 12	12.0
NSA 1B-1	10+00	13+52	352	B-009 and B-010	11 – 15	12.0
	13+52	16+00	248	B-011	7 – 10	9.5
	16+00	17+52	152	B-013	11 – 16	7.0
NSA 1B-2	20+00	22+34	234	N/A	N/A	N/A
NSA 1C	30+00	31+29	129	N/A	N/A	N/A
NSA 2A	40+00	51+20	1,120	N/A	N/A	N/A
NSA 2B	60+00	61+25	125	B-024	14	12.0
	61+25	70+50	925	B-026, B-028, B-030 and B-031	7 – 13	7.0

1. Referenced to individual noise barrier stationing.

The drilled shaft excavations should be carefully observed by a geotechnical engineering representative as soon as possible following excavation to assure adequacy. If inadequate bearing soil is encountered, the shaft excavations should be continued into more suitable end bearing soils. Since water has an adverse affect on cohesive soil, drilled shaft concrete should be placed as soon as possible following excavation, preferably the same day to reduce the potential for water related damage. Drilled shaft excavations should be kept dry and clean until concrete is placed to reduce damage to the bearing surfaces.

5.1.1 Drilled Shaft Considerations

The minimum requirements for proper inspection of drilled shaft construction are as follows:

- A qualified inspector should record the material types being removed from the hole as excavation proceeds.

- The use of casing for drilled shafts is recommended if caving material and/or groundwater is encountered at any time during the drilling of the shaft, or if groundwater seepage occurs in the drilled shaft.
- The placement of all concrete for the drilled shafts shall follow the American Concrete Institute's Design and Construction of Drilled Piers (ACI 336.3R-93).
- Concrete placed freefall should not be allowed to hit the sidewalls of the excavation and should not pass through any water. Therefore, concrete should be placed by tremie method if groundwater is encountered during construction of the drilled shafts.
- If concrete is placed by tremie method, it must be done so with an adequate head to displace water or slurry if groundwater has entered the caisson (all tremie procedures shall follow applicable ACI specifications).
- The volume of concrete should be checked to ensure voids did not result during extraction of the casing.
- Pulling casing with insufficient concrete inside should be restricted.
- The bottom of drilled shaft excavation should be clean and free of loose material. Any loose material observed should be removed using a clean-out bucket (muck bucket).

In addition, it is recommended that, if casing is used, it be pulled after the concrete is poured, allowing for reuse of the casing, and eliminating reduction of side resistance (between soil and concrete).

5.2 Lateral Earth Pressure

For the soil types encountered in the borings, the "in-situ" unit weight (γ), cohesion (c), effective angle of friction (ϕ'), and lateral earth pressure coefficients for at-rest conditions (k_o), active conditions (k_a), and passive conditions (k_p) have been estimated and are provided in Table 4 and Table 5.

Table 4. Estimated Undrained (Short-term) Soil Parameters for Design

Soil Type	γ (pcf) ¹	c (psf)	ϕ	k_a	k_o	k_p
Soft to Medium Stiff Cohesive Soil	110	750	0°	1.0	1.0	1.0
Stiff Cohesive Soil	115	1,500	0°	1.0	1.0	1.0
Very Stiff to Hard Cohesive Soil	120	3,000	0°	1.0	1.0	1.0
Very Loose to Loose Granular Soil	120	0	28°	0.36	0.53	2.77
Medium Dense Granular Soil	125	0	30°	0.33	0.50	3.00
Dense to Very Dense Granular Soil	130	0	34°	0.28	0.44	3.53
Compacted Cohesive Engineered Fill	125	1,500	0°	1.0	1.0	1.0
Compacted Granular Engineered Fill	135	0	33°	0.30	0.46	3.39

1. When below groundwater table, use effective unit weight, $\gamma' = \gamma - 62.4$ pcf and add hydrostatic water pressure.

Table 5. Estimated Drained (Long-term) Soil Parameters for Design

Soil Type	γ (pcf) ¹	c (psf)	ϕ	k_a	k_o	k_p
Natural Cohesive Soil	115	0	26°	0.39	0.56	2.56
Very Loose to Loose Granular Soil	120	0	28°	0.36	0.53	2.77
Medium Dense Granular Soil	125	0	30°	0.33	0.50	3.00
Dense to Very Dense Granular Soil	130	0	34°	0.28	0.44	3.53
Compacted Cohesive Engineered Fill	125	0	28°	0.36	0.53	2.77
Compacted Granular Engineered Fill	135	0	33°	0.30	0.46	3.39

1. When below groundwater table, use effective unit weight, $\gamma' = \gamma - 62.4$ pcf and add hydrostatic water pressure.

These parameters are considered appropriate for the design of all subsurface structures and any excavation support systems. Subsurface structures (where the top of the structure is restrained from movement) should be designed based on at-rest (k_o) conditions. For proposed temporary retaining structures (where the top of the structure is allowed to move), earth pressure distributions should be based on active (k_a) and passive (k_p) conditions. The values in this table have been estimated from correlation charts based on minimum standards specified for compacted engineered fill materials. These recommendations do not take into consideration the effect of any surcharge loading or a sloped ground surface (a flat surface is assumed). Earth pressures on excavation support systems will be dependent on the type of sheeting and method of bracing or anchorage.

5.3 Construction Considerations

All site work shall conform to local codes and to the latest ODOT Construction and Material Specifications (CMS), including that all excavation and embankment preparation and construction should follow ODOT Item 200 (Earthwork).

Prior to beginning excavation, grading, and/or embankment operations across the site, all necessary clearing and grubbing shall be completed. Topsoil and unsuitable fill materials (as determined by a geotechnical engineer or an experienced representative thereof) should be stripped away from proposed pavement/embankment areas prior to excavation.

5.3.1 Groundwater Considerations

Based on the groundwater observations made during drilling, groundwater is not anticipated to be encountered during installation of the drilled shafts. If groundwater is encountered, proper groundwater control should be employed and maintained to prevent disturbance to excavation bottoms consisting of cohesive soil, and to prevent the possible development of a quick or "boiling" condition where soft silts and/or fine sands are encountered. It is preferable that the groundwater level, if encountered, be maintained at least 36 inches below the deepest excavation. In the case of drilled shafts, the utilization of casing will be required below the water table to maintain an open hole and prevent the sidewalls from collapse. In addition, concrete placed below the water table should be placed by tremie method as described in Section 5.1.1. Any seepage or groundwater encountered at this site should be able to be controlled by pumping from temporary sumps. Additional measures may be required depending on seasonal fluctuations of the groundwater level. Note that determining and maintaining actual groundwater levels during construction is the responsibility of the contractor.

6.0 LIMITATIONS OF STUDY

The above recommendations are predicated upon construction inspection by a qualified soil technician under the direct supervision of a professional geotechnical engineer. Adequate testing and inspection during construction are considered necessary to assure an adequate foundation system and are part of our recommendations.

Our recommendations for this project were developed utilizing soil and bedrock information obtained from the test borings that were made at the proposed site. At this time we would like to point out that soil borings only depict the soil and bedrock conditions at the specific locations and time at which they were made. The conditions at other locations on the site may differ from those occurring at the boring locations.

The conclusions and recommendations herein have been based upon the available soil and bedrock information and the design details furnished by a representative of the



owner of the proposed project. Any revision in the plans for the proposed construction from those anticipated in this report should be brought to the attention of the geotechnical engineer to determine whether any changes in the foundation or earthwork recommendations are necessary. If deviations from the noted subsurface conditions are encountered during construction, they should also be brought to the attention of the geotechnical engineer.

The scope of our services does not include any environmental assessment or investigation for the presence or absence of hazardous or toxic materials in the soil, groundwater, or surface water within or beyond the site studied. Any statements in this report or on the test boring logs regarding odors, staining of soils, or other unusual conditions observed are strictly for the information of our client.

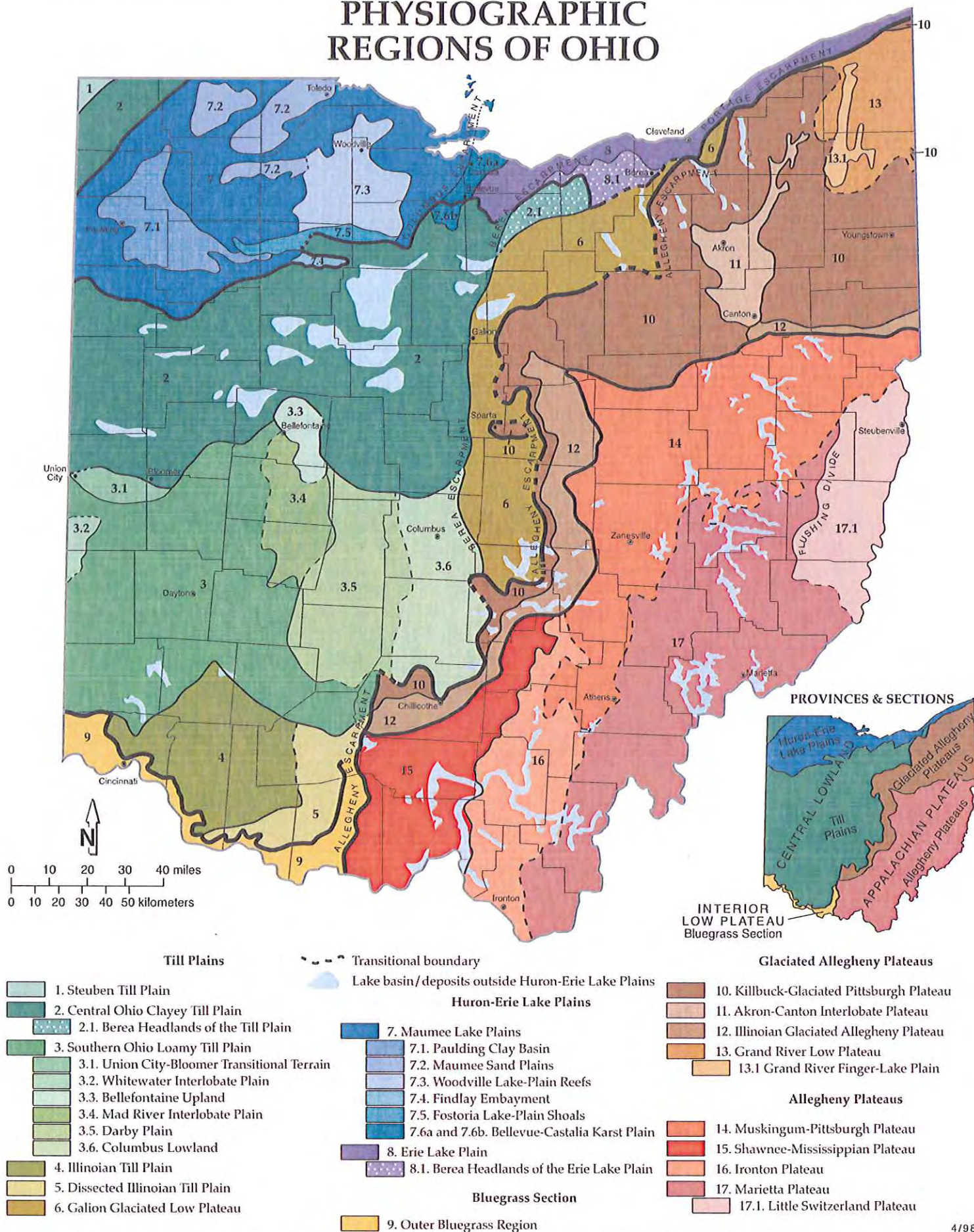
Our professional services have been performed, our findings obtained, and our recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices. Resource International is not responsible for the conclusions, opinions, or recommendations made by others based upon the data included



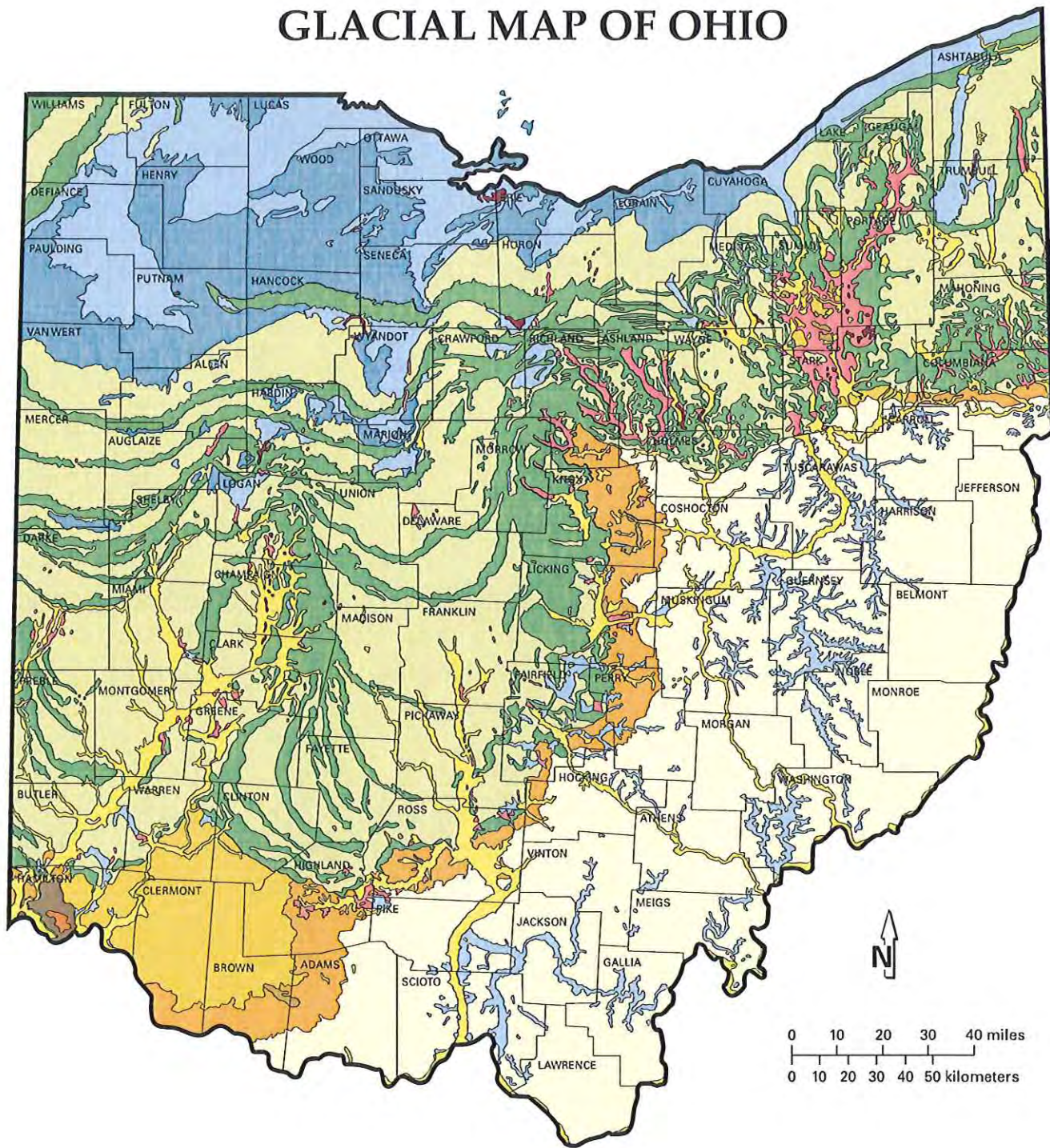
APPENDIX I

STATE GEOLOGY

PHYSIOGRAPHIC REGIONS OF OHIO



GLACIAL MAP OF OHIO



WISCONSINAN
(14,000 to 24,000 years old)

- Ground moraine
- Wave-planed ground moraine
- End moraine

ILLINOIAN
(130,000 to 300,000 years old)

- Ground moraine
- Dissected ground moraine
- Hummocky moraine

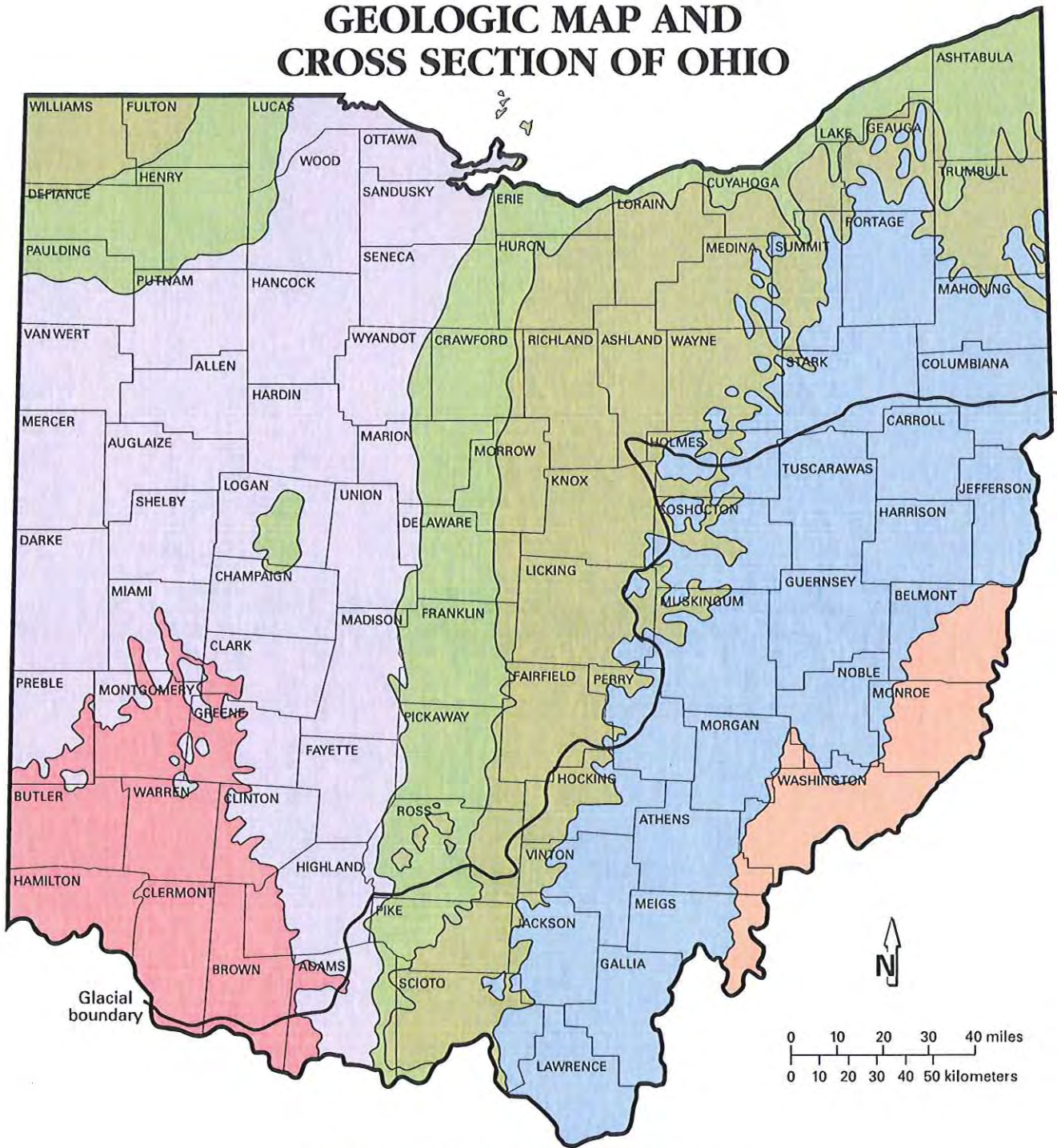
PRE-ILLINOIAN
(older than 300,000 years)

- Ground moraine
- Dissected ground moraine

- Kames and eskers
- Outwash
- Lake deposits
- Peat
- Colluvium

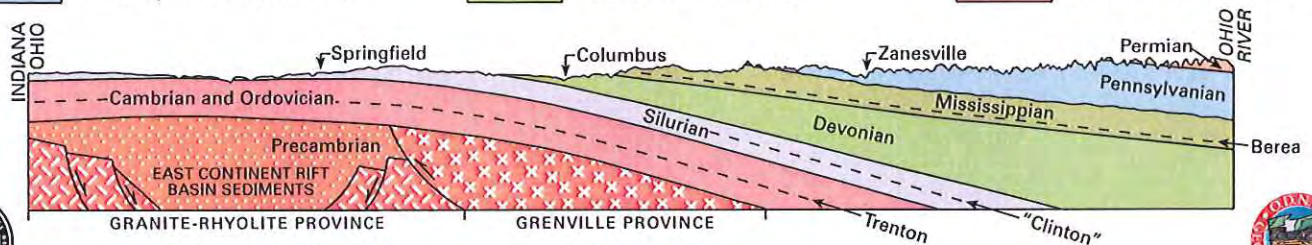


GEOLOGIC MAP AND CROSS SECTION OF OHIO



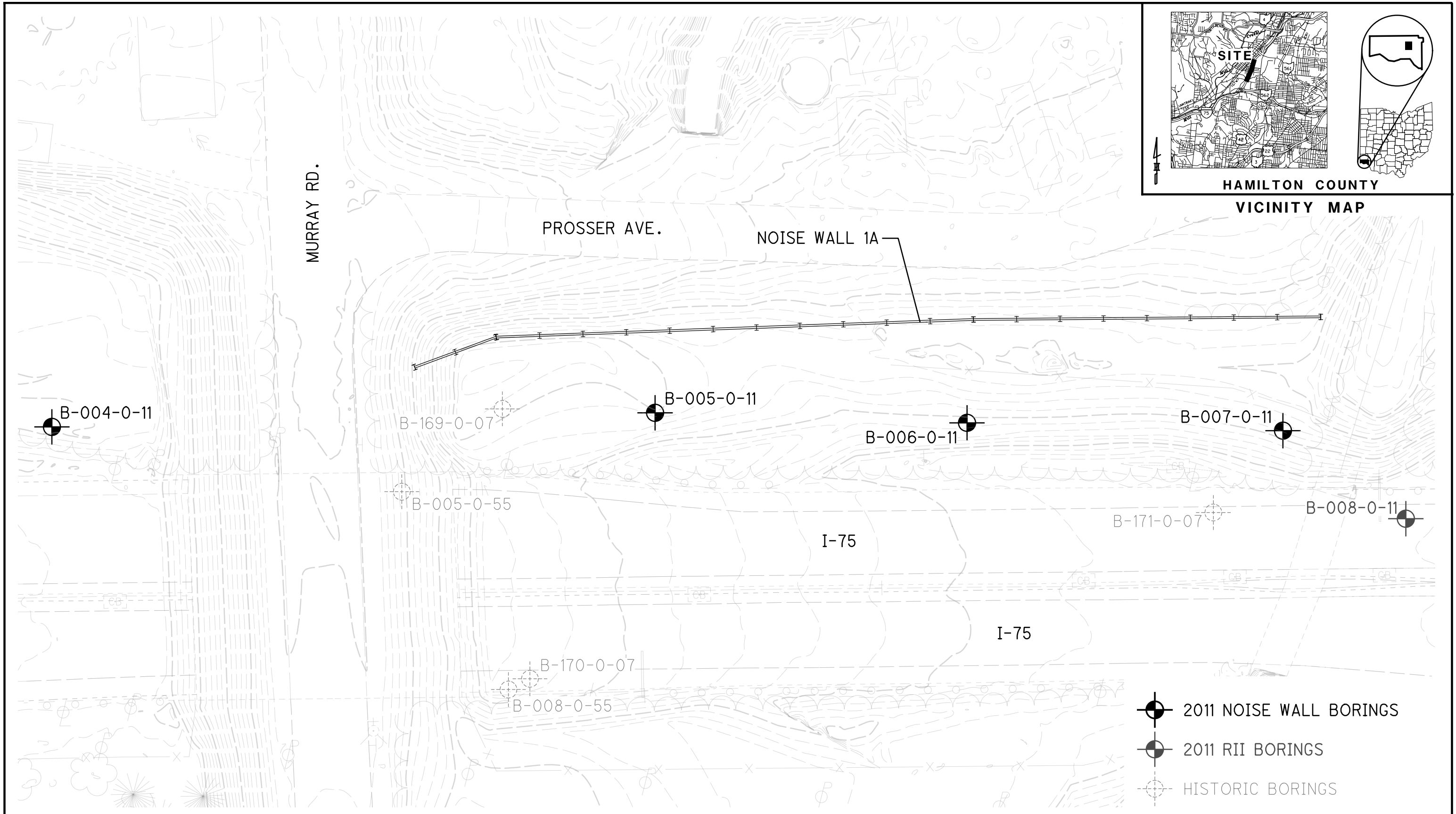
GEOLOGIC SYSTEM (million years before present)

Permian (286-245)	Mississippian (360-320)	Silurian (438-408)
Pennsylvanian (320-286)	Devonian (408-360)	Ordovician (505-438)



APPENDIX II

VICINITY MAP AND BORING PLAN

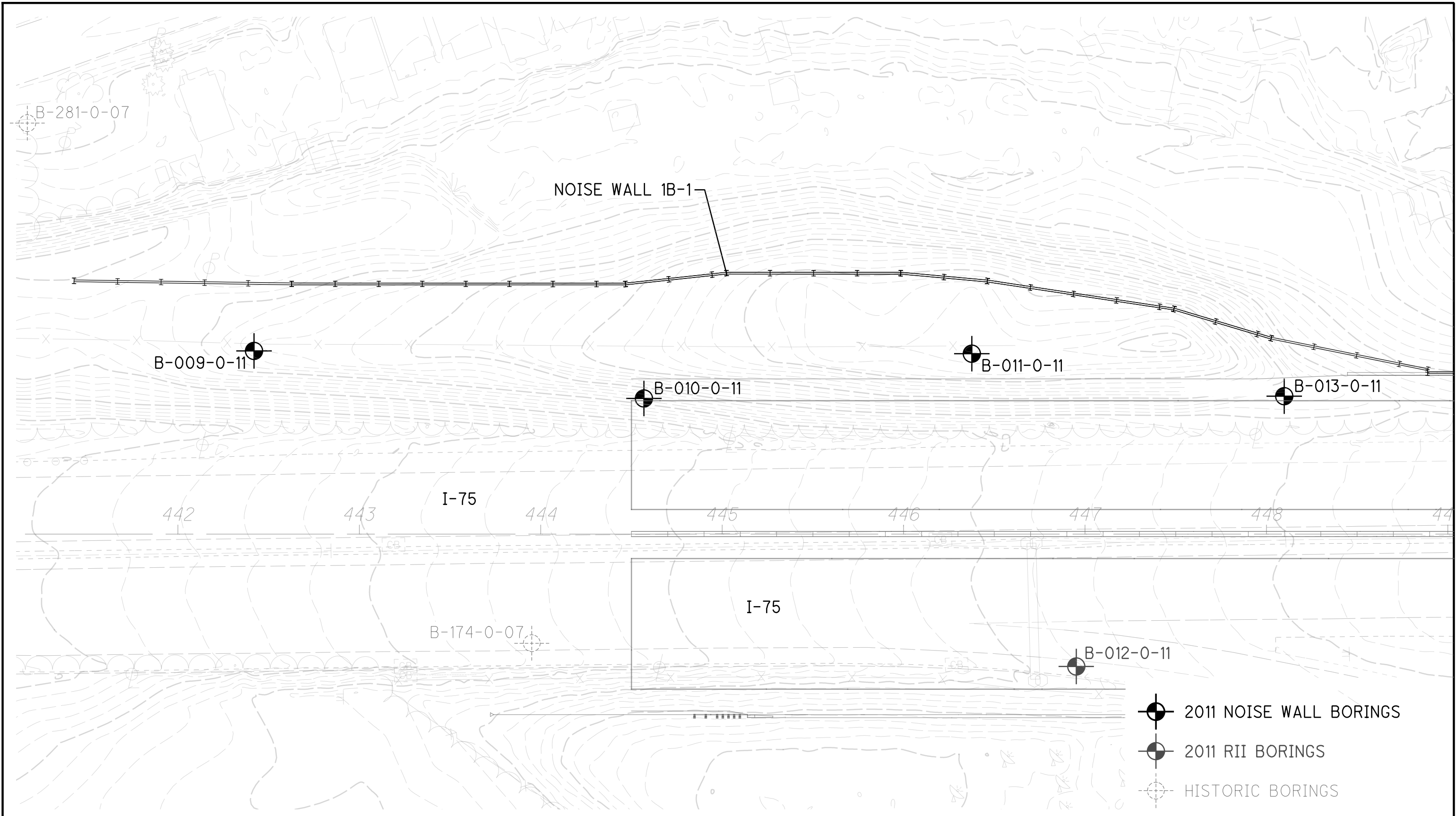


BORING PLAN
HAM-75-7.85 NOISE WALL 1A
HAMILTON COUNTY, OHIO

PROJECT NO. Rii B-10-020		DRAWN RRM
SCALE: 1"=50'		REVIEWED BRT
0 25 50		DATE 8-9-13



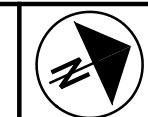
RESOURCE
INTERNATIONAL, INC.



BORING PLAN
HAM-75-7.85 NOISE WALL 1B-1
HAMILTON COUNTY, OHIO

PROJECT NO.
Rii B-10-020

SCALE: 1"=50'
0 25 50



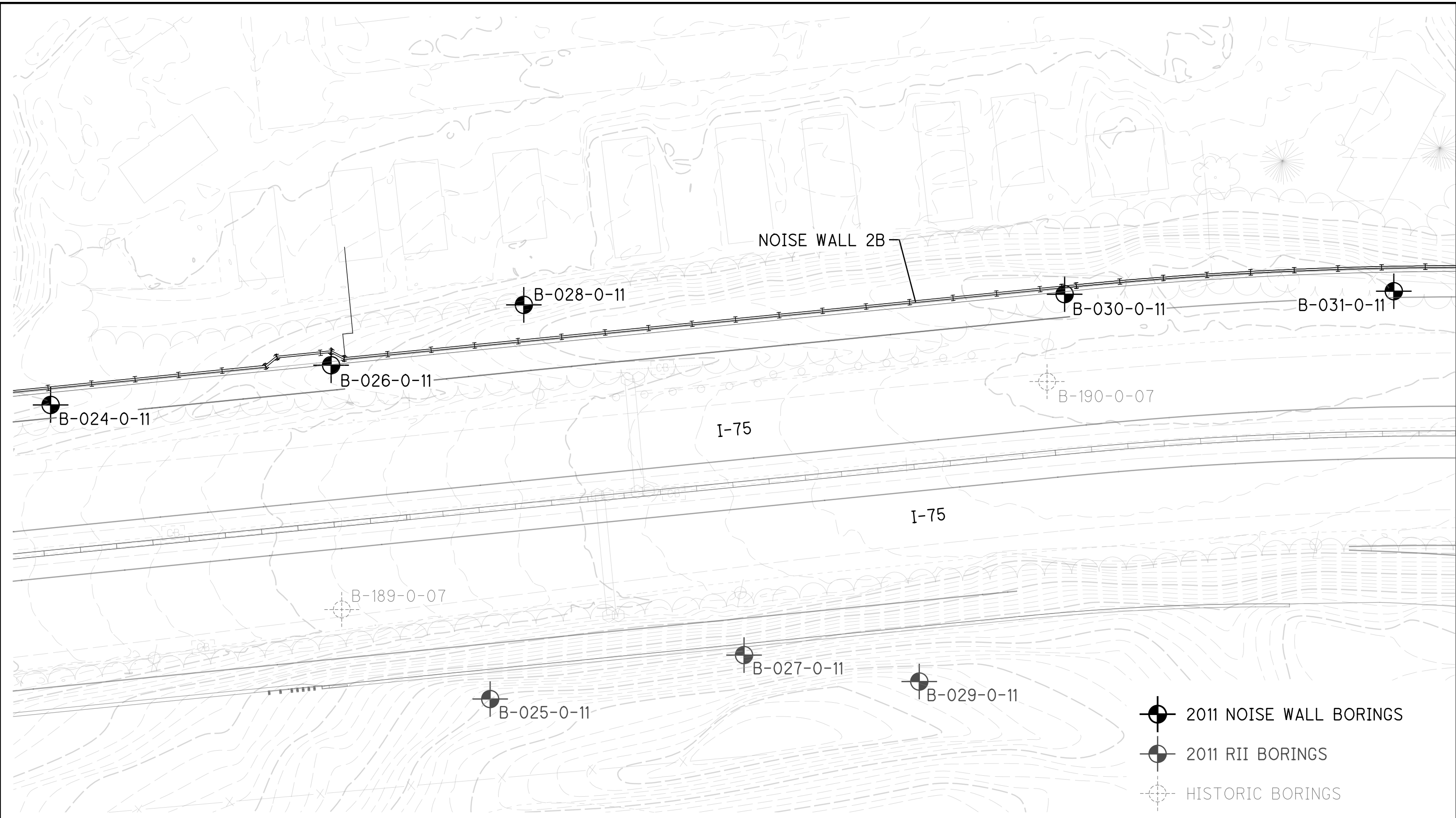
DRAWN
RRM

REVIEWED
BRT

DATE
8-9-13



RESOURCE
INTERNATIONAL, INC.



BORING PLAN
HAM-75-7.85 NOISE WALL 2B
HAMILTON COUNTY, OHIO

PROJECT NO.
Rii B-10-020

DRAWN
RRM

REVIEWED
BRT

DATE
8-9-13

SCALE: 1"=50'



RESOURCE
INTERNATIONAL, INC.

APPENDIX III

DESCRIPTION OF SOIL TERMS

DESCRIPTION OF SOIL TERMS

The following terminology was used to describe soils throughout this report and is generally adapted from ASTM 2487/2488 and ODOT Specifications for Geotechnical Explorations.

Granular Soils - The relative compactness of granular soils is described as:

ODOT A-1, A-2, A-3, A-4 (non-plastic) or USCS GW, GP, GM, GC, SW, SP, SM, SC, ML (non-plastic)

<u>Description</u>	<u>Blows per foot – SPT (N₆₀)</u>		
Very Loose	Below		5
Loose	5	-	10
Medium Dense	11	-	30
Dense	31	-	50
Very Dense	Over		50

Cohesive Soils - The relative consistency of cohesive soils is described as:

ODOT A-4, A-5, A-6, A-7, A-8 or USCS ML, CL, OL, MH, CH, OH, PT

<u>Description</u>	<u>Blows per foot – SPT (N₆₀)</u>			<u>Unconfined Compression (tsf)</u>	
Very Soft	Below		2	UCS ≤	0.25
Soft	2	-	4	0.25 < UCS ≤	0.5
Medium Stiff	5	-	8	0.5 < UCS ≤	1.0
Stiff	9	-	15	1.0 < UCS ≤	2.0
Very Stiff	16	-	30	2.0 < UCS ≤	4.0
Hard	Over		30	UCS >	4.0

Gradation - The following size-related denominations are used to describe soils:

<u>Soil Fraction</u>	<u>USCS Size</u>	<u>ODOT Size</u>
Boulders	Larger than 12"	Larger than 12"
Cobbles	12" to 3"	12" to 3"
Gravel coarse	3" to ¾"	3" to ¾"
fine	¾" to 4.75 mm (¾" to #4 Sieve)	¾" to 2.0 mm (¾" to #10 Sieve)
Sand coarse	4.75 mm to 2.0 mm (#4 to #10 Sieve)	2.0 mm to 0.42 mm (#10 to #40 Sieve)
medium	2.0 mm to 0.42 mm (#10 to #40 Sieve)	-
fine	0.42 mm to 0.074 mm (#40 to #200 Sieve)	0.42 mm to 0.074 mm (#40 to #200 Sieve)
Silt	0.074 mm to 0.005 mm (#200 to 0.005 mm)	0.074 mm to 0.005 mm (#200 to 0.005 mm)
Clay	Smaller than 0.005 mm	Smaller than 0.005 mm

Modifiers of Components - Modifiers of components are as follows:

<u>Term</u>	<u>Range</u>		
Trace	0%	-	10%
Little	10%	-	20%
Some	20%	-	35%
And	35%	-	50%

Moisture Table - The following moisture-related denominations are used to describe cohesive soils:

<u>Term</u>	<u>Range - USCS</u>	<u>Range - ODOT</u>
Dry	0% to 10%	Well below Plastic Limit
Damp	>2% below Plastic Limit	Below Plastic Limit
Moist	2% below to 2% above Plastic Limit	Above PL to 3% below LL
Very Moist	>2% above Plastic Limit	
Wet	≥ Liquid Limit	3% below LL to above LL

Organic Content – The following terms are used to describe organic soils:

<u>Term</u>	<u>Organic Content (%)</u>
Slightly organic	2-4
Moderately organic	4-10
Highly organic	>10

Bedrock – The following terms are used to describe bedrock hardness:

<u>Term</u>	<u>Blows per foot – SPT (N)</u>		
Very Soft	Below		50
Soft	50/5"	–	50/6"
Medium Hard	50/3"	–	50/4"
Hard	50/1"	–	50/2"
Very Hard	50/0"		



CLASSIFICATION OF SOILS

Ohio Department of Transportation

(The classification of a soil is found by proceeding from top to bottom of the chart.
The first classification that the test data fits is the correct classification.)

SYMBOL	DESCRIPTION	Classification		LL _O /LL x 100*	% Pass #40	% Pass #200	Liquid Limit (LL)	Plastic Index (PI)	Group Index Max.	REMARKS
		AASHTO	OHIO							
	Gravel and/or Stone Fragments	A-1-a			30 Max.	15 Max.		6 Max.	0	Min. of 50% combined gravel, cobble and boulder sizes
	Gravel and/or Stone Fragments with Sand	A-1-b			50 Max.	25 Max.		6 Max.	0	
	Fine Sand	A-3			51 Min.	10 Max.	NON-PLASTIC		0	
	Coarse and Fine Sand	--	A-3a			35 Max.		6 Max.	0	Min. of 50% combined coarse and fine sand sizes
	Gravel and/or Stone Fragments with Sand and Silt	A-2-4				35 Max.	40 Max.	10 Max.	0	
		A-2-5					41 Min.			
	Gravel and/or Stone Fragments with Sand, Silt and Clay	A-2-6				35 Max.	40 Max.	11 Min.	4	
		A-2-7					41 Min.			
	Sandy Silt	A-4	A-4a	76 Min.		36 Min.	40 Max.	10 Max.	8	Less than 50% silt sizes
	Silt	A-4	A-4b	76 Min.		50 Min.	40 Max.	10 Max.	8	50% or more silt sizes
	Elastic Silt and Clay	A-5		76 Min.		36 Min.	41 Min.	10 Max.	12	
	Silt and Clay	A-6	A-6a	76 Min.		36 Min.	40 Max.	11 - 15	10	
	Silty Clay	A-6	A-6b	76 Min.		36 Min.	40 Max.	16 Min.	16	
	Elastic Clay	A-7-5		76 Min.		36 Min.	41 Min.	≤ LL-30	20	
	Clay	A-7-6		76 Min.		36 Min.	41 Min.	> LL-30	20	
	Organic Silt	A-8	A-8a	75 Max.		36 Min.				W/o organics would classify as A-4a or A-4b
	Organic Clay	A-8	A-8b	75 Max.		36 Min.				W/o organics would classify as A-5, A-6a, A-6b, A-7-5 or A-7-6
MATERIAL CLASSIFIED BY VISUAL INSPECTION Sod and Topsoil Pavement or Base Uncontrolled Fill (Describe) Bouldery Zone Peat, S-Sedimentary W-Woody F-Fibrous L-Loamy & etc										

* Only perform the oven-dried liquid limit test and this calculation if organic material is present in the sample.

APPENDIX IV

BORING LOGS:

**B-004-0-11 through B-007-0-11,
B-009-0-11 through B-011-0-13,
B-013-0-11, B-024-0-11, B-026-0-11,
B-028-0-11, B-030-0-11 and B-031-0-11**

Definitions of Abbreviations for Boring Logs

A	=	Adhesion (pounds per square foot)
AS	=	Auger Sample
BCP	=	Bentonite Chips or Pellets
C	=	Cohesion (pounds per square foot)
CB	=	Cased (Concentric) Boring
C/B	=	Neat Cement/Bentonite Grout
Cl ⁻	=	Chloride Ion Concentration (parts per million)
FA	=	Angle of Internal Friction (degrees)
FF	=	Friction Factor
GS	=	Geoprobe Sample
HSA	=	Hollow Stem Auger
HSB	=	High Solids Content Bentonite Grout
K	=	Modulus of Horizontal Subgrade Reaction (kips per cubic foot)
LOI	=	Percent Organic Content (by weight) as determined by ASTM D-2974 (loss on ignition test)
MD	=	Rotary Mud Drilling
NQ	=	Wireline Method (1.875-inch diameter rock core)
NX	=	Conventional Method (2.126-inch diameter rock core)
PC	=	Neat Portland Cement Grout
PID	=	Photo-Ionization Detector Reading (parts per million)
qh	=	Unconfined Compressive Strength of Soil as determined by a hand penetrometer (tons per square foot)
qr	=	Unconfined Compressive Strength of Intact Rock Core as determined by ASTM D-2938 (pounds per square inch)
qu	=	Unconfined Compressive Strength of Soil as determined by ASTM D-2166 (tons per square foot)
quu	=	Unconsolidated-Undrained Triaxial Compressive Strength as determined by ASTM D-2850 (pounds per square foot)
RC	=	Rock Coring
SO ⁴⁻	=	Sulfate Concentration
SFA	=	Solid Flight Auger
SS	=	Split Spoon Sample
3S	=	For instances of no recovery from standard SS interval, a 3.0 inch O.D. split spoon is driven the full length of the standard SS interval plus an additional 6.0 inches to obtain a representative sample. Only the final 6.0 inches of sample is retained. Blow counts from 3S sampling are not correlated with N ₆₀ values.
ss	=	Soluble Salts (conductivity)
ST	=	Thin-walled (Shelby) Tube Sample
uw	=	"In-Situ" Unit Weight of Soil (pounds per cubic foot)
VIS	=	Visual classification only, no testing performed
WOH	=	Weight of Hammer and Drill Rods "pushed" split spoon sampler 6-inches.
WD	=	Rotary Wash Drilling

	PROJECT: HAM-75-7.85	DRILLING FIRM / OPERATOR: RII / S.M.	DRILL RIG: CME-750X (SN 310218)	STATION / OFFSET: 432+99.54 / 73.2' Lt	EXPLORATION ID B-004-0-11
	TYPE: NOISE WALL	SAMPLING FIRM / LOGGER: RII / T.F.	HAMMER: CME AUTOMATIC	ALIGNMENT: I-75	
	PID: 77889 BR ID: NA	DRILLING METHOD: 4.25" HSA	CALIBRATION DATE: 5/6/11	ELEVATION: 544.0 (MSL) EOB: 25.0 ft.	PAGE 1 OF 1
	START: 10/18/11 END: 10/18/11	SAMPLING METHOD: SPT	ENERGY RATIO (%): 77.1	LAT / LONG : 39.178967186 ° N / 84.486701538 ° W	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
0.3' - TOPSOIL (4.0") FILL: HARD, BROWN SANDY SILT , SOME CLAY, TRACE FINE GRAVEL, DAMP.	544.0 543.7																	
		1	5	39	67	SS-1	4.25	-	-	-	-	-	-	-	-	11	A-4a (V)	<V>
	541.0	2	9 21															<V>
		3																<V>
FILL: VERY DENSE, LIGHT BROWN GRAVEL AND SAND , LITTLE SILT, TRACE CLAY, DRY. -ASPHALT AND CONCRETE FRAGMENTS PRESENT IN SS-2		4	20 26 26	67	39	SS-2	-	-	-	-	-	-	-	-	-	3	A-1-b (V)	<V>
		5																<V>
		6	17															<V>
	536.0	7	23 26	63	50	SS-3	-	58	15	10	11	6	NP	NP	NP	3	A-1-b (0)	<V>
		8																<V>
FILL: VERY LOOSE TO LOOSE, REDDISH BROWN GRAVEL WITH SAND AND SILT , LITTLE CLAY, DAMP TO MOIST.		9	5 2 3	6	44	SS-4	-	-	-	-	-	-	-	-	-	10	A-2-4 (V)	<V>
		10																<V>
		11	3															<V>
		12	3 2	6	33	SS-5	-	-	-	-	-	-	-	-	-	9	A-2-4 (V)	<V>
		13																<V>
-SLAG AND COAL FRAGMENTS PRESENT IN SS-6		14	2 1 1	3	33	SS-6	-	29	21	17	22	11	28	19	9	13	A-2-4 (0)	<V>
	528.0	15																<V>
STIFF, BROWN SILTY CLAY , TRACE COARSE TO FINE SAND, MOIST.	527.5	16	2				2.00	-	-	-	-	-	-	-	-	19	A-6b (V)	<V>
LOOSE TO DENSE, BROWN GRAVEL AND SAND , LITTLE SILT, TRACE CLAY, DRY TO DAMP.		17	3 3	8	44	SS-7	-	-	-	-	-	-	-	-	-	5	A-1-b (V)	<V>
		18																<V>
		19	19 13 12	32	44	SS-8	-	-	-	-	-	-	-	-	-	4	A-1-b (V)	<V>
		20																<V>
		21	9															<V>
		22	11 13	31	61	SS-9	-	-	-	-	-	-	-	-	-	3	A-1-b (V)	<V>
		23																<V>
	519.0	24	8 11 14	32	67	SS-10	-	-	-	-	-	-	-	-	-	3	A-1-b (V)	<V>
		25																<V>

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING; CAVE-IN DEPTH @ 10.3'

ABANDONMENT METHODS, MATERIALS, QUANTITIES: COMPACTED WITH THE AUGER 50 LBS BENTONITE CHIPS AND SOIL CUTTINGS

	PROJECT: HAM-75-7.85	DRILLING FIRM / OPERATOR: RII / S.M.	DRILL RIG: CME-750X (SN 310218)	STATION / OFFSET: 11+34.24 / 45.0' Rt	EXPLORATION ID B-005-0-11
	TYPE: NOISE WALL	SAMPLING FIRM / LOGGER: RII / T.F.	HAMMER: CME AUTOMATIC	ALIGNMENT: BL WALL 1A	
	PID: 77889 BR ID: NA	DRILLING METHOD: 4.25" HSA	CALIBRATION DATE: 5/6/11	ELEVATION: 540.5 (MSL) EOB: 30.0 ft.	PAGE 1 OF 1
	START: 10/18/11 END: 10/18/11	SAMPLING METHOD: SPT	ENERGY RATIO (%): 77.1	LAT / LONG : 39.179809005 ° N / 84.486258203 ° W	

MATERIAL DESCRIPTION AND NOTES	ELEV. 540.5	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
0.5' - TOPSOIL (6.0") FILL: HARD, BROWN SANDY SILT , LITTLE CLAY, TRACE FINE GRAVEL, DAMP. -TRACE ORGANICS IN SS-1	540.0	1	4	21	67	SS-1	4.25	-	-	-	-	-	-	-	-	10	A-4a (V)	<V>
FILL: HARD, BROWN TO MOTTLED BROWN AND GRAY SILT AND CLAY , SOME COARSE TO FINE SAND, TRACE FINE GRAVEL, DAMP. -TRACE ROOT FIBERS PRESENT IN SS-3	537.5	2	8															<V>
		3																<V>
		4	4	22	39	SS-2	4.50	-	-	-	-	-	-	-	-	12	A-6a (V)	<V>
	532.5	5	8															<V>
		6	4															<V>
		7	7	19	33	SS-3	4.50	1	4	21	44	30	28	14	14	12	A-6a (9)	<V>
FILL: MEDIUM STIFF TO STIFF, DARK GRAY AND BLACK SILTY CLAY , AND COARSE TO FINE SAND, LITTLE FINE GRAVEL, DAMP TO MOIST. -ASPHALT FRAGMENTS PRESENT IN SS-4	525.0	8																<V>
		9	4	10	33	SS-4	1.75	-	-	-	-	-	-	-	-	14	A-6b (V)	<V>
		10	4															<V>
	525.0	11	4															<V>
		12	3	6	33	SS-5	1.50	-	-	-	-	-	-	-	-	16	A-6b (V)	<V>
		13	2															<V>
-COAL AND CERAMIC FRAGMENTS PRESENT FROM 11.0' TO 18.0'	525.0	14	3	5	39	SS-6	1.00	12	17	28	23	20	32	16	16	19	A-6b (3)	<V>
		15	2															<V>
		16	2	5	50	SS-7	-	-	-	-	-	-	-	-	-	13	A-4a (V)	<V>
LOOSE TO MEDIUM DENSE, DARK GRAY AND BLACK SANDY SILT , LITTLE FINE GRAVEL, LITTLE CLAY, MOIST. -WOOD FRAGMENT PRESENT IN SS-8 AND SS-9	517.5	17	2															<V>
		18																<V>
		19	9	12	33	SS-8	-	-	-	-	-	-	-	-	-	13	A-4a (V)	<V>
	517.5	20	5															<V>
		21	4	13	39	SS-9	-	-	-	-	-	-	-	-	-	17	A-4a (V)	<V>
		22	6															<V>
VERY LOOSE, BROWN COARSE AND FINE SAND , LITTLE FINE GRAVEL, TRACE SILT, DAMP.	513.5	23																<V>
		24	2	4	39	SS-10	-	-	-	-	-	-	-	-	-	8	A-3a (V)	<V>
		25	1															<V>
LOOSE, BROWNISH GRAY SANDY SILT , LITTLE FINE GRAVEL, MOIST.	513.5	26																<V>
		27																<V>
		28																<V>
	513.5	29	2	10	56	SS-11	-	-	-	-	-	-	-	-	-	16	A-4a (V)	<V>
		30	4															<V>
		EOB	4															<V>

NOTES: GROUNDWATER ENCOUNTERED INITIALLY @ 26.0' AND AT COMPLETION @ 21.0'; CAVE-IN DEPTH @ 17.4'

ABANDONMENT METHODS, MATERIALS, QUANTITIES: COMPACTED WITH THE AUGER 50 LBS BENTONITE CHIPS AND SOIL CUTTINGS

	PROJECT: HAM-75-7.85		DRILLING FIRM / OPERATOR: RII / S.M.		DRILL RIG: CME-750X (SN 310218)		STATION / OFFSET: 13+06.30 / 56.9' Rt		EXPLORATION ID B-006-0-11	
	TYPE: NOISE WALL		SAMPLING FIRM / LOGGER: RII / T.F.		HAMMER: CME AUTOMATIC		ALIGNMENT: BL WALL 1A			
	PID: 77889 BR ID: NA		DRILLING METHOD: 4.25" HSA		CALIBRATION DATE: 5/6/11		ELEVATION: 534.7 (MSL) EOB: 25.0 ft.		PAGE 1 OF 1	
	START: 10/17/11 END: 10/17/11		SAMPLING METHOD: SPT		ENERGY RATIO (%): 77.1		LAT / LONG : 39.180237872 ° N / 84.486000382 ° W			

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
0.5' - TOPSOIL (6.0")	534.7																	
LOOSE, BROWN COARSE AND FINE SAND , LITTLE FINE GRAVEL, TRACE CLAY, MOIST.	533.7	1	2	6	56	SS-1	-	-	-	-	-	-	-	-	-	11	A-3a (V)	<V>
	531.7	2	3															<V>
STIFF, BROWN SILT AND CLAY , AND COARSE TO FINE SAND, MOIST.		3																<V>
		4	4	9	33	SS-2	2.00	0	11	29	34	26	26	14	12	14	A-6a (6)	<V>
		5	4															<V>
		6	4															<V>
	526.7	7	4	10	39	SS-3	2.00	-	-	-	-	-	-	-	-	18	A-6a (V)	<V>
		8																<V>
MEDIUM DENSE, BROWN COARSE AND FINE SAND , LITTLE FINE GRAVEL, LITTLE SILT, TRACE CLAY, MOIST.		9	5	13	50	SS-4	-	-	-	-	-	-	-	-	-	11	A-3a (V)	<V>
		10	5															<V>
		11	3															<V>
	521.7	12	5	15	44	SS-5	-	-	-	-	-	-	-	-	-	11	A-3a (V)	<V>
		13	7															<V>
VERY LOOSE TO LOOSE, BROWN GRAVEL AND SAND , LITTLE SILT, TRACE CLAY, DAMP.		14	3	4	50	SS-6	-	-	-	-	-	-	-	-	-	5	A-1-b (V)	<V>
		15	2															<V>
		16	3															<V>
		17	1	3	61	SS-7	-	15	52	17	13	3	NP	NP	NP	8	A-1-b (0)	<V>
		18	1															<V>
		19	2	5	39	SS-8	-	-	-	-	-	-	-	-	-	6	A-1-b (V)	<V>
		20	2															<V>
		21	2															<V>
	511.7	22	3	9	50	SS-9	-	-	-	-	-	-	-	-	-	6	A-1-b (V)	<V>
		23	4															<V>
MEDIUM DENSE, BROWN GRAVEL WITH SAND AND SILT , TRACE CLAY, MOIST.		24	2															<V>
	509.7	25	7	18	56	SS-10	-	-	-	-	-	-	-	-	-	14	A-2-4 (V)	<V>
		EOB	7															<V>

NOTES: GROUNDWATER INITIALLY ENCOUNTERED @ 24.0'; CAVE-IN DEPTH @ 8.3'

ABANDONMENT METHODS, MATERIALS, QUANTITIES: COMPACTED WITH THE AUGER 50 LBS BENTONITE CHIPS AND SOIL CUTTINGS



PROJECT: HAM-75-7.85
 TYPE: NOISE WALL
 PID: 77889 BR ID: NA
 START: 10/11/11 END: 10/11/11

DRILLING FIRM / OPERATOR: RII / T.F.
 SAMPLING FIRM / LOGGER: RII / S.M.
 DRILLING METHOD: 4.25" HSA
 SAMPLING METHOD: SPT

DRILL RIG: CME-750X (SN 310218)
 HAMMER: CME AUTOMATIC
 CALIBRATION DATE: 5/6/11
 ENERGY RATIO (%): 77.1

STATION / OFFSET: 14+82.57 / 62.7' Rt
 ALIGNMENT: BL WALL 1A
 ELEVATION: 536.8 (MSL) EOB: 25.0 ft.
 LAT / LONG : 39.180681229 ° N / 84.485747882 ° W

EXPLORATION ID
B-007-0-11

PAGE
 1 OF 1

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
0.6' - TOPSOIL (7.0")	536.8																	
VERY LOOSE TO MEDIUM DENSE, BROWN COARSE AND FINE SAND , LITTLE FINE GRAVEL, TRACE SILT, TRACE CLAY, DRY TO DAMP.	536.2	1	2	4	67	SS-1	-	-	-	-	-	-	-	-	-	6	A-3a (V)	<V>
		2	1															<V>
		3	2															<V>
		4	7	15	67	SS-2	-	-	-	-	-	-	-	-	-	4	A-3a (V)	<V>
		5	6															<V>
-COBBLES PRESENT THROUGHOUT		6	5															<V>
		7	7	17	78	SS-3	-	15	29	43	10	3	NP	NP	NP	4	A-3a (0)	<V>
		8	6															<V>
HARD, BROWN SILTY CLAY , TRACE COARSE TO FINE SAND, TRACE FINE GRAVEL, MOIST.	528.8	9	5	24	56	SS-4	4.5+	-	-	-	-	-	-	-	-	21	A-6b (V)	<V>
		10	8															<V>
		11	11															<V>
MEDIUM DENSE, BROWN FINE SAND , AND COARSE SAND, TRACE SILT, TRACE CLAY, DRY TO DAMP.	526.3	12	7	23	67	SS-5	-	-	-	-	-	-	-	-	-	6	A-3 (V)	<V>
		13	6															<V>
		14	7	15	78	SS-6	-	-	-	-	-	-	-	-	-	9	A-3 (V)	<V>
		15	5															<V>
-COBBLES PRESENT THROUGHOUT		16	7															<V>
		17	6	17	89	SS-7	-	-	-	-	-	-	-	-	-	5	A-3 (V)	<V>
		18	7															<V>
		19	6	18	89	SS-8	-	0	44	47	7	2	NP	NP	NP	4	A-3 (0)	<V>
		20	6															<V>
		21	8															<V>
		22	6	19	89	SS-9	-	-	-	-	-	-	-	-	-	4	A-3 (V)	<V>
		23	7															<V>
MEDIUM STIFF, GRAY SILTY CLAY , LITTLE COARSE TO FINE SAND, TRACE FINE GRAVEL, MOIST.	513.8	24	6	9	67	SS-10	0.75	-	-	-	-	-	-	-	-	25	A-6b (V)	<V>
		25	4															<V>
	511.8	EOB	3															<V>

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING; CAVE-IN DEPTH @ 8.7'

ABANDONMENT METHODS, MATERIALS, QUANTITIES: COMPACTED WITH THE AUGER 50 LBS BENTONITE CHIPS AND SOIL CUTTINGS

	PROJECT: HAM-75-7.85	DRILLING FIRM / OPERATOR: RII / T.F.	DRILL RIG: CME-750X (SN 310218)	STATION / OFFSET: 10+99.25 / 36.9' Rt	EXPLORATION ID B-009-0-11
	TYPE: NOISE WALL	SAMPLING FIRM / LOGGER: RII / S.M.	HAMMER: CME AUTOMATIC	ALIGNMENT: BL WALL 1B	
	PID: 77889 BR ID: NA	DRILLING METHOD: 4.25" HSA	CALIBRATION DATE: 5/6/11	ELEVATION: 546.7 (MSL) EOB: 50.0 ft.	PAGE 1 OF 2
	START: 11/30/11 END: 11/30/11	SAMPLING METHOD: SPT	ENERGY RATIO (%): 77.1	LAT / LONG: 39.181374542 ° N / 84.485479455 ° W	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
0.7' - TOPSOIL (8.0")	546.7																	
VERY LOOSE, BROWN FINE SAND , SOME COARSE SAND, TRACE FINE GRAVEL, TRACE SILT, TRACE CLAY, DAMP.	543.7	1	WOH 1	4	44	SS-1	-	-	-	-	-	-	-	-	-	7	A-3 (V)	<L>
LOOSE TO DENSE, BROWN FINE SAND , SOME COARSE SAND, TRACE FINE GRAVEL, TRACE SILT, TRACE CLAY, DRY TO DAMP.	528.7	2	2															<L>
		3																<L>
		4	2	13	67	SS-2	-	-	-	-	-	-	-	-	-	7	A-3 (V)	<L>
		5	6															<L>
		6	3															<L>
		7	4	13	72	SS-3	-	5	29	58	6	2	NP	NP	NP	8	A-3 (0)	<L>
		8																<L>
		9	2	10	78	SS-4	-	-	-	-	-	-	-	-	-	8	A-3 (V)	<L>
		10	4															<L>
		11	5															<L>
MEDIUM DENSE, BROWN SANDY SILT , TRACE CLAY, TRACE FINE GRAVEL, MOIST.	526.2	12	9	31	72	SS-5	-	-	-	-	-	-	-	-	-	6	A-3 (V)	<L>
		13	15															<L>
		14	3															<L>
		15	5	15	78	SS-6	-	-	-	-	-	-	-	-	-	3	A-3 (V)	<L>
		16	7															<L>
		17	4	24	78	SS-7	-	-	-	-	-	-	-	-	-	4	A-3 (V)	<L>
		18	10															<L>
		19	4															<L>
		20	6	18	89	SS-8	-	3	15	46	29	7	NP	NP	NP	10	A-4a (0)	<L>
		21	8															<L>
MEDIUM DENSE, BROWN GRAVEL AND SAND , TRACE SILT, DAMP.	523.7	22	5	21	67	SS-9	-	-	-	-	-	-	-	-	-	8	A-1-b (V)	<L>
DENSE TO VERY DENSE, BROWN GRAVEL , SOME COARSE TO FINE SAND, DAMP. -COBBLES PRESENT THROUGHOUT	518.7	23																<L>
		24	6	33	56	SS-10	-	-	-	-	-	-	-	-	-	5	A-1-a (V)	<L>
		25	12															<L>
		26	14															<L>
		27	8	54	78	SS-11	-	-	-	-	-	-	-	-	-	4	A-1-a (V)	<L>
MEDIUM STIFF, GRAY SANDY SILT , LITTLE CLAY, LITTLE FINE GRAVEL, MOIST.		28	18															<L>
		29	24															<L>
		30	1	5	44	SS-12	1.00	13	6	23	45	13	22	17	5	17	A-4a (5)	<L>

PID: 77889	BR ID: NA	PROJECT: HAM-75-7.85	STATION / OFFSET: 10+99.25 / 36.9' Rt	START: 11/30/11	END: 11/30/11	PG 2 OF 2	B-009-0-11												
MATERIAL DESCRIPTION AND NOTES		ELEV. 515.7	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
									GR	CS	FS	SI	CL	LL	PL	PI			
MEDIUM DENSE TO DENSE, BROWN FINE SAND, TRACE SILT, TRACE FINE GRAVEL, TRACE CLAY, DRY TO DAMP.		514.7																	
			32																
			33																
			34	6	9	27	72	SS-13	-	-	-	-	-	-	-	-	7	A-3 (V)	
			35		12														
			36																
			37																
			38																
			39	8	8	26	78	SS-14	-	-	-	-	-	-	-	-	4	A-3 (V)	
			40		12														
			41																
			42																
			43																
			44	6	12	33	100	SS-15	-	-	-	-	-	-	-	-	4	A-3 (V)	
			45		14														
			46																
			47																
	48																		
	49	8	12	35	89	SS-16	-	-	-	-	-	-	-	-	4	A-3 (V)			
	50	15																	
		496.7	EOB																
NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING; CAVE-IN DEPTH @ 20.6'																			
ABANDONMENT METHODS. MATERIALS. QUANTITIES: COMPACTED WITH THE AUGER 50 LBS BENTONITE CHIPS AND SOIL CUTTINGS																			

	PROJECT: HAM-75-7.85	DRILLING FIRM / OPERATOR: RII / T.F.	DRILL RIG: CME-750X (SN 310218)	STATION / OFFSET: 13+07.37 / 63.8' Rt	EXPLORATION ID B-010-0-11
	TYPE: NOISE WALL	SAMPLING FIRM / LOGGER: RII / S.M.	HAMMER: CME AUTOMATIC	ALIGNMENT: BL WALL 1B	
	PID: 77889 BR ID: NA	DRILLING METHOD: 4.25" HSA	CALIBRATION DATE: 5/6/11	ELEVATION: 546.0 (MSL) EOB: 25.0 ft.	PAGE 1 OF 1
	START: 10/11/11 END: 10/11/11	SAMPLING METHOD: SPT	ENERGY RATIO (%): 77.1	LAT / LONG : 39.181888329 ° N / 84.485095341 ° W	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
0.6' - TOPSOIL (7.0")	545.4																	
FILL: VERY STIFF TO HARD, BROWN SANDY SILT , SOME CLAY, TRACE FINE GRAVEL, DRY TO DAMP.		1	4	9	67	SS-1	3.50	-	-	-	-	-	-	-	-	10	A-4a (V)	
		2	3															
		3																
		4	7	12	78	SS-2	4.50	-	-	-	-	-	-	-	-	7	A-4a (V)	
VERY STIFF, BROWN SANDY SILT , LITTLE CLAY, TRACE FINE GRAVEL, DRY.		5	4	5														
		6	5															
		7	6	18	44	SS-3	-	1	2	41	35	21	20	14	6	7	A-4a (4)	
		8																
-TRACE ROOT FIBERS PRESENT IN SS-4	538.0																	
MEDIUM DENSE, BROWN GRAVEL WITH SAND AND SILT , TRACE CLAY, DAMP.	535.5																	
MEDIUM DENSE TO DENSE, BROWN COARSE AND FINE SAND , SOME FINE GRAVEL, LITTLE SILT, TRACE CLAY, DRY.		9	9	24	67	SS-4	3.00	-	-	-	-	-	-	-	-	9	A-4a (V)	
		10	10															
		11	9	26	78	SS-5	-	-	-	-	-	-	-	-	-	10	A-2-4 (V)	
		12	10															
-COBBLES PRESENT THROUGHOUT	533.0																	
MEDIUM DENSE TO DENSE, BROWN COARSE AND FINE SAND , SOME FINE GRAVEL, LITTLE SILT, TRACE CLAY, DRY.		13																
		14	6	26	78	SS-6	-	-	-	-	-	-	-	-	-	4	A-3a (V)	
		15	9															
		16	7	26	89	SS-7	-	24	24	36	12	4	NP	NP	NP	4	A-3a (0)	
DENSE, BROWN GRAVEL WITH SAND AND SILT , TRACE CLAY, DAMP.		17	8															
		18																
		19	12	32	89	SS-8	-	-	-	-	-	-	-	-	-	10	A-2-4 (V)	
		20	13															
HARD, GRAY SANDY SILT , TRACE CLAY, TRACE FINE GRAVEL, DAMP.		21	9	41	67	SS-9	-	-	-	-	-	-	-	-	-	7	A-2-4 (V)	
		22	12															
		23	20															
		24	13	44	78	SS-10	4.50	-	-	-	-	-	-	-	-	11	A-4a (V)	
	523.0																	
	521.0																	
		EOB	25	16	18													

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING; CAVE-IN DEPTH @ 9.0'

ABANDONMENT METHODS, MATERIALS, QUANTITIES: COMPACTED WITH THE AUGER 50 LBS BENTONITE CHIPS AND SOIL CUTTINGS

	PROJECT: HAM-75-7.85		DRILLING FIRM / OPERATOR: RII / T.F.		DRILL RIG: CME-750X (SN 310218)		STATION / OFFSET: 14+99.05 / 40.7' Rt		EXPLORATION ID B-011-0-11	
	TYPE: NOISE WALL		SAMPLING FIRM / LOGGER: RII / S.M.		HAMMER: CME AUTOMATIC		ALIGNMENT: BL WALL 1B			
	PID: 77889 BR ID: NA		DRILLING METHOD: 4.25" HSA		CALIBRATION DATE: 5/6/11		ELEVATION: 562.5 (MSL) EOB: 25.0 ft.		PAGE 1 OF 1	
	START: 10/10/11 END: 10/10/11		SAMPLING METHOD: SPT		ENERGY RATIO (%): 77.1		LAT / LONG : 39.182370998 ° N / 84.484923695 ° W			

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
0.9' - TOPSOIL (11.0")	562.5																	
FILL: HARD, BROWN SILTY CLAY, LITTLE COARSE TO FINE SAND, TRACE FINE GRAVEL, DRY TO DAMP. -TRACE ROOT AND WOOD FIBERS PRESENT IN SS-2	561.6	1	5	8	78	SS-1	4.50	-	-	-	-	-	-	-	-	15	A-6b (V)	<V>
		2	2															<V>
		3	4															<V>
		4	6	18	67	SS-2	4.50	-	-	-	-	-	-	-	-	10	A-6b (V)	<V>
		5	8															<V>
		6	6															<V>
	554.5	7	7	19	78	SS-3	4.50	9	8	9	30	44	39	18	21	16	A-6b (12)	<V>
		8	8															<V>
HARD, BROWN SILTY CLAY , LITTLE COARSE TO FINE SAND, TRACE FINE GRAVEL, DAMP.		9	7															<V>
	552.0	10	6	17	78	SS-4	4.50	-	-	-	-	-	-	-	-	17	A-6b (V)	<V>
		11	7															<V>
MEDIUM DENSE, LIGHT BROWN COARSE AND FINE SAND, SOME SILT, TRACE CLAY, TRACE FINE GRAVEL, DAMP. -COBBLES PRESENT THROUGHOUT		12	22	23	89	SS-5	-	-	-	-	-	-	-	-	-	8	A-3a (V)	<V>
		13	10															<V>
		14	8															<V>
		15	14	18	89	SS-6	-	-	-	-	-	-	-	-	-	8	A-3a (V)	<V>
		16	7															<V>
		17	6	18	78	SS-7	-	-	-	-	-	-	-	-	-	8	A-3a (V)	<V>
		18	8															<V>
		19	12	13	89	SS-8	-	8	2	58	23	9	NP	NP	NP	8	A-3a (0)	<V>
		20	6															<V>
		21	6	14	89	SS-9	-	-	-	-	-	-	-	-	-	7	A-3a (V)	<V>
	539.5	22	4															<V>
		23	7															<V>
DENSE, BROWN GRAVEL , SOME COARSE TO FINE SAND, TRACE SILT, DAMP. -COBBLES PRESENT IN SS-10	537.5	24	18	40	89	SS-10	-	-	-	-	-	-	-	-	-	5	A-1-a (V)	<V>
		25	15															<V>
			16															<V>

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING; CAVE-IN DEPTH @ 10.0'

ABANDONMENT METHODS, MATERIALS, QUANTITIES: COMPACTED WITH THE AUGER 50 LBS BENTONITE CHIPS AND SOIL CUTTINGS

	PROJECT: HAM-75-7.85		DRILLING FIRM / OPERATOR: RII / T.F.		DRILL RIG: CME-750X (SN 310218)		STATION / OFFSET: 16+77.30 / 29.9' Rt		EXPLORATION ID B-013-0-11	
	TYPE: NOISE WALL		SAMPLING FIRM / LOGGER: RII / S.M.		HAMMER: CME AUTOMATIC		ALIGNMENT: BL WALL 1B			
	PID: 77889 BR ID: NA		DRILLING METHOD: 4.25" HSA		CALIBRATION DATE: 5/6/11		ELEVATION: 552.5 (MSL) EOB: 25.0 ft.		PAGE 1 OF 1	
	START: 10/16/11 END: 10/16/11		SAMPLING METHOD: SPT		ENERGY RATIO (%): 77.1		LAT / LONG : 39.182780027 ° N / 84.484608056 ° W			

MATERIAL DESCRIPTION AND NOTES	ELEV. 552.5	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
0.9' - TOPSOIL (11.0")	551.6																	
FILL: VERY STIFF TO HARD, BROWN TO DARK BROWN SILT AND CLAY, SOME COARSE TO FINE SAND, TRACE FINE GRAVEL, DRY TO MOIST. -TRACE ROOT FIBERS PRESENT IN SS-1 AND SS-2		1	7	17	67	SS-1	4.50	-	-	-	-	-	-	-	15	A-6a (V)		
		2	6	7														
		3																
		4	9	23	67	SS-2	2.50	-	-	-	-	-	-	-	14	A-6a (V)		
		5	8	10														
		6	6															
		7	7	22	67	SS-3	4.50	1	3	27	41	28	27	15	12	9	A-6a (8)	
		8																
		9	6	28	44	SS-4	4.50	-	-	-	-	-	-	-	-	13	A-6a (V)	
		10	9	13														
HARD, DARK BROWN SILT AND CLAY, SOME COARSE TO FINE SAND, TRACE FINE GRAVEL, DAMP TO MOIST. -TRACE ROOT FIBERS PRESENT IN SS-5	542.0	11	7															
		12	7	24	67	SS-5	4.50	-	-	-	-	-	-	-	15	A-6a (V)		
		13																
		14	9	28	50	SS-6	4.5+	-	-	-	-	-	-	-	14	A-6a (V)		
		15	9	13														
MEDIUM DENSE, BROWN SANDY SILT, TRACE CLAY, TRACE FINE GRAVEL, MOIST TO WET.	537.0	16	6															
		17	7	18	67	SS-7	-	-	-	-	-	-	-	-	19	A-4a (V)		
		18																
		19	7	21	67	SS-8	-	2	1	49	39	9	NP	NP	NP	12	A-4a (3)	
		20	7	9														
		21	9	21	78	SS-9	-	-	-	-	-	-	-	-	22	A-4a (V)		
		22	7	9														
HARD, BROWN SILT AND CLAY, LITTLE COARSE TO FINE SAND, TRACE FINE GRAVEL, DAMP.	529.5	23																
		24	8															
		25	10	37	78	SS-10	4.50	-	-	-	-	-	-	-	11	A-6a (V)		
527.5	EOB																	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING; CAVE-IN DEPTH @ 13.5'

ABANDONMENT METHODS, MATERIALS, QUANTITIES: COMPACTED WITH THE AUGER 50 LBS BENTONITE CHIPS AND SOIL CUTTINGS



PROJECT: HAM-75-7.85
 TYPE: NOISE WALL
 PID: 77889 BR ID: NA
 START: 10/6/11 END: 10/6/11

DRILLING FIRM / OPERATOR: RII / T.F.
 SAMPLING FIRM / LOGGER: RII / S.M.
 DRILLING METHOD: 4.25" HSA
 SAMPLING METHOD: SPT

DRILL RIG: CME-750X (SN 310218)
 HAMMER: CME AUTOMATIC
 CALIBRATION DATE: 5/6/11
 ENERGY RATIO (%): 77.1

STATION / OFFSET: 60+84.44 / 9.4' Rt
 ALIGNMENT: BL WALL 2B
 ELEVATION: 550.8 (MSL) EOB: 30.0 ft.
 LAT / LONG : 39.18700339 ° N / 84.482605252 ° W

EXPLORATION ID
B-024-0-11

PAGE
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MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
0.6' - TOPSOIL (7.0")	550.8																	
FILL: STIFF, DARK BROWN SANDY SILT , LITTLE CLAY, DAMP. -TRACE ROOT FIBERS PRESENT IN SS-1	550.2	1	2	5	56	SS-1	2.00	-	-	-	-	-	-	-	-	13	A-4a (V)	<V>
		2	2															<V>
	547.8	3																<V>
FILL: MEDIUM STIFF, BROWN SILT AND CLAY , LITTLE COARSE TO FINE SAND, TRACE FINE GRAVEL, MOIST. -TRACE ROOT AND WOOD FIBERS PRESENT IN SS-2		4	4	5	28	SS-2	1.00	-	-	-	-	-	-	-	-	19	A-6a (V)	<V>
		5	2															<V>
	545.3	6																<V>
POSSIBLE FILL: VERY LOOSE TO MEDIUM DENSE, BROWN FINE SAND , TRACE SILT, TRACE CLAY, DRY TO DAMP.		7	3	4	56	SS-3	-	-	-	-	-	-	-	-	-	8	A-3 (V)	<V>
		8	2	1														<V>
		9	3															<V>
		10	6	15	78	SS-4	-	-	-	-	-	-	-	-	-	4	A-3 (V)	<V>
		11																<V>
		12	4	18	83	SS-5	-	-	-	-	-	-	-	-	-	5	A-3 (V)	<V>
	537.8	13	6	8														<V>
POSSIBLE FILL: MEDIUM DENSE, BROWNISH GRAY COARSE AND FINE SAND , SOME SILT, TRACE CLAY, TRACE FINE GRAVEL, MOIST.		14	2	13	100	SS-6	-	3	18	46	27	6	NP	NP	NP	14	A-3a (0)	<V>
		15	4	6														<V>
		16	5															<V>
		17	4	12	89	SS-7	-	-	-	-	-	-	-	-	-	16	A-3a (V)	<V>
	532.8	18	5															<V>
STIFF, BROWN SILTY CLAY , LITTLE COARSE TO FINE SAND, TRACE FINE GRAVEL, MOIST. -TRACE ROOT FIBERS PRESENT IN SS-8		19	2	6	100	SS-8	2.00	-	-	-	-	-	-	-	-	19	A-6b (V)	<V>
		20	3															<V>
	530.3	21	1															<V>
SOFT TO STIFF, GRAY SILT AND CLAY , SOME COARSE TO FINE SAND, TRACE FINE GRAVEL, MOIST TO WET.		22	2	6	100	SS-9	1.50	-	-	-	-	-	-	-	-	24	A-6a (V)	<V>
		23	3															<V>
		24	2	3														<V>
		25	1	3	100	SS-10	0.50	1	1	23	48	27	27	14	13	22	A-6a (9)	<V>
		26																<V>
		27																<V>
		28																<V>
		29	2	6	78	SS-11	1.50	-	-	-	-	-	-	-	-	19	A-6a (V)	<V>
		30	3															<V>
		EOB																<V>

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING

ABANDONMENT METHODS, MATERIALS, QUANTITIES: COMPACTED WITH THE AUGER 50 LBS BENTONITE CHIPS AND SOIL CUTTINGS



PROJECT: HAM-75-7.85
 TYPE: NOISE WALL
 PID: 77889 BR ID: NA
 START: 10/5/11 END: 10/5/11

DRILLING FIRM / OPERATOR: RII / T.F.
 SAMPLING FIRM / LOGGER: RII / S.M.
 DRILLING METHOD: 4.25" HSA
 SAMPLING METHOD: SPT

DRILL RIG: CME-750X (SN 310218)
 HAMMER: CME AUTOMATIC
 CALIBRATION DATE: 5/6/11
 ENERGY RATIO (%): 77.1

STATION / OFFSET: 62+41.18 / 7.4' Rt
 ALIGNMENT: BL WALL 2B
 ELEVATION: 561.2 (MSL) EOB: 25.0 f
 LAT / LONG : 39.187408 ° N / 84.482456999 ° W

EXPLORATION ID
B-026-0-11

PAGE
 1 OF 1

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
0.8' - TOPSOIL (9.0")	560.4																	
STIFF TO VERY STIFF, DARK BROWN SILT AND CLAY , AND COARSE TO FINE SAND, TRACE FINE GRAVEL, DAMP TO MOIST. -TRACE ROOT FIBERS PRESENT IN SS-1		1	2	9	67	SS-1	2.00	-	-	-	-	-	-	-	-	11	A-6a (V)	
		2	3															
		3	4															
		4	6	19	33	SS-2	3.00	3	12	43	21	21	29	14	15	17	A-6a (3)	
		5	9															
		6	2															
		7	7	24	44	SS-3	3.50	-	-	-	-	-	-	-	-	14	A-6a (V)	
		8	12															
LOOSE, BROWN FINE SAND , TRACE SILT, TRACE CLAY, MOIST.	553.2																	
		9	2	8	28	SS-4	-	-	-	-	-	-	-	-	-	11	A-3 (V)	
		10	4															
MEDIUM STIFF TO VERY STIFF, BROWN SILT , LITTLE CLAY, TRACE COARSE TO FINE SAND, TRACE FINE GRAVEL, MOIST.	550.7																	
		11	3															
		12	6	13	67	SS-5	2.00	1	0	4	78	17	26	18	8	22	A-4b (8)	
		13	4															
		14	2															
		15	7	17	67	SS-6	4.00	-	-	-	-	-	-	-	-	18	A-4b (V)	
		16	6															
		17	4	14	78	SS-7	1.25	-	-	-	-	-	-	-	-	19	A-4b (V)	
		18	5															
		19	3	6	100	SS-8	1.00	-	-	-	-	-	-	-	-	19	A-4b (V)	
		20	2															
		21	3															
		22	4	13	100	SS-9	2.00	-	-	-	-	-	-	-	-	21	A-4b (V)	
		23	6															
LOOSE, BROWN FINE SAND , TRACE SILT, TRACE CLAY, DAMP.	538.2																	
		24	2	8	100	SS-10	-	-	-	-	-	-	-	-	-	5	A-3 (V)	
		25	3															
	536.2	EOB																

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING; CAVE-IN DEPTH @ 9.0'

ABANDONMENT METHODS, MATERIALS, QUANTITIES: COMPACTED WITH THE AUGER 50 LBS BENTONITE CHIPS AND SOIL CUTTINGS

	PROJECT: HAM-75-7.85		DRILLING FIRM / OPERATOR: RII / T.F.		DRILL RIG: CME-750X (SN 310218)		STATION / OFFSET: 63+51.11 / 19.5' Lt		EXPLORATION ID B-028-0-11	
	TYPE: NOISE WALL		SAMPLING FIRM / LOGGER: RII / S.M.		HAMMER: CME AUTOMATIC		ALIGNMENT: BL WALL 2B			
	PID: 77889 BR ID: NA		DRILLING METHOD: 4.25" HSA		CALIBRATION DATE: 5/6/11		ELEVATION: 560.8 (MSL) EOB: 25.0 ft.		PAGE 1 OF 1	
	START: 10/5/11 END: 10/5/11		SAMPLING METHOD: SPT		ENERGY RATIO (%): 77.1		LAT / LONG : 39.187718403 ° N / 84.482421549 ° W			

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
0.9' - TOPSOIL (11.0")	560.8																	
STIFF TO VERY STIFF, BROWN TO GRAY SILT AND CLAY , DAMP TO MOIST.	559.9	1	2	10	67	SS-1	4.00	-	-	-	-	-	-	-	-	14	A-6a (V)	
		2	3	5														
		3																
		4	2	4	13	67	SS-2	2.00	-	-	-	-	-	-	-	22	A-6a (V)	
		5		6														
	550.3	6	4	21	100	SS-3	3.25	0	0	0	53	47	33	18	15	22	A-6a (10)	
		7	8	8														
		8																
		9	2	4	12	100	SS-4	1.50	-	-	-	-	-	-	-	26	A-6a (V)	
		10		5														
VERY STIFF, BROWN SANDY SILT , TRACE CLAY, WET.	547.8	11	7	28	100	SS-5	2.25	-	-	-	-	-	-	-	27	A-4a (V)		
12			10	12														
VERY STIFF TO HARD, BROWN TO BROWNISH GRAY CLAY , SOME SILT, TRACE COARSE TO FINE SAND, TRACE FINE GRAVEL, MOIST.	540.3	13																
		14	5	10	35	100	SS-6	4.00	-	-	-	-	-	-	-	32		A-7-6 (V)
		15		17														
		16	6	9	31	100	SS-7	4.50	-	-	-	-	-	-	-	29		A-7-6 (V)
		17		15														
VERY STIFF, GRAY SILT AND CLAY , LITTLE COARSE TO FINE SAND, TRACE FINE GRAVEL, DAMP TO MOIST.	535.8	18																
		19	7	8	26	100	SS-8	2.25	-	-	-	-	-	-	-	28		A-7-6 (V)
		20		12														
		21	6	10	26	100	SS-9	4.00	-	-	-	-	-	-	-	11		A-6a (V)
		22		10														
		23																
		24	9	6	18	100	SS-10	3.00	-	-	-	-	-	-	-	19		A-6a (V)
		25		8														
		EOB																

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING; CAVE-IN DEPTH @ 5.6'

ABANDONMENT METHODS, MATERIALS, QUANTITIES: COMPACTED WITH THE AUGER 50 LBS BENTONITE CHIPS AND SOIL CUTTINGS



PROJECT: HAM-75-7.85
 TYPE: NOISE WALL
 PID: 77889 BR ID: NA
 START: 10/5/11 END: 10/5/11

DRILLING FIRM / OPERATOR: RII / T.F.
 SAMPLING FIRM / LOGGER: RII / S.M.
 DRILLING METHOD: 4.25" HSA
 SAMPLING METHOD: SPT

DRILL RIG: CME-750X (SN 310218)
 HAMMER: CME AUTOMATIC
 CALIBRATION DATE: 5/6/11
 ENERGY RATIO (%): 77.1

STATION / OFFSET: 66+47.44 / 4.1' Rt
 ALIGNMENT: BL WALL 2B
 ELEVATION: 570.0 (MSL) EOB: 25.0 ft.
 LAT / LONG : 39.188474513 ° N / 84.482026813 ° W

EXPLORATION ID
B-030-0-11

PAGE
 1 OF 1

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
0.7" - TOPSOIL (8.0")	570.0																	
STIFF TO VERY STIFF, BROWN SILT , LITTLE CLAY, TRACE FINE SAND, TRACE FINE GRAVEL, DAMP TO MOIST.	569.3	1	2	17	56	SS-1	2.25	-	-	-	-	-	-	-	-	16	A-4b (V)	<V>
		2	6															<V>
		3																<V>
		4	4	12	67	SS-2	1.75	1	0	4	77	18	27	19	8	19	A-4b (8)	<V>
		5	2															<V>
		6	7															<V>
		7	9	26	78	SS-3	1.50	-	-	-	-	-	-	-	-	15	A-4b (V)	<V>
STIFF TO VERY STIFF, GRAY CLAY , SOME SILT, MOIST.	562.0	8																<V>
		9	3	9	78	SS-4	1.50	0	0	0	35	65	43	21	22	24	A-7-6 (13)	<V>
		10	4															<V>
		11	5															<V>
		12	6	17	100	SS-5	2.75	-	-	-	-	-	-	-	-	26	A-7-6 (V)	<V>
		13	7															<V>
		14																<V>
		15			100	ST-6	2.50	0	0	0	29	71	43	19	24	26	A-7-6 (14)	<V>
		16	4															<V>
		17	4	12	100	SS-7	1.50	-	-	-	-	-	-	-	-	29	A-7-6 (V)	<V>
HARD, GRAY SILT AND CLAY , LITTLE COARSE TO FINE SAND, TRACE FINE GRAVEL, DAMP.	547.0	18	5															<V>
		19	4															<V>
		20	6	17	100	SS-8	2.25	-	-	-	-	-	-	-	-	26	A-7-6 (V)	<V>
		21	7															<V>
		22	5	18	100	SS-9	2.25	-	-	-	-	-	-	-	-	27	A-7-6 (V)	<V>
		23	8															<V>
	545.0	24	2															<V>
		25	5	19	100	SS-10	4.5+	-	-	-	-	-	-	-	-	12	A-6a (V)	<V>
		EOB	10															<V>

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING; CAVE-IN DEPTH @ 5.5'

ABANDONMENT METHODS, MATERIALS, QUANTITIES: COMPACTED WITH THE AUGER 50 LBS BENTONITE CHIPS AND SOIL CUTTINGS

	PROJECT: HAM-75-7.85	DRILLING FIRM / OPERATOR: RII / T.F.	DRILL RIG: CME-750X (SN 310218)	STATION / OFFSET: 68+28.46 / 13.2' Rt	EXPLORATION ID B-031-0-11
	TYPE: NOISE WALL	SAMPLING FIRM / LOGGER: RII / S.M.	HAMMER: CME AUTOMATIC	ALIGNMENT: BL WALL 2B	
	PID: 77889 BR ID: NA	DRILLING METHOD: 4.25" HSA	CALIBRATION DATE: 5/6/11	ELEVATION: 570.0 (MSL) EOB: 25.0 ft.	PAGE 1 OF 1
	START: 10/5/11 END: 10/5/11	SAMPLING METHOD: SPT	ENERGY RATIO (%): 77.1	LAT / LONG : 39.188931528 ° N / 84.481780743 ° W	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
0.8' - TOPSOIL (9.0")	570.2																	
VERY STIFF TO HARD, BROWN TO BROWNISH GRAY SILTY CLAY , TRACE COARSE TO FINE SAND, DAMP TO MOIST.		1	2	14	33	SS-1	4.5+	-	-	-	-	-	-	-	-	16	A-6b (V)	
		2	4	7														
		3																
-COBBLES PRESENT FROM 1.0' TO 5.0'		4	4	18	67	SS-2	4.5+	-	-	-	-	-	-	-	-	18	A-6b (V)	
		5	6	8														
		6	7															
		7	9	23	100	SS-3	3.75	-	-	-	-	-	-	-	-	20	A-6b (V)	
		8	9															
		9	4															
		10	5	14	89	SS-4	4.5+	-	-	-	-	-	-	-	-	25	A-6b (V)	
		11	6															
STIFF TO VERY STIFF, GRAY CLAY , SOME SILT, MOIST.	559.5	12	8	19	100	SS-5	2.50	0	0	0	25	75	48	19	29	30	A-7-6 (17)	
		13	7															
		14	2	12	89	SS-6	2.50	-	-	-	-	-	-	-	-	29	A-7-6 (V)	
		15	3	6														
		16	5															
		17	6	17	100	SS-7	2.50	-	-	-	-	-	-	-	-	25	A-7-6 (V)	
		18	7															
		19	5	14	100	SS-8	2.00	-	-	-	-	-	-	-	-	20	A-7-6 (V)	
		20	6															
		21	7															
		22	8	22	50	SS-9	2.50	-	-	-	-	-	-	-	-	30	A-7-6 (V)	
		23	9															
VERY STIFF, BROWN SILT AND CLAY , LITTLE COARSE TO FINE SAND, TRACE FINE GRAVEL, DAMP. -COBBLES PRESENT IN SS-10	547.0	24	5	32	44	SS-10	4.00	-	-	-	-	-	-	-	-	14	A-6a (V)	
	545.0	25	10	15														
		EOB																

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING; CAVE-IN DEPTH @ 8.5'

ABANDONMENT METHODS, MATERIALS, QUANTITIES: COMPACTED WITH THE AUGER 50 LBS BENTONITE CHIPS AND SOIL CUTTINGS

APPENDIX V

NOISE WALL DESIGN TABLES

Figure 802.1.2-1

Granular Soil Foundation Depth Table												
	Post Spacing (PS) [ft]				Foundation Depth [ft]							
	PS ≤ 8'	8' < PS ≤ 12'	12' < PS ≤ 16'	16' < PS ≤ 24'	Soil Properties	N ⁽³⁾	2-3	4-9	10-19	20-29	30-49	50-60
						ϕ ⁽⁴⁾	25-32	27-35	30-38	32-40	34-43	36-44
Barrier Height (H) [ft]	H ≤ 12'	H ≤ 10'	H ≤ 8'	H ≤ 6'	Transverse Ground Slope	Level	8.0	8.0	6.5	6.0	6.0	6.0
						5:1	8.0	8.0	7.0	6.5	6.0	6.0
						4:1	8.5	8.5	7.0	7.0	6.0	6.0
						3:1	9.0	8.5	7.5	7.0	6.5	6.5
						2:1	10.0	9.5	8.0	7.5	7.0	6.5
	12' < H ≤ 16'	10' < H ≤ 14'	8' < H ≤ 12'	6' < H ≤ 10'		Level	9.5	9.5	8.0	7.5	7.5	6.5
						5:1	10.5	10.0	8.5	8.0	8.0	7.0
						4:1	11.0	10.5	9.0	8.5	8.0	7.5
						3:1	11.5	11.0	9.5	9.0	8.5	7.5
						2:1	12.5	12.0	10.0	9.5	9.0	8.0
	16' < H ≤ 20'	14' < H ≤ 20'	12' < H ≤ 16'	10' < H ≤ 14'		Level	11.5	11.0	9.5	9.0	8.0	8.0
						5:1	12.5	11.5	10.0	10.0	8.5	8.5
						4:1	13.0	12.0	10.5	10.5	9.0	8.5
						3:1	13.5	13.0	11.0	10.5	9.5	9.0
						2:1	14.5	14.5	12.0	11.5	10.0	9.5
			16' < H ≤ 20'	14' < H ≤ 20'		Level	15.5	14.0	12.0	11.0	10.5	10.5
						5:1	19.0	16.0	13.5	12.5	11.0	11.0
						4:1	20.5	17.5	14.0	13.0	12.0	11.5
						3:1	24.0	19.5	15.0	14.0	12.5	12.0
						2:1	*	30.0	19.0	16.0	14.0	13.0

Notes:

1. The foundation depth is the required embedment into in-situ soil. Resistance provided by soil placed as new embankment should be ignored.
2. Barrier Height [H] is the distance from the top of the drilled shaft to the top of the higher barrier wall at the post rounded to the nearest ft.
3. N = Corrected SPT N-value (see BDM Section 802.1.2)
4. φ = Estimated friction angle based on N-value
5. * = exceeds maximum drilled shaft length

Figure 802.1.2-2

Cohesive Soil Foundation Depth Table											
	Post Spacing (PS) [ft]				Foundation Depth [ft]						
	PS ≤ 8'	8' < PS ≤ 12'	12' < PS ≤ 16'	16' < PS ≤ 24'	Soil Properties	N ⁽³⁾	0-1	2-3	4-8	9-15	16-32
Barrier Height (H) [ft]	H ≤ 12'	H ≤ 10'	H ≤ 8'	H ≤ 6'	Transverse Ground Slope	Level	12.5	12.5	7.0	6.0	6.0
						5:1	13.5	13.5	7.5	6.0	6.0
						4:1	13.5	13.5	7.5	6.0	6.0
						3:1	14.0	14.0	8.0	6.0	6.0
						2:1	14.5	15.0	8.0	6.0	6.0
	12' < H ≤ 16'	10' < H ≤ 14'	8' < H ≤ 12'	6' < H ≤ 10'		Level	17.0	17.0	9.5	7.5	6.0
						5:1	18.5	18.5	10.0	8.0	6.0
						4:1	19.0	18.5	10.5	8.0	6.0
						3:1	19.5	19.0	10.5	8.0	6.0
						2:1	20.0	20.0	11.0	8.5	6.0
	16' < H ≤ 20'	14' < H ≤ 20'	12' < H ≤ 16'	10' < H ≤ 14'		Level	21.5	21.0	13.5	9.5	6.5
						5:1	23.0	23.0	14.5	10.0	7.0
						4:1	23.5	23.0	14.5	10.0	7.0
						3:1	25.0	24.0	15.0	10.5	7.0
						2:1	25.5	24.5	16.0	11.0	7.0
			16' < H ≤ 20'	14' < H ≤ 20'		Level	*	*	19.0	13.0	9.0
						5:1	*	*	20.5	14.0	9.0
						4:1	*	*	21.0	14.5	9.0
						3:1	*	*	22.0	15.0	9.5
						2:1	*	*	24.0	15.0	10.0

Notes:

1. The foundation depth is the required embedment into in-situ soil. Resistance provided by soil placed as new embankment should be ignored.
2. Barrier Height [H] is the distance from the top of the drilled shaft to the top of the higher barrier wall at the post rounded to the nearest ft.
3. N = Corrected SPT N-value (see BDM Section 802.1.2)
4. * = exceeds maximum drilled shaft length

APPENDIX VI

NOISE WALL CALCULATIONS

NOISE WALL FOUNDATION DATA TABLE

BORING: **B-005**
 Elevation (ft) (m): **540.5**
 GWT Elevation (ft) (m): _____
 Project ID: **B-10-020 - HAM-75-7.85 - NSA 1A**
NOTE: You need to input only Highlighted cells

Row (by Transverse Ground Slope) **5**
 Column (by SPT Blow Counts) **5**

Layer	Depth		Elevation		Thick. (ft)	N	Ave. N @ 5'	C _N	Corr. N	Ave. Corr. N	Soil Type	Post Spacing (ft)	Barrier Height (ft)	Panel Group	Transverse Ground Slope	Drilled Shaft Depth (ft)
	From (ft)	To (ft)	From (ft)	To (ft)												
1	0.0	2.5	540.5	538.0	2.5	21				26	Cohesive	8 thru 12	10 and Less	I	2:1	6.0
2	2.5	5.0	538.0	535.5	2.5	22	22	1.60	34							
3	5.0	7.5	535.5	533.0	2.5	19										
4	7.5	10.0	533.0	530.5	2.5	10	15	1.20	17							
5	10.0	12.5	530.5	528.0	2.5	6										
6	12.5	15.0	528.0	525.5	2.5	5	6	1.00	6							
7	15.0	17.5	525.5	523.0	2.5	5										
8	17.5	20.0	523.0	520.5	2.5	12	9	0.96	8							
9	20.0	22.5	520.5	518.0	2.5	13										
10	22.5	25.0	518.0	515.5	2.5	4	9	0.90	8							

Notes:

- (1) Drilled shaft diameter = 2'-6"
- (2) Noise wall height is the distance from the top of drilled shaft to the top of the higher barrier wall at that post, rounded to the nearest foot.
- (3) If within the required length of the foundation, bedrock is encountered, the drilled shaft foundation may be terminated after 3 feet of penetration into hard bedrock or 6 feet of penetration into soft bedrock.
- (4) Embedment of posts into the drilled shafts shall not be less than 3'-6", except for concrete posts which shall be embedded not less than 3'-0".

Reference:

Ohio Department Of Transportation plan insert sheets on "Noise Barrier Details" and "Foundation Selection".

NOISE WALL FOUNDATION DATA TABLE

BORING: **B-005**
 Elevation (ft) (m): **540.5**
 GWT Elevation (ft) (m): _____
 Project ID: **B-10-020 - HAM-75-7.85 - NSA 1A**
NOTE: You need to input only Highlighted cells

Row (by Transverse Ground Slope) **5**
 Column (by SPT Blow Counts) **5**

Layer	Depth		Elevation		Thick. (ft)	N	Ave. N @ 5'	C _N	Corr. N	Ave. Corr. N	Soil Type	Post Spacing (ft)	Barrier Height (ft)	Panel Group	Transverse Ground Slope	Drilled Shaft Depth (ft)
	From (ft)	To (ft)	From (ft)	To (ft)												
1	0.0	2.5	540.5	538.0	2.5	21				26	Cohesive	16 thru 24	10 thru 14	III	2:1	7.0
2	2.5	5.0	538.0	535.5	2.5	22	22	1.60	34							
3	5.0	7.5	535.5	533.0	2.5	19										
4	7.5	10.0	533.0	530.5	2.5	10	15	1.20	17							
5	10.0	12.5	530.5	528.0	2.5	6										
6	12.5	15.0	528.0	525.5	2.5	5	6	1.00	6							
7	15.0	17.5	525.5	523.0	2.5	5										
8	17.5	20.0	523.0	520.5	2.5	12	9	0.96	8							
9	20.0	22.5	520.5	518.0	2.5	13										
10	22.5	25.0	518.0	515.5	2.5	4	9	0.90	8							

Notes:

- Drilled shaft diameter = 2'-6"
- Noise wall height is the distance from the top of drilled shaft to the top of the higher barrier wall at that post, rounded to the nearest foot.
- If within the required length of the foundation, bedrock is encountered, the drilled shaft foundation may be terminated after 3 feet of penetration into hard bedrock or 6 feet of penetration into soft bedrock.
- Embedment of posts into the drilled shafts shall not be less than 3'-6", except for concrete posts which shall be embedded not less than 3'-0".

Reference:

Ohio Department Of Transportation plan insert sheets on "Noise Barrier Details" and "Foundation Selection".

NOISE WALL FOUNDATION DATA TABLE

BORING: **B-006**
 Elevation (ft) (m): **534.7**
 GWT Elevation (ft) (m): _____

Project ID: **B-10-020 - HAM-75-7.85 - NSA 1A**

NOTE: You need to input only Highlighted cells

Row (by Transverse Ground Slope) 5
Column (by SPT Blow Counts) 3

Layer	Depth		Elevation		Thick. (ft)	N	Ave. N @ 5'	C _N	Corr. N	Ave. Corr. N	Soil Type	Post Spacing (ft)	Barrier Height (ft)	Panel Group	Transverse Ground Slope	Drilled Shaft Depth (ft)
	From (ft)	To (ft)	From (ft)	To (ft)												
1	0.0	2.5	534.7	532.2	2.5	6				12	Granular	16 thru 24	10 thru 14	III	2:1	12.0
2	2.5	5.0	532.2	529.7	2.5	9	8	1.60	12							
3	5.0	7.5	529.7	527.2	2.5	10										
4	7.5	10.0	527.2	524.7	2.5	13	12	1.20	14							
5	10.0	12.5	524.7	522.2	2.5	15										
6	12.5	15.0	522.2	519.7	2.5	4	10	1.00	10							
7	15.0	17.5	519.7	517.2	2.5	3										
8	17.5	20.0	517.2	514.7	2.5	5	4	0.96	4							
9	20.0	22.5	514.7	512.2	2.5	9										
10	22.5	25.0	512.2	509.7	2.5	18	14	0.90	12							

Notes:

- (1) Drilled shaft diameter = 2'-6"
- (2) Noise wall height is the distance from the top of drilled shaft to the top of the higher barrier wall at that post, rounded to the nearest foot.
- (3) If within the required length of the foundation, bedrock is encountered, the drilled shaft foundation may be terminated after 3 feet of penetration into hard bedrock or 6 feet of penetration into soft bedrock.
- (4) Embedment of posts into the drilled shafts shall not be less than 3'-6", except for concrete posts which shall be embedded not less than 3'-0".

Reference:

Ohio Department Of Transportation plan insert sheets on "Noise Barrier Details" and "Foundation Selection".

NOISE WALL FOUNDATION DATA TABLE

BORING: **B-007**
 Elevation (ft) (m): **536.8**
 GWT Elevation (ft) (m): _____

Project ID: **B-10-020 - HAM-75-7.85 - NSA 1A**
NOTE: You need to input only Highlighted cells

Row (by Transverse Ground Slope) **5**
 Column (by SPT Blow Counts) **3**

Layer	Depth		Elevation		Thick. (ft)	N	Ave. N @ 5'	C _N	Corr. N	Ave. Corr. N	Soil Type	Post Spacing (ft)	Barrier Height (ft)	Panel Group	Transverse Ground Slope	Drilled Shaft Depth (ft)
	From (ft)	To (ft)	From (ft)	To (ft)												
1	0.0	2.5	536.8	534.3	2.5	4				20	Granular	16 thru 24	10 thru 14	III	2:1	12.0
2	2.5	5.0	534.3	531.8	2.5	15	10	1.60	15							
3	5.0	7.5	531.8	529.3	2.5	17										
4	7.5	10.0	529.3	526.8	2.5	24	21	1.20	25							
5	10.0	12.5	526.8	524.3	2.5	23										
6	12.5	15.0	524.3	521.8	2.5	15	19	1.00	19							
7	15.0	17.5	521.8	519.3	2.5	17										
8	17.5	20.0	519.3	516.8	2.5	18	18	0.96	17							
9	20.0	22.5	516.8	514.3	2.5	19										
10	22.5	25.0	514.3	511.8	2.5	9	14	0.90	13							

Notes:

- (1) Drilled shaft diameter = 2'-6"
- (2) Noise wall height is the distance from the top of drilled shaft to the top of the higher barrier wall at that post, rounded to the nearest foot.
- (3) If within the required length of the foundation, bedrock is encountered, the drilled shaft foundation may be terminated after 3 feet of penetration into hard bedrock or 6 feet of penetration into soft bedrock.
- (4) Embedment of posts into the drilled shafts shall not be less than 3'-6", except for concrete posts which shall be embedded not less than 3'-0".

Reference:

Ohio Department Of Transportation plan insert sheets on "Noise Barrier Details" and "Foundation Selection".

NOISE WALL FOUNDATION DATA TABLE

BORING: **B-007**
 Elevation (ft) (m): **536.8**
 GWT Elevation (ft) (m): _____
 Project ID: **B-10-020 - HAM-75-7.85 - NSA 1A**
NOTE: You need to input only Highlighted cells

Row (by Transverse Ground Slope) **5**
 Column (by SPT Blow Counts) **4**

Layer	Depth		Elevation		Thick. (ft)	N	Ave. N @ 5'	C _N	Corr. N	Ave. Corr. N	Soil Type	Post Spacing (ft)	Barrier Height (ft)	Panel Group	Transverse Ground Slope	Drilled Shaft Depth (ft)
	From (ft)	To (ft)	From (ft)	To (ft)												
1	0.0	2.5	536.8	534.3	2.5	4				20	Granular	8 thru 12	10 thru 14	II	2:1	9.5
2	2.5	5.0	534.3	531.8	2.5	15	10	1.60	15							
3	5.0	7.5	531.8	529.3	2.5	17										
4	7.5	10.0	529.3	526.8	2.5	24	21	1.20	25							
5	10.0	12.5	526.8	524.3	2.5	23										
6	12.5	15.0	524.3	521.8	2.5	15	19	1.00	19							
7	15.0	17.5	521.8	519.3	2.5	17										
8	17.5	20.0	519.3	516.8	2.5	18	18	0.96	17							
9	20.0	22.5	516.8	514.3	2.5	19										
10	22.5	25.0	514.3	511.8	2.5	9	14	0.90	13							

Notes:

- (1) Drilled shaft diameter = 2'-6"
- (2) Noise wall height is the distance from the top of drilled shaft to the top of the higher barrier wall at that post, rounded to the nearest foot.
- (3) If within the required length of the foundation, bedrock is encountered, the drilled shaft foundation may be terminated after 3 feet of penetration into hard bedrock or 6 feet of penetration into soft bedrock.
- (4) Embedment of posts into the drilled shafts shall not be less than 3'-6", except for concrete posts which shall be embedded not less than 3'-0".

Reference:

Ohio Department Of Transportation plan insert sheets on "Noise Barrier Details" and "Foundation Selection".

NOISE WALL FOUNDATION DATA TABLE

BORING: **B-009**
 Elevation (ft) (m): **546.7**
 GWT Elevation (ft) (m): _____

Project ID: **B-10-020 - HAM-75-7.85 - NSA 1B-1**
NOTE: You need to input only Highlighted cells

Row (by Transverse Ground Slope) **5**
 Column (by SPT Blow Counts) **3**

Layer	Depth		Elevation		Thick. (ft)	N	Ave. N @ 5'	C _N	Corr. N	Ave. Corr. N	Soil Type	Post Spacing (ft)	Barrier Height (ft)	Panel Group	Transverse Ground Slope	Drilled Shaft Depth (ft)
	From (ft)	To (ft)	From (ft)	To (ft)												
1	0.0	2.5	546.7	544.2	2.5	4				17	Granular	16 thru 24	10 thru 14	III	2:1	12.0
2	2.5	5.0	544.2	541.7	2.5	13	9	1.60	14							
3	5.0	7.5	541.7	539.2	2.5	13										
4	7.5	10.0	539.2	536.7	2.5	10	12	1.20	14							
5	10.0	12.5	536.7	534.2	2.5	31										
6	12.5	15.0	534.2	531.7	2.5	15	23	1.00	23							
7	15.0	17.5	531.7	529.2	2.5	24										
8	17.5	20.0	529.2	526.7	2.5	18	21	0.96	20							
9	20.0	22.5	526.7	524.2	2.5	21										
10	22.5	25.0	524.2	521.7	2.5	33	27	0.90	24							

Notes:

- (1) Drilled shaft diameter = 2'-6"
- (2) Noise wall height is the distance from the top of drilled shaft to the top of the higher barrier wall at that post, rounded to the nearest foot.
- (3) If within the required length of the foundation, bedrock is encountered, the drilled shaft foundation may be terminated after 3 feet of penetration into hard bedrock or 6 feet of penetration into soft bedrock.
- (4) Embedment of posts into the drilled shafts shall not be less than 3'-6", except for concrete posts which shall be embedded not less than 3'-0".

Reference:

Ohio Department Of Transportation plan insert sheets on "Noise Barrier Details" and "Foundation Selection".

NOISE WALL FOUNDATION DATA TABLE

BORING: **B-010**
 Elevation (ft) (m): **546.0**
 GWT Elevation (ft) (m): _____
 Project ID: **B-10-020 - HAM-75-7.85 - NSA 1B-1**
NOTE: You need to input only Highlighted cells

Row (by Transverse Ground Slope) **5**
 Column (by SPT Blow Counts) **4**

Layer	Depth		Elevation		Thick. (ft)	N	Ave. N @ 5'	C _N	Corr. N	Ave. Corr. N	Soil Type	Post Spacing (ft)	Barrier Height (ft)	Panel Group	Transverse Ground Slope	Drilled Shaft Depth (ft)
	From (ft)	To (ft)	From (ft)	To (ft)												
1	0.0	2.5	546.0	543.5	2.5	9				23	Granular	16 thru 24	10 thru 14	III	2:1	11.5
2	2.5	5.0	543.5	541.0	2.5	12	11	1.60	17							
3	5.0	7.5	541.0	538.5	2.5	18										
4	7.5	10.0	538.5	536.0	2.5	24	21	1.20	25							
5	10.0	12.5	536.0	533.5	2.5	26										
6	12.5	15.0	533.5	531.0	2.5	26	26	1.00	26							
7	15.0	17.5	531.0	528.5	2.5	26										
8	17.5	20.0	528.5	526.0	2.5	32	29	0.96	28							
9	20.0	22.5	526.0	523.5	2.5	41										
10	22.5	25.0	523.5	521.0	2.5	44	43	0.90	38							

Notes:

- (1) Drilled shaft diameter = 2'-6"
- (2) Noise wall height is the distance from the top of drilled shaft to the top of the higher barrier wall at that post, rounded to the nearest foot.
- (3) If within the required length of the foundation, bedrock is encountered, the drilled shaft foundation may be terminated after 3 feet of penetration into hard bedrock or 6 feet of penetration into soft bedrock.
- (4) Embedment of posts into the drilled shafts shall not be less than 3'-6", except for concrete posts which shall be embedded not less than 3'-0".

Reference:

Ohio Department Of Transportation plan insert sheets on "Noise Barrier Details" and "Foundation Selection".

NOISE WALL FOUNDATION DATA TABLE

BORING: **B-011**
 Elevation (ft) (m): **562.5**
 GWT Elevation (ft) (m): _____
 Project ID: **B-10-020 - HAM-75-7.85 - NSA 1B-1**
NOTE: You need to input only Highlighted cells

Row (by Transverse Ground Slope) **5**
 Column (by SPT Blow Counts) **4**

Layer	Depth		Elevation		Thick. (ft)	N	Ave. N @ 5'	C _N	Corr. N	Ave. Corr. N	Soil Type	Post Spacing (ft)	Barrier Height (ft)	Panel Group	Transverse Ground Slope	Drilled Shaft Depth (ft)
	From (ft)	To (ft)	From (ft)	To (ft)												
1	0.0	2.5	562.5	560.0	2.5	8				22	Granular	16 thru 24	6 thru 10	II	2:1	9.5
2	2.5	5.0	560.0	557.5	2.5	18	13	1.60	21							
3	5.0	7.5	557.5	555.0	2.5	19										
4	7.5	10.0	555.0	552.5	2.5	17	18	1.20	22							
5	10.0	12.5	552.5	550.0	2.5	23										
6	12.5	15.0	550.0	547.5	2.5	18	21	1.00	21							
7	15.0	17.5	547.5	545.0	2.5	18										
8	17.5	20.0	545.0	542.5	2.5	13	16	0.96	15							
9	20.0	22.5	542.5	540.0	2.5	14										
10	22.5	25.0	540.0	537.5	2.5	40	27	0.90	24							

Notes:

- (1) Drilled shaft diameter = 2'-6"
- (2) Noise wall height is the distance from the top of drilled shaft to the top of the higher barrier wall at that post, rounded to the nearest foot.
- (3) If within the required length of the foundation, bedrock is encountered, the drilled shaft foundation may be terminated after 3 feet of penetration into hard bedrock or 6 feet of penetration into soft bedrock.
- (4) Embedment of posts into the drilled shafts shall not be less than 3'-6", except for concrete posts which shall be embedded not less than 3'-0".

Reference:

Ohio Department Of Transportation plan insert sheets on "Noise Barrier Details" and "Foundation Selection".

NOISE WALL FOUNDATION DATA TABLE

BORING: **B-013**
 Elevation (ft) (m): **552.5**
 GWT Elevation (ft) (m): _____
 Project ID: **B-10-020 - HAM-75-7.85 - NSA 1B-1**
NOTE: You need to input only Highlighted cells

Row (by Transverse Ground Slope) **5**
 Column (by SPT Blow Counts) **5**

Layer	Depth		Elevation		Thick. (ft)	N	Ave. N @ 5'	C _N	Corr. N	Ave. Corr. N	Soil Type	Post Spacing (ft)	Barrier Height (ft)	Panel Group	Transverse Ground Slope	Drilled Shaft Depth (ft)
	From (ft)	To (ft)	From (ft)	To (ft)												
1	0.0	2.5	552.5	550.0	2.5	17				31	Cohesive	8 thru 12	14 thru 20	III	2:1	7.0
2	2.5	5.0	550.0	547.5	2.5	23	20	1.60	32							
3	5.0	7.5	547.5	545.0	2.5	22										
4	7.5	10.0	545.0	542.5	2.5	28	25	1.20	30							
5	10.0	12.5	542.5	540.0	2.5	24										
6	12.5	15.0	540.0	537.5	2.5	28	26	1.00	26							
7	15.0	17.5	537.5	535.0	2.5	18										
8	17.5	20.0	535.0	532.5	2.5	21	20	0.96	19							
9	20.0	22.5	532.5	530.0	2.5	21										
10	22.5	25.0	530.0	527.5	2.5	37	29	0.90	26							

Notes:

- Drilled shaft diameter = 2'-6"
- Noise wall height is the distance from the top of drilled shaft to the top of the higher barrier wall at that post, rounded to the nearest foot.
- If within the required length of the foundation, bedrock is encountered, the drilled shaft foundation may be terminated after 3 feet of penetration into hard bedrock or 6 feet of penetration into soft bedrock.
- Embedment of posts into the drilled shafts shall not be less than 3'-6", except for concrete posts which shall be embedded not less than 3'-0".

Reference:

Ohio Department Of Transportation plan insert sheets on "Noise Barrier Details" and "Foundation Selection".

NOISE WALL FOUNDATION DATA TABLE

BORING: **B-024** Project ID: **B-10-020 - HAM-75-7.85 - NSA 2B**
 Elevation (ft) (m): **550.8**
 GWT Elevation (ft) (m): _____

Row (by Transverse Ground Slope) **5**
 Column (by SPT Blow Counts) **3**

NOTE: You need to input only Highlighted cells

Layer	Depth		Elevation		Thick. (ft)	N	Ave. N @ 5'	C _N	Corr. N	Ave. Corr. N	Soil Type	Post Spacing (ft)	Barrier Height (ft)	Panel Group	Transverse Ground Slope	Drilled Shaft Depth (ft)
	From (ft)	To (ft)	From (ft)	To (ft)												
1	0.0	2.5	550.8	548.3	2.5	5				12	Granular	16 thru 24	10 thru 14	III	2:1	12.0
2	2.5	5.0	548.3	545.8	2.5	5	5	1.60	8							
3	5.0	7.5	545.8	543.3	2.5	4										
4	7.5	10.0	543.3	540.8	2.5	15	10	1.20	11							
5	10.0	12.5	540.8	538.3	2.5	18										
6	12.5	15.0	538.3	535.8	2.5	13	16	1.00	16							
7	15.0	17.5	535.8	533.3	2.5	12										
8	17.5	20.0	533.3	530.8	2.5	6	9	0.96	9							
9	20.0	22.5	530.8	528.3	2.5	6										
10	22.5	25.0	528.3	525.8	2.5	3	5	0.90	4							

Notes:

- Drilled shaft diameter = 2'-6"
- Noise wall height is the distance from the top of drilled shaft to the top of the higher barrier wall at that post, rounded to the nearest foot.
- If within the required length of the foundation, bedrock is encountered, the drilled shaft foundation may be terminated after 3 feet of penetration into hard bedrock or 6 feet of penetration into soft bedrock.
- Embedment of posts into the drilled shafts shall not be less than 3'-6", except for concrete posts which shall be embedded not less than 3'-0".

Reference:

Ohio Department Of Transportation plan insert sheets on "Noise Barrier Details" and "Foundation Selection".

NOISE WALL FOUNDATION DATA TABLE

BORING: **B-026**
 Elevation (ft) (m): **561.2**
 GWT Elevation (ft) (m): _____
 Project ID: **B-10-020 - HAM-75-7.85 - NSA 2B**
NOTE: You need to input only Highlighted cells

Row (by Transverse Ground Slope) **5**
 Column (by SPT Blow Counts) **5**

Layer	Depth		Elevation		Thick. (ft)	N	Ave. N @ 5'	C _N	Corr. N	Ave. Corr. N	Soil Type	Post Spacing (ft)	Barrier Height (ft)	Panel Group	Transverse Ground Slope	Drilled Shaft Depth (ft)
	From (ft)	To (ft)	From (ft)	To (ft)												
1	0.0	2.5	561.2	558.7	2.5	9				21	Cohesive	16 thru 24	10 thru 14	III	2:1	7.0
2	2.5	5.0	558.7	556.2	2.5	19	14	1.60	22							
3	5.0	7.5	556.2	553.7	2.5	24										
4	7.5	10.0	553.7	551.2	2.5	8	16	1.20	19							
5	10.0	12.5	551.2	548.7	2.5	13										
6	12.5	15.0	548.7	546.2	2.5	17	15	1.00	15							
7	15.0	17.5	546.2	543.7	2.5	14										
8	17.5	20.0	543.7	541.2	2.5	6	10	0.96	10							
9	20.0	22.5	541.2	538.7	2.5	13										
10	22.5	25.0	538.7	536.2	2.5	8	11	0.90	9							

Notes:

- Drilled shaft diameter = 2'-6"
- Noise wall height is the distance from the top of drilled shaft to the top of the higher barrier wall at that post, rounded to the nearest foot.
- If within the required length of the foundation, bedrock is encountered, the drilled shaft foundation may be terminated after 3 feet of penetration into hard bedrock or 6 feet of penetration into soft bedrock.
- Embedment of posts into the drilled shafts shall not be less than 3'-6", except for concrete posts which shall be embedded not less than 3'-0".

Reference:

Ohio Department Of Transportation plan insert sheets on "Noise Barrier Details" and "Foundation Selection".

NOISE WALL FOUNDATION DATA TABLE

BORING: **B-028**
 Elevation (ft) (m): **560.8**
 GWT Elevation (ft) (m): _____

Project ID: **B-10-020 - HAM-75-7.85 - NSA 2B**
NOTE: You need to input only Highlighted cells

Row (by Transverse Ground Slope) **5**
 Column (by SPT Blow Counts) **5**

Layer	Depth		Elevation		Thick. (ft)	N	Ave. N @ 5'	C _N	Corr. N	Ave. Corr. N	Soil Type	Post Spacing (ft)	Barrier Height (ft)	Panel Group	Transverse Ground Slope	Drilled Shaft Depth (ft)
	From (ft)	To (ft)	From (ft)	To (ft)												
1	0.0	2.5	560.8	558.3	2.5	10				19	Cohesive	16 thru 24	10 thru 14	III	2:1	7.0
2	2.5	5.0	558.3	555.8	2.5	13	12	1.60	18							
3	5.0	7.5	555.8	553.3	2.5	21										
4	7.5	10.0	553.3	550.8	2.5	12	17	1.20	20							
5	10.0	12.5	550.8	548.3	2.5	28										
6	12.5	15.0	548.3	545.8	2.5	35	32	1.00	32							
7	15.0	17.5	545.8	543.3	2.5	31										
8	17.5	20.0	543.3	540.8	2.5	26	29	0.96	27							
9	20.0	22.5	540.8	538.3	2.5	26										
10	22.5	25.0	538.3	535.8	2.5	18	22	0.90	20							

Notes:

- Drilled shaft diameter = 2'-6"
- Noise wall height is the distance from the top of drilled shaft to the top of the higher barrier wall at that post, rounded to the nearest foot.
- If within the required length of the foundation, bedrock is encountered, the drilled shaft foundation may be terminated after 3 feet of penetration into hard bedrock or 6 feet of penetration into soft bedrock.
- Embedment of posts into the drilled shafts shall not be less than 3'-6", except for concrete posts which shall be embedded not less than 3'-0".

Reference:

Ohio Department Of Transportation plan insert sheets on "Noise Barrier Details" and "Foundation Selection".

NOISE WALL FOUNDATION DATA TABLE

BORING: **B-030**
 Elevation (ft) (m): **570.0**
 GWT Elevation (ft) (m): _____

Project ID: **B-10-020 - HAM-75-7.85 - NSA 2B**

NOTE: You need to input only Highlighted cells

Row (by Transverse Ground Slope) 5
Column (by SPT Blow Counts) 5

Layer	Depth		Elevation		Thick. (ft)	N	Ave. N @ 5'	C _N	Corr. N	Ave. Corr. N	Soil Type	Post Spacing (ft)	Barrier Height (ft)	Panel Group	Transverse Ground Slope	Drilled Shaft Depth (ft)
	From (ft)	To (ft)	From (ft)	To (ft)												
1	0.0	2.5	570.0	567.5	2.5	17				22	Cohesive	16 thru 24	10 thru 14	III	2:1	7.0
2	2.5	5.0	567.5	565.0	2.5	12	15	1.60	23							
3	5.0	7.5	565.0	562.5	2.5	26										
4	7.5	10.0	562.5	560.0	2.5	9	18	1.20	21							
5	10.0	12.5	560.0	557.5	2.5	17										
6	12.5	15.0	557.5	555.0	2.5	15	16	1.00	16							
7	15.0	17.5	555.0	552.5	2.5	12										
8	17.5	20.0	552.5	550.0	2.5	17	15	0.96	14							
9	20.0	22.5	550.0	547.5	2.5	18										
10	22.5	25.0	547.5	545.0	2.5	19	19	0.90	17							

Notes:

- (1) Drilled shaft diameter = 2'-6"
- (2) Noise wall height is the distance from the top of drilled shaft to the top of the higher barrier wall at that post, rounded to the nearest foot.
- (3) If within the required length of the foundation, bedrock is encountered, the drilled shaft foundation may be terminated after 3 feet of penetration into hard bedrock or 6 feet of penetration into soft bedrock.
- (4) Embedment of posts into the drilled shafts shall not be less than 3'-6", except for concrete posts which shall be embedded not less than 3'-0".

Reference:

Ohio Department Of Transportation plan insert sheets on "Noise Barrier Details" and "Foundation Selection".

NOISE WALL FOUNDATION DATA TABLE

BORING: **B-031**
 Elevation (ft) (m): **570.0**
 GWT Elevation (ft) (m): _____
 Project ID: **B-10-020 - HAM-75-7.85 - NSA 2B**
NOTE: You need to input only Highlighted cells

Row (by Transverse Ground Slope) **5**
 Column (by SPT Blow Counts) **5**

Layer	Depth		Elevation		Thick. (ft)	N	Ave. N @ 5'	C _N	Corr. N	Ave. Corr. N	Soil Type	Post Spacing (ft)	Barrier Height (ft)	Panel Group	Transverse Ground Slope	Drilled Shaft Depth (ft)
	From (ft)	To (ft)	From (ft)	To (ft)												
1	0.0	2.5	570.0	567.5	2.5	14				24	Cohesive	16 thru 24	10 thru 14	III	2:1	7.0
2	2.5	5.0	567.5	565.0	2.5	18	16	1.60	26							
3	5.0	7.5	565.0	562.5	2.5	23										
4	7.5	10.0	562.5	560.0	2.5	14	19	1.20	22							
5	10.0	12.5	560.0	557.5	2.5	19										
6	12.5	15.0	557.5	555.0	2.5	12	16	1.00	16							
7	15.0	17.5	555.0	552.5	2.5	17										
8	17.5	20.0	552.5	550.0	2.5	14	16	0.96	15							
9	20.0	22.5	550.0	547.5	2.5	22										
10	22.5	25.0	547.5	545.0	2.5	32	27	0.90	24							

Notes:

- Drilled shaft diameter = 2'-6"
- Noise wall height is the distance from the top of drilled shaft to the top of the higher barrier wall at that post, rounded to the nearest foot.
- If within the required length of the foundation, bedrock is encountered, the drilled shaft foundation may be terminated after 3 feet of penetration into hard bedrock or 6 feet of penetration into soft bedrock.
- Embedment of posts into the drilled shafts shall not be less than 3'-6", except for concrete posts which shall be embedded not less than 3'-0".

Reference:

Ohio Department Of Transportation plan insert sheets on "Noise Barrier Details" and "Foundation Selection".