



Pro Geotech, Inc.

3201 E. Royalton Road • Cleveland, Ohio 44147 • 440-717-1415 • fax 440-717-1416 • www.progeotech.com

November 4, 2015

Mr. Naiel Hussein, P.E.
Parsons Brinckerhoff
2545 Farmers Drive, Suite 350
Columbus, Ohio 43235

**Reference: Final Roadway Exploration Report for HAN-75-14.39
Findlay, Hancock County, Ohio
PID No. 87005
PGI Project Nos. G13011G & G15004G**

Dear Mr. Hussein:

Enclosed please find our Final Subsurface Exploration Report for the above referenced project. Our services included a geotechnical field exploration, laboratory testing, engineering analysis, and related design and construction recommendations. These services have been provided in accordance with our proposals dated January 16, 2013 and dated December 10, 2014. It is important that the items under "**Limitations**" be precisely followed and complied with.

We appreciate the opportunity of working with you on this project and we invite you to contact us at (440) 717-1415 when we can be of further assistance.

Respectfully,

PRO GEOTECH, INC.

Shan Sivakumaran, P.E.
Project Manager/Geotechnical Engineer

Walid I. Najjar, P.E.
Senior Geotechnical Engineer

Enclosure
Final/Roadway Rpt/SS/11/4/2015

**FINAL
ROADWAY EXPLORATION REPORT
FOR HAN-75-14.39**

**HANCOCK COUNTY, OHIO
PID NO. 87005**

**PREPARED FOR:
PARSONS BRINCKERHOFF**

**PREPARED BY:
PRO GEOTECH, INC.**

NOVEMBER 4, 2015

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1.0 EXECUTIVE SUMMARY

This report has been prepared for the HAN-75-14.39 project which calls for improvements to a section of Interstate Route 75 (IR-75) and U.S. Route 68 (US 68) in Findlay, Hancock County, Ohio. A total of 137 test borings; 134 in 2013 and three (3) in 2015 were advanced at the project for pavement, roadway, and embankment design purposes. Of these test borings, 81 (78 in 2013 and 3 in 2015 along IR-75 mainline) were advanced along IR-75 mainline, proposed IR-75 realignment, IR-75 ramps at SR 12 Interchange, US 68 mainline, and side roads including proposed Lima Avenue, Logan Avenue, Harrison Street, and the proposed Service Road associated with pavement rehabilitation, roadway widening, and embankment construction. Fifty-six (56) of them were advanced in 2013 along proposed US 68 Ramp A, Lima Ramp B, Lima Ramp G, Lima Ramp H, US 68 Ramp D, US 68 Ramp C, Lima Ramp E, Lima Ramp A, US 68 Ramp B, and Lima Ramp F associated with roadway and embankment construction. In order to determine the thickness and composition of the existing pavement, three (3) pavement cores were obtained from Harrison Street, Logan Avenue, and Lima Avenue.

The subsurface soils encountered in the test borings consisted of both fill material and natural soils. The soils are generally cohesive in nature. The fill material consisted of stone fragments (A-1-a), stone fragments with sand (A-1-b), stone fragments with sand, silt, and clay (A-2-6), coarse and fine sand (A-3a), both cohesive and non-cohesive sandy silt (A-4a), silt and clay (A-6a), silty clay (A-6b), and clay (A-7-6). The natural soils consisted of stone fragments with sand (A-1-b), fine sand (A-3), coarse and fine sand (A-3a), both cohesive and non-cohesive sandy silt (A-4a), silt (A-4b), silt and clay (A-6a), silty clay (A-6b), and clay (A-7-6). Elastic silt and clay (A-5) and elastic clay (A-7-5) soils which are considered unsuitable soils according to ODOT CMS 703.16 Specifications were also encountered in some of the test borings drilled for proposed ramps. Bedrock was encountered at relatively shallow depths below the existing ground surface. The bedrock was slightly strong to very strong in relative strength and moderately weathered and contained very thin to thin bedding. The bedrock was fractured to moderately fractured, contained tight aperture spacing with slightly rough surfaces. Based on the sulfate test results performed on the upper soil samples of pavement borings, about 10% of the tested soil samples have sulfate content greater than 3,000 ppm. Table 5.1.1 summarizes the test boring that had a sulfate content greater than 3,000 ppm.

Table 5.1.1 – Summary of High Sulfate Content Soils Information

Roadway	Boring No.	Station	Sulfate Content (ppm)
IR 75	B-001-0-13	745+51.3, 44.5' RT	10119
IR 75	B-003-3-13	754+55.7, 29.0' LT	12779
IR 75	B-004-0-13	758+26.5, 74.2' LT	14839
IR 75	B-007-0-13	770+17.5, 23.1' LT	4431
SR 15/US 68	B-079-0-13	743+86.8, 11.6' LT	4974

Table 5.1.3 summarizes the thickness, depth range below the existing ground where unsuitable soil encountered in test boring locations of the Ramps.

Table 5.1.3 – Summary of Unsuitable Soils Information

Roadway	Boring No.	Station	Depth Range Below Existing Ground (feet)	Thickness (feet)	Soil Type
US 68 Ramp A	B-091-0-13	775+11	2.0 - 11.0	9.0	A-7-5
Lima Ramp G	B-119-0-13	800+35	3.5 - 8.5	5.0	A-5
Lima Ramp G	B-120-0-13	801+92	0.5 - 8.0	7.5	A-7-5
Lima Ramp H	B-104-0-13	800+49	4.0 - 6.0	2.0	A-5
Lima Ramp H	B-105-0-13	804+50	6.0 - 6.5	0.5	A-7-5
Lima Ramp H	B-110-1-13	804+97 *	6.0 - 8.5	2.5	A-7-5
Lima Ramp H	B-111-0-13	805+73*	3.0 - 8.5	5.5	A-7-5
Lima Ramp H	B-111-1-13	806+30*	1.0 - 3.5	2.5	A-7-5
Lima Ramp H	B-113-0-13	806+79 *	18.5 - 21.0	2.5	A-7-5
Lima Ramp H	B-106-0-13	808+92	0.6 - 7.5	6.9	A-7-5
US 68 Ramp D	B-108-0-13	801+21	1.5 - 8.5	7.0	A-7-5
US 68 Ramp D	B-109-0-13	802+89	3.5 - 7.5	4.0	A-7-5
US 68 Ramp D	B-111-1-13	806+30	1.0 - 3.5	2.5	A-7-5
Lima Ramp E	B-144-0-13	783+96	0.5 - 3.5	3.0	A-7-5
Lima Ramp E	B-141-0-13	790+87	6.0 - 8.5	2.5	A-7-5
US 68 Ramp B	B-154-0-13	804+02	0 - 6.0	6.0	A-7-5/A-5
US 68 Ramp B	B-135-1-13	795+80 **	6.0 - 14.0	8.0	A-7-5
US 68 Ramp B	B-135-2-13	794+50	0.5 - 3.5	3.0	A-7-5
US 68 Ramp B	B-155-0-13	808+02	0.5 - 3.5	3.0	A-7-5
Lima Ramp F	B-158-0-13	803+01	6.0 - 7.2	1.2	A-5

* Referenced to U 68 Ramp D Baseline and ** Referenced to US 68 Ramp C Baseline

The soil information obtained from the project test borings advanced along IR-75 and US 68 mainlines was used to obtain pavement design parameters. The pavement design parameter information is summarized in Table 6.1.1.

Table 6.1.1 – Summary of Pavement Design Parameters

Parameter	Value
Average N _{60L}	12.3
Average PI	14.7
Average Group Index	7.01
Average CBR	7
Resilient Modulus (M _R , psi)	8,400

Table 6.2.23 summarizes the station limits along Roadway/Ramps where waiting period is required to allow the foundation soil to consolidate after completing the embankment and before constructing the pavement and/or approach slab. Waiting period should be applied on the Ramp section which has waiting period between 98 days and 425 days.

Table 6.2.23 – Summary of Waiting Period for Roadway/Ramps

Roadway/Ramp	Boring No.	Embankment Design Height (feet)	Total Settlement (inches)	Waiting Period (Days)	Approximate Station Limits
IR 75 Realignment	B-016-0-13	24.0	1.30	14	799+00 to 813+00
IR 75 Widening	B-049-1-13	20.6	1.37	15	895+00 to 905+50
US 68 Ramp A	B-091-0-13 *	5.8	8.02	424	773+00 to 777+00
Lima Ramp G	B-120-0-13 *	13.5	4.62	231	798+35 to 803+92
Lima Ramp H	B-104-0-13	6.0	1.94	32	798+49 to 801+60
Lima Ramp H	B-111-1-13	6.0	8.93	165	806+50 to 807+25
US 68 Ramp D	B-108-0-13 *	12.9	9.40	233	799+21 to 804+89
US 68 Ramp D	B-110-0-13	22.0	6.14	178	804+89 to 806+45
US 68 Ramp C	B-136-0-13	35.0	1.32	14	791+50 to 794+75
US 68 Ramp C	B-132-0-13	55.2	5.86	3	799+25 to 802+25
Lima Ramp E	B-144-0-13	4.7	6.93	99	781+10 to 785+96
Lima Ramp E	B-141-0-13 *	16.1	16.19	402	788+87 to 792+87
US 68 Ramp B	B-154-0-13 *	14.8	5.45	254	803+00 to 806+00
US 68 Ramp B	B-155-0-13*	19.3	11.58	141	807+00 to 810+02
Lima Ramp F	B-158-0-13	10.6	2.12	30	801+01 to 805+01

* Required Installing Settlement Plate

Table 6.3.1 summarizes the revised waiting periods for surcharge load height (half of the embankment design height) of each ramp section where surcharge treatment is required to accelerate the settlement of the foundations soils and to reduce the waiting period. Table 6.3.1 also summarizes the

settlement under proposed embankment design height and settlement under pre-loading (proposed embankment and surcharge load).

Table 6.3.1 – Summary of Revised Waiting Periods for Pre-Loading

Ramp Section	Boring No.	Height of Surcharge Layer (feet)	Settlement under Proposed Embankment (inches)	Settlement under Pre-Loading (inches)	Waiting Period (Days)
US 68 Ramp A	B-091-0-13	3.0	8.02	10.92	223
Lima Ramp G	B-120-0-13	7.0	4.62	5.66	166
Lima Ramp H	B-111-1-13	3.0	8.93	10.97	111
US 68 Ramp D	B-108-0-13	6.0	9.40	11.37	174
US 68 Ramp D	B-110-0-13	11.0	6.14	7.40	115
Lima Ramp E	B-144-0-13	2.0	6.93	8.31	77
Lima Ramp E	B-141-0-13	8.0	16.19	19.66	217
US 68 Ramp B	B-154-0-13	7.0	5.45	6.53	156
US 68 Ramp B	B-155-0-13	10.0	11.58	13.32	93

If these revised waiting periods summarized in Table 6.3.1 still conflict with project construction schedule, other alternatives; installing sand or wick drains in foundations soils or excavation of unsuitable compressible soils and replacement with ODOT Item 203 should be explored to mitigate the settlement along subject ramp sections.

Table 6.3.2 summarizes the revised waiting periods for using sand drains under proposed embankment design height at each subject ramp section. For the calculations, sand drains triangular spacing of 9 feet center to center and diameter of 1 foot were assumed.

Table 6.3.2 – Summary of Revised Waiting Periods for Sand Drains

Ramp Section	Boring No.	Initial Total Settlement (inches)	Combined Degree of Consolidation (%)	Waiting Period (Days)	Approximate Station Limits
US 68 Ramp A	B-091-0-13 *	8.02	96	120	773+00 to 777+00
Lima Ramp G	B-120-0-13 *	4.62	97	101	798+35 to 803+92
Lima Ramp H	B-111-1-13	8.93	97	81	806+50 to 807+25
US 68 Ramp D	B-108-0-13 *	9.40	97	101	799+21 to 804+89
US 68 Ramp D	B-110-0-13	6.14	97	81	804+89 to 806+45
Lima Ramp E	B-144-0-13	6.93	98	67	781+10 to 785+96
Lima Ramp E	B-141-0-13 *	16.19	97	134	788+87 to 792+87
US 68 Ramp B	B-154-0-13 *	5.45	97	101	803+00 to 806+00
US 68 Ramp B	B-155-0-13 *	11.58	98	81	807+00 to 810+02

* Required Installing Settlement Plate

If excavation and replacement method is selected to mitigate the settlement in foundation soils, removal of compressible soils; elastic clay (A-7-5) soils and elastic silt and clay (A-5) soils should be required beyond both sides of toe of the embankment slope and replacing it with ODOT Item 203 before placing fill for the proposed embankment. Table 6.3.3 summarizes the excavation depths below existing ground and Station Limits for removal in the vicinity of test boring locations. The actual excavation depths and station limits should be determined at the site by the field engineer based on the encountered soil conditions.

Table 6.3.3 – Summary of Excavation Limits of Compressible Soils

Roadway	Boring No.	Excavation Depth Below Existing Ground (feet)	Approximate Station Limits	Reason for Removal
US 68 Ramp A	B-091-0-13	11.0	773+00 to 777+00	A-7-5
Lima Ramp G	B-119-0-13	8.5	798+35 to 801+00	A-5
Lima Ramp G	B-120-0-13	8.0	801+00 to 803+92	A-7-5
Lima Ramp H	B-104-0-13	6.0	798+49 to 801+60	A-5
Lima Ramp H	B-105-0-13			A-7-5
Lima Ramp H	B-110-1-13			A-7-5
Lima Ramp H	B-111-0-13	See Table 6.5.1		A-7-5
Lima Ramp H	B-111-1-13	3.5	806+50 to 807+25	A-7-5
Lima Ramp H	B-113-0-13			A-7-5
Lima Ramp H	B-106-0-13	See Table 6.5.1		A-7-5
US 68 Ramp D	B-108-0-13	8.5	799+21 to 802+00	A-7-5
US 68 Ramp D	B-109-0-13	7.5	802+00 to 804+89	A-7-5
US 68 Ramp D	B-110-0-13	6.0	804+89 to 805+45	A-7-5
Lima Ramp E	B-144-0-13	See Table 6.5.1		A-7-5
Lima Ramp E	B-141-0-13	8.5	788+87 to 792+87	A-7-5
US 68 Ramp B	B-135-1-13	13.5	803+00 to 803+50	A-7-5
US 68 Ramp B	B-154-0-13	6.0	803+50 to 804+50	A-7-5/A-5
US 68 Ramp B	B-135-2-13	3.5	804+50 to 806+00	A-7-5
US 68 Ramp B	B-155-0-13	3.5	807+00 to 810+02	A-7-5
Lima Ramp F	B-158-0-13	7.2	801+01 to 805+01	A-7-5

Table 6.5.1 summarizes the station limits of the roadway and ramp sections where special benching is required during the construction of proposed embankment.

Table 6.5.1 – Summary of Special Benching Locations

Roadway	Approximate Station Limits
IR-75 Widening	771+50 to 772+00, Left
IR-75 Widening	773+50 to 776+00, Left
IR-75 Widening	783+50 to 784+00, Left
IR-75 Widening	955+50 to 958+00, Left
IR-75 Widening	958+50 to 960+75, Left
IR-75 Widening	984+00 to 986+00, Right
IR-75 Widening	987+50 to 988+50, Right
SR 12 Ramp C	865+75 to 868+00, Left
SR 12 Ramp D	866+50 to 868+50, Right
US 224 Ramp B	922+00 to 923+00, Right
US 224 Ramp D	929+00 to 930+50, Right

The stabilizing options may be by modifying the properties of the soil using either cement or lime kiln dust. Since the average Plasticity Index (PI) for the entire project is 14.6, the stabilizing option must be performed by modifying the properties of the soils using cement. The stabilization depth should be 12 inches. Chemical stabilization will not be effective on these soils that have high sulfate content. Therefore, the excavation and replacement option should be used to stabilize the subgrade in the high sulfate content soil areas. However, based on the ODOT *GBI Subgrade Analysis* spreadsheet, unstable soils with low N values and/or excessive moisture were not encountered within the 3 feet of the proposed subgrade in project test borings drilled between Stations 744+28 and 770+217 of IR-75 and between Stations 741+87 and 745+87 of US 68/SR 15. Therefore, excavation and replacement option is not required to stabilize the subgrade where high sulfate content soils encountered. However, ODOT recommends stabilizing the subgrade to the depth of 12 inches between Stations 756+00 to 760+00 using excavation and replacement option due to prevalent A-4a soil encountered in the southern end of the project.

Unstable soils that have low N values (<10) and/or high moisture contents (>optimum moisture+3%, wet soils) will be present along the existing grade of the proposed ramps and roadway. Unstable soils will also be present in the wetlands and drainage ditches where proposed ramps cross. If these unstable soils are left in place, they may cause slope instability to the proposed embankment. Therefore, all existing unstable soils need to be removed beyond the toe and replaced with ODOT Item 203 before

placing fill for embankment construction. All replacement soils should be compacted to 95% of the maximum dry density in accordance with ODOT 203.05 specifications before placing fill for embankment construction. Table 6.5.2 summarizes the test boring locations of the roadway and ramps and station limits where unstable/unsuitable soils were encountered within the upper three (3) feet.

Table 6.5.2 – Summary of Excavation Limits of Unsuitable/Unstable Soils

Roadway	Boring No.	Excavation Depth Below Existing Ground (feet)	Approximate Station Limits	Problem
IR-75 Realignment	B-012-0-13	2.0	789+00 to 795+00, Left	Wetland F
IR-75 Realignment		2.0	798+00 to 802, Left	Wetland E
IR-75 Widening	B-027-2-13	Disk and dry	824+44 to 828+44, Right	Excess Moisture
IR-75 Widening	B-047-1-13	Disk and dry	900+91 to 904+91, Left	Weak
US 68 Ramp A	B-093-0-13	Disk and dry	781+45 to 785+45	Weak & Ex. Moisture
US 68 Ramp A	B-097-0-13	Disk and dry	797+75 to 801+75	Weak & Ex. Moisture
Lima Ramp B	B-098-0-13	3.0	745+00 to 747+50	Weak
Lima Ramp B	B-100-0-13	2.0	751+76 to 755+76	Unstable Soil
Lima Ramp G	B-102-0-13	Disk and dry	791+00 to 791+00	Weak & Ex. Moisture
Lima Ramp H	B-111-0-13	3.5	805+50 to 806+50	Unsuitable Soil A-7-5*
Lima Ramp H	B-106-0-13	3.0	808+50 to 809+83	Unsuitable Soil A-7-5*
US 68 Ramp C	B-132-0-13	2.0	799+05 to 801+50	Wetland E
US 68 Ramp C	B-124-0-13	2.0	806+20 to 813+00	Wetland I
US 68 Ramp C	B-123-0-13	2.0	813+00 to 817+00	Wetland I
Lima Ramp E	B-144-0-13	3.5	781+10 to 785+96	Unsuitable Soil A-7-5*
Lima Ramp E		2.0	783+10 to 786+20	Wetland C
Lima Ramp A	B-147-0-13	1.5	751+87 to 755+87	Unstable Soil
Lima Ramp F	B-159-0-13	3.5	804+50 to 806+10	Unstable Soil
Lima Ramp F		1.5	801+50 to 805+50	Pond 2
Lima Ramp F	B-160-0-13	3.0	806+10 to 810+00	Pond 1
Lima Ramp F		2.0	811+80 to 814+90	Wetland C

*Unsuitable soils near subgrade

2.0 INTRODUCTION

This report has been prepared for the HAN-75-14.39 project which calls for improvements to a section of Interstate Route 75 (IR-75) and U.S. Route 68 (US 68) in Findlay, Hancock County, Ohio. Also included in this report are proposed improvements to the IR-75/US 68 interchange and to three side roads. It represents the intent of Parsons Brinckerhoff (PB), the design engineer, and the Ohio Department of Transportation (ODOT), the owner, to secure subsurface information at the selected locations in accordance with ODOT's *Specifications for Geotechnical Explorations*, and to obtain recommendations regarding geotechnical factors pertaining to design and construction of this project.

2.1 Project Description

Present plans call for the improvements to sections of IR-75 and US 68 in Findlay, Hancock County, Ohio. The IR-75 section starts at 0.22 miles north of C.R. 313/Lima Avenue and ends at 0.4 miles south of C.R. 99 with an approximate length of 5.128 miles. The US 68 section starts at 0.56 miles south of C.R. 313/Lima Avenue and ends at IR-75 with an approximate length of 1.0 mile. As part of these improvements, a section of IR-75 between Harrison Street and the Norfolk Southern Railroad Bridges will be completely realigned, a third lane will be added along IR-75 in each NB and SB direction either along the median or outside shoulders depending on space availability, and existing pavement along IR-75 within the project limit will be rehabilitated to full depth of pavement. A new embankment with an approximate length of 3350 feet and maximum height of 27.5 feet will be constructed along the realignment between Stations 788+50 to 822+00 of the IR-75 baseline. Due to this IR-75 SB and NB widening along the section of IR-75 outside shoulders, the existing embankment sections with a height of more than 10.0 feet will be widened between Stations 817+50 to 824+50 and between Stations 893+00 to 912+50. Sections of all IR-75 ramps at the SR 12 and US 224 interchanges will be rehabilitated to full depth of pavement. Existing US 68 pavement within the project limit will be rehabilitated to full depth.

Present plans also call for redesigning the IR-75/US 68 interchange completely. As part of redesigning the IR-75/US 68 Interchange, a total eight 8 bridges; 3 will be newly constructed and 5 will be replaced. Existing ramps will completely be removed and replaced with ten (10) new ramps; US 68 Ramp A, US 68 Ramp B, US 68 Ramp C, US 68 Ramp D, Lima Ramp A, Lima Ramp B, Lima Ramp E, Lima Ramp F, Lima Ramp G, and Lima Ramp H. Associated with redesigning IR-75/US 68 interchange, US 68/Lima Avenue interchange will be completely redesigned and Lima Avenue will be realigned.

Sections of Side Roads including Harrison Street and Logan Avenue will be rehabilitated and a proposed Service Road will be constructed. The Site Location Map is presented as Figure 2.2.

This report has been developed based on the field exploration program, laboratory testing, and information secured for site-specific studies. It must be noted that, as with any exploration program, the site exploration identifies actual subsurface conditions only at those locations where samples were obtained. The data derived through sampling and laboratory testing is reduced by geotechnical engineers and geologists who then render an opinion regarding the overall subsurface conditions and their likely reaction on the site. The actual site conditions may differ from those inferred to exist. Therefore, although a fair amount of subsurface data has been assembled during this exploration, this report may not provide all of the geotechnical data needed for construction of this project. This report was prepared using English units.

2.2 Scope of Services

The scope of services for this project was in accordance with Pro Geotech, Inc. (PGI) Proposal Nos. PG12067 dated January 16, 2013 and PG14044 dated December 10, 2014 and governed by ODOT's *Specifications for Geotechnical Explorations* dated January 2007 and updated January 20, 2012 and ODOT's *Geotechnical Bulletin (GB1)* dated January 12, 2012, hereafter referred to as ODOT Specifications. Our scope of services consisted of the execution of the following tasks:

Task I – Planning and Marking Test Borings, which primarily consisted of performing the site reconnaissance to evaluate the proposed project site from a geotechnical standpoint, reviewing and compiling all existing geology of the project site obtained from ODOT and ODNR sources, obtaining necessary permits and notifying the Ohio Utility Protection Services (OUPS) about the proposed drilling operations. Test borings were marked in the field by PGI personnel based on the boring location stations provided by PB personnel.

Task II - Test Boring and Sampling Program, which primarily consisted of field verification of the test boring locations with regards to the underground utilities, advancing the test borings at the site, conducting field tests, sampling the subsurface materials, and preparing field drilling logs.

Our scope of services included advancing a total of 124 test borings; 121 in 2013 and three (3) in 2015 for the subgrade, roadway and embankment design purposes. Sixty two of these test borings were

to be advanced for the subgrade design purposes for the rehabilitation of IR-75, IR-75 Ramps at SR 12 Interchange, US 68, Proposed Lime Avenue, and side roads. These subgrade test borings were to be advanced to an approximate depth of seven (7) feet each below the existing subgrade. Rest of the Sixty two test borings were to be advanced for roadway and embankment design purposes for the IR-75 widening, realignment and redesigning the ramps at the interchange of IR-75/US 68. These test borings were advanced to approximate depths ranging from 10 feet to 45 feet below the existing ground surface.

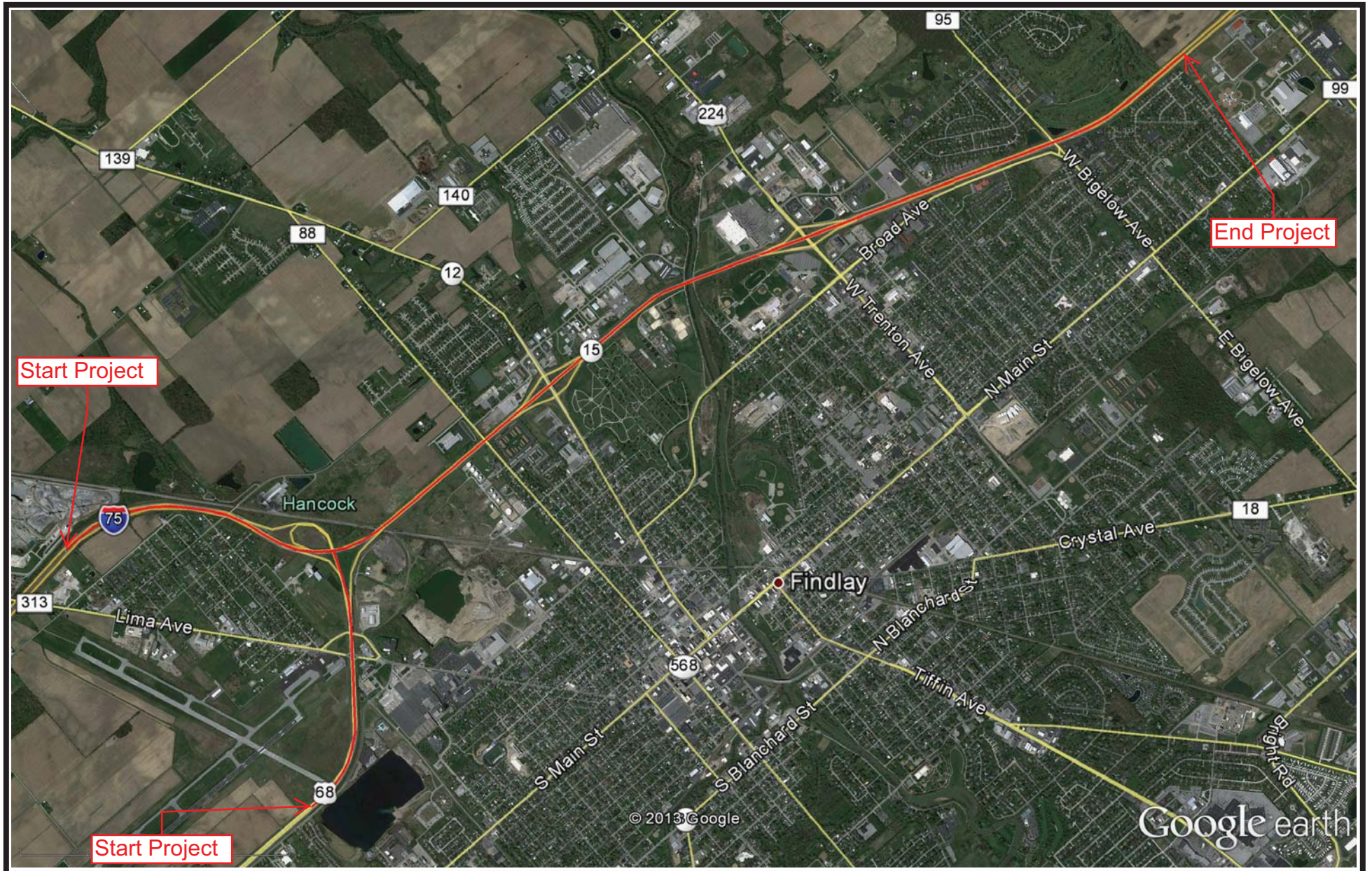
All test borings were advanced in accordance with the ODOT *Specifications for Geotechnical Explorations*. The groundwater conditions were monitored during and upon completion of the drilling operations. PGI provided all of the traffic control required during the fieldwork.

Task III - Testing Program, which consisted of performing soil classification and engineering properties tests on selected soil and rock samples, and classifying the soils in accordance with the ODOT Soil Classification System.

Task IV - Geotechnical Exploration Report, which included the following:

- A brief description of the project and our exploration methods
- Typed drilling logs and laboratory test results
- A description of subsurface soil, rock, and groundwater conditions
- Discussions pertaining to earthwork considerations, groundwater management, and construction monitoring
- Recommendations and discussions pertaining to pavement design including CBR Value(s)
- Embankment recommendations including estimated settlement and slope stability analysis
- Preparation of ODOT Geotechnical Design Checklists
- Geotechnical Exploration Plans are included in our scope of services for this project

The scope of services did not include any environmental assessments for the presence or absence of wetlands or hazardous or toxic materials in the soil, surface water, groundwater or air, on, below, or around this site. Any statement in this report or on the boring logs regarding odors, colors or unusual or suspicious items or conditions is strictly for the client's information.



Google Earth Pro

miles 3

Project: HAN-75-14.39
 Findlay, Hancock County, Ohio
 Site Location Map - Figure 2.1



3.0 GEOLOGY AND OBSERVATIONS OF THE PROJECT

3.1 Geology

Based on information obtained from the Physiographic Regions of Ohio, the project site lies on the Huron-Erie Lake Plains and Till Plains Sections of the Central Lowland Province. The southern part of the project site is located within the Findlay Embayment District of the Maumee Lake Plains Region of the Huron-Erie Lake Plains Section while the northern part of the project site is located within the Central Ohio Clayey Till Plain Region of the Till Plains Section. The Columbus Escarpment separates the Findlay Embayment District from the Central Ohio Clayey Till Plain Region. The project site is located at approximate elevations ranging from 776 feet to 830 feet. According to Bulletin 44, *Geology of Water in Ohio* (issued in 1943 and reprinted in 1968), both the Illinoian and Wisconsin Glaciers passed over the area and left a coating of drift materials (largely till) ranging from 5 feet to 100 feet in thickness. The main geologic deposit in the southern part of the project site consists of silty to gravelly Wisconsinan-age lacustrine deposits and wave-planed clay till; ground moraine, flat to gently undulating over Dolomite bedrock of Silurian-age. The northern part of the project site consists of clayey, high-lime Wisconsinan-age till; lake-planed moraine, very flat, planed by waves in glacial lakes; small patches of sand, silt, or clay over Dolomite bedrock of Silurian-age. Based on the *Soil Survey of Hancock County, Ohio* and from the *U.S. Department of Agriculture, Natural Resource Conservation Service* website, the natural site soils in the vicinity of the project area consist primarily of layers of loam, clay loam, sandy clay loam, silty clay loam, silt loam, silty clay, clay, fine sandy loam, gravelly clay loam, gravelly loam, gravelly sandy loam, gravelly coarse sandy loam, gravelly loamy coarse sand, very gravelly loamy coarse sand, stratified gravelly sandy loam to loam and stratified sandy loam to gravelly silty loam. These soils are classified as A-4, A-6, A-7, A-1-b, A-2, A-1, and A-3 based on the AASHTO Soil Classification System. However, the project site has incurred cut and fill operations due to construction of existing IR-75 and US 68. Thus the composition of the surface and subsurface soils has changed from natural in most areas.

Based on information obtained from the Ohio Geological Survey, bedrock in the vicinity of the project site was deposited during the Upper and Lower Silurian Period of the Paleozoic Era and is expected to consist of Tymochtee/Greenfield Group dolomite. Tymochtee Group dolomite is described as shades of gray and brown, very finely crystalline which occur as thin to massive beds with carbonaceous shale laminae and beds. Greenfield Group dolomite is described as shades of gray and brown; very finely to coarsely crystalline which occurs as massive beds to laminae; argillaceous and locally brecciated in the

lower portion. According to ODNR's Ohio Gas and Oil Wells Locator website, many active and abandoned wells are located within the project site. According to ODNR's Ohio Mines Locator website, no abandoned underground or surface mines are present in the immediate vicinity of the project site. Based on the Ohio Division of Geological Survey Interactive Map of Ohio Mineral Industries, an active limestone industrial quarry is located approximately 0.4 miles southwest of the project site. According to ODNR, the project site is located outside of the "Probable Karst Regions" of Ohio and outside of the "Landslide-Prone Areas" of Ohio. According to the ODNR website, two (2) earthquakes occurred within Hancock County; one in 1990 with a magnitude of 2.3 Richter Scale and another in 2011 with a magnitude of 2.4 Richter Scale. Their epicenters were located, respectively approximately 8.8 miles to the northeast in Big Lick Township and 14.2 miles to the south in Delaware Township.

3.2 Observations of the Project

The reconnaissance was performed by one of PGI's geotechnical engineers in June 2013 on the project sites; IR-75/US 68 mainlines, proposed Ramps at the IR-75/US 68 Interchange, and side roads. These sites are located to the west and south-west of the Findlay downtown area. The Blanchard River intersects the project site on the north side. This section of IR-75 and US 68 NB and SB consists of two traffic lanes in each direction with paved shoulders. Pavement of existing IR-75 and US 68 traffic lanes appeared to be in good condition with few transverse cracks observed in the pavement across the entire project site. Occasional edge cracking was observed along the edge of pavement. Median shoulders along IR-75 are covered with grass south of the Harrison Street Bridge and north of the US 224 Bridge. The embankment sections of existing IR-75 and US 68 within the project site generally appeared to be in good condition with occasional minor erosion. These embankment sections are covered with grass and/or small bushes. No visible signs of embankment slope instability were observed and embankment settlement was not observed. Three wetland areas are located within the proposed ramp sites at the IR-75/US 68 interchange. Few drainage ditches are located within the project site and tall cattail vegetation was observed in the wetland areas and along the drainage ditches. The proposed ramp sites are covered with grass, small bushes, and few trees and are relatively flat. The pavement surface of the existing ramps consists of an asphaltic concrete overlay which generally appeared to be in fair condition. Underground oil, gas, sewer, and water lines are present across the project site. The side roads pavement surfaces consist of asphaltic concrete, which generally appeared to be in fair to poor condition. Longitudinal and lateral cracks were observed across the existing pavement throughout the side roads.

4.0 EXPLORATION

4.1 Historic and Project Exploration Program

Historic Information from three (3) geotechnical explorations performed in 1955, 2002, and 2010 within the project limits was obtained from the ODOT Geotechnical Documents Management System ftp site. This historic information is provided below and included in Appendix A.

1955 Exploration: A roadway exploration was performed in 1955 under the project designation of HAN-25-13.71 (HAN-25-12.99) for the original construction of a section of IR-75 from 0.89 miles south of Lima Avenue (CR 313) to 400 feet north of CR 95 with a total project length of 5.74 miles. Soil profile sheets are available for this exploration. Note that many of the historic soil borings presented on the soil profile sheets represent the original grade and most of which is embankment fill that was placed to raise the grade to current IR-75 subgrade. N-values from SPT tests were not included on the soil profiles of the historic borings. Therefore they were not included in the project soil profile sheets.

2002 Exploration: A structure foundation exploration was performed in 2002 under the project designation of HAN-75-15.99 for the West Sandusky Street Bridge over IR-75. Structure Foundation Investigation sheets are available for this exploration. Soil information obtained from test boring B-104-0-02 which was advanced along IR-75 median was included in the project soil profile sheet.

2010 Exploration: A roadway/structure exploration was performed in 2010 under the project designation of HAN-224-11.81 for US 224 Interchange improvements. Soil profile sheets are available for this exploration. Soil information obtained from test borings B-006-0-10, B-010-0-10 through B-013-0-10, B-015-0-10 through B-017-0-10, B-021-0-10 through B-023-0-10, and B-025-0-10 through B029-0-10 which were advanced in the vicinity of US 224 Interchange were included in the project soil profile sheets.

Current Project Exploration: In order to explore the subsurface conditions at the project site, drilling, sampling, and field testing operations were performed during June through September, 2013 and April 2015. A total of 137 test borings; 134 in 2013 and 3 in 2015 were advanced at the project for pavement, roadway, and embankment design purposes. Of these test borings, 81 (78 in 2013 and 3 in 2015 along IR-75 mainline) were advanced along IR-75 mainline, proposed IR-75 realignment, IR-75 ramps at SR 12 Interchange, US 68 mainline, and side roads including proposed Lima Avenue, Logan Avenue, Harrison Street, and the proposed

Service Road associated with pavement rehabilitation, roadway widening, and embankment construction. Fifty-six (56) of them were advanced in 2013 along proposed US 68 Ramp A, Lima Ramp B, Lima Ramp G, Lima Ramp H, US 68 Ramp D, US 68 Ramp C, Lima Ramp E, Lima Ramp A, US 68 Ramp B, and Lima Ramp F associated with roadway and embankment construction. Refer to the Boring Location Map included in Appendix A for exact location of the test borings. In order to determine the thickness and composition of the existing pavement, three (3) pavement cores were obtained from Harrison Street, Logan Avenue, and Lima Avenue.

IR-75 & US 68 Mainlines: Of the 81 test borings, 37 were identified as B-001-0-13 through B-011-0-13, B-028-0-13 through B-042-0-13, B-053-0-13, B-054-0-13, B-056-0-0-13, B-057-0-13, B-061-0-13 through B-064-0-13, B-066-0-13 through B-068-0-13 were advanced in 2013 and three (3) were identified as B-070-0-14, B-073-0-14, and B-076-0-14 were advanced in 2015 along existing IR-75 SB and NB lanes and shoulders for pavement rehabilitation and widening purposes. Eight (8) test borings identified as B-012-0-13 through B-016-0-13, B-021-0-13, B-025-1-13, and B-026-0-13 were advanced along proposed IR-75 realignment between Stations 788+50 and 822+00 for embankment design purposes. Eleven (11) test borings identified as B-118-0-13, B-026-2-13, B-027-0-13, B-027-2-13, B-043-0-13, B-044-0-13, B-044-1-13, B-047-1-13, B-049-0-13, B-049-1-13, and B-050-0-13 were advanced along two (2) sections of existing IR-75 between Stations 817+50 and 824+50, Right and between Stations 893+00 and 914+50, Right and Left for embankment widening design purposes. Six (6) test borings identified as B-034-1-13, B-035-1-13, B-035-2-13, B-036-1-13, B-037-1-13, and B-038-1-13 were advanced along IR 75 ramps at SR 12 interchange for realignment and rehabilitation design purposes. Six (6) test borings identified as B-078-0-13 through B-082-0-13, and B-088-0-13 were advanced along US 68 SB and NB lanes for pavement rehabilitation and widening design purposes. Ten (10) test borings identified as B-162-0-13 through B-166-0-13 and B-178-0-13 through B-180-0-13 were advanced along sections of existing side roads including proposed Lima Avenue, Logan Avenue, Harrison Street, and the proposed Service Road for pavement rehabilitation and roadway design purposes. These test borings were advanced to approximate depths ranging from 2.5 feet to 43.6 feet below the existing ground/pavement surface.

Proposed Ramps: Of the fifty-five (55) test borings; nine (9) test borings identified as B-089-0-13 through B-097-0-13 were advanced along US 68 Ramp A for roadway/embankment design purposes. Four (4) test borings identified as B-098-0-13 through B-101-0-13 were advanced along Lima Ramp B for

roadway/embankment design purposes. Four (4) test borings identified as B-102-0-13, B-103-0-13, B-119-0-13, and B-120-0-13 were advanced along Lima Ramp G for roadway/embankment design purposes. Three (3) test borings identified as B-104-0-13, B-105-0-13, and B-106-0-13 were advanced along Lima Ramp H. Six (6) test borings identified as B-107-0-13 through B-110-0-13, B-115-0-13, and B-117-0-13 were advanced along US 68 Ramp D for roadway/embankment design purposes. Nine (9) test borings identified as B-121-0-13 through B-125-0-13, B-132-0-13, B-136-0-13, B-138-0-13, and B-140-0-13 were advanced along US 68 Ramp C for roadway/embankment design purposes. Four (4) test borings identified as B-141-0-13, B-143-0-13 through B-145-0-13 were advanced along Lima Ramp E for roadway/embankment design purposes. Four (4) test borings identified as B-146-0-13 through B-149-0-13 were advanced along Lima Ramp A for roadway/embankment design purposes. Five (5) test borings identified as B-150-0-13 and B-153-0-13 through B-156-0-13 were advanced along US 68 Ramp B for roadway/embankment design purposes. Seven (7) test borings identified as B-151-0-13, B-152-0-13, B-157-0-13 through B-161-0-13 were advanced along Lima Ramp F for roadway/embankment design purposes. These test borings were advanced to approximate depths ranging from 2.7 feet to 36.0 feet below the existing ground/pavement surface.

General: All test borings were advanced in accordance with accepted ASTM procedures. All test borings from the above subsurface exploration were monitored for the presence of groundwater during the drilling operations and were backfilled upon completion of drilling operations for safety purposes. The test borings were marked in the field based on boring location plans developed by PGI personnel and after obtaining approval from PB personnel. The test borings located along existing IR-75 and US 68 mainlines were marked by PGI. The test borings located along the ramps were marked by PB and PGI. Site geometry, utility locations, overhead clearance, and accessibility were also taken into account when locating the test borings. Test boring B-160-0-13 located along the proposed Lima Ramp F was moved approximately 90 feet to the south due to a pond located along the proposed ramp alignment. During sampling at test boring B-152-0-13 located along the proposed Lima Ramp F, the split spoon dropped from a depth of 7.0 feet to 8.0 feet with no resistance indicating a void due to a possible storm conduit. It was decided to terminate the hole at 8.0 feet. No utility marks were observed at this boring location prior to drilling. At the time of test boring location selection, the vertical soil sampling intervals were determined based on the needs for design and construction of the project. A total of seven (7) drill rigs; four of which were All Terrain Vehicle (ATV) mounted Diedrich 90, Diedrich 50, CME 45C, and CME 750X and three

were truck mounted CME 55, CME 75, and CME 45B were used to advance the test borings. All borings were advanced using 2.25-inch and 3.25-inch inside diameter, continuous flight hollow stem augers (HSA). Representative disturbed soil samples were collected at intervals in accordance with ODOT Specifications. A standard 2.0-inch outside diameter split-barrel sampler was driven into the soil by means of a 140-lb hammer falling freely through a distance of 30-inches in accordance with the Standard Penetration Test (ASTM D 1586). A total of 21 undisturbed Shelby Tube samples were obtained in 2013 in accordance with Thin-Walled Tube Sampling of Soils (ASTM D 1587) from the test borings. Two (2) undisturbed Shelby Tube samples were also obtained in 2015 in the vicinity of test borings B-120-0-13 and B-154-0-13 for additional laboratory testing of unsuitable soils. All test borings were monitored for the presence of groundwater during drilling operations and upon completion. All test borings were backfilled with compacted soil cuttings and/or bentonite mix upon completion of drilling operations for safety purposes. All borings advanced through pavement were capped with of asphalt patch and/or Set 45 non-shrink concrete to match existing pavement at the end of drilling operations.

Latitude/longitude and northing/easting coordinates, stations and offsets, and surface elevations at the drilled test boring locations were provided to PGI by PB personnel. The typed drilling logs, Boring Location Map, and Soil Boring Profiles are included in Appendix A. Northing and easting coordinates shown on the Soil Boring Profile sheets are grid. A project adjustment factor (PAF) of 1.00009818 was used to convert the grid coordinates to ground coordinates for this project. The typed drilling logs are included in Appendix A. These logs show the SPT resistance values (N-values) for each soil sample taken in the test borings and present the classification and description of soils encountered at various depths in the test borings. The N-values as measured in the field have been corrected to an equivalent rod energy ratio of 60% (N_{60}) in accordance with ODOT's *Specifications for Geotechnical Explorations*. The sample depth shown on the logs and laboratory test results indicate the top of each sampling or testing interval.

4.2 Laboratory Testing Program

All soil and rock samples obtained during the drilling and sampling operations were returned to PGI's geotechnical soils laboratory in Cleveland, Ohio. Upon arrival, the samples were visually examined and classified by a geotechnical engineer and a geologist to verify the classifications made in the field and to note any additional characteristics, which may not have been observed in the field.

Moisture content determination tests were performed on all soil samples obtained by PGI as per ODOT specifications. Additional laboratory soil tests were performed on selected soil samples for the

purpose of soil classification and for analysis of engineering characteristics. These tests consisted of Moisture Content Determination, Particle-Size Analysis, Liquid and Plastic Limit, Plasticity Index Determination, Organic Content, Direct Shear Test of Soils under Consolidated Drained Conditions, Unconfined Compressive Strength of Cohesive Soils, One-Dimensional Consolidation Properties of Soils, and Sulfate Content Tests. All laboratory tests were performed in accordance with the ASTM or other standards listed in "Laboratory Test Standards" located in Appendix B. The results of the laboratory tests are also included in Appendix B. The sulfate tests were performed in accordance with TxDOT TEX-145-E Determining Sulfate Content in Soils – Colorimetric Method on the upper samples obtained from the IR 75 and US 68 Mainline test borings. The soils were classified in accordance with the ODOT Soil Classification System, a description of which is also included in Appendix B. Upon completion of the laboratory testing, all samples were placed in storage at PGI's facility. Unless otherwise requested in writing, the soil and rock samples will be retained through completion and ODOT approval of Stage 2 plans.

5.0 FINDINGS

5.1 Subsurface Soil Conditions

IR-75 & US 68 Mainlines: The subsurface soil conditions were determined from the soil information obtained from the 78 test borings which were advanced along existing IR-75 SB and NB lanes and shoulders, proposed IR-75 realignment, IR-75 ramps at the SR 12 Interchange, existing US 68 SB and NB lanes, sections of side roads pavement including Lima Avenue, Logan Avenue, Harrison Street, and a proposed Service Road. The following is the summary of subsurface conditions at the test borings advanced to obtain soil information for each of the above sections.

IR-75 Pavement Rehabilitation & Widening: The subsurface soil conditions were determined from the soil information obtained from the following forty (40) test borings; B-001-0-13 through B-011-0-13, B-028-0-13 through B-042-0-13, B-053-0-13, B-054-0-13, B-056-0-0-13 B-057-0-13, B-061-0-13 through B-064-0-13, B-066-0-13 through B-068-0-13, B-070-0-14, B-073-0-14, and B-076-0-14 which were advanced along existing IR 75 NB and SB lanes and shoulders for pavement rehabilitation and widening purposes. These test borings were advanced to approximate depths ranging from 7.0 feet to 17.0 feet below the existing ground/pavement surface.

Two (2) of these borings were advanced through berm material along the IR 75 shoulders. The berm material ranged in thickness from 5.0 inches to 12.0 inches with an average thickness of 8.5 inches. Fifteen of these borings were advanced through topsoil in the IR 75 median and shoulders. The topsoil ranged in thickness from 1.0 inch to 9.5 inches with an average thickness of 3.8 inches. Twenty three borings were advanced through the pavement of the IR 75 NB and SB lanes. The pavement consisted of asphalt over concrete. The asphalt thickness ranged from 4.0 inches to 6.5 inches with an average thickness of 4.7 inches. The concrete thickness ranged from 7.0 inches to 12.5 inches with an average thickness of 10.7 inches. Roadbase material consisting of gravel/stone fragments with sand was encountered below the concrete pavement in eighteen of the test borings with approximate thicknesses ranging from 3.0 inches to 24.0 inches and averaging 8.7 inches. Fill material was encountered in thirty-five of the borings to depths ranging from 0.9 feet to 11.5 feet below the ground or pavement surface with an average depth of 5.6 feet. The fill material consisted of stone fragments (A-1-a), stone fragments with sand (A-1-b), stone fragments with sand and silt (A-2-4), stone fragments with sand, silt, and clay (A-2-6), coarse and fine sand (A-3a), both cohesive and non-cohesive sandy silt (A-4a), silt and clay (A-6a), silty clay (A-6b), and clay (A-7-6). Natural soils were encountered in twenty-seven (27) of the test borings. The natural soils consisted of stone fragments with sand (A-1-b), fine sand (A-3), coarse and fine sand (A-3a), both cohesive and non-cohesive sandy silt (A-4a), silt (A-4b), silt and clay (A-6a), silty clay (A-6b), and clay (A-7-6).

The laboratory test results indicated that the moisture contents of the tested cohesive soil samples obtained from the IR 75 mainline test borings ranged from 6% to 26% and the consistency ranged from "medium stiff" to "hard", but was predominately "very stiff". The laboratory test results indicated that the moisture contents of the tested non-cohesive soils ranged from 5% to 34% and the relative density ranged from "very loose" to "very dense", but was predominately "medium dense". Of the seventy-eight cohesive soil samples tested for Atterberg limits, twenty-four had natural moisture contents greater than or equal to their plastic limits and an additional twenty-eight samples had natural moisture contents less than their plastic limits. PGI performed liquid limits twice (air dried and oven dried) on three samples to determine whether these samples would to be classified as A-8 samples. Based on the results, these samples were classified as A-6a and A-6b and not organic soils (A-8). Sulfate test results ranged from 95 to 14,831 parts per million (ppm) as determined by the TxDOT TEX-145-E Method. Note that four (4) of the thirty-eight samples tested had a sulfate content greater than 3,000 ppm which will require stabilization using the excavation and replacement option in accordance with the ODOT GB-1

Specifications. Refer to Table 5.1.1 below for finding the test boring that had a sulfate content greater than 3,000 ppm.

Bedrock consisting of dolomite was encountered to termination depth in two of the thirty-seven test borings at depths ranging from 8.5 feet to 11.5 feet below the ground or pavement surface. Additionally, auger refusal was encountered in one test boring at a depth of 7.0 feet on what may have been bedrock. A five foot core sample was obtained from test boring B-004-0-13 which was also advanced for culvert design purposes, at a depth of 12.0 feet below the ground surface. The bedrock was strong in relative strength and moderately weathered and contained very thin to thin bedding. The bedrock was fractured to moderately fractured, contained tight aperture spacing with slightly rough surface. The Rock Quality Designation (RQD) obtained for the bedrock core sample was 35% and the recovery was 100%.

IR-75 Realignment: The subsurface soil conditions were determined from the soil information obtained from eight (8) test borings; B-012-0-13 through B-016-0-13, B-021-0-13, B-025-1-13, and B-026-0-13 which were advanced along proposed IR 75 realignment between approximate Stations 788+50 and 822+00 for embankment design purposes. These test borings were advanced to approximate depths ranging from 2.5 feet to 37.1 feet below the existing ground/pavement surface.

Test borings B-013-0-13 and B-014-0-13 were advanced through 12.0 inches of berm material along the IR 75 shoulders. Test borings B-021-0-13 and B-026-0-13 were advanced through the pavement of IR 75. The pavement consisted of 3.0 inches of asphalt in both borings and 12.0 inches and 9.0 inches of concrete in borings B-021-0-13 and B-026-0-13, respectively. Roadbase material consisting of gravel with sand was encountered below the concrete pavement with an approximate thickness ranging from 4.0 inches to 8.0 inches. The remaining test borings were advanced through topsoil in the IR 75 median and shoulders. The topsoil ranged in thickness from 6.0 inch to 12.0 inches with an average thickness of 7.8 inches. Fill material was encountered in seven of the eight test borings advanced for IR 75 Realignment design purposes to depths ranging from 1.5 feet to 33.5 feet below the ground or pavement surface with an average depth of 13.9 feet. Four of these eight borings consisted entirely of fill material. The fill material consisted of stone fragments (A-1-a), sandy silt (A-4a), silt and clay (A-6a), silty clay (A-6b), and clay (A-7-6). Natural soils were encountered in three of the seven test borings. Test boring B-025-1-13 consisted entirely of natural soils. The natural soils consisted of coarse and fine sand (A-3a), sandy silt (A-4a), non-cohesive silt (A-4b), and silty clay (A-6b).

The laboratory test results indicated that the moisture contents of the tested cohesive soil samples obtained from the proposed IR 75 Realignment test borings ranged from 7% to 28% and the consistency ranged from "soft" to "very stiff", but was predominately "stiff". The laboratory test results indicated that the moisture contents of the tested non-cohesive soils ranged from 6% to 22% and the relative density ranged from "medium dense" to "very dense". Of the thirteen (13) cohesive soil samples tested for Atterberg limits, two (2) had natural moisture contents greater than or equal to their plastic limits and an additional five (5) soil samples had natural moisture contents within 3% of their plastic limits. Sulfate test results ranged from 845 to 1,426 parts per million (ppm) as determined by the TxDOT TEX-145-E Method. None of the samples tested had a sulfate content greater than 3,000 ppm which would require stabilization using the excavation and replacement option in accordance with the ODOT GB-1 Specifications.

Bedrock consisting of dolomite was encountered and split spoon sampled in three of the eight test borings at depths ranging from 8.0 feet to 11.0 feet below the ground or pavement surface. Additionally, auger refusal was encountered in four test borings at depths ranging from 1.5 feet to 33.5 feet on what may have been bedrock.

IR-75 Embankment Widening: The subsurface soil conditions were determined from the soil information obtained from eleven (11) test borings which were advanced along sections of existing IR 75 for embankment widening design purposes. Four (4) test borings identified as B-118-0-13, B-026-2-13, B-027-0-13, and B-027-2-13 were located between Stations 816+75 and 824+00, Right. Seven (7) test borings identified as B-043-0-13, B-044-0-13, B-044-1-13, B-047-1-13, B-049-0-13, B-049-1-13, 12, and B-050-0-13 were located between Stations 892+50 and 912+00 Right and Left. These test borings were advanced to approximate depths ranging from 15.5 feet to 43.6 feet below the existing ground/pavement surface.

Test borings B-026-2-13 and B-027-2-13 were advanced through 6.0 inches and 8.0 inches of topsoil, respectively and fill material along the toe of the embankment slope east of the IR 75 NB lane. Both of these borings are located near existing buried gas lines owned by the Marathon Gas Company. Due to the proximity of test boring B-026-2-13 to the gas lines, at the request of Marathon Gas Company, Shelby Tube samples were obtained in order to minimize the risk of damage to the gas lines by vibration caused by driving split spoons. A Marathon Gas Company representative was on site during drilling operations and the borings were completed without damaging the gas lines. Five of the test borings were advanced through the pavement

of IR 75. The pavement consisted of asphalt ranging in thickness from 4.0 inches to 5.5 inches and averaging 4.7 inches thick and concrete ranging in thickness from 5.0 inches to 11.5 inches and averaging 8.1 inches thick. Base material consisting of stone fragments with sand was encountered in two (2) of the borings advanced through pavement and ranged in thickness from 6.0 inches to 11.0 inches and averaged 8.5 inches thick. The remaining six test borings were advanced through topsoil in the IR 75 shoulders. The topsoil ranged in thickness from 1.0 inch to 8.0 inches with an average thickness of 4.8 inches. Fill material was encountered in all of the test borings advanced for IR 75 Embankment Widening design purposes to depths ranging from 3.5 feet to 28.5 feet below the ground or pavement surface with an average depth of 13.1 feet. The fill material consisted of stone fragments with sand and silt (A-2-4), both cohesive and non-cohesive sandy silt (A-4a), cohesive silt (A-4b), silt and clay (A-6a), silty clay (A-6b), and clay (A-7-6). Natural soils were encountered below the fill material in all of the test borings. The natural soils consisted of coarse and fine sand (A-3a), both cohesive and non-cohesive sandy silt (A-4a), cohesive and non-cohesive silt (A-4b), and silty clay (A-6b).

The laboratory test results indicated that the moisture contents of the tested cohesive soil samples obtained from the IR 75 Widening test borings ranged from 8% to 25% and the consistency ranged from "medium stiff" to "hard". The laboratory test results indicated that the moisture contents of the tested non-cohesive soils ranged from 7% to 38% and the relative density ranged from "medium dense" to "very dense". Of the twenty-seven (27) cohesive soil samples tested for Atterberg limits, thirteen (13) had natural moisture contents greater than or equal to their plastic limits and an additional ten (10) samples had natural moisture contents within 3% of their plastic limits. Sulfate test results ranged from 185 to 806 parts per million (ppm) as determined by the TxDOT TEX-145-E Method. None of the samples tested had a sulfate content greater than 3,000 ppm which would require stabilization using the excavation and replacement option in accordance with the ODOT GB-1 Specifications.

Bedrock consisting of dolomite was encountered in three of the test borings at depths ranging from 16.0 feet to 29.0 feet below the ground surface and was split spoon sampled to auger refusal. Additionally, auger refusal was encountered in four (4) test borings at depths ranging from 15.0 feet to 39.00 feet on what may have been bedrock.

IR 75 Ramps at SR 12 Interchange: The subsurface soil conditions were determined from the soil information obtained from six (6) test borings; B-034-1-13, B-035-1-13, B-035-2-13, B-036-1-13, B-037-1-13, and B-038-1-13 which were advanced along existing IR 75 ramps at SR 12 interchange for realignment and pavement rehabilitation design purposes. These test borings were advanced to approximate depths ranging from 7.5 feet to 10.0 feet below the existing ground/pavement surface.

Test borings B-034-1-13, B-036-1-13 and B-038-1-13 were advanced through shoulder berm material ranging in thickness from 3.0 inches to 7.0 inches and averaging 5.3 inches in thickness. Test borings B-035-2-13 and B-037-1-13 were advanced through the pavement of the IR 75 NB exit ramp and the IR 75 NB entrance ramp, respectively. The pavement consisted of 17 inches of asphalt in B-035-2-13 and 8.0 inches of asphalt over 3.5 inches of concrete in B-037-1-13. Test boring B-035-1-13 was advanced through 3.0 inches of topsoil on the west side of the IR 75 SB entrance ramp.

Fill material was encountered in all of the six test borings advanced for IR 75 Ramps at SR 12 Interchange design purposes to depths ranging from 3.5 feet to the termination depth of 10.0 feet below the ground or pavement surface. Four of the six test borings were terminated in fill material. The fill material consisted of cohesive and non-cohesive sandy silt (A-4a), non-cohesive silt (A-4b), silt and clay (A-6a), and silty clay (A-6b). Natural soils were encountered below the fill material in two of the six test borings. The natural soils consisted of both cohesive and non-cohesive sandy silt (A-4a), and silt and clay (A-6a).

The laboratory test results indicated that the moisture contents of the tested cohesive soil samples obtained from the IR 75 Ramps at SR 12 test borings ranged from 9% to 22% and the consistency of the cohesive soils ranged from "medium stiff" to "hard", but was predominately "stiff". The laboratory test results indicated that the moisture contents of the tested non-cohesive soils ranged from 15% to 27% while the relative densities of the non-cohesive soils were "medium dense". Of the ten (10) cohesive soil samples tested for Atterberg limits, three (3) had natural moisture contents greater than or equal to their plastic limits and an additional two (2) soil samples had natural moisture contents within 3% of their plastic limits. Sulfate test results ranged from 208 to 798 parts per million (ppm) as determined by the TxDOT TEX-145-E Method. None of the samples tested had a sulfate content greater than 3,000 ppm which would require stabilization using the excavation and replacement option in accordance with the ODOT GB-1 Specifications. Bedrock was not encountered in any of the test borings advanced for the IR 75 Ramps at SR 12 design purposes.

US 68 Pavement Rehabilitation and Widening: The subsurface soil conditions were determined from the soil information obtained from six (6) test borings; B-078-0-13 through B-082-0-13 and B-088-0-13 which were advanced along US 68 SB and NB lanes for pavement rehabilitation and widening design purposes. These test borings were advanced to approximate depths ranging from 6.3 feet to 10.0 feet below the existing ground/pavement surface.

Five of the six test borings were advanced through the pavement of the US 68 NB and SB lanes. The pavement consisted of asphalt with a thickness ranging from 9.5 inches to 16.5 inches with an average thickness of 12.5 inches. Concrete was not encountered in any of these test borings. Roadbase material consisting of stone fragments with sand was encountered below the asphalt pavement in two (2) of the test borings with approximate thicknesses ranging from 6.0 inches to 22.0 inches with an average thickness of 14.0 inches. Fill material was encountered in all of the test borings to depths ranging from 6.5 feet below the ground or pavement surface to termination depth. All six test borings consisted entirely of fill material. The fill material consisted of stone fragments with sand (A-1-b), sandy silt (A-4a), silt and clay (A-6a), silty clay (A-6b), and clay (A-7-6).

The laboratory test results indicated that the moisture contents of the tested cohesive soil samples obtained from the US 68 Mainline test borings ranged from 8% to 27% and the consistency ranged from "stiff" to "hard", but was predominately "very stiff". The laboratory test results indicated that the moisture contents of the tested non-cohesive soils was 8% and the relative density of the non-cohesive soils was "medium dense". Of the eight (8) cohesive soil samples tested for Atterberg limits, one had a natural moisture content equal to its plastic limit and an additional three (3) soil samples had natural moisture contents within 3% of their plastic limits. Sulfate test results ranged from 307 to 4,974 parts per million (ppm) as determined by the TxDOT TEX-145-E Method. Note that one (1) of the six (6) samples tested had a sulfate content greater than 3,000 ppm which will require stabilization using the excavation and replacement option in accordance with the ODOT GB-1 Specifications. Refer to Table 5.1.1 for finding the test boring that had a sulfate content greater than 3,000 ppm.

Auger refusal was encountered in test borings B-079-0-13, B-080-0-13, and B-082-0-13 at depths ranging from 6.0 feet to 6.5 feet on what may have been bedrock. Groundwater was not encountered in any of these test borings advanced for US 68 Mainline design purposes.

Table 5.1.1 – Summary of High Sulfate Content Soils Information

Roadway	Boring No.	Station	Sulfate Content (ppm)
IR 75	B-001-0-13	745+51.3, 44.5' RT	10119
IR 75	B-003-3-13	754+55.7, 29.0' LT	12779
IR 75	B-004-0-13	758+26.5, 74.2' LT	14839
IR 75	B-007-0-13	770+17.5, 23.1' LT	4431
SR 15/US 68	B-079-0-13	743+86.8, 11.6' LT	4974

Side Roads Improvements: The subsurface soil conditions were determined from the soil information obtained from ten (10) test borings; B-162-0-13 through B-166-0-13, B-176-0-13, and B-177-0-13 through B-180-0-13 which were advanced along side roads for the proposed Lima Avenue, Logan Avenue, Harrison Street, and Service Road for pavement rehabilitation and roadway design purposes. These test borings were advanced to approximate depths ranging from 1.9 feet to 10.7 feet below the existing ground/pavement surface.

Four (4) of the ten (10) test borings, B-162-0-13, B-164-0-13, B-165-0-13, and B-166-0-13 were advanced for the proposed Lima Avenue design purposes. Test borings B-162-0-13 and B-166-0-13 were advanced through the pavement of Lima Avenue and consisted of 3.0 inches and 6.0 inches of asphalt, respectively. Roadbase consisting of stone fragments with sand was encountered below the pavement and ranged in thickness from 2.0 inches to 4.0 inches. Test borings B-164-0-13 and B-165-0-13 were advanced through 6.0 inches and 2.5 inches of topsoil, respectively along the proposed realignment of Lima Avenue. Test boring B-163-0-13 was advanced through the pavement of Logan Avenue near the Lima Avenue intersection and consisted of 3.0 inches of asphalt over 9.0 inches of stone fragments with sand base material. Test boring B-176-0-13 was advanced through the pavement of Harrison Street and consisted of 6.5 inches of asphalt over 5.0 inches of stone fragments with sand base material. Test borings B-177-0-13, B-178-0-13, B-179-0-13 and B-180-0-13 were advanced for design of the proposed Service Road. These borings were advanced through topsoil ranging in thickness from 6.0 inches to 10.0 inches and averaging 7.5 inches thick. Test boring B-179-0-13 is located near existing buried gas lines owned by the Marathon Gas Company. Due to the proximity of this test boring to the gas lines, a Marathon Gas Company representative was on site during drilling operations and the boring was completed without damaging the gas lines.

Fill material was encountered in five of the ten test borings advanced for Side Roads design purposes to depths ranging from 3.5 feet below the ground or pavement surface to termination depth. The fill material consisted of stone and asphalt fragments with sand and silt (A-2-4), coarse and fine sand (A-3a), sandy silt (A-4a), silt and clay (A-6a), and clay (A-7-6). Natural soils were encountered below the

fill material in five of the test borings. The natural soils consisted of non-cohesive sandy silt (A-4a), silt and clay (A-6a), silty clay (A-6b), and clay (A-7-6).

The laboratory test results indicated that the moisture contents of the tested cohesive soil samples obtained from the side road test borings ranged from 9% to 31% and the consistency ranged from "medium stiff" to "very stiff", but was predominately "stiff" to "very stiff". The laboratory test results indicated that the moisture contents of the tested non-cohesive soils ranged from 5% to 9% and the relative density ranged from "loose" to "medium dense". Of the fifteen (15) cohesive soil samples tested for Atterberg limits, three (3) had natural moisture contents greater than or equal to their plastic limits and an additional seven (7) samples had natural moisture contents within 3% of their plastic limits. PGI performed liquid limits twice (air dried and oven dried) on a sample obtained from B-180-0-13 at a depth of 1 foot to determine whether the sample would be classified as an A-8 sample. Based on the results, the sample was classified as A-6a and not organic soils (A-8). Organic content of the sample was measured at 9.7% which classifies the sample as "moderately organic".

Bedrock consisting of dolomite was encountered in test boring B-165-0-13 which was also advanced for culvert design purposes, at a depth of 5.4 feet below the pavement surface and was split spoon sampled to auger refusal at 5.7 feet then a 5.0 feet core sample was obtained. The dolomite bedrock was gray and moderately weathered, very strong in relative strength and contained very thin to thin bedding. The bedrock was moderately fractured, contained tight to narrow aperture spacing with slightly to very rough surfaces. The Rock Quality Designation (RQD) obtained for the bedrock core sample was 48% and the recovery was 97%. Additionally, auger refusal was encountered in the remaining nine test borings at depths ranging from 1.9 feet to 6.0 feet on what may have been bedrock.

In order to determine the condition of the existing pavement, a total of three (3) pavement cores were obtained. The core samples were obtained using 4.0-inch outside diameter core barrels with industrial diamond impregnated cutting teeth. The pavement core locations were marked in the field by PGI personnel based on the general locations selected on the plan sheet by PB personnel.

Pavement core sample C-02 was obtained from the pavement of Harrison Street and consisted of 5.5 inches of asphalt over 6.0 inches of crushed aggregate base material. Pavement core sample C-03 was obtained from the pavement of Logan Avenue near the intersection of Lima Avenue and consisted of 3.5 inches of asphalt over 3.5 inches of stone fragments with sand base material. Pavement core sample C-04 was obtained from Lima Avenue and consisted of 6.0 inches of asphalt over 3.0 inches of crushed aggregate base material. Concrete was not encountered in any of the core samples. In general, the

asphalt at these locations appeared to be in fair condition. The pavement core information is summarized in the Table 5.1.2

Table 5.1.2 – Summary of Pavement Core Information

Core Sample No.	Core Sample Thickness (Inches)	Asphalt Thickness (Inches)	Roadbase Type
C-2	11.5	5.5	Crushed Aggregate
C-3	7.0	3.5	Gravel With Sand and Silt
C-4	9.0	6.0	Crushed Aggregate

General: For specific conditions of the IR-75 and US 68 mainlines test borings at various depths, refer to the individual test boring logs located in Appendix A of this report. For complete moisture contents and Atterberg limit test results, please refer to the laboratory test results in Appendix B.

Proposed Ramps: The subsurface soil conditions were determined from the soil information obtained from fifty-five (55) test borings which were advanced along proposed US 68 Ramp A, Lima Ramp B, Lima Ramp G, Lima Ramp H, US 68 Ramp D, US 68 Ramp C, Lima Ramp E, Lima Ramp A, US 68 Ramp B, and Lima Ramp F. The following is the summary of the subsurface conditions of the test borings drilled to obtain soil information for each of the above ramps.

US 68 Ramp A: The subsurface soil conditions were determined from the soil information obtained from nine (9) test borings; B-089-0-13 through B-097-0-13 which were advanced along the proposed US 68 Ramp A alignment for roadway/embankment design purposes. These test borings were advanced to approximate depths ranging from 5.5 feet to 36.0 feet below the existing ground/pavement surface.

Three of the nine test borings were advanced through the pavement of the existing ramp. The pavement consisted of asphalt with a thickness ranging from 5.0 inches to 12.0 inches with an average thickness of 8.3 inches. Concrete measuring 7.4 inches in thickness was encountered below the asphalt in one of the test borings advanced through the pavement. Five of the nine test borings were advanced through topsoil ranging in thickness from 2.0 inches to 9.0 inches and averaging 5.8 inches in thickness. Test boring B-094-0-13 was

advanced through the shoulder berm along the existing ramp. Roadbase material consisting of stone fragments with sand was encountered below the asphalt pavement in 2 of the test borings with approximate thicknesses ranging from 9.0 inches to 12.0 inches with an average thickness of 10.5 inches. Fill material was encountered in eight of the nine test borings to depths ranging from 4.5 feet below the ground or pavement surface to termination depth. Four of the nine test borings consisted entirely of fill material. The fill material consisted of stone fragments with sand and silt (A-2-4), sandy silt (A-4a), silt and clay (A-6a), silty clay (A-6b), elastic clay (A-7-5), and clay (A-7-6). Natural soils were encountered below the fill material in five of the test borings. The natural soils consisted of non-cohesive sandy silt (A-4a), silt and clay (A-6a), and silty clay (A-6b).

The laboratory test results indicated that the moisture contents of the tested cohesive soil samples obtained from the US 68 Ramp A test borings ranged from 10% to 83% and the consistency ranged from "soft" to "hard", but was predominately "very stiff". Note that the unusually high moisture contents occurred in soils classified as elastic clay (A-7-5) was encountered in test boring B-091-0-13 between depths of 2.0 and 11.0 feet below the existing ground surface. The laboratory test results indicated that the moisture contents of the tested non-cohesive soils ranged from 8% to 9% and the relative density was "medium dense". Of the thirteen (13) cohesive soil samples tested for Atterberg limits, seven (7) had natural moisture contents greater than or equal to their plastic limits and an additional five (5) samples had natural moisture contents within 3% of their plastic limits.

Bedrock consisting of dolomite was encountered in test boring B-097-0-13 at a depth of 6.0 feet below the ground surface and was split spoon sampled to auger refusal at 6.3 feet. Auger refusal was encountered in seven (7) of the test borings at depths ranging from 4.5 feet to 36.0 feet on what may have been bedrock.

Lima Ramp B: The subsurface soil conditions were determined from the soil information obtained from four (4) test borings; B-098-0-13 through B-101-0-13 which were advanced along proposed Lima Ramp B alignment for roadway/embankment design purposes. These test borings were advanced to approximate depths ranging from 2.7 feet to 8.0 feet below the existing ground surface.

All four of the test borings were advanced through soil along the proposed alignment of Lima Ramp B. Fill material was encountered in three of the four test borings to depths ranging from 3.0 feet below the ground surface to termination depth. The fill material consisted of sandy silt (A-4a), silt and clay (A-6a),

and clay (A-7-6). Natural soil consisting of clay (A-7-6) was encountered in test boring B-100-0-13. A hydrocarbon odor was encountered in test boring B-098-0-13 at a depth of 3.5 feet.

The laboratory test results indicated that the moisture contents of the tested cohesive soil samples obtained from the Lima Ramp B test borings ranged from 12% to 24% and the consistency ranged from "medium stiff" to "stiff", but was predominately "stiff". The laboratory test results indicated that the moisture contents of the tested non-cohesive soils ranged from 8% to 9% and the relative density was "medium dense". Of the six (6) cohesive soil samples tested for Atterberg limits, one (1) had a natural moisture content greater than its plastic limit and an additional two (2) samples had natural moisture contents within 3% of their plastic limits.

Bedrock consisting of dolomite was encountered in all of the test borings advanced for Lima Ramp B design purposes at depths ranging from 2.0 feet to 6.5 feet below the ground surface and was split spoon sampled to auger refusal.

Lima Ramp G: The subsurface soil conditions were determined from the soil information obtained from four (4) test borings; B-102-0-13, B-103-0-13, B-119-0-13, and B-120-0-13 which were advanced along proposed Lima Ramp G for roadway/embankment design purposes. These test borings were advanced to approximate depths ranging from 6.2 feet to 13.1 feet below the existing ground surface.

Three of the four test borings were advanced through soil and one test boring was advanced through gravel and asphalt pieces along the proposed alignment of Lima Ramp G. Fill material was encountered in all of the four test borings to depths ranging from 5.5 feet to 8.5 feet and averaging 7.0 feet below the ground surface. The fill material consisted of gravel and stone fragments (A-1-a), sandy silt (A-4a), elastic silt and clay (A-5), elastic clay (A-7-5), silty clay (A-6b), and clay (A-7-6). Natural soil was encountered below the fill material in two of the test borings and consisted of silty clay (A-6b).

The laboratory test results indicated that the moisture contents of the tested cohesive soil samples obtained from the Lima Ramp G test borings ranged from 19% to 75% and the consistency ranged from "soft" to "stiff", but was predominately "medium stiff". Note that the unusually high moisture contents occurred in soils classified as elastic silt and clay (A-5) which was encountered in test boring B-119-0-13 between depths of 3.5 feet and 8.5 feet below ground surface and elastic clay (A-7-5) encountered in test boring B-119-0-13 between depths of 0.5 feet and 8.0 feet below the existing ground surface. The laboratory test results indicated that the moisture content of the tested granular material was 5% with a relative density of "dense". Of the six (6) samples tested for Atterberg limits, one (1) had a natural

moisture content greater than its liquid limit, four (4) had natural moisture contents greater than their plastic limits and an additional one (1) sample had a natural moisture content within 3% of its plastic limit.

Bedrock consisting of dolomite was encountered in all of the test borings advanced for Lima Ramp G design purposes at depths ranging from 5.8 feet to 11.5 feet below the ground surface and was split spoon sampled to auger refusal.

Lima Ramp H: The subsurface soil conditions were determined from the soil information obtained from three (3) test borings; B-104-0-13, B-105-0-13, and B-106-0-13 which were advanced along proposed Lima Ramp H alignment for roadway/embankment design purposes. These test borings were advanced to an approximate depth of 10.0 feet each below the existing ground surface.

All three test borings were advanced through topsoil ranging in thickness from 6.0 inches to 8.0 inches and averaging 6.7 inches thick along the proposed alignment of Lima Ramp H. Fill material was encountered in all three test borings to depths ranging from 6.0 feet to 10.0 feet and averaging 7.5 feet below the ground surface. Test boring B-106-0-13 consisted entirely of fill material. The fill material consisted of dolomite fragments (A-1-a), elastic silt and clay (A-5), elastic clay (A-7-5), silt and clay (A-6a), silty clay (A-6b), and clay (A-7-6). Natural soil was encountered below the fill material in two of the test borings and consisted of coarse and fine sand (A-3a), silt and clay (A-6a), and silty clay (A-6b).

The laboratory test results indicated that the moisture contents of the tested cohesive soil samples obtained from the Lima Ramp H test borings ranged from 11% to 58% and the consistency ranged from "medium stiff" to "very stiff", but was predominately "medium stiff". Note that the unusually high moisture contents occurred in soils classified as elastic silt and clay (A-5), and elastic clay (A-7-5) that were encountered in test boring B-104-0-13 between depths of 4.0 feet and 6.0 feet, in test boring B-105-0-13 between depths of 6.0 feet and 6.5 feet, and in test boring B-106-0-13 between depths of 0.7 feet and 8.5 feet below the existing ground surface. The laboratory test results indicated that the moisture content of the tested granular material ranged from 2% to 22% and a relative density of "loose". Of the four (4) cohesive soil samples tested for Atterberg limits, one (1) had a natural moisture content greater than its plastic limit and an additional two (2) samples had natural moisture contents within 3% of their plastic limit.

Bedrock consisting of dolomite was encountered in test boring B-104-0-13 at a depth of 9.7 feet below the ground surface and was split spoon sampled to auger refusal.

US 68 Ramp D: The subsurface soil conditions were determined from the soil information obtained from six (6) test borings; B-107-0-13 through B-110-0-13, B-115-0-13, and B-117-0-13 which were advanced along proposed US 68 Ramp D alignment for roadway/embankment design purposes. These test borings were advanced to approximate depths ranging from 6.3 feet to 44.0 feet below the existing ground/pavement surface.

Two (2) of the six (6) test borings were advanced through the pavement of the existing ramp. The pavement consisted of asphalt with a thickness ranging from 1.0 inch to 4.75 inches with an average thickness of 2.9 inches. Concrete measuring 6.5 inches in thickness was encountered below the asphalt in one of the test borings advanced through the pavement. Fill material was encountered in five of the six test borings to depths ranging from 3.5 feet to 36.0 feet below the ground or pavement surface. Five of the six test borings consisted entirely of fill material. The fill material consisted of both cohesive and non-cohesive sandy silt (A-4a), silt (A-4b), silt and clay (A-6a), silty clay (A-6b), and elastic clay (A-7-5). Natural soil was encountered in five of the test borings and consisted of both cohesive and non-cohesive sandy silt (A-4a), silt (A-4b), silt and clay (A-6a), silty clay (A-6b), and clay (A-7-6).

The laboratory test results indicated that the moisture contents of the tested cohesive soil samples obtained from the US 68 Ramp D test borings ranged from 7% to 78% and the consistency ranged from "very soft" to "hard", but was predominately "medium stiff" to "very stiff". Note that the unusually high moisture contents occurred in soils classified as elastic clay (A-7-5) that were encountered in test boring B-108-0-13 between depths of 1.5 feet and 8.5 feet, in test boring B-109-0-13 between depths of 3.5 feet and 7.5 feet, in test boring B-110-0-13 between depths of 3.0 feet and 6.0 feet. The laboratory test results indicated that the moisture contents of the tested non-cohesive soils ranged from 6% to 21% and the relative density ranged from "very loose" to "dense". Of the ten (10) cohesive soil samples tested for Atterberg limits, one (1) had a natural moisture content greater than its liquid limit, eight (8) had natural moisture contents greater than their plastic limits, and one (1) sample had natural moisture content within 3% of its plastic limit.

Bedrock consisting of dolomite was encountered in four (4) of the six test borings at depths ranging from 6.0 feet to 12.8 feet below the ground surface and was split spoon sampled to auger refusal at 6.3 feet. Auger refusal was encountered in two of the test borings at depths ranging from 10.5 feet to 44.0 feet on what may have been bedrock.

US 68 Ramp C: The subsurface soil conditions were determined from the soil information obtained from nine (9) test borings; B-121-0-13 through B-125-0-13, B-132-0-13, B-136-0-13, B-138-0-13, and B-140-

0-13 which were advanced along proposed US 68 Ramp C alignment for roadway/embankment design purposes. These test borings were advanced to approximate depths ranging from 10.0 feet to 17.5 feet below the existing ground/pavement surface.

Two (2) of the nine (9) test borings were advanced through the pavement or gravel. The pavement consisted of 18 inches of asphalt in test boring B-138-0-13. Test boring B-136-0-13 was advanced through eight inches of gravel. The remaining test borings were advanced through topsoil ranging in thickness from 3.0 inches to 12.0 inches and averaging 8.9 inches in thickness. Fill material was encountered in four of the nine test borings to depths ranging from 6.0 feet to 11.5 feet and averaging 8.4 feet below the ground or pavement surface. The fill material consisted of silt and clay (A-6a), and silty clay (A-6b). Natural soil was encountered in seven of the test borings and consisted of both cohesive and non-cohesive sandy silt (A-4a), both cohesive and non-cohesive silt (A-4b), silt and clay (A-6a), silty clay (A-6b), and clay (A-7-6).

The laboratory test results indicated that the moisture contents of the tested cohesive soil samples obtained from the US 68 Ramp C test borings ranged from 10% to 25% and the consistency ranged from "medium stiff" to "hard", but was predominately "stiff". The laboratory test results indicated that the moisture contents of the tested non-cohesive soils ranged from 8% to 18% and the relative density ranged from "medium dense" to, "very dense". Of the eight (8) cohesive soil samples tested for Atterberg limits, two (2) had natural moisture contents greater than or equal to their plastic limits and an additional four (4) samples had natural moisture contents within 3% of their plastic limits.

Bedrock consisting of dolomite was encountered in five of the test borings at depths ranging from 3.5 feet to 11.5 feet below the ground surface and was split spoon sampled. A 6.5 feet and 5.0 feet core samples were obtained from test borings B-136-0-13 and B-132-0-13, respectively. The dolomite bedrock was gray, highly to moderately weathered, very strong in relative strength and contained very thin to thin bedding. The bedrock was moderately fractured, contained tight to narrow aperture spacing with slightly to very rough surfaces. The Rock Quality Designation (RQD) for the bedrock core sample obtained from B-132-0-13 was 26% and from B-136-0-13 was 25%. The recovery was 96% and 93%, respectively. Auger refusal was encountered in two of the test borings at depths ranging from 9.0 feet to 13.5 feet on what may have been bedrock.

Lima Ramp E: The subsurface soil conditions were determined from the soil information obtained from four (4) test borings; B-141-0-13, B-143-0-13 through B-145-0-13 which were advanced along proposed Lima Ramp E alignment for roadway/embankment design purposes. These test borings were advanced to approximate depths ranging from 3.8 feet to 14.5 feet below the existing ground surface.

All four test borings were advanced through soil. Fill material was encountered in three of the four test borings to depths ranging from 3.5 feet to 8.5 feet and averaging 6.8 feet below the ground surface. The fill material consisted of stone fragments with sand and silt (A-2-4), silty clay (A-6b), and elastic clay (A-7-5). Natural soil was encountered in three of the test borings and consists of non-cohesive silt (A-4b), silt and clay (A-6a), and silty clay (A-6b).

The laboratory test results indicated that the moisture contents of the tested cohesive soil samples obtained from the Lima Ramp E test borings ranged from 15% to 81% and the consistency ranged from "soft" to "very stiff". Note that the unusually high moisture contents occurred in soils classified as elastic clay (A-7-5) that were encountered in test borings B-144-0-13 and B-141-0-13 between depths of 0.5 feet and 3.5 feet and between depths of 6.0 feet and 8.5 feet, respectively below the existing ground surface. The laboratory test results indicated that the moisture contents of the tested non-cohesive soils ranged from 4% to 37% and the relative density ranged from "loose" to, "medium dense". Of the five (5) cohesive soil samples tested for Atterberg limits, two (2) had natural moisture contents greater than their liquid limits, one (1) had a moisture content greater than its plastic limit, and an additional two (2) samples had natural moisture contents within 3% of their plastic limits.

Bedrock consisting of dolomite was encountered in all of the test borings at depths ranging from 3.6 feet to 13.5 feet below the ground surface and was split spoon sampled. A 2.0 feet and 4.0 feet core sample was obtained from, test boring B-143-0-13. The dolomite bedrock was gray and highly to moderately weathered, slightly strong to strong in relative strength and contained very thin to thin bedding. The bedrock was highly to moderately fractured, contained tight to narrow aperture spacing with slightly to very rough surfaces. The Rock Quality Designation (RQD) for the bedrock core samples was 0% and 14%. The recovery was 100% and 95%, respectively.

Lima Ramp A: The subsurface soil conditions were determined from the soil information obtained from four (4) test borings; B-146-0-13 through B-149-0-13 which were advanced along proposed Lima Ramp A alignment for roadway/embankment design purposes. However, test borings B-148-0-13 and B-149-0-13 were located outside the limits of proposed Lima Ramp A, therefore information obtained from test

borings B-146-0-13 and 147-0-13 will be used for Lima Ramp A design purposes. These test borings were advanced to approximate depths ranging from 3.0 feet to 4.1 feet below the existing ground surface.

Both of the test borings were advanced through topsoil ranging in thickness from 3.0 inches to 6.0 inches and averaging 4.5 inches thick. Fill material consisting of silty clay (A-6a) was encountered in test boring B-146-0-13 to a depth of 3.5 feet. Test boring B-147-0-13 consisted entirely of natural soil below the topsoil consisting of sandy silt (A-4a).

Both the fill material and natural soils consisted entirely of cohesive soils. The laboratory test results indicated that the moisture contents of the tested cohesive soil samples obtained from the Lima Ramp A test borings ranged from 16% to 20% and the consistency ranged from "soft" to "stiff". Both of the cohesive soil samples tested for Atterberg limits, had natural moisture contents greater than their plastic limits. Auger refusal was encountered in both test borings at depths ranging from 3.0 feet to 4.1 feet on what may have been bedrock.

US 68 Ramp B: The subsurface soil conditions were determined from the soil information obtained from five (5) test borings; B-150-0-13, B-153-0-13 through B-156-0-13 which were advanced along proposed US 68 Ramp B alignment for roadway/embankment design purposes. These test borings were advanced to approximate depths ranging from 8.0 feet to 10.5 feet below the existing ground/pavement surface.

Two of the five test borings were advanced through pavement. The pavement consisted of asphalt with a thickness ranging from 4.0 inches to 4.5 inches with an average thickness of 4.25 inches. Concrete measuring 11.5 inches in thickness was encountered below the asphalt in both borings. Eight inches of base material consisting of limestone aggregate was encountered below the concrete. The remaining three test borings were advanced through soil. Fill material was encountered in four of the five test borings to depths ranging from 6.0 feet to termination depth at 10.5 feet and averaging 8.6 feet below the ground or pavement surface. The fill material consisted of sandy silt (A-4a), silt and clay (A-6a), silty clay (A-6b), elastic clay (A-7-5), and clay (A-7-6). Natural soil was encountered in two of the test borings and consists of silt and clay (A-6a), and clay (A-7-6).

Both the fill material and natural soils consist entirely of cohesive soils. The laboratory test results indicated that the moisture contents of the tested cohesive soil samples obtained from the Lima Ramp E test borings ranged from 10% to 67% and the consistency ranged from "soft" to "hard", but was predominately "very stiff". Note that the unusually high moisture contents occurred in soils classified as elastic clay (A-7-5) that were encountered in test borings B-154-0-13 and B-155-0-13 to approximate

depths of 6.0 feet and 3.5 feet below the existing ground surface. Of the four (4) cohesive soil samples tested for Atterberg limits, two (2) had natural moisture contents greater than their plastic limits, and an additional sample had a natural moisture content within 3% of its plastic limit.

Bedrock consisting of dolomite was encountered in test boring B-150-0-13 at a depth of 8.5 feet below the ground surface and was split spoon sampled. Additionally, auger refusal was encountered in test borings B-154-0-13 and 155-0-13 at depths of 8.0 feet and 8.6 feet on what may have been bedrock.

Lima Ramp F: The subsurface soil conditions were determined from the soil information obtained from seven (7) test borings; B-151-0-13, B-152-0-13, B-157-0-13 through B-161-0-13 which were advanced along proposed Lima Ramp F alignment for roadway/embankment design purposes. These test borings were advanced to approximate depths ranging from 7.3 feet to 21.5 feet below the existing ground/pavement surface.

Three (3) of the seven (7) test borings were advanced through pavement. The pavement consisted of asphalt with a thickness ranging from 4.0 inches to 25.0 inches with an average thickness of 11.25 inches. Concrete measuring 8.0 inches and 10.5 inches and averaging 9.25 inches in thickness was encountered below the asphalt in two of the test borings. Five inches of base material consisting of limestone aggregate was encountered below the concrete in one of the test borings. The remaining four test borings were advanced through soil. Fill material was encountered in all of the test borings to depths ranging from 3.5 feet to 18.0 feet and averaging 7.6 feet below the ground or pavement surface. The fill material consisted of slag or limestone aggregate (A-1a), gravel and stone fragments with sand (A-1-b), both cohesive and non-cohesive sandy silt (A-4a), elastic silt and clay (A-5), silt and clay (A-6a), and clay (A-7-6). Natural soil was encountered in five of the test borings and consists of sandy silt (A-4a), silt and clay (A-6a), silty clay (A-6b) and clay (A-7-6).

The laboratory test results indicated that the moisture contents of the tested cohesive soil samples obtained from the Lima Ramp F test borings ranged from 12% to 89% and the consistency ranged from "very soft" to "hard", but was predominately "stiff" to "very stiff". Note that the unusually high moisture contents occurred in soils classified as elastic silt and clay (A-5) that were encountered in test boring B-158-0-13 between depths of 6 feet and 7.2 feet below the existing ground surface. The laboratory test results indicated that the moisture contents of the tested non-cohesive soils ranged from 1% to 13% and the relative density ranged from "medium dense" to "very dense". Of the nine (9) cohesive soil samples tested for Atterberg limits, one (1) had a moisture content greater than its liquid limit, four (4) had natural

moisture contents greater than their plastic limits, and an additional sample had a natural moisture content within 3% of its plastic limit.

Bedrock consisting of dolomite was encountered in three (3) of the test borings at depths ranging from 6.9 feet to 9.5 feet below the ground surface and was split spoon sampled. Additionally, auger refusal was encountered in test boring B-158-0-13 at a depth of 9.9 feet on what may have been bedrock.

General: Elastic silt and clay (A-5) and elastic clay (A-7-5) soils were encountered in numerous ramp test borings at various depths. These soils are considered unsuitable according to ODOT *Construction and Material Specifications, Item 703.16A*, because they are highly elastic soils. The consistency of these soils ranged from "very soft" to "very stiff", but was predominately "soft" to "medium stiff". Of the 15 elastic soil samples tested for Atterberg limits, eight (8) had a moisture content greater than their liquid limits, and seven (7) had natural moisture contents greater than their plastic limits. Normally soils with moisture contents greater than or equal to their liquid limits are in a liquid state and have no shear strength. Soils with moisture contents greater than or equal to their plastic limits and less than their liquid limits are in a plastic state and have the potential of volume change under certain loading conditions. Therefore it is expected that these foundation soils will incur large volume change under the embankment loading due to primary consolidation and secondary settlement. Elastic clay (A-7-5) soils are also subject to considerable volume change when moisture variation occurs in foundation soils.

As indicated in the boring logs the thickness of these elastic soil layers varies across the project site and were encountered on both sides of US 68 between IR 75 and Lima Avenue. These elastic soils may have originated from lime dust from the limestone quarry that was located adjacent to the area. These elastic soils effloresced when exposed to a mild HCL acid solution. Several attempts were made to push Shelby tubes at different boring locations in order to obtain undisturbed samples of this soil layer during 2013 subsurface exploration. No or very minimum recovery was obtained in test boring B-109-0-13. However, two (2) Shelby tube undisturbed samples were obtained in the vicinity of drilled test borings B-120-0-13 and B-154-0-13 during 2015 subsurface exploration. Unconfined Compressive Strength of Cohesive Soils, Direct Shear Test of Soils, and One-Dimensional Consolidation Properties of Soils tests were performed at the laboratory in these soils. Table 5.1.3 summarizes the thickness, depth range below the existing ground where unsuitable soil encountered in test boring location of the Ramp.

Table 5.1.3 – Summary of Unsuitable Soils Information

Roadway	Boring No.	Station	Depth Range Below Existing Ground (feet)	Thickness (feet)	Soil Type
US 68 Ramp A	B-091-0-13	775+11	2.0 - 11.0	9.0	A-7-5
Lima Ramp G	B-119-0-13	800+35	3.5 - 8.5	5.0	A-5
Lima Ramp G	B-120-0-13	801+92	0.5 - 8.0	7.5	A-7-5
Lima Ramp H	B-104-0-13	800+49	4.0 - 6.0	2.0	A-5
Lima Ramp H	B-105-0-13	804+50	6.0 - 6.5	0.5	A-7-5
Lima Ramp H	B-110-1-13	804+97 *	6.0 - 8.5	2.5	A-7-5
Lima Ramp H	B-111-0-13	805+73*	3.0 - 8.5	5.5	A-7-5
Lima Ramp H	B-111-1-13	806+30*	1.0 - 3.5	2.5	A-7-5
Lima Ramp H	B-113-0-13	806+79 *	18.5 - 21.0	2.5	A-7-5
Lima Ramp H	B-106-0-13	808+92	0.6 - 7.5	6.9	A-7-5
US 68 Ramp D	B-108-0-13	801+21	1.5 - 8.5	7.0	A-7-5
US 68 Ramp D	B-109-0-13	802+89	3.5 - 7.5	4.0	A-7-5
US 68 Ramp D	B-111-1-13	806+30	1.0 - 3.5	2.5	A-7-5
Lima Ramp E	B-144-0-13	783+96	0.5 - 3.5	3.0	A-7-5
Lima Ramp E	B-141-0-13	790+87	6.0 - 8.5	2.5	A-7-5
US 68 Ramp B	B-154-0-13	804+02	0 - 6.0	6.0	A-7-5/A-5
US 68 Ramp B	B-135-1-13	795+80 **	6.0 - 14.0	8.0	A-7-5
US 68 Ramp B	B-135-2-13	794+50	0.5 - 3.5	3.0	A-7-5
US 68 Ramp B	B-155-0-13	808+02	0.5 - 3.5	3.0	A-7-5
Lima Ramp F	B-158-0-13	803+01	6.0 - 7.2	1.2	A-5

* Referenced to U 68 Ramp D Baseline and ** Referenced to US 68 Ramp C Baseline

For specific conditions of the proposed Ramp test borings at various depths, refer to the individual test boring logs located in Appendix A of this report. For complete moisture contents and Atterberg limit test results, please refer to the laboratory test results in Appendix B.

5.2 Interpretation of Consolidation Test Results

Sample ST-3 from Boring B-121-0-13: From the laboratory consolidation curve, it was determined that the soil sample was pre-consolidated. Pre-consolidation pressure (p'_p) of the foundation soil was determined at depth of 7.0 feet using the Casagrande construction procedure. Based on the procedure, it is estimated that the soil sample was at some time in the past, subjected to a maximum consolidation pressure of 1.22 tsf. This is more than the anticipated maximum design pressure to be applied in the field at this boring location. The existing overburden pressure (p'_o) of 0.45 tsf was calculated at the sample depth. The field consolidation curve, which was constructed using standard procedures, is attached in

Appendix B. The average compression index (C_c) and recompression index (C_r) of 0.165 and 0.020, respectively, were obtained from the field consolidation curve. The average coefficient of consolidation (C_v) of 0.01 square inches/minute was calculated.

Sample ST-3 from Boring B-155-0-13: From the laboratory consolidation curve, it was determined that the soil sample was pre-consolidated. Pre-consolidation pressure (p'_p) of the foundation soil was determined at depth of 7.0 feet using the Casagrande construction procedure. Based on the procedure, it is estimated that the soil sample was at some time in the past, subjected to a maximum consolidation pressure of 2.05 tsf. This is more than the anticipated maximum design pressure to be applied in the field at this boring location. The existing overburden pressure (p'_o) of 0.44 tsf was calculated at the sample depth. The field consolidation curve, which was constructed using standard procedures, is attached in Appendix B. The average compression index (C_c) and recompression index (C_r) of 0.181 and 0.029, respectively, were obtained from the field consolidation curve. The average coefficient of consolidation (C_v) of 0.01 square inches/minute was calculated.

Sample ST (2015) from Boring B-120-0-13: This Shelby tube sample was obtained in the vicinity of drilled location of the boring B-120-0-13 during 2015 filed exploration. From the laboratory consolidation curve, it was determined that the soil sample was pre-consolidated. Pre-consolidation pressure (p'_p) of the foundation soil was determined at depth of 6.0 feet using the Casagrande construction procedure. Based on the procedure, it is estimated that the soil sample was at some time in the past, subjected to a maximum consolidation pressure of 1.37 tsf. This is more than the anticipated maximum design pressure to be applied in the field at this boring location. The existing overburden pressure (p'_o) of 0.30 tsf was calculated at the sample depth. The field consolidation curve, which was constructed using standard procedures, is attached in Appendix B. The average compression index (C_c) and recompression index (C_r) of 0.435 and 0.036 respectively, were obtained from the field consolidation curve. The average coefficient of consolidation (C_v) of 0.03 square inches/minute was calculated.

Sample ST (2015) from Boring B-154-0-13: This Shelby tube sample was obtained in the vicinity of drilled location of the boring B-154-0-13 during 2015 filed exploration. From the laboratory consolidation curve, it was determined that the soil sample was slightly pre-consolidated. Pre-consolidation pressure (p'_p) of the foundation soil was determined at depth of 4.5 feet using the

Casagrande construction procedure. Based on the procedure, it is estimated that the soil sample was at some time in the past, subjected to a maximum consolidation pressure of 0.86 tsf. This is more than the anticipated maximum design pressure to be applied in the field at this boring location. The existing overburden pressure (p'_o) of 0.21 tsf was calculated at the sample depth. The field consolidation curve, which was constructed using standard procedures, is attached in Appendix B. The average compression index (C_c) and recompression index (C_r) of 0.636 and 0.028, respectively, were obtained from the field consolidation curve. The average coefficient of consolidation (C_v) of 0.01 square inches/minute was calculated.

5.3 Groundwater Conditions

Table 5.3.1 summarizes the groundwater level measurements where groundwater was encountered at the boring locations for the entire project. The groundwater levels were measured by PGI at the IR-75 and US 68 mainlines and proposed ramps test boring locations during drilling and upon completion of drilling operations. It should be noted that groundwater elevations are subject to seasonal fluctuations. All test borings drilled were backfilled immediately upon completion for safety purposes; therefore an extended groundwater level reading was not taken.

Table 5.3.1 – Groundwater Information

Boring Number	Surface Elevation (ft.)	Groundwater Depth (ft.)		Groundwater Elevation (ft.)	
		D.D.	U.C.	D.D.	U.C.
IR-75 Mainline					
B-025-1-13	778.1	9.0	9.0	769.1	769.1
B-026-0-13	802.6	33.5	27.0	769.1	775.6
B-026-2-13	882.6	11.5	12.5	771.1	770.1
B-032-0-13	780.1	6.5	Dry	773.6	Dry
B-033-0-13	779.3	6.3	Dry	773.0	Dry
B-034-0-13	776.8	6.0	Dry	770.8	Dry
B-035-0-13	776.1	7.0	5.0	769.1	771.1
B-042-0-13	776.5	9.0	Dry	767.5	Dry
B-043-0-13	774.7	11.0	14.0	763.7	760.7
B-044-0-13	782.3	16.5	Dry	765.8	Dry
B-044-1-13	785.1	18.5	27.0	766.6	758.1
B-047-1-13	765.7	7.0	12.0	758.7	753.7
B-049-1-13	769.6	11.0	14.0	758.6	755.6

Boring Number	Surface Elevation (ft.)	Groundwater Depth (ft.)		Groundwater Elevation (ft.)	
		D.D.	U.C.	D.D.	U.C.
B-050-0-13	796.9	41.0	Dry	755.9	Dry
B-056-0-13	778.7	Dry	7.0	Dry	771.7
B-057-0-13	779.8	5.5	5.5	774.3	774.3
B-076-0-14	833.1	9.8	9.2	823.3	823.9
Side Roads					
B-180-0-13	784.5	8.5	5.0	776.0	779.5
Proposed Ramps					
B-098-0-13	798.2	7.0	Dry	791.2	Dry
B-103-0-13	787.2	7.0	4.7	780.2	782.5
B-104-0-13	788.4	8.5	6.6	779.9	781.8
B-108-0-13	788.8	10.0	6.5	778.8	782.3
B-109-0-13	788.2	8.0	7.5	780.2	780.7
B-110-0-13	786.5	12.8	6.5	773.7	780.0
B-115-0-13	780.9	10.5	10.5	770.4	770.4
B-117-0-13	811.4	38.5	38.5	772.9	772.9
B-119-0-13	788.7	10.5	6.8	778.2	781.9
B-120-0-13	788.2	13.0	8.5	775.2	779.7
B-121-0-13	780.0	13.5	6.0	766.5	774.0
B-122-0-13	777.4	9.0	6.1	768.4	771.3
B-123-0-13	776.9	8.5	5.6	768.4	771.3
B-124-0-13	776.7	8.5	5.3	768.2	771.4
B-125-0-13	778.7	11.0	5.9	767.7	772.8
B-143-0-13	785.6	8.5	NR	777.1	NR
B-144-0-13	787.4	4.8	4.8	782.6	782.6
B-155-0-13	782.0	6.0	3.0	776.0	779.0
B-159-0-13	783.6	8.5	8.5	775.1	775.1

Elevations were provided by PB personnel D.D. – During Drilling, U.C. – Upon Completion of drilling operations NR – No Reading

6.0 ANALYSIS AND RECOMMENDATIONS

Based upon the findings of the field exploration program, laboratory testing, and subsequent engineering analysis, the following sections have been prepared to address the geotechnical aspects related to the design and construction of this project.

6.1 Pavement Design Parameters

The soil information obtained from project test borings advanced along IR-75 and US 68 mainlines was used to obtain pavement design parameters. Also soil information obtained from the historic test borings advanced for the West Sandusky Street Bridge over IR-75 Structure Foundation Investigation in 2002 and from US 224 Interchange Improvements in 2010, was used to obtain pavement design parameters for this project. The subgrade analysis was performed in accordance with *Geotechnical Bulletin-GB1* from ODOT released August 7, 2013. All of the laboratory test data obtained from the project and historic test borings was entered into the ODOT *GB1 Subgrade Analysis* spreadsheet Version 12.0 dated 1/19/2012. Based on the analysis, the following conclusions are presented. An average Group Index was obtained from the ODOT *GB1 Subgrade Analysis*. This Average Group Index is based on the soils encountered within a depth of approximately 6.5 feet below the proposed bottom of pavement. The Design CBR value was obtained by correlating the Group Index on the chart illustrated in Figure 203-2 of the ODOT Pavement Design Manual, issued 2008. The Resilient Modulus was calculated using the relationship to the CBR shown in Figure 203-2 of the ODOT Pavement Design Manual, issued 2008. The pavement design parameter information is summarized in Table 6.1.1.

Table 6.1.1 – Summary of Pavement Design Parameters

Parameter	Value
Average N_{60L}	12.3
Average PI	14.7
Average Group Index	7.06
Average CBR	7
Resilient Modulus (M_R , psi)	8,400

Appropriate drainage systems, such as edge drains or underdrains are strongly recommended to minimize subgrade weakening resulting from excessive moisture penetration. All drain pipes should be installed in accordance with ODOT's "Construction and Materials Specifications," Item 605 - "Underdrains" issued January 1, 2013.

6.2 Embankment Design

Slope stability and settlement analyses were performed for the proposed embankments to be constructed along IR-75 and US 68 Mainlines and proposed Ramps. GSTABL7 with STEDwin, version 2.0 program that was developed by Mr. Garry H. Gregory, P.E. was used to perform the stability analyses for the proposed embankment slopes to estimate the Factor of Safety. Trial failure surfaces were generated using the method of slices for short term and long-term stability. The Modified Bishop Method of Slices was used to generate circular trial failure surfaces. Shear strengths were obtained from the laboratory tests performed on the undisturbed soils samples and from past experience with similar types of soils for slope stability and settlement analyses. Microsoft Excel spreadsheets were used to perform the settlement analyses for the proposed embankments. The change in the effective overburden pressure in the foundation soils, which will be caused by the weight of the proposed embankment fill, was calculated using the Hough Method. The bulk unit weight of the fill material used for the proposed embankment is assumed to be 125 pcf. The existing foundation soil profiles below the proposed embankment fill placement locations were estimated from the adjacent boring locations. The phreatic surface was approximated from the water level readings from the adjacent test boring locations. The consolidation parameters; compression index (Cc) and recompression index (Cr) were obtained from moisture content, from the laboratory tests performed on the undisturbed soils samples, and obtained from past experience on similar types of soils were used to calculate the consolidation and immediate settlements. The values of coefficient of consolidation for soil layers were estimated from laboratory consolidation test results and the chart which shows the approximate correlations between Coefficient of Consolidation vs. Liquid Limits (after U.S. Navy, 1971). Multi-layer soil system was treated as a single layer and equivalent thickness of the single foundation soil layer was calculated. Based on the equivalent thickness and coefficient of consolidation value of single foundation soil layer, rate of consolidation settlement of the foundation soils was calculated for the time factor. The slope stability analysis computer output and settlement analysis spread sheets are included in Appendix B.

IR-75 & US 68 Mainlines

Embankment at IR-75 Realignment: The plan and profile and cross-section drawings provided by PB personnel indicate that the embankment will be constructed along IR-75 realignment between approximate Stations 788+50 to 822+00 to raise the existing grade to the proposed realignment IR-75 subgrade. The maximum height of the proposed embankment will be approximately 33.5 feet at Station 809+50. The proposed embankment slopes will be constructed at angles ranging from 2 to 6 (Horizontal): 1 (Vertical). Some of the proposed embankment slopes with a height greater than 20.0 feet and an angle steeper than 3.0 (Horizontal): 1.0 (Vertical) will be constructed using reinforcement between Stations 804+50 and 805+50, Left, 807+00 and 807+50, Left, 813+42.39 and 813+94.82, Right, and 815+00 and 818+25, Right. These reinforced soil slopes will be designed by others. Soil information obtained from eight (8) test borings; B-012-0-13 through B-016-0-13, B-021-0-13, B-025-1-13, and B-026-0-13 which were advanced along IR-75 realignment, was used to design the proposed embankment. Also, soil information obtained from eight (8) test borings; B-016-1-13 and B-017-0-13 through B-020-0-13 which were advanced for designing HAN-75-1540 bridges, B-020-2-13 which was advanced for designing a culvert at Station 811+98, and B-021-1-13 and B-023-0-13 which were advanced for designing HAN-75-1526 bridges, was used to design the proposed embankment.

The proposed embankment slope with an angle of 3 (Horizontal): 1 (Vertical) was used to analyze the stability of the slope. Two (2) locations at Stations 804+00, Left in the vicinity of test boring B-016-0-13 and 809+50, Left in the vicinity of test borings B-020-2-13 and B-021-0-13 were identified to be critical for failure of slope, and were selected for analyzing slope stability. Table 6.2.1 summarizes the safety factors for the short term and long term stability of the proposed embankment. Based on this slope stability analyses, the calculated Safety Factors for both short term and long term exceeded the required Safety Factors specified in the ODOT Embankment Checklist.

Table 6.2.1 –Summary of Critical Factors of Safety at IR-75 Realignment

Station	Slope Side	Stability	Method Used	Factor of Safety
804+00	Left	Short Term	Circular	3.04
804+00	Left	Long Term	Circular	2.07
809+50	Left	Short Term	Circular	1.96
809+50	Left	Long Term	Circular	1.49

To estimate the anticipated settlement of the proposed embankment fill due to the volume change in the foundation soils, settlement analyses were performed at Station 804+75 in the vicinity of test boring

B-016-0-13 and at Station 807+50 in the vicinity of test boring B-019-0-13. The height of the embankment fill at Station 804+75 will be approximately 24.0 feet and at Station 807+50 will be approximately 33.5 feet. Table 6.2.2 summarizes the cross section Station, embankment height, and estimated total settlement (primary consolidation and/or immediate settlement) of the underlying foundation soils encountered at the test boring location.

Table 6.2.2–Summary of Anticipated Total Settlement at IR-75 Realignment

Station	Test Boring	Embankment Height (feet)	Estimated Total Settlement (inches)
804+75	B-016-0-13	24.0	1.30
807+50	B-019-0-13	33.5	1.77

Based on the settlement analysis, the estimated total settlement will be more than one inch in the vicinity of boring locations B-016-0-10 and B-019-0-13. If the ramp pavement is constructed immediately upon completion of the embankment construction, it will result in damage to the pavement. Therefore, a waiting period, after the completion of the embankment and before the construction of pavement will be required to allow the foundation soil to consolidate. Based on our calculations, it is recommended that a waiting period of 14 days is required for 50 percent degree of consolidation to occur after completing the embankment and before constructing the pavement of IR 75 Realignment. This waiting period was calculated using coefficient of consolidation (C_v) of 0.680 square feet/day, single foundation soil layer equivalent thickness of 7.071 feet, and one sided drainage for foundation soils and is to be applied between Stations 799+00 and 813+00 of IR 75 Realignment.

Embankment at IR-75 Widening: The plan and cross-section drawings provided by PB personnel indicate that the embankments will be constructed along sections of IR-75 SB and NB outside shoulders for widening. Two (2) sections of embankments along IR-75 with a height of more than 10.0 feet which were identified to be critical for embankment design were located between Stations 817+50 to 824+50, Right and between Stations 893+00 to 914+50, Left and Right. Soil information obtained from 11 test borings; B-118-0-13, B-026-2-13, B-027-0-13, B-027-2-13 which were advanced between Stations 817+50 to 824+00 and B-043-0-13, B-044-0-13, B-044-1-13, B-047-1-13, B-049-0-13, B-049-1-13, and B-050-0-13 which were advanced between Stations 893+00 to 914+50 was used to design the proposed embankments.

The maximum height of the proposed embankment widening between Stations 817+50 and 824+50, Right will be approximately 22.0 feet at Station 817+50. The proposed embankment slopes of this

section will be constructed at angles ranging from 3 to 4 (Horizontal): 1 (Vertical) and will be unreinforced. The maximum height of the proposed embankment between Stations 893+00 to 914+50 widening will be approximately 20.6 feet at Station 904+00. The proposed embankment slopes of this section will be constructed at angles ranging from 1.5 to 4 (Horizontal): 1 (Vertical) and will be both reinforced and unreinforced. The proposed embankment with a height greater than 20.0 feet and an angle steeper than 3.0 (Horizontal): 1.0 (Vertical) will be constructed using reinforcement between Stations 894+50 and 909+50. Also, the proposed embankment with an angle steeper than 2.0 (Horizontal): 1.0 (Vertical) will be constructed using reinforcement between Stations 912+50 and 915+00. These reinforced slopes will be designed by others.

The proposed embankment slope with angles of 3 (Horizontal): 1 (Vertical) and 2 (Horizontal): 1 (Vertical) were used to analyze the stability of the slope. Two (2) locations; one from between Stations 817+50 to 824+50, at Station 819+50, Right in the vicinity of test borings B-118-0-13 and B-026-2-13 and another between Stations 893+00 to 914+50, at Station 893+00, Left in the vicinity of test boring B-044-0-13 which were identified to be critical for failure of slope, were selected for analyzing slope stability. Table 6.2.3 summarizes the safety factors for the short term and long term stability of the proposed embankment. Based on this slope stability analyses, the calculated Safety Factors for both short term and long term exceed the required Safety Factors specified in the ODOT Embankment Checklist.

Table 6.2.3 –Summary of Critical Factors of Safety at IR-75 Widening

Station	Slope Side	Stability	Method Used	Factor of Safety
819+50	Right	Short Term	Circular	3.02
819+50	Right	Long Term	Circular	2.11
893+00	Left	Short Term	Circular	4.57
893+00	Left	Long Term	Circular	2.18

To estimate the anticipated settlement of the proposed embankment fill due to the volume change in the foundation soils, settlement analyses were performed at Station 822+00 in the vicinity of test boring B-026-2-13 and at Station 904+00 in the vicinity of test boring B-049-1-13. The height of the embankment fill at Station 822+00 will be approximately 12.9 feet and at Station 904+00 will be approximately 20.6 feet. Table 6.2.4 summarizes the cross section Station, embankment height, and estimated total settlement (primary consolidation and/or immediate settlement) of the underlying foundation soils encountered at the test boring location.

Table 6.2.4–Summary of Anticipated Total Settlement at IR-75 Widening

Station	Test Boring	Embankment Height (feet)	Estimated Total Settlement (inches)
822+00	B-026-2-13	12.9	0.95
904+00	B-049-1-10	20.6	1.37

Based on the settlement analysis, the estimated total settlement will be more than one inch in the vicinity of boring location B-049-1-13. If the IR-75 pavement is constructed immediately upon completion of the embankment construction, it will result in damage to the pavement. Therefore, a waiting period, after the completion of the embankment and before the construction of pavement will be required to allow the foundation soil to consolidate. Based on our calculations, it is recommended that a waiting period of 15 days is required for 50 percent degree of consolidation to occur after completing the embankment and before constructing the pavement of IR-75 Widening. This waiting period was calculated using coefficient of consolidation (C_v) of 1.800 square feet/day, single foundation soil layer equivalent thickness of 11.666 feet, and one sided drainage for foundation soils and is to be applied between Stations 895+00 to 896+75 and 900+50 to 905+50 of IR 75 widening, on both left and right sides.

Embankment at US 68 Widening: The plan and cross-section drawings provided by PB personnel indicate that the embankments will be constructed along sections of US 68 SB and NB outside shoulders for widening. The maximum height of the proposed embankment will be approximately 23.2 feet at Station 761+00. The proposed embankment slopes will be constructed at angles ranging from 1.5 to 6 (Horizontal): 1 (Vertical) and will be reinforced and unreinforced. The proposed embankment slope with an angle steeper than 2.0 (Horizontal): 1.0 (Vertical) will be constructed using reinforcement between Stations 764+00 and 766+50 and will be designed by others. Soil information obtained from six (6) test borings B-078-0-13 through B-082-0-13, and B-088-0-13 which were advanced along US 68, were used to design the proposed embankment. Also, soil information obtained from nine (9) test borings; B-149-0-13 and B-148-0-13 which were advanced for designing Lima Ramp A, B-098-0-13 which was advanced for designing Lima Ramp B, B-080-1-13 and B-082-1-13 which were advanced for designing Retaining Wall 1, and B-083-0-13, B-084-0-13, B-086-0-13, and B-087-0-13 which were advanced for designing HAN-68-1585 bridge, was used to design the proposed embankment.

Since proposed unreinforced embankment slopes will be constructed flatter than 3 (Horizontal): 1 (Vertical) and to a maximum height of 10.0 feet, stability of the slopes will not be a concern. To estimate the anticipated settlement of the proposed embankment fill due to the volume change in the foundation soils, settlement analyses were performed at Stations 756+00 in the vicinity of test boring B-082-0-13 and 759+25 in the vicinity of test boring B-086-0-13. The height of the embankment fill at Station 756+00 will be approximately 20.0 feet and at Station 761+00 will be approximately 14.2 feet. Table 6.2.5 summarizes the cross section Station, embankment height, and estimated total settlement (primary consolidation and/or immediate settlement) of the underlying foundation soils encountered at the test boring location.

Table 6.2.5–Summary of Anticipated Total Settlement at US 68 Widening

Station	Test Boring	Embankment Height (feet)	Estimated Total Settlement (inches)
756+00	B-082-0-13	20.0	0.58
759+25	B-086-0-13	14.2	0.95

Based on the settlement analysis, the estimated total settlement of the underlying foundation soils after completion of the embankment will be on the order of 1.0 inch in the vicinity of boring locations B-082-0-13 and B-086-0-13. Therefore, no waiting period, after the completion of the embankment and before the construction of pavement will be required.

Proposed Ramps

Embankment at US 68 Ramp A: The plan and profile and cross-section drawings provided by PB personnel indicate that the embankments will be constructed along US 68 Ramp A to bring the existing grade to the proposed profile subgrade. The maximum height of the proposed embankment will be approximately 19.3 feet at Station 772+00. The proposed embankment slopes will be constructed at angles ranging from 4 to 6 (Horizontal): 1 (vertical) and will be reinforced and unreinforced. A section of proposed embankment back slope with a height greater than 20.0 feet and an angle steeper than 3.0 (Horizontal): 1.0 (Vertical) will be constructed using reinforcement between Stations 773+50 and 775+50 and will be designed by others. Soil information obtained from nine (9) test borings; B-089-0-13 through B-097-0-13 which was advanced along US 68 Ramp A was used to design the proposed embankment along US 68 Ramp A.

Since the slopes of the proposed embankments will be constructed flatter than 4 (Horizontal): 1 (Vertical), the stability of the slopes will not be a concern. However, elastic clay (A-7-5) soils which are considered unsuitable soils according to ODOT CMS 703.16A specifications were encountered in the foundation soils in test boring B-091-0-13. These unsuitable soils may cause slope instability within the proposed embankment. Therefore, the proposed embankment slope at one (1) location; Station 775+00, Left in the vicinity of test boring B-091-0-13 which was identified to be critical for failure of slope, was selected for analyzing slope stability. Table 6.2.6 summarizes the safety factors for the short term and long term stability of the embankment. Based on this slope stability analysis, the calculated Safety Factors for both short term and long term exceed the required Safety Factors specified in the ODOT Embankment Checklist.

Table 6.2.6 –Summary of Critical Factors of Safety at US 68 Ramp A

Station	Slope Side	Stability	Method Used	Factor of Safety
775+00	Right	Short Term	Circular	2.23
775+00	Right	Long Term	Circular	1.34

To estimate the anticipated settlement of the proposed embankment fill due to the volume change in the foundation soils, settlement analyses were performed at Station 771+50 in the vicinity of test boring B-090-0-13 and at Station 775+00 in the vicinity of test boring B-091-0-13. The height of the embankment fill at Station 771+50 will be approximately 19.3 feet and at Station 775+00 will be approximately 5.8 feet. Table 6.2.7 summarizes the cross section Station, embankment height, and estimated total settlement (primary consolidation and/or immediate settlement) of the underlying foundation soils encountered at the test boring location.

Table 6.2.7–Summary of Anticipated Total Settlement at US 68 Ramp A

Station	Test Boring	Embankment Height (feet)	Estimated Total Settlement (inches)
771+50	B-090-0-13	19.3	0.79
775+00	B-091-0-13	5.8	8.02

Based on the settlement analysis, the estimated total settlement will be more than one inch in the vicinity of boring location B-091-0-13. If the ramp pavement is constructed immediately upon completion of the embankment construction, it will result in damage to the pavement. Therefore, a waiting period, after the completion of the embankment and before the construction of pavement will be required to allow the foundation soil to consolidate. Based on our calculations, it is recommended that a

waiting period of 424 days is required for 90 percent degree of consolidation to occur after completing the embankment and before constructing the pavement of US 68 Ramp A. This waiting period was calculated using coefficient of consolidation (C_v) of 1.80 square feet/day, single foundation soil layer equivalent thickness of 29.999 feet, and one sided drainage for foundation soils and is to be applied between Stations 773+00 and 777+00 of US 68 Ramp A. A settlement device should be installed at the top of the existing foundation soils before any fill is being placed. PGI recommends installing settlement device to measure the settlement in the vicinity of Station 775+10, 4.0', Left along US 68 Ramp A.

Embankment at Lima Ramp B: The plan and profile and cross-section drawings provided by PB personnel indicate that the embankment will be constructed along Lima Ramp B to bring the existing grade to the proposed profile subgrade. The maximum height of the proposed embankment will be approximately 7.7 feet at Station 753+00. The proposed embankment slopes will be constructed at angles ranging from 4 to 6 (Horizontal): 1 (Vertical) and unreinforced. Soil information obtained from four (4) test borings B-098-0-13 through B-101-0-13 was used to design the proposed embankment. Since the slopes of the proposed embankments will be constructed flatter than 4 (Horizontal): 1 (Vertical), stability of the slopes will not be a concern. To estimate the anticipated total settlement of the proposed embankment fill due to the volume change in the foundation soils, settlement analysis was performed at Station 750+38 in the vicinity of test boring B-099-0-13. The height of the embankment fill at Station 750+38 will be approximately 6.5 feet. Table 6.2.8 summarizes the cross section Station, embankment height, and estimated total settlement (primary consolidation and/or immediate settlement) of the underlying foundation soils encountered at the test boring location.

Table 6.2.8–Summary of Anticipated Consolidation Settlement at Lima Ramp B

Station	Test Boring	Embankment Height (feet)	Estimated Total Settlement (inches)
750+38	B-099-0-13	6.5	0.38

Based on the settlement analysis, the estimated total settlement of the underlying foundation soils after completion of the embankment will be on the order of 0.5 inch in the vicinity of boring location B-099-0-13. Therefore, no waiting period, after the completion of the embankment and before the construction of pavement will be required.

Embankment at Lima Ramp G: The plan and profile and cross-section drawings provided by PB personnel indicate that the embankment will be constructed along Lima Ramp G to bring the existing grade to the proposed profile subgrade. The maximum height of the proposed embankment will be approximately 14.2 feet at Station 802+50. The proposed embankment slopes will be constructed at angles ranging from 3 to 6 (Horizontal): 1 (Vertical) and will be unreinforced. Soil information obtained from four (4) test borings B-102-0-13, B-103-0-13, B-119-0-13, and B-120-0-13 was used to design the proposed embankment.

Elastic clay (A-7-5) soils which are considered unsuitable soils according to ODOT CMS 703.16A specifications were encountered in the foundation soils in test borings B-119-0-13 and B-120-0-13. The proposed embankment slope at one (1) location; Station 801+52, Right in the vicinity of test boring B-120-0-13, where the proposed embankment slope with an angle of 3 (Horizontal): 1 (Vertical) is to be constructed and A-7-5 soils with moisture content ranging from 42% to 52% were encountered, was identified to be critical for failure of slope and was selected for analyzing slope stability. Table 6.2.9 summarizes the safety factors for the short term and long term stability of the embankment. Based on this slope stability analysis, the calculated Safety Factors for both short term and long term exceed the required Safety Factors specified in the ODOT Embankment Checklist.

Table 6.2.9 –Summary of Critical Factors of Safety at Lima Ramp G

Station	Slope Side	Stability	Method Used	Factor of Safety
801+52	Right	Short Term	Circular	2.20
801+52	Right	Long Term	Circular	1.32

To estimate the anticipated settlement of the proposed embankment fill due to the volume change in the foundation soils, settlement analysis was performed at Station 801+52 in the vicinity of test boring B-120-0-13. The height of the embankment fill at Station 801+52 will be approximately 13.5 feet. Table 6.2.10 summarizes the cross section Station, embankment height, and estimated total settlement (primary consolidation and/or immediate settlement) of the underlying foundation soils encountered at the test boring location.

Table 6.2.10–Summary of Anticipated Total Settlement at Lima Ramp G

Station	Test Boring	Embankment Height (feet)	Estimated Total Settlement (inches)
801+52	B-120-0-13	13.5	4.62

Based on the settlement analysis, the estimated total settlement of the underlying foundation soils will exceed one inch in the vicinity of boring location B-120-0-13. If the ramp pavement is constructed immediately upon completion of the embankment construction, it will result in damage to the pavement. Therefore, a waiting period, after the completion of the embankment and before the construction of pavement will be required to allow the foundation soil to consolidate. Based on our calculations, it is recommended that a waiting period of 231 days is required for 90 percent degree of consolidation to occur after completing the embankment and before constructing the pavement of Lima Ramp G. This waiting period was calculated using coefficient of consolidation (C_v) of 0.300 square feet/day, single foundation soil layer equivalent thickness of 9.033 feet, and one sided drainage for foundation soils and is to be applied between Stations 798+35 and 803+92 of Lima Ramp G. A settlement device should be installed at the top of the existing foundation soils before any fill is being placed. PGI recommends installing settlement device to measure the settlement in the vicinity of Station 802+00, CL along Lima Ramp G.

Embankment at Lima Ramp H: The plan and profile and cross-section drawings provided by PB personnel indicate that the excavations will be performed and embankments will be constructed along Lima Ramp H to bring the existing grade to the proposed profile subgrade. The maximum height of the proposed embankment will be approximately 6.5 feet at Station 807+20 and maximum cut of the proposed embankment will be approximately 11.6 feet at Station 808+00. The proposed embankment slopes will be constructed at angles ranging from 3 to 6 (Horizontal): 1 (Vertical) and will be unreinforced. Soil information obtained from three (3) test borings B-104-0-13 through B-106-0-13 was used to design the proposed embankment. Also soil information obtained from six (6) test borings; B-110-1-13, B-111-0-13, B-111-1-13, B-111-2-13, B-112-0-13, and B-113-0-13 which were advanced for designing HAN-75-1617 Bridge, was used to design the proposed embankment.

Since the slopes of the proposed embankments will be constructed on the compacted engineered foundation fill, at angle 3 (Horizontal): 1 (Vertical) or flatter, and to a maximum height of 6.5 feet, stability of the slopes will not be a concern. However, elastic clay (A-7-5) and elastic silt and clay (A-5) soils which are considered unsuitable soils according to ODOT CMS 703.16A specifications were encountered in the foundation soils in test borings B-104-0-13 through B-106-0-13, B-110-1-13, B-111-0-13, B-111-1-13, and B-113-0-13. These unsuitable soils may cause slope instability within the proposed embankment. Therefore, the proposed embankment/cut slope at two (2) locations; Station

801+50, Right in the vicinity of test boring B-104-0-13 and Station 808+50, Right in the vicinity of test boring B-106-0-13, were selected for analyzing slope stability. Table 6.2.11 summarizes the safety factors for the short term and long term stability of the embankment/cut slopes. Based on this slope stability analyses, the calculated Safety Factors for both short term and long term exceed the required Safety Factors specified in the ODOT Embankment Checklist.

Table 6.2.11 –Summary of Critical Factors of Safety at Lima Ramp H

Station	Slope Side	Stability	Method Used	Factor of Safety
801+50	Right	Short Term	Circular	2.72
801+50	Right	Long Term	Circular	1.53
808+50	Right	Short Term	Circular	1.96
808+50	Right	Long Term	Circular	1.55

To estimate the anticipated settlement of the proposed embankment fill due to the volume change in the foundation soils, settlement analysis was performed at Station 800+50 in the vicinity of test boring B-104-0-13 and at Station 808+92 in the vicinity of test boring B-106-0-13. The height of the embankment fill at Station 800+50 will be approximately 6.0 feet and at Station 808+92 will be approximately 5.0 feet. Table 6.2.12 summarizes the cross section Station, embankment height, and estimated total settlement (primary consolidation and/or immediate settlement) of the underlying foundation soils encountered at the test boring locations.

Table 6.2.12–Summary of Anticipated Total Settlement at Lima Ramp H

Station	Test Boring	Embankment Height (feet)	Estimated Total Settlement (inches)
800+50	B-104-0-13	6.0	1.94
806+30*	B-111-1-13	6.0	8.93
808+92	B-106-0-13	5.0	0.72

* Referenced to U 68 Ramp D Baseline

Based on the settlement analysis, the estimated total settlement of the underlying foundation soils will exceed one inch in the vicinity of boring locations B-104-0-13 and B-111-1-13. If the ramp pavement is constructed immediately upon completion of the embankment construction, it will result in damage to the pavement. Therefore, a waiting period, after the completion of the embankment and before the construction of pavement will be required to allow the foundation soil to consolidate. Based on our calculations, it is recommended that a waiting period of 32 days is required for 70 percent of the consolidation to occur after completing the embankment and before constructing the pavement of Lima

Ramp H in the vicinity of boring location B-104-0-13. This waiting period was calculated using coefficient of consolidation (C_v) of 0.100 square feet/day, single foundation soil layer equivalent thickness of 2.817 feet, and one sided drainage for foundation soils and is to be applied between Stations 798+49 and 801+60 of Lima Ramp H in the vicinity of boring location B-111-1-13. Based on our calculations, it is recommended that a waiting period of 165 days is required for 90 percent of the consolidation to occur after completing the embankment and before constructing the pavement of Lima Ramp H. This waiting period was calculated using coefficient of consolidation (C_v) of 0.200 square feet/day, single foundation soil layer equivalent thickness of 6.245 feet, and one sided drainage for foundation soils and is to be applied between Stations 806+50 and 807+25 of Lima Ramp H.

Embankment at US 68 Ramp D: The plan and profile and cross-section drawings provided by PB personnel indicate that the embankment will be constructed along US 68 Ramp D to bring the existing grade to the proposed profile subgrade. The maximum height of the proposed embankment will be approximately 34.0 feet at Station 809+00. The proposed embankment slopes will be constructed at angles ranging from 2 to 6 (Horizontal): 1 (Vertical) and will be reinforced and unreinforced. The proposed embankment slopes with a height greater than 20.0 feet and an angle steeper than 3 (Horizontal): 1 (Vertical) will be constructed using reinforcement between Stations 804+00 and 805+00, Right and 807+00 and 813+38, Right. These reinforced slopes will be designed by others. Soil information obtained from six (6) test borings B-107-0-13 through B-110-0-13, B-115-0-13, and B-117-0-13 was used to design the proposed embankment. Also soil information obtained from two (2) test borings; B-119-0-13 and B-120-0-13 which were advanced for designing Lima Ramp G was used to design the proposed embankment.

Elastic clay (A-7-5) soils which are considered unsuitable soils according to ODOT CMS 703.16A specifications were encountered in the foundation soils in test borings B-108-0-13 through B-110-0-13, B-119-0-13, and B-120-0-13. These unsuitable soils may cause slope instability within the proposed embankment. Therefore, the proposed embankment slope at two (2) locations; Station 798+05, Right in the vicinity of test boring B-107-0-13, where the proposed embankment slope with an angle of 2 (Horizontal): 1 (Vertical) is to be constructed and Station 801+50, Left in the vicinity of test borings B-108-0-13, where A-7-5 soils with moisture content ranging from 60% to 78% were encountered, were selected for analyzing slope stability. Table 6.2.13 summarizes the safety factors for the short term and long term stability of the embankment. Based on this slope stability analyses, the calculated Safety

Factors for both short term and long term exceed the required Safety Factors specified in the ODOT Embankment Checklist.

Table 6.2.13 –Summary of Critical Factors of Safety at US 68 Ramp D

Station	Slope Side	Stability	Method Used	Factor of Safety
798+05	Right	Short Term	Circular	4.69
798+05	Right	Long Term	Circular	2.26
801+50	Left	Short Term	Circular	8.56
801+50	Left	Long Term	Circular	4.74

To estimate the anticipated settlement of the proposed embankment fill due to the volume change in the foundation soils, settlement analyses were performed at Station 801+50 in the vicinity of test boring B-108-0-13, at Station 804+50 in the vicinity of test boring B-110-0-13, and at Station 810+00 in the vicinity of test boring B-115-0-13. The height of the embankment fill at Station 801+50 will be approximately 12.9 feet, at Station 804+50 will be approximately 22.0 feet, and at Station 810+00 will be approximately 36.0 feet. Table 6.2.14 summarizes the cross section Station, embankment height, and estimated total settlement (primary consolidation and/or immediate settlement) of the underlying foundation soils encountered at the test boring location.

Table 6.2.14–Summary of Anticipated Total Settlement at US 68 Ramp D

Station	Test Boring	Embankment Height (feet)	Estimated Total Settlement (inches)
801+50	B-108-0-13	12.9	9.40
804+50	B-110-0-13	22.0	6.14
810+00	B-115-0-13	36.0	1.29

Based on the settlement analyses, the estimated total settlement of the underlying foundation soils will exceed one inch in the vicinity of all three boring locations. If the ramp pavement is constructed immediately upon completion of the embankment construction, it will result in damage to the pavement. Therefore, a waiting period, after the completion of the embankment and before the construction of pavement will be required to allow the foundation soil to consolidate. Based on our calculations, it is recommended that a waiting period of 233 days is required for 90 percent of the consolidation to occur after completing the embankment and before constructing the pavement of US 68 Ramp D in the vicinity of boring location B-108-0-13. This waiting period was calculated using coefficient of consolidation (C_v) of 0.200 square feet/day, single foundation soil layer equivalent thickness of 7.415 feet, and one sided drainage for foundation soils and is to be applied between Stations 799+21 and 804+89 of US 68 Ramp

D. A settlement device should be installed at the top of the existing foundation soils before any fill is being placed. PGI recommends installing settlement device to measure the settlement in the vicinity of Station 804+50, CL along US 68 Ramp D. Based on our calculations, it is recommended that a waiting period of 178 days is required for 90 percent of the consolidation to occur after completing the embankment and before constructing the pavement of US 68 Ramp D in the vicinity of boring location B-110-0-13. This waiting period was calculated using coefficient of consolidation (C_v) of 1.500 square feet/day, single foundation soil layer equivalent thickness of 17.722 feet, and one sided drainage for foundation soils and is to be applied between Stations 804+89 and 806+45 of US 68 Ramp D.

Embankment at US 68 Ramp C: The plan and profile and cross-section drawings provided by PB personnel indicate that the embankments will be constructed along US 68 Ramp C to bring the existing grade to the proposed profile subgrade. The maximum height of the proposed embankment will be approximately 55.5 feet at Station 799+50. The proposed embankment slopes will be constructed at angles ranging from 2 to 6 (Horizontal): 1 (Vertical) and will be reinforced and unreinforced. The proposed embankment slopes with a height greater than 20.0 feet and an angle steeper than 3 (Horizontal): 1 (Vertical) will be constructed using reinforcement between Stations 794+00 and 795+00, Left and Right and 805+50 and 808+50, Left and will be designed by others. Soil information obtained from nine (9) test borings B-121-0-13 through B-125-0-13, B-132-0-13, B-136-0-13, B-138-0-13, and B-140-0-13 was used to design the proposed embankment. Also soil information obtained from 15 test borings; B-141-0-13 and B-143-0-13 which were advanced for designing Lima Ramp E, B-154-0-13 through B-156-0-13 which were advanced for designing US 68 Ramp B, B-135-0-13, B-135-1-13, B-135-2-13, B-133-0-13, and B-132-1-13 which were advanced for designing HAN-75-1656 Bridge, B-131-0-13, B-131-1-13, B-130-0-13, B-128-0-13, and B-126-0-13 which were advanced for designing HAN-75-1668 Bridge, was used to design the proposed embankment. Elastic clay (A-7-5) soils which are considered unsuitable soils according to ODOT CMS 703.16A specifications were encountered in the foundation soils in test borings B-141-0-13, B-154-0-13, B-155-0-13, B-135-0-13, B-135-1-13, and B-135-2-13.

The proposed embankment slope with an angle of 3 (Horizontal): 1 (Vertical) was used to analyze the stability of the slope. Two (2) locations at Station 800+50, Left in the vicinity of test boring B-132-0-13 and at Station 811+00, Right in the vicinity of test boring B-124-0-13, were identified to be critical for failure of slope, and were selected for analyzing slope stability. Table 6.2.15 summarizes the safety

factors for the short term and long term stability of the embankment for existing soil conditions. Based on this slope stability analyses, the calculated Safety Factors for both short term and long term exceed the required Safety Factors specified in the ODOT Embankment Checklist.

Table 6.2.15 –Summary of Critical Factors of Safety at US 68 Ramp C

Station	Slope Side	Stability	Method Used	Factor of Safety
800+50	Left	Short Term	Circular	2.34
800+50	Left	Long Term	Circular	2.08
811+00	Right	Short Term	Circular	4.35
811+00	Right	Long Term	Circular	2.51

To estimate the anticipated settlement of the proposed embankment fill due to the volume change in the foundation soils, settlement analyses were performed at Station 794+25 in the vicinity of test boring B-136-0-13, at Station 800+50 in the vicinity of test boring B-132-0-13, and at Station 811+00 in the vicinity of test boring B-124-0-13. The height of the embankment fill at Station 794+25 will be approximately 35.0 feet, at Station 800+50 will be approximately 54.2 feet, and at Station 807+50 will be approximately 20.0 feet. Table 6.2.16 summarizes the cross section Station, embankment height, and estimated total settlement (primary consolidation and/or immediate settlement) of the underlying foundation soils encountered at the test boring location.

Table 6.2.16–Summary of Anticipated Total Settlement at US 68 Ramp C

Station	Test Boring	Embankment Height (feet)	Estimated Total Settlement (inches)
794+25	B-136-0-13	35.0	1.32
800+50	B-132-0-13	54.2	5.86
811+00	B-124-0-13	20.0	1.05

Based on the settlement analyses, the estimated total settlement of the underlying foundation soils will exceed one inch in the vicinity of boring locations B-136-0-13 and B-132-0-13. If the ramp pavement is constructed immediately upon completion of the embankment construction, it will result in damage to the pavement. Therefore, a waiting period for pavement construction after completing the embankment and before the construction of pavement will be required to allow the foundation soil to consolidate. Based on our calculations, it is recommended that a waiting period of 14 days is required for 50 percent of the consolidation to occur after completing the embankment and before constructing the pavement of US 68 Ramp C in the vicinity of boring location B-136-0-13. This waiting period was calculated using coefficient of consolidation (C_v) of 2.200 square feet/day, foundation soils equivalent

thickness of 12.500 feet in test boring B-136-0-13, one sided drainage for foundation soils and is to be applied between Stations 791+50 and 794+75 of US 68 Ramp C. Based on our calculations, it is recommended that a waiting period of 3 days is required for 90 percent of the consolidation to occur after completing the embankment and before constructing the pavement of US 68 Ramp C in the vicinity of boring location B-132-0-13. This waiting period was calculated using coefficient of consolidation (C_v) of 1.700 square feet/day, foundation soils equivalent thickness of 2.500 feet in test boring B-132-0-13 location, and one sided drainage for foundation soils and is to be applied between Stations 799+25 to 802+25 of US 68 Ramp C.

Embankment at Lima Ramp E: The plan and profile and cross-section drawings provided by PB personnel indicate that the embankment will be constructed along Lima Ramp E to bring the existing grade to the proposed profile subgrade. The maximum height of the proposed embankment will be approximately 18.8 feet at Station 792+00. The proposed embankment and cut slopes will be constructed at angles ranging from 3 to 6 (Horizontal): 1 (Vertical) and will be unreinforced. Soil information obtained from four (4) test borings B-141-0-13, B-143-0-13 through B-145-0-13 was used to design the proposed embankment.

Since slopes of the proposed embankment will be constructed on the compacted engineered foundation fill and at angle 3 (Horizontal): 1 (Vertical) or flatter, stability of the slopes will not be a concern. However, elastic clay (A-7-5) soils which are considered unsuitable soils according to ODOT CMS 703.16A specification were encountered in test borings B-144-0-13 and B-141-0-13. These unsuitable soils may cause slope instability within the proposed embankment. Therefore, the proposed embankment slope at two (2) locations at Station 784+00, Left in the vicinity of test boring B-144-0-13 and at Station 790+99, Left in the vicinity of test boring B-141-0-13 were identified to be critical for failure of slope, and were selected for analyzing slope stability. Table 6.2.17 summarizes the safety factors for the short term and long term stability of the embankment for existing soil conditions. Based on this slope stability analyses, the calculated Safety Factors for both short term and long term exceed the required Safety Factors specified in the ODOT Embankment Checklist.

Table 6.2.17 –Summary of Critical Factors of Safety at Lima Ramp E

Station	Slope Side	Stability	Method Used	Factor of Safety
784+00	Left	Short Term	Circular	3.81
784+00	Left	Long Term	Circular	2.30
790+98	Left	Short Term	Circular	2.93
790+98	Left	Long Term	Circular	2.54

To estimate the anticipated settlement of the proposed embankment fill due to the volume change in the foundation soils, settlement analyses were performed at Station 787+73 in the vicinity of test boring B-143-0-13 and at Station 790+99 in the vicinity of test boring B-141-0-13. The height of the embankment fill at Station 787+73 will be approximately 7.0 feet and at Station 790+99 will be approximately 16.1 feet. Table 6.2.18 summarizes the cross section Station, embankment height, and estimated total settlement (primary consolidation and/or immediate settlement) of the underlying foundation soils encountered at the test boring location.

Table 6.2.18–Summary of Anticipated Total Settlement at Lima Ramp E

Station	Test Boring	Embankment Height (feet)	Estimated Total Settlement (inches)
783+96	B-144-0-13	4.5	6.93
787+73	B-143-0-13	7.0	0.73
790+99	B-141-0-13	16.1	16.19

Based on the settlement analyses, the estimated total settlement of the underlying foundation soils will exceed one inch in the vicinity of boring locations B-144-0-13 and B-141-0-13. If the ramp pavement is constructed immediately upon completion of the embankment construction, it will result in damage to the pavement. Therefore, a waiting period, after the completion of the embankment and before the construction of pavement will be required to allow the foundation soil to consolidate. Based on our calculations, it is recommended that a waiting period of 99 days is required for 90 percent of the consolidation to occur after completing the embankment and before constructing the pavement of Lima Ramp E in the vicinity of boring location B-144-0-13. This waiting period was calculated using coefficient of consolidation (C_v) of 0.200 square feet/day, single foundation soil layer equivalent thickness of 4.836 feet, and one sided drainage for foundation soils and is to be applied between Stations 781+10 and 785+96 of Lima Ramp E. Based on our calculations, it is recommended that a waiting period of 402 days is required for 95 percent of the consolidation to occur after completing the embankment and before constructing the pavement of Lima Ramp E in the vicinity of boring location B-141-0-13. This waiting period was calculated using coefficient of consolidation (C_v) of 0.310 square feet/day, single foundation soil layer equivalent thickness of 10.510 feet, and one sided drainage for foundation soils and is to be applied between Stations 788+87 and 792+87 of Lima Ramp E. A settlement device should be installed at the top of the existing foundation soils before any fill is being placed. PGI recommends

installing settlement devices to measure the settlement in the vicinity of Station 790+87, CL of Lima Ramp E.

Embankment at Lima Ramp A: The plan and profile and cross-section drawings provided by PB personnel indicate that the embankment will be constructed along Lima Ramp A to bring the existing grade to the proposed profile subgrade. The maximum height of the proposed embankment will be approximately 8.4 feet at Station 755+00. The proposed embankment slopes will be constructed at an angle of 4 (Horizontal): 1 (Vertical). Soil information obtained from two (2) test borings B-146-0-13 and B-147-0-13 was used to design the proposed embankment.

Since slopes of the proposed embankment will be constructed flatter than 4 (Horizontal): 1 (Vertical) and to the maximum height of 8.4 feet, stability of the slopes or settlement will not be a concern.

Embankment at US 68 Ramp B: The plan and profile and cross-section drawings provided by PB personnel indicate that the embankment will be constructed along US 68 Ramp B to bring the existing grade to the proposed profile subgrade. The maximum height of the proposed embankment will be approximately 21.0 feet at Station 807+40. The proposed embankment and cut slopes will be constructed at angles ranging from 4 to 6 (Horizontal): 1 (Vertical). Soil information obtained from five (5) test borings B-150-0-13 and B-153-0-13 through B-156-0-13 was used to design the proposed embankment. Also, soil information obtained from three (3) test boring; B-152-0-13 which were advanced for designing Lima Ramp F and B-135-1-13 and B-135-2-13 which was advanced for designing HAN-75-1656 Bridge were used to design the proposed embankment.

Since slopes of the proposed embankment will be constructed on the compacted engineered foundation fill and 4 (Horizontal): 1 (Vertical) angle or flatter, stability of the slopes will not be a concern. However, elastic clay (A-7-5) and elastic silt and clay (A-5) soils which are considered unsuitable soils according to ODOT CMS 703.16A specifications were encountered in test borings B-154-0-13, B-155-0-13, B-135-1-13, and B-135-2-13. These unsuitable soils may cause slope instability within the proposed embankment. Therefore, the proposed embankment slope at two (2) locations at Station 804+00, Left in the vicinity of test boring B-154-0-13 and at Station 808+00, Right in the vicinity of test boring B-155-0-13 were identified to be critical for failure of slope and were selected for analyzing slope stability. Table 6.2.19 summarizes the safety factors for the short term and long term stability of the

embankment for existing soil conditions. Based on this slope stability analyses, the calculated Safety Factors for both short term and long term exceed the required Safety Factors specified in the ODOT Embankment Checklist.

Table 6.2.19 –Summary of Critical Factors of Safety at US 68 Ramp B

Station	Slope Side	Stability	Method Used	Factor of Safety
804+00	Left	Short Term	Circular	2.90
804+00	Left	Long Term	Circular	1.61
808+00	Left	Short Term	Circular	1.90
808+00	Left	Long Term	Circular	1.32

To estimate the anticipated settlement of the proposed embankment fill due to the volume change in the foundation soils, settlement analyses were performed at Station 804+00 in the vicinity of test boring B-154-0-13 and at Station 808+00 in the vicinity of test boring B-155-0-13. The maximum height of the embankment fill at Station 804+00 will be approximately 14.8 feet at Station 808+00 will be approximately 19.3 feet. Table 6.2.20 summarizes the cross section Station, embankment height, and estimated total settlement (primary consolidation and/or immediate settlement) of the underlying foundation soils encountered at the test boring location.

Table 6.2.20–Summary of Anticipated Total Settlement at US 68 Ramp B

Station	Test Boring	Embankment Height (feet)	Estimated Total Settlement (inches)
804+00	B-154-0-13	14.8	5.45
808+00	B-155-0-13	19.3	11.58

Based on the settlement analyses, the estimated total settlement of the underlying foundation soils will exceed one inch in the vicinity of boring locations B-154-0-13 and B-155-0-13. If the ramp pavement is constructed immediately upon completion of the embankment construction, it will result in damage to the pavement. Therefore, a waiting period, after the completion of the embankment and before the construction of pavement will be required to allow the foundation soil to consolidate. Based on our calculations, it is recommended that a waiting period of 141 days is required for 95 percent of the consolidation to occur after completing the embankment and before constructing the pavement of US 68 Ramp B in the vicinity of boring location B-155-0-13. This waiting period was calculated using coefficient of consolidation (C_v) of 0.200 square feet/day, single foundation soil layer equivalent thickness of 5.000 feet, and one sided drainage for foundation soils and is to be applied between Stations

807+00 and 810+02 of US 68 Ramp B. Based on our calculations, it is recommended that a waiting period of 254 days is required for 90 percent of the consolidation to occur after completing the embankment and before constructing the pavement of US 68 Ramp B in the vicinity of boring location B-154-0-13. This waiting period was calculated using coefficient of consolidation (C_v) of 0.300 square feet/day, single foundation soil layer equivalent thickness of 9.472 feet, and one sided drainage for foundation soils and is to be applied between Stations 803+00 and 806+00 of US 68 Ramp B. A settlement device should be installed at the top of the existing foundation soils before any fill is being placed. PGI recommends installing settlement devices to measure the settlement in the vicinity of Stations 804+00, CL and 808+00, CL of US 68 Ramp B.

Embankment at Lima Ramp F: The plan and profile and cross-section drawings provided by PB personnel indicate that the excavation will be performed and embankments will be constructed along sections of the Lima Ramp F to bring the existing grade to the proposed profile subgrade. The maximum depth of the proposed cut will be approximately 6.5 feet at Station 800+00 and the maximum height of the proposed embankment will be approximately 15.0 feet at Station 805+80. The proposed embankment slopes will be constructed at angles ranging from 2 to 6 (Horizontal): 1 (Vertical) and will be unreinforced. Soil information obtained from seven (7) test borings B-151-0-13, B-152-0-13, B-157-0-13 through B-161-0-13 was used to design the proposed embankment.

Two (2) ponds are located along the alignment of the proposed ramp between approximate Stations 802+60 and 802+50 (Pond 2) and between approximate Stations 806+25 and 809+90 (Pond 1). Refer to Section 6.4 “Lima Ramp F” under Proposed Embankments for recommendations for removal and replacement of all unstable soils. Elastic silt and clay (A-5) soil which are considered unsuitable soils according to ODOT CMS 703.16 Specifications was encountered in test boring B-158-0-13. The proposed embankment slope at two (2) locations; one at Station 803+00, Right in the vicinity of test boring B-158-0-13, where A-5 soils with moisture content of 89% was encountered and another one at Station 805+50, Right in the vicinity of test boring B-159-0-13, where the proposed embankment slope with an angle of 2 (Horizontal): 1 (Vertical) is to be constructed, were identified to be critical for failure of slope, and were selected for analyzing slope stability. Table 6.2.21 summarizes the safety factors for the short term and long term stability of the embankment. Based on this slope stability analyses, the calculated Safety Factors for both short term and long term exceed the required Safety Factors specified in the ODOT Embankment Checklist.

Table 6.2.21 –Summary of Critical Factors of Safety at Lima Ramp F

Station	Slope Side	Stability	Method Used	Factor of Safety
803+00	Right	Short Term	Circular	3.38
803+00	Right	Long Term	Circular	1.43
805+50	Right	Short Term	Circular	3.24
805+50	Right	Long Term	Circular	1.79

To estimate the anticipated settlement of the proposed embankment fill due to the volume change in the foundation soils, settlement analyses were performed at Station 803+00 in the vicinity of test boring B-158-0-13 and at Station 805+50 in the vicinity of test boring B-159-0-13. The maximum height of the embankment fill at Station 803+00 will be approximately 10.6 feet and at Station 805+50 will be approximately 16.0 feet. Table 6.2.22 summarizes the cross section Station, embankment height, and estimated total settlement (primary consolidation and/or immediate settlement) of the underlying foundation soils encountered at the test boring location.

Table 6.2.22–Summary of Anticipated Total Settlement at Lima Ramp F

Station	Test Boring	Embankment Height (feet)	Estimated Total Settlement (inches)
803+00	B-158-0-13	10.6	2.12
805+50	B-159-0-13	16.0	0.79

Based on the settlement analyses, the estimated total settlement of the underlying foundation soils will exceed one inch in the vicinity of boring location B-158-0-13. If the ramp pavement is constructed immediately upon completion of the embankment construction, it will result in damage to the pavement. Therefore, a waiting period, after the completion of the embankment and before the construction of pavement will be required to allow the foundation soil to consolidate. Based on our calculations, it is recommended that a waiting period of 30 days is required for 60 percent of the consolidation to occur after completing the embankment and before constructing the pavement of Lima Ramp F. This waiting period was calculated using coefficient of consolidation (C_v) of 1.800 square feet/day, single foundation soil layer equivalent thickness of 13.777 feet, and one sided drainage for foundation soils and is to be applied between Stations 801+01 and 805+01 of Lima Ramp F.

General: Table 6.2.23 summarizes the total settlement under proposed embankment height for the Roadway/Ramp sections based on the above analyses. Note that the ramp sections where excessive

settlement is expected to occur in foundation soils contain compressible unsuitable soils; elastic clay (A-7-5) and elastic silt and clay (A-5) in foundation layers. In these ramp sections, if the proposed embankments are supported in geogrid draft foundations, settlement in compressible foundation soils will still be an issue. Table 6.2.23 also summarizes the station limits along Roadway/Ramps where waiting period is required to allow the foundation soil to consolidate after completing the embankment and before constructing the pavement and/or approach slab. Waiting period should be applied on the Ramp section which has waiting period between 98 days and 425 days. These required waiting periods may conflict with the project construction schedule.

Table 6.2.23 – Summary of Waiting Periods for Roadway/Ramp Sections

Roadway/Ramp	Boring No.	Embankment Design Height (feet)	Total Settlement (inches)	Waiting Period (Days)	Approximate Station Limits
IR 75 Realignment	B-016-0-13	24.0	1.30	14	799+00 to 813+00
IR 75 Widening	B-049-1-13	20.6	1.37	15	895+00 to 905+50
US 68 Ramp A	B-091-0-13 *	5.8	8.02	424	773+00 to 777+00
Lima Ramp G	B-120-0-13 *	13.5	4.62	231	798+35 to 803+92
Lima Ramp H	B-104-0-13	6.0	1.94	32	798+49 to 801+60
Lima Ramp H	B-111-1-13	6.0	8.93	165	806+50 to 807+25
US 68 Ramp D	B-108-0-13 *	12.9	9.40	233	799+21 to 804+89
US 68 Ramp D	B-110-0-13	22.0	6.14	178	804+89 to 806+45
US 68 Ramp C	B-136-0-13	35.0	1.32	14	791+50 to 794+75
US 68 Ramp C	B-132-0-13	55.2	5.86	3	799+25 to 802+25
Lima Ramp E	B-144-0-13	4.7	6.93	99	781+10 to 785+96
Lima Ramp E	B-141-0-13 *	16.1	16.19	402	788+87 to 792+87
US 68 Ramp B	B-154-0-13 *	14.8	5.45	209	803+00 to 806+00
US 68 Ramp B	B-155-0-13*	19.3	11.58	141	807+00 to 810+02
Lima Ramp F	B-158-0-13	10.6	2.12	30	801+01 to 805+01

* Required Installing Settlement Plate

Installing settlement plates within the proposed embankment area of these ramp sections as indicated in Table 6.2.23 should be required to measure the amount and rate of settlement. By measuring this settlement, it can confirm when the remaining settlement at each location is less than what the approach slabs or pavement can tolerate. The settlement devices should be installed at the top of the existing foundation soils before any fill is being placed. The survey should be performed weekly to measure the settlement. The final survey is complete when there is no change in four (4) weekly consecutive settlement readings. The waiting period should be either specified on Table 6.2.23 or when no change in four weekly consecutive settlement readings occurs in the field whichever occurs last. Each settlement

device can consist of a three (3) foot square steel plate with a vertical reference rod (usually $\frac{3}{4}$ inch diameter pipe) attached to each steel plate. The reference rods should be added in 4-foot sections as the height of the embankment increases. The elevation of the top of the reference rod for the first 4-foot section should be surveyed before the placement of embankment fill. Thereafter the elevation of the top of each reference rod section should be surveyed before adding the next reference rod section and should be continued until the embankment reaches the required design height.

6.3 Settlement Mitigation

If these required waiting periods specified on Table 6.2.23 conflict with the project construction schedule, then pre-loading technique may be used to mitigate the consolidation settlement in foundations soils of the ramp sections. Pre-loading technique is described as applying additional surcharge loads on the proposed fill embankment above and beyond the design height. This pre-loading technique is to be more effective, if surcharge loads should be applied sufficiently large such that 50% of the total settlement estimated from the fill embankment and the surcharge load is equal to or greater than 100 percent of the settlement estimated under the fill embankment alone at its design height. Waiting period calculations were revised for the pre-loading. It is assumed that that the height of surcharge load is to be placed above the proposed embankment fill at each concerned ramp section will be half of embankment design height. Table 6.3.1 summarizes the revised waiting periods for surcharge load height (half of the embankment design height) of each ramp section where surcharge treatment is required to accelerate the settlement of the foundations soils and to reduce the waiting period. Table 6.3.1 also summarizes the settlement under proposed embankment design height and settlement under pre-loading (proposed embankment and surcharge load). The revised waiting periods and settlement under pre-loading calculations spreadsheets are included in Appendix B.

Also included in Appendix B is revised waiting period and settlement calculations spreadsheet for ten feet height of surcharge load to be placed at each concerned ramp section above the proposed embankment fill. This information is provided to compare waiting periods with the half of embankment design height pre-loading and not for construction. The construction of 10 feet height of surcharge layer above the proposed embankment fill will be problematic. Wider construction area will be needed at the base of the embankment and may be interfering with adjacent ramps. Staged construction of the embankment may also be required to prevent any slope failure due to developing excess pore water

pressure in foundation soils. All surcharge embankment slopes should be constructed at an angle of 2 (Horizontal): 1 (Vertical).

Table 6.3.1 – Summary of Revised Waiting Periods for Pre-Loading

Ramp Section	Boring No.	Height of Surcharge Layer (feet)	Settlement under Proposed Embankment (inches)	Settlement under Pre-Loading (inches)	Waiting Period (Days)
US 68 Ramp A	B-091-0-13	3.0	8.02	10.92	223
Lima Ramp G	B-120-0-13	7.0	4.62	5.66	166
Lima Ramp H	B-111-1-13	3.0	8.93	10.97	111
US 68 Ramp D	B-108-0-13	6.0	9.40	11.37	174
US 68 Ramp D	B-110-0-13	11.0	6.14	7.40	115
Lima Ramp E	B-144-0-13	2.0	6.93	8.31	77
Lima Ramp E	B-141-0-13	8.0	16.19	19.66	217
US 68 Ramp B	B-154-0-13	7.0	5.45	7.53	156
US 68 Ramp B	B-155-0-13	10.0	11.58	13.32	93

Over the long term, secondary settlement should also be expected in foundations soils where highly plastic soil layers encountered in test boring locations after the completion of primary consolidation. Settlement analysis was performed at the test boring B-120-0-13 in order to estimate the anticipated secondary settlement. This settlement will be on the order of 1.50 inches will occur in underlying elastic clay (A-7-5) foundation soils over the period of 10 years. Note that using the surcharge will not completely eliminate secondary settlement on the ramp sections. However, it will be successfully used to reduce the magnitude of secondary settlement.

If these revised waiting periods summarized in Table 6.3.1 still conflict with project construction schedule, other alternatives; installing sand or wick drains in foundations soils or excavation of unsuitable compressive soils and replacement with ODOT Item 203 should be explored to mitigate the settlement along subject ramp sections. Sand Drains or Wick Drains can be installed in foundation soils of the ramp to accelerate the consolidation settlement and to reduce the overall waiting period required. Sand Drains are typically installed by jetting or augering 12 to 18 inch diameter holes to top of bedrock and backfilling with high permeability sand. Typical Sand Drain spacings are 8 to 15 feet center to center. Wick Drains typically consist of a long plastic core surrounded by a geotextile. The geotextile functions as a separator and a filter to keep holes in the plastic core from being plugged by the adjacent soil, and the plastic core provides a route for the excess pore water pressures to dissipate. The drains are typically band-shaped (rectangular) measuring 2 to 4 inch wide in plan dimension. They are attached to a mandrel and are usually driven/pushed into place using either static or vibratory force. A drainage blanket should be

placed across the ramp section surface prior to installing the sand/wick drains in order to provide drainage path beneath the proposed embankment for water flowing from the sand/wick drains. After the sand/wick drains are installed, the fill for proposed embankment should be placed above the drainage blanket. The process of installing the sand/wick drains creates a smear zone due to soil disturbance that can impede the drainage. Therefore, care should be taken during installation to minimize the soil disturbance around the drains. Sand/wick drains should be designed in such a way that the spacing of the drains should have maximum efficiency.

Waiting period calculations were performed for using sand drains to accelerate the ramp foundation soil settlement. It is assumed that soil disturbance will be negligible around the sand drains during the installation. For the above calculations, sand drains triangular spacing of 9 feet center to center and diameter of 1 foot were assumed. Table 6.3.2 summarizes the revised waiting periods for using sand drains for the proposed embankment design height at each subject ramp section. The revised waiting period calculation spreadsheets using sand drains are included in Appendix B.

Table 6.3.2 – Summary of Revised Waiting Periods for using Sand Drains

Ramp Section	Boring No.	Initial Total Settlement (inches)	Combined Degree of Consolidation (%)	Waiting Period (Days)	Approximate Station Limits
US 68 Ramp A	B-091-0-13 *	8.02	96	120	773+00 to 777+00
Lima Ramp G	B-120-0-13 *	4.62	97	101	798+35 to 803+92
Lima Ramp H	B-111-1-13	8.93	97	81	806+50 to 807+25
US 68 Ramp D	B-108-0-13 *	9.40	97	101	799+21 to 804+89
US 68 Ramp D	B-110-0-13	6.14	97	81	804+89 to 806+45
Lima Ramp E	B-144-0-13	6.93	98	67	781+10 to 785+96
Lima Ramp E	B-141-0-13 *	16.19	97	134	788+87 to 792+87
US 68 Ramp B	B-154-0-13 *	5.45	97	101	803+00 to 806+00
US 68 Ramp B	B-155-0-13 *	11.58	98	81	807+00 to 810+02

* Required Installing Settlement Plate

If excavation and replacement method is selected to mitigate the settlement in foundation soils, removal of compressible soils; elastic clay (A-7-5) soils and elastic silt and clay (A-5) soils should be required beyond both sides of toe of the embankment slope and replacing it with ODOT Item 203 before placing fill for the proposed embankment. PGI recommends drilling additional test borings in the vicinity of these drilled test borings to delineate the boundary of compressible soils along the ramp sections. Table 6.3.3 summarizes the excavation depths below existing ground and Station Limits for removal in the vicinity of test boring locations. The actual excavation depths and station limits should be determined at the site by the field engineer based on the encountered soil conditions.

Table 6.3.3 – Summary of Excavation Limits of Compressible Soils

Roadway	Boring No.	Excavation Depth Below Existing Ground (feet)	Approximate Station Limits	Reason for Removal
US 68 Ramp A	B-091-0-13	11.0	773+00 to 777+00	A-7-5
Lima Ramp G	B-119-0-13	8.5	798+35 to 801+00	A-5
Lima Ramp G	B-120-0-13	8.0	801+00 to 803+92	A-7-5
Lima Ramp H	B-104-0-13	6.0	798+49 to 801+60	A-5
Lima Ramp H	B-105-0-13			A-7-5
Lima Ramp H	B-110-1-13			A-7-5
Lima Ramp H	B-111-0-13	See Table 6.5.1		A-7-5
Lima Ramp H	B-111-1-13	3.5	806+50 to 807+25	A-7-5
Lima Ramp H	B-113-0-13			A-7-5
Lima Ramp H	B-106-0-13	See Table 6.5.1		A-7-5
US 68 Ramp D	B-108-0-13	8.5	799+21 to 802+00	A-7-5
US 68 Ramp D	B-109-0-13	7.5	802+00 to 804+89	A-7-5
US 68 Ramp D	B-110-0-13	6.0	804+89 to 805+45	A-7-5
Lima Ramp E	B-144-0-13	See Table 6.5.1		A-7-5
Lima Ramp E	B-141-0-13	8.5	788+87 to 792+87	A-7-5
US 68 Ramp B	B-135-1-13	13.5	803+00 to 803+50	A-7-5
US 68 Ramp B	B-154-0-13	6.0	803+50 to 804+50	A-7-5/A-5
US 68 Ramp B	B-135-2-13	3.5	804+50 to 806+00	A-7-5
US 68 Ramp B	B-155-0-13	3.5	807+00 to 810+02	A-7-5
Lima Ramp F	B-158-0-13	7.2	801+01 to 805+01	A-7-5

6.4 Groundwater Management

Based on the groundwater conditions described in Section 5.2, "Groundwater Conditions," groundwater problems may be anticipated for excavations of structure foundations. If the bottom depth of the excavation for the soil slope extends below the water level at the boring locations, water infiltration

is anticipated. Low to moderate volume pumping or dewatering may be required using sump pumps. It must be noted that the groundwater levels during construction may vary due to seasonal fluctuations, and groundwater may occur where not encountered previously.

6.5 Earthwork and Construction Monitoring

IR-75/US 68 Mainline: Present plans call for full-depth pavement replacement along the existing sections of IR-75 and US 68 mainlines. At each boring location, PGI calculated the approximate cut and fill depths to the proposed pavement subgrade based on the cross section sheets provided by PB personnel and entered into the ODOT *GBI Subgrade Analysis* Spreadsheet. The topsoil and granular base should be stripped and the asphalt and concrete pavement should be milled from the site prior to beginning pavement construction.

Subgrade Analyses: Based on the findings from project and historic test boring logs, unsuitable soil classified as silt A-4b was encountered in project test boring B-025-1-13 (815+37, 208' Lt) at depths ranging from 6.0 feet to 8.5 feet, in project test boring B-035-1-13 (857+77, 13' Lt, SR 12 Ramp B BL) at depths ranging from 6.0 feet to 7.5 feet, in project test boring B-043-0-13 (889+24, 54' Rt) at depths ranging from 6.0 feet to 7.5 feet, and in historic test boring B-017-0-10 (918+97, 49' Lt, US 224 Ramp B BL) at depths ranging from 4.0 feet to 5.5 feet below the existing grade. Due to the susceptibility of silt soils to frost penetration and heave, the removal of the silt soil is required to a depth of three (3) feet below the bottom of proposed subgrade. However, these silt soils were encountered in these test borings at depths greater than three (3) feet below the proposed subgrade. Therefore, removal of silt will not be required in these test boring locations. Bedrock was encountered in 13 of the 78 project test borings at depths ranging from 2.0 feet in test boring B-178-0-13 (6+96, 5' Rt, Service Road BL) to 22.6 feet in test boring B-082-0-13 (756+10, 41' Rt) below the proposed subgrade. Therefore, bedrock excavation should not be required.

Based on the ODOT *GBI* dated August 7, 2013, soils that have low N values (≤ 12) are considered as weak soils and soils that have high moisture content greater than optimum moisture +3% are considered to have excessive moisture. Both of the above described soils are considered unstable soils. Unstable soils with low N values and/or excessive moisture were encountered in project test borings B-006-0-13 (765+99, 17' Rt), B-007-0-13 (770+17, 23' Lt), B-008-0-13 (773+78, 7' Lt), B-029-0-13 (833+01, 8' Rt), B-032-0-13 (845+28, 9' Lt), B-033-0-13 (849+14, 8' Rt), B-034-0-13 (853+21, 9' Rt),

B-034-1-13 (854+68, 6' Lt, SR 12 Ramp B BL), B-035-0-13 (857+25, 43' Rt), B-035-1-13 (857+78, 13' Lt), B-036-0-13 (860+70, 12' Lt), B-037-0-13 (864+88, 8' Rt), B-038-0-13 (869+08, 12' Rt), B-038-1-13 (869+48, 18' Lt, SR 12 Ramp D BL), B-040-0-13 (877+14, 11' Lt), B-043-0-13 (889+24, 54' Rt), B-044-1-13 (895+93, 35' Rt), B-049-0-13 (902+96, 35' Lt), B-050-0-13 (905+35, 35' Rt), B-057-0-13 (933+84, 17' Lt), B-061-0-13 (949+87, 19' Lt), B-063-0-13 (957+95, 19' Rt), B-068-0-13 (977+99, 28' Lt), B-176-0-13 (112+38, 6' Rt, Harrison St BL), B-178-0-13 (6+96, 5' Rt, Service Road BL), and B-179-0-13 (10+19, 2' Rt, Service Road BL) within three (3) feet of the proposed subgrade. Unstable soils with low N values were also encountered in historic test borings B-104-0-02 (843+08, 7' Rt), B-022-0-10 (936+08, 5' Lt, US 224 Ramp C BL), B-023-0-10 (939+62, 63' Lt), B-025-0-10 (931+08, 2' Lt, US 224 Ramp D BL), B-027-0-10 (939+07, 73' Rt), and B-028-0-10 (939+07, 73' Rt) within three (3) feet of the proposed subgrade. Granular soils considered as weak and excessive moisture soils were encountered in test borings B-011-0-13 (785+92, 11' Rt), B-036-0-13 (860+70, 12' Lt), B-066-0-13 (970+14, 29' Rt) B-016-0-10 (915+06, 20' Lt, US 224 Ramp B BL), B-025-0-10 (931+08, 2' Lt, US 224 Ramp D BL), and B-026-0-10 (935+08, 3' Rt, US 224 Ramp D BL) within three (3) feet of the proposed subgrade. Therefore, it is expected that during construction of new pavement, the roadway subgrade areas in the vicinity of these test borings may become unstable under repetitive construction traffic loads or might show yielding conditions. Therefore, pavement subgrade for this project will likely require stabilization during construction in the vicinity of these test borings. The stabilizing options may be either by excavation and replacement or by modifying the properties of the soil using cement or lime kiln dust. Rubblize and Roll is also an option and lime stabilization is not an option for this project according to the ODOT *GB1 Subgrade Analysis* spreadsheet. However, according to GB1, if the project is along an interstate, or along a divided highway with four or more lanes, and is more than one mile in length, the subgrade of the entire project should be globally stabilized. Therefore, this IR-75 interstate project consisting of a four lane divided highway and measuring 5.128 miles in length, should be subjected to global stabilization. This global stabilization should apply to Side Roads as well.

The stabilizing options may be by modifying the properties of the soil using either cement or lime kiln dust. Since the average Plasticity Index (PI) for the entire project is 14.6, the stabilizing option must be performed by modifying the properties of the soils using cement. The stabilization depth should be 12 inches. The lateral extent of the stabilization depth must be 18 inches beyond each edge of proposed pavement. Adjustment of depth may be necessary during construction. The field engineer should determine the actual stabilization depth based on the actual subgrade conditions encountered during

construction. Proof rolling must be performed after global stabilization to verify that the area has achieved a non-yielding condition. According to the test boring logs, N_{60} values less than 4 (soft soils) were not encountered in any of the test borings. However, about 5% of the total area of a globally chemically stabilized project does not pass proof roll and requires alternate means of stabilization based on our past experience. Therefore, the excavation and replacement option should be used to stabilize the subgrade in the areas that failed proof rolling. Also based on the sulfate test results, about 10% of the tested soil samples have sulfate content greater than 3,000 ppm along IR-75 between Stations 744+28 and 770+217 and along US 68/SR 15 between Stations 741+87 and 745+87. Chemical stabilization will not be effective on these soils that have high sulfate content. Therefore, the excavation and replacement option should be used to stabilize the subgrade in the high sulfate content soil areas. However, based on the ODOT *GBI Subgrade Analysis* spreadsheet, unstable soils with low N values and/or excessive moisture were not encountered within the 3 feet of the proposed subgrade in project test borings drilled between Stations 744+28 and 770+217 of IR-75 and between Stations 741+87 and 745+87 of US 68/SR 15. Therefore, excavation and replacement option should not be required to stabilize the subgrade. However, ODOT recommends stabilizing the subgrade to the depth of 12 inches between Stations 756+00 to 760+00 using excavation and replacement option due to prevalent A-4a soil encountered in the southern end of the project. In order to estimate the amount of cement that will be required per square yard of subgrade, *GBI* uses 6 percent cement assuming a dry soil weight of 110 pcf. Using the formula provided in *GBI-Section G*, the amount of cement used to treat one square yard of the site subgrade soils to a depth of 12-inches will be 59.4 pounds/square yard.

Proposed Embankments: All earthwork operations should be conducted in accordance with ODOT *Construction and Material Specifications*, Item 203, issued 2013. Embankment construction should follow the guidelines specified in Item 203.05 “Embankment Construction Methods”. If an embankment is to be constructed more than nine (9) feet in height to reach proposed subgrade, the existing ground need not to be stripped of any topsoil. However, all existing embankment slopes steeper than 8H:1V should be stripped of topsoil before placing embankment fill. PGI has utilized ODOT’s *GB 2 – Special Benching and Sidehill Embankment Fills*, released August 7, 2013 to determine the need for any special benching. Based on the cross-section drawings provided by PB personnel, “Sliver” fills where the existing embankment slopes will receive less than 3 feet thickness of fill, were identified. Table 6.5.1 summarizes the station limits of the roadway and ramp sections where special benching is required during the

construction of proposed embankment. Unsuitable elastic clay (A-7-5) soils and elastic silt and clay (A-5) soils will be present within three (3) feet of the proposed ramp subgrade in the vicinity of boring locations. If these soils are left in place, they are subject to considerable volume change when moisture variation occurs in foundation soils and may cause yield condition of the subgrade. Therefore, these unsuitable soils need to be removed beyond the limit of roadway and replaced with ODOT Item 203. PGI recommends drilling additional test borings in the vicinity of the drilled test borings where unsuitable soils were encountered, to delineate the boundary of unsuitable soils. Table 6.5.2 summarizes the test boring locations of the roadway and ramps and station limits where unsuitable soils were encountered within the upper three (3) feet.

Unstable soils that have low N values (<10) and/or high moisture contents (>optimum moisture+3%, wet soils) will be present along the existing grade of the proposed ramps and roadway. Unstable soils will also be present in the wetlands and drainage ditches where proposed ramps cross. If these unstable soils are left in place, they may cause slope instability within the proposed embankment. Therefore, all existing unstable soils need to be removed beyond the toe and replaced with ODOT Item 203 before placing fill for embankment construction. All replacement soils should be compacted to 95% of the maximum dry density according to Supplement 1015. Table 6.5.2 summarizes the test boring locations of the roadway and ramps and station limits where unstable soils were encountered within the upper three (3) feet. Adjustment of excavation depth and Station limits may be necessary during construction. The field engineer based on the soil conditions encountered during construction should determine the actual station limits and depths.

Table 6.5.1 – Summary of Special Benching Locations

Roadway	Approximate Station Limits
IR-75 Widening	771+50 to 772+00, Left
IR-75 Widening	773+50 to 776+00, Left
IR-75 Widening	783+50 to 784+00, Left
IR-75 Widening	955+50 to 958+00, Left
IR-75 Widening	958+50 to 960+75, Left
IR-75 Widening	984+00 to 986+00, Right
IR-75 Widening	987+50 to 988+50, Right
SR 12 Ramp C	865+75 to 868+00, Left
SR 12 Ramp D	866+50 to 868+50, Right
US 224 Ramp B	922+00 to 923+00, Right
US 224 Ramp D	929+00 to 930+50, Right

IR-75 Realignment: Based on the cross section drawings for this proposed IR 75 realignment, between Stations 788+50 to 822+00, the proposed embankment should be knitted together with the existing IR-75 embankment slope at the beginning and end of the realignment. Most of the existing slopes on which the proposed embankments will be constructed, are steeper than 8H:1V and will receive more than 3 feet width of embankment fill. Therefore, these existing slopes should be benched in accordance with the standard specifications as provided in the 2013 ODOT *Construction and Material Specifications, Item 203.05*. The proposed embankment slope between Stations 798+00 and 802+00 on the left side will be located within the Wetland E. Therefore, before placing fill for construction of embankment, all soft soils within 5 feet of the toe of the slope should be removed and replaced with ODOT Item 203. Existing drainage ditches are located within the proposed realignment. Therefore, any soft soils along the drainage ditch area should be removed and replaced with ODOT Item 203 before placing fill for embankment construction.

IR-75 Widening: Based on the cross section drawings provided for this proposed IR 75 widening, the proposed embankment should be knitted together with the existing IR-75 embankment slopes along IR-75 widening. It appears that most of the existing slopes on which the proposed embankments will be constructed, are steeper than 8H:1V and will receive more than 3 feet width of embankment fill. Therefore, these existing slopes should be benched in accordance with the standard specifications as provided in the 2013 ODOT *Construction and Material Specifications, Item 203.05*. Existing drainage ditches are located along the proposed widening. Therefore, any soft soils along the drainage ditch area should be removed and replaced with ODOT Item 203 before placing fill for embankment construction.

Based on the test boring logs prepared for this site, soils that have low N values (<10) and/or high moisture contents (>optimum moisture+3%, wet soils) were encountered in test borings B-027-2-13 and B-047-1-13 within the upper three (3) feet. Therefore, these existing soils need to be disked and dried and be compacted before placing fill for embankment construction.

US 68 Ramp A: Based on the cross sections provided for this proposed ramp, it appears that most of the existing slopes on which the proposed embankments will be constructed, are steeper than 8H:1V and will receive more than 3 feet width of embankment fill. Therefore, these existing slopes should be benched in accordance with the standard specifications as provided in the 2013 ODOT *Construction and Material Specifications, Item 203.05*. Based on the test boring logs prepared for this proposed ramp, soils that have

low N values (<10) and/or high moisture contents (>optimum moisture+3%, wet soils) were encountered in test borings B-093-0-13 and B-097-0-13 within the upper three (3) feet. Therefore, these existing soils need to be disked and dried and be compacted before placing fill for embankment construction.

Lima Ramp B: Based on the cross sections provided for this proposed ramp, it appears that most of the existing slopes on which the proposed embankments will be constructed, are steeper than 8H:1V and will receive more than 3 feet width of embankment fill. Therefore, these existing slopes should be benched in accordance with the standard specifications for benched embankment construction as provided in the 2013 ODOT *Construction and Material Specifications, Item 203.05*. Based on the test boring logs prepared for this ramp, unstable soils that have low N values (<10) and/or high moisture contents (>optimum moisture+3%, wet soils) were encountered in test borings B-098-0-13 and B-100-0-13 within the upper three (3) feet. Therefore existing soils in the vicinity of boring B-100-0-13 will become unstable and need to be removed and replaced with ODOT Item 203. The roadway subgrade in the vicinity of boring B-098-0-13 will become unstable under repetitive construction traffic loads or might show yielding conditions. Therefore, roadway subgrade should be stabilized during construction.

Table 6.5.2 – Summary of Excavation Limits of Unsuitable/Unstable Soils

Roadway	Boring No.	Excavation Depth Below Existing Ground (feet)	Approximate Station Limits	Problem
IR-75 Realignment	B-012-0-13	2.0	789+00 to 795+00, Left	Wetland F
IR-75 Realignment		2.0	798+00 to 802, Left	Wetland E
IR-75 Widening	B-027-2-13	Disk and dry	824+44 to 828+44, Right	Excess Moisture
IR-75 Widening	B-047-1-13	Disk and dry	900+91 to 904+91, Left	Weak
US 68 Ramp A	B-093-0-13	Disk and dry	781+45 to 785+45	Weak & Ex. Moisture
US 68 Ramp A	B-097-0-13	Disk and dry	797+75 to 801+75	Weak & Ex. Moisture
Lima Ramp B	B-098-0-13	3.0	745+00 to 747+50	Weak
Lima Ramp B	B-100-0-13	2.0	751+76 to 755+76	Unstable Soil
Lima Ramp G	B-102-0-13	Disk and dry	791+00 to 791+00	Weak & Ex. Moisture
Lima Ramp H	B-111-0-13	3.5	805+50 to 806+50	Unsuitable Soil A-7-5*
Lima Ramp H	B-106-0-13	3.0	808+50 to 809+83	Unsuitable Soil A-7-5*
US 68 Ramp C	B-132-0-13	2.0	799+05 to 801+50	Wetland E
US 68 Ramp C	B-124-0-13	2.0	806+20 to 813+00	Wetland I
US 68 Ramp C	B-123-0-13	2.0	813+00 to 817+00	Wetland I
Lima Ramp E	B-144-0-13	3.5	781+10 to 785+96	Unsuitable Soil A-7-5*
Lima Ramp E		2.0	783+10 to 786+20	Wetland C
Lima Ramp A	B-147-0-13	1.5	751+87 to 755+87	Unstable Soil

Roadway	Boring No.	Excavation Depth Below Existing Ground (feet)	Approximate Station Limits	Problem
Lima Ramp F	B-159-0-13	3.5	804+50 to 806+10	Unstable Soil
Lima Ramp F		1.5	801+50 to 805+50	Pond 2
Lima Ramp F	B-160-0-13	3.0	806+10 to 810+00	Pond 1
Lima Ramp F		2.0	811+80 to 814+90	Wetland C

*Unsuitable soils near subgrade

Lima Ramp G: Based on the cross section drawings provided for this proposed ramp, it appears that most of the existing slopes on which the proposed embankments will be constructed, are steeper than 8H:1V and will receive more than 3 feet width of embankment fill. Therefore, these existing slopes should be benched in accordance with the standard specifications for benched embankment construction as provided in the 2013 ODOT *Construction and Material Specifications, Item 203.05*. Based on the test boring logs prepared for this ramp, unstable soils that have low N values (<10) and/or high moisture contents (>optimum moisture+3%, wet soils) were encountered in test boring B-102-0-13 within the upper three (3) feet. Therefore, these existing soils need to be disked and dried and be compacted before placing fill for embankment construction.

Lima Ramp H: Soils consisting of elastic clay (A-7-5) which are considered unsuitable according to ODOT Construction and Material Specifications, Item 703.16A, were encountered in test boring B-111-0-13 between depths of 1.0 feet and 3.5 feet and in test boring B-106-0-13 between depths of 0.7 feet and 8.5 feet below the existing ground surface. These unsuitable soils will be encountered within 3 feet of the proposed Ramp subgrade in the vicinity of Stations 805+50 and 806+50. Therefore, these soils should be removed and replaced with ODOT Item 203 before construction of pavement.

US 68 Ramp D: Based on the cross section drawings for this proposed ramp, it appears that most of the existing slopes on which the proposed embankments will be constructed, are steeper than 8H:1V and will receive more than 3 feet width of embankment fill. Therefore, these existing slopes should be benched in accordance with the standard specifications as provided in the 2013 ODOT *Construction and Material Specifications, Item 203.05*.

US 68 Ramp C: Based on the cross section drawings provided for this proposed ramp, it appears that most of the existing slopes on which the proposed embankments will be constructed, are steeper than 8H:1V and will receive more than 3 feet width of embankment fill. Therefore, these existing slopes should be benched in accordance with the standard specifications as provided in the 2013 ODOT *Construction and Material Specifications, Item 203.05*. The proposed embankment between Stations 799+05 and 801+50 and between Stations 806+20 and 820+50 will be located on the Wetland E and Wetland I, respectively. Therefore, before placing fill for construction of embankment, any soft soils on the wetland area beyond the toe of the slope should be removed and replaced with ODOT Item 203. Existing drainage ditches are located within the proposed embankment. Therefore, before placing fill for construction of embankment, any soft soils in the drainage ditch area should be removed and replaced with ODOT Item 203. Based on the test boring logs prepared for this ramp, weak soils that have low N values (<10) were encountered in test borings B-140-0-13, B-122-0-13, B-132-1-13, B-133-0-13, B-131-1-13, B-130-0-13, B-128-0-13, and B-126-0-13 within the upper three (3) feet. Therefore, these existing soils need to be disked and dried and be compacted before placing fill for embankment construction.

Lima Ramp E: Based on the cross section drawings provided for this proposed ramp, it appears that most of the existing slopes on which the proposed embankments will be constructed, are steeper than 8H:1V and will receive more than 3 feet width of embankment fill. Therefore, these existing slopes should be benched in accordance with the standard specifications as provided in the 2013 ODOT *Construction and Material Specifications, Item 203.05*. Soils consisting of elastic clay (A-7-5) which are considered unsuitable according to ODOT *Construction and Material Specifications, Item 703.16A*, were encountered in test boring B-144-0-13 between depths of 0.5 feet to 3.5 feet and in test boring B-141-0-13 between depths of 6.0 feet to 8.5 feet below the existing ground surface. These unsuitable soils will be encountered within 3 feet of the proposed ramp subgrade in the vicinity of Station 784+00 and should be removed and replaced with ODOT Item 203. Existing drainage ditches are located within the proposed embankment. Therefore, before placing fill for construction of embankment, any soft soils in the drainage ditch area should be removed and replaced with ODOT Item 203. This proposed ramp alignment will cross the Wetland C between Stations 783+10 and 786+20. Therefore, before placing fill for construction of embankment, all soft soils within 5 feet of the ramp toe should be removed and replaced with ODOT Item 203. Wood pieces were encountered in test boring B-143-0-13 in the 6.0 feet sample. These wood pieces may be from a buried utility pole or railroad ties at this location.

Lima Ramp A: Existing drainage ditches are located within the proposed embankment. Therefore, before placing fill for construction of embankment, any soft soils in the drainage ditch area should be removed and replaced with ODOT Item 203. Based on the test boring logs prepared for this ramp, unstable soils that have low N values (<10) and/or high moisture contents (>optimum moisture+3%, wet soils) were encountered in test boring B-147-0-13 above the bedrock. Therefore existing soils in the vicinity of boring B-147-0-13 needs to be removed and replaced with ODOT Item 203.

US 68 Ramp B: Based on the cross section drawings provided for this proposed ramp, it appears that most of the existing slopes on which the proposed embankments will be constructed, are steeper than 8H:1V and will receive more than 3 feet width of embankment fill. Therefore, these existing slopes should be benched in accordance with the standard specifications as provided in the 2013 ODOT *Construction and Material Specifications, Item 203.05*. Unsuitable soils consisting of elastic clay (A-7-5) were encountered in test boring B-154-0-13 to a depth of 6.0 feet and in test boring B-155-0-13 to a depth 3.5 feet below the existing ground surface. Existing drainage ditches are located within the proposed embankment. Therefore, before placing fill for construction of the embankment, any soft soils along the drainage ditch area should be removed and replaced with compacted ODOT Item 203.

Lima Ramp F: Based on the cross section drawings provided for this proposed ramp, it appears that most of the existing slopes on which the proposed embankments will be constructed, are steeper than 8H:1V and will receive more than 3 feet width of embankment fill. Therefore, these existing slopes should be benched in accordance with the standard specifications as provided in the 2013 ODOT *Construction and Material Specifications, Item 203.05*. Two (2) ponds are located along the proposed ramp between approximate Stations 801+50 and 802+50 (Pond 2) and between approximate Stations 806+10 and 810+00 (Pond 1). Therefore, before placing fill for construction of embankment, all soft soils in the pond area, within the proposed embankment should be removed and replaced with compacted ODOT Item 203. During the field operations, approximate water depths of 4.5 feet in Pond 1 and 1.0 foot in Pond 2 were measured at the middle of the pond. The approximate thickness of the sludge at the bottom of the pond ranged from 0.5 feet to 2.5 feet in Pond 1 and 2.0 feet to 4.0 feet in Pond 2. Harder material was encountered below the sludge and appeared to be bedrock. Few existing drainage ditches are located within the proposed embankment. Therefore, before placing fill for construction of embankment, any soft soils along the drainage area should be removed and replaced with compacted ODOT Item 203. Based on

the test boring logs prepared for this ramp, unstable soils that have low N values (<10) and/or high moisture contents (>optimum moisture+3%, wet soils) were encountered in test boring B-159-0-13 within the upper 3.5 feet. Therefore, these existing soils should be removed and replaced with compacted ODOT Item 203. This proposed ramp alignment will cross the Wetland C between Stations 811+80 and 814+90. Therefore, before placing fill for construction of embankment, all soft soils within 5 feet of the ramp toe should be removed and replaced with ODOT Item 203.

General: All fill material must be approved by qualified geotechnical personnel prior to placement. The subgrade during construction should be cambered or adequately shaped to promote rapid drainage towards catch basins or underdrains where any collected water can be intercepted and removed. The replacement fill materials should be placed in lifts of eight (8) inches in thickness (loose measure) and be compacted to an unyielding condition in accordance with ODOT 203.07 “Compaction and Moisture Requirements” specifications. The top 12 inches of the fill materials in pavement subgrade areas should be placed in lifts of eight (8) inches in thickness (loose measure) and be compacted to an unyielding condition in accordance with ODOT 204.03 “Compaction of the Subgrade” specifications. All in-place density tests should be performed as per Supplement 1015 “Compaction Testing of Unbound Materials” during earthwork construction.

7.0 LIMITATIONS

This report is subject to the following conditions and limitations:

7.1 The subsurface conditions described are based on an examination of the soil samples at the sampling intervals. Varying soil deposits, including fill material, may exist between the sampling intervals and between the test boring locations. Variation in subsurface conditions from those indicated in this report may become apparent during the earthwork and/or installation of the foundations. Such variations may require changes and/or modifications in our recommendations. Such changes may cause time delays and/or additional costs. Owners must be made aware of these limitations and must incorporate them in the design budget and scheduling of the project.

7.2 The design of the proposed project does not vary from the technical information provided and specified in this report. All changes in the design must be reviewed by our geotechnical engineers. PGI cannot assume any responsibility for interpretations made by others of the subsurface conditions and their behavior based on this report.

7.3 All earthwork and foundation construction must be performed under the supervision of a Professional Engineer in accordance with ODOT Construction Specifications.

7.4 The subsurface exploration for this project is strictly from a geotechnical standpoint. An environmental site assessment was not included in the scope of these geotechnical services.

7.5 All sheeting, shoring, and bracing of trenches, pits and excavations should be made the responsibility of the contractor and should comply with all current and applicable local, state and federal safety codes, regulations and practices, including the Occupational Safety and Health Administration (OSHA).

APPENDICES

APPENDIX A

PROJECT BORING LOGS

ROADWAY BORING LOGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / ALAN</u>	DRILL RIG: <u>CME 750X ATV</u>	STATION / OFFSET: <u>745+51.3, 44.5' RT</u>	EXPLORATION ID <u>B-001-0-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	PAGE 1 OF 1
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>1/6/12</u>	ELEVATION: <u>794.0 (MSL)</u> EOB: <u>7.5 ft.</u>	
START: <u>8/8/13</u> END: <u>8/8/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>67.1</u>	COORD: <u>41.015073810, 83.687319280</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			ODOT CLASS (GI)	BACK FILL		
								GR	CS	FS	SI	CL	LL	PL	PI			WC	
ASPHALT PAVEMENT (6.25" THICK)	793.5																		
CONCRETE PAVEMENT (9" THICK)	792.7	1																	
VERY STIFF, DARK BROWN, SILT AND CLAY , SOME SAND, LITTLE STONE FRAGMENTS, FILL, DAMP	791.0	2	5	10	23	83	SS-1	4.5+	20	9	19	33	19	26	14	12	12	A-6a (4)	
HARD TO VERY STIFF, DARK BROWN, SANDY SILT , SOME CLAY, LITTLE STONE FRAGMENTS, FILL, DAMP	788.0	3	7	13	32	89	SS-2	4.5+	14	13	18	34	21	18	14	4	7	A-4a (4)	
@4.5'; VERY STIFF		4	7	9	19	56	SS-3	4.5+	-	-	-	-	-	-	-	-	-	8	A-4a (V)
STIFF, BLACK, SILT AND CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, MOIST	786.5	6	5	3	12	100	SS-4	3.25	-	-	-	-	-	-	-	-	-	23	A-6a (V)
		7																	

EOB

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 1421\1\0\LED001\PUBLIC\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / JOHN</u>	DRILL RIG: <u>CME 55 TRUCK</u>	STATION / OFFSET: <u>749+60.3, 32.4' RT</u>	EXPLORATION ID <u>B-002-0-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	PAGE 1 OF 1
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>2.25" HSA</u>	CALIBRATION DATE: <u>6/13/13</u>	ELEVATION: <u>793.2 (MSL)</u> EOB: <u>10.0 ft.</u>	
START: <u>7/17/13</u> END: <u>7/17/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>70.2</u>	COORD: <u>41.016180640, 83.687349280</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
TOPSOIL (4" THICK) VERY STIFF TO STIFF, DARK BROWN TO BROWN, SANDY SILT , LITTLE TO SOME CLAY, LITTLE TO TRACE STONE FRAGMENTS, FILL, DAMP	793.2 792.9	1	5															<<<<<<
@3.5'; BROWN, SOME CLAY, TRACE STONE FRAGMENTS		2	6 12	21	78	SS-1	4.25	19	3	11	49	18	23	13	10	11	A-4a (6)	<<<<<<
@6.0'; STIFF, SOME CLAY, TRACE STONE FRAGMENTS		4	3 8 11	22	83	SS-2	2.50	2	9	17	45	27	22	17	5	14	A-4a (7)	<<<<<<
@8.5'; STIFF, SOME CLAY, TRACE STONE FRAGMENTS		6	4 6 6	14	100	SS-3	4.5+	-	-	-	-	-	-	-	-	16	A-4a (V)	<<<<<<
		7	5 7 6	15	83	SS-4	4.00	-	-	-	-	-	-	-	-	16	A-4a (V)	<<<<<<
	783.2	10					EOB											<<<<<<

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 14:21\\UNCLED01\PUBLIC\PROJECT FILES\13 PROJECTS\G13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 1421\UNCLEDC01\PUBLIC\PROJECT FILES\13 PROJECTS\G13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / JOHN</u>	DRILL RIG: <u>CME 55 TRUCK</u>	STATION / OFFSET: <u>754+55.7, 29.0' LT</u>	EXPLORATION ID <u>B-003-0-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	PAGE 1 OF 1
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>2.25" HSA</u>	CALIBRATION DATE: <u>6/13/13</u>	ELEVATION: <u>791.2 (MSL)</u> EOB: <u>10.0 ft.</u>	
START: <u>7/17/13</u> END: <u>7/17/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>70.2</u>	COORD: <u>41.017546660, 83.687270140</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
TOPSOIL (4" THICK)	791.2																	<< << <<
VERY STIFF, BROWN, SANDY SILT , SOME CLAY, TRACE STONE FRAGMENTS, FILL, DAMP	790.9	1	7															<< << <<
		2	8 14	26	22	SS-1	4.5+	6	8	17	41	28	26	17	9	10	A-4a (7)	<< << <<
		3																<< << <<
VERY STIFF TO STIFF, BROWN TO DARK BROWN, SANDY SILT , "AND" CLAY, TRACE STONE FRAGMENTS, FILL, DAMP	787.7	4	11 9 13	26	0	AS-2	--	-	-	-	-	-	-	-	-	12	A-4a (V)	<< << <<
@3.5'; NO SPLIT SPOON RECOVERY, TIRE PIECE PLUGGED TIP OF THE SPOON, OBTAINED AN AUGER SAMPLE		5																<< << <<
@6.0'; STIFF, DARK BROWN		6																<< << <<
		7	4 5 7	14	17	SS-3	--	2	5	19	38	36	25	16	9	15	A-4a (8)	<< << <<
		8																<< << <<
@8.5'; STIFF, DARK BROWN		9	5 4 6	12	56	SS-4	3.00	-	-	-	-	-	-	-	-	16	A-4a (V)	<< << <<
	781.2	10																<< << <<
		EOB																<< << <<

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 1421\INCL\ED001\PUBLIC\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / JOHN</u>	DRILL RIG: <u>CME 55 TRUCK</u>	STATION / OFFSET: <u>758+26.5, 74.2' LT</u>	EXPLORATION ID <u>B-004-0-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	PAGE 1 OF 1
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>2.25" HSA</u>	CALIBRATION DATE: <u>6/13/13</u>	ELEVATION: <u>792.2 (MSL)</u> EOB: <u>17.0 ft.</u>	
START: <u>7/16/13</u> END: <u>7/16/13</u>	SAMPLING METHOD: <u>SPT/NX</u>	ENERGY RATIO (%): <u>70.2</u>	COORD: <u>41.018568710, 83.686997510</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTH	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			ODOT CLASS (GI)	BACK FILL	
								GR	CS	FS	SI	CL	LL	PL	PI			WC
TOPSOIL (2" THICK)	792.2	0																
STIFF TO VERY STIFF, BROWN, SANDY SILT , SOME CLAY, TRACE TO LITTLE STONE FRAGMENTS, FILL, DAMP	792.0	1	3															<<<<<<
		2	5	15	56	SS-1	--	5	6	13	47	29	25	16	9	14	A-4a (8)	<<<<<<
		3																<<<<<<
@3.5'; VERY STIFF, SOME CLAY LITTLE STONE FRAGMENTS		4	3															<<<<<<
		5	11	28	67	SS-2	4.50	16	9	17	31	27	26	16	10	11	A-4a (5)	<<<<<<
		6																<<<<<<
STIFF, BROWN, SILT AND CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, DAMP TO MOIST	786.2	6	4															<<<<<<
		7	6	14	78	SS-3	2.00	-	-	-	-	-	-	-	-	16	A-6a (V)	<<<<<<
		8																<<<<<<
@8.5'; MOIST		9	4															<<<<<<
		10	5	14	89	SS-4	3.50	-	-	-	-	-	-	-	-	18	A-6a (V)	<<<<<<
		11																<<<<<<
STIFF, BROWN, SANDY SILT , SOME CLAY, LITTLE STONE FRAGMENTS, FILL, DAMP	781.2	11	8															<<<<<<
	780.7	11	50/0"	-	100	SS-5	--	-	-	-	-	-	-	-	-	10	A-4a (V)	<<<<<<
DOLOMITE , GRAY, MODERATELY TO SLIGHTLY WEATHERED, STRONG, VERY THIN TO THIN BEDDED, FRACTURED TO MODERATELY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.		12																<<<<<<
		13																<<<<<<
		14																<<<<<<
		15	0		100	NX-1												<<<<<<
		16																<<<<<<
	775.2	16																<<<<<<
		17																<<<<<<
		EOB																<<<<<<

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING AND NO READING WAS TAKEN UPON COMPLETION DUE TO ROCK CORING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / ALAN</u>	DRILL RIG: <u>CME 750X ATV</u>	STATION / OFFSET: <u>761+87.8, 37.1' RT</u>	EXPLORATION ID <u>B-005-0-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	PAGE 1 OF 1
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>1/6/12</u>	ELEVATION: <u>789.9 (MSL)</u> EOB: <u>7.5 ft.</u>	
START: <u>8/8/13</u> END: <u>8/8/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>67.1</u>	COORD: <u>41.019336980, 83.686066350</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL	
								GR	CS	FS	SI	CL	LL	PL	PI				
ASPHALT PAVEMENT (4" THICK)	789.6																		
CONCRETE PAVEMENT (11" THICK)	788.7	1																	
VERY DENSE, BROWN, STONE FRAGMENTS , SOME SAND, TRACE FINES, BASE MATERIAL (8" THICK)	788.0	2	50/5"	-	100	SS-1	--	62	23	8	-	7	-	NP	NP	NP	10	A-1-a (0)	
VERY STIFF TO STIFF, DARK BROWN, SILT AND CLAY , SOME SAND, TRACE STONE FRAGMENTS, FILL, DAMP		3																	
		4	5	6	9	17	78	SS-2	4.5+	4	7	16	40	33	28	17	11	14	A-6a (8)
@4.5'; STIFF		5	4	5	6	12	78	SS-3	4.5+	-	-	-	-	-	-	-	-	16	A-6a (V)
	783.9	6	5	7	10	19	89	SS-4	4.5+	-	-	-	-	-	-	-	-	22	A-6b (V)
VERY STIFF, BLACK, SILTY CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, MOIST	782.4	7																	

EOB

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 1421\INCL\ED01\PUBLIC\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / JOHN</u>	DRILL RIG: <u>CME 55 TRUCK</u>	STATION / OFFSET: <u>765+98.5, 16.5' RT</u>	EXPLORATION ID <u>B-006-0-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	PAGE 1 OF 1
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>2.25" HSA</u>	CALIBRATION DATE: <u>6/13/13</u>	ELEVATION: <u>788.2 (MSL)</u> EOB: <u>7.2 ft.</u>	
START: <u>7/17/13</u> END: <u>7/17/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>70.2</u>	COORD: <u>41.020300760, 83.685320480</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV. 788.2	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL	
								GR	CS	FS	SI	CL	LL	PL	PI				
TOPSOIL (2" THICK)	788.0																	<< < > >>	
VERY STIFF, BROWN TO DARK BROWN, SILT AND CLAY , SOME TO LITTLE SAND, LITTLE TO TRACE STONE FRAGMENTS, DAMP TO MOIST		1	6	8	21	39	SS-1	4.5+	13	6	15	35	31	29	17	12	11	A-6a (7)	<< < > >>
		2																<< < > >>	
		3																<< < > >>	
@3.5'; MEDIUM STIFF, DARK BROWN, SOME SAND, TRACE STONE FRAGMENTS		4	5	4	8	89	SS-2	2.00	5	4	18	46	27	38	26	12	17	A-6a (8)	<< < > >>
		5																<< < > >>	
		6																<< < > >>	
@6.0'; STIFF, LITTLE SAND, TRACE STONE FRAGMENTS, MOIST	781.2	6	4	5	-	93	SS-3	3.25	-	-	-	-	-	-	-	-	24	A-6a (V)	<< < > >>
POSSIBLE DOLOMITE BEDROCK	781.0	7																<< < > >>	

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 14:21:10\CLEDC01\PUBLIC\PROJECT FILES\13 PROJECTS\HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / ALAN</u>	DRILL RIG: <u>CME 750X ATV</u>	STATION / OFFSET: <u>770+17.5, 23.1' LT</u>	EXPLORATION ID <u>B-007-0-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>1/6/12</u>	ELEVATION: <u>787.8 (MSL)</u> EOB: <u>7.5 ft.</u>	PAGE 1 OF 1
START: <u>8/7/13</u> END: <u>8/7/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>67.1</u>	COORD: <u>41.021233070, 83.684420250</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV. 787.8	DEPTH	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
ASPHALT PAVEMENT (5.5" THICK)	787.3																	
CONCRETE PAVEMENT (10" THICK)	786.5	1																
HARD TO VERY STIFF, DARK BROWN, SANDY SILT , LITTLE TO SOME CLAY, SOME TO TRACE STONE FRAGMENTS, FILL, DAMP		2	27 12 26	42	89	SS-1	4.5+	29	15	18	20	18	19	13	6	6	A-4a (1)	↖ ↗
@3.0'; SOME CLAY, TRACE STONE FRAGMENTS		3																↖ ↗
@4.5'; VERY STIFF, SOME CLAY, TRACE STONE FRAGMENTS		4	20 19 12	35	83	SS-2	4.5+	10	20	30	10	30	25	17	8	11	A-4a (1)	↖ ↗
@6.0'; VERY STIFF, SOME CLAY, TRACE STONE FRAGMENTS		5	9 10 9	21	72	SS-3	4.5+	13	7	14	38	28	26	16	10	12	A-4a (6)	↖ ↗
		6																↖ ↗
		7	6 8 9	19	83	SS-4	4.5+	-	-	-	-	-	-	-	-	17	A-4a (V)	↖ ↗
	780.3	EOB																↖ ↗

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 1421\UNCLEDC01\PUBLIC\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / ALAN</u>	DRILL RIG: <u>CME 750X ATV</u>	STATION / OFFSET: <u>773+78.3, 7.4' LT</u>	EXPLORATION ID <u>B-008-0-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>1/6/12</u>	ELEVATION: <u>786.7 (MSL)</u> EOB: <u>7.0 ft.</u>	PAGE 1 OF 1
START: <u>8/7/13</u> END: <u>8/7/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>67.1</u>	COORD: <u>41.021868260, 83.683410340</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL	
								GR	CS	FS	SI	CL	LL	PL	PI				
TOPSOIL (6" THICK)	786.7																	<< < > >>	
STIFF TO VERY STIFF, DARK BROWN TO BROWN, SANDY SILT , SOME CLAY, SOME TO TRACE STONE FRAGMENTS, FILL, DAMP	786.2	1	5															<< < > >>	
@2.5'; VERY STIFF, TRACE STONE FRAGMENTS		2	4	6	11	56	SS-1	2.00	23	9	13	32	23	24	16	8	12	A-4a (4)	<< < > >>
	782.7	3	6															<< < > >>	
		4	8	7	17	67	SS-2	4.5+	10	6	15	42	27	26	16	10	13	A-4a (7)	<< < > >>
VERY STIFF, BROWN	781.2	5	5															<< < > >>	
	781.2	6	13	9	25	56	SS-3	4.5+	47	9	11	22	11	19	15	4	8	A-2-4 (0)	<< < > >>
STIFF, BLACK, SILTY CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, MOIST		779.7	7	3															<< < > >>
	779.7	EOB	4	6	11	67	SS-4	4.00	-	-	-	-	-	-	-	-	22	A-6b (V)	<< < > >>

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 1421\UNCLEDC01\PUBLIC\PROJECT FILES\13 PROJECTS\HAN-75 ROADWAY.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: HAN-75-14.39	DRILLING FIRM / OPERATOR: DLZ / ALAN	DRILL RIG: CME 750X ATV	STATION / OFFSET: 778+15.0, 12.3' RT	EXPLORATION ID B-009-0-13
TYPE: ROADWAY WIDENING	SAMPLING FIRM / LOGGER: PGI / F.BUSHER	HAMMER: CME AUTOMATIC	ALIGNMENT: IR-75 BASELINE	
PID: 87005 BR ID:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 1/6/12	ELEVATION: 786.3 (MSL) EOB: 8.0 ft.	PAGE 1 OF 1
START: 8/8/13 END: 8/8/13	SAMPLING METHOD: SPT	ENERGY RATIO (%): 67.1	COORD: 41.022549470, 83.682108090	

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			
ASPHALT PAVEMENT (4" THICK)	786.3																	
CONCRETE PAVEMENT (11" THICK)	786.0																	
GRAY STONE FRAGMENTS WITH SAND, TRACE FINES, BASE MATERIAL (6" THICK)	785.1	1																
VERY DENSE, DARK BROWN, NON-PLASTIC SANDY SILT , SOME STONE FRAGMENTS, FILL, MOIST	784.6	2	50/3"	-	100	SS-1	--	-	-	-	-	-	-	-	-	9	A-1-b (V)	
HARD, BROWN, PLASTIC SANDY SILT , SOME STONE FRAGMENTS, LITTLE CLAY, FILL, DAMP	782.8	3	27 30 25	62	44	SS-2	4.5+	21	11	19	45	4	NP	NP	NP	15	A-4a (3)	
STIFF, DARK BROWN, SILT AND CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, MOIST	781.3	4	12 17 25	47	50	SS-3	4.5+	26	8	15	32	19	23	13	10	11	A-4a (3)	
VERY STIFF, BLACK, SILTY CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, MOIST	779.8	5	4 6 7	15	72	SS-4	2.00	-	-	-	-	-	-	-	-	18	A-6a (V)	
	778.3	6	4 7 9	18	67	SS-5	2.00	-	-	-	-	-	-	-	-	26	A-6b (V)	
		7																
		8																
		EOB																

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 14:22:\UNCLEDC01\PUBLIC\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: HAN-75-14.39	DRILLING FIRM / OPERATOR: DLZ / ALAN	DRILL RIG: CME 75 TRUCK	STATION / OFFSET: 782+35.6, 5.0' RT	EXPLORATION ID
TYPE: ROADWAY WIDENING	SAMPLING FIRM / LOGGER: PGI / K. JONES	HAMMER: CME AUTOMATIC	ALIGNMENT: IR-75 BASELINE	B-010-0-13
PID: 87005 BR ID:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 1/6/12	ELEVATION: 786.3 (MSL) EOB: 9.1 ft.	PAGE
START: 8/14/13 END: 8/14/13	SAMPLING METHOD: SPT	ENERGY RATIO (%): 70.6	COORD: 41.023174390, 83.680830180	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				
TOPSOIL (4" THICK)	786.3																	< >	
GRAY STONE FRAGMENTS (2" THICK)	786.0																	< >	
HARD TO VERY STIFF, BROWN, SANDY SILT , SOME TO LITTLE STONE FRAGMENTS, LITTLE CLAY, FILL, DAMP	785.8	1	5	15	41	100	SS-1	3.50	27	8	16	31	18	25	16	9	11	A-4a (3)	< >
@2.0'; VERY STIFF, "AND" STONE FRAGMENTS, NO SPLIT SPOON RECOVERY, OBTAINED AN AUGER SAMPLE		2	5	8	26	0	BS-2	4.5+	44	6	12	21	17	20	12	8	8	A-4a (1)	< >
		3		14															< >
		4																	< >
@4.5'; VERY STIFF, LITTLE STONE FRAGMENTS		5	8	9	22	100	SS-3	4.5+	-	-	-	-	-	-	-	-	13	A-4a (V)	< >
		6		10															< >
	779.3	7																	< >
VERY STIFF, BLACK, SILT AND CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, MOIST	777.8	8	13	9	26	100	SS-4	4.00	-	-	-	-	-	-	-	-	19	A-6a (V)	< >
	777.3	9		13															< >
DENSE, LIGHT GRAY, DOLOMITE FRAGMENTS , TRACE FINES	777.3	9	23	50/1"	-	86	SS-5	-	-	-	-	-	-	-	-	-	5	A-1-a (V)	< >
LIGHT GRAY, DOLOMITE BEDROCK	777.2	9																	< >

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT GDT-5/27/14 1422:\CLEED001\PUBLIC\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEET\SHAN-75 ROADWAY.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / ALAN</u>	DRILL RIG: <u>CME 750X ATV</u>	STATION / OFFSET: <u>785+91.6, 10.9' RT</u>	EXPLORATION ID <u>B-011-0-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / K. JONES</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>1/6/12</u>	ELEVATION: <u>786.4 (MSL)</u> EOB: <u>7.5 ft.</u>	PAGE 1 OF 1
START: <u>8/7/13</u> END: <u>8/7/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>67.1</u>	COORD: <u>41.023602840, 83.679673430</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
ASPHALT PAVEMENT (4" THICK)	786.4																	
CONCRETE PAVEMENT (11.5" THICK)	786.1																	
GRAY STONE FRAGMENTS WITH SAND, LITTLE FINES, BASE MATERIAL (8" THICK)	785.1	1																
STIFF TO VERY STIFF, DARK BROWN TO BROWN, SILT AND CLAY , SOME SAND, LITTLE TO TRACE STONE FRAGMENTS, FILL, DAMP TO MOIST	784.4	2	27	8	15	22	SS-1	--	27	41	17	12	3	NP	NP	NP	20	A-1-b (0)
@4.5'; VERY STIFF, TRACE STONE FRAGMENTS, MOIST		3	4	5	16	89	SS-2	2.00	15	7	15	37	26	27	16	11	12	A-6a (6)
@6.0'; VERY STIFF, BROWN, TRACE STONE FRAGMENTS		4	6	6	19	56	SS-3	4.5+	-	-	-	-	-	-	-	-	17	A-6a (V)
		5	6	6	11													
		6	6	7	22	67	SS-4	4.5+	-	-	-	-	-	-	-	-	16	A-6a (V)
	778.9	7	6	7	13													

EOB

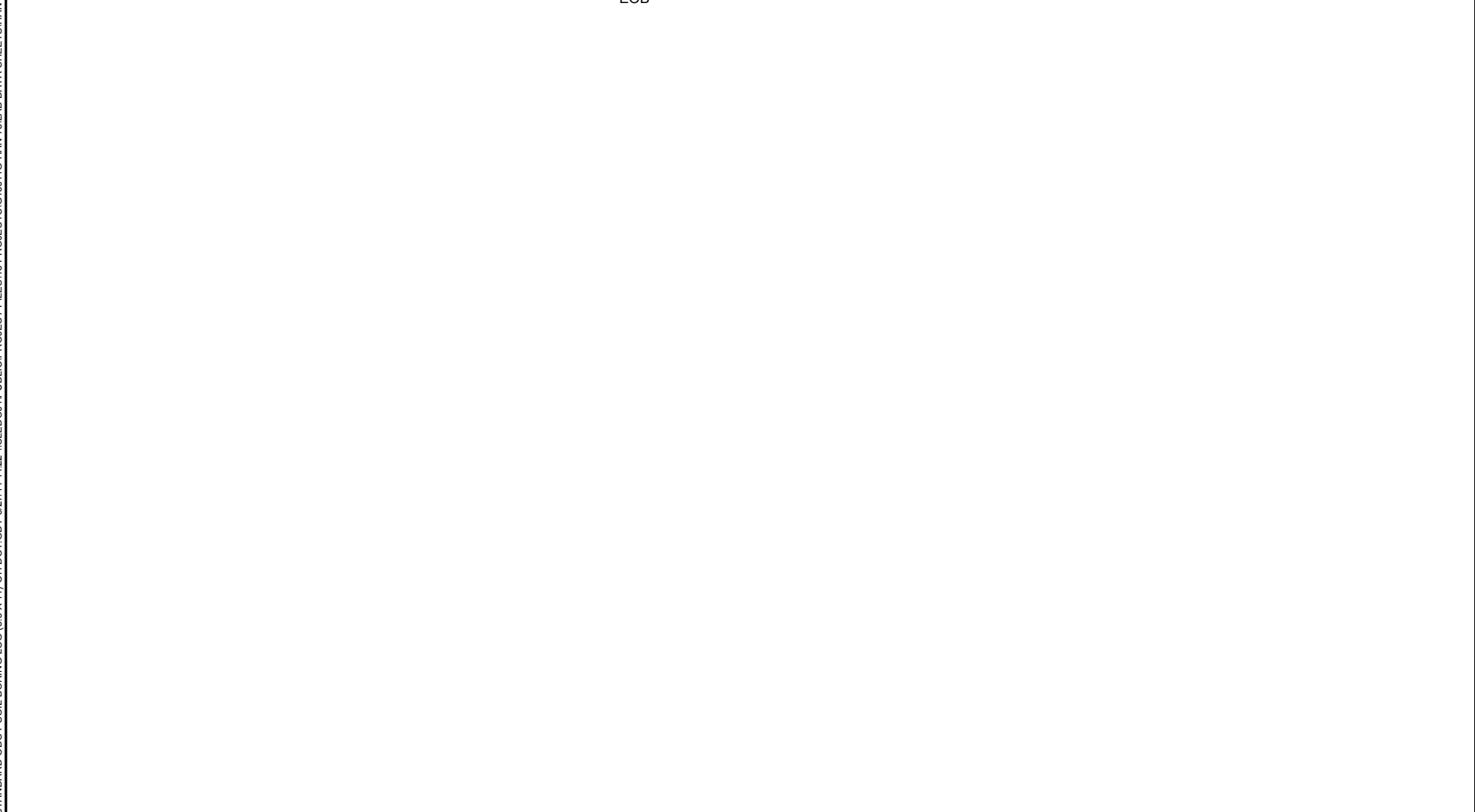
STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 14:22:\CLEED01\PUBLIC\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEET\HAN-75 ROADWAY.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: HOLE WAS BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>B-M / JOSH DEAN</u>	DRILL RIG: <u>DIEDRICH D-90 ATV</u>	STATION / OFFSET: <u>789+90.4, 17.7' LT</u>	EXPLORATION ID <u>B-012-0-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>9/18/12</u>	ELEVATION: <u>778.1 (MSL)</u> EOB: <u>2.5 ft.</u>	PAGE 1 OF 1
START: <u>8/5/13</u> END: <u>8/5/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>80.2</u>	COORD: <u>41.024118820, 83.678395130</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
TOPSOIL (6" THICK)	778.1																	<L> >V> <L>
MEDIUM STIFF, BROWN, SILTY CLAY , LITTLE SAND, SOME ROOTS, FILL, MOIST	777.6	1																<L> >V> <L>
POSSIBLE DOLOMITE BEDROCK	776.6	TR	4		89	SS-1	-	-	-	-	-	-	-	-	23	A-6b (V)		<L> >V> <L>
@2.5" AUGER REFUSAL	775.6	2																<L> >V> <L>
		EOB																<L> >V> <L>

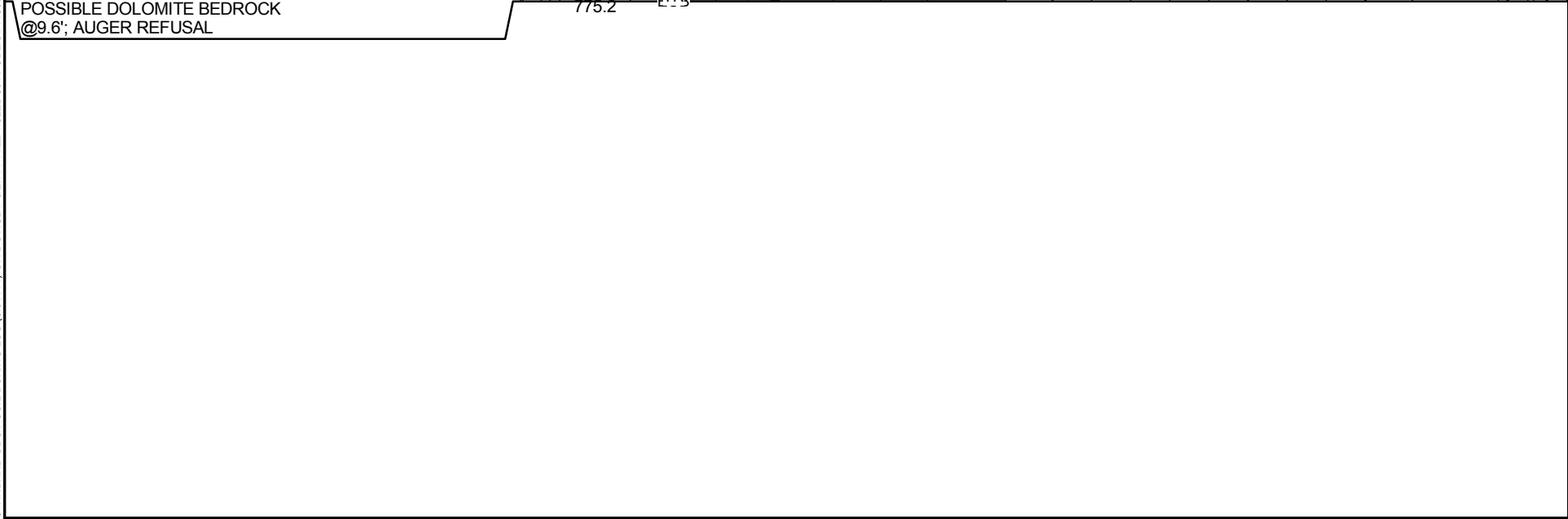
STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 14:22:\GLED001\PUBLIC\PROJECT FILES\13 PROJECTS\G13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ



NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / JOHN</u>	DRILL RIG: <u>CME 55 TRUCK</u>	STATION / OFFSET: <u>793+83.6, 20.7' LT</u>	EXPLORATION ID <u>B-013-0-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	PAGE 1 OF 1
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>2.25" HSA</u>	CALIBRATION DATE: <u>6/13/13</u>	ELEVATION: <u>784.8 (MSL)</u> EOB: <u>9.6 ft.</u>	
START: <u>7/16/13</u> END: <u>7/16/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>70.2</u>	COORD: <u>41.024368620, 83.676947350</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
GRAY STONE FRAGMENTS WITH SAND, SHOULDER BASE (12" THICK)	784.8																	< >
VERY DENSE, GRAY, STONE AND CONCRETE FRAGMENTS, FILL, DAMP	783.8	1	16															< >
		2	32 30	73	39	SS-1	4.5+	-	-	-	-	-	-	-	6	A-1-a (V)		< >
STIFF, DARK BROWN, SANDY SILT , SOME CLAY, TRACE STONE FRAGMENTS, FILL, DAMP	782.3	3																< >
		4	6															< >
		5	7 6	15	78	SS-2	2.00	4	7	17	38	34	37	29	8	13	A-4a (7)	< >
	778.8	6																< >
VERY STIFF TO STIFF, DARK BROWN, SILT AND CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, DAMP TO MOIST		7	3															< >
		8	7 9	19	83	SS-3	4.25	5	5	14	41	35	33	20	13	16	A-6a (9)	< >
		9	3															< >
@8.5'; STIFF, MOIST			5 50/1"	-	92	SS-4	2.00	-	-	-	-	-	-	-	18	A-6a (V)		< >
POSSIBLE DOLOMITE BEDROCK @9.6'; AUGER REFUSAL	775.3																	< >



NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 14:22:\GLED001\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

PROJECT: HAN-75-14.39	DRILLING FIRM / OPERATOR: OTB / JOHN	DRILL RIG: DIEDRICH D-50 ATV	STATION / OFFSET: 797+77.1, 34.9' RT	EXPLORATION ID
TYPE: ROADWAY WIDENING	SAMPLING FIRM / LOGGER: PGI / F.BUSHER	HAMMER: DIEDRICH AUTOMATIC	ALIGNMENT: IR-75 BASELINE	B-014-0-13
PID: 87005 BR ID:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 12/10/11	ELEVATION: 786.0 (MSL) EOB: 11.4 ft.	PAGE
START: 6/25/13 END: 6/25/13	SAMPLING METHOD: SPT	ENERGY RATIO (%): 81.7	COORD: 41.025026310, 83.675794160	1 OF 1

MATERIAL DESCRIPTION AND NOTES	ELEV. 786.0	DEPTH	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	BACK FILL		
								GR	CS	FS	SI	CL	LL	PL	PI	WC				
GRAY STONE FRAGMENTS WITH SAND AND SILT, SHOULDER BASE	785.0																	<< V >>		
STIFF TO MEDIUM STIFF, DARK BROWN, SILTY CLAY , SOME SAND, TRACE STONE FRAGMENTS, FILL, DAMP TO MOIST	780.0	1	4	3	10	56	SS-1	2.00	10	5	16	30	39	40	21	19	19	A-6b (10)	<< V >>	
@3.5'; MEDIUM STIFF, MOIST		2																	<< V >>	
		3																		<< V >>
		4	2	3	3	8	44	SS-2	2.00	2	4	20	37	37	38	19	19	21	A-6b (11)	<< V >>
		5																		<< V >>
STIFF, BROWN, SILT AND CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, MOIST	780.0	6	2	3	10	78	SS-3	2.00	-	-	-	-	-	-	-	-	21	A-6a (V)	<< V >>	
	777.5	7																	<< V >>	
	777.5	8																	<< V >>	
MEDIUM STIFF, DARK BROWN, CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, MOIST	775.0	9	2	2	3	7	56	SS-4	1.00	-	-	-	-	-	-	-	25	A-7-6 (V)	<< V >>	
	775.0	10																	<< V >>	
GRAY DOLOMITE BEDROCK	774.6	11	50/5"	-	40	SS-5	--	-	-	-	-	-	-	-	-	-	-	Rock (V)	<< V >>	

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 14:22:10\GLED001\PUBLIC\PROJECT FILES\13 PROJECTS\G13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 14:22:\UNCLEDC01\PUBLIC\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>OTB / JOHN</u>	DRILL RIG: <u>DIEDRICH D-50 ATV</u>	STATION / OFFSET: <u>801+61.7, 32.9' RT</u>	EXPLORATION ID <u>B-015-0-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>12/10/11</u>	ELEVATION: <u>792.4 (MSL)</u> EOB: <u>10.0 ft.</u>	PAGE 1 OF 1
START: <u>6/25/13</u> END: <u>6/25/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>81.7</u>	COORD: <u>41.025758440, 83.674762040</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	BACK FILL	
								GR	CS	FS	SI	CL	LL	PL	PI	WC			
TOPSOIL (6" THICK)	792.4																		
STIFF, DARK BROWN, SILTY CLAY , LITTLE TO SOME SAND, TRACE TO LITTLE STONE FRAGMENTS, FILL, DAMP	791.9	1	3																<< << <<
		2	4	6	14	100	SS-1	2.00	5	7	12	36	40	40	19	21	18	A-6b (12)	<< << <<
		3																	<< << <<
@3.5'; SOME SAND, LITTLE STONE FRAGMENTS, TRACE ROOTS		4	2	3	4	10	44	SS-2	2.00	12	9	14	25	40	38	19	19	17	A-6b (10)
		5																	<< << <<
	786.4	6	2																<< << <<
MEDIUM STIFF, GRAY, SILT AND CLAY , TRACE SAND, TRACE STONE FRAGMENTS, FILL, DAMP		7	2	2	5	100	SS-3	1.00	-	-	-	-	-	-	-	-	-	17	A-6a (V)
		8																	<< << <<
	783.9	9	2																<< << <<
STIFF, DARK GRAY, CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, DAMP		10	4	5	12	72	SS-4	2.50	-	-	-	-	-	-	-	-	-	22	A-7-6 (V)
	782.4	EOB																	<< << <<

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>B-M / JOSH DEAN</u>	DRILL RIG: <u>DIEDRICH D-90 ATV</u>	STATION / OFFSET: <u>804+79.5, 29.6' LT</u>	EXPLORATION ID <u>B-016-0-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>9/18/12</u>	ELEVATION: <u>780.4 (MSL)</u> EOB: <u>8.2 ft.</u>	PAGE 1 OF 1
START: <u>7/25/13</u> END: <u>7/25/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>80.2</u>	COORD: <u>41.026554430, 83.674240070</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV. 780.4	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL	
								GR	CS	FS	SI	CL	LL	PL	PI				
TOPSOIL (7" THICK)	779.8																	< >	
STIFF, DARK BROWN, SILT AND CLAY , LITTLE SAND, LITTLE ROOTS, FILL, MOIST		1	3	11	67	SS-1	2.50	-	-	-	-	-	-	-	28	A-6a (V)	< >		
		2	3	5													< >		
		3															< >		
STIFF TO SOFT, MOTTLED BROWN AND GRAY, SILTY CLAY , LITTLE SAND, MOIST	776.9	4	3	11	100	SS-2	2.50	0	3	17	38	42	39	20	19	23	A-6b (12)	< >	
		5	3	5														< >	
@6.0'; SOFT		6																< >	
		7	2	1	2	4	100	SS-3	0.50	-	-	-	-	-	-	-	24	A-6b (V)	< >
		8																< >	
LIGHT GRAY, DOLOMITE FRAGMENTS , BEDROCK @8.2'; AUGER REFUSAL	772.4 772.2	TR EUB	50/2"	-	50	SS-4	--	-	-	-	-	-	-	-	-	3	Rock (V)	< >	

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 14:22:\CLEED01\PUBLIC\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / JOHN</u>	DRILL RIG: <u>CME 55 TRUCK</u>	STATION / OFFSET: <u>811+13.0, 4.8' RT</u>	EXPLORATION ID <u>B-021-0-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	PAGE 1 OF 2
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>2.25" HSA</u>	CALIBRATION DATE: <u>6/13/13</u>	ELEVATION: <u>805.8 (MSL)</u> EOB: <u>37.1 ft.</u>	
START: <u>7/17/13</u> END: <u>7/17/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>70.2</u>	COORD: <u>41.028083660, 83.673188350</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV. 805.8	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
ASPHALT PAVEMENT (3" THICK)	805.6																	
CONCRETE PAVEMENT (12" THICK)	804.6	1																
GRAY STONE FRAGMENTS WITH SAND, BASE MATERIAL (8" THICK)	803.9	2	6	15	44	SS-1	2.00	26	14	16	25	19	33	21	12	14	A-6a (2)	
STIFF TO VERY STIFF, BROWN TO DARK BROWN, SILT AND CLAY, SOME TO LITTLE SAND, SOME TO TRACE STONE FRAGMENTS, FILL, DAMP		3	7															
@3.5'; DARK BROWN, TRACE STONE FRAGMENTS		4	4	14	56	SS-2	2.00	4	5	20	38	33	29	16	13	14	A-6a (8)	
		5	5															
@6.0'; DARK BROWN, TRACE STONE FRAGMENTS		6	3															
		7	7	14	50	SS-3	2.00	-	-	-	-	-	-	-	-	15	A-6a (V)	
		8																
@8.5'; VERY STIFF, DARK BROWN, TRACE STONE FRAGMENTS		9	5	19	44	SS-4	4.5+	-	-	-	-	-	-	-	-	14	A-6a (V)	
		10	6															
		11	10															
@11.0'; VERY STIFF, BROWN, TRACE STONE FRAGMENTS		12	2	16	44	SS-5	4.5+	-	-	-	-	-	-	-	-	16	A-6a (V)	
		13	5															
@13.5'; STIFF, DARK BROWN, TRACE STONE FRAGMENTS, MOIST		14	5	15	56	SS-6	2.00	-	-	-	-	-	-	-	-	17	A-6a (V)	
		15	8															
@16.0'; STIFF, DARK BROWN, TRACE STONE FRAGMENTS		16	3	13	61	SS-7	2.00	-	-	-	-	-	-	-	-	13	A-6a (V)	
		17	4															
		18	7															
@18.5'; VERY STIFF, LITTLE SAND, LITTLE STONE FRAGMENTS		19	3	27	67	SS-8	2.00	-	-	-	-	-	-	-	-	16	A-6a (V)	
			8	15														

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT GDT-5/27/14 1422:\O\ED001\PUBLIC\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEET\SHAN-75 ROADWAY.GPJ

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 14:22:\UNCLEDC01\PUBLIC\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

PID: 87005		BR ID: _____		PROJECT: HAN-75-14.39		STATION / OFFSET: 811+13.0, 4.8' RT		START: 7/17/13		END: 7/17/13		PG 2 OF 2		B-021-0-13							
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				
STIFF TO VERY STIFF, BROWN TO DARK BROWN, SILT AND CLAY , SOME TO LITTLE SAND, SOME TO TRACE STONE FRAGMENTS, FILL, DAMP (continued) @23.5'; VERY STIFF, LITTLE SAND, TRACE STONE FRAGMENTS			785.8	21																	
				22																	
				23																	
				24	7	14	29	56	SS-9	4.5+	-	-	-	-	-	-	-	-	15	A-6a (V)	
VERY STIFF, DARK BROWN, CLAY , LITTLE SAND, FILL, DAMP			777.3	25																	
				26																	
				27																	
				28																	
BROWN, COARSE AND FINE SAND , SEAM, WET MEDIUM DENSE, BROWN AND GRAY, NON-PLASTIC SILT , TRACE SAND, MOIST			772.3	29	5	8	22	83	SS-10	4.5+	0	2	15	38	45	45	22	23	18	A-7-6 (14)	
			772.1	30																	
@37.1'; AUGER REFUSAL, POSSIBLE DOLOMITE BEDROCK			768.7	34	6	7	21	100	SS-11A&B	4.5+	-	-	-	-	-	-	-	-	22	A-3a (V)	
				35							4.5+	-	-	-	-	-	-	-	-	21	A-4b (V)
				36																	
				37																	

EOB

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 14:22:\UNCLEDC01\PROJECTS\13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>B-M / JOSH DEAN</u>	DRILL RIG: <u>DIEDRICH D-90 ATV</u>	STATION / OFFSET: <u>815+36.6, 207.6' LT</u>	EXPLORATION ID <u>B-025-1-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>9/18/12</u>	ELEVATION: <u>778.1 (MSL)</u> EOB: <u>10.5 ft.</u>	PAGE 1 OF 1
START: <u>7/24/13</u> END: <u>7/24/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>80.2</u>	COORD: <u>41.029274400, 83.673691090</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTH	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL	
								GR	CS	FS	SI	CL	LL	PL	PI				
TOPSOIL (12" THICK)	778.1																		
VERY STIFF, BROWN, MOTTLED GRAY, SILTY CLAY , SOME SAND, TRACE STONE FRAGMENTS, MOIST	777.1	1	2	5	19	56	SS-1	2.00	-	-	-	-	-	-	-	-	22	A-6b (V)	
VERY STIFF, BROWN, SANDY SILT , SOME CLAY, TRACE STONE FRAGMENTS, DAMP	774.6	3	5	6	7	17	78	SS-2	4.5+	5	7	16	37	35	25	17	8	14	A-4a (7)
MEDIUM DENSE, GRAY, NON-PLASTIC SILT , TRACE SAND, MOIST	772.1	6	3	4	5	12	83	SS-3	4.00	-	-	-	-	-	-	-	-	19	A-4b (V)
VERY STIFF, GRAY, SANDY SILT , SOME CLAY, LITTLE STONE FRAGMENTS, DAMP	769.6	8	4	8	7	20	67	SS-4	4.25	-	-	-	-	-	-	-	-	7	A-4a (V)
@10.5'; AUGER REFUSAL, POSSIBLE DOLOMITE BEDROCK	767.6	10																	

FTR3

NOTES: GROUNDWATER WAS ENCOUNTERED AT 9.0' DURING AND UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH 1 BAG OF BENTONITE PELLETS/SOIL CUTTINGS MIXTURE

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH.DOT.GDT - 10/18/15 13:29 - I:\GEO\TECH\SERVER\SHARED FOLDERS\COMPANY\PUBLIC\PROJECT FILES\13011G HAN-75L

PROJECT: <u> HAN-75-14.39 </u>	DRILLING FIRM / OPERATOR: <u> DLZ / ALAN </u>	DRILL RIG: <u> CME 75 TRUCK </u>	STATION / OFFSET: <u> 819+32, 45' RT. </u>	EXPLORATION ID <u> B-118-0-13 </u>
TYPE: <u> ROADWAY WIDENING </u>	SAMPLING FIRM / LOGGER: <u> PGI / W. NAJJAR </u>	HAMMER: <u> CME AUTOMATIC </u>	ALIGNMENT: <u> I-75 BASELINE </u>	
PID: <u> 87005 </u> STR ID: <u> </u>	DRILLING METHOD: <u> 3.25" HSA </u>	CALIBRATION DATE: <u> 2/20/07 </u>	ELEVATION: <u> 803.7 (MSL) </u> EOB: <u> 38.0 ft. </u>	PAGE <u> 1 OF 2 </u>
START: <u> 8/27/13 </u> END: <u> 8/27/13 </u>	SAMPLING METHOD: <u> SPT </u>	ENERGY RATIO (%): <u> 81.9 </u>	COORD: <u> 41.030314, 83.672735 </u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	BACK FILL	
								GR	CS	FS	SI	CL	LL	PL	PI	WC			
ASPHALT PAVEMENT (4.5" THICK)	803.7																		
CONCRETE PAVEMENT (5" THICK)	802.9																		
STIFF, DARK BROWN TO BROWN, SILT AND CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, DAMP		1																	
		2	10	4	5	12	72	SS-1	3.00	8	12	18	30	32	33	20	13	14	A-6a (7)
@3.5'; BROWN		3																	
		4	4	4	6	14	67	SS-2	4.5+	-	-	-	-	-	-	-	-	14	A-6a (V)
		5																	
	797.7	6																	
VERY STIFF, BROWN AND GRAY, SANDY SILT , SOME CLAY, TRACE STONE FRAGMENTS, FILL, DAMP		7	5	6	7	18	44	SS-3	4.5+	-	-	-	-	-	-	-	-	11	A-4a (V)
		8																	
	795.2	9	4	4	6	14	72	SS-4	2.75	5	8	17	36	34	29	17	12	14	A-6a (8)
STIFF TO VERY STIFF, BROWN, SILT AND CLAY , SOME SAND, TRACE STONE FRAGMENTS, FILL, DAMP		10																	
@11.0'; VERY STIFF		11																	
		12	4	7	8	20	83	SS-5	4.5+	-	-	-	-	-	-	-	-	12	A-6a (V)
		13																	
	790.2	14	4	6	6	16	78	SS-6	4.5+	-	-	-	-	-	-	-	-	11	A-4a (V)
VERY STIFF, DARK BROWN TO BROWN, SANDY SILT , SOME CLAY, TRACE STONE FRAGMENTS, FILL, DAMP		15																	
		16																	
		17																	
		18																	
@18.5'; BROWN		19	5	8	11	26	78	SS-7	4.5+	-	-	-	-	-	-	-	-	12	A-4a (V)

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH.DOT.GDT - 10/18/15 13:29 - I:\GEO\TECHSERVER\SHARED FOLDERS\COMPANY\PUBLIC\PROJECT FILES\13 PROJECTS\IG HAN-75\L

PID: 87005		STR ID:		PROJECT: HAN-75-14.39		STATION / OFFSET: 819+32, 45' RT.		START: 8/27/13		END: 8/27/13		PG 2 OF 2		B-118-0-13						
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			
VERY STIFF, DARK BROWN TO BROWN, SANDY SILT , SOME CLAY, TRACE STONE FRAGMENTS, FILL, DAMP <i>(continued)</i> @23.5'; PUSHED SHELBY TUBE			783.7	21																
			22																	
			775.2	23																
				24																
VERY STIFF, MOTTLED BROWN AND GRAY, SILTY CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, DAMP			770.2	25			100	ST-8	4.5+	-	-	-	-	-	-	-	-	-	A-4a (V)	
				26																
			775.2	27																
				28																
VERY STIFF, GRAY, PLASTIC SILT , "AND" CLAY, TRACE SAND, DAMP			770.2	29	6	6	18	89	SS-9	3.00	-	-	-	-	-	-	-	18	A-6b (V)	
				30		7														
@38.0' AUGER REFUSAL, POSSIBLE DOLOMITE BEDROCK			765.7	31																
				32																
			770.2	33																
				34	4	8	30	89	SS-10	4.5+	0	1	4	53	42	26	18	8	16	A-4b (8)
			765.7	35		14														
				36																
			765.7	37																
				38																
				EOB																

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: HAN-75-14.39	DRILLING FIRM / OPERATOR: DLZ / JOHN	DRILL RIG: CME 55 TRUCK	STATION / OFFSET: 820+01.2, 36.1' LT	EXPLORATION ID: B-026-0-13
TYPE: ROADWAY WIDENING	SAMPLING FIRM / LOGGER: PGI / W. NAJJAR	HAMMER: CME AUTOMATIC	ALIGNMENT: IR-75 BASELINE	
PID: 87005 BR ID:	DRILLING METHOD: 2.25" HSA	CALIBRATION DATE: 6/13/13	ELEVATION: 802.6 (MSL) EOB: 36.7 ft.	PAGE: 1 OF 2
START: 7/16/13 END: 7/16/13	SAMPLING METHOD: SPT	ENERGY RATIO (%): 70.2	COORD: 41.030505480, 83.673027440	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
ASPHALT PAVEMENT (3" THICK)	802.3																	
CONCRETE PAVEMENT (9" THICK)	801.6																	
GRAY STONE FRAGMENTS WITH SAND, BASE MATERIAL (4" THICK)	801.2	1	14															
MEDIUM DENSE, BROWN, STONE FRAGMENTS , WITH SAND, SOME FINES, FILL, MOIST		2	9	22	50	SS-1	4.5+	29	27	19	20	5	31	29	2	16	A-1-b (0)	
		3	10															
	799.1																	
VERY STIFF TO HARD, BROWN, SANDY SILT , SOME CLAY, TRACE TO LITTLE STONE FRAGMENTS, FILL, DAMP		4	5															
		5	6	16	78	SS-2	--	5	7	17	39	32	28	18	10	13	A-4a (7)	
		6	8															
@6.0'; LITTLE STONE FRAGMENTS		7	5															
		8	7	18	6	SS-3	--	-	-	-	-	-	-	-	-	9	A-4a (V)	
		9	8															
		10	6	19	56	SS-4	2.50	-	-	-	-	-	-	-	-	14	A-4a (V)	
		11	8															
		12	2															
		13	4	16	44	SS-5	4.25	-	-	-	-	-	-	-	-	15	A-4a (V)	
		14	10															
		15	3	21	78	SS-6	4.5+	-	-	-	-	-	-	-	-	15	A-4a (V)	
		16	6															
@16.0'; HARD		17	10	48	22	SS-7	3.25	-	-	-	-	-	-	-	-	11	A-4a (V)	
		18	19															
		19	22															
	784.1																	
VERY STIFF TO STIFF, DARK BROWN TO BROWN, SILT AND CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, DAMP		19	3	18	56	SS-8	3.25	-	-	-	-	-	-	-	-	14	A-6a (V)	
			4															
			11															

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 14:22:\CLEDED01\PUBLIC\PROJECT FILES\13 PROJECTS\G13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 14:22:\UNCLEDC01\PUBLIC\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

PID: 87005		BR ID:		PROJECT: HAN-75-14.39		STATION / OFFSET: 820+01.2, 36.1' LT		START: 7/16/13		END: 7/16/13		PG 2 OF 2		B-026-0-13										
MATERIAL DESCRIPTION AND NOTES				ELEV. 782.6	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL			
											GR	CS	FS	SI	CL	LL	PL	PI						
VERY STIFF TO STIFF, DARK BROWN TO BROWN, SILT AND CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, DAMP (continued) @23.5'; STIFF, BROWN				782.6	21																			
					22																			
				774.1	23																			
					24	4	6	7	15	78	SS-9	2.00	-	-	-	-	-	-	-	-	13	A-6a (V)		
				774.1	25																			
					26																			
STIFF TO VERY STIFF, MOTTLED BROWN AND GRAY, SILTY CLAY , LITTLE TO NO SAND, TRACE TO NO STONE FRAGMENTS, DAMP @33.5'; VERY STIFF				774.1	27																			
					28																			
				765.9	29	2	4	4	9	100	SS-10	3.25	-	-	-	-	-	-	-	-	19	A-6b (V)		
					30																			
				765.9	31																			
					32																			
@36.7'; AUGER REFUSAL AND POSSIBLE DOLOMITE BEDROCK				765.9	33																			
					34	6	6	11	20	100	SS-11	4.5+	0	0	0	37	63	39	23	16	20	A-6b (10)		
				765.9	35																			
					36																			

NOTES: GROUNDWATER WAS ENCOUNTERED AT 33.5' DURING DRILLING AND AT 27.0' UPON COMPLETION OF DRILLING OPERATIONS.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: AUGER CUTTINGS MIXED WITH 1 BAG OF BENTONITE PELLETS/SOIL CUTTINGS MIXTURE

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 14:22:\UNCLEDC01\PROJECT FILES\13 PROJECTS\G13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>B-M / JOSH DEAN</u>	DRILL RIG: <u>DIEDRICH D-90 ATV</u>	STATION / OFFSET: <u>822+18.7, 92.2' RT</u>	EXPLORATION ID <u>B-026-2-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>9/18/12</u>	ELEVATION: <u>782.6 (MSL)</u> EOB: <u>17.5 ft.</u>	PAGE 1 OF 1
START: <u>8/7/13</u> END: <u>8/7/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>80.2</u>	COORD: <u>41.031100050, 83.672557270</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV. 782.6	DEPTH	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
TOPSOIL (6" THICK)	782.1																	
VERY STIFF TO MEDIUM STIFF, BROWN TO DARK BROWN, SANDY SILT , SOME CLAY, TRACE STONE FRAGMENTS, TRACE ROOTS, FILL, MOIST		1	3	6	16	83	SS-1	-	-	-	-	-	-	-	-	-	21	A-4a (V)
@3.5'; MEDIUM STIFF, DARK BROWN		4	1	2	3	7	67	SS-2	-	-	-	-	-	-	-	-	23	A-4a (V)
@5.5'; BROWN AND GRAY		6																
		7				54	ST-3	2.00	-	-	-	-	-	-	-	-	17	A-4a (V)
STIFF, BROWN AND GRAY, PLASTIC SILT , SOME SAND, LITTLE CLAY, TRACE STONE FRAGMENTS, FILL, DAMP	775.1	8				88	ST-4	2.00	4	8	16	56	16	23	15	8	14	A-4b (7)
		9																
HARD, DARK BROWN TO BROWN, PLASTIC SILT , SOME CLAY, LITTLE SAND, TRACE STONE FRAGMENTS, MOIST	772.6	10	8	11	31	100	SS-5	3.50	-	-	-	-	-	-	-	-	15	A-4b (V)
@12'; PUSHED SHELBY TUBE, NO RECOVERY		12																
BROWN @14.0'; PUSHED SHELBY TUBE		14				0	ST-6	-	-	-	-	-	-	-	-	-	-	
@16.0'; BROWN		15				75	ST-7	-	-	-	-	-	-	-	-	-	16	A-4b (V)
@17.5' SPLIT SPOON REFUSAL, POSSIBLE BEDROCK	765.1	17	13	14	32	89	SS-8	-	-	-	-	-	-	-	-	-	14	A-4b (V)
		EOB																

NOTES: GROUNDWATER WAS ENCOUNTERED AT 11.5' DURING DRILLING AND AT 12.5' UPON COMPLETION OF DRILLING OPERATIONS. USED SHELBY TUBES INSTEAD OF SPT TO MINIMIZE VIBRATION ON GAS PIPE. ABANDONMENT METHODS, MATERIALS, QUANTITIES: AUGER CUTTINGS MIXED WITH 1 BAG OF BENTONITE PELLETS/SOIL CUTTINGS MIXTURE

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT-GDT-5/27/14 14:22:\UNCLEDD01\PROJECTS\13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

PROJECT: HAN-75-14.39		DRILLING FIRM / OPERATOR: DLZ / ALAN		DRILL RIG: CME 75 TRUCK		STATION / OFFSET: 825+00.6, 43.7' RT		EXPLORATION ID												
TYPE: ROADWAY WIDENING		SAMPLING FIRM / LOGGER: PGI / W. NAJJAR		HAMMER: CME AUTOMATIC		ALIGNMENT: IR-75 BASELINE		B-027-0-13												
PID: 87005 BR ID:		DRILLING METHOD: 3.25" HSA		CALIBRATION DATE: 1/6/12		ELEVATION: 789.9 (MSL) EOB: 22.8 ft.		PAGE												
START: 8/22/13 END: 8/22/13		SAMPLING METHOD: SPT		ENERGY RATIO (%): 70.6		COORD: 41.031874590, 83.672725970		1 OF 2												
MATERIAL DESCRIPTION AND NOTES		ELEV.	DEPTHS	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			ODOT CLASS (GI)	BACK FILL		
									GR	CS	FS	SI	CL	LL	PL	PI			WC	
ASPHALT PAVEMENT (5" THICK)		789.9																		
CONCRETE PAVEMENT (7" THICK)		789.5																		
GRAY STONE FRAGMENTS WITH SAND, BASE MATERIAL (6" THICK)		788.9																		
STIFF, BROWN, SANDY SILT, SOME CLAY, LITTLE STONE FRAGMENTS, FILL, DAMP		788.4	1	4	5	12	89	SS-1	--	-	-	-	-	-	-	-	-	16	A-4a (V)	
			2																	
			3																	
STIFF, BROWN, SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS, FILL, DAMP		786.4	4	4	5	6	13	100	SS-2	3.00	-	-	-	-	-	-	-	19	A-6a (V)	
			5																	
			6																	
VERY STIFF, BROWN TO BROWN AND GRAY, SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS, FILL, DAMP		783.9	7	7	12	8	24	56	SS-3	4.50	-	-	-	-	-	-	-	13	A-4a (V)	
			8																	
@8.5'; BROWN AND GRAY			9	4	6	9	18	78	SS-4	4.5+	-	-	-	-	-	-	-	16	A-4a (V)	
			10																	
			11																	
STIFF, MOTTLED BROWN AND GRAY, SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS, MOIST		778.9	12	4	5	6	13	94	SS-5	3.25	2	4	13	39	42	38	18	20	22	A-6b (12)
			13																	
			14	4	6	8	16	67	SS-6	4.5+	-	-	-	-	-	-	-	13	A-4b (V)	
VERY STIFF, BROWN TO GRAY, PLASTIC SILT, "AND" CLAY, TRACE SAND, TRACE TO NO STONE FRAGMENTS, DAMP		776.4	15																	
@16.0'; GRAY			16	6	11	12	27	100	SS-7	4.5+	-	-	-	-	-	-	-	11	A-4b (V)	
			17																	
			18																	
@18.5'; GRAY			19	3	8	8	19	83	SS-8	4.00	1	0	1	55	43	27	19	8	17	A-4b (8)

MATERIAL DESCRIPTION AND NOTES	ELEV. 769.9	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			
VERY STIFF, BROWN TO GRAY, PLASTIC SILT , "AND" CLAY, TRACE SAND, TRACE TO NO STONE FRAGMENTS, DAMP (<i>continued</i>) @21.0'; GRAY	769.9	21	6														<L> <L> <L> <L> <L> <L> <L> <L> <L> <L>	
GRAY DOLOMITE BEDROCK @22.8' AUGER REFUSAL	767.1	22 EOB	12 50/3"		93	SS-9	4.5+	-	-	-	-	-	-	-	-	14	A-4b (V)	<L> <L> <L> <L> <L> <L> <L> <L> <L> <L>

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 14:22:\CLEDC01\PUBLIC\PROJECT FILES\13 PROJECTS\HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH ODOT GDT-5/27/14 1422:\UNCLEDD01\PUBLIC\PROJECT FILES\13 PROJECTS\G13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>B-M / JOSH DEAN</u>	DRILL RIG: <u>DIEDRICH D-90 ATV</u>	STATION / OFFSET: <u>826+44.2, 73.6' RT</u>	EXPLORATION ID
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	B-027-2-13
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>9/18/12</u>	ELEVATION: <u>781.1 (MSL)</u> EOB: <u>15.5 ft.</u>	PAGE
START: <u>7/30/13</u> END: <u>7/30/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>80.2</u>	COORD: <u>41.032268000, 83.672614030</u>	1 OF 1

MATERIAL DESCRIPTION AND NOTES	ELEV. 781.1	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	BACK FILL		
								GR	CS	FS	SI	CL	LL	PL	PI	WC				
TOPSOIL (8" THICK)	780.4																			
MEDIUM STIFF, BROWN, SILT AND CLAY , SOME SAND, TRACE STONE FRAGMENTS, FILL, MOIST	778.1	1	2	3	4	9	100	SS-1	1.00	2	4	22	33	39	38	20	18	22	A-6b (11)	
MEDIUM STIFF, BROWN, SILT AND CLAY , SOME SAND, TRACE STONE FRAGMENTS, FILL, DAMP		3																		
MEDIUM STIFF, BROWN, SILT AND CLAY , SOME SAND, TRACE STONE FRAGMENTS, FILL, DAMP	775.6	4					71	ST-2	1.00	6	8	19	37	30	31	19	12	16	A-6a (7)	
@3.5'; PUSHED SHELBY TUBE, U.C. STRENGTH = 1858 psf. D.S. ANGLE OF SHEAR RESISTANCE = 19.4°, COHESION = 3.4 psi		5																		
STIFF TO HARD, BROWN, SANDY SILT , SOME CLAY, LITTLE STONE FRAGMENTS, DAMP	770.1	6	3	4	5	12	89	SS-3	2.50	-	-	-	-	-	-	-	-	16	A-4a (V)	
@8.5'; HARD		7																		
	770.1	8																		
DENSE, GRAY, NON-PLASTIC SILT , TRACE SAND, MOIST		9	25	14	13	36	100	SS-4	4.5+	-	-	-	-	-	-	-	-	-	13	A-4a (V)
	767.6	10																		
DENSE, GRAY, NON-PLASTIC SILT , TRACE SAND, MOIST		11	8	11	16	36	100	SS-5	--	-	-	-	-	-	-	-	-	-	16	A-4b (V)
	767.6	12																		
VERY DENSE, GRAY, NON-PLASTIC SANDY SILT , SOME STONE FRAGMENTS, DAMP		13																		
	765.6	14	26	42	51	124	83	SS-6	--	-	-	-	-	-	-	-	-	7	A-4a (V)	
@15.5'; AUGER REFUSAL, POSSIBLE DOLOMITE BEDROCK		15																		

EOB

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / ALAN</u>	DRILL RIG: <u>CME 750X ATV</u>	STATION / OFFSET: <u>829+05.1, 9.3' LT</u>	EXPLORATION ID <u>B-028-0-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>1/6/12</u>	ELEVATION: <u>785.4 (MSL)</u> EOB: <u>7.5 ft.</u>	PAGE 1 OF 1
START: <u>8/6/13</u> END: <u>8/6/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>67.1</u>	COORD: <u>41.032985630, 83.672908190</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV. 785.4	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			ODOT CLASS (GI)	BACK FILL		
								GR	CS	FS	SI	CL	LL	PL	PI			WC	
ASPHALT PAVEMENT (4.5" THICK)	785.0																		
CONCRETE PAVEMENT (11' THICK)	784.1	1																	
VERY STIFF, DARK BROWN, SILT AND CLAY , SOME SAND, TRACE STONE FRAGMENTS, FILL, DAMP	782.4	2	20	12	27	89	SS-1	4.5+	2	6	18	25	49	28	16	12	12	A-6a (9)	
VERY STIFF, DARK BROWN TO BLACK, SILTY CLAY , SOME TO LITTLE SAND, TRACE STONE FRAGMENTS, FILL, DAMP	779.4	3	5	8	10	20	100	SS-2	4.5+	1	4	18	41	36	38	22	16	19	A-6b (10)
@4.5'; BLACK, LITTLE SAND	779.4	4	5	8	9	19	100	SS-3	4.00	-	-	-	-	-	-	-	-	22	A-6b (V)
STIFF, GREENISH GRAY, SILTY CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, DAMP	777.9	5	4	5	6	12	100	SS-4	2.50	-	-	-	-	-	-	-	-	20	A-6b (V)
		6																	
		7																	

EOB

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 14:22:\CLEED01\PUBLIC\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / ALAN</u>	DRILL RIG: <u>CME 75 TRUCK</u>	STATION / OFFSET: <u>833+01.0, 8.1' RT</u>	EXPLORATION ID
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / K. JONES</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	B-029-0-13
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>1/6/12</u>	ELEVATION: <u>783.5 (MSL)</u> EOB: <u>8.0 ft.</u>	PAGE
START: <u>8/14/13</u> END: <u>8/14/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>70.6</u>	COORD: <u>41.034071940, 83.672835110</u>	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			
ASPHALT PAVEMENT (5" THICK)	783.5																	
CONCRETE PAVEMENT (11" THICK)	783.1																	
GRAY STONE FRAGMENTS WITH SAND, BASE MATERIAL (6" THICK)	782.2	1																
HARD, DARK BROWN, SILT AND CLAY , SOME SAND, TRACE STONE FRAGMENTS, FILL, DAMP	781.4	2																
	780.0	3	5	8	33	100	SS-1	4.5+	6	12	22	39	21	35	23	12	19	A-6a (6)
MEDIUM DENSE, BROWN, STONE FRAGMENTS WITH SAND , LITTLE FINES, FILL, MOIST TO WET	780.0	4	12	6	12	28	SS-2	--	40	26	17	14	3	NP	NP	NP	21	A-1-b (0)
	778.5	5	5	8	14	67	SS-3	2.00	-	-	-	-	-	-	-	-	17	A-6a (V)
STIFF, BROWN, SILT AND CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, DAMP	777.0	6	5	8	14	67	SS-3	2.00	-	-	-	-	-	-	-	-	17	A-6a (V)
VERY STIFF, BROWN, SANDY SILT , SOME CLAY, TRACE STONE FRAGMENTS, DAMP	777.0	7	5	7	20	67	SS-4	4.5+	-	-	-	-	-	-	-	-	13	A-4a (V)
	775.5	8	5	7	20	67	SS-4	4.5+	-	-	-	-	-	-	-	-	13	A-4a (V)
	775.5	EOB																

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 14:22:\UNCLEDC01\PUBLIC\PROJECT FILES\13 PROJECTS\G13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / JOHN</u>	DRILL RIG: <u>CME 55 TRUCK</u>	STATION / OFFSET: <u>836+21.1, 44.7' LT</u>	EXPLORATION ID <u>B-030-0-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>2.25" HSA</u>	CALIBRATION DATE: <u>6/13/13</u>	ELEVATION: <u>780.7 (MSL)</u> EOB: <u>10.0 ft.</u>	PAGE 1 OF 1
START: <u>7/15/13</u> END: <u>7/15/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>70.2</u>	COORD: <u>41.034951330, 83.673018540</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
TOPSOIL (2" THICK)	780.7																	
VERY STIFF, BROWN, SILTY CLAY , SOME SAND, LITTLE STONE FRAGMENTS, FILL, DAMP	780.5	1	6														<< << <<	
		2	6 10	19	44	SS-1	4.5+	14	10	17	33	26	38	15	23	12	A-6b (10)	<< << <<
		3															<< << <<	
VERY STIFF TO HARD, BROWN, SANDY SILT , SOME CLAY, TRACE STONE FRAGMENTS, DAMP	777.2	4	6 10 10	23	72	SS-2	4.5+	8	8	17	43	24	23	15	8	12	A-4a (6)	<< << <<
		5															<< << <<	
@6.0'; HARD		6															<< << <<	
		7	4 10 20	35	89	SS-3	4.5+	-	-	-	-	-	-	-	-	12	A-4a (V)	<< << <<
		8															<< << <<	
@8.5'; VERY STIFF, DARK GRAY		9	6 8 8	19	100	SS-4	4.5+	-	-	-	-	-	-	-	-	11	A-4a (V)	<< << <<
	770.7	10															<< << <<	
		EOB															<< << <<	

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 14:22:10\GLED001\PUBLIC\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / ALAN</u>	DRILL RIG: <u>CME 75 TRUCK</u>	STATION / OFFSET: <u>841+10.8, 42.2' RT</u>	EXPLORATION ID <u>B-031-0-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	PAGE 1 OF 1
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>1/6/12</u>	ELEVATION: <u>779.7 (MSL)</u> EOB: <u>10.0 ft.</u>	
START: <u>8/22/13</u> END: <u>8/22/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>70.6</u>	COORD: <u>41.036293670, 83.672691490</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			ODOT CLASS (GI)	BACK FILL	
								GR	CS	FS	SI	CL	LL	PL	PI			WC
TOPSOIL (2" THICK)	779.7																	
STIFF, BROWN, SILTY CLAY , SOME SAND, LITTLE STONE FRAGMENTS, FILL, DAMP	779.5	1	5															<< << <<
		2	6	15	56	SS-1	2.25	19	7	15	29	30	34	18	16	13	A-6b (7)	<< << <<
STIFF, BROWN, SILT AND CLAY , SOME SAND, TRACE STONE FRAGMENTS, WITH SANDY SILT LAYER, DAMP	777.3	3																<< << <<
		4	5															<< << <<
		5	3	9	61	SS-2	2.25	6	10	16	39	29	29	17	12	17	A-6a (7)	<< << <<
HARD, BROWN AND GRAY TO GRAY, SANDY SILT , SOME CLAY, TRACE STONE FRAGMENTS, DAMP	774.9	6																<< << <<
		7	5	14	39	100	SS-3	4.5+	-	-	-	-	-	-	-	10	A-4a (V)	<< << <<
		8																<< << <<
		9	8	15	31	94	SS-4	4.5+	-	-	-	-	-	-	-	11	A-4a (V)	<< << <<
@8.5'; GRAY, WITH INTERBEDDED SAND LAYERS		10																<< << <<
	769.7	EOB																<< << <<

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT GDT-5/27/14 14:22:\UNCLEDC01\PUBLIC\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEET\SHAN-75 ROADWAY.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / ALAN</u>	DRILL RIG: <u>CME 750X ATV</u>	STATION / OFFSET: <u>845+27.6, 9.4' LT</u>	EXPLORATION ID <u>B-032-0-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / K. JONES</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>1/6/12</u>	ELEVATION: <u>780.1 (MSL)</u> EOB: <u>9.0 ft.</u>	PAGE 1 OF 1
START: <u>8/6/13</u> END: <u>8/6/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>67.1</u>	COORD: <u>41.037438520, 83.672868320</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
ASPHALT PAVEMENT (4.5" THICK)	779.7																	
CONCRETE PAVEMENT (11" THICK)	778.8	1																
GRAY STONE FRAGMENTS WITH SAND, BASE MATERIAL (3" THICK)	778.6	2	16															
MEDIUM DENSE, DARK BROWN, NON-PLASTIC SANDY SILT , TRACE STONE FRAGMENTS, FILL, MOIST	777.1	3	8	17	33	SS-1	4.5+	6	22	25	31	16	NP	NP	NP	23	A-4a (2)	
STIFF, GREENISH GRAY, SILTY CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, MOIST	775.6	4	4	11	72	SS-2	3.50	1	2	14	37	46	40	19	21	20	A-6b (12)	
MEDIUM STIFF, BROWN, SILT AND CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, MOIST	774.1	5	3	8	39	SS-3	2.50	-	-	-	-	-	-	-	-	20	A-6a (V)	
VERY LOOSE, BROWN, NON-PLASTIC SILT , TRACE SAND, WET	772.6	6	2	3	100	SS-4	--	-	-	-	-	-	-	-	-	34	A-4b (V)	
MEDIUM DENSE, LIGHT GRAY, COARSE AND FINE SAND , SOME FINES, WET	771.1	8	1	12	100	SS-5	--	-	-	-	-	-	-	-	-	26	A-3a (V)	
		9																

NOTES: GROUNDWATER WAS ENCOUNTERED AT 6.5' DURING DRILLING AND WAS DRY UPON COMPLETION OF DRILLING OPERATIONS.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 14:22:\UNCLEDC01\PUBLIC\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / ALAN</u>	DRILL RIG: <u>CME 75 TRUCK</u>	STATION / OFFSET: <u>849+13.6, 7.9' RT</u>	EXPLORATION ID <u>B-033-0-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / K. JONES</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>1/6/12</u>	ELEVATION: <u>779.3 (MSL)</u> EOB: <u>8.0 ft.</u>	PAGE 1 OF 1
START: <u>8/14/13</u> END: <u>8/14/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>70.6</u>	COORD: <u>41.038497580, 83.672795880</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
ASPHALT PAVEMENT (5" THICK)	779.3																	
CONCRETE PAVEMENT (11" THICK)	778.0	1																
GRAY STONE FRAGMENTS WITH SAND, BASE MATERIAL (9" THICK)	777.2	2																
VERY STIFF, DARK BROWN, SANDY SILT , LITTLE CLAY, TRACE STONE FRAGMENTS, FILL, DAMP	775.8	3	7	12	20	67	SS-1	4.5+	8	15	26	35	16	36	26	10	19	A-4a (3)
MEDIUM STIFF, BROWN, SILTY CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, DAMP TO MOIST		4	6	3	7	28	SS-2	2.25	1	3	14	42	40	34	17	17	17	A-6b (11)
@5.0'; MOIST		5	4	4	8	100	SS-3	3.50	-	-	-	-	-	-	-	-	22	A-6b (V)
	772.8	6	4	4	3													
MEDIUM DENSE, BROWN, COARSE AND FINE SAND , LITTLE FINES, WET	771.3	7	4	5	13	67	SS-4	2.25	-	-	-	-	-	-	-	-	26	A-3a (V)
		8		6														

EOB

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 14:22:\CLEED001\PUBLIC\PROJECT FILES\13 PROJECTS\G13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

NOTES: GROUNDWATER WAS ENCOUNTERED AT 6.3' DURING DRILLING AND WAS DRY UPON COMPLETION OF DRILLING OPERATIONS.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / JOHN</u>	DRILL RIG: <u>CME 55 TRUCK</u>	STATION / OFFSET: <u>853+21.1, 8.9' RT</u>	EXPLORATION ID <u>B-034-0-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	PAGE 1 OF 1
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>2.25" HSA</u>	CALIBRATION DATE: <u>6/13/13</u>	ELEVATION: <u>776.8 (MSL)</u> EOB: <u>10.0 ft.</u>	
START: <u>7/15/13</u> END: <u>7/15/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>70.2</u>	COORD: <u>41.039617850, 83.673056940</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL		
								GR	CS	FS	SI	CL	LL	PL	PI					
GRAY STONE FRAGMENTS SHOULDER BERM MATERIAL (12" THICK)	776.8																	< < < <		
STIFF, BROWN, SILTY CLAY , LITTLE TO TRACE SAND, TRACE TO NO STONE FRAGMENTS, MOIST	775.8	1	4	5	11	50	SS-1	3.25	7	5	15	31	42	38	16	22	18	A-6b (12)	< < < <	
@3.0'; TRACE SAND		2																< < < <		
		3																< < < <		
		4	3	5	6	13	72	SS-2	4.5+	0	1	4	27	68	39	21	18	25	A-6b (11)	< < < <
		5																< < < <		
	770.8	6	3	2	4	7	100	SS-3	--	-	-	-	-	-	-	-	20	A-3a (V)	< < < <	
LOOSE, BROWN, COARSE AND FINE SAND , TRACE FINES, WET		7																< < < <		
		8																< < < <		
	768.3	9	3	5	8	15	100	SS-4	2.25	-	-	-	-	-	-	-	11	A-4a (V)	< < < <	
STIFF, GRAY, SANDY SILT , SOME CLAY, TRACE STONE FRAGMENTS, DAMP		10																< < < <		
	766.8	EOB																< < < <		

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 14:22:\GLED001\PROJECTS\G13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

NOTES: GROUNDWATER WAS ENCOUNTERED AT 6.0' DURING DRILLING AND WAS DRY UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: HAN-75-14.39	DRILLING FIRM / OPERATOR: B-M / JOSH DEAN	DRILL RIG: DIEDRICH D-90 ATV	STATION / OFFSET: 854+68.2, 5.5' LT	EXPLORATION ID: B-034-1-13
TYPE: ROADWAY WIDENING	SAMPLING FIRM / LOGGER: PGI / W. NAJJAR	HAMMER: DIEDRICH AUTOMATIC	ALIGNMENT: SR 12 RAMP B BLINE	
PID: 87005 BR ID:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 9/18/12	ELEVATION: 779.4 (MSL) EOB: 10.0 ft.	PAGE: 1 OF 1
START: 7/31/13 END: 7/31/13	SAMPLING METHOD: SPT	ENERGY RATIO (%): 80.2	COORD: 41.040015950, 83.672487620	

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				
GRAY STONE FRAGMENTS, BASE MATERIAL (7" THICK)	779.4																<< < <		
MEDIUM DENSE, BROWN, NON-PLASTIC SANDY SILT , LITTLE STONE FRAGMENTS, FILL, MOIST	778.8	1	5														<< < <		
		2	6	11	23	100	SS-1	2.00	14	21	25	29	11	NP	NP	NP	24	A-4a (1)	<< < <
		3																<< < <	
STIFF TO MEDIUM STIFF, BROWN, SILTY CLAY , SOME SAND, TRACE STONE FRAGMENTS, MOIST	775.9	4	5															<< < <	
		5	5	5	13	56	SS-2	2.50	2	5	16	35	42	38	18	20	19	A-6b (12)	<< < <
		6																<< < <	
@6.0'; MEDIUM STIFF		7	2															<< < <	
		8	2	4	8	94	SS-3	1.25	-	-	-	-	-	-	-	-	21	A-6b (V)	<< < <
		9																<< < <	
MEDIUM DENSE, BROWN, NON-PLASTIC SANDY SILT , TRACE STONE FRAGMENTS, MOIST	770.9	10	1															<< < <	
	769.4	EOB	1	7	11	89	SS-4	--	-	-	-	-	-	-	-	-	27	A-4a (V)	<< < <

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 14:22:10\GLED001\PUBLIC\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / JOHN</u>	DRILL RIG: <u>CME 55 TRUCK</u>	STATION / OFFSET: <u>857+24.7, 43.2' RT</u>	EXPLORATION ID
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	B-035-0-13
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>2.25" HSA</u>	CALIBRATION DATE: <u>6/13/13</u>	ELEVATION: <u>776.1 (MSL)</u> EOB: <u>10.0 ft.</u>	PAGE
START: <u>7/15/13</u> END: <u>7/15/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>70.2</u>	COORD: <u>41.040722860, 83.672647930</u>	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				
TOPSOIL (1" THICK) STIFF, BROWN, SILT AND CLAY , SOME TO LITTLE SAND, TRACE TO LITTLE STONE FRAGS, FILL, MOIST	776.1 776.0	0															< < < <		
@3.5'; LITTLE SAND, LITTLE STONE FRAGMENTS		1	4														< < < <		
		2	4	5	11	50	SS-1	-	7	6	16	40	31	27	14	13	18	A-6a (8)	
		3																< < < <	
		4	3	5	6	13	72	SS-2	-	13	6	14	42	25	29	17	12	20	A-6a (7)
		5																	< < < <
	770.1	6	3	2	4	7	100	SS-3	-	-	-	-	-	-	-	-	13	A-3a (V)	
LOOSE, BROWN, COARSE AND FINE SAND , TRACE FINES, FILL, WET		7																	< < < <
		8																	< < < <
	767.6	9	3	5	8	15	100	SS-4	-	-	-	-	-	-	-	-	22	A-4a (V)	
MEDIUM DENSE, BROWN, NON-PLASTIC SANDY SILT , TRACE STONE FRAGMENTS, WET		10																	< < < <
	766.1	EOB																	< < < <

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT GDT-5/27/14 14:22:01\PROJECTS\13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

NOTES: GROUNDWATER WAS ENCOUNTERED AT 7.0' DURING DRILLING AND AT 5.0' UPON COMPLETION OF DRILLING OPERATIONS.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 14:22:\UNCLEDC01\PUBLIC\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / JOHN</u>	DRILL RIG: <u>CME 55 TRUCK</u>	STATION / OFFSET: <u>857+77.7, 13.0' LT</u>	EXPLORATION ID <u>B-035-1-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>SR 12 RAMP A BLINE</u>	
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>2.25" HSA</u>	CALIBRATION DATE: <u>6/13/13</u>	ELEVATION: <u>778.6 (MSL)</u> EOB: <u>7.5 ft.</u>	PAGE 1 OF 1
START: <u>7/15/13</u> END: <u>7/15/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>70.2</u>	COORD: <u>41.040844660, 83.673341350</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			ODOT CLASS (GI)	BACK FILL		
								GR	CS	FS	SI	CL	LL	PL	PI			WC	
TOPSOIL (3" THICK)	778.6																		
STIFF, GRAY, SILT AND CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, MOIST	778.3	1	5															<< <> <>	
		2	4	6	12	50	SS-1	3.00	3	5	15	34	43	26	13	13	17	A-6a (9)	<< <> <>
		3																<< <> <>	
MEDIUM DENSE, BROWN, NON-PLASTIC SANDY SILT , TRACE STONE FRAGMENTS, FILL, MOIST	775.1	4	4	5	13	100	SS-2	3.00	2	13	37	33	15	NP	NP	NP	15	A-4a (3)	<< <> <>
		5																<< <> <>	
		6																<< <> <>	
MEDIUM DENSE, GRAY, NON-PLASTIC SILT , TRACE STONE FRAGMENTS W/SILT AND CLAY LAYER, FILL, MOIST	772.6	6	4	7	15	89	SS-3	3.50	-	-	-	-	-	-	-	-	18	A-4b (V)	<< <> <>
	771.1	7		6														<< <> <>	
		EOB																	

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>B-M / JOSH DEAN</u>	DRILL RIG: <u>DIEDRICH D-90 ATV</u>	STATION / OFFSET: <u>858+77.1, 6.6' RT</u>	EXPLORATION ID <u>B-035-2-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>SR 12 RAMP B BLINE</u>	
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>9/18/12</u>	ELEVATION: <u>788.4 (MSL)</u> EOB: <u>7.5 ft.</u>	PAGE 1 OF 1
START: <u>7/31/13</u> END: <u>7/31/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>80.2</u>	COORD: <u>41.041083880, 83.672041740</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV. 788.4	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
ASPHALT PAVEMENT (17" THICK)	787.0	1																
STIFF, BROWN, SANDY SILT , SOME STONE FRAGMENTS, LITTLE CLAY, FILL, DAMP	784.9	2 3	4 5	13	67	SS-1	4.00	25	18	20	24	13	31	26	5	22	A-4a (0)	
STIFF, BROWN AND DARK BROWN, SILTY CLAY , SOME SAND, TRACE STONE FRAGMENTS, FILL, DAMP	782.4	4 5	3 4	13	94	SS-2	2.00	3	6	18	32	41	36	19	17	19	A-6b (10)	
VERY STIFF, BROWN, SILT AND CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, DAMP	780.9	6 7	5 6	17	78	SS-3	4.00	-	-	-	-	-	-	-	-	16	A-6a (V)	

EOB

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 14:22:\UNCLEDC01\PUBLIC\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / ALAN</u>	DRILL RIG: <u>CME 750X ATV</u>	STATION / OFFSET: <u>860+69.5, 11.6' LT</u>	EXPLORATION ID <u>B-036-0-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	PAGE 1 OF 1
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>1/6/12</u>	ELEVATION: <u>777.0 (MSL)</u> EOB: <u>7.5 ft.</u>	
START: <u>8/6/13</u> END: <u>8/6/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>67.1</u>	COORD: <u>41.041670110, 83.672837930</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV. 777.0	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					
ASPHALT PAVEMENT (4.5" THICK)	776.6																			
CONCRETE PAVEMENT (10.5" THICK)	775.8	1																		
MEDIUM DENSE, GRAY, STONE FRAGMENTS , SOME SAND, TRACE FINES, FILL, DAMP	774.0	2	22	15	25	33	SS-1	--	69	18	7	-	6	-	NP	NP	NP	9	A-1-a (0)	
LOOSE, DARK BROWN, COARSE AND FINE SAND , SOME FINES, FILL, MOIST	772.5	3	4	4	9	67	SS-2	--	0	10	63	20	7	NP	NP	NP	26	A-3a (0)		
MEDIUM STIFF, MOTTLED BROWN AND GRAY, SILTY CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, MOIST	771.0	4	2	3	7	89	SS-3	--	-	-	-	-	-	-	-	-	-	20	A-6b (V)	
LOOSE, BROWN, COARSE AND FINE SAND , SOME FINES, MOIST	769.5	5	2	4	10	100	SS-4	--	-	-	-	-	-	-	-	-	-	18	A-3a (V)	
		6																		
		7																		

EOB

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 14:22:\CLEED01\PUBLIC\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / JOHN</u>	DRILL RIG: <u>CME 55 TRUCK</u>	STATION / OFFSET: <u>865+00.0, 8.1' LT</u>	EXPLORATION ID: <u>B-036-1-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>SR 12 RAMP C BLINE</u>	
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>2.25" HSA</u>	CALIBRATION DATE: <u>6/13/13</u>	ELEVATION: <u>780.5 (MSL)</u> EOB: <u>10.0 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>7/15/13</u> END: <u>7/15/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>70.2</u>	COORD: <u>41.042873240, 83.673337350</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	BACK FILL	
								GR	CS	FS	SI	CL	LL	PL	PI	WC			
GRAY STONE FRAGMENTS WITH SAND, BASE MATERIAL (3" THICK)	780.5																		
STIFF, DARK BROWN, SILT AND CLAY, "AND" TO TRACE STONE FRAGMENTS, SOME SAND, FILL, DAMP	780.3	1	5																<< << <<
		2	6	6	14	56	SS-1	2.00	37	12	11	20	20	32	17	15	13	A-6a (2)	<< << <<
@3.5'; SOME SAND TRACE STONE FRAGMENTS		3																	<< << <<
		4	5																<< << <<
		5	6	5	13	50	SS-2	2.00	9	11	22	30	28	33	20	13	12	A-6a (6)	<< << <<
@6.0'; SOME SAND TRACE STONE FRAGMENTS		6																	<< << <<
		7	5	6	7	15	67	SS-3	4.00	-	-	-	-	-	-	-	17	A-6a (V)	<< << <<
@8.5'; SOME SAND TRACE STONE FRAGMENTS		8																	<< << <<
		9	3	4	6	12	83	SS-4	2.00	-	-	-	-	-	-	-	15	A-6a (V)	<< << <<
	770.5	10																	<< << <<

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 14:22:10\GLED001\PUBLIC\PROJECT FILES\13 PROJECTS\G13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / ALAN</u>	DRILL RIG: <u>CME 45C TRACKED</u>	STATION / OFFSET: <u>864+87.8, 7.7' RT</u>	EXPLORATION ID <u>B-037-0-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / K. JONES</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	PAGE 1 OF 1
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>1/6/12</u>	ELEVATION: <u>776.7 (MSL)</u> EOB: <u>7.5 ft.</u>	
START: <u>8/15/13</u> END: <u>8/15/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>84.8</u>	COORD: <u>41.042817980, 83.672757520</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL	
								GR	CS	FS	SI	CL	LL	PL	PI				
ASPHALT PAVEMENT (4.75" THICK)	776.7																		
CONCRETE PAVEMENT (11" THICK)	776.3																		
GRAY STONE FRAGMENTS WITH SAND, BASE MATERIAL (8" THICK)	775.4	1																	
STIFF, DARK BROWN, STONE FRAGMENTS WITH SAND, SILT, AND CLAY , FILL, DAMP	774.8	2	4	5	14	56	SS-1	2.00	16	31	24	10	19	37	20	17	16	A-2-6 (1)	
VERY STIFF TO STIFF, BROWN, SANDY SILT , SOME CLAY, TRACE STONE FRAGMENTS, DAMP	773.2	3	4	5	6	16	61	SS-2	4.5+	6	9	17	34	34	27	17	10	15	A-4a (7)
		4																	
		5																	
@6.0'; STIFF		6	2																
		7	4	4	11	44	SS-3	2.00	-	-	-	-	-	-	-	-	-	13	A-4a (V)
	769.2	EOB																	

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 14:22:\UNCLEDC01\PUBLIC\PROJECT FILES\13 PROJECTS\HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>B-M / JOSH DEAN</u>	DRILL RIG: <u>DIEDRICH D-90 ATV</u>	STATION / OFFSET: <u>865+13.1, 2.2' RT</u>	EXPLORATION ID <u>B-037-1-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>SR 12 RAMP D BLINE</u>	
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>9/18/12</u>	ELEVATION: <u>781.8 (MSL)</u> EOB: <u>10.0 ft.</u>	PAGE 1 OF 1
START: <u>8/1/13</u> END: <u>8/1/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>80.2</u>	COORD: <u>41.042934430, 83.672056530</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	BACK FILL	
								GR	CS	FS	SI	CL	LL	PL	PI	WC			
ASPHALT PAVEMENT (8" THICK)	781.8																		
CONCRETE PAVEMENT (3.5" THICK)	781.1																		
GRAY STONE FRAGMENTS WITH SAND, BASE MATERIAL (6" THICK)	780.9																		
VERY STIFF TO STIFF, BROWN TO DARK BROWN, SILT AND CLAY , "AND" TO SOME SAND, SOME TO LITTLE STONE FRAGMENTS, FILL, DAMP	780.3	1	6	7	16	83	SS-1	3.00	22	18	20	21	19	32	18	14	15	A-6a (2)	
@3.5'; DARK BROWN, SOME SAND, LITTLE STONE FRAGMENTS		2		5															
		3																	
		4	5	5	8	17	100	SS-2	3.50	19	19	16	22	24	32	17	15	13	A-6a (4)
		5																	
@6.0'; STIFF, DARK BROWN, SOME SAND, LITTLE STONE FRAGMENTS		6	4	4	6	13	89	SS-3	3.50	-	-	-	-	-	-	-	-	14	A-6a (V)
		7																	
	773.3	8																	
VERY STIFF, BROWN, SANDY SILT , SOME CLAY, TRACE STONE FRAGMENTS, FILL, DAMP		9	16	6	6	16	72	SS-4	2.00	-	-	-	-	-	-	-	-	16	A-4a (V)
	771.8	10																	
		EOB																	

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 14:22:\UNCLEDC01\PUBLIC\PROJECT FILES\13 PROJECTS\G13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 14:22:10\GLED001\PUBLIC\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / JOHN</u>	DRILL RIG: <u>CME 55 TRUCK</u>	STATION / OFFSET: <u>869+08.0, 73.3' LT</u>	EXPLORATION ID <u>B-038-0-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>2.25" HSA</u>	CALIBRATION DATE: <u>6/13/13</u>	ELEVATION: <u>775.6 (MSL)</u> EOB: <u>10.0 ft.</u>	PAGE 1 OF 1
START: <u>7/15/13</u> END: <u>7/15/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>70.2</u>	COORD: <u>41.043972590, 83.673040690</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			ODOT CLASS (GI)	BACK FILL			
								GR	CS	FS	SI	CL	LL	PL	PI			WC		
TOPSOIL (1" THICK)	775.6																<<<<<<			
VERY STIFF TO MEDIUM STIFF, DARK BROWN, SILT AND CLAY , SOME TO "AND" SAND, LITTLE STONE FRAGMENTS, FILL, DAMP	775.5	1	4	9	18	39	SS-1	4.00	14	14	20	27	25	33	18	15	14	A-6a (5)	<<<<<<	
		2																<<<<<<		
		3																<<<<<<		
@3.5'; MEDIUM STIFF, "AND" SAND		4	2	2	4	7	56	SS-2	1.75	12	16	25	23	24	32	17	15	16	A-6a (4)	<<<<<<
		5																	<<<<<<	
	769.6	6	6	9	11	23	89	SS-3	4.5+	-	-	-	-	-	-	-	-	14	A-4a (V)	<<<<<<
VERY STIFF, BROWN, SANDY SILT , SOME CLAY, TRACE STONE FRAGMENTS, DAMP		7																	<<<<<<	
	767.1	8																	<<<<<<	
HARD, DARK GRAY, SILT AND CLAY , LITTLE SAND, LITTLE STONE FRAGMENTS, DAMP		9	7	14	13	32	94	SS-4	4.5+	-	-	-	-	-	-	-	-	12	A-6a (V)	<<<<<<
	765.6	10																	<<<<<<	
		EOB																	<<<<<<	

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>B-M / JOSH DEAN</u>	DRILL RIG: <u>DIEDRICH D-90 ATV</u>	STATION / OFFSET: <u>869+47.7, 17.7' LT</u>	EXPLORATION ID: <u>B-038-1-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>SR 12 RAMP D BLINE</u>	
PID: <u>87005</u> BR ID: <u></u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>9/18/12</u>	ELEVATION: <u>776.2 (MSL)</u> EOB: <u>10.0 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>8/1/13</u> END: <u>8/1/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>80.2</u>	COORD: <u>41.044074890, 67.252172000</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL	
								GR	CS	FS	SI	CL	LL	PL	PI				
GRAY STONE FRAGMENTS WITH SAND, BASE MATERIAL (6" THICK)	776.2																		
HARD TO STIFF, BROWN, SILT AND CLAY , "AND" SAND, LITTLE STONE FRAGMENTS, FILL, DAMP	775.7	1	16															<< < < <	
@3.5'; STIFF		2	16	7	31	78	SS-1	2.25	-	-	-	-	-	-	-	-	9	A-6a (V)	<< < < <
		3																<< < < <	
		4	3	4	11	50	SS-2	3.50	12	15	25	21	27	28	15	13	15	A-6a (4)	<< < < <
	770.2	5																<< < < <	
STIFF, BROWN, SANDY SILT , SOME CLAY, LITTLE STONE FRAGMENTS, FILL, DAMP		6	3	4	12	56	SS-3	2.00	14	11	19	29	27	26	16	10	13	A-4a (4)	<< < < <
		7																<< < < <	
	767.7	8																<< < < <	
VERY STIFF, BROWN, SILT AND CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, DAMP		9	6	10	28	100	SS-4	4.5+	-	-	-	-	-	-	-	-	14	A-6a (V)	<< < < <
	766.2	10																<< < < <	
		EOB																<< < < <	

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 14:22:\GLED001\PROJECT FILES\13 PROJECTS\G13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>B-M / JOSH DEAN</u>	DRILL RIG: <u>DIEDRICH D-90 ATV</u>	STATION / OFFSET: <u>873+16.7, 57.4' RT</u>	EXPLORATION ID <u>B-039-0-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>9/18/12</u>	ELEVATION: <u>777.5 (MSL)</u> EOB: <u>10.0 ft.</u>	PAGE 1 OF 1
START: <u>8/1/13</u> END: <u>8/1/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>80.2</u>	COORD: <u>41.045091760, 83.672556950</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
ASPHALT PAVEMENT (5" THICK)	777.5																	
CONCRETE PAVEMENT (12.5" THICK)	777.1																	
DENSE, BROWN, STONE FRAGMENTS , LITTLE SAND WITH SILTY CLAY LAYER, FILL, DAMP	776.0	1																
		2	17															
		3	13	39	89	SS-1	4.50	-	-	-	-	-	-	-	-	7	A-1-a (V)	
		4	16															
STIFF, BLACK, SILTY CLAY , "AND" SAND, TRACE STONE FRAGMENTS, FILL, MOIST	774.7																	
		4	3															
		5	4	12	100	SS-2	3.50	9	11	25	24	31	36	18	18	20	A-6b (7)	
		6	5															
STIFF TO MEDIUM STIFF, BROWN, SILTY CLAY , SOME SAND, TRACE STONE FRAGMENTS, MOIST	771.5																	
		6	4															
		7	4	12	89	SS-3	4.00	3	7	20	30	40	34	17	17	18	A-6b (10)	
		8	5															
@8.5'; MEDIUM STIFF		9	2															
		10	2	7	100	SS-4	1.00	-	-	-	-	-	-	-	-	21	A-6b (V)	
	767.5	EOB	3															

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 14:22:10\GLED001\PUBLIC\PROJECT FILES\13 PROJECTS\G13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / ALAN</u>	DRILL RIG: <u>CME 750X ATV</u>	STATION / OFFSET: <u>877+14.2, 11.2' LT</u>	EXPLORATION ID B-040-0-13
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / K. JONES</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	
PID: <u>87005</u> BR ID: <u></u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>1/6/12</u>	ELEVATION: <u>777.7 (MSL)</u> EOB: <u>7.5 ft.</u>	PAGE 1 OF 1
START: <u>8/6/13</u> END: <u>8/6/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>67.1</u>	COORD: <u>41.046184090, 83.672795800</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTH	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	BACK FILL	
								GR	CS	FS	SI	CL	LL	PL	PI	WC			
ASPHALT PAVEMENT (5" THICK)	777.3																	X	
CONCRETE PAVEMENT (11" THICK)	776.4	1																X	
GRAY STONE AND CONCRETE FRAGMENTS WITH SAND, BASE MATERIAL (8" THICK)	775.7	2	16	27	44	SS-1	--	-	-	-	-	-	-	-	-	20	A-6b (V)	<	
VERY STIFF TO STIFF, BLACK, SILTY CLAY , SOME SAND, TRACE STONE FRAGMENTS, FILL, DAMP TO MOIST @3.0'; STIFF, MOIST	773.2	3	4	5	10	78	SS-2	3.50	1	4	21	37	37	39	21	18	24	A-6b (11)	<
STIFF, BROWN, CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, MOIST	771.7	4	3	3	9	83	SS-3	3.00	1	2	16	31	50	42	16	26	22	A-7-6 (15)	<
STIFF, BROWN, SILTY CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, DAMP	770.2	5	3	5	11	89	SS-4	2.00	-	-	-	-	-	-	-	20	A-6b (V)	<	
		6																	<
		7																	<
		EOB																	<

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 14:22:\GLED001\PROJECT FILES\13 PROJECTS\G13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / ALAN</u>	DRILL RIG: <u>CME 45C TRACKED</u>	STATION / OFFSET: <u>881+15.3, 7.6' RT</u>	EXPLORATION ID <u>B-041-0-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / K. JONES</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	PAGE 1 OF 1
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>1/6/12</u>	ELEVATION: <u>777.0 (MSL)</u> EOB: <u>7.5 ft.</u>	
START: <u>8/15/13</u> END: <u>8/15/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>84.8</u>	COORD: <u>41.047284380, 83.672717580</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			ODOT CLASS (GI)	BACK FILL		
								GR	CS	FS	SI	CL	LL	PL	PI			WC	
ASPHALT PAVEMENT (5" THICK)	777.0																		
CONCRETE PAVEMENT (11" THICK)	776.6																		
GRAY STONE FRAGMENTS WITH SAND, BASE MATERIAL (8" THICK)	775.7	1																	
VERY STIFF, GRAY, SILT AND CLAY , SOME SAND, TRACE STONE FRAGMENTS, FILL, DAMP	775.0	2																	
VERY STIFF, DARK BROWN, SANDY SILT , SOME CLAY, FILL, DAMP	773.5	3	13	8	21	100	SS-1	4.5+	4	11	22	26	37	30	17	13	15	A-6a (7)	
		4	2	6	5	16	61	SS-2	4.5+	0	6	39	31	24	29	19	10	16	A-4a (4)
	771.0	5																	
HARD, GREENISH GRAY, SILT AND CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, DAMP	769.5	6	6	10	12	31	89	SS-3	3.00	-	-	-	-	-	-	-	-	19	A-6a (V)
		7																	

EOB

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 14:22:\CLEED01\PUBLIC\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: HAN-75-14.39	DRILLING FIRM / OPERATOR: DLZ / JOHN	DRILL RIG: CME 55 TRUCK	STATION / OFFSET: 885+07.9, 44.4' LT	EXPLORATION ID: B-042-0-13
TYPE: ROADWAY WIDENING	SAMPLING FIRM / LOGGER: PGI / W. NAJJAR	HAMMER: CME AUTOMATIC	ALIGNMENT: IR-75 BASELINE	
PID: 87005 BR ID:	DRILLING METHOD: 2.25" HSA	CALIBRATION DATE: 6/13/13	ELEVATION: 776.5 (MSL) EOB: 10.0 ft.	PAGE: 1 OF 1
START: 7/15/13 END: 7/15/13	SAMPLING METHOD: SPT	ENERGY RATIO (%): 70.2	COORD: 41.048362990, 83.672896610	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL	
								GR	CS	FS	SI	CL	LL	PL	PI				
TOPSOIL (2" THICK)	776.5																		
MEDIUM DENSE, BROWN, COARSE AND FINE SAND, WITH ASPHALT PIECES, FILL, DAMP	776.3	1	7														<< < < <		
		2	7	3	12	56	SS-1	--	-	-	-	-	-	-	-	5	A-3a (V)	<< < < <	
		3															<< < < <		
VERY STIFF, MOTTLED BROWN AND GRAY, SILTY CLAY, SOME SAND, TRACE STONE FRAGMENTS, DAMP	773.0	4	7														<< < < <		
		5	7	8	18	67	SS-2	3.25	2	6	18	33	41	37	21	16	20	A-6b (10)	<< < < <
		6																<< < < <	
VERY STIFF, BROWN, SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS, DAMP	770.5	7	5															<< < < <	
		8	7	9	19	100	SS-3	4.5+	4	7	18	42	29	25	16	9	14	A-4a (7)	<< < < <
		9																<< < < <	
DENSE, BROWN AND GRAY, COARSE AND FINE SAND, LITTLE FINES, WET	768.0	10	6															<< < < <	
	766.5		14	16	35	100	SS-4	0.25	-	-	-	-	-	-	-	-	24	A-3a (V)	<< < < <
		EOB																<< < < <	

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 14:22:\CLEDC01\PROJECTS\G13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

NOTES: GROUNDWATER WAS ENCOUNTERED AT 9.0' DURING DRILLING AND DRY UPON COMPLETION OF DRILLING OPERATIONS.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT GDT-5/27/14 1423:\UNCLEDD01\PUBLIC\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

PROJECT: <u>HAN-75-14.39</u>		DRILLING FIRM / OPERATOR: <u>B-M / JOSH DEAN</u>		DRILL RIG: <u>DIEDRICH D-90 ATV</u>		STATION / OFFSET: <u>889+24.1, 53.8' RT</u>		EXPLORATION ID <u>B-043-0-13</u>											
TYPE: <u>ROADWAY WIDENING</u>		SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>		HAMMER: <u>DIEDRICH AUTOMATIC</u>		ALIGNMENT: <u>IR-75 BASELINE</u>		PAGE 1 OF 2											
PID: <u>87005</u> BR ID: _____		DRILLING METHOD: <u>3.25" HSA</u>		CALIBRATION DATE: <u>9/18/12</u>		ELEVATION: <u>774.7 (MSL)</u> EOB: <u>26.0 ft.</u>		COORD: <u>41.049488250, 83.672482400</u>											
START: <u>8/1/13</u> END: <u>8/1/13</u>		SAMPLING METHOD: <u>SPT</u>		ENERGY RATIO (%): <u>80.2</u>															
MATERIAL DESCRIPTION AND NOTES	ELEV. 774.7	DEPTH	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			ODOT CLASS (GI)	BACK FILL		
								GR	CS	FS	SI	CL	LL	PL	PI			WC	
TOPSOIL (6" THICK)	774.2																		
MEDIUM STIFF, DARK BROWN, SILT AND CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, TRACE ROOTS, FILL, MOIST		1	2	7	67	SS-1	1.00	-	-	-	-	-	-	-	-	-	20	A-6a (V)	
		2	3																
	771.2	3																	
VERY STIFF, MOTTLED BROWN AND GRAY, SILT AND CLAY , SOME SAND, TRACE STONE FRAGMENTS, MOIST		4	3	16	89	SS-2	2.25	9	11	16	30	34	33	18	15	19	A-6a (8)		
		5	5	7															
	768.7	6																	
VERY STIFF, GRAY, PLASTIC SILT , "AND" CLAY, TRACE SAND, TRACE STONE FRAGMENTS, MOIST		7	4	20	83	SS-3	4.5+	1	1	4	51	43	27	17	10	18	A-4b (8)		
		8	6	9															
	766.2	9	6	32	94	SS-4	1.50	-	-	-	-	-	-	-	-	-	24	A-3a (V)	
DENSE TO LOOSE, BROWN TO GRAY, COARSE AND FINE SAND , LITTLE FINES, WET		10	11	13															
		11	1	7	89	SS-5	1.00	-	-	-	-	-	-	-	-	-	26	A-3a (V)	
@11.0'; LOOSE, GRAY, TRACE FINES, WITH INTERBEDDED SILT SEAMS, WET		12	1	4															
	761.2	13																	
VERY STIFF TO HARD, GRAY TO DARK GRAY, SANDY SILT , SOME CLAY, LITTLE TO "AND" STONE FRAGMENTS, TILL, DAMP		14	5	29	100	SS-6	4.5+	-	-	-	-	-	-	-	-	-	12	A-4a (V)	
		15	8	14															
@16.0'; HARD, DARK GRAY		16	8	55	89	SS-7	4.5+	-	-	-	-	-	-	-	-	-	9	A-4a (V)	
		17	17	24															
		18																	
@18.5'; HARD, SOME CLAY, "AND" STONE FRAGMENTS		19	100	-	17	SS-8	--	38	6	16	12	28	18	14	4	14	A-4a (1)		

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 1423:\CLEED01\PUBLIC\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

PID: 87005		BR ID: _____		PROJECT: HAN-75-14.39		STATION / OFFSET: 889+24.1, 53.8' RT		START: 8/1/13		END: 8/1/13		PG 2 OF 2		B-043-0-13																								
MATERIAL DESCRIPTION AND NOTES				ELEV. 754.7	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																				
VERY STIFF TO HARD, GRAY TO DARK GRAY, SANDY SILT , SOME CLAY, LITTLE TO "AND" STONE FRAGMENTS, TILL, DAMP (continued)				751.2	21	15 19 30	65	100	SS-9	4.5+	-	-	-	-	-	-	-	-	10	A-4a (V)																		
																						750.2	24	28 29 50	106	89	SS-10	--	-	-	-	-	-	-	-	5	A-1-b (V)	
@26.0'; AUGER REFUSAL				748.7	26	EOB																																

NOTES: GROUNDWATER WAS ENCOUNTERED AT 11.0' DURING DRILLING AND AT 14.0' UPON COMPLETION OF DRILLING OPERATIONS.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / JOHN</u>	DRILL RIG: <u>CME 55 TRUCK</u>	STATION / OFFSET: <u>892+90.7, 45.2' LT</u>	EXPLORATION ID <u>B-044-0-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>2.25" HSA</u>	CALIBRATION DATE: <u>6/13/13</u>	ELEVATION: <u>782.3 (MSL)</u> EOB: <u>30.1 ft.</u>	PAGE 1 OF 2
START: <u>7/15/13</u> END: <u>7/15/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>70.2</u>	COORD: <u>41.050523890, 83.672589980</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV. 782.3	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	BACK FILL		
								GR	CS	FS	SI	CL	LL	PL	PI	WC				
TOPSOIL (1" THICK) STIFF, BROWN, CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, DAMP	782.2	1	4																	
		2	5	15	44	SS-1	2.00	1	4	12	29	54	44	20	24	18	A-7-6 (14)			
	778.8	3																		
STIFF TO VERY STIFF, BROWN TO BLACK, SILT AND CLAY , SOME SAND, TRACE STONE FRAGMENTS, FILL, DAMP		4	5	14	50	SS-2	2.00	3	6	16	37	38	31	18	13	14	A-6a (9)			
		5																		
@6.0'; VERY STIFF, BROWN AND DARK BROWN		6	4	16	78	SS-3	4.50	-	-	-	-	-	-	-	-	15	A-6a (V)			
		7	7	7																
		8																		
@8.5'; STIFF, BLACK		9	5	12	56	SS-4	2.00	-	-	-	-	-	-	-	-	18	A-6a (V)			
		10	6	4																
	771.3	11																		
STIFF, MOTTLED BROWN AND GRAY, CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, DAMP		12	7	9	56	SS-5	3.00	1	3	12	30	54	48	20	28	20	A-7-6 (17)			
		13																		
	768.8	14	9	27	100	SS-6	--	-	-	-	-	-	-	-	-	17	A-6a (V)			
VERY STIFF, BROWN, SILT AND CLAY , SOME SAND, TRACE STONE FRAGMENTS, DAMP		15	11	12																
		16																		
	766.3	17	11	28	89	SS-7	1.50	-	-	-	-	-	-	-	-	22	A-3a (V)			
MEDIUM DENSE, DARK BROWN, COARSE AND FINE SAND , LITTLE FINES, WET		18	13	11																
		19	7	15	89	SS-8	3.50	-	-	-	-	-	-	-	-	21	A-4b (V)			
MEDIUM DENSE, GRAY, NON-PLASTIC SILT , TRACE SAND, WET	763.8		6	7																

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT GDT-5/27/14 1423:\CLEDD01\PUBLIC\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

MATERIAL DESCRIPTION AND NOTES	ELEV. 762.3	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, GRAY, NON-PLASTIC SILT , TRACE SAND, WET (continued)	761.3	21	10															
VERY STIFF TO HARD, DARK GRAY, SANDY SILT , SOME CLAY, LITTLE STONE FRAGMENTS, TILL, DAMP		22	12 12	28	100	SS-9	4.50	-	-	-	-	-	-	-	12	A-4a (V)	<V>	
@23.5'; HARD		24	10 13 24	43	100	SS-10	4.50	-	-	-	-	-	-	-	8	A-4a (V)	<V>	
	753.3	TR	22	-	100	SS-11A	--	-	-	-	-	-	-	-	6	A-4a (V)	<V>	
GRAY DOLOMITE BEDROCK			50 50	117	100	SS-11B	--	-	-	-	-	-	-	-	-	Rock (V)	<V>	
@30.1'; AUGER REFUSAL	752.2	EOB															<V>	

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 1423:\CLEDC01\PUBLIC\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEET\HAN-75 ROADWAY.GPJ

NOTES: GROUNDWATER WAS ENCOUNTERED AT 16.5' DURING DRILLING AND DRY UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: HAN-75-14.39	DRILLING FIRM / OPERATOR: B-M / JOSH DEAN	DRILL RIG: DIEDRICH D-90 ATV	STATION / OFFSET: 895+92.5, 35.2' RT	EXPLORATION ID: B-044-1-13
TYPE: ROADWAY WIDENING	SAMPLING FIRM / LOGGER: PGI / W. NAJJAR	HAMMER: DIEDRICH AUTOMATIC	ALIGNMENT: IR-75 BASELINE	
PID: 87005 BR ID:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 9/18/12	ELEVATION: 785.1 (MSL) EOB: 32.5 ft.	PAGE: 1 OF 2
START: 8/1/13 END: 8/1/13	SAMPLING METHOD: SPT	ENERGY RATIO (%): 80.2	COORD: 41.051244920, 83.671972140	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	BACK FILL		
								GR	CS	FS	SI	CL	LL	PL	PI	WC				
ASPHALT PAVEMENT (5.5" THICK)	785.1																			
CONCRETE PAVEMENT (11.5" THICK)	784.6																			
STIFF, BROWN, SILT AND CLAY, SOME SAND, LITTLE STONE FRAGMENTS, FILL, DAMP	783.7	1																		
		2	3	4	5	12	50	SS-1	3.75	15	17	14	25	29	29	17	12	14	A-6a (5)	
		3																		
VERY STIFF, BROWN TO DARK BROWN, SOME CLAY, TRACE STONE FRAGMENTS, FILL, DAMP	781.6	4	5	6	9	20	94	SS-2	4.5+	6	8	16	36	34	26	17	9	13	A-4a (7)	
		5																		
@6.0'; STIFF, DARK BROWN		6	4	5	6	15	89	SS-3	3.50	-	-	-	-	-	-	-	-	-	16	A-4a (V)
		7																		
		8																		
STIFF TO VERY STIFF, DARK BROWN TO BROWN, SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS, FILL, DAMP TO MOIST	776.6	9	3	4	6	13	100	SS-4	4.5+	-	-	-	-	-	-	-	-	-	15	A-6a (V)
		10																		
@11.0'; VERY STIFF, BROWN		11	5	6	7	17	100	SS-5	4.5+	-	-	-	-	-	-	-	-	-	16	A-6a (V)
		12																		
@13.5'; VERY STIFF, BROWN, MOIST		13																		
		14	4	6	8	19	89	SS-6	3.00	3	8	17	33	39	32	18	14	19	A-6a (9)	
		15																		
STIFF, BROWN, SILTY CLAY, SOME SAND, TRACE STONE FRAGMENTS, MOIST	769.1	16	4	5	6	15	100	SS-7	2.00	-	-	-	-	-	-	-	-	-	20	A-6b (V)
		17																		
		18																		
VERY LOOSE, BROWN, NON-PLASTIC SILT, TRACE SAND, WET	766.6	19	1	1	2	4	78	SS-8	--	-	-	-	-	-	-	-	-	-	38	A-4b (V)

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT GDT-5/27/14 1423:\CLEDED01\PUBLIC\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

MATERIAL DESCRIPTION AND NOTES	ELEV. 765.1	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			
VERY LOOSE, BROWN, NON-PLASTIC SILT , TRACE SAND, WET (<i>continued</i>)	764.1	21	6															< >
MEDIUM DENSE, BROWN, NON-PLASTIC SILT , LITTLE SAND, WET	764.1	22	9 11	27	72	SS-9	1.00	-	-	-	-	-	-	-	27	A-4b (V)	< >	
	761.6	23																< >
HARD, GRAY TO DARK GRAY, SANDY SILT , SOME CLAY, LITTLE STONE FRAGMENTS, (TILL), DAMP	761.6	24	5 19 25	59	100	SS-10	4.5+	-	-	-	-	-	-	-	9	A-4a (V)	< >	
		25																< >
		26	5															< >
		27	18 13	41	89	SS-11	4.5+	15	11	11	36	27	20	12	8	10	A-4a (6)	< >
		28																< >
@28.5'; DARK GRAY		29	17 28 35	84	89	SS-12	4.5+	-	-	-	-	-	-	-	9	A-4a (V)	< >	
		30																< >
		31																< >
		32	15 37 30	90	83	SS-13	4.5+	-	-	-	-	-	-	-	8	A-4a (V)	< >	
	752.6	EOB																< >

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 1423:\CLEDED01\PUBLIC\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEET\HAN-75 ROADWAY.GPJ

NOTES: GROUNDWATER WAS ENCOUNTERED AT 18.5' DURING DRILLING AND AT 27.0' UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 1423:\UNCLEDC01\PUBLIC\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>B-M / JOSH DEAN</u>	DRILL RIG: <u>DIEDRICH D-90 ATV</u>	STATION / OFFSET: <u>902+90.6, 128.5' LT</u>	EXPLORATION ID <u>B-047-1-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>9/18/12</u>	ELEVATION: <u>765.7 (MSL)</u> EOB: <u>15.5 ft.</u>	PAGE 1 OF 1
START: <u>8/5/13</u> END: <u>8/5/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>80.2</u>	COORD: <u>41.051939580, 83.671567690</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTH	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI		
TOPSOIL (3" THICK)	765.7																
MEDIUM STIFF TO STIFF, DARK BROWN TO BROWN AND GRAY, SILT AND CLAY , SOME SAND, TRACE STONE FRAGMENTS, FILL, MOIST	765.5	1	2														
		2	3	8	67	SS-1	-	-	-	-	-	-	-	-	19	A-6a (V)	
@3.5'; STIFF, BROWN AND GRAY		3															
		4	3	11	100	SS-2	-	-	-	-	-	-	-	-	25	A-6a (V)	
@6.0'; PUSHED SHELBY TUBE, U.C. STRENGTH = 3486 psf		5	4														
		6															
		7			33	ST-3	-	1	2	29	39	29	28	17	11	23	A-6a (7)
		8															
HARD, GRAY, PLASTIC SILT , SOME CLAY, LITTLE SAND, LITTLE STONE FRAGMENTS, MOIST	757.2	9	2	11	39	SS-4	-	17	6	6	50	21	23	16	7	18	A-4b (7)
		10		18													
		11															
HARD, GRAY, SANDY SILT , SOME CLAY, LITTLE STONE FRAGMENTS, TILL, DAMP	754.7	11	11														
		12	12	35	94	SS-5	-	-	-	-	-	-	-	-	8	A-4a (V)	
		13	14														
		14	25														
		15	20	44	100	SS-6	-	-	-	-	-	-	-	-	9	A-4a (V)	
@15.0'; AUGER TO REFUSAL ON POSSIBLE DOLOMITE BEDROCK	750.7 750.2	TR EOB	13														

NOTES: GROUNDWATER WAS ENCOUNTERED AT 7.0' DURING DRILLING AND AT 12.0' UPON COMPLETION OF DRILLING OPERATIONS.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: MIXED WITH ONE-HALF BAG OF BENTONITE PELLETS/SOIL CUTTINGS MIXTURE

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / ALAN</u>	DRILL RIG: <u>CME 75 TRUCK</u>	STATION / OFFSET: <u>902+96.5, 34.8' LT</u>	EXPLORATION ID <u>B-049-0-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / K. JONES</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	PAGE 1 OF 2
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>1/6/12</u>	ELEVATION: <u>796.6 (MSL)</u> EOB: <u>40.0 ft.</u>	
START: <u>8/13/13</u> END: <u>8/13/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>70.6</u>	COORD: <u>41.053123430, 83.671327150</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
ASPHALT PAVEMENT (4.5" THICK)	796.6																	
CONCRETE PAVEMENT (10" THICK)	796.2																	
GRAY STONE FRAGMENTS WITH SAND, BASE MATERIAL (10" THICK)	795.4	1																
	794.5	2																
MEDIUM DENSE, BROWN, NON-PLASTIC SANDY SILT , LITTLE STONE FRAGMENTS, FILL, DAMP	793.1	3	14 8 7	18	56	SS-1	--	-	-	-	-	-	-	-	13	A-4a (V)		
STIFF, BROWN, PLASTIC SANDY SILT , SOME CLAY, TRACE STONE FRAGMENTS, FILL, DAMP	790.6	4	5 4 5	11	100	SS-2	4.5+	3	8	16	41	32	22	14	8	14	A-4a (8)	
		5																
STIFF TO HARD, BROWN, CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, DAMP TO MOIST		6	2 1 3	5	72	SS-3	1.25	3	4	15	30	48	41	19	22	16	A-7-6 (13)	
		7																
		8																
@8.5'; HARD		9	2 3 3	7	100	SS-4	4.25	-	-	-	-	-	-	-	-	17	A-7-6 (V)	
		10																
@11.0'; VERY STIFF		11	2 2 5	8	100	SS-5	3.50	-	-	-	-	-	-	-	-	17	A-7-6 (V)	
		12																
		13																
@13.5'; HARD		14	3 4 7	13	100	SS-6	4.50	-	-	-	-	-	-	-	-	17	A-7-6 (V)	
		15																
@16.0'; HARD, MOIST		16	3 6 8	16	100	SS-7	4.5+	-	-	-	-	-	-	-	-	17	A-7-6 (V)	
		17																
		18																
STIFF, BROWN TO BROWN AND GRAY, SILTY CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, DAMP	778.1	19	3 5 8	15	100	SS-8	2.00	-	-	-	-	-	-	-	-	15	A-6b (V)	

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 1423:\CLEED01\PUBLIC\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 1423:\UNCLEDC01\PUBLIC\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

PID: 87005		BR ID:		PROJECT: HAN-75-14.39		STATION / OFFSET: 902+96.5, 34.8' LT		START: 8/13/13		END: 8/13/13		PG 2 OF 2		B-049-0-13						
MATERIAL DESCRIPTION AND NOTES			ELEV. 776.6	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
										GR	CS	FS	SI	CL	LL	PL	PI			
STIFF, BROWN TO BROWN AND GRAY, SILTY CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, DAMP (continued) @21.0'; BROWN AND GRAY			776.6	21	3															
				22	5 6	13	100	SS-9	--	5	4	15	34	42	36	18	18	17	A-6b (11)	
@23.5'; BROWN AND GRAY @23.5'; PUSHED SHELBY TUBE, 16" RECOVERY			770.6	23																
				24			67	ST-10	4.5+	-	-	-	-	-	-	-	-	-	-	A-6b (V)
VERY STIFF TO HARD, GRAY, SANDY SILT , SOME CLAY, LITTLE STONE FRAGMENTS, TILL, DAMP			763.1	26	6															
				27	10 10	24	100	SS-11	4.5+	-	-	-	-	-	-	-	-	-	12	A-4a (V)
@31.0'; HARD			763.1	28																
				29	5 9 11	24	100	SS-12	4.5+	-	-	-	-	-	-	-	-	-	11	A-4a (V)
STIFF TO VERY STIFF, DARK BROWN, SILT AND CLAY , LITTLE SAND, TRACE TO NO STONE FRAGMENTS, DAMP			757.1	31	12															
				32	15 13	33	100	SS-13	3.25	-	-	-	-	-	-	-	-	-	11	A-4a (V)
@38.5'; VERY STIFF, LITTLE SAND, NO STONE FRAGMENTS			756.6	33																
				34	4 5 6	13	100	SS-14	2.00	-	-	-	-	-	-	-	-	-	21	A-6a (V)
POSSIBLE DOLOMITE BEDROCK			756.6	35																
				36	4 5 5	12	100	SS-15	3.75	-	-	-	-	-	-	-	-	-	22	A-6a (V)
TR			756.6	37																
				38																
EOB			756.6	39	8															
				40	16 50/5"	-	94	SS-16	--	0	2	11	46	41	40	25	15	9	A-6a (10)	

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT GDT-5/27/14 1423:\CLEDED01\PUBLIC\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>B-M / JOSH DEAN</u>	DRILL RIG: <u>DIEDRICH D-90 ATV</u>	STATION / OFFSET: <u>904+26.9, 76.6' RT</u>	EXPLORATION ID <u>B-049-1-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>9/18/12</u>	ELEVATION: <u>769.6 (MSL)</u> EOB: <u>18.0 ft.</u>	PAGE 1 OF 1
START: <u>8/5/13</u> END: <u>8/5/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>80.2</u>	COORD: <u>41.053353410, 83.670784460</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL	
								GR	CS	FS	SI	CL	LL	PL	PI				
TOPSOIL (5" THICK)	769.6																		
STIFF, BROWN, SILTY CLAY , SOME SAND, TRACE STONE FRAGMENTS, TRACE ROOTS, FILL, DAMP	769.2	1	3															<< << <<	
		2	4	5	12	78	SS-1	2.00	2	5	16	36	41	39	20	19	17	A-6b (12)	<< << <<
		3																	<< << <<
		4	3	3	5	11	100	SS-2	3.00	-	-	-	-	-	-	-	19	A-6b (V)	<< << <<
MEDIUM STIFF, BROWN, SILT AND CLAY , SOME SAND, TRACE STONE FRAGMENTS, MOIST @6.0'; PUSHED SHELBY TUBE, D.S. ANGLE OF SHEAR RESISTANCE = 28.7°, COHESION = 1.4 psi	763.6	5																	<< << <<
		6																	<< << <<
		7				75	ST-3	2.00	2	7	21	39	31	33	19	14	24	A-6a (9)	<< << <<
		8	1	2	2	5	78	SS-4	1.00	-	-	-	-	-	-	-	24	A-6a (V)	<< << <<
MEDIUM STIFF, BROWN, PLASTIC SILT , SOME CLAY, TRACE SAND, WET	758.6	10																	<< << <<
		11	3	3	3	8	89	SS-5	1.00	0	0	1	78	21	28	24	4	25	A-4b (8)
DENSE, BROWN, NON-PLASTIC SANDY SILT , LITTLE STONE FRAGMENTS, TILL, DAMP	756.1	12																	<< << <<
		13																	<< << <<
		14	8	18	14	43	100	SS-6	3.00	-	-	-	-	-	-	-	9	A-4a (V)	<< << <<
GRAY DOLOMITE BEDROCK	753.6	15																	<< << <<
		16	50/3"			33	SS-7	--	-	-	-	-	-	-	-	-	8	Rock (V)	<< << <<
@18.0'; AUGER REFUSAL	751.6	17																	<< << <<
		18																	<< << <<

NOTES: GROUNDWATER WAS ENCOUNTERED AT 11.0' DURING DRILLING AND AT 14.0' UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / ALAN</u>	DRILL RIG: <u>CME 75 TRUCK</u>	STATION / OFFSET: <u>905+34.8, 34.5' RT</u>	EXPLORATION ID
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / K. JONES</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	B-050-0-13
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>1/6/12</u>	ELEVATION: <u>796.9 (MSL)</u> EOB: <u>43.6 ft.</u>	PAGE
START: <u>8/13/13</u> END: <u>8/13/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>70.6</u>	COORD: <u>41.053671190, 83.670792170</u>	1 OF 3

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			
ASPHALT PAVEMENT (4" THICK)	796.6																	
CONCRETE PAVEMENT (7" THICK)	796.0																	
GRAY STONE FRAGMENTS WITH SAND, BASE MATERIAL (13" THICK)	794.9	1																
MEDIUM DENSE, BROWN, STONE FRAGMENTS WITH SAND AND SILT , FILL, DAMP	793.4	2	23															
		3	12	24	67	SS-1	4.5+	23	13	32	23	9	NP	NP	NP	12	A-2-4 (0)	
STIFF, DARK BROWN, SILT AND CLAY , SOME SAND, TRACE STONE FRAGMENTS, FILL, DAMP	790.9	4	4															
		5	3	11	100	SS-2	2.75	4	5	17	34	40	35	20	15	17	A-6a (10)	
MEDIUM STIFF TO STIFF, BROWN, SILTY CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, DAMP	785.9	6	4															
		7	3	8	100	SS-3	2.00	-	-	-	-	-	-	-	-	17	A-6a (V)	
@8.5'; STIFF	783.4	8																
		9	4															
		10	4	13	94	SS-4	2.00	3	5	13	29	50	35	18	17	16	A-6b (11)	
VERY STIFF, BLACK, CLAY , SOME SAND, TRACE STONE FRAGMENTS, FILL, DAMP	783.4	11	4															
		12	6	19	100	SS-5	4.00	2	5	17	31	45	41	21	20	18	A-7-6 (12)	
VERY STIFF, DARK BROWN TO BROWN, SILT AND CLAY , SOME SAND, TRACE STONE FRAGMENTS, FILL, DAMP		13																
		14	4															
		15	5	16	100	SS-6	4.5+	-	-	-	-	-	-	-	-	16	A-6a (V)	
		16																
		17	4															
		18	6	16	100	SS-7	4.5+	-	-	-	-	-	-	-	-	16	A-6a (V)	
		19																
		20	4															
		21	7	20	100	SS-8	4.5+	-	-	-	-	-	-	-	-	15	A-6a (V)	
		22	10															

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 14:23:\UNCLEDD01\PUBLIC\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

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PID: 87005	BR ID: _____	PROJECT: HAN-75-14.39	STATION / OFFSET: 905+34.8, 34.5' RT	START: 8/13/13	END: 8/13/13	PG 3 OF 3	B-050-0-13													
MATERIAL DESCRIPTION AND NOTES		ELEV. 755.5	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				
DENSE, GRAY, NON-PLASTIC SANDY SILT , LITTLE STONE FRAGMENTS, TILL, DAMP (<i>continued</i>)		753.4	42	12	49	39	SS-17	--	-	-	-	-	-	-	-	-	-	10	A-4a (V)	<L> >L> <L> >L> <L> >L> <L> >L>
			43	30																
GRAY DOLOMITE BEDROCK @43.6'; AUGER REFUSAL		753.3	TR3	60/2"	-	100	SS-18	--	-	-	-	-	-	-	-	-	-	5	Rock (V)	<L> >L> <L> >L> <L> >L> <L> >L>

NOTES: GROUNDWATER WAS ENCOUNTERED AT 41.0' DURING DRILLING AND WAS DRY UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>B-M / JOSH DEAN</u>	DRILL RIG: <u>DIEDRICH D-90 ATV</u>	STATION / OFFSET: <u>918+00.6, 34.4' LT</u>	EXPLORATION ID <u>B-053-0-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	
PID: <u>87005</u> BR ID: <u></u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>9/18/12</u>	ELEVATION: <u>777.1 (MSL)</u> EOB: <u>7.5 ft.</u>	PAGE 1 OF 1
START: <u>8/15/13</u> END: <u>8/15/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>80.2</u>	COORD: <u>41.056995700, 83.669436870</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
ASPHALT PAVEMENT (4" THICK)	777.1																	
CONCRETE PAVEMENT (9.25" THICK)	776.0	1																
GRAY STONE FRAGMENTS WITH SAND, BASE MATERIAL (9.5" THICK)	775.2	2	2	3	8	39	SS-1	4.00	0	8	26	34	32	40	17	23	11	A-6b (11)
MEDIUM STIFF, BROWN, SILTY CLAY , SOME SAND, NO TO TRACE STONE FRAGMENTS, DAMP		3																
@3.5'; STIFF, SOME SAND, TRACE STONE FRAGMENTS		4	3	4	13	67	SS-2	3.25	6	12	21	29	32	35	17	18	17	A-6b (8)
		5																
@6.0'; HARD, NO SPLIT SPOON RECOVERY		6																
		7	9	12	43	0	SS-3	-	-	-	-	-	-	-	-	-	-	
	769.6	EOB	20															

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 14:23:\CLEDC01\PUBLIC\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 1423:\UNCLEDC01\PUBLIC\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / ALAN</u>	DRILL RIG: <u>CME 75 TRUCK</u>	STATION / OFFSET: <u>922+32.1, 35.1' RT</u>	EXPLORATION ID
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	B-054-0-13
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>1/6/12</u>	ELEVATION: <u>776.5 (MSL)</u> EOB: <u>7.5 ft.</u>	PAGE
START: <u>8/22/13</u> END: <u>8/22/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>70.6</u>	COORD: <u>41.058040500, 83.668658450</u>	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			
ASPHALT PAVEMENT (4.75" THICK)	776.5																	
CONCRETE PAVEMENT (7" THICK)	775.5																	
GRAY STONE FRAGMENTS WITH SAND, BASE MATERIAL (12" THICK)	774.5	1	25															
MEDIUM DENSE, BROWN, NON-PLASTIC SANDY SILT , "AND" STONE FRAGMENTS, MOIST	773.0	2	35 10	53	50	SS-1	--	36	4	13	43	4	NP	NP	NP	15	A-4a (2)	
VERY STIFF, BROWN TO DARK GRAY, SILT AND CLAY , "AND" SAND, TRACE STONE FRAGMENTS, DAMP		3																
		4	5 5 10	18	78	SS-2	4.5+	2	11	27	32	28	30	19	11	17	A-6a (5)	
		5																
@6.0'; DARK GRAY		6																
		7	5 10 12	26	94	SS-3	4.5+	-	-	-	-	-	-	-	-	11	A-6a (V)	
	769.0	EOB																

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / ALAN</u>	DRILL RIG: <u>CME 45C TRACKED</u>	STATION / OFFSET: <u>930+01.2, 25.4' RT</u>	EXPLORATION ID <u>B-056-0-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / K. JONES</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	PAGE 1 OF 1
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>1/6/12</u>	ELEVATION: <u>778.7 (MSL)</u> EOB: <u>7.5 ft.</u>	
START: <u>8/15/13</u> END: <u>8/15/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>84.8</u>	COORD: <u>41.060029820, 83.667725120</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
ASPHALT PAVEMENT (5" THICK)	778.3																	
CONCRETE PAVEMENT (11" THICK)	777.3	1																
GRAY STONE FRAGMENTS WITH SAND, BASE MATERIAL (8" THICK)	776.7	2																
VERY DENSE, GRAY, STONE FRAGMENTS WITH SAND AND SILT , (BASE), MOIST	775.2	3	25 60 37	137	100	SS-1	4.5+	32	14	24	17	13	NP	NP	NP	12	A-2-4 (0)	
VERY STIFF, BROWN, SILT AND CLAY , "AND" SAND, TRACE STONE FRAGMENTS, FILL, DAMP	771.7	4	2	8	20	100	SS-2	4.5+	1	10	45	20	24	29	17	12	16	A-6a (2)
		5																
		6																
	771.7	6	6	7	24	100	SS-3	--	-	-	-	-	-	-	-	-	19	A-3a (V)
MEDIUM DENSE, GRAY, COARSE AND FINE SAND , LITTLE FINES, TRACE STONE FRAGMENTS, WET	771.2	7	7	10														
		EOB																

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 14:23:\UNCLEDC01\PUBLIC\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING BUT WAS MEASURED AT 7.0' UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 1423:\CLEED01\PUBLIC\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / ALAN</u>	DRILL RIG: <u>CME 750X ATV</u>	STATION / OFFSET: <u>933+84.0, 16.9' LT</u>	EXPLORATION ID <u>B-057-0-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>1/6/12</u>	ELEVATION: <u>779.8 (MSL)</u> EOB: <u>10.0 ft.</u>	PAGE 1 OF 1
START: <u>8/6/13</u> END: <u>8/6/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>67.1</u>	COORD: <u>41.061055350, 83.667388240</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTH	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
TOPSOIL (6" THICK)	779.8																	
STIFF, BROWN, SILTY CLAY , SOME TO "AND" SAND, TRACE STONE FRAGMENTS, FILL, DAMP TO MOIST	779.3	1	4															
@2.5'; "AND" SAND, MOIST		2	6	7	15	100	SS-1	2.00	3	6	15	43	33	35	19	16	18	A-6b (10)
		3	3															
		4	4	6	11	100	SS-2	2.00	4	16	22	27	31	39	16	23	17	A-6b (10)
STIFF, BROWN, SILT AND CLAY , SOME SAND, TRACE STONE FRAGMENTS, DAMP	775.8	5	3															
		6	5	5	11	78	SS-3	3.50	-	-	-	-	-	-	-	-	16	A-6a (V)
LOOSE, DARK BROWN, COARSE AND FINE SAND , LITTLE STONE FRAGMENTS, TRACE FINES, WET	774.3	7	2	2	4	67	SS-4	--	-	-	-	-	-	-	-	-	23	A-3a (V)
		8	3															
LOOSE, BROWN, FINE SAND , TRACE FINES, WET	772.8	9	2	2	4	100	SS-5	--	-	-	-	-	-	-	-	-	27	A-3 (V)
		10	6	10	18	100	SS-6	--	-	-	-	-	-	-	-	-	18	A-1-b (V)
MEDIUM DENSE, GRAY, STONE FRAGMENTS WITH SAND , LITTLE FINES, WET	771.3																	
	769.8	EOB																

NOTES: GROUNDWATER WAS ENCOUNTERED AT 5.5' DURING AND UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: AUGER CUTTINGS MIXED WITH 1/2 BAG OF BENTONITE PELLETS/SOIL CUTTINGS MIXTURE

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 14:23:\UNCLED01\PUBLIC\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / ALAN</u>	DRILL RIG: <u>CME 750X ATV</u>	STATION / OFFSET: <u>949+86.7, 18.6' LT</u>	EXPLORATION ID
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	B-061-0-13
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>1/6/12</u>	ELEVATION: <u>803.3 (MSL)</u> EOB: <u>10.0 ft.</u>	PAGE 1 OF 1
START: <u>8/6/13</u> END: <u>8/6/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>67.1</u>	COORD: <u>41.065183190, 83.665380880</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
TOPSOIL (8" THICK)	803.3																	
MEDIUM STIFF, BROWN, CLAY , LITTLE SAND, LITTLE STONE FRAGMENTS, FILL, DAMP	802.6	1	3	7	56	SS-1	2.00	13	12	7	24	44	46	20	26	18	A-7-6 (14)	
VERY STIFF, BROWN, CLAY , TRACE SAND, MOIST	800.8	2	3															
		3	4	21	89	SS-2	4.5+	0	1	1	21	77	45	19	26	20	A-7-6 (15)	
		4	8	11														
		5	5	21	100	SS-3	4.5+	-	-	-	-	-	-	-	-	20	A-7-6 (V)	
		6	8	11														
		7	4	26	100	SS-4	4.5+	-	-	-	-	-	-	-	-	20	A-7-6 (V)	
	796.3	8	9	14														
HARD, BROWN, SILT AND CLAY , TRACE SAND, TRACE STONE FRAGMENTS, DAMP		9	6	32	100	SS-5	4.5+	-	-	-	-	-	-	-	-	16	A-6a (V)	
		10	13	16														
			6	30	100	SS-6	4.5+	-	-	-	-	-	-	-	-	17	A-6a (V)	
	793.3		12	15														
		EOB																

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / ALAN</u>	DRILL RIG: <u>CME 45C TRACKED</u>	STATION / OFFSET: <u>953+92.6, 29.4' RT</u>	EXPLORATION ID <u>B-062-0-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	PAGE 1 OF 1
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>1/6/12</u>	ELEVATION: <u>807.0 (MSL)</u> EOB: <u>7.5 ft.</u>	
START: <u>8/15/13</u> END: <u>8/15/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>84.8</u>	COORD: <u>41.066182450, 83.664707410</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			ODOT CLASS (GI)	BACK FILL	
								GR	CS	FS	SI	CL	LL	PL	PI			WC
ASPHALT PAVEMENT (4.5" THICK)	806.6																	
CONCRETE PAVEMENT (11.5" THICK)	805.7	1																
GRAY STONE FRAGMENTS WITH SAND, BASE MATERIAL (8" THICK)	805.0	2																
HARD, BROWN, SANDY SILT , LITTLE STONE FRAGMENTS, TRACE CLAY, FILL, DAMP	803.5	3	13 30 11	58	100	SS-1	4.5+	19	21	22	29	9	35	26	9	19	A-4a (1)	
VERY STIFF TO HARD, BROWN, SILT AND CLAY , TRACE SAND, TRACE STONE FRAGMENTS, DAMP		4	4 6 12	25	133	SS-2	4.5+	2	3	7	39	49	33	18	15	16	A-6a (10)	
		5																
@6.0'; HARD		6																
		7	7 10 13	33	133	SS-3	4.5+	-	-	-	-	-	-	-	-	17	A-6a (V)	
	799.5	EOB																

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 1423:\CLEDC01\PUBLIC\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 14:23:\UNC\EDC01\PUBLIC\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / ALAN</u>	DRILL RIG: <u>CME 45C TRACKED</u>	STATION / OFFSET: <u>957+94.6, 18.8' RT</u>	EXPLORATION ID <u>B-063-0-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	PAGE 1 OF 1
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>1/6/12</u>	ELEVATION: <u>808.9 (MSL)</u> EOB: <u>10.0 ft.</u>	
START: <u>8/15/13</u> END: <u>8/15/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>84.8</u>	COORD: <u>41.067227560, 83.664238350</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	BACK FILL		
								GR	CS	FS	SI	CL	LL	PL	PI	WC				
GRAY STONE FRAGMENTS WITH SAND, SHOULDER BERM MATERIAL (5" THICK)	808.9																			
STIFF, BROWN, SANDY SILT , SOME CLAY, TRACE STONE FRAGMENTS, FILL, DAMP	806.9	1	5	5	14	89	SS-1	3.00	-	-	-	-	-	-	-	-	-	15	A-4a (V)	< > < >
STIFF, BROWN, CLAY , TRACE SAND, TRACE STONE FRAGMENTS, FILL, DAMP	805.4	2	2	4	13	94	SS-2	4.5+	2	2	4	23	69	43	22	21	22	A-7-6 (13)	< > < >	
STIFF TO MEDIUM STIFF, GRAY, SILTY CLAY , TRACE SAND, FILL, MOIST	805.4	3	2	3	10	100	SS-3	3.50	0	2	5	31	62	40	19	21	25	A-6b (12)	< > < >	
		4		4																< > < >
@6.0' ; MEDIUM STIFF		5																		< > < >
		6	2	3	8	100	SS-4	1.00	-	-	-	-	-	-	-	-	-	22	A-6b (V)	< > < >
		7		3																< > < >
STIFF, BROWN, CLAY , TRACE SAND, TRACE ROOTS, MOIST	800.4	8																		< > < >
		9	2	4	11	100	SS-5	4.00	-	-	-	-	-	-	-	-	-	24	A-7-6 (V)	< > < >
	798.9	10		4																< > < >
		EOB																		< > < >

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / ALAN</u>	DRILL RIG: <u>CME 750X ATV</u>	STATION / OFFSET: <u>961+94.7, 29.0' LT</u>	EXPLORATION ID <u>B-064-0-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>1/6/12</u>	ELEVATION: <u>811.8 (MSL)</u> EOB: <u>7.5 ft.</u>	PAGE 1 OF 1
START: <u>8/5/13</u> END: <u>8/5/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>67.1</u>	COORD: <u>41.068303120, 83.663898140</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			ODOT CLASS (GI)	BACK FILL	
								GR	CS	FS	SI	CL	LL	PL	PI			WC
ASPHALT PAVEMENT (4.5" THICK)	811.8																	
CONCRETE PAVEMENT (11" THICK)	811.4																	
GRAY STONE FRAGMENTS WITH SAND, TRACE FINES, BASE MATERIAL (7" THICK)	810.5	1																
VERY STIFF, BROWN, SILT AND CLAY , TRACE SAND, TRACE STONE FRAGMENTS, FILL, DAMP	809.9	2	28	9	18	17	SS-1	--	-	-	-	-	-	-	-	-	8	A-1-b (V)
		3	7															
		4	10	14	27	89	SS-2	4.5+	1	1	3	48	47	31	19	12	15	A-6a (9)
VERY STIFF, BROWN, SILTY CLAY , TRACE SAND, TRACE STONE FRAGMENTS, FILL, DAMP	807.3	5	7	12	29	72	SS-3	4.5+	2	2	3	35	58	37	19	18	18	A-6b (11)
	805.8	6	7	14														
VERY STIFF, BROWN, SILTY CLAY , TRACE SAND, TRACE STONE FRAGMENTS, DAMP	804.3	7	10	15	28	100	SS-4	4.5+	-	-	-	-	-	-	-	-	19	A-6b (V)

EOB

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 14:23:\CLEED001\PUBLIC\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / ALAN</u>	DRILL RIG: <u>CME 45C TRACKED</u>	STATION / OFFSET: <u>970+14.3, 28.9' RT</u>	EXPLORATION ID <u>B-066-0-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	PAGE 1 OF 1
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>1/6/12</u>	ELEVATION: <u>813.0 (MSL)</u> EOB: <u>7.5 ft.</u>	
START: <u>8/15/13</u> END: <u>8/15/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>84.8</u>	COORD: <u>41.070358190, 83.662671710</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
ASPHALT PAVEMENT (4.75" THICK)	812.7																	
CONCRETE PAVEMENT (11" THICK)	811.7	1																
GRAY STONE FRAGMENTS WITH SAND, BASE MATERIAL (8" THICK)	811.0	2																
MEDIUM DENSE, BROWN, STONE FRAGMENTS WITH SAND , LITTLE FINES, FILL, MOIST	809.5	3	23	15	28	100	SS-1	--	30	41	15	11	3	NP	NP	NP	20	A-1-b (0)
STIFF, BROWN, CLAY , TRACE SAND, DAMP	807.0	4	2	4	14	100	SS-2	2.00	0	2	6	24	68	46	22	24	22	A-7-6 (15)
	807.0	5																
VERY STIFF, BROWN, SILTY CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, DAMP	805.5	6	6	8	25	100	SS-3	4.5+	-	-	-	-	-	-	-	-	19	A-6b (V)
	805.5	7																

EOB

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 14:23:10\GLED001\PUBLIC\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / ALAN</u>	DRILL RIG: <u>CME 750X ATV</u>	STATION / OFFSET: <u>977+98.9, 28.0' LT</u>	EXPLORATION ID <u>B-068-0-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	
PID: <u>87005</u> BR ID: <u></u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>1/6/12</u>	ELEVATION: <u>811.3 (MSL)</u> EOB: <u>7.5 ft.</u>	PAGE 1 OF 1
START: <u>8/5/13</u> END: <u>8/5/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>67.1</u>	COORD: <u>41.072432230, 83.661879070</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
ASPHALT PAVEMENT (4.5" THICK)	811.3																	
CONCRETE PAVEMENT (11.5" THICK)	810.9	1																
GRAY STONE FRAGMENTS WITH SAND, BASE MATERIAL (5" THICK)	810.0	2	6	13	17	SS-1	--	-	-	-	-	-	-	-	13	A-4a (V)		
STIFF, BROWN, SANDY SILT , SOME CLAY, TRACE STONE AND CONCRETE FRAGMENTS, FILL, DAMP @3.0'; SOME CLAY, TRACE STONE FRAGMENTS, TRACE ROOTS	809.6	3	6															
		4	3	11	17	SS-2	--	-	-	-	-	-	-	-	18	A-4a (V)		
STIFF, BLACK, CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, MOIST	806.8	5	4	12	72	SS-3	4.00	4	4	10	27	55	48	19	29	22	A-7-6 (17)	
	805.3	6	3	12	78	SS-4	3.00	-	-	-	-	-	-	-	-	-	-	-
STIFF, BROWN, SILTY CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, MOIST	803.8	7	5	12	78	SS-4	3.00	-	-	-	-	-	-	-	23	A-6b (V)		
		EOB	6															

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 14:23:00\GLED001\PUBLIC\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT GDT-8/1/15 17:54\NLEDC01\PUBLIC\PROJECT FILES\15 PROJECTS\G15004G-(MOD-3 FOR HAN-75-14.39)\LAB DATA SHEET\G15004G.GPJ

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>PGI / ZEKE</u>	DRILL RIG: <u>CME 45B TRUCK</u>	STATION / OFFSET: <u>989+24.2, 29.0' RT</u>	EXPLORATION ID: <u>B-070-0-14</u>
TYPE: <u>ROADWAY WIDENNING</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	
PID: <u>87005</u> BR ID: <u></u>	DRILLING METHOD: <u>2.25" HSA</u>	CALIBRATION DATE: <u>2/20/14</u>	ELEVATION: <u>832.9 (MSL)</u> EOB: <u>7.2 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>4/24/15</u> END: <u>4/24/15</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>61.8</u>	COORD: <u>41.075297500, 83.660328600</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTH	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL	
								GR	CS	FS	SI	CL	LL	PL	PI				
ASPHALT PAVEMENT (4" THICK)	832.6																		
CONCRETE SLAB (10.5" THICK)																			
GRAY AND BROWN, STONE FRAGMENTS WITH SAND ROADBASE	831.7	1					--	33	29	16	17	5	NP	NP	NP	8	A-1-b (0)		
MEDIUM DENSE, BROWN, STONE FRAGMENTS AND CINDERS WITH SAND AND SILT TRACE CLAY, FILL, MOIST	831.1	2	11	10	5	15	67	SS-1A&B	--	42	20	15	15	8	40	33	7	16	A-2-4 (0)
VERY STIFF TO HARD, BROWN TO BROWN AND GRAY, SILTY CLAY , LITTLE SAND TRACE STONE FRAGMENTS, DAMP	830.2	3	8	11	16	28	100	SS-2	4.5+	3	5	11	33	48	35	19	16	15	A-6b (10)
@5.7'; HARD, BROWN AND GRAY		4	7	10	13	24	100	SS-3	3.00	-	-	-	-	-	-	-	-	19	A-6b (V)
		5	15	17	21	39	100	SS-4	4.5+	-	-	-	-	-	-	-	-	16	A-6b (V)
	825.7	7																	

EOB

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING AND UPON COMPLETION OF THE DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: PAVEMENT WAS REPLACED WITH 0.5 BAG ASPHALT COLD PATCH; HOLE WAS BACKFILLED WITH AUGER CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT GDT-8/1/15 17:54-NCLEDC01\PUBLIC\PROJECT FILES\15 PROJECTS\GIS\5004G-(MOD-3 FOR HAN-75-14.39)\LAB DATA SHEET\SG15004G.GPJ

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>PGI / ZEKE</u>	DRILL RIG: <u>CME 45B TRUCK</u>	STATION / OFFSET: <u>999+15.6, 30.1' LT</u>	EXPLORATION ID: <u>B-073-0-14</u>
TYPE: <u>ROADWAY WIDENNING</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	
PID: <u>87005</u> BR ID: <u></u>	DRILLING METHOD: <u>2.25" HSA</u>	CALIBRATION DATE: <u>2/20/14</u>	ELEVATION: <u>836.2 (MSL)</u> EOB: <u>7.3 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>4/24/15</u> END: <u>4/24/15</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>61.8</u>	COORD: <u>41.078007700, 83.660053400</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTH	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
ASPHALT PAVEMENT (5" THICK)	836.2																	
CONCRETE SLAB (11.0" THICK)	835.7																	
LIGHT BROWN, STONE FRAGMENTS SOME SAND, ROADBASE	834.8	1																
STIFF, DARK BROWN, CLAY , TRACE SAND, TRACE STONE FRAGMENTS, FILL, DAMP	834.4	2	11	5	10	61	SS-1A&B	--	59	22	10	6	3	NP	NP	NP	7	A-1-a (0)
VERY STIFF TO STIFF, BROWN, SILT AND CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, MOIST	833.4	3	7	8	21	100	SS-2	4.5+	2	2	4	39	53	41	21	20	19	A-7-6 (12)
@4.3'; STIFF		4	7	8	12													
		5	4	7	8	15	SS-3	4.5+	-	-	-	-	-	-	-	-	21	A-6a (V)
		6	8	11	13	25	SS-4	4.5+	-	-	-	-	-	-	-	-	20	A-6a (V)
	828.9	7																
		EOB																

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING AND UPON COMPLETION OF THE DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: PAVEMENT WAS REPLACED WITH 0.5 BAG ASPHALT COLD PATCH; HOLE WAS BACKFILLED WITH AUGER CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH-DOT-GDT-8/1/15 17:54-NCLEDC01\PUBLIC\PROJECT FILES\15 PROJECTS\G1500\G-(MOD-3 FOR HAN-75-14.39)\LAB DATA SHEET\G1500\G.GPJ

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>PGI / ZEKE</u>	DRILL RIG: <u>CME 45B TRUCK</u>	STATION / OFFSET: <u>1009+05.0, 15.5' RT</u>	EXPLORATION ID: <u>B-076-0-14</u>
TYPE: <u>ROADWAY WIDENNING</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>2.25" HSA</u>	CALIBRATION DATE: <u>2/20/14</u>	ELEVATION: <u>833.1 (MSL)</u> EOB: <u>10.0 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>4/24/15</u> END: <u>4/24/15</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>61.8</u>	COORD: <u>41.080721900, 83.659872800</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTH	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI				
TOPSOIL (4.0" THICK)	833.1																		
STIFF, BROWN, SILTY CLAY , TRACE SAND, TRACE STONE FRAGMENTS, DAMP	832.8	1	3	7	14	72	SS-1	4.5+	1	1	4	46	48	40	20	20	18	A-6b (12)	
		2																	
		3																	
		4	5	7	15	100	SS-2A&B	4.5+	4	2	3	43	48	36	17	19	15	A-6b (12)	
STIFF, BROWN, CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, DAMP	828.4	5		8				3.00	-	-	-	-	-	-	-	-	21	A-7-6 (V)	
		6																	
STIFF TO VERY STIFF, BROWN, SILT AND CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, MOIST TO DAMP	827.1	6	3	5	13	100	SS-3	2.25	-	-	-	-	-	-	-	-	19	A-6a (V)	
		7		8															
		8																	
@8.5'; VERY STIFF, DAMP		9	6	10	26	100	SS-4	4.5+	-	-	-	-	-	-	-	-	15	A-6a (V)	
	823.1	10		15															

NOTES: GROUNDWATER WAS ENCOUNTERED AT A DEPTH OF 9.8' DURING DRILLING AND 9.2' UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: HOLE WAS BACKFILLED WITH AUGER CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / ALAN</u>	DRILL RIG: <u>CME 45C TRACKED</u>	STATION / OFFSET: <u>739+94.9, 7.5' RT</u>	EXPLORATION ID <u>B-078-0-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>US-68 BASELINE</u>	PAGE 1 OF 1
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>1/6/12</u>	ELEVATION: <u>803.3 (MSL)</u> EOB: <u>7.5 ft.</u>	
START: <u>8/16/13</u> END: <u>8/16/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>84.8</u>	COORD: <u>41.020348820, 83.662305830</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV. 803.3	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				
ASPHALT PAVEMENT (14" THICK)	802.1	1																	
VERY STIFF, BROWN, SILTY CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, DAMP	800.3	2	9	7	16	100	SS-1	4.5+	4	5	13	35	43	38	18	20	14	A-6b (12)	
VERY STIFF, BROWN TO DARK BROWN, SILT AND CLAY , SOME TO LITTLE SAND, TRACE STONE FRAGMENTS, FILL, DAMP TO MOIST		3	3	6	8	20	100	SS-2	4.5+	1	5	18	21	55	33	18	15	18	A-6a (10)
		4																	
		5																	
@6.0'; DARK BROWN, LITTLE SAND, TRACE STONE FRAGMENTS, MOIST	795.8	6	4	6	7	18	100	SS-3	3.75	-	-	-	-	-	-	-	-	20	A-6a (V)
		7																	

EOB

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 14:23:\CLEED001\PUBLIC\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / ALAN</u>	DRILL RIG: <u>CME 75 TRUCK</u>	STATION / OFFSET: <u>743+86.8, 11.6' LT</u>	EXPLORATION ID <u>B-079-0-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>US-68 BASELINE</u>	
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>1/6/12</u>	ELEVATION: <u>800.1 (MSL)</u> EOB: <u>6.3 ft.</u>	PAGE 1 OF 1
START: <u>8/21/13</u> END: <u>8/21/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>70.6</u>	COORD: <u>41.021020400, 83.663415050</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
ASPHALT PAVEMENT (16.5" THICK)	800.1																	
MEDIUM DENSE, BROWN, GRAVEL AND STONE FRAGMENTS WITH SAND , SOME FINES, FILL, DAMP @3.0'; NO SPLIT SPOON RECOVERY	798.7	1																
		2	18 14 7	25	72	SS-1	--	29	35	13	15	8	NP	NP	NP	8	A-1-b (0)	
		3	7															
		4	8 8	19	0	SS-2	-	-	-	-	-	-	-	-	-	-	A-1-b (V)	
	794.6	5	4															
HARD, DARK BROWN, SILT AND CLAY , LITTLE SAND, TRACE STONE & ASPHALT FRAGMENTS, FILL, DAMP	794.1	6	7 50/3"	-	80	SS-3	4.5+	-	-	-	-	-	-	-	-	18	A-6a (V)	
POSSIBLE DOLOMITE BEDROCK	793.8	EOB																

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 14:23:10\GLED001\PUBLIC\PROJECT FILES\13 PROJECTS\HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / ALAN</u>	DRILL RIG: <u>CME 45C TRACKED</u>	STATION / OFFSET: <u>747+86.3, 10.1' RT</u>	EXPLORATION ID <u>B-080-0-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>US-68 BASELINE</u>	
PID: <u>87005</u> BR ID: <u></u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>1/6/12</u>	ELEVATION: <u>797.2 (MSL)</u> EOB: <u>6.8 ft.</u>	PAGE 1 OF 1
START: <u>8/16/13</u> END: <u>8/16/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>84.8</u>	COORD: <u>41.021734610, 83.664516190</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			ODOT CLASS (GI)	BACK FILL		
								GR	CS	FS	SI	CL	LL	PL	PI			WC	
ASPHALT PAVEMENT (11" THICK)	797.2																		
GRAY STONE FRAGMENTS WITH SAND, BASE MATERIAL (22" THICK)	796.3	1																	
STIFF, BROWN, SILTY CLAY , SOME SAND, TRACE STONE FRAGMENTS, FILL, DAMP	794.5	2	6	5	13	100	SS-1	2.00	4	6	14	36	40	34	18	16	15	A-6b (10)	
VERY STIFF TO MEDIUM STIFF, DARK BROWN TO BROWN, SILT AND CLAY , SOME SAND, TRACE STONE FRAGMENTS, FILL, DAMP	793.7	3	3	4	8	17	100	SS-2	4.5+	2	4	19	45	30	33	22	11	18	A-6a (8)
@5.5'; MEDIUM STIFF, BROWN	790.7	4																	
POSSIBLE DOLOMITE BEDROCK	790.4	5	1	4	50/3"	-	80	SS-3	2.00	-	-	-	-	-	-	-	20	A-6a (V)	
		6																	

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 1423:\UNCLEDC01\PUBLIC\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / ALAN</u>	DRILL RIG: <u>CME 75 TRUCK</u>	STATION / OFFSET: <u>751+98.7, 8.3' LT</u>	EXPLORATION ID <u>B-081-0-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>US-68 BASELINE</u>	
PID: <u>87005</u> BR ID: <u></u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>1/6/12</u>	ELEVATION: <u>794.8 (MSL)</u> EOB: <u>7.0 ft.</u>	PAGE 1 OF 1
START: <u>8/21/13</u> END: <u>8/21/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>70.6</u>	COORD: <u>41.022382180, 83.665743540</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
ASPHALT PAVEMENT (11.5" THICK)	794.8																	
GRAY STONE FRAGMENTS WITH SAND, SOME FINES, BASE MATERIAL (6" THICK)	793.8	1																
MEDIUM DENSE, BROWN, STONE FRAGMENTS WITH SAND , SOME FINES, FILL, DAMP	793.3	2	12	8	14	67	SS-1	--	36	29	13	17	5	NP	NP	NP	8	A-1-b (0)
VERY STIFF, BROWN, SILT AND CLAY , SOME SAND, TRACE STONE FRAGMENTS, FILL, DAMP	791.8	3	5	7	16	100	SS-2	4.5+	4	6	15	37	38	31	18	13	15	A-6a (9)
	789.3	5																
HARD, BLACK, CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, DAMP	787.8	6	5	8	33	100	SS-3	3.00	-	-	-	-	-	-	-	-	27	A-7-6 (V)
	787.8	7																

EOB

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 1423:\UNCLEDC01\PUBLIC\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / ALAN</u>	DRILL RIG: <u>CME 75 TRUCK</u>	STATION / OFFSET: <u>756+10.5, 41.3' RT</u>	EXPLORATION ID <u>B-082-0-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>US-68 BASELINE</u>	
PID: <u>87005</u> BR ID: <u></u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>1/6/12</u>	ELEVATION: <u>793.8 (MSL)</u> EOB: <u>6.9 ft.</u>	PAGE 1 OF 1
START: <u>8/20/13</u> END: <u>8/21/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>70.6</u>	COORD: <u>41.023177200, 83.666819340</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
TOPSOIL (4" THICK)	793.8																	
STIFF, BROWN, SANDY SILT , SOME STONE FRAGMENTS, LITTLE CLAY, TRACE ROOTS, FILL, DAMP	793.5	1	5															<V>
		2	5	13	44	SS-1	2.50	23	26	13	20	18	28	18	10	9	A-4a (1)	<V>
		3																<V>
STIFF TO VERY STIFF, BLACK TO BLACK AND DARK BROWN, SILTY CLAY , SOME SAND, TRACE STONE FRAGMENTS, FILL, DAMP	790.3	4	4															<V>
		5	4	12	72	SS-2	2.00	7	6	18	37	32	39	22	17	20	A-6b (10)	<V>
		6																<V>
@6.0'; VERY STIFF, BLACK AND DARK BROWN POSSIBLE DOLOMITE BEDROCK	787.3		20															<V>
@6.9'; AUGER REFUSAL	786.9		50/1"	-	100	SS-3	3.25	-	-	-	-	-	-	-	-	18	A-6b (V)	<V>
		EOB																<V>

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 14:23:00\PROJECT FILES\13 PROJECTS\13\1011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 1423:\CLEDC01\PUBLIC\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / JOHN</u>	DRILL RIG: <u>CME 55 TRUCK</u>	STATION / OFFSET: <u>763+79.9, 33.7' RT</u>	EXPLORATION ID <u>B-088-0-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>US-68 BASELINE</u>	
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>2.25" HSA</u>	CALIBRATION DATE: <u>6/13/13</u>	ELEVATION: <u>812.9 (MSL)</u> EOB: <u>10.0 ft.</u>	PAGE 1 OF 1
START: <u>7/22/13</u> END: <u>7/22/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>70.2</u>	COORD: <u>41.024443700, 83.669050400</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
ASPHALT PAVEMENT (9.5" THICK)	812.9																	
HARD, BROWN, SILT AND CLAY , LITTLE SAND, WITH ASPHALT PIECES, FILL, DAMP	812.1	1	21															
		2	45	62	28	SS-1	3.50	-	-	-	-	-	-	-	8	A-6a (V)		
		3																
HARD, BROWN AND GRAY, SANDY SILT , SOME CLAY, LITTLE STONE FRAGMENTS, FILL, DAMP	809.4	4	5															
		5	21	34	50	SS-2	4.5+	18	5	19	33	25	24	16	8	11	A-4a (5)	
		6																
VERY STIFF, BROWN TO BROWN AND GRAY, SILT AND CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, DAMP	806.9	7	9															
		8	8	16	39	SS-3	3.50	-	-	-	-	-	-	-	15	A-6a (V)		
		9																
@8.5'; BROWN AND GRAY	802.9	10	3															
		EOB	11	26	44	SS-4	2.50	-	-	-	-	-	-	-	14	A-6a (V)		
			11															

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

RAMP BORING LOGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / ALAN</u>	DRILL RIG: <u>CME 75 TRUCK</u>	STATION / OFFSET: <u>767+67.4, 20.3' LT</u>	EXPLORATION ID
TYPE: <u>RAMP RE-ALIGNMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>US 68 RAMP A BASELINE</u>	B-089-0-13
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>1/6/12</u>	ELEVATION: <u>805.2 (MSL)</u> EOB: <u>18.8 ft.</u>	PAGE
START: <u>8/21/13</u> END: <u>8/21/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>70.6</u>	COORD: <u>41.025021630, 83.670235540</u>	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				
ASPHALT PAVEMENT (12" THICK)	805.2																		
MEDIUM DENSE, GRAY, STONE FRAGMENTS WITH SAND AND SILT , FILL, DAMP	804.2	1	20																
		2	8	4	14	56	SS-1	--	-	-	-	-	-	-	-	6	A-2-4 (V)		
		3																	
	800.7	4	4																
STIFF TO VERY STIFF, BROWN AND GRAY TO BROWN, SILT AND CLAY , SOME TO LITTLE SAND, TRACE STONE FRAGMENTS , FILL, DAMP TO MOIST		5																	
@6.0'; VERY STIFF, BROWN		6																	
		7	3	7	7	16	78	SS-3	4.5+	7	8	16	37	32	26	15	11	12	A-6a (7)
		8																	
@8.5'; VERY STIFF, BROWN AND GRAY, MOIST		9	5	6	10	19	72	SS-4	4.5+	-	-	-	-	-	-	-	-	16	A-6a (V)
		10																	
@11.0'; VERY STIFF, BROWN, LITTLE SAND, TRACE STONE FRAGMENTS		11																	
		12	6	12	13	29	56	SS-5	4.5+	-	-	-	-	-	-	-	-	13	A-6a (V)
		13																	
@13.5'; STIFF, BROWN, MOIST		14	3	5	8	15	39	SS-6	2.50	-	-	-	-	-	-	-	-	19	A-6a (V)
		15																	
VERY STIFF, BROWN, SILTY CLAY , LITTLE SAND, TRACE STONE FRAGMENTS , MOIST	789.2	16																	
		17	4	7	13	24	83	SS-7	3.50	-	-	-	-	-	-	-	-	18	A-6b (V)
@ 18.5'; NO SPLIT SPOON RECOVERY	786.7	18																	
POSSIBLE DOLOMITE BEDROCK	786.4																		
@ 18.8'; AUGER REFUSAL			50/2"			0		SS-8											

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT GDT-6/27/14-07:58-VCLIED001\PUBLIC\PROJECT FILES\13 PROJECTS\G13011G HAN-75\LAB DATA SHEETS\HAN-75 RAMP.S.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: HOLE WAS BACKFILLED WITH SOIL CUTTINGS

PROJECT: HAN-75-14.39	DRILLING FIRM / OPERATOR: DLZ / ALAN	DRILL RIG: DIEDRICH D-50 ATV	STATION / OFFSET: 771+43.0, 6.1' LT	EXPLORATION ID: B-090-0-13
TYPE: RAMP RE-ALIGNMENT	SAMPLING FIRM / LOGGER: PGI / W. NAJJAR	HAMMER: DIEDRICH AUTOMATIC	ALIGNMENT: US 68 RAMP A BASELINE	
PID: 87005 BR ID:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 12/10/11	ELEVATION: 792.0 (MSL) EOB: 15.5 ft.	PAGE: 1 OF 1
START: 8/21/13 END: 8/21/13	SAMPLING METHOD: SPT	ENERGY RATIO (%): 81.7	COORD: 41.025724460, 83.671238270	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
ASPHALT PAVEMENT (8" THICK)	792.0																	
LIGHT BROWN STONE FRAGMENTS WITH SAND, LITTLE FINES (9" THICK ROADBASE)	791.4																	
STIFF TO VERY STIFF, GRAY TO BROWN, SANDY SILT, "AND" TO SOME CLAY, LITTLE TO TRACE STONE FRAGMENTS, FILL, DAMP	790.6	1	11	6	15	56	SS-1	--	-	-	-	-	-	-	-	-	8	A-4a (V)
@3.5'; VERY STIFF, SOME CLAY		2																
		3																
@6.0'; VERY STIFF, GRAY AND BROWN, TRACE STONE FRAGMENTS		4	7	8	19	44	SS-2	4.5+	13	5	9	36	37	26	17	9	12	A-4a (8)
		5																
@8.5'; VERY STIFF, BROWN, TRACE STONE FRAGMENTS		6	8	9	22	67	SS-3	4.5+	-	-	-	-	-	-	-	-	10	A-4a (V)
		7																
		8																
		9	4	7	19	100	SS-4	4.5+	-	-	-	-	-	-	-	-	14	A-4a (V)
		10																
VERY STIFF, BROWN, SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS, DAMP TO MOIST	781.0	11	4	7	20	78	SS-5	4.5+	-	-	-	-	-	-	-	-	19	A-6b (V)
MOIST @12.5'; PUSHED SHELBY TUBE, U.C. STRENGTH = 5757 psf. D.S. ANGLE OF SHEAR RESISTANCE = 24.7°, COHESION = 1.0 psi		12																
		13																
@15.5'; AUGER REFUSAL, POSSIBLE DOLOMITE BEDROCK	776.5	14				79	ST-6	4.5+	1	3	14	33	49	40	19	21	21	A-6b (12)
		15																

EOB

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-6/27/14-07:58-\\CLED001\PUBLIC\PROJECT FILES\13 PROJECTS\G1801\G HAN-75\LAB DATA SHEETS\HAN-75 RAMPSS.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: HOLE WAS BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>BM / JOSH DEAN</u>	DRILL RIG: <u>DIEDRICH D-90 ATV</u>	STATION / OFFSET: <u>775+11.3, 29.2' LT</u>	EXPLORATION ID <u>B-091-0-13</u>
TYPE: <u>RAMP RE-ALIGNMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>US 68 RAMP A BASELINE</u>	
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>9/18/12</u>	ELEVATION: <u>789.5 (MSL)</u> EOB: <u>15.0 ft.</u>	PAGE <u>1 OF 1</u>
START: <u>7/29/13</u> END: <u>7/29/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>80.2</u>	COORD: <u>41.026363540, 83.672267200</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV. 789.5	DEPTH	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
TOPSOIL (3" THICK)	789.3	1																< < < < <
STIFF, DARK BROWN, CLAY , TRACE SAND, FILL, WET TO MOIST	787.5	2	2	7	100	SS-1	1.50	-	-	-	-	-	-	-	-	26	A-7-6 (V)	< < < < <
SOFT, LIGHT GRAY, ELASTIC CLAY , NO TO TRACE SAND, FILL, MOIST		3																< < < < <
		4	1	5	100	SS-2	0.50	0	0	0	33	67	76	57	19	83	A-7-5 (16)	< < < < <
		5	2															< < < < <
@6.0'; SOFT, TRACE SAND		6	1															< < < < <
		7	1	4	100	SS-3	0.25	-	-	-	-	-	-	-	-	73	A-7-5 (V)	< < < < <
		8	2															< < < < <
@8.5'; SOFT, TRACE SAND		9	1															< < < < <
		10	1	3	100	SS-4	0.75	-	-	-	-	-	-	-	-	77	A-7-5 (V)	< < < < <
	778.5	11																< < < < <
VERY STIFF, DARK BROWN, CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, MOIST	776.0	12	1	4	100	SS-5	0.50	1	2	15	39	43	56	29	27	38	A-7-6 (18)	< < < < <
	776.0	13	2															< < < < <
STIFF, MOTTLED BROWN AND GRAY, SILTY CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, MOIST	774.5	14	4	15	100	SS-6	--	-	-	-	-	-	-	-	-	22	A-6b (V)	< < < < <
	774.5	15	5	6														< < < < <
		EOB	6															< < < < <

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-6/27/14-07:58-VLIED001\PUBLIC\PROJECT FILES\13 PROJECTS\GIS\001\G HAN-75\LAB DATA SHEETS\HAN-75 RAMP.S.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: HOLE WAS BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / ALAN</u>	DRILL RIG: <u>CME 75 TRUCK</u>	STATION / OFFSET: <u>778+96.4, 19.7' LT</u>	EXPLORATION ID <u>B-092-0-13</u>
TYPE: <u>RAMP RE-ALIGNMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>US 68 RAMP A BASELINE</u>	
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>1/6/12</u>	ELEVATION: <u>807.6 (MSL)</u> EOB: <u>36.0 ft.</u>	PAGE 1 OF 2
START: <u>8/26/13</u> END: <u>8/26/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>77</u>	COORD: <u>41.026853920, 83.673448490</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			ODOT CLASS (GI)	BACK FILL	
								GR	CS	FS	SI	CL	LL	PL	PI			WC
ASPHALT PAVEMENT (5" THICK)	807.2																	
CONCRETE PAVEMENT (7.5" THICK)	806.6																	
BROWN STONE FRAGMENTS WITH SAND, LITTLE FINES (12" THICK ROADBASE)	805.6	1																
HARD, BROWN, SANDY SILT , SOME CLAY, TRACE STONE FRAGMENTS, FILL, DAMP	804.1	2	23															
		3	16	33	83	SS-1	4.5+	-	-	-	-	-	-	-	12	A-4a (V)		
		4	10															
STIFF, BROWN, SILT AND CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, MOIST	799.1	5	5															
		6	5	15	67	SS-2	3.50	-	-	-	-	-	-	-	18	A-6a (V)		
		7	4															
@6.0'; STIFF	799.1	8	4															
		9	3	12	78	SS-3	3.50	-	-	-	-	-	-	-	16	A-6a (V)		
		10	6															
VERY STIFF, BROWN AND GRAY TO GRAY, SANDY SILT , SOME CLAY, LITTLE STONE FRAGMENTS, FILL, DAMP	791.6	11	4															
		12	5	17	83	SS-4	4.5+	-	-	-	-	-	-	-	13	A-4a (V)		
		13	8															
@13.5'; GRAY	791.6	14	4															
		15	6	17	89	SS-5	4.5+	-	-	-	-	-	-	-	14	A-4a (V)		
		16	7															
VERY STIFF, GREENISH GRAY TO BROWN, SILTY CLAY , TRACE TO LITTLE SAND, TRACE STONE FRAGMENTS, FILL, MOIST TO DAMP	791.6	17	5															
		18	5	17	94	SS-6	4.5+	-	-	-	-	-	-	-	14	A-4a (V)		
		19	4															
@18.5'; DAMP	791.6	20	4															
		21	5	18	61	SS-7	3.00	-	-	-	-	-	-	-	21	A-6b (V)		
		22	4															
		23	6	19	50	SS-8	4.00	-	-	-	-	-	-	-	18	A-6b (V)		

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT GDT-6/27/14-07:58 \\\CLEDC01\PUBLIC\PROJECT FILES\13 PROJECTS\G13011G HAN-75\LAB DATA SHEETS\HAN-75 RAMP.S GPJ

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-8/27/14-07:58-\\CLED001\PUBLIC\PROJECT FILES\13 PROJECTS\G13011G HAN-75\LAB DATA SHEETS\HAN-75 RAMPS.GPJ

PID: 87005		BR ID:		PROJECT: HAN-75-14.39		STATION / OFFSET: 778+96.4, 19.7' LT		START: 8/26/13		END: 8/26/13		PG 2 OF 2		B-092-0-13							
MATERIAL DESCRIPTION AND NOTES		ELEV. 787.6	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL		
									GR	CS	FS	SI	CL	LL	PL	PI					
VERY STIFF, GREENISH GRAY TO BROWN, SILTY CLAY , TRACE TO LITTLE SAND, TRACE STONE FRAGMENTS, FILL, MOIST TO DAMP <i>(continued)</i> @21"; BROWN, DAMP, PUSHED SHELBY TUBE		784.1	21																		
			22			89	ST-9	4.5+	-	-	-	-	-	-	-	-	-	A-6b (V)			
			23																		
VERY STIFF, BROWN, CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, DAMP		779.1	24	6	9	24	89	SS-10	4.50	-	-	-	-	-	-	-	-	17	A-7-6 (V)		
			25		10																
			26	4	6	7	17	94	SS-11	4.00	2	3	10	40	45	41	19	22	19	A-7-6 (13)	
VERY STIFF, DARK BROWN, SANDY SILT , SOME CLAY, TRACE STONE FRAGMENTS, FILL, MOIST		776.6	27																		
			28																		
			29	3	5	5	13	100	SS-12	3.00	1	4	41	30	24	30	22	8	21	A-4a (4)	
VERY STIFF, GREENISH BROWN, SILTY CLAY , SOME SAND, TRACE STONE FRAGMENTS, FILL, MOIST @33.5"; VERY STIFF @36"; SPLIT SPOON AND AUGER REFUSAL, POSSIBLE DOLOMITE BEDROCK		771.6	30																		
			31	3	5	5	13	100	SS-13	2.50	-	-	-	-	-	-	-	-	18	A-6b (V)	
			32																		
@33.5"; VERY STIFF @36"; SPLIT SPOON AND AUGER REFUSAL, POSSIBLE DOLOMITE BEDROCK		771.6	33																		
			34	4	5	9	18	94	SS-14	2.25	2	6	17	37	38	33	16	17	24	A-6b (11)	
@36"; SPLIT SPOON AND AUGER REFUSAL, POSSIBLE DOLOMITE BEDROCK		771.6	35																		
			36																		
EOB			36		50/0"			SS-15	-	-	-	-	-	-	-	-	-	-			

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: HOLE WAS BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>BM / JOSH DEAN</u>	DRILL RIG: <u>DIEDRICH D-90 ATV</u>	STATION / OFFSET: <u>783+44.6, 5.2' LT</u>	EXPLORATION ID <u>B-093-0-13</u>
TYPE: <u>RAMP RE-ALIGNMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>US 68 RAMP A BASELINE</u>	
PID: <u>87005</u> BR ID: <u></u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>9/18/12</u>	ELEVATION: <u>777.5 (MSL)</u> EOB: <u>8.0 ft.</u>	PAGE 1 OF 1
START: <u>7/18/13</u> END: <u>7/18/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>80.2</u>	COORD: <u>41.026897230, 83.675032130</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV. 777.5	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			
TOPSOIL (12" THICK)	776.5	1															<< < > >>	
STIFF, BLACK, CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, TRACE ROOTS, FILL	775.5	2	2	7	67	SS-1A&B	2.00	-	-	-	-	-	-	-	27	A-7-6 (V)	<< < > >>	
MEDIUM STIFF, MOTTLED BROWN AND GRAY, SILTY CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, MOIST	774.0	3					1.75	-	-	-	-	-	-	-	23	A-6b (V)	<< < > >>	
STIFF TO HARD, BROWN TO BROWN AND GRAY, SILT AND CLAY , TRACE SAND, TRACE STONE FRAGMENTS, DAMP	774.0	4	3	9	100	SS-2	1.75	1	2	6	53	38	38	25	13	22	A-6a (9)	<< < > >>
		5																<< < > >>
@6.0'; HARD, BROWN AND GRAY		6	4	8	32	100	SS-3	4.5+	-	-	-	-	-	-	18	A-6a (V)	<< < > >>	
		7	8	16														<< < > >>
POSSIBLE DOLOMITE BEDROCK @8.0'; AUGER REFUSAL	769.9 769.5	TR EOB																<< < > >>

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-6/27/14-07:58-\\CLED001\PUBLIC\PROJECT FILES\13 PROJECTS\G18011G HAN-75\LAB DATA SHEETS\HAN-75 RAMP.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: HOLE WAS BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>OTB / JOHN</u>	DRILL RIG: <u>DIEDRICH D-50 ATV</u>	STATION / OFFSET: <u>787+51.3, 26.1' LT</u>	EXPLORATION ID <u>B-094-0-13</u>
TYPE: <u>RAMP RE-ALIGNMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>US 68 RAMP A BASELINE</u>	
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>12/10/11</u>	ELEVATION: <u>780.9 (MSL)</u> EOB: <u>10.0 ft.</u>	PAGE 1 OF 1
START: <u>6/25/13</u> END: <u>6/25/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>81.7</u>	COORD: <u>41.026344840, 83.676270190</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV. 780.9	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			ODOT CLASS (GI)	BACK FILL		
								GR	CS	FS	SI	CL	LL	PL	PI			WC	
BROWN GRAVEL AND STONE FRAGMENTS WITH SAND AND SILT (SHOULDER BASE)	779.4	1															<V>		
VERY STIFF, DARK BROWN, CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, DAMP	774.4	2	2	10	72	SS-1	4.5+	0	3	15	32	50	44	23	21	23	A-7-6 (13)	<V>	
		3	3	4														<V>	
		4	2	3	10	44	SS-2	3.00	2	2	13	37	46	47	23	24	22	A-7-6 (15)	<V>
		5	3	4															<V>
VERY STIFF, BROWN AND GRAY, SILTY CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, DAMP	772.4	7	3	10	100	SS-3	4.00	-	-	-	-	-	-	-	-	19	A-6b (V)	<V>	
		8	3	4															<V>
MEDIUM DENSE, BROWN, NON-PLASTIC SANDY SILT , LITTLE STONE FRAGMENTS, DAMP	771.4	9	5	-	67	SS-4	--	-	-	-	-	-	-	-	-	9	A-4a (V)	<V>	
POSSIBLE DOLOMITE BEDROCK	770.9	10																<V>	

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-6/27/14-07:58-VCLIED001\PUBLIC\PROJECT FILES\13 PROJECTS\G1801\G HAN-75\LAB DATA SHEETS\HAN-75 RAMP5.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: HOLE WAS BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>OTB / JOHN</u>	DRILL RIG: <u>DIEDRICH D-50 ATV</u>	STATION / OFFSET: <u>791+52.0, 7.2' LT</u>	EXPLORATION ID <u>B-095-0-13</u>
TYPE: <u>RAMP RE-ALIGNMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>US 68 RAMP A BASELINE</u>	
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>12/10/11</u>	ELEVATION: <u>779.2 (MSL)</u> EOB: <u>6.2 ft.</u>	PAGE 1 OF 1
START: <u>6/24/13</u> END: <u>6/24/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>81.7</u>	COORD: <u>41.025535890, 83.677220950</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV. 779.2	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL	
								GR	CS	FS	SI	CL	LL	PL	PI				
TOPSOIL (9" THICK)	778.4																<< < > >>		
BROWN GRAVEL AND STONE FRAGMENTS WITH SAND AND SILT	777.7	1															<< < > >>		
HARD, DARK BROWN, SILTY CLAY , SOME SAND, TRACE STONE FRAGMENTS, FILL, DAMP	775.7	2	4	3	11	100	SS-1	4.5+	1	3	32	28	36	34	18	16	18	A-6b (8)	<< < > >>
HARD, BROWN AND GRAY, SILT AND CLAY , "AND" SAND, FILL, MOIST	773.5	3																<< < > >>	
	773.0	4	3	3	11	56	SS-2	3.75	0	3	33	32	32	29	15	14	17	A-6a (7)	<< < > >>
	773.5	5																<< < > >>	
POSSIBLE DOLOMITE BEDROCK @ 6.0'; NO SPLIT SPOON RECOVERY @ 6.2'; AUGER REFUSAL	773.0	6	50/1"				SS-3											Rock (V)	<< < > >>

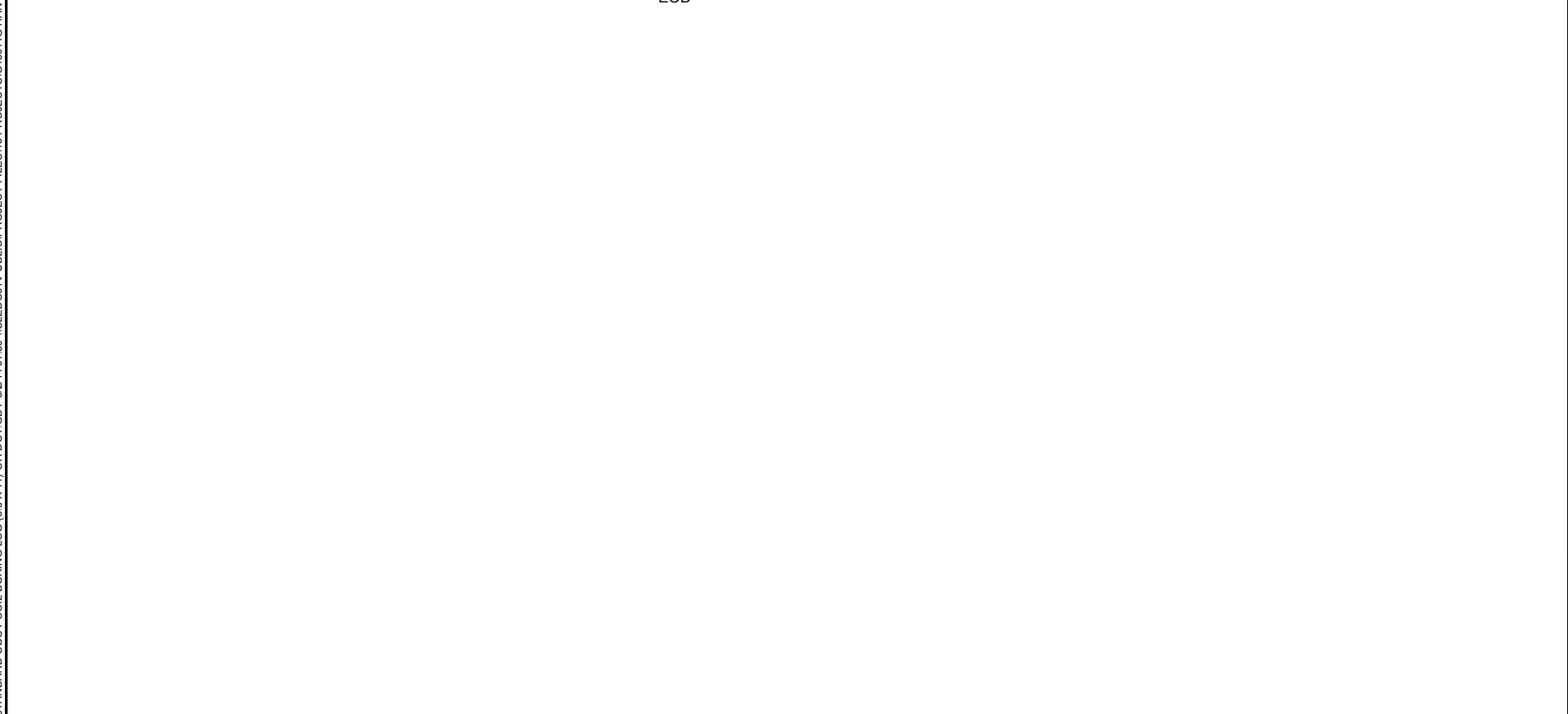
STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-6/27/14-07:59-\\CLED001\PUBLIC\PROJECT FILES\13 PROJECTS\G18011\G HAN-75\LAB DATA SHEETS\HAN-75 RAMP.S.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: HOLE WAS BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>BM / JOSH DEAN</u>	DRILL RIG: <u>DIEDRICH D-90 ATV</u>	STATION / OFFSET: <u>795+37.1, 1.6' RT</u>	EXPLORATION ID <u>B-096-0-13</u>
TYPE: <u>RAMP RE-ALIGNMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>US 68 RAMP A BASELINE</u>	
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>9/18/12</u>	ELEVATION: <u>779.3 (MSL)</u> EOB: <u>5.5 ft.</u>	PAGE 1 OF 1
START: <u>8/16/13</u> END: <u>8/16/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>80.2</u>	COORD: <u>41.024695120, 83.678066140</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
TOPSOIL (3" THICK) VERY STIFF, BROWN AND GRAY, SANDY SILT , SOME CLAY, TRACE STONE FRAGMENTS, FILL, DAMP	779.3 779.0	1	8														<< < > >>	
		2	8	7	20	100	SS-1	4.5+	5	8	16	40	31	23	14	9	11	A-4a (7)
		3																<< < > >>
	774.8	4	11															<< < > >>
GRAY DOLOMITE BEDROCK @ 5.5'; AUGER REFUSAL	773.8	5	9				SS-2	--	-	-	-	-	-	-	-	-	-	Rock (V)
		EOB	50/5"			6												<< < > >>

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-8/27/14-07:59-\\CLED001\PUBLIC\PROJECT FILES\13 PROJECTS\G18011G HAN-75\LAB DATA SHEETS\HAN-75 RAMP.S.GPJ



NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: HOLE WAS BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / JOHN</u>	DRILL RIG: <u>CME 55 TRUCK</u>	STATION / OFFSET: <u>799+74.6, 18.0' LT</u>	EXPLORATION ID <u>B-097-0-13</u>
TYPE: <u>RAMP RE-ALIGNMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>US 68 RAMP A BASELINE</u>	
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>2.25" SSA</u>	CALIBRATION DATE: <u>6/13/13</u>	ELEVATION: <u>781.7 (MSL)</u> EOB: <u>6.4 ft.</u>	PAGE 1 OF 1
START: <u>7/16/13</u> END: <u>7/16/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>70.2</u>	COORD: <u>41.023937980, 83.679298320</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
TOPSOIL (2" THICK)	781.7																	<L> >L>
MEDIUM STIFF, DARK BROWN, SILTY CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, MOIST	781.5	1	2	6	39	SS-1	0.75	-	-	-	-	-	-	-	20	A-6b (V)	<L> >L>	
		2															<L> >L>	
		3															<L> >L>	
STIFF, BLACK, CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, MOIST	778.2	4	1	4	72	SS-2	1.25	9	6	12	44	29	49	26	23	31	A-7-6 (15)	<L> >L>
		5																<L> >L>
GRAY DOLOMITE BEDROCK @ 6.3'; AUGER REFUSAL	775.7 775.4	6	50/4"	-	100	SS-3	--	-	-	-	-	-	-	-	8	Rock (V)	<L> >L>	
																		<L> >L>

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-6/27/14-07:59-\\CLED001\PUBLIC\PROJECT FILES\13 PROJECTS\G1001\G HAN-75\LAB DATA SHEETS\HAN-75 RAMP.S.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: HOLE WAS BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>BM / JOSH DEAN</u>	DRILL RIG: <u>DIEDRICH D-90 ATV</u>	STATION / OFFSET: <u>745+86.3, 1.8' LT</u>	EXPLORATION ID <u>B-098-0-13</u>
TYPE: <u>RAMP RE-ALIGNMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>LIMA RAMP B BASELINE</u>	
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>9/18/12</u>	ELEVATION: <u>798.2 (MSL)</u> EOB: <u>8.0 ft.</u>	PAGE 1 OF 1
START: <u>7/29/13</u> END: <u>7/29/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>80.2</u>	COORD: <u>41.021467570, 83.663873090</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL		
								GR	CS	FS	SI	CL	LL	PL	PI					
STIFF, BROWN, SILT AND CLAY , SOME SAND, SOME STONE FRAGMENTS, FILL, DAMP	798.2	1																<< < > >>		
		2	3	4	9	67	SS-1	1.75	28	15	12	22	23	32	17	15	14	A-6a (4)	<< < > >>	
		3																	<< < > >>	
STIFF, DARK BROWN, SILTY CLAY , SOME SAND, TRACE STONE FRAGS, FILL, MOIST @3.5'; HYDROCARBON ODOR	794.7	4	2	3	4	9	83	SS-2	2.25	8	8	17	37	30	40	24	16	20	A-6b (9)	<< < > >>
		5																		<< < > >>
		6	28	50/1"	-	100	SS-3	--	-	-	-	-	-	-	-	-	-	8	Rock (V)	<< < > >>
GRAY DOLOMITE BEDROCK @7.0'; AUGER SAMPLE OBTAINED @8.0'; AUGER REFUSAL	791.7	7																		<< < > >>
		8																		
	790.2	EOB																		<< < > >>

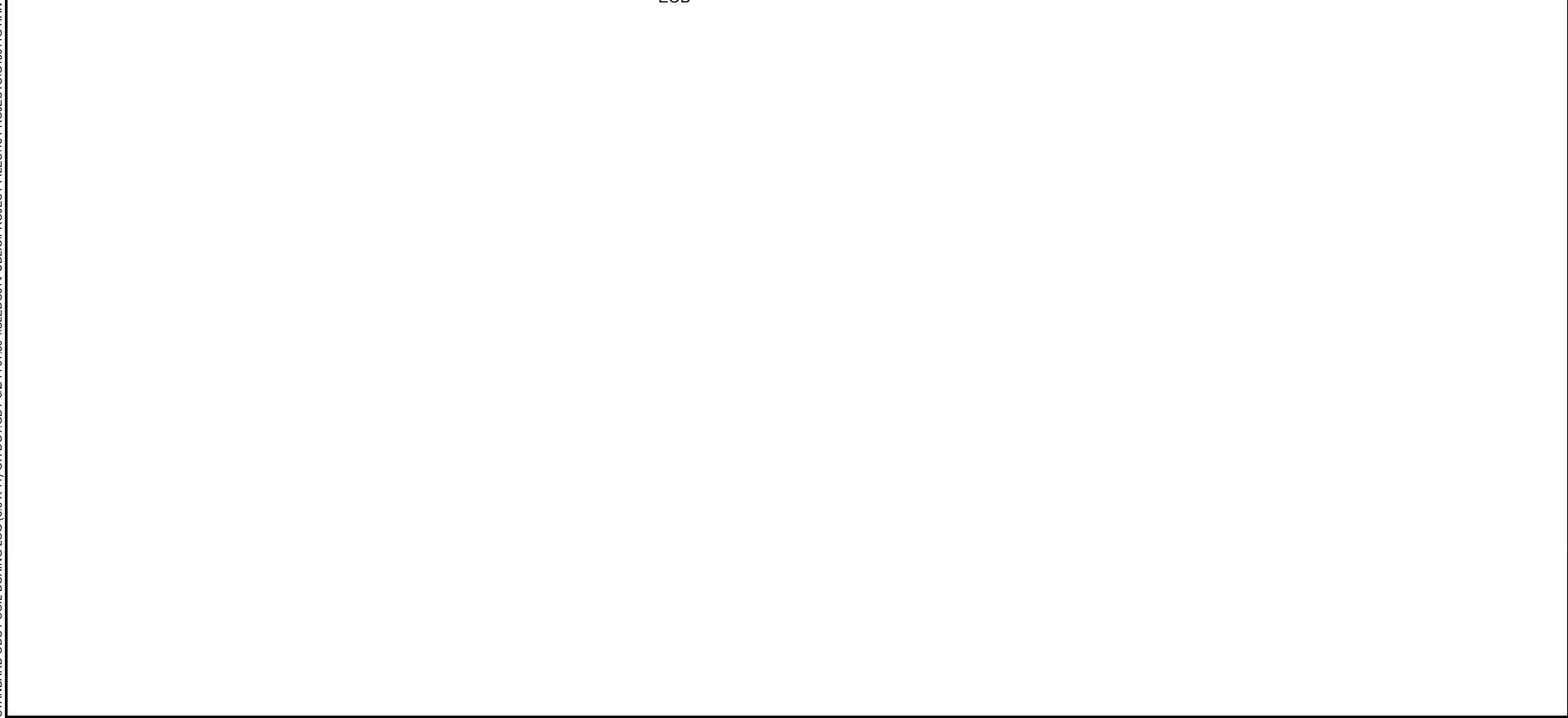
STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-6/27/14-07:59-\\CLED001\PUBLIC\PROJECT FILES\13 PROJECTS\G1801\G HAN-75\LAB DATA SHEETS\HAN-75 RAMP\PS.GPJ

NOTES: GROUNDWATER WAS ENCOUNTERED AT 7.0' DURING DRILLING AND WAS DRY UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>BM / JOSH DEAN</u>	DRILL RIG: <u>DIEDRICH D-90 ATV</u>	STATION / OFFSET: <u>749+89.4, 2.6' RT</u>	EXPLORATION ID <u>B-099-0-13</u>
TYPE: <u>RAMP RE-ALIGNMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>LIMA RAMP B BASELINE</u>	
PID: <u>87005</u> BR ID: <u></u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>9/18/12</u>	ELEVATION: <u>792.5 (MSL)</u> EOB: <u>5.5 ft.</u>	PAGE 1 OF 1
START: <u>7/29/13</u> END: <u>7/29/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>80.2</u>	COORD: <u>41.022194320, 83.664973790</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
TOPSOIL (6" THICK)	792.5																	<L> >V> <L>
STIFF, BROWN AND BLACK, CLAY , SOME STONE FRAGMENTS, LITTLE SAND, FILL, DAMP	792.0	1	3															<L> >V> <L>
		2	4	11	22	SS-1	1.75	25	3	10	24	38	53	26	27	24	A-7-6 (14)	<L> >V> <L>
		3																<L> >V> <L>
GRAY DOLOMITE BEDROCK	789.0	TR	50/3"	-	67	SS-2	--	-	-	-	-	-	-	-	-	4	Rock (V)	<L> >V> <L>
@5.5'; AUGER REFUSAL	787.0	EOB																<L> >V> <L>

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-6/27/14-07:59-\\CLED001\PUBLIC\PROJECT FILES\13 PROJECTS\G13011G HAN-75\LAB DATA SHEETS\HAN-75 RAMP.S.GPJ



NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>OTB / JOHN</u>	DRILL RIG: <u>DIEDRICH D-50 ATV</u>	STATION / OFFSET: <u>753+75.9, 23.8' LT</u>	EXPLORATION ID <u>B-100-0-13</u>
TYPE: <u>RAMP RE-ALIGNMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>LIMA RAMP B BASELINE</u>	PAGE 1 OF 1
PID: <u>87005</u> BR ID: <u></u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>12/10/11</u>	ELEVATION: <u>790.9 (MSL)</u> EOB: <u>2.7 ft.</u>	
START: <u>6/13/13</u> END: <u>6/13/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>81.7</u>	COORD: <u>41.022889260, 83.666036290</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL	
								GR	CS	FS	SI	CL	LL	PL	PI				
TOPSOIL (6" THICK)	790.9																	<L> >V> <L>	
STIFF, DARK BROWN, CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, DAMP	790.4	1	3															>L> <V> <L>	
			3	50/0"	-	-	SS-1	2.00	1	3	17	36	43	50	24	26	20	A-7-6 (16)	>L> <V> <L>
GRAY DOLOMITE BEDROCK	788.9	TR																>L> <V> <L>	
@2.5'; AUGER SAMPLE OBTAINED	788.2						AS-2	--	-	-	-	-	-	-	-	-	1	Rock (V)	>L> <V> <L>
@2.7'; AUGER REFUSAL		EOB																>L> <V> <L>	

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-6/27/14-07:59-\\CLED001\PUBLIC\PROJECT FILES\13 PROJECTS\G18011G HAN-75\LAB DATA SHEETS\HAN-75 RAMP.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>OTB / JOHN</u>	DRILL RIG: <u>DIEDRICH D-50 ATV</u>	STATION / OFFSET: <u>757+13.8, 126.4' LT</u>	EXPLORATION ID <u>B-101-0-13</u>
TYPE: <u>RAMP RE-ALIGNMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>LIMA RAMP B BASELINE</u>	
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>12/10/11</u>	ELEVATION: <u>790.2 (MSL)</u> EOB: <u>4.5 ft.</u>	PAGE 1 OF 1
START: <u>6/13/13</u> END: <u>6/13/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>81.7</u>	COORD: <u>41.023642450, 83.667179920</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			ODOT CLASS (GI)	BACK FILL		
								GR	CS	FS	SI	CL	LL	PL	PI			WC	
TOPSOIL (12" THICK)	790.2																	<L> >L>	
STIFF, BROWN, SANDY SILT , SOME CLAY, TRACE STONE FRAGMENTS, FILL, DAMP	789.2	1	4	6	15	100	SS-1	2.75	3	5	23	37	32	26	16	10	12	A-4a (7)	<L> >L>
STIFF, BROWN, SILTY CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, MOIST	787.2	2																	<L> >L>
STIFF, BROWN, SILTY CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, MOIST	786.4	3																	<L> >L>
GRAY DOLOMITE BEDROCK @4.5'; AUGER REFUSAL	785.7	4	50/5"	-	100	SS-2	1.50	2	4	14	35	45	37	19	18	20	A-6b (11)	<L> >L>	
@4.2'; AUGER SAMPLE OBTAINED	785.7	EOB				AS-3	--	-	-	-	-	-	-	-	-	-	1	Rock (V)	<L> >L>

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-6/27/14-07:59-\\CLED001\PUBLIC\PROJECT FILES\13 PROJECTS\G13011G HAN-75\LAB DATA SHEETS\HAN-75 RAMP.S.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>OTB / JOHN</u>	DRILL RIG: <u>DIEDRICH D-50 ATV</u>	STATION / OFFSET: <u>792+77.6, 23.7' RT</u>	EXPLORATION ID <u>B-102-0-13</u>
TYPE: <u>RAMP RE-ALIGNMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>LIMA RAMP G BASELINE</u>	
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>12/10/11</u>	ELEVATION: <u>789.4 (MSL)</u> EOB: <u>6.2 ft.</u>	PAGE 1 OF 1
START: <u>6/13/13</u> END: <u>6/13/14</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>81.7</u>	COORD: <u>41.024494210, 83.886238550</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
GRAVEL WITH ASPHALT PIECES	789.4																	
VERY STIFF, BROWN TO BLACK, SILTY CLAY , LITTLE TO "AND" SAND, TRACE STONE FRAGMENTS, FILL, MOIST	788.5	1																
@3.5'; BLACK, "AND" SAND		2	4	2	8	83	SS-1	3.00	-	-	-	-	-	-	-	-	24	A-6b (V)
		3																
		4	2	3	7	72	SS-2	1.25	8	16	25	19	32	36	20	16	21	A-6b (5)
		5																
GRAY DOLOMITE BEDROCK @6.2'; AUGER REFUSAL	783.6 783.2	6	50/2"			50	SS-3	--	-	-	-	-	-	-	-	-	-	Rock (V)

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-6/27/14-07:59-\\CLED001\PUBLIC\PROJECT FILES\13 PROJECTS\G18011\G HAN-75\LAB DATA SHEETS\HAN-75 RAMP.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>OTB / JOHN</u>	DRILL RIG: <u>DIEDRICH D-50 ATV</u>	STATION / OFFSET: <u>796+83.3, 3.2' LT</u>	EXPLORATION ID <u>B-103-0-13</u>
TYPE: <u>RAMP RE-ALIGNMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>LIMA RAMP G BASELINE</u>	
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>12/10/11</u>	ELEVATION: <u>787.2 (MSL)</u> EOB: <u>7.0 ft.</u>	PAGE 1 OF 1
START: <u>6/13/13</u> END: <u>6/13/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>81.7</u>	COORD: <u>41.025051050, 83.669508410</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL	
								GR	CS	FS	SI	CL	LL	PL	PI				
TOPSOIL (4" THICK)	786.9	0															<L> <V> <R>		
VERY STIFF, DARK BROWN, CLAY , SOME SAND, TRACE STONE FRAGMENTS, FILL, MOIST	783.7	1	5	4	20	72	SS-1	3.50	5	8	18	35	34	42	16	26	24	A-7-6 (14)	<L> <V> <R>
STIFF, DARK BROWN, SILTY CLAY , SOME SAND, TRACE STONE FRAGMENTS, FILL, MOIST	781.7	2	2	3	8	72	SS-2	1.75	2	4	17	34	43	35	19	16	22	A-6b (10)	<L> <V> <R>
VERY STIFF, BROWN, SILTY CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, DAMP	780.9	3																	<L> <V> <R>
GRAY DOLOMITE BEDROCK @7.0'; SPLIT SPOON AND AUGER REFUSAL	780.2	4	50/5"		100		SS-3A&B	3.50	-	-	-	-	-	-	-	-	19	A-6b (V) Rock (V)	<L> <V> <R>
		5																	<L> <V> <R>
		6																	<L> <V> <R>
		7																	<L> <V> <R>
		7	50/0"				SS-4	--	-	-	-	-	-	-	-	-	-	-	<L> <V> <R>

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DDT-GDT-6/27/14-07:59-\\CLED001\PUBLIC\PROJECT FILES\13 PROJECTS\G13011\G HAN-75\LAB DATA SHEETS\HAN-75 RAMP.GPJ

NOTES: GROUNDWATER WAS ENCOUNTERED AT 7.0' DURING DRILLING AND AT 4.7' UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>OTB / JOHN</u>	DRILL RIG: <u>DIEDRICH D-50 ATV</u>	STATION / OFFSET: <u>800+49.1, 5.5' LT</u>	EXPLORATION ID <u>B-104-0-13</u>
TYPE: <u>RAMP RE-ALIGNMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>LIMA RAMP H BASELINE</u>	
PID: <u>87005</u> BR ID: <u></u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>12/10/11</u>	ELEVATION: <u>788.4 (MSL)</u> EOB: <u>10.0 ft.</u>	PAGE <u>1 OF 1</u>
START: <u>6/13/13</u> END: <u>6/13/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>81.7</u>	COORD: <u>41.025881110, 83.670294240</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
TOPSOIL (6" THICK)	788.4																	
AUGERED THROUGH STONE FRAGMENTS	787.9	1				AS-1	--											
		2																
		3																
	784.4	4																
MEDIUM STIFF, DARK GRAY, ELASTIC SILT AND CLAY , SOME SAND, FILL, MOIST		5	3	8	100	SS-2	0.75	0	1	21	43	35	44	34	10	58	A-5 (9)	
		6																
	782.4	7	2	8	78	SS-3	0.75	-	-	-	-	-	-	-	-	18	A-6b (V)	
MEDIUM STIFF, BROWN, SILTY CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, DAMP		8																
	779.9	9	2	74	89	SS-4	0.75	-	-	-	-	-	-	-	-	15	A-6a (V)	
MEDIUM STIFF, BROWN, SILT AND CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, DAMP	778.7		4	50														
GRAY DOLOMITE BEDROCK @10.0'; AUGER REFUSAL	778.4	10																

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-6/27/14-07:59-\\CLED001\PUBLIC\PROJECT FILES\13 PROJECTS\G1001\G HAN-75\LAB DATA SHEETS\HAN-75 RAMP\PS.GPJ

NOTES: GROUNDWATER WAS ENCOUNTERED AT 8.5' DURING DRILLING AND AT 6.6' UPON COMPLETION OF DRILLING OPERATIONS.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-6/27/14-07:59-\\CLED001\PUBLIC\PROJECT FILES\13 PROJECTS\G1901\G HAN-75\LAB DATA SHEETS\HAN-75 RAMPS.GPJ

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>OTB / JOHN</u>	DRILL RIG: <u>DIEDRICH D-50 ATV</u>	STATION / OFFSET: <u>804+49.8, 0.1' LT</u>	EXPLORATION ID <u>B-105-0-13</u>
TYPE: <u>RAMP RE-ALIGNMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>LIMA RAMP H BASELINE</u>	
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>12/10/11</u>	ELEVATION: <u>787.2 (MSL)</u> EOB: <u>10.0 ft.</u>	PAGE 1 OF 1
START: <u>6/18/13</u> END: <u>6/18/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>81.7</u>	COORD: <u>41.026672870, 83.671282080</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			ODOT CLASS (GI)	BACK FILL			
								GR	CS	FS	SI	CL	LL	PL	PI			WC		
STIFF, BROWN, SILTY CLAY , SOME SAND, LITTLE STONE FRAGMENTS, FILL, DAMP	787.2	1																<< < > >>		
		2	4	6	4	14	100	SS-1	1.50	16	16	15	26	27	33	15	18	13	A-6b (7)	<< < > >>
	783.7	3																	<< < > >>	
VERY STIFF, BROWN, SILT AND CLAY , "AND" STONE FRAGMENTS, SOME SAND, FILL, DAMP		4	5	5	8	18	44	SS-2	4.5+	36	12	12	20	20	33	20	13	11	A-6a (2)	<< < > >>
	781.2	5																	<< < > >>	
MEDIUM STIFF, LIGHT GRAY, ELASTIC CLAY , TRACE SAND, FILL, MOIST	780.7	6	2						0.75	-	-	-	-	-	-	-	-	48	A-7-5 (V)	<< < > >>
		7	3	3	8	100	SS-3A&B	--	-	-	-	-	-	-	-	-	-	22	A-3a (V)	<< < > >>
LOOSE, GRAY, COARSE AND FINE SAND , LITTLE STONE FRAGMENTS, TRACE FINES, MOIST		8																	<< < > >>	
	778.7	9	2	3	4	10	67	SS-4	2.50	-	-	-	-	-	-	-	-	22	A-6b (V)	<< < > >>
STIFF, BROWN, SILTY CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, MOIST	777.2	10																	<< < > >>	
EOB																				

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>BM / JOSH DEAN</u>	DRILL RIG: <u>DIEDRICH D-90 ATV</u>	STATION / OFFSET: <u>808+92.0, 1.7' LT</u>	EXPLORATION ID
TYPE: <u>RAMP RE-ALIGNMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>LIMA RAMP H BASELINE</u>	B-106-0-13
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>9/18/12</u>	ELEVATION: <u>788.1 (MSL)</u> EOB: <u>10.0 ft.</u>	PAGE
START: <u>7/29/13</u> END: <u>7/29/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>80.2</u>	COORD: <u>41.026956590, 83.672822740</u>	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				
TOPSOIL (8" THICK)	788.1																	<< < > >>	
MEDIUM STIFF TO STIFF, LIGHT GRAY TO BROWN, ELASTIC CLAY , TRACE SAND, TRACE ROOTS, FILL, DAMP	787.5	1	2															<< < > >>	
		2	3	3	8	100	SS-1	1.00	-	-	-	-	-	-	-	40	A-7-5 (V)	<< < > >>	
		3																<< < > >>	
@3.5'; STIFF, LIGHT GRAY, TRACE SAND		4	3	4	5	12	100	SS-2	3.00	0	1	6	51	42	53	41	12	40	A-7-5 (11)
		5																<< < > >>	
@6.0'; MEDIUM STIFF, BROWN, TRACE SAND		6	2															<< < > >>	
	780.8	7	2	3	7	100	SS-3	1.50	-	-	-	-	-	-	-	-	25	A-7-5 (V)	
MEDIUM STIFF TO VERY STIFF, BROWN AND GRAY, CLAY , TRACE SAND, TRACE STONE FRAGMENTS, FILL, MOIST		8																<< < > >>	
@8.5'; VERY STIFF		9	5	6	8	19	100	SS-4	2.50	-	-	-	-	-	-	-	27	A-7-6 (V)	
	778.1	10																<< < > >>	
		EOB																<< < > >>	

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT GDT-6/27/14-07:59-\\CLED001\PUBLIC\PROJECT FILES\13 PROJECTS\G18011G HAN-75\LAB DATA SHEETS\HAN-75 RAMP.S.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>OTB / JOHN</u>	DRILL RIG: <u>DIEDRICH D-50 ATV</u>	STATION / OFFSET: <u>798+09.2, 9.7' RT</u>	EXPLORATION ID
TYPE: <u>RAMP RE-ALIGNMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>US 68 RAMP D BASELINE</u>	B-107-0-13
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>12/10/11</u>	ELEVATION: <u>786.5 (MSL)</u> EOB: <u>6.3 ft.</u>	PAGE
START: <u>6/13/13</u> END: <u>6/13/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>81.7</u>	COORD: <u>41.025163920, 83.670022660</u>	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			
MEDIUM STIFF TO VERY STIFF, BROWN, SILTY CLAY , LITTLE TO SOME SAND, MOIST	786.5																	<L> >L>
		1																<L> >L>
		2	3	8	100	SS-1	1.00	0	3	12	41	44	40	18	22	21	A-6b (13)	<L> >L>
		3	3															<L> >L>
@3.5'; VERY STIFF, SOME SAND		4	2	14	72	SS-2	3.25	0	5	16	34	45	39	16	23	20	A-6b (13)	<L> >L>
		5	5															<L> >L>
	780.5																	<L> >L>
GRAY DOLOMITE BEDROCK	780.3	TR EOB	50/3"	-	17	SS-3	--	-	-	-	-	-	-	-	-	-	Rock (V)	<L> >L>

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-6/27/14-07:59-\\CLED001\PUBLIC\PROJECT FILES\13 PROJECTS\G18011\G HAN-75\LAB DATA SHEETS\HAN-75 RAMP\PS.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>OTB / JOHN</u>	DRILL RIG: <u>DIEDRICH D-50 ATV</u>	STATION / OFFSET: <u>801+21.3, 0.9' RT</u>	EXPLORATION ID
TYPE: <u>RAMP RE-ALIGNMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>US 68 RAMP D BASELINE</u>	B-108-0-13
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>12/10/11</u>	ELEVATION: <u>788.8 (MSL)</u> EOB: <u>12.9 ft.</u>	PAGE
START: <u>6/12/13</u> END: <u>6/12/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>81.7</u>	COORD: <u>41.025759080, 83.670834970</u>	1 OF 1

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI		
TOPSOIL (6" THICK)	788.8																
COARSE GRAVEL (12" THICK)	787.3	1															
VERY SOFT, DARK GRAY TO LIGHT GRAY, ELASTIC CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, MOIST		2	1	-	100	SS-1	0.25	-	-	-	-	-	-	-	65	A-7-5 (V)	
@3.5'; LIGHT GRAY, WET		3															
		4	1	-	100	SS-2	0.25	-	-	-	-	-	-	-	68	A-7-5 (V)	
		5															
		6															
@6.5'; PUSHED SHELBY TUBE, 300 - 350 PSI DOWN PRESSURE		7															
		8			100	ST-3	1.25	1	3	16	39	41	46	30	16	36	A-7-5 (12)
	780.3	9	2														
STIFF, GRAY, CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, MOIST		10	3	10	100	SS-4	2.25	-	-	-	-	-	-	-	24	A-7-6 (V)	
		11	4														
	777.8	TR															
GRAY DOLOMITE BEDROCK																	
	775.9	EOB															

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-6/27/14-07:59-\\CLED001\PUBLIC\PROJECT FILES\13 PROJECTS\G18011G HAN-75\LAB DATA SHEETS\HAN-75 RAMP5.GPJ

NOTES: GROUNDWATER WAS ENCOUNTERED AT 10.0' DURING DRILLING AND AT 6.5' UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH 1/2 BAG OF BENTONITE PELLETS/SOIL CUTTINGS MIXTURE

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>BM / JOSH DEAN</u>	DRILL RIG: <u>DIEDRICH D-90 ATV</u>	STATION / OFFSET: <u>802+89.5, 3.5' RT</u>	EXPLORATION ID: <u>B-109-0-13</u>
TYPE: <u>RAMP RE-ALIGNMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>US 68 RAMP D BASELINE</u>	
PID: <u>87005</u> BR ID: <u></u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>9/18/12</u>	ELEVATION: <u>788.2 (MSL)</u> EOB: <u>13.5 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>8/7/13</u> END: <u>8/7/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>80.2</u>	COORD: <u>41.026107350, 83.671235260</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
ASPHALT PAVEMENT (1") GRAVEL BASE (2" THICK)	788.2 788.1 787.9	0-1																
DENSE, DARK BROWN AND BLACK, NON-PLASTIC SANDY SILT , LITTLE STONE FRAGMENTS, FILL, MOIST		1-2	14 18	8	35	94	SS-1	--	-	-	-	-	-	-	-	-	15	A-4a (V)
MEDIUM STIFF, DARK GRAY, ELASTIC CLAY , TRACE SAND, FILL, MOIST	784.7	3-4	3	2	5	61	SS-2	0.50	0	0	1	32	67	67	40	27	60	A-7-5 (19)
@5.5'; PUSHED SHELBY TUBE, U.C. STRENGTH = 546 psf		5-6																
STIFF, BROWN, SILTY CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, DAMP	780.7	7-8	2	3	11	67	SS-4	2.50	-	-	-	-	-	-	-	-	19	A-6b (V)
		9-10																
HARD, BROWN, SILT AND CLAY , LITTLE SAND, LITTLE STONE FRAGMENTS, DAMP	777.2 775.9	11-12	8	11	79	89	SS-5	4.5+	-	-	-	-	-	-	-	-	14	A-6a (V)
GRAY DOLOMITE BEDROCK @13.5'; AUGER REFUSAL	774.7	13																

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT GDT-02/14-07-59-UCLEDC01\PUBLIC\PROJECT FILES\13 PROJECTS\G13011G HAN-75\LAB DATA SHEETS\HAN-75 RAMP D.GPJ

NOTES: GROUNDWATER WAS ENCOUNTERED AT 8.0' DURING DRILLING AND AT 7.5' UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH 2 BAGS OF BENTONITE PELLETS/SOIL CUTTINGS MIXTURE

PROJECT: HAN-75-14.39	DRILLING FIRM / OPERATOR: OTB / JOHN	DRILL RIG: DIEDRICH D-50 ATV	STATION / OFFSET: 804+46.6, 21.3' RT	EXPLORATION ID: B-110-0-13
TYPE: RAMP RE-ALIGNMENT	SAMPLING FIRM / LOGGER: PGI / F.BUSHER	HAMMER: DIEDRICH AUTOMATIC	ALIGNMENT: US 68 RAMP D BASELINE	
PID: 87005 BR ID:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 12/10/11	ELEVATION: 786.5 (MSL) EOB: 13.0 ft.	PAGE: 1 OF 1
START: 6/12/13 END: 6/12/13	SAMPLING METHOD: SPT	ENERGY RATIO (%): 81.7	COORD: 41.026463940, 83.671560520	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTH	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
ASPHALT PIECES WITH SANDY SILT (FILL)	786.5	1																
	783.5	2	8	19	35	100	SS-1	--	-	-	-	-	-	-	-	-	6	A-1-a (V)
MEDIUM STIFF, LIGHT GRAY, ELASTIC CLAY, LITTLE SAND, TRACE STONE FRAGMENTS, FILL, MOIST		3																
	780.5	4	1	2	7	100	SS-2	2.00	3	2	14	36	45	54	36	18	47	A-7-5 (14)
MEDIUM STIFF, DARK BROWN, SILTY CLAY, SOME SAND, FILL, MOIST	778.0	6	1	1	4	100	SS-3	1.00	0	3	18	42	37	39	22	17	29	A-6b (11)
	773.7	7																
MEDIUM STIFF, BROWN, SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS, FILL, MOIST	773.5	9	3	2	7	100	SS-4	1.75	-	-	-	-	-	-	-	-	28	A-6b (V)
		10																
		11																
		12																
GRAY DOLOMITE BEDROCK	773.5	13	50/2"	-	-	25	SS-5	--	-	-	-	-	-	-	-	-	-	Rock (V)

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-6/27/14-07:59-\\CLED001\PUBLIC\PROJECT FILES\13 PROJECTS\G1801\G HAN-75\LAB DATA SHEETS\HAN-75 RAMP\G.PJ

NOTES: GROUNDWATER WAS ENCOUNTERED AT 12.8' DURING DRILLING AND AT 6.5' UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: MIXED WITH 1 BAG OF BENTONITE PELLETS/SOIL CUTTINGS MIXTURE

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>OTB / JOHN</u>	DRILL RIG: <u>DIEDRICH D-50 ATV</u>	STATION / OFFSET: <u>809+94.9, 20.7' RT</u>	EXPLORATION ID <u>B-115-0-13</u>
TYPE: <u>RAMP RE-ALIGNMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>US 68 RAMP D BASELINE</u>	
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>12/10/11</u>	ELEVATION: <u>780.9 (MSL)</u> EOB: <u>11.5 ft.</u>	PAGE <u>1 OF 1</u>
START: <u>6/24/13</u> END: <u>6/24/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>81.7</u>	COORD: <u>41.027755260, 83.672479250</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV. 780.9	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
STIFF, BROWN, SANDY SILT , SOME CLAY, TRACE STONE FRAGMENTS, FILL, DAMP		1	4															
		2	4	3	10	100	SS-1	1.75	-	-	-	-	-	-	-	-	11	A-4a (V)
	777.4	3																
LOOSE, BROWN, NON-PLASTIC SANDY SILT , TRACE STONE FRAGMENTS, TRACE ROOTS, MOIST		4	3	4	10	67	SS-2	-	-	-	-	-	-	-	-	-	15	A-4a (V)
	775.9	5																
VERY STIFF, BROWN, SILT AND CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, MOIST @ 5.5'; PUSHED SHELBY TUBE, 550 PSI DOWN PRESSURE		6				63	ST-3	3.00	2	1	10	45	42	32	19	13	20	A-6a (9)
	772.4	7																
		8																
MEDIUM DENSE, GRAY, NON-PLASTIC SILT , TRACE SAND, MOIST		9	4	5	22	89	SS-4	-	-	-	-	-	-	-	-	-	21	A-4b (V)
	770.4	10																
@10.5' POSSIBLE DOLOMITE BEDROCK	770.4	TR																
@11.0'; NO SPLIT SPOON RECOVERY																		
@11.5'; AUGER REFUSAL	769.4	EOB	50/2"			0	SS-5	-	-	-	-	-	-	-	-	-	-	Rock (V)

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT GDT-6/27/14-07:59 \\\IEDOC01\PUBLIC\PROJECT FILES\13 PROJECTS\IG1801\IG HAN-75\LAB DATA SHEETS\HAN-75 RAMPS.GPJ

NOTES: GROUNDWATER WAS ENCOUNTERED AT 10.5' DURING DRILLING AND UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: MIXED WITH 1/2 BAG OF BENTONITE PELLETS/SOIL CUTTINGS MIXTURE

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / ALAN</u>	DRILL RIG: <u>CME 75 TRUCK</u>	STATION / OFFSET: <u>812+97.5, 12.5' LT</u>	EXPLORATION ID
TYPE: <u>RAMP RE-ALIGNMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>US 68 RAMP D BASELINE</u>	B-117-0-13
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>2/20/07</u>	ELEVATION: <u>811.4 (MSL)</u> EOB: <u>44.0 ft.</u>	PAGE
START: <u>8/22/13</u> END: <u>8/22/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>81.9</u>	COORD: <u>41.028559760, 83.672751040</u>	1 OF 2

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			
ASPHALT PAVEMENT (4.75" THICK)	811.4																	
CONCRETE PAVEMENT (6.5" THICK)	810.5																	
VERY STIFF, DARK BROWN, SANDY SILT , SOME CLAY, SOME STONE FRAGMENTS, FILL, DAMP	807.9	1	4	9	25	100	SS-1	--	-	-	-	-	-	-	-	7	A-4a (V)	
MEDIUM STIFF, BROWN AND DARK BROWN, SILT AND CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, DAMP	805.4	4	4	2	8	78	SS-2	1.50	-	-	-	-	-	-	-	17	A-6a (V)	
STIFF, BROWN, SANDY SILT , SOME CLAY, TRACE STONE FRAGMENTS, FILL, DAMP	802.9	6	4	4	11	89	SS-3	2.00	-	-	-	-	-	-	-	15	A-4a (V)	
MEDIUM DENSE, GRAY, NON-PLASTIC SILT , TRACE SAND, FILL, DAMP	800.4	9	3	6	19	72	SS-4	--	-	-	-	-	-	-	-	15	A-4b (V)	
HARD TO STIFF, BROWN, SILT AND CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, DAMP	790.4	11	6	11	40	11	SS-5	--	-	-	-	-	-	-	-	14	A-6a (V)	
@13.5'; STIFF		14	5	3	11	78	SS-6	2.50	-	-	-	-	-	-	-	18	A-6a (V)	
@16.0'; VERY STIFF		16	3	7	19	83	SS-7	4.5+	-	-	-	-	-	-	-	15	A-6a (V)	
@18.0'; VERY STIFF		19	3	5	18	72	SS-8	4.5+	-	-	-	-	-	-	-	16	A-6a (V)	
VERY STIFF, BROWN, SILTY CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, DAMP	787.9	21	4	7	19	89	SS-9	3.50	-	-	-	-	-	-	-	17	A-6b (V)	
VERY STIFF, BROWN, CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, DAMP	783.4	24	6	6	19	83	SS-10	4.00	0	2	16	36	46	46	25	21	19	A-7-6 (14)
@28.0'; PUSHED SHELBY TUBE		28																
STIFF TO HARD, MOTTLED BROWN AND GRAY, CLAY , LITTLE SAND, DAMP		28				56	ST-11	4.00	-	-	-	-	-	-	-	16	A-7-6 (V)	

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT GDT-6/27/14-07:59-\\CLED001\PUBLIC\PROJECT FILES\13 PROJECTS\IG1801\G HAN-75\LAB DATA SHEETS\HAN-75 RAMP.S.GPJ

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-8/27/14-07:59-\\CLED001\PUBLIC\PROJECT FILES\13 PROJECTS\GIS\0110 HAN-75\LAB DATA SHEETS\HAN-75 RAMP.S.GPJ

PID: 87005		BR ID: _____		PROJECT: HAN-75-14.39		STATION / OFFSET: 812+97.5, 12.5' LT		START: 8/22/13		END: 8/22/13		PG 2 OF 2		B-117-0-13									
MATERIAL DESCRIPTION AND NOTES				ELEV. 781.4	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL		
											GR	CS	FS	SI	CL	LL	PL	PI					
STIFF TO HARD, MOTTLED BROWN AND GRAY, CLAY, LITTLE SAND, DAMP (continued)				781.4	31																	< \ / >	
					32																		
HARD @33.5'; NO SPLIT SPOON RECOVERY				781.4	33																		< \ / >
					34	7	11	33	0	SS-12	-	-	-	-	-	-	-	-	-	-	-	-	-
				781.4	35																		< \ / >
					36	3	5	14	78	SS-13	3.00	0	2	9	30	59	44	21	23	20	A-7-6 (14)		
MEDIUM DENSE TO VERY LOOSE, BROWN, NON-PLASTIC SANDY SILT, TRACE SAND, WET				772.9	37																		< \ / >
					38	6	7	20	83	SS-14	--	-	-	-	-	-	-	-	-	21	A-4a (V)		
@43.0'; VERY LOOSE @44.0' SPLIT SPOON AND AUGER REFUSAL, POSSIBLE DOLOMITE BEDROCK				767.4	39																		< \ / >
					40																		
				767.4	41																		< \ / >
					42																		
				767.4	43																		< \ / >
					44	WOH			17	SS-15	-	-	-	-	-	-	-	-	-	20			
					EOB																	< \ / >	

NOTES: GROUNDWATER WAS ENCOUNTERED AT 38.5' DURING DRILLING AND UPON COMPLETION OF DRILLING OPERATIONS.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: MIXED WITH 3/4 BAG SOIL CUTTINGS/BENTONITE PELLETS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>OTB / JOHN</u>	DRILL RIG: <u>DIEDRICH D-50 ATV</u>	STATION / OFFSET: <u>800+35.0, 2.1' RT</u>	EXPLORATION ID <u>B-119-0-13</u>
TYPE: <u>RAMP RE-ALIGNMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>LIMA RAMP G BASELINE</u>	
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>12/10/11</u>	ELEVATION: <u>788.7 (MSL)</u> EOB: <u>11.8 ft.</u>	PAGE 1 OF 1
START: <u>6/12/13</u> END: <u>6/12/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>81.7</u>	COORD: <u>41.025701690, 83.670449890</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
TOPSOIL (5" THICK) DENSE, GRAY, STONE FRAGMENTS , LITTLE SAND, FILL, DAMP	788.7 788.3	1																
		2																
		3	19 20 13	45	100	SS-1	--	-	-	-	-	-	-	-	5	A-1-a (V)		
STIFF, LIGHT GRAY, ELASTIC SILT AND CLAY , TRACE SAND, TRACE STONE FRAGMENTS , FILL, WET	785.2	4	5 3 1	5	100	SS-2	2.00	1	0	1	28	70	64	55	9	75	A-5 (12)	
		5																
@6.0'; DARK BROWN AND LIGHT GRAY		6																
		7	1 2 3	7	100	SS-3	--	-	-	-	-	-	-	-	42	A-5 (V)		
		8																
VERY STIFF, DARK BROWN, SILT AND CLAY , SOME SAND, TRACE STONE FRAGMENTS , DAMP @8.5'; PUSHED SHELBY TUBE, U.C. STRENGTH = 4818 psf. D.S. ANGLE OF SHEAR RESISTANCE = 20.2°, COHESION = 7.8 psi	780.2	9			83	ST-4	3.00	2	4	19	27	48	35	21	14	20	A-6a (10)	
		10																
		11																
GRAY DOLOMITE BEDROCK @11.8'; AUGER REFUSAL	777.2 776.9	TR EOB	50/3"		100	SS-5	--	-	-	-	-	-	-	-	-	-	Rock (V)	

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT GDT-6/27/14-07:59-UCLEDC01PUBLICPROJECT FILES\13 PROJECTS\G13011G HAN-75\LAB DATA SHEETS\HAN-75 RAMPFS.GPJ

NOTES: GROUNDWATER WAS ENCOUNTERED AT 10.5' DURING DRILLING, AT 6.8' UPON COMPLETION, AND 5.2' AFTER 14 HOURS OF COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: AUGER CUTTINGS MIXED WITH 1/2 BAG OF BENTONITE PELLETS/SOIL CUTTINGS MIXTURE

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH-DOT-GDT-7729/15 13:05-\\CLIEDC01\PUBLIC\PROJECT FILES\13 PROJECTS\G1301\G HAN-75\LAB DATA SHEETS\HAN-75 RAMPS.GPJ

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>OTB / JOHN</u>	DRILL RIG: <u>DIEDRICH D-50 ATV</u>	STATION / OFFSET: <u>801+91.9, 5.2' LT</u>	EXPLORATION ID: <u>B-120-0-13</u>
TYPE: <u>RAMP RE-ALIGNMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>LIMA RAMP G BASELINE</u>	
PID: <u>87005</u> BR ID: <u></u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>12/10/11</u>	ELEVATION: <u>788.2 (MSL)</u> EOB: <u>13.1 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>6/12/13</u> END: <u>6/13/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>81.7</u>	COORD: <u>41.025972270, 83.670893360</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV. 788.2	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			ODOT CLASS (GI)	BACK FILL		
								GR	CS	FS	SI	CL	LL	PL	PI			WC	
TOPSOIL (6" THICK)	787.7																		
VERY STIFF, LIGHT GRAY, ELASTIC CLAY , TRACE SAND, TRACE STONE FRAGMENTS, FILL, MOIST		1																	
@3.0'; SOFT		2	9	6	18	100	SS-1	3.00	-	-	-	-	-	-	-	-	42	A-7-5 (V)	
		3																	
		4	1	1	3	100	SS-2	0.50	-	-	-	-	-	-	-	-	52	A-7-5 (V)	
@5.0'; PUSHED SHELBY TUBE IN 2015 EXPLORATION. LL=57, PL=36, PI=21 EFFECTIVE SHEAR STRENGTH; PHI ANGLE = 17.8 DEG. AND COHESION = 11.9 PSI MEDIUM STIFF BLACK COLOR PRESENT		5																	
		6	2	2	4	8	100	SS-3	1.50	1	0	7	43	49	58	35	23	50	A-7-5 (17)
		7																	
STIFF, BROWN, SILTY CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, MOIST	780.2	8																	
@10.5'; NO SPLIT SPOON RECOVERY		9	3	3	5	11	100	SS-4	2.00	-	-	-	-	-	-	-	-	22	A-6b (V)
		10																	
GRAY DOLOMITE BEDROCK	777.5	11	50/2"			0	SS-5	-	-	-	-	-	-	-	-	-	-	-	Rock (V)
@13.1'; AUGER REFUSAL	775.1	12																	
	775.1	13	50/2"			50	SS-6	--	-	-	-	-	-	-	-	-	-	19	Rock (V)

NOTES: GROUNDWATER WAS ENCOUNTERED AT 13.0' DURING DRILLING AND AT 8.5' UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: AUGER CUTTINGS MIXED WITH 1/2 BAG OF BENTONITE PELLETS/SOIL CUTTINGS MIXTURE

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>BM / JOSH DEAN</u>	DRILL RIG: <u>DIEDRICH D-90 ATV</u>	STATION / OFFSET: <u>823+15.4, 9.4' LT</u>	EXPLORATION ID
TYPE: <u>RAMP RE-ALIGNMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>US 68 RAMP C BASELINE</u>	B-121-0-13
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>9/18/12</u>	ELEVATION: <u>780.0 (MSL)</u> EOB: <u>15.5 ft.</u>	PAGE
START: <u>7/24/13</u> END: <u>7/24/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>80.2</u>	COORD: <u>41.031371860, 83.673195960</u>	1 OF 1

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
TOPSOIL (6" THICK)	780.0																	
STIFF, BROWN, SILT AND CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, TRACE ROOTS, FILL, DAMP	779.5	1	3															
		2	4	7	15	83	SS-1	4.5+	-	-	-	-	-	-	-	-	15	A-6a (V)
	776.5	3																
MEDIUM STIFF, BROWN, SILTY CLAY , SOME SAND, TRACE STONE FRAGMENTS, FILL, MOIST	774.0	4	3	3	8	100	SS-2	1.00	-	-	-	-	-	-	-	-	21	A-6b (V)
		5																
STIFF, BROWN, SILT AND CLAY , SOME SAND, TRACE STONE FRAGMENTS, DAMP @6.0'; PUSHED SHELBY TUBE, U.C. STRENGTH = 4668 psf. D.S. ANGLE OF SHEAR RESISTANCE = 29.2°, COHESION = 2.6 psi	771.5	6																
		7				100	ST-3	2.00	2	6	15	39	38	31	19	12	18	A-6a (9)
		8																
STIFF TO HARD, BROWN TO GRAY, SANDY SILT , SOME CLAY, TRACE STONE FRAGMENTS, DAMP @9.7'; WET COARSE AND FINE SAND LAYER (3" THICK)	766.5	9	2	3	9	100	SS-4	2.00	-	-	-	-	-	-	-	-	16	A-4a (V)
		10		4														
@11.0'; HARD, GRAY		11																
		12	5	10	35	78	SS-5	4.5+	-	-	-	-	-	-	-	-	14	A-4a (V)
		13		16														
VERY DENSE, GRAY, DOLOMITE FRAGMENTS , TRACE SAND, WET	764.5	14	15	19	64	44	SS-6	--	-	-	-	-	-	-	-	-	-	A-1-a (V)
@15.5'; AUGER REFUSAL, POSSIBLE DOLOMITE BEDROCK	764.5	15		29														

<p>NOTES: GROUNDWATER WAS ENCOUNTERED AT 13.5' DURING DRILLING AND AT 6.0' UPON COMPLETION OF DRILLING OPERATIONS.</p> <p>ABANDONMENT METHODS, MATERIALS, QUANTITIES: SOIL MIXED WITH 1/2 BAG OF BENTONITE PELLETS/SOIL CUTTINGS MIXTURE</p>																	
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STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT GDT-02/14-07-59-UCLEDC01PUBLICPROJECT FILES\13 PROJECTS\IG\8011G HAN-75\LAB DATA SHEETS\HAN-75 RAMPSS.GPJ

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>OTB / JOHN</u>	DRILL RIG: <u>DIEDRICH D-50 ATV</u>	STATION / OFFSET: <u>818+98.8, 1.3' RT</u>	EXPLORATION ID
TYPE: <u>RAMP RE-ALIGNMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>US 68 RAMP C BASELINE</u>	B-122-0-13
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>12/10/11</u>	ELEVATION: <u>777.4 (MSL)</u> EOB: <u>11.0 ft.</u>	PAGE
START: <u>6/12/13</u> END: <u>6/12/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>81.7</u>	COORD: <u>41.030254180, 83.673462350</u>	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			
TOPSOIL (8" THICK)	777.4																	
STIFF, MOTTLED BROWN AND GRAY, SILTY CLAY , SOME SAND, DAMP	776.7	1	2															
		2	3	10	100	SS-1	1.75	0	4	17	35	44	40	19	21	18	A-6b (12)	
		3	4															
STIFF, BROWN AND GRAY, SILT AND CLAY , SOME SAND, TRACE STONE FRAGMENTS, DAMP	773.9	4	2															
		5	3	10	89	SS-2	2.00	-	-	-	-	-	-	-	-	17	A-6a (V)	
		6	4															
STIFF, GRAY, SILT , SOME CLAY, TRACE SAND, DAMP	771.4	7	5															
		8	4	14	100	SS-3	2.00	-	-	-	-	-	-	-	-	19	A-4b (V)	
		9	6															
STIFF, BROWN, SANDY SILT , SOME CLAY, LITTLE STONE FRAGMENTS, DAMP	768.9	10	8															
	768.4	11	8	40	79	44	SS-4A&B	2.00	-	-	-	-	-	-	-	11	A-4a (V)	
VERY DENSE, GRAY, DOLOMITE FRAGMENTS , TRACE SAND				18													A-1-a (V)	
@11.0'; SPLIT SPOON REFUSAL, POSSIBLE DOLOMITE BEDROCK	766.4	EOB																
			50/0"			SS-5												

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT GDT-6/27/14-07:59-\\CLED001\PUBLIC\PROJECT FILES\13 PROJECTS\G1801\G HAN-75\LAB DATA SHEETS\HAN-75 RAMPS.GPJ

NOTES: GROUNDWATER WAS ENCOUNTERED AT 9.0' DURING DRILLING AND AT 6.1' UPON COMPLETION OF DRILLING OPERATIONS.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: SOIL MIXED WITH 1/2 BAG OF BENTONITE PELLETS/SOIL CUTTINGS MIXTURE

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>OTB / JOHN</u>	DRILL RIG: <u>DIEDRICH D-50 ATV</u>	STATION / OFFSET: <u>814+95.1, 1.8' RT</u>	EXPLORATION ID
TYPE: <u>RAMP RE-ALIGNMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / S.SHAN</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>US 68 RAMP C BASELINE</u>	B-123-0-13
PID: <u>87005</u> BR ID: <u></u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>12/10/11</u>	ELEVATION: <u>777.0 (MSL)</u> EOB: <u>10.0 ft.</u>	PAGE
START: <u>7/31/13</u> END: <u>7/31/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>81.7</u>	COORD: <u>41.029420920, 83.674409930</u>	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			
TOPSOIL (12" THICK)	777.0																<< < > >>	
MEDIUM STIFF, MOTTLED BROWN AND GRAY, SILTY CLAY , SOME SAND, TRACE STONE FRAGMENTS, MOIST	776.0	1	2	7	67	SS-1	1.00	-	-	-	-	-	-	-	22	A-6b (V)	<< < > >>	
		2	3														<< < > >>	
		3															<< < > >>	
STIFF, BROWN, SANDY SILT , SOME CLAY, LITTLE STONE FRAGMENTS, DAMP	773.5	4	4	12	100	SS-2	2.00	-	-	-	-	-	-	-	15	A-4a (V)	<< < > >>	
		5	5														<< < > >>	
	771.0	6	4														<< < > >>	
MEDIUM DENSE, GRAY, NON-PLASTIC SILT , TRACE SAND, TRACE STONE FRAGMENTS, MOIST		7	5	18	78	SS-3	--	1	2	8	60	29	NP	NP	NP	18	A-4b (8)	<< < > >>
		8																<< < > >>
	768.5	9	35															<< < > >>
DENSE, GRAY, NON-PLASTIC SANDY SILT , MOIST	768.0	TR	50/2"	-	75	SS-4	--	-	-	-	-	-	-	-	10	A-4a (V)	<< < > >>	
GRAY DOLOMITE BEDROCK																		<< < > >>
@10.0' SPLIT SPOON AND AUGER REFUSAL	767.0	EOB	10	50/0"		SS-5	--	-	-	-	-	-	-	-		Rock (V)	<< < > >>	

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT GDT-6/27/14-07:59-\\CLED001\PUBLIC\PROJECT FILES\13 PROJECTS\G1001\G HAN-75\LAB DATA SHEETS\HAN-75 RAMP.S.GPJ

NOTES: GROUNDWATER WAS ENCOUNTERED AT 8.5' DURING DRILLING AND AT 5.6' UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: HAN-75-14.39	DRILLING FIRM / OPERATOR: OTB / JOHN	DRILL RIG: DIEDRICH D-50 ATV	STATION / OFFSET: 810+98.5, 0.4' RT	EXPLORATION ID: B-124-0-13
TYPE: RAMP RE-ALIGNMENT	SAMPLING FIRM / LOGGER: PGI / F.BUSHER	HAMMER: DIEDRICH AUTOMATIC	ALIGNMENT: US 68 RAMP C BASELINE	
PID: 87005 BR ID:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 12/10/11	ELEVATION: 776.7 (MSL) EOB: 10.5 ft.	PAGE: 1 OF 1
START: 7/31/13 END: 7/31/13	SAMPLING METHOD: SPT	ENERGY RATIO (%): 81.7	COORD: 41.028694490, 83.675480710	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			ODOT CLASS (GI)	BACK FILL	
								GR	CS	FS	SI	CL	LL	PL	PI			WC
TOPSOIL (12" THICK)	776.7																	
MEDIUM STIFF TO STIFF, MOTTLED BROWN AND GRAY, CLAY, SOME SAND, MOIST @3.5'; STIFF	775.7	1	1	3	8	78	SS-1	1.00	0	2	21	39	38	41	23	18	24	A-7-6 (11)
		2																
		3																
		4	2	4	5	12	83	SS-2	2.00	-	-	-	-	-	-	-	25	A-7-6 (V)
		5																
	770.7	6																
VERY STIFF, GRAY, SILT, SOME CLAY, LITTLE SAND, MOIST @7.2'; WET, BROWN COARSE AND FINE SAND SEAM (2" THICK)	770.7	7	4	6	7	18	89	SS-3	4.5+	-	-	-	-	-	-	-	19	A-4b (V)
		8																
DENSE, GRAY, DOLOMITE FRAGMENTS, TRACE SAND, DAMP	768.2	9	13	24			88	SS-4	--	-	-	-	-	-	-	-	9	A-1-a (V)
GRAY DOLOMITE BEDROCK	767.2	TR																
@10.5' SPLIT SPOON AND AUGER REFUSAL	766.2	EOB																

50/0"	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Rock (V)
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NOTES: GROUNDWATER WAS ENCOUNTERED AT 8.5' DURING DRILLING AND AT 5.3' UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT GDT-6/27/14-07:59-\\CLED001\PUBLIC\PROJECT FILES\13 PROJECTS\G1801\G HAN-75\LAB DATA SHEETS\HAN-75 RAMP5.GPJ

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>OTB / JOHN</u>	DRILL RIG: <u>DIEDRICH D-50 ATV</u>	STATION / OFFSET: <u>806+90.1, 3.2' LT</u>	EXPLORATION ID
TYPE: <u>RAMP RE-ALIGNMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>US 68 RAMP C BASELINE</u>	B-125-0-13
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>12/10/11</u>	ELEVATION: <u>778.7 (MSL)</u> EOB: <u>11.1 ft.</u>	PAGE
START: <u>6/12/13</u> END: <u>6/12/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>81.7</u>	COORD: <u>41.027734030, 83.676199750</u>	1 OF 1

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
TOPSOIL (10" THICK)	778.7																	
MEDIUM DENSE, BROWN AND GRAY, NON-PLASTIC SILT , LITTLE SAND, MOIST @1.0'; NO SPLIT SPOON RECOVERY	777.9	1	5	5	14	0	SS-1	-	-	-	-	-	-	-	-	-	-	A-4b (V)
@3.5'; PUSHED SHELBY TUBE		2																
		3																
		4				83	ST-2	--	-	-	-	-	-	-	-	-	21	A-4b (V)
		5																
	772.7	6	4	4	11	100	SS-3	2.00	0	1	9	64	26	24	19	5	18	A-4b (8)
STIFF, GRAY, SILT , SOME CLAY, TRACE SAND, DAMP		7																
		8																
	770.2	9	6	17	46	89	SS-4	--	-	-	-	-	-	-	-	-	8	A-4a (V)
DENSE, GRAY, NON-PLASTIC SANDY SILT , SOME STONE FRAGMENTS, DAMP		10																
		11																
GRAY DOLOMITE BEDROCK @11.1' AUGER REFUSAL	767.7 767.6		60/1"			100	SS-5	--	-	-	-	-	-	-	-	-	13	Rock (V)

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-6/27/14-07:59-\\CLED001\PUBLIC\PROJECT FILES\13 PROJECTS\13011G HAN-75\LAB DATA SHEETS\HAN-75 RAMP5.GPJ

NOTES: GROUNDWATER WAS ENCOUNTERED AT 11.0' DURING DRILLING AND AT 5.9' UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: HOLE WAS BACKFILLED WITH 1/2 BAG OF BENTONITE PELLETS/SOIL CUTTINGS MIXTURE

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>OTB / JOHN</u>	DRILL RIG: <u>DIEDRICH D-50 ATV</u>	STATION / OFFSET: <u>800+80.3, 9.2' RT</u>	EXPLORATION ID <u>B-132-0-13</u>
TYPE: <u>RAMP RE-ALIGNMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>US 68 RAMP C BASELINE</u>	
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>12/10/11</u>	ELEVATION: <u>776.2 (MSL)</u> EOB: <u>11.0 ft.</u>	PAGE 1 OF 1
START: <u>6/25/13</u> END: <u>6/25/13</u>	SAMPLING METHOD: <u>SPT/NX</u>	ENERGY RATIO (%): <u>81.7</u>	COORD: <u>41.026207800, 83.675551360</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI		
TOPSOIL (11" THICK)	776.2																
MEDIUM STIFF, BROWN AND DARK BROWN, SILTY CLAY , LITTLE SAND, LITTLE STONE FRAGMENTS AND ROOTS, DAMP	775.3	1	2	8	67	SS-1	1.00	15	1	11	29	44	39	20	19	19	A-6b (11)
@3.5'; NO SPLIT SPOON RECOVERY	772.7	3															
POSSIBLE GRAY DOLOMITE BEDROCK	772.7	TR	60/1"	-	0	SS-2	-	-	-	-	-	-	-	-	-	-	Rock (V)
@4.5' AUGER REFUSAL, BEGAN CORING BEDROCK	771.7	4															
DOLOMITE , GRAY, HIGHLY TO MODERATELY WEATHERED, SLIGHTLY STRONG, VERY THIN TO THIN BEDDED, MODERATELY FRACTURED.	771.7	5															
		6															
		7															
		8	26		96	NX-1											CORE
		9															
		10															
	765.2	11															
		EOB															

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-6/27/14-07:59-\\CLED001\PUBLIC\PROJECT FILES\13 PROJECTS\G18011G HAN-75\LAB DATA SHEETS\HAN-75 RAMP5.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING. NO READING WAS TAKEN UPON COMPLETION DUE TO WATER USED DURING ROCK CORING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT GDT - 6/16/14 11:50 - M:\PROJECT FILES\13011G HAN-75\LAB DATA SHEETS\HAN-75 RAMPS.GPJ

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>BM / JOSH DEAN</u>	DRILL RIG: <u>DIEDRICH D-90 ATV</u>	STATION / OFFSET: <u>794+35.02, 4.41 RT</u>	EXPLORATION ID: <u>B-136-0-13</u>
TYPE: <u>RAMP RE-ALIGNMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>US 68 RAMP C BASELINE</u>	
PID: <u>87005</u> STR ID: <u></u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>9/18/12</u>	ELEVATION: <u>785.9 (MSL)</u> EOB: <u>17.5 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>8/6/13</u> END: <u>8/6/13</u>	SAMPLING METHOD: <u>SPT/NX</u>	ENERGY RATIO (%): <u>80.2</u>	COORD: <u>41.025636310, 83.673427950</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTH	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
GRAVEL (5" THICK)	785.9																	
STIFF, DARK BROWN TO BROWN, SILT AND CLAY, LITTLE SAND, LITTLE TO TRACE STONE FRAGMENTS, FILL, DAMP	785.5	1	4															
		2	4	15	67	SS-1	--	-	-	-	-	-	-	-	15	A-6a (V)		
@3.5'; TRACE STONE FRAGMENTS		3																
		4	5	15	94	SS-2	2.00	-	-	-	-	-	-	-	16	A-6a (V)		
@6.0'; BLACK, TRACE STONE FRAGMENTS, SLIGHTLY ORGANIC, DAMP		5																
		6	4	12	89	SS-3	3.00	3	4	15	39	39	37	22	18	A-6a (10)		
@8.5'; BROWN, TRACE STONE FRAGMENTS		7																
		8																
@11.0'; PUSHED SHELBY TUBE	774.9	9	2	9	94	SS-4	2.00	-	-	-	-	-	-	-	18	A-6a (V)		
		10	3															
STIFF, BROWN, MOTTLED GRAY, SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS, MOIST	774.4	11			100	ST-5	3.00	-	-	-	-	-	-	-	24	A-6b (V)		
POSSIBLE DOLOMITE BEDROCK		12																
@12.5'; AUGER REFUSAL, BEGAN CORING BEDROCK	773.4	13																
DOLOMITE GRAY, HIGHLY TO MODERATELY WEATHERED, STRONG, VERY THIN TO THIN BEDDED, HIGHLY TO MODERATELY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH, FEW VERTICAL & ANGULAR FRACTURES.		14																
		15	7	93		NX-1										CORE		
		16																
		17																
	768.4	EOB																

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING. NO READING WAS TAKEN UPON COMPLETION DUE TO WATER USED DURING ROCK CORING OPERATIONS.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>BM / JOSH DEAN</u>	DRILL RIG: <u>DIEDRICH D-90 ATV</u>	STATION / OFFSET: <u>791+31.2, 4.2' LT</u>	EXPLORATION ID
TYPE: <u>RAMP RE-ALIGNMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>US 68 RAMP C BASELINE</u>	B-138-0-13
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>9/18/12</u>	ELEVATION: <u>782.7 (MSL)</u> EOB: <u>10.0 ft.</u>	PAGE
START: <u>8/6/13</u> END: <u>8/6/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>80.2</u>	COORD: <u>41.025541970, 83.672333910</u>	1 OF 1

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI		
ASPHALT PAVEMENT (18" THICK)	782.7																
VERY STIFF, DARK BROWN AND GRAY, SILT AND CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, DAMP	781.2	1															
		2	5	19	94	SS-1	4.5+	-	-	-	-	-	-	-	16	A-6a (V)	
		3	6	8													
		4	11	25	83	SS-2	2.00	-	-	-	-	-	-	-	15	A-6a (V)	
STIFF, MOTTLED BROWN AND GRAY, SILTY CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, DAMP @7.5'; PUSHED SHELBY TUBE, U.C. STRENGTH = 1887 psf. D.S. ANGLE OF SHEAR RESISTANCE = 24.8°, COHESION = 4.0 psi	776.7	5															
		6	3	11	100	SS-3	--	-	-	-	-	-	-	-	19	A-6b (V)	
		7	4	4													
GRAY DOLOMITE BEDROCK @10.0'; AUGER REFUSAL	773.7	8			100	ST-4	2.00	3	3	14	36	44	37	19	18	22	A-6b (11)
	772.7	9	50/1"		50	SS-5	--	-	-	-	-	-	-	-	18	Rock (V)	
		10															

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-6/27/14-07:59-\\CLED001\PUBLIC\PROJECT FILES\13 PROJECTS\1010\G HAN-75\LAB DATA SHEETS\HAN-75 RAMP5.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / ALAN</u>	DRILL RIG: <u>CME 75 TRUCK</u>	STATION / OFFSET: <u>787+35.6, 21.5' RT</u>	EXPLORATION ID <u>B-140-0-13</u>
TYPE: <u>RAMP RE-ALIGNMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>US 68 RAMP C BASELINE</u>	
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>1/6/12</u>	ELEVATION: <u>798.8 (MSL)</u> EOB: <u>10.0 ft.</u>	PAGE <u>1 OF 1</u>
START: <u>8/21/13</u> END: <u>8/21/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>77</u>	COORD: <u>41.025301800, 83.670929270</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			ODOT CLASS (GI)	BACK FILL		
								GR	CS	FS	SI	CL	LL	PL	PI			WC	
TOPSOIL (3" THICK)	798.8																		
STIFF TO VERY STIFF, DARK BROWN AND BROWN, SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS, FILL, DAMP @1.0'; TRACE ROOTS	798.5	1	7	3	9	28	SS-1	--	-	-	-	-	-	-	-	-	10	A-4a (V)	
@3.5'; VERY STIFF		2																	
@5.5'; STIFF		3																	
		4	7	4	9	17	39	SS-2	4.25	-	-	-	-	-	-	-	12	A-4a (V)	
		5																	
		6	6	6	6	15	83	SS-3	4.25	5	7	17	38	33	28	18	10	13	A-4a (7)
		7																	
		8																	
VERY STIFF, BROWN AND GRAY, SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS, FILL, DAMP	790.3	9	7	10	10	26	89	SS-4	3.50	-	-	-	-	-	-	-	16	A-6a (V)	
	788.8	10																	
		EOB																	

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-6/27/14-07:59-\\CLED001\PUBLIC\PROJECT FILES\13 PROJECTS\130111G HAN-75\LAB DATA SHEETS\HAN-75 RAMP.S.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>OTB / JOHN</u>	DRILL RIG: <u>DIEDRICH D-50 ATV</u>	STATION / OFFSET: <u>790+87.3, 6.7' LT</u>	EXPLORATION ID <u>B-141-0-13</u>
TYPE: <u>RAMP RE-ALIGNMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>LIMA RAMP E BASELINE</u>	
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>12/10/11</u>	ELEVATION: <u>789.5 (MSL)</u> EOB: <u>13.7 ft.</u>	PAGE 1 OF 1
START: <u>6/19/13</u> END: <u>6/19/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>81.7</u>	COORD: <u>41.025372990, 83.672210850</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV. 789.5	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			
MEDIUM STIFF TO SOFT, BROWN, SILTY CLAY , TRACE SAND, TRACE STONE FRAGMENTS, FILL, WET		1															<< << <<	
		2	2	7	67	SS-1	--	-	-	-	-	-	-	-	39	A-6b (V)	<< << <<	
@3.0'; SOFT		3															<< << <<	
		4	1	3	83	SS-2	0.50	1	0	1	56	42	37	17	20	47	A-6b (12)	<< << <<
	783.5	5															<< << <<	
VERY SOFT, LIGHT GRAY, ELASTIC CLAY , TRACE SAND, FILL, WET		6															<< << <<	
		7	1	-	100	SS-3	0.25	-	-	-	-	-	-	-	81	A-7-5 (V)	<< << <<	
	781.0	8															<< << <<	
STIFF, BROWN, SILTY CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, MOIST		9	3	10	100	SS-4	3.25	1	3	13	54	29	37	18	19	22	A-6b (12)	<< << <<
		10	2	5													<< << <<	
		11															<< << <<	
		12	2	3	12	100	SS-5	2.25	-	-	-	-	-	-	20	A-6b (V)	<< << <<	
		13	3	6													<< << <<	
GRAY DOLOMITE BEDROCK	776.0 775.8	TR EUB	50/2"	-	100	SS-6	-	-	-	-	-	-	-	-	-	-	Rock (V)	<< << <<

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT GDT-6/27/14-07:59-\\CLED001\PUBLIC\PROJECT FILES\13 PROJECTS\G1801\G HAN-75\LAB DATA SHEETS\HAN-75 RAMP\G.PJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>OTB / JOHN</u>	DRILL RIG: <u>DIEDRICH D-50 ATV</u>	STATION / OFFSET: <u>787+84.5, 19.5' RT</u>	EXPLORATION ID: <u>B-143-0-13</u>
TYPE: <u>RAMP RE-ALIGNMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>LIMA RAMP E BASELINE</u>	
PID: <u>87005</u> BR ID: <u></u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>12/10/11</u>	ELEVATION: <u>785.6 (MSL)</u> EOB: <u>14.5 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>6/17/13</u> END: <u>6/17/13</u>	SAMPLING METHOD: <u>SPT/NX</u>	ENERGY RATIO (%): <u>81.7</u>	COORD: <u>41.025106680, 83.671164270</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI		
TOPSOIL (8" THICK)	785.6																
LOOSE, GRAY, STONE FRAGMENTS WITH SAND AND SILT , FILL, DAMP	785.0	1	3	7	67	SS-1	--	29	28	15	13	15	24	17	7	15	A-2-4 (0)
		2															
		3															
SOFT, BROWN, SILTY CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, MOIST	782.1	4	3	4	67	SS-2	0.50	-	-	-	-	-	-	-	-	20	A-6b (V)
		5															
		6															
MEDIUM DENSE, GRAY, STONE FRAGMENTS WITH SAND AND SILT , SOME WOOD PIECES, FILL @6.0'; STRONG CREOSOTE ODOR	779.6	7	3	15	22	SS-3	--	-	-	-	-	-	-	-	-	11	A-2-4 (V)
		8															
GRAY DOLOMITE BEDROCK @9.0'; AUGER REFUSAL AND BEGAN CORING BEDROCK	776.6	9	50/3"	-	33	SS-4	--	-	-	-	-	-	-	-	-	4	Rock (V)
DOLOMITE , GRAY, HIGHLY WEATHERED, SLIGHTLY STRONG, VERY THIN TO THIN BEDDED, HIGHLY FRACTURED.		10			100	NX-1											CORE
@11.0'; DOLOMITE , GRAY, MODERATELY WEATHERED, STRONG, VERY THIN TO THIN BEDDED, HIGHLY TO MODERATELY FRACTURED.		11															
		12															
		13		14	95	NX-2											CORE
		14															
	771.1																

<p>NOTES: GROUNDWATER WAS ENCOUNTERED AT 8.5' DURING DRILLING. NO READING WAS TAKEN UPON COMPLETION DUE TO WATER USED DURING ROCK CORING OPERATIONS.</p> <p>ABANDONMENT METHODS, MATERIALS, QUANTITIES: NOT RECORDED</p>
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STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT GDT-6/27/14-07:59-\\CLED001\PUBLIC\PROJECT FILES\13 PROJECTS\IG1001\G HAN-75\LAB DATA SHEETS\HAN-75 RAMP\G.PJ

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>OTB / JOHN</u>	DRILL RIG: <u>DIEDRICH D-50 ATV</u>	STATION / OFFSET: <u>783+96.1, 14.2' LT</u>	EXPLORATION ID
TYPE: <u>RAMP RE-ALIGNMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>LIMA RAMP E BASELINE</u>	B-144-0-13
PID: <u>87005</u> BR ID: <u></u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>12/10/11</u>	ELEVATION: <u>787.4 (MSL)</u> EOB: <u>6.1 ft.</u>	PAGE
START: <u>6/14/13</u> END: <u>6/14/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>81.7</u>	COORD: <u>41.024413650, 83.670086550</u>	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				
TOPSOIL (6" THICK)	787.4																	<V>	
SOFT, LIGHT GRAY, ELASTIC CLAY , TRACE SAND, FILL, MOIST	786.9	1	1	2	4	100	SS-1	0.50	0	0	3	48	49	75	59	16	79	A-7-5 (14)	<V>
		2																<V>	
		3																<V>	
LOOSE, BROWN, NON-PLASTIC SILT , TRACE SAND, WET	783.9	4	WOH	1	7	17	SS-2	--	-	-	-	-	-	-	-	-	37	A-4b (V)	<V>
		5																<V>	
		6																<V>	
GRAY DOLOMITE BEDROCK @6.1'; AUGER REFUSAL	781.4	6	TR				SS-3	--	-	-	-	-	-	-	-	-	-	Rock (V)	<V>
	781.3																		<V>

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-6/27/14-07:59-\\CLED001\PUBLIC\PROJECT FILES\13 PROJECTS\G130110 HAN-75\LAB DATA SHEETS\HAN-75 RAMP.S.GPJ

NOTES: GROUNDWATER WAS ENCOUNTERED AT 4.8' DURING AND UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>OTB / JOHN</u>	DRILL RIG: <u>DIEDRICH D-50 ATV</u>	STATION / OFFSET: <u>779+09.7, 8.2' RT</u>	EXPLORATION ID <u>B-145-0-13</u>
TYPE: <u>RAMP RE-ALIGNMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>LIMA RAMP E BASELINE</u>	
PID: <u>87005</u> BR ID: <u></u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>12/10/11</u>	ELEVATION: <u>788.3 (MSL)</u> EOB: <u>3.8 ft.</u>	PAGE 1 OF 1
START: <u>6/17/13</u> END: <u>6/17/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>81.7</u>	COORD: <u>41.023590920, 83.668689510</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL	
								GR	CS	FS	SI	CL	LL	PL	PI				
TOPSOIL (18" THICK)	788.3																	<L> >L>	
STIFF, BROWN, SILT AND CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, TRACE ROOTS, MOIST	786.8	1																<L> >L>	
		2	2	3	11	100	SS-1	2.00	6	5	14	35	40	30	18	12	16	A-6a (9)	<L> >L>
		3																<L> >L>	
GRAY DOLOMITE BEDROCK @3.8'; AUGER REFUSAL	784.7 784.5	EOB	50/3"	-	67	SS-2	--	-	-	-	-	-	-	-	-	-	-	Rock (V)	<L> >L>

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-6/27/14-07:59-\\CLED001\PUBLIC\PROJECT FILES\13 PROJECTS\G13011G HAN-75\LAB DATA SHEETS\HAN-75 RAMP.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>OTB / JOHN</u>	DRILL RIG: <u>DIEDRICH D-50 ATV</u>	STATION / OFFSET: <u>758+01.3, 77.5' RT</u>	EXPLORATION ID <u>B-146-0-13</u>
TYPE: <u>RAMP RE-ALIGNMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>LIMA RAMP A BASELINE</u>	PAGE 1 OF 1
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>12/10/11</u>	ELEVATION: <u>791.7 (MSL)</u> EOB: <u>4.1 ft.</u>	
START: <u>6/13/13</u> END: <u>6/13/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>81.7</u>	COORD: <u>41.023189970, 83.667804980</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
TOPSOIL (6" THICK)	791.7																	<L> >V> <L>
VERY STIFF, BROWN, SILTY CLAY , SOME SAND, FILL, MOIST	791.2	1	3															<L> >V> <L>
		2	4	11	100	SS-1	3.75	0	6	16	36	42	34	16	18	16	A-6b (11)	<L> >V> <L>
@3.5'; NO SPLIT SPOON RECOVERY	788.2	3																<L> >V> <L>
POSSIBLE DOLOMITE BEDROCK	787.6	TR	60/1"	-	0	SS-2	--	-	-	-	-	-	-	-	-	-	Rock (V)	<L> >V> <L>
AUGER REFUSAL AT 4.0' @4.1'; AUGER REFUSAL	787.6	EOB																<L> >V> <L>

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-6/27/14-07:59 \\\CLEDC01\PUBLIC\PROJECT FILES\13 PROJECTS\G18011G HAN-75\LAB DATA SHEETS\HAN-75 RAMP.S.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>BM / JOSH DEAN</u>	DRILL RIG: <u>DIEDRICH D-90 ATV</u>	STATION / OFFSET: <u>753+86.6, 11.1' RT</u>	EXPLORATION ID <u>B-147-0-13</u>
TYPE: <u>RAMP RE-ALIGNMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>LIMA RAMP A BASELINE</u>	PAGE 1 OF 1
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>9/18/12</u>	ELEVATION: <u>791.3 (MSL)</u> EOB: <u>3.0 ft.</u>	
START: <u>8/6/13</u> END: <u>8/6/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>80.2</u>	COORD: <u>41.022590820, 83.666389970</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL	
								GR	CS	FS	SI	CL	LL	PL	PI				
TOPSOIL (3" THICK) SOFT, BROWN, SANDY SILT , SOME CLAY, TRACE STONE FRAGMENTS, MOIST	791.0																	<L> >L> <L> >L>	
POSSIBLE DOLOMITE BEDROCK	789.8	TR	2	50/4"	-	80	SS-1	0.50	7	8	20	31	34	23	15	8	20	A-4a (6)	<L> >L> <L> >L>
@3.0'; AUGER REFUSAL	788.3	EOB																<L> >L> <L> >L>	

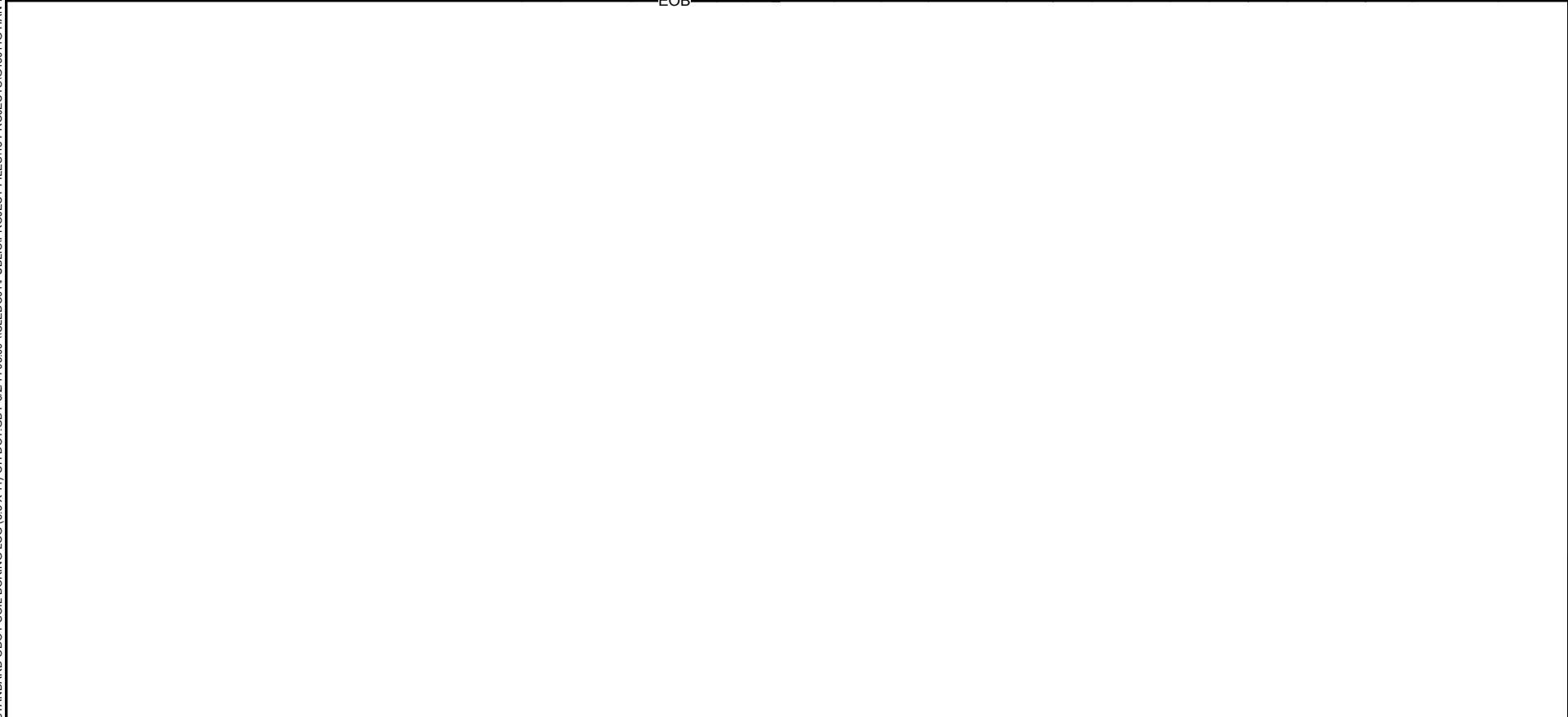
STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-8/27/14-07:59-\\CLED001\PUBLIC\PROJECT FILES\13 PROJECTS\G18011G HAN-75\LAB DATA SHEETS\HAN-75 RAMP.S GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>BM / JOSH DEAN</u>	DRILL RIG: <u>DIEDRICH D-90 ATV</u>	STATION / OFFSET: <u>750+01.2, 42.4' LT</u>	EXPLORATION ID <u>B-148-0-13</u>
TYPE: <u>RAMP RE-ALIGNMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>US 68 BASELINE</u>	
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>9/18/12</u>	ELEVATION: <u>794.4 (MSL)</u> EOB: <u>5.5 ft.</u>	PAGE 1 OF 1
START: <u>8/7/13</u> END: <u>8/7/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>80.2</u>	COORD: <u>41.021978550, 83.665250330</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL	
								GR	CS	FS	SI	CL	LL	PL	PI				
TOPSOIL (4" THICK)	794.4																	<< < > >>	
MEDIUM STIFF, BROWN, SILT AND CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, DAMP	794.1	1	4	2	5	89	SS-1	1.00	-	-	-	-	-	-	-	-	18	A-6a (V)	<< < > >>
		2																<< < > >>	
		3																<< < > >>	
STIFF, BROWN, CLAY , SOME SAND, TRACE STONE FRAGMENTS, MOIST	790.9	4	3	4	11	72	SS-2	2.00	2	4	17	31	46	42	18	24	21	A-7-6 (14)	<< < > >>
@5.5'; AUGER REFUSAL, POSSIBLE DOLOMITE BEDROCK	788.9	5																<< < > >>	
		EOB																<< < > >>	

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-8/27/14 08:00-10:00 PUBLIC PROJECT FILES\13 PROJECTS\GIS\001\G HAN-75\LAB DATA SHEETS\HAN-75 RAMP.S.GPJ



NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>BM / JOSH DEAN</u>	DRILL RIG: <u>DIEDRICH D-90 ATV</u>	STATION / OFFSET: <u>745+86.6, 40.5' LT</u>	EXPLORATION ID <u>B-149-0-13</u>
TYPE: <u>RAMP RE-ALIGNMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>US 68 BASELINE</u>	
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>9/18/12</u>	ELEVATION: <u>797.6 (MSL)</u> EOB: <u>5.5 ft.</u>	PAGE 1 OF 1
START: <u>8/7/13</u> END: <u>8/7/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>80.2</u>	COORD: <u>41.021291220, 83.664052820</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL	
								GR	CS	FS	SI	CL	LL	PL	PI				
GRAVEL	797.6																		
VERY STIFF, BROWN AND GRAY, SANDY SILT , SOME CLAY, TRACE STONE FRAGMENTS, FILL, DAMP	796.6	1	4	7	19	83	SS-1	4.5+	-	-	-	-	-	-	-	-	10	A-4a (V)	
VERY STIFF, BROWN, CLAY , LITTLE SAND, DAMP	794.1	2																	
@5.5'; AUGER REFUSAL, POSSIBLE DOLOMITE BEDROCK	792.1	3																	
	792.1	4	4	6	17	100	SS-2	4.5+	1	3	16	29	51	48	22	26	20	A-7-6 (16)	
		5																	
		EOB																	

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-6/27/14-08:00-\\CLED001\PUBLIC\PROJECT FILES\13 PROJECTS\G18011G HAN-75\LAB DATA SHEETS\HAN-75 RAMP.S.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / ALAN</u>	DRILL RIG: <u>CME 75 TRUCK</u>	STATION / OFFSET: <u>788+20.0, 1.0' RT</u>	EXPLORATION ID
TYPE: <u>RAMP RE-ALIGNMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>US 68 RAMP B BASELINE</u>	B-150-0-13
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>1/6/12</u>	ELEVATION: <u>785.9 (MSL)</u> EOB: <u>9.8 ft.</u>	PAGE
START: <u>8/8/13</u> END: <u>8/8/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>77</u>	COORD: <u>41.023675020, 83.678770330</u>	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			
ASPHALT PAVEMENT (4.5" THICK)	785.9																	
CONCRETE PAVEMENT (11.5" THICK)	785.5																	
CRUSHED DOLOMITE AGGREGATE BASE (8" THICK)	784.6	1																
VERY STIFF, BROWN, STONE FRAGMENTS WITH SAND , SOME FINES, FILL, DAMP	783.9	2																
	782.4	3	14 7 14	27	44	SS-1	--	29	32	14	16	9	25	22	3	10	A-1-b (0)	
VERY STIFF, DARK BROWN TO BROWN, SILT AND CLAY , SOME TO LITTLE SAND, LITTLE TO TRACE STONE FRAGS, FILL, DAMP		4	15 7 9	21	56	SS-2	2.50	17	11	14	32	26	30	17	13	13	A-6a (6)	
@5.0'; BROWN		5	5 10 11	27	78	SS-3	4.5+	-	-	-	-	-	-	-	-	13	A-6a (V)	
@6.5'; BLACK, LITTLE SAND, TRACE STONE FRAGMENTS		6																
		7	7 8 9	22	83	SS-4	4.5+	-	-	-	-	-	-	-	-	17	A-6a (V)	
@8.0'; LITTLE SAND, TRACE STONE FRAGMENTS	777.4	8	5 50/3"	-	56	SS-5	--	-	-	-	-	-	-	-	-	16	A-6a (V)	
GRAY DOLOMITE BEDROCK	776.1	9																
		EOB	50/3"	-	-	SS-6	--	-	-	-	-	-	-	-	-	-	Rock (V)	

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-6/27/14 08:00-VLIED001\PUBLIC\PROJECT FILES\13 PROJECTS\13011G HAN-75\LAB DATA SHEETS\HAN-75 RAMP5.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / ALAN</u>	DRILL RIG: <u>CME 75 TRUCK</u>	STATION / OFFSET: <u>791+93.8, 54.8' RT</u>	EXPLORATION ID <u>B-151-0-13</u>
TYPE: <u>RAMP RE-ALIGNMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>LIMA RAMP F BASELINE</u>	PAGE 1 OF 1
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>1/6/12</u>	ELEVATION: <u>789.1 (MSL)</u> EOB: <u>10.0 ft.</u>	
START: <u>8/23/13</u> END: <u>8/23/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>77</u>	COORD: <u>41.023935780, 83.677446860</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			ODOT CLASS (GI)	BACK FILL		
								GR	CS	FS	SI	CL	LL	PL	PI			WC	
ASPHALT PAVEMENT (4.75" THICK)	789.1																		
CONCRETE PAVEMENT (8" THICK)	788.7																		
LIMESTONE AGGREGATE BASE (5" THICK)	788.0																		
HARD, BROWN TO DARK BROWN, SANDY SILT , SOME CLAY, LITTLE TO TRACE STONE FRAGMENTS, FILL, DAMP	787.6																		
		1																	
		2	23	50	-	56	SS-1	--	-	-	-	-	-	-	-	-	12	A-4a (V)	
		3																	
@3.5'; BROWN AND DARK BROWN, TRACE STONE FRAGMENTS		4	6	5	41	67	SS-2	4.5+	-	-	-	-	-	-	-	-	14	A-4a (V)	
		5																	
@6.0'; TRACE STONE FRAGMENTS		6	16	16	40	11	SS-3	4.5+	-	-	-	-	-	-	-	-	14	A-4a (V)	
		7	16	15															
	780.6	8																	
VERY STIFF, BROWN, SILT AND CLAY , SOME SAND, TRACE STONE FRAGMENTS, FILL, DAMP	779.1	9	5	6	7	17	83	SS-4	4.5+	4	6	17	36	37	33	20	13	16	A-6a (9)
		10																	

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-6/27/14 08:00-VLIED001PUBLICPROJECT FILES\13 PROJECTS\13011G HAN-75\LAB DATA SHEETS\HAN-75 RAMP5.GPJ

EOB

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / ALAN</u>	DRILL RIG: <u>CME 75 TRUCK</u>	STATION / OFFSET: <u>796+20.1, 5.6' LT</u>	EXPLORATION ID <u>B-152-0-13</u>
TYPE: <u>RAMP RE-ALIGNMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>LIMA RAMP F BASELINE</u>	PAGE 1 OF 1
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>1/6/12</u>	ELEVATION: <u>789.1 (MSL)</u> EOB: <u>8.0 ft.</u>	
START: <u>8/7/13</u> END: <u>8/7/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>77</u>	COORD: <u>41.024612000, 83.676154330</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
ASPHALT PAVEMENT (4" THICK)	788.8																	
CONCRETE PAVEMENT (10.5" THICK)	787.9	1																
VERY DENSE, BROWN, GRAVEL AND STONE FRAGMENTS WITH SAND , LITTLE FINES, FILL, DAMP	786.1	2	17 50/3"	-	100	SS-1	--	20	34	27	15	4	NP	NP	NP	13	A-1-b (0)	
VERY DENSE, BROWN, NON-PLASTIC SANDY SILT , LITTLE STONE FRAGMENTS, FILL, DAMP	782.1	3	25 41 30	91	67	SS-2	--	-	-	-	-	-	-	-	-	13	A-4a (V)	
	781.1	4	12 24 20	56	100	SS-3	--	-	-	-	-	-	-	-	-	13	A-4a (V)	
	782.1	5																
NOTE: @ 7.0', SPLIT SPOON DROPPED TO 8.0' AND DECIDED TO TERMINATE THE HOLE. NO UTILITIES WERE MARKED.	781.1	7																
		8																

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-6/27/14-08:00-VLIED001\PUBLIC\PROJECT FILES\13 PROJECTS\IG18011G HAN-75\LAB DATA SHEETS\HAN-75 RAMP5.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / ALAN</u>	DRILL RIG: <u>CME 75 TRUCK</u>	STATION / OFFSET: <u>800+08.5, 2.7' LT</u>	EXPLORATION ID <u>B-153-0-13</u>
TYPE: <u>RAMP RE-ALIGNMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / K. JONES</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>US 68 RAMP B BASELINE</u>	PAGE 1 OF 1
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>1/6/12</u>	ELEVATION: <u>794.2 (MSL)</u> EOB: <u>10.5 ft.</u>	
START: <u>8/15/13</u> END: <u>8/15/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>77</u>	COORD: <u>41.025293070, 83.675056890</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL	
								GR	CS	FS	SI	CL	LL	PL	PI				
ASPHALT PAVEMENT (4" THICK)	793.9																		
CONCRETE PAVEMENT (11.5" THICK)	792.8	1																	
CRUSHED LIMESTONE AGGREGATE BASE	792.2	2																	
HARD TO VERY STIFF, BROWN, SANDY SILT , SOME CLAY, TRACE STONE FRAGMENTS, FILL, DAMP @3.0'; VERY STIFF	789.7	3	31	25	18	55	78	SS-1	4.5+	-	-	-	-	-	-	-	-	14	A-4a (V)
		4	8	12	9	27	100	SS-2	4.5+	-	-	-	-	-	-	-	-	10	A-4a (V)
VERY STIFF, BROWN TO DARK BROWN, SILT AND CLAY , LITTLE TO SOME SAND, TRACE TO LITTLE STONE FRAGMENTS, FILL, DAMP @6.0'; LITTLE SAND, LITTLE STONE FRAGMENTS	783.7	5	7	9	6	19	11	SS-3	4.5+	-	-	-	-	-	-	-	-	19	A-6a (V)
		6	8	8	10	23	67	SS-4	2.00	-	-	-	-	-	-	-	-	10	A-6a (V)
@7.5'; SOME SAND		7	4	9	10	24	78	SS-5	4.5+	7	5	18	38	32	29	18	11	15	A-6a (7)
@9.0'; DARK BROWN		8	4	5	8	17	72	SS-6	3.25	-	-	-	-	-	-	-	-	17	A-6a (V)
		9																	
		10																	

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-6/27/14 08:00: \C\LED001\PUBLIC\PROJECT FILES\13 PROJECTS\IG\8011G HAN-75\LAB DATA SHEETS\HAN-75 RAMPS.GPJ

EOB

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (6.5 X 11)-OH-DOT-GDT-7729/15 13:05-\\CLED001\PUBLIC\PROJECT FILES\13 PROJECTS\G-1301 G HAN-75\LAB DATA SHEETS\HAN-75 RAMPS.GPJ

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>BM / JOSH DEAN</u>	DRILL RIG: <u>DIEDRICH D-90 ATV</u>	STATION / OFFSET: <u>804+02.3, 5.0' LT</u>	EXPLORATION ID: <u>B-154-0-13</u>
TYPE: <u>RAMP RE-ALIGNMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>US 68 RAMP B BASELINE</u>	
PID: <u>87005</u> BR ID: <u></u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>9/18/12</u>	ELEVATION: <u>781.7 (MSL)</u> EOB: <u>8.0 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>7/17/13</u> END: <u>7/17/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>80.2</u>	COORD: <u>41.025819320, 83.673815570</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	BACK FILL	
								GR	CS	FS	SI	CL	LL	PL	PI	WC			
MEDIUM STIFF, GRAY, ELASTIC CLAY , TRACE SAND, TRACE STONE FRAGMENTS, FILL, MOIST	781.7	1																	<< < > >>
		2	2	7	44	SS-1	2.25	3	2	3	48	44	66	47	19	56	A-7-5 (16)		<< < > >>
		3																	<< < > >>
SOFT, WHITE, ELASTIC SILT AND CLAY MOIST @3.5'; PUSHED SHELBY TUBE IN 2015 EXPLORATION EFFECTIVE SHEAR STRENGTH; PHI ANGLE = 23.8 DEG. AND COHESION = 2.3 PSI	778.2	4			100	ST-2	0.50	0	0	0	25	75	61	58	3	65	A-5 (12)		<< < > >>
		5																	<< < > >>
		6																	<< < > >>
MEDIUM STIFF, MOTTLED BROWN AND GRAY, SILTY CLAY , SOME SAND, TRACE STONE FRAGMENTS, MOIST	775.7	7	3	5	44	SS-3	2.00	-	-	-	-	-	-	-	-	24	A-6b (V)		<< < > >>
		8	2																<< < > >>
@8.0'; AUGER REFUSAL, POSSIBLE DOLOMITE BEDROCK	773.8 773.7	EOB																	<< < > >>

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>BM / JOSH DEAN</u>	DRILL RIG: <u>DIEDRICH D-90 ATV</u>	STATION / OFFSET: <u>808+02.9, 8.5' RT</u>	EXPLORATION ID <u>B-155-0-13</u>
TYPE: <u>RAMP RE-ALIGNMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>US 68 RAMP B BASELINE</u>	
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>9/18/12</u>	ELEVATION: <u>782.0 (MSL)</u> EOB: <u>8.5 ft.</u>	PAGE <u>1 OF 1</u>
START: <u>7/30/13</u> END: <u>7/30/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>80.2</u>	COORD: <u>41.025834700, 83.672379260</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
TOPSOIL (6" THICK)	782.0																	
SOFT, LIGHT GRAY, ELASTIC CLAY , TRACE SAND, FILL, MOIST	781.5	1	1	4	100	SS-1	1.00	-	-	-	-	-	-	-	67	A-7-5 (V)		
		2																
		3																
STIFF, DARK BROWN, CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, MOIST	778.5	4	2	9	83	SS-2	2.00	-	-	-	-	-	-	-	25	A-7-6 (V)		
		5	3															
		6																
STIFF, BROWN AND GRAY, CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, MOIST	776.0	7																
@6.0'; PUSHED SHELBY TUBE, D.S. ANGLE OF SHEAR RESISTANCE = 19.7°, COHESION = 5.7 psi	774.0	8		83		ST-3	--	10	2	13	31	44	41	24	17	26	A-7-6 (11)	
POSSIBLE DOLOMITE BEDROCK	773.5		50/1"		0	SS-4	-	-	-	-	-	-	-	-	-	-	Rock (V)	
@8'; NO SPLIT SPOON RECOVERY																		
@8.5'; AUGER REFUSAL																		

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-6/27/14 08:00-10:00:00 PUBLIC PROJECT FILES\13 PROJECTS\13011G HAN-75\LAB DATA SHEETS\HAN-75 RAMP.S.GPJ

NOTES: GROUNDWATER WAS ENCOUNTERED AT 6.0' DURING DRILLING AND AT 3.0' UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: AUGER CUTTINGS MIXED WITH 1/2 BAG OF BENTONITE PELLETS/SOIL CUTTINGS MIXTURE

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>BM / JOSH DEAN</u>	DRILL RIG: <u>DIEDRICH D-90 ATV</u>	STATION / OFFSET: <u>812+17.0, 9.2' LT</u>	EXPLORATION ID <u>B-156-0-13</u>
TYPE: <u>RAMP RE-ALIGNMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>US 68 RAMP B BASELINE</u>	
PID: <u>87005</u> BR ID: <u></u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>9/18/12</u>	ELEVATION: <u>794.9 (MSL)</u> EOB: <u>10.0 ft.</u>	PAGE <u>1 OF 1</u>
START: <u>7/29/13</u> END: <u>7/29/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>80.2</u>	COORD: <u>41.025410230, 83.671001250</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
TOPSOIL (8" THICK)	794.9																	
STIFF, BROWN AND GRAY, SANDY SILT , SOME CLAY, LITTLE STONE FRAGMENTS, FILL, DAMP	794.3	1	4	5	15	83	SS-1	2.00	-	-	-	-	-	-	-	-	14	A-4a (V)
		2																
		3																
VERY STIFF, DARK BROWN, SILTY CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, DAMP	791.4	4	6	8	24	100	SS-2	4.5+	-	-	-	-	-	-	-	-	18	A-6b (V)
		5																
		6																
VERY STIFF, BLACK, CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, DAMP	788.9	6	6	5	17	100	SS-3	4.5+	1	2	15	40	42	47	25	22	10	A-7-6 (14)
		7																
		8																
VERY STIFF, DARK BROWN, SILT AND CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, DAMP	786.4	9	4	7	21	100	SS-4	4.5+	-	-	-	-	-	-	-	-	13	A-6a (V)
		10																
	784.9																	
		EOB																

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-6/27/14 08:00-10:00 PUBLIC PROJECT FILES\13 PROJECTS\101\10 HAN-75\LAB DATA SHEETS\HAN-75 RAMPS.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / ALAN</u>	DRILL RIG: <u>DIEDRICH D-50 ATV</u>	STATION / OFFSET: <u>800+19.6, 4.3' LT</u>	EXPLORATION ID: <u>B-157-0-13</u>
TYPE: <u>RAMP RE-ALIGNMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>LIMA RAMP F BASELINE</u>	
PID: <u>87005</u> BR ID: <u></u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>12/10/11</u>	ELEVATION: <u>796.7 (MSL)</u> EOB: <u>21.5 ft.</u>	PAGE: <u>1 OF 2</u>
START: <u>8/6/13</u> END: <u>8/6/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>81.7</u>	COORD: <u>41.025111710, 83.674864640</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
ASPHALT PAVEMENT (25" THICK)	796.7	1																
	794.6	2																
VERY STIFF, BROWN, SANDY SILT , SOME CLAY, TRACE STONE FRAGMENTS, FILL, DAMP	793.2	3	3	6	18	67	SS-1	4.5+	-	-	-	-	-	-	-	-	12	A-4a (V)
		4	7	5	16	83	SS-2	3.00	-	-	-	-	-	-	-	-	15	A-6a (V)
VERY STIFF TO STIFF, DARK BROWN TO BROWN, SILT AND CLAY , LITTLE TO SOME SAND, TRACE STONE FRAGMENTS, FILL, DAMP		5																
@6.0'; STIFF, BROWN, SOME SAND		6	4	4	11	72	SS-3	2.00	4	6	15	42	33	29	18	11	15	A-6a (8)
	788.2	7	4	4	11	72	SS-3	2.00	4	6	15	42	33	29	18	11	15	A-6a (8)
VERY STIFF TO HARD, BROWN AND GRAY TO BROWN, SANDY SILT , SOME CLAY, TRACE STONE FRAGMENTS, FILL, DAMP		8																
		9	4	7	19	67	SS-4	4.5+	-	-	-	-	-	-	-	-	11	A-4a (V)
		10																
@11.0'; HARD, BROWN		11	10	11	33	78	SS-5	4.5+	-	-	-	-	-	-	-	-	14	A-4a (V)
		12	11	13	33	78	SS-5	4.5+	-	-	-	-	-	-	-	-	14	A-4a (V)
		13																
@13.5'; VERY STIFF		14	3	5	18	78	SS-6	4.5+	-	-	-	-	-	-	-	-	12	A-4a (V)
		15	8															
@16.0'; VERY STIFF		16	4	7	19	72	SS-7	4.5+	-	-	-	-	-	-	-	-	15	A-4a (V)
		17	7	7	19	72	SS-7	4.5+	-	-	-	-	-	-	-	-	15	A-4a (V)
	778.7	18																
VERY STIFF, BLACK, CLAY , SOME SAND, TRACE STONE FRAGMENTS, FILL, MOIST		18																
@18.0'; PUSHED SHELBY TUBE		19			100		ST-8	3.50	-	-	-	-	-	-	-	-	28	A-7-6 (V)
@19.5'; NO SPLIT SPOON RECOVERY		19																

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-6/27/14-08:00-\\CLED001\PUBLIC\PROJECT FILES\13 PROJECTS\G13011G HAN-75\LAB DATA SHEETS\HAN-75 RAMPS.GPJ

MATERIAL DESCRIPTION AND NOTES	ELEV. 776.7	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			
VERY STIFF, BLACK, CLAY , SOME SAND, TRACE STONE FRAGMENTS, FILL, MOIST (<i>continued</i>) @21.5'; AUGER REFUSAL AND POSSIBLE DOLOMITE BEDROCK	775.2	21 EOB	4 5 8	18	0	SS-9	--	-	-	-	-	-	-	-	-	-	-	<L> >L> <L> >L>

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-8/27/14-08:00-\\CLED001\PUBLIC\PROJECT FILES\13 PROJECTS\G18011G HAN-75\LAB DATA SHEETS\HAN-75 RAMPS.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>OTB / JOHN</u>	DRILL RIG: <u>DIEDRICH D-50 ATV</u>	STATION / OFFSET: <u>803+00.7, 1.3' LT</u>	EXPLORATION ID <u>B-158-0-13</u>
TYPE: <u>RAMP RE-ALIGNMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>LIMA RAMP F BASELINE</u>	
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>12/10/11</u>	ELEVATION: <u>784.7 (MSL)</u> EOB: <u>10.0 ft.</u>	PAGE 1 OF 1
START: <u>6/14/13</u> END: <u>6/14/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>81.7</u>	COORD: <u>41.025249890, 83.673862430</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV. 784.7	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			
VERY STIFF, BROWN, CLAY , SOME SAND, TRACE STONE FRAGMENTS, FILL, DAMP		1	4														<< < > >>	
	782.2	2	9	23	44	SS-1	4.00	6	6	18	29	41	41	19	22	13	A-7-6 (12)	<< < > >>
GRAY, STONE FRAGMENTS , FILL @3'; AUGER SAMPLE OBTAINED	781.2	3			-	AS-2	--	-	-	-	-	-	-	-	-	1	A-1-a (V)	<< < > >>
MEDIUM STIFF, DARK BROWN, CLAY , SOME SAND, TRACE STONE FRAGMENTS, FILL, MOIST		4	3	8	6	SS-3	--	-	-	-	-	-	-	-	-	28	A-7-6 (V)	<< < > >>
	778.7	5																<< < > >>
VERY SOFT, LIGHT GRAY, ELASTIC SILT AND CLAY , TRACE SAND, FILL, DAMP	777.5	6	1	3	100	SS-4A&B	0.00	0	1	1	35	63	71	62	9	89	A-5 (12)	<< < > >>
SOFT, BROWN, CLAY , LITTLE SAND, MOIST	776.2	7	0	2			0.50	-	-	-	-	-	-	-	-	28	A-7-6 (V)	<< < > >>
VERY STIFF, GRAY, SILTY CLAY , LITTLE SAND, MOIST	774.8	8																<< < > >>
	774.7	9	2	3	20	100	SS-5	--	-	-	-	-	-	-	-	24	A-6b (V)	<< < > >>
POSSIBLE DOLOMITE BEDROCK	774.7	10	3	12														<< < > >>

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-6/27/14 08:00-VLIED001\PUBLIC\PROJECT FILES\13 PROJECTS\IG1801\G HAN-75\LAB DATA SHEETS\HAN-75 RAMPS.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>OTB / JOHN</u>	DRILL RIG: <u>DIEDRICH D-50 ATV</u>	STATION / OFFSET: <u>805+87.9, 4.9' LT</u>	EXPLORATION ID <u>B-159-0-13</u>
TYPE: <u>RAMP RE-ALIGNMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>LIMA RAMP F BASELINE</u>	
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>12/10/11</u>	ELEVATION: <u>783.6 (MSL)</u> EOB: <u>8.6 ft.</u>	PAGE 1 OF 1
START: <u>6/14/13</u> END: <u>6/14/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>81.7</u>	COORD: <u>41.025248470, 83.672821030</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV. 783.6	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL	
								GR	CS	FS	SI	CL	LL	PL	PI				
SOFT, BROWN, SILT AND CLAY , TRACE SAND, TRACE STONE FRAGMENTS, TRACE ROOTS, FILL, MOIST TO WET	783.6	1																<V>	
		2	1	4	100	SS-1	0.50	5	3	7	43	42	38	25	13	36	A-6a (9)	<V>	
		3																	<V>
STIFF, BROWN, SILTY CLAY , LITTLE SAND, LITTLE STONE FRAGMENTS, LITTLE ROOTS, MOIST	780.1	4	3	4	12	100	SS-2	3.00	14	6	14	34	32	35	18	17	20	A-6b (9)	<V>
		5	4	5															<V>
		6																	<V>
STIFF, BROWN, SILT , SOME CLAY, LITTLE SAND, MOIST	777.6	7	4	4	12	100	SS-3	4.5+	-	-	-	-	-	-	-	-	18	A-4b (V)	<V>
		8																	<V>
GRAY DOLOMITE BEDROCK	775.1	775.0	TR ₃	60/1"	-	100	SS-4	--	-	-	-	-	-	-	-	-	-	Rock (V)	<V>

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-6/27/14 08:00-10:00 PUBLIC PROJECT FILES\13 PROJECTS\130110 HAN-75\LAB DATA SHEETS\HAN-75 RAMP.FS.GPJ

NOTES: GROUNDWATER WAS ENCOUNTERED AT 8.5' DURING AND UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>OTB / JOHN</u>	DRILL RIG: <u>DIEDRICH D-50 ATV</u>	STATION / OFFSET: <u>808+16.9, 90.6' RT</u>	EXPLORATION ID
TYPE: <u>RAMP RE-ALIGNMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>LIMA RAMP F BASELINE</u>	B-160-0-13
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>12/10/11</u>	ELEVATION: <u>787.0 (MSL)</u> EOB: <u>10.3 ft.</u>	PAGE
START: <u>6/14/13</u> END: <u>6/14/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>81.7</u>	COORD: <u>41.024880240, 83.672091490</u>	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			
MEDIUM STIFF TO SOFT, DARK BROWN, CLAY , SOME SAND, TRACE STONE FRAGMENTS, FILL, DAMP	787.0	1	2															<< < > >>
		2	3	8	100	SS-1	1.00	3	4	18	40	35	43	22	21	21	A-7-6 (13)	<< < > >>
@3.5'; SOFT		3																<< < > >>
		4	2	1	4	44	SS-2	0.50	-	-	-	-	-	-	-	27	A-7-6 (V)	<< < > >>
	781.0	5																<< < > >>
STIFF, BROWN, SILTY CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, DAMP		6	2															<< < > >>
		7	3	10	100	SS-3	2.50	4	4	16	33	43	37	18	19	18	A-6b (12)	<< < > >>
	778.5	8																<< < > >>
STIFF, BROWN, SILT AND CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, MOIST	777.5	9	2	4	-	80	SS-4	1.00	-	-	-	-	-	-	-	20	A-6a (V)	<< < > >>
GRAY DOLOMITE BEDROCK	776.7	10	4	50/3"														<< < > >>
@10.3'; AUGER REFUSAL		EOB																<< < > >>

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-6/27/14 08:00-10:00:00\PUBLIC\PROJECT FILES\13 PROJECTS\G13011\G HAN-75\LAB DATA SHEETS\HAN-75 RAMPS.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>OTB / JOHN</u>	DRILL RIG: <u>DIEDRICH D-50 ATV</u>	STATION / OFFSET: <u>811+50.5, 2.1' RT</u>	EXPLORATION ID <u>B-161-0-13</u>
TYPE: <u>RAMP RE-ALIGNMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>LIMA RAMP F BASELINE</u>	
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>12/10/11</u>	ELEVATION: <u>786.4 (MSL)</u> EOB: <u>7.3 ft.</u>	PAGE 1 OF 1
START: <u>6/14/13</u> END: <u>6/14/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>81.7</u>	COORD: <u>41.024787440, 83.670884920</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL		
								GR	CS	FS	SI	CL	LL	PL	PI					
TOPSOIL (10" THICK)	786.4																	<< < > >>		
MEDIUM DENSE, GRAY, SLAG, FILL, DAMP	785.6	1	4	8	14	100	SS-1	--	-	-	-	-	-	-	-	-	12	A-1-a (V)	<< < > >>	
		2																<< < > >>		
		3																<< < > >>		
STIFF, DARK BROWN, SILT AND CLAY , SOME SAND, TRACE STONE FRAGMENTS, FILL, MOIST	782.9	4	2	3	4	10	100	SS-2	2.25	5	6	16	34	39	28	16	12	19	A-6a (8)	<< < > >>
		5																	<< < > >>	
STIFF, BROWN, SANDY SILT , SOME CLAY, TRACE STONE FRAGMENTS, TRACE ROOTS, DAMP	780.9	6	5																<< < > >>	
GRAY DOLOMITE BEDROCK	779.9	TR																	<< < > >>	
@7.3'; AUGER SAMPLE OBTAINED	779.1	EOB					AS-4	--	-	-	-	-	-	-	-	-	3	Rock (V)	<< < > >>	

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-6/27/14 08:00-\\CLED001\PUBLIC\PROJECT FILES\13 PROJECTS\GIS\80110\HAN-75\LAB DATA SHEETS\HAN-75 RAMPES.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

SIDE ROADS BORING LOGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / JOHN</u>	DRILL RIG: <u>CME 55 TRUCK</u>	STATION / OFFSET: <u>52+82.1, 22.2' LT</u>	EXPLORATION ID <u>B-162-0-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>PRO LIMA AVE BASELINE</u>	PAGE 1 OF 1
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>2.25" HSA</u>	CALIBRATION DATE: <u>6/13/13</u>	ELEVATION: <u>795.0 (MSL)</u> EOB: <u>3.5 ft.</u>	
START: <u>7/22/13</u> END: <u>7/22/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>70.2</u>	COORD: <u>41.021275300, 83.670216310</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
ASPHALT PAVEMENT (3" THICK)	795.0																	
GRAY STONE FRAGMENTS WITH SAND, BASE MATERIAL (4" THICK)	794.8 794.4	1																
MEDIUM DENSE, BROWN, COARSE AND FINE SAND , SOME FINES, LITTLE STONE FRAGMENTS, FILL, MOIST		2	8	6	12	67	SS-1	1.50	20	33	17	23	7	NP	NP	NP	9	A-3a (0)
@3.5'; AUGER REFUSAL AND POSSIBLE DOLOMITE BEDROCK	791.5	3																

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 1423:\UNCLEDC01\PUBLIC\PROJECT FILES\13 PROJECTS\G13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / JOHN</u>	DRILL RIG: <u>CME 55 TRUCK</u>	STATION / OFFSET: <u>11+39.2, 23.6' RT</u>	EXPLORATION ID <u>B-163-0-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>LOGAN AVE BASELINE</u>	
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>2.25" HSA</u>	CALIBRATION DATE: <u>6/13/13</u>	ELEVATION: <u>794.5 (MSL)</u> EOB: <u>4.3 ft.</u>	PAGE <u>1 OF 1</u>
START: <u>7/22/13</u> END: <u>7/22/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>70.2</u>	COORD: <u>41.022005020, 83.669676770</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL		
								GR	CS	FS	SI	CL	LL	PL	PI					
ASPHALT PAVEMENT (3" THICK)	794.5																			
GRAY STONE FRAGMENTS WITH SAND, BASE MATERIAL (9" THICK)	794.2 793.7																			
MEDIUM DENSE, BROWN, NON-PLASTIC SANDY SILT , LITTLE STONE FRAGMENTS, DAMP		1	5	6	7	15	39	SS-1	4.50	18	13	19	32	18	20	17	3	11	A-4a (3)	
SOFT, BROWN, SILT AND CLAY , SOME SAND, LITTLE STONE FRAGMENTS, DAMP	791.5	2																		
POSSIBLE DOLOMITE BEDROCK @4.3'; AUGER REFUSAL	790.5 790.2	3	2					SS-2	0.50	16	8	13	52	11	29	14	15	18	A-6a (8)	
		4	50/3"			-														

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 1423:\CLEDC01\PUBLIC\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 1423:\UNCLED01\PUBLIC\PROJECT FILES\13 PROJECTS\G13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>OTB / JOHN</u>	DRILL RIG: <u>DIEDRICH D-50 ATV</u>	STATION / OFFSET: <u>59+48.8, 15.9' RT</u>	EXPLORATION ID <u>B-164-0-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>PRO LIMA AVE BASELINE</u>	
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>12/10/11</u>	ELEVATION: <u>792.3 (MSL)</u> EOB: <u>1.7 ft.</u>	PAGE 1 OF 1
START: <u>6/13/13</u> END: <u>6/13/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>81.7</u>	COORD: <u>41.022571530, 83.668556400</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			ODOT CLASS (GI)	BACK FILL				
								GR	CS	FS	SI	CL	LL	PL	PI			WC			
TOPSOIL (6" THICK)	792.3																				
STIFF, BROWN, SILT AND CLAY , SOME SAND, TRACE STONE FRAGMENTS, DAMP	791.8																				
POSSIBLE DOLOMITE BEDROCK @1.7'; AUGER REFUSAL	790.8 790.6	1 TR EUB	6 50/2"	-	75	SS-1	2.00	2	5	18	39	36	35	20	15	14	A-6a (10)				

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / JOHN</u>	DRILL RIG: <u>CME 55 TRUCK</u>	STATION / OFFSET: <u>68+48.7, 10.0' LT</u>	EXPLORATION ID <u>B-165-0-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>PRO LIMA AVE BASELINE</u>	PAGE 1 OF 1
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>2.25" HSA</u>	CALIBRATION DATE: <u>6/13/13</u>	ELEVATION: <u>788.3 (MSL)</u> EOB: <u>10.7 ft.</u>	
START: <u>7/22/13</u> END: <u>7/22/13</u>	SAMPLING METHOD: <u>SPT/NX</u>	ENERGY RATIO (%): <u>70.2</u>	COORD: <u>41.024129680, 83.666243980</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
ASPHALT PAVEMENT (2.5" THICK)	788.3																	
GRAY STONE FRAGMENTS WITH SAND, BASE MATERIAL (2" THICK)	788.1	1	4															
STIFF TO MEDIUM STIFF, BLACK, CLAY , SOME TO LITTLE SAND, TRACE STONE FRAGMENTS, FILL, DAMP TO MOIST	787.9	2	5	4	11	28	SS-1	3.25	8	6	16	30	40	41	20	21	19	A-7-6 (12)
@3.5'; MEDIUM STIFF, LITTLE SAND, MOIST		3																
		4	2	4	7	44	SS-2	2.25	1	3	11	33	52	57	27	30	30	A-7-6 (19)
POSSIBLE DOLOMITE BEDROCK	782.9	5																
@5.7'; AUGER REFUSAL AND BEGAN CORING BEDROCK	782.6	6																
DOLOMITE , GRAY, MODERATELY WEATHERED, VERY STRONG, VERY THIN TO THIN BEDDED, MODERATELY FRACTURED.		7																
		8		48		97	NX-1											CORE
		9																
		10																
	777.6	EOB																

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 14:23 \\CLED001\PUBLIC\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING AND NO READING WAS TAKEN UPON COMPLETION DUE TO ROCK CORING OPERATIONS.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / JOHN</u>	DRILL RIG: <u>CME 55 TRUCK</u>	STATION / OFFSET: <u>72+51.3, 26.1' RT</u>	EXPLORATION ID <u>B-166-0-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>PRO LIMA AVE BASELINE</u>	PAGE 1 OF 1
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>2.25" HSA</u>	CALIBRATION DATE: <u>6/13/13</u>	ELEVATION: <u>791.6 (MSL)</u> EOB: <u>5.4 ft.</u>	
START: <u>7/22/13</u> END: <u>7/22/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>70.2</u>	COORD: <u>41.024445670, 83.664830810</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL	
								GR	CS	FS	SI	CL	LL	PL	PI				
ASPHALT PAVEMENT (6" THICK)	791.6																		
GRAY STONE FRAGMENTS WITH SAND, BASE MATERIAL (3" THICK)	791.1																		
STIFF, DARK BROWN, SILT AND CLAY , SOME SAND, TRACE STONE FRAGMENTS, FILL, DAMP	790.8	1	3	5	12	33	SS-1	3.50	5	10	19	37	29	29	17	12	16	A-6a (7)	
		2																	
		3																	
VERY STIFF, BROWN, SANDY SILT , SOME CLAY, TRACE STONE FRAGMENTS, FILL, DAMP	788.1	4	6	9	23	72	SS-2	3.50	5	8	18	39	30	25	16	9	14	A-4a (7)	
		5																	
@5.4'; AUGER REFUSAL, POSSIBLE DOLOMITE BEDROCK	786.2	EOB																	

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 1423:\CLEDC01\PUBLIC\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / ALAN</u>	DRILL RIG: <u>CME 75 TRUCK</u>	STATION / OFFSET: <u>112+37.8, 6.0' RT</u>	EXPLORATION ID <u>B-176-0-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>HARRISON RD BASELINE</u>	PAGE 1 OF 1
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>1/6/12</u>	ELEVATION: <u>801.5 (MSL)</u> EOB: <u>5.0 ft.</u>	
START: <u>8/27/13</u> END: <u>8/27/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>70.6</u>	COORD: <u>41.024418820, 83.681459290</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	BACK FILL		
								GR	CS	FS	SI	CL	LL	PL	PI	WC				
ASPHALT PAVEMENT (6.5" THICK)	801.5																			
GRAY STONE FRAGMENTS WITH SAND, BASE MATERIAL (5" THICK)	800.9																			
STIFF, BROWN, SILT AND CLAY , SOME SAND, TRACE STONE FRAGMENTS, FILL, DAMP	800.5	1	5	3	9	78	SS-1	2.00	2	5	19	40	34	32	17	15	16	A-6a (10)	< >	
		2																		< >
		3																		< >
VERY STIFF, BROWN, SANDY SILT , LITTLE CLAY, LITTLE STONE FRAGMENTS, FILL, DAMP	798.0	4	10	8	-	73	SS-2	4.5+	20	12	15	34	19	22	16	6	9	A-4a (4)	< >	
	797.0																			< >
NOTE: TERMINATED AT 5.0' DUE TO POSSIBLE OBSTRUCTION	796.5	5																		< >
		EOB																		< >

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 1423:\CLEDC01\PUBLIC\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>OTB / JOHN</u>	DRILL RIG: <u>DIEDRICH D-50 ATV</u>	STATION / OFFSET: <u>2+98.1, 7.3' RT</u>	EXPLORATION ID <u>B-177-0-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>SERVICE RD BASELINE</u>	
PID: <u>87005</u> BR ID: <u></u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>12/10/11</u>	ELEVATION: <u>789.0 (MSL)</u> EOB: <u>6.5 ft.</u>	PAGE 1 OF 1
START: <u>6/19/13</u> END: <u>6/19/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>81.7</u>	COORD: <u>41.025389760, 83.665099140</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL	
								GR	CS	FS	SI	CL	LL	PL	PI				
TOPSOIL (6" THICK)	789.0																	<><><>	
STIFF, BROWN, SILT AND CLAY , SOME SAND, DAMP	788.5	1	4	5	15	100	SS-1	2.00	0	6	17	35	42	32	18	14	16	A-6a (10)	<><><>
		2		6															<><><>
		3																	<><><>
VERY STIFF, BROWN, SILTY CLAY , LITTLE SAND, LITTLE STONE FRAGMENTS, DAMP	785.5	4	3	5	20	33	SS-2	2.00	13	4	14	31	38	37	18	19	14	A-6b (10)	<><><>
		5		10															<><><>
		6																	<><><>
POSSIBLE DOLOMITE BEDROCK @6.5'; AUGER REFUSAL	783.0 782.5																		<><><>

EOB

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 14:23:10\GLED001\PUBLIC\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>OTB / JOHN</u>	DRILL RIG: <u>DIEDRICH D-50 ATV</u>	STATION / OFFSET: <u>6+95.8, 5.1' RT</u>	EXPLORATION ID <u>B-178-0-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>SERVICE RD BASELINE</u>	
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>12/10/11</u>	ELEVATION: <u>784.7 (MSL)</u> EOB: <u>3.5 ft.</u>	PAGE 1 OF 1
START: <u>6/19/13</u> END: <u>6/19/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>81.7</u>	COORD: <u>41.026081460, 83.666197640</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV. 784.7	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL	
								GR	CS	FS	SI	CL	LL	PL	PI				
TOPSOIL (8" THICK)	784.1																	<L> >L>	
STIFF, BROWN, CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, MOIST		1																<L> >L>	
		2	2	3	10	100	SS-1	4.00	4	4	12	28	52	41	19	22	20	A-7-6 (13)	<L> >L>
	781.7	TR																<L> >L>	
POSSIBLE DOLOMITE BEDROCK @3.5'; AUGER REFUSAL	781.2	EOB																<L> >L>	

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 1423:\CLEDC01\PUBLIC\PROJECT FILES\13 PROJECTS\G13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>OTB / JOHN</u>	DRILL RIG: <u>DIEDRICH D-50 ATV</u>	STATION / OFFSET: <u>10+18.7, 2.3' RT</u>	EXPLORATION ID <u>B-179-0-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>SERVICE RD BASELINE</u>	PAGE 1 OF 1
PID: <u>87005</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>12/10/11</u>	ELEVATION: <u>784.1 (MSL)</u> EOB: <u>5.0 ft.</u>	
START: <u>6/19/13</u> END: <u>6/19/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>81.7</u>	COORD: <u>41.026504440, 83.667222040</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
TOPSOIL (6" THICK)	784.1																	
MEDIUM STIFF, BROWN, SANDY SILT , "AND" CLAY, TRACE STONE FRAGMENTS, DAMP	783.6	1	3	3	8	100	SS-1	1.00	1	3	18	41	37	28	19	9	16	A-4a (8)
	780.1	TR																
POSSIBLE DOLOMITE BEDROCK @5.0'; AUGER REFUSAL	779.1	EOB	4	50/5"	-	18	SS-2	3.50	-	-	-	-	-	-	-	-	18	A-4a (V)

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 1424-\\GLED001\PUBLIC\PROJECT FILES\13 PROJECTS\G13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-5/27/14 1424\1\0LED001\PUBLIC\PROJECT FILES\13 PROJECTS\IG13011G HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>OTB / JOHN</u>	DRILL RIG: <u>DIEDRICH D-50 ATV</u>	STATION / OFFSET: <u>14+99.8, 0.7' LT</u>	EXPLORATION ID <u>B-180-0-13</u>
TYPE: <u>ROADWAY WIDENING</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>SERVICE RD BASELINE</u>	
PID: <u>87005</u> BR ID: <u></u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>12/10/11</u>	ELEVATION: <u>784.5 (MSL)</u> EOB: <u>8.6 ft.</u>	PAGE 1 OF 1
START: <u>6/19/13</u> END: <u>6/19/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>81.7</u>	COORD: <u>41.027535120, 83.668280460</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV. 784.5	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
TOPSOIL (10" THICK)	783.7	0 - 1																
VERY STIFF, BLACK, SILT AND CLAY , SOME SAND, TRACE STONE FRAGMENTS, FILL, DAMP	781.0	1 - 3	5 6 12	25	100	SS-1	4.50	4	9	17	40	30	34	20	14	19	A-6a (9)	
VERY STIFF, DARK BROWN, CLAY , TRACE SAND, TRACE STONE FRAGMENTS, FILL, MOIST	778.5	3 - 5	3 3 9	16	44	SS-2	3.25	2	2	5	42	49	52	29	23	31	A-7-6 (16)	
LOOSE, ASPHALT PIECES, WITH SAND AND SILT, FILL, DAMP @6.5'; DAMP	775.5	5 - 7	6 3 3	8	78	SS-3	3.25	-	-	-	-	-	-	-	-	5	A-2-4 (V)	
GRAY DOLOMITE BEDROCK @8.6'; AUGER REFUSAL	775.9	7 - 8																
		TR																
		W EOB	60/1"	-	100	SS-4	--	-	-	-	-	-	-	-	-	17	Rock (V)	

NOTES: GROUNDWATER WAS ENCOUNTERED AT 8.5' DURING DRILLING AND AT 5.0' UPON COMPLETION OF DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: MIXED WITH 1/2 BAG OF BENTONITE PELLETS/SOIL CUTTINGS MIXTURE

HISTORIC BORING LOGS

PROJECT: <u>HAN-224-11.81</u>	DRILLING FIRM / OPERATOR: <u>BBCM / R. BUSHONG</u>	DRILL RIG: <u>TRUCK 55</u>	STATION / OFFSET: <u>624+29, 49.6 LT</u>	EXPLORATION ID: <u>B-006-0-10</u>
TYPE: <u>INTERCHANGE IMPROVEMENTS</u>	SAMPLING FIRM / LOGGER: <u>BBCM / D. GODWIN</u>	HAMMER: <u>SAFETY HAMMER</u>	ALIGNMENT: <u>US 224 CENTERLINE</u>	PAGE: <u>1 OF 1</u>
PID: <u>84557</u> BR ID: <u></u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>2/17/09</u>	ELEVATION: <u>777.2 (MSL)</u> EOB: <u>21.4 ft.</u>	
START: <u>10/13/10</u> END: <u>10/13/10</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>86</u>	COORD: <u>509339 N, 1646300 E</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			ODOT CLASS (GI)	INST.
								GR	CS	FS	SI	CL	LL	PL	PI		
ASPHALT - 6 INCHES	776.7	1															
CONCRETE - 13 INCHES	775.6	2															
GRANULAR BASE - 5 INCHES	775.2	3															
Fill: Very-stiff dark-gray and gray SILT AND CLAY, some fine to coarse sand, trace fine gravel, slight hydrocarbon odor, dry.	771.7	4	2	14	72	SS-1	2.0-3.0	-	-	-	-	-	-	-	-	14	A-6a (V)
Possible Fill: Stiff to very-stiff gray, dark-gray and brown SILTY CLAY, some fine sand, trace coarse sand, trace fine gravel, slight hydrocarbon odor, dry to damp.	770.6	5	3	7													
Hard gray SILT AND CLAY, little to some fine to coarse sand, trace fine gravel, slight hydrocarbon odor in Sample SS-2B, dry to damp.	770.6	6	8	-	100	SS-2A	1.75-2.5	-	-	-	-	-	-	-	-	19	A-6b (V)
	770.6	7	12	36	100	SS-2B	4.0-4.5+	3	7	14	37	39	26	15	11	11	A-6a (8)
Medium-dense gray SANDY SILT, interbedded with silt and silty clay, moist.	765.4	8	7														
	764.2	9	8	24	89	SS-3	4.0-4.5+	-	-	-	-	-	-	-	-	13	A-6a (V)
Medium-dense gray SILT, some clay, little fine to coarse sand, trace fine gravel, few zones interbedded with fine sand, moist.	765.4	10	3	-	100	SS-4A	4.0-4.5+	-	-	-	-	-	-	-	-	17	A-6a (V)
	764.2	11	6	26	86	SS-4B	-	-	-	-	-	-	-	-	-	23	A-4a (V)
Dense gray GRAVEL WITH SAND, trace to little silt, trace clay, moist becoming wet, slight hydrocarbon odor in Sample SS-7, strong hydrocarbon odor in Sample SS-8, slight sheen of hydrocarbon product noted in Sample SS-8.	759.2	12	6	26	89	SS-5	-	1	2	9	63	25	NP	NP	NP	21	A-4b (8)
	759.2	13	6	34	94	SS-6	-	-	-	-	-	-	-	-	-	20	A-4b (V)
EOB	755.8	14	6	12	12	34	94	SS-6	-	-	-	-	-	-	-	20	A-4b (V)
	755.8	15	10	52	78	SS-7	-	-	-	-	-	-	-	-	-	6	A-1-b (V)
	755.8	16	19	17													
	755.8	17	50-0.4'	-	100	SS-8	-	-	-	-	-	-	-	-	-	8	A-1-b (V)

- Encountered seepage at 13.0'.
- Encountered water at 21.0'.
- Slight hydrocarbon odor noted in Samples SS-1, SS-2A, SS-2B and SS-7.
- Strong hydrocarbon odor and hydrocarbon "sheen" was noted in Sample SS-8.
- A "sheen" of hydrocarbon-type product was observed on the drilling tools after retrieving Sample SS-8.
- Boring was terminated and grouted after noting the hydrocarbon-type product.

NOTES: SEE ABOVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: 1/4 BAG BENTONITE; 1 BAG PORTLAND CEMENT; ~20 GAL. WATER



PROJECT: <u>HAN-224-11.81</u>	DRILLING FIRM / OPERATOR: <u>BBCM / R. BUSHONG</u>	DRILL RIG: <u>TRUCK 55</u>	STATION / OFFSET: <u>1908+00</u>	EXPLORATION ID: <u>B-010-0-10</u>
TYPE: <u>INTERCHANGE IMPROVEMENTS</u>	SAMPLING FIRM / LOGGER: <u>BBCM / D. GODWIN</u>	HAMMER: <u>SAFETY HAMMER</u>	ALIGNMENT: <u>ON RAMP A BASELINE</u>	
PID: <u>84557</u> BR ID: _____	DRILLING METHOD: <u>4.5" CFA</u>	CALIBRATION DATE: <u>2/17/09</u>	ELEVATION: <u>795.6 (MSL)</u> EOB: <u>7.3 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>10/14/10</u> END: <u>10/14/10</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>86</u>	COORD: <u>507673 N, 1645607 E</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
ASPHALT - 6 INCHES	795.6																	
CONCRETE - 7 INCHES	794.5																	
GRANULAR BASE - 3 INCHES	794.3	1																
Fill: Loose to medium-dense dark-gray and brown SANDY SILT, little clay, trace fine gravel, damp.	792.8	2	6	4	13	44	SS-1	-	10	18	30	22	20	31	21	10	19	A-4a (1)
Fill: Very-stiff to hard gray and brown SILT AND CLAY, "and" fine to coarse sand, little fine gravel, damp to moist.	791.3	3	3	5	17	78	SS-2	2.5-4.25	14	17	22	23	24	29	16	13	14	A-6a (3)
Fill: Very-stiff to hard brown mixed with gray and dark-gray SILT AND CLAY, some fine to coarse sand, trace fine to coarse gravel, slightly organic, dry to damp.	791.3	4	5	7	22	83	SS-3	4.5+	-	-	-	-	-	-	-	-	19	A-6a (V)
	788.3	5	10	8	24	39	SS-4	3.75-4.5+	-	-	-	-	-	-	-	-	14	A-6a (V)
		6																
		7																

EOB

- No seepage noted.

NOTES: SEE ABOVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: SOIL CUTTINGS

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PLATE 31

PROJECT: <u>HAN-224-11.81</u>	DRILLING FIRM / OPERATOR: <u>BBCM / R. BUSHONG</u>	DRILL RIG: <u>TRUCK 55</u>	STATION / OFFSET: <u>1912+00</u>	EXPLORATION ID: <u>B-011-0-10</u>
TYPE: <u>INTERCHANGE IMPROVEMENTS</u>	SAMPLING FIRM / LOGGER: <u>BBCM / D. GODWIN</u>	HAMMER: <u>SAFETY HAMMER</u>	ALIGNMENT: <u>ON RAMP A BASELINE</u>	PAGE 1 OF 1
PID: <u>84557</u> BR ID: _____	DRILLING METHOD: <u>4.5" CFA</u>	CALIBRATION DATE: <u>2/17/09</u>	ELEVATION: <u>789.0 (MSL)</u> EOB: <u>7.4 ft.</u>	
START: <u>10/14/10</u> END: <u>10/14/10</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>86</u>	COORD: <u>508049 N, 1645743 E</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI		
ASPHALT - 5 INCHES	788.6																
CONCRETE - 7 INCHES	788.0																
GRANULAR BASE - 5 INCHES	787.6																
Fill: Medium-dense brown and gray GRAVEL , some to "and" fine to coarse sand, trace silt, trace clay, dry.	786.1	W	14	27	67	SS-1	-	52	22	13	10	3	NP	NP	NP	5	A-1-a (0)
Fill: Hard gray and dark-gray SILT AND CLAY , some fine to coarse sand, trace fine gravel, slightly organic, damp.	784.6		4	16	72	SS-2	4.0-4.5+	-	-	-	-	-	-	-	-	16	A-6a (V)
Fill: Very-stiff to hard brown mixed with gray SILT AND CLAY , some fine to coarse sand, little to some fine to coarse gravel, damp.			2	14	39	SS-3	3.5-4.5+	28	7	14	23	28	34	19	15	16	A-6a (5)
			5	23	39	SS-4	4.0-4.5+	-	-	-	-	-	-	-	-	17	A-6a (V)
	781.6	EOB	7	9													

- Encountered slight seepage at 2.9'.
 - Boring was "dry" at completion.

NOTES: SEE ABOVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: SOIL CUTTINGS

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PLATE 32



PROJECT: <u>HAN-224-11.81</u>	DRILLING FIRM / OPERATOR: <u>BBCM / R. BUSHONG</u>	DRILL RIG: <u>TRUCK 55</u>	STATION / OFFSET: <u>1916+00, 2.0 RT</u>	EXPLORATION ID: <u>B-012-0-10</u>
TYPE: <u>INTERCHANGE IMPROVEMENTS</u>	SAMPLING FIRM / LOGGER: <u>BBCM / D. GODWIN</u>	HAMMER: <u>SAFETY HAMMER</u>	ALIGNMENT: <u>RAMP A BASELINE</u>	PAGE: <u>1 OF 1</u>
PID: <u>84557</u> BR ID: <u></u>	DRILLING METHOD: <u>4.5" CFA</u>	CALIBRATION DATE: <u>2/17/09</u>	ELEVATION: <u>778.7 (MSL)</u> EOB: <u>7.4 ft.</u>	
START: <u>10/14/10</u> END: <u>10/14/10</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>86</u>	COORD: <u>508425 N, 1645879 E</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	BACK FILL	
								GR	CS	FS	SI	CL	LL	PL	PI	WC			
ASPHALT - 5 INCHES	778.3																		
CONCRETE - 7 INCHES	777.7																		
Fill: Medium-dense brown and gray GRAVEL , some fine to coarse sand, trace silt, few pockets of silty clay, dry.	776.7	1	14	-	100	SS-1A	-	-	-	-	-	-	-	-	-	-	14	A-1-a (V)	
Fill: Hard brown mixed with dark-gray and gray SILT AND CLAY , some fine to coarse sand, trace fine gravel, dry.	774.3	2	9	6	22	100	SS-1B	4.5+	-	-	-	-	-	-	-	-	13	A-6a (V)	
Possible Fill: Very-stiff to hard brown mottled with dark-gray and gray SILTY CLAY , some to "and" fine sand, trace coarse sand, trace fine gravel, damp.	771.3	3	7	9	7	23	83	SS-2	4.5+	3	5	18	35	39	31	17	14	15	A-6a (9)
		4	6	8	10	26	83	SS-3	3.75-4.5+	3	7	23	29	38	35	19	16	17	A-6b (9)
		5	1	3	4	10	61	SS-4	3.25-4.0	-	-	-	-	-	-	-	-	-	19
		6																	
		7																	

EOB

- No seepage noted.

NOTES: SEE ABOVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: SOIL CUTTINGS

Project No. 401898

PLATE 33



PROJECT: <u>HAN-224-11.81</u>	DRILLING FIRM / OPERATOR: <u>BBCM / R. BUSHONG</u>	DRILL RIG: <u>ATV 550X</u>	STATION / OFFSET: <u>1920+00, 8.0 RT</u>	EXPLORATION ID: <u>B-013-0-10</u>
TYPE: <u>INTERCHANGE IMPROVEMENTS</u>	SAMPLING FIRM / LOGGER: <u>BBCM / D. GODWIN</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>RAMP A BASELINE</u>	PAGE 1 OF 1
PID: <u>84557</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>2/17/09</u>	ELEVATION: <u>773.6 (MSL)</u> EOB: <u>16.6 ft.</u>	
START: <u>10/4/10</u> END: <u>10/4/10</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>85</u>	COORD: <u>508813 N, 1645984 E</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			ODOT CLASS (GI)	BACK FILL	
								GR	CS	FS	SI	CL	LL	PL	PI			WC
ROOTMAT/TOPSOIL - 6 INCHES	773.6																	
Fill: Hard brown mixed with gray SILT AND CLAY , some fine to coarse sand, trace fine to coarse gravel, dry.	773.1	1	5														<<<<<<	
		2	8	26	39	SS-1	4.0-4.5+	-	-	-	-	-	-	-	-	14	A-6a (V)	<<<<<<
	770.6	3															<<<<<<	
Hard gray SILT AND CLAY , some fine to coarse sand, trace fine gravel, dry.		4	4														<<<<<<	
		5	7	23	67	SS-2	4.5+	7	8	13	33	39	27	15	12	11	A-6a (8)	<<<<<<
		6															<<<<<<	
		7	3	5	17	87	SS-3	4.5+	-	-	-	-	-	-	-	13	A-6a (V)	<<<<<<
	765.6	8															<<<<<<	
Medium-dense gray SILT , trace to little clay, trace to little fine sand, interbedded with fine sand and silty clay above 10 feet, few lenses of fine sand below 13 feet, damp to moist.		9	5														<<<<<<	
		10	6	26	94	SS-4	-	-	-	-	-	-	-	-	-	23	A-4b (V)	<<<<<<
		11															<<<<<<	
		12	5	9	34	100	SS-5	-	-	-	-	-	-	-	-	15	A-4b (V)	<<<<<<
		13															<<<<<<	
		14	6	12	34	100	SS-6	-	-	-	-	-	-	-	-	15	A-4b (V)	<<<<<<
		15															<<<<<<	
	757.6	16															<<<<<<	
DOLOMITE , gray, strong, highly fractured.	757.0		50-0.3'		100	SS-7	-	-	-	-	-	-	-	-	-	15	Rock (V)	<<<<<<

- Encountered slight seepage at 16.0'.
- Encountered auger refusal at 16.6'.
- Groundwater measured in borehole at 16.3' after drilling completed.

NOTES: SEE ABOVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: SOIL CUTTINGS

Project No. 401898

PLATE 34

PROJECT: <u>HAN-224-11.81</u>	DRILLING FIRM / OPERATOR: <u>BBCM / R. BUSHONG</u>	DRILL RIG: <u>TRUCK 55</u>	STATION / OFFSET: <u>2912+00, 5.0 RT</u>	EXPLORATION ID: <u>B-015-0-10</u>
TYPE: <u>INTERCHANGE IMPROVEMENTS</u>	SAMPLING FIRM / LOGGER: <u>BBCM / D. GODWIN</u>	HAMMER: <u>SAFETY HAMMER</u>	ALIGNMENT: <u>RAMP B BASELINE</u>	PAGE: <u>1 OF 1</u>
PID: <u>84557</u> BR ID: _____	DRILLING METHOD: <u>4.5" CFA</u>	CALIBRATION DATE: <u>2/17/09</u>	ELEVATION: <u>789.2 (MSL)</u> EOB: <u>7.1 ft.</u>	
START: <u>10/14/10</u> END: <u>10/14/10</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>86</u>	COORD: <u>508018 N, 1645830 E</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
ASPHALT - 5 INCHES	788.8																	
CONCRETE - 6 INCHES	788.3																	
GRANULAR BASE - 2 INCHES	788.1	1	2															
Fill: Very-stiff to hard gray mixed with dark-gray and brown SILT AND CLAY, some fine to coarse sand, trace fine gravel, damp.	786.6	2	3	10	72	SS-1	3.25-4.25	7	7	18	29	39	31	17	14	15	A-6a (8)	<L><L><L>
Fill: Medium-dense gray and brown GRAVEL WITH SAND AND SILT, little clay, moist.	785.1	3	5	30	78	SS-2	-	45	16	13	15	11	26	17	9	9	A-2-4 (0)	<L><L><L>
Fill: Very-stiff to hard brown mixed with dark-gray and gray SILT AND CLAY, some to "and" fine to coarse sand, trace fine gravel, moist to wet.	782.1	4	8	13														<L><L><L>
		5	6	4	16	SS-3	3.75-4.5+	-	-	-	-	-	-	-	-	17	A-6a (V)	<L><L><L>
		6	5	7	-	100	SS-4A	3.5-3.75	-	-	-	-	-	-	-	14	A-6a (V)	<L><L><L>
		7	7	9	23	100	SS-4B	3.5-4.0	-	-	-	-	-	-	-	15	A-6a (V)	<L><L><L>

- Encountered water at 5.6'.

NOTES: SEE ABOVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: SOIL CUTTINGS

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PLATE 37



PROJECT: <u>HAN-224-11.81</u>	DRILLING FIRM / OPERATOR: <u>BBCM / R. BUSHONG</u>	DRILL RIG: <u>TRUCK 55</u>	STATION / OFFSET: <u>2916+00, 5.0 RT</u>	EXPLORATION ID: <u>B-016-0-10</u>
TYPE: <u>INTERCHANGE IMPROVEMENTS</u>	SAMPLING FIRM / LOGGER: <u>BBCM / D. GODWIN</u>	HAMMER: <u>SAFETY HAMMER</u>	ALIGNMENT: <u>RAMP B BASELINE</u>	PAGE: <u>1 OF 1</u>
PID: <u>84557</u> BR ID: _____	DRILLING METHOD: <u>4.5" CFA</u>	CALIBRATION DATE: <u>2/17/09</u>	ELEVATION: <u>778.6 (MSL)</u> EOB: <u>7.8 ft.</u>	
START: <u>10/14/10</u> END: <u>10/14/10</u>	SAMPLING METHOD: <u>SPT / ST</u>	ENERGY RATIO (%): <u>86</u>	COORD: <u>508386 N, 1645979 E</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI		
ASPHALT - 6 INCHES	778.6																
CONCRETE - 7 INCHES	778.1 777.5																
Fill: Medium-dense gray and brown GRAVEL WITH SAND, trace silt, trace clay, dry.	775.8	1	9														
		2	12 10	32	67	SS-1	-	49	22	17	9	3	NP	NP	NP	13	A-1-b (0)
Fill: Very-stiff to hard brown and gray mixed with dark-gray SILTY CLAY, little to some fine to coarse sand, trace fine gravel, damp to moist.	772.3	3	4														
		4	4 3	10	83	SS-2	2.25- 4.0	6	6	16	30	42	36	19	17	17	A-6b (10)
		5			85	ST-3	4.0- 4.5+	-	-	-	-	-	-	-	-	15	A-6b (V)
Very-stiff brown mottled with gray CLAY, some silt, little fine to coarse sand, trace fine gravel, damp.	770.8	6	3														
		7	5 6	16	72	SS-4	2.5- 3.5	-	-	-	-	-	-	-	-	22	A-7-6 (V)

EOB

- No seepage noted.

NOTES: SEE ABOVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: SOIL CUTTINGS

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PLATE 38

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PROJECT: <u>HAN-224-11.81</u>	DRILLING FIRM / OPERATOR: <u>BBCM / R. BUSHONG</u>	DRILL RIG: <u>TRUCK 55</u>	STATION / OFFSET: <u>2920+00, 23.5 LT</u>	EXPLORATION ID: <u>B-017-0-10</u>
TYPE: <u>INTERCHANGE IMPROVEMENTS</u>	SAMPLING FIRM / LOGGER: <u>BBCM / D. GODWIN</u>	HAMMER: <u>SAFETY HAMMER</u>	ALIGNMENT: <u>RAMP B BASELINE</u>	PAGE: <u>1 OF 1</u>
PID: <u>84557</u> BR ID: _____	DRILLING METHOD: <u>4.5" CFA</u>	CALIBRATION DATE: <u>2/17/09</u>	ELEVATION: <u>777.3 (MSL)</u> EOB: <u>20.0 ft.</u>	
START: <u>10/14/10</u> END: <u>10/14/10</u>	SAMPLING METHOD: <u>SPT / ST</u>	ENERGY RATIO (%): <u>86</u>	COORD: <u>508747 N, 1646140 E</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			ODOT CLASS (GI)	BACK FILL		
								GR	CS	FS	SI	CL	LL	PL	PI			WC	
ROOTMAT/TOPSOIL - 7 INCHES	777.3																		
Fill: Hard brown SILT AND CLAY , "and" fine sand, trace coarse sand, trace fine gravel, few seams of dark-gray silt, dry.	776.7	1	10														<<<<<<		
	774.8	2	15 12	39	94	SS-1	4.5+	1	10	40	26	23	27	15	12	11	A-6a (3)	<<<<<<	
Very-stiff to hard brown mottled with gray SILTY CLAY , some fine to coarse sand, trace fine gravel, damp.	773.3	3	6	6	23	78	SS-2	3.9- 4.5+	-	-	-	-	-	-	-	20	A-6b (V)	<<<<<<	
Medium-dense gray and brown SILT , "and" fine sand, trace clay, damp.	771.8	4	5	5	14	44	SS-3	-	-	-	-	-	-	-	-	26	A-4b (V)	<<<<<<	
Medium-dense brown and gray GRAVEL WITH SAND , little silt, trace clay, damp.	771.8	5	5	5	14	44	SS-3	-	-	-	-	-	-	-	-	26	A-4b (V)	<<<<<<	
	771.8	6	5	9	27	67	SS-4	-	25	30	25	15	5	NP	NP	NP	14	A-1-b (0)	<<<<<<
	771.8	7	5	9	27	67	SS-4	-	25	30	25	15	5	NP	NP	NP	14	A-1-b (0)	<<<<<<
	769.0	8					ST	-	-	-	-	-	-	-	-	-	-	-	<<<<<<
Hard gray SILT AND CLAY , some fine to coarse sand, trace fine gravel, dry.	769.0	9	5	6	23	44	SS-5	4.5+	-	-	-	-	-	-	-	12	A-6a (V)	<<<<<<	
	769.0	10	6	10															<<<<<<
	769.0	11	6	7	20	67	SS-6	4.5+	-	-	-	-	-	-	-	13	A-6a (V)	<<<<<<	
	769.0	12	6	7	20	67	SS-6	4.5+	-	-	-	-	-	-	-	13	A-6a (V)	<<<<<<	
Medium-dense gray SILT , trace to little clay, trace fine sand, few lenses of silty clay, damp to moist.	764.3	13																	<<<<<<
	764.3	14	5	10	36	44	SS-7	-	-	-	-	-	-	-	-	18	A-4b (V)	<<<<<<	
	764.3	15	5	15															<<<<<<
	764.3	16	6																<<<<<<
	764.3	17	6	9	32	44	SS-8	-	-	-	-	-	-	-	-	23	A-4b (V)	<<<<<<	
	764.3	18	6	13															<<<<<<
	764.3	19	5	8	30	100	SS-9	4.5+	-	-	-	-	-	-	-	16	A-4b (V)	<<<<<<	
	764.3	20	5	13															<<<<<<
	757.3	EOB																	<<<<<<

- Encountered slight seepage at 4.0'.
 - Boring "dry" at completion.

NOTES: SEE ABOVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: SOIL CUTTINGS

Project No. 401898

PLATE 39

PLATE 122 out of 637

PROJECT: <u>HAN-224-11.81</u>	DRILLING FIRM / OPERATOR: <u>BBCM / R. BUSHONG</u>	DRILL RIG: <u>TRUCK 55</u>	STATION / OFFSET: <u>3933+55, 6.4 RT</u>	EXPLORATION ID: <u>B-021-0-10</u>
TYPE: <u>INTERCHANGE IMPROVEMENTS</u>	SAMPLING FIRM / LOGGER: <u>BBCM / D. GODWIN</u>	HAMMER: <u>SAFETY HAMMER</u>	ALIGNMENT: <u>RAMP C BASELINE</u>	PAGE: <u>1 OF 1</u>
PID: <u>84557</u> BR ID: _____	DRILLING METHOD: <u>4.5" CFA</u>	CALIBRATION DATE: <u>2/17/09</u>	ELEVATION: <u>779.1 (MSL)</u> EOB: <u>7.5 ft.</u>	
START: <u>10/13/10</u> END: <u>10/13/10</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>86</u>	COORD: <u>510071 N, 1646488 E</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			ODOT CLASS (GI)	BACK FILL	
								GR	CS	FS	SI	CL	LL	PL	PI			WC
ASPHALT - 6 INCHES	778.6																	
CONCRETE - 10 INCHES	777.8																	
GRANULAR BASE - 2 INCHES	777.6																	
Fill: Hard brown and dark-gray SILT AND CLAY , some fine to coarse sand, little fine to coarse gravel, dry.	777.1	1	6	-	100	SS-1A	4.0-4.5+	-	-	-	-	-	-	-	-	-	19	A-6a (V)
Fill: Medium-dense gray GRAVEL , some sand, trace silt, trace clay, damp.	776.1	2	6	11	24	SS-1B	-	68	16	6	7	3	NP	NP	NP	6	A-1-a (0)	
Very-stiff to hard gray mottled with brown SILT AND CLAY , "and" fine sand, trace coarse sand, trace fine gravel, many seams of fine to coarse sand, damp to moist.	773.1	3	6	11	24	SS-2	3.75-4.5+	1	2	47	21	29	27	14	13	15	A-6a (4)	
Loose gray COARSE AND FINE SAND , trace fine gravel, trace silt, damp.	771.6	4	2	3	7	SS-3	-	-	-	-	-	-	-	-	-	27	A-6a (V)	
		5	3	3	10	SS-4	-	-	-	-	-	-	-	-	-	22	A-3a (V)	
		6	3	3	10	SS-4	-	-	-	-	-	-	-	-	-	22	A-3a (V)	
		7	3	4	10	SS-4	-	-	-	-	-	-	-	-	-	22	A-3a (V)	
		EOB																

- Encountered slight seepage at 6.0'.
 - Boring was "dry" at completion.

NOTES: SEE ABOVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: SOIL CUTTINGS

Project No. 401898

PLATE 47

PROJECT: <u>HAN-224-11.81</u>	DRILLING FIRM / OPERATOR: <u>BBCM / R. BUSHONG</u>	DRILL RIG: <u>TRUCK 55</u>	STATION / OFFSET: <u>3937+00, 5.0 LT</u>	EXPLORATION ID: <u>B-022-0-10</u>
TYPE: <u>INTERCHANGE IMPROVEMENTS</u>	SAMPLING FIRM / LOGGER: <u>BBCM / D. GODWIN</u>	HAMMER: <u>SAFETY HAMMER</u>	ALIGNMENT: <u>RAMP C BASELINE</u>	PAGE: <u>1 OF 1</u>
PID: <u>84557</u> BR ID: _____	DRILLING METHOD: <u>4.5" CFA</u>	CALIBRATION DATE: <u>2/17/09</u>	ELEVATION: <u>780.8 (MSL)</u> EOB: <u>7.5 ft.</u>	
START: <u>10/13/10</u> END: <u>10/13/10</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>86</u>	COORD: <u>510390 N, 1646621 E</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
ASPHALT - 6 INCHES	780.3																	
CONCRETE - 8 INCHES	779.6	1																
GRANULAR BASE - 4 INCHES	779.3	2	3															
Fill: Very-stiff gray, dark-gray and brown CLAY , "and" silt, little fine to coarse sand, little fine gravel, damp.	777.8	3	5	14	50	SS-1	2.5-3.5	11	4	11	37	37	41	20	21	18	A-7-6 (12)	
		4	4	16	61	SS-2	3.0-4.25	1	3	12	40	44	42	20	22	22	A-7-6 (13)	
Stiff to very-stiff brown mottled with gray CLAY , "and" silt, little fine to coarse sand, trace fine gravel, few hard zones, damp to moist.	774.8	5	2	7	78	SS-3	1.5-2.0	-	-	-	-	-	-	-	-	25	A-7-6 (V)	
		6	3															
Loose gray COARSE AND FINE SAND ; trace fine gravel, trace silt, damp.	773.3	7	3	9	61	SS-4	-	-	-	-	-	-	-	-	-	24	A-3a (V)	
		EOB																

- Encountered seepage at 6.0'.

NOTES: SEE ABOVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: SOIL CUTTINGS

Project No. 401898

PLATE 48



PROJECT: <u>HAN-224-11.81</u>	DRILLING FIRM / OPERATOR: <u>BBCM / R. BUSHONG</u>	DRILL RIG: <u>TRUCK 55</u>	STATION / OFFSET: <u>3940+55</u>	EXPLORATION ID: <u>B-023-0-10</u>
TYPE: <u>INTERCHANGE IMPROVEMENTS</u>	SAMPLING FIRM / LOGGER: <u>BBCM / D. GODWIN</u>	HAMMER: <u>SAFETY HAMMER</u>	ALIGNMENT: <u>ON RAMP C BASELINE</u>	
PID: <u>84557</u> BR ID: _____	DRILLING METHOD: <u>4.5" CFA</u>	CALIBRATION DATE: <u>2/17/09</u>	ELEVATION: <u>784.4 (MSL)</u> EOB: <u>7.0 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>10/13/10</u> END: <u>10/13/10</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>86</u>	COORD: <u>510719 N, 1646753 E</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	BACK FILL	
								GR	CS	FS	SI	CL	LL	PL	PI	WC			
GRANULAR BERM - 11 INCHES	784.4																		
Fill: Very-stiff to hard gray mixed with dark-gray and brown SILTY CLAY , little fine to coarse sand, trace fine gravel, damp.	783.5	1	4															<< < > >>	
	781.9	2	6	4	14	50	SS-1	3.75-4.5+	7	7	12	36	38	39	20	19	18	A-6b (11)	<< < > >>
Very-stiff to hard brown mottled with gray SILT AND CLAY , little to some fine to coarse and, trace fine gravel, damp.		3	3	4	14	72	SS-2	3.0-4.25	1	3	17	45	34	32	17	15	19	A-6a (10)	<< < > >>
	778.9	4	3	5	11	78	SS-3	4.0-4.5+	-	-	-	-	-	-	-	-	17	A-6a (V)	<< < > >>
Very-stiff brown mottled with gray SILTY CLAY , some fine sand, trace coarse sand, trace fine gravel, damp to moist.		5	6	5	19	100	SS-4	2.25-3.0	-	-	-	-	-	-	-	-	25	A-6b (V)	<< < > >>
	777.4	6	6	7															<< < > >>
		7																	<< < > >>

- No seepage noted.

NOTES: SEE ABOVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: SOIL CUTTINGS

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PLATE 49

Project No. 401898

PLATE 132 out of 637

PROJECT: <u>HAN-224-11.81</u>	DRILLING FIRM / OPERATOR: <u>BBCM / R. BUSHONG</u>	DRILL RIG: <u>ATV 550X</u>	STATION / OFFSET: <u>4932+00</u>	EXPLORATION ID: <u>B-025-0-10</u>
TYPE: <u>INTERCHANGE IMPROVEMENTS</u>	SAMPLING FIRM / LOGGER: <u>BBCM / D. GODWIN</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>ON RAMP D BASELINE</u>	PAGE: <u>1 OF 1</u>
PID: <u>84557</u> BR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>2/17/09</u>	ELEVATION: <u>776.9 (MSL)</u> EOB: <u>20.0 ft.</u>	
START: <u>10/4/10</u> END: <u>10/4/10</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>85</u>	COORD: <u>509863 N, 1646600 E</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	HOLE SEALED
								GR	CS	FS	SI	CL	LL	PL	PI			
ROOTMAT/TOPSOIL - 7 INCHES	776.9																	
Fill: Very-stiff to hard brown and dark-brown SILTY CLAY , "and" fine to coarse sand, trace fine gravel, dry to damp.	776.3	1																
		2	2	8	39	SS-1	3.75-4.5+	3	11	27	23	36	38	18	20	17	A-6b (9)	
Very-loose brown FINE SAND , trace coarse sand, trace silt, moist.	773.9	3	2	4	-	100	SS-2A	-	-	-	-	-	-	-	-	20	A-3 (V)	
Medium-dense gray GRAVEL WITH SAND , trace silt, trace clay, moist becoming wet.	773.5	4	3	5	11	27	SS-2B	-	-	-	-	-	-	-	-	20	A-1-b (V)	
	770.9	5	4	5	17	72	SS-3	-	25	35	29	7	4	NP	NP	NP	47	A-1-b (0)
Medium-dense gray FINE SAND , trace coarse sand, trace silt, trace fine gravel, wet.	770.9	6	3	7														
	768.9	7	4	5	13	72	SS-4	-	-	-	-	-	-	-	-	24	A-3 (V)	
Hard gray SANDY SILT , some clay, trace fine gravel, moist.	768.9	8																
	766.4	9	3	4	14	78	SS-5	4.0-4.5+	-	-	-	-	-	-	-	14	A-4a (V)	
Medium-dense gray SILT , trace to little clay, trace to little fine to coarse sand, few seams of fine sand, few zones interbedded with silty clay, moist to wet.	766.4	10	4	6														
		11	4	5	20	67	SS-6	-	-	-	-	-	-	-	-	19	A-4b (V)	
		12	5	9														
		13																
		14	3	4	13	78	SS-7	-	-	-	-	-	-	-	-	18	A-4b (V)	
		15	4	5														
		16	2															
		17	2	8	14	72	SS-8	-	-	-	-	-	-	-	-	22	A-4b (V)	
Very-stiff to hard gray SILT AND CLAY , little fine to coarse sand, trace fine gravel, few silt seams, moist.	758.9	18																
	756.9	19	7	9	28	44	SS-9	2.75-4.5+	-	-	-	-	-	-	-	16	A-6a (V)	
		20	9	11														

- Encountered water at 4.5'.

NOTES: SEE ABOVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: 1/4 BAG BENTONITE; 1 BAG PORTLAND CEMENT; APPROX. 25 GAL. WATER

Project No. 401898
PLATE 51
PLATE 134 out of 637

PROJECT: <u>HAN-224-11.81</u>	DRILLING FIRM / OPERATOR: <u>BBCM / R. BUSHONG</u>	DRILL RIG: <u>TRUCK 55</u>	STATION / OFFSET: <u>4936+00, 3.0 RT</u>	EXPLORATION ID: <u>B-026-0-10</u>
TYPE: <u>INTERCHANGE IMPROVEMENTS</u>	SAMPLING FIRM / LOGGER: <u>BBCM / D. GODWIN</u>	HAMMER: <u>SAFETY HAMMER</u>	ALIGNMENT: <u>RAMP D BASELINE</u>	PAGE: <u>1 OF 1</u>
PID: <u>84557</u> BR ID: _____	DRILLING METHOD: <u>4.5" CFA</u>	CALIBRATION DATE: <u>2/17/09</u>	ELEVATION: <u>780.2 (MSL)</u> EOB: <u>10.0 ft.</u>	
START: <u>10/13/10</u> END: <u>10/13/10</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>86</u>	COORD: <u>510244 N, 1646723 E</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
ASPHALT - 6 INCHES	779.7																	
CONCRETE - 7 INCHES	779.1																	
GRANULAR BASE - 5 INCHES	778.7																	
Fill: Hard dark-gray SILTY CLAY , some fine to coarse sand, little fine gravel, damp.	777.2	1	5	6	16	44	SS-1	4.0-4.5+	15	21	13	25	26	38	19	19	16	A-6b (6)
Very-stiff to hard brown mottled with gray SILTY CLAY , "and" fine to coarse sand, trace fine gravel, damp.	775.7	2	6	7	22	39	SS-2	3.75-4.5+	4	24	25	21	26	34	17	17	16	A-6b (5)
Loose brown and gray COARSE AND FINE SAND little silt, trace fine gravel, few pockets of silty clay, damp.	774.2	3	2	2	6	100	SS-3	-	-	-	-	-	-	-	-	-	24	A-3a (V)
Hard gray SILT AND CLAY , some fine to coarse sand, trace fine gravel, dry to damp.	772.2	4	6	9	29	39	SS-4	4.5+	-	-	-	-	-	-	-	-	11	A-6a (V)
Stiff brown mottled with gray SILT AND CLAY , "and" fine to coarse sand, little fine gravel, moist.	770.2	5	4	4	14	44	SS-5	1.7	-	-	-	-	-	-	-	-	21	A-6a (V)
	770.2	6	4	4	6													

- Encountered slight seepage at 7.0'.
 - Boring was "dry" at completion.

NOTES: SEE ABOVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: SOIL CUTTINGS

PROJECTS\1112364\T00.GPJ

Project No. 401898

PLATE 135 out of 637

PLATE 52



PROJECT: <u>HAN-224-11.81</u>	DRILLING FIRM / OPERATOR: <u>BBCM / R. BUSHONG</u>	DRILL RIG: <u>TRUCK 55</u>	STATION / OFFSET: <u>4940+00, 4.0 RT</u>	EXPLORATION ID: <u>B-027-0-10</u>
TYPE: <u>INTERCHANGE IMPROVEMENTS</u>	SAMPLING FIRM / LOGGER: <u>BBCM / D. GODWIN</u>	HAMMER: <u>SAFETY HAMMER</u>	ALIGNMENT: <u>RAMP D BASELINE</u>	PAGE: <u>1 OF 1</u>
PID: <u>84557</u> BR ID: _____	DRILLING METHOD: <u>4.5" CFA</u>	CALIBRATION DATE: <u>2/17/09</u>	ELEVATION: <u>783.6 (MSL)</u> EOB: <u>7.3 ft.</u>	
START: <u>10/13/10</u> END: <u>10/13/10</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>86</u>	COORD: <u>510619 N, 1646860 E</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	BACK FILL	
								GR	CS	FS	SI	CL	LL	PL	PI	WC			
ASPHALT - 6 INCHES	783.1																		
CONCRETE - 4 INCHES	782.8	1																	
GRANULAR BASE - 6 INCHES	782.3	2																	
Fill: Hard dark-gray and gray SILT AND CLAY, some fine to coarse sand, little fine gravel, dry.	780.8	2	5	4	13	72	SS-1	4.0-4.5+	16	18	14	29	23	31	17	14	14	A-6a (5)	
Very-stiff to hard gray mottled with dark-gray and brown SILTY CLAY, little fine to coarse sand, trace fine gravel, slightly organic, damp.		3	6	7	19	72	SS-2	4.0-4.5+	-	-	-	-	-	-	-	-	-	18	A-6b (V)
		4	2	4	9	100	SS-3	1.75-2.5	1	1	16	48	34	36	18	18	23	A-6b (11)	
Stiff brown mottled with gray SILTY CLAY, some fine sand, trace coarse sand, trace fine gravel, moist.	777.8	5	2	4	9	100	SS-3	1.75-2.5	1	1	16	48	34	36	18	18	23	A-6b (11)	
	776.3	6	3	4	11	50	SS-4	1.5-1.75	-	-	-	-	-	-	-	-	-	23	A-6b (V)
		7	4	4															

EOB

- No seepage noted.

NOTES: SEE ABOVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: SOIL CUTTINGS

PROJECTS\1112364\T00.GPJ - 66:41 11/8/15 - .T.DOT.GD1 - CURRENT WITH PLATES - (1)X9 (8.8)X9 - GOT LODO

PLATE 53

Project No. 401898

PLATE 136 out of 637



PROJECT: <u>HAN-224-11.81</u>	DRILLING FIRM / OPERATOR: <u>BBCM / R. BUSHONG</u>	DRILL RIG: <u>TRUCK 55</u>	STATION / OFFSET: <u>4944+00, 5.0 RT</u>	EXPLORATION ID: <u>B-028-0-10</u>
TYPE: <u>INTERCHANGE IMPROVEMENTS</u>	SAMPLING FIRM / LOGGER: <u>BBCM / D. GODWIN</u>	HAMMER: <u>SAFETY HAMMER</u>	ALIGNMENT: <u>RAMP D BASELINE</u>	PAGE: <u>1 OF 1</u>
PID: <u>84557</u> BR ID: _____	DRILLING METHOD: <u>4.5" CFA</u>	CALIBRATION DATE: <u>2/17/09</u>	ELEVATION: <u>791.1 (MSL)</u> EOB: <u>7.2 ft.</u>	
START: <u>10/13/10</u> END: <u>10/13/10</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>86</u>	COORD: <u>510995 N, 1646997 E</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
GRANULAR BERM - 14 INCHES	791.1																	
Fill: Hard brown mixed with gray SILTY CLAY , little fine to coarse sand, trace fine gravel, dry.	789.9	1	4															<< < > >>
	788.4	2	9	26	44	SS-1	4.0-4.5+	6	9	11	30	44	34	17	17	14	A-6b (11)	<< < > >>
Very-stiff gray mottled with brown CLAY , some silt, trace fine to coarse sand, trace fine gravel, damp.	786.9	3	6	24	78	SS-2	2.75-4.0	-	-	-	-	-	-	-	-	24	A-7-6 (V)	<< < > >>
		4	7	10														<< < > >>
Very-stiff to hard brown mottled with gray CLAY , some silt, trace to little fine to coarse sand, trace fine gravel, dry to damp.		5	2	19	78	SS-3	2.75-4.25	2	2	7	29	60	48	23	25	20	A-7-6 (16)	<< < > >>
		6	4	9														<< < > >>
	783.9	7	8	12	42	78	SS-4	4.5+	-	-	-	-	-	-	-	16	A-7-6 (V)	<< < > >>
		EOB	17															<< < > >>

- No seepage noted.

NOTES: SEE ABOVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: SOIL CUTTINGS

Project No. 401898

PLATE 54

Project No. 401898

PLATE 137 out of 637



PROJECT: <u>HAN-224-11.81</u>	DRILLING FIRM / OPERATOR: <u>BBCM / R. BUSHONG</u>	DRILL RIG: <u>TRUCK 55</u>	STATION / OFFSET: <u>4948+00, 5.0 RT</u>	EXPLORATION ID: <u>B-029-0-10</u>
TYPE: <u>INTERCHANGE IMPROVEMENTS</u>	SAMPLING FIRM / LOGGER: <u>BBCM / D. GODWIN</u>	HAMMER: <u>SAFETY HAMMER</u>	ALIGNMENT: <u>RAMP D BASELINE</u>	PAGE 1 OF 1
PID: <u>84557</u> BR ID: _____	DRILLING METHOD: <u>4.5" CFA</u>	CALIBRATION DATE: <u>2/17/09</u>	ELEVATION: <u>799.2 (MSL)</u> EOB: <u>7.4 ft.</u>	
START: <u>10/13/10</u> END: <u>10/13/10</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>86</u>	COORD: <u>511371 N, 1647134 E</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	BACK FILL	
								GR	CS	FS	SI	CL	LL	PL	PI	WC			
ASPHALT - 7 INCHES	798.6																		
CONCRETE - 7 INCHES	798.0																		
GRANULAR BASE - 3 INCHES	797.8																		
Fill: Hard brown mixed with gray SILT AND CLAY, some fine to coarse sand, little fine gravel, dry.	796.3																		
Hard brown mottled with gray SILTY CLAY, little fine to coarse sand, trace fine gravel, damp.																			
	791.8	EOB																	

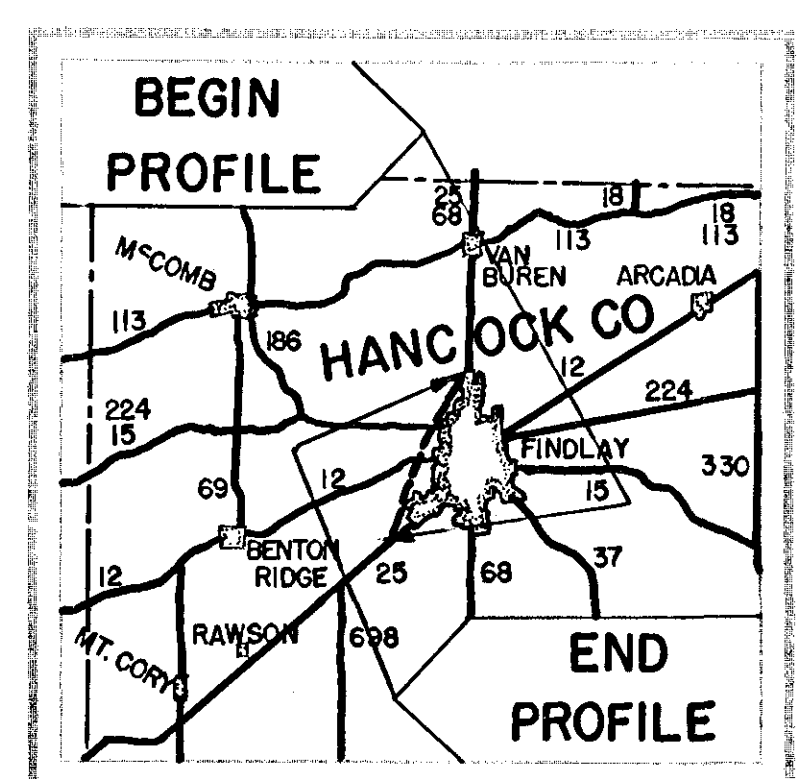
- No seepage noted.

NOTES: SEE ABOVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: SOIL CUTTINGS

PROJECT NO. 401898
 PLATE 55
 PLATE 138 out of 637

NOTE: THE INFORMATION SHOWN BY THIS SUBGRADE PROFILE WAS SECURED FOR THE USE OF THE STATE OF OHIO AND IS NOT TO BE CONSTRUED AS A PART OF THE PLANS GOVERNING THE CONSTRUCTION OF THE PROJECT.



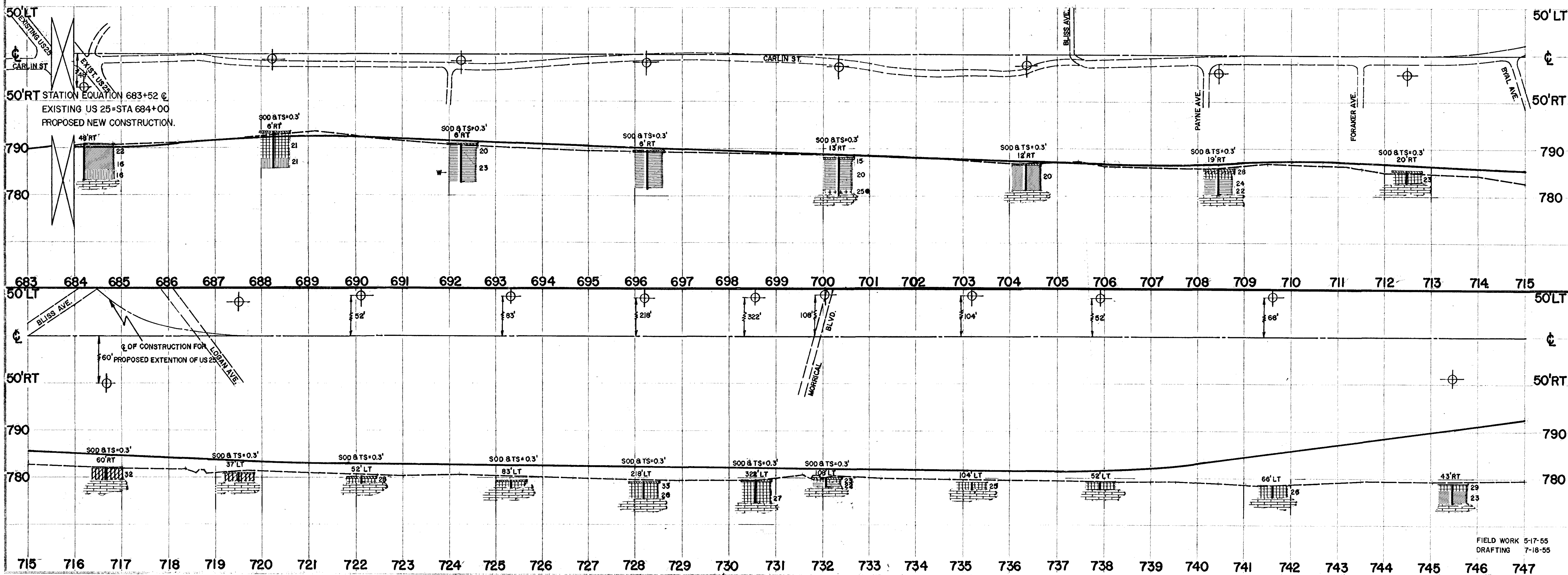
LEGEND FOR PROJECT-AVERAGE RESULTS OF TESTS- 162 SAMPLES TESTED

DESCRIPTION	H. R. B. CLASS	OHIO CLASS	% AGG	% C. SAND	% F. SAND	% SILT	% CLAY	LIQUID LIMIT	PLASTICITY INDEX	WATER CONTENT	SAMPLES TESTED
GRAVEL	A-1-b(0)	A-1-b	25	32	21	11	11	20	2	16	3
COARSE & FINE SAND	-	A-3d	3	7	59	19	12	17	1	22	2
GRAVEL WITH SAND & SILT	A-2-4(0)	A-2-4	14	17	38	13	18	21	7	23	2
SANDY SILT	A-4	A-4d	5	5	29	33	28	24	6	19	44
SILT	A-4(8)	A-4b	1	1	8	60	30	23	4	19	8
ELASTIC SILT & CLAY	A-5(12)	A-5	0	0	0	42	58	65	10	36	1
SILT & CLAY	A-6(9)	A-6d	5	6	16	33	40	30	13	18	39
SILTY CLAY	A-6(11)	A-6b	3	3	12	34	48	37	18	21	30
ELASTIC CLAY	A-7-5(15)	A-7-5	2	3	5	40	50	58	19	29	4
CLAY	A-7-6(15)	A-7-6	2	4	12	32	50	45	25	24	29

(VISUAL CLASSIFICATION)

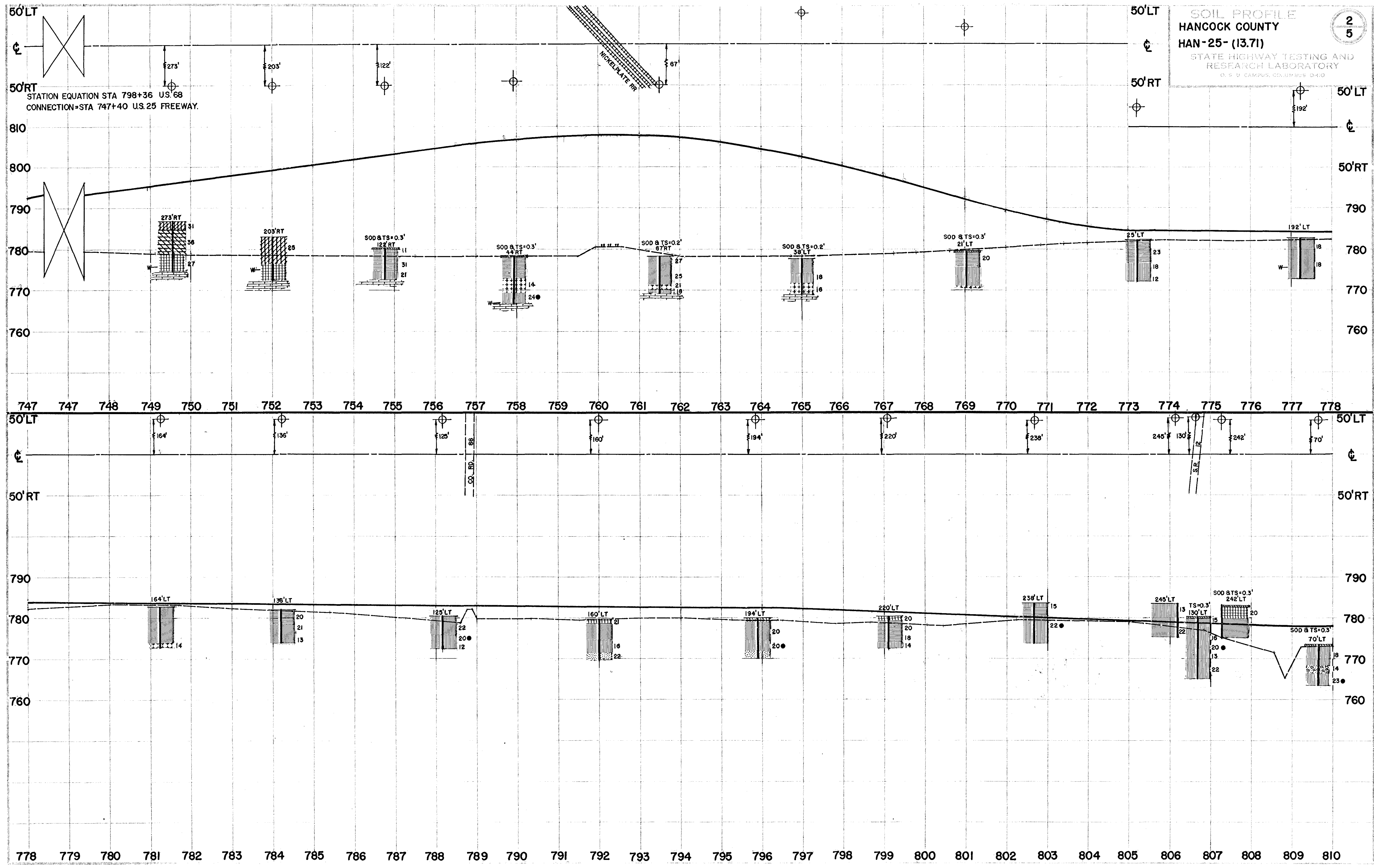
AUGER BORING PLOTTED TO VERTICAL SCALE ONLY
 AUGER BORING - PLAN VIEW
 WATER CONTENT NEARLY EQUAL TO OR GREATER THAN THE LIQUID LIMIT
 TOP SOIL. TS. = X = APPROXIMATE DEPTH

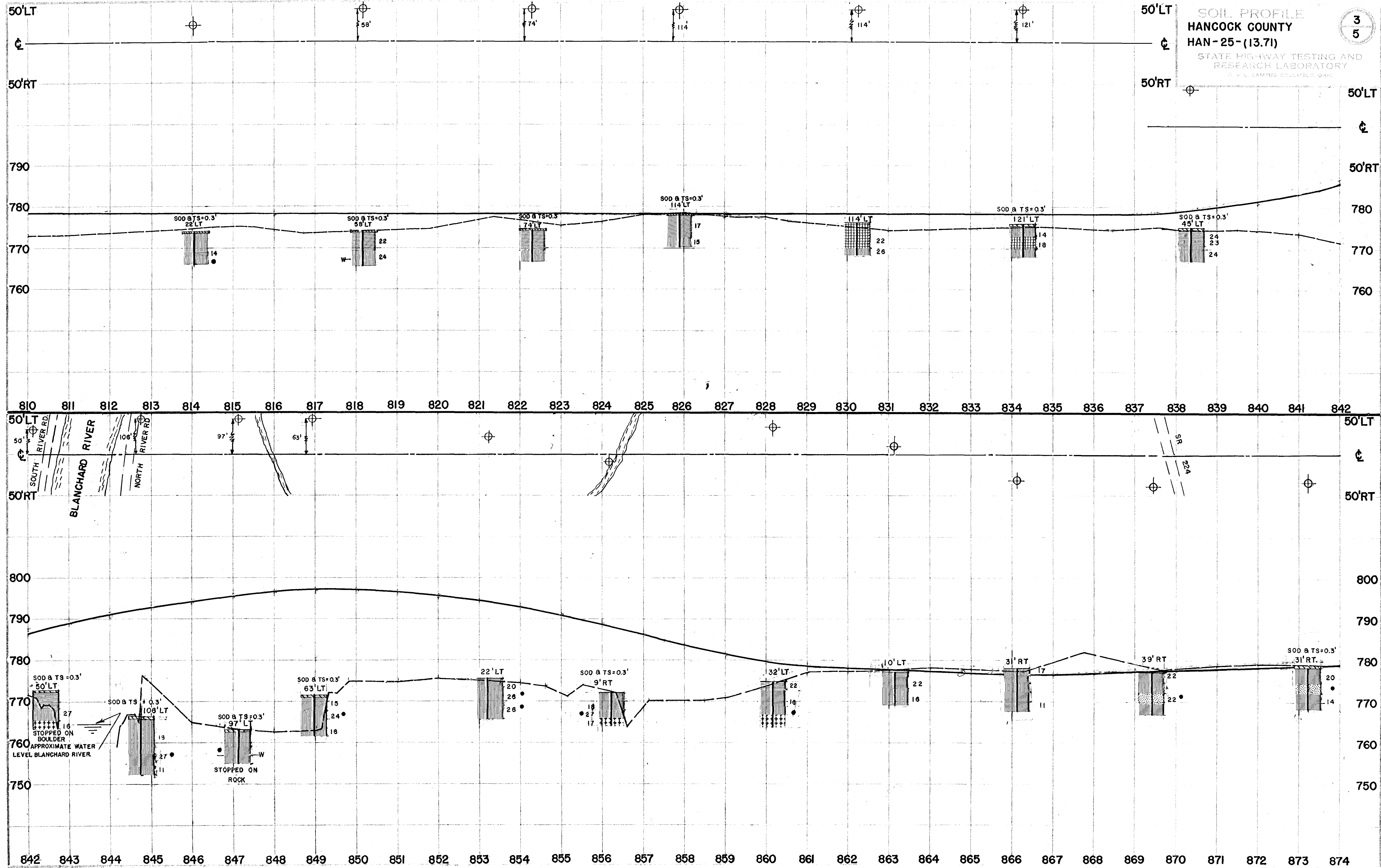
SAMPLES TESTED
 LAB NOS SO:16660-16771 INCL;
 15676-15679 INCL; 16137-16138 INCL;
 16256-16266 INCL; 17221-17253 INCL.
 NOTE: FIGURES BESIDE BORINGS INDICATE WATER CONTENT IN PERCENT



SOIL PROFILE
 HANCOCK COUNTY
 HAN-25- (13.71)
 STATE HIGHWAY TESTING AND
 RESEARCH LABORATORY
 O. S. U. CAMPUS, CO. UM955 0-10

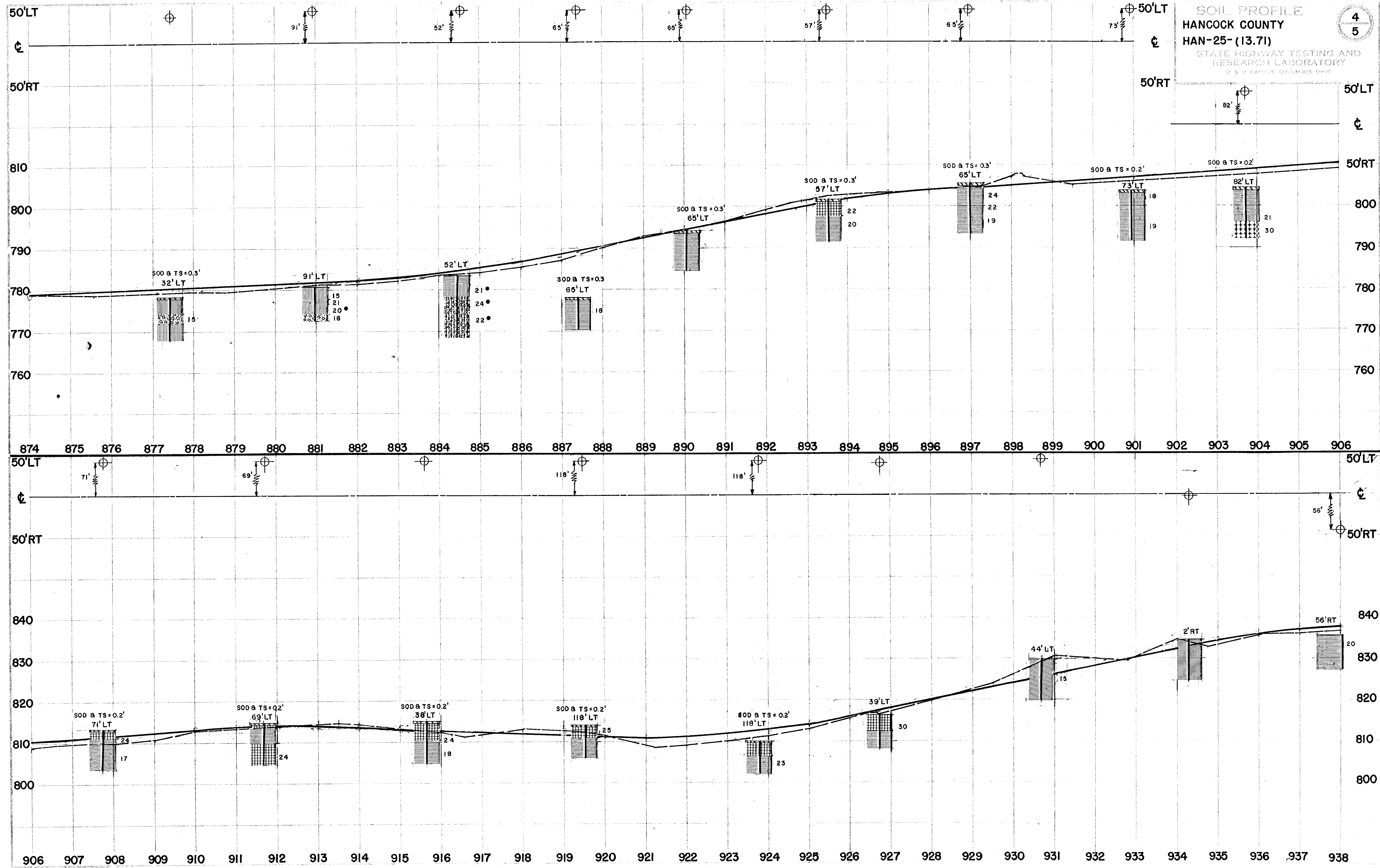
2
5





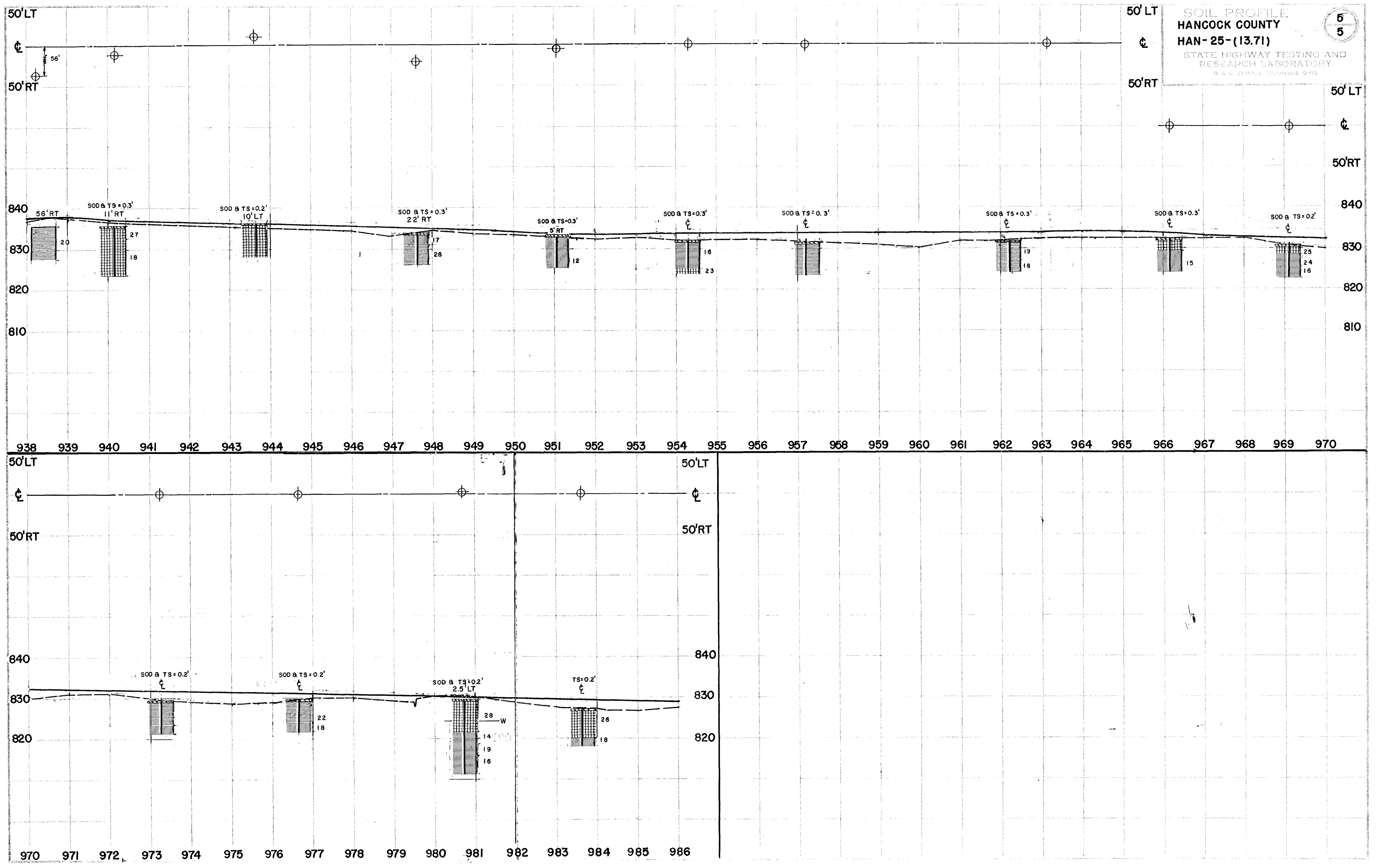
SOIL PROFILE
 HANCOCK COUNTY
 HAN-25-(13.71)
 STATE HIGHWAY TESTING AND
 RESEARCH LABORATORY
 O. S. U. CAMPUS, COLUMBUS, OHIO

4
5



SOIL PROFILE
 HANCOCK COUNTY
 HAN-25-(13.71)
 STATE HIGHWAY TESTING AND
 RESEARCH LABORATORY
 O. S. U. CAMPUS, COLUMBUS, OHIO

5
5



BRIDGE /CULVERT BORING LOGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH.DOT.GDT-1/16/14 14:06:\C\EDC01\PUBLIC\PROJECT FILES\13 PROJECTS\1011G HAN-75\LAB DATA SHEETS\CULVERT\GPJ

PROJECT: <u>HAN-75-14.39 - CULVERTS</u>	DRILLING FIRM / OPERATOR: <u>B-M / JOSH DEAN</u>	DRILL RIG: <u>DIEDRICH D-90 ATV</u>	STATION / OFFSET: <u>810+53, 152 LT</u>	EXPLORATION ID: <u>B-020-2-13</u>
TYPE: <u>CULVERT CONSTRUCTION</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	
PID: <u>87005</u> BR ID: <u></u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>9/18/12</u>	ELEVATION: <u>778.8 (MSL)</u> EOB: <u>17.0 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>7/25/13</u> END: <u>7/25/13</u>	SAMPLING METHOD: <u>SPT/NX</u>	ENERGY RATIO (%): <u>80.2</u>	COORD: <u>41.028053900, 83.673792430</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
TOPSOIL (8" THICK)	778.8																	
VERY STIFF TO MEDIUM STIFF, DARK BROWN AND BLACK, SILTY CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, MOIST	778.1	1	3															
		2	4	16	67	SS-1	--	-	-	-	-	-	-	-	23	A-6b (V)		
		3																
MEDIUM STIFF, BROWN, SILT , SOME CLAY, TRACE STONE FRAGMENTS, MOIST	775.3	4	2															
		5	2	7	100	SS-2	-	-	-	-	-	-	-	-	20	A-4b (V)		
		6																
		7	2	8	100	SS-3	4.00	-	-	-	-	-	-	-	22	A-4b (V)		
		8																
MEDIUM DENSE, GRAY, NON-PLASTIC SILT , TRACE SAND, MOIST	770.3	9	5															
		10	7	24	100	SS-4	--	1	0	3	78	18	20	18	2	16	A-4b (8)	
		11																
MEDIUM DENSE, GRAY, NON-PLASTIC SANDY SILT , LITTLE STONE FRAGMENTS, MOIST	767.8	11	8															
	767.3		50/2"	-	100	SS-5	--	-	-	-	-	-	-	-	13	A-4a (V)		
GRAY DOLOMITE BEDROCK	766.8	12																
DOLOMITE GRAY, MODERATELY TO SLIGHTLY WEATHERED, STRONG, THIN TO THICK BEDDED, JOINTED, HIGHLY TO MODERATELY FRACTURED, APERTURE WIDTH TIGHT TO NARROW, SLIGHTLY TO VERY ROUGH.		13																
		14																
		15	36		100	NX-6											CORE	
		16																
	761.8	17																
		EOB																

NOTES: GROUNDWATER WAS ENCOUNTERED AT 9.0' DURING DRILLING AND NO READING WAS TAKEN UPON COMPLETION OF DRILLING DUE TO ROCK CORING OPERATIONS.

ABANDONMENT METHODS, MATERIALS, QUANTITIES BACKFILLED WITH 0.5 BAG OF BENTONITE PELLETS/SOIL CUTTINGS MIXTURE

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH.DOT.GDT-11/25/13 12:42\NCLEDD01\PUBLIC\PROJECT FILES\13 PROJECTS\G1301\G HAN-75\LAB DATA SHEETS\BRIDGES\1526 I75 TUNNEL BR.GPJ

PROJECT: <u>HAN-75-1526 L&R</u>	DRILLING FIRM / OPERATOR: <u>B-M / JOSH DEAN</u>	DRILL RIG: <u>DIEDRICH D-90 ATV</u>	STATION / OFFSET: <u>805+72, 112 LT</u>	EXPLORATION ID <u>B-016-1-13</u>
TYPE: <u>BRIDGE REPLACEMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	
PID: <u>87005</u> BR ID: <u>HAN-75-1526</u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>9/18/12</u>	ELEVATION: <u>778.9 (MSL)</u> EOB: <u>13.0 ft.</u>	PAGE 1 OF 1
START: <u>7/19/13</u> END: <u>7/19/13</u>	SAMPLING METHOD: <u>SPT/NX</u>	ENERGY RATIO (%): <u>80.2</u>	COORD: <u>41.026882210, 83.674322080</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTH	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
TOPSOIL (8" THICK)	778.9																	
STIFF, DARK BROWN, CLAY , LITTLE SAND, FILL, MODERATELY ORGANIC, MOIST	775.4	1	3	13	94	SS-1	3.75	0	2	12	38	48	50	25	25	24	A-7-6 (16)	<< << <<
STIFF, GRAY AND BROWN, SILTY CLAY , LITTLE SAND, TRACE STONE FRAGMENTS AND ROOTS, MOIST	772.9	3	3	12	89	SS-2	3.25	-	-	-	-	-	-	-	-	24	A-6b (V)	<< << <<
HARD, BROWN, SANDY SILT , SOME CLAY, LITTLE STONE FRAGMENTS AND ROOTS, DAMP @8.0'; AUGER REFUSAL, BEGAN CORING BEDROCK	770.9	4	6	64	100	SS-3	4.5+	-	-	-	-	-	-	-	-	12	A-4a (V)	<< << <<
DOLOMITE , LIGHT GRAY, MODERATELY TO SLIGHTLY WEATHERED, STRONG, VERY THIN TO THIN BEDDED, FRACTURED TO MODERATELY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH. @10.5'; U.C. STRENGTH = 14,460 psi.	770.9	7	11 37														CORE	<< << <<
		8															CORE	<< << <<
		9	0		100	NX-1												<< << <<
		10																<< << <<
		11	56		98	NX-2												<< << <<
	765.9	12																<< << <<
		13																<< << <<
		EOB																<< << <<

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING. NO READING WAS TAKEN UPON COMPLETION DUE TO WATER USED DURING ROCK CORING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES HOLE WAS BACKFILLED WITH SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT GDT-11/14/13 14:11:10\LED001\PROJECT FILES\13 PROJECTS\101\IG HAN-75\LAB DATA SHEETS\BRIDGES\1526\75 TUNNEL BR GPJ

PROJECT: HAN-75-1526 L&R	DRILLING FIRM / OPERATOR: B-M / JOSH DEAN	DRILL RIG: DIEDRICH D-90 ATV	STATION / OFFSET: 806+23, 56 LT	EXPLORATION ID
TYPE: BRIDGE REPLACEMENT	SAMPLING FIRM / LOGGER: PGI / W. NAJJAR	HAMMER: DIEDRICH AUTOMATIC	ALIGNMENT: IR-75 BASELINE	B-017-0-13
PID: 87005 BR ID: HAN-75-1526	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 9/18/12	ELEVATION: 780.6 (MSL) EOB: 20.5 ft.	PAGE
START: 7/25/13 END: 7/25/13	SAMPLING METHOD: SPT/NX	ENERGY RATIO (%): 80.2	COORD: 41.026922720, 83.674058460	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			
TOPSOIL (8" THICK)	780.6																	
VERY STIFF, DARK BROWN, SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS, TRACE ROOTS, FILL, DAMP	779.9	1	3															
		2	5	17	78	SS-1	3.50	-	-	-	-	-	-	-	16	A-6a (V)		
	777.1	3	8															
STIFF, BROWN, SILTY CLAY, SOME SAND, MOIST	774.6	4	3															
		5	4	11	100	SS-2	2.25	0	2	26	30	42	38	19	19	21	A-6b (11)	
	773.4	6	1															
SOFT, BROWN, SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS, MOIST TO WET	773.4	7	1	3	89	SS-3	1.25	-	-	-	-	-	-	-	31	A-6a (V)		
MEDIUM DENSE TO DENSE, BROWN, STONE FRAGMENTS WITH SAND, LITTLE FINES, DAMP TO WET @8.5'; ROCK IN SPOON TIP AND LOW RECOVERY	771.1	8																
		9	13															
POSSIBLE DOLOMITE BEDROCK NOTE: AUGERED TO 10.5', BEGAN CORING BEDROCK	770.1	10	37		7	SS-4	-	-	-	-	-	-	-	-	8	A-1-b (V)		
		11	50/2'															
DOLOMITE, LIGHT GRAY, MODERATELY WEATHERED, STRONG, VERY THIN TO THIN BEDDED, FRACTURED TO MODERATELY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.		12																
		13																
		14																
		15																
@16.0'; U.C. STRENGTH = 11,682 psi.		16	48		100	NX-1											CORE	
		17																
		18																
		19																
	760.1	20																
		EOB																

NOTES: GROUNDWATER WAS ENCOUNTERED AT 9.0' DURING DRILLING AND NO READING WAS TAKEN UPON COMPLETION OF DRILLING DUE TO ROCK CORING OPERATIONS.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: HOLE WAS BACKFILLED WITH 1.5 BAGS SOIL CUTTINGS/BENTONITE PELLETS

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT GDT-11/14/13 14:11:14\LED001\PUBLIC\PROJECT FILES\13 PROJECTS\G13011G HAN-75\LAB DATA SHEETS\BRIDGES\1526\75 TUNNEL BR GPJ

PROJECT: HAN-75-1526 L&R		DRILLING FIRM / OPERATOR: DLZ / JOHN		DRILL RIG: CME 55 TRUCK		STATION / OFFSET: 806+21, 37 RT		EXPLORATION ID										
TYPE: BRIDGE REPLACEMENT		SAMPLING FIRM / LOGGER: PGI / W. NAJJAR		HAMMER: CME AUTOMATIC		ALIGNMENT: IR-75 BASELINE		B-018-0-13										
PID: 87005 BR ID: HAN-75-1526		DRILLING METHOD: 2.25" SSA		CALIBRATION DATE: 6/13/13		ELEVATION: 802.2 (MSL) EOB: 44.0 ft.		PAGE										
START: 7/9/13 END: 7/10/13		SAMPLING METHOD: SPT / NQ		ENERGY RATIO (%): 70.2		COORD: 41.026817900, 83.673749350		1 OF 2										
MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			ODOT CLASS (GI)	BACK FILL	
								GR	CS	FS	SI	CL	LL	PL	PI			WC
ASPHALT PAVEMENT (5.0" THICK)	801.9																	
CONCRETE PAVEMENT (7.0" THICK)	801.0																	
DAMP BROWN STONE AND CONCRETE FRAGMENTS WITH SAND (ROADBASE)	799.2	1	8															
		2	14	23	50	SS-1	-	-	-	-	-	-	-	-	-	-	12	A-1-b (V)
		3																
VERY STIFF TO STIFF, BROWN AND GRAY TO BROWN, SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS, FILL, DAMP TO MOIST		4	2															
		5	8	19	78	SS-2	4.50	-	-	-	-	-	-	-	-	-	17	A-6a (V)
@6.0'; STIFF, MOIST		6																
		7	3															
		8																
@8.5'; STIFF, BROWN		9	8															
		10	7	15	67	SS-4	3.00	-	-	-	-	-	-	-	-	-	16	A-6a (V)
	791.2	11																
VERY STIFF, BROWN, SANDY SILT, SOME CLAY, LITTLE STONE FRAGMENTS, FILL, MOIST		12	4															
		13	5	16	50	SS-5	4.00	-	-	-	-	-	-	-	-	-	14	A-4a (V)
	788.7	14																
VERY STIFF, BROWN AND DARK BROWN, SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS, FILL, DAMP		15	4															
		16	8															
@16.0'; DARK BROWN		17	6															
		18	9	28	44	SS-7	4.5+	-	-	-	-	-	-	-	-	-	16	A-6b (V)
@18.5'; BROWN		19																
		20	5															
		21	7	20	56	SS-8	4.5+	-	-	-	-	-	-	-	-	-	18	A-6b (V)
@21.0'; BROWN		22																
		23	4															
		24	6	18	56	SS-9	4.50	-	-	-	-	-	-	-	-	-	19	A-6b (V)
	778.2	25																
STIFF, BLACK, SILT AND CLAY, "AND" SAND, TRACE STONE FRAGMENTS, FILL, SLIGHTLY ORGANIC, MOIST		26	2															
		27	3	9	100	SS-10	2.25	2	3	40	28	27	29	18	11	22	A-6a (4)	
	775.2	28																
STIFF, BROWN AND GRAY, SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS, MOIST		29																
		30	4															
		31	5	15	100	SS-11	2.50	-	-	-	-	-	-	-	-	-	19	A-6a (V)

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-11/4/13 14:11 \\CLIEDC01\PUBLIC\PROJECT FILES\13 PROJECTS\G13011G HAN-75\LAB DATA SHEETS\BRIDGES\1526\75 TUNNEL BR.GPJ

PID: 87005		BR ID: HAN-75-1526		PROJECT: HAN-75-1526 L&R		STATION / OFFSET: 806+21, 37 RT		START: 7/9/13		END: 7/10/13		PG 2 OF 2		B-018-0-13							
MATERIAL DESCRIPTION AND NOTES			ELEV. 772.2	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			ODOT CLASS (GI)	BACK FILL		
										GR	CS	FS	SI	CL	LL	PL	PI			WC	
STIFF, BROWN AND GRAY, SILT AND CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, MOIST (continued)			770.7	TR																	
POSSIBLE GRAY DOLOMITE BEDROCK @33.5'; NO SPLIT SPOON RECOVERY			768.2	32																	
@34.0'; AUGER REFUSAL, BEGAN CORING BEDROCK				33																	
DOLOMITE , LIGHT GRAY, SLIGHTLY WEATHERED, STRONG, JOINTED, HIGHLY TO MODERATELY FRACTURED, APERTURE WIDTH TIGHT TO NARROW, SLIGHTLY TO VERY ROUGH; RQD 70%, REC 78%. @36.5'; U.C. STRENGTH = 13,068 psi.			758.2	34	60/3"	-	0	SS-12	-	-	-	-	-	-	-	-	-	-	-	Rock (V)	
				35																	
				36																	
				37																	
				38																	
				39		70		78	NQ-1												CORE
				40																	
				41																	
				42																	
				43																	
				44	EOB																

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING. NO READING WAS TAKEN UPON COMPLETION DUE TO WATER USED DURING ROCK CORING OPERATIONS.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: HOLE WAS BACKFILLED WITH SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT GDT-11/14/13 14:11:10\LED001\PROJECT FILES\13 PROJECTS\IG1001G HAN-75\LAB DATA SHEETS\BRIDGES\1526 175 TUNNEL BR GPJ

PROJECT: HAN-75-1526 L&R	DRILLING FIRM / OPERATOR: B-M / JOSH DEAN	DRILL RIG: DIEDRICH D-90 ATV	STATION / OFFSET: 807+13, 75 LT	EXPLORATION ID: B-019-0-13
TYPE: BRIDGE REPLACEMENT	SAMPLING FIRM / LOGGER: PGI / W. NAJJAR	HAMMER: DIEDRICH AUTOMATIC	ALIGNMENT: IR-75 BASELINE	
PID: 87005 BR ID: HAN-75-1526	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 9/18/12	ELEVATION: 779.5 (MSL) EOB: 20.5 ft.	PAGE: 1 OF 1
START: 7/25/13 END: 7/25/13	SAMPLING METHOD: SPT/NX	ENERGY RATIO (%): 80.2	COORD: 41.027158610, 83.673971270	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
TOPSOIL (8" THICK)	779.5																	
STIFF, DARK BROWN, SILT AND CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, DAMP	778.8	1	3	15	100	SS-1	4.5+	-	-	-	-	-	-	-	18	A-6a (V)	<< << <<	
		2	3	8													<< << <<	
	776.0	3															<< << <<	
VERY STIFF, MOTTLED BROWN AND GRAY, SILTY CLAY , SOME SAND, DAMP	773.5	4	4	16	100	SS-2	3.50	0	2	21	33	44	38	20	18	20	A-6b (11)	<< << <<
		5	5	7														<< << <<
LOOSE, BROWN, NON-PLASTIC SANDY SILT , LITTLE STONE FRAGMENTS, DAMP	771.0	6	1	7	17	SS-3	--	-	-	-	-	-	-	-	9	A-4a (V)	<< << <<	
		7	2	3														<< << <<
VERY DENSE, BROWN AND GRAY, NON-PLASTIC SANDY SILT , SOME STONE FRAGMENTS, DAMP @10.0'; DRILLING WAS HARDER	769.5	8	14	53	100	SS-4	--	-	-	-	-	-	-	-	8	A-4a (V)	<< << <<	
	769.0	9	17															<< << <<
POSSIBLE DOLOMITE BEDROCK NOTE: AUGERED TO 10.5' AND BEGAN CORING BEDROCK		10	23															<< << <<
DOLOMITE , GRAY, SEVERELY TO MODERATELY WEATHERED, VERY STRONG, THIN TO MEDIUM BEDDED, JOINTED, HIGHLY TO MODERATELY FRACTURED, APERTURE WIDTH TIGHT TO NARROW, SLIGHTLY TO VERY ROUGH. @14.5'; U.C. STRENGTH = 17,035 psi.		11																<< << <<
		12																<< << <<
		13																<< << <<
		14																<< << <<
		15	45		100	NX-1												<< << <<
		16																<< << <<
		17																<< << <<
		18																<< << <<
		19																<< << <<
	759.0	20																<< << <<
		EOB																<< << <<

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING. NO READING WAS TAKEN UPON COMPLETION DUE TO WATER USED DURING ROCK CORING OPERATIONS.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: HOLE WAS BACKFILLED WITH SOIL CUTTINGS

PROJECT: HAN-75-1526 L&R	DRILLING FIRM / OPERATOR: DLZ / JOHN	DRILL RIG: CME 55 TRUCK	STATION / OFFSET: 807+21, 32 RT	EXPLORATION ID: B-020-0-13
TYPE: BRIDGE REPLACEMENT	SAMPLING FIRM / LOGGER: PGI / W. NAJJAR	HAMMER: CME AUTOMATIC	ALIGNMENT: IR-75 BASELINE	
PID: 87005 BR ID: HAN-75-1526	DRILLING METHOD: 2.25" SSA	CALIBRATION DATE: 6/13/13	ELEVATION: 803.1 (MSL) EOB: 45.0 ft.	PAGE: 1 OF 2
START: 7/8/13 END: 7/9/13	SAMPLING METHOD: SPT / NQ	ENERGY RATIO (%): 70.2	COORD: 41.027045710, 83.673612780	

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			
ASPHALT PAVEMENT (5.0" THICK)	802.7																	
CONCRETE PAVEMENT (7.0" THICK)	802.1																	
BROWN STONE AND CONCRETE FRAGMENTS WITH SAND AND SILT (ROADBASE)	801.1																	
VERY STIFF TO HARD, BROWN AND GRAY TO BROWN, SILT AND CLAY, LITTLE SAND, TRACE TO SOME STONE FRAGMENTS, FILL, DAMP		1	6															
		2	9	26	67	SS-12	-	-	-	-	-	-	-	-	22	A-6a (V)		
		3																
		4	2															
		5	5	18	89	SS-3	2.50	-	-	-	-	-	-	-	15	A-6a (V)		
		6																
@6.0'; HARD		7	8															
		8																
@8.5'; HARD, BROWN, SOME STONE FRAGMENTS		9	10															
		10	21	42	78	SS-5	2.50	-	-	-	-	-	-	-	9	A-6a (V)		
		11																
@11.0'; STIFF, BROWN		12	4															
		13	5	14	94	SS-6	4.5+	-	-	-	-	-	-	-	17	A-6a (V)		
	789.6	14																
VERY STIFF, BROWN AND BLACK TO BROWN, SILTY CLAY, TRACE TO LITTLE SAND, TRACE STONE FRAGMENTS, FILL, MOIST		15	5															
@14.0'; BLACK		16	9	26	100	SS-7	4.5+	-	-	-	-	-	-	-	20	A-6b (V)		
@16.0'; DARK BROWN, LITTLE SAND		17	4															
		18	6	21	89	SS-8	3.00	-	-	-	-	-	-	-	22	A-6b (V)		
@18.5'; BROWN, LITTLE SAND		19	4															
		20	6	16	89	SS-9	4.50	-	-	-	-	-	-	-	21	A-6b (V)		
	782.1	21																
VERY STIFF, MOTTLED BROWN AND GRAY, SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS, MOIST		22	6															
		23	10	25	100	SS-10	3.50	-	-	-	-	-	-	-	20	A-6b (V)		
	780.1	24																
VERY STIFF, BROWN AND GRAY TO BROWN, PLASTIC SILT, SOME CLAY, LITTLE SAND, DAMP TO MOIST		25	8															
		26	9	27	100	SS-11	-	0	2	11	61	26	24	19	5	13	A-4b (8)	
		27																
		28																
@28.5'; BROWN, TRACE SAND, MOIST		29	5															
			5	16	100	SS-12	-	-	-	-	-	-	-	-	20	A-4b (V)		

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT-GDT-11/14/13 14:11:11\CLIEDCO\PUBLIC\PROJECT FILES\13 PROJECTS\IG\01\IG HAN-75\LAB DATA SHEETS\BRIDGES\1526\75 TUNNEL BR GPJ

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-11/4/13 14:11 \\CLIEDC01\PUBLIC\PROJECT FILES\13 PROJECTS\G1301\G HAN-75\LAB DATA SHEETS\BRIDGES\1526\75 TUNNEL BR.GPJ

PID: 87005		BR ID: HAN-75-1526		PROJECT: HAN-75-1526 L&R		STATION / OFFSET: 807+21, 32 RT		START: 7/8/13		END: 7/9/13		PG 2 OF 2		B-020-0-13						
MATERIAL DESCRIPTION AND NOTES			ELEV. 773.1	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			
VERY STIFF, BROWN AND GRAY TO BROWN, PLASTIC SILT , SOME CLAY, LITTLE SAND, DAMP TO MOIST <i>(continued)</i>			769.6	31																< \ / >
GRAY DOLOMITE BEDROCK NOTE: AUGERED TO 35.0', BEGAN CORING BEDROCK			768.1	33	60/3"	-	100	SS-13	-	-	-	-	-	-	-	-	-	13	Rock (V)	< \ / >
DOLOMITE, LIGHT GRAY, SLIGHTLY WEATHERED, STRONG, JOINTED, HIGHLY TO MODERATELY FRACTURED, APERTURE WIDTH TIGHT TO NARROW, SLIGHTLY TO VERY ROUGH; RQD 60%, REC 92%.			763.1	35																< \ / >
DOLOMITE, LIGHT GRAY, SLIGHTLY WEATHERED, VERY STRONG, JOINTED, HIGHLY TO MODERATELY FRACTURED, APERTURE WIDTH TIGHT TO NARROW, SLIGHTLY TO VERY ROUGH; RQD 85%, REC 100%. @40.5'; U.C. STRENGTH = 20,551 psi.			758.1	37	60		91	NQ-1												< \ / >
				38																< \ / >
				39																< \ / >
				40																< \ / >
				41																< \ / >
				42	85		100	NQ-2												< \ / >
				43																< \ / >
				44																< \ / >
				45																< \ / >
EOB																				< \ / >

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING. NO READING WAS TAKEN UPON COMPLETION DUE TO WATER USED DURING ROCK CORING OPERATIONS.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: HOLE WAS BACKFILLED WITH SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-11/14/13 14:11:10\EDC01\PROJECT FILES\13 PROJECTS\G1901\G HAN-75\LAB DATA SHEETS\BRIDGES\1526\75 TUNNEL BR.GPJ

PROJECT: HAN-75-1526 L&R	DRILLING FIRM / OPERATOR: B-M / JOSH DEAN	DRILL RIG: DIEDRICH D-90 ATV	STATION / OFFSET: 807+72, 153 RT	EXPLORATION ID: B-020-1-13
TYPE: BRIDGE REPLACEMENT	SAMPLING FIRM / LOGGER: PGI / W. NAJJAR	HAMMER: DIEDRICH AUTOMATIC	ALIGNMENT: IR-75 BASELINE	
PID: 87005 BR ID: HAN-75-1526	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 9/18/12	ELEVATION: 784.5 (MSL) EOB: 18.5 ft.	PAGE: 1 OF 1
START: 7/29/13 END: 7/29/13	SAMPLING METHOD: SPT/NX	ENERGY RATIO (%): 80.2	COORD: 41.027032460, 83.673132280	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
TOPSOIL (8" THICK)	784.5																	
MEDIUM STIFF TO VERY STIFF, BROWN, SILTY CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, MOIST TO DAMP	783.9	1	2	8	83	SS-1	4.5+	2	4	16	35	43	39	19	20	20	A-6b (12)	
@3.5'; VERY STIFF, DAMP		2	4															
		3																
		4	7	27	89	SS-2	4.5+	-	-	-	-	-	-	-	-	18	A-6b (V)	
		5	8	12														
	778.5	6	5	15	78	SS-3	2.25	-	-	-	-	-	-	-	-	19	A-6a (V)	
STIFF TO MEDIUM STIFF, BROWN, SILT AND CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, MOIST TO DAMP		7	6	5														
@8.5'; MEDIUM STIFF, DAMP		8																
		9	2	4	8	33	SS-4	3.50	-	-	-	-	-	-	-	18	A-6a (V)	
		10																
	772.6	11	3															
MEDIUM DENSE, BROWN, NON-PLASTIC SANDY SILT , WET	772.1	12	4	5	12	50	SS-5A&B	3.00	-	-	-	-	-	-	-	18	A-6a (V)	
POSSIBLE DOLOMITE BEDROCK		13						--	-	-	-	-	-	-	-	29	A-4a (V)	
@13.5' AUGER RESUSAL, BEGAN CORING BEDROCK	771.0	14																
DOLOMITE , LIGHT GRAY, SLIGHTLY WEATHERED, VERY STRONG, JOINTED, FRACTURED TO MODERATELY FRACTURED, APERTURE WIDTH TIGHT TO NARROW, SLIGHTLY TO VERY ROUGH.		15																
@14.0'; U.C. STRENGTH = 25,119 psi.		16	28		100	NX-1											CORE	
		17																
	766.0	18																

EOB

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING. NO READING WAS TAKEN UPON COMPLETION DUE TO WATER USED DURING ROCK CORING OPERATIONS.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: HOLE WAS BACKFILLED WITH SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH-DOT-GDT-1/15/14 14:57 \\CLED001\PUBLIC\PROJECT FILES\13 PROJECTS\13001 IG HAN-75\LAB DATA SHEETS\BRIDGES\1540 RAILROAD BR.GPJ

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>B-M / JOSH DEAN</u>	DRILL RIG: <u>DIEDRICH D-90 ATV</u>	STATION / OFFSET: <u>812+46, 93 LT</u>	EXPLORATION ID <u>B-021-1-13</u>
TYPE: <u>BRIDGE REPLACEMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT:	
PID: <u>87005</u> BR ID: <u>HAN-75-1540</u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>9/18/12</u>	ELEVATION: <u>779.1 (MSL)</u> EOB: <u>17.5 ft.</u>	PAGE 1 OF 1
START: <u>8/24/13</u> END: <u>8/24/13</u>	SAMPLING METHOD: <u>SPT/NX</u>	ENERGY RATIO (%): <u>80.2</u>	COORD: <u>41.028494030, 83.673417980</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	779.1	DEPTH	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
									GR	CS	FS	SI	CL	LL	PL	PI			
NOTE: THE AREA WAS CLEARED OF VEGETATION WITH A DOZER PRIOR TO DRILLING OPERATIONS. THE TOP 1' WAS DISTURBED.	778.1		1	2															
STIFF, DARK BROWN, CLAY , LITTLE SAND, TRACE ROOTS, FILL, DAMP	775.6		2	3	11	56	SS-1	2.50	-	-	-	-	-	-	-	-	-	25	A-7-6 (V)
MEDIUM STIFF, MOTTLED BROWN AND GRAY, SILTY CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, DAMP	773.1		3	2	8	100	SS-2	2.00	-	-	-	-	-	-	-	-	-	25	A-7-6 (V)
MEDIUM DENSE, BROWN AND GRAY, COARSE AND FINE SAND , SOME FINES, WET	770.6		4	3	12	100	SS-3	-	-	-	-	-	-	-	-	-	-	23	A-3a (V)
VERY STIFF, GRAY, SILT AND CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, DAMP TO MOIST	767.1		5	3	6														
@11.0'; MOIST	766.6		6	3	8	21	100	SS-4	4.5+	-	-	-	-	-	-	-	-	18	A-6a (V)
LIGHT GRAY DOLOMITE BEDROCK @12.5'; AUGER REFUSAL AND STARTED CORING BEDROCK	763.5		7	4	12	100	SS-5	1.50	2	2	16	39	41	34	19	15	25	A-6a (10)	
LIMESTONE LIGHT GRAY, SLIGHTLY WEATHERED, STRONG, THIN TO THICK BEDDED, FRACTURED TO MODERATELY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.	761.6		8	51		100	NX-1												CORE
LIMESTONE LIGHT GRAY, SLIGHTLY WEATHERED, STRONG, THIN TO THICK BEDDED, FRACTURED TO MODERATELY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.			9	48		100	NX-2												CORE

NOTES: GROUNDWATER WAS ENCOUNTERED AT 6.0' DURING DRILLING AND NO READING WAS TAKEN UPON COMPLETION OF DRILLING DUE TO ROCK CORING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES HOLE WAS BACKFILLED WITH 1 BAG SOIL CUTTINGS/BENTONITE PELLETS

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH-DOT-GDT-1/15/14 14:57: \cledc01\public\project files\13 projects\g-1301\g-han-75\lab data sheets\bridges\1540 rail road br.gpj

PID: 87005		BR ID: HAN-75-1540		PROJECT: HAN-75-14.39		STATION / OFFSET: 813+63, 14 LT		START: 8/16/13		END: 8/16/13		PG 2 OF 2		B-021-2-13						
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			
@29.5'; BOULDER ENCOUNTERED			777.0																	
VERY STIFF, BROWN, MOTTLED GRAY, CLAY, LITTLE SAND, TRACE STONE FRAGMENTS, MOIST			773.5	31-32	3 5	15	61	SS-6	0.75	-	-	-	-	-	-	-	26	A-7-6 (V)		
VERY STIFF, GRAY, SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS, MOIST			771.0	33-35	3 5	16	72	SS-7	2.25	-	-	-	-	-	-	-	19	A-4a (V)		
MEDIUM DENSE, GRAY, NON-PLASTIC SILT LITTLE SAND, MOIST			768.0	36-37	5 7	21	94	SS-8	-	-	-	-	-	-	-	-	24	A-4b (V)		
VERY STIFF, GRAY, SILT AND CLAY LITTLE SAND, TRACE STONE FRAGMENTS, DAMP			765.5	38-40	7 11	33	100	SS-9	-	-	-	-	-	-	-	-	18	A-6a (V)		
LIGHT GRAY DOLOMITE BEDROCK NOTE: AUGERED TO 42.0 FEET AND STARTED CORING BEDROCK			765.0	41-42	18 50/4"	-	80	SS-10	-	60	7	3	13	17	28	17	11	14	A-6a (V)	
DOLOMITE, LIGHT GRAY, SLIGHTLY WEATHERED, STRONG, THIN TO THICK BEDDED, FRACTURED TO MODERATELY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.			755.0	43-51	60	100	NX-1											CORE		
				52																

NOTES: GROUNDWATER WAS ENCOUNTERED AT 32.0' DURING DRILLING AND NO READING WAS TAKEN UPON COMPLETION OF DRILLING DUE TO ROCK CORING OPERATIONS.

ABANDONMENT METHODS, MATERIALS, QUANTITIES BACKFILLED WITH 1.0 BAG SOIL CUTTINGS/BENTONITE PELLETS

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH-DOT-GDT-1/15/14 14:57: \cledc01\public\project files\13 projects\g-001\g-han-75\lab data sheets\bridges\1540 rail road BR.GPJ

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>B-M / JOSH DEAN</u>	DRILL RIG: <u>DIEDRICH D-90 ATV</u>	STATION / OFFSET: <u>815+31, 106 RT</u>	EXPLORATION ID: <u>B-022-1-13</u>
TYPE: <u>BRIDGE REPLACEMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: _____	
PID: <u>87005</u> BR ID: <u>HAN-75-1540</u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>9/18/12</u>	ELEVATION: <u>779.1 (MSL)</u> EOB: <u>18.5 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>7/26/13</u> END: <u>7/26/13</u>	SAMPLING METHOD: <u>SPT/NX</u>	ENERGY RATIO (%): <u>80.2</u>	COORD: <u>41.029191180, 83.672561280</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTH	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI		
COARSE STONE FRAGMENTS AND SLAG (18" THICK, THROUGH ABUTMENT SLOPE)	779.1																
MEDIUM STIFF, DARK BROWN, CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, DAMP	777.6	1	5	9	56	SS-1	3.00	-	-	-	-	-	-	-	-	27	A-7-6 (V)
MEDIUM STIFF, BROWN, MOTTLED GRAY, CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, DAMP	775.6	2	3	8	61	SS-2	2.25	3	2	14	44	37	41	17	24	24	A-7-6 (14)
LOOSE, BROWN, NON-PLASTIC SILT , LITTLE SAND, MOIST	773.1	3	2	5	100	SS-3	-	-	-	-	-	-	-	-	-	23	A-4b (V)
MEDIUM DENSE, BROWN, SILT AND CLAY , TRACE SAND, DAMP	770.6	4	2	24	100	SS-4	4.5+	0	0	1	44	55	30	19	11	17	A-6a (8)
LIGHT GRAY DOLOMITE BEDROCK	766.8	5	3	32	89	SS-1	2.50	-	-	-	-	-	-	-	-	10	A-6a (V)
@13.5'; AUGER REFUSAL AND STARTED CORING BEDROCK	765.6	6	2														
DOLOMITE LIGHT GRAY, SEVERELY TO MODERATELY WEATHERED, STRONG, FRACTURED TO MODERATELY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.	760.6	7	48		100	NX-1											CORE
		8															
		9															
		10															
		11															
		12															
		13															
		14															
		15															
		16															
		17															
		18															

NOTES: GROUNDWATER WAS ENCOUNTERED AT 12.0' DURING DRILLING AND NO READING WAS TAKEN UPON COMPLETION OF DRILLING DUE TO ROCK CORING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES HOLE WAS BACKFILLED WITH 0.5 BAG SOIL CUTTINGS/BENTONITE PELLETS

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH-DOT-GDT-1/15/14 14:57:\C:\EDC01\PUBLIC\PROJECT FILES\13 PROJECTS\G13011G HAN-75\LAB DATA SHEETS\BRIDGES\1540 RAILROAD BR.GPJ

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>B-M / JOSH DEAN</u>	DRILL RIG: <u>DIEDRICH D-90 ATV</u>	STATION / OFFSET: <u>814+72, 95 LT</u>	EXPLORATION ID: <u>B-023-0-13</u>
TYPE: <u>BRIDGE REPLACEMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT:	
PID: <u>87005</u> BR ID: <u>HAN-75-1540</u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>9/18/12</u>	ELEVATION: <u>778.8 (MSL)</u> EOB: <u>21.5 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>7/23/13</u> END: <u>7/23/13</u>	SAMPLING METHOD: <u>SPT/NX</u>	ENERGY RATIO (%): <u>80.2</u>	COORD: <u>41.029080290, 83.673302840</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
NOTE: THE AREA WAS CLEARED OF VEGETATION WITH A DOZER PRIOR TO DRILLING OPERATIONS. THE TOP 8" WAS DISTURBED.	778.8																	
STIFF, DARK BROWN, SILTY CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, MOIST	778.1	1	3															
		2	4	11	44	SS-1	2.75	-	-	-	-	-	-	-	-	19	A-6b (V)	
	775.3	3																
STIFF, BROWN, MOTTLED GRAY, SILTY CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, MOIST		4	3	9	56	SS-2	1.75	-	-	-	-	-	-	-	-	22	A-6b (V)	
	772.8	5																
LOOSE TO MEDIUM DENSE, BROWN, NON-PLASTIC SANDY SILT , TRACE STONE FRAGMENTS, MOIST TO DAMP		6	1															
		7	3	8	61	SS-3	-	1	1	35	49	14	NP	NP	NP	22	A-4a (6)	
		8																
@8.5'; MEDIUM DENSE, DAMP		9	11															
	768.8	10	12	36	44	SS-4	-	-	-	-	-	-	-	-	-	11	A-4a (V)	
		11	15															
LIGHT GRAY DOLOMITE BEDROCK	767.3	12																
@11.5'; AUGER REFUSAL AND STARTED CORING BEDROCK		13																
LIMESTONE LIGHT GRAY, SLIGHTLY WEATHERED, STRONG, THIN TO THICK BEDDED, FRACTURED TO MODERATELY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.		14																
		15																
		16																
		17	37		96	NX-1											CORE	
		18																
		19																
		20																
	757.3	21																

EOB

NOTES: NO GROUNDWATER WAS ENCOUNTERED DURING DRILLING AND NO READING WAS TAKEN UPON COMPLETION OF DRILLING DUE TO ROCK CORING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES HOLE WAS BACKFILLED WITH SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH-DOT-GDT-1/15/14 14:57:\C:\EDC01\PROJECTS\G13011G HAN-75\LAB DATA SHEETS\BRIDGES\1540 RAILROAD BR.GPJ

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>B-M / JOSH DEAN</u>	DRILL RIG: <u>DIEDRICH D-90 ATV</u>	STATION / OFFSET: <u>815+95, 63 RT</u>	EXPLORATION ID: <u>B-024-0-13</u>
TYPE: <u>BRIDGE REPLACEMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: _____	
PID: <u>87005</u> BR ID: <u>HAN-75-1540</u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>9/18/12</u>	ELEVATION: <u>782.0 (MSL)</u> EOB: <u>29.5 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>7/23/13</u> END: <u>7/23/13</u>	SAMPLING METHOD: <u>SPT/NX</u>	ENERGY RATIO (%): <u>80.2</u>	COORD: <u>41.029379550, 83.672697720</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTH	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
TOPSOIL (3" THICK)	782.0																	
BROWN AND GRAY, GRAVEL AND ROCK FRAGMENTS FILL GRAY GRAVEL AND ROCK FRAGMENTS	781.8 781.0	1	5															
LOOSE, GRAY, GRAVEL AND ROCK FRAGMENTS WITH SAND AND SILT FILL, MOIST		2	4	9	56	SS-1	-	-	-	-	-	-	-	-	9	A-2-4 (V)		
@ 3.5'; NO RECOVERY, SPOON TIP BLOCKED WITH STONE FROM ABOVE		3																
@ 3.5', WATER IN BORING APPEARED TO BE PERCHED WATER IN GRAVEL ABOVE DRAINING FROM EMBANKMENT		4	3	11	0	SS-2	-	-	-	-	-	-	-	-		A-2-4 (V)		
		5	5	3														
STIFF, MOTTLED BROWN AND GRAY TO GRAY, SILTY CLAY, LITTLE SAND, TRACE ROCK FRAGMENTS, MOIST	776.0	6	2	9	56	SS-3	3.00	-	-	-	-	-	-	-	25	A-6b (V)		
		7	3	4														
		8																
		9	3	9	100	SS-4	2.50	2	2	13	34	49	38	22	16	26	A-6b (10)	
	771.0	10	3	4														
DENSE, GRAY, NON-PLASTIC SILT LITTLE SAND, TRACE STONE FRAGMENTS, MOIST	768.5 768.0	11	1	40	17	SS-5	-	-	-	-	-	-	-	-	18	A-4b (V)		
		12	6	24														
STIFF, GRAY, SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS, DAMP	767.0	13	7	-	71	SS-6	-	-	-	-	-	-	-	-	18	A-4a (V)		
LIGHT GRAY DOLOMITE BEDROCK @ 14.5'; AUGER REFUSAL AND STARTED CORING BEDROCK		14																
DOLOMITE LIGHT GRAY, SLIGHTLY WEATHERED, STRONG, THINLY LAMINATED, FRACTURED TO MODERATELY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.	757.5	15																
		16																
		17																
		18																
		19																
		20	46		100	NX-1											CORE	
		21																
		22																
		23																
DOLOMITE LIGHT GRAY, SLIGHTLY WEATHERED, STRONG, THIN TO THICK BEDDED, FRACTURED TO MODERATELY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.	755.0	24																
		25	23		100	NX-2												
		26																
		27																
DOLOMITE LIGHT GRAY, SLIGHTLY WEATHERED, STRONG, THIN TO THICK BEDDED, FRACTURED TO MODERATELY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.	752.5	28	60		100	NX-3												
		29																

EOB

NOTES: GROUNDWATER WAS ENCOUNTERED AT 3.5' DURING DRILLING AND NO READING WAS TAKEN UPON COMPLETION OF DRILLING DUE TO ROCK CORING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES HOLE WAS BACKFILLED WITH 1 BAG SOIL CUTTINGS/BENTONITE PELLETS

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH-DOT-GDT-1/15/14 14:57 \\CLED001\PROJECTS\13011G HAN-75\LAB DATA SHEETS\BRIDGES\1540 RAILROAD BR.GPJ

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>B-M / JOSH DEAN</u>	DRILL RIG: <u>DIEDRICH D-90 ATV</u>	STATION / OFFSET: <u>816+69, 124 RT</u>	EXPLORATION ID: <u>B-025-0-13</u>
TYPE: <u>BRIDGE REPLACEMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: _____	
PID: <u>87005</u> BR ID: <u>HAN-75-1540</u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>9/18/12</u>	ELEVATION: <u>779.3 (MSL)</u> EOB: <u>18.0 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>7/23/13</u> END: <u>7/23/13</u>	SAMPLING METHOD: <u>SPT/NX</u>	ENERGY RATIO (%): <u>80.2</u>	COORD: <u>41.029581060, 83.672465560</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	779.3	DEPTH	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	BACK FILL
									GR	CS	FS	SI	CL	LL	PL	PI	WC		
TOPSOIL (12"THICK)	778.3																		
VERY STIFF, BROWN TO BLACK, NON-PLASTIC SANDY SILT , TRACE STONE FRAGMENTS, FILL, MOIST	775.8		1	7	17	78	SS-1	4.5+	-	-	-	-	-	-	-	-	-	16	A-4a (V)
STIFF, MOTTLED BROWN AND GRAY, SILTY CLAY , LITTLE SAND, MOIST	773.3		2	6	7														
VERY STIFF, GRAY, SILT AND CLAY , TRACE SAND, DAMP	768.3		3	4	9	67	SS-2	1.00	-	-	-	-	-	-	-	-	-	20	A-6b (V)
			4	3															
			5	2	5	83	SS-3	1.00	-	-	-	-	-	-	-	-	-	19	A-6a (V)
			6	2															
			7	5	6	19	83	SS-4	2.00	0	0	1	49	50	30	19	11	19	A-6a (8)
			8	6	8														
			9	3	2	8	56	SS-5	-	-	-	-	-	-	-	-	-	22	A-3a (V)
LOOSE, GRAY, COARSE AND FINE SAND LITTLE FINES, WET	766.8		10	2															
POSSIBLE LIGHT GRAY DOLOMITE BEDROCK @ 12.5'; AUGER REFUSAL AND STARTED CORING BEDROCK	766.3		11	3															
DOLOMITE , LIGHT GRAY, SLIGHTLY WEATHERED, STRONG, THIN TO THICK BEDDED, FRACTURED TO MODERATELY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.	763.0		12	28		100	NX-1												CORE
DOLOMITE , LIGHT GRAY, SLIGHTLY WEATHERED, STRONG, THIN TO THICK BEDDED, FRACTURED TO MODERATELY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.	761.3		13	30		80	NX-2												CORE
			14																
			15																
			16																
			17																
			18																

NOTES: GROUNDWATER WAS ENCOUNTERED AT 11.0' DURING DRILLING AND NO READING WAS TAKEN UPON COMPLETION OF DRILLING DUE TO ROCK CORING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES HOLE WAS BACKFILLED WITH 0.5 BAG SOIL CUTTINGS/BENTONITE PELLETS

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH.DOT.GDT-7/14/14 18:10:00.M:PROJECT FILES\13 PROJECTS\IG1301\IG HAN-75\LAB DATA SHEETS\BRIDGES\1697\BLANCHARD RIVER.GPJ

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>B-M / JOSH DEAN</u>	DRILL RIG: <u>DIEDRICH D-90 ATV</u>	STATION / OFFSET: <u>897+32.0, 56.8' LT</u>	EXPLORATION ID: <u>B-046-0-13</u>
TYPE: <u>BRIDGE REPLACEMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	
PID: <u>87005</u> BR ID: <u>HAN-75-1697</u>	DRILLING METHOD: <u>3.25" HSA / NX</u>	CALIBRATION DATE: <u>9/18/12</u>	ELEVATION: <u>768.8 (MSL)</u> EOB: <u>27.5 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>8/2/13</u> END: <u>8/2/13</u>	SAMPLING METHOD: <u>SPT/NX</u>	ENERGY RATIO (%): <u>80.2</u>	COORD: <u>41.051691190, 83.672110910</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTH	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
TOPSOIL (4' THICK)	768.8																	
MEDIUM STIFF, BROWN, SILTY CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, DAMP	768.5	1	2															
		2	3	8	78	SS-1	2.00	-	-	-	-	-	-	-	-	18	A-6b (V)	
	765.3	3	3															
MEDIUM STIFF, BROWN, CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, MOIST	765.3	4	2	7	100	SS-2	2.00	-	-	-	-	-	-	-	-	25	A-7-6 (V)	
		5	3															
VERY STIFF TO HARD, BROWN AND GRAY, SANDY SILT , SOME CLAY, TRACE STONE FRAGMENTS, MOIST TO DAMP	762.8	6	3	23	94	SS-3	4.00	-	-	-	-	-	-	-	-	16	A-4a (V)	
		7	7	10														
@8.5'; HARD, DAMP		8																
		9	8	31	100	SS-4	4.5+	-	-	-	-	-	-	-	-	13	A-4a (V)	
		10	10	13														
@11.0'; NO SPLIT SPOON RECOVERY		11																
		12	6	19	56	SS-5	-	-	-	-	-	-	-	-	-	-		
	755.3	13	8															
HARD, GRAY, PLASTIC SILT , SOME CLAY, TRACE STONE FRAGMENTS, DAMP	755.3	14	16	48	89	SS-6	4.5+	-	-	-	-	-	-	-	-	8	A-4b (V)	
		15	19	17														
@16.0'; NO SPLIT SPOON RECOVERY	752.8	16																
POSSIBLE DOLOMITE BEDROCK NOTE: AUGERED TO 16.5', BEGAN CORING BEDROCK	752.3	16	50/1"	-	0	SS-7	-	-	-	-	-	-	-	-	-	-		
DOLOMITE , LIGHT GRAY, SLIGHTLY WEATHERED, MODERATELY STRONG, VERY THIN TO THIN BEDDED, FRACTURED TO MODERATELY FRACTURED WITH FEW ANGULAR FRACTURES, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH. NOTE: VUGGY FROM 16.5' TO 18.0'.	748.3	18	44	94		NX-1											CORE	
		19																
DOLOMITE , LIGHT GRAY, SLIGHTLY WEATHERED, MODERATELY STRONG, VERY THIN TO THIN BEDDED, FRACTURED TO MODERATELY FRACTURED WITH FEW ANGULAR FRACTURES, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH. @20.9'; COMPRESSIVE STRENGTH = 6,888 PSI	741.3	21	21	96		NX-2											CORE	
		22																
		23																
		24																
		25																
		26																
	741.3	27																
		EOB																

NOTES: NO GROUNDWATER WAS ENCOUNTERED DURING DRILLING AND NO READING WAS TAKEN UPON COMPLETION OF DRILLING DUE TO ROCK CORING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES BACKFILLED WITH SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH-DOT-GDT-7/14/14 18:10-M:PROJECT FILES\13 PROJECTS\IG1301\IG HAN-75\LAB DATA SHEETS\BRIDGES\1897\BLANCHARD RIVER.GPJ

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>B-M / JOSH DEAN</u>	DRILL RIG: <u>DIEDRICH D-90 ATV</u>	STATION / OFFSET: <u>898+68.8, 52.4' RT</u>	EXPLORATION ID: <u>B-047-0-13</u>
TYPE: <u>BRIDGE REPLACEMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	
PID: <u>87005</u> BR ID: <u>HAN-75-1697</u>	DRILLING METHOD: <u>3.25" HSA / NX</u>	CALIBRATION DATE: <u>9/18/12</u>	ELEVATION: <u>765.9 (MSL)</u> EOB: <u>21.5 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>8/2/13</u> END: <u>8/2/13</u>	SAMPLING METHOD: <u>SPT/NX</u>	ENERGY RATIO (%): <u>80.2</u>	COORD: <u>41.051939580, 83.671567690</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTH	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
TOPSOIL (5" THICK)	765.9																	
MEDIUM STIFF, BROWN, SILTY CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, MOIST	765.5	1	3	8	89	SS-1	2.75	-	-	-	-	-	-	-	-	-	19	A-6b (V)
		2	3															
		3																
		4	2	7	67	SS-2	2.50	-	-	-	-	-	-	-	-	-	21	A-6b (V)
		5	3															
	759.9	6	2															
MEDIUM STIFF, BROWN, CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, MOIST		7	2	7	94	SS-3	2.00	-	-	-	-	-	-	-	-	-	25	A-7-6 (V)
		8	3															
		9	1	7	94	SS-4	1.50	-	-	-	-	-	-	-	-	-	25	A-7-6 (V)
		10	2															
		11	3															
@11.0'; NO SPLIT SPOON RECOVERY	754.9	TR																
POSSIBLE DOLOMITE BEDROCK	754.4		50/1"	-	0	SS-5	-	-	-	-	-	-	-	-	-	-		
NOTE: AUGERED TO 11.5', BEGAN CORING BEDROCK																		
DOLOMITE LIGHT GRAY, SLIGHTLY WEATHERED, STRONG, VERY THIN TO THIN BEDDED, FRACTURED TO MODERATELY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.																		
NOTE: VUGGY FROM 11.5' TO 18.0'																		
@16.2'; COMPRESSIVE STRENGTH = 9,765 PSI																		
		12																
		13																
		14																
		15																
		16	48	100		NX-1												CORE
		17																
		18																
		19																
		20																
	744.4	21																
		EOB																

NOTES: NO GROUNDWATER WAS ENCOUNTERED DURING DRILLING AND NO READING WAS TAKEN UPON COMPLETION OF DRILLING DUE TO ROCK CORING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>PGI / ZEKE</u>	DRILL RIG: <u>CME 45B TRUCK</u>	STATION / OFFSET: <u>903+70.5, 76.0' RT</u>	EXPLORATION ID
TYPE: <u>BRIDGE REPLACEMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / ZEKE</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	B-049-2-14
PID: <u>87005</u> BR ID: <u>HAN-75-1713</u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>2/20/14</u>	ELEVATION: <u>772.2 (MSL)</u> EOB: <u>32.9 ft.</u>	PAGE
START: <u>4/6/15</u> END: <u>4/6/15</u>	SAMPLING METHOD: <u>SPT/NX</u>	ENERGY RATIO (%): <u>61.8</u>	COORD: <u>41.053208600, 83.670857500</u>	1 OF 2

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
TOPSOIL (6.0" THICK)	771.7																	
STIFF, BROWN, SANDY SILT , SOME CLAY, TRACE STONE FRAGMENTS, FILL, DAMP		1	5															
		2	4	10	89	SS-1	2.00	-	-	-	-	-	-	-	-	14	A-4a (V)	
		3	6															
		4	9															
		5	7	12	78	SS-2	1.50	8	6	15	45	26	26	17	9	16	A-4a (7)	
	766.2	6	5															
STIFF, DARK BROWN TO BROWN, SILT AND CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, MOIST @6.0'; NO SPLITSPOON RECOVERY AND AUGER SAMPLE WAS TAKEN		7	4	11	0	SS-3	--	-	-	-	-	-	-	-	-	17	A-6a (V)	
		8	7															
@9.5'; BROWN		9	3	12	100	SS-4A&B	2.00	11	8	9	29	43	30	17	13	29	A-6a (9)	
		10	5	7			3.75	-	-	-	-	-	-	-	-	20	A-6a (V)	
	761.2	11																
STIFF, DARK BROWN, SANDY SILT , SOME CLAY, TRACE STONE FRAGMENTS, FILL, MOIST		12	5	12	100	SS-5	2.25	-	-	-	-	-	-	-	-	25	A-4a (V)	
		13	7															
STIFF, BROWN, SILTY CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, MOIST		14	4	11	100	SS-6	--	-	-	-	-	-	-	-	-	24	A-6b (V)	
		15	5	6														
STIFF, BROWN, SILT , SOME CLAY, LITTLE SAND, TRACE STONE FRAGMENTS, MOIST		16	4	11	89	SS-7	--	5	4	8	56	27	27	19	8	19	A-4b (8)	
	756.2	17	7	4														
MEDIUM DENSE, BROWN, NON-PLASTIC SILT , LITTLE STONE FRAGMENTS, TRACE SAND, MOIST		18	4	46	56	SS-8	--	-	-	-	-	-	-	-	-	9	A-4b (V)	
	754.9	19	17	28														
DOLOMITE GRAY, HIGHLY WEATHERED.		20																
NOTE: AUGERED TO 22.5 FEET AND BEGIN CORING BEDROCK.		21																
	752.7	22																
DOLOMITE GRAY, MODERATELY TO SLIGHTLY WEATHERED, VERY STRONG, VERY THIN TO MEDIUM BEDDED, FRACTURED TO SLIGHTLY FRACTURED, TIGHT TO NARROW APERTURE WIDTH, SLIGHTLY ROUGH. U.C. STRENGTH @ 25.4' = 15,276 psi.		23																
	749.7	24																
		25	35	54		NX-1												CORE
	745.7	26																
DOLOMITE GRAY, HIGHLY TO MODERATELY WEATHERED, VERY STRONG, VERY THIN TO THIN BEDDED, HIGHLY FRACTURED TO MODERATELY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.		27																
		28	17	96		NX-2												CORE
	741.7	29																
		30																
DOLOMITE GRAY, HIGHLY TO MODERATELY WEATHERED, VERY STRONG, VERY THIN TO THIN		31	27	100		NX-3												CORE
	740.4																	

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH-DOT-GDT-5/19/15 17:25: \C:\EDC01\PROJECT FILES\15 PROJECTS\G15004G-IMOD-3 FOR HAN-75-14.39\LAB DATA SHEETS\G15004G.GPJ

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT GDT-5/19/15 17:25 \\CLED001\PUBLIC\PROJECT FILES\5 PROJECTS\G15004G-1\MOD-3 FOR HAN-75-14.39\LAB DATA SHEETS\G15004G.GPJ

PID: 87005		BR ID: HAN-75-1713		PROJECT: HAN-75-14.39		STATION / OFFSET: 903+70.5, 76.0' RT		START: 4/6/15		END: 4/6/15		PG 2 OF 2		B-049-2-14							
MATERIAL DESCRIPTION AND NOTES				ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
				740.2							GR	CS	FS	SI	CL	LL	PL	PI			
BEDDED, HIGHLY FRACTURED TO MODERATELY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH. DOLOMITE GRAY, HIGHLY TO MODERATELY WEATHERED, VERY STRONG, VERY THIN BEDDED, HIGHLY FRACTURED TO MODERATELY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH. <i>(continued)</i>				739.3	EOB	0		100	NX-4										CORE	$\frac{<L}{>L}$	
				NOTES: GROUNDWATER WAS ENCOUNTERED AT A DEPTH OF 17.3' DURING DRILLING AND NO READING WAS TAKEN UPON COMPLETION DUE TO WATER USED DURING ROCK CORING OPERATIONS. ABANDONMENT METHODS, MATERIALS, QUANTITIES: HOLE WAS BACKFILLED WITH AUGER CUTTINGS																	

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>PGI / ZEKE</u>	DRILL RIG: <u>CME 45B TRUCK</u>	STATION / OFFSET: <u>904+61.0, 69.1' LT</u>	EXPLORATION ID: <u>B-049-3-14</u>
TYPE: <u>BRIDGE REPLACEMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / ZEKE</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>IR-75 BASELINE</u>	
PID: <u>87005</u> BR ID: <u>HAN-75-1713</u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>2/20/14</u>	ELEVATION: <u>772.7 (MSL)</u> EOB: <u>31.0 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>4/7/15</u> END: <u>4/7/15</u>	SAMPLING METHOD: <u>SPT/NX</u>	ENERGY RATIO (%): <u>61.8</u>	COORD: <u>41.053579800, 83.671237300</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI				
TOPSOIL (3.0" THICK)	772.7																		
VERY STIFF TO STIFF, BROWN, SILT AND CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, TRACE ROOTS, FILL, DAMP	772.5	1	9																
		2	6	18	33	SS-1	--	-	-	-	-	-	-	-	-	-	15	A-6a (V)	
		3																	
@3.5'; STIFF		4	9																
		5	6	13	44	SS-2	--	-	-	-	-	-	-	-	-	-	17	A-6a (V)	
	766.7	6																	
VERY STIFF, BROWN, SILTY CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, MOIST		7	8	18	100	SS-3	4.00	1	3	10	26	60	35	18	17	21	A-6b (11)		
		8																	
	764.2	9	3	11	100	SS-4	3.00	-	-	-	-	-	-	-	-	-	20	A-4b (V)	
MEDIUM STIFF, GRAY, SILT , SOME CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	762.9	10	4	7															
MEDIUM DENSE, GRAY, NON-PLASTIC SILT , TRACE SAND		11																	
	760.7	12	5	14	33	SS-5	2.50	-	-	-	-	-	-	-	-	-	19	A-4b (V)	
STIFF, GRAY, SILT , SOME CLAY, TRACE SAND, TRACE STONE FRAGMENTS, MOIST		13																	
		14	5	15	100	SS-6	4.5+	1	1	2	71	25	23	19	4	17	A-4b (8)		
	756.7	15																	
HARD, GRAY, SANDY SILT , SOME CLAY, LITTLE STONE FRAGMENTS, DAMP		16	4	33	89	SS-7	--	-	-	-	-	-	-	-	-	-	6	A-4a (V)	
		17																	
	753.7	18																	
DOLOMITE GRAY, HIGHLY WEATHERED.		19	27	-	100	SS-8	--	-	-	-	-	-	-	-	-	-	7	A-4a (V)	
@21.0'; AUGER REFUSAL AND BEGIN CORING BEDROCK.		20	50/3"																
	751.7	21																	
DOLOMITE GRAY, HIGHLY TO MODERATELY WEATHERED, STRONG, VERY THIN TO THIN BEDDED, HIGHLY FRACTURED TO MODERATELY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.		22		17	79	NX-1												CORE	
	749.7	23																	
DOLOMITE GRAY, MODERATELY WEATHERED, STRONG, THIN BEDDED, MODERATELY TO SLIGHTLY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.		24		58	100	NX-2												CORE	
U.C. STRENGTH @ 25.1' = 11,226 psi.	746.7	25																	
DOLOMITE GRAY, HIGHLY TO MODERATELY WEATHERED, STRONG, VERY THIN TO THIN BEDDED, HIGHLY FRACTURED TO MODERATELY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.		26																	
	744.2	27		52	100	NX-3												CORE	
		28																	
DOLOMITE GRAY, HIGHLY TO MODERATELY WEATHERED, STRONG, VERY THIN TO THIN BEDDED, HIGHLY FRACTURED TO MODERATELY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.		29																	
	741.7	30		0	93	NX-4												CORE	
		31																	

NOTES: GROUNDWATER WAS ENCOUNTERED AT A DEPTH OF 9.3' DURING DRILLING AND NO READING WAS TAKEN UPON COMPLETION DUE TO WATER USED DURING ROCK CORING OPERATIONS.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: HOLE WAS BACKFILLED WITH AUGER CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH-DOT-GDT-5/19/15-17-25-15\ICLED001\PROJECT FILES\15 PROJECTS\G15004G-IMOD-3 FOR HAN-75-14.39\LAB DATA SHEETS\G15004G.GPJ

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH-DOT-GDT-2/3/14 18:48\N\LED001\PUBLIC\PROJECT FILES\13 PROJECTS\G1301\G HAN-75\LAB DATA SHEETS\BRIDGES\1585-LIMA AVE.GPJ

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>B-M / JOSH DEAN</u>	DRILL RIG: <u>DIEDRICH D-90 ATV</u>	STATION / OFFSET: <u>757+93.3, 70.4' RT</u>	EXPLORATION ID: <u>B-083-0-13</u>
TYPE: <u>BRIDGE REPLACEMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>US 68 BASELINE</u>	
PID: <u>87005</u> BR ID: <u>HAN-68-1585</u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>9/18/12</u>	ELEVATION: <u>790.1 (MSL)</u> EOB: <u>15.0 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>7/29/13</u> END: <u>7/29/13</u>	SAMPLING METHOD: <u>SPT/NX</u>	ENERGY RATIO (%): <u>80.2</u>	COORD: <u>41.023545620, 83.667281450</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	BACK FILL	
								GR	CS	FS	SI	CL	LL	PL	PI	WC			
TOPSOIL (4" THICK)	790.1																		
MEDIUM STIFF, DARK BROWN, SILTY CLAY , LITTLE SAND, TRACE STONE FRAGMENTS & ROOTS, FILL, DAMP	789.7	1	1	5	83	SS-1	1.50	-	-	-	-	-	-	-	-	-	-	18	A-6b (V)
	786.4	2	2																
POSSIBLE DOLOMITE BEDROCK NOTE: AUGERED TO 5.0' AND STARTED CORING BEDROCK	785.1	3																	
	785.1	4	50/3"		67	SS-2	4.5+	-	-	-	-	-	-	-	-	-	-	18	A-6b (V)
DOLOMITE LIGHT GRAY, MODERATELY TO SLIGHTLY WEATHERED, STRONG, VERY THIN TO THIN BEDDED, JOINTED, HIGHLY TO MODERATELY FRACTURED, FEW ANGULAR FRACTURES, APERTURE WIDTH TIGHT TO NARROW, SLIGHTLY TO VERY ROUGH.	775.1	5																	
		6																	
		7																	
		8																	
		9																	
		10	38		100	NX-1													CORE
		11																	
		12																	
@ 14.2'; UNIT WEIGHT = 165.51 lbs/ft ³ , COMPRESSIVE STRENGTH = 14,427 psi		13																	
		14																	
	775.1	15																	
		EOB																	

NOTES: NO GROUNDWATER WAS ENCOUNTERED DURING DRILLING AND NO READING WAS TAKEN UPON COMPLETION DUE TO ROCK CORING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES HOLE WAS BACKFILLED WITH AUGER CUTTINGS

STANDARD ODOT SOIL BORING LOG (6.5 X 11)-OH-DOT-GDT-2/3/14 18:48\NCL\EDC01\PUBLIC\PROJECT FILES\13 PROJECTS\G13011G HAN-75\LAB DATA SHEETS\BRIDGES\1585-LIMA AVE.GPJ

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>OTB / JOHN</u>	DRILL RIG: <u>DIEDRICH D-50 ATV</u>	STATION / OFFSET: <u>758+30.4, 39.2' LT</u>	EXPLORATION ID: <u>B-084-0-13</u>
TYPE: <u>BRIDGE REPLACEMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>US 68 BASELINE</u>	
PID: <u>87005</u> BR ID: <u>HAN-68-1585</u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>12/10/11</u>	ELEVATION: <u>798.2 (MSL)</u> EOB: <u>21.2 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>6/21/13</u> END: <u>6/21/13</u>	SAMPLING METHOD: <u>SPT/NX</u>	ENERGY RATIO (%): <u>81.7</u>	COORD: <u>41.023368470, 83.667629530</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTH	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
GRAVEL AND ROCK FRAGMENTS WITH SAND AND SILT (BERM MATERIAL)	798.2																	
MEDIUM STIFF TO VERY STIFF, DARK BROWN TO BROWN, SILTY CLAY , LITTLE SAND, TRACE ROCK FRAGMENTS, FILL, MOIST TO DAMP	797.2	1	2	3	8	100	SS-1	4.5+	2	3	15	37	43	33	17	16	19	A-6b (10)
@3.5'; VERY STIFF, BROWN, DAMP		2																
@6.0'; BROWN AND BLACK, DAMP		3																
@8.0'; COBBLE WITH WOOD		4	4	5	18	100	SS-2	4.5+	-	-	-	-	-	-	-	-	15	A-6b (V)
		5																
		6																
		7	2	2	7	100	SS-3	2.50	-	-	-	-	-	-	-	-	18	A-6b (V)
		8																
VERY STIFF, BROWN, SILTY CLAY , LITTLE SAND, TRACE ROCK FRAGMENTS, DAMP	789.7	9	4	5	19	100	SS-4	3.50	-	-	-	-	-	-	-	-	18	A-6b (V)
@11.0', NO SPLIT SPOON RECOVERY	787.2	10																
POSSIBLE DOLOMITE BEDROCK	787.0	11																
@11.2'; STARTED CORING BEDROCK		11																
DOLOMITE LIGHT GRAY, MODERATELY TO SLIGHTLY WEATHERED, STRONG, VERY THIN TO THIN BEDDED, JOINTED, HIGHLY TO MODERATELY FRACTURED, FEW ANGULAR FRACTURES, APERTURE WIDTH TIGHT TO NARROW, SLIGHTLY TO VERY ROUGH.		12																
		13																
		14																
		15																
		16																
@17.7'; UNIT WEIGHT = 165.75 lbs/ft ³ , COMPRESSIVE STRENGTH = 14,787 psi		17																
		18																
		19																
		20																
	777.0	21																
		EOB																

NOTES: NO GROUNDWATER WAS ENCOUNTERED DURING DRILLING AND NO READING WAS TAKEN UPON COMPLETION DUE TO ROCK CORING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES HOLE WAS BACKFILLED WITH SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (6.5 X 11)-OH-DOT-GDT-2/3/14 18:48\NLEDC01\PUBLIC\PROJECT FILES\13 PROJECTS\G13011G HAN-75\LAB DATA SHEETS\BRIDGES\1585-LIMA AVE.GPJ

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>OTB / JOHN</u>	DRILL RIG: <u>DIEDRICH D-50 ATV</u>	STATION / OFFSET: <u>758+97.6, 36.8' RT</u>	EXPLORATION ID: <u>B-086-0-13</u>
TYPE: <u>BRIDGE REPLACEMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>US 68 BASELINE</u>	
PID: <u>87005</u> BR ID: <u>HAN-68-1585</u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>12/10/11</u>	ELEVATION: <u>801.1 (MSL)</u> EOB: <u>25.0 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>6/20/13</u> END: <u>6/21/13</u>	SAMPLING METHOD: <u>SPT/NX</u>	ENERGY RATIO (%): <u>81.7</u>	COORD: <u>41.023646320, 83.667655620</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
ASPHALT PAVEMENT (9.5" THICK)	801.1																	
ODOT 304 CRUSHED LIMESTONE BASE	799.3	1																
MEDIUM STIFF TO STIFF, GREENISH GRAY TO BROWN, CLAY, LITTLE SAND, FILL, MOIST TO DAMP		2	2	7	67	SS-1	3.25	0	3	12	37	48	43	17	26	22	A-7-6 (15)	
@4.0'; STIFF, BROWN, DAMP		3	3															
@6.0'; BROWN AND BLACK, LITTLE SAND		4	2															
		5	5	14	72	SS-2	4.5+	-	-	-	-	-	-	-	-	16	A-7-6 (V)	
		6																
	794.1	7	4				3.75	-	-	-	-	-	-	-	-	24	A-7-6 (V)	
STIFF, BROWN TO GREENISH GRAY, SILTY CLAY, LITTLE TO SOME SAND, TRACE ROCK FRAGMENTS, FILL, DAMP		8	5	14	100	SS-3A&B	4.5+	-	-	-	-	-	-	-	-	14	A-6b (V)	
@9.0'; GREENISH GRAY, SOME SAND, AND ROOTS		9																
		10	2	4	12	100	SS-4	3.00	-	-	-	-	-	-	-	19	A-6b (V)	
		11																
STIFF, BROWN, SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS, DAMP	789.6	12	6															
LIGHT GRAY DOLOMITE BEDROCK	788.9	TR	50/5"	-	73	SS-5	4.5+	-	-	-	-	-	-	-	-	17	A-6b (V)	
NOTE: AUGERED TO 15.0' AND STARTED CORING BEDROCK		13																
DOLOMITE LIGHT GRAY, MODERATELY TO SLIGHTLY WEATHERED, STRONG, VERY THIN TO THIN BEDDED, JOINTED, HIGHLY TO MODERATELY FRACTURED, FEW ANGULAR FRACTURES, APERTURE WIDTH TIGHT TO NARROW, SLIGHTLY TO VERY ROUGH; RQD 43%, REC 100%.	786.1	14																
@21.2'; UNIT WEIGHT = 165.57 lbs/ft ³ , COMPRESSIVE STRENGTH = 13,781 psi		15																
		16																
		17																
		18																
		19																
		20	43		100	NX-1											CORE	
		21																
		22																
		23																
		24																
	776.1	25																
		EOB																

NOTES: NO GROUNDWATER WAS ENCOUNTERED DURING DRILLING OPERATIONS AND NO READING WAS TAKEN UPON COMPLETION DUE TO ROCK CORING OPERATIONS..
 ABANDONMENT METHODS, MATERIALS, QUANTITIES PAVEMENT WAS REPLACED WITH ASPHALT COLD PATCH; HOLE WAS BACKFILLED WITH AUGER CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT-GDT-10/29/13 18:45 \C\IEDC01\PROJECT FILES\13 PROJECTS\G1011G HAN-75\LAB DATA SHEETS\BRIDGES\1617 RAMP BRIDGE.GPJ

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>OTB / JOHN</u>	DRILL RIG: <u>DIEDRICH D-50 ATV</u>	STATION / OFFSET: <u>804+97, 71 RT</u>	EXPLORATION ID: <u>B-110-1-13</u>
TYPE: <u>NEW BRIDGE</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>US 68 RAMP D BASELINE</u>	
PID: <u>87005</u> BR ID: <u>HAN-68-1617</u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>12/10/11</u>	ELEVATION: <u>786.5 (MSL)</u> EOB: <u>13.1 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>6/18/13</u> END: <u>6/18/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>81.7</u>	COORD: <u>41.026653720, 83.671533050</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
TOPSOIL (8" THICK)	786.5																	
VERY STIFF TO SOFT, BROWN, SANDY SILT , SOME CLAY, TRACE STONE FRAGMENTS & ROOTS, FILL, DAMP	785.8	1	4															
		2	6	16	78	SS-1	4.5+	-	-	-	-	-	-	-	10	A-4a (V)		
@3.5'; SOFT		3																
		4	4	4	6	SS-2	-	-	-	-	-	-	-	-	12	A-4a (V)		
		5	1	2														
SOFT, WHITE, ELASTIC CLAY , TRACE SAND, FILL, MOIST	780.5	6	1	3	100	SS-3	1.50	-	-	-	-	-	-	-	61	A-7-5 (V)		
		7	1	1														
		8																
MEDIUM STIFF, DARK BROWN, CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, MOIST	778.0	9	2	3	8	83	SS-4	2.75	1	1	10	39	49	46	22	24	A-7-6 (15)	
		10	3	3														
		11	3															
MEDIUM STIFF, BROWN, SILT AND CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, MOIST	775.5	11	3															
	774.5	12	3	50/5"	-	76	SS-5	2.25	1	4	16	35	44	33	19	14	A-6a (10)	
POSSIBLE DOLOMITE BEDROCK	773.4	TR																
@13.1'; AUGER REFUSAL		EOB																

NOTES: GROUNDWATER WAS ENCOUNTERED AT 11.5' DURING DRILLING AND NO AT 4.9' UPON COMPLETION OF DRILLING OPERATIONS.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: HOLE WAS BACKFILLED WITH 3/4 BAG SOIL CUTTINGS/BENTONITE PELLETS

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT GDT-10/29/13 18:45 \C\EDC01\PROJECT FILES\13 PROJECTS\G1001\G10 HAN-75\LAB DATA SHEETS\BRIDGES\1617 RAMP BRIDGE.GPJ

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>OTB / JOHN</u>	DRILL RIG: <u>DIEDRICH D-50 ATV</u>	STATION / OFFSET: <u>805+73, 42 RT</u>	EXPLORATION ID: <u>B-111-0-13</u>
TYPE: <u>NEW BRIDGE</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>US 68 RAMP D BASELINE</u>	
PID: <u>87005</u> BR ID: <u>HAN-68-1617</u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>12/10/11</u>	ELEVATION: <u>785.4 (MSL)</u> EOB: <u>24.5 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>6/18/13</u> END: <u>6/18/13</u>	SAMPLING METHOD: <u>SPT/NX</u>	ENERGY RATIO (%): <u>81.7</u>	COORD: <u>41.026765090, 83.671774980</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
TOPSOIL (6" THICK)	785.4																	
VERY STIFF, BROWN, SANDY SILT , SOME CLAY, LITTLE STONE FRAGMENTS, FILL, DAMP	784.9	1	3														<< << <<	
		2	8	25	100	SS-1	4.5+	-	-	-	-	-	-	-	10	A-4a (V)	<< << <<	
	782.4	3															<< << <<	
STIFF, DARK BROWN AND WHITE, ELASTIC CLAY , TRACE SAND, FILL, MOIST		4	4	11	78	SS-2	3.50	-	-	-	-	-	-	-	39	A-7-5 (V)	<< << <<	
		5															<< << <<	
@6.0'; VERY SOFT, WHITE		6	1				1.50	0	1	6	37	56	59	47	12	64	A-7-5 (13)	
@7.0'; VERY SOFT, DARK BROWN		7	0	1	100	SS-3A&B	1.75	-	-	-	-	-	-	-	37		A-7-5 (V)	
	776.9	8															<< << <<	
MEDIUM STIFF, DARK BROWN, CLAY , LITTLE SAND, FILL, MOIST		9	2	5	44	SS-4	3.50	-	-	-	-	-	-	-	24		A-7-6 (V)	
	774.4	10															<< << <<	
MEDIUM STIFF, BROWN, SILTY CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, MOIST		11	2														<< << <<	
	772.5	12	1	5	67	SS-5	2.50	-	-	-	-	-	-	-	23		A-6b (V)	
GRAY DOLOMITE BEDROCK NOTE: AUGERED TO 14.5', BEGIN ROCK CORE	770.9	13															<< << <<	
		14	60/2"		50	SS-6											Rock (V)	
DOLOMITE , GRAY, SLIGHTLY WEATHERED, STRONG, THIN TO THICK BEDDED, HIGHLY TO MODERATELY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.		15															<< << <<	
		16															<< << <<	
		17															<< << <<	
		18															<< << <<	
@19.4'; U.C. STRENGTH = 17,226 psi.		19															<< << <<	
		20	30		98	NX-1											<< << <<	
		21															<< << <<	
		22															<< << <<	
		23															<< << <<	
	760.9	24															<< << <<	
		EOB															<< << <<	

NOTES: GROUNDWATER WAS ENCOUNTERED AT 9.0' DURING DRILLING AND NO READING WAS TAKEN UPON COMPLETION OF DRILLING DUE TO ROCK CORING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: HOLE WAS BACKFILLED WITH SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT GDT-10/29/13 18:45 \CLED01\PROJECT FILES\13 PROJECTS\G101\G HAN-75\LAB DATA SHEETS\BRIDGES\1617 RAMP BRIDGE.GPJ

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>OTB / JOHN</u>	DRILL RIG: <u>DIEDRICH D-50 ATV</u>	STATION / OFFSET: <u>806+30, 17 LT</u>	EXPLORATION ID: <u>B-111-1-13</u>
TYPE: <u>NEW BRIDGE</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>US 68 RAMP D BASELINE</u>	
PID: <u>87005</u> BR ID: <u>HAN-68-1617</u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>12/10/11</u>	ELEVATION: <u>781.5 (MSL)</u> EOB: <u>20.0 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>6/20/13</u> END: <u>6/20/13</u>	SAMPLING METHOD: <u>SPT/NX</u>	ENERGY RATIO (%): <u>81.7</u>	COORD: <u>41.026802970, 83.672069620</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTH	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
TOPSOIL (12" THICK)	781.5																	
SOFT, WHITE, ELASTIC CLAY , TRACE SAND, TRACE ROOTS, FILL, MOIST	780.5	1	1	4	100	SS-1	2.25	-	-	-	-	-	-	-	-	68	A-7-5 (V)	<<<<<<
MEDIUM STIFF, DARK BROWN, CLAY , LITTLE SAND, FILL, MOIST	778.0	2	2															<<<<<<
MEDIUM STIFF, BROWN, MOTTLED GRAY, SILTY CLAY , SOME SAND, TRACE STONE FRAGMENTS, MOIST	775.5	3	3	7	56	SS-2	3.50	-	-	-	-	-	-	-	-	29	A-7-6 (V)	<<<<<<
LOOSE, BROWN, NON-PLASTIC SANDY SILT , LITTLE STONE FRAGMENTS, MOIST	773.0	4	2															<<<<<<
POSSIBLE DOLOMITE BEDROCK NOTE: AUGERED TO 10.0', BEGIN CORING ROCK	772.0	5	3	8	100	SS-3	4.50	1	16	15	24	44	38	20	18	21	A-6b (10)	<<<<<<
DOLOMITE , LIGHT GRAY, HIGHLY WEATHERED, STRONG, THIN BEDDED, HIGHLY FRACTURED TO FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH. @10.0'; U.C. STRENGTH = 9,934 psi.	771.5	6	3															<<<<<<
DOLOMITE , LIGHT GRAY, HIGHLY TO SLIGHTLY WEATHERED, STRONG, THIN TO THICK BEDDED, FRACTURED TO MODERATELY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH. @19.0'; U.C. STRENGTH = 10,808 psi.	768.6	7	3	-	47	SS-4	2.25	-	-	-	-	-	-	-	-	19	A-4a (V)	<<<<<<
		8																<<<<<<
		9	13		100	NX-1												<<<<<<
		10																<<<<<<
		11																<<<<<<
		12																<<<<<<
		13	42		100	NX-2												<<<<<<
		14																<<<<<<
		15																<<<<<<
		16																<<<<<<
		17																<<<<<<
		18																<<<<<<
		19																<<<<<<
		20																<<<<<<

NOTES: NO GROUNDWATER WAS ENCOUNTERED DURING DRILLING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: HOLE WAS BACKFILLED WITH SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT.GDT-10/29/13 18:45:13\CLIEDC01\PROJECT FILES\13 PROJECTS\G19011G HAN-75\LAB DATA SHEETS\BRIDGES\1617 RAMP BRIDGE.GPJ

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>OTB / JOHN</u>	DRILL RIG: <u>DIEDRICH D-50 ATV</u>	STATION / OFFSET: <u>806+46, 34 RT</u>	EXPLORATION ID
TYPE: <u>NEW BRIDGE</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>US 68 RAMP D BASELINE</u>	B-111-2-13
PID: <u>87005</u> BR ID: <u>HAN-68-1617</u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>12/10/11</u>	ELEVATION: <u>782.5 (MSL)</u> EOB: <u>22.5 ft.</u>	PAGE
START: <u>6/19/13</u> END: <u>6/19/13</u>	SAMPLING METHOD: <u>SPT/NX</u>	ENERGY RATIO (%): <u>81.7</u>	COORD: <u>41.026915690, 83.671943240</u>	1 OF 1

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI		
BERM MATERIAL ALONG AN ASPHALT DRIVE (12" THICK)	782.5																
DENSE, BROWN, STONE FRAGMENTS WITH SAND , LITTLE ASPHALT PIECES, LITTLE FINES, DAMP	781.5	1	18														<< << <<
STIFF, DARK BROWN, CLAY , LITTLE SAND, FILL, MOIST	780.5	2	18 9	37	100	SS-1	--	-	-	-	-	-	-	-	6	A-1-b (V)	<< << <<
		3															<< << <<
		4	3 4	11	78	SS-2	3.75	-	-	-	-	-	-	-	28	A-7-6 (V)	<< << <<
	776.5	5															<< << <<
MEDIUM STIFF TO STIFF, MOTTLED BROWN AND GRAY TO BROWN, SILTY CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, MOIST		6	2														<< << <<
@8.5'; STIFF, BROWN		7	2 3	7	100	SS-3	2.75	-	-	-	-	-	-	-	22	A-6b (V)	<< << <<
		8															<< << <<
		9	1 2	12	22	SS-4	3.50	-	-	-	-	-	-	-	22	A-6b (V)	<< << <<
	771.5	10	7														<< << <<
GRAY DOLOMITE BEDROCK	771.5	11	32 50/1"	-	43	SS-5	-	-	-	-	-	-	-	-	-	Rock (V)	<< << <<
@12.5'; AUGER REFUSAL BEGIN ROCK CORING	770.0	12															<< << <<
DOLOMITE , GRAY, SLIGHTLY WEATHERED, VERY STRONG, THIN BEDDED, HIGHLY TO MODERATELY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.		13															<< << <<
		14															<< << <<
		15															<< << <<
		16															<< << <<
		17															<< << <<
		18	65		100	NX-1											<< << <<
@18.9'; U.C. STRENGTH = 15,587 psi.		19															<< << <<
		20															<< << <<
		21															<< << <<
	760.0	22															<< << <<
		EOB															<< << <<

NOTES: GROUNDWATER WAS ENCOUNTERED AT 10.5' DURING DRILLING AND NO READING WAS TAKEN UPON COMPLETION OF DRILLING DUE TO ROCK CORING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: HOLE WAS BACKFILLED WITH SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DDT-GDT-10/29/13 18:45:14\CLIEDC01\PROJECT FILES\13 PROJECTS\101\G HAN-75\LAB DATA SHEETS\BRIDGES\1617 RAMP BRIDGE.GPJ

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>OTB / JOHN</u>	DRILL RIG: <u>DIEDRICH D-50 ATV</u>	STATION / OFFSET: <u>807+01, 27 LT</u>	EXPLORATION ID <u>B-112-0-13</u>
TYPE: <u>NEW BRIDGE</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>US 68 RAMP D BASELINE</u>	
PID: <u>87005</u> BR ID: <u>HAN-68-1617</u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>12/10/11</u>	ELEVATION: <u>780.8 (MSL)</u> EOB: <u>19.0 ft.</u>	PAGE 1 OF 1
START: <u>6/24/13</u> END: <u>6/24/13</u>	SAMPLING METHOD: <u>SPT/NX</u>	ENERGY RATIO (%): <u>81.7</u>	COORD: <u>41.026958950, 83.672233560</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV. 780.8	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
TOPSOIL (10" THICK)	780.0																<< << <<	
STIFF, BROWN, SILT AND CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, DAMP		1	4														<< << <<	
		2	5	15	100	SS-1	4.5+	-	-	-	-	-	-	-	16	A-6a (V)	<< << <<	
		3	6														<< << <<	
STIFF, DARK GRAY, CLAY , LITTLE SAND, FILL, MOIST	777.3																<< << <<	
		4	3	10	39	SS-2	3.25	0	2	14	39	45	47	22	25	A-7-6 (15)	<< << <<	
		5	4														<< << <<	
MEDIUM STIFF, BROWN, SILTY CLAY , LITTLE SAND, TRACE STONE FRAGMENTS	774.8																<< << <<	
		6	2														<< << <<	
		7	3	8	33	SS-3	3.00	-	-	-	-	-	-	-	25	A-6b (V)	<< << <<	
		8	3														<< << <<	
@8.5'; NO SPLIT SPOON RECOVERY	772.3																<< << <<	
POSSIBLE DOLOMITE BEDROCK	771.8	TR	50/1"	-	0	SS-4	-	-	-	-	-	-	-	-	-	Rock (V)	<< << <<	
@9.0'; AUGER REFUSAL AND BEGAN CORING BEDROCK																	<< << <<	
DOLOMITE , GRAY, HIGHLY TO SLIGHTLY WEATHERED, VERY STRONG, THIN TO THICK BEDDED, FRACTURED TO MODERATELY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.																	<< << <<	
		10															<< << <<	
		11															<< << <<	
		12															<< << <<	
		13															<< << <<	
@13.8'; U.C. STRENGTH = 23,987 psi.		14	47		100	NX-1										CORE	<< << <<	
		15															<< << <<	
		16															<< << <<	
		17															<< << <<	
		18															<< << <<	
	761.8	EOB															<< << <<	

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING AND NO READING WAS TAKEN UPON COMPLETION OF DRILLING DUE TO ROCK CORING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: HOLE WAS BACKFILLED WITH SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH-DOT-GDT-10/29/13 18:45\I:\E\DC01\PROJECT FILES\13 PROJECTS\G1001\G HAN-75\LAB DATA SHEETS\BRIDGES\1617 RAMP BRIDGE.GPJ

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / ALAN</u>	DRILL RIG: <u>CME 75 TRUCK</u>	STATION / OFFSET: <u>806+79, 82 LT</u>	EXPLORATION ID: <u>B-113-0-13</u>
TYPE: <u>NEW BRIDGE</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>US 68 RAMP D BASELINE</u>	
PID: <u>87005</u> BR ID: <u>HAN-68-1617</u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>1/6/12</u>	ELEVATION: <u>797.6 (MSL)</u> EOB: <u>24.5 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>8/22/13</u> END: <u>8/22/13</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>70.6</u>	COORD: <u>41.026828240, 83.672365870</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
ASPHALT PAVEMENT (9" THICK)	797.6																	
MEDIUM DENSE, BROWN, STONE FRAGMENTS WITH SAND , LITTLE FINES, ROADBASE, DAMP	796.9	1	4															
		2	6	12	67	SS-1	-	-	-	-	-	-	-	-	8	A-1-b (V)		
	794.1	3																
VERY STIFF, DARK BROWN, SANDY SILT , SOME CLAY, TRACE TO LITTLE STONE FRAGMENTS, FILL, DAMP		4	3															
		5	6	18	67	SS-2	4.5+	-	-	-	-	-	-	-	12	A-4a (V)		
@6.0'; LITTLE STONE FRAGMENTS		6																
		7	10															
	789.1	8	9	19	11	SS-3	-	-	-	-	-	-	-	9	A-4a (V)			
STIFF TO VERY STIFF, BROWN, SILT AND CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, DAMP		9	4															
		10	6	15	72	SS-4	4.5+	-	-	-	-	-	-	15	A-6a (V)			
@11.0'; VERY STIFF		11																
		12	6	16	72	SS-5	3.00	-	-	-	-	-	-	15	A-6a (V)			
	784.1	13																
MEDIUM DENSE, BROWN, NON-PLASTIC SANDY SILT , LITTLE STONE FRAGMENTS, FILL, DAMP		14	11															
	781.6	15	8	18	72	SS-6	-	-	-	-	-	-	-	7	A-4a (V)			
STIFF, BROWN AND GRAY, SILTY CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, FILL, DAMP		16																
		17	3	15	67	SS-7	3.50	-	-	-	-	-	-	18	A-6b (V)			
	779.1	18																
VERY STIFF, DARK BROWN, ELASTIC CLAY , SOME SAND, TRACE STONE FRAGMENTS, FILL, MOIST		19	4															
		20	7	18	78	SS-8	4.5+	1	3	22	33	41	46	32	14	24	A-7-5 (11)	
	776.6	21																
STIFF, MOTTLED BROWN AND GRAY TO BROWN, SILT AND CLAY , LITTLE SAND, TRACE TO LITTLE STONE FRAGMENTS, MOIST		22	4															
		23	4	13	67	SS-9	2.50	-	-	-	-	-	-	20	A-6a (V)			
@23.5'; BROWN, LITTLE STONE FRAGMENTS	773.6	24	3															
POSSIBLE DOLOMITE BEDROCK	773.1																	
@24.5'; AUGER REFUSAL																		

TR
EOB

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING OR UPON COMPLETION OF DRILLING OPERATIONS

ABANDONMENT METHODS, MATERIALS, QUANTITIES: HOLE WAS BACKFILLED WITH SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH-DOT-GDT-1/15/14 16:07: \C:\EPC01\PUBLIC\PROJECT FILES\13 PROJECTS\1G HAN-75\LAB DATA SHEETS\BRIDGES\1686 175 FLYOVER.GPJ

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>OTB / JOHN</u>	DRILL RIG: <u>DIEDRICH D-50 ATV</u>	STATION / OFFSET: <u>799+42, 105 LT</u>	EXPLORATION ID: <u>B-132-1-13</u>
TYPE: <u>BRIDGE REPLACEMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>US 68 RAMP C BL</u>	
PID: <u>87005</u> BR ID: <u>HAN-68-1656</u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>12/10/11</u>	ELEVATION: <u>776.4 (MSL)</u> EOB: <u>14.0 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>6/26/13</u> END: <u>6/26/13</u>	SAMPLING METHOD: <u>SPT/NX</u>	ENERGY RATIO (%): <u>81.7</u>	COORD: <u>41.025707770, 83.675389690</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			ODOT CLASS (GI)	BACK FILL	
								GR	CS	FS	SI	CL	LL	PL	PI			WC
TOPSOIL	776.4																	
MEDIUM STIFF, MOTTLED BROWN AND GRAY, CLAY , SOME SAND, TRACE ROOTS, MOIST	775.9	1	1															<< << <<
		2	3	8	89	SS-1	3.50	-	-	-	-	-	-	-	20	A-7-6 (V)		<< << <<
	773.6	3																<< << <<
LIGHT GRAY DOLOMITE BEDROCK		TR																<< << <<
NOTE: AUGERED TO 4.0' AND BEGAN CORING BEDROCK	772.4	4	50/3"		100	SS	-	-	-	-	-	-	-	-	-	Rock (V)		<< << <<
DOLOMITE LIGHT GRAY, SLIGHTLY WEATHERED, STRONG, THIN TO THICK BEDDED, HIGHLY TO MODERATELY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.		5																<< << <<
		6	0		100	NX-1										CORE		<< << <<
		7																<< << <<
		8																<< << <<
	767.2	9	0		93	NX-2										CORE		<< << <<
DOLOMITE LIGHT GRAY, SLIGHTLY WEATHERED, STRONG, VERY THIN TO THIN BEDDED, HIGHLY TO MODERATELY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.		10																<< << <<
		11																<< << <<
		12	26		100	NX-3										CORE		<< << <<
		13																<< << <<
	762.4	14																<< << <<
		EOB																<< << <<

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING. NO READING WAS TAKEN UPON COMPLETION DUE TO WATER USED DURING ROCK CORING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES BACKFILLED WITH SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH-DOT-GDT-1/15/14 16:07: \C:\EPC01\PUBLIC\PROJECT FILES\13 PROJECTS\1G HAN-75\LAB DATA SHEETS\BRIDGES\1686 175 FLYOVER.GPJ

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>OTB / JOHN</u>	DRILL RIG: <u>DIEDRICH D-50 ATV</u>	STATION / OFFSET: <u>799+25, 0 RT</u>	EXPLORATION ID: <u>B-133-0-13</u>
TYPE: <u>BRIDGE REPLACEMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>US 68 RAMP C BL</u>	
PID: <u>87005</u> BR ID: <u>HAN-68-1656</u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>12/10/11</u>	ELEVATION: <u>776.1 (MSL)</u> EOB: <u>14.5 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>6/25/13</u> END: <u>6/25/13</u>	SAMPLING METHOD: <u>SPT/NX</u>	ENERGY RATIO (%): <u>81.7</u>	COORD: <u>41.025924040, 83.675138270</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
TOPSOIL	776.1																	
MEDIUM STIFF, BROWN AND GRAY, SILT AND CLAY, SOME SAND, TRACE ROOTS	775.6	1	3	7	100	SS-1	4.00	0	6	18	32	44	42	20	22	19	A-7-6 (13)	<< << <<
	772.6	2																>> >> >>
DOLOMITE LIGHT GRAY, HIGHLY TO MODERATELY WEATHERED, STRONG. LIGHT GRAY DOLOMITE BEDROCK	771.6	3																<< << <<
NOTE: AUGERED TO 4.5' AND BEGAN CORING BEDROCK		4	50/4"		75	SS-2												>> >> >>
DOLOMITE LIGHT GRAY, SLIGHTLY WEATHERED, STRONG, VERY THIN TO THIN BEDDED, HIGHLY TO MODERATELY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.	766.1	5																<< << <<
		6																>> >> >>
		7	36		100	NX-1												<< << <<
		8																>> >> >>
		9																<< << <<
DOLOMITE LIGHT GRAY, SLIGHTLY WEATHERED, STRONG, THIN TO THICK BEDDED, SLIGHTLY TO MODERATELY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.	761.6	10																>> >> >>
		11																<< << <<
		12	69		74	NX-2												>> >> >>
		13																<< << <<
		14																>> >> >>
	761.6	EOB																<< << <<

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING. NO READING WAS TAKEN UPON COMPLETION DUE TO WATER USED DURING ROCK CORING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>DLZ / ALAN</u>	DRILL RIG: <u>CME 75 TRUCK</u>	STATION / OFFSET: <u>797+21, 10 RT</u>	EXPLORATION ID: <u>B-134-0-13</u>
TYPE: <u>BRIDGE REPLACEMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>US 68 RAMP C BL</u>	
PID: <u>87005</u> BR ID: <u>HAN-68-1656</u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>1/6/12</u>	ELEVATION: <u>799.5 (MSL)</u> EOB: <u>42.0 ft.</u>	PAGE: <u>1 OF 2</u>
START: <u>8/8/13</u> END: <u>8/8/13</u>	SAMPLING METHOD: <u>SPT / NQ2</u>	ENERGY RATIO (%): <u>70.6</u>	COORD: <u>41.025735590, 83.674449340</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
ASPHALT PAVEMENT (4.25" THICK)	799.2																	
CONCRETE PAVEMENT (11" THICK)	798.2	1																
GRAY STONE FRAGMENTS WITH SAND (BASE MATERIAL, 11" THICK)	797.3	2	12															
HARD, DARK BROWN, SANDY SILT , SOME CLAY, TRACE ROCK FRAGMENTS, FILL, DAMP	795.0	3	18 23	48	56	SS-1	4.5+	-	-	-	-	-	-	-	-	-	12	A-4a (V)
VERY STIFF TO STIFF, DARK BROWN, SANDY SILT , SOME CLAY, TRACE ROCK FRAGMENTS, FILL, DAMP TO MOIST		4																
		5	5															
		6	8	28	67	SS-2	4.00	-	-	-	-	-	-	-	-	-	10	A-4a (V)
		7																
		8	5	7	16	100	SS-3	4.5+	-	-	-	-	-	-	-	-	16	A-4a (V)
@9.0'; STIFF		9																
		10	3	3	13	100	SS-4	4.5+	-	-	-	-	-	-	-	-	14	A-4a (V)
		11																
VERY STIFF, DARK GRAY TO BLACK, SILT AND CLAY LITTLE SAND, TRACE ROCK FRAGMENTS, FILL, DAMP	787.5	12	5	8	20	100	SS-5	4.5+	-	-	-	-	-	-	-	-	15	A-6a (V)
		13																
@14.5'; BLACK		14																
		15	3	7	20	100	SS-6	4.5+	-	-	-	-	-	-	-	-	18	A-6a (V)
		16																
		17																
		18	3	7	18	100	SS-7	4.00	-	-	-	-	-	-	-	-	15	A-6a (V)
		19																
VERY STIFF, BROWN, SANDY SILT , SOME CLAY, TRACE ROCK FRAGMENTS, FILL, MOIST	780.0	20	8	10	20	100	SS-8	3.50	-	-	-	-	-	-	-	-	19	A-6b (V)
		21																
@22.0'; STIFF		22																
		23	3	4	11	100	SS-9	4.00	-	-	-	-	-	-	-	-	18	A-6b (V)
		24																
MEDIUM STIFF, BROWN, CLAY , SOME SAND, MOIST	775.0	25	2	3	8	100	SS-10	3.00	-	-	-	-	-	-	-	-	22	A-6b (V)
		26																
DOLOMITE , LIGHT GRAY, HIGHLY TO MODERATELY WEATHERED. LIGHT GRAY DOLOMITE BEDROCK NOTE: AUGERED TO 27.0' AND BEGAN CORING BEDROCK	773.0 772.5	27																
		28	50/3"		100	SS-11	--	--	--	--	--	--	--	--	--	--	2	Rock (V)
		29																
DOLOMITE , LIGHT GRAY, SLIGHTLY WEATHERED, STRONG, VERY THIN TO THIN BEDDED, FRACTURED TO	769.8	29	0		80	NX-1												CORE

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH-DOT-GDT-1/15/14 16:07: \C:\EDC01\PUBLIC\PROJECT FILES\13 PROJECTS\G13011G HAN-75\LAB DATA SHEETS\BRIDGES\1686 175 FLYOVER.GPJ

MATERIAL DESCRIPTION AND NOTES	ELEV. 769.5	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			
HIGHLY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH. DOLOMITE LIGHT GRAY, SLIGHTLY WEATHERED, STRONG, VERY THIN TO THIN BEDDED, HIGHLY TO MODERATELY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH. <i>(continued)</i>	764.6	31	28		100	NX-2											CORE	
32																		
33																		
34																		
DOLOMITE LIGHT GRAY, SLIGHTLY WEATHERED, STRONG, VERY THIN TO THIN BEDDED, HIGHLY TO MODERATELY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.	757.5	35	20		85	NX-3											CORE	
36																		
37																		
38																		
39																		
40																		
41																		
42																		
EOB																		

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH-DOT-GDT-1/15/14 16:07: \\CLED001\PUBLIC\PROJECT FILES\3 PROJECTS\G-13011G HAN-75\LAB DATA SHEETS\BRIDGES\1656 175 FLYOVER.GPJ

NOTES: GROUNDWATER WAS ENCOUNTERED AT 26.5' DURING DRILLING AND NO READING WAS TAKEN UPON COMPLETION OF DRILLING DUE TO ROCK CORING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: PAVEMENT WAS REPLACED WITH 1.0 BAG ASPHALT COLD PATCH; BACKFILLED WITH 1.0 BAG OF BENTONITE PELLETS/SOIL CUTTINGS MIXTURE

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>PGI / ZEKE</u>	DRILL RIG: <u>CME 45B TRUCK</u>	STATION / OFFSET: <u>800+16, 92' RT.</u>	EXPLORATION ID <u>B-132-2-14</u>
TYPE: <u>BRIDGE REPLACEMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / ZEKE</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>US 68 RAMP C BASELINE</u>	
PID: <u>87005</u> STR ID: <u>HAN-68-1656</u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>2/20/14</u>	ELEVATION: <u>776.7 (MSL)</u> EOB: <u>14.5 ft.</u>	PAGE 1 OF 1
START: <u>4/23/15</u> END: <u>4/23/15</u>	SAMPLING METHOD: <u>SPT/NX</u>	ENERGY RATIO (%): <u>61.8</u>	COORD: <u>41.026263, 83.675189</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	776.7	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				WC	ODOT CLASS (GI)	BACK FILL
									GR	CS	FS	SI	CL	LL	PL	PI				
TOPSOIL (12.0" THICK)	775.7																			
MEDIUM STIFF, DARK BROWN, SILTY CLAY , TRACE SAND, TRACE STONE FRAGMENTS, FILL, MOIST	775.2		1	3	5	12	100	SS-1A	3.50	-	-	-	-	-	-	-	-	20	A-6b (V)	
STIFF, BROWN AND GRAY, SILT AND CLAY , SOME SAND, TRACE STONE FRAGMENTS, DAMP	773.7		2		7			SS-1B	4.00	3	7	18	38	34	30	18	12	16	A-6a (8)	
VERY STIFF, BROWN, SANDY SILT , SOME CLAY, TRACE SAND, MOIST	772.7		3																	
DOLOMITE , LIGHT GARY, HIGHLY WEATHERED. @4.5'; AUGER REFUSAL AND BEGIN CORING BEDROCK.	772.2		4	10	50/4"	-	90	SS-2A	--	-	-	-	-	-	-	-	-	19	A-4a (V)	
	772.2							SS-2B	--	-	-	-	-	-	-	-	-	3	Rock (V)	
DOLOMITE , LIGHT GRAY, MODERATELY WEATHERED, STRONG, VERY THIN BEDDED, FRACTURED TO MODERATELY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.	771.2		5		0		92	NX-1												CORE
DOLOMITE , LIGHT GRAY TO GRAY, MODERATELY WEATHERED, STRONG, VERY THIN BEDDED, FRACTURED TO MODERATELY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.	769.7		6		0		100	NX-2												CORE
DOLOMITE , GRAY, MODERATELY WEATHERED, STRONG, VERY THIN TO THIN BEDDED, FRACTURED TO MODERATELY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.	767.9		7		0		100	NX-3												CORE
DOLOMITE , GRAY, MODERATELY WEATHERED, STRONG, VERY THIN TO THIN BEDDED, FRACTURED TO MODERATELY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.	765.2		8		0		100	NX-4												CORE
DOLOMITE , GRAY, MODERATELY WEATHERED, STRONG, VERY THIN BEDDED, FRACTURED TO MODERATELY FRACTURED W/FEW VERTICAL FRACTURES, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH. U.C. STRENGTH @ 9.5' = 11,180 psi.	762.2		9		22		100	NX-4												CORE
DOLOMITE , GRAY, MODERATELY WEATHERED, STRONG, VERY THIN BEDDED, FRACTURED TO MODERATELY FRACTURED W/FEW VERTICAL FRACTURES, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.	762.2		10		39		94	NX-5												CORE
	762.2		11																	
	762.2		12																	
	762.2		13																	
	762.2		14																	
	762.2		EOB																	

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING AND NO READING WAS TAKEN UPON COMPLETION DUE TO WATER USED DURING ROCK CORING OPERATIONS. ABANDONMENT METHODS, MATERIALS, QUANTITIES: HOLE WAS BACKFILLED WITH 1 BAG OF BENTONITE PELLETS/SOIL CUTTINGS MIXTURE

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>PGI / ZEKE</u>	DRILL RIG: <u>CME 45B TRUCK</u>	STATION / OFFSET: <u>798+84, 22' RT.</u>
TYPE: <u>BRIDGE REPLACEMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / ZEKE</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>US 68 RAMP C BASELINE</u>
PID: <u>87005</u> STR ID: <u>HAN-68-1656</u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>2/20/14</u>	ELEVATION: <u>777.6 (MSL)</u> EOB: <u>15.0 ft.</u>
START: <u>4/24/15</u> END: <u>4/24/15</u>	SAMPLING METHOD: <u>SPT/NX</u>	ENERGY RATIO (%): <u>61.8</u>	COORD: <u>41.025923, 83.674972</u>

EXPLORATION ID <u>B-133-1-14</u>
PAGE 1 OF 1

MATERIAL DESCRIPTION AND NOTES	ELEV.	777.6	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	BACK FILL	
									GR	CS	FS	SI	CL	LL	PL	PI	WC			
TOPSOIL (4.0" THICK) STIFF, BROWN, MOTTLED GRAY, CLAY, LITTLE SAND, MOIST	777.3		1																	
			2	2	3	4	7	56	SS-1	2.00	0	1	13	32	54	52	22	30	23	A-7-6 (18)
	774.1		3																	
VERY STIFF, BROWN, SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS, MOIST	773.1		4	7	8	50/3"	-	13	SS-2A	--	-	-	-	-	-	-	-	-	22	A-6b (V)
DOLOMITE, LIGHT GRAY, HIGHLY WEATHERED.	772.6		5						SS-2B	--	-	-	-	-	-	-	-	-	4	Rock (V)
DOLOMITE, LIGHT GRAY, HIGHLY TO MODERATELY WEATHERED, STRONG, VERY THIN BEDDED, FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.	772.1		6						NX-1											CORE
DOLOMITE, LIGHT GRAY TO GRAY, MODERATELY WEATHERED, VERY STRONG, VERY THIN TO THIN BEDDED, FRACTURED TO MODERATELY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.			7																	CORE
U.C. STRENGTH @ 8.6' = 16,234 psi.	768.6		8																	
DOLOMITE, GRAY, MODERATELY WEATHERED, VERY STRONG, VERY THIN TO THIN BEDDED, FRACTURED TO MODERATELY FRACTURED WITH FEW ANGULAR AND VERTICAL FRACTURES, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.			9																	
			10																	
			11																	
	764.6		12																	
DOLOMITE, GRAY, MODERATELY WEATHERED, VERY STRONG, VERY THIN TO THIN BEDDED, FRACTURED TO MODERATELY FRACTURED WITH FEW VERTICAL FRACTURES, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.			13																	
			14																	
	762.6		15	22					97	NX-4										CORE
			EOB																	

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING AND NO READING WAS TAKEN UPON COMPLETION DUE TO WATER USED DURING ROCK CORING OPERATIONS.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: HOLE WAS BACKFILLED WITH 1 BAG OF BENTONITE PELLETS/SOIL CUTTINGS MIXTURE

MATERIAL DESCRIPTION AND NOTES	ELEV. 762.4	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
DOLOMITE LIGHT GRAY, SLIGHTLY WEATHERED, STRONG, VERY THIN TO THIN BEDDED, SLIGHTLY TO MODERATELY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH. <i>(continued)</i>		31	60		100	NX-3										CORE	< >	
		32						< >										
		33						< >										
	758.4	34						< >										
	EOB															< >		

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH DOT GDT-1/15/14 16:07: \\CLED001\PUBLIC\PROJECT FILES\3 PROJECTS\G-1301\G HAN-75\LAB DATA SHEETS\BRIDGES\1656 175 FLYOVER.GPJ

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING. NO READING WAS TAKEN UPON COMPLETION DUE TO WATER USED DURING ROCK CORING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>B-M / JOSH DEAN</u>	DRILL RIG: <u>DIEDRICH D-90 ATV</u>	STATION / OFFSET: <u>795+80, 21 RT</u>	EXPLORATION ID: <u>B-135-1-13</u>
TYPE: <u>BRIDGE REPLACEMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>US 68 RAMP C BL</u>	
PID: <u>87005</u> BR ID: <u>HAN-68-1656</u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>9/18/12</u>	ELEVATION: <u>787.3 (MSL)</u> EOB: <u>29.5 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>7/16/13</u> END: <u>7/17/13</u>	SAMPLING METHOD: <u>SPT/NX</u>	ENERGY RATIO (%): <u>80.2</u>	COORD: <u>41.025713590, 83.673935660</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTH	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	BACK FILL		
								GR	CS	FS	SI	CL	LL	PL	PI	WC				
STIFF, BROWN, SILT AND CLAY LITTLE SAND, LITTLE STONE FRAGMENTS, FILL, DAMP	787.3	1	3																	
		2	4	5	12	83	SS-1	4.5+	-	-	-	-	-	-	-	-	16	A-6a (V)		
		3																		
		4	4	5	6	15	100	SS-2	4.5+	-	-	-	-	-	-	-	-	12	A-6a (V)	
		5																		
STIFF TO SOFT, LIGHT GRAY TO LIGHT GRAY AND DARK BROWN, ELASTIC CLAY, TRACE SAND, FILL, MOIST @8.5'; SOFT @11.0'; SOFT, LIGHT GRAY AND DARK GRAY @13.5'; SOFT, LIGHT GRAY AND DARK GRAY LIGHT GRAY DOLOMITE BEDROCK NOTE: AUGERED TO 14.5' AND BEGAN CORING BEDROCK DOLOMITE LIGHT GRAY, SLIGHTLY WEATHERED, STRONG, VERY THIN TO THIN BEDDED, FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH. DOLOMITE LIGHT GRAY, SLIGHTLY WEATHERED, STRONG, VERY THIN TO THIN BEDDED, FRACTURED TO MODERATELY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH. DOLOMITE LIGHT GRAY, SLIGHTLY WEATHERED, STRONG, VERY THIN TO THIN BEDDED, FRACTURED TO MODERATELY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.	781.3	6	5																	
		7	4	5	12	100	SS-3	2.50	-	-	-	-	-	-	-	-	51	A-7-5 (V)		
		8																		
		9	2	1	1	3	100	SS-4	0.75	-	-	-	-	-	-	-	46	A-7-5 (V)		
		10																		
		11	1	1	1	3	100	SS-5	0.25	0	0	2	29	69	67	52	15	80	A-7-5 (14)	
		12																		
		13																		
		14	100	-	100			SS-6	--	-	-	-	-	-	-	-	-	35	A-7-5 (V)	
		15																		
DOLOMITE LIGHT GRAY, SLIGHTLY WEATHERED, STRONG, VERY THIN TO THIN BEDDED, FRACTURED TO MODERATELY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.	773.4 772.8 770.3	16	0			90	NX-1											CORE		
		17																		
		18																		
		19																		
		20																		
		21	30				89	NX-2											CORE	
		22																		
		23																		
		24																		
		25																		
DOLOMITE LIGHT GRAY, SLIGHTLY WEATHERED, STRONG, VERY THIN TO THIN BEDDED, FRACTURED TO MODERATELY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.	762.8	26																		
		27	20				100	NX-3											CORE	
		28																		
		29																		
	757.8																			

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING. NO READING WAS TAKEN UPON COMPLETION DUE TO WATER USED DURING ROCK CORING OPERATIONS.

ABANDONMENT METHODS, MATERIALS, QUANTITIES BACKFILLED WITH SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH-DOT-GDT-1/15/14-16-07-\\CLED001\PUBLIC\PROJECT FILES\13 PROJECTS\G-13011G HAN-75\LAB DATA SHEETS\BRIDGES\1656 175 FLYOVER.GPJ

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH-DOT-GDT-1/15/14 16:07: \C:\EPC01\PUBLIC\PROJECT FILES\13 PROJECTS\1301 IG HAN-75\LAB DATA SHEETS\BRIDGES\1686 175 FLYOVER.GPJ

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>B-M / JOSH DEAN</u>	DRILL RIG: <u>DIEDRICH D-90 ATV</u>	STATION / OFFSET: <u>794+50, 93 RT</u>	EXPLORATION ID: <u>B-135-2-13</u>
TYPE: <u>BRIDGE REPLACEMENT</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>US 68 RAMP C BL</u>	
PID: <u>87005</u> BR ID: <u>HAN-68-1656</u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>9/18/12</u>	ELEVATION: <u>782.0 (MSL)</u> EOB: <u>14.0 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>7/16/13</u> END: <u>7/16/13</u>	SAMPLING METHOD: <u>SPT/NX</u>	ENERGY RATIO (%): <u>80.2</u>	COORD: <u>41.025880920, 83.673457020</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTH	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL	
								GR	CS	FS	SI	CL	LL	PL	PI				
TOPSOIL (6" THICK)	782.0																		
SOFT, LIGHT GRAY, ELASTIC CLAY, TRACE SAND, FILL, MOIST	781.5	1	2	5	100	SS-1	0.25	-	-	-	-	-	-	-	-	-	78	A-7-5 (V)	<><><>
		2	2																<><><>
	778.5	3																	<><><>
STIFF, BROWN, MOTTLED GRAY, CLAY, SOME SAND, TRACE STONE FRAGMENTS, MOIST		4	2	9	83	SS-2	2.25	1	2	20	33	44	42	22	20		25	A-7-6 (12)	<><><>
		5	3																<><><>
		6	4																<><><>
	774.0	7	2	12	94	SS-3	1.75	-	-	-	-	-	-	-	-	-	23	A-7-6 (V)	<><><>
		8	7																<><><>
LIGHT GRAY DOLOMITE BEDROCK	773.0	TR																	<><><>
DOLOMITE LIGHT GRAY, SLIGHTLY WEATHERED, STRONG, THIN TO THICK BEDDED, SLIGHTLY TO MODERATELY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.		9	100/2"	-	100	SS-4	--	-	-	-	-	-	-	-	-	-	13	Rock (V)	<><><>
		10																	<><><>
		11																	<><><>
		12	30		100	NX-1													<><><>
		13																	<><><>
	768.0	EOB																	<><><>

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING. NO READING WAS TAKEN UPON COMPLETION DUE TO WATER USED DURING ROCK CORING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES BACKFILLED WITH SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH.DOT.GDT-1/15/14 17:45: \C\EDC01\PUBLIC\PROJECT FILES\3 PROJECTS\G1301 G HAN-75\LAB DATA SHEETS\BRIDGES\1688 RR FL\YOVER.GPJ

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>B-M / JOSH DEAN</u>	DRILL RIG: <u>DIEDRICH D-90 ATV</u>	STATION / OFFSET: <u>804+90, 1 LT</u>	EXPLORATION ID: <u>B-128-0-13</u>
TYPE: <u>NEW BRIDGE</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>ABUTMENT</u>	
PID: <u>87005</u> BR ID: <u>HAN-68-1668</u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>9/18/12</u>	ELEVATION: <u>777.7 (MSL)</u> EOB: <u>29.0 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>7/22/13</u> END: <u>7/22/13</u>	SAMPLING METHOD: <u>SPT/NX</u>	ENERGY RATIO (%): <u>80.2</u>	COORD: <u>41.027184670, 83.676213590</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
TOPSOIL	777.7																	
STIFF, BROWN, SILTY CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, MOIST	775.2	1	3	9	56	SS-1	2.50	-	-	-	-	-	-	-	-	-	22	A-6b (V)
@2.5'; PUSHED SHELBY TUBE, 24" RECOVERY		2	4															
STIFF, BROWN AND GRAY, SILT , SOME CLAY, LITTLE SAND, MOIST	773.2	3			100	ST-2	4.00	-	-	-	-	-	-	-	-	-	22	A-4b (V)
VERY STIFF, BROWN, SANDY SILT , SOME CLAY, SOME STONES FRAGMENTS, DAMP	772.2	4																
GRAY DOLOMITE BEDROCK	770.2	5	6	15	95	67	SS-3	2.25	21	7	12	34	26	25	17	8	14	A-4a (5)
NOTE: AUGERED TO 7.5' AND BEGAN CORING BEDROCK		6	56															
DOLOMITE LIGHT GRAY, HIGHLY TO MODERATELY WEATHERED, STRONG, VERY THIN TO THIN BEDDED, HIGHLY FRACTURED TO FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.	768.2	7																
		8	30		100	NX-1												CORE
		9																
DOLOMITE LIGHT GRAY, MODERATELY TO SLIGHTLY WEATHERED, STRONG, VERY THIN TO THIN BEDDED, HIGHLY TO MODERATELY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.	763.7	10																
		11																
		12	37		100	NX-2												CORE
		13																
DOLOMITE LIGHT GRAY, MODERATELY TO SLIGHTLY WEATHERED, STRONG, VERY THIN TO THIN BEDDED, HIGHLY FRACTURED TO FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.	753.7	14																
		15																
		16																
		17																
		18																
		19	60		100	NX-3												CORE
		20																
		21																
		22																
		23																
DOLOMITE LIGHT GRAY, MODERATELY TO SLIGHTLY WEATHERED, STRONG, VERY THIN TO THIN BEDDED, HIGHLY FRACTURED TO FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.	753.7	24																
		25																
		26	6		100	NX-4												CORE
		27																
		28																
	748.7	29																

EOB

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING. NO READING WAS TAKEN UPON COMPLETION DUE TO WATER USED DURING ROCK CORING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES BACKFILLED WITH SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH.DOT.GDT--1/15/14 17:45: \C:\EDC01\PUBLIC\PROJECT FILES\3 PROJECTS\1011G HAN-75\LAB DATA SHEETS\BRIDGES\1688 RR FLYOVER.GPJ

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>B-M / JOSH DEAN</u>	DRILL RIG: <u>DIEDRICH D-90 ATV</u>	STATION / OFFSET: <u>803+49, 6 RT</u>	EXPLORATION ID: <u>B-129-0-13</u>
TYPE: <u>NEW BRIDGE</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>PIER</u>	
PID: <u>87005</u> BR ID: <u>HAN-68-1668</u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>9/18/12</u>	ELEVATION: <u>777.5 (MSL)</u> EOB: <u>27.0 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>7/17/13</u> END: <u>7/17/13</u>	SAMPLING METHOD: <u>SPT/NX</u>	ENERGY RATIO (%): <u>80.2</u>	COORD: <u>41.026816080, 83.676070100</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV. 777.5	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	BACK FILL	
								GR	CS	FS	SI	CL	LL	PL	PI	WC			
TOPSOIL	776.7																		
MEDIUM STIFF, BROWN, MOTTLED GRAY, SILTY CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, MOIST		1	2	7	67	SS-1	2.75	-	-	-	-	-	-	-	-	-	20	A-6b (V)	
		2	3																
	774.0	3																	
STIFF, BROWN AND GRAY TO GRAY, SILT AND CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, MOIST		4	4	11	100	SS-2	4.00	-	-	-	-	-	-	-	-	-	21	A-6a (V)	
		5	4																
@6.0'; GRAY	771.0	6	4	-	63	SS-3	2.50	-	-	-	-	-	-	-	-	-	20	A-6a (V)	
GRAY DOLOMITE BEDROCK	770.5	TR	100/2'																
DOLOMITE LIGHT GRAY, MODERATELY TO SLIGHTLY WEATHERED, STRONG, VERY THIN TO THIN BEDDED, HIGHLY FRACTURED TO FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.	769.5				96	NX-1													
		7																	
DOLOMITE LIGHT GRAY, SLIGHTLY TO MODERATELY WEATHERED, STRONG, VERY THIN TO THIN BEDDED, MODERATELY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.		8																	
		9																	
		10																	
		11																	
		12	33		69	NX-2													
		13																	
		14																	
	760.5	15																	
DOLOMITE LIGHT GRAY, SLIGHTLY WEATHERED, STRONG, VERY THIN TO THIN BEDDED, HIGHLY FRACTURED TO FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.		16																	
		17																	
	758.5	18	38		100	NX-3													
DOLOMITE LIGHT GRAY, SLIGHTLY WEATHERED, STRONG, VERY THIN TO THIN BEDDED, MODERATELY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.		19																	
		20																	
		21																	
		22																	
		23	50		83	NX-4													
		24																	
		25																	
		26																	
	750.5	27																	
		EOB																	

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING. NO READING WAS TAKEN UPON COMPLETION DUE TO WATER USED DURING ROCK CORING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES HOLE WAS BACKFILLED WITH SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH.DOT.GDT-1/15/14 17:45: \C:\EPC01\PROJECT FILES\13 PROJECTS\1011G HAN-75\LAB DATA SHEETS\BRIDGES\1688 RR FLYOVER.GPJ

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>B-M / JOSH DEAN</u>	DRILL RIG: <u>DIEDRICH D-90 ATV</u>	STATION / OFFSET: <u>802+34, 135 RT</u>	EXPLORATION ID: <u>B-130-0-13</u>
TYPE: <u>NEW BRIDGE</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>MSE WALL</u>	
PID: <u>87005</u> BR ID: <u>HAN-68-1668</u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>9/18/12</u>	ELEVATION: <u>776.2 (MSL)</u> EOB: <u>14.0 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>7/18/13</u> END: <u>7/18/13</u>	SAMPLING METHOD: <u>SPT/NX</u>	ENERGY RATIO (%): <u>80.2</u>	COORD: <u>41.026712010, 83.675488970</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTH	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
STIFF, BROWN, SILT AND CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, DAMP	776.2																	
		1	3															
		2	3	9	100	SS-1	2.25	-	-	-	-	-	-	-	-	16	A-6a (V)	
	772.7	3																
MEDIUM DENSE, BROWN, NON-PLASTIC SILT TRACE SAND, MOIST	771.7		4															
		4	4	72	78	SS-2	-	-	-	-	-	-	-	-	-	19	A-4b (V)	
GRAY DOLOMITE BEDROCK	770.2	5																
NOTE: AUGERED TO 6.0' AND BEGAN CORING BEDROCK		6																
DOLOMITE LIGHT GRAY, MODERATELY TO SLIGHTLY WEATHERED, STRONG, VERY THIN TO THIN BEDDED, HIGHLY FRACTURED TO FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.	769.0	7	0		97	NX-1												CORE
	767.9	8	0		98	NX-2												CORE
DOLOMITE LIGHT GRAY, MODERATELY TO SLIGHTLY WEATHERED, STRONG, VERY THIN TO THIN BEDDED, HIGHLY FRACTURED TO FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.	766.3	9	0		100	NX-3												CORE
		10																
DOLOMITE LIGHT GRAY, SLIGHTLY WEATHERED, STRONG, VERY THIN TO THIN BEDDED, HIGHLY FRACTURED TO FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.		11																
		12	128		100	NX-4												CORE
DOLOMITE LIGHT GRAY, SLIGHTLY WEATHERED, STRONG, VERY THIN TO THIN BEDDED, FRACTURED TO MODERATELY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.	762.2	13																
		14																
		EOB																

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING. NO READING WAS TAKEN UPON COMPLETION DUE TO WATER USED DURING ROCK CORING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES HOLE WAS BACKFILLED WITH SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH-DOT-GDT-1/15/14 17:45: \C:\EDEC01\PUBLIC\PROJECT FILES\3 PROJECTS\G13011G HAN-75\LAB DATA SHEETS\BRIDGES\1688 RR FL-YOVER.GPJ

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>B-M / JOSH DEAN</u>	DRILL RIG: <u>DIEDRICH D-90 ATV</u>	STATION / OFFSET: <u>802+48, 29 RT</u>	EXPLORATION ID: <u>B-131-0-13</u>
TYPE: <u>NEW BRIDGE</u>	SAMPLING FIRM / LOGGER: <u>PGI / W. NAJJAR</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>ABUTMENT</u>	
PID: <u>87005</u> BR ID: <u>HAN-68-1668</u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>9/18/12</u>	ELEVATION: <u>784.3 (MSL)</u> EOB: <u>24.0 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>8/16/13</u> END: <u>8/16/13</u>	SAMPLING METHOD: <u>SPT/NX</u>	ENERGY RATIO (%): <u>80.2</u>	COORD: <u>41.026596180, 83.675846370</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTH	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI			
TOPSOIL (1.0" THICK)	784.2	1	3															
VERY STIFF, BROWN, SILT AND CLAY , LITTLE SAND, TRACE ROCK FRAGMENTS, FILL, DAMP	784.2	2	6	16	89	SS-1	4.5+	-	-	-	-	-	-	-	-	13	A-6a (V)	
		3																
		4	2	8	21	83	SS-2	4.5+	-	-	-	-	-	-	-	12	A-6a (V)	
		5																
	778.3	6	7	8	23	44	SS-3	4.5+	-	-	-	-	-	-	-	11	A-4a (V)	
VERY STIFF, BROWN, SANDY SILT , SOME CLAY, TRACE STONE FRAGMENTS, FILL, DAMP	778.3	7	8	9														
		8																
	775.8	9	4	5	15	100	SS-4	3.00	0	2	17	39	42	37	20	17	21	A-6b (11)
STIFF, BROWN AND GRAY, SILTY CLAY , LITTLE SAND, MOIST	775.8	10	5	6														
		11																
	773.3	12	4	4	12	83	SS-5	3.25	-	-	-	-	-	-	-	-	16	A-6a (V)
STIFF, BROWN AND GRAY, SILT AND CLAY , LITTLE SAND, TRACE ROCK FRAGMENTS, DAMP	773.3	13	5															
@ 13.5'; NO SPLIT SPOON RECOVERY	770.8	13																
POSSIBLE DOLOMITE BEDROCK	770.3	14	50/5"	-	0	SS-6	-	-	-	-	-	-	-	-	-	-	-	
DOLOMITE GRAY, SLIGHTLY TO MODERATELY WEATHERED, STRONG, THIN BEDDED, FRACTURED TO MODERATELY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.	770.3	15																
		16																
		17																
		18																
		19																
		20		60		100	NX-1										CORE	
		21																
		22																
		23																
	760.3	24																
		EOB																

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING. NO READING WAS TAKEN UPON COMPLETION DUE TO WATER USED DURING ROCK CORING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES HOLE WAS BACKFILLED WITH SOIL CUTTINGS

STANDARD ODOT SOIL BORING LOG (8.5 X 11)-OH-DOT-GDT-1/15/14-17:45-\\CLED001\PUBLIC\PROJECT FILES\13 PROJECTS\13011G HAN-75\LAB DATA SHEETS\BRIDGES\1688 RR FLYOVER.GPJ

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>OTB / JOHN</u>	DRILL RIG: <u>DIEDRICH D-50 ATV</u>	STATION / OFFSET: <u>802+11, 79 LT</u>	EXPLORATION ID: <u>B-131-1-13</u>
TYPE: <u>NEW BRIDGE</u>	SAMPLING FIRM / LOGGER: <u>PGI / F.BUSHER</u>	HAMMER: <u>DIEDRICH AUTOMATIC</u>	ALIGNMENT: <u>MSE WALL</u>	
PID: <u>87005</u> BR ID: <u>HAN-68-1668</u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>12/10/11</u>	ELEVATION: <u>779.2 (MSL)</u> EOB: <u>24.0 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>6/25/13</u> END: <u>6/25/13</u>	SAMPLING METHOD: <u>SPT/NX</u>	ENERGY RATIO (%): <u>81.7</u>	COORD: <u>41.026355560, 83.676109910</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	BACK FILL
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
TOPSOIL	779.2																	
MEDIUM STIFF, DARK GRAY, CLAY , TRACE SAND W/ASPHALT PIECES, FILL, DAMP	778.6	1	2															<< << <<
		2	3	7	39	SS-1	3.50	-	-	-	-	-	-	-	-	20	A-7-6 (V)	<< << <<
	775.7	3																<< << <<
STIFF, MOTTLED BROWN AND GRAY, SILTY CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, MOIST	775.7	4	2															<< << <<
		5	3	10	44	SS-2	3.00	-	-	-	-	-	-	-	-	18	A-6b (V)	<< << <<
	773.2	6																<< << <<
VERY STIFF, BROWN AND GRAY, SILT AND CLAY , TRACE SAND, TRACE STONE FRAGMENTS, MOIST	773.2	7	7															<< << <<
GRAY DOLOMITE BEDROCK	772.0	7	30	72	56	SS-3	2.75	1	1	4	54	40	33	22	11	21	A-6a (8)	<< << <<
@8.5': NO SPLIT SPOON RECOVERY NOTE: AUGERED TO 9.0' AND BEGAN CORING BEDROCK	772.0	8	23				-	-	-	-	-	-	-	-	-	-	-	Rock (V)
DOLOMITE LIGHT GRAY, SLIGHTLY TO MODERATELY WEATHERED, STRONG, VERY THIN TO THIN BEDDED, SLIGHTLY TO MODERATELY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.	770.2	9	50/3"	-	0	SS-4	-	-	-	-	-	-	-	-	-	-	-	<< << <<
		10																<< << <<
		11																<< << <<
		12																<< << <<
		13																<< << <<
		14	30		100	NX-1												<< << <<
		15																<< << <<
		16																<< << <<
		17																<< << <<
	760.2	18																<< << <<
DOLOMITE LIGHT GRAY, SLIGHTLY WEATHERED, STRONG, VERY THIN TO THIN BEDDED, SLIGHTLY TO MODERATELY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.	760.2	19																<< << <<
		20																<< << <<
		21	63		95	NX-2												<< << <<
		22																<< << <<
		23																<< << <<
	755.2	24																<< << <<
		EOB																<< << <<

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING. NO READING WAS TAKEN UPON COMPLETION DUE TO WATER USED DURING ROCK CORING OPERATIONS.
 ABANDONMENT METHODS, MATERIALS, QUANTITIES HOLE WAS BACKFILLED WITH SOIL CUTTINGS

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>PGI / ZEKE</u>	DRILL RIG: <u>CME 45B TRUCK</u>	STATION / OFFSET: <u>69+83, 90' LT.</u>	EXPLORATION ID <u>B-065-1-14</u>
TYPE: <u>CULVERT CONSTRUCTION</u>	SAMPLING FIRM / LOGGER: <u>PGI / ZEKE</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>LIMA AVE BASELINE</u>	
PID: <u>87005</u> STR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>2/20/14</u>	ELEVATION: <u>790.2 (MSL)</u> EOB: <u>13.5 ft.</u>	PAGE 1 OF 1
START: <u>4/13/15</u> END: <u>4/13/15</u>	SAMPLING METHOD: <u>SPT/NX</u>	ENERGY RATIO (%): <u>61.8</u>	COORD: <u>41.024417, 83.665815</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				ODOT CLASS (GI)	BACK FILL	
								GR	CS	FS	SI	CL	LL	PL	PI	WC			
ROADBASE (8.0" THICK)	790.2																		
STIFF, DARK BROWN AND BROWN, SILTY CLAY , SOME SAND, TRACE STONE FRAGMENTS, DAMP	789.5	1	4	5	10	44	SS-1	3.50	4	5	16	30	45	40	21	19	18	A-6b (12)	
		2		5															
	786.7	3																	
STIFF, BROWN, SILT AND CLAY , LITTLE SAND, TRACE STONE FRAGMENTS, MOIST		4	4	7	15	100	SS-2	4.00	-	-	-	-	-	-	-	-	20	A-6a (V)	
		5		8															
	784.2	6																	
VERY STIFF, BROWN, SANDY SILT , "AND" CLAY, LITTLE STONE FRAGMENTS, DAMP		7	10	11	14	26	100	SS-3	4.5+	16	8	25	15	36	24	15	9	14	A-4a (3)
		8																	
@8.5'; SPLIT SPOON REFUSAL AND BEGIN CORING BEDROCK.	781.7	TR																	
DOLOMITE , GRAY, HIGHLY TO MODERATELY WEATHERED, STRONG, VERY THIN TO THIN BEDDED, FRACTURED TO MODERATELY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.		9																	
		10																	
POINT LOAD INDEX = 346.00 psi, UCS = 8,304 psi	778.2		0			95	NX-1												CORE
		11																	
	776.7		0			89	NX-2												CORE
		12																	
		13																	
		EOB																	

NOTES: GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING AND NO READING WAS TAKEN UPON COMPLETION DUE TO WATER USED DURING ROCK CORING OPERATIONS.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: HOLE WAS BACKFILLED WITH 0.5 BAG OF BENTONITE PELLETS/SOIL CUTTINGS MIXTURE

PROJECT: <u>HAN-75-14.39</u>	DRILLING FIRM / OPERATOR: <u>PGI / ZEKE</u>	DRILL RIG: <u>CME 45B TRUCK</u>	STATION / OFFSET: <u>69+58, 19' RT.</u>	EXPLORATION ID <u>B-065-2-14</u>
TYPE: <u>CULVERT CONSTRUCTION</u>	SAMPLING FIRM / LOGGER: <u>PGI / ZEKE</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>LIMA AVE BASELINE</u>	PAGE 1 OF 1
PID: <u>87005</u> STR ID: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>2/20/14</u>	ELEVATION: <u>789.3 (MSL)</u> EOB: <u>11.5 ft.</u>	
START: <u>4/7/15</u> END: <u>4/8/15</u>	SAMPLING METHOD: <u>SPT/NX</u>	ENERGY RATIO (%): <u>61.8</u>	COORD: <u>41.024112, 83.665769</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	789.3	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	BACK FILL		
									GR	CS	FS	SI	CL	LL	PL	PI					
TOPSOIL (6.0" THICK)	788.8																				
VERY STIFF, DARK BROWN, SANDY SILT , SOME CLAY, SOME STONE FRAGMENTS, FILL, DAMP			1	5	7	9	16	56	SS-1	--	-	-	-	-	-	-	-	9	A-4a (V)	< \ / >	
			2																	< \ / >	
	785.8		3																	< \ / >	
MEDIUM DENSE, GRAY, LIMESTONE FRAGMENTS WITH SAND , FILL, WET	784.8	W	4	11	11	4	15	100	SS-2	1.00	19	52	15	10	4	NP	NP	NP	61	A-1-b (0)	< \ / >
STIFF, GRAY, SANDY SILT , SOME CLAY, SOME STONE FRAGMENTS, FILL, MOIST			5																		< \ / >
	782.8		6	7														15	A-4a (V)	< \ / >	
@6.6'; BEGIN CORING BEDROCK.	782.7		TR					50/1"													< \ / >
DOLOMITE , GRAY, HIGHLY TO MODERATELY WEATHERED, STRONG, VERY THIN BEDDED, HIGHLY FRACTURED TO FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.	781.8		7																		< \ / >
DOLOMITE , GRAY, HIGHLY TO MODERATELY WEATHERED, STRONG, VERY THIN TO THIN BEDDED, HIGHLY FRACTURED TO MODERATELY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.			8																		< \ / >
DOLOMITE , GRAY, HIGHLY TO MODERATELY WEATHERED, STRONG, VERY THIN TO THIN BEDDED, HIGHLY FRACTURED TO MODERATELY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH. POINT LOAD INDEX = 395.08 psi, UCS = 9,482 psi	779.8		9																		< \ / >
DOLOMITE , GRAY, HIGHLY TO MODERATELY WEATHERED, STRONG, VERY THIN TO THIN BEDDED, FRACTURED TO MODERATELY FRACTURED, TIGHT APERTURE WIDTH, SLIGHTLY ROUGH.	777.8		10																		< \ / >
			11																		< \ / >
			EOB																		< \ / >

NOTES: GROUNDWATER WAS ENCOUNTERED AT A DEPTH OF 4.5' DURING DRILLING AND NO READING WAS TAKEN UPON COMPLETION DUE TO WATER USED DURING ROCK CORING OPERATIONS.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: HOLE WAS BACKFILLED WITH AUGER CUTTINGS

APPENDIX B

PRO US LAB ODOT SUMMARY ODOT OH DOT GDT 5/27/14 14:34 \NCLEDC01\PUBLIC\PROJECT FILES\13 PROJECTS\G130116\HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

Boring Number	Sample Number	Depth (ft)	Water Content %	Liquid Limit %	Plastic Limit %	Plast. Index	Specific Gravity	Agg. %	Coarse Sand %	Fine Sand %	Silt %	Silt & Clay Comb. %	Clay %	Soil Description	Class. Symbol
B-001-0-13	SS-1	1.5	12	26	14	12		20	9	19	33	52	19	DARK BROWN SILT AND CLAY, SOME SAND, LITTLE STONE FRAGMENTS (FILL)	A-6a (4)
B-001-0-13	SS-2	3.0	7	18	14	4		14	13	18	34	55	21	DARK BROWN SANDY SILT, SOME CLAY, LITTLE STONE FRAGMENTS (FILL)	A-4a (4)
B-001-0-13	SS-3	4.5	8											DARK BROWN SANDY SILT, SOME CLAY, LITTLE STONE FRAGMENTS (FILL)	A-4a (V)
B-001-0-13	SS-4	6.0	23											BLACK SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (V)
B-002-0-13	SS-1	1.0	11	23	13	10		19	3	11	49	67	18	DARK BROWN SANDY SILT, LITTLE CLAY, LITTLE STONE FRAGMENTS (FILL)	A-4a (6)
B-002-0-13	SS-2	3.5	14	22	17	5		2	9	17	45	72	27	BROWN SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS (FILL)	A-4a (7)
B-002-0-13	SS-3	6.0	16											DARK BROWN SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS (FILL)	A-4a (V)
B-002-0-13	SS-4	8.5	16											DARK BROWN SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS (FILL)	A-4a (V)
B-003-0-13	SS-1	1.0	10	26	17	9		6	8	17	41	69	28	BROWN SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS (FILL)	A-4a (7)
B-003-0-13	SS-2	3.5	12											BROWN SANDY SILT, "AND" CLAY, LITTLE STONE FRAGMENTS (FILL)	A-4a (V)
B-003-0-13	SS-3	6.0	15	25	16	9		2	5	19	38	74	36	DARK BROWN SANDY SILT, "AND" CLAY, LITTLE STONE FRAGMENTS (FILL)	A-4a (8)
B-003-0-13	SS-4	8.5	16											DARK BROWN SANDY SILT, "AND" CLAY, LITTLE STONE FRAGMENTS (FILL)	A-4a (V)
B-004-0-13	SS-1	1.0	14	25	16	9		5	6	13	47	76	29	BROWN SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS (FILL)	A-4a (8)
B-004-0-13	SS-2	3.5	11	26	16	10		16	9	17	31	58	27	BROWN SANDY SILT, SOME CLAY, LITTLE STONE FRAGMENTS (FILL)	A-4a (5)
B-004-0-13	SS-3	6.0	16											BROWN SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (V)
B-004-0-13	SS-4	8.5	18											BROWN SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (V)
B-004-0-13	SS-5	11.0	10											BROWN SANDY SILT, SOME CLAY, LITTLE STONE FRAGMENTS (FILL)	A-4a (V)
B-005-0-13	SS-1	1.5	10	NP	NP	NP		62	23	8		7		BROWN STONE FRAGMENTS, SOME SAND, TRACE FINES (FILL)	A-1-a (0)
B-005-0-13	SS-2	3.0	14	28	17	11		4	7	16	40	73	33	DARK BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (8)
B-005-0-13	SS-3	4.5	16											DARK BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (V)
B-005-0-13	SS-4	6.0	22											BLACK SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-6b (V)
B-006-0-13	SS-1	1.0	11	29	17	12		13	6	15	35	66	31	BROWN SILT AND CLAY, SOME SAND, LITTLE STONE FRAGMENTS (FILL)	A-6a (7)
B-006-0-13	SS-2	3.5	17	38	26	12		5	4	18	46	73	27	DARK BROWN SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (8)
B-006-0-13	SS-3	6.0	24											BROWN SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (V)
B-007-0-13	SS-1	1.5	6	19	13	6		29	15	18	20	38	18	DARK BROWN SANDY SILT, LITTLE CLAY, SOME STONE FRAGMENTS (FILL)	A-4a (1)
B-007-0-13	SS-2	3.0	11	25	17	8		10	20	30	10	40	30	DARK BROWN SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS (FILL)	A-4a (1)
B-007-0-13	SS-3	4.5	12	26	16	10		13	7	14	38	66	28	DARK BROWN SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS (FILL)	A-4a (6)
B-007-0-13	SS-4	6.0	17											DARK BROWN SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS (FILL)	A-4a (V)
B-008-0-13	SS-1	1.0	12	24	16	8		23	9	13	32	55	23	DARK BROWN SANDY SILT, SOME CLAY, SOME STONE FRAGMENTS (FILL)	A-4a (4)



Pro Geotech, Inc.

TR.-TRACE, BR.-BROWN, LI.-LITTLE, S/F-STONE FRAGMENTS, SO.-SOME, RB-ROADBASE, NP-NON-PLASTIC, POSS-POSSIBLE, MOD-MODERATELY

Summary of Laboratory Results

Client: PARSONS BRINKERHOFF
 Project: HAN-75-14.39
 Location: FINDLAY, HANCOCK COUNTY, OHIO
 PID Number: 87005

PRO US LAB ODOT SUMMARY ODOT OH DOT GDT-5/27/14 14:34:14 C:\ELECTRO\INPUT\PROJECT FILES\13 PROJECTS\13 HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

Boring Number	Sample Number	Depth (ft)	Water Content %	Liquid Limit %	Plastic Limit %	Plast. Index	Specific Gravity	Agg. %	Coarse Sand %	Fine Sand %	Silt %	Silt & Clay Comb. %	Clay %	Soil Description	Class. Symbol
B-008-0-13	SS-2	2.5	13	26	16	10		10	6	15	42	69	27	DARK BROWN SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS (FILL)	A-4a (7)
B-008-0-13	SS-3	4.0	8	19	15	4		47	9	11	22	33	11	BROWN SANDY SILT, SOME CLAY, SOME STONE FRAGMENTS (FILL)	A-2-4 (0)
B-008-0-13	SS-4	5.5	22											BLACK SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-6b (V)
B-009-0-13	SS-1	1.5	9											BROWN STONE FRAGMENTS WITH SAND, TRACE FINES (FILL)	A-1-b (V)
B-009-0-13	SS-2	2.0	15	NP	NP	NP		21	11	19	45	49	4	DARK BROWN, NON-PLASTIC SANDY SILT, SOME STONE FRAGMENTS (FILL)	A-4a (3)
B-009-0-13	SS-3	3.5	11	23	13	10		26	8	15	32	51	19	BROWN, PLASTIC SANDY SILT, SOME STONE FRAGMENTS, LITTLE CLAY (FILL)	A-4a (3)
B-009-0-13	SS-4	5.0	18											DARK BROWN SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (V)
B-009-0-13	SS-5	6.5	26											BLACK SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-6b (V)
B-010-0-13	SS-1	0.5	11	25	16	9		27	8	16	31	49	18	BROWN SANDY SILT, SOME STONE FRAGMENTS, LITTLE CLAY (FILL)	A-4a (3)
B-010-0-13	SS-2	2.0	8	20	12	8		44	6	12	21	38	17	BROWN SANDY SILT, "AND" STONE FRAGMENTS, LITTLE CLAY (FILL)	A-4a (1)
B-010-0-13	SS-3	4.5	13											BROWN SANDY SILT, LITTLE CLAY, LITTLE STONE FRAGMENTS (FILL)	A-4a (V)
B-010-0-13	SS-4	7.0	19											BLACK SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (V)
B-010-0-13	SS-5	8.5	5											LIGHT GRAY DOLOMITE FRAGMENTS, TRACE FINES	A-1-a (V)
B-011-0-13	SS-1	1.5	20	NP	NP	NP		27	41	17	12	15	3	GRAY STONE FRAGMENTS WITH SAND, LITTLE FINES (FILL)	A-1-b (0)
B-011-0-13	SS-2	3.0	12	27	16	11		15	7	15	37	63	26	DARK BROWN SILT AND CLAY, SOME SAND, LITTLE STONE FRAGMENTS (FILL)	A-6a (6)
B-011-0-13	SS-3	4.5	17											DARK BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (V)
B-011-0-13	SS-4	6.0	16											BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGS (FILL)	A-6a (V)
B-012-0-13	SS-1	1.0	23											BROWN SILTY CLAY, LITTLE SAND, SOME ROOTS (FILL)	A-6b (V)
B-013-0-13	SS-1	1.0	6											GRAY CONCRETE AND STONE FRAGMENTS (FILL)	A-1-a (V)
B-013-0-13	SS-2	3.5	13	37	29	8		4	7	17	38	72	34	DARK BROWN SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS (FILL)	A-4a (7)
B-013-0-13	SS-3	6.0	16	33	20	13		5	5	14	41	76	35	DARK BROWN SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (9)
B-013-0-13	SS-4	8.5	18											DARK BROWN SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (V)
B-014-0-13	SS-1	1.0	19	40	21	19		10	5	16	30	69	39	DARK BROWN SILTY CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6b (10)
B-014-0-13	SS-2	3.5	21	38	19	19		2	4	20	37	74	37	DARK BROWN SILTY CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6b (11)
B-014-0-13	SS-3	6.0	21											BROWN SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (V)
B-014-0-13	SS-4	8.5	25											DARK BROWN CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-7-6 (V)
B-014-0-13	SS-5	11.0												GRAY DOLOMITE BEDROCK	Rock (V)
B-015-0-13	SS-1	1.0	18	40	19	21		5	7	12	36	76	40	DARK BROWN SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-6b (12)
B-015-0-13	SS-2	3.5	17	38	19	19		12	9	14	25	65	40	DARK BROWN SILTY CLAY, SOME SAND, LITTLE STONE FRAGS, TRACE ROOTS (FILL)	A-6b (10)



Pro Geotech, Inc.

TR.-TRACE, BR.-BROWN, LI.-LITTLE, S/F-STONE FRAGMENTS, SO.-SOME, RB-ROADBASE, NP-NON-PLASTIC, POSS-POSSIBLE, MOD-MODERATELY

Summary of Laboratory Results

Client: PARSONS BRINKERHOFF
 Project: HAN-75-14.39
 Location: FINDLAY, HANCOCK COUNTY, OHIO
 PID Number: 87005

PRO US LAB ODOT SUMMARY ODOT OH DOT GDT 5/27/14 14:34 \NCLEDC01\PUBLIC\PROJECT FILES\13 PROJECTS\G130116 HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

Boring Number	Sample Number	Depth (ft)	Water Content %	Liquid Limit %	Plastic Limit %	Plast. Index	Specific Gravity	Agg. %	Coarse Sand %	Fine Sand %	Silt %	Silt & Clay Comb. %	Clay %	Soil Description	Class. Symbol
B-015-0-13	SS-3	6.0	17											GRAY SILT AND CLAY, TRACE SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (V)
B-015-0-13	SS-4	8.5	22											DARK GRAY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-7-6 (V)
B-016-0-13	SS-1	1.0	28											DARK BROWN SILT AND CLAY, LITTLE SAND, LITTLE ROOTS (FILL)	A-6a (V)
B-016-0-13	SS-2	3.5	23	39	20	19		0	3	17	38	80	42	BROWN, MOTTLED GRAY SILTY CLAY, LITTLE SAND	A-6b (12)
B-016-0-13	SS-3	6.0	24											BROWN, MOTTLED GRAY SILTY CLAY, LITTLE SAND	A-6b (V)
B-016-0-13	SS-4	8.0	3											LIGHT GRAY DOLOMITE BEDROCK	Rock (V)
B-021-0-13	SS-1	1.5	14	33	21	12		26	14	16	25	44	19	BROWN SILT AND CLAY, SOME SAND, SOME STONE FRAGMENTS (FILL)	A-6a (2)
B-021-0-13	SS-2	3.5	14	29	16	13		4	5	20	38	71	33	DARK BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (8)
B-021-0-13	SS-3	6.0	15											DARK BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (V)
B-021-0-13	SS-4	8.5	14											DARK BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (V)
B-021-0-13	SS-5	11.0	16											BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (V)
B-021-0-13	SS-6	13.5	17											DARK BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (V)
B-021-0-13	SS-7	16.0	13											DARK BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (V)
B-021-0-13	SS-8	18.5	16											DARK BROWN SILT AND CLAY, LITTLE SAND, LITTLE STONE FRAGMENTS (FILL)	A-6a (V)
B-021-0-13	SS-9	23.5	15											DARK BROWN SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (V)
B-021-0-13	SS-10	28.5	18	45	22	23		0	2	15	38	83	45	DARK BROWN CLAY, LITTLE SAND (FILL)	A-7-6 (14)
B-021-0-13	SS-11A	33.5	22											BROWN COARSE AND FINE SAND SEAMS	A-3a (V)
B-021-0-13	SS-11B	33.7	21											BROWN AND GRAY NON-PLASTIC SILT, TRACE SAND	A-4b (V)
B-025-1-13	SS-1	1.0	22											BROWN, MOTTLED GRAY SILTY CLAY, SOME SAND, TRACE STONE FRAGMENTS	A-6b (V)
B-025-1-13	SS-2	3.5	14	25	17	8		5	7	16	37	72	35	BROWN SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS	A-4a (7)
B-025-1-13	SS-3	6.0	19											GRAY, NON-PLASTIC SILT, TRACE SAND	A-4b (V)
B-025-1-13	SS-4	8.5	7											GRAY SANDY SILT, SOME CLAY, LITTLE STONE FRAGMENTS	A-4a (V)
B-026-0-13	SS-1	1.0	16	31	29	2		29	27	19	20	25	5	GRAY STONE FRAGMENTS WITH SAND, SOME FINES (BASE)	A-1-b (0)
B-026-0-13	SS-2	3.5	13	28	18	10		5	7	17	39	71	32	BROWN SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS (FILL)	A-4a (7)
B-026-0-13	SS-3	6.0	9											BROWN SANDY SILT, SOME CLAY, LITTLE STONE FRAGMENTS (FILL)	A-4a (V)
B-026-0-13	SS-4	8.5	14											BROWN SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS (FILL)	A-4a (V)
B-026-0-13	SS-5	11.0	15											BROWN SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS (FILL)	A-4a (V)
B-026-0-13	SS-6	13.5	15											BROWN SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS (FILL)	A-4a (V)
B-026-0-13	SS-7	16.0	11											BROWN SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS (FILL)	A-4a (V)



Pro Geotech, Inc.

TR.-TRACE, BR.-BROWN, LI.-LITTLE, S/F-STONE FRAGMENTS, SO.-SOME, RB-ROADBASE, NP-NON-PLASTIC, POSS-POSSIBLE, MOD-MODERATELY

Summary of Laboratory Results

Client: PARSONS BRINKERHOFF

Project: HAN-75-14.39

Location: FINDLAY, HANCOCK COUNTY, OHIO

PID Number: 87005

PRO US LAB ODOT SUMMARY ODOT OH DOT GDT 5/27/14 14:34 \NCLEDC01\INPUT\PROJECT FILES\130116 HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

Boring Number	Sample Number	Depth (ft)	Water Content %	Liquid Limit %	Plastic Limit %	Plast. Index	Specific Gravity	Agg. %	Coarse Sand %	Fine Sand %	Silt %	Silt & Clay Comb. %	Clay %	Soil Description	Class. Symbol
B-026-0-13	SS-8	18.5	14											DARK BROWN SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (V)
B-026-0-13	SS-9	23.5	13											BROWN SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (V)
B-026-0-13	SS-10	28.5	19											BROWN, MOTTLED GRAY SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-6b (V)
B-026-0-13	SS-11	33.5	20	39	23	16		0	0	0	37	100	63	GRAY SILTY CLAY	A-6b (10)
B-026-2-13	SS-1	1.0	21											BROWN SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS, TRACE ROOTS (FILL)	A-4a (V)
B-026-2-13	SS-2	3.5	23											DARK BROWN SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS (FILL)	A-4a (V)
B-026-2-13	ST-3	5.5	17											BROWN AND GRAY SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS (FILL)	A-4a (V)
B-026-2-13	ST-4	7.5	14	23	15	8		4	8	16	56	72	16	BROWN AND GRAY PLASTIC SILT, SOME SAND, LITTLE CLAY, TRACE STONE FRAGS (FILL)	A-4b (7)
B-026-2-13	SS-5	10.0	15											DARK BROWN PLASTIC SILT, SOME CLAY, SOME SAND, TRACE STONE FRAGMENTS	A-4b (V)
B-026-2-13	ST-6	12.0												NO RECOVERY	
B-026-2-13	ST-7	14.0	16											BROWN PLASTIC SILT, SOME CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-4b (V)
B-026-2-13	SS-8	16.0	14											BROWN PLASTIC SILT, SOME CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-4b (V)
B-027-0-13	SS-1	1.0	16											BROWN SANDY SILT, SOME CLAY, LITTLE STONE FRAGMENTS (FILL)	A-4a (V)
B-027-0-13	SS-2	3.5	19											BROWN SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (V)
B-027-0-13	SS-3	6.0	13											BROWN SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS (FILL)	A-4a (V)
B-027-0-13	SS-4	8.5	16											BROWN AND GRAY SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS (FILL)	A-4a (V)
B-027-0-13	SS-5	11.0	22	38	18	20		2	4	13	39	81	42	BROWN, MOTTLED GRAY SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-6b (12)
B-027-0-13	SS-6	13.5	13											BROWN PLASTIC SILT, "AND" CLAY, TRACE STONE FRAGMENTS	A-4b (V)
B-027-0-13	SS-7	16.0	11											GRAY PLASTIC SILT, "AND" CLAY, TRACE SAND	A-4b (V)
B-027-0-13	SS-8	18.5	17	27	19	8		1	0	1	55	98	43	GRAY PLASTIC SILT, "AND" CLAY, TRACE SAND	A-4b (8)
B-027-0-13	SS-9	21.0	14											GRAY PLASTIC SILT, "AND" CLAY, TRACE SAND	A-4b (V)
B-027-2-13	SS-1	1.0	22	38	20	18		2	4	22	33	72	39	BROWN SILTY CLAY, SOME SAND, TRACE STONE FRAGMENTS	A-6b (11)
B-027-2-13	ST-2	3.5	16	31	19	12		6	8	19	37	67	30	BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (7)
B-027-2-13	SS-3	5.5	16											BROWN SANDY SILT, SOME CLAY, LITTLE STONE FRAGMENTS	A-4a (V)
B-027-2-13	SS-4	8.5	13											BROWN SANDY SILT, SOME CLAY, LITTLE STONE FRAGMENTS	A-4a (V)
B-027-2-13	SS-5	11.0	16											GRAY, NON-PLASTIC SILT, TRACE SAND	A-4b (V)
B-027-2-13	SS-6	13.5	7											GRAY, NON-PLASTIC SANDY SILT, SOME STONE FRAGMENTS	A-4a (V)
B-028-0-13	SS-1	1.5	12	28	16	12		2	6	18	25	74	49	DARK BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (9)



Pro Geotech, Inc.

TR.-TRACE, BR.-BROWN, LI.-LITTLE, S/F-STONE FRAGMENTS, SO.-SOME, RB-ROADBASE, NP-NON-PLASTIC, POSS-POSSIBLE, MOD-MODERATELY

Summary of Laboratory Results

Client: PARSONS BRINKERHOFF

Project: HAN-75-14.39

Location: FINDLAY, HANCOCK COUNTY, OHIO

PID Number: 87005

PRO US LAB ODOT SUMMARY ODOT OH DOT GDT 5/27/14 14:34 \NCLED01\INPUT\PROJECT FILES\13 PROJECTS\16 HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

Boring Number	Sample Number	Depth (ft)	Water Content %	Liquid Limit %	Plastic Limit %	Plast. Index	Specific Gravity	Agg. %	Coarse Sand %	Fine Sand %	Silt %	Silt & Clay Comb. %	Clay %	Soil Description	Class. Symbol
B-028-0-13	SS-2	3.0	19	38	22	16		1	4	18	41	77	36	DARK BROWN SILTY CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6b (10)
B-028-0-13	SS-3	4.5	22											BLACK SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-6b (V)
B-028-0-13	SS-4	6.0	20											GREENISH GRAY SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-6b (V)
B-029-0-13	SS-1	2.0	19	35	23	12		6	12	22	39	60	21	DARK BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (6)
B-029-0-13	SS-2	3.5	21	NP	NP	NP		40	26	17	14	17	3	BROWN STONE FRAGMENTS WITH SAND, LITTLE FINES (FILL)	A-1-b (0)
B-029-0-13	SS-3	5.0	17											BROWN SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-6a (V)
B-029-0-13	SS-4	6.5	13											BROWN SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS	A-4a (V)
B-030-0-13	SS-1	1.0	12	38	15	23		14	10	17	33	59	26	BROWN SILTY CLAY, SOME SAND, LITTLE STONE FRAGMENTS (FILL)	A-6b (10)
B-030-0-13	SS-2	3.5	12	23	15	8		8	8	17	43	67	24	BROWN SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS	A-4a (6)
B-030-0-13	SS-3	6.0	12											BROWN SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS	A-4a (V)
B-030-0-13	SS-4	8.5	11											DARK GRAY SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS	A-4a (V)
B-031-0-13	SS-1	1.0	13	34	18	16		19	7	15	29	59	30	BROWN SILTY CLAY, SOME SAND, LITTLE STONE FRAGMENTS (FILL)	A-6b (7)
B-031-0-13	SS-2	3.5	17	29	17	12		6	10	16	39	68	29	BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGS, W/ SANDY SILT LAYER	A-6a (7)
B-031-0-13	SS-3	6.0	10											BROWN AND GRAY SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS	A-4a (V)
B-031-0-13	SS-4	8.5	11											GRAY SANDY SILT, SOME CLAY, TRACE STONE FRAGS W/ INTERBED SAND LAYERS	A-4a (V)
B-032-0-13	SS-1	1.5	23	NP	NP	NP		6	22	25	31	47	16	DARK BROWN NON-PLASTIC SANDY SILT, TRACE STONE FRAGMENTS (FILL)	A-4a (2)
B-032-0-13	SS-2	3.0	20	40	19	21		1	2	14	37	83	46	GREENISH GRAY SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-6b (12)
B-032-0-13	SS-3	4.5	20											BROWN SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (V)
B-032-0-13	SS-4	6.0	34											BROWN, NON-PLASTIC SILT, TRACE SAND	A-4b (V)
B-032-0-13	SS-4	7.5	26											LIGHT GRAY COARSE AND FINE SAND, SOME FINES	A-3a (V)
B-033-0-13	SS-1	2.0	19	36	26	10		8	15	26	35	51	16	DARK BROWN SANDY SILT, LITTLE CLAY, TRACE STONE FRAGMENTS (FILL)	A-4a (3)
B-033-0-13	SS-2	3.5	17	34	17	17		1	3	14	42	82	40	BROWN SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-6b (11)
B-033-0-13	SS-3	5.0	22											BROWN SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-6b (V)
B-033-0-13	SS-4	6.5	26											BROWN COARSE AND FINE SAND, LITTLE FINES	A-3a (V)
B-034-0-13	SS-1	1.0	18	38	16	22		7	5	15	31	73	42	BROWN SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-6b (12)
B-034-0-13	SS-2	3.5	25	39	21	18		0	0	4	27	95	68	BROWN SILTY CLAY, TRACE SAND	A-6b (11)
B-034-0-13	SS-3	6.0	20											BROWN COARSE AND FINE SAND, TRACE FINES	A-3a (V)
B-034-0-13	SS-4	8.5	11											GRAY SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS	A-4a (V)
B-034-1-13	SS-1	1.0	24	NP	NP	NP		14	21	25	29	40	11	BROWN NON-PLASTIC SANDY SILT, LITTLE STONE FRAGMENTS (FILL)	A-4a (1)



Pro Geotech, Inc.

TR.-TRACE, BR.-BROWN, LI.-LITTLE, S/F-STONE FRAGMENTS, SO.-SOME, RB-ROADBASE, NP-NON-PLASTIC, POSS-POSSIBLE, MOD-MODERATELY

Summary of Laboratory Results

Client: PARSONS BRINKERHOFF
 Project: HAN-75-14.39
 Location: FINDLAY, HANCOCK COUNTY, OHIO
 PID Number: 87005

PRO US LAB ODOT SUMMARY ODOT OH DOT GDT 5/27/14 14:34 \NCLEDC01\PUBLIC\PROJECT FILES\13 PROJECTS\G130116 HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

Boring Number	Sample Number	Depth (ft)	Water Content %	Liquid Limit %	Plastic Limit %	Plast. Index	Specific Gravity	Agg. %	Coarse Sand %	Fine Sand %	Silt %	Silt & Clay Comb. %	Clay %	Soil Description	Class. Symbol
B-034-1-13	SS-2	3.5	19	38	18	20		2	5	16	35	77	42	BROWN SILTY CLAY, SOME SAND, TRACE STONE FRAGMENTS	A-6b (12)
B-034-1-13	SS-3	6.0	21											BROWN SILTY CLAY, SOME SAND, TRACE STONE FRAGMENTS	A-6b (V)
B-034-1-13	SS-4	8.5	27											BROWN NON-PLASTIC SANDY SILT, TRACE STONE FRAGMENTS	A-4a (V)
B-035-0-13	SS-1	1.0	18	27	14	13		7	6	16	40	71	31	BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (8)
B-035-0-13	SS-2	3.5	20	29	17	12		13	6	14	42	67	25	BROWN SILT AND CLAY, LITTLE SAND, LITTLE STONE FRAGMENTS (FILL)	A-6a (7)
B-035-0-13	SS-3	6.0	13											BROWN COARSE AND FINE SAND, TRACE FINES	A-3a (V)
B-035-0-13	SS-4	8.5	22											BROWN NON-PLASTIC SANDY SILT, TRACE STONE FRAGMENTS	A-4a (V)
B-035-1-13	SS-1	1.0	17	26	13	13		3	5	15	34	77	43	GRAY SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (9)
B-035-1-13	SS-2	3.5	15	NP	NP	NP		2	13	37	33	48	15	BROWN NON-PLASTIC SANDY SILT, TRACE STONE FRAGMENTS (FILL)	A-4a (3)
B-035-1-13	SS-3	6.0	18											GRAY NON-PLASTIC SILT, TRACE STONE FRAGS W/SILT AND CLAY LAYER (FILL)	A-4b (V)
B-035-2-13	SS-1	1.5	22	31	26	5		25	18	20	24	37	13	BROWN SANDY SILT, LITTLE CLAY, SOME STONE FRAGMENTS (FILL)	A-4a (0)
B-035-2-13	SS-2	3.5	19	36	19	17		3	6	18	32	73	41	BROWN AND DARK BROWN SILTY CLAY, SOME SAND, TRACE STONE FRAGS (FILL)	A-6b (10)
B-035-2-13	SS-3	6.0	16											BROWN SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (V)
B-036-0-13	SS-1	1.5	9	NP	NP	NP		69	18	7		6		GRAY STONE FRAGMENTS, SOME SAND, TRACE FINES (FILL)	A-1-a (0)
B-036-0-13	SS-2	3.0	26	NP	NP	NP		0	9	63	20	27	7	DARK BROWN COARSE AND FINE SAND, SOME FINES (FILL)	A-3a (0)
B-036-0-13	SS-3	4.5	20											BROWN, MOTTLED GRAY SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-6b (V)
B-036-0-13	SS-4	6.0	18											BROWN COARSE AND FINE SAND, SOME FINES	A-3a (V)
B-036-1-13	SS-1	1.0	13	32	17	15		37	12	11	20	40	20	BROWN SILT AND CLAY, "AND" STONE FRAGMENTS, SOME SAND, (FILL)	A-6a (2)
B-036-1-13	SS-2	3.5	12	33	20	13		9	11	22	30	58	28	DARK BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (6)
B-036-1-13	SS-3	6.0	17											DARK BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (V)
B-036-1-13	SS-4	8.5	15											DARK BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (V)
B-037-0-13	SS-1	2.0	16	37	20	17		16	31	24	10	29	19	DARK BROWN STONE FRAGMENTS WITH SAND, SILT AND CLAY (FILL)	A-2-6 (1)
B-037-0-13	SS-2	3.5	15	27	17	10		6	9	17	34	68	34	BROWN SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS	A-4a (7)
B-037-0-13	SS-3	6.0	13											BROWN SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS	A-4a (V)
B-037-1-13	SS-1	1.0	15	32	18	14		22	18	20	21	40	19	BROWN SILT AND CLAY, "AND" SAND, SOME STONE FRAGMENTS (FILL)	A-6a (2)
B-037-1-13	SS-2	3.5	13	32	17	15		19	19	16	22	46	24	DARK BROWN SILT AND CLAY, SOME SAND, LITTLE STONE FRAGMENTS (FILL)	A-6a (4)
B-037-1-13	SS-3	6.0	14											DARK BROWN SILT AND CLAY, SOME SAND, LITTLE STONE FRAGMENTS (FILL)	A-6a (V)
B-037-1-13	SS-4	8.5	16											BROWN SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS (FILL)	A-4a (V)
B-038-0-13	SS-1	1.0	14	33	18	15		14	14	20	27	52	25	DARK BROWN SILT AND CLAY, SOME SAND, LITTLE STONE FRAGMENTS (FILL)	A-6a (5)



Pro Geotech, Inc.

TR.-TRACE, BR.-BROWN, LI.-LITTLE, S/F-STONE FRAGMENTS, SO.-SOME, RB-ROADBASE, NP-NON-PLASTIC, POSS-POSSIBLE, MOD-MODERATELY

Summary of Laboratory Results

Client: PARSONS BRINKERHOFF
 Project: HAN-75-14.39
 Location: FINDLAY, HANCOCK COUNTY, OHIO
 PID Number: 87005

PRO US LAB ODOT SUMMARY ODOT OH DOT GDT-5/27/14 14:34:14 CLEDC01PUBLOC PROJECT FILES\13 PROJECTS\IG\3011G\HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

Boring Number	Sample Number	Depth (ft)	Water Content %	Liquid Limit %	Plastic Limit %	Plast. Index	Specific Gravity	Agg. %	Coarse Sand %	Fine Sand %	Silt %	Silt & Clay Comb. %	Clay %	Soil Description	Class. Symbol
B-038-0-13	SS-2	3.5	16	32	17	15		12	16	25	23	47	24	DARK BROWN SILT AND CLAY, "AND" SAND, LITTLE STONE FRAGMENTS (FILL)	A-6a (4)
B-038-0-13	SS-3	6.0	14											BROWN SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS	A-4a (V)
B-038-0-13	SS-4	8.5	12											DARK GRAY SILT AND CLAY, LITTLE SAND, LITTLE STONE FRAGMENTS	A-6a (V)
B-038-1-13	SS-1	1.0	9											BROWN SILT AND CLAY, "AND" SAND, LITTLE STONE FRAGMENTS (FILL)	A-6a (V)
B-038-1-13	SS-2	3.5	15	28	15	13		12	15	25	21	48	27	BROWN SILT AND CLAY, "AND" SAND, LITTLE STONE FRAGMENTS (FILL)	A-6a (4)
B-038-1-13	SS-3	6.0	13	26	16	10		14	11	19	29	56	27	BROWN SANDY SILT, SOME CLAY, LITTLE STONE FRAGMENTS (FILL)	A-4a (4)
B-038-1-13	SS-4	8.5	14											BROWN SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-6a (V)
B-039-0-13	SS-1	1.5	7											BROWN STONE FRAGMENTS, LITTLE SAND W/ SILTY CLAY LAYER (FILL)	A-1-a (V)
B-039-0-13	SS-2	3.5	20	36	18	18		9	11	25	24	55	31	BLACK SILTY CLAY, "AND" SAND, TRACE STONE FRAGMENTS (FILL)	A-6b (7)
B-039-0-13	SS-3	6.0	18	34	17	17		3	7	20	30	70	40	BROWN SILTY CLAY, SOME SAND, TRACE STONE FRAGMENTS	A-6b (10)
B-039-0-13	SS-4	8.5	21											BROWN SILTY CLAY, SOME SAND, TRACE STONE FRAGMENTS	A-6b (V)
B-040-0-13	SS-1	1.5	20											GRAY SILTY CLAY, LITTLE SAND, TRACE FINES (FILL)	A-6b (V)
B-040-0-13	SS-2	3.0	24	39	21	18		1	4	21	37	74	37	BLACK SILTY CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6b (11)
B-040-0-13	SS-3	4.5	22	42	16	26		1	2	16	31	81	50	BROWN CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-7-6 (15)
B-040-0-13	SS-4	6.0	20											BROWN SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-6b (V)
B-041-0-13	SS-1	2.0	15	30	17	13		4	11	22	26	63	37	DARK GRAY SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (7)
B-041-0-13	SS-2	3.5	16	29	19	10		0	6	39	31	55	24	DARK BROWN SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS (FILL)	A-4a (4)
B-041-0-13	SS-3	6.0	19											GREENISH GRAY SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-6a (V)
B-042-0-13	SS-1	1.0	5											BROWN COARSE AND FINE SAND W/ASPHALT PIECES (FILL)	A-3a (V)
B-042-0-13	SS-2	3.5	20	37	21	16		2	6	18	33	74	41	BROWN, MOTTLED GRAY SILTY CLAY, SOME SAND, TRACE STONE FRAGMENTS	A-6b (10)
B-042-0-13	SS-3	6.0	14	25	16	9		4	7	18	42	71	29	BROWN SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS	A-4a (7)
B-042-0-13	SS-4	8.5	24											BROWN AND GRAY COARSE AND FINE SAND, LITTLE FINES	A-3a (V)
B-043-0-13	SS-1	1.0	20											DARK BROWN SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGS & ROOTS (FILL)	A-6a (V)
B-043-0-13	SS-2	3.5	19	33	18	15		9	11	16	30	64	34	BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS	A-6a (8)
B-043-0-13	SS-3	6.0	18	27	17	10		1	1	4	51	94	43	GRAY PLASTIC SILT, "AND" CLAY, TRACE SAND, TRACE STONE FRAGMENTS	A-4b (8)
B-043-0-13	SS-4	8.5	24											BROWN COARSE AND FINE SAND, LITTLE FINES	A-3a (V)
B-043-0-13	SS-5	11.0	26											GRAY COARSE AND FINE SAND, TRACE FINES W/INTERBEDDED SILT SEAMS	A-3a (V)
B-043-0-13	SS-6	13.5	12											GRAY SANDY SILT, SOME CLAY, LITTLE STONE FRAGMENTS (TILL)	A-4a (V)
B-043-0-13	SS-7	16.0	9											DARK GRAY SANDY SILT, SOME CLAY, LITTLE STONE FRAGMENTS (TILL)	A-4a (V)



Pro Geotech, Inc.

TR.-TRACE, BR.-BROWN, LI.-LITTLE, S/F-STONE FRAGMENTS, SO.-SOME, RB-ROADBASE, NP-NON-PLASTIC, POSS-POSSIBLE, MOD-MODERATELY

Summary of Laboratory Results

Client: PARSONS BRINKERHOFF

Project: HAN-75-14.39

Location: FINDLAY, HANCOCK COUNTY, OHIO

PID Number: 87005

PRO US LAB ODOT SUMMARY ODOT QH.DOT.GDT 5/27/14 14:34 \C\LED01\PUBLIC\PROJECT FILES\13 PROJECTS\G130116 HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

Boring Number	Sample Number	Depth (ft)	Water Content %	Liquid Limit %	Plastic Limit %	Plast. Index	Specific Gravity	Agg. %	Coarse Sand %	Fine Sand %	Silt %	Silt & Clay Comb. %	Clay %	Soil Description	Class. Symbol
B-043-0-13	SS-8	18.5	14	18	14	4		38	6	16	12	40	28	GRAY, SANDY SILT, "AND" STONE FRAGMENTS, SOME CLAY	A-4a (1)
B-043-0-13	SS-9	21.0	10											GRAY SANDY SILT, SOME CLAY, LITTLE STONE FRAGMENTS (TILL)	A-4a (V)
B-043-0-13	SS-10	23.5	5											GRAY DOLOMITE FRAGMENTS WITH SAND, TRACE FINES	A-1-b (V)
B-044-0-13	SS-1	1.0	18	44	20	24		1	4	12	29	83	54	BROWN CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-7-6 (14)
B-044-0-13	SS-2	3.5	14	31	18	13		3	6	16	37	75	38	BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (9)
B-044-0-13	SS-3	6.0	15											BROWN AND DARK BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGS (FILL)	A-6a (V)
B-044-0-13	SS-4	8.5	18											BLACK SILT AND CLAY, SOME SAND TRACE STONE FRAGMENTS (FILL)	A-6a (V)
B-044-0-13	SS-5	11.0	20	48	20	28		1	3	12	30	84	54	BROWN, MOTTLED GRAY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-7-6 (17)
B-044-0-13	SS-6	13.5	17											BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS	A-6a (V)
B-044-0-13	SS-7	16.0	22											DARK BROWN COARSE AND FINE SAND, LITTLE FINES	A-3a (V)
B-044-0-13	SS-8	18.5	21											GRAY, NON-PLASTIC SILT, TRACE SAND	A-4b (V)
B-044-0-13	SS-9	21.0	12											DARK GRAY SANDY SILT, SOME CLAY, LITTLE STONE FRAGMENTS (TILL)	A-4a (V)
B-044-0-13	SS-10	23.5	8											DARK GRAY SANDY SILT, SOME CLAY, LITTLE STONE FRAGMENTS (TILL)	A-4a (V)
B-044-0-13	SS-11A	28.5	6											DARK GRAY SANDY SILT, SOME CLAY, SOME STONE FRAGMENTS (TILL)	A-4a (V)
B-044-0-13	SS-11B	29.0												GRAY DOLOMITE BEDROCK	Rock (V)
B-044-1-13	SS-1	1.5	14	29	17	12		15	17	14	25	54	29	BROWN SILT AND CLAY, SOME SAND, LITTLE STONE FRAGMENTS (FILL)	A-6a (5)
B-044-1-13	SS-2	3.5	13	26	17	9		6	8	16	36	70	34	BROWN SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS (FILL)	A-4a (7)
B-044-1-13	SS-3	6.0	16											DARK BROWN SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS (FILL)	A-4a (V)
B-044-1-13	SS-4	8.5	15											DARK BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (V)
B-044-1-13	SS-5	11.0	16											BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (V)
B-044-1-13	SS-6	13.5	19	32	18	14		3	8	17	33	72	39	BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (9)
B-044-1-13	SS-7	16.0	20											BROWN SILTY CLAY, SOME SAND, TRACE STONE FRAGMENTS	A-6b (V)
B-044-1-13	SS-8	18.5	38											BROWN NON-PLASTIC SILT, TRACE SAND	A-4b (V)
B-044-1-13	SS-9	21.0	27											BROWN NON-PLASTIC SILT, LITTLE SAND	A-4b (V)
B-044-1-13	SS-10	23.5	9											GRAY SANDY SILT, SOME CLAY, LITTLE STONE FRAGMENTS (TILL)	A-4a (V)
B-044-1-13	SS-11	26.0	10	20	12	8		15	11	11	36	63	27	GRAY SANDY SILT, SOME CLAY, LITTLE STONE FRAGMENTS (TILL)	A-4a (6)
B-044-1-13	SS-12	28.5	9											DARK GRAY SANDY SILT, SOME CLAY, LITTLE STONE FRAGMENTS (TILL)	A-4a (V)
B-044-1-13	SS-13	31.0	8											DARK GRAY SANDY SILT, SOME CLAY, LITTLE STONE FRAGMENTS (TILL)	A-4a (V)
B-047-1-13	SS-1	1.0	19											DARK BROWN SILT AND CLAY, LITTLE SAND, TRACE ROCK FRAGMENTS (FILL)	A-6a (V)



Pro Geotech, Inc.

TR.-TRACE, BR.-BROWN, LI.-LITTLE, S/F-STONE FRAGMENTS, SO.-SOME, RB-ROADBASE, NP-NON-PLASTIC, POSS-POSSIBLE, MOD-MODERATELY

Summary of Laboratory Results

Client: PARSONS BRINKERHOFF
 Project: HAN-75-14.39
 Location: FINDLAY, HANCOCK COUNTY, OHIO
 PID Number: 87005

PRO US LAB ODOT SUMMARY ODOT OH DOT GDT 5/27/14 14:34 \NCLED01\INPUT\PROJECT FILES\13 PROJECTS\G130116 HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

Boring Number	Sample Number	Depth (ft)	Water Content %	Liquid Limit %	Plastic Limit %	Plast. Index	Specific Gravity	Agg. %	Coarse Sand %	Fine Sand %	Silt %	Silt & Clay Comb. %	Clay %	Soil Description	Class. Symbol
B-047-1-13	SS-2	3.5	25											BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (V)
B-047-1-13	ST-3	6.0	23	28	17	11		1	2	29	39	68	29	BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (7)
B-047-1-13	SS-4	8.5	18	23	16	7		17	6	6	50	71	21	GRAY, PLASTIC SILT, SOME CLAY, LITTLE SAND, LITTLE STONE FRAGMENTS	A-4b (7)
B-047-1-13	SS-5	11.0	8											GRAY SANDY SILT, SOME CLAY, LITTLE STONE FRAGMENTS (TILL)	A-4a (V)
B-047-1-13	SS-5	13.5	9											GRAY SANDY SILT, SOME CLAY, LITTLE STONE FRAGMENTS (TILL)	A-4a (V)
B-049-0-13	SS-1	2.0	13											BROWN NON-PLASTIC SANDY SILT, LITTLE STONE FRAGMENTS (FILL)	A-4a (V)
B-049-0-13	SS-2	3.5	14	22	14	8		3	8	16	41	73	32	BROWN PLASTIC SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS (FILL)	A-4a (8)
B-049-0-13	SS-3	6.0	16	41	19	22		3	4	15	30	78	48	BROWN CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-7-6 (13)
B-049-0-13	SS-4	8.5	17											BROWN CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-7-6 (V)
B-049-0-13	SS-5	11.0	17											BROWN CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-7-6 (V)
B-049-0-13	SS-6	13.5	17											BROWN CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-7-6 (V)
B-049-0-13	SS-7	16.0	17											BROWN CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-7-6 (V)
B-049-0-13	SS-8	18.5	15											BROWN SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-6b (V)
B-049-0-13	SS-9	21.0	17	36	18	18		5	4	15	34	76	42	BROWN AND GRAY SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-6b (11)
B-049-0-13	ST-10	23.5												BROWN AND GRAY SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-6b (V)
B-049-0-13	SS-11	26.0	12											GRAY SANDY SILT, SOME CLAY, LITTLE STONE FRAGMENTS	A-4a (V)
B-049-0-13	SS-12	28.5	11											GRAY SANDY SILT, SOME CLAY, LITTLE STONE FRAGMENTS	A-4a (V)
B-049-0-13	SS-13	31.0	11											GRAY SANDY SILT, SOME CLAY, LITTLE STONE FRAGMENTS	A-4a (V)
B-049-0-13	SS-14	33.5	21											DARK BROWN SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-6a (V)
B-049-0-13	SS-15	36.0	22											DARK BROWN SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-6a (V)
B-049-0-13	SS-16	38.5	9	40	25	15		0	2	11	46	87	41	DARK BROWN SILT AND CLAY, LITTLE SAND	A-6a (10)
B-049-1-13	SS-1	1.0	17	39	20	19		2	5	16	36	77	41	BROWN SILTY CLAY, SOME SAND, TRACE STONE FRAGS & ROOTS (FILL)	A-6b (12)
B-049-1-13	SS-2	3.5	19											BROWN SILTY CLAY, SOME SAND, TRACE STONE FRAGS & ROOTS (FILL)	A-6b (V)
B-049-1-13	ST-3	6.0	24	33	19	14		2	7	21	39	70	31	BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS	A-6a (9)
B-049-1-13	SS-4	8.0	24											BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS	A-6a (V)
B-049-1-13	SS-5	11.0	25	28	24	4		0	0	1	78	99	21	BROWN PLASTIC SILT, SOME CLAY, TRACE SAND	A-4b (8)
B-049-1-13	SS-6	13.5	9											BROWN NON-PLASTIC SANDY SILT, LITTLE STONE FRAGMENTS	A-4a (V)
B-049-1-13	SS-7	16.0	8											GRAY DOLOMITE BEDROCK	Rock (V)
B-050-0-13	SS-1	2.0	12	NP	NP	NP		23	13	32	23	32	9	BROWN STONE FRAGMENTS WITH SAND AND SILT (FILL)	A-2-4 (0)



Pro Geotech, Inc.

TR.-TRACE, BR.-BROWN, LI.-LITTLE, S/F-STONE FRAGMENTS, SO.-SOME, RB-ROADBASE, NP-NON-PLASTIC, POSS-POSSIBLE, MOD-MODERATELY

Summary of Laboratory Results

Client: PARSONS BRINKERHOFF
 Project: HAN-75-14.39
 Location: FINDLAY, HANCOCK COUNTY, OHIO
 PID Number: 87005

PRO US LAB ODOT SUMMARY ODOT QH.DOT.GDT-5/27/14.34-INLEDC01PUB.LOIPROJECT FILES\13 PROJECTS\G130116 HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

Boring Number	Sample Number	Depth (ft)	Water Content %	Liquid Limit %	Plastic Limit %	Plast. Index	Specific Gravity	Agg. %	Coarse Sand %	Fine Sand %	Silt %	Silt & Clay Comb. %	Clay %	Soil Description	Class. Symbol
B-050-0-13	SS-2	3.5	17	35	20	15		4	5	17	34	74	40	DARK BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (10)
B-050-0-13	SS-3	6.0	17											BROWN SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (V)
B-050-0-13	SS-4	8.5	16	35	18	17		3	5	13	29	79	50	BROWN SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-6b (11)
B-050-0-13	SS-5	11.0	18	41	21	20		2	5	17	31	76	45	BLACK CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-7-6 (12)
B-050-0-13	SS-6	13.5	16											DARK BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (V)
B-050-0-13	SS-7	16.0	16											DARK BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (V)
B-050-0-13	SS-8	18.5	15											DARK BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (V)
B-050-0-13	SS-9	21.0	15											DARK BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (V)
B-050-0-13	SS-10	23.5	18											BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (V)
B-050-0-13	SS-11	26.0	14											BROWN SILTY CLAY, SOME SAND, TRACE STONE FRAGMENTS	A-6b (V)
B-050-0-13	SS-12	28.5	16											BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS	A-6a (V)
B-050-0-13	SS-13	31.0	24											BROWN NON-PLASTIC SANDY SILT, TRACE STONE FRAGMENTS	A-4a (V)
B-050-0-13	SS-14	33.5	19											GRAY, PLASTIC SILT, SOME CLAY, TRACE SAND, TRACE STONE FRAGMENTS	A-4b (V)
B-050-0-13	SS-15	36.0	17											GRAY, PLASTIC SILT, SOME CLAY, TRACE SAND, TRACE STONE FRAGMENTS	A-4b (V)
B-050-0-13	SS-16	38.5	16	22	18	4		1	1	3	69	95	26	GRAY, PLASTIC SILT, SOME CLAY, TRACE SAND, TRACE STONE FRAGMENTS	A-4b (8)
B-050-0-13	SS-17	41.0	10											GRAY, NON-PLASTIC SANDY SILT, LITTLE STONE FRAGMENTS (TILL)	A-4a (V)
B-050-0-13	SS-18	43.5	5											GRAY DOLOMITE BEDROCK	Rock (V)
B-053-0-13	SS-1	1.2	11	40	17	23		0	8	26	34	66	32	BROWN SILTY CLAY, SOME SAND	A-6b (11)
B-053-0-13	SS-2	3.5	17	35	17	18		6	12	21	29	61	32	BROWN SILTY CLAY, SOME SAND, TRACE STONE FRAGMENTS	A-6b (8)
B-053-0-13	SS-3	6.0												NO RECOVERY	
B-054-0-13	SS-1	1.0	15	NP	NP	NP		36	4	13	43	47	4	BROWN NON-PLASTIC SANDY SILT, "AND" STONE FRAGMENTS	A-4a (2)
B-054-0-13	SS-2	3.5	17	30	19	11		2	11	27	32	60	28	BROWN SILT AND CLAY, "AND" SAND, TRACE STONE FRAGMENTS	A-6a (5)
B-054-0-13	SS-3	6.0	11											DARK GRAY SILT AND CLAY, "AND" SAND, TRACE STONE FRAGMENTS	A-6a (V)
B-056-0-13	SS-1	2.0	12	NP	NP	NP		32	14	24	17	30	13	GRAY STONE FRAGMENTS WITH SAND AND SILT (BASE)	A-2-4 (0)
B-056-0-13	SS-2	3.5	16	29	17	12		1	10	45	20	44	24	BROWN SILT AND CLAY, "AND" SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (2)
B-056-0-13	SS-3	6.0	19											GRAY COARSE AND FINE SAND, LITTLE FINES, TRACE STONE FRAGMENTS	A-3a (V)
B-057-0-13	SS-1	1.0	18	35	19	16		3	6	15	43	76	33	BROWN SILTY CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6b (10)
B-057-0-13	SS-2	2.5	17	39	16	23		4	16	22	27	58	31	BROWN SILTY CLAY, "AND" SAND, TRACE STONE FRAGMENTS (FILL)	A-6b (10)
B-057-0-13	SS-3	4.0	16											BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS	A-6a (V)



Pro Geotech, Inc.

TR.-TRACE, BR.-BROWN, LI.-LITTLE, S/F-STONE FRAGMENTS, SO.-SOME, RB-ROADBASE, NP-NON-PLASTIC, POSS-POSSIBLE, MOD-MODERATELY

Summary of Laboratory Results

Client: PARSONS BRINKERHOFF
 Project: HAN-75-14.39
 Location: FINDLAY, HANCOCK COUNTY, OHIO
 PID Number: 87005

PRO US LAB ODOT SUMMARY ODOT OH DOT GDT 5/27/14 14:34 \CLED01\INPUT\PROJECT FILES\13 PROJECTS\16 HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

Boring Number	Sample Number	Depth (ft)	Water Content %	Liquid Limit %	Plastic Limit %	Plast. Index	Specific Gravity	Agg. %	Coarse Sand %	Fine Sand %	Silt %	Silt & Clay Comb. %	Clay %	Soil Description	Class. Symbol
B-057-0-13	SS-4	5.5	23											DARK BROWN COARSE AND FINE SAND, LITTLE STONE FRAGS, TRACE FINES	A-3a (V)
B-057-0-13	SS-5	7.0	27											BROWN FINE SAND, TRACE FINES	A-3 (V)
B-057-0-13	SS-6	8.5	18											GRAY STONE FRAGMENTS WITH SAND, LITTLE FINES	A-1-b (V)
B-061-0-13	SS-1	1.0	18	46	20	26		13	12	7	24	68	44	BROWN CLAY, LITTLE SAND, LITTLE STONE FRAGMENTS (FILL)	A-7-6 (14)
B-061-0-13	SS-2	2.5	20	45	19	26		0	1	1	21	98	77	BROWN CLAY, TRACE SAND	A-7-6 (15)
B-061-0-13	SS-3	4.0	20											BROWN CLAY, TRACE SAND	A-7-6 (V)
B-061-0-13	SS-4	5.5	20											BROWN CLAY, TRACE SAND	A-7-6 (V)
B-061-0-13	SS-5	7.0	16											BROWN SILT AND CLAY, TRACE SAND, TRACE STONE FRAGMENTS	A-6a (V)
B-061-0-13	SS-6	8.5	17											BROWN SILT AND CLAY, TRACE SAND, TRACE STONE FRAGMENTS	A-6a (V)
B-062-0-13	SS-1	2.0	19	35	26	9		19	21	22	29	38	9	BROWN SANDY SILT, LITTLE STONE FRAGMENTS, TRACE CLAY (FILL)	A-4a (1)
B-062-0-13	SS-2	3.5	16	33	18	15		2	3	7	39	88	49	BROWN SILT AND CLAY, TRACE SAND, TRACE STONE FRAGMENTS	A-6a (10)
B-062-0-13	SS-3	6.0	17											BROWN SILT AND CLAY, TRACE SAND, TRACE STONE FRAGMENTS	A-6a (V)
B-063-0-13	SS-1	0.5	15											BROWN SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS (FILL)	A-4a (V)
B-063-0-13	SS-2	2.0	22	43	22	21		2	2	4	23	92	69	BROWN CLAY, TRACE SAND, TRACE STONE FRAGMENTS (FILL)	A-7-6 (13)
B-063-0-13	SS-3	3.5	25	40	19	21		0	2	5	31	93	62	GRAY SILTY CLAY, TRACE SAND (FILL)	A-6b (12)
B-063-0-13	SS-4	6.0	22											GRAY SILTY CLAY, TRACE SAND (FILL)	A-6b (V)
B-063-0-13	SS-5	8.5	24											BROWN CLAY, TRACE SAND, TRACE ROOTS	A-7-6 (V)
B-064-0-13	SS-1	1.5	8											GRAY STONE FRAGMENTS WITH SAND, TRACE FINES (BASE)	A-1-b (V)
B-064-0-13	SS-2	3.0	15	31	19	12		1	1	3	48	95	47	BROWN SILT AND CLAY, TRACE SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (9)
B-064-0-13	SS-3	4.5	18	37	19	18		2	2	3	35	93	58	BROWN SILTY CLAY, TRACE SAND, TRACE STONE FRAGMENTS (FILL)	A-6b (11)
B-064-0-13	SS-4	6.0	19											BROWN SILTY CLAY, TRACE SAND, TRACE STONE FRAGMENTS	A-6b (V)
B-066-0-13	SS-1	2.0	20	NP	NP	NP		30	41	15	11	14	3	BROWN STONE FRAGMENTS WITH SAND, LITTLE FINES (FILL)	A-1-b (0)
B-066-0-13	SS-2	3.5	22	46	22	24		0	2	6	24	92	68	BROWN CLAY, TRACE SAND	A-7-6 (15)
B-066-0-13	SS-3	6.0	19											BROWN SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-6b (V)
B-067-0-13	SS-1	0.5	16	36	18	18		7	7	9	34	77	43	BROWN SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-6b (11)
B-067-0-13	SS-2	2.0	20	45	18	27		2	1	12	32	85	53	BROWN CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-7-6 (16)
B-067-0-13	SS-3	3.5	17											BROWN SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-6b (V)
B-067-0-13	SS-4	6.0	16											BROWN SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-6a (V)
B-067-0-13	SS-4	8.5	17											BROWN SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-6a (V)



Pro Geotech, Inc.

TR.-TRACE, BR.-BROWN, LI.-LITTLE, S/F-STONE FRAGMENTS, SO.-SOME, RB-ROADBASE, NP-NON-PLASTIC, POSS-POSSIBLE, MOD-MODERATELY

Summary of Laboratory Results

Client: PARSONS BRINKERHOFF
 Project: HAN-75-14.39
 Location: FINDLAY, HANCOCK COUNTY, OHIO
 PID Number: 87005

PRO US LAB ODOT SUMMARY ODOT OH DOT GDT 5/27/14 14:34 \NCLEDC01\PUBLIC\PROJECT FILES\13 PROJECTS\G130116 HAN-75 LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

Boring Number	Sample Number	Depth (ft)	Water Content %	Liquid Limit %	Plastic Limit %	Plast. Index	Specific Gravity	Agg. %	Coarse Sand %	Fine Sand %	Silt %	Silt & Clay Comb. %	Clay %	Soil Description	Class. Symbol
B-068-0-13	SS-1	1.5	13											BROWN SANDY SILT, SOME CLAY W/CONCRETE FRAGMENTS (FILL)	A-4a (V)
B-068-0-13	SS-2	3.0	18											BROWN SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS AND ROOTS (FILL)	A-4a (V)
B-068-0-13	SS-3	4.5	22	48	19	29		4	4	10	27	82	55	BLACK CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-7-6 (17)
B-068-0-13	SS-4	6.0	23											BROWN SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-6b (V)
B-078-0-13	SS-1	2.0	14	38	18	20		4	5	13	35	78	43	BROWN SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-6b (12)
B-078-0-13	SS-2	3.5	18	33	18	15		1	5	18	21	76	55	BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (10)
B-078-0-13	SS-3	6.0	20											DARK BROWN SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (V)
B-079-0-13	SS-1	1.5	8	NP	NP	NP		29	35	13	15	23	8	BROWN GRAVEL AND STONE FRAGMENTS WITH SAND, SOME FINES (FILL)	A-1-b (0)
B-079-0-13	SS-2	3.0												NO RECOVERY	A-1-b (V)
B-079-0-13	SS-3	5.0	18											BROWN SILT AND CLAY, LITTLE SAND, TRACE STONE & ASPHALT FRAGS (FILL)	A-6a (V)
B-080-0-13	SS-1	2.0	15	34	18	16		4	6	14	36	76	40	BROWN SILTY CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6b (10)
B-080-0-13	SS-2	3.5	18	33	22	11		2	4	19	45	75	30	DARK BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (8)
B-080-0-13	SS-3	5.5	20											BROWN SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (V)
B-081-0-13	SS-1	1.5	8	NP	NP	NP		36	29	13	17	22	5	BROWN, STONE FRAGMENTS WITH SAND, SOME FINES (FILL)	A-1-b (0)
B-081-0-13	SS-2	3.0	15	31	18	13		4	6	15	37	75	38	BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (9)
B-081-0-13	SS-3	5.5	27											BLACK CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-7-6 (V)
B-082-0-13	SS-1	1.0	9	28	18	10		23	26	13	20	38	18	BROWN SANDY SILT, LITTLE CLAY, SOME STONE FRAGS, TRACE ROOTS (FILL)	A-4a (1)
B-082-0-13	SS-2	3.5	20	39	22	17		7	6	18	37	69	32	BLACK SILTY CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6b (10)
B-082-0-13	SS-3	6.0	18											BLACK AND DARK BROWN SILTY CLAY, SOME SAND, TRACE STONE FRAGMENTS	A-6b (V)
B-088-0-13	SS-1	1.0	8											BROWN SILT AND CLAY, LITTLE SAND WITH ASPHALT PIECES	A-6a (V)
B-088-0-13	SS-2	3.5	11	24	16	8		18	5	19	33	58	25	BROWN AND GRAY SANDY SILT, SOME CLAY, LITTLE STONE FRAGMENTS (FILL)	A-4a (5)
B-088-0-13	SS-3	6.0	15											BROWN SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (V)
B-088-0-13	SS-4	8.5	14											BROWN AND GRAY SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGS (FILL)	A-6a (V)
B-118-0-13	SS-1	1.5	14	33	20	13		8	12	18	30	62	32	DARK BROWN SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (7)
B-118-0-13	SS-2	3.5	14											BROWN SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (V)
B-118-0-13	SS-3	6.0	11											BROWN AND GRAY SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS (FILL)	A-4a (V)
B-118-0-13	SS-4	8.5	14	29	17	12		5	8	17	36	70	34	BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGS (FILL)	A-6a (8)
B-118-0-13	SS-5	11.0	12											BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGS (FILL)	A-6a (V)
B-118-0-13	SS-6	13.5	11											DARK BROWN SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS (FILL)	A-4a (V)



Pro Geotech, Inc.

TR.-TRACE, BR.-BROWN, LI.-LITTLE, S/F-STONE FRAGMENTS, SO.-SOME, RB-ROADBASE, NP-NON-PLASTIC, POSS-POSSIBLE, MOD-MODERATELY

Summary of Laboratory Results

Client: PARSONS BRINKERHOFF
 Project: HAN-75-14.39
 Location: FINDLAY, HANCOCK COUNTY, OHIO
 PID Number: 87005

PRO US LAB ODOT SUMMARY ODOT-OH.DOT.GDT-5/27/14 14:34 \CLED01\INPUT\PROJECT FILES\13 PROJECTS\G130116\HAN-75\LAB DATA SHEETS\HAN-75 ROADWAY.GPJ

Boring Number	Sample Number	Depth (ft)	Water Content %	Liquid Limit %	Plastic Limit %	Plast. Index	Specific Gravity	Agg. %	Coarse Sand %	Fine Sand %	Silt %	Silt&Clay Comb. %	Clay %	Soil Description	Class. Symbol
B-118-0-13	SS-7	18.5	12											BROWN SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS (FILL)	A-4a (V)
B-118-0-13	ST-8	23.5												BROWN SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS (FILL)	A-4a (V)
B-118-0-13	SS-9	28.5	18											BROWN, MOTTLED GRAY SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-6b (V)
B-118-0-13	SS-10	33.5	16	26	18	8		0	1	4	53	95	42	GRAY, PLASTIC SILT, "AND" CLAY, TRACE SAND	A-4b (8)
B-162-0-13	SS-1	1.0	9	NP	NP	NP		20	33	17	23	30	7	BROWN COARSE AND FINE SAND, SOME FINES, LITTLE STONE FRAGMENTS (FILL)	A-3a (0)
B-163-0-13	SS-1	1.0	11	20	17	3		18	13	19	32	50	18	BROWN NON-PLASTIC SANDY SILT, LITTLE STONE FRAGMENTS	A-4a (3)
B-163-0-13	SS-2	3.5	18	29	14	15		16	8	13	52	63	11	BROWN SILT AND CLAY, SOME SAND, LITTLE STONE FRAGMENTS	A-6a (8)
B-164-0-13	SS-1	1.0	14	35	20	15		2	5	18	39	75	36	BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (10)
B-165-0-13	SS-1	1.0	19	41	20	21		8	6	16	30	70	40	BLACK CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-7-6 (12)
B-165-0-13	SS-2	3.5	30	57	27	30		1	3	11	33	85	52	BLACK CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-7-6 (19)
B-166-0-13	SS-1	1.0	16	29	17	12		5	10	19	37	66	29	DARK BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (7)
B-166-0-13	SS-2	3.5	14	25	16	9		5	8	18	39	69	30	BROWN SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS (FILL)	A-4a (7)
B-176-0-13	SS-1	1.0	16	32	17	15		2	5	19	40	74	34	BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (10)
B-176-0-13	SS-2	3.5	9	22	16	6		20	12	15	34	53	19	BROWN SANDY SILT, LITTLE CLAY, LITTLE STONE FRAGMENTS (FILL)	A-4a (4)
B-177-0-13	SS-1	1.0	16	32	18	14		0	6	17	35	77	42	BROWN SILT AND CLAY, SOME SAND	A-6a (10)
B-177-0-13	SS-2	3.5	14	37	18	19		13	4	14	31	69	38	BROWN SILTY CLAY, LITTLE SAND, LITTLE STONE FRAGMENTS	A-6b (10)
B-178-0-13	SS-1	1.0	20	41	19	22		4	4	12	28	80	52	BROWN CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-7-6 (13)
B-179-0-13	SS-1	1.0	16	28	19	9		1	3	18	41	78	37	BROWN SANDY SILT, "AND" CLAY, TRACE STONE FRAGMENTS (FILL)	A-4a (8)
B-179-0-13	SS-2	3.5	18											BROWN SANDY SILT, "AND" CLAY, TRACE STONE FRAGMENTS (FILL)	A-4a (V)
B-180-0-13	SS-1	1.0	19	34	20	14		4	9	17	40	70	30	BLACK SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (9)
B-180-0-13	SS-2	3.5	31	52	29	23		2	2	5	42	91	49	DARK BROWN CLAY, TRACE SAND, TRACE STONE FRAGMENTS (FILL)	A-7-6 (16)
B-180-0-13	SS-3	6.0	5											ASPHALT PIECES, WITH SAND AND SILT (FILL)	A-2-4 (V)
B-180-0-13	SS-4	8.5	17											GRAY DOLOMITE BEDROCK	Rock (V)



Pro Geotech, Inc.

TR.-TRACE, BR.-BROWN, LI.-LITTLE, S/F-STONE FRAGMENTS, SO.-SOME, RB-ROADBASE, NP-NON-PLASTIC, POSS-POSSIBLE, MOD-MODERATELY

Summary of Laboratory Results

Client: PARSONS BRINKERHOFF
 Project: HAN-75-14.39
 Location: FINDLAY, HANCOCK COUNTY, OHIO
 PID Number: 87005

PRO US LAB ODOT SUMMARY ODOT-OH.DOT.GDT-6/2/14 08:06:14 ICLIED001PUBLIC\PROJECT FILES\13 PROJECTS\IG HAN-75\LAB DATA SHEETS\HAN-75 RAMPS.GPJ

Boring Number	Sample Number	Depth (ft)	Water Content %	Liquid Limit %	Plastic Limit %	Plast. Index	Specific Gravity	Agg. %	Coarse Sand %	Fine Sand %	Silt %	Silt & Clay Comb. %	Clay %	Soil Description	Class. Symbol
B-089-0-13	SS-1	1.0	6											GRAY STONE FRAGMENTS WITH SAND AND SILT (FILL)	A-2-4 (V)
B-089-0-13	SS-2	3.5	12											BROWN AND GRAY SILT AND CLAY, SOME SAND, TRACE STONE FRAGS (FILL)	A-2-4 (V)
B-089-0-13	SS-3	6.0	12	26	15	11		7	8	16	37	69	32	BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (7)
B-089-0-13	SS-4	8.5	16											BROWN AND GRAY SILT AND CLAY, SOME SAND, TRACE STONE FRAGS (FILL)	A-6a (V)
B-089-0-13	SS-5	11.0	13											BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (V)
B-089-0-13	SS-6	13.5	19											BROWN SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-6a (V)
B-089-0-13	SS-7	16.0	18											BROWN SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-6b (V)
B-089-0-13	SS-8	18.5												NO RECOVERY	
B-090-0-13	SS-1	1.0	8											LIGHT BROWN STONE FRAGS W/ SAND, LITTLE FINES W/SANDY SILT LAYER (FILL)	A-4a (V)
B-090-0-13	SS-2	3.5	12	26	17	9		13	5	9	36	73	37	GRAY, SANDY SILT, "AND" CLAY, LITTLE STONE FRAGMENTS (FILL)	A-4a (8)
B-090-0-13	SS-3	6.0	10											GRAY AND BROWN SANDY SILT, "AND" CLAY, TRACE STONE FRAGMENTS (FILL)	A-4a (V)
B-090-0-13	SS-4	8.5	14											BROWN SANDY SILT, "AND" CLAY, TRACE STONE FRAGMENTS (FILL)	A-4a (V)
B-090-0-13	SS-5	11.0	19											BROWN SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-6b (V)
B-090-0-13	ST-6	12.5	21	40	19	21		1	3	14	33	82	49	BROWN SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-6b (12)
B-091-0-13	SS-1	1.0	26											DARK BROWN CLAY, LITTLE SAND, W/LIGHT GRAY, ELASTIC CLAY (FILL)	A-7-6 (V)
B-091-0-13	SS-2	3.5	83	76	57	19		0	0	0	33	100	67	LIGHT GRAY ELASTIC CLAY (FILL)	A-7-5 (16)
B-091-0-13	SS-3	6.0	73											LIGHT GRAY ELASTIC CLAY, TRACE SAND (FILL)	A-7-5 (V)
B-091-0-13	SS-4	8.5	77											LIGHT GRAY ELASTIC CLAY, TRACE SAND (FILL)	A-7-5 (V)
B-091-0-13	SS-5	11.0	38	56	29	27		1	2	15	39	82	43	DARK BROWN CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-7-6 (18)
B-091-0-13	SS-6	13.5	22											BROWN, MOTTLED GRAY, SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-6b (V)
B-092-0-13	SS-1	1.5	12											BROWN SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS (FILL)	A-4a (V)
B-092-0-13	SS-2	3.5	18											BROWN SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (V)
B-092-0-13	SS-3	6.0	16											BROWN SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (V)
B-092-0-13	SS-4	8.5	13											BROWN AND GRAY SANDY SILT, SOME CLAY, LITTLE STONE FRAGMENTS (FILL)	A-4a (V)
B-092-0-13	SS-5	11.0	14											BROWN AND GRAY SANDY SILT, SOME CLAY, LITTLE STONE FRAGMENTS (FILL)	A-4a (V)
B-092-0-13	SS-6	13.5	14											GRAY SANDY SILT, SOME CLAY, LITTLE STONE FRAGMENTS (FILL)	A-4a (V)
B-092-0-13	SS-7	16.0	21											GREENISH GRAY SILTY CLAY, TRACE SAND, TRACE STONE FRAGMENTS (FILL)	A-6b (V)
B-092-0-13	SS-8	18.5	18											GREENISH GRAY SILTY CLAY, TRACE SAND, TRACE STONE FRAGMENTS (FILL)	A-6b (V)
B-092-0-13	ST-9	21.0												BROWN SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-6b (V)



Pro Geotech, Inc.

TR.-TRACE, BR.-BROWN, LI.-LITTLE, S/F-STONE FRAGMENTS, SO.-SOME, RB-ROADBASE, NP-NON-PLASTIC, POSS-POSSIBLE, MOD-MODERATELY

Summary of Laboratory Results

Client: PARSONS BRINKERHOFF
 Project: HAN-75-14.39
 Location: HANCOCK COUNTY, OHIO
 PID Number: 87005

PRO US LAB ODOT SUMMARY ODOT OH DOT GDT 8/2/14 08:06:14 C:\EDOC\1\PUBLIC\PROJECT FILES\13 PROJECTS\IG HAN-75\LAB DATA SHEETS\HAN-75 RAMPS.GPJ

Boring Number	Sample Number	Depth (ft)	Water Content %	Liquid Limit %	Plastic Limit %	Plast. Index	Specific Gravity	Agg. %	Coarse Sand %	Fine Sand %	Silt %	Silt & Clay Comb. %	Clay %	Soil Description	Class. Symbol
B-092-0-13	SS-10	23.5	17											BROWN CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-7-6 (V)
B-092-0-13	SS-11	26.0	19	41	19	22		2	3	10	40	85	45	BROWN CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-7-6 (13)
B-092-0-13	SS-12	28.5	21	30	22	8		1	4	41	30	54	24	DARK BROWN SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS (FILL)	A-4a (4)
B-092-0-13	SS-13	31.0	18											GREENISH BROWN SILTY CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6b (V)
B-092-0-13	SS-14	33.5	24	33	16	17		2	6	17	37	75	38	GREENISH BROWN SILTY CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6b (11)
B-092-0-13	SS-15	36.0												NO RECOVERY	
B-093-0-13	SS-1A	1.0	27											BLACK CLAY, LITTLE SAND, TRACE STONE FRAGMENTS AND ROOTS (FILL)	A-7-6 (V)
B-093-0-13	SS-1B	2.0	23											BROWN, MOTTLED GRAY SILTY CLAY, LITTLE SAND, TRACE STONE FRAGS	A-6b (V)
B-093-0-13	SS-3	3.5	22	38	25	13		1	2	6	53	91	38	BROWN SILT AND CLAY, TRACE SAND, TRACE STONE FRAGMENTS	A-6a (9)
B-093-0-13	SS-4	6.0	18											BROWN AND GRAY SILT AND CLAY, TRACE SAND, TRACE STONE FRAGS	A-6a (V)
B-094-0-13	SS-1	1.5	23	44	23	21		0	3	15	32	82	50	DARK BROWN CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-7-6 (13)
B-094-0-13	SS-2	4.0	22	47	23	24		2	2	13	37	83	46	DARK BROWN CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-7-6 (15)
B-094-0-13	SS-3	6.5	19											BROWN AND GRAY SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-6b (V)
B-094-0-13	SS-4	8.5	9											BROWN, NON PLASTIC SANDY SILT, LITTLE STONE FRAGMENTS	A-4a (V)
B-095-0-13	SS-1	1.5	18	34	18	16		1	3	32	28	64	36	DARK BROWN SILTY CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6b (8)
B-095-0-13	SS-2	3.5	17	29	15	14		0	3	33	32	64	32	BROWN AND GRAY SILT AND CLAY, "AND" SAND (FILL)	A-6a (7)
B-095-0-13	SS-3	6.0												NO RECOVERY (POSS. BR)	Rock (V)
B-096-0-13	SS-1	1.0	11	23	14	9		5	8	16	40	71	31	BROWN AND GRAY SANDY SILT, SOME CLAY, TRACE ROCK FRAGMENTS (FILL)	A-4a (7)
B-096-0-13	SS-2	3.5												GRAY DOLOMITE ROCK	Rock (V)
B-097-0-13	SS-1	1.0	20											DARK BROWN SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-6b (V)
B-097-0-13	SS-2	3.5	31	49	26	23		9	6	12	44	73	29	BLACK CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-7-6 (15)
B-097-0-13	SS-3	6.0	8											GRAY DOLOMITE BEDROCK	Rock (V)
B-098-0-13	SS-1	1.0	14	32	17	15		28	15	12	22	45	23	BROWN SILT AND CLAY, SOME SAND, SOME STONE FRAGMENTS (FILL)	A-6a (4)
B-098-0-13	SS-2	3.5	20	40	24	16		8	8	17	37	67	30	DARK BROWN SILTY CLAY, SOME SAND, TRACE S/F W/HYDROCARBON ODOR (FILL)	A-6b (9)
B-098-0-13	SS-3	6.0	8											GRAY DOLOMITE BEDROCK	Rock (V)
B-099-0-13	SS-1	1.0	24	53	26	27		25	3	10	24	62	38	BROWN AND DARK BROWN CLAY, LITTLE SAND, SOME STONE FRAGS (FILL)	A-7-6 (14)
B-099-0-13	SS-2	3.5	4											GRAY DOLOMITE BEDROCK	Rock (V)
B-100-0-13	SS-1	1.0	20	50	24	26		1	3	17	36	79	43	DARK BROWN CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-7-6 (16)
B-100-0-13	AS-2	2.0	1											GRAY DOLOMITE BEDROCK	Rock (V)



Pro Geotech, Inc.

TR.-TRACE, BR.-BROWN, LI.-LITTLE, S/F-STONE FRAGMENTS, SO.-SOME, RB-ROADBASE, NP-NON-PLASTIC, POSS-POSSIBLE, MOD-MODERATELY

Summary of Laboratory Results

Client: PARSONS BRINKERHOFF
 Project: HAN-75-14.39
 Location: HANCOCK COUNTY, OHIO
 PID Number: 87005

PRO US LAB ODOT SUMMARY ODOT OH DOT GDT 6/21/14 08:06:14 ICLIED001PUBLIC\PROJECT FILES\13 PROJECTS\IG HAN-75\LAB DATA SHEETS\HAN-75 RAMPS.GPJ

Boring Number	Sample Number	Depth (ft)	Water Content %	Liquid Limit %	Plastic Limit %	Plast. Index	Specific Gravity	Agg. %	Coarse Sand %	Fine Sand %	Silt %	Silt & Clay Comb. %	Clay %	Soil Description	Class. Symbol
B-101-0-13	SS-1	1.0	12	26	16	10		3	5	23	37	69	32	BROWN SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS (FILL)	A-4a (7)
B-101-0-13	SS-2	3.5	20	37	19	18		2	4	14	35	80	45	BROWN SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-6b (11)
B-101-0-13	AS-3	4.2	1											GRAY DOLOMITE BEDROCK	Rock (V)
B-102-0-13	SS-1	1.5	24											BROWN SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-6b (V)
B-102-0-13	SS-2	3.5	21	36	20	16		8	16	25	19	51	32	BLACK, SILTY CLAY, "AND" SAND, TRACE STONE FRAGMENTS (FILL)	A-6b (5)
B-102-0-13	SS-3	6.0												GRAY DOLOMITE BEDROCK	Rock (V)
B-103-0-13	SS-1	1.5	24	42	16	26		5	8	18	35	69	34	DARK BROWN CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-7-6 (14)
B-103-0-13	SS-2	3.5	22	35	19	16		2	4	17	34	77	43	DARK BROWN SILTY CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6b (10)
B-103-0-13	SS-3A	6.0	19											BROWN SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-6b (V)
B-103-0-13	SS-3B	6.3												GRAY DOLOMITE BEDROCK	Rock (V)
B-104-0-13	AS-1	1.0	2											GRAY STONE FRAGMENTS	A-1-a (V)
B-104-0-13	SS-2	4.0	58	44	34	10		0	1	21	43	78	35	DARK GRAY ELASTIC SILT AND CLAY, SOME SAND (FILL)	A-5 (9)
B-104-0-13	SS-3	6.0	18											BROWN SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-6b (V)
B-104-0-13	SS-4	8.5	15											BROWN SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-6a (V)
B-105-0-13	SS-1	1.0	13	33	15	18		16	16	15	26	53	27	BROWN SILTY CLAY, "AND" SAND, LITTLE STONE FRAGMENTS (FILL)	A-6b (7)
B-105-0-13	SS-2	3.5	11	33	20	13		36	12	12	20	40	20	BROWN SILT AND CLAY, "AND" STONE FRAGMENTS, SOME SAND (FILL)	A-6a (2)
B-105-0-13	SS-3A	6.0	48											LIGHT GRAY ELASTIC SILT AND CLAY, TRACE SAND (FILL)	A-7-5 (V)
B-105-0-13	SS-3B	6.5	22											GRAY COARSE AND FINE SAND, LITTLE STONE FRAGMENTS, TRACE FINES	A-3a (V)
B-105-0-13	SS-4	8.5	22											BROWN SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-6b (V)
B-106-0-13	SS-1	1.0	40											LIGHT GRAY ELASTIC CLAY, TRACE SAND, TRACE S/F AND ROOTS (FILL)	A-7-5 (V)
B-106-0-13	SS-2	3.5	40	53	41	12		0	1	6	51	93	42	LIGHT GRAY ELASTIC CLAY, TRACE SAND, TRACE S/F (FILL)	A-7-5 (11)
B-106-0-13	SS-3	6.0	25											BROWN, ELASTIC CLAY, TRACE SAND W/CLAY LAYER (FILL)	A-7-5 (V)
B-106-0-13	SS-4	8.5	27											BROWN AND GRAY CLAY, TRACE SAND, TRACE STONE FRAGMENTS (FILL)	A-7-6 (V)
B-107-0-13	SS-1	1.5	21	40	18	22		0	3	12	41	85	44	BROWN SILTY CLAY, LITTLE SAND	A-6b (13)
B-107-0-13	SS-2	3.5	20	39	16	23		0	5	16	34	79	45	BROWN SILTY CLAY, SOME SAND	A-6b (13)
B-107-0-13	SS-3	6.0												GRAY DOLOMITE BEDROCK	Rock (V)
B-108-0-13	SS-1	1.5	65											DARK GRAY ELASTIC CLAY, TRACE SAND, TRACE STONE FRAGS (FILL)	A-7-5 (V)
B-108-0-13	SS-2	3.5	68											LIGHT GRAY CLAY, TRACE SAND (FILL)	A-7-5 (V)
B-108-0-13	SS-3	6.5	36	46	30	16		1	3	16	39	80	41	DARK GRAY ELASTIC CLAY, TRACE SAND (FILL)	A-7-5 (12)



Pro Geotech, Inc.

TR.-TRACE, BR.-BROWN, LI.-LITTLE, S/F-STONE FRAGMENTS, SO.-SOME, RB-ROADBASE, NP-NON-PLASTIC, POSS-POSSIBLE, MOD-MODERATELY

Summary of Laboratory Results

Client: PARSONS BRINKERHOFF
 Project: HAN-75-14.39
 Location: HANCOCK COUNTY, OHIO
 PID Number: 87005

PRO US LAB ODOT SUMMARY ODOT OH DOT GDT-6/2/14 08:06:14 C:\EDC01\PUBLIC\PROJECT FILES\13 PROJECTS\IG HAN-75\LAB DATA SHEETS\HAN-75 RAMPS.GPJ

Boring Number	Sample Number	Depth (ft)	Water Content %	Liquid Limit %	Plastic Limit %	Plast. Index	Specific Gravity	Agg. %	Coarse Sand %	Fine Sand %	Silt %	Silt & Clay Comb. %	Clay %	Soil Description	Class. Symbol
B-108-0-13	SS-4	8.5	24											GRAY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-7-6 (V)
B-108-0-13	SS-5	11.0												GRAY DOLOMITE BEDROCK	Rock (V)
B-108-0-13	SS-6	12.8												GRAY DOLOMITE BEDROCK	Rock (V)
B-109-0-13	SS-1	1.0	15											DARK BROWN & BLACK, NON-PLASTIC SANDY SILT, LITTLE STONE FRAGS (FILL)	A-4a (V)
B-109-0-13	SS-2	3.5	60	67	40	27		0	0	1	32	99	67	DARK GRAY, ELASTIC CLAY, TRACE SAND (FILL)	A-7-5 (19)
B-109-0-13	ST-3	5.5	78	64	46	18		0	0	3	36	97	61	DARK GRAY, ELASTIC CLAY, TRACE SAND	A-7-5 (15)
B-109-0-13	SS-4	7.5	19											BROWN SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-6b (V)
B-109-0-13	SS-5	11.0	14											BROWN SILT AND CLAY, LITTLE SAND, LITTLE STONE FRAGMENTS	A-6a (V)
B-110-0-13	SS-1	1.5	6											ASPHALT PIECES WITH SAND AND SILT (FILL)	A-1-a (V)
B-110-0-13	SS-2	3.5	47	54	36	18		3	2	14	36	81	45	LIGHT GRAY ELASTIC CLAY, LITTLE SAND, TRACE STONE FRAGS (FILL)	A-7-5 (14)
B-110-0-13	SS-3	6.0	29	39	22	17		0	3	18	42	79	37	DARK BROWN SILTY CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6b (11)
B-110-0-13	SS-4	8.5	28											BROWN SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-6b (V)
B-110-0-13	SS-5	12.8												GRAY DOLOMITE BEDROCK	Rock (V)
B-115-0-13	SS-1	1.0	11											BROWN SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS (FILL)	A-4a (V)
B-115-0-13	SS-2	3.5	15											BROWN, NON-PLASTIC SANDY SILT, TRACE STONE FRAGMENTS & ROOTS	A-4a (V)
B-115-0-13	ST-3	5.0	20	32	19	13		2	1	10	45	87	42	BROWN SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-6a (9)
B-115-0-13	SS-4	8.5	21											GRAY, NON-PLASTIC SILT, TRACE SAND	A-4b (V)
B-115-0-13	SS-5	11.0												NO RECOVERY	Rock (V)
B-117-0-13	SS-1	1.0	7											DARK BROWN SANDY SILT, SOME CLAY, SOME STONE FRAGMENTS (FILL)	A-4a (V)
B-117-0-13	SS-2	3.5	17											BROWN AND DARK BROWN SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGS (FILL)	A-6a (V)
B-117-0-13	SS-3	6.0	15											BROWN SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS (FILL)	A-4a (V)
B-117-0-13	SS-4	8.5	15											GRAY, NON-PLASTIC SILT, TRACE SAND (FILL)	A-4b (V)
B-117-0-13	SS-5	11.0	14											BROWN SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (V)
B-117-0-13	SS-6	13.5	18											BROWN SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (V)
B-117-0-13	SS-7	16.0	15											BROWN SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (V)
B-117-0-13	SS-8	18.5	16											BROWN SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (V)
B-117-0-13	SS-9	21.0	17											BROWN SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-6b (V)
B-117-0-13	SS-10	23.5	19	46	25	21		0	2	16	36	82	46	DARK BROWN CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-7-6 (14)
B-117-0-13	ST-11	28.0	16											MOTTLED GRAY AND BROWN CLAY, LITTLE SAND	A-7-6 (V)



Pro Geotech, Inc.

TR.-TRACE, BR.-BROWN, LI.-LITTLE, S/F-STONE FRAGMENTS, SO.-SOME, RB-ROADBASE, NP-NON-PLASTIC, POSS-POSSIBLE, MOD-MODERATELY

Summary of Laboratory Results

Client: PARSONS BRINKERHOFF
 Project: HAN-75-14.39
 Location: HANCOCK COUNTY, OHIO
 PID Number: 87005

PRO US LAB ODOT SUMMARY ODOT-OH.DOT.GDT-6/2/14 08:06:14 C:\EDC01\PUBLIC\PROJECT FILES\13 PROJECTS\IG HAN-75\LAB DATA SHEETS\HAN-75 RAMPS.GPJ

Boring Number	Sample Number	Depth (ft)	Water Content %	Liquid Limit %	Plastic Limit %	Plast. Index	Specific Gravity	Agg. %	Coarse Sand %	Fine Sand %	Silt %	Silt & Clay Comb. %	Clay %	Soil Description	Class. Symbol
B-117-0-13	SS-12	33.5												NO RECOVERY	
B-117-0-13	SS-13	36.0	20	44	21	23		0	2	9	30	89	59	MOTTLED GRAY AND BROWN CLAY, LITTLE SAND	A-7-6 (14)
B-117-0-13	SS-14	38.5	21											BROWN, NON-PLASTIC SANDY SILT, TRACE SAND	A-4a (V)
B-117-0-13	SS-15	43.5	20											BROWN, NON-PLASTIC SANDY SILT, TRACE SAND	
B-119-0-13	SS-1	2.0	5											GRAY STONE FRAGMENTS, LITTLE SAND	A-1-a (V)
B-119-0-13	SS-2	3.5	75	64	55	9		1	0	1	28	98	70	LIGHT GRAY ELASTIC SILT AND CLAY, TRACE SAND (FILL)	A-5 (12)
B-119-0-13	SS-3	6.0	42											DARK BROWN AND LIGHT GRAY ELASTIC SILT AND CLAY, TR SAND (FILL)	A-5 (V)
B-119-0-13	ST-4	8.5	20	35	21	14		2	4	19	27	75	48	DARK BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS	A-6a (10)
B-119-0-13	SS-5	11.5												GRAY DOLOMITE BEDROCK	Rock (V)
B-120-0-13	SS-1	1.5	42											LIGHT GRAY ELASTIC CLAY, TRACE SAND (FILL)	A-7-5 (V)
B-120-0-13	SS-2	3.0	52											LIGHT GRAY ELASTIC CLAY, TRACE SAND (FILL)	A-7-5 (V)
B-120-0-13	SS-3	5.5	50	58	35	23		1	0	7	43	92	49	LIGHT GRAY AND BLACK ELASTIC CLAY, TRACE SAND (FILL)	A-7-5 (17)
B-120-0-13	SS-4	8.0	22											BROWN SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-6b (V)
B-120-0-13	SS-5	10.5												NO RECOVERY	Rock (V)
B-120-0-13	SS-6	13.0	19											GRAY DOLOMITE BEDROCK	Rock (V)
B-121-0-13	SS-1	1.0	15											DARK BROWN SILT AND CLAY, LITTLE SAND, TRACE STONE FRAG & ROOT (FILL)	A-6a (V)
B-121-0-13	SS-2	3.5	21											DARK BROWN SILTY CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6b (V)
B-121-0-13	ST-3	6.0	18	31	19	12		2	6	15	39	77	38	BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS	A-6a (9)
B-121-0-13	SS-4	8.5	16											BROWN SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS	A-4a (V)
B-121-0-13	SS-5	11.0	14											GRAY SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS	A-4a (V)
B-121-0-13	SS-6	13.5												GRAY DOLOMITE FRAGMENTS, TRACE SAND	A-1-a (V)
B-122-0-13	SS-1	1.0	18	40	19	21		0	4	17	35	79	44	MOTTLED BROWN AND GRAY SILTY CLAY, SOME SAND	A-6b (12)
B-122-0-13	SS-2	3.5	17											BROWN AND GRAY SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-6a (V)
B-122-0-13	SS-3	6.0	19											GRAY SILT, SOME CLAY, TRACE SAND	A-4b (V)
B-122-0-13	SS-4A	8.5	11											BROWN SANDY SILT, SOME CLAY, LITTLE STONE FRAGMENTS	A-4a (V)
B-122-0-13	SS-4B	9.0												GRAY DOLOMITE BEDROCK	A-1-a (V)
B-122-0-13	SS-5	11.0												NO SPOON PENETRATION	
B-123-0-13	SS-1	1.0	22											MOTTLED BROWN AND GRAY SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-6b (V)
B-123-0-13	SS-2	3.5	15											BROWN SANDY SILT, SOME CLAY, LITTLE STONE FRAGMENTS	A-4a (V)



Pro Geotech, Inc.

TR.-TRACE, BR.-BROWN, LI.-LITTLE, S/F-STONE FRAGMENTS, SO.-SOME, RB-ROADBASE, NP-NON-PLASTIC, POSS-POSSIBLE, MOD-MODERATELY

Summary of Laboratory Results

Client: PARSONS BRINKERHOFF
 Project: HAN-75-14.39
 Location: HANCOCK COUNTY, OHIO
 PID Number: 87005

PRO US LAB ODOT SUMMARY ODOT OH DOT GDT 6/21/14 08:06:11 C:\EDC01\PUBLIC\PROJECT FILES\13 PROJECTS\IG HAN-75\LAB DATA SHEETS\HAN-75 RAMPS.GPJ

Boring Number	Sample Number	Depth (ft)	Water Content %	Liquid Limit %	Plastic Limit %	Plast. Index	Specific Gravity	Agg. %	Coarse Sand %	Fine Sand %	Silt %	Silt & Clay Comb. %	Clay %	Soil Description	Class. Symbol
B-123-0-13	SS-3	6.0	18	NP	NP	NP		1	2	8	60	89	29	GRAY NON-PLASTIC SILT, TRACE SAND, TRACE STONE FRAGMENTS	A-4b (8)
B-123-0-13	SS-4	8.5	10											GRAY NON-PLASTIC SANDY SILT, LITTLE STONE FRAGMENTS	A-4a (V)
B-123-0-13	SS-5	10.0												NO RECOVERY	Rock (V)
B-124-0-13	SS-1	1.0	24	41	23	18		0	2	21	39	77	38	MOTTLED BROWN AND GRAY CLAY, SOME SAND	A-7-6 (11)
B-124-0-13	SS-2	3.5	25											MOTTLED BROWN AND GRAY CLAY, SOME SAND	A-7-6 (V)
B-124-0-13	SS-3	6.0	19											GRAY SILT, SOME CLAY, LITTLE SAND	A-4b (V)
B-124-0-13	SS-4	8.5	9											GRAY DOLOMITE FRAGMENTS, TRACE SAND	A-1-a (V)
B-124-0-13	SS-5	10.5												NO SPOON PENETRATION	Rock (V)
B-125-0-13	SS-1	1.0												NO SPOON RECOVERY	A-4b (V)
B-125-0-13	ST-2	3.5	21											BROWN AND GRAY, NON-PLASTIC SILT, LITTLE SAND	A-4b (V)
B-125-0-13	SS-3	6.0	18	24	19	5		0	2	9	64	90	26	GRAY SILT, SOME CLAY, TRACE SAND	A-4b (8)
B-125-0-13	SS-4	8.5	8											GRAY NON-PLASTIC SANDY SILT, SOME STONE FRAGMENTS	A-4a (V)
B-125-0-13	SS-5	11.0	13											GRAY DOLOMITE BEDROCK	Rock (V)
B-132-0-13	SS-1	1.0	19	39	20	19		15	1	11	29	73	44	BROWN AND DARK BR. SILTY CLAY, LITTLE SAND & S/F, TRACE ROOTS	A-6b (11)
B-132-0-13	SS-2	3.5												NO RECOVERY	Rock (V)
B-136-0-13	SS-1	1.0	15											DARK BROWN SILT AND CLAY, LITTLE SAND, LITTLE STONE FRAGS (FILL)	A-6a (V)
B-136-0-13	SS-2	3.5	16											DARK BROWN SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGS (FILL)	A-6a (V)
B-136-0-13	SS-3	6.0	18	37	22	15		3	4	15	39	78	39	BLACK SILT AND CLAY, LITTLE SAND, TR. S/F, SLIGHTLY ORGANIC (FILL)	A-6a (10)
B-136-0-13	SS-4	8.5	18											BROWN SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (V)
B-136-0-13	ST-5	11.0	24											BROWN, MOTTLED GRAY SILTY CLAY, LITTLE SAND, TRACE STONE FRAGS	A-6b (V)
B-138-0-13	SS-1	1.5	16											DARK BROWN & GRAY SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGS (FILL)	A-6a (V)
B-138-0-13	SS-2	3.5	15											DARK BROWN & GRAY SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGS (FILL)	A-6a (V)
B-138-0-13	SS-3	6.0	19											MOTTLED BROWN AND GRAY SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-6b (V)
B-138-0-13	ST-4	7.5	22	37	19	18		3	3	14	36	80	44	MOTTLED BROWN AND GRAY SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-6b (11)
B-138-0-13	SS-5	9.0	18											BROWN SILTY CLAY WITH DOLOMITE FRAGMENTS	Rock (V)
B-140-0-13	SS-1	1.0	10											DARK BROWN SANDY SILT, SOME CLAY, TRACE STONE FRAGS & ROOTS (FILL)	A-4a (V)
B-140-0-13	SS-2	3.5	12											BROWN & DARK BROWN SANDY SILT, SOME CLAY, TRACE STONE FRAGS (FILL)	A-4a (V)
B-140-0-13	SS-3	5.5	13	28	18	10		5	7	17	38	71	33	DARK BROWN SANDY SILT, SOME CLAY, TRACE STONE FRAGS (FILL)	A-4a (7)
B-140-0-13	SS-4	8.5	16											BROWN AND GRAY SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGS (FILL)	A-6a (V)



Pro Geotech, Inc.

TR.-TRACE, BR.-BROWN, LI.-LITTLE, S/F-STONE FRAGMENTS, SO.-SOME, RB-ROADBASE, NP-NON-PLASTIC, POSS-POSSIBLE, MOD-MODERATELY

Summary of Laboratory Results

Client: PARSONS BRINKERHOFF
 Project: HAN-75-14.39
 Location: HANCOCK COUNTY, OHIO
 PID Number: 87005

PRO US LAB ODOT SUMMARY ODOT-OH-DOT-GDT-6/21/14 08:06:11 C:\EDOC\1\PUBLIC\PROJECT FILES\13 PROJECTS\IG HAN-75\LAB DATA SHEETS\HAN-75 RAMPS.GPJ

Boring Number	Sample Number	Depth (ft)	Water Content %	Liquid Limit %	Plastic Limit %	Plast. Index	Specific Gravity	Agg. %	Coarse Sand %	Fine Sand %	Silt %	Silt & Clay Comb. %	Clay %	Soil Description	Class. Symbol
B-141-0-13	SS-1	1.0	39											BROWN SILTY CLAY, TRACE SAND, TRACE STONE FRAGMENTS (FILL)	A-6b (V)
B-141-0-13	SS-2	3.5	47	37	17	20		1	0	1	56	98	42	BROWN SILTY CLAY, TRACE SAND, TRACE STONE FRAGMENTS (FILL)	A-6b (12)
B-141-0-13	SS-3	6.0	81											LIGHT GRAY ELASTIC CLAY, TRACE SAND (FILL)	A-7-5 (V)
B-141-0-13	SS-4	8.5	22	37	18	19		1	3	13	54	83	29	BROWN SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-6b (12)
B-141-0-13	SS-5	11.0	20											BROWN SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-6b (V)
B-141-0-13	SS-6	13.5												GRAY DOLOMITE BEDROCK	Rock (V)
B-143-0-13	SS-1	1.0	15	24	17	7		29	28	15	13	28	15	BROWN STONE FRAGMENTS WITH SAND AND SILT (FILL)	A-2-4 (0)
B-143-0-13	SS-2	3.5	20											GREENISH BROWN SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-6b (V)
B-143-0-13	SS-3	6.0	11											BROWN STONE FRAGMENTS WITH WOOD PIECES (FILL)	A-2-4 (V)
B-143-0-13	SS-4	8.5	4											GRAY DOLOMITE BEDROCK	Rock (V)
B-144-0-13	SS-1	1.0	79	75	59	16		0	0	3	48	97	49	LIGHT GRAY ELASTIC CLAY, TRACE SAND (FILL)	A-7-5 (14)
B-144-0-13	SS-2	3.5	37											BROWN, NON-PLASTIC SILT, TRACE SAND	A-4b (V)
B-144-0-13	SS-3	6.0												GRAY DOLOMITE BEDROCK	Rock (V)
B-145-0-13	SS-1	1.5	16	30	18	12		6	5	14	35	75	40	BROWN SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS AND ROOTS	A-6a (9)
B-145-0-13	SS-2	3.5												GRAY DOLOMITE BEDROCK	Rock (V)
B-146-0-13	SS-1	1.0	16	34	16	18		0	6	16	36	78	42	BROWN SILTY CLAY, SOME SAND (FILL)	A-6b (11)
B-146-0-13	SS-2	3.5												NO RECOVERY, POSSIBLE BEDROCK	Rock (V)
B-147-0-13	SS-1	1.0	20	23	15	8		7	8	20	31	65	34	BROWN SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS	A-4a (6)
B-148-0-13	SS-1	1.0	18											BROWN SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (V)
B-148-0-13	SS-2	3.5	21	42	18	24		2	4	17	31	77	46	BROWN CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-7-6 (14)
B-149-0-13	SS-1	1.0	10											BROWN AND GRAY SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS (FILL)	A-4a (V)
B-149-0-13	SS-2	3.5	20	48	22	26		1	3	16	29	80	51	BROWN CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-7-6 (16)
B-150-0-13	SS-1	2.0	10	25	22	3		29	32	14	16	25	9	BROWN STONE FRAGMENTS WITH SAND, SOME FINES (FILL)	A-1-b (0)
B-150-0-13	SS-2	3.5	13	30	17	13		17	11	14	32	58	26	DARK BROWN SILT AND CLAY, SOME SAND, LITTLE STONE FRAGMENTS (FILL)	A-6a (6)
B-150-0-13	SS-3	5.0	13											BROWN SILT AND CLAY, SOME SAND, LITTLE STONE FRAGMENTS (FILL)	A-6a (V)
B-150-0-13	SS-4	6.5	17											BLACK SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (V)
B-150-0-13	SS-5	8.0	16											DARK BROWN SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (V)
B-150-0-13	SS-6	9.5												GRAY DOLOMITE BEDROCK	Rock (V)
B-151-0-13	SS-1	1.5	12											BROWN, SANDY SILT, SOME CLAY, LITTLE STONE FRAGMENTS (FILL)	A-4a (V)



Pro Geotech, Inc.

TR.-TRACE, BR.-BROWN, LI.-LITTLE, S/F-STONE FRAGMENTS, SO.-SOME, RB-ROADBASE, NP-NON-PLASTIC, POSS-POSSIBLE, MOD-MODERATELY

Summary of Laboratory Results

Client: PARSONS BRINKERHOFF
 Project: HAN-75-14.39
 Location: HANCOCK COUNTY, OHIO
 PID Number: 87005

PRO US LAB ODOT SUMMARY ODOT-OH.DOT.GDT-6/21/14 08:06:14 ICLIED001PUBLIC\PROJECT FILES\13 PROJECTS\IG HAN-75\LAB DATA SHEETS\HAN-75 RAMPS.GPJ

Boring Number	Sample Number	Depth (ft)	Water Content %	Liquid Limit %	Plastic Limit %	Plast. Index	Specific Gravity	Agg. %	Coarse Sand %	Fine Sand %	Silt %	Silt & Clay Comb. %	Clay %	Soil Description	Class. Symbol
B-151-0-13	SS-2	3.5	14											DARK BROWN & BROWN SANDY SILT, SOME CLAY, TRACE STONE FRAGS (FILL)	A-4a (V)
B-151-0-13	SS-3	6.0	14											BROWN SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS (FILL)	A-4a (V)
B-151-0-13	SS-4	8.5	16	33	20	13		4	6	17	36	73	37	BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (9)
B-152-0-13	SS-1	1.5	13	NP	NP	NP		20	34	27	15	19	4	BROWN, GRAVEL AND STONE FRAGMENTS WITH SAND, LITTLE FINES (FILL)	A-1-b (0)
B-152-0-13	SS-2	3.0	13											BROWN, NON-PLASTIC SANDY SILT, LITTLE STONE FRAGMENTS (FILL)	A-4a (V)
B-152-0-13	SS-3	4.5	13											BROWN, NON-PLASTIC SANDY SILT, LITTLE STONE FRAGMENTS (FILL)	A-4a (V)
B-153-0-13	SS-1	1.5	14											BROWN SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS (FILL)	A-4a (V)
B-153-0-13	SS-2	3.0	10											BROWN SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS (FILL)	A-4a (V)
B-153-0-13	SS-3	4.5	19											BROWN SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (V)
B-153-0-13	SS-4	6.0	10											BROWN SILT AND CLAY, LITTLE SAND, LITTLE STONE FRAGMENTS (FILL)	A-6a (V)
B-153-0-13	SS-5	7.5	15	29	18	11		7	5	18	38	70	32	BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (7)
B-153-0-13	SS-6	9.0	17											DARK BROWN SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGS (FILL)	A-6a (V)
B-154-0-13	SS-1	1.0	56	66	47	19		3	2	3	48	92	44	GRAY ELASTIC CLAY, TRACE SAND, TRACE STONE FRAGMENTS (FILL)	A-7-5 (16)
B-154-0-13	SS-2	3.5	65											GRAY ELASTIC CLAY, TRACE SAND, TRACE STONE FRAGMENTS (FILL)	A-7-5 (V)
B-154-0-13	SS-3	6.0	24											MOTTLED BROWN AND GRAY SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-6b (V)
B-155-0-13	SS-1	1.0	67											LIGHT GRAY ELASTIC CLAY, TRACE SAND (FILL)	A-7-5 (V)
B-155-0-13	SS-2	3.5	25											DARK BROWN CLAY, LITTLE SAND TRACE STONE FRAGMENTS (FILL)	A-7-6 (V)
B-155-0-13	ST-3	6.0	26	41	24	17		10	2	13	31	75	44	DARK BROWN CLAY, LITTLE SAND TRACE STONE FRAGMENTS (FILL)	A-7-6 (11)
B-155-0-13	SS-4	8.0												NO RECOVERY	Rock (V)
B-156-0-13	SS-1	1.0	14											BROWN AND GRAY, SANDY SILT, SOME CLAY, LITTLE STONE FRAGMENTS (FILL)	A-4a (V)
B-156-0-13	SS-2	3.5	18											DARK BROWN SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-6b (V)
B-156-0-13	SS-3	6.0	10	47	25	22		1	2	15	40	82	42	BLACK CLAY, LITTLE SAND, TRACE STONE FRAGS (FILL)	A-7-6 (14)
B-156-0-13	SS-4	8.5	13											DARK BROWN SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (V)
B-157-0-13	SS-1	2.0	12											BROWN SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS (FILL)	A-4a (V)
B-157-0-13	SS-2	3.5	15											DARK BROWN SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (V)
B-157-0-13	SS-3	6.0	15	29	18	11		4	6	15	42	75	33	BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (8)
B-157-0-13	SS-4	8.5	11											BROWN AND GRAY SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS (FILL)	A-4a (V)
B-157-0-13	SS-5	11.0	14											BROWN SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS (FILL)	A-4a (V)
B-157-0-13	SS-6	13.5	12											BROWN AND GRAY SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS (FILL)	A-4a (V)



Pro Geotech, Inc.

TR.-TRACE, BR.-BROWN, LI.-LITTLE, S/F-STONE FRAGMENTS, SO.-SOME, RB-ROADBASE, NP-NON-PLASTIC, POSS-POSSIBLE, MOD-MODERATELY

Summary of Laboratory Results

Client: PARSONS BRINKERHOFF
 Project: HAN-75-14.39
 Location: HANCOCK COUNTY, OHIO
 PID Number: 87005

PRO US LAB ODOT SUMMARY ODOT-OH.DOT.GDT-6/2/14 08:06-1CLED001PUBLICPROJECTFILES\3 PROJECTS\IG HAN-75\LAB DATA SHEETS\HAN-75 RAMPS.GPJ

Boring Number	Sample Number	Depth (ft)	Water Content %	Liquid Limit %	Plastic Limit %	Plast. Index	Specific Gravity	Agg. %	Coarse Sand %	Fine Sand %	Silt %	Silt & Clay Comb. %	Clay %	Soil Description	Class. Symbol
B-157-0-13	SS-7	16.0	15											BROWN AND GRAY SANDY SILT, SOME CLAY, TRACE STONE FRAGMENTS (FILL)	A-4a (V)
B-157-0-13	ST-8	18.0	28											BLACK CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-7-6 (V)
B-157-0-13	SS-9	19.5												NO RECOVERY	
B-158-0-13	SS-1	1.0	13	41	19	22		6	6	18	29	70	41	BROWN CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-7-6 (12)
B-158-0-13	AS-2	2.5	1											GRAY STONE FRAGMENTS	A-1-a (V)
B-158-0-13	SS-3	3.5	28											DARK BROWN CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-7-6 (V)
B-158-0-13	SS-4A	6.0	89	71	62	9		0	0	1	35	98	63	LIGHT GRAY ELASTIC SILT AND CLAY, TRACE SAND (FILL)	A-5 (12)
B-158-0-13	SS-4B	7.2	28											BROWN CLAY, LITTLE SAND	A-7-6 (V)
B-158-0-13	SS-5	8.5	24											GRAY SILTY CLAY, LITTLE SAND	A-6b (V)
B-159-0-13	SS-1	1.0	36	38	25	13		5	3	7	43	85	42	BROWN SILT AND CLAY, TRACE SAND, TR. STONE FRAGS, TRACE ROOTS (FILL)	A-6a (9)
B-159-0-13	SS-2	3.5	20	35	18	17		14	6	14	34	66	32	BROWN SILTY CLAY, LITTLE SAND, LITTLE STONE FRAGMENTS & ROOTS	A-6b (9)
B-159-0-13	SS-3	6.0	18											BROWN SILT, SOME CLAY, LITTLE SAND	A-4b (V)
B-159-0-13	SS-4	8.5												GRAY DOLOMITE BEDROCK	Rock (V)
B-160-0-13	SS-1	1.0	21	43	22	21		3	4	18	40	75	35	DARK BROWN CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-7-6 (13)
B-160-0-13	SS-2	3.5	27											DARK BROWN CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-7-6 (V)
B-160-0-13	SS-3	6.0	18	37	18	19		4	4	16	33	76	43	BROWN SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-6b (12)
B-160-0-13	SS-4	8.5	20											BROWN SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-6a (V)
B-161-0-13	SS-1	1.0	12											GRAY SLAG	A-1-a (V)
B-161-0-13	SS-2	3.5	19	28	16	12		5	6	16	34	73	39	DARK BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL)	A-6a (8)
B-161-0-13	SS-3	6.0	14											BROWN SANDY SILT, SOME CLAY, SOME STONE FRAGS, TRACE ROOTS	A-4a (V)
B-161-0-13	AS-4	7.0	3											GRAY DOLOMITE BEDROCK	Rock (V)



TR.-TRACE, BR.-BROWN, LI.-LITTLE, S/F-STONE FRAGMENTS, SO.-SOME, RB-ROADBASE, NP-NON-PLASTIC, POSS-POSSIBLE, MOD-MODERATELY

Summary of Laboratory Results

Client: PARSONS BRINKERHOFF
 Project: HAN-75-14.39
 Location: HANCOCK COUNTY, OHIO
 PID Number: 87005

PRO US LAB ODOT SUMMARY ODOT-OH DOT.GDT-8/1/15 18:03:10 CLEDC01PUBLICPROJECT FILES\15 PROJECTS\G15004G-MOD-3 FOR HAN-75-14.39\LAB DATA SHEETS\G15004G.GPJ

Boring Number	Sample Number	Depth (ft)	Water Content %	Liquid Limit %	Plastic Limit %	Plast. Index	Specific Gravity	Agg. %	Coarse Sand %	Fine Sand %	Silt %	Silt & Clay Comb. %	Clay %	Soil Description	Class. Symbol
B-070-0-14	SS-1A	1.2	8	NP	NP	NP		33	29	16	17	22	5	GRAY AND BROWN STONE FRAGMENTS WITH SAND (ROADBASE)	A-1-b (0)
B-070-0-14	SS-1B	1.8	16	40	33	7		42	20	15	15	23	8	BROWN STONE FRAGMENTS WITH SAND AND SILT, TRACE CLAY (FILL)	A-2-4 (0)
B-070-0-14	SS-2	2.7	15	35	19	16		3	5	11	33	81	48	BROWN SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-6b (10)
B-070-0-14	SS-3	4.2	19											BROWN SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-6b (V)
B-070-0-14	SS-4	5.7	16											BROWN AND GRAY SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-6b (V)
B-073-0-14	SS-1A	1.3	7	NP	NP	NP		59	22	10	6	9	3	LIGHT BROWN STONE FRAGMENTS, SOME SAND (ROADBASE)	A-1-a (0)
B-073-0-14	SS-1B	1.8	19	41	21	20		2	2	4	39	92	53	DARK BROWN CLAY, TRACE SAND, TRACE STONE FRAGMENTS (FILL)	A-7-6 (12)
B-073-0-14	SS-2	2.8	20	31	18	13		7	6	12	32	75	43	BROWN SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-6a (9)
B-073-0-14	SS-3	4.3	21											BROWN SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-6a (V)
B-073-0-14	SS-4	5.8	20											BROWN SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-6a (V)
B-076-0-14	SS-1	1.0	18	40	20	20		1	1	4	46	94	48	BROWN SILTY CLAY, TRACE SAND, TRACE STONE FRAGMENTS	A-6b (12)
B-076-0-14	SS-2A	4.0	15	36	17	19		4	2	3	43	91	48	BROWN SILTY CLAY, TRACE SAND, TRACE STONE FRAGMENTS	A-6b (12)
B-076-0-14	SS-2B	4.5	21											BROWN CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-7-6 (V)
B-076-0-14	SS-3	6.0	19											BROWN SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-6a (V)
B-076-0-14	SS-4	8.5	15											BROWN SILT AND CLAY, LITTLE SAND, TRACE STONE FRAGMENTS	A-6a (V)

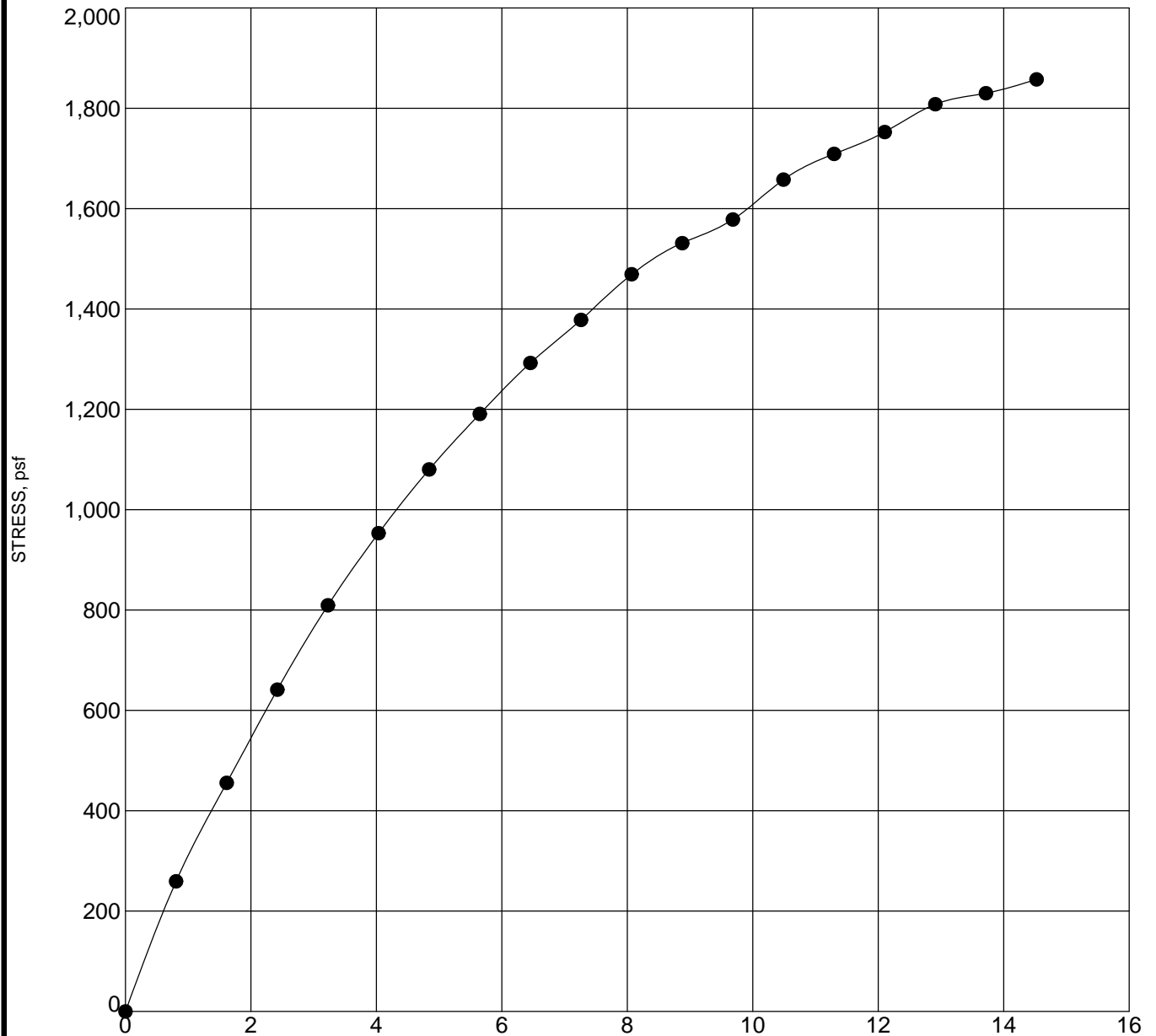


TR.-TRACE, BR.-BROWN, LI.-LITTLE, S/F-STONE FRAGMENTS, SO.-SOME, RB-ROADBASE, NP-NON-PLASTIC, POSS-POSSIBLE, MOD-MODERATELY

Summary of Laboratory Results

Client: PARSONS BRINCKERHOFF
 Project: HAN-75-14.39 (2015 Exploration)
 Location: FINDLAY, OH
 PID Number: 87005

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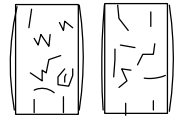


BORING NO: B-027-2-13

SAMPLE DEPTH: 3.5 ft

SAMPLE NO.: ST-2

FAILURE SKETCH:



TEST RESULT SUMMARY

AVERAGE DIAMETER: 2.855"

AVERAGE HEIGHT: 6.198"

HEIGHT TO DIAMETER RATIO: 2.17

WET DENSITY: 132 psf

MOISTURE CONTENT: 18.4 %

DRY DENSITY: 111 psf

LIQUID LIMIT: 31%

PLASTIC LIMIT: 19%

PLASTICITY INDEX: 12%

CLASSIFICATION: BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL) **AVE. RATE OF STRAIN:** 0.875 %/Min.

UNCONFINED COMPRESSIVE STRENGTH: 1858psf

STRAIN AT FAILURE: 14.52%



Pro Geotech, Inc.

UNCONFINED COMPRESSION TEST

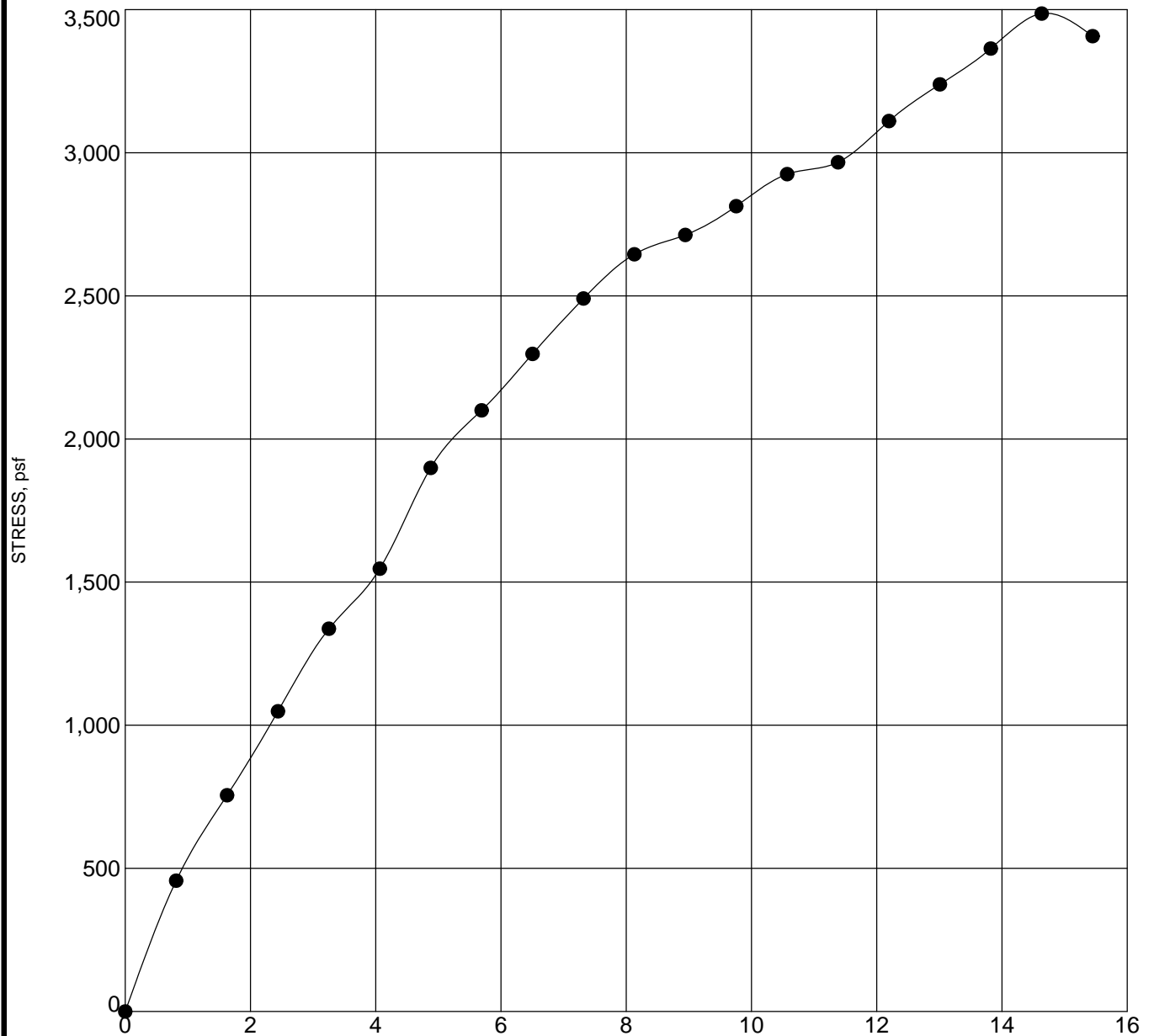
Client: PARSONS BRINKERHOFF

Project: HAN-75-14.39 - IR-75 WIDENING

Location: FINDLAY, HANCOCK COUNTY, OHIO

PID NO.: 87005

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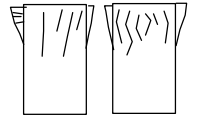


BORING NO: B-047-1-13

SAMPLE DEPTH: 6.0 ft

SAMPLE NO.: ST-3

FAILURE SKETCH:



TEST RESULT SUMMARY

AVERAGE DIAMETER: 2.815" **AVERAGE HEIGHT:** 6.150" **HEIGHT TO DIAMETER RATIO:** 2.18

WET DENSITY: 124 psf **MOISTURE CONTENT:** 27.2% **DRY DENSITY:** 98 psf

LIQUID LIMIT: 28% **PLASTIC LIMIT:** 17% **PLASTICITY INDEX:** 11%

CLASSIFICATION: BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS (FILL) **AVE. RATE OF STRAIN:** 1.346 %/Min.

UNCONFINED COMPRESSIVE STRENGTH: 3486psf

STRAIN AT FAILURE: 14.63%

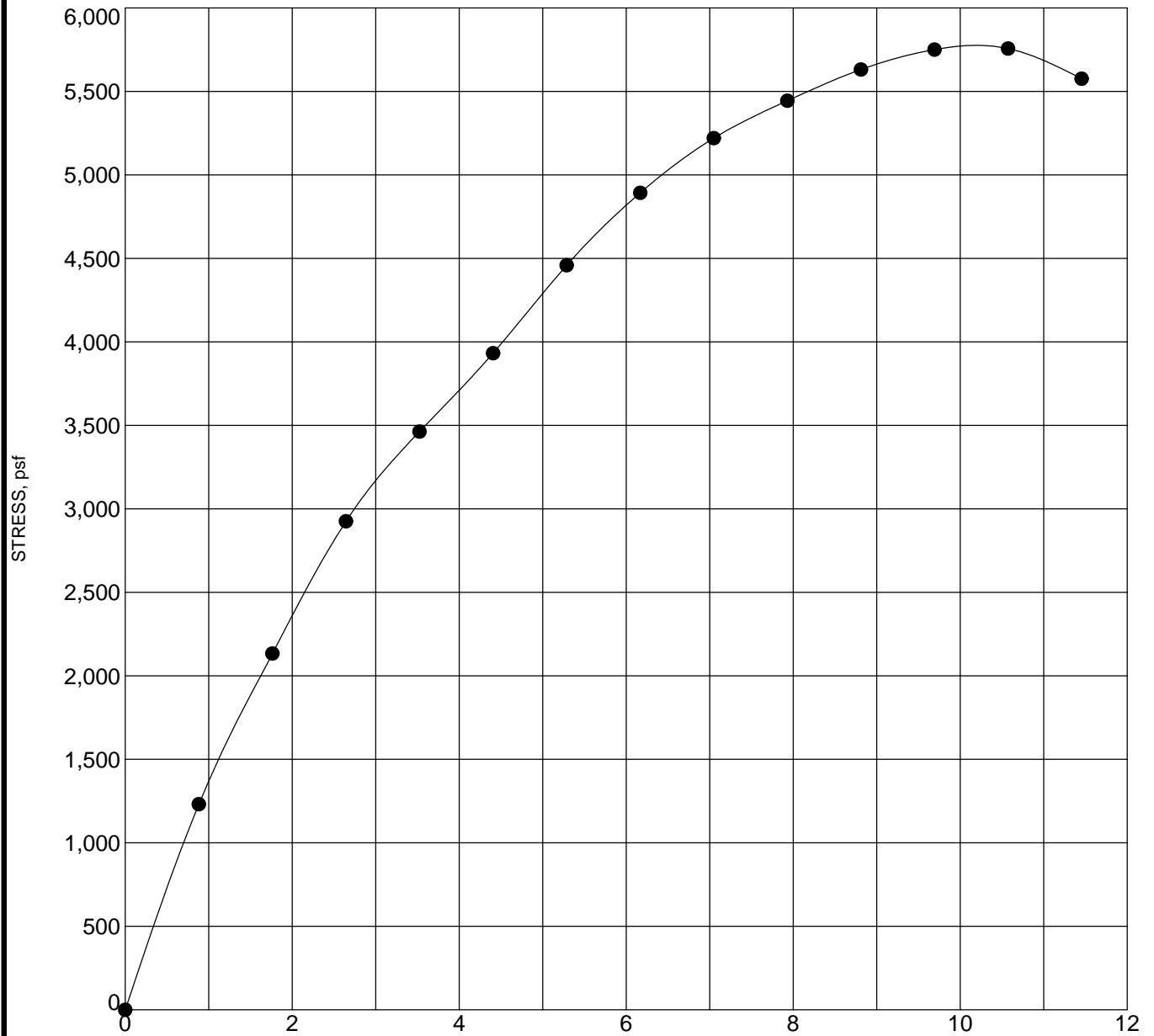


Pro Geotech, Inc.

UNCONFINED COMPRESSION TEST

Client: PARSONS BRINKERHOFF
 Project: HAN-75-14.39 - IR-75 WIDENING
 Location: FINDLAY, HANCOCK COUNTY, OHIO
 PID NO.: 87005

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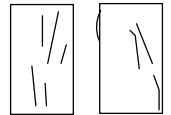


BORING NO: B-090-0-13

SAMPLE DEPTH: 12.5 ft

SAMPLE NO.: ST-6

FAILURE SKETCH:



TEST RESULT SUMMARY

AVERAGE DIAMETER: 2.860" **AVERAGE HEIGHT:** 5.675" **HEIGHT TO DIAMETER RATIO:** 1.98

WET DENSITY: 130 psf **MOISTURE CONTENT:** 19.5% **DRY DENSITY:** 109 psf

LIQUID LIMIT: 40% **PLASTIC LIMIT:** 19% **PLASTICITY INDEX:** 21%

CLASSIFICATION: BROWN SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS **AVE. RATE OF STRAIN:** 0.642 %/Min.

UNCONFINED COMPRESSIVE STRENGTH: 5757psf **STRAIN AT FAILURE:** 10.57%

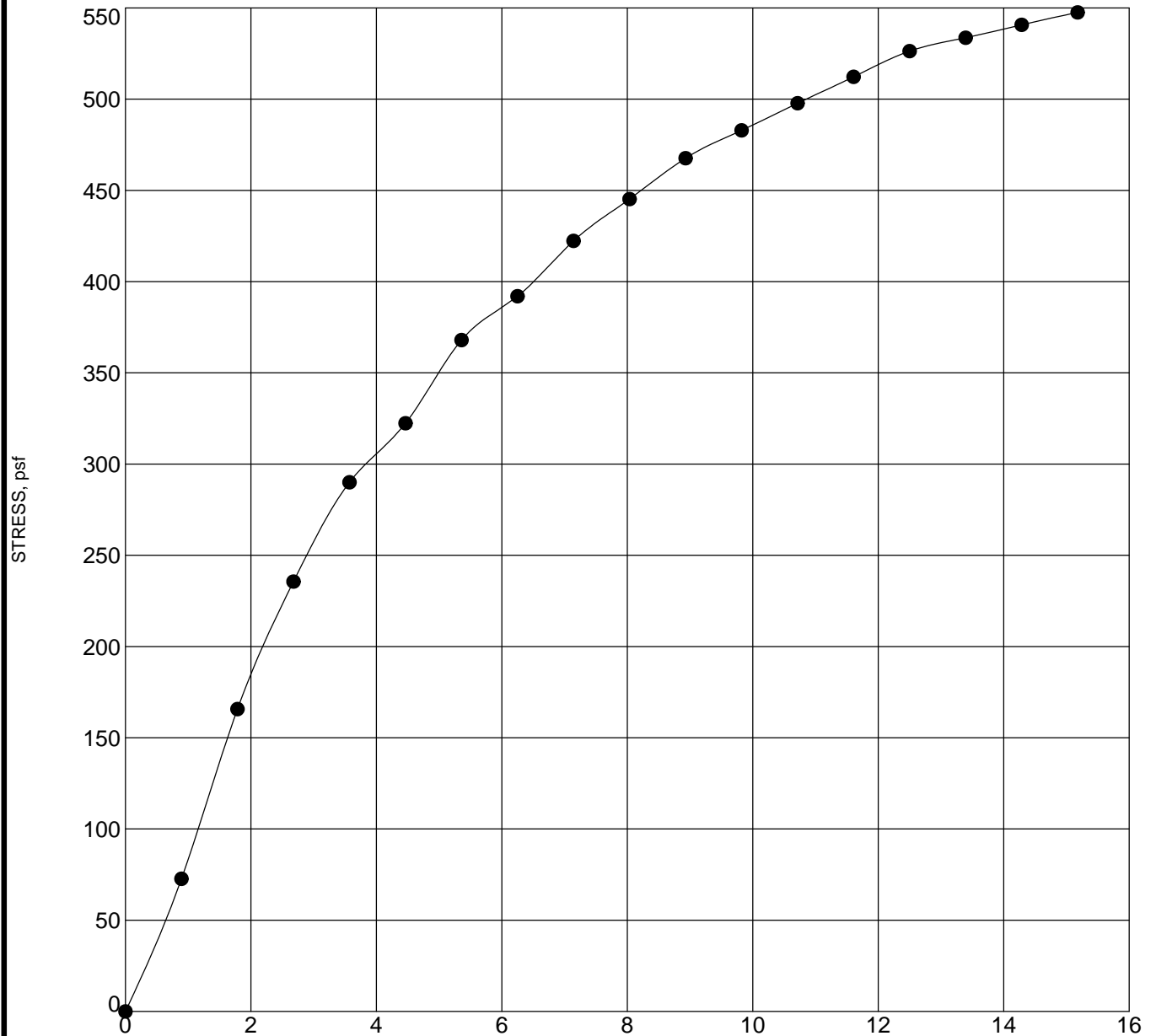


Pro Geotech, Inc.

UNCONFINED COMPRESSION TEST

Client: PARSONS BRINKERHOFF
 Project: HAN-75-14.39 - US 68 RAMP A
 Location: HANCOCK COUNTY, OHIO
 PID NO.: 87005

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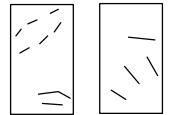


BORING NO: B-109-0-13

SAMPLE DEPTH: 5.5 ft

SAMPLE NO.: ST-3

FAILURE SKETCH:



TEST RESULT SUMMARY

AVERAGE DIAMETER: 2.880"

AVERAGE HEIGHT: 5.600"

HEIGHT TO DIAMETER RATIO: 1.94

WET DENSITY: 117 psf

MOISTURE CONTENT: 27.8 %

DRY DENSITY: 91 psf

LIQUID LIMIT: 64%

PLASTIC LIMIT: 46%

PLASTICITY INDEX: 18%

CLASSIFICATION: DARK GRAY, ELASTIC CLAY, TRACE SAND

AVE. RATE OF STRAIN: 0.858 %/Min.

UNCONFINED COMPRESSIVE STRENGTH: 546psf

STRAIN AT FAILURE: 15.00%

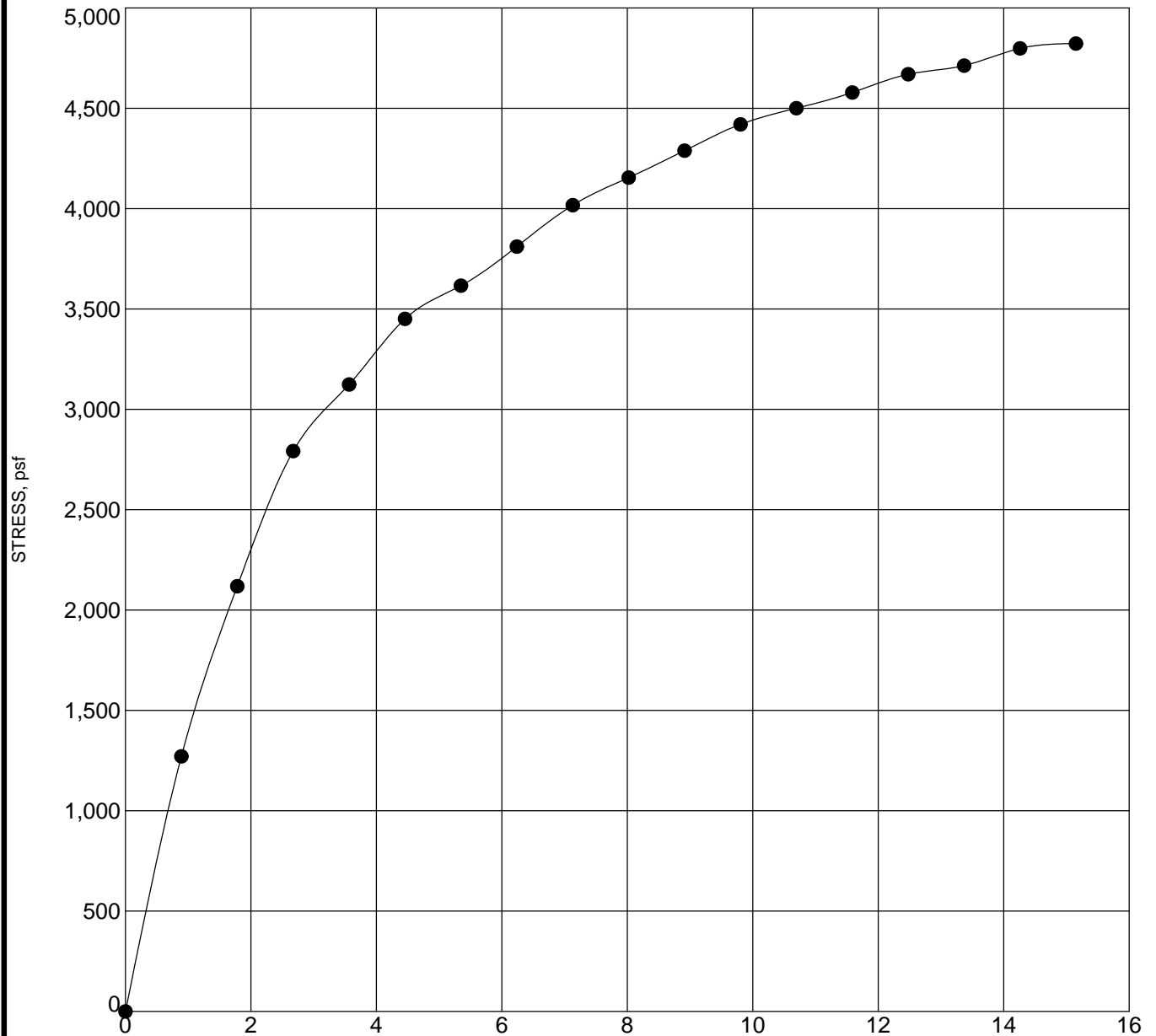


Pro Geotech, Inc.

UNCONFINED COMPRESSION TEST

Client: PARSONS BRINKERHOFF
 Project: HAN-75-14.39 - US 68 RAMP D
 Location: HANCOCK COUNTY, OHIO
 PID NO: 87005

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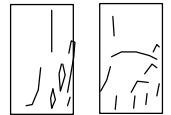


BORING NO: B-119-0-13

SAMPLE DEPTH: 8.5 ft

SAMPLE NO.: ST-4

FAILURE SKETCH:



TEST RESULT SUMMARY

AVERAGE DIAMETER: 2.865"

AVERAGE HEIGHT: 5.610"

HEIGHT TO DIAMETER RATIO: 1.96

WET DENSITY: 131 psf

MOISTURE CONTENT: 19.4 %

DRY DENSITY: 110 psf

LIQUID LIMIT: 35%

PLASTIC LIMIT: 21%

PLASTICITY INDEX: 14%

CLASSIFICATION: DARK BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS

AVE. RATE OF STRAIN: 0.865 %/Min.

UNCONFINED COMPRESSIVE STRENGTH: 4818psf

STRAIN AT FAILURE: 15.00%

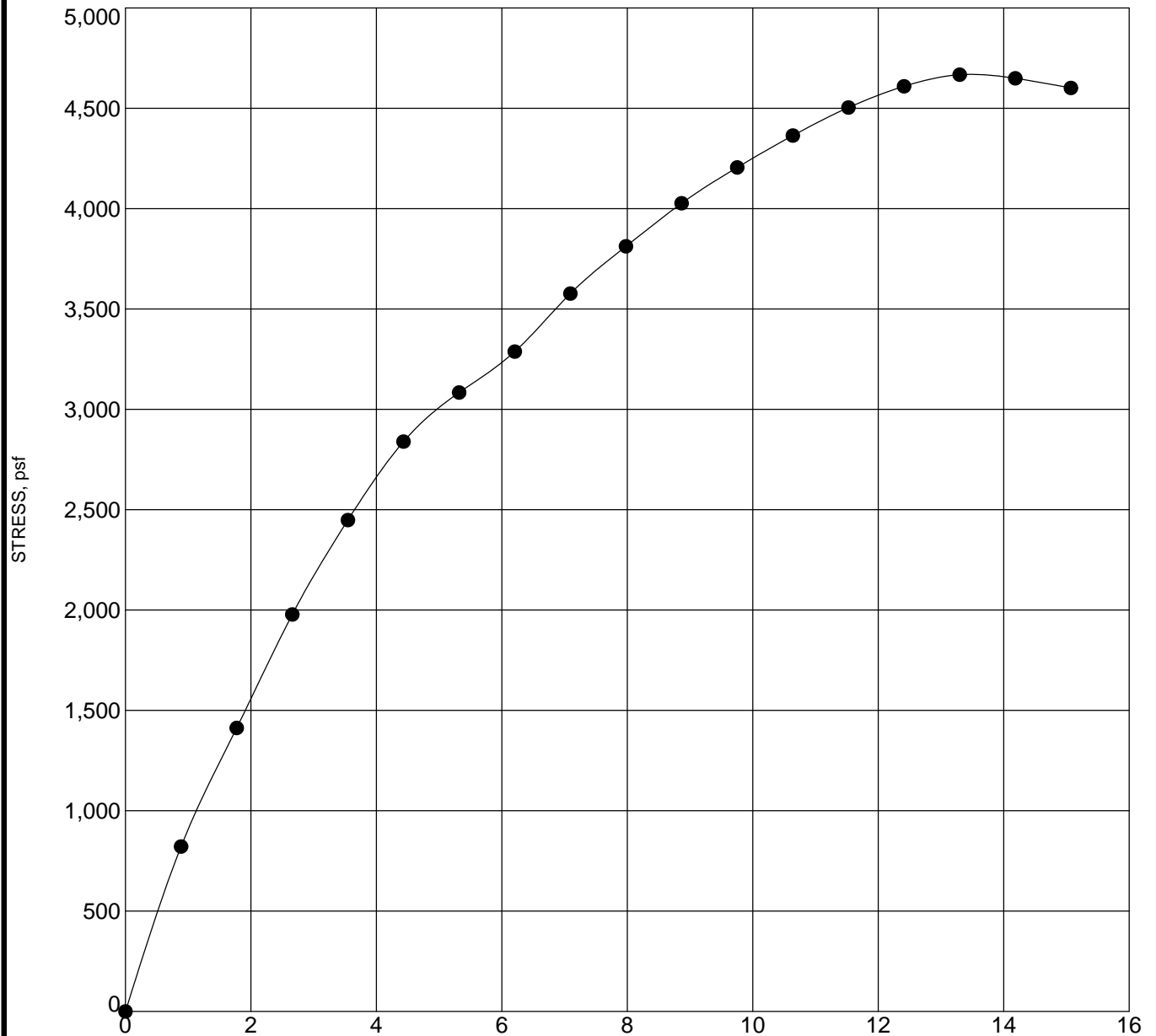


Pro Geotech, Inc.

UNCONFINED COMPRESSION TEST

Client: PARSONS BRINKERHOFF
 Project: HAN-75-14.39 - LIMA AVE. RAMP G
 Location: HANCOCK COUNTY, OHIO
 PID NO.: 87005

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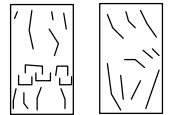


BORING NO.: B-121-0-13

SAMPLE DEPTH: 6.0 ft

SAMPLE NO.: ST-3

FAILURE SKETCH:



TEST RESULT SUMMARY

AVERAGE DIAMETER: 2.880"

AVERAGE HEIGHT: 5.640"

HEIGHT TO DIAMETER RATIO: 1.96

WET DENSITY: 137 psf

MOISTURE CONTENT: 13.6 %

DRY DENSITY: 121 psf

LIQUID LIMIT: 31%

PLASTIC LIMIT: 19%

PLASTICITY INDEX: 12%

CLASSIFICATION: BROWN SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS

AVE. RATE OF STRAIN: 0.848 %/Min.

UNCONFINED COMPRESSIVE STRENGTH: 4668psf

STRAIN AT FAILURE: 13.30%

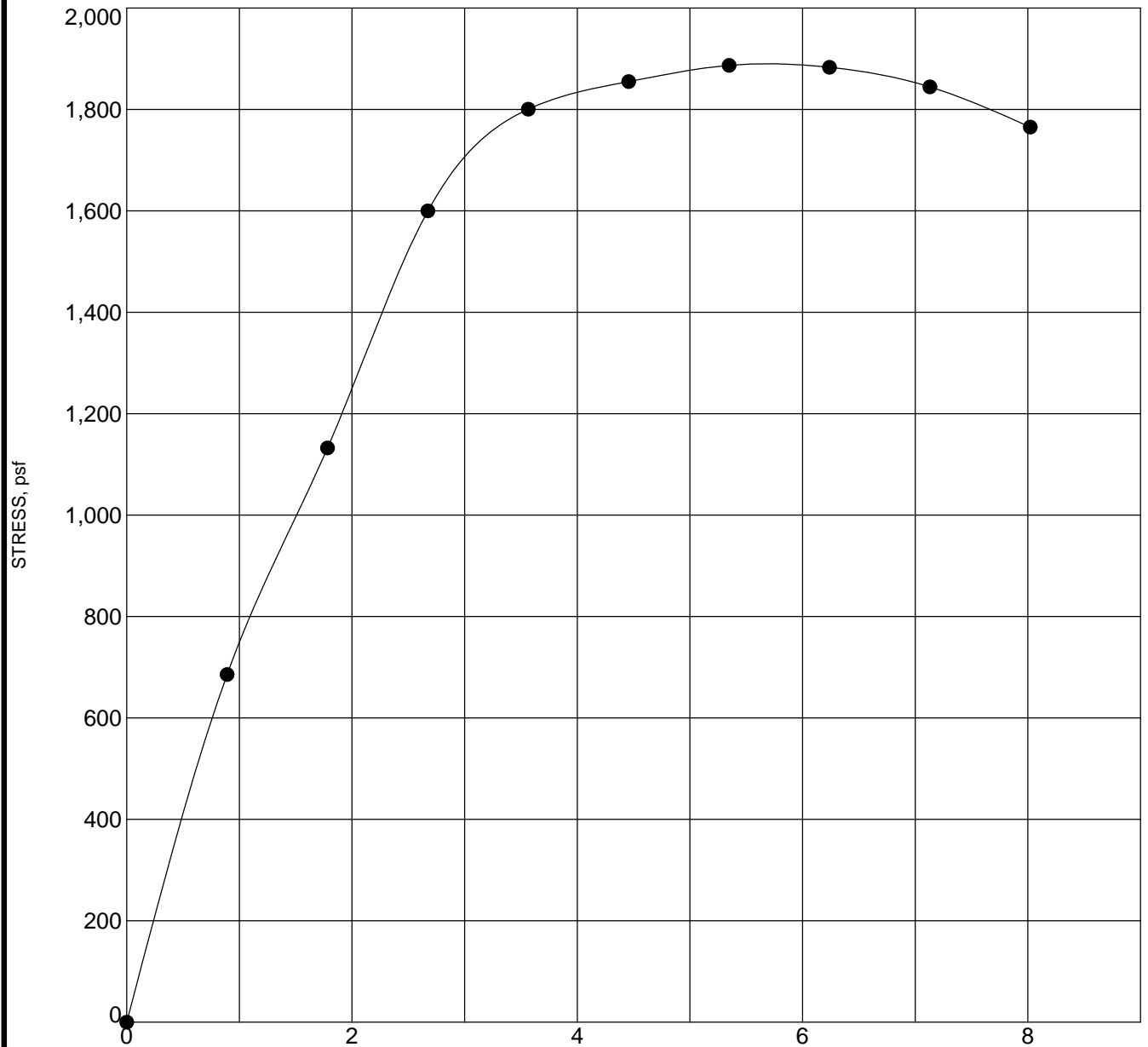


Pro Geotech, Inc.

UNCONFINED COMPRESSION TEST

Client: PARSONS BRINKERHOFF
 Project: HAN-75-14.39 - US 68 RAMP C
 Location: HANCOCK COUNTY, OHIO
 PID NO.: 87005

PRO. US. UNCONFINED1-PRIMEING.GDT-1/27/14 12:34:16\LED001\PUBLIC\PROJECT FILES\13 PROJECTS\G13011G HAN-75\LAB DATA SHEETS\HAN-75 RAMPS.GPJ

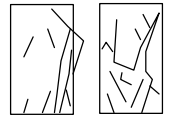


BORING NO: B-138-0-13

SAMPLE DEPTH: 7.5 ft

SAMPLE NO.: ST-4

FAILURE SKETCH:



TEST RESULT SUMMARY

AVERAGE DIAMETER: 2.860" **AVERAGE HEIGHT:** 5.610" **HEIGHT TO DIAMETER RATIO:** 1.96

WET DENSITY: 128 psf **MOISTURE CONTENT:** 19.0 % **DRY DENSITY:** 108 psf

LIQUID LIMIT: 37% **PLASTIC LIMIT:** 19% **PLASTICITY INDEX:** 18%

CLASSIFICATION: BOTTLED BROWN AND GRAY SILTY CLAY, LITTLE SAND, TRACE STONE FRAGMENTS **AVE. RATE OF STRAIN:** 0.764 %/Min.

UNCONFINED COMPRESSIVE STRENGTH: 1887psf

STRAIN AT FAILURE: 5.35%



Pro Geotech, Inc.

UNCONFINED COMPRESSION TEST

Client: PARSONS BRINKERHOFF
 Project: HAN-75-14.39 - US 68 RAMP C
 Location: HANCOCK COUNTY, OHIO
 PID NO: 87005

Shear Strength by Direct Shear (Small Shear Box)



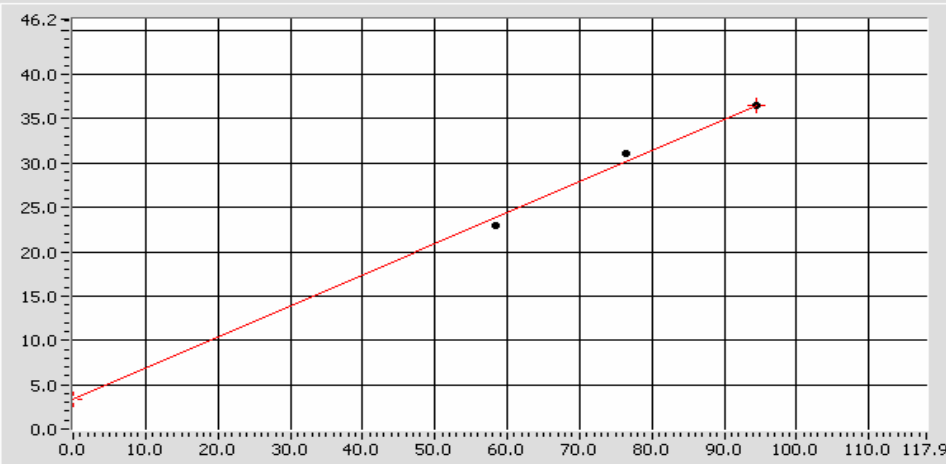
Client	Parsons Brinckerhoff	Lab Ref	
Project	HAN-75-14 39-IR-75 Widening	Job	G13011G
Borehole	B-27-2-13	Sample	ST-2

Test Details			
Standard	ASTM D3080-03 / AASHTO T236-92	Particle Specific Gravity	2.70
Sample Type	Thin walled push in sample	Single or Multi Stage	Single Stage
Lab. Temperature	72.0 degree F	Location	Hancock County, OH
Sample Description	Brown SILT AND CLAY, some sand, trace stone fragments		
Variations from procedure	None		

Test Summary				
Reference	B	C	D	
Normal Stress	58.41 psi	76.38 psi	94.35 psi	
Peak Strength	23.01 psi	31.15 psi	36.53 psi	
Corresponding Horizontal Displacement	0.2359 in	0.2358 in	0.1477 in	
Residual Stress	N/A	N/A	N/A	
Rate of Shear Displacement	Stage 1: 0.001170in/min	Stage 1: 0.001059in/min	Stage 1: 0.001066in/min	
Final Height	0.8001 in	0.8405 in	0.9041 in	
Sample Area	4.90870 in ²	4.90870 in ²	4.90870 in ²	
Initial Wet Unit Weight	119.86 lbf/ft ³	123.05 lbf/ft ³	127.66 lbf/ft ³	
Initial Dry Unit Weight	92.77 lbf/ft ³	98.25 lbf/ft ³	104.23 lbf/ft ³	
Final Wet Unit Weight	140.53 lbf/ft ³	142.12 lbf/ft ³	136.60 lbf/ft ³	
Final Dry Unit Weight	118.02 lbf/ft ³	118.07 lbf/ft ³	117.90 lbf/ft ³	
Final Moisture Content	19.1 %	20.4 %	15.8 %	
Particle Specific Gravity	2.70	2.70	2.70	
Final Void Ratio	0.4287	0.4281	0.4063	
Final Saturation	120.10%	128.48%	92.55%	

Maximum Shear Stress vs Normal Stress

Peak Shear Stress psi



Peak ●

Angle of Shear Resistance
19.38 Degrees

Cohesion
3.35 psi

Normal Stress psi

Shear Strength by Direct Shear (Small Shear Box)



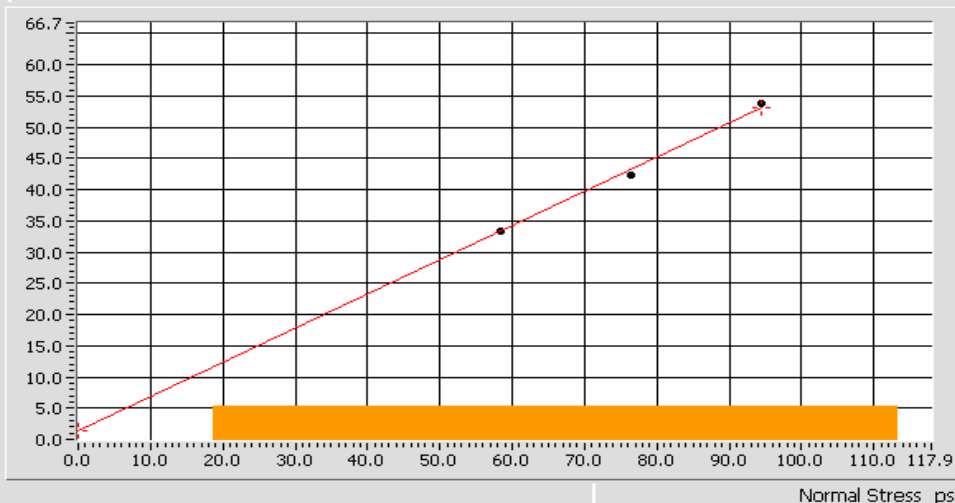
Client	Parsons Brinckerhoff	Lab Ref	
Project	HAN-75-14 39-IR-75 Widening	Job	G13011G
Borehole	B-049-1-13	Sample	ST-3

Test Details			
Standard	ASTM D3080-03 / AASHTO T236-92	Particle Specific Gravity	2.70
Sample Type	Thin walled push in sample	Single or Multi Stage	Single Stage
Lab. Temperature	72.0 degree F	Location	Hancock County, OH
Sample Description	Brown SILT AND CLAY, some sand, trace stone fragments		
Variations from procedure	None		

Test Summary				
Reference	A	B	C	
Normal Stress	58.41 psi	76.40 psi	94.35 psi	
Peak Strength	33.42 psi	42.37 psi	53.78 psi	
Corresponding Horizontal Displacement	0.2829 in	0.2357 in	0.2830 in	
Residual Stress	N/A	N/A	N/A	
Rate of Shear Displacement	Stage 1: 0.013593in/min	Stage 1: 0.007619in/min	Stage 1: 0.010215in/min	
Final Height	0.8344 in	0.8420 in	0.8095 in	
Sample Area	4.90870 in ²	4.90870 in ²	4.90870 in ²	
Initial Wet Unit Weight	112.31 lbf/ft ³	108.16 lbf/ft ³	106.49 lbf/ft ³	
Initial Dry Unit Weight	90.18 lbf/ft ³	86.12 lbf/ft ³	85.20 lbf/ft ³	
Final Wet Unit Weight	134.84 lbf/ft ³	128.86 lbf/ft ³	133.46 lbf/ft ³	
Final Dry Unit Weight	111.31 lbf/ft ³	105.35 lbf/ft ³	108.40 lbf/ft ³	
Final Moisture Content	21.1 %	22.3 %	23.1 %	
Particle Specific Gravity	2.70	2.70	2.70	
Final Void Ratio	0.5148	0.6006	0.5555	
Final Saturation	110.84%	100.35%	112.38%	

Maximum Shear Stress vs Normal Stress

Peak Shear Stress psi



Peak ●

Angle of Shear Resistance
 Degrees

Cohesion
 psi

Shear Strength by Direct Shear (Small Shear Box)



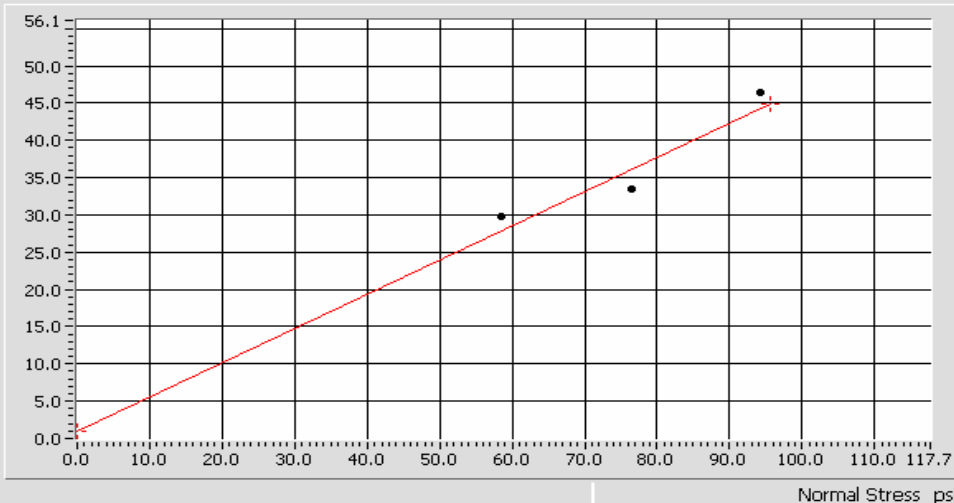
Client	Parsons Brinckerhoff	Lab Ref	
Project	HAN-75-14 39 – US 68 Ramp A	Job	G13011G
Borehole	B-090-0-13	Sample	ST-6

Test Details			
Standard	ASTM D3080-03 / AASHTO T236-92	Particle Specific Gravity	2.70
Sample Type	Thin walled push in sample	Single or Multi Stage	Single Stage
Lab. Temperature	72.0 deg.F	Location	Hancock County, OH
Sample Description	Brown SILTY CLAY, little sand, trace stone fragments		
Variations from procedure	None		

Test Summary				
Reference	B	C	D	
Normal Stress	58.41 psi	76.38 psi	94.15 psi	
Peak Strength	29.77 psi	33.46 psi	46.45 psi	
Corresponding Horizontal Displacement	0.3303 in	0.1887 in	0.2831 in	
Residual Stress	N/A	N/A	N/A	
Rate of Shear Displacement	Stage 1: 0.003168in/min	Stage 1: 0.021749in/min	Stage 1: 0.004512in/min	
Final Height	0.9353 in	0.9199 in	1.0257 in	
Sample Area	4.90870 in ²	4.90870 in ²	4.90870 in ²	
Initial Wet Unit Weight	127.96 lbf/ft ³	126.23 lbf/ft ³	115.21 lbf/ft ³	
Initial Dry Unit Weight	106.06 lbf/ft ³	104.04 lbf/ft ³	95.60 lbf/ft ³	
Final Wet Unit Weight	140.03 lbf/ft ³	139.69 lbf/ft ³	124.35 lbf/ft ³	
Final Dry Unit Weight	117.59 lbf/ft ³	117.06 lbf/ft ³	105.04 lbf/ft ³	
Final Moisture Content	19.1 %	19.3 %	18.4 %	
Particle Specific Gravity	2.70	2.70	2.70	
Final Void Ratio	0.4340	0.4405	0.6077	
Final Saturation	118.73%	118.52%	81.80%	

Maximum Shear Stress vs Normal Stress

Peak Shear Stress psi



Peak ●

Angle of Shear Resistance
 Degrees

Cohesion
 psi

Shear Strength by Direct Shear (Small Shear Box)



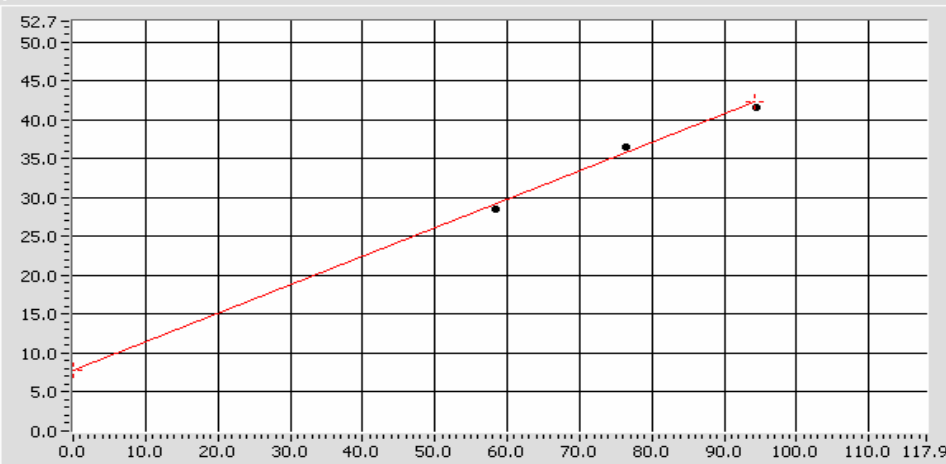
Client	Parsons Brinckerhoff	Lab Ref	
Project	HAN-75-14 39-Lima Ramp G	Job	G13011G
Borehole	B-119-0-13	Sample	ST-4

Test Details			
Standard	ASTM D3080-03 / AASHTO T236-92	Particle Specific Gravity	2.70
Sample Type	Thin walled push in sample	Single or Multi Stage	Single Stage
Lab. Temperature	72.0 degree F	Location	Hancock County, OH
Sample Description	Brown SILT AND CLAY, Some sand, trace stone fragments		
Variations from procedure	None		

Test Summary				
Reference	A	B	C	
Normal Stress	58.41 psi	76.38 psi	94.35 psi	
Peak Strength	28.59 psi	36.55 psi	41.71 psi	
Corresponding Horizontal Displacement	0.2357 in	0.2831 in	0.2831 in	
Residual Stress	N/A	N/A	N/A	
Rate of Shear Displacement	Stage 1: 0.003190in/min	Stage 1: 0.011234in/min	Stage 1: 0.003972in/min	
Final Height	0.8860 in	0.8692 in	0.8916 in	
Sample Area	4.90870 in ²	4.90870 in ²	4.90870 in ²	
Initial Wet Unit Weight	124.79 lbf/ft ³	122.02 lbf/ft ³	128.32 lbf/ft ³	
Initial Dry Unit Weight	104.90 lbf/ft ³	101.71 lbf/ft ³	107.64 lbf/ft ³	
Final Wet Unit Weight	140.58 lbf/ft ³	140.06 lbf/ft ³	142.35 lbf/ft ³	
Final Dry Unit Weight	119.58 lbf/ft ³	118.53 lbf/ft ³	121.69 lbf/ft ³	
Final Moisture Content	17.6 %	18.2 %	17.0 %	
Particle Specific Gravity	2.70	2.70	2.70	
Final Void Ratio	0.4101	0.4226	0.3856	
Final Saturation	115.64%	116.05%	118.87%	

Maximum Shear Stress vs Normal Stress

Peak Shear Stress psi



Normal Stress psi

Peak ●

Angle of Shear Resistance
20.17 Degrees

Cohesion
7.75 psi

Shear Strength by Direct Shear (Small Shear Box)



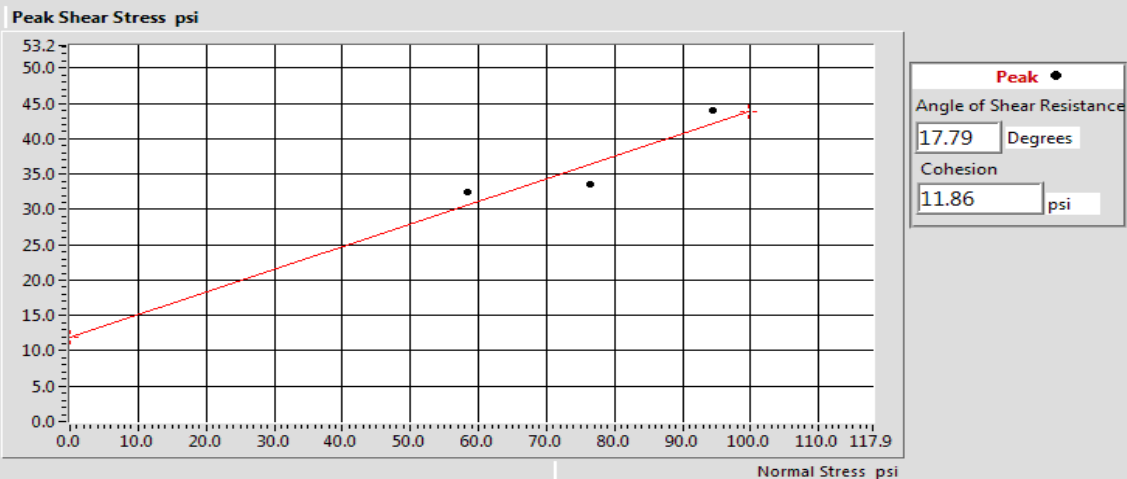
Pro Geotech, Inc.

Client	Parsons Brinckerhoff	Lab Ref	
Project	HAN-75-14.39	Job	G15004G
Borehole	B-120-0-13	Sample	ST (2015)

Test Details			
Standard	ASTM D3080-04	Particle Specific Gravity	2.75
Sample Type	Thin walled push in sample	Single or Multi Stage	Single Stage
Lab. Temperature	72.0 deg.F	Location	Hancock County OH
Sample Description	LIGHT GRAY ELASTIC CLAY, TRACE SAND, TRACE S/F		
Variations from procedure	None		

Test Summary				
Reference	A	B	C	
Normal Stress	58.41 psi	76.38 psi	94.35 psi	
Peak Strength	32.41 psi	33.60 psi	44.11 psi	
Corresponding Horizontal Displacement	0.3063 in	0.0750 in	0.1999 in	
Residual Stress	N/A	N/A	N/A	
Rate of Shear Displacement	Stage 1: 0.065558in/min	Stage 1: 0.104075in/min	Stage 1: 0.075785in/min	
Final Height	0.8948 in	0.8542 in	0.8129 in	
Sample Area	4.90870 in ²	4.90870 in ²	4.90870 in ²	
Initial Wet Unit Weight	106.54 lbf/ft ³	101.65 lbf/ft ³	100.69 lbf/ft ³	
Initial Dry Unit Weight	74.33 lbf/ft ³	67.29 lbf/ft ³	64.51 lbf/ft ³	
Final Wet Unit Weight	116.69 lbf/ft ³	117.04 lbf/ft ³	117.23 lbf/ft ³	
Final Dry Unit Weight	84.73 lbf/ft ³	79.03 lbf/ft ³	80.02 lbf/ft ³	
Final Moisture Content	37.7 %	48.1 %	46.5 %	
Particle Specific Gravity	2.75	2.75	2.75	
Final Void Ratio	0.9900	1.1336	1.1072	
Final Saturation	102.86%	114.55%	113.41%	

Maximum Shear Stress vs Normal Stress



Shear Strength by Direct Shear (Small Shear Box)



Client	Parsons Brinckerhoff	Lab Ref	
Project	HAN-75-14 39-US 68 Ramp C	Job	G13011G
Borehole	B-121-0-13	Sample	ST-4

Test Details

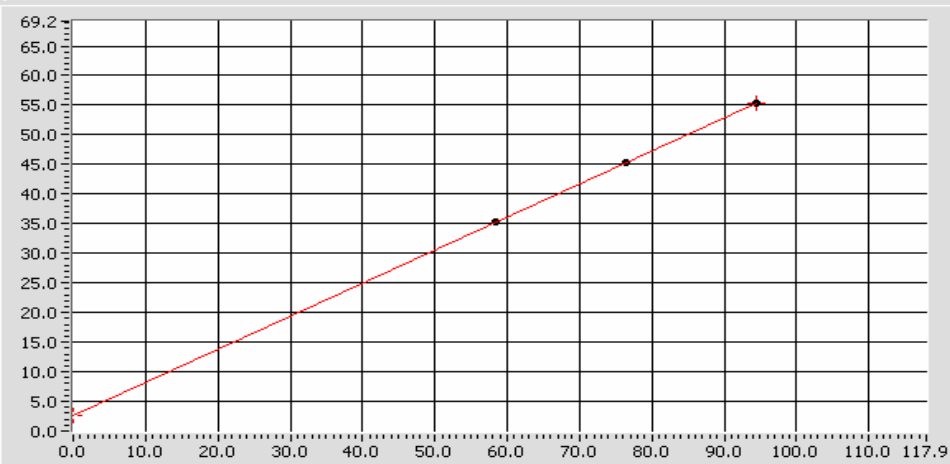
Standard	ASTM D3080-03 / AASHTO T236-92	Particle Specific Gravity	2.70
Sample Type	Thin walled push in sample	Single or Multi Stage	Single Stage
Lab. Temperature	72.0 deg.F	Location	Hancock County, OH
Sample Description	Brown SILT AND CLAY, some sand, trace stone fragments		
Variations from procedure	None		

Test Summary

Reference	A	B	D
Normal Stress	58.41 psi	76.38 psi	94.35 psi
Peak Strength	35.26 psi	45.31 psi	55.34 psi
Corresponding Horizontal Displacement	0.2358 in	0.1886 in	0.3302 in
Residual Stress	N/A	N/A	N/A
Rate of Shear Displacement	Stage 1: 0.003386in/min	Stage 1: 0.003398in/min	Stage 1: 0.006042in/min
Final Height	0.8995 in	0.8632 in	0.8765 in
Sample Area	4.90870 in ²	4.90870 in ²	4.90870 in ²
Initial Wet Unit Weight	133.96 lbf/ft ³	134.93 lbf/ft ³	133.20 lbf/ft ³
Initial Dry Unit Weight	110.76 lbf/ft ³	111.91 lbf/ft ³	109.98 lbf/ft ³
Final Wet Unit Weight	142.59 lbf/ft ³	147.49 lbf/ft ³	144.56 lbf/ft ³
Final Dry Unit Weight	123.75 lbf/ft ³	127.71 lbf/ft ³	126.36 lbf/ft ³
Final Moisture Content	15.2 %	15.5 %	14.4 %
Particle Specific Gravity	2.70	2.70	2.70
Final Void Ratio	0.3625	0.3203	0.3344
Final Saturation	113.34%	130.53%	116.33%

Maximum Shear Stress vs Normal Stress

Peak Shear Stress psi



Normal Stress psi

Peak ●

Angle of Shear Resistance
29.19 Degrees

Cohesion
2.64 psi

Shear Strength by Direct Shear (Small Shear Box)



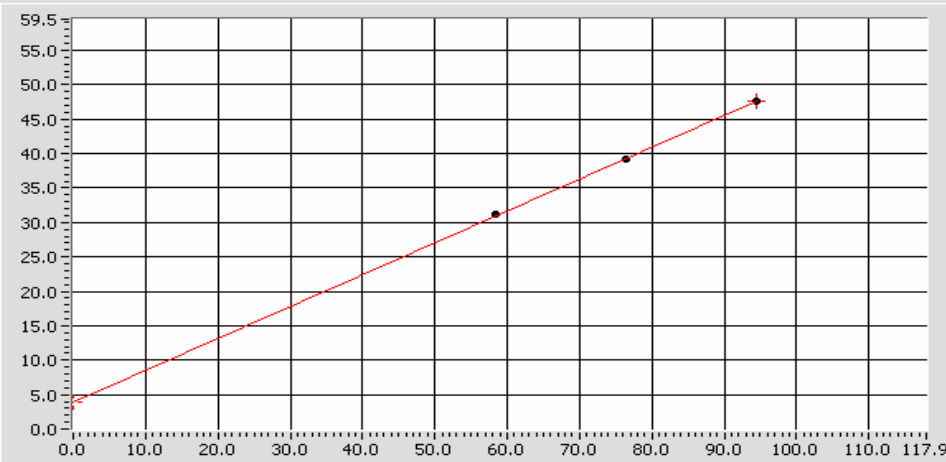
Client	Parsons Brinckerhoff	Lab Ref	
Project	HAN-75-14 39-US 68 Ramp C	Job	G13011G
Borehole	B-138-0-13	Sample	ST-4

Test Details			
Standard	ASTM D3080-03 / AASHTO T236-92	Particle Specific Gravity	2.70
Sample Type	Thin walled push in sample	Single or Multi Stage	Single Stage
Lab. Temperature	72.0 degree F	Location	Hancock County, OH
Sample Description	Brown, mottled gray SILTY CLAY, little sand, trace stone fragments		
Variations from procedure	None		

Test Summary				
Reference	A	B	C	
Normal Stress	58.41 psi	76.36 psi	94.35 psi	
Peak Strength	31.08 psi	39.08 psi	47.69 psi	
Corresponding Horizontal Displacement	0.3775 in	0.2831 in	0.2830 in	
Residual Stress	N/A	N/A	N/A	
Rate of Shear Displacement	Stage 1: 0.006042in/min	Stage 1: 0.005148in/min	Stage 1: 0.007227in/min	
Final Height	0.9291 in	0.9057 in	0.8999 in	
Sample Area	4.90870 in ²	4.90870 in ²	4.90870 in ²	
Initial Wet Unit Weight	125.56 lbf/ft ³	126.92 lbf/ft ³	126.98 lbf/ft ³	
Initial Dry Unit Weight	104.00 lbf/ft ³	103.89 lbf/ft ³	104.73 lbf/ft ³	
Final Wet Unit Weight	140.31 lbf/ft ³	138.73 lbf/ft ³	139.15 lbf/ft ³	
Final Dry Unit Weight	116.98 lbf/ft ³	116.77 lbf/ft ³	117.78 lbf/ft ³	
Final Moisture Content	20.0 %	18.8 %	18.2 %	
Particle Specific Gravity	2.70	2.70	2.70	
Final Void Ratio	0.4415	0.4440	0.4317	
Final Saturation	122.03%	114.38%	113.53%	

Maximum Shear Stress vs Normal Stress

Peak Shear Stress psi



Normal Stress psi

Peak ●

Angle of Shear Resistance
24.85 Degrees

Cohesion
3.99 psi

Shear Strength by Direct Shear (Small Shear Box)



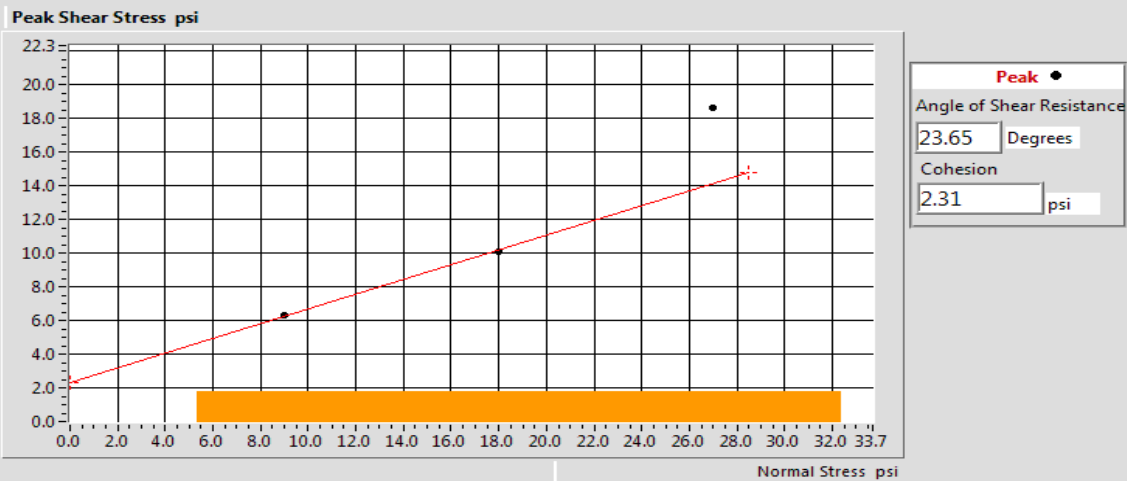
Pro Geotech, Inc.

Client	Parsons Brinckerhoff	Lab Ref	
Project	HAN-75-14.39	Job	G15004G
Borehole	B-154-0-13	Sample	ST-2 (2015)

Test Details			
Standard	ASTM D3080-03	Particle Specific Gravity	2.75
Sample Type	Thin walled push in sample	Single or Multi Stage	Single Stage
Lab. Temperature	72.0 deg.F	Location	Hancock County OH
Sample Description	WHITE ELASTIC SILT AND CLAY		
Variations from procedure	None		

Test Summary				
Reference	A	B	C	
Normal Stress	8.99 psi	17.97 psi	26.96 psi	
Peak Strength	6.31 psi	10.09 psi	18.66 psi	
Corresponding Horizontal Displacement	0.3303 in	0.2278 in	0.1997 in	
Residual Stress	N/A	N/A	N/A	
Rate of Shear Displacement	Stage 1: 0.052628in/min	Stage 1: 0.041114in/min	Stage 1: 0.030314in/min	
Final Height	0.9218 in	0.9333 in	0.8620 in	
Sample Area	4.90870 in ²	4.90870 in ²	4.90870 in ²	
Initial Wet Unit Weight	89.18 lbf/ft ³	87.97 lbf/ft ³	91.34 lbf/ft ³	
Initial Dry Unit Weight	48.29 lbf/ft ³	48.49 lbf/ft ³	51.64 lbf/ft ³	
Final Wet Unit Weight	98.64 lbf/ft ³	100.40 lbf/ft ³	110.27 lbf/ft ³	
Final Dry Unit Weight	53.87 lbf/ft ³	55.50 lbf/ft ³	62.51 lbf/ft ³	
Final Moisture Content	83.1 %	80.9 %	76.4 %	
Particle Specific Gravity	2.75	2.75	2.75	
Final Void Ratio	2.1882	2.0380	1.6975	
Final Saturation	104.46%	107.18%	121.53%	

Maximum Shear Stress vs Normal Stress



Shear Strength by Direct Shear (Small Shear Box)



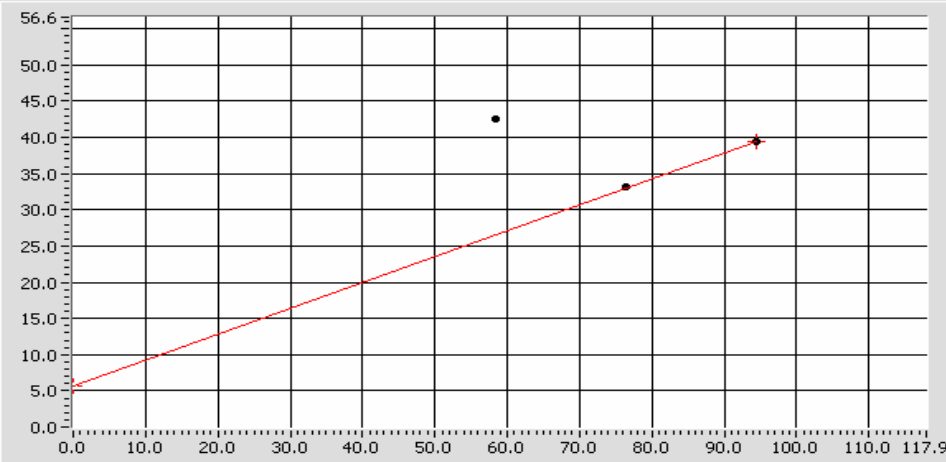
Client	Parsons Brinckerhoff	Lab Ref	
Project	HAN-75-14 39-US 68 Ramp B	Job	G13011G
Borehole	B-155-0-13	Sample	ST-3

Test Details			
Standard	ASTM D3080-03 / AASHTO T236-92	Particle Specific Gravity	2.70
Sample Type	Thin walled push in sample	Single or Multi Stage	Single Stage
Lab. Temperature	72.0 degree F	Location	Hancock County, OH
Sample Description	Dark brown CLAY, little sand, trace stone fragments		
Variations from procedure	None		

Test Summary				
Reference	A	B	C	
Normal Stress	58.41 psi	76.38 psi	94.35 psi	
Peak Strength	42.62 psi	33.15 psi	39.38 psi	
Corresponding Horizontal Displacement	0.3774 in	0.2830 in	0.1887 in	
Residual Stress	N/A	N/A	N/A	
Rate of Shear Displacement	Stage 1: 0.004195in/min	Stage 1: 0.001049in/min	Stage 1: 0.002561in/min	
Final Height	0.9349 in	0.8639 in	0.8391 in	
Sample Area	4.90870 in ²	4.90870 in ²	4.90870 in ²	
Initial Wet Unit Weight	123.39 lbf/ft ³	121.82 lbf/ft ³	123.78 lbf/ft ³	
Initial Dry Unit Weight	98.88 lbf/ft ³	93.82 lbf/ft ³	95.84 lbf/ft ³	
Final Wet Unit Weight	132.33 lbf/ft ³	136.19 lbf/ft ³	140.10 lbf/ft ³	
Final Dry Unit Weight	108.09 lbf/ft ³	109.91 lbf/ft ³	114.45 lbf/ft ³	
Final Moisture Content	22.4 %	23.9 %	22.4 %	
Particle Specific Gravity	2.70	2.70	2.70	
Final Void Ratio	0.5599	0.5342	0.4733	
Final Saturation	108.10%	120.87%	127.85%	

Maximum Shear Stress vs Normal Stress

Peak Shear Stress psi



Peak ●

Angle of Shear Resistance
19.66 Degrees

Cohesion
5.66 psi

Normal Stress psi

**One Dimensional Consolidation
Properties
(Oedometer)**



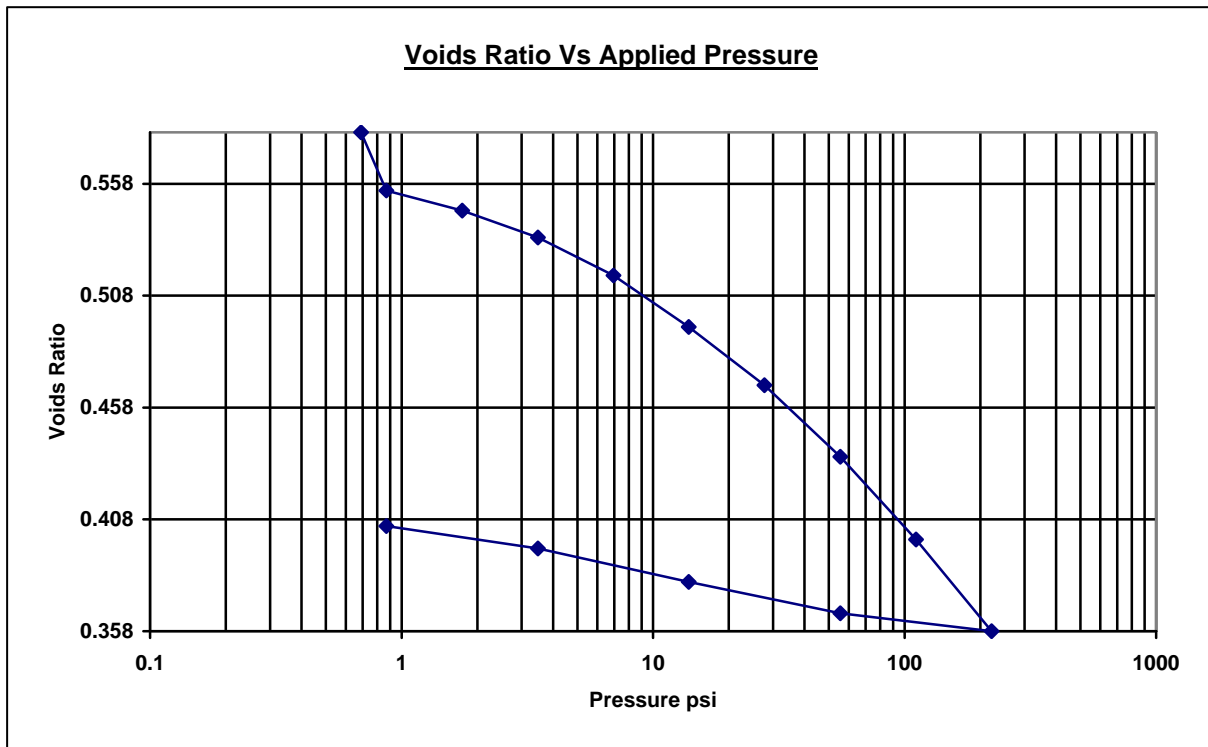
Pro Geotech, Inc.

Client	Parsons Brinckerhoff	Lab Ref	
Project	HAN-75-14 39	Job	G13011G
Borehole	B-121-0-13	Sample	ST-3
Location	Hancock County OH	Depth	6.0'

Test Details			
Standard	ASTM D2435-96 / AASHTO T216-94	Particle Specific Gravity	2.70
Sample Type	Thin walled push in sample	Lab. Temperature	72.0 deg.F
Method of Testing (A/B)	B		
Sample Description	Brown SILT AND CLAY, SOME SAND, TRACE STONE FRAGMENTS		
Variations from Procedure	None		

Specimen Details			
Specimen Reference	A	Description	
Depth within Sample	12.0000in	Orientation within Sample	
Specimen Mass	0.2925 lb	Condition	Inundated
Specimen Height	0.7900 in	Preparation	Standard
Comments			

Apparatus			
Ring Number	1	Ring Diameter	2.5030 in
Ring Height	0.7900 in	Ring Weight	0.1431 lb
Lever Ratio	10.00 : 1	Drainage	Double-Sided



**One Dimensional Consolidation
Properties
(Oedometer)**



Pro Geotech, Inc.

Client	Parsons Brinckerhoff	Lab Ref	
Project	HAN-75-14 39	Job	G13011G
Borehole	B-121-0	Sample	ST-3
Location	Hancock County OH	Depth	6.0'

Initial Moisture Content*	22.0 % (trimmings: 22.0 %)	Final Moisture Content	17.1 %
Initial Bulk Density	130.03 lb/ft ³	Final Bulk Density	140.54 lb/ft ³
Initial Dry Density	106.62 lb/ft ³	Final Dry Density	120.00 lb/ft ³
Initial Void Ratio	0.5810	Final Void Ratio	0.4047
Initial Degree of Saturation	102.05%	Final Degree of Saturation	114.22%
Pre-consolidation Pressure	0.69 psi		

* Calculated from initial and dry weights of whole specimen

Pressure (Loading)	Load Increment Duration	Deformation (Corrected)	d ₁₀₀ (Corrected)	Coefficient of Consolidation (c _v)
0.00				
0.87 psi	381.000 min	0.0131 in	0.0119 in	0.00262 in ² /min
1.74 psi	1260.000 min	0.0172 in	0.0164 in	0.00272 in ² /min
3.48 psi	1080.000 min	0.0236 in	0.0216 in	0.00406 in ² /min
6.95 psi	480.000 min	0.0321 in	0.0293 in	0.00725 in ² /min
13.87 psi	762.000 min	0.0435 in	0.0396 in	0.01064 in ² /min
27.74 psi	1260.000 min	0.0566 in	0.0528 in	0.01096 in ² /min
55.55 psi	605.000 min	0.0724 in	0.0665 in	0.02049 in ² /min
111.00 psi	762.000 min	0.0909 in	0.0877 in	0.01431 in ² /min
221.80 psi	1440.000 min	0.1116 in	0.1060 in	0.01569 in ² /min
55.55 psi	240.000 min	0.1073 in	-----	-----
13.87 psi	762.000 min	0.1004 in	-----	-----
3.48 psi	3120.000 min	0.0927 in	-----	-----
0.87 psi	381.000 min	0.0881 in	-----	-----

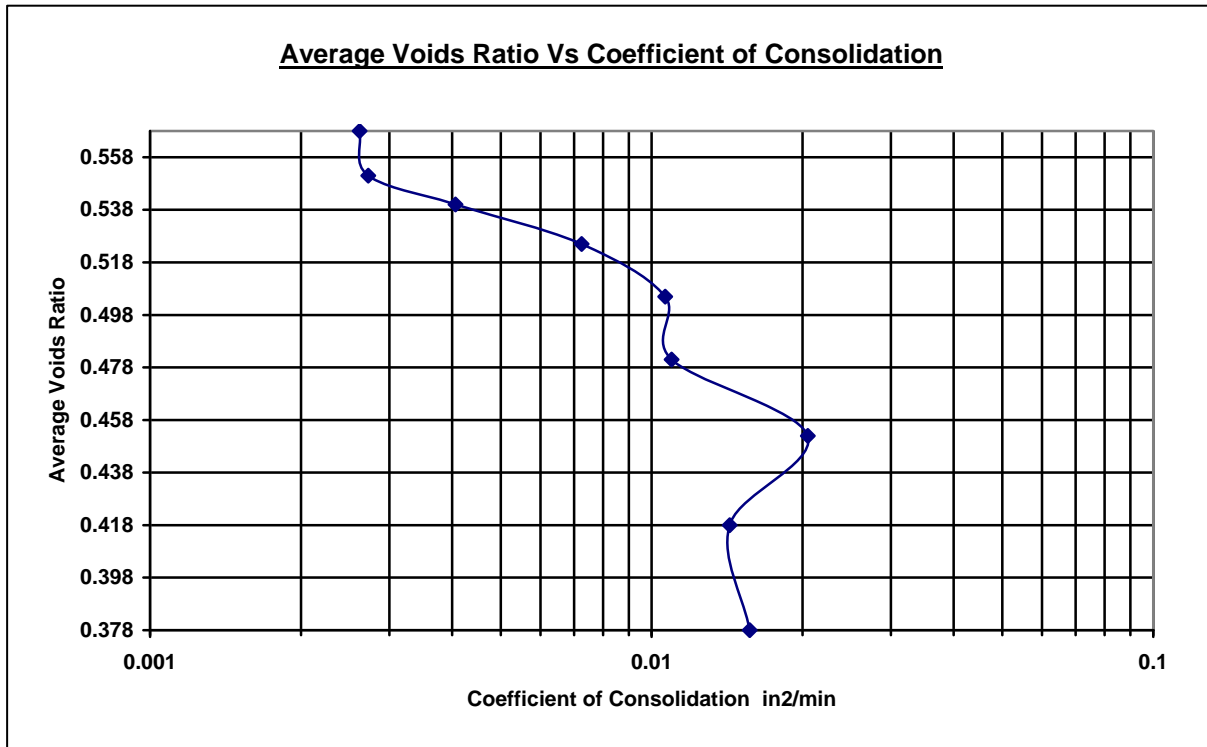
Method of Time Fitting Used	Square Root Time
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**One Dimensional Consolidation
Properties
(Oedometer)**



Pro Geotech, Inc.

Client	Parsons Brinckerhoff	Lab Ref	
Project	HAN-75-14 39	Job	G13011G
Borehole	B-121-0	Sample	ST-3
Location	Hancock County OH	Depth	6.0'



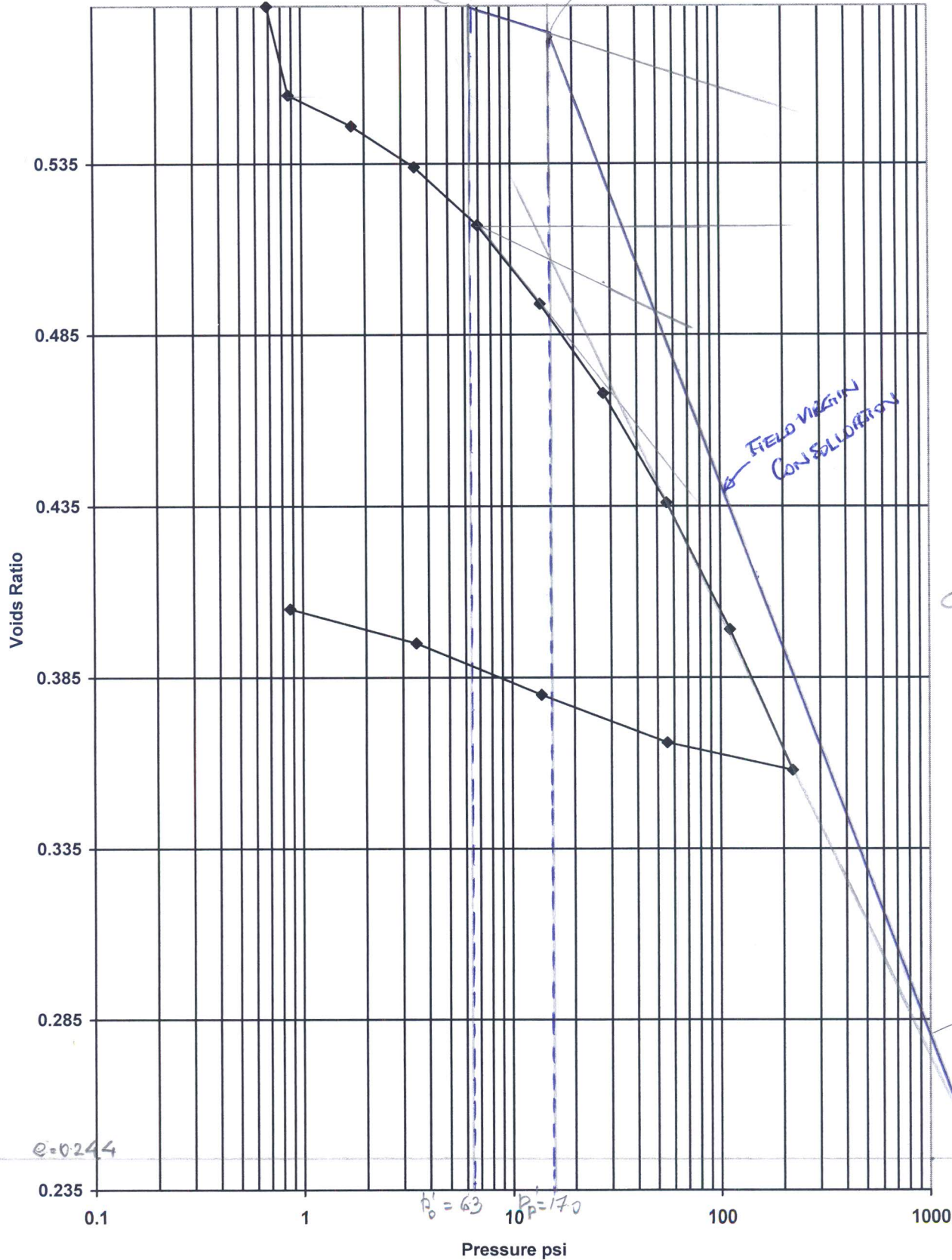
Tested By and Date:	FB/11/03/2013
Checked By and Date:	SS/11/25/2013
Approved By and Date:	WN/12/12/2013

BORING NO. B-121-0-13

SAMPLE NO. ST3

Voids Ratio Vs Applied Pressure

$$C_{r2} = \frac{0.581 - 0.5725}{\log_{10}\left(\frac{17}{63}\right)} = 0.020$$



$$C_c = \frac{0.5725 - 0.2898}{\log_{10}\left(\frac{1000}{17}\right)} = 0.165$$

(1000, 0.2898)

**One Dimensional Consolidation
Properties
(Oedometer)**



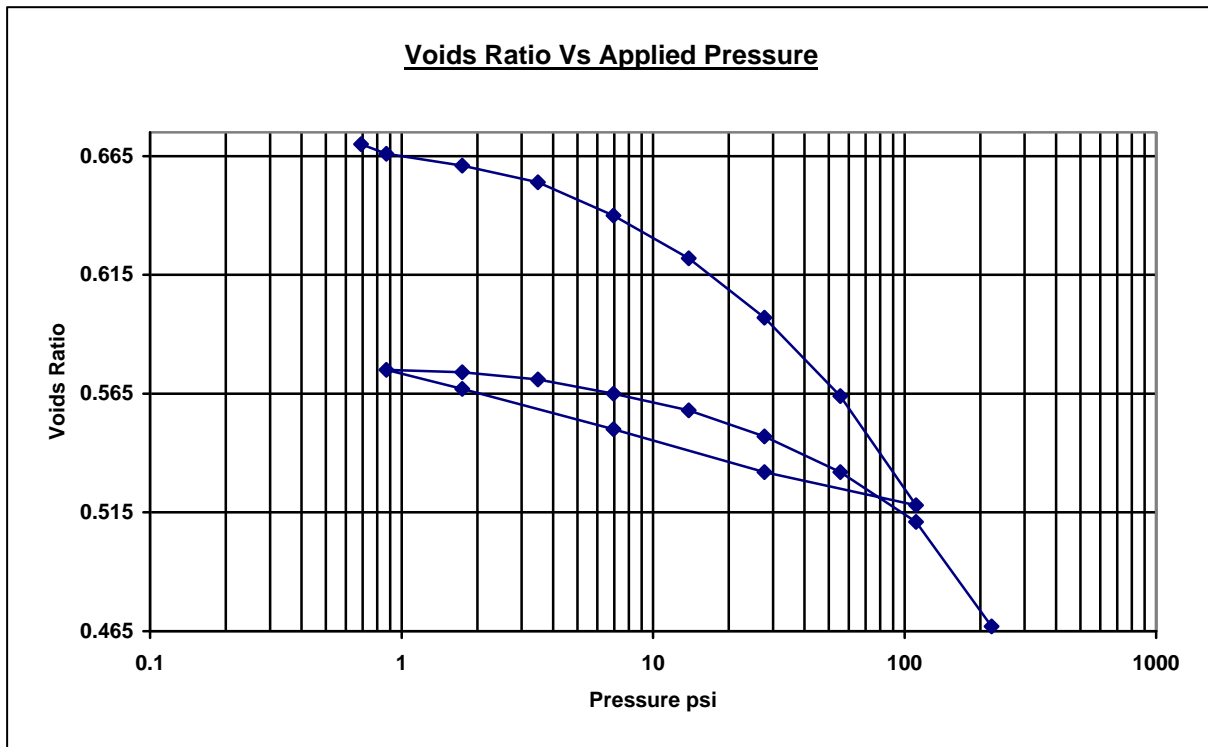
Pro Geotech, Inc.

Client	Parsons Brinckerhoff	Lab Ref	
Project	HAN-75-14 39	Job	G13011G
Borehole	B-155-0-13	Sample	ST-3
Location	Hancock County OH	Depth	6.0'

Test Details			
Standard	ASTM D2435-96 / AASHTO T216-94	Particle Specific Gravity	2.70
Sample Type	Thin walled push in sample	Lab. Temperature	72 deg.F
Method of Testing (A/B)	B		
Sample Description	Brown CLAY, LITTLE SAND, TRACE STONE FRAGMENTS		
Variations from Procedure	None		

Specimen Details			
Specimen Reference	B	Description	
Depth within Sample	16.0000in	Orientation within Sample	
Specimen Mass	0.2821 lb	Condition	Inundated
Specimen Height	0.7900 in	Preparation	As per ASTM
Comments			

Apparatus			
Ring Number	1	Ring Diameter	2.5030 in
Ring Height	0.7900 in	Ring Weight	0.1431 lb
Lever Ratio	10.00 : 1	Drainage	Double-Sided



**One Dimensional Consolidation
Properties
(Oedometer)**



Pro Geotech, Inc.

Client	Parsons Brinckerhoff	Lab Ref	
Project	HAN-75-14 39	Job	G13011G
Borehole	B-155-0-13	Sample	ST-3
Location	Hancock County OH	Depth	6.0'

Initial Moisture Content*	24.3 % (trimmings: 24.8 %)	Final Moisture Content	18.7 %
Initial Bulk Density	125.40 lb/ft ³	Final Bulk Density	136.36 lb/ft ³
Initial Dry Density	100.92 lb/ft ³	Final Dry Density	114.92 lb/ft ³
Initial Void Ratio	0.6701	Final Void Ratio	0.4667
Initial Degree of Saturation	97.73%	Final Degree of Saturation	107.93%
Pre-consolidation Pressure	0.69 psi		

* Calculated from initial and dry weights of whole specimen

Pressure (Loading)	Load Increment Duration	Deformation (Corrected)	d₁₀₀ (Corrected)	Coefficient of Consolidation (c_v)
0.00				
0.87 psi	381.000 min	0.0019 in	0.0015 in	0.01469 in ² /min
1.74 psi	762.000 min	0.0041 in	0.0035 in	0.00880 in ² /min
3.48 psi	381.000 min	0.0077 in	0.0062 in	0.01829 in ² /min
6.95 psi	960.000 min	0.0143 in	0.0121 in	0.01246 in ² /min
13.87 psi	605.000 min	0.0229 in	0.0204 in	0.00918 in ² /min
27.74 psi	605.000 min	0.0345 in	0.0312 in	0.00949 in ² /min
55.55 psi	480.000 min	0.0504 in	0.0466 in	0.00845 in ² /min
111.00 psi	1260.000 min	0.0719 in	0.0655 in	0.01109 in ² /min
27.74 psi	1260.000 min	0.0653 in	-----	-----
6.95 psi	1080.000 min	0.0567 in	-----	-----
1.74 psi	480.000 min	0.0487 in	-----	-----
0.87 psi	605.000 min	0.0452 in	-----	-----
1.74 psi	302.000 min	0.0456 in	0.0456 in	0.01519 in ² /min
3.48 psi	2400.000 min	0.0467 in	0.0464 in	0.00458 in ² /min
6.95 psi	762.000 min	0.0498 in	0.0486 in	0.00493 in ² /min
13.87 psi	605.000 min	0.0533 in	0.0531 in	0.00602 in ² /min
27.74 psi	480.000 min	0.0584 in	0.0573 in	0.00793 in ² /min
55.55 psi	1260.000 min	0.0653 in	0.0638 in	0.01051 in ² /min
111.00 psi	1260.000 min	0.0751 in	0.0722 in	0.01518 in ² /min
221.80 psi	2400.000 min	0.0962 in	0.0903 in	0.00956 in ² /min

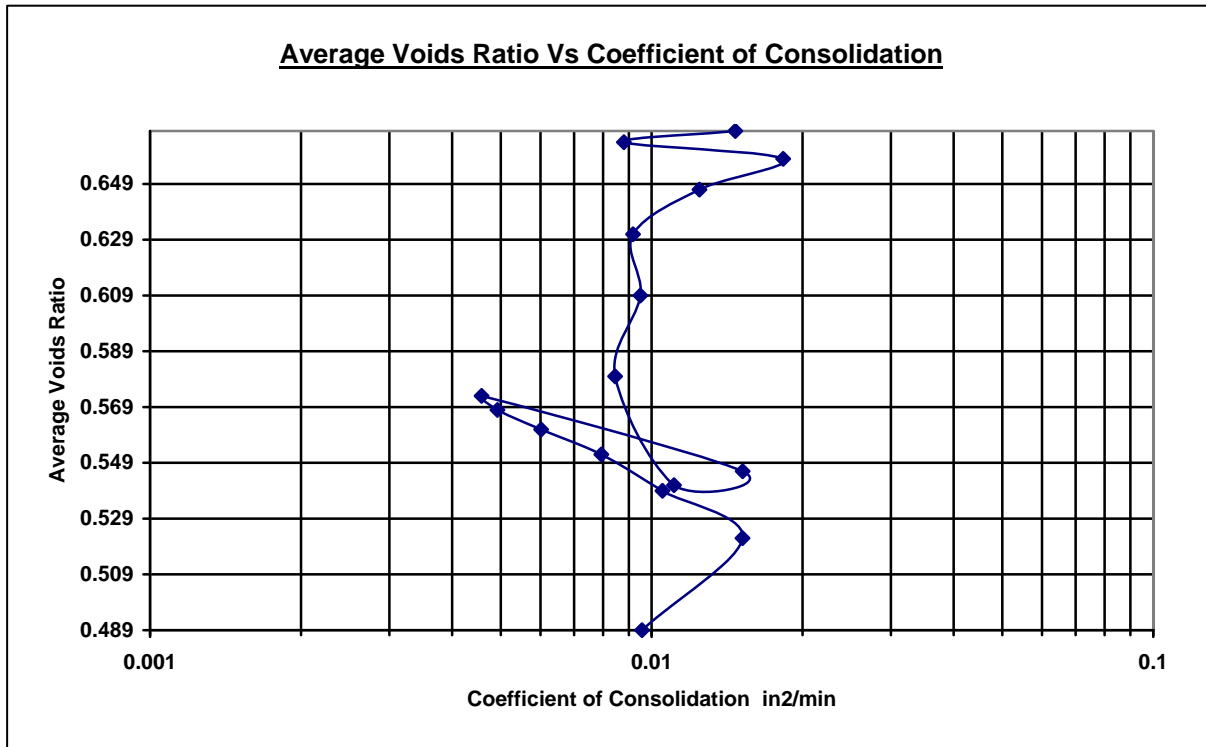
Method of Time Fitting Used	Square Root Time
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**One Dimensional Consolidation
Properties
(Oedometer)**



Pro Geotech, Inc.

Client	Parsons Brinckerhoff	Lab Ref	
Project	HAN-75-14 39	Job	G13011G
Borehole	B-155-0-13	Sample	ST-3
Location	Hancock County OH	Depth	6.0'

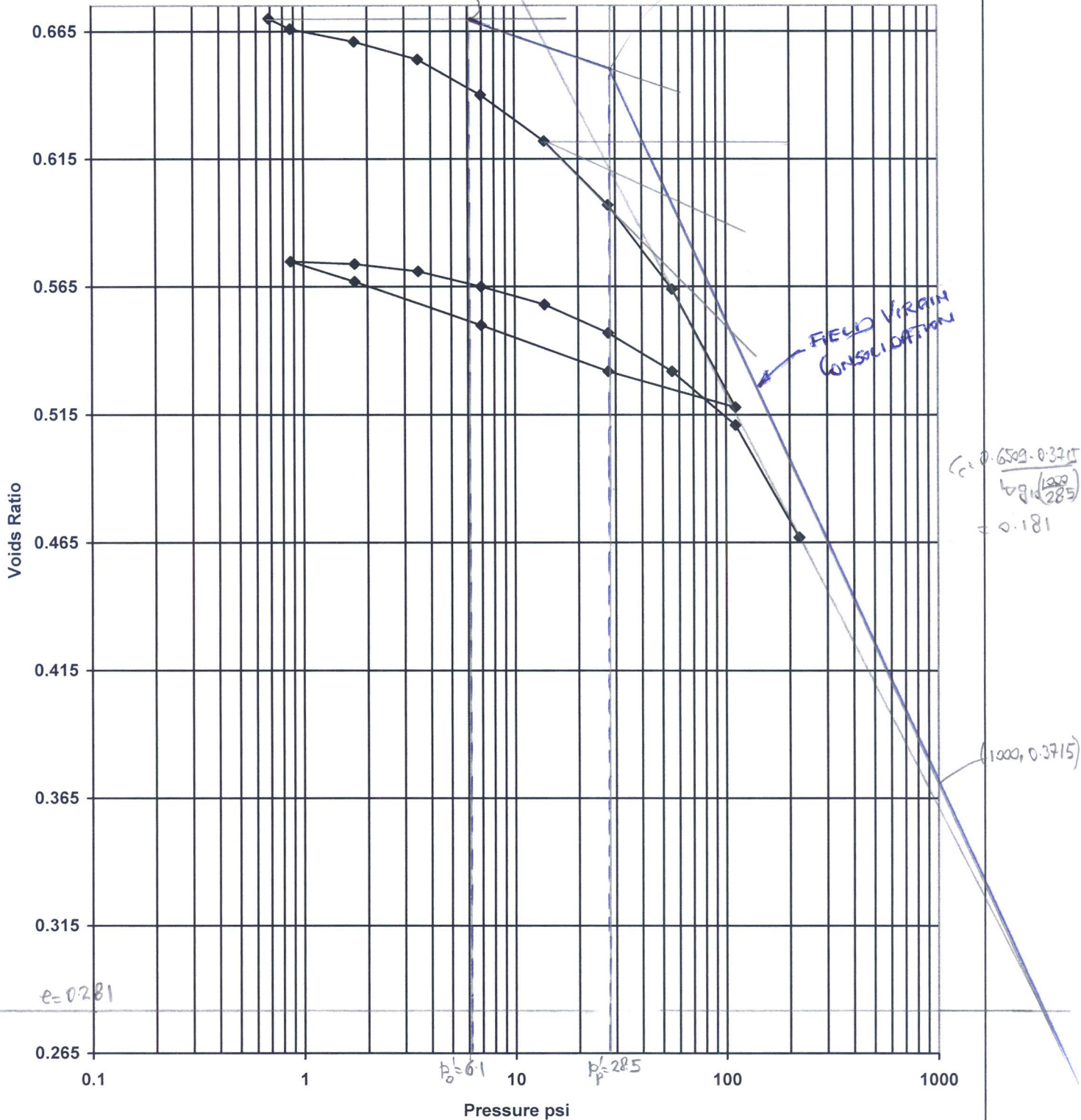


Tested By and Date:	FB/11/19/2013
Checked By and Date:	SS/12/4/2013
Approved By and Date:	WN/12/10/2013

BORING NO B-155-0-13

SAMPLE NO. ST-3

Voids Ratio Vs Applied Pressure



**One Dimensional Consolidation
Properties
(Oedometer)**

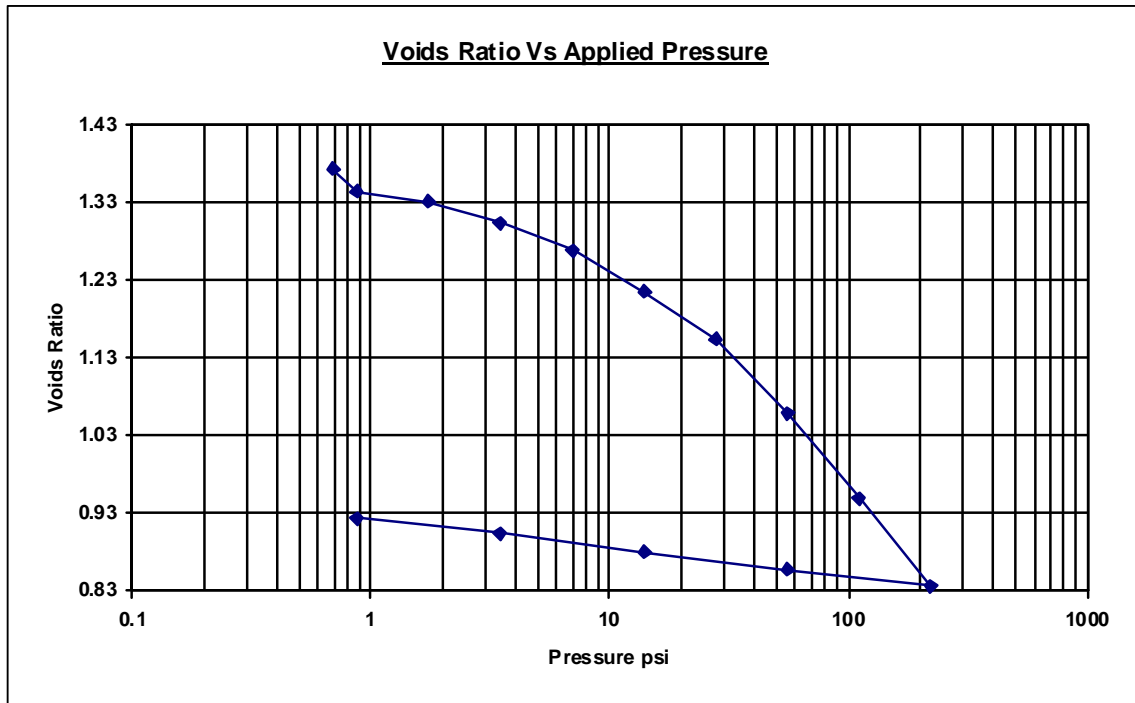


Client	Parsons Brinckerhoff	Lab Ref	
Project	HAN-75-14 39	Job	G13011G
Borehole	B-120-0-13	Sample	ST (2015)
Location	Hancock County OH	Depth	5.0 feet

Test Details			
Standard	ASTM D2435-96 / AASHTO T216-94	Particle Specific Gravity	2.75
Sample Type	Thin walled push in sample	Lab. Temperature	72.0 deg.F
Method of Testing (A/B)	A		
Sample Description	LIGTH GRAY ELASTIC CLAY, TRACE SAND, TRACE S/F		
Variations from Procedure	None		

Specimen Details			
Specimen Reference	B	Description	
Depth within Sample	12.0000in	Orientation within Sample	
Specimen Mass	0.2480 lb	Condition	Inundated
Specimen Height	0.7900 in	Preparation	Standard
Comments			

Apparatus			
Ring Number	1	Ring Diameter	2.5030 in
Ring Height	0.7900 in	Ring Weight	0.1431 lb
Lever Ratio	10.00 : 1	Drainage	Double-Sided



**One Dimensional Consolidation
Properties
(Oedometer)**



Client	Parsons Brinckerhoff	Lab Ref	
Project	HAN-75-14 39	Job	G15011G
Borehole	B-120-0-13	Sample	ST (2015)
Location	Hancock County OH	Depth	5.0 feet

Initial Moisture Content*	55.2 % (trimmings: 55.2 %)	Final Moisture Content	37.5 %
Initial Bulk Density	110.24 lb/ft3	Final Bulk Density	120.53 lb/ft3
Initial Dry Density	71.04 lb/ft3	Final Dry Density	87.67 lb/ft3
Initial Void Ratio	1.3728	Final Void Ratio	0.9227
Initial Degree of Saturation	108.55%	Final Degree of Saturation	109.68%
Pre-consolidation Pressure	0.69 psi		

* Calculated from initial and dry weights of whole specimen

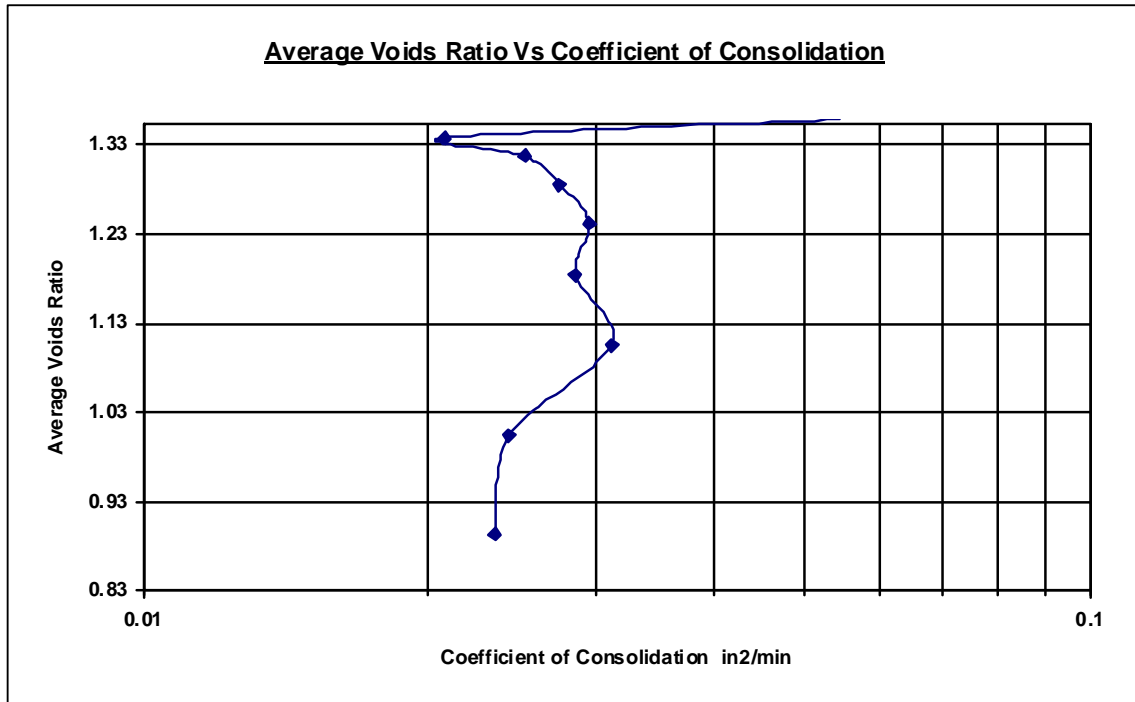
Pressure (Loading)	Load Increment Duration	Deformation (Corrected)	d ₁₀₀ (Corrected)	Coefficient of Consolidation (c _v)
0.00				
0.87 psi	1080.000 min	0.0095 in	0.0055 in	0.05430 in ² /min
1.74 psi	480.000 min	0.0137 in	0.0113 in	0.02081 in ² /min
3.48 psi	960.000 min	0.0229 in	0.0181 in	0.02528 in ² /min
6.95 psi	605.000 min	0.0348 in	0.0291 in	0.02751 in ² /min
13.87 psi	762.000 min	0.0520 in	0.0443 in	0.02957 in ² /min
27.74 psi	480.000 min	0.0728 in	0.0639 in	0.02863 in ² /min
55.55 psi	960.000 min	0.1046 in	0.0917 in	0.03120 in ² /min
111.00 psi	1440.000 min	0.1411 in	0.1261 in	0.02433 in ² /min
221.80 psi	1260.000 min	0.1785 in	0.1644 in	0.02355 in ² /min
55.55 psi	1260.000 min	0.1733 in	-----	-----
13.87 psi	1440.000 min	0.1639 in	-----	-----
3.48 psi	605.000 min	0.1561 in	-----	-----
0.87 psi	762.000 min	0.1498 in	-----	-----

Method of Time Fitting Used	Square Root Time
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**One Dimensional Consolidation
Properties
(Oedometer)**

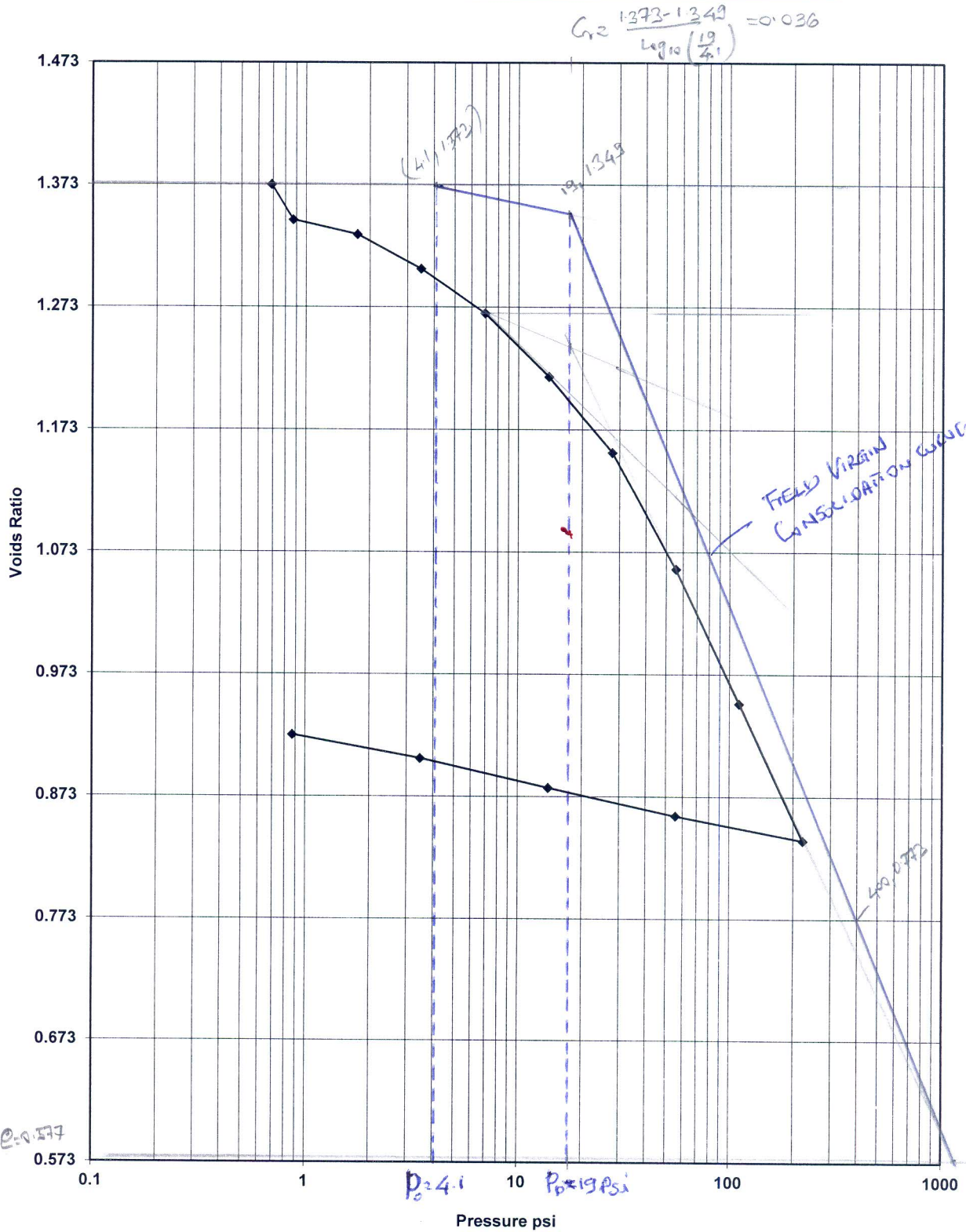


Client	Parsons Brinckerhoff	Lab Ref	
Project	HAN-75-14 39	Job	G15011G
Borehole	B-120-0-13	Sample	ST (2015)
Location	Hancock County OH	Depth	5.0 feet



BORING NO. B-120-0-13 SAMPLE NO. ST (2015)

Voids Ratio Vs Applied Pressure (Boring B-120-0-13)



Stage: 1 of 13

Client

Parsons Brinckerhoff

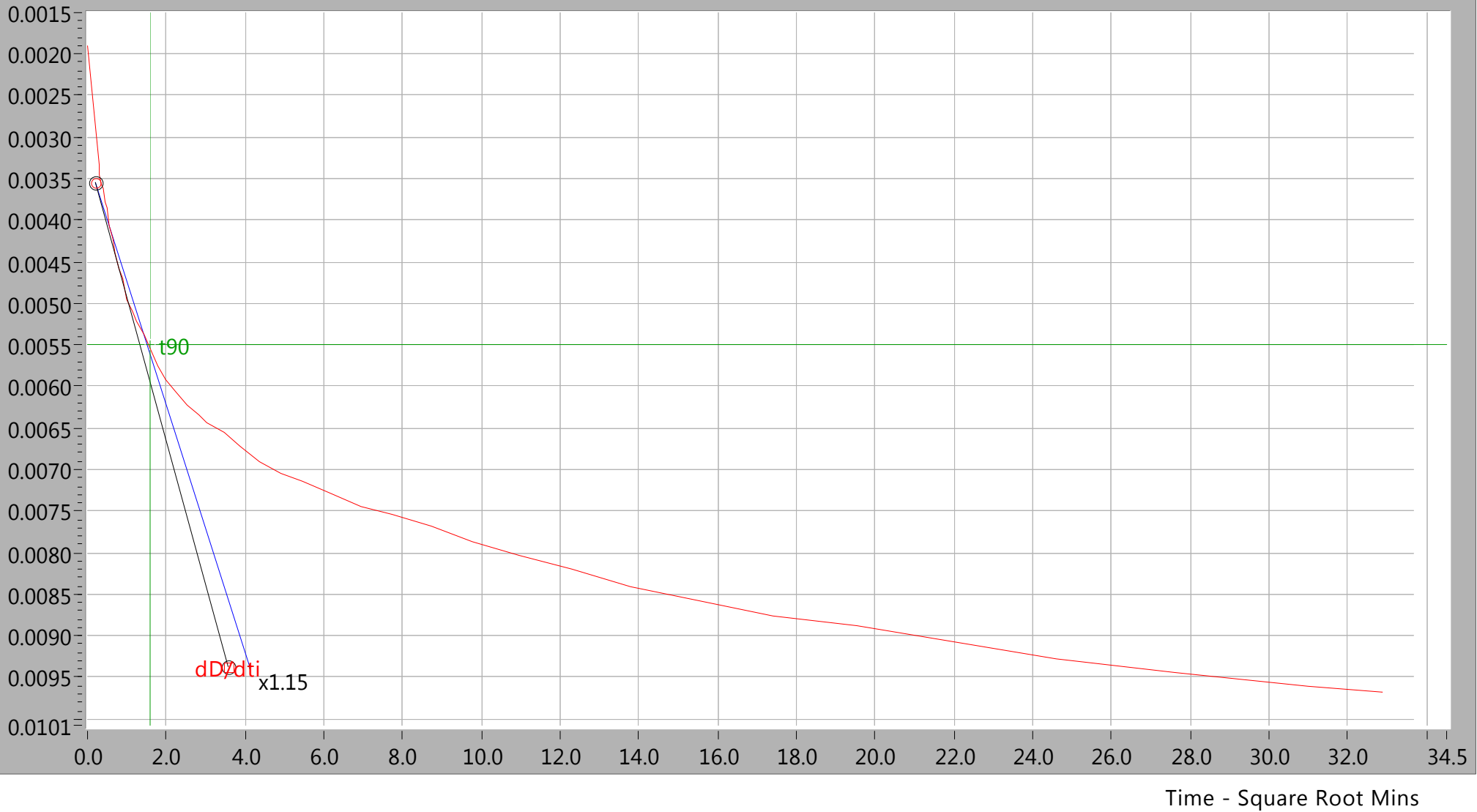
Job Number

G15004G

Sample Number

ST-1

Vertical Displacement in



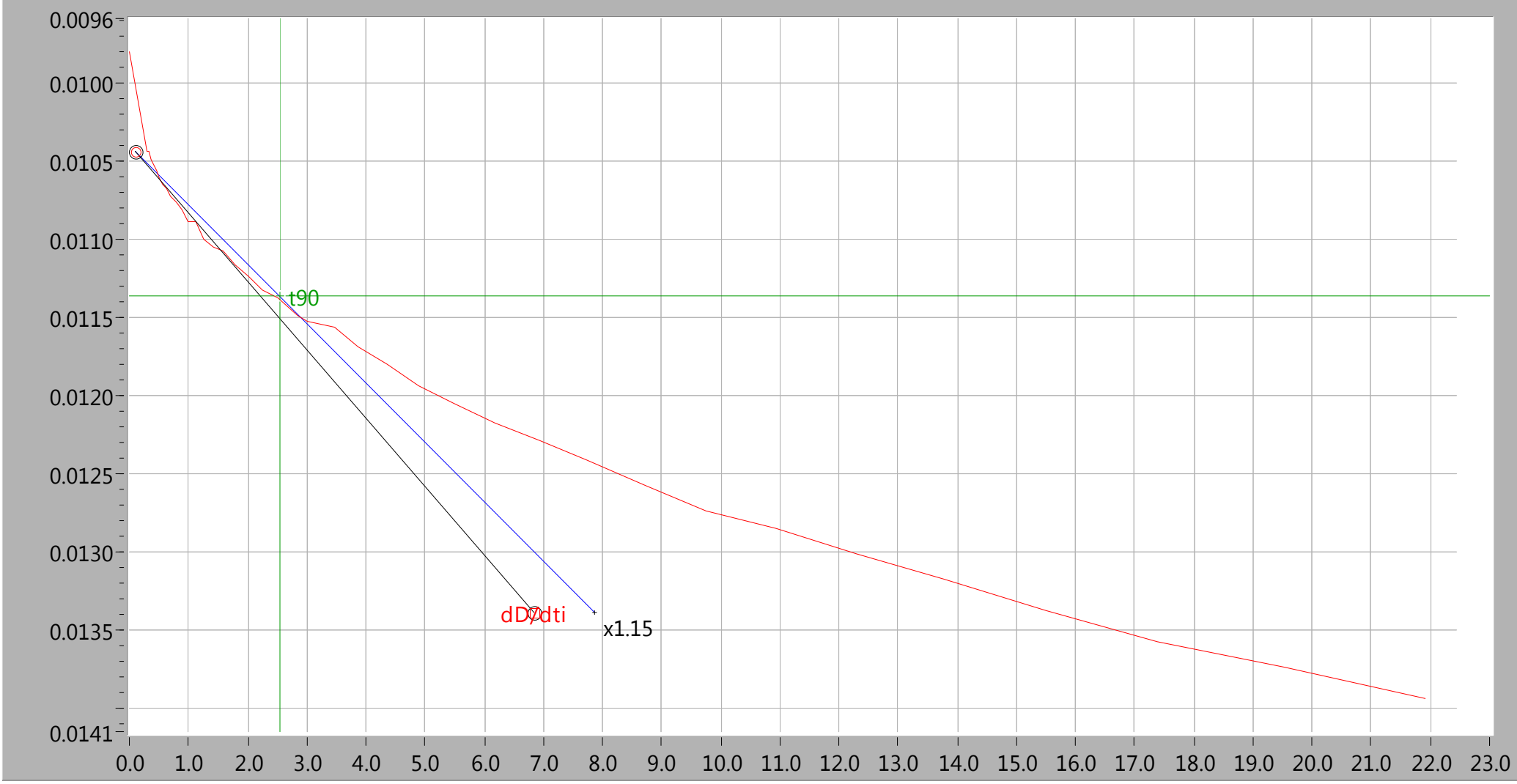
DS7 - Geotechnical Software

Time - Square Root Mins

Stage: 2 of 13

Client	Job Number	Sample Number
Parsons Brinckerhoff	G15004G	ST-1

Vertical Displacement in

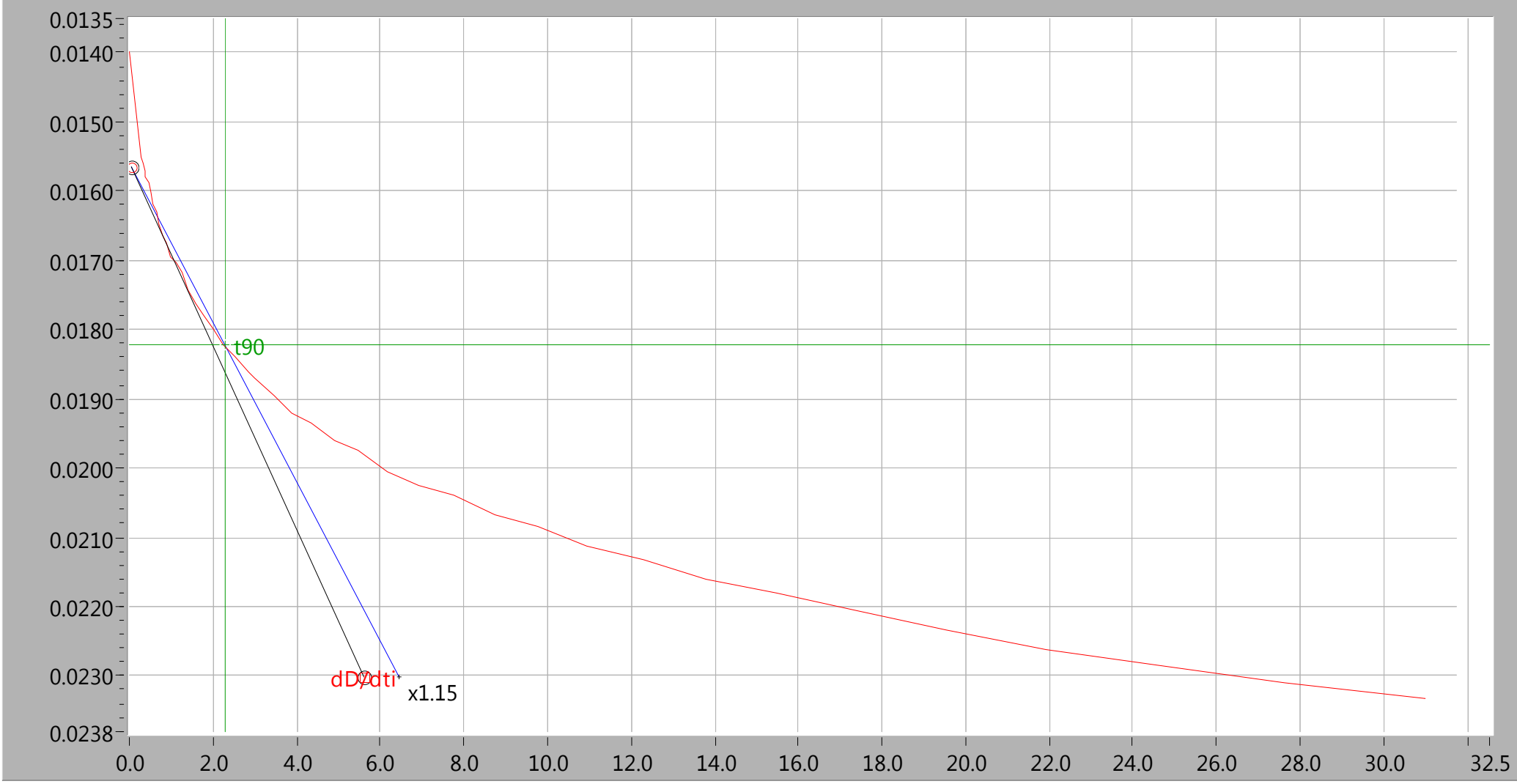


Time - Square Root Mins

Stage: 3 of 13

Client	Job Number	Sample Number
Parsons Brinckerhoff	G15004G	ST-1

Vertical Displacement in

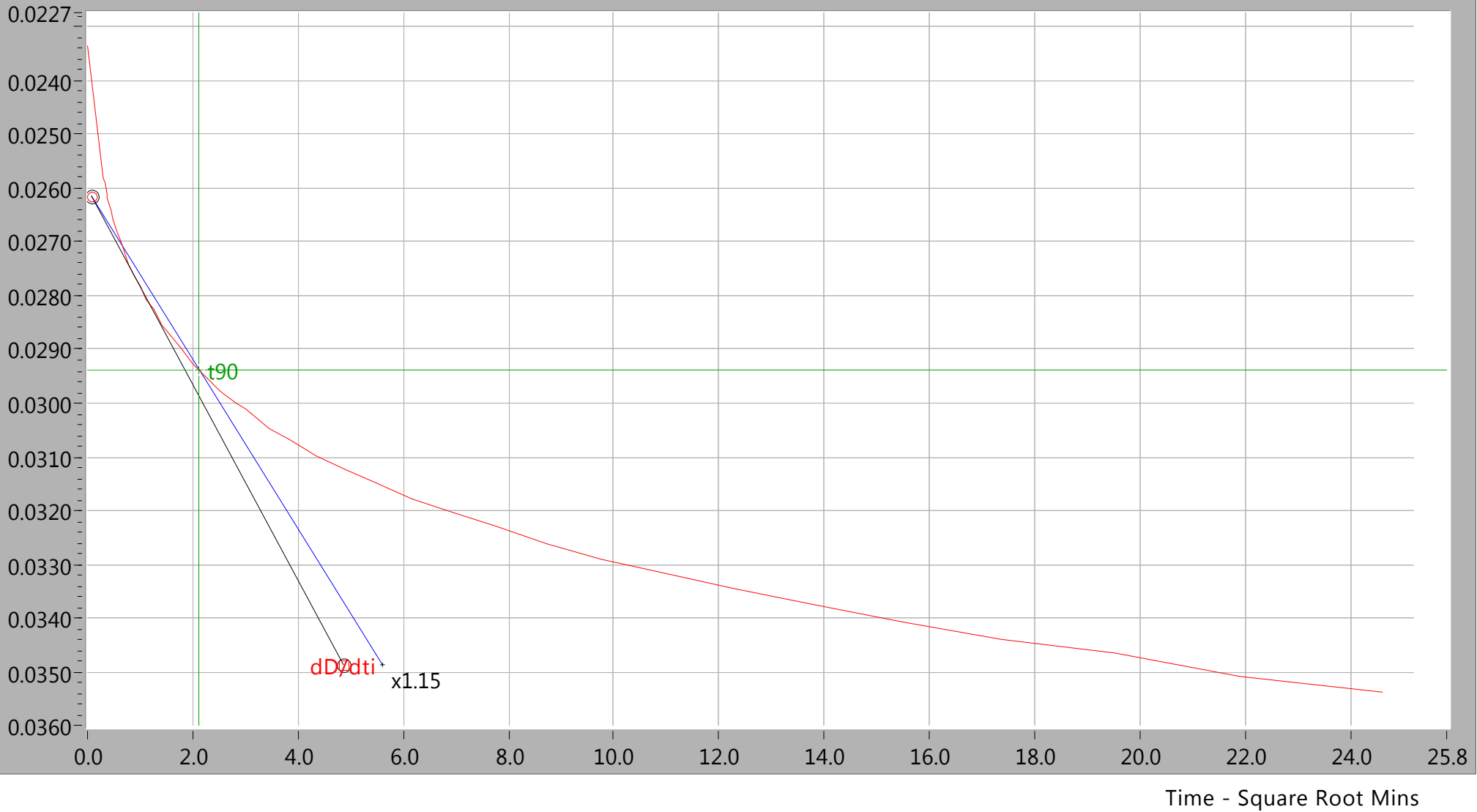


Time - Square Root Mins

Stage: 4 of 13

Client	Job Number	Sample Number
Parsons Brinckerhoff	G15004G	ST-1

Vertical Displacement in



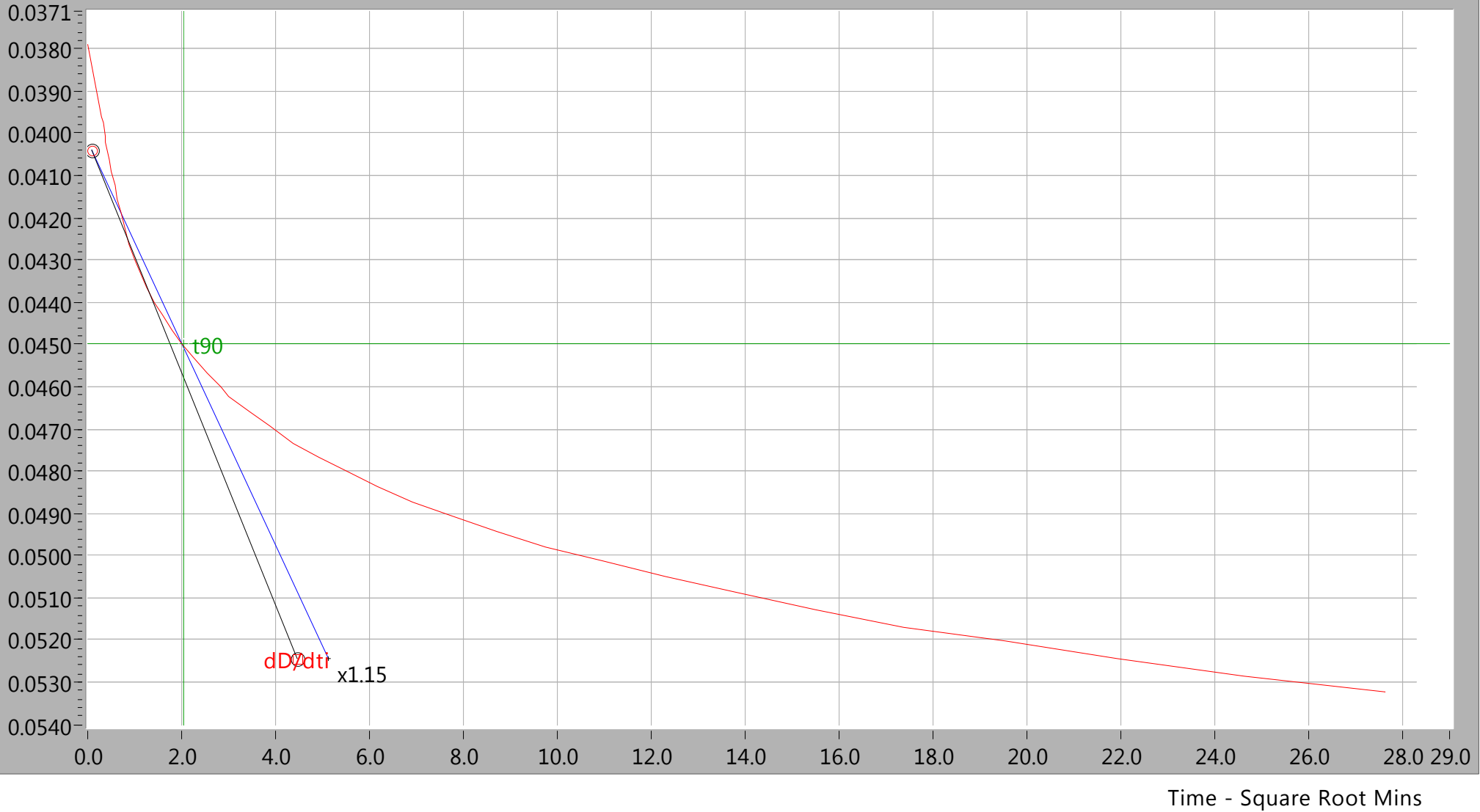
DS7 - Geotechnical Software

Time - Square Root Mins

Stage: 5 of 13

Client	Job Number	Sample Number
Parsons Brinckerhoff	G15004G	ST-1

Vertical Displacement in



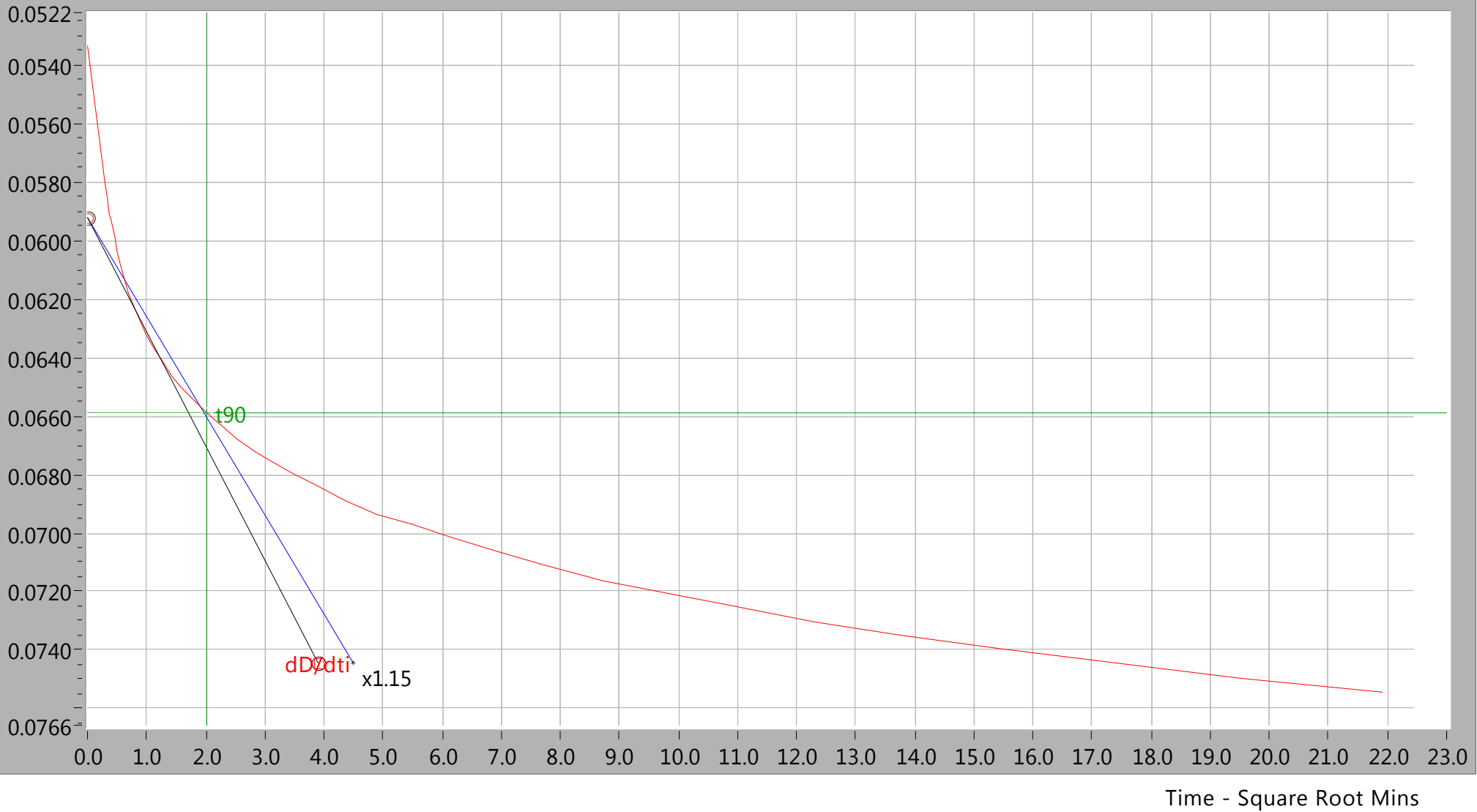
DS7 - Geotechnical Software

Time - Square Root Mins

Stage: 6 of 13

Client	Job Number	Sample Number
Parsons Brinckerhoff	G15004G	ST-1

Vertical Displacement in

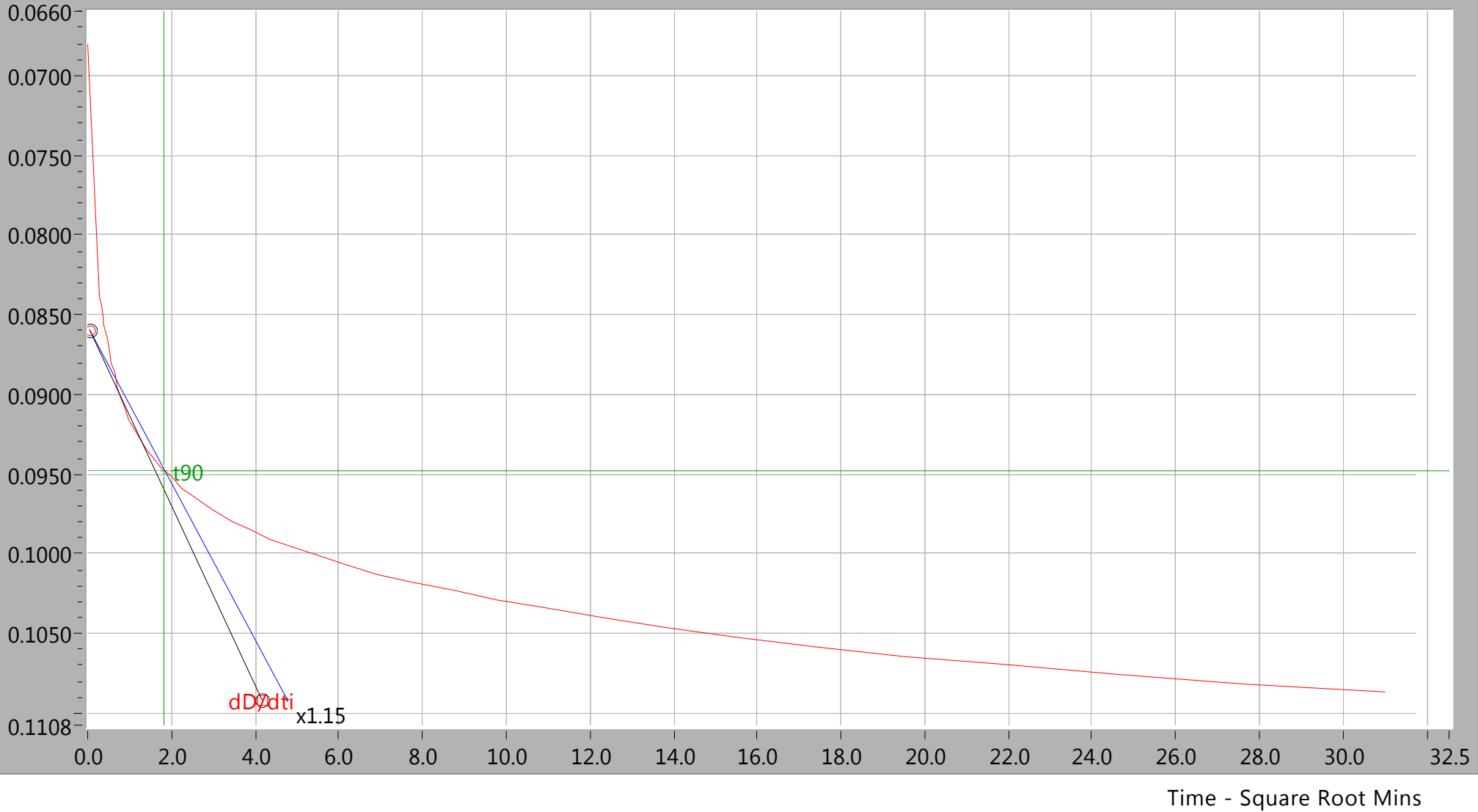


DS7 - Geotechnical Software

Stage: 7 of 13

Client	Job Number	Sample Number
Parsons Brinckerhoff	G15004G	ST-1

Vertical Displacement in

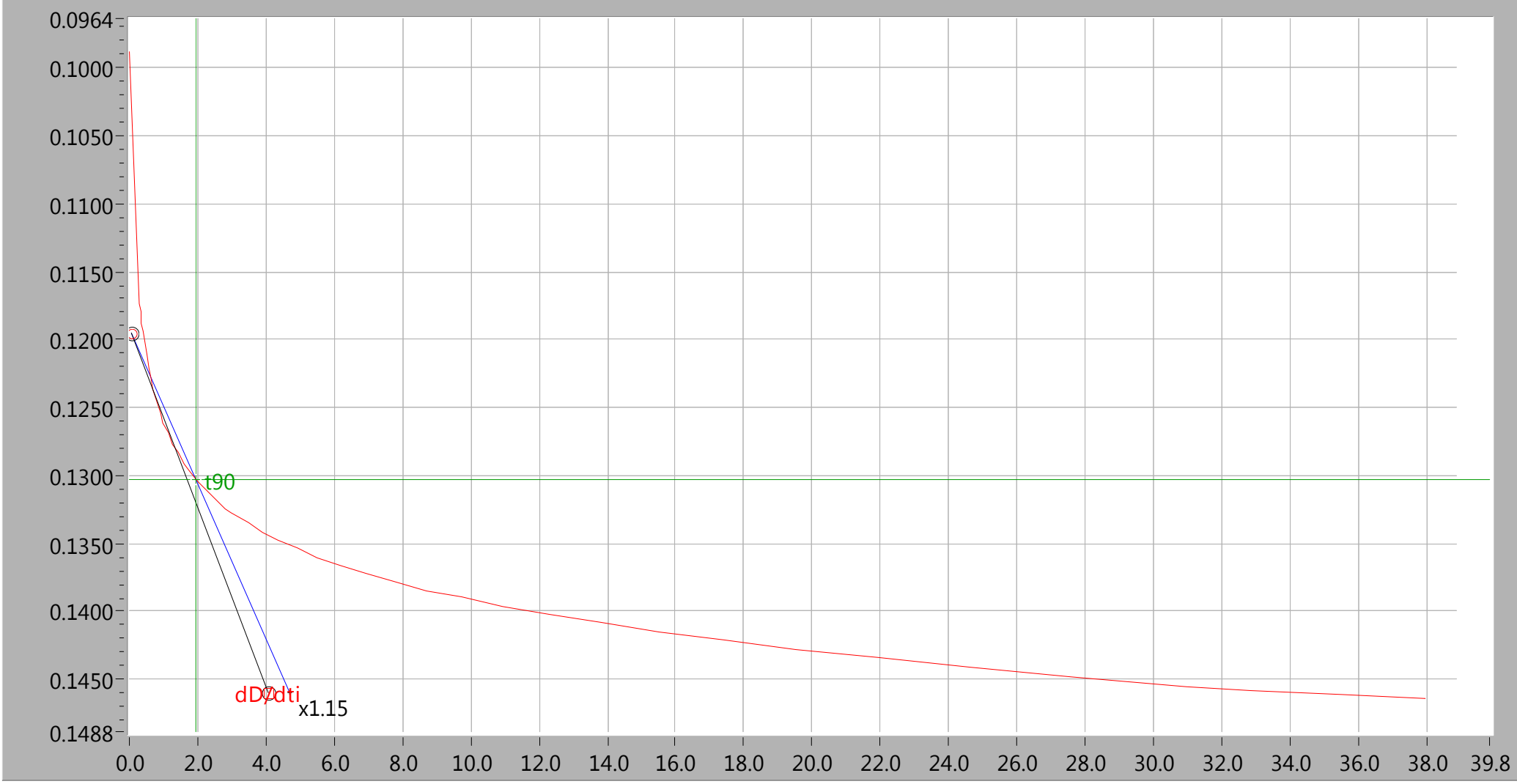


DS7 - Geotechnical Software

Stage: 8 of 13

Client	Job Number	Sample Number
Parsons Brinckerhoff	G15004G	ST-1

Vertical Displacement in

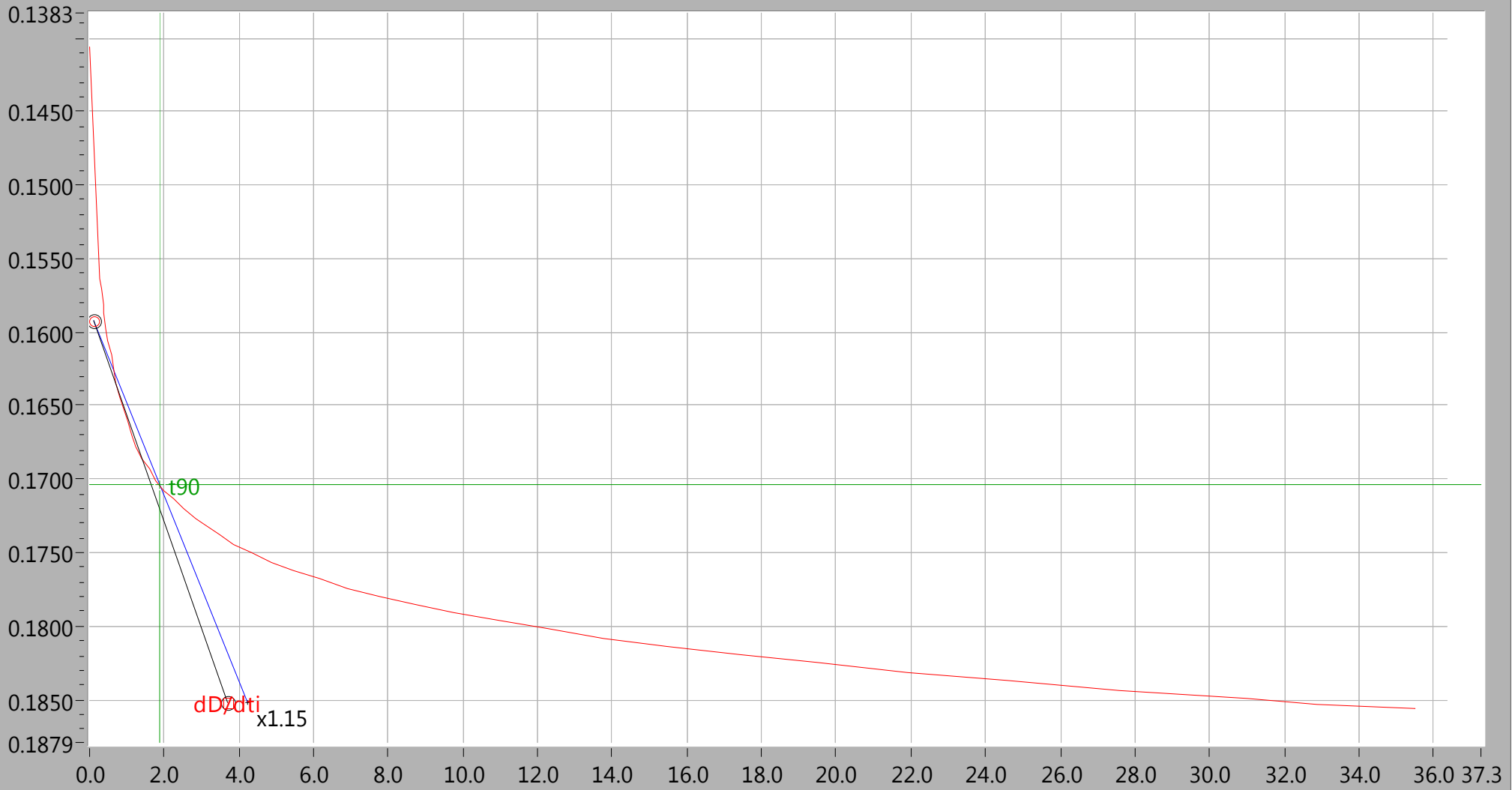


Time - Square Root Mins

Stage: 9 of 13

Client	Job Number	Sample Number
Parsons Brinckerhoff	G15004G	ST-1

Vertical Displacement in



Time - Square Root Mins

**One Dimensional Consolidation
Properties
(Oedometer)**

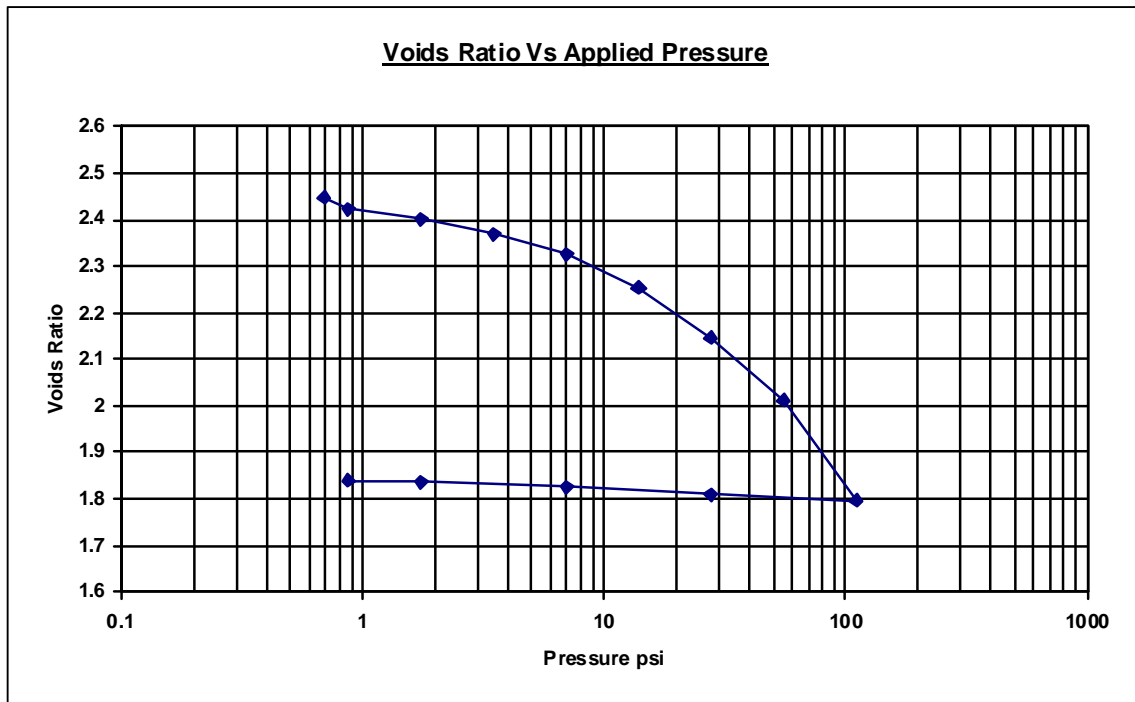


Client	Parsons Brinckerhoff	Lab Ref	
Project	HAN-75-14 39	Job	G13011G
Borehole	B-154-0-13	Sample	ST-2 (2015)
Location	Hancock County OH	Depth	5.0 feet

Test Details			
Standard	ASTM D2435-96 / AASHTO T216-94	Particle Specific Gravity	2.75
Sample Type	Thin walled push in sample	Lab. Temperature	72.0 deg.F
Method of Testing (A/B)	A		
Sample Description	WHITE AND GRAY ELASTIC CLAY		
Variations from Procedure	None		

Specimen Details			
Specimen Reference	A	Description	
Depth within Sample	12.0000in	Orientation within Sample	
Specimen Mass	0.2038 lb	Condition	Inundated
Specimen Height	0.7900 in	Preparation	
Comments			

Apparatus			
Ring Number	1	Ring Diameter	2.5030 in
Ring Height	0.7900 in	Ring Weight	0.1431 lb
Lever Ratio	10.00 : 1	Drainage	Double-Sided



**One Dimensional Consolidation
Properties
(Oedometer)**



Client	Parsons Brinckerhoff	Lab Ref	
Project	HAN-75-14 39	Job	G13011G
Borehole	B-154-0-13	Sample	ST-2 (2015)
Location	Hancock County OH	Depth	5.0 feet

Initial Moisture Content*	85.3 % (trimmings: 85.3 %)	Final Moisture Content	67.0 %
Initial Bulk Density	90.60 lb/ft3	Final Bulk Density	99.11 lb/ft3
Initial Dry Density	48.90 lb/ft3	Final Dry Density	59.34 lb/ft3
Initial Void Ratio	2.4470	Final Void Ratio	1.8403
Initial Degree of Saturation	94.09%	Final Degree of Saturation	98.30%
Pre-consolidation Pressure	0.69 psi		

* Calculated from initial and dry weights of whole specimen

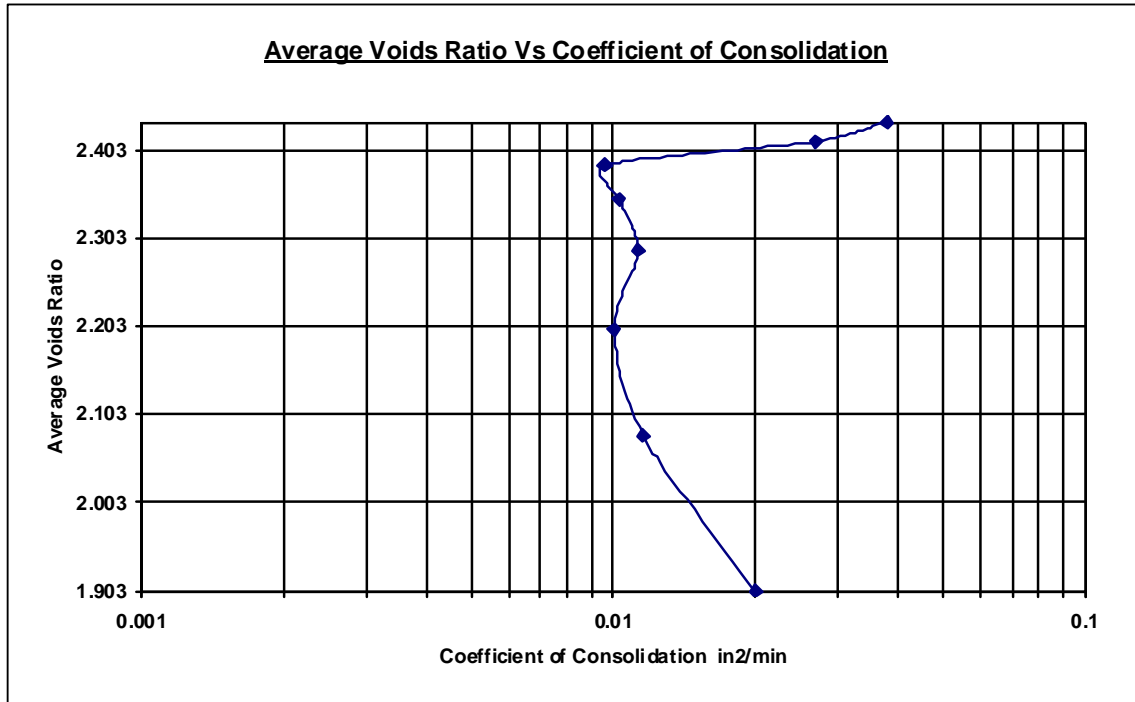
Pressure (Loading)	Load Increment Duration	Deformation (Corrected)	d ₁₀₀ (Corrected)	Coefficient of Consolidation (c _v)
0.00				
0.87 psi	1260.000 min	0.0058 in	0.0028 in	0.03814 in ² /min
1.74 psi	1680.000 min	0.0104 in	0.0073 in	0.02693 in ² /min
3.48 psi	3840.000 min	0.0179 in	0.0134 in	0.00958 in ² /min
6.95 psi	2640.000 min	0.0278 in	0.0219 in	0.01026 in ² /min
13.87 psi	2880.000 min	0.0444 in	0.0346 in	0.01125 in ² /min
27.74 psi	4080.000 min	0.0689 in	0.0540 in	0.01006 in ² /min
55.55 psi	1440.000 min	0.0998 in	0.0832 in	0.01157 in ² /min
111.00 psi	4080.000 min	0.1494 in	0.1277 in	0.02003 in ² /min
27.74 psi	4080.000 min	0.1459 in	-----	-----
6.95 psi	3120.000 min	0.1426 in	-----	-----
1.74 psi	1440.000 min	0.1400 in	-----	-----
0.87 psi	1260.000 min	0.1391 in	-----	-----

Method of Time Fitting Used	Square Root Time
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**One Dimensional Consolidation
Properties
(Oedometer)**



Client	Parsons Brinckerhoff	Lab Ref	
Project	HAN-75-14 39	Job	G13011G
Borehole	B-154-0-13	Sample	ST-2 (2015)
Location	Hancock County OH	Depth	5.0 feet

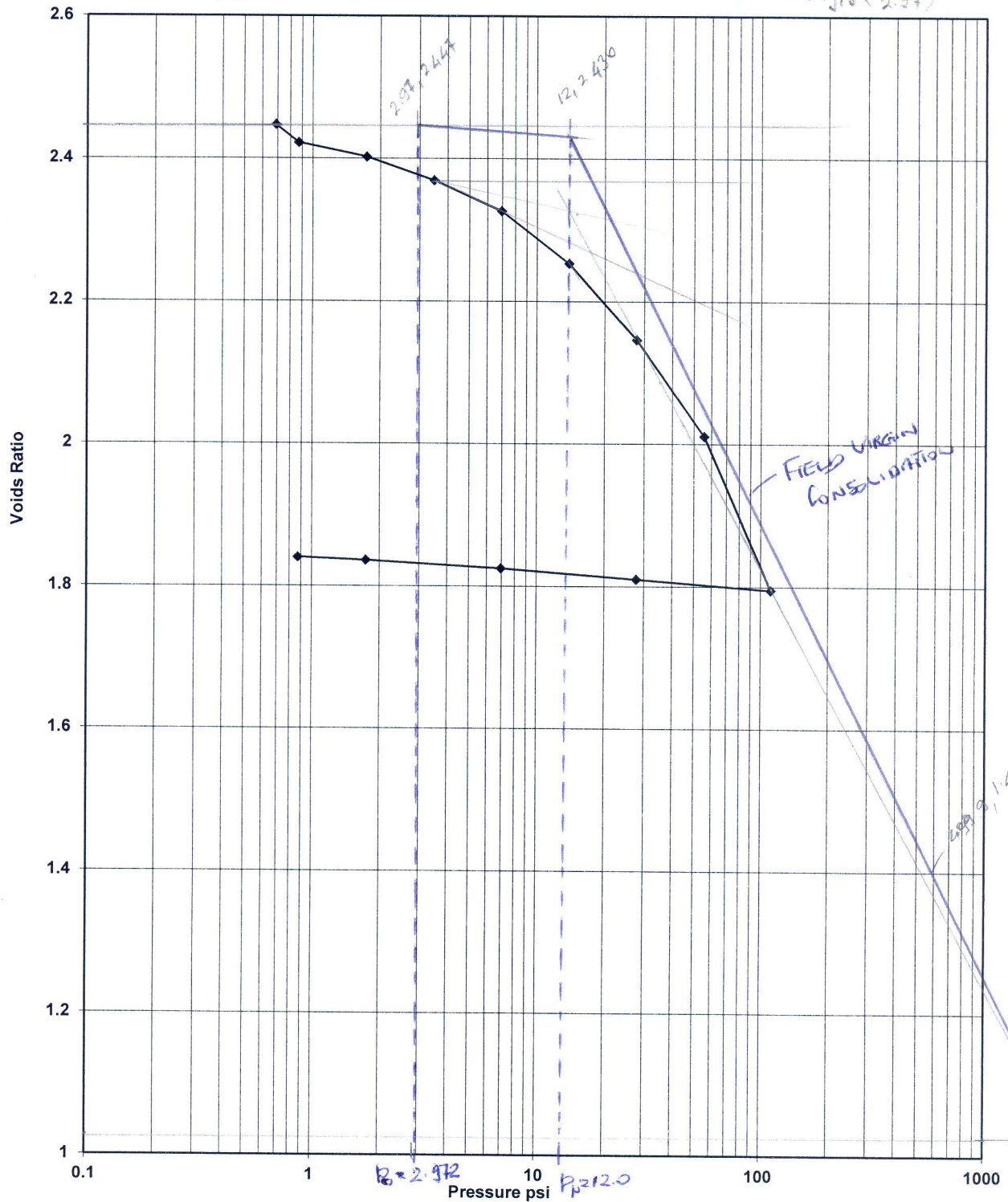


BORING NO. B-154-0-13

SAMPLE NO. 51-2 (2015)

Voids Ratio Vs Applied Pressure (Boring B-154-0-13)

$$C_c = \frac{2.447 - 2.420}{\log_{10}\left(\frac{12}{2.97}\right)} = 0.028$$

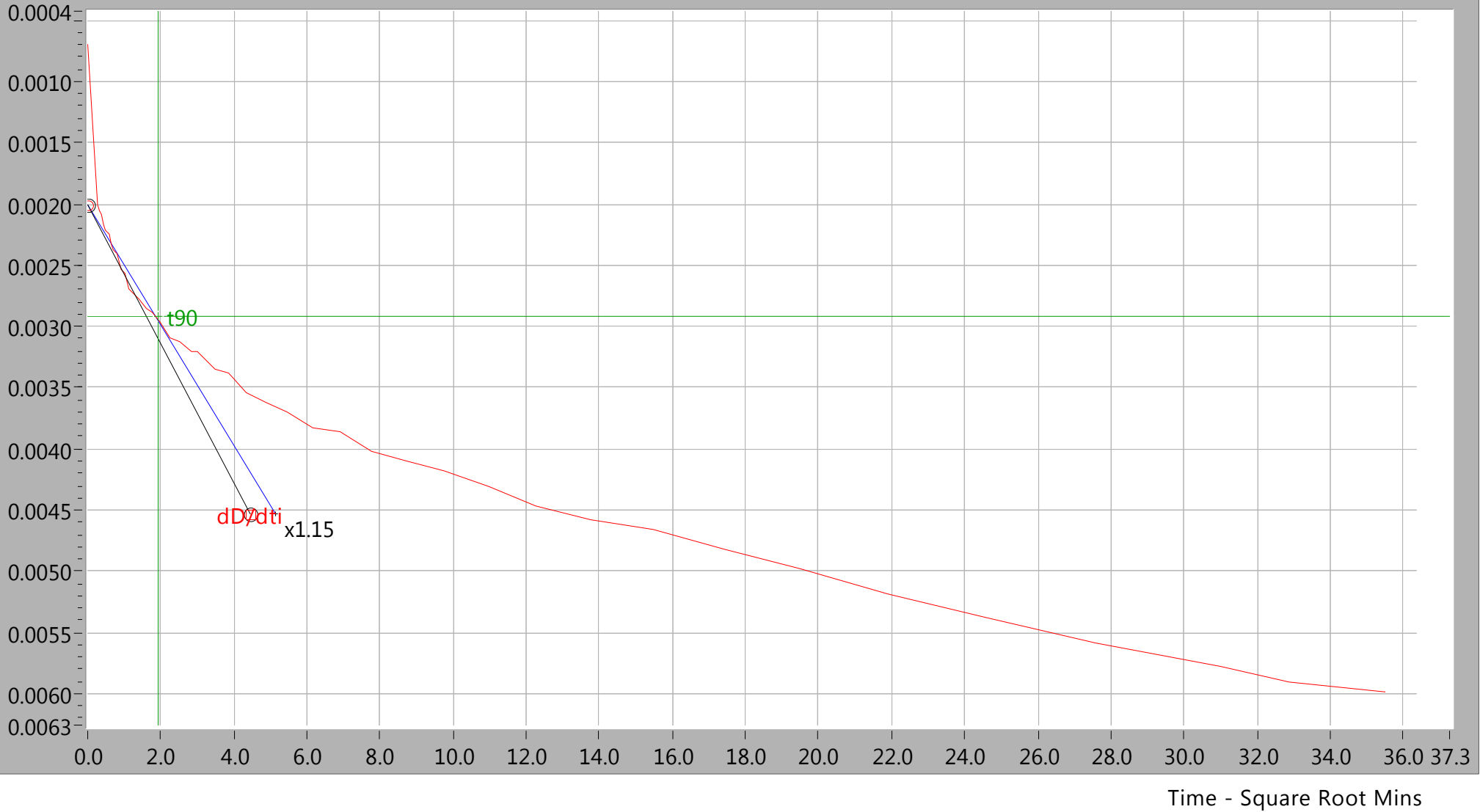


$$C_c = \frac{2.42 - 1.40}{\log_{10}\left(\frac{1490.9}{12}\right)} = 0.636$$

Stage: 1 of 12

Client	Job Number	Sample Number
Parsons Brinckerhoff	G15004G	ST-2

Vertical Displacement in

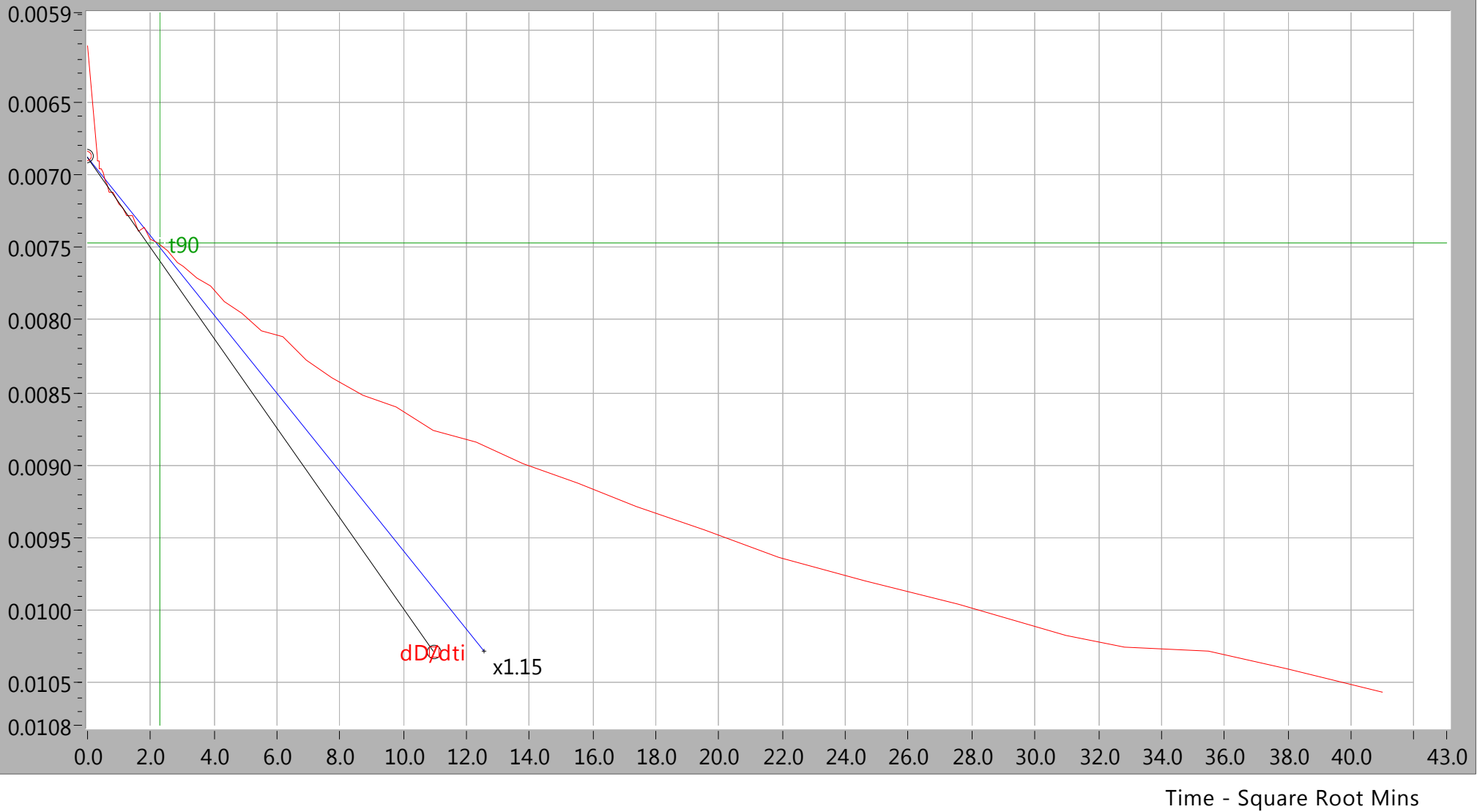


Time - Square Root Mins

Stage: 2 of 12

Client	Job Number	Sample Number
Parsons Brinckerhoff	G15004G	ST-2

Vertical Displacement in



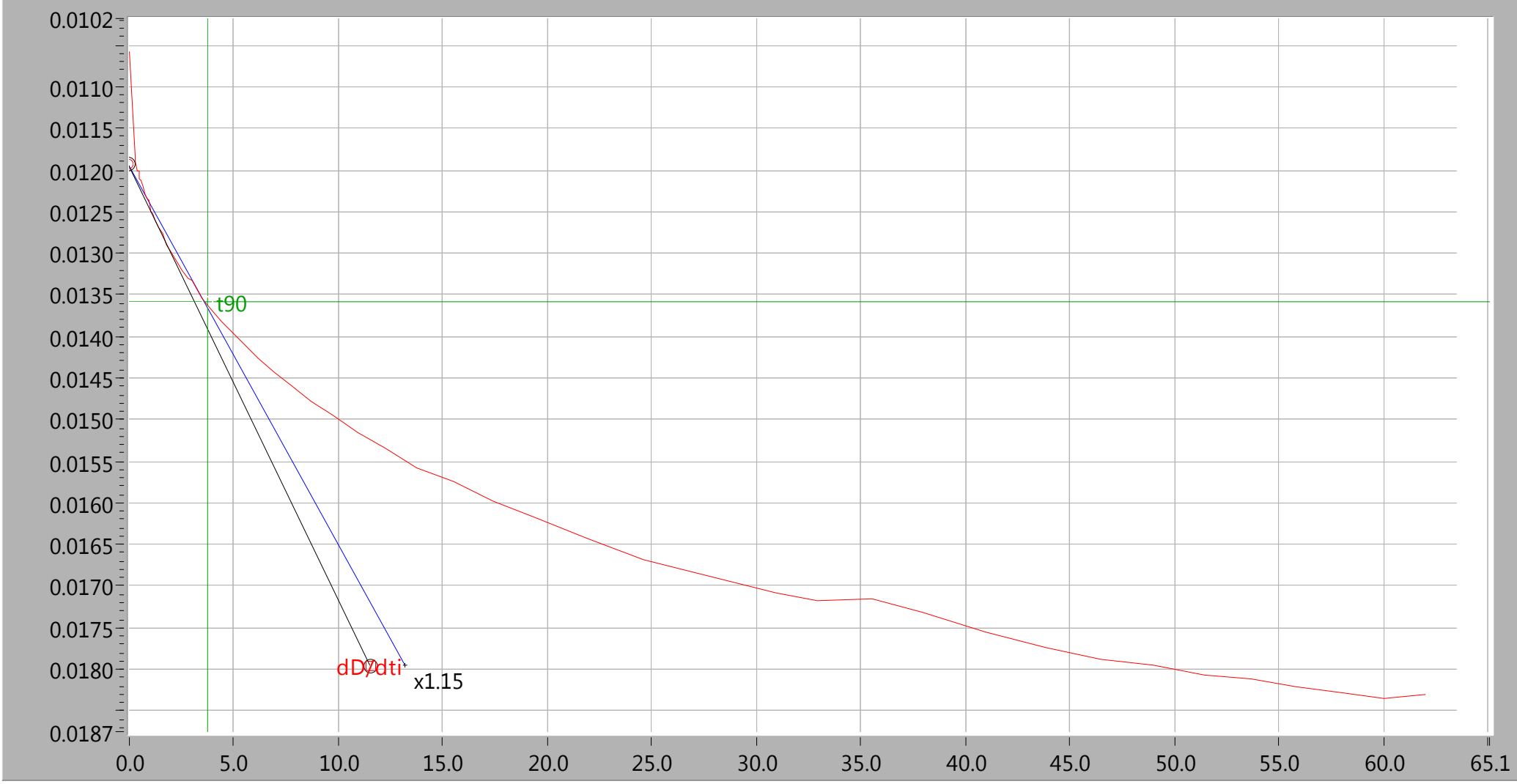
DS7 - Geotechnical Software

Time - Square Root Mins

Stage: 3 of 12

Client	Job Number	Sample Number
Parsons Brinckerhoff	G15004G	ST-2

Vertical Displacement in

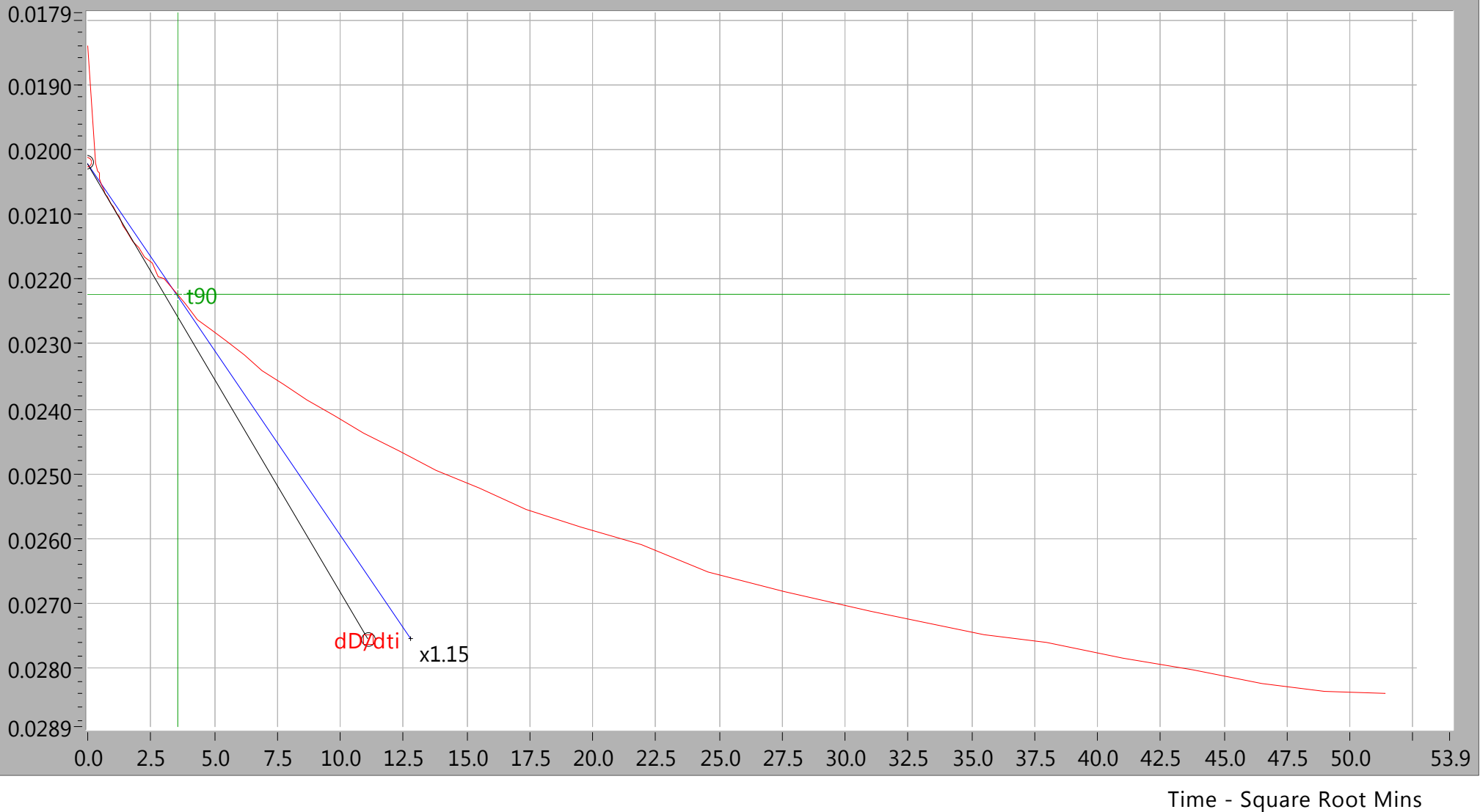


Time - Square Root Mins

Stage: 4 of 12

Client	Job Number	Sample Number
Parsons Brinckerhoff	G15004G	ST-2

Vertical Displacement in

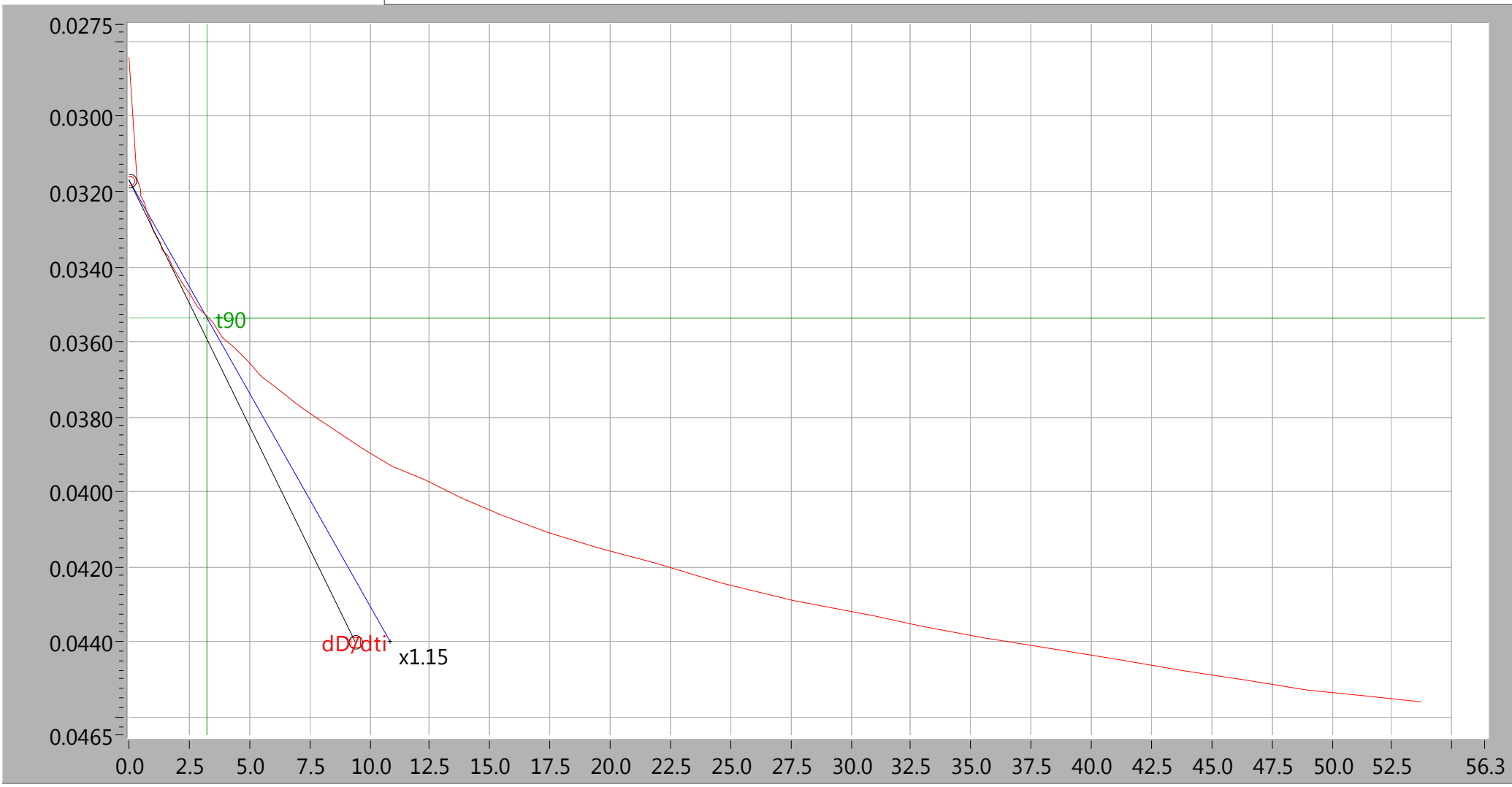


DS7 - Geotechnical Software

Stage: 5 of 12

Client	Job Number	Sample Number
Parsons Brinckerhoff	G15004G	ST-2

Vertical Displacement in

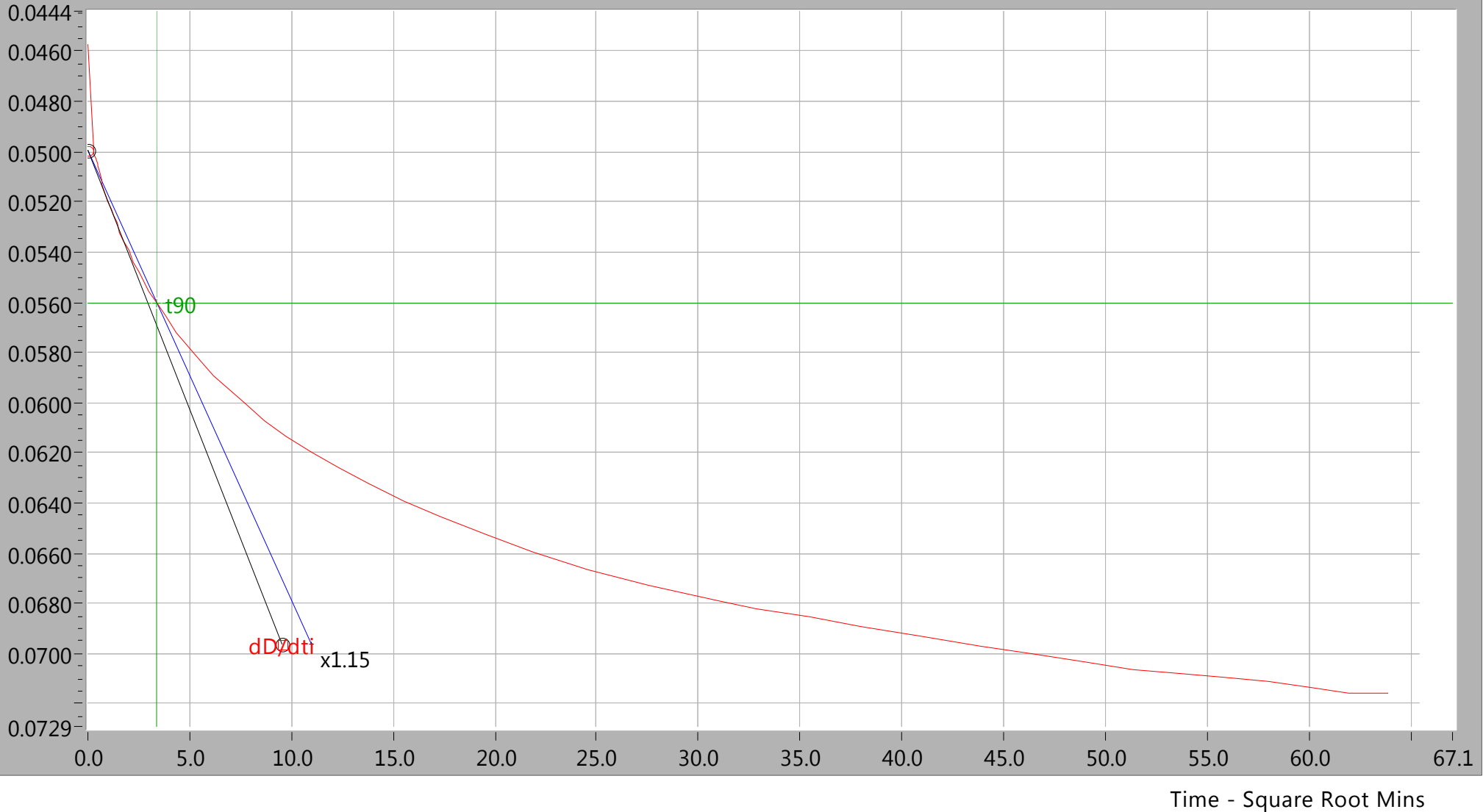


Time - Square Root Mins

Stage: 6 of 12

Client	Job Number	Sample Number
Parsons Brinckerhoff	G15004G	ST-2

Vertical Displacement in



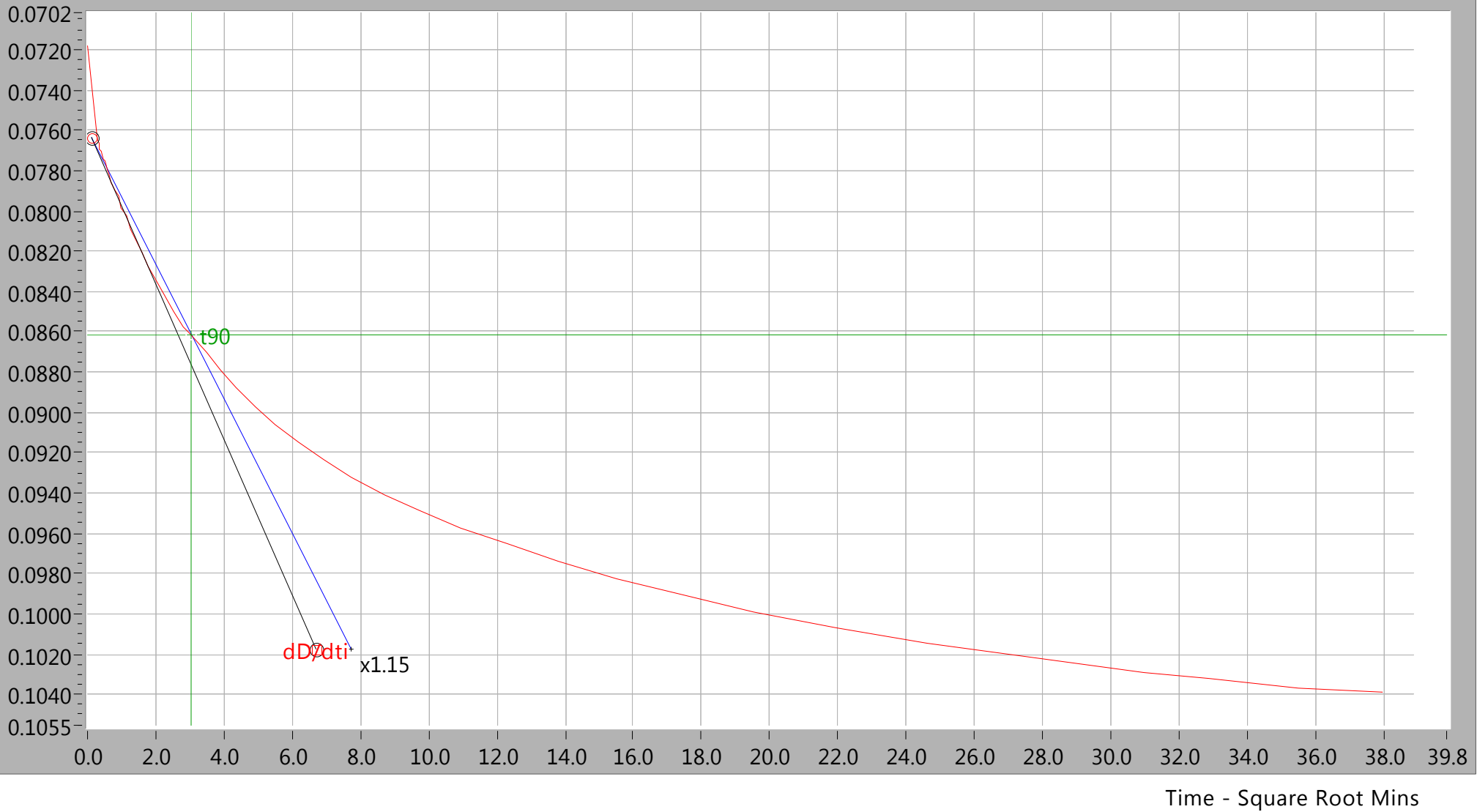
DS7 - Geotechnical Software

Time - Square Root Mins

Stage: 7 of 12

Client	Job Number	Sample Number
Parsons Brinckerhoff	G15004G	ST-2

Vertical Displacement in



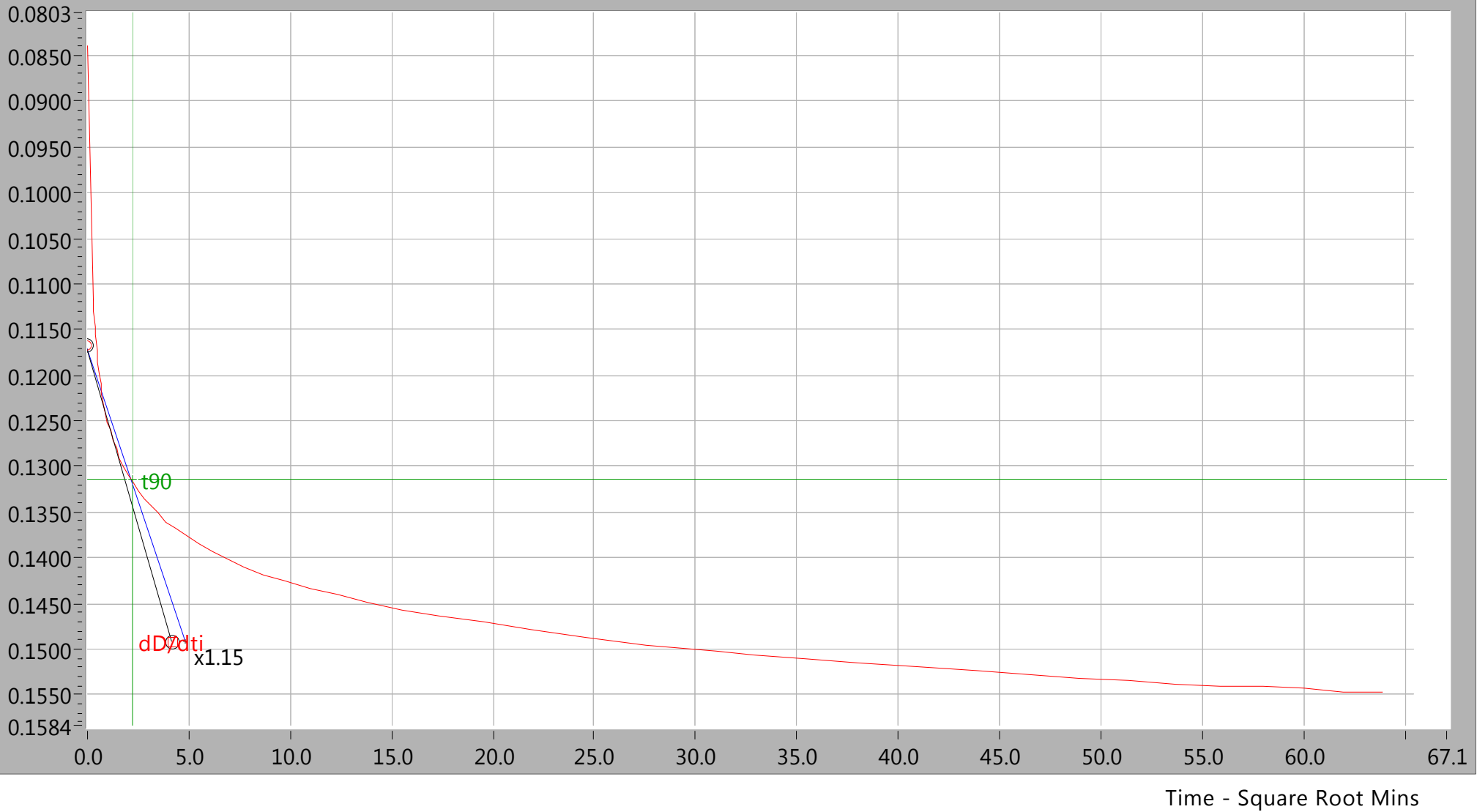
DS7 - Geotechnical Software

Time - Square Root Mins

Stage: 8 of 12

Client	Job Number	Sample Number
Parsons Brinckerhoff	G15004G	ST-2

Vertical Displacement in



DS7 - Geotechnical Software

SULFATE CONTENT TEST RESULTS

Determining Sulfate Content in Soils - Colorimetric Method
TxDOT TEX-145-E

Project: HAN-75-14.96
 PID: 87005
 Proj. No.: G13011G
 Report Date: 5/5/2015
 Technician: S.P.

Sample	Station	Offset or Lanes	Dilution Ratio (1:20)	Dilution Ratio (1:10)	Readings			Average Reading	Sulfate Concentration (ppm)
					1	2	3		
B-001-0-13	745+51.4	44.5' RT	20	10	50.5	41.62	59.66	50.59	10119
B-002-0-13	749+60.3	32.4' RT	20	1	55.66	58.11	48.55	54.11	1082
B-003-0-13	754+55.7	29.0' LT	20	10	58.73	71.35	61.6	63.89	12779
B-004-0-13	758+05.1	97.2' RT	20	10	66.7	80.08	75.69	74.16	14831
B-005-0-13	761+87.8	37.1' RT	20	1	44.06	40.99	46.23	43.76	875
B-006-0-13	765+98.5	16.5' RT	20	1	89.44	94.18	100.8	94.81	1896
B-007-0-13	770+17.5	23.1' LT	20	10	22.07	29.70	14.69	22.15	4431
B-008-0-13	773+78.3	7.4' LT	20	1	27.19	40.53	24.86	30.86	617
B-009-0-13	779+15.0	12.3' RT	20	1	26.76	23.93	17.50	22.73	455
B-010-0-13	782+35.6	5.0' RT							
B-011-0-13	785+91.6	10.9' RT							
B-012-0-13	789+90.4	17.7' LT							
B-013-0-13	793+83.6	20.7' LT	20	1	38.66	35.19	52.90	42.25	845
B-014-0-13	797+77.1	34.9' RT							
B-016-0-13	804+79.5	29.6' LT							
B-021-0-13	811+13.0	4.8' RT	20	1	74.16	69.95	69.72	71.28	1426
B-025-1-13	815+36.6	207.6' LT							
B-026-0-13	820+01.2	36.1' LT	20	1	55.86	55.74	57.92	56.51	1130
B-027-0-13	825+00.6	43.7' RT	20	1	38.49	41.87	40.60	40.32	806
B-028-0-13	829+05.1	9.3' LT	20	1	49.03	50.47	52.61	50.70	1014
B-029-0-13	833+01.0	8.1' RT	20	1	23.57	21.32	20.05	21.65	433
B-030-0-13	836+21.1	44.7' LT	20	1	26.38	29.92	28.14	28.15	563
B-031-0-13	841+10.8	42.2' RT	20	1	20.31	21.69	28.61	23.54	471
B-032-0-13	845+27.6	9.4' LT	20	1	7.68	10.32	6.34	8.11	162
B-033-0-13	849+13.6	7.9' RT	20	1	8.13	13.51	12.18	11.27	225
B-034-0-13	853+21.1	8.9' RT	20	1	42.51	43.92	46.89	44.44	889
B-034-1-13	854+68.2	5.5' LT	20	1	28.15	31.00	29.19	29.45	589
B-035-0-13	857+24.7	43.2' RT	20	1	41.84	18.05	24.68	28.19	564
B-035-1-13	857+77.7	13.0' LT	20	1	30.53	31.63	34.08	32.08	642
B-035-2-13	858+77.1	6.6' RT	20	1	28.22	27.74	31.67	29.21	584
B-036-0-13	860+69.5	11.6' LT	20	1	52.47	33.79	38.29	41.52	830
B-036-1-13	865+00.0	8.1' LT	20	1	34.31	37.49	38.31	36.70	734
B-037-0-13	864+87.8	7.7' RT	20	1	6.14	7.53	6.50	6.72	134
B-037-1-13	865+13.1	2.2' RT	20	1	10.42	10.43	10.36	10.40	208
B-038-0-13	869+08.4	11.8' RT	20	1	22.34	24.94	28.47	25.25	505

Subgrade Analysis

V. 12.00 12/30/11

Global Options		
320	R&R	Option
206	CS	Option
	LS	No
	LKD	Option
206	Depth	12

Design CBR	7
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Classification Counts by Sample																	
R	1a	1b	3	3a	2-4	2-5	2-6	2-7	4a	4b	5	6a	6b	7-5	7-6	8a	8b
13	8	13	1	8	4	0	1	1	65	4	0	100	69	0	27	0	0
4%	3%	4%	0%	3%	1%		0%	0%	21%	1%		32%	22%		9%		
4%	11%											84%					

Surface Class	
2-5	0
4b	0
5	0
7-5	0
7-6	6
8a	6
8b	0
R	0

% Borings	
N _{60L} ≤ 5	4%
≤ 10	39%
≥ 20	5%
M+	65%
R	14%

% Surface	
22%	
0%	22%

UC @ Surface	
15.3	
0	
0	

Rig	ER
A	67
B	70
C	71
D	80
E	82
F	85
G	60
H	86
I	62

Total Borings	95
PID	87005

Average	N ₆₀	N _{60L}	PI	Clay	M	M _{OPT}	GI
Maximum	20.3	12.3	14.7	30.4	16.5	13.5	7.01
Minimum	137	30	57	31	77	98	19
	4	4	18	12	2	6	3
					6	3	6

Location	HAN-75-14.39, FINDLAY, OH
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#	B #	Boring Location	Depth To	Cut Fill	Subgrade	Standard Penetration			Physical Characteristics				Moisture			Class		Comments	Problem		Undercuts		Analysis
						n ₂	n ₃	N	Rig	N ₆₀	N _{60L}	LL	PL	PI	% Silt	% Clay	P 200		M	M _{OPT}	Ohio DOT	GI	

1	B-001-0-13	745+51.30, 44.45' RT IR-75 BASELINE	1.5 3.0 3.0 4.5 4.5 6.0	-1.9	-0.4 1.1 1.1 2.6 2.6 4.1	10 11 13 16 9 8	21 A 29 17	23 32 19	19	26 14 18 14	12 4	33 19 34 21	52 55	12 14 7 10 8 10	6a 4a 4a	4 4 5							
2	B-002-0-13	749+60.32, 32.43' RT IR-75 BASELINE	1.0 2.5 3.5 5.0 6.0 7.5	-1.9	-0.9 0.6 1.6 3.1 4.1 5.6	6 12 8 11 6 6	18 B 19 12	21 22 14	14	23 13 22 17	10 5	49 18 45 27	67 72	11 10 14 12 16 10	4a 4a 4a	6 7 5	Excessive Moisture		MN		12	OK	
3	B-003-0-13	754+55.67, 29.02' LT IR-75 BASELINE	1.0 2.5 3.5 5.0 5.0 7.5	-1.6	-0.6 0.9 1.9 3.4 3.4 5.9	8 14 9 13 5 7	22 B 26 12	26 26 14	14	26 17 25 16	9	41 28 38 36	69 74	10 12 12 10 15 11	4a 4a 4a	7 5 8	Excessive Moisture		MN		12	OK	
4	B-004-0-13	758+26.50, 74.17' LT IR-75 BASELINE	1.0 2.5 3.5 5.0 6.0 7.5	-1.6	-0.6 0.9 1.9 3.4 4.4 5.9	5 8 11 13 6 6	13 B 24 12	15 28 14	14	25 16 26 16	9 10	47 29 31 27	76 58	14 11 11 11 16 14	4a 4a 6a	8 5 8							
5	B-005-0-13	761+87.79, 37.13' RT IR-75 BASELINE	1.5 1.9 3.0 4.5 4.5 6.0	-1.9	-0.4 0.0 1.1 2.6 2.6 4.1	50 6 9 5 6	50 A 15 11	56 17 12	12	NP NP NP 28 17 11	NP 11	7 7 40 33	7 73	10 6 14 14 16 14	1a 6a 6a	0 8 8							
6	B-006-0-13	765+98.51, 16.48' RT IR-75 BASELINE	1.0 2.5 3.5 5.0 6.0 7.0 7.0 7.3	-0.7	0.4 1.9 2.9 4.4 5.4 6.4 6.4 6.7	8 10 4 3 5 50	18 B 7 55	21 8 64	8	29 17 38 26	12 12	35 31 46 27	66 73	11 14 17 21 24 14	6a 6a 6a R	7 8	Weak Soil Excessive Moisture Bedrock	BR	N M		18	Unstable Soil	
7	B-007-0-13	770+17.46, 23.13' LT IR-75 BASELINE	1.5 3.0 3.0 4.5 4.5 6.0 6.0 7.5	-3.2	-1.7 -0.2 -0.2 1.3 1.3 2.8 2.8 4.3	12 26 19 12 10 9 8 9	38 A 31 19 17	42 35 21 19	19	19 13 25 17	6 8	20 18 11 30	38 41	6 10 11 12 12 10 17 10	4a 4a 4a 4a	1 1 5 5	Excessive Moisture		M			Unstable Soil	
8	B-008-0-13	773+78.27, 7.38' LT IR-75 BASELINE	1.0 2.5 2.5 4.0 4.0 5.5 5.5 7.0	-3.9	-2.9 -1.4 -1.4 0.1 0.1 1.6 1.6 3.1	4 6 8 7 13 9 4 6	10 A 15 22 11	11 17 25 11	11	24 16 26 16	8 10	32 23 42 27	55 69	12 11 13 11 8 10 22 16	4a 4a 4a 6b	4 7 5 10	Weak Soil		N		14	OK	
9	B-009-0-13	779+14.97, 12.31' RT IR-75 BASELINE	1.5 1.8 2.0 3.5 3.5 5.0 5.0 6.5	-1.2	0.3 0.6 0.8 2.3 2.3 3.8 3.8 5.3	50 30 25 17 25 6 7	50 A 62 42 13	56 62 47 15	15	NP NP NP 23 12 11	NP 11	45 4 32 19	49 51	9 15 11 11 10 18 14	4a 4a 4a 6a	3 4 4 8							
10	B-010-0-13	782+35.61, 5.00' RT IR-75 BASELINE	0.5 2.0 2.0 3.5 4.5 6.0	-0.8	-0.3 1.2 1.2 2.7 3.7 5.2	15 20 8 14 9 10	35 C 26 19	41 26 22	22	25 16 20 12	9 8	31 18 21 17	49 38	11 11 8 10 13 10	4a 4a 4a	3 1 5							
11	B-011-0-13	785+91.58, 10.87' RT IR-75 BASELINE	1.5 3.0 3.0 4.5 4.5 6.0	0.0	1.5 3.0 3.0 4.5 4.5 6.0	8 5 5 9 6 11	13 A 14 17	15 16 19	15	NP NP NP 27 16 11	NP 11	12 13 37 26	25 63	20 6 12 14 17 14	1b 6a 6a	0 6 8	Excessive Moisture		M			OK	

#	Boring				Cut Fill	Subgrade		Standard Penetration						Physical Characteristics					Moisture		Class		Comments	Problem		Undercuts		Analysis	
	B #	Boring Location	Depth	To		Depth	To	n ₂	n ₃	N	Rig	N ₆₀	N _{60L}	LL	PL	PI	% Silt	% Clay	P 200	M	M _{OPT}	Ohio DOT		GI	w/ Class	w/ MN	UC Class		UC MN
12	B-012-0-13	789+90.38, 17.65' LT IR-75 BASELINE	1.0 1.5	1.5 1.8	11.0	12.0 12.5	12.5 12.8	50		50	D	67							23	16	6b R		Excessive Moisture Bedrock	BR	M	24		OK	
13	B-013-0-13	793+83.61, 20.71' LT IR-75 BASELINE	1.0 3.5 6.0	2.5 5.0 7.5	11.0	12.0 14.5 17.0	13.5 16.0 18.5	32 7 7	30 6 9	62 13 16	B	73 15 19		37 33	29 20	8 13	38 41	34 35	72 76	6 13 16	6 15	1a 4a 6a							
14	B-014-0-13	797+77.14, 34.85' RT IR-75 BASELINE	1.0 3.5 6.0	2.5 5.0 7.5	3.8	4.8 7.3 9.8	6.3 8.8 11.3	3 3 3	4 3 4	7 6 7	E	10 8 10		40 38	21 19	19 19	30 37	39 37	69 74	19 21	16 16 14	6b 6b 6a	10	Weak Soil Weak Soil Weak Soil		N N N		15 18 15	OK OK OK
15	B-015-0-13	801+61.66, 32.92' RT IR-75 BASELINE	1.0 3.5 6.0	2.5 5.0 7.5	3.2	4.2 6.7 9.2	5.7 8.2 10.7	4 3 2	6 4 2	10 7 4	E	14 10 5		40 38	19 19	21 19	36 25	40 40	76 65	18 17 17	16 16 14	6b 6b 6a	12	Weak Soil Weak Soil		N N		15 27	OK OK
16	B-016-0-13	804+79.49, 29.55' LT IR-75 BASELINE	1.0 3.5 6.0	2.5 5.0 7.5	21.9	22.9 25.4 27.9	24.4 26.9 29.4	3 3 1	5 5 2	8 8 3	D	11 11 4		39	20	19	38	42	80	28 23 24	14 16 16	6a 6b 6b	12	Weak Soil Weak Soil Weak Soil		N N N		14 14 30	OK OK OK
17	B-021-0-13	811+13.01, 4.75' RT IR-75 BASELINE	1.5 3.5 6.0	3.0 5.0 7.5	9.0	10.5 12.5 15.0	12.0 14.0 16.5	6 5 7	7 7 5	13 12 12	B	15 14 14		33 29	21 16	12 13	25 38	19 33	44 71	14 14 15	16 14 14	6a 6a 6a							
18	B-025-1-13	815+36.57, 207.59' LT IR-75 BASELINE	1.0 3.5 6.0	2.5 5.0 7.5	33.5	34.5 37.0 39.5	36.0 38.5 41.0	5 6 4	9 7 5	14 13 9	D	19 17 12		25	17	8	37	35	72	22 14 19	16 12 10	6b 4a 4b		Excessive Moisture Silt soil	4b	M MN	36	12	OK OK
19	B-118-0-13	819+31.83, 45.04' RT IR-75 BASELINE	1.5 3.5 6.0	3.0 5.0 7.5	2.5	4.0 6.0 8.5	5.5 7.5 10.0	4 4 6	5 6 7	9 10 13	E	12 14 18								22 14 19	14 14 11	6a 6a 4a	8	Both Excessive Moisture		MN M		12	OK OK
20	B-026-0-13	820+01.19, 36.05' LT IR-75 BASELINE	1.0 3.5 6.0	2.5 5.0 7.5	2.0	3.0 5.5 8.0	4.5 7.0 9.5	9 6 7	10 8 8	19 14 15	B	22 16 18		31 28	29 18	2 10	20 39	5 32	25 71	16 13 9	6 13 10	1b 4a 4a	0	Excessive Moisture		M			OK
21	B-026-2-13	822+18.71, 92.20' RT IR-75 BASELINE	1.0 3.5 5.5	2.5 5.0 7.5	18.2	19.2 21.7 23.7	20.7 23.2 25.7	6 2	6 3	12 5	D	16 7								21 23 17	10 10 10	4a 4a 4a		Excessive Moisture Weak Soil Excessive Moisture		M N M		21 12	OK OK OK
22	B-027-0-13	825+00.61, 43.72' RT IR-75 BASELINE	1.0 3.5 6.0	2.5 5.0 7.5	2.6	3.6 6.1 8.6	5.1 7.6 10.1	5 5 12	5 6 8	10 11 20	C	12 13 24								16 19 13	10 14 10	4a 6a 4a	5	Both Excessive Moisture		MN MN		12 12	OK OK
23	B-027-2-13	826+44.16, 73.62' RT IR-75 BASELINE	1.0 3.5 5.5	2.5 5.5 7.0	6.5	7.5 10.0 12.0	9.0 12.0 13.5	3 4	4 5	7 9	D	9 12								22 16 16	18 18 10	7-6 7-6 4a		Weak Soil Both		N MN		16 12	OK OK
24	B-028-0-13	829+05.07, 9.32' LT IR-75 BASELINE	1.5 3.0 4.5	3.0 4.5 6.0	-1.0	0.5 2.0 3.5	2.0 3.5 5.0	12 8 8	12 10 9	24 18 17	A	27 20 19		28 38	16 22	12 16	25 41	49 36	74 77	12 19 22	14 17 16	6a 6b 6b	9 10 10	Excessive Moisture		M			OK
25	B-029-0-13	833+01.02, 8.13' RT IR-75 BASELINE	2.0 3.5 5.0	3.5 5.0 6.5	-1.0	1.0 2.5 4.0	2.5 4.0 5.5	8 6 8	20 4 4	28 10 12	C	33 12 14		35 NP	23 NP	12 NP	39 14	21 3	60 17	19 21 17	18 6 14	6a 1b 6a	6 0 8	Excessive Moisture		MN		---	Unstable Soil
26	B-030-0-13	836+21.08, 44.67' LT IR-75 BASELINE	1.0 3.5 6.0	2.5 5.0 7.5	0.2	1.2 3.7 6.2	2.7 5.2 7.7	6 10 10	10 10 20	16 20 30	B	19 23 35		38 23	15 15	23 8	33 43	26 24	59 67	12 12 12	16 10 10	6b 4a 4a	10 6						
27	B-031-0-13	841+10.79, 42.22' RT IR-75 BASELINE	1.0 3.5 5.0	2.5 5.0 7.5	0.0	1.0 3.5 5.0	2.5 5.0 7.5	6 3 14	7 5 19	13 8 33	C	15 9 39		34 29	18 17	16 12	29 39	30 29	59 68	13 17 10	16 14 10	6b 6a 4a	7	Weak Soil		N		16	OK

#	Boring				Cut Fill	Subgrade		Standard Penetration						Physical Characteristics				Moisture		Class		Comments	Problem		Undercuts		Analysis	
	B #	Boring Location	Depth	To		Depth	To	n ₂	n ₃	N	Rig	N ₆₀	N _{60L}	LL	PL	PI	% Silt	% Clay	P 200	M	M _{OPT}		Ohio DOT	GI	w/ Class	w/ MN		UC Class
28	B-032-0-13	845+27.59, 9.42' LT IR-75 BASELINE	1.5 3.0 4.5	3.0 4.5 6.0	-1.9	-0.4 1.1 2.6	1.1 2.6 4.1	8 4 3	7 6 4	15 10 7	A	17 11 8	NP 40	NP 19	NP 21	31 37	16 46	47 83	23 20 20	11 16 14	4a 6b 6a	2 12 8	Excessive Moisture Weak Soil Weak Soil		M N N		14 18	Unstable Soil Unstable Soil Unstable Soil
29	B-033-0-13	849+13.60, 7.93' RT IR-75 BASELINE	2.0 3.5 5.0	3.5 5.0 6.5	-2.6	-0.6 0.9 2.4	0.9 2.4 3.9	12 3 4	5 3 3	17 6 7	C	20 7 8	36 34	26 17	10 17	35 42	16 40	51 82	19 17 22	11 16 16	4a 6b 6b	3 11 10	Weak Soil Weak Soil		N N	21 18	Unstable Soil Unstable Soil	
30	B-034-0-13	853+21.08, 8.92' RT IR-75 BASELINE	1.0 3.5 6.0	2.5 5.0 7.5	-2.6	-1.6 0.9 3.4	-0.1 2.4 4.9	4 5 2	5 6 4	9 11 6	B	11 13 7	38 39	16 21	22 18	31 27	42 68	73 95	18 25 20	16 6b 8	6b 6b 3a	12 11 0	Weak Soil Weak Soil Weak Soil		N MN N	14 12 ---	Unstable Soil OK	
31	B-034-1-13	854+68.15, 5.46' LT SR 12 RAMP B BASELINE	1.0 3.5 6.0	2.5 5.0 7.5	-3.7	-2.7 -0.2 2.3	-1.2 1.3 3.8	6 5 2	11 5 4	0 10 6	D	23 13 8	NP 38	NP 18	NP 20	29 34	11 43	40 77	24 19 21	11 16 16	4a 6b 6b	1 12 10	Excessive Moisture Weak Soil		M N	18	Unstable Soil	
32	B-035-0-13	857+24.68, 43.20' RT IR-75 BASELINE	1.0 3.5 6.0	2.5 5.0 7.5	-1.0	0.0 2.5 5.0	1.5 4.0 6.5	4 5 2	5 6 4	9 11 6	B	11 13 7	27 29	14 17	13 12	40 42	31 25	71 67	18 20 13	14 14 8	6a 6a 3a	8 7 0	Weak Soil Excessive Moisture Weak Soil		N MN N	14 12 ---	Unstable Soil Unstable Soil	
33	B-035-1-13	857+77.68, 13.02' LT SR 12 RAMP A BASELINE	1.0 3.5 6.0	2.5 5.0 7.5	-1.8	-0.8 1.7 4.2	0.7 3.2 5.7	4 6 7	6 5 6	10 11 13	B	12 13 15	26 NP	13 NP	13 NP	34 33	43 15	77 48	17 15 18	14 11 10	6a 4a 4b	9 3	Excessive Moisture Silt soil	4b	MN M	36	12	Unstable Soil
34	B-035-2-13	858+77.12, 6.63' RT SR 12 RAMP B BASELINE	1.5 3.5 6.0	3.0 5.0 7.5	-3.2	-1.7 0.3 2.8	-0.2 1.8 4.3	5 4 6	5 6 7	10 10 13	D	13 13 17	31 36	26 19	5 17	24 32	13 41	37 73	22 19 16	21 16 16	4a 6b 6b	0 10 10						
35	B-036-0-13	860+69.46, 11.58' LT IR-75 BASELINE	1.5 3.0 4.5	3.0 4.5 6.0	-1.9	-0.4 1.1 2.6	1.1 2.6 4.1	15 4 3	7 4 3	22 8 6	A	25 9 7	NP NP	NP NP	NP NP	20	6 7	6 27	9 26 20	6 8 16	1a 3a 6b	0 0 10	Weak Soil Weak Soil		N N	---	21	OK Unstable Soil
36	B-036-1-13	864+99.99, 8.13' LT SR 12 RAMP C BASELINE	1.0 3.5 6.0	2.5 5.0 7.5	-0.2	0.8 3.3 5.8	2.3 4.8 7.3	6 6 6	6 5 7	12 11 13	B	14 13 15	32 33	17 20	15 13	20 30	20 28	40 58	13 12 17	14 15 14	6a 6a 6a	2 6 6						
37	B-037-0-13	864+87.84, 7.74' RT IR-75 BASELINE	2.0 3.5 6.0	3.5 5.0 7.5	-2.6	-0.6 0.9 3.4	0.9 2.4 4.9	5 5 4	5 6 4	10 11 8	F	14 16 11	37 27	20 17	17 10	10 34	19 34	29 68	16 15 13	10 12 10	2-6 4a 4a	1 7 5	Excessive Moisture Weak Soil		MN N	12 14	Unstable Soil OK	
38	B-037-1-13	865+13.05, 2.24' RT SR 12 RAMP D BASELINE	1.0 3.5 6.0	2.5 5.0 7.5	-2.1	-1.1 1.4 3.9	0.4 2.9 5.4	7 5 4	5 8 6	12 13 10	D	16 17 13	32 32	18 17	14 15	21 22	19 24	40 46	15 13 14	14 14 14	6a 6a 6a	2 4 8						
39	B-038-0-13	869+08.39, 11.75' RT IR-75 BASELINE	1.0 3.5 6.0	2.5 5.0 7.5	-2.3	-1.3 1.3 3.8	0.3 2.8 5.3	9 2 9	6 4 11	15 6 20	B	18 7 23	33 32	18 17	15 15	27 23	25 24	52 47	14 16 14	14 10 14	6a 6a 4a	5 4 5	Weak Soil		N	21	Unstable Soil	
40	B-038-1-13	869+47.68, 17.67' LT SR 12 RAMP D BASELINE	1.0 3.5 6.0	2.5 5.0 7.5	-1.0	0.0 2.5 5.0	1.5 4.0 6.5	16 4 4	7 4 5	23 8 9	D	31 11 12	28 26	15 16	13 10	21 29	27 27	48 56	15 13	14 11	6a 6a 4a	8 4 4	Weak Soil		N	14	OK	
41	B-039-0-13	873+16.69, 57.40' RT IR-75 BASELINE	1.5 3.5 6.0	3.0 5.0 7.5	-0.5	1.0 3.0 5.5	2.5 4.5 7.0	13 4 4	16 5 5	29 9 9	D	39 12 12	36 34	18 17	18 17	24 30	31 40	55 70	7 20 18	6 16 16	1a 6b 6b	0 7 10	Both		MN	12	OK	
42	B-040-0-13	877+14.24, 11.21' LT IR-75 BASELINE	1.5 3.0 4.5	3.0 4.5 6.0	-1.9	-0.4 1.1 2.6	1.1 2.6 4.1	12 5 3	12 4 5	24 9 8	A	27 10 9	39 42	21 16	18 26	37 31	37 50	74 81	20 22	16 18	6b 6b 7-6	10 11	Weak Soil Weak Soil		N N	15 16	Unstable Soil Unstable Soil	
43	B-041-0-13	881+15.29, 7.63' RT IR-75 BASELINE	2.0 3.5 6.0	3.5 5.0 7.5	-1.9	0.1 1.6 4.1	1.6 3.1 5.6	8 6 10	7 5 12	15 11 22	F	21 16 31	30 29	17 19	13 10	26 31	37 24	63 55	15 16 19	14 14 14	6a 4a 6a	7 4 8						

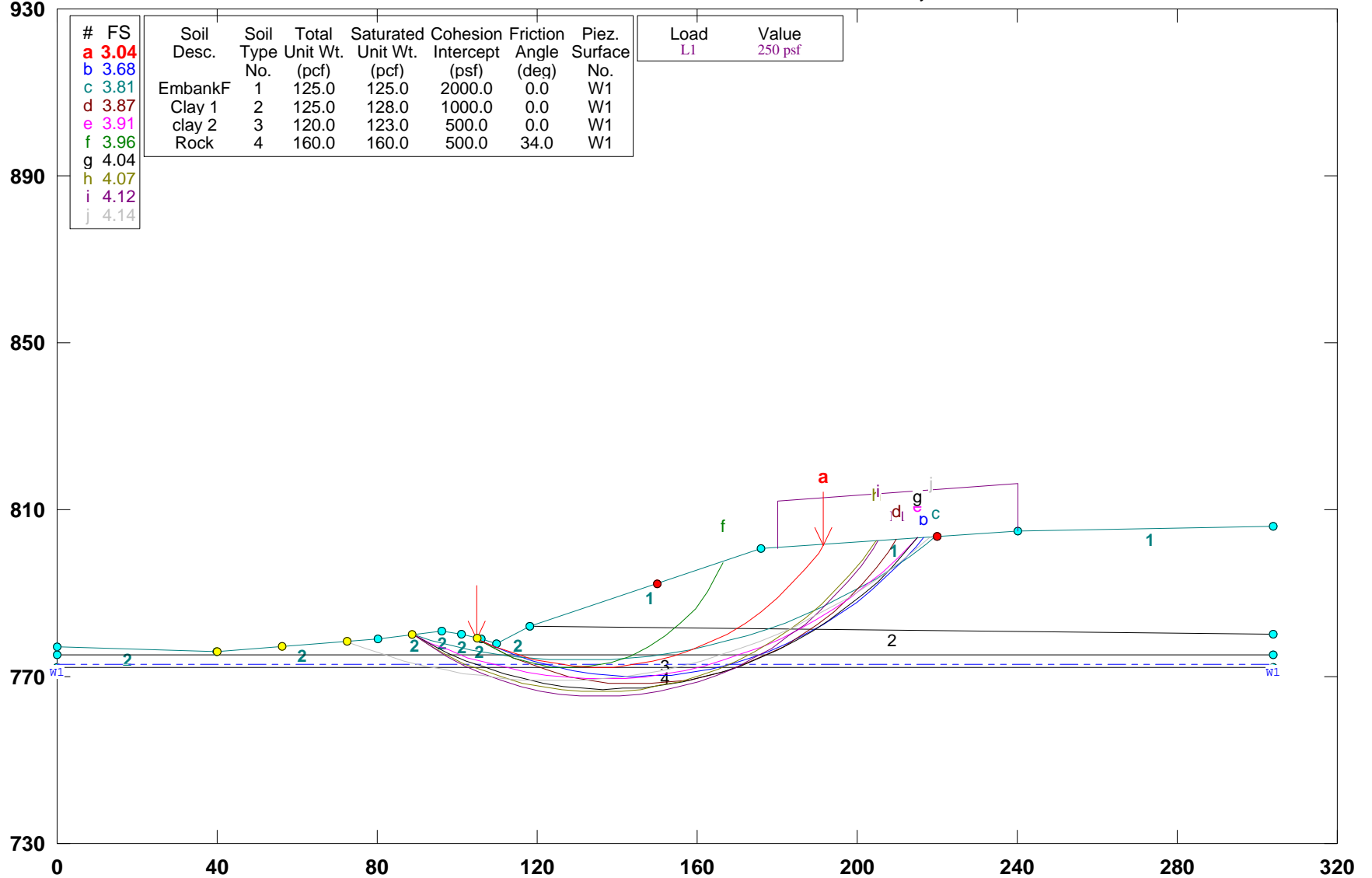
#	Boring					Subgrade		Standard Penetration						Physical Characteristics					Moisture		Class		Comments	Problem		Undercuts		Analysis		
	B #	Boring Location	Depth	To	Cut Fill	Depth	To	n ₂	n ₃	N	Rig	N ₆₀	N _{60L}	LL	PL	PI	% Silt	% Clay	P 200	M	M _{OPT}	Ohio DOT		GI	w/ Class	w/ MN	UC Class		UC MN	
44	B-042-0-13	885+07.94, 44.44' LT IR-75 BASELINE	1.0 3.5 6.0	2.5 5.0 7.5	0.0	1.0 3.5 6.0	2.5 5.0 7.5	7 7 7	3 8 9	10 15 16	B	12 18 19		37 25	21 16	16 9	33 42	41 29	74 71	5 20 14	8 16 11	3a 6b 4a	0 10 7							
45	B-043-0-13	889+24.05, 53.76' RT IR-75 BASELINE	1.0 3.5 6.0	2.5 5.0 7.5	0.0	1.0 3.5 6.0	2.5 5.0 7.5	2 5 6	3 7 9	5 12 15	D	7 16 20		33 27	18 17	15 10	30 51	34 43	64 94	20 19 18	14 14 18	6a 6a 4b	8 8 8	Weak Soil Silt soil	4b	N		21	Unstable Soil OK	
46	B-044-0-13	892+90.74, 45.23' LT IR-75 BASELINE	1.0 3.5 6.0	2.5 5.0 7.5	-1.3	-0.3 2.3 4.8	1.3 3.8 6.3	5 5 7	8 7 7	13 12 14	B	15 14 16		44 31	20 18	24 13	29 37	54 38	83 75	18 14 15	18 14 14	7-6 6a 6a	14 9 8							
47	B-044-1-13	895+92.51, 35.19' RT IR-75 BASELINE	1.5 3.5 6.0	3.0 5.0 7.5	0.0	1.5 3.5 6.0	3.0 5.0 7.5	4 6 5	5 9 6	9 15 11	D	12 20 15								14 13 16	10 10 10	4a 4a 4a	5 5 5	Both Excessive Moisture		MN M		12	Unstable Soil OK	
48	B-047-1-13	902+90.56, 128.53' LT IR-75 BASELINE	1.0 3.5 6.0	2.5 5.0 8.0	28.8	29.8 32.3 34.8	31.3 33.8 36.8	3 4	3 4	6 8	D	8 11								19 25 23	14 16 16	6a 6b 6b		Weak Soil Weak Soil Excessive Moisture		N N M		18 14 12	OK OK OK	
49	B-049-0-13	902+96.45, 34.77' LT IR-75 BASELINE	2.0 3.5 6.0 8.5	3.5 5.0 7.5 10.0	-3.9	-1.9 -0.4 2.1 4.6	-0.4 1.1 3.6 6.1	8 4 1 3	7 5 3	15 9 4 6	C	18 11 5 7		22 41	14 19	8 22	41 30	32 48	73 78	13 16 17	10 18 18	4a 4a 7-6 7-6	5 8 13 14	Weak Soil Weak Soil Weak Soil		N N N		14 27 21	Unstable Soil Unstable Soil OK	
50	B-049-1-13	904+26.91, 76.62' RT IR-75 BASELINE	1.0 3.5 6.0	2.5 5.0 8.0	15.5	16.5 19.0 21.5	18.0 20.5 23.5	4 3	5 5	9 8	D	12 11		39	20	19	36	41	77	17 19 24	16 16 16	6b 6b 6b		Weak Soil Excessive Moisture		N M		14 12	OK OK	
51	B-050-0-13	905+34.80, 34.52' RT IR-75 BASELINE	2.0 3.5 6.0 8.5	3.5 5.0 7.5 10.0	-7.1	-5.1 -3.6 -1.1 1.4	-3.6 -2.1 0.4 2.9	12 3 3 4	8 6 4 7	20 9 7 11	C	24 11 8 13		NP 35	NP 20	NP 15	23 34	9 40	32 74	12 17 17 16		2-4 6a 6a 6a	0 8 8 8	Weak Soil Excessive Moisture		N N		14 18	OK Unstable Soil	
52	B-053-0-13	918+00.62, 34.44' LT IR-75 BASELINE	1.3 3.5 6.0	2.8 5.0 7.5	1.9	3.2 5.4 7.9	4.7 6.9 9.4	3 4 12	3 6 20	6 10 32	D	8 13 43		40 35	17 17	23 18	34 29	32 32	66 61	11 17	16 16	6b 6b	11	Weak Soil		N		18	OK	
53	B-054-0-13	922+32+12, 35.07' RT IR-75 BASELINE	1.0 3.5 6.0	2.5 5.0 7.5	0.5	1.5 4.0 6.5	3.0 5.5 8.0	35 5 10	10 10 12	45 15 22	B	53 18 26		NP 30	NP 19	NP 11	43 32	4 28	47 60	15 17 11	11 14 14	4a 6a 6a	2 5							
54	B-056-0-13	930+01.24, 25.44' RT IR-75 BASELINE	2.0 3.5 6.0	3.5 5.0 7.5	-2.5	-0.5 1.0 3.5	1.0 2.5 5.0	60 8 7	37 6 10	97 14 17	F	137 20 24		NP 29	NP 17	NP 12	17 20	13 24	30 44	12 16 19	10 14 8	2-4 6a 3a	0 2 0			M			OK	
55	B-057-0-13	933+83.96, 16.86' LT IR-75 BASELINE	1.0 2.5 4.0	2.5 5.0 7.5	-1.6	-0.6 0.9 2.4	0.9 2.4 3.9	6 4 5	7 6 5	13 10 10	A	15 11 11		35 39	19 16	16 23	43 27	33 31	76 58	18 17 16	16 16 16	6b 6b 6a	10 10 8	Weak Soil Weak Soil		N N		14 14	Unstable Soil	
56	B-061-0-13	949+86.65, 18.64' LT IR-75 BASELINE	1.0 2.5 4.0	2.5 4.0 5.5	-0.7	0.4 1.9 3.4	1.9 3.4 4.9	3 8 8	3 11 11	6 19 19	A	7 21 21		46 45	20 19	26 26	24 21	44 77	68 98	18 20 20	18 18 18	7-6 7-6 7-6	14 15 14	Weak Soil		N		21	Unstable Soil	
57	B-062-0-13	953+92.55, 29.43' RT IR-75 BASELINE	2.0 3.5 6.0	3.5 5.0 7.5	-1.9	0.1 1.6 4.1	1.6 3.1 5.6	30 6 10	11 12 13	41 18 23	F	58 25 33		35 33	26 18	9 15	29 39	9 49	38 88	19 16 17	21 14 14	4a 6a 6a	1 10 8							
58	B-063-0-13	957+94.58, 18.83' RT IR-75 BASELINE	0.5 2.0 3.5	2.0 3.5 5.0	-1.9	-1.4 0.1 1.6	0.1 1.6 3.1	5 4 3	5 5 4	10 9 7	F	14 13 10		43 40	22 19	21	23 31	69 62	92 93	15 22 25	10 19 16	4a 7-6 6b	5 13 12	Excessive Moisture Weak Soil		MN N		12 15	Unstable Soil Unstable Soil	
59	B-064-0-13	961+94.71, 28.95' LT IR-75 BASELINE	1.5 3.0 4.5	3.0 4.5 6.0	-1.9	-0.4 1.1 2.6	1.1 2.6 4.1	9 10 12	7 14 14	16 24 26	A	18 27 29		31 37	19 19	12 18	48 35	47 38	95 73	8 15 18	6 14 16	1b 6a 6b	0 9 11							

#	Boring				Cut Fill	Subgrade		Standard Penetration						Physical Characteristics				Moisture		Class		Comments	Problem		Undercuts		Analysis	
	B #	Boring Location	Depth	To		Depth	To	n ₂	n ₃	N	Rig	N ₆₀	N _{60L}	LL	PL	PI	% Silt	% Clay	P 200	M	M _{OPT}		Ohio DOT	GI	w/ Class	w/ MN		UC Class
60	B-066-0-13	970+14.30, 28.85' RT IR-75 BASELINE	2.0 3.5 6.0	3.5 5.0 7.5	-1.9	0.1 1.6 4.1	1.6 3.1 5.6	15 4 8	5 6 10	20 10 18	F	28 14 25	NP 46 24	NP 22 24	NP 24 24	11 24 24	3 68 92	14 92	20 22 19	6 19 16	1b 7-6 6b	0 15 10	Excessive Moisture		M			OK
61	B-067-0-13	974+15.71, 17.51' RT IR-75 BASELINE	0.5 2.0 3.5	2.0 3.5 5.0	-1.3	-0.8 0.7 2.2	0.7 2.2 3.7	4 5 7	5 5 11	9 10 18	F	13 14 25	36 45 27	18 18 27	18 27	34 32 32	43 53 53	77 85	16 20 17	16 18 16	6b 7-6 6b	11 16 10						
62	B-068-0-13	977+98.94, 27.98' LT IR-75 BASELINE	1.5 3.0 4.5	3.0 4.5 6.0	-1.3	0.2 1.7 3.2	1.7 3.2 4.7	6 4 5	6 6 6	12 10 11	A	13 11 12							13 18 22	10 10 18	4a 4a 7-6	5 5 17	Weak Soil Excessive Moisture		N MN		14 12	Unstable Soil OK
63	B-078-0-13	739+94.91, 7.52' RT US 68 BASELINE	2.0 3.5 6.0	3.5 5.0 7.5	-0.6	1.4 2.9 5.4	2.9 4.4 6.9	7 6 6	4 8 7	11 14 13	F	16 20 18	38 33 20	18 18 15	20 15	35 21 21	43 55 55	78 76	14 18 20	16 14 14	6b 6a 6a	12 10	Excessive Moisture		M			OK
64	B-079-0-13	743+86.77 , 11.61' LT US 68 BASELINE	1.5 3.0 5.0 6.0	3.0 4.5 6.0 6.3	-1.0	0.5 2.0 4.0 5.0	2.0 3.5 5.0 5.3	14 8 7 5	7 8 50 57	21 16 19 67	C	25 19 67	NP NP NP	NP NP NP	NP NP NP	15 8 23		8 8 18	6 6 14	1b 1b 6a R	0 0 8	Bedrock	BR			24	OK	
65	B-080-0-13	747+86.33, 41.01' LT US 68 BASELINE	2.0 3.5 5.5 6.5	3.5 5.0 6.5 6.8	-0.6	1.4 2.9 4.9 5.9	2.9 4.4 5.9 6.2	5 4 4	4 8 50	9 12 54	F	13 17 76	34 33 22	18 16 11	16 11	36 45 45	41 30 30	77 75	15 18 20	16 17 14	6b 6a 6a R	10 8 8	Bedrock	BR	M		24	OK
66	B-081-0-13	751+98.70, 8.34' LT US 68 BASELINE	1.5 3.0 5.5	3.0 4.5 7.0	6.5	8.0 9.5 12.0	9.5 11.0 13.5	8 7 8	4 7 20	12 14 28	C	14 16 33	NP 31 18	NP 13	NP 13	17 37 37	5 38 32	22 75	8 15 27	6 14 18	1b 6A 7-6		Excessive Moisture		M			OK
67	B-082-0-13	756+10.49, 41.32' RT US 68 BASELINE	1.0 3.5 6.0 6.5	2.5 5.0 6.5 6.6	16.1	17.1 19.6 22.1 22.6	18.6 21.1 22.6 22.7	5 4	6 6	11 10	C	13 12	28 39	18 22	10 17	20 37	18 32	38 69	9 20 18	13 17 16	4a 6b 6b R		Bedrock	BR			24	OK
68	B-088-0-13	763+79.86, 33.71' RT US 68 BASELINE	1.0 3.5 6.0 8.5	2.5 5.0 7.5 10.0	-3.9	-2.9 -0.4 2.1 4.6	-1.4 1.1 3.6 6.1	45 21 8 11	8 8 6 11	53 29 14 22	B	62 34 16 26	24 8	16 8	8	33 25	58	8 11 15 14	14 11 14 14	6a 4a 6a 6a	8 5 8 8							
69	B-162-0-13	52+82.13, 22.19' LT LIMA AVE BASELINE	1.0 3.5	2.5 3.5	-1.3	-0.3 2.2	1.2 2.2	6	4	10	B	12	NP	NP	NP	23	7	30	9	8	3a R	0	Bedrock	BR			24	OK
70	B-163-0-13	11+39.18, 23.60' RT LOGAN AVE BASELINE	1.0 3.5 4.0	2.5 4.0 4.0	0.0	1.0 3.5 4.0	2.5 4.0 4.0	6 50	7 50	13 50	B	15 59	20 29	17 14	3 15	32 52	18 11	50 63	11 18	12 14	4a 6a R	3 8	Bedrock	BR			24	OK
71	B-164-0-13	59+48.83, 15.92' RT LIMA AVE BASELINE	1.0 1.5	1.5 1.5	1.3	2.3 2.8	2.8 2.8	50		50	E	68	35	20	15	39	36	75	14		6a R	10	Bedrock	BR			24	OK
72	B-165-0-13	68+48.67, 9.95' LT LIMA AVE BASELINE	1.0 3.5 5.4	2.5 5.0 5.4	3.6	4.6 7.1 9.0	6.1 8.6 9.0	5 2	4 4	9 6	B	11 7	41 57	20 27	21 30	30 33	40 52	70 85	19 30	18 24	7-6 7-6 R	12 19	Weak Soil Weak Soil Bedrock	BR	N N		14 21	OK OK OK
73	B-166-0-13	72+51.27, 26.13' RT LIMA AVE BASELINE	1.0 3.5 5.4	2.5 5.0 5.4	-1.0	0.0 2.5 4.4	1.5 4.0 4.4	5 9	5 11	10 20	B	12 23	29 25	17 16	12 9	37 39	29 30	66 69	16 14	14 11	6a 4a R	7 7	Bedrock	BR			24	OK
74	B-176-0-13	112+37.82, 6.02' RT ARRISON RD BASELIN	1.0 3.5	2.5 4.8	-1.3	-0.3 2.2	1.2 3.5	3 8	5 50	8 58	C	9 68	32 22	17 16	15 6	40 34	34 19	74 53	16 9	14 11	6a 4a	10 4	Weak Soil		N		16	Unstable Soil
75	B-177-0-13	2+98.06, 7.34' RT SERVICE RD BASELINE	1.0 3.5 6.0	2.5 5.0 6.0	-2.3	-1.3 1.3 3.8	0.3 2.8 3.8	5 5	6 10	11 15	E	15 20	32 37	18 18	14 19	35 31	42 38	77 69	16 14	14 16	6a 6b R	10 10	Bedrock	BR			24	OK

#	Boring				Cut Fill	Subgrade		Standard Penetration						Physical Characteristics					Moisture		Class		Comments	Problem		Undercuts		Analysis				
	B #	Boring Location	Depth	To		Depth	To	n ₂	n ₃	N	Rig	N ₆₀	N _{60L}	LL	PL	PI	% Silt	% Clay	P 200	M	M _{OPT}	Ohio DOT		GI	w/ Class	w/ MN	UC Class		UC MN			
76	B-178-0-13	6+95.80, 5.11' RT SERVICE RD BASELINE	1.0 3.0	2.5 3.0	-1.0	0.0 2.0	1.5 2.0	3	4	7	E	10				41	19	22	28	52	80	20	18	7-6 R	13	Weak Soil Bedrock	BR	N	24	15	Unstable Soil OK	
77	B-179-0-13	10+18.70, 2.27' RT SERVICE RD BASELINE	1.0 3.5 4.0	2.5 4.0 4.4	0.9	1.9 4.4 4.9	3.4 4.9 5.3	3	3	6	E	8				28	19	9	41	37	78	16	14 10	4a 4a R	8 5	Weak Soil Bedrock	BR	N	24	18	Unstable Soil OK	
78	B-180-0-13	14+99.84, 0.71' LT SERVICE RD BASELINE	1.0 3.5 6.0	2.5 5.0 7.5	-1.0	0.0 2.5 5.0	1.5 4.0 6.5	6	12	18	E	25				34	20 52	14 29	40 42	30 49	70 91	19 31 5	15 26 10	6a 7-6 2-4	9 16	Weak Soil		N		18	OK	
79	B-104-0-02	843+07.63, 7.35' RT IR-75 BASELINE	1.0 3.5 6.0	2.5 5.0 7.5	-2.6	-1.6 0.9 3.4	-0.1 2.4 4.9	13	14	27	G	27											14 14 6	6a 6a 1a	8 8 0	Both Weak Soil		MN N		---		
80	B-010-0-10	907+08.01, 39.29' LT IR-75 BASELINE	1.3 2.8 4.3 5.8	2.8 4.3 5.8 7.3	-7.7	-6.4 -4.9 -3.4 -1.9	-4.9 -3.4 -1.9	4	5	9	H	13				31	21 29	10 16 13	22 23	20 24	42 47	19 14 19 14	16 14 14 14	4a 6a 6a 6a	1 3 8 8							
81	B-011-0-10	911+07.77, 47.33' LT IR-75 BASELINE	1.4 2.9 4.4 5.9	2.9 4.4 5.9 7.4	-7.1	-5.7 -4.2 -2.7 -2.7 -1.2	-4.2 -2.7 -1.2	15	4	19	H	27				NP	NP	NP	10	3	13	5	6	1a	0							
82	B-012-0-10	915+07.20, 19.84' RT JS 224 RAMP A BASELINE	1.4 2.9 4.4 5.9	2.9 4.4 5.9 7.4	1.3	2.7 4.2 5.7 7.2	4.2 5.7 7.2 8.7	9	6	15	H	22				31	17 35	14 19	35 29	39 38	74 67	13 15 17 19	14 14 16 16	6a 6a 6b 6b	8 9	Weak Soil		N		15	OK	
83	B-013-0-10	919+07.24, 12.09' RT JS 224 RAMP A BASELINE	1.0 3.5 6.0	2.5 5.0 7.5	0.8	1.8 4.3 6.8	3.3 5.8 8.3	8	10	18	H	26				27	15	12	33	39	72	14 11 13	14 14 14	6a 6a 6a	8 8							
84	B-015-0-10	911+10.07, 45.00' RT IR-75 BASELINE	1.1 2.6 4.1 5.6	2.6 4.1 5.6 7.1	-7.1	-6.0 -4.5 -3.0 -1.5	-4.5 -3.0 -1.5	3	4	7	H	10				31	17 26	14 9	29 15	39 11	68 26	15 9 17 15	14 10 14 6a	8 0 8 8	Weak Soil		N		15	OK		
85	B-016-0-10	915+05.80, 20.00' LT JS 224 RAMP B BASELINE	1.3 2.8 4.3 5.8	2.8 4.3 5.8 7.3	0.8	2.1 3.6 5.1 6.6	3.6 5.1 6.6 8.1	12	10	22	H	32				NP	NP	NP	9	3	12	13	6	1b	0	Excessive Moisture		M N		15	OK	
86	B-017-0-10	918+96.68, 48.86' LT JS 224 RAMP B BASELINE	1.0 2.5 4.0 5.5	2.5 4.0 5.5 7.0	1.6	2.6 4.1 5.6 7.1	4.1 5.6 7.1 8.6	15	12	27	H	39				27	12	15	26	23	49	11 20 26 14	14 16 10 6	6a 6b 4b 1b	5 10	Silt soil Excessive Moisture	4b	MN M	36	12	OK	
87	B-006-0-10	925+11.74, 9.48' RT IR-75 BASELINE	3.5 6.0	5.0 7.5	-1.3	2.2 4.7 6.5	3.7 6.5 7.5	3	7	10	H	14							26	15	11	37	39	76	14 19 11	14 16 14	6a 6b 6a	8 10				
88	B-021-0-10	932+62.64, 10.18' RT JS 224 RAMP C BASELINE	1.5 2.0 3.0 4.5	2.0 3.0 4.5 6.0	-2.3	-0.8 -0.3 0.8 2.3	-0.3 0.8 2.3 3.8	6	11	17	H	24				NP	NP	NP	7	3	10	6	6	1a	0							
89	B-022-0-10	936+07.76, 5.39' LT JS 224 RAMP C BASELINE	1.5 3.0 4.5 6.0	3.0 4.5 6.0 7.5	-2.6	-1.1 0.4 1.9 3.4	0.4 1.9 3.4 4.9	5	5	10	H	14				41	20 42	21 22	37 40	37 44	74 84	18 22 25 24	18 18 18 8	7-6 7-6 7-6 3a	12 13 14 0	Weak Soil Weak Soil Weak Soil		N N		21 ---	Unstable Soil OK	
90	B-023-0-10	939+62.37, 63.09' LT IR-75 BASELINE	1.0 2.5 4.0 5.5	2.5 4.0 5.5 7.0	-2.6	-1.6 -0.1 1.4 2.9	-0.1 1.4 2.9 4.4	6	4	10	H	14				39	19 32	20 17	36 45	38 34	74 79	18 19 17 25	16 14 14 16	6b 6a 6a 6b	12 10 8 10	Excessive Moisture Weak Soil Weak Soil Excessive Moisture		MN N M		12 14	Unstable Soil Unstable Soil	
91	B-025-0-10	931+07.68, 2.22' LT JS 224 RAMP D BASELINE	1.5 3.0 3.5 4.5	3.0 4.5 6.0 7.5	-2.6	-1.1 0.4 0.9 1.9	0.4 0.9 1.9 3.4	2	4	6	F	8				38	20	18	25	26	51	17 20 20 47	16 6 6 6	6b 3 1b 1b	0 6 0 0	Weak Soil Weak Soil Excessive Moisture Excessive Moisture		N N M M		---	Unstable Soil	

HAN-75-14.39-IR 75Realignment-EmbankmentSlope Stability@Sta 80+00, LT STerm

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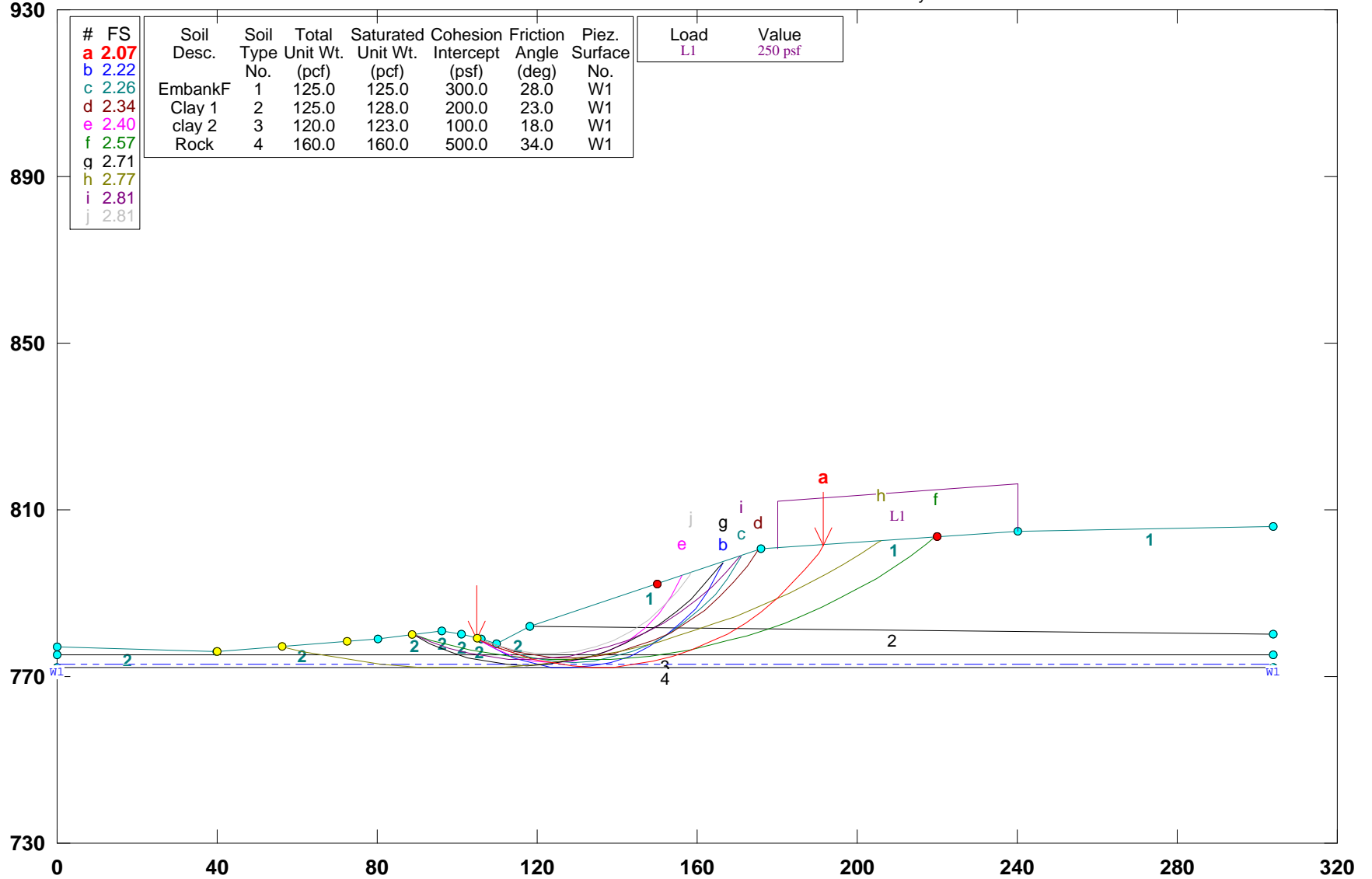
GSTABL7 v.2 FSmin=3.04

Safety Factors Are Calculated By The Modified Bishop Method



HAN-75-14.39-IR 75Realignment-EmbankmentSlope Stability@Sta 804+00, LT LTerm

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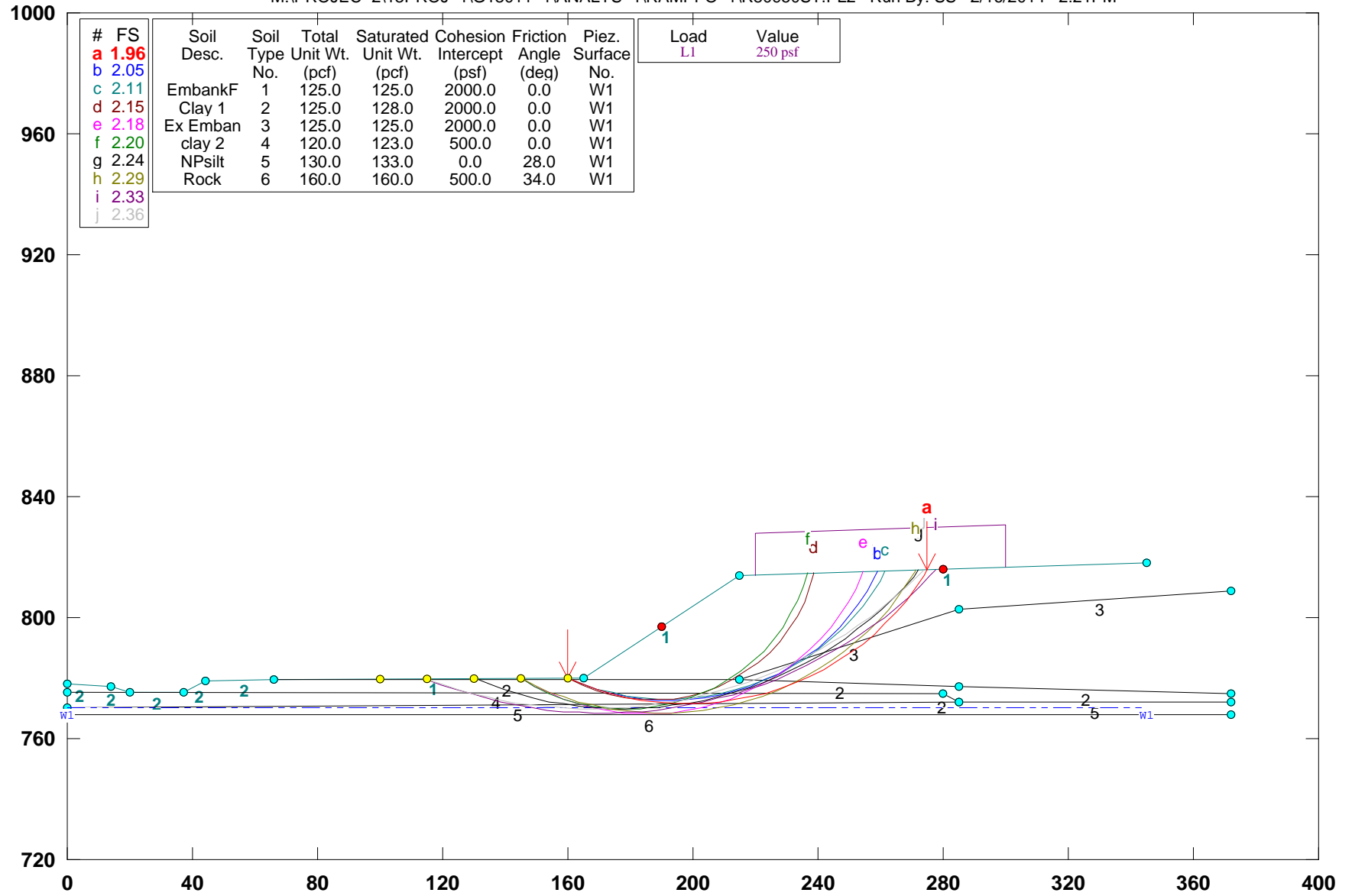
GSTABL7 v.2 FSmin=2.07

Safety Factors Are Calculated By The Modified Bishop Method



HAN-75-14.39-IR 75Realignment-EmbankmentSlope Stability@Sta 809+50, LT STerm

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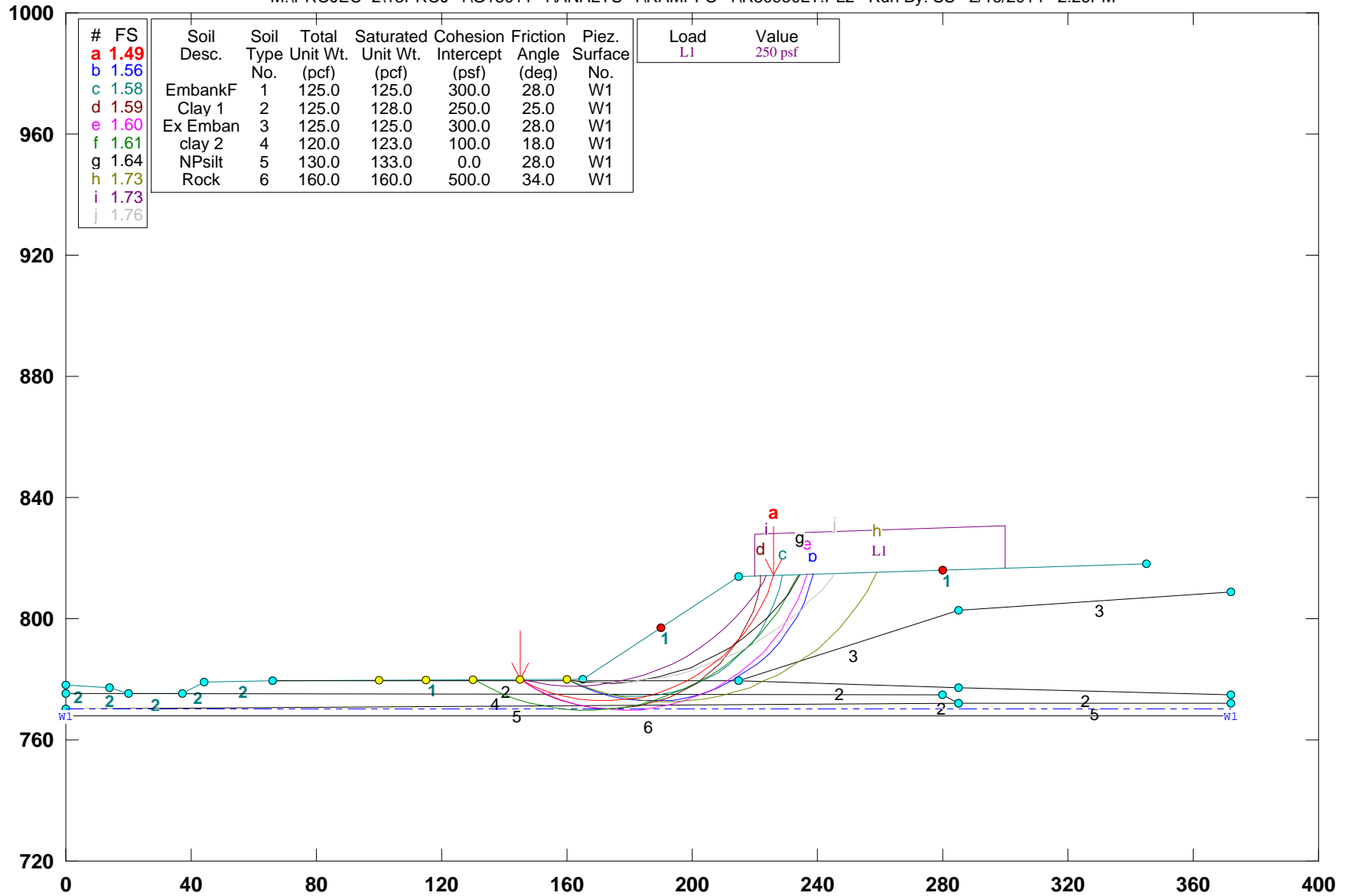
GSTABL7 v.2 FSmin=1.96

Safety Factors Are Calculated By The Modified Bishop Method



HAN-75-14.39-IR 75Realignment-EmbankmentSlope Stability@Sta 809+50, LT LTerm

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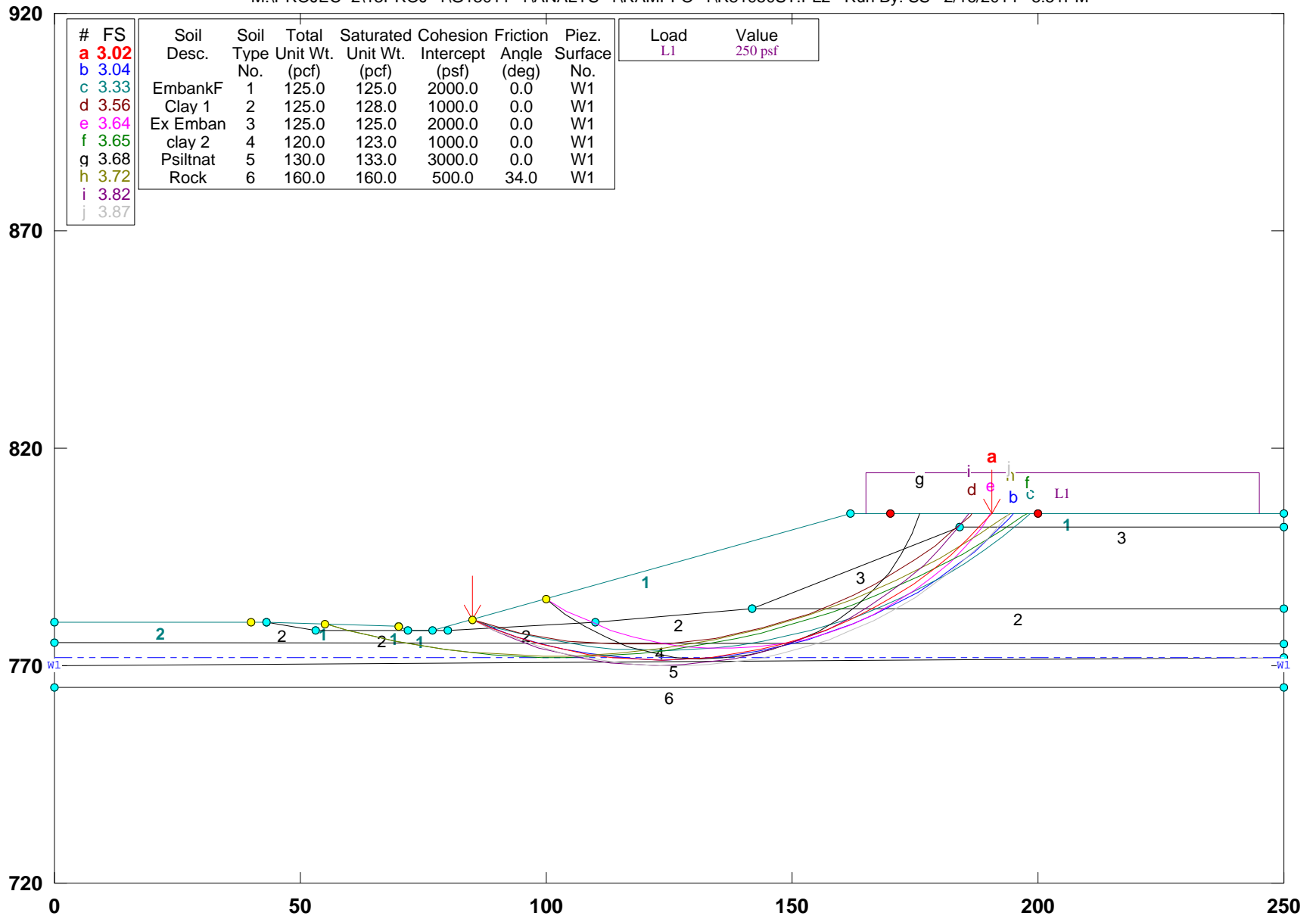
GSTABL7 v.2 FSmin=1.49

Safety Factors Are Calculated By The Modified Bishop Method



HAN-75-14.39-IR 75 Widening-Embankment Slope Stability@Sta 819+50 RT STerm

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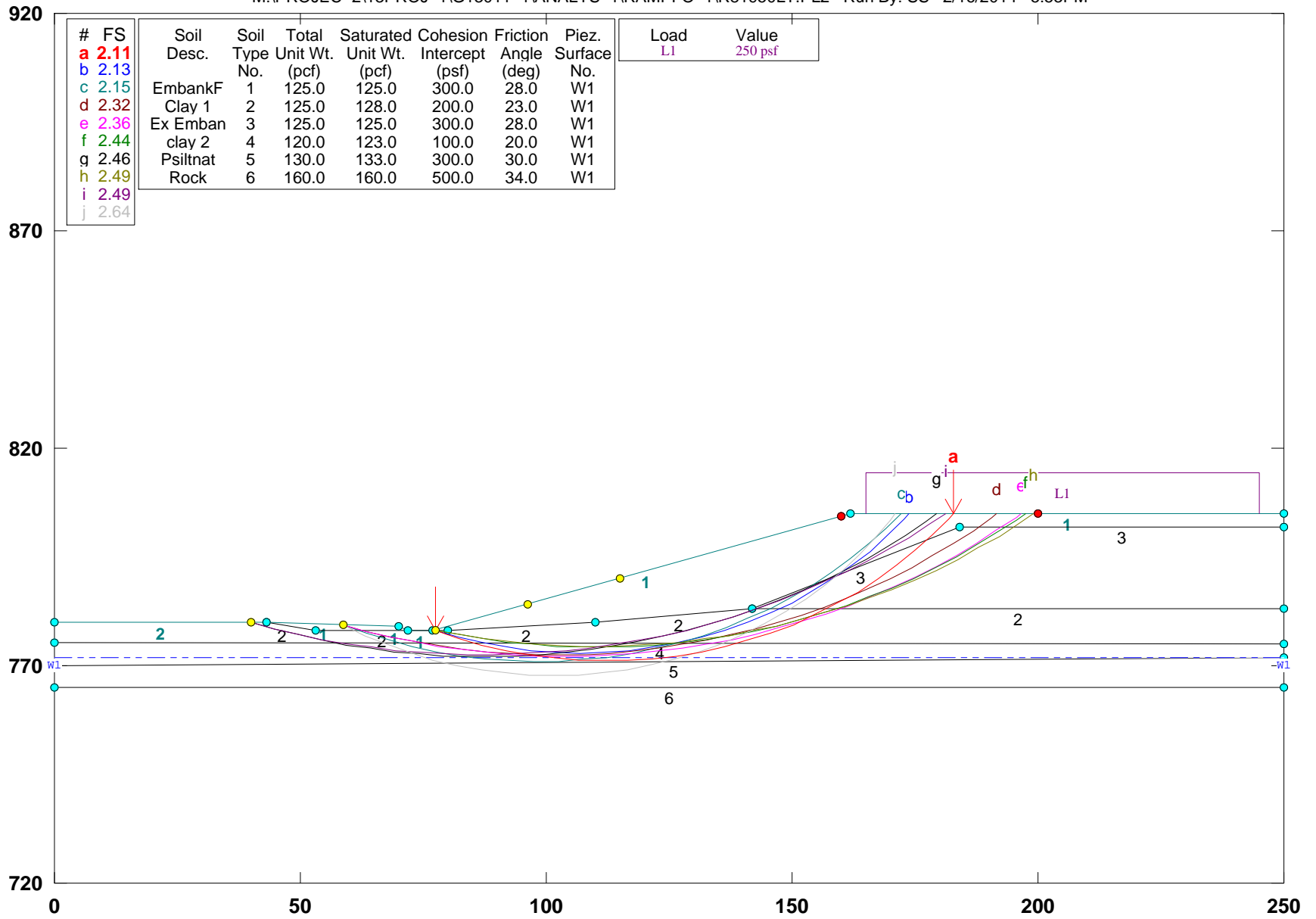
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Safety Factors Are Calculated By The Modified Bishop Method



HAN-75-14.39-IR 75 Widening-Embankment Slope Stability@Sta 819+50 RT LTerm

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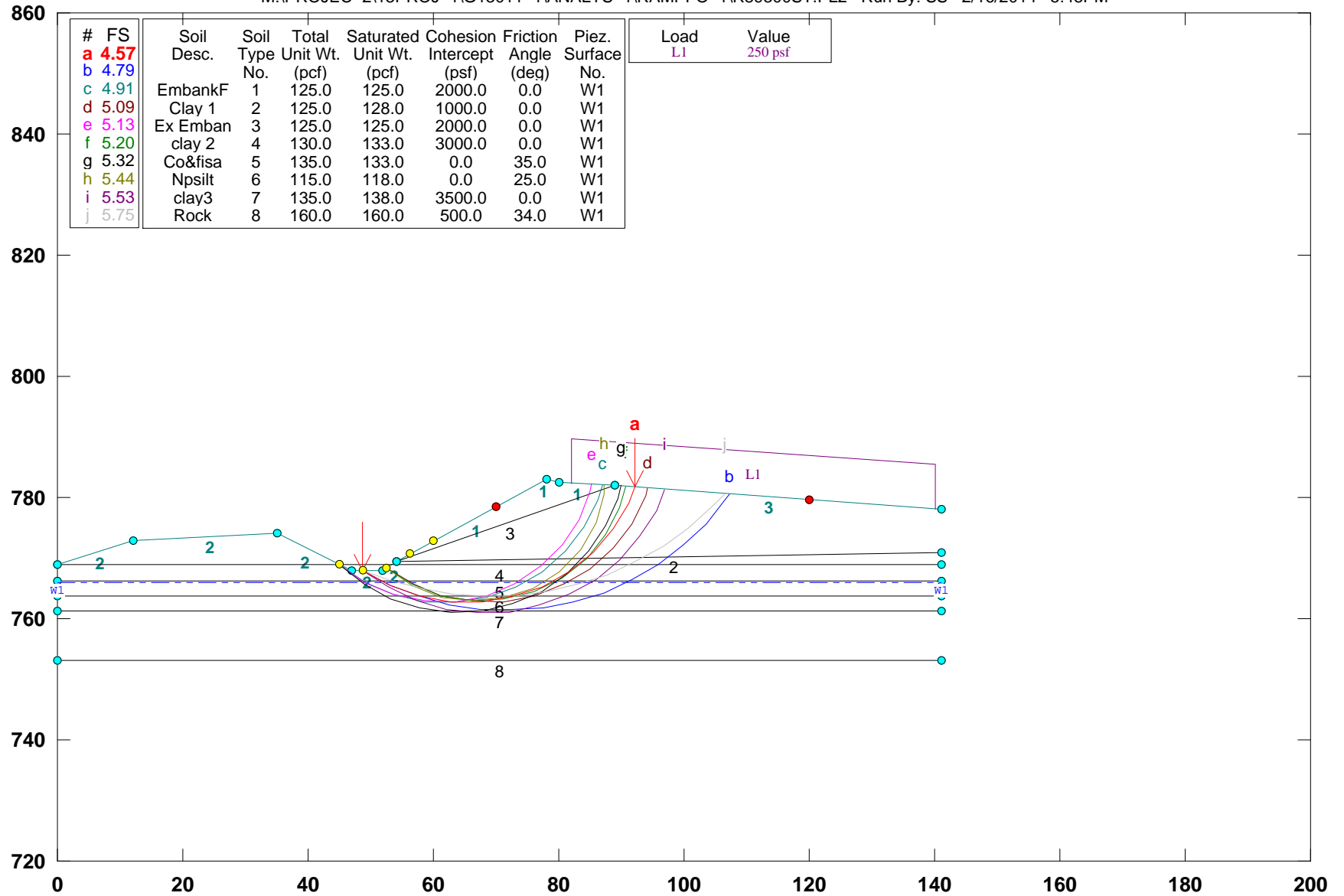


GSTABL7 v.2 FSmin=2.11
 Safety Factors Are Calculated By The Modified Bishop Method



HAN-75-14.39-IR 75 Widening-Embankment Slope Stability@Sta 893+00, LT STerm

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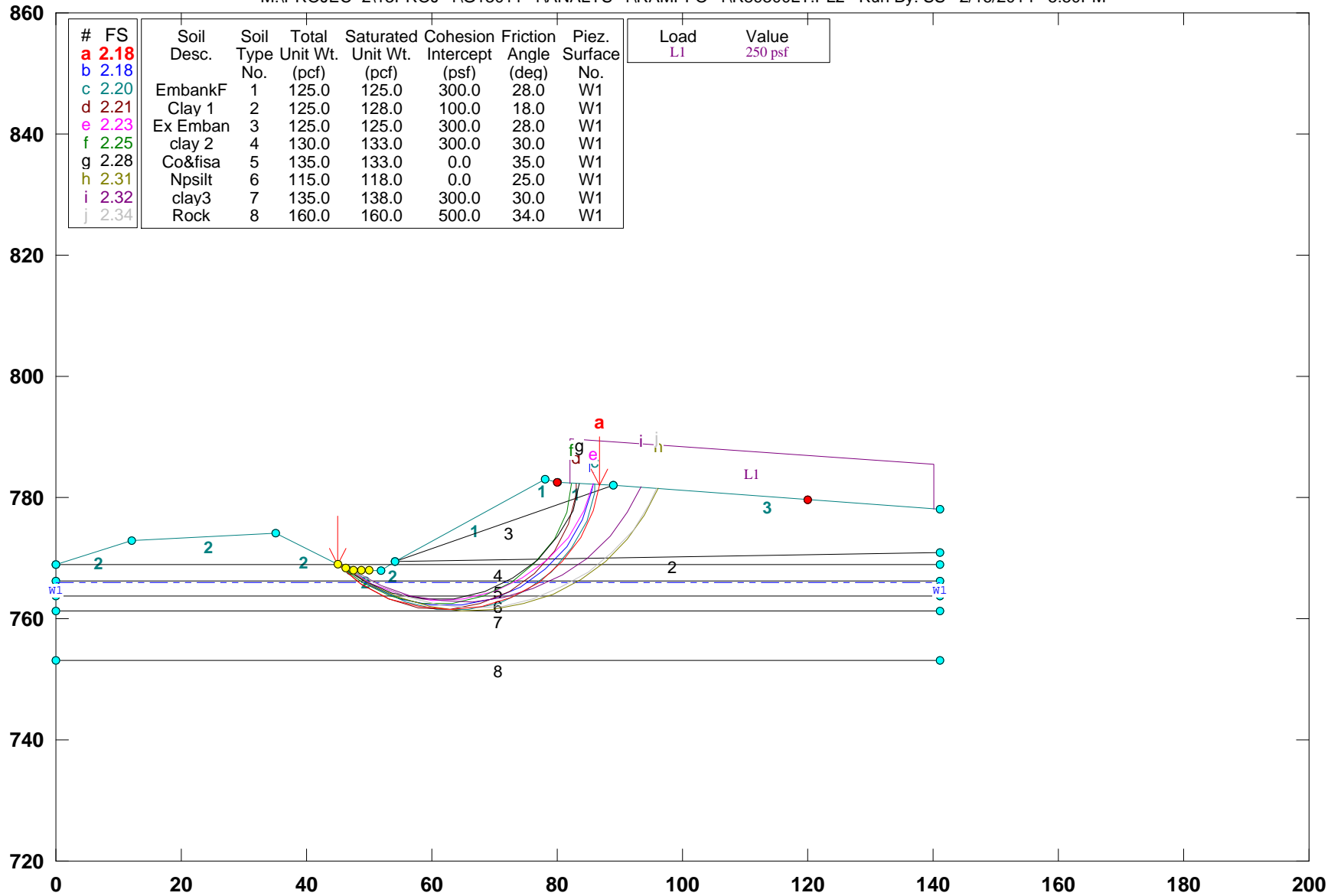
GSTABL7 v.2 FSmin=4.57

Safety Factors Are Calculated By The Modified Bishop Method



HAN-75-14.39-IR 75 Widening-Embankment Slope Stability@Sta 893+00, LT LTerm

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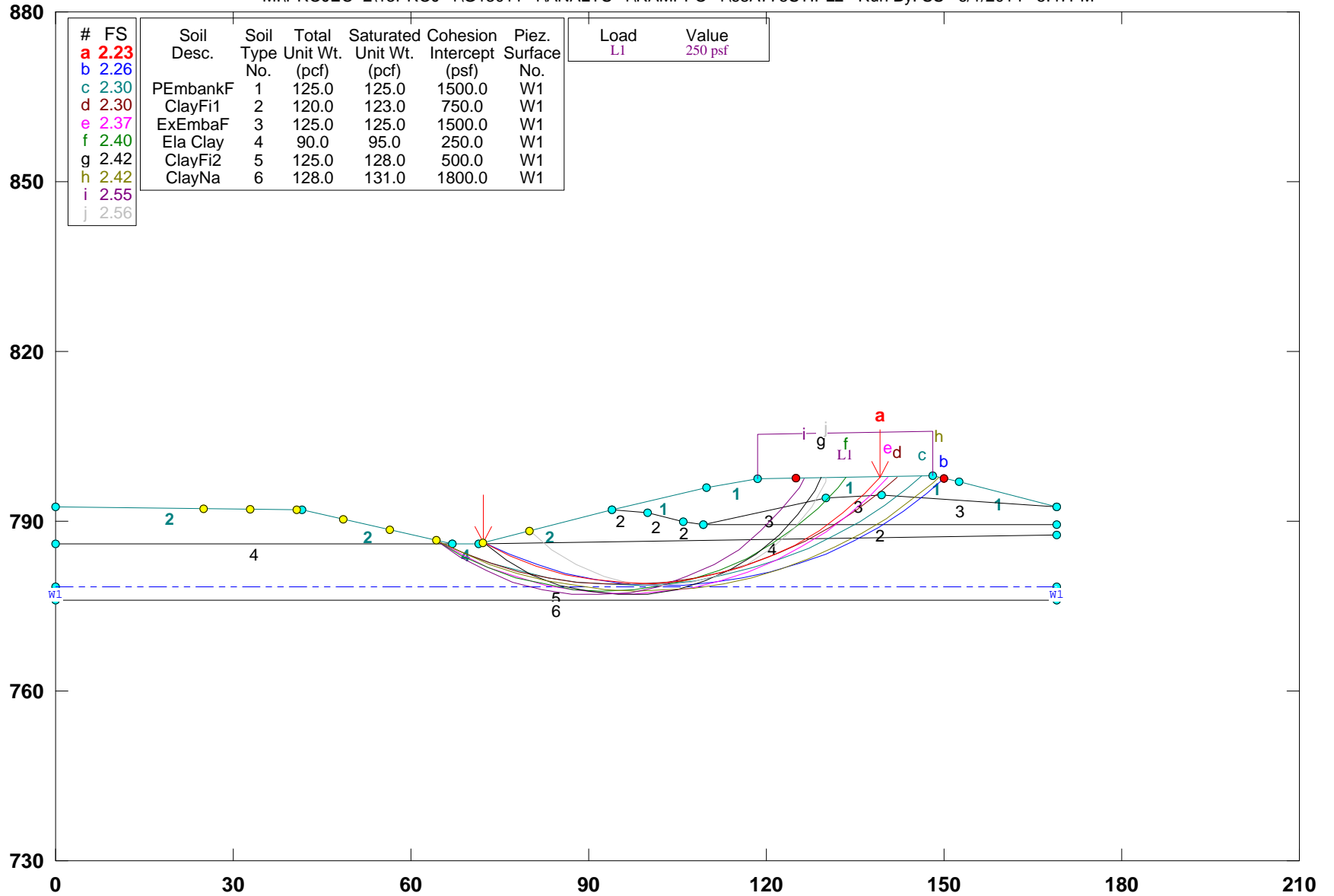
#	FS	Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.	Load	Value
a	2.18	EmbankF	1	125.0	125.0	300.0	28.0	W1	L1	250 psf
b	2.18	Clay 1	2	125.0	128.0	100.0	18.0	W1		
c	2.20	Ex Emбан	3	125.0	125.0	300.0	28.0	W1		
d	2.21	clay 2	4	130.0	133.0	300.0	30.0	W1		
e	2.23	Co&fisa	5	135.0	133.0	0.0	35.0	W1		
f	2.25	Npsilt	6	115.0	118.0	0.0	25.0	W1		
g	2.28	clay3	7	135.0	138.0	300.0	30.0	W1		
h	2.31	Rock	8	160.0	160.0	500.0	34.0	W1		
i	2.32									
j	2.34									

GSTABL7 v.2 FSmin=2.18
Safety Factors Are Calculated By The Modified Bishop Method



HAN-75-14.39-us 68 Ramp A Embankment Slope Stability @Sta 775+00, LT STerm

M:\PROJEC~2\13PROJ~1\G13011~1\ANALYS~1\RAMPFO~1\68A775ST.PL2 Run By: SS 6/1/2014 5:47PM

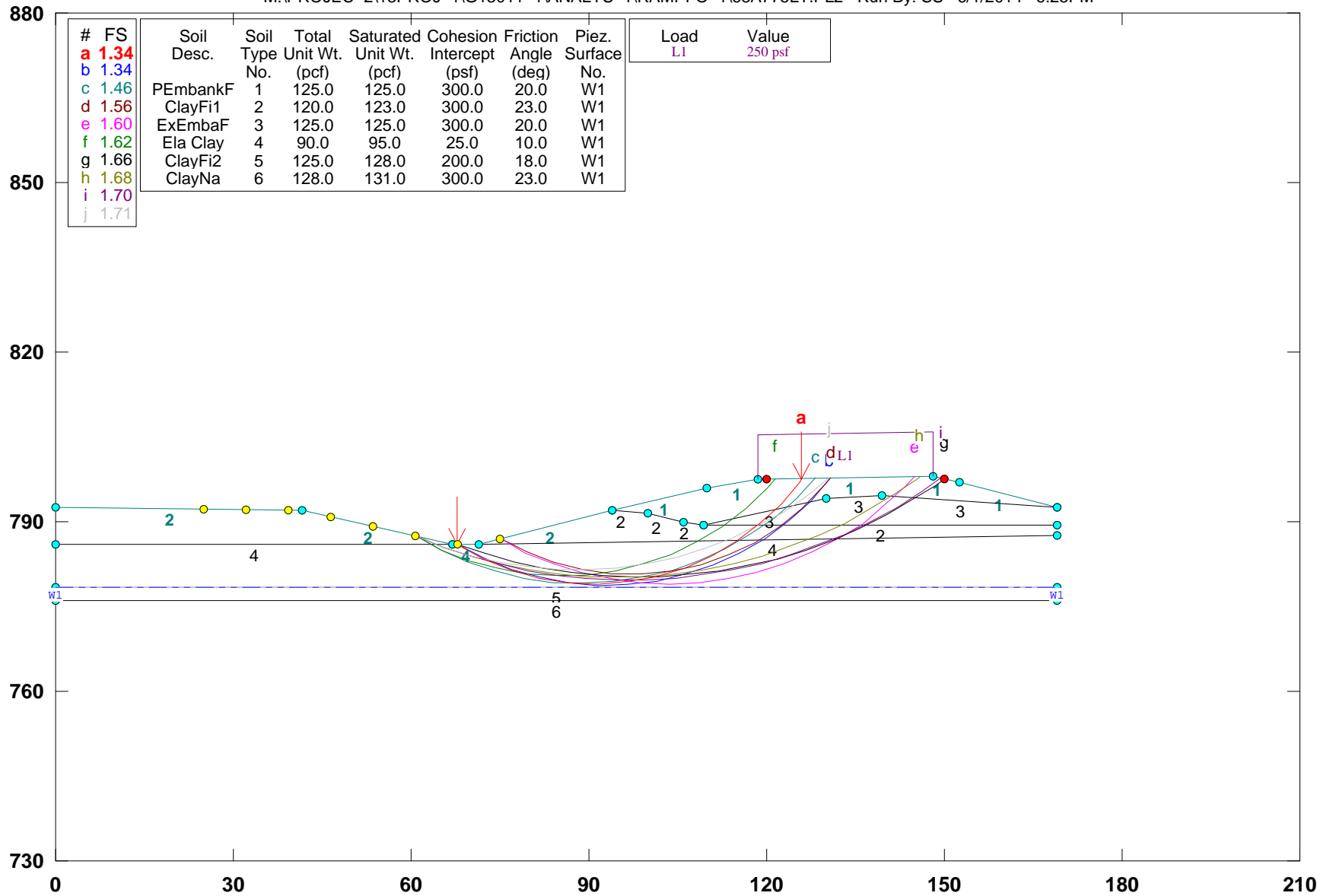


GSTABL7 v.2 FSmin=2.23
 Safety Factors Are Calculated By The Modified Bishop Method



HAN-75-14.39-us 68 Ramp A Embankment Slope Stability@Sta 775+00, LT LTerm

M:\PROJEC~2\13PROJ~1\G13011~1\ANALYS~1\RAMPF0~1\68A775LT.PL2 Run By: SS 6/1/2014 6:25PM



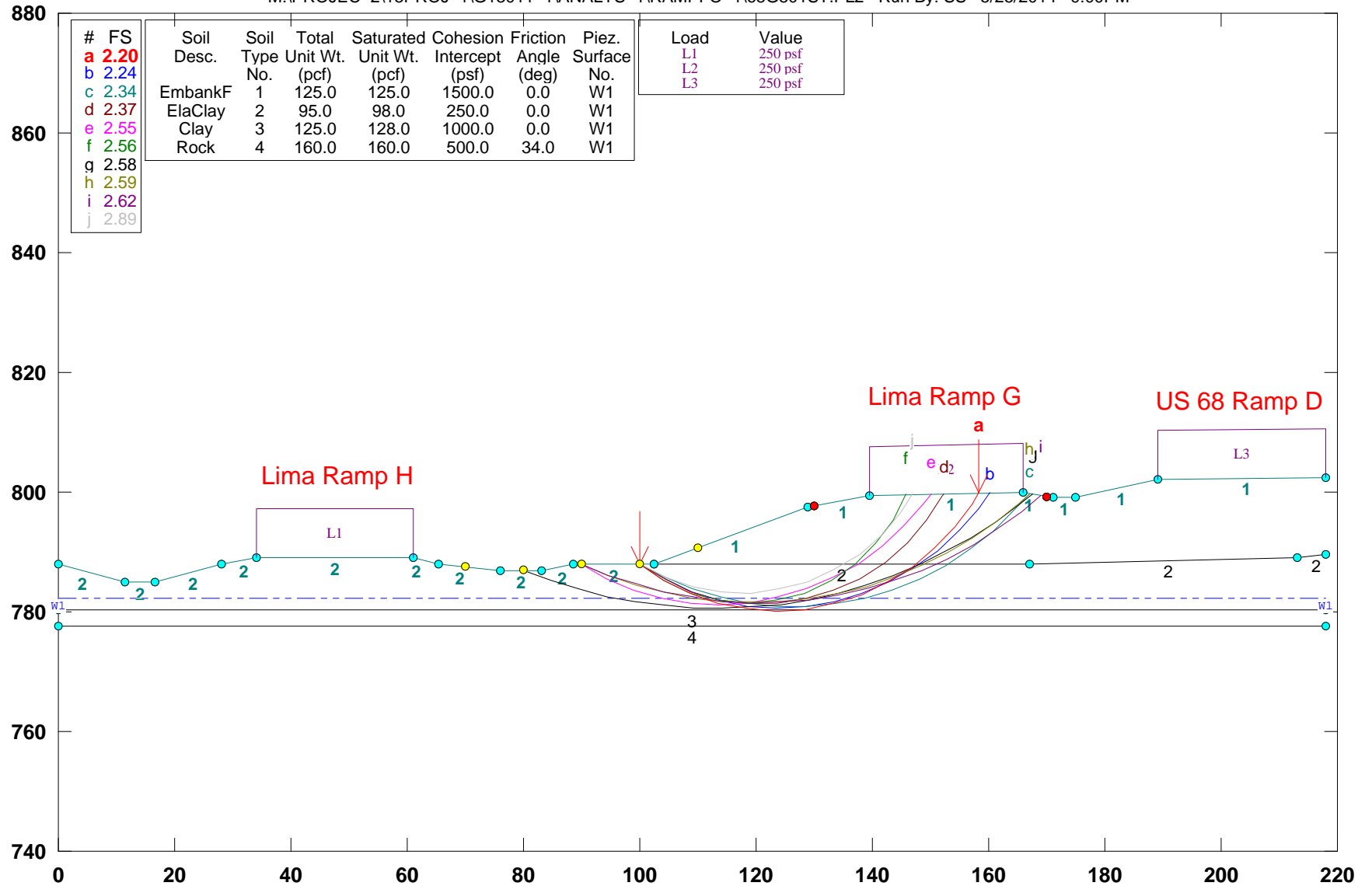
GSTABL7 v.2 FSmin=1.34

Safety Factors Are Calculated By The Modified Bishop Method



HAN-75-14.39-Lima Ramp G-Embankment Slope Stability@Sta 801+52, RT STerm

M:\PROJEC~2\13PROJ~1\G13011~1\ANALYS~1\RAMPFO~1\68G801ST.PL2 Run By: SS 5/25/2014 9:00PM



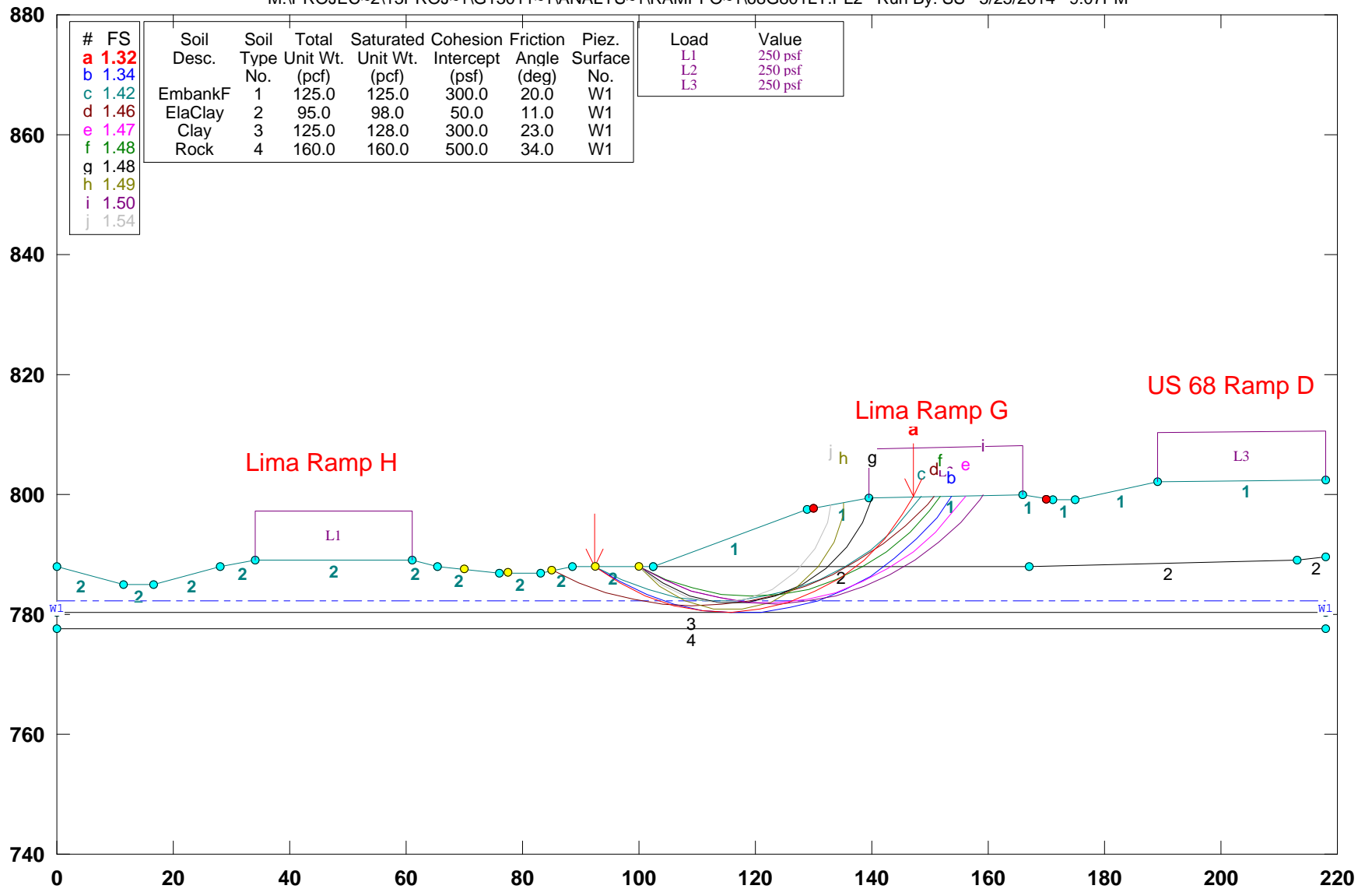
GSTABL7 v.2 FSmin=2.20

Safety Factors Are Calculated By The Modified Bishop Method



HAN-75-14.39-Lima Ramp G-Embankment Slope Stability@Sta 801+52, RT LTerm

M:\PROJEC~2\13PROJ~1\G13011~1\ANALYS~1\RAMPFO~1\68G801LT.PL2 Run By: SS 5/25/2014 9:07PM

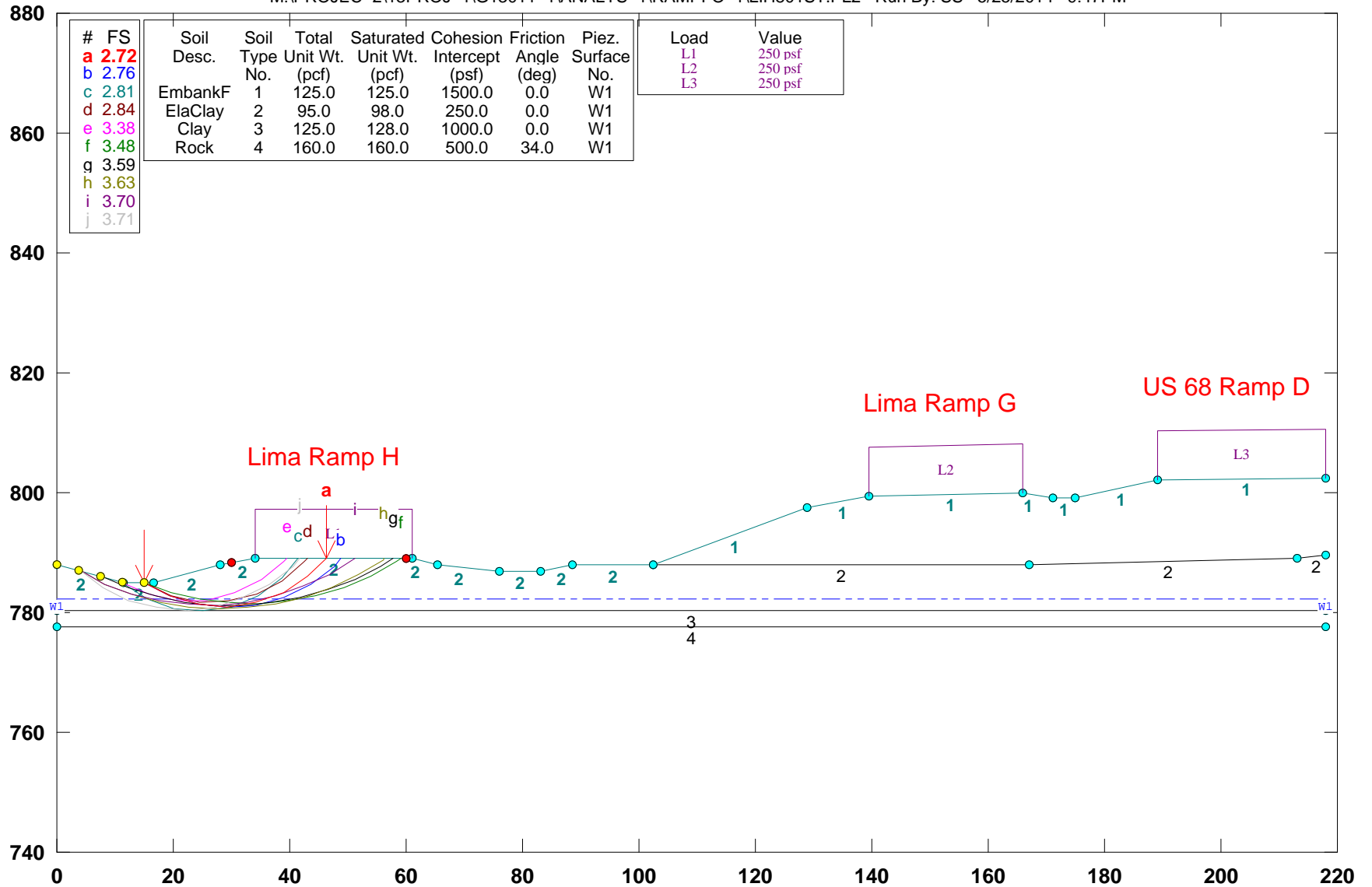


GSTABL7 v.2 FSmin=1.32
 Safety Factors Are Calculated By The Modified Bishop Method



HAN-75-14.39-Lima Ramp H-Embankment Slope Stability@Sta 801+50, RT STerm

M:\PROJEC-2\13PROJ-1\G13011-1\ANALYS-1\RAMPFO-1\LIH801ST.PL2 Run By: SS 5/25/2014 9:47PM



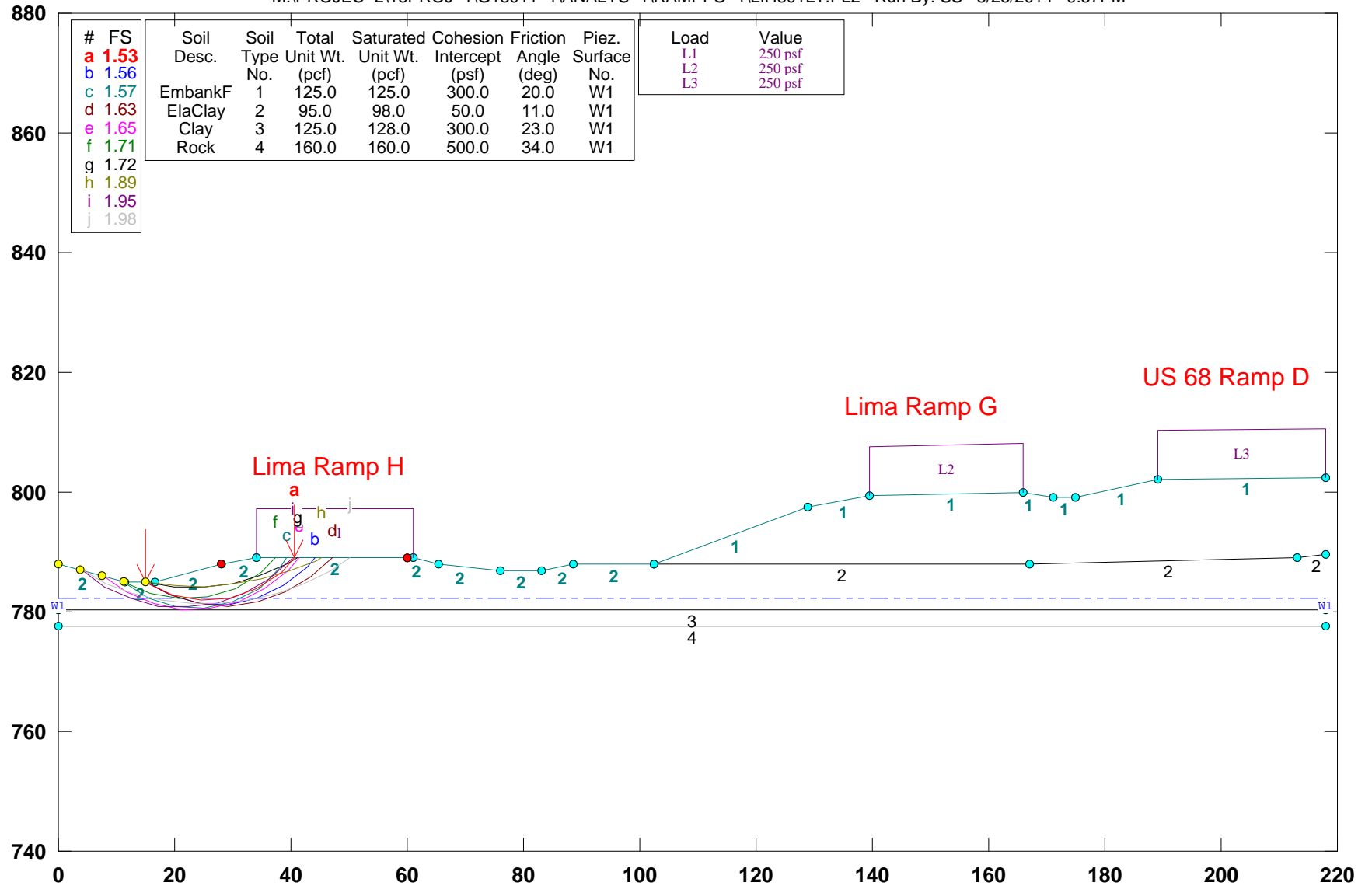
GSTABL7 v.2 FSmin=2.72

Safety Factors Are Calculated By The Modified Bishop Method



HAN-75-14.39-Lima Ramp H-Embankment Slope Stability@Sta 801+50, RT LTerm

M:\PROJEC-2\13PROJ-1\G13011-1\ANALYS-1\RAMPFO-1\LIH801LT.PL2 Run By: SS 5/25/2014 9:57PM



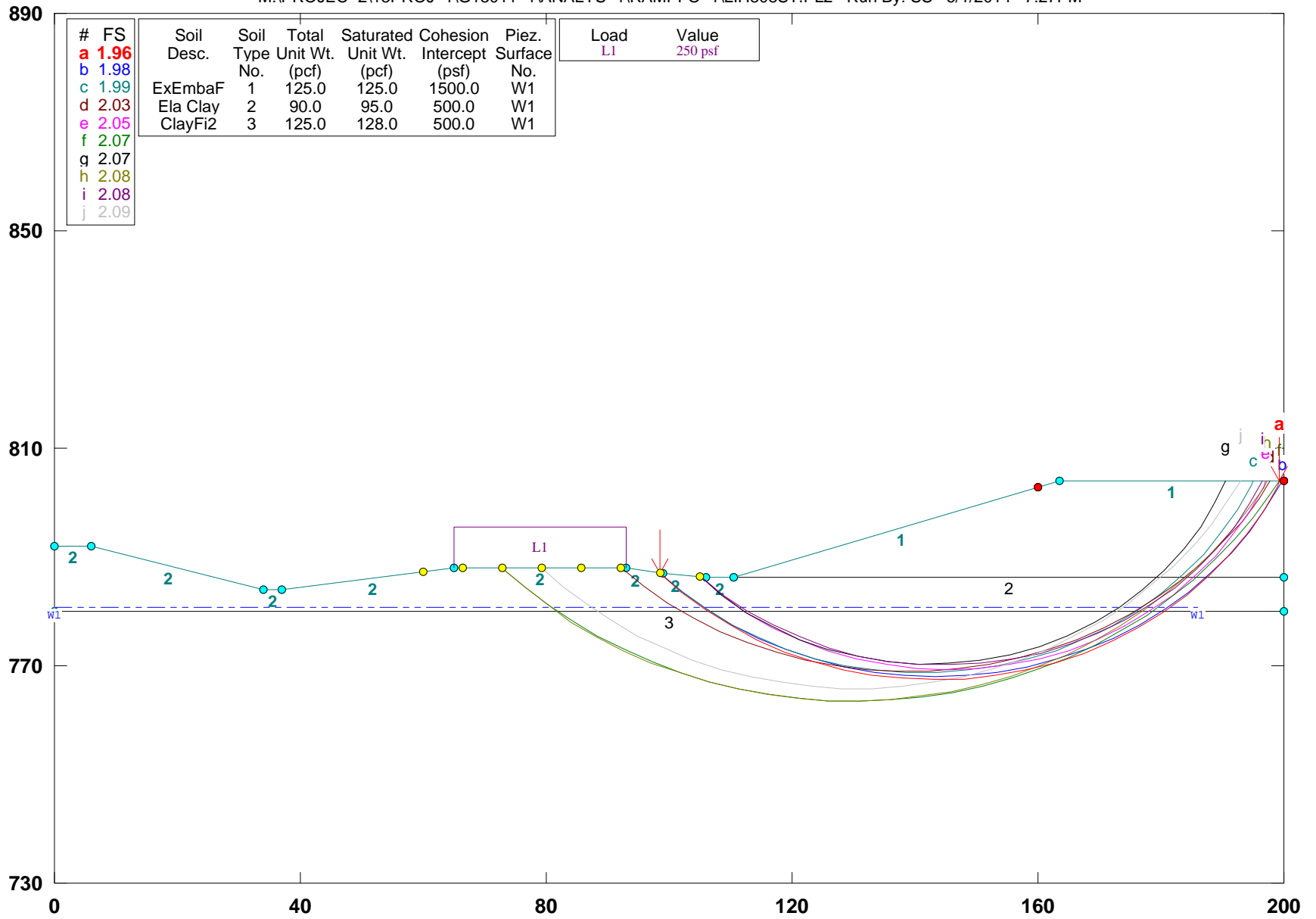
GSTABL7 v.2 FSmin=1.53

Safety Factors Are Calculated By The Modified Bishop Method



HAN-75-14.39-Lima Ramp H Cut Slope Stability@Sta 808+50, RT STerm

M:\PROJEC-2\13PROJ-1\G13011-1\ANALYS-1\RAMPF0-1\LIH808ST.PL2 Run By: SS 6/1/2014 7:27PM



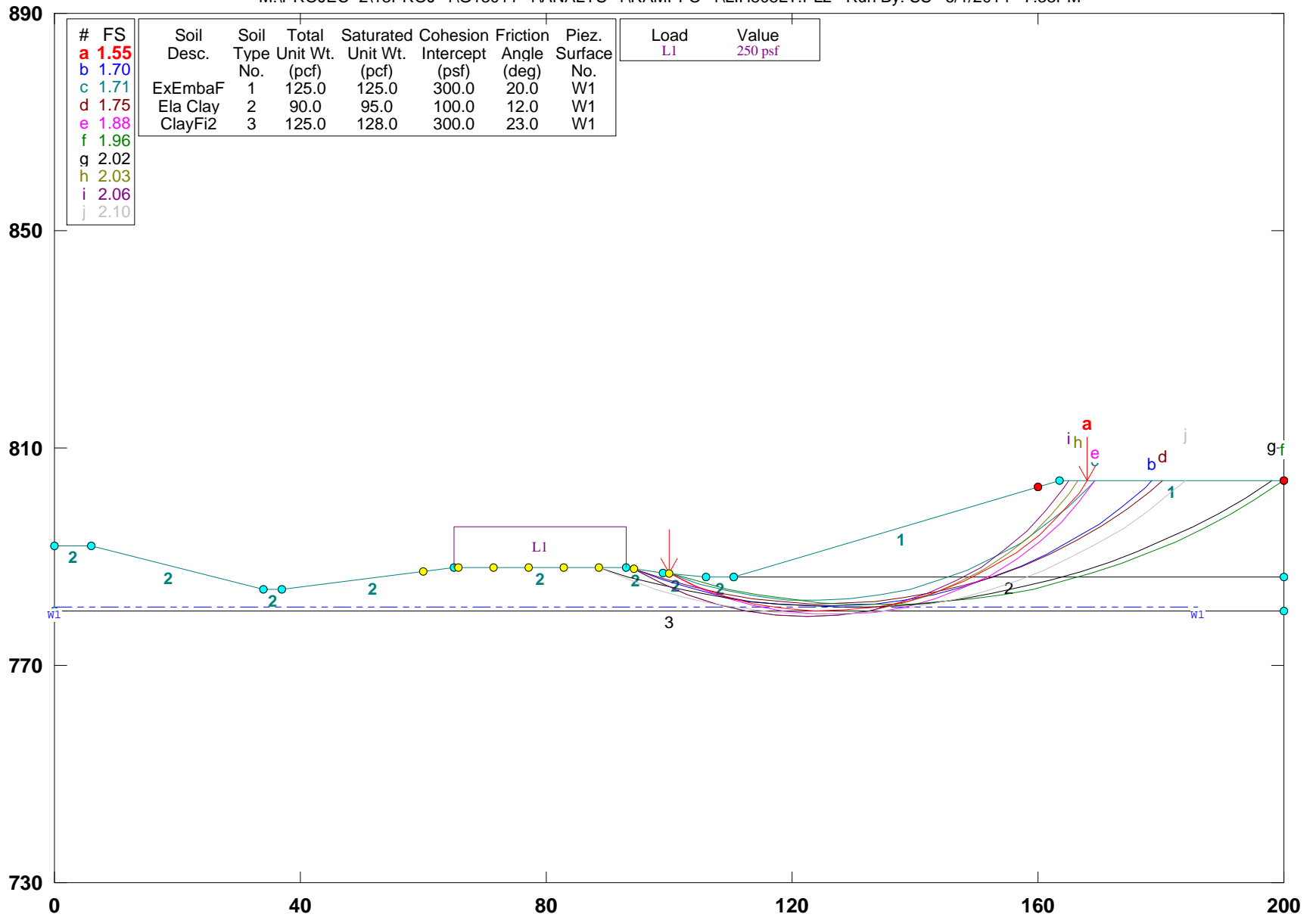
GSTABL7 v.2 FSmin=1.96

Safety Factors Are Calculated By The Modified Bishop Method



HAN-75-14.39-Lima Ramp H Cut Slope Stability@Sta 808+50, RT LTerm

M:\PROJEC-2\13PROJ-1\G13011-1\ANALYS-1\RAMPFO-1\LIH808LT.PL2 Run By: SS 6/1/2014 7:33PM



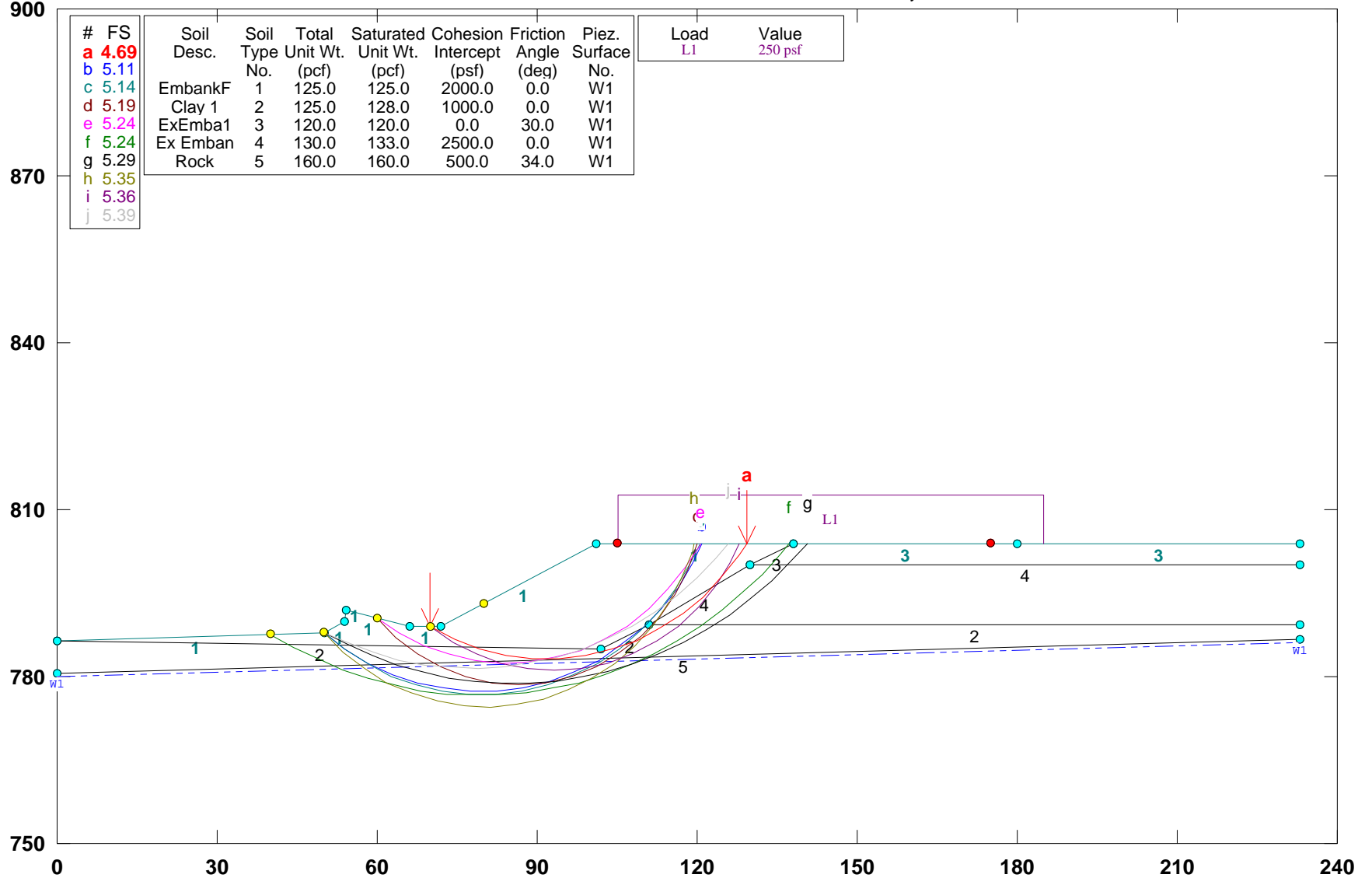
GSTABL7 v.2 FSmin=1.55

Safety Factors Are Calculated By The Modified Bishop Method



HAN-75-14.39-US 68 Ramp D-Embankment Slope Stability@Sta 798+05, RT STerm

M:\PROJEC-2\13PROJ-1\G13011-1\ANALYS-1\RAMPFO-1\68AST.PL2 Run By: SS 2/19/2014 4:06AM



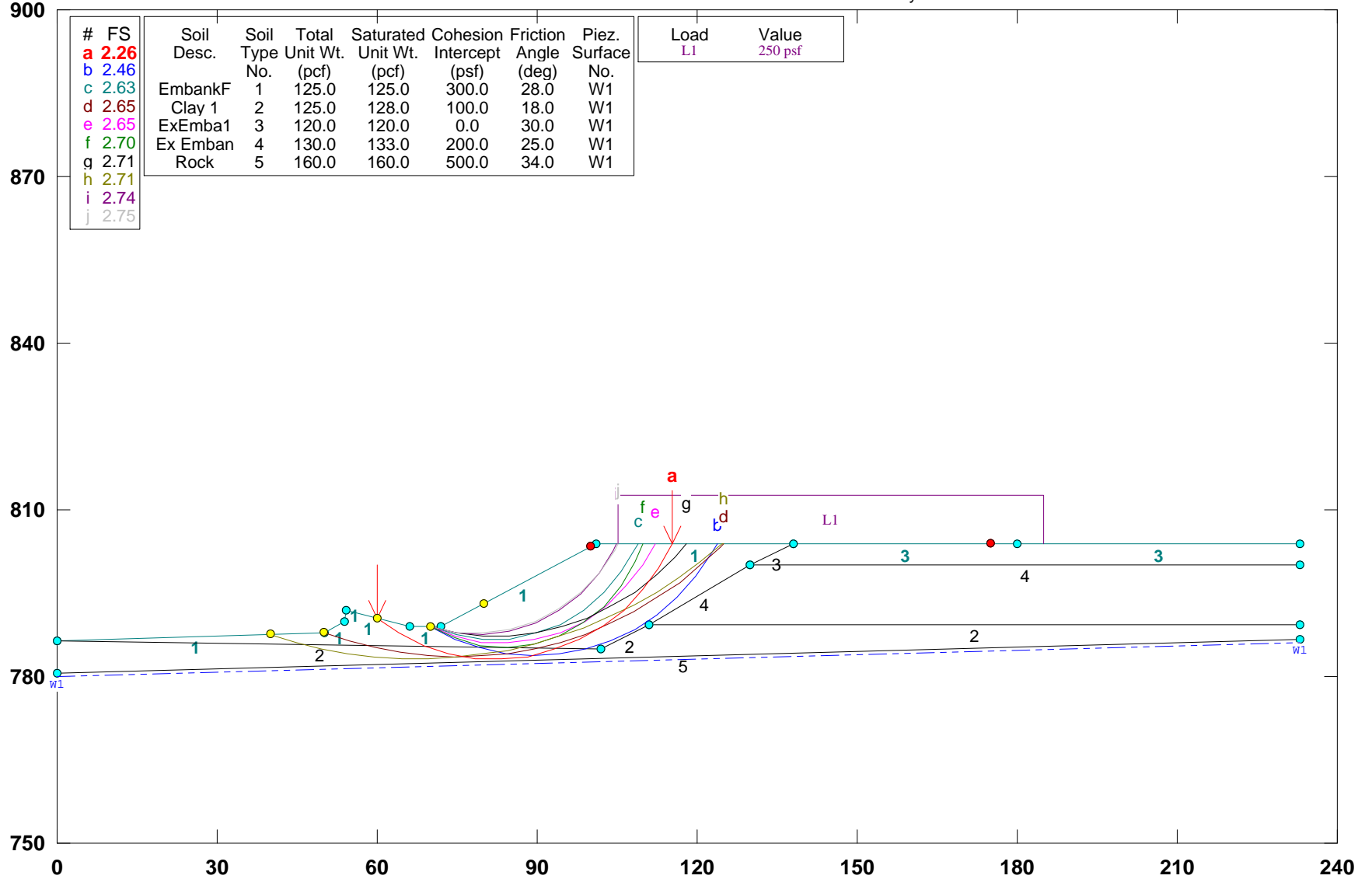
GSTABL7 v.2 FSmin=4.69

Safety Factors Are Calculated By The Modified Bishop Method



HAN-75-14.39-US 68 Ramp D-Embankment Slope Stability@Sta 798+05, RT LTerm

M:\PROJEC-2\13PROJ-1\G13011~1\ANALYS-1\RAMPFO~1\68ALT.PL2 Run By: SS 2/19/2014 4:09AM



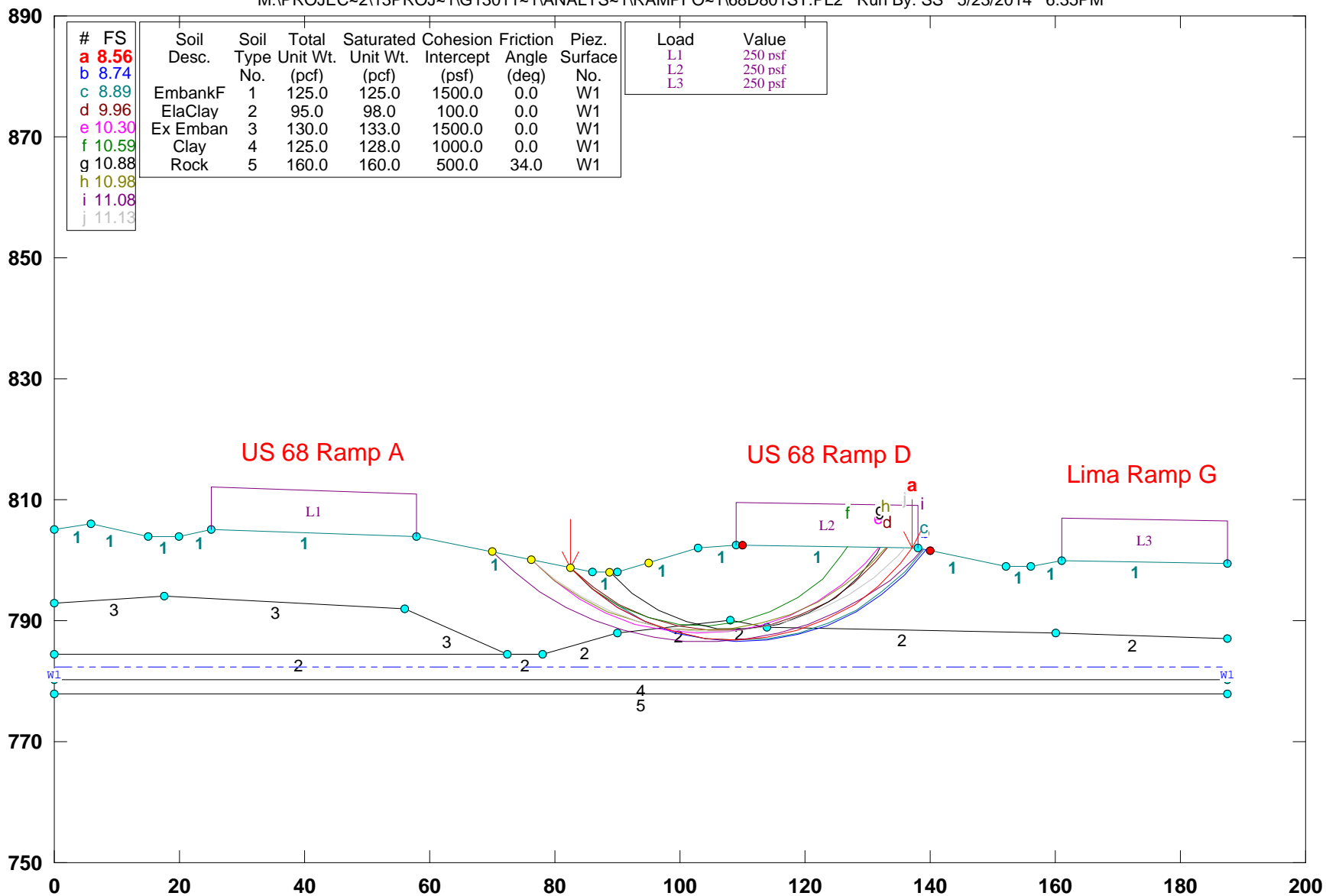
GSTABL7 v.2 FSmin=2.26

Safety Factors Are Calculated By The Modified Bishop Method



HAN-75-14.39-US 68 Ramp D-Embankment Slope Stability@Sta 801+50, LT STerm

M:\PROJEC-2\13PROJ-1\G13011-1\ANALYS-1\RAMPFO-1\68D801ST.PL2 Run By: SS 5/23/2014 6:35PM



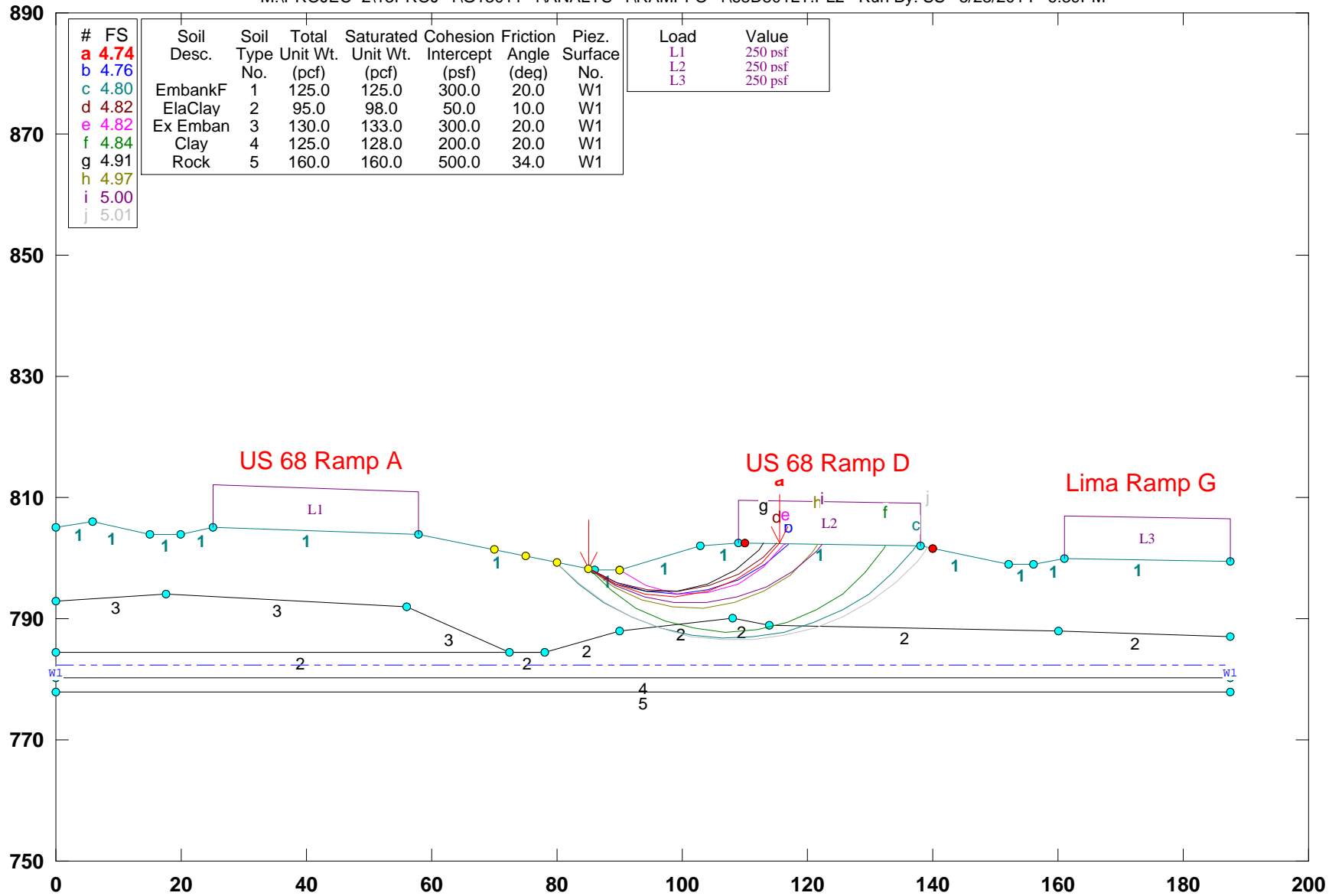
GSTABL7 v.2 FSmin=8.56

Safety Factors Are Calculated By The Modified Bishop Method



HAN-75-14.39-US 68 Ramp D-Embankment Slope Stability@Sta 801+50, LT LTerm

M:\PROJEC-2\13PROJ-1\G13011-1\ANALYS-1\RAMPFO-1\68D801LT.PL2 Run By: SS 5/23/2014 6:39PM



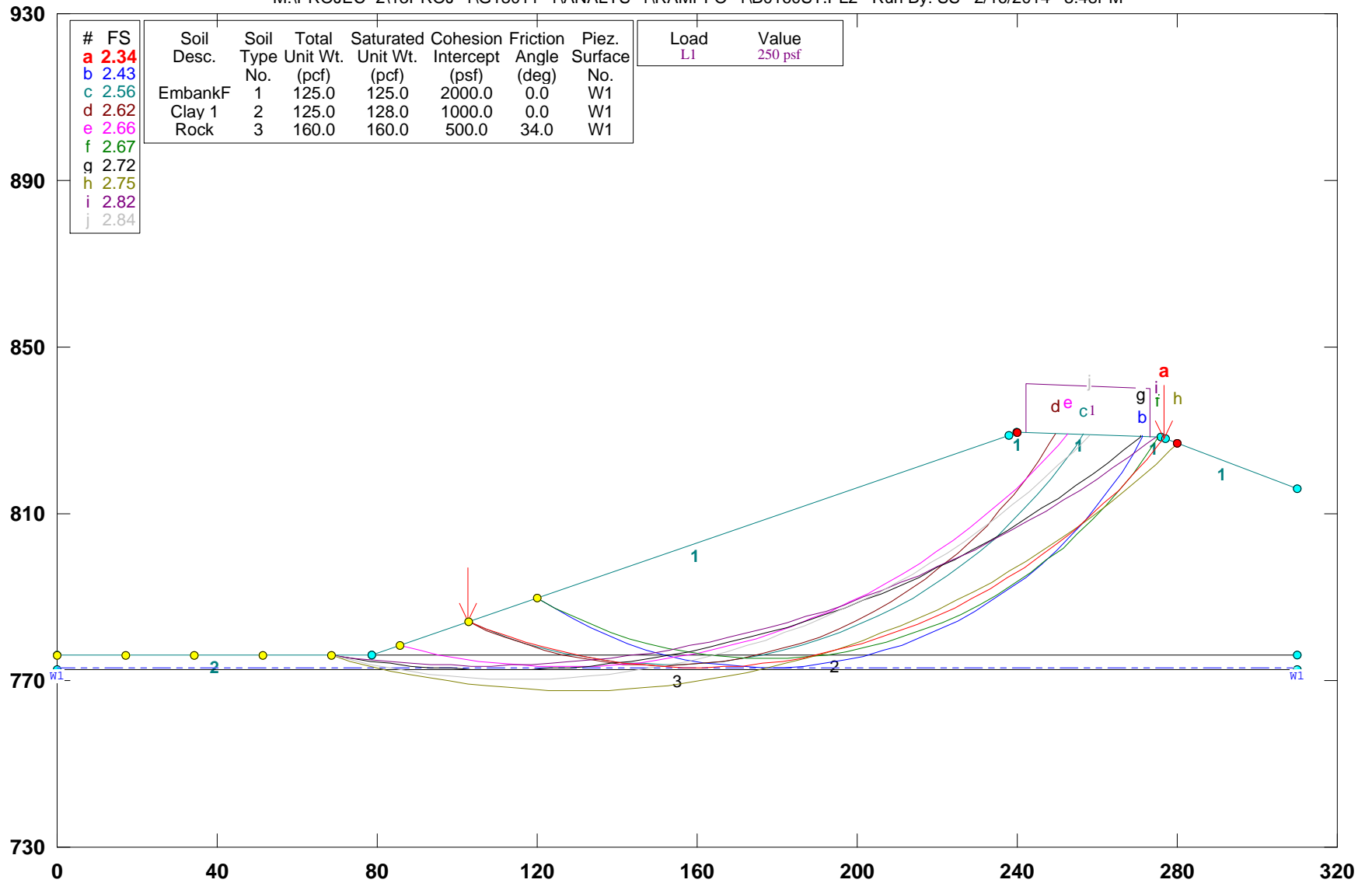
GSTABL7 v.2 FSmin=4.74

Safety Factors Are Calculated By The Modified Bishop Method



HAN-75-14.39-us 68 Ramp C Embankment Slope Stability@Sta 800+50, LT STerm

M:\PROJEC-2\13PROJ-1\G13011-1\ANALYS-1\RAMPF0-1\B0160ST.PL2 Run By: SS 2/16/2014 3:48PM



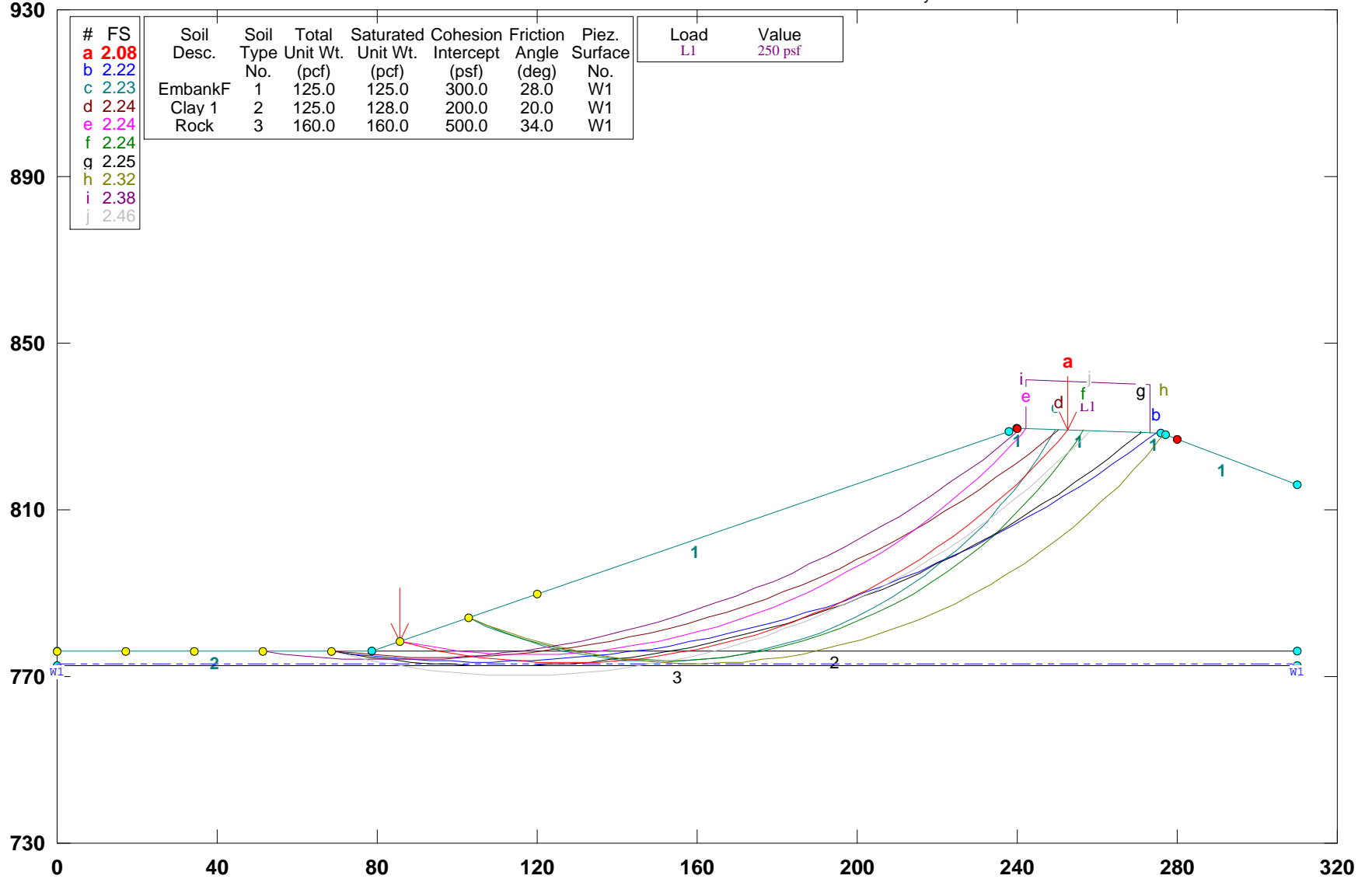
GSTABL7 v.2 FSmin=2.34

Safety Factors Are Calculated By The Modified Bishop Method



HAN-75-14.39-us 68 Ramp C Embankment Slope Stability@Sta 800+50, LT LTerm

M:\PROJEC~2\13PROJ~1\G13011~1\ANALYS~1\RAMPFO~1\68C800LT.PL2 Run By: SS 2/16/2014 3:56PM



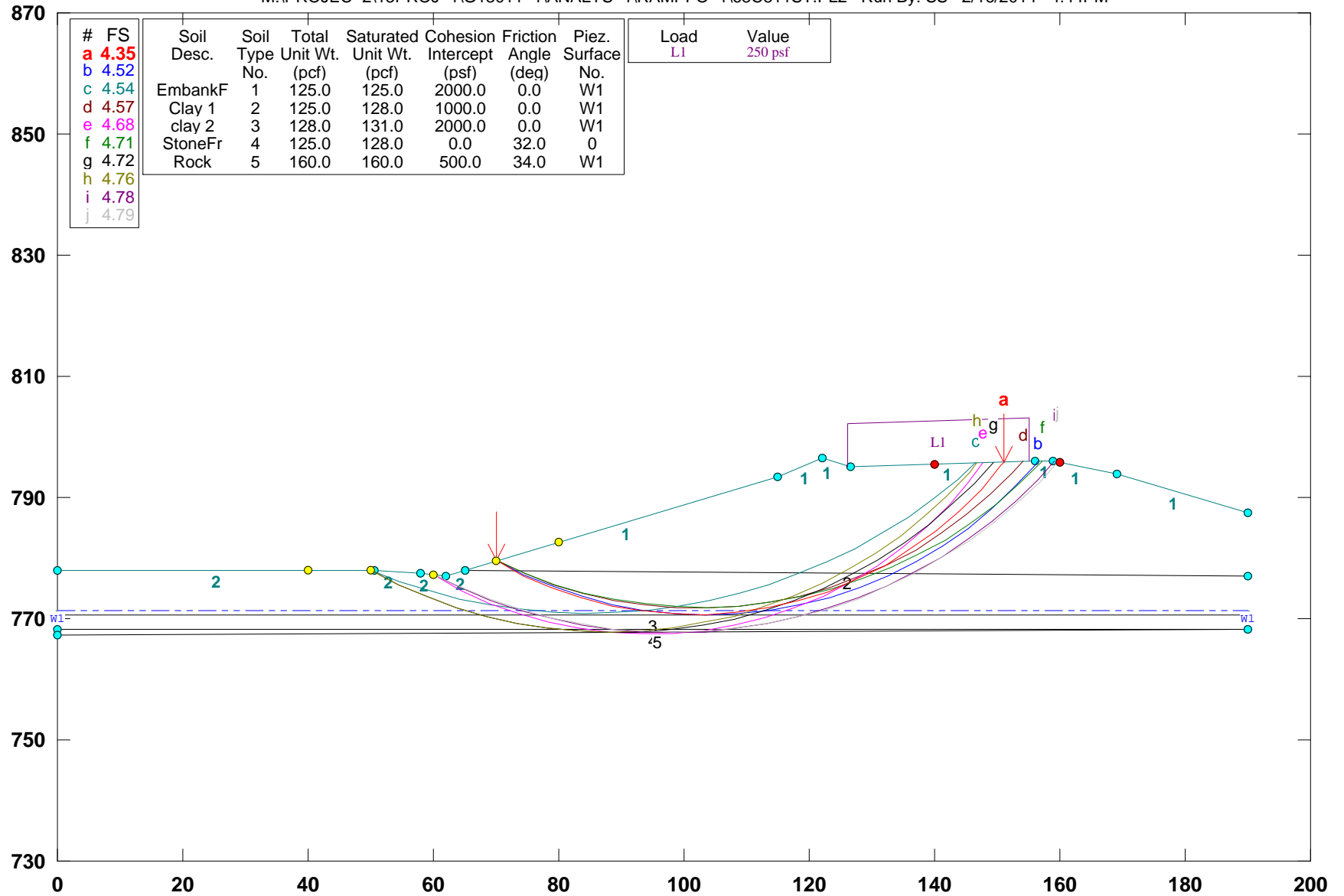
GSTABL7 v.2 FSmin=2.08

Safety Factors Are Calculated By The Modified Bishop Method



HAN-75-14.39 - US 68 Ramp C - Embankment Slope Stability@Sta 811+00, RT STerm

M:\PROJEC-2\13PROJ-1\G13011-1\ANALYS-1\RAMPFO-1\68C811ST.PL2 Run By: SS 2/16/2014 4:44PM

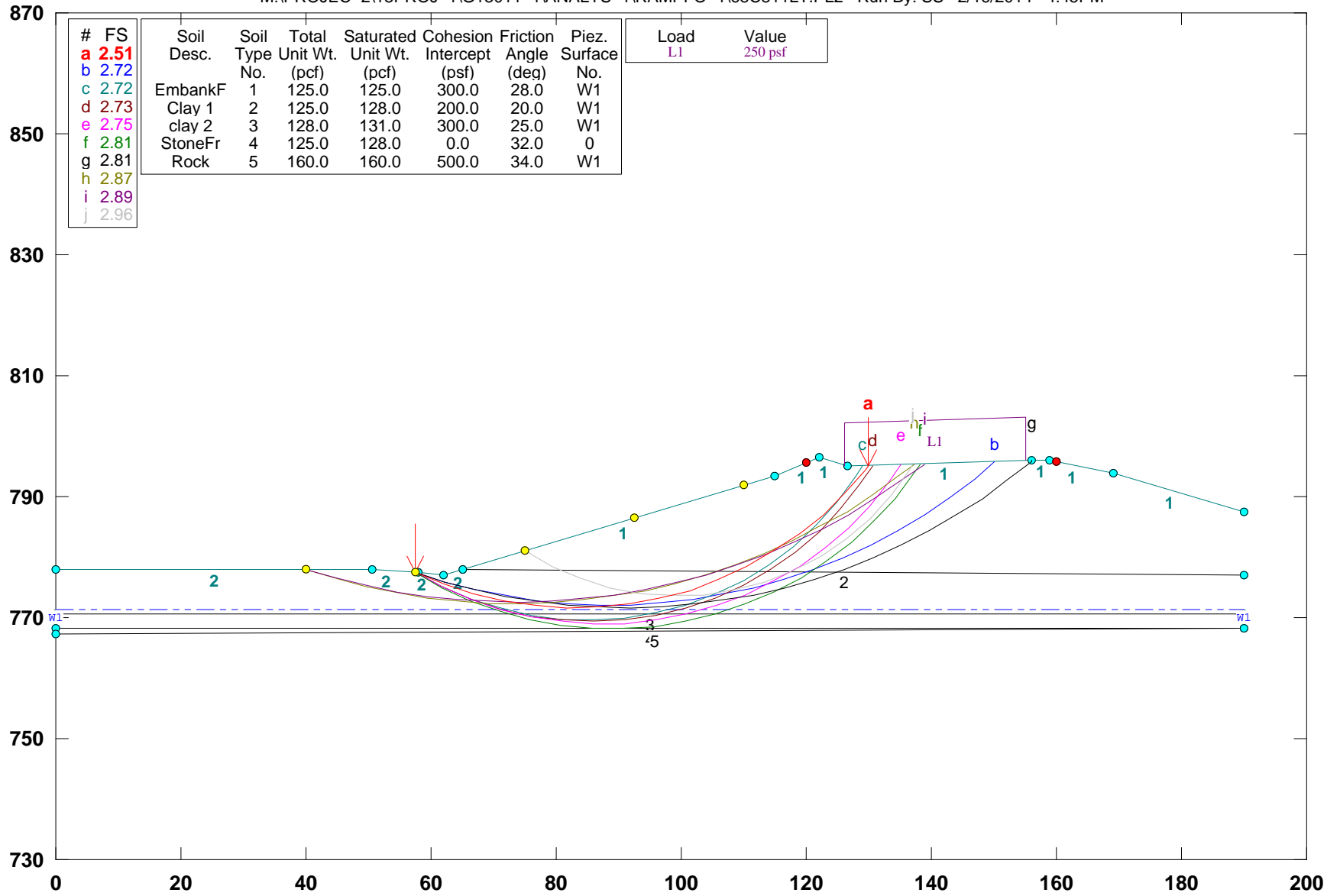


GSTABL7 v.2 FSmin=4.35
Safety Factors Are Calculated By The Modified Bishop Method



HAN-75-14.39 - US 68 Ramp C - Embankment Slope Stability@Sta 811+00, RT LTerm

M:\PROJEC-2\13PROJ-1\G13011-1\ANALYS-1\RAMPFO-1\68C811LT.PL2 Run By: SS 2/16/2014 4:45PM

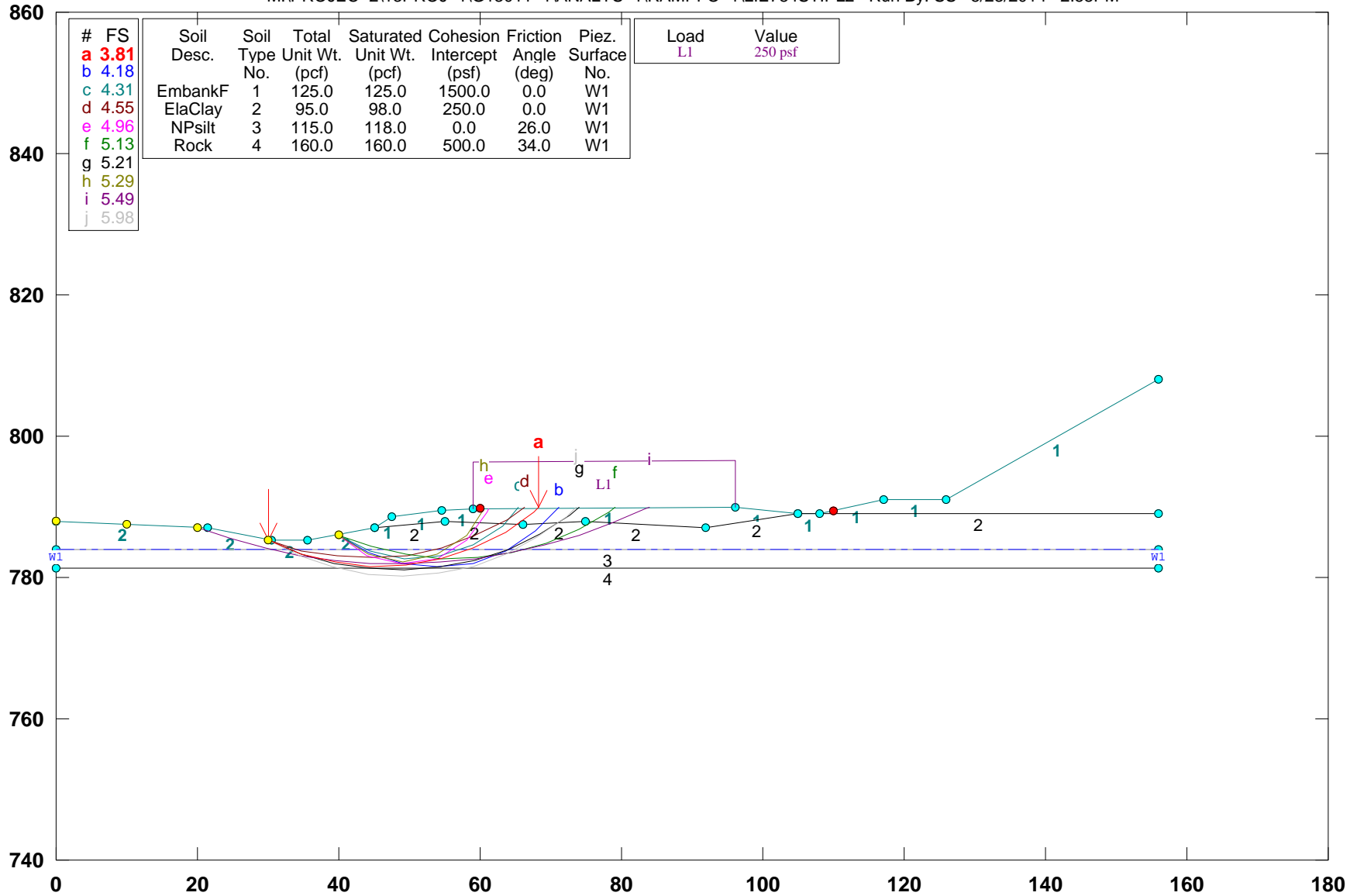


GSTABL7 v.2 FSmin=2.51
 Safety Factors Are Calculated By The Modified Bishop Method



HAN-75-14.39 - Lima Ramp E - Embankment Slope Stability@Sta 784+00, RT STerm

M:\PROJEC~2\13PROJ-1\G13011-1\ANALYS~1\RAMPFO~1\LIE784ST.PL2 Run By: SS 5/23/2014 2:58PM



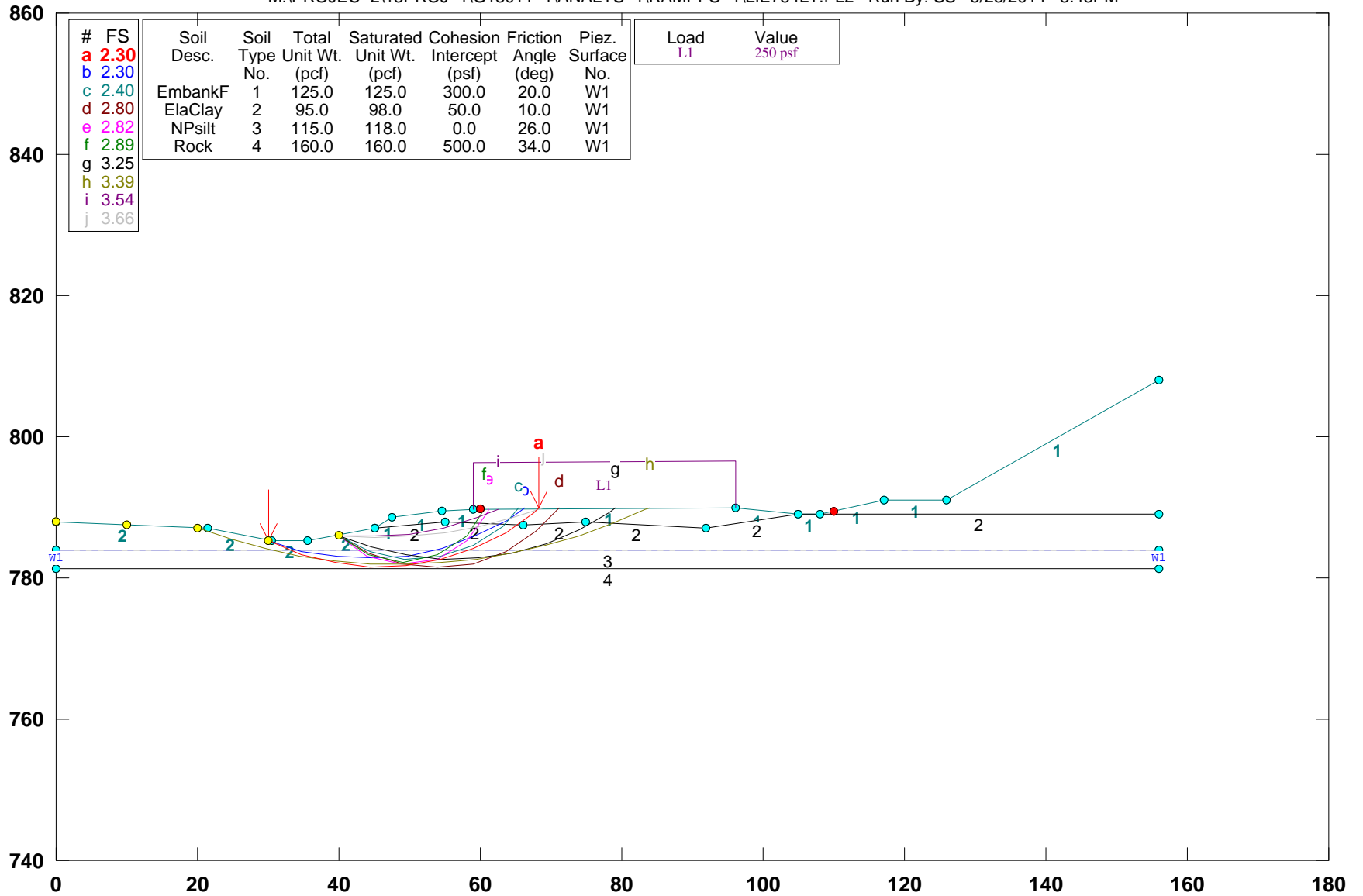
GSTABL7 v.2 FSmin=3.81

Safety Factors Are Calculated By The Modified Bishop Method



HAN-75-14.39 - Lima Ramp E - Embankment Slope Stability@Sta 784+00, RT LTerm

M:\PROJEC~2\13PROJ-1\G13011-1\ANALYS~1\RAMPFO-1\LIE784LT.PL2 Run By: SS 5/23/2014 3:43PM



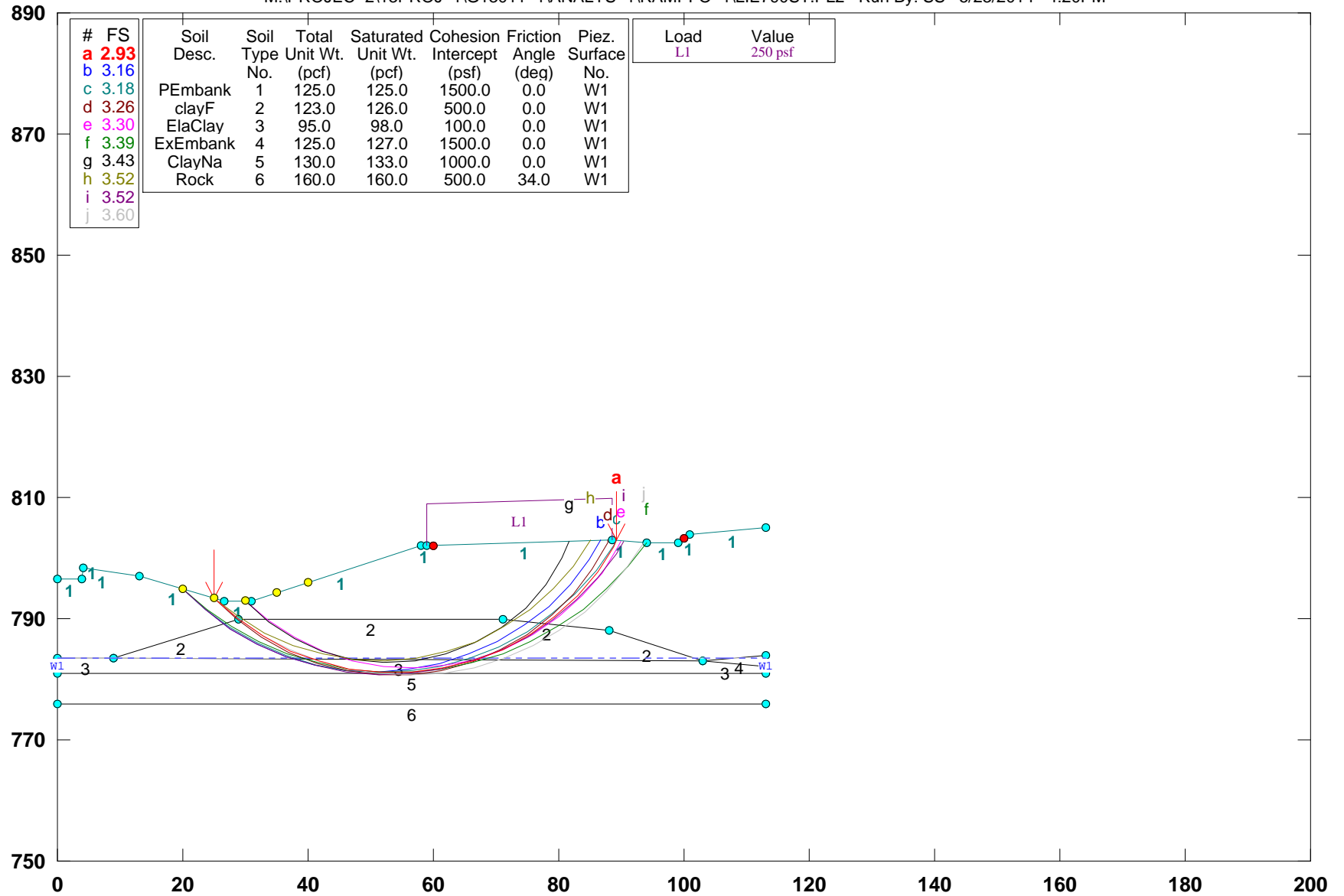
GSTABL7 v.2 FSmin=2.30

Safety Factors Are Calculated By The Modified Bishop Method



HAN-75-14.39 - Lima Ramp E - Embankment Slope Stability@Sta 790+98, RT STerm

M:\PROJEC~2\13PROJ~1\G13011~1\ANALYS~1\RAMPFO~1\LIE790ST.PL2 Run By: SS 5/23/2014 4:20PM



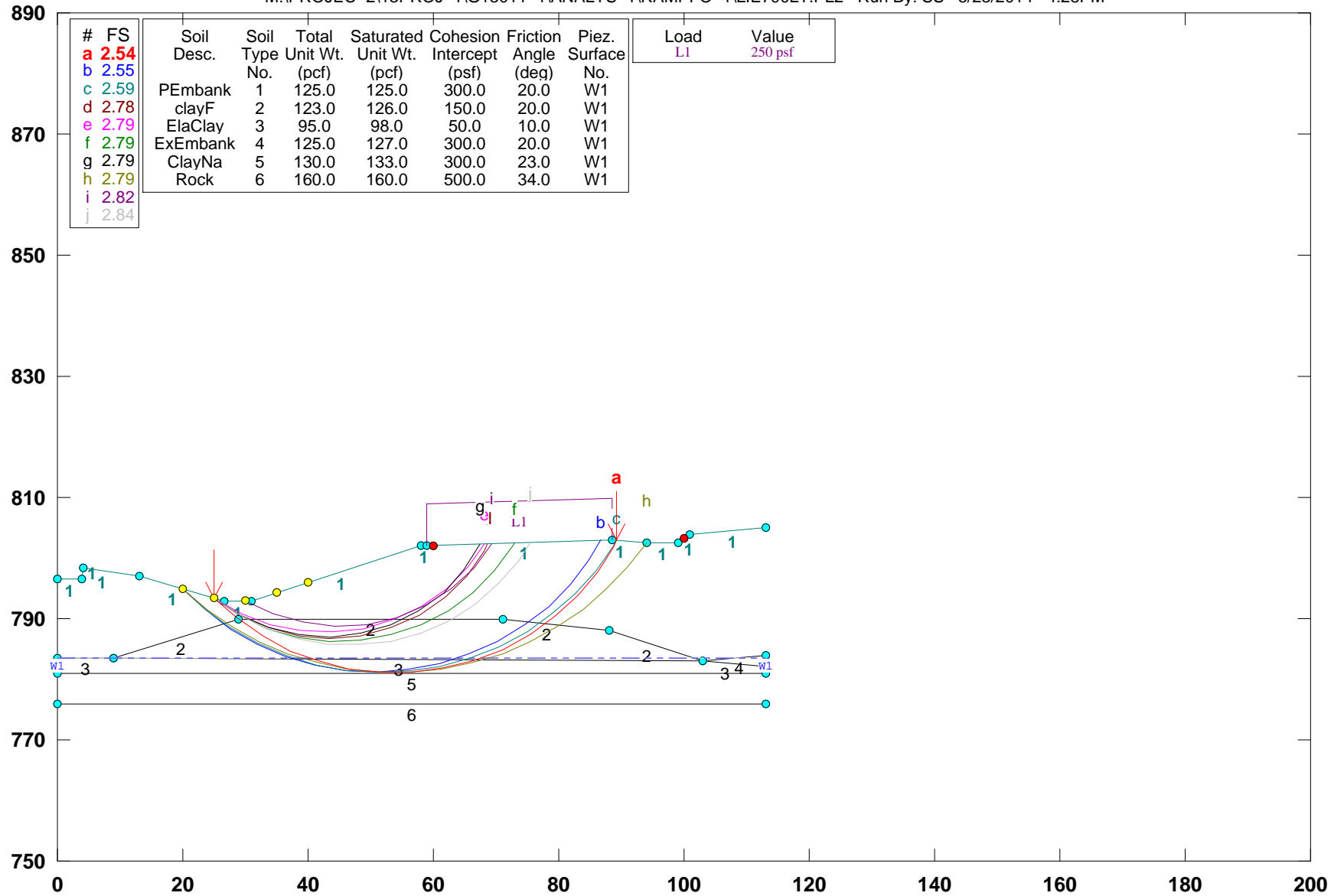
GSTABL7 v.2 FSmin=2.93

Safety Factors Are Calculated By The Modified Bishop Method



HAN-75-14.39 - Lima Ramp E - Embankment Slope Stability@Sta 790+98, RT LTerm

M:\PROJEC~2\13PROJ~1\G13011~1\ANALYS~1\RAMPFO~1\IE790LT.PL2 Run By: SS 5/23/2014 4:28PM



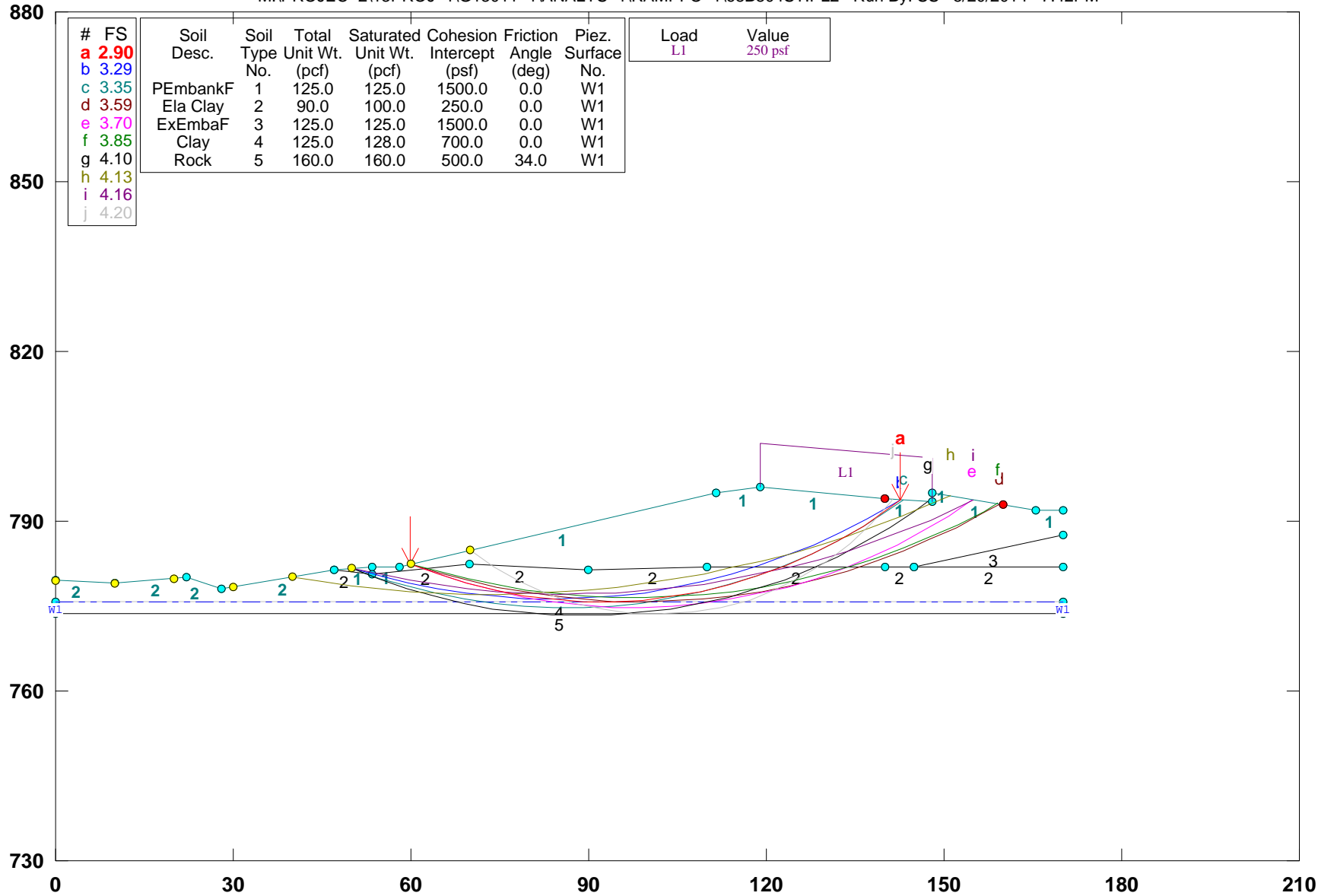
GSTABL7 v.2 FSmin=2.54

Safety Factors Are Calculated By The Modified Bishop Method



HAN-75-14.39-us 68 Ramp B Embankment Slope Stability@Sta 804+00, LT STerm

M:\PROJEC~2\13PROJ~1\G13011~1\ANALYS~1\RAMPFO~1\68B804ST.PL2 Run By: SS 5/20/2014 7:42PM



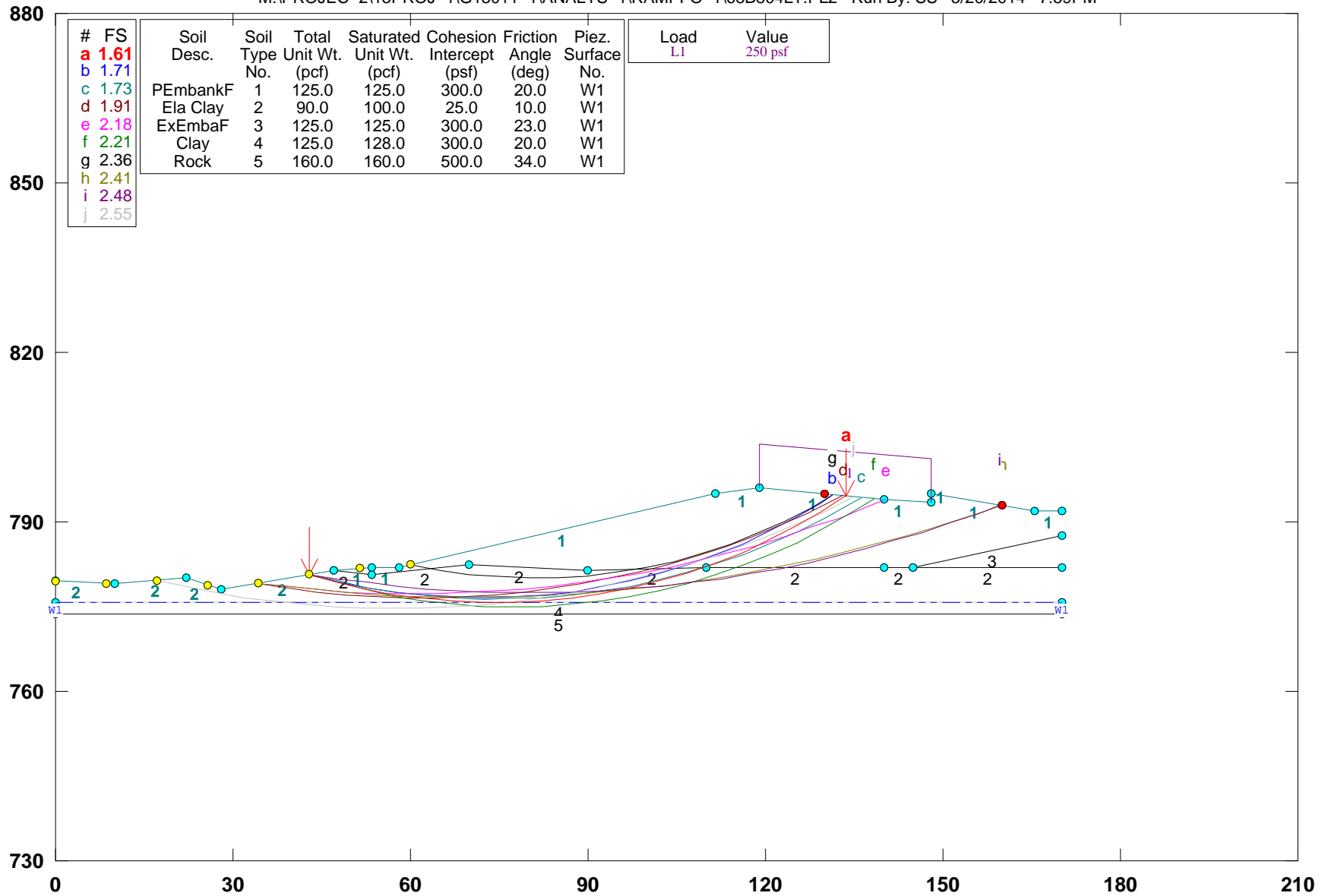
GSTABL7 v.2 FSmin=2.90

Safety Factors Are Calculated By The Modified Bishop Method



HAN-75-14.39-us 68 Ramp B Embankment Slope Stability@Sta 804+00, LT LTerm

M:\PROJEC~2\13PROJ~1\G13011~1\ANALYS~1\RAMPFO~1\68B804LT.PL2 Run By: SS 5/20/2014 7:59PM



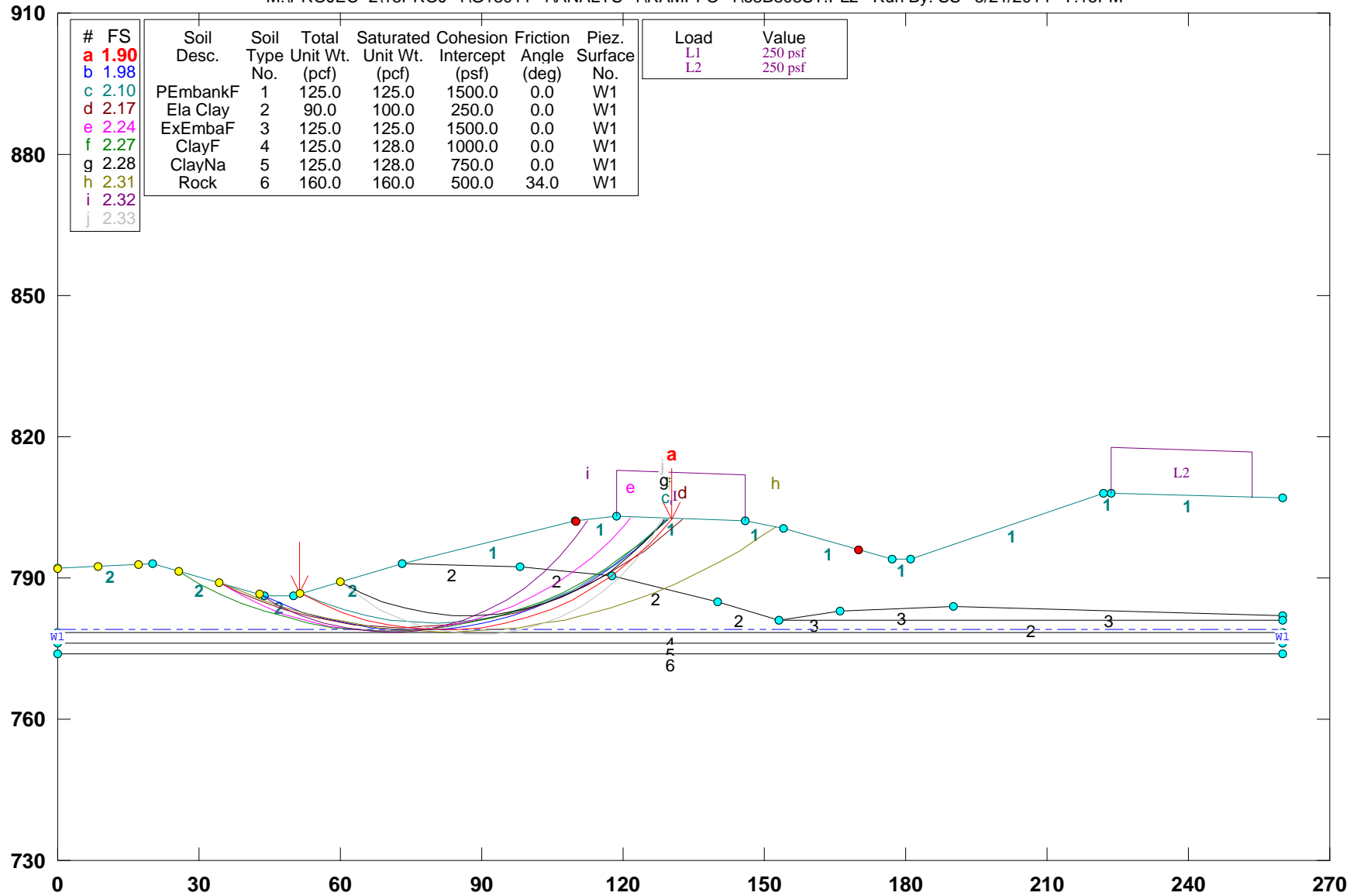
GSTABL7 v.2 FSmin=1.61

Safety Factors Are Calculated By The Modified Bishop Method



HAN-75-14.39-US 68 Ramp B Embankment Slope Stability@Sta 808+00, LT STerm

M:\PROJEC-2\13PROJ-1\G13011-1\ANALYS-1\RAMPFO-1\68B808ST.PL2 Run By: SS 5/21/2014 7:15PM



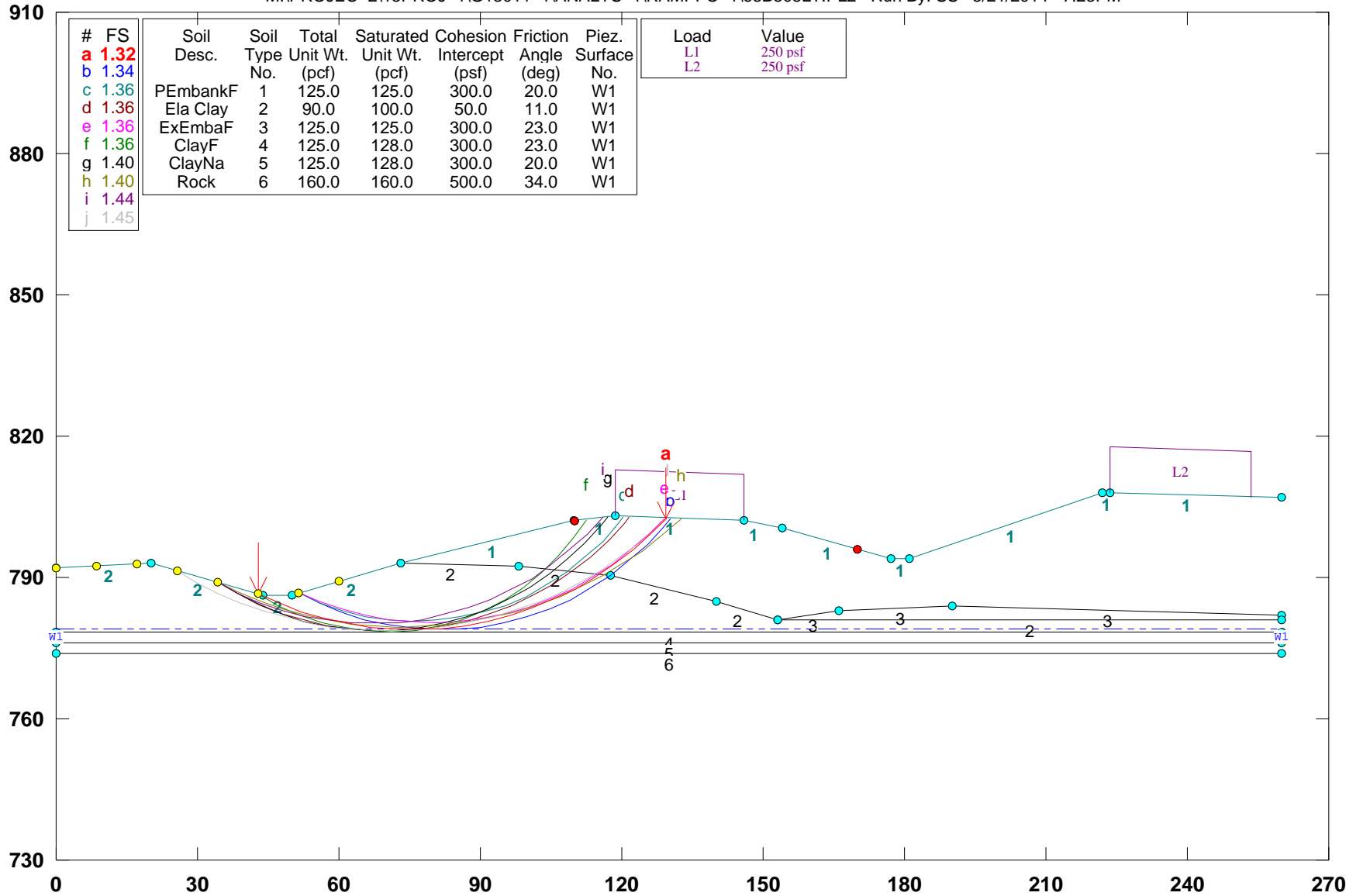
GSTABL7 v.2 FSmin=1.90

Safety Factors Are Calculated By The Modified Bishop Method



HAN-75-14.39-US 68 Ramp B Embankment Slope Stability@Sta 808+00, LT LTerm

M:\PROJEC-2\13PROJ-1\G13011-1\ANALYS-1\RAMPFO-1\68B808LT.PL2 Run By: SS 5/21/2014 7:23PM



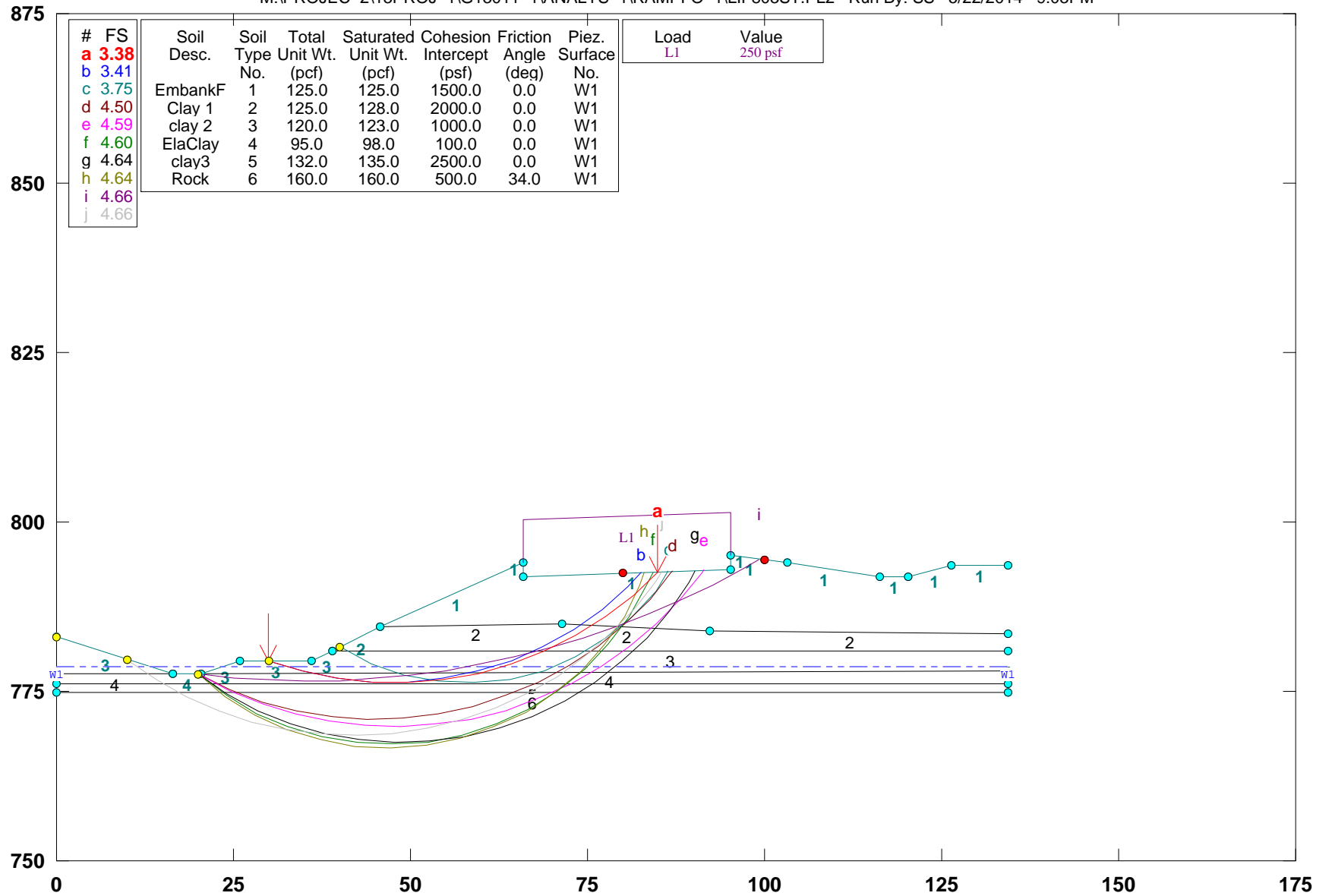
GSTABL7 v.2 FSmin=1.32

Safety Factors Are Calculated By The Modified Bishop Method



HAN-75-14.39 - Lima Ramp F - Embankment Slope Stability@Sta 803+00, RT STerm

M:\PROJEC~2\13PROJ~1\G13011~1\ANALYS~1\RAMPFO~1\LIF803ST.PL2 Run By: SS 5/22/2014 9:03PM

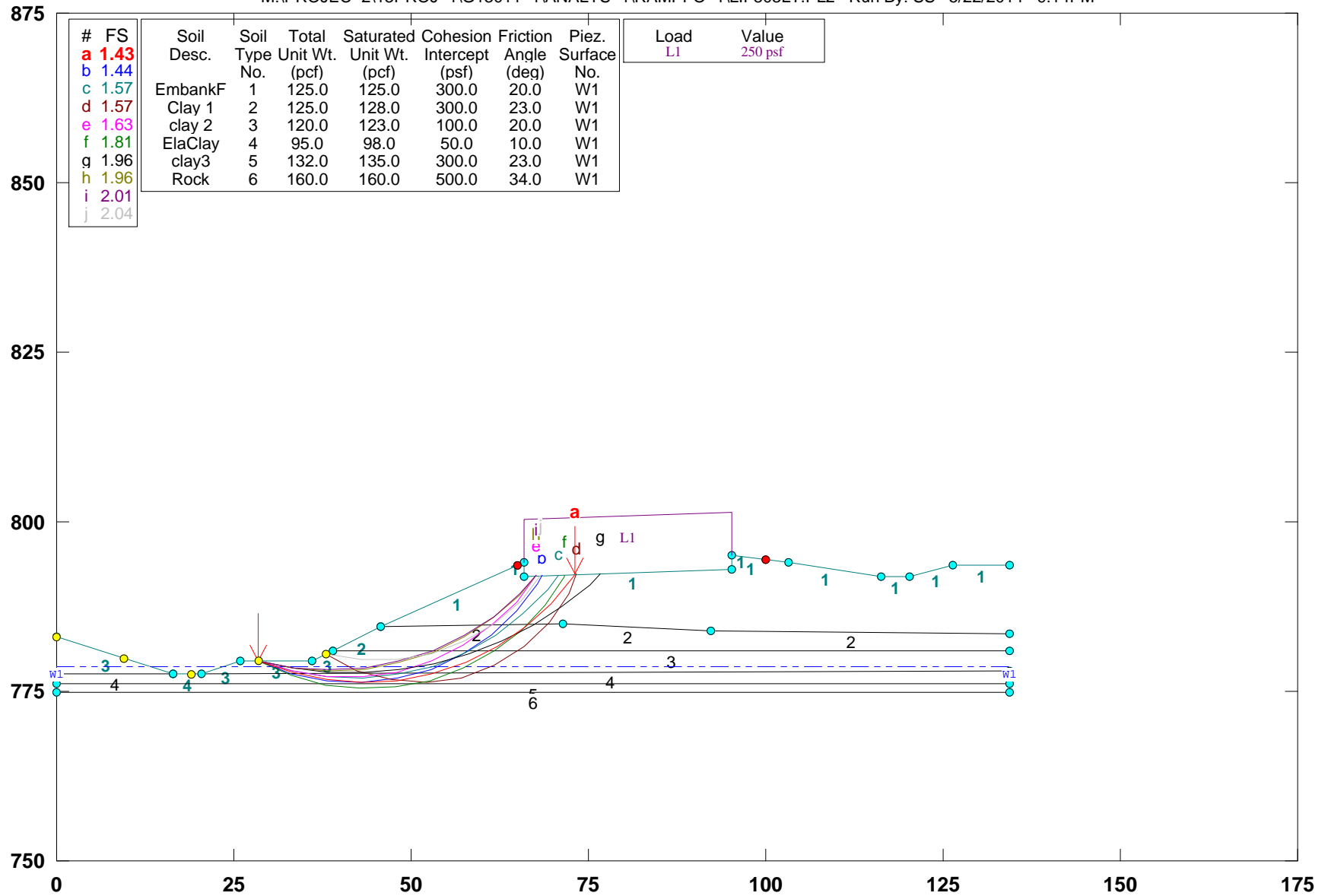


GSTABL7 v.2 FSmin=3.38
 Safety Factors Are Calculated By The Modified Bishop Method



HAN-75-14.39 - Lima Ramp F - Embankment Slope Stability@Sta 803+00, RT LTerm

M:\PROJEC~2\13PROJ~1\G13011~1\ANALYS~1\RAMPFO~1\LIF803LT.PL2 Run By: SS 5/22/2014 9:14PM



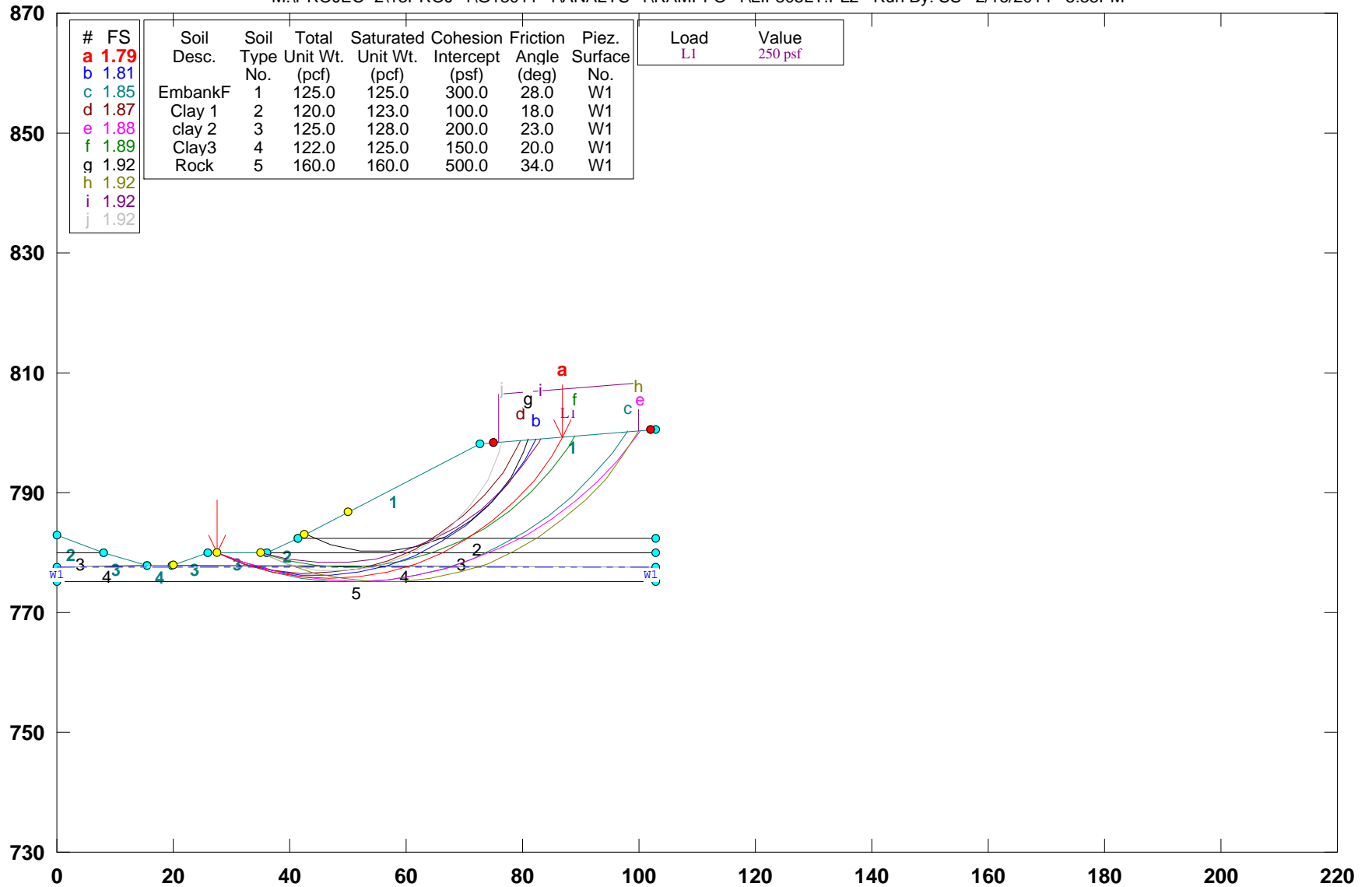
GSTABL7 v.2 FSmin=1.43

Safety Factors Are Calculated By The Modified Bishop Method



HAN-75-14.39 - Lima Ramp F - Embankment Slope Stability @Sta 805+50, RT LTerm

M:\PROJEC-2\13PROJ-1\G13011-1\ANALYS-1\RAMPFO-1\LIF805LT.PL2 Run By: SS 2/16/2014 5:38PM



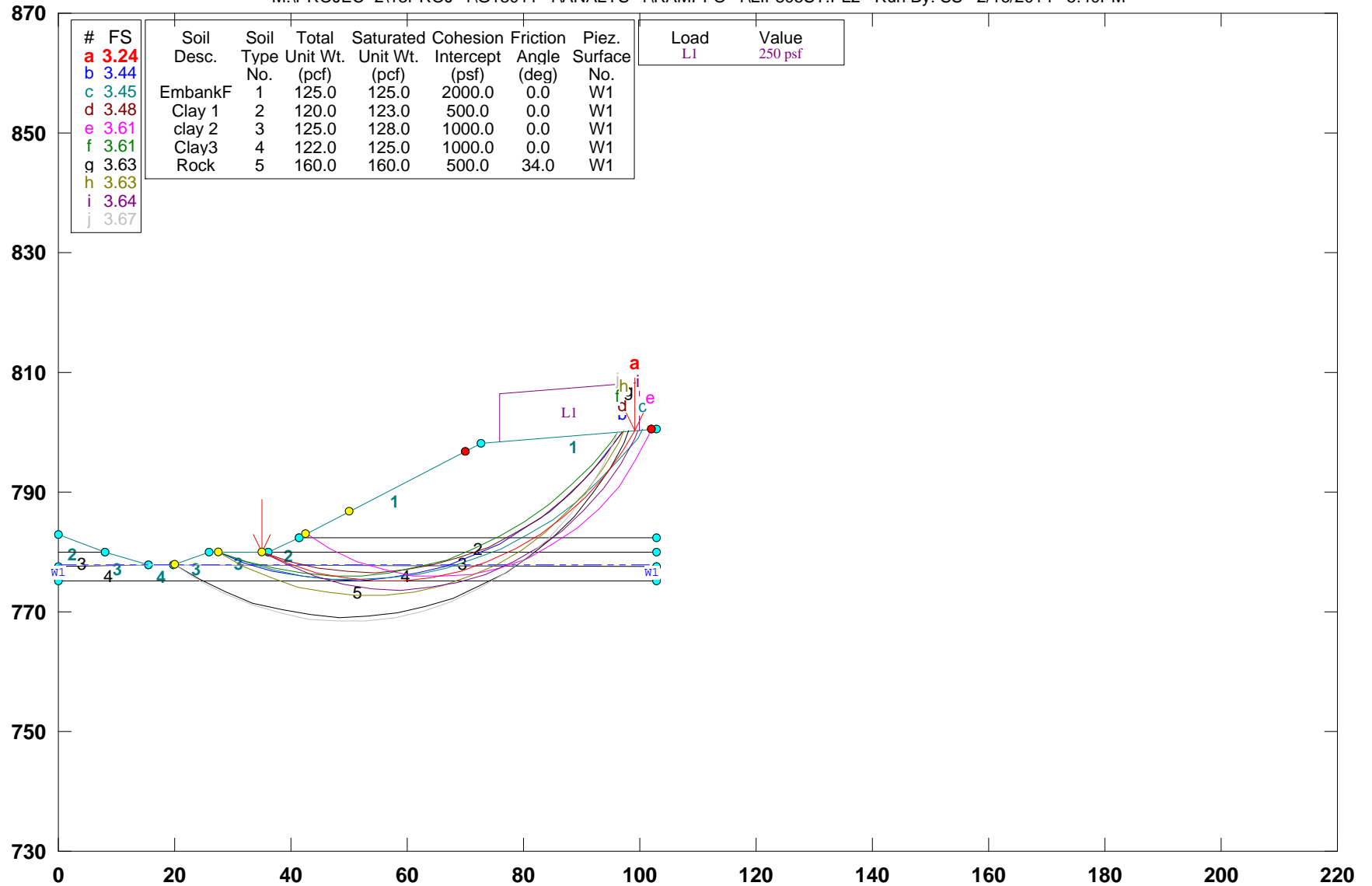
Load	Value
L1	250 psf

GSTABL7 v.2 FSmin=1.79
 Safety Factors Are Calculated By The Modified Bishop Method



HAN-75-14.39 - Lima Ramp F - Embankment Slope Stability @Sta 805+50, RT STerm

M:\PROJEC-2\13PROJ-1\G13011-1\ANALYS-1\RAMPFO-1\LIF805ST.PL2 Run By: SS 2/16/2014 5:40PM



GSTABL7 v.2 FSmin=3.24

Safety Factors Are Calculated By The Modified Bishop Method



SETTLEMENT ANALYSIS for EMBANKMENT FOUNDATION

Project:	HAN-75-14.39-IR-75 Realignment		Project #	G13011G	Test Boring #	B-016-0-13
Type of Foundation	Compression Index (Cc) (From Lab Test)		Groundwater Table below Top of foundation (feet)			
Strip Foundation	Recompression Index (Cr) (From Lab Test)		Unit Weight of Water (pcf)		62.4	
Station 804+75	Embankment Height (feet)		24.0			
Width of Embankment = 100'	Applied Pressure Top of Foundation Soil (psf)		3000		Unit Weight of E. Fill above the Foundation Soil (pcf) 125	
Depth Below the Foundation (Z)	AVERAGE PROPERTIES		CALCULATIONS			Total
Z=0.0' (above Water Table) Z=1.75' (At Centre of Layer)	Thickness of Layer (feet)	3.5	OB Pressure at the top Layer(psf)	0	Settlement	
	Corrected SPT Value (N)	11	OB Pressure at the center Layer (psf)	219	(inches)	
	Specific Gravity of Soil Solids (G)	2.75	Excess Pressure At Center Due to appliedLoad	2948		
	Moisture content (%)	28	Compression Index (C _c)	0.28		
	Liquid Limit (%)	50	Recompression Index (C _r)	0.028	0.028	
	Plastic Limit (%)	25	Initial Void Ratio (e ₀)	0.76		
	Plasticity Index (%)	25	Settlement due to compression (inches)	7.77		
	Unit Weight of soil (pcf)	125	Settlement due to recompression (inches)	0.78	0.78	
Z=3.5'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	438		
Z=3.5' (above Water Table) Z=5.75' (At Centre of Layer)	Thickness of Layer (feet)	4.5	OB Pressure at the top Layer(psf)	438	Settlement	
	Corrected SPT Value (N)	8	OB Pressure at the center Layer (psf)	708	(inches)	
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad	2837		
	Moisture content (%)	24	Compression Index (C _c)	0.24		
	Liquid Limit (%)	39	Recompression Index (C _r)	0.024	0.024	
	Plastic Limit (%)	20	Initial Void Ratio (e ₀)	0.74		
	Plasticity Index (%)	19	Settlement due to compression (inches)	5.21		
	Unit Weight of soil (pcf)	120	Settlement due to recompression (inches)	0.52	0.52	
Z=8.0'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	978		
Z= (above Water Table) Z= (At Centre of Layer)	Thickness of Layer (feet)		OB Pressure at the top Layer(psf)		Settlement	
	Corrected SPT Value (N)		OB Pressure at the center Layer (psf)		(inches)	
	Specific Gravity of Soil Solids (G)		Excess Pressure At Center Due to appliedLoad			
	Moisture content (%)		Compression Index (C _c)			
	Liquid Limit (%)		Recompression Index (C _r)			
	Plastic Limit (%)		Initial Void Ratio (e ₀)			
	Plasticity Index (%)		Settlement due to compression (inches)			
	Unit Weight of soil (pcf)		Settlement due to recompression (inches)			
Z='	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)			

Total Settlement	1.30
Consolidation Settlement	1.3
Immediate Settlement	0

SETTLEMENT ANALYSIS for EMBANKMENT FOUNDATION

Project:	HAN-75-14.39-IR-75 Realignment		Project #	G13011G	Test Boring #	B-019-0-13
Type of Foundation	Compression Index (Cc) (From Lab Test)			Groundwater Table below Top of foundation (feet)		
Strip Foundation	Recompression Index (Cr) (From Lab Test)			Unit Weight of Water (pcf)		62.4
Station 807+50, Left	Embankment Height (feet)		33.5			
Width of Embankment = 84.0'	Applied Pressure Top of Foundation Soil (psf)		4188	Unit Weight of E. Fill above the Foundation Soil (pcf)		125
Depth Below the Foundation (Z)	AVERAGE PROPERTIES		CALCULATIONS			Total
Z=0.0' (above Water Table) Z=1.75' (At Centre of Layer)	Thickness of Layer (feet)	3.5	OB Pressure at the top Layer(psf)	0	Settlement	
	Corrected SPT Value (N)	15	OB Pressure at the center Layer (psf)	224	(inches)	
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad	4103		
	Moisture content (%)	18	Compression Index (C _c)	0.18		
	Liquid Limit (%)	33	Recompression Index (C _r)	0.018	0.018	
	Plastic Limit (%)	21	Initial Void Ratio (e ₀)	0.55		
	Plasticity Index (%)	12	Settlement due to compression (inches)	6.26		
	Unit Weight of soil (pcf)	128	Settlement due to recompression (inches)	0.63	0.63	
Z=3.5'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	448		
Z=3.5' (above Water Table) Z=4.75' (At Centre of Layer)	Thickness of Layer (feet)	2.5	OB Pressure at the top Layer(psf)	448	Settlement	
	Corrected SPT Value (N)	16	OB Pressure at the center Layer (psf)	604	(inches)	
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad	3964		
	Moisture content (%)	20	Compression Index (C _c)	0.2		
	Liquid Limit (%)	38	Recompression Index (C _r)	0.02	0.02	
	Plastic Limit (%)	20	Initial Void Ratio (e ₀)	0.62		
	Plasticity Index (%)	18	Settlement due to compression (inches)	3.26		
	Unit Weight of soil (pcf)	125	Settlement due to recompression (inches)	0.33	0.33	
Z=6.0'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	761		
Z=6.0' (above Water Table) Z=7.25' (At Centre of Layer)	Thickness of Layer (feet)	2.5	OB Pressure at the top Layer(psf)	761	Settlement	
	Corrected SPT Value (N)	7	OB Pressure at the center Layer (psf)	904	(inches)	
	Specific Gravity of Soil Solids (G)	2.65	Excess Pressure At Center Due to appliedLoad	3855		
	Moisture content (%)	9	Bearing Capacity Index (C)	30		
	Liquid Limit (%)	NP	Immediate Settlement in Foundation Soil (inches)	0.72	0.72	
	Plastic Limit (%)	NP	Initial Void Ratio (e ₀)	0.57		
	Plasticity Index (%)	NP				
	Unit Weight of soil (pcf)	115				
Z=8.5'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	1048		

Project:	HAN-75-14.39-IR-75 Realignment		Project #	G13011G	Test Boring #	B-019-0-13
Z=8.5' (above Water Table) Z=9.25' (At Centre of Layer) Z=10.0'	Thickness of Layer (feet)	1.5	OB Pressure at the top Layer(psf)		1048	Settlement (inches)
	Corrected SPT Value (N)	53	OB Pressure at the center Layer (psf)		1153	
	Specific Gravity of Soil Solids (G)	2.65	Excess Pressure At Center Due to appliedLoad		3773	
	Moisture content (%)	8	Bearing Capacity Index (C)		115	
	Liquid Limit (%)	NP	Immediate Settlement in Foundation Soil (inches)		0.10	0.10
	Plastic Limit (%)	NP	Initial Void Ratio (e ₀)		0.28	
	Plasticity Index (%)	NP				
	Unit Weight of soil (pcf)	140				
	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)		1258	

Toatl Settlement **1.77**
Consolidation Settlement **0.96**
Immediate Settlement **0.81**

SETTLEMENT ANALYSIS for EMBANKMENT FOUNDATION

Project:	HAN-75-14.39-IR-75 Widening		Project #	G13011G	Test Boring #	B-026-2-13
Type of Foundation	Compression Index (Cc) (From Lab Test)			Groundwater Table below Top of foundation (feet)	11.5	
Strip Foundation	Recompression Index (Cr) (From Lab Test)			Unit Weight of Water (pcf)	62.4	
Station 822+00, Right	Embankment Height (feet)		12.9			
Width of Embankment = 32.0'	Applied Pressure Top of Foundation Soil (psf)		1613	Unit Weight of E. Fill above the Foundation Soil (pcf)	125	
Depth Below the Foundation (Z)	AVERAGE PROPERTIES		CALCULATIONS			Total
Z=0.0' (above Water Table) Z=3.75' (At Centre of Layer)	Thickness of Layer (feet)	7.5	OB Pressure at the top Layer(psf)	0	Settlement	
	Corrected SPT Value (N)	12	OB Pressure at the center Layer (psf)	469	(inches)	
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad	1444		
	Moisture content (%)	21	Compression Index (C _c)	0.21		
	Liquid Limit (%)		Recompression Index (C _r)	0.021	0.21	
	Plastic Limit (%)		Initial Void Ratio (e ₀)	0.63		
	Plasticity Index (%)		Settlement due to compression (inches)	7.08		
	Unit Weight of soil (pcf)	125	Settlement due to recompression (inches)	0.71	0.71	
Z=7.5'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	938		
Z=7.5' (above Water Table) Z=8.75' (At Centre of Layer)	Thickness of Layer (feet)	2.5	OB Pressure at the top Layer(psf)	938	Settlement	
	Corrected SPT Value (N)		OB Pressure at the center Layer (psf)	1088	(inches)	
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad	1267		
	Moisture content (%)	14	Compression Index (C _c)	0.14		
	Liquid Limit (%)	23	Recompression Index (C _r)	0.014	0.014	
	Plastic Limit (%)	15	Initial Void Ratio (e ₀)	0.60		
	Plasticity Index (%)	8	Settlement due to compression (inches)	0.88		
	Unit Weight of soil (pcf)	120	Settlement due to recompression (inches)	0.09	0.09	
Z=10.0'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	1238		
Z=10.0' (above Water Table) Z=10.75' (At Centre of Layer)	Thickness of Layer (feet)	1.5	OB Pressure at the top Layer(psf)	1238	Settlement	
	Corrected SPT Value (N)	31	OB Pressure at the center Layer (psf)	1335	(inches)	
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad	1207		
	Moisture content (%)	15	Compression Index (C _c)	0.15		
	Liquid Limit (%)	23	Recompression Index (C _r)	0.015	0.015	
	Plastic Limit (%)	15	Initial Void Ratio (e ₀)	0.49		
	Plasticity Index (%)	8	Settlement due to compression (inches)	0.51		
	Unit Weight of soil (pcf)	130	Settlement due to recompression (inches)	0.05	0.05	
Z=11.5'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	1433		

Project:	HAN-75-14.39-IR-75 Widening		Project #	G13011G	Test Boring #	B-026-2-13
Z=11.5'	Thickness of Layer (feet)	3.5	OB Pressure at the top Layer(psf)		1433	Settlement (inches)
	Corrected SPT Value (N)	32	OB Pressure at the center Layer (psf)		1551	
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad		1141	
(below Water Table)	Moisture content (%)	15	Compression Index (C _c)		0.15	
Z=13.25' (At Centre of Layer)	Liquid Limit (%)	23	Recompression Index (C _r)		0.015	0.015
	Plastic Limit (%)	15	Initial Void Ratio (e ₀)		0.49	
	Plasticity Index (%)	8	Settlement due to compression (inches)		1.01	
	Unit Weight of soil (pcf)	130	Settlement due to recompression (inches)		0.10	0.10
Z=15.0'	Submerged Unit Weight of Soil (pcf)	67.6	OB Pressure at the bottom Layer (psf)		1669	

Toatl Settlement 0.95
Consolidation Settlement 0.95
Immediate Settlement 0

SETTLEMENT ANALYSIS for EMBANKMENT FOUNDATION

Project:	HAN-75-14.39-IR-75 Widening	Project #	G13011G	Test Boring #	B-049-1-13
Type of Foundation	Compression Index (Cc) (From Lab Test)		Groundwater Table below Top of foundation (feet)	11	
Strip Foundation	Recompression Index (Cr) (From Lab Test)		Unit Weight of Water (pcf)	62.4	
Station 904+00, Right	Embankment Height (feet)	20.6			
Width of Embankment = 85.0'	Applied Pressure Top of Foundation Soil (psf)	2575	Unit Weight of E. Fill above the Foundation Soil (pcf)	125	
Depth Below the Foundation (Z)	AVERAGE PROPERTIES		CALCULATIONS		Total
Z=0.0' (above Water Table) Z=3.00' (At Centre of Layer)	Thickness of Layer (feet)	6	OB Pressure at the top Layer(psf)	0	Settlement
	Corrected SPT Value (N)	12	OB Pressure at the center Layer (psf)	375	(inches)
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad	2487	
	Moisture content (%)	17	Compression Index (C _c)	0.17	
	Liquid Limit (%)	39	Recompression Index (C _r)	0.017	0.017
	Plastic Limit (%)	20	Initial Void Ratio (e ₀)	0.58	
	Plasticity Index (%)	19	Settlement due to compression (inches)	6.85	
	Unit Weight of soil (pcf)	125	Settlement due to recompression (inches)	0.69	0.69
Z=6.0'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	750	
Z=6.0' (above Water Table) Z=8.50' (At Centre of Layer)	Thickness of Layer (feet)	5	OB Pressure at the top Layer(psf)	750	Settlement
	Corrected SPT Value (N)	5	OB Pressure at the center Layer (psf)	1045	(inches)
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad	2341	
	Moisture content (%)	24	Compression Index (C _c)	0.24	
	Liquid Limit (%)	33	Recompression Index (C _r)	0.024	0.024
	Plastic Limit (%)	19	Initial Void Ratio (e ₀)	0.77	
	Plasticity Index (%)	14	Settlement due to compression (inches)	4.15	
	Unit Weight of soil (pcf)	118	Settlement due to recompression (inches)	0.42	0.42
Z=11.0'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	1340	
Z=11.0' (below Water Table) Z=12.25' (At Centre of Layer)	Thickness of Layer (feet)	2.5	OB Pressure at the top Layer(psf)	1340	Settlement
	Corrected SPT Value (N)	8	OB Pressure at the center Layer (psf)	1406	(inches)
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad	2251	
	Moisture content (%)	25	Compression Index (C _c)	0.25	
	Liquid Limit (%)	28	Recompression Index (C _r)	0.025	0.025
	Plastic Limit (%)	24	Initial Void Ratio (e ₀)	0.83	
	Plasticity Index (%)	4	Settlement due to compression (inches)	1.70	
	Unit Weight of soil (pcf)	115	Settlement due to recompression (inches)	0.17	0.17
Z=13.5'	Submerged Unit Weight of Soil (pcf)	52.6	OB Pressure at the bottom Layer (psf)	1472	

Project:	HAN-75-14.39-IR-75 Widening		Project #	G13011G	Test Boring #	B-049-1-13
Z=13.5' (below Water Table) Z=14.75' (At Centre of Layer) Z=16.0'	Thickness of Layer (feet)	2.5	OB Pressure at the top Layer(psf)		1472	Settlement (inches)
	Corrected SPT Value (N)	43	OB Pressure at the center Layer (psf)		1569	
	Specific Gravity of Soil Solids (G)	2.65	Excess Pressure At Center Due to appliedLoad		2194	
	Moisture content (%)	9	Bearing Capacity Index (C)		115	
	Liquid Limit (%)	NP	Immediate Settlement in Foundation Soil (inches)		0.10	0.10
	Plastic Limit (%)	NP	Initial Void Ratio (e ₀)		0.29	
	Plasticity Index (%)	NP				
	Unit Weight of soil (pcf)	140				
	Submerged Unit Weight of Soil (pcf)	77.6	OB Pressure at the bottom Layer (psf)		1666	

Toatl Settlement **1.37**
Consolidation Settlement **1.27**
Immediate Settlement **0.1**

SETTLEMENT ANALYSIS for EMBANKMENT FOUNDATION

Project:	HAN-75-14.39-US 68 Widening	Project #	G13011G	Test Boring #	B-082-0-13
Type of Foundation	Compression Index (Cc) (From Lab Test)		Groundwater Table below Top of foundation (feet)		
Strip Foundation	Recompression Index (Cr) (From Lab Test)		Unit Weight of Water (pcf)		62.4
Station 756+00	Embankment Height (feet)	20.0			
Width of Embankment = 120'	Applied Pressure Top of Foundation Soil (psf)	2500	Unit Weight of E. Fill above the Foundation Soil (pcf)		125
Depth Below the Foundation (Z)	AVERAGE PROPERTIES		CALCULATIONS		Total
Z=0.0' (above Water Table) Z=1.75' (At Centre of Layer)	Thickness of Layer (feet)	3.5	OB Pressure at the top Layer(psf)	0	Settlement
	Corrected SPT Value (N)	13	OB Pressure at the center Layer (psf)	219	(inches)
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad	2464	
	Moisture content (%)	9	Compression Index (C _c)	0.09	
	Liquid Limit (%)	28	Recompression Index (C _r)	0.009	0.009
	Plastic Limit (%)	18	Initial Void Ratio (e ₀)	0.47	
	Plasticity Index (%)	10	Settlement due to compression (inches)	2.80	
	Unit Weight of soil (pcf)	125	Settlement due to recompression (inches)	0.28	0.28
Z=3.5'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	438	
Z=3.5' (above Water Table) Z=5.0' (At Centre of Layer)	Thickness of Layer (feet)	3	OB Pressure at the top Layer(psf)	438	Settlement
	Corrected SPT Value (N)	12	OB Pressure at the center Layer (psf)	625	(inches)
	Specific Gravity of Soil Solids (G)	2.75	Excess Pressure At Center Due to appliedLoad	2400	
	Moisture content (%)	20	Compression Index (C _c)	0.2	
	Liquid Limit (%)	39	Recompression Index (C _r)	0.02	0.02
	Plastic Limit (%)	22	Initial Void Ratio (e ₀)	0.65	
	Plasticity Index (%)	17	Settlement due to compression (inches)	2.99	
	Unit Weight of soil (pcf)	125	Settlement due to recompression (inches)	0.30	0.30
Z=6.5'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	813	
Z= (above Water Table) Z= (At Centre of Layer)	Thickness of Layer (feet)		OB Pressure at the top Layer(psf)		Settlement
	Corrected SPT Value (N)		OB Pressure at the center Layer (psf)		(inches)
	Specific Gravity of Soil Solids (G)		Excess Pressure At Center Due to appliedLoad		
	Moisture content (%)		Compression Index (C _c)		
	Liquid Limit (%)		Recompression Index (C _r)		
	Plastic Limit (%)		Initial Void Ratio (e ₀)		
	Plasticity Index (%)		Settlement due to compression (inches)		
	Unit Weight of soil (pcf)		Settlement due to recompression (inches)		
	Z='	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	

Total Settlement	0.58
Consolidation Settlement	0.58
Immediate Settlement	0

SETTLEMENT ANALYSIS for EMBANKMENT FOUNDATION

Project:	HAN-75-14.39-US 68 Widening	Project #	G13011G	Test Boring #	B-086-0-13
Type of Foundation	Compression Index (Cc) (From Lab Test)		Groundwater Table below Top of foundation (feet)		
Strip Foundation	Recompression Index (Cr) (From Lab Test)		Unit Weight of Water (pcf)	62.4	
Station 759+25	Embankment Height (feet)	14.2			
Width of Embankment = 130'	Applied Pressure Top of Foundation Soil (psf)	1775	Unit Weight of E. Fill above the Foundation Soil (pcf)	125	
Depth Below the Foundation (Z)	AVERAGE PROPERTIES		CALCULATIONS		Total
Z=0.0' (above Water Table) Z=3.5' (At Centre of Layer)	Thickness of Layer (feet)	7	OB Pressure at the top Layer(psf)	0	Settlement
	Corrected SPT Value (N)	11	OB Pressure at the center Layer (psf)	420	(inches)
	Specific Gravity of Soil Solids (G)	2.75	Excess Pressure At Center Due to appliedLoad	1728	
	Moisture content (%)	21	Compression Index (C _c)	0.21	
	Liquid Limit (%)	43	Recompression Index (C _r)	0.021	0.021
	Plastic Limit (%)	17	Initial Void Ratio (e ₀)	0.73	
	Plasticity Index (%)	26	Settlement due to compression (inches)	7.23	
	Unit Weight of soil (pcf)	120	Settlement due to recompression (inches)	0.72	0.72
Z=7.0'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	840	
Z=7.0' (above Water Table) Z=9.25' (At Centre of Layer)	Thickness of Layer (feet)	4.5	OB Pressure at the top Layer(psf)	840	Settlement
	Corrected SPT Value (N)	13	OB Pressure at the center Layer (psf)	1121	(inches)
	Specific Gravity of Soil Solids (G)	2.75	Excess Pressure At Center Due to appliedLoad	1657	
	Moisture content (%)	17	Compression Index (C _c)	0.17	
	Liquid Limit (%)	39	Recompression Index (C _r)	0.017	0.017
	Plastic Limit (%)	22	Initial Void Ratio (e ₀)	0.61	
	Plasticity Index (%)	17	Settlement due to compression (inches)	2.25	
	Unit Weight of soil (pcf)	125	Settlement due to recompression (inches)	0.23	0.23
Z=11.5'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	1403	
Z= (above Water Table) Z= (At Centre of Layer)	Thickness of Layer (feet)		OB Pressure at the top Layer(psf)		Settlement
	Corrected SPT Value (N)		OB Pressure at the center Layer (psf)		(inches)
	Specific Gravity of Soil Solids (G)		Excess Pressure At Center Due to appliedLoad		
	Moisture content (%)		Compression Index (C _c)		
	Liquid Limit (%)		Recompression Index (C _r)		
	Plastic Limit (%)		Initial Void Ratio (e ₀)		
	Plasticity Index (%)		Settlement due to compression (inches)		
	Unit Weight of soil (pcf)		Settlement due to recompression (inches)		
Z='	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)		

Total Settlement	0.95
Consolidation Settlement	0.95
Immediate Settlement	0

Stress Distribution using 2 V : 1 H Slope Method for Strip footing

Boring No.: B-016-0-13

Roadway: IR-75 Realignment

Station: 804+75

Width of the footing B (feet)	100	Applied Design Pressure (psf)	3000				
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Depth (Z) below the footing (feet)	1.75	5.75					
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Vertical Stress Intensity at Z q (psf)	2948	2837					
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Boring No.: B-019-0-13

Roadway: IR-75 Realignment

Station: 807+50

Width of the footing B (feet)	84	Applied Design Pressure (psf)	4188				
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Depth (Z) below the footing (feet)	1.75	4.75	7.25	9.25			
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Vertical Stress Intensity at Z q (psf)	4103	3964	3855	3773			
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Boring No.: B-026-2-13

Roadway: IR-75 Widening

Station: 822+50

Width of the footing B (feet)	32	Applied Design Pressure (psf)	1613				
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Depth (Z) below the footing (feet)	3.75	8.75	10.75	13.25			
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Vertical Stress Intensity at Z q (psf)	1444	1267	1207	1141			
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Boring No.: B-049-1-13

Roadway: IR-75 Widening

Station: 904+00

Width of the footing B (feet)	85	Applied Design Pressure (psf)	2575				
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Depth (Z) below the footing (feet)	3	8.5	12.25	14.75			
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Vertical Stress Intensity at Z q (psf)	2487	2341	2251	2194			
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Boring No.: B-082-0-13

Roadway: US 68 Widening

Station: 756+00

Width of the footing B (feet)	120	Applied Design Pressure (psf)	2500				
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Depth (Z) below the footing (feet)	1.75	5					
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Vertical Stress Intensity at Z q (psf)	2464	2400					
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Boring No.: B-086-0-13

Roadway: US 68 Widening

Station: 759+25

Width of the footing B (feet)	130	Applied Design Pressure (psf)	1775				
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Depth (Z) below the footing (feet)	3.5	9.25					
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Vertical Stress Intensity at Z q (psf)	1728	1657					
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SETTLEMENT ANALYSIS for EMBANKMENT FOUNDATION

Project:	HAN-75-14.39-US 68 Ramp A		Project #	G13011G	Test Boring #	B-090-0-13
Type of Foundation	Compression Index (Cc) (From Lab Test)			Groundwater Table below Top of foundation (feet)		
Strip Foundation	Recompression Index (Cr) (From Lab Test)			Unit Weight of Water (pcf)		62.4
Station 771+50	Embankment Height (feet)		19.3			
Width of Embankment = 50'	Applied Pressure Top of Foundation Soil (psf)		2413	Unit Weight of E. Fill above the Foundation Soil (pcf)		125
Depth Below the Foundation (Z)	AVERAGE PROPERTIES		CALCULATIONS			Total
Z=0.0' (above Water Table) Z=5.5' (At Centre of Layer)	Thickness of Layer (feet)	11	OB Pressure at the top Layer(psf)	0	Settlement	
	Corrected SPT Value (N)	19	OB Pressure at the center Layer (psf)	715	(inches)	
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad	2174		
	Moisture content (%)	11	Compression Index (C _c)	0.11		
	Liquid Limit (%)	26	Recompression Index (C _r)	0.011	0.011	
	Plastic Limit (%)	17	Initial Void Ratio (e ₀)	0.44		
	Plasticity Index (%)	9	Settlement due to compression (inches)	6.12		
	Unit Weight of soil (pcf)	130	Settlement due to recompression (inches)	0.61	0.61	
Z=11.0'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	1430		
Z=11.0' (above Water Table) Z=13.25' (At Centre of Layer)	Thickness of Layer (feet)	3.5	OB Pressure at the top Layer(psf)	1430	Settlement	
	Corrected SPT Value (N)	20	OB Pressure at the center Layer (psf)	1661	(inches)	
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad	1900		
	Moisture content (%)	20	Compression Index (C _c)	0.2		
	Liquid Limit (%)	40	Recompression Index (C _r)	0.02	0.02	
	Plastic Limit (%)	19	Initial Void Ratio (e ₀)	0.53		
	Plasticity Index (%)	21	Settlement due to compression (inches)	1.82		
	Unit Weight of soil (pcf)	132	Settlement due to recompression (inches)	0.18	0.18	
Z=15.5'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	1892		
Z= (above Water Table) Z= (At Centre of Layer)	Thickness of Layer (feet)		OB Pressure at the top Layer(psf)		Settlement	
	Corrected SPT Value (N)		OB Pressure at the center Layer (psf)		(inches)	
	Specific Gravity of Soil Solids (G)		Excess Pressure At Center Due to appliedLoad			
	Moisture content (%)		Compression Index (C _c)			
	Liquid Limit (%)		Recompression Index (C _r)			
	Plastic Limit (%)		Initial Void Ratio (e ₀)			
	Plasticity Index (%)		Settlement due to compression (inches)			
	Unit Weight of soil (pcf)		Settlement due to recompression (inches)			
	Z='	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)		

Total Settlement	0.79
Consolidation Settlement	0.79
Immediate Settlement	0

SETTLEMENT ANALYSIS for EMBANKMENT FOUNDATION

Project:	HAN-75-14.39-US 68 Ramp A		Project #	G13011G	Test Boring #	B-091-0-13
Type of Foundation	Compression Index (Cc) (From Lab Test)		Groundwater Table below Top of foundation (feet)			
Strip Foundation	Recompression Index (Cr) (From Lab Test)		Unit Weight of Water (pcf)		62.4	
Station 775+00	Embankment Height (feet)		5.8			
Width of Embankment = 50'	Applied Pressure Top of Foundation Soil (psf)		725	Unit Weight of E. Fill above the Foundation Soil (pcf)		125
Depth Below the Foundation (Z)	AVERAGE PROPERTIES		CALCULATIONS			Total
Z=0.0' (above Water Table) Z=1.0' (At Centre of Layer)	Thickness of Layer (feet)	2	OB Pressure at the top Layer(psf)	0	Settlement	
	Corrected SPT Value (N)	7	OB Pressure at the center Layer (psf)	125	(inches)	
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad	711		
	Moisture content (%)	26	Compression Index (C _c)	0.26		
	Liquid Limit (%)	40	Recompression Index (C _r)	0.026		0.026
	Plastic Limit (%)		Initial Void Ratio (e ₀)	0.70		
	Plasticity Index (%)		Settlement due to compression (inches)	3.03		
	Unit Weight of soil (pcf)	125	Settlement due to recompression (inches)	0.30		0.30
Z=2.0'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	250		
Z=2.0' (above Water Table) Z=6.5' (At Centre of Layer)	Thickness of Layer (feet)	9	OB Pressure at the top Layer(psf)	250	Settlement	
	Corrected SPT Value (N)	4	OB Pressure at the center Layer (psf)	678	(inches)	
	Specific Gravity of Soil Solids (G)	2.75	Excess Pressure At Center Due to appliedLoad	642		
	Moisture content (%)	78	Compression Index (C _c)	0.78		0.78
	Liquid Limit (%)	76	Recompression Index (C _r)	0.078		
	Plastic Limit (%)	57	Initial Void Ratio (e ₀)	2.22		
	Plasticity Index (%)	19	Settlement due to compression (inches)	7.58		7.58
	Unit Weight of soil (pcf)	95	Settlement due to recompression (inches)	0.76		
Z=11.0'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	1105		
Z=11.0' (above Water Table) Z=12.25' (At Centre of Layer)	Thickness of Layer (feet)	2.5	OB Pressure at the top Layer(psf)	1105	Settlement	
	Corrected SPT Value (N)	4	OB Pressure at the center Layer (psf)	1261	(inches)	
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad	582		
	Moisture content (%)	38	Compression Index (C _c)	0.38		
	Liquid Limit (%)	56	Recompression Index (C _r)	0.038		0.038
	Plastic Limit (%)	29	Initial Void Ratio (e ₀)	0.86		
	Plasticity Index (%)	27	Settlement due to compression (inches)	1.01		
	Unit Weight of soil (pcf)	125	Settlement due to recompression (inches)	0.10		0.10
Z=13.5'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	1418		

Project:	HAN-75-14.39-US 68 Ramp A		Project #	G13011G	Test Boring #	B-091-0-13
Z=13.5' (above Water Table) Z=14.25' (At Centre of Layer) Z=15.0'	Thickness of Layer (feet)	1.5	OB Pressure at the top Layer(psf)		1418	Settlement (inches)
	Corrected SPT Value (N)	15	OB Pressure at the center Layer (psf)		1514	
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad		564	
	Moisture content (%)	22	Compression Index (C _c)		0.22	
	Liquid Limit (%)	40	Recompression Index (C _r)		0.022	0.022
	Plastic Limit (%)		Initial Void Ratio (e ₀)		0.61	
	Plasticity Index (%)		Settlement due to compression (inches)		0.34	
	Unit Weight of soil (pcf)	128	Settlement due to recompression (inches)		0.03	0.03
Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)		1610		

Toatl Settlement 8.02
Consolidation Settlement 8.02
Immediate Settlement 0

SETTLEMENT ANALYSIS for EMBANKMENT FOUNDATION

Project:	HAN-75-14.39-Lima Ramp B		Project #	G13011G	Test Boring #	B-099-0-13
Type of Foundation	Compression Index (Cc) (From Lab Test)		Groundwater Table below Top of foundation (feet)			
Strip Foundation	Recompression Index (Cr) (From Lab Test)		Unit Weight of Water (pcf)		62.4	
Station 750+38	Embankment Height (feet)		6.5			
Width of Embankment = 35'	Applied Pressure Top of Foundation Soil (psf)		813	Unit Weight of E. Fill above the Foundation Soil (pcf)		125
Depth Below the Foundation (Z)	AVERAGE PROPERTIES		CALCULATIONS			Total
Z=0.0' (above Water Table) Z=1.75' (At Centre of Layer)	Thickness of Layer (feet)	3.5	OB Pressure at the top Layer(psf)	0	Settlement	
	Corrected SPT Value (N)	11	OB Pressure at the center Layer (psf)	210	(inches)	
	Specific Gravity of Soil Solids (G)	2.75	Excess Pressure At Center Due to appliedLoad	774		
	Moisture content (%)	24	Compression Index (C _c)	0.24		
	Liquid Limit (%)	53	Recompression Index (C _r)	0.024	0.024	
	Plastic Limit (%)	26	Initial Void Ratio (e ₀)	0.77		
	Plasticity Index (%)	27	Settlement due to compression (inches)	3.81		
	Unit Weight of soil (pcf)	120	Settlement due to recompression (inches)	0.38	0.38	
	Z=3.5'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	420	
Z=' (above Water Table) Z=' (At Centre of Layer)	Thickness of Layer (feet)		OB Pressure at the top Layer(psf)		Settlement	
	Corrected SPT Value (N)		OB Pressure at the center Layer (psf)		(inches)	
	Specific Gravity of Soil Solids (G)		Excess Pressure At Center Due to appliedLoad			
	Moisture content (%)		Compression Index (C _c)			
	Liquid Limit (%)		Recompression Index (C _r)			
	Plastic Limit (%)		Initial Void Ratio (e ₀)			
	Plasticity Index (%)		Settlement due to compression (inches)			
	Unit Weight of soil (pcf)		Settlement due to recompression (inches)			
	Z='	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)		
Z= (above Water Table) Z= (At Centre of Layer)	Thickness of Layer (feet)		OB Pressure at the top Layer(psf)		Settlement	
	Corrected SPT Value (N)		OB Pressure at the center Layer (psf)		(inches)	
	Specific Gravity of Soil Solids (G)		Excess Pressure At Center Due to appliedLoad			
	Moisture content (%)		Compression Index (C _c)			
	Liquid Limit (%)		Recompression Index (C _r)			
	Plastic Limit (%)		Initial Void Ratio (e ₀)			
	Plasticity Index (%)		Settlement due to compression (inches)			
	Unit Weight of soil (pcf)		Settlement due to recompression (inches)			
	Z='	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)		

Total Settlement	0.38
Consolidation Settlement	0.38
Immediate Settlement	0

SETTLEMENT ANALYSIS for EMBANKMENT FOUNDATION

Project:	HAN-75-14.39-Lima Ramp G		Project #	G13011G	Test Boring #	B-120-0-13
Type of Foundation	Compression Index (Cc) (From Lab Test)			Groundwater Table below Top of foundation (feet)	8	
Strip Foundation	Recompression Index (Cr) (From Lab Test)			Unit Weight of Water (pcf)	62.4	
Station 801+52, Right	Embankment Height (feet)		13.5			
Width of Embankment = 60'	Applied Pressure Top of Foundation Soil (psf)		1688	Unit Weight of E. Fill above the Foundation Soil (pcf)	125	
Depth Below the Foundation (Z)	AVERAGE PROPERTIES		CALCULATIONS			Total
Z=0.0' (above Water Table) Z=1.5' (At Centre of Layer)	Thickness of Layer (feet)	3	OB Pressure at the top Layer(psf)	0	Settlement	
	Corrected SPT Value (N)	18	OB Pressure at the center Layer (psf)	158	(inches)	
	Specific Gravity of Soil Solids (G)	2.75	Excess Pressure At Center Due to appliedLoad	1647		
	Moisture content (%)	42	Compression Index (C _c)	0.42		
	Liquid Limit (%)	58	Recompression Index (C _r)	0.042	0.042	
	Plastic Limit (%)	35	Initial Void Ratio (e ₀)	1.32		
	Plasticity Index (%)	23	Settlement due to compression (inches)	6.90		
	Unit Weight of soil (pcf)	105	Settlement due to recompression (inches)	0.69	0.69	
Z=3.0'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	315		
Z=3.0' (above Water Table) Z=4.25' (At Centre of Layer)	Thickness of Layer (feet)	2.5	OB Pressure at the top Layer(psf)	315	Settlement	
	Corrected SPT Value (N)	3	OB Pressure at the center Layer (psf)	428	(inches)	
	Specific Gravity of Soil Solids (G)	2.75	Excess Pressure At Center Due to appliedLoad	1576		
	Moisture content (%)	49	Compression Index (C _c)	0.49	0.49	
	Liquid Limit (%)	58	Recompression Index (C _r)	0.049		
	Plastic Limit (%)	35	Initial Void Ratio (e ₀)	1.84		
	Plasticity Index (%)	23	Settlement due to compression (inches)	3.47	3.47	
	Unit Weight of soil (pcf)	90	Settlement due to recompression (inches)	0.35		
Z=5.5'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	540		
Z=5.5' (above Water Table) Z=6.75' (At Centre of Layer)	Thickness of Layer (feet)	2.5	OB Pressure at the top Layer(psf)	540	Settlement	
	Corrected SPT Value (N)	8	OB Pressure at the center Layer (psf)	653	(inches)	
	Specific Gravity of Soil Solids (G)	2.75	Excess Pressure At Center Due to appliedLoad	1517		
	Moisture content (%)	49	Compression Index (C _c)	0.49		
	Liquid Limit (%)	58	Recompression Index (C _r)	0.049	0.049	
	Plastic Limit (%)	35	Initial Void Ratio (e ₀)	1.84		
	Plasticity Index (%)	23	Settlement due to compression (inches)	2.70		
	Unit Weight of soil (pcf)	90	Settlement due to recompression (inches)	0.27	0.27	
Z=8.0'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	765		
Z=8.0'	Thickness of Layer (feet)	2.7	OB Pressure at the top Layer(psf)	765	Settlement	
	Corrected SPT Value (N)	11	OB Pressure at the center Layer (psf)	850	(inches)	
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad	1460		

Project:	HAN-75-14.39-Lima Ramp G		Project #	G13011G	Test Boring #	B-120-0-13
(below Water Table) Z=9.35' (At Centre of Layer)	Moisture content (%)	22	Compression Index (C_c)		0.22	
	Liquid Limit (%)	36	Recompression Index (C_r)		0.022	0.022
	Plastic Limit (%)	20	Initial Void Ratio (e_0)		0.64	
	Plasticity Index (%)	16	Settlement due to compression (inches)		1.88	
	Unit Weight of soil (pcf)	125	Settlement due to recompression (inches)		0.19	0.19
	Z=10.7'	Submerged Unit Weight of Soil (pcf)	62.6	OB Pressure at the bottom Layer (psf)		934

Toatl Settlement **4.62**
Consolidation Settlement **4.62**
Immediate Settlement **0**

Stress Distribution using 2 V : 1 H Slope Method for Strip footing

Boring No.: B-090-0-13

Ramp: US 68 Ramp A

Station: 771+50

Width of the footing B (feet)	50	Applied Design Pressure (psf)	2413						
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Depth (Z) below the footing (feet)	5.5	13.5							
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Vertical Stress Intensity at Z q (psf)	2174	1900							
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Boring No.: B-091-0-13

Ramp: US 68 Ramp A

Station: 775+00

Width of the footing B (feet)	50	Applied Design Pressure (psf)	725						
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Depth (Z) below the footing (feet)	1	6.5	12.25	14.25					
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Vertical Stress Intensity at Z q (psf)	711	642	582	564					
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Boring No.: B-099-0-13

Ramp: Lima Ramp B

Station: 750+38

Width of the footing B (feet)	35	Applied Design Pressure (psf)	813						
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Depth (Z) below the footing (feet)	1.75								
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Vertical Stress Intensity at Z q (psf)	774								
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Boring No.: B-120-0-13

Ramp: Lima Ramp G

Station: 801+52

Width of the footing B (feet)	60	Applied Design Pressure (psf)	1688						
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Depth (Z) below the footing (feet)	1.5	4.25	6.75	9.35					
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Vertical Stress Intensity at Z q (psf)	1647	1576	1517	1460					
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SETTLEMENT ANALYSIS for EMBANKMENT FOUNDATION

Project:	HAN-75-14.39-Lima Ramp H	Project #	G13011G	Test Boring #	B-104-0-13
Type of Foundation	Compression Index (Cc) (From Lab Test)		Groundwater Table below Top of foundation (feet)		6
Strip Foundation	Recompression Index (Cr) (From Lab Test)		Unit Weight of Water (pcf)		62.4
Station 800+50	Embankment Height (feet)	6.0			
Width of Embankment = 90'	Applied Pressure Top of Foundation Soil (psf)	750	Unit Weight of E. Fill above the Foundation Soil (pcf)		125
Depth Below the Foundation (Z)	AVERAGE PROPERTIES		CALCULATIONS		Total
Z=0.0 (above Water Table) Z=2.0' (At Centre of Layer)	Thickness of Layer (feet)	4	OB Pressure at the top Layer(psf)	0	Settlement
	Corrected SPT Value (N)	22	OB Pressure at the center Layer (psf)	260	(inches)
	Specific Gravity of Soil Solids (G)	2.67	Excess Pressure At Center Due to appliedLoad	721	
	Moisture content (%)	2	Bearing Capacity Index (C)	160	
	Liquid Limit (%)	NP	Immediate Settlement in Foundation Soil (inches)	0.17	0.17
	Plastic Limit (%)	NP	Initial Void Ratio (e ₀)	0.31	
	Plasticity Index (%)	NP			
	Unit Weight of soil (pcf)	130			
Z=4.0'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	520	
Z=4.0' (above Water Table) Z=5.0' (At Centre of Layer)	Thickness of Layer (feet)	2	OB Pressure at the top Layer(psf)	520	Settlement
	Corrected SPT Value (N)	8	OB Pressure at the center Layer (psf)	620	(inches)
	Specific Gravity of Soil Solids (G)	2.75	Excess Pressure At Center Due to appliedLoad	682	
	Moisture content (%)	58	Compression Index (C _c)	0.58	0.58
	Liquid Limit (%)	44	Recompression Index (C _r)	0.058	
	Plastic Limit (%)	34	Initial Void Ratio (e ₀)	1.71	
	Plasticity Index (%)	10	Settlement due to compression (inches)	1.65	1.65
	Unit Weight of soil (pcf)	100	Settlement due to recompression (inches)	0.17	
Z=6.0'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	720	
Z=6.0' (below Water Table) Z=7.85' (At Centre of Layer)	Thickness of Layer (feet)	3.5	OB Pressure at the top Layer(psf)	720	Settlement
	Corrected SPT Value (N)	8	OB Pressure at the center Layer (psf)	838	(inches)
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad	648	
	Moisture content (%)	17	Compression Index (C _c)	0.17	
	Liquid Limit (%)		Recompression Index (C _r)	0.017	0.017
	Plastic Limit (%)		Initial Void Ratio (e ₀)	0.58	
	Plasticity Index (%)		Settlement due to compression (inches)	1.13	
	Unit Weight of soil (pcf)	125	Settlement due to recompression (inches)	0.11	0.11
Z=9.7'	Submerged Unit Weight of Soil (pcf)	67.6	OB Pressure at the bottom Layer (psf)	957	

Total Settlement **1.94**
Consolidation Settlement **1.8**
Immediate Settlement **0.14**

SETTLEMENT ANALYSIS for EMBANKMENT FOUNDATION

Project:	HAN-75-14.39-Lima Ramp H		Project #	G13011G	Test Boring #	B-111-1-13
Type of Foundation	Compression Index (Cc) (From Lab Test)		Groundwater Table below Top of foundation (feet)			
Strip Foundation	Recompression Index (Cr) (From Lab Test)		Unit Weight of Water (pcf)		62.4	
Station 806+80	Embankment Height (feet)		6.0			
Width of Embankment = 50'	Applied Pressure Top of Foundation Soil (psf)		750	Unit Weight of E. Fill above the Foundation Soil (pcf)		125
Depth Below the Foundation (Z)	AVERAGE PROPERTIES		CALCULATIONS			Total
Z=0.0' (above Water Table) Z=1.75' (At Centre of Layer)	Thickness of Layer (feet)	3.5	OB Pressure at the top Layer(psf)	0	Settlement	
	Corrected SPT Value (N)	4	OB Pressure at the center Layer (psf)	166	(inches)	
	Specific Gravity of Soil Solids (G)	2.75	Excess Pressure At Center Due to appliedLoad	725		
	Moisture content (%)	68	Compression Index (C _c)	0.68	0.68	
	Liquid Limit (%)		Recompression Index (C _r)	0.068		
	Plastic Limit (%)		Initial Void Ratio (e ₀)	2.03		
	Plasticity Index (%)		Settlement due to compression (inches)	6.86	6.86	
	Unit Weight of soil (pcf)	95	Settlement due to recompression (inches)	0.69		
Z=3.5'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	333		
Z=3.5' (above Water Table) Z=4.75' (At Centre of Layer)	Thickness of Layer (feet)	2.5	OB Pressure at the top Layer(psf)	333	Settlement	
	Corrected SPT Value (N)	4	OB Pressure at the center Layer (psf)	483	(inches)	
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad	685		
	Moisture content (%)	29	Compression Index (C _c)	0.29	0.29	
	Liquid Limit (%)		Recompression Index (C _r)	0.029		
	Plastic Limit (%)		Initial Void Ratio (e ₀)	0.81		
	Plasticity Index (%)		Settlement due to compression (inches)	1.84	1.84	
	Unit Weight of soil (pcf)	120	Settlement due to recompression (inches)	0.18		
Z=6.0'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	633		
Z=6.0' (above Water Table) Z=7.25' (At Centre of Layer)	Thickness of Layer (feet)	2.5	OB Pressure at the top Layer(psf)	633	Settlement	
	Corrected SPT Value (N)	8	OB Pressure at the center Layer (psf)	783	(inches)	
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad	655		
	Moisture content (%)	21	Compression Index (C _c)	0.21		
	Liquid Limit (%)	38	Recompression Index (C _r)	0.021	0.021	
	Plastic Limit (%)	20	Initial Void Ratio (e ₀)	0.70		
	Plasticity Index (%)	18	Settlement due to compression (inches)	0.98		
	Unit Weight of soil (pcf)	120	Settlement due to recompression (inches)	0.10	0.10	
Z=8.5'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	933		

Project:	HAN-75-14.39-Lima Ramp H		Project #	G13011G	Test Boring #	B-111-1-13
Z=8.5 (above Water Table) Z=9.0' (At Centre of Layer) Z=9.5'	Thickness of Layer (feet)	1	OB Pressure at the top Layer(psf)		933	Settlement (inches)
	Corrected SPT Value (N)		OB Pressure at the center Layer (psf)		990	
	Specific Gravity of Soil Solids (G)	2.67	Excess Pressure At Center Due to appliedLoad		636	
	Moisture content (%)	19	Bearing Capacity Index (C)		20	
	Liquid Limit (%)	NP	Immediate Settlement in Foundation Soil (inches)		0.13	0.13
	Plastic Limit (%)	NP	Initial Void Ratio (e ₀)		0.72	
	Plasticity Index (%)	NP				
	Unit Weight of soil (pcf)	115				
Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)		1048		

Toatl Settlement 8.93
Consolidation Settlement 8.8
Immediate Settlement 0.13

SETTLEMENT ANALYSIS for EMBANKMENT FOUNDATION

Project:	HAN-75-14.39-Lima Ramp H		Project #	G13011G	Test Boring #	B-106-0-13
Type of Foundation	Compression Index (Cc) (From Lab Test)		Groundwater Table below Top of foundation (feet)			
Strip Foundation	Recompression Index (Cr) (From Lab Test)		Unit Weight of Water (pcf)		62.4	
Station 808+92, Left	Embankment Height (feet)		5.0			
Width of Embankment = 60'	Applied Pressure Top of Foundation Soil (psf)		625	Unit Weight of E. Fill above the Foundation Soil (pcf)		125
Depth Below the Foundation (Z)	AVERAGE PROPERTIES		CALCULATIONS			Total
Z=0.0' (above Water Table) Z=3.0' (At Centre of Layer)	Thickness of Layer (feet)	6	OB Pressure at the top Layer(psf)	0	Settlement	
	Corrected SPT Value (N)	10	OB Pressure at the center Layer (psf)	315	(inches)	
	Specific Gravity of Soil Solids (G)	2.75	Excess Pressure At Center Due to appliedLoad	595		
	Moisture content (%)	40	Compression Index (C _c)	0.4		
	Liquid Limit (%)	53	Recompression Index (C _r)	0.04	0.04	
	Plastic Limit (%)	41	Initial Void Ratio (e ₀)	1.29		
	Plasticity Index (%)	12	Settlement due to compression (inches)	5.80		
	Unit Weight of soil (pcf)	105	Settlement due to recompression (inches)	0.58	0.58	
Z=6.0'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	630		
Z=6.0' (above Water Table) Z=6.75' (At Centre of Layer)	Thickness of Layer (feet)	1.5	OB Pressure at the top Layer(psf)	630	Settlement	
	Corrected SPT Value (N)	7	OB Pressure at the center Layer (psf)	698	(inches)	
	Specific Gravity of Soil Solids (G)	2.75	Excess Pressure At Center Due to appliedLoad	562		
	Moisture content (%)	25	Compression Index (C _c)	0.25		
	Liquid Limit (%)	53	Recompression Index (C _r)	0.025	0.025	
	Plastic Limit (%)	41	Initial Void Ratio (e ₀)	1.38		
	Plasticity Index (%)	12	Settlement due to compression (inches)	0.48		
	Unit Weight of soil (pcf)	90	Settlement due to recompression (inches)	0.05	0.05	
Z=7.5'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	765		
Z=7.5' (below Water Table) Z=8.75' (At Centre of Layer)	Thickness of Layer (feet)	2.5	OB Pressure at the top Layer(psf)	765	Settlement	
	Corrected SPT Value (N)	19	OB Pressure at the center Layer (psf)	921	(inches)	
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad	545		
	Moisture content (%)	27	Compression Index (C _c)	0.27		
	Liquid Limit (%)		Recompression Index (C _r)	0.027	0.022	
	Plastic Limit (%)		Initial Void Ratio (e ₀)	0.71		
	Plasticity Index (%)		Settlement due to compression (inches)	0.96		
	Unit Weight of soil (pcf)	125	Settlement due to recompression (inches)	0.10	0.10	
Z=10.0'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	1078		

Total Settlement	0.72
Consolidation Settlement	0.72
Immediate Settlement	0

SETTLEMENT ANALYSIS for EMBANKMENT FOUNDATION

Project:	HAN-75-14.39-US 68 Ramp D		Project #	G13011G	Test Boring #	B-108-0-13
Type of Foundation	Compression Index (Cc) (From Lab Test)			Groundwater Table below Top of foundation (feet)	6.5	
Strip Foundation	Recompression Index (Cr) (From Lab Test)			Unit Weight of Water (pcf)	62.4	
Station 801+50	Embankment Height (feet)		12.9			
Width of Embankment = 80'	Applied Pressure Top of Foundation Soil (psf)		1613	Unit Weight of E. Fill above the Foundation Soil (pcf)	125	
Depth Below the Foundation (Z)	AVERAGE PROPERTIES		CALCULATIONS			Total
Z=0.0 (above Water Table) Z=0.75' (At Centre of Layer)	Thickness of Layer (feet)	1.5	OB Pressure at the top Layer(psf)	0	Settlement	
	Corrected SPT Value (N)		OB Pressure at the center Layer (psf)	94	(inches)	
	Specific Gravity of Soil Solids (G)	2.67	Excess Pressure At Center Due to appliedLoad	1598		
	Moisture content (%)	6	Bearing Capacity Index (C)	160		
	Liquid Limit (%)	NP	Immediate Settlement in Foundation Soil (inches)	0.14	0.14	
	Plastic Limit (%)	NP	Initial Void Ratio (e ₀)	0.41		
	Plasticity Index (%)	NP				
	Unit Weight of soil (pcf)	125				
Z=1.5'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	188		
Z=1.5' (above Water Table) Z=4.00' (At Centre of Layer)	Thickness of Layer (feet)	5	OB Pressure at the top Layer(psf)	188	Settlement	
	Corrected SPT Value (N)	7	OB Pressure at the center Layer (psf)	425	(inches)	
	Specific Gravity of Soil Solids (G)	2.75	Excess Pressure At Center Due to appliedLoad	1536		
	Moisture content (%)	67	Compression Index (C _c)	0.67	0.67	
	Liquid Limit (%)		Recompression Index (C _r)	0.067		
	Plastic Limit (%)		Initial Void Ratio (e ₀)	2.02		
	Plasticity Index (%)		Settlement due to compression (inches)	8.85	8.85	
	Unit Weight of soil (pcf)	95	Settlement due to recompression (inches)	0.89		
Z=6.5'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	663		
Z=6.5' (below Water Table) Z=7.50' (At Centre of Layer)	Thickness of Layer (feet)	2	OB Pressure at the top Layer(psf)	663	Settlement	
	Corrected SPT Value (N)		OB Pressure at the center Layer (psf)	700	(inches)	
	Specific Gravity of Soil Solids (G)	2.75	Excess Pressure At Center Due to appliedLoad	1475		
	Moisture content (%)	36	Compression Index (C _c)	0.36		
	Liquid Limit (%)	46	Recompression Index (C _r)	0.036	0.036	
	Plastic Limit (%)	36	Initial Void Ratio (e ₀)	1.33		
	Plasticity Index (%)	16	Settlement due to compression (inches)	1.82		
	Unit Weight of soil (pcf)	100	Settlement due to recompression (inches)	0.18	0.18	
Z=8.5'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	738		

Project:	HAN-75-14.39-US 68 Ramp D		Project #	G13011G	Test Boring #	B-108-0-13
Z=8.5'	Thickness of Layer (feet)	2.5	OB Pressure at the top Layer(psf)	738	Settlement	
	Corrected SPT Value (N)	7	OB Pressure at the center Layer (psf)	822	(inches)	
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad	1438		
(below Water Table)	Moisture content (%)	28	Compression Index (C _c)	0.28		
Z=9.75' (At Centre of Layer)	Liquid Limit (%)		Recompression Index (C _r)	0.028	0.028	
	Plastic Limit (%)		Initial Void Ratio (e ₀)	0.66		
	Plasticity Index (%)		Settlement due to compression (inches)	2.22		
	Unit Weight of soil (pcf)	130	Settlement due to recompression (inches)	0.22	0.22	
Z=11.0'	Submerged Unit Weight of Soil (pcf)	67.6	OB Pressure at the bottom Layer (psf)	907		

Toatl Settlement **9.40**
Consolidation Settlement **9.25**
Immediate Settlement **0.15**

SETTLEMENT ANALYSIS for EMBANKMENT FOUNDATION

Project:	HAN-75-14.39-US 68 Ramp D	Project #	G13011G	Test Boring #	B-110-0-13
Type of Foundation	Compression Index (Cc) (From Lab Test)		Groundwater Table below Top of foundation (feet)		6
Strip Foundation	Recompression Index (Cr) (From Lab Test)		Unit Weight of Water (pcf)		62.4
Station 804+50	Embankment Height (feet)	22.0			
Width of Embankment = 90'	Applied Pressure Top of Foundation Soil (psf)	2750	Unit Weight of E. Fill above the Foundation Soil (pcf)		125
Depth Below the Foundation (Z)	AVERAGE PROPERTIES		CALCULATIONS		Total
Z=0.0 (above Water Table) Z=1.50' (At Centre of Layer)	Thickness of Layer (feet)	3	OB Pressure at the top Layer(psf)	0	Settlement
	Corrected SPT Value (N)	35	OB Pressure at the center Layer (psf)	203	(inches)
	Specific Gravity of Soil Solids (G)	2.67	Excess Pressure At Center Due to appliedLoad	2705	
	Moisture content (%)	6	Bearing Capacity Index (C)	160	
	Liquid Limit (%)	NP	Immediate Settlement in Foundation Soil (inches)	0.26	0.26
	Plastic Limit (%)	NP	Initial Void Ratio (e ₀)	0.31	
	Plasticity Index (%)	NP			
	Unit Weight of soil (pcf)	135			
Z=3.0'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	405	
Z=3.0' (above Water Table) Z=4.50' (At Centre of Layer)	Thickness of Layer (feet)	3	OB Pressure at the top Layer(psf)	405	Settlement
	Corrected SPT Value (N)	7	OB Pressure at the center Layer (psf)	555	(inches)
	Specific Gravity of Soil Solids (G)	2.75	Excess Pressure At Center Due to appliedLoad	2619	
	Moisture content (%)	47	Compression Index (C _c)	0.47	0.47
	Liquid Limit (%)	54	Recompression Index (C _r)	0.047	
	Plastic Limit (%)	36	Initial Void Ratio (e ₀)	1.52	
	Plasticity Index (%)	18	Settlement due to compression (inches)	5.08	5.08
	Unit Weight of soil (pcf)	100	Settlement due to recompression (inches)	0.51	
Z=6.0'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	705	
Z=6.0' (below Water Table) Z=9.4' (At Centre of Layer)	Thickness of Layer (feet)	6.8	OB Pressure at the top Layer(psf)	705	Settlement
	Corrected SPT Value (N)	7	OB Pressure at the center Layer (psf)	935	(inches)
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad	2490	
	Moisture content (%)	29	Compression Index (C _c)	0.29	
	Liquid Limit (%)	39	Recompression Index (C _r)	0.029	0.029
	Plastic Limit (%)	22	Initial Void Ratio (e ₀)	0.67	
	Plasticity Index (%)	17	Settlement due to compression (inches)	7.98	
	Unit Weight of soil (pcf)	130	Settlement due to recompression (inches)	0.80	0.80
Z=12.8'	Submerged Unit Weight of Soil (pcf)	67.6	OB Pressure at the bottom Layer (psf)	1165	

Total Settlement **6.14**
Consolidation Settlement **5.88**
Immediate Settlement **0.26**

SETTLEMENT ANALYSIS for EMBANKMENT FOUNDATION

Project:	HAN-75-14.39-US 68 Ramp D	Project #	G13011G	Test Boring #	B-115-0-13
Type of Foundation	Compression Index (Cc) (From Lab Test)		Groundwater Table below Top of foundation (feet)		
Strip Foundation	Recompression Index (Cr) (From Lab Test)		Unit Weight of Water (pcf)		62.4
Station 810+00	Embankment Height (feet)	36.0			
Width of Embankment = 70'	Applied Pressure Top of Foundation Soil (psf)	4500	Unit Weight of E. Fill above the Foundation Soil (pcf)		125
Depth Below the Foundation (Z)	AVERAGE PROPERTIES		CALCULATIONS		Total
Z=0.0' (above Water Table) Z=1.75' (At Centre of Layer)	Thickness of Layer (feet)	3.5	OB Pressure at the top Layer(psf)	0	Settlement
	Corrected SPT Value (N)	10	OB Pressure at the center Layer (psf)	210	(inches)
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad	4390	
	Moisture content (%)	11	Compression Index (C _c)	0.11	
	Liquid Limit (%)		Recompression Index (C _r)	0.011	0.011
	Plastic Limit (%)		Initial Void Ratio (e ₀)	0.56	
	Plasticity Index (%)		Settlement due to compression (inches)	3.97	
	Unit Weight of soil (pcf)	120	Settlement due to recompression (inches)	0.40	0.40
Z=3.5'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	420	
Z=3.5' (above Water Table) Z=4.25' (At Centre of Layer)	Thickness of Layer (feet)	1.5	OB Pressure at the top Layer(psf)	420	Settlement
	Corrected SPT Value (N)	10	OB Pressure at the center Layer (psf)	509	(inches)
	Specific Gravity of Soil Solids (G)	2.67	Excess Pressure At Center Due to appliedLoad	4242	
	Moisture content (%)	15	Bearing Capacity Index (C)	60	
	Liquid Limit (%)	NP	Immediate Settlement in Foundation Soil (inches)	0.29	0.29
	Plastic Limit (%)	NP	Initial Void Ratio (e ₀)	0.62	
	Plasticity Index (%)	NP			
	Unit Weight of soil (pcf)	118			
Z=5.0'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	597	
Z=5.0' (above Water Table) Z=6.75' (At Centre of Layer)	Thickness of Layer (feet)	3.5	OB Pressure at the top Layer(psf)	597	Settlement
	Corrected SPT Value (N)		OB Pressure at the center Layer (psf)	816	(inches)
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad	4104	
	Moisture content (%)	20	Compression Index (C _c)	0.2	
	Liquid Limit (%)	32	Recompression Index (C _r)	0.02	0.02
	Plastic Limit (%)	19	Initial Void Ratio (e ₀)	0.62	
	Plasticity Index (%)	13	Settlement due to compression (inches)	4.05	
	Unit Weight of soil (pcf)	125	Settlement due to recompression (inches)	0.41	0.41
Z=8.5'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	1035	

Project:	HAN-75-14.39-US 68 Ramp D		Project #	G13011G	Test Boring #	B-115-0-13
Z=8.5' (above Water Table) Z=9.50' (At Centre of Layer)	Thickness of Layer (feet)	2	OB Pressure at the top Layer(psf)		1035	Settlement (inches)
	Corrected SPT Value (N)	22	OB Pressure at the center Layer (psf)		1165	
	Specific Gravity of Soil Solids (G)	2.67	Excess Pressure At Center Due to appliedLoad		3962	
	Moisture content (%)	21	Bearing Capacity Index (C)		80	
	Liquid Limit (%)	NP	Immediate Settlement in Foundation Soil (inches)		0.19	0.19
	Plastic Limit (%)	NP	Initial Void Ratio (e ₀)		0.55	
	Plasticity Index (%)	NP				
	Unit Weight of soil (pcf)	130				
Z=10.5'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)		1295	

Toatl Settlement **1.29**
Consolidation Settlement **0.81**
Immediate Settlement **0.48**

SETTLEMENT ANALYSIS for EMBANKMENT FOUNDATION

Project:	HAN-75-14.39-US 68 Ramp C		Project #	G13011G	Test Boring #	B-136-0-13
Type of Foundation	Compression Index (Cc) (From Lab Test)			Groundwater Table below Top of foundation (feet)		
Strip Foundation	Recompression Index (Cr) (From Lab Test)			Unit Weight of Water (pcf)		62.4
Station 794+25	Embankment Height (feet)		35.0			
Width of Embankment = 110'	Applied Pressure Top of Foundation Soil (psf)		4375	Unit Weight of E. Fill above the Foundation Soil (pcf)		125
Depth Below the Foundation (Z)	AVERAGE PROPERTIES		CALCULATIONS			Total
Z=0.0' (above Water Table) Z=3.00' (At Centre of Layer)	Thickness of Layer (feet)	6	OB Pressure at the top Layer(psf)	0	Settlement	
	Corrected SPT Value (N)	15	OB Pressure at the center Layer (psf)	375	(inches)	
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad	4259		
	Moisture content (%)	16	Compression Index (C _c)	0.16		
	Liquid Limit (%)	37	Recompression Index (C _r)	0.016		0.016
	Plastic Limit (%)	22	Initial Void Ratio (e ₀)	0.56		
	Plasticity Index (%)	15	Settlement due to compression (inches)	8.05		
	Unit Weight of soil (pcf)	125	Settlement due to recompression (inches)	0.80		0.80
Z=6.0'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	750		
Z=6.0' (above Water Table) Z=8.75' (At Centre of Layer)	Thickness of Layer (feet)	5.5	OB Pressure at the top Layer(psf)	750	Settlement	
	Corrected SPT Value (N)	11	OB Pressure at the center Layer (psf)	1102	(inches)	
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad	4053		
	Moisture content (%)	18	Compression Index (C _c)	0.18		
	Liquid Limit (%)	37	Recompression Index (C _r)	0.018		0.018
	Plastic Limit (%)	22	Initial Void Ratio (e ₀)	0.55		
	Plasticity Index (%)	15	Settlement due to compression (inches)	5.12		
	Unit Weight of soil (pcf)	128	Settlement due to recompression (inches)	0.51		0.51
Z=11.5'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	1454		
Z=' (above Water Table) Z=' (At Centre of Layer)	Thickness of Layer (feet)		OB Pressure at the top Layer(psf)		Settlement	
	Corrected SPT Value (N)		OB Pressure at the center Layer (psf)		(inches)	
	Specific Gravity of Soil Solids (G)		Excess Pressure At Center Due to appliedLoad			
	Moisture content (%)		Compression Index (C _c)			
	Liquid Limit (%)		Recompression Index (C _r)			
	Plastic Limit (%)		Initial Void Ratio (e ₀)			
	Plasticity Index (%)		Settlement due to compression (inches)			
	Unit Weight of soil (pcf)		Settlement due to recompression (inches)			
Z='	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)			

Total Settlement	1.32
Consolidation Settlement	1.32
Immediate Settlement	0

SETTLEMENT ANALYSIS for EMBANKMENT FOUNDATION

Project:	HAN-75-14.39-US 68 Ramp C		Project #	G13011G	Test Boring #	B-132-0-13
Type of Foundation	Compression Index (Cc) (From Lab Test)		Groundwater Table below Top of foundation (feet)			
Strip Foundation	Recompression Index (Cr) (From Lab Test)		Unit Weight of Water (pcf)		62.4	
Station 800+50	Embankment Height (feet)		55.2			
Width of Embankment = 150'	Applied Pressure Top of Foundation Soil (psf)		6900		Unit Weight of E. Fill above the Foundation Soil (pcf) 125	
Depth Below the Foundation (Z)	AVERAGE PROPERTIES		CALCULATIONS			Total
Z=1.0' Note: Unsuitable soil is to be removed and replaced with ODOT Item 203 (above Water Table) Z=2.25' (At Centre of Layer)	Thickness of Layer (feet)	2.5	OB Pressure at the top Layer(psf)	0	Settlement	
	Estimated Corrected SPT Value (N)	8	OB Pressure at the center Layer (psf)	156	(inches)	
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad	6798		
	Estimated Moisture content (%)	19	Compression Index (C _c)	0.19		0.19
	Liquid Limit (%)	39	Recompression Index (C _r)	0.019		
	Plastic Limit (%)	20	Initial Void Ratio (e ₀)	0.60		
	Plasticity Index (%)	19	Settlement due to compression (inches)	5.86		5.86
	Unit Weight of soil (pcf)	125	Settlement due to recompression (inches)	0.59		
	Z=3.5'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	313	
Z= (above Water Table) Z= (At Centre of Layer)	Thickness of Layer (feet)		OB Pressure at the top Layer(psf)		Settlement	
	Corrected SPT Value (N)		OB Pressure at the center Layer (psf)		(inches)	
	Specific Gravity of Soil Solids (G)		Excess Pressure At Center Due to appliedLoad			
	Moisture content (%)		Compression Index (C _c)			
	Liquid Limit (%)		Recompression Index (C _r)			
	Plastic Limit (%)		Initial Void Ratio (e ₀)			
	Plasticity Index (%)		Settlement due to compression (inches)			
	Unit Weight of soil (pcf)		Settlement due to recompression (inches)			
	Z=	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)		
Z=' (above Water Table) Z=' (At Centre of Layer)	Thickness of Layer (feet)		OB Pressure at the top Layer(psf)		Settlement	
	Corrected SPT Value (N)		OB Pressure at the center Layer (psf)		(inches)	
	Specific Gravity of Soil Solids (G)		Excess Pressure At Center Due to appliedLoad			
	Moisture content (%)		Compression Index (C _c)			
	Liquid Limit (%)		Recompression Index (C _r)			
	Plastic Limit (%)		Initial Void Ratio (e ₀)			
	Plasticity Index (%)		Settlement due to compression (inches)			
	Unit Weight of soil (pcf)		Settlement due to recompression (inches)			
	Z='	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)		

Total Settlement	5.86
Consolidation Settlement	5.86
Immediate Settlement	0

SETTLEMENT ANALYSIS for EMBANKMENT FOUNDATION

Project:	HAN-75-14.39-US 68 Ramp C		Project #	G13011G	Test Boring #	B-124-0-13
Type of Foundation	Compression Index (Cc) (From Lab Test)		Groundwater Table below Top of foundation (feet)		6	
Strip Foundation	Recompression Index (Cr) (From Lab Test)		Unit Weight of Water (pcf)		62.4	
Station 811+00	Embankment Height (feet)		21.0			
Width of Embankment = 100'	Applied Pressure Top of Foundation Soil (psf)		2625		Unit Weight of E. Fill above the Foundation Soil (pcf) 125	
Depth Below the Foundation (Z)	AVERAGE PROPERTIES		CALCULATIONS			Total
Z=1.0'	Thickness of Layer (feet)	1	OB Pressure at the top Layer(psf)	0	Settlement	
Note: Unsuitable soil is to be removed and replaced with ODOT Item 203 (above Water Table) Z=1.50' (At Centre of Layer)	Estimated Corrected SPT Value (N)	15	OB Pressure at the center Layer (psf)	63	(inches)	
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad	2586		
	Estimated Moisture content (%)	15	Compression Index (C _c)	0.15		
	Liquid Limit (%)		Recompression Index (C _r)	0.015	0.015	
	Plastic Limit (%)		Initial Void Ratio (e ₀)	0.55		
	Plasticity Index (%)		Settlement due to compression (inches)	1.89		
	Unit Weight of soil (pcf)	125	Settlement due to recompression (inches)	0.19	0.19	
	Z=2.0'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	125	
Z=2.0'	Thickness of Layer (feet)	4	OB Pressure at the top Layer(psf)	125	Settlement	
(above Water Table) Z=4.0' (At Centre of Layer)	Corrected SPT Value (N)	10	OB Pressure at the center Layer (psf)	375	(inches)	
	Specific Gravity of Soil Solids (G)	2.75	Excess Pressure At Center Due to appliedLoad	2524		
	Moisture content (%)	25	Compression Index (C _c)	0.25		
	Liquid Limit (%)	41	Recompression Index (C _r)	0.025	0.025	
	Plastic Limit (%)	23	Initial Void Ratio (e ₀)	0.72		
	Plasticity Index (%)	18	Settlement due to compression (inches)	6.21		
	Unit Weight of soil (pcf)	125	Settlement due to recompression (inches)	0.62	0.62	
	Z=6.0'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	625	
Z=6.0'	Thickness of Layer (feet)	2.5	OB Pressure at the top Layer(psf)	625	Settlement	
(below Water Table) Z=7.25' (At Centre of Layer)	Corrected SPT Value (N)	18	OB Pressure at the center Layer (psf)	710	(inches)	
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad	2448		
	Moisture content (%)	19	Compression Index (C _c)	0.19		
	Liquid Limit (%)		Recompression Index (C _r)	0.019	0.019	
	Plastic Limit (%)		Initial Void Ratio (e ₀)	0.54		
	Plasticity Index (%)		Settlement due to compression (inches)	2.40		
	Unit Weight of soil (pcf)	130	Settlement due to recompression (inches)	0.24	0.24	
	Z=8.5'	Submerged Unit Weight of Soil (pcf)	67.6	OB Pressure at the bottom Layer (psf)	794	

Total Settlement	1.05
Consolidation Settlement	1.05
Immediate Settlement	0

Stress Distribution using 2 V : 1 H Slope Method for Strip footing

Boring No.: B-136-0-13		Ramp: US 68 Ramp C			Station: 794+25				
Width of the footing B (feet)	110	Applied Design Pressure (psf)	4375						
Depth (Z) below the footing (feet)	3	8.75							
Vertical Stress Intensity at Z q (psf)	4259	4053							

Boring No.: B-132-0-13		Ramp: US 68 Ramp C			Station: 800+50				
Width of the footing B (feet)	150	Applied Design Pressure (psf)	6900						
Depth (Z) below the footing (feet)	2.25								
Vertical Stress Intensity at Z q (psf)	6798								

Boring No.: B-124-0-13		Ramp: US 68 Ramp C			Station: 811+00				
Width of the footing B (feet)	100	Applied Design Pressure (psf)	2625						
Depth (Z) below the footing (feet)	1.5	4	7.25						
Vertical Stress Intensity at Z q (psf)	2586	2524	2448						

Boring No.: B-108-0-13		Ramp: US 68 Ramp D			Station: 801+50				
Width of the footing B (feet)	80	Applied Design Pressure (psf)	1613						
Depth (Z) below the footing (feet)	0.75	4	7.5	9.75					
Vertical Stress Intensity at Z q (psf)	1598	1536	1475	1438					

Boring No.: B-110-0-13		Ramp: US 68 Ramp D			Station: 804+50				
Width of the footing B (feet)	90	Applied Design Pressure (psf)	2750						
Depth (Z) below the footing (feet)	1.5	4.5	9.4						
Vertical Stress Intensity at Z q (psf)	2705	2619	2490						

Boring No.: B-115-0-13		Ramp: US 68 Ramp D			Station: 810+00				
Width of the footing B (feet)	70	Applied Design Pressure (psf)	4500						
Depth (Z) below the footing (feet)	1.75	4.25	6.75	9.5					
Vertical Stress Intensity at Z q (psf)	4390	4242	4104	3962					

Stress Distribution using 2 V : 1 H Slope Method for Strip footing

Boring No.: B-104-0-13 **Ramp: Lima Ramp H** **Station: 800+50**

Width of the footing B (feet)	50	Applied Design Pressure (psf)	750	
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Depth (Z) below the footing (feet)	2	5	7.85				
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Vertical Stress Intensity at Z q (psf)	721	682	648				
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Boring No.: B-106-0-13 **Ramp: Lima Ramp H** **Station: 808+92**

Width of the footing B (feet)	60	Applied Design Pressure (psf)	625	
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Depth (Z) below the footing (feet)	3	6.75	8.75				
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Vertical Stress Intensity at Z q (psf)	595	562	545				
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Boring No.: B-111-1-13 **Ramp: Lima Ramp H** **Station: 806+80**

Width of the footing B (feet)	50	Applied Design Pressure (psf)	750	
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Depth (Z) below the footing (feet)	1.75	4.75	7.25	9			
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Vertical Stress Intensity at Z q (psf)	725	685	655	636			
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SETTLEMENT ANALYSIS for EMBANKMENT FOUNDATION

Project:	HAN-75-14.39-Lima Ramp E		Project #	G13011G	Test Boring #	B-144-0-13
Type of Foundation	Compression Index (Cc) (From Lab Test)		Groundwater Table below Top of foundation (feet)		4.5	
Strip Foundation	Recompression Index (Cr) (From Lab Test)		Unit Weight of Water (pcf)		62.4	
Station 783+96, Left	Embankment Height (feet)		4.7			
Width of Embankment = 40'	Applied Pressure Top of Foundation Soil (psf)		588	Unit Weight of E. Fill above the Foundation Soil (pcf)		125
Depth Below the Foundation (Z)	AVERAGE PROPERTIES		CALCULATIONS			Total
Z=0.0' (above Water Table) Z=1.75' (At Centre of Layer)	Thickness of Layer (feet)	3.5	OB Pressure at the top Layer(psf)	0	Settlement	
	Corrected SPT Value (N)	4	OB Pressure at the center Layer (psf)	166	(inches)	
	Specific Gravity of Soil Solids (G)	2.75	Excess Pressure At Center Due to appliedLoad	563		
	Moisture content (%)	79	Compression Index (C _c)	0.79	0.79	
	Liquid Limit (%)	75	Recompression Index (C _r)	0.079		
	Plastic Limit (%)	59	Initial Void Ratio (e ₀)	2.23		
	Plasticity Index (%)	16	Settlement due to compression (inches)	6.59	6.59	
	Unit Weight of soil (pcf)	95	Settlement due to recompression (inches)	0.66		
Z=3.50'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	333		
Z=3.50' (above Water Table) Z=4.00' (At Centre of Layer)	Thickness of Layer (feet)	1	OB Pressure at the top Layer(psf)	333	Settlement	
	Corrected SPT Value (N)	7	OB Pressure at the center Layer (psf)	390	(inches)	
	Specific Gravity of Soil Solids (G)	2.67	Excess Pressure At Center Due to appliedLoad	535		
	Moisture content (%)	37	Bearing Capacity Index (C)	30		
	Liquid Limit (%)	NP	Immediate Settlement in Foundation Soil (inches)	0.15	0.15	
	Plastic Limit (%)	NP	Initial Void Ratio (e ₀)	0.98		
	Plasticity Index (%)	NP				
	Unit Weight of soil (pcf)	115				
Z=4.50'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	448		
Z=4.50' (below Water Table) Z=5.25' (At Centre of Layer)	Thickness of Layer (feet)	1.5	OB Pressure at the top Layer(psf)	448	Settlement	
	Corrected SPT Value (N)	7	OB Pressure at the center Layer (psf)	487	(inches)	
	Specific Gravity of Soil Solids (G)	2.67	Excess Pressure At Center Due to appliedLoad	520		
	Moisture content (%)	37	Bearing Capacity Index (C)	30		
	Liquid Limit (%)	NP	Immediate Settlement in Foundation Soil (inches)	0.19	0.19	
	Plastic Limit (%)	NP	Initial Void Ratio (e ₀)	0.98		
	Plasticity Index (%)	NP				
	Unit Weight of soil (pcf)	115				
Z=6.0'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	526		

Total Settlement	6.93
Consolidation Settlement	6.59
Immediate Settlement	0.34

SETTLEMENT ANALYSIS for EMBANKMENT FOUNDATION

Project:	HAN-75-14.39-Lima Ramp E	Project #	G13011G	Test Boring #	B-143-0-13
Type of Foundation	Compression Index (Cc) (From Lab Test)		Groundwater Table below Top of foundation (feet)		
Strip Foundation	Recompression Index (Cr) (From Lab Test)		Unit Weight of Water (pcf)		62.4
Station 787+73, Left	Embankment Height (feet)	7.0			
Width of Embankment = 40'	Applied Pressure Top of Foundation Soil (psf)	875	Unit Weight of E. Fill above the Foundation Soil (pcf)		125
Depth Below the Foundation (Z)	AVERAGE PROPERTIES		CALCULATIONS		Total
Z=0.0' (above Water Table) Z=1.75' (At Centre of Layer)	Thickness of Layer (feet)	3.5	OB Pressure at the top Layer(psf)	0	Settlement
	Corrected SPT Value (N)	7	OB Pressure at the center Layer (psf)	245	(inches)
	Specific Gravity of Soil Solids (G)	2.65	Excess Pressure At Center Due to appliedLoad	838	
	Moisture content (%)	15	Bearing Capacity Index (C)	50	
	Liquid Limit (%)	NP	Immediate Settlement in Foundation Soil (inches)	0.54	0.54
	Plastic Limit (%)	NP	Initial Void Ratio (e ₀)	0.36	
	Plasticity Index (%)	NP			
	Unit Weight of soil (pcf)	140			
Z=3.5'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	490	
Z=3.5' (above Water Table) Z=4.75' (At Centre of Layer)	Thickness of Layer (feet)	2.5	OB Pressure at the top Layer(psf)	490	Settlement
	Corrected SPT Value (N)	4	OB Pressure at the center Layer (psf)	640	(inches)
	Specific Gravity of Soil Solids (G)	2.75	Excess Pressure At Center Due to appliedLoad	782	
	Moisture content (%)	20	Compression Index (C _c)	0.2	
	Liquid Limit (%)	37	Recompression Index (C _r)	0.02	0.02
	Plastic Limit (%)	17	Initial Void Ratio (e ₀)	0.72	
	Plasticity Index (%)	20	Settlement due to compression (inches)	1.21	
	Unit Weight of soil (pcf)	120	Settlement due to recompression (inches)	0.12	0.12
Z=6.0'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	790	
Z=6.0' (above Water Table) Z=7.25' (At Centre of Layer)	Thickness of Layer (feet)	2.5	OB Pressure at the top Layer(psf)	790	Settlement
	Corrected SPT Value (N)	15	OB Pressure at the center Layer (psf)	946	(inches)
	Specific Gravity of Soil Solids (G)	2.65	Excess Pressure At Center Due to appliedLoad	741	
	Moisture content (%)	11	Bearing Capacity Index (C)	120	
	Liquid Limit (%)	NP	Immediate Settlement in Foundation Soil (inches)	0.06	0.06
	Plastic Limit (%)	NP	Initial Void Ratio (e ₀)	0.47	
	Plasticity Index (%)	NP			
	Unit Weight of soil (pcf)	125			
Z=8.5'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	1103	

Total Settlement **0.73**
Consolidation Settlement **0.12**
Immediate Settlement **0.61**

SETTLEMENT ANALYSIS for EMBANKMENT FOUNDATION

Project:	HAN-75-14.39-Lima Ramp E		Project #	G13011G	Test Boring #	B-141-0-13
Type of Foundation	Compression Index (Cc) (From Lab Test)		Groundwater Table below Top of foundation (feet)			
Strip Foundation	Recompression Index (Cr) (From Lab Test)		Unit Weight of Water (pcf)		62.4	
Station 790+99, Left	Embankment Height (feet)		16.1			
Width of Embankment = 60'	Applied Pressure Top of Foundation Soil (psf)		2013		Unit Weight of E. Fill above the Foundation Soil (pcf)	
Width of Embankment = 60'	Applied Pressure Top of Foundation Soil (psf)		2013		Unit Weight of E. Fill above the Foundation Soil (pcf)	
Depth Below the Foundation (Z)	AVERAGE PROPERTIES		CALCULATIONS			Total
Z=0.0' (above Water Table) Z=3.0' (At Centre of Layer)	Thickness of Layer (feet)	6	OB Pressure at the top Layer(psf)	0	Settlement	
	Corrected SPT Value (N)	5	OB Pressure at the center Layer (psf)	360	(inches)	
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad	1917		
	Moisture content (%)	43	Compression Index (C _c)	0.43	0.43	
	Liquid Limit (%)	37	Recompression Index (C _r)	0.043		
	Plastic Limit (%)	17	Initial Void Ratio (e ₀)	1.01		
	Plasticity Index (%)	20	Settlement due to compression (inches)	12.35	12.35	
	Unit Weight of soil (pcf)	120	Settlement due to recompression (inches)	1.24		
	Z=6.0'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	720	
Z=6.0' (above Water Table) Z=7.25' (At Centre of Layer)	Thickness of Layer (feet)	2.5	OB Pressure at the top Layer(psf)	720	Settlement	
	Corrected SPT Value (N)	1	OB Pressure at the center Layer (psf)	833	(inches)	
	Specific Gravity of Soil Solids (G)	2.75	Excess Pressure At Center Due to appliedLoad	1796		
	Moisture content (%)	81	Compression Index (C _c)	0.81	0.81	
	Liquid Limit (%)		Recompression Index (C _r)	0.081		
	Plastic Limit (%)		Initial Void Ratio (e ₀)	2.45		
	Plasticity Index (%)		Settlement due to compression (inches)	3.52	3.52	
	Unit Weight of soil (pcf)	90	Settlement due to recompression (inches)	0.35		
	Z=8.5'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	945	
Z=8.5' (above Water Table) Z=11.0' (At Centre of Layer)	Thickness of Layer (feet)	6	OB Pressure at the top Layer(psf)	945	Settlement	
	Corrected SPT Value (N)	11	OB Pressure at the center Layer (psf)	1305	(inches)	
	Specific Gravity of Soil Solids (G)	2.75	Excess Pressure At Center Due to appliedLoad	1701		
	Moisture content (%)	21	Compression Index (C _c)	0.21		
	Liquid Limit (%)	37	Recompression Index (C _r)	0.021	0.021	
	Plastic Limit (%)	18	Initial Void Ratio (e ₀)	0.73		
	Plasticity Index (%)	19	Settlement due to compression (inches)	3.17		
	Unit Weight of soil (pcf)	120	Settlement due to recompression (inches)	0.32	0.32	
	Z=13.5'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	1665	

Total Settlement	16.19
Consolidation Settlement	16.19
Immediate Settlement	0

SETTLEMENT ANALYSIS for EMBANKMENT FOUNDATION

Project:	HAN-75-14.39-US 68 Ramp B		Project #	G13011G	Test Boring #	B-154-0-13
Type of Foundation	Compression Index (Cc) (From Lab Test)		Groundwater Table below Top of foundation (feet)			
Strip Foundation	Recompression Index (Cr) (From Lab Test)		Unit Weight of Water (pcf)		62.4	
Station 804+00, Left	Embankment Height (feet)		14.8			
Width of Embankment = 80'	Applied Pressure Top of Foundation Soil (psf)		1850		Unit Weight of E. Fill above the Foundation Soil (pcf) 125	
Depth Below the Foundation (Z)	AVERAGE PROPERTIES		CALCULATIONS		Total	
Z=0.0' (above Water Table) Z=1.75' (At Centre of Layer)	Thickness of Layer (feet)	3.5	OB Pressure at the top Layer(psf)	0	Settlement	
	Corrected SPT Value (N)	7	OB Pressure at the center Layer (psf)	166	(inches)	
	Specific Gravity of Soil Solids (G)	2.75	Excess Pressure At Center Due to appliedLoad	1810		
	Moisture content (%)	61	Compression Index (C _c)	0.61		
	Liquid Limit (%)	66	Recompression Index (C _r)	0.061	0.061	
	Plastic Limit (%)	47	Initial Void Ratio (e ₀)	1.91		
	Plasticity Index (%)	19	Settlement due to compression (inches)	9.47		
	Unit Weight of soil (pcf)	95	Settlement due to recompression (inches)	0.95	0.95	
Z=3.50'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	333		
Z=3.50' (above Water Table) Z=4.75' (At Centre of Layer)	Thickness of Layer (feet)	2.5	OB Pressure at the top Layer(psf)	333	Settlement	
	Corrected SPT Value (N)	4	OB Pressure at the center Layer (psf)	451	(inches)	
	Specific Gravity of Soil Solids (G)	2.75	Excess Pressure At Center Due to appliedLoad	1746		
	Moisture content (%)	61	Compression Index (C _c)	6.95 0.61	0.61	
	Liquid Limit (%)	66	Recompression Index (C _r)	0.061		
	Plastic Limit (%)	47	Initial Void Ratio (e ₀)	1.91		
	Plasticity Index (%)	19	Settlement due to compression (inches)	4.33	4.33	
	Unit Weight of soil (pcf)	95	Settlement due to recompression (inches)	0.43		
Z=6.0'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	570		
Z=6.0' (above Water Table) Z=6.95' (At Centre of Layer)	Thickness of Layer (feet)	1.9	OB Pressure at the top Layer(psf)	570	Settlement	
	Corrected SPT Value (N)	5	OB Pressure at the center Layer (psf)	689	(inches)	
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad	1702		
	Moisture content (%)	24	Compression Index (C _c)	0.24		
	Liquid Limit (%)	41	Recompression Index (C _r)	0.024	0.024	
	Plastic Limit (%)	24	Initial Void Ratio (e ₀)	0.67		
	Plasticity Index (%)	17	Settlement due to compression (inches)	1.77		
	Unit Weight of soil (pcf)	125	Settlement due to recompression (inches)	0.18	0.18	
Z=7.9'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	808		

Total Settlement	5.45
Consolidation Settlement	5.45
Immediate Settlement	0

SETTLEMENT ANALYSIS for EMBANKMENT FOUNDATION

Project:	HAN-75-14.39-US 68 Ramp B	Project #	G13011G	Test Boring #	B-155-0-13
Type of Foundation	Compression Index (Cc) (From Lab Test)		Groundwater Table below Top of foundation (feet)		
Strip Foundation	Recompression Index (Cr) (From Lab Test)		Unit Weight of Water (pcf)		62.4
Station 808+00, Left	Embankment Height (feet)	19.3			
Width of Embankment = 80'	Applied Pressure Top of Foundation Soil (psf)	2413	Unit Weight of E. Fill above the Foundation Soil (pcf)		125
Depth Below the Foundation (Z)	AVERAGE PROPERTIES		CALCULATIONS		Total
Z=0.0' (above Water Table) Z=1.75' (At Centre of Layer)	Thickness of Layer (feet)	3.5	OB Pressure at the top Layer(psf)	0	Settlement
	Corrected SPT Value (N)	4	OB Pressure at the center Layer (psf)	166	(inches)
	Specific Gravity of Soil Solids (G)	2.75	Excess Pressure At Center Due to appliedLoad	2361	
	Moisture content (%)	67	Compression Index (C _c)	0.67	0.67
	Liquid Limit (%)	66	Recompression Index (C _r)	0.067	
	Plastic Limit (%)	47	Initial Void Ratio (e ₀)	2.02	
	Plasticity Index (%)	19	Settlement due to compression (inches)	11.03	11.03
	Unit Weight of soil (pcf)	95	Settlement due to recompression (inches)	1.10	
	Z=3.5'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	333
Z=3.5' (above Water Table) Z=5.75' (At Centre of Layer)	Thickness of Layer (feet)	4.5	OB Pressure at the top Layer(psf)	333	Settlement
	Corrected SPT Value (N)	9	OB Pressure at the center Layer (psf)	614	(inches)
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad	2251	
	Moisture content (%)	26	Compression Index (C _c)	6.95	0.26
	Liquid Limit (%)	41	Recompression Index (C _r)	0.026	0.026
	Plastic Limit (%)	24	Initial Void Ratio (e ₀)	0.70	
	Plasticity Index (%)	17	Settlement due to compression (inches)	5.53	
	Unit Weight of soil (pcf)	125	Settlement due to recompression (inches)	0.55	0.55
	Z=8.0'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	895
Z=' (above Water Table) Z=' (At Centre of Layer)	Thickness of Layer (feet)		OB Pressure at the top Layer(psf)		Settlement
	Corrected SPT Value (N)		OB Pressure at the center Layer (psf)		(inches)
	Specific Gravity of Soil Solids (G)		Excess Pressure At Center Due to appliedLoad		
	Moisture content (%)		Compression Index (C _c)		
	Liquid Limit (%)		Recompression Index (C _r)		
	Plastic Limit (%)		Initial Void Ratio (e ₀)		
	Plasticity Index (%)		Settlement due to compression (inches)		
	Unit Weight of soil (pcf)		Settlement due to recompression (inches)		
	Z='	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	

Total Settlement	11.58
Consolidation Settlement	11.58
Immediate Settlement	0

SETTLEMENT ANALYSIS for EMBANKMENT FOUNDATION

Project:	HAN-75-14.39-LIMA Ramp F		Project #	G13011G	Test Boring #	B-158-0-13
Type of Foundation	Compression Index (Cc) (From Lab Test)		Groundwater Table below Top of foundation (feet)			
Strip Foundation	Recompression Index (Cr) (From Lab Test)		Unit Weight of Water (pcf)		62.4	
Station 803+00, Right	Embankment Height (feet)		10.6			
Width of Embankment = 40'	Applied Pressure Top of Foundation Soil (psf)		1325		Unit Weight of E. Fill above the Foundation Soil (pcf) 125	
Depth Below the Foundation (Z)	AVERAGE PROPERTIES		CALCULATIONS		Total	
Z=0.0' (above Water Table) Z=1.75' (At Centre of Layer)	Thickness of Layer (feet)	3.5	OB Pressure at the top Layer(psf)	0	Settlement	
	Estimated Corrected SPT Value (N)	23	OB Pressure at the center Layer (psf)	228	(inches)	
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad	1269		
	Estimated Moisture content (%)	13	Compression Index (C _c)	0.13		
	Liquid Limit (%)	41	Recompression Index (C _r)	0.013	0.013	
	Plastic Limit (%)	19	Initial Void Ratio (e ₀)	0.46		
	Plasticity Index (%)	22	Settlement due to compression (inches)	3.05		
	Unit Weight of soil (pcf)	130	Settlement due to recompression (inches)	0.31	0.31	
Z=3.5'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	455		
Z=3.5' (above Water Table) Z=4.75' (At Centre of Layer)	Thickness of Layer (feet)	2.5	OB Pressure at the top Layer(psf)	455	Settlement	
	Corrected SPT Value (N)	8	OB Pressure at the center Layer (psf)	611	(inches)	
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad	1184		
	Moisture content (%)	28	Compression Index (C _c)	0.28		
	Liquid Limit (%)		Recompression Index (C _r)	0.028	0.028	
	Plastic Limit (%)		Initial Void Ratio (e ₀)	0.73		
	Plasticity Index (%)		Settlement due to compression (inches)	2.28		
	Unit Weight of soil (pcf)	125	Settlement due to recompression (inches)	0.23	0.23	
Z=6.0'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	768		
Z=6.0' (above Water Table) Z=6.65' (At Centre of Layer)	Thickness of Layer (feet)	1.3	OB Pressure at the top Layer(psf)	768	Settlement	
	Corrected SPT Value (N)	3	OB Pressure at the center Layer (psf)	826	(inches)	
	Specific Gravity of Soil Solids (G)	2.75	Excess Pressure At Center Due to appliedLoad	1136		
	Moisture content (%)	89	Compression Index (C _c)	0.89	0.89	
	Liquid Limit (%)		Recompression Index (C _r)	0.089		
	Plastic Limit (%)		Initial Void Ratio (e ₀)	2.60		
	Plasticity Index (%)		Settlement due to compression (inches)	1.45	1.45	
	Unit Weight of soil (pcf)	90	Settlement due to recompression (inches)	0.14		
Z=7.3'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	885		

Project:	HAN-75-14.39-LIMA Ramp F		Project #	G13011G	Test Boring #	B-158-0-13
Z=7.3'	Thickness of Layer (feet)	2.5	OB Pressure at the top Layer(psf)		885	Settlement (inches)
	Corrected SPT Value (N)	5	OB Pressure at the center Layer (psf)		1035	
(above Water Table) Z=8.60' (At Centre of Layer)	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad		1100	
	Moisture content (%)	26	Compression Index (C _c)		0.26	
	Liquid Limit (%)		Recompression Index (C _r)		0.026	0.018
	Plastic Limit (%)		Initial Void Ratio (e ₀)		0.77	
	Plasticity Index (%)		Settlement due to compression (inches)		1.39	
	Unit Weight of soil (pcf)	120	Settlement due to recompression (inches)		0.14	0.14
Z=9.9'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)		1185	

Toatl Settlement 2.12
Consolidation Settlement 2.12
Immediate Settlement 0

SETTLEMENT ANALYSIS for EMBANKMENT FOUNDATION

Project:	HAN-75-14.39-LIMA Ramp F		Project #	G13011G	Test Boring #	B-159-0-13
Type of Foundation	Compression Index (Cc) (From Lab Test)		Groundwater Table below Top of foundation (feet)			
Strip Foundation	Recompression Index (Cr) (From Lab Test)		Unit Weight of Water (pcf)		62.4	
Station 805+50, Right	Embankment Height (feet)		16.0			
Width of Embankment = 50'	Applied Pressure Top of Foundation Soil (psf)		2000	Unit Weight of E. Fill above the Foundation Soil (pcf)		125
Depth Below the Foundation (Z)	AVERAGE PROPERTIES		CALCULATIONS			Total
Z=0.0'	Thickness of Layer (feet)	3.5	OB Pressure at the top Layer(psf)	0	Settlement	
Note: Unstable soil is to be removed and replaced with ODOT Item 203 (above Water Table) Z=1.75' (At Centre of Layer)	Estimated Corrected SPT Value (N)	12	OB Pressure at the center Layer (psf)	219	(inches)	
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad	1932		
	Estimated Moisture content (%)	15	Compression Index (C _c)	0.15		
	Liquid Limit (%)		Recompression Index (C _r)	0.015	0.015	
	Plastic Limit (%)		Initial Void Ratio (e ₀)	0.55		
	Plasticity Index (%)		Settlement due to compression (inches)	4.03		
	Unit Weight of soil (pcf)	125	Settlement due to recompression (inches)	0.40	0.40	
	Z=3.5'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	438	
Z=3.5'	Thickness of Layer (feet)	2.5	OB Pressure at the top Layer(psf)	438	Settlement	
(above Water Table) Z=4.75' (At Centre of Layer)	Corrected SPT Value (N)	12	OB Pressure at the center Layer (psf)	594	(inches)	
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad	1826		
	Moisture content (%)	20	Compression Index (C _c)	0.2		
	Liquid Limit (%)	35	Recompression Index (C _r)	0.02	0.02	
	Plastic Limit (%)	18	Initial Void Ratio (e ₀)	0.62		
	Plasticity Index (%)	17	Settlement due to compression (inches)	2.26		
	Unit Weight of soil (pcf)	125	Settlement due to recompression (inches)	0.23	0.23	
	Z=6.0'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	750	
Z=6.0'	Thickness of Layer (feet)	2.5	OB Pressure at the top Layer(psf)	750	Settlement	
(above Water Table) Z=7.25' (At Centre of Layer)	Corrected SPT Value (N)	12	OB Pressure at the center Layer (psf)	906	(inches)	
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad	1747		
	Moisture content (%)	18	Compression Index (C _c)	0.18		
	Liquid Limit (%)		Recompression Index (C _r)	0.018	0.018	
	Plastic Limit (%)		Initial Void Ratio (e ₀)	0.59		
	Plasticity Index (%)		Settlement due to compression (inches)	1.58		
	Unit Weight of soil (pcf)	125	Settlement due to recompression (inches)	0.16	0.16	
	Z=8.5'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	1063	

Total Settlement	0.79
Consolidation Settlement	0.79
Immediate Settlement	0

Stress Distribution using 2 V : 1 H Slope Method for Strip footing

Boring No.: B-144-0-13		Ramp: Lima Ramp E			Station: 783+96				
Width of the footing B (feet)	40	Applied Design Pressure (psf)		588					
Depth (Z) below the footing (feet)	1.75	4	5.25						
Vertical Stress Intensity at Z q (psf)	563	535	520						

Boring No.: B-143-0-13		Ramp: Lima Ramp E			Station: 787+73				
Width of the footing B (feet)	40	Applied Design Pressure (psf)		875					
Depth (Z) below the footing (feet)	1.75	4.75	7.25						
Vertical Stress Intensity at Z q (psf)	838	782	741						

Boring No.: B-141-0-13		Ramp: Lima Ramp E			Station: 790+99				
Width of the footing B (feet)	60	Applied Design Pressure (psf)		2013					
Depth (Z) below the footing (feet)	3	7.25	11						
Vertical Stress Intensity at Z q (psf)	1917	1796	1701						

Boring No.: B-154-0-13		Ramp: US 68 Ramp B			Station: 804+00				
Width of the footing B (feet)	80	Applied Design Pressure (psf)		1850					
Depth (Z) below the footing (feet)	1.75	4.75	6.95						
Vertical Stress Intensity at Z q (psf)	1810	1746	1702						

Boring No.: B-155-0-13		Ramp: US 68 Ramp B			Station: 808+00				
Width of the footing B (feet)	80	Applied Design Pressure (psf)		2413					
Depth (Z) below the footing (feet)	1.75	5.75							
Vertical Stress Intensity at Z q (psf)	2361	2251							

Boring No.: B-158-0-13		Ramp: Lima Ramp F			Station: 803+00				
Width of the footing B (feet)	40	Applied Design Pressure (psf)		1325					
Depth (Z) below the footing (feet)	1.75	4.75	6.65	8.16					
Vertical Stress Intensity at Z q (psf)	1269	1184	1136	1100					

Boring No.: B-159-0-13

Ramp: Lima Ramp F

Station: 805+50

Width of the footing B (feet)	50	Applied Design Pressure (psf)	2000						
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Depth (Z) below the footing (feet)	1.75	4.75	7.25						
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Vertical Stress Intensity at Z q (psf)	1932	1826	1747						
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HAN-75-14.39 - WAITING PERIOD CALCULATIONS FOR ROADWAY/RAMP SECTIONS

Roadway/Ramps	Test Boring	Thickness of Foundation (feet)	Initial Primary Consolidation (inches)	Embankment Design Height (feet)	Total Settlement (inches)	Required Average Degree	C _{v1} (ft ² /Day)	C _{v2} (ft ² /Day)	C _{v3} (ft ² /Day)	C _{v4} (ft ² /Day)	Equivalent Thickness Layer C _v (ft ² /Day)	Time Factor (Tv)	Drainage	Required Waiting Period (Days)	Left over Settlement (inches)	Station Limits	Layer 1 Thickness H ₁ (feet)	Layer 2 Thickness H ₂ (feet)	Layer 3 Thickness H ₃ (feet)	Layer 4 Thickness H ₄ (feet)	Equivalent Thickness H' _T (feet)
IR-75 Realignment	B-016-0-13	8.0	1.3	24.0	1.3	50	0.68	1.08			0.680	0.197	One-Sided	14	0.65	799+00 to 813+00	3.5	4.5			7.071
IR-75 Widening	B-049-1-13	13.5	1.27	20.6	1.37	50	1.80	3.00	3.50		1.800	0.197	One-Sided	15	0.69	895+00 to 905+00	6	5	2.5		11.666
US 68 Ramp A	B-091-0-13	15.0	8.02	5.8	8.02	90	1.80	0.30	0.49	3.00	1.800	0.848	One-Sided	424	0.80	773+00 to 777+00	2	9	2.5	1.5	29.999
Lima Ramp G	B-120-0-13	10.7	4.62	13.5	4.62	90	0.30	0.30	0.30	2.05	0.300	0.848	One-Sided	231	0.46	798+35 to 803+92	3	2.5	2.5	2.7	9.033
Lima Ramp H	B-104-0-13	9.7	1.8	6.0	1.94	70	0.10	2.05			0.100	0.403	One-Sided	32	0.58	798+49 to 801+60	2	3.7			2.817
Lima Ramp H	B-111-1-13	9.5	8.8	6.0	8.93	90	0.20	0.70	1.08	1.80	0.200	0.848	One-Sided	165	0.89	806+50 to 807+25	3.5	2.5	2.5	1	6.245
US 68 Ramp D	B-108-0-13	9.5	9.25	12.9	9.4	90	0.20	0.70	0.69		0.200	0.848	One-Sided	233	0.94	799+21 to 804+89	5	2	2.5		7.415
US 68 Ramp D	B-110-0-13	12.8	5.88	22.0	6.14	90	1.50	0.30	1.08	1.08	1.500	0.848	One-Sided	178	0.61	804+89 to 806+45	3	3	2.5	4.3	17.722
US 68 Ramp C	B-136-0-13	11.5	1.32	35.0	1.32	50	2.20	2.20			2.200	0.197	One-Sided	14	0.66	791+50 to 794+75	6	6.5			12.500
US 68 Ramp C	B-132-0-13	2.5	5.86	55.2	5.86	90	1.70				1.700	0.848	One-Sided	3	0.59	799+25 to 802+25	2.5				2.500
Lima Ramp E	B-144-0-13	6	6.59	4.7	6.93	90	0.20	0.70			0.200	0.848	One-Sided	99	0.69	781+10 to 785+96	3.5	2.5			4.836
Lima Ramp E	B-141-0-13	13.5	16.19	16.1	16.19	95	0.31	0.30	2.00		0.310	1.129	One-Sided	402	0.81	788+87 to 792+87	6	2.5	5		10.510
US 68 Ramp B	B-154-0-13	7.9	5.45	14.8	5.45	90	0.30	0.10	1.80		0.300	0.848	One-Sided	209	0.55	803+00 to 806+00	3.5	2.5	1.9		8.606
US 68 Ramp B	B-155-0-13	8	11.58	19.3	11.58	95	0.20	1.80			0.200	1.127	One-Sided	141	0.58	807+00 to 810+02	3.5	4.5			5.000
Lima Ramp F	B-158-0-13	9.9	2.12	10.6	2.12	60	1.80	1.80	0.10	2.20	1.800	0.286	One-Sided	30	0.85	801+01 to 805+01	3.5	2.5	1.3	2.5	13.777

HAN-75-14.39 - WAITING PERIOD CALCULATIONS FOR PRE-LOADING (APL)

Roadway/Ramps	Test Boring	Thickness of Foundation (feet)	Initial Primary Consolidation (inches)	Pre-Loading Height (feet)	Consolidation Settlement APL (inches)	Estimated Average Degree	C _{v1} (ft ² /Day)	C _{v2} (ft ² /Day)	C _{v3} (ft ² /Day)	C _{v4} (ft ² /Day)	Equivalent Thickness Layer C _v (ft ² /Day)	Time Factor (Tv)	Drainage	Required Waiting Period (Days)	Embankment Design Height (feet)	Station Limits	Layer 1 Thickness H ₁ (feet)	Layer 2 Thickness H ₂ (feet)	Layer 3 Thickness H ₃ (feet)	Layer 4 Thickness H ₄ (feet)	Equivalent Thickness H' _T (feet)
US 68 Ramp A	B-091-0-13	15.0	8.02	3	10.92	73	1.80	0.30	0.49	3.00	1.800	0.446	One-Sided	223	5.8	773+00 to 777+00	2	9	2.5	1.5	29.999
US 68 Ramp A	B-091-0-13	15.0	8.02	10	15.63	51	1.80	0.30	0.49	3.00	1.800	0.204	One-Sided	102	5.8	773+00 to 777+00	2	9	2.5	1.5	29.999
Lima Ramp G	B-120-0-13	10.7	4.62	7	5.66	82	0.30	0.30	0.30	2.05	0.300	0.61	One-Sided	166	13.5	798+35 to 805+52	3	2.5	2.5	2.7	9.033
Lima Ramp G	B-120-0-13	10.7	4.62	10	6.02	77	0.30	0.30	0.30	2.05	0.300	0.511	One-Sided	139	13.5	798+35 to 805+52	3	2.5	2.5	2.7	9.033
Lima Ramp H	B-111-1-13	9.5	8.8	3	10.97	80	0.20	0.70	1.08	1.80	0.200	0.567	One-Sided	111	6.0	806+50 to 807+25	3.5	2.5	2.5	1	6.245
Lima Ramp H	B-111-1-13	9.5	8.8	10	14.15	62	0.20	0.70	1.08	1.80	0.200	0.307	One-Sided	60	6.0	806+50 to 807+25	3.5	2.5	2.5	1	6.245
US 68 Ramp D	B-108-0-13	9.5	9.25	6	11.21	83	0.20	0.70	0.69		0.200	0.633	One-Sided	174	12.9	799+21 to 804+89	5	2	2.5		7.415
US 68 Ramp D	B-108-0-13	9.5	9.25	10	12.22	76	0.20	0.70	0.69		0.200	0.493	One-Sided	136	12.9	799+21 to 804+89	5	2	2.5		7.415
US 68 Ramp D	B-110-0-13	12.8	5.88	11	7.4	79	1.50	0.30	1.08	1.08	1.500	0.547	One-Sided	115	12.9	804+89 to 806+45	3	3	2.5	4.3	17.722
Lima Ramp E	B-144-0-13	6	6.59	2	7.87	84	0.20	0.70			0.200	0.658	One-Sided	77	4.7	781+10 to 785+96	3.5	2.5			4.836
Lima Ramp E	B-144-0-13	6	6.59	10	10.97	60	0.20	0.70			0.200	0.286	One-Sided	33	4.7	781+10 to 785+96	3.5	2.5			4.836
Lima Ramp E	B-141-0-13	13.5	16.19	8	19.66	82	0.31	0.30	2.00		0.310	0.61	One-Sided	217	16.1	788+87 to 792+87	6	2.5	5		10.510
Lima Ramp E	B-141-0-13	13.5	16.19	10	20.37	79	0.31	0.30	2.00		0.310	0.547	One-Sided	195	16.1	788+87 to 792+87	6	2.5	5		10.510
US 68 Ramp B	B-154-0-13	7.9	5.45	7	6.53	83	0.30	0.10	1.80		0.300	0.633	One-Sided	156	14.8	803+00 to 806+00	3.5	2.5	1.9		8.606
US 68 Ramp B	B-154-0-13	7.9	5.45	10	6.9	79	0.30	0.10	1.80		0.300	0.547	One-Sided	164	14.8	803+00 to 806+00	3.5	3	1.9		9.472
US 68 Ramp B	B-155-0-13	8	11.58	10	13.32	87	0.20	1.80			0.200	0.742	One-Sided	93	19.3	807+00 to 810+02	3.5	4.5			5.000
US 68 Ramp B	B-155-0-13	8	11.58	10	13.32	87	0.20	1.80			0.200	0.742	One-Sided	93	19.3	807+00 to 810+02	3.5	4.5			5.000

SETTLEMENT ANALYSIS for EMBANKMENT FOUNDATION (PRE-LOADING)

Project:	HAN-75-14.39-US 68 Ramp A	Project #	G13011G	Test Boring #	B-091-0-13
Type of Foundation	Surcharge Layer Height (feet)	3	Groundwater Table below Top of foundation (feet)		
Strip Foundation	Embankment Design Height (feet)	5.8	Unit Weight of Water (pcf)		62.4
Station 775+00	Surcharge Height including Embankment (feet)	8.8			
Width of Embankment = 70'	Applied Pressure Top of Foundation Soil (psf)	1100	Unit Weight of E. Fill above the Foundation Soil (pcf)		125
Depth Below the Foundation (Z)	AVERAGE PROPERTIES		CALCULATIONS		Total
Z=0.0' (above Water Table) Z=1.0' (At Centre of Layer)	Thickness of Layer (feet)	2	OB Pressure at the top Layer(psf)	0	Settlement
	Corrected SPT Value (N)	7	OB Pressure at the center Layer (psf)	125	(inches)
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad	1085	
	Moisture content (%)	26	Compression Index (C _c)	0.26	
	Liquid Limit (%)	40	Recompression Index (C _r)	0.026	0.026
	Plastic Limit (%)		Initial Void Ratio (e ₀)	0.70	
	Plasticity Index (%)		Settlement due to compression (inches)	3.62	
	Unit Weight of soil (pcf)	125	Settlement due to recompression (inches)	0.36	0.36
Z=2.0'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	250	
Z=2.0' (above Water Table) Z=6.5' (At Centre of Layer)	Thickness of Layer (feet)	9	OB Pressure at the top Layer(psf)	250	Settlement
	Corrected SPT Value (N)	4	OB Pressure at the center Layer (psf)	678	(inches)
	Specific Gravity of Soil Solids (G)	2.75	Excess Pressure At Center Due to appliedLoad	1007	
	Moisture content (%)	78	Compression Index (C _c)	0.78	0.78
	Liquid Limit (%)	76	Recompression Index (C _r)	0.078	
	Plastic Limit (%)	57	Initial Void Ratio (e ₀)	2.22	
	Plasticity Index (%)	19	Settlement due to compression (inches)	10.36	10.36
	Unit Weight of soil (pcf)	95	Settlement due to recompression (inches)	1.04	
Z=11.0'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	1105	
Z=11.0' (above Water Table) Z=12.25' (At Centre of Layer)	Thickness of Layer (feet)	2.5	OB Pressure at the top Layer(psf)	1105	Settlement
	Corrected SPT Value (N)	4	OB Pressure at the center Layer (psf)	1261	(inches)
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad	936	
	Moisture content (%)	38	Compression Index (C _c)	0.38	
	Liquid Limit (%)	56	Recompression Index (C _r)	0.038	0.038
	Plastic Limit (%)	29	Initial Void Ratio (e ₀)	0.86	
	Plasticity Index (%)	27	Settlement due to compression (inches)	1.48	
	Unit Weight of soil (pcf)	125	Settlement due to recompression (inches)	0.15	0.15
Z=13.5'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	1418	

Project:	HAN-75-14.39-US 68 Ramp A		Project #	G13011G	Test Boring #	B-091-0-13
Z=13.5' (above Water Table) Z=14.25' (At Centre of Layer) Z=15.0'	Thickness of Layer (feet)	1.5	OB Pressure at the top Layer(psf)		1418	Settlement (inches)
	Corrected SPT Value (N)	15	OB Pressure at the center Layer (psf)		1514	
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad		914	
	Moisture content (%)	22	Compression Index (C _c)		0.22	
	Liquid Limit (%)	40	Recompression Index (C _r)		0.022	0.022
	Plastic Limit (%)		Initial Void Ratio (e ₀)		0.61	
	Plasticity Index (%)		Settlement due to compression (inches)		0.51	
	Unit Weight of soil (pcf)	128	Settlement due to recompression (inches)		0.05	0.05
Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)		1610		

Toatl Settlement 10.92
Consolidation Settlement 10.92
Immediate Settlement 0

SETTLEMENT ANALYSIS for EMBANKMENT FOUNDATION (PRE-LOADING)

Project:	HAN-75-14.39-US 68 Ramp A	Project #	G13011G	Test Boring #	B-091-0-13
Type of Foundation	Surcharge Layer Height (feet)	10	Groundwater Table below Top of foundation (feet)		
Strip Foundation	Embankment Design Height (feet)	5.8	Unit Weight of Water (pcf)		62.4
Station 775+00	Surcharge Height including Embankment (feet)	15.8			
Width of Embankment = 80.0'	Applied Pressure Top of Foundation Soil (psf)	1975	Unit Weight of E. Fill above the Foundation Soil (pcf)		125
Depth Below the Foundation (Z)	AVERAGE PROPERTIES		CALCULATIONS		Total
Z=0.0' (above Water Table) Z=1.0' (At Centre of Layer)	Thickness of Layer (feet)	2	OB Pressure at the top Layer(psf)	0	Settlement
	Corrected SPT Value (N)	7	OB Pressure at the center Layer (psf)	125	(inches)
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad	1951	
	Moisture content (%)	26	Compression Index (C _c)	0.26	
	Liquid Limit (%)	40	Recompression Index (C _r)	0.026	0.026
	Plastic Limit (%)		Initial Void Ratio (e ₀)	0.70	
	Plasticity Index (%)		Settlement due to compression (inches)	4.48	
	Unit Weight of soil (pcf)	125	Settlement due to recompression (inches)	0.45	0.45
Z=2.0'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	250	
Z=2.0' (above Water Table) Z=6.5' (At Centre of Layer)	Thickness of Layer (feet)	9	OB Pressure at the top Layer(psf)	250	Settlement
	Corrected SPT Value (N)	4	OB Pressure at the center Layer (psf)	678	(inches)
	Specific Gravity of Soil Solids (G)	2.75	Excess Pressure At Center Due to appliedLoad	1827	
	Moisture content (%)	78	Compression Index (C _c)	0.78	0.78
	Liquid Limit (%)	76	Recompression Index (C _r)	0.078	
	Plastic Limit (%)	57	Initial Void Ratio (e ₀)	2.22	
	Plasticity Index (%)	19	Settlement due to compression (inches)	14.87	14.87
	Unit Weight of soil (pcf)	95	Settlement due to recompression (inches)	1.49	
Z=11.0'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	1105	
Z=11.0' (above Water Table) Z=12.25' (At Centre of Layer)	Thickness of Layer (feet)	2.5	OB Pressure at the top Layer(psf)	1105	Settlement
	Corrected SPT Value (N)	4	OB Pressure at the center Layer (psf)	1261	(inches)
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad	1713	
	Moisture content (%)	38	Compression Index (C _c)	0.38	
	Liquid Limit (%)	56	Recompression Index (C _r)	0.038	0.038
	Plastic Limit (%)	29	Initial Void Ratio (e ₀)	0.86	
	Plasticity Index (%)	27	Settlement due to compression (inches)	2.28	
	Unit Weight of soil (pcf)	125	Settlement due to recompression (inches)	0.23	0.23
Z=13.5'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	1418	

Project:	HAN-75-14.39-US 68 Ramp A		Project #	G13011G	Test Boring #	B-091-0-13
Z=13.5' (above Water Table) Z=14.25' (At Centre of Layer) Z=15.0'	Thickness of Layer (feet)	1.5	OB Pressure at the top Layer(psf)		1418	Settlement (inches)
	Corrected SPT Value (N)	15	OB Pressure at the center Layer (psf)		1514	
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad		1676	
	Moisture content (%)	22	Compression Index (C _c)		0.22	
	Liquid Limit (%)	40	Recompression Index (C _r)		0.022	0.022
	Plastic Limit (%)		Initial Void Ratio (e ₀)		0.61	
	Plasticity Index (%)		Settlement due to compression (inches)		0.80	
	Unit Weight of soil (pcf)	128	Settlement due to recompression (inches)		0.08	0.08
	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)		1610	

Toatl Settlement 15.63
Consolidation Settlement 15.63
Immediate Settlement 0

SETTLEMENT ANALYSIS for EMBANKMENT FOUNDATION (PRE-LOADING)

Project:	HAN-75-14.39-Lima Ramp G	Project #	G13011G	Test Boring #	B-120-0-13
Type of Foundation	Surcharge Layer Height (feet)	7	Groundwater Table below Top of foundation (feet)	8	
Strip Foundation	Embankment Design Height (feet)	13.5	Unit Weight of Water (pcf)	62.4	
Station 801+52, Right	Surcharge Height including Embankment (feet)	20.5			
Width of Embankment = 80'	Applied Pressure Top of Foundation Soil (psf)	2563	Unit Weight of E. Fill above the Foundation Soil (pcf)	125	
Depth Below the Foundation (Z)	AVERAGE PROPERTIES		CALCULATIONS		Total
Z=0.0' (above Water Table) Z=1.5' (At Centre of Layer)	Thickness of Layer (feet)	3	OB Pressure at the top Layer(psf)	0	Settlement
	Corrected SPT Value (N)	18	OB Pressure at the center Layer (psf)	158	(inches)
	Specific Gravity of Soil Solids (G)	2.75	Excess Pressure At Center Due to appliedLoad	2516	
	Moisture content (%)	42	Compression Index (C _c)	0.42	
	Liquid Limit (%)	58	Recompression Index (C _r)	0.042	0.042
	Plastic Limit (%)	35	Initial Void Ratio (e ₀)	1.32	
	Plasticity Index (%)	23	Settlement due to compression (inches)	8.01	
	Unit Weight of soil (pcf)	105	Settlement due to recompression (inches)	0.80	0.80
Z=3.0'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	315	
Z=3.0' (above Water Table) Z=4.25' (At Centre of Layer)	Thickness of Layer (feet)	2.5	OB Pressure at the top Layer(psf)	315	Settlement
	Corrected SPT Value (N)	3	OB Pressure at the center Layer (psf)	428	(inches)
	Specific Gravity of Soil Solids (G)	2.75	Excess Pressure At Center Due to appliedLoad	2434	
	Moisture content (%)	49	Compression Index (C _c)	0.49	0.49
	Liquid Limit (%)	58	Recompression Index (C _r)	0.049	
	Plastic Limit (%)	35	Initial Void Ratio (e ₀)	1.84	
	Plasticity Index (%)	23	Settlement due to compression (inches)	4.27	4.27
	Unit Weight of soil (pcf)	90	Settlement due to recompression (inches)	0.43	
Z=5.5'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	540	
Z=5.5' (above Water Table) Z=6.75' (At Centre of Layer)	Thickness of Layer (feet)	2.5	OB Pressure at the top Layer(psf)	540	Settlement
	Corrected SPT Value (N)	8	OB Pressure at the center Layer (psf)	653	(inches)
	Specific Gravity of Soil Solids (G)	2.75	Excess Pressure At Center Due to appliedLoad	2364	
	Moisture content (%)	49	Compression Index (C _c)	0.49	
	Liquid Limit (%)	58	Recompression Index (C _r)	0.049	0.049
	Plastic Limit (%)	35	Initial Void Ratio (e ₀)	1.84	
	Plasticity Index (%)	23	Settlement due to compression (inches)	3.44	
	Unit Weight of soil (pcf)	90	Settlement due to recompression (inches)	0.34	0.34
Z=8.0'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	765	
Z=8.0'	Thickness of Layer (feet)	2.7	OB Pressure at the top Layer(psf)	765	Settlement
	Corrected SPT Value (N)	11	OB Pressure at the center Layer (psf)	850	(inches)
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad	2295	

Project:	HAN-75-14.39-Lima Ramp G		Project #	G13011G	Test Boring #	B-120-0-13
(below Water Table) Z=9.35' (At Centre of Layer)	Moisture content (%)	22	Compression Index (C_c)		0.22	
	Liquid Limit (%)	36	Recompression Index (C_r)		0.022	0.022
	Plastic Limit (%)	20	Initial Void Ratio (e_0)		0.64	
	Plasticity Index (%)	16	Settlement due to compression (inches)		2.46	
	Unit Weight of soil (pcf)	125	Settlement due to recompression (inches)		0.25	0.25
	Z=10.7'	Submerged Unit Weight of Soil (pcf)	62.6	OB Pressure at the bottom Layer (psf)		934

Toatl Settlement **5.66**
Consolidation Settlement **5.66**
Immediate Settlement **0**

SETTLEMENT ANALYSIS for EMBANKMENT FOUNDATION (PRE-LOADING)

Project:	HAN-75-14.39-Lima Ramp G	Project #	G13011G	Test Boring #	B-120-0-13
Type of Foundation	Surcharge Layer Height (feet)	10	Groundwater Table below Top of foundation (feet)	8	
Strip Foundation	Embankment Design Height (feet)	13.5	Unit Weight of Water (pcf)	62.4	
Station 801+52, Right	Surcharge Height including Embankment (feet)	23.5			
Width of Embankment = 85'	Applied Pressure Top of Foundation Soil (psf)	2938	Unit Weight of E. Fill above the Foundation Soil (pcf)	125	
Depth Below the Foundation (Z)	AVERAGE PROPERTIES		CALCULATIONS		Total
Z=0.0' (above Water Table) Z=1.5' (At Centre of Layer)	Thickness of Layer (feet)	3	OB Pressure at the top Layer(psf)	0	Settlement
	Corrected SPT Value (N)	18	OB Pressure at the center Layer (psf)	158	(inches)
	Specific Gravity of Soil Solids (G)	2.75	Excess Pressure At Center Due to appliedLoad	2887	
	Moisture content (%)	42	Compression Index (C _c)	0.42	
	Liquid Limit (%)	58	Recompression Index (C _r)	0.042	0.042
	Plastic Limit (%)	35	Initial Void Ratio (e ₀)	1.32	
	Plasticity Index (%)	23	Settlement due to compression (inches)	8.38	
	Unit Weight of soil (pcf)	105	Settlement due to recompression (inches)	0.84	0.84
Z=3.0'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	315	
Z=3.0' (above Water Table) Z=4.25' (At Centre of Layer)	Thickness of Layer (feet)	2.5	OB Pressure at the top Layer(psf)	315	Settlement
	Corrected SPT Value (N)	3	OB Pressure at the center Layer (psf)	428	(inches)
	Specific Gravity of Soil Solids (G)	2.75	Excess Pressure At Center Due to appliedLoad	2798	
	Moisture content (%)	49	Compression Index (C _c)	0.49	0.49
	Liquid Limit (%)	58	Recompression Index (C _r)	0.049	
	Plastic Limit (%)	35	Initial Void Ratio (e ₀)	1.84	
	Plasticity Index (%)	23	Settlement due to compression (inches)	4.54	4.54
	Unit Weight of soil (pcf)	90	Settlement due to recompression (inches)	0.45	
Z=5.5'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	540	
Z=5.5' (above Water Table) Z=6.75' (At Centre of Layer)	Thickness of Layer (feet)	2.5	OB Pressure at the top Layer(psf)	540	Settlement
	Corrected SPT Value (N)	8	OB Pressure at the center Layer (psf)	653	(inches)
	Specific Gravity of Soil Solids (G)	2.75	Excess Pressure At Center Due to appliedLoad	2722	
	Moisture content (%)	49	Compression Index (C _c)	0.49	
	Liquid Limit (%)	58	Recompression Index (C _r)	0.049	0.049
	Plastic Limit (%)	35	Initial Void Ratio (e ₀)	1.84	
	Plasticity Index (%)	23	Settlement due to compression (inches)	3.69	
	Unit Weight of soil (pcf)	90	Settlement due to recompression (inches)	0.37	0.37
Z=8.0'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	765	
Z=8.0'	Thickness of Layer (feet)	2.7	OB Pressure at the top Layer(psf)	765	Settlement
	Corrected SPT Value (N)	11	OB Pressure at the center Layer (psf)	850	(inches)
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad	2647	

Project:	HAN-75-14.39-Lima Ramp G		Project #	G13011G	Test Boring #	B-120-0-13
(below Water Table) Z=9.35' (At Centre of Layer)	Moisture content (%)	22	Compression Index (C_c)		0.22	
	Liquid Limit (%)	36	Recompression Index (C_r)		0.022	0.022
	Plastic Limit (%)	20	Initial Void Ratio (e_0)		0.64	
	Plasticity Index (%)	16	Settlement due to compression (inches)		2.66	
	Unit Weight of soil (pcf)	125	Settlement due to recompression (inches)		0.27	0.27
	Z=10.7'	Submerged Unit Weight of Soil (pcf)	62.6	OB Pressure at the bottom Layer (psf)		934

Toatl Settlement **6.02**
Consolidation Settlement **6.02**
Immediate Settlement **0**

Stress Distribution using 2 V : 1 H Slope Method for Strip footing

Surcharge Height 7'

Boring No.: B-120-0-13

Ramp: Lima Ramp G

Station: 801+52

Width of the footing B (feet)	80	Applied Design Pressure (psf)	2563						
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Depth (Z) below the footing (feet)	1.5	4.25	6.75	9.35					
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Vertical Stress Intensity at Z q (psf)	2516	2434	2364	2295					
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Surcharge Height 10'

Boring No.: B-120-0-13

Ramp: Lima Ramp G

Station: 801+52

Width of the footing B (feet)	85	Applied Design Pressure (psf)	2938						
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Depth (Z) below the footing (feet)	1.5	4.25	6.75	9.35					
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Vertical Stress Intensity at Z q (psf)	2887	2798	2722	2647					
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SETTLEMENT ANALYSIS for EMBANKMENT FOUNDATION (PRE-LOADING)

Project:	HAN-75-14.39-Lima Ramp H		Project #	G13011G	Test Boring #	B-111-1-13
Type of Foundation	Surcharge Layer Height (feet)		3	Groundwater Table below Top of foundation (feet)		
Strip Foundation	Embankment Design Height (feet)		6	Unit Weight of Water (pcf)		62.4
Station 806+80	Surcharge Height including Embankment (feet)		9.0			
Width of Embankment = 50'	Applied Pressure Top of Foundation Soil (psf)		1125	Unit Weight of E. Fill above the Foundation Soil (pcf)		125
Depth Below the Foundation (Z)	AVERAGE PROPERTIES			CALCULATIONS		Total
Z=0.0' (above Water Table) Z=1.75' (At Centre of Layer)	Thickness of Layer (feet)	3.5	OB Pressure at the top Layer(psf)	0	Settlement	
	Corrected SPT Value (N)	4	OB Pressure at the center Layer (psf)	166	(inches)	
	Specific Gravity of Soil Solids (G)	2.75	Excess Pressure At Center Due to appliedLoad	1090		
	Moisture content (%)	68	Compression Index (C _c)	0.68	0.68	
	Liquid Limit (%)		Recompression Index (C _r)	0.068		
	Plastic Limit (%)		Initial Void Ratio (e ₀)	2.03		
	Plasticity Index (%)		Settlement due to compression (inches)	8.27	8.27	
	Unit Weight of soil (pcf)	95	Settlement due to recompression (inches)	0.83		
Z=3.5'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	333		
Z=3.5' (above Water Table) Z=4.75' (At Centre of Layer)	Thickness of Layer (feet)	2.5	OB Pressure at the top Layer(psf)	333	Settlement	
	Corrected SPT Value (N)	4	OB Pressure at the center Layer (psf)	483	(inches)	
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad	1036		
	Moisture content (%)	29	Compression Index (C _c)	0.29	0.29	
	Liquid Limit (%)		Recompression Index (C _r)	0.029		
	Plastic Limit (%)		Initial Void Ratio (e ₀)	0.81		
	Plasticity Index (%)		Settlement due to compression (inches)	2.39	2.39	
	Unit Weight of soil (pcf)	120	Settlement due to recompression (inches)	0.24		
Z=6.0'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	633		
Z=6.0' (above Water Table) Z=7.25' (At Centre of Layer)	Thickness of Layer (feet)	2.5	OB Pressure at the top Layer(psf)	633	Settlement	
	Corrected SPT Value (N)	8	OB Pressure at the center Layer (psf)	783	(inches)	
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad	994		
	Moisture content (%)	21	Compression Index (C _c)	0.21		
	Liquid Limit (%)	38	Recompression Index (C _r)	0.021	0.021	
	Plastic Limit (%)	20	Initial Void Ratio (e ₀)	0.70		
	Plasticity Index (%)	18	Settlement due to compression (inches)	1.32		
	Unit Weight of soil (pcf)	120	Settlement due to recompression (inches)	0.13	0.13	
Z=8.5'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	933		

Project:	HAN-75-14.39-Lima Ramp H		Project #	G13011G	Test Boring #	B-111-1-13
Z=8.5 (above Water Table) Z=9.0' (At Centre of Layer) Z=9.5'	Thickness of Layer (feet)	1	OB Pressure at the top Layer(psf)		933	Settlement (inches)
	Corrected SPT Value (N)		OB Pressure at the center Layer (psf)		990	
	Specific Gravity of Soil Solids (G)	2.67	Excess Pressure At Center Due to appliedLoad		967	
	Moisture content (%)	19	Bearing Capacity Index (C)		20	
	Liquid Limit (%)	NP	Immediate Settlement in Foundation Soil (inches)		0.18	0.18
	Plastic Limit (%)	NP	Initial Void Ratio (e ₀)		0.72	
	Plasticity Index (%)	NP				
	Unit Weight of soil (pcf)	115				
	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)		1048	

Toatl Settlement 10.97
Consolidation Settlement 10.79
Immediate Settlement 0.18

SETTLEMENT ANALYSIS for EMBANKMENT FOUNDATION (PRE-LOADING)

Project:	HAN-75-14.39-Lima Ramp H	Project #	G13011G	Test Boring #	B-111-1-13
Type of Foundation	Surcharge Layer Height (feet)	10	Groundwater Table below Top of foundation (feet)		
Strip Foundation	Embankment Design Height (feet)	6	Unit Weight of Water (pcf)		62.4
Station 806+80	Surcharge Height including Embankment (feet)	16.0			
Width of Embankment = 50'	Applied Pressure Top of Foundation Soil (psf)	2000	Unit Weight of E. Fill above the Foundation Soil (pcf)		125
Depth Below the Foundation (Z)	AVERAGE PROPERTIES		CALCULATIONS		Total
Z=0.0' (above Water Table) Z=1.75' (At Centre of Layer)	Thickness of Layer (feet)	3.5	OB Pressure at the top Layer(psf)	0	Settlement
	Corrected SPT Value (N)	4	OB Pressure at the center Layer (psf)	166	(inches)
	Specific Gravity of Soil Solids (G)	2.75	Excess Pressure At Center Due to appliedLoad	1948	
	Moisture content (%)	68	Compression Index (C _c)	0.68	0.68
	Liquid Limit (%)		Recompression Index (C _r)	0.068	
	Plastic Limit (%)		Initial Void Ratio (e ₀)	2.03	
	Plasticity Index (%)		Settlement due to compression (inches)	10.39	10.39
	Unit Weight of soil (pcf)	95	Settlement due to recompression (inches)	1.04	
Z=3.5'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	333	
Z=3.5' (above Water Table) Z=4.75' (At Centre of Layer)	Thickness of Layer (feet)	2.5	OB Pressure at the top Layer(psf)	333	Settlement
	Corrected SPT Value (N)	4	OB Pressure at the center Layer (psf)	483	(inches)
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad	1864	
	Moisture content (%)	29	Compression Index (C _c)	0.29	0.29
	Liquid Limit (%)		Recompression Index (C _r)	0.029	
	Plastic Limit (%)		Initial Void Ratio (e ₀)	0.81	
	Plasticity Index (%)		Settlement due to compression (inches)	3.30	3.30
	Unit Weight of soil (pcf)	120	Settlement due to recompression (inches)	0.33	
Z=6.0'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	633	
Z=6.0' (above Water Table) Z=7.25' (At Centre of Layer)	Thickness of Layer (feet)	2.5	OB Pressure at the top Layer(psf)	633	Settlement
	Corrected SPT Value (N)	8	OB Pressure at the center Layer (psf)	783	(inches)
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad	1799	
	Moisture content (%)	21	Compression Index (C _c)	0.21	
	Liquid Limit (%)	38	Recompression Index (C _r)	0.021	0.021
	Plastic Limit (%)	20	Initial Void Ratio (e ₀)	0.70	
	Plasticity Index (%)	18	Settlement due to compression (inches)	1.92	
	Unit Weight of soil (pcf)	120	Settlement due to recompression (inches)	0.19	0.19
Z=8.5'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	933	

Project:	HAN-75-14.39-Lima Ramp H		Project #	G13011G	Test Boring #	B-111-1-13
Z=8.5 (above Water Table) Z=9.0' (At Centre of Layer) Z=9.5'	Thickness of Layer (feet)	1	OB Pressure at the top Layer(psf)		933	Settlement (inches)
	Corrected SPT Value (N)		OB Pressure at the center Layer (psf)		990	
	Specific Gravity of Soil Solids (G)	2.67	Excess Pressure At Center Due to appliedLoad		1757	
	Moisture content (%)	19	Bearing Capacity Index (C)		20	
	Liquid Limit (%)	NP	Immediate Settlement in Foundation Soil (inches)		0.27	0.27
	Plastic Limit (%)	NP	Initial Void Ratio (e ₀)		0.72	
	Plasticity Index (%)	NP				
	Unit Weight of soil (pcf)	115				
	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)		1048	

Toatl Settlement 14.15
Consolidation Settlement 13.88
Immediate Settlement 0.27

Stress Distribution using 2 V : 1 H Slope Method for Strip footing

Surcharge Height 3'

Boring No.: B-111-1-13 **Ramp: Lima Ramp H** **Station: 806+80**

Width of the footing B (feet)	55	Applied Design Pressure (psf)	1125				
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Depth (Z) below the footing (feet)	1.75	4.75	7.25	9			
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Vertical Stress Intensity at Z q (psf)	1090	1036	994	967			
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Surcharge Height10'

Boring No.: B-111-1-13 **Ramp: Lima Ramp H** **Station: 806+80**

Width of the footing B (feet)	65	Applied Design Pressure (psf)	2000				
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Depth (Z) below the footing (feet)	1.75	4.75	7.25	9			
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Vertical Stress Intensity at Z q (psf)	1948	1864	1799	1757			
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SETTLEMENT ANALYSIS for EMBANKMENT FOUNDATION (PRE-LOADING)

Project:	HAN-75-14.39-US 68 Ramp D	Project #	G13011G	Test Boring #	B-108-0-13
Type of Foundation	Surcharge Layer Height (feet)	6	Groundwater Table below Top of foundation (feet)	6.5	
Strip Foundation	Embankment Design Height (feet)	12.9	Unit Weight of Water (pcf)	62.4	
Station 801+50	Surcharge Height including Embankment (feet)	18.9			
Width of Embankment = 100'	Applied Pressure Top of Foundation Soil (psf)	2363	Unit Weight of E. Fill above the Foundation Soil (pcf)	125	
Depth Below the Foundation (Z)	AVERAGE PROPERTIES		CALCULATIONS		Total
Z=0.0 (above Water Table) Z=0.75' (At Centre of Layer)	Thickness of Layer (feet)	1.5	OB Pressure at the top Layer(psf)	0	Settlement
	Corrected SPT Value (N)		OB Pressure at the center Layer (psf)	94	(inches)
	Specific Gravity of Soil Solids (G)	2.67	Excess Pressure At Center Due to appliedLoad	2345	
	Moisture content (%)	6	Bearing Capacity Index (C)	160	
	Liquid Limit (%)	NP	Immediate Settlement in Foundation Soil (inches)	0.16	0.16
	Plastic Limit (%)	NP	Initial Void Ratio (e ₀)	0.41	
	Plasticity Index (%)	NP			
	Unit Weight of soil (pcf)	125			
Z=1.5'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	188	
Z=1.5' (above Water Table) Z=4.00' (At Centre of Layer)	Thickness of Layer (feet)	5	OB Pressure at the top Layer(psf)	188	Settlement
	Corrected SPT Value (N)	7	OB Pressure at the center Layer (psf)	425	(inches)
	Specific Gravity of Soil Solids (G)	2.75	Excess Pressure At Center Due to appliedLoad	2272	
	Moisture content (%)	67	Compression Index (C _c)	0.67	0.67
	Liquid Limit (%)		Recompression Index (C _r)	0.067	
	Plastic Limit (%)		Initial Void Ratio (e ₀)	2.02	
	Plasticity Index (%)		Settlement due to compression (inches)	10.69	10.69
	Unit Weight of soil (pcf)	95	Settlement due to recompression (inches)	1.07	
Z=6.5'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	663	
Z=6.5' (below Water Table) Z=7.50' (At Centre of Layer)	Thickness of Layer (feet)	2	OB Pressure at the top Layer(psf)	663	Settlement
	Corrected SPT Value (N)		OB Pressure at the center Layer (psf)	700	(inches)
	Specific Gravity of Soil Solids (G)	2.75	Excess Pressure At Center Due to appliedLoad	2198	
	Moisture content (%)	36	Compression Index (C _c)	0.36	
	Liquid Limit (%)	46	Recompression Index (C _r)	0.036	0.036
	Plastic Limit (%)	36	Initial Void Ratio (e ₀)	1.33	
	Plasticity Index (%)	16	Settlement due to compression (inches)	2.28	
	Unit Weight of soil (pcf)	100	Settlement due to recompression (inches)	0.23	0.23
Z=8.5'	Submerged Unit Weight of Soil (pcf)	37.6	OB Pressure at the bottom Layer (psf)	738	

Project:	HAN-75-14.39-US 68 Ramp D		Project #	G13011G	Test Boring #	B-108-0-13
Z=8.5'	Thickness of Layer (feet)	2.5	OB Pressure at the top Layer(psf)		738	Settlement (inches)
	Corrected SPT Value (N)	7	OB Pressure at the center Layer (psf)		822	
(below Water Table) Z=9.75' (At Centre of Layer)	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad		2153	
	Moisture content (%)	28	Compression Index (C _c)		0.28	
	Liquid Limit (%)		Recompression Index (C _r)		0.028	0.028
	Plastic Limit (%)		Initial Void Ratio (e ₀)		0.66	
	Plasticity Index (%)		Settlement due to compression (inches)		2.83	
	Unit Weight of soil (pcf)	130	Settlement due to recompression (inches)		0.28	0.28
Z=11.0'	Submerged Unit Weight of Soil (pcf)	67.6	OB Pressure at the bottom Layer (psf)		907	

Toatl Settlement **11.37**
Consolidation Settlement **11.21**
Immediate Settlement **0.16**

SETTLEMENT ANALYSIS for EMBANKMENT FOUNDATION (PRE-LOADING)

Project:	HAN-75-14.39-US 68 Ramp D	Project #	G13011G	Test Boring #	B-108-0-13
Type of Foundation	Surcharge Layer Height (feet)	10	Groundwater Table below Top of foundation (feet)	6.5	
Strip Foundation	Embankment Design Height (feet)	12.9	Unit Weight of Water (pcf)	62.4	
Station 801+50	Surcharge Height including Embankment (feet)	22.9			
Width of Embankment = 108'	Applied Pressure Top of Foundation Soil (psf)	2863	Unit Weight of E. Fill above the Foundation Soil (pcf)	125	
Depth Below the Foundation (Z)	AVERAGE PROPERTIES		CALCULATIONS		Total
Z=0.0 (above Water Table) Z=0.75' (At Centre of Layer)	Thickness of Layer (feet)	1.5	OB Pressure at the top Layer(psf)	0	Settlement
	Corrected SPT Value (N)		OB Pressure at the center Layer (psf)	94	(inches)
	Specific Gravity of Soil Solids (G)	2.67	Excess Pressure At Center Due to appliedLoad	2843	
	Moisture content (%)	6	Bearing Capacity Index (C)	160	
	Liquid Limit (%)	NP	Immediate Settlement in Foundation Soil (inches)	0.17	0.17
	Plastic Limit (%)	NP	Initial Void Ratio (e ₀)	0.41	
	Plasticity Index (%)	NP			
	Unit Weight of soil (pcf)	125			
Z=1.5'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	188	
Z=1.5' (above Water Table) Z=4.00' (At Centre of Layer)	Thickness of Layer (feet)	5	OB Pressure at the top Layer(psf)	188	Settlement
	Corrected SPT Value (N)	7	OB Pressure at the center Layer (psf)	425	(inches)
	Specific Gravity of Soil Solids (G)	2.75	Excess Pressure At Center Due to appliedLoad	2761	
	Moisture content (%)	67	Compression Index (C _c)	0.67	0.67
	Liquid Limit (%)		Recompression Index (C _r)	0.067	
	Plastic Limit (%)		Initial Void Ratio (e ₀)	2.02	
	Plasticity Index (%)		Settlement due to compression (inches)	11.66	11.66
	Unit Weight of soil (pcf)	95	Settlement due to recompression (inches)	1.17	
Z=6.5'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	663	
Z=6.5' (below Water Table) Z=7.50' (At Centre of Layer)	Thickness of Layer (feet)	2	OB Pressure at the top Layer(psf)	663	Settlement
	Corrected SPT Value (N)		OB Pressure at the center Layer (psf)	700	(inches)
	Specific Gravity of Soil Solids (G)	2.75	Excess Pressure At Center Due to appliedLoad	2677	
	Moisture content (%)	36	Compression Index (C _c)	0.36	
	Liquid Limit (%)	46	Recompression Index (C _r)	0.036	0.036
	Plastic Limit (%)	36	Initial Void Ratio (e ₀)	1.33	
	Plasticity Index (%)	16	Settlement due to compression (inches)	2.53	
	Unit Weight of soil (pcf)	100	Settlement due to recompression (inches)	0.25	0.25
Z=8.5'	Submerged Unit Weight of Soil (pcf)	37.6	OB Pressure at the bottom Layer (psf)	738	

Project:	HAN-75-14.39-US 68 Ramp D		Project #	G13011G	Test Boring #	B-108-0-13
Z=8.5'	Thickness of Layer (feet)	2.5	OB Pressure at the top Layer(psf)		738	Settlement (inches)
	Corrected SPT Value (N)	7	OB Pressure at the center Layer (psf)		822	
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad		2626	
(below Water Table)	Moisture content (%)	28	Compression Index (C _c)		0.28	
Z=9.75' (At Centre of Layer)	Liquid Limit (%)		Recompression Index (C _r)		0.028	0.028
	Plastic Limit (%)		Initial Void Ratio (e ₀)		0.66	
	Plasticity Index (%)		Settlement due to compression (inches)		3.15	
	Unit Weight of soil (pcf)	130	Settlement due to recompression (inches)		0.32	0.32
Z=11.0'	Submerged Unit Weight of Soil (pcf)	67.6	OB Pressure at the bottom Layer (psf)		907	

Toatl Settlement **12.39**
Consolidation Settlement **12.22**
Immediate Settlement **0.17**

SETTLEMENT ANALYSIS for EMBANKMENT FOUNDATION (PRE-LOADING)

Project:	HAN-75-14.39-US 68 Ramp D	Project #	G13011G	Test Boring #	B-110-0-13
Type of Foundation	Surcharge Layer Height (feet)	11	Groundwater Table below Top of foundation (feet)	6	
Strip Foundation	Embankment Design Height (feet)	22	Unit Weight of Water (pcf)	62.4	
Station 804+50	Surcharge Height including Embankment (feet)	33.0			
Width of Embankment = 90'	Applied Pressure Top of Foundation Soil (psf)	4125	Unit Weight of E. Fill above the Foundation Soil (pcf)	125	
Depth Below the Foundation (Z)	AVERAGE PROPERTIES		CALCULATIONS		Total
Z=0.0 (above Water Table) Z=1.50' (At Centre of Layer)	Thickness of Layer (feet)	3	OB Pressure at the top Layer(psf)	0	Settlement
	Corrected SPT Value (N)	35	OB Pressure at the center Layer (psf)	203	(inches)
	Specific Gravity of Soil Solids (G)	2.67	Excess Pressure At Center Due to appliedLoad	4070	
	Moisture content (%)	6	Bearing Capacity Index (C)	160	
	Liquid Limit (%)	NP	Immediate Settlement in Foundation Soil (inches)	0.30	0.30
	Plastic Limit (%)	NP	Initial Void Ratio (e ₀)	0.31	
	Plasticity Index (%)	NP			
	Unit Weight of soil (pcf)	135			
Z=3.0'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	405	
Z=3.0' (above Water Table) Z=4.50' (At Centre of Layer)	Thickness of Layer (feet)	3	OB Pressure at the top Layer(psf)	405	Settlement
	Corrected SPT Value (N)	7	OB Pressure at the center Layer (psf)	555	(inches)
	Specific Gravity of Soil Solids (G)	2.75	Excess Pressure At Center Due to appliedLoad	3963	
	Moisture content (%)	47	Compression Index (C _c)	0.47	0.47
	Liquid Limit (%)	54	Recompression Index (C _r)	0.047	
	Plastic Limit (%)	36	Initial Void Ratio (e ₀)	1.52	
	Plasticity Index (%)	18	Settlement due to compression (inches)	6.11	6.11
	Unit Weight of soil (pcf)	100	Settlement due to recompression (inches)	0.61	
Z=6.0'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	705	
Z=6.0' (below Water Table) Z=9.4' (At Centre of Layer)	Thickness of Layer (feet)	6.8	OB Pressure at the top Layer(psf)	705	Settlement
	Corrected SPT Value (N)	7	OB Pressure at the center Layer (psf)	935	(inches)
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad	3800	
	Moisture content (%)	29	Compression Index (C _c)	0.29	
	Liquid Limit (%)	39	Recompression Index (C _r)	0.029	0.029
	Plastic Limit (%)	22	Initial Void Ratio (e ₀)	0.67	
	Plasticity Index (%)	17	Settlement due to compression (inches)	9.97	
	Unit Weight of soil (pcf)	130	Settlement due to recompression (inches)	1.00	1.00
Z=12.8'	Submerged Unit Weight of Soil (pcf)	67.6	OB Pressure at the bottom Layer (psf)	1165	

Total Settlement	7.40
Consolidation Settlement	7.11
Immediate Settlement	0.3

SETTLEMENT ANALYSIS for EMBANKMENT FOUNDATION (PRE-LOADING)

Project:	HAN-75-14.39-Lima Ramp E	Project #	G13011G	Test Boring #	B-144-0-13
Type of Foundation	Surcharge Layer Height (feet)	2	Groundwater Table below Top of foundation (feet)	4.5	
Strip Foundation	Embankment Design Height (feet)	4.7	Unit Weight of Water (pcf)	62.4	
Station 783+96, Left	Surcharge Height including Embankment (feet)	6.7			
Width of Embankment = 45'	Applied Pressure Top of Foundation Soil (psf)	838	Unit Weight of E. Fill above the Foundation Soil (pcf)	125	
Depth Below the Foundation (Z)	AVERAGE PROPERTIES		CALCULATIONS		Total
Z=0.0' (above Water Table) Z=1.75' (At Centre of Layer)	Thickness of Layer (feet)	3.5	OB Pressure at the top Layer(psf)	0	Settlement
	Corrected SPT Value (N)	4	OB Pressure at the center Layer (psf)	166	(inches)
	Specific Gravity of Soil Solids (G)	2.75	Excess Pressure At Center Due to appliedLoad	807	
	Moisture content (%)	79	Compression Index (C _c)	0.79	0.79
	Liquid Limit (%)	75	Recompression Index (C _r)	0.079	
	Plastic Limit (%)	59	Initial Void Ratio (e ₀)	2.23	
	Plasticity Index (%)	16	Settlement due to compression (inches)	7.87	7.87
	Unit Weight of soil (pcf)	95	Settlement due to recompression (inches)	0.79	
Z=3.50'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	333	
Z=3.50' (above Water Table) Z=4.00' (At Centre of Layer)	Thickness of Layer (feet)	1	OB Pressure at the top Layer(psf)	333	Settlement
	Corrected SPT Value (N)	7	OB Pressure at the center Layer (psf)	390	(inches)
	Specific Gravity of Soil Solids (G)	2.67	Excess Pressure At Center Due to appliedLoad	770	
	Moisture content (%)	37	Bearing Capacity Index (C)	30	
	Liquid Limit (%)	NP	Immediate Settlement in Foundation Soil (inches)	0.19	0.19
	Plastic Limit (%)	NP	Initial Void Ratio (e ₀)	0.98	
	Plasticity Index (%)	NP			
	Unit Weight of soil (pcf)	115			
Z=4.50'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	448	
Z=4.50' (below Water Table) Z=5.25' (At Centre of Layer)	Thickness of Layer (feet)	1.5	OB Pressure at the top Layer(psf)	448	Settlement
	Corrected SPT Value (N)	7	OB Pressure at the center Layer (psf)	487	(inches)
	Specific Gravity of Soil Solids (G)	2.67	Excess Pressure At Center Due to appliedLoad	750	
	Moisture content (%)	37	Bearing Capacity Index (C)	30	
	Liquid Limit (%)	NP	Immediate Settlement in Foundation Soil (inches)	0.24	0.24
	Plastic Limit (%)	NP	Initial Void Ratio (e ₀)	0.98	
	Plasticity Index (%)	NP			
	Unit Weight of soil (pcf)	115			
Z=6.0'	Submerged Unit Weight of Soil (pcf)	52.6	OB Pressure at the bottom Layer (psf)	526	

Total Settlement	8.31
Consolidation Settlement	7.87
Immediate Settlement	0.44

SETTLEMENT ANALYSIS for EMBANKMENT FOUNDATION (PRE-LOADING)

Project:	HAN-75-14.39-Lima Ramp E		Project #	G13011G	Test Boring #	B-144-0-13
Type of Foundation	Surcharge Layer Height (feet)		10	Groundwater Table below Top of foundation (feet)		4.5
Strip Foundation	Embankment Design Height (feet)		4.7	Unit Weight of Water (pcf)		62.4
Station 783+96, Left	Surcharge Height including Embankment (feet)		14.7			
Width of Embankment = 55'	Applied Pressure Top of Foundation Soil (psf)		1838	Unit Weight of E. Fill above the Foundation Soil (pcf)		125
Depth Below the Foundation (Z)	AVERAGE PROPERTIES		CALCULATIONS			Total
Z=0.0' (above Water Table) Z=1.75' (At Centre of Layer)	Thickness of Layer (feet)	3.5	OB Pressure at the top Layer(psf)		0	Settlement
	Corrected SPT Value (N)	4	OB Pressure at the center Layer (psf)		166	(inches)
	Specific Gravity of Soil Solids (G)	2.75	Excess Pressure At Center Due to appliedLoad		1781	
	Moisture content (%)	79	Compression Index (C _c)		0.79	0.79
	Liquid Limit (%)	75	Recompression Index (C _r)		0.079	
	Plastic Limit (%)	59	Initial Void Ratio (e ₀)		2.23	
	Plasticity Index (%)	16	Settlement due to compression (inches)		10.97	10.97
	Unit Weight of soil (pcf)	95	Settlement due to recompression (inches)		1.10	
Z=3.50'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)		333	
Z=3.50' (above Water Table) Z=4.00' (At Centre of Layer)	Thickness of Layer (feet)	1	OB Pressure at the top Layer(psf)		333	Settlement
	Corrected SPT Value (N)	7	OB Pressure at the center Layer (psf)		390	(inches)
	Specific Gravity of Soil Solids (G)	2.67	Excess Pressure At Center Due to appliedLoad		1713	
	Moisture content (%)	37	Bearing Capacity Index (C)		30	
	Liquid Limit (%)	NP	Immediate Settlement in Foundation Soil (inches)		0.29	0.29
	Plastic Limit (%)	NP	Initial Void Ratio (e ₀)		0.98	
	Plasticity Index (%)	NP				
	Unit Weight of soil (pcf)	115				
Z=4.50'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)		448	
Z=4.50' (below Water Table) Z=5.25' (At Centre of Layer)	Thickness of Layer (feet)	1.5	OB Pressure at the top Layer(psf)		448	Settlement
	Corrected SPT Value (N)	7	OB Pressure at the center Layer (psf)		487	(inches)
	Specific Gravity of Soil Solids (G)	2.67	Excess Pressure At Center Due to appliedLoad		1678	
	Moisture content (%)	37	Bearing Capacity Index (C)		30	
	Liquid Limit (%)	NP	Immediate Settlement in Foundation Soil (inches)		0.39	0.39
	Plastic Limit (%)	NP	Initial Void Ratio (e ₀)		0.98	
	Plasticity Index (%)	NP				
	Unit Weight of soil (pcf)	115				
Z=6.0'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)		526	

Total Settlement	11.65
Consolidation Settlement	10.97
Immediate Settlement	0.68

SETTLEMENT ANALYSIS for EMBANKMENT FOUNDATION (PRE-LOADING)

Project:	HAN-75-14.39-Lima Ramp E	Project #	G13011G	Test Boring #	B-141-0-13
Type of Foundation	Surcharge Layer Height (feet)	8	Groundwater Table below Top of foundation (feet)		
Strip Foundation	Embankment Design Height (feet)	16.1	Unit Weight of Water (pcf)		62.4
Station 790+99, Left	Surcharge Height including Embankment (feet)	24.1			
Width of Embankment = 80'	Applied Pressure Top of Foundation Soil (psf)	3013	Unit Weight of E. Fill above the Foundation Soil (pcf)		125
Depth Below the Foundation (Z)	AVERAGE PROPERTIES		CALCULATIONS		Total
Z=0.0' (above Water Table) Z=3.0' (At Centre of Layer)	Thickness of Layer (feet)	6	OB Pressure at the top Layer(psf)	0	Settlement
	Corrected SPT Value (N)	5	OB Pressure at the center Layer (psf)	360	(inches)
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad	2904	
	Moisture content (%)	43	Compression Index (C _c)	0.43	0.43
	Liquid Limit (%)	37	Recompression Index (C _r)	0.043	
	Plastic Limit (%)	17	Initial Void Ratio (e ₀)	1.01	
	Plasticity Index (%)	20	Settlement due to compression (inches)	14.76	14.76
	Unit Weight of soil (pcf)	120	Settlement due to recompression (inches)	1.48	
Z=6.0'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	720	
Z=6.0' (above Water Table) Z=7.25' (At Centre of Layer)	Thickness of Layer (feet)	2.5	OB Pressure at the top Layer(psf)	720	Settlement
	Corrected SPT Value (N)	1	OB Pressure at the center Layer (psf)	833	(inches)
	Specific Gravity of Soil Solids (G)	2.75	Excess Pressure At Center Due to appliedLoad	2763	
	Moisture content (%)	81	Compression Index (C _c)	0.81	0.81
	Liquid Limit (%)		Recompression Index (C _r)	0.081	
	Plastic Limit (%)		Initial Void Ratio (e ₀)	2.45	
	Plasticity Index (%)		Settlement due to compression (inches)	4.47	4.47
	Unit Weight of soil (pcf)	90	Settlement due to recompression (inches)	0.45	
Z=8.5'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	945	
Z=8.5' (above Water Table) Z=11.0' (At Centre of Layer)	Thickness of Layer (feet)	6	OB Pressure at the top Layer(psf)	945	Settlement
	Corrected SPT Value (N)	11	OB Pressure at the center Layer (psf)	1305	(inches)
	Specific Gravity of Soil Solids (G)	2.75	Excess Pressure At Center Due to appliedLoad	2649	
	Moisture content (%)	21	Compression Index (C _c)	0.21	
	Liquid Limit (%)	37	Recompression Index (C _r)	0.021	0.021
	Plastic Limit (%)	18	Initial Void Ratio (e ₀)	0.73	
	Plasticity Index (%)	19	Settlement due to compression (inches)	4.21	
	Unit Weight of soil (pcf)	120	Settlement due to recompression (inches)	0.42	0.42
Z=13.5'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	1665	

Total Settlement	19.66
Consolidation Settlement	19.66
Immediate Settlement	0

SETTLEMENT ANALYSIS for EMBANKMENT FOUNDATION (PRE-LOADING)

Project:	HAN-75-14.39-Lima Ramp E	Project #	G13011G	Test Boring #	B-141-0-13
Type of Foundation	Surcharge Layer Height (feet)	10	Groundwater Table below Top of foundation (feet)		
Strip Foundation	Embankment Design Height (feet)	16.1	Unit Weight of Water (pcf)		62.4
Station 790+99, Left	Surcharge Height including Embankment (feet)	26.1			
Width of Embankment = 85'	Applied Pressure Top of Foundation Soil (psf)	3263	Unit Weight of E. Fill above the Foundation Soil (pcf)		125
Depth Below the Foundation (Z)	AVERAGE PROPERTIES		CALCULATIONS		Total
Z=0.0' (above Water Table) Z=3.0' (At Centre of Layer)	Thickness of Layer (feet)	6	OB Pressure at the top Layer(psf)	0	Settlement
	Corrected SPT Value (N)	5	OB Pressure at the center Layer (psf)	360	(inches)
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad	3152	
	Moisture content (%)	43	Compression Index (C _c)	0.43	0.43
	Liquid Limit (%)	37	Recompression Index (C _r)	0.043	
	Plastic Limit (%)	17	Initial Void Ratio (e ₀)	1.01	
	Plasticity Index (%)	20	Settlement due to compression (inches)	15.25	15.25
	Unit Weight of soil (pcf)	120	Settlement due to recompression (inches)	1.53	
Z=6.0'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	720	
Z=6.0' (above Water Table) Z=7.25' (At Centre of Layer)	Thickness of Layer (feet)	2.5	OB Pressure at the top Layer(psf)	720	Settlement
	Corrected SPT Value (N)	1	OB Pressure at the center Layer (psf)	833	(inches)
	Specific Gravity of Soil Solids (G)	2.75	Excess Pressure At Center Due to appliedLoad	3007	
	Moisture content (%)	81	Compression Index (C _c)	0.81	0.81
	Liquid Limit (%)		Recompression Index (C _r)	0.081	
	Plastic Limit (%)		Initial Void Ratio (e ₀)	2.45	
	Plasticity Index (%)		Settlement due to compression (inches)	4.67	4.67
	Unit Weight of soil (pcf)	90	Settlement due to recompression (inches)	0.47	
Z=8.5'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	945	
Z=8.5' (above Water Table) Z=11.0' (At Centre of Layer)	Thickness of Layer (feet)	6	OB Pressure at the top Layer(psf)	945	Settlement
	Corrected SPT Value (N)	11	OB Pressure at the center Layer (psf)	1305	(inches)
	Specific Gravity of Soil Solids (G)	2.75	Excess Pressure At Center Due to appliedLoad	2889	
	Moisture content (%)	21	Compression Index (C _c)	0.21	
	Liquid Limit (%)	37	Recompression Index (C _r)	0.021	0.021
	Plastic Limit (%)	18	Initial Void Ratio (e ₀)	0.73	
	Plasticity Index (%)	19	Settlement due to compression (inches)	4.43	
	Unit Weight of soil (pcf)	120	Settlement due to recompression (inches)	0.44	0.44
Z=13.5'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	1665	

Total Settlement	20.37
Consolidation Settlement	20.37
Immediate Settlement	0

SETTLEMENT ANALYSIS for EMBANKMENT FOUNDATION (PRE-LOADING)

Project:	HAN-75-14.39-US 68 Ramp B		Project #	G13011G	Test Boring #	B-154-0-13
Type of Foundation	Surcharge Layer Height (feet)		8	Groundwater Table below Top of foundation (feet)		
Strip Foundation	Embankment Design Height (feet)		14.8	Unit Weight of Water (pcf)		62.4
Station 804+00, Left	Surcharge Height including Embankment (feet)		21.8			
Width of Embankment = 100'	Applied Pressure Top of Foundation Soil (psf)		2725	Unit Weight of E. Fill above the Foundation Soil (pcf)		125
Depth Below the Foundation (Z)	AVERAGE PROPERTIES		CALCULATIONS			Total
Z=0.0' (above Water Table) Z=1.75' (At Centre of Layer)	Thickness of Layer (feet)	3.5	OB Pressure at the top Layer(psf)	0	Settlement	
	Corrected SPT Value (N)	7	OB Pressure at the center Layer (psf)	166	(inches)	
	Specific Gravity of Soil Solids (G)	2.75	Excess Pressure At Center Due to appliedLoad	2678		
	Moisture content (%)	61	Compression Index (C _c)	0.61		
	Liquid Limit (%)	66	Recompression Index (C _r)	0.061	0.061	
	Plastic Limit (%)	47	Initial Void Ratio (e ₀)	1.91		
	Plasticity Index (%)	19	Settlement due to compression (inches)	10.86		
	Unit Weight of soil (pcf)	95	Settlement due to recompression (inches)	1.09	1.09	
	Z=3.5'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	333	
Z=3.5' (above Water Table) Z=4.75' (At Centre of Layer)	Thickness of Layer (feet)	2.5	OB Pressure at the top Layer(psf)	333	Settlement	
	Corrected SPT Value (N)	4	OB Pressure at the center Layer (psf)	451	(inches)	
	Specific Gravity of Soil Solids (G)	2.75	Excess Pressure At Center Due to appliedLoad	2601		
	Moisture content (%)	61	Compression Index (C _c)	0.61	0.61	
	Liquid Limit (%)	66	Recompression Index (C _r)	0.061		
	Plastic Limit (%)	47	Initial Void Ratio (e ₀)	1.91		
	Plasticity Index (%)	19	Settlement due to compression (inches)	5.22	5.22	
	Unit Weight of soil (pcf)	95	Settlement due to recompression (inches)	0.52		
	Z=6.0'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	570	
Z=6.0' (above Water Table) Z=6.95' (At Centre of Layer)	Thickness of Layer (feet)	1.9	OB Pressure at the top Layer(psf)	570	Settlement	
	Corrected SPT Value (N)	5	OB Pressure at the center Layer (psf)	689	(inches)	
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad	2548		
	Moisture content (%)	24	Compression Index (C _c)	0.24		
	Liquid Limit (%)	41	Recompression Index (C _r)	0.024	0.024	
	Plastic Limit (%)	24	Initial Void Ratio (e ₀)	0.67		
	Plasticity Index (%)	17	Settlement due to compression (inches)	2.20		
	Unit Weight of soil (pcf)	125	Settlement due to recompression (inches)	0.22	0.22	
	Z=7.9'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	808	

Total Settlement	6.53
Consolidation Settlement	6.53
Immediate Settlement	0

SETTLEMENT ANALYSIS for EMBANKMENT FOUNDATION (PRE-LOADING)

Project:	HAN-75-14.39-US 68 Ramp B		Project #	G13011G	Test Boring #	B-154-0-13
Type of Foundation	Surcharge Layer Height (feet)		10	Groundwater Table below Top of foundation (feet)		
Strip Foundation	Embankment Design Height (feet)		14.8	Unit Weight of Water (pcf)		62.4
Station 804+00, Left	Surcharge Height including Embankment (feet)		24.8			
Width of Embankment = 105'	Applied Pressure Top of Foundation Soil (psf)		3100	Unit Weight of E. Fill above the Foundation Soil (pcf)		125
Depth Below the Foundation (Z)	AVERAGE PROPERTIES		CALCULATIONS			Total
Z=0.0' (above Water Table) Z=1.75' (At Centre of Layer)	Thickness of Layer (feet)	3.5	OB Pressure at the top Layer(psf)	0	Settlement	
	Corrected SPT Value (N)	7	OB Pressure at the center Layer (psf)	166	(inches)	
	Specific Gravity of Soil Solids (G)	2.75	Excess Pressure At Center Due to appliedLoad	3049		
	Moisture content (%)	61	Compression Index (C _c)	0.61		
	Liquid Limit (%)	66	Recompression Index (C _r)	0.061		0.061
	Plastic Limit (%)	47	Initial Void Ratio (e ₀)	1.91		
	Plasticity Index (%)	19	Settlement due to compression (inches)	11.33		
	Unit Weight of soil (pcf)	95	Settlement due to recompression (inches)	1.13		1.13
Z=3.5'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	333		
Z=3.5' (above Water Table) Z=4.75' (At Centre of Layer)	Thickness of Layer (feet)	2.5	OB Pressure at the top Layer(psf)	333	Settlement	
	Corrected SPT Value (N)	4	OB Pressure at the center Layer (psf)	451	(inches)	
	Specific Gravity of Soil Solids (G)	2.75	Excess Pressure At Center Due to appliedLoad	2966		
	Moisture content (%)	61	Compression Index (C _c)	0.61		0.61
	Liquid Limit (%)	66	Recompression Index (C _r)	0.061		
	Plastic Limit (%)	47	Initial Void Ratio (e ₀)	1.91		
	Plasticity Index (%)	19	Settlement due to compression (inches)	5.53		5.53
	Unit Weight of soil (pcf)	95	Settlement due to recompression (inches)	0.55		
Z=6.0'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	570		
Z=6.0' (above Water Table) Z=6.95' (At Centre of Layer)	Thickness of Layer (feet)	1.9	OB Pressure at the top Layer(psf)	570	Settlement	
	Corrected SPT Value (N)	5	OB Pressure at the center Layer (psf)	689	(inches)	
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad	2908		
	Moisture content (%)	24	Compression Index (C _c)	0.24		
	Liquid Limit (%)	41	Recompression Index (C _r)	0.024		0.024
	Plastic Limit (%)	24	Initial Void Ratio (e ₀)	0.67		
	Plasticity Index (%)	17	Settlement due to compression (inches)	2.35		
	Unit Weight of soil (pcf)	125	Settlement due to recompression (inches)	0.24		0.24
Z=7.9'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	808		

Total Settlement	6.90
Consolidation Settlement	6.9
Immediate Settlement	0

SETTLEMENT ANALYSIS for EMBANKMENT FOUNDATION (PRE-LOADING)

Project:	HAN-75-14.39-US 68 Ramp B	Project #	G13011G	Test Boring #	B-155-0-13
Type of Foundation	Surcharge Layer Height (feet)	10	Groundwater Table below Top of foundation (feet)		
Strip Foundation	Embankment Design Height (feet)	19.3	Unit Weight of Water (pcf)		62.4
Station 808+00, Left	Surcharge Height including Embankment (feet)	29.3			
Width of Embankment = 100'	Applied Pressure Top of Foundation Soil (psf)	3663	Unit Weight of E. Fill above the Foundation Soil (pcf)		125
Depth Below the Foundation (Z)	AVERAGE PROPERTIES		CALCULATIONS		Total
Z=0.0' (above Water Table) Z=1.75' (At Centre of Layer)	Thickness of Layer (feet)	3.5	OB Pressure at the top Layer(psf)	0	Settlement
	Corrected SPT Value (N)	4	OB Pressure at the center Layer (psf)	166	(inches)
	Specific Gravity of Soil Solids (G)	2.75	Excess Pressure At Center Due to appliedLoad	3600	
	Moisture content (%)	67	Compression Index (C _c)	0.67	0.67
	Liquid Limit (%)	66	Recompression Index (C _r)	0.067	
	Plastic Limit (%)	47	Initial Void Ratio (e ₀)	2.02	
	Plasticity Index (%)	19	Settlement due to compression (inches)	12.64	12.64
	Unit Weight of soil (pcf)	95	Settlement due to recompression (inches)	1.26	
Z=3.5'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	333	
Z=3.5' (above Water Table) Z=5.75' (At Centre of Layer)	Thickness of Layer (feet)	4.5	OB Pressure at the top Layer(psf)	333	Settlement
	Corrected SPT Value (N)	9	OB Pressure at the center Layer (psf)	614	(inches)
	Specific Gravity of Soil Solids (G)	2.7	Excess Pressure At Center Due to appliedLoad	3464	
	Moisture content (%)	26	Compression Index (C _c)	0.26	
	Liquid Limit (%)	41	Recompression Index (C _r)	0.026	0.026
	Plastic Limit (%)	24	Initial Void Ratio (e ₀)	0.70	
	Plasticity Index (%)	17	Settlement due to compression (inches)	6.80	
	Unit Weight of soil (pcf)	125	Settlement due to recompression (inches)	0.68	0.68
Z=8.0'	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)	895	
Z=' (above Water Table) Z=' (At Centre of Layer)	Thickness of Layer (feet)		OB Pressure at the top Layer(psf)		Settlement
	Corrected SPT Value (N)		OB Pressure at the center Layer (psf)		(inches)
	Specific Gravity of Soil Solids (G)		Excess Pressure At Center Due to appliedLoad		
	Moisture content (%)		Compression Index (C _c)		
	Liquid Limit (%)		Recompression Index (C _r)		
	Plastic Limit (%)		Initial Void Ratio (e ₀)		
	Plasticity Index (%)		Settlement due to compression (inches)		
	Unit Weight of soil (pcf)		Settlement due to recompression (inches)		
Z='	Submerged Unit Weight of Soil (pcf)		OB Pressure at the bottom Layer (psf)		

Total Settlement	13.32
Consolidation Settlement	13.32
Immediate Settlement	0



PROJECT HAN-75-14.36
 PROJECT NO. G13011G SHEET NO. 1 OF 1
 CALCULATED BY SS DATE 08/28/15
 CHECKED BY _____ DATE _____
 SCALE _____

RAMP SETTLEMENT CALCULATIONS

WAITING PERIOD CALCULATIONS TO ACCELERATE SETTLEMENT USING SAND DRAINS

Ramp : US 68 Ramp A Boring No.: B-091-0-13 Foundation Soil Thickness (H_v): 15.0 feet
 Total Settlement = 8.02" Initial Waiting Period = 424 Days Equivalent Foundation Thickness = 30.0 feet

Coefficient of consolidation for Vertical Drainage (C_v): 1.8 Square feet/Day for Equivalent Thickness Layer

Coefficient of consolidation for Radial Drainage (C_H): = 0.3 Square feet/Day

Sand Drain Spacing (S): 9 feet Center to Center Triangular Spacing Sand Drain Diameter (d_w): 1.0 foot

For Triangular Spacing

Effective Diameter d_e = 1.05 X S (Triangular Spacing)

= 1.05 X 9 = 9.45'

n = d_e/d_w = 9.45'/1.0' = 9.5 ~ 10 (assumed)

Degree of Consolidation for Combined (Vertical and Radial) Drainage (U_C) = (100% - (100% - U_V) (100% - U_R))

Use Time Factor (T_R) Curves for Radial Drainage and Time Factor Curve (T_V) for Vertical Drainage from Fig 6.6 NAVFAC DM-7

Check for Waiting Period (t₉₀) at 90% Consolidation for Radial Drainage (U_R) to see if assumed 9' spacing is effective

t₉₀ = T_R X d_e²/C_H = (0.45 x 9.45X9.45)/0.30 = 134 Days

initial 424 Days OK

Assume time t = 120 days to compute Degree of Consolidation for Combined Drainage (U_C)

T_R = t X C_H/d_e² = 120 X 0.3/(9.45 X 9.45) = 0.403

U_R = 88% Consolidation for Radial Drainage from the Time Factor Curve

For t = 120 Days U_R = 88% Calculate the Degree of Consolidation for Vertical Drainage (U_V)

First Calculate the Time Factor (T_V) for Vertical Drainage

T_V = t X C_v/H_v² = 120 X 1.8/(30.0 X 30.0) = 0.24

U_V = 57% Consolidation for Vertical Drainage from the Time Factor Curve

U_C = (1.00 - (1.00 - 0.88) (1.00 - 0.57)) = 94.8%

Settlement in Clay Layers = 0.948 X 8.02" = 7.61" at 120 Days



PROJECT HAN-75-14.36
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RAMP SETTLEMENT CALCULATIONS

WAITING PERIOD CALCULATIONS TO ACCELERATE SETTLEMENT USING SAND DRAINS

Ramp : Lima Ramp G	Boring No.: B-120-0-13	Foundation Soil Thickness (H _v): 10.7 feet
Total Settlement = 4.62 inches	Initial Waiting Period = 231 Days	Equivalent Foundation Thickness = 9.03 feet
Coefficient of consolidation for Vertical Drainage (C _v): 0.3 Square feet/Day for Equivalent Thickness Layer		
Coefficient of consolidation for Radial Drainage (C _H): = 0.4 Square feet/Day		
Sand Drain Spacing (S): 9 feet Center to Center Triangular Spacing		Sand Drain Diameter (d _w): 1.0 foot
For Triangular Spacing		
Effective Diameter d _e = 1.05 X S (Triangular Spacing)		
= 1.05 X 9 = 9.45'		
n = d _e /d _w = 9.45'/1.0' = 9.5 ~ 10 (assumed)		
Degree of Consolidation for Combined (Vertical and Radial) Drainage (U _C) = (100% - (100% - U _V) (100% - U _R))		
Use Time Factor (T _R) Curves for Radial Drainage and Time Factor Curve (T _V) for Vertical Drainage from Fig 6.6 NAVFAC DM-7		
Check for Waiting Period (t ₉₀) at 90% Consolidation for Radial Drainage (U _R) to see if assumed 9' spacing is effective		
t ₉₀ = T _R X d _e ² /C _H = (0.45 x 9.45X9.45)/0.40 = 101 Days		
initial 231 Days OK		
For t = 101 Days U _R = 90%		Claculate the Degree of Consolidation for Vertical Drainage (U _V)
First Claculate the Time Factor (T _V) for Vertical Drainage		
T _V = t X C _v /H _v ² = 101 X 0.3/(9.03 X 9.03) = 0.371		
U _V = 69% Consolidation for Vertical Drainage from the Time Factor Curve		
U _C = (1.00 - (1.00-0.90) (1.00-0.69)) = 96.9%		
Settlement in Clay Layers = 0.969 X 4.62" = 4.47" at 101 Days		



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RAMP SETTLEMENT CALCULATIONS

WAITING PERIOD CALCULATIONS TO ACCELERATE SETTLEMENT USING SAND DRAINS

Ramp : Lima Ramp H	Boring No.: B-111-1-13	Foundation Soil Thickness (H _v): 9.5 feet
Total Settlement = 8.93 inches	Initial Waiting Period = 165 Days	Equivalent Foundation Thickness = 6.245 feet
Coefficient of consolidation for Vertical Drainage (C _v): 0.2 Square feet/Day for Equivalent Thickness Layer		
Coefficient of consolidation for Radial Drainage (C _H): = 0.5 Square feet/Day		
Sand Drain Spacing (S): 9 feet Center to Center Triangular Spacing		Sand Drain Diameter (d _w): 1.0 foot
For Triangular Spacing		
Effective Diameter d _e = 1.05 X S (Triangular Spacing)		
= 1.05 X 9 = 9.45'		
n = d _e /d _w = 9.45'/1.0' = 9.5 ~ 10 (assumed)		
Degree of Consolidation for Combined (Vertical and Radial) Drainage (U _C) = (100%- (100%-U _V) (100%-U _R))		
Use Time Factor (T _R) Curves for Radial Drainage and Time Factor Curve (T _V) for Vertical Drainage from Fig 6.6 NAVFAC DM-7		
Check for Waiting Period (t ₉₀) at 90% Consolidation for Radial Drainage (U _R) to see if assumed 9' spacing is effective		
t ₉₀ = T _R X d _e ² /C _H = (0.45 x 9.45X9.45)/0.50 = 81 Days		
initial 165 Days OK		
For t=81 Days U _R = 90%		Claculate the Degree of Consolidation for Vertical Drainage (U _V)
First Claculate the Time Factor (T _V) for Vertical Drainage		
T _V = t X C _v /H _v ² = 81 X 0.2/(6.25 X 6.25) = 0.415		
U _V = 72% Consolidation for Vertical Drainage from the Time Factor Curve		
U _C = (1.00 - (1.00-0.90) (1.00-0.72)) = 97.2%		
Settlement in Clay Layers = 0.972 X 8.93" = 8.68" at 81 Days		



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RAMP SETTLEMENT CALCULATIONS

WAITING PERIOD CALCULATIONS TO ACCELERATE SETTLEMENT USING SAND DRAINS

Ramp : US 68 Ramp D	Boring No.: B-108-0-13	Foundation Soil Thickness (H _v): 9.5 feet
Total Settlement = 9.4 inches	Initial Waiting Period = 233 Days	Equivalent Foundation Thickness = 7.42 feet
Coefficient of consolidation for Vertical Drainage (C _v): 0.2 Square feet/Day for Equivalent Thickness Layer		
Coefficient of consolidation for Radial Drainage (C _H): = 0.4 Square feet/Day		
Sand Drain Spacing (S): 9 feet Center to Center Triangular Spacing		Sand Drain Diameter (d _w): 1.0 foot
For Triangular Spacing		
Effective Diameter d _e = 1.05 X S (Triangular Spacing)		
= 1.05 X 9 = 9.45'		
n = d _e /d _w = 9.45'/1.0' = 9.5 ~ 10 (assumed)		
Degree of Consolidation for Combined (Vertical and Radial) Drainage (U _C) = (100% - (100% - U _V) (100% - U _R))		
Use Time Factor (T _R) Curves for Radial Drainage and Time Factor Curve (T _V) for Vertical Drainage from Fig 6.6 NAVFAC DM-7		
Check for Waiting Period (t ₉₀) at 90% Consolidation for Radial Drainage (U _R) to see if assumed 9' spacing is effective		
t ₉₀ = T _R X d _e ² /C _H = (0.45 x 9.45X9.45)/0.40 = 101 Days		
initial 233 Days OK		
For t = 101 Days U _R = 90%		Claculate the Degree of Consolidation for Vertical Drainage (U _V)
First Claculate the Time Factor (T _V) for Vertical Drainage		
T _V = t X C _v /H _v ² = 101 X 0.2/(7.42 X 7.42) = 0.367		
U _V = 67% Consolidation for Vertical Drainage from the Time Factor Curve		
U _C = (1.00 - (1.00-0.90) (1.00-0.67)) = 96.7%		
Settlement in Clay Layers = 0.967 X 9.40" = 9.09" at 101 Days		



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RAMP SETTLEMENT CALCULATIONS

WAITING PERIOD CALCULATIONS TO ACCELERATE SETTLEMENT USING SAND DRAINS

Ramp :	US 68 Ramp D	Boring No.:	B-110-0-13	Foundation Soil Thickness (H _v):	12.8 feet
Total Settlement =	6.14 inches	Initial Waiting Period =	178 Days	Equivalent Foundation Thickness =	17.72 feet
Coefficient of consolidation for Vertical Drainage (C _v):	1.5 Square feet/Day for Equivalent Thickness Layer				
Coefficient of consolidation for Radial Drainage (C _H):	= 0.5 Square feet/Day				
Sand Drain Spacing (S):	9 feet Center to Center Triangular Spacing			Sand Drain Diameter (d _w):	1.0 foot
	For Triangular Spacing				
	Effective Diameter d _e = 1.05 X S (Triangular Spacing)				
	= 1.05 X 9		= 9.45'		
	n = d _e /d _w		= 9.45'/1.0' = 9.5 ~ 10 (assumed)		
Degree of Consolidation for Combined (Vertical and Radial) Drainage (U _C) =	(100% - (100% - U _V) (100% - U _R))				
Use Time Factor (T _R) Curves for Radial Drainage and Time Factor Curve (T _V) for Vertical Drainage from Fig 6.6 NAVFAC DM-7					
Check for Waiting Period (t ₉₀) at 90% Consolidation for Radial Drainage (U _R) to see if assumed 9' spacing is effective					
	t ₉₀ = T _R X d _e ² /C _H		= (0.45 x 9.45X9.45)/0.50 = 81 Days		
	initial 178 Days OK				
	For t=81 Days U _R = 90%		Claculate the Degree of Consolidation for Vertical Drainage (U _V)		
	First Claculate the Time Factor (T _V) for Vertical Drainage				
	T _V = t X C _v /H _v ²		= 81 X 1.5/(17.72 X 17.72) = 0.387		
	U _V = 70% Consolidation for Vertical Drainage from the Time Factor Curve				
	U _C = (1.00 - (1.00-0.90) (1.00-0.70)) = 97.0%				
	Settlement in Clay Layers = 0.970 X 6.14" = 5.96" at 81 Days				



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RAMP SETTLEMENT CALCULATIONS

WAITING PERIOD CALCULATIONS TO ACCELERATE SETTLEMENT USING SAND DRAINS

Ramp : Lima Ramp E	Boring No.: B-144-0-13	Foundation Soil Thickness (H _v): 6.0 feet
Total Settlement = 6.93 inches	Initial Waiting Period = 99 Days	Equivalent Foundation Thickness = 4.836 feet
Coefficient of consolidation for Vertical Drainage (C _v): 0.2 Square feet/Day for Equivalent Thickness Layer		
Coefficient of consolidation for Radial Drainage (C _H): = 0.6 Square feet/Day		
Sand Drain Spacing (S): 9 feet Center to Center Triangular Spacing		Sand Drain Diameter (d _w): 1.0 foot
For Triangular Spacing		
Effective Diameter d _e = 1.05 X S (Triangular Spacing)		
= 1.05 X 9 = 9.45'		
n = d _e /d _w = 9.45'/1.0' = 9.5 ~ 10 (assumed)		
Degree of Consolidation for Combined (Vertical and Radial) Drainage (U _C) = (100% - (100% - U _V) (100% - U _R))		
Use Time Factor (T _R) Curves for Radial Drainage and Time Factor Curve (T _V) for Vertical Drainage from Fig 6.6 NAVFAC DM-7		
Check for Waiting Period (t ₉₀) at 90% Consolidation for Radial Drainage (U _R) to see if assumed 9' spacing is effective		
t ₉₀ = T _R X d _e ² /C _H = (0.45 x 9.45 X 9.45)/0.60 = 67 Days		
initial 99 Days OK		
For t = 67 Days U _R = 90%		Calculate the Degree of Consolidation for Vertical Drainage (U _V)
First Calculate the Time Factor (T _V) for Vertical Drainage		
T _V = t X C _v /H _v ² = 67 X 0.2/(4.84 X 4.84) = 0.572		
U _V = 78% Consolidation for Vertical Drainage from the Time Factor Curve		
U _C = (1.00 - (1.00 - 0.90) (1.00 - 0.78)) = 98.0%		
Settlement in Clay Layers = 0.98 X 6.93" = 6.77" at 67 Days		



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RAMP SETTLEMENT CALCULATIONS

WAITING PERIOD CALCULATIONS TO ACCELERATE SETTLEMENT USING SAND DRAINS

Ramp : Lima Ramp E	Boring No.: B-141-0-13	Foundation Soil Thickness (H _v): 13.5 feet
Total Settlement = 16.19"	Initial Waiting Period = 402 Days	Equivalent Foundation Thickness = 10.51 feet
Coefficient of consolidation for Vertical Drainage (C _v):		0.310 Square feet/Day for Equivalent Thickness Layer
Coefficient of consolidation for Radial Drainage (C _H): = 0.3 Square feet/Day		

Sand Drain Spacing (S): 9 feet Center to Center Triangular Spacing	Sand Drain Diameter (d _w): 1.0 foot
For Triangular Spacing	
Effective Diameter d _e = 1.05 X S (Triangular Spacing)	
= 1.05 X 9 = 9.45'	
n = d _e /d _w = 9.45'/1.0' = 9.5 ~ 10 (assumed)	

Degree of Consolidation for Combined (Vertical and Radial) Drainage (U_C) = (100% - (100% - U_V) (100% - U_R))
 Use Time Factor (T_R) Curves for Radial Drainage and Time Factor Curve (T_V) for Vertical Drainage from Fig 6.6 NAVFAC DM-7

Check for Waiting Period (t ₉₀) at 90% Consolidation for Radial Drainage (U _R) to see if assumed 9' spacing is effective	
$t_{90} = T_R \times d_e^2 / C_H$	= (0.45 x 9.45 X 9.45) / 0.30 = 134 Days
initial 402 Days OK	

For t = 134 Days U _R = 90%	Calculate the Degree of Consolidation for Vertical Drainage (U _V)
First Calculate the Time Factor (T _V) for Vertical Drainage	
$T_V = t \times C_v / H_v^2$	= 134 X 0.31 / (10.51 X 10.51) = 0.376
U _V = 69% Consolidation for Vertical Drainage from the Time Factor Curve	
U _C = (1.00 - (1.00 - 0.90) (1.00 - 0.69)) = 96.9%	

Settlement in Clay Layers = 0.969 X 16.19" = 15.69" at 134 Days



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RAMP SETTLEMENT CALCULATIONS

WAITING PERIOD CALCULATIONS TO ACCELERATE SETTLEMENT USING SAND DRAINS

Ramp :	US 68 Ramp B	Boring No.:	B-154-0-13	Foundation Soil Thickness (H _v):	7.9 feet
Total Settlement =	5.45 inches	Initial Waiting Period =	209 Days	Equivalent Foundation Thickness =	8.61 feet
Coefficient of consolidation for Vertical Drainage (C _v):	0.3 Square feet/Day for Equivalent Thickness Layer				
Coefficient of consolidation for Radial Drainage (C _H):	= 0.4 Square feet/Day				
Sand Drain Spacing (S):	9 feet Center to Center Triangular Spacing			Sand Drain Diameter (d _w):	1.0 foot
	For Triangular Spacing				
	Effective Diameter d _e = 1.05 X S (Triangular Spacing)				
	= 1.05 X 9		= 9.45'		
	n = d _e /d _w		= 9.45'/1.0' = 9.5 ~ 10 (assumed)		
Degree of Consolidation for Combined (Vertical and Radial) Drainage (U _C) =	(100% - (100% - U _V) (100% - U _R))				
Use Time Factor (T _R) Curves for Radial Drainage and Time Factor Curve (T _V) for Vertical Drainage from Fig 6.6 NAVFAC DM-7					
Check for Waiting Period (t ₉₀) at 90% Consolidation for Radial Drainage (U _R) to see if assumed 9' spacing is effective					
	t ₉₀ = T _R X d _e ² /C _H		= (0.45 x 9.45X9.45)/0.40 = 101 Days		
	initial 209 Days OK				
	For t = 101 Days U _R = 90%		Claculate the Degree of Consolidation for Vertical Drainage (U _V)		
	First Claculate the Time Factor (T _V) for Vertical Drainage				
	T _V = t X C _v /H _v ²		= 101 X 0.3/(8.61 X 8.61) = 0.409		
	U _V = 72% Consolidation for Vertical Drainage from the Time Factor Curve				
	U _C = (1.00 - (1.00-0.90) (1.00-0.72)) = 97.2%				
	Settlement in Clay Layers = 0.972 X 5.45" = 5.30" at 101 Days				



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RAMP SETTLEMENT CALCULATIONS

WAITING PERIOD CALCULATIONS TO ACCELERATE SETTLEMENT USING SAND DRAINS

Ramp :	US 68 Ramp B	Boring No.:	B-155-0-13	Foundation Soil Thickness (H _v):	8.0 feet
Total Settlement =	11.58 inches	Initial Waiting Period =	141 Days	Equivalent Foundation Thickness =	5.0 feet
Coefficient of consolidation for Vertical Drainage (C _v):	0.2 Square feet/Day for Equivalent Thickness Layer				
Coefficient of consolidation for Radial Drainage (C _H):	= 0.5 Square feet/Day				
Sand Drain Spacing (S):	9 feet Center to Center Triangular Spacing			Sand Drain Diameter (d _w):	1.0 foot
	For Triangular Spacing				
	Effective Diameter d _e = 1.05 X S (Triangular Spacing)				
	= 1.05 X 9		= 9.45'		
	n = d _e /d _w		= 9.45'/1.0' = 9.5 ~ 10 (assumed)		
Degree of Consolidation for Combined (Vertical and Radial) Drainage (U _C) =	(100% - (100% - U _V) (100% - U _R))				
Use Time Factor (T _R) Curves for Radial Drainage and Time Factor Curve (T _V) for Vertical Drainage from Fig 6.6 NAVFAC DM-7					
Check for Waiting Period (t ₉₀) at 90% Consolidation for Radial Drainage (U _R) to see if assumed 9' spacing is effective					
	t ₉₀ = T _R X d _e ² /C _H		= (0.45 x 9.45X9.45)/0.50 = 81 Days		
	initial 141 Days OK				
	For t=81 Days U _R = 90%		Claculate the Degree of Consolidation for Vertical Drainage (U _V)		
	First Claculate the Time Factor (T _V) for Vertical Drainage				
	T _V = t X C _v /H _v ²		= 81 X 0.2/(5.0 X 5.0) = 0.648		
	U _V = 84% Consolidation for Vertical Drainage from the Time Factor Curve				
	U _C = (1.00 - (1.00-0.90) (1.00-0.84)) = 98.4%				
	Settlement in Clay Layers = 0.984 X 11.58" = 11.39" at 81 Days				

VI.D. Geotechnical Reports

C-R-S: HAN-75-14.39-Pavement/Roadway/Embankment	PID: 87005	Reviewer:SS	Date:7/30/2015
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General	
Y N <input checked="" type="checkbox"/> 1	Has the first complete version of a geotechnical report being submitted been labeled as 'Draft'?
<input checked="" type="checkbox"/> N X 2	Subsequent to ODOT's review and approval, has the complete version of the revised geotechnical report being submitted been labeled 'Final'?
<input checked="" type="checkbox"/> N X 3	Have all geotechnical reports being submitted been titled correctly as prescribed in Section 705.1 of the SGE?

Report Body	
<input checked="" type="checkbox"/> N X 4	Do all geotechnical reports being submitted contain an Executive Summary as described in Section 705.2 of the SGE?
<input checked="" type="checkbox"/> N X 5	Do all geotechnical reports being submitted contain an Introduction as described in Section 705.3 of the SGE?
<input checked="" type="checkbox"/> N X 6	Do all geotechnical reports being submitted contain a section titled "Geology and Observations of the Project," as described in Section 705.4 of the SGE?
<input checked="" type="checkbox"/> N X 7	Do all geotechnical reports being submitted contain a section titled "Exploration," as described in Section 705.5 of the SGE?
<input checked="" type="checkbox"/> N X 8	Do all geotechnical reports being submitted contain a section titled "Findings," as described in Section 705.6 of the SGE?
<input checked="" type="checkbox"/> N X 9	Do all geotechnical reports being submitted contain a section titled "Analyses and Recommendations," as described in Section 705.7 of the SGE?

VI.D. Geotechnical Reports

Appendices		
<input checked="" type="checkbox"/>	N X 10	Do all geotechnical reports being submitted contain all applicable Appendices as described in Section 705.8 of the SGE?
<input checked="" type="checkbox"/>	N X 11	Do the Appendices present a site Boring Plan showing all boring locations as described in Section 705.8.1 of the SGE?
<input checked="" type="checkbox"/>	N X 12	Do the Appendices include boring logs as described in Section 705.8.2 of the SGE?
<input checked="" type="checkbox"/>	N X 13	Do the Appendices present reports of undisturbed test data as described in Section 705.8.3 of the SGE?
<input checked="" type="checkbox"/>	N X 14	Do the Appendices present calculations in a logical format to support recommendations as described in Section 705.8.4 of the SGE?

Notes:

VI.A. Soil Profile Checklist

Cover Sheet	
	11 Has the following general information been provided on the cover sheet
<input checked="" type="checkbox"/>	N X a. Brief description of the project?
<input checked="" type="checkbox"/>	N X b. Brief presentation of geological and topographical information? Include comments on structure and pavement conditions.
<input checked="" type="checkbox"/>	N X c. Brief presentation of boring and sampling methods? Include date of last calibration and drill rod energy ratio as a percent for the hammer systems used.
<input checked="" type="checkbox"/>	N X d. Summary of general soil, bedrock, and groundwater conditions, including a generalized interpretation of findings?
<input checked="" type="checkbox"/>	N X e. Statement of where original drawings and data may be inspected?
<input checked="" type="checkbox"/>	N X f. Statement of where soil or rock samples may be inspected, if applicable?
<input checked="" type="checkbox"/>	N X g. Initials of personnel and dates they performed field reconnaissance, subsurface exploration and preparation of the soil profile?
<input checked="" type="checkbox"/>	N X 12 Has a Legend been provided?
	13 Have the following items been included in the Legend:
<input checked="" type="checkbox"/>	N X a. Symbols and usual descriptions for only the soil and bedrock types presented in the Soil Profile, as per the Soil and Rock Symbology Chart in Appendix D of the SGE?
<input checked="" type="checkbox"/>	N X b. All miscellaneous symbols and acronyms, used on any of the sheets, defined?
<input checked="" type="checkbox"/>	N X c. The number of soil samples for each classification that were mechanically classified and visually described in the current exploration?
<input checked="" type="checkbox"/>	N X 14 Has a Location Map, showing the beginning and end stations for the project, been shown on the cover sheet, sized per the L&D Manual?
<input checked="" type="checkbox"/>	N X 15 Have the station limits for each plan and profile sheet for projects with multiple alignments, or greater than 1500', been identified in a table?

VI.A. Soil Profile Checklist

<input checked="" type="checkbox"/>	N	X	16	Have the station limits for any cross section sheets been identified in the same table?
<input checked="" type="checkbox"/>	N	X	17	Has a summary table of test data for all samples been shown?
<input checked="" type="checkbox"/>	N	X	18	If borings from previous subsurface explorations are being used, has that data been shown in a separate table?
<input checked="" type="checkbox"/>	N	X	19	In the summary table, has the data been displayed by test boring in ascending stationing order for each roadway?
<input checked="" type="checkbox"/>	N	X	20	Have the centerline or baseline station, offset, and exploration identification number been provided for each boring presented in the table?
			21	For each sample, has the following information been provided in the summary table:
<input checked="" type="checkbox"/>	N	X		a. Sample depth interval?
<input checked="" type="checkbox"/>	N	X		b. Sample number and type (other than split spoon)?
<input checked="" type="checkbox"/>	N	X		c. Percent recovery?
<input checked="" type="checkbox"/>	N	X		d. Percentage of aggregate, coarse sand, fine sand, silt, and clay size particles?
<input checked="" type="checkbox"/>	N	X		e. Liquid limit, plastic limit, plasticity index, and water content, all rounded to the nearest percent or whole number?
<input checked="" type="checkbox"/>	N	X		f. ODOT classification, and Group Index?
<input checked="" type="checkbox"/>	N	X		g. Visual description of samples not mechanically classified, including water content, and estimated ODOT classification with 'Visual' in parentheses?
<input checked="" type="checkbox"/>	N	X	22	Have all undisturbed test results been displayed in graphical format on the sheet prior to the plan and profile sheets?
Surface Data				
			23	Has the following information been shown in a roadway plan drawing:
<input checked="" type="checkbox"/>	N	X		a Existing surface features described in Section 702.5.1?
<input checked="" type="checkbox"/>	N	X		b Proposed construction items, as described in Section 702.5.2?
Y	N	<input checked="" type="checkbox"/>		c Project and historic boring locations, with appropriate exploration targets and exploration identification numbers?

VI.A. Soil Profile Checklist

Y	N	<input checked="" type="checkbox"/>	d	Notes regarding observations not readily shown by drawings?
<input checked="" type="checkbox"/>	N	X	24	Have the existing ground surface contours been presented?
<input checked="" type="checkbox"/>	N	X	25	If cross sections are to be developed for stationing covered on a plan sheet, has an index for the appropriate cross section sheets been included on the plan sheet?
Subsurface Data				
<input checked="" type="checkbox"/>	N	X	26	Has all the roadway subsurface data been presented in the form of a profile along the centerline or baseline, and on cross sections where applicable?
			27	Have the graphical boring logs been correctly shown, as follows:
<input checked="" type="checkbox"/>	N	X	a.	Location and depth of boring indicated by a heavy dashed vertical line?
<input checked="" type="checkbox"/>	N	X	b.	Exploration identification number above the boring?
<input checked="" type="checkbox"/>	N	X	c.	Logs indicate soil and bedrock layers with symbols 0.4" wide and centered on the heavy dashed vertical line where possible?
<input checked="" type="checkbox"/>	N	X	d.	Bedrock exposures with 0.4" wide symbols, but without a heavy dashed vertical line?
<input checked="" type="checkbox"/>	N	X	e.	Soil and bedrock symbols as per ODOT Soil and Rock Symbology chart (SGE - Appendix D)?
<input checked="" type="checkbox"/>	N	X	f.	Historical borings shown in same manner with the exploration identification number above the boring?
<input checked="" type="checkbox"/>	N	X	28	Have the proposed groundline and existing groundline been shown on the profile view, according to ODOT CADD standards?
<input checked="" type="checkbox"/>	N	X	29	Have the offsets from centerline or baseline been indicated above the borings in the profile view?
<input checked="" type="checkbox"/>	N	X	30	Have borings located immediately adjacent to the centerline or baseline and considered representative of centerline or baseline subsurface conditions been referenced directly to the centerline or baseline?
<input checked="" type="checkbox"/>	N	X	31	Have offset borings in or near the same elevation interval of a centerline or baseline boring been plotted either on a cross section or immediately above or below the centerline boring in a box containing an elevation scale?

VI.A. Soil Profile Checklist

Y	N	<input checked="" type="checkbox"/>	32	Have cross-sections been developed to show subsurface conditions disclosed by a series of borings drilled transverse to centerline or baseline?
<input checked="" type="checkbox"/>	N	X	33	Have the existing and proposed groundlines been displayed on cross section sheets according to ODOT CADD standards?
Y	N	<input checked="" type="checkbox"/>	34	Have bedrock exposures shown on the cross sections been plotted along the contour of the cross section?
			35	Has the following information been provided adjacent to the graphical logs or bedrock exposure:
<input checked="" type="checkbox"/>	N	X	a.	Thickness, to the nearest 0.1', of sod/topsoil or other shallow surface material written above the boring (with corresponding symbology at top of log)?
<input checked="" type="checkbox"/>	N	X	b.	Moisture content, to nearest whole percent, with the bottom of the text aligned with the bottom of the sample? Label this column as 'WC' at bottom of the boring.
<input checked="" type="checkbox"/>	N	X	c.	N ₆₀ , aligned with the bottom of sample? Label column as 'N ₆₀ ' at bottom of boring.
<input checked="" type="checkbox"/>	N	X	d.	Free water indicated by a horizontal line with a 'w' attached, and static water indicated by a shaded equilateral triangle, point down?
<input checked="" type="checkbox"/>	N	X	e.	Complete geologic description of each bedrock unit, including unit core loss, unit RQD, SDI, and compressive strength test results?
<input checked="" type="checkbox"/>	N	X	f.	Visual description of any uncontrolled fill or interval not adequately defined by a graphical symbol?
<input checked="" type="checkbox"/>	N	X	g.	Organic content with modifiers, per 603.5?
<input checked="" type="checkbox"/>	N	X	h.	Designate a plastic soil with moisture content equal to or greater than the liquid limit minus three with a 1/8" solid black circle adjacent to the moisture content?
<input checked="" type="checkbox"/>	N	X	i.	Designate a non-plastic soil with moisture content exceeding 25% or exceeding 19% but appearing wet initially, with a 1/8" open circle with a horizontal line through it adjacent to the moisture content?
<input checked="" type="checkbox"/>	N	X	j.	The reason for discontinuing a boring prior to reaching the planned depth indicated immediately below the boring?

Notes:

II. Reconnaissance and Planning Checklist

C-R-S: <u>HAN-75-14.39</u>	PID: <u>87005</u>	Reviewer: <u>SS</u>	Date: <u>2/17/2014</u>
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All projects must establish the geologic setting and identify possible geologic hazards that may exist in the project area prior to preliminary design. This Reconnaissance and Planning Checklist should be followed as a guide to establishing the above conditions.

<input checked="" type="checkbox"/> N	1 Has the "Planning and Reconnaissance" section of the ODOT <u>Specifications for Geotechnical Explorations</u> been followed?	Soil profile sheets from ODOT Geotechnical Documents Management System were available. None Available. None Available. None Available. None Available.
	2 Have the following ODOT sources of geotechnical information been reviewed:	
<input checked="" type="checkbox"/> N X	a past construction plans, including soil profile sheets from District	
Y <input checked="" type="checkbox"/> X	b past project construction diaries	
Y <input checked="" type="checkbox"/> X	c interviews with people knowledgeable of the project site	
Y <input checked="" type="checkbox"/> X	d archived boring logs on file with the OGE	
Y <input checked="" type="checkbox"/> X	e past District and County Garage maintenance records	
<input checked="" type="checkbox"/> N	3 Has ODNR geotechnical information been reviewed? Indicate which references were reviewed:	
	<input type="checkbox"/> "Bedrock Geologic Map(s)"	
	<input type="checkbox"/> "Bedrock Topography Map(s)"	
	<input type="checkbox"/> "Known and Probable Karst in Ohio"	
	<input type="checkbox"/> "Soil Survey(s)"	
	<input type="checkbox"/> Ohio Wetland Inventory Map	
	<input type="checkbox"/> "Landslides and Related Features"	
	<input type="checkbox"/> aerial photographs	
	<input type="checkbox"/> boring logs <input type="checkbox"/> water well logs	
	<input type="checkbox"/> Other List Other items:	
<input checked="" type="checkbox"/> N	4 Has information regarding the possible existence of geologic hazards in, or adjacent to, the project area been requested and obtained from individuals in the project area? Indicate which individuals were consulted:	<input type="checkbox"/> "Bedrock Structure Map(s)" <input type="checkbox"/> "Geologic Map of Ohio" <input type="checkbox"/> "Quaternary Geology of Ohio" <input type="checkbox"/> National Wetland Inventory Map <input type="checkbox"/> Report of Investigations <input type="checkbox"/> measured geologic section(s) <input type="checkbox"/> Bulletins <input type="checkbox"/> Information Circulars
	<input type="checkbox"/> ODOT construction and maintenance employees <input type="checkbox"/> ODOT employees (active or retired) who were involved with the original construction? <input type="checkbox"/> current, former, adjacent landowner(s)	

II. Reconnaissance and Planning Checklist

<p><input type="checkbox"/> County Engineer / County employees</p> <p>9 Township Trustees and employees</p> <p>9 local planning and zoning officials</p>	<p>According to Mr. Christopher Long from Hancock Co. ODOT service garage, does not have any concerned of the site.</p>
<p>9 City or Village officials</p> <p>9 Other List Other items:</p> <p><input checked="" type="checkbox"/> N X 5 Has information pertaining to the existence of underground mines within, or adjacent to, the project area (requested from the District AUMIRA Coordinator, DMRM, and DGS) been reviewed?</p> <p><input checked="" type="checkbox"/> N X 6 Has the information from DMRM and DGS been reviewed regarding the existence of active, reclaimed, or abandoned surface mines within, or adjacent to, the project areas?</p> <p>Y <input checked="" type="checkbox"/> X 7 Has any of the geotechnical information gathered in Question 3, indicated the potential presence of lake bed sediments, organic soil, or peat deposits?</p>	
<p>8 Identify the geologic features that may influence the design on this project:</p> <p>9 Landslide 9 Wetland or Peat</p> <p>9 Rockfall 9 Karst</p>	<p>9 Fractures / Faults in exposed rock faces 9 Other</p> <p>9 Underground Mine 9 Surface Mine</p>

Notes

Stage 1:

III.C. Subgrade Checklist

C-R-S: HAN-75-14.39	PID: 87005	Reviewer: SS	Date: 11/4/2015
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If you do not have any subgrade work on the project, you do not have to fill out this checklist.

<input checked="" type="checkbox"/> N X 1	Has the subsurface investigation adequately characterized the soil or rock according to <u>Geotechnical Bulletin 1: Plan Subgrades (GB1)</u> ?	
Y N <input checked="" type="checkbox"/> 2	If soils classified as A-2-5, A-4b, A-5, or A-7-5 are present at the proposed subgrade (soil profile), do the plans specify that these materials need to be removed and replaced?	Silt classified as A-4b was encountered 3' below the proposed subgrade in some of the borings. Elastic A-5 and A-7-5 soils were not encountered within the 3' of the proposed subgrade.
Y N <input checked="" type="checkbox"/>	a If these materials are to be removed and replaced, have the station limits, depth, and lateral limits for the planned removal been provided?	
Y N <input checked="" type="checkbox"/> 3	If there is any rock, shale, or coal present at the proposed subgrade (CMS 204.05), do the plans specify the removal of the material?	Bedrock encountered at depths greater than two (2) feet below the proposed subgrade. Therefore, removal bedrock is not necessary.
Y N <input checked="" type="checkbox"/>	a If removal of any rock, shale, or coal is required, have the station limits, depth, and lateral limits for the planned removal of the material at proposed subgrade been provided?	
<input checked="" type="checkbox"/> N X 4	In accordance with GB1, do the SPT values and existing moisture contents for the proposed subgrade soils indicate the need for subgrade stabilization?	
<input checked="" type="checkbox"/> N X	a If removal and replacement is applicable, has the detail of subgrade removal been shown on the plans, including depth of removal, station limits, lateral extent, replacement material, and plan notes (Item 204 – Subgrade Compaction and Proof Rolling)?	For high sulfate content soils
<input checked="" type="checkbox"/> N X	b If chemical stabilization is applicable, has the detail of this treatment been shown on the plans, including depth, percentage of chemical, station limits, lateral extent, and plan notes? Indicate type of subgrade treatment specified: <input type="checkbox"/> cement treatment <input type="checkbox"/> lime treatment <input checked="" type="checkbox"/> other List Other items:	Entire project will be stabilized using cement. PB will show the detail on the plans. Cement to 12" depth
Y N <input checked="" type="checkbox"/> 5	If drainage or groundwater is an issue with the proposed subgrade, has an appropriate drainage system (e.g., pipe, underdrains) been provided?	
Y <input checked="" type="checkbox"/> X 6	Has an appropriate quantity of Proof Rolling been included in the plans (CMS 204.06)?	To be included by PB
<input checked="" type="checkbox"/> N X 7	Has a design CBR value been provided?	

III.C. Subgrade Checklist

Notes:

Stage 1:

III.B. Embankments Checklist

C-R-S: HAN-75-14.39	PID: 87005	Reviewer: SS	Date: 11/4/2015
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Settlement	
<input checked="" type="checkbox"/> N X 1	<p>If soil conditions and project requirements warrant, have settlement issues been addressed?</p> <p>If not applicable (X), go to Question 14</p>
<input checked="" type="checkbox"/> N X 2	<p>Have consolidation properties of the foundation soils been determined?</p> <p>Check methods used:</p> <p><input type="checkbox"/> laboratory consolidation tests</p> <p><input type="checkbox"/> empirical correlations with moisture content and Atterberg values</p> <p><input type="checkbox"/> other</p>
<input checked="" type="checkbox"/> N X 3	<p>Have calculations been performed to estimate the total expected embankment settlement and the time of consolidation?</p> <p>Check method used:</p> <p><input type="checkbox"/> EMBANK or equivalent software</p> <p><input type="checkbox"/> hand calculations</p>
<input checked="" type="checkbox"/> N X 4	<p>If differing foundation soil and/or loading conditions occur throughout the embankment area, have sufficient analyses been completed to evaluate consolidation at locations representative of the most critical conditions?</p>
Y <input type="checkbox"/> X 5	<p>Have the total settlement and the time of consolidation analyses indicated acceptable values at all locations for the scope of the embankment work?</p>
<input checked="" type="checkbox"/> N X 6	<p>If total settlement or time of consolidation is unacceptable, have the stations and lateral extent of the problem areas been defined?</p>
<input checked="" type="checkbox"/> N X 7	<p>Has a method been chosen as a solution to the settlement issues?</p> <p>Check methods used:</p> <p><input type="checkbox"/> waiting periods with monitoring</p> <p><input type="checkbox"/> drainage blanket and wick drains</p> <p><input type="checkbox"/> surcharge (preloading)</p> <p><input type="checkbox"/> removal and replacement of weak soil</p> <p><input type="checkbox"/> lowering proposed grade / change alignment</p> <p><input type="checkbox"/> lightweight fill</p>

III.B. Embankments Checklist

		<input type="checkbox"/> other	List Other items:		
Y	<input checked="" type="checkbox"/> N	X	8	Based on accepted design practices, and where applicable, adhering to published guidelines and design recommendations from FHWA, have calculations been performed to evaluate the effectiveness of the chosen solution(s)?	To be performed by PB
Y	N	X	9	Has an economic analysis been performed to evaluate the cost benefits of the recommended solution compared to others?	
Y	N	X	10	Have all necessary notes, specifications, and details for the chosen solution been determined?	
Y	N	X	11	Have the need, locations, type, plan notes, and reading schedule for settlement platforms been determined?	
Y	N	X	12	Have the effects of the predicted settlement and the chosen solution been determined and accounted for on the construction schedule?	
<input checked="" type="checkbox"/> Y	N	X	13	Has the effect of any foundation soil consolidation (including differential settlement) been evaluated with regard to adjacent structures (e.g., bridges, buildings, culverts, utilities) which will also undergo settlement and be subject to stresses induced by the consolidation of the surrounding soil?	

Notes :

Stage 1:

III.B. Embankments Checklist

Stability		
<input checked="" type="checkbox"/> Y	N X 14	If soil conditions and project requirements warrant, have stability issues been addressed? If not applicable (X), go to Question 27
<input checked="" type="checkbox"/> Y	N X 15	Has the total (short term) and effective (long term) shear strength of the foundation soils been determined? Check method used: <input type="checkbox"/> laboratory shear tests <input type="checkbox"/> estimation from SPT or field tests
<input checked="" type="checkbox"/> Y	N X 16	Have the OGE's recommended values of shear strength for proposed embankment fill material (total: c = 2000 psf, phi = 0; effective: c = 300 psf, phi = 28) been used in the stability analyses?
<input checked="" type="checkbox"/> Y	N X 17	Have calculations been performed to determine the F.S. for stability? Check method used: <input type="checkbox"/> STABL, XSTABL, or equivalent software <input type="checkbox"/> hand calculations
	18	Have the following F.S. been met or exceeded, as determined by the calculations, for the given stability conditions:
<input checked="" type="checkbox"/> Y	N X	a 1.30 for short term condition
<input checked="" type="checkbox"/> Y	N X	b 1.30 for long term condition
Y	N <input checked="" type="checkbox"/> X	c 1.10 for rapid drawdown, flood condition
Y	N <input checked="" type="checkbox"/> X	d 1.50 for embankment supporting bridge abutments (not on deep foundations)
<input checked="" type="checkbox"/> Y	N X 19	When differing soil or loading conditions occur throughout the embankment area, have sufficient analyses been completed to evaluate the stability at locations representative of the most critical conditions?
Y	N <input checked="" type="checkbox"/> X 20	If the F.S. was not met or exceeded, have the stations and lateral extent of the problem areas been defined?
Y	N X 21	Has a method been chosen as a solution to the stability issues? Check the method(s) used: <input type="checkbox"/> flattening slopes <input type="checkbox"/> counterberm <input type="checkbox"/> lightweight embankment

III.B. Embankments Checklist

				<input type="checkbox"/> reinforced soil slope <input type="checkbox"/> soil nailing <input type="checkbox"/> drainage blanket and wick drains <input type="checkbox"/> removal of soft soil, adding shear key <input type="checkbox"/> reduced grade / change alignment <input type="checkbox"/> stage construction <input type="checkbox"/> controlled rate of fill placement <input type="checkbox"/> drilled shaft slope stabilization <input type="checkbox"/> other	
				List Other items:	
Y	N	X	22	Based on accepted design practices, and where applicable, adhering to published guidelines and design recommendations from FHWA, have calculations been performed to evaluate the effectiveness of the chosen solution(s)?	
Y	N	X	23	Has an economic analysis been performed to evaluate the cost benefits of the recommended solution compared to others?	
Y	N	X	24	Have all necessary notes, specifications, and details for the chosen solution been determined?	
Y	N	X	25	Have the need, location, type, plan notes, and reading schedule for piezometers and inclinometers been determined?	
Y	N	X	26	If piezometers will be used, has the critical pressure value been determined and the appropriate information included in the plans?	
Y	N	X	27	Have the effects of the stability solution been determined and accounted for on the construction schedule?	
Y	N	X	28	Has the effect of the stability solution been evaluated with regard to structures (e.g., bridges, buildings, culverts, utilities) which may be subject to unusual stresses or require special construction considerations?	

Notes:

Stage 1:

III.B. Embankments Checklist

Sidehill Fills	
Y N <input checked="" type="checkbox"/>	29 If soil conditions and project requirements warrant, have sidehill fill issues been addressed? If not applicable (X), go to Question 34
Y N X	30 In accordance with <u>Geotechnical Bulletin 2: Special Benching and Sidehill Embankment Fills (GB 2)</u> , have sidehill fills been evaluated to determine if special benching or shear keys are needed?
	31 In accordance with GB 2, if special benching or shear keys are required, has
Y N X	a Plan Note G110 from L&D3 been included in the General Notes?
Y N X	b quantities for both excavation and embankment been calculated for the benched areas and added to the plan General Quantities?
Y N X	c the special benching or shear keys been indicated on the appropriate cross sections?
Y N X	32 Have water bearing zones been identified and their impact addressed?
Y N X	33 Have subsurface drainage controls been adequately addressed?

Notes:

Stage 1:

III.B. Embankments Checklist

Special				
Y	<input checked="" type="checkbox"/> X	34	Have all of the environmental factors, including wetlands, stream mitigation, and landfills, been considered and incorporated prior to design and analysis of embankment settlement and stability, including EPA or other government agencies' involvement, mitigation, or special design or construction considerations?	Wetland area are located along some of the ramps and to be determined in the field based on the condition of severity.
		35	If an embankment is to be placed through standing water or over weak, wet soils (with or without a fabric separator), the fill should be placed by the method of end dumping to a given height above the standing water or until compaction is achievable over the soft soil. If end dumping is to be specified,	
Y	N	X	a has the material type for the fill to be end dumped been specified?	
Y	N	X	b has the need for a fabric separator or filter layer been determined?	
Y	N	X	c has the height of fill to be end dumped been determined?	
Y	N	X	d have all notes and specifications for end dumping been developed?	

Notes:

Stage 1:

LABORATORY TEST STANDARDS

STANDARD	REFERENCE NUMBER
I. Soil/Rock Testing	
Description and Identification of Soils (Visual-Manual Procedures)	ASTM D 2488
Classification of Soils for Engineering Purposes (USCS).	ASTM D 2487
Laboratory Determination of Water (Moisture) Content of Soil and Rock.....	ASTM D 2216
Classification for Sizes of Aggregate for Road and Bridge Construction	ASTM D 488
Liquid Limit, Plastic Limit, and Plasticity Index of Soils	ASTM D 4318
Shrinkage Factors of Soils by Mercury Method.....	ASTM D 427
Moisture, Ash, and Organic Matter of Peat and Other Organic Soils	ASTM D 2974
Specific gravity of Soils.....	ASTM D 854
Direct Shear Test of Soils under Consolidated Drained Conditions.....	ASTM D 3080
Particle-Size Analysis of Soils	ASTM D 422
Unconfined Compressive Strength of Cohesive Soils.....	ASTM D 2166
Compressive Strength of Intact Rock Core Specimens	ASTM D 7012
Slake Durability Index of Shale/Similar Weak Rock Test	ASTM D 4644
Point Load Test of Rock Core Specimens	ISRM* / ASTM D5731
CBR (California Bearing Ratio) of Laboratory-Compacted Soils.....	ASTM D 1883
Laboratory Compaction Characteristics of Soil using Standard Effort	ASTM D 698
Laboratory Compaction Characteristics of Soil using Modified Effort.....	ASTM D 1557
One-Dimensional Consolidation Properties of Soils	ASTM D 2435
One-Dimensional Swell or Settlement Potential of Cohesive Soils	ASTM D 4546
Ph of Soil.....	ASTM D 4972

*ISRM – International Society for Rock Mechanics

II. Concrete Testing

Compressive Strength for Cylindrical Concrete Specimens.....	ASTM C-39
Acid-Soluble Chloride in Mortar and Concrete.....	ASTM C 1152



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 ₀ /LL _L 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	Uncontrolled Fill (Describe)	Bouldery Zone	Peat, S-Sedimentary, W-Woody, F-Fibrous, L-Loamy & etc
Pavement or Base			

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

APPENDIX A.1 - ODOT Quick Reference for Visual Description of Soils

1) STRENGTH OF SOIL:

Non-Cohesive (granular) Soils - Compactness	
Description	Blows Per Ft.
Very Loose	≤ 4
Loose	5 – 10
Medium Dense	11 – 30
Dense	31 – 50
Very Dense	> 50

2) COLOR :

If a color is a uniform color throughout, the term is single, modified by an adjective such as light or dark. If the predominate color is shaded by a secondary color, the secondary color precedes the primary color. If two major and distinct colors are swirled throughout the soil, the colors are modified by the term “mottled”

3) PRIMARY COMPONENT

Use **DESCRIPTION** from ODOT Soil Classification Chart on Back

Cohesive (fine grained) Soils - Consistency

Description	Qu (TSF)	Blows Per Ft.	Hand Manipulation
Very Soft	<0.25	<2	Easily penetrates 2” by fist
Soft	0.25-0.5	2 - 4	Easily penetrates 2” by thumb
Medium Stiff	0.5-1.0	5 - 8	Penetrates by thumb with moderate effort
Stiff	1.0-2.0	9 - 15	Readily indents by thumb, but not penetrate
Very Stiff	2.0-4.0	16 - 30	Readily indents by thumbnail
Hard	>4.0	>30	Indent with difficulty by thumbnail

4) COMPONENT MODIFIERS:

Description	Percentage By Weight
Trace	0% - 10%
Little	10% - 20%
Some	20% - 35%
“And”	35% -50%

5) Soil Organic Content

Description	% by Weight
Slightly Organic	2% - 4%
Moderately Organic	4% - 10%
Highly Organic	> 10%

6) Relative Visual Moisture

Description	Criteria	
	Cohesive Soil	Non-cohesive Soils
Dry	Powdery; Cannot be rolled; Water content well below the plastic limit	No moisture present
Damp	Leaves very little moisture when pressed between fingers; Crumbles at or before rolled to 1/8”; Water content below plastic limit	Internal moisture, but no to little surface moisture
Moist	Leaves small amounts of moisture when pressed between fingers; Rolled to 1/8” or smaller before crumbling; Water content above plastic limit to -3% of the liquid limit	Free water on surface, moist (shiny) appearance
Wet	Very mushy; Rolled multiple times to 1/8” or smaller before crumbles; Near or above the liquid limit	Voids filled with free water, can be poured from split spoon.

References

Publications – ODOT (www.dot.state.oh.us/drrc/)

CADD Engineering Standards Manual, Office of Production

Construction and Material Specifications, Office of Construction Administration

Pavement Design & Rehabilitation Manual, Morse, Miller, et al., Office of Pavement Engineering

Specifications for Geotechnical Explorations, Office of Geotechnical Engineering

WSDOT Geotechnical Design Manual M 46-03.08, Chapter 9 “Embankments”, Issued; October 2013

Geotechnical Bulletins – ODOT

GB1 Plan Subgrades

GB2 Special Benching and Sidehill Embankment Fills

GB5 Geotechnical Submission Guidelines

GB9 Geotechnical Software

Publications – ODNR (www.dnr.state.oh.us/)

Bedrock Geology Map, DGS

Bedrock Structure Map, DGS

Bedrock Topography Map, DGS

Geologic Map of Ohio, DGS

Known and Probable Karst in Ohio, DGS

Ohio Wetland Inventory Map (DSWC)

National Wetland Inventory Map (DSWC)

Quaternary Geology of Ohio, DGS

Soil Survey, DSWC

USGS Open File Map Series #78-1057 Landslides and Related Features, DGS

Other publications or information available from ODNR: bulletins, boring logs, measured geologic regions(s), information circulars, water well logs, report of investigations