APPENDIX J CASE 10-T-0189 HDD SITE INVESTIGATION AND PLANNING REPORT & INADVERTENT RELEASE AND CONTINGENCY PLAN (HDD) (C 114M)



HDD Design Summary Report Crossings HDD 1 to HDD 2 in Segments 1 & 2 – Packages 1A & 1B

Putnam to Whitehall Washington County, New York

CHA Project Number: 066076

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1.0 INTRODUCTION

1.1 PURPOSE

The Champlain Hudson Power Express (CHPE) consists of installing a pair of HVDC electrical transmission cables with an associated telecommunications line from Canada to New York City. The portion of the work addressed herein, is located in the upland portion of the route from the south end of Lake Champlain to New York City along the uplands of the Hudson River Valley. This work includes approximately 170 crossings under roads, railroads, wetlands water bodies, and obstructions to be installed using horizontal directional drilling (HDD) methods to minimize interference with use or impacts to the environment. This Design Summary Report addresses the design for the HDD crossings in Segments 1 & 2 – Packages 1A & 1B from Putnam to Whitehall. These crossings are designated HDD 1 through HDD 2.

The purposes of this Design Summary Report are to provide the following:

- Review of the existing geological, hydrogeological, and geotechnical conditions for HDD 1 through HDD 2 for a total of 4 crossings (2 per site) in Segments 1 & 2 Packages 1A & 1B.
- Provide a descriptive narrative of the HDD Crossings in support of the attached design drawings and technical specifications.
- Present stress and inadvertent release analyses that support the proposed designs.
- Evaluate construction considerations including inadvertent return mitigation.

2.0 PROJECT DESCRIPTION

The proposed CHPE route follows the Hudson River Valley of New York. The new transmission line will be approximately 146 miles in length, extending from the south end of Lake Champlain to Astoria, NY. Segment 1 & 2 – Package 1A & 1B is located in approximately a 13-mile section of the route in Washington County, New York.

A Project Locus Map and a plan showing the locations of the HDD 1 through HDD 2 crossings are presented in Appendix B.

The HDD crossing addressed in this report are located as shown in Table 1 below:

Table 1: HDD Locations, Lengths, and Description

HDD #	Start Station	End Station	HDD Length, ft	Obstruction Crossed
1	10145+16	10154+30	896 / 881	Mill Brook Culverts
2	12920+90	12950+20	3032 / 2989	South Bay of Lake Champlain

3.0 BACKGROUND

The underground construction of two HVDC electrical transmission cables is proposed to be housed in individual 10-inch-diameter DR 9 HDPE conduits distance dependent on depth and soil Thermal Resistivity (TR) values provided by NKT and as shown on drawings plans. A third, 2inch-diameter DR 9 conduit will be bundled with one of the 10-inch diameter conduits for a telecommunications line. Longer and deeper bores such as South Bay may require a larger diameter (i.e. 12-inch and 3 inch) conduits with larger DR values (i.e. DR 7) to resist tension stresses during installation and collapsing long-term. This is checked and determined on a caseby-case basis and design sizes are shown on the design drawings shown in Appendix E. The conduits are to be installed in a 16 to 22-inch final ream diameter bore holes. The proposal is to install the cables at least 25 feet below congested areas, roads, railroads, under/around other obstructions, 15 to 25 feet below wetland and small streams, and 35 to 45 feet below open bodies (i.e., ponds, lakes, canals, and rivers) of water using HDD methods. HDD is a widely used trenchless construction method to install conduits with limited disturbance to the ground around the bore alignment, minimal ground surface impacts above the alignment, and to minimize the potential of inadvertent releases of drilling fluids while boring. The goal for using HDD methods is to install the conduits while controlling and minimizing the amount of impact to congested areas, existing underground obstructions, and to the adjacent wetlands to the extent possible.

4.0 SITE CONDITIONS

4.1.1 Project Datum and Topography

HDD #1

The ground surface elevations along the HDD path gently undulates between El. 266 and El. 292

(reference datum NAVD 1988). Mill Brook and wetlands are present between approximately Sta.

10147+60 and Sta. 10148+60 (at about El. 268) and between approximately Sta. 10152+80 and

Sta. 10153+25 (at about El. 276).

<u>HDD #2</u>

The ground surface elevations along the HDD path ranges between approximately El. 125 at the

west end of the bore alignment, to approximately El. 79 at the mudline in the middle of the canal,

to El. 120 at the east end of the bore alignment (reference datum NAVD 1988). Wetlands are

present between approximately Sta. 12947+00 and Sta. 12948+80 and are at about El. 105-113.

The South Bay Canal is located between approximately Sta. 12930+50 and Sta. 12941+00 with a

water level at approximately El. 94 (reference datum NAVD 1988).

4.1.2 Geotechnical Data

HDD #1

Subsurface investigations were conducted by AECOM in 2020 for Transmission Developers, Inc.

There are two borings at HDD #1: GTB-PD7 and GTB-PD7A that ranged in depth at

approximately 50 feet below grade. Both borings show a thin layer of poorly graded sand. Boring

GTB-PD7 shows a 14 foot layer of loose silt over soft to very soft organic soils and clay reaching

the bottom of the bore. Boring GTB-PD7A shows an initial 14 foot layer of medium dense silt, a

14 to 15 foot layer of loose silt, all over very soft to soft clay. The Geotechnical Data Report for

this location is provided in Appendix C.

Based on the borings, the soil profile for the HDD #1 BoreAid analyses was divided into two [2]

layers: medium dense silt and very soft to soft lean clay. The soil profiles used for BoreAid

analyses of the HDD #1 in this segment are presented in Appendix D.

HDD Design Summary Report Site Conditions

Segments 1 & 2 – Packages 1A & 1B

Case 10-T-0139

HDD #2

Subsurface investigations were conducted in 2012 by TRC for Transmission Developers, Inc. and in 2022 by Kiewit. There are ten borings to date all drilled to the north of the bridge. Geophysics is planned to check for rock fill at shorelines for the alternative, and preferred, south route. These northern borings B109.7-1, B109.8-1, B110.0-1, and B110.1-1 (conducted in 2012) indicate mostly fat and lean clays at the depth of the planned drill. Borings K-109.6, K-109.7, K109.9, K110.0, K110.1, and K110.3 (conducted in 2022) indicate fill and rock at depth in addition to the fat clays. The draft geotechnical report and draft boring logs can be found in Appendix C. In addition, boring logs from the existing 1961 bridge were reviewed and considered during the evaluation of the southern route that is now considered the preferred route.

Based on these borings and historic borings for the State Route 22 bridge construction, the idealized soil profile along the HDD #2 alignment was divided into four [4] layers for BoreAid analyses: loose silt, upper soft clay, medium stiff clay, and lower soft clay. The rock fill and sand layers encountered during recent borings from the existing causeway is not expected to be present along the south of Bridge alignment selected. The soil profiles used for BoreAid analyses of the HDD #2 can be found in Appendix D. No new borings south of the bridge are planned at this time due to barge access limitations.

Archeological ruins and remains of old bridges were noted north of the bridge at HDD #2. Remains of approximately 10 sunken ships or barges, some circa 1812, and a 1913 bridge are located just north of the jetties, see Appendix F. In addition, the records appear to indicate that barges were sunk as part of the foundation system for the 1913 bridge in addition to dumping gravel, cobbles and boulders and pushing them down into the soft sediments. The locations of these ruins and related obstructions are not expected to be present along the south of bridge alignment selected as shown in the recent geophysical survey report (see Appendix C).

5.0 DESIGN SUMMARY

The HDD construction process in soils generally consists of three steps:

Step 1: Drill a small diameter (approximately 7 to 9 inches diameter) pilot hole along the preplanned bore path. During the pilot hole boring, the location of the drill bit is tracked to confirm that it is following the planned path. If the drilling is observed to start to deviate from the planned path, corrections are made using a "bent" lead drilling section and controlled rotation of drill pipe string. The drill bit is designed to cut through the soil in combination with pressurized drilling fluid assisting the cutting of the soil, and transport of the cuttings to the entry pit for removal. The drilling fluid is generally a combination of bentonite (a clay mineral) and water, combined with NSF certified additives to support sides of the borehole and to better carry the cuttings to the entry pit at lower pressures and velocities. The drilling fluids typically used under waterbodies and wetland areas are typically required in the project specifications to be "non-toxic and environmentally friendly". Once the pilot bore reaches the exit point, the next step of the process, hole enlargement begins.

Step 2: Enlarge the pilot hole to the diameter required for insertion of the conduits. This is accomplished by using successively larger reaming bits pulled through the pilot bore to gradually enlarge the bore from about 8 inches diameter 16 to 22 inches diameter to accommodate in this case a HDPE conduit about 10 inches in diameter in one bore and a bundle of two, conduits, one 10 inches diameter and the other 2 inches diameter that are to be pulled into the enlarged bore hole. HDD#2 will be the 12-inch and 3-inch bundle variation. We estimate that one and possibly a second reaming pass will be used to create the 16 to 22 inch-inch-diameter borehole. This pulling in of a bundle of conduits is sometimes referred to as a slick bore. During this step, the borehole is still filled with drilling fluid to support the sides of the bore hole in preparation for Step 3, the insertion of the conduit.

Step 3: Pull the conduits into the enlarged hole. While the pilot hole and reaming operations are ongoing, the contractor will also be fabricating the conduits to be installed. The conduits come in about 40-foot-long sections and need to be fusion butt welded, debeaded internally, and arranged for the pullback into to the borehole. Ideally, the complete conduit (or bundle of conduits) will be welded (and bundled) into one long length for insertion. The goal is usually to

pull the bundle into the bore in one, continuous, smooth, around the clock, operation. However, depending on work area and access constraints, sometimes the pipe is assembled in 2 or 3 lengths that then joined (welded), "on the fly" as the conduit (bundle) is slowly pulled into the borehole. As the conduit (bundle) is pulled into the hole it may be ballasted with clean water, and some of the drilling fluid supporting the sides of the hole is displaced by the conduit and collected for eventual disposal. Upon completion of the conduit installation, the conduit will be allowed to relax and come to equilibrium in the hole, and the conduit will be cleaned and capped as described in the HDD technical specifications.

5.1 GEOMETRY AND LAYOUT

The HDD profiles are generally defined by the following parameters:

- Entry point location;
- Exit point location;
- Entry angle;
- Exit angle;
- Horizontal and vertical radius of Curvature;
- Lengths of tangent sections;
- Length of crossing;
- Depth of crossing and depth of cover;
- Site constraints and obstructions; and
- Available work and layout areas

The proposed bore paths entry angle, exit angle, and a vertical and horizontal design radii of curvature for each HDD crossing in this segment are shown in the design drawings provided in Appendix E.

The design drawings that summarize the proposed HDD installations are in Appendix E. The HDD technical specifications are found in Section 33057.13 of the Technical Specifications. Inadvertent release prevention and mitigation plans for each HDD crossing are provided as separate documents.

The site conditions posed various challenges in developing a design that is both constructible and minimizes the potential for negative environmental impacts. The proposed design has entry and exit pits and work areas constrained by available easements and traffic considerations. Available

work areas may limit the lengths of the conduit that can be pre-assembled, necessitating having to pre-assemble the bundle several segments that will have to be welded together during the pull back. Workzone requirements are shown Appendix A. HDD specific work areas at the entry and exit ends of the bores are noted on the drawings in Appendix E. In addition, space and easement constraints will require that during pullback, the above ground sections of the conduit will not be straight and will require rollers to accommodate a horizontal bend. Conduit assembly is expected to be performed at the ends of the alignment shown on the drawings in Appendix E for HDD specific work areas. In some cases, the limited work area at the one end of the HDD alignment, may require that the drilling and reaming prior to pullback be performed by the HDD rig located at the one end of the alignment, but the HDD rig may need to be relocated to the other end of the alignment for the pullback/conduit installation phase of the work. In addition, for some longer bores in soft/weak ground conditions, the intersection bore method may be used to better control the risk of inadvertent drilling fluid releases.

5.2 SUBSURFACE MODEL DEVELOPMENT

A subsurface model was developed for each HDD location based on the boring logs to approximately represent the subsurface conditions along the proposed HDD alignment. BoreAid Version 5.0.14 (2015) modeling software (a product of Vermeer) was used to model the HDD. Geotechnical input parameters of the soil were estimated as described below.

The internal friction angles (AASHTO LRFD, Ed. 7) were estimated using the Standard Penetration Test (SPT) blow counts. The shear modulus (G) of each layer was estimated using soil density or consistency based on SPT blow count (N-value) and representative soil layer descriptions were used to estimate Young's Modulus (E) using Hunt (1986). The shear modulus was estimated using the relationship G = E/[2(1+v)], taking Poisson's Ratio (v) equal to 0.3. Dry and saturated unit weights were selected based on soil type using Table 2-8 from the Manual on Estimating Soil Properties for Foundation Design (EPRI, 1990). For cohesive soils, cohesion was estimated based on empirical correlations with SPT blow counts (EPRI 1990). A table with the soil properties used for the HDDs in Segment 1 & 2 – Package 1A & 1B is presented in Appendix G.

5.2.1 BoreAid Analysis

For the BoreAid analyses, the pipe configuration analyzed was for a pipe with a dimension ratio

(DR) of 9 which may be assumed to be ballasted with water during pullback to create a near neutral

buoyancy. The following conduit configurations were used:

1) An individual 10-inch-diameter DR 9 HDPE conduit, and

2) A bundle consisting of a 10-inch-diameter DR 9 HDPE conduit and a 2-inch-diameter DR

9 HDPE conduit

3) A bundle consisting of a 12-inch diameter DR 7 HDPE conduit and a 3-inch diameter DR

7 HDPE conduit is used for HDD#2

The stresses and deflections of the pipe are evaluated and compared to allowable values as shown

on the BoreAid runs presented in Appendix D.

In addition, a run where 2-inch-diameter DR 9 or 3-inch diameter DR7 HDPE conduit is modeled

alone was performed to check installation stresses in that conduit.

5.2.2 Inadvertent Return and Hydro-fracture Analysis

BoreAid modeling software was used to perform inadvertent return analyses for each HDD

alignment. The bore path alignment was selected and checked so that the allowable bore pressures

are greater than the static and circulating pressures throughout most of the alignment except at the

ends. The allowable pressures are related to in-situ ground and water stresses around the bore

hole, and the strength of the ground. The Limiting Formation Pressure Figure from BoreAid,

indicates a generally acceptable factor of safety against the potential for inadvertent return along

the proposed bore paths except at the ends.

Based on the bore path selection process, areas with the greatest potential for an inadvertent return

were examined and adjusted during the design process to further limit the risks associated with an

inadvertent return when possible. The entry and exit points exhibited the greatest potential for

inadvertent returns. The depth of the entry/exit pits should be considered by the Contractor to

increase the effective soil stress and provide a storage volume for returns to and near the entry and

HDD Design Summary Report Design Summary exit points. Note that while the potential for inadvertent return has been reduced through the design process, inadvertent returns are still possible through existing fissures in the soil or rock, shrinkage cracks, weak soils, or porous deposits of coarse gravel.

Fractures within and/or inadvertent releases through the surrounding soils may cause loss of drilling fluid pressures or inadvertent return of drilling fluid into the wetlands. The areas of greatest concern are reduced soil cover over the bore alignment and where there is a risk of release to the wetlands. The contractor will be required to institute pre-emptive measures in this area to mitigate the effects of a release in the event that one should occur. Such measures may include containment booms and a standby vacuum truck to collect any released drilling fluids immediately. Ground heave or settlement from inadvertent release also pose risks to structures such as roadways. The HDD alignments were designed with geometries to providing enough soil cover to reduce the risk of inadvertent return. The Inadvertent Release Contingency Plan describes additional methods for mitigating inadvertent returns.

5.3 LIMITATIONS

The structural analysis and inadvertent return mitigation analysis were performed using the proposed design bore paths and typically anticipated equipment and means and methods. The HDD subcontractor must submit structural and inadvertent return mitigation calculations and analysis for each bore path, including their final bore path geometry reflecting its specific equipment and contractor's specific means, methods, drilling fluids, and proposed final contractor refined final planned alignment. It is important to note that the Kiewit Design Team's analysis has been done without consideration for point loading due to unpredictable subsurface features such as encountering rocks, boulders, or other extremely dense material that may damage the pipe. The risk of such pipeline damage is low yet has been reported on some projects in recent years.

6.0 **CONSTRUCTION CONSIDERATIONS**

6.1 RISK AWARENESS AND ASSESSMENT

The risks to be aware of during HDD include: inadvertent returns or fluid loss; any potential

obstructions blocking or causing large deviations from the planned bore path; and electromagnetic

effects on the HDD steering equipment from nearby high voltage power lines.

6.2 SITE ANALYSIS

A site analysis must be performed by the HDD Subcontractor prior to commencing HDD

operations to write the site-specific reports that are required. Considerations might need to be taken

for items such as for site access, construction of HDD entry and exit pits, and layout area for

equipment and supplies.

6.3 **EROSION CONTROL**

The proposed bore path crosses under roads, parking lots, water, stormwater and gas and electric

utility lines, as well as under streams/wetlands, bodies of water, and railroads. The soil erosion

control drawing will show where primary soil erosion control measures are required. The technical

specifications and Inadvertent Release Contingency Plan both detail the requirements for both

primary and secondary sediment and erosion control measures to be followed in case of an

inadvertent return, which ultimately could deposit the fine bentonite sediment into the stream or

wetland or bodies of water if not controlled. Construction of the entry and exit pits and related

work area may be close to the stream/wetlands. Silt fence, straw bales, and other soil erosion

control measures will be required to be installed as shown in the construction drawings. Secondary

control measures are to be readily accessible at or near the work areas in accordance with the

project specifications and Inadvertent Release Contingency Plan.

6.4 SURVEILLANCE AND MONITORING

During installation of the pipe by HDD, monitoring the stream, wetlands, waterbodies and bore

alignment for indications of potential inadvertent returns or inadvertent releases will be necessary.

The contractor will have primary responsibility for this monitoring and associated response and

reporting in real-time. This will be accomplished as detailed in the Inadvertent Release

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Contingency Plan. Continuous visual inspection of the entire path is the most significant method of detection. However, an experienced drill crew can often prevent a return by monitoring drilling fluid pressures. A loss of pressure may indicate that an inadvertent release has occurred. Regardless of the level of preparation, inspection, monitoring, etc., inadvertent returns are not always possible to predict or prevent. However, a significant effort can minimize the possibility but not eliminate it.

7.0 REFERENCES

American Association of State Highway and Transportation Officials. (2014). AASHTO LRFD bridge design specifications, Seventh edition, U.S. customary units. Washington, DC: American Association of State Highway and Transportation Officials.

Mayne, P.W., and Kulhawy, F.H. (1990). Manual on Estimating Soil Properties for Foundation Design. Electric Power Research Institute (EPRI).

Hunt, R.E. (1986). Geotechnical Engineering Analysis and Evaluation, McGraw-Hill Book Company, New York.

Workzones

HDD WORK ZONE CONFIGURATION CONSIDERATIONS

Introduction:

In general, HDD requires ample space for both entry and exit operations, work area, or Work zones. The HDD contractor or subcontractor ideally wants to consolidate all operations within these footprints. The exit Work zone also includes a narrower extension for the assembly of the full length pull back string of conduit or pipe. The size of these desired Work zones is driven by rig size in Table 1.

TYPICAL HDD	ENTRY AND EXI	T WORKSPACE
SYSTEM DESCRIPTION	ENTRY WORKSPACE	EXIT WORKSPACE
MAXI (24"-48")	150′ X 350′	150′ X 250′
MIDI (12"-(24")	150′ X 250′	100' X 200'
MINI (2"-(12")	varies per site	varies per site

TABLE 1

An example of an entry Work zones is shown in Figure 1a below.

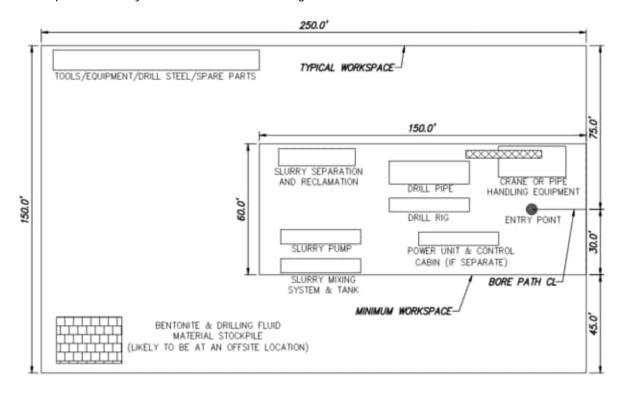


FIGURE 1a: Typical Entry Work Zone Configuration

An example of an exit Work zones is shown in Figure 1b below.

HDD WORK ZONE CONFIGURATION CONSIDERATIONS

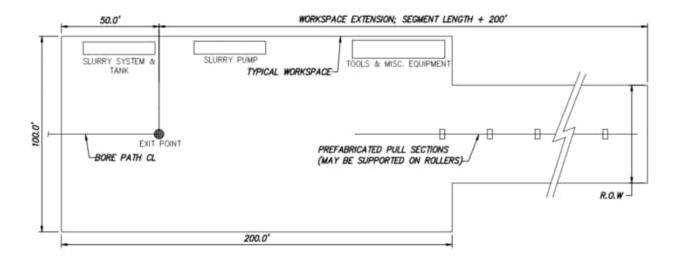


FIGURE 1b: Typical Exit Work Zone Configuration

Work zones should also be able to facilitate contingencies for space to recover a failed bore hole and a new offset bore, the ability swap entry for exit, or in some cases rigs on both ends.

CHPE Project Limitations:

Available Work zone areas for the Central Hudson Power Express Project (CHPE) are constrained because the project occupies a narrow existing corridor and is essential in a linear brown field. This is complicated by the rail corridor which precedes most forms of environmental regulations, and it traverses numerous wetlands or other sensitive areas which affects available Work zone areas.

We have assumed the majority of HDDs will be accommodated by a Mini or Midi HDD class machine and support equipment, <12-inch diameter and 1500 feet individual bores.

- 1. Ideally, an Entry workspace approximately 20 to 25 feet wide x 150 to 200 feet long for a small rig with a mounted pipe rack and self-contained power unit and operator control cabin on the rig; a separate mud mixing and pumping unit, plus a separate mud processing and separation unit support by equipment arranged linearly. Since each crossing is a pair two, 20 x 150 Work zones are equivalent to a 40 x 150 overall work area, and we have assumed the support equipment will be set once for both HDDs. It is also assumed existing roads or access roads will parallel one side of a Work zone.
- 2. Ideally, an exit workspace approximately 15 to 20 feet wide and between 60% and 110% of the bore length is needed to layout and assemble the conduit for pullback.

A somewhat smaller entry Work zones may be possible depending on drill rig specifics and the availability of nearby areas for support equipment support operations. The project will have remote

HDD WORK ZONE CONFIGURATION CONSIDERATIONS

yards. Small work areas tend to reduce access and efficiency of operations, raise costs, but are necessitated by the specific project and site constraints.

See Figure 1c below covers general considerations and typical workspace configurations drafted for the CHPE Project.

GROUND TYPE	RIG SIZE	BORE LENGTH	WORK AREA	NOMINAL FOOTPRINT
		(ft)	(ft²)	(ft x ft)
SOIL	Large/Maxi	>2,500	37,500*	150 x 250*
	Medium/Midi	1000-2500	15,000*	100 x 150*
	Small/Mini	<1000	3,000*	30 x 100*
ROCK	Large/Maxi	>2,500	37,500*	150 x 250*
	Small/Mini & Medium/Midi	1000-2500	15,000*	100 x 150*
PIPE ASSEMBLY	ALL	ALL	**	25 x (conduit length + 50)**

Notes:

FIGURE 1c

^{*} The entry and exit workspaces typically need space for a drill rig and support equipment such as a pipe rack, power unit operator control cabin, a mud mixing and pumping unit, plus a separate mud processing and separation unit support equipment arranged linearly in line may be possible. Somewhat smaller work areas may be possible depending on drill rig specifics and availability of nearby areas for support equipment and support operations. Often need to coordinate final work areas with selected contractor's specific operations. Smaller work areas tend to reduce access and efficiency of operations.

^{**} For HDD conduit bundle assembly and pullback, need a corridor equal to at least 1/3 to ½ of the length of the total bundle length and minimum 20 feet wide, typically at the exit end. Best if corridor equals the full length of the total bundle length plus about 50 ft

Appendix B

Locus Map



Appendix C

HDD Geotechnical Data Reports for CHPE Segment 1 & 2 – Package 1A & 1B HDDs



MEMORANDUM

DATE: April 14, 2022

TO: Antonio Marruso, P.E.; CHA Consulting, Inc.

FROM: Matthew Hawley, P.E.; Kiewit Engineering (NY) Corp. MKH

Jaren Knighton; Kiewit Engineering (NY) Corp.

SUBJECT: Geotechnical Data: Segment 1 - HDD Crossing 1

Champlain Hudson Power Express Project

Putnam Station, New York

Kiewit Engineering is providing the enclosed geotechnical data for use in the Lake Road horizontal direction drill (HDD) design for the Champlain Hudson Power Express project in Upstate New York. This HDD crossing is located west of Putnam Station, New York. The approximate station for HDD crossing Number 1 is STA 10148+00 (43.722099° N, 73.418212° W).

The geotechnical data at this HDD crossing is enclosed. The available data is from the previous investigation by AECOM, referenced below. No additional exploratory borings were performed at this HDD location.

 AECOM, Geotechnical Data Report, Upland Segments, Champlain Hudson Power Express, dated May 28, 2021.

Contact us if you have questions or require additional information.

HDD 1 Boring PD-7, PD-7A Segment 1





	BORING CO	NTRACTOR:												SHEET 1 OF 3		
	ADT										4			PROJECT NAME: CHPE -		
	DRILLER:								O	\mathcal{I}_{Λ}				PROJECT NO.: 60323056		
	Chris Chaillo	u												HOLE NO.: PD-7		
	SOILS ENGI	NEER:												START DATE: 12/30/20		
	Chris French							BORIN	G LOG					FINISH DATE: 12/30/20		
	LOCATION:	MP - 3.03 (Lake Ro	ad)											OFFSET: N/A		
GRO	UND WATER	ROBSERVATIONS				CAS	SING	SAMPLER		DRIL	L BIT	CORE E	BARREL	DRILL RIG: Geoprobe 7822DT		
	Water at 20'	(inferred)		TYPE		Flush Jo	oint Steel		California Modified		cone er Bit			BORING TYPE: SPT		
		,		SIZE I.C).		4"	2	2.5"					BORING O.D.: 4.5"		
				SIZE O.	D.	4	.5"		3"	3 7/8"				SURFACE ELEV.:		
	1	1		HAMME	R WT.	140) lbs	14	0 lbs					LONGITUDE:		
D	CORING			HAMME		3	0"	3	30"		T	 	1	LATITUDE:		
E P	RATE MIN/FT		TYPE	PEN. in	REC. in	BI OW	S PER 6	in ON SA	MDI ED	N Corr. ⁽²⁾	USCS CLASS.	STRAT.		FIELD IDENTIFICATION OF SOILS		
T H	IVIIIN/F I	(FEET)	NO.	"'	"'		QUALIT					DEPTH		FIELD IDENTIFICATION OF SOILS		
		0'-5'			Hand C			Cleared			SP			; Dark brown fine-coarse SAND, some cobbles, little		
1.0														dense, frozen-mud '; Gray SILT, little clay, trace medium-fine sand; stiff,		
2.0											ML		moist	, Gray Sill, little clay, trace medium-line sand, still,		
3.0													TD_1: /	3.0'-5.0')		
4.0		3'-5'	S-1										1113-1, (3.0-3.0)		
		NG SAMPLE DEPTHS TYPE FROM - TO AND (FEET)														
5.0							_	F 4		_			Gray S	ILT and clay; medium stiff, moist		
6.0		5'-7'	S-2	24"	12"	4	5	5	4	7	ML		Gray S	ic r and day, medium sun, moist		
0.0																
7.0		71.01	0.0	0.411	40"					_	01		Brown	CLAY and silt; medium stiff, moist		
8.0		7'-9'	S-3	24"	18"	8	7	7 8		5	CL		DIOWII	CLAT and sitt, medium still, moist		
9.0		01.441		0.411	40"							Gray b	rown SILT, some glay; stiff, moist			
10.0		9-11	5-4	24"	18"	6	8	9	11	11	ML		Olay D	own oil 1, some glay, still, most		
11.0													SAA			
12.0		11'-'13'	S-5	24"	15"	8 10			9 10		12 ML		SAA			
													TR-2; (12.0'-12.5')		
13.0		401.451	0.0	0.4"	0.41	_	44	44	0				Gray b	rown clayey SILT; stiff, moist		
14.0		13-15	5-6	24"	24"	5	11	11	8	14	ML		Cray D			
15.0		451.471	0.7	0.4"	0.411	_		_	4		01		Grav a	nd brown CLAY and silt, ~1" lenses of stiff silt; soft,		
16.0		15-17	5-7	24"	24"	3	2	3	4	3	CL		moist	16.0'-16.5')		
17.0													,,,			
18.0																
19.0																
20.0	NOTES:			<u> </u>	<u> </u>					<u> </u>	<u> </u>		The inf	ormation contained on this log is not warranted		
	(1) Thick-wall ri	ing lined drive sampler actor: Ncorr=N*(2.0 ² -1.;				T samples.	Rings dime	ensions = 2	2-1/2" O.D.	by 2-7/16" I	.D. by 6" le	ength.	to shov agrees if he fir	when actual subsurface condition. The contractor that he will make no claims against AECOM ands that the actual conditions do not conform a indicated by this log.		
<u> </u>		on represents a field														
	PLE TYPE: PORTIONS:		S= SPLI TRACE=	T SPOON =1-10%	I	U=SHEL LITTLE=	BY TUBE 10-20%		R=ROCI SOME=2			AND=3	5-50%			

	BORING CO	NTRACTOR:								SHEET 2 OF 3			
	ADT					9							PROJECT NAME: CHPE -
	DRILLER:												PROJECT NO.: 60323056
	Chris Chaillou	ı											HOLE NO.: PD-7
	SOILS ENGI	NEER:											START DATE: 12/30/20
	Chris French							BORIN	G LOG				FINISH DATE: 12/30/20
		MP - 3.03 (Lake Ro											OFFSET: N/A
D E	CORING RATE	DEPTHS FROM - TO	TYPE AND	PEN. in	REC. in	BI OW	S DED 6 i	n ON SAI	ADI ED	N Corr.	USCS CLASS.	STRAT. CHNG.	FIELD IDENTIFICATION OF SOILS
P T	MIN/FT	(FEET)	NO.	""	"'			DESIGN		Con.	CLASS.	DEPTH	TILLE IDENTIFICATION OF SOILS
Н		` '				,							
21.0		20'-22'	S-8	24"	24"		W	HC			CL		Gray CLAY and silt; stiff, wet
21.0													
22.0													
23.0													
20.0													
24.0													
25.0													
		25'-27'	S-9	24"	24"	WOH	WOH	WOH	2		CL		Gray CLAY and silt; soft, wet
26.0													TR-4; (26.0'-26.5')
27.0													,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
28.0													
29.0													
20.0													
30.0		30'-32'	S-10	24"	24"	WOH				CL		SAA	
31.0													
32.0													
02.0													
33.0													
34.0													
35.0		35'-37'	S-11	24" 24" WOH CL							CI		SAA
36.0		00 01	0 11	2-7	2-7			J11			02		
27.0													
37.0													
38.0													
39.0													
20.0													
40.0		401 401	0.40	0.4"	0.4"		10/4	211			01		Gray silty CLAY; soft, wet
41.0		40'-42'	S-12	24"	24"		W	OH			CL		only only out 1, son, wet
42.0													
43.0													
44.0													
44.0													
45.0													
												The information contained on this log is not warranted to show the actual subsurface condition. The contractor	
													agrees that he will make no claims against AECOM
	Coil des	on represents - E. I.I	idonie -	tion of -	DM P	mintor ·····	nnn n#	uloc ==+	4				if he finds that the actual conditions do not conform
	Soil description	on represents a field		tion after		U=SHEL			R=ROC	CORE			to those indicated by this log.
	PORTIONS:		TRACE=			LITTLE=			SOME=2			AND=35	i-50%

	BORING CONTRACTOR:												SHEET 3 OF 3
	ADT		ļ			ÿ	A -						PROJECT NAME: CHPE -
	DRILLER:						Δ.			M			PROJECT NO.: 60323056
	Chris Chaillou	u											HOLE NO.: PD-7
	SOILS ENGIN	NEER:											START DATE: 12/30/20
	Chris French			<u> </u>			!	BORING	3 LOG				FINISH DATE: 12/30/20
D		MP - 3.03 (Lake Ro		DEN	T 250							STRAT.	OFFSET: N/A
E P T H	CORING RATE MIN/FT	DEPTHS FROM - TO (FEET)	TYPE AND NO.	PEN. in	REC. in			in ON SAN Y DESIGN		N Corr.	USCS CLASS.		FIELD IDENTIFICATION OF SOILS
		45'-47'	S-13	24"	24"	WOR	WOH	WOH	2		CL		SAA
46.0													TR-5; (46.0'-46.5')
47.0								 					
48.0					ļ.,,						_		SAA
49.0		48'-50'	S-14	24"	24"	WOR	WOR	WOH	WOH		CL		SAA
50.0													
													Boring PD-7 terminated at 50', grouted to surface
51.0				<u> </u>									
52.0													
53.0		<u> </u>		[<u> </u>	$\overline{\longrightarrow}$					
54.0													
55.0		ļ											
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58.0													
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61.0													
62.0													
63.0													
64.0													
65.0													
66.0													
67.0													
68.0		<u> </u>			<u> </u>			-					
69.0													
70.0													
	NOTES:	ion represents a field	1 identifier	ation after	DM Rur	rmietor unl	loss other	wisa nata	4				The information contained on this log is not warranted to show the actual subsurface condition. The contractor agrees that he will make no claims against DMJM Harris AECOM if he finds that the actual conditions do not conform to those indicated by this log.

SAMPLE TYPE:

PROPORTIONS:

S= SPLIT SPOON

TRACE=1-10%

U=SHELBY TUBE

LITTLE=10-20%

R=ROCK CORE

SOME=20-35%

BORING CONTRACTOR: SHEET													SHEET 1 OF 3				
	ADT					52								PROJECT NAME: CHPE -			
	DRILLER:			1			AE			$M_{\rm A}$				PROJECT NO.: 60323056			
	Chris Chaillo													HOLE NO.: PD-7A			
				1													
	SOILS ENGI							DODIN	0100					START DATE: 12/29/20			
-	Chris French							BOKIN	G LOG					FINISH DATE: 12/29/20			
		MP - 2.99 (Lake Ro	ad)	I		I		l .		1				OFFSET: N/A			
GRO	OUND WATER	ROBSERVATIONS				CAS	SING		SAMPLER California		L BIT	CORE	BARREL	DRILL RIG: Geoprobe 7822DT			
	Water at 15'	(inferred)		TYPE		Flush J	oint Steel	Modified			er Bit			BORING TYPE: SPT			
				SIZE I.D).		4"	2	.5"					BORING O.D.: 4.5"			
				SIZE O.	D.	4	.5"	;	3"	3 7/8"				SURFACE ELEV.:			
	1			HAMME	R WT.	140	0 lbs	140) lbs					LONGITUDE:			
D	CORING	SAMPLE		HAMME	R FALL	3	80"	3	80"					LATITUDE:			
Е	RATE	DEPTHS	TYPE	PEN.	REC.					N	USCS	STRAT.					
P	MIN/FT	FROM - TO	AND	in	in		S PER 6			Corr.(2)				FIELD IDENTIFICATION OF SOILS			
T H		(FEET)	NO.			(ROCK	QUALITY	DESIGN	NATION)			DEPTH					
		0'-5'					Hand (Cleared			SP			; Brown fine-coarse SAND, little silt, little subangular			
1.0													gravel;	loose, moist			
										-							
2.0											l		2 0'-5 0	'; Brown clayey SILT, little fine-medium sand, medium			
3.0											ML		stiff, mo				
3.0		3'-5'	S-1														
4.0												TR-1; (3.0'-5.0')				
5.0													D	ille annual aller annual aller annual a			
0.0		5'-7'	S-2	24"	24"	12	14	16	19	20	ML		Brown	silt, some clay; very stiff, moist			
6.0																	
7.0																	
		7'-9'	S-3	24"	16"	15	15	12	10	8	ML		Brown	SILT, some clay; medium stiff, moist, pink mottling			
8.0																	
													TR-2; (8.0'-8.5')			
9.0		9'-11'	S-4	24"	18"	9	15	15	15	20	ML		Brown	clayey SILT; very stiff, moist			
10.0		3-11	0 7	24	10	J	10	10	10	20	IVIL						
11.0													_				
		11'-'13'	S-5	24"	24"	9	12	11	15	15	ML		Brown	clayey SILT, stiff, moist			
12.0																	
13.0																	
		13'-15'	S-6	24"	24"	9	8	10	9	12	ML		SAA				
14.0																	
45.5																	
15.0		15'-17'	S-7	24"	22"	3	4	5	5	6	ML		Brown	SILT and clay, trace fine-medium sand, trace			
16.0		13-17	0-1	24	22	J	7	3	3		IVIL			ular gravel; medium stiff, wet			
													TR-3; (16.0'-16.5')			
17.0																	
18.0						-											
19.0			1						1								
. 5.5	9.0																
20.0																	
												ormation contained on this log is not warranted					
													the actual subsurface condition. The contractor that he will make no claims against AECOM				
	,=, 50110000111	(2.0 -1.0	jiii./(3.	=.+ j	0.00.								_	that he will make no claims against AECOW nds that the actual conditions do not conform			
														e indicated by this log.			
	Soil description	on represents a field	identifica	ation after	D.M. Bur	mister un	less other	wise note	d.								
	PLE TYPE:			T SPOON	I		BY TUBE		R=ROC								
PRO	PORTIONS:		TRACE=	=1-10%		LITTLE=	:10-20%		SOME=2	20-35%		AND=3	5-50%				

	BORING CO	NTRACTOR:											SHEET 2 OF 3
	ADT						A =		10				PROJECT NAME: CHPE -
	DRILLER:						4						PROJECT NO.: 60323056
	Chris Chaillo	ı											HOLE NO.: PD-7A
	SOILS ENGI	NEER:											START DATE: 12/29/20
	Chris French							BORIN	G LOG				FINISH DATE: 12/29/20
D	CORING	MP - 2.99 (Lake Ro DEPTHS	ad) TYPE	PEN.	REC.					N	HSCS	STRAT.	OFFSET: N/A
E P	RATE	FROM - TO	AND	in	in	BLOW	S PER 6 i	n ON SAI	MPLER	Corr.	CLASS.		FIELD IDENTIFICATION OF SOILS
Т	MIN/FT	(FEET)	NO.			(ROCK	QUALITY	DESIGN	IATION)			DEPTH	
Н		20'-22'	S-8	24"	20"	WOH	1	1	2	1	ML		Gray SILT and clay; very soft, wet
21.0		20-22	3-0	24	20	WOH		'	2	'	IVIL		eray era raina eray, very eeri, mer
22.0													
23.0													
24.0													
24.0													
25.0		051.071	0.0	0.411	40"	14/011	141011	14/011	•				SAA
26.0		25'-27'	S-9	9 24" 18" WOH WOH 3							ML		SAA
												TR-4; (26.0'-26.5')	
27.0													
28.0													
29.0													
29.0													
30.0		001.001	0.40	0.411	0.411	14/011	141011		•		01		Gray CLAY and silt; soft, wet
31.0		30'-32'	S-10	24"	24"	WOH	WOH	2	2	1	CL		Gray CLAT and Silt, Sort, wet
32.0													
33.0													
34.0													
34.0													
35.0		051 071	0.44	24"	24"	WOLL	WOLL	WOLL	0		01		SAA, very soft
36.0		35'-37'	S-11	24	24	WOH	WOH	WOH	3		CL		o
													TR-5; (36.0'-36.5')
37.0													
38.0													
39.0													
55.5													
40.0		40'-42'	S-12	24"	24"	WOH	WOH	1	1	1	CL		SAA
41.0		40-42	5-12	24	24	WOR	WOR	ı	-	!	CL		G. U.
40.0													
42.0													
43.0													
44.0													
45.0	NOTES:												The information contained on this log is not warranted
	NOTES.												to show the actual subsurface condition. The contractor
													agrees that he will make no claims against AECOM
	Soil description	on renresents a field	identifica	tion after	DM Burr	nietar unl	ese other	visa noto	4				if he finds that the actual conditions do not conform

SAMPLE TYPE:

PROPORTIONS:

S= SPLIT SPOON

TRACE=1-10%

U=SHELBY TUBE

LITTLE=10-20%

R=ROCK CORE

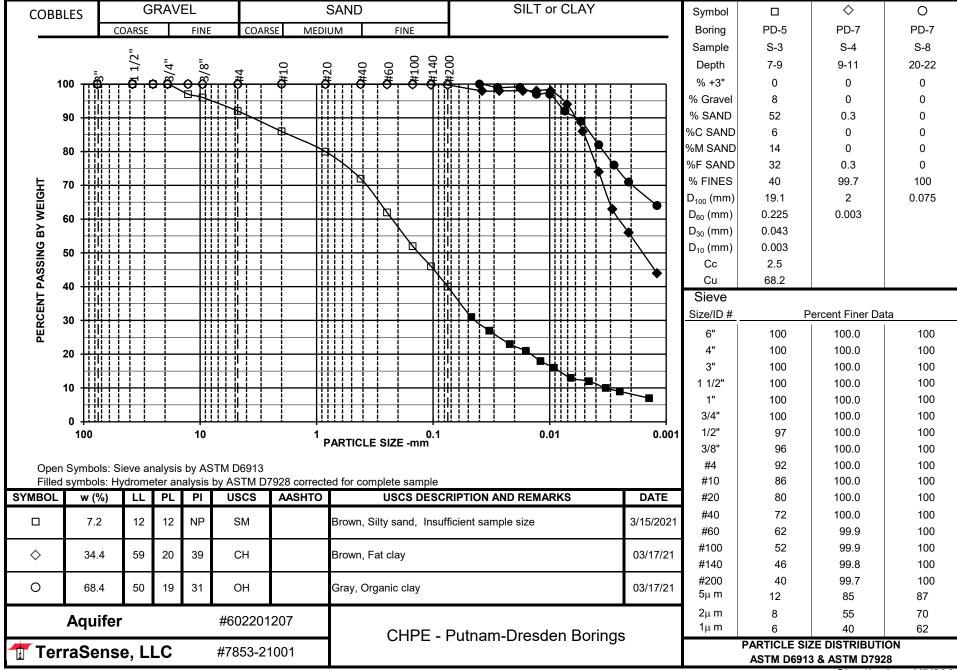
SOME=20-35%

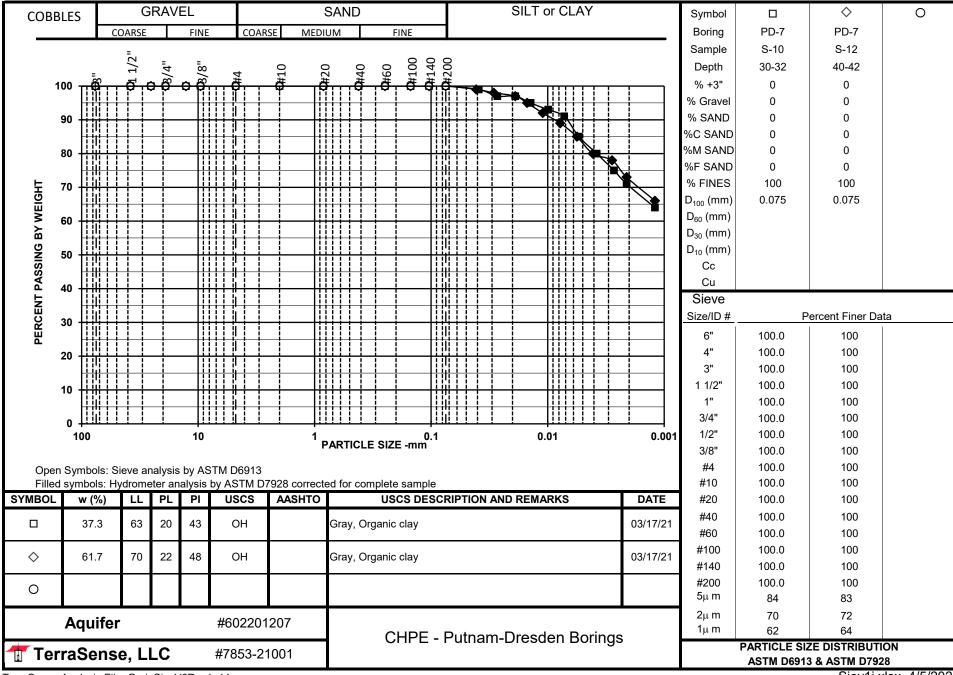
ADT												
SOILS ENGINEER: START DATE: 12/29/20												
SOILS ENGINEER: START DATE: 12/29/20												
Chris French LOCATION: MP - 2.99 (Lake Road) D CORING RATE FROM - TO AND IN MIN/FT (FEET) NO. REC. (ROCK QUALITY DESIGNATION) BLOWS PER 6 IN ON SAMPLER (ROCK QUALITY DESIGNATION) BORING LOG N USCS STRAT. CLASS. CHNG. DEPTH COT. CLASS. CHNG. DEPTH												
LOCATION: MP - 2.99 (Lake Road) D CORING RATE FROM - TO AND IN MIN/FT (FEET) NO. REC. BLOWS PER 6 IN ON SAMPLER (ROCK QUALITY DESIGNATION) NO. REC. BLOWS PER 6 IN ON SAMPLER (ROCK QUALITY DESIGNATION) NO. DEPTH OFFSET: N/A OFFSET: N/A FIELD IDENTIFICATION OF SOIL DEPTH												
D CORING RATE FROM - TO AND in in BLOWS PER 6 in ON SAMPLER (ROCK QUALITY DESIGNATION) N USCS STRAT. Corr. CLASS. CHNG. DEPTH NO. DEPTH												
RATE FROM - TO AND in in BLOWS PER 6 in ON SAMPLER COTT. CLASS. CHNG. DEPTH												
T H MIN/FT (FEET) NO. (ROCK QUALITY DESIGNATION) DEPTH	.S											
45'-47' S-13 24" 20" WOH WOH 1 CL Gray Silly CLAY; Very Soil, Wel												
46.0												
TR-6; (46.0'-46.5')												
47.0												
48.0												
48'-50' S-14 24" 24" WOR WOR WOH 3 CL SAA												
49.0												
50.0												
Boring terminated at 50', grouted to surface												
51.0												
52.0												
53.0												
54.0												
55.0												
56.0												
57.0												
58.0												
59.0												
60.0												
61.0												
62.0												
63.0												
64.0												
65.0												
66.0												
67.0												
68.0												
69.0												
70.0												
NOTES: The information contained on this log is not war	anted											
	ntractor											
to show the actual subsurface condition. The co	agrees that he will make no claims against DMJM Harris											
agrees that he will make no claims against DM.												

	Table 3-1: Summary of Geotechnical Laboratory Testing of Soil Samples Putnam to Dresden Segment (PD)														
			Putn	am to D	<u> Presden</u>	Segme	nt (PD)								
Boring ID	Sample ID	Depth (ft)	USCS Symbol	% Gravel	% Sand	% Silt	% Clay	LL ⁽¹⁾ (%)	PL ⁽²⁾ (%)	PI ⁽³⁾ (%)	Water Content	Org. Content (%)			
	S-4	9-11	ML	0	27.5	65.5	7	-	-	-	19.2	-			
PD-1	S-8	20-22	SM	0	63.9	32.1	4	-	-	-	18.8	-			
FD-1	S-10	30-32	ML	0	37.6	57.4	5	-	-	-	18.0	-			
	S-12	40-42	SM	0	83.8	13.2	3	-	-	-	18.6	-			
PD-2	S-2	5-7	ML	0	2.3	82.7	15	-	-	-	18.5	-			
	S-2	5-7	СН	3	9	14	74	81	30	51	42.2	-			
PD-4	S-2	7-9	CH	0	5.7	19.3	75	72	24	48	37.8	-			
	S-3	11-13	CH	2	11	40	47	60	21	39	33.1	-			
PD-5	S-3	7-9	SM	8	52	32	8	12	12	NP	7.2	-			
	S-4	9-11	CH	0	0.3	44.7	55	59	20	39	34.4	-			
PD-7	S-8	20-22	OH	0	0	30	70	50	19	31	68.4	-			
1 D-7	S-10	30-32	OH	0	0	30	70	63	20	43	37.3	-			
	S-12	40-42	ОН	0	0	28	72	70	22	48	61.7	-			
	S-1	5-7	СН	0	0.1	19.9	80	70	23	47	30.7	-			
PD-9	S-3	9-11	CH	0	0	21	79	66	23	43	44	-			
	S-5	13-15	СН	0	0	8	92	75	24	51	43.8	-			
PD-10	S-1	6-8	GW	49	47	3	1	-	-	-	8.5	-			
10 10	S-2	8-10	SM	13	49	33	5	-	-	-	8.7	-			
PD-13	S-1	5-7	SM	21	42	28	9	-	-	-	4.2	-			
1010	S-2	7-8	SM	22	42	27	9	-	-	-	4.6	-			
	S-1	5-7	ML	0.2	7	85.8	7	-	-	-	24.1	-			
PD-14	S-3	9-11	ML	0	23	72	5	-	-	-	24.2	-			
	S-5	13-15	ML	0	15.3	80.7	4	-	-	-	22.7	-			

Notes:

- (1) LL = Liquid Limit
- (2) PL = Plastic Limit
- (3) PI = Plasticity Index
- (4) SG = Specific Gravity









DATE: June 17, 2022

TO: Antonio Marruso, P.E.; CHA Consulting, Inc.

FROM: Matthew Hawley, P.E.; Kiewit Engineering (NY) Corp. MKH

Jaren Knighton; Kiewit Engineering (NY) Corp.

SUBJECT: Geotechnical Data: Segment 2 – Package 1B - HDD Crossing 2

Champlain Hudson Power Express Project

Whitehall, New York

Kiewit Engineering is providing the attached geotechnical data for use in the horizontal direction drill (HDD) design for the Champlain Hudson Power Express project in Upstate New York. This HDD crossing is located west of Whitehall, New York. The approximate station for the start of HDD crossing Number 2 is STA 12920+00 (43.5748° N, 73.4359° W).

The geotechnical data at this HDD crossing is attached. The available data is from the previous investigations by S.W. Cole and the State of New York and the recent investigations by Kiewit Engineering and Schnabel Engineering, referenced below.

- Kiewit Engineering Group Inc., Segment 2 Package 1B HDD South Bay, Champlain-Hudson Power Express, dated May 11, 2022.
- Schnabel Engineering, Geophysical Survey North and South of the Rt. 22 Bridge, Champlain Power Express: Rt 22-Whitehall, NY, dated June 10, 2022.
- State of New York Departments of Public Works and Transportation, South Bay Bridge, S.H. 9113, Whitehall-Dresden, Route 22, Washington County, dated 1971.
- S.W. Cole Engineering, Inc., Geotechnical and Geophysical Data Report, Champlain Hudson Power Express Project, Route 22 Terrestrial Route, dated January 4, 2013.

Contact us if you have questions or require additional information.

Kiewit Project Number: 20001480 Page 1 of 1

HDD 2

Boring List:

S.W. Cole: B109.7-1, B109.8-1, B110.1-1

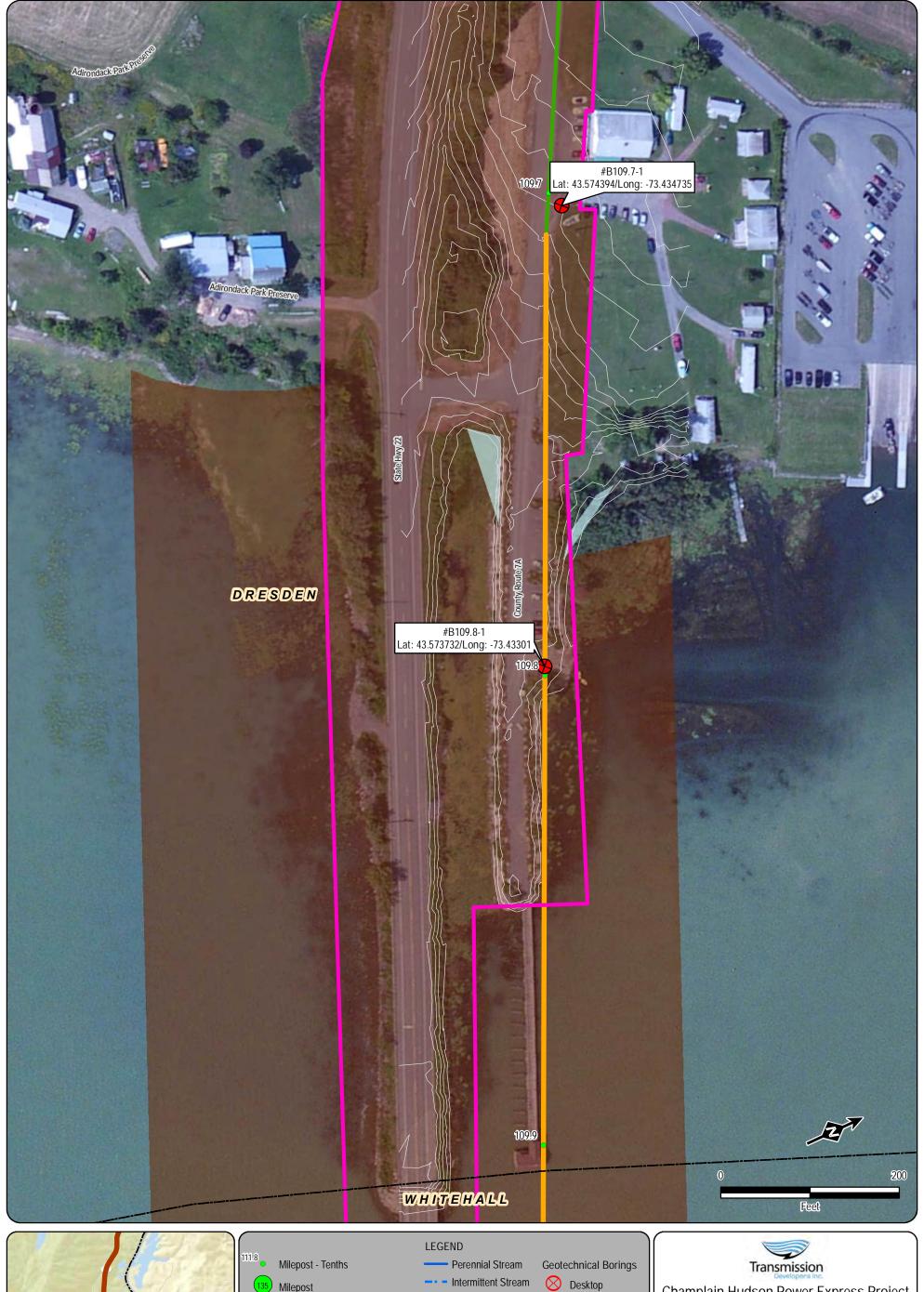
Kiewit: K-109.6, K-109.7, K-109.9, K-110.0,

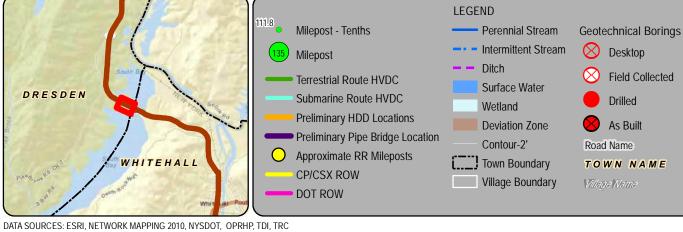
K-110.1, K-110.3

State of New York DOT: SB-1 to SB-11, P-1 to P-6

Schnabel Engineering Geophysics Report

Segment 2 - Package 1B





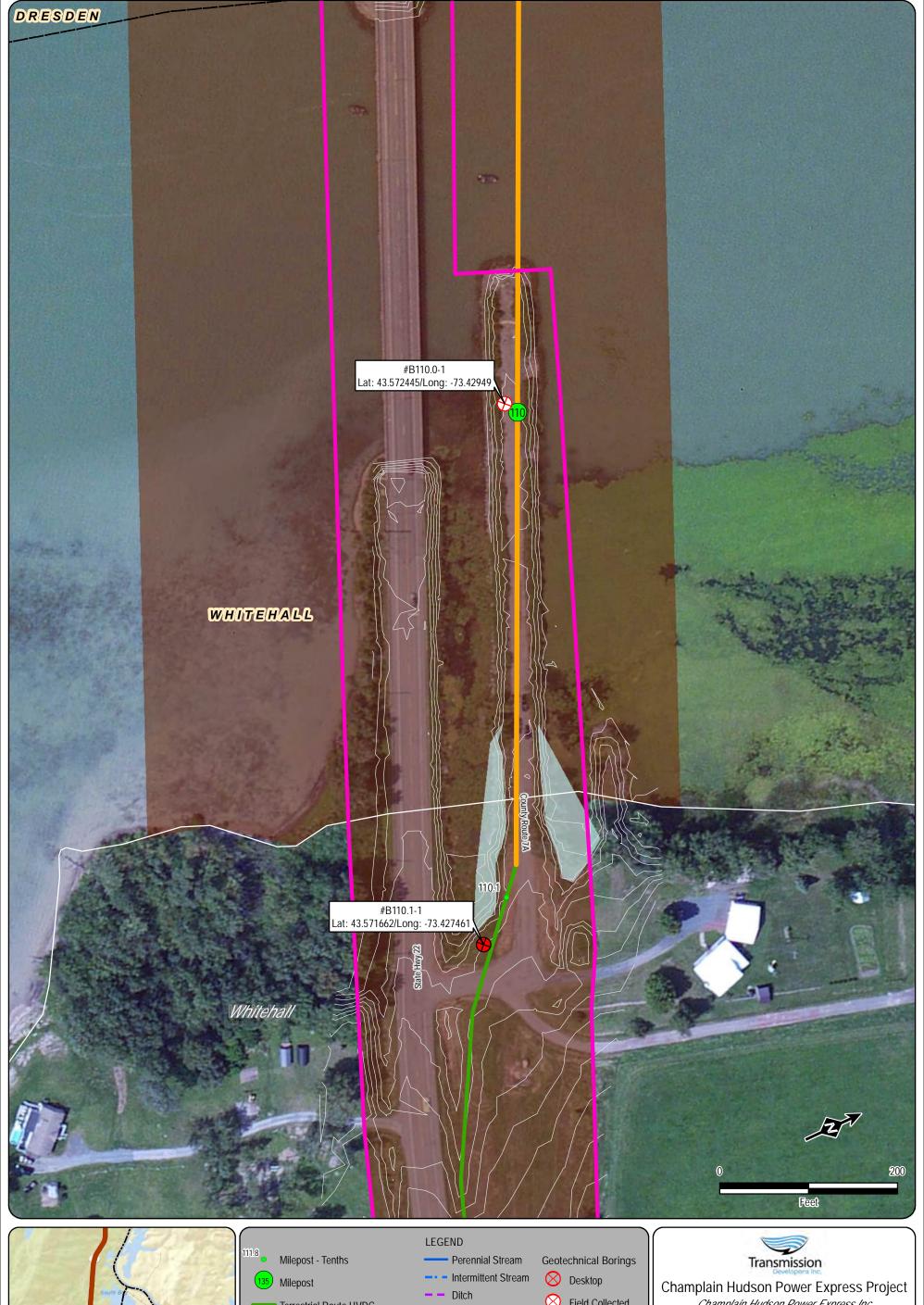
Champlain Hudson Power Express Project Champlain Hudson Power Express Inc.

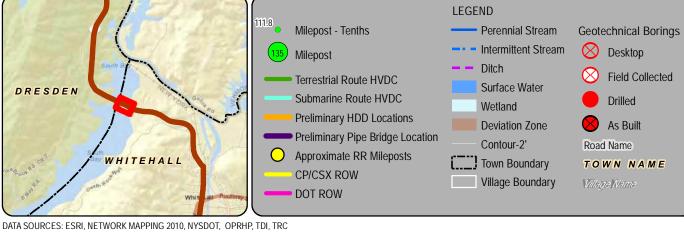
Geotechnical Boring Locations

Dresden/Whitehall - Route 22

Sheet 8 of 10

Prepared by: HR VTA & TRC 12/13/2012





Champlain Hudson Power Express Inc.

Geotechnical Boring Locations Whitehall/Dresden - Route 22 Sheet 9 of 10

Prepared by: HR VIA & TRC 12/13/2012



LOCATION:

DRILLING CO.:

BORING LOG

DRILLER:

SIZE I.D. HAMMER WT. HAMMER FALL

RICK CARUSO

B109.7-1 **BORING NO.:** SHEET: 1 OF 1

PROJECT NO.: 10-1256

DATE START: 11/3/2012 DATE FINISH: 11/3/2012

NOT AVAILABLE **ELEVATION:**

NBS

SWC REP.:

WATER LEVEL INFORMATION

CASING: HSA 4 1/4" SAMPLER: SS 2" 140 lbs 30 in CORE BARREL:

PROJECT / CLIENT: CHAMPLAIN HUDSON POWER EXPRESS PROJECT / TRC

TRC COMPANIES, INC.

TYPE

DRESDEN AND WHITEHALL, NEW YORK

SOILS APPEAR SATURATED BELOW 7.0' ±

DED.		0/111	/IPLE		SAMI	PLER BL	LOWS P	ER 6"	DEPTH	STRATA & TEST DATA
PER FOOT	NO.	PEN.	REC.	DEPTH @ BOT	0-6	6-12	12-18	18-24	DEI III	OTRAIA & IEOT DATA
										BROWN SILTY GRAVELLY SAND
	1D	24"	4"	2.0'	12	5	5	9	2.0'	~ MEDIUM DENSE ~
										BROWN CLAY SOME SAND TRACE SILT AND GRAVEL
	2D	24"	13"	4.0'	7	8	11	13	4.0'	w = 33.0%, W $_{L}$ = 66, W $_{P}$ = 27 ~ MEDIUM DENSE ~
	3D	24"	18"	6.0'	10	9	9	12		LIGHT BROWN CLAYEY SILT
										~ MEDIUM DENSE ~
	4D	24"	18"	8.0'	5	6	7	8	8.0'	
	5D	24"	24"	10.0'	10	8	9	13		GRAY - BROWN CLAYEY SILT
	טט	24	24	10.0	10	0	Э	13		~ MEDIUM DENSE ~
									12.0'	~ INLUION DENSE ~
	6D	24"	18"	15.0'	6	7	10	9		
	טט	24	18	15.0	О	/	10	9		
										GRAY - BROWN SILT AND CLAY
										~ LOOSE TO MEDIUM DENSE ~
	7D	24"	18"	20.0'	4	5	6	7		
	8D	24"	18"	25.0'	4	6	7	8	25.0'	
-										BOTTOM OF EXPLORATION @ 25.0'
										20110 m 01 2/4 2014 m 01 0 20.0
AMPLE	ES:			SOIL C	LASSIF	FIED BY	′ :		REMAR	KS:

C = 2" SHELBY TUBE S = 3" SHELBY TUBE

U = 3.5" SHELBY TUBE

DRILLER - VISUALLY SOIL TECH. - VISUALLY LABORATORY TEST

STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.:

B109.7-1



BORING LOG

BORING NO.:	B109.8-1
SHEET:	1 OF 1
PROJECT NO.:	10-1256
DATE START:	11/1/2012
DATE FINISH:	11/1/2012
	•

PROJECT / CLIENT:	CHAMPLAIN HUDSON POWER EXPRESS PR	OJECT / TRC	
LOCATION:	DRESDEN AND WHITEHALL, NEW YORK		
DRILLING CO.:	TRC COMPANIES, INC.	DRILLER:	RICK CARUSO

DRILLER: RICK CARUSO ELEVATION:

 TYPE
 SIZE I.D.
 HAMMER WT. HAMMER FALL

 CASING:
 HSA
 4 1/4"

 SAMPLER:
 SS
 2"
 140 lbs
 30 in

 CORE BARREL:

SWC REP.: NBS
WATER LEVEL INFORMATION
ANTICIPATED TO BE IN AGREEMENT WITH

WATER LEVEL OF LAKE

CASING BLOWS		SAM	1PLE		SAME	PLER BL	OWS P	ER 6"	DEPTH	STRATA & TEST DATA	
PER FOOT	NO.	PEN.	REC.	DEPTH @ BOT	0-6	6-12	12-18	18-24	DEI III	OTRAIA & TEST DATA	
	1D	5"	5"	0.4'	50-5"				0.4'	BROWN GRAVELLY SAND WITH SOME SILT	
										STONE RIPRAP (FILL) (OBSERVED DIFFICULT AUGER ADVANCEMENT - NO SAMPLING)	
									13.0'		
	2D	24"	12"	15.0'	6	2	2	2		GRAY - BROWN SILTY CLAY WITH TRACE FINE SAND ~ MEDIUM TO STIFF ~	
	3D	24"	18"	20.0'	3	3	2	11	19.5'		
										GRAY - BROWN CLAYEY SILT WITH FEW WOOD FRAGMENTS ~ MEDIUM DENSE ~	
	4D	24"	24"	25.0'	7	5	7	8	27.0'		
	5D	24"	24"	30.0'	10	8	8	9		GRAY SILT AND CLAY	
										~ MEDIUM DENSE ~	
	6D	24"	24"	35.0'	10	10	10	10	35.0'		
										BOTTOM OF EXPLORATION @ 35.0'	
SAMPLES: SOIL CLASSIFIED BY: D = SPLIT SPOON C = 2" SHELBY TUBE DRILLER - VISUALLY S = 3" SHELBY TUBE X SOIL TECH VISUALLY U = 3.5" SHELBY TUBE LABORATORY TEST			JALLY	REMAR	STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. BORING NO.: B109.8-1						



LOCATION:

DRILLING CO.:

BORING LOG

RICK CARUSO

DRILLER:

B110.1-1 **BORING NO.:** SHEET: 1 OF 1

PROJECT NO.: 10-1256

DATE START: 11/4/2012 DATE FINISH: 11/4/012

NOT AVAILABLE **ELEVATION:**

NBS

SWC REP.: WATER LEVEL INFORMATION

SOILS APPEAR SATURATED BELOW 5.5' ±

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HSA	4 1/4"		
SAMPLER:	SS	2"	140 lbs	30 in
CORE BARREL:				

PROJECT / CLIENT: CHAMPLAIN HUDSON POWER EXPRESS PROJECT / TRC

TRC COMPANIES, INC.

DRESDEN AND WHITEHALL, NEW YORK

CASING BLOWS		SAN	MPLE		SAMPLER BLOWS PER 6"				DEPTH	STRATA & TEST DATA
PER FOOT	NO.	PEN.	REC.	DEPTH @ BOT	0-6	6-12	12-18	18-24	DEPTH	SIRATA & TEST DATA
										BROWN GRAVELLY SILTY SAND
	1D	24"	2"	2.0'	21	28	18	6		~ MEDIUM DENSE TO DENSE ~
									3.0'	
	2D	24"	0"	4.0'	13	8	6	8		GRAY - BROWN SILT AND CLAY
	3D	24"	16"	6.0'	6	6	5	6	6.0'	~ MEDIUM DENSE ~
	00	27	10	0.0	-	0			0.0	GRAY - BROWN SILT AND CLAY WITH SOME FINE SAND
	4D	24"	2"	8.0'	9	8	8	7	8.0'	~ MEDIUM DENSE ~
	5D	24"	18"	10.0'	7	7	7	6		
									-	
	6D	24"	18"	15.0'	8	9	9	10		
										BROWN CLAY TRACE SILT
										~ MEDIUM DENSE ~
	7D	24"	18"	20.0'	9	9	10	9		$W = 36.0\%, W_1 = 53, W_P = 25$
			10	20.0						11 - 50.576, 11 [- 56, 11 p - 25
			40"	0= 01						
	8D	24"	18"	25.0'	9	10	11	11		
									27.0'	
										GRAY SILTY CLAY
	9D	24"	18"	30.0'	10	11	11	10		~ STIFF ~ (PROBABLE ROD FRICTION AGAINST INSIDE OF AUGER)
									32.0'	
									JZ.U	
									1	DARK GRAY CLAY TRACE SILT
	10D	24"	18"	35.0'	15	15	13	12]	$W = 45.0\%, W_L = 62, W_P = 26$
										~ MEDIUM DENSE ~
	11D	24"	18"	40.0'	11	10	8	9	40.0'	BOTTOM OF EXPLORATION @ 40.0'
SAMPLI	= <u></u>			SOIL C	LASSII	FIED BY	 Y:		REMAR	KS:
	IT SPC	ON								

C = 2" SHELBY TUBE S = 3" SHELBY TUBE U = 3.5" SHELBY TUBE

DRILLER - VISUALLY SOIL TECH. - VISUALLY LABORATORY TEST

STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: B110.1-1



TDI Champlain Hudson Power Express 10-1256 S

				Grain Size Analysis						b			L	aboratory Theri	mal Conductivi	ty		- Laboratory Resistivity	
Boring	Sample Depth (ft)	SWCE Sample	VCE Sample Natural		Gra	ain Size Analy	ysis		P	tterberg Limi	ts		e Point 1	Moisture	Point 2		e Point 3		-
Designation		Number	Moisture Content (%)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Silt and Clay (%)	LL (%)	PL (%)	PI	As-received Moisture Content (%)	Thermal Conductivity (W / (m*K)	Moisture Content (%)	Thermal Conductivity (W / (m*K)	Moisture Content (%)	Thermal Conductivity (W / (m*K)	As-received Resistivity (ohm-cm)	Saturated Resistivity (ohm-cm)
B101.6-1	2-4	10319S	11.6	20.0	51.2	_	_	28.8				11.4	2.451					5200	4800
B101.6-1	13-13.4 & 15-17	10540S	4.5	41.9	34.1		_	23.9				11.5	1.192	1.5	0.605	15.8	2.020		
						-	-							1.5					
B102.4-1	3-5 & 5-7	10541S	7.1	39.2	40.6	-	-	20.2				12.0	1.822	2.0	0.866	9.7	2.759		
B102.4-1	13-15	10320S	9.5	16.6	38.8	-	-	44.6											<u> </u>
B103.7-1	6-8	103215	29.8	2.2	22.3	46.1	29.4	75.5	28	18	10							1600	1300
B103.7-1	8-10 & 13-15	10542S	28.7	0.0	6.3	-	-	93.7				28.7	1.555	2.7	0.381	8.7	1.612		
B105.3-1	6-8	10322S	5.7	42.6	44.4	-	-	13.0											
B107.1-1												9.7	1.651						
A108.3-1	0-2 & 2-2.9	10543S	5.0	36.0	40.5	-	-	23.5				13.0	1.458	1.9	0.748	8.3	2.600		
B108.3-1	2-4	10323S	5.6	45.8	36.3	,	_	17.9										8800	6100
B109.7-1	2-4	10330S	33.0	0.2	6.0	4.0	89.7	93.7	66	27	39							470	410
									00	21	39	24.2	4.070	2.0	0.050	14.5	0.005	470	410
109.7-1	8-10 & 13-15	10544S	34.2	0.0	0.3	-	-	99.7				34.2	1.372	3.0	0.268	14.5	0.895		
B109.8-1	18-20 & 23-25	10545\$	34.6	0.0	0.5	-	-	99.5				34.6	1.088	2.6	0.422	13.1	0.488		
B110.0-1	18-20	10324S	36.0	0.0	0.0	3.2	96.8	100.0	53	25	28								
B110.0-1	23-25 & 33-35	10546S	42.7	0.0	0.7	-	-	99.3				42.7	1.170	1.1	0.403	10.5	0.760		
B110.1-1	28-30	10325S	45.0	0.0	0.0	2.4	97.6	100.0	62	26	36								
B111.9-1	3-5	10326S	20.4	3.0	38.2	-	-	58.8										1300	1100
B111.9-1	6-8 & 8-9.7	10547S	14.7	32.0	51.7	-	-	16.3				14.7	1.622	5.4	0.451	11.5	2.388		
B111.9-1	13-15 & 18-20	10548S	36.9	0.0	0.0	-	_	100.0				36.9	1.316	2.1	0.400	14.5	0.914		
B112.0-1	13-15	10327S	37.0	0.0	0.6	6.0	93.4	99.4	45	24	21								
B112.0-1	9-11 & 18-20	10549\$	32.6	0.0	0.6		-	99.4		:		32.6	1.635	2.3	0.338	8.4	0.600		
B112.1-1	2-4 & 4-6	10551\$	5.1	33.7	46.4	-	-	19.9			<u>.</u>	5.1	1.358	2.1	2.287	10.1	2.360		_
B112.1-1	6-10	10328S	24.0	1.0	32.0	30.6	36.3	66.9	32	21	11							780	760
B112.1-1	13-15 & 18-20	10550S	38.7	2.8	9.5	-	-	87.7				38.7	1.078	2.4	0.306	12.6	0.741		



Report of Hydrometer

ASTM D-422

Project Name CHAMPLAIN HUDSON POWER EXPRESS PROJECT

Client TRC COMPANIES, INC

Material Type BROWN CLAY SOME SAND TRACE SILT AND GRAVEL (CH)

Material Source BULK SAMPLE 2'-4'

Exploration B-109.7-1

Project Number 10-1256

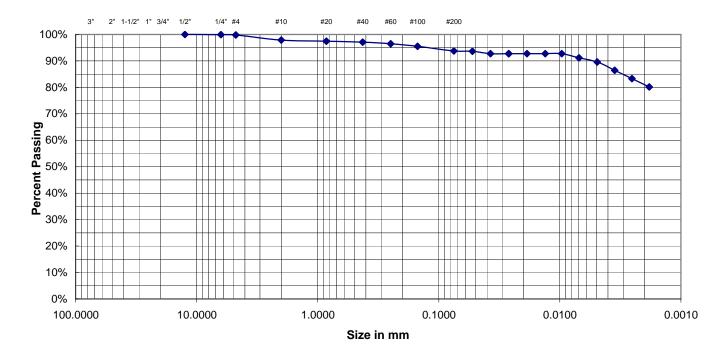
Lab ID 10330S

Date Received 11/16/2012

Date Completed 11/26/2012

Tested By MJS

;	Sieve Analys	sis	Hydrom	Hydrometer Analysis					
Sieve Size	Standard Designation (mm)	Amount Passing (%)	Particle Size (mm)	Amount Passing (%)					
3"	75	100	0.053	93.7					
2"	50	100	0.037	92.7					
1-1/2"	37.5	100	0.026	92.7					
1"	25	100	0.019	92.7					
3/4"	19	100	0.013	92.7					
1/2"	12.5	100	0.010	92.7					
1/4"	6.3	100	0.007	91.2					
No. 4	4.75	100	0.005	89.6					
No. 10	2	98	0.004	86.4					
No. 20	0.85	97	0.003	83.3					
No. 40	0.425	97	0.002	80.2					
No. 60	0.25	96							
No. 100	0.15	96							
No. 200	0.075	93.7							



Particle Distribution

Gravel, retained on #4	0.2%
Sand, passing #4 and retained on #200	6.0%
Fines, 0.074 to 0.005	4.0%
Clay Fraction, <0.005	89.7%

Comments: MOISTURE CONTENT = 33% Chad B. Michaud

Reviewed By



REPORT OF ATTERBERG LIMITS **ASTM D4318**

Project Name Client Soil Description Soil Source

CHAMPLAIN HUDSON POWER EXPRESS TRC COMPANIES, INC BR CLAY SOME SAND TRACE SILT AND GVL (CH) B-109.7-1, BULK SAMPLE 2'-4'

Project Number 10-1256 Laboratory ID 10330S **Date Received** 11/16/2012 **Date Completed** 11/28/2012 Tested By

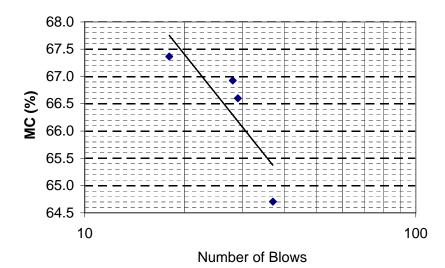
MJS

TEST RESULTS

Estimate of Material Retained On the No. 40 Sieve 3%

Liquid	Plastic	Plasticity
Limit	Limit	Index
66	27	39

LIQUID LIMIT CURVE



Chad B. Michaud



Report of Gradation

ASTM C-117 & C-136

Project Name EASTERN NY - CHAMPLAIN HUDSON POWER EXPRESS PROJECT -

GEOTECHNICAL EXPLORATIONS, SOIL THERMAL CONDUCTIVITY,

Client TRC COMPANIES, INC.

Exploration **B-109.7-1**

Material Source S-5(8.0'-10.0') & S-6(13.0'-15.0')

Project Number 10-1256

Lab ID 10544S

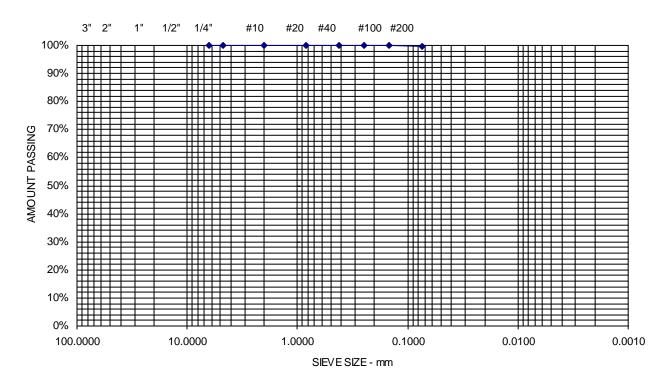
Date Received 12/21/2012

Date Completed 12/28/2012

Tested By SHAWN BENOIT

STANDARD DESIGNATION (mm/µm)	SIEVE SIZE	AMOUNT PASSING (%	<u>)</u>
6.3 mm	1/4"	100	
4.75 mm	No. 4	100	0% Gravel
2.00 mm	No. 10	100	
850 um	No. 20	100	
425 um	No. 40	100	0.3% Sand
250 um	No. 60	100	
150 um	No. 100	100	
75 um	No. 200	99.7	99.7% Fines

GRAY-BROWN SILTY CLAY TRACE SAND (CL)



Comments: MOISTURE CONTENT = 34.2%



Report of Gradation

ASTM C-117 & C-136

Project Name EASTERN NY - CHAMPLAIN HUDSON POWER EXPRESS PROJECT -

GEOTECHNICAL EXPLORATIONS, SOIL THERMAL CONDUCTIVITY,

Client TRC COMPANIES, INC.

Exploration **B-109.8-1**

Material Source S-7(18.0'-20.0') & S-8(23.0'-25.0')

Project Number 10-1256

Lab ID 10545S

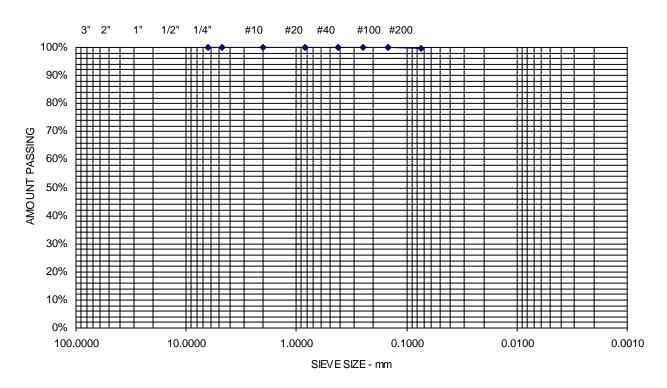
Date Received 12/21/2012

Date Completed 12/28/2012

Tested By SHAWN BENOIT

STANDARD DESIGNATION (mm/µm)	SIEVE SIZE	AMOUNT PASSING (%)
6.3 mm	1/4"	100	
4.75 mm	No. 4	100	0% Gravel
2.00 mm	No. 10	100	
850 um	No. 20	100	
425 um	No. 40	100	0.5% Sand
250 um	No. 60	100	
150 um	No. 100	100	
75 um	No. 200	99.5	99.5% Fines

GRAY CLAY TRACE SAND (CL)



Comments: MOISTURE CONTENT = 34.6%



Report of Hydrometer

CHAMPLAIN HUDSON POWER EXPRESS PROJECT Project Name

TRC COMPANIES, INC Client

BROWN CLAY TRACE SILT (CH) Material Type

Material Source S-7, 18' - 20'

B-110.1-1 Exploration

10-1256 Project Number

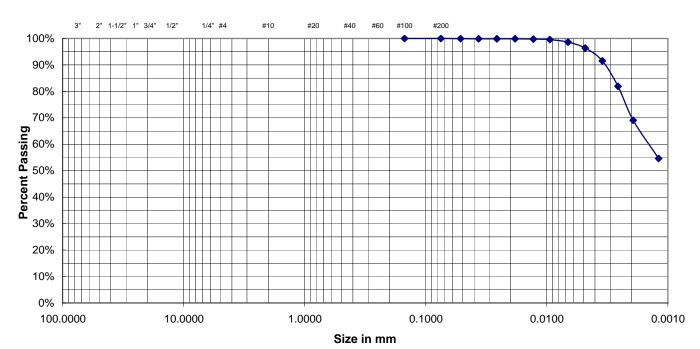
Lab ID 10324

11/16/2012 Date Received Date Completed 11/21/2012

Tested By MJS

Hydrometer Analysis

;	Sieve Analys	sis	Hyd	rometer Analysis
Sieve Size	Standard Designation (mm)	Amount Passing (%)	Particle (mm	
3"	75	100	0.052	99.9
2"	50	100	0.037	7 99.9
1-1/2"	37.5	100	0.026	99.9
1"	25	100	0.018	99.9
3/4"	19	100	0.013	3 99.7
1/2"	12.5	100	0.009	9 99.6
1/4"	6.3	100	0.007	7 98.6
No. 4	4.75	100	0.008	5 96.4
No. 10	2	100	0.003	3 91.5
No. 20	0.85	100	0.003	3 81.9
No. 40	0.425	100	0.002	2 69.1
No. 60	0.25	100		
No. 100	0.15	100		
No. 200	0.075	100.0		



Particle Distribution

Gravel, retained on #4	0.0%
Sand, passing #4 and retained on #200	0.0%
Fines, 0.074 to 0.005	3.2%
Clay Fraction, <0.005	96.8%

MOISTURE CONTENT = 36% Chad B. Michaud Comments:

Reviewed By



REPORT OF ATTERBERG LIMITS ASTM D4318

Project Name Client Soil Description Soil Source CHAMPLAIN HUDSON POWER EXPRESS TRC COMPANIES, INC BROWN CLAY TRACE SILT (CH)

B-110.1-1 ,S-7, 18'-20'

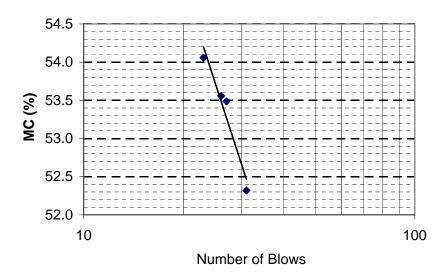
Project Number 10-1256 Laboratory ID 10324S Date Received 11/16/2012 Date Completed 11/26/2012 Tested By MJS

TEST RESULTS

Estimate of Material Retained	
On the No. 40 Sieve	
0%	

	Liquid	Plastic	Plasticity
	Limit	Limit	Index
_	53	25	28

LIQUID LIMIT CURVE



Chad B. Michaud



Report of Gradation

ASTM C-117 & C-136

Project Name EASTERN NY - CHAMPLAIN HUDSON POWER EXPRESS PROJECT -

GEOTECHNICAL EXPLORATIONS, SOIL THERMAL CONDUCTIVITY,

Client TRC COMPANIES, INC.

Exploration B-110.1-1

Material Source S-8(23.0'-25.0') & S-10(33.0'-35.0')

Project Number 10-1256

Lab ID 10546S

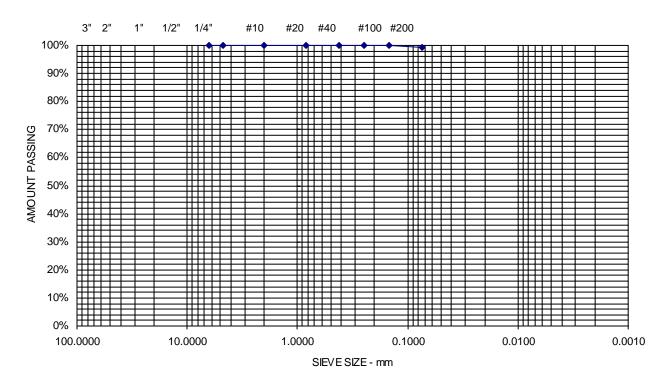
Date Received 12/21/2012

Date Completed 12/28/2012

Tested By SHAWN BENOIT

STANDARD DESIGNATION (mm/µm)	SIEVE SIZE	AMOUNT PASSING (%)	
6.3 mm	1/4"	100	
4.75 mm	No. 4	100 0% Gravel	
2.00 mm	No. 10	100	
850 um	No. 20	100	
425 um	No. 40	100 0.7% Sand	
250 um	No. 60	100	
150 um	No. 100	100	
75 um	No. 200	99.3 99.3% Fine	s

BROWN-DARK GRAY CLAY TRACE SAND (CL)



Comments: MOISTURE CONTENT = 42.7%



Report of Hydrometer

CHAMPLAIN HUDSON POWER EXPRESS PROJECT Project Name

TRC COMPANIES, INC Client

DARK GRAY CLAY TRACE SILT (CH) Material Type

Material Source S-9, 28' - 30'

Exploration

B-110.1-1

10-1256 Project Number

Lab ID 10325

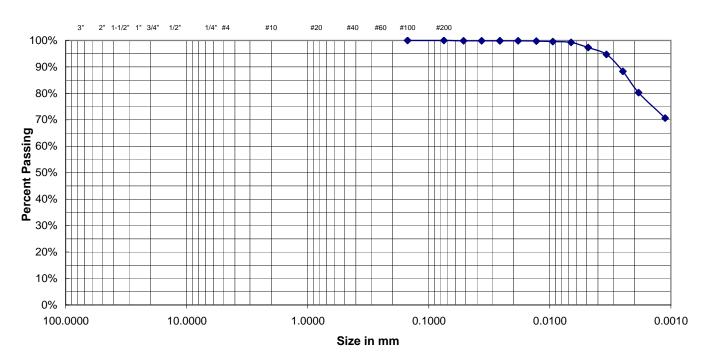
11/16/2012 Date Received

11/21/2012 **Date Completed**

Tested By MJS

Sieve Analysis	Hydrometer Analysis
Ctandard	

•	Sieve Allalys	ıs		Trydrometer Analysis				
Sieve Size	Standard Designation (mm)	Amount Passing (%)		icle Size mm)	Amount Passing (%)			
3"	75	100	0	0.052	99.9			
2"	50	100	0	0.037	99.9			
1-1/2"	37.5	100	0	0.026	99.9			
1"	25	100	0	0.018	99.9			
3/4"	19	100	0	0.013	99.7			
1/2"	12.5	100	0	0.009	99.6			
1/4"	6.3	100	0	0.007	99.3			
No. 4	4.75	100	0	0.005	97.3			
No. 10	2	100	0	0.003	94.8			
No. 20	0.85	100	0	0.002	88.3			
No. 40	0.425	100	0	0.002	80.3			
No. 60	0.25	100						
No. 100	0.15	100						
No. 200	0.075	100.0						



Particle Distribution

Gravel, retained on #4	0.0%
Sand, passing #4 and retained on #200	0.0%
Fines, 0.074 to 0.005	2.4%
Clay Fraction, <0.005	97.6%

Chad B. Michaud MOISTURE CONTENT = 45% Comments:

Reviewed By



REPORT OF ATTERBERG LIMITS ASTM D4318

Project Name Client Soil Description Soil Source CHAMPLAIN HUDSON POWER EXPRESS TRC COMPANIES, INC DARK GRAY CLAY TRACE SILT (CH)

B-110.1-1, S-9, 28'-30'

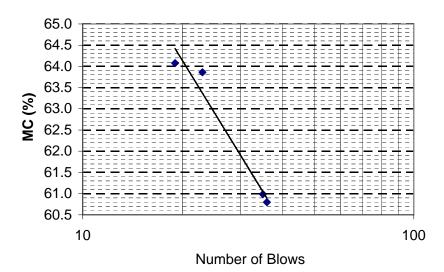
Project Number 10-1256 Laboratory ID 10325S Date Received 11/16/2012 Date Completed 11/26/2012 Tested By MJS

TEST RESULTS

Estimate of Material Retained
On the No. 40 Sieve
0%

Liquid	Plastic	Plasticity
Limit	Limit	Index
62	26	36

LIQUID LIMIT CURVE





Boring Number		Appa		sistivity Spacing	(ohm-m	eters)		Geomean (ohm-m)	Min (ohm-m)	Max (ohm-m)	Median (ohm-m)	m-m) Dev Depth S			•
	1	2	3.5	5	6.5	8	10	,	,	,	` ,		(ft)		Saturation
														TILL	
B101.6	503.5	350.4	216.8	184.2	163.8	156.7	181.9	228.8	156.7	503.5	184.2	129.5	>25		± 5
														TILL	
B103.7	108.3	86.4	62.4	53.4	47.7	43.1	34.3	58.0	34.3	108.3	53.4	26.3	>20		± 5
B107.11	759.8	1177.1	1767.2	2187.4	2439.3	2601.1	2468.6	1768.7	759.8	2601.1	2187.4	710.3	5.5	FILL	±2
B109.77	35.5	34.2	18.1	16.1	15.6	15.1	14.0	19.8	14.0	35.5	16.1	9.4	>25	FILL/ CLAYEY SILT	± 7
B111.9	27.1	30.8	41.8	45.8	47.1	46.2	41.6	39.3	27.1	47.1	41.8	8.0	± 23	FILL	± 18.5



S. W. COLE ENGINEERING, INC. RESISTIVITY COMPUTATION DATA SHEET Champlain Hudson Power Express - Transmission Line Wenner Configuration

Job Number	10-1256	Date	11/5/2012	
Spread No	b109-7	lat/long:	Mid point	
Orientation			C1 Max	See GPS Coordinates

2 1.00 3.00 200 8.9 34.2 0.02872 3.5 1.75 5.25 200 2.7 18.1 0.04915 5 2.50 7.50 200 1.7 16.1 0.04719 6.5 3.25 9.75 200 1.3 15.6 0.02818 8 4.00 12.00 200 1.0 15.1 0.00717							
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$							
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$				I			%
1 0.50 1.50 200 18.5 35.5 0.14072 2 1.00 3.00 200 8.9 34.2 0.02872 3.5 1.75 5.25 200 2.7 18.1 0.04915 5 2.50 7.50 200 1.7 16.1 0.04719 6.5 3.25 9.75 200 1.3 15.6 0.02818 8 4.00 12.00 200 1.0 15.1 0.00717	(distance-feet)	ft	ft	mA	(v/I)	(ohm-meters)	Error
2 1.00 3.00 200 8.9 34.2 0.02872 3.5 1.75 5.25 200 2.7 18.1 0.04915 5 2.50 7.50 200 1.7 16.1 0.04719 6.5 3.25 9.75 200 1.3 15.6 0.02818 8 4.00 12.00 200 1.0 15.1 0.00717					Ω		
3.5 1.75 5.25 200 2.7 18.1 0.04915 5 2.50 7.50 200 1.7 16.1 0.04719 6.5 3.25 9.75 200 1.3 15.6 0.02818 8 4.00 12.00 200 1.0 15.1 0.00717	1	0.50	1.50	200	18.5	35.5	0.140728
5 2.50 7.50 200 1.7 16.1 0.04719 6.5 3.25 9.75 200 1.3 15.6 0.02818 8 4.00 12.00 200 1.0 15.1 0.00717	2	1.00	3.00	200	8.9	34.2	0.028728
6.5 3.25 9.75 200 1.3 15.6 0.02818 8 4.00 12.00 200 1.0 15.1 0.00717	3.5	1.75	5.25	200	2.7	18.1	0.049159
8 4.00 12.00 200 1.0 15.1 0.00717	5	2.50	7.50	200	1.7	16.1	0.047192
	6.5	3.25	9.75	200	1.3	15.6	0.028181
10 5.00 15.00 200 0.7 14.0 0.00915	8	4.00	12.00	200	1.0	15.1	0.007173
	10	5.00	15.00	200	0.7	14.0	0.009154

 Geomean
 20

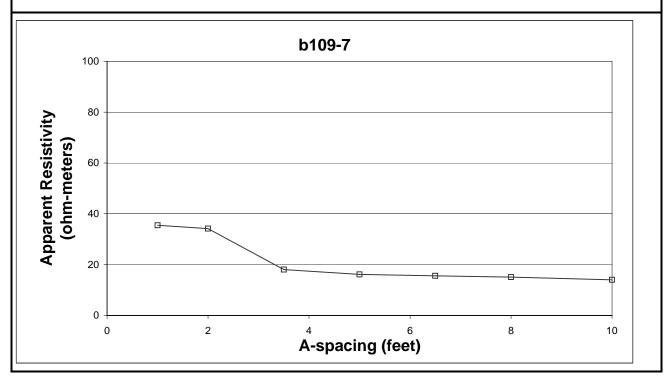
 Min
 14

 Max
 35

 Median
 16

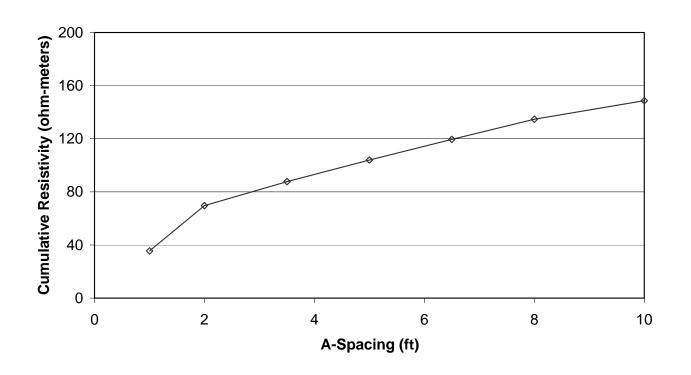
 Std. Dev.
 9

C2 Max



					Apparent		Cumulative
A - Spacing	A/2	A+A/2	- 1	(2piV/I)	Resistivity	%	Resistivity
(distance-feet)	ft	ft	mA	mV	(ohm-meters)	Error	
1	0.5	1.5	200	116.4597507	35.49693202	0.140728	35
2	1	3	200	56.08192134	34.18753925	0.028728	70
3.5	1.75	5.25	200	16.95225387	18.08466443	0.049159	88
5	2.5	7.5	200	10.59524114	16.14714749	0.047192	104
6.5	3.25	9.75	200	7.885805968	15.62335878	0.028181	120
8	4	12	200	6.196257438	15.10895414	0.007173	135
10	5	15	200	4.599888547	14.02046029	0.009154	149

b109-7
CUMULATIVE APPARENT RESISTIVITY





Segment 2 Package 1B HDD - South Bay Champlain Hudson Power Express

New York

PROJECT NUMBER

20001480

CREATED BY DATE

Kiewit 05/11/2022

Legend Key

- Borings by Others
- Kiewit Borings (2022)





Champlain Hudson Power Express **New York**

BORING NO: K-109.6

PROJECT NUMBER 20001480 START DATE

LOGGED BY Rafael Salas Jr

COORDINATES GROUND ELEV. N 1729316.31 E 773989.17

128.0 ft

02/14/2022

DRILLER/RIG

Ian / Diedrich D-90

FINISH DATE DRILL CONTRACTOR HAMMER TYPE/EFF. 02/15/2022 Manual Parratt Wolff Sample Type Core Run No. Blow Counts (N Value) **Graphic Log** Pocket Pen. (tsf) Legend € Recovery % Depth (ft) SPT N Value ▲ SPT N Value
● MC (%)
— PL & LL (%)

► Fines Content (%) Elevation **Material Description Notes** 60 FAT CLAY (CH), very stiff to firm, brown to Boring advanced grayish brown, semi-moist to moist, ice present with 3.5" ID HSA 75% 8-7-9 in first 2 ft (16)100% 3-4-7-9 (11) 2-2-3-7 5 84% (5) 100% 5-6-6-8 (12)75% 3-3-4-7 (7) 10 100% 3-4-4-6 (8) 15 100% 2-3-4-6 (7) 20 100% 3-4-6-7 (10)25 100% 4-4-8-8 (12)30 Page 1 of 2



Champlain Hudson Power Express **New York**

BORING NO: K-109.6

128.0 ft

N 1729316.31 PROJECT NUMBER **LOGGED BY COORDINATES** 20001480 Rafael Salas Jr E 773989.17 START DATE DRILLER/RIG **GROUND ELEV.** 02/14/2022 Ian / Diedrich D-90

Book State State		FINISH	H DATE_	02/15/2022	DRILL CONTRACTOR		Parr	att W	olff	HAMMER TYPE/E	FF. N	Manual	_
FAT CLAY (CH), very stiff to firm, brown to graysh brown, semi-moist to moist, ice present in first 2 ft 100% 3.4-5-8 (9) 100% 3.3-5-8 (8) Boring Terminated at 45 ft	Depth (ft)	Elevation (ft)	Graphic Log			Core Run No.	Recovery % RQD	Pocket Pen. (tsf)	Blow Counts (N Value)	Notes	▲ SPT I ● MC (9 — PL & ▼ Fines	N Value %) LL (%) Content (
Page 2 of 2	- 35		9	in first 2 ft	f to firm, brown to st to moist, ice present		100%	d.	3-4-5-8 (9) 1-2-3-5 (5)				



Champlain Hudson Power Express

New York

BORING NO: K-109.7

 PROJECT NUMBER
 20001480

 START DATE
 02/15/2022

LOGGED BY Rafael Salas Jr

DRILLER/RIG lan / Diedrich D-90

GROUND ELEV.

N 1729079.71 E 774330.69 117.3 ft

FINISH DATE

02/16/2022

DRILL CONTRACTOR D

Parratt Wolff

HAMMER TYPE/EFF.

Manual

	FINIS	H DAIE	02/16/2022 BRILL CONTRACTO	——	Pari	att W	olff	HAWWER ITPE		Manua	<u> </u>	-
Depth (ft)	Elevation (ft)	Graphic Log	Material Description	Sample Type Core Run No.	Recovery % RQD	Pocket Pen. (tsf)	Blow Counts (N Value)	Notes	▲ SP ● MC — PL ■ Fin	Legend T N Value C (%) . & LL (%) les Content		
			FAT CLAY (CH), very stiff to soft, brown, semi- moist to moist, ice present in first 2 ft	ν (ζ	84%	ш.	17-20-8-9 (28)	Boring advanced with 3.5" ID HSA	20	40 60	80	
	- - -	/////			0%		3-2-4-4 (6)		A			
- 5 -	- - -				96%		2-2-2-4 (4)		A •			×
	-	/////		M	100%		4-11-10-11 (21) 2-4-4-6		A			
- 10 -	-		- with orange-brown clay seams		10070		(8)					
] - - - -	/////		M	1000/		0.4.4.5					
- 15 -	- - - -				100%		2-4-4-5 (8)					
	- - - -			\square								
20 -	-				100%		2-3-5-7 (8)					
	-											
- 25 -	-		- color change to dark gray		100%		4-8-7-9 (15)		A			
	- - - -											
	-				100%		2-4-4-6 (8)		A			
- 30 -		! 		_IV_VI			. , ,			Page	e 1 of	3



Champlain Hudson Power Express **New York**

BORING NO: K-109.7

PROJECT NUMBER 20001480 START DATE 02/15/2022

LOGGED BY DRILLER/RIG

Rafael Salas Jr

COORDINATES GROUND ELEV. N 1729079.71 E 774330.69 117.3 ft

EINIGH DATE

Ian / Diedrich D-90

HAMMER TYPE/EFE

	FINISI	H DATE_	02/16/2022	DRILL CONTRACTOR		Parr	att Wo	olff	HAMMER TYPE/	EFF.	M	anual		_
Depth (ft)	Elevation (ft)	Graphic Log	Material D	Pescription 5	Core Run No.	Recovery % RQD	Pocket Pen. (tsf)	Blow Counts (N Value)	Notes	<u>•</u>	Leg SPT N MC (% PL & L Fines (yend Value) L (%) Content	(%)	_
	Ш	9	044	Ò	၈ ၂	œ	Δ.	Δ.	0 in the size of a constant	20	40	60	80	_
			SAA			100%		4-8-9-10 4-5-7-9 (12)	3-inch ring sampler	A				
35 -						100%		4-5-6-9 (11)						
- 40 -	77.3		Silty CLAY (CL), firm, g	ray, moist		100%		7-10-9-12	3-inch ring sampler		•			
- 45 - 						100%		4-4-4-6 (8)		A				
- 50 -						100%		2-3-3-4 (6)	3-inch ring sampler	A				
 				<u> </u>		100%		4-5-9-17		1	10			E
- 55 -						100%		3-2-3-4 (5)						
60		<u> </u>			$\ $			(7)						
												Page	2 of 3	3



02/15/2022

PROJECT NUMBER

START DATE

EXPLORATORY BORING LOG

Champlain Hudson Power Express

New York

Rafael Salas Jr

Ian / Diedrich D-90

LOGGED BY

DRILLER/RIG

BORING NO: K-109.7

COORDINATES N 1729079.71 E 774330.69

GROUND ELEV. 117.3 ft

			02/13/2022		_	ıuı		uncn					17.0			
	FINISI	H DATE	02/16/2022	DRILL CONTRACTO	R —		Parr	att Wo	olff	HAMMER TYPE	/EFF. _		Ма	nua	I	_
Depth (ft)	Elevation (ft)	Graphic Log	Material De	scription	Sample Type	Core Run No.	Recovery % RQD	Pocket Pen. (tsf)	Blow Counts (N Value)	Notes		SP' MC PL Fin	Γ N V (%) & LL es Co			
	ш		Silty CLAY (CL), firm, gra	v moiet	တ	၁	ш.	-			20	4	0	60	80	
- 65 -	52.3		Boring Terminated at 65 f				100%		2-4-5-8 (9)		A					
- 70 -																
- 75 -																
- 																
· .																
80 -																
[]																
- 85 -																
- 90 -														Page	e 3 o	f 3



PROJECT NUMBER

30

EXPLORATORY BORING LOG

Champlain Hudson Power Express **New York**

Rafael Salas Jr

LOGGED BY

BORING NO: K-109.9

N 1728748.47 **COORDINATES** E 775045.06

Page 1 of 4

GROUND ELEV.

START DATE DRILLER/RIG 02/21/2022 Joel / Sonic Drill Rig 102.1 ft **FINISH DATE DRILL CONTRACTOR** HAMMER TYPE/EFF. 02/22/2022 Manual Parratt Wolff Sample Type
Core Run No.
Recovery %
RQD Blow Counts (N Value) **Graphic Log** Pocket Pen. (tsf) Legend € Depth (ft) SPT N Value Elevation ● MC (%)
— PL & LL (%)

■ Fines Content (%) **Material Description** Notes ASPHALT PAVEMENT Boring performed using sonic drilling 101.1 SILT (ML), brown, semi-moist, with sand, techniques to medium coarse to coarse, with clay, FILL advance through shotrock fill. 5 97.1 ROCK FILL, dark bluish gray, 3 to 6 inches 10 15 20 25



02/21/2022

PROJECT NUMBER

START DATE

EXPLORATORY BORING LOG

Champlain Hudson Power Express **New York**

Rafael Salas Jr

Joel / Sonic Drill Rig

LOGGED BY

DRILLER/RIG

BORING NO: K-109.9

N 1728748.47 **COORDINATES** E 775045.06

GROUND ELEV. 102.1 ft

	EINUC:			DDII I CONTRACTO	_					HAMMED TYPE						
	FINISI	H DATE	02/22/2022	DRILL CONTRACTO	K _		Parr	att Wo	olff	HAMMER TYPE/	EFF. -		Ma	anua	al	
Depth (ft)	Elevation (ft)	Graphic Log	Material De	scription	Sample Type	ore Run No.	Recovery % RQD	Pocket Pen. (tsf)	Blow Counts (N Value)	Notes		▲ SF ● MO — PI ■ Fil	PT N ' C (%) L & LI nes C		nt (%)	
	ш		ROCK FILL, dark bluish ç	ray 3 to 6 inches	()	O	_	_			20	0	40	60	8	0
- 35 -			NOOKT IEE, GAIK BIGIST (jray, 5 to 6 mones												
- 40 -																
- 45 -																
- 50 -	52.1		LEAN CLAY (CL), firm to moist to moist	soft, dark gray, semi-						Consistency based on visual/manual review of samples obtained from sonic drilling.						
- 55 -							100%					•				
- 60 -			_		*		100%									
00 -														Pag	ge 2	of 4



PROJECT NUMBER

EXPLORATORY BORING LOG

Champlain Hudson Power Express **New York**

Rafael Salas Jr

LOGGED BY

BORING NO: K-109.9

N 1728748.47 **COORDINATES** E 775045.06

	FINISH	H DATE	02/21/2022			el / So							.1 ft			
(ft)		_	02/22/2022	DRILL CONTRACTOR	?	Par	ratt Wo		HAMMER TYPE/EI	FF.		М	anu	al		_
Depth (ft)	Elevation (ft)	Graphic Log	Material Des	scription	Sample Type			Blow Counts (N Value)	Notes	-	▲ S ● M — P	Leg PT N C (% L & L nes (jend Value) L (%) Conte	nt (%)	
	Ele	ō	LEAN CLAY (CL) firm to	aaft dark gray aami	Sa	8 8	8	<u> </u>		20	0	40	60		80	\Box
 			LEAN CLAY (CL), firm to moist to moist	soft, dark gray, semi-												
- 65 - - - - -	37.1		FAT CLAY (CH), firm to so moist to moist	oft, dark gray, semi-												
		[]]]]]			M	100%					-					B
70 -		/////			M	100%										
		'/////														
		/////														
		/////														
- 75 -		'/////														
[73]		/////														
		/////														
		/////			*	100%							•			
80		/////				100%										
		/////														
		'/////														
		/////														
0,5	47.4	/////														
- 85 -	17.1		LEAN CLAY (CL), firm to moist to moist	soft, dark gray, semi-												
		<i> </i>														
		////														
					8	100%				H		+	•			H
90		<u> </u>			**	100%										



Champlain Hudson Power Express

New York

BORING NO: K-109.9

N 1728748.47

PROJECT NUMBER **LOGGED BY** COORDINATES 20001480 Rafael Salas Jr E 775045.06 START DATE DRILLER/RIG **GROUND ELEV.** 02/21/2022 Joel / Sonic Drill Rig 102.1 ft FINISH DATE **DRILL CONTRACTOR** HAMMER TYPE/EFF. 02/22/2022 Manual Parratt Wolff

		-	DIVIDE SOLUTION	_		Pari	att Wo	ΟΙΠ	TAMMEN TIT E/EI	_	 IVIA	nua	.1	—
Depth (ft)	Elevation (ft)	Graphic Log	Material Description	sample Type	Core Run No.	Recovery % RQD	Pocket Pen. (tsf)	Blow Counts (N Value)	Notes		Lege TNV: (%) & LL les Co			
- 95 -	ш		LEAN CLAY (CL), firm to soft, dark gray, semi- moist to moist	8	3			ш		20	140	60	80	
-100-	2.1		Boring Terminated at 100 ft											
-105-														
-110-														
-115-														
120												£		
											 ı	Page	e 4 d	of 4



02/22/2022

PROJECT NUMBER

START DATE

EXPLORATORY BORING LOG

Champlain Hudson Power Express
New York

Rafael Salas Jr

Joel / Sonic Drill Rig

LOGGED BY

DRILLER/RIG

BORING NO: K-110.0

COORDINATES N 1728458.86 E 775712.37

GROUND ELEV. 101.8 ft

	EIL.::		· · · · · · · · · · · · · · · · · · · 	DDU 1 001125 1 523										-
	FINISH	H DATE	02/28/2022	DRILL CONTRACTO	R	Pari	att Wo	lff	HAMMER TYPE	EFF.	М	anual		-
Depth (ft)	Elevation (ft)	Graphic Log	Material De	escription	Sample Type Core Run No.	Recovery % RQD	Pocket Pen. (tsf)	Blow Counts (N Value)	Notes		SPT N MC (% PL & L Fines (yend Value) LL (%) Content (
	ш_		CILT (MI.) haravira a amai		တ ပ	-	_	ш	Davina nanfamaad	20	40	60	80	\dashv
			SILT (ML), brown, semi- medium coarse to coarse	e, with clay, FILL					Boring performed using sonic drilling techniques to advance through shotrock fill.					
- 5 - - 5 -	96.8		ROCK FILL, dark bluish	gray, 3 to 6 inches	-									
- 10 - 														
 														_
 - 15 -														
- 20 - 														
- 25 -														
- 30 -														
- 30 -					•							Page	1 of 4	-



02/22/2022

PROJECT NUMBER

START DATE

EXPLORATORY BORING LOG

Champlain Hudson Power Express **New York**

Rafael Salas Jr

Joel / Sonic Drill Rig

LOGGED BY

DRILLER/RIG

BORING NO: K-110.0

N 1728458.86

101.8 ft

Page 2 of 4

COORDINATES E 775712.37

GROUND ELEV.

HAMMER TYPE/EFF.

FINISH DATE DRILL CONTRACTOR 02/28/2022 Manual Parratt Wolff Sample Type
Core Run No.
Recovery % Blow Counts (N Value) Legend **Graphic Log** Pocket Pen. (tsf) € ▲ SPT N Value
● MC (%)
— PL & LL (%)

► Fines Content (%) Depth (ft) Elevation **Material Description** Notes 60 ROCK FILL, dark bluish gray, 3 to 6 inches 35 40 45 50 55 46.8 ROCK FILL with FAT CLAY (CH), dark gray, wet 100% 60



02/22/2022

PROJECT NUMBER

START DATE

EXPLORATORY BORING LOG

Champlain Hudson Power Express **New York**

Rafael Salas Jr

Joel / Sonic Drill Rig

LOGGED BY

DRILLER/RIG

BORING NO: K-110.0

N 1728458.86

GROUND ELEV.

COORDINATES E 775712.37

HAMMER TYPE/EFF. Manual

101.8 ft

Page 3 of 4

FINISH DATE DRILL CONTRACTOR 02/28/2022 Parratt Wolff Sample Type
Core Run No.
Recovery %
RQD Blow Counts (N Value) Legend **Graphic Log** Pocket Pen. (tsf) € ▲ SPT N Value
● MC (%)
— PL & LL (%)

► Fines Content (%) Depth (ft) Elevation **Material Description** Notes 60 ROCK FILL with FAT CLAY (CH), dark gray, wet 65 100% 70 75 100% 80 85 **M** 100% 100% 90



02/22/2022

PROJECT NUMBER

START DATE

EXPLORATORY BORING LOG

Champlain Hudson Power Express

New York

Rafael Salas Jr

Joel / Sonic Drill Rig

LOGGED BY

DRILLER/RIG

BORING NO: K-110.0

COORDINATES N 1728458.86 E 775712.37

GROUND ELEV. 101.8 ft

	FINISH	H DATE	02/28/2022	DRILL CONTRACTO			Parr	att Wo		HAMMER TYP	E/EFF	-	M	lanu	al	
Depth (ft)	Elevation (ft)	Graphic Log	Material De	escription	Sample Type	Core Run No.	Recovery % RQD	Pocket Pen. (tsf)	Blow Counts (N Value)	Notes			SPT N MC (% PL & I Fines		e nt (%)	_
-	ш		ROCK FILL with FAT CL	AY (CH), dark gray,	0,	0	_	_				20	40	60	3 (80
			wet													
. –																
- 95 –																
	3.8		LEAN CLAY (CL), firm to	soft, dark gray, semi-			100%									
		V////	moist to moist - with roots (organics) a	t 98 ft depth	M		100%									
-100-		/////														
		[/////														
		Y////														
		V////														
105		/////														
		[/////														
		Y/////														
		W///I			M		100%					-		•		
-110-	-8.2						100%									
	0.2		End of Boring at 110 ft													
-115-																
-120															ge 4	



Champlain Hudson Power Express

New York

BORING NO: K-110.1

 PROJECT NUMBER
 20001480

 START DATE
 02/17/2022

LOGGED BY
DRILLER/RIG

Rafael Salas Jr Ian / Diedrich D-90 GROUND ELEV.

N 1728114.61 E 776424.81 109.3 ft

FINISH DATE

02/17/2022

DRILL CONTRACTOR

Parratt Wolff

HAMMER TYPE/EFF.

Manual

Depui (ii)	Elevation (ft)	Graphic Log	Material Description	Core Run No.	Recovery % RQD	Pocket Pen. (tsf)	Blow Counts (N Value)	Notes	≜	Leo SPT N MC (% - PL & I Fines	gend I Value 5) LL (%) Content	± (%)	
- -	Ē	. 5	LEAN CLAY (CL), stiff, brown, semi-moist, with gravel, medium coarse to coarse,	8 <u>3</u>	7 5%	<u>~</u>	7-5-6-4	Boring advanced with 3.5" ID HSA	20	40	60	80	<u>D</u>
-	107.3		subangular, ice present in first 2 ft FAT CLAY (CH), very stiff to firm, brown with orange and gray seams, semi-moist to moist				(11)						
-		<i> </i>	Grange and gray scams, schil-moist to moist		75%		9-10-7-7 (17)		4				
-]]]]]			75%		3-3-2-2 (5)		A				
-					38%		1-2-2-3 (4)		A	•			
-		/////			100%		2-2-4-5 (6)		A				
) – -		/////	V.	_									_
-		/////	<u>r</u>										
- - 5 -		//////		$\langle $	100%		2-3-4-6 (7)		A				
, _ _		//////											
-		'/////	7	7									
_ _ _ (<i>'</i> /////			100%		4-4-4-4 (8)		A	•	+		
-]]]]]											
-				7									
-		/////			100%		2-3-4-4 (7)		A				
-		/////											
-		/////		1	100%		2-3-4-6						
_ _ 		/////	/	\parallel	100%		2-3-4-6 (7)					\Box	_



START DATE

EXPLORATORY BORING LOG

Champlain Hudson Power Express **New York**

BORING NO: K-110.1

PROJECT NUMBER **LOGGED BY** 20001480 02/17/2022

Rafael Salas Jr DRILLER/RIG Ian / Diedrich D-90

FINISH DATE DRILL CONTRACTOR 02/17/2022

COORDINATES

N 1728114.61 E 776424.81

GROUND ELEV. HAMMER TYPE/EFF.

109.3 ft Manual

	FINISH	I DATE	02/17/2022 DRILL CONTRACTO	R _		Parr	att W	olff	HAMMER TYPE	EFF. N	/lanual	
Depth (ft)	Elevation (ft)	Graphic Log	Material Description	Sample Type	Core Run No.	Recovery % RQD	Pocket Pen. (tsf)	Blow Counts (N Value)	Notes	▲ SPT N ■ MC (% — PL & ■ Fines	%) LL (%) Content (9	
 	76.3		FAT CLAY (CH), very stiff to firm, brown with orange and gray seams, semi-moist to moist		0	_	_	ш		20 40	60	80
- 35 -			LEAN CLAY (CL), firm to soft, brown with orange and gray seams, semi-moist to moist	X		100%		2-4-4-7 (8) 7-8-12-18	3-inch ring sampler	A		- E
 						100%		3-3-3-5		A		
- 40 - - 			- color change to dark gray					(6)				
45 –			- Modified California Spoon rebounded about			100%		2-2-2-4 (4)	3-inch ring sampler	A		
			every hit of the hammer - split spoon sunk down 1 ft with the weight of	M		100%		3-8-13-19		•		
50 -			the hammer			100%		1-1-2-3 (3)				
· _			- split spoon sunk down 1 ft with the weight of the hammer			100%		1-1-2-5		A		
55 -			- Modified California Spoon rebounded about 1" after every hit of the hammer	X		100%		(3) 5-8-17-25	3-inch ring sampler	1 10		E
60				\bigvee		100%		2-3-4-4 (7)		A	Page	



EXPLORATORY BORING LOG

Champlain Hudson Power Express
New York

BORING NO: K-110.1

N 1728114.61 PROJECT NUMBER **LOGGED BY COORDINATES** 20001480 E 776424.81 Rafael Salas Jr START DATE DRILLER/RIG **GROUND ELEV.** 02/17/2022 Ian / Diedrich D-90 109.3 ft **FINISH DATE DRILL CONTRACTOR** HAMMER TYPE/EFF. 02/17/2022 Manual Parratt Wolff

		-	02/11/2022	_		ı an	all VV	JIII		_		- Tricain			_
Depth (ft)	Elevation (ft)	Graphic Log	Material Description	Sample Type	Core Run No.	Recovery % RQD	Pocket Pen. (tsf)	Blow Counts (N Value)	Notes			eger N Val (%) & LL (° es Con			
	ш			Ø	ပ	_	_	ш		20	4	0	60	80	
 			- split spoon sunk down 1 ft with the weight of												
		V////I	the hammer	X		100%		1-1-3-6 (4)		A					
- 65 -	44.3		Boring Terminated at 65 ft	\square				(4)						\pm	
														1	
														+	
70 -															
														+	
 														#	
- - 75 -															
- 80 -															
														\pm	
- 85 -															
														\perp	
- - -														-	
														+	
- 90 -												Р	age	3 of	3



EXPLORATORY BORING LOG

Champlain Hudson Power Express **New York**

BORING NO: K-110.3

PROJECT NUMBER 20001480 START DATE

LOGGED BY

Rafael Salas Jr

COORDINATES

GROUND ELEV.

N 1727858.44 E 777043.41

124.8 ft

FINISH DATE

02/16/2022

DRILLER/RIG **DRILL CONTRACTOR**

Ian / Diedrich D-90

	FINISH	I DATE	02/16/2022	DRILL CONTRACTO	R_	Par	ratt W	olff	HAMMER TYPE	EFF.	Ma	anual	
Depth (ft)	Elevation (ft)	Graphic Log	Material De	scription	Sample Type	Recovery %	Pocket Pen. (tsf)	Blow Counts (N Value)	Notes		SPT N MC (%) PL & LI Fines C	Jend Value) L (%) Content (
			LEAN CLAY (CL), firm, domoist, ice present in first	ark brown, semi- 2 ft		84%		11-5-1-2 (6)	Boring advanced with 3.5" ID HSA	20	40	60	80
	122.8	/////	FAT CLAY (CH), firm to s moist to moist	oft, dark brown, semi-		100%	,	4-3-5-3 (8)		A +	•		+ E
- 5 - 5		/////				100%		6-4-2-4 (6)		A			
		/ ////				100%		4-4-4-6 (8)		A	•		
- 10 -		/////	- color change to dark gr	ay		100%		1-3-2-2 (5)		A			
		/////											
		/////			\bigvee	100%		1-2-3-3		A	•		E
- 15 - 		/////						(5)					
		/////			М								
20 -		<u> </u>				100%		1-2-2-3 (4)					
 		/////											
		/////				100%		1-1-1-3 (2)					
- 25 - 		' /////											
		/////			M	100%		1-1-1-3					
30 -		/////				100%		(2)				Page	1 of 2



20001480

PROJECT NUMBER

EXPLORATORY BORING LOG

Champlain Hudson Power Express **New York**

Rafael Salas Jr

LOGGED BY

BORING NO: K-110.3

N 1727858.44 **COORDINATES** E 777043.41

START DATE	02/16/2022	DRILLER/RIG		lar	ı / Die	drich l	D-90	GROUND ELEV.		124	1.8 ft		
FINISH DATE	02/16/2022	DRILL CONTRACTO	R_		Parr	att Wo	olff	HAMMER TYPE/E	:FF	N	/lanua	ıl	_
Depth (ft) Elevation (ft) Graphic Log	Material De	escription	Sample Type	Core Run No.	Recovery % RQD	Pocket Pen. (tsf)	Blow Counts (N Value)	Notes		Le SPT I MC (9 PL & Fines	gend N Value %) LL (%)		
- 45 - 79.8	- split spoon sunk down the hammer - split spoon sunk down the hammer Boring Terminated at 45	1 ft with the weight of			100%		1-1-2-2 (3) 1-1-2-3 (3)					- 180 - 180	



SOIL LEGEND

Explanation of Symbols and Terms Used on Boring and Test Pit Logs for Sampling and Description of Soils

SAM	IPLE AND DRILL METHODS		COMMON ABBREVIAT	IONS AND	ACRONYMS		
	Standard Penetration Split-Spoon	MR	Mud Rotary	Bulk	Bulk Sample		
	Sample	HSA	Hollow Stem Auger	EOB	End of Boring		
	Undisturbed Sample	SSA	Solid Stem Auger	AR	Auger Refusal		
	Piston Sampler	SS	Split Spoon Sampler	N-Value	Sum of blows for last two 6-in.		
8	Grab Sample	UD	Undisturbed Sample	iv-value	increments of SPT		
	Bulk Sample	WOR	Weight of Rods	USCS	Unified Soil Classification		
	Auger Cuttings	WOH	Weight of Hammer	0505	System		
	Rock Core	SPT	Standard Penetration Test				
	Modified California Sample	REC	Recovery				
V	ATER LEVEL SYMBOLS	RQD	Rock Quality Designation	CRO	OSS SECTION LEGEND		
∇	Observation at time of drilling	MC	Moisture Content				
T	Observation after drilling	PI	Plasticity Index	N	N(bpf) % Moisture Content		
▼	Delayed observation	PL	Plastic Limit		Moisture Content		
₩	Perched water observed at drilling	LL	Liquid Limit	Recove	<u></u>		
₹	Observed Seepage	CPT	Cone Penetration Test		ND % ND WE WE WE		
<u> • </u>	Cave-in Depth	PP	Pocket Penetrometer				

	RELATIVE DENSITY / CONSISTENCY						
Coarse-g	rained Soils	Fine-grained Soils					
N-Value	Density	N-Value	Consistency	Pocket Pen (TSF)			
0 - 4	Very Loose	0 - 1	Very Soft	0.0 - 0.25			
5 - 10	Loose	2 - 4	Soft	0.25 - 0.50			
11 - 30	Medium	5 - 8	Firm	0.51 - 1.00			
		9 - 15	Stiff	1.01 - 2.00			
31 - 50	Dense	16 - 30	Very Stiff	2.01-4.00			
> 50	Very Dense	> 30	Hard	> 4.00			

RELATIVE PROPORTIONS OF GRAVEL, SAND, AND FINES					
Trace	> 5 %				
Few	5 to 10 %				
Little	15 to 25 %				
Some	30 - 45 %				
Mostly	50 to 100 %				

SOIL GRAIN SIZE

U.S. Standard Sieve

6	;"	3" 3/	4"	4 1	0 40) 20	00	
Boulders	Cobbloo	Gra	ivel		Sand		Silt	Clay
boulders	Cobbles	Coarse	Fine	Coarse	Medium	Fine	Sill	Clay
15	52 70	6.2 19	.1 4.	.76 2.0	00 0.42	20 0.0	0.0	002 (mm)

CRITERIA	FOR DESCRIBING MOISTURE CONDITION	CRITERIA FOR DESCRIBING CEMENTATION		
Description	Criteria	Description	Criteria	
Dry	Absence of moisture, dusty, dry to the touch	Weak	Crumbles or breaks with handling or little finger pressure	
Moist	Damp but no visible free water	Moderate	Crumbles or breaks with considerable finger pressure	
Wet	Visible free water, typically soil is below water table	Strong	Will not crumble or break with finger pressure	

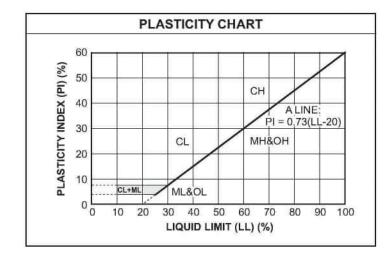
	CRITERIA FOR DESCRIBING STRUCTURE					
Description	Criteria					
Stratified	Alternating layers of varying material or color with layers at least 1/4 in. thick; note thickness					
Laminated	Alternating layers of varying material or color with the layers less than 1/4 in. thick; note thickness					
Fissured	Breaks along definite planes of fracture with little resistance to fracturing					
Slickensided	Fracture planes appear polished or glossy, sometimes striated					
Blocky	Cohesive soil that can be broken down into small angular lumps which resist further breakdown					
Lensed	Inclusion of small pockets of different soils, such as lenses of sand scattered through a mass of clay; note thickness					
Homogeneous	Same color and appearance throughout					



SOIL SYMBOLS

		USCS SOIL TYPES
Symbol	Group	Description
1:5	GW	Well-graded gravels, gravel sand mixtures with trace or no fines
\$*5%	GP	Poorly-graded gravels, gravel-sand mixtures with trace or no fines
	GW-GM	Well-graded gravels, gravel-sand mixtures with silt fines
1:14	GW-GC	Well-graded gravels, gravel-sand mixtures with clay fines
2.13	GP-GM	Poorly-graded gravels, gravel-sand mixtures with silt fines
2.64	GP-GC	Poorly-graded gravels, gravel-sand mixtures with clay fines
	GM	Silty gravels, gravel-silt-sand mixtures
HH	GC	Clayey gravels, gravel-sand-clay mixtures
110%	GC-GM	Clayey gravels, gravel-sand-clay-silt mixtures
ф 6 д ф 4	SW	Well-graded sands, sand-gravel mixtures with trace or no fines
	SP	Poorly-graded sands, sand-gravel mixtures with trace or no fines
4 d 4	SW-SM	Well-graded sands, sand-gravel mixtures with silt fines
	SW-SC	Well-graded sands, sand-gravel mixtures with clayfines
	SP-SM	Poorly-graded sands, sand-gravel mixtures with silt fines
	SP-SC	Poorly-graded sands, sand-gravel mixtures with clay fines
	SM	Silty sands, sand-gravel-silt mixtures
WW	SC	Clayey sands, sand-gravel-clay mixtures
	SC-SM	Clayey sands, sand-gravel-clay-silt mixtures
	ML	Inorganic silts with low plasticity
	CL	Inorganic clays of low plasticity, gravelly or sandy clays, silty clays, lean clays
	CL-ML	Inorganic clay-silts of low plasticity, gravelly clays, sandy clays, silty clays, lean clays
	OL	Organic silts and organic silty clays of low plasticity
	МН	Inorganic silts of high plasticity, elastic silts
	СН	Inorganic clays of high plasticity, fat clays
33333	ОН	Organic clays and organic silts of high plasticity
<u> </u>	PT	Peat, humus, swamp soils with high organic contents

	OTHER MATERIALS							
Symbol	Description							
	Asphalt							
	Concrete							
	Crushed Stone/Aggregate Base							
	Fill							





ROCK LEGEND

Explanation of Symbols and Terms Used on Boring and Test Pit
Logs for Sampling and Description of Rock

	TERMS AND ABBREVIATIONS
Fracture	Collective term for any seperation in a geologic formation
Joint (JT)	Natural break in a layer or body of rock that lacks visible offset
Bedding	Layers of sedimentary rocks that are distinctly different from overlying and underlying beds
Mechanical Break (MB)	Breaks due to drilling or handling in rock or sediment cores
RQD	Rock Quality Designation
REC	Percent Recovery
Shear (SH)	Surface of differential movement evident by presence of slickensides, striations, or polishing
Shear Zone (SZ)	Zone of gouge and rock fragments bounded by planar shear surfaces
Fault (FT)	Planar fracture with significant displacement

ROCK HARDNESS					
Very Soft	Very Soft Can be deformed by hand (has a rock-like character but can be broken easily by hand)				
Soft Can be scratched by fingernail (cannot be crumbled between fingers but can be easily p light blows of a geology hammer)					
Moderately Hard	Can be scratched easily with a knife; cannot be scratched with a fingernail (can be pitted with moderate blows of a geology hammer)				
Hard	Difficult to scratch with a knife (cannot be pitted with a geology hammer but can be chipped with moderate blows of the hammer)				
Very Hard	Cannot be scratched with a knife (chips can be broken off only with heavy blows of the geology hammer)				

BEDDING THICKNESS					
Laminated	< 0.04 in.	< 1 mm			
Parting	0.04 - 1/4 in.	1 - 6 mm			
Banded	1/4 - 1 in.	6 mm - 3 cm			
Thin	1 - 4 in.	3 - 9.1 cm			
Medium	4 in 1 ft.	9.1 - 30.5 cm			
Thick	1 - 3 ft.	30.5 cm - 1 m			
Massive	> 3 ft.	> 1 m			

VOIDS			
Porous	Smaller than a pinhead. Their presence is indicated by the degree of absorbency.		
Pitted	Pinhead size to a 1/4 in. If only thin walls separate the individual pits, the core may be described as honeycombed.		
Vug	1/4 in. to the diameter of the core. The upper limit will vary with core size.		
Cavity	Larger than the diameter of the core.		

TEXTURE				
Aphanitic	Individual grains or crystals are too small to be seen with the naked eye.			
Fine-grained, finely crystalline	Grain diameters between 0.1 and 1 mm; grains or crystals can be seen with naked eye.			
Medium-grained, crystalline	Grain diameters between 1 and 5 mm.			
Coarse-grained, coarsely crystalline	Grain diameters greater than 5 mm.			

JOINT AND FRACTURE DENSITY						
Very Tight < 2 in. < 5.1 cm						
Tight	2 in 1 ft.	5.1 - 30.5 cm				
Moderately tight	1 - 3 ft.	30.5 - 91.4 cm				
Wide 3 - 10 ft. 91.4 cm - 3 m						

	WEATHERING			
Unweathered	No evidence of any mechanical or chemical alteration.			
Slightly	Superficial discoloration, alteration, and/or discoloration along discontinuities; less than 10% of the rock volume is altered; strength is essentially unaffected.			
Moderately	Discoloration is evident; surface is pitted and altered, with alterations penetrating well below rock surfaces; 10 to 50% of the rock is altered; strength is noticeably less than unweathered rock.			
Highly	Entire section is discolored; alteration is greater than 50%; some areas of slightly weathered rock are present; some minerals are leached away; retains only a fraction of its original strength (wet strength is usually lower than dry strength).			
Decomposed	Saprolite; rock is essentially reduced to a soil with a relic rock texture; can be molded or crumbled by hand.			



ROCK SYMBOLS

ROCK TYPES				
		Shale		
	X X X X X X X X X X X X X X X X X X X	Siltstone		
		Sandstone		
	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Conglomerate		
Rocks	0.0	Breccia		
Sedimentary Rocks		Limestone		
Sedim		Dolomite		
		Gypsum		
		Coal		
	္ () ()	Coral		
		Chalk		
		Slate		
sks		Schist		
Metamorphic Rocks		Gneiss		
tamorp		Quartzite		
Me		Serpentinite		
	+ +	Greenstone		
	5555	Granite		
	* * * * * * *	Tuff		
Igneous Rocks	7	Rhyolite		
	<u></u>	Dacite		
	=	Andesite		
		Basalt		

OTHER MATERIALS			
		Asphalt	
Other		Concrete	
		Bedrock	

ROCK QUALITY DESIGNATION (RQD) AND RECOVERY					
% RQD	Quality				
< 25	Very Poor	Recovery (%) = $\frac{\text{Length of Core Sample Recovered}}{\text{Length of the Core Run}} \times 100$			
25 - 50	Poor	Length of the Core Run			
50 - 75	Fair	RQD (%) = Sum of Lengths of Intact Rock Pieces of 4 in. and Longer x 100			
75 - 90	Good	Length of the Core Run			
90 - 100	Excellent				



Project:

ATLANTIC TESTING LABORATORIES

WBE certified company

LABORATORY DETERMINATION OF MOISTURE CONTENT OF SOILS **ASTM D 2216**

Page 1 of 1

PROJECT INFORMATION

Client: Kiewit Intrastructure Co.

Champlain Hudson Power Express

United Cable Installation Various Locations, New York

ATL Report No.: CD10279E-06-03-22

Report Date: Date Received: March 9, 2022

February 23, 2022

TEST DATA

Boring	Sample	Depth	Moisture
No.	No.	(ft)	Content (%)
K-109.6	SS-4/5	2-4	42.3
	SS-16/17	23-25	42.0
	SS-20/21	33-35	42.0
K-109.7	SS-5/6	4-6	35.5
	SS-9/10	8-10	38.0
	SS-17/18	28-30	42.2
	MC-25/26	40-42	45.7
	MC-29/30	50-52	41.9
K-110.3	SS-3/4	2-4	45.4
	SS-7/8	6-8	45.9
	SS-11/12	13-15	44.6
	SS-19/20	33-35	47.3

Reviewed By:	K	1	Date:	03/09/22
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ATLANTIC TESTING LABORATORIES

WBE certified company

AMOUNT OF MATERIAL IN SOILS FINER THAN THE NO. 200 SIEVE ASTM D 1140

PROJECT INFORMATION

Client: Kiewit Intrastructure Co.

ATL Report No.:

CD10279E-06-03-22

Project: Champlain Hudson Power Express

Report Date:

March 9, 2022

United Cable Installation

Test Date:

February 23, 2022

Various Locations, New York Performed By:

A. River

TEST DATA

Boring	Sample	Depth	Method	Soak Time	Initial Dry	% Finer
No.	No.	(ft)	(A or B)	(min)	Weight (g)	than #200
K-109.6	SS-4/5	2-4	Α	10	94.86	99.3
K-109.6	SS-16/17	23-25	Α	10	89.49	99.8
K-109.7	SS-5/6	4-6	Α	10	80.61	97.3
K-109.7	SS-17/18	28-30	A	10	84.29	99.4
K-109.7	MC-29/30	50-52	Α	10	138.97	99.9
K-110.3	SS-3/4	2-4	Α	10	55.26	98.3
K-110.3	SS-11/12	13-15	Α	10	62.78	99.7

Reviewed By:	\mathcal{L}_{1}	7/) Date:	03/09/22
		J		***************************************



ATLANTIC TESTING LABORATORIES

WBE certified company

Page 1 of 2

LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOIL **ASTM D 4318**

PROJECT INFORMATION

Client:

Kiewit Instrastructure Co.

Project:

Champlain Hudson Power Express

United Cable Installation

Various Locations, New York

ATL Report No.: CD10279E-06-03-22

Report Date: Date Received: March 9, 2022

February 23, 2022

TEST DATA

Boring No.	Sample No.	LL	PL	PI
K-109.6	SS-4/5	76	25	51
K-109.6	SS-16/17	65	21	44
K-109.7	SS-5/6	69	24	4 S
K-109.7	SS-17/18	70	22	48
K109.7	MC-29/30	36	18	18
K-110.3	SS-3/4	85	27	58
K-110.3	SS-11/12	66	25	41

SAMPLE INFORMATION

		Maximum	Estimated Amount of Sample	As Received Moisture
		Grain Size	Retained on No. 40 Sieve	Content
Boring No.	Sample No.	(mm)	(%)	(%)
K-109.6	SS-4/5	0.074	0	42.3
K-109.6	SS-16/17	0.002	0	42.0
K-109.7	SS-5/6	0.42	1	3S.5
K-109.7	SS-17/18	0.074	0	42.2
K109.7	MC-29/30	0.002	0	41.9
K-110.3	SS-3/4	0.074	0	45.4
K-110.3	SS-11/12	0.002	0	44.6

PREPARATION INFORMATION

Boring No.	Sample No.	Preparation	Method of Removing Oversized Material
K-109.6	SS-4/5	Air Dry	Not Necessary
K-109.6	SS-16/17	Air Dry	Not Necessary
K-109.7	SS-5/6	Air Dry	Pulverizing and Screening
K-109.7	SS-17/18	Air Dry	Not Necessary
K109.7	MC-29/30	Air Dry	Not Necessary
K-110.3	SS-3/4	Air Dry	Not Necessary
K-110.3	SS-11/12	Air Dry	Not Necessary

Client: Kiewit Instrastructure Co. ATL Report No. CD10279E-06-03-22 Project: Champlain Hudson Power Express Date: March 9, 2022 Page 2 of 2

EQUIP	MENT	INFORM	NOITAN
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Liquid Limit Procedure: Multipoint	: - Method A	X	Single Point - Method B	
Liquid Limit Apparatus:	Manual	X	Motor Driven	
Liquid Limit Grooving Tool Material:	Plastic	X	Metal	
Liquid Limit Grooving Tool Shape:	Flat	X	Curved (AASHTO Only)	
Plastic Limit:	Hand Rolled	X	Mechanical Rolling Device	

Reviewed By: Date:

03/09/22



ATLANTIC TESTING LABORATORIES

CORROSION ANALYSIS SUITE

Client: Kiewit Intrastructure Co.

Project: Champlain Hudson Power Express

United Cable Installation

Location: Various Locations, New York

Sample: K-109.6, SS-8/9

ATL Report No.

CD10279E-06-03-22

Report Date:

Depth (ft):

March 9, 2022

Date Received:

February 23, 2022

6-8

MEASURING pH OF SOIL FOR USE IN CORROSION TESTING

ASTM G 51

Type of Test	Soil Temperature (°C)	p	H Reading	ξS	Average
Laboratory	20.0	7.77	7.78	7.75	7.77

pH of calibration standards used:

7.00

MEASUREMENT OF SOIL RESISITIVITY USING THE TWO-ELECTRODE SOIL BOX METHOD **ASTM G 187 (LABORATORY)**

Test Date: Meter Used:

03/02/22 Miller 400A Performed by:

E. Hannon

Soil Box Factor:

1.29

	Temperature at	Measured	Calculated
Date Collected	Collection (°C)	Resistance (Ω)	Resistivity (Ω/cm)
10/19/2021	Not Provided	430	555

WATER-SOLUBLE CHLORIDE ION CONTENT IN SOIL AASHTO T 291, Method A

Chloride by Mass of Soil (mg/kg)	
165	

WATER-SOLUBLE SULFATE IN SOIL ASTM C 1580

Sulfate by Mass of Sample (%)	Sulfate by Mass of Sample (mg/kg)
0.33	3300

Reviewed By:

Date:

03/09/22



Project:

ATLANTIC TESTING LABORATORIES

WBE certified company

LABORATORY DETERMINATION OF MOISTURE CONTENT OF SOILS ASTM D 2216

Page 1 of 1

PROJECT INFORMATION

Client: Kiewit Intrastructure Co.

Champlain Hudson Power Express

United Cable Installation Various Locations, New York

ATL Report No.: CD10279E-07-03-22

Report Date: Date Received: March 22, 2022

March 15, 2022

TEST DATA

Boring	Sample	Depth	Moisture
No.	No.	(ft)	Content (%)
K-109.9	S-1/2	58-60	32.8
	S-3/4	68-70	49.6
	S-5/6	78-80	55.1
	S-7/8	88-90	53.6
K-110.0	S-8/9	108-110	49.5
K-110.1	S-7/8	6-8	34.0
	S-13/14	18-20	40.9
	S-21/22	35-37	39.7
	S-27/28	45-47	40.4
	S-31/32	55-57	38.6

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Re۱	/1	AI	MA	'n	H١	٠.

Date: 03/22/22



ATLANTIC TESTING LABORATORIES

WBE certified company

AMOUNT OF MATERIAL IN SOILS FINER THAN THE NO. 200 SIEVE ASTM D 1140

PROJECT INFORMATION

Client: Kiewit Intrastructure Co.

ATL Report No.:

CD10279E-07-03-22

Project:

Champlain Hudson Power Express

Report Date:

March 22, 2022

United Cable Installation

Various Locations, New York

Test Date:

March 18, 2022

Performed By:

E. Hannon

TEST DATA

Boring	Sample	Depth	Method	Soak Time	Initial Dry	% Finer
No.	No.	(ft)	(A or B)	(min)	Weight (g)	than #200
K-109.9	S-3/4	68-70	Α	10	141.64	100.0
K-109.9	S-7/8	88-90	Α	10	123.26	99.8
K-110.0	S-8/9	108-110	Α	10	92.14	99.9
K-110.1	S-13/14	18-20	Α	10	95.33	99.9
K-110.1	S-21/22	35-37	Α	10	121.17	100.0
K-110.1	S-31/32	55-57	Α	10	192.31	99.8

Reviewed By:

Date:

03/22/22



ATLANTIC TESTING LABORATORIES

WBE certified company

Page 1 of 2

LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOIL **ASTM D 4318**

PROJECT INFORMATION

Client:

Kiewit Instrastructure Co.

Project:

Champlain Hudson Power Express

United Cable Installation

Various Locations, New York

ATL Report No.: CD10279E-07-03-22

Report Date: Date Received: March 22, 2022

March 15, 2022

TEST DATA

Boring No.	Sample No.	LL	PL	Pl
K-109.9	S-1/2	48	23	25
K-109.9	S-3/4	52	22	30
K-109.9	S-5/6	54	23	31
K-109.9	S-7/8	39	19	20
K-110.0	S-8/9	47	18	29
K-110.1	S-13/14	65	23	42
K-110.1	S-21/22	39	19	20
K-110.1	S-31/32	33	17	16

SAMPLE INFORMATION

		Maximum	Estimated Amount of Sample	As Received Moisture
		Grain Size	Retained on No. 40 Sieve	Content
Boring No.	Sample No.	(mm)	(%)	(%)
K-109.9	S-1/2	0.074	0	32.8
K-109.9	S-3/4	0.05	0	49.6
K-109.9	S-5/6	0.074	0	55.1
K-109.9	S-7/8	0.05	0	53.6
K-110.0	S-8/9	0.05	0	49.5
K-110.1	S-13/14	0.05	0	40.9
K-110.1	S-21/22	0.05	0	39.7
K-110.1	S-31/32	0.05	0	38.6

PREPARATION INFORMATION

Boring No.	Sample No.	Preparation	Method of Removing Oversized Material
K-109.9	S-1/2	Air Dry	Not Necessary
K-109.9	S-3/4	Air Dry	Not Necessary
K-109.9	S-5/6	Air Dry	Not Necessary
K-109.9	S-7/8	Air Dry	Not Necessary
K-110.0	S-8/9	Air Dry	Not Necessary
K-110.1	S-13/14	Air Dry	Not Necessary
K-110.1	S-21/22	Air Dry	Not Necessary
K-110.1	S-31/32	Air Dry	Not Necessary

 Client:
 Kiewit Instrastructure Co.
 ATL Report No.
 CD10279E-07-03-22

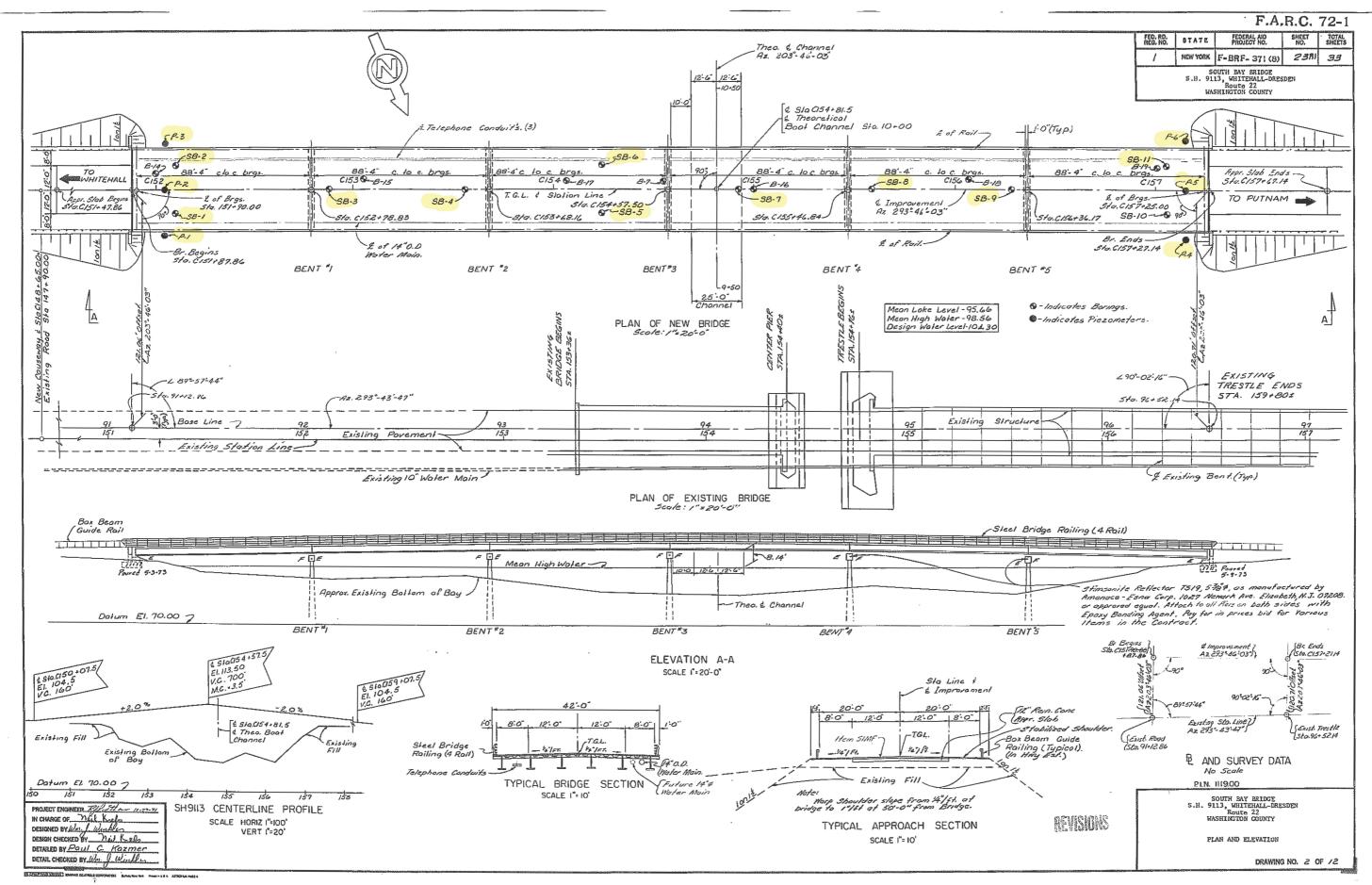
 Project:
 Champlain Hudson Power Express
 Date:
 March 22, 2022

Page 2 of 2

Liquid Limit Procedure: Multipoin	nt - Method A	X	Single Point - Method B	
Liquid Limit Apparatus:	Manual	X	Motor Driven	
Liquid Limit Grooving Tool Material:	Plastic	X	Metal	
Liquid Limit Grooving Tool Shape:	Flat	X	Curved (AASHTO Only)	
Plastic Limit:	Hand Rolled	X	Mechanical Rolling Device	

Reviewed By:

Date: 03/22/22



B.S	STRIC UNTY S.M. PI NTRA OJEC	ROJ.	<u>Vash:</u> NO: SM	ing	24	Bay	SU	BU BS	REA URF	U OF SOI	PUBLIC WOF L MECHANIC PLORATION PACT)	5	HOLE NO. SB-1 (U.D.H. LINE & STA.CL 152/10 OFFSET 12' Rt.
QU	AD. LO	OCA ERIE	TION S_	!				D	ATE	, START_ , FINISH_	3/10/66 3/25/66	DEP	F. ELEV. 103-1 TH TO WATER O DESCRIBE UNDER "REMARKS")
	SING MPLE	R C).D. <u>-</u>).D. <u>-</u>	4.5' 2.0'	rt Pt	I.D.	3•75 •375	2" V 2" I	NEIG NSII	OF LENGT	MMER 300# H OF SAMPLE	R	HAMMER FALL CASING 18"SAMPLER 18"
DEPTH DEPTH D BELOW SURFACE		SAMPLE NO.	5	MAG	S O PLEF 12 18	₹	CROSS SECTION	MOISTURE	COLOR		DESCRIPTION		REMARKS
	95 76												Used "AW" Rods
5* -	30 26 32										nd Gravel		
and the second s	40 45 48									and Bot	llders	;	6" casing to 38t 4" casing to 55t
±0°	山 52 40												
15-	31 35 38 40									·			
	53 41 43												
50 F	50 48 60							,			<i>y</i>		
25 <u>t</u>	55 63 63 62												
A CONTRACTOR CONTRACTO	61 75 70								į.				
_30±	93 78									1 1 1 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			
35 <u>*</u>	94 170 330 630												End of
	410 919 1200									. i Ursi			6" Pipe
_40±	2750 710 22						- 13 · 1						Drilled & Cored 2 boulder at 41 to 43.5
43.5				2						CLAY	· .		
451	80 103 82		2		3			M	Gr.	Trace o	of Silt		100# hyd. Press. used to push
	78 61 CONDI	TIONS	48.5	TERIA	ALS,	AND	LAYI	ERS	Gr. ENCO	OUNTERED MIL	JST BE DESCRIB		ACCORDANCE WITH CONTRACT DETAIL UNDER "REMARKS".
TH	E SUBS	URFAC E DES	E INF	ORM/	AT ION	N SHC	WN H	IEREC	ON WA	S OBTAINED	DRILLING CON'	TRACTO	OR Sprague&Henwood, Inc.
TO IS	DENT PRESEI SUBSTI	I CAL NTED TUTE	INFOF IN GO FOR	RMATI DOD INVI	ION A FAIT ESTIC	AVAIL TH,	ABLE BUT	TO IS N	THE :	VE ACCESS STATE. IT NTENDED AS ETATION OR	D.P.W. INSPEC DISTRICT SOIL		GR. Jan. Cana
	DGMENT						-				SHEET 1 0)F <u></u>	HOLE NO. SB-1

B.S COI PRO	TRIC JNTY .M. P NTRA OJEC AD. L	ROJ. CT S T OCAT	tdar 00/ M3 2 4017	ngt 2 out	34 b. Be		SU	BUI BSI ge (RTM REA URF	TATE OF IMENT OF SOLUTION ACE EXPENSION (CONTROLUTION SING OF RO , START , FINISH	PUBLIC L MECI PLORAT PACT) oute 22 3/10/	WORKS HANICS TION LOC	LINE & STA CL152/10
	SING MPLE	R C).D. <u>4</u>).D. <u>2</u>	.5" 2.0"		I.D.3 I.D.1	•75 •37	<u>"</u> v 5" i	VEIO NSII	SHT OF HADE LENGT	MMER_ H OF SA	300#	HAMMER FALL 8" CASING18" SAMPLER 18"
O BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.		LOW SAMI	PLEF	₹	CROSS SECTION	MOISTURE	COLOR		DESCR IL AND	IPTION ROCK	REMARKS
55*	85 110 65 72 63	J3	1	2	1			M	Gr.	CLAY Trace of	*Silt.		End of 4" pipe 55'
60 1		T4(6	0 - 6:	1.5)	R 1	•3		М	Gr.	Very so:	Pt .		used to push sampler
65 <u>-</u>		J5	0	0	1			М	Gr.				
70 -		T6(7	0-7	1.5)R 1	3		M	Gr.				50# hyd. Press. used to push Sampler-T6
75°		J (0	0	0			M	Gr				
861 - 851		T8 (80-	81.		1.3		M	Gr				50# hyd. Press. used to push Sampler-T8
901_		_T9	O	0	0			M	Gr				15# hyd. Press. —
95		T10(1.3	1. 4. 19 11	M	Gr				used to push Sampler-T10
100			-	9-10	1.5)Rl		M					50# hyd. Press. used to push Sampler-T12
THI FOR AV TO IS	E SUBS R STAT AILABL IDENT PRESE SUBSTI	URFAC E DES E TO I CAL NTED TUTE OF T	E INFIGURE	FORMAND SERS (CRMATSOOD INVESTIGATED	ATION	N SHO	OWN H PURF THE ABLE BUT	IEREC POSES TY MA	BSEF ON WA Y HA THE	S OBTAINED IT IS MADE	DRILLIN CONTR. D.P.W. I	DESCRIBED IG CONTRACT SOILS TECTOR CT SOILS E	CTOR Sprague&Henwood, Inc. Dennis Emmerson Sentore NGR.

DISTRICT NO. 1 COUNTY Washington B.S.M. PROJ. NO. 234 CONTRACT SM 234 PROJECT South QUAD. LOCATION	DEPART BURE SUBSUR Bay Bride	STATE OF NEW YORK TMENT OF PUBLIC WORKS AU OF SOIL MECHANICS RFACE EXPLORATION LOG (CONTRACT) Ge Crossing of Rte. 22 TE, START 3/10/66 SUF	HOLE NO. SB-1 (UDH) LINE & STA.CL 152/10 OFFSET 12' Rt. RF. ELEV. 103.1
SOIL SERIES	DAT	'E.FINISH 3/25/66 DEF	PTH TO WATER_ SO DESCRIBE UNDER "REMARKS") HAMMER FALL
SAMPLER O 6 12 18 24 O 6 12 18 24 O 6 12 18 24	CROSS SECTION MOISTURE	FIELD DESCRIPTION OF SOIL AND ROCK	REMARKS
105 ¹ J13 0 1 0	M G	CLAY Some Silt	
110 T14(110-111.5)RL	4 M G	r. Soft	100# hyd. Press. used to push Sampler-T14
J15 1 1 0	M		
120' T16(120-121.5)RL	4 M G	}r •	100# hyd. Press. used to push sampler-T16
125 ^t	M	Fr. Very soft	
130 T18(130-131.5)R1	t W G		100# hyd. Press. used to push Sampler-T18
135' 119 0 0	- M G	r.	
140' T20(143-141.5)R	1.5 M G		50# hyd. Press. used to push Sampler-T20
1454 J21 0 1 2 2 150-151.5)R1	1. M 0		250# hyd. Press. used to push sampler-T22 13" to refusal
ALL CONDITIONS, MATERIALS, AND	LAYERS EN LEVEL OBSI OWN HEREON W PURPOSES. T THEY MAY F LABLE TO THE BUT IS NOT	COUNTERED MUST BE DESCRIBED IN ERVATIONS MUST BE DESCRIBED IN DRILLING CONTRACT CONTR. SOILS TECH D.P.W. INSPECTOR INTENDED AS DISTRICT SOILS EN	ACCORDANCE WITH CONTRACT DETAIL UNDER "REMARKS". FOR Sprague & Henwood, Inc. Dennis Emmerson J. Sentore

B.S. GON PRO QUA SOI	TRIC JNTY M. P NTRA JJEC AD. L L SI GING	ROJ. CT S T OCAT	Shir NO SM_ FION S_ D.D.	igto 2 Sout 1	n 34 h B	1.D.3	SU rid	BUI BSI ge 0 _ D	RTM REA JRF Pros ATE ATE	TATE OF NEW YORK MENT OF PUBLIC WORKS U OF SOIL MECHANICS FACE EXPLORATION LOC (CONTRACT) singof Route 22 , START 3/10/66 SU , FINISH 3/25/66 DE GHT OF HAMMER 300# DE LENGTH OF SAMPLER 12	LINE & STA. CL. 152/10 OFFSET 12' Rt. RF. ELEV. 103.1 PTH TO WATER LSO DESCRIBE UNDER "REMARKS") HAMMER FALL
DEPTH BELOW SURFACE		LE NO.	В	LOW	S O PLEF	N	CROSS SECTION	MOISTURE	COLOR	FIELD DESCRIPTION OF SOIL AND ROCK	REMARKS
155°		J23	3	:3 4	- Li			M	ær.	CLAY AND SILT	
160						12 C 14 C					200# hyd. Press.
165		T 24(165	-166	5.5	Rl.	2	М	Gr.	SILT Some Clay	used to push sampler-T24
170 <u>'</u> - 175 <u>'</u>				Same Same		inger	, , , , , , , , , , , , , , , , , , ,	31			
1801		J25 J26	6 - P	12 P	14				Gr.		End of Hole
		स्य स ें का मे						건 편	l Eur		Sample J26 from Shelby tube: used 500# hyd. Press. to push tube 9" to refusal at 180.8'
				of the second			e j				DRILLER: John Uporsky
			- 25						- 10 miles		
THE FOR AVA	SIFICATE SUBS	URFAC E DES E TO I CAL NTED TUTE	E INFORMATION OF THE PORT OF T	FORMAND ! ERS (RMAT DOD INVI	ATION ESTIMONLY ION FAITESTI	N SHO	WN H PURF THE ABLE	L O	N WA Y HA THE	DUNTERED MUST BE DESCRIBED IN REVATIONS MUST BE DESCRIBED IN SOUTH OF THE PROPERTY OF THE PROP	N DETAIL UNDER "REMARKS". CTOR Sprague&Henwood, Inc. H. Dennis Emmerson J. Santope NGR.

B.S CO	TRIC UNTY .M. P	ROJ. CT S	ashi NO SM_	ngt - 2	34		SU	BU JBS	REA URF	MENT OF PUBL U OF SOIL ME ACE EXPLORA (CONTRACT) OSSING OF ROUTE	IC WORKS CHANICS ATION LOG	HOLE NO. SB-2 LINE & STA. CL 152/10 OFFSET 12' Left	1 _ 1 ×
QU.	OJEC AD. L IL SI	OGAT ERIE	TION S_	V				D	ATE	, START 2/28 , FINISH 3/9/	3/66 SUF 166 DEF	RF. ELEV. 103.0 PTH TO WATER so describe under "remarks")	-
	SING MPLE	R C).D, <u>2</u>).D. <u>2</u>	2•75 2•0"	;" 	I.D. I.DL	2.5 .375	\ <u>"</u> \	NEI NSI	OF HAMMER OF LENGTH OF S	300# SAMPLER <u>18</u>	HAMMER FALL CASING 18"SAMPLER 18"	_
DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	0 /	SAMI		₹ [18]/	CROSS SECTION	MOISTURE	COLOR	FIELD DESC OF SOIL AN	· ·	REMARKS	
= 0 = - - - 5* -	627 840 240 130	<u> </u>	6	/12	18	/24				LAND fill		Used "B" rods O'-35' 6" pipe	
10	88 80 65 65 61									SAND-GRAVEL AND BOULDERS		•	
- - 15*-	68 55 45 48		•				£1			•			
20 <u>*</u>	42 65 63 55 60 66			9					er.			-	
- 25'-	80 81 70 76 80												
301 <u> </u>	90 92 88 85 90 92												
35 -	106 132 215 217 80											Reduced to $2\frac{1}{2}$ " pipe at 35'	
- 40 t	27 6 5 5 7 20	1	0	0	1			М	Gr.	Very soft CLA Trace of silt			
45 <u>t</u>	20 19 12 13 16	2	2	2	2			W	Gr.	Soft			
	CONDI		, MA	TERIA	1 ALS, WATI	AND ER	LAYI	ERS	ENCC BSER	DUNTERED MUST BE VATIONS MUST BE	DESCRIBED IN	ACCORDANCE WITH CONTRACT DETAIL UNDER "REMARKS".	H
THI FOI AV TO IS	THE SUBSURFACE INFORMATION SHOWN HEREON WAS OBTAINED FOR STATE DESIGN AND ESTIMATE PURPOSES. IT IS MADED AVAILABLE TO BIDDERS ONLY THAT THEY MAY HAVE ACCESS TO IDENTICAL INFORMATION AVAILABLE TO THE STATE. IS PRESENTED IN GOOD FAITH, BUT IS NOT INTENDED A SUBSTITUTE FOR INVESTIGATIONS, INTERPRETATION OF JUDGMENT OF THE BIDDER.										ING CONTRACT	Dennis Emmerson J. Santore GR. Lucus	· .

EUDIT ON DES - 110 164'

()

B.S COI PR	TRIC UNTY .M. P NTRA OJEC	' Wa ROJ. CT S T	shir NO M_	gte Sou	34 ith		SL	BU JBS	REA REA URF	U OF SO FACE EXF (CONTI	PUBLICATION PUBLIC	C WOR HANIC TION	S LOG	LINE OFFS	ET1	SB-2 CL_1' 2' Lt.	—— i
so	AD. L IL SI SING	ERIE			- ++		2.5"	D	ATE	START_ FINISH_ GHT OF HA	3/ 9/	/66	DEPT	H TO		R "REMA	
	MPLE	R C).D. <u>3</u>	2.0"	<u></u>	I.D.	L•37	5"	NSI	OF HADE LENGT	H OF SA	MPLE	R <u>18'</u>	CASI	NG <u>18"</u> S	AMPLE	R <u>18"</u>
DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.		LOW SAMI	PLEF	N R 18/24	CROSS SECTION	MOISTURE	COLOR		DESCR				REMA	RKS	·
-50'- -	8 14 14 15	3	2	1	18	/24		M	Gr.	Soft	- Harris						
55°-	17 17 17	4	0	0						CLAY	Transport						
	14 16 16				0			M	Gr.	Trace of	eilt :						
601	15 16	5	0	0	0			Mg	Gr.								
651-	17 21 17 25	6	0	0				м	Gr.								
-	ଦ ୧୫ ୧୯	<u> </u>			0			M	G.L.								
701_	18 24 21	7	0	0	0			М	Gr.								
75'_	22 23 23											1			-		
-	21 20 23	8	0	0	0			М	Gr.	Very so	oft						
80 '	23 24 44 38 40	9	0	0	0			W	Gr.) · · · · ·							
85 <u>L</u>	37 36 34 38	10	0	0	0		i nakak	W.	Gr.		*						
90'_	39 38 32																
-	35 31 35 34	14	0	0	0			W	Gr.								
951_	39 36 36	12	0	0	0			W	Gr.								
100		TIONS	, MA	TERIA		AND	LAY	ERS	ENC	OUNTERED M	UST BE	DESCRIB	ED IN	ACCORD	ANCE W	ITH CON	TRACT
SPEC THI FOI AV. TO IS A	E SUBS R STAT AILABL IDENT PRESE SUBSTI	URFAC E DES E TO I CAL NTED TUTE OF T	E INFIGURE	FORMA AND S ERS (RMAT) DOD INVI	ATION ESTIM DNLY ION / FAITESTIE	N SHO	OWN H PURF THE ABLE BUT	HERECOSES EY MA	DN WAS. LY HATHE	S OBTAINED	DRILLIN CONTR. D.P.W.	DESCRIBI NG CON' . SOILS INSPEC CT SOIL	ED IN TRACTO TECH. TOR S ENG	DETAIL R Spre Denr	UNDER gue&Hei dis Emme antore	"REMARI	es".

B.S GO	STRIC UNTY S.M. P NTRA OJEC	'W ROJ. CT S	tdaa ON M	ingt	34	h Ba	SU	BU JBS	REA URF	TATE OF IMENT OF OF SOIL OF SOIL CONTE	PUBLIC L MEC PLORAT RACT)	WOR HANICS TION L	s l	HOLE LINE OFFS	NO. SB-2 8 STA CL 152/1 ET 12 Lt.	LO
QU	AD. L	OCAT	LIOP	₩				C	ATE	, START_ , FINISH_	2/28/6	6	SURF.	ELE\	/ 103.0 WATER BE UNDER "REMARK	<u> </u>
	SING MPLE	R C).D. <u>2</u>).D. <u>2</u>	2.75 2.0'	5 <u> </u>	l.D.2 l.D.2	2.5" L.37	\ '5"	WEIG NSI	OHT OF HA	MMER H OF SA	300# MPLER			HAMMER FALL NG <u>18"</u> SAMPLER:	
DEPTH BELOW SURFACE		SAMPLE NO.	•	SAM	/S 0 PLEF 112 18	₹	CROSS SECTION	MOISTURE	COLOR	· ·	DESCR IL AND				REMARKS	-
	37 37 38	13	Č O	0	0			W	Gr.	Gerap S						
105*	37 33 35 35	14	0	0				i di	~	gravita Transfer Standard Company						
-110	40 37 39				0				Gr.	CLAY Trace o	f Silt		, ;			
	38 40 41 43	15	0	0	0		·	W	Gr.	Very so	ft					
1151	40 35 32	16	0	() ()	30 g			i.ii ₩	Gr.							
1201	35 44 45 40				0											
	44 42 51	17	0	0	0			W	Gr.							
1251	47 44 42 43	18	0	0		· ·										H
1301	54				0			W	Gr.							
1051	45 45 44 48	19	0	0	0			м	Gr.							
135	47 50 54											**************************************				
1401	48 52 66 74	20	0	0	0			М	Gr.			19 2 7 7				
145	77 68 58	21	0	0	0			M	Gr.							
Property of the Property of th	57 57 62 60	22	0	0				м	Gr.							
		TIONS.	MA	TERIALL	ALS, WAT	AND	LAYI LEVE	ERS	ENCO	DUNTERED MU	JST BE (DESCRIBE DESCRIBE	D IN I	ACCORD.	ANCE WITH CONTRA	ACT
FO AV TO IS	R STAT AILABL IDENT PRESE	E DES E TO ! ICAL NTED TUTE !	IGN A BIDDE INFOR IN GO	AND ERS (RMAT DOD INV	ESTIN ONLY ION A FAIT ESTIC	ATE THAT VAIL	PURF THE ABLE BUT	POSES TY MA TO TS N	S. KY HA' THE : NOT !!	S OBTAINED IT IS MADE VE ACCESS STATE AND IT NTENDED AS ETATION OR	CONTR.		TECH	Den J.	ague&Henwood, Innis Emmerson Santore	c. usi

B.S COI PRO	TRIC UNTY .M. P NTRA OJEC AD. L	ROJ. CT S T OCA	ashi NO. _M_ TION	ngt 	on 34 h E	ay l	SU	BUI BSI ge	REAURF URF Gros	OF SOL FACE EXF (CONTR Sing of Re	PUBL L ME PLOR/ RACT) oute 2 2/28/	LIC WO ECHANI ATION 22 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	CS LOG SURF	HOLE NO. SB-2 LINE & STA.CL 152/10 OFFSET 12' Lt.
CA	IL SI SING MPLE	- (S).D, <u>2</u>).D, <u>2</u>	2.75		I.D.(V	VEI	HT OF HADE LENGT	MMEF	300#		H TO WATER DESCRIBE UNDER "REMARKS") HAMMER FALL CASING 18"SAMPLER 18"
DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	9	SAMI	S O PLEF 12 18	N R 18 24	CROSS SECTION	MOISTURE	COLOR			RIPTIC		REMARKS
-	65 64 68 78	3 %	0.	<i>\$</i> -	V.			* 177	(figire	: :				
1551 - -	97 93 89 76 66	•		\$ 5 5, 4	\$4. 44.			eres (c)						
1601		23	်	0	0		# 1	M	Gr.	CLAY Trace of	of Sil			
1651	59			- f*.				# 12 # 1	Sa i	very sc				
1761	68	24	0	0	0			М	Gr.					
175	71 66 100 150			. 24.	130 130			क क	79.		i.			
1 891	159 125 133 92	25	0	0	- A- 			€	Gr.					
1851				99 37.4	0	No. 1				CLAY Some si		3 3 4 3		
1901	90 78 75 72 66		100 miles				Ŧ	* * * * * * * * * * * * * * * * * * *		Very so	9 T 0			
	68 65 60 52	26	0	0	0			W	Gr.					
1951	59 60 55													
2001 ALL SPE	51 COND	27 TIONS TIONS	, MA	O TERIA ALL	ALS, WAT	AND	LAYI LEVE	W ERS L O	Gr. ENCO BSEF	OUNTERED ME	JST BE	DESCRI	BED IN	ACCORDANCE WITH CONTRACT DETAIL UNDER "REMARKS". R Sprague & Henwood, Inc.
FO AV TC IS A	R STAT Allabl IDENT PRESE SUBSTI	E DES E TO ICAL NTED TUTE	IGN A BIDDE INFOF IN GO FOR	ND ERS (RMAT : DOD INVI	ESTIN DNLY ION / FAI ESTI	AATE THAT AVAIL TH.	PURP THE ABLE BUT	OSES Y MA TO IS N	Y HA THE	S OBTAINED IT IS MADE VE ACCESS STATEIT NTENDED AS ETATION OR	D.P.W DISTI	R. SOILS . INSPE RICT SO	TECH. CTOR ILS ENG	Dennis Emmerson J. Santage R. Linguist
	DGMENT				`•				<u>.</u>		SHE	ET_4	OF6	HOLE NO. SB-2

COU B.S. COI PRO QUA SOI	AD. L IL SI	ROJ. CT S T_ OCAT	shir NO. M_ TION S_	23 So	n 4 uth		SU y Br	BU BS 1dg _ D	REA URF e Cr ATE	U OF SOIL ACE EXP (CONTR. COSSING OF , START, FINISH	PUBLI L MEC LORA ACT) Route 2/2 3/	C WOI CHANIC TION 22 8/66 9/66	LOG LOG SURF DEPT	ELEV H TO	103. NATER	12 Lef 12 Lef 0 R "REMAR	<u>t </u>
	SING MPLE	R C		.0"		l. D1	·375	_ \ 2" I	NEIG NSI	OHT OF HAI DE LENGTH	MMER HOFS/	AMPLE	# R <u>18"</u>	CASIN	IG 18"	R FALL	₹ <u>18"</u>
DEPTH BELOW		SAMPLE NO.	S	LOW: 6 12	PLER	R 18 ∕	CROSS SECTION	MOISTURE	COLOR	FIELD OF SOI					REMA	RKS	
- 205L	71 61 80 79 69 89 72 72 91									CLAY Some Silt			•				
2101		28	0	0	0			W	Gr.	Very no							
215 ¹ - -	63 66 61 62 58			2													
220* - - - 225*	69 61 64 62 59 61	29	0	0	0			W	Gr.	CLAY Trace Si	lt	Line of the control o					
230'	70 65 65 57	_30	0	8	0		9	W	Gr.				and the second				
235	55 58 69 64 65 61	31		0				· W.	Gr.	Very Sof	::" 't 				, duny		
2451	54 56 53 50				0												
THE FOR AVA	CONDI CIFICA' E SUBS R STAT AILABL IDENT PRESE	URFACI E DES E TO ! I CAL NTED TUTE !	E INFIGN ABIDDE	ORMAIND ERS COMMATI	TION STIM ONLY ON A FAIT	SHOWATE THAT	WN H PURP THE ABLE BUT	EREC OSES Y MA	ON WAS	DUNTERED MU EVATIONS MU S OBTAINED IT IS MADE VE ACCESS STATE IT NTENDED AS ETATION OR	DRILLI CONTR D.P.W. DISTRI	NG CON R. SOILS INSPEC	ITRACTO TECH. CTOR LS ENG	DETAIL OR Spra Denni J. Sa	UNDER gue&He s Emme ntore	nwood, I	s". ac.

E0011 214 207 - /10 (6/)

B.S. CON	TRIC INTY M. P. ITRA OJEC	ZWROJ. CT S	nshi NO SM So	uth	on 234 Bay		SU	BUI BSI	RTN REA URF	MENT OF U OF SOI FACE EXF (CONTF	PUBLIC L MECH PLORAT RACT) te 22	WORKS HANICS ION LOG	OFFSET_). SB-2 STA <u>CL 152/1</u> 12' Lt.	<u>o</u>
CAS	AD. L L SE SING MPLE	ERIE	:S _	.75	**	I.D.	2.5'	D v	ATE VEI	HT OF HA	3/ 9/66 MMER _	DE (AL 300#	HAM	103:0 FER NDER "REMARKS MER FALL 8'SAMPLER 1	
DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.		SAMI	/S O PLEF	N R 18	CROSS SECTION	MOISTURE	COLOR		DESCR		REI	MARKS	
252		32	3	14	9					CLAY Some Sil	t			End of Hole 252	
											v *6				
	1.67 187								:	e de la companya de l	24 , ks		Driller:		Н
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DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.		6 /	S O PLEF 12 18	R [18 ∕	CROSS SECTION	MOISTURE	COLOR		DESCR			REMARKS	
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	ING APLE	R C).D. <u>_</u>).D. <u>_</u>	2.7° 2.0'	5" "—	I.D.	2.5' •375	<u>'</u> V	VEIO NSI	GHT OF HA	MMER H OF SAN	300#	HAMMER FALL CASING 18"SAMPLER 18"
DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.		LOW SAMI	S O PLEF	N R	CROSS SECTION		COLOR	FIELD	DESCRII IL AND	PTION	REMARKS
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DISTI COUI B.S.M CONT PROG QUAL SOIL	NTY. 1. PR TRAC JECT D. LC	Was ROJ. DT S CAT RIE:	NO. M_ TON	gto 23 So	uth		SU	BUI BSI idge _ D	RTM REA URF SET ATE	(AL	
CASI SAMI		0 9	.D, <u>2</u> .D. <u>2</u>	•75 •0"	<u>**</u>	l.D.	2.5 37	" V 5" I	VEIO NSI	GHT OF HAMMER 300# DE LENGTH OF SAMPLER 18	HAMMER FALL CASING18"SAMPLER18"
DEPTH D BELOW SURFACE	CASING	SAMPLE NO.	S ০ /	6 /	S OI PLER 12 18	18 /	CROSS SECTION	MOISTURE	COLOR	FIELD DESCRIPTION OF SOIL AND ROCK	REMARKS
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325 ¹ 335 ¹ 3 ¹ 10 ¹		1 43	20	12	18			M	Gr	STET Some Sand Stiff SAND	
THE SPORTS OF TH	SUBSUI STATE LABLE DENTI	RFACE DESI TO E CAL ! TED ! UTE F	MAT INF GN A IDDE NFOR N GO OR	ORMAND ERS OMATION	TION STIM ONLY ON A FAIT	AND R SHO	WN H PURP THE ABLE BUT	EREO OSES Y MA TO IS N	N WAS	DUNTERED MUST BE DESCRIBED IN DRILLING CONTRACT	TOR Sprague&Henwood, Inc. H. Dennis Emmerson John Santoge IGR.

-14 283 - 118 46A.

DISTRIC COUNTY B.S.M. F CONTRA PROJEC QUAD. L SOIL S	ROJ CT : T OCA	ashin NO. SM_ TION	23 Sc	34 outh	n Ba	SL y Bi	BU JBS	ARTM REA URF Se CI	MENT OF NI MENT OF SOIL OF SOIL ACE EXPL (CONTRA COSSING OF 1 , START	PUBLIC MEC ORAT ACT) Route : 2/ 2/6	WORKS HANICS TION LOG	HOLE N LINE & OFFSET	STA.CL 15 0'	
CASING SAMPLE	R (D.D. 3	2.7' 2.0'	5" "	I.D. I.D1	2.5' .37'	r 1	WEIG	HT OF HAN	MER	(AL 300#		MER FALL	
BELOW SURFACE BLOWS ON	SAMPLE NO.		IMA	S O PLEF	₹	CROSS SECTION	MOISTURE	COLOR	FIELD OF SOII			RE	MARKS	
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QU/ SOI	DJEC AD. L IL SI	OCA ERIE	TION S _	-				C	ATE ATE	ssing of , START , FINIS	r <u>2/</u> H <u>2/</u>	2/66 25/66	<u> </u>	DEPTH	ELEV I TO WA	JNDER "		<u> </u>
	SING	R C).D,2).D.2			I.D. I.D.]	2.5' .37	5" 1	WEI NSI	SHT OF DE LEN	HAMN GTH O	IER _ F SAI	300∯ MPLER		HAI CASING	MMER I <u>8" S</u> AN		<u>.8"</u>
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SOI	IL SE	ERIE	S _				•	,C	ATE	HT OF HA		2/25/66	DEP	TH TO WATER SO DESCRIBE UNDER "REMARKS") HAMMER FALL
SAI	MPLE	R C).D.	2.0	51	I.D.	•37	5" l	NSI	DE LENGT	H O	SAMP	LER 18	CASING 18'SAMPLER 18
DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.		SAM	S O PLEF 112 18	R B	CROSS SECTION	MOISTURE	COLOR	B .		SCRIPT AND RO		REMARKS
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FOF	STAT	E DES	IGN A	AND !	ESTIN	AATE	PURF	POSES	3.	S OBTAINED IT IS MADE	i .		LS TECH	Dennis Emmerson John Santore
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A S	SUBSTI	TUTE I	FOR	INV	ESTI	SATIC	ons,	IN.	TERPR	ETATION OR				John J. Turney
JUC	GMENT	OF T	זב 5	ושטטו	FK •						SH	IEET <u>4</u>	_OF9_	// HOLE NO. SB-3 /

D. ... 382 - 1:0 (64)

CASING CASON CAS	DISTRICT NO. 1 COUNTY Washington B.S.M. PROJ. NO. CONTRACT SM 234 PROJECT South QUAD. LOCATION SOIL SERIES	DEPARTI BUREA SUBSURI Bay Bridge DATE	AU OF SOIL MECHANICS FACE EXPLORATION LOG (CONTRACT) Crossing of Route 22 E, START 2/2/66 SUR	HOLE NO. SB-3 LINE & STA.CL 152/88 OFFSET 0: F. ELEV. 96.8 TH TO WATER O DESCRIBE UNDER "REMARKS")
SAMPLER SAMP	CASING O.D.2.75" I.D. SAMPLER O.D.2.0" I.D.	2.5" WEI	(ALS GHT OF HAMMER 300#	HAMMER FALL
0	SAMPLER O 6 12 18	CROSS SECTION MOISTURE		REMARKS
A SUBSTITUTE FOR INVESTIGATIONS, INTERPRETATION OR	0	W Gr. LAYERS ENC. LEVEL OBSEL OWN HEREON WA PURPOSES. I THEY MAY HA LABLE TO THE BUT IS NOT !!	OUNTERED MUST BE DESCRIBED IN RYATIONS MUST BE DESCRIBED IN DRILLING CONTRACTOR CONTR. SOILS TECH. D.P.W. INSPECTOR DISTRICT SOILS ENGINEER OF THE PROPERTY OF	OR Sprague&Henwood, Inc. Dennis Emmerson John Samtore

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QUAD. LOCATION SOIL SERIES	STATE OF NEW YORK DEPARTMENT OF PUBLIC WORKS BUREAU OF SOIL MECHANICS SUBSURFACE EXPLORATION LOG (CONTRACT) Bay Bridge Crossing of Route 22 DATE, START 2/2/66 SUR DATE, FINISH 2/25/66 DEP (ALS	O DESCRIBE UNDER "REMARKS")
SAMPLER O.D. 2.0" I.I	D. 2.5" WEIGHT OF HAMMER 300# INSIDE LENGTH OF SAMPLER 18	HAMMER FALL CASING 18"SAMPLER 18"
SAMPLE NO SAMPLE NO 6 12 18 18 19 19 19 19 19 19 19 19 19 19 19 19 19	SSOR SOLL AND ROCK PAGE 100 STATE OF SOIL AND ROCK	REMARKS
42	CLAY W Gr. Soft	Reduced to 2½" pipe at 55!
65! 14	W Gr. CLAY Trace of Silt Very soft	
2 0 0 3 8 8 75 14 1 1 22 2 2 2 2 80 9 9 10 15 0 0	W Gr. CLAY	
851 8	Very soft	
8 1 8 10 95 0 18 0 0 0 18 0 0 8 0 0	W Gr	
ALL CONDITIONS, MATERIALS, AM	SHOWN HEREON WAS OBTAINED TE PURPOSES. IT IS MADE HAT THEY MAY HAVE ACCESS ALLABLE TO THE STATE. IT, BUT IS NOT INTENDED AS DISTRICT SOILS EN	OR Sprague&Henwood, Inc. Dennis Emmerson John Santore

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B.S. COI PRO	TRICTUNTY M. PINTRA DJECTON	Wa ROJ. CT S T	shin NO. M_	ngto	234 Sc	uth	DEPARTMENT OF PUBLIC WORKS BUREAU OF SOIL MECHANICS SUBSURFACE EXPLORATION LOG (CONTRACT) Bay Bridge Crossing of Route 22 DATE, START 2/2/66 SURF. ELEV. 96.8						CL 152/88 0'		
SOI	SOIL SERIESDATE, FINISH _2/25/66 DEPTH TO WATER(ALSO DESCRIBE UNDER "REMARKS") CASING O.D.2.75" I.D. 2.5" WEIGHT OF HAMMER300# HAMMER FALL SAMPLER O.D.2.0" I.D1.375" INSIDE LENGTH OF SAMPLER _18" CASING 18"SAMPLER 18"														
	NO SAMPLER SAMPLER O 6 12 18					N R	CROSS SECTION OISTURE			FIELD DESCRIPTION OF SOIL AND ROCK			REMARKS		
= 0 = - - -	8	SA	6	/12	/18	/24		*		WATER			Lake Bottom Elevation		
+55 <u>+</u>	W e i	1	0	0	0			W	Gr.	SILT Trace of	clay			92.3	
_10 <u>*</u> -	h t	2	0	0	0			W	Gr.	Very sof			Used "B" rods 0'-55'- 4" 55'-296.5'- 2	pipe 📙	
15"	f C a	3	0	0	0			·W	Gr.	·			·		
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45 <u>-</u> 47 <u>-</u>	42	NRec NB			7			W	Gr	İ					
47 48 Nec. 3 3 W Gr. 49 44 8 2 2 4 W Gr. 50 48 9 4 7 2 W Gr. CLAY-SOME GRAVEL FIRM ALL CONDITIONS, MATERIALS, AND LAYERS ENCOUNTERED MUST BE DESCRIBED IN ACCORDANCE WITH CONTRACT SPECIFICATIONS. ALL WATER LEVEL OBSERVATIONS MUST BE DESCRIBED IN DETAIL UNDER "REMARKS".														H CONTRACT	
THE FOR AV	SUBS R STAT AILABL IDENT	URFAC E DES E TO ICAL	E INFOR	FORM/ AND ERS (RMAT	ATION ESTIN	N SHO	OWN F PURF THE ABLE BUT	IEREC POSES EY MA E TO	ON WA	DRILLING CONTRACTOR Sprague&Henwood, Inc. CONTR. SOILS TECH. Dennis Emmerson D.P.W. INSPECTOR John Santore DISTRICT SOILS ENGR.					
A S	GMENT	OF T	HE B	IDDE	ESTI	SATI(JNS,	i NT	EKPR	ETATION OR	SHEET_	1_OF_9	HOLE !	NO. SB-3	

STATE OF										IEW YORK			_	
COU B.S	TRIC JNTY .M. P	ROJ.	Was NO	hing	ztor	[BU	REA	MENT OF U OF SOI	PUBLIC WO L MECHAN LORATION	ICS	HOLE NO. SB-4 LINE & STA. CL 153/56 OFFSET 01	
PRO	DJEC	T	So	uth	Bas	7 Br	idge	e Cr	oss.	ing of Rou	te 22			_
QUA	AD. L	OCA	TION	<u> ا</u>	_			_ D	ATE	, START_	3/2/66	SUR	F. ELEV. 96.8 TH TO WATER	_
SO	L SI	ERIE	:S _					D	ATE	FINISH _	3/9/66	DEP	TH TO WATER	_
<u> </u>												(ALS	O DESCRIBE UNDER "REMARKS"	_
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	CIFICA			ALL	WAT	ER	LEVE	L O	BSER	VATIONS MU	ST BE DESCR	IBED IN	DETAIL UNDER "REMARKS",	1
											DRILLING CO		OR Sprague&Henwood, Inc.	
+0-	CHBC	HREAC	FIME	FORMA	AT I ON	y sho	DWV H	EREO	N WA	S OBTAINED	CONTENTO CO	C TECH	Dennie Emmercon	-
FOF	STAT	E DES	IGN A	AND E	ESTIN	MATE	PURP	OSES	•	IT IS MADE			Dennis Emmerson	-
AVA	LDENT	E TO	BIDDE	ERS C	NLY ON 7	THAT HAVA	THE	Y MA	Y HA THE	VE ACCESS STATE, IT	D.P.W. INSPE	-	1 1 T Trains	. /
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CAS	SING MPLE	R C	D.D.2	<u>.75'</u>		I.D.	2 <u>.5'</u>	<u> </u>	NEI	SHT OF HAI	MMER_	300#	HAMMER FALL 3" CASING 18"SAMPLER 18"
DEPTH BELOW SURFACE	CASING	SAMPLE NO.		LOW SAMI	PLEF	N R 18 24	CROSS SECTION	MOISTURE	COLOR	FIELD OF SOI		PTION ROCK	REMARKS
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FORM THE 787 - (18 187)

B.S COI PRO	TRIC JNTY .M. P NTRA DJEC	'Wa ROJ. CT S T	ida NO _ M _ ToO	2: uth	n 34 Bay		SL	BU BS cr	REA URF	U OF SOL FACE EXF (CONTI Lng of Rou	PUBLIC IL MECH PLORAT RACT) te: 22	WORKS HANICS HON LOG	LINE	NOSB_4 8 STA.CL 153/56 ET0'
SOI	AD. L L SI SING	ERIE	S _).D.2	•75'	<u> </u>			D	ATE	START_ SHT OF HA	3/9	9/66 DEI		WATER_ BE UNDER "REMARKS")
	MPLE	R C).D.2	.0"		I.DJ	•37	5" I	NSI	DE LENGT	H OF SA	MPLER 18		NG 18"SAMPLER 18"
DEPTH BELOW F SURFACE	BLOWS ON CASING	SAMPLE NO.	0 /	LOW SAMI	PLEF	?	CROSS SECTION	MOISTURE	COLOR		DESCR IL AND			REMARKS
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	CONDI			TERIA						OUNTERED MI	IST BE D	DESCRIBED IN DESCRIBED IN	DETAIL	NCE WITH CONTRACT UNDER "REMARKS".
FOF	THE SUBSURFACE INFORMATION SHOWN HEREON WAS OBTAINED FOR STATE DESIGN AND ESTIMATE PURPOSES. IT IS MADE AVAILABLE TO BIDDERS ONLY THAT THEY MAY HAVE ACCESS DRILLING CONTRACTOR Sprague&Henwood, Inc. CONTR. SOILS TECH. Dennis Emmerson D.P.W. INSPECTOR J. Santore 1													
TO	IDENT	I CAL NTED	INFOF	RMAT !	ION /	AVAIL TH.	ABLE BUT	TO IS N	THE OT I	STATE. IT NTENDED AS	1	T SOILS EN		pul. Keenesce
JUC	SUBST I OGMENT	OF T	FOR HE BI	INVI	:STI(∍A FIC	UNS,	ı N T	EKPR	ETATION OR	SHEET	3_OF	<u>5</u>	HOLE NO. SB-4

FOR 24 207 A 110 1641

B.S COI PRO	TRIC JNTY .M. P NTRA DJEC AD. L	POJ. CT S T OCA	Was NO M_ SM_ TION	shir 	gto 234 h B	 ay 1	SU	BUI BSI ge (RTN REA URF	TATE OF NEW YORK MENT OF PUBLIC W U OF SOIL MECHAN ACE EXPLORATION (CONTRACT) sing of Route 22 , START 3/2/66 , FINISH 3/9/66	NICS N LOG	HOLE NO. SB-4 LINE & STA.CL 153/56 OFFSET O' ELEV. 96.8 H TO WATER DESCRIBE UNDER "REMARKS")	
	SING VPLE	R C).D. <u>2</u>).D. <u>2</u>	2.75 2.0"	5"	I.D. I.D.	2. 1/37	<u>5"</u> v	VEIO NSI	OHT OF HAMMER 300 DE LENGTH OF SAMP	#	HAMMER FALL CASING 18" SAMPLER 18"	
DEPTH BELOW SURFACE	ш	SAMPLE NO.		LOW SAMI	PLEF		CROSS SECTION	MOISTURE	COLOR	FIELD DESCRIPT OF SOIL AND RO		REMARKS	
155	75 89 92 82 91 90 93 88		THE STATE OF THE S							CLAY			
160 <u>*</u> 165 <u>*</u>	98 110 76 80 85 94	32	0	0	0				Gr.	Some Silt			
170 t	145 173 183 192 186 165 167	33	0						Ġr.	Very soft			
175† 180†	318 250 260 244	34	6	(a) (b) (c) (d)					Gr.				
1851	155 152 157				*7					CLAY AND SILT		End of 2½" pipe 186'	
1901 - - 1951		35	10	9	111			™	Gr.				
THE FOR	ALL CONDITIONS, MATERIALS, AND LAYERS ENCOUNTERED MUST BE DESCRIBED IN ACCORDANCE WITH CONTRACT SPECIFICATIONS. ALL WATER LEVEL OBSERVATIONS MUST BE DESCRIBED IN DETAIL UNDER "REMARKS". THE SUBSURFACE INFORMATION SHOWN HEREON WAS OBTAINED FOR STATE DESIGN AND ESTIMATE PURPOSES. IT IS MADE AVAILABLE TO BIDDERS ONLY THAT THEY MAY HAVE ACCESS D.P.W. INSPECTOR J. Santore												
IS AS JUC	PRESE SUBSTI GMENT	NTED TUTE	IN GC FOR HE BI	OD INVE DDEF	FAI STI	ſΗ,	BUT	IS N	OT !	DISTRICT S ETATION OR SHEET 4	,	()	

DISTRI COUNT B.S.M. CONTR PROJE	Y _WEPROJACT S	shin NO. SM_ Sc	234 outh	Bay B	SU	BUI BS	RTM REA URF	U OF SOI FACE EXF (CONTR sing of Rea	PUBLIC V L MECHAPLORATION	NICS N LOG	HOLE NO. SB-4 LINE & STA. CI. 153/56 OFFSET 0'
SOIL S CASING SAMPL	SERIE S (ER (S D.D. 2 D.D. 2	2.75" 2.0"	_ I.D. _ I.D1	2.5	D	ATE	HT OF HA	3/9/60 MMFR	DEP (ALSO 300#	TH TO WATER D DESCRIBE UNDER "REMARKS") HAMMER FALL CASING 18"SAMPLER 18"
BELOWS ON	SAMPLE NO.	S	LOWS AMPL 6 12	ER	CROSS SECTION	MOISTURE	COLOR		DESCRIPT		REMARKS
2021	36	9	9 1	2		М	Gr.	CLAY AND	SILT		End of Hole 202
								gowe Cope		4.	Driller: Wayne Rice
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THE SUBFOR STA	LL CONDITIONS, MATERIALS, AND LAYERS ENCOUNTERED MUST BE DESCRIBED IN ACCORDANCE WITH CONTRACT PECIFICATIONS. ALL WATER LEVEL OBSERVATIONS MUST BE DESCRIBED IN DETAIL UNDER "REMARKS". THE SUBSURFACE INFORMATION SHOWN HEREON WAS OBTAINED FOR STATE DESIGN AND ESTIMATE PURPOSES. IT IS MADE AVAILABLE TO BIDDERS ONLY THAT THEY MAY HAVE ACCESS AVAILABLE TO BIDDERS ONLY THAT THEY MAY HAVE ACCESS IT IS PRESENTED IN GOOD FAITH, BUT IS NOT INTENDED AS A SUBSTITUTE FOR INVESTIGATIONS, INTERPRETATION OR JUDGMENT OF THE BIDDER. DRILLING CONTRACTOR SPREWE-HENWOOD, Inc. CONTR. SOILS TECH. DENMIS EMMETSON D.P.W. INSPECTOR DISTRICT SOILS ENGR. SHEET 5 OF 5. HOLE NO. SB-4										

DISTRICT NO. 1 COUNTY Washington B.S.M. PROJ. NO. 234 PROJECT South I QUAD. LOCATION SOIL SERIES	DEPARTMENT OF NEW YORK DEPARTMENT OF PUBLIC WORKS BUREAU OF SOIL MECHANICS SUBSURFACE EXPLORATION LOG (CONTRACT) BY Bridge Crossing of Route 22 DATE, START 3/10/66 DEF	HOLE NO. SB-5 LINE & STA.CL 154/24 OFFSET 12' Rt. RF. ELEV. 98.6 PTH TO WATER SO DESCRIBE UNDER "REMARKS")									
CASING O.D. 2.75" I.D SAMPLER O.D. 2.0" I.D	2.5" WEIGHT OF HAMMER 300# 1.375" INSIDE LENGTH OF SAMPLER 18										
SURFLOW SURFLOW SAMPLE NO. SAMPLE	SCHOOL OF SOIL AND ROCK OF SOIL AND ROCK	REMARKS									
5*	WATER	Used "AW" Rods									
10 ¹		Lake Bottom Elevation 86.1									
15 ^t 0 C	W Br. ORGANIC SILT some fibers										
20! a	W Br. Very soft										
30 7 4 0 0	ORGANIC SILT Trace of clay										
35'	W Br.										
13 6 0 0 10 10 10 10 10 10 10 10 10 10 10 10	W Br. Very soft										
11 0 12 0 15 19 8 0 0 0	W Br. W Br. LAYERS ENCOUNTERED MUST BE DESCRIBED IN LEVEL OBSERVATIONS MUST BE DESCRIBED IN	ACCORDANCE WITH CONTRACT DETAIL UNDER "REMARKS"									
THE SUBSURFACE INFORMATION S FOR STATE DESIGN AND ESTIMAT AVAILABLE TO BIDDERS ONLY TH TO IDENTICAL INFORMATION AVA IS PRESENTED IN GOOD FAITH.	THE SUBSURFACE INFORMATION SHOWN HEREON WAS OBTAINED FOR STATE DESIGN AND ESTIMATE PURPOSES. IT IS MADE AVAILABLE TO BIDDERS ONLY THAT THEY MAY HAVE ACCESS TO IDENTICAL INFORMATION AVAILABLE TO THE STATE. IT IS PRESENTED IN GOOD FAITH, BUT IS NOT INTENDED AS A SUBSTITUTE FOR INVESTIGATIONS, INTERPRETATION OR JUDGMENT OF THE BIDDER. DRILLING CONTRACTOR Sprague&Henwood, Inc. CONTR. SOILS TECH. Dennis Emmerson D.P.W. INSPECTOR DISTRICT SOILS ENGR. SHEET 1 OF 6 HOLE NO. SB-5										

B.S COI PRO	TRIC JNTY .M. P NTRA DJEC AD. L	Y_Well ROJ. ACT S T OCA ERIE	NO SM_ FION S_	234 N	Sou		SU	BUI BSI Brid D	RTI REA URF lge ATE	, FINISH <u>3/17/66</u> DEI	HOLE NO. SB-5 LINE & STA.CL 154/24 OFFSET 12' Rt. RF. ELEV. 98.6 PTH TO WATER SO DESCRIBE UNDER "REMARKS")
SAI	SING MPLE	R C).D, <u>2</u>).D, <u>3</u>	2.75 2.0"	5" 	I.D. I.D.	2.5 L.37	" v 5" l	VEI NSI	GHT OF HAMMER300# DE LENGTH OF SAMPLER _18	HAMMER FALL CASING 8" SAMPLER 8"
DEPTH BELOW F SURFACE	<u> </u>	SAMPLE NO.	0 /	LOW SAMI	PLEF	R 8/	CROSS SECTION	MOISTURE	COLOR	FIELD DESCRIPTION OF SOIL AND ROCK	REMARKS
-	19 20 21 21 18 15 18 20	9	0	0	0			М	Br•	SILT some clay	
60 -	21 20 16 21	10	0	0	0		and compared and section of	M	Gr.	Company Communication Communic	Server and the server
65, t	24 23 19 25 24 21	11 11	0	0	0			М	Gr.		
70*_ - -	21 21 29 25 29	12	0	0	0			M	Gr.	CLAY Trace of silt	
75 <u>*</u> - -	29 24 28 29 29	13	0	0	0			M	Gr	Very soft	
- 80 <u>1</u> - - -	32 35 36 32 40 42	14	0	0	6		د د دورت ا	M	Gr		
85 <u>1</u> - - -	35 42 50 49	15	0	0	@ 2			M	Gr	CLAY Trace of silt Some gravel, very soft	
901	50 46 50 53 54	16	0	0	0			M ∄	Gr		
95"-	48 50 55 66 56	17 18	0	0	0			M	Gr	Trace of silt, very soft	
THI FOO AV/ TO IS A	ALL CONDITIONS, MATERIALS, AND LAYERS ENCOUNTERED MUST BE DESCRIBED IN ACCORDANCE WITH CONTRACT SPECIFICATIONS. ALL WATER LEVEL OBSERVATIONS MUST BE DESCRIBED IN DETAIL UNDER "REMARKS". THE SUBSURFACE INFORMATION SHOWN HEREON WAS OBTAINED FOR STATE DESIGN AND ESTIMATE PURPOSES. IT IS MADE AVAILABLE TO BIDDERS ONLY THAT THEY MAY HAVE ACCESS TO IDENTICAL INFORMATION AVAILABLE TO THE STATE. IT IS PRESENTED IN GOOD FAITH, BUT IS NOT INTENDED AS A SUBSTITUTE FOR INVESTIGATIONS, INTERPRETATION OR JUDGMENT OF THE BIDDER. DRILLING CONTRACTOR Sprague&Henwood, Inc. CONTR. SOILS TECH. Dennis Emmerson D.P.W. INSPECTOR DISTRICT SOILS ENGR. SHEET 2 OF 6 . HOLE NO. SB-5										

B.S COI PRO	TRIC JNTY .M. P NTRA DJEC AD. L	ROJ. CT S	NO NO M_	ingt 2 S	on 34 out		SU y B	BU BS rid	REA URF	STATE OF NEW YORK MENT OF PUBLIC WORKS AU OF SOIL MECHANICS RFACE EXPLORATION LOG (CONTRACT) Crossing of Route 22 E, START 3/10/66 SURF. ELEV. 98.6 DEPTH TO WATER (ALSO DESCRIBE LINDER "DEMARKS")		
CAS SAI	SING	R C).D, <u>2</u>).D. <u>2</u>	2.75 2.0"	11	I.D. I.D. ¹	2.5 .37	<u>"</u> V	NEI(E, START		
DEPTH BELOW SURFACE	60	SAMPLE NO.	5	LOW SAMI	PLEF	₹	CROSS SECTION	MOISTURE	COLOR	FIELD DESCRIPTION REMARKS OF SOIL AND ROCK		
- - 105	40 41 44 40 34											
1101		19	0	0	0				Gr.	CLAY some silt		
115	30 40 45 44 42 38	20	0	0	0		* ms. c	e de se sua	Gr.			
1201	42 44 46 51	21	0	0	Ō			M	Gr.	Very soft		
- - - 125 <u>'</u>	38 42 50 52 45	22	0	0	0				Gr.			
130	50 46 40	24	0	Ô	0			M	Gr.			
1351	43 42 45	25	0	0	Θ		tio #arrin	M	Gr.			
140	60 60 62 55 40	26	0	0	Ō							
1454	45 49 49 45	27	Θ	0	0			M	Gr.			
1501	60 66 77 92	28	0	0	0			M	Gr			
THI FOR AVA TO IS A	THE SUBSURFACE INFORMATION SHOWN HEREON WAS OBTAINED FOR STATE DESIGN AND ESTIMATE PURPOSES. IT IS MADE AVAILABLE TO BIDDERS ONLY THAT THEY MAY HAVE ACCESS TO IDENTICAL INFORMATION AVAILABLE TO THE STATE. IT IS PRESENTED IN GOOD FAITH, BUT IS NOT INTENDED AS A SUBSTITUTE FOR INVESTIGATIONS, INTERPRETATION OR JUDGMENT OF THE BIDDER. DRILLING CONTRACTOR Sprague&Henwood, Inc. CONTR. SOILS TECH. Dennis Emmerson D.P.W. INSPECTOR DISTRICT SOILS ENGR. SHEET 3 OF 6. HOLE NO. SB-5											

20011 014 002 - 110 164.

B.S COI PRO	TRIC JNTY .M. P NTRA DJEC AD. L	Was ROJ. CT S T OCA	NO NO M_	Sou	34 i th		SU	BU JBS dge	REA URF Cro	OF SOL FACE EXF (CONTR ssing Rout	PUBLIL MEPLORA PLORA RACT) te 22	IC WORI CHANICS ATION L	OG SURF.	OFFSET	A CL 154/24 12' Rt.
CAS	SING WPLE).D, <u>2</u>).D. <u>2</u>	2.75) ^{1†}	I.D.	2.5 1.37	<u>:" \</u>	WEIG	HT OF HA	MMER	300#	,	HAMN	ER DER "REMARKS") IER FALL 'SAMPLER_18
DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	•	LOW SAMI	PLEF	N R 18/ 24	CROSS SECTION	MOISTURE	COLOR			RIPTION ID ROCK		REM	ARKS
160±	44 45 63 52 53 191 99 104 54 55 65 65 69	29	0	0	0			M :	Gr •	CLAY some si Very so					
	81 82 92 100 130 128 132 127 122 123 100 110 88	30	0	0	0			M	Gr.						
185 <u>'</u> - 190 <u>'</u> 195 <u>'</u>	116 82 84 66 75 75 85 90 82 85 90 83	32	0	1	3			M	Gr.						
THE FOR AVA	ALL CONDITIONS, MATERIALS, AND LAYERS ENCOUNTERED MUST BE DESCRIBED IN ACCORDANCE WITH CONTRACT SPECIFICATIONS. ALL WATER LEVEL OBSERVATIONS MUST BE DESCRIBED IN DETAIL UNDER "REMARKS". THE SUBSURFACE INFORMATION SHOWN HEREON WAS OBTAINED FOR STATE DESIGN AND ESTIMATE PURPOSES. IT IS MADE AVAILABLE TO BIDDERS ONLY THAT THEY MAY HAVE ACCESS TO IDENTICAL INFORMATION AVAILABLE TO THE STATE. IT IS PRESENTED IN GOOD FAITH, BUT IS NOT INTENDED AS A SUBSTITUTE FOR INVESTIGATIONS, INTERPRETATION OR JUDGMENT OF THE BIDDER. DESCRIBED IN ACCORDANCE WITH CONTRACT SPRENGES. DRILLING CONTRACTOR SPRENGE&Henwood, Inc. CONTR. SOILS TECH. DENNIS EMBERSON D.P.W. INSPECTOR DISTRICT SOILS ENGR. SHEET 4 OF 6 . HOLE NO. SB-5														

B.S. COI PRO	TRIC JNTY .M. P NTRA DJEC AD. L	ROJ CT : T OCA	wash NO SM_		234 Sout		SU ay E	BUI BS Fid	REA URF	TATE OF MENT OF U OF SO ACE EX (CONT Crossing of , START.	PUIL N PLOI RACT of Ro 3/10	BLIC WO MECHANI RATION) ute 22 /66	CS LOG SUR	LINE OFFS F. ELEV	ET	.CI. 154 2 Rt. 8.6	
CAS	SING MPLE		D.D. <u>-</u>		5 ¹¹	I.D. I.D.	2.5' .375			GHT OF H				TH TO SO DESCRI			
DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	4	LOW SAM		₹ '	CROSS SECTION	MOISTURE	COLOR			SCRIPTION			REMAF	RKS	
2101 2151 2151 2251 2351 2451	78 67 52 55 55 56 76 76 78 78 78 78 78 78 79 79 79 79 79 79 79 79 79 79	333 334 345 335	G		(a)	AND	LAY	W W	Gr.	Very	soft	BE DESCR	IBED IN			TH CONT	
THI FOR AVAILABLE A	THE SUBSURFACE INFORMATION SHOWN HEREON WAS OBTAINED FOR STATE DESIGN AND ESTIMATE PURPOSES. IT IS MADE AVAILABLE TO BIDDERS ONLY THAT THEY MAY HAVE ACCESS TO IDENTICAL INFORMATION AVAILABLE TO THE STATE. IT IS PRESENTED IN GOOD FAITH, BUT IS NOT INTENDED AS A SUBSTITUTE FOR INVESTIGATIONS, INTERPRETATION OR JUDGMENT OF THE BIDDER.												NTRACT S TECH COTOR _	OR Spra	UNDER gue&Her Emmer	REMARK	s". 26.

FORM THE 207 - 115 /6/1

B.S CO PR QU	AD. L	ROJ. CT S T OCA	shi NO SM_ TIO	·	234 Sout		SU ay 1	BU BS Fid	REAURF	TATE OF MENT OF MENT OF SOIL OF SOIL CONTECTIONS OF START	PUBLIC NECHAPLORATION RACT) F Route 22 3/10/66	NICS N LOG	LINE OFFS		154 <u>/24</u> Rt.
CA	SING	ERIE	.S _					D 5" v	NEIG	HT OF HA	3/1/66 MMER	DEP (ALS 300#	O DESCRI	WATER BE UNDER "RE HAMMER FA NGL&" SAMF	ALL
O BELOW	BLOWS ON CASING	SAMPLE NO.		SAM SAM 6	PLEF	₹ 8/	CROSS SECTION	MOISTURE	COLOR		DESCRIP IL AND R		4	REMARKS	
252	2 8 3	37	0	0	0			W	Gr.	CLAY some sil	t, very so	oft	End o	f Hole 252	
											4.		Drill	er: Wayne	Rice
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The second of th															
				TERI	ALS,	AND	LAY	ERS	ENC	OUNTERED MU	JST BE DES	CRIBED IN	ACCORD	ANCE WITH	CONTRACT
TH FO AV	R STAT	URFAC E DES E TO ICAL NTED TUTE	E INI IGN / BIDDI INFOI IN GO FOR	FORMAND I ERS C RMAT OOD	ATION ESTIM ONLY ION / FAIT	N SHO	OWN F PURF THE ABLE BUT	IEREC POSES Y MA TO	N WA	S OBTAINED IT IS MADE VE ACCESS STATE IT NTENDED AS ETATION OR	DRILLING CONTR. SO D.P.W. INS DISTRICT	CONTRACT DILS TECH PECTOR _ SOILS EN	OR Spre	UNDER "REM ague&Henwoonis Emmerso HOLE NO.	d,Inc.

E0011 011 987 - /10 1841

DISTRICT NO. 1 COUNTY Washington	STATE OF NEW YOR DEPARTMENT OF PUBLIC BUREAU OF SOIL MECH	WORKS HOLE NO. SB-6 (UDH)
B.S.M. PROJ. NO. 234 CONTRACT SM 234 PROJECT South Bay Br	SUBSURFACE EXPLORAT (CONTRACT)	
QUAD. LOCATION	DATE, START 3/15/6	SURF. ELEV. 98.6 DEPTH TO WATER (ALSO DESCRIBE UNDER "REMARKS")
	3-75" WEIGHT OF HAMMER _ L-375" INSIDE LENGTH OF SAI	HAMMER FALL MPLER 18" CASING18" SAMPLER 18"
SUBELOWS ON SAMPLER NO. SAMPLER NO. SAMPLER NO. SAMPLER NO. SAMPLE	SECTION A COLOR OF SOIL AND	
	WATER	Used "B" Rods
51		
10*		
3.5° л оо	W Br.	Lake Bottom Elev. 85.1
15° W O	ORGANIC SILT Trace of clay	
8 h		
0 J2 0 0 0 f 0	W Br. Very soft	
25 [‡] s 26 [‡] Ing J3 0 0		
1 0	W Br. SILT Some clay	
30* 2 5 T4 (30-31.5)R 1.5	W Br. Very soft	20 lbs. hyd.Press. used to push sampler-T4
7 11 12		
35 <u>* 13 </u>	W Gr.	
7 9 bot 11	CLAY AND SILT Very soft	15 lbs. hyd. Press. Used to
7 T6 (40-41.5)R 1.5		push sampler-T6
8 45! 7		
7 J7 0 0 0 11 0 11 0 1 1 1 1 1 1 1 1 1 1 1	W Gr	15 lbs. hyd. Press. used to
10 50 12 T8 (50-51.5)R 1. ALL CONDITIONS, MATERIALS, AND	LAYERS ENCOUNTERED MUST BE D	push sampler-T8 ESCRIBED IN ACCORDANCE WITH CONTRACT
SPECIFICATIONS. ALL WATER	DRILLIN	escribed in detail under "remarks". G CONTRACTOR Sprague&Henwood, Inc.
THE SUBSURFACE INFORMATION SH FOR STATE DESIGN AND ESTIMATE AVAILABLE TO BIDDERS ONLY THA TO IDENTICAL INFORMATION AVAI IS PRESENTED IN GOOD FAITH,	T THEY MAY HAVE ACCESS LABLE TO THE STATE. IT	SOILS TECH. Dennis Emmerson NSPECTOR J. Santore T SOILS ENGR.
A SUBSTITUTE FOR INVESTIGATI	ONS, INTERPRETATION OR	1_OF_4 . HOLE NO. SB-6

										TATE OF P	IEW YORK	,	
B.S CO	TRICUNTY .M. P	ROJ.	ning NO M	ton	4.		SL	BU IBS	REA URF	MENT OF U OF SOI ACE EXF (CONTR	PUBLIC L MECHAPLORATION	WORKS ANICS ON LOG	HOLE NO.SB-6 (UDH) LINE & STA.CL 154/24 OFFSET 121 Lt.
QU	OJEC AD. L IL S	OCA	TIO	V	Sour	GA B	ay .	_	ATE	rossing of , START_ . FINISH	3/1	5/66 CHP	F. ELEV98.6 TH TO WATER to describe under "remarks")
	SING MPLE	- C).D).D	4.5	11 11	I.D3	.75	" \	NFIG	SHT OF HA	MMFR	300#	HAMMER FALL "CASING 18"SAMPLER 18"
							Г.		T		1101 041		_ OAOIIIOOAIIII EEII
OF DEPTH BELOW SURFACE	100	SAMPLE NO.	0 /	SAM	/S 0 PLEF 12 18	R 8	CROSS SECTION	MOISTURE	COLOR		DESCRIF		REMARKS
-	8				ļ	<u> </u>							
-	9									, , , , , , , , , , , , , , , , , , ,			
	11			<u> </u>						AT 437			
55*-	11	J 9	0	0				M	Gr.	CLAY Trace	of Silt		
-	21		<u> </u>		0								
_	19 20												di ees
60° <u>_</u>			160	63	C/2				a	Very so	·P+		No Hyd. Press.
-	18 19	TLO	(60	-OT	2/5	To.	P	M	Gr.	Acra Po)T 0		sampler-T10
_	21												
_	23 25		<u> </u>		1.5		10 Jan 14 J	· 5		e waan ee waa ay daa iyo is a aa ah is ah i gaarta ay ay ah is ah iyo ah iyo ah gaarta ay ah iyo ah iyo ah iyo ah iyo ah iyo ah iyo ah iyo ah iyo ah iyo ah iyo ah iyo ah iyo ah iyo ah iyo ah		e grada de como de gamento.	Company of the second
651	26	J11	0	0				M	Gr.				
-	27				0					e de din			
_	31							·		:			
-701	34									62			
-	32 30	T12	(70	<u>-71.</u>	5)F	1.	5	M	Gr.	Matagy grad	: ⁴ ,		15# hyd. press.
_	33												sampler-T12
- 25 S	34												
75 *	32	J13	0	0		- 1	Servey.	M	Gr.	ence mangrapha na 1861 na 1974	and the second s	Long of the management of the R	
_	30				0	1 14		**					End of 4"
-	34			 							e'		pipe 80 ^t
-86-	39		1600	05									
_		T14	(80	-91	45JI	La	•	M	Gr.				No hyd. Press.
-	37.								1				used to push
-			_	-	-								sampler T14
851	-	J15	2	8				M	Gr	CLAY			
_				ļ. 1	-5		-			Some s	ilt		
-	-						1			some g	ravel		
<u> 1</u> 00			1-				_		-	firm			
-		T16	(9	0-9	1.7	R 1	• 2	M	Gr				15# hyd. Press.
_													sampler-T16
			-	-	 	-	1						
95°-		J17	1	1				М	Gr	CLAY			
-	<u> </u>		-	1	2	-	1			Some S	ilt		
the contract	323						1			Soft			
100			Rec		2.8		Ľ	M					
	COND CIFICA		, MA	TERI.	ALS, Wat	AND ER	LAY	ERS :L C	ENC(BSER	DUNTERED MU	IST BE DE	SCRIBED IN	ACCORDANCE WITH CONTRACT DETAIL UNDER "REMARKS".
											<u>L</u>		OR Sprague&Henwood, Inc.
TH	E SUBS	URFAC	E-IN	FORM.	ATIO	N SHO	OWN F	HEREC	N WA	S OBTAINED	CONTR. S	OILS TECH	Dennis Emmerson
AV.	ALLABI	F TO	BIDD	ERS :	ONLY	THAT	THE	Y M/	Y HA		D.P.W. IN	SPECTOR _	J. Santoxe
15	PRESE SUBSTI	NTED	IN G	OOD	FAL	TH,	BUT	15 1	I TO	NTENDED AS ETATION OR	DISTRICT	SOILS EN	GR.
Ju	DGMENT	OFT	HE B	IDDE	R.	-(111)	-···• ,	414			SHEET_	2 OF	HOLE NO. 58-6

DISTRICT NO. 1 COUNTY Washington B.S.M. PROJ. NO. 234 PROJECT South Bay QUAD. LOCATION SOIL SERIES	BU SUBS	REA REA URF	TATE OF NEW YORK MENT OF PUBLIC WORKS U OF SOIL MECHANICS FACE EXPLORATION LOG (CONTRACT) Ling of Rice 22 START 3/15/66 SUR CFINISH 3/25/66 DEP	HOLE NO. SB-6 (UDH) LINE & STA. CL 154/24 OFFSET 12' Lt. F. ELEV. 98.6 TH TO WATER O DESCRIBE UNDER "REMARKS")
CASING O.D. 4.5" I. SAMPLER O.D. 2.0" I.	D3•75" \	NEIG	GHT OF HAMMER 300# DE LENGTH OF SAMPLER 18	HAMMER FALL
BLOWS ON SAMPLE NO. SAMPLE NO. 6 6 15 18 10 9 0 6 12 18 18 18 18 18 18 18 18 18 18 18 18 18	CROSS SECTION OISTUF	COLOR	FIELD DESCRIPTION OF SOIL AND ROCK	REMARKS
102 ¹ T18 (102-103.5)	R 1.2 M	Gr.	CLAY Some Silt	15 hyd. Press. used to push sampler-T18
105 ¹ J19 2 2	М	Gr.		
110' T20(110-111.5)R	1.5 M	Gr.	Soft An argument & and a second of the seco	20# hyd. Press.
115 ¹ J21 O 0			Very soft	sampler-T20
	M	Gr.	very sol c	
120 ^t T22(120-121.5)R	1.5 M	Gr.		25# hyd. Press. used to push sampler-T22
125 ¹ J23 8 6	M -	Gr.	Stiff CLAY AND SILT	
130' T24(130-131.5)F	11.2 M	Gr.		25# hyd. Press. used to push
135	angle hinder and and	ng that Joseph Sal		sampler-T24
J25 7 6 6	M	Gr.		
140 T26(140-141.5)1	R1.4 M	Gr		35# hyd. Press. used to push sampler-T26
145 ¹ J27 4 4 3	M	Gr	Firm	65# hyd. Press.
150 T28(150-151-5) ALL CONDITIONS, MATERIALS, A	ND LAYERS	ENC	DUNTERED MUST BE DESCRIBED IN	used to push sampler-T28 ACCORDANCE WITH CONTRACT
THE SUBSURFACE INFORMATION FOR STATE DESIGN AND ESTIMA AVAILABLE TO BIDDERS ONLY I TO IDENTICAL INFORMATION AV IS PRESENTED IN GOOD FAITH A SUBSTITUTE FOR INVESTIGA JUDGMENT OF THE BIDDER.	SHOWN HERECATE PURPOSES THAT THEY MA VAILABLE TO H. BUT IS N	ON WAS. AY HATHE	DRILLING CONTRACTO S OBTAINED IT IS MADE VE ACCESS STATE. LT NTENDED AS FITATION OR PRINCE OF THE P	DETAIL UNDER "REMARKS". OR Sprague&Henwood, Inc. Dennis Emmerson J. Santore
2000 00 002 - 00 000			V. 22	

B.S. COI PRO	TRIC JNTY .M. P NTRA OJEC	ROJ. CT S	NO NO M	Sov	234 ith	Вау	SU	BUI BSI dge	REA URF	MENT OF U OF SOIFACE EXP	PUBLIC IL MEC PLORAT RACT)	WORK HANICS TION L	j	HOLE NO. SB-6 (UDE) LINE & STA.CL 154/24 OFFSET 121 Lt.
QUA	AD. L	OCAT		ا				ח	ATF	, START_ , FINISH_	3/15/	/66 /66		ELEV. 98.6 H TO WATER DESCRIBE UNDER "REMARKS")
	SING MPLE	R C).D, <u>2</u>).D. <u>3</u>	4.5" 2.0"	· -	I.D.	3.75 1.37	" v '5" l	VEI NSI	OHT OF HA	MMER_ H OF SA	∴300	#	HAMMER FALL CASING 18"SAMPLER 18"
DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	0 /	SAMI 6 12	PLEF	R 8	CROSS SECTION	MOISTURE	COLOR		DESCR			REMARKS
							- À	i fa		CLAY AN	d SILF			
155 <u>1</u> - -		the P			8 · ·					+A _{ss} ore _{sso}				
160 ¹		J29	11	8	6		ē.	M	Gr.	Stiff				
165		T30(165	-16	5.5) ু	Rl.	ļ.	M	Gr	# 11.5g . g	. 教育		. 27 . 28 m	
1701 -						100 TV	18.4		\$35.					
1751							di previ			and the second s	ermin cress do mas	the section described in the sec	Algebra	
1771		J31	11	10	11		 	M	Gr	Hard				End of Hole 177 ¹
								75 P.						Driller: Lee Werley
				2°					185. B	Section 1				
	And the Control of th													
										. 1964 Mg				
-								1	Section 2					
THE FOR AVA	E SUBS R STAT ALLABL IDENT	TIONS FIONS URFAC E DES E TO I CAL NTED TUTE	E INI IGN / BIDDI INFOI IN GO FOR	FORMA AND S ERS (RMAT) OOD	ATION ESTIM DNLY ION A FAIT	SHOWATE THAT	DWN F PURF THE ABLE BUT	IEREC POSES EY MA	N WA	S OBTAINED IT IS MADE VE ACCESS STATE. IT NTENDED AS ETATION OR	DRILLIN CONTR. D.P.W. DISTRIC	DESCRIBEI NG C ONTI , SOILS 1	RACTO FECH. OR S ENG	\sim 11 \sim \sim \sim 6

110 207 - /10 (C/)

B.S.I CON PRO QUA	NTY VI. PI TRA JEC D. LI	Was ROJ. CT S T OCA1	NO. Sou	tor 2 1th	34 Bay		SU dge	BUI BSI Cro	RTM REA URF SSI	MENT OF U OF SOIL FACE EXP (CONTRA IN START	PUBLIC WO MECHAN LORATION ACT) 22 3/8/66	LOG LOG SURF	OFFSET 0' ELEV. 98.6	54 <i>+</i> 92
	BURGAL OF SOIL MECHANICS SUBSURFACE EXPLORATION LOG CONTRACT SM													
DISTRICT NO. 1														
	DISTRICT NO. 1 DEPARTMENT OF PUBLIC WORKS SURSIDER SAMPROL NO. 50LNT WISHINGTON 234 PROJECT South Bay Bridge Crossing of Moute 22 South Bay Bridge Crossing of Moute 22 Contract Sampler South Bay Bridge Crossing of Moute 22 Contract Sampler South Bay Bridge Crossing of Moute 22 Contract Sampler Contract Sample													
101	DISTRICT NO. 1													
15'	DISTRICT NO. 1													
201	а	2	0	0	0			W	Gr.	en North	? Clay			
25 *		3	0	0	0			W	Gr.	Very soi	Pt			
30 <u> </u>	DISTRICT NO. 1													
35!	DISTRICT NO. 1													
40°	5	6	0	0	0			W.	Gr.	Some Si	lt			
45*	8 7 9 10	7	0	0	0			W	Gr.	Very So	ft			
ALL	10 CONDI	TIONS	, MA	TERI	ALS,	AND ER	LAYI	ERS	ENC	OUNTERED MUS	ST BE DESCR	IBED IN	DETAIL UNDER "REMAI	RKS".
FOR AVA TO IS F	STAT ILABL IDENT PRESE JBSTI	E DES E TO ! ICAL NTFD	IGN A BIDDE INFOR IN GO FOR	AND ERS RMAT OOD INV	ESTII ONLY ION FAI ESTI	MATE THAT AVAIL TH.	PURF THE ABLE BUT	POSES TY MA TO TS N	Y HA THE	IT IS MADE		S TECH. ECTOR DILS ENG	Dennis Emmerson J. Santore	ei nist

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B.S COI PRO	AD. L	ROJ. CT S T OCAT	Shin NO M_		n 34 ath		SU	BUI BS dge	REA URF Cro	U OF SOI	PUBLIC L MECH PLORAT (ACT) Route 22 3/6	WORI HANICS ION L	OG SURF.	HOLE NO LINE & STA OFFSET ELEV98 H TO WATER DESCRIBE UNDE	0! 3.6
12	SING MPLE	R C).D. <u>3</u>).D. <u>3</u>	2.7! 2.0'	5" "	I.D. I.D.	2.5' 1.3	<u>'</u> v 75' l	NEI(OHT OF HA	MMER _ H OF SAI	300#			R FALL
DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.		LOW SAMI	PLEF	₹	CROSS SECTION	MOISTURE	COLOR		DESCRI IL AND			REMA	RKS
	8 10 12 11 8 9	9	1	0	0			M	Gr.	Very so	ft		,		
601	12 11 14	10	1	1	1			M	Gr.	CLAY				() 和谐 () 24 () () () () () () () () () () () () () () () () () () (
65 ' —	13 14 24 28 27 30	11	3	3	3		e he e e e	M	Gr.	Trace of	-	and the second			
70 ! - - -	35 36 34 37	12	3	* 4	3			M	Gr.	firm			;		
75 '_ - -	29 35 39 45 47 48	13	3	4	4			M	Gr.						
80' <u> </u>	43 47 39 40 38	14		3	4			М	Gr.		and the second s	(Appropriate Section 1)	ining pa		
85 <u>1</u> - -	44 51 50 50 47	15	1	1	2		i i i i i i i i i i i i i i i i i i i	M	Gr	Soft	and Angele and	Carlotte Services			
90'_	49 53 50 50 48	16	1	2	2			M	Gr						
95'-	47 51 48 44 48	17	2	1	1			M	Gr						
THI FOR AVA TO IS A	E SUBS R STAT AILABL IDENT	TIONS TIONS URFAC E DES E TO I CAL NTED TUTE	E INFIGURE	FORM/ AND S ERS (RMAT: OOD	ALS, WATION ESTIMONLY ION / FAITESTIC	N SHO	OWN H PURF T THE ABLE BUT	HERECOSES EY MA	ENCO BSEF ON WA S. Y HA THE	S OBTAINED IT IS MADE VE ACCESS STATE. IT NTENDED AS ETATION OR	IST BE D	G CONT SOILS NSPECT T SOILS	D IN ERACTOR TECH TOR S ENGR	J. Santore	"REMARKS". nwood, Inc.

B.S COI PRO	TRIC JNTY .M. P NTRA DJEC	ROJ. CT S	NO.	2	234	 Son	SU uth	BUI BSI Bay	RTN REA URF	TATE OF MENT OF U OF SOIL ACE EXP	PUB L MI PLOR (ACT) Ing 0	LIC W ECHAN ATION	NICS N LOG Se 22	OF	DLE NO. NE & ST FSET	A. <u>CE 1</u>	54 <i>f</i> 92
SO! CA!	SING	ERIE	S).D,2	•75'	·····	I.D, 3	2.5'	D	ATE VEIG	, START_ , FINISH_ GHT OF HA DE LENGTI	3 MME I	/14/66 R	DEF (AL 300#	SO DES		R ER "REM. ER FAL	L
-		Š			S 0					DE ELIVOT		SAIVIF	<u> </u>		431140_10	- SAIVITE	LN
DEPTH BELOW F SURFACE	BLOWS ON CASING	SAMPLE		6 /	PLEF	R 18 ∕	CROSS SECTION	MOISTURE	COLOR	FIELD OF SO	_				REM	ARKS	
-	51 55 54									CLAY							
105	45	19	0	0				м	Gr.	Trace of	silt	;	·				
	46 41 43				0			**	02.0	Very sof	t						
110	41 40	20	0	0	0	_		M	Gr.	very sof	't						
11151	39 43 41									SILT some cla	У						
	40 39 39	21	0	1	0			M	Gr.		e e e e e e e e e e e e e e e e e e e						
1201	40 35 33	22	0	0				1.6	Gr.								H
	35 34 32				0		·	M	QT.			*					
125	30 40 39	- 23	0	Θ	Θ			M	Gr.	SILT ANI	CLA	Y .	e Side a Market e				
1301	40 36 30										5 4					معرد	
	45 37 39	24	0	0	0			M	Gr.	Very∷so:	. 0						
135	45	25	0	1		·		м	Gr.				18 乾 13.	į.			
	54 49 51				0	1		7									
140	49 47	26	3	4	3			М	Gr.	firm							
- 145	45 49 50													V			
-	59 64 64	27	2	3	3			M	Gr	soft			D.				
150_ ALL	CONDI	28 TIONS	MA	1 TERIA	O ALS,	AND	LAYI	MERS	Gr	DUNTERED ML	IST BI	E DESC	RIBED IN	ACC	ORDANCE 1		
THE	SUBS	URFACI	E INF	ORMA	401T	, SHC	IWN H	IEREO	N WA	S OBTAINED	DRIL	LING C	ONTRAC	TOR S	NIL UNDER prague&B ennis Em	enwood,	. 1
FOF AV/ TC	STAT ALLABL IDENT	E DES E TO ! ICAL NTFD	IGN A BIDDE INFOR IN GO	ND E RS C MATI	STIN ONLY ION A	AATE THAT AVAIL TH.	PURP THE ABLE BUT	OSES Y MA TO IS N	Y HA THE	IT IS MADE VE ACCESS STATE. LT NTENDED AS	D.P.V	V. INSF	PECTOR SOILS EN	<u> </u>	Santor		Lewise
	SUBSTI					-A11C	,,,	1193	LRER	ETATION OR	SHE	ET_3	_OF_6	<u>.</u>	HOLE	NO	SB-7 (

B.S.	TRIC JNTY .M. P NTRA	' <u>We</u> ROJ. CT S	NO SM_	ngto	34		SU	BUI BSI	RTN REA JRF	MENT OF POUR OF SOIL CONTRACT CONTRACT CONTRACT CONTRACT CONTRACT COSSING OF RECEIVED TO SERVING CONTRACT COSSING OF RECEIVED CONTRACT COSSING OF RECEIVED COSSING OF RECEIVED COSSING	UBLIC MECH ORATI	WORKS IANICS ON LOG	LINE	110.	SB-7 CL 154	- 792 —
QU/ SOI	AD. LOSE	OCA ERIE	TION S	N	5"	I.D.	2.5"	D	ATE ATE	START 3/ FINISH 3/1 OHT OF HAMM DE LENGTH (8/66 L4/66 MER	SUF DEF (AL:		WATER BE UNDER IAMMER	"REMARKS	
UN DEPTH O BELOW I SURFACE	BLOWS ON CASING	SAMPLE NO.		SLOW SAMI	PLEF	₹	CROSS SECTION	MOISTURE	COLOR	FIELD DI OF SOIL			\$ 1	REMAR	KS	
	48 51 45 45 45 45									CLAY						
1601	66 65 80	29	5	8	8			Gr.	M	Trace of	garan an digana an dig					
16 <u>5</u> *	64 73 66 65 65	V 2					in de de de de de de de de de de de de de	عندو معرسون» د الاخت	parameter second	sitte	स्टब्स्ट के विकास कर कर कर है. इंग्रह्म के विकास कर कर कर के किस के किस कर कर कर कर कर कर कर कर कर कर कर कर कर					
1.70 <u>t</u> -	92 100 101 103 88 65	30	6	6	-8			GR.	M	firm						
175	57 70 85 88 94		e Se la Wali								e ky					
180 <u>*</u> - 185 <u>*</u>	124 130 145 155	31	6	5	6			GR.	M							
7901 - - -	198 180 165 164 169	20						94.	1 8 2		·					
195 <u>'</u>	92 97 93 94 140	32	5	7	8			GR.	M							
<u>2</u> 00 <u>1</u>	129 128 119 130	33 TIONS	6	7	7				M	NINTEDEN MIST	or P	ESCRIBED IN	ACCORD	NCE WIT	H CONTRA	
THE FOR AVA	SUBS STAT	URFACE DESE TO ICAL NTED TUTE	E INI IGN SIDD INFO IN G	FORMA AND ERS (RMAT OOD	ATION ESTIN ONLY ION A FAIT	N SHO	OWN H PURF THE ABLE BUT	IEREO OSES Y MA	N WA	S OBTAINED IT IS MADE VE ACCESS STATE ALL NTENDED AS ETATION OR	BE DI PRILLING CONTR. P.P.W. II		TOR Sprag	under " rue&Henwis Emmer	REMARKS".	2.

ECONT CO 307 - 119 /641

DISTRICT NO. 1 COUNTY Washington B.S.M. PROJ. NO. 234 PROJECT South QUAD. LOCATION SOIL SERIES	DEPARTMEN BUREAU SUBSURFAC Bay Bridge Cro DATE, S DATE, F	OF SOIL MECHANICS SE EXPLORATION LOG (CONTRACT) DESING OF ROUTE 22 TART 3/8/66 SUF INISH 3/14/66 DEF	RF. ELEV. 98.6 PTH TO WATER SO DESCRIBE UNDER "REMARKS")
SAMPLER O.D. 2.0" I.D.	2.5" WEIGHT 1.375" INSIDE	OF HAMMER309# : LENGTH OF SAMPLER _18	HAMMER FALL GASING 18"SAMPLER 18"
SAMPLE NO SAMPLE NO 6 6 12 18 24	SECTION MOISTURE COLOR	FIELD DESCRIPTION OF SOIL AND ROCK	REMARKS
123 120 119 100 205 97 93 106 117	C	LAY	
210! 119	M Gr. T	race of Silt	
101 97 92 96 96 35 7 87 87 89 100	₩ Gr•	Stiff	
225, 106 100 95 88 83 230, 86 113, 36, 6, 7 104, 7	W Gr.		
103 98 235 108 109 105 116 121 240 120			
119 37 9 11 13 125 127 131 137 144 144 144 144 144 144 144 144 144 14	W Gr.		
THE SUBSURFACE INFORMATION SHE FOR STATE DESIGN AND ESTIMATE AVAILABLE TO BIDDERS ONLY THAT TO IDENTICAL INFORMATION AVAILABLE TO AVAILABLE TO AVAILABLE TO BIDDERS ONLY THAT TO IDENTICAL INFORMATION AVAILABLE TO BIDDERS ONLY THAT TO IDENTICAL INFORMATION AVAILABLE TO BIDDERS ONLY THAT TO IDENTICAL INFORMATION AVAILABLE TO BIDDERS ONLY THAT TO IDENTICAL INFORMATION AVAILABLE TO BE THE PROPERTY OF	OWN HEREON WAS OF PURPOSES. IT	DRILLING CONTRACT CONTR. SOILS TECH ACCESS TECHNOLI	TOR Sprague&Henwood, Inc. J. Santore
IS PRESENTED IN GOOD FAITH, A SUBSTITUTE FOR INVESTIGAT! JUDGMENT OF THE BIDDER.	ONS, INTERPRETA	TION OR	HOLE NO. SB-7

ISTRIC OUNTY IS.M. P ONTRA ROJEC	<u> </u>	NO. M_		ton 234 Søi	 th	SU	BU BS Bri	REA URF	TATE OF MENT OF OF SOIL OF SOIL CONTE	PUBLIC L MECH PLORAT RACT) of Route	WORKS HANICS ION LOC	LINE	E NO. SB-7 8 STA. CL 154 ET 0'	#
ASING	ERIE	S _ 			I.D. I.D. ¹		_ D	NFIC	HT OF HA	3/14/60 MMFR	OE (A 300#	PTH TO	WATER BE UNDER "REMARK HAMMER FALL NG18" SAMPLER	
SURFACE BLOWS ON CASING	SAMPLE NO.		REMARKS											
)	38	13		14			W	Gr.	Silt-He	ard		End of Hole 252		
	-											Drill	er: Lee Werley	
		<i>y</i> *	1 2	*2			A control of			-				
				1,1				~ ya 21						
		4		12			1/2							
														3
		2		No. of the second			A							
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			TERIA	ALS,	AND	LAYI	ERS	ENC	OUNTERED MI	UST BE D	DESCRIBED	IN ACCORD	ANCE WITH CONTR	AC.
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B.S CO	TRIC JNTY .M. P	ROJ.	Mash: NO SM_	ingt	34		SL	BU JBS	ARTI REA URF	TATE OF INTERPORT OF SOIL OF SOIL CONTRACT OF SOIL CONTRA	PUBL L MEG PLORA RACT)	IC WO	CS	HOLE NO. SB-8 LINE & STA.CL 155/58 OFFSET 01	
PR	JJEC An I		So.	uth	Bay	Br	idge	Cr C	OSSI ATE	ing of Rou	<u>s /эц /4</u>	56	SHP	F. ELEV. 96.8	-
SO	IL SI	ERIE	S_	W				_ 5	ATE	, SIAKI _ , FINISH _	3/7/	66 <u></u>	_ DEP	TH TO WATER O DESCRIBE UNDER "REMARKS"	-
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	SING MPLE	R C).D. <u>.</u>).D. <u>.</u>	2.0 2.0	<u>5''</u>	I.D. I.D 1	<u>-37</u>	2" \ <u>5"</u>	NSI	OHT OF HA	MMER H OF S	<u> </u>	# ER	HAMMER FALL CASING 18"SAMPLER 18	17
ш	2	ó	В	LOW	/S O	N	,	w w				F. J.		b	╡
DEPTH O BELOW SURFACE	BLOWS ON CASING	SAMPLE	0 /	SAM	PLEF 12 18	R ∏8 ∕	CROSS SECTION	MOISTURE	COLOR	FIELD OF SO	-			REMARKS	
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	i g														Н
	h													Surface Elev.	H
151	t									Very sof	ît.			changed from	П
-	0	2	0	0	0			W	Gr.	SILT				96.8 [†] to 98.6 [†]	Н
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	CONDI		, MA	#EKI/ ALL	WAT	ER	LEVE	L O	BSER	RVATIONS MU	ST BE	DESCRI	BED IN	ACCORDANCE WITH CONTRACT DETAIL UNDER "REMARKS".	
											DRILLI	NG CO	NTRACT	OR Sprague&Henwood, Inc.	ا د
THE	SUBS	URFAC	E INF	ORM	ATION ESTIM	N SHO	WN F	EREC OSES	N WA	S OBTAINED				Dennis Emmerson	_
AVA	ILABL	E TO	BIDDE	ERS (YJNC	THAT	THE	Y MA	AH Y	VE ACCESS STATE. IT			CTOR _	12 12 11 11 1 11/11	رر-
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	GMENT						,				SHEE	T_1	OF6	HOLE NO. SB-8	U
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B.S	TRICUNTY .M. P NTRA	' <u>Wa</u> ROJ. CT S	shir NO. M		34	- Rey	SU	BUI BSI	REA URF	MENT OF U OF SOU FACE EXP (CONTR	PUBLIC L MECH LORAT ACT)	WORKS HANICS ION LOC	LINE & STA CT. 15	5 <u>/58</u>
QU	AD. L	OCAT		/				_ D	ATE	, START , FINISH _	2/24/66	SU	JRF. ELEV. 96.8 EPTH TO WATER LSO DESCRIBE UNDER "REMA	RKS")
	SING MPLE	RC).D2.).D2.	.0"		I.DI	2.5	<u>" </u>	NEI NSI	OHT OF HAI DE LENGTH	MMER_ H OF SA	300#	HAMMER FALI CASING 18"SAMPLE	
DEPTH BELOW SURFACE		SAMPLE NO		LOW SAMF 6 12	PLEF	N R 18 24	CROSS SECTION	MOISTURE	COLOR		DESCRI L AND		REMARKS	
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B.S COI	TRIC JNTY .M. P NTRA DJEC	ROJ. CT S	NO M_		34 th F	ay	SU Brid	BU BS	RTM REA URF Cros	U OF SO ACE EXP (CONTI	PUBLIC IL MEC PLORAT PACT) oute 22	C WORKS HANICS FION LOC	G C	HOLE NO LINE & S DFFSET_	TA.CL	155458
SO CAS	IL SI SING	ERIE	S).D.:	2.7	5"	1.D.	2.5	D	MEIG	FINISH BHT OF HA	3/ 7/6	(A 300#	PTH LSO D	TO WAT ESCRIBE UN HAMI	ER DER "RE MER FA	LL.
SAI ±≱ÿ	MPLE	Ŏ,	В	LOW	/S 0		Ī					MPLER 18	3"_ C	CASING <u>LO</u>	<u>SAMP</u>	LER_10
DEPT BELO SURFA	CASIP	SAMPLE	0/	6 /	PLEF 12 18	₹ 8 24	CROSS SECTION	MOISTURE	COLOR		DESCR IL AND	ROCK		REN	IARKS	
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IS A	PRESE SUBSTI	NTED TUTE	IN GO FOR	OOD VNI	FAI ESTI	TH,	BUT	15 N	I TO	STATE. IT NTENDED AS ETATION OR	DISTRIC	CT SOILS E	NGR.	Jo hu	TK	ELHISC.
	OGMENT									3 m 1.4 m	SHEET	r <u>3</u> 0F_	6	U HOL	E NO.	SB-8(

COI B.S	TRIC UNTY .M. PI	ROJ.	ashi NO M	• 23	on 4	_	SL	BU BS	REA URF	U OF SOI FACE EXF (CONTR	PUBLIC L MECH PLORAT RACT)	WORKS IANICS ION LO		LE NO NE & STA. FSETO'	<u> しし エフフチフ</u>	<u>88</u> —
PR	OJEC AD. L	T		Server.	Sou			Brio C	lge ΔTF	Crossing ©	f Route 2/24	22 166 Q I	JRF. EL	FV 96	.8	-
SO	IL SE	ERIE	S _					_ 0	ATE	FINISH_	3/7/	/66 DE		O WATER		-
	SING MPLE	R C).D, <u>2</u>).D. <u>2</u>	2.75 2.0"	11	I.D. I.D. ³	2.5 L.37	<u>"</u> \	NEI(GHT OF HA	MMER _ H OF SAI	300#		HAMMER	RFALL	
±§8 ¥ §	NG	E NO.			'S O PLEF	N	SS	URE	OR	FIFID	DESCRI	PTION		DEMAS		
DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE	06		12/	18/	CROSS SECTION	MOISTURE	COLOR		IL AND			REMAR	iks	
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	CONDI CIFICAT		, MA	TERI. ALL	ALS, Wat	AND ER	LAY	ERS	ENC BSE	OUNTERED MURYATIONS MU		ESCRIBED ESCRIBED		RDANCE WIT IL UNDER "	H CONTRAC	СТ
	N. Carlo			-05	A T 1 0		Dirw.	Jen	NI 1410	e DETAINED				rague&Hem	wood,Inc.	<u>.</u>
FO	R STAT	E DES	IGN / BIDD!	AND ERS	ESTII ONLY	AATE THA	PURF THE	POSES EY MA	S. AY HA	S OBTAINED IT IS MADE AVE ACCESS	1	SOILS TEC		nnis Emme nn Santor		
TC IS	IDENT	I CAL	INFO	RMAT	ION .	AVAIL TH.	ABL! BUT	0T	THE	STATE. IT	1	T SOILS E	•	John!	F. Kun	esc
JU!	SUBST I DGMENT	TUTE OF T	FOR HE B	INV	ESTI	GAT I	JNS,	IN.	EKPR	RETATION, OR	SHEET	40F	<u>6</u>	HOLE	NO. <u>SB-8</u>	

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B.S. COM PRO QUA		ROJ. CT S T OCA	shin NO. SM STION	out	234 h B	ay I	SU Brid	BUI BSI ge	REAURF	TATE OF INTERPORT OF SOLUTION (CONTRESSING OF REALT, START, FINISH, START, STAR	PUI L N PLOI RACT oute	BLIC WO NECHAN RATION) 22 /24/66	ICS LOG SUR	OFF:	E NO E & STA. SET0' V96 WATER	.8	
	SING	R C).D, <u>_</u>).D	2.7 2.0	75")"	I.D. I.D.	2.5 1.37	5" V '5" I	VEIO NSI	GHT OF HA	MME H OF	F SAMPL	00#		HAMMER	RFALL	
DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	S	6 /	S O PLEF 12 18	₹ [18]/	CROSS SECTION	MOISTURE	COLOR			SCRIPTI AND RO			REMAR	KS	
2101	71 85 64 65 60 57 53 49 43 76 95 97	35	5.	5	<u>ц</u>				Gr.	firm							
2251	107 94 100 97 85 78 90 79 96 85 100 82 84 77	37	7	7:	5			M	Gr.	stiff							
2451 2461	90 95 76 68 69 75 78 65 64 60 61 64 75 77 81	38 39	7	6 8	7		о и ч ў	M	Gr.		ust .	BE DESCF	RIBED IN	ACCORI	DANCE WIT	'H CONTI	RACT
THI FOR AVA TO 1S	E SUBS R STAT AILABL IDENT PRESE SUBSTI	URFAC E DES E TO I I CAL INTED TUTE OF T	E INFIGN ABIDDE INFORINGO FOR HE BI	FORMA AND S ERS (C RMAT) DOD INVE	ATION ESTIM DNLY ION / FAITESTI	N SHO	DWN H PURF THE ABLE BUT	IEREC POSES TY MA	DN WA	S OBTAINED IT IS MADE	DRI COI D.P.	BE DESCR	ONTRACTI LS TECH. ECTOR _ DILS ENG	OR Spr Den Joh	UNDER ague &He nis Emme n Santor HOLE	remarks nwood, I rson	s". inc. inc.

B.S.	JNTY M. P	T NO (T ROJ. NOT S	NO	ing	ton ah		SU	BU JBS	REA URF	TATE OF MENT OF OF SOIL OF SOIL CONTR	PUBLIC W L MECHAN LORATION ACT)	NICS N LOG	HOLE NO. SB-8 LINE & STACL 155/58 OFFSET 0'
QU/ SOI	AD. L L SI	OCAT ERIE	[[0] S 	V				C	ATE	, START , FINISH _	2/24/66 3/ 7/66	SURI	F. ELEV. 96.8 TH TO WATER DESCRIBE UNDER "REMARKS")
	SING MPLE	R C).D, _).D, _	2.0	<u>ラ"</u> "	I.D. I.D.	-37	5" \ 5" I	NEIG	SHT OF HA	MMER39 H OF SAMP	# LER <u>18"</u>	HAMMER FALL CASING 18'SAMPLER 18"
DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.		LOW SAMI	PLEF 112 /	N R 18 24	CROSS SECTION	MOISTURE	COLOR		DESCRIPT L AND RO		REMARKS
252 <u>°</u> 252 <u>°</u>		40	4	6	8	_		W	Gr.	SILT Some cla	y-firm		
	W.												End of Hole 252'
													Driller:
	NY H												Lee Werley
-										igenet (\$1). Salay			
-										and was sold			
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1 1					\(\frac{1}{2}\)					1.1 1.1 4.	9		
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						-							
		I ITIONS TIONS	, MA	TERI/ ALL	ALS, WAT	AND ER	LAY	ERS	ENC	OUNTERED MU	ST BE DESC	RIBED IN	ACCORDANCE WITH CONTRACT DETAIL UNDER "REMARKS".
THE FOR AVA	SUBS STAT ALLABL IDENT PRESE	SURFAC E DES E TO ICAL	E INI IGN / BIDDI INFOI IN GO FOR	FORMAND SERS (CRIMAT COOL)	ATION ESTIN ONLY ION FAI ESTI	N SHO MATE THAT AVAIL	OWN F PURF T THE ABLE	HERECOSES EY MA E TO	ON WAS.	S OBTAINED IT IS MADE VE ACCESS STATE. LT NTENDED AS ETATION OR		CONTRACTO LS TECH. PECTOR COILS ENG	Sprague & Henwood, Inc. Dennis Emmerson John Sarfore GR.

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									-	TATE OF A	IEW YORK			
B.S	TRIC JNTY .M. P	ROJ.	Shin NO	·- <u>-</u>	34	_	SU	BUI BSI	RTN REA JRF	U OF SOL ACE EXP (CONTR	PUBLIC WO L MECHAN PLORATION (ACT)	ICS	HOLE NO. SB-S LINE & STA. CL OFFSET) 156 <u>/2</u> 8
PR(QU	DJEC	T OCA	TION	1	Sou	th B	ay I	_ D	ATE	, START $_$	f Route 22 2/1/66 2/22/66	SUF	RF. ELEV. 96.8 PTH TO WATER so describe under "re	EMARKS")
CAS SAI		R C).D, 2).D. 2	.75 .0"	**	I.D. I.D.1	2.5' •37'	<u>"</u> V 5" I	VEIG NSII	OHT OF HA	MMER 300 H OF SAMPL	0# .ER	HAMMER FA 18"CASING <u>18"</u> SAMF	ALL PLER_18"
DEPTH O BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	0 /	LOW SAMI	PLEF	3	CROSS SECTION	MOISTURE	COLOR		DESCRIPTION		REMARKS	
-													0'-70'- 4" Pipe 70'-295'- 2½" pip	e H
										WATER			Used "B" Rods	\exists
-														
_													Lake Bottom	
11.5	W H e O a i fm	1	0	0									Elevation 85.3'	
- 15 └	g m h e				0			W	Gr.	SAND AND	SILT			
-	t r	2	5	7	8			M	Gr.	Soft				H
201	20 20									2020	·			В
-	22 27 31	3	6	4	5			М	Gr.	SILT ANI				
25-	28 20									some gra	3A6T		i i i i i i i i i i i i i i i i i i i	<u> </u>
_	27 30 29	4	6	8	13			M	Gr					
30-	30 33			1 1						Firm				F
_	36 47 40	No	Rec	•										
35 <u>'</u>	24 23 32	5	7	0		-							· 	
_	49 52				0			M	Gr	1 0757	f fine Sand			
140-	55 39 81	6	1	0		 		М	Gr	Very so	ft			H
THE PARK SUPPLIES AND ADDRESS OF THE PARK SUPPLIES AND ADDRESS OF	110 95				0					CLAY Trace o	P 5414			
454	105		7	8	3	-				Soft	<u></u>			
	158 160				8			M	Gr					
_50 <u>.</u>	156 135	8	5 MA	TERI/	ALS.	AND	LAYI	MERS	ENC	OUNTERED MU	JST BE DESCR	RIBED IN	ACCORDANCE WITH (CONTRACT
SPE	CIFICA	TIONS	•	ALL	WAT	ER	LEVE	L O	BSEF	RVATIONS MU	ST BE DESCR	IBED IN	I DETAIL UNDER "REN TOR <u>Sprague&Henwe</u>	AARKS".
FO! AV.	R STAT ALLABL	E DES	IGN A	AND ERS (RMAT	ESTII ONLY ION	THAN AVAII	PURF T THE ABLE	OSES Y MA	Y HA THE	S OBTAINED IT IS MADE VE ACCESS STATE. IT NTENDED AS	CONTR. SOIL D.P.W. INSPI DISTRICT SO	LS TECH Ector -	John A Sapt	son
IS A JU	SUBSTI	TUTE	FOR	INV	ESTI	GATI	ons,	INT	ERPR	ETATION OR			7. HOLE NO.	

B.S. COM PRO	TRICTUNTY M. PINTRA DJECTAD. LC	ROJ. CT S T DCAT	NO. NO. M_	2; S:	34 outl		SU y Bi	BUI BSI Fide	RTN REA URF Ge C	TATE OF NEW YORK MENT OF PUBLIC WORKS U OF SOIL MECHANICS FACE EXPLORATION LOC (CONTRACT) POSSING OF ROUTE 22 C, START 2/1/66 SU C FINISH 2/22/66 DE	IRF. ELEV96.38
CAS	L SE	C		•75	11	D	2.5°	" V	VFIC	HT OF HAMMER 300#	PTH TO WATER LSO DESCRIBE UNDER "REMARKS") HAMMER FALL B" CASING18" SAMPLER 18"
DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	8	AMF	S O	N R	CROSS SECTION	MOISTURE	COLOR	FIELD DESCRIPTION OF SOIL AND ROCK	REMARKS
55'-	120 163 161 175 165 162 191 199 163 149	9	5	4	6			W	Gr.	CLAY Trace of Silt Soft	
60 - _	159 181 220 217 180 183	10	3	2	3		grande.	W	Gr.		
-70 : -	208 241 227 246 8 9	12	2	2	က က		enang sa	W	Gr.	a filologica gara awa aya aya kata kata kata kata kata kata	Reduced to 2½" pipe
751	10 12 13 11 14	13.	1	2	.2			W	Gr	Very soft	
80 <u>*</u>	13 9 11 8 12	» 14	(O:	0	0			W	Gr		
85 <u>*</u> -90 <u>*</u>	11 13 12 14 11 11	15	1	0	0		gar sa kig	W	Gr	and and the second seco	
95	13 15 16 14 19 25	16		1	0			W			
	21 24 23 19 condi	18	3 1 , MA	TERI/	O L 1	AND			G1 ENC		IN ACCORDANCE WITH CONTRACT
THE FOF AVA TO IS	R STAT ALLABL IDENT PRESE SUBSTI OGMENT	URFAC E DES E TO I CAL NTED TUTE OF T	E INFIGN ABIDDE INFORIN GOFOR HE BI	ORMAND ERS (RMAT)	ESTIN ONLY ION / FAI ESTI	SHC	OWN H PURP THE ABLE BUT	IEREC POSES TY MA	ON WA	DRILLING CONTRACT S OBTAINED IT IS MADE CONTR. SOILS TEC	CTOR Sprague&Henwood, Inc. Dennis Emmerson John A. Sentore,

B.S CO PR	STRIC UNTY S.M. P NTRA OJEC AD. L	ROJ. CT S	NO.	Sou	234 1th		SU	BU JBS idge	REA URF	MENT OF NO MENT OF SOIL OF SOIL (CONTRADSSING OF RESTART	MECACT) oute 2 2/ 1/	C WORKS	og	HOLE NO. SILINE & STA. CILINE OFFSET OFFSET SELEV. 96.4	<u>156∤28</u>
SO	IL SE SING MPLE	ERIE	S	.75'	1	I.D.	2.5 -37	D 5" v	ATE VEIG	FINISH _	MER	66 [300#	EPTH (ALSO	TO WATER DESCRIBE UNDER "FE HAMMER I CASING 18'SAM	ALL
DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	5	LOW AMF	PLEF	N R 18/ 24	CROSS SECTION	MOISTURE	COLOR	FIELD OF SOII		RIPTION ROCK		REMARKS	6
±00' ±	21 27 28 25 26 29 31 28	19	1	a	0			W	Gr.	18,7% 50,000,000,000					
110	28 31 25 28 26 24	20	1	1	ì		1. 春水	W	Gr.	and the second s	ita ika ang	en en en en en en en en en en en en en e	· 物政。		-
115	31 36 34 31	21	0	j.	2			W	Gr.						
125	29 37 40 38	22			8			W	Gr.	CLAY soft					
130	45 40 44	23	N N	<u>ع</u>	2			W	Gr.		V .				
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140	42 41 38	24	1	1%	2			Ŵ	Gr.						
145	65 66 58			in the second se											
SPE THO AV TO IS A	CONDI CIFICAT E SUBSI R STAT AILABL	URFACE E DES E TO ! I CAL NTED TUTE	E INFIGN ABIDDE	ORMAIND E	TION STIM ONLY ON A FAIT	SHC	WN H PURP THE ABLE BUT	IEREC POSES TY MA	ON WAS	S OBTAINED IT IS MADE	DRILLII CONTR D.P.W. DISTRI	DESCRIBED	ACTOR ECH PR ENGR	John A. Santo	od, Inc. on re

B.S COI	TRIC JNTY .M. P	<u>Was</u> ROJ. CT S	hin NO	_	234		SU	BU BS	REA URF	U OF SOIL MI ACE EXPLOR (CONTRACT)	LIC WORKS ECHANICS ATION LOG	HOLE NO. SB-9 LINE & STA. CL 156/28 OFFSET 0'	
QU	DJEC AD. L L SI	OCAT	TION	<u> </u>		Sou	th I	`D	ATE	ge Crossing of , START 2/ , FINISH 2/2	1/66 SUR 2/66 DEP	F. ELEV. 96.8 TH TO WATER o describe under "remarks"	- - -
	SING	R C).D.2).D.2			I.D. I.D.		<u>'</u> \ 5" I	NEIG NSII	OF HAMME OF LENGTH OF	R 300#	HAMMER FALL	_
DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO,		SAMI	/S 0 PLEF 112 18	₹ 118 /	CROSS SECTION	MOISTURE	COLOR	FIELD DES		REMARKS	
-	55 56									CLAY			
-	65 63 58						,						H
1554	60 62	1 1			1 1			Š		Soft			H
	59 57		,										H
760r	58 52	26	α	5				M	Gr.		· · · · · · · · · · · · · · · · · · ·		${\mathbb H}$
-	48 49		_		5			₹V.	ا ا	CLAY			H
1654	49							Ī		Trace of Sil	t		H
-	51. 48 55	e de la companya de la companya de la companya de la companya de la companya de la companya de la companya de La companya de la co	20 10 10	- 4 - 5	1			3 %		Soft			H
	56 62	·											
1701	91 71	27	3	43				W	Gr.		· · · · · · · · · · · · · · · · · · ·	• • • • • • • • • • • • • • • • • • •	$oxed{H}$
-	69 64	ř.			4					CLAY			Н
1751	77 85												Н
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_	120 129				14					Hard			Ц
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_	135 119									*			H
1901	102	29	7	6	-		1	W	Gr.	Firm	 : 		\sharp
-	73 68			-									H
195	59 75					<u> </u>	1	1 T.					H
	86 110									1 			
-	127 135 115		7	9	10	-		W	Gr	in the second se			H
	CONDI	TIONS,		TERI	10 ALS, Wat	AND	LAYI	ERS	ENC		E DESCRIBED IN	ACCORDANCE WITH CONTRACT DETAIL UNDER "REMARKS".	+
	CIFICAT									DRIL	LING CONTRACT	OR Sprague&Henwood, Inc.	
FOF	STAT	E DES	IGN A	AND !	ESTII ONLY	MATE THAT	PURF THE	OSES Y MA	S. XY HA'	S OBTAINED IT IS MADE VE ACCESS D.P.V	TR. SOILS TECH.	John A. Santore	- 1
TC IS	IDENT	ICAL NTED	INFO	TAMP	ION ,	AVAIL TH,	ABLE BUT	. TO 1 S I	THE !	STATE. IT	RICT SOILS EN	John I Leve	70
	GMENT					-, . i C	,				ET_4_OF7	HOLE NO. SB-9	4

B.S. COI PRO	TRIC JNTY .M. P NTRA OJEC AD. L	ROJ.	NO NO M_	ingt 	ton 234 th I		SU Brid	BU BS	ARTI REA URF <u>©ros</u>	ATE OF NEW YORK ENT OF PUBLIC WO I OF SOIL MECHANI ACE EXPLORATION (CONTRACT) Sing of Route 22 START 2/1/66	CS LINE & STA CL 156	5 <u>/2</u> 8
CAS	IL SI SING MPLE	ERIE					1	D	NEI(FINISH <u>2/22/66</u> IT OF HAMMER3	DEPTH TO WATER (ALSO DESCRIBE UNDER "REMARK OO# HAMMER FALL ER 18" CASING 18"SAMPLER	
DEPTH BELOW SURFACE	100	SAMPLE NO.	0 2	LOW SAMI	PLEF	R ∏8 ∕	CROSS SECTION	MOISTURE	COLOR	FIELD DESCRIPTION OF SOIL AND ROC		
- - 205+ -	110 112 121 123 128 143 127 113									CLAY		
210 ¹	97	31	5	6	7			W	Gr.	Trace of Silt	Par Assures	
- 21 5' - - -	72 70 72 62 63											
<u>220 -</u> - 225 -	67 64 72 83 107	32	6	7	10			W	Gr.	Firm		
	123 150 151 156 165		8	9								
- 235 ! -	90 126 105 96 117 106				8			W	Gr			
2)49 1 -	112 126 105 97 92	34	-8	9	9			W	Gr			
245 <u>1</u>	100 104 88 96 147 166											
SPE	CONDI	35 TIONS	. /	ALL	WAT	AND ER	LEVE	ERS L C	BSEF	DRILLING CO	BED IN DETAIL UNDER "REMARKS NTRACTOR <u>Sprague&Henwood, Inc</u>	:".
FOF AVA TO IS A	R STAT ALLABL IDENT PRESE	E DES E TO ICAL NTED TUTE	IGN A BIDDE INFOR IN GO FOR	AND E ERS (RMAT ! DOD INV!	ESTIN ONLY ION / FAI ESTI	AATE THAT AVAIL TH.	PURP THE ABLE BUT	POSES Y MA TO IS N	AY HA THE	OBTAINED I IS MADE E ACCESS TATE. IT. TENDED AS TATION OR CONTR. SOILS D.P.W. INSPE DISTRICT SOILS SHEET 5	S TECH. Dennis Emmerson CTOR John A. Santore,	<u>usc</u>

									S	TATE OF	NE	W YORK			
COL	TRIC JNTY .M. P	<u>Wa</u>	shir	agto	n,	_		BU	REA	MENT OF U OF SC	F P	UBLIC WO MECHANI ORATION	CS	HOLE NO. SB-9 LINE & STA.CL 156#	28∶
	IVI. P				234				<u> </u>	(CONT	RAC	CT)		OFFSET	
PRO	DJEC	T		Sout	sh B	ay	Brid			ssing of]				~	
	AD. L			ا				_ <u>D</u>	ATE	, START		2/1/66		F. ELEV	
SOI	L SE	-RIE	s _					_ D	ATE	, FINISH		2/22/66	DEP	TH TO WATER	s")
CAS	SING		ם מ	2.7	5**	I D	2.	5' v	NFIC	SHT OF H	ΔΜΙ	MER300		_ HAMMER FALL	
	MPLE	R C).D. ₫	2.0	•	l Di	-375	ı i	NSI	DE LENG	TH (OF SAMPLE	ER _18	CASING 18"SAMPLER	18"
	Z	o O		LOW	C 0	NI.	T		1					A AMERICA	
DEPTH BELOW SURFACE	BLOWS ON CASING			SAMI			CROSS SECTION	MOISTURE	COLOR	FIELD) D	ESCRIPTIO	NC	DEMARKO	
SEP SEP	OWS	SAMPLE	0/		12/		SS	018	3			AND ROC		REMARKS	-
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ALL			, MA	TERI	ALS,	AND	LAY	ERS	ENC	OUNTERED !	MUST	BE DESCRI	BED IN	ACCORDANCE WITH CONTRADETAIL UNDER "REMARKS	ACT
SPE	CIFICA	IONS		ALL	WAT	<u> </u>	LEVE	.L C	DOE	TALIUNS N	7.12				
						u 5:::	Sun! !		N. 14. *	E OBTAINED				OR Sprague&Henwood, Inc	
FOR	STAT	E DES	IGN A	AND !	ESTI	MATE	PURF	OSES	· ·	S OBTAINED				Dennis Emmerson	
AV/	ALLABL	E TO	BIDDE	ERS (RMAT	ONLY ION /	THA ⁻ JIAVA	T THE	Y M/ : TO	Y HA THE	VE ACCESS STATE. IT	- N	P.W. INSPE		The second of the	usc
15	PRESE	NTED	IN GO	OOD .	FAL	TH,	BUT	15 1	1 TO!	NTENDED AS ETATION OR	0	DISTRICT SO	ILS EN	GR.	
JUI	SUBST I DGMENT	OF T	HE B	IDDE	L31∏ R•	un i i (٠,٠٠٠,	, 19	. <u>-</u> 13	,,,,,oit on	ءِ	SHEET 6	OF 7	HOLE NO. SB	-9 /
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B.S. COI PRO	TRIC JNTY .M. P NTRA DJEC AD. L	ROJ. CT S T OCA ERIE	NO SM_S TION S _	egte	on 234 1 Ba		SU	BUI BSI e C _ D _ D	REA URF POSS PATE PATE	, FINISH _	PUBLIC L MECHAPLORATION RACT) ate 22 2/1/6 2/22/6	WORKS ANICS ON LOG 66 SUF 56 DEF	HOLE NO. SB-9 LINE & STA. CL 156/28 OFFSET 0' RF. ELEV. 96.8 PTH TO WATER SO DESCRIBE UNDER "REMARKS")
	SING MPLE	R C).D. <u>-</u>).D. <u>-</u>	2.75 2.0)" 	l.D. l.D.	2.0 L.37	<u>"</u> V 5" I	NEI0 NSII	OHT OF HA	MMER H OF SAM	300# PLER <u>1</u>	HAMMER FALL 8" CASING 18" SAMPLER 18"
DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	,	LOW SAMF	PLER	₹	CROSS SECTION	MOISTURE	COLOR		DESCRIP IL AND F		REMARKS
305 ' 305 '													
310 '		41	15	19	24			M	Gr.	SILT Trace of	f Clay		
31-5 <u>-</u>									and displayer .	Hard			
320±		4 2	23	36	37			M	Gr.	SILT Trace o	f Sand		
330 <u>'</u> - -		43	27	35	56			M	Gr.	SILT			
335 <u>'</u> - -										Some Sa Hard	nd.		
340		44	75	165	185			М	Gr.	SAND	·		End of Hole 351'1"
345 <u>1</u>										Some Si	Committee of		
THE FOR AVAILABLE A	E SUBS R STAT AILABL IDENT	URFAC E DES E TO I CAL NTED TUTE	E INFORMATION OF THE PROPERTY	FORMA ALL FORMA AND E ERS C RMATI	ALS, WATION ATION ESTIN DNLY ION A FAIT	AND ER SHO MATE THATAVAIL	LAYI LEVE	IEREC OSES Y MA	ENCO BSEF ON WA S. THE JOT I	OUNTERED MI	DRILLING CONTR. SO D.P.W. IN:	CONTRACT	IGR. John . Keemsce

EOD: 014 382 - 119 (64)

COI B.S COI PRO QUA SO	TRIC JNTY .M. P NTRA OJEC AD. L IL SE	ROJ. CT S T OCAT	NO. SM_ TION	Sou	on 234 th 1	Bay	SU	BUF BSU Lge _ D	RTM REA JRF Cro-	TATE OF INTERPORT OF SOIL OF SOIL OF SOIL OF SOIL OF SOIL OF THE S	PUBLIC L MECH PLORATION RACT) Route 22 3/3/66 3/16/66	WORKS ANICS ON LOG SUI AL CAL	HOLE NO. SB-10 LINE & STA CL 157/06 OFFSET 12' Rt. RF. ELEV. 101.5 PTH TO WATER SO DESCRIBE UNDER "REMARKS") HAMMER FALL
SAI	MPLE	R C	.D. 2	LOW		I.D.1	37	5" II	NSI	DE LENGT	H OF SAM	PLER 18	CASING18" SAMPLER18"
DEPTH BELOW SURFACE		SAMPLE	5	6 12	PLEF	₹	CROSS SECTION	MOISTURE	COLOR		DESCRIF		REMARKS
- 5* -	185 296 180 92 73 84 54	3.4				5000				LAND FI SAND AN AND BOU	D GRAVEL		Used "B" Rods Used Piston for all Shelby Tubes 6" pipe to 34"
	25 26 41 36 35 38												
15:	50 58 41 40												
	56 55 61 69 72												
30'- 33•5'	112 350 530 245 280 370 160												Reduced to 4" -
35 '	23 44 26 42 84	Nec J1	1	0	0			BR.	M	CLAY Trace a	of Silt	•	End of Pipe - at 40'
- - - -	101	J2	1	3	5			BR	M	Soft	·		
45		т3				1.	5 t		М				100 lbs. hyd.pressure used to push shelby tube T3
SPE THO A V TO I S A	E SUBS R STAT AILABL IDENT PRESE	URFACE E DES E TO ! I CAL NTED TUTE	E INFIGURE	FORMA AND E ERS C RMATI	ATION ESTIMONLY ION / FAITESTIC	N SHO	WN H PURP THE ABLE BUT	ERS L O	N WA Y HA THE OT I	S OBTAINED IT IS MADE VE ACCESS STATE. IT NTENDED AS ETATION OR	DRILLING CONTR. S D.P.W. IN	SCRIBED IN GCONTRAC SOILS TECH ISPECTOR SOILS EN	NGR. Santore Keenese

B.S COI PR	TRICUNTY .M. P NTRA	ROJ. CT S T	OM _M&	·2	34 Sou	eh :	SU Bay]	BUI BSI 3rid	RTN REA URF	MENT OF U OF SO ACE EXP (CONTI Crossing of , START_	PUBLIC IL MECH PLORAT RACT) I Route	WORI IANICS ION L	S LOG	HOLE NO(UDH) SB-10 LINE & STA. CL 157/06 OFFSET 121 Rt.
so	IL SI	ERIE	S		-			D	ATE	, FINISH _	3/16/	66	DEPT	H TO WATER DESCRIBE UNDER "REMARKS")
	SING MPLE	RC).D. <u> </u>	2.0	111	I.D. I.D.	37	2 V 5" I	NSI	OHT OF HA	H OF SAI	MPLER	18"	HAMMER FALL CASING18" SAMPLER 18"
DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.		SAM 16 /	/S O PLEF	₹	CROSS SECTION	MOISTURE	COLOR		DESCRI IL AND			REMARKS
-50 * - - - - - -		T 5	(55	- 56.	5)F	1.:	*	M	Br.		of Silt		us	0 lbs. Hyd. Pressure ed to push ampler - T5
_60!		J 6	1	2	2			M	Br.	Soft			,	
65 L		17	(65	- 66	5)I	1.	3 *	M	Br.				เ	100 lbs. Hyd. Pressure seed to push sampler- T7
.70 t		J8	5	0	1			М	Br.					
75 <u>'</u> - -		T 9	(75	- 76	.5)]	R 1.	3	М	Br				1	100 lbs. hyd. pressure used to push sampler- T9
-801 - -		J10		0	1			М	Gr					
- 85 ' -		7*11.	(85	-86	.5)	R1.1	Assert Age.	M.	Gr		i kati j a w on		1	150 lbs. Hyd. pressure used to push sampler- Tll
-90±		312	Θ.		0			M	Gr					
95*—		T13	(9:	5-96	.5)	R1.;		M	Gr	# 1				100 lbs. Hyd. press. used to push sampler- T13
	CONDI		O MA	TERI	ALS,	AND	LAYE	M RS	GT ENCC	UNTERED MI	UST BE D	ESCRIBE	D IN	ACCORDANCE WITH CONTRACT DETAIL UNDER "REMARKS".
THE FOR AV/ TO IS	E SUBS R STAT ALLABL	URFACI E DES E TO I ICAL NTED TUTE	E INF IGN A BIDDE INFOF IN GO FOR	FORMAND SERS (CRMAT)	ATION ESTIM ONLY ION / FAIT	N SHO MATE THAT	OWN H PURP THE ABLE BUT	EREO OSES Y MA TO IS N	N WAS Y HAY THE S	S OBTAINED IT IS MADE	DRILLING	G CONT SOILS NSPECT T SOILS	RACTOR TECH OR S ENGI	Pennis Emmerson Santore

B.S.N CONT	RICT NO WAS IN PROJECT STACES	shin . NO SM_	٠	234		SU	BUI BSI	REA URF	MENT OF U OF SO! FACE EXF (CONTR	PUBLIC IL MECI PLORAT RACT)	WORKS HANICS TION LOC	LINE & STA.CL 157/06 OFFSET 12' Rt.
QUAD	JECT D. LOCA SERIE	TIOI S_			. 22 <u>. 13</u>		D	ATE ATE	, START_ , FINISH_	3/ 3/1	3/66 SU 6/66 DE	IRF. ELEV. 101.5 PTH TO WATER LSO DESCRIBE UNDER "REMARKS")
CASI SAMI		O.D. <u>1</u> O.D. <u>1</u>			I.D.	3•75 1•37	<u>"</u> V 5" I	VEIO NSII	OHT OF HA	MMER_ HOFSA	300# MPLER <u>18</u>	HAMMER FALL "CASING8" SAMPLER 18"
DEPTH BELOW ON DAY	CASING SAMPLE NO.		SAM	/S 0 PLEF 112 18	₹ 118 /	CROSS SECTION	MOISTURE	COLOR		DESCR		REMARKS
05*		(10	5-10)6.5)R	1. 3	M	Gr.	Sec. 1	of Silt		100 lbs. Hyd. Press psed to push _ sampler- T15
110	J 16	0	1	Ō			M	Gr.				
115	T17	(11	5-1	16.	5)R	1.3	M	Gr.	Very s	oft		75 lbs. Hyd. Press. used to push sampler- T17
1201	J18	0	1	1			М	Gr				
125	J1 9	(12	5-1	26.	5)R	1. 3	M	Gr				150 lbs. Hyd. Press. used to push sampler- T19
1301	J20	0 0	0	1			М	Gr				
135	TP2	(2)	35-1	36.	5)R	1.5	М	Gr	•			50 lbs. Hyd. Press. used to push sampler- T21
<u> </u>	J2:	2 0.	0	G)		М	Gr.				
145	T2	3(14	5-1	6.5	5)R	.2	М	Gr.		·		50 lbs. hyd. press. used to push sampler- T23
THE S FOR S AVAIL TO IS IS PI A SU	SUBSURFAC STATE DES LABLE TO	E INI BIDD INFOI IN G	FORM AND ERS RMAT OOD INV	ATION ESTINONLY ION FAI	N SHO	DWN H PURP T THE ABLE BUT	EREO OSES Y MA TO IS N	N WA	S OBTAINED	DRILLIN CONTR. D.P.W. I	SOILS TECHNOLOGY TO SOILS TECHNOLOGY TO SOILS E	TOR Sprague & Henwood, Inc. H. Dennis Emmerson J. Santoge NGR.
										SULEI	3_OF ¹	+ . HOLE NO. SB-10

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B.S. CON PRO	INTY M. P ITRA JEC VD. L	OCAT	NO M_	gto 2 Sou	n 34 th]		SU	BUI BSI age D	RTN REA URF Cro	TATE OF NE MENT OF F U OF SOIL ACE EXPL (CONTRACE SSING OF ROU	PUBLIC WO MECHANIC ORATION CT) Ite 22	CS LOG SUR	HOLE NO. (DH) SB-10 LINE & STACL 157/06 OFFSET 12' Rt. F. ELEV. 101.5
SOI CAS SAN	L SI	ERIE C R C	S).D	4.5	;tr	I.D.	3.7	D 5" v	ATE VEIG	FINISH HT OF HAM	3/16/66 MER 300#	_ DEP	TH TO WATER O DESCRIBE UNDER "REMARKS") HAMMER FALL CASINGIS" SAMPLERIS"
DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	(SAM	S O PLEF 12 18	N R 18 24	CROSS SECTION	MOISTURE	COLOR		ESCRIPTIO AND ROC		REMARKS
-50'- 152'-		J24	0	0		_		М	Gr.	Clay, trace silt-Very	e of soft		End of Hole
					201 (No.		1. A.					Driller: John Uporsky
			2.4		**.			P.					
			20 mm			7-3-kg		e de la companya de l		Forge out			
					Art .								
		12.00 (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	-C):	A	3.			1 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1					
							Service and		1 3 A.A.				
		## / W / W / W / W / W / W / W / W / W /											
						31							
THE FOR AVA	SUBS STAT ILABL IDENT PRESE UBSTI	URFAC E DES E TO ICAL	E INFIGURE	FORMAND ERS (RMATOOD INV	ATION ESTIMONLY ION / FAITESTIC	SHOWATE THAT	WN H PURP THE ABLE BUT	EREC OSES Y MA	N WA	S OBTAINED IT IS MADE VE ACCESS STATE. IT NTENDED AS ETATION OR	r be describ Drilling Con Contr. Soils	NTRACTO TECH. CTOR _ LS ENO	ACCORDANCE WITH CONTRACT DETAIL UNDER "REMARKS". OR Sprague&Henwood, Inc. Dennis Emmerson J. Santore GR. HOLE NO. SB-10

COU B.S. CON PRO QUA SOI	TRIC JNTY M. P NTRA DJEC AD. L L SI	ROJ. CT S T OCA ERIE	NO SM_ FION S_	ngte	234 Sout	1.D.	SU ay I	BUI JBSI Brid D D	REAURF BE (ATE	MENT OF PUBLIC WORKS AU OF SOIL MECHANICS FACE EXPLORATION LOG (CONTRACT) Crossing of Route 22 E, START 1/31/66 SURF. ELEV. 101.5 E, FINISH 2/28/66 DEPTH TO WATER (ALSO DESCRIBE UNDER "REMARKS") IGHT OF HAMMER 300# HAMMER FALL
	MPLE	R C).D.	2.0'		I.D.	•37	5" 1	NSI	IDE LENGTH OF SAMPLER 18" CASING SAMPLER 18"
DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.		LOW SAMI 6	PLEF	N 18 24	CROSS SECTION	MOISTURE	COLOR	FIELD DESCRIPTION OF SOIL AND ROCK REMARKS
1 1 1		10	1.0	67						SILT Some sand
355 <u>+</u> - - -		ी <u>.</u> ं	142	67	120)		M	Gr.	
360 <u>1</u>										Hard
36 5•		43	83	154	290			М	Gr.	SAND
370°										some silt
375 <u>+</u>			6	¥.						
- - 3801) _r } _t	117							
- - 385				21.3	258			М	Gr.	r. Very compact
- - - -				1.7 p				ā		
390 <u>'</u> - -										
395 ' -										
	CONDI		, MA	TERIA	ALS,	AND ER	LAYI	ERS	ENCC BSER	COUNTERED MUST BE DESCRIBED IN ACCORDANCE WITH CONTRACT REVATIONS MUST BE DESCRIBED IN DETAIL UNDER "REMARKS".
FOR AVA TO IS	STAT (ILABL IDENT	E DES E TO ICAL NTED TUTE	IGN A BIDDE INFOF IN GO FOR	ND ERS C RMATI OOD INVE	ESTIN ONLY ION A FAIT ESTIC	AATE THAT AVAIL TH.	PURP THE ABLE BUT	POSES TY MA TO TS N	· Y HA THE	DRILLING CONTRACTOR Sprague&Henwood, Inc. CONTR. SOILS TECH. Dennis Emmerson D.P.W. INSPECTOR John Santore DISTRICT SOILS ENGR. SHEET 8 OF 9 . HOLE NO. SB-11

FORM ON 287 - 112 164'

B.S. COI PRO	TRIC JNTY M. PI NTRA DJEC AD. LI L SE	ROJ. CT S T OCA	NO NO M_	ngto	34 Sou		SU Bay	BU BS Bri	ARTINEA URF	U OF SOI ACE EXP (CONTR	PUBLIC WOF L MECHANIC LORATION ACT) of Route 22 1/31/66	LOG LOG SURF	HOLE NO. SB-11 LINE & STACL 157/06 OFFSET 12' Left ELEV. 101.5 H TO WATER D DESCRIBE UNDER "REMARKS")
CAS SAI	SING MPLE	R C).D,2).D,2	•75' •0"	17	I.D. I.D1	2.5	5" V 5" I	NEIG NSII	SHT OF HAI	MMER 300# HOF SAMPLE		HAMMER FALL CASING SAMPLER SAM
DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.		LOW SAMI	PLEF	₹	CROSS SECTION	MOISTURE	COLOR		DESCRIPTION L AND ROCK		REMARKS
										Fill Mat from O' No sampl		fill	Used "B" rods 0'-21'- 6" pipe 21'-60'- 4" pipe 60'-250'- 22" pipe
	· .									No blows from O'	on 6" pipe to 21!		
-	42 28 31								· · · · · · · · · · · · · · · · · · ·				Reduced to 4" pipe at 21'
25 <u>'</u> - - - -30 <u>-</u>	46 52 48 50 62 53												
35 <u>-</u> 35 <u>-</u>	186 178 186 172 169 243	1	5	7					~		· · · · · · · · · · · · · · · · · · ·		
710 1	3 45 51 5 565	2	7	2	4			M	Gr.	CLAY Some grader of silt-	vel, trace firm		
452	238 175 270 380 220	3	4	3	3					CLAY Trace of	silt		
50 · _	385 490 520 625	14 TIONS	3	ŽĮ.	3 4	AND	LAYF	M M	Gr.		ST BE DESCRIB	ED IN	ACCORDANCE WITH CONTRACT
THE FOR AVA	SUBSI STATI ILABLI IDENT PRESEI	URFACI E DES E TO I CAL NTED TUTE	E INFIGURE	FORMA AND E ERS C RMATI	ATION ESTIM DNLY ION A FAIT	SHOWATE	DWN H PURP THE ABLE BUT	ERECOSES Y MA TO	N WAS	S OBTAINED IT IS MADE VE ACCESS STATE. IT NTENDED AS ETATION OR	ST BE DESCRIB Drilling con'	TRACTO TECH. TOR S ENG	Dennis Emmerson John Sentore

B.S COI	TRIC JNTY .M. P	<u>Was</u> ROJ. CT S	Shin NO SM	gtor 234			SU	BU BS	REA URF	TATE OF MENT OF U OF SOI ACE EXP (CONTR	PUBLIC N L MECHA PLORATIO (ACT)	NICS N LOG	HOLE NO. SB-11 LINE & STA. CL 157/06 OFFSET 12' Left
QU	OJEC AD. L IL SI	OCA	TION	۱				_ D	ATE	ssing of I ,START_ ,FINISH_	1/31/66	SURF	ELEV. 101.5 H TO WATER
8	SING MPLE	R C).D.2).D.2	•75 •0"	<u>''</u>	I.D. I.D.	2.5° •37	" V 5" I	VEIG NSI	OHT OF HA	MMER3 H OF SAME	800# PLER <u>18"</u>	HAMMER FALL CASING18" SAMPLER18"
O BELOW SURFACE	133	SAMPLE NO.		LOW SAMI		₹	CROSS SECTION	MOISTURE	COLOR		DESCRIPT		REMARKS
55'—	330 455 516 685 495 630 675 590 710	5	5	4	5			M	Gr•	CLAY Trace of	f silt		
65 ' -	9 10 11 13 20 21 26 26	-6 -7	2	2	<u>1</u>			M	Gr.	CLAY			Reduced to 2½" pipe at 60'
-70¹ - 75¹	25 26 27 25 34 29 27 27	8	1	2	4_				Gr.	Very sof			
- - - - - -	22 34 34 24 38 37 46	10	0	1	1			M	Gr.				
85 <u>*</u> -90*	38 76 54 63 62 54 61 42	11	2		1			W	Gr Gr				
951	51 48 57 53 45 56 62 61	13	1	2	1			W					
THE FOR AVA	E SUBS R STAT ALLABL IDENT PRESE	URFAC E DES E TO ICAL NTED TUTE	E INFOR	FORMA AND E ERS C RMATI	ATION ESTIM DNLY ION A FAIT	SHO	WN H PURP THE ABLE BUT	EREC OSES Y MA	N WAS	STATE. IT NTENDED AS ETATION OR	DRILLING (CONTR. SO D.P.W. INS DISTRICT S	CONTRACTO OILS TECH. PECTOR SOILS ENG	ACCORDANCE WITH CONTRACT DETAIL UNDER "REMARKS". R Sprague&Henwood, Inc. Dennis Emmerson John Santore R. HOLE NO. SB-11

B.S COI PR	TRIC UNTY .M. P NTRA OJEC	ROJ. CT S	NO.	gtor 2	234 Sou	- l	SU Bay	BUI BSI Bri	RTN REA URF	TATE OF MENT OF U OF SOI CONTROL CONTR	PUBLI L MEC PLORA ACT)	C WO CHANI TION	CS LOG	HOLE NO. LINE & ST. OFFSET	A. CL 1577 12' Left	<u>40</u> 6 —
SO	AD. L IL SI SING	ERIE	S).D.2	•75'	21	I.D.	2.	D 5" V	ATE VEIC	HT OF HA	2/28, MMER	/ <u>66</u> 300	DEPT (ALSO		R ER "REMARKS ER FALL	
SAI		R C).D	2.0'	<u> </u>	I.D.	•37	<u>5" I</u>	NSI	DE LENGT	H OF SA		ER <u>18"</u>	CASING18"	SAMPLERLE	<u>3"</u>
DEPTH BELOW SURFACE	1 44	SAMPLE NO.	5	LOW: SAMP	PLEF	} '	CROSS SECTION	MOISTURE	COLOR	FIELD OF SO				REMA	ARKS	
105'	48 54	15	0	0	1		ř	M	Gr.	CLAY Very sof	, ት የመጀመሪ የ ቴ					
1101	45 m 25 m	16	1	0	ា្ន			М	Gr.	CLAY Trace of						
115	149 52 60 54 69	17	1	0	0			M	Gr.	very so	rt					
120	70 60 61 71 73 67	18	1	0	1			W	Gr	CLAY						
130	74 81 78 85 86 83	19	0	0		4										
1351	90 95 103 96 98				1			M	Gr	. Very s≎			÷			
340°	93 84 85 90 76	20	1	14	5			М	Gr	Soft	^					
145	81 83 84 80 92 86									· · · · · · · · · · · · · · · · · · ·						
	87 81 CONDI) MÁ	TERIA	LS, WATI	AND	LAYI	ERS	ENC	OUNTERED MU	ST BE	DESCRI	BED IN	ACCORDANCE V	"REMARKS"	•
FO AV TO IS A	R STAT ALLABL IDENT PRESE	E DES E TO ICAL NTED TUTE	IGN A BIDDE INFOR IN GO FOR	ND ERS CRATION	STIM ONLY ON A FAIT	AATE THAT AVAIL TH.	PURF THE ABLE BUT	POSES TY MA TO TO	Y HA THE	S OBTAINED IT IS MADE VE ACCESS STATE. IT NTENDED AS ETATION OR	CONTR D.P.W. DISTRI	NSPE	S TECH. CTOR ILS ENG	John Sante	nerson Fre Line	sce

B.S COI	TRIC UNTY .M. P NTRA	<u>₩</u> ROJ. CT S	shi NO	ngte 	231	 	SL	BU JBS	REA URF	MENT OF PUBLIC WORK U OF SOIL MECHANICS FACE EXPLORATION L (CONTRACT)	}	HOLE NO. LINE & ST. OFFSET	SB-11 A. <u>CL 157</u># 2' Left	<u>06</u> —
QU	OJEC AD. L IL SI	OCA"		I			ay ı	D	ATE	rossing of Route 22 , START 1/31/66 , FINISH 2/28/66	SURF DEPT	ELEV. 10 H TO WATE DESCRIBE UND)1.5 R	_
	SING	R C).D	2.0	<u> </u>	I.D.1	2. •37	5"	NEI(OHT OF HAMMER 300# DE LENGTH OF SAMPLER		НАММ	ER FALL	
O BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	5	LOW SAMF	PLEF		CROSS SECTION	MOISTURE	COLOR	FIELD DESCRIPTION OF SOIL AND ROCK		REMA	\RKS	
-	83 97 84 92									· 《意义传》。				
15 5' - -	91 98 98	2 (4) 2 (2) 2 (2)		*										
160-	104 96	22	0	O .5	1			W	Gr.					
165 <u>'</u>	113 126 110 103 99									TO CLAY STEED TO SEE				
-70 <u>*</u>	126 112 140 147	23	O	O .s						Very soft				
-	93 141 153 128	<i>E.</i>)			2			W	Gr.					
175-	135 104 116													
1801	116 125 145 139	24	6	၀	1		-	W	Gr.					
1851	165 177 189 147													
1901	Tor	25	0	2 2 4				W	Gr.					
ـــــــــــــــــــــــــــــــــــــ	132 155 137 164				0									
-	153 172 187 185			4.7	1			**						
ALL	196 CONDI	TIONS		ERIA					ENC	DUNTERED MUST BE DESCRIBED INTERED MUST BE DESCRIBED DRILLING CONTR	NI C		"REMARKS"	ŀ
FOF AVA TO	R STATALLABL IDENT PRESE	E DES E TO ! ICAL NTED	IGN A BIDDE INFOR IN GO	ND ERS C	STIN ONLY ON A	AATE THAT AVAIL	PURP THE ABLE BUT	OSES Y MA TO IS N	Y HA THE	S OBTAINED IT IS MADE VE ACCESS STATE. IT NTENDED AS CONTR. SOILS T D.P.W. INSPECTO DISTRICT SOILS	ECH OR	John Santo	erson	_
A S	OGMENT	OF TI	HE BI	DDER	8.	ALIC	, CANC	INT	EKPR	SHEET 4 OF	9	. HOLE	NO. SB-11	<u>/</u>

B.S. COI PRO	TRIC JNTY .M. P NTRA DJEC AD. L	ROJ. CT S T OCA	NO SM_	23 S	on 4	h Be	SU	BU BS ride	REAURF	OF SO CONTROL OF	PUE IL M PLOF RACT) Reu 1/31	ECH RATION te 22	WORKS ANICS ON LO	G URF.	HOLE NO LINE & S OFFSET_	TA CL 1 12'	57 / 06 Left	- -
CAS	IL SI SING MPLE	(.S _).D, <u>2</u>).D. 2				2.5 37	<u>"</u> V	VEIG	HT OF HADE LENGT	AMME	R	300#		H TO WAT DESCRIBE UN HAMI CASING ¹⁸	MER FA	11	
DEPTH BELOW F SURFACE	BLOWS ON CASING	SAMPLE NO.		SAMI	S O PLEF 12 18	₹ 18/	CROSS SECTION	MOISTURE	COLOR	FIELD OF SO					REM	IARKS		
2051	141 180 215 203 217 233 495										÷							
2104	215	27	8	11	16			М	Gr.	CLAY Some si	1t							
2201	262 280 320 305 204 213 234 265	28	4	7	8			М	Gr				ty.					
225 ¹	271 337 295 307 352 372 435 420	29	7	17	16			М	Gr	Firm								
23 51	398 395 408 415 417 417	30	4	8	7		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	M	Gr	•								
2401 - 245	365 385 423 441 395 435 355 440	31	5	7	8			M	Gr.) 								
SPEC	495 410 390 CONDI	IONS		ALL	ALS, WATE	ER I	LEVE	L O	BSER	OUNTERED MIVATIONS MU	DRIL	E DES	SCRIBED CONTRA	IN D CTOR	CCORDANCE ETAIL UNDER Sprague&I Dennis Et	R "REMA Henwood	RKS".	I
FOR AVA TC IS A S	STATE ILABLE IDENT	E DES E TO ! I CAL NTED TUTE !	IGN ABIDDE INFOR IN GO FOR	ND E RS C MATI OD	STIM NLY ON A FAIT	ATE THAT VAIL	PURPO THE ABLE BUT	OSES Y MA TO IS N	· 1 Y HA\ THE S	IT IS MADE	D.P.V	V, IN	OILS TEC SPECTOR SOILS E	NGR	John Santa	T. K	SB	- /

ODE ON DET - 119 /64'

COU B.S. COM PRO QUA SOI	TRIC JNTY .M. P NTRA OJEC AD. L IL SE	ROJ. CT S T OCA ERIE	NO SM_ TION S _	ngte 2 So V	n 34 uth		SU Br:	BUIBS	RTM REA URF Cro	TATE OF NEW YORK MENT OF PUBLIC WO U OF SOIL MECHAN ACE EXPLORATION (CONTRACT) DISSING OF ROUTE 22 , START 1/31/66 , FINISH 2/28/66	LINE & STA. CI. 157/06 OFFSET 12' Left SURF. ELEV. 101.5 DEPTH TO WATER (ALSO DESCRIBE UNDER "REMARKS")
	MPLE	R C).D. 2	2.0"		I.D.	37	5" l	NSI	DE LENGTH OF SAMPL	ER 18" CASING18" SAMPLER 18'
DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	0 /	SAMI	S O PLEF 12 18	R 18	CROSS SECTION	MOISTURE	COLOR	FIELD DESCRIPTION OF SOIL AND RO	TEMANNS
-										CLAY	End of Casing 250'
255 <u>'</u>								:		Trace of Silt	
256 <u>1</u>		32	7	6				м	Gr.	t e	
			•		7			**			
2601											
2651										- Sarta af a - 13 and a sarta and a	
		33	5	7	7			M	Gr.	Firm	
reconstructor											
2704			1.						1		
-		- 4			;					4r. 2	
275		34	12	16				м	Gr.		
_		_3*	-23	10	25			1.1		CLAY some silt	
2801											
		3. j			2.5				4 -	araba	
	4 · · · · · · · · · · · · · · · · · · ·									Stiff	
28 5		35	5	14				M	Gr.		
					32					CLAY AND SILT	
-5991 -										***	
							.				
295±		36	32	28			-	М	Gr	Hard	
-					36		1				
B00 '_				<u> </u>			1				
	CONDI		, MA	TERI	WAT	AND ER	LEVE	LRS L O	BSER	VATIONS MUST BE DESCR	RIBED IN ACCORDANCE WITH CONTRACT
FOR AVA	R STAT	E DES E TO: ICAL	IGN A BIDDE INFOR	AND ! ERS (RMAT	ESTIN ONLY ION A	AATE THAT AVAIL	PURP THE ABLE	OSES Y MA	Y HA	CONTR. SOIL CONTR. SOIL CONTR. SOIL CONTR. SOIL CONTR. SOIL CONTR. SOIL CONTR. SOIL CONTR. SOIL	ECTOR John Santore
IS A S	PRESE	NTED TUTE	IN GO FOR	DOD INVI	FAI1 ESTI	гн.	BUT	15 N	OT 1	DISTRICT SO ETATION OR SHEET 6	DILS ENGR.

207 -

110 100

COUN B.S.M. CONT PROJ QUAD	RICT NOT TY WE TO THE TOTAL THE TOTA	NO SM TION_	234 South	SL Bay	BUI BSI Brid	RTN REA URF ge (U OF SOI	PUBLI L MEC PLORA RACT) f Route 1/31/6	C WORKS CHANICS TION LOG	HOLE NO. LINE & ST OFFSET RF. ELEV. PTH TO WATI SO DESCRIBE UNI	TA.CL 157400 12' Left 101.5	_
CASIN	NG C).D, 2.	75" I.I	D. <u>2.5</u> DJ.37	<u>" V</u>	VEIG	HT OF HA	MMER	(ALS 300#		MER FALL	
DEPTH BELOW SURFACE BLOWS ON	CASING SAMPLE NO.	SA	WS ON MPLER 12 18 2 18	CROSS SECTION	MOISTURE	COLOR		-	RIPTION D ROCK	REM	ARKS	
3051	37	15 23	37		M	Gr.	CLAY Trace of	' Silt				#
3101	38	27	+1		M	Gr.	Hard					
320			83				SILT Trace of	clay				
339	39	9 1	26		M	Gr.	SILT Trace of Hard	f sand				
335	119	25 5	3 102		M	Gr	SIIT Some sa Hard	nd				
345*			3 186		M	Gr						
THE SI FOR S' AVAIL, TO 101 IS PRI A SUB	UBSURFAC TATE DES ABLE TO ENTICAL	E INFOR	MATION SESTIMATION AVAILABLE FAITH	SHOWN HITE PURPHAT THE ALLABLE	IEREO OSES Y MA	N WAS	S OBTAINED	DRILLII CONTR D.P.W. DISTRI	DESCRIBED IN NG CONTRACT . SOILS TECH INSPECTOR _ CT SOILS EN		R "REMARKS". Henwood, Inc. merson	ses

B.S COI PRO	TRIC JNTY .M. P NTRA DJEC AD. L	ROJ. CT S T OCA	Wash NO SM_	23 V	ton 4 S	l	SU Ba	BUI JBS y Bi	REA URF cidg		HOLE NO. SB-11 LINE & STA.CL 157/06 OFFSET 12' Left F. ELEV. 101.5
CA:	SING MPLE	-).D. 2	2.75	511	I.D.	2.	5" V	VEIC	GHT OF HAMMER 300# DE LENGTH OF SAMPLER 18	TH TO WATER O DESCRIBE UNDER "REMARKS") HAMMER FALL CASING18"SAMPLER 18"
DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	;	SLOW SAMI	PLEF	₹ .	CROSS SECTION	MOISTURE	COLOR	FIELD DESCRIPTION OF SOIL AND ROCK	REMARKS
# ⊕0'- - - - - - - -		45		252				M	Gr.	SAND some silt	
410'							,				
-15 <u>'</u> - - -									SW ST		
425 <u>:</u>										Very compact	
- - 430- 431-		д 6	192	1	400			M	Gr.		
											End of Hole 431' Driller: John Uporsky
				3							
THE FOR AVA TO IS A S	SUBSI STATE ILABLE IDENTI	JRFACE E DES E TO S I CAL NTED TUTE F	E INFIGN ABIDDE	ORMA AND E ERS C RMATI	TION ESTIM ONLY ON A FAIT	SHO	WN H PURP THE ABLE BUT	EREO OSES Y MA TO IS N	N WAS	DUNTERED MUST BE DESCRIBED IN EVATIONS MUST BE DESCRIBED IN DRILLING CONTRACTOR CONTR. SOILS TECH. D.P.W. INSPECTOR DISTRICT SOILS ENGINEER STATE. IT OF SHEET 9 OF 9	DETAIL UNDER "REMARKS". OR Sprague&Henwood, Inc. Dennis Emmerson John Santore

EUDIN DIN 282 - (12 /6/)

STATE OF NEW YORK DISTRICT NO. Wosh. DEPARTMENT OF TRANSPORTATION HOLE NO. \triangle SOIL MECHANICS BUREAU LINE & STA. SUBSURFACE EXPLORATION LOG B.S.M. PROJ. NO. (STATE FORÇES) OFFSET. South Dridge PROJECT QUAD. LOCATION DATE, START_ DATE, FINISH SURF. ELEV. SOIL SERIES DEPTH TO WATER (ALSO DESCRIBE UNDER "REMARKS") WEIGHT OF HAMMER 300 CASING O.D. 2.9 I.D. 2.3 SAMPLER O.D. 2.0 I.D. 1.4 HAMMER FALL INSIDE LENGTH OF SAMPLER 15 CASING 15 SAMPLER 15 BLOWS ON Š BLOWS ON MOISTURE DEPTH BELOW SURFACE **DESCRIPTION** SAMPLER **REMARKS** OF SOIL AND ROCK 6 12 18 24 Water. Pontoon Boring 5. fone. Zo_ 10 30 Silt some clay 50ft-Plastic. Gr. W 56nders. THE SUBSURFACE INFORMATION SHOWN HEREON WAS OBTAINED DRILL RIG OPERATOR __ FOR STATE DESIGN AND ESTIMATE PURPOSES. IT IS MADE Frida SOIL DESCRIPTIONS _ AVAILABLE TO BIDDERS ONLY THAT THEY MAY HAVE ACCESS TO IDENTICAL INFORMATION AVAILABLE TO THE STATE. IT IS ROCK DESCRIPTIONS. PRESENTED IN GOOD FAITH, BUT IS NOT INTENDED AS A SUB-DISTRICT SOILS ENGR. _ STITUTE FOR INVESTIGATIONS, INTERPRETATION OR JUDG-

HOLE NODA-P

SHEET __OF _____

MENT OF THE BIDDER.

B.S	TRICUNTY .M. P	roj. T	NC S	1/0) 00	is H	·	ay	- - - - -	SUBS	STATE OF ARTMENT OF T DIL MECHAN SURFACE EX (STATE I C/GC	RANSPORTATION PLORES) LOG 00 - / 0)	HOLE NO. D.A-P-/ LINE & STA. OFFSET RE ELEV.	_
so	IL S SING MPLE	ERIE	S_		· · · · · · · · · · · · · · · · · · ·	I.D.ć I.D. ر	<u> </u>	_ D _ [\	ATE WEI	HT OF HADE LENGT	AMMER 3	00	RF. ELEV. PTH TO WATER SO DESCRIBE UNDER "REMARKS HAMMER FALL CASING SAMPLER	")
) DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.		SAM	VS O		CROSS SECTION	MOISTURE	COLOR	1	SCRIPTION IN THE PROPERTY OF T	31	REMARKS	
50 = -	37 49	1	1	1	1		5 2			5,H50 Soft-	me clo	Ž	Piezometer	
-					-					End	52		Piezometer Set at 52'	
_														H
-														
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									,	CAN'S BALESCOMMINGS				
_										E.C. Market Company of the Company o		en en en en en en en en en en en en en e		
-										ANT AND AND AND AND AND AND AND AND AND AND				H
-										2 Market Control Transit				
											<u> </u>			山
FOF AV TO PRE STI	R STAT AILABL IDENTI ESENTE	E DES E TO E CAL IN D IN G FOR IN	IGN IDDE FORM OOD IVEST	AND RS OI MATIC FAITI FIGAT	ESTI NLY ⁻)N AV H, BU	MATE THAT 'AILAI T IS	PUR THEY BLE T NOT I	POSE MAY O TE NTE	ES. IT Y HAV HE ST NDED	OBTAINED IS MADE /E ACCESS ATE. IT IS AS A SUB- OR JUDG-	SOIL DES ROCK DE DISTRICT	CRIPTION: SCRIPTIO SOILS E	NGR.	_ _ _ _ _
WE	,, UI (IIL DIL	, J L I\.				Parallel Market			***	SHEET_	2 OF 2	HOLE NO DA-1	<u>~</u> [

B.S	TRIC JNTY .M. P	ROJ.	NO.				•		S	OIL MECHAN	RANSPORTATION IICS BUREAU (PLORATION LOG FORCES)		HOLE NO. D. A P. C. LINE & STA	2
QU/	OJEC AD. L	OCA	TIOI		h	/3	ay	D	ATE	dge , START_	(1/19.00-		ELEV	_
	IL SE									, FINISH	L	(ALSO	H TO WATER DESCRIBE UNDER "REMARKS	<u>s")</u>
SAI	SING MPLE	R C).D. <u>2</u>).D	2.2	<u> </u>	I.D.4 I.D. 2	2, 3 1, 4		WEIG NSI	OF LENGT	AMMER 300 TH OF SAMPLER	15	HAMMER FALL CASING 1.5 SAMPLER	1.5
DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.		SAMI	PLEF	?	CROSS SECTION		COLOR	DE	ESCRIPTION DIL AND ROCK		REMARKS	·
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	54		ļ											
	435													H
_	10						Q							H
	10	· ·				_								
	6													
26_	<i>10</i>													+
	9													A
_	Q												·	
	2													
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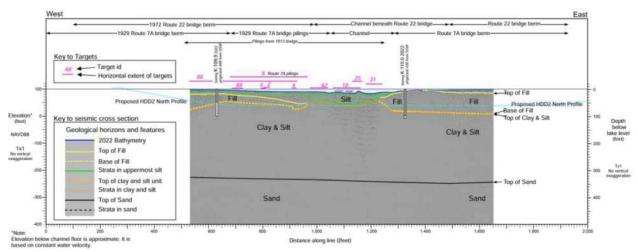
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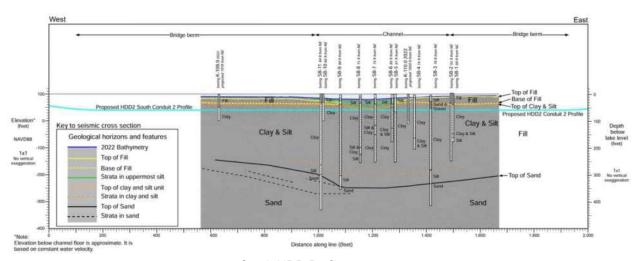
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North HDD Profile



South HDD Profile

REPORT June10, 2022



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Executive Summary

Schnabel Engineering has contracted inSight LLC to conduct a geophysical investigation in support of horizontal directional drill (HDD) design and construction at Route 22, South Bay, in Whitehall NY. Schnabel contracted inSight, LLC (inSight) to collect multibeam bathymetry, sidescan sonar, magnetic field, and reflection seismic data in the vicinity of a horizontal directional drill for the Champlain Hudson Power Express cable installation below South Bay in the vicinity of the Route 22 bridge.

inSight's investigation includes both single and multibeam bathymetry, side-scan sonar, magnetic field, and reflection seismic measurements. Insight collected single beam bathymetry in addition to the multibeam bathymetry to QC the multibeam data. inSight also integrated historical surveys and existing geotechnical borings to aid in the interpretation of and provide context to map major stratigraphic horizons, locate the presence of existing utilities, and locate shallow obstructions to construction inside and outside the area of investigation (AOI). inSight conducted geophysical surveys, integrated data, and interpreted the results. The goal of the geophysical investigation was to support HDD planning, design and construction.

inSight conducted geophysical investigations between April 23rd and April 25th, 2022. inSight surveyed the area during a period of high water. The water level at the time of survey was approximately 3 feet above normal. The high water level allowed inSight to cover more of the area of investigation from bank to bank than previously expected. The lake level at the time of survey ranged between 98.5ft and 98.9ft NAVD88.

Top of rock was not interpreted in the seismic record. Between approximately -150ft NAVD88 and -225ft NAVD88 seismic data shows evidence of a layer of sand. The top of this sand horizon is benchmarked by borings SB-11 and SB-3. Above the sand unit are alternating layers of lacustrine clays and silts. Surrounding the current Route 22 bridge and the 1913 Route 22 bridge layers of fill were interpreted in the subsurface from the seismic data. The base of fill in the vicinity of the northern planned HDD route varies between approximately 50ft NAVD88 in the west and 0ft NAVD88 in the east. The base of fill horizon is variable along the pathway of the northern proposed HDD. Near the southern proposed HDD pathway, the base of fill ranges from approximately 40ft NAVD88 in the west to 80ft NAVD88 in the east. Recent sediments drape the top of fill at both proposed HDD pathways.

No existing discernable utilities were detected by inSight's investigation.

Upright pilings mapped by side-scan orthosonographs along the northern proposed HDD pathway may present obstacles to HDD installation. The pile-tip elevations are not measurable by the methods employed in this geophysical investigation. Upright piles cut below the waterline are visible in side-scan orthosonographs. Numerous hulls of wrecked vessels lie on the floor to the north of proposed northern HDD pathway. Six wrecks have been cataloged by the New York State Museum. These wrecks along with accumulated debris in the vicinity of the northern proposed HDD pathway limited the ability of the seismic pulses to penetrate the subsurface. There may be obstructions in the subsurface that lie below surface debris along the northern proposed HDD pathway not identified in this investigation.

To the south of the proposed southern HDD pathway on the eastern half of the crossing there are two discrete targets (Target 74 and Target 75) interpreted from the magnetic field data. in Sight has interpreted these targets to be in the shallow subsurface; they are likely contained within the layer

of fill. inSight does not see evidence that the anomalies are related to components of the current Route 22 bridge.

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1.0 Introduction

Schnabel Engineering (Schnabel) is conducting a geophysical investigation in support of horizontal directional drill (HDD) design and construction in Whitehall NY. Schnabel contracted in Sight, LLC (in Sight) to conduct a geophysical investigation to collect single- and multibeam bathymetry, side-scan sonar, magnetic field, and reflection seismic in the vicinity of a horizontal directional drill for Hudson Power Express cable installation below Lake Champlain in the vicinity of the Route 22 bridge.

inSight's investigation includes single- and multibeam bathymetry, side-scan sonar, magnetic field, and reflection seismic. inSight also integrated historical surveys and existing geotechnical borings to aid in the interpretation of and provide context to map major stratigraphic horizons, locate the presence of existing utilities, and locate shallow obstructions to construction inside and outside the area of investigation (AOI). The area of investigation is shown in Figure 1. inSight conducted geophysical surveys, integrated data, and interpreted the results. The goal of the geophysical investigation was to support HDD design and construction.

The location of all data from the geophysical investigation are referenced to North American Datum of 1983 [NAD83 (2011)] New York State Plane East. The units are US Survey ft. All elevations are referenced to North American Vertical Datum of 1988 (NAVD 88).

Table 1. Project timeline.

Item	Tasks	Description	Completed
1	Mobilization	Mobilization of equipment & personnel to site.	2022.04.22
2	Field work	Geophysical field work completed	2022.04.25
3	Processing	Bathymetry	2022.05.15
4		Side scan	2022.05.15
5		Magnetic field	2022.05.15
6		Reflection seismology	2022.05.15
7	Integration	Processing, integration, and interpretation	2022.06.03
8	Report	Draft report	2022.06.10
9	Report	Final Report	2022.06.15



2.0 Scope of Work

The following is the scope of work that defined the investigation at the beginning of the project. It is referenced in this report in the past tense. Section 3 on Methodology presents any additions or changes to the original scope of work.

The inSight team was to conduct the tasks presented below. The area of investigation, is located in the South Bay of Lake Champlain.

The following tasks will be performed:

- Task 1 Mobilization
- Task 2 Multibeam bathymetry acquisition and processing
- Task 3 Side-scan acquisition and processing
- Task 4 Magnetic field acquisition and processing
- Task 5 Seismic acquisition and processing
- Task 6 Data integration, interpretation, and mapping
- Task 7 Letter Report

2.1 Task 1 – Mobilization

Insight proposed to provide all personnel, equipment, and vessels necessary to perform the geophysical investigation.

2.2 Task 2 – Multibeam bathymetry

2.2.1 Multibeam bathymetry acquisition

inSight, LLC proposed to use an Edgetech 6205 multibeam echosounder to map the bathymetric elevations of the area of investigation. The MBES was to be paired with an RTK GNSS receiver with dual GPS antennae and an IMU. Data was to be collected and edited in Quinsy, PDS, or HYPACK software.

XYZ data output from processing software can be imported into AutoCAD, Microstation, ESRI, or other Geospatial Information System (GIS) software for presentation or integration for design purposes.

Four measurements are critical to establish elevation. These are: (1) velocity of sound in water, (2) travel time of acoustic wave from source to first break, (3) lever arm offsets and sensor calibration, and (4) water level (tide stage). inSight uses a Castaway CTD to measure the velocity of sound in water. Lever arm offsets are measured during the installation of the multibeam echo sounder (MBES), the inertial motion unit (IMU), and the GPS antennae. inSight records local water level measurements using Real Time Kinetic (RTK) Virtual Reference Station (VRS) GNSS aided GPS. inSight creates water level corrections for the waterline elevations in the area of investigation based on the RTK water levels and compares these to the water level data recorded at a local tide gauge. If no local tide gauge exists, inSight will set up a temporary gauge for the duration of survey activities.

Horizontal accuracy of the single beam bathymetry was predicted to be approximately +/- 0.2ft. Vertical accuracy was predicted to be approximately +/- 0.2ft. inSight also acquired single-beam bathymetry as a redundant supplement to multibeam bathymetry.

2.2.2 Multibeam bathymetry processing

Hypack combines position data with sensor data. Iterative patch testing was to be performed to ensure that the yaw, pitch, and roll values assigned to the sensor are accurate and that motion artifacts are minimized. Cursory analysis of the multibeam data focuses on identifying spurious data points (i.e., fish, debris, or aquatic vegetation) both manually and through statistical analysis of the dataset. Once the data are cleaned and all artifacts removed, the operator exports data as an average, median, and minimum XYZ file in a specified bin size (1ftx1ft or 3ftx3ft).

To create surface maps or contours of the XYZ point files, inSight uses Golden Software's Surfer to grid and contour the data. Surface maps are exported as geotiffs. Contours are exported as .dxf files. geotiff and .dxf files are then imported into QGIS and AutoCAD software to create maps and figures. XYZ point files were to be delivered with the final report.

2.3 Task 3 – Side-scan reflectivity mapping

2.3.1 Side-scan data acquisition

inSight planned to use an Edgetech 4205 or an Edgetech 6205 at 540kHz to produce side-scan orthosonographsTM.

The side-scan sonar transmits ultrasonic waves obliquely into the water and measures the amplitude of the backscatter from the lake bottom as a function of range. The reflectivity is a function of the lake bottom roughness and the sediment acoustic properties. These reflectivity images produce a high-definition picture of the debris, structures, and sediments on the lake bottom.

inSight planned to survey the area of investigation with lines parallel to the Rt. 22 bridge. Line spacing was planned at 30ft spacing. Line spacing is designed to allow sufficient overlaps in coverage so that inSight can produce seamless orthosonographs that utilize the ideal ranges of the reflectivity data. Portions of the data where the signal attenuates beyond inSight standards are removed.

Horizontal accuracy of the side-scan measurements is approximately +/- 6ft. Side-scan measurements require at least 6ft of water to effectively measure the river floor reflectivity.

2.3.2 Side-scan reflectivity data processing

Side-scan images produce 100% coverage with 100% redundancy and 200% overlap of the lake bottom in the areas of investigation. The two independent orthosonographs insonified from two directions suffice to constitute the 200% redundancy. Orthosonographs are seamless aerial-photograph-like images that are insonified from one direction only. The resolution of inSight orthosonographs is 0.3ft per pixel.

2.4 Task 4 – Magnetic field mapping

2.4.1 Magnetic field data acquisition

To identify utilities and ferromagnetic obstructions to drilling and HDD construction, inSight measures local anomalies in the Earth's magnetic field using a Geometrics G-882 cesium magnetometer with a depth sensor and altimeter. Magnetometers are towed at least 100ft behind the vessel and between 5-15ft above the lake floor. Magnetometer lines will be parallel and perpendicular to the bridge and will be spaced to provide sufficient overlap in coverage.

Horizontal accuracy of the magnetic field measurements is approximately +/- 5ft. Magnetic field measurements require at least 4ft of water to effectively deploy and tow gear.

2.4.2 Magnetic field data processing

The data is evaluated line by line. The evaluation removes any measurement artifacts. The data is gridded using triangulation with linear interpolation. Derivatives of the magnetic field data are mapped to see greater detail in areas of large total magnetic field deviation.

2.5 Task 5 – Reflection seismology

2.5.1 Seismic reflection data acquisition

inSight proposed to employ an Edgetech SB-512i Sub Bottom Profiler. Reflection seismic works like single-beam bathymetry. The much lower frequency seismic waves, however, penetrate the mudline and reflect off the strata in the subsurface. Reflection seismology provides cross sections of the strata and when multiple lines are interpreted, seismic data yields surfaces that are interpolated between data points.

Horizontal accuracy of the reflection seismic measurements is approximately +/- 5ft. At best, accuracy in the vertical elevation of seismic results is approximately 0.5-1.0ft for every 10ft of penetration into the lake floor. Seismic measurements require at least 6ft of water to safely navigate.

2.5.2 Seismic reflection data processing

inSight processes the seismic lines using wave-equation migration. Every seismic section is migrated according to a constant velocity model using water velocities measured on site during the seismic survey.

Geological interpretation of reflection seismology requires physical confirmation by SPT boring or another subsurface sample types.

2.6 Task 6 – Data integration, interpretation, and mapping

After processing each single-tool measurement, inSight was to integrate each data type into Kingdom seismic processing software and GIS and AutoCAD spatial reference software. inSight uses redundant measurements to quantify all results. Each survey is calibrated in the local area with a proprietary test. All measurements are processed independently and integrated into a single georeference frame after processing. Redundant measurements (repeat lines or scans) quantify the precision and delineate uncertainty in the measurements. Repeat lines are not always delivered to the client but are available for review upon request.

Side-scan results were to be interpreted for geomorphology, sediment type, obstructions, utilities, and infrastructure. Seismic data were to be interpreted to delineate major stratigraphic units and shallow subsurface obstructions. Magnetic data were to be interpreted for indications of utilities and ferrous targets.

At each stage of the workflow in Sight data retains its geo-referenced location.

inSight produces a series of surface maps, contours, and ASCII text files from the bathymetry. Orthosonographs provide detailed images beyond the bathymetry. Geotiffs are delivered to the client and can be inserted into AutoCAD, ESRI, or other GIS software. Magnetometer results are overlaid on the orthosonographs to show where the magnetic anomalies appear. Magnetic field contours can be delivered as .dxf or as geotiffs. Target maps are created that identify and categorize both geomorphic and anthropomorphic features on or above the lake floor. Targets are presented in tables, as maps, and as .dxf files.

2.7 Task 7 – Letter report

A letter report is to include PDF figures of all primary results. The report is to state the scope of work, methodology, results, and major conclusions from the investigation.

Method applied

Multi-beam bathymetry Horizontal accuracy ~ ±0.2ft Vertical accuracy~ ±0.2ft

Sub-bottom reflection seismology (10kHz) Horizontal accuracy $\sim \pm 1.5 ft$ with dGPS Vertical accuracy $\sim \pm 1.0 ft$ for every 10ft of penetration. Vertical precision $\sim \pm 0.5 ft$

By correlating the measurements, in Sight estimates the following: Subsurface horizontal accuracy $\sim \pm 5 {\rm ft}$ Subsurface vertical accuracy $\sim \pm 1.0 {\rm ft}$ for every 10ft of penetration. Subsurface vertical precision $\sim \pm 0.5 {\rm ft}$

3.0 Methodology

3.1 Task 1 – Mobilization

inSight mobilized survey equipment, a shallow-draft survey vessel and a crew of three persons to the project site without incident.

3.2 Task 2 – Multibeam bathymetry

3.2.1 Multibeam bathymetry acquisition

inSight used an Edgetech 6205 to map the bathymetric elevations of the area of investigation. The multibeam echo sounder (MBES) was paired with an RTK GNSS receiver with dual GPS antennae and an IMU. Data was collected and edited in HYPACK software. In addition to collecting bathymetry data with a MBES, inSight also used a single-beam echo sounder for quality assurance and quality control.

Four measurements are critical to establish elevation. These are: (1) velocity of sound in water, (2) travel time of acoustic wave from source to first break, (3) lever arm offsets and sensor calibration, and (4) water level (tide stage). inSight used a castaway CTD to measure the velocity of sound in water. Lever arm offsets were measured during the installation of the multibeam echo sounder (MBES), the inertial motion unit (IMU), and the GPS antennae. inSight recorded local water level measurements using Real Time Kinetic (RTK) Virtual Reference Station (VRS) GNSS aided GPS. inSight creates water level corrections for the waterline elevations in the area of investigation based on the RTK water levels and compares these to the water level data recorded at a local tide gauge.

inSight acquired the MBES bathymetric data using Hypack's Hysweep software. The MBES line spacing for the project was 30ft; inSight monitored coverage during the survey and adjusted spacing to approximately 15ft in the shallower sections of the area of investigation.

3.2.2 Multibeam data processing

Multibeam data processing was completed using Chesapeake Sonar Wiz. Data was processed in two basic steps. During the first step, the operator performs QC checks of the position, elevation, and vessel sensor attitude data from the GPS and IMU collected by Edgetech's Discover software. Sound velocity profiles and water level correction profiles were also generated and applied to the multibeam data at this stage. Once all peripheral data was acceptable, the workflow progressed to the combination of position data with sensor data. During the second step, sonar data is integrated with the multibeam sensor data. Iterative patch testing is performed to ensure that the yaw, pitch, and roll values assigned to the sensor are as accurate as possible and that motion artifacts are minimized. Cursory analysis of the multibeam data was focused on identifying spurious data points (i.e., fish, debris, or aquatic vegetation) both manually and through statistical analysis of the dataset. Once the data was cleaned and all artifacts were removed the operator exported the data as median XYZ file in a 1ft x 1ft and 3ftx3ft bin size.

Horizontal accuracy of the single beam bathymetry was approximately +/- 0.2ft. Vertical accuracy was approximately +/- 0.2ft.

The resulting XYZ ASCII text files output from Sonar Wiz software were used to create 3D contours as .dxf and surface maps that are presented in this report as figures. Additionally, geotiffs of the bathymetry surface maps are available. inSight produced 1ft contours of the average elevation per 1ftx1ft bin referenced to North American Datum of 1983 (NAD83 (2011)) New York State Plane East. The units are US Survey ft. All elevations are referenced to North American Vertical Datum of 1988 (NAVD 88).

To create surface maps or contours of the XYZ point files, inSight used Golden Software's Surfer to grid, tin, and contour the data. Surface maps were exported as geotiffs. Contours were exported as .dxf files, geotiff, and .dxf files are then imported into AutoCAD to create maps and figures. XYZ point files will be delivered with the final report.

3.3 Task 3 – Side-scan reflectivity mapping

3.3.1 Side-scan data acquisition

inSight used an Edgetech 6205 at 540kHz to produce side-scan orthosonographsTM.

The side-scan sonar transmits ultrasonic waves obliquely into the water and measures the amplitude of the backscatter from the lake bottom as a function of range. The reflectivity is a function of the lake bottom roughness and the sediment acoustic properties. These reflectivity images produce a high-definition picture of the debris, structures, and sediments on the lake bottom.

inSight surveyed the area of investigation with lines parallel to the Rt. 22 Bridge. In the deeper areas of the investigation lines were spaced 30ft apart. In shallower areas, survey lines were spaced approximately 15ft apart. Line spacing is designed to allow sufficient overlaps in coverage so that inSight can produce seamless orthosonographs that utilize the ideal ranges of the reflectivity data. Portions of the data where the signal attenuates beyond inSight standards were removed.

Horizontal accuracy of the side-scan measurements is approximately +/- 6ft.

3.3.2 Side-scan reflectivity data processing

Side-scan images produce 100% coverage with 100% redundancy and 200% overlap of the lake bottom in the area of investigation. The two independent orthosonographs insonified from two directions suffice to constitute the 200% redundancy. Orthosonographs are seamless aerial-photograph-like images that are insonified from one direction only. The resolution of inSight orthosonographs is 0.3ft per pixel.

3.4 Task 4 – Magnetic field mapping

3.4.1 Magnetic field data acquisition

To identify utilities and ferromagnetic obstructions to drilling and construction, in Sight measured local anomalies in the Earth's magnetic field using a Geometrics G-882 cesium magnetometer with a depth sensor and altimeter. The magnetometer was towed at least 100ft behind the vessel and between 5-15ft above the lake floor. The magnetometer lines were parallel and perpendicular to the bridge and were spaced to provide sufficient overlap in coverage.

Horizontal accuracy of the magnetic field measurements was approximately +/- 5ft.

3.4.2 Magnetic field data processing

The magnetic field data was evaluated line by line. The evaluation removes any measurement artifacts. The data was gridded using triangulation with linear interpolation. in Sight determined that the mapping of derivatives of the magnetic field data did not yield information not contained in the magnetic field contours.

3.5 Task 5 – Reflection seismology

3.5.1 Seismic reflection data acquisition

inSight used an Edgetech SB-512i and implemented multiple frequencies to map the subsurface in the AOI. inSight selected the 1-10kHz pulse to image and interpret recent sediment thickness in the shallow subsurface. inSight used the 0.5-6kHz and 0.5-2.7kHz pulses to investigate the total sediment thickness.

inSight acquired a total of 85 piezoelectric seismic profiles in the AOI: 27 tracklines are along 9 survey lines perpendicular to the bridge, and 58 are along 20 survey lines parallel to the bridge. Figure 2 plots the seismic reflection tracklines where data were acquired during the investigation. Note that inSight acquired data at different frequencies on different lines. Table 2 summarizes the sub-bottom data collected.

Horizontal accuracy of the reflection seismic measurements is approximately +/- 5ft. Under ideal conditions, vertical accuracy is approximately +/- 1ft per 10ft of penetration.

3.5.2 Seismic reflection data processing

inSight processed the navigation data to produce a navigation point for every seismic trace. inSight filtered the seismic data using both frequency bandpass and derivative filters. The data were also deconvolved and processed with automatic gain control, then split between real and imaginary components. The real component seismic data were migrated using a constant velocity model that used water velocities measured on site with the CastAway CTD during the seismic survey. We used constant velocity Stolt time migration, before and after automated gain control, then converted

to depth. The seismic data were interpreted in the Kingdom Suite interpretation system. inSight used the bathymetry data result to adjust the mudline in the sub-bottom profiles.

Using processed data collected with the single channel zero offset chirp sub-bottom profiler (SB-512i), inSight was able to delineate major stratigraphic horizons up to ~300ft below the lake floor. inSight's processing techniques were critical to achieve the results presented herein.

Table 2. Summary of reflection seismic survey types.

Pulse Frequency	Line Type	Number of profiles surveyed
1.0 to 10 kHz	parallel line	18
1.0 to 10 kHz	perpendicular line	9
0.51: 0.0111		00
0.5 to 6.0 kHz	parallel line	20
0.5 to 6.0 kHz	perpendicular line	9
0.5 to 2.7 kHz	parallel line	20
0.5 to 2.7 kHz	perpendicular line	9

3.6 Task 6 – Data integration, interpretation, and mapping

After processing each single-tool measurement, in Sight integrated all the data with existing borings (provided by Schnabel) into Kingdom Suite seismic processing software and GIS and AutoCAD spatial reference software. in Sight used the borings provided by Schnabel to guide geological interpretation of stratigraphy in the seismic data.

The features on the floor of the South Bay of Lake Champlain were interpreted and outlined using bathymetry and side-scan orthosonographs.

The XYZ positions of the features and targets identified in the target map are based on the bathymetry data.

High-definition mapping determines the horizontal and vertical locations of features on the surface and of interfaces in the subsurface. Marine geophysics provides cross sections with repeatable accuracy of ± 1 ft vertically for every 10ft of penetration (below the lake floor) and ± 3.0 ft or better horizontally.

Method applied

Multi-beam bathymetry Horizontal accuracy ~ ±0.2ft Vertical accuracy~ ±0.2ft

Side scan orthosonography Horizontal accuracy ~ ±5 ft Vertical accuracy~ n.a.

Magnetic field mapping Horizontal accuracy ~ ±5.0ft

Sub-bottom reflection seismology

Horizontal accuracy $\sim \pm 1.5 ft$ with dGPS Vertical accuracy $\sim \pm 1.0 ft$ for every 10ft of penetration. Vertical precision $\sim \pm 0.5 ft$

By correlating the measurements, in Sight estimates the following: Subsurface horizontal accuracy $\sim \pm 5 ft$ Subsurface vertical accuracy $\sim \pm 1.0 ft$ for every 10ft of penetration. Subsurface vertical precision $\sim \pm 0.5 ft$

3.7 Task 7 – Report

The draft report was presented to Schnabel on June 10, 2022. The final report was delivered to Schnabel on June 15, 2022.

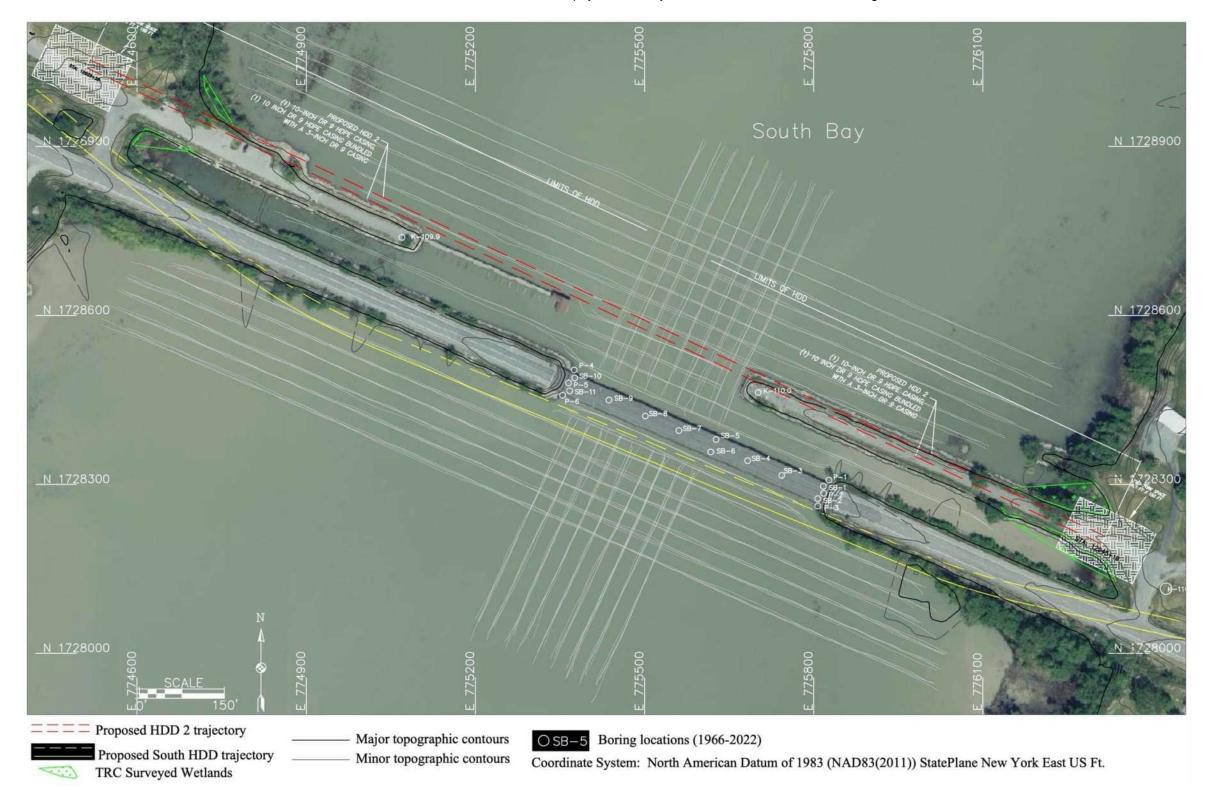


Figure 2. Seismic tracklines.

4.0 Results

Schnabel Engineering (Schnabel) is conducting a geophysical investigation in support of horizontal directional drill (HDD) design and construction in Whitehall NY. Schnabel contracted in Sight, LLC (in Sight) to conduct a geophysical investigation to collect single- and multibeam bathymetry, side-scan sonar, magnetic field, and reflection seismic in the vicinity of a horizontal directional drill for Hudson Power Express cable installation below Lake Champlain in the vicinity of the Route 22 bridge.

inSight's investigation includes single- and multibeam bathymetry, side-scan sonar, magnetic field, and reflection seismic. inSight also integrated historical surveys and existing geotechnical borings to aid in the interpretation of and provide context to map major stratigraphic horizons, locate the presence of existing utilities, and locate shallow obstructions to construction inside and outside the area of investigation (AOI). inSight conducted geophysical surveys, integrated data, and interpreted the results. The goal of the geophysical investigation was to support HDD design and construction.

The location of all data from the geophysical investigation are referenced to North American Datum of 1983 [NAD83 (2011)] New York State Plane East. The units are US Survey ft. All elevations are referenced to North American Vertical Datum of 1988 (NAVD 88).

inSight used existing borings to design survey lines, define the parameters of the seismic investigation, and guide preliminary interpretation of seismic data

inSight conducted geophysical investigations between April 23rd and April 25th, 2022. inSight surveyed the area during a period of high water. The water level at the time of survey was approximately 3 feet above normal. The relatively high water level allowed inSight to cover more of the area of investigation from bank to bank than previously expected.

Top of rock was not interpreted in the seismic record. Between approximately -150ft NAVD88 and -225ft NAVD88 seismic data shows evidence of a layer of sand. The top of this sand horizon is benchmarked by borings SB-11 and SB-3. Above the sand unit are alternating layers of lacustrine clays and silts. Below the current Route 22 bridge and the 1913 Route 22 bridge layers of fill are visible in the seismic data. The base of fill in the vicinity of the northern planned HDD route varies between approximately 50ft NAVD88 and 0ft NAVD88 in the west. The base of fill horizon is variable along the pathway of the northern proposed HDD. Near the southern proposed HDD pathway, the base of fill ranges from approximately 40ft NAVD88 in the west to 80ft NAVD88 in the east. Recent sediments drape the top of fill at both proposed HDD pathways.

No existing discernable utilities were detected by inSight's investigation.

Upright pilings mapped by side-scan orthosonographs along the northern proposed HDD pathway may present obstacles to HDD installation. The pile-tip elevations are not measurable by the methods employed in this geophysical investigation. Upright piles cut below the waterline are visible in side-scan orthosonographs. Numerous hulls of wrecked vessels lie on the floor to the north of proposed northern HDD pathway. Six wrecks have been cataloged by the New York State Museum. These wrecks along with accumulated debris in the vicinity of the northern proposed HDD pathway limited the ability of the seismic pulses to penetrate into the subsurface.

To the south of the proposed southern HDD pathway on the eastern half of the crossing there are two discrete targets (Target 74 and Target 75) that were interpreted from the magnetic field data. in Sight has interpreted these targets to be in the shallow subsurface; they are likely contained within

the layer of fill. in Sight does not see evidence that the anomalies are related to components of the current Route 22 bridge.

4.1 Bathymetry

Multibeam bathymetry data were collected between April 23 and April 25, 2022. The bathymetry was binned and gridded in 1ftx1ft cells. The bathymetry surface map is shown in Figure 3.

4.1.1 Bathymetry data coverage

Higher than normal lake levels, between 98.5ft NAVD88 and 98.9ft NAVD88 allowed for better-than-expected coverage of the shallow areas in South Bay.

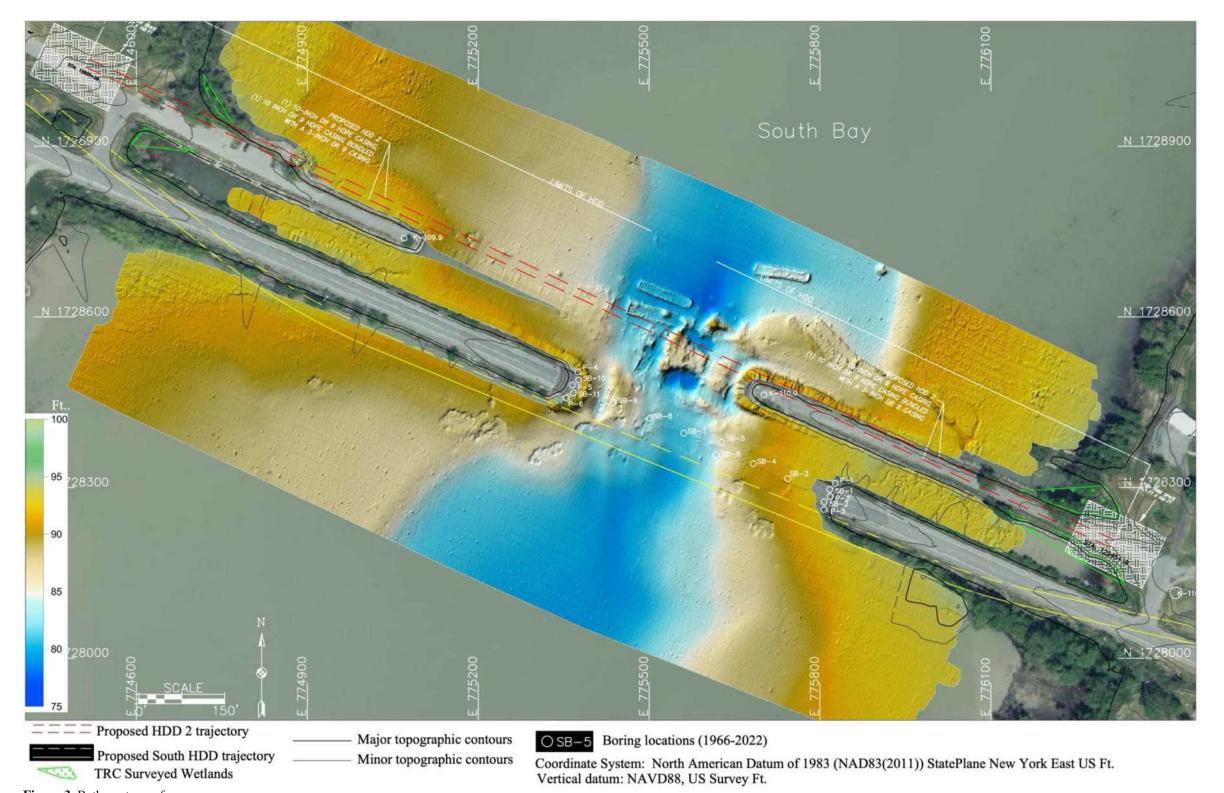


Figure 3. Bathymetry surface map.

4.2 Side-scan orthosonography

Side-scan data were collected at the same time as the MBES data on April 23rd, 2022. The survey lines were parallel to the bridge, approximately east-west, so the lake bottom was insonified, or "illuminated," from the north and from the south. The survey lines did not exceed 40ft spacing.

Figure 4 shows the orthosonograph insonified from the north. Figure 5 shows the orthosonograph insonified from the south. Figure 6 displays the targets and lake-bottom sediment types interpreted from the side-scan orthosonograph. Three lake-bottom sediment types were interpreted in the orthosonographs: rough and discontinuous surface with coarse to fine sediments including boulders and debris; smooth continuous surface, the uppermost soft fine sediments; and fill, with riprap and coarse material on slopes of bridge berms.

The orthosonographs provide detailed information on the character of the lake bottom, supplementing the multibeam bathymetry data in locating and identifying debris (e.g., old pier pilings, construction debris, shipwrecks) on the lake bottom. Numerous hulls of wrecked vessels lie on the floor to the north of proposed northern HDD pathway. Six wrecks have been cataloged by the New York State Museum.

The side-scan orthosonographs mapped upright pilings along the northern proposed HDD pathway. The pile-tip elevations are not measurable by the measurements employed in this geophysical investigation. Upright piles cut below the waterline are visible in side-scan orthosonographs.



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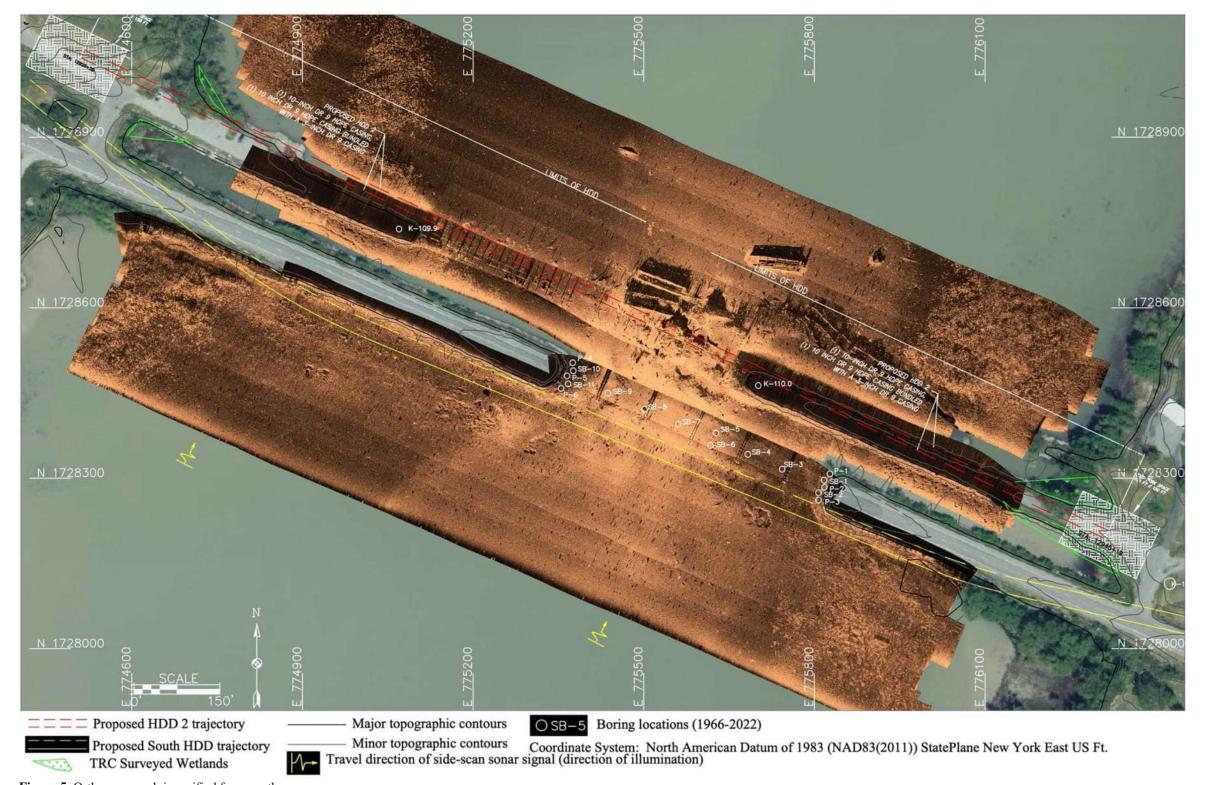


Figure 5. Orthosonograph insonified from south.



4.3 Magnetic field mapping

inSight interpreted the total magnetic field data. inSight determined that the mapping of derivatives of the magnetic field data did not yield information not contained in the magnetic field contours.

Figure 7 shows the total magnetic field data mapped with contours every 50nT. Figure 8 shows the magnetic field ribbon map.

Magnetic field mapping identified numerous anomalies in the vicinity of the northern proposed HDD pathway. Magnetic signatures of the submerged wrecks aligned with features interpreted in the side-scan and multibeam maps. The current Route 22 bridge has a significant magnetic signature. There are two discrete targets (Targets 74 and 75) to the south of the southern proposed HDD pathway on the east side of South Bay that inSight interprets to be in the shallow subsurface. inSight does not see evidence that the anomalies are related to components of the current Route 22 bridge.

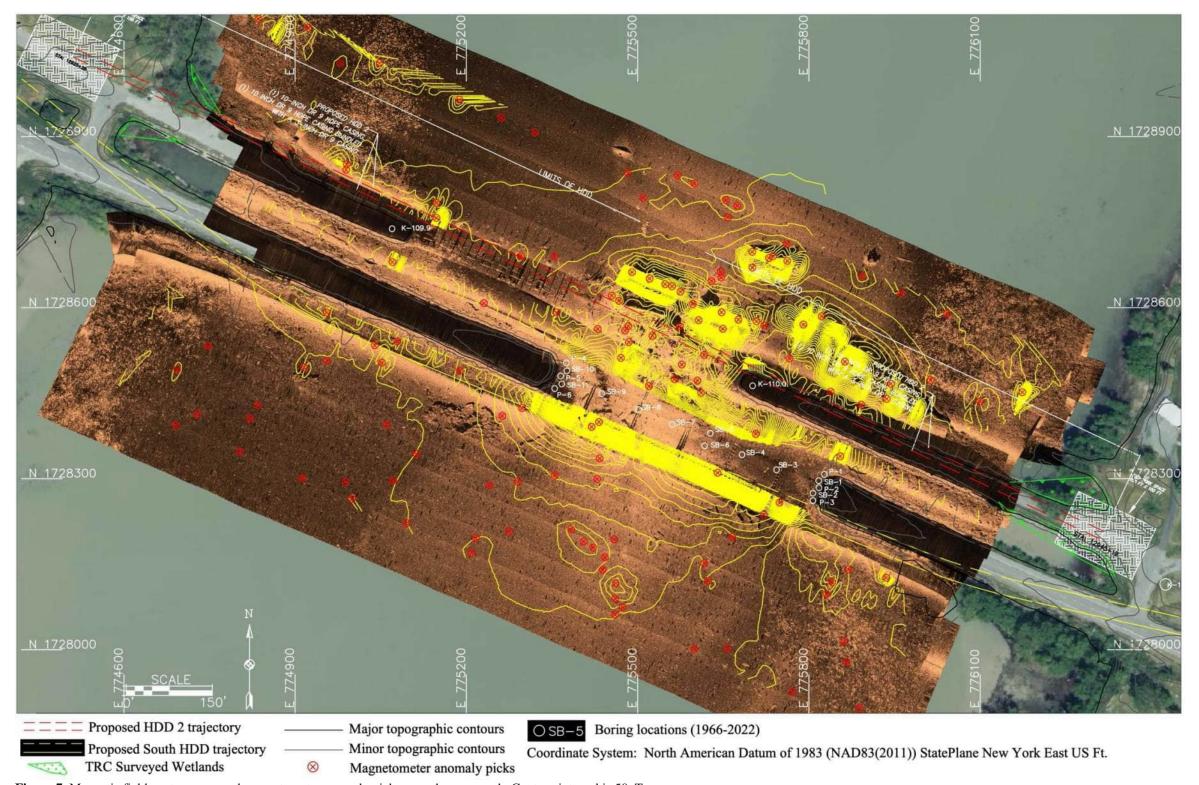


Figure 7. Magnetic field contour map and magnetometer anomaly picks on orthosonograph. Contour interval is 50nT.

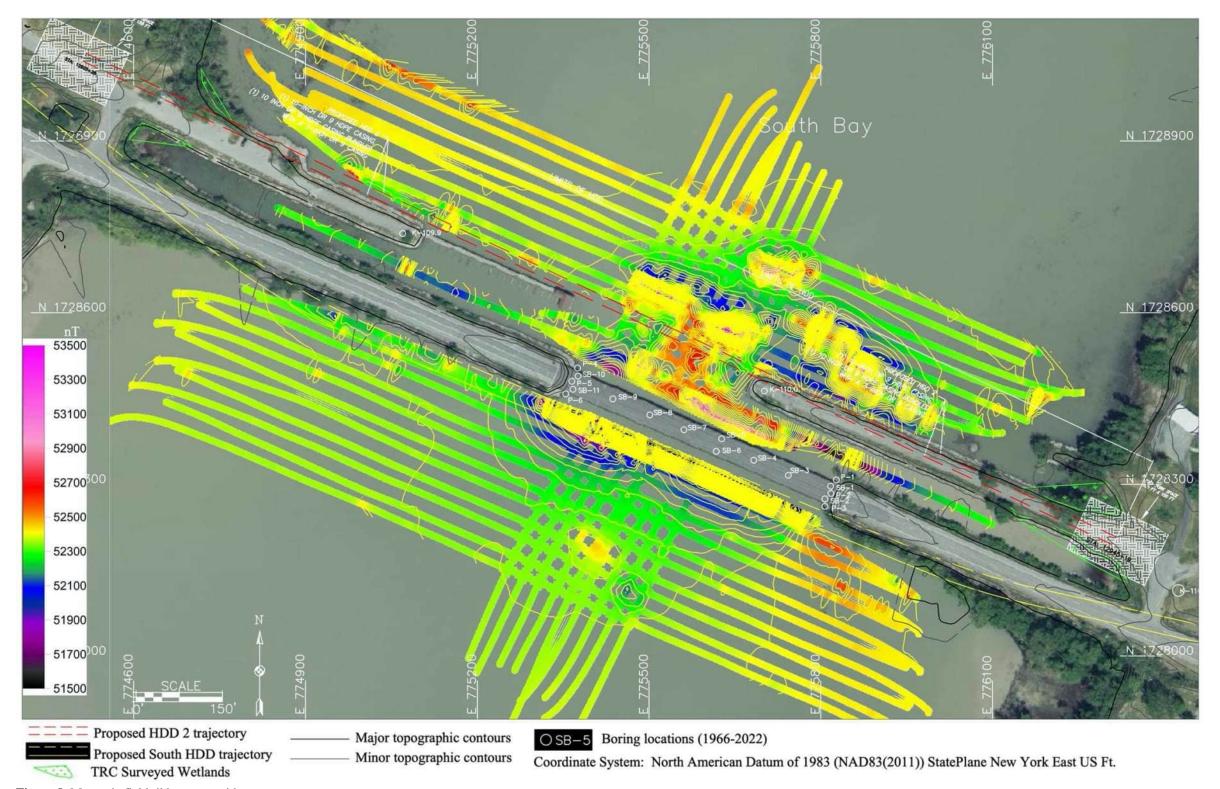


Figure 8. Magnetic field ribbon map with contours. Contour interval is 50nT.

4.4 Seismology

inSight acquired a total of 85 piezoelectric seismic data within the AOI; 27 of these lines are perpendicular to the bridge and 58 are parallel to the bridge. Figure 2 plots the piezoelectric seismic tracklines where data were acquired during the investigation. inSight acquired data at different frequencies on different lines.

Using processed data collected with the single channel zero offset chirp sub-bottom profiler (SB-512i) used for this survey, inSight was able to delineate major stratigraphic horizons, from oldest to youngest:

- 1. The top of sand which underlies a unit of alternating lacustrine clays and silts,
- 2. the top of alternating lacustrine clays and silts,
- 3. an approximation of the base of fill and riprap,
- 4. the top of fill and riprap.

Top of rock was not interpreted in the seismic record.

The seismic method has limitations: Numerous hulls of wrecked vessels lie on the floor to the north of proposed northern HDD pathway. Wrecks along with accumulated debris in the vicinity of the northern proposed HDD pathway limited the ability of the seismic pulses to penetrate into the subsurface.

Figure 9 is a map that plots the locations of the interpreted seismic profiles along the proposed northern and southern HDD pathways. Figures 10 and 11 are interpreted seismic profiles perpendicular to the length of the lake (parallel to the bridge). Figure 10 plots a cross sectional stratigraphic profile in the vicinity of the proposed northern HDD. Figure 11 plots a cross sectional stratigraphic profile in the vicinity of the proposed southern HDD.

Between approximately -150ft NAVD88 and -225ft NAVD88 seismic data shows evidence of a layer of sand. The top of this sand horizon is benchmarked by borings SB-11 and SB-3. Above the sand unit are alternating layers of lacustrine clays and silts.

Surrounding the current Route 22 bridge and the 1913 Route 22 bridge layers of fill were interpreted in the subsurface from the seismic data. The base of fill in the vicinity of the northern planned HDD route varies between approximately 50ft NAVD88 in the west and 0ft NAVD88 in the east. The base of fill horizon is variable along the pathway of the northern proposed HDD.

Near the southern proposed HDD pathway, the base of fill ranges from approximately 40ft NAVD88 in the west to 80ft NAVD88 in the east. Recent sediments drape the top of fill at both proposed HDD pathways.

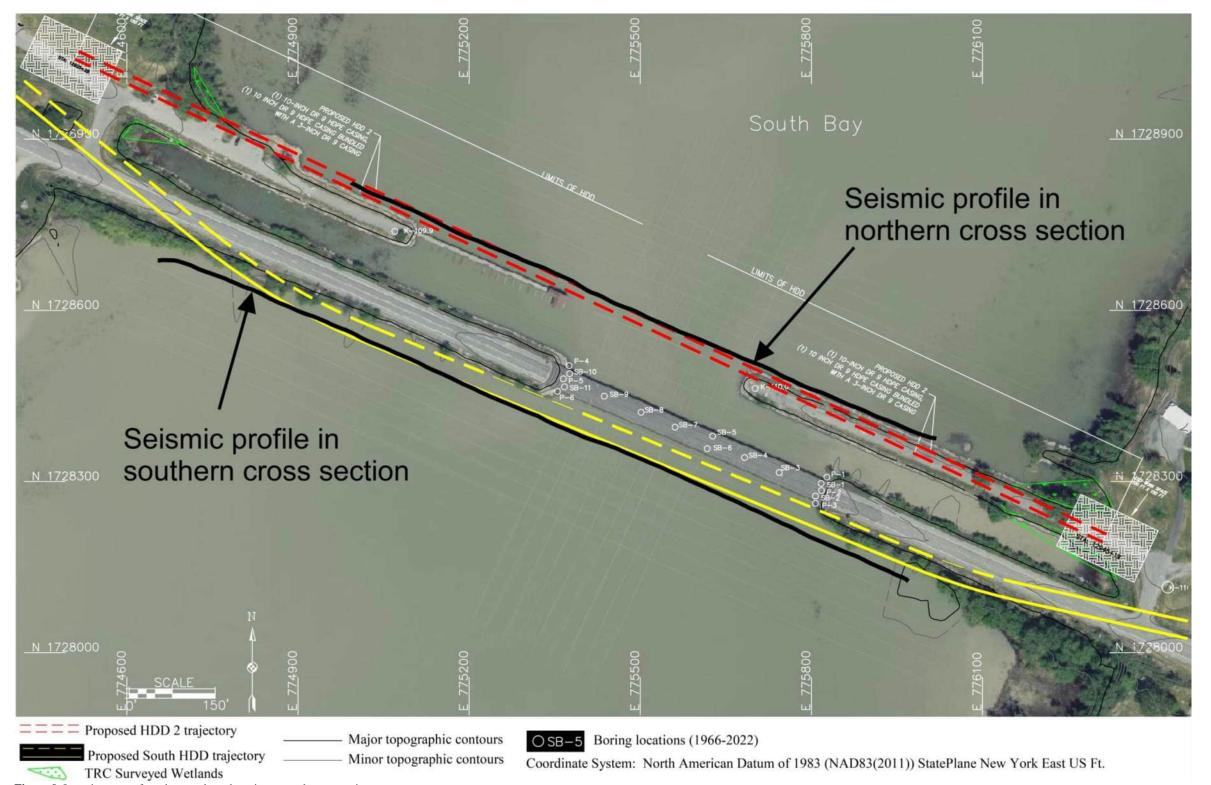


Figure 9. Location map of northern and southern interpreted cross sections.

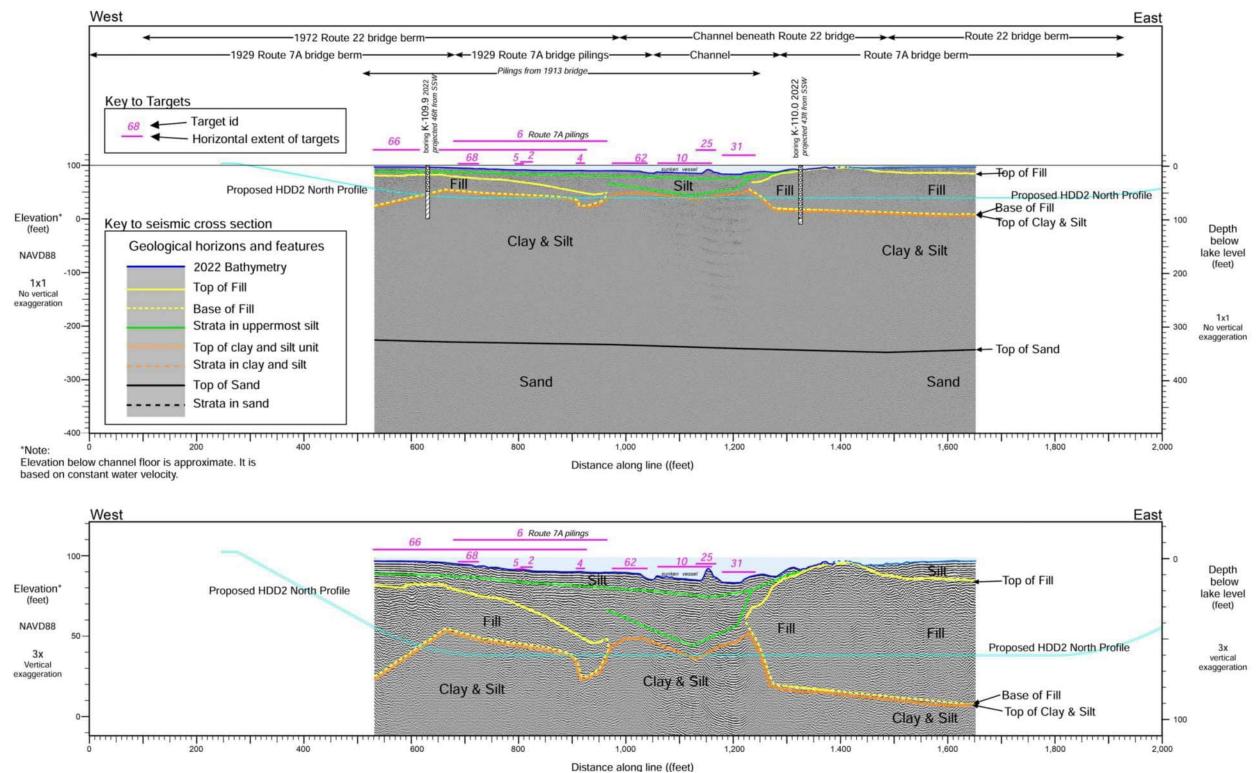


Figure 10. Interpreted west-east cross section from a seismic profile near the proposed northern HDD pathway. Planimetrics of HDD taken from AutoCAD file provided by Schanbel.

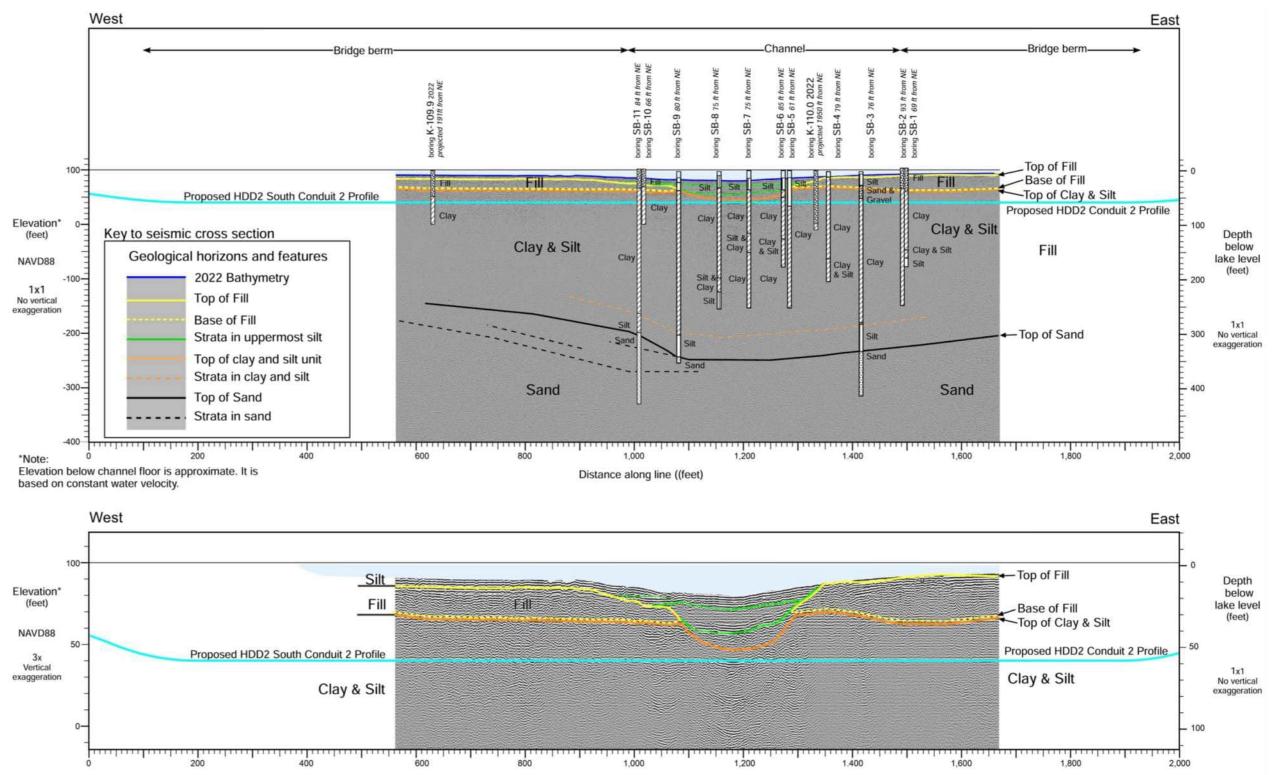


Figure 11. Interpreted west-east cross section from a seismic profile near the proposed southern HDD pathway. Planimetrics of HDD taken from AutoCAD file provided by Schanbel.

4.5 Integration of data and geologic interpretation

Top of rock was not interpreted in the seismic record. Between approximately -150ft NAVD88 and -225ft NAVD88 seismic data shows evidence of a layer of sand. The top of this sand horizon is benchmarked by borings SB-11 and SB-3. Above the sand unit are alternating layers of lacustrine clays and silts. Below the current Route 22 bridge and the 1913 Route 22 bridge layers of fill are visible in the seismic data. Recent sediments drape the top of fill at both proposed HDD pathways. Figure 12 is a surface map that plots the interpreted base of fill in the area of investigation. Figure 13 is a surface map that plots the interpreted top of fill in the area of investigation.

Lake-bottom sediment types were interpreted from the side-scan reflectivity data. Three lake-bottom sediment types were interpreted in the orthosonographs: rough and discontinuous surface with coarse to fine sediments including boulders and debris; smooth continuous surface, the uppermost soft fine sediments; and fill, with riprap and coarse material on slopes of bridge berms.

The orthosonographs provide detailed information on the character of the lake bottom, supplementing the multibeam bathymetry data in locating and identifying debris (e.g., old pier pilings, construction debris, shipwrecks) on the lake bottom.

Upright pilings mapped by side-scan orthosonographs along the northern proposed HDD pathway may present obstacles to HDD installation. The pile-tip elevations are not measurable by the methods employed in this geophysical investigation. Upright piles cut below the waterline are visible in side-scan orthosonographs.

The integrated interpretation provides the following overview of interpreted obstructions to the proposed HDD construction:

Along the northern proposed HDD route, fill is deep along the alignment. The base of fill horizon is variable along the pathway of the northern proposed HDD. The base of fill in the vicinity of the northern planned HDD route varies between approximately 50ft NAVD88 and 0ft NAVD88 in the west. Fill is deepest on the eastern half of the alignment north of the 1913 construction of the Route 22 bridge. Piles exist along the length of the northern proposed HDD pathway. Pile-tip elevations are unknown. Debris and shipwrecks compromise seismic data along the northern proposed HDD pathway.

Along the southern proposed HDD route, the elevation of the base of fill is close to the elevation of the southern proposed HDD pathway. Near the southern proposed HDD pathway, the base of fill ranges from approximately 40ft NAVD88 in the west to 80ft NAVD88 in the east. Two discrete magnetic field anomalies (Targets 74 and 75) were identified south of the southern proposed HDD pathway on the eastern side of the lake. inSight interprets these anomalies to be in the shallow subsurface within the layer of fill. inSight does not see any evidence that these anomalies are related to components of the existing Route 22 bridge.

Figure 14 plots the targets of interpreted from side-scan orthosonographs, magnetic field data, and seismic profiles. Table 3 tabulates target location and best possible description.

Ta	ble	3.	Ί	ar	gei	t.	l1S	t.

Target	Table 3.	Target list.		1	1	1					Т	Т			
Populari 2 - Marco Popular	Target number	Target			ш	Ś		S	Description	point number	Easting	Northing	Circle Diameter(ft)	Length	Width
1			1-	yes, iv- P=p:	no, n.a. artial: ?	.– not a = unkno	ppiicabi own	e,			NYSP E USIL	NYSP E USIL			
1	Target										Easting	Northing			
1	1	Elongated debris	Y	Υ	n.a.				Debris		775454	1728889	n.a.	44	17
1	1									1b	775496	1728876	n.a.	n.a.	n.a.
2 Area of debries	1										775491	1728860	n.a.	n.a.	n.a.
2 25 775263 1728708 n.a. n.	1									1d	775449	1728874	n.a.	n.a.	n.a.
2 26 775241 1728708 n.a. n.	2	Area of debris	Υ	Υ					Debris	2a	775263	1728722	n.a.	22	14
2	2									2b	775263	1728708	n.a.	n.a.	n.a.
3 Area of debris Y Y Y	2									2c	775241	1728708	n.a.	n.a.	n.a.
4	2									2d	775241	1728722	n.a.	n.a.	n.a.
5 17530 1728602 23 n.a. n.a	3	Area of debris	Υ	Υ					Debris	3	775334	1728704	14	n.a.	n.a.
6 Piles under pier Y Y Y	4		Υ	Υ						4	775345	1728678	13	n.a.	n.a.
6 6 775377 1728621 n.a. n.a	5		Υ	Υ						5	775230	1728692	23	n.a.	n.a.
6 6c 775367 1728698 n.a. n.	6	Piles under pier	Υ	Υ					Piles under pier	6a	775110	1728739	n.a.	292	25
6	6									6b	775377	1728621	n.a.	n.a.	n.a.
7 Area of debris Y Y Y Debris 7a 775437 172884 n.a. 48 14 7 Debris 7b 775483 1728684 n.a. 128669 n.a. n.a. n.a. n.a. 7 To 775483 1728666 n.a. n.a. n.a. n.a. 7 To 775479 1728666 n.a. n.a. n.a. n.a. 8 Sunken vessel Y Y Y N Y Wreck F5: Canal Boat (NYSM 11642)* 8 B 775487 1728674 n.a. 105 31 8 B 775487 1728674 n.a. n.a. n.a. n.a. 8 Sunken vessel Y Y Y N Y Wreck F5: Canal Boat (NYSM 11642)* 8 B 775584 1728674 n.a. n.a. n.a. n.a. 8 C 775571 1728606 n.a. n.a. n.a. n.a. 9 T 7 T T T T T T T T T T T T T T T T T	6									6c	775367	1728598	n.a.	n.a.	n.a.
7	6									6d	775100	1728716	n.a.	n.a.	n.a.
7 7b 775483 1728669 n.a. n.a. <td< td=""><td>7</td><td>Area of debris</td><td>Υ</td><td>Υ</td><td></td><td></td><td></td><td></td><td>Debris</td><td>7a</td><td>775437</td><td>1728684</td><td>n.a.</td><td>48</td><td>14</td></td<>	7	Area of debris	Υ	Υ					Debris	7a	775437	1728684	n.a.	48	14
7 7 775479 1728656 n.a.	7									7b			n.a.		
7	7									7c	775479		n.a.	n.a.	
8 Sunken vessel Y <	7									7d					
8	8	Sunken vessel	Y	Y	Y		N	Y	Wreck F5: Canal Boat (NYSM 11642)*	8a					
8 9 N Y	8									8b	775584	1728634	n.a.	n.a.	n.a.
8 N Y	8									8c			n.a.	n.a.	
9 N Y										8d					
10 Sunken vessel Y Y Y Y Y Y Wreck G5: Canal Boat (NYSM 11643)* 10a 775463 1728632 n.a. 110 34 10 10 10b 775570 1728607 n.a.			N	Υ						9					
10 10 10b 775570 1728607 n.a. n.a. <td< td=""><td></td><td>Sunken vessel</td><td></td><td></td><td>Y</td><td></td><td>N</td><td>Υ</td><td>Wreck G5: Canal Boat (NYSM 11643)*</td><td>10a</td><td></td><td></td><td></td><td></td><td></td></td<>		Sunken vessel			Y		N	Υ	Wreck G5: Canal Boat (NYSM 11643)*	10a					
10 10c 775563 1728574 n.a. <										10b					
10 10d 775457 1728598 n.a. n.a. n.a. n.a. n.a. 1 11 Area of vertical debris Y Debris; vertical 11a 775397 1728628 n.a. 155 45										10c					
11 Area of vertical debris Y Debris; vertical 11a 775397 1728628 n.a. 155 45															
11 7100 ST VEHICLE GENERAL TO 100 100 100 100 100 100 100 100 100 10		Area of vertical debris		Υ					Debris; vertical						
		Sa or vortisal dobito		<u> </u>											

Target number	Target	oathymetry	side-scan	magnetometer	seismic	Jtility	sunken vessel	Description	ooint number	Corner or center point Easting	Corner or center point Northing	Circle Diameter(ft)	-ength	Width
11	3.3		0,		0)		0,		11c	775527	1728534	n.a.	n.a.	n.a.
11									11d	775381	1728586	n.a.	n.a.	n.a.
12	Area of debris		Υ					Debris	12a	775378	1728576	n.a.	31	12
12									12b	775409	1728576	n.a.	n.a.	n.a.
12									12c	775409	1728564	n.a.	n.a.	n.a.
12									12d	775378	1728564	n.a.	n.a.	n.a.
13	Area of debris		Υ						13	775406	1728552	11	n.a.	n.a.
14			Υ						14	775224	1728462	33	n.a.	n.a.
15			Υ						15	775417	1728461	18	n.a.	n.a.
16	Bridge piers	Υ	Υ	Υ		N	Υ	Piers or piles under bridge	16a	775421	1728474	n.a.	52	14
16									16b	775434	1728469	n.a.	n.a.	n.a.
16									16c	775416	1728420	n.a.	n.a.	n.a.
16									16d	775403	1728425	n.a.	n.a.	n.a.
17	Area of debris		Υ					Debris	17a	775487	1728546	n.a.	31	9
17									17b	775515	1728532	n.a.	n.a.	n.a.
17									17c	775511	1728524	n.a.	n.a.	n.a.
17									17d	775483	1728538	n.a.	n.a.	n.a.
18	Area of vertical debris		Υ					Debris	18	775482	1728508	56	n.a.	n.a.
19	Elongated debris		Υ					Debris	19	775466	1728413	25	n.a.	n.a.
20	Debris near pilings		Υ					Debris	20	775515	1728426	43	n.a.	n.a.
21	Debris near pilings		Υ					Debris	21	775501	1728405	21	n.a.	n.a.
22	Area of debris		Υ					Debris	22	775522	1728481	12	n.a.	n.a.
23	Area of debris		Υ					Debris	23	775535	1728491	13	n.a.	n.a.
24	Area of debris		Υ					Debris	24	775528	1728517	35	n.a.	n.a.
25	Area of debris		Υ					Debris	25	775552	1728558	44	n.a.	n.a.
26	Area of debris		Υ					Debris	26	775581	1728575	13	n.a.	n.a.
27	Area of debris		Υ					Debris	27	775588	1728604	41	n.a.	n.a.
28	Area of debris		Υ					Debris	28	775616	1728636	13	n.a.	n.a.
29	Area of elongated debris		Υ					Debris	29a	775595	1728602	n.a.	67	17
29									29b	775659	1728581	n.a.	n.a.	n.a.
29									29c	775654	1728565	n.a.	n.a.	n.a.
29									29d	775590	1728586	n.a.	n.a.	n.a.
30	Area of elongated debris		Υ						30	775613	1728572	33	n.a.	n.a.
31	Area of elongated debris and large object		Y					Debris	31a	775586	1728569	n.a.	70	71

Target number	Target	bathymetry	side-scan	magnetometer	seismic	Utility	sunken vessel	Description	point number	Corner or center point Easting	Corner or center point Northing	Circle Diameter(ft)	Length	Width
31									31b	775651	1728542	n.a.	n.a.	n.a.
31									31c	775634	1728505	n.a.	n.a.	n.a.
31									31d	775569	1728533	n.a.	n.a.	n.a.
32	Area of debris		Υ					Debris	32	775560	1728520	16	n.a.	n.a.
33	Area of debris		Υ					Debris	33	775576	1728519	14	n.a.	n.a.
34	Area of debris		Υ					Debris	34	775592	1728510	22	n.a.	n.a.
35	Area of elongated debris		Υ						35a	775573	1728509	n.a.	16	4
35									35b	775584	1728499	n.a.	n.a.	n.a.
35									35c	775574	1728487	n.a.	n.a.	n.a.
35									35d	775562	1728496	n.a.	n.a.	n.a.
36	Area of elongated and vertical debris		Y					Debris	36a	775548	1728503	n.a.	119	36
36									36b	775655	1728452	n.a.	n.a.	n.a.
36									36c	775640	1728419	n.a.	n.a.	n.a.
36									36d	775533	1728470	n.a.	n.a.	n.a.
37	Area of elongated and vertical debris		Y					Debris	37a	775607	1728510	n.a.	53	36
37									37b	775658	1728495	n.a.	n.a.	n.a.
37									37c	775647	1728461	n.a.	n.a.	n.a.
37									37d	775597	1728477	n.a.	n.a.	n.a.
38	Bridge piers	Υ	Υ					Piers or piles under bridge	38a	775583	1728402	n.a.	61	24
38									38b	775601	1728396	n.a.	n.a.	n.a.
38									38c	775582	1728338	n.a.	n.a.	n.a.
38									38d	775559	1728344	n.a.	n.a.	n.a.
39	Area of elongated debris		Υ					Debris	39	775633	1728266	59	n.a.	n.a.
40	Trenches		Υ						40a	775673	1728265	n.a.	52	52
40									40b	775725	1728265	n.a.	n.a.	n.a.
40									40c	775725	1728213	n.a.	n.a.	n.a.
40									40d	775673	1728213	n.a.	n.a.	n.a.
41			Υ						41	775655	1728304	31	n.a.	n.a.
42	Bridge piers	Υ	Υ					Piers or piles under bridge	42a	775651	1728313	n.a.	57	11
42									42b	775668	1728367	n.a.	n.a.	n.a.
42									42c	775679	1728364	n.a.	n.a.	n.a.
42									42d	775662	1728310	n.a.	n.a.	n.a.
43	Bridge piers	Υ	Υ					Piers or piles under bridge	43a	775725	1728277	n.a.	58	13

			ı	I										
Target number	Target	bathymetry	side-scan	magnetometer	seismic	Utility	sunken vessel	Description	point number	Corner or center point Easting	Corner or center point Northing	Circle Diameter(ft)	Length	Width
43									43b	775749	1728330	n.a.	n.a.	n.a.
43									43c	775761	1728324	n.a.	n.a.	n.a.
43									43d	775738	1728272	n.a.	n.a.	n.a.
44	Area of debris		Υ					Debris	44	775670	1728425	26	n.a.	n.a.
45	Area of debris		Υ					Debris	45	775707	1728416	22	n.a.	n.a.
46	Area of debris		Υ					Debris	46	775673	1728500	21	n.a.	n.a.
47	Area of debris		Υ					Debris	47	775701	1728524	13	n.a.	n.a.
48	Area of debris		Υ					Debris	48	775710	1728554	32	n.a.	n.a.
49	Area of debris		Υ					Debris	49	775690	1728567	18	n.a.	n.a.
50	Area of debris		Υ					Debris	50	775654	1728602	17	n.a.	n.a.
51	Area of elongated debris		Υ					Debris	51a	775665	1728600	n.a.	46	9
51									51b	775721	1728600	n.a.	n.a.	n.a.
51									51c	775721	1728591	n.a.	n.a.	n.a.
51									51d	775665	1728591	n.a.	n.a.	n.a.
52	Area of elongated debris		Y					Debris	52	775719	1728608	42	n.a.	n.a.
53	Sunken vessels	Y	Υ	Y		N	Υ	Wreck H5: Canal Boat (NYSM 11644)*	53a	775752	1728629	n.a.	242	70
53								Wreck I5: Canal Boat (NYSM 11645)*	53b	775967	1728518	n.a.	n.a.	n.a.
53								Wreck J5: Canal Boat (NYSM 11646)*	53c	775936	1728455	n.a.	n.a.	n.a.
53									53d	775721	1728567	n.a.	n.a.	n.a.
54	Sunken vessel	Y	Y	Y		N	Υ	Wreck E5: Canal Boat (NYSM 11641)*	54a	775677	1728697	n.a.	109	49
54									54b	775786	1728697	n.a.	n.a.	n.a.
54									54c	775786	1728657	n.a.	n.a.	n.a.
54									54d	775677	1728657	n.a.	n.a.	n.a.
55	Sunken vessel	Y	Υ	n.a.		N	Υ	Sunken vessel	55	775911	1728686	29	n.a.	n.a.
56			Υ	n.a.				elongate	56a	775953	1728693	n.a.	31	10
56									56b	775982	1728684	n.a.	n.a.	n.a.
56									56c	775980	1728674	n.a.	n.a.	n.a.
56									56d	775950	1728683	n.a.	n.a.	n.a.
57			Υ						57	775880	1728470	35	n.a.	n.a.
58			Υ						58	775924	1728443	16	n.a.	n.a.
59			Υ						59	775946	1728434	21	n.a.	n.a.
60	Trench	Υ	Υ						60a	775966	1728500	n.a.	132	31

													T	
Target		athymetry	side-scan	magnetometer	seismic	Jtility	sunken vessel		ooint number	Corner or center point	Corner or center point	Circle Diameter(ft)	ength	Width
number	Target	bat	sid	ш	sei	3	sur	Description	60b	Easting	Northing			
60									60c	776057	1728405	n.a.	n.a.	n.a.
60									60d	776035	1728383	n.a.	n.a.	n.a.
60								Debris; elongated	61a	775944	1728478	n.a.	n.a.	n.a.
61	Area of elongated debris		Y					Debits, elotigated	61b	775827	1728368	n.a.	52	17
61									61c	775851	1728380	n.a.	n.a.	n.a.
61									61d	775915	1728293	n.a.	n.a.	n.a.
61										775890	1728281	n.a.	n.a.	n.a.
62	Area of elongated and vertical debris		Υ					Debris; elongated and vertical	62a	775413	1728675	n.a.	58	45
62									62b	775466	1728652	n.a.	n.a.	n.a.
62									62c	775448	1728611	n.a.	n.a.	n.a.
62									62d	775396	1728634	n.a.	n.a.	n.a.
63	Area of elongated and vertical debris		Y					Debris; elongated and vertical	63a	775648	1728579	n.a.	40	20
63	vertical debris		'						63b	775684	1728561			n.a.
63									63c	775675	1728543	n.a. n.a.	n.a.	
63									63d	775639	1728560	n.a.	n.a. n.a.	n.a. n.a.
64	Area of debris		Y					Debris	64	775667	1728579	18	n.a.	n.a.
65	Alea of debits		Y						65	775946	1728448	22	n.a.	n.a.
66	Historic bridge	Υ	Y	Υ			N	Piles of historic bridge remnant	66a	774929	1728887	n.a.	470	42
66	Thistoric bridge	'	'	-			11	•	66b	775359	1728699	n.a.	n.a.	n.a.
66									66c	775344	1728659	n.a.	n.a.	n.a.
66									66d	774915	1728846	n.a.	n.a.	n.a.
67	Magnetic anomaly			Y					67	774977	1728860	50	n.a.	n.a.
68	Magnetic anomaly			Y					68	775154	1728759	50	n.a.	n.a.
69	Magnetic anomaly			Y					69a	775537	1728473	n.a.	98	32
69				Y					69b	775628	1728437	n.a.	n.a.	n.a.
69				Y					69c	775617	1728407	n.a.	n.a.	n.a.
69				Y					69d	775524	1728445	n.a.	n.a.	n.a.
70	Magnetic anomaly			Y					70	775992	1728419	24	n.a.	n.a.
71	Magnetic anomaly			Y					71	776177	1728447	53	n.a.	n.a.
72	Magnetic anomaly			Υ					72	775402	1728192	71	n.a.	n.a.
73	Magnetic anomaly			Υ					73	775466	1728106	62	n.a.	n.a.
	J							Buried object seen in magnetometer and seismic(upper 10 feet)	74					
74	Buried object			Υ	Υ			23.52 53,56 5557 III magnitionistor and oblimino(apper 10 foot)	17	775815	1728189	36	n.a.	n.a.

Target number	Target	bathymetry	side-scan	magnetometer	seismic	Utility	sunken vessel	Description	point number	Corner or center point Easting	Corner or center point Northing	Circle Diameter(ft)	Length	Width
75	Object possible boat and buried debris		Y	Y				Possible boat and buried debris	75	775935	1728130	57	n.a.	n.a.
76	Debris		Υ						76	774897	1728868	45	n.a.	n.a.
77	Bridge piers	Υ	Υ					Piers or piles under bridge	77a	775505	1728442	n.a.	64	14
77									77b	775517	1728436	n.a.	n.a.	n.a.
77									77c	775491	1728377	n.a.	n.a.	n.a.
77									77d	775479	1728383	n.a.	n.a.	n.a.
78	Buried object	Υ			Υ			Buried object	78	775879	1728169	50	n.a.	n.a.
79	Possible pilings	Υ			Υ			Possible piling	79	775518	1728370	15	n.a.	n.a.
80	Possible pilings	Υ			Υ			Possible piling	80	775590	1728352	15	n.a.	n.a.

^{*} Wreck identification based on Historic South Bay Survey excerpt from 03 LSReport.docx



Figure 12. Interpreted and interpolated elevation of base of road fill map.

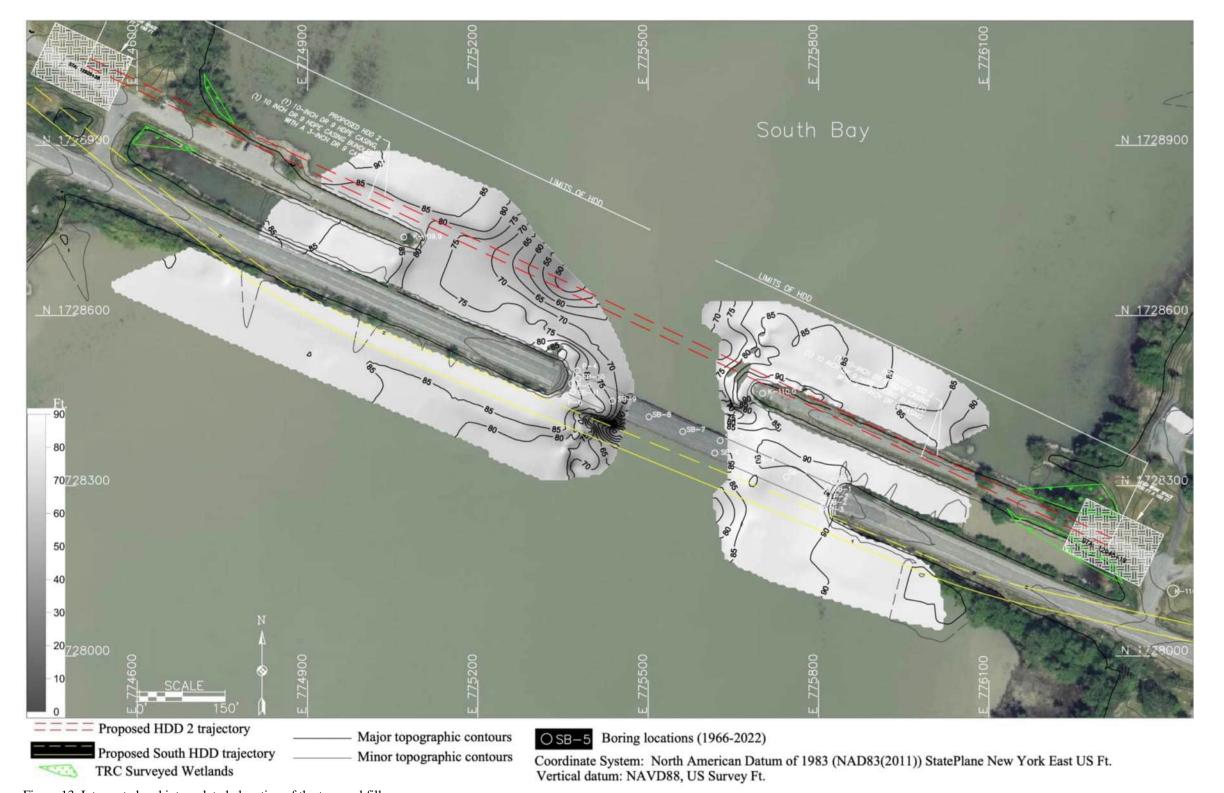


Figure 13. Interpreted and interpolated elevation of the top road fill map.



Figure 14. Integrated target and shallow subsurface obstruction map.

5.0 Conclusions

inSight's investigation includes single- and multibeam bathymetry, side-scan sonar, magnetic field, and reflection seismic. inSight also integrated historical surveys and existing geotechnical borings to aid in the interpretation of and provide context to map major stratigraphic horizons, locate the presence of existing utilities, and locate shallow obstructions to construction inside and outside the area of investigation (AOI). inSight conducted geophysical surveys, integrated data, and interpreted the results. The goal of the geophysical investigation was to support HDD design and construction.

Top of rock was not interpreted in the seismic record. Between approximately -150ft NAVD88 and -225ft NAVD88 seismic data shows evidence of a layer of sand. The top of this sand horizon is benchmarked by borings SB-11 and SB-3. Above the sand unit are alternating layers of lacustrine clays and silts. Below the current Route 22 bridge and the 1913 Route 22 bridge layers of fill are visible in the seismic data. Recent sediments drape the top of fill at both proposed HDD pathways.

No existing discernable utilities were detected by inSight's investigation.

Main conclusions pertinent to HDD construction:

- 1) A variable thickness of road fill exists beneath the current Route 22 bridge and the 1913 Route 22 bridge. Layers of fill are visible in the seismic data and in the existing borings provided by Schnabel. The base of fill in the vicinity of the northern planned HDD route varies between approximately 0ft NAVD88 in the west and 50ft NAVD88 in the east. Near the southern proposed HDD pathway, the base of fill ranges from approximately 40ft NAVD88 in the west to 80ft NAVD88 in the east.
- 2) Upright pilings mapped by side-scan orthosonographs along the northern proposed HDD pathway may present obstacles to HDD installation. The pile-tip elevations are not measurable by the methods employed in this geophysical investigation. Upright piles cut below the waterline are visible in side-scan orthosonographs. Other geophysical measurements may be able to quantify the elevations of the pile tips.
- 3) To the south of the proposed southern HDD pathway on the eastern half of the crossing there are two discrete targets (Target 74 and Target 75) that were interpreted from the magnetic field data. inSight has interpreted these targets to be in the shallow subsurface; they are likely contained within the layer of fill. inSight does not see evidence that the anomalies are related to components of the current Route 22 bridge.

Champlain Hudson Power Express: Rt 22-Whitehall, NY Geophysical Survey North and South of the Rt. 22 Bridge

Appendix I – Digital point files, surfaces, and maps

This Appendix includes a **ShareFile link** to digital data presented in this report.

Appendix D

BoreAid HDD Simulation Output



Generated Output



WARNING: The accuracy of the data obtained by the BoreAid® system is highly dependent upon accurate data gathering, data input and proper use of the software. Vermeer is not responsible for that information. BoreAid® data is not intended to replace the need for future on-site utility locating, measuring and verification procedures, which are essential for accurate placement of new underground installations and avoidance of existing utilities.

CALL YOUR ONE-CALL SYSTEM FIRST



WARNING: Always contact your local One-Call system before the start of your digging project. The BoreAid® system is intended to be used with other utility locating methods, such as the use of the One-Call system and the exposing of existing utilities by potholing.

Locate utilities before drilling. Call 811 (U.S. only) or 1-888-258-0808 (U.S. or Canada) or local utility companies or national regulating authority.

Before you start any digging project, do not forget to call the local One-Call system in your area and any utility company that does not subscribe to the One-Call system. For areas not represented by One-Call Systems International, contact the appropriate utility companies or national regulating authority to locate and mark the underground installations. If you do not call, you may have an accident or suffer injuries; cause interruption of services; damage the environment; or experience job delays.

OSHA CFR 29 1926.651 requires that the estimated location of underground utilities be determined before beginning the excavation or underground drilling operation. When the actual excavation or bore approaches an estimated utility location, the exact location of the underground installation must be determined by a safe, acceptable and dependable method. If the utility cannot be precisely located, it must be shut off by the utility company.

Project Summary

General: HDD #1

Ref: Lake Road - New York

P1A

Start Date: 12-10-2021 End Date: 12-10-2021

Designer: TAR

CHA

Description: Lake Road HDD - New York

Input Summary

Start Coordinate (0.00, 0.00, 291.00) ft End Coordinate (884.00, 0.00, 289.76) ft

Project Length 884.00 ft
Pipe Type HDPE
OD Classification IPS

Pipe OD 10.750 in

Pipe DR 9.0
Pipe Thickness 1.19 in
Rod Length 15.00 ft
Rod Diameter 3.5 in

Drill Rig Location (0.00, 0.00, 0.00) ft

Soil Summary

Number of Layers: 2

Soil Layer #1 USCS, Silt (M), ML

From Assistant

Unit Weight: 0.0521 (dry), 0.0637 (sat) [lb/in3]

Phi: 32.00, S.M.: 100.00, Coh: 0.00 [psi]

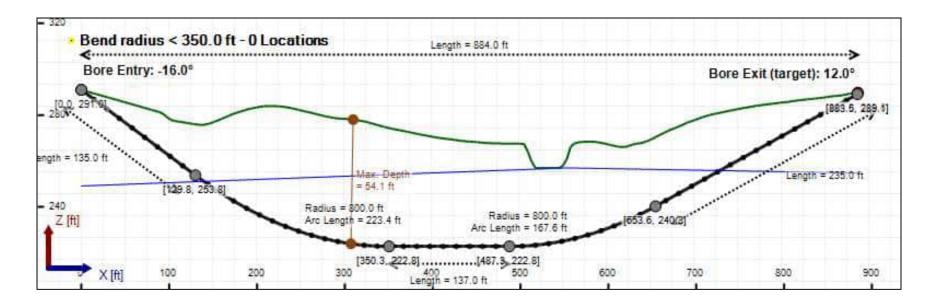
Soil Layer #2 USCS, Clay (C), CL

From Assistant

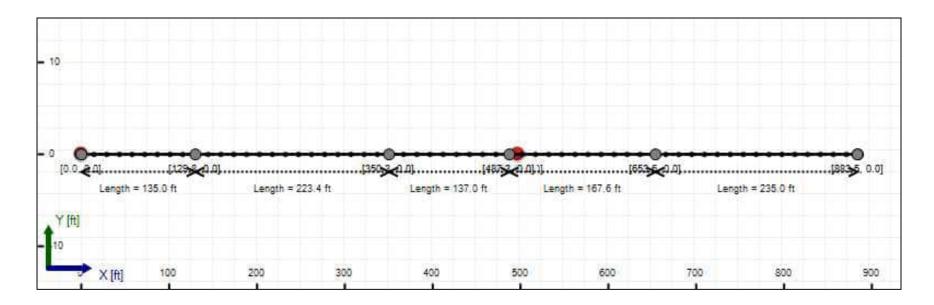
Unit Weight: 0.0405 (dry), 0.0579 (sat) [lb/in3]

Phi: 0.00, S.M.: 200.00, Coh: 3.13 [psi]

Bore Cross-Section View



Bore Plan View



Load Verifier Input Summary:

Pipe Application: Electrical Cable

Pipe Type: HDPE Classification: IPS Pipe OD: 10" (10.75")

Pipe DR: 9

Pipe Length: 899.99 ft Internal Pressure: 0 psi

Borehole Diameter: 1.34400002161662 ft

Silo Width: 1.34400002161662 ft

Surface Surcharge: 0 psi

Short Term Modulus: 57500 psi Long Term Modulus: 28200 psi Short Term Poisson Ratio: 0.35 Long Term Poisson Ratio: 0.45 Pipe Unit Weight: 0.03430 lb/in3

Allowable Tensile Stress (Short Term): 1200 psi Allowable Tensile Stress (Long Term): 1100 psi

Allowable Compressive Stress (Short Term): 1150 psi Allowable Compressive Stress (Long Term): 1150 psi

Surface-pipe friction coefficient at entrance: 0.5 Surface-pipe friction coefficient in borehole: 0.3

Pipe-soil friction angle: 30

Slurry Unit Weight: 0.05419 lb/in3

Hydrokinetic Pressure: 10 psi

Ballast Unit Weight: 0.03613 lb/in3

In-service Load Summary:

Pressure [psi]	Deformed	Collapsed
Earth Pressure	4.1	23.2
Water Pressure	14.4	12.8
Surface Surcharge	0.0	0.0
Internal Pressure	0.0	0.0
Net Pressure	18.5	36.0
Deflection		
Earth Load Deflection	1.239	6.782
Buoyant Deflection	0.132	0.132
Reissner Effect	0	0
Net Deflection	1.371	6.914
Compressive Stress [psi]		
Compressive Wall Stress	83.2	162.2

Installation Load Summary:

Forces/Stresses	@Maximum Force	Absolute Maximum
Pullback Force [lb]	17030.0	17030.0
Pullback Stress [psi]	474.9	474.9
Pullback Strain	8.260E-3	8.260E-3
Bending Stress [psi]	0.0	32.2
Bending Strain	0	5.599E-4
Tensile Stress [psi]	474.9	505.4
Tensile Strain	8.260E-3	9.349E-3

Net External Pressure = 34.2 [psi]

Buoyant Deflection = 0.1

Hydrokinetic Force = 567.6 lb

In-service Analysis

	Calculated	Allowable	Factor of Safety	Check
Deflection [%]	1.371	7.5	5.5	OK
Unconstrained Collapse [psi]	44.0	123.4	2.8	OK
Compressive Wall Stress [psi]	83.2	1150.0	13.8	OK

Installation Analysis

	Calculated	Allowable	Factor of Safety	Check
Deflection [%]	0.065	7.5	115.8	OK
Unconstrained Collapse [psi]	54.3	227.5	4.2	OK
Tensile Stress [psi]	505.4	1200.0	2.4	OK

Maximum Allowable Bore Pressure Summary

Ream Number	Initial Diameter	Final Diameter	Estimated Maximum Pressure (Avg.)	Estimated Maximum Pressure (Local)
Pilot Bore	0.00 in	8.00 in	79.569 psi	59.712 psi
1	8.00 in	12.00 in	79.537 psi	59.621 psi
2	12.00 in	16.13 in	79.492 psi	59.489 psi

Note: The maximum bore pressures presented in this table are the maximum values along the length of the bore and not the maximum allowable at any point. The estimated maximum pressures should be compared to the estimated circulating pressures along the bore to determine potential locations of inadvertant returns.

Estimated Circulating Pressure Summary

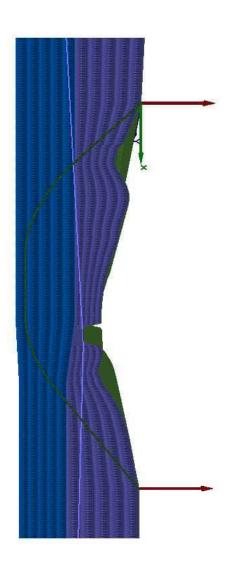
Active	Shear Rate [rpm]	Shear Stress [Fann Degrees]
No	600	37
No	300	32
No	200	29
Yes	100	25
Yes	6	17
No	3	15

Flow Rate (Q): 40.00 US (liquid) gallon/min

Drill Fluid Density: 0.040 lb/in3 Rheological model: Bingham-Plastic Plastic Viscosity (PV): 25.53

Yield Point (YP): 16.49

Effective Viscosity (cP): 1202.0



Virtual Site

