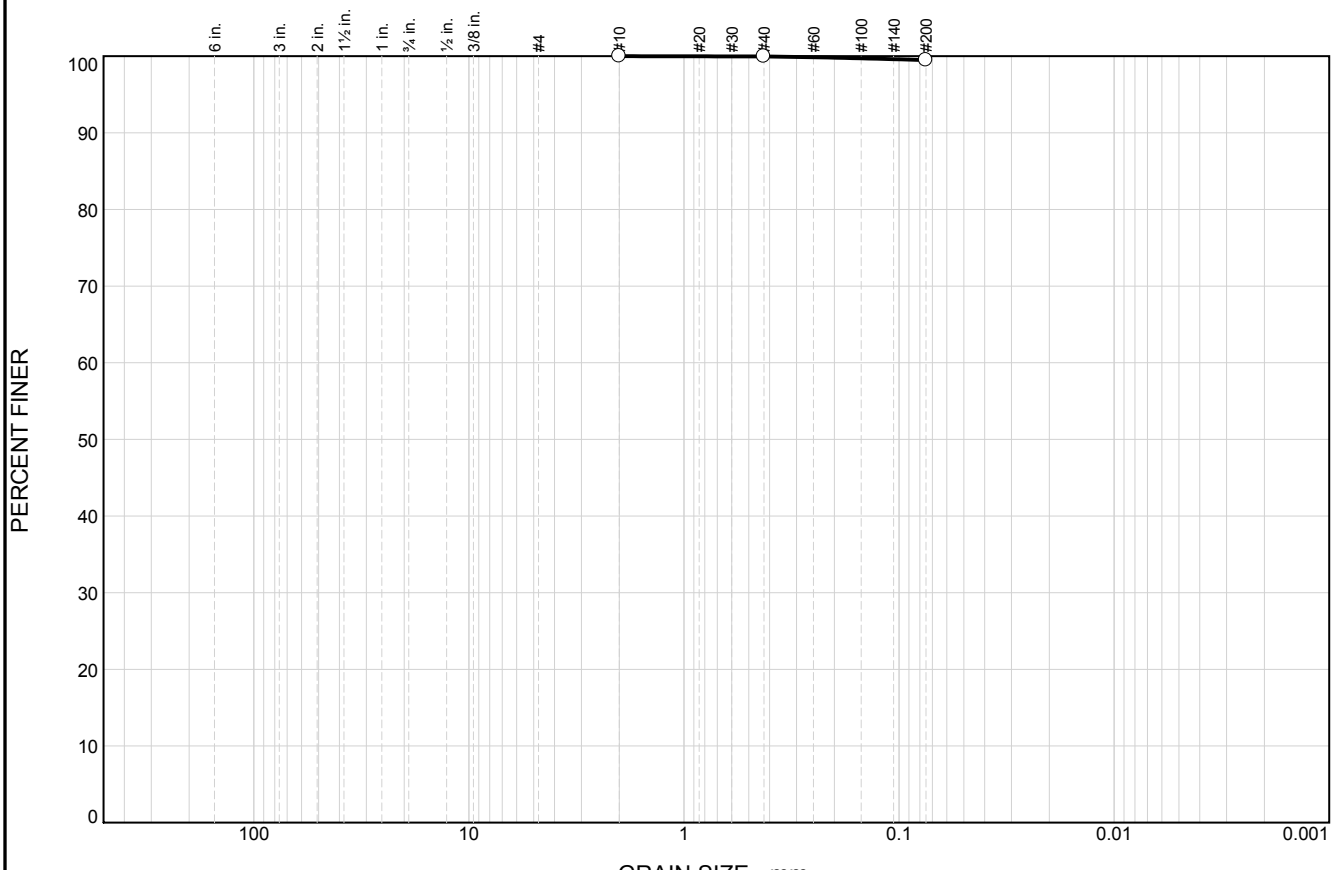
Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	0.0	0.5	99.5	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	32	25								

Material Description	USCS	AASHTO
○ BROWN SILT	ML	A-4(8)

Project No. 195651 **Client:** TRANSMISSION DEVELOPERS INC.

Project: TDI CHAMPLAIN HUDSON POWER EXPRESS - CSX

○ **Source of Sample:** B180.1-1 **Depth:** 13.5-15.0 FT **Sample Number:** S-6

Remarks:
○SAMPLE DESCRIPTION BASED ON VISUAL IDENTIFICATION AND LABORATORY ANALYSIS

TRC Engineers, Inc.

Mt. Laurel, NJ

Figure 22

Tested By: TBT 12/10/12 **Checked By:** JPB 03/12/13

EXPLORATION PLAN

Champlain-Hudson Power Express- Phase 4 HDD Borings – Package 5
Schenectady through Selkirk, NY
January 4, 2023 ■ Terracon Project No. JB215256J

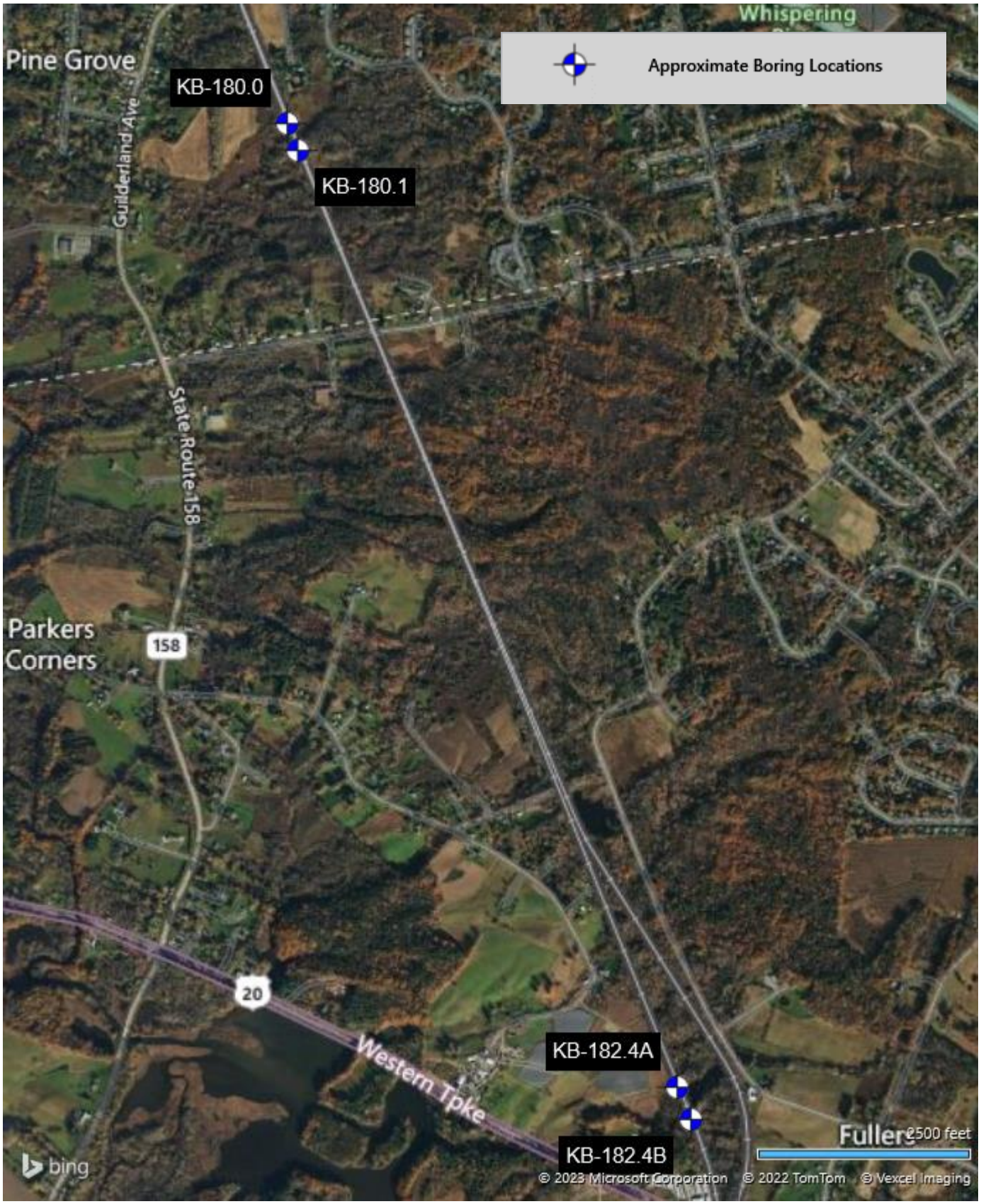


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

AERIAL PHOTOGRAPHY PROVIDED BY MICROSOFT BING MAPS

BORING LOG NO. KB-180.0

PROJECT: Phase 4 Borings

CLIENT: Kiewit Engineering (NY) Corp
Lone Tree, CO

SITE: Champlain to Hudson HDD Crossings

LOCATION See Exploration Plan

Latitude: 42.7617° Longitude: -73.9798°

Surface Elev.: 311.8 (Ft.)

DEPTH	ELEVATION (Ft.)	Description
0.3	311.5	**FILL - BALLAST**, gray
		FILL - POORLY GRADED SAND, trace silt
3.5	308.3	**FILL - SILTY SAND**
		organic layer at 6.2 feet
8.0	303.8	**SILT (ML)**, varved silt and clay, brown, very soft to medium stiff
		grades gray

DEPTH (Ft.)	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		13	6-7-8-9 N=15			
		15	5-8-5-3 N=13			
5		18	1-2-3-3 N=5	16.4	NP	34
		24	1-2-3-1 N=5			
		20	3-4-4-5 N=8			
10		20	1-2-3-3 N=5	34.0	34-26-8	91
15		24	1-2-3-4 N=5			
20		24	WH-1-2-2 N=3			
25						

WATER LEVEL OBSERVATIONS

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
0-52' 3 1/4" HSA

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by others.

Notes:

Hammer Efficiency Summary:
Energy Transfer Ratio: 84.7% +/-5.0%
Hammer Efficiency Correction (CE): 1.41
Logged by JCH
WH = Weight of hammer

WATER LEVEL OBSERVATIONS

No free water encountered

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 11-07-2022	Boring Completed: 11-07-2022
Drill Rig: Mobil B-57	Driller: L. Zito
Project No.: JB215256J	

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JB215256J PHASE 4 BORINGS.GPJ TERRACON_DATATEMPLATE.GDT 1/4/23

BORING LOG NO. KB-180.0

PROJECT: Phase 4 Borings

CLIENT: Kiewit Engineering (NY) Corp
Lone Tree, CO

SITE: Champlain to Hudson HDD Crossings

LOCATION See Exploration Plan

Latitude: 42.7617° Longitude: -73.9798°

Surface Elev.: 311.8 (Ft.)

DEPTH ELEVATION (Ft.)

GRAPHIC LOG	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
SILT (ML), varved silt and clay, gray, very soft to medium stiff *(continued)*				20	3-3-2-1 N=5	22.6	22-21-1	99
	30			24	WH/12"-1-2 N=1			
	35			22	1-2-2-3 3" Split Spoon With Ring Samplers			
	40			24	WH/18"-1	30.5	34-24-10	96
	45			24	WH/24"			
	50							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
0-52' 3 1/4" HSA

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by others.

Notes:

Hammer Efficiency Summary:
Energy Transfer Ratio: 84.7% +/-5.0%
Hammer Efficiency Correction (CE): 1.41
Logged by JCH
WH = Weight of hammer

WATER LEVEL OBSERVATIONS

No free water encountered

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 11-07-2022 | Boring Completed: 11-07-2022

Drill Rig: Mobil B-57 | Driller: L. Zito

Project No.: JB215256J

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JB215256J PHASE 4 BORINGS.GPJ TERRACON_DATATEMPLATE.GDT 1/4/23

BORING LOG NO. KB-180.0

PROJECT: Phase 4 Borings

CLIENT: Kiewit Engineering (NY) Corp
Lone Tree, CO

SITE: Champlain to Hudson HDD Crossings

LOCATION See Exploration Plan

Latitude: 42.7617° Longitude: -73.9798°

Surface Elev.: 311.8 (Ft.)

GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	SILT (ML), varved silt and clay, gray, very soft to medium stiff *(continued)*					24	WH/24"			
	52.0	259.8								
	Boring Terminated at 52 Feet									

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
0-52' 3 1/4" HSA

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by others.

Notes:

Hammer Efficiency Summary:
Energy Transfer Ratio: 84.7% +/-5.0%
Hammer Efficiency Correction (CE): 1.41
Logged by JCH
WH = Weight of hammer

WATER LEVEL OBSERVATIONS

No free water encountered

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 11-07-2022	Boring Completed: 11-07-2022
Drill Rig: Mobil B-57	Driller: L. Zito
Project No.: JB215256J	

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JB215256J PHASE 4 BORINGS.GPJ TERRACON_DATATEMPLATE.GDT 1/4/23

BORING LOG NO. KB-180.1

PROJECT: Phase 4 Borings

CLIENT: Kiewit Engineering (NY) Corp
Lone Tree, CO

SITE: Champlain to Hudson HDD Crossings

LOCATION See Exploration Plan

Latitude: 42.7608° Longitude: -73.9793°

Surface Elev.: 310.6 (Ft.)

DEPTH	ELEVATION (Ft.)	Description
0.5	310.1	**FILL - BALLAST**
		FILL - SILT WITH SAND, brown
		Pushed casing to 5 feet to start sampling
10.0	300.6	**LEAN CLAY (CL)**, varved silt and clay, brown, very soft to stiff
		grades gray

DEPTH (Ft.)	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
5		24	3-4-6-6 N=10	23.7	30-24-6	76
10		24	2-2-2-3 N=4			
15		20	3-4-5-6 N=9	30.7	35-22-13	98
20		18	WH/24"			
25						

WATER LEVEL OBSERVATIONS

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
0-15' 4" Casing
15-72' Mud Rotary

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by others.

Notes:

Hammer Efficiency Summary:
Energy Transfer Ratio: 84.7% +/-5.0%
Hammer Efficiency Correction (CE): 1.41
Logged by JTO
WH = Weight of hammer

WATER LEVEL OBSERVATIONS

No free water encountered

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 11-07-2022	Boring Completed: 11-08-2022
Drill Rig: Diedrich D-50	Driller: S. Morey
Project No.: JB215256J	

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JB215256J PHASE 4 BORINGS.GPJ TERRACON_DATATEMPLATE.GDT 1/4/23

BORING LOG NO. KB-180.1

PROJECT: Phase 4 Borings

CLIENT: Kiewit Engineering (NY) Corp
Lone Tree, CO

SITE: Champlain to Hudson HDD Crossings

LOCATION See Exploration Plan

Latitude: 42.7608° Longitude: -73.9793°

Surface Elev.: 310.6 (Ft.)

GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	LEAN CLAY (CL), varved silt and clay, gray, very soft to stiff *(continued)*									
			30			24	WH/12"-8-11 3" Split Spoon With Ring Samplers	22.4	26-18-8	98
			35							
			40			24	WH/24"			
			45							
			50							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
0-15' 4" Casing
15-72' Mud Rotary

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by others.

Notes:

Hammer Efficiency Summary:
Energy Transfer Ratio: 84.7% +/-5.0%
Hammer Efficiency Correction (CE): 1.41
Logged by JTO
WH = Weight of hammer

WATER LEVEL OBSERVATIONS

No free water encountered

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 11-07-2022 | Boring Completed: 11-08-2022
Drill Rig: Diedrich D-50 | Driller: S. Morey
Project No.: JB215256J

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JB215256J PHASE 4 BORINGS.GPJ TERRACON_DATATEMPLATE.GDT 1/4/23

BORING LOG NO. KB-180.1

PROJECT: Phase 4 Borings

CLIENT: Kiewit Engineering (NY) Corp
Lone Tree, CO

SITE: Champlain to Hudson HDD Crossings

LOCATION See Exploration Plan

Latitude: 42.7608° Longitude: -73.9793°

Surface Elev.: 310.6 (Ft.)

DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
LEAN CLAY (CL), varved silt and clay, gray, very soft to stiff *(continued)*					24	WH/24"	37.0	35-21-14	96
		55							
		60			18	WH/24"			
		65							
		70			24	WH/12"-3-3 N=3			
72.0	238.6								
Boring Terminated at 72 Feet									

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
0-15' 4" Casing
15-72' Mud Rotary

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by others.

Notes:

Hammer Efficiency Summary:
Energy Transfer Ratio: 84.7% +/-5.0%
Hammer Efficiency Correction (CE): 1.41
Logged by JTO
WH = Weight of hammer

WATER LEVEL OBSERVATIONS

No free water encountered

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 11-07-2022 | Boring Completed: 11-08-2022

Drill Rig: Diedrich D-50 | Driller: S. Morey

Project No.: JB215256J

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JB215256J PHASE 4 BORINGS.GPJ TERRACON_DATATEMPLATE.GDT 1/4/23

Summary of Laboratory Results

BORING ID	Depth (Ft.)	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
KB-169.0-9.5	2-4	7.2			
KB-169.0-9.5	8-10	6.7			
KB-169.0-9.5	20-22	16.4	29	20	9
KB-169.0-9.5	35-37	7.2			
KB-180.0	4-6	16.4	NP	NP	NP
KB-180.0	10-12	34.0	34	26	8
KB-180.0	25-27	22.6	22	21	1
KB-180.0	40-42	30.5	34	24	10
KB-180.1	5-7	23.7	30	24	6
KB-180.1	15-17	30.7	35	22	13
KB-180.1	30-32	22.4	26	18	8
KB-180.1	50-52	37.0	35	21	14
KB-182.4A	4-6	27.1	34	26	8
KB-182.4A	10-12	31.2	33	29	4
KB-182.4A	30-31.5	32.0	40	26	14
KB-182.4A	45-46.5	28.5	40	23	17
KB-182.4B	5-7	21.4	29	21	8
KB-182.4B	10-12	6.1			
KB-182.4B	25-27	34.5	37	22	15
KB-182.4B	55-57	31.1	34	22	12
KB-182.4B	75-77	24.0	25	20	5
KB-183.7B	4-6	12.2			
KB-183.7B	15-17	8.2			
KB-183.7B	20-22	16.9			
KB-188.6	4-6	10.0			
KB-188.6	20-22	7.7			
KB-188.6	40-42	10.9			
KB-188.6	55-57	9.8			
KB-189.7	4-6	8.9			
KB-189.7	10-12	32.8			
KB-189.7	25-27	8.7			
KB-189.7	40-42	9.6			
KB-190.2	6-8	8.7			
KB-190.9	2-4	22.8			
KB-190.9	10-12	12.4			
KB-191.8	4-6	19.2	25	21	4
KB-191.8	15-17	10.1			

PROJECT: Phase 4 Borings

SITE: Champlain to Hudson HDD Crossings

Terracon
30 Corporate Cir Ste 201
Albany, NY

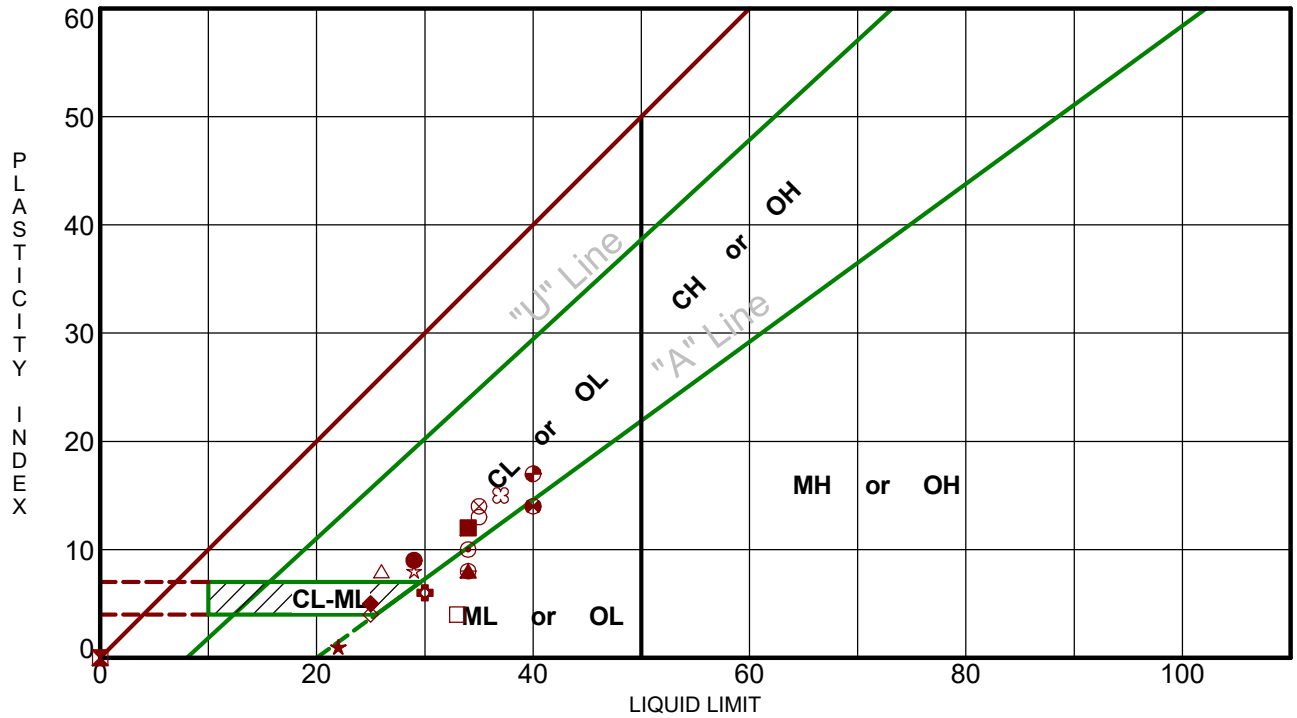
PROJECT NUMBER: JB215256J

CLIENT: Kiewit Engineering (NY) Corp
Lone Tree, CO

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. SMART LAB SUMMARY-PORTRAIT JB215256J PHASE 4 BORINGS.GPJ TERRACON_DATATEMPLATE.GDT 1/3/23

ATTERBERG LIMITS RESULTS

ASTM D4318



	Boring ID	Depth (Ft)	LL	PL	PI	Fines	USCS	Description
●	KB-169.0-9.5	20 - 22	29	20	9	49.7	SC	CLAYEY SAND with GRAVEL
⊠	KB-180.0	4 - 6	NP	NP	NP	34.0	SM	SILTY SAND
▲	KB-180.0	10 - 12	34	26	8	91.2	ML	SILT
★	KB-180.0	25 - 27	22	21	1	99.2	ML	SILT
⊙	KB-180.0	40 - 42	34	24	10	96.5	ML	SILT
✿	KB-180.1	5 - 7	30	24	6	76.0	ML	SILT with SAND
○	KB-180.1	15 - 17	35	22	13	98.4	CL	LEAN CLAY
△	KB-180.1	30 - 32	26	18	8	97.9	CL	LEAN CLAY
⊗	KB-180.1	50 - 52	35	21	14	95.6	CL	LEAN CLAY
⊕	KB-182.4A	4 - 6	34	26	8	96.9	ML	SILT
□	KB-182.4A	10 - 12	33	29	4	97.6	ML	SILT
⊗	KB-182.4A	30 - 31.5	40	26	14	98.7	ML	SILT
◕	KB-182.4A	45 - 46.5	40	23	17	99.3	CL	LEAN CLAY
☆	KB-182.4B	5 - 7	29	21	8	71.2	CL	LEAN CLAY with GRAVEL
✿	KB-182.4B	25 - 27	37	22	15	99.5	CL	LEAN CLAY
■	KB-182.4B	55 - 57	34	22	12	98.5	CL	LEAN CLAY
◆	KB-182.4B	75 - 77	25	20	5	99.6	CL-ML	SILTY CLAY
◇	KB-191.8	4 - 6	25	21	4	99.4	CL-ML	SILTY CLAY

PROJECT: Phase 4 Borings

SITE: Champlain to Hudson HDD Crossings

Terracon
30 Corporate Cir Ste 201
Albany, NY

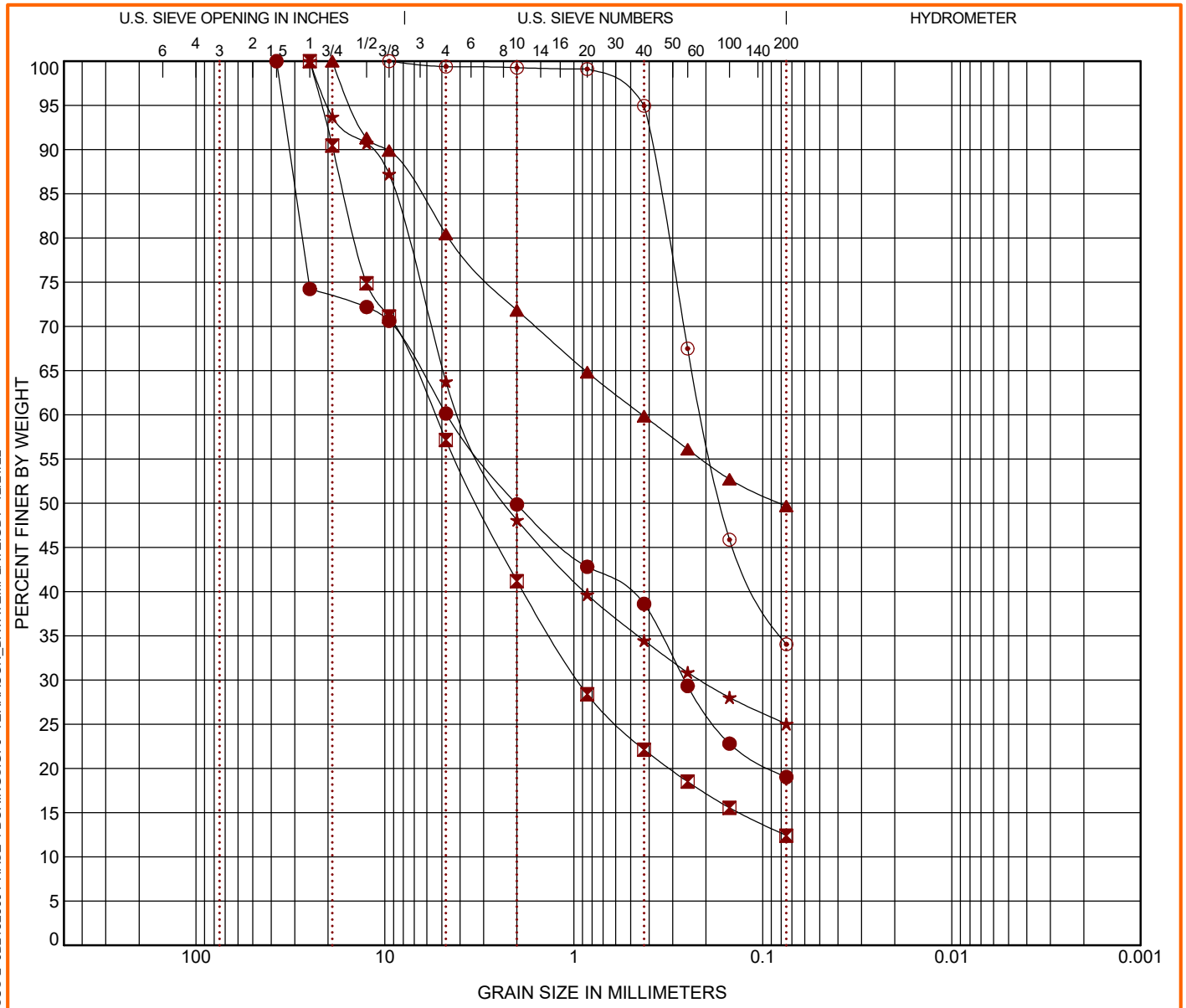
PROJECT NUMBER: JB215256J

CLIENT: Kiewit Engineering (NY) Corp
Lone Tree, CO

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. ATTERBERG LIMITS JB215256J PHASE 4 BORINGS.GPJ TERRACON_DATATEMPLATE.GDT 12/21/22

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring ID	Depth (Ft)	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
●	KB-169.0-9.5	2 - 4	SILTY SAND with GRAVEL (SM)	7.2					
⊠	KB-169.0-9.5	8 - 10	SILTY SAND with GRAVEL (SM)	6.7				3.71	124.11
▲	KB-169.0-9.5	20 - 22	CLAYEY SAND with GRAVEL (SC)	16.4	29	20	9		
★	KB-169.0-9.5	35 - 37	SILTY SAND with GRAVEL (SM)	7.2					
⊙	KB-180.0	4 - 6	SILTY SAND (SM)	16.4	NP	NP	NP		

	Boring ID	Depth (Ft)	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
●	KB-169.0-9.5	2 - 4	37.5	4.691	0.26		0.0	39.9	41.1		19.0	
⊠	KB-169.0-9.5	8 - 10	25	5.474	0.946		0.0	42.9	44.7		12.4	
▲	KB-169.0-9.5	20 - 22	19	0.435			0.0	19.6	30.8		49.7	
★	KB-169.0-9.5	35 - 37	25	3.859	0.214		0.0	36.2	38.7		25.0	
⊙	KB-180.0	4 - 6	9.5	0.209			0.0	0.6	65.3		34.0	

PROJECT: Phase 4 Borings

PROJECT NUMBER: JB215256J

SITE: Champlain to Hudson HDD Crossings

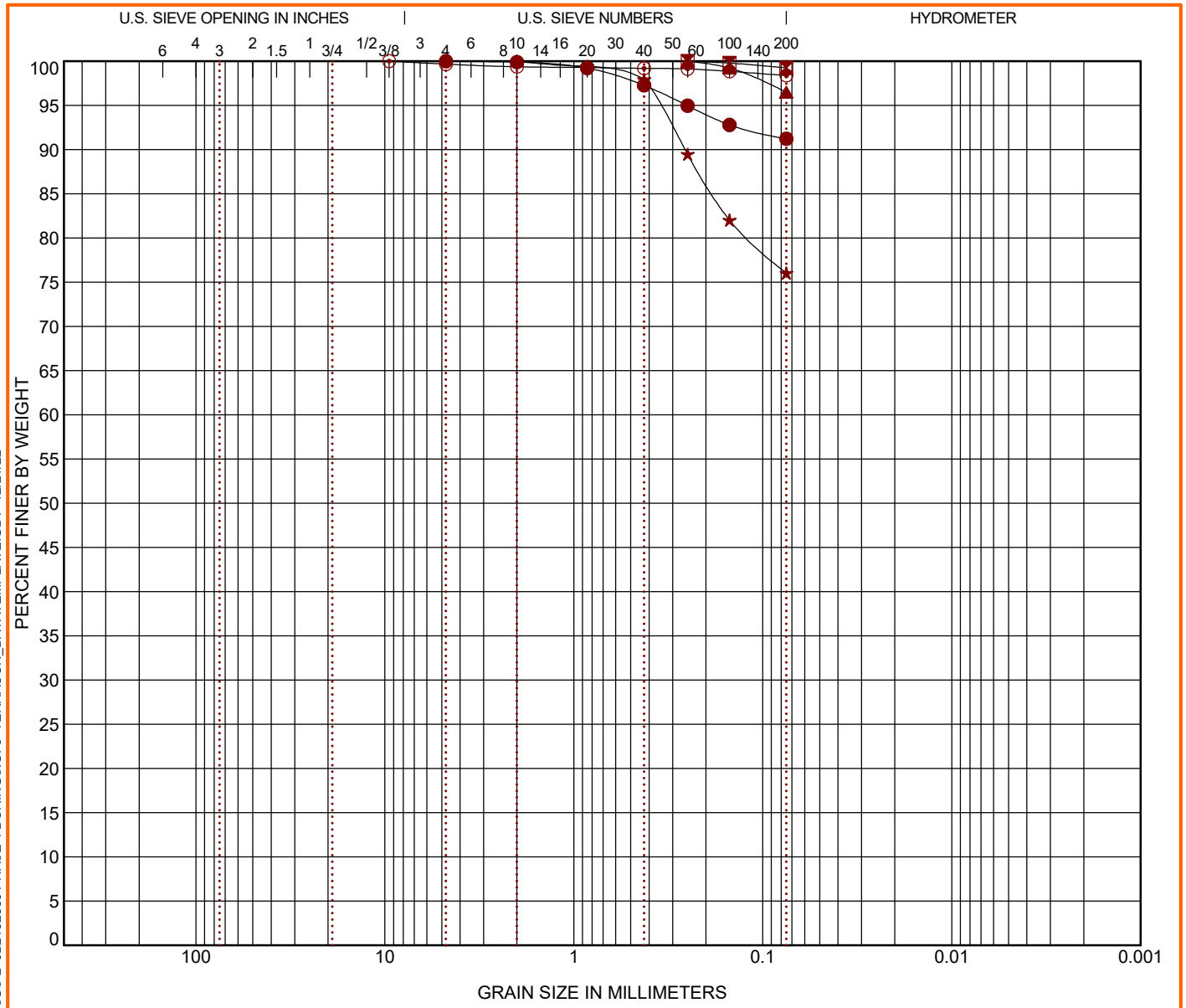
Terracon
30 Corporate Cir Ste 201
Albany, NY

CLIENT: Kiewit Engineering (NY) Corp
Lone Tree, CO

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS-2 JB215256J PHASE 4 BORINGS.GPJ TERRACON_DATATEMPLATE.GDT 12/21/22

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring ID	Depth (Ft)	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
●	KB-180.0	10 - 12	SILT (ML)	34.0	34	26	8		
⊠	KB-180.0	25 - 27	SILT (ML)	22.6	22	21	1		
▲	KB-180.0	40 - 42	SILT (ML)	30.5	34	24	10		
★	KB-180.1	5 - 7	SILT with SAND (ML)	23.7	30	24	6		
⊙	KB-180.1	15 - 17	LEAN CLAY (CL)	30.7	35	22	13		

	Boring ID	Depth (Ft)	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
●	KB-180.0	10 - 12	4.75				0.0	0.0	8.8		91.2	
⊠	KB-180.0	25 - 27	0.25				0.0	0.0	0.8		99.2	
▲	KB-180.0	40 - 42	0.25				0.0	0.0	3.5		96.5	
★	KB-180.1	5 - 7	2				0.0	0.0	24.0		76.0	
⊙	KB-180.1	15 - 17	9.5				0.0	0.3	1.3		98.4	

PROJECT: Phase 4 Borings

PROJECT NUMBER: JB215256J

SITE: Champlain to Hudson HDD Crossings

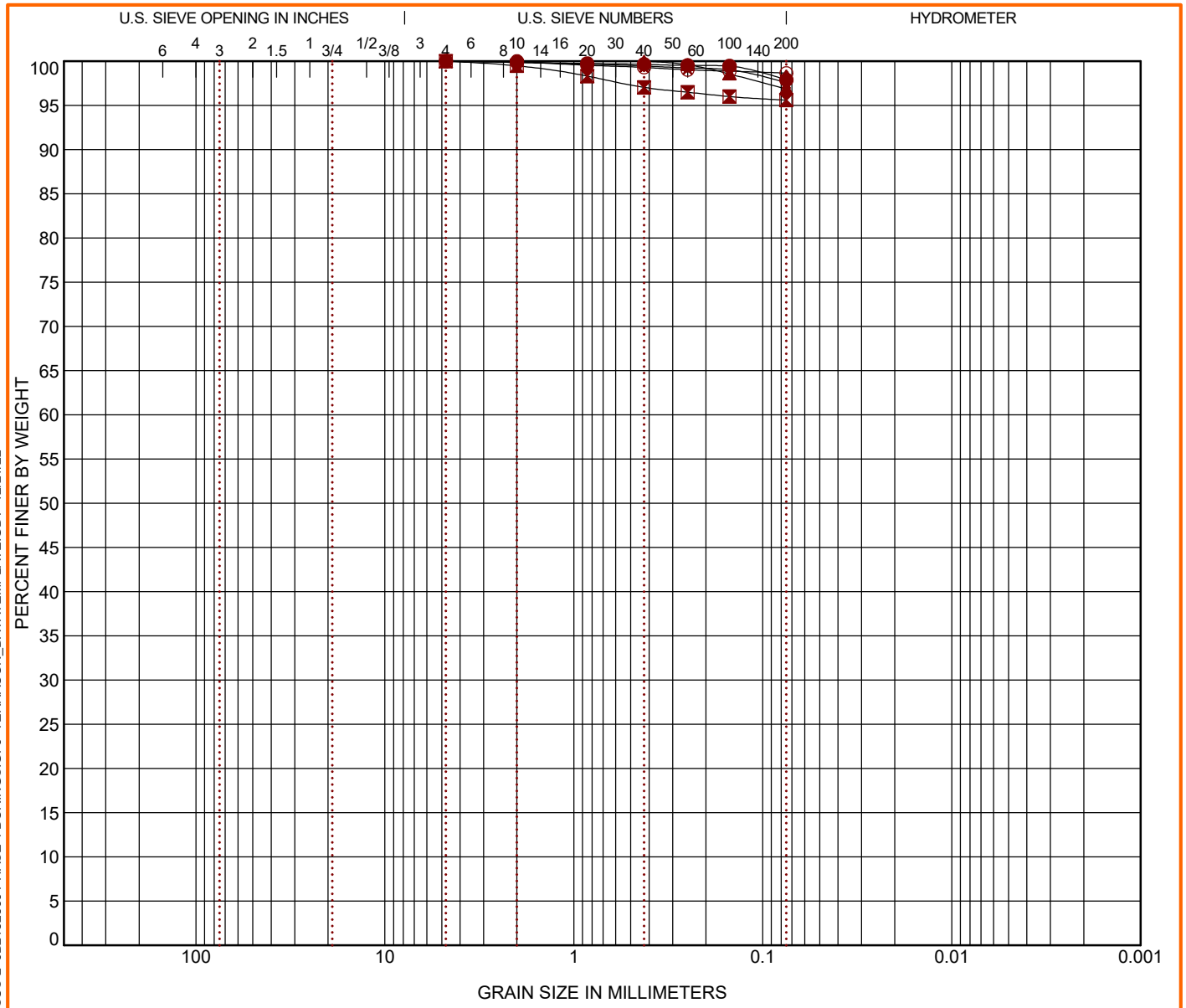
Terracon
30 Corporate Cir Ste 201
Albany, NY

CLIENT: Kiewit Engineering (NY) Corp
Lone Tree, CO

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS-2 JB215256J PHASE 4 BORINGS.GPJ TERRACON_DATATEMPLATE.GDT 12/21/22

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring ID	Depth (Ft)	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
●	KB-180.1	30 - 32	LEAN CLAY (CL)	22.4	26	18	8		
⊠	KB-180.1	50 - 52	LEAN CLAY (CL)	37.0	35	21	14		
▲	KB-182.4A	4 - 6	SILT (ML)	27.1	34	26	8		
★	KB-182.4A	10 - 12	SILT (ML)	31.2	33	29	4		
⊙	KB-182.4A	30 - 31.5	SILT (ML)	32.0	40	26	14		

	Boring ID	Depth (Ft)	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
●	KB-180.1	30 - 32	4.75				0.0	0.0	2.1		97.9	
⊠	KB-180.1	50 - 52	4.75				0.0	0.0	4.4		95.6	
▲	KB-182.4A	4 - 6	0.425				0.0	0.0	3.1		96.9	
★	KB-182.4A	10 - 12	4.75				0.0	0.0	2.4		97.6	
⊙	KB-182.4A	30 - 31.5	2				0.0	0.0	1.3		98.7	

PROJECT: Phase 4 Borings

PROJECT NUMBER: JB215256J

SITE: Champlain to Hudson HDD Crossings

Terracon
30 Corporate Cir Ste 201
Albany, NY

CLIENT: Kiewit Engineering (NY) Corp
Lone Tree, CO

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS-2 JB215256J PHASE 4 BORINGS.GPJ TERRACON_DATATEMPLATE.GDT 12/21/22

Kiewit

MEMORANDUM

DATE: November 7, 2022

TO: Nick Strater; Brierley Associates Underground Engineers, PLLC

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

SUBJECT: Geotechnical Data: Segment 8 – Package 5 – HDD Crossing 75.A – Revision 1
Champlain Hudson Power Express Project
Schenectady, 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 south of Schenectady, New York. The approximate station for the start of HDD crossing Number 75.A is STA 50210+00 (42.751052° N, 73.973983° W).

The geotechnical data at this HDD crossing is attached. The available data is from the previous investigation by TRC and the recent investigation by Terracon, referenced below.

- ConeTec, Presentation of Site Investigation Results, CHPE HDD Crossings, Rotterdam & Whitehall, New York, dated September 21, 2022.
- TRC, Geotechnical Data Report, Champlain Hudson Power Express, Canadian Pacific Railway Borings MP 177.6-228.2, dated March 15, 2013.
- Terracon, Geotechnical Data Report, Champlain-Hudson Power Express-Package 5, Schenectady through Selkirk, dated April 4, 2022.

Contact us if you have questions or require additional information.

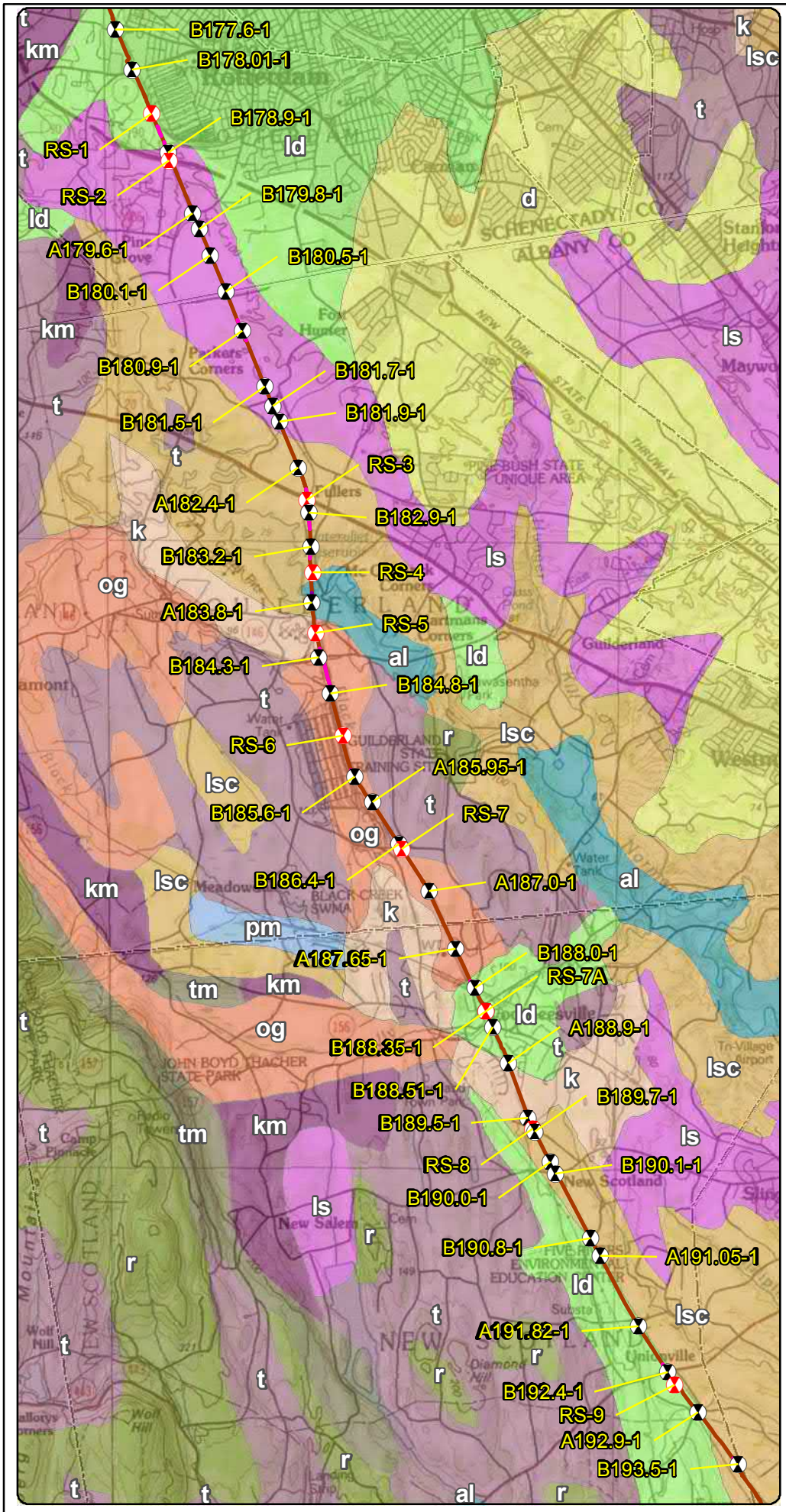
HDD 75.A
Borings B180.9-1, K-180.8,
K-181.0, SCPT22-180.9, CPT22-181.1
Segment 8

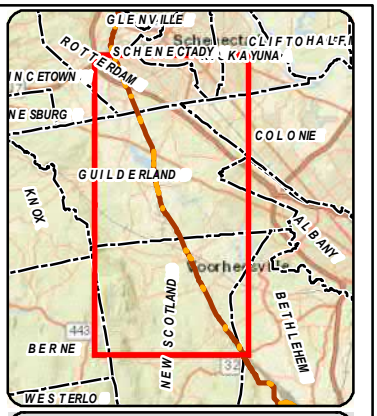
CHPE Segment 8 & 9 - Package 5
HDD Soil Boring Coordinates and Elevations

Firm	Boring	Northing (feet)	Easting (feet)	Ground Surface Elevation (feet)
TRC*	A179.6-1	1433335.8	631009.7	332.5
	A182.4-1	1420048.2	636557.9	291.5
	A187.65-1	1394856.5	644775.4	327.7
	A191.05-1	1378814.5	652321.0	274.7
	A191.82-1	1375154.9	654314.3	257.1
	A192.9-1	1370644.3	657458.6	232.8
	B177.1-1	1445275.2	626125.8	347.3
	B177.6-1	1442944.0	627003.0	346.5
	B178.01-1	1440838.2	627828.3	368.5
	B178.9-1	1436461.4	629767.4	322.1
	B180.1-1	1431140.9	631965.3	310.4
	B180.9-1	1427158.5	633611.8	307.5
	B182.9-1	1417657.6	637123.9	291.5
	B183.2-1	1415871.4	637202.5	290.2
	B184.3-1	1410133.0	637597.6	324.0
	B184.8-1	1408223.8	638230.4	323.1
	B185.6-1	1403875.9	639489.9	328.2
	B188.0-1	1392812.4	645793.4	330.9
	B188.35-1	1391616.5	646333.6	333.4
	B188.51-1	1390815.1	646697.7	340.2
	B190.0-1	1383732.6	649743.4	296.3
	B190.1-1	1383134.9	649975.5	294.6
	B190.8-1	1379726.2	651827.2	282.3
	B192.4-1	1372732.4	655878.1	239.3
	B193.5-1	1367919.2	659547.5	218.6
AECOM**	RS-2	1436092.2	629800.7	315.6
	RS-3	1418336.4	636985.0	303.2
	RS-4	1414567.4	637285.8	302.2
	RS-5	1411399.1	637471.6	319.0
	RS-7A	1391599.9	646333.6	340.5
	RS-9	1372089.8	656230.9	238.7
	SY-7	1353089.8	670133.9	159.8
	SY-8	1353716.5	671626.7	175.0
	SY-9	1353046.4	673133.41	163.1
	SY-9A	1351940.0	674314.3	158.3
	SY-10	1350838.3	675488.6	166.0
	SCH-19	1446199.8	625927.0	333.8
	SCH-19A	1445712.1	626032.4	343.1

Notes:
- Northings and Eastings are provided in NAD83 New York State Plane East Zone.
- Elevations are referenced to the NAVD88 datum.
* TRC boring coordinates as shown in Table 1-6 in AECOM report (reference below). Boring elevations estimated from November 2021 topographic survey by Williams Aerial.
** AECOM boring coordinates and elevations as shown in Table 1-6 in AECOM report.
*** Kiewit boring coordinates and elevations are noted on the boring logs.

Reference:
AECOM, Geotechnical Data Report, Upland Segments: Putnam Station, Washington County, to Cementon, Green County, NY, Champlain Hudson Power Express, dated May 28, 2021.





LEGEND

- 2021 Boring Location
- Previous (2013) Boring Location
- Terrestrial Route HVDC
- Submarine Route HVDC
- Terrestrial Route HVAC
- Preliminary HDD Locations
- Preliminary Pipe Bridge Location
- Town Boundary
- County Boundary

Surficial Geology

- al - Recent alluvium
- d - Dunes
- k - Kame deposits
- km - Kame moraine
- ld - Lacustrine delta
- ls - Lacustrine sand
- lsc - Lacustrine silt and clay
- og - Outwash sand and gravel
- pm - Swamp deposits
- r - Bedrock
- t - Till
- tm - Till moraine

N

0.7 0.35 0 0.7 Miles

Transmission Developers Inc.

Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

Surficial Geology and Geotechnical Borings Rotterdam to Selkirk Figure 3-8

Prepared on 5/4/2021

by: AECOM

DATA SOURCES: ESRI, NYSDOT, NOAA, USACE, NYDOS, TDI, TRC

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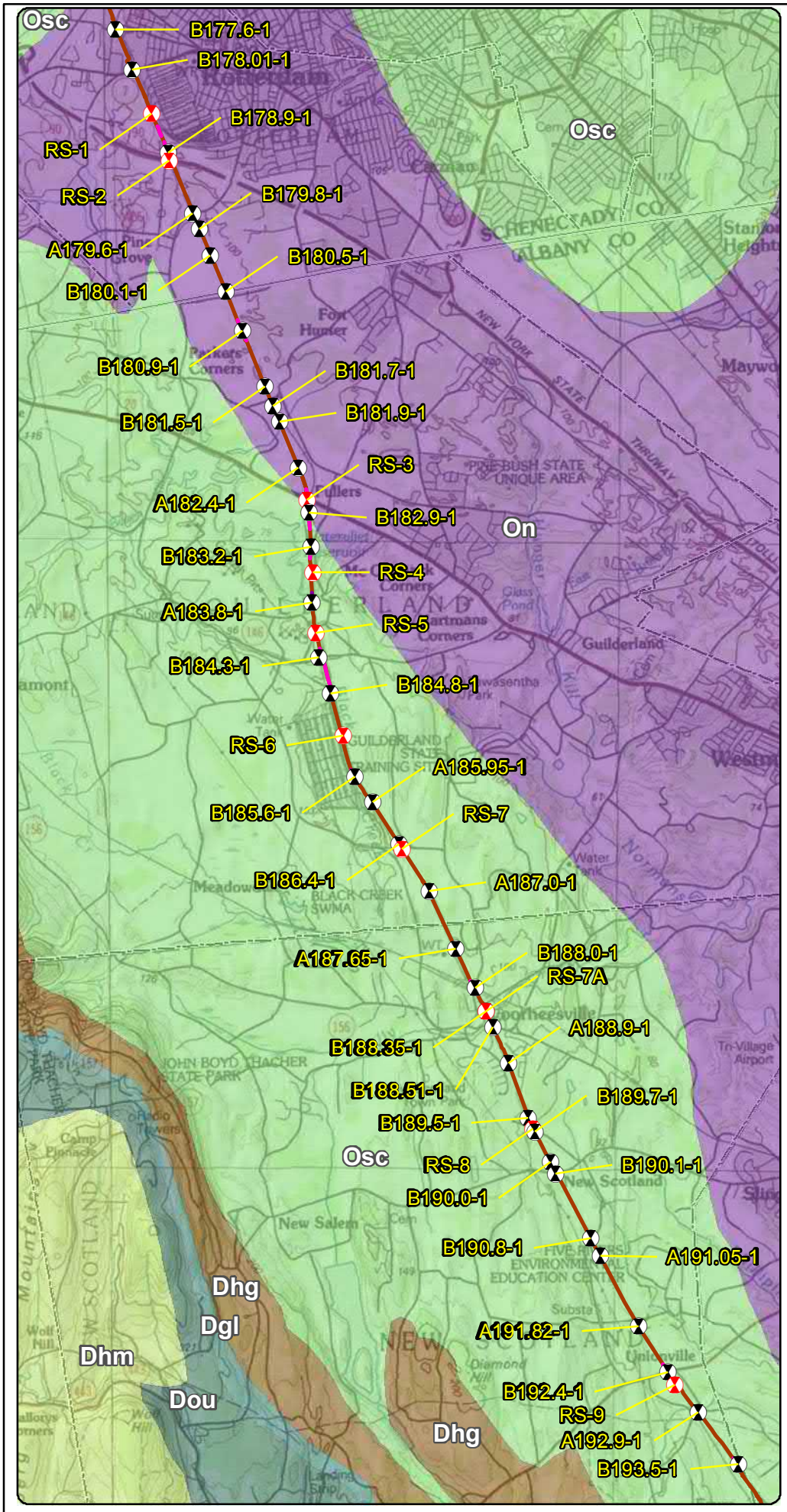

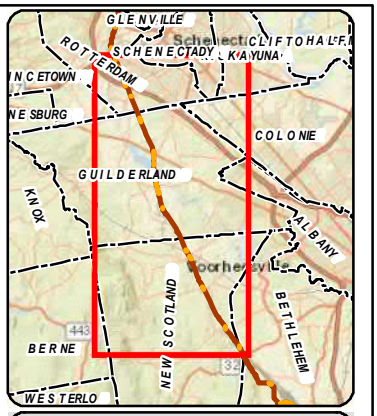

LEGEND

- 2021 Boring Location
- Previous (2013) Boring Location
- Terrestrial Route HVDC
- Submarine Route HVDC
- Terrestrial Route HVAC
- Preliminary HDD Locations
- Preliminary Pipe Bridge Location
- Town Boundary
- County Boundary

Bedrock Geology

- Dgl - Glenerie Formation
- Dhg - Port Ewen Formation
- Dhm - Undiff Lower Hamilton Group
- Dou - Onondaga Limestone
- On - Normanskill Shale
- Osc - Schenectady Formation

* Schenectady Formation includes: graywacke, sandstone, siltstone, shale

N

0.7 0.35 0 0.7 Miles

Transmission

Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

Bedrock Geology and Geotechnical Borings Rotterdam to Selkirk Figure 4-8

Prepared on 5/4/2021

by: AECOM

DATA SOURCES: ESRI, NYSDOT, NOAA, USACE, NYDOS, TDI, TRC

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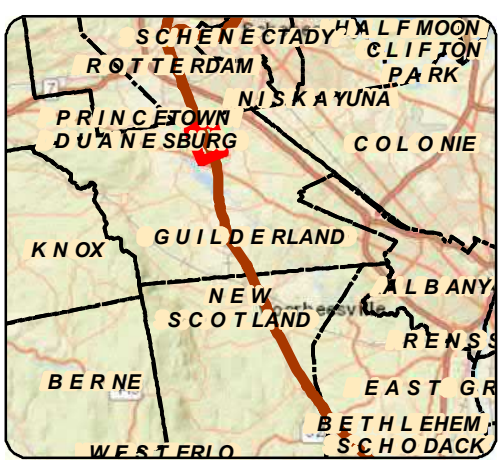
B180.9-1
181
181.1
181.2
181.3
181.4
GUILDERLAND
B181.5-1
181.6
181.7
B181.7-1
181.8
B181.9-1
182
182.1
W Old State Rd
Miller Rd
W Lydius St
0
1,000
Feet



LEGEND

- 111.8 Certified Milepost - Tenths
- 135 Certified Milepost
- 111.8 Preferred Alternative Milepost - Tenths
- 135 Preferred Alternative Milepost
- Terrestrial Route HVDC
- Submarine Route HVDC
- Terrestrial Route HVAC
- Preliminary HDD Locations
- Preliminary Pipe Bridge Location
- 2021 Boring Location
- Previous (2013) Boring Location
- Streams/Ditches
- Railroad ROW
- Deviation Zone
- Deviation Zone Outside ROW
- Preferred Alternative Deviation Zone
- Preferred Alternative Deviation Zone Outside ROW
- Town Boundary
- Village Boundary
- State Park (OPRHP)

Parcel Ownership: TOWN NAME

Road Name: Village Name

Transmission Developers Inc.

Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

BORING LOCATION PLAN

Rotterdam to Selkirk

Figure A-8

Sheet 4 of 14

Prepared by: AECOM 5/4/2021

DATA SOURCES: ESRI, NETWORK MAPPING 2010, NYSDOT, OPRHP, TDI, TRC

Y:\Projects\CHPE\Route\Consensus_Alternative_Routes\MXD\Alt_5_Routes_DZ_201909\Boring_Locations\Maps_for_May_2021_Report\Rotterdam_to_Selkirk_Boring_Locations_Mapset_May_2021_Report.mxd

TEST BORING LOG

PROJECT: TDI CHAMPLAIN HUDSON POWER EXPRESS
LOCATION: CSX RAILROAD ROW, NY

BORING	**B180.9-1**
G.S. ELEV.	N/A
FILE	195651
SHEET	1 OF 1

GROUNDWATER DATA			
FIRST ENCOUNTERED NR			
DEPTH	HOUR	DATE	ELAPSED TIME
22.3'	NR	11/3	0 HR

METHOD OF ADVANCING BOREHOLE				
a	FROM	0.0 '	TO	10.0 '
d	FROM	10.0 '	TO	30.0 '

DRILLER	P. PLANTIER
HELPER	M. NAGEY
INSPECTOR	C. POPPE
DATE STARTED	11/03/2012
DATE COMPLETED	11/03/2012

DEPTH	A	B				C	DESCRIPTION	Wn	REMARKS
	S-1	6	5	3	4		***BLACK/TAN F/M SAND, SM SILT (FILL)*** 2.0		
	S-2	6	5	4	6		***TAN F/M SAND, TR TO SM SILT*** 4.0		
5	S-3	6	5	4	5		***GRAY-BROWN SILT, TR CLAY*** 6.0	26.5	
	S-4	4	2	4	3		***BROWN SILT, TR TO SM F/ SAND, TR CLAY*** 8.0		
10	S-5	5	3	5	5		***BROWN SILT, SM F/ SAND, TR CLAY*** 13.5	22.7	
15	S-6	13	4	2			***BROWN SILTY F/ SAND*** 18.5	22.7	
20	S-7	3	2	2			***GRAY BROWN SILT, SM CLAY, TR F/M SAND*** 23.5	29.6	
25	S-8	3	2	2			***DARK GRAY CLAYEY SILT, SM F/M/C SAND*** 28.5	29.5	
30	S-9	2	3	3			***GRAY CLAYEY SILT*** 30.0		
							END OF BORING AT 30'		
35									

DRN.	TBT
CKD.	PWK

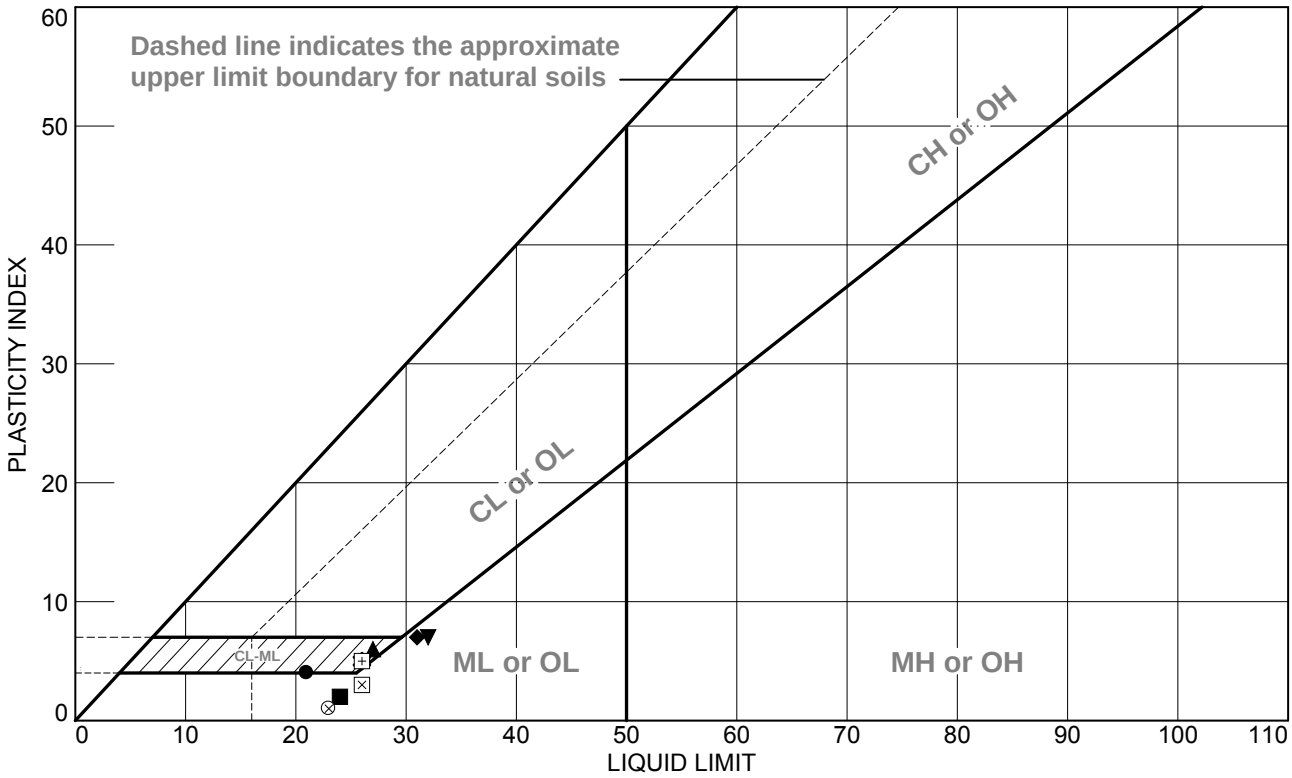
NEW PROJECTS TEST BORING LOG 195651_TDI_CSX.GPJ SITE BLAUVELT.GDT 3/5/13

SUMMARY OF LABORATORY TEST DATA

Project Name: TDI Champlain Hudson Power Express – CSX
Client Name: Transmission Developers, Inc.
TRC Project #: 195651

SAMPLE IDENTIFICATION			Soil Group (USCS System)	GRAIN SIZE DISTRIBUTION				PLASTICITY				Specific Gravity	Moisture Content (%)	Unit Weight (pcf)	Compressive Strength (tsf)	Organic Content (%)
Boring #	Sample #	Depth (ft)		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Liquidity Index)					
B180.9-1	S-3	4.0-6.0	ML	-	-	-		22	24	NP	-	-	26.5	-	-	-
	S-5	8.0-10.0	-	-	-	-		-	-	-	-	-	22.7	-	-	-
	S-6	13.5-15.0	-	-	-	-		-	-	-	-	-	22.7	-	-	-
	S-7	18.5-20.0	CL-ML	0.0	3.8	67.3	28.9	26	21	5	1.7	2.76	29.6	-	-	-
	S-8	23.5-25.0	-	34.5		37.6	27.9	-	-	-	-	2.72	29.5	-	-	-
B181.5-1	S-1	0.0-2.0	-	-	-	-	-	-	-	-	-	-	9.6	-	-	-
	S-3	4.0-6.0	-	-	-	-	-	-	-	-	-	-	30.3	-	-	-
	S-5	8.0-10.0	ML	0.0	7.2	92.8		-	-	-	-	-	23.3	-	-	-
	S-6	13.5-15.0	-	-	-	-	-	-	-	-	-	-	29.4	-	-	-
	S-7	18.5-20.0	ML	-	-	-	-	23	22	1	6.9	-	28.9	-	-	-
B181.7-1	S-1	0.0-2.0	-	-	-	-	-	-	-	-	-	-	30.3	-	-	-
	S-4	6.0-8.0	ML	0.0	8.9	70.6	20.5	26	23	3	2.6	2.74	30.7	-	-	-
	S-6	13.5-15.0	ML	-	-	-	-	23	20	3	1.6	-	24.9	-	-	-

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

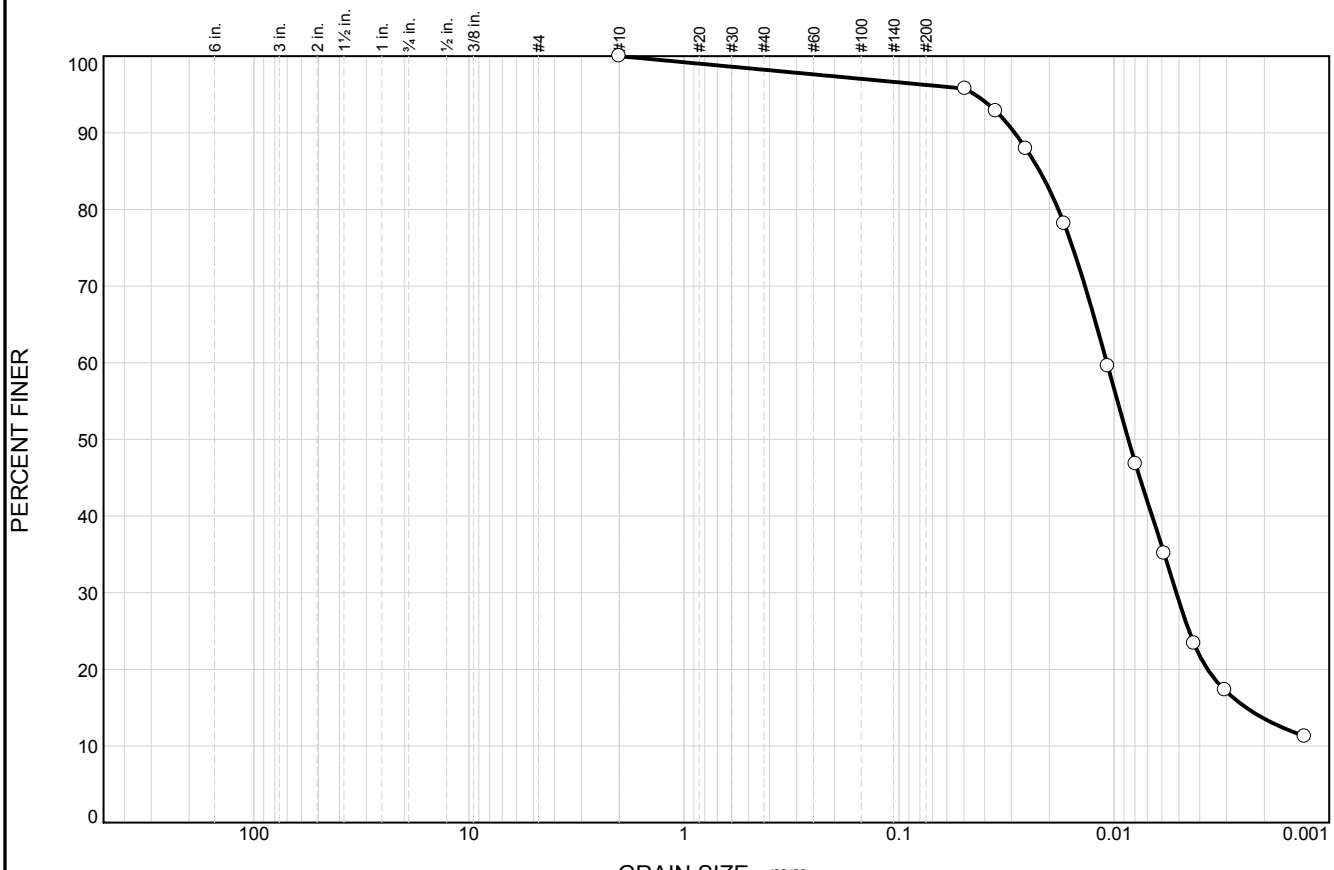
	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B178.9-1	S-3 & S-4	4.0-8.0 FT	18.4	17	21	4	SC-SM
■	A179.6-1	S-6	13.5-15.0 FT	23.3	22	24	2	ML
▲	A179.6-1	S-7	18.5-20.0 FT	29.1	21	27	6	CL-ML
◆	B179.8-1	S-2 & S-3	2.0-6.0 FT	27.8	24	31	7	ML
▼	B180.1-1	S-6	13.5-15.0 FT	33.9	25	32	7	ML
✱	B180.5-1	S-6 & S-7	13.5-20.0 FT	27.5	21	26	5	CL-ML
⊕	B180.9-1	S-3	4.0-6.0 FT	26.5	24	22	NP	ML
⊞	B180.9-1	S-7	18.5-20.0 FT	29.6	21	26	5	CL-ML
⊗	B181.5-1	S-7	18.5-20.0 FT	28.9	22	23	1	ML
⊠	B181.7-1	S-4	6.0-8.0 FT	30.7	23	26	3	ML

TRC Engineers, Inc.
Mt. Laurel, NJ

Client: TRANSMISSION DEVELOPERS INC.
Project: TDI CHAMPLAIN HUDSON POWER EXPRESS - CSX

Project No.: 195651 **Figure** 1

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	1.8	2.0	67.3	28.9

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	26	21	0.0222	0.0108	0.0086	0.0051	0.0024			

Material Description	USCS	AASHTO
○ GRAY-BROWN SILT, SM CLAY, TR F/M SAND	CL-ML	A-4(4)

Project No. 195651 **Client:** TRANSMISSION DEVELOPERS INC.

Project: TDI CHAMPLAIN HUDSON POWER EXPRESS - CSX

○ **Source of Sample:** B180.9-1 **Depth:** 18.5-20.0 FT **Sample Number:** S-7

Remarks:
○SAMPLE DESCRIPTION BASED ON VISUAL IDENTIFICATION AND LABORATORY ANALYSIS

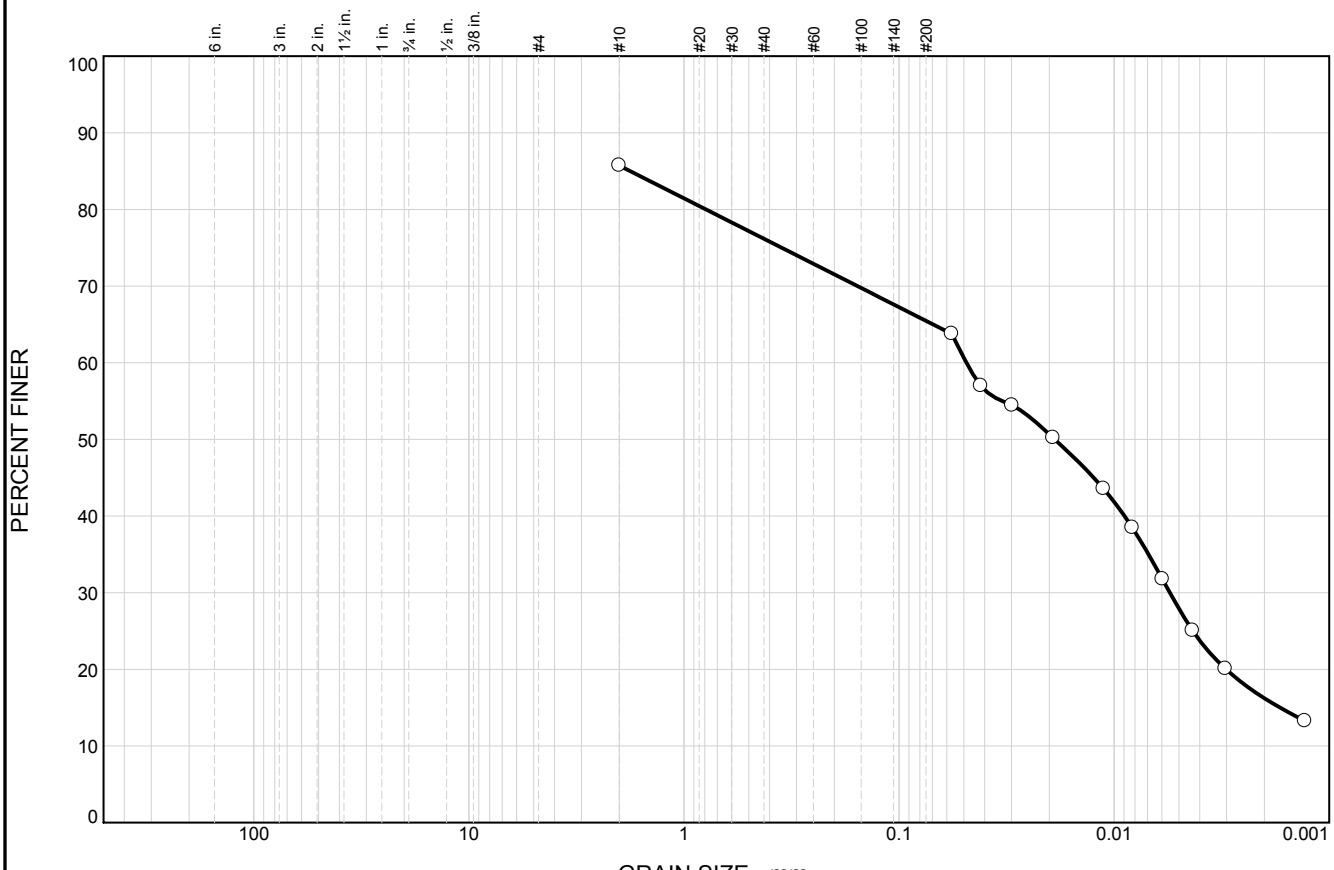
TRC Engineers, Inc.

Mt. Laurel, NJ

Figure 25

Tested By: TBT 12/12/12 **Checked By:** JPB 03/12/13

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○					9.5	10.7	37.6	27.9

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			1.7774	0.0486	0.0189	0.0055	0.0017			

Material Description	USCS	AASHTO
○ DARK GRAY CLAYEY SILT, SM F/M/C SAND		

Project No. 195651 **Client:** TRANSMISSION DEVELOPERS INC.

Project: TDI CHAMPLAIN HUDSON POWER EXPRESS - CSX

○ **Source of Sample:** B180.9-1 **Depth:** 23.5-25.0 FT **Sample Number:** S-8

Remarks:
○SAMPLE DESCRIPTION BASED ON VISUAL IDENTIFICATION AND LABORATORY ANALYSIS

TRC Engineers, Inc.

Mt. Laurel, NJ

Figure 26

Tested By: TBT 12/11/12 **Checked By:** JPB 03/12/13

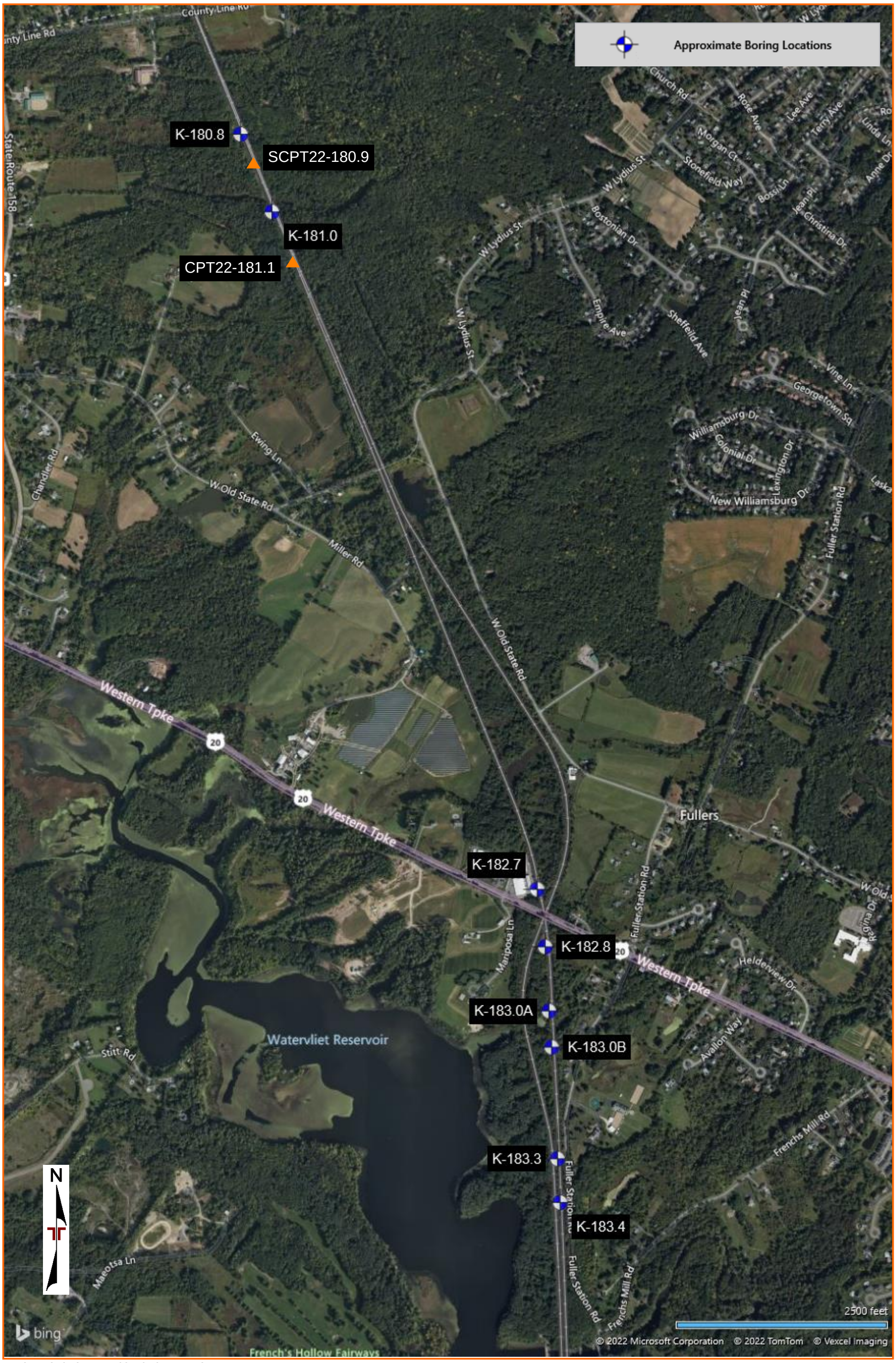


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

AERIAL PHOTOGRAPHY PROVIDED BY MICROSOFT BING MAPS

BORING LOG NO. K-180.8

PROJECT: Champlain-Hudson Power Express Package 5

CLIENT: Kiewit Engineering (NY) Corp.

SITE: Champlain to Hudson HDD Crossings Schenectady, NY

LOCATION See Exploration Plan

Latitude: 42.750978° Longitude: -73.973976°

Surface Elev.: 303.86 (Ft.)

DEPTH	ELEVATION (Ft.)	Description	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	LABORATORY HP (tsf)	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
2.0	302	**FILL - POORLY GRADED SAND**, brown, loose				18	1-3-4-4 N=7				
6.0	298	**POORLY GRADED SAND (SP)**, brown, loose to medium dense	5			17	4-4-4-4 N=8				
						24	3-4-6-6 N=10				
14.0	290	**SILTY SAND (SM)**, brown, loose to medium dense **Silt lenses between 4 and 8 feet**				14	4-6-4-5 N=10		23.4		27
			10			16	4-5-1-2 N=6				
						24	2-1-3-2 N=4				
16.0	288	**SILT (ML)**, gray, very soft	15			12	WOH-WOH-WOH-3		29.2	NP	97
24.0	280	**SILT AND CLAY (CL-ML)**, gray, very soft **fine sand lense encountered**	20			0	WOH/24"				
26.0	278	**SILT (ML)**, gray, very soft	25			24	Pushed Shelby Tube		26.8	NP	99
		SILT AND CLAY (CL-ML), gray, very soft									

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3 1/4 HSA

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by Kiewit.

Notes:

Logged by: MO
Hammer Efficency Summary:
Energy Transfer Ratio: 84.7% +/-5.7%
Hammer Efficiency Correction (CE):1.41
WOH = Weight of Hammer

WATER LEVEL OBSERVATIONS

While drilling

At completion of drilling

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 01-27-2022 | Boring Completed: 01-28-2022

Drill Rig: Diedrich D-50 | Driller: B. Duffey

Project No.: JB215256B

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JB215256B CHAMPLAIN-HUDSON.GPJ TERRACON_DATATEMPLATE.GDT 4/4/22

BORING LOG NO. K-180.8

PROJECT: Champlain-Hudson Power Express Package 5

CLIENT: Kiewit Engineering (NY) Corp.

SITE: Champlain to Hudson HDD Crossings Schenectady, NY

LOCATION See Exploration Plan

Latitude: 42.750978° Longitude: -73.973976°

Surface Elev.: 303.86 (Ft.)

GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	LABORATORY HP (tsf)	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	SILT AND CLAY (CL-ML), gray, very soft *(continued)*										
			30			24	WOH/24"				
						24	WOH/24"				
	35.0	269	35								
	Boring Terminated at 35 Feet										

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3 1/4 HSA

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by Kiewit.

Notes:

Logged by: MO
Hammer Efficency Summary:
Energy Transfer Ratio: 84.7% +/-5.7%
Hammer Efficiency Correction (CE):1.41
WOH = Weight of Hammer

WATER LEVEL OBSERVATIONS

While drilling

At completion of drilling

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 01-27-2022 | Boring Completed: 01-28-2022

Drill Rig: Diedrich D-50 | Driller: B. Duffey

Project No.: JB215256B

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JB215256B CHAMPLAIN-HUDSON.GPJ TERRACON_DATATEMPLATE.GDT 4/4/22

BORING LOG NO. K-181.0

PROJECT: Champlain-Hudson Power Express Package 5

CLIENT: Kiewit Engineering (NY) Corp.

SITE: Champlain to Hudson HDD Crossings Schenectady, NY

LOCATION See Exploration Plan

Latitude: 42.748452° Longitude: -73.972562°

Surface Elev.: 308.86 (Ft.)

DEPTH	ELEVATION (Ft.)	Description	DEPTH (Ft.)	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)	LL-PL-PI	PERCENT FINES
		FILL - SILTY SAND WITH GRAVEL (SM), brown, medium dense		18	4-4-8-10 N=12			
				20	7-6-5-5 N=11			
4.0	305	**SILT AND CLAY (CL-ML)**, brown, medium stiff	5	13	3-3-4-5 N=7			
				20	4-4-4-7 N=8			
8.0	301	**SILT (ML)**, brown, stiff		19	5-6-6-5 N=12	23.9	NP	97
10.0	299	**SILT AND CLAY (CL-ML)**, gray, very soft to stiff	10	13	3-3-4-3 N=7			
			15	14	5-7-7-9 N=14	22.4		
			20	14	WOH-WOH-2-3 N=2			
			25	24	5-5-6-7 N=11 3" Spoon with ring samplers	34.6	30-18-12	91

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3 1/4 HSA

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by Kiewit.

Notes:

Logged by: MO
Hammer Efficency Summary:
Energy Transfer Ratio: 84.7% +/-5.7%
Hammer Efficiency Correction (CE):1.41
WOH = Weight of Hammer

WATER LEVEL OBSERVATIONS

No measurable groundwater prior to grouting

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 01-27-2022 | Boring Completed: 01-31-2022

Drill Rig: Diedrich D-50 | Driller: B. Duffey

Project No.: JB215256B

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JB215256B CHAMPLAIN-HUDSON.GPJ TERRACON_DATATEMPLATE.GDT 4/4/22

BORING LOG NO. K-181.0

PROJECT: Champlain-Hudson Power Express Package 5

CLIENT: Kiewit Engineering (NY) Corp.

SITE: Champlain to Hudson HDD Crossings Schenectady, NY

LOCATION See Exploration Plan

Latitude: 42.748452° Longitude: -73.972562°

Surface Elev.: 308.86 (Ft.)

DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS
	SILT AND CLAY (CL-ML), gray, very soft to stiff *(continued)*				
		30	X	24	WOH/24"
			X	24	WOH/24"
35.0	274	35			
	Boring Terminated at 35 Feet				

GRAPHIC LOG | WATER LEVEL OBSERVATIONS | LABORATORY HP (tsf) | WATER CONTENT (%) | ATTERBERG LIMITS LL-PL-PI | PERCENT FINES

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3 1/4 HSA

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by Kiewit.

Notes:

Logged by: MO
Hammer Efficency Summary:
Energy Transfer Ratio: 84.7% +/-5.7%
Hammer Efficiency Correction (CE):1.41
WOH = Weight of Hammer

WATER LEVEL OBSERVATIONS

No measurable groundwater prior to grouting

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 01-27-2022 | Boring Completed: 01-31-2022

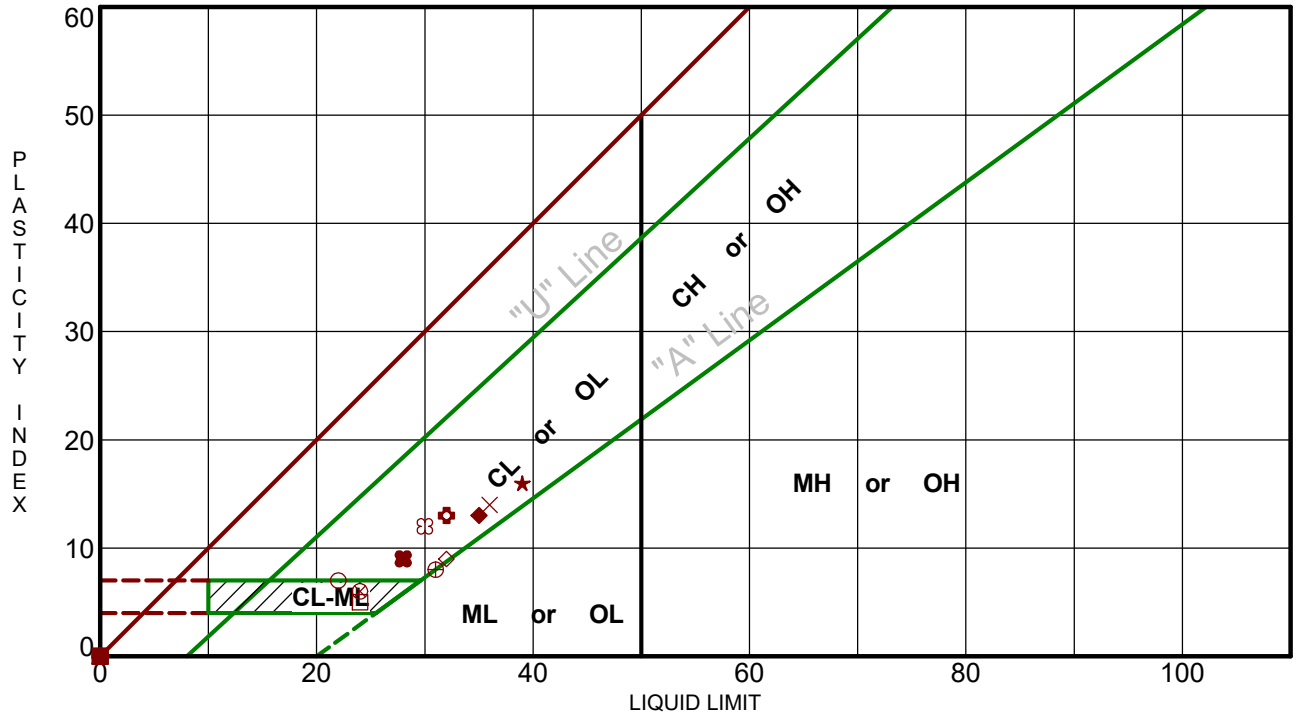
Drill Rig: Diedrich D-50 | Driller: B. Duffey

Project No.: JB215256B

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JB215256B CHAMPLAIN-HUDSON.GPJ TERRACON_DATATEMPLATE.GDT 4/4/22

ATTERBERG LIMITS RESULTS

ASTM D4318



Boring ID		Depth (Ft)	LL	PL	PI	Fines	USCS	Description
●	K-177.2	24 - 26	NP	NP	NP	6.8	SP-SM	POORLY GRADED SAND with SILT and GRAVEL
⊠	K-178.1	15 - 17	NP	NP	NP	68.2	ML	SANDY SILT
▲	K-178.1	28 - 30	NP	NP	NP	91.5	ML	SILT
★	K-178.7A	25 - 27	39	23	16	92.8	CL	LEAN CLAY
⊙	K-178.7B	20 - 22	NP	NP	NP	60.8	ML	SANDY SILT
✿	K-178.7B	30 - 32	32	19	13	96.8	CL	LEAN CLAY
○	K-178.8	29 - 31	22	15	7	97.6	CL-ML	SILTY CLAY
△	K-178.96	20 - 22	NP	NP	NP	93.6	ML	SILT
⊗	K-178.96	29 - 31	24	18	6	94.3	CL-ML	SILTY CLAY
⊕	K-179.6	6 - 8	31	23	8	90.5	ML	SILT
□	K-179.6	14 - 16	24	19	5	84.6	CL-ML	SILTY CLAY with SAND
⊗	K-180.8	14 - 16	NP	NP	NP	97.0	ML	SILT
◕	K-180.8	24 - 26	NP	NP	NP	99.0	ML	SILT
☆	K-181.0	8 - 10	NP	NP	NP	96.9	ML	SILT
✿	K-181.0	25 - 27	30	18	12	90.8	CL	LEAN CLAY
■	K-182.7	8 - 10	NP	NP	NP	97.6	ML	SILT
◆	K-182.7	24 - 26	35	22	13	94.4	CL	LEAN CLAY
◇	K-182.8	8 - 10	32	23	9	93.3	CL	LEAN CLAY
×	K-182.8	25 - 27	36	22	14	92.3	CL	LEAN CLAY
✖	K-183.0A	6 - 8	28	19	9	58.7	CL	SANDY LEAN CLAY

PROJECT: Champlain-Hudson Power Express Package 5

SITE: Champlain to Hudson HDD Crossings Schenectady, NY

Terracon
30 Corporate Cir Ste 201
Albany, NY

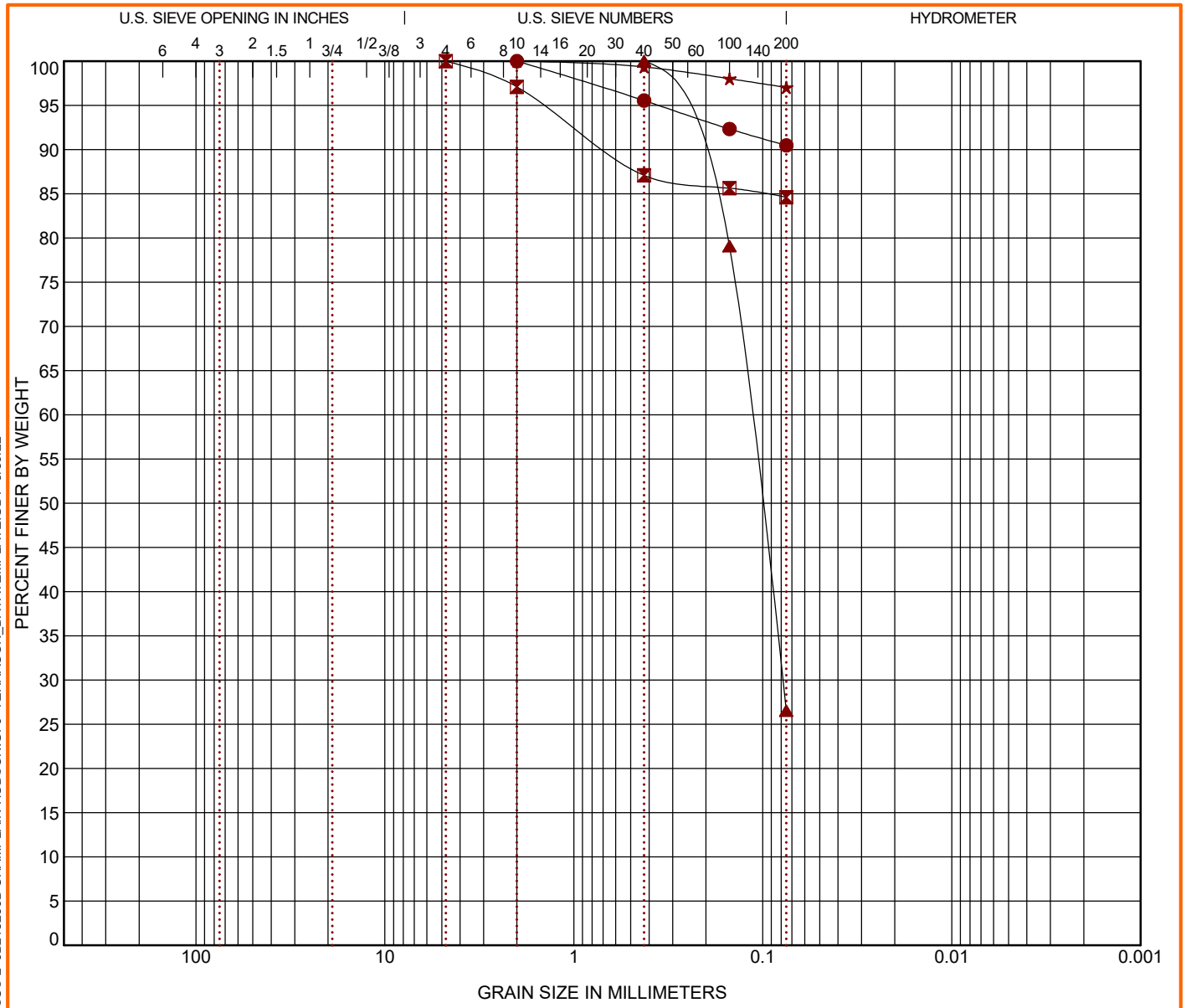
PROJECT NUMBER: JB215256B

CLIENT: Kiewit Engineering (NY) Corp.

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. ATTERBERG LIMITS JB215256B CHAMPLAIN-HUDSON.GPJ TERRACON_DATATEMPLATE.GDT 4/4/22

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring ID	Depth (Ft)	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
●	K-179.6	6 - 8	SILT (ML)	33.1	31	23	8		
⊠	K-179.6	14 - 16	SILTY CLAY with SAND (CL-ML)	28.8	24	19	5		
▲	K-180.8	6 - 8	SILTY SAND (SM)	23.4					
★	K-180.8	14 - 16	SILT (ML)	29.2	NP	NP	NP		

	Boring ID	Depth (Ft)	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
●	K-179.6	6 - 8	2				0.0	0.0	9.5		90.5	
⊠	K-179.6	14 - 16	4.75				0.0	0.0	15.4		84.6	
▲	K-180.8	6 - 8	0.425	0.117	0.079		0.0	0.0	73.5		26.5	
★	K-180.8	14 - 16	2				0.0	0.0	3.0		97.0	

PROJECT: Champlain-Hudson Power Express Package 5

SITE: Champlain to Hudson HDD Crossings Schenectady, NY

Terracon
30 Corporate Cir Ste 201
Albany, NY

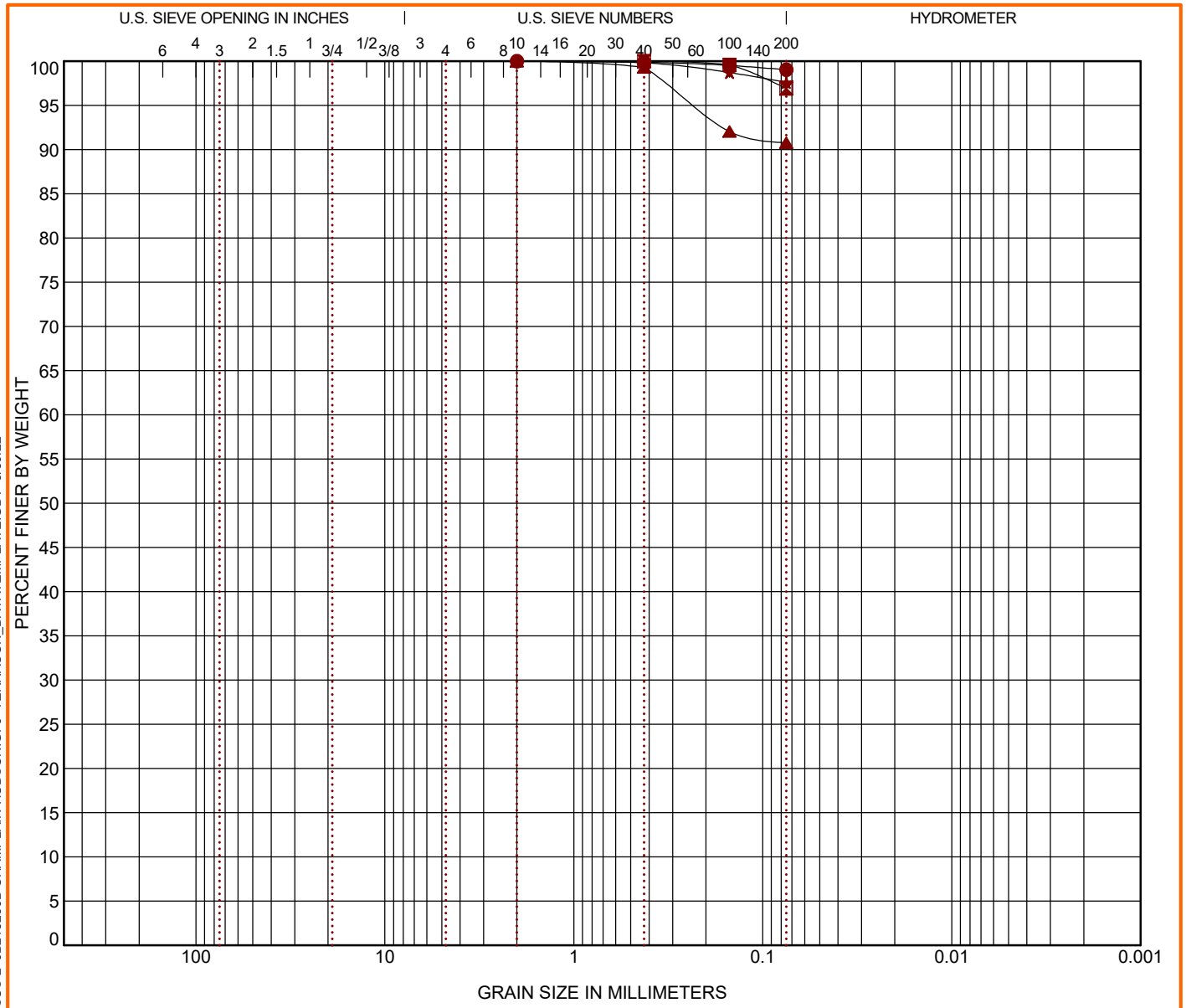
PROJECT NUMBER: JB215256B

CLIENT: Kiewit Engineering (NY) Corp.

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS-2 JB215256B CHAMPLAIN-HUDSON.GPJ TERRACON_DATATEMPLATE.GDT 3/30/22

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring ID	Depth (Ft)	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
●	K-180.8	24 - 26	SILT (ML)	26.8	NP	NP	NP		
⊠	K-181.0	8 - 10	SILT (ML)	23.9	NP	NP	NP		
▲	K-181.0	25 - 27	LEAN CLAY (CL)	34.6	30	18	12		
★	K-182.7	8 - 10	SILT (ML)	24.4	NP	NP	NP		

	Boring ID	Depth (Ft)	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
●	K-180.8	24 - 26	2				0.0	0.0	1.0		99.0	
⊠	K-181.0	8 - 10	0.425				0.0	0.0	3.1		96.9	
▲	K-181.0	25 - 27	2				0.0	0.0	9.2		90.8	
★	K-182.7	8 - 10	2				0.0	0.0	2.4		97.6	

PROJECT: Champlain-Hudson Power Express Package 5

SITE: Champlain to Hudson HDD Crossings Schenectady, NY

Terracon
30 Corporate Cir Ste 201
Albany, NY

PROJECT NUMBER: JB215256B

CLIENT: Kiewit Engineering (NY) Corp.

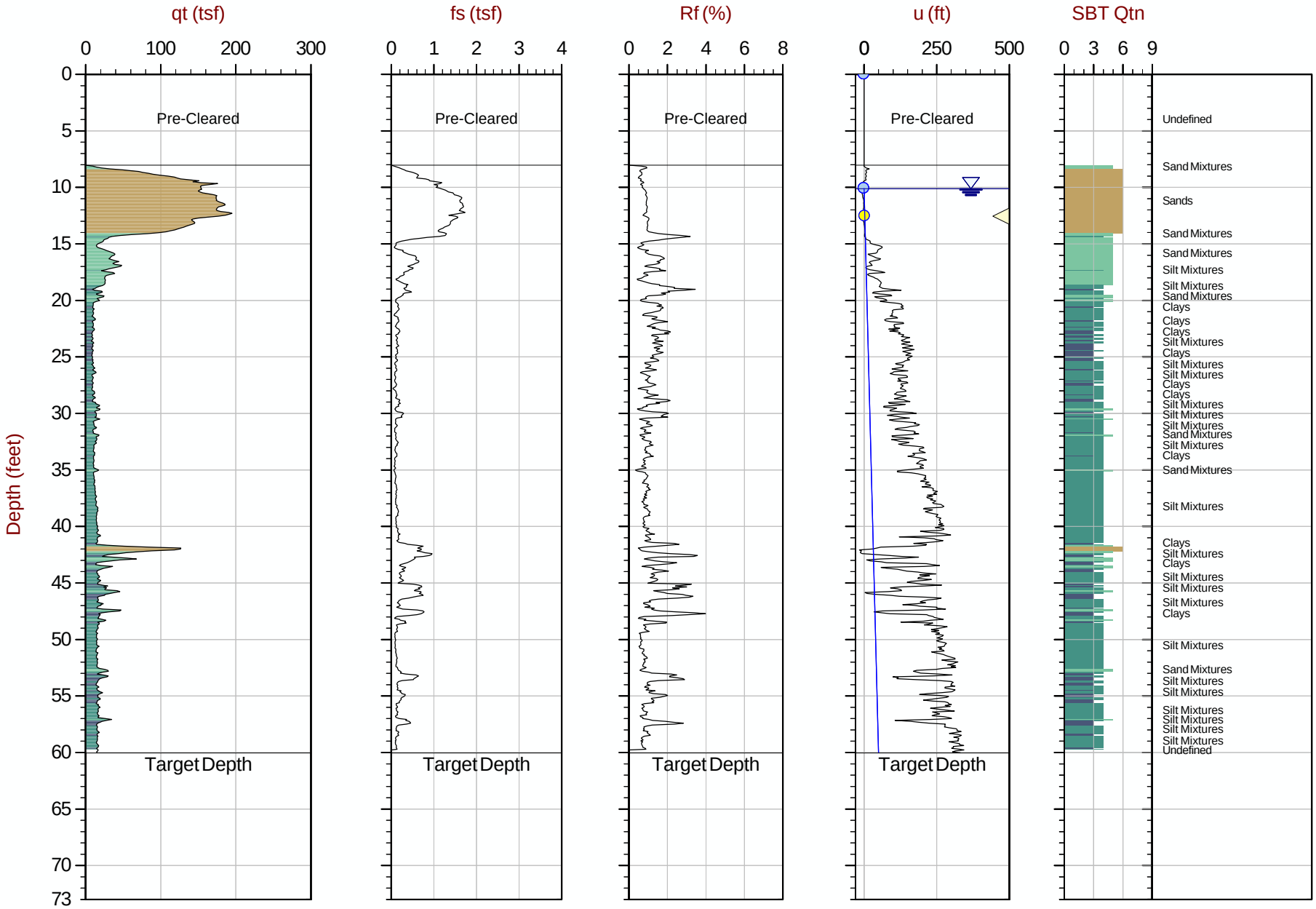
LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS-2 JB215256B CHAMPLAIN-HUDSON.GPJ TERRACON_DATATEMPLATE.GDT 3/30/22

CONETEC

Kiewit

Job No: 22-53-24741
Date: 2022-09-08 13:12
Site: CHPE HDD Crossings, Upstate NY, NY

Sounding: SCPT22-180.9
Cone: 612:T1500F15U35



Max Depth: 18.300 m / 60.04 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 22-53-24741_SP180.9.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM Zone 18 N: 4733579m E: 584014m

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

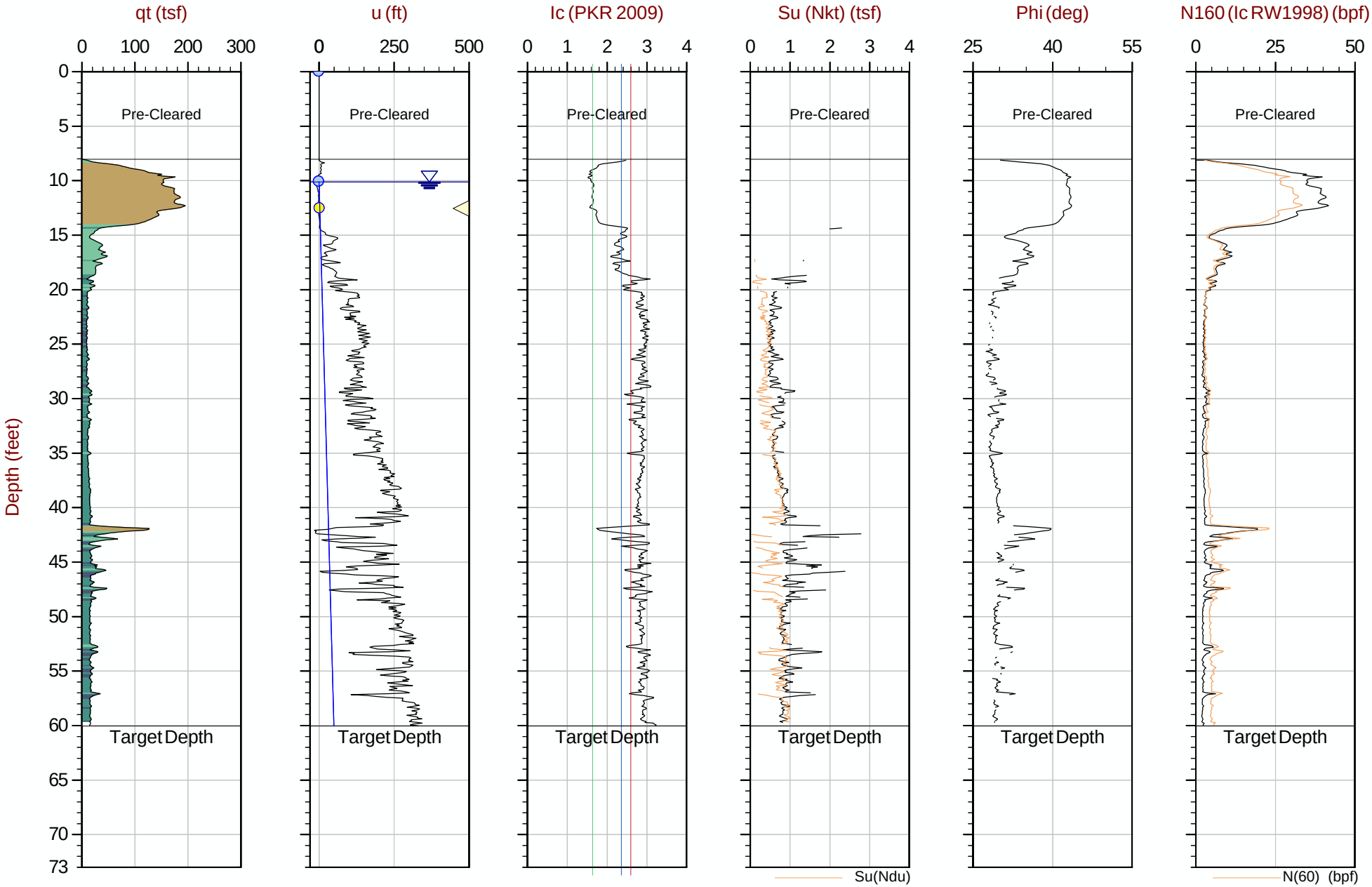
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

Kiewit

Job No: 22-53-24741
Date: 2022-09-08 13:12
Site: CHPE HDD Crossings, Upstate NY, NY

Sounding: SCPT22-180.9
Cone: 612:T1500F15U35



Max Depth: 18.300 m / 60.04 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 22-53-24741_SP180.9.COR
Unit Wt: SBTQtn (PKR2009)
Su Nkt/Ndu: 15.0 / 9.0

SBT: Robertson, 2009 and 2010
Coords: UTM Zone 18 N: 4733579m E: 584014m

Hydrostatic Line ● Ueq ● Assumed Ueq ◁ PPD, Ueq achieved ◁ PPD, Ueq not achieved

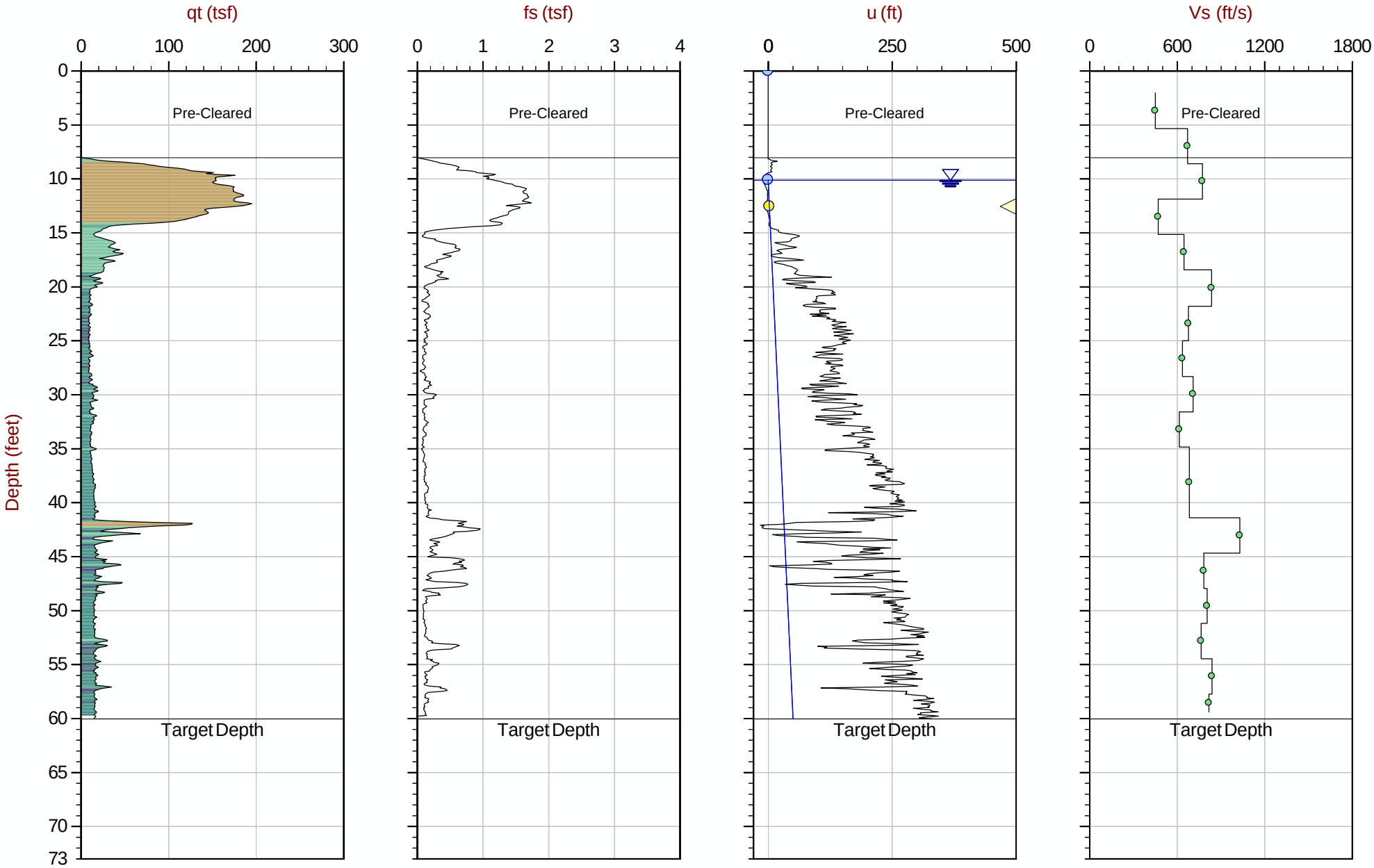
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

Kiewit

Job No: 22-53-24741
Date: 2022-09-08 13:12
Site: CHPE HDD Crossings, Upstate NY, NY

Sounding: SCPT22-180.9
Cone: 612:T1500F15U35



Max Depth: 18.300 m / 60.04 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 22-53-24741_SP180.9.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM Zone 18 N: 4733579m E: 584014m

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

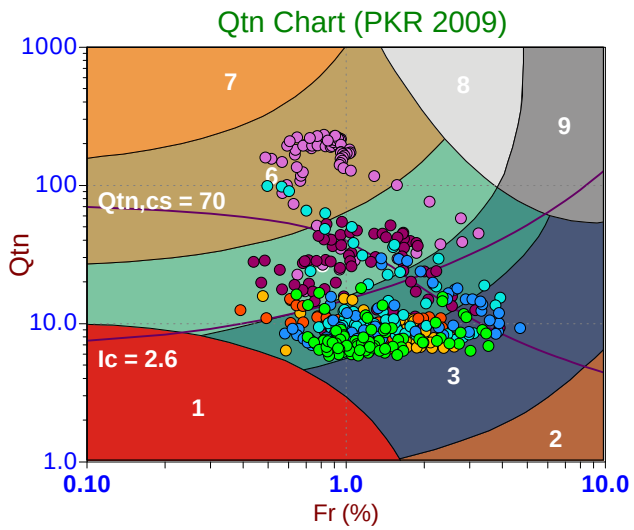
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

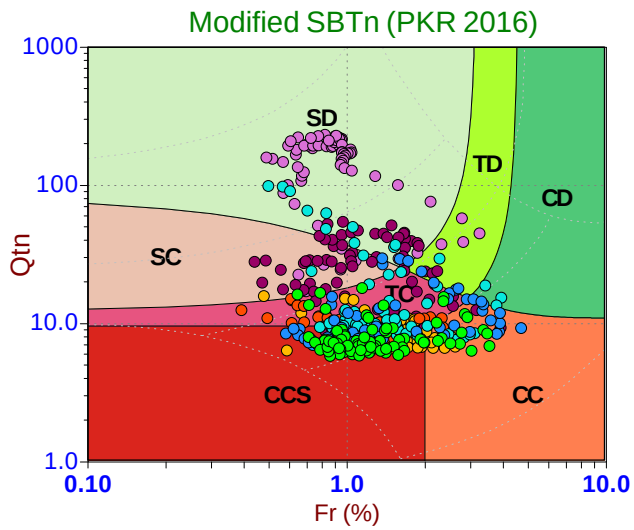
CONETEC

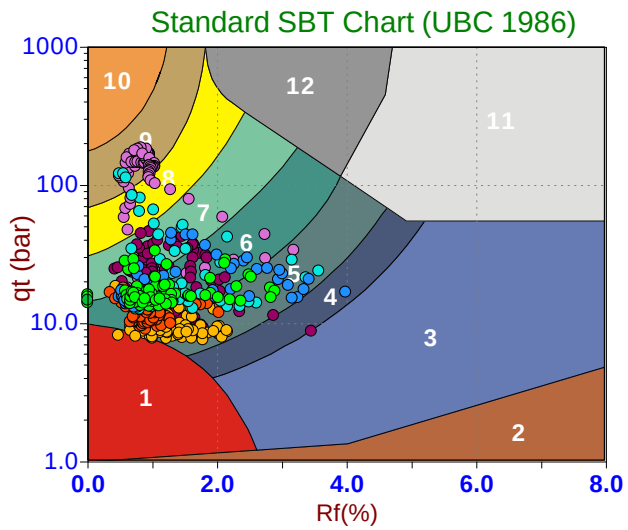
Kiewit

Job No: 22-53-24741
Date: 2022-09-08 13:12
Site: CHPE HDD Crossings, Upstate NY, NY

Sounding: SCPT22-180.9
Cone: 612:T1500F15U35







Depth Ranges
- >0.0 to 7.5 ft
- >7.5 to 15.0 ft
- >15.0 to 22.5 ft
- >22.5 to 30.0 ft
- >30.0 to 37.5 ft
- >37.5 to 45.0 ft
- >45.0 to 52.5 ft
- >52.5 to 60.0 ft
- >60.0 to 67.5 ft
- >67.5 to 75.0 ft
- >75.0 ft

Legend
- Sensitive, Fine Grained
- Organic Soils
- Clays
- Silt Mixtures
- Sand Mixtures
- Sands
- Gravelly Sand to Sand
- Stiff Sand to Clayey Sand
- Very Stiff Fine Grained

Legend
- CCS (Cont. sensitive clay like)
- CC (Cont. clay like)
- TC (Cont. transitional)
- SC (Cont. sand like)
- CD (Dil. clay like)
- TD (Dil. transitional)
- SD (Dil. sand like)

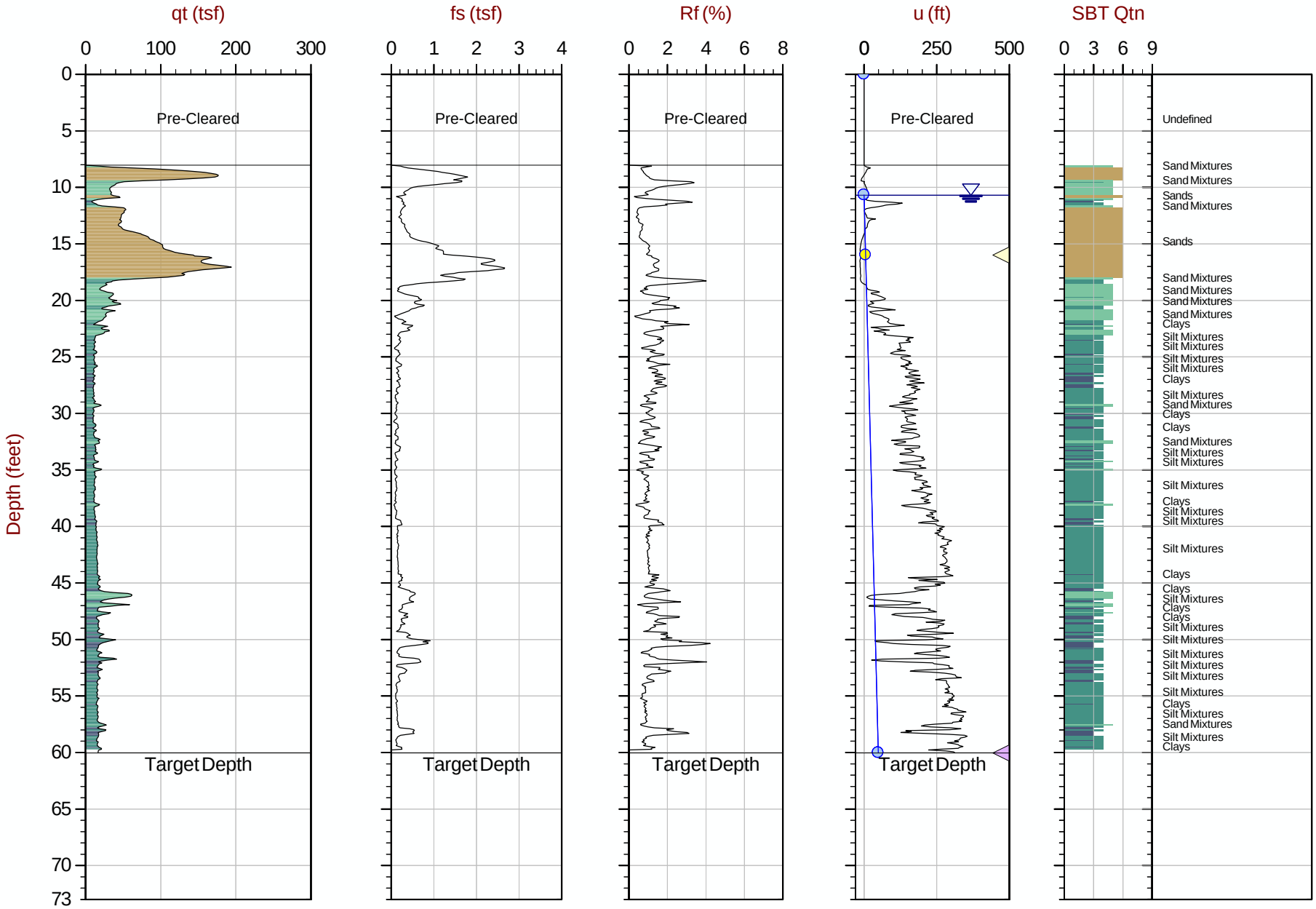
Legend
- Sensitive Fines
- Organic Soil
- Clay
- Silty Clay
- Clayey Silt
- Silt
- Sandy Silt
- Silty Sand/Sand
- Sand
- Gravelly Sand
- Stiff Fine Grained
- Cemented Sand

CONETEC

Kiewit

Job No: 22-53-24741
Date: 2022-09-08 14:12
Site: CHPE HDD Crossings, Upstate NY, NY

Sounding: CPT22-181.1
Cone: 612:T1500F15U35



Max Depth: 18.300 m / 60.04 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 22-53-24741_CP181.1.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM Zone 18 N: 4733206m E: 584169m

Hydrostatic Line | Ueq | Assumed Ueq | PPD, Ueq achieved | PPD, Ueq not achieved

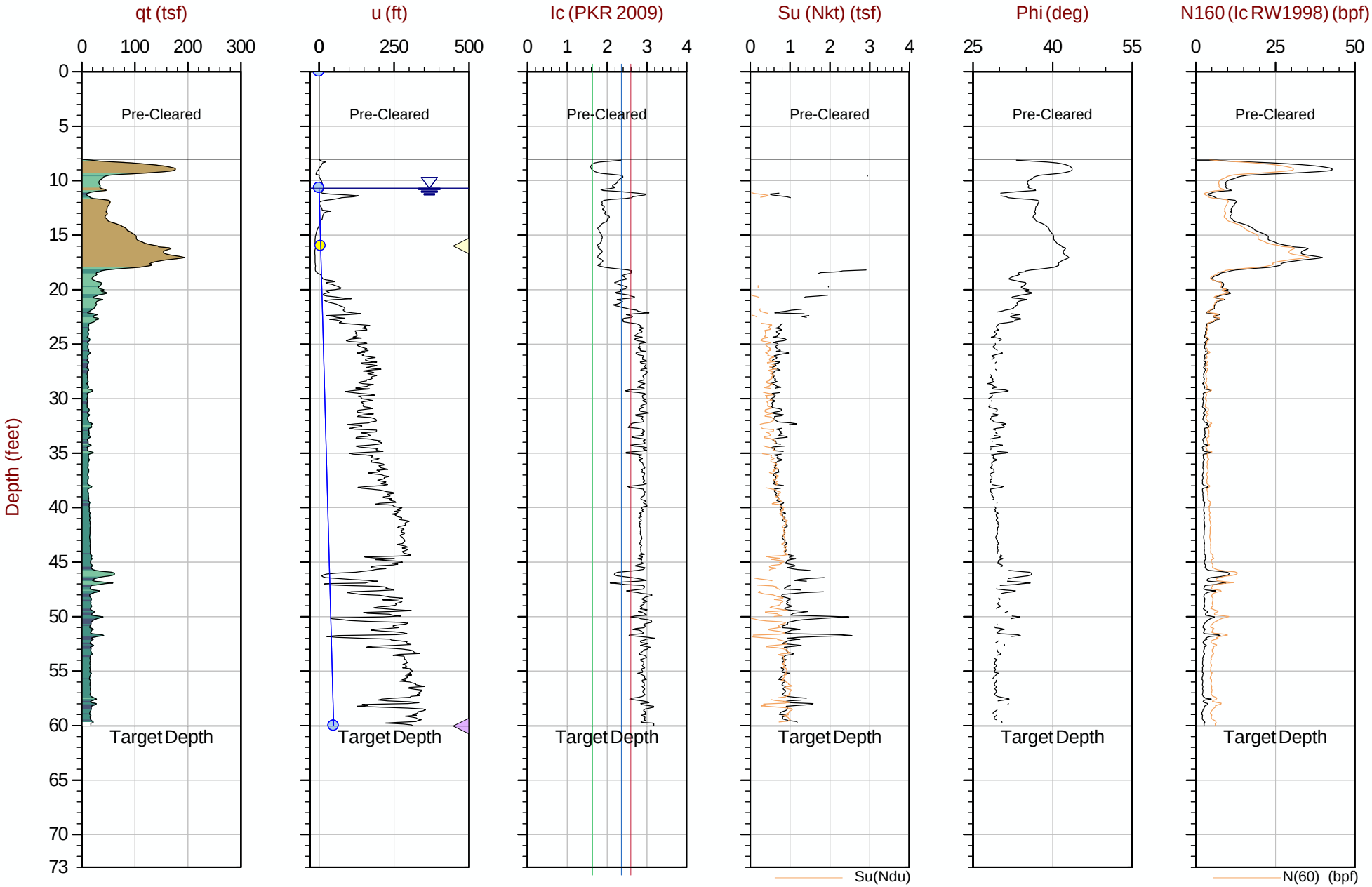
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

Kiewit

Job No: 22-53-24741
Date: 2022-09-08 14:12
Site: CHPE HDD Crossings, Upstate NY, NY

Sounding: CPT22-181.1
Cone: 612:T1500F15U35



Max Depth: 18.300 m / 60.04 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

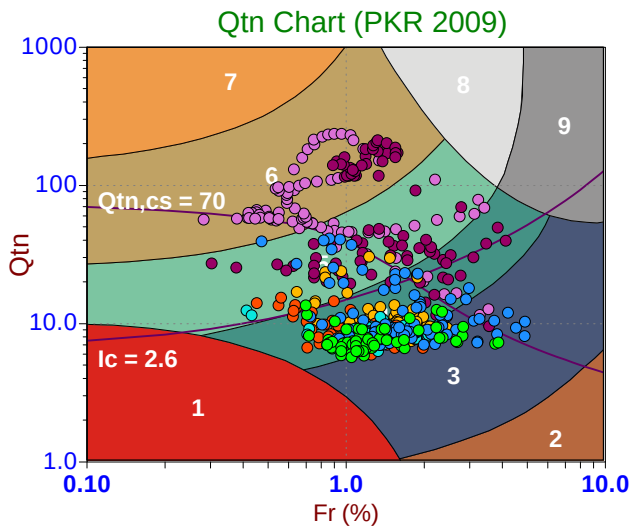
File: 22-53-24741_CP181.1.COR
Unit Wt: SBTQtn (PKR2009)
Su Nkt/Ndu: 15.0 / 9.0

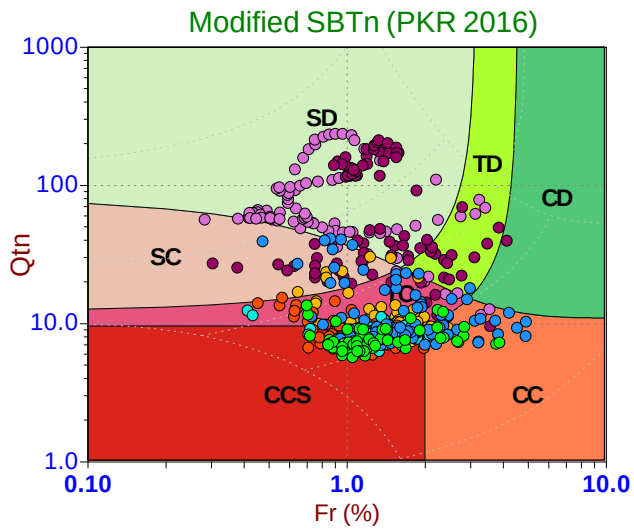
SBT: Robertson, 2009 and 2010
Coords: UTM Zone 18 N: 4733206m E: 584169m

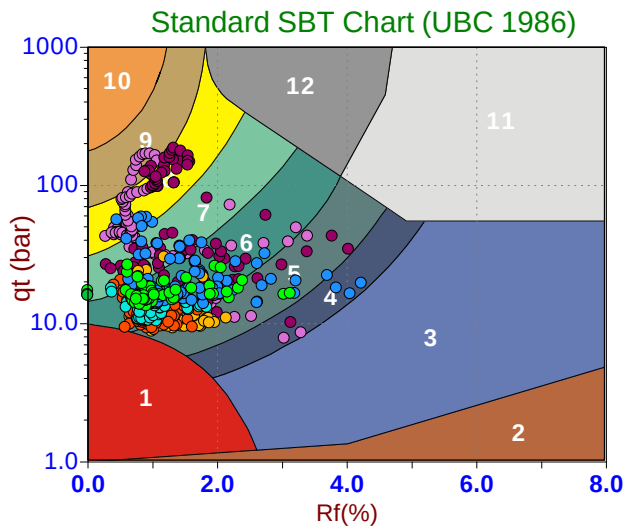
Hydrostatic Line ○ Ueq ● Assumed Ueq ◁ PPD, Ueq achieved ◁ PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC	*Kiewit*	Job No: 22-53-24741 · Date: 2022-09-08 14:12 · Site: CHPE HDD Crossings, Upstate NY, NY · Sounding: CPT22-181.1 · Cone: 612:T1500F15U35







Depth Ranges
- >0.0 to 7.5 ft
- >7.5 to 15.0 ft
- >15.0 to 22.5 ft
- >22.5 to 30.0 ft
- >30.0 to 37.5 ft
- >37.5 to 45.0 ft
- >45.0 to 52.5 ft
- >52.5 to 60.0 ft
- >60.0 to 67.5 ft
- >67.5 to 75.0 ft
- >75.0 ft

Legend
- Sensitive, Fine Grained
- Organic Soils
- Clays
- Silt Mixtures
- Sand Mixtures
- Sands
- Gravelly Sand to Sand
- Stiff Sand to Clayey Sand
- Very Stiff Fine Grained

Legend
- CCS (Cont. sensitive clay like)
- CC (Cont. clay like)
- TC (Cont. transitional)
- SC (Cont. sand like)
- CD (Dil. clay like)
- TD (Dil. transitional)
- SD (Dil. sand like)

Legend
- Sensitive Fines
- Organic Soil
- Clay
- Silty Clay
- Clayey Silt
- Silt
- Sandy Silt
- Silty Sand/Sand
- Sand
- Gravelly Sand
- Stiff Fine Grained
- Cemented Sand

Kiewit

MEMORANDUM

DATE: February 13, 2023

TO: Nick Strater; Brierley Associates Underground Engineers, PLLC

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

SUBJECT: Geotechnical Data: Segment 8 – Package 5 – HDD Crossing 75.B – Revision 1
Champlain Hudson Power Express Project
Schenectady, 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 south of Schenectady, New York. The approximate station for the start of HDD crossing Number 75.B is STA 50290+50 (42.7308°N, 73.9629°W).

The geotechnical data at this HDD crossing is attached. The available data is from the previous investigation by TRC and the recent investigation by Terracon, referenced below.

- TRC, Geotechnical Data Report, Champlain Hudson Power Express, Canadian Pacific Railway Borings MP 177.6-228.2, dated March 15, 2013.
- Terracon, Results of Field Exploration, Champlain-Hudson Power Express – Phase 4 HDD Borings – Package 5, Schenectady through Selkirk, NY, dated January 4, 2023

Contact us if you have questions or require additional information.

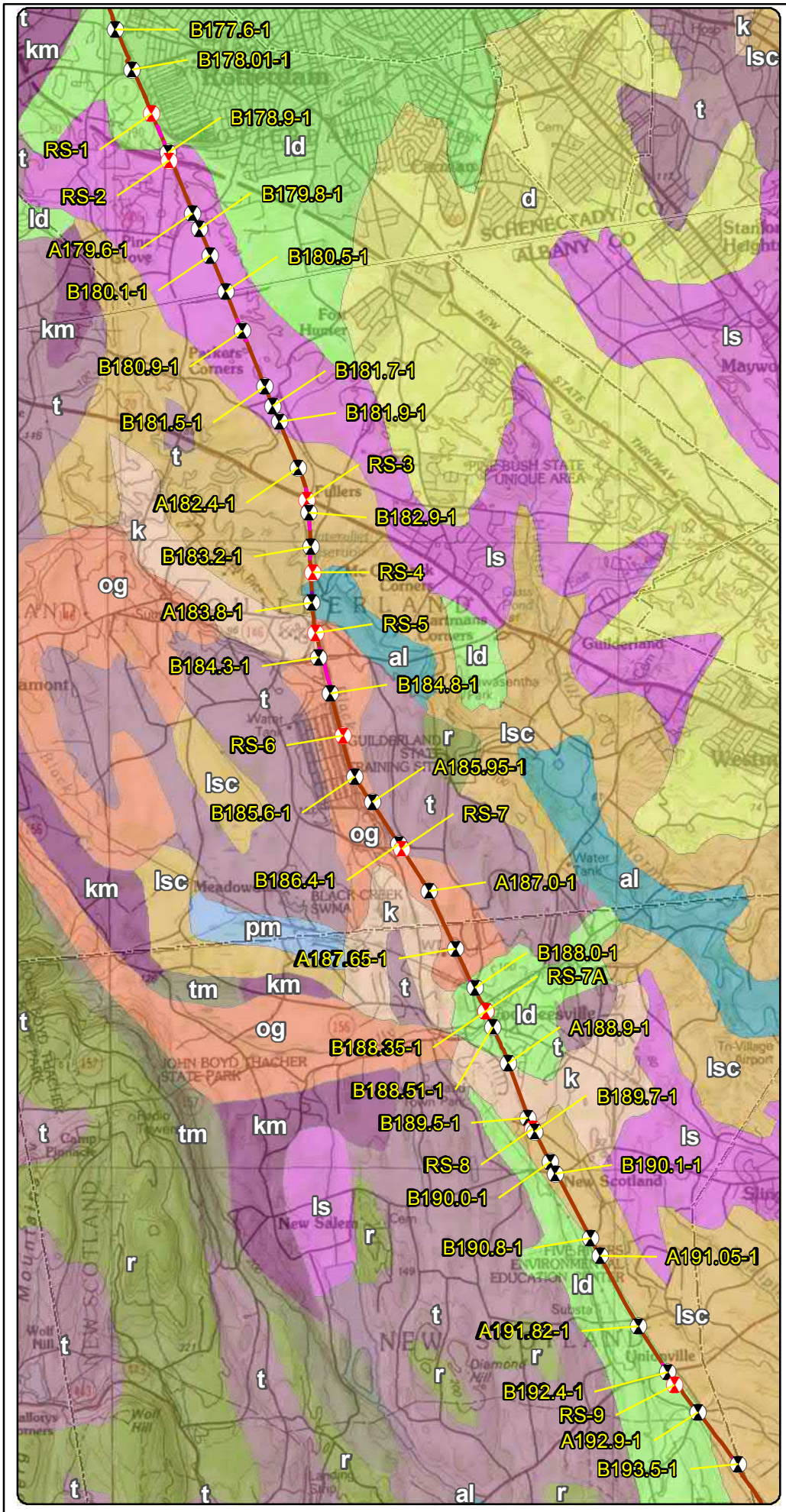
HDD 75B
Borings A182.4-1, KB-182.4A,
KB-182.4B
Segment 8 - Package 5

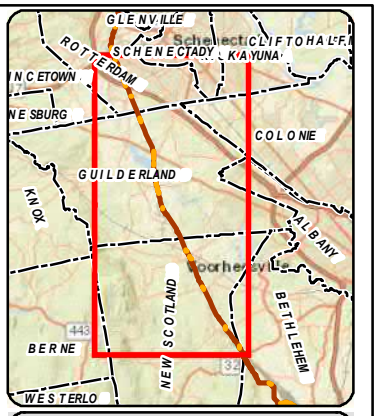
CHPE Segment 8 & 9 - Package 5
HDD Soil Boring Coordinates and Elevations

Firm	Boring	Northing (feet)	Easting (feet)	Ground Surface Elevation (feet)
TRC*	A179.6-1	1433335.8	631009.7	332.5
	A182.4-1	1420048.2	636557.9	291.5
	A187.65-1	1394856.5	644775.4	327.7
	A191.05-1	1378814.5	652321.0	274.7
	A191.82-1	1375154.9	654314.3	257.1
	A192.9-1	1370644.3	657458.6	232.8
	B177.1-1	1445275.2	626125.8	347.3
	B177.6-1	1442944.0	627003.0	346.5
	B178.01-1	1440838.2	627828.3	368.5
	B178.9-1	1436461.4	629767.4	322.1
	B180.1-1	1431140.9	631965.3	310.4
	B180.9-1	1427158.5	633611.8	307.5
	B182.9-1	1417657.6	637123.9	291.5
	B183.2-1	1415871.4	637202.5	290.2
	B184.3-1	1410133.0	637597.6	324.0
	B184.8-1	1408223.8	638230.4	323.1
	B185.6-1	1403875.9	639489.9	328.2
	B188.0-1	1392812.4	645793.4	330.9
	B188.35-1	1391616.5	646333.6	333.4
	B188.51-1	1390815.1	646697.7	340.2
	B190.0-1	1383732.6	649743.4	296.3
	B190.1-1	1383134.9	649975.5	294.6
	B190.8-1	1379726.2	651827.2	282.3
	B192.4-1	1372732.4	655878.1	239.3
	B193.5-1	1367919.2	659547.5	218.6
AECOM**	RS-2	1436092.2	629800.7	315.6
	RS-3	1418336.4	636985.0	303.2
	RS-4	1414567.4	637285.8	302.2
	RS-5	1411399.1	637471.6	319.0
	RS-7A	1391599.9	646333.6	340.5
	RS-9	1372089.8	656230.9	238.7
	SY-7	1353089.8	670133.9	159.8
	SY-8	1353716.5	671626.7	175.0
	SY-9	1353046.4	673133.41	163.1
	SY-9A	1351940.0	674314.3	158.3
	SY-10	1350838.3	675488.6	166.0
	SCH-19	1446199.8	625927.0	333.8
	SCH-19A	1445712.1	626032.4	343.1

Notes:
- Northings and Eastings are provided in NAD83 New York State Plane East Zone.
- Elevations are referenced to the NAVD88 datum.
* TRC boring coordinates as shown in Table 1-6 in AECOM report (reference below). Boring elevations estimated from November 2021 topographic survey by Williams Aerial.
** AECOM boring coordinates and elevations as shown in Table 1-6 in AECOM report.
*** Kiewit boring coordinates and elevations are noted on the boring logs.

Reference:
AECOM, Geotechnical Data Report, Upland Segments: Putnam Station, Washington County, to Cementon, Green County, NY, Champlain Hudson Power Express, dated May 28, 2021.





LEGEND

- 2021 Boring Location
- Previous (2013) Boring Location
- Terrestrial Route HVDC
- Submarine Route HVDC
- Terrestrial Route HVAC
- Preliminary HDD Locations
- Preliminary Pipe Bridge Location
- Town Boundary
- County Boundary

Surficial Geology

- al - Recent alluvium
- d - Dunes
- k - Kame deposits
- km - Kame moraine
- ld - Lacustrine delta
- ls - Lacustrine sand
- lsc - Lacustrine silt and clay
- og - Outwash sand and gravel
- pm - Swamp deposits
- r - Bedrock
- t - Till
- tm - Till moraine

N

0.7 0.35 0 0.7 Miles

Transmission Developers Inc.

Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

Surficial Geology and Geotechnical Borings Rotterdam to Selkirk Figure 3-8

Prepared on 5/4/2021

by: AECOM

DATA SOURCES: ESRI, NYSDOT, NOAA, USACE, NYDOS, TDI, TRC

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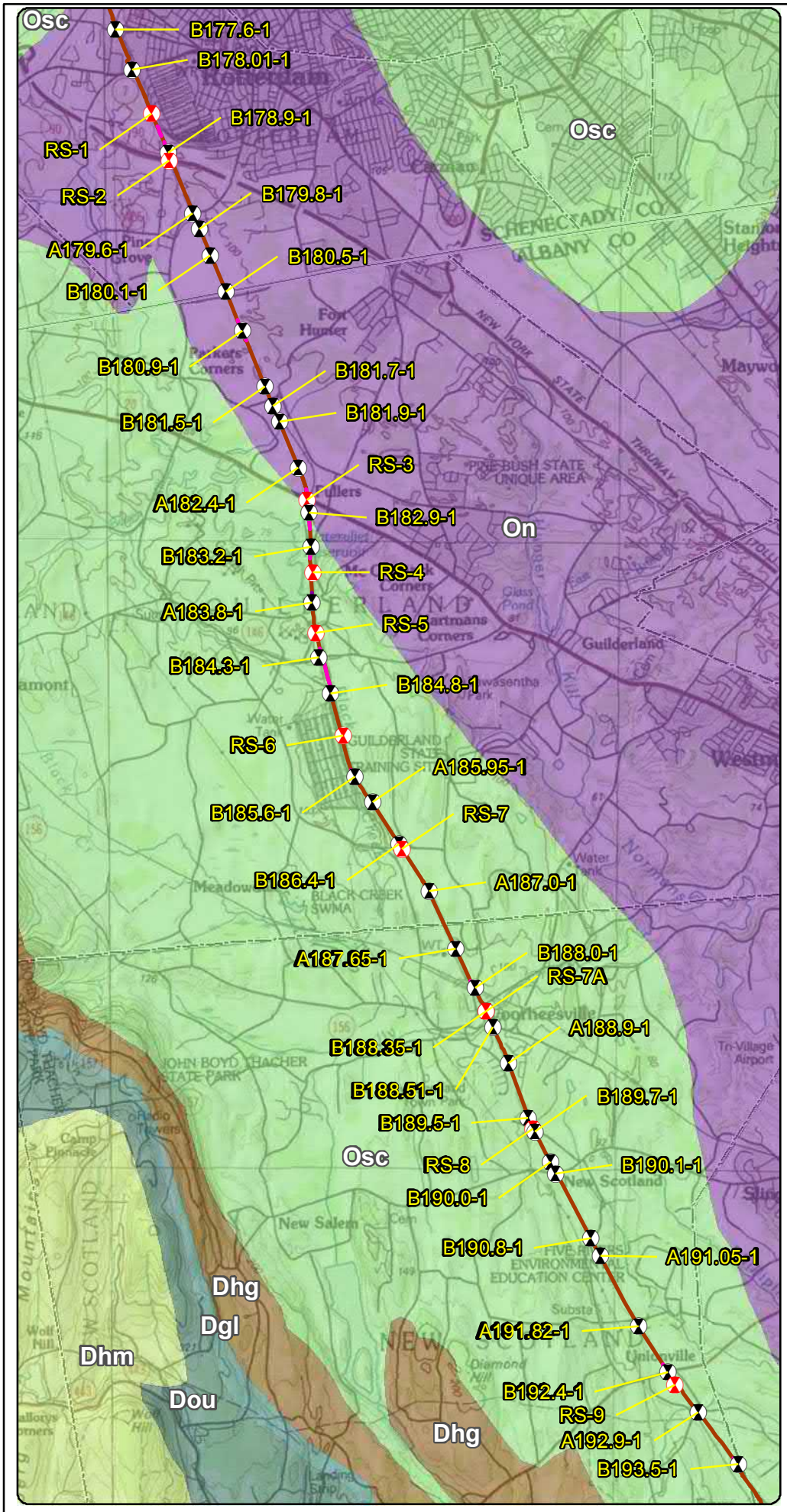

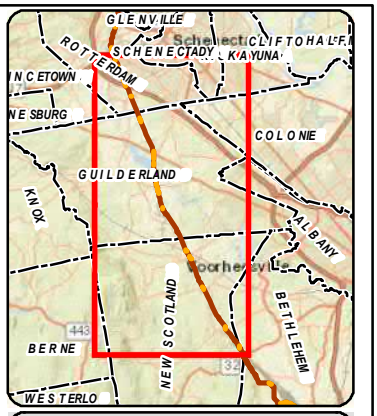

LEGEND

- 2021 Boring Location
- Previous (2013) Boring Location
- Terrestrial Route HVDC
- Submarine Route HVDC
- Terrestrial Route HVAC
- Preliminary HDD Locations
- Preliminary Pipe Bridge Location
- Town Boundary
- County Boundary

Bedrock Geology

- Dgl - Glenerie Formation
- Dhg - Port Ewen Formation
- Dhm - Undiff Lower Hamilton Group
- Dou - Onondaga Limestone
- On - Normanskill Shale
- Osc - Schenectady Formation

* Schenectady Formation includes: graywacke, sandstone, siltstone, shale

N

0.7 0.35 0 0.7 Miles

Transmission

Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

Bedrock Geology and Geotechnical Borings Rotterdam to Selkirk Figure 4-8

Prepared on 5/4/2021

by: AECOM

DATA SOURCES: ESRI, NYSDOT, NOAA, USACE, NYDOS, TDI, TRC

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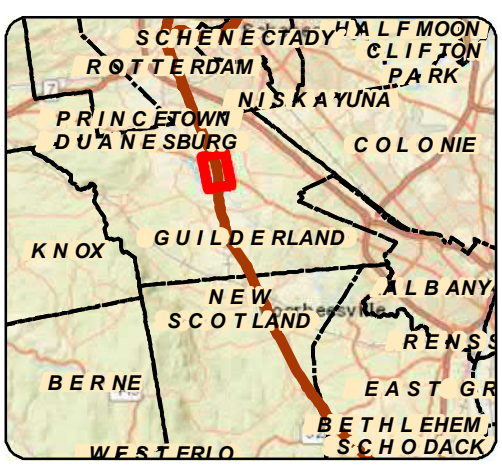
182.1
182.2
182.3
A182.4-1
182.5
182.6
182.7
GUILDERLAND
RS-3
182.8
B182.9-1
183
183.1
183.2
B183.2-1
183.3
183.4
Western Ave
W Old State Rd
Conrail
Fuller Station Rd
Lawler Ln
Spring Farm Ln
Helderview Dr
Katie Ln
Avalon Way
Normandy Sq
French's Mill Rd
0
1,000
Feet



LEGEND

- 111.8 Certified Milepost - Tenths
- 135 Certified Milepost
- 111.8 Preferred Alternative Milepost - Tenths
- 135 Preferred Alternative Milepost
- Terrestrial Route HVDC
- Submarine Route HVDC
- Terrestrial Route HVAC
- Preliminary HDD Locations
- Preliminary Pipe Bridge Location
- 2021 Boring Location
- Previous (2013) Boring Location
- Streams/Ditches
- Railroad ROW
- Deviation Zone
- Deviation Zone Outside ROW
- Preferred Alternative Deviation Zone
- Preferred Alternative Deviation Zone Outside ROW
- Town Boundary
- Village Boundary
- State Park (OPRHP)

Parcel Ownership: TOWN NAME

Road Name: Village Name

Transmission Developers Inc.

Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

BORING LOCATION PLAN

Rotterdam to Selkirk

Figure A-8

Sheet 5 of 14

Prepared by: AECOM 5/4/2021

DATA SOURCES: ESRI, NETWORK MAPPING 2010, NYSDOT, OPRHP, TDI, TRC

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TEST BORING LOG

PROJECT: TDI CHAMPLAIN HUDSON POWER EXPRESS
LOCATION: CSX RAILROAD ROW, NY

BORING	**A182.4-1**
G.S. ELEV.	N/A
FILE	195651
SHEET	1 OF 1

GROUNDWATER DATA			
FIRST ENCOUNTERED NR			
DEPTH	HOUR	DATE	ELAPSED TIME
DRY	NR	11/5	0 HR

METHOD OF ADVANCING BOREHOLE				
a	FROM	0.0 '	TO	10.0 '

DRILLER	P. PLANTIER
HELPER	M. NAGEY
INSPECTOR	C. POPPE
DATE STARTED	11/05/2012
DATE COMPLETED	11/05/2012

DEPTH	A	B	C	DESCRIPTION	Wn	REMARKS
	S-1	3 3 3 3		***BLACK SILTY F/M/C SAND, TR TO SM F/ GRAVEL-SIZED ROCK FRAGMENTS, TR FOAM, TR WOOD (FILL)*** 2.0		
	S-2	3 3 4 5		***BROWN SILTY F/M/C SAND, SM F/ GRAVEL***	14.9	
5	S-3	2 2 3 4		6.0		
	S-4	3 2 3 2		***LIGHT BROWN M/C SAND*** 8.0		
10	S-5	2 3 4 6		***LIGHT BROWN M/C SAND, TR F/ GRAVEL*** 10.0	9.9	
				END OF BORING AT 10'		
15						
20						
25						
30						
35						

DRN.	TBT
CKD.	PWK

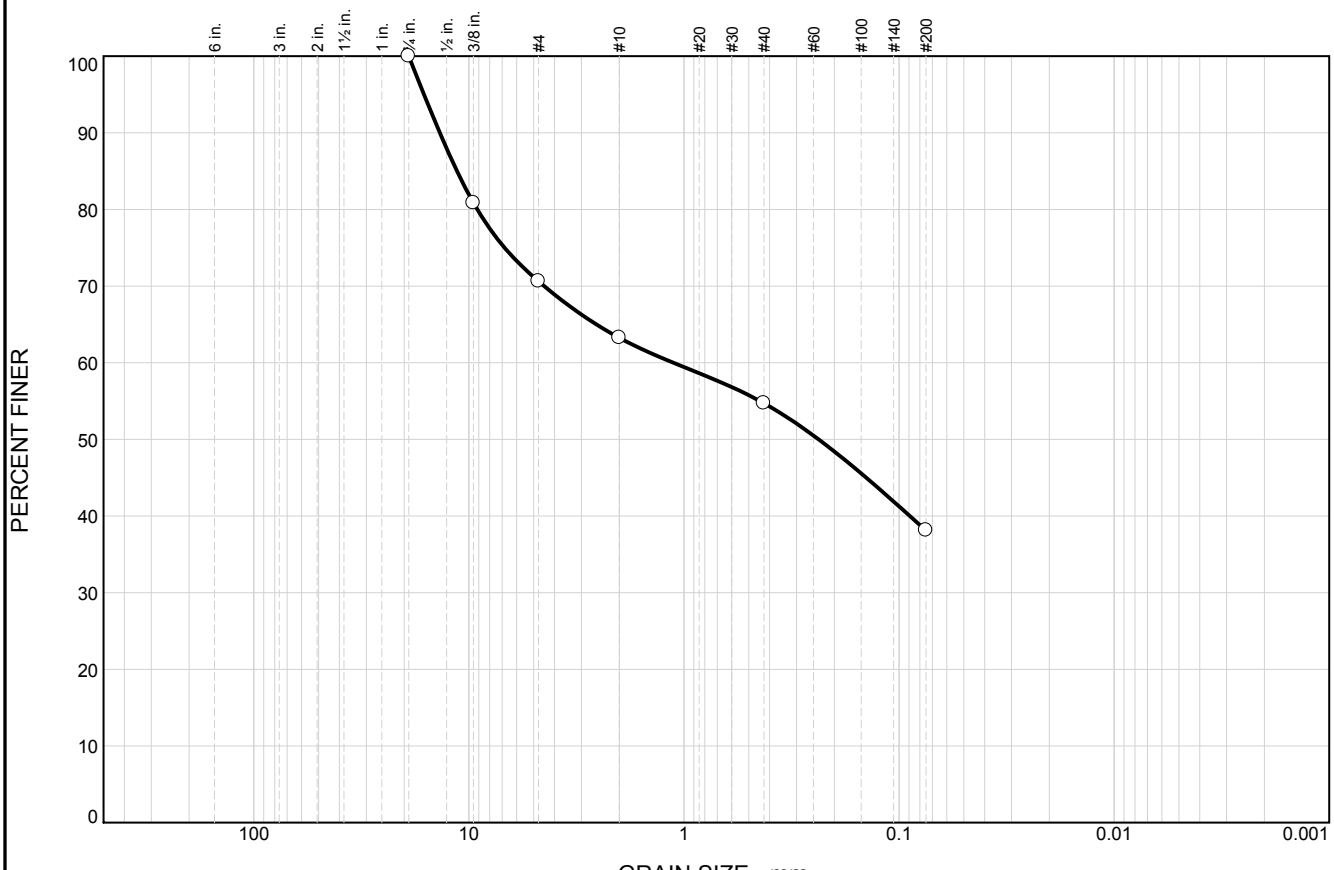
NEW PROJECTS TEST BORING LOG 195651_TDI_CSX.GPJ SITE BLAUVELT.GDT 3/12/13

SUMMARY OF LABORATORY TEST DATA

Project Name: TDI Champlain Hudson Power Express – CSX
Client Name: Transmission Developers, Inc.
TRC Project #: 195651

SAMPLE IDENTIFICATION			Soil Group (USCS System)	GRAIN SIZE DISTRIBUTION				PLASTICITY				Specific Gravity	Moisture Content (%)	Unit Weight (pcf)	Compressive Strength (tsf)	Organic Content (%)
Boring #	Sample #	Depth (ft)		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Liquidity Index)					
	S-7	18.5-20.0	ML	-	-	-	-	22	21	1	7.8	-	28.8	-	-	-
B181.9-1	S-2	2.0-4.0	-	-	-	-	-	-	-	-	-	-	31.2	94.0	-	-
	S-3	4.0-6.0	-	-	-	-	-	-	-	-	-	-	28.8	-	-	-
	S-5	8.0-10.0	-	0.0	0.1	99.9		-	-	-	-	-	24.4	-	-	-
	S-6	13.5-15.0	-	0.0	5.7	71.1	23.2	-	-	-	-	2.73	26.9	-	-	-
	S-7	18.5-20.0	CL-ML	0.0	2.5	54.6	42.9	28	21	7	1.3	2.76	29.9	-	-	-
	S-8	23.5-25.0														
A182.4-1	S-2	2.0-4.0	SM	29.4	32.5	38.1		-	-	-	-	-	14.9	-	-	-
	S-5	8.0-10.0	-	-	-	-	-	-	-	-	-	-	9.9	-	-	-
B182.9-1	S-1	0.0-2.0	-	-	-	-	-	-	-	-	-	-	13.2	-	-	21.8
	S-2	2.0-4.0	-	-	-	-	-	-	-	-	-	-	25.2	-	-	-
	S-4	6.0-8.0	-	0.0	5.4	45.7	48.9	-	-	-	-	2.77	34.9	-	-	-
	S-6	13.5-15.0	-	-	-	-	-	-	-	-	-		33.2	-	-	-

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	29.4	7.3	8.6	16.6	38.1	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			11.3581	1.1209	0.2365					

Material Description	USCS	AASHTO
○ BROWN SILTY F/M/C SAND, SM F/ GRAVEL	SM	

Project No. 195651 **Client:** TRANSMISSION DEVELOPERS INC.
Project: TDI CHAMPLAIN HUDSON POWER EXPRESS - CSX

○ **Source of Sample:** A182.4-1 **Depth:** 2.0-4.0 FT **Sample Number:** S-2

Remarks:
○SAMPLE DESCRIPTION BASED ON VISUAL IDENTIFICATION AND LABORATORY ANALYSIS

TRC Engineers, Inc.

Mt. Laurel, NJ

Figure 32

Tested By: TBT 12/11/12 **Checked By:** JPB 03/12/13

EXPLORATION PLAN

Champlain-Hudson Power Express- Phase 4 HDD Borings – Package 5
Schenectady through Selkirk, NY
January 4, 2023 ■ Terracon Project No. JB215256J

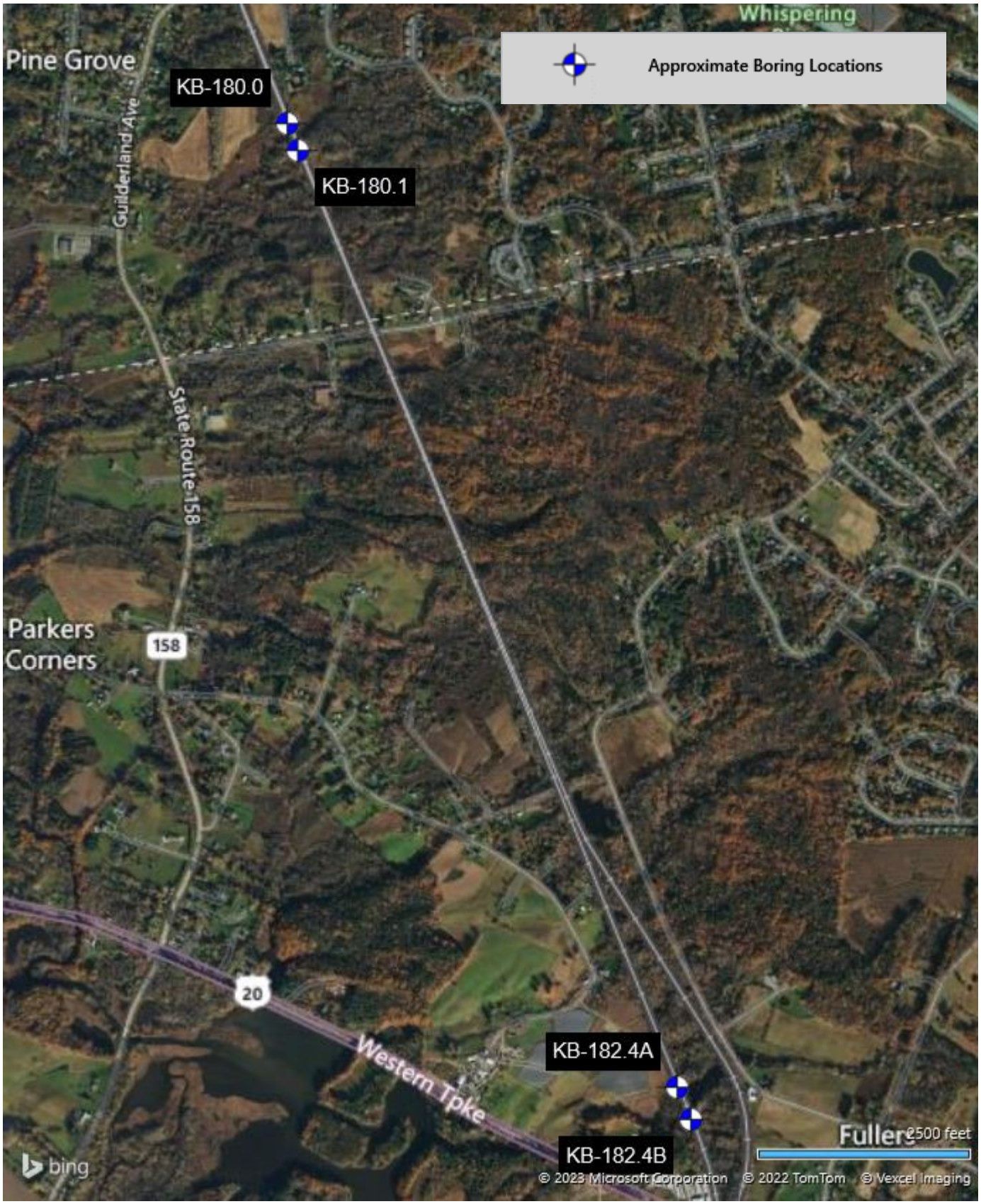


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

AERIAL PHOTOGRAPHY PROVIDED BY MICROSOFT BING MAPS

BORING LOG NO. KB-182.4A

PROJECT: Phase 4 Borings

CLIENT: Kiewit Engineering (NY) Corp
Lone Tree, CO

SITE: Champlain to Hudson HDD Crossings

LOCATION See Exploration Plan

Latitude: 42.7305° Longitude: -73.9626°

Surface Elev.: 292.6 (Ft.)

DEPTH	ELEVATION (Ft.)	Description
0.5	292.1	**FILL - BALLAST**
		FILL - SILT, brown
8.5	284.1	**organics and roots at 8.2 feet**
		SILT (ML), varved silt and clay, gray, soft to medium stiff

DEPTH (Ft.)	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	1	2-4-3-3 N=7			
	18	2-3-3-4 N=6			
5	20	1-2-3-3 N=5	27.1	34-26-8	97
	24	3-2-3-4 N=5			
	20	3-3-4-5 N=7			
10	21	1-4-2-3 N=6	31.2	33-29-4	98
15	24	1/12"-2-2 N=3			
20	24	WH-1-2-3 N=3			
25					

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3 1/4" HSA

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by others.

Notes:

Hammer Efficiency Summary:
Energy Transfer Ratio: 84.7% +/-5.0%
Hammer Efficiency Correction (CE): 1.41
Logged by JCH
WH = Weight of hammer
WR = Weight of rod

WATER LEVEL OBSERVATIONS

No free water encountered

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 11-09-2022	Boring Completed: 11-09-2022
Drill Rig: Mobil B-57	Driller: L. Zito
Project No.: JB215256J	

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JB215256J PHASE 4 BORINGS.GPJ TERRACON_DATATEMPLATE.GDT 1/4/23

BORING LOG NO. KB-182.4A

PROJECT: Phase 4 Borings

CLIENT: Kiewit Engineering (NY) Corp
Lone Tree, CO

SITE: Champlain to Hudson HDD Crossings

LOCATION See Exploration Plan

Latitude: 42.7305° Longitude: -73.9626°

Surface Elev.: 292.6 (Ft.)

DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
SILT (ML), varved silt and clay, gray, soft to medium stiff *(continued)*				18	WH/12"-2 N=2			
		30		18	WH/12"-2 N=2	32.0	40-26-14	99
		35		10	1-2-3 N=5			
		40		24	2-3-5-6 3" Split Spoon With Ring Samplers			
45.0	247.6	45						
LEAN CLAY (CL), varved silt and clay, gray, very soft to soft				18	WH/12"-2 N=2	28.5	40-23-17	99
		50						

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3 1/4" HSA

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by others.

Notes:

Hammer Efficiency Summary:
Energy Transfer Ratio: 84.7% +/-5.0%
Hammer Efficiency Correction (CE): 1.41
Logged by JCH
WH = Weight of hammer
WR = Weight of rod

WATER LEVEL OBSERVATIONS

No free water encountered

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 11-09-2022	Boring Completed: 11-09-2022
Drill Rig: Mobil B-57	Driller: L. Zito
Project No.: JB215256J	

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JB215256J PHASE 4 BORINGS.GPJ TERRACON_DATATEMPLATE.GDT 1/4/23

BORING LOG NO. KB-182.4A

PROJECT: Phase 4 Borings

CLIENT: Kiewit Engineering (NY) Corp
Lone Tree, CO

SITE: Champlain to Hudson HDD Crossings

LOCATION See Exploration Plan

Latitude: 42.7305° Longitude: -73.9626°

Surface Elev.: 292.6 (Ft.)

DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS
LEAN CLAY (CL), varved silt and clay, gray, very soft to soft *(continued)*				24	WH/18"-3
		55		18	WH/18"
		60		24	WH/12"-2-3 N=2
		65		24	WR-WH-1-1 N=1
67.0	225.6				
Boring Terminated at 67 Feet					

GRAPHIC LOG | WATER LEVEL OBSERVATIONS | WATER CONTENT (%) | ATTERBERG LIMITS LL-PL-PI | PERCENT FINES

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3 1/4" HSA

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by others.

Notes:

Hammer Efficiency Summary:
Energy Transfer Ratio: 84.7% +/-5.0%
Hammer Efficiency Correction (CE): 1.41
Logged by JCH
WH = Weight of hammer
WR = Weight of rod

WATER LEVEL OBSERVATIONS

No free water encountered

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 11-09-2022 | Boring Completed: 11-09-2022

Drill Rig: Mobil B-57 | Driller: L. Zito

Project No.: JB215256J

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JB215256J PHASE 4 BORINGS.GPJ TERRACON_DATATEMPLATE.GDT 1/4/23

BORING LOG NO. KB-182.4B

PROJECT: Phase 4 Borings

CLIENT: Kiewit Engineering (NY) Corp
Lone Tree, CO

SITE: Champlain to Hudson HDD Crossings

LOCATION See Exploration Plan

Latitude: 42.7295° Longitude: -73.9620°

Surface Elev.: 291.5 (Ft.)

DEPTH	ELEVATION (Ft.)	Description
0.5	291	**BALLAST**
		FILL - SILTY SAND WITH GRAVEL, black
2.0	289.5	
		FILL - LEAN CLAY WITH GRAVEL (CL), trace sand, brown
10.0	281.5	
		POORLY GRADED SAND (SP), brown, loose
15.0	276.5	
		LEAN CLAY (CL), varved silt and clay, brown, very soft to soft
		grades gray

DEPTH (Ft.)	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		5	5-9-14-14 N=23			
5		18	5-3-3-3 N=6	21.4	29-21-8	71
10		17	4-4-5-6 N=9	6.1		6
15		24	WH-2-1-1 N=3			
20		24	WH/18"-2			
25						

WATER LEVEL OBSERVATIONS

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
4" Casing to 5 feet
Mud Rotary from 5' to 87'

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by others.

Notes:

Hammer Efficiency Summary:
Energy Transfer Ratio: 84.8% +/-3.7%
Hammer Efficiency Correction (CE): 1.41
Logged by JTO
WH = Weight of hammer
WR = Weight of rods

WATER LEVEL OBSERVATIONS

No free water encountered

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 11-11-2022	Boring Completed: 11-11-2022
Drill Rig: Acker Renegade	Driller: L. Spicher
Project No.: JB215256J	

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JB215256J PHASE 4 BORINGS.GPJ TERRACON_DATATEMPLATE.GDT 1/4/23

BORING LOG NO. KB-182.4B

PROJECT: Phase 4 Borings

CLIENT: Kiewit Engineering (NY) Corp
Lone Tree, CO

SITE: Champlain to Hudson HDD Crossings

LOCATION See Exploration Plan

Latitude: 42.7295° Longitude: -73.9620°

Surface Elev.: 291.5 (Ft.)

GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	LEAN CLAY (CL), varved silt and clay, gray, very soft to soft *(continued)*					24	WH/24"	34.5	37-22-15	99
			30							
			35			24	WH-1-3-4 N=4			
			40							
			45			24	1-4-4-5 3" Spit Spoon With Ring Samplers			
			50							

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
4" Casing to 5 feet
Mud Rotary from 5' to 87'

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by others.

Notes:

Hammer Efficiency Summary:
Energy Transfer Ratio: 84.8% +/-3.7%
Hammer Efficiency Correction (CE): 1.41
Logged by JTO
WH = Weight of hammer
WR = Weight of rods

WATER LEVEL OBSERVATIONS

No free water encountered

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 11-11-2022 | Boring Completed: 11-11-2022
Drill Rig: Acker Renegade | Driller: L. Spicher
Project No.: JB215256J

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JB215256J PHASE 4 BORINGS.GPJ TERRACON_DATATEMPLATE.GDT 1/4/23

BORING LOG NO. KB-182.4B

PROJECT: Phase 4 Borings

CLIENT: Kiewit Engineering (NY) Corp
Lone Tree, CO

SITE: Champlain to Hudson HDD Crossings

LOCATION See Exploration Plan

Latitude: 42.7295° Longitude: -73.9620°

Surface Elev.: 291.5 (Ft.)

DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	LEAN CLAY (CL), varved silt and clay, gray, very soft to soft *(continued)*							
		55						
				24	WR-WH/12"-1	31.1	34-22-12	99
		60						
		65						
				24	WR-1-WH/12" N=1			
		70						
75.0	216.5	75						

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
4" Casing to 5 feet
Mud Rotary from 5' to 87'

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by others.

Notes:

Hammer Efficiency Summary:
Energy Transfer Ratio: 84.8% +/-3.7%
Hammer Efficiency Correction (CE): 1.41
Logged by JTO
WH = Weight of hammer
WR = Weight of rods

WATER LEVEL OBSERVATIONS

No free water encountered

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 11-11-2022 | Boring Completed: 11-11-2022
Drill Rig: Acker Renegade | Driller: L. Spicher
Project No.: JB215256J

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JB215256J PHASE 4 BORINGS.GPJ TERRACON_DATATEMPLATE.GDT 1/4/23

BORING LOG NO. KB-182.4B

PROJECT: Phase 4 Borings

CLIENT: Kiewit Engineering (NY) Corp
Lone Tree, CO

SITE: Champlain to Hudson HDD Crossings

LOCATION See Exploration Plan

Latitude: 42.7295° Longitude: -73.9620°

Surface Elev.: 291.5 (Ft.)

DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	SILTY CLAY (CL-ML), varved silt and clay, gray, very soft to soft				24	WH/24"	24.0	25-20-5	100
		80							
		85			24	WR-WH-2-5 N=2			
87.0	204.5								
	Boring Terminated at 87 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
4" Casing to 5 feet
Mud Rotary from 5' to 87'

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by others.

Notes:

Hammer Efficiency Summary:
Energy Transfer Ratio: 84.8% +/-3.7%
Hammer Efficiency Correction (CE): 1.41
Logged by JTO
WH = Weight of hammer
WR = Weight of rods

WATER LEVEL OBSERVATIONS

No free water encountered

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 11-11-2022 | Boring Completed: 11-11-2022
Drill Rig: Acker Renegade | Driller: L. Spicher
Project No.: JB215256J

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JB215256J PHASE 4 BORINGS.GPJ TERRACON_DATATEMPLATE.GDT 1/4/23

Summary of Laboratory Results

BORING ID	Depth (Ft.)	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
KB-169.0-9.5	2-4	7.2			
KB-169.0-9.5	8-10	6.7			
KB-169.0-9.5	20-22	16.4	29	20	9
KB-169.0-9.5	35-37	7.2			
KB-180.0	4-6	16.4	NP	NP	NP
KB-180.0	10-12	34.0	34	26	8
KB-180.0	25-27	22.6	22	21	1
KB-180.0	40-42	30.5	34	24	10
KB-180.1	5-7	23.7	30	24	6
KB-180.1	15-17	30.7	35	22	13
KB-180.1	30-32	22.4	26	18	8
KB-180.1	50-52	37.0	35	21	14
KB-182.4A	4-6	27.1	34	26	8
KB-182.4A	10-12	31.2	33	29	4
KB-182.4A	30-31.5	32.0	40	26	14
KB-182.4A	45-46.5	28.5	40	23	17
KB-182.4B	5-7	21.4	29	21	8
KB-182.4B	10-12	6.1			
KB-182.4B	25-27	34.5	37	22	15
KB-182.4B	55-57	31.1	34	22	12
KB-182.4B	75-77	24.0	25	20	5
KB-183.7B	4-6	12.2			
KB-183.7B	15-17	8.2			
KB-183.7B	20-22	16.9			
KB-188.6	4-6	10.0			
KB-188.6	20-22	7.7			
KB-188.6	40-42	10.9			
KB-188.6	55-57	9.8			
KB-189.7	4-6	8.9			
KB-189.7	10-12	32.8			
KB-189.7	25-27	8.7			
KB-189.7	40-42	9.6			
KB-190.2	6-8	8.7			
KB-190.9	2-4	22.8			
KB-190.9	10-12	12.4			
KB-191.8	4-6	19.2	25	21	4
KB-191.8	15-17	10.1			

PROJECT: Phase 4 Borings

SITE: Champlain to Hudson HDD Crossings

Terracon
30 Corporate Cir Ste 201
Albany, NY

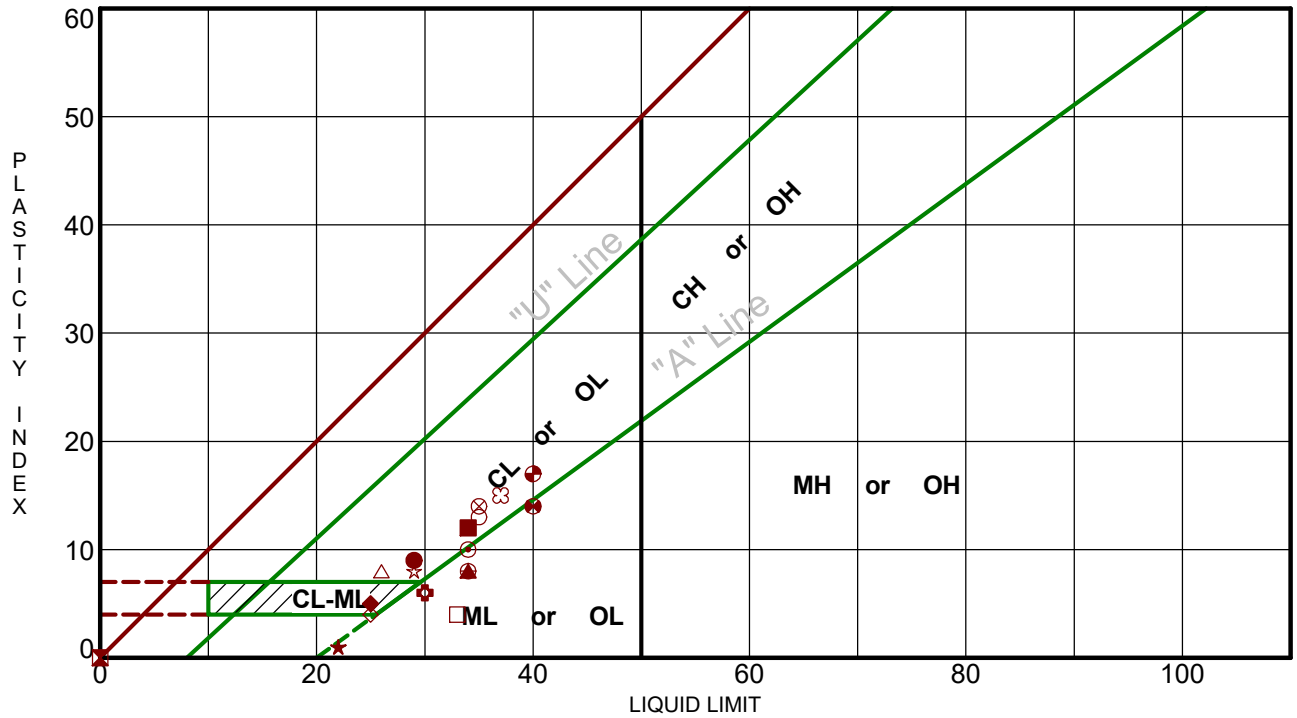
PROJECT NUMBER: JB215256J

CLIENT: Kiewit Engineering (NY) Corp
Lone Tree, CO

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. SMART LAB SUMMARY-PORTRAIT JB215256J PHASE 4 BORINGS.GPJ TERRACON_DATATEMPLATE.GDT 1/3/23

ATTERBERG LIMITS RESULTS

ASTM D4318



	Boring ID	Depth (Ft)	LL	PL	PI	Fines	USCS	Description
●	KB-169.0-9.5	20 - 22	29	20	9	49.7	SC	CLAYEY SAND with GRAVEL
⊠	KB-180.0	4 - 6	NP	NP	NP	34.0	SM	SILTY SAND
▲	KB-180.0	10 - 12	34	26	8	91.2	ML	SILT
★	KB-180.0	25 - 27	22	21	1	99.2	ML	SILT
⊙	KB-180.0	40 - 42	34	24	10	96.5	ML	SILT
✿	KB-180.1	5 - 7	30	24	6	76.0	ML	SILT with SAND
○	KB-180.1	15 - 17	35	22	13	98.4	CL	LEAN CLAY
△	KB-180.1	30 - 32	26	18	8	97.9	CL	LEAN CLAY
⊗	KB-180.1	50 - 52	35	21	14	95.6	CL	LEAN CLAY
⊕	KB-182.4A	4 - 6	34	26	8	96.9	ML	SILT
□	KB-182.4A	10 - 12	33	29	4	97.6	ML	SILT
⊗	KB-182.4A	30 - 31.5	40	26	14	98.7	ML	SILT
◕	KB-182.4A	45 - 46.5	40	23	17	99.3	CL	LEAN CLAY
☆	KB-182.4B	5 - 7	29	21	8	71.2	CL	LEAN CLAY with GRAVEL
✿	KB-182.4B	25 - 27	37	22	15	99.5	CL	LEAN CLAY
■	KB-182.4B	55 - 57	34	22	12	98.5	CL	LEAN CLAY
◆	KB-182.4B	75 - 77	25	20	5	99.6	CL-ML	SILTY CLAY
◇	KB-191.8	4 - 6	25	21	4	99.4	CL-ML	SILTY CLAY

PROJECT: Phase 4 Borings

SITE: Champlain to Hudson HDD Crossings

Terracon
30 Corporate Cir Ste 201
Albany, NY

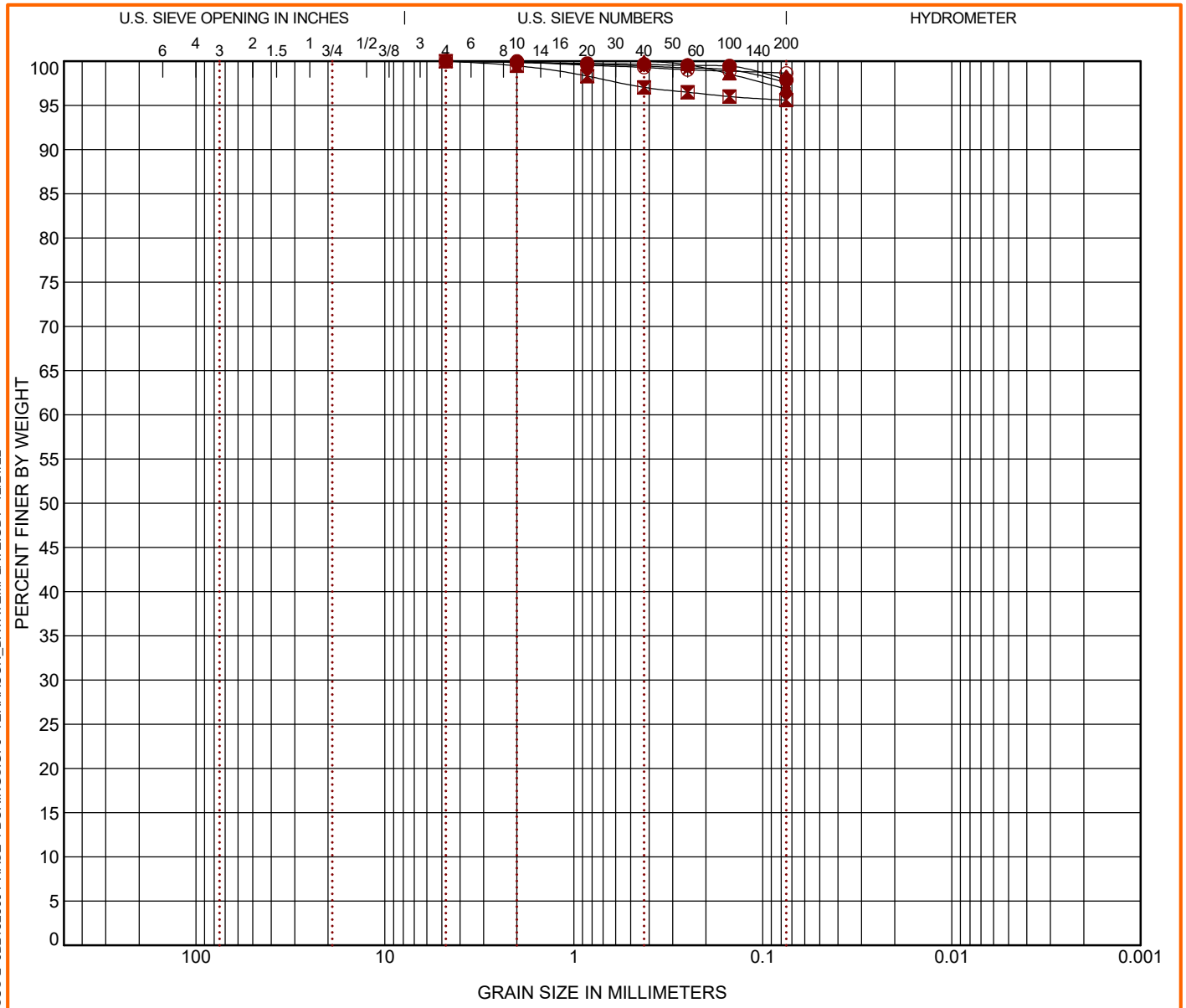
PROJECT NUMBER: JB215256J

CLIENT: Kiewit Engineering (NY) Corp
Lone Tree, CO

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. ATTERBERG LIMITS JB215256J PHASE 4 BORINGS.GPJ TERRACON_DATATEMPLATE.GDT 12/21/22

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring ID	Depth (Ft)	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
●	KB-180.1	30 - 32	LEAN CLAY (CL)	22.4	26	18	8		
⊠	KB-180.1	50 - 52	LEAN CLAY (CL)	37.0	35	21	14		
▲	KB-182.4A	4 - 6	SILT (ML)	27.1	34	26	8		
★	KB-182.4A	10 - 12	SILT (ML)	31.2	33	29	4		
⊙	KB-182.4A	30 - 31.5	SILT (ML)	32.0	40	26	14		

	Boring ID	Depth (Ft)	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
●	KB-180.1	30 - 32	4.75				0.0	0.0	2.1		97.9	
⊠	KB-180.1	50 - 52	4.75				0.0	0.0	4.4		95.6	
▲	KB-182.4A	4 - 6	0.425				0.0	0.0	3.1		96.9	
★	KB-182.4A	10 - 12	4.75				0.0	0.0	2.4		97.6	
⊙	KB-182.4A	30 - 31.5	2				0.0	0.0	1.3		98.7	

PROJECT: Phase 4 Borings

PROJECT NUMBER: JB215256J

SITE: Champlain to Hudson HDD Crossings

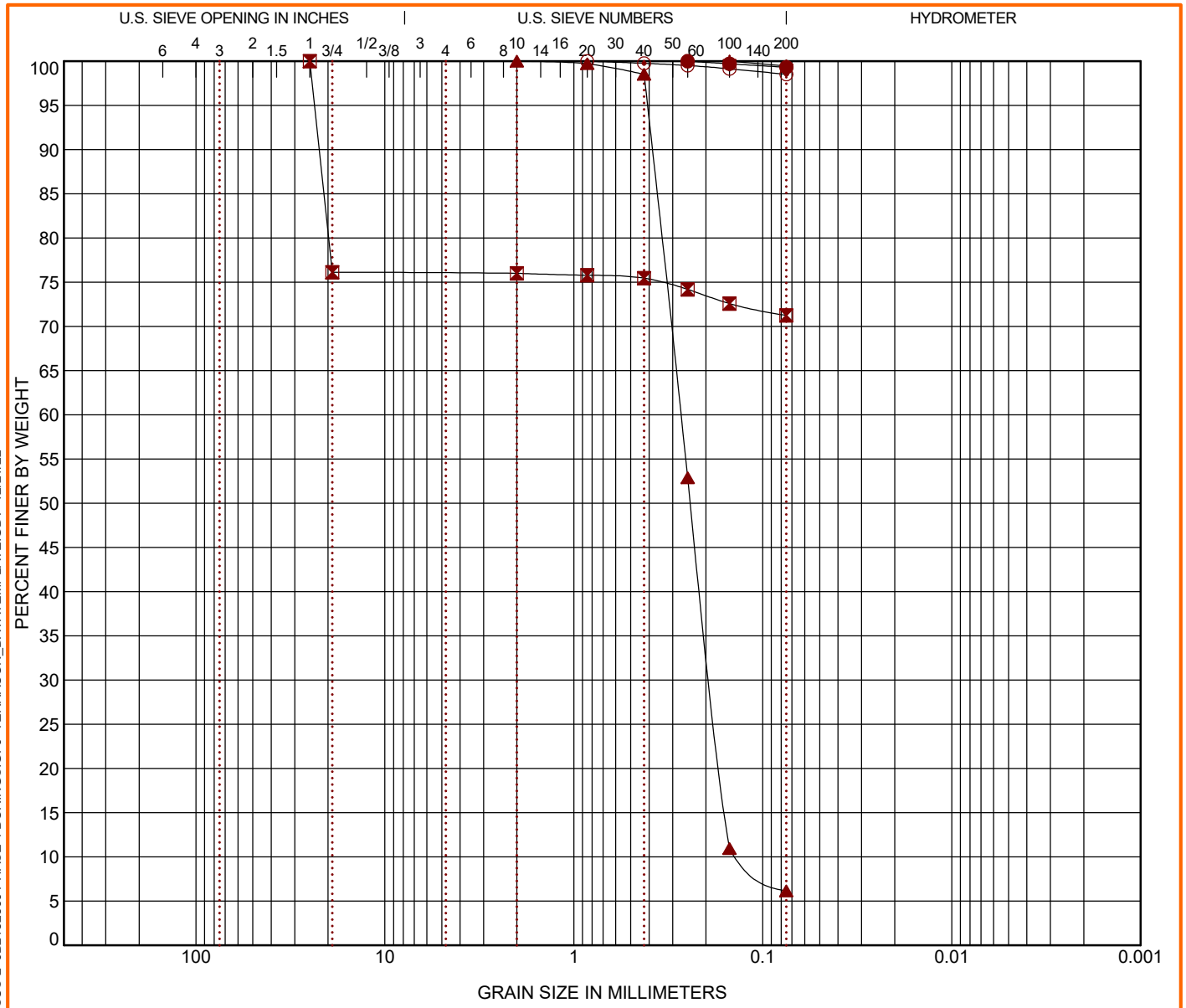
Terracon
30 Corporate Cir Ste 201
Albany, NY

CLIENT: Kiewit Engineering (NY) Corp
Lone Tree, CO

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS-2 JB215256J PHASE 4 BORINGS.GPJ TERRACON_DATATEMPLATE.GDT 12/21/22

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring ID	Depth (Ft)	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
●	KB-182.4A	45 - 46.5	LEAN CLAY (CL)	28.5	40	23	17		
⊠	KB-182.4B	5 - 7	LEAN CLAY with GRAVEL (CL)	21.4	29	21	8		
▲	KB-182.4B	10 - 12	POORLY GRADED SAND (SP)	6.1				1.01	2.07
★	KB-182.4B	25 - 27	LEAN CLAY (CL)	34.5	37	22	15		
⊙	KB-182.4B	55 - 57	LEAN CLAY (CL)	31.1	34	22	12		

	Boring ID	Depth (Ft)	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
●	KB-182.4A	45 - 46.5	0.25				0.0	0.0	0.7		99.3	
⊠	KB-182.4B	5 - 7	25				0.0	24.0	4.8		71.2	
▲	KB-182.4B	10 - 12	2	0.272	0.189	0.131	0.0	0.0	93.9		6.1	
★	KB-182.4B	25 - 27	0.15				0.0	0.0	0.5		99.5	
⊙	KB-182.4B	55 - 57	0.85				0.0	0.0	1.5		98.5	

PROJECT: Phase 4 Borings

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GRAIN SIZE DISTRIBUTION

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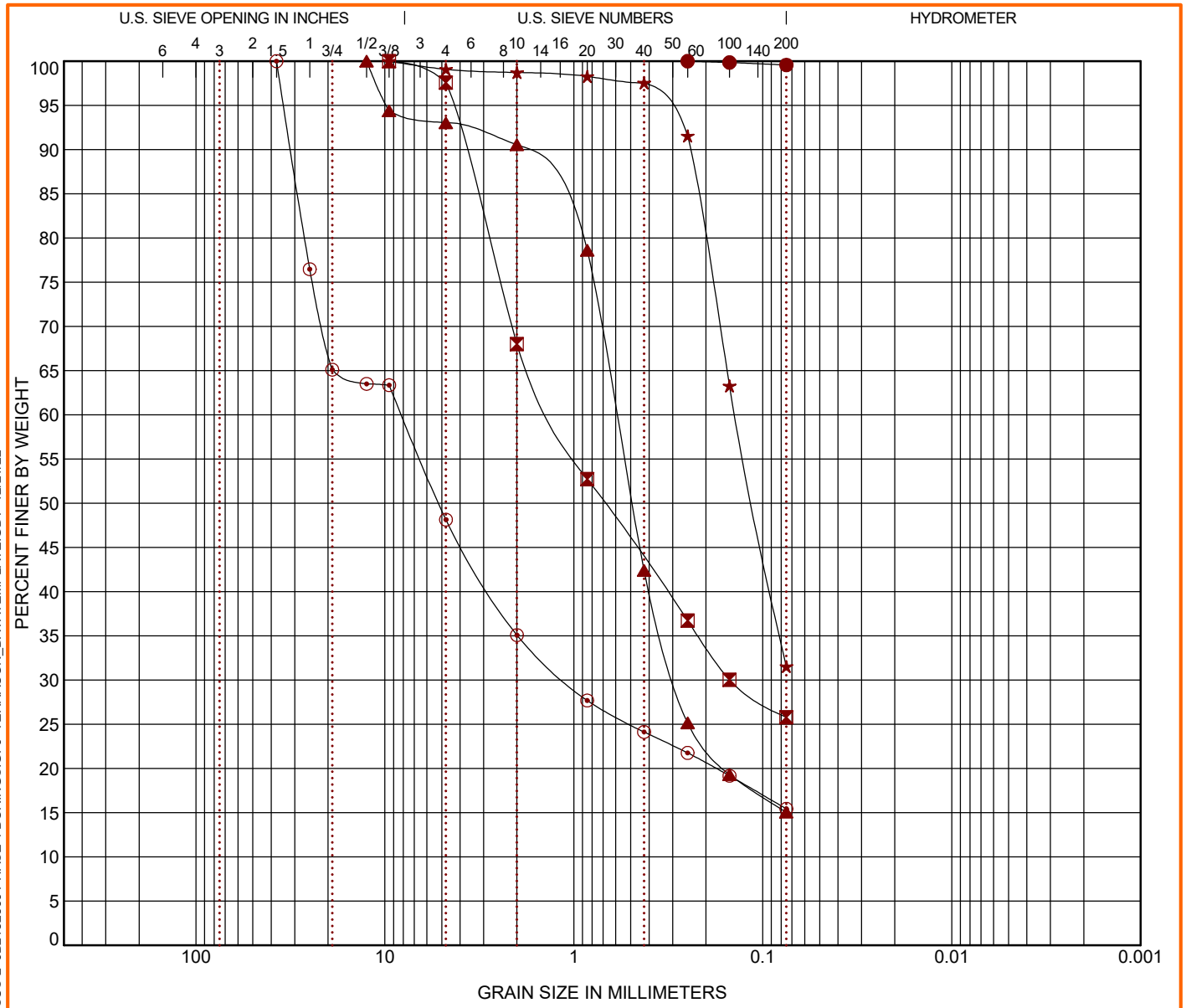


COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring ID	Depth (Ft)	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
●	KB-182.4B	75 - 77	SILTY CLAY (CL-ML)	24.0	25	20	5		
⊠	KB-183.7B	4 - 6	SILTY SAND (SM)	12.2					
▲	KB-183.7B	15 - 17	SILTY SAND (SM)	8.2					
★	KB-183.7B	20 - 22	SILTY SAND (SM)	16.9					
⊙	KB-188.6	4 - 6	SILTY GRAVEL with SAND (GM)	10.0					

	Boring ID	Depth (Ft)	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
●	KB-182.4B	75 - 77	0.25				0.0	0.0	0.4		99.6	
⊠	KB-183.7B	4 - 6	9.5	1.278	0.149		0.0	2.4	71.8		25.8	
▲	KB-183.7B	15 - 17	12.5	0.595	0.29		0.0	7.0	78.0		15.0	
★	KB-183.7B	20 - 22	9.5	0.14			0.0	0.9	67.5		31.5	
⊙	KB-188.6	4 - 6	37.5	8.154	1.111		0.0	51.9	32.7		15.4	

PROJECT: Phase 4 Borings

SITE: Champlain to Hudson HDD Crossings

Terracon
30 Corporate Cir Ste 201
Albany, NY

PROJECT NUMBER: JB215256J

CLIENT: Kiewit Engineering (NY) Corp
Lone Tree, CO

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS-2 JB215256J PHASE 4 BORINGS.GPJ TERRACON_DATATEMPLATE.GDT 12/21/22

Kiewit

MEMORANDUM

DATE: February 13, 2023

TO: Nick Strater; Brierley Associates Underground Engineers, PLLC

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

SUBJECT: Geotechnical Data: Segment 8 – Package 5 – HDD Crossing 76 and 76.A – Revision 1
Champlain Hudson Power Express Project
Schenectady, 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 south of Schenectady, New York. The approximate station for the start of HDD crossing Number 76 and 76.A is STA 50307+00 (42.7266° N, 73.9610° W).

The geotechnical data at this HDD crossing is attached. The available data is from the previous investigation by AECOM and TRC and the recent investigation by Terracon, referenced below.

- AECOM, Geotechnical Data Report, Upland Segments, Champlain Hudson Power Express, dated May 28, 2021.
- TRC, Geotechnical Data Report, Champlain Hudson Power Express, Canadian Pacific Railway Borings MP 177.6-228.2, dated March 15, 2013.
- Terracon, Geotechnical Data Report, Champlain-Hudson Power Express-Package 5, Schenectady through Selkirk, dated April 4, 2022.
- Terracon, Geotechnical Data Report, Champlain-Hudson Power Express-Additional HDD Borings – Phase 3, Fort Ann to Coxsackie, dated November 3, 2022.

Contact us if you have questions or require additional information.

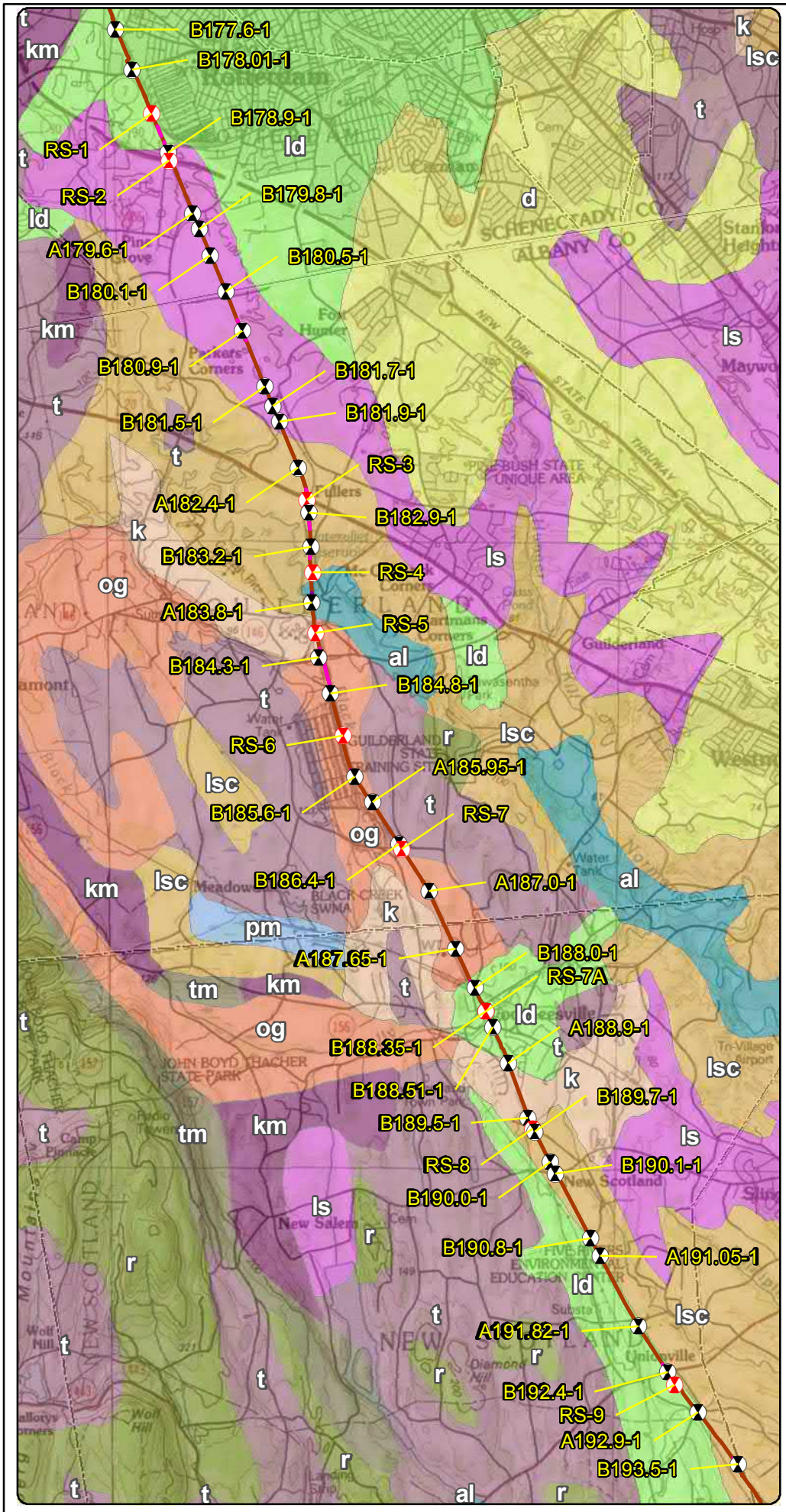
HDD 76 & 76.A
Borings RS-3, B182.9-1, K-182.7,
K-182.8, K-183.0A, K-183.0B,
KB-182.7B
Segment 8 - Package 5

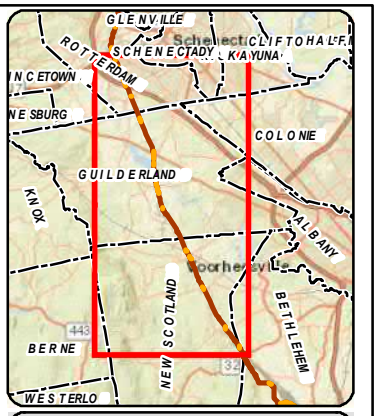
CHPE Segment 8 & 9 - Package 5
HDD Soil Boring Coordinates and Elevations

Firm	Boring	Northing (feet)	Easting (feet)	Ground Surface Elevation (feet)
TRC*	A179.6-1	1433335.8	631009.7	332.5
	A182.4-1	1420048.2	636557.9	291.5
	A187.65-1	1394856.5	644775.4	327.7
	A191.05-1	1378814.5	652321.0	274.7
	A191.82-1	1375154.9	654314.3	257.1
	A192.9-1	1370644.3	657458.6	232.8
	B177.1-1	1445275.2	626125.8	347.3
	B177.6-1	1442944.0	627003.0	346.5
	B178.01-1	1440838.2	627828.3	368.5
	B178.9-1	1436461.4	629767.4	322.1
	B180.1-1	1431140.9	631965.3	310.4
	B180.9-1	1427158.5	633611.8	307.5
	B182.9-1	1417657.6	637123.9	291.5
	B183.2-1	1415871.4	637202.5	290.2
	B184.3-1	1410133.0	637597.6	324.0
	B184.8-1	1408223.8	638230.4	323.1
	B185.6-1	1403875.9	639489.9	328.2
	B188.0-1	1392812.4	645793.4	330.9
	B188.35-1	1391616.5	646333.6	333.4
	B188.51-1	1390815.1	646697.7	340.2
	B190.0-1	1383732.6	649743.4	296.3
	B190.1-1	1383134.9	649975.5	294.6
	B190.8-1	1379726.2	651827.2	282.3
	B192.4-1	1372732.4	655878.1	239.3
	B193.5-1	1367919.2	659547.5	218.6
AECOM**	RS-2	1436092.2	629800.7	315.6
	RS-3	1418336.4	636985.0	303.2
	RS-4	1414567.4	637285.8	302.2
	RS-5	1411399.1	637471.6	319.0
	RS-7A	1391599.9	646333.6	340.5
	RS-9	1372089.8	656230.9	238.7
	SY-7	1353089.8	670133.9	159.8
	SY-8	1353716.5	671626.7	175.0
	SY-9	1353046.4	673133.41	163.1
	SY-9A	1351940.0	674314.3	158.3
	SY-10	1350838.3	675488.6	166.0
	SCH-19	1446199.8	625927.0	333.8
	SCH-19A	1445712.1	626032.4	343.1

Notes:
- Northings and Eastings are provided in NAD83 New York State Plane East Zone.
- Elevations are referenced to the NAVD88 datum.
* TRC boring coordinates as shown in Table 1-6 in AECOM report (reference below). Boring elevations estimated from November 2021 topographic survey by Williams Aerial.
** AECOM boring coordinates and elevations as shown in Table 1-6 in AECOM report.
*** Kiewit boring coordinates and elevations are noted on the boring logs.

Reference:
AECOM, Geotechnical Data Report, Upland Segments: Putnam Station, Washington County, to Cementon, Green County, NY, Champlain Hudson Power Express, dated May 28, 2021.





LEGEND

- 2021 Boring Location
- Previous (2013) Boring Location
- Terrestrial Route HVDC
- Submarine Route HVDC
- Terrestrial Route HVAC
- Preliminary HDD Locations
- Preliminary Pipe Bridge Location
- Town Boundary
- County Boundary

Surficial Geology

- al - Recent alluvium
- d - Dunes
- k - Kame deposits
- km - Kame moraine
- ld - Lacustrine delta
- ls - Lacustrine sand
- lsc - Lacustrine silt and clay
- og - Outwash sand and gravel
- pm - Swamp deposits
- r - Bedrock
- t - Till
- tm - Till moraine

N

0.7 0.35 0 0.7 Miles

Transmission Developers Inc.

Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

Surficial Geology and Geotechnical Borings Rotterdam to Selkirk Figure 3-8

Prepared on 5/4/2021

by: AECOM

DATA SOURCES: ESRI, NYSDOT, NOAA, USACE, NYDOS, TDI, TRC

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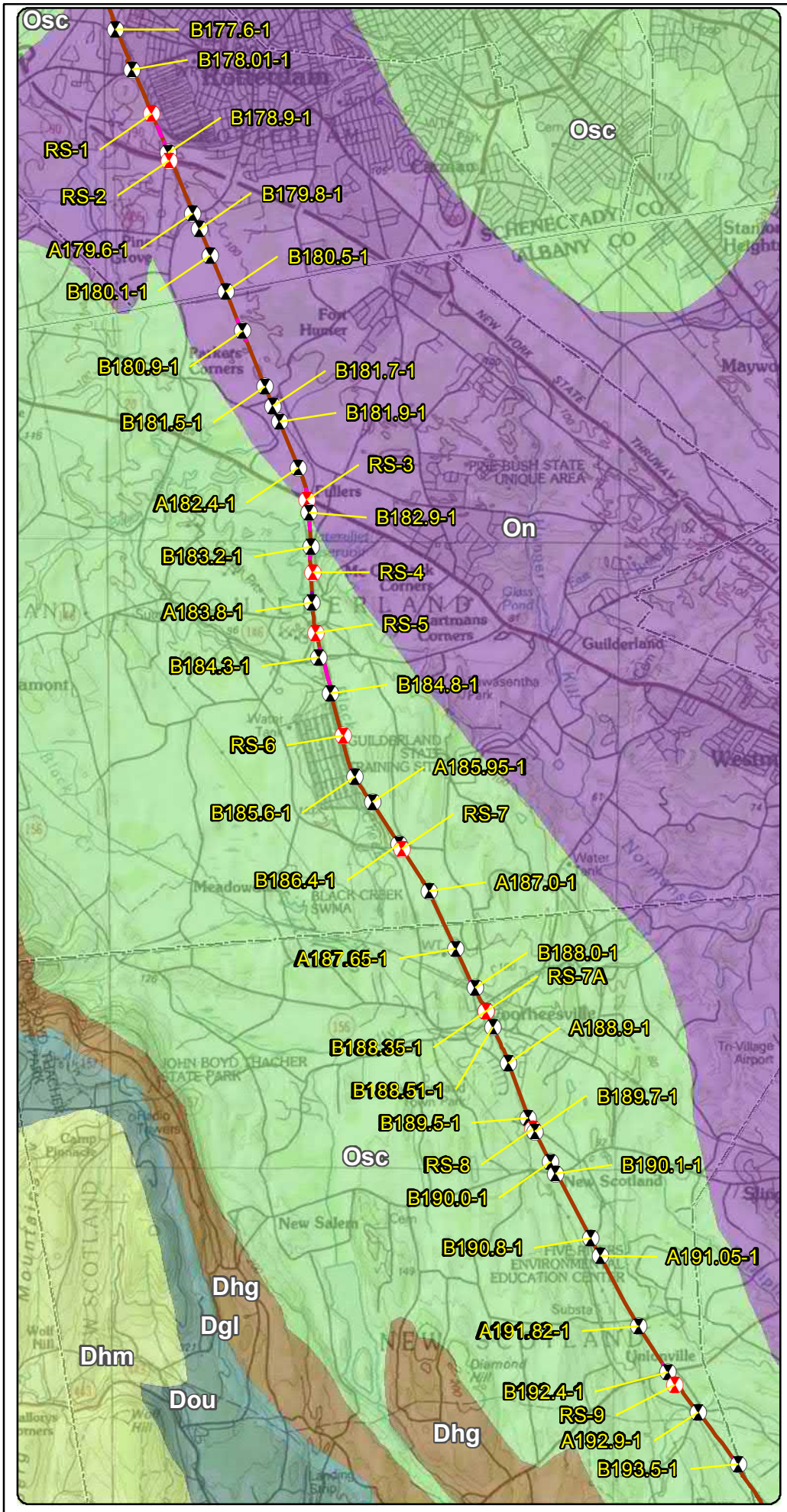

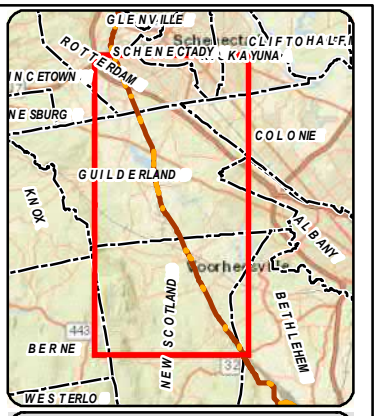

LEGEND

- 2021 Boring Location
- Previous (2013) Boring Location
- Terrestrial Route HVDC
- Submarine Route HVDC
- Terrestrial Route HVAC
- Preliminary HDD Locations
- Preliminary Pipe Bridge Location
- Town Boundary
- County Boundary

Bedrock Geology

- Dgl - Glenerie Formation
- Dhg - Port Ewen Formation
- Dhm - Undiff Lower Hamilton Group
- Dou - Onondaga Limestone
- On - Normanskill Shale
- Osc - Schenectady Formation

* Schenectady Formation includes: graywacke, sandstone, siltstone, shale

N

0.7 0.35 0 0.7 Miles

Transmission

Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

Bedrock Geology and Geotechnical Borings Rotterdam to Selkirk Figure 4-8

Prepared on 5/4/2021

by: AECOM

DATA SOURCES: ESRI, NYSDOT, NOAA, USACE, NYDOS, TDI, TRC

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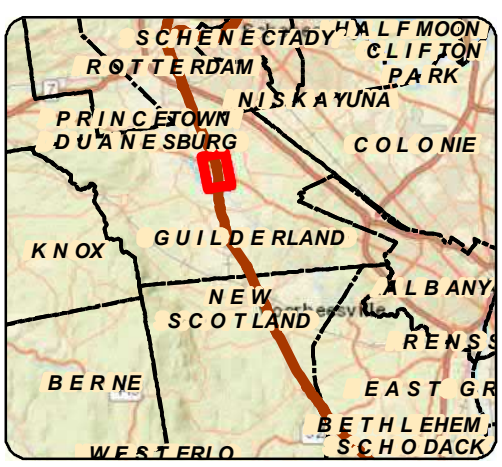
182.1
182.2
182.3
A182.4-1
182.5
182.6
182.7
GUILDERLAND
RS-3
182.8
B182.9-1
183
183.1
183.2
B183.2-1
183.3
183.4
Western Ave
W Old State Rd
Conrail
Fuller Station Rd
Lawler Ln
Spring Farm Ln
Helderview Dr
Katie Ln
Avalon Way
Normandy Sq
French's Mill Rd
0
1,000
Feet



LEGEND

- 111.8 Certified Milepost - Tenths
- 135 Certified Milepost
- 111.8 Preferred Alternative Milepost - Tenths
- 135 Preferred Alternative Milepost
- Terrestrial Route HVDC
- Submarine Route HVDC
- Terrestrial Route HVAC
- Preliminary HDD Locations
- Preliminary Pipe Bridge Location
- 2021 Boring Location
- Previous (2013) Boring Location
- Streams/Ditches
- Railroad ROW
- Deviation Zone
- Deviation Zone Outside ROW
- Preferred Alternative Deviation Zone
- Preferred Alternative Deviation Zone Outside ROW
- Town Boundary
- Village Boundary
- State Park (OPRHP)

Parcel Ownership: TOWN NAME

Road Name: Village Name

Transmission Developers Inc.

Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

BORING LOCATION PLAN

Rotterdam to Selkirk

Figure A-8

Sheet 5 of 14

Prepared by: AECOM 5/4/2021

DATA SOURCES: ESRI, NETWORK MAPPING 2010, NYSDOT, OPRHP, TDI, TRC

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BORING CONTRACTOR: ADT	AECOM	SHEET 1 OF 2
DRILLER: Chris Chaillou		PROJECT NAME: CHPE -
		PROJECT NO.: 60323056
		HOLE NO.: **RS-3**
SOILS ENGINEER/GEOLOGIST: Chris French		START DATE: 3/11/21
	BORING LOG	FINISH DATE: 3/11/21
LOCATION: MP 182.75 (CSX Rail)		OFFSET: N/A

GROUND WATER OBSERVATIONS		CASING	SAMPLER	DRILL BIT	CORE BARREL	DRILL RIG: CME LC-55
5' (inferred)	TYPE	Flush Joint Steel	California Modified	Tricone Roller 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.:
	HAMMER WT.	140 lbs	140 lbs			NORTHING
	HAMMER FALL	30"	30"			EASTING

DEPTH	CORING RATE MIN/FT	SAMPLE DEPTHS FROM - TO (FEET)	TYPE AND NO.	PEN. in	REC. in	BLOWS PER 6 in ON SAMPLER (ROCK QUALITY DESIGNATION)				N Corr.(2)	USCS CLASS.	STRAT. CHNG. DEPTH	FIELD IDENTIFICATION OF SOILS
		0'-5'				Hand Cleared					GM		0'-2.1' Brown angular to sub-rounded GRAVEL, some fine to coarse Sand, little Silt, dense, saturated
1.0													
2.0											ML	Clayey SILT	2.1'-3.7' Brown Clayey SILT, little fine to coarse Sand, medium stiff, moist
3.0											ML		3.7'-5' Gray Clayey SILT, trace fine Sand, medium Stiff, moist
		3'-5'	S-1										
4.0													TR-1; (3.0'-5.0')
5.0													
		5'-7'	S-2	24"	24"	3	6	7	7	8	ML		Gray Clayey SILT, trace fine Sand, organics, soft, saturated
6.0													
7.0													
		7'-9'	S-3	24"	24"	7	11	13	15	16	ML/SM		SAA
8.0													8.2'-9' Brown fine to medium SAND, some Silt, medium dense, saturated
9.0													TR-2; (8.0'-8.5')
		9'-11'	S-4	24"	24"	2	7	6	6	8	ML		Brown Clayey SILT, trace fine to medium Sand, soft, saturated
10.0													
11.0													
		11'-13'	S-5	24"	24"	2	4	4	5	5	ML		SAA
12.0													
													TR-3; (12.0'-12.5')
13.0													
		13'-15'	S-6	24"	24"	2	4	4	6	5	ML		Brown Clayey SILT, increasing Clay with depth to become Silt and Clay, soft, wet
14.0													
15.0													
		15'-17'	S-7	24"	24"	8	6	6	7	8	ML		Brown Clayey SILT, soft, wet
16.0													
17.0													
18.0													
19.0													
20.0													

NOTES:

(1) Thick-wall ring lined drive sampler (California sampler) used for SPT samples. Rings dimensions = 2-1/2" O.D. by 2-7/16" I.D. by 6" length.

(2) Correction factor: $N_{corr}=N*(2.0^2-1.375^2)in./(3.0^2-2.4^2)in. = N*0.65$.

Soil description represents a field identification after D.M. Burmister unless otherwise noted.

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 if he finds that the actual conditions do not conform to those indicated by this log.

SAMPLE TYPE:	S= SPLIT SPOON	U=SHELBY TUBE	R=ROCK CORE	
PROPORTIONS:	TRACE=1-10%	LITTLE=10-20%	SOME=20-35%	AND=35-50%

BORING CONTRACTOR: ADT	AECOM	SHEET 2 OF 2
DRILLER: Chris Chaillou		PROJECT NAME: CHPE -
		PROJECT NO.: 60323056
		HOLE NO.: **RS-3**
SOILS ENGINEER: Chris French		START DATE: 3/11/21
	BORING LOG	FINISH DATE: 3/11/21
LOCATION: MP 182.75 (CSX Rail)		OFFSET: N/A

DEPTH	CORING RATE MIN/FT	DEPTHS FROM - TO (FEET)	TYPE AND NO.	PEN. in	REC. in	BLOWS PER 6 in ON SAMPLER (ROCK QUALITY DESIGNATION)				N Corr.	USCS CLASS.	STRAT. CHNG. DEPTH	FIELD IDENTIFICATION OF SOILS
		20'-22'	S-8	24"	24"	3	3	5	5	5	CH/MH		Gray interbedded Silty CLAY and Clayey Silt, soft, wet
21.0													
22.0													
23.0													
24.0													
25.0													
		25'-27'	S-9	24"	24"	WOH	3	5	4	5	CH		Gray Silty CLAY, occasional ~0.5" Clayey Silt lenses, soft, wet
26.0													
27.0													TR-4; (26.0'-26.5')
28.0													
29.0													
30.0												Silty CLAY	
		30'-32'	S-10	24"	24"	2	5	5	11	7	CH		Gray Silty CLAY, soft, wet
31.0													
32.0													
33.0													
34.0													
35.0													
		35'-37'	S-11	24"	24"	WHO/3"	4	4	6	5	CH		SAA
36.0													
37.0													TR-5; (36.0'-36.5')
38.0													
		38'-40'	S-12	24"	24"	3	4	6	9	7	CH		SAA
39.0													
40.0													
													RS-3 terminated at 40', grouted to surface
41.0													
42.0													
43.0													
44.0													
45.0													

NOTES:

Soil description represents a field identification after D.M. Burmister unless otherwise noted.

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 if he finds that the actual conditions do not conform to those indicated by this log.

SAMPLE TYPE:	S= SPLIT SPOON	U=SHELBY TUBE	R=ROCK CORE	
PROPORTIONS:	TRACE=1-10%	LITTLE=10-20%	SOME=20-35%	AND=35-50%

TEST BORING LOG

PROJECT: TDI CHAMPLAIN HUDSON POWER EXPRESS
LOCATION: CSX RAILROAD ROW, NY

BORING	**B182.9-1**
G.S. ELEV.	N/A
FILE	195651
SHEET	1 OF 1

GROUNDWATER DATA			
FIRST ENCOUNTERED NR			
DEPTH	HOUR	DATE	ELAPSED TIME
DRY	NR	11/5	0 HR

METHOD OF ADVANCING BOREHOLE				
a	FROM	0.0 '	TO	10.0 '
d	FROM	10.0 '	TO	25.0 '

DRILLER	P. PLANTIER
HELPER	M. NAGEY
INSPECTOR	C. POPPE
DATE STARTED	11/05/2012
DATE COMPLETED	11/05/2012

DEPTH	A	B	C	DESCRIPTION	Wn	REMARKS
	S-1	3 4 8 7		***BROWN/BLACK F/M SANDY SILT, TR TO SM F/ GRAVEL-SIZED ROCK FRAGMENTS (FILL)*** 2.0	13.2	
	S-2	2 6 5 3		***BLACK/BROWN SILT, TR F/ SAND (FILL)*** 4.0	25.2	
5	S-3	3 8 8 4				
	S-4	3 4 4 3			34.9	
10	S-5	4 4 4 8		***BROWN SILT AND CLAY, TR M/F SAND*** 13.5		
15	S-6	2 2 2		***GRAY SILT*** 18.5	33.2	
20	S-7	2 2 3		***GRAY SILTY CLAY***		
25	S-8	3 3 3		25.0	29.1	
				END OF BORING AT 25'		
30						
35						

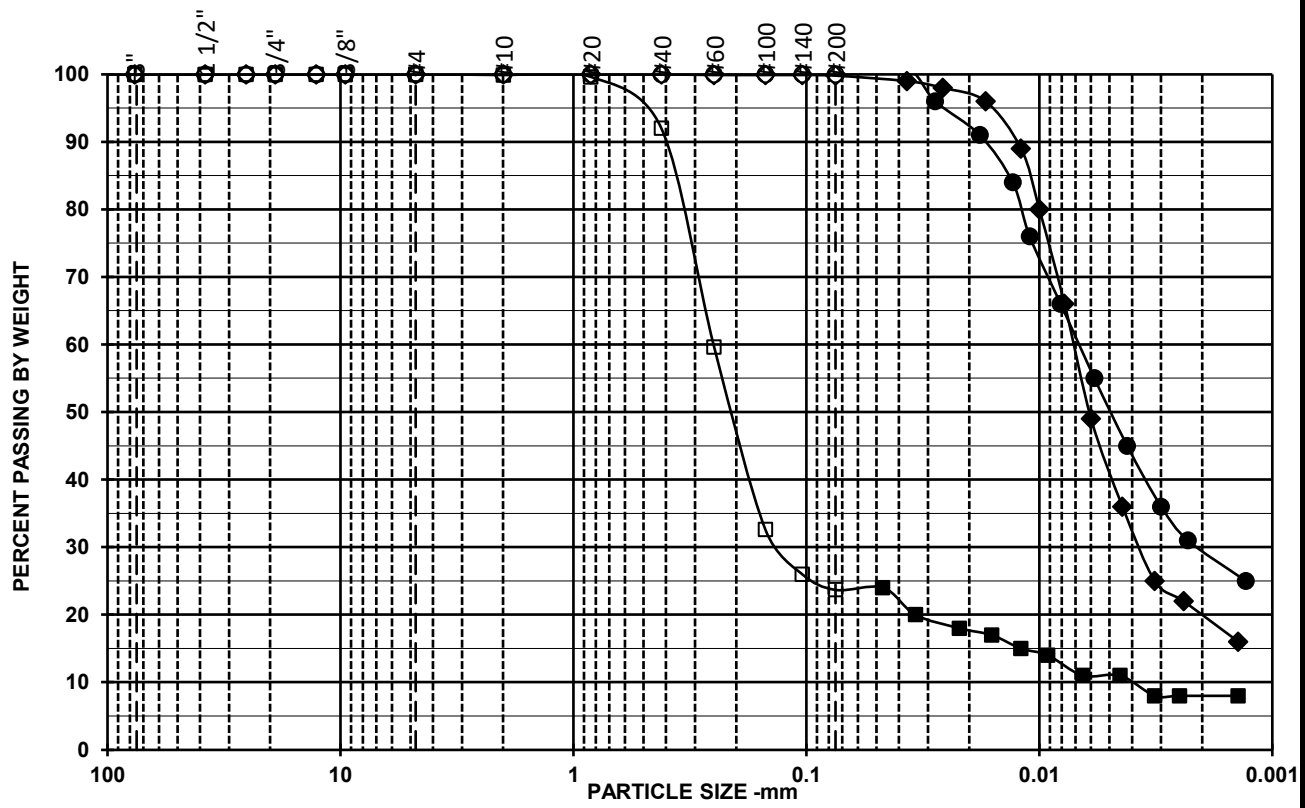
DRN.	TBT
CKD.	PWK

NEW PROJECTS TEST BORING LOG 195651_TDI_CSX.GPJ SITE BLAUVELT.GDT 3/12/13

Aquifer
CHPE - Rotterdam-Selkirk Borings
LABORATORY SOIL TESTING DATA SUMMARY

BORING NO.	SAMPLE NO.	DEPTH (ft)	IDENTIFICATION TESTS							REMARKS
			WATER CONTENT (%)	LIQUID LIMIT (-)	PLASTIC LIMIT (-)	PLAS. INDEX (-)	USCS SYMB. (1)	SIEVE MINUS NO. 200 (%)	HYDROMETER % MINUS 2 μm (%)	
RS-2	S-2	5-7	27.3	29	18	11	CL	99.4	20	
RS-2	S-7	15-17	21.7	19	19	NP	ML	92.4	7	
RS-2	S-9	25-27	27.5	21	15	6	CL-ML	99.7	20	
RS-3	S-3	7-9	18.3	18	10	8	SC	23.7	8	
RS-3	S-8	20-22	26.9	32	20	12	CL	99.8	20	
RS-3	S-10	30-32	27.6	31	19	12	CL	100	30	
RS-5	S-2	5-7	6.4				SM	22	6	
RS-5	S-4	9-11	8.0				SM	18	4	
RS-7	S-2	5-7	11.0	26	15	11	SC	49	19	
RS-7	S-4	9-11	11.0	30	15	15	CL	56	25	
RS-7A	S-4	9-11	15.4				GC	19	5	
RS-7A	S-9	25-27	22.1				SM	20	5	
RS-9	S-2	5-7	33.4	32	22	10	CL	96.1	19	
RS-9	S-7	15-17	39.7	41	20	21	CL	99	54	
RS-9	S-10	30-32	40.9	43	22	21	CL	100	49	

Note: (1) USCS symbol based on visual observation and Sieve and Atterberg limits reported.



Open Symbols: Sieve analysis by ASTM D6913
Filled symbols: Hydrometer analysis by ASTM D7928 corrected for complete sample

SYMBOL	w (%)	LL	PL	PI	USCS	AASHTO	USCS DESCRIPTION AND REMARKS	DATE
□	18.3	18	10	8	SC		Brown, Clayey sand	05/07/21
◇	26.9	32	20	12	CL		Brownish gray, Lean clay	05/07/21
○	27.6	31	19	12	CL		Gray, Lean clay	05/07/21

Aquifer

TerraSense, LLC #7853-21009

CHPE - Rotterdam-Selkirk Borings

Symbol	□	◇	○
Boring	RS-3	RS-3	RS-3
Sample	S-3	S-8	S-10
Depth	7-9	20-22	30-32
% +3"	0	0	0
% Gravel	0	0	0
% SAND	76.3	0.2	0
%C SAND	0.1	0	0
%M SAND	7.9	0	0
%F SAND	68.3	0.2	0
% FINES	23.7	99.8	100
D_{100} (mm)	4.75	2	0.075
D_{60} (mm)	0.251	0.00711	0.00675
D_{30} (mm)	0.13	0.0037	0.0021
D_{10} (mm)	0.004		
Cc	16.8		
Cu	62.8		

Sieve Size/ID #	Percent Finer Data		
6"	100.0	100.0	100.0
4"	100.0	100.0	100.0
3"	100.0	100.0	100.0
1 1/2"	100.0	100.0	100.0
1"	100.0	100.0	100.0
3/4"	100.0	100.0	100.0
1/2"	100.0	100.0	100.0
3/8"	100.0	100.0	100.0
#4	100.0	100.0	100.0
#10	99.9	100.0	100.0
#20	99.6	100.0	100.0
#40	92.0	100.0	100.0
#60	59.6	99.9	100.0
#100	32.6	99.9	100.0
#140	26.0	99.9	100.0
#200	23.7	99.8	100.0
5μ m	11	41	50
2μ m	8	20	30
1μ m	8	12	22

PARTICLE SIZE DISTRIBUTION
ASTM D6913 & ASTM D7928

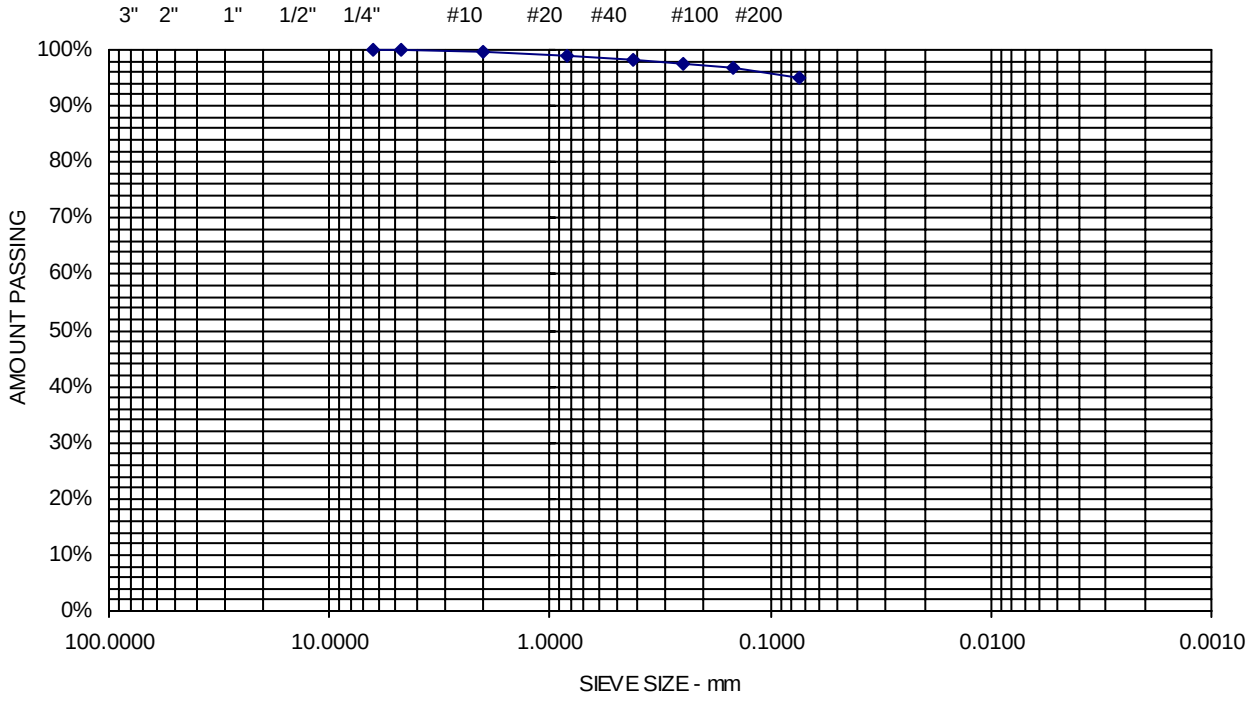
Report of Gradation

ASTM C-117 & C-136

Project Name	EASTERN NY - CHAMPLAIN HUDSON POWER EXPRESS PROJECT - GEOTECHNICAL EXPLORATIONS, SOIL THERMAL CONDUCTIVITY,	Project Number	10-1256
Client	TRC COMPANIES, INC.	Lab ID	10866S
		Date Received	3/1/2013
		Date Completed	3/7/2013
Material Source	**B182.9-1, 2.0' - 13.5' (1 OF 2)**	Tested By	SHAWN BENOIT

STANDARD DESIGNATION (mm/µm)	SIEVE SIZE	AMOUNT PASSING (%)	
6.3 mm	**1/4"**	**100**	
4.75 mm	**No. 4**	**100**	0.2% Gravel
2.00 mm	**No. 10**	**100**	
850 um	**No. 20**	**99**	
425 um	**No. 40**	**98**	5% Sand
250 um	**No. 60**	**97**	
150 um	**No. 100**	**97**	
75 um	**No. 200**	**94.8**	94.8% Fines

BROWN CLAYEY SILT TRACE SAND AND GRAVEL (ML)



Comments: MOISTURE CONTENT = 38.2%

Sheet

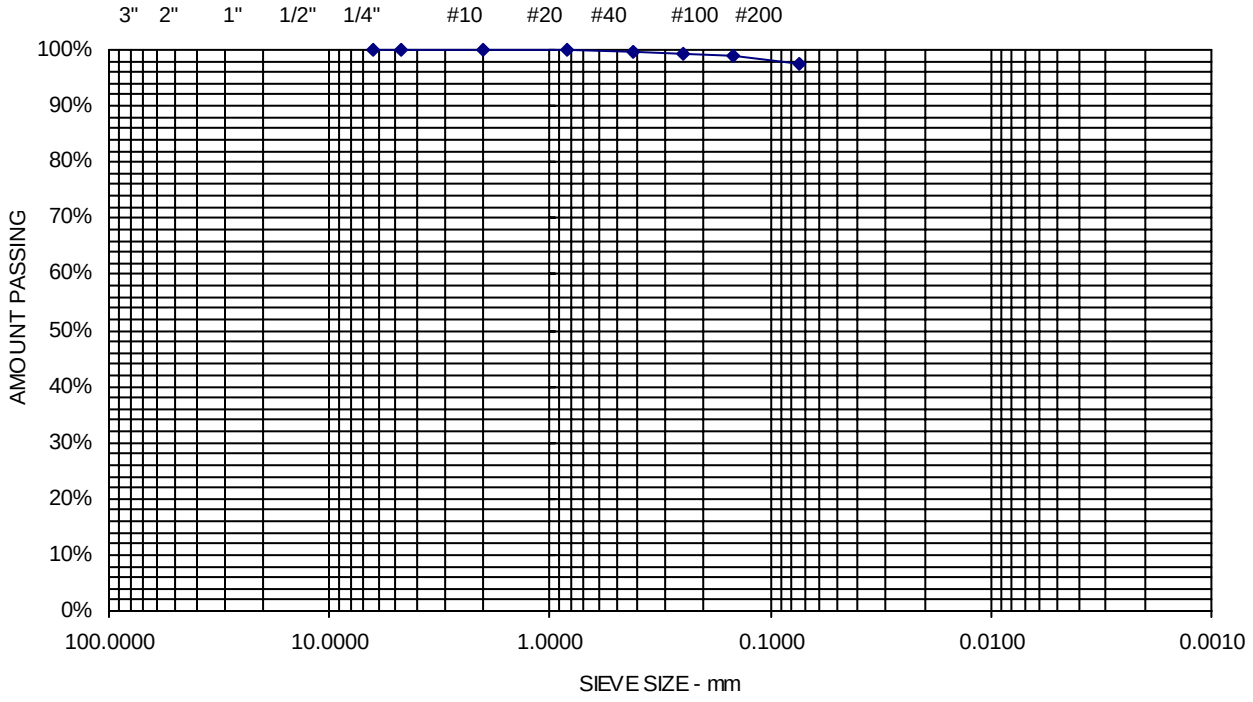
Report of Gradation

ASTM C-117 & C-136

Project Name	EASTERN NY - CHAMPLAIN HUDSON POWER EXPRESS PROJECT - GEOTECHNICAL EXPLORATIONS, SOIL THERMAL CONDUCTIVITY,	Project Number	10-1256
Client	TRC COMPANIES, INC.	Lab ID	10839S
		Date Received	3/1/2013
		Date Completed	3/6/2013
Material Source	**B182.9-1, 13.5' - 25.0' (2 OF 2)**	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**	2.5% Sand
250 um	**No. 60**	**99**	
150 um	**No. 100**	**99**	
75 um	**No. 200**	**97.5**	97.5% Fines

BROWN CLAY AND SILT TRACE SAND (ML)



Comments: MOISTURE CONTENT = 26.5%

Sheet

SUMMARY OF LABORATORY TEST DATA

Project Name: TDI Champlain Hudson Power Express – CSX
Client Name: Transmission Developers, Inc.
TRC Project #: 195651

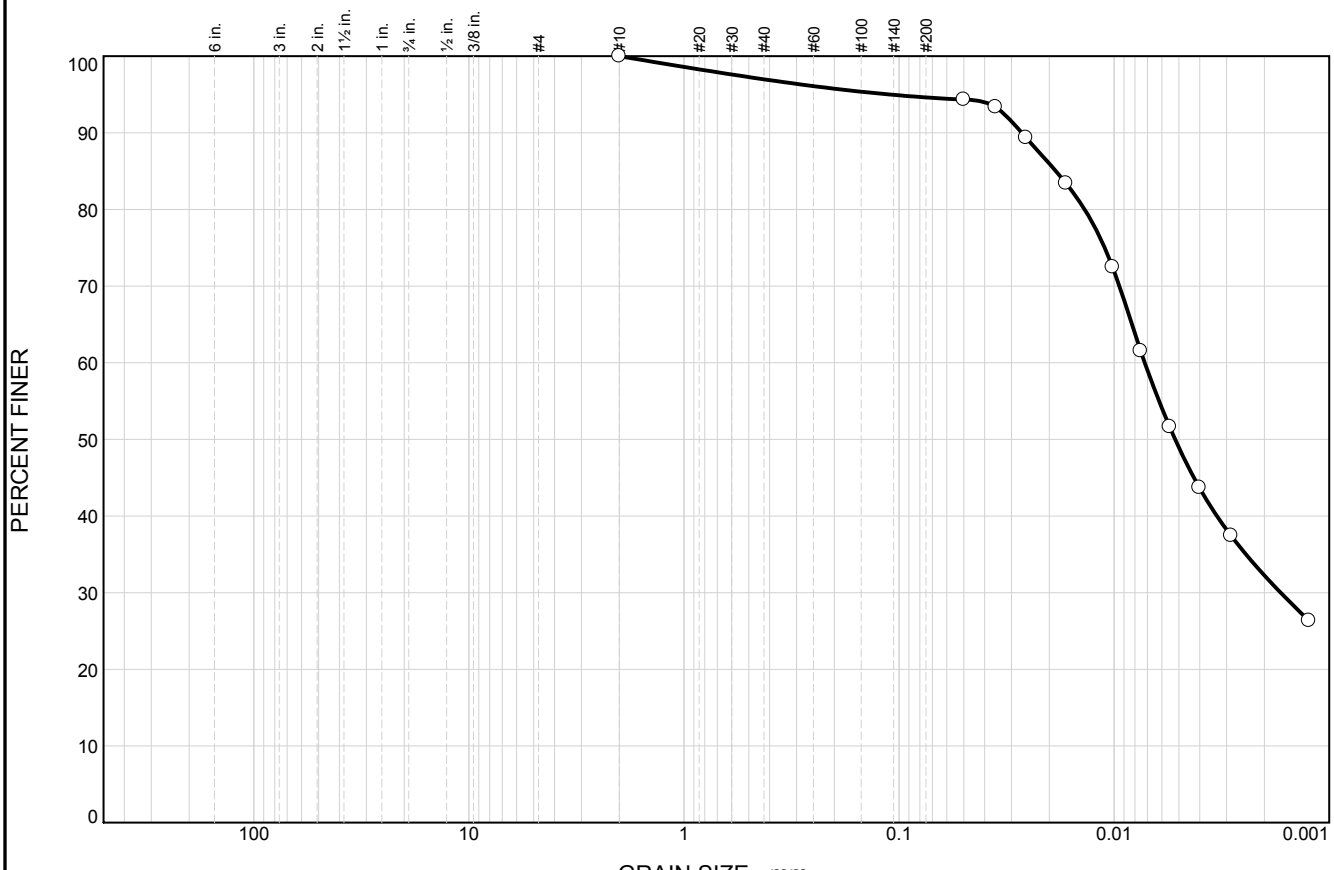
SAMPLE IDENTIFICATION			Soil Group (USCS System)	GRAIN SIZE DISTRIBUTION				PLASTICITY				Specific Gravity	Moisture Content (%)	Unit Weight (pcf)	Compressive Strength (tsf)	Organic Content (%)
Boring #	Sample #	Depth (ft)		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Liquidity Index)					
	S-7	18.5-20.0	ML	-	-	-	-	22	21	1	7.8	-	28.8	-	-	-
B181.9-1	S-2	2.0-4.0	-	-	-	-	-	-	-	-	-	-	31.2	94.0	-	-
	S-3	4.0-6.0	-	-	-	-	-	-	-	-	-	-	28.8	-	-	-
	S-5	8.0-10.0	-	0.0	0.1	99.9		-	-	-	-	-	24.4	-	-	-
	S-6	13.5-15.0	-	0.0	5.7	71.1	23.2	-	-	-	-	2.73	26.9	-	-	-
	S-7	18.5-20.0	CL-ML	0.0	2.5	54.6	42.9	28	21	7	1.3	2.76	29.9	-	-	-
	S-8	23.5-25.0														
A182.4-1	S-2	2.0-4.0	SM	29.4	32.5	38.1		-	-	-	-	-	14.9	-	-	-
	S-5	8.0-10.0	-	-	-	-	-	-	-	-	-	-	9.9	-	-	-
B182.9-1	S-1	0.0-2.0	-	-	-	-	-	-	-	-	-	-	13.2	-	-	21.8
	S-2	2.0-4.0	-	-	-	-	-	-	-	-	-	-	25.2	-	-	-
	S-4	6.0-8.0	-	0.0	5.4	45.7	48.9	-	-	-	-	2.77	34.9	-	-	-
	S-6	13.5-15.0	-	-	-	-	-	-	-	-	-		33.2	-	-	-

SUMMARY OF LABORATORY TEST DATA

Project Name: TDI Champlain Hudson Power Express – CSX
Client Name: Transmission Developers, Inc.
TRC Project #: 195651

SAMPLE IDENTIFICATION			Soil Group (USCS System)	GRAIN SIZE DISTRIBUTION				PLASTICITY				Specific Gravity	Moisture Content (%)	Unit Weight (pcf)	Compressive Strength (tsf)	Organic Content (%)
Boring #	Sample #	Depth (ft)		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Liquidity Index)					
	S-7	18.5-20.0	-	0.0	0.1	38.2	61.7	-	-	-	-	2.75	29.1	-	-	-
	S-8	23.5-25.0														
B183.2-1	S-1	0.0-2.0	-	-	-	-	-	-	-	-	-	-	27.4	-	-	54.6
	S-2	2.0-4.0														
	S-4	6.0-8.0	-	-	-	-	-	-	-	-	-	-	29.0	-	-	8.2
	S-5	8.0-10.0	CL-ML	6.6		52.7	40.7	24	19	5	1.7	2.76	27.5	-	-	-
	S-6	13.5-15.0														
B183.8-1	S-1	0.0-2.0	-	-	-	-	-	-	-	-	-	-	25.8	-	-	8.5
	S-2	2.0-4.0	ML	4.1	29.9	66.0		-	-	-	-	-	27.4	-	-	-
	S-3	4.0-6.0	SM	14.1	64.6	21.3		-	-	-	-	-	17.9	-	-	-
	S-4	6.0-8.0	-	-	-	-	-	-	-	-	-	-	11.6	-	-	-

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	3.0	2.4	45.7	48.9

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.0187	0.0072	0.0052	0.0017				

Material Description	USCS	AASHTO
○ BROWN SILT AND CLAY, TR M/F SAND		

Project No. 195651 **Client:** TRANSMISSION DEVELOPERS INC.
Project: TDI CHAMPLAIN HUDSON POWER EXPRESS - CSX

○ **Source of Sample:** B182.9-1 **Depth:** 6.0-8.0 FT **Sample Number:** S-4

Remarks:
○SAMPLE DESCRIPTION BASED ON VISUAL IDENTIFICATION AND LABORATORY ANALYSIS

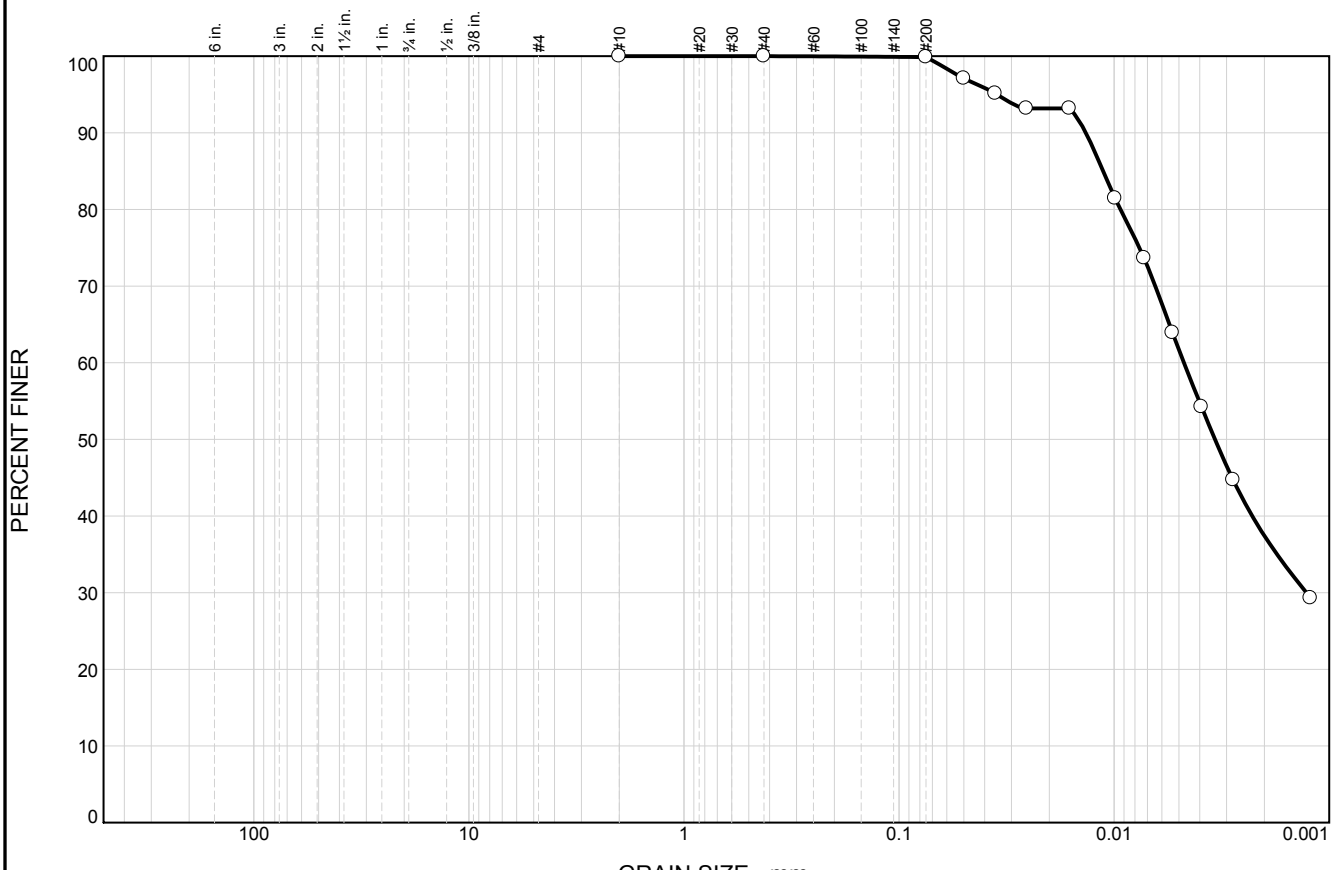
TRC Engineers, Inc.

Mt. Laurel, NJ

Figure 33

Tested By: TBT 12/11/13 **Checked By:** JPB 03/12/13

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	0.0	0.1	38.2	61.7

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.0112	0.0047	0.0034	0.0013				

Material Description	USCS	AASHTO
○ GRAY SILTY CLAY		

Project No. 195651 **Client:** TRANSMISSION DEVELOPERS INC.

Project: TDI CHAMPLAIN HUDSON POWER EXPRESS - CSX

○ **Sample Source:** B182.9-1 **Depth:** 18.5-25.0 FT **Sample No.:** S-7 & S-8

Remarks:
○SAMPLE DESCRIPTION BASED ON VISUAL IDENTIFICATION AND LABORATORY ANALYSIS

TRC Engineers, Inc.

Mt. Laurel, NJ

Figure 34

Tested By: TBT 12/11/12 **Checked By:** JPB 03/12/13

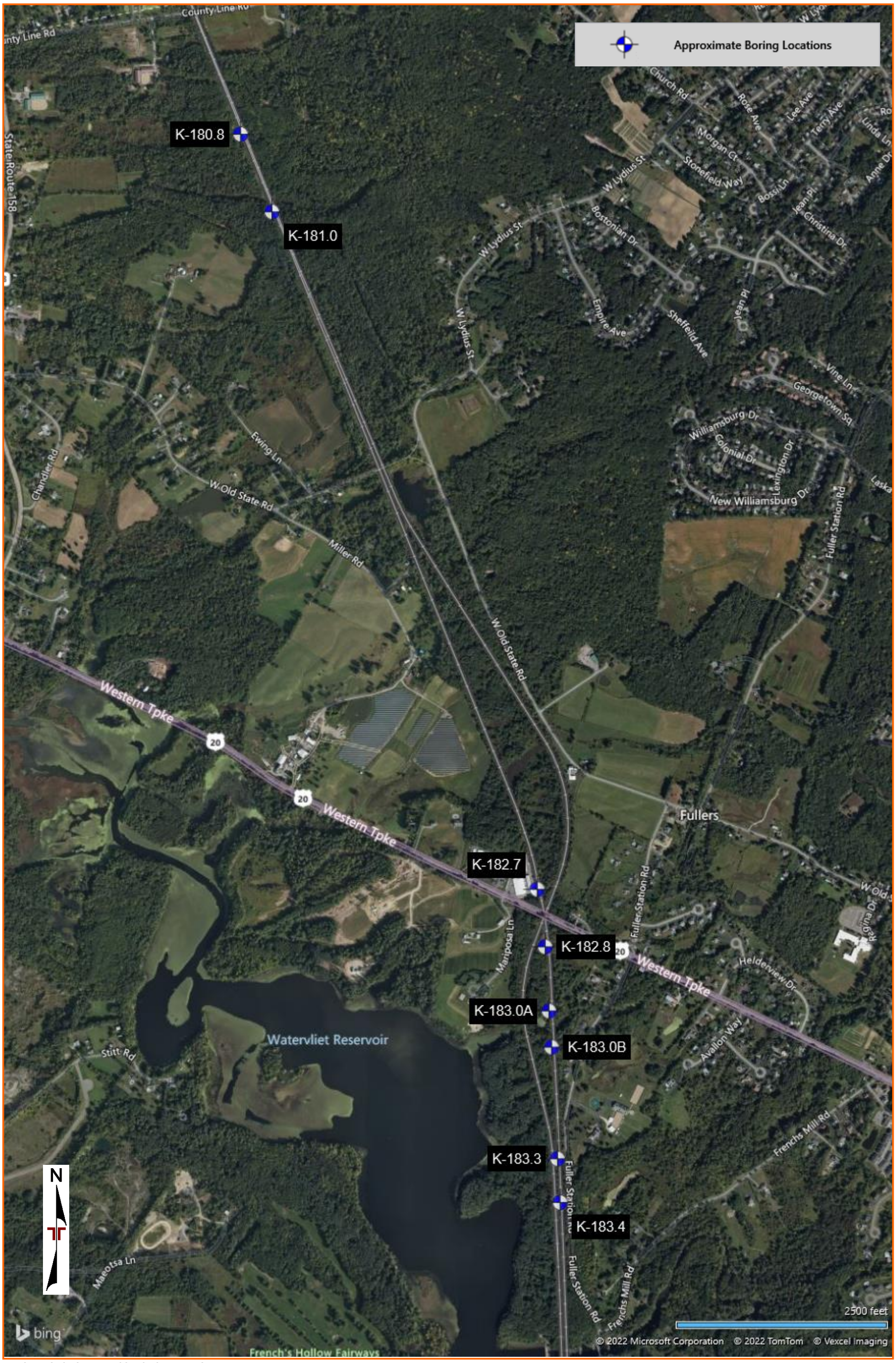


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

AERIAL PHOTOGRAPHY PROVIDED BY MICROSOFT BING MAPS

BORING LOG NO. K-182.7

PROJECT: Champlain-Hudson Power Express Package 5

CLIENT: Kiewit Engineering (NY) Corp.

SITE: Champlain to Hudson HDD Crossings Schenectady, NY

LOCATION See Exploration Plan

Latitude: 42.726576° Longitude: -73.960879°

Surface Elev.: 292.27 (Ft.)

DEPTH	ELEVATION (Ft.)	Description	DEPTH (Ft.)	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
2.0	290.5	**FILL - POORLY GRADED GRAVEL**, ballast material, black, loose		1	2-4-3-4 N=7			
8.0	284.5	**SILT AND CLAY (CL-ML)**, brown, medium stiff to stiff	5	18	6-5-3-5 N=8			
				21	5-5-6-6 N=11			
				24	4-3-5-5 N=8			
10.0	282.5	**SILT (ML)**, brown, stiff		20	4-6-8-10 N=14	24.4	NP	98
15.0	277.5	**SILT AND CLAY (CL-ML)**, brown, medium stiff	10	15	3-3-3-5 N=6			
		SILT AND CLAY (CL-ML), gray, very soft to medium stiff	15	9	1-1-2-2 N=3			
			20	17	2-2-1-2 N=3			
			25	24	3-3-5-8 N=8 3" Split spoon with rings	36.3	35-22-13	94

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3 1/4 HSA

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by Kiewit.

Notes:

Logged by: MO
Hammer Efficency Summary:
Energy Transfer Ratio: 84.7% +/-5.7%
Hammer Efficiency Correction (CE):1.41
WOH = Weight of Hammer

WATER LEVEL OBSERVATIONS

No measurable groundwater prior to grouting

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 02-01-2022 | Boring Completed: 02-01-2022

Drill Rig: Diedrich D-50 | Driller: B. Duffey

Project No.: JB215256B

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JB215256B CHAMPLAIN-HUDSON.GPJ TERRACON_DATATEMPLATE.GDT 4/4/22

BORING LOG NO. K-182.7

PROJECT: Champlain-Hudson Power Express Package 5

CLIENT: Kiewit Engineering (NY) Corp.

SITE: Champlain to Hudson HDD Crossings Schenectady, NY

LOCATION See Exploration Plan

Latitude: 42.726576° Longitude: -73.960879°

Surface Elev.: 292.27 (Ft.)

DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)
SILT AND CLAY (CL-ML), gray, very soft to medium stiff *(continued)*						
		30	X	24	WOH-3-3-2 N=6	
		35	X	24	WOH-WOH-WOH-4	30.7
		40	X	24	WOH-WOH-WOH-3	
		45	X	24	WOH-WOH-WOH-4	36.2
			X	24	WOH-WOH-WOH-5	
50.0	242.5	50				
Boring Terminated at 50 Feet						

GRAPHIC LOG | WATER LEVEL OBSERVATIONS | LABORATORY HP (tsf) | ATTERBERG LIMITS LL-PL-PI | PERCENT FINES

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3 1/4 HSA

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by Kiewit.

Notes:

Logged by: MO
Hammer Efficency Summary:
Energy Transfer Ratio: 84.7% +/-5.7%
Hammer Efficiency Correction (CE):1.41
WOH = Weight of Hammer

WATER LEVEL OBSERVATIONS

No measurable groundwater prior to grouting

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 02-01-2022 | Boring Completed: 02-01-2022

Drill Rig: Diedrich D-50 | Driller: B. Duffey

Project No.: JB215256B

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JB215256B CHAMPLAIN-HUDSON.GPJ TERRACON_DATATEMPLATE.GDT 4/4/22

BORING LOG NO. K-182.8

PROJECT: Champlain-Hudson Power Express Package 5

CLIENT: Kiewit Engineering (NY) Corp.

SITE: Champlain to Hudson HDD Crossings Schenectady, NY

LOCATION See Exploration Plan

Latitude: 42.724705° Longitude: -73.960508°

Surface Elev.: 290.87 (Ft.)

DEPTH	ELEVATION (Ft.)	Description
2.0	289	**FILL - CINDERS AND FLY ASH**, black, dense
10.0	281	**SILT AND CLAY (CL-ML)**, trace fine sand, brown, stiff to hard
		SILT AND CLAY (CL-ML), gray, very soft to soft

DEPTH (Ft.)	RECOVERY (In.)	FIELD TEST RESULTS	LABORATORY HP (tsf)	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	19	5-20-14-12 N=34				
	19	3-4-4-5 N=8				
5	24	5-4-5-7 N=9				
	23	8-11-13-23 N=24				
	21	11-23-13-12 N=36		30.8	32-23-9	93
10	15	4-2-1-3 N=3	.5 (HP)			
15	24	WOH-WOH-WOH-2	.6 (HP)			
20	24	WOH-WOH-WOH-WOH	.5 (HP)			
25	24	WOH-WOH-3-2 N=3 3" Split Spoon With Ring Samplers		34.5	36-22-14	92

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3 1/4 HSA

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by Kiewit.

Notes:

Logged by: MO
Hammer Efficency Summary:
Energy Transfer Ratio: 84.7% +/-5.7%
Hammer Efficiency Correction (CE):1.41
WOH = Weight of Hammer

WATER LEVEL OBSERVATIONS

No measurable groundwater prior to grouting

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 02-03-2022 | Boring Completed: 02-03-2022

Drill Rig: Diedrich D-50 | Driller: B. Duffey

Project No.: JB215256B

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JB215256B CHAMPLAIN-HUDSON.GPJ TERRACON_DATATEMPLATE.GDT 4/4/22

BORING LOG NO. K-182.8

PROJECT: Champlain-Hudson Power Express Package 5

CLIENT: Kiewit Engineering (NY) Corp.

SITE: Champlain to Hudson HDD Crossings Schenectady, NY

LOCATION See Exploration Plan

Latitude: 42.724705° Longitude: -73.960508°

Surface Elev.: 290.87 (Ft.)

DEPTH ELEVATION (Ft.)

GRAPHIC LOG	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	LABORATORY HP (tsf)	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
SILT AND CLAY (CL-ML), gray, very soft to soft *(continued)*									
	30			24	WOH-WOH-WOH-9	.5 (HP)			
	35			24	WOH-WOH-WOH-4	.6 (HP)	38.0		
	40			24	WOH-WOH-WOH-5	.75 (HP)			
	45			24	WOH-WOH-WOH-5	.75 (HP)	33.8		
				24	WOH-WOH-WOH-5	.75 (HP)			
50.0 241	50								
Boring Terminated at 50 Feet									

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3 1/4 HSA

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by Kiewit.

Notes:

Logged by: MO
Hammer Efficency Summary:
Energy Transfer Ratio: 84.7% +/-5.7%
Hammer Efficiency Correction (CE):1.41
WOH = Weight of Hammer

WATER LEVEL OBSERVATIONS

No measurable groundwater prior to grouting

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 02-03-2022 | Boring Completed: 02-03-2022

Drill Rig: Diedrich D-50 | Driller: B. Duffey

Project No.: JB215256B

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JB215256B CHAMPLAIN-HUDSON.GPJ TERRACON_DATATEMPLATE.GDT 4/4/22

BORING LOG NO. K-183.0A

PROJECT: Champlain-Hudson Power Express Package 5

CLIENT: Kiewit Engineering (NY) Corp.

SITE: Champlain to Hudson HDD Crossings Schenectady, NY

LOCATION See Exploration Plan

Latitude: 42.722568° Longitude: -73.960252°

Surface Elev.: 291.78 (Ft.)

DEPTH	ELEVATION (Ft.)	Description	DEPTH (Ft.)	RECOVERY (In.)	FIELD TEST RESULTS	LABORATORY HP (tsf)	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		FILL - CINDERS, FLY ASH AND BALLAST, black and gray, very dense		24	25-43-45-25 N=88				
3.0	289			14	16-10-12-12 N=22				
		FILL - WELL GRADED SAND WITH CLAY, trace gravel, brown, medium dense	5	12	6-6-5-6 N=11				
6.0	286								
		SILT AND CLAY (CL-ML), brown, very soft to stiff		16	4-4-4-8 N=8	1.75 (HP)	23.6	28-19-9	59
				13	9-7-6-5 N=13	1.75 (HP)			
			10	18	1-1-2-3 N=3	1.0 (HP)			
			15	20	2-3-2-2 N=5	1.75 (HP)			
		grades sandy	20	24	4-5-6-10 N=11 3" Split Spoon With Ring Samplers		30.3	32-25-7	57
			25	24	1-1-1-3 N=2	.5 (HP)			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3 1/4 HSA

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by Kiewit.

Notes:

Logged by: MO
Hammer Efficency Summary:
Energy Transfer Ratio: 84.7% +/-5.7%
Hammer Efficiency Correction (CE):1.41
WOH = Weight of Hammer

WATER LEVEL OBSERVATIONS

No measurable groundwater prior to grouting

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 02-08-2022 | Boring Completed: 02-08-2022

Drill Rig: Diedrich D-50 | Driller: B. Duffey

Project No.: JB215256B

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JB215256B CHAMPLAIN-HUDSON.GPJ TERRACON_DATATEMPLATE.GDT 4/4/22

BORING LOG NO. K-183.0A

PROJECT: Champlain-Hudson Power Express Package 5

CLIENT: Kiewit Engineering (NY) Corp.

SITE: Champlain to Hudson HDD Crossings Schenectady, NY

LOCATION See Exploration Plan

Latitude: 42.722568° Longitude: -73.960252°

Surface Elev.: 291.78 (Ft.)

DEPTH	ELEVATION (Ft.)	DESCRIPTION	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	LABORATORY HP (tsf)	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		SILT AND CLAY (CL-ML), brown, very soft to stiff *(continued)*									
30.0	262	**SILT AND CLAY (CL-ML)**, gray, very soft to stiff									
			30		X	24	WOH-WOH-5-4 N=5	.5 (HP)			
		grades with sand	35		X	24	WOH-WOH WOH-5	.5 (HP)	36.8	34-20-14	76
			40		X	24	WOH-WOH -WOH-5	.75 (HP)			
			45		X	24	WOH-WOH -WOH-6	.75 (HP)			
			50		X	24	WOH-WOH-4-5 N=4	.5 (HP)			
			55		X	24	WOH-WOH-2-3 N=2	.5 (HP)	33.2		

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3 1/4 HSA

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by Kiewit.

Notes:

Logged by: MO
Hammer Efficency Summary:
Energy Transfer Ratio: 84.7% +/-5.7%
Hammer Efficiency Correction (CE):1.41
WOH = Weight of Hammer

WATER LEVEL OBSERVATIONS

No measurable groundwater prior to grouting

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 02-08-2022 | Boring Completed: 02-08-2022

Drill Rig: Diedrich D-50 | Driller: B. Duffey

Project No.: JB215256B

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JB215256B CHAMPLAIN-HUDSON.GPJ TERRACON_DATATEMPLATE.GDT 4/4/22

BORING LOG NO. K-183.0A

PROJECT: Champlain-Hudson Power Express Package 5

CLIENT: Kiewit Engineering (NY) Corp.

SITE: Champlain to Hudson HDD Crossings Schenectady, NY

LOCATION See Exploration Plan

Latitude: 42.722568° Longitude: -73.960252°

Surface Elev.: 291.78 (Ft.)

DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	LABORATORY HP (tsf)
SILT AND CLAY (CL-ML), gray, very soft to stiff *(continued)*						
		60		24	WOH-4-5-6 N=9	1 (HP)
		65		24	WOH-3-6-8 N=9	1 (HP)
66.0	226					
Boring Terminated at 66 Feet						

GRAPHIC LOG | WATER LEVEL OBSERVATIONS | WATER CONTENT (%) | ATTERBERG LIMITS LL-PL-PI | PERCENT FINES

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3 1/4 HSA

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by Kiewit.

Notes:

Logged by: MO
Hammer Efficency Summary:
Energy Transfer Ratio: 84.7% +/-5.7%
Hammer Efficiency Correction (CE):1.41
WOH = Weight of Hammer

WATER LEVEL OBSERVATIONS

No measurable groundwater prior to grouting

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 02-08-2022 | Boring Completed: 02-08-2022

Drill Rig: Diedrich D-50 | Driller: B. Duffey

Project No.: JB215256B

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JB215256B CHAMPLAIN-HUDSON.GPJ TERRACON_DATATEMPLATE.GDT 4/4/22

BORING LOG NO. K-183.0B

PROJECT: Champlain-Hudson Power Express Package 5

CLIENT: Kiewit Engineering (NY) Corp.

SITE: Champlain to Hudson HDD Crossings Schenectady, NY

LOCATION See Exploration Plan

Latitude: 42.721465° Longitude: -73.960187°

Surface Elev.: 292.63 (Ft.)

DEPTH	ELEVATION (Ft.)	Description	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	LABORATORY HP (tsf)	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		FILL - CINDERS, FLY ASH AND BALLAST, black and gray, very dense				24	33-135-52-40 N=187				
2.0	290.5	**FILL - WELL GRADED SAND WITH GRAVEL**, brown, dense				14	19-30-2-15 N=32				
4.0	288.5	**SILT AND CLAY (CL-ML)**, brown, very stiff	5	▽		16	8-8-10-15 N=18				
		>9" sand seam noted				23	6-8-10-13 N=18				
8.0	284.5	**SILT (ML)**, brown, very stiff				22	7-8-9-8 N=17	3.25 (HP)	23.9	NP	85
10.0	282.5	**grades with sand**	10								
		SILT AND CLAY (CL-ML), brown, very soft to soft				21	2-1-2-1 N=3	1.75 (HP)			
			15			24	1-WOH-WOH-2	.5 (HP)			
			20			24	3-1-2-1 N=3 3" Splt Spooon With Ring Samplers		31.7	29-18-11	78
25.0	267.5	**SILT AND CLAY (CL-ML)**, gray, very soft to medium stiff	25			24	4-4-1-1 N=5	.5 (HP)			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3 1/4 HSA

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by Kiewit.

Notes:

Logged by: MO
Hammer Efficency Summary:
Energy Transfer Ratio: 84.7% +/-5.7%
Hammer Efficiency Correction (CE):1.41
WOH = Weight of Hammer

WATER LEVEL OBSERVATIONS

▽ *While drilling*

No measurable groundwater prior to grouting

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 02-07-2022	Boring Completed: 02-07-2022
Drill Rig: Diedrich D-50	Driller: B. Duffey
Project No.: JB215256B	

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JB215256B CHAMPLAIN-HUDSON.GPJ TERRACON_DATATEMPLATE.GDT 4/4/22

BORING LOG NO. K-183.0B

PROJECT: Champlain-Hudson Power Express Package 5

CLIENT: Kiewit Engineering (NY) Corp.

SITE: Champlain to Hudson HDD Crossings Schenectady, NY

LOCATION See Exploration Plan

Latitude: 42.721465° Longitude: -73.960187°

Surface Elev.: 292.63 (Ft.)

DEPTH ELEVATION (Ft.)

GRAPHIC LOG	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	LABORATORY HP (tsf)	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
SILT AND CLAY (CL-ML), gray, very soft to medium stiff *(continued)*									
	30			24	WOH-3-4-6	.5 (HP)			
	35			24	WOH-WOH-WOH-4	.75 (HP)	35.6	33-20-13	90
	40			24	WOH-WOH-WOH-3	.5 (HP)			
	45			24	WOH-WOH-WOH-3	.5 (HP)			
	50			24	WOH-WOH-WOH-3	.5 (HP)	29.6		
	55				WOH-WOH-	.75			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3 1/4 HSA

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by Kiewit.

Notes:

Logged by: MO
Hammer Efficency Summary:
Energy Transfer Ratio: 84.7% +/-5.7%
Hammer Efficiency Correction (CE):1.41
WOH = Weight of Hammer

WATER LEVEL OBSERVATIONS

While drilling

No measurable groundwater prior to grouting

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 02-07-2022 | Boring Completed: 02-07-2022

Drill Rig: Diedrich D-50 | Driller: B. Duffey

Project No.: JB215256B

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JB215256B CHAMPLAIN-HUDSON.GPJ TERRACON_DATATEMPLATE.GDT 4/4/22

BORING LOG NO. K-183.0B

PROJECT: Champlain-Hudson Power Express Package 5

CLIENT: Kiewit Engineering (NY) Corp.

SITE: Champlain to Hudson HDD Crossings Schenectady, NY

LOCATION See Exploration Plan

Latitude: 42.721465° Longitude: -73.960187°

Surface Elev.: 292.63 (Ft.)

DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	LABORATORY HP (tsf)
	SILT AND CLAY (CL-ML), gray, very soft to medium stiff *(continued)*			24	WOH-3	(HP)
		60		21	WOH-4-6-7 N=10	.75 (HP)
		65		21	WOH-6-8-6-21 N=14	1.0 (HP)
66.0	226.5					
	Boring Terminated at 66 Feet					

GRAPHIC LOG | WATER LEVEL OBSERVATIONS | WATER CONTENT (%) | ATTERBERG LIMITS LL-PL-PI | PERCENT FINES

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3 1/4 HSA

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by Kiewit.

Notes:

Logged by: MO
Hammer Efficency Summary:
Energy Transfer Ratio: 84.7% +/-5.7%
Hammer Efficiency Correction (CE):1.41
WOH = Weight of Hammer

WATER LEVEL OBSERVATIONS

While drilling

No measurable groundwater prior to grouting

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 02-07-2022 | Boring Completed: 02-07-2022

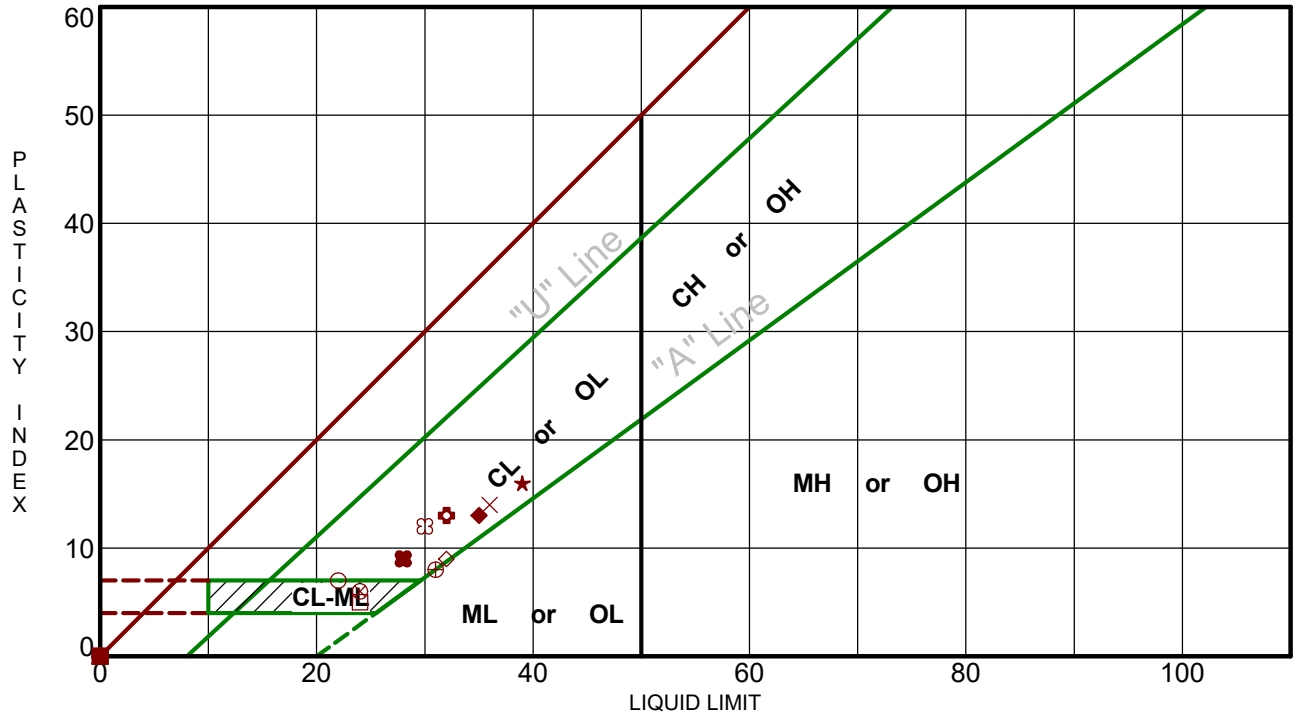
Drill Rig: Diedrich D-50 | Driller: B. Duffey

Project No.: JB215256B

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JB215256B CHAMPLAIN-HUDSON.GPJ TERRACON_DATATEMPLATE.GDT 4/4/22

ATTERBERG LIMITS RESULTS

ASTM D4318



Boring ID		Depth (Ft)	LL	PL	PI	Fines	USCS	Description
●	K-177.2	24 - 26	NP	NP	NP	6.8	SP-SM	POORLY GRADED SAND with SILT and GRAVEL
⊠	K-178.1	15 - 17	NP	NP	NP	68.2	ML	SANDY SILT
▲	K-178.1	28 - 30	NP	NP	NP	91.5	ML	SILT
★	K-178.7A	25 - 27	39	23	16	92.8	CL	LEAN CLAY
⊙	K-178.7B	20 - 22	NP	NP	NP	60.8	ML	SANDY SILT
✿	K-178.7B	30 - 32	32	19	13	96.8	CL	LEAN CLAY
○	K-178.8	29 - 31	22	15	7	97.6	CL-ML	SILTY CLAY
△	K-178.96	20 - 22	NP	NP	NP	93.6	ML	SILT
⊗	K-178.96	29 - 31	24	18	6	94.3	CL-ML	SILTY CLAY
⊕	K-179.6	6 - 8	31	23	8	90.5	ML	SILT
□	K-179.6	14 - 16	24	19	5	84.6	CL-ML	SILTY CLAY with SAND
⊗	K-180.8	14 - 16	NP	NP	NP	97.0	ML	SILT
◕	K-180.8	24 - 26	NP	NP	NP	99.0	ML	SILT
☆	K-181.0	8 - 10	NP	NP	NP	96.9	ML	SILT
✿	K-181.0	25 - 27	30	18	12	90.8	CL	LEAN CLAY
■	K-182.7	8 - 10	NP	NP	NP	97.6	ML	SILT
◆	K-182.7	24 - 26	35	22	13	94.4	CL	LEAN CLAY
◇	K-182.8	8 - 10	32	23	9	93.3	CL	LEAN CLAY
×	K-182.8	25 - 27	36	22	14	92.3	CL	LEAN CLAY
✖	K-183.0A	6 - 8	28	19	9	58.7	CL	SANDY LEAN CLAY

PROJECT: Champlain-Hudson Power Express Package 5

SITE: Champlain to Hudson HDD Crossings Schenectady, NY

Terracon
30 Corporate Cir Ste 201
Albany, NY

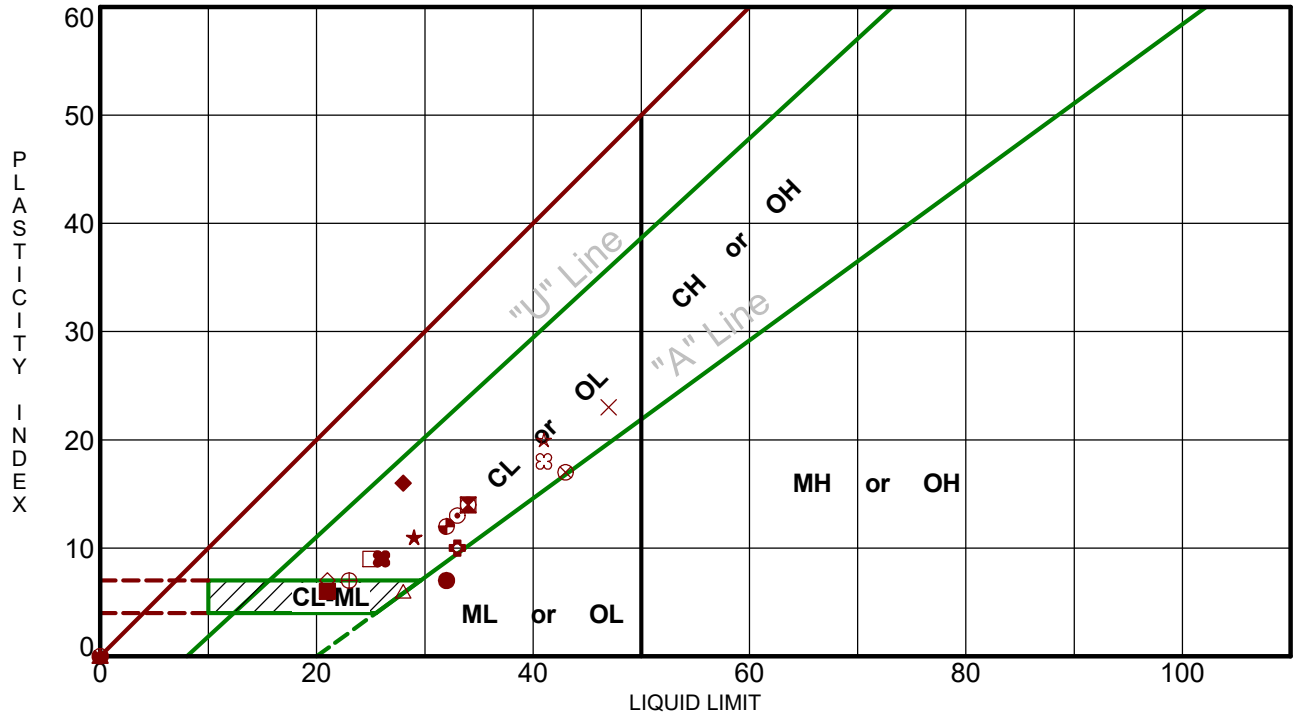
PROJECT NUMBER: JB215256B

CLIENT: Kiewit Engineering (NY) Corp.

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. ATTERBERG LIMITS JB215256B CHAMPLAIN-HUDSON.GPJ TERRACON_DATATEMPLATE.GDT 4/4/22

ATTERBERG LIMITS RESULTS

ASTM D4318



Boring ID		Depth (Ft)	LL	PL	PI	Fines	USCS	Description
●	K-183.0A	19 - 21	32	25	7	57.3	ML	SANDY SILT
⊠	K-183.0A	34 - 36	34	20	14	76.1	CL	LEAN CLAY with SAND
▲	K-183.0B	8 - 10	NP	NP	NP	84.8	ML	SILT with SAND
★	K-183.0B	20 - 22	29	18	11	78.2	CL	LEAN CLAY with SAND
⊙	K-183.0B	35 - 37	33	20	13	89.9	CL	LEAN CLAY
✿	K-183.3	10 - 12	33	23	10	73.5	CL	LEAN CLAY with SAND
○	K-183.3	24 - 26	34	20	14	80.5	CL	LEAN CLAY with SAND
△	K-183.4	15 - 17	28	22	6	84.9	CL-ML	SILTY CLAY with SAND
⊗	K-183.4	23 - 25	43	26	17	72.5	CL	LEAN CLAY with SAND
⊕	K-184.5	15 - 17	23	16	7	54.0	CL-ML	SANDY SILTY CLAY
□	K-184.5	30 - 32	25	16	9	45.0	SC	CLAYEY SAND with GRAVEL
⊛	K-184.7	10 - 12	NP	NP	NP	5.0	SP	POORLY GRADED SAND with GRAVEL
◕	K-185.6	8 - 10	32	20	12		CL	LEAN CLAY
☆	K-192.3	10 - 12	41	21	20	80.5	CL	LEAN CLAY with SAND
✿	K-192.3	38 - 40	41	23	18	81.6	CL	LEAN CLAY with SAND
■	K-193.5	12 - 14	21	15	6	55.7	CL-ML	SANDY SILTY CLAY
◆	K-193.5	20 - 22	28	12	16	15.3	GC	CLAYEY GRAVEL with SAND
◇	K-193.5	33 - 34	21	14	7	24.0	SC-SM	SILTY, CLAYEY SAND with GRAVEL
×	K-193.6	8 - 10	47	24	23	78.3	CL	LEAN CLAY with SAND
✖	K-193.6	21 - 23	26	17	9	94.5	CL	LEAN CLAY

PROJECT: Champlain-Hudson Power Express Package 5

SITE: Champlain to Hudson HDD Crossings Schenectady, NY

Terracon
30 Corporate Cir Ste 201
Albany, NY

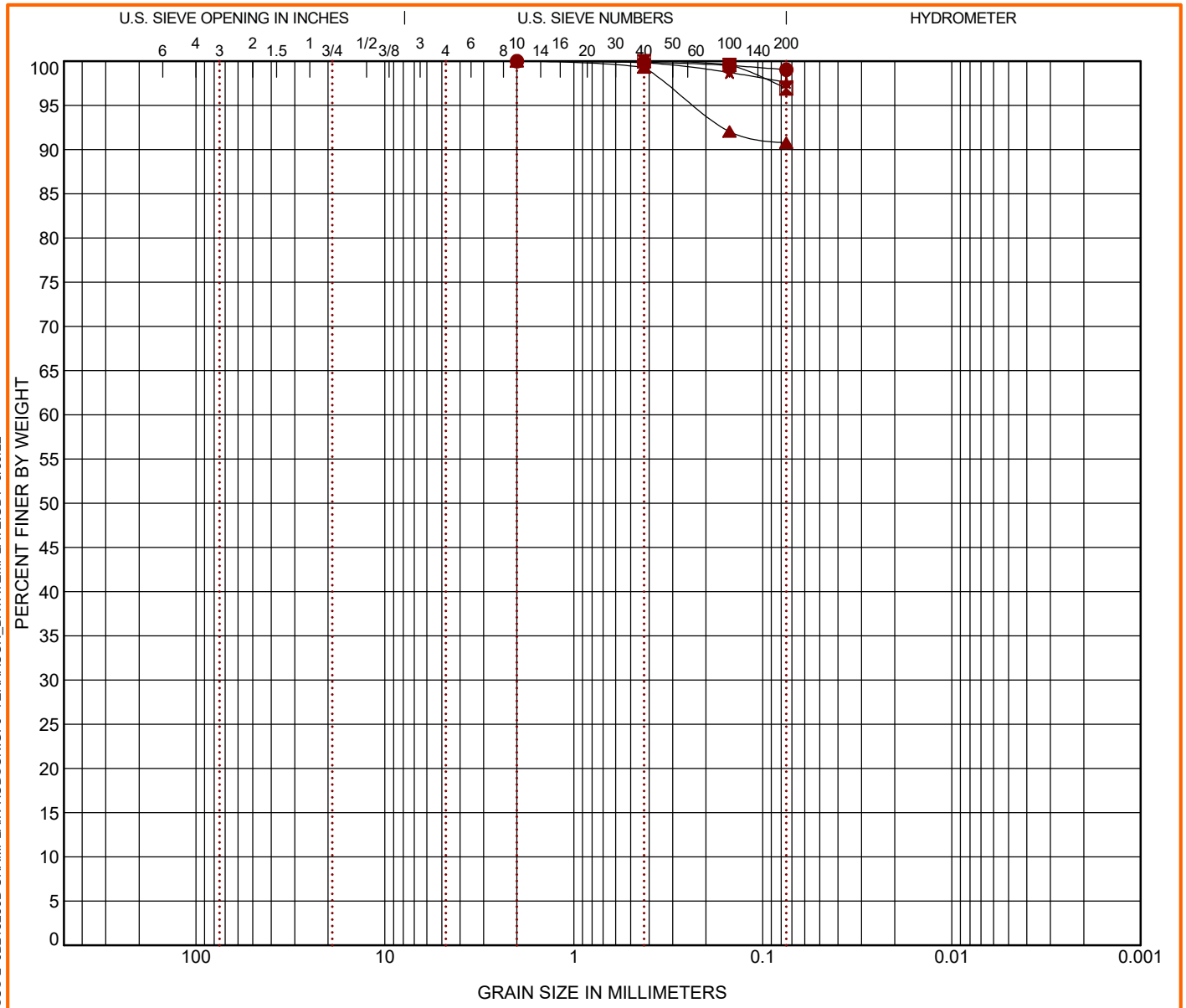
PROJECT NUMBER: JB215256B

CLIENT: Kiewit Engineering (NY) Corp.

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. ATTERBERG LIMITS JB215256B CHAMPLAIN-HUDSON.GPJ TERRACON_DATATEMPLATE.GDT 4/4/22

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring ID	Depth (Ft)	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
●	K-180.8	24 - 26	SILT (ML)	26.8	NP	NP	NP		
⊠	K-181.0	8 - 10	SILT (ML)	23.9	NP	NP	NP		
▲	K-181.0	25 - 27	LEAN CLAY (CL)	34.6	30	18	12		
★	K-182.7	8 - 10	SILT (ML)	24.4	NP	NP	NP		

	Boring ID	Depth (Ft)	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
●	K-180.8	24 - 26	2				0.0	0.0	1.0		99.0	
⊠	K-181.0	8 - 10	0.425				0.0	0.0	3.1		96.9	
▲	K-181.0	25 - 27	2				0.0	0.0	9.2		90.8	
★	K-182.7	8 - 10	2				0.0	0.0	2.4		97.6	

PROJECT: Champlain-Hudson Power Express Package 5

SITE: Champlain to Hudson HDD Crossings Schenectady, NY

Terracon
30 Corporate Cir Ste 201
Albany, NY

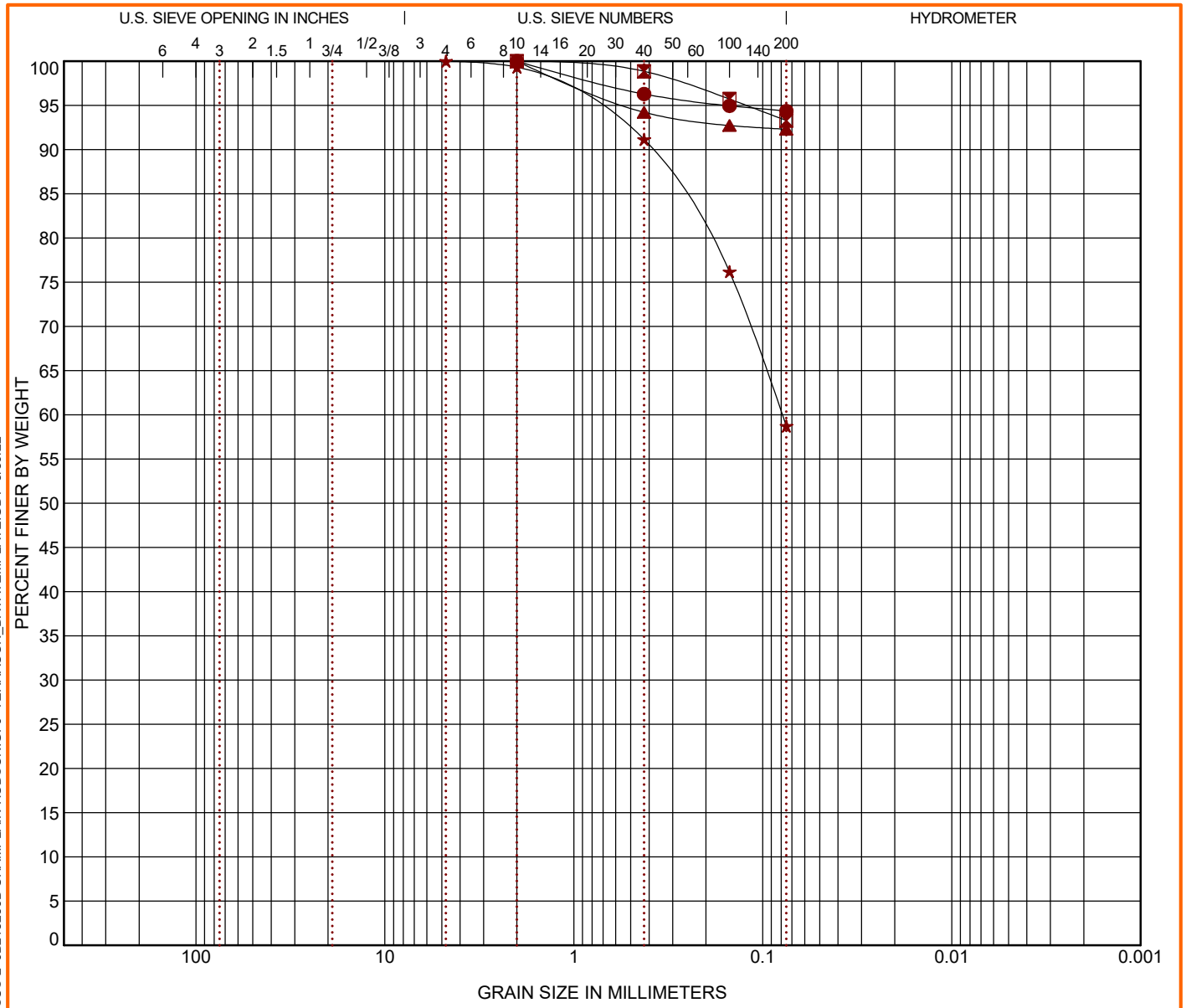
PROJECT NUMBER: JB215256B

CLIENT: Kiewit Engineering (NY) Corp.

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS-2 JB215256B CHAMPLAIN-HUDSON.GPJ TERRACON_DATATEMPLATE.GDT 3/30/22

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring ID	Depth (Ft)	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
●	K-182.7	24 - 26	LEAN CLAY (CL)	36.3	35	22	13		
⊠	K-182.8	8 - 10	LEAN CLAY (CL)	30.8	32	23	9		
▲	K-182.8	25 - 27	LEAN CLAY (CL)	34.5	36	22	14		
★	K-183.0A	6 - 8	SANDY LEAN CLAY (CL)	23.6	28	19	9		

	Boring ID	Depth (Ft)	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
●	K-182.7	24 - 26	2				0.0	0.0	5.6		94.4	
⊠	K-182.8	8 - 10	2				0.0	0.0	6.7		93.3	
▲	K-182.8	25 - 27	2				0.0	0.0	7.7		92.3	
★	K-183.0A	6 - 8	4.75	0.079			0.0	0.0	41.3		58.7	

PROJECT: Champlain-Hudson Power Express Package 5

SITE: Champlain to Hudson HDD Crossings Schenectady, NY

Terracon
30 Corporate Cir Ste 201
Albany, NY

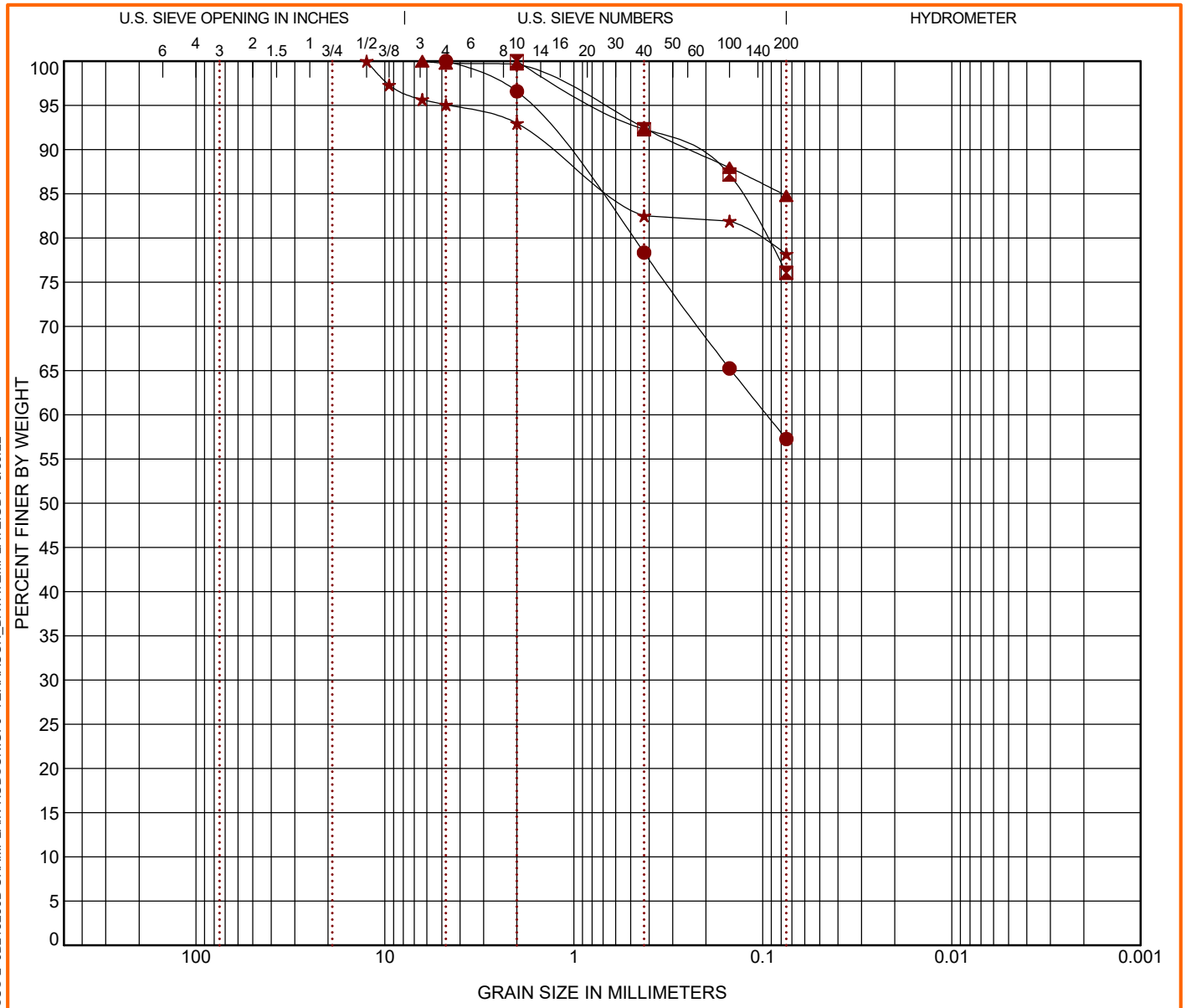
PROJECT NUMBER: JB215256B

CLIENT: Kiewit Engineering (NY) Corp.

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS-2 JB215256B CHAMPLAIN-HUDSON.GPJ TERRACON_DATATEMPLATE.GDT 3/30/22

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring ID	Depth (Ft)	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
●	K-183.0A	19 - 21	SANDY SILT (ML)	30.3	32	25	7		
⊠	K-183.0A	34 - 36	LEAN CLAY with SAND (CL)	36.8	34	20	14		
▲	K-183.0B	8 - 10	SILT with SAND (ML)	23.9	NP	NP	NP		
★	K-183.0B	20 - 22	LEAN CLAY with SAND (CL)	31.7	29	18	11		

	Boring ID	Depth (Ft)	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
●	K-183.0A	19 - 21	4.75	0.095			0.0	0.0	42.7		57.3	
⊠	K-183.0A	34 - 36	2				0.0	0.0	23.9		76.1	
▲	K-183.0B	8 - 10	6.35				0.0	0.2	15.0		84.8	
★	K-183.0B	20 - 22	12.5				0.0	4.9	16.9		78.2	

PROJECT: Champlain-Hudson Power Express Package 5

SITE: Champlain to Hudson HDD Crossings Schenectady, NY

Terracon
30 Corporate Cir Ste 201
Albany, NY

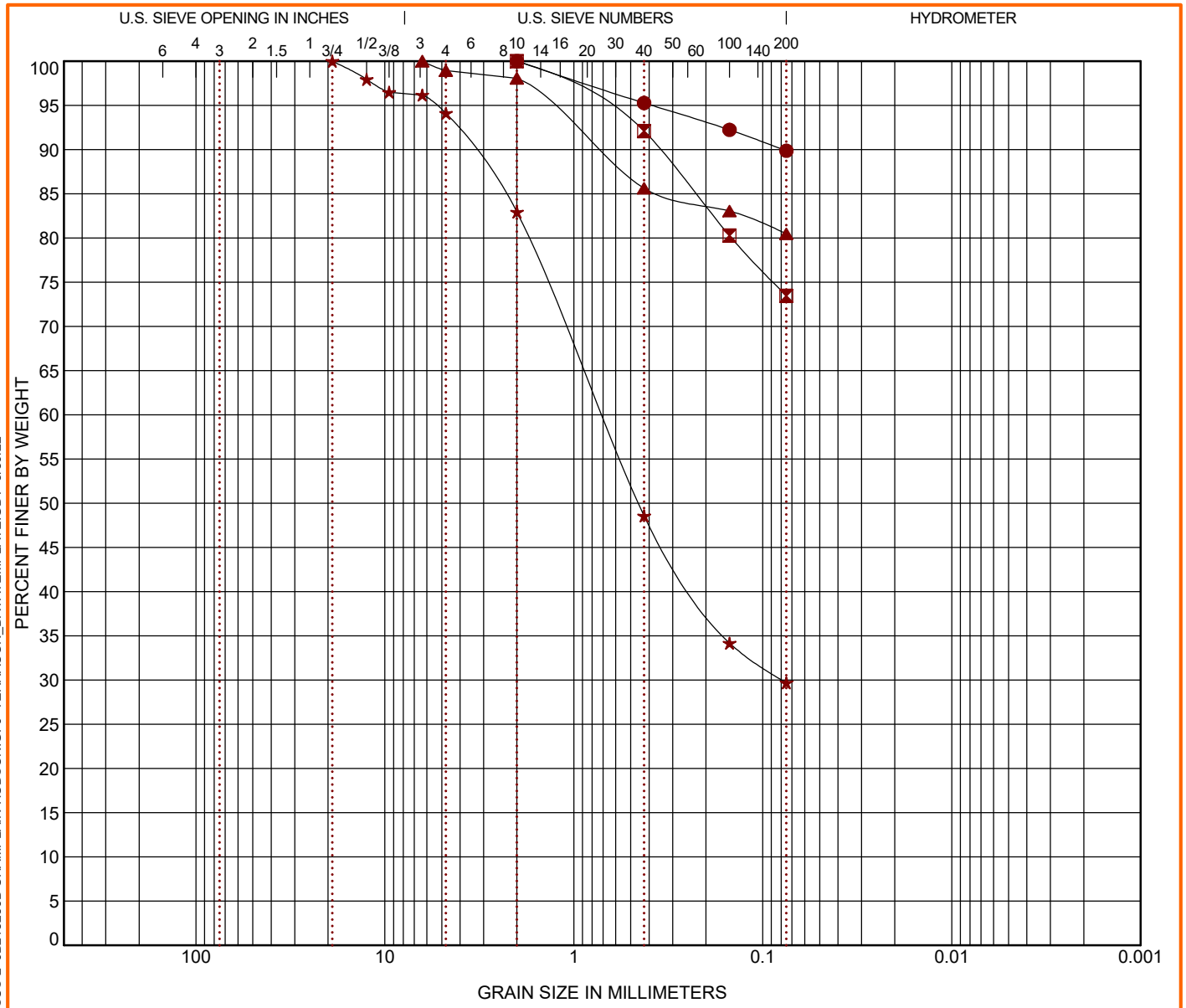
PROJECT NUMBER: JB215256B

CLIENT: Kiewit Engineering (NY) Corp.

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS-2 JB215256B CHAMPLAIN-HUDSON.GPJ TERRACON_DATATEMPLATE.GDT 3/30/22

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring ID	Depth (Ft)	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
●	K-183.0B	35 - 37	LEAN CLAY (CL)	35.6	33	20	13		
⊠	K-183.3	10 - 12	LEAN CLAY with SAND (CL)	31.0	33	23	10		
▲	K-183.3	24 - 26	LEAN CLAY with SAND (CL)	33.2	34	20	14		
★	K-183.4	8 - 10	SILTY SAND (SM)	13.8					

	Boring ID	Depth (Ft)	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
●	K-183.0B	35 - 37	2				0.0	0.0	10.1		89.9	
⊠	K-183.3	10 - 12	2				0.0	0.0	26.5		73.5	
▲	K-183.3	24 - 26	6.35				0.0	1.1	18.5		80.5	
★	K-183.4	8 - 10	19	0.711	0.079		0.0	5.9	64.4		29.7	

PROJECT: Champlain-Hudson Power Express Package 5

SITE: Champlain to Hudson HDD Crossings Schenectady, NY

Terracon
30 Corporate Cir Ste 201
Albany, NY

PROJECT NUMBER: JB215256B

CLIENT: Kiewit Engineering (NY) Corp.

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS-2 JB215256B CHAMPLAIN-HUDSON.GPJ TERRACON_DATATEMPLATE.GDT 3/30/22

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

AERIAL PHOTOGRAPHY PROVIDED BY MICROSOFT BING MAPS

BORING LOG NO. KB-182.7B

PROJECT: CHPE - Additional HDD Borings - Phase 3

CLIENT: Kiewit Engineering (NY) Corp
Lone Tree, CO

SITE: Fort Ann to Coxsackie, NY

LOCATION See Exploration Plan

Latitude: 42.726419° Longitude: -73.960840°

Surface Elev.: 291.1610 (Ft.)

DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
FILL - SILT WITH SAND, occasional rootlets, black			10	2-2-5-3 N=7			
			0	3-3-2-4 N=5			
		5	4	6-7-8-7 N=15			
			12	5-5-6-5 N=11	31.5		80
8.5	282.7						
LEAN CLAY (CL), varved silt and clay, brown, very soft to very stiff			24	9-7-8-12 N=15			
		10	24	5-3-3-4 N=6			
grades gray							
		15					
		20	24	WH-WH-WH-WH	31.1	30-20-10	99
		25					

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
0-10' 4 inch casing
10'-92 mud rotary

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by others.

Notes:

Logged by AB
Hammer Efficiency Summary:
Energy Transfer Ratio: 84.7% +/-5.0%
Hammer Efficiency Correction (CE): 1.41
WH = Weight of hammer

WATER LEVEL OBSERVATIONS

No free water observed

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 09-23-2022
Boring Completed: 09-23-2022
Drill Rig: Diedrich D-50
Driller: S. Morey
Project No.: JB215256G

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JB215256G CHPE - ADDITIONAL.GPJ TERRACON_DATATEMPLATE.GDT 11/2/22

BORING LOG NO. KB-182.7B

PROJECT: CHPE - Additional HDD Borings - Phase 3

CLIENT: Kiewit Engineering (NY) Corp
Lone Tree, CO

SITE: Fort Ann to Coxsackie, NY

LOCATION See Exploration Plan

Latitude: 42.726419° Longitude: -73.960840°

Surface Elev.: 291.1610 (Ft.)

DEPTH ELEVATION (Ft.)

GRAPHIC LOG	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS		WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
LEAN CLAY (CL), varved silt and clay, brown, very soft to very stiff *(continued)*									
	30			24	WH-WH-WH-WH				
	35								
	40			24	WH-WH-WH-WH				
	45								
	50			24	WH-WH-WH-WH		35.4	35-22-13	99
	55								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
0-10' 4 inch casing
10'-92 mud rotary

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by others.

Notes:

Logged by AB
Hammer Efficiency Summary:
Energy Transfer Ratio: 84.7% +/-5.0%
Hammer Efficiency Correction (CE): 1.41
WH = Weight of hammer
WR = Weight of rods

WATER LEVEL OBSERVATIONS

No free water observed

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 09-23-2022 | Boring Completed: 09-23-2022
Drill Rig: Diedrich D-50 | Driller: S. Morey
Project No.: JB215256G

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JB215256G CHPE - ADDITIONAL.GPJ TERRACON_DATATEMPLATE.GDT 11/2/22

BORING LOG NO. KB-182.7B

PROJECT: CHPE - Additional HDD Borings - Phase 3

CLIENT: Kiewit Engineering (NY) Corp
Lone Tree, CO

SITE: Fort Ann to Coxsackie, NY

LOCATION See Exploration Plan

Latitude: 42.726419° Longitude: -73.960840°

Surface Elev.: 291.1610 (Ft.)

DEPTH ELEVATION (Ft.)

GRAPHIC LOG		DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS		WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	LEAN CLAY (CL), varved silt and clay, brown, very soft to very stiff *(continued)*									
		60			24	WH-WH-5-5 3" Split Spoon With Ring Sampler				
		65								
		70			24	WH-WH-WH-WH				
		75								
		80			24	WH-6-3-3 N=9		26.5	27-19-8	98

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
0-10' 4 inch casing
10'-92 mud rotary

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by others.

Notes:

Logged by AB
Hammer Efficiency Summary:
Energy Transfer Ratio: 84.7% +/-5.0%
Hammer Efficiency Correction (CE): 1.41
WH = Weight of hammer
WR = Weight of rods

WATER LEVEL OBSERVATIONS

No free water observed

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 09-23-2022 | Boring Completed: 09-23-2022
Drill Rig: Diedrich D-50 | Driller: S. Morey
Project No.: JB215256G

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JB215256G CHPE - ADDITIONAL.GPJ TERRACON_DATATEMPLATE.GDT 11/2/22

BORING LOG NO. KB-182.7B

PROJECT: CHPE - Additional HDD Borings - Phase 3

CLIENT: Kiewit Engineering (NY) Corp
Lone Tree, CO

SITE: Fort Ann to Coxsackie, NY

LOCATION See Exploration Plan

Latitude: 42.726419° Longitude: -73.960840°

Surface Elev.: 291.1610 (Ft.)

GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS		WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	LEAN CLAY (CL), varved silt and clay, brown, very soft to very stiff *(continued)*		85								
			90			24	WH-9-11-9 N=20				
	92.0	199.2									
	Boring Terminated at 92 Feet										

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
0-10' 4 inch casing
10'-92 mud rotary

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by others.

Notes:

Logged by AB
Hammer Efficiency Summary:
Energy Transfer Ratio: 84.7% +/-5.0%
Hammer Efficiency Correction (CE): 1.41
WH = Weight of hammer
WR = Weight of rods

WATER LEVEL OBSERVATIONS

No free water observed

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 09-23-2022	Boring Completed: 09-23-2022
Drill Rig: Diedrich D-50	Driller: S. Morey
Project No.: JB215256G	

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JB215256G CHPE - ADDITIONAL.GPJ TERRACON_DATATEMPLATE.GDT 11/2/22

Summary of Laboratory Results

BORING ID	Depth (Ft.)	Water Content (%)	Organic Content (%)
KB-115.5	2-4	13.4	3.4
KB-115.5	15-17	70.8	
KB-117.6-1.6D	3-5	4.0	
KB-117.6-1.6D	20-22	22.7	
KB-117.6-1.6D	35-37	26.2	
KB-117.6-1.6D	49-51	15.3	
KB-122.9	4-6	23.1	
KB-122.9	15-17	18.6	
KB-122.9	25-27	77.9	
KB-122.9	45-47	74.8	
KB-123.0	2-4	10.9	
KB-123.0	20-22	68.3	
KB-123.0	35-37	51.0	
KB-123.0	50-52	45.9	
KB-123.0	65-67	34.5	
KB-132.1A	4-6	27.5	
KB-132.1A	15-17	38.1	
KB-132.1A	30-32	34.0	
KB-132.3A	4-6	12.1	
KB-132.3A	15-17	45.2	
KB-132.3A	30-32	37.2	
KB-132.5A	4-6	17.4	
KB-132.5A	30-32	38.8	
KB-132.5A	45-47	38.2	
KB-135.7	2-4	36.6	
KB-135.7	15-17	41.9	
KB-135.7	30-32	34.8	
KB-135.8	2-4	5.6	
KB-135.8	15-17	42.7	
KB-135.8	30-32	36.8	
KB-135.8	40-42	28.3	
KB-160.6	2-4	12.2	
KB-163.1	4-6	11.7	
KB-163.2	8-10	12.1	
KB-169.0-3.3	6-8	12.0	
KB-169.0-3.3	25-27	11.5	
KB-169.0-3.3	35-37	8.4	
KB-177.1	10-12	8.9	
KB-177.1	25-27	11.5	
KB-177.1	40-42	11.2	
KB-177.1	50-52	5.7	
KB-182.7B	6-8	31.5	

PROJECT: CHPE - Additional HDD Borings - Phase 3

SITE: Fort Ann to Coxsackie, NY

Terracon
30 Corporate Cir Ste 201
Albany, NY

PROJECT NUMBER: JB215256G

CLIENT: Kiewit Engineering (NY) Corp
Lone Tree, CO

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. SMART LAB SUMMARY-PORTRAIT JB215256G CHPE - ADDITIONAL.GPJ TERRACON_DATATEMPLATE.GDT 11/2/22

Summary of Laboratory Results

BORING ID	Depth (Ft.)	Water Content (%)	Organic Content (%)
KB-182.7B	20-22	31.1	
KB-182.7B	50-52	35.4	
KB-182.7B	80-82	26.5	
KB-184.2	4-6	17.3	
KB-184.2	20-21.5	10.0	
KB-184.9	10-12	35.4	
KB-184.9	25-26.5	8.6	
KB-184.9	40-42	9.2	
KB-184.9	55-56.5	12.2	
KB-185.4	6-8	34.3	
KB-185.4	20-21.5	13.7	
KB-185.4	35-39	9.1	
KB-185.4	45-47	14.7	
KB-192.4	15-17	36.9	
KB-192.4	25-27	42.6	
KB-192.4	45-47	46.0	
KB-192.4	65-67	8.0	
KB-192.8B	15-17	36.5	
KB-192.8B	40-40.2	14.1	
KB-192.8B	50-50.2	14.2	
KB-194.0-3.6B	5-7	31.0	
KB-194.0-3.6B	30-32	37.9	
KB-194.0-3.6B	50-52	39.6	
KB-194.0-3.6B	70-72	46.7	
KB-194.0-3.9B	4-6	31.5	
KB-194.0-3.9B	25-26.5	50.2	
KB-194.0-3.9B	45-46.5	43.4	
KB-194.0-3.9B	60-61.5	52.9	
KB-194.0-4.4	20-22	50.1	
KB-194.0-4.4	40-42	37.9	
KB-194.0-4.4	50-52	47.6	
KB-194.0-4.4	70-72	37.4	
KB-194.0-4.6B	4-6	24.1	
KB-194.0-4.6B	20-21.5	40.3	
KB-194.0-4.6B	40-41.5	42.9	
KB-194.0-4.6B	60-61.5	45.6	
KB-200.6	8-10	20.3	
KB-200.6	30-32	30.5	
KB-200.6	45-47	26.3	
KB-200.6	55-57	33.6	
KB-200.8A	15-17	39.6	
KB-200.8A	35-36.5	45.0	

PROJECT: CHPE - Additional HDD Borings - Phase 3

SITE: Fort Ann to Coxsackie, NY

Terracon
30 Corporate Cir Ste 201
Albany, NY

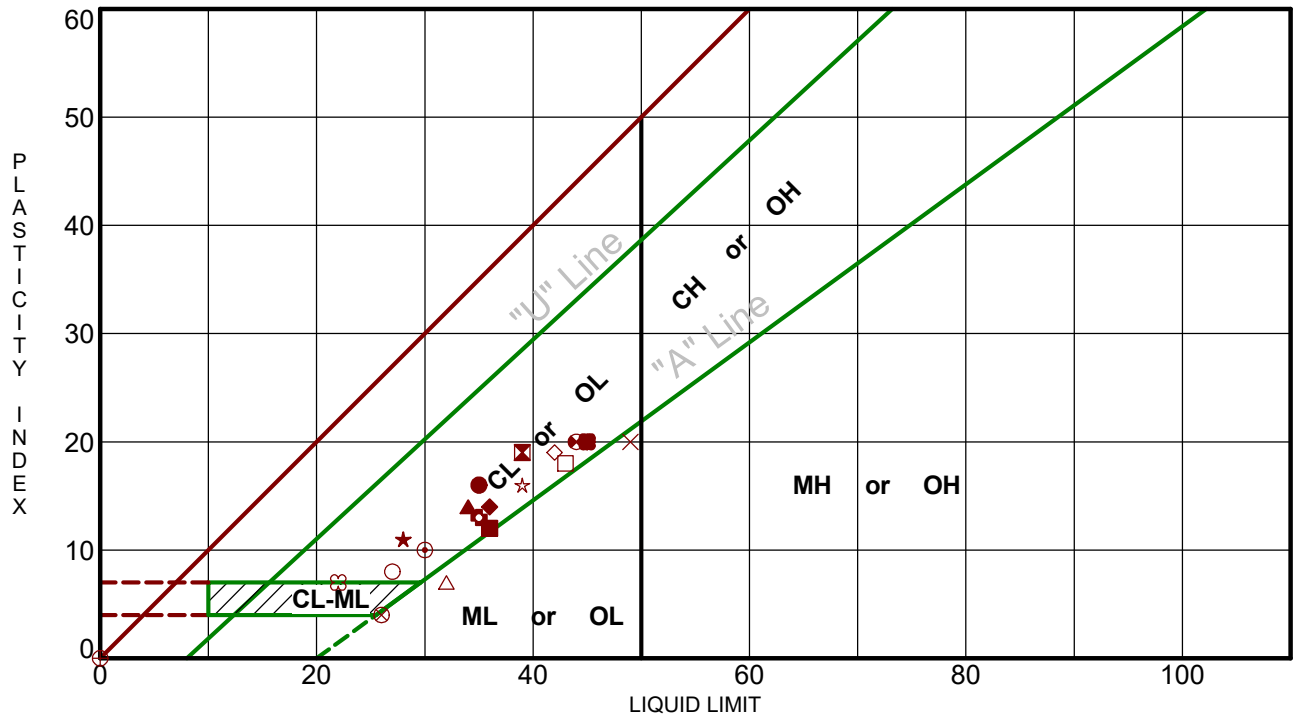
PROJECT NUMBER: JB215256G

CLIENT: Kiewit Engineering (NY) Corp
Lone Tree, CO

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. SMART LAB SUMMARY-PORTRAIT JB215256G CHPE - ADDITIONAL.GPJ TERRACON_DATATEMPLATE.GDT 11/2/22

ATTERBERG LIMITS RESULTS

ASTM D4318



Boring ID		Depth (Ft)	LL	PL	PI	Fines	USCS	Description
●	KB-135.7	30 - 32	35	19	16	96.6	CL	LEAN CLAY
⊠	KB-135.8	15 - 17	39	20	19	93.6	CL	LEAN CLAY
▲	KB-135.8	30 - 32	34	20	14	94.2	CL	LEAN CLAY
★	KB-135.8	40 - 42	28	17	11	99.5	CL	LEAN CLAY
⊙	KB-182.7B	20 - 22	30	20	10	98.6	CL	LEAN CLAY
✿	KB-182.7B	50 - 52	35	22	13	98.6	CL	LEAN CLAY
○	KB-182.7B	80 - 82	27	19	8	98.3	CL	LEAN CLAY
△	KB-184.9	10 - 12	32	25	7	86.1	ML	SILT
⊗	KB-185.4	6 - 8	26	22	4	87.4	ML	SILT
⊕	KB-185.4	20 - 21.5	NP	NP	NP	15.8	SM	SILTY SAND
□	KB-192.4	15 - 17	43	25	18	87.5	CL	LEAN CLAY
⊗	KB-192.4	25 - 27	44	24	20	97.7	CL	LEAN CLAY
◕	KB-192.4	45 - 47	45	25	20	92.4	CL	LEAN CLAY
☆	KB-192.8B	15 - 17	39	23	16	81.8	CL	LEAN CLAY with SAND
✿	KB-192.8B	50 - 50.2	22	15	7	26.0	SC-SM	SILTY, CLAYEY SAND
■	KB-194.0-3.6B	5 - 7	36	24	12	89.4	CL	LEAN CLAY
◆	KB-194.0-3.6B	30 - 32	36	22	14	95.7	CL	LEAN CLAY
◇	KB-194.0-3.6B	50 - 52	42	23	19	95.7	CL	LEAN CLAY
×	KB-194.0-3.6B	70 - 72	49	29	20	91.9	ML	SILT
✖	KB-194.0-3.9B	4 - 6	45	25	20	76.6	CL	LEAN CLAY with SAND

PROJECT: CHPE - Additional HDD Borings - Phase 3

SITE: Fort Ann to Coxsackie, NY

Terracon
30 Corporate Cir Ste 201
Albany, NY

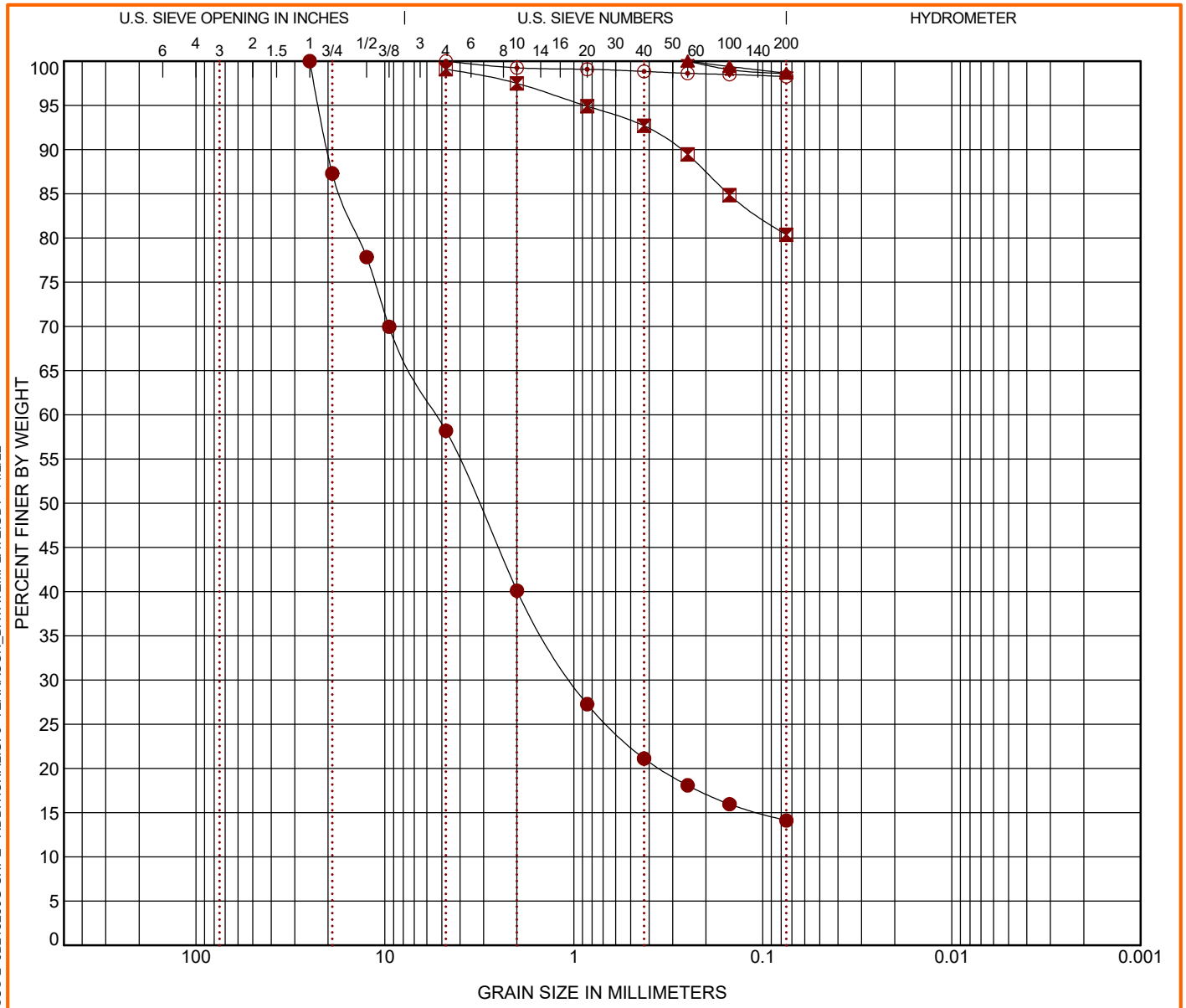
PROJECT NUMBER: JB215256G

CLIENT: Kiewit Engineering (NY) Corp
Lone Tree, CO

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. ATTERBERG LIMITS JB215256G CHPE - ADDITIONAL.GPJ TERRACON_DATATEMPLATE.GDT 11/2/22

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring ID	Depth (Ft)	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
●	KB-177.1	50 - 52	SILTY SAND with GRAVEL (SM)	5.7					
⊠	KB-182.7B	6 - 8	SILT with SAND (ML)	31.5					
▲	KB-182.7B	20 - 22	LEAN CLAY (CL)	31.1	30	20	10		
★	KB-182.7B	50 - 52	LEAN CLAY (CL)	35.4	35	22	13		
⊙	KB-182.7B	80 - 82	LEAN CLAY (CL)	26.5	27	19	8		

	Boring ID	Depth (Ft)	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
●	KB-177.1	50 - 52	25	5.281	1.019		0.0	41.8	44.1		14.1	
⊠	KB-182.7B	6 - 8	4.75						18.7		80.4	
▲	KB-182.7B	20 - 22	0.25				0.0	0.0	1.4		98.6	
★	KB-182.7B	50 - 52	0.25				0.0	0.0	1.4		98.6	
⊙	KB-182.7B	80 - 82	4.75				0.0	0.0	1.7		98.3	

PROJECT: CHPE - Additional HDD Borings - Phase 3

SITE: Fort Ann to Coxsackie, NY

Terracon
30 Corporate Cir Ste 201
Albany, NY

PROJECT NUMBER: JB215256G

CLIENT: Kiewit Engineering (NY) Corp
Lone Tree, CO

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS-2 JB215256G CHPE - ADDITIONAL.GPJ TERRACON_DATATEMPLATE.GDT 11/2/22

Kiewit

MEMORANDUM

DATE: November 7, 2022

TO: Nick Strater; Brierley Associates Underground Engineers, PLLC

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

SUBJECT: Geotechnical Data: Segment 8 – Package 5 – HDD Crossing 77 – Revision 1
Champlain Hudson Power Express Project
Schenectady, 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 south of Schenectady, New York. The approximate station for the start of HDD crossing Number 77 is STA 50333+00 (42.71946° N, 73.96017° W).

The geotechnical data at this HDD crossing is attached. The available data is from the previous investigations by AECOM and TRC and the recent investigation by Terracon, referenced below.

- AECOM, Geotechnical Data Report, Upland Segments, Champlain Hudson Power Express, dated May 28, 2021.
- TRC, Geotechnical Data Report, Champlain Hudson Power Express, Canadian Pacific Railway Borings MP 177.6-228.2, dated March 15, 2013.
- Terracon, Geotechnical Data Report, Champlain-Hudson Power Express-Package 5, Schenectady through Selkirk, dated April 4, 2022.

Contact us if you have questions or require additional information.

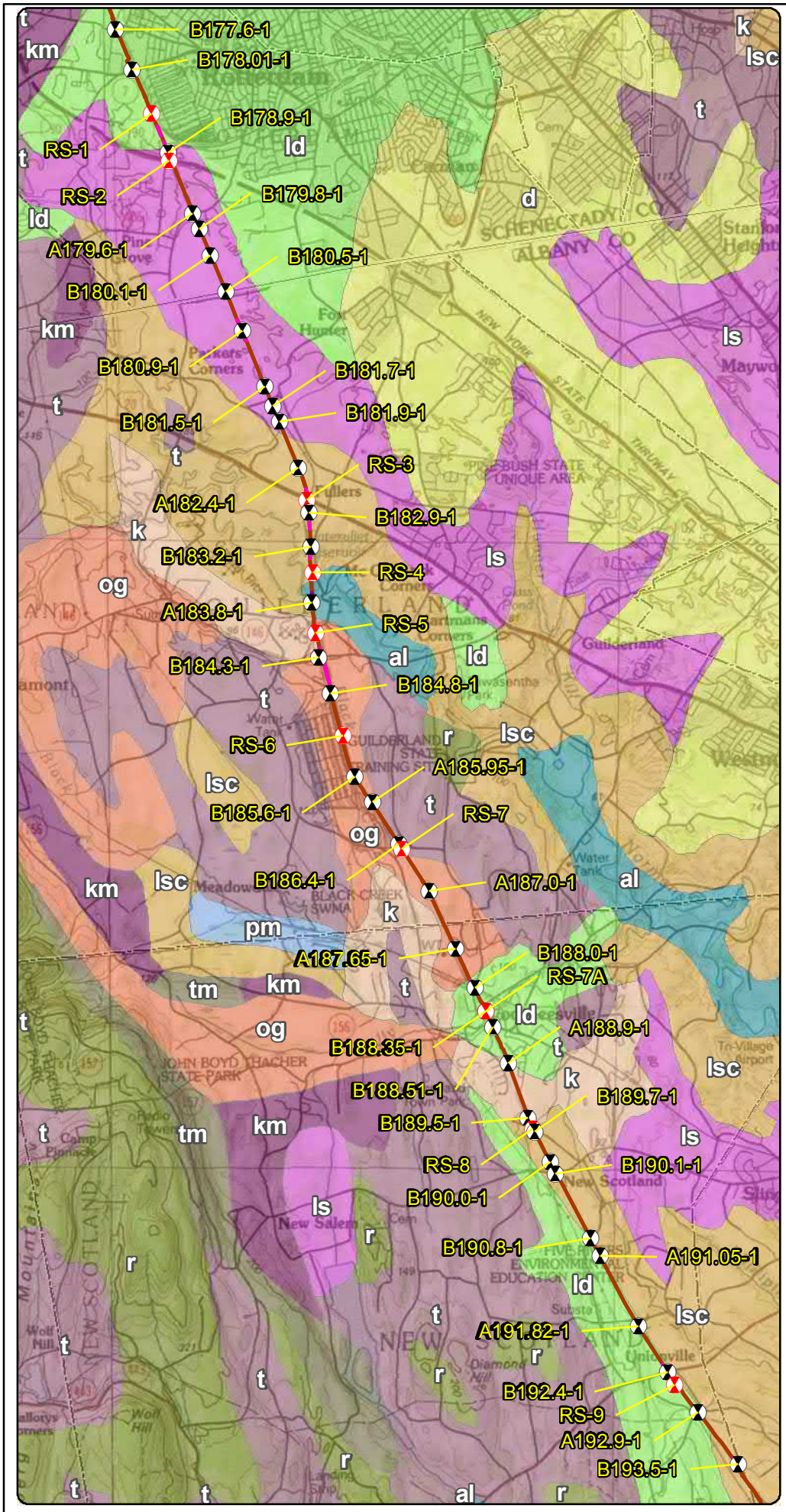
HDD 77
Borings B183.2-1, RS-4,
K-183.3, K-183.4
Segment 8 - Package 5

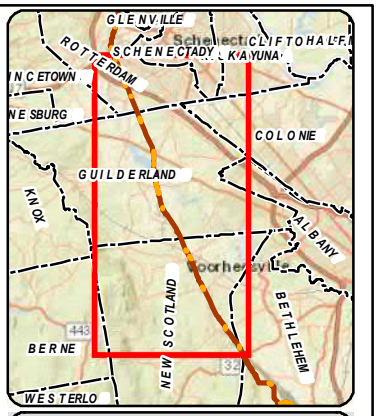
CHPE Segment 8 & 9 - Package 5
HDD Soil Boring Coordinates and Elevations

Firm	Boring	Northing (feet)	Easting (feet)	Ground Surface Elevation (feet)
TRC*	A179.6-1	1433335.8	631009.7	332.5
	A182.4-1	1420048.2	636557.9	291.5
	A187.65-1	1394856.5	644775.4	327.7
	A191.05-1	1378814.5	652321.0	274.7
	A191.82-1	1375154.9	654314.3	257.1
	A192.9-1	1370644.3	657458.6	232.8
	B177.1-1	1445275.2	626125.8	347.3
	B177.6-1	1442944.0	627003.0	346.5
	B178.01-1	1440838.2	627828.3	368.5
	B178.9-1	1436461.4	629767.4	322.1
	B180.1-1	1431140.9	631965.3	310.4
	B180.9-1	1427158.5	633611.8	307.5
	B182.9-1	1417657.6	637123.9	291.5
	B183.2-1	1415871.4	637202.5	290.2
	B184.3-1	1410133.0	637597.6	324.0
	B184.8-1	1408223.8	638230.4	323.1
	B185.6-1	1403875.9	639489.9	328.2
	B188.0-1	1392812.4	645793.4	330.9
	B188.35-1	1391616.5	646333.6	333.4
	B188.51-1	1390815.1	646697.7	340.2
	B190.0-1	1383732.6	649743.4	296.3
	B190.1-1	1383134.9	649975.5	294.6
	B190.8-1	1379726.2	651827.2	282.3
	B192.4-1	1372732.4	655878.1	239.3
	B193.5-1	1367919.2	659547.5	218.6
AECOM**	RS-2	1436092.2	629800.7	315.6
	RS-3	1418336.4	636985.0	303.2
	RS-4	1414567.4	637285.8	302.2
	RS-5	1411399.1	637471.6	319.0
	RS-7A	1391599.9	646333.6	340.5
	RS-9	1372089.8	656230.9	238.7
	SY-7	1353089.8	670133.9	159.8
	SY-8	1353716.5	671626.7	175.0
	SY-9	1353046.4	673133.41	163.1
	SY-9A	1351940.0	674314.3	158.3
	SY-10	1350838.3	675488.6	166.0
	SCH-19	1446199.8	625927.0	333.8
	SCH-19A	1445712.1	626032.4	343.1

Notes:
- Northings and Eastings are provided in NAD83 New York State Plane East Zone.
- Elevations are referenced to the NAVD88 datum.
* TRC boring coordinates as shown in Table 1-6 in AECOM report (reference below). Boring elevations estimated from November 2021 topographic survey by Williams Aerial.
** AECOM boring coordinates and elevations as shown in Table 1-6 in AECOM report.
*** Kiewit boring coordinates and elevations are noted on the boring logs.

Reference:
AECOM, Geotechnical Data Report, Upland Segments: Putnam Station, Washington County, to Cementon, Green County, NY, Champlain Hudson Power Express, dated May 28, 2021.





LEGEND

- 2021 Boring Location
- Previous (2013) Boring Location
- Terrestrial Route HVDC
- Submarine Route HVDC
- Terrestrial Route HVAC
- Preliminary HDD Locations
- Preliminary Pipe Bridge Location
- Town Boundary
- County Boundary

Surficial Geology

- al - Recent alluvium
- d - Dunes
- k - Kame deposits
- km - Kame moraine
- ld - Lacustrine delta
- ls - Lacustrine sand
- lsc - Lacustrine silt and clay
- og - Outwash sand and gravel
- pm - Swamp deposits
- r - Bedrock
- t - Till
- tm - Till moraine

N

0.7 0.35 0 0.7 Miles

Transmission Developers Inc.

Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

Surficial Geology and Geotechnical Borings Rotterdam to Selkirk Figure 3-8

Prepared on 5/4/2021

by: AECOM

DATA SOURCES: ESRI, NYSDOT, NOAA, USACE, NYDOS, TDI, TRC

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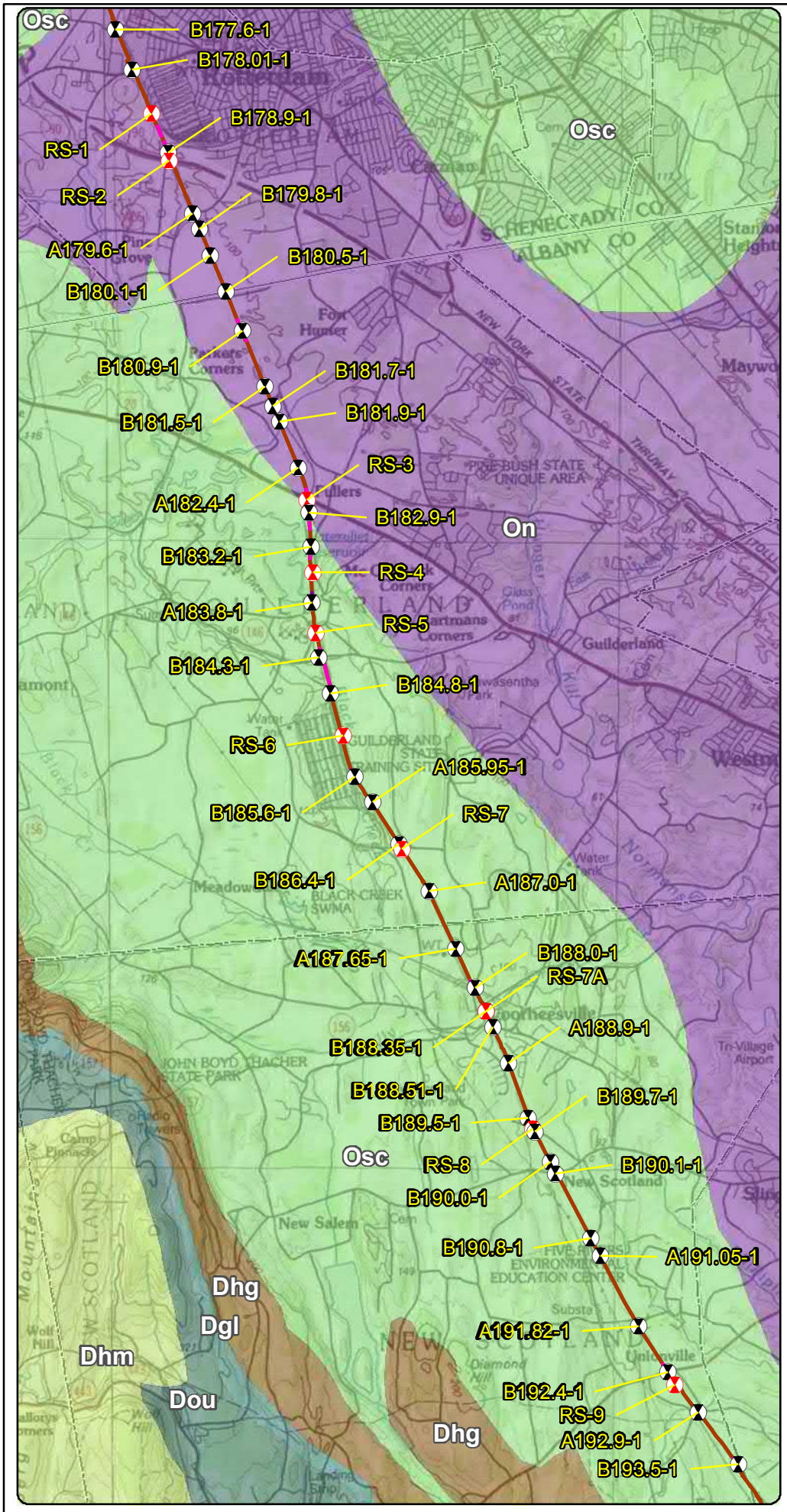

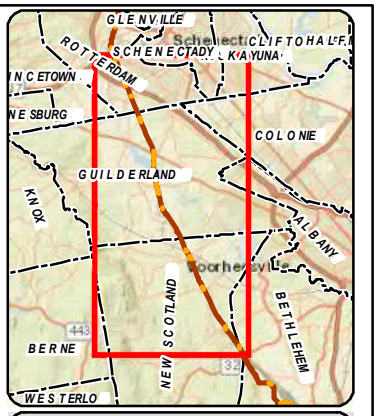

LEGEND

- 2021 Boring Location
- Previous (2013) Boring Location
- Terrestrial Route HVDC
- Submarine Route HVDC
- Terrestrial Route HVAC
- Preliminary HDD Locations
- Preliminary Pipe Bridge Location
- Town Boundary
- County Boundary

Bedrock Geology

- Dgl - Glenerie Formation
- Dhg - Port Ewen Formation
- Dhm - Undiff Lower Hamilton Group
- Dou - Onondaga Limestone
- On - Normanskill Shale
- Osc - Schenectady Formation

* Schenectady Formation includes: graywacke, sandstone, siltstone, shale

N

0.7 0.35 0 0.7 Miles

Transmission

Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

Bedrock Geology and Geotechnical Borings Rotterdam to Selkirk Figure 4-8

Prepared on 5/4/2021

by: AECOM

DATA SOURCES: ESRI, NYSDOT, NOAA, USACE, NYDOS, TDI, TRC

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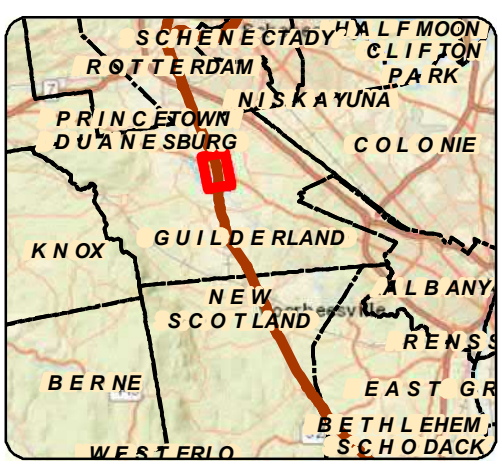
182.1
182.2
182.3
A182.4-1
182.5
182.6
182.7
GUILDERLAND
RS-3
182.8
B182.9-1
183
183.1
183.2
B183.2-1
183.3
183.4
Western Ave
W Old State Rd
Conrail
Fuller Station Rd
Lawler Ln
Spring Farm Ln
Helderview Dr
Katie Ln
Avalon Way
Normandy Sq
French's Mill Rd
0
1,000
Feet



LEGEND

- 111.8 Certified Milepost - Tenths
- 135 Certified Milepost
- 111.8 Preferred Alternative Milepost - Tenths
- 135 Preferred Alternative Milepost
- Terrestrial Route HVDC
- Submarine Route HVDC
- Terrestrial Route HVAC
- Preliminary HDD Locations
- Preliminary Pipe Bridge Location
- 2021 Boring Location
- Previous (2013) Boring Location
- Streams/Ditches
- Railroad ROW
- Deviation Zone
- Deviation Zone Outside ROW
- Preferred Alternative Deviation Zone
- Preferred Alternative Deviation Zone Outside ROW
- Town Boundary
- Village Boundary
- State Park (OPRHP)

Parcel Ownership: TOWN NAME

Road Name: Village Name

Transmission Developers Inc.

Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

BORING LOCATION PLAN

Rotterdam to Selkirk

Figure A-8

Sheet 5 of 14

Prepared by: AECOM 5/4/2021

DATA SOURCES: ESRI, NETWORK MAPPING 2010, NYSDOT, OPRHP, TDI, TRC

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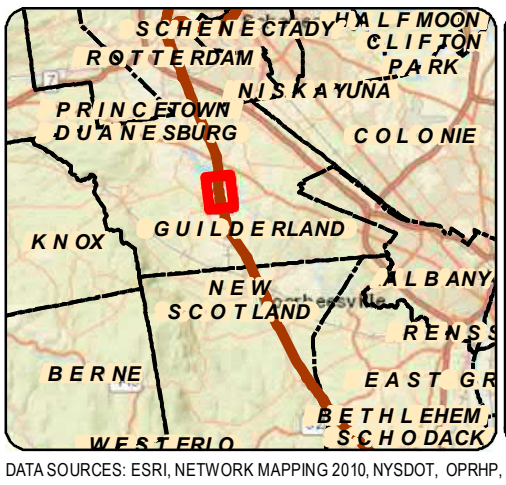
183.4
183.5
RS-4
183.6
183.7
A183.8-1
183.9
184
GUILDERLAND
RS-5
184.2
184.3
B184.3-1
184.5
184.6
Hurst Rd
French's Mill Rd
Tree Frog Ln
Fuller Station Rd
French's Hollow Rd
Elizabethfield Way
Diagonal Rd
Main St
Forest Ln
RT-146
Van Wormer Dr
Wagner Rd
Nelson Pl
School Rd
East Dr
Van Buren Blvd
0
1,000
Feet



LEGEND

- 111.8 Certified Milepost - Tenths
- 135 Certified Milepost
- 111.8 Preferred Alternative Milepost - Tenths
- 135 Preferred Alternative Milepost
- Terrestrial Route HVDC
- Submarine Route HVDC
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- 2021 Boring Location
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- Railroad ROW
- Deviation Zone
- Deviation Zone Outside ROW
- Preferred Alternative Deviation Zone
- Preferred Alternative Deviation Zone Outside ROW
- Town Boundary
- Village Boundary
- State Park (OPRHP)

Parcel Ownership: TOWN NAME

Road Name: Village Name

Transmission Developers Inc.

Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

BORING LOCATION PLAN

Rotterdam to Selkirk

Figure A-8

Sheet 6 of 14

Prepared by: AECOM 5/4/2021

DATA SOURCES: ESRI, NETWORK MAPPING 2010, NYSDOT, OPRHP, TDI, TRC

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BORING CONTRACTOR: ADT	AECOM	SHEET 1 OF 1
DRILLER: Chris Chaillou		PROJECT NAME: CHPE -
		PROJECT NO.: 60323056
		HOLE NO.: **RS-4**
SOILS ENGINEER: Chris French		START DATE: 3/11/21
	BORING LOG	FINISH DATE: 3/11/21
LOCATION: MP 183.50 (CSX Rail)		OFFSET: N/A

GROUND WATER OBSERVATIONS		CASING	SAMPLER	DRILL BIT	CORE BARREL	DRILL RIG: CME LC-55
none observed	TYPE	Flush Joint Steel	California Modified	Tricone Roller 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.:
	HAMMER WT.	140 lbs	140 lbs			NORTHING
	HAMMER FALL	30"	30"			EASTING

DEPTH	CORING RATE MIN/FT	SAMPLE DEPTHS FROM - TO (FEET)	TYPE AND NO.	PEN. in	REC. in	BLOWS PER 6 in ON SAMPLER (ROCK QUALITY DESIGNATION)				N Corr.(2)	USCS CLASS.	STRAT. CHNG. DEPTH	FIELD IDENTIFICATION OF SOILS
		0'-5'				Hand Cleared					SW		0'-1.1' Black fine to coarse SAND, some angular Gravel, trace Silt, dense, moist
1.0											SM		1.1'-4.5' Brown fine to coarse SAND, some Clayey Silt, dense, moist
2.0													
											ML	SILT and CLAY	4.5'-5' Brown SILT and Clay, trace fine Sand, medium stiff, moist
3.0													
		3'-5'	S-1										TR-1; (3.0'-5.0')
4.0													
5.0													
		5'-7'	S-2	24"	24"	13	17	18	16	23	ML		Brown Clayey SILT, stiff, moist
6.0													
7.0													
		7'-9'	S-3	24"	24"	22	19	20	22	25	ML		SAA
8.0													
													TR-2; (8.0'-8.5')
9.0													
		9'-11'	S-4	24"	24"	8	14	20	22	22	ML		SAA
10.0													
11.0													
		11'-13'	S-5	24"	24"	16	20	20	23	26	ML		Brown SILT and Clay, stiff, moist
12.0													
													TR-3; (12.0'-12.5')
13.0													
		13'-15'	S-6	24"	24"	11	16	14	22	20	ML		SAA
14.0													14.7'-15' Brown Clayey SILT, medium stiff, saturated
15.0													
		15'-16'	S-7	12"	12"	14	14			-	ML		Brown Clayey SILT, occasional very fine sand laminations, medium stiff, saturated
16.0													
													15.6'-16' Brown SILT and Clay, medium stiff, moist
17.0													TR-4; (15.0'-15.5')
													RS-4 terminated at 16' then grouted to surface
18.0													
19.0													
20.0													

NOTES:

(1) Thick-wall ring lined drive sampler (California sampler) used for SPT samples. Rings dimensions = 2-1/2" O.D. by 2-7/16" I.D. by 6" length.

(2) Correction factor: $N_{corr}=N*(2.0^2-1.375^2)in./(3.0^2-2.4^2)in. = N*0.65$.

Soil description represents a field identification after D.M. Burmister unless otherwise noted.

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 if he finds that the actual conditions do not conform to those indicated by this log.

SAMPLE TYPE:	S= SPLIT SPOON	U=SHELBY TUBE	R=ROCK CORE	
PROPORTIONS:	TRACE=1-10%	LITTLE=10-20%	SOME=20-35%	AND=35-50%

TEST BORING LOG

PROJECT: TDI CHAMPLAIN HUDSON POWER EXPRESS
LOCATION: CSX RAILROAD ROW, NY

BORING	**B183.2-1**
G.S. ELEV.	N/A
FILE	195651
SHEET	1 OF 1

GROUNDWATER DATA			
FIRST ENCOUNTERED NR			
DEPTH	HOUR	DATE	ELAPSED TIME
6.0'	NR	11/6	0 HR

METHOD OF ADVANCING BOREHOLE				
a	FROM	0.0 '	TO	10.0 '
d	FROM	10.0 '	TO	20.0 '

DRILLER	P. PLANTIER
HELPER	M. NAGEY
INSPECTOR	N/A
DATE STARTED	11/06/2012
DATE COMPLETED	11/06/2012

DEPTH	A	B	C	DESCRIPTION	Wn	REMARKS
	S-1	5 4 1 3		***BLACK F/M SANDY SILT, TR TO SM F/ GRAVEL (FILL)***	27.4	
	S-2	4 1 2 1				
5	S-3	2 1 1 2		6.0		
	S-4	7 7 5 6		***GRAY SILT AND CLAY, TR F/M/C SAND***	29.0	
10	S-5	6 6 8 5				
15	S-6	4 5 5 6			27.5	
20	S-7	2 1 2 2		20.0		
				END OF BORING AT 20'		
25						
30						
35						

DRN.	TBT
CKD.	PWK

NEW PROJECTS TEST BORING LOG 195651_TDI_CSX.GPJ SITE BLAUVELT.GDT 3/12/13

S.W.COLE ENGINEERING, INC.

Report of Hydrometer

ASTM D-422

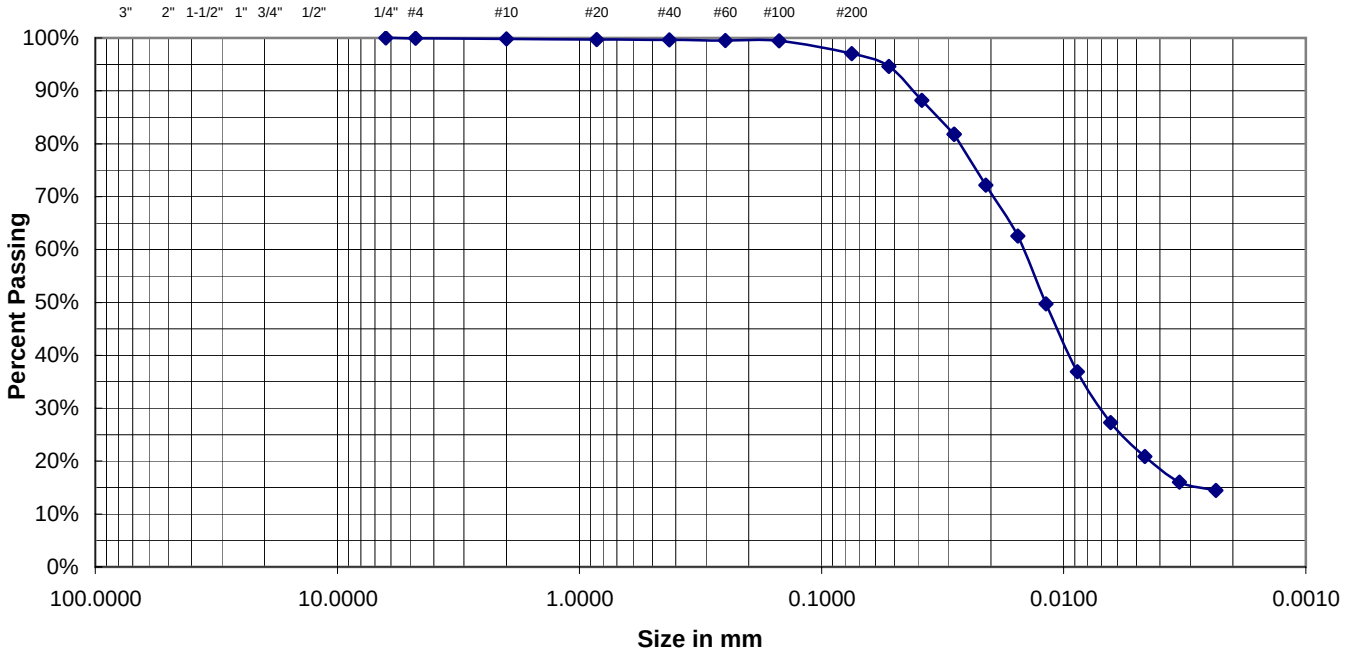
Project Name	CHAMPLAIN HUDSON POWER EXPRESS PROJECT	Project Number	10-1256
Client	TRC COMPANIES, INC	Lab ID	10887S
Material Type	GRAY CLAYEY SILT TRACE SAND AND GRAVEL (ML)	Date Received	3/1/2013
Material Source	6.0'-20.0'	Date Completed	3/6/2013
Exploration	B-183.2-1	Tested By	MJS

Sieve Analysis

Sieve Size	Standard Designation (mm)	Amount Passing (%)
3"	75	**100**
2"	50	**100**
1-1/2"	37.5	**100**
1"	25	**100**
3/4"	19	**100**
1/2"	12.5	**100**
1/4"	6.3	**100**
No. 4	4.75	**100**
No. 10	2	**100**
No. 20	0.85	**100**
No. 40	0.425	**100**
No. 60	0.25	**100**
No. 100	0.15	**99**
No. 200	0.075	**97.0**

Hydrometer Analysis

Particle Size (mm)	Amount Passing (%)
0.053	94.6
0.039	88.2
0.028	81.8
0.021	72.1
0.015	62.5
0.012	49.7
0.009	36.9
0.006	27.3
0.005	20.8
0.003	16.0
0.002	14.4



Particle Distribution	
Gravel, retained on #4	0.1%
Sand, passing #4 and retained on #200	2.9%
Fines, 0.074 to 0.005	74.9%
Clay Fraction, <0.005	22.1%

Comments: MOISTURE CONTENT = 25.4%

Chad B. Michaud

Reviewed By

S.W.COLE ENGINEERING, INC. • Geotechnical Engineering • Field & Lab Testing • Scientific & Environmental Consulting

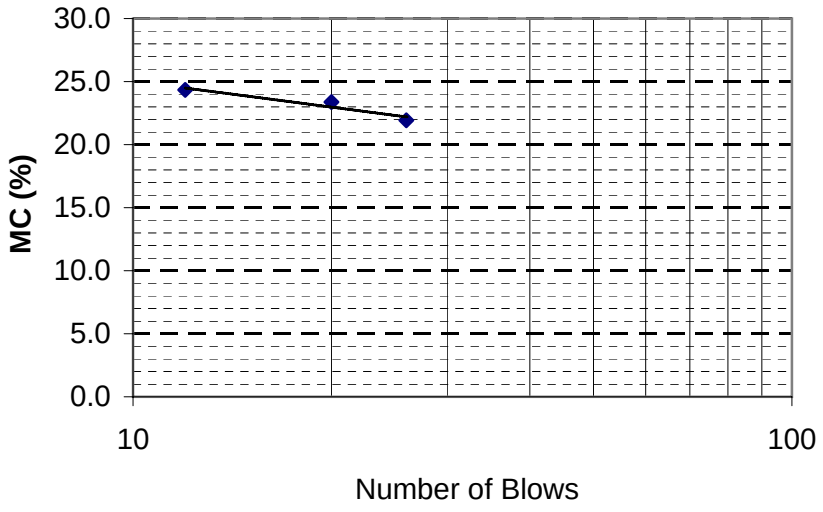
REPORT OF ATTERBERG LIMITS
ASTM D4318

Project Name	CHAMPLAIN HUDSON POWER EXPRESS	Project Number	10-1256
Client	TRC COMPANIES, INC	Laboratory ID	10887S
Soil Description	GRAY CLAYEY SILT TRACE SAND AND GRAVEL (ML)	Date Received	3/1/2013
Soil Source	B-183.2-1, 6.0-20.0'	Date Completed	3/5/2013
		Tested By	SLH

TEST RESULTS

Estimate of Material Retained On the No. 40 Sieve	Liquid Limit	Plastic Limit	Plasticity Index
0%	22	19	3

LIQUID LIMIT CURVE

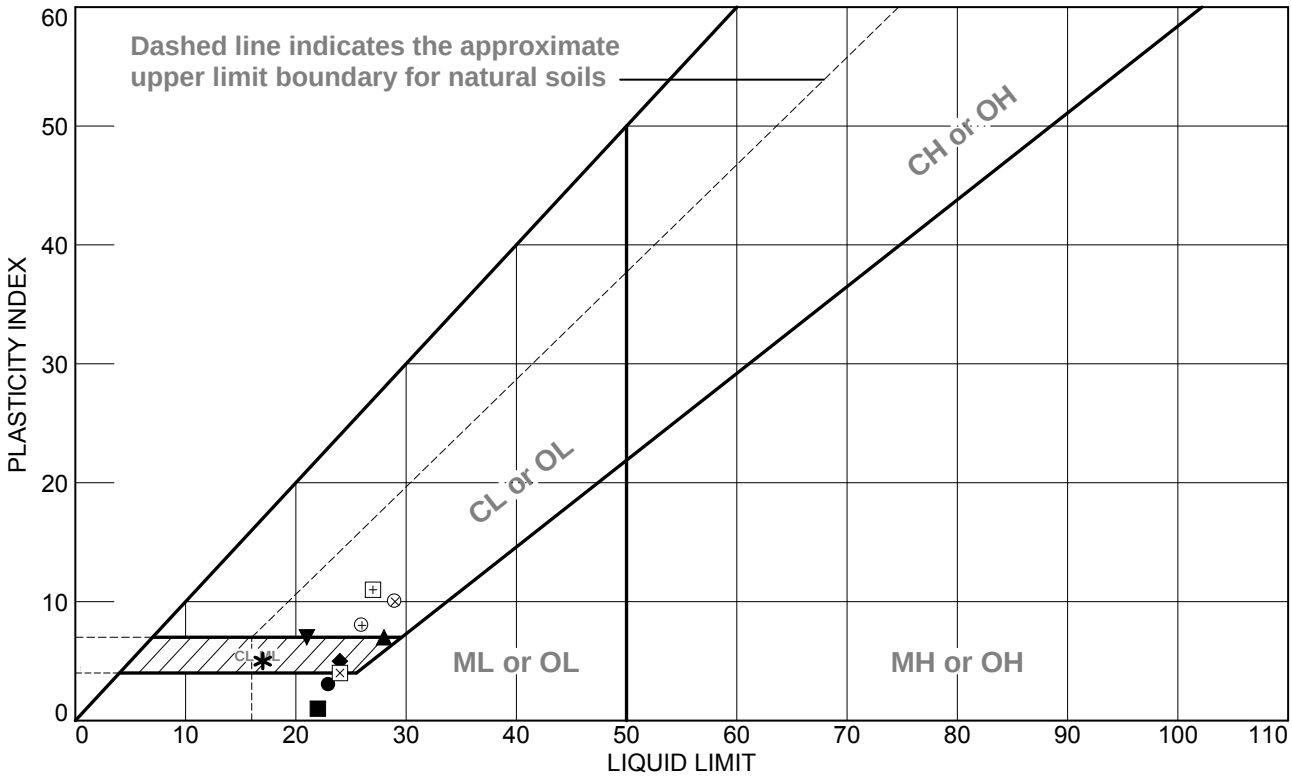


SUMMARY OF LABORATORY TEST DATA

Project Name: TDI Champlain Hudson Power Express – CSX
Client Name: Transmission Developers, Inc.
TRC Project #: 195651

SAMPLE IDENTIFICATION			Soil Group (USCS System)	GRAIN SIZE DISTRIBUTION				PLASTICITY				Specific Gravity	Moisture Content (%)	Unit Weight (pcf)	Compressive Strength (tsf)	Organic Content (%)
Boring #	Sample #	Depth (ft)		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Liquidity Index)					
	S-7	18.5-20.0	-	0.0	0.1	38.2	61.7	-	-	-	-	2.75	29.1	-	-	-
	S-8	23.5-25.0														
B183.2-1	S-1	0.0-2.0	-	-	-	-	-	-	-	-	-	-	27.4	-	-	54.6
	S-2	2.0-4.0														
	S-4	6.0-8.0	-	-	-	-	-	-	-	-	-	-	29.0	-	-	8.2
	S-5	8.0-10.0	CL-ML	6.6		52.7	40.7	24	19	5	1.7	2.76	27.5	-	-	-
	S-6	13.5-15.0														
B183.8-1	S-1	0.0-2.0	-	-	-	-	-	-	-	-	-	-	25.8	-	-	8.5
	S-2	2.0-4.0	ML	4.1	29.9	66.0		-	-	-	-	-	27.4	-	-	-
	S-3	4.0-6.0	SM	14.1	64.6	21.3		-	-	-	-	-	17.9	-	-	-
	S-4	6.0-8.0	-	-	-	-	-	-	-	-	-	-	11.6	-	-	-

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

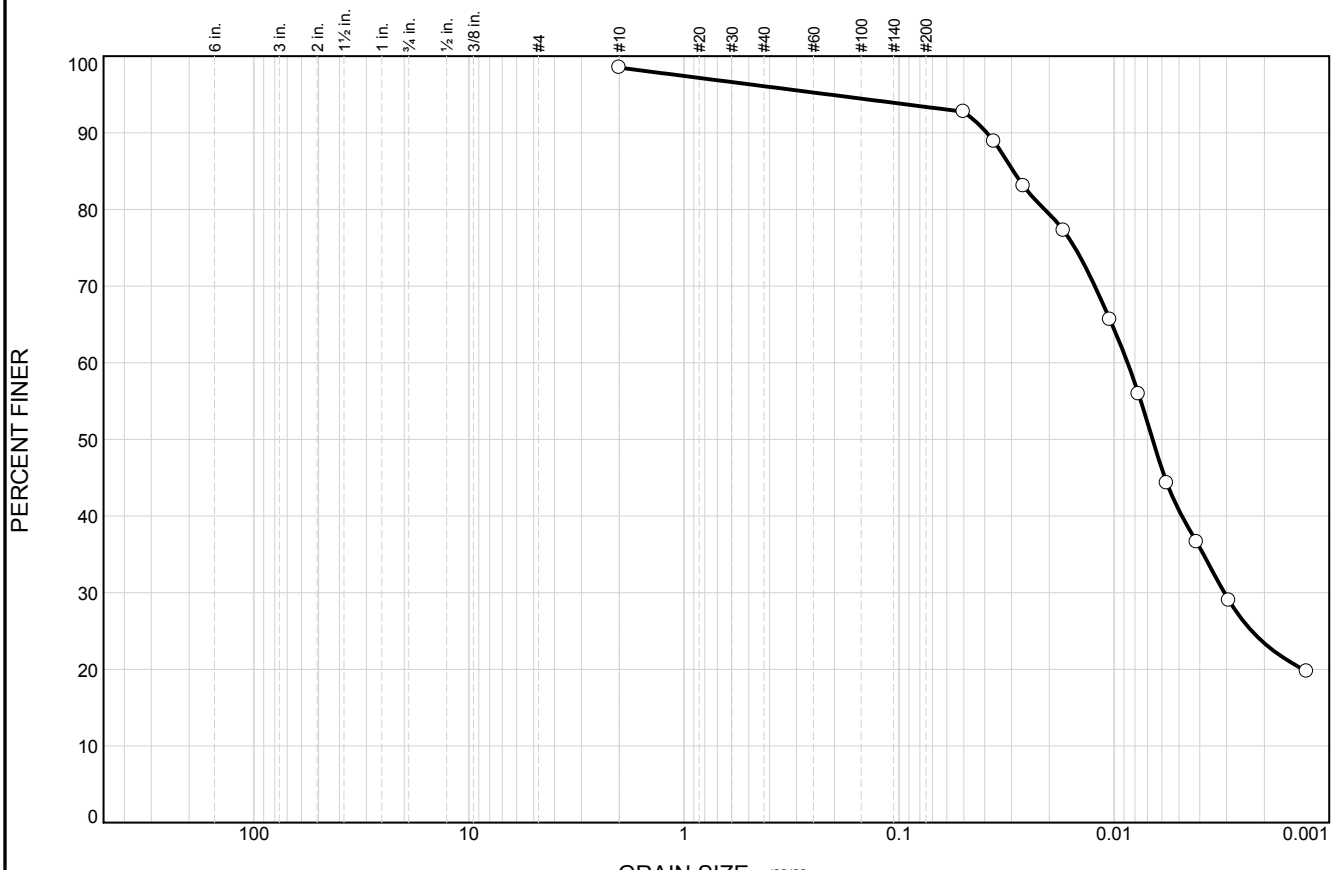
	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B181.7-1	S-6	13.5-15.0 FT	24.9	20	23	3	ML
■	B181.7-1	S-7	18.5-20.0 FT	28.8	21	22	1	ML
▲	B181.9-1	S-7 & S-8	18.5-25.0 FT	29.9	21	28	7	CL-ML
◆	B183.2-1	S-5 & S-6	8.0-15.0 FT	27.5	19	24	5	CL-ML
▼	B184.8-1	S-6	13.5-15.0 FT	21.8	14	21	7	CL-ML
✱	B184.8-1	S-8	23.5-25.0 FT	11.3	12	17	5	CL-ML
⊕	B185.6-1	S-7	13.5-15.0 FT	9.1	18	26	8	CL
⊞	B186.4-1	S-5	8.0-8.4 FT	8.4	16	27	11	CL
⊗	B190.8-1	S-5	8.0-10.0 FT	23.0	19	29	10	CL
⊠	A191.82-1	S-4 & S-5	6.0-10.0 FT	19.5	20	24	4	CL-ML

TRC
Engineers, Inc.
Mt. Laurel, NJ

Client: TRANSMISSION DEVELOPERS INC.
Project: TDI CHAMPLAIN HUDSON POWER EXPRESS - CSX

Project No.: 195651 **Figure** 2

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○					2.4	2.7	52.7	40.7

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	24	19	0.0294	0.0087	0.0066	0.0031				

Material Description	USCS	AASHTO
○ GRAY SILT AND CLAY, TR F/M/C SAND	CL-ML	A-4(3)

Project No. 195651 **Client:** TRANSMISSION DEVELOPERS INC.

Project: TDI CHAMPLAIN HUDSON POWER EXPRESS - CSX

○ **Sample Source:** B183.2-1 **Depth:** 8.0-15.0 FT **Sample No.:** S-5 & S-6

Remarks:
○SAMPLE DESCRIPTION BASED ON VISUAL IDENTIFICATION AND LABORATORY ANALYSIS

TRC Engineers, Inc.

Mt. Laurel, NJ

Figure 35

Tested By: TBT 12/19/12 **Checked By:** JPB 03/12/13

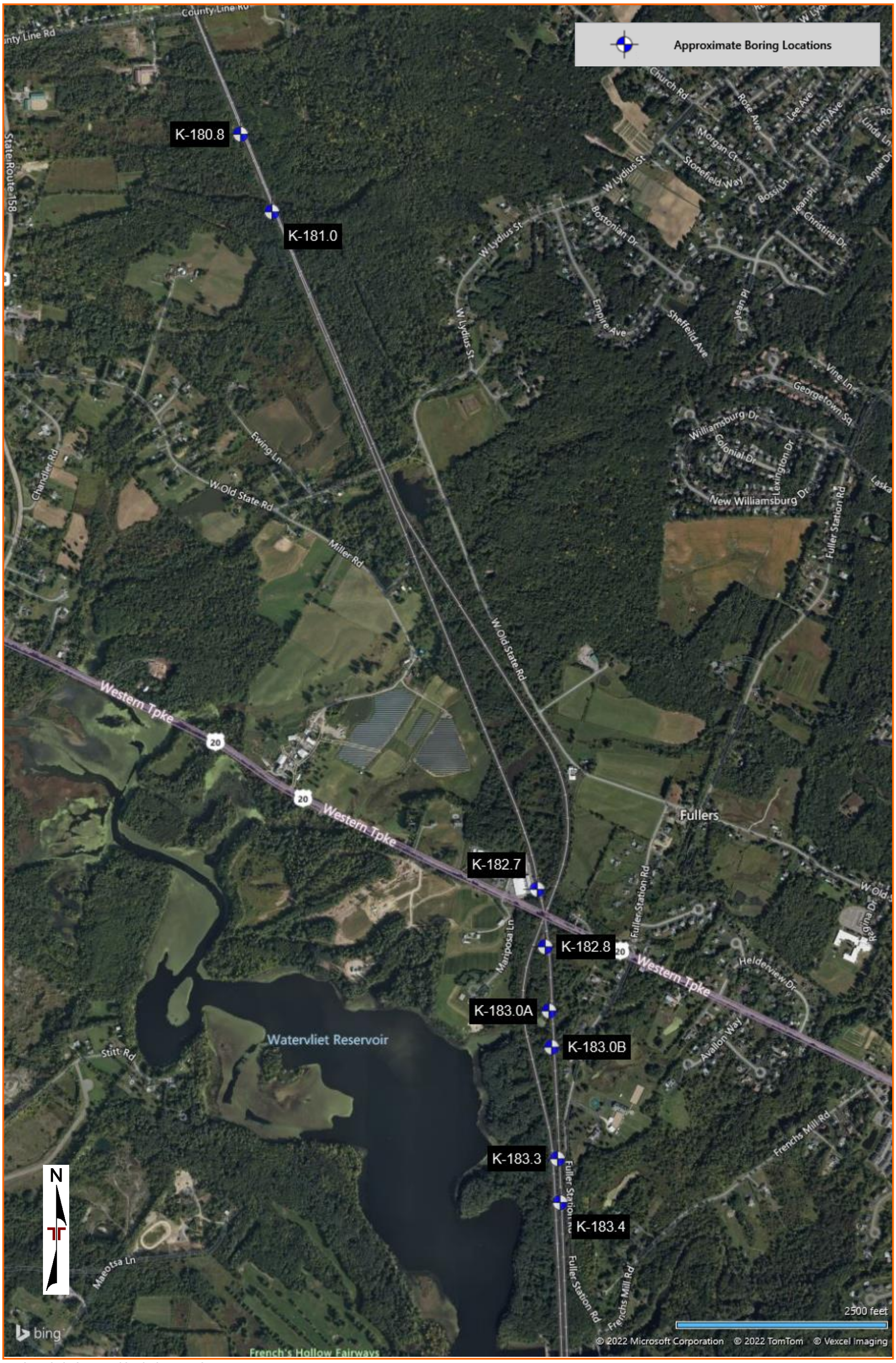


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

AERIAL PHOTOGRAPHY PROVIDED BY MICROSOFT BING MAPS

BORING LOG NO. K-183.3

PROJECT: Champlain-Hudson Power Express Package 5

CLIENT: Kiewit Engineering (NY) Corp.

SITE: Champlain to Hudson HDD Crossings Schenectady, NY

LOCATION See Exploration Plan

Latitude: 42.717858° Longitude: -73.959959°

Surface Elev.: 296.69 (Ft.)

DEPTH	ELEVATION (Ft.)	Description
		FILL - CINDERS, FLY ASH AND BALLAST, trace clay and sand, very dense to medium dense
4.0	292.5	
		FILL - SILT AND CLAY, with sand, brown, hard
6.0	290.5	
		SILT AND CLAY, brown, very soft to stiff
		grades with sand
24.0	272.5	
		SILT AND CLAY, gray, very soft to stiff

DEPTH (Ft.)	RECOVERY (In.)	FIELD TEST RESULTS	LABORATORY HP (tsf)	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	22	25-49-31-23 N=80				
	18	19-13-14-16 N=27				
5	24	32-40-17-16 N=57	>4.5			
	11	1-2-2-5 N=4	2.0 (HP)	26.6		
	23	7-7-7-8 N=14	2.0 (HP)			
10	19	2-2-3-5 N=5	1.25 (HP)	31.0	33-23-10	73
15	24	WOH-1-1-2	1.25 (HP)			
20	24	3-3-4-6 N=7	1.25 (HP)			
25	24	2-6-7-8 N=13 3" Split Spoon With Ring Samplers		33.2	34-20-14	80

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3 1/4 HSA

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by Kiewit.

Notes:

Logged by: MO
Hammer Efficency Summary:
Energy Transfer Ratio: 84.7% +/-5.7%
Hammer Efficiency Correction (CE):1.41
WOH = Weight of Hammer

WATER LEVEL OBSERVATIONS

No measurable groundwater prior to grouting

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 02-03-2022 | Boring Completed: 02-08-2022

Drill Rig: Diedrich D-50 | Driller: B. Duffey

Project No.: JB215256B

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JB215256B CHAMPLAIN-HUDSON.GPJ TERRACON_DATATEMPLATE.GDT 4/4/22

BORING LOG NO. K-183.3

PROJECT: Champlain-Hudson Power Express Package 5

CLIENT: Kiewit Engineering (NY) Corp.

SITE: Champlain to Hudson HDD Crossings Schenectady, NY

LOCATION See Exploration Plan

Latitude: 42.717858° Longitude: -73.959959°

Surface Elev.: 296.69 (Ft.)

GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	LABORATORY HP (tsf)	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	SILT AND CLAY, gray, very soft to stiff *(continued)*										
			30		X	24	WOH-WOH-WOH-7	.75 (HP)			
	31.0	265.5									
	Boring Terminated at 31 Feet										

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3 1/4 HSA

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by Kiewit.

Notes:

Logged by: MO
Hammer Efficency Summary:
Energy Transfer Ratio: 84.7% +/-5.7%
Hammer Efficiency Correction (CE):1.41
WOH = Weight of Hammer

WATER LEVEL OBSERVATIONS

No measurable groundwater prior to grouting

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 02-03-2022 | Boring Completed: 02-08-2022

Drill Rig: Diedrich D-50 | Driller: B. Duffey

Project No.: JB215256B

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JB215256B CHAMPLAIN-HUDSON.GPJ TERRACON_DATATEMPLATE.GDT 4/4/22

BORING LOG NO. K-183.4

PROJECT: Champlain-Hudson Power Express Package 5

CLIENT: Kiewit Engineering (NY) Corp.

SITE: Champlain to Hudson HDD Crossings Schenectady, NY

LOCATION See Exploration Plan

Latitude: 42.716398° Longitude: -73.959877°

Surface Elev.: 298.33 (Ft.)

DEPTH	ELEVATION (Ft.)	Description
0.0	298.33	
2.0	296.5	**FILL - POORLY GRADED GRAVEL (GP)**, contains fly ash, black, frozen ballast
6.0	292.5	**FILL - POORLY GRADED SAND (SP)**, trace clay and gravel, brown, medium dense
15.0	283.5	**SILTY SAND (SM)**, trace gravel, brown, loose
		SILT AND CLAY (CL-ML), brown, medium stiff to very stiff

DEPTH (Ft.)	RECOVERY (In.)	FIELD TEST RESULTS	LABORATORY HP (tsf)	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	24	91-112-35-71 N=147				
	13	12-8-9-9 N=17				
5	12	4-5-5-4 N=10				
	12	4-4-5-4 N=9				
	12	4-3-4-3 N=7		13.8		30
10	12	3-4-3-4 N=7	2.5 (HP)			
15	16	2-3-5-5 N=8	1.75 (HP)	24.8	28-22-6	85
20	23	4-6-8-10 N=14	3.25 (HP)			
	24	6-6-11-11 N=17 3" Split Spoon With Ring Samplers	2.0 (HP)	34.3	43-26-17	72
25	24	4-7-5-6 N=12	1.75 (HP)			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3 1/4 HSA

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by Kiewit.

Notes:

Logged by: MO
Hammer Efficency Summary:
Energy Transfer Ratio: 84.7% +/-5.7%
Hammer Efficiency Correction (CE):1.41
WOH = Weight of Hammer

WATER LEVEL OBSERVATIONS

No measurable groundwater prior to grouting

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 02-02-2022 | Boring Completed: 02-02-2022

Drill Rig: Diedrich D-50 | Driller: B. Duffey

Project No.: JB215256B

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JB215256B CHAMPLAIN-HUDSON.GPJ TERRACON_DATATEMPLATE.GDT 4/4/22

BORING LOG NO. K-183.4

PROJECT: Champlain-Hudson Power Express Package 5

CLIENT: Kiewit Engineering (NY) Corp.

SITE: Champlain to Hudson HDD Crossings Schenectady, NY

LOCATION See Exploration Plan

Latitude: 42.716398° Longitude: -73.959877°

Surface Elev.: 298.33 (Ft.)

DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	LABORATORY HP (tsf)	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
SILT AND CLAY (CL-ML), brown, medium stiff to very stiff *(continued)*									
		30	X	24	4-4-6-7 N=10	1 (HP)			
		35	X	24	3-3-4-6 N=7	.5 (HP)	33.1		
38.0	260.5								
SILT AND CLAY (CL-ML), gray, medium stiff			X		WOH-3-4-7 N=7	1.0 (HP)			
40.0	258.5	40							
Boring Terminated at 40 Feet									

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3 1/4 HSA

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by Kiewit.

Notes:

Logged by: MO
Hammer Efficency Summary:
Energy Transfer Ratio: 84.7% +/-5.7%
Hammer Efficiency Correction (CE):1.41
WOH = Weight of Hammer

WATER LEVEL OBSERVATIONS

No measurable groundwater prior to grouting

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 02-02-2022 | Boring Completed: 02-02-2022

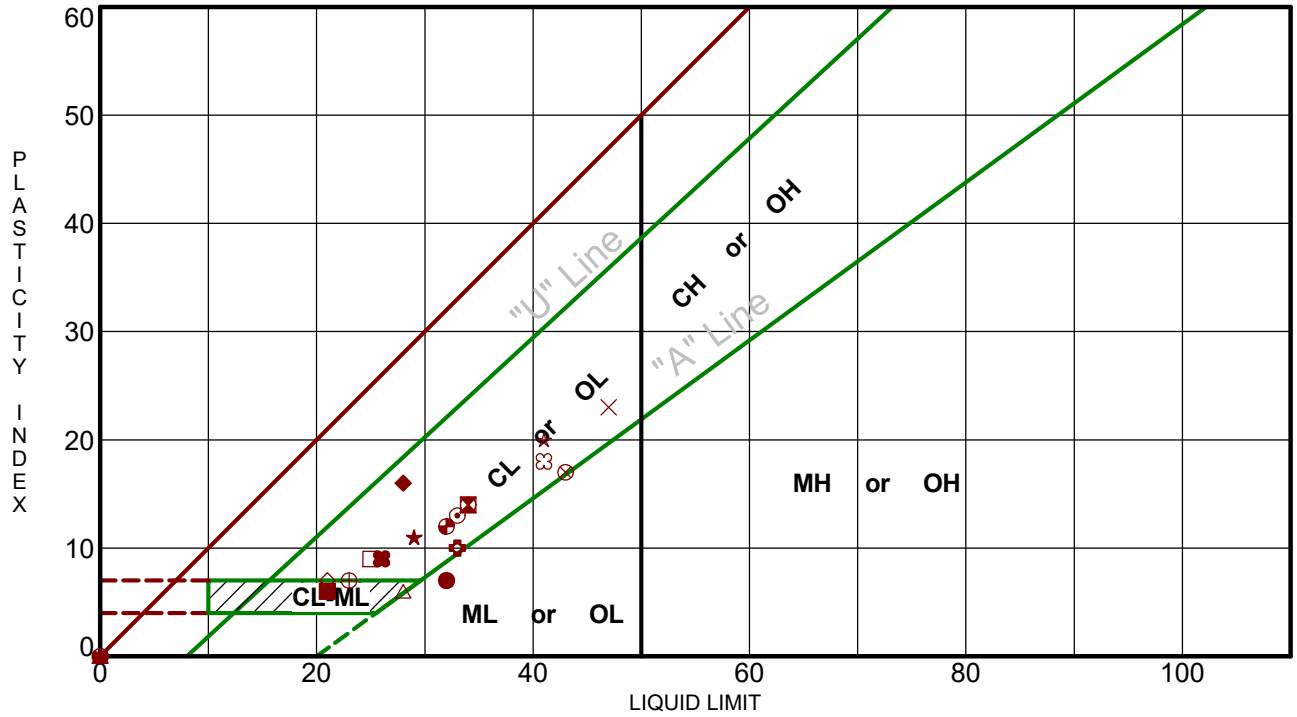
Drill Rig: Diedrich D-50 | Driller: B. Duffey

Project No.: JB215256B

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JB215256B CHAMPLAIN-HUDSON.GPJ TERRACON_DATATEMPLATE.GDT 4/4/22

ATTERBERG LIMITS RESULTS

ASTM D4318



Boring ID		Depth (Ft)	LL	PL	PI	Fines	USCS	Description
●	K-183.0A	19 - 21	32	25	7	57.3	ML	SANDY SILT
⊠	K-183.0A	34 - 36	34	20	14	76.1	CL	LEAN CLAY with SAND
▲	K-183.0B	8 - 10	NP	NP	NP	84.8	ML	SILT with SAND
★	K-183.0B	20 - 22	29	18	11	78.2	CL	LEAN CLAY with SAND
⊙	K-183.0B	35 - 37	33	20	13	89.9	CL	LEAN CLAY
✿	K-183.3	10 - 12	33	23	10	73.5	CL	LEAN CLAY with SAND
○	K-183.3	24 - 26	34	20	14	80.5	CL	LEAN CLAY with SAND
△	K-183.4	15 - 17	28	22	6	84.9	CL-ML	SILTY CLAY with SAND
⊗	K-183.4	23 - 25	43	26	17	72.5	CL	LEAN CLAY with SAND
⊕	K-184.5	15 - 17	23	16	7	54.0	CL-ML	SANDY SILTY CLAY
□	K-184.5	30 - 32	25	16	9	45.0	SC	CLAYEY SAND with GRAVEL
⊛	K-184.7	10 - 12	NP	NP	NP	5.0	SP	POORLY GRADED SAND with GRAVEL
◕	K-185.6	8 - 10	32	20	12		CL	LEAN CLAY
☆	K-192.3	10 - 12	41	21	20	80.5	CL	LEAN CLAY with SAND
✿	K-192.3	38 - 40	41	23	18	81.6	CL	LEAN CLAY with SAND
■	K-193.5	12 - 14	21	15	6	55.7	CL-ML	SANDY SILTY CLAY
◆	K-193.5	20 - 22	28	12	16	15.3	GC	CLAYEY GRAVEL with SAND
◇	K-193.5	33 - 34	21	14	7	24.0	SC-SM	SILTY, CLAYEY SAND with GRAVEL
×	K-193.6	8 - 10	47	24	23	78.3	CL	LEAN CLAY with SAND
✖	K-193.6	21 - 23	26	17	9	94.5	CL	LEAN CLAY

PROJECT: Champlain-Hudson Power Express Package 5

SITE: Champlain to Hudson HDD Crossings Schenectady, NY

Terracon
30 Corporate Cir Ste 201
Albany, NY

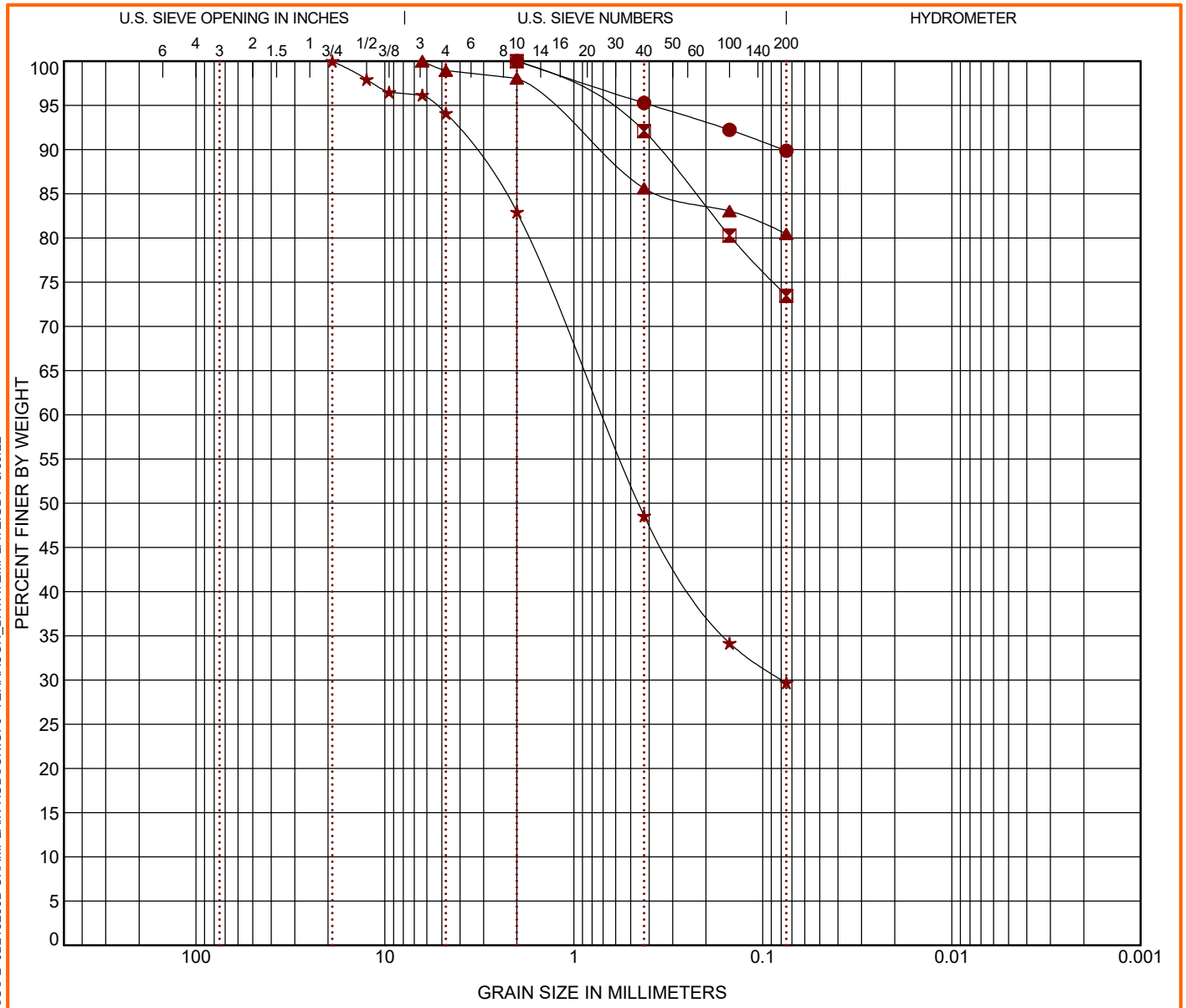
PROJECT NUMBER: JB215256B

CLIENT: Kiewit Engineering (NY) Corp.

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. ATTERBERG LIMITS JB215256B CHAMPLAIN-HUDSON.GPJ TERRACON_DATATEMPLATE.GDT 4/4/22

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring ID	Depth (Ft)	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
●	K-183.0B	35 - 37	LEAN CLAY (CL)	35.6	33	20	13		
⊠	K-183.3	10 - 12	LEAN CLAY with SAND (CL)	31.0	33	23	10		
▲	K-183.3	24 - 26	LEAN CLAY with SAND (CL)	33.2	34	20	14		
★	K-183.4	8 - 10	SILTY SAND (SM)	13.8					

	Boring ID	Depth (Ft)	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
●	K-183.0B	35 - 37	2				0.0	0.0	10.1		89.9	
⊠	K-183.3	10 - 12	2				0.0	0.0	26.5		73.5	
▲	K-183.3	24 - 26	6.35				0.0	1.1	18.5		80.5	
★	K-183.4	8 - 10	19	0.711	0.079		0.0	5.9	64.4		29.7	

PROJECT: Champlain-Hudson Power Express Package 5

SITE: Champlain to Hudson HDD Crossings Schenectady, NY

Terracon
30 Corporate Cir Ste 201
Albany, NY

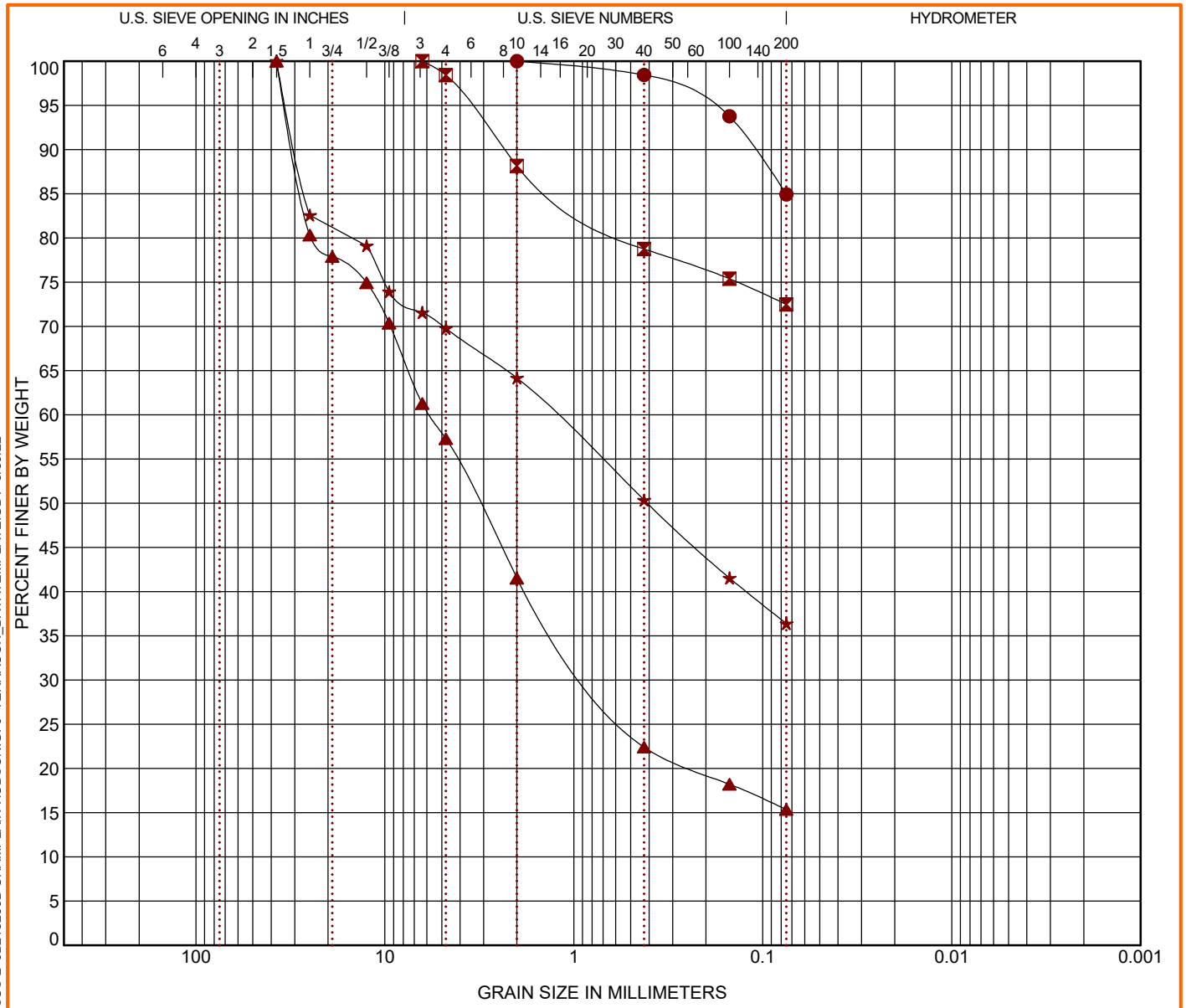
PROJECT NUMBER: JB215256B

CLIENT: Kiewit Engineering (NY) Corp.

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS-2 JB215256B CHAMPLAIN-HUDSON.GPJ TERRACON_DATATEMPLATE.GDT 3/30/22

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring ID	Depth (Ft)	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
●	K-183.4	15 - 17	SILTY CLAY with SAND (CL-ML)	24.8	28	22	6		
⊠	K-183.4	23 - 25	LEAN CLAY with SAND (CL)	34.3	43	26	17		
▲	K-184.3	4 - 6	SILTY GRAVEL with SAND (GM)	18.5					
★	K-184.3	15 - 17	SILTY SAND with GRAVEL (SM)	10.6					

	Boring ID	Depth (Ft)	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
●	K-183.4	15 - 17	2				0.0	0.0	15.1		84.9	
⊠	K-183.4	23 - 25	6.35				0.0	1.6	26.0		72.5	
▲	K-184.3	4 - 6	37.5	5.79	0.787		0.0	42.7	41.9		15.3	
★	K-184.3	15 - 17	37.5	1.254			0.0	30.2	33.4		36.4	

PROJECT: Champlain-Hudson Power Express Package 5

SITE: Champlain to Hudson HDD Crossings Schenectady, NY

Terracon
30 Corporate Cir Ste 201
Albany, NY

PROJECT NUMBER: JB215256B

CLIENT: Kiewit Engineering (NY) Corp.

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS-2 JB215256B CHAMPLAIN-HUDSON.GPJ TERRACON_DATATEMPLATE.GDT 3/30/22

Kiewit

MEMORANDUM

DATE: February 13, 2023

TO: Nick Strater; Brierley Associates Underground Engineers, PLLC

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

SUBJECT: Geotechnical Data: Segment 8 – Package 5 – HDD Crossing 78 – Revision 1
Champlain Hudson Power Express Project
Schenectady, 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 south of Schenectady, New York. The approximate station for the start of HDD crossing Number 78 is STA 50382+00 (42.7059° N, 73.9591° W).

The geotechnical data at this HDD crossing is attached. The available data is from the previous investigations by AECOM and TRC and the recent investigations by Terracon.

- AECOM, Geotechnical Data Report, Upland Segments, Champlain Hudson Power Express, dated May 28, 2021.
- TRC, Geotechnical Data Report, Champlain Hudson Power Express, Canadian Pacific Railway Borings MP 177.6-228.2, dated March 15, 2013.
- Terracon, Geotechnical Data Report, Champlain-Hudson Power Express-Package 5, Schenectady through Selkirk, dated April 4, 2022.
- Terracon, Geotechnical Data Report, Champlain-Hudson Power Express – Additional HDD Borings – Phase 3, Fort Ann to Coxsackie, dated November 3, 2022

Contact us if you have questions or require additional information.

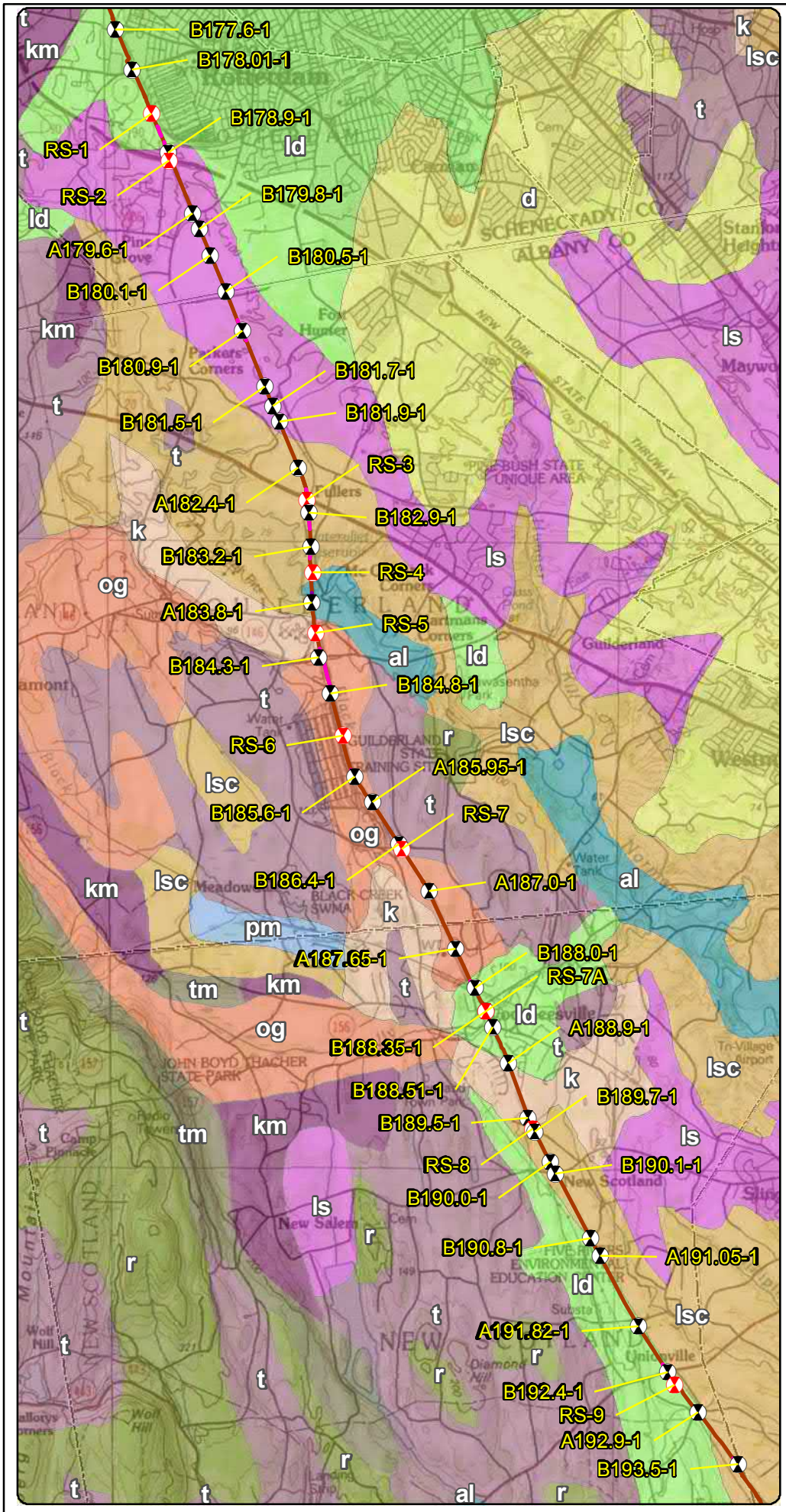
HDD 78
Borings B184.3-1, RS-5
K-184.3, K-184.4, K-184.5,
K-184.6, KB-184.2
Segment 8 - Package 5

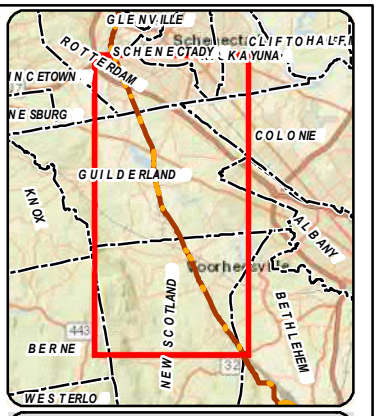
CHPE Segment 8 & 9 - Package 5
HDD Soil Boring Coordinates and Elevations

Firm	Boring	Northing (feet)	Easting (feet)	Ground Surface Elevation (feet)
TRC*	A179.6-1	1433335.8	631009.7	332.5
	A182.4-1	1420048.2	636557.9	291.5
	A187.65-1	1394856.5	644775.4	327.7
	A191.05-1	1378814.5	652321.0	274.7
	A191.82-1	1375154.9	654314.3	257.1
	A192.9-1	1370644.3	657458.6	232.8
	B177.1-1	1445275.2	626125.8	347.3
	B177.6-1	1442944.0	627003.0	346.5
	B178.01-1	1440838.2	627828.3	368.5
	B178.9-1	1436461.4	629767.4	322.1
	B180.1-1	1431140.9	631965.3	310.4
	B180.9-1	1427158.5	633611.8	307.5
	B182.9-1	1417657.6	637123.9	291.5
	B183.2-1	1415871.4	637202.5	290.2
	B184.3-1	1410133.0	637597.6	324.0
	B184.8-1	1408223.8	638230.4	323.1
	B185.6-1	1403875.9	639489.9	328.2
	B188.0-1	1392812.4	645793.4	330.9
	B188.35-1	1391616.5	646333.6	333.4
	B188.51-1	1390815.1	646697.7	340.2
	B190.0-1	1383732.6	649743.4	296.3
	B190.1-1	1383134.9	649975.5	294.6
	B190.8-1	1379726.2	651827.2	282.3
	B192.4-1	1372732.4	655878.1	239.3
	B193.5-1	1367919.2	659547.5	218.6
AECOM**	RS-2	1436092.2	629800.7	315.6
	RS-3	1418336.4	636985.0	303.2
	RS-4	1414567.4	637285.8	302.2
	RS-5	1411399.1	637471.6	319.0
	RS-7A	1391599.9	646333.6	340.5
	RS-9	1372089.8	656230.9	238.7
	SY-7	1353089.8	670133.9	159.8
	SY-8	1353716.5	671626.7	175.0
	SY-9	1353046.4	673133.41	163.1
	SY-9A	1351940.0	674314.3	158.3
	SY-10	1350838.3	675488.6	166.0
	SCH-19	1446199.8	625927.0	333.8
	SCH-19A	1445712.1	626032.4	343.1

Notes:
- Northings and Eastings are provided in NAD83 New York State Plane East Zone.
- Elevations are referenced to the NAVD88 datum.
* TRC boring coordinates as shown in Table 1-6 in AECOM report (reference below). Boring elevations estimated from November 2021 topographic survey by Williams Aerial.
** AECOM boring coordinates and elevations as shown in Table 1-6 in AECOM report.
*** Kiewit boring coordinates and elevations are noted on the boring logs.

Reference:
AECOM, Geotechnical Data Report, Upland Segments: Putnam Station, Washington County, to Cementon, Green County, NY, Champlain Hudson Power Express, dated May 28, 2021.





LEGEND

- 2021 Boring Location
- Previous (2013) Boring Location
- Terrestrial Route HVDC
- Submarine Route HVDC
- Terrestrial Route HVAC
- Preliminary HDD Locations
- Preliminary Pipe Bridge Location
- Town Boundary
- County Boundary

Surficial Geology

- al - Recent alluvium
- d - Dunes
- k - Kame deposits
- km - Kame moraine
- ld - Lacustrine delta
- ls - Lacustrine sand
- lsc - Lacustrine silt and clay
- og - Outwash sand and gravel
- pm - Swamp deposits
- r - Bedrock
- t - Till
- tm - Till moraine

N

0.7 0.35 0 0.7 Miles

Transmission Developers Inc.

Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

Surficial Geology and Geotechnical Borings Rotterdam to Selkirk Figure 3-8

Prepared on 5/4/2021

by: AECOM

DATA SOURCES: ESRI, NYSDOT, NOAA, USACE, NYDOS, TDI, TRC

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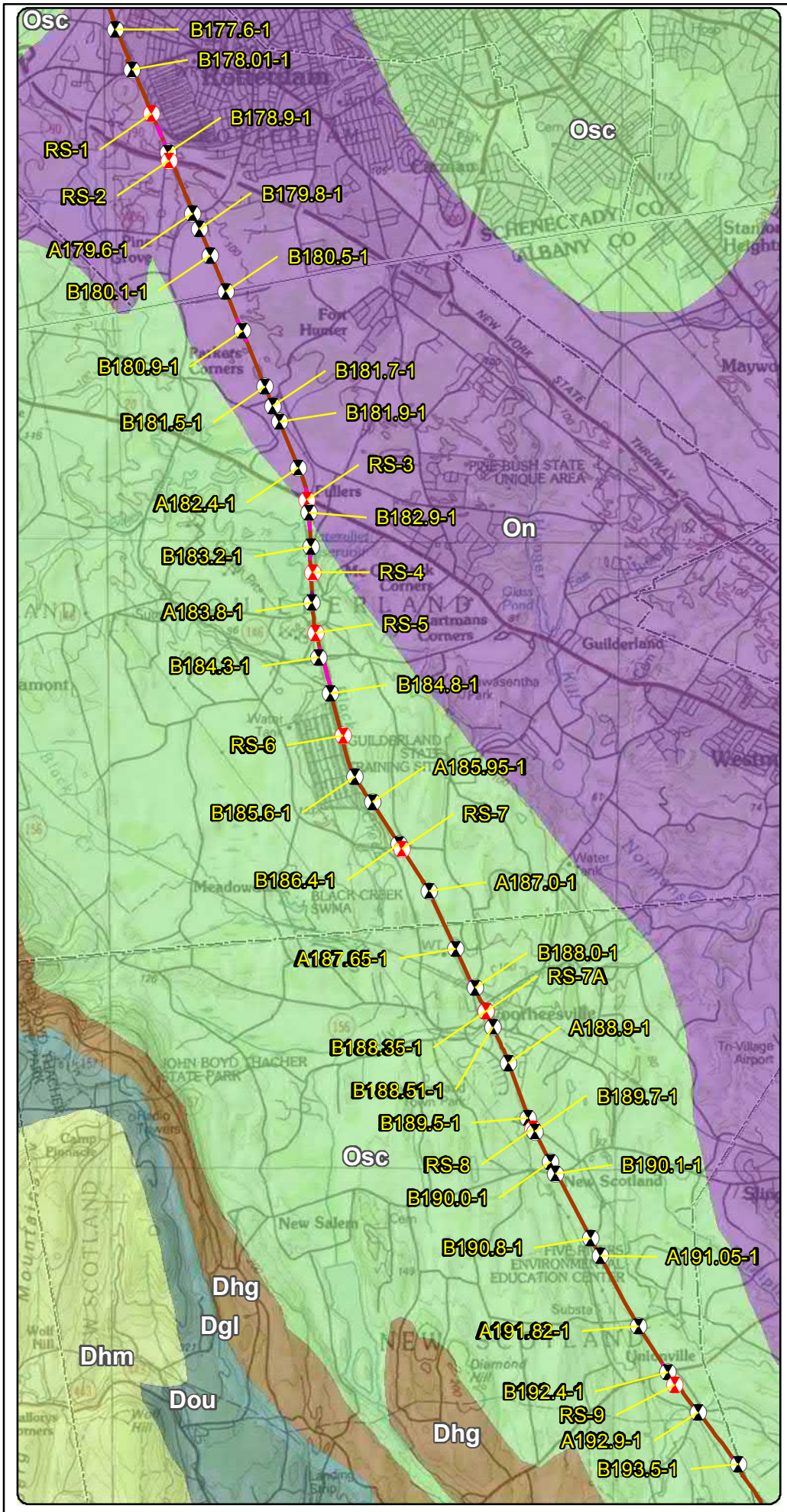

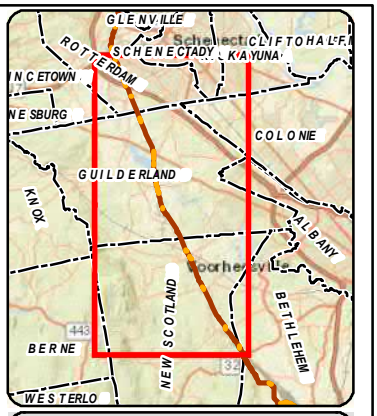

LEGEND

- 2021 Boring Location
- Previous (2013) Boring Location
- Terrestrial Route HVDC
- Submarine Route HVDC
- Terrestrial Route HVAC
- Preliminary HDD Locations
- Preliminary Pipe Bridge Location
- Town Boundary
- County Boundary

Bedrock Geology

- Dgl - Glenerie Formation
- Dhg - Port Ewen Formation
- Dhm - Undiff Lower Hamilton Group
- Dou - Onondaga Limestone
- On - Normanskill Shale
- Osc - Schenectady Formation

* Schenectady Formation includes: graywacke, sandstone, siltstone, shale

N

0.7 0.35 0 0.7 Miles

Transmission

Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

Bedrock Geology and Geotechnical Borings Rotterdam to Selkirk Figure 4-8

Prepared on 5/4/2021

by: AECOM

DATA SOURCES: ESRI, NYSDOT, NOAA, USACE, NYDOS, TDI, TRC

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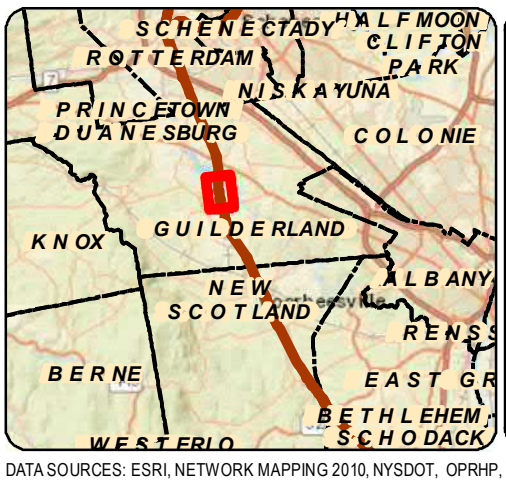
183.4
183.5
RS-4
183.6
183.7
A183.8-1
183.9
184
GUILDERLAND
RS-5
184.2
184.3
B184.3-1
184.5
184.6
Hurst Rd
French's Mill Rd
Tree Frog Ln
Fuller Station Rd
French's Hollow Rd
Elizabethfield Way
Diagonal Rd
Main St
Forest Ln
RT-146
Van Wormer Dr
Wagner Rd
Nelson Pl
School Rd
East Dr
Van Buren Blvd
0
1,000
Feet



LEGEND

- 111.8 Certified Milepost - Tenths
- 135 Certified Milepost
- 111.8 Preferred Alternative Milepost - Tenths
- 135 Preferred Alternative Milepost
- Terrestrial Route HVDC
- Submarine Route HVDC
- Terrestrial Route HVAC
- Preliminary HDD Locations
- Preliminary Pipe Bridge Location
- 2021 Boring Location
- Previous (2013) Boring Location
- Streams/Ditches
- Railroad ROW
- Deviation Zone
- Deviation Zone Outside ROW
- Preferred Alternative Deviation Zone
- Preferred Alternative Deviation Zone Outside ROW
- Town Boundary
- Village Boundary
- State Park (OPRHP)

Parcel Ownership: TOWN NAME

Road Name: Village Name

Transmission Developers Inc.

Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

BORING LOCATION PLAN

Rotterdam to Selkirk

Figure A-8

Sheet 6 of 14

Prepared by: AECOM 5/4/2021

DATA SOURCES: ESRI, NETWORK MAPPING 2010, NYSDOT, OPRHP, TDI, TRC

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TEST BORING LOG

PROJECT: TDI CHAMPLAIN HUDSON POWER EXPRESS
LOCATION: CSX RAILROAD ROW, NY

BORING	**B184.3-1**
G.S. ELEV.	N/A
FILE	195651
SHEET	1 OF 1

GROUNDWATER DATA			
FIRST ENCOUNTERED NR			
DEPTH	HOUR	DATE	ELAPSED TIME
6.0'	NR	11/15	0 HR

METHOD OF ADVANCING BOREHOLE				
a	FROM	0.0 '	TO	10.0 '
c2	FROM	10.0 '	TO	15.0 '
d	FROM	15.0 '	TO	30.0 '

DRILLER	P. PLANTIER
HELPER	M. NAGEY
INSPECTOR	N/A
DATE STARTED	11/14/2012
DATE COMPLETED	11/15/2012

DEPTH	A	B	C	DESCRIPTION	Wn	REMARKS
	S-1	4 6 5 4				ROOTS AT 0.0-2.0 FT
	S-2	7 6 7 7		***BROWN SILTY M/C/F SAND, SM F/C GRAVEL***	12.5	
5	S-3	8 7 8 5				
	S-4	6 4 6 4		8.0	15.1	
10	S-5	2 4 2 4		***BROWN SILTY F/C GRAVEL-SIZED ROCK FRAGMENTS, TR TO SM M/C SAND***	7.9	
				13.0		
				BOULDERS & COBBLES (GLACIAL TILL)		
15	R-1			15.0		
	S-6	12 25 50/0.3		16.3 ***BROWN M/C SANDY SILT, SM F/ GRAVEL-SIZED ROCK FRAGMENTS (GLACIAL TILL)***		
20	S-7	17 31 50/0.3				
	S-8	31 50/0.2		***GRAY F/M/C SANDY CLAY, SM F/ GRAVEL, TR TO SM SILT (GLACIAL TILL)***		
25					12.6	
	S-9	44 50/0.1		29.1		
30				***END OF BORING AT 29.1'***		
35						

DRN.	TBT
CKD.	PWK

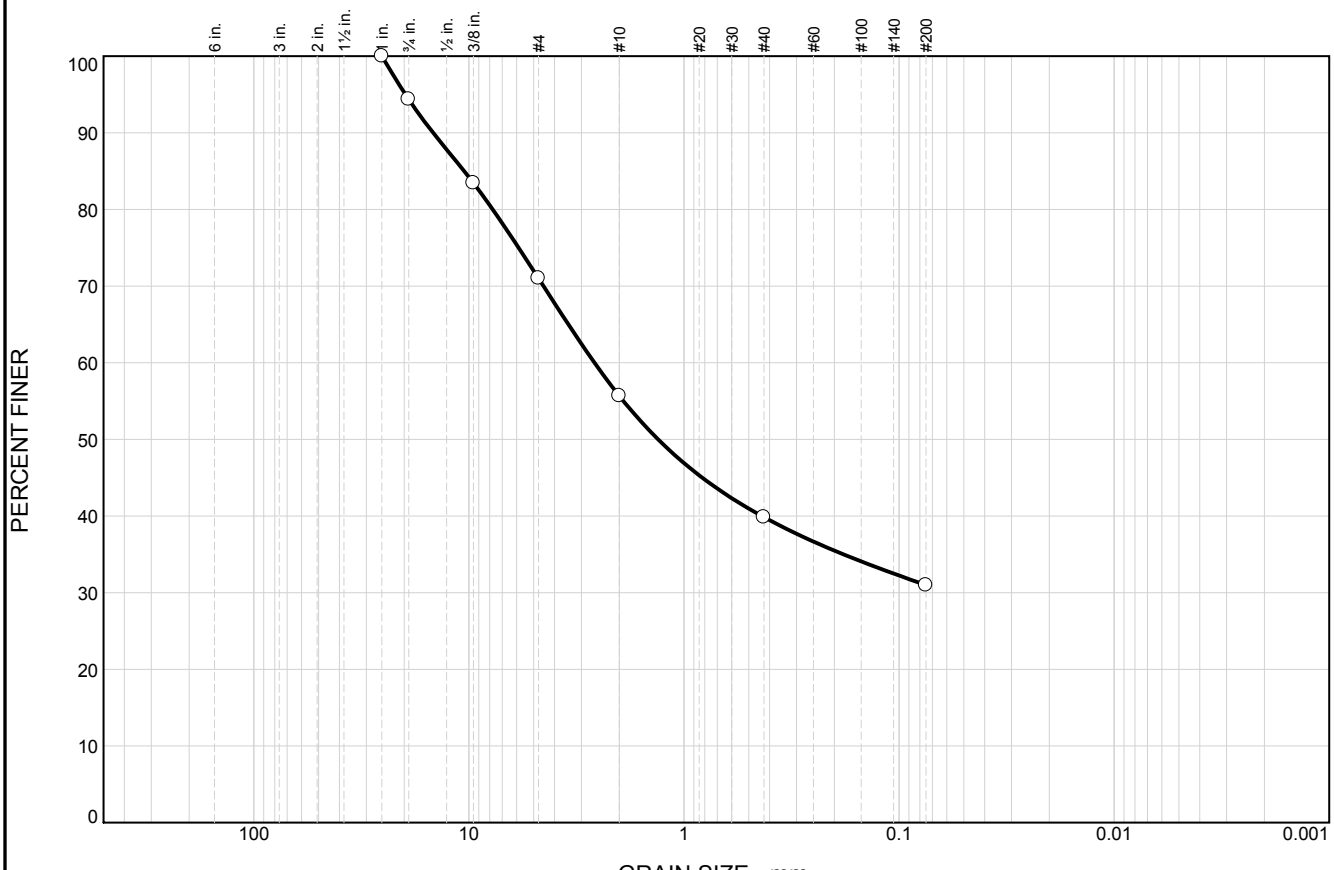
NEW PROJECTS TEST BORING LOG 195651_TDI_CSX.GPJ SITE BLAUVELT.GDT 3/12/13

SUMMARY OF LABORATORY TEST DATA

Project Name: TDI Champlain Hudson Power Express – CSX
Client Name: Transmission Developers, Inc.
TRC Project #: 195651

SAMPLE IDENTIFICATION			Soil Group (USCS System)	GRAIN SIZE DISTRIBUTION				PLASTICITY				Specific Gravity	Moisture Content (%)	Unit Weight (pcf)	Compressive Strength (tsf)	Organic Content (%)
Boring #	Sample #	Depth (ft)		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Liquidity Index)					
	S-5	8.0-10.0		8.9	57.0	34.1		-	-	-	-	-	12.2	-	-	-
	R-1	14.8-15.3	-	-	-	-		-	-	-	-	-	-	165.4	550	-
B184.3-1	S-2	2.0-4.0	-	-	-	-		-	-	-	-	-	12.5	-	-	-
	S-3	4.0-6.0	SM	29.0	40.0	31.0		-	-	-	-	-	15.1	-	-	-
	S-4	6.0-8.0														
	S-5	8.0-10.0	-	-	-	-		-	-	-	-	-	7.9	-	-	-
	S-7	18.5-20.0	-	18.3	36.5	45.2		-	-	-	-	-	12.6	-	-	-
	S-8	23.5-24.2														
B184.8-1	S-3	4.0-6.0	GM	37.2	34.5	28.3		-	-	-	-	-	13.0	-	-	-
	S-6	13.5-15.0	CL-ML	-	-	-		21	14	7	1.1	-	21.8	-	-	-
	S-8	23.5-25.0	CL-ML	-	-	-		17	12	5	-0.1	-	11.3	-	-	-

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	5.6	23.4	15.3	15.8	8.9	31.0	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			10.5261	2.6065	1.3191					

Material Description	USCS	AASHTO
○ BROWN SILTY M/C/F SAND, SM F/C GRAVEL	SM	

Project No. 195651 **Client:** TRANSMISSION DEVELOPERS INC.

Project: TDI CHAMPLAIN HUDSON POWER EXPRESS - CSX

○ **Source of Sample:** B184.3-1 **Depth:** 4.0-8.0 FT **Sample Number:** S-3 & S-4

Remarks:
○SAMPLE DESCRIPTION BASED ON VISUAL IDENTIFICATION AND LABORATORY ANALYSIS

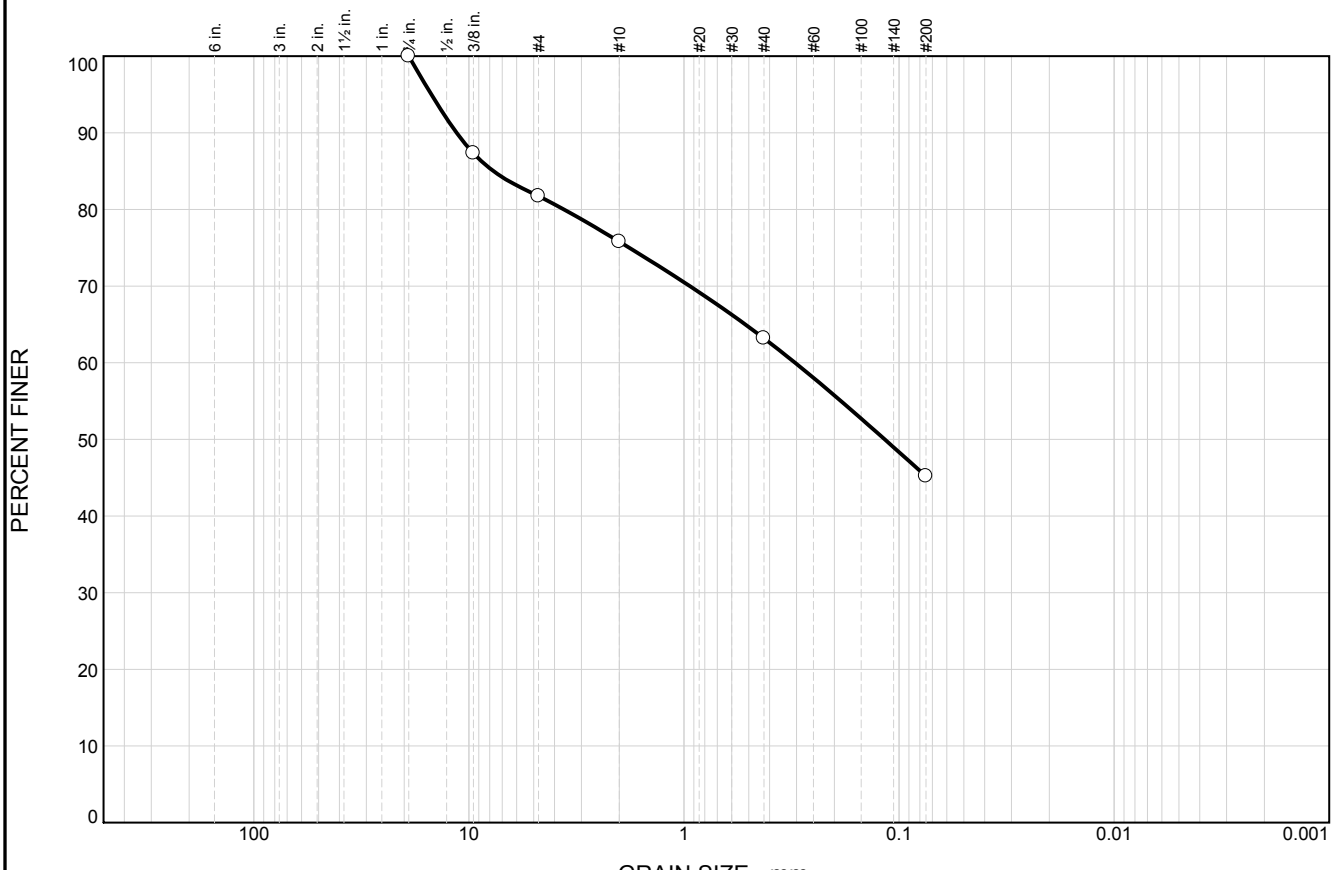
TRC Engineers, Inc.

Mt. Laurel, NJ

Figure 39

Tested By: TBT 12/18/12 **Checked By:** JPB 03/12/13

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	18.3	5.9	12.6	18.0	45.2	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			7.6894	0.3045	0.1166					

Material Description	USCS	AASHTO
○ GRAY F/M/C SANDY CLAY, SM F/ GRAVEL, TR TO SM SILT		

Project No. 195651 **Client:** TRANSMISSION DEVELOPERS INC.

Project: TDI CHAMPLAIN HUDSON POWER EXPRESS - CSX

○ **Sample Source:** B184.3-1 **Depth:** 18.5-24.2 FT **Sample No.:** S-7 & S-8

Remarks:
○SAMPLE DESCRIPTION BASED ON VISUAL IDENTIFICATION AND LABORATORY ANALYSIS

TRC Engineers, Inc.

Mt. Laurel, NJ

Figure 40

Tested By: TBT 12/20/12 **Checked By:** JPB 03/12/13

BORING CONTRACTOR: ADT	AECOM	SHEET 1 OF 1
DRILLER: Chris Chaillou		PROJECT NAME: CHPE -
SOILS ENGINEER/GEOLOGIST: Chris French		PROJECT NO.: 60323056
		HOLE NO.: **RS-5**
		START DATE: 3/11/21
	BORING LOG	FINISH DATE: 3/11/21
LOCATION: MP 184.10 (CSX Rail)		OFFSET: N/A

GROUND WATER OBSERVATIONS		CASING	SAMPLER	DRILL BIT	CORE BARREL	DRILL RIG: CME LC-55
WT at 10' (inferred)	TYPE	Flush Joint Steel	California Modified	Tricone Roller 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.:
	HAMMER WT.	140 lbs	140 lbs			NORTHING
	HAMMER FALL	30"	30"			EASTING

DEPTH	CORING RATE MIN/FT	SAMPLE DEPTHS FROM - TO (FEET)	TYPE AND NO.	PEN. in	REC. in	BLOWS PER 6 in ON SAMPLER (ROCK QUALITY DESIGNATION)				N Corr.(2)	USCS CLASS.	STRAT. CHNG. DEPTH	FIELD IDENTIFICATION OF SOILS
		0'-5'				Hand Cleared					SM	SAND & GRAVEL	0'-2.5' Brown fine to coarse SAND, some Silt, little sub-angular to sub rounded Gravel, trace Cobbles, very dense
1.0													
2.0											SW		2.5'-5' Dark Brown fine to coarse SAND, little rounded to sub-rounded Gravel, trace Cobbles, trace Silt, dense, moist
3.0													
		3'-5'	S-1										
4.0													TR-1; (3.0'-5.0')
5.0													
		5'-7'	S-2	24"	7"	30	20	23	25	28	SW		Dark Brown fine to coarse SAND, little rounded to sub-rounded Gravel, trace Silt, dense, moist
6.0													
7.0													
		7'-9'	S-3	24"	14"	27	27	22	24	32	SW		SAA
8.0													
													TR-2; (8.0'-8.5')
9.0													
		9'-11	S-4	24"	15"	17	19	25	25	29	SP		Brown coarse SAND, little sub-rounded to rounded Gravel, little fine to medium Sand, trace Silt, very dense, Saturated
10.0													
11.0													
		11'-13'	S-5	24"	12"	18	28	33	22	40	SW		Brown fine to coarse SAND, little sub-rounded to rounded Gravel, little Silt, very dense, moist
12.0													TR-3; (12.0'-12.5')
13.0													
		13'-15'	S-6	24"	16"	18	20	19	18	25	SP		Brown fine to medium SAND, trace Silt, dense, saturated
14.0													TR-4; (14.0'-14.5')
15.0													
		15'-16'	S-7	12"	10"	20	20			-	SP		SAA
16.0													
17.0													RS-5 terminated at 16' then grouted to surface
18.0													
19.0													
20.0													

NOTES:

(1) Thick-wall ring lined drive sampler (California sampler) used for SPT samples. Rings dimensions = 2-1/2" O.D. by 2-7/16" I.D. by 6" length.

(2) Correction factor: $N_{corr}=N*(2.0^2-1.375^2)in./(3.0^2-2.4^2)in. = N*0.65$.

Soil description represents a field identification after D.M. Burmister unless otherwise noted.

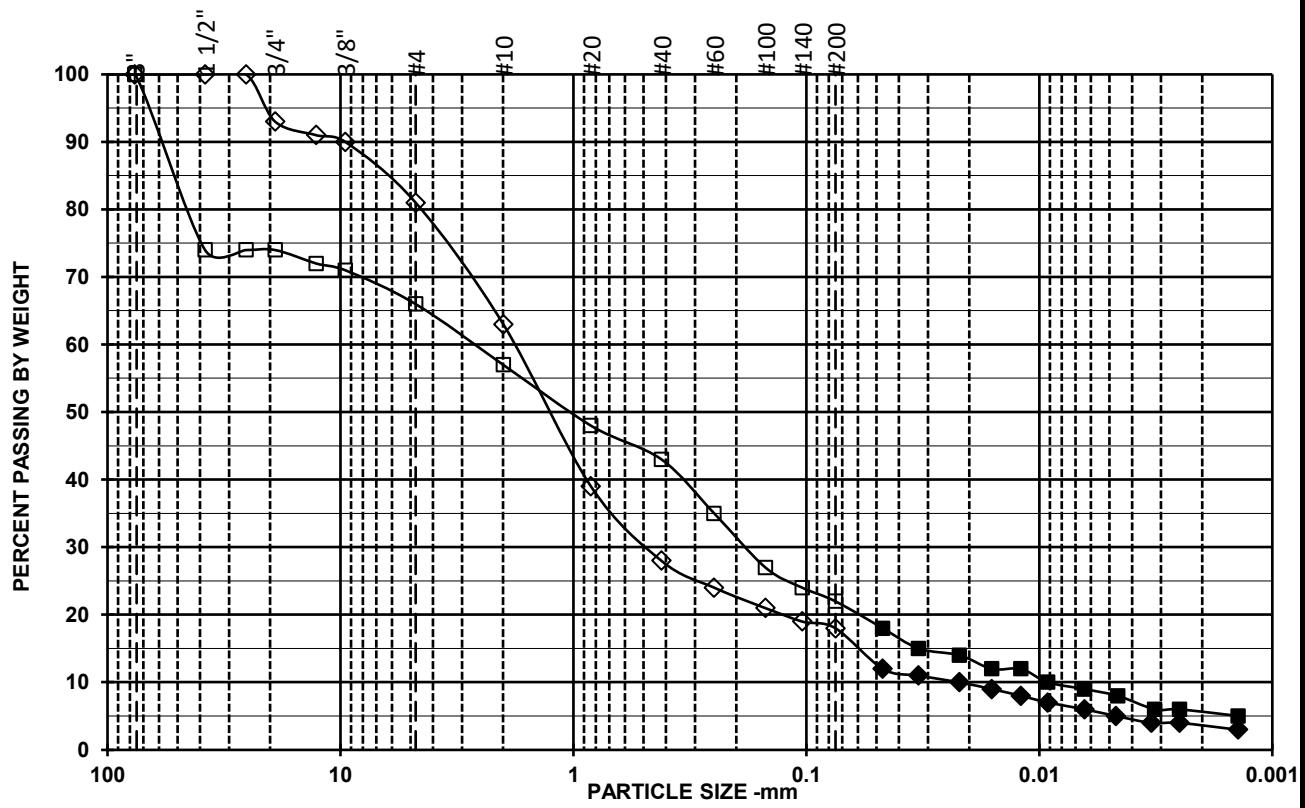
The information contained on this log is not warranted to show the actual subsurface condition. The contractor agrees that he will make no claims against AECOM if he finds that the actual conditions do not conform to those indicated by this log.

SAMPLE TYPE:	S= SPLIT SPOON	U=SHELBY TUBE	R=ROCK CORE	
PROPORTIONS:	TRACE=1-10%	LITTLE=10-20%	SOME=20-35%	AND=35-50%

Table 3-8: Summary of Geotechnical Laboratory Testing of Soil Samples
Rotterdam to Selkirk Segment (RS)

Boring ID	Sample ID	Depth (ft)	USCS Symbol	% Gravel	% Sand	% Silt	% Clay	LL [1] (%)	PL [2] (%)	PI [3] (%)	Water Content	Org. Content (%)
RS-2	S-2	5-7	CL	0	0.6	79.4	20	29	18	11	27.3	-
	S-7	15-17	ML	0	7.6	85.4	7	19	19	NP	21.7	-
	S-9	25-27	CL-ML	0	0.3	79.7	20	21	15	6	27.5	-
RS-3	S-3	7-9	SC	0	76.3	15.7	8	18	10	8	18.3	-
	S-8	20-22	CL	0	0.2	79.8	20	32	20	12	26.9	-
	S-10	30-32	CL	0	0	70	30	31	19	12	27.6	-
RS-5	S-2	5-7	SM	34	44	16	6	-	-	-	6.4	-
	S-4	9-11	SM	19	63	14	4	-	-	-	8	-
RS-7	S-2	5-7	SC	21	30	30	19	26	15	11	11	-
	S-4	9-11	CL	15	29	31	25	30	15	15	11	-
RS-7A	S-4	9-11	GC	46	35	14	5	-	-	-	15.4	-
	S-9	25-27	SM	2	78	15	5	-	-	-	22.1	-
RS-9	S-2	5-7	CL	0.1	3.8	77.1	19	32	22	10	33.4	-
	S-7	15-17	CL	0	1	45	54	41	20	21	39.7	-
	S-10	30-32	CL	0	0	51	49	43	22	21	40.9	-

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



Open Symbols: Sieve analysis by ASTM D6913
Filled symbols: Hydrometer analysis by ASTM D7928 corrected for complete sample

SYMBOL	w (%)	LL	PL	PI	USCS	AASHTO	USCS DESCRIPTION AND REMARKS	DATE
□	6.4				SM		Brown, Silty sand with gravel, Insufficient sample size	05/07/21
◇	8.0				SM		Brown, Silty sand with gravel, Insufficient sample size	05/07/21
○								

Symbol	□	◇	○
Boring	RS-5	RS-5	
Sample	S-2	S-4	
Depth	5-7	9-11	
% +3"	0	0	
% Gravel	34	19	
% SAND	44	63	
%C SAND	9	18	
%M SAND	14	35	
%F SAND	21	10	
% FINES	22	18	
D_{100} (mm)	76.2	25.4	
D_{60} (mm)	2.67	1.79	
D_{30} (mm)	0.18	0.48	
D_{10} (mm)	0.0092	0.022	
Cc	1.3	5.9	
Cu	290.2	81.4	

Sieve Size/ID #	Percent Finer Data		
6"	100	100	
4"	100	100	
3"	100	100	
1 1/2"	74	100	
1"	74	100	
3/4"	74	93	
1/2"	72	91	
3/8"	71	90	
#4	66	81	
#10	57	63	
#20	48	39	
#40	43	28	
#60	35	24	
#100	27	21	
#140	24	19	
#200	22	18	
5μ m	8	5	
2μ m	6	4	
1μ m	4	2	

Aquifer

TerraSense, LLC #7853-21009

CHPE - Rotterdam-Selkirk Borings

PARTICLE SIZE DISTRIBUTION
ASTM D6913 & ASTM D7928

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

AERIAL PHOTOGRAPHY PROVIDED BY MICROSOFT BING MAPS

BORING LOG NO. K-184.3

PROJECT: Champlain-Hudson Power Express Package 5

CLIENT: Kiewit Engineering (NY) Corp.

SITE: Champlain to Hudson HDD Crossings Schenectady, NY

LOCATION See Exploration Plan

Latitude: 42.703786° Longitude: -73.958333°

Surface Elev.: 318.65 (Ft.)

DEPTH	ELEVATION (Ft.)	Description
1.0	317.5	**FILL - TOPSOIL and BALLAST**
2.0	316.5	**FILL - POORLY GRADED GRAVEL WITH SAND**, organics noted, brown, medium dense
4.0	314.5	**FILL - SILTY SAND WITH GRAVEL**, dark brown, loose
6.0	312.5	**SILTY GRAVEL WITH SAND (GM)**, brown, loose
10.0	308.5	**POORLY GRADED GRAVEL WITH SAND (GP)**, trace silt, dense
		SILTY SAND WITH GRAVEL (SM), occasional cobbles and boulders, dark gray, dense to very dense, (Glacial Till)
		Difficult augering noted in the Glacial Till

DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	LABORATORY HP (tsf)	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
			11	4-6-9-9 N=15				
			12	3-4-3-3 N=7				
5			5	2-1-3-6 N=4		18.5		15
			0	16-15-17-20 N=32				
			12	25-22-22-32 N=44		19.7		
10			6	50-50/4"				
15			7	17-20-23-30 N=43		10.6		36
			3	3" OD SS				
20			24	3" OD SS				
			24	3" OD SS		9.9		39
25			0	50/5"				

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3 1/4" ID HSA to 30'

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by Kiewit.

Notes:

Logged by: MO
Hammer Efficency Summary:
Energy Transfer Ratio: 77.4% +/-2.7%
Hammer Efficiency Correction (CE):1.29

WATER LEVEL OBSERVATIONS

While drilling

9.7' prior to grouting on 1/14

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 01-13-2022 | Boring Completed: 01-14-2022

Drill Rig: CME 550x | Driller: B. Duffey

Project No.: JB215256B

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JB215256B CHAMPLAIN-HUDSON.GPJ TERRACON_DATATEMPLATE.GDT 4/4/22

BORING LOG NO. K-184.3

PROJECT: Champlain-Hudson Power Express Package 5

CLIENT: Kiewit Engineering (NY) Corp.

SITE: Champlain to Hudson HDD Crossings Schenectady, NY

LOCATION See Exploration Plan

Latitude: 42.703786° Longitude: -73.958333°

Surface Elev.: 318.65 (Ft.)

GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	LABORATORY HP (tsf)	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	SILTY SAND WITH GRAVEL (SM), occasional cobbles and boulders, dark gray, dense to very dense, (Glacial Till) *(continued)*		30			2	50/2"				
	35.0	283.5	35			0	50/0"				
	Sampler Refusal on Probable Boulders at 35 Feet										

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3 1/4" ID HSA to 30'

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by Kiewit.

Notes:

Logged by: MO
Hammer Efficency Summary:
Energy Transfer Ratio: 77.4% +/-2.7%
Hammer Efficiency Correction (CE):1.29

WATER LEVEL OBSERVATIONS

While drilling

9.7' prior to grouting on 1/14

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 01-13-2022 | Boring Completed: 01-14-2022

Drill Rig: CME 550x | Driller: B. Duffey

Project No.: JB215256B

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JB215256B CHAMPLAIN-HUDSON.GPJ TERRACON_DATATEMPLATE.GDT 4/4/22

BORING LOG NO. K-184.4

PROJECT: Champlain-Hudson Power Express Package 5

CLIENT: Kiewit Engineering (NY) Corp.

SITE: Champlain to Hudson HDD Crossings Schenectady, NY

LOCATION See Exploration Plan

Latitude: 42.702554° Longitude: -73.958075°

Surface Elev.: 322.84 (Ft.)

DEPTH	ELEVATION (Ft.)	Description
		FILL - SILTY SAND WITH GRAVEL, crushed stone noted, brown, medium dense and dense
		-similar, asphalt milling noted
		-similar, layer of asphalt milling noted
		-similar, trace gravel
10.0	313	
		SILTY SAND WITH GRAVEL (SM), rootlets observed, brown, medium dense, probable former topsoil remnants
15.0	308	
		SILT (ML), gray, hard
17.0	306	
		SILTY SAND WITH GRAVEL (SM), cobbles and boulders noted, gray, dense to very dense, (GLACIAL TILL)

DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	LABORATORY HP (tsf)	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
			14	5-6-9-20 N=15				
			11	15-24-24-21 N=48				
5			7	16-16-16-12 N=32				
			19	5-6-8-12 N=14		9.1		
			16	12-9-8-11 N=17				
10			11	13-7-7-6 N=14				
15			9	6-12-24-42 N=36		13.2		98
20			24	33-33-60-109 N=93				
			24	19-25-34-60 N=59				
25			24	50-52-51-60 N=103		8.9		43

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3 1/4" ID HSA to 34'. 3" OD SS from 20' to 26'

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by Kiewit.

Notes:

Logged by: MO
Hammer Efficency Summary:
Energy Transfer Ratio: 77.4% +/-2.7%
Hammer Efficiency Correction (CE):1.29

WATER LEVEL OBSERVATIONS

While drilling

28.5' at completion of drilling

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 01-19-2022 | Boring Completed: 01-19-2022

Drill Rig: CME 550x | Driller: B. Duffey

Project No.: JB215256B

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JB215256B CHAMPLAIN-HUDSON.GPJ TERRACON_DATATEMPLATE.GDT 4/4/22

BORING LOG NO. K-184.4

PROJECT: Champlain-Hudson Power Express Package 5

CLIENT: Kiewit Engineering (NY) Corp.

SITE: Champlain to Hudson HDD Crossings Schenectady, NY

LOCATION See Exploration Plan

Latitude: 42.702554° Longitude: -73.958075°

Surface Elev.: 322.84 (Ft.)

GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	LABORATORY HP (tsf)	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	SILTY SAND WITH GRAVEL (SM), cobbles and boulders noted, gray, dense to very dense, (GLACIAL TILL) *(continued)*										
			30			10	10-16-16-19 N=32				
	34.0	289				16	13-50-50/0"				
	Sampler Refusal at 34 Feet										

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3 1/4" ID HSA to 34'. 3" OD SS from 20' to 26'

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by Kiewit.

Notes:

Logged by: MO
Hammer Efficency Summary:
Energy Transfer Ratio: 77.4% +/-2.7%
Hammer Efficiency Correction (CE):1.29

WATER LEVEL OBSERVATIONS

While drilling

28.5' at completion of drilling

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 01-19-2022 | Boring Completed: 01-19-2022

Drill Rig: CME 550x | Driller: B. Duffey

Project No.: JB215256B

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JB215256B CHAMPLAIN-HUDSON.GPJ TERRACON_DATATEMPLATE.GDT 4/4/22

BORING LOG NO. K-184.5

PROJECT: Champlain-Hudson Power Express Package 5

CLIENT: Kiewit Engineering (NY) Corp.

SITE: Champlain to Hudson HDD Crossings Schenectady, NY

LOCATION See Exploration Plan

Latitude: 42.701422° Longitude: -73.957520°

Surface Elev.: 322.18 (Ft.)

DEPTH	ELEVATION (Ft.)	Description
2.0	320	**TOPSOIL and BALLAST**
4.0	318	**FILL - SILT**, trace gravel and sand, brown, stiff
6.0	316	**FILL - SILT AND CLAY**, trace gravel, asphalt and cinders noted, black and brown, hard
15.0	307	**SANDY SILT WITH GRAVEL (ML)**, gray and brown, hard, (GLACIAL TILL)
		-No recovery. Probable cobbles and boulders encountered
		SANDY SILTY CLAY (CL-ML), gray, hard, (GLACIAL TILL)
		-No recovery. Probable cobbles and boulders encountered

DEPTH (Ft.)	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	9	6-5-2-2 N=7			
	8	3-4-6-9 N=10			
5	19	11-17-22-10 N=39			
	4	50/4"			
	16	22-30-40-50 N=70	11.0		51
10	0	27-37-38-52 N=75			
15	15	25-15-16-25 N=31	11.2	23-16-7	54
20	0	78-75/2"			
	0	74-102-134 N=236			
25	1	81-125			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3 1/4" ID HSA to 35'. 3" OD SS from 20' to 26'

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by Kiewit.

Notes:

Logged by: MO
Hammer Efficency Summary:
Energy Transfer Ratio: 77.4% +/-2.7%
Hammer Efficiency Correction (CE):1.29

WATER LEVEL OBSERVATIONS

While sampling

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 01-20-2022 | Boring Completed: 01-20-2022

Drill Rig: CME 550x | Driller: B. Duffey

Project No.: JB215256B

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JB215256B CHAMPLAIN-HUDSON.GPJ TERRACON_DATATEMPLATE.GDT 4/4/22

BORING LOG NO. K-184.5

PROJECT: Champlain-Hudson Power Express Package 5

CLIENT: Kiewit Engineering (NY) Corp.

SITE: Champlain to Hudson HDD Crossings Schenectady, NY

LOCATION See Exploration Plan

Latitude: 42.701422° Longitude: -73.957520°

Surface Elev.: 322.18 (Ft.)

DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
SANDY SILTY CLAY (CL-ML), gray, hard, (GLACIAL TILL) *(continued)*								
30.0	292	30						
CLAYEY SAND WITH GRAVEL (SC), gray, medium dense to dense, (GLACIAL TILL)				20	9-12-15-30 N=27	10.8	25-16-9	45
				6	14-15-20-36 N=35			
35.0	287	35						
Boring Terminated at 35 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3 1/4" ID HSA to 35'. 3" OD SS from 20' to 26'

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by Kiewit.

Notes:

Logged by: MO
Hammer Efficency Summary:
Energy Transfer Ratio: 77.4% +/-2.7%
Hammer Efficiency Correction (CE):1.29

WATER LEVEL OBSERVATIONS

While sampling

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 01-20-2022 | Boring Completed: 01-20-2022

Drill Rig: CME 550x | Driller: B. Duffey

Project No.: JB215256B

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JB215256B CHAMPLAIN-HUDSON.GPJ TERRACON_DATATEMPLATE.GDT 4/4/22

BORING LOG NO. K-184.6

PROJECT: Champlain-Hudson Power Express Package 5

CLIENT: Kiewit Engineering (NY) Corp.

SITE: Champlain to Hudson HDD Crossings Schenectady, NY

LOCATION See Exploration Plan

Latitude: 42.700301° Longitude: -73.957146°

Surface Elev.: 322.21 (Ft.)

DEPTH	ELEVATION (Ft.)	Description
0.5	321.5	**TOPSOIL and BALLAST**
0.8	321.5	**FILL - SILTY SAND**, roots and rootlets noted, gray, loose
		FILL - SILTY SAND WITH GRAVEL, crushed stone noted, orange to brown, loose
4.0	318	**SILTY SAND WITH GRAVEL (SM)**, occasional cobbles and boulders, orange to brown, dense to very dense, (GLACIAL TILL)
		Perched water at 6'
		Grades to dark gray at about 8', mottling noted
		More frequent cobbles and boulders from 10' onward, difficult drilling noted
		Tricone rollerbit refusal on boulder, switch to 4 1/4" HSA

DEPTH (Ft.)	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)	PERCENT FINES
		1	4-2-2-3 N=4		
		8	4-3-6-6 N=9		
5		24	10-16-19-25 N=35		
		18	41-36-34-32 N=70	12.1	
		24	20-31-43-51 N=74		
10		14	15-34-51-50/-1"	6.1	
15		18	38-19-28 N=47		
20		18	12-17-18 N=35	11.8	45
			3" OD SS		
25		24 24	8-18-25-36 N=43 3" OD SS		

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
4 1/4" ID HSA to 34'Standard SPT taken from 30 to 32 feet and then sampled again using 3" OD SS for bulk sample

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by Kiewit.

Notes:

Logged by: JCH
Hammer Efficency Summary:
Energy Transfer Ratio: 91.3% +/-2.7%
Hammer Efficiency Correction (CE):1.52

WATER LEVEL OBSERVATIONS

1.5' after 2-4' sample

No measurable groundwater prior to grouting on 1/14

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 01-13-2022 | Boring Completed: 01-14-2022

Drill Rig: CME 750x | Driller: J. Lamm

Project No.: JB215256B

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JB215256B CHAMPLAIN-HUDSON.GPJ TERRACON_DATATEMPLATE.GDT 4/4/22

BORING LOG NO. K-184.6

PROJECT: Champlain-Hudson Power Express Package 5

CLIENT: Kiewit Engineering (NY) Corp.

SITE: Champlain to Hudson HDD Crossings Schenectady, NY

LOCATION See Exploration Plan

Latitude: 42.700301° Longitude: -73.957146°

Surface Elev.: 322.21 (Ft.)

DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	LABORATORY HP (tsf)	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
SILTY SAND WITH GRAVEL (SM), occasional cobbles and boulders, orange to brown, dense to very dense, (GLACIAL TILL) *(continued)*					24	3" OD SS		7.5		44
		30			24	16-16-16-21 N=32				
		35			24	6-11-17-18 N=28				
37.0	285									
Boring Terminated at 37 Feet										

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
4 1/4" ID HSA to 34'Standard SPT taken from 30 to 32 feet and then sampled again using 3" OD SS for bulk sample

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by Kiewit.

Notes:

Logged by: JCH
Hammer Efficency Summary:
Energy Transfer Ratio: 91.3% +/-2.7%
Hammer Efficiency Correction (CE):1.52

WATER LEVEL OBSERVATIONS

1.5' after 2-4' sample

No measurable groundwater prior to grouting on 1/14

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 01-13-2022 | Boring Completed: 01-14-2022

Drill Rig: CME 750x | Driller: J. Lamm

Project No.: JB215256B

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JB215256B CHAMPLAIN-HUDSON.GPJ TERRACON_DATATEMPLATE.GDT 4/4/22

BORING LOG NO. K-184.7

PROJECT: Champlain-Hudson Power Express Package 5

CLIENT: Kiewit Engineering (NY) Corp.

SITE: Champlain to Hudson HDD Crossings Schenectady, NY

LOCATION See Exploration Plan

Latitude: 42.698924° Longitude: -73.956684°

Surface Elev.: 321.45 (Ft.)

DEPTH	ELEVATION (Ft.)	Description
0.5	321	**TOPSOIL and BALLAST**
		FILL - SILTY SAND WITH GRAVEL, clay noted, occasional pieces of wood and organics, gray to brown, loose
		Occasional wet gravel seams and mottling noted 6'-8'
8.0	313.5	**POORLY GRADED GRAVEL WITH SAND (GP)**, black to gray, loose
10.0	311.5	**POORLY GRADED SAND WITH GRAVEL (SP)**, gray, loose
12.5	309	**SILTY SAND WITH GRAVEL (SM)**, occasional cobbles and boulders, dark gray, dense to very dense, (GLACIAL TILL)
		More difficult auger advancement noted in the glacial till

DEPTH (Ft.)	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	14	1-4-1-2 N=5			
	12	2-4-5-5 N=9			
5					
	12	2-2-4-3 N=6	25.3		
	3	3-6-3-4 N=9			
10	9	14-2-4-8 N=6	49.1	NP	5
15	13	12-32-50/2"			
20	16	8-13-22 N=35	13.6		37
25	18	12-16-23 N=39			

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
4 1/4" ID HSA to 34' Standard SPT taken from 30 to 32 feet and then sampled again using 3" OD SS for bulk sample

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by Kiewit.

Notes:

Logged by: JCH
Hammer Efficency Summary:
Energy Transfer Ratio: 91.3% +/-2.7%
Hammer Efficiency Correction (CE):1.52

WATER LEVEL OBSERVATIONS

1.5' 15 minutes after 8-10' sample

19.2' prior to grouting on 1/13

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 01-12-2022 | Boring Completed: 01-13-2022

Drill Rig: CME 750x | Driller: J. Lamm

Project No.: JB215256B

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JB215256B CHAMPLAIN-HUDSON.GPJ TERRACON_DATATEMPLATE.GDT 4/4/22

BORING LOG NO. K-184.7

PROJECT: Champlain-Hudson Power Express Package 5

CLIENT: Kiewit Engineering (NY) Corp.

SITE: Champlain to Hudson HDD Crossings Schenectady, NY

LOCATION See Exploration Plan

Latitude: 42.698924° Longitude: -73.956684°

Surface Elev.: 321.45 (Ft.)

GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	LABORATORY HP (tsf)	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	SILTY SAND WITH GRAVEL (SM), occasional cobbles and boulders, dark gray, dense to very dense, (GLACIAL TILL) *(continued)*		30			16 24	29-38-26 N=64 3" OD SS				
						24	3" OD SS				
	36.0	285.5	35			18	17-20-20-22 N=40		16.1		48
	Boring Terminated at 36 Feet										

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
4 1/4" ID HSA to 34' Standard SPT taken from 30 to 32 feet and then sampled again using 3" OD SS for bulk sample

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by Kiewit.

Notes:

Logged by: JCH
Hammer Efficency Summary:

Energy Transfer Ratio: 91.3% +/-2.7%

Hammer Efficiency Correction (CE):1.52

WATER LEVEL OBSERVATIONS

1.5' 15 minutes after 8-10' sample

19.2' prior to grouting on 1/13

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 01-12-2022 | Boring Completed: 01-13-2022

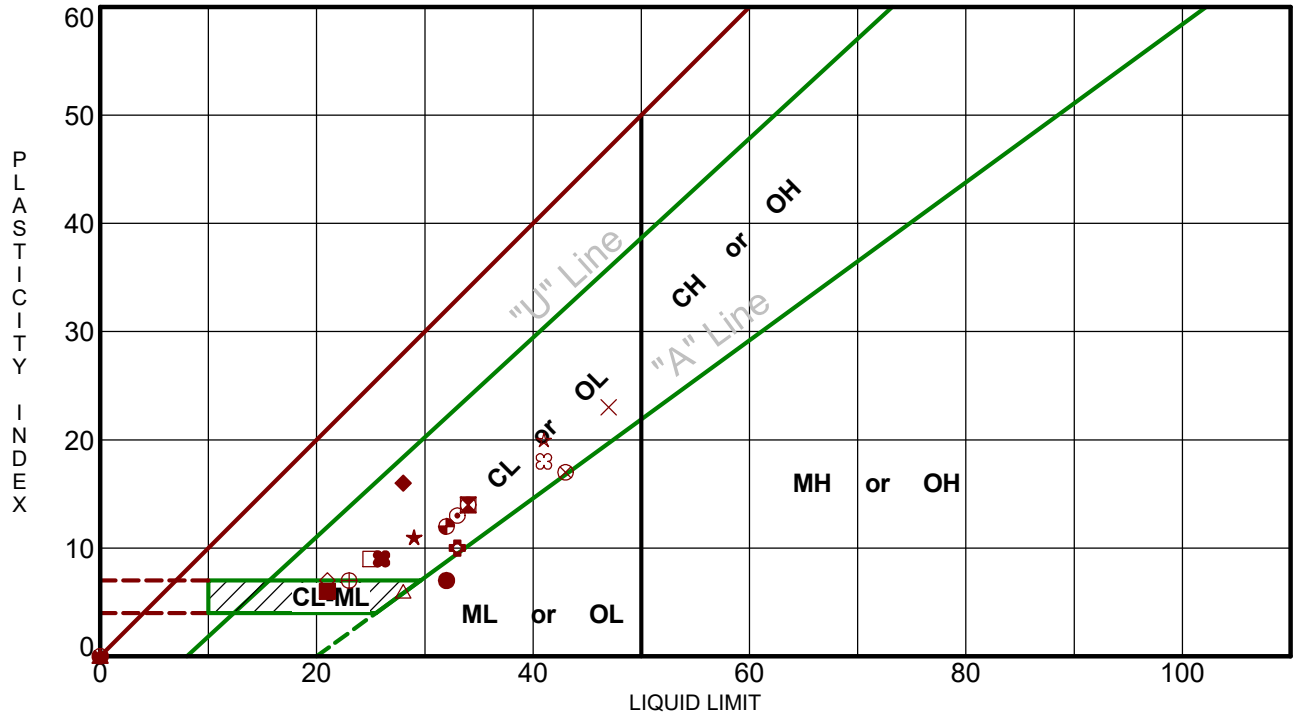
Drill Rig: CME 750x | Driller: J. Lamm

Project No.: JB215256B

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JB215256B CHAMPLAIN-HUDSON.GPJ TERRACON_DATATEMPLATE.GDT 4/4/22

ATTERBERG LIMITS RESULTS

ASTM D4318



Boring ID		Depth (Ft)	LL	PL	PI	Fines	USCS	Description
●	K-183.0A	19 - 21	32	25	7	57.3	ML	SANDY SILT
⊠	K-183.0A	34 - 36	34	20	14	76.1	CL	LEAN CLAY with SAND
▲	K-183.0B	8 - 10	NP	NP	NP	84.8	ML	SILT with SAND
★	K-183.0B	20 - 22	29	18	11	78.2	CL	LEAN CLAY with SAND
⊙	K-183.0B	35 - 37	33	20	13	89.9	CL	LEAN CLAY
✿	K-183.3	10 - 12	33	23	10	73.5	CL	LEAN CLAY with SAND
○	K-183.3	24 - 26	34	20	14	80.5	CL	LEAN CLAY with SAND
△	K-183.4	15 - 17	28	22	6	84.9	CL-ML	SILTY CLAY with SAND
⊗	K-183.4	23 - 25	43	26	17	72.5	CL	LEAN CLAY with SAND
⊕	K-184.5	15 - 17	23	16	7	54.0	CL-ML	SANDY SILTY CLAY
□	K-184.5	30 - 32	25	16	9	45.0	SC	CLAYEY SAND with GRAVEL
⊛	K-184.7	10 - 12	NP	NP	NP	5.0	SP	POORLY GRADED SAND with GRAVEL
◕	K-185.6	8 - 10	32	20	12		CL	LEAN CLAY
☆	K-192.3	10 - 12	41	21	20	80.5	CL	LEAN CLAY with SAND
✿	K-192.3	38 - 40	41	23	18	81.6	CL	LEAN CLAY with SAND
■	K-193.5	12 - 14	21	15	6	55.7	CL-ML	SANDY SILTY CLAY
◆	K-193.5	20 - 22	28	12	16	15.3	GC	CLAYEY GRAVEL with SAND
◇	K-193.5	33 - 34	21	14	7	24.0	SC-SM	SILTY, CLAYEY SAND with GRAVEL
×	K-193.6	8 - 10	47	24	23	78.3	CL	LEAN CLAY with SAND
✖	K-193.6	21 - 23	26	17	9	94.5	CL	LEAN CLAY

PROJECT: Champlain-Hudson Power Express Package 5

SITE: Champlain to Hudson HDD Crossings Schenectady, NY

Terracon
30 Corporate Cir Ste 201
Albany, NY

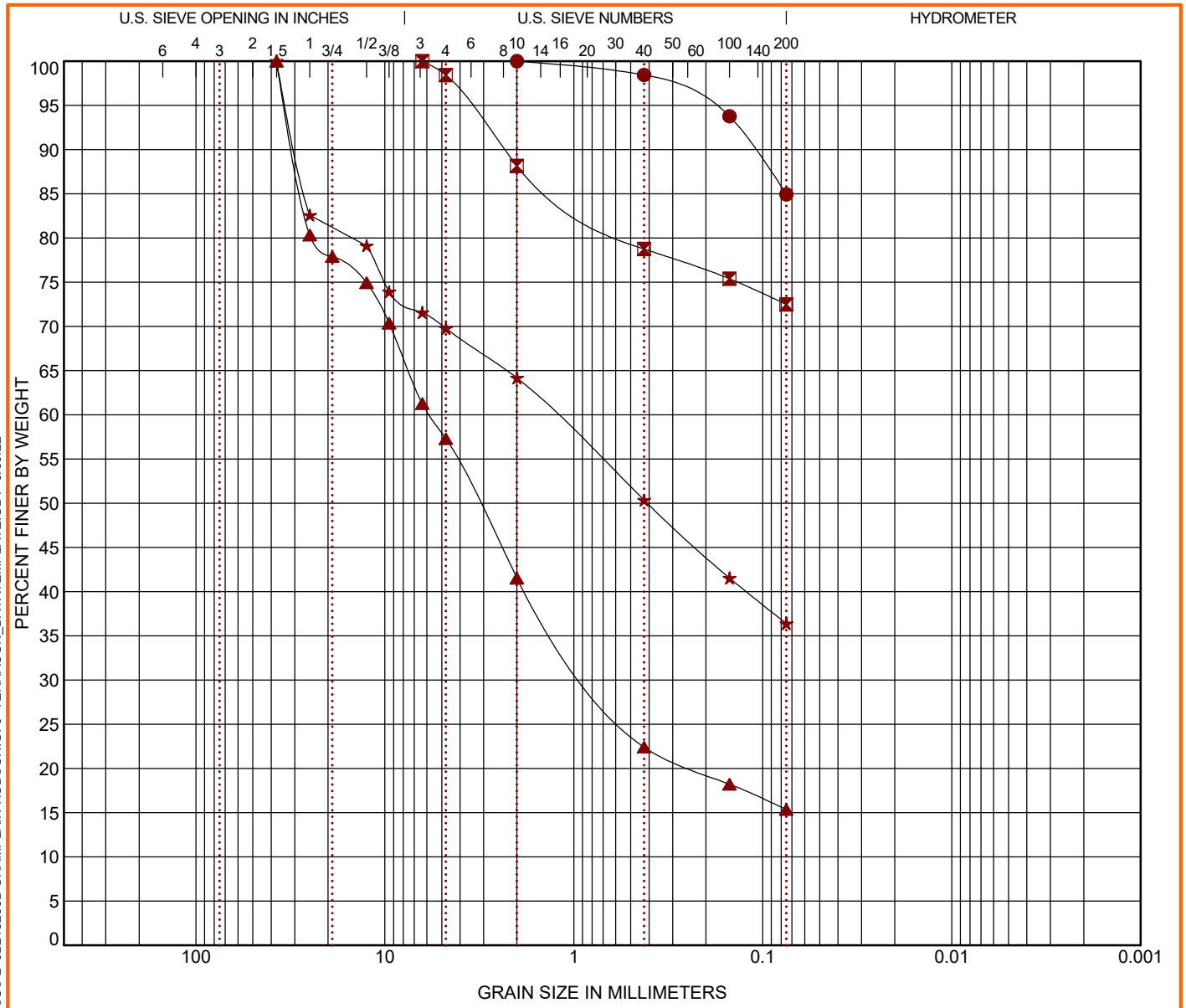
PROJECT NUMBER: JB215256B

CLIENT: Kiewit Engineering (NY) Corp.

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. ATTERBERG LIMITS JB215256B CHAMPLAIN-HUDSON.GPJ TERRACON_DATATEMPLATE.GDT 4/4/22

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring ID	Depth (Ft)	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
●	K-183.4	15 - 17	SILTY CLAY with SAND (CL-ML)	24.8	28	22	6		
⊠	K-183.4	23 - 25	LEAN CLAY with SAND (CL)	34.3	43	26	17		
▲	K-184.3	4 - 6	SILTY GRAVEL with SAND (GM)	18.5					
★	K-184.3	15 - 17	SILTY SAND with GRAVEL (SM)	10.6					

	Boring ID	Depth (Ft)	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
●	K-183.4	15 - 17	2				0.0	0.0	15.1		84.9	
⊠	K-183.4	23 - 25	6.35				0.0	1.6	26.0		72.5	
▲	K-184.3	4 - 6	37.5	5.79	0.787		0.0	42.7	41.9		15.3	
★	K-184.3	15 - 17	37.5	1.254			0.0	30.2	33.4		36.4	

PROJECT: Champlain-Hudson Power Express Package 5

SITE: Champlain to Hudson HDD Crossings Schenectady, NY

Terracon
30 Corporate Cir Ste 201
Albany, NY

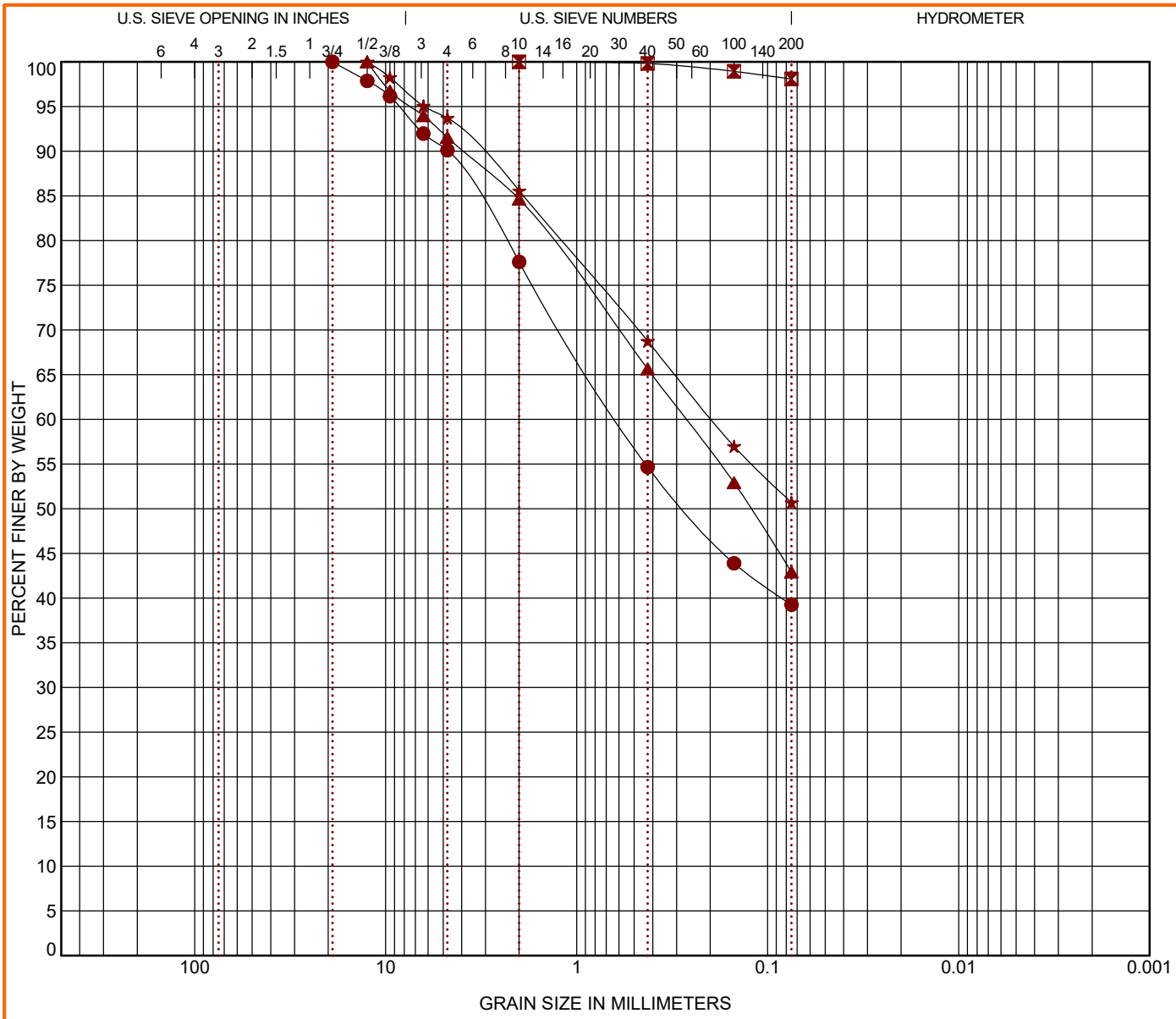
PROJECT NUMBER: JB215256B

CLIENT: Kiewit Engineering (NY) Corp.

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS-2 JB215256B CHAMPLAIN-HUDSON.GPJ TERRACON_DATATEMPLATE.GDT 3/30/22

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring ID	Depth (Ft)	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
●	K-184.3	22 - 24	SILTY SAND (SM)	9.9					
⊠	K-184.4	15 - 17	SILT (ML)	13.2					
▲	K-184.4	24 - 26	SILTY SAND (SM)	8.9					
★	K-184.5	8 - 10	SANDY SILT (ML)	11.0					

	Boring ID	Depth (Ft)	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
●	K-184.3	22 - 24	19	0.609			0.0	9.9	50.9		39.3	
⊠	K-184.4	15 - 17	2				0.0	0.0	1.9		98.1	
▲	K-184.4	24 - 26	12.5	0.268			0.0	8.5	48.6		42.9	
★	K-184.5	8 - 10	12.5	0.196			0.0	6.3	43.0		50.7	

PROJECT: Champlain-Hudson Power Express Package 5

SITE: Champlain to Hudson HDD Crossings Schenectady, NY

Terracon
30 Corporate Cir Ste 201
Albany, NY

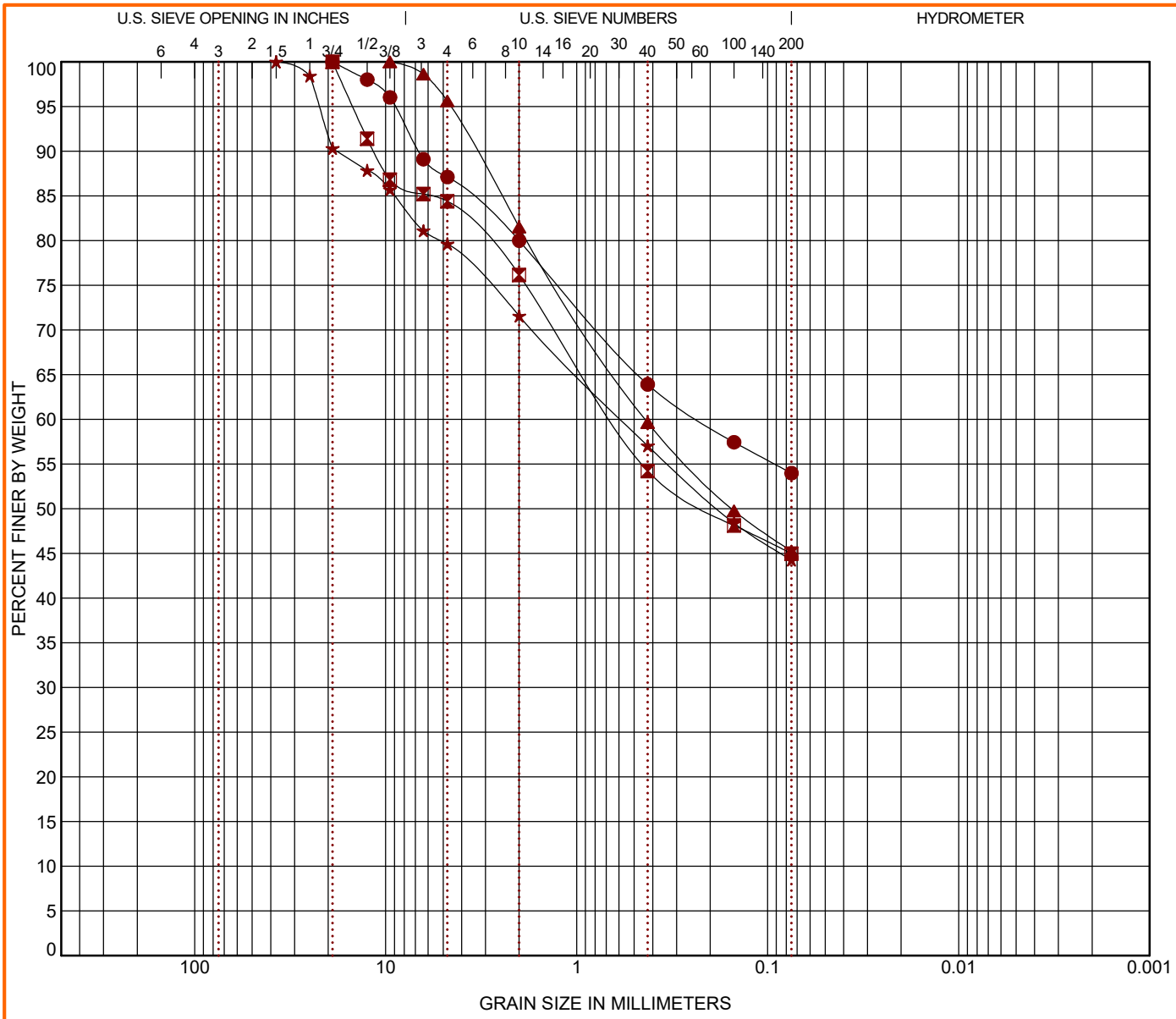
PROJECT NUMBER: JB215256B

CLIENT: Kiewit Engineering (NY) Corp.

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS-2 JB215256B CHAMPLAIN-HUDSON.GPJ TERRACON_DATATEMPLATE.GDT 3/30/22

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring ID	Depth (Ft)	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
●	K-184.5	15 - 17	SANDY SILTY CLAY (CL-ML)	11.2	23	16	7		
⊠	K-184.5	30 - 32	CLAYEY SAND with GRAVEL (SC)	10.8	25	16	9		
▲	K-184.6	20 - 21.5	SILTY SAND (SM)	11.8					
★	K-184.6	27 - 29	SILTY SAND with GRAVEL (SM)	7.5					

	Boring ID	Depth (Ft)	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
●	K-184.5	15 - 17	19	0.227			0.0	12.9	33.1		54.0	
⊠	K-184.5	30 - 32	19	0.639			0.0	15.6	39.4		45.0	
▲	K-184.6	20 - 21.5	9.5	0.436			0.0	4.4	50.4		45.2	
★	K-184.6	27 - 29	37.5	0.582			0.0	20.4	35.4		44.3	

PROJECT: Champlain-Hudson Power Express Package 5

SITE: Champlain to Hudson HDD Crossings Schenectady, NY

Terracon
30 Corporate Cir Ste 201
Albany, NY

PROJECT NUMBER: JB215256B

CLIENT: Kiewit Engineering (NY) Corp.

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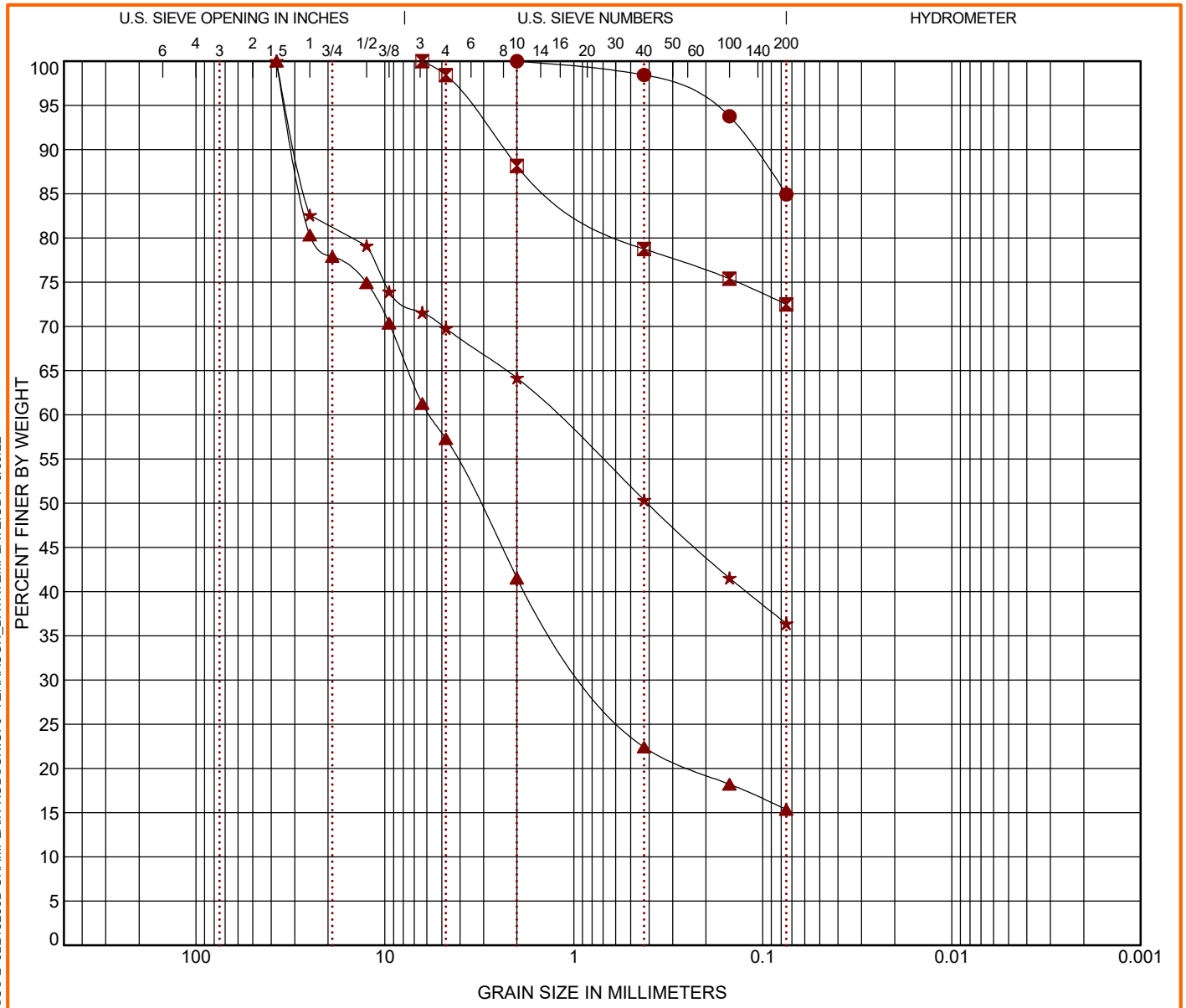
GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring ID	Depth (Ft)	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
●	K-183.4	15 - 17	SILTY CLAY with SAND (CL-ML)	24.8	28	22	6		
⊠	K-183.4	23 - 25	LEAN CLAY with SAND (CL)	34.3	43	26	17		
▲	K-184.3	4 - 6	SILTY GRAVEL with SAND (GM)	18.5					
★	K-184.3	15 - 17	SILTY SAND with GRAVEL (SM)	10.6					

	Boring ID	Depth (Ft)	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
●	K-183.4	15 - 17	2				0.0	0.0	15.1		84.9	
⊠	K-183.4	23 - 25	6.35				0.0	1.6	26.0		72.5	
▲	K-184.3	4 - 6	37.5	5.79	0.787		0.0	42.7	41.9		15.3	
★	K-184.3	15 - 17	37.5	1.254			0.0	30.2	33.4		36.4	

PROJECT: Champlain-Hudson Power Express Package 5

SITE: Champlain to Hudson HDD Crossings Schenectady, NY

Terracon
30 Corporate Cir Ste 201
Albany, NY

PROJECT NUMBER: JB215256B

CLIENT: Kiewit Engineering (NY) Corp.

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GRAIN SIZE DISTRIBUTION

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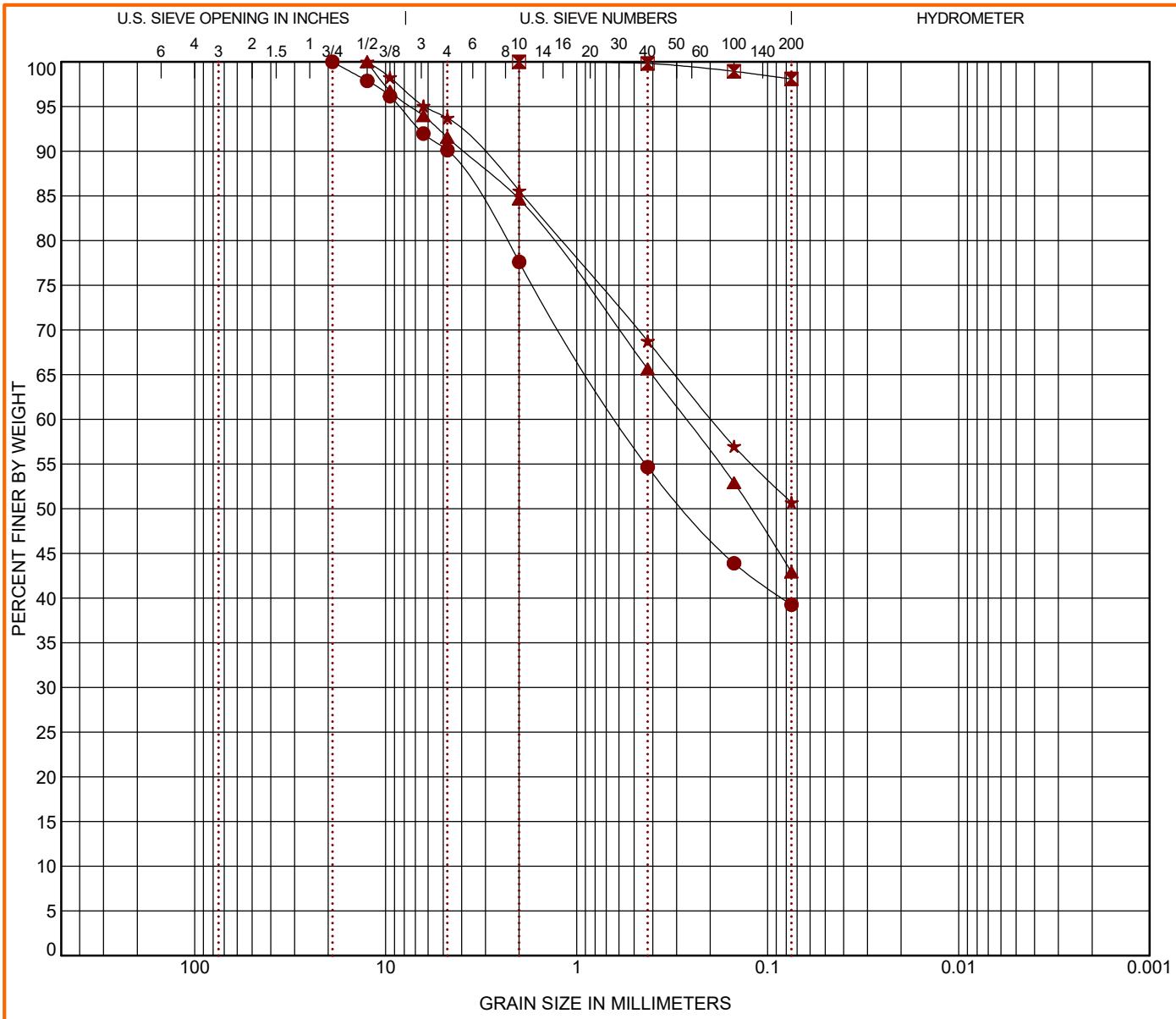

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring ID	Depth (Ft)	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
●	K-184.3	22 - 24	SILTY SAND (SM)	9.9					
⊠	K-184.4	15 - 17	SILT (ML)	13.2					
▲	K-184.4	24 - 26	SILTY SAND (SM)	8.9					
★	K-184.5	8 - 10	SANDY SILT (ML)	11.0					

	Boring ID	Depth (Ft)	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
●	K-184.3	22 - 24	19	0.609			0.0	9.9	50.9		39.3	
⊠	K-184.4	15 - 17	2				0.0	0.0	1.9		98.1	
▲	K-184.4	24 - 26	12.5	0.268			0.0	8.5	48.6		42.9	
★	K-184.5	8 - 10	12.5	0.196			0.0	6.3	43.0		50.7	

PROJECT: Champlain-Hudson Power Express Package 5

SITE: Champlain to Hudson HDD Crossings Schenectady, NY

Terracon
30 Corporate Cir Ste 201
Albany, NY

PROJECT NUMBER: JB215256B

CLIENT: Kiewit Engineering (NY) Corp.

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GRAIN SIZE DISTRIBUTION

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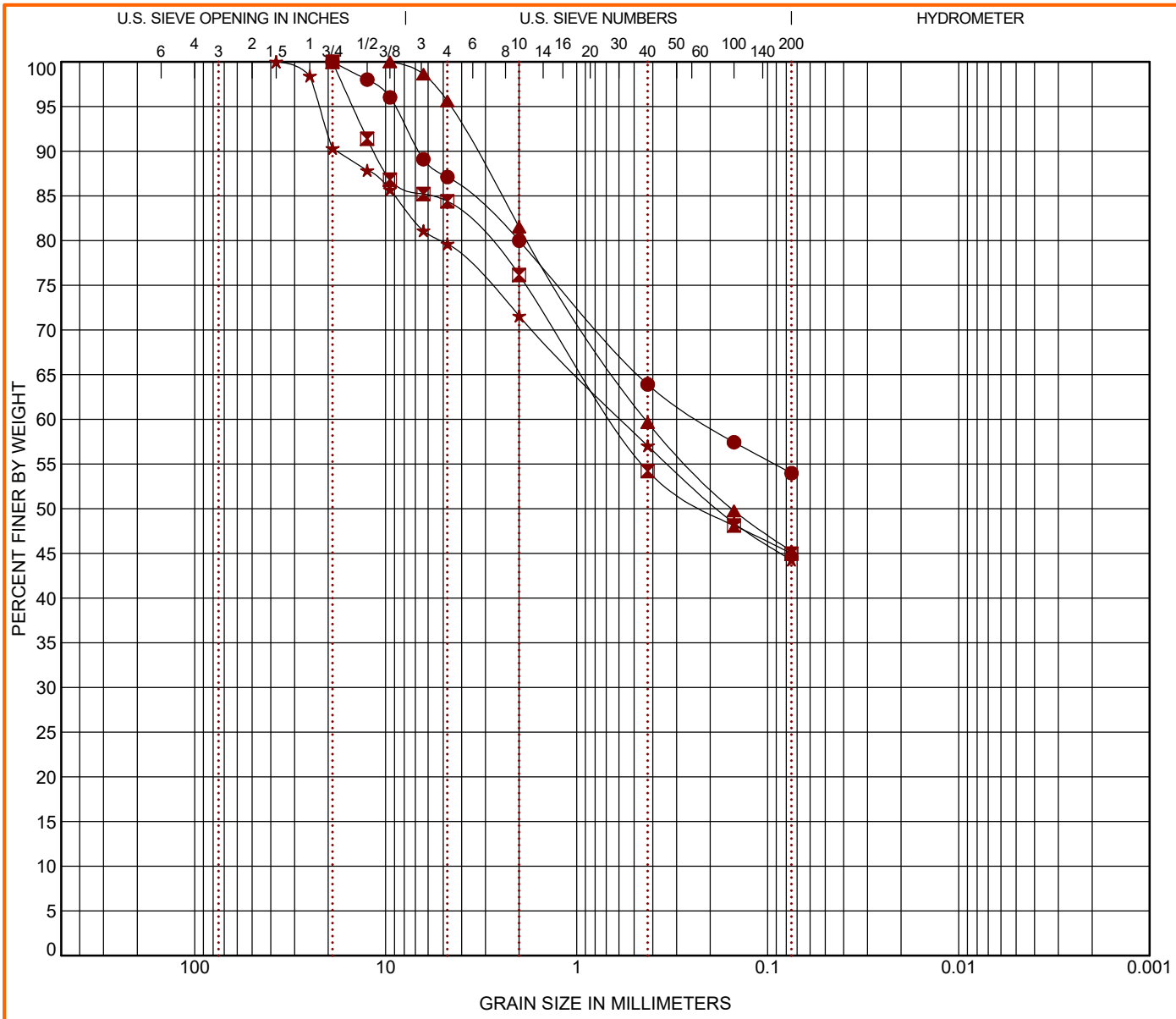

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring ID	Depth (Ft)	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
●	K-184.5	15 - 17	SANDY SILTY CLAY (CL-ML)	11.2	23	16	7		
⊠	K-184.5	30 - 32	CLAYEY SAND with GRAVEL (SC)	10.8	25	16	9		
▲	K-184.6	20 - 21.5	SILTY SAND (SM)	11.8					
★	K-184.6	27 - 29	SILTY SAND with GRAVEL (SM)	7.5					

	Boring ID	Depth (Ft)	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
●	K-184.5	15 - 17	19	0.227			0.0	12.9	33.1		54.0	
⊠	K-184.5	30 - 32	19	0.639			0.0	15.6	39.4		45.0	
▲	K-184.6	20 - 21.5	9.5	0.436			0.0	4.4	50.4		45.2	
★	K-184.6	27 - 29	37.5	0.582			0.0	20.4	35.4		44.3	

PROJECT: Champlain-Hudson Power Express Package 5

SITE: Champlain to Hudson HDD Crossings Schenectady, NY

Terracon
30 Corporate Cir Ste 201
Albany, NY

PROJECT NUMBER: JB215256B

CLIENT: Kiewit Engineering (NY) Corp.

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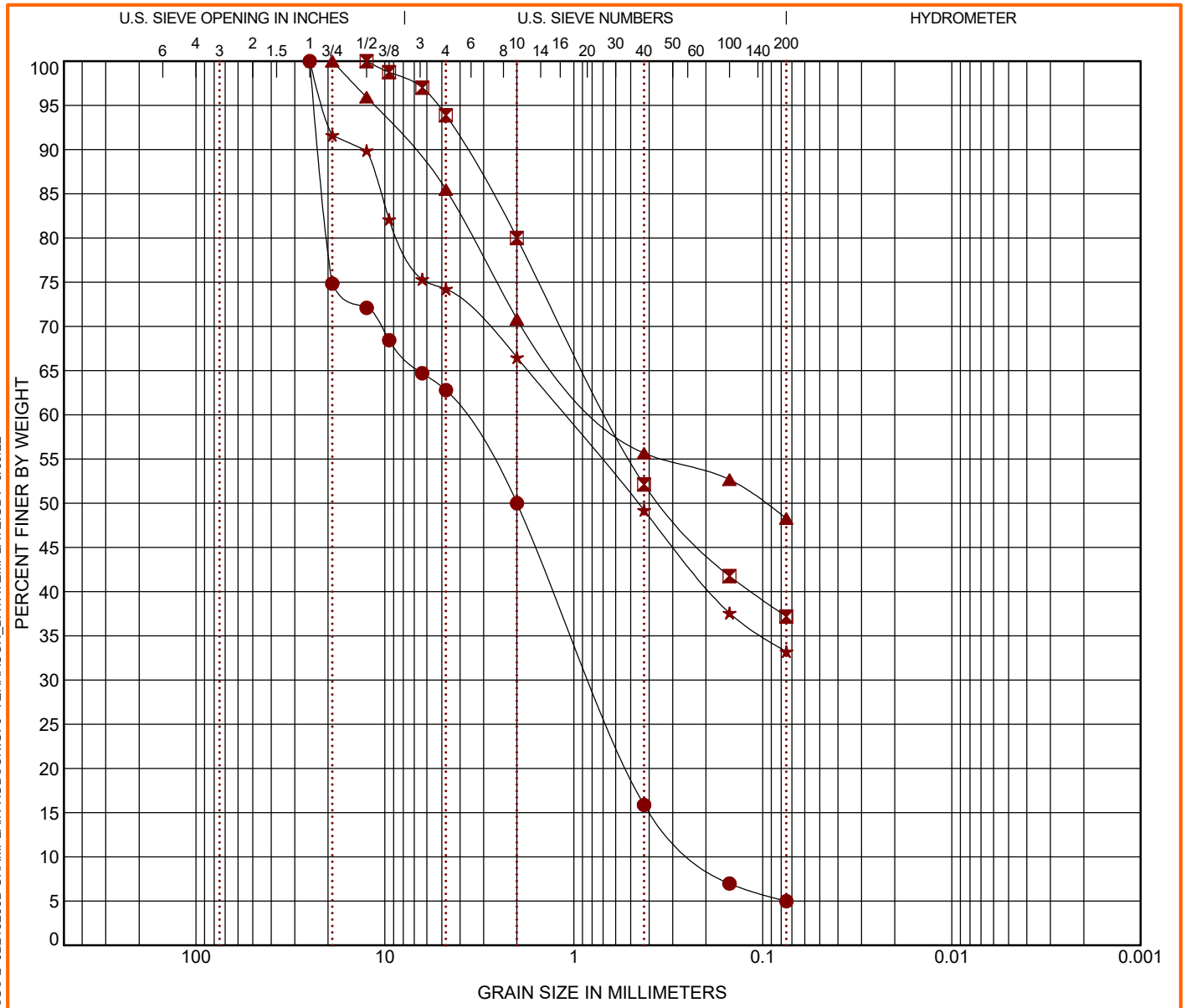
GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring ID	Depth (Ft)	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
●	K-184.7	10 - 12	POORLY GRADED SAND with GRAVEL (SP)	49.1	NP	NP	NP	0.77	18.40
⊠	K-184.7	20 - 21.5	SILTY SAND (SM)	13.6					
▲	K-184.7	34 - 36	SILTY SAND (SM)	16.1					
★	K-185.6	4 - 6	SILTY SAND with GRAVEL (SM)	12.1					

	Boring ID	Depth (Ft)	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
●	K-184.7	10 - 12	25	3.933	0.807	0.214	0.0	37.2	57.8		5.0	
⊠	K-184.7	20 - 21.5	12.5	0.659			0.0	6.1	56.7		37.2	
▲	K-184.7	34 - 36	19	0.662			0.0	14.5	37.2		48.3	
★	K-185.6	4 - 6	25	1.118			0.0	25.8	41.0		33.2	

PROJECT: Champlain-Hudson Power Express Package 5

SITE: Champlain to Hudson HDD Crossings Schenectady, NY

Terracon
30 Corporate Cir Ste 201
Albany, NY

PROJECT NUMBER: JB215256B

CLIENT: Kiewit Engineering (NY) Corp.

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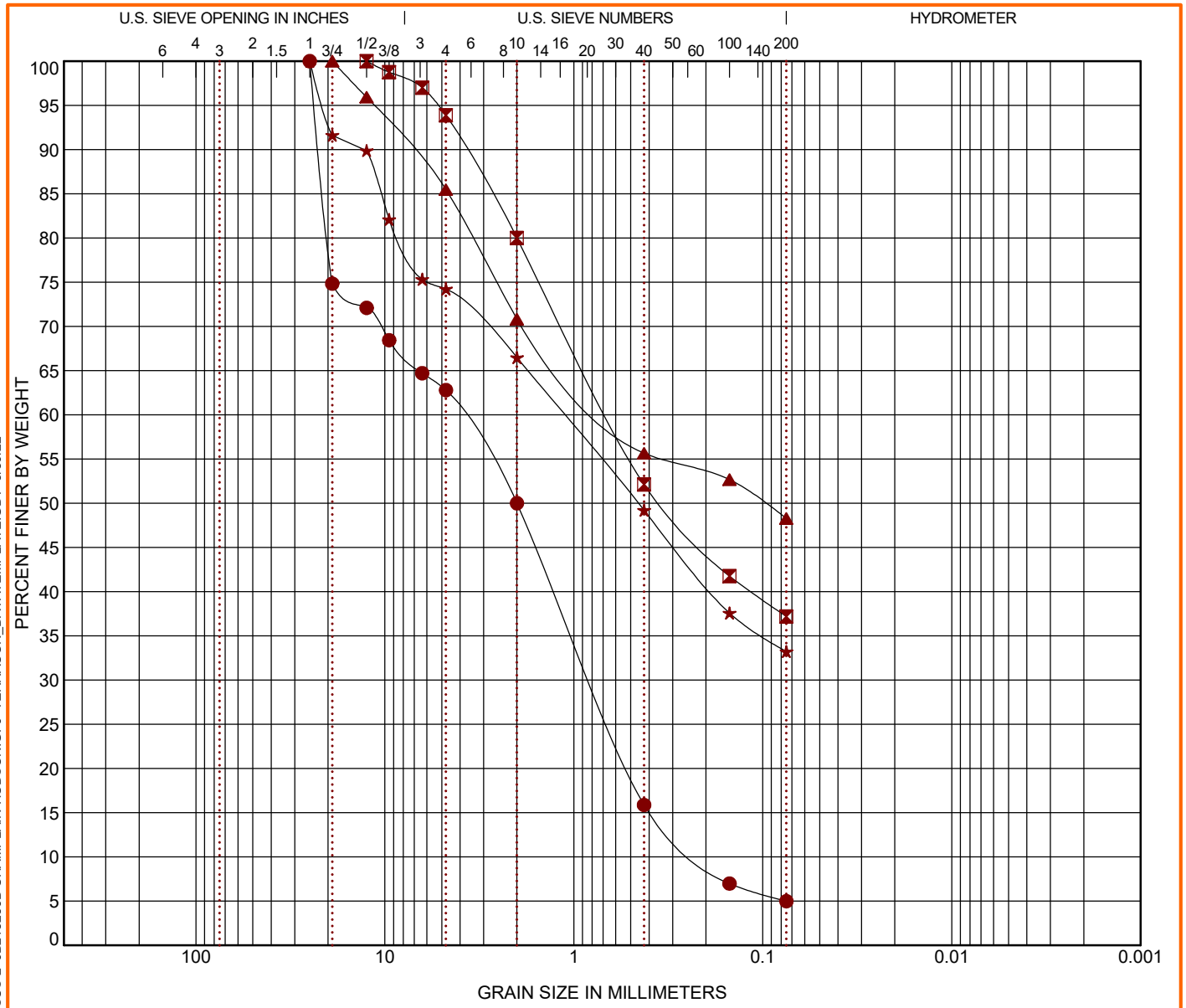
GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring ID	Depth (Ft)	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
●	K-184.7	10 - 12	POORLY GRADED SAND with GRAVEL (SP)	49.1	NP	NP	NP	0.77	18.40
⊠	K-184.7	20 - 21.5	SILTY SAND (SM)	13.6					
▲	K-184.7	34 - 36	SILTY SAND (SM)	16.1					
★	K-185.6	4 - 6	SILTY SAND with GRAVEL (SM)	12.1					

	Boring ID	Depth (Ft)	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
●	K-184.7	10 - 12	25	3.933	0.807	0.214	0.0	37.2	57.8		5.0	
⊠	K-184.7	20 - 21.5	12.5	0.659			0.0	6.1	56.7		37.2	
▲	K-184.7	34 - 36	19	0.662			0.0	14.5	37.2		48.3	
★	K-185.6	4 - 6	25	1.118			0.0	25.8	41.0		33.2	

PROJECT: Champlain-Hudson Power Express Package 5

SITE: Champlain to Hudson HDD Crossings Schenectady, NY

Terracon
30 Corporate Cir Ste 201
Albany, NY

PROJECT NUMBER: JB215256B

CLIENT: Kiewit Engineering (NY) Corp.

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS-2 JB215256B CHAMPLAIN-HUDSON.GPJ TERRACON_DATATEMPLATE.GDT 3/30/22

Summary of Laboratory Results

BORING ID	Depth (Ft.)	Organic Content (%)
K-178.0	4-6	2
K-178.96	6-8	2.1
K-184.4	10-12	0.4
K-184.7	8-10	0.3
K-185.6	6-8	11.6
K-188.4B	8-10	1.2
K-194.0-4.6	6-8	4.3

PROJECT: Champlain-Hudson Power Express Package 5

SITE: Champlain to Hudson HDD Crossings Schenectady, NY

Terracon
30 Corporate Cir Ste 201
Albany, NY

PROJECT NUMBER: JB215256B

CLIENT: Kiewit Engineering (NY) Corp.

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. SMART LAB SUMMARY-PORTRAIT JB215256B CHAMPLAIN-HUDSON.GPJ TERRACON_DATATEMPLATE.GDT 3/25/22

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

AERIAL PHOTOGRAPHY PROVIDED BY MICROSOFT BING MAPS

BORING LOG NO. KB-184.2

PROJECT: CHPE - Additional HDD Borings - Phase 3

CLIENT: Kiewit Engineering (NY) Corp
Lone Tree, CO

SITE: Fort Ann to Coxsackie, NY

LOCATION See Exploration Plan

Latitude: 42.705227° Longitude: -73.958876°

Surface Elev.: 319.8773 (Ft.)

DEPTH	ELEVATION (Ft.)	Description	DEPTH (Ft.)	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)	PERCENT FINES
0.1	319.8	**TOPSOIL**					
		FILL - SILTY SAND, occasional coal fragments, brown		16	2-6-5-5 N=11		
3.0	316.9			14	2-4-4-3 N=8		
4.0	315.9	**FILL - SILTY CLAY**, occasional cobbles, orange and brown					
		SILTY SAND (SM), occasional cobbles and boulders, brown, medium dense to very dense, (GLACIAL TILL) **grades gray**	5	16	2-5-10-14 N=15	17.3	40
				22	22-16-21-26 N=37		
				20	21-24-17-15 N=41		
			10	2	50/2"		
			15	5	13-50/2"		
20.0	299.9						
		SANDY SILT (ML), occasional cobbles and boulders, gray, dense to very dense, (GLACIAL TILL)	20	18	19-24-24 N=48	10.0	52
			25	18	12-36-42 N=78		
27.0	292.9						
		WEATHERED SHALE, dark gray					

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
0-10' - 2 1/4" HSA
10-30' - Mud Rotary
Water added after 10'

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by others.

Notes:

Logged by JCH
Hammer Efficiency Summary:
Energy Transfer Ratio: 91.3% +/- 2.7%
Hammer Efficiency Correction (CE): 1.52

WATER LEVEL OBSERVATIONS

No free water observed

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 09-07-2022	Boring Completed: 09-07-2022
Drill Rig: CME 750-X	Driller: C. Schindler
Project No.: JB215256G	

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JB215256G CHPE - ADDITIONAL.GPJ TERRACON_DATATEMPLATE.GDT 11/2/22

BORING LOG NO. KB-184.2

PROJECT: CHPE - Additional HDD Borings - Phase 3

CLIENT: Kiewit Engineering (NY) Corp
Lone Tree, CO

SITE: Fort Ann to Coxsackie, NY

LOCATION See Exploration Plan

Latitude: 42.705227° Longitude: -73.958876°

Surface Elev.: 319.8773 (Ft.)

DEPTH	ELEVATION (Ft.)	Description	FIELD TEST RESULTS
		WEATHERED SHALE, dark gray *(continued)*	
30.0	289.9	**SHALE**, slightly weathered, very close to moderate fractured, good RQD, dark gray	REC = 100% RQD = 88%
40.0	279.9	**SHALE**, slightly weathered, very close to moderate fractured, good RQD, dark gray	REC = 100% RQD = 75%
50.0	269.9	**completely weathered seam at 49.9'**	
		Boring Terminated at 50 Feet	

GRAPHIC LOG | DEPTH (Ft.) | WATER LEVEL OBSERVATIONS | SAMPLE TYPE | RECOVERY (In.) | WATER CONTENT (%) | ATTERBERG LIMITS LL-PL-PI | PERCENT FINES

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
0-10' - 2 1/4" HSA
10-30' - Mud Rotary
Water added after 10'

Abandonment Method:
Boring backfilled with bentonite grout upon completion

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by others.

Notes:

Logged by JCH
Hammer Efficiency Summary:
Energy Transfer Ratio: 91.3% +/- 2.7%
Hammer Efficiency Correction (CE): 1.52

WATER LEVEL OBSERVATIONS

No free water observed

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 09-07-2022	Boring Completed: 09-07-2022
Drill Rig: CME 750-X	Driller: C. Schindler
Project No.: JB215256G	

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL JB215256G CHPE - ADDITIONAL.GPJ TERRACON_DATATEMPLATE.GDT 11/2/22

Summary of Laboratory Results

BORING ID	Depth (Ft.)	Water Content (%)	Organic Content (%)
KB-182.7B	20-22	31.1	
KB-182.7B	50-52	35.4	
KB-182.7B	80-82	26.5	
KB-184.2	4-6	17.3	
KB-184.2	20-21.5	10.0	
KB-184.9	10-12	35.4	
KB-184.9	25-26.5	8.6	
KB-184.9	40-42	9.2	
KB-184.9	55-56.5	12.2	
KB-185.4	6-8	34.3	
KB-185.4	20-21.5	13.7	
KB-185.4	35-39	9.1	
KB-185.4	45-47	14.7	
KB-192.4	15-17	36.9	
KB-192.4	25-27	42.6	
KB-192.4	45-47	46.0	
KB-192.4	65-67	8.0	
KB-192.8B	15-17	36.5	
KB-192.8B	40-40.2	14.1	
KB-192.8B	50-50.2	14.2	
KB-194.0-3.6B	5-7	31.0	
KB-194.0-3.6B	30-32	37.9	
KB-194.0-3.6B	50-52	39.6	
KB-194.0-3.6B	70-72	46.7	
KB-194.0-3.9B	4-6	31.5	
KB-194.0-3.9B	25-26.5	50.2	
KB-194.0-3.9B	45-46.5	43.4	
KB-194.0-3.9B	60-61.5	52.9	
KB-194.0-4.4	20-22	50.1	
KB-194.0-4.4	40-42	37.9	
KB-194.0-4.4	50-52	47.6	
KB-194.0-4.4	70-72	37.4	
KB-194.0-4.6B	4-6	24.1	
KB-194.0-4.6B	20-21.5	40.3	
KB-194.0-4.6B	40-41.5	42.9	
KB-194.0-4.6B	60-61.5	45.6	
KB-200.6	8-10	20.3	
KB-200.6	30-32	30.5	
KB-200.6	45-47	26.3	
KB-200.6	55-57	33.6	
KB-200.8A	15-17	39.6	
KB-200.8A	35-36.5	45.0	

PROJECT: CHPE - Additional HDD Borings - Phase 3

SITE: Fort Ann to Coxsackie, NY

Terracon
30 Corporate Cir Ste 201
Albany, NY

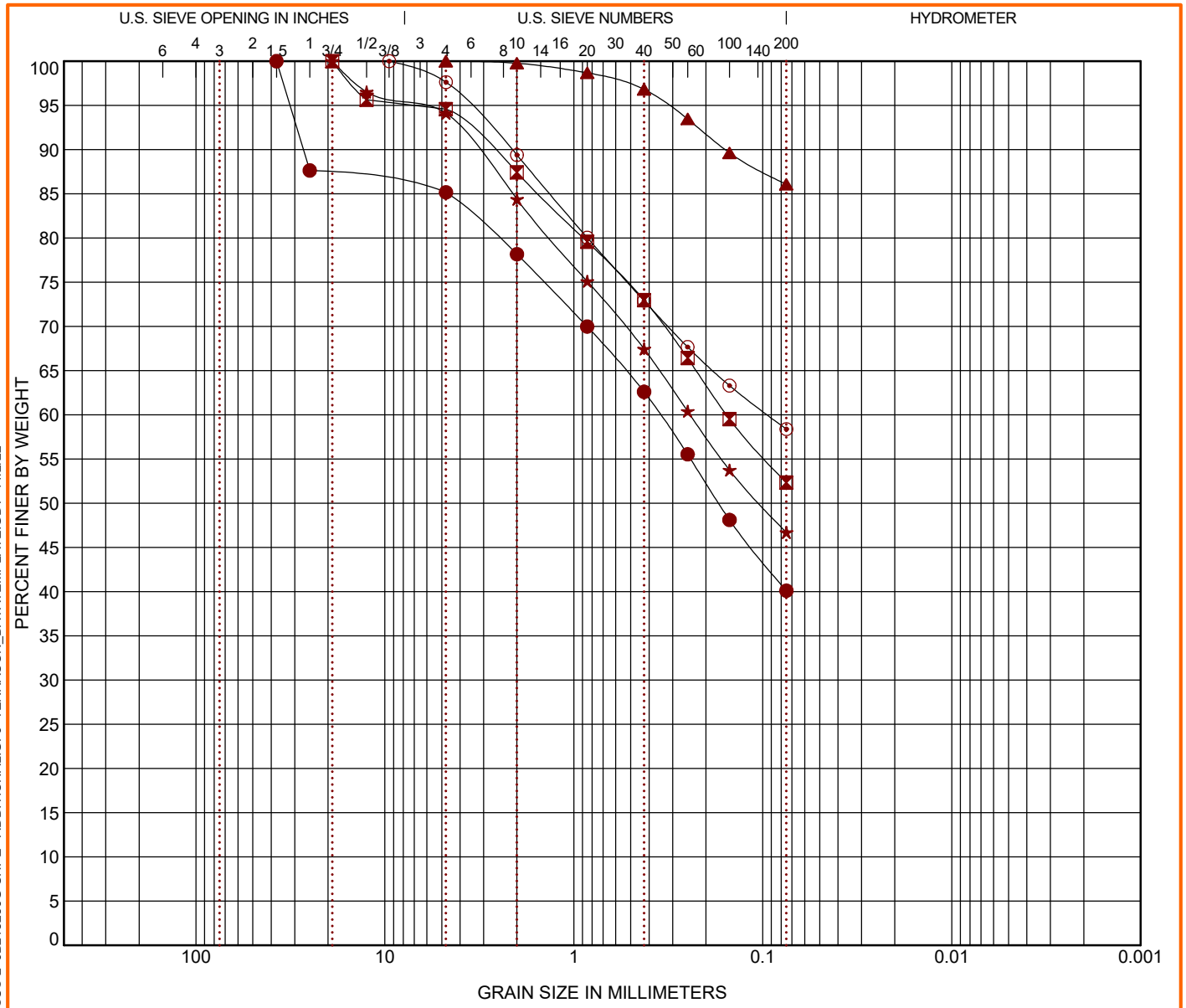
PROJECT NUMBER: JB215256G

CLIENT: Kiewit Engineering (NY) Corp
Lone Tree, CO

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. SMART LAB SUMMARY-PORTRAIT JB215256G CHPE - ADDITIONAL.GPJ TERRACON_DATATEMPLATE.GDT 11/2/22

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring ID	Depth (Ft)	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
●	KB-184.2	4 - 6	SILTY SAND (SM)	17.3					
⊠	KB-184.2	20 - 21.5	SANDY SILT (ML)	10.0					
▲	KB-184.9	10 - 12	SILT (ML)	35.4	32	25	7		
★	KB-184.9	25 - 26.5	SILTY SAND (SM)	8.6					
⊙	KB-184.9	40 - 42	SANDY SILT (ML)	9.2					

	Boring ID	Depth (Ft)	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
●	KB-184.2	4 - 6	37.5	0.35			0.0	14.8	45.1		40.1	
⊠	KB-184.2	20 - 21.5	19	0.156			0.0	5.4	42.3		52.3	
▲	KB-184.9	10 - 12	4.75				0.0	0.0	13.9		86.1	
★	KB-184.9	25 - 26.5	19	0.242			0.0	5.9	47.4		46.7	
⊙	KB-184.9	40 - 42	9.5	0.094			0.0	2.4	39.3		58.4	

PROJECT: CHPE - Additional HDD Borings - Phase 3

PROJECT NUMBER: JB215256G

SITE: Fort Ann to Coxsackie, NY

Terracon
30 Corporate Cir Ste 201
Albany, NY

CLIENT: Kiewit Engineering (NY) Corp
Lone Tree, CO

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS-2 JB215256G CHPE - ADDITIONAL.GPJ TERRACON_DATATEMPLATE.GDT 11/2/22

Rock Core – Boring KB-184.2

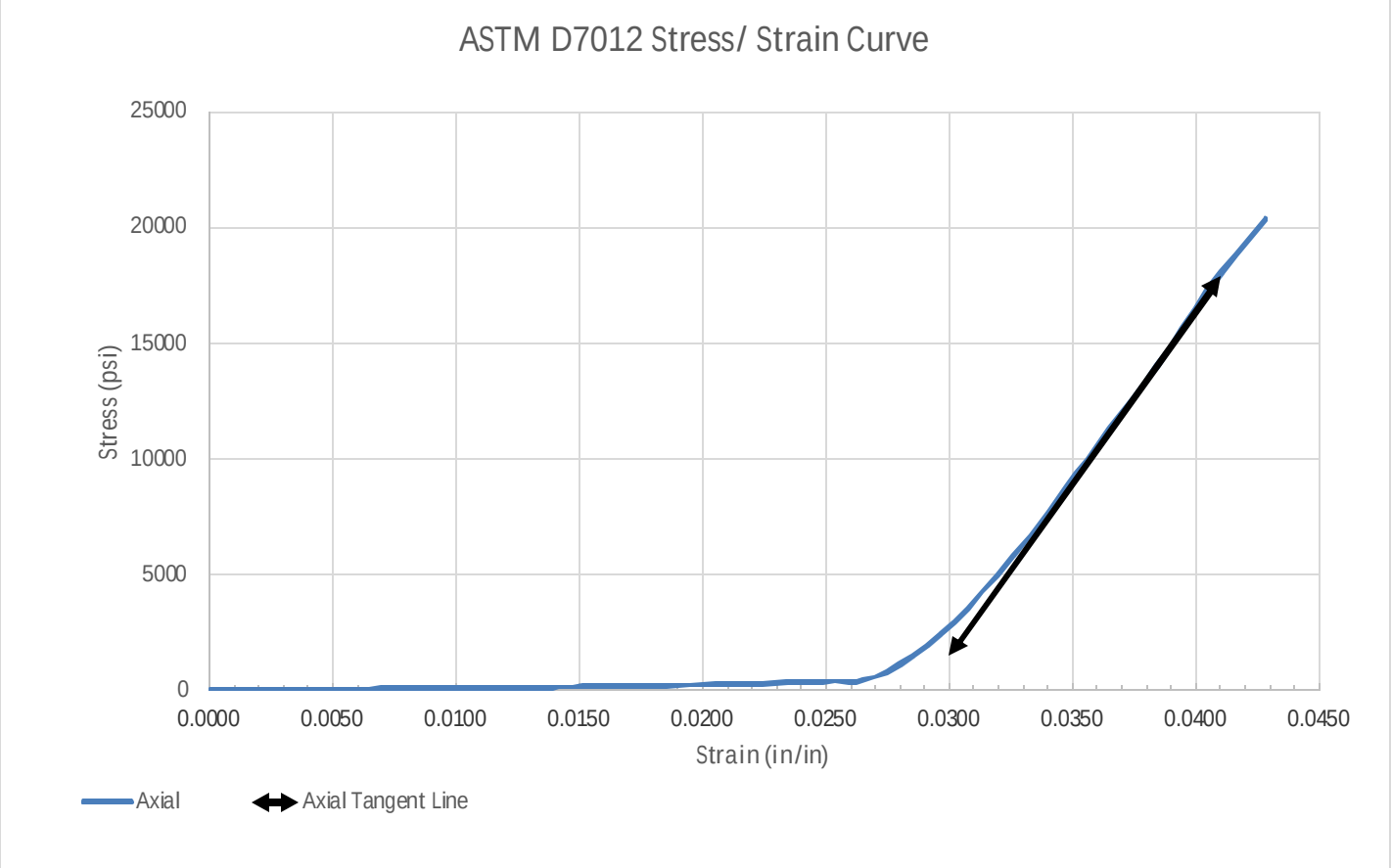
Rock Core – Boring KB-192.8B

Rock Core D7012 Method C

Client
Kiewit Engineering (NY) Corp

Project
CHPE - Additional HDD Borings - Phase 3

Project No. JB215256G



SAMPLE LOCATION			
Site:	LAB Testing		
Description:	Shale		
Boring:	KB-184.2	Depth (feet):	30-40
SPECIMEN INFORMATION			
Sample No.:		Mass (g):	556.95
Length (in.):	4.12	Diameter (in.):	1.98
L/D Ratio:	2.08	Density (pcf):	167.25
TEST RESULTS			
Failure Load (lbs):			62843
Failure Strain (in/in):			0.047
Unconfined Compressive Strength (psi):			20,410
Elastic Modulus, E, (ksi):			1491
Time of Failure (min):			01:00
Rate of Loading (in/sec):			0.04
Moisture Content Post-break:			0.40%

Rock Core D7012 Method C

Client Kiewit Engineering (NY) **Project** CHPE - Additional HDD Borings - Phase 3

Project No. JB215256G

Equipment:	TICCS ID:
Calipers	W-44049
Scale	B-71466
Dial Indicator	C-70608
Compression (spherically seated)	C-48999

Samples were prepared and tested in accordance with ASTM D4543 and D7012. Deviations, if any, are noted below:
Notes:

Per ASTM D4543, this specimen has not met the requirements for perpendicularity, by exceeding 0.250º.
Per ASTM D4543, this specimen has not met the requirements for flatness, by exceeding 0.001 inches.
Per ASTM D4543, this specimen has not met the requirements for parallelism, by exceeding 0.25º.
Per ASTM D4543, this specimen has not met the requirements for flatness, by exceeding 0.001 inches.
Per ASTM D4543 and ASTM D7012, the desired specimen length to diameter are between 2.0:1 and 2.5:1.

According to ASTM D7012 Section 8.2.1, this specimen, although not meeting all requirements of ASTM D4543 is acceptable for testing. However, the results reported may differ from results obtained from a test specimen that meets the requirements of D4543.

Client
Kiewit Engineering (NY) Corp

Project
CHPE - Additional HDD Borings - Phase 3

Project No. JB215256G

Splitting Tensile Strength of Intact Rock Core Specimens, ASTM D3967

Boring	KB-184.2	**Material Description**	Shale
Sample No		**Equipment Used**	Tinius Olsen (120,000lbs)
Depth (ft)	30-40	**TICCS ID/Serial No.**	C-48999, 118285
Lab No	9518	**Calibration Date**	11/2/2021

	TENSILE STRENGTH				
Lab No.	1	2	3	4	5
Diameter (in)	1.98	1.98	1.98	1.98	1.98
Length (in)	0.66	0.55	0.56	0.6	0.69
Length Diameter Ratio	0.33	0.28	0.28	0.30	0.35
Rate of Loading	0.066	0.055	0.056	0.06	0.069
Moisture Condition	0.40%	0.40%	0.40%	0.40%	0.40%
Maximum Applied Load (lbf)	5132	5000	4982	4971	6632
Splitting Tensile Strength (psi)	2501.4	2924.4	2861.9	2665.2	3091.9

	TENSILE STRENGTH				
Lab No.	6	7	8	9	10
Diameter (in)	1.98	1.98	1.98	1.98	--
Length (in)	0.64	0.61	0.6	0.59	--
Length Diameter Ratio	0.32	0.31	0.30	0.30	--
Rate of Loading	0.064	0.061	0.06	0.059	--
Moisture Condition	0.40%	0.40%	0.40%	0.40%	--
Maximum Applied Load (lbf)	5201	5046	5258	4867	--
Splitting Tensile Strength (psi)	2614.2	2661.0	2819.1	2653.7	--

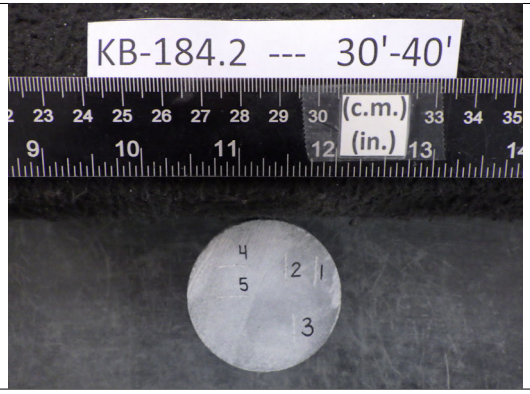
Client:	Terracon Consultants, Inc.		
Project:	Champlain-Hudson Power Express		
Location:		Project No:	GTX-315284
Boring ID: KB-184.2	Sample Type: cylinder	Tested By:	tlm
Sample ID: ---	Test Date: 10/24/22	Checked By:	smd
Depth : 30'-40'	Test Id: 689780		
Test Comment: ---			
Visual Description: ---			
Sample Comment: ---			

Abrasiveness of Rock Using the Cerchar Method by ASTM D7625

Boring ID	Sample ID	Depth	Stylus No	Reading 1	Reading 2	Average	Comments
KB-184.2	---	30-40 ft	1	1.3	1.7	1.50	
			2	3.1	2.4	2.75	
			3	1.3	0.5	0.90	
			4	3.7	3.5	3.60	
			5	0.8	0.7	0.75	
			Average CAIs			1.9	
			Average CAI *			2.36	
					CERCHAR Abrasiveness Index Classification	**High abrasiveness**	

Notes

Test Surface: Saw Cut
Moisture Condition: As Received
Apparatus Type: Original CERCHAR
Stylus Hardness: Rockwell Hardess 54/56 HRC
Stylus Displacement Relative to Rock Fabric:
Styli 1-3: Normal; Styli 4-5: Parallel
* CAI = (0.99 * CAIs) + 0.48
CAIs = CERCHAR index for smooth (saw cut) surface
CAI = CERCHAR index for natural surface
Comments:



Kiewit

MEMORANDUM

DATE: February 13, 2023

TO: Nick Strater; Brierley Associates Underground Engineers, PLLC

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

SUBJECT: Geotechnical Data: Segment 8 – Package 5 – HDD Crossing 79.B – Revision 1
Champlain Hudson Power Express Project
Schenectady, 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 south of Schenectady, New York. The approximate station for the start of HDD crossing Number 79.B is STA 50410+00 (42.6987° N, 73.9567° W).

The geotechnical data at this HDD crossing is attached. The available data is from the previous investigation by TRC and the recent investigation by Terracon.

- TRC, Geotechnical Data Report, Champlain Hudson Power Express, Canadian Pacific Railway Borings MP 177.6-228.2, dated March 15, 2013.
- Terracon, Geotechnical Data Report, Champlain-Hudson Power Express-Package 5, Schenectady through Selkirk, dated April 4, 2022.
- Terracon, Geotechnical Data Report, Champlain-Hudson Power Express – Additional HDD Borings – Phase 3, Fort Ann to Coxsackie, dated November 3, 2022.

Contact us if you have questions or require additional information.

HDD 79.B
Borings B184.8-1, K-184.7, KB-184.9
Segment 6 - Design Package 4A

CHPE Segment 8 & 9 - Package 5
HDD Soil Boring Coordinates and Elevations

Firm	Boring	Northing (feet)	Easting (feet)	Ground Surface Elevation (feet)
TRC*	A179.6-1	1433335.8	631009.7	332.5
	A182.4-1	1420048.2	636557.9	291.5
	A187.65-1	1394856.5	644775.4	327.7
	A191.05-1	1378814.5	652321.0	274.7
	A191.82-1	1375154.9	654314.3	257.1
	A192.9-1	1370644.3	657458.6	232.8
	B177.1-1	1445275.2	626125.8	347.3
	B177.6-1	1442944.0	627003.0	346.5
	B178.01-1	1440838.2	627828.3	368.5
	B178.9-1	1436461.4	629767.4	322.1
	B180.1-1	1431140.9	631965.3	310.4
	B180.9-1	1427158.5	633611.8	307.5
	B182.9-1	1417657.6	637123.9	291.5
	B183.2-1	1415871.4	637202.5	290.2
	B184.3-1	1410133.0	637597.6	324.0
	B184.8-1	1408223.8	638230.4	323.1
	B185.6-1	1403875.9	639489.9	328.2
	B188.0-1	1392812.4	645793.4	330.9
	B188.35-1	1391616.5	646333.6	333.4
	B188.51-1	1390815.1	646697.7	340.2
	B190.0-1	1383732.6	649743.4	296.3
	B190.1-1	1383134.9	649975.5	294.6
	B190.8-1	1379726.2	651827.2	282.3
	B192.4-1	1372732.4	655878.1	239.3
	B193.5-1	1367919.2	659547.5	218.6
AECOM**	RS-2	1436092.2	629800.7	315.6
	RS-3	1418336.4	636985.0	303.2
	RS-4	1414567.4	637285.8	302.2
	RS-5	1411399.1	637471.6	319.0
	RS-7A	1391599.9	646333.6	340.5
	RS-9	1372089.8	656230.9	238.7
	SY-7	1353089.8	670133.9	159.8
	SY-8	1353716.5	671626.7	175.0
	SY-9	1353046.4	673133.41	163.1
	SY-9A	1351940.0	674314.3	158.3
	SY-10	1350838.3	675488.6	166.0
	SCH-19	1446199.8	625927.0	333.8
	SCH-19A	1445712.1	626032.4	343.1

Notes:
- Northings and Eastings are provided in NAD83 New York State Plane East Zone.
- Elevations are referenced to the NAVD88 datum.
* TRC boring coordinates as shown in Table 1-6 in AECOM report (reference below). Boring elevations estimated from November 2021 topographic survey by Williams Aerial.
** AECOM boring coordinates and elevations as shown in Table 1-6 in AECOM report.
*** Kiewit boring coordinates and elevations are noted on the boring logs.

Reference:
AECOM, Geotechnical Data Report, Upland Segments: Putnam Station, Washington County, to Cementon, Green County, NY, Champlain Hudson Power Express, dated May 28, 2021.