Package 7A Phase 4 Borings

Champlain Hudson Power Express

New York

PROJECT NUMBER 20001480

CREATED BY Kiewit

DATE 02/17/2023

Legend Key

- Kiewit Borings

EXPLORATORY BORING LOG

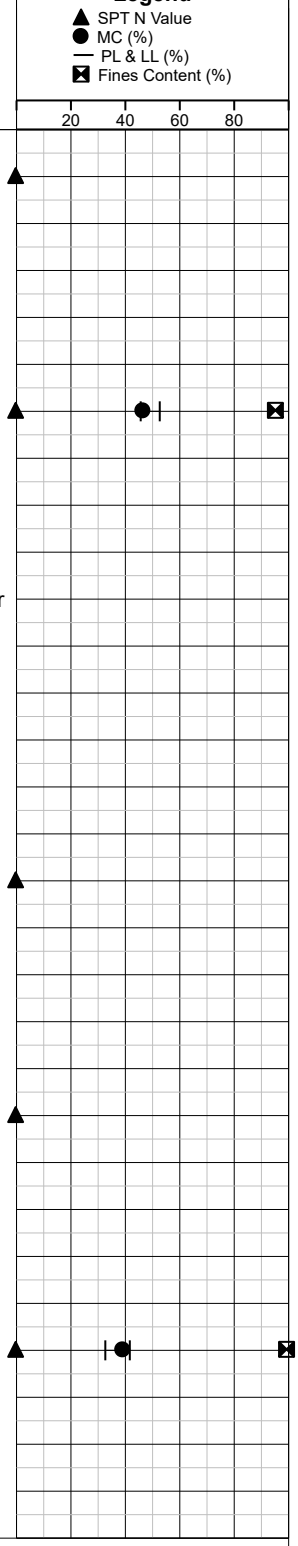
Champlain Hudson Power Express

New York

BORING NO: KB-221.8B

PROJECT NUMBER	20001480	**LOGGED BY**	S. Ahmad	**COORDINATES**	N 1234009.68 E 661045.34
START DATE	01/16/2023	**DRILLER/RIG**	Eric / Geoprobe 7822DT	**GROUND ELEV.**	101.0 ft
FINISH DATE	01/17/2023	**DRILL CONTRACTOR**	ADT Inc.	**HAMMER TYPE/EFF.**	Automatic

Depth (ft)	Elevation (ft)	Material Description	Sample Type	Core Run No.	Recovery % RQD	Pocket Pen. (tsf)	Blow Counts (N Value)	Notes
		SILT (ML), gray, soft to very soft, moist		10	100%		0-0-0-0 (0)	
35	66.0	SILT (MH), gray, very soft, moist		11	100%		0-0-0-0 (0)	
40				1	100%		0-0-0-0	3-inch ring sampler
45	56.0	SILT (ML), gray, very soft, moist		12	100%		0-0-0-0 (0)	
50				13	100%		0-0-0-0 (0)	
55				14	100%		0-0-0-0 (0)	
60								



EXPLORATORY BORING LOG

Champlain Hudson Power Express

New York

BORING NO: KB-221.8B

PROJECT NUMBER	20001480	**LOGGED BY**	S. Ahmad	**COORDINATES**	N 1234009.68 E 661045.34
START DATE	01/16/2023	**DRILLER/RIG**	Eric / Geoprobe 7822DT	**GROUND ELEV.**	101.0 ft
FINISH DATE	01/17/2023	**DRILL CONTRACTOR**	ADT Inc.	**HAMMER TYPE/EFF.**	Automatic

Depth (ft)	Elevation (ft)	Graphic Log	Material Description	Sample Type	Core Run No.	Recovery % RQD	Pocket Pen. (tsf)	Blow Counts (N Value)	Notes
			SILT (ML), gray, very soft, moist		15	100%		0-0-0-0 (0)	Boring extended due to soft soils
65									
70					16	100%		0-0-0-0 (0)	
75									
80					17	100%		0-0-0-0 (0)	
	19.0		Boring Terminated at 82ft						
85									
90									

Legend

- ▲ SPT N Value
- ● MC (%)
- — PL & LL (%)
- ⊠ Fines Content (%)

20 40 60 80

SOIL LEGEND

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

SAMPLE AND DRILL METHODS

☒	Standard Penetration Split-Spoon Sample
■	Undisturbed Sample
⊞	Piston Sampler
	Grab Sample
◇	Bulk Sample
	Auger Cuttings
▮	Rock Core
⋈	Modified California Sample

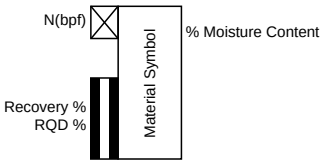
WATER LEVEL SYMBOLS

▽	Observation at time of drilling
▽	Observation after drilling
▼	Delayed observation
	Perched water observed at drilling
	Observed Seepage
	Cave-in Depth

COMMON ABBREVIATIONS AND ACRONYMS

MR	Mud Rotary
HSA	Hollow Stem Auger
SSA	Solid Stem Auger
SS	Split Spoon Sampler
UD	Undisturbed Sample
WOR	Weight of Rods
WOH	Weight of Hammer
SPT	Standard Penetration Test
REC	Recovery
RQD	Rock Quality Designation
MC	Moisture Content
PI	Plasticity Index
PL	Plastic Limit
LL	Liquid Limit
CPT	Cone Penetration Test
PP	Pocket Penetrometer
Bulk	Bulk Sample
EOB	End of Boring
AR	Auger Refusal
N-Value	Sum of blows for last two 6-in. increments of SPT
USCS	Unified Soil Classification System

CROSS SECTION LEGEND



RELATIVE DENSITY / CONSISTENCY

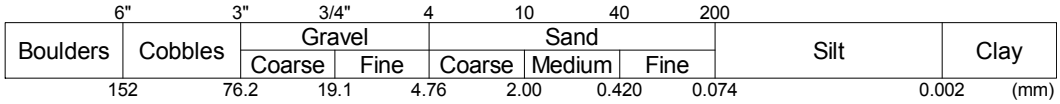
Coarse-grained Soils		Fine-grained Soils		
N-Value	Density	N-Value	Consistency	Pocket Pen (TSF)
0 - 4	Very Loose	0 - 1	Very Soft	0.0 - 0.25
5 - 10	Loose	2 - 4	Soft	0.25 - 0.50
11 - 30	Medium	5 - 8	Firm	0.51 - 1.00
31 - 50	Dense	9 - 15	Stiff	1.01 - 2.00
> 50	Very Dense	16 - 30	Very Stiff	2.01-4.00
		>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

RELATIVE PROPORTIONS OF GRAVEL, SAND, AND FINES

Trace	> 5 %
Few	5 to 10 %
Little	15 to 25 %
Some	30 - 45 %
Mostly	50 to 100 %

SOIL GRAIN SIZE

U.S. Standard Sieve



CRITERIA FOR DESCRIBING MOISTURE CONDITION

Description	Criteria
Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible free water
Wet	Visible free water, typically soil is below water table

CRITERIA FOR DESCRIBING CEMENTATION

Description	Criteria
Weak	Crumbles or breaks with handling or little finger pressure
Moderate	Crumbles or breaks with considerable finger pressure
Strong	Will not crumble or break with finger pressure

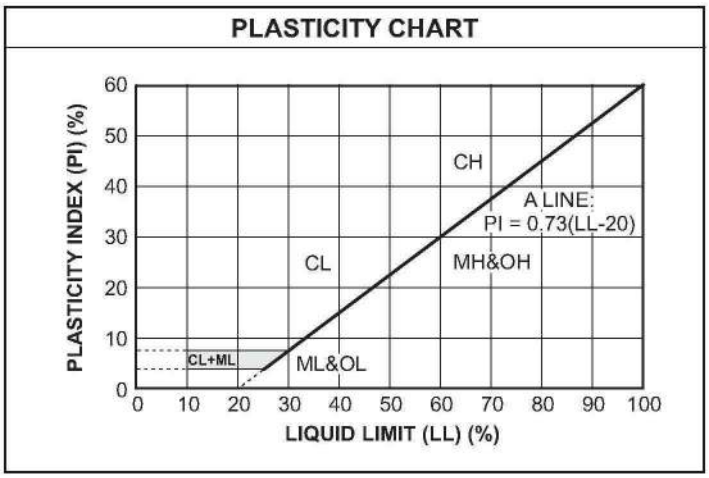
CRITERIA FOR DESCRIBING STRUCTURE

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

SOIL SYMBOLS

USCS SOIL TYPES		
Symbol	Group	Description
	GW	Well-graded gravels, gravel sand mixtures with trace or no fines
	GP	Poorly-graded gravels, gravel-sand mixtures with trace or no fines
	GW-GM	Well-graded gravels, gravel-sand mixtures with silt fines
	GW-GC	Well-graded gravels, gravel-sand mixtures with clay fines
	GP-GM	Poorly-graded gravels, gravel-sand mixtures with silt fines
	GP-GC	Poorly-graded gravels, gravel-sand mixtures with clay fines
	GM	Silty gravels, gravel-silt-sand mixtures
	GC	Clayey gravels, gravel-sand-clay mixtures
	GC-GM	Clayey gravels, gravel-sand-clay-silt mixtures
	SW	Well-graded sands, sand-gravel mixtures with trace or no fines
	SP	Poorly-graded sands, sand-gravel mixtures with trace or no fines
	SW-SM	Well-graded sands, sand-gravel mixtures with silt fines
	SW-SC	Well-graded sands, sand-gravel mixtures with clayfines
	SP-SM	Poorly-graded sands, sand-gravel mixtures with silt fines
	SP-SC	Poorly-graded sands, sand-gravel mixtures with clay fines
	SM	Silty sands, sand-gravel-silt mixtures
	SC	Clayey sands, sand-gravel-clay mixtures
	SC-SM	Clayey sands, sand-gravel-clay-silt mixtures
	ML	Inorganic silts with low plasticity
	CL	Inorganic clays of low plasticity, gravelly or sandy clays, silty clays, lean clays
	CL-ML	Inorganic clay-silts of low plasticity, gravelly clays, sandy clays, silty clays, lean clays
	OL	Organic silts and organic silty clays of low plasticity
	MH	Inorganic silts of high plasticity, elastic silts
	CH	Inorganic clays of high plasticity, fat clays
	OH	Organic clays and organic silts of high plasticity
	PT	Peat, humus, swamp soils with high organic contents

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



Summary of Laboratory Results

BORING ID	Depth (Ft.)	Water Content (%)
KB-169.0-1.0	4-6	18.6
KB-169.0-1.0	10-12	22.8
KB-169.0-1.0	20-22	29.0
KB-169.0-1.0	35-37	26.2
KB-169.0-1.0	50-52	25.1
KB-169.0-2.4	4-6	9.7
KB-169.0-2.4	20-22	20.1
KB-169.0-2.4	35-37	29.8
KB-169.0-2.4	55-57	23.6
KB-169.0-2.5	4-6	18.0
KB-169.0-2.5	10-12	18.5
KB-169.0-2.5	30-32	28.0
KB-169.0-2.5	40-42	24.7
KB-169.0-3.6	4-6	13.0
KB-169.0-3.6	10-12	3.4
KB-169.0-3.6	25-27	13.3
KB-169.0-3.6	40-42	9.3
KB-169.0-3.6	50-52	2.5
KB-169.0-3.7	4-6	11.7
KB-169.0-3.7	20-22	23.0
KB-169.0-3.7	40-42	4.4
KB-169.0-3.7	60-62	8.6
KB-169.0-7.9	4-6	18.1
KB-221.0B	4-6	11.0
KB-221.0B	10-12	40.8
KB-221.0B	30-32	37.4
KB-221.0B	50-52	29.6
KB-221.8B	4-6	32.1
KB-221.8B	20-22	44.4
KB-221.8B	35-37	46.6
KB-221.8B	55-57	39.2
KB-222.8	6-8	33.6
KB-222.8	20-22	43.2
KB-222.8	45-47	39.4
KB-222.8	65-67	45.0

PROJECT: Lab Testing

SITE: Champlain to Hudsdon Power Express

Terracon
30 Corporate Cir Ste 201
Albany, NY

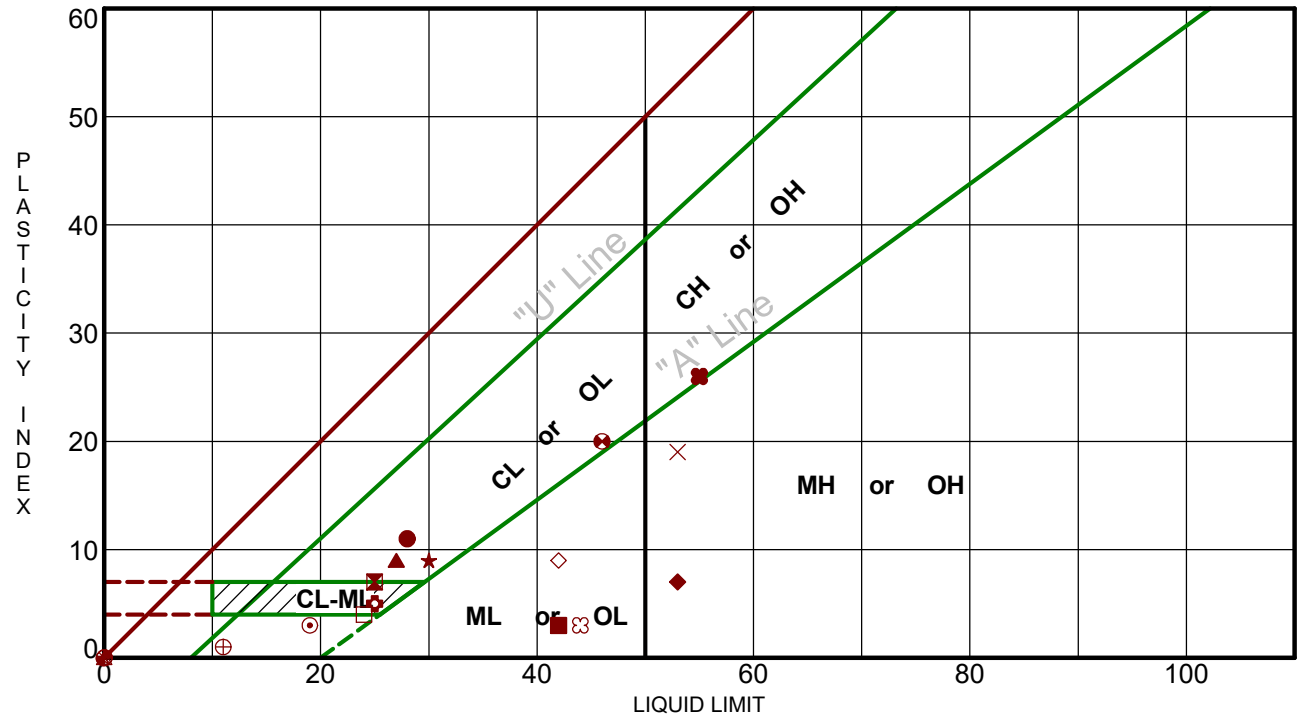
PROJECT NUMBER: JB215256H

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

EXHIBIT: B-1

ATTERBERG LIMITS RESULTS

ASTM D4318



Boring ID	Depth (Ft)	LL	PL	PI	Fines	USCS	Description
KB-169.0-1.0	20 - 22	28	17	11	93.4	CL	LEAN CLAY
KB-169.0-1.0	35 - 37	25	18	7	97.1	CL-ML	SILTY CLAY
KB-169.0-1.0	50 - 52	27	18	9	99.4	CL	LEAN CLAY
KB-169.0-2.4	20 - 22	30	21	9	73.6	ML	SANDY SILT
KB-169.0-2.4	35 - 37	19	16	3	87.9	ML	SILT
KB-169.0-2.5	30 - 32	25	20	5	92.5	CL-ML	SILTY CLAY
KB-169.0-2.5	40 - 42	NP	NP	NP	95.7	ML	SILT
KB-169.0-3.6	4 - 6	NP	NP	NP	8.8	GP-GM	POORLY GRADED GRAVEL with SILT and SAND
KB-169.0-3.6	50 - 52	NP	NP	NP	43.6	SM	SILTY SAND
KB-169.0-3.7	60 - 62	11	10	1	39.1	SM	SILTY SAND
KB-221.0B	4 - 6	24	20	4	16.9	SC-SM	SILTY, CLAYEY SAND with GRAVEL
KB-221.0B	10 - 12	46	26	20	96.3	CL	LEAN CLAY
KB-221.0B	30 - 32	NP	NP	NP	96.0	ML	SILT
KB-221.0B	50 - 52	NP	NP	NP	99.4	ML	SILT
KB-221.8B	4 - 6	44	41	3	72.3	ML	SILT with GRAVEL
KB-221.8B	20 - 22	42	39	3	98.3	ML	SILT
KB-221.8B	35 - 37	53	46	7	95.5	MH	ELASTIC SILT
KB-221.8B	55 - 57	42	33	9	99.6	ML	SILT
KB-222.8	6 - 8	53	34	19	97.5	MH	ELASTIC SILT
KB-222.8	20 - 22	55	29	26	92.8	CH	FAT CLAY

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Terracon
30 Corporate Cir Ste 201
Albany, NY

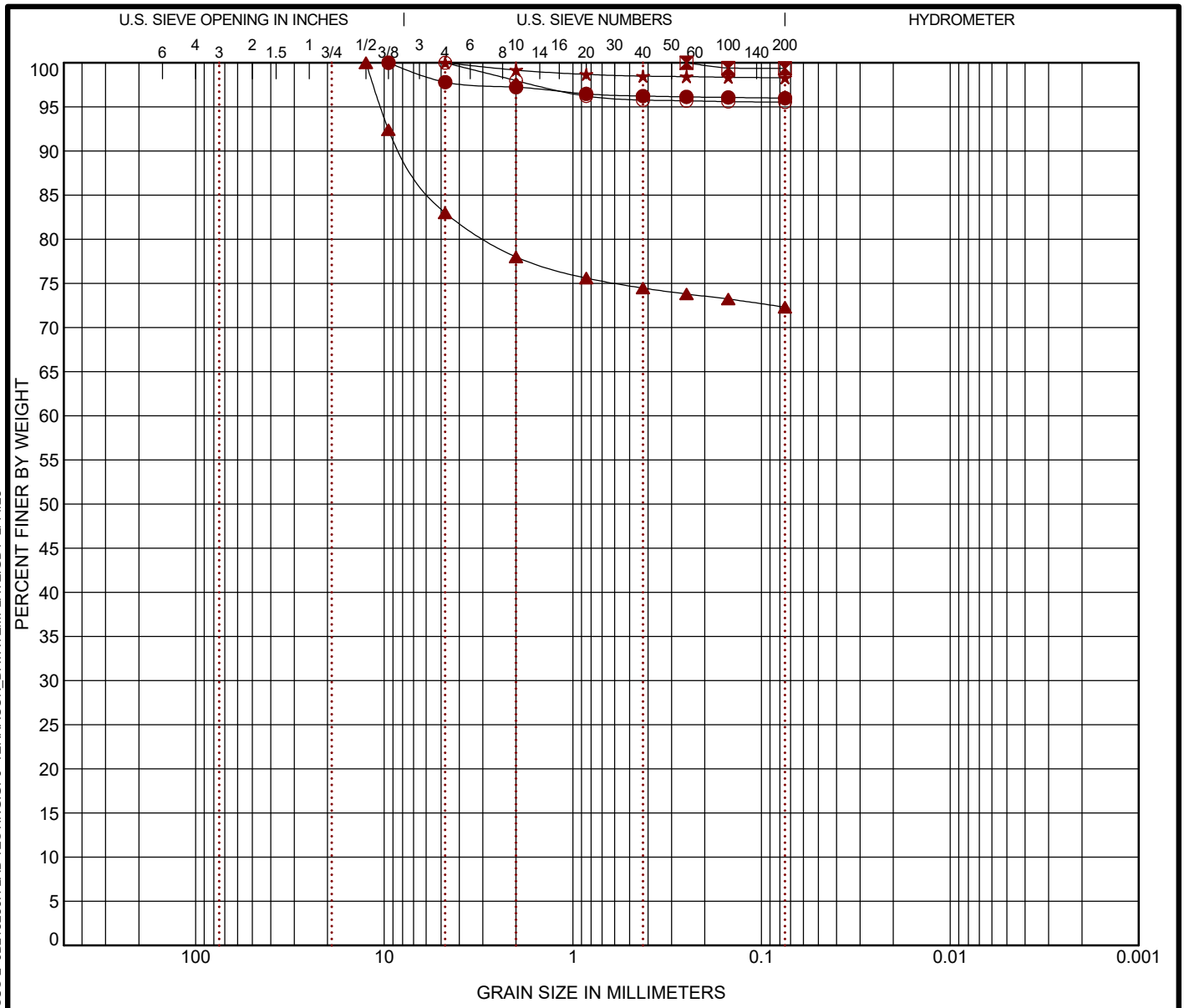
PROJECT NUMBER: JB215256H

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

EXHIBIT: B-1

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-221.0B	30 - 32	SILT (ML)	37.4	NP	NP	NP		
⊠	KB-221.0B	50 - 52	SILT (ML)	29.6	NP	NP	NP		
▲	KB-221.8B	4 - 6	SILT with GRAVEL (ML)	32.1	44	41	3		
★	KB-221.8B	20 - 22	SILT (ML)	44.4	42	39	3		
⊙	KB-221.8B	35 - 37	ELASTIC SILT (MH)	46.6	53	46	7		

Boring ID		Depth (Ft)	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
●	KB-221.0B	30 - 32	9.5				0.0	2.2	1.8		96.0	
⊠	KB-221.0B	50 - 52	0.25				0.0	0.0	0.6		99.4	
▲	KB-221.8B	4 - 6	12.5				0.0	17.0	10.7		72.3	
★	KB-221.8B	20 - 22	4.75				0.0	0.0	1.7		98.3	
⊙	KB-221.8B	35 - 37	4.75				0.0	0.0	4.5		95.5	

PROJECT: Lab Testing

SITE: Champlain to Hudsdon Power Express

Terracon
30 Corporate Cir Ste 201
Albany, NY

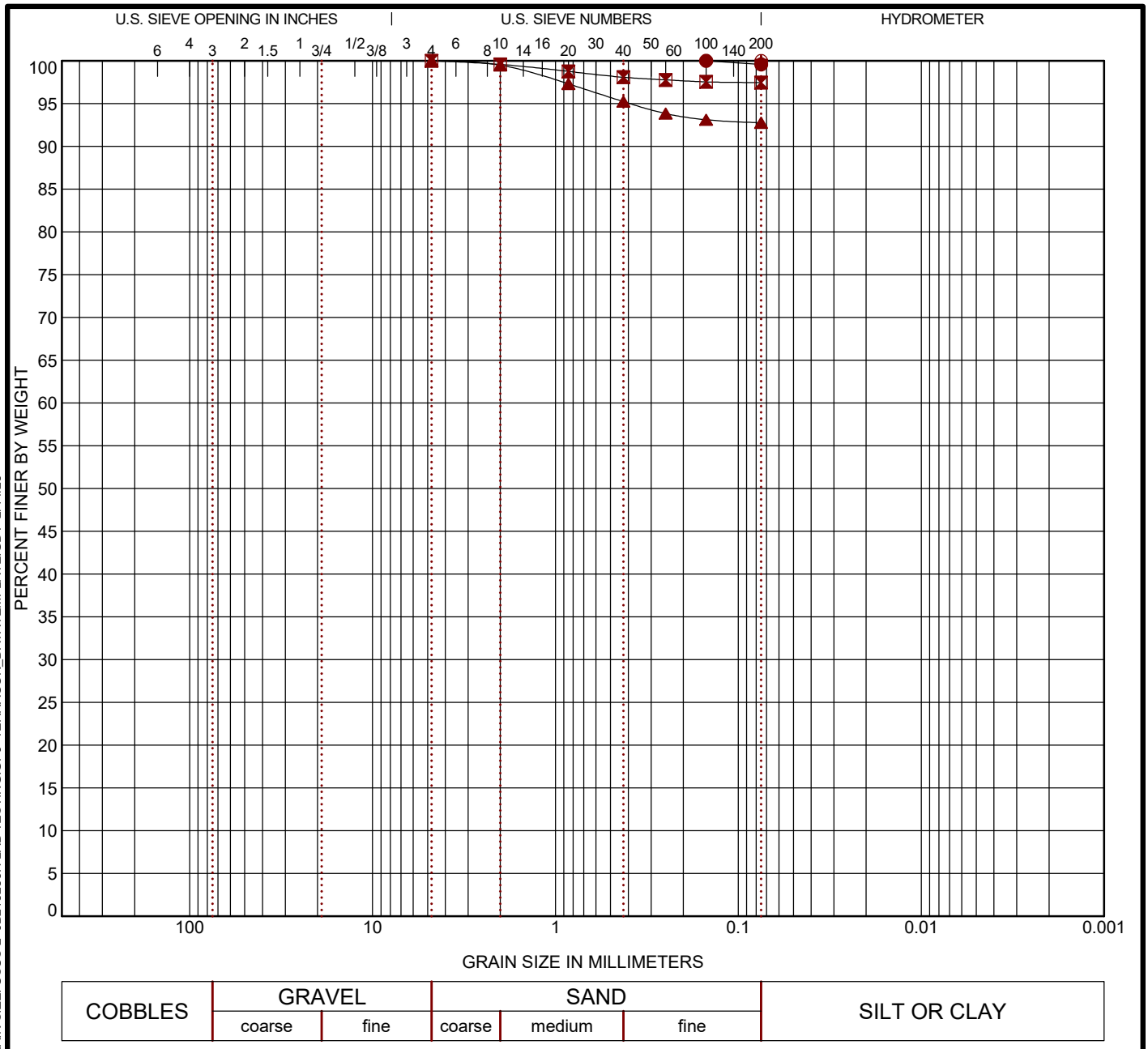
PROJECT NUMBER: JB215256H

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

EXHIBIT: B-6

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



Boring ID	Depth (Ft)	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
KB-221.8B	55 - 57	SILT (ML)	39.2	42	33	9		
KB-222.8	6 - 8	ELASTIC SILT (MH)	33.6	53	34	19		
KB-222.8	20 - 22	FAT CLAY (CH)	43.2	55	29	26		
KB-222.8	45 - 47	SILT (ML)	39.4	43	28	15		
KB-222.8	65 - 67	ELASTIC SILT (MH)	45.0	52	29	23		

Boring ID	Depth (Ft)	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
KB-221.8B	55 - 57	0.15				0.0	0.0	0.4		99.6	
KB-222.8	6 - 8	4.75				0.0	0.0	2.5		97.5	
KB-222.8	20 - 22	4.75				0.0	0.0	7.2		92.8	
KB-222.8	45 - 47	0.075				0.0	0.0	0.0		100.0	
KB-222.8	65 - 67	0.075				0.0	0.0	0.0		100.0	

PROJECT: Lab Testing

SITE: Champlain to Hudsdon Power Express

Terracon
30 Corporate Cir Ste 201
Albany, NY

PROJECT NUMBER: JB215256H

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

EXHIBIT: B-7

Kiewit

MEMORANDUM

DATE: December 16, 2022

TO: Zachary Bauer, Tetra Tech Rooney

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

SUBJECT: Geotechnical Data: Segment 11 – Package 7A – HDD Crossing 118 – Revision 1
Champlain Hudson Power Express Project
Catskill, New York

Kiewit Engineering is providing the attached geotechnical data for use in the horizontal direction drill (HDD) design for the Champlain Hudson Power Express project in Upstate New York. This HDD crossing is located west of Catskill, New York. The approximate station for the start of HDD crossing number 118 is STA 70139+50 (42.2156° N, 73.8818° W).

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

- TRC, Geotechnical Data Report, Champlain Hudson Power Express, Canadian Pacific Railway Borings MP 177.6-228.2, dated March 15, 2013.
- Terracon Consultants-NY, Inc., Results of Field Exploration, Champlain-Hudson Power Express – Package 7a, Catskill, NY, dated May 23, 2022.
- Kiewit Engineering (NY) Corp., Package 7A Phase 3 Borings, Champlain Hudson Power Express, New York, dated December 8, 2022.

Contact us if you have questions or require additional information.

HDD 118
Borings B222.34-1, K-222.3, K-222.4, KB-222.2
Segment 11 - Design Package 7A

CHPE Segment 11 - Package 7A
HDD Soil Boring Coordinates and Elevations

Firm	Boring	Northing (feet)	Easting (feet)	Ground Surface Elevation (feet)
TRC*	B221.0-1	1237452.6	663787.2	99.6
	B221.2-1	1236173.4	663261.8	115.0
	B221.4-1	1235622.5	662622.3	22.4
	B221.5-1	1235006.9	662058.8	95.5
	B221.6-1	1234675.8	661633.8	98.3
	B221.8-1	1234265.3	661277.2	99.4
	B222.34-1	1232191.5	659098.9	133.5
	B222.6-1	1231252.6	658182.3	113.7
	B222.9-1	1229751.0	657274.3	121.4
	B225.8-1	1215861.0	650622.7	91.0
	B226.1-1	1214654.4	650328.3	105.9
	B226.2-1	1214120.5	650254.4	108.5
	B226.6-1	1211894.7	649689.7	112.1
AECOM**	CU-1	1237028.6	663123.9	19.7
	CU-2	1236042.7	662897.0	24.8
	CU-2A	1235325.9	662268.9	38.1
	CU-5A	1210523.7	649411.8	118.4
	SC-5	1239310.3	664321.6	110.2
	SC-6	1237781.0	663919.8	101.6

Notes:

- Northings and Eastings are provided in NAD83 New York State Plane East Zone.
- Elevations are referenced to the NAVD88 datum.

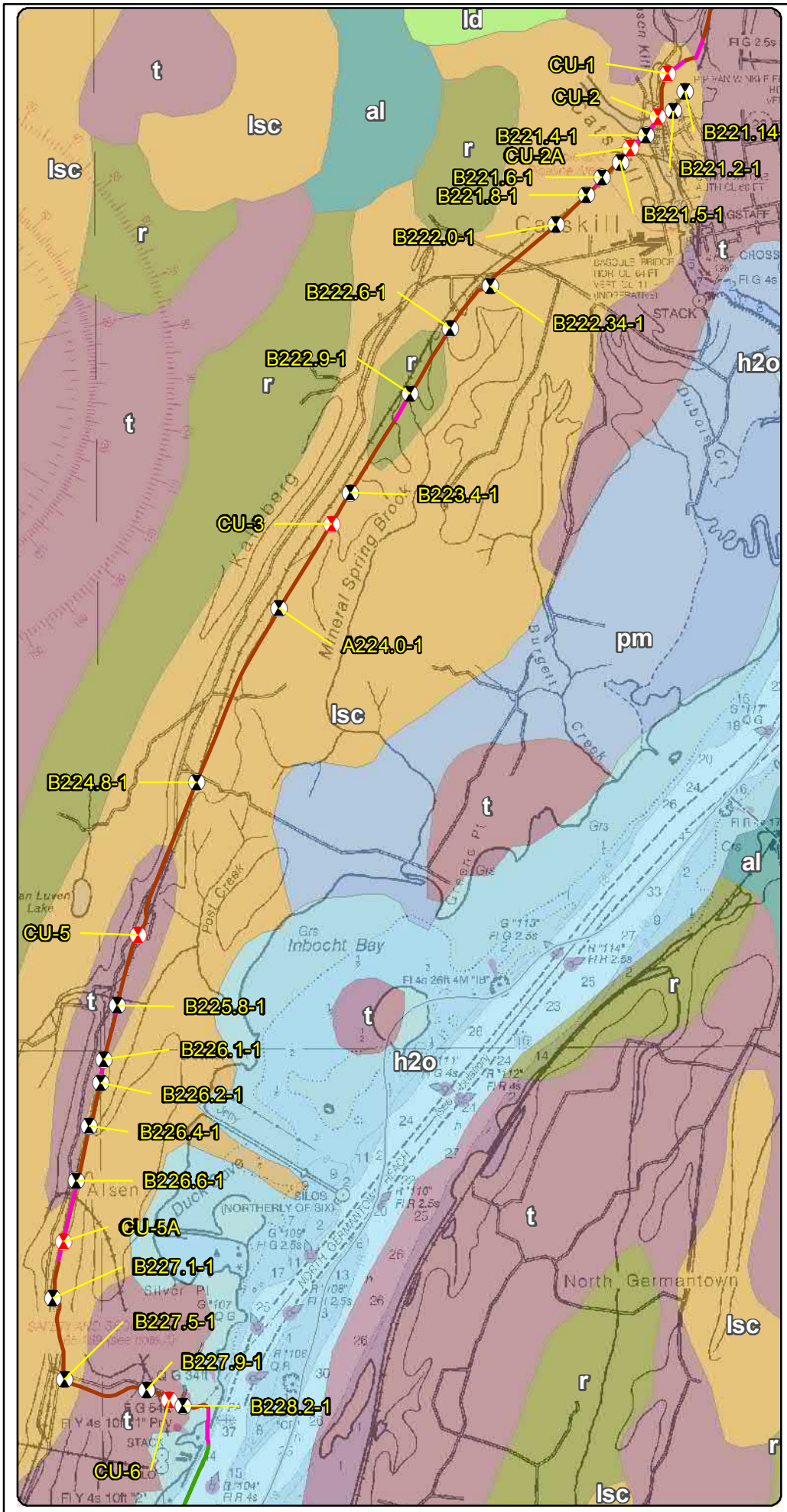
* TRC boring coordinates as shown in Table 1-6 in AECOM report (reference below). Boring elevations estimated from November 2021 topographic survey by Williams Aerial.

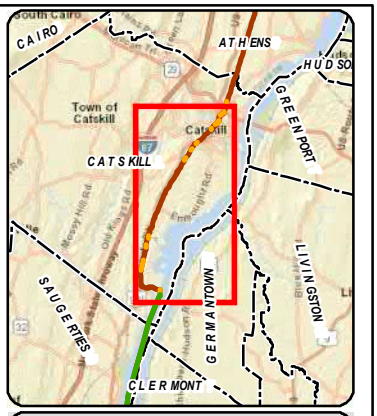
** AECOM boring coordinates and elevations as shown in Table 1-6 in AECOM report.

*** 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
- h2o - Water
- ld - Lacustrine delta
- lsc - Lacustrine silt and clay
- pm - Swamp deposits
- r - Bedrock
- t - Till

N

0.3 0.15 0 0.3 Miles

Transmission

Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

Surficial Geology and Geotechnical Borings Catskill to Upland Figure 3-11

Prepared on 5/3/2021

by: AECOM

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

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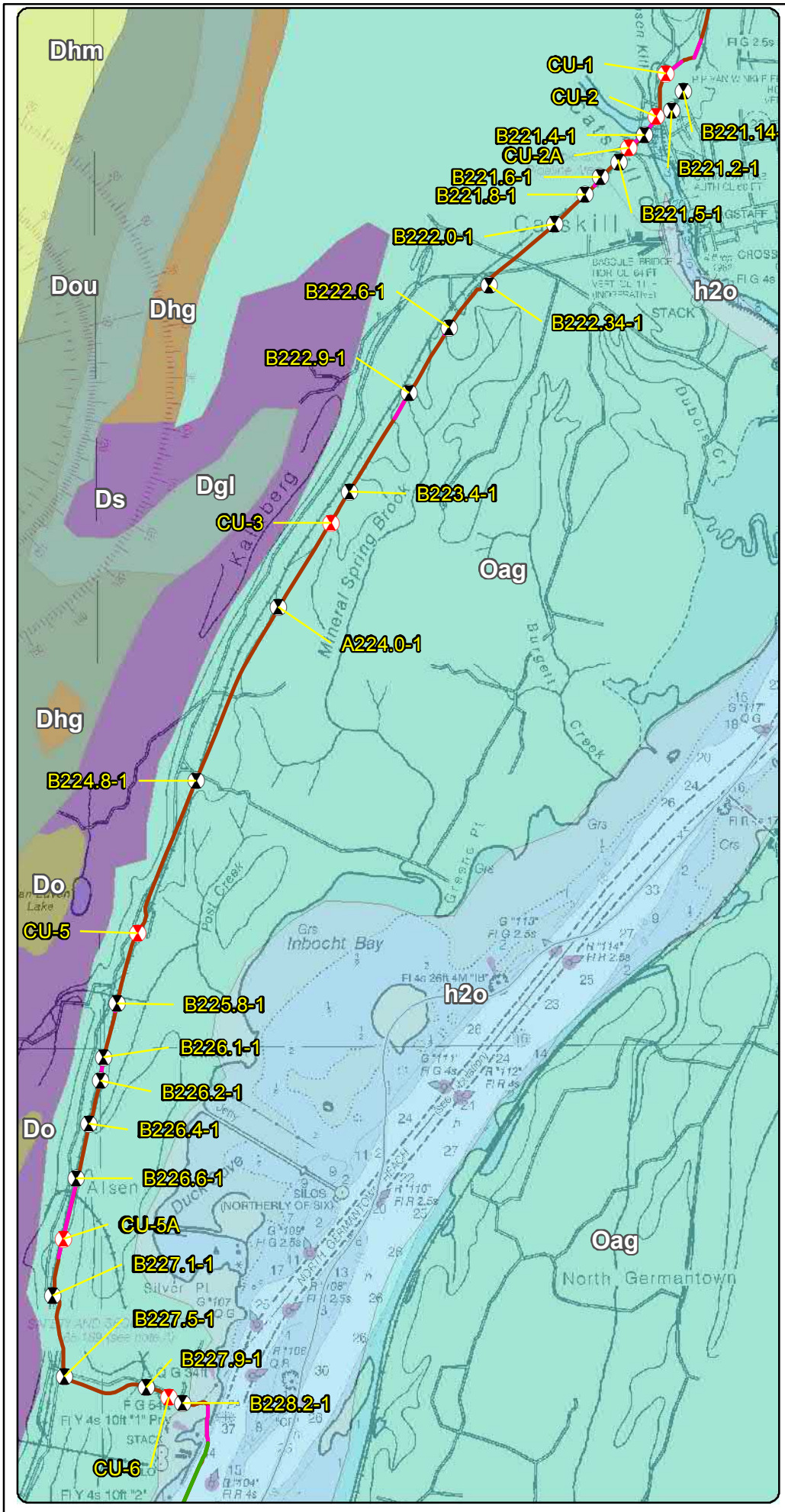

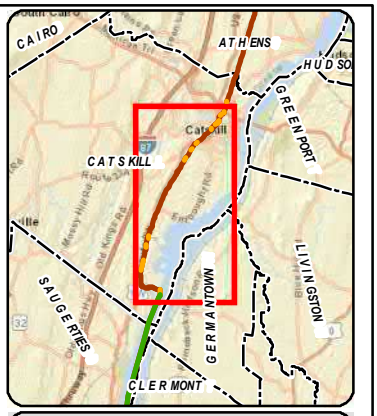

LEGEND

- 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
- Do - Oriskany Sandstone
- Dou - Onondaga Limestone
- Ds - Cashaqua Shale
- Oag - Austin Glen Form (graywacke, shale)
- h2o - Water

N

0.3 0.15 0 0.3 Miles

Transmission Developers Inc.

Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

Bedrock Geology and Geotechnical Borings Catskill to Upland Figure 4-11

Prepared on 5/18/2021

by: AECOM

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

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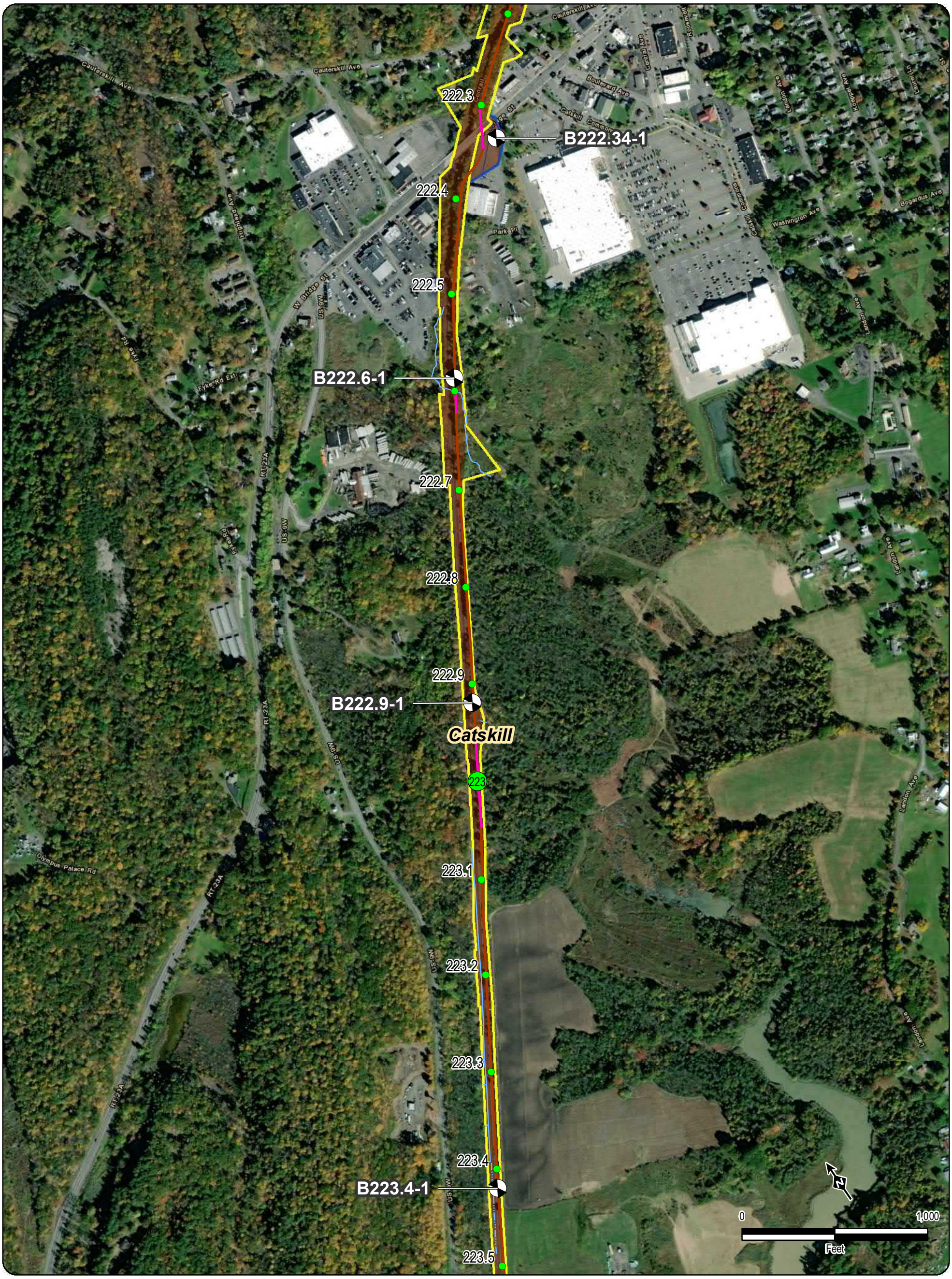

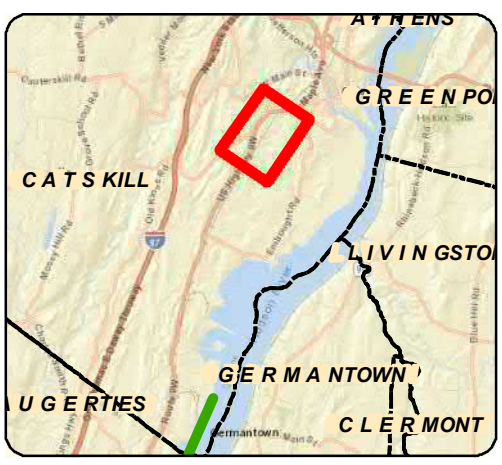

LEGEND

- 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

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

Transmission Developers Inc.

Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

BORING LOCATION PLAN

Catskill to Upland

Figure A-11

Sheet 2 of 6

Prepared by: AECOM 5/20/2021

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TEST BORING LOG

PROJECT: TDI CHAMPLAIN HUDSON POWER EXPRESS

LOCATION: CSX RAILROAD ROW, NY

BORING	**B222.3-1**
G.S. ELEV.	N/A
FILE	195651
SHEET	1 OF 1

Note: Boring Log is named as B222.34-1 elsewhere

GROUNDWATER DATA			
FIRST ENCOUNTERED DRY			
DEPTH	HOUR	DATE	ELAPSED TIME

METHOD OF ADVANCING BOREHOLE				
a	FROM	0.0 '	TO	4.0 '
d	FROM	4.0 '	TO	25.0 '

DRILLER	P. PLANTIER
HELPER	M. NAGEY
INSPECTOR	C. POPPE
DATE STARTED	02/15/2013
DATE COMPLETED	02/15/2013

DEPTH	A	B	C	DESCRIPTION	Wn	REMARKS
	S-1	2 2 2 5		***DARK BROWN F/M SANDY SILT*** 2.0		BORING RELOCATED AND DRILLED AT MP 222.34-1
	S-2	5 6 6 7		***LIGHT BROWN CLAY***	31.3	
5	S-3	6 9 10 15		6.0		
	S-4	4 7 8 10			35.2	
10	S-5	5 8 11 9			36.2	
15	S-6	5 4 5		***GRAY AND BROWN CLAY***	34.8	
20	S-7	2 4 6				
25	S-8	5 6 5		25.0 ***END OF BORING AT 25'***		
30						
35						

DRN.	JPB
CKD.	PWK

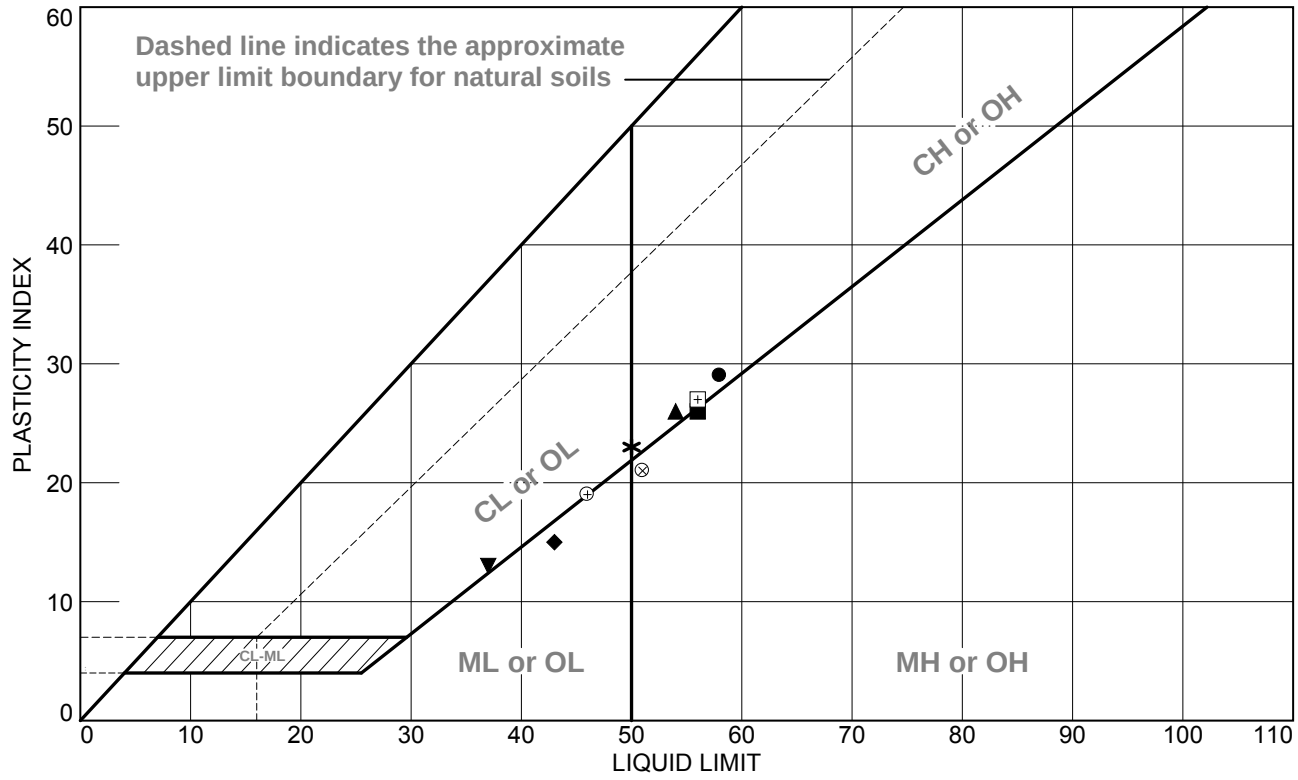
NEW PROJECTS TEST BORING LOG 195651_TDI_CSX.GPJ SITE BLAUVELT.GDT 3/12/13

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)					
B222.34-1	S-2	2.0-4.0	-	-	-	-	-	-	-	-	-	-	31.3	-	-	-
	S-4	6.0-8.0	CH	-	-	-	-	58	29	29	0.2	-	35.2	-	-	-
	S-5	8.0-10.0	-	-	-	-	-	-	-	-	-	-	36.2	88.2	-	-
	S-6	13.5-15.0	CH/MH	-	-	-	-	56	30	26	0.2	-	34.8	-	-	-
B222.6-1	S-3	4.0-6.0	SM	0.0	6.6	93.4		-	-	-	-	-	19.6	-	-	-
	S-4	6.0-8.0	-	17.1	18.6	64.3		-	-	-	-	-	30.0	-	-	14.4
	S-5	8.0-10.0														
	R-2	15.6-16.0	-	-	-	-		-	-	-	-	-	-	166.7	665	-
	R-3	22.6-23.0	-	-	-	-		-	-	-	-	-	-	169.0	436	-
B222.9-1	S-2	2.0-4.0	-	-	-	-	-	-	-	-	-	-	29.7	-	-	-
	S-3	4.0-6.0	-	-	-	-	-	-	-	-	-	-	33.0	-	-	-

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B222.34-1	S-4	6.0-8.0 FT	35.2	29	58	29	CH
■	B222.34-1	S-6	13.5-15.0 FT	34.8	30	56	26	CH/MH
▲	B222.9-1	S-5	8.0-10.0 FT	33.4	28	54	26	CH
◆	B223.4-1	S-7	18.5-20.0 FT	31.6	28	43	15	ML
▼	B224.8-1	S-8 & S-9	23.5-30.0 FT	33.3	24	37	13	CL
✱	B226.1-1	S-6	13.5-15.0 FT	36.9	27	50	23	CH
⊕	B226.1-1	S-8	23.5-25.0 FT	39.0	27	46	19	CL
⊞	B226.6-1	S-3 & S-4	4.0-8.0 FT	38.8	29	56	27	CH
⊗	B226.6-1	S-6 & S-7	13.5-20.0 FT	53.7	30	51	21	MH

TRC
Engineers, Inc.
Mt. Laurel, NJ

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

Project No.: 195651 **Figure** 9

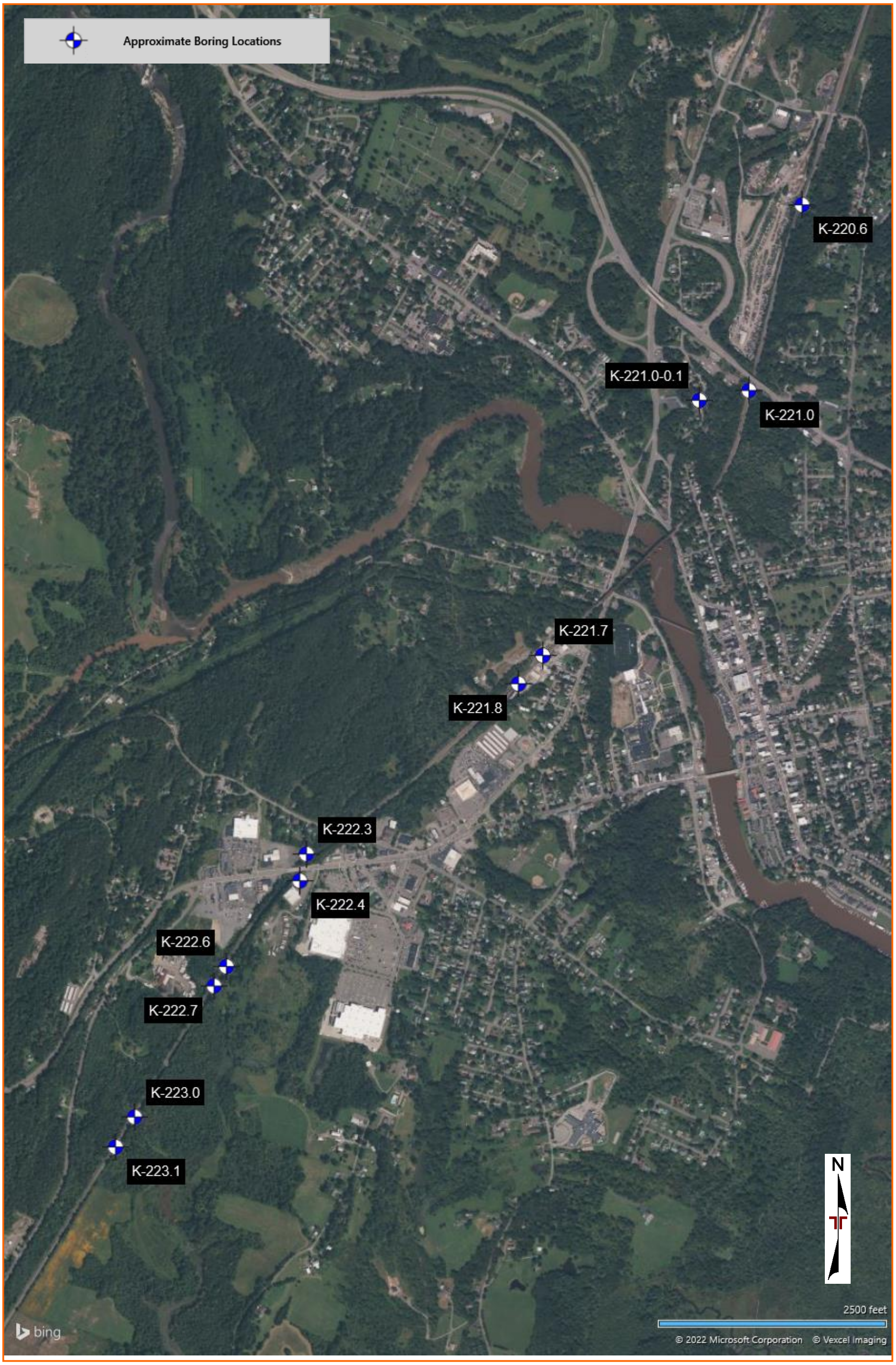


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

AERIAL PHOTOGRAPHY PROVIDED BY MICROSOFT BING MAPS

BORING LOG NO. K-222.3

PROJECT: Champlain-Hudson Power Express Package 7a

CLIENT: Kiewit Engineering (NY) Corp.

SITE: Champlain to Hudson HDD Crossings
Catskill, NY

LOCATION See Exploration Plan

Latitude: 42.214811° Longitude: -73.883942°

Surface Elev.: 135.28 (Ft.)

DEPTH	ELEVATION (Ft.)	Description	DEPTH (Ft.)	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		FILL - SILT AND CLAY, gravel noted, brown, stiff			12	29-8-7-11 N=15			
2.0	133.5								
		SILT AND CLAY (CL-ML), brown, stiff to very stiff			15	4-6-6-12 N=12			
			5		16	8-8-12-14 N=20			
6.0	129.5								
		SANDY LEAN CLAY (CL), brown, stiff to very stiff			22	11-11-11-13 N=22	25.9	43-22-21	60
					24	11-12-12-12 N=24			
			10		8	5-5-6-8 N=11	28.3	41-20-21	70
13.0	122.5								
		WEATHERED ROCK, gray, very dense			8	5-50/4"			
15.5	120		15						
		GRAYWACKE, slightly weathered, close fractured, good RQD, gray				REC =98% RQD= 83%			
20.5	115		20						
		GRAYWACKE, moderately weathered, with highly weathered veins, close to moderate fractured, fair RQD, gray				REC =100% RQD= 73%			
			25						

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

Hammer Type: Automatic

Advancement Method:
4 1/4 HSA

Abandonment Method:
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 LC
Hammer Efficiency Summary:
Energy Transfer Ratio: 89.2% +/-2.4%
Hammer Efficiency Correction (CE):1.49
WOH = Weight of Hammer

WATER LEVEL OBSERVATIONS

No measurable groundwater prior to grouting

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 03-23-2022 | Boring Completed: 03-23-2022

Drill Rig: Diedrich D-70 | Driller: J. Raushcer

Project No.: JB215256D

BORING LOG NO. K-222.3

PROJECT: Champlain-Hudson Power Express Package 7a

CLIENT: Kiewit Engineering (NY) Corp.

SITE: Champlain to Hudson HDD Crossings
Catskill, NY

LOCATION See Exploration Plan

Latitude: 42.214811° Longitude: -73.883942°

Surface Elev.: 135.28 (Ft.)

DEPTH	ELEVATION (Ft.)	Description	FIELD TEST RESULTS
25.5	110	**GRAYWACKE**, slightly to moderately weathered, close to wide fractured, fair RQD, gray	REC =100% RQD= 69%
30.5	105	**GRAYWACKE**, highly weathered, with highly weathered veins,very close fractured, poor RQD, gray	REC =93% RQD= 28%
35.5	100	**GRAYWACKE**, highly weathered, with highly weathered veins,very close fractured, poor RQD, gray	REC =100% RQD= 46%
40.5	95	***Boring Terminated at 40.5 Feet***	

GRAPHIC LOG | DEPTH (Ft.) | WATER LEVEL OBSERVATIONS | SAMPLE TYPE | RECOVERY (In.) | FIELD TEST RESULTS | 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:
4 1/4 HSA

Abandonment Method:
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 LC
Hammer Efficiency Summary:
Energy Transfer Ratio: 89.2% +/-2.4%
Hammer Efficiency Correction (CE):1.49
WOH = Weight of Hammer

WATER LEVEL OBSERVATIONS

No measurable groundwater prior to grouting

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 03-23-2022 | Boring Completed: 03-23-2022

Drill Rig: Diedrich D-70 | Driller: J. Raushcer

Project No.: JB215256D

BORING LOG NO. K-222.4

PROJECT: Champlain-Hudson Power Express Package 7a

CLIENT: Kiewit Engineering (NY) Corp.

SITE: Champlain to Hudson HDD Crossings
Catskill, NY

LOCATION See Exploration Plan

Latitude: 42.214008° Longitude: -73.884214°

Surface Elev.: 133.13 (Ft.)

DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	FILL - ASPHALT, CINDERS AND BRICKS, black, medium dense							
2.0	131			12	29-8-7-11 N=15			
	LEAN CLAY (CL), brown, stiff			15	4-6-6-12 N=12			
		5		16	8-8-12-14 N=20			
				22	11-11-11-13 N=22	31.4		
				24	11-12-12-12 N=24			
		10		8	5-5-6-8 N=11	30.0	44-22-22	87
15.0	118							
15.8	**WEATHERED ROCK**, black, very dense 117.5	15		8	5-50/4"			
	GRAYWACKE, unweathered, close to wide fractured, excellent RQD, gray				REC =96% RQD= 91%			
20.8	112.5	20						
	GRAYWACKE, unweathered, close to wide fractured, excellent RQD, gray				REC =96% RQD= 96%			
		25						

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

Hammer Type: Automatic

Advancement Method:
4 1/4 HSA

Abandonment Method:
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: 86.9% +/-2.2%
Hammer Efficiency Correction (CE):1.52

WATER LEVEL OBSERVATIONS

No measurable groundwater prior to grouting

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 03-16-2022 | Boring Completed: 03-16-2022

Drill Rig: Mobile B-57 | Driller: S. Kahn

Project No.: JB215256D

BORING LOG NO. K-222.4

PROJECT: Champlain-Hudson Power Express Package 7a

CLIENT: Kiewit Engineering (NY) Corp.

SITE: Champlain to Hudson HDD Crossings
Catskill, NY

LOCATION See Exploration Plan

Latitude: 42.214008° Longitude: -73.884214°

Surface Elev.: 133.13 (Ft.)

DEPTH	ELEVATION (Ft.)	Description	FIELD TEST RESULTS
25.8	107.5	**GRAYWACKE**, unweathered, moderate to wide fractured, excellent RQD, gray	REC =100% RQD= 91%
30.8	102.5	**GRAYWACKE**, unweathered, wide fractured, excellent RQD, gray	REC =96% RQD= 88%
35.8	97.5	**GRAYWACKE**, unweathered, wide fractured, excellent RQD, gray	REC =100% RQD= 100%
40.8	92.5	***Boring Terminated at 40.8 Feet***	

GRAPHIC LOG | DEPTH (Ft.) | WATER LEVEL OBSERVATIONS | SAMPLE TYPE | RECOVERY (In.) | FIELD TEST RESULTS | 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:
4 1/4 HSA

Abandonment Method:
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: 86.9% +/-2.2%
Hammer Efficiency Correction (CE):1.52

WATER LEVEL OBSERVATIONS

No measurable groundwater prior to grouting

Terracon
30 Corporate Cir Ste 201
Albany, NY

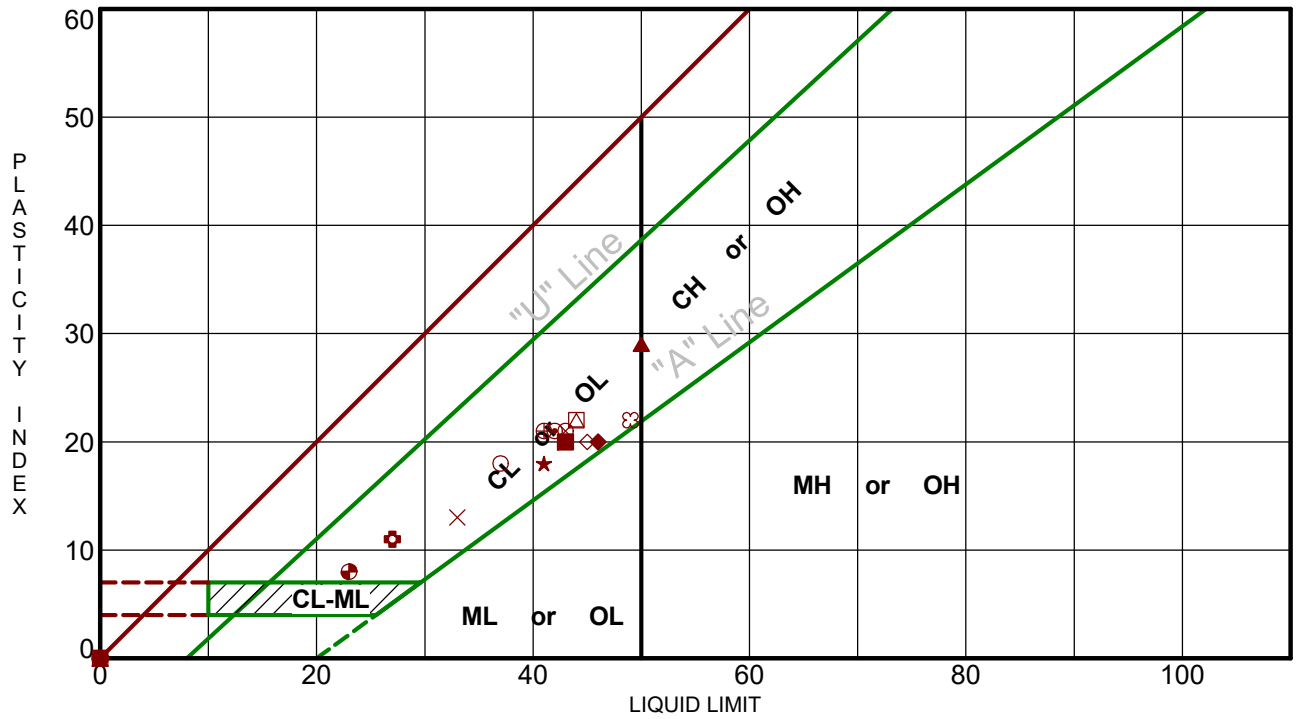
Boring Started: 03-16-2022 | Boring Completed: 03-16-2022

Drill Rig: Mobile B-57 | Driller: S. Kahn

Project No.: JB215256D

ATTERBERG LIMITS RESULTS

ASTM D4318



Boring ID		Depth (Ft)	LL	PL	PI	Fines	USCS	Description
●	K-220.6	6 - 8	NP	NP	NP	22.1	GM	SILTY GRAVEL with SAND
⊠	K-220.6	13 - 15	NP	NP	NP	11.9	SW-SM	WELL-GRADED SAND with SILT and GRAVEL
▲	K-221.0	8 - 10	50	21	29	73.4	CH	FAT CLAY with SAND
★	K-221.0	23 - 25	41	23	18	89.8	CL	LEAN CLAY
⊙	K-221.7	10 - 12	42	21	21	93.6	CL	LEAN CLAY
✿	K-221.7	33 - 35	27	16	11	58.8	CL	SANDY LEAN CLAY
○	K-221.8	8 - 10	37	19	18	91.3	CL	LEAN CLAY
△	K-221.8	35 - 37	44	22	22	79.7	CL	LEAN CLAY with SAND
⊗	K-222.3	6 - 8	43	22	21	59.8	CL	SANDY LEAN CLAY
⊕	K-222.3	10 - 12	41	20	21	69.6	CL	SANDY LEAN CLAY
□	K-222.4	10 - 12	44	22	22	87.3	CL	LEAN CLAY
⊛	K-222.6	15 - 17	NP	NP	NP	6.5	GW-GM	WELL-GRADED GRAVEL with SILT and SAND
◕	K-222.6	35 - 37	23	15	8	86.7	CL	LEAN CLAY
☆	K-222.7	10 - 12	NP	NP	NP	25.3	GM	SILTY GRAVEL with SAND
❀	K-222.7	25 - 27	49	27	22	76.3	CL	LEAN CLAY with SAND
■	K-223.0	10 - 12	43	23	20	58.5	CL	SANDY LEAN CLAY
◆	K-223.0	25 - 27	46	26	20	84.9	CL	LEAN CLAY with SAND
◇	K-223.1	15 - 17	45	25	20	71.3	CL	LEAN CLAY with SAND
×	K-223.1	29 - 31	33	20	13	98.3	CL	LEAN CLAY

PROJECT: Champlain-Hudson Power Express
Package 7a

SITE: Champlain to Hudson HDD Crossings
Catskill, NY

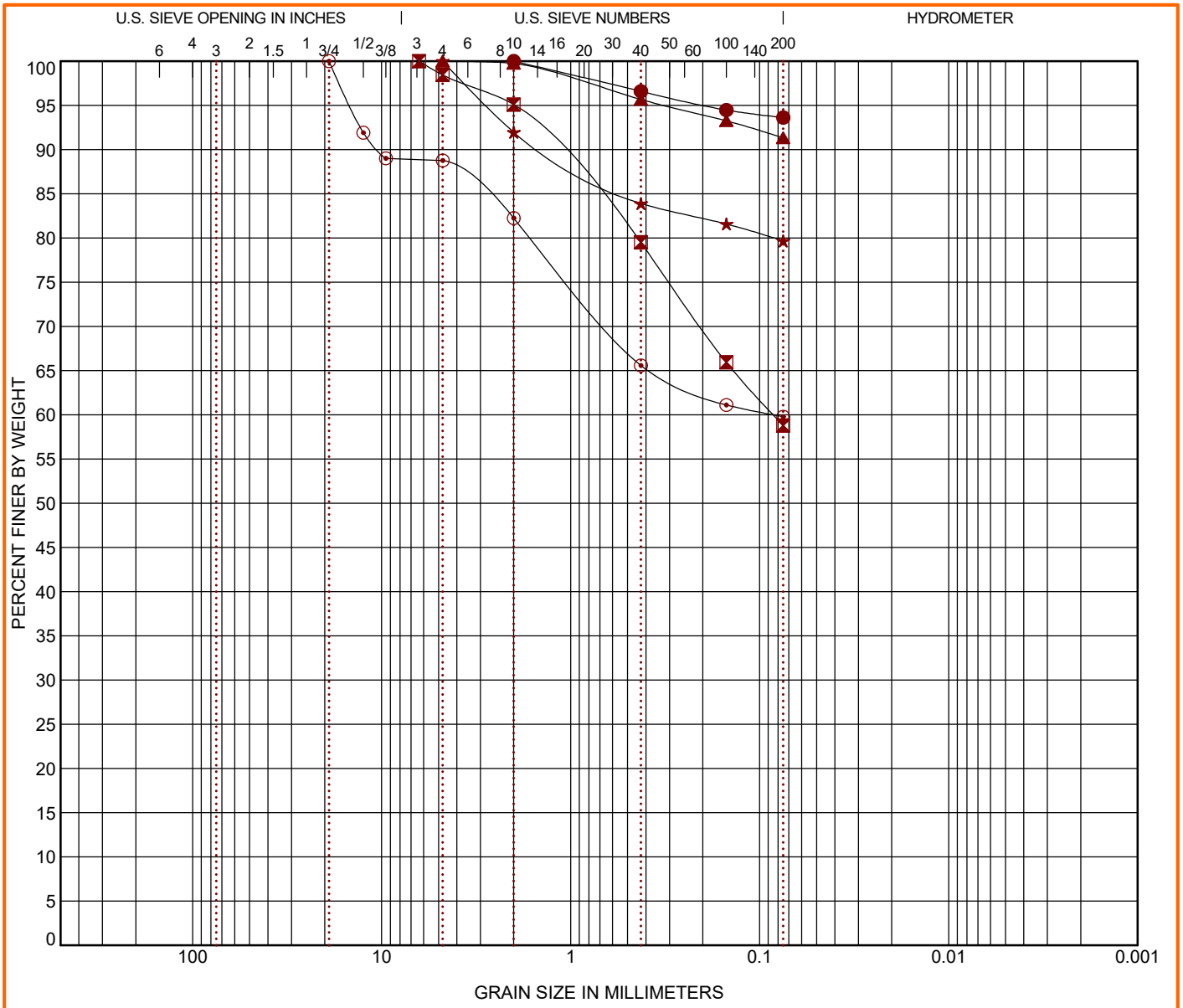
Terracon
30 Corporate Cir Ste 201
Albany, NY

PROJECT NUMBER: JB215256D

CLIENT: Kiewit Engineering (NY) Corp.

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-221.7	10 - 12	LEAN CLAY (CL)	41.7	42	21	21		
⊠	K-221.7	33 - 35	SANDY LEAN CLAY (CL)	23.8	27	16	11		
▲	K-221.8	8 - 10	LEAN CLAY (CL)	40.2	37	19	18		
★	K-221.8	35 - 37	LEAN CLAY with SAND (CL)	48.3	44	22	22		
⊙	K-222.3	6 - 8	SANDY LEAN CLAY (CL)	25.9	43	22	21		

Boring ID		Depth (Ft)	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
●	K-221.7	10 - 12	2				0.0	0.0	6.4		93.6	
⊠	K-221.7	33 - 35	6.35	0.084			0.0	1.6	39.6		58.8	
▲	K-221.8	8 - 10	4.75				0.0	0.0	8.7		91.3	
★	K-221.8	35 - 37	4.75				0.0	0.0	20.3		79.7	
⊙	K-222.3	6 - 8	19	0.084			0.0	11.2	29.0		59.8	

PROJECT: Champlain-Hudson Power Express Package 7a

SITE: Champlain to Hudson HDD Crossings Catskill, NY

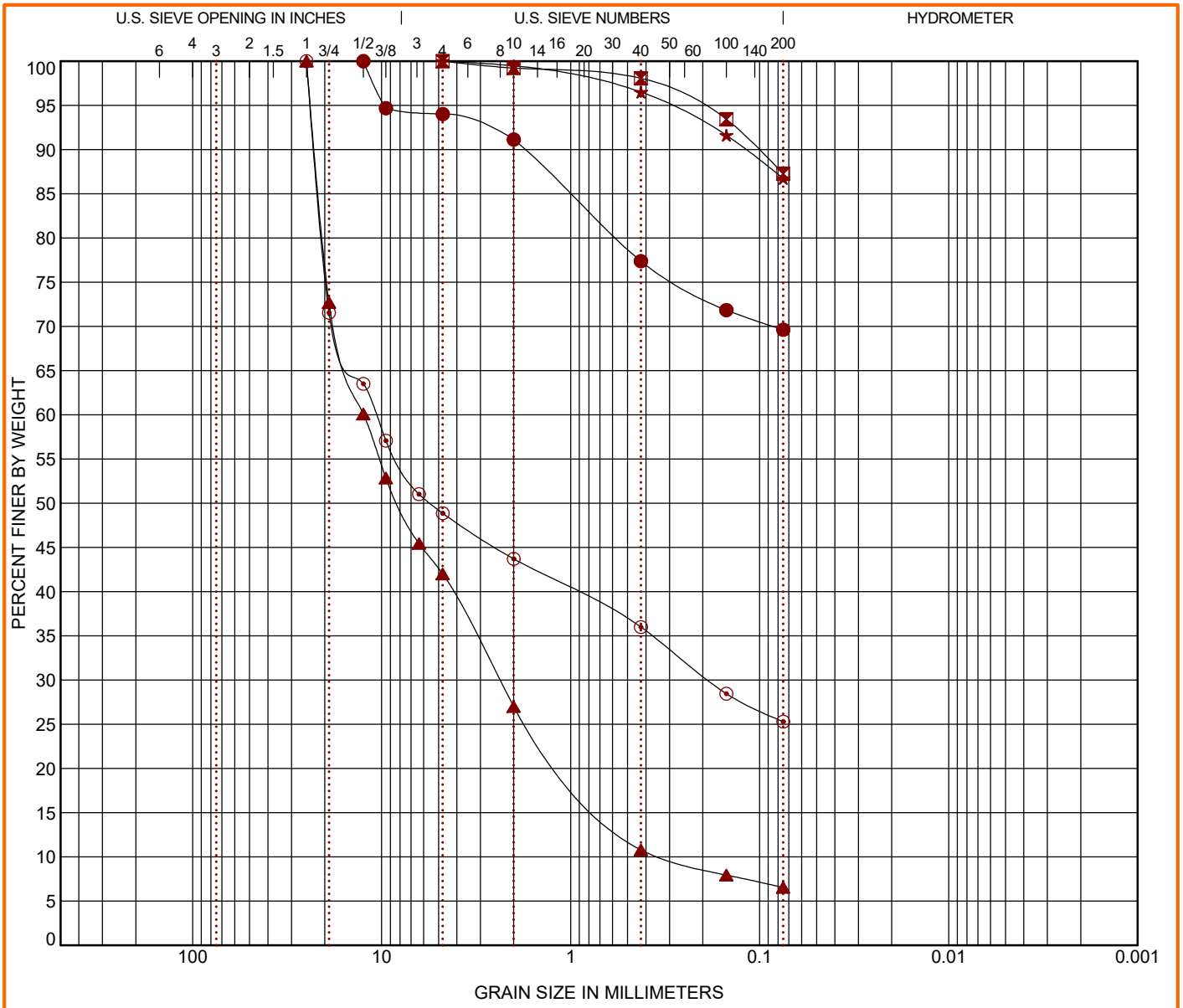
Terracon
30 Corporate Cir Ste 201
Albany, NY

PROJECT NUMBER: JB215256D

CLIENT: Kiewit Engineering (NY) Corp.

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-222.3	10 - 12	SANDY LEAN CLAY (CL)	28.3	41	20	21		
⊠	K-222.4	10 - 12	LEAN CLAY (CL)	30.0	44	22	22		
▲	K-222.6	15 - 17	WELL-GRADED GRAVEL with SILT and SAND (GW-GM)	9.2	NP	NP	NP	1.42	39.06
★	K-222.6	35 - 37	LEAN CLAY (CL)	25.5	23	15	8		
⊙	K-222.7	10 - 12	SILTY GRAVEL with SAND (GM)	11.5	NP	NP	NP		

Boring ID		Depth (Ft)	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
●	K-222.3	10 - 12	12.5				0.0	6.0	24.4		69.6	
⊠	K-222.4	10 - 12	4.75				0.0	0.0	12.7		87.3	
▲	K-222.6	15 - 17	25	12.459	2.379	0.319	0.0	58.0	35.5		6.5	
★	K-222.6	35 - 37	4.75				0.0	0.0	13.3		86.7	
⊙	K-222.7	10 - 12	25	10.764	0.186		0.0	51.1	23.6		25.3	

PROJECT: Champlain-Hudson Power Express Package 7a

SITE: Champlain to Hudson HDD Crossings Catskill, NY

Terracon
30 Corporate Cir Ste 201
Albany, NY

PROJECT NUMBER: JB215256D

CLIENT: Kiewit Engineering (NY) Corp.

GeoTesting EXPRESS

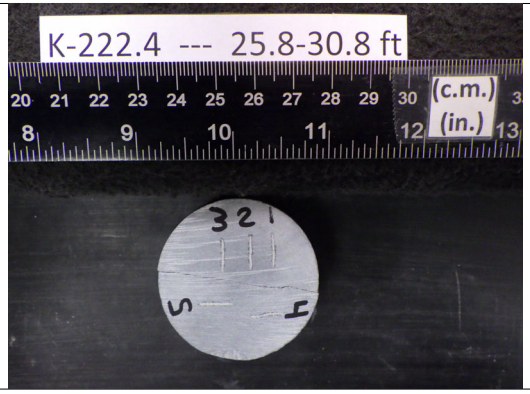
Client:	Terracon Consultants, Inc.				
Project:	Champlain-Hudson Power Express				
Location:				Project No:	GTX-315284
Boring ID:	K-222.4	Sample Type:	cylinder	Tested By:	tlm
Sample ID:	---	Test Date:	04/29/22	Checked By:	smd
Depth :	25.8-30.8 ft	Test Id:	664261		
Test Comment:	---				
Visual Description:	---				
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
K-222.4	---	25.8-30.8 ft	1	0.6	0.5	0.55	
			2	0.8	0.4	0.60	
			3	0.7	0.6	0.65	
			4	0.3	0.6	0.45	
			5	0.9	0.6	0.75	
			Average CAIs			0.6	
			Average CAI *			1.07	
				CERCHAR Abrasiveness Index Classification		**Medium 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:

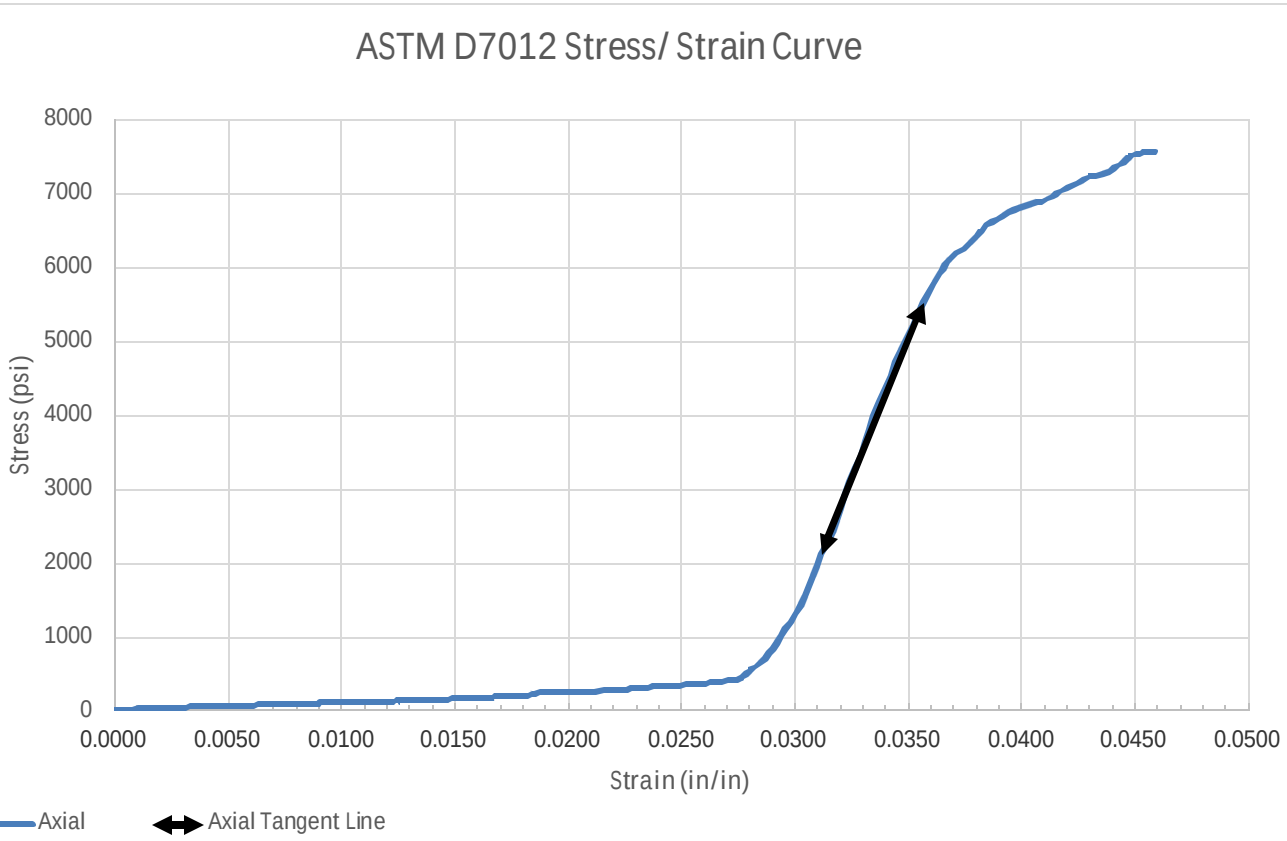


Rock Core D7012 Method C

Client
Kiewit Engineering Corp

Project
Champlain-Hudson Power Express Project

Project No. JD215256



SAMPLE LOCATION

Site:	Kiewit Engineering Power Express		
Description:	Calcareous Meta Sandstone		
Boring:	K-222.4	Depth (feet):	25.8-30.8

SPECIMEN INFORMATION

Sample No.:		Mass (g):	569.52
Length (in.):	4.13	Diameter (in.):	2
L/D Ratio:	2.065	Density (pcf):	167.219

TEST RESULTS

Failure Load (lbs):	23795
Failure Strain (in/in):	0.052
Unconfined Compressive Strength (psi):	7,574
Elastic Modulus, E, (ksi):	756
Time of Failure (min):	03:19
Rate of Loading (in/sec):	0.04
Moisture Content Post-break:	0.88%

Rock Core D7012 Method C

Client
Kiewit Engineering Corp

Project
Champlain-Hudson Power Express Project

Project No. JD215256

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.

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 Corp

Project
Champlain-Hudson Power Express Project

Project No. JD215256

Boring	K-222.4	Material Description	Calcareous Meta Sandstone
Sample No		Equipment Used	Tinius Olsen (120,000lbs)
Depth (ft)	25.8-30.8	TICCS ID/Serial No.	C-48999, 118285
Lab No	2979	Calibration Date	11/2/2021

Splitting Tensile Strength of Intact Rock Core Specimens, ASTM D3967

	TENSILE STRENGTH				
Lab No.	1	2	3	4	5
Diameter (in)	1.94	1.99	1.95	1.97	1.96
Length (in)	0.6	0.64	0.68	0.75	0.66
Length Diameter Ratio	0.31	0.32	0.35	0.38	0.34
Rate of Loading	0.006	0.0064	0.0068	0.0075	0.0066
Moisture Condition	0.83%	0.83%	0.83%	0.83%	0.83%
Maximum Applied Load (lbf)	3925	4718	3321	4178	3471
Splitting Tensile Strength (psi)	2147.8	2359.5	1595.2	1801.1	1709.1

	TENSILE STRENGTH				
Lab No.	6	7	8	9	10
Diameter (in)	1.97	1.99	1.99	1.97	1.97
Length (in)	0.59	0.68	0.64	0.63	0.6
Length Diameter Ratio	0.30	0.34	0.32	0.32	0.30
Rate of Loading	0.0059	0.0068	0.0064	0.0063	0.006
Moisture Condition	0.83%	0.83%	0.83%	0.83%	0.83%
Maximum Applied Load (lbf)	2958	1745	4540	4638	3787
Splitting Tensile Strength (psi)	1621.0	821.4	2270.5	2380.3	2040.7

Package 7A Phase 3 Borings

Champlain Hudson Power Express

New York

PROJECT NUMBER 20001480

CREATED BY Kiewit

DATE 12/08/2022

Legend Key

- Kiewit Borings (Phase 3)

EXPLORATORY BORING LOG

Champlain Hudson Power Express

New York

BORING NO: KB-222.2

PROJECT NUMBER	20001480	**LOGGED BY**	J. Knighton	**COORDINATES**	N 1232655.66 E 659566.12
START DATE	09/13/2022	**DRILLER/RIG**	T. Van Ness / CME-75	**GROUND ELEV.**	123.1 ft
FINISH DATE	09/14/2022	**DRILL CONTRACTOR**	ADT Inc.	**HAMMER TYPE/EFF.**	Automatic

Depth (ft)	Elevation (ft)	Material Description	Sample Type	Core Run No.	Recovery % RQD	Pocket Pen. (tsf)	Blow Counts (N Value)	Notes
0	123.0	2" Topsoil FILL: Silty SAND with Gravel, loose, fine to coarse gravel, wet			30%		4-5-3-3 (8)	Boring advanced with 3-7/8" Mud Rotary
	120.1	SILT (MH), brown, firm to stiff, moist, high plasticity			50%	0.8	4-4-5-4 (9)	
5					100%	2.5	1-3-4-5 (7)	
					100%	2.5	7-6-7-7 (13)	
10					100%	2.0	2-3-3-5 (6)	Set 4" casing to 10 ft
15		Gray clay in spoon at 15 - 16 ft				1.0		
		Brown at 16 - 17 ft			100%	1.8	1-3-4-4 (7)	
20	102.1	LEAN CLAY (CL), gray, firm to very soft, wet, medium plasticity			100%	2.2	2-3-4-3 (7)	
25					100%	0.8	1-1-2-2 (3)	
30								

Legend

- SPT N Value
- MC (%)
- PL & LL (%)
- Fines Content (%)

20 40 60 80

EXPLORATORY BORING LOG

Champlain Hudson Power Express

New York

BORING NO: KB-222.2

PROJECT NUMBER	20001480	**LOGGED BY**	J. Knighton	**COORDINATES**	N 1232655.66 E 659566.12
START DATE	09/13/2022	**DRILLER/RIG**	T. Van Ness / CME-75	**GROUND ELEV.**	123.1 ft
FINISH DATE	09/14/2022	**DRILL CONTRACTOR**	ADT Inc.	**HAMMER TYPE/EFF.**	Automatic

Depth (ft)	Elevation (ft)	Graphic Log	Material Description	Sample Type	Core Run No.	Recovery % RQD	Pocket Pen. (tsf)	Blow Counts (N Value)	Notes
			LEAN CLAY (CL), gray, firm to very soft, wet, medium plasticity			100%	0.5	0-0-1-2 (1)	
35						100%	0.5	1-2-2-3	3-inch ring sampler
40						100%		0-0-0-2 (0)	
45						100%		0-0-1-2 (1)	
	74.1		Weathered rock						
50						38%		34-18-20-26	3-inch ring sampler
	70.1		Graywacke, gray, very closely to moderately spaced discontinuities, good RQD, moderately weathered						Driller noted increased resistance at 53 ft Set 3" casing to 55 ft Cut with tricone bit to 55 ft
55					1	95% 79			UCS = 12,091 psi
60									

Legend

- SPT N Value
- MC (%)
- PL & LL (%)
- Fines Content (%)

20 40 60 80

EXPLORATORY BORING LOG

Champlain Hudson Power Express

New York

BORING NO: KB-222.2

PROJECT NUMBER	20001480	**LOGGED BY**	J. Knighton	**COORDINATES**	N 1232655.66 E 659566.12
START DATE	09/13/2022	**DRILLER/RIG**	T. Van Ness / CME-75	**GROUND ELEV.**	123.1 ft
FINISH DATE	09/14/2022	**DRILL CONTRACTOR**	ADT Inc.	**HAMMER TYPE/EFF.**	Automatic

Depth (ft)	Elevation (ft)	Graphic Log	Material Description	Sample Type	Core Run No.	Recovery % / RQD	Pocket Pen. (tsf)	Blow Counts (N Value)	Notes
65			Graywacke, gray, very closely to moderately spaced discontinuities, good RQD, moderately weathered		2	98% / 97			
			Very closely spaced discontinuities, occasional calcite veins and shale lenses		3	92% / 65			
70	53.1		Boring Terminated at 70 ft						
75									
80									
85									
90									

Legend

▲ SPT N Value
● MC (%)
— PL & LL (%)
⊠ Fines Content (%)

20 40 60 80

Champlain Hudson Power Express
Kiewit Engineering (NY) Corp.

KB-222.2 - Runs 1 through 3

Summary of Laboratory Results

BORING ID	Depth (Ft.)	Water Content (%)
KB-183.6	8	11.5
KB-183.8	4-6	12.7
KB-184.0	4-6	19.9
KB-184.0	10-12	14.1
KB-187.5	10-12	15.9
KB-187.5	20-22	9.2
KB-187.5	30-32	14.1
KB-187.5	40-42	12.2
KB-187.5	45-47	10.9
KB-187.5	60-62	7.5
KB-187.7	10-12	6.3
KB-187.7	20-22	24.3
KB-187.7	35-37	7.2
KB-187.7	55-57	6.6
KB-190.8	4-6	10.9
KB-190.8	15-17	22.7
KB-191.7	4-6	24.0
KB-191.7	10-12	28.2
KB-191.7	25-27	33.6
KB-192.8A	8-10	29.1
KB-192.8A	20-22	30.3
KB-192.8A	40-42	19.6
KB-193.9	4-6	30.2
KB-193.9	10-12	35.1
KB-193.9	15-17	36.0
KB-193.9	35-37	56.2
KB-194.0	4-6	37.9
KB-194.0	15-17	49.1
KB-194.0	25-27	49.4
KB-194.0	35-37	11.2
KB-220.5	8-10	14.2
KB-221.0A	4-6	30.5
KB-221.0A	8-10	9.0
KB-221.0A	15-17	6.1
KB-221.0A	25-27	6.1
KB-221.0A	35-37	6.8
KB-221.3	8	17.8
KB-221.4	4-6	14.8
KB-221.4	8-10	10.5
KB-222.2	7-9	37.9
KB-222.2	25-27	36.9
KB-222.2	40-42	38.2

PROJECT: LAB Testing

SITE: Champlain- Hudson Power Express

Terracon
30 Corporate Cir Ste 201
Albany, NY

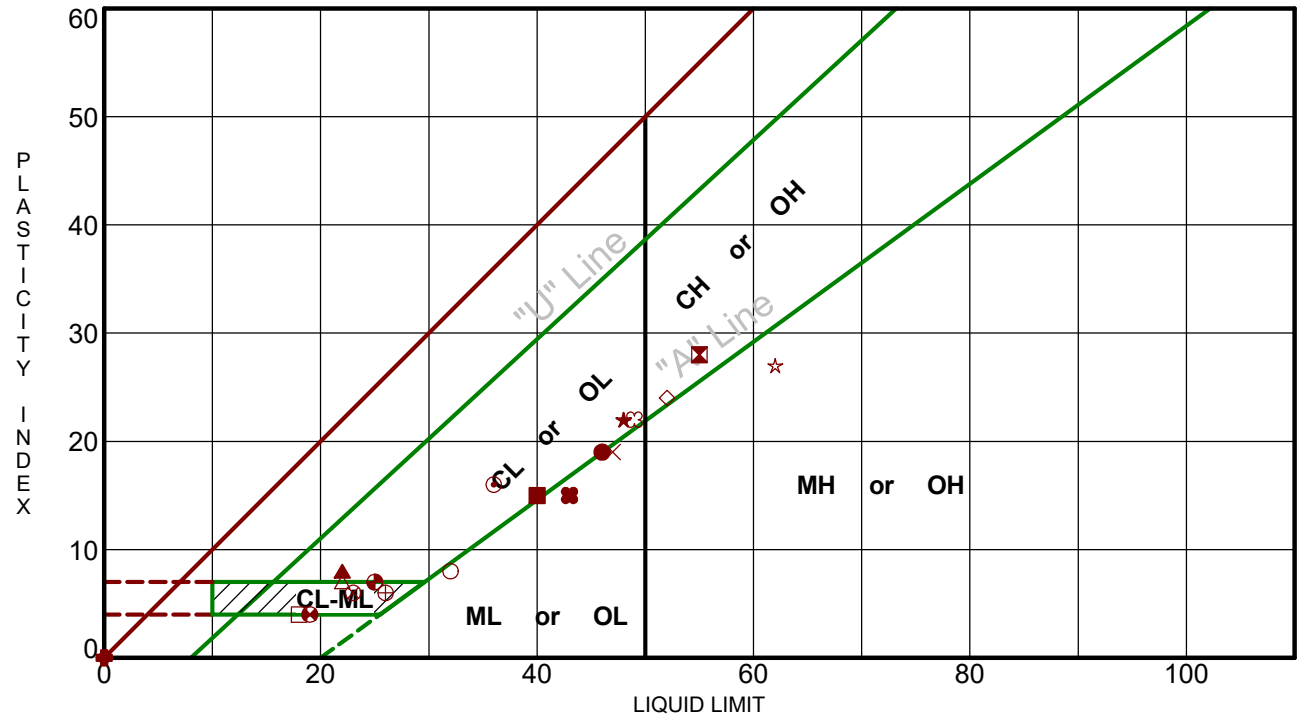
PROJECT NUMBER: JB215256H

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

EXHIBIT: B-1

ATTERBERG LIMITS RESULTS

ASTM D4318



Boring ID	Depth (Ft)	LL	PL	PI	Fines	USCS	Description
KB-193.9	15 - 17	46	27	19	70.4	CL	LEAN CLAY with SAND
KB-193.9	35 - 37	55	27	28	96.8	CH	FAT CLAY
KB-194.0	4 - 6	22	14	8	81.9	CL	LEAN CLAY with SAND
KB-194.0	15 - 17	48	26	22	85.2	CL	LEAN CLAY
KB-194.0	25 - 27	36	20	16	97.0	CL	LEAN CLAY
KB-194.0	35 - 37	NP	NP	NP	14.7	SM	SILTY SAND with GRAVEL
KB-220.5	8 - 10	32	24	8	26.2	SM	SILTY SAND with GRAVEL
KB-221.0A	4 - 6	22	15	7	89.6	CL-ML	SILTY CLAY
KB-221.0A	8 - 10	23	17	6	11.7	GP-GC	POORLY GRADED GRAVEL with SILTY CLAY and SAND
KB-221.0A	15 - 17	26	20	6	11.8	GP-GC	POORLY GRADED GRAVEL with SILTY CLAY and SAND
KB-221.0A	25 - 27	18	14	4	25.9	GC-GM	SILTY, CLAYEY GRAVEL with SAND
KB-221.0A	35 - 37	19	15	4	21.0	SC-SM	SILTY, CLAYEY SAND with GRAVEL
KB-221.3	8	25	18	7	13.7	GC-GM	SILTY, CLAYEY GRAVEL with SAND
KB-222.2	7 - 9	62	35	27	100.0	MH	ELASTIC SILT
KB-222.2	25 - 27	49	27	22	94.8	CL	LEAN CLAY
KB-222.2	40 - 42	40	25	15	90.4	CL	LEAN CLAY
KB-222.6A	15 - 17	NP	NP	NP	7.4	GP-GM	POORLY GRADED GRAVEL with SAND and SILT
KB-222.6A	35 - 37	52	28	24	87.3	CH	FAT CLAY
KB-222.6A	50 - 52	47	28	19	96.5	ML	SILT
KB-222.6A	65 - 67	43	28	15	99.3	ML	SILT

PROJECT: LAB Testing

SITE: Champlain- Hudson Power Express

Terracon
30 Corporate Cir Ste 201
Albany, NY

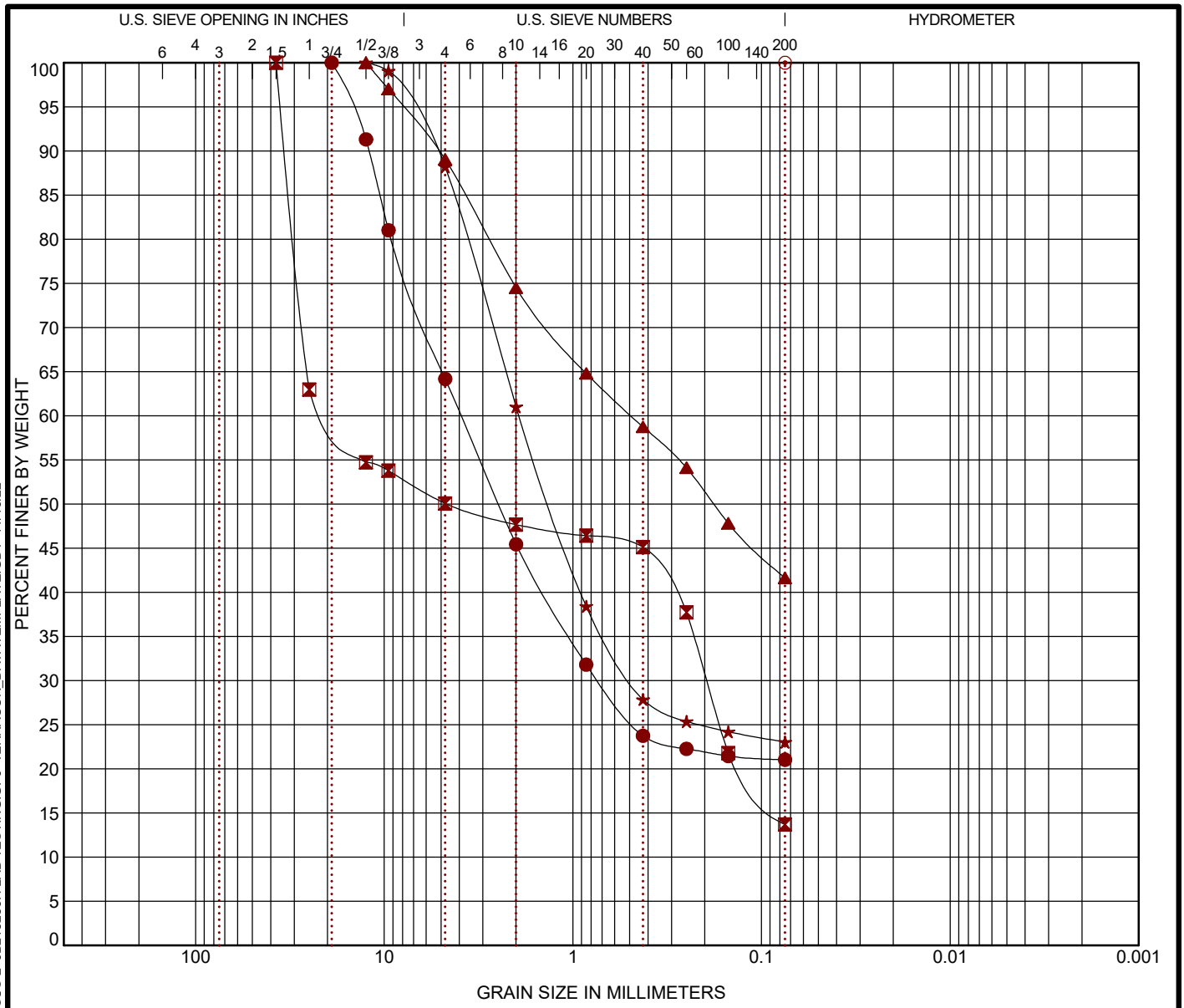
PROJECT NUMBER: JB215256H

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

EXHIBIT: B-2

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-221.0A	35 - 37	SILTY, CLAYEY SAND with GRAVEL (SC-SM)	6.8	19	15	4		
⊠	KB-221.3	8	SILTY, CLAYEY GRAVEL with SAND (GC-GM)	17.8	25	18	7		
▲	KB-221.4	4 - 6	SILTY SAND (SM)	14.8					
★	KB-221.4	8 - 10	SILTY SAND (SM)	10.5					
⊙	KB-222.2	7 - 9	ELASTIC SILT (MH)	37.9	62	35	27		

Boring ID		Depth (Ft)	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
●	KB-221.0A	35 - 37	19	3.917	0.728		0.0	35.8	43.1		21.0	
⊠	KB-221.3	8	37.5	19.495	0.195		0.0	49.9	36.4		13.7	
▲	KB-221.4	4 - 6	12.5	0.491			0.0	10.9	47.4		41.6	
★	KB-221.4	8 - 10	12.5	1.924	0.489		0.0	11.8	65.2		23.0	
⊙	KB-222.2	7 - 9	0.075				0.0	0.0	0.0		100.0	

PROJECT: LAB Testing

SITE: Champlain- Hudson Power Express

Terracon
30 Corporate Cir Ste 201
Albany, NY

PROJECT NUMBER: JB215256H

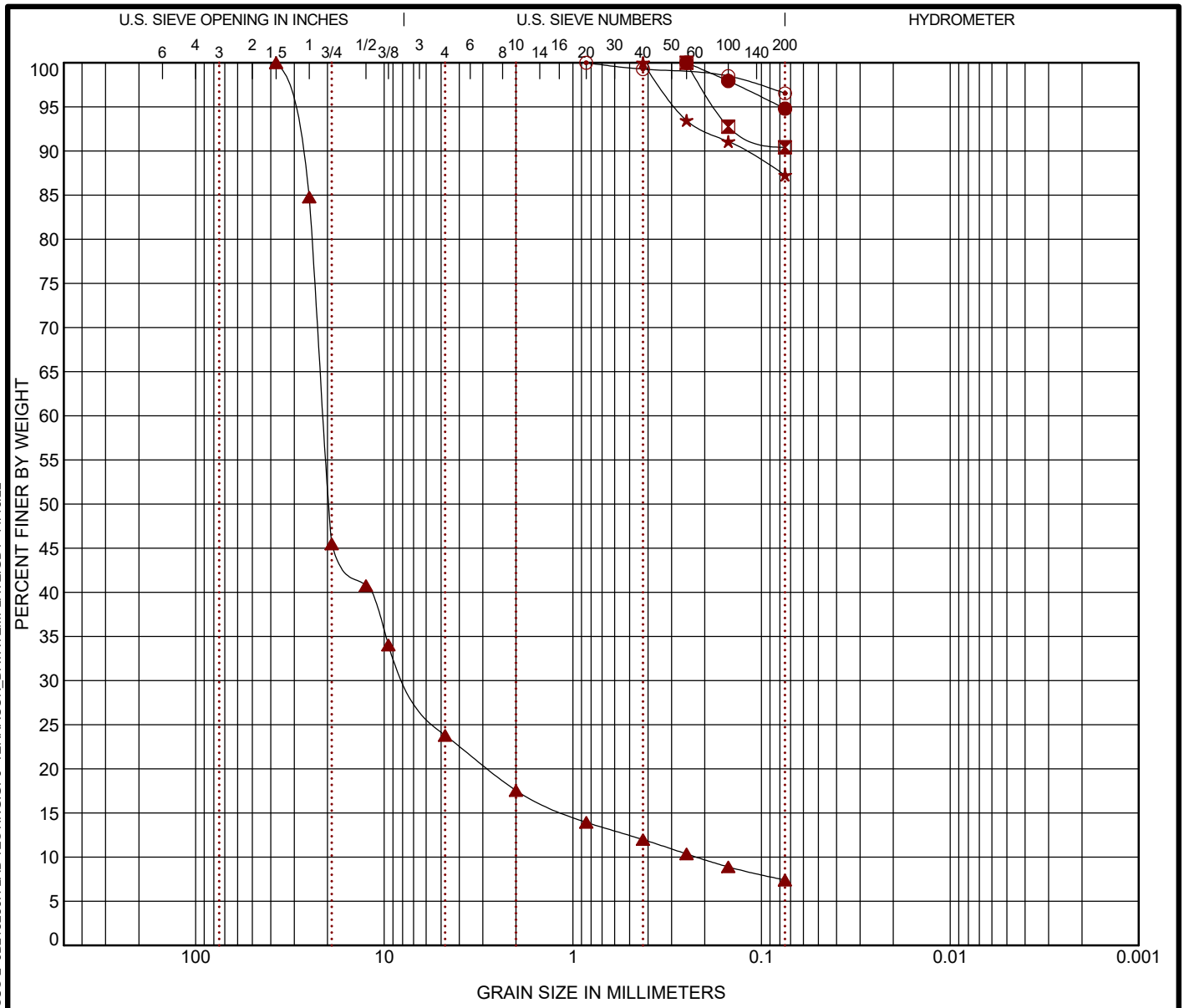
CLIENT: Kiewit Engineering (NY) Corp
Lone Tree, CO

EXHIBIT: B-8

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS-2 JB215256H LAB TESTING.GPJ TERRACON_DATATEMPLATE.GDT 11/16/22

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



Boring ID	Depth (Ft)	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
KB-222.2	25 - 27	LEAN CLAY (CL)	36.9	49	27	22		
KB-222.2	40 - 42	LEAN CLAY (CL)	38.2	40	25	15		
KB-222.6A	15 - 17	POORLY GRADED GRAVEL with SAND and SILT (GP-GM)	1.2	NP	NP	NP	11.29	95.41
KB-222.6A	35 - 37	FAT CLAY (CH)	35.8	52	28	24		
KB-222.6A	50 - 52	SILT (ML)	41.7	47	28	19		

Boring ID	Depth (Ft)	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
KB-222.2	25 - 27	0.25				0.0	0.0	5.2		94.8	
KB-222.2	40 - 42	0.25				0.0	0.0	9.6		90.4	
KB-222.6A	15 - 17	37.5	21.027	7.232	0.22	0.0	76.2	16.4		7.4	
KB-222.6A	35 - 37	0.425				0.0	0.0	12.7		87.3	
KB-222.6A	50 - 52	0.85				0.0	0.0	3.5		96.5	

PROJECT: LAB Testing

SITE: Champlain- Hudson Power Express

Terracon
30 Corporate Cir Ste 201
Albany, NY

PROJECT NUMBER: JB215256H

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

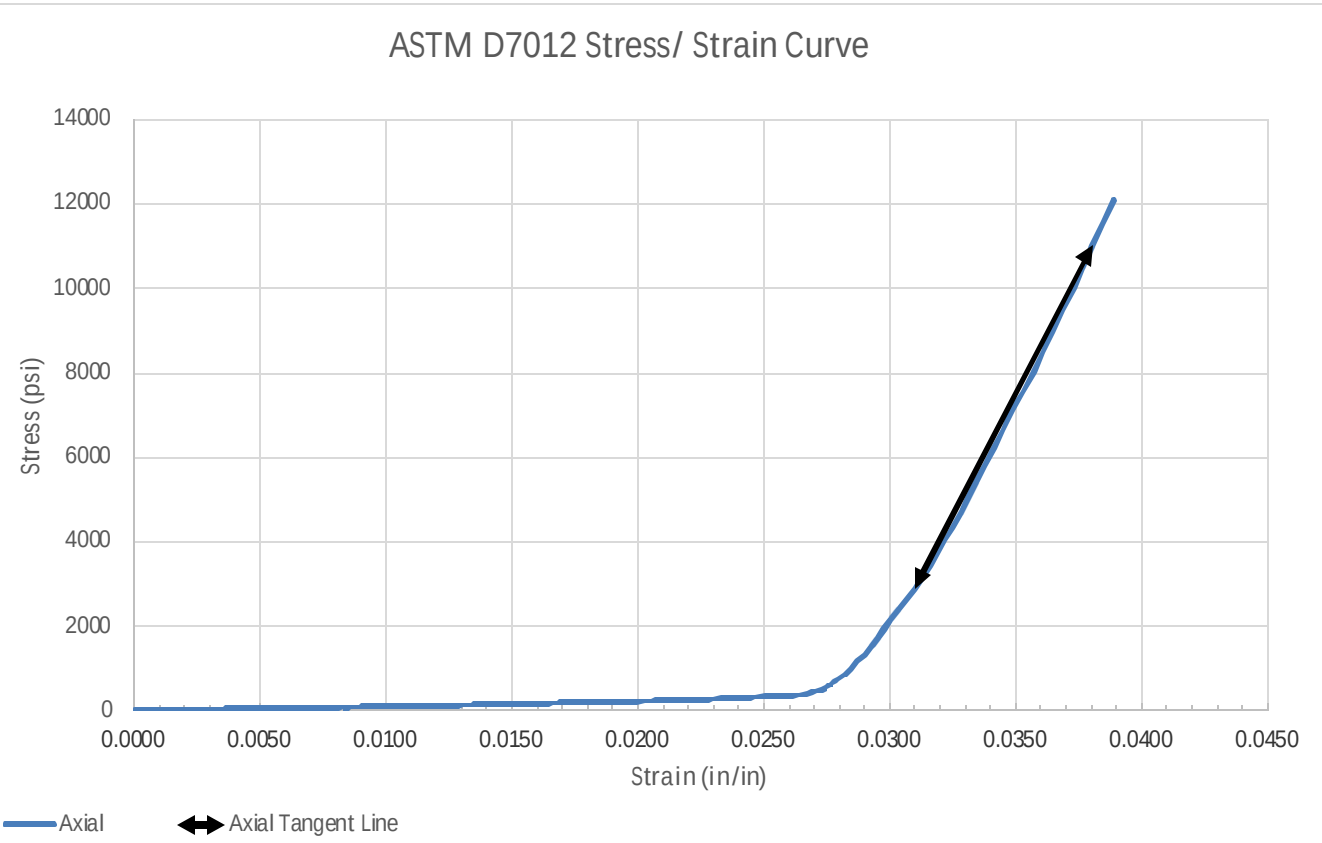
EXHIBIT: B-9

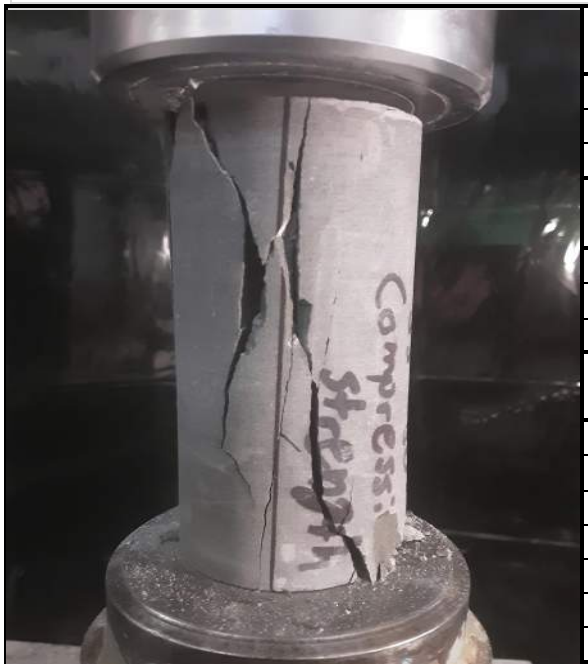
Rock Core D7012 Method C

Client
Kiewit Engineering (NY) Corp

Project
LAB Testing

Project No. JB215256H





SAMPLE LOCATION			
Site:	LAB Testing		
Description:	Greywacke		
Boring:	KB-222.2	Depth (feet):	55.0-60.0

SPECIMEN INFORMATION			
Sample No.:	RC1	Mass (g):	556.78
Length (in.):	4.14	Diameter (in.):	1.97
L/D Ratio:	2.10	Density (pcf):	168.09

TEST RESULTS	
Failure Load (lbs):	36853
Failure Strain (in/in):	0.042
Unconfined Compressive Strength (psi):	12,091
Elastic Modulus, E, (ksi):	1152
Time of Failure (min):	02:10
Rate of Loading (in/sec):	0.04
Moisture Content Post-break:	0.56%

Rock Core D7012 Method C

Client	Project
Kiewit Engineering (NY) Corp	LAB Testing

Project No. JB215256H

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.

Kiewit

MEMORANDUM

DATE: March 15, 2023

TO: Zachary Bauer; Tetra Tech Rooney

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

SUBJECT: Geotechnical Data: Segment 11 – Package 7A – HDD Crossing 119 – Revision 2
Champlain Hudson Power Express Project
Catskill, 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 southwest of Catskill, New York. The approximate station for the start of HDD crossing number 119 is STA 70158+50 (42.2109° N, 73.8873° W).

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

- TRC, Geotechnical Data Report, Champlain Hudson Power Express, Canadian Pacific Railway Borings MP 177.6-228.2, dated March 15, 2013.
- Terracon Consultants-NY, Inc., Results of Field Exploration, Champlain-Hudson Power Express – Package 7a, Catskill, NY, dated May 23, 2022.
- Kiewit Engineering (NY) Corp., Package 7A Phase 3 Borings, Champlain Hudson Power Express, New York, dated December 8, 2022.
- Kiewit Engineering (NY) Corp., Package 7A Phase 4 Borings, Champlain Hudson Power Express, NY, dated February 17, 2023.

Contact us if you have questions or require additional information.

HDD 119
Borings B222.6-1, K-222.6,
K-222.7, KB-222.6A, KB-222.8
Segment 11 - Design Package 7A

CHPE Segment 11 - Package 7A
HDD Soil Boring Coordinates and Elevations

Firm	Boring	Northing (feet)	Easting (feet)	Ground Surface Elevation (feet)
TRC*	B221.0-1	1237452.6	663787.2	99.6
	B221.2-1	1236173.4	663261.8	115.0
	B221.4-1	1235622.5	662622.3	22.4
	B221.5-1	1235006.9	662058.8	95.5
	B221.6-1	1234675.8	661633.8	98.3
	B221.8-1	1234265.3	661277.2	99.4
	B222.34-1	1232191.5	659098.9	133.5
	B222.6-1	1231252.6	658182.3	113.7
	B222.9-1	1229751.0	657274.3	121.4
	B225.8-1	1215861.0	650622.7	91.0
	B226.1-1	1214654.4	650328.3	105.9
	B226.2-1	1214120.5	650254.4	108.5
	B226.6-1	1211894.7	649689.7	112.1
AECOM**	CU-1	1237028.6	663123.9	19.7
	CU-2	1236042.7	662897.0	24.8
	CU-2A	1235325.9	662268.9	38.1
	CU-5A	1210523.7	649411.8	118.4
	SC-5	1239310.3	664321.6	110.2
	SC-6	1237781.0	663919.8	101.6

Notes:

- Northings and Eastings are provided in NAD83 New York State Plane East Zone.
- Elevations are referenced to the NAVD88 datum.

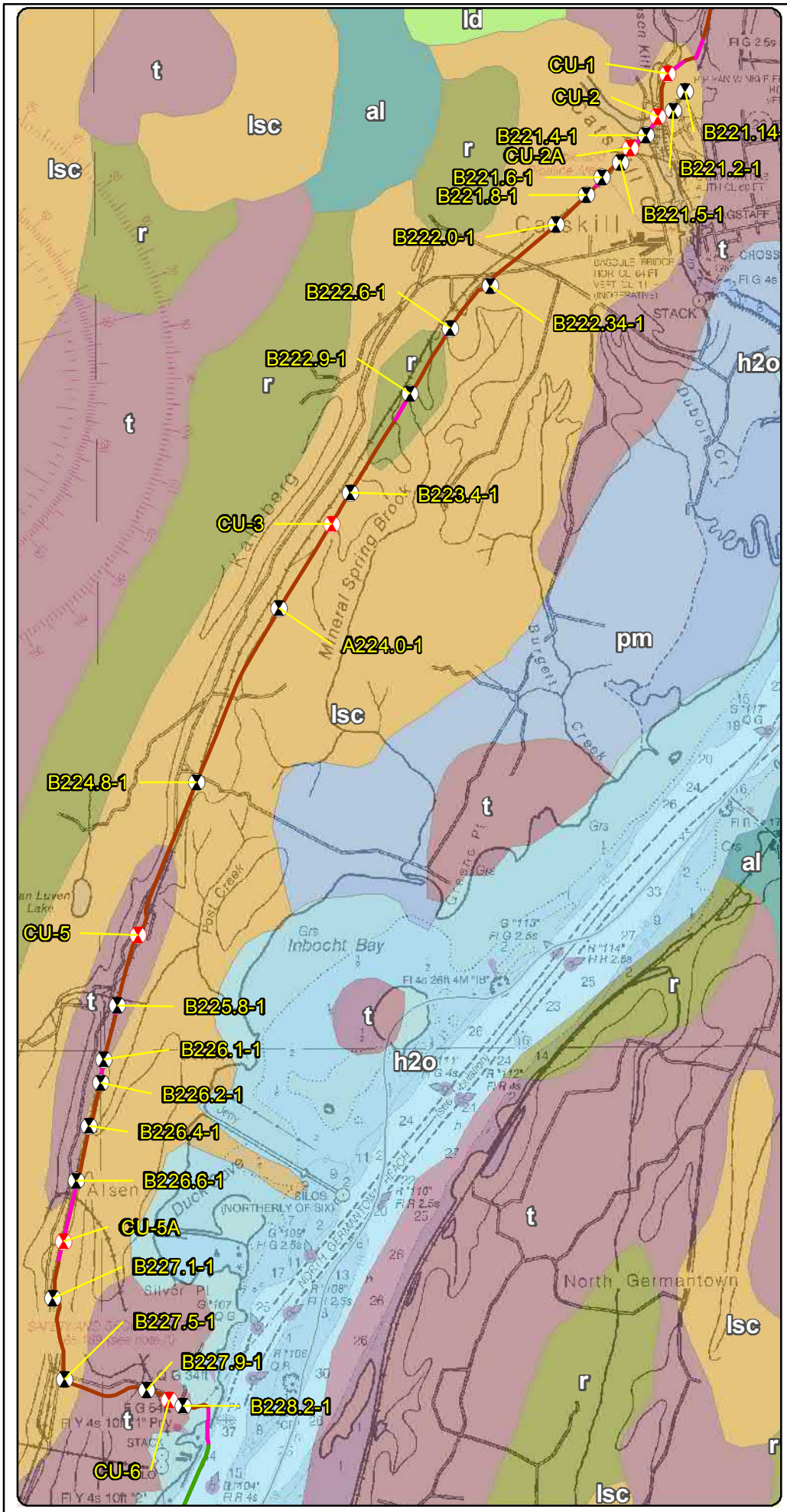
* TRC boring coordinates as shown in Table 1-6 in AECOM report (reference below). Boring elevations estimated from November 2021 topographic survey by Williams Aerial.

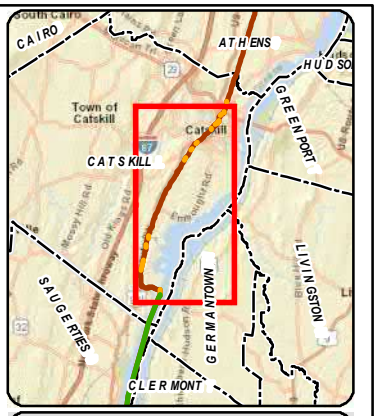
** AECOM boring coordinates and elevations as shown in Table 1-6 in AECOM report.

*** 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
- h2o - Water
- ld - Lacustrine delta
- lsc - Lacustrine silt and clay
- pm - Swamp deposits
- r - Bedrock
- t - Till

N

0.3 0.15 0 0.3 Miles

Transmission

Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

Surficial Geology and Geotechnical Borings Catskill to Upland Figure 3-11

Prepared on 5/3/2021

by: AECOM

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

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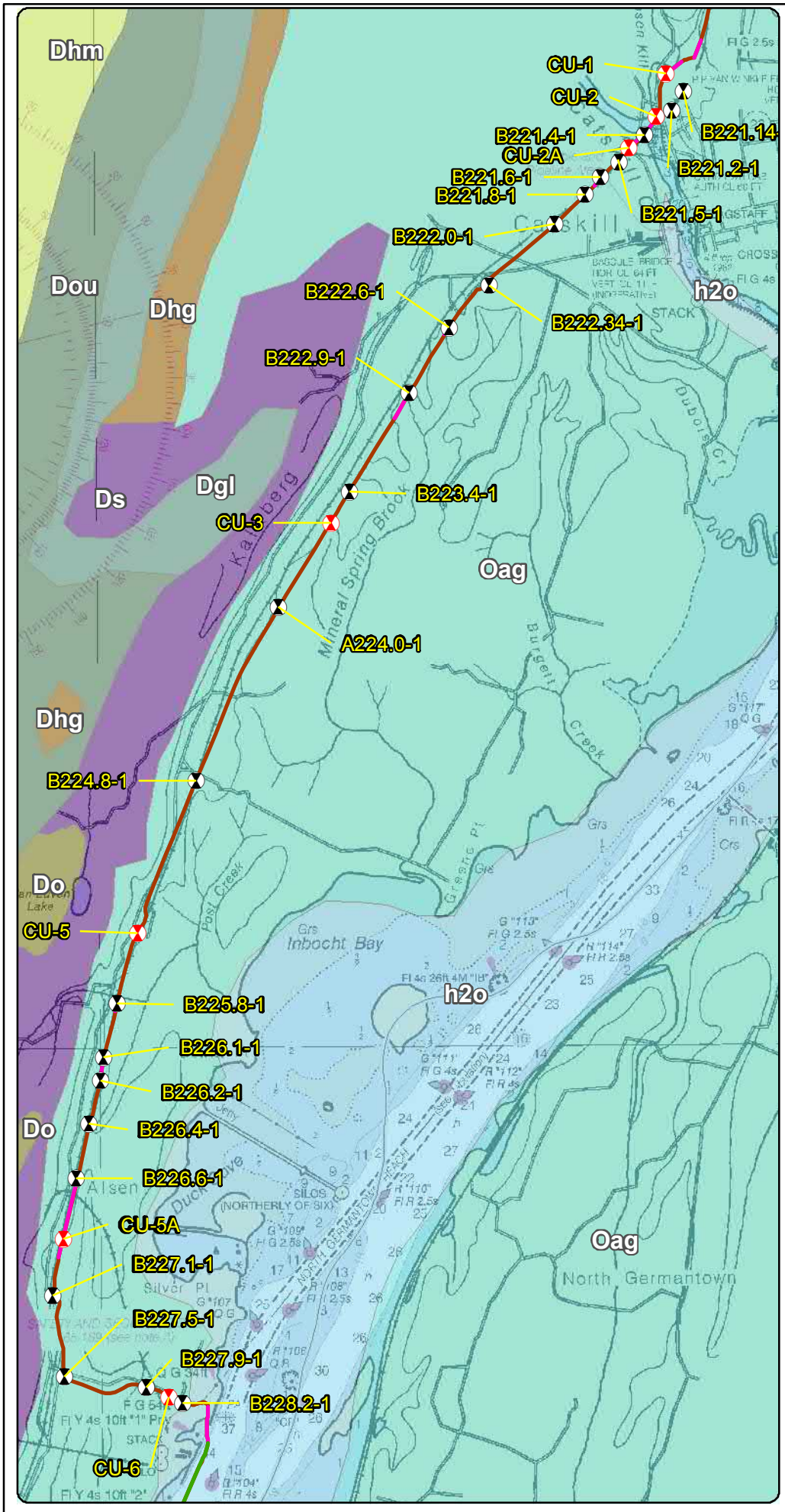

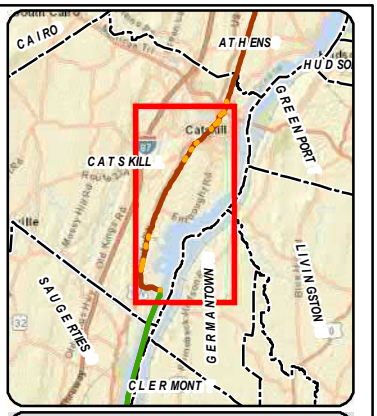

LEGEND

- 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
- Do - Oriskany Sandstone
- Dou - Onondaga Limestone
- Ds - Cashaqua Shale
- Oag - Austin Glen Form (graywacke, shale)
- h2o - Water

N

0.3 0.15 0 0.3 Miles

Transmission Developers Inc.

Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

Bedrock Geology and Geotechnical Borings Catskill to Upland Figure 4-11

Prepared on 5/18/2021

by: AECOM

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

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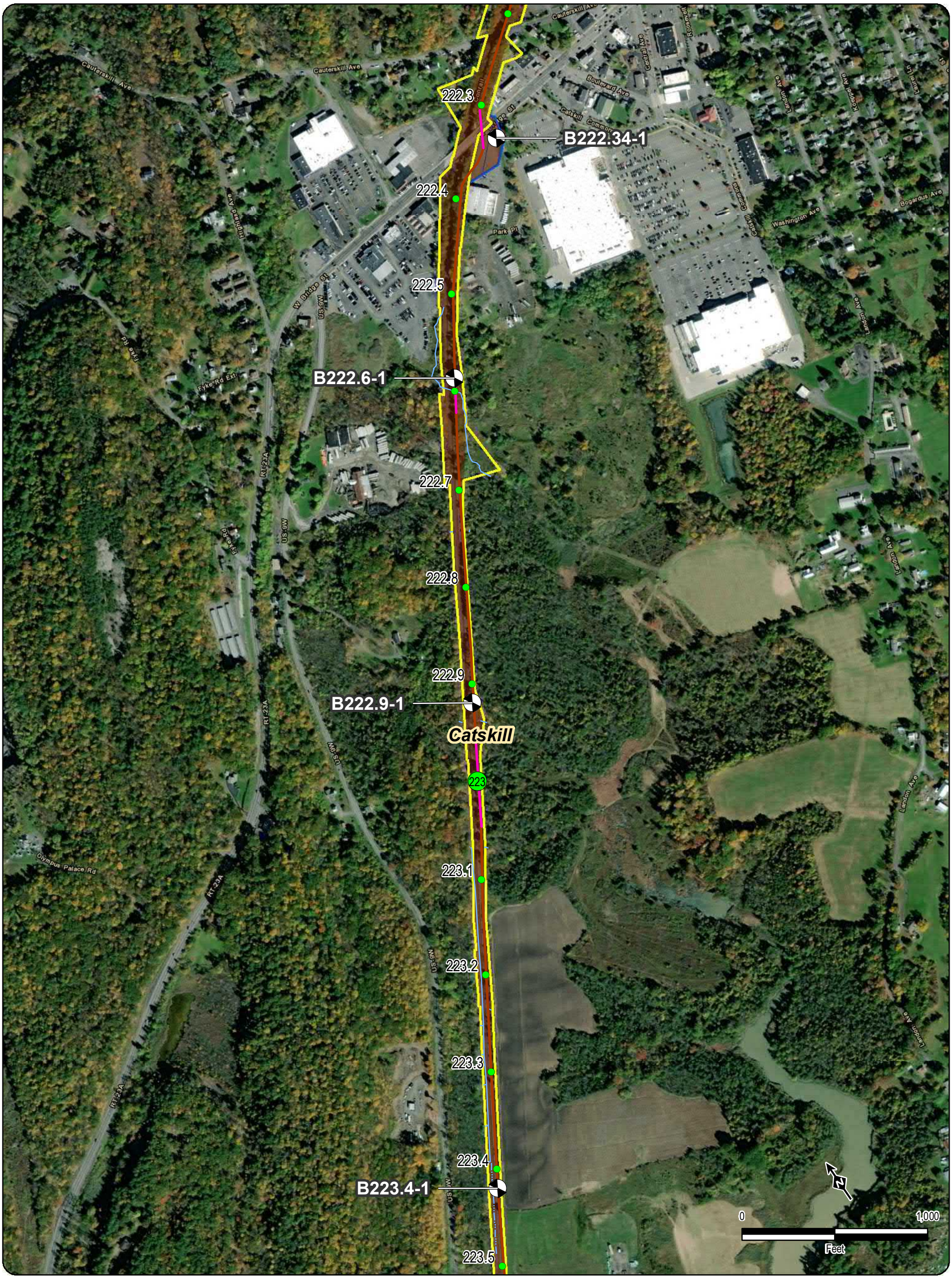

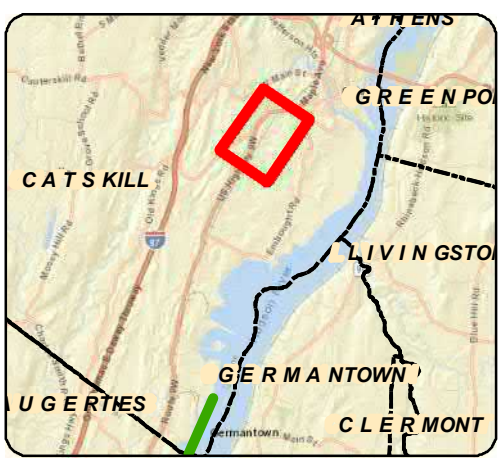

LEGEND

- 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

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

Transmission Developers Inc.

Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

BORING LOCATION PLAN

Catskill to Upland

Figure A-11

Sheet 2 of 6

Prepared by: AECOM 5/20/2021

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TEST BORING LOG

PROJECT: TDI CHAMPLAIN HUDSON POWER EXPRESS

LOCATION: CSX RAILROAD ROW, NY

BORING	**B222.6-1**
G.S. ELEV.	N/A
FILE	195651
SHEET	1 OF 1

GROUNDWATER DATA			
FIRST ENCOUNTERED NR			
DEPTH	HOUR	DATE	ELAPSED TIME
23.5'	NR	12/2	0 HR

METHOD OF ADVANCING BOREHOLE				
a	FROM	0.0 '	TO	10.0 '
d	FROM	10.0 '	TO	14.0 '
c_2	FROM	14.0 '	TO	27.5 '
d	FROM	27.5 '	TO	30.5 '

DRILLER	P. PLANTIER
HELPER	M. NAGEY
INSPECTOR	N/A
DATE STARTED	12/02/2012
DATE COMPLETED	12/02/2012

DEPTH	A	B	C	DESCRIPTION	Wn	REMARKS
	S-1	1 2 2 3		***BLACK SILT, SM F/ SAND, TR F/ GRAVEL (FILL)*** 2.0		
	S-2	50/0.4		***GRAY SILT, TR TO SM F/ GRAVEL, TR CLAY, TR F/ SAND (FILL)*** 4.0		
5	S-3	4 6 5 4		***BROWN TO DARK GRAY SILT, TR F/M SAND (FILL)*** 6.0	19.6	
	S-4	4 7 6 5				
10	S-5	4 8 9 10		***BROWN TO GRAY CLAY, SM M/F/C SAND, SM F/ GRAVEL, TR TO SM SILT (FILL)***	30.0	
	S-6	30 50/0.0		13.5 14.0 ***GRAY F/C GRAVEL-SIZED ROCK FRAGMENTS (FILL)***		
15	R-1	REC =60% RQD =0%				
20	R-2	REC =80% RQD =26%		***BOULDERS AND COBBLES (POSSIBLE FILL)***		
	R-3	REC =0% RQD =0%				
25	R-4	REC =0% RQD =0%		27.5		ATTEMPTED SAMPLING AT 22.5 FT, ENCOUNTERED SPOON REFUSAL (50/0.0)
	S-8	4 6 5		***LIGHT BROWN SILT, TR WOOD***		
30	S-9	3 4 3		30.5		
				END OF BORING AT 30.5'		
35						

DRN.	TBT
CKD.	PWK

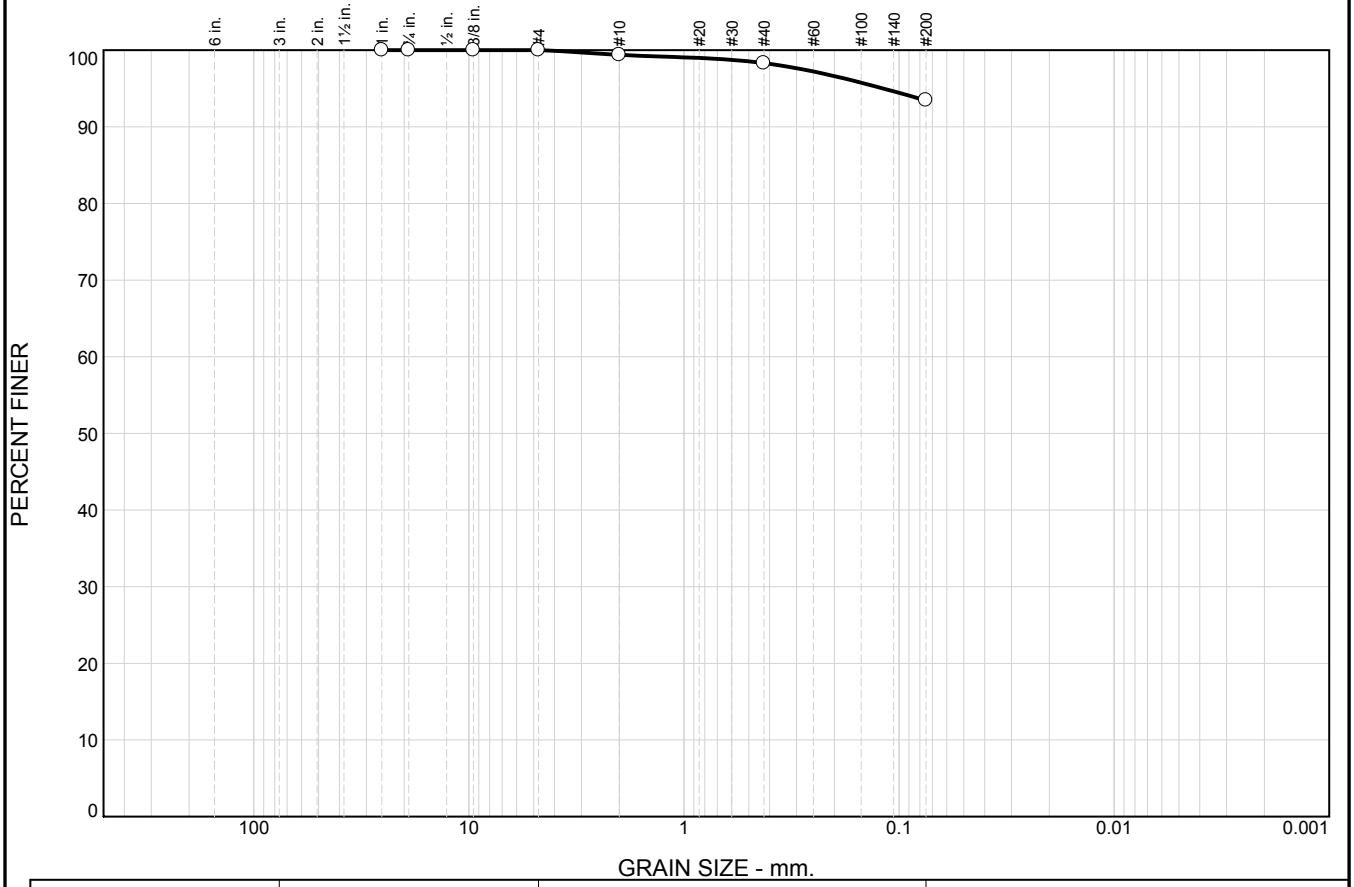
NEW PROJECTS TEST BORING LOG 195651_TDI_CSX.GPJ SITE BLAUVELT.GDT 3/12/13

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)					
B222.34-1	S-2	2.0-4.0	-	-	-	-	-	-	-	-	-	-	31.3	-	-	-
	S-4	6.0-8.0	CH	-	-	-	-	58	29	29	0.2	-	35.2	-	-	-
	S-5	8.0-10.0	-	-	-	-	-	-	-	-	-	-	36.2	88.2	-	-
	S-6	13.5-15.0	CH/MH	-	-	-	-	56	30	26	0.2	-	34.8	-	-	-
B222.6-1	S-3	4.0-6.0	SM	0.0	6.6	93.4		-	-	-	-	-	19.6	-	-	-
	S-4	6.0-8.0	-	17.1	18.6	64.3		-	-	-	-	-	30.0	-	-	14.4
	S-5	8.0-10.0														
	R-2	15.6-16.0	-	-	-	-		-	-	-	-	-	-	166.7	665	-
	R-3	22.6-23.0	-	-	-	-		-	-	-	-	-	-	169.0	436	-
B222.9-1	S-2	2.0-4.0	-	-	-	-	-	-	-	-	-	-	29.7	-	-	-
	S-3	4.0-6.0	-	-	-	-	-	-	-	-	-	-	33.0	-	-	-

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.6	1.1	4.9	93.4	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_C	C_u
○										

Material Description	USCS	AASHTO
○ BROWN TO DARK GRAY SILT, TR F/M SAND		

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

Project: TDI CHAMPLAIN HUDSON POWER EXPRESS - CSX

○ **Source of Sample:** B222.6-1 **Depth:** 4.0-6.0 FT **Sample Number:** S-3

TRC Engineers, Inc.

Mt. Laurel, NJ

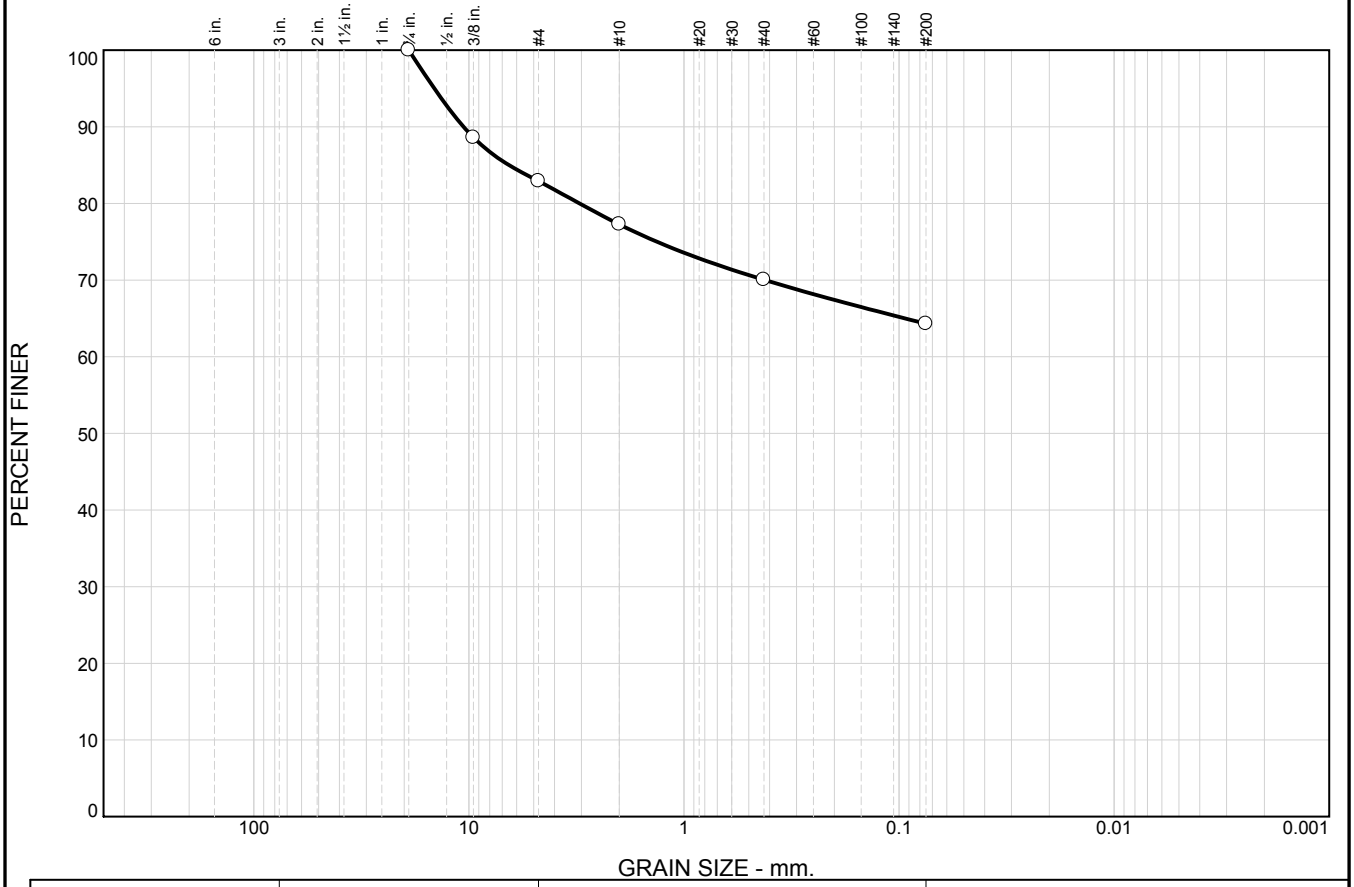
Remarks:

○SAMPLE DESCRIPTION BASED ON VISUAL IDENTIFICATION AND LABORATORY ANALYSIS

Figure 127

Tested By: TBT 01/10/13 **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	17.1	5.6	7.3	5.7	64.3	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_C	C_u
○			6.5044							

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

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

Project: TDI CHAMPLAIN HUDSON POWER EXPRESS - CSX

○ **Sample Source:** B222.6-1 **Depth:** 6.0-10.0 FT **Sample No.:** S-4 & S-5

TRC Engineers, Inc.

Mt. Laurel, NJ

Remarks:

○SAMPLE DESCRIPTION BASED ON VISUAL IDENTIFICATION AND LABORATORY ANALYSIS

Figure 128

Tested By: BMH 01/29/13 **Checked By:** JPB 03/12/13

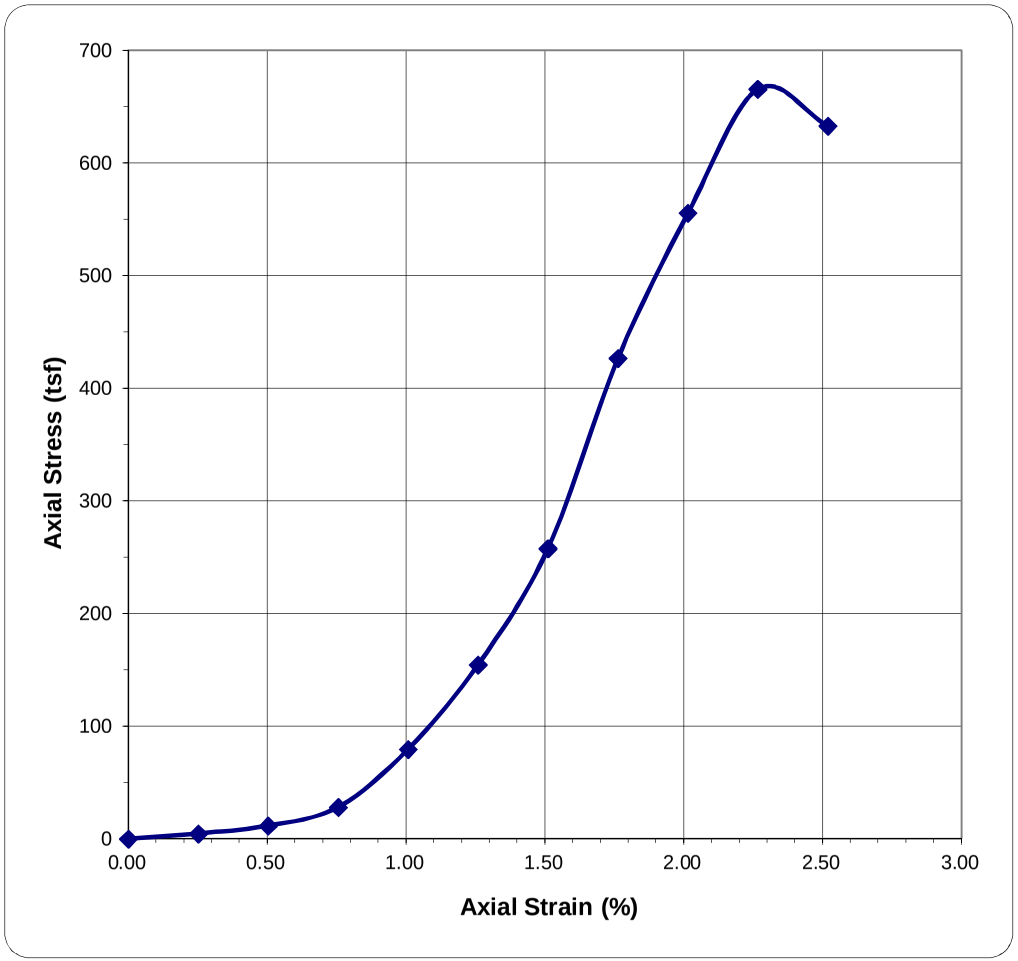
TRC Engineers, Inc.
Soil Mechanics Laboratory

Unconfined Compression Strength Test of Rock Core

Project Name:	TDI				
Project No.:	195651	**Average Sample Diameter (in.):**	1.978	**Sample Description:**	
Boring No.:	B222.6-1	**Cross Sectional Area (sq. in.)**	3.073	COBBLES WITHIN GLACIAL TILL	
Sample No:	R-2	**Average Sample Height (in.):**	3.971		
Depth (ft):	15.6-16.0	**Sample Mass-Dry (g):**	533.95		
Elevation (ft):		**Unit Weight (PCF)**	166.7		

Test Data

Strain Dial (in.)	Load (lb)	Strain (%)	Stress (tsf)
0.000	0	0.00	0
0.010	200	0.25	5
0.020	500	0.50	12
0.030	1200	0.76	28
0.040	3400	1.01	80
0.050	6600	1.26	155
0.060	11000	1.51	258
0.070	18200	1.76	426
0.080	23700	2.01	555
0.090	28400	2.27	665
0.100	27000	2.52	633



Failure Conditions:

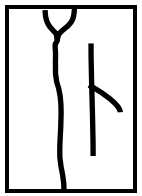


FIGURE: 157

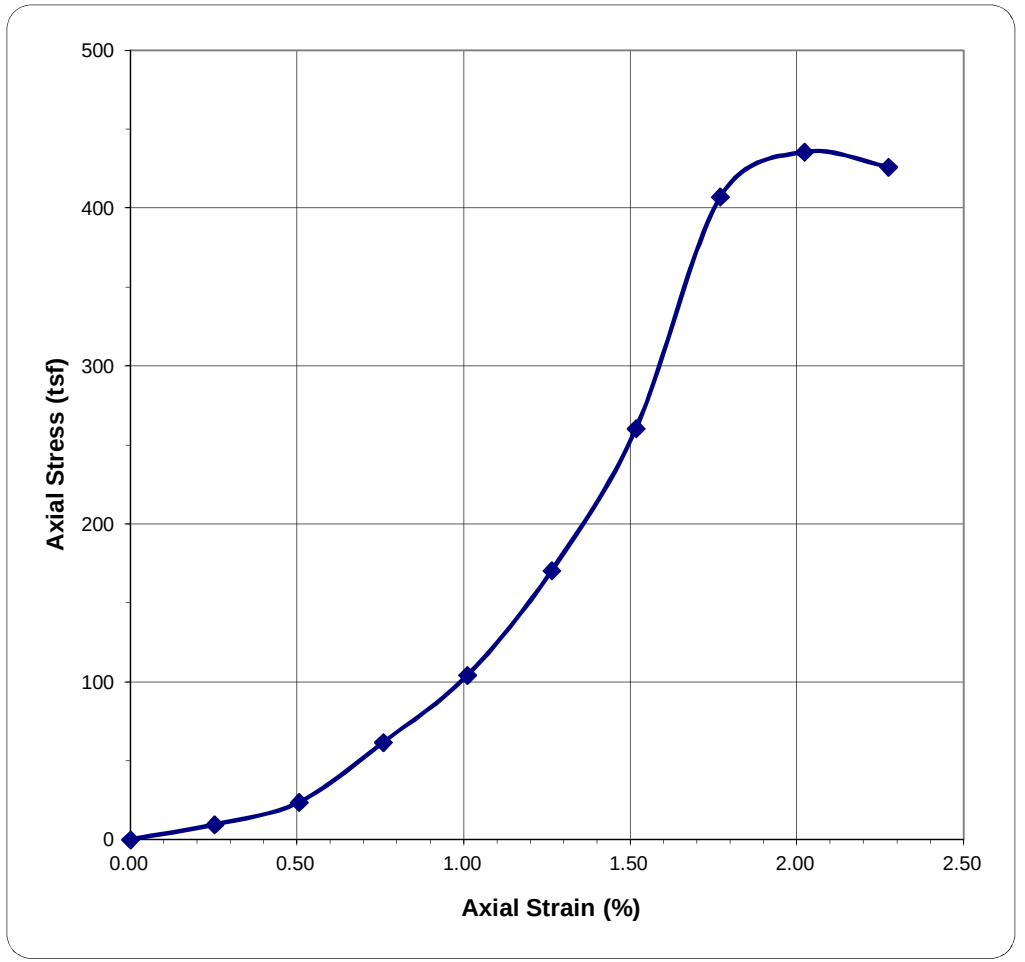
TRC Engineers, Inc.
Soil Mechanics Laboratory

Unconfined Compression Strength Test of Rock Core

Project Name:	TDI				
Project No.:	195651	**Average Sample Diameter (in.):**	1.968	**Sample Description:**	
Boring No.:	B222.6-1	**Cross Sectional Area (sq. in.)**	3.042	COBBLES WITHIN GLACIAL TILL	
Sample No:	R-3	**Average Sample Height (in.):**	3.956		
Depth (ft):	22.6-23.0	**Sample Mass-Dry (g):**	533.82		
Elevation (ft):		**Unit Weight (PCF)**	169.0		

Test Data

Strain Dial (in.)	Load (lb)	Strain (%)	Stress (tsf)
0.000	0	0.00	0
0.010	400	0.25	9
0.020	1000	0.51	24
0.030	2600	0.76	62
0.040	4400	1.01	104
0.050	7200	1.26	170
0.060	11000	1.52	260
0.070	17200	1.77	407
0.080	18400	2.02	436
0.090	18000	2.28	426



Failure Conditions:

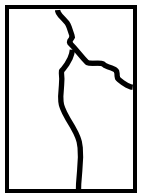


FIGURE: 158

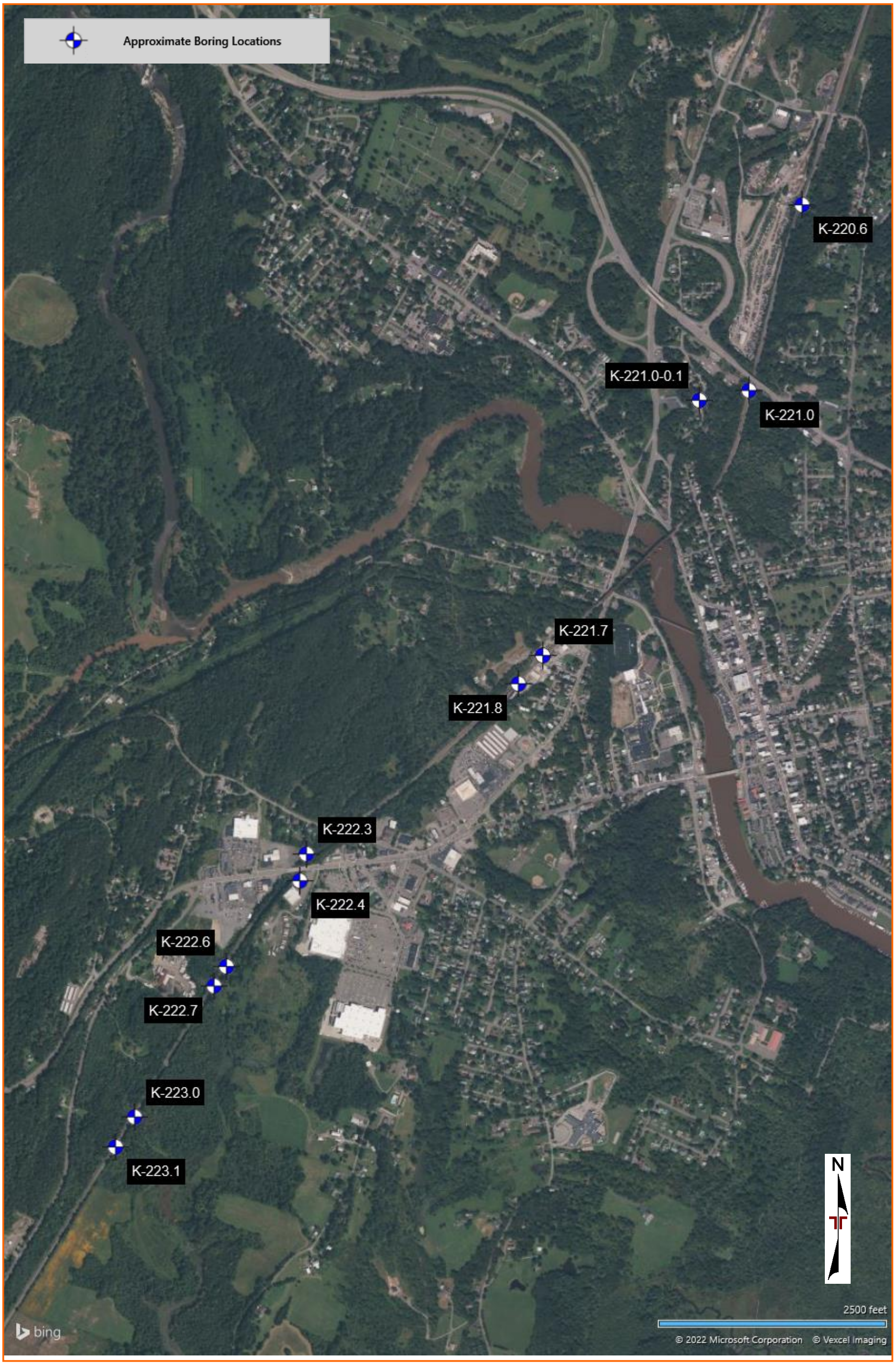


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

AERIAL PHOTOGRAPHY PROVIDED BY MICROSOFT BING MAPS

BORING LOG NO. K-222.6

PROJECT: Champlain-Hudson Power Express Package 7a

CLIENT: Kiewit Engineering (NY) Corp.

SITE: Champlain to Hudson HDD Crossings
Catskill, NY

LOCATION See Exploration Plan

Latitude: 42.211433° Longitude: -73.887189°

Surface Elev.: 113.96 (Ft.)

DEPTH	ELEVATION (Ft.)	Description
		FILL - SOILS REMOVED VIA VACUUM EXTRACTION
6.0	108	
		FILL - SILT AND CLAY, fine gravel noted, brown, stiff to very stiff
		no recovery, pushed cobble
15.0	99	
		FILL - WELL GRADED GRAVEL WITH SILT AND SAND, brown, medium dense
17.0	97	
		FILL - SILT AND CLAY, fine gravel noted, brown, very stiff

DEPTH (Ft.)	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
5						
		14	10-9-7-6 N=16			
		8	7-8-5-6 N=13			
10		0	8-7-8-6 N=15			
15		11	19-9-16-11 N=25	9.2	NP	7
		6	6-8-9-6 N=17			
20						
25						

WATER LEVEL OBSERVATIONS

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

Hammer Type: Automatic

Advancement Method:
4 1/4 HSA

Abandonment Method:
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: 86.9% +/-2.2%
Hammer Efficiency Correction (CE):1.52

WATER LEVEL OBSERVATIONS

No measurable groundwater prior to grouting

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 03-28-2022 | Boring Completed: 03-28-2022

Drill Rig: Mobile B-57 | Driller: S. Kahn

Project No.: JB215256D

BORING LOG NO. K-222.6

PROJECT: Champlain-Hudson Power Express Package 7a

CLIENT: Kiewit Engineering (NY) Corp.

SITE: Champlain to Hudson HDD Crossings
Catskill, NY

LOCATION See Exploration Plan

Latitude: 42.211433° Longitude: -73.887189°

Surface Elev.: 113.96 (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
FILL - SILT AND CLAY, fine gravel noted, brown, very stiff *(continued)*									
				X	7	21-10-11-10 N=21	8.9		
30.0	84	30							
SILT AND CLAY (CL-ML), gray, stiff									
				X	15	6-7-5-5 N=12			
35.0	79	35							
LEAN CLAY (CL), gray, soft									
				X	15	3-3-2-3 3" Split Spoon with ring sampler	25.5	23-15-8	87
				X	15	3-2-2-3 N=4			
40.0	74	40							
Boring Terminated at 40 Feet									

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

Hammer Type: Automatic

Advancement Method:
4 1/4 HSA

Abandonment Method:
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: 86.9% +/-2.2%
Hammer Efficiency Correction (CE):1.52

WATER LEVEL OBSERVATIONS

No measurable groundwater prior to grouting

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 03-28-2022 | Boring Completed: 03-28-2022

Drill Rig: Mobile B-57 | Driller: S. Kahn

Project No.: JB215256D

BORING LOG NO. K-222.7

PROJECT: Champlain-Hudson Power Express Package 7a

CLIENT: Kiewit Engineering (NY) Corp.

SITE: Champlain to Hudson HDD Crossings
Catskill, NY

LOCATION See Exploration Plan

Latitude: 42.210847° Longitude: -73.887689°

Surface Elev.: 114.84 (Ft.)

DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
FILL - SOILS REMOVED VIA VACUUM EXTRACTION								
6.0	109	5						
FILL - SILT AND CLAY, fine gravel noted, medium stiff to stiff				9	8-7-5-5 N=12			
10.0	105	10		0	5-3-2-2 N=5			
FILL - SILTY GRAVEL WITH SAND, brown, medium dense				10	4-7-4-14 N=11	11.5	NP	25
15.0	100	15						
FILL - SILT AND CLAY, fine gravel noted, brown, medium stiff				16	4-3-2-2 N=5			
		20		16	WOH-2-3-4 N=5			
25.0	90	25						

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

Hammer Type: Automatic

Advancement Method:
4 1/4 HSA

Abandonment Method:
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 Efficiency Summary:
Energy Transfer Ratio: 77.4% +/-2.7%
Hammer Efficiency Correction (CE):1.29
WOH = Weight of Hammer

WATER LEVEL OBSERVATIONS

No measurable groundwater prior to grouting

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 03-25-2022 | Boring Completed: 03-25-2022

Drill Rig: CME 550 | Driller: B. Duffy

Project No.: JB215256D

BORING LOG NO. K-222.7

PROJECT: Champlain-Hudson Power Express Package 7a

CLIENT: Kiewit Engineering (NY) Corp.

SITE: Champlain to Hudson HDD Crossings Catskill, NY

LOCATION See Exploration Plan

Latitude: 42.210847° Longitude: -73.887689°

Surface Elev.: 114.84 (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
	FILL - LEAN CLAY WITH SAND, brown, stiff				16	WOH-3-5-5 N=8	34.3	49-27-22	76
30.0	85	30			12	WOH-2-50/4			
	FILL - Cored through boulder								
31.8	83								
	FILL - Boulders	35							
40.0	75	40							
	SILT AND CLAY (CL-ML), gray, very soft				18	WOH-WOH-WOH-2			
42.0	73								
	Boring Terminated at 42 Feet								

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

Hammer Type: Automatic

Advancement Method:
4 1/4 HSA

Abandonment Method:
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 Efficiency Summary:
Energy Transfer Ratio: 77.4% +/-2.7%
Hammer Efficiency Correction (CE):1.29
WOH = Weight of Hammer

WATER LEVEL OBSERVATIONS

No measurable groundwater prior to grouting

Terracon
30 Corporate Cir Ste 201
Albany, NY

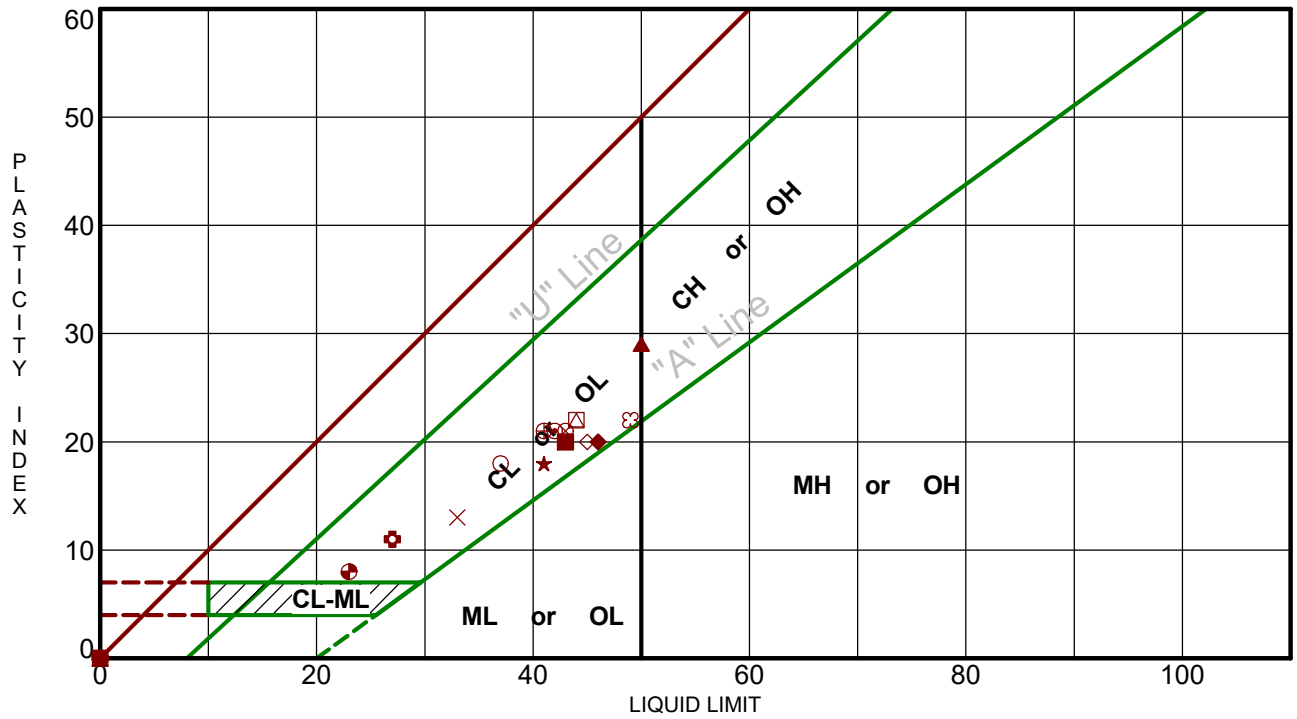
Boring Started: 03-25-2022 | Boring Completed: 03-25-2022

Drill Rig: CME 550 | Driller: B. Duffy

Project No.: JB215256D

ATTERBERG LIMITS RESULTS

ASTM D4318



Boring ID		Depth (Ft)	LL	PL	PI	Fines	USCS	Description
●	K-220.6	6 - 8	NP	NP	NP	22.1	GM	SILTY GRAVEL with SAND
⊠	K-220.6	13 - 15	NP	NP	NP	11.9	SW-SM	WELL-GRADED SAND with SILT and GRAVEL
▲	K-221.0	8 - 10	50	21	29	73.4	CH	FAT CLAY with SAND
★	K-221.0	23 - 25	41	23	18	89.8	CL	LEAN CLAY
⊙	K-221.7	10 - 12	42	21	21	93.6	CL	LEAN CLAY
✿	K-221.7	33 - 35	27	16	11	58.8	CL	SANDY LEAN CLAY
○	K-221.8	8 - 10	37	19	18	91.3	CL	LEAN CLAY
△	K-221.8	35 - 37	44	22	22	79.7	CL	LEAN CLAY with SAND
⊗	K-222.3	6 - 8	43	22	21	59.8	CL	SANDY LEAN CLAY
⊕	K-222.3	10 - 12	41	20	21	69.6	CL	SANDY LEAN CLAY
□	K-222.4	10 - 12	44	22	22	87.3	CL	LEAN CLAY
⊛	K-222.6	15 - 17	NP	NP	NP	6.5	GW-GM	WELL-GRADED GRAVEL with SILT and SAND
◕	K-222.6	35 - 37	23	15	8	86.7	CL	LEAN CLAY
☆	K-222.7	10 - 12	NP	NP	NP	25.3	GM	SILTY GRAVEL with SAND
❀	K-222.7	25 - 27	49	27	22	76.3	CL	LEAN CLAY with SAND
■	K-223.0	10 - 12	43	23	20	58.5	CL	SANDY LEAN CLAY
◆	K-223.0	25 - 27	46	26	20	84.9	CL	LEAN CLAY with SAND
◇	K-223.1	15 - 17	45	25	20	71.3	CL	LEAN CLAY with SAND
×	K-223.1	29 - 31	33	20	13	98.3	CL	LEAN CLAY

PROJECT: Champlain-Hudson Power Express
Package 7a

SITE: Champlain to Hudson HDD Crossings
Catskill, NY

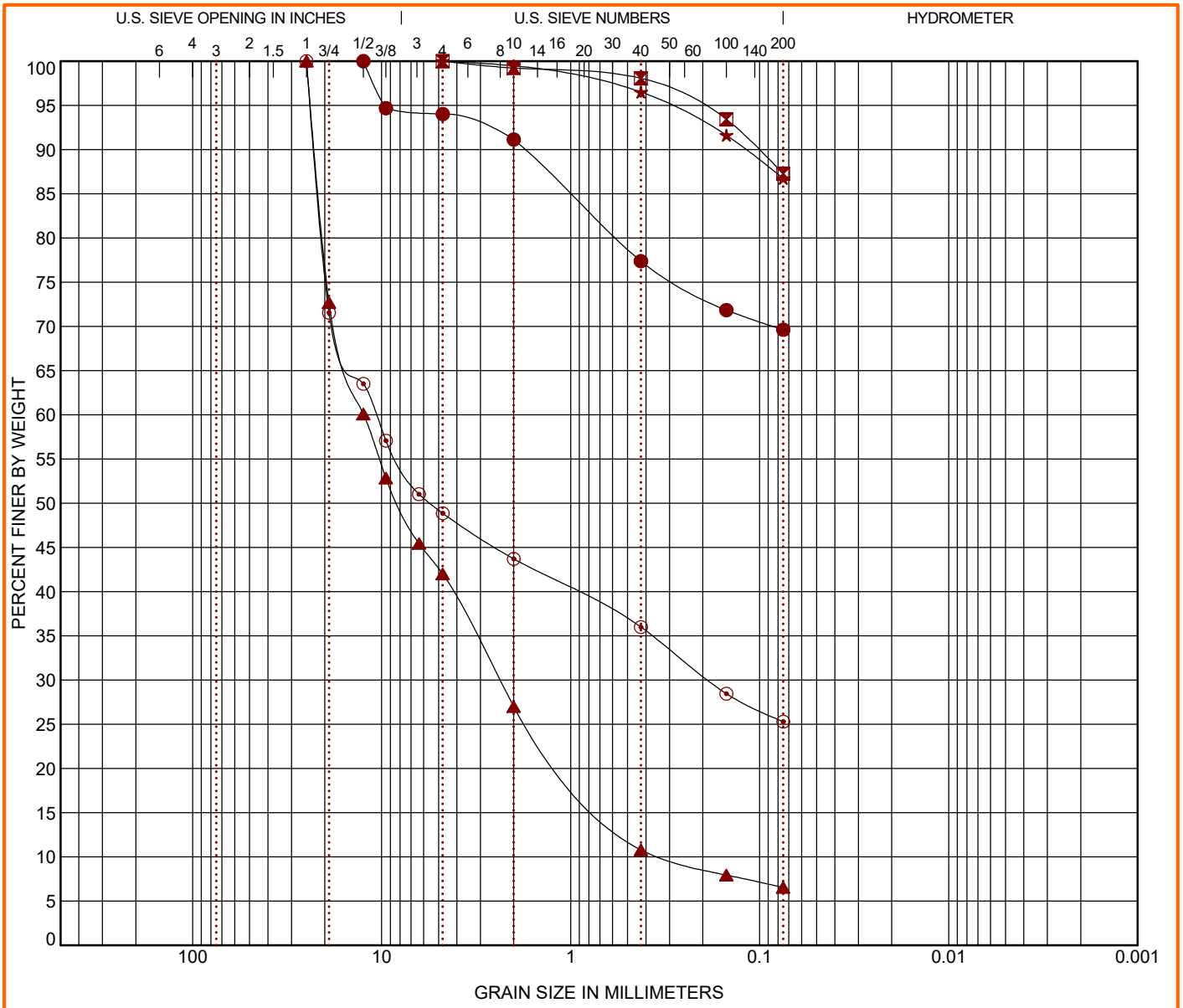
Terracon
30 Corporate Cir Ste 201
Albany, NY

PROJECT NUMBER: JB215256D

CLIENT: Kiewit Engineering (NY) Corp.

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-222.3	10 - 12	SANDY LEAN CLAY (CL)	28.3	41	20	21		
⊠	K-222.4	10 - 12	LEAN CLAY (CL)	30.0	44	22	22		
▲	K-222.6	15 - 17	WELL-GRADED GRAVEL with SILT and SAND (GW-GM)	9.2	NP	NP	NP	1.42	39.06
★	K-222.6	35 - 37	LEAN CLAY (CL)	25.5	23	15	8		
⊙	K-222.7	10 - 12	SILTY GRAVEL with SAND (GM)	11.5	NP	NP	NP		

Boring ID		Depth (Ft)	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
●	K-222.3	10 - 12	12.5				0.0	6.0	24.4		69.6	
⊠	K-222.4	10 - 12	4.75				0.0	0.0	12.7		87.3	
▲	K-222.6	15 - 17	25	12.459	2.379	0.319	0.0	58.0	35.5		6.5	
★	K-222.6	35 - 37	4.75				0.0	0.0	13.3		86.7	
⊙	K-222.7	10 - 12	25	10.764	0.186		0.0	51.1	23.6		25.3	

PROJECT: Champlain-Hudson Power Express Package 7a

SITE: Champlain to Hudson HDD Crossings Catskill, NY

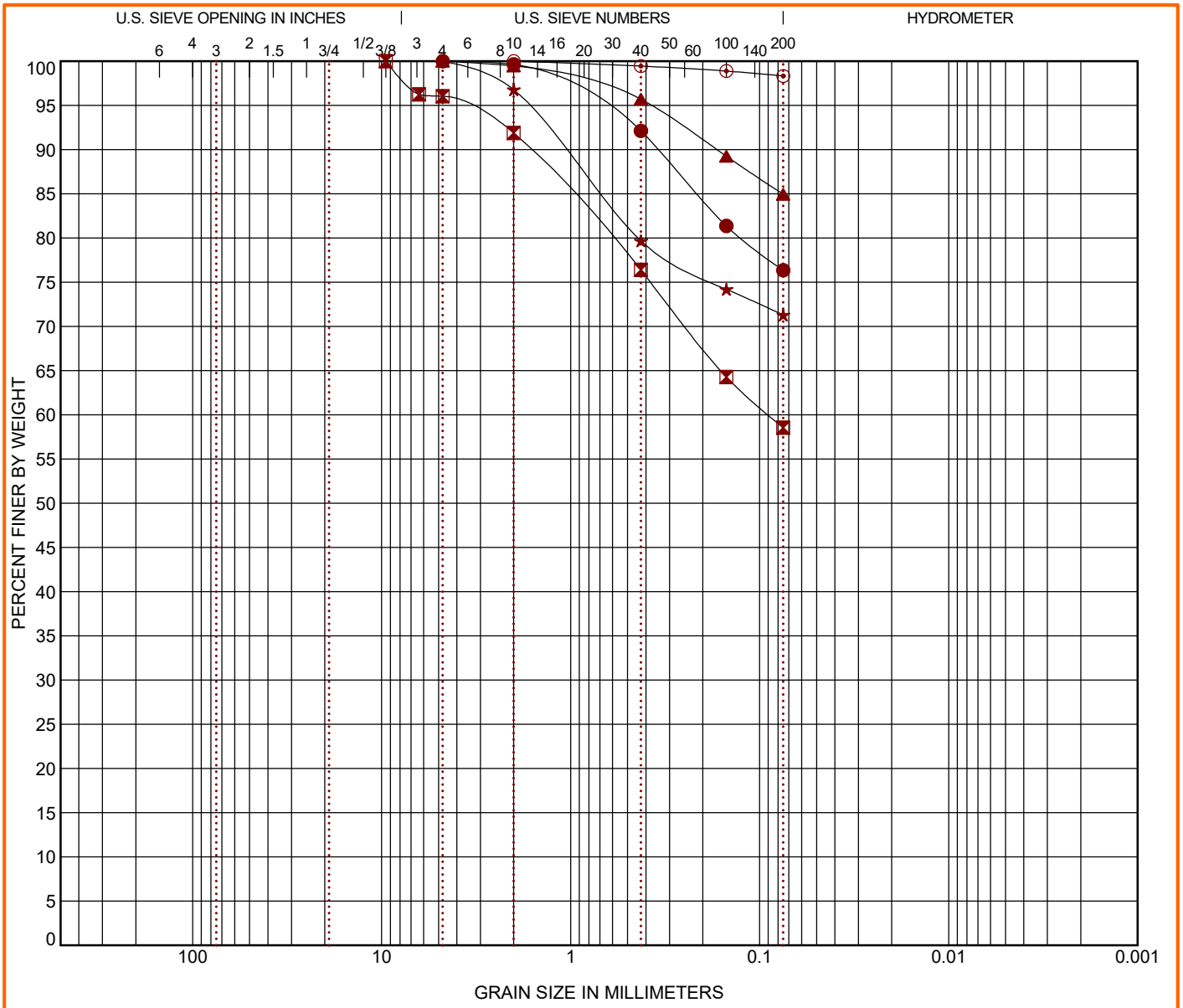
Terracon
30 Corporate Cir Ste 201
Albany, NY

PROJECT NUMBER: JB215256D

CLIENT: Kiewit Engineering (NY) Corp.

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-222.7	25 - 27	LEAN CLAY with SAND (CL)	34.3	49	27	22		
⊠	K-223.0	10 - 12	SANDY LEAN CLAY (CL)	34.0	43	23	20		
▲	K-223.0	25 - 27	LEAN CLAY with SAND (CL)	33.4	46	26	20		
★	K-223.1	15 - 17	LEAN CLAY with SAND (CL)	33.5	45	25	20		
⊙	K-223.1	29 - 31	LEAN CLAY (CL)	33.9	33	20	13		

Boring ID		Depth (Ft)	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
●	K-222.7	25 - 27	4.75				0.0	0.0	23.7		76.3	
⊠	K-223.0	10 - 12	9.5	0.09			0.0	4.0	37.5		58.5	
▲	K-223.0	25 - 27	4.75				0.0	0.0	15.1		84.9	
★	K-223.1	15 - 17	4.75				0.0	0.0	28.7		71.3	
⊙	K-223.1	29 - 31	2				0.0	0.0	1.7		98.3	

PROJECT: Champlain-Hudson Power Express Package 7a

SITE: Champlain to Hudson HDD Crossings Catskill, NY

Terracon
30 Corporate Cir Ste 201
Albany, NY

PROJECT NUMBER: JB215256D

CLIENT: Kiewit Engineering (NY) Corp.

Package 7A Phase 3 Borings

Champlain Hudson Power Express

New York

PROJECT NUMBER 20001480

CREATED BY Kiewit

DATE 12/08/2022

Legend Key

- Kiewit Borings (Phase 3)

EXPLORATORY BORING LOG

Champlain Hudson Power Express

New York

BORING NO: KB-222.6A

PROJECT NUMBER	20001480	**LOGGED BY**	A. McCart	**COORDINATES**	N 1231211.05 E 658150.84
START DATE	09/06/2022	**DRILLER/RIG**	M. Eaves / CME-850	**GROUND ELEV.**	114.0 ft
FINISH DATE	09/07/2022	**DRILL CONTRACTOR**	Parratt Wolff	**HAMMER TYPE/EFF.**	Automatic

Depth (ft)	Elevation (ft)	Material Description	Sample Type	Core Run No.	Recovery % RQD	Pocket Pen. (tsf)	Blow Counts (N Value)	Notes
0		Excavated to 8 ft by air knife and vacuum						Boring advanced with 4.25" ID HSA
	106.0	FILL: GRAVEL with Sand and Silt (GP-GM), dark brown, medium dense to very dense, moist			38%		6-8-10-12 (18)	
10					50%		20-14-12-8 (26)	
15		Rock/large cobble encountered at 15.5 - 17 ft			60%		35-50/4"	
20	94.0	Fat CLAY (CH), trace silt, light brown with light gray mottling, stiff to firm, moist			84%		2-1-2-3 (3)	
25					84%		2-2-2-3 (4)	
30								

Legend

- SPT N Value
- MC (%)
- PL & LL (%)
- Fines Content (%)

20 40 60 80

EXPLORATORY BORING LOG

Champlain Hudson Power Express

New York

BORING NO: KB-222.6A

PROJECT NUMBER	20001480	**LOGGED BY**	A. McCart	**COORDINATES**	N 1231211.05 E 658150.84
START DATE	09/06/2022	**DRILLER/RIG**	M. Eaves / CME-850	**GROUND ELEV.**	114.0 ft
FINISH DATE	09/07/2022	**DRILL CONTRACTOR**	Parratt Wolff	**HAMMER TYPE/EFF.**	Automatic

Depth (ft)	Elevation (ft)	Material Description	Sample Type	Core Run No.	Recovery % RQD	Pocket Pen. (tsf)	Blow Counts (N Value)	Notes
		Fat CLAY (CH), trace silt, light brown with light gray mottling, stiff to firm, moist			100%		3-4-5-8 (9)	
35		Wet below 35 ft			100%		3-3-3-5 (6)	
40		Gray to dark gray, soft to very soft, no silt below 40 ft			100%		0-0-3-2 (3)	
45					100%		0-0-0-0 (0)	WOH
	66.0	SILT (ML), gray, very soft, wet						
50					100%		0-0-0-0 (0)	WOH
55					100%		0-0-4-4	3-inch ring sampler
60								

Legend

- SPT N Value
- MC (%)
- PL & LL (%)
- Fines Content (%)

20 40 60 80

EXPLORATORY BORING LOG

Champlain Hudson Power Express

New York

BORING NO: KB-222.6A

PROJECT NUMBER	20001480	**LOGGED BY**	A. McCart	**COORDINATES**	N 1231211.05 E 658150.84
START DATE	09/06/2022	**DRILLER/RIG**	M. Eaves / CME-850	**GROUND ELEV.**	114.0 ft
FINISH DATE	09/07/2022	**DRILL CONTRACTOR**	Parratt Wolff	**HAMMER TYPE/EFF.**	Automatic

Depth (ft)	Elevation (ft)	Graphic Log	Material Description	Sample Type	Core Run No.	Recovery % RQD	Pocket Pen. (tsf)	Blow Counts (N Value)	Notes
			SILT (ML), gray, very soft, wet			100%		0-0-2-3 (2)	
65						100%		0-0-0-0 (0)	WOH
70						100%		0-0-0-0 (0)	WOH
75						100%		0-0-0-0 (0)	WOH
80						100%		0-0-0-0 (0)	WOH
	32.0		Boring Terminated at 82 ft						
85									
90									

Legend

- SPT N Value
- MC (%)
- PL & LL (%)
- Fines Content (%)

20 40 60 80

Summary of Laboratory Results

BORING ID	Depth (Ft.)	Water Content (%)
KB-222.6A	15-17	1.2
KB-222.6A	35-37	35.8
KB-222.6A	50-52	41.7
KB-222.6A	65-67	38.4
KB-223.1A	6-8	31.3
KB-223.1A	25-27	39.6
KB-223.1A	45-47	22.0
KB-226.1	6-8	33.3
KB-226.1	20-22	37.7
KB-226.8A	4-6	35.5
KB-226.8A	20-22	37.4
KB-226.8A	38-40	46.7

PROJECT: LAB Testing

SITE: Champlain- Hudson Power Express

Terracon
30 Corporate Cir Ste 201
Albany, NY

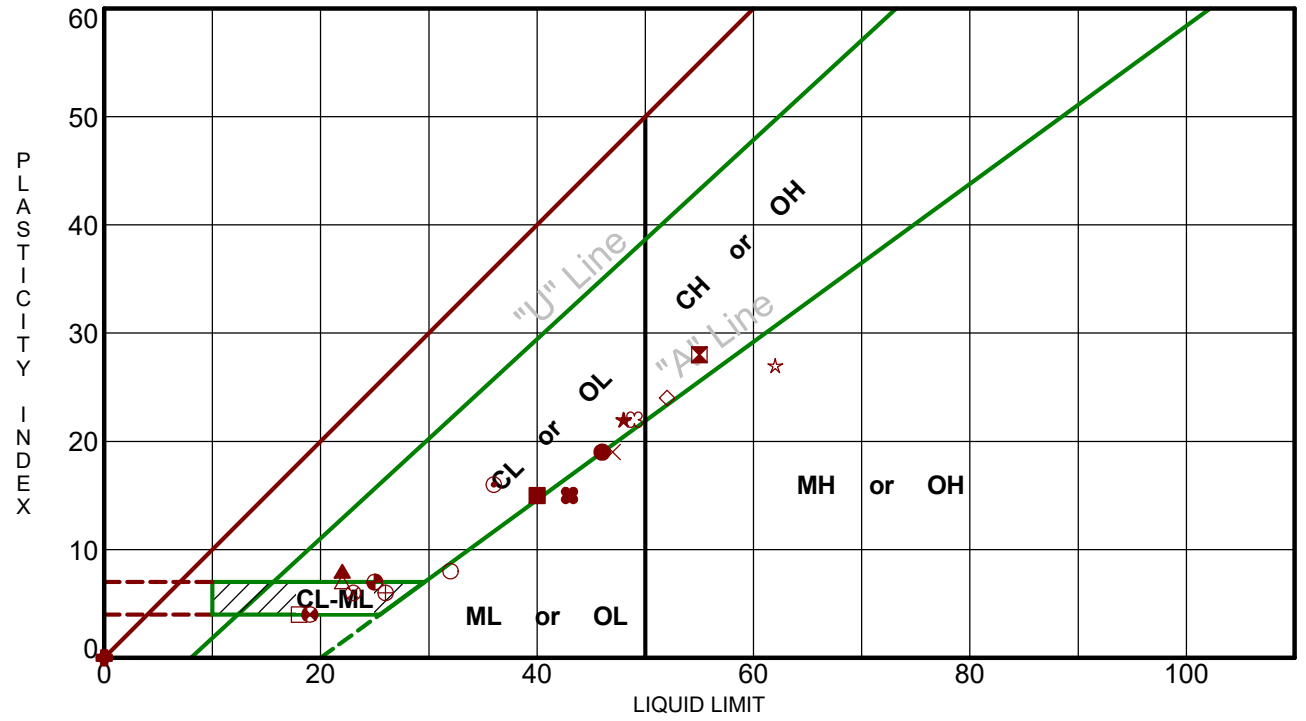
PROJECT NUMBER: JB215256H

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

EXHIBIT: B-2

ATTERBERG LIMITS RESULTS

ASTM D4318



Boring ID	Depth (Ft)	LL	PL	PI	Fines	USCS	Description
KB-193.9	15 - 17	46	27	19	70.4	CL	LEAN CLAY with SAND
KB-193.9	35 - 37	55	27	28	96.8	CH	FAT CLAY
KB-194.0	4 - 6	22	14	8	81.9	CL	LEAN CLAY with SAND
KB-194.0	15 - 17	48	26	22	85.2	CL	LEAN CLAY
KB-194.0	25 - 27	36	20	16	97.0	CL	LEAN CLAY
KB-194.0	35 - 37	NP	NP	NP	14.7	SM	SILTY SAND with GRAVEL
KB-220.5	8 - 10	32	24	8	26.2	SM	SILTY SAND with GRAVEL
KB-221.0A	4 - 6	22	15	7	89.6	CL-ML	SILTY CLAY
KB-221.0A	8 - 10	23	17	6	11.7	GP-GC	POORLY GRADED GRAVEL with SILTY CLAY and SAND
KB-221.0A	15 - 17	26	20	6	11.8	GP-GC	POORLY GRADED GRAVEL with SILTY CLAY and SAND
KB-221.0A	25 - 27	18	14	4	25.9	GC-GM	SILTY, CLAYEY GRAVEL with SAND
KB-221.0A	35 - 37	19	15	4	21.0	SC-SM	SILTY, CLAYEY SAND with GRAVEL
KB-221.3	8	25	18	7	13.7	GC-GM	SILTY, CLAYEY GRAVEL with SAND
KB-222.2	7 - 9	62	35	27	100.0	MH	ELASTIC SILT
KB-222.2	25 - 27	49	27	22	94.8	CL	LEAN CLAY
KB-222.2	40 - 42	40	25	15	90.4	CL	LEAN CLAY
KB-222.6A	15 - 17	NP	NP	NP	7.4	GP-GM	POORLY GRADED GRAVEL with SAND and SILT
KB-222.6A	35 - 37	52	28	24	87.3	CH	FAT CLAY
KB-222.6A	50 - 52	47	28	19	96.5	ML	SILT
KB-222.6A	65 - 67	43	28	15	99.3	ML	SILT

PROJECT: LAB Testing

SITE: Champlain- Hudson Power Express

Terracon
30 Corporate Cir Ste 201
Albany, NY

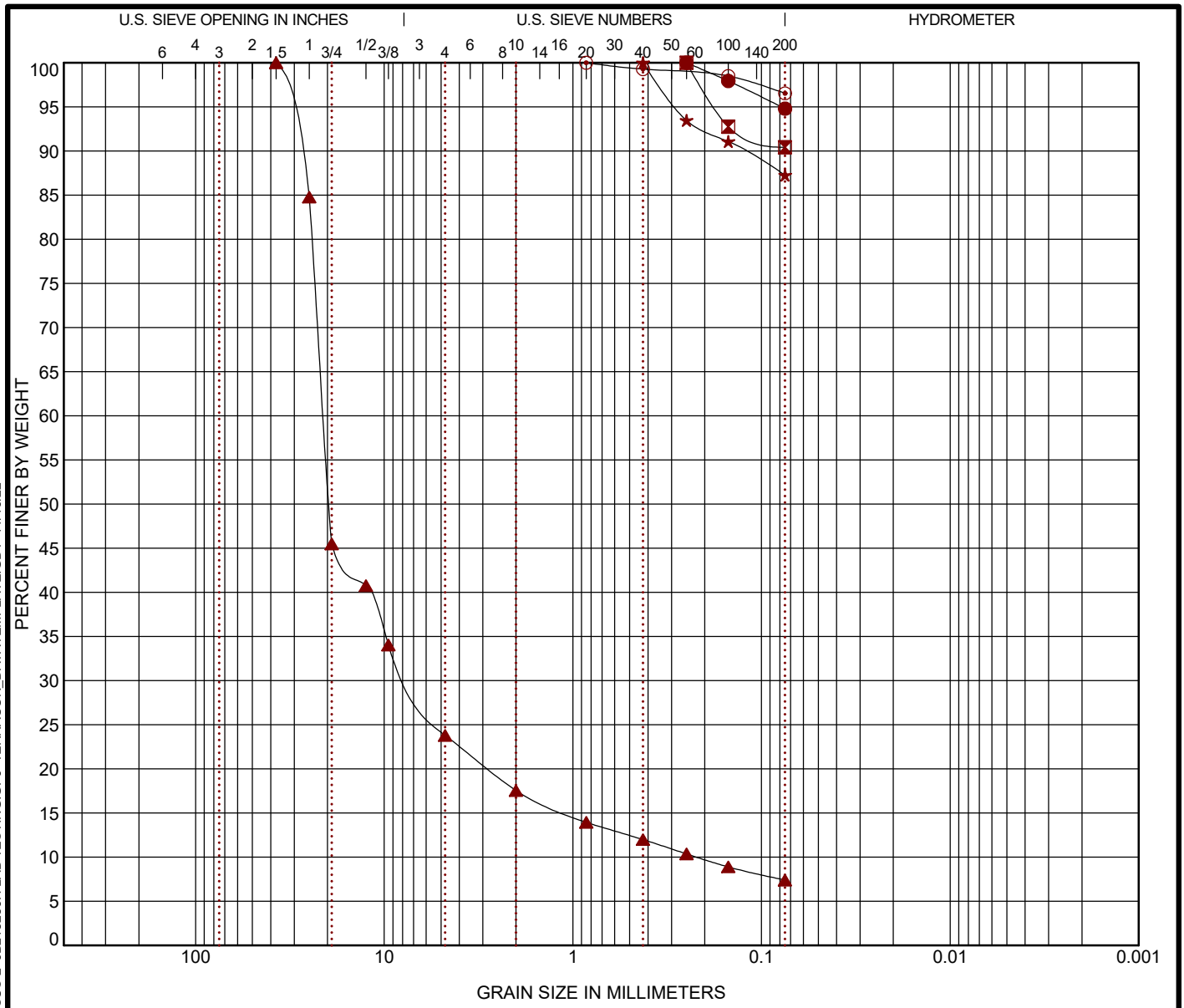
PROJECT NUMBER: JB215256H

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

EXHIBIT: B-2

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



Boring ID	Depth (Ft)	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
KB-222.2	25 - 27	LEAN CLAY (CL)	36.9	49	27	22		
KB-222.2	40 - 42	LEAN CLAY (CL)	38.2	40	25	15		
KB-222.6A	15 - 17	POORLY GRADED GRAVEL with SAND and SILT (GP-GM)	1.2	NP	NP	NP	11.29	95.41
KB-222.6A	35 - 37	FAT CLAY (CH)	35.8	52	28	24		
KB-222.6A	50 - 52	SILT (ML)	41.7	47	28	19		

Boring ID	Depth (Ft)	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
KB-222.2	25 - 27	0.25				0.0	0.0	5.2		94.8	
KB-222.2	40 - 42	0.25				0.0	0.0	9.6		90.4	
KB-222.6A	15 - 17	37.5	21.027	7.232	0.22	0.0	76.2	16.4		7.4	
KB-222.6A	35 - 37	0.425				0.0	0.0	12.7		87.3	
KB-222.6A	50 - 52	0.85				0.0	0.0	3.5		96.5	

PROJECT: LAB Testing

SITE: Champlain- Hudson Power Express

Terracon
30 Corporate Cir Ste 201
Albany, NY

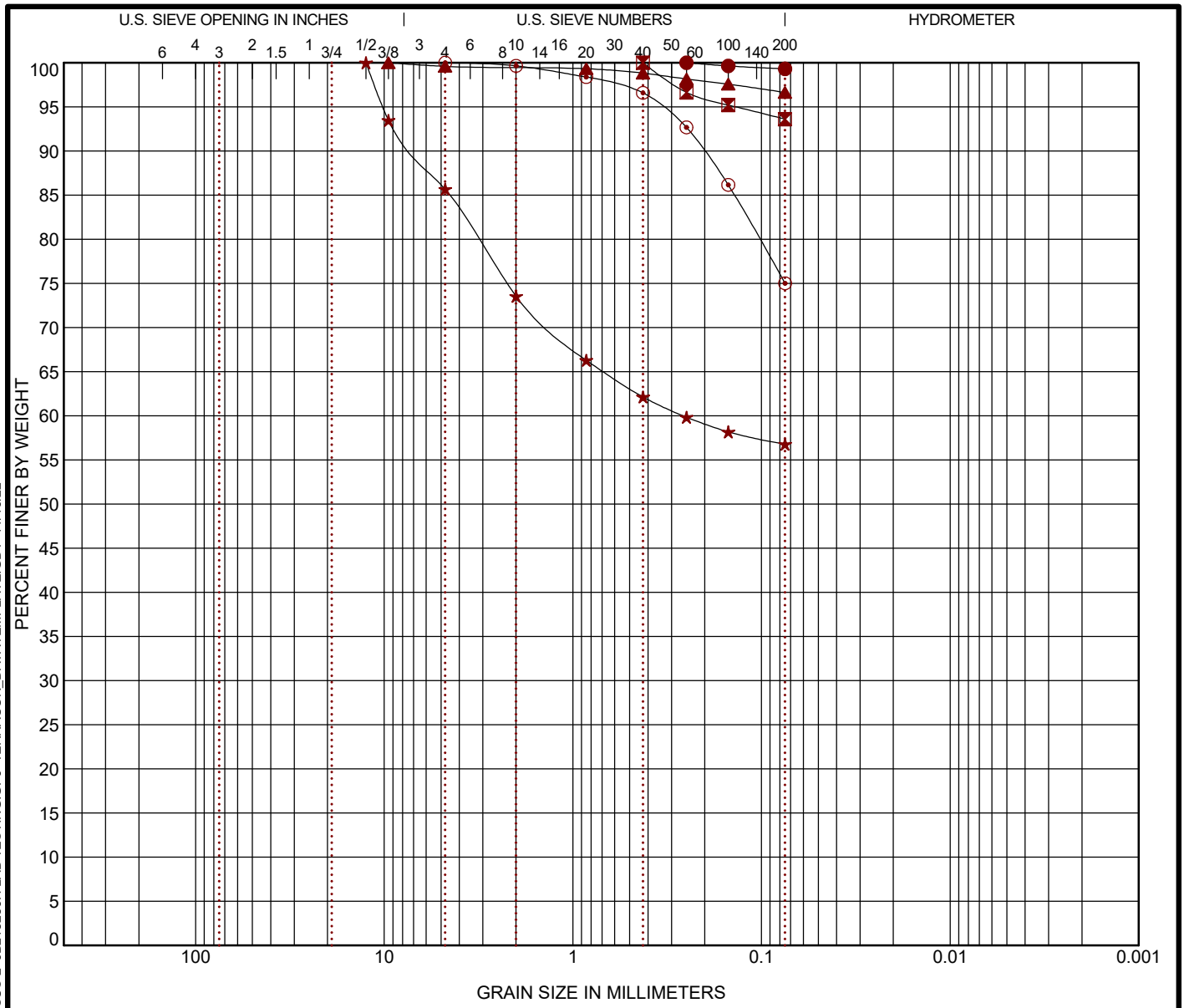
PROJECT NUMBER: JB215256H

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

EXHIBIT: B-9

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



Boring ID	Depth (Ft)	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
● KB-222.6A	65 - 67	SILT (ML)	38.4	43	28	15		
⊠ KB-223.1A	6 - 8	FAT CLAY (CH)	31.3	57	29	28		
▲ KB-223.1A	25 - 27	ELASTIC SILT (MH)	39.6	52	30	22		
★ KB-223.1A	45 - 47	SANDY LEAN CLAY (CL)	22.0	31	19	12		
⊙ KB-226.1	6 - 8	ELASTIC SILT with SAND (MH)	33.3	64	36	28		

Boring ID	Depth (Ft)	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
● KB-222.6A	65 - 67	0.25				0.0	0.0	0.7		99.3	
⊠ KB-223.1A	6 - 8	0.425				0.0	0.0	6.4		93.6	
▲ KB-223.1A	25 - 27	9.5				0.0	0.4	3.0		96.6	
★ KB-223.1A	45 - 47	12.5	0.259			0.0	14.3	28.9		56.8	
⊙ KB-226.1	6 - 8	4.75				0.0	0.0	25.0		75.0	

PROJECT: LAB Testing

SITE: Champlain- Hudson Power Express

Terracon
30 Corporate Cir Ste 201
Albany, NY

PROJECT NUMBER: JB215256H

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

EXHIBIT: B-10

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS-2 JB215256H LAB TESTING.GPJ TERRACON_DATATEMPLATE.GDT 11/16/22

Package 7A Phase 4 Borings

Champlain Hudson Power Express

New York

PROJECT NUMBER 20001480

CREATED BY Kiewit

DATE 02/17/2023

Legend Key

- Kiewit Borings

EXPLORATORY BORING LOG

Champlain Hudson Power Express

New York

BORING NO: KB-222.8

PROJECT NUMBER	20001480	**LOGGED BY**	S. Ahmad	**COORDINATES**	N 1230382.95 E 657696.81
START DATE	01/09/2023	**DRILLER/RIG**	Eric / Geoprobe 7822DT	**GROUND ELEV.**	117.2 ft
FINISH DATE	01/11/2023	**DRILL CONTRACTOR**	ADT Inc.	**HAMMER TYPE/EFF.**	Automatic

Depth (ft)	Elevation (ft)	Material Description	Sample Type	Core Run No.	Recovery % RQD	Pocket Pen. (tsf)	Blow Counts (N Value)	Notes
0		CLAY (CL), brown, soft, moist		1	62%		0-1-1-3 (2)	Boring advanced with 4" ID Mud Rotary
	115.2	SILT (MH), brown, very stiff, moist		2	79%		5-8-10-11 (18)	
5				3	100%		9-12-14-13 (26)	
				4	96%		12-13-14-13 (27)	
				5	100%		12-13-13-12 (26)	
10				6	100%		12-12-12-11 (24)	
15	102.2	CLAY (CH), brown, very soft to firm, moist		7	100%		0-2-3-5 (5)	
20				8	96%		1-3-4-5 (7)	
25				9	100%		0-2-2-5 (4)	
30		brown to gray		10	100%		0-0-0-0 (0)	
35								

Legend

- SPT N Value
- MC (%)
- PL & LL (%)
- Fines Content (%)

20 40 60 80

EXPLORATORY BORING LOG

Champlain Hudson Power Express

New York

BORING NO: KB-222.8

PROJECT NUMBER	20001480	**LOGGED BY**	S. Ahmad	**COORDINATES**	N 1230382.95 E 657696.81
START DATE	01/09/2023	**DRILLER/RIG**	Eric / Geoprobe 7822DT	**GROUND ELEV.**	117.2 ft
FINISH DATE	01/11/2023	**DRILL CONTRACTOR**	ADT Inc.	**HAMMER TYPE/EFF.**	Automatic

Depth (ft)	Elevation (ft)	Graphic Log	Material Description	Sample Type	Core Run No.	Recovery % RQD	Pocket Pen. (tsf)	Blow Counts (N Value)	Notes
			CLAY (CH), gray, soft to very soft, moist		11	100%		0-0-0-0 (0)	
40					12	100%		0-0-0-0 (0)	
45	72.2		SILT (ML), gray, very soft, moist		13	100%		0-0-0-0 (0)	
50					14	100%		0-0-0-0 (0)	
55					15	100%		0-0-0-0 (0)	
60					16	100%		0-0-0-0 (0)	
65	52.2		SILT (MH), gray, very soft, moist		17	100%		0-0-0-0 (0)	
70									

Legend

- SPT N Value
- MC (%)
- PL & LL (%)
- Fines Content (%)

20 40 60 80

EXPLORATORY BORING LOG

Champlain Hudson Power Express

New York

BORING NO: KB-222.8

PROJECT NUMBER	20001480	**LOGGED BY**	S. Ahmad	**COORDINATES**	N 1230382.95 E 657696.81
START DATE	01/09/2023	**DRILLER/RIG**	Eric / Geoprobe 7822DT	**GROUND ELEV.**	117.2 ft
FINISH DATE	01/11/2023	**DRILL CONTRACTOR**	ADT Inc.	**HAMMER TYPE/EFF.**	Automatic

Depth (ft)	Elevation (ft)	Graphic Log	Material Description	Sample Type	Core Run No.	Recovery % RQD	Pocket Pen. (tsf)	Blow Counts (N Value)	Notes
			SILT (MH), gray, very soft, moist		1	100%		0-0-0-0	3-inch ring sampler
75			stiff		18	62%		2-6-8-8 (14)	
80			very soft		19	100%		0-0-0-0 (0)	
85	31.2		CLAY (CL), gray, hard, moist, with rock fragments (glacial till)						rig chatter at 86ft while drilling
90	27.2		Boring Terminated at 90ft		20	75%		50/4"	
95									
100									
105									

Legend

- SPT N Value
- MC (%)
- PL & LL (%)
- Fines Content (%)

20 40 60 80

SOIL LEGEND

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

SAMPLE AND DRILL METHODS

☒	Standard Penetration Split-Spoon Sample
■	Undisturbed Sample
⊞	Piston Sampler
	Grab Sample
◇	Bulk Sample
	Auger Cuttings
▮	Rock Core
⋈	Modified California Sample

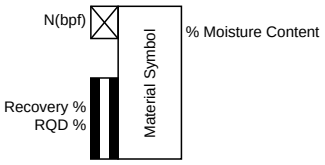
WATER LEVEL SYMBOLS

▽	Observation at time of drilling
▽	Observation after drilling
▼	Delayed observation
	Perched water observed at drilling
	Observed Seepage
	Cave-in Depth

COMMON ABBREVIATIONS AND ACRONYMS

MR	Mud Rotary
HSA	Hollow Stem Auger
SSA	Solid Stem Auger
SS	Split Spoon Sampler
UD	Undisturbed Sample
WOR	Weight of Rods
WOH	Weight of Hammer
SPT	Standard Penetration Test
REC	Recovery
RQD	Rock Quality Designation
MC	Moisture Content
PI	Plasticity Index
PL	Plastic Limit
LL	Liquid Limit
CPT	Cone Penetration Test
PP	Pocket Penetrometer
Bulk	Bulk Sample
EOB	End of Boring
AR	Auger Refusal
N-Value	Sum of blows for last two 6-in. increments of SPT
USCS	Unified Soil Classification System

CROSS SECTION LEGEND



RELATIVE DENSITY / CONSISTENCY

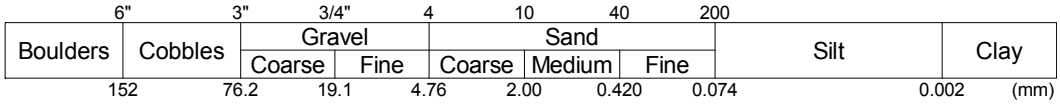
Coarse-grained Soils		Fine-grained Soils		
N-Value	Density	N-Value	Consistency	Pocket Pen (TSF)
0 - 4	Very Loose	0 - 1	Very Soft	0.0 - 0.25
5 - 10	Loose	2 - 4	Soft	0.25 - 0.50
11 - 30	Medium	5 - 8	Firm	0.51 - 1.00
31 - 50	Dense	9 - 15	Stiff	1.01 - 2.00
> 50	Very Dense	16 - 30	Very Stiff	2.01-4.00
		>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

RELATIVE PROPORTIONS OF GRAVEL, SAND, AND FINES

Trace	> 5 %
Few	5 to 10 %
Little	15 to 25 %
Some	30 - 45 %
Mostly	50 to 100 %

SOIL GRAIN SIZE

U.S. Standard Sieve



CRITERIA FOR DESCRIBING MOISTURE CONDITION

Description	Criteria
Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible free water
Wet	Visible free water, typically soil is below water table

CRITERIA FOR DESCRIBING CEMENTATION

Description	Criteria
Weak	Crumbles or breaks with handling or little finger pressure
Moderate	Crumbles or breaks with considerable finger pressure
Strong	Will not crumble or break with finger pressure

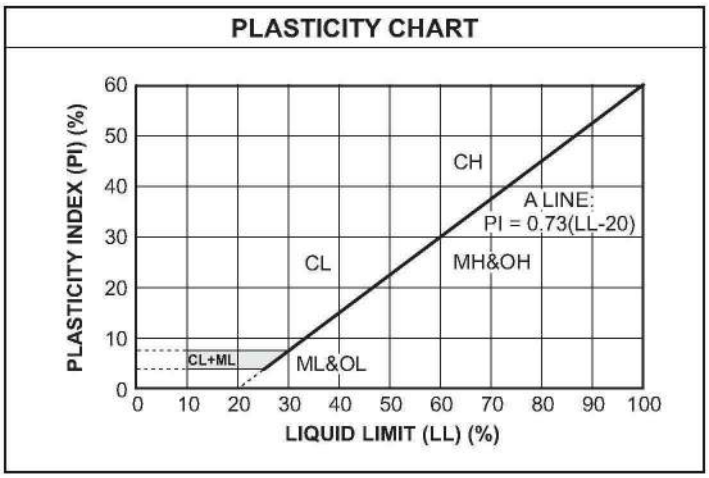
CRITERIA FOR DESCRIBING STRUCTURE

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

SOIL SYMBOLS

USCS SOIL TYPES		
Symbol	Group	Description
	GW	Well-graded gravels, gravel sand mixtures with trace or no fines
	GP	Poorly-graded gravels, gravel-sand mixtures with trace or no fines
	GW-GM	Well-graded gravels, gravel-sand mixtures with silt fines
	GW-GC	Well-graded gravels, gravel-sand mixtures with clay fines
	GP-GM	Poorly-graded gravels, gravel-sand mixtures with silt fines
	GP-GC	Poorly-graded gravels, gravel-sand mixtures with clay fines
	GM	Silty gravels, gravel-silt-sand mixtures
	GC	Clayey gravels, gravel-sand-clay mixtures
	GC-GM	Clayey gravels, gravel-sand-clay-silt mixtures
	SW	Well-graded sands, sand-gravel mixtures with trace or no fines
	SP	Poorly-graded sands, sand-gravel mixtures with trace or no fines
	SW-SM	Well-graded sands, sand-gravel mixtures with silt fines
	SW-SC	Well-graded sands, sand-gravel mixtures with clayfines
	SP-SM	Poorly-graded sands, sand-gravel mixtures with silt fines
	SP-SC	Poorly-graded sands, sand-gravel mixtures with clay fines
	SM	Silty sands, sand-gravel-silt mixtures
	SC	Clayey sands, sand-gravel-clay mixtures
	SC-SM	Clayey sands, sand-gravel-clay-silt mixtures
	ML	Inorganic silts with low plasticity
	CL	Inorganic clays of low plasticity, gravelly or sandy clays, silty clays, lean clays
	CL-ML	Inorganic clay-silts of low plasticity, gravelly clays, sandy clays, silty clays, lean clays
	OL	Organic silts and organic silty clays of low plasticity
	MH	Inorganic silts of high plasticity, elastic silts
	CH	Inorganic clays of high plasticity, fat clays
	OH	Organic clays and organic silts of high plasticity
	PT	Peat, humus, swamp soils with high organic contents

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



Summary of Laboratory Results

BORING ID	Depth (Ft.)	Water Content (%)
KB-169.0-1.0	4-6	18.6
KB-169.0-1.0	10-12	22.8
KB-169.0-1.0	20-22	29.0
KB-169.0-1.0	35-37	26.2
KB-169.0-1.0	50-52	25.1
KB-169.0-2.4	4-6	9.7
KB-169.0-2.4	20-22	20.1
KB-169.0-2.4	35-37	29.8
KB-169.0-2.4	55-57	23.6
KB-169.0-2.5	4-6	18.0
KB-169.0-2.5	10-12	18.5
KB-169.0-2.5	30-32	28.0
KB-169.0-2.5	40-42	24.7
KB-169.0-3.6	4-6	13.0
KB-169.0-3.6	10-12	3.4
KB-169.0-3.6	25-27	13.3
KB-169.0-3.6	40-42	9.3
KB-169.0-3.6	50-52	2.5
KB-169.0-3.7	4-6	11.7
KB-169.0-3.7	20-22	23.0
KB-169.0-3.7	40-42	4.4
KB-169.0-3.7	60-62	8.6
KB-169.0-7.9	4-6	18.1
KB-221.0B	4-6	11.0
KB-221.0B	10-12	40.8
KB-221.0B	30-32	37.4
KB-221.0B	50-52	29.6
KB-221.8B	4-6	32.1
KB-221.8B	20-22	44.4
KB-221.8B	35-37	46.6
KB-221.8B	55-57	39.2
KB-222.8	6-8	33.6
KB-222.8	20-22	43.2
KB-222.8	45-47	39.4
KB-222.8	65-67	45.0

PROJECT: Lab Testing

SITE: Champlain to Hudsdon Power Express

Terracon
30 Corporate Cir Ste 201
Albany, NY

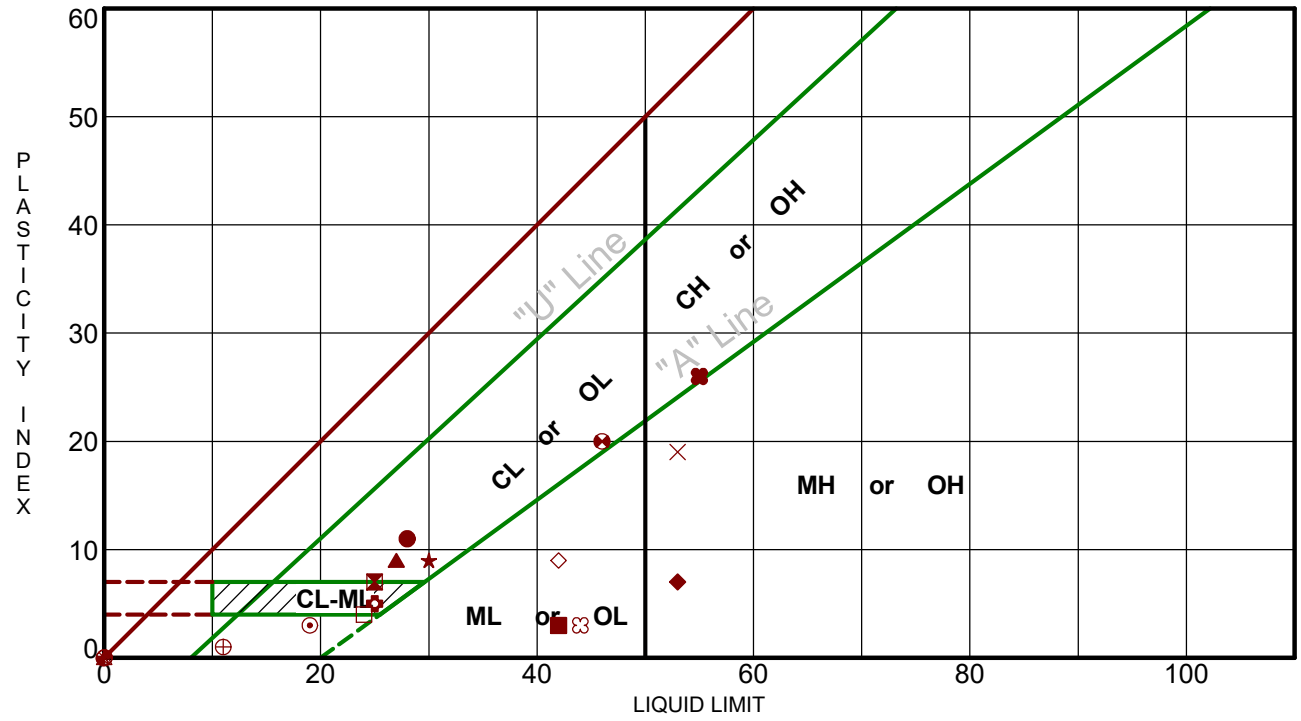
PROJECT NUMBER: JB215256H

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

EXHIBIT: B-1

ATTERBERG LIMITS RESULTS

ASTM D4318



Boring ID	Depth (Ft)	LL	PL	PI	Fines	USCS	Description
KB-169.0-1.0	20 - 22	28	17	11	93.4	CL	LEAN CLAY
KB-169.0-1.0	35 - 37	25	18	7	97.1	CL-ML	SILTY CLAY
KB-169.0-1.0	50 - 52	27	18	9	99.4	CL	LEAN CLAY
KB-169.0-2.4	20 - 22	30	21	9	73.6	ML	SANDY SILT
KB-169.0-2.4	35 - 37	19	16	3	87.9	ML	SILT
KB-169.0-2.5	30 - 32	25	20	5	92.5	CL-ML	SILTY CLAY
KB-169.0-2.5	40 - 42	NP	NP	NP	95.7	ML	SILT
KB-169.0-3.6	4 - 6	NP	NP	NP	8.8	GP-GM	POORLY GRADED GRAVEL with SILT and SAND
KB-169.0-3.6	50 - 52	NP	NP	NP	43.6	SM	SILTY SAND
KB-169.0-3.7	60 - 62	11	10	1	39.1	SM	SILTY SAND
KB-221.0B	4 - 6	24	20	4	16.9	SC-SM	SILTY, CLAYEY SAND with GRAVEL
KB-221.0B	10 - 12	46	26	20	96.3	CL	LEAN CLAY
KB-221.0B	30 - 32	NP	NP	NP	96.0	ML	SILT
KB-221.0B	50 - 52	NP	NP	NP	99.4	ML	SILT
KB-221.8B	4 - 6	44	41	3	72.3	ML	SILT with GRAVEL
KB-221.8B	20 - 22	42	39	3	98.3	ML	SILT
KB-221.8B	35 - 37	53	46	7	95.5	MH	ELASTIC SILT
KB-221.8B	55 - 57	42	33	9	99.6	ML	SILT
KB-222.8	6 - 8	53	34	19	97.5	MH	ELASTIC SILT
KB-222.8	20 - 22	55	29	26	92.8	CH	FAT CLAY

PROJECT: Lab Testing

SITE: Champlain to Hudsdon Power Express

Terracon
30 Corporate Cir Ste 201
Albany, NY

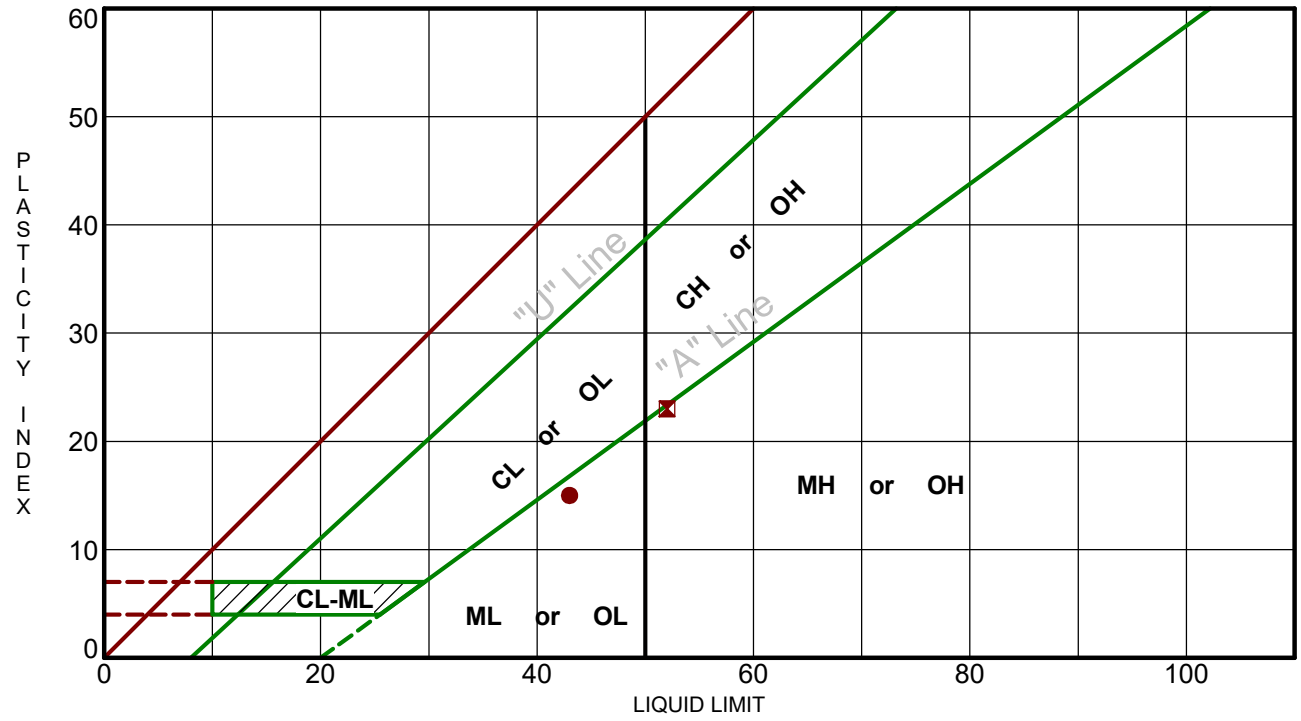
PROJECT NUMBER: JB215256H

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

EXHIBIT: B-1

ATTERBERG LIMITS RESULTS

ASTM D4318



Boring ID	Depth (Ft)	LL	PL	PI	Fines	USCS	Description
● KB-222.8	45 - 47	43	28	15	100.0	ML	SILT
⊠ KB-222.8	65 - 67	52	29	23	100.0	MH	ELASTIC SILT

PROJECT: Lab Testing

SITE: Champlain to Hudsdon Power Express

Terracon
30 Corporate Cir Ste 201
Albany, NY

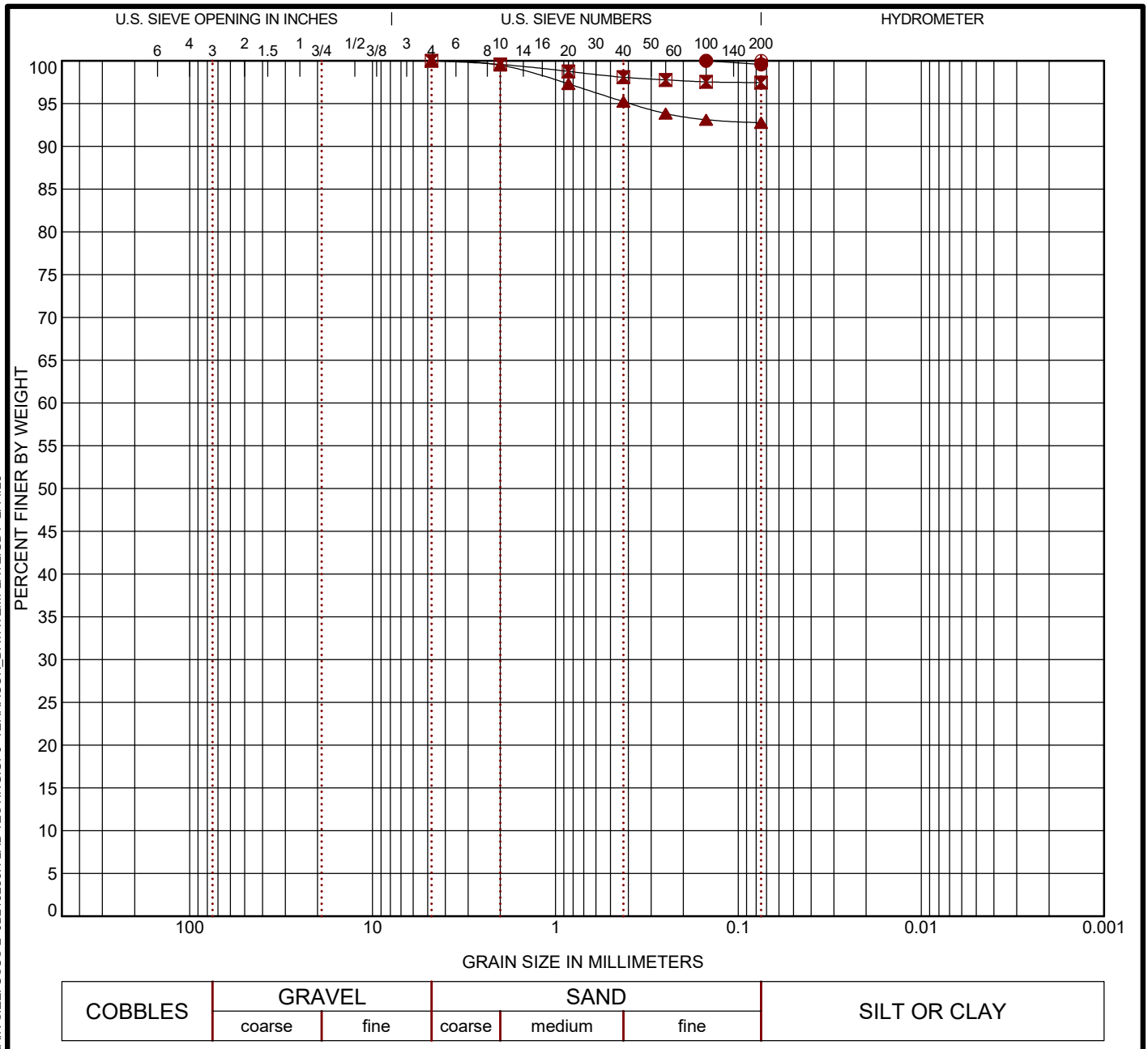
PROJECT NUMBER: JB215256H

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

EXHIBIT: B-2

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



Boring ID	Depth (Ft)	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
KB-221.8B	55 - 57	SILT (ML)	39.2	42	33	9		
KB-222.8	6 - 8	ELASTIC SILT (MH)	33.6	53	34	19		
KB-222.8	20 - 22	FAT CLAY (CH)	43.2	55	29	26		
KB-222.8	45 - 47	SILT (ML)	39.4	43	28	15		
KB-222.8	65 - 67	ELASTIC SILT (MH)	45.0	52	29	23		

Boring ID	Depth (Ft)	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
KB-221.8B	55 - 57	0.15				0.0	0.0	0.4		99.6	
KB-222.8	6 - 8	4.75				0.0	0.0	2.5		97.5	
KB-222.8	20 - 22	4.75				0.0	0.0	7.2		92.8	
KB-222.8	45 - 47	0.075				0.0	0.0	0.0		100.0	
KB-222.8	65 - 67	0.075				0.0	0.0	0.0		100.0	

PROJECT: Lab Testing

SITE: Champlain to Hudsdon Power Express

Terracon
30 Corporate Cir Ste 201
Albany, NY

PROJECT NUMBER: JB215256H

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

EXHIBIT: B-7

Kiewit

MEMORANDUM

DATE: December 16, 2022

TO: Zachary Bauer; Tetra Tech Rooney

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

SUBJECT: Geotechnical Data: Segment 11 – Package 7A – HDD Crossing 120 – Revision 1
Champlain Hudson Power Express Project
Catskill, 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 Catskill, New York. The approximate station for the start of HDD crossing number 120 is STA 70174+00 (42.2081° N, 73.8897° W).

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

- TRC, Geotechnical Data Report, Champlain Hudson Power Express, Canadian Pacific Railway Borings MP 177.6-228.2, dated March 15, 2013.
- Terracon Consultants-NY, Inc., Results of Field Exploration, Champlain-Hudson Power Express – Package 7a, Catskill, NY, dated May 23, 2022.
- Kiewit Engineering (NY) Corp., Package 7A Phase 3 Borings, Champlain Hudson Power Express, New York, dated December 8, 2022.

Contact us if you have questions or require additional information.

HDD 120
Borings B222.9-1, K-223.0, K-223.1, KB-223.1A
Segment 11 - Design Package 7A

CHPE Segment 11 - Package 7A
HDD Soil Boring Coordinates and Elevations

Firm	Boring	Northing (feet)	Easting (feet)	Ground Surface Elevation (feet)
TRC*	B221.0-1	1237452.6	663787.2	99.6
	B221.2-1	1236173.4	663261.8	115.0
	B221.4-1	1235622.5	662622.3	22.4
	B221.5-1	1235006.9	662058.8	95.5
	B221.6-1	1234675.8	661633.8	98.3
	B221.8-1	1234265.3	661277.2	99.4
	B222.34-1	1232191.5	659098.9	133.5
	B222.6-1	1231252.6	658182.3	113.7
	B222.9-1	1229751.0	657274.3	121.4
	B225.8-1	1215861.0	650622.7	91.0
	B226.1-1	1214654.4	650328.3	105.9
	B226.2-1	1214120.5	650254.4	108.5
	B226.6-1	1211894.7	649689.7	112.1
AECOM**	CU-1	1237028.6	663123.9	19.7
	CU-2	1236042.7	662897.0	24.8
	CU-2A	1235325.9	662268.9	38.1
	CU-5A	1210523.7	649411.8	118.4
	SC-5	1239310.3	664321.6	110.2
	SC-6	1237781.0	663919.8	101.6

Notes:

- Northings and Eastings are provided in NAD83 New York State Plane East Zone.
- Elevations are referenced to the NAVD88 datum.

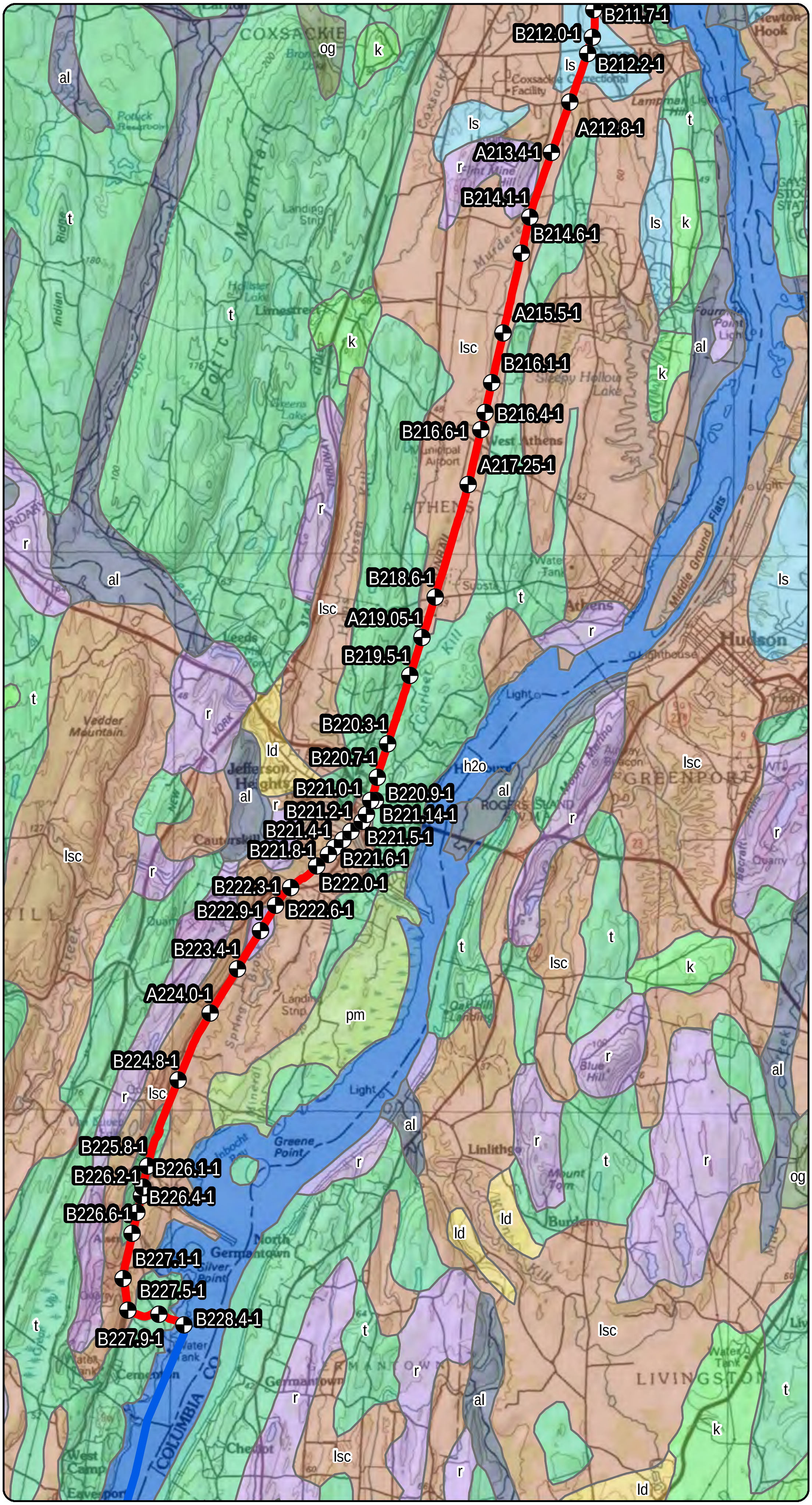
* TRC boring coordinates as shown in Table 1-6 in AECOM report (reference below). Boring elevations estimated from November 2021 topographic survey by Williams Aerial.

** 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

- Approximate Boring Locations
- Submarine Route
- Terrestrial Route along CP Railroad ROW
- Terrestrial Route along CSX Railroad ROW
- Terrestrial Route

Surficial Geology

- al - Recent alluvium, fine sand to gravel
- d - Dunes, fine to medium sands
- h2o, Water
- k - Kame deposits, coarse to fine gravel and/or sand
- km - Kame moraine, variable texture from boulders to sand
- ld - Lacustrine delta, coarse to fine gravel and sand
- ls - Lacustrine sand, generally quartz sand, well sorted, stratified
- lsc - Lacustrine silt and clay, generally laminated silt and clay
- og - Outwash sand and gravel, coarse to fine gravel with sand
- pm - Swamp deposits, peat-muck, organic silt and sand in poorly drained area
- r - Bedrock, exposed or generally within 1 meter of surface
- t - Till, variable texture (boulders to silt)
- tm - Till moraine, variable texture (size and sorting)

N

0 50 100

Miles

Transmission Developers Inc.

Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

Surficial Geology and Geotechnical Borings

CSX Railroad ROW: Page 3 of 3

HDR | DTA & TRC

Prepared: 1/15/2013

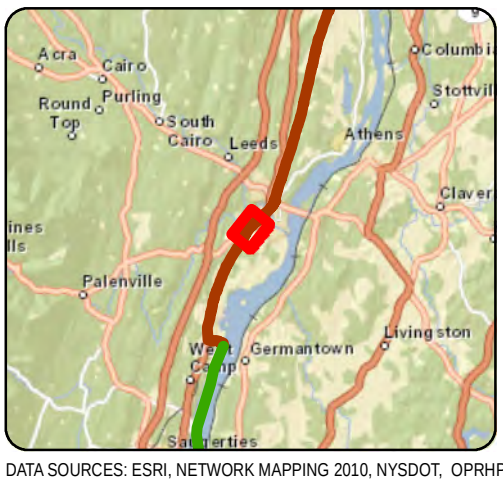
DATA SOURCES:USGS, ESRI, TDI, HDR/DTA, TRC

#B222.0-1
Lat: 42.217999
Long: -73.878061
Distance to Nearest Crossing:
0.2 mi N of Cauterskill Rd

#B222.34-1
Lat: 42.214183
Long: -73.883586
Distance to Nearest Crossing:
0.1 mi S of Cauterskill Rd

#B222.6-1
Lat: 42.21162
Long: -73.886995
Distance to Nearest Crossing:
0.4 mi S of Cauterskill Rd

#B222.9-1
Lat: 42.207517
Long: -73.890383
Distance to Nearest Crossing:
0.7 mi S of Cauterskill Rd



LEGEND

- 111.8 Milepost - Tenths
- 135 Milepost
- Terrestrial Route HVDC
- Submarine Route HVDC
- Preliminary HDD Locations
- Preliminary Pipe Bridge Location
- Approximate RR Mileposts
- CP/CSX ROW
- DOT ROW
- Perennial Stream
- Intermittent Stream
- Ditch
- Surface Water
- Wetland
- Town Boundary
- Village Boundary

Geotechnical Borings
- Not Drilled
- As Built

Road Name
TOWN NAME
Village Name

Transmission Developers Inc.

Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

Geotechnical Boring Locations

Catskill - CSX

Sheet 91 of 95

Prepared by: HDR | DTA & TRC 3/12/2013

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

T:\PROJECTS\AUGUSTA\CHPEI\Geotechnical_Boring_Locations_As_Built_11x17.mxd

TEST BORING LOG

PROJECT: TDI CHAMPLAIN HUDSON POWER EXPRESS

LOCATION: CSX RAILROAD ROW, NY

BORING	**B222.9-1**
G.S. ELEV.	N/A
FILE	195651
SHEET	1 OF 1

GROUNDWATER DATA			
FIRST ENCOUNTERED NR			
DEPTH	HOUR	DATE	ELAPSED TIME
10.0'	NR	12/2	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	N/A
DATE STARTED	12/02/2012
DATE COMPLETED	12/02/2012

DEPTH	A	B	C	DESCRIPTION	Wn	REMARKS
	S-1	5 5 9 5		***LIGHT BROWN SILT, SM F/ GRAVEL, TR CLAY, TR F/M SAND*** 2.0		
	S-2	9 10 11 9		***LIGHT BROWN SILT, TR CLAY*** 4.0	29.7	
5	S-3	8 7 11 8			33.0	
	S-4	11 13 19 18			30.8	
▼ 10	S-5	12 12 12 12			33.4	
	S-6	4 5 6		***LIGHT BROWN SILT, SM CLAY***	30.5	
15						
20	S-7	5 6 7				
				23.5		
	S-8	30 50/0.4				
25				***TAN SILT*** 28.5		
	S-9	21 13 22		***GRAY C/ GRAVEL-SIZED ROCK FRAGMENTS*** 30.0		
30				***END OF BORING AT 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

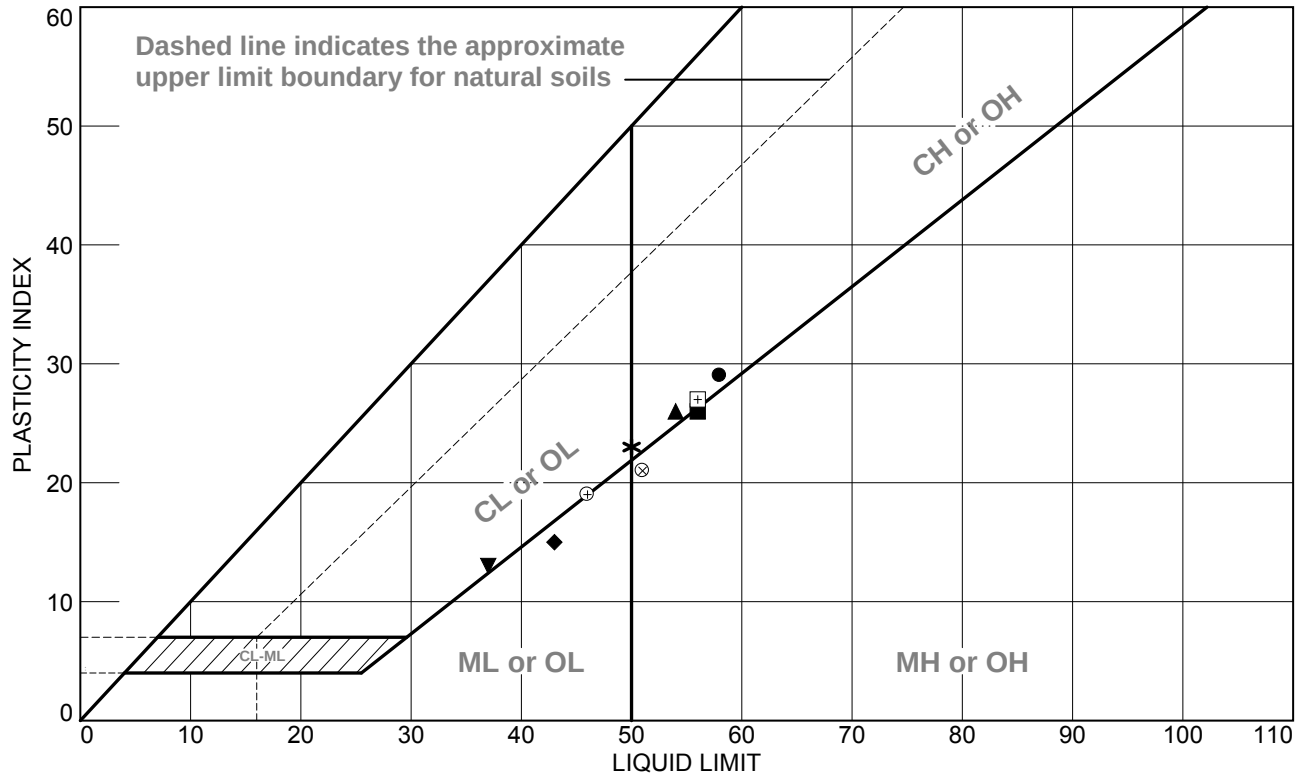
SAMPLE IDENTIFICATION			Soil Group (USCS System)	GRAIN SIZE DISTRIBUTION				PLASTICITY				Specific Gravity	Moisture Content (%)	Unit Weight (pcf)	Compressive Strength (tsf)	Organic Content (%)
Boring #	Sample #	Depth (ft)		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Liquidity Index)					
B222.34-1	S-2	2.0-4.0	-	-	-	-	-	-	-	-	-	-	31.3	-	-	-
	S-4	6.0-8.0	CH	-	-	-	-	58	29	29	0.2	-	35.2	-	-	-
	S-5	8.0-10.0	-	-	-	-	-	-	-	-	-	-	36.2	88.2	-	-
	S-6	13.5-15.0	CH/MH	-	-	-	-	56	30	26	0.2	-	34.8	-	-	-
B222.6-1	S-3	4.0-6.0	SM	0.0	6.6	93.4		-	-	-	-	-	19.6	-	-	-
	S-4	6.0-8.0	-	17.1	18.6	64.3		-	-	-	-	-	30.0	-	-	14.4
	S-5	8.0-10.0														
	R-2	15.6-16.0	-	-	-	-		-	-	-	-	-	-	166.7	665	-
	R-3	22.6-23.0	-	-	-	-		-	-	-	-	-	-	169.0	436	-
B222.9-1	S-2	2.0-4.0	-	-	-	-	-	-	-	-	-	-	29.7	-	-	-
	S-3	4.0-6.0	-	-	-	-	-	-	-	-	-	-	33.0	-	-	-

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-4	6.0-8.0	-	-	-	-	-	-	-	-	-	-	30.8	-	-	-
	S-5	8.0-10.0	CH	-	-	-	-	54	28	26	0.2	-	33.4	89.6	-	-
	S-6	13.5-15.0	-	-	-	-	-	-	-	-	-	-	30.5	94.4	-	-
B223.4-1	S-1	0.0-2.0	-	45.4	17.9	36.7		-	-	-	-	-	18.9	-	-	-
	S-2	2.0-4.0														
	S-3	4.0-6.0	-	-	-	-	-	-	-	-	-	-	37.6	-	-	-
	S-4	6.0-8.0	-	4.6		3.4	92.0	-	-	-	-	2.79	35.5	-	-	-
	S-5	8.0-10.0	-	-	-	-	-	-	-	-	-	-	30.5	-	-	-
	S-6	13.5-15.0	-	-	-	-	-	-	-	-	-	-	34.3	89.5	-	-
	S-7	18.5-20.0	ML	-	-	-	-	43	28	15	0.2	-	31.6	-	-	-
A224.0-1	S-1	0.0-2.0	-	-	-	-	-	-	-	-	-	-	3.1	-	-	-

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B222.34-1	S-4	6.0-8.0 FT	35.2	29	58	29	CH
■	B222.34-1	S-6	13.5-15.0 FT	34.8	30	56	26	CH/MH
▲	B222.9-1	S-5	8.0-10.0 FT	33.4	28	54	26	CH
◆	B223.4-1	S-7	18.5-20.0 FT	31.6	28	43	15	ML
▼	B224.8-1	S-8 & S-9	23.5-30.0 FT	33.3	24	37	13	CL
✱	B226.1-1	S-6	13.5-15.0 FT	36.9	27	50	23	CH
⊕	B226.1-1	S-8	23.5-25.0 FT	39.0	27	46	19	CL
⊞	B226.6-1	S-3 & S-4	4.0-8.0 FT	38.8	29	56	27	CH
⊗	B226.6-1	S-6 & S-7	13.5-20.0 FT	53.7	30	51	21	MH

TRC
Engineers, Inc.
Mt. Laurel, NJ

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

Project No.: 195651 **Figure** 9

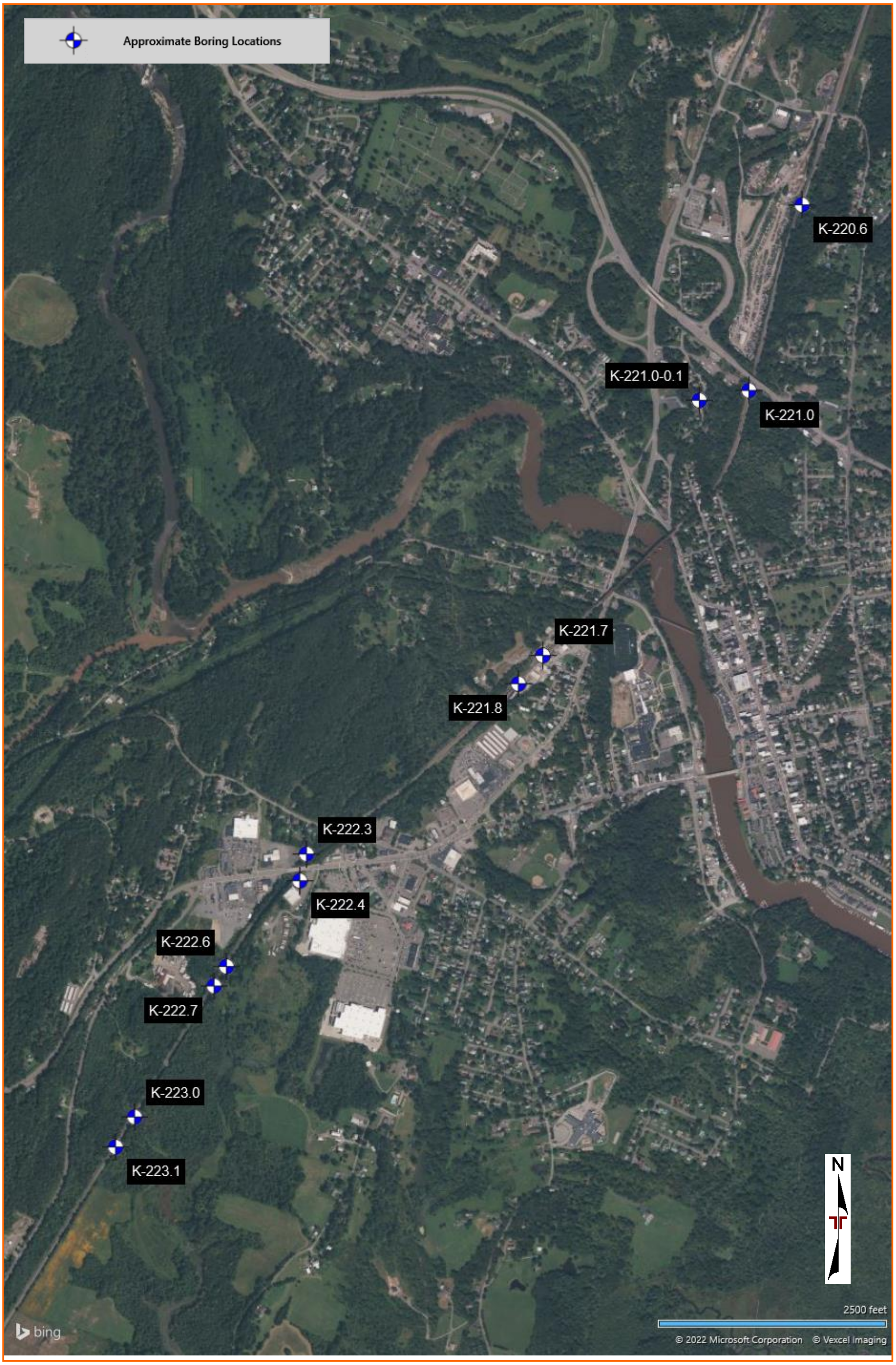


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

AERIAL PHOTOGRAPHY PROVIDED BY MICROSOFT BING MAPS

BORING LOG NO. K-223.0

PROJECT: Champlain-Hudson Power Express Package 7a

CLIENT: Kiewit Engineering (NY) Corp.

SITE: Champlain to Hudson HDD Crossings
Catskill, NY

LOCATION See Exploration Plan

Latitude: 42.206914° Longitude: -73.890911°

Surface Elev.: 118.72 (Ft.)

DEPTH	ELEVATION (Ft.)	Description
		FILL - SOILS REMOVED VIA VACUUM EXTRACTION
6.5	112	
		FILL - SILT AND CLAY, with gravel, gray and brown, medium stiff to stiff
10.0	108.5	
		FILL - SANDY LEAN CLAY, gray and brown, soft
15.0	103.5	
		FILL - SILT AND CLAY, gray and brown, medium stiff
25.0	93.5	

DEPTH (Ft.)	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
5						
		5	5-6-4 N=10			
		2	4-3-3-5 N=6			
10		8	3-2-2-3 N=4	34.0	43-23-20	59
15		12	2-2-3-5 N=5			
20		16	WOH-2-5-6 N=7			
25						

Stratification lines are approximate. In-situ, the transition may be gradual.
Rock core taken from offset boring due to broken core barell. Coring terminated at 39' with approval from Jaren with Kiewit after pictures of rock core were seent to him.

Hammer Type: Automatic

Advancement Method:
4 1/4 HSA

Abandonment Method:
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 LC
Hammer Efficiency Summary:
Energy Transfer Ratio: 89.2% +/-2.4%
Hammer Efficiency Correction (CE):1.49
WOH = Weight of Hammer

WATER LEVEL OBSERVATIONS

No measurable groundwater prior to grouting

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 03-25-2022 | Boring Completed: 03-28-2022

Drill Rig: Diedrich D-70 | Driller: J. Raushcer

Project No.: JB215256D

BORING LOG NO. K-223.0

PROJECT: Champlain-Hudson Power Express Package 7a

CLIENT: Kiewit Engineering (NY) Corp.

SITE: Champlain to Hudson HDD Crossings
Catskill, NY

LOCATION See Exploration Plan

Latitude: 42.206914° Longitude: -73.890911°

Surface Elev.: 118.72 (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
	FILL - LEAN CLAY WITH SAND, gray and brown, stiff				22	2-6-6-7 N=12	33.4	46-26-20	85
30.0	88.5	30							
	FILL - SILTY SAND WITH GRAVEL, brown, medium dense				18	11-8-10-15 N=18			
32.0	86.5								
	WEATHERED ROCK, gray								
34.0	84.5								
35.0	**GRAYWACKE**, highly weathered, very close fractured, very poor RQD, gray 83.5	35				REC = 33% RQD = 0%			
	GRAYWACKE, moderately weathered, with highly weathered veins, very close to moderate fractured, fair RQD, gray					REC = 92% RQD = 69%			
39.0	79.5								
	Boring Terminated at 39 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.
Rock core taken from offset boring due to broken core barell. Coring terminated at 39' with approval from Jaren with Kiewit after pictures of rock core were seent to him.

Hammer Type: Automatic

Advancement Method:
4 1/4 HSA

Abandonment Method:
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 LC
Hammer Efficiency Summary:
Energy Transfer Ratio: 89.2% +/-2.4%
Hammer Efficiency Correction (CE):1.49
WOH = Weight of Hammer

WATER LEVEL OBSERVATIONS

No measurable groundwater prior to grouting

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 03-25-2022 | Boring Completed: 03-28-2022

Drill Rig: Diedrich D-70 | Driller: J. Raushcer

Project No.: JB215256D

BORING LOG NO. K-223.1

PROJECT: Champlain-Hudson Power Express Package 7a

CLIENT: Kiewit Engineering (NY) Corp.

SITE: Champlain to Hudson HDD Crossings
Catskill, NY

LOCATION See Exploration Plan

Latitude: 42.206011° Longitude: -73.891683°

Surface Elev.: 123.08 (Ft.)

DEPTH	ELEVATION (Ft.)	Description	DEPTH (Ft.)	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		FILL - SOILS REMOVED VIA VACUUM EXTRACTION							
6.0	117								
		FILL - SILT AND CLAY, brown, medium stiff			16	2-3-3-5 N=6			
					0	4-8-4-9 N=12			
10.0	113	no recovery, pushed cobble during sampling from 8'-10'							
		SILT AND CLAY (CL-ML), brown, stiff			16	2-5-6-7 N=11			
15.0	108								
		LEAN CLAY WITH SAND (CL), brown, stiff			16	3-5-6-6 N=11	33.5	45-25-20	71
20.0	103								
		LEAN CLAY (CL), gray, soft			18	2-1-2-3 N=3			

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

Hammer Type: Automatic

Advancement Method:
4 1/4 HSA

Abandonment Method:
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 Efficiency Summary:
Energy Transfer Ratio: 77.4% +/-2.7%
Hammer Efficiency Correction (CE):1.29

WATER LEVEL OBSERVATIONS

No measurable groundwater prior to grouting

Terracon
30 Corporate Cir Ste 201
Albany, NY

Boring Started: 03-29-2022 | Boring Completed: 03-29-2022

Drill Rig: CME 550 | Driller: B. Duffy

Project No.: JB215256D

BORING LOG NO. K-223.1

PROJECT: Champlain-Hudson Power Express Package 7a

CLIENT: Kiewit Engineering (NY) Corp.

SITE: Champlain to Hudson HDD Crossings
Catskill, NY

LOCATION See Exploration Plan

Latitude: 42.206011° Longitude: -73.891683°

Surface Elev.: 123.08 (Ft.)

DEPTH	ELEVATION (Ft.)	DESCRIPTION	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		LEAN CLAY (CL), gray, soft *(continued)*								
						16	2-1-2-3 N=3			
			30			24	1-2-1-2 N=3	33.9	33-20-13	98
35.0	88	**WEATHERED ROCK**, gray, very dense	35				50/1"			
40.1	83	***Boring Terminated at 40.1 Feet***	40				50/1"			

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

Hammer Type: Automatic

Advancement Method:
4 1/4 HSA

Abandonment Method:
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 Efficiency Summary:
Energy Transfer Ratio: 77.4% +/-2.7%
Hammer Efficiency Correction (CE):1.29

WATER LEVEL OBSERVATIONS

No measurable groundwater prior to grouting

Terracon
30 Corporate Cir Ste 201
Albany, NY

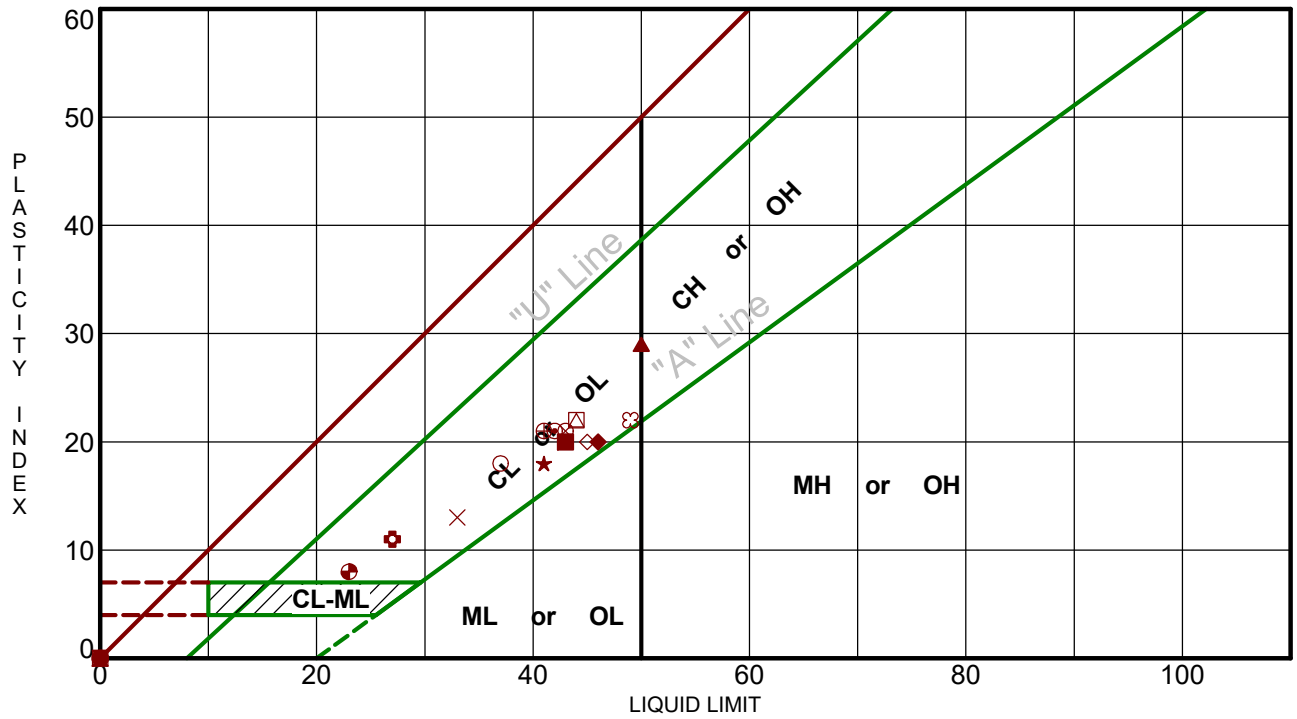
Boring Started: 03-29-2022 | Boring Completed: 03-29-2022

Drill Rig: CME 550 | Driller: B. Duffy

Project No.: JB215256D

ATTERBERG LIMITS RESULTS

ASTM D4318



Boring ID		Depth (Ft)	LL	PL	PI	Fines	USCS	Description
●	K-220.6	6 - 8	NP	NP	NP	22.1	GM	SILTY GRAVEL with SAND
⊠	K-220.6	13 - 15	NP	NP	NP	11.9	SW-SM	WELL-GRADED SAND with SILT and GRAVEL
▲	K-221.0	8 - 10	50	21	29	73.4	CH	FAT CLAY with SAND
★	K-221.0	23 - 25	41	23	18	89.8	CL	LEAN CLAY
⊙	K-221.7	10 - 12	42	21	21	93.6	CL	LEAN CLAY
✿	K-221.7	33 - 35	27	16	11	58.8	CL	SANDY LEAN CLAY
○	K-221.8	8 - 10	37	19	18	91.3	CL	LEAN CLAY
△	K-221.8	35 - 37	44	22	22	79.7	CL	LEAN CLAY with SAND
⊗	K-222.3	6 - 8	43	22	21	59.8	CL	SANDY LEAN CLAY
⊕	K-222.3	10 - 12	41	20	21	69.6	CL	SANDY LEAN CLAY
□	K-222.4	10 - 12	44	22	22	87.3	CL	LEAN CLAY
⊛	K-222.6	15 - 17	NP	NP	NP	6.5	GW-GM	WELL-GRADED GRAVEL with SILT and SAND
◕	K-222.6	35 - 37	23	15	8	86.7	CL	LEAN CLAY
☆	K-222.7	10 - 12	NP	NP	NP	25.3	GM	SILTY GRAVEL with SAND
❀	K-222.7	25 - 27	49	27	22	76.3	CL	LEAN CLAY with SAND
■	K-223.0	10 - 12	43	23	20	58.5	CL	SANDY LEAN CLAY
◆	K-223.0	25 - 27	46	26	20	84.9	CL	LEAN CLAY with SAND
◇	K-223.1	15 - 17	45	25	20	71.3	CL	LEAN CLAY with SAND
×	K-223.1	29 - 31	33	20	13	98.3	CL	LEAN CLAY

PROJECT: Champlain-Hudson Power Express
Package 7a

SITE: Champlain to Hudson HDD Crossings
Catskill, NY

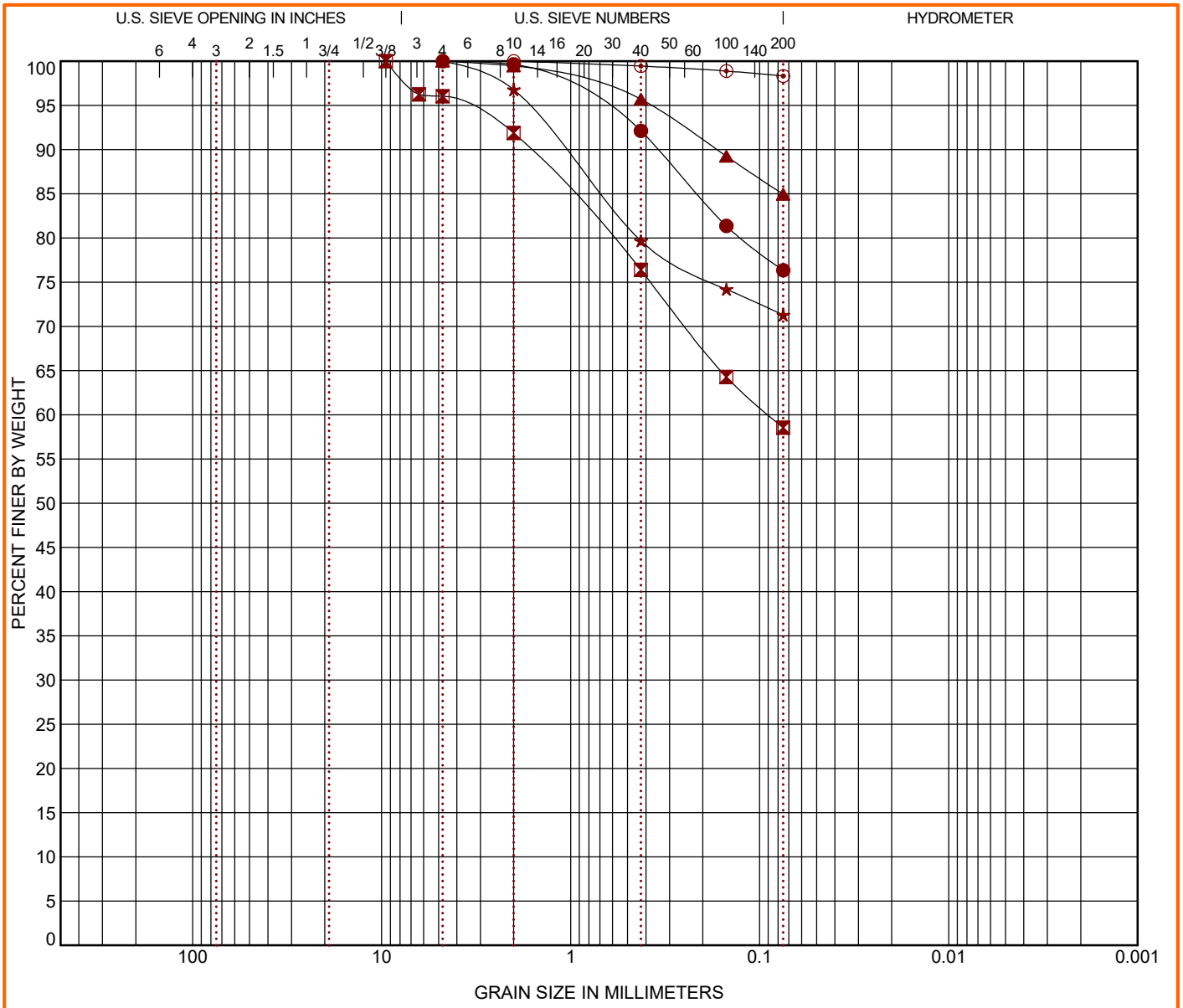
Terracon
30 Corporate Cir Ste 201
Albany, NY

PROJECT NUMBER: JB215256D

CLIENT: Kiewit Engineering (NY) Corp.

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-222.7	25 - 27	LEAN CLAY with SAND (CL)	34.3	49	27	22		
⊠	K-223.0	10 - 12	SANDY LEAN CLAY (CL)	34.0	43	23	20		
▲	K-223.0	25 - 27	LEAN CLAY with SAND (CL)	33.4	46	26	20		
★	K-223.1	15 - 17	LEAN CLAY with SAND (CL)	33.5	45	25	20		
⊙	K-223.1	29 - 31	LEAN CLAY (CL)	33.9	33	20	13		

Boring ID		Depth (Ft)	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
●	K-222.7	25 - 27	4.75				0.0	0.0	23.7		76.3	
⊠	K-223.0	10 - 12	9.5	0.09			0.0	4.0	37.5		58.5	
▲	K-223.0	25 - 27	4.75				0.0	0.0	15.1		84.9	
★	K-223.1	15 - 17	4.75				0.0	0.0	28.7		71.3	
⊙	K-223.1	29 - 31	2				0.0	0.0	1.7		98.3	

PROJECT: Champlain-Hudson Power Express Package 7a

SITE: Champlain to Hudson HDD Crossings Catskill, NY

Terracon
30 Corporate Cir Ste 201
Albany, NY

PROJECT NUMBER: JB215256D

CLIENT: Kiewit Engineering (NY) Corp.

Summary of Laboratory Results

BORING ID	Depth (Ft.)	Organic Content (%)
K-221.0-0.1	2-4	1.2
K-223.0	6.5-8	1.4

PROJECT: Champlain-Hudson Power Express Package 7a

SITE: Champlain to Hudson HDD Crossings Catskill, NY

Terracon
30 Corporate Cir Ste 201
Albany, NY

PROJECT NUMBER: JB215256D

CLIENT: Kiewit Engineering (NY) Corp.

Client

Kiewit Engineering (NY) Corp
Lone Tree, CO

Project

Champlain-Hudson Power Express Project
JB215256

Date Received: 4/25/2022

Results from Corrosion Testing

Sample Location	K-221.0-0.1	K-223.0
Sample Depth (ft.)	4'-6'	8'-10'
pH Analysis, ASTM G 51	6.93	8.19
Water Soluble Sulfate (SO4), ASTM C 1580 (ppm)	5	10
Sulfides, AWWA 4500-S D, (mg/kg)	Nil	Nil
Chlorides, ASTM D 512, (ppm)	42	19
Red-Ox, ASTM G 200, (mV)	+465	+444
Total Salts, AWWA 2520 B, (mg/kg)	560	358
Resistivity (Saturated), ASTM G 57, (ohm-cm)	3690	8560

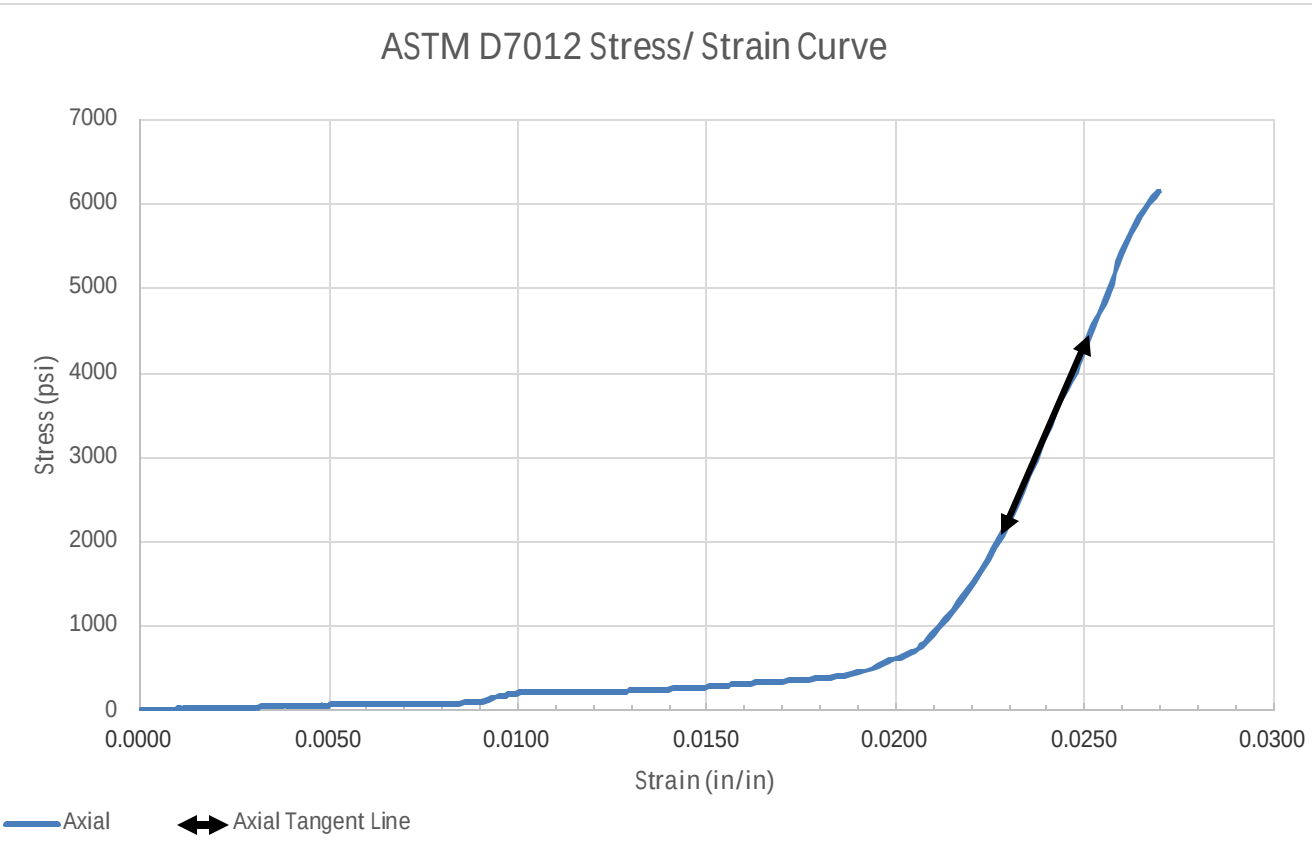
Analyzed By: Kyle Lemcke
Laboratory Supervisor

Rock Core D7012 Method C

Client
Kiewit Engineering Corp

Project
Champlain-Hudson Power Express Project

Project No. JB215256



SAMPLE LOCATION

Site:	Kiewit Engineering Corp.		
Description:	GRAYWACKE		
Boring:	K-223.0	Depth (feet):	35-39

SPECIMEN INFORMATION

Sample No.:	Lab: 5070	Mass (g):	562.22
Length (in.):	4.1	Diameter (in.):	1.98
L/D Ratio:	2.071	Density (pcf):	169.660

TEST RESULTS

Failure Load (lbs):	18930
Failure Strain (in/in):	0.028
Unconfined Compressive Strength (psi):	6,148
Elastic Modulus, E, (ksi):	1018
Time of Failure (min):	03:13
Rate of Loading (in/sec):	0.04
Moisture Content Post-break:	0.73%

Rock Core D7012 Method C

Client
Kiewit Engineering Corp

Project
Champlain-Hudson Power Express Project

Project No. JB215256

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.

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.

Package 7A Phase 3 Borings

Champlain Hudson Power Express

New York

PROJECT NUMBER 20001480

CREATED BY Kiewit

DATE 12/08/2022

Legend Key

- Kiewit Borings (Phase 3)

EXPLORATORY BORING LOG

Champlain Hudson Power Express

New York

BORING NO: KB-223.1A

PROJECT NUMBER	20001480	**LOGGED BY**	A. McCart	**COORDINATES**	N 1229202.46 E 657065.28
START DATE	09/08/2022	**DRILLER/RIG**	M. Eaves / CME-850	**GROUND ELEV.**	114.7 ft
FINISH DATE	09/12/2022	**DRILL CONTRACTOR**	Parratt Wolff	**HAMMER TYPE/EFF.**	Automatic

Depth (ft)	Elevation (ft)	Material Description	Sample Type	Core Run No.	Recovery % RQD	Pocket Pen. (tsf)	Blow Counts (N Value)	Notes
0	114.4	4" Topsoil FAT CLAY (CH), light brown with gray mottling, soft to very stiff, moist			62%		1-3-3-3 (6)	Boring advanced with 4.25" ID HSA
					71%		3-5-7-8 (12)	
5		Dark brown, soft clay seam at 4.5 - 4.6 ft			84%		1-3-5-7 (8)	
					100%		8-9-10-14 (19)	
					100%		3-3-6-6 (9)	
10					100%		0-2-4-6 (6)	
15					92%		3-3-5-7 (8)	
20					100%		0-1-2-4 (3)	
25	89.2	SILT (MH), gray, firm to soft, moist, high plasticity			100%		2-3-3-7 (6)	
30								

Legend

- SPT N Value
- MC (%)
- PL & LL (%)
- Fines Content (%)

20 40 60 80

EXPLORATORY BORING LOG

Champlain Hudson Power Express

New York

BORING NO: KB-223.1A

PROJECT NUMBER	20001480	**LOGGED BY**	A. McCart	**COORDINATES**	N 1229202.46 E 657065.28
START DATE	09/08/2022	**DRILLER/RIG**	M. Eaves / CME-850	**GROUND ELEV.**	114.7 ft
FINISH DATE	09/12/2022	**DRILL CONTRACTOR**	Parratt Wolff	**HAMMER TYPE/EFF.**	Automatic

Depth (ft)	Elevation (ft)	Material Description	Sample Type	Core Run No.	Recovery % RQD	Pocket Pen. (tsf)	Blow Counts (N Value)	Notes
		SILT (MH), gray, firm to soft, moist, high plasticity Softer with depth			100%		1-2-1-3 (3)	
35					100%		0-0-2-2 (2)	
40					100%		0-0-2-2 (2)	
45	69.7	LEAN CLAY with Sand (CL), gray, stiff, fine to coarse, wet			92%		0-0-4-12 (4)	
	67.7	Weathered rock, gravel sized pieces in end of spoon						
50					100%		50/2"	
55					100%		50/3"	
	57.2	Graywacke, gray, very closely to moderately spaced discontinuities, unweathered Vertical fracture at 58.7 - 59.3 ft						
60								

Legend

- SPT N Value
- MC (%)
- PL & LL (%)
- Fines Content (%)

20 40 60 80

EXPLORATORY BORING LOG

Champlain Hudson Power Express

New York

BORING NO: KB-223.1A

PROJECT NUMBER	20001480	**LOGGED BY**	A. McCart	**COORDINATES**	N 1229202.46 E 657065.28
START DATE	09/08/2022	**DRILLER/RIG**	M. Eaves / CME-850	**GROUND ELEV.**	114.7 ft
FINISH DATE	09/12/2022	**DRILL CONTRACTOR**	Parratt Wolff	**HAMMER TYPE/EFF.**	Automatic

Depth (ft)	Elevation (ft)	Graphic Log	Material Description	Sample Type	Core Run No.	Recovery % / RQD	Pocket Pen. (tsf)	Blow Counts (N Value)	Notes
65			Graywacke, gray, very closely to moderately spaced discontinuities, unweathered		1	97% 83			UCS = 7441 psi
			Frequent vertical fractures below 63.5 ft		2	83% 44			
			Interbedded with shale and trace calcite veins at 65.5 - 71.5 ft		3	83% 83			
70					4	68% 43			
			Occasional calcite veins, no fractures or joints, widely spaced discontinuities at 73 - 77 ft		5	79% 72			
75					6	100% 94			
80			Interbedded with shale at 80 - 82 ft						
			Occasional calcite veins, dark gray to gray below 82 ft		7	100% 70			
85	29.7		Boring Terminated at 85 ft						
90									

Legend

▲ SPT N Value
● MC (%)
— PL & LL (%)
⊠ Fines Content (%)

20 40 60 80

Champlain Hudson Power Express
Kiewit Engineering (NY) Corp.

KB-223.1A - Runs 1 through 5

KB-223.1A - Runs 6 through 7

Summary of Laboratory Results

BORING ID	Depth (Ft.)	Water Content (%)
KB-222.6A	15-17	1.2
KB-222.6A	35-37	35.8
KB-222.6A	50-52	41.7
KB-222.6A	65-67	38.4
KB-223.1A	6-8	31.3
KB-223.1A	25-27	39.6
KB-223.1A	45-47	22.0
KB-226.1	6-8	33.3
KB-226.1	20-22	37.7
KB-226.8A	4-6	35.5
KB-226.8A	20-22	37.4
KB-226.8A	38-40	46.7

PROJECT: LAB Testing

SITE: Champlain- Hudson Power Express

Terracon
30 Corporate Cir Ste 201
Albany, NY

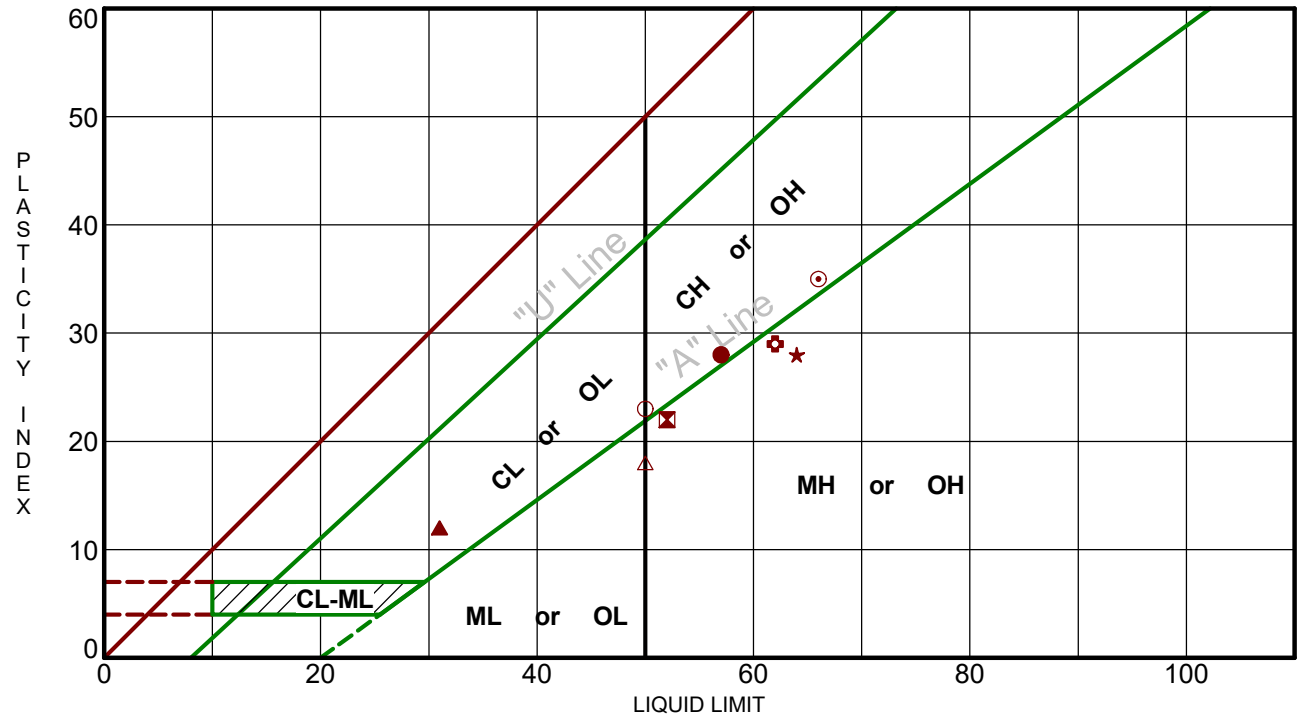
PROJECT NUMBER: JB215256H

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

EXHIBIT: B-2

ATTERBERG LIMITS RESULTS

ASTM D4318



Boring ID	Depth (Ft)	LL	PL	PI	Fines	USCS	Description
● KB-223.1A	6 - 8	57	29	28	93.6	CH	FAT CLAY
⊠ KB-223.1A	25 - 27	52	30	22	96.6	MH	ELASTIC SILT
▲ KB-223.1A	45 - 47	31	19	12	56.8	CL	SANDY LEAN CLAY
★ KB-226.1	6 - 8	64	36	28	75.0	MH	ELASTIC SILT with SAND
⊙ KB-226.1	20 - 22	66	31	35	82.9	CH	FAT CLAY with SAND
✿ KB-226.8A	4 - 6	62	33	29	100.0	MH	ELASTIC SILT
○ KB-226.8A	20 - 22	50	27	23	100.0	CH	FAT CLAY
△ KB-226.8A	38 - 40	50	32	18	100.0	MH	ELASTIC SILT

PROJECT: LAB Testing

SITE: Champlain- Hudson Power Express

Terracon
30 Corporate Cir Ste 201
Albany, NY

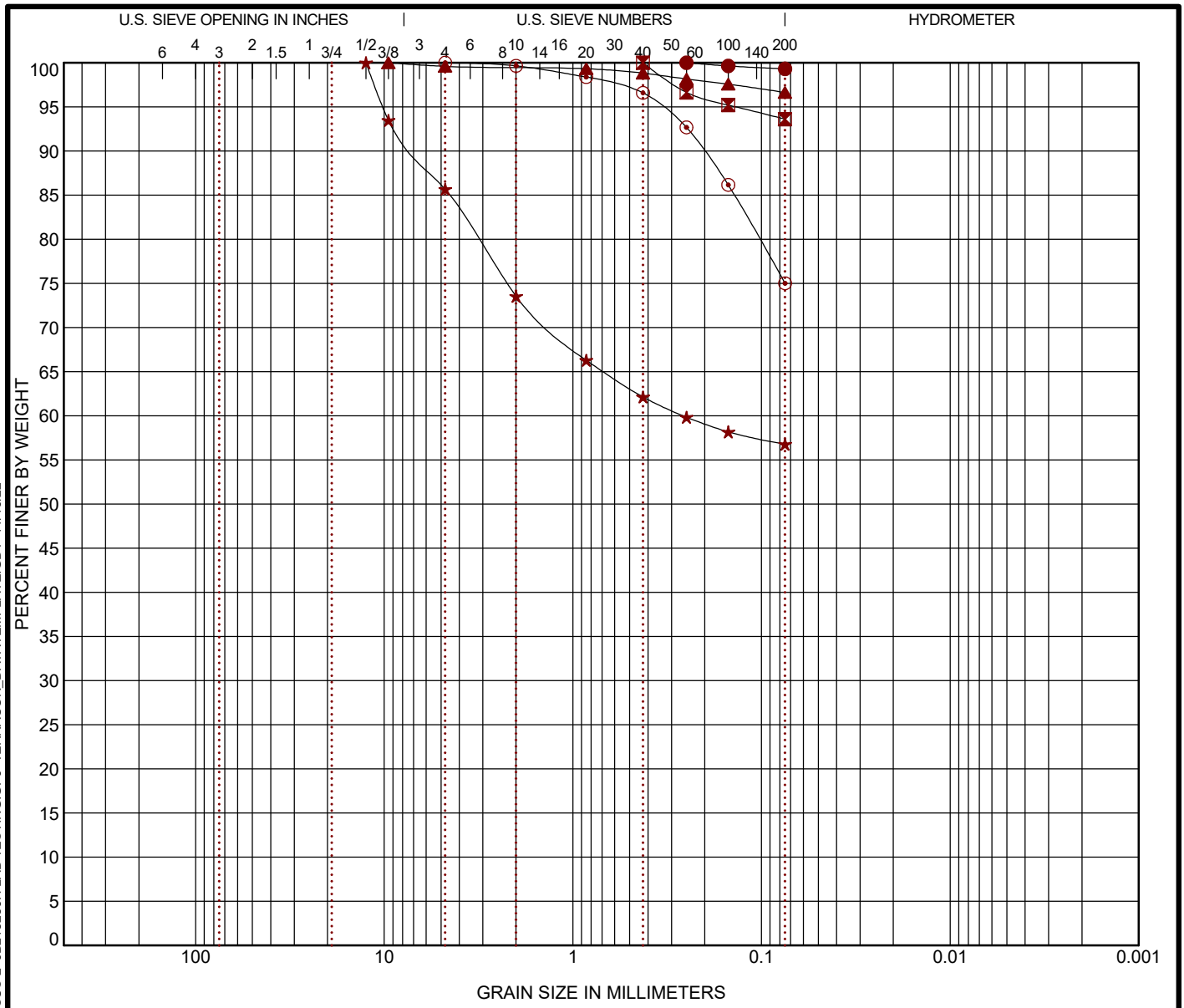
PROJECT NUMBER: JB215256H

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

EXHIBIT: B-3

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



Boring ID	Depth (Ft)	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
● KB-222.6A	65 - 67	SILT (ML)	38.4	43	28	15		
⊠ KB-223.1A	6 - 8	FAT CLAY (CH)	31.3	57	29	28		
▲ KB-223.1A	25 - 27	ELASTIC SILT (MH)	39.6	52	30	22		
★ KB-223.1A	45 - 47	SANDY LEAN CLAY (CL)	22.0	31	19	12		
⊙ KB-226.1	6 - 8	ELASTIC SILT with SAND (MH)	33.3	64	36	28		

Boring ID	Depth (Ft)	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
● KB-222.6A	65 - 67	0.25				0.0	0.0	0.7		99.3	
⊠ KB-223.1A	6 - 8	0.425				0.0	0.0	6.4		93.6	
▲ KB-223.1A	25 - 27	9.5				0.0	0.4	3.0		96.6	
★ KB-223.1A	45 - 47	12.5	0.259			0.0	14.3	28.9		56.8	
⊙ KB-226.1	6 - 8	4.75				0.0	0.0	25.0		75.0	

PROJECT: LAB Testing

SITE: Champlain- Hudson Power Express

Terracon
30 Corporate Cir Ste 201
Albany, NY

PROJECT NUMBER: JB215256H

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

EXHIBIT: B-10

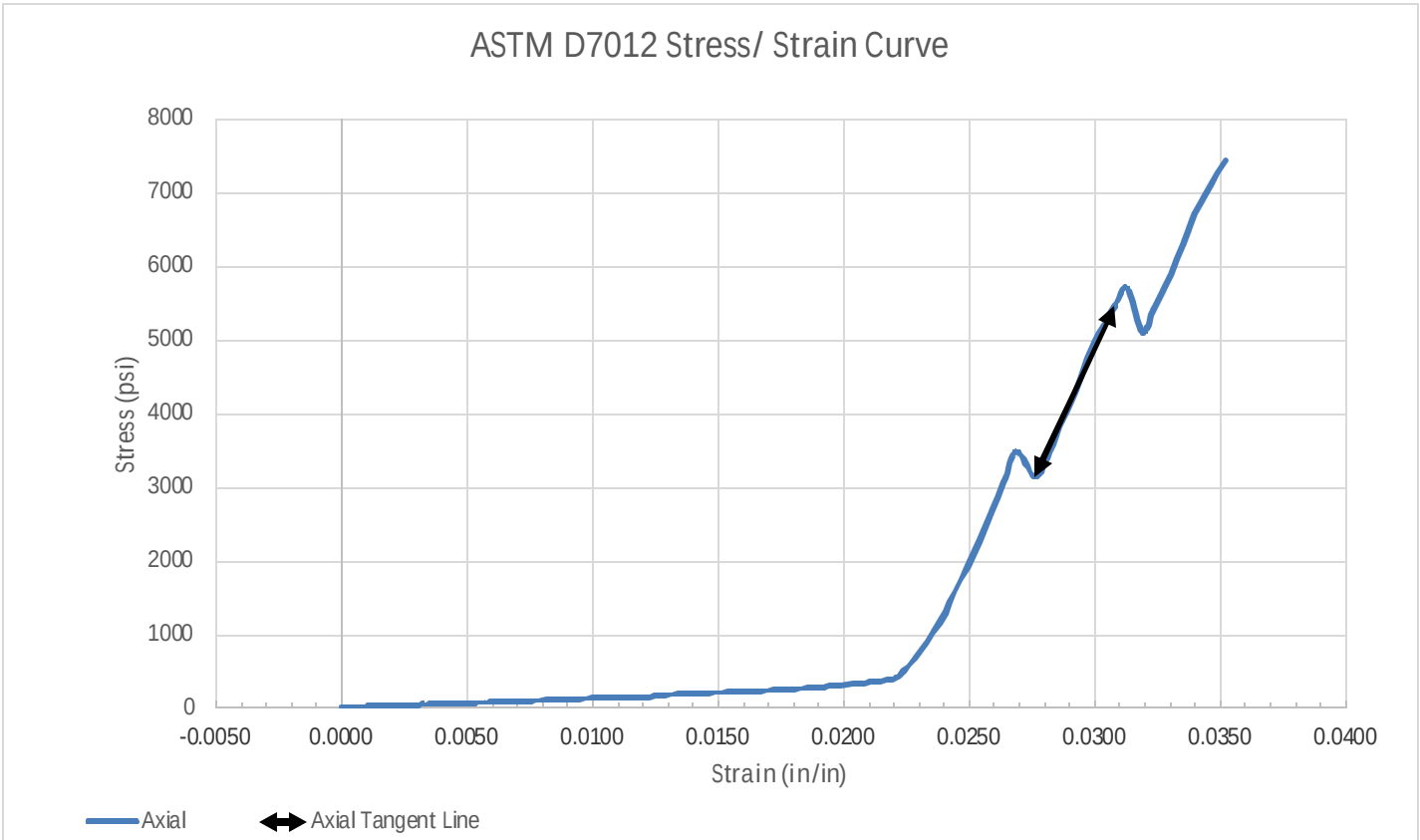
LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS-2 JB215256H LAB TESTING.GPJ TERRACON_DATATEMPLATE.GDT 11/16/22

Rock Core D7012 Method C

Client
Kiewit Engineering (NY) Corp

Project
LAB Testing

Project No. JB215256H



SAMPLE LOCATION

Site:	LAB Testing		
Description:	Greywacke, Broke along Calcite vein		
Boring:	KB-223.1A	Depth (feet):	62.5-65.5

SPECIMEN INFORMATION

Sample No.:	RC2	Mass (g):	561.63
Length (in.):	4.1	Diameter (in.):	1.97
L/D Ratio:	2.08	Density (pcf):	171.21

TEST RESULTS

Failure Load (lbs):	22679
Failure Strain (in/in):	0.037
Unconfined Compressive Strength (psi):	7,441
Elastic Modulus, E, (ksi):	726
Time of Failure (min):	03:14
Rate of Loading (in/sec):	0.04
Moisture Content Post-break:	0.34%

Rock Core D7012 Method C

Client	Project
Kiewit Engineering (NY) Corp	LAB Testing

Project No. JB215256H

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.

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.

Kiewit

MEMORANDUM

DATE: December 16, 2022

TO: Zachary Bauer; Tetra Tech Rooney

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

SUBJECT: Geotechnical Data: Segment 11 – Package 7A – HDD Crossing 122 – Revision 1
Champlain Hudson Power Express Project
Catskill, 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 Catskill, New York. The approximate station for the start of HDD crossing number 122 is STA 70341+50 (42.1673° N, 73.9160° W).

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

- TRC, Geotechnical Data Report, Champlain Hudson Power Express, Canadian Pacific Railway Borings MP 177.6-228.2, dated March 15, 2013.
- Kiewit Engineering (NY) Corp., Segment 11 Package 7A HDD Borings - Catskill, Champlain-Hudson Power Express, dated May 9, 2022.
- Kiewit Engineering (NY) Corp., Package 7A Phase 3 Borings, Champlain Hudson Power Express, New York, dated December 8, 2022.

Contact us if you have questions or require additional information.

HDD 122
Borings B226.1-1, B226.2-1,
K-226.2A, K-226.2B, KB-226.1
Segment 11 - Design Package 7A

CHPE Segment 11 - Package 7A
HDD Soil Boring Coordinates and Elevations

Firm	Boring	Northing (feet)	Easting (feet)	Ground Surface Elevation (feet)
TRC*	B221.0-1	1237452.6	663787.2	99.6
	B221.2-1	1236173.4	663261.8	115.0
	B221.4-1	1235622.5	662622.3	22.4
	B221.5-1	1235006.9	662058.8	95.5
	B221.6-1	1234675.8	661633.8	98.3
	B221.8-1	1234265.3	661277.2	99.4
	B222.34-1	1232191.5	659098.9	133.5
	B222.6-1	1231252.6	658182.3	113.7
	B222.9-1	1229751.0	657274.3	121.4
	B225.8-1	1215861.0	650622.7	91.0
	B226.1-1	1214654.4	650328.3	105.9
	B226.2-1	1214120.5	650254.4	108.5
	B226.6-1	1211894.7	649689.7	112.1
AECOM**	CU-1	1237028.6	663123.9	19.7
	CU-2	1236042.7	662897.0	24.8
	CU-2A	1235325.9	662268.9	38.1
	CU-5A	1210523.7	649411.8	118.4
	SC-5	1239310.3	664321.6	110.2
	SC-6	1237781.0	663919.8	101.6

Notes:

- Northings and Eastings are provided in NAD83 New York State Plane East Zone.
- Elevations are referenced to the NAVD88 datum.

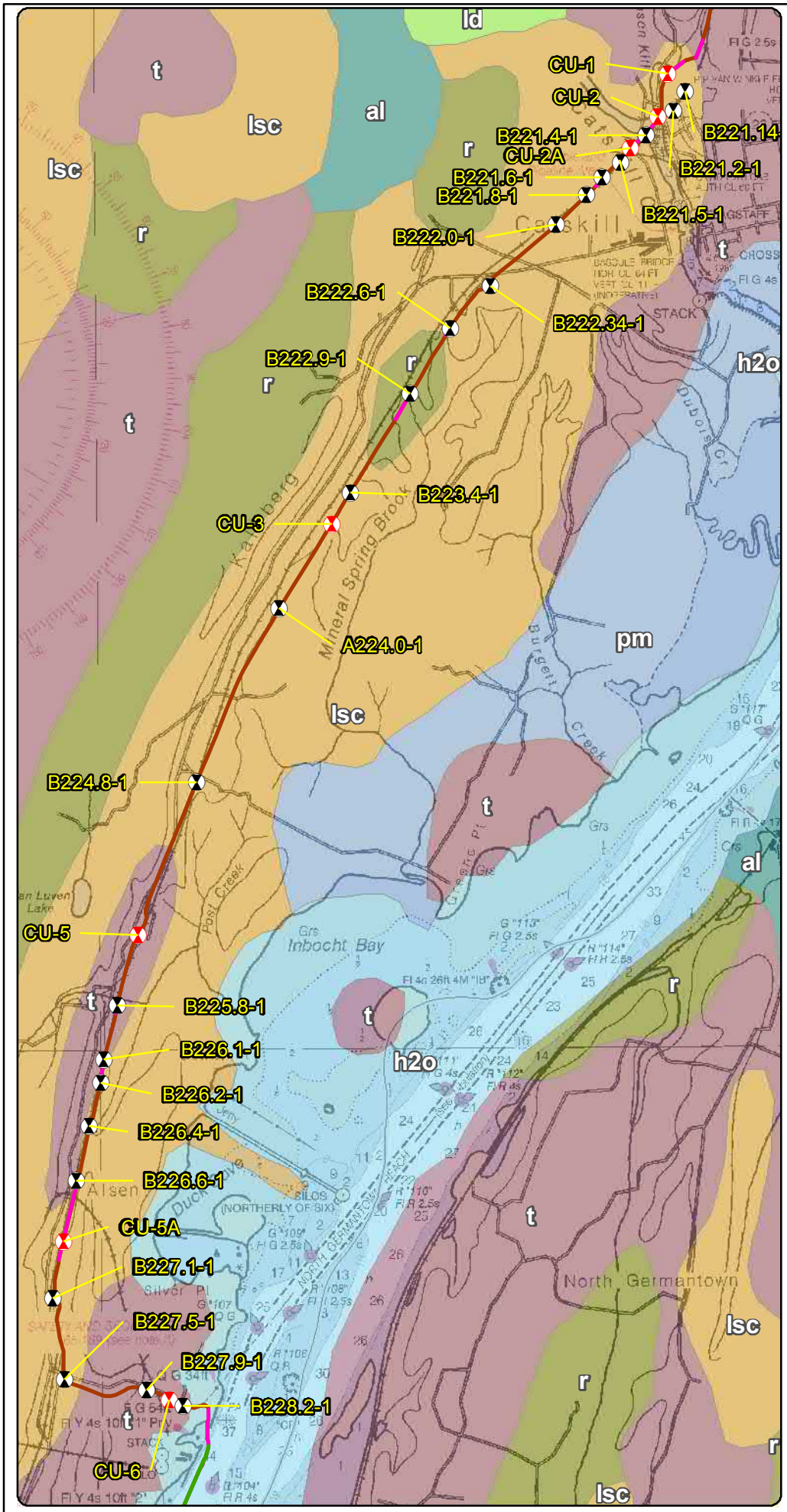
* TRC boring coordinates as shown in Table 1-6 in AECOM report (reference below). Boring elevations estimated from November 2021 topographic survey by Williams Aerial.

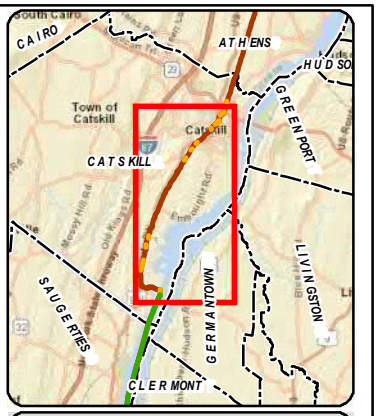
** AECOM boring coordinates and elevations as shown in Table 1-6 in AECOM report.

*** 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
- h2o - Water
- ld - Lacustrine delta
- lsc - Lacustrine silt and clay
- pm - Swamp deposits
- r - Bedrock
- t - Till

N

0.3 0.15 0 0.3 Miles

Transmission

Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

Surficial Geology and Geotechnical Borings Catskill to Upland Figure 3-11

Prepared on 5/3/2021

by: AECOM

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

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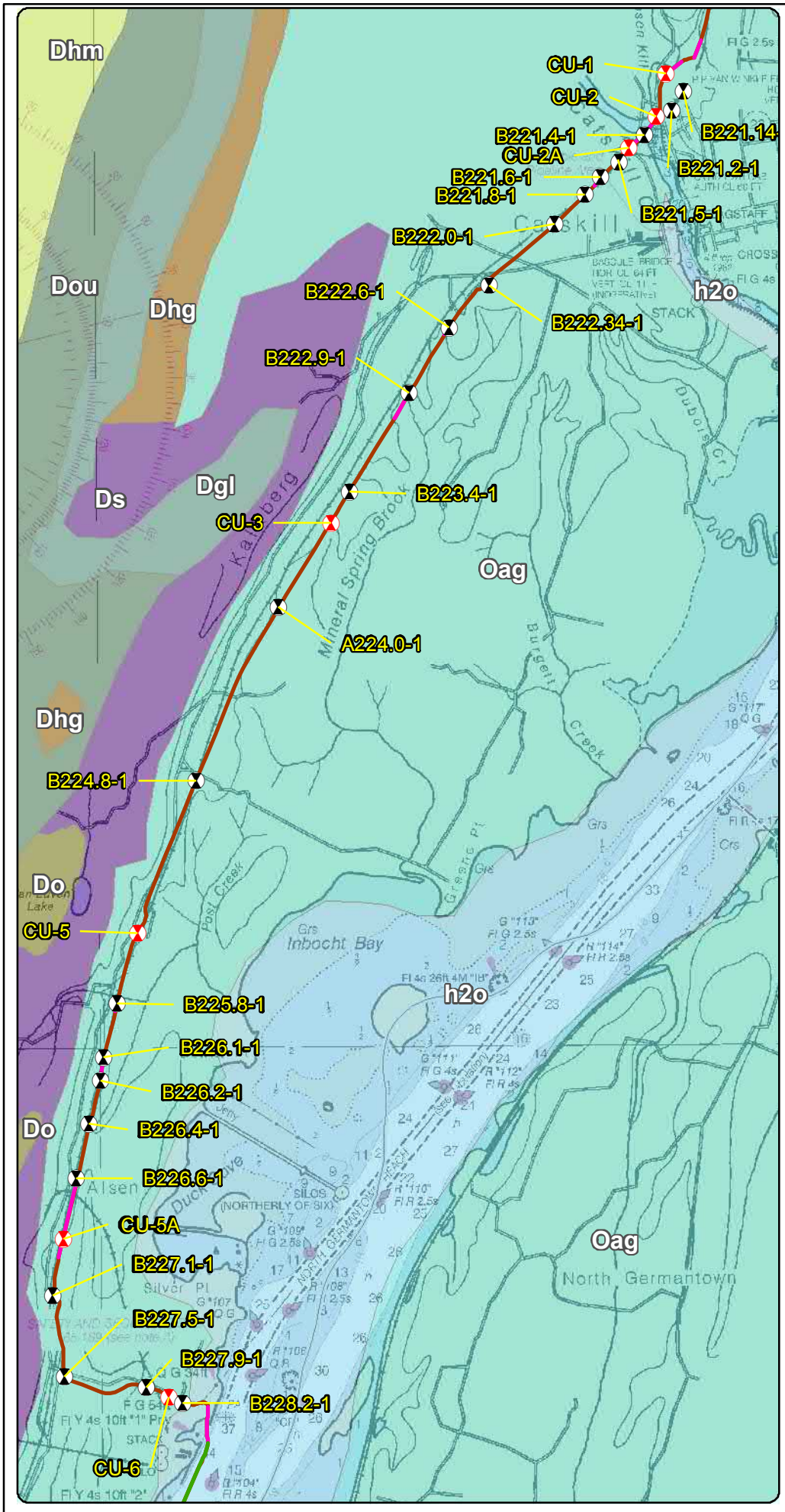

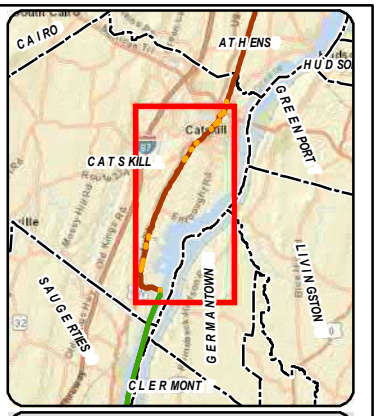

LEGEND

- 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
- Do - Oriskany Sandstone
- Dou - Onondaga Limestone
- Ds - Cashaqua Shale
- Oag - Austin Glen Form (graywacke, shale)
- h2o - Water

N

0.3 0.15 0 0.3 Miles

Transmission Developers Inc.

Champlain Hudson Power Express Project

Champlain Hudson Power Express Inc.

Bedrock Geology and Geotechnical Borings Catskill to Upland Figure 4-11

Prepared on 5/18/2021

by: AECOM

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

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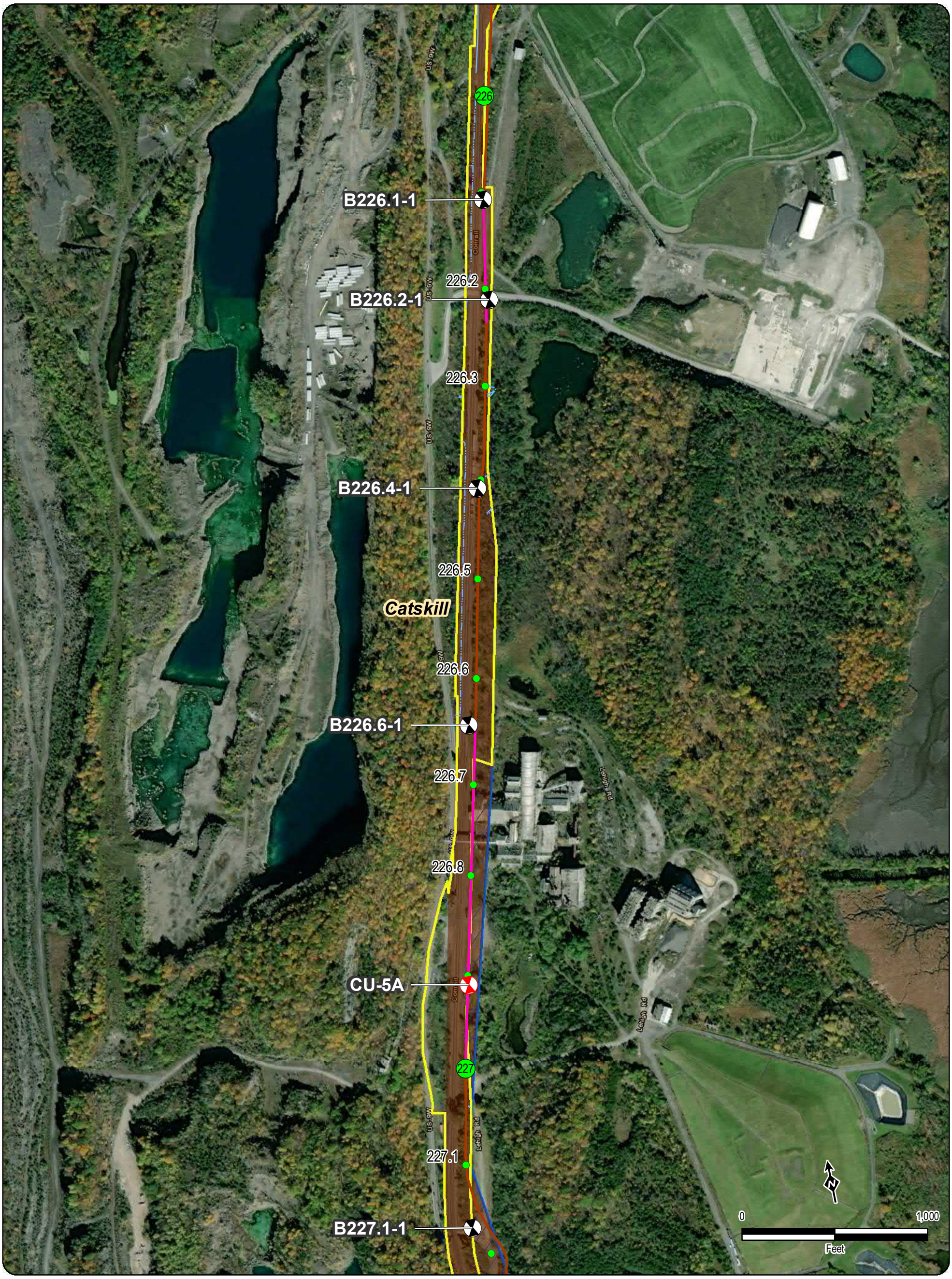
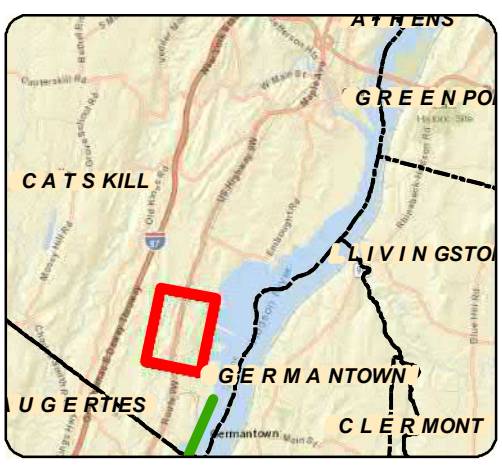




LEGEND

- 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

Catskill to Upland

Figure A-11

Sheet 5 of 6

Prepared by: AECOM 5/20/2021

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

Y:\Projects\CHPEI\Route\Consensus_Alternative_Routes\MXD\Alt_5_Routes_DZ_201909\Boring_Locations\Maps_for_May_2021_Report\Catskill_to_Upland_Boring_Locations_Mapset_May_2021_Report.mxd

TEST BORING LOG

PROJECT: TDI CHAMPLAIN HUDSON POWER EXPRESS

LOCATION: CSX RAILROAD ROW, NY

BORING	**B226.1-1**
G.S. ELEV.	N/A
FILE	195651
SHEET	1 OF 1

GROUNDWATER DATA			
FIRST ENCOUNTERED NR			
DEPTH	HOUR	DATE	ELAPSED TIME
DRY	NR	12/2	0 HR

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

DRILLER	R. CARUSO
HELPER	C. SMART
INSPECTOR	N/A
DATE STARTED	12/02/2012
DATE COMPLETED	12/02/2012

DEPTH	A	B	C	DESCRIPTION	Wn	REMARKS
	S-1	19 20 19 12		***GRAY M/C SANDY F/C GRAVEL-SIZED ROCK FRAGMENTS, TR SILT (FILL)***	3.4	
	S-2	5 6 6 7		2.0 ***GRAY CLAY, TR TO SM M/F/C SAND, TR F/ GRAVEL***	37.7	
5	S-3	8 10 10 11		4.0		
	S-4	4 6 5 5			30.8	
	S-5	6 8 11 12		***BROWN TO GRAY CLAY, TR TO SM SILT, TR F/C SAND***		
10				13.5		
15	S-6	9 11 10			36.9	
				TAN AND PINK CLAYEY SILT		
				18.5		
20	S-7	7 8 13			39.1	
				TAN, BROWN, AND GRAY CLAYEY SILT		
				23.5		
25	S-8	8 11 9			39.0	
				GRAY CLAYEY SILT		
30	S-9	3 4 4		30.0		
				END OF BORING AT 30'		
35						

DRN.	TBT
CKD.	PWK

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

TEST BORING LOG

PROJECT: TDI CHAMPLAIN HUDSON POWER EXPRESS

LOCATION: CSX RAILROAD ROW, NY

BORING	**B226.2-1**
G.S. ELEV.	N/A
FILE	195651
SHEET	1 OF 1

GROUNDWATER DATA			
FIRST ENCOUNTERED NR			
DEPTH	HOUR	DATE	ELAPSED TIME
DRY	NR	12/1	0 HR

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

DRILLER	R. CARUSO
HELPER	C. SMART
INSPECTOR	N/A
DATE STARTED	12/01/2012
DATE COMPLETED	12/01/2012

DEPTH	A	B	C	DESCRIPTION	Wn	REMARKS
	S-1	9 9 6 5			6.3	
	S-2	4 5 6 6				
5	S-3	4 5 4 7				
	S-4	4 6 8 7			5.9	
	S-5	6 10 7 6			5.8	
10				***GRAY TO DARK GRAY F/ GRAVELLY M/C/F SAND, TR TO SM SILT, TR ASPHALT (FILL)***		
15	S-6	6 6 9				
	S-7	38 39 12			18.0	
20				23.5		
	S-8	8 10 15		***LIGHT BROWN CLAY, TR SILT*** 25.0	28.0	
25				***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

SUMMARY OF LABORATORY TEST DATA

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

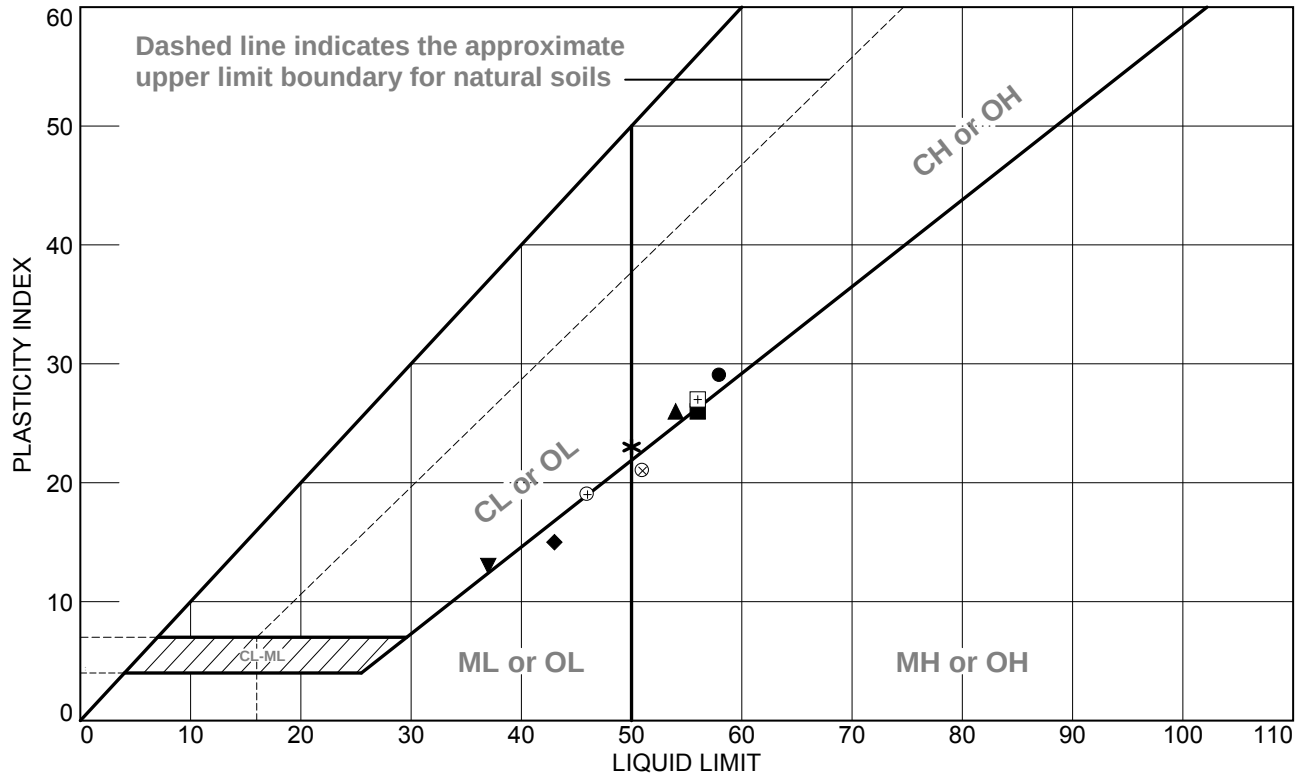
SAMPLE IDENTIFICATION			Soil Group (USCS System)	GRAIN SIZE DISTRIBUTION				PLASTICITY				Specific Gravity	Moisture Content (%)	Unit Weight (pcf)	Compressive Strength (tsf)	Organic Content (%)
Boring #	Sample #	Depth (ft)		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Liquidity Index)					
	S-4	6.0-8.0	ML	20.2	25.0	54.8		-	-	-	-	-	19.0	-	-	-
	S-5	8.0-10.0														
	S-6	13.5-15.0	-	0.4	4.0	95.6		-	-	-	-	-	37.1	-	-	-
	S-7	18.5-20.0	-	-	-	-	-	-	-	-	-	-	33.3	91.7	-	-
	S-8	23.5-25.0	-	-	-	-	-	-	-	-	-	-	39.5	-	-	-
B226.1-1	S-1	0.0-2.0	-	-	-	-	-	-	-	-	-	-	3.4	-	-	-
	S-2	2.0-4.0	CL	4.2	13.4	82.4		-	-	-	-	-	37.7	-	-	-
	S-3	4.0-6.0	-	9.4		13.1	77.5	-	-	-	-	2.73	30.8	90.0	-	-
	S-4	6.0-8.0												-		
	S-6	13.5-15.0	CH	-	-	-	-	50	27	23	0.4	-	36.9	86.0	-	-

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	-	-	-	-	-	-	-	-	-	-	39.1	-	-	-
	S-8	23.5-25.0	CL	-	-	-	-	46	27	19	0.6	-	39.0	84.5	-	-
B226.2-1	S-1	0.0-2.0	-	-	-	-	-	-	-	-	-	-	6.3	-	-	-
	S-3	4.0-6.0	SP-SM	36.2	52.5	11.3		-	-	-	-	-	5.9	-	-	-
	S-4	6.0-8.0														
	S-5	8.0-10.0	-	-	-	-	-	-	-	-	-	-	5.8	-	-	-
	S-7	18.5-20.0	-	-	-	-	-	-	-	-	-	-	18.0	-	-	-
	S-8	23.5-25.0	-	-	-	-	-	-	-	-	-	-	28.0	94.9	-	-
B226.4-1	S-2	2.0-4.0	-	-	-	-	-	-	-	-	-	-	48.5	-	-	-
	S-4	6.0-8.0	-	-	-	-	-	-	-	-	-	-	32.3	-	-	-
	S-5	8.0-10.9	-	-	-	-	-	-	-	-	-	-	31.9	88.5	-	-

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

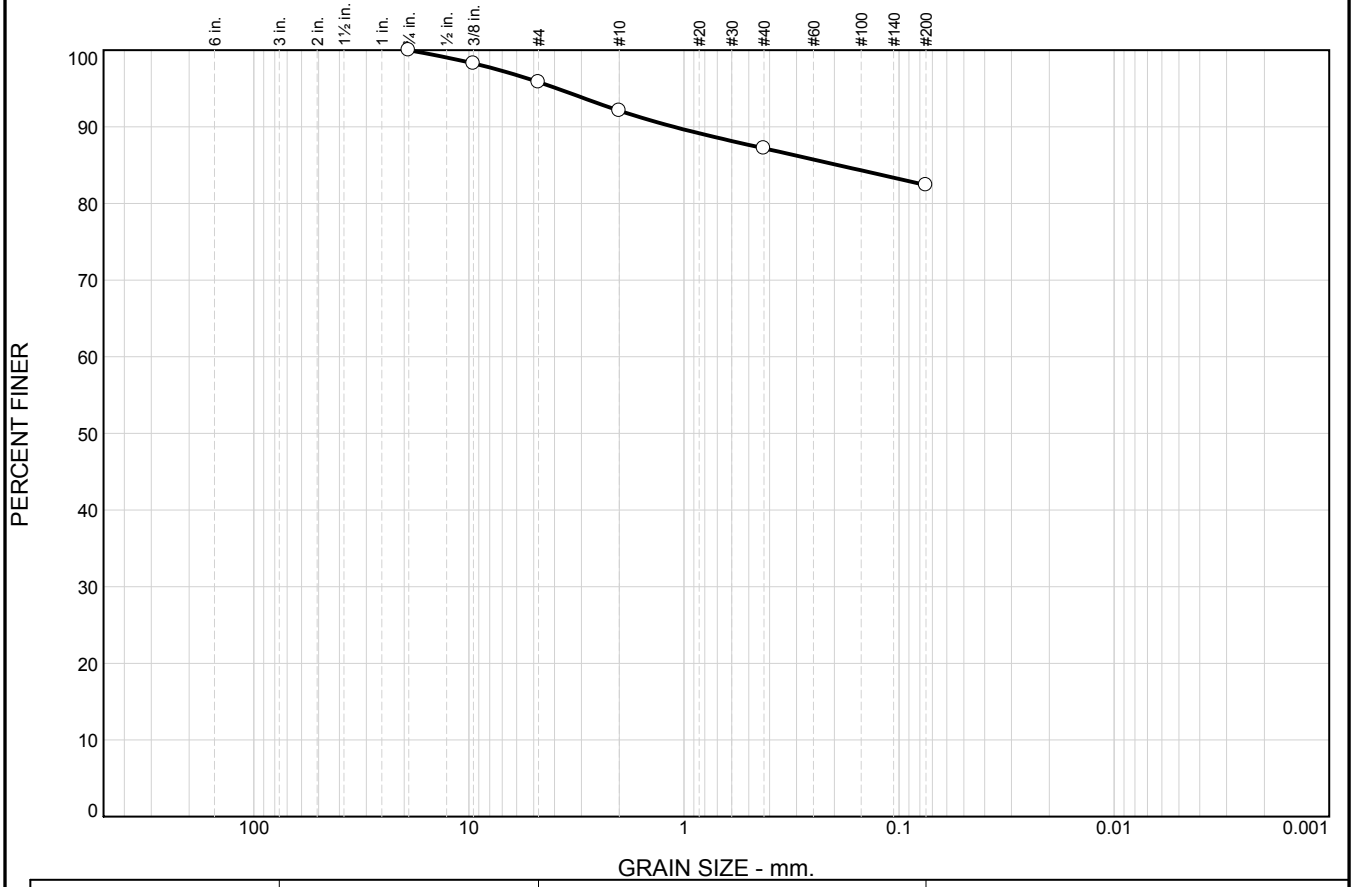
	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B222.34-1	S-4	6.0-8.0 FT	35.2	29	58	29	CH
■	B222.34-1	S-6	13.5-15.0 FT	34.8	30	56	26	CH/MH
▲	B222.9-1	S-5	8.0-10.0 FT	33.4	28	54	26	CH
◆	B223.4-1	S-7	18.5-20.0 FT	31.6	28	43	15	ML
▼	B224.8-1	S-8 & S-9	23.5-30.0 FT	33.3	24	37	13	CL
✱	B226.1-1	S-6	13.5-15.0 FT	36.9	27	50	23	CH
⊕	B226.1-1	S-8	23.5-25.0 FT	39.0	27	46	19	CL
⊞	B226.6-1	S-3 & S-4	4.0-8.0 FT	38.8	29	56	27	CH
⊗	B226.6-1	S-6 & S-7	13.5-20.0 FT	53.7	30	51	21	MH

TRC
Engineers, Inc.
Mt. Laurel, NJ

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

Project No.: 195651 **Figure** 9

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	4.2	3.7	4.9	4.8	82.4	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_C	C_u
○			0.1918							

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

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

Project: TDI CHAMPLAIN HUDSON POWER EXPRESS - CSX

○ **Source of Sample:** B226.1-1 **Depth:** 2.0-4.0 FT **Sample Number:** S-2

TRC Engineers, Inc.

Mt. Laurel, NJ

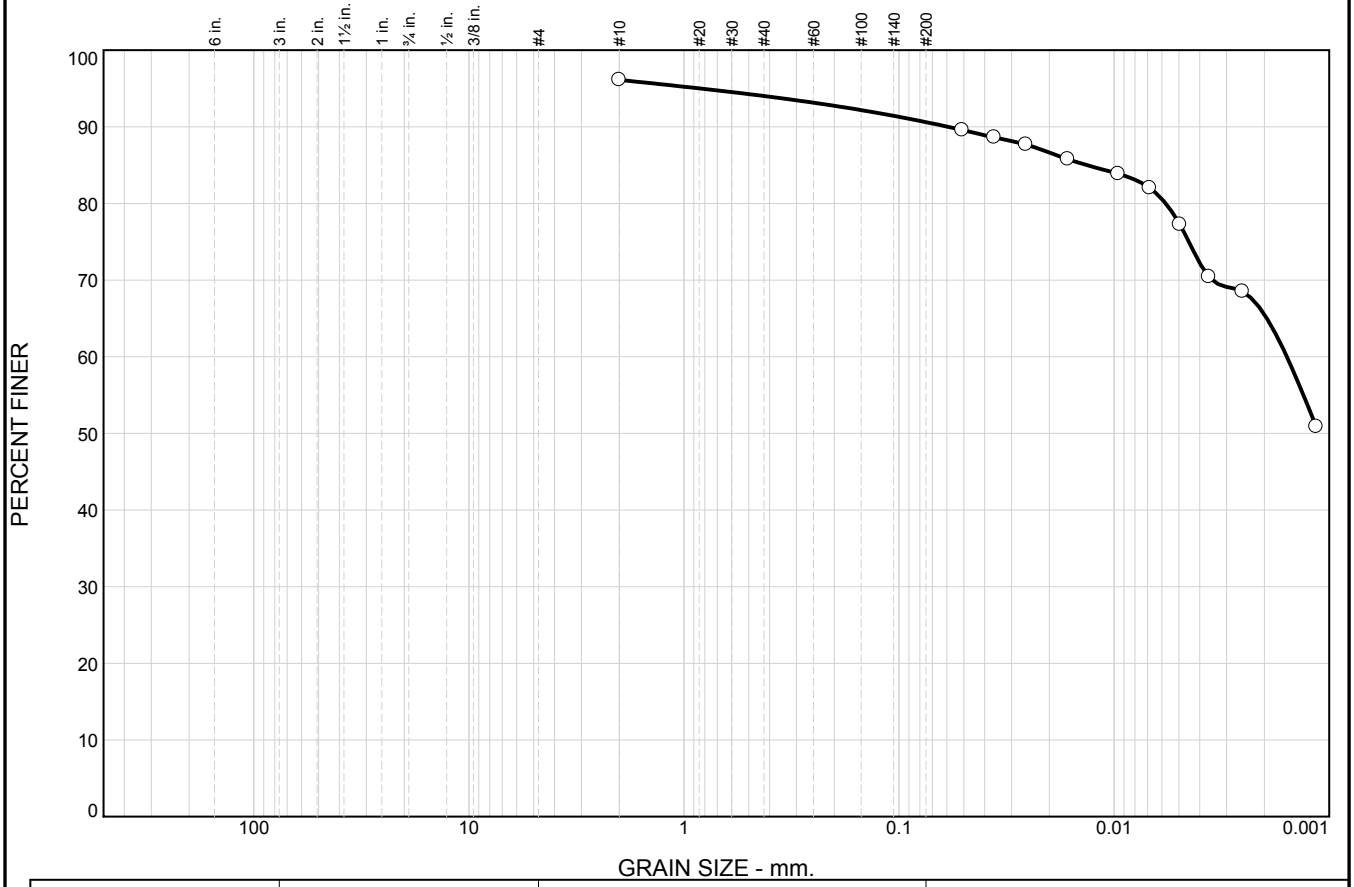
Remarks:

○SAMPLE DESCRIPTION BASED ON VISUAL IDENTIFICATION AND LABORATORY ANALYSIS

Figure 137

Tested By: TBT 01/10/13 **Checked By:** JPB 03/12/13

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○					2.1	3.4	13.1	77.5

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_C	C_u
○			0.0134	0.0016						

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

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

Project: TDI CHAMPLAIN HUDSON POWER EXPRESS - CSX

○ **Source of Sample:** B226.1-1 **Depth:** 4.0-8.0 FT **Sample Number:** S-3 & S-4

TRC Engineers, Inc.

Mt. Laurel, NJ

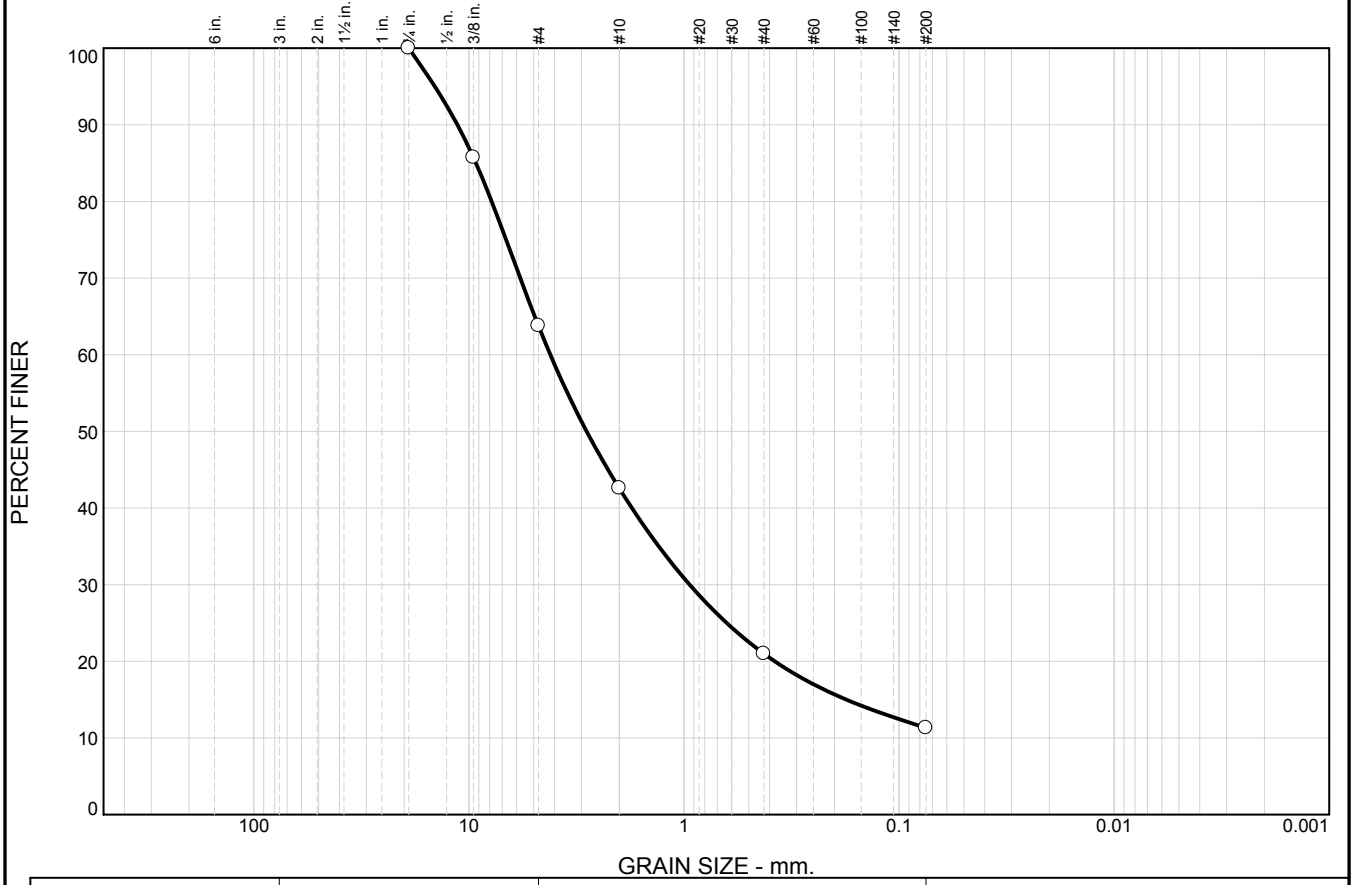
Remarks:

○SAMPLE DESCRIPTION BASED ON VISUAL IDENTIFICATION AND LABORATORY ANALYSIS

Figure 138

Tested By: TBT 01/08/13 **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	36.2	21.2	21.6	9.7	11.3	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_C	C_u
○			9.2769	4.1829	2.8353	0.9414	0.1758			

Material Description	USCS	AASHTO
○ GRAY TO DARK GRAY F/ GRAVELLY M/C/F SAND, TR TO SM SILT, TR ASPHALT (FILL)	SP-SM	

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

Project: TDI CHAMPLAIN HUDSON POWER EXPRESS - CSX

○ **Source of Sample:** B226.2-1 **Depth:** 4.0-8.0 FT **Sample Number:** S-3 & S-4

TRC Engineers, Inc.

Mt. Laurel, NJ

Remarks:

○SAMPLE DESCRIPTION BASED ON VISUAL IDENTIFICATION AND LABORATORY ANALYSIS

Figure 139

Tested By: TBT 01/10/13 **Checked By:** JPB 03/12/13