NEW HAVEN RAIL MAINTENANCE FACILITY IMPROVEMENTS

NEW HAVEN RAIL YARD
New Haven, CT

MAINTENANCE OF WAY BUILDING & EMPLOYEE PARKING

FINAL STRUCTURE SOIL AND ROCK REPORT

December 2014

STATE PROJECT NO. 0301-0124

Prepared For: Connecticut Department of Transportation
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NEW HAVEN RAIL YARD

FACILITIES IMPROVEMENTS PROJECT

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TABLE OF CONTENTS

SECTION **PAGE**

1.0 General 1

2.0 Coordinate System and Datum 1

3.0 Subsurface Conditions 2

3.1 Subsurface Exploration 2
3.2 Laboratory Testing 4
3.3 Engineering Properties of Soil 5
3.3.1 Probable Fill 6
3.3.2 Organic Clayey Silt 6
3.3.3 Sands and Silts 7

4.0 Engineering Analysis and Recommendations 8

4.1 General 8
4.2 Building Foundation 9
4.3 Retaining Walls 12
4.4 Utilities 12

5.0 Seismic Considerations 13

TABLES

1 Laboratory Data Summary

2 Recommended Soil Properties for Design

FIGURES

1 Site Location Plan

2 Boring Location Plan

3.1 Subsurface Profile A-A

3.2 Subsurface Profile B-B

4 Foundation Plan

APPENDIX

A Test Boring Logs

B Laboratory Data

C Current Design Drawings

1.0 General

The New Haven Rail Yard Facilities Improvements Project involves the construction of a number of new facilities and the reconfiguration of several existing facilities within the rail yard located in New Haven, Connecticut. A Final Geotechnical Report dated October 2007 was previously prepared for this project. A Maintenance of Way (MOW) Building was not part of the project at that time and is presently proposed just south of the rail yard on the site of the former Connecticut Freezers Cold Storage Facility. A site location plan is shown on Figure 1. This report addresses the subsurface conditions and provides foundation recommendations for the proposed MOW Building.

The proposed MOW Building is approximately 250 feet long and 93 feet wide. Current design indicates a 1st floor concrete slab, with a surface elevation of approximately 16.0 feet, to be supported along with a 2-storey structure above by square precast prestressed concrete piles. The currently proposed pile layout is as shown on the Figure 4 foundation plan. Other current design drawings are included as Appendix C.

The project is to be designed and constructed in accordance with the Connecticut 2005 State Building Code, which consists of the 2003 International Building Code with the 2005 Connecticut Supplement and in accordance with the 2012 AASHTO LRFD Bridge Design Specifications.

2.0 Coordinate System and Datum

The Connecticut coordinate system of the 1983 North American Datum (NAD 83) is being used for the New Haven Rail Yard Facilities Improvements Project and the datum being used is the 1988 North American Vertical Datum (NAVD 88).

3.0 Subsurface Conditions

3.1 Subsurface Exploration

A number of subsurface investigation programs have been performed in the New Haven Rail Yard. The entire rail yard has been filled at various times, with western portion having been uplands and the eastern portion tidal lands. The MOW Building site is located in an area that has only recently been added to the rail yard. This area, just south of the former rail yard limits, is also an area that was once tidal and below sea level and has been filled at various times.

Five test borings, MOW-1 through 5 were drilled across the building site in June of 2014. The boring logs are included as Appendix A. The boring log sample descriptions are based on the system required by ConnDOT in their Geotechnical Manual. A boring location plan is included as Figure 2 and subsurface profiles are included as Figures 3.1 and 3.2.

The borings were drilled from approximately elevation 12.0 from the surface of the existing cold storage facility concrete floor slab which is supported above the existing ground surface by Franki piles. Beneath this existing pile-supported slab, currently under demolition, a void space exists between the bottom of the slab and the existing ground surface and measured at the boring locations to be between approximately 0.5 and 4.0 feet.

Boring MOW-1, with a ground surface starting at a depth of approximately 5.5 feet, indicated the following generalized strata in order of occurrence:

- 13.5 feet of probable fill comprised of approximately 4.5 feet of dense sand and gravel overlying 9 feet of stiff to medium stiff organic clayey silt
- 13 feet of medium stiff to very soft organic clayey silt
- 10.5 feet of medium dense to dense silty sand
- 7.5 feet of medium stiff organic clayey silt

- 0.2 feet of medium stiff peat
- 15.5 feet of medium dense to dense sand
- 17 feet of dense to very dense sand and silt
- 13.5 feet of dense to very dense silty sand

Boring MOW-2, with a ground surface starting at a depth of approximately 5.5 feet, indicated the following generalized strata in order of occurrence:

- 12 feet of probable fill comprised of approximately 4 feet of dense to very dense silty gravelly sand, overlying 2.5 feet of stiff organic clayey silt, overlying 5.5 feet of medium dense gravelly sand
- 18.5 feet of medium stiff to very soft organic clayey silt
- 9 feet of very loose silt and sand
- 51 feet of dense to very dense silty sand

Boring MOW-3, with a ground surface starting at a depth of approximately 2.5 feet, indicated the following generalized strata in order of occurrence:

- 20.5 feet of probable fill comprised of approximately 5.5 feet of medium dense sand, overlying 4 feet of very dense silty sand, overlying 5.5 feet of loose to medium dense silt and sand, overlying 5.5 feet of dense silty gravelly sand
- 30 feet of soft to very soft organic clayey silt
- 19.5 feet of medium dense to dense silty sand
- 10 feet of dense sandy silt
- 18.5 feet of dense to very dense silty sand

Boring MOW-4, with a ground surface starting at a depth of approximately 2.5 feet, indicated the following generalized strata in order of occurrence:

- 20.5 feet of probable fill comprised of approximately 15 feet of medium dense to dense silty gravelly sand, overlying 5.5 feet of dense silty sand

- 26.5 feet of medium stiff to very soft organic clayey silt
- 0.2 feet of medium stiff to stiff peat
- 13 feet of dense silty sand
- 5 feet of dense to very dense silt and sand
- 10 feet of very dense sandy silt
- 5 feet of very dense silt and sand
- 5 feet of dense sandy silt
- 13.5 feet of dense to very dense silty sand

Boring MOW-5, with a ground surface starting at a depth of approximately 2 feet, indicated the following generalized strata in order of occurrence:

- 20.5 feet of probable fill comprised of approximately 10.5 feet of medium dense to dense silty gravelly sand, overlying 10 feet of medium dense to dense sand and gravel
- 26 feet of medium stiff to very soft organic clayey silt
- 14 feet of medium dense to very dense silty sand
- 5 feet of dense silt and sand
- 15 feet of dense to very dense silty sand
- 5 feet of dense sandy silt
- 13.5 of very dense silty sand

The ground water surface was estimated from the five MOW borings to between approximately elevation +0.5 and +2.0. The ground water table noted in all the borings of the rail yard test boring program averaged approximately elevation +1.5 and appeared to be tidally influenced.

3.2 Laboratory Testing

Testing was performed in accordance with all applicable American Society for Testing Materials (ASTM) standards. The laboratory descriptions are based on

the Unified Soil Classification System and are in general agreement with the log descriptions. Testing was performed on a total of 5 undisturbed samples of the organic clayey silt and 35 split-spoon samples distributed among the all soil types. The tests performed and the quantities were:

- Total Unit Weight 5
- Dry Unit Weight 10
- Water Content 37
- Atterberg Limits 11
- Torvane Strength 16
- Sieve/Hydrometer Analysis 39
- Consolidation 5
- Unconsolidated Undrained Triaxial Compression 5

All laboratory data is included as Appendix B and a summary of the laboratory test results is included as Table 1.

3.3 Engineering Properties of Soil

The engineering properties of the various soils have been evaluated based on the borings and laboratory testing. The collective review of all 5 borings indicates a relative uniform profile across the proposed MOW Building site with the following generalized strata in order of occurrence:

- Probable Fill: 12 to 20.5 feet of medium dense to very dense silty gravelly sand, sand, silty sand, sand & silt, sand & gravel, gravelly sand and stiff to medium stiff organic clayey silt (isolated to the lower portion at MOW-1). The bottom elevation of this generalized stratum varied from approximately -5.5 to -11.0.
- Organic Clayey Silt: 26 to 30 feet of medium stiff to very soft, typically very soft organic clayey silt with the inclusion of 0 to 10.5 feet of very loose to dense silty sand and silt & sand. The bottom elevation of this generalized stratum varied from approximately -33 to -41.

- Sands and Silts: 46 to 52.5 feet of medium dense to very dense sand, silty sand, sand & silt, silt & sand, and sandy silt. The bottom sampled elevation of this generalized stratum varied from approximately -84 to -89.

3.3.1 Probable Fill

Some of the soils above the organic clayey silt may be natural soils deposits and not fill deposits. Because the thickness of any natural deposits are likely thin and not readily discernable from the fill deposits, the whole of the soils above the organic clayey silt has been referred to herein as Probable Fill. The majority of this layer is granular in nature with Standard Penetration Test N-values ranging from 10 to 83 blows per foot and averaging 32. Based on the Standard Penetration Test (SPT) results an angle of internal friction of 36 degrees and a total unit weight of 120 pounds per cubic foot (pcf) are recommended for design. Within the lower portion of this layer at boring MOW-1 only, organic clayey silt was encountered with a Standard Penetration Test N-value of 7. For this material an undrained shear strength of 500 psf, along with a total unit weight of 110 pcf is recommended for design. The above recommended values are summarized in Table 2.

3.3.2 Organic Clayey Silt

The organic clayey silt Standard Penetration Test N-values ranged from 0 to 24 blows per foot. Excluding anomalies the N-Values ranged from 0 to 5 with the majority being 0. Table 1 summarizes the results of laboratory tests performed on the organic clayey silt samples. An overview of results is:

- Undrained Shear Strength (UU-test): Values ranged from approximately 500 to 1300 psf. For design an aggregate value of 600 psf is recommended.

- Torvane Shear Strength: Values ranged from approximately 0.23 to 0.24 tons per square foot (tsf).
- Water Content: Values ranged from approximately 45 to 85% and averaged approximately 70%
- Liquid Limit: Values ranged from approximately 49 to 102% and averaged approximately 82%
- Plastic Limit: Values ranged from approximately 36 to 72% and averaged approximately 46%
- Plasticity Index: Values ranged from approximately 13 to 47% and averaged approximately 36%
- Liquidity Index: Values ranged from 0.23 to 0.86 and averaged approximately 0.67
- Total Unit Weight: Values ranged from 90.6 to 108.2 pounds per cubic foot (pcf). For design an average total unit weight of 98 pcf is recommended.
- Compression Ratio CR: Values ranged from 0.227 to 0.250, averaging 0.239. For design the average CR value of 0.239 is recommended.
- Re-Compression Ratio RR: Values ranged from 0.021 to 0.047, averaging 0.029. For design the average RR value of 0.029 is recommended.
- Over Consolidation Ration OCR: Values ranged from 1.5 to 2.31 and averaged 1.89. Excluding the data from the samples obtained from boring MOW-1, which appears to be atypical, the values range from 1.5 to 1.75 with an average of 1.66. For design an OCR of 1.5 is recommended.
- Coefficient of Consolidation c_v Values ranged from 0.0022 to 0.0050, averaging 0.0035 cm^2/sec.

The above recommended values are summarized in Table 2.

3.3.3 Sand and Silts

For this layer of sands and silts of varying proportions the Standard Penetration Test N-values ranged from 18 to 74 blows per foot and averaged 44.5. Based on

the Standard Penetration Test (SPT) results an angle of internal friction of 39 degrees and a total unit weight of 120 pcf are recommended for design. The above recommended values are summarized in Table 2.

4.0 Engineering Analysis and Recommendations

4.1 General

The existing grade beneath the footprint of the proposed MOW Building, based on the borings, varied from approximately elevation +6.5 to +10.0. The existing grade around the structure is estimated to range from approximately elevation +6.5 to +7.5.

Based on the current design drawings (Appendix C), the finish grade around and beneath the proposed MOW Building footprint is to be increased substantially. Around the proposed MOW Building structure the drawings indicate a general ramping up toward the structure to a maximum elevation of approximately 15.5. Beneath the proposed MOW Building structure, the drawings indicate an increase in grade across the full building footprint to temporarily support the new 1st floor slab also to a maximum elevation of approximately 15.5. This translates to an estimated maximum increase in grade outside of and beneath the proposed building of approximately 9 feet.

Calculations of consolidation of the organic clayey silt from this increase in grade have been performed based on the estimated 9 feet of fill and the laboratory test results using the recommended parameters in above Section 3.3.2. Total maximum settlement due to consolidation of the organic clayey silt was calculated to be approximately 3.3 inches at the center of the structure for a 9-foot increase in grade. At the middle of the long side of the structure the maximum consolidation was calculated to be approximately 1.2 inches. Lesser amounts of settlement are anticipated where less fill is placed, decreasing to zero

where no increase in grade is proposed. The proposed MOW Building and ancillary structures along with all buried facilities will need to be designed to accommodate this total and differential settlement.

It is estimated that within one year of placement of the fill that 75% of the predicted settlement will have occurred. This results in a maximum settlement after one year of approximately ¼ inch or less at the edges of the structure, with the least at the corners. Minimum differential settlements are anticipated if a one year waiting period, after the structure fill is placed, occurs before connections are made to ancillary structures or buried facilities.

4.2 Building Foundation

The typically very soft organic clayey silts underlying the site along with the current intent to increase the existing grade beneath the proposed MOW Building indicates that a deep foundation system is required to provide support for the MOW Building, as is currently planned, with capacity being obtained in side resistance and end bearing from the sands and silts (bearing stratum) underlying the organic clayey silt. The above indicated settlement from consolidation of the organic clayey silt, is believed to be sufficient to develop full down drag along the piles above the bottom elevation of the organic clayey silt layer. To lessen the down drag loads, it is recommended that an approximate 1/16-inch thick bitumen coating be used on the piles and have a penetration value (ASTM D-5) of at least 80 and extend from the bottom of pile cap to the bottom of the organic clayey silt layer or to approximately elevation -41.

The existing CCO Shop and Central Distribution Warehouse structures located adjacent and to the north, northwest of the MOW Building site are supported by 16-inch square precast prestressed concrete piles with an allowable compressive capacity of 100 kips. It is recommended that the MOW Building foundation also be supported by 16-inch square precast prestressed concrete piles. Current

design for the MOW Building requires the piles to have an LRFD-factored resistance of 135 kips in compression and 50 kips in tension. The total calculated down drag for a bitumen-coated 16-inch square precast prestressed concrete pile is 30 kips.

Based on CTDOT's Bridge Design Manual the Ultimate Pile Capacity (UPC) is equal to the factored design load divided by the resistance factor plus the scour load plus the downdrag load. The factored design load is 135 kips, there is no scour and the downdrag load is 30 kips. With a pile load test and PDA testing the resistance factor is 0.8, so the UPC = 200 kips.

Combined friction/end bearing piles obtain their capacity from a combination of skin friction and end-bearing, with the friction portion of the capacity increasing with length. Frictional capacity will start at approximately elevation -41, which is the lowest elevation for the start of the continuous medium dense to very dense sands and silts based on the MOW borings.

The I-95/I-91/SR34 Interchange Pile Load Test Program Evaluation Report dated September 2002, for Areas C & D located to the north of the MOW Building site, recommends a range of ultimate skin friction from 0.8 to 1.2 ksf and an ultimate end bearing of 50 ksf for precast prestressed concrete piles. Using an average of 1.0 ksf for ultimate skin friction and the 50 ksf for ultimate end bearing, the approximate calculated penetration in the bearing stratum (below elevation -41) to obtain the above ultimate pile capacity is 22 feet.. Based on the dynamic pile load testing (PDA) performed at the nearby Central Distribution Warehouse site, similar capacities were achieved on 16-inch prestressed precast concrete piles with penetration in the bearing stratum at approximately 25 feet. If 16-inch piles are used it is recommended that the piles extend to elevation -66 or a penetration of 25 feet into the bearing stratum.

It is recommended that five test piles be driven with PDA testing performed on each pile. The test piles should be located at the approximate corners of the structure and one at the approximate center of the structure. The piles should have a minimum resistance factor of 0.8, as verified by the PDA tests and a static load test performed on one of the piles.

For lateral response of the piles, it is recommended that the computer program LPILE be utilized along with the following input parameters for the soils:

Generalized Soil Strata	**Soil Type**	**Total Unit Weight (PCF)**	**Angle of Internal Friction (DEGREES)**	**Undrained Shear Strength (PSF)**
New and Existing Fill above Elevation -11	Sand	120	36	-
Organic Clayey Silt from Elevation -11 to -41	Soft Clay	98	-	600
Sands and Silts below Elevation -41	Sand	120	39	-

Using the above table of input parameters and assuming an approximate top of fill elevation of 15.5 and an approximate top of pile elevation of 12.5, the lateral response of a 16-inch precast prestressed concrete pile was analyzed with the use of the LPILE program at varying degrees of assumed pile head fixity. The summary results of the lateral analysis are:

Lateral Load (KIPS)	0% Fixity		50% Fixity		100% Fixity	
	Top of Pile Deflection (IN)	Maximum Moment (IN-KIPS)	Top of Pile Deflection (IN)	Maximum Moment (IN-KIPS)	Top of Pile Deflection (IN)	Maximum Moment (IN-KIPS)
5	0.030	127.0	0.022	88.0	0.013	175.4
10	0.060	253.9	0.043	176.0	0.027	350.8

The point of fixity of the pile was noted at approximately 22 feet below the top of pile / bottom of pile cap.

4.3 Retaining Walls

Retaining walls are to be cast-in-place concrete pile supported walls. It is recommended that 16 inch square precast prestressed piles with bitumastic coating, similar to those used to support the building structure be used for the cast-in-place concrete retaining walls.

4.4 Utilities

As indicated in above Section 4.1, total maximum settlement due to consolidation of the organic clayey silt was calculated to be approximately 3.3 inches at the center of the building but 1.2 inches at the middle of the long edge where the proposed increase in grade is greatest at an estimated 9 feet with lesser amounts decreasing to zero where no increase in grade is proposed. Any utilities that are proposed to be buried within this soil mass will need to be designed accordingly for these settlements. If the utilities are not installed until one year after the placement of fill, 75% of the above settlements are estimated to have occurred.

5.0 SEISMIC CONSIDERATIONS

Based on the recent site investigations, Site Class E is appropriate for earthquake design of all structures at the MOW Building site.

The spectral acceleration for short periods S_S and for a 1 second period S_1 in accordance with the values in Appendix K of the 2005 State Building Code, 2009 Amendments are:

$S_S = 0.243$

$S_1 = 0.062$

The 2005 State Building Code allows a Site Specific Procedure to be used to determine ground motion accelerations. A Site Specific Study was performed in the area that is applicable to this site. The "Final Report, Seismic Design Criteria, I-95 New Haven Harbor Crossing Corridor Improvement Program", March, 2001, recommended a peak ground acceleration value of 0.15g be used for the soils typical of the site (Type IV), which includes fills over organic clayey silts over silty sand or silt, with bedrock at a great depth.

Liquefaction is only considered a problem where 2 or 3 contiguous samples occur within one boring, or individual samples at a similar elevation occur across adjacent borings. Review of the borings logs does not indicate a liquefaction concern.

TABLES

TABLE 1

NEW HAVEN RAIL YARD FACILITIES IMPROVEMENTS

LABORATORY DATA SUMMARY

Boring Number	Boring Surface Elevation (feet)	Sample Number	Laboratory Sample Description	Depth (feet)	Elevation (feet)	γ_t (pcf)	Average γ_d (pcf)	Average Water Content	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Compression Ratio CR	Re-Compression Ratio RR	Pre-Consolidation Pressure Max Past Pressure tsf	Estimated In-Situ Stress tsf	OCR	(UU-test) Unconsolidated Undrained Strength (psf)	Average Torvane per Sample (tsf)	Coefficient of Consolidation c_v (cm^2/sec)	Secondary Compression Index c_α Normally Consolidated	Secondary Compression Index c_α Over Consolidated	e_o
MOW-1	12.0	UP-2	Dark Gray Organic Silt, trace Sand, trace shell fragments, medium consistency	23.0	-11.0	95.0	55.7	72.9	82	43	39	0.77	0.245	0.021	1.160	0.502	2.31	612	0.28	0.0036	0.00938	0.00088	1.467
MOW-1	12.0	UP-3	Dark Gray Organic Silt, trace fine Sand, trace shell fragments, medium consistency	48.0	-36.0	108.2	72.1	46.1	69	38	31	0.26	0.232	0.047	2.300	1.062	2.17	1322	0.44	0.0028	0.00925	0.00087	0.989
MOW-3	12.0	UP-1	Dark Gray Organic Silt, trace shell fragments, medium consistency	28.0	-16.0	96.1	56.8	73.1	85	45	40	0.70	0.227	0.023	1.570	0.914	1.72	655	0.28	0.0050	0.00962	0.00075	1.380
MOW-4	12.0	UP-1	Dark Gray Organic Silt, trace shell fragments, medium consistency	33.0	-21.0	99.0	56.9	69.7	76	40	36	0.82	0.250	0.026	1.500	1.003	1.50	511	0.23	0.0038	0.01013	0.00075	1.456
MOW-5	12.0	UP-2	Dark Gray Organic Silt, medium consistency	38.0	-26.0	90.6	59.0	71.5	80	43	37	0.77	0.239	0.028	1.950	1.116	1.75	664	0.23	0.0022	0.01088	0.00100	1.229
	Additional Split Spoon Samples with Atterberg Limit Testing Performed																						
MOW-1	12.0	S-3	Dark brown Organic Silt, trace Sand (OL)	15.0	-3.0			46.8	49	36	13	0.83											
MOW-2	12.0	S-5	Gray Organic Silt, trace Sand (OH)	25.0	-13.0			68.8	76	42	34	0.79											
MOW-3	12.0	S-8	Gray Organic Silt, trace Sand (OH)	35.0	-23.0			72.0	82	42	40	0.75											
MOW-3	12.0	S-11	Gray Organic Silt, little fine to medium Sand (OH)	50.0	-38.0			85.3	109	72	37	0.36											
MOW-4	12.0	S-9	Gray Organic Silt, trace Sand (OH)	40.0	-28.0			77.8	91	49	42	0.69											
MOW-5	12.0	S-6	Gray Organic Silt, trace Sand (OH)	25.0	-13.0			84.7	103	56	47	0.61											
			Maximum =	50.0	-3.0	108.2	72.1	85.3	109	72	47	0.83	0.250	0.047	2.300	1.116	2.31	1322	0.44	0.0050	0.01088	0.00100	1.467
			Minimum =	15.0	-38.0	90.6	55.7	46.1	49	36	13	0.26	0.227	0.021	1.160	0.502	1.50	511	0.23	0.0022	0.00925	0.00075	0.989
			Average =	32.7	-20.7	97.8	60.1	69.9	82	46	36	0.67	0.239	0.029	1.696	0.919	1.89	753	0.29	0.0035	0.00985	0.00085	1.304

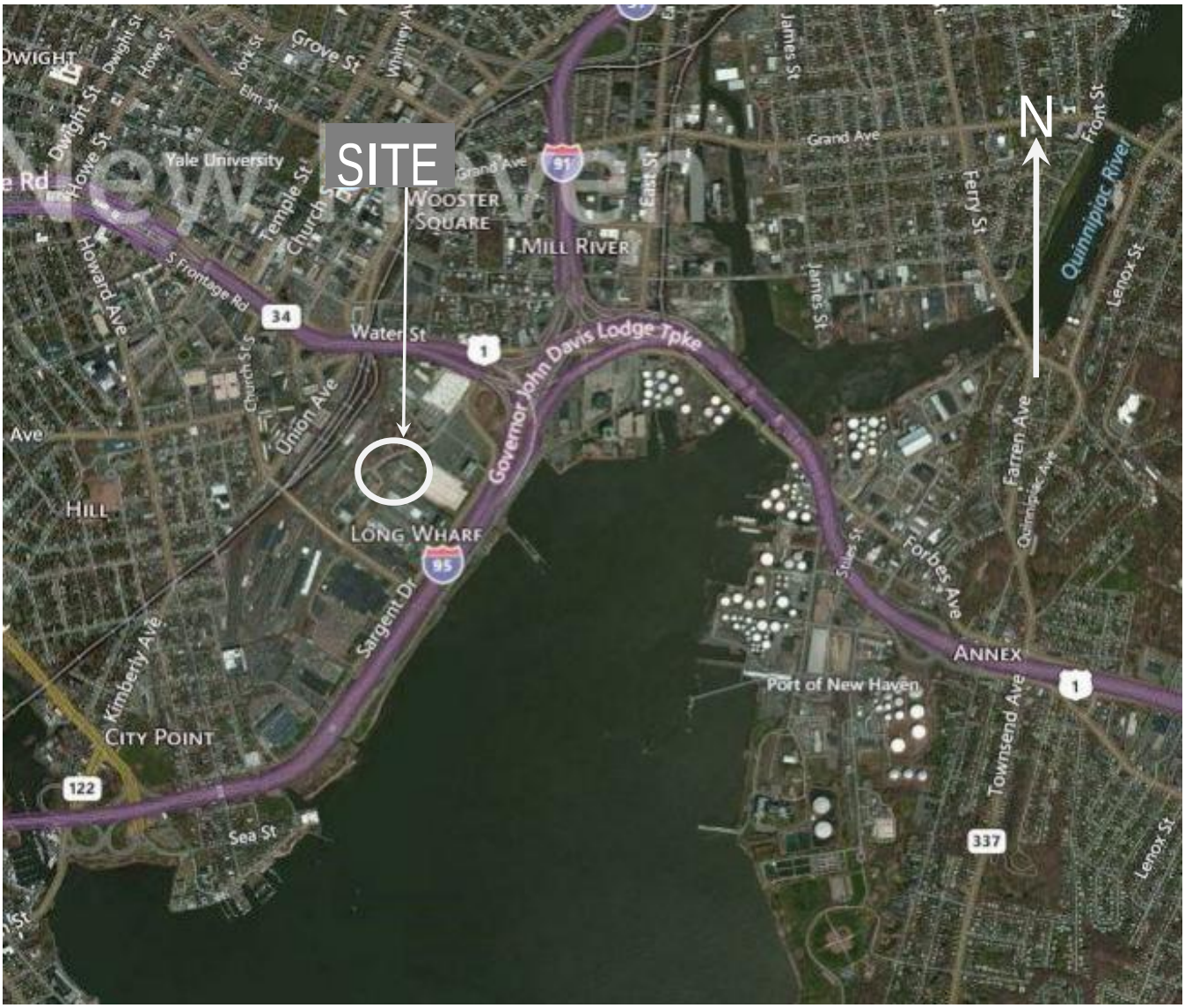
TABLE 2

NEW HAVEN RAIL YARD FACILITIES IMPROVEMENTS

RECOMMENDED SOIL PROPERTIES FOR DESIGN

Generalized Soil Strata	Total Unit Weight (PCF)	Angle of Internal Friction (DEGREES)	Undrained Shear Strength (PSF)	Compression Ratio CR	Re-Compression Ratio RR	Coefficient of Consolidation C_v cm^2/sec	OCR
Probable Fill - Granular	120	36					
Probable Fill – Cohesive	98		500				
Organic Clayey Silt	98		600	0.239	0.029	0.0035	1.5
Sands and Silts	120	39					

FIGURES

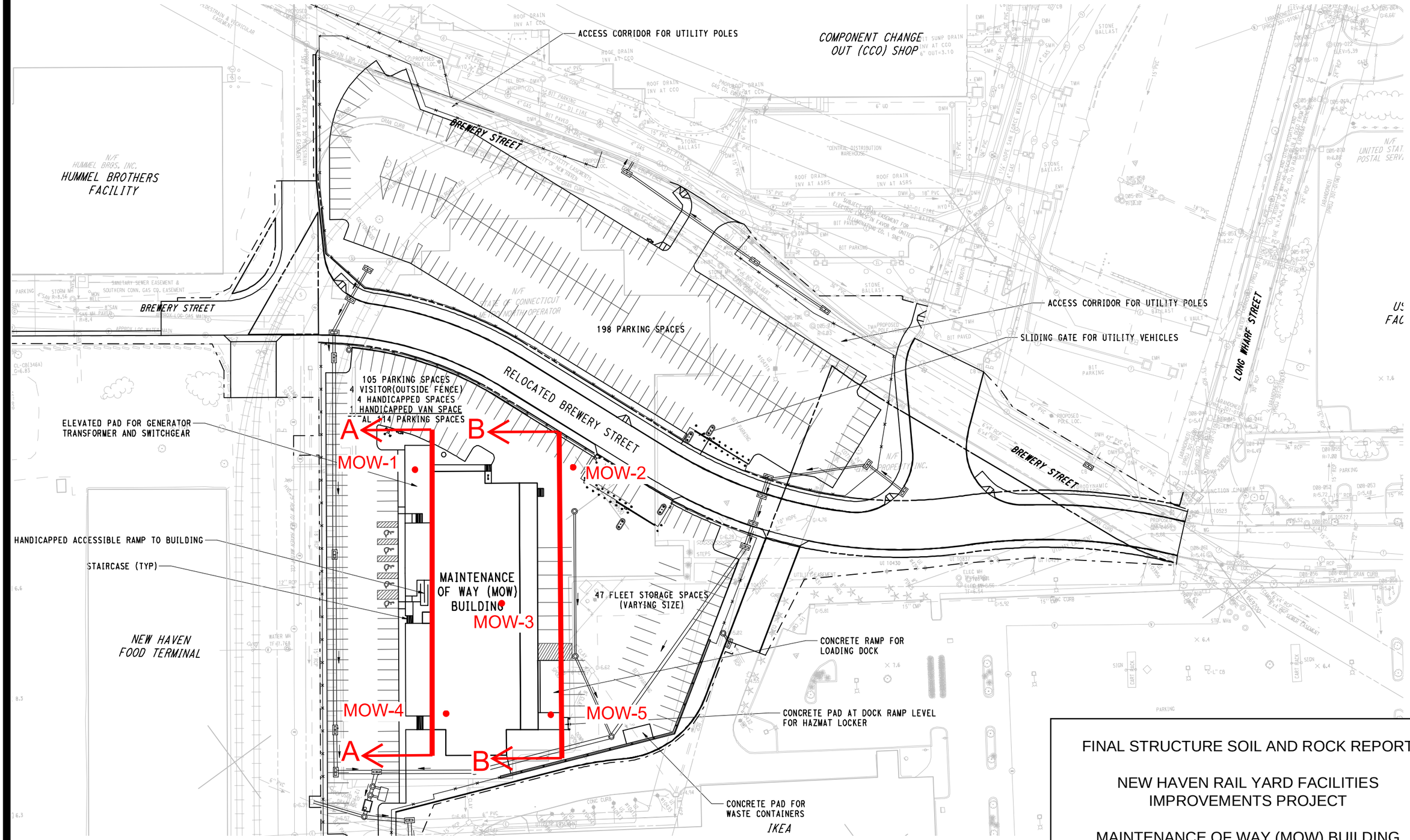


FINAL STRUCTURE SOIL AND ROCK REPORT

NEW HAVEN RAIL YARD FACILITIES IMPROVEMENTS PROJECT

MAINTENANCE OF WAY (MOW) BUILDING
SITE LOCATION PLAN

DECEMBER 2014 FIGURE 1



LEGEND:

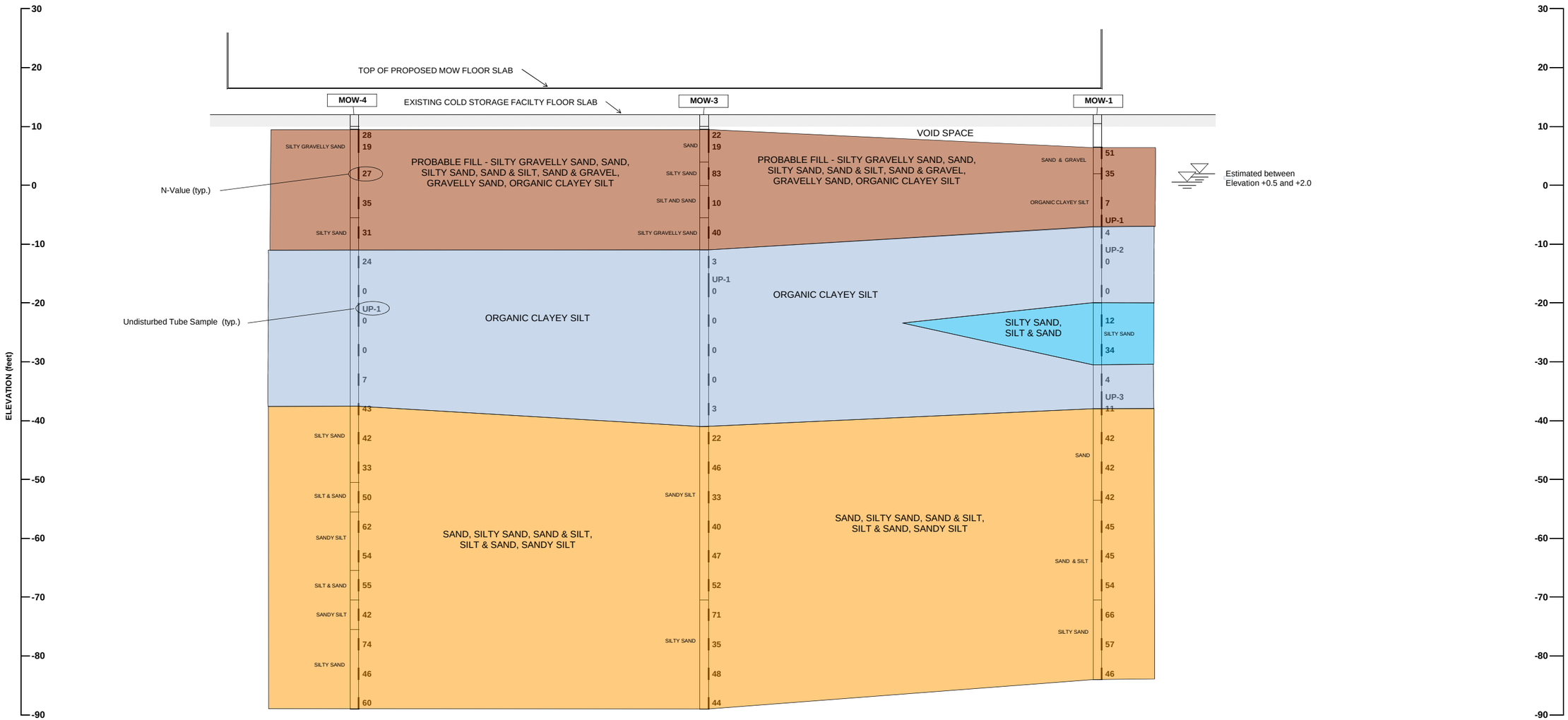
• MOW-4

FINAL STRUCTURE SOIL AND ROCK REPORT

NEW HAVEN RAIL YARD FACILITIES IMPROVEMENTS PROJECT

MAINTENANCE OF WAY (MOW) BUILDING BORING LOCATION PLAN

DECEMBER 2014 FIGURE 2



LEGEND

- PROBABLE FILL - SILTY GRAVELLY SAND, SAND, SILTY SAND, SILT & SAND, SAND & GRAVEL, GRAVELLY SAND, ORGANIC CLAYEY SILT
- SILTY SAND, SILT & SAND
- ORGANIC CLAYEY SILT
- SAND, SILTY SAND, SAND & SILT, SILT & SAND, SANDY SILT

0 5 10 15 20 25 30 60

HORIZONTAL SCALE (feet)

FINAL STUCTURE SOIL AND ROCK REPORT

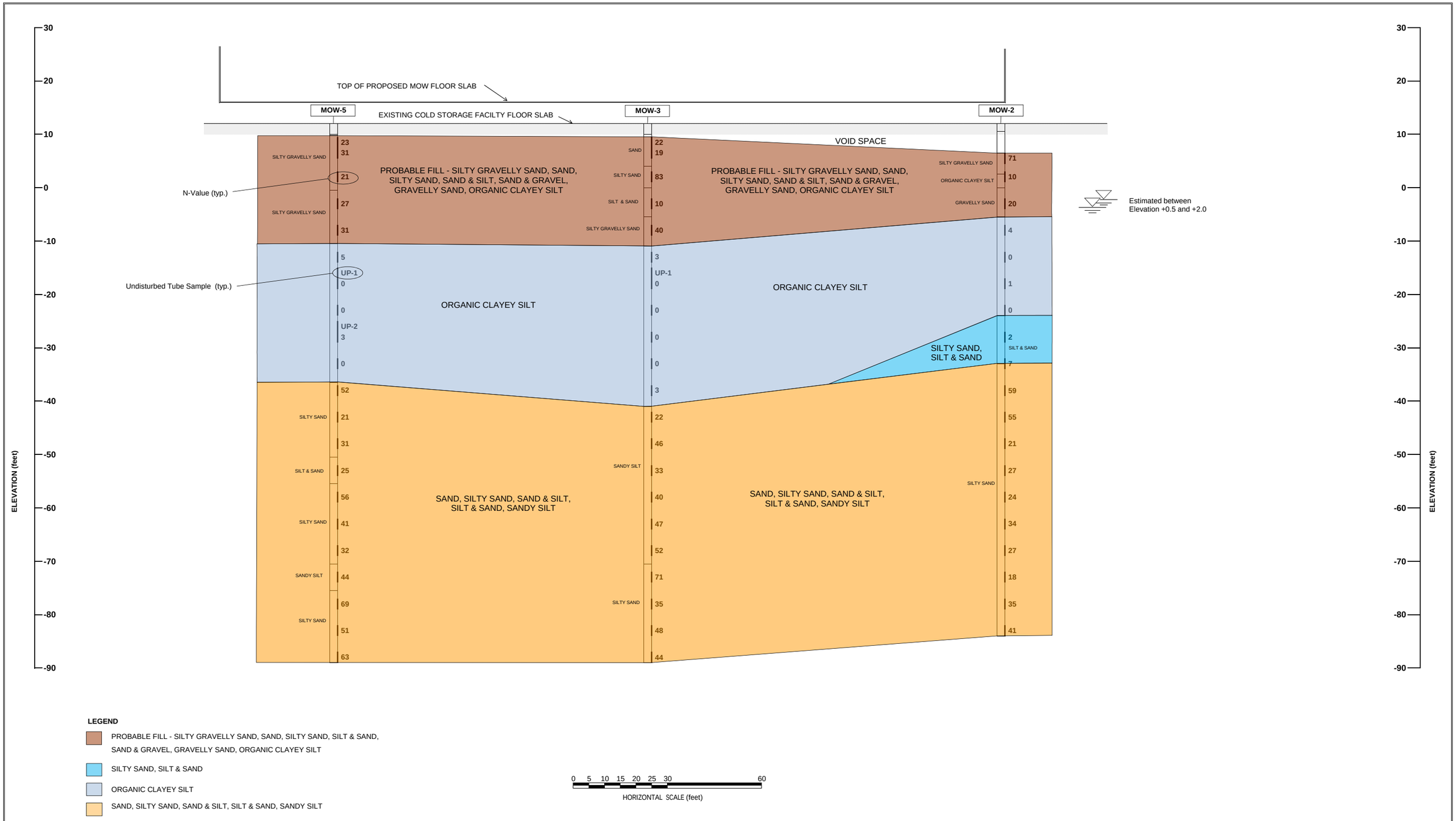
NEW HAVEN RAIL YARD FACILITIES IMPROVEMENTS PROJECT

MAINTENANCE OF WAY (MOW) BUILDING

SUBSURFACE PROFILE A-A

DECEMBER 2014

FIGURE 3A



FINAL STRUCTURE SOIL AND ROCK REPORT

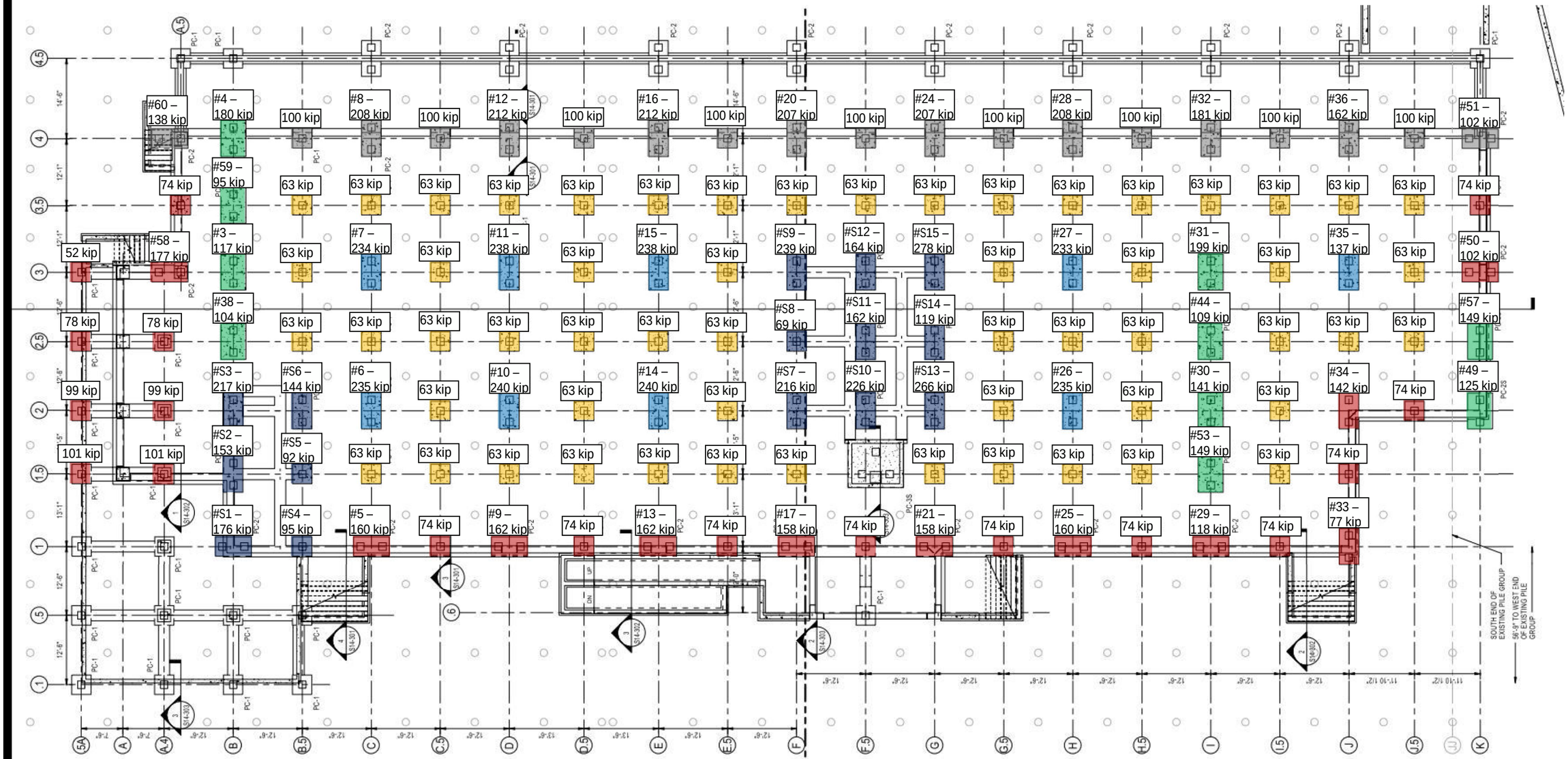
NEW HAVEN RAIL YARD FACILITIES IMPROVEMENTS PROJECT

MAINTENANCE OF WAY (MOW) BUILDING

SUBSURFACE PROFILE B-B

DECEMBER 2014

FIGURE 3B



NH MOW Pile Foundation Plan

Notes:

1. *Pile cap loading shown on this plan is factored LRFD Value*
2. *Suggested single pile capacity: 135 kips (compression), -50 kips (Tension), LRFD*

Legend

- *Typical Interior Pile = 63 kips*
- *Exterior Pile*
- *Interior Pile under Column*
- *Loading Dock Exterior Pile*
- *Interior Pile under Shear Wall*
- *Pile under Braced Frame Column*

FINAL STRUCTURE SOIL AND ROCK REPORT

NEW HAVEN RAIL YARD FACILITIES IMPROVEMENTS PROJECT

MAINTENANCE OF WAY (MOW) BUILDING FOUNDATION PLAN

DECEMBER 2014

FIGURE 4

APPENDIX A

TEST BORING LOGS

Driller	W. Hoeckele	**BORING LOG**		Hole No.:	MOW-1
Inspector:	D. D'Angelo	Town:	New Haven	Stat./Offset:	
Engineer:	Parsons Brinckerhoff	Project No.:	0301-0124	Northing:	668680
Start Date:	6-18-14	Route No.:		Easting:	952688
Finish Date:	6-19-14	Bridge No.:		Surface Elevation:	12.0

Project Description: New Haven Rail Yard Facilities Improvements - Maintenance of Way (MOW) Building

Casing Size/Type: HW	Sampler Type/Size: Split Spoon / 1-3/8" I.D.	Core Barrel Type:
Hammer Wt.: 300lb Fall: 24in.	Hammer Wt.: 140lb Fall: 30in.	

Groundwater Observations: @10.0 to 11.5 feet (Estimated)

Depth (ft)	SAMPLES: Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0						FLOOR SLAB	Cold Storage Facility Floor Slab: Concrete (0"-5"), Styrofoam (5"-11"), Concrete (11"-16")	
						VOID	Void between floor slab and ground surface (16"-66")	10
5								
	S-1	3 17 34 45	24	16		SANDY GRAVEL	Reddish-brown c-f GRAVEL, some c-f sand, trace silt, very dense (PROBABLE FILL)	5
10	S-2	28 28 7 7	24	16		ORGANIC CLAYEY SILT	S-2A (Above 10'): Reddish-brown c-f SAND and m-f GRAVEL, little silt, dense (PROBABLE FILL) S-2B (Below 10'): Dark gray ORGANIC clayey SILT, trace m gravel, stiff (PROBABLE FILL)	0
							Note: Wash from 9' to 14 ' very gravelly	
15	S-3	4 4 3 5	24	7			Dark brown ORGANIC clayey SILT, trace f sand, medium stiff (PROBABLE FILL to ~19 feet)	-5
	UP-1	P U S H	24	0			Note: Undisturbed sample attempt @ 17' to 19' resulted in no recovery. Bottom of tube slightly crushed and plugged with sand and gravel wash.	
20	S-4	2 1 3 2	24	24			Dark gray ORGANIC clayey SILT, trace shells, soft to medium stiff	-10

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test
Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in	NOTES: 1. SPT's taken with spooling winch and safety hammer	Sheet
Earth: 90.5ft Rock: 0ft	2. Hole drilled with a Diedrich D50 mounted on a rubber tracked ATV 3. Hole grouted upon completion	1 of 5
No. of Soil Samples: 22 No. of Core Runs: 0		SM-001-M REV. 1/02

Driller	W. Hoeckele	**BORING LOG**		Hole No.:	MOW-1
Inspector:	D. D'Angelo	Town:	New Haven	Stat./Offset:	
Engineer:	Parsons Brinckerhoff	Project No.:	0301-0124	Northing:	668680
Start Date:	6-18-14	Route No.:		Easting:	952688
Finish Date:	6-19-14	Bridge No.:		Surface Elevation:	12.0

Project Description: New Haven Rail Yard Facilities Improvements - Maintenance of Way (MOW) Building

Casing Size/Type: HW	Sampler Type/Size: Split Spoon / 1-3/8" I.D.	Core Barrel Type:
Hammer Wt.: 300lb Fall: 24in.	Hammer Wt.: 140lb Fall: 30in.	

Groundwater Observations: @10.0 to 11.5 feet (Estimated)

Depth (ft)	SAMPLES Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
								-10
	UP-2	P U S H	24	24		ORGANIC CLAYEY SILT *(con't)*	Dark gray ORGANIC clayey SILT	
25	S-5	WOR WOR WOH WOH	24	24			Dark gray ORGANIC clayey SILT, trace shells, very soft	
								-15
30	S-6	WOR WOR WOH WOH	24	24			Dark gray ORGANIC clayey SILT, trace shells, very soft	
						SILTY SAND		-20
35	S-7	5 6 6 7	24	24			Gray f SAND, little silt, medium dense	
								-25
40	S-8	12 17 17 21	24	19			Gray f SAND, little silt, dense	
								-30
						ORGANIC CLAYEY SILT		

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test
Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 90.5ft Rock: 0ft	NOTES: 1. SPT's taken with spooling winch and safety hammer 2. Hole drilled with a Diedrich D50 mounted on a rubber tracked ATV 3. Hole grouted upon completion	Sheet 2 of 5
No. of Soil Samples: 22 No. of Core Runs: 0		SM-001-M REV. 1/02

Driller	W. Hoeckele	**BORING LOG**		Hole No.:	MOW-1
Inspector:	D. D'Angelo	Town:	New Haven	Stat./Offset:	
Engineer:	Parsons Brinckerhoff	Project No.:	0301-0124	Northing:	668680
Start Date:	6-18-14	Route No.:		Easting:	952688
Finish Date:	6-19-14	Bridge No.:		Surface Elevation:	12.0

Project Description: New Haven Rail Yard Facilities Improvements - Maintenance of Way (MOW) Building

Casing Size/Type: HW	Sampler Type/Size: Split Spoon / 1-3/8" I.D.	Core Barrel Type:
Hammer Wt.: 300lb Fall: 24in.	Hammer Wt.: 140lb Fall: 30in.	

Groundwater Observations: @10.0 to 11.5 feet (Estimated)

Depth (ft)	SAMPLES: Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
45	S-9	1 1 3 3	24	24		ORGANIC CLAYEY SILT *(con't)*	Dark gray ORGANIC clayey SILT, trace shells, soft to medium stiff	
								-35
	UP-3	P U S H	24	24			Dark gray ORGANIC clayey SILT, trace shells	
50	S-10	WOH 3 8 14	24	18		PEAT SAND	S-10A (Above 50'): Dark gray ORGANIC clayey SILT, trace shells, very soft to medium stiff S-10B (50' to 50.2'): Dark brown PEAT, medium stiff S-10C (Below 50.2'): Gray f SAND, trace silt, medium dense	-40
55	S-11	6 15 27 30	24	14			Reddish-brown c-f SAND, trace silt, dense	
								-45
60	S-12	20 20 22 24	24	20			Reddish-brown to gray c-f SAND, trace f gravel, dense	
								-50
65	S-13	15 21 21 24	24	20			S-13A (Above 65.5'): Reddish-brown to gray c-f SAND, trace f gravel, dense S-13B (Below 65.5'): Reddish-brown f SAND,	

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test
Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in	NOTES: 1. SPT's taken with spooling winch and safety hammer	Sheet
Earth: 90.5ft Rock: 0ft	2. Hole drilled with a Diedrich D50 mounted on a rubber tracked ATV 3. Hole grouted upon completion	3 of 5
No. of Soil Samples: 22 No. of Core Runs: 0		SM-001-M REV. 1/02

Driller	W. Hoeckele	**BORING LOG**		Hole No.:	MOW-1
Inspector:	D. D'Angelo	Town:	New Haven	Stat./Offset:	
Engineer:	Parsons Brinckerhoff	Project No.:	0301-0124	Northing:	668680
Start Date:	6-18-14	Route No.:		Easting:	952688
Finish Date:	6-19-14	Bridge No.:		Surface Elevation:	12.0

Project Description: New Haven Rail Yard Facilities Improvements - Maintenance of Way (MOW) Building

Casing Size/Type: HW	Sampler Type/Size: Split Spoon / 1-3/8" I.D.	Core Barrel Type:
Hammer Wt.: 300lb Fall: 24in.	Hammer Wt.: 140lb Fall: 30in.	

Groundwater Observations: @10.0 to 11.5 feet (Estimated)

Depth (ft)	SAMPLES Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
						SAND AND SILT *(con't)*	some silt, dense	-55
70	S-14	9 17 28 29	24	18			Reddish-brown SILT and f SAND, dense	-60
75	S-15	13 19 26 49	24	19			Reddish-brown f SAND, some silt, dense	-65
80	S-16	9 19 35 92	24	20			Reddish-brown f SAND and SILT, very dense	-70
						SILTY SAND		
85	S-17	16 28 38 41	24	14			Reddish-brown f SAND, little silt, very dense	-75

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test
Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in	NOTES: 1. SPT's taken with spooling winch and safety hammer	Sheet
Earth: 90.5ft Rock: 0ft	2. Hole drilled with a Diedrich D50 mounted on a rubber tracked ATV	4 of 5
No. of Soil Samples: 22 No. of Core Runs: 0	3. Hole grouted upon completion	SM-001-M REV. 1/02

Driller	W. Hoeckele	**BORING LOG**		Hole No.:	MOW-1
Inspector:	D. D'Angelo	Town:	New Haven	Stat./Offset:	
Engineer:	Parsons Brinckerhoff	Project No.:	0301-0124	Northing:	668680
Start Date:	6-18-14	Route No.:		Easting:	952688
Finish Date:	6-19-14	Bridge No.:		Surface Elevation:	12.0

Project Description: New Haven Rail Yard Facilities Improvements - Maintenance of Way (MOW) Building

Casing Size/Type: HW	Sampler Type/Size: Split Spoon / 1-3/8" I.D.	Core Barrel Type:
Hammer Wt.: 300lb Fall: 24in.	Hammer Wt.: 140lb Fall: 30in.	

Groundwater Observations: @10.0 to 11.5 feet (Estimated)

Depth (ft)	SAMPLES Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
						SILTY SAND *(con't)*		
90	S-18	14 28 29 37	24	14			Reddish-brown f SAND, some silt, very dense	
								-80
95	S-19	14 23 23 32	24	16			Reddish-brown f SAND, trace silt, dense	
							END OF BORING 96 ft	-85
100								-90
105								-95
110								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test
Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in	NOTES: 1. SPT's taken with spooling winch and safety hammer	Sheet
Earth: 90.5ft Rock: 0ft	2. Hole drilled with a Diedrich D50 mounted on a rubber tracked ATV 3. Hole grouted upon completion	5 of 5
No. of Soil Samples: 22 No. of Core Runs: 0		SM-001-M REV. 1/02

Driller W. Hoeckele	**BORING LOG**		Hole No.: MOW-2
Inspector: D. D'Angelo	Town: New Haven		Stat./Offset:
Engineer: Parsons Brinckerhoff	Project No.: 0301-0124		Northing: 668792
Start Date: 6-16-14	Route No.:		Easting: 952769
Finish Date: 6-17-14	Bridge No.:		Surface Elevation: 12.0
Project Description: New Haven Rail Yard Facilities Improvements - Maintenance of Way (MOW) Building			
Casing Size/Type: HW	Sampler Type/Size: Split Spoon / 1-3/8" I.D.		Core Barrel Type:
Hammer Wt.: 300lb Fall: 24in.	Hammer Wt.: 140lb Fall: 30in.		
Groundwater Observations: @10.0 to 11.5 feet (Estimated)			

Depth (ft)	SAMPLES Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0						FLOOR SLAB	Cold Storage Facility Floor Slab: Concrete (0"-5"), Styrofoam (5"-11"), Concrete (11"-16") Void between floor slab and ground surface (16"-66")	
						VOID		10
5								
	S-1	21 42 29 44	24	10		SILTY GRAVELLY SAND	Reddish-brown c-f SAND, some silt, some m-f gravel, very dense (PROBABLE FILL)	5
10	S-2	11 6 4 5	24	10		ORGANIC CLAYEY SILT	S-2A (Above 9.5'): Reddish-brown SILT, little c-f SAND, trace m-f Gravel, dense (PROBABLE FILL) S-2B (Below 9.5'): Dark gray ORGANIC clayey SILT, stiff (PROBABLE FILL)	
						GRAVELLY SAND		0
15	S-3	12 12 8 10	24	12			Gray c-f SAND, little m-f gravel, trace silt, medium dense (PROBABLE FILL)	-5
						ORGANIC CLAYEY SILT		
20	S-4	3 2 2 3	24	19			Dark gray ORGANIC clayey SILT, trace shells, soft to medium stiff	-10

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test
Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 90.5ft Rock: 0ft	NOTES: 1. SPT's taken with spooling winch and safety hammer 2. Hole drilled with a Diedrich D50 mounted on a rubber tracked ATV 3. Hole grouted upon completion	Sheet 1 of 5
No. of Soil Samples: 22 No. of Core Runs: 0		SM-001-M REV. 1/02

Driller	W. Hoeckele	**BORING LOG**		Hole No.:	MOW-2
Inspector:	D. D'Angelo	Town:	New Haven	Stat./Offset:	
Engineer:	Parsons Brinckerhoff	Project No.:	0301-0124	Northing:	668792
Start Date:	6-16-14	Route No.:		Easting:	952769
Finish Date:	6-17-14	Bridge No.:		Surface Elevation:	12.0

Project Description: New Haven Rail Yard Facilities Improvements - Maintenance of Way (MOW) Building

Casing Size/Type: HW	Sampler Type/Size: Split Spoon / 1-3/8" I.D.	Core Barrel Type:
Hammer Wt.: 300lb Fall: 24in.	Hammer Wt.: 140lb Fall: 30in.	

Groundwater Observations: @10.0 to 11.5 feet (Estimated)

Depth (ft)	SAMPLES Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
						ORGANIC CLAYEY SILT *(con't)*		-10
25	S-5	WOR WOH WOH WOH	24	21			Dark gray ORGANIC clayey SILT, trace f sand, trace shells, very soft	
								-15
30	S-6	WOR WOR 1 2	24	22			Dark gray ORGANIC clayey SILT, trace shells, very soft	
								-20
35	S-7	WOH WOH WOH WOH	24	24			S-7A (Above 35'): Dark gray ORGANIC clayey SILT, trace shells, very soft S-7B (Below 35'): Dark gray SILT and f SAND, trace clay, very loose	
						SILT AND SAND		-25
40	S-8	1 1 1 4	24	24			Dark gray f SAND, some silt, trace clay, very loose	
								-30

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test
Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in	NOTES: 1. SPT's taken with spooling winch and safety hammer	Sheet
Earth: 90.5ft Rock: 0ft	2. Hole drilled with a Diedrich D50 mounted on a rubber tracked ATV 3. Hole grouted upon completion	2 of 5
No. of Soil Samples: 22 No. of Core Runs: 0		SM-001-M REV. 1/02

Driller	W. Hoeckele	**BORING LOG**		Hole No.:	MOW-2
Inspector:	D. D'Angelo	Town:	New Haven	Stat./Offset:	
Engineer:	Parsons Brinckerhoff	Project No.:	0301-0124	Northing:	668792
Start Date:	6-16-14	Route No.:		Easting:	952769
Finish Date:	6-17-14	Bridge No.:		Surface Elevation:	12.0

Project Description: New Haven Rail Yard Facilities Improvements - Maintenance of Way (MOW) Building

Casing Size/Type: HW	Sampler Type/Size: Split Spoon / 1-3/8" I.D.	Core Barrel Type:
Hammer Wt.: 300lb Fall: 24in.	Hammer Wt.: 140lb Fall: 30in.	

Groundwater Observations: @10.0 to 11.5 feet (Estimated)

Depth (ft)	SAMPLES Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
45	S-9	WOH WOH 7 27	24	24		SILTY SAND	S-9A (Above 45'): Dark gray SILT and f SAND, trace clay, trace shells, very loose S-9B (Below 45'): Reddish-brown f SAND, little silt, medium dense	
								-35
50	S-10	18 29 30 32	24	14			Reddish-brown c-f SAND, little f gravel, trace silt, very dense	
								-40
55	S-11	16 23 32 42	24	16			Reddish-brown f SAND and SILT, very dense	
								-45
60	S-12	6 10 11 16	24	16			Reddish-brown f SAND, trace silt, medium dense	
								-50
65	S-13	7 11 16 22	24	17			Reddish-brown f SAND, little silt, medium dense	

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test
Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in	NOTES: 1. SPT's taken with spooling winch and safety hammer	Sheet
Earth: 90.5ft Rock: 0ft	2. Hole drilled with a Diedrich D50 mounted on a rubber tracked ATV 3. Hole grouted upon completion	3 of 5
No. of Soil Samples: 22 No. of Core Runs: 0		SM-001-M REV. 1/02

Driller	W. Hoeckele	**BORING LOG**		Hole No.:	MOW-2
Inspector:	D. D'Angelo	Town:	New Haven	Stat./Offset:	
Engineer:	Parsons Brinckerhoff	Project No.:	0301-0124	Northing:	668792
Start Date:	6-16-14	Route No.:		Easting:	952769
Finish Date:	6-17-14	Bridge No.:		Surface Elevation:	12.0

Project Description: New Haven Rail Yard Facilities Improvements - Maintenance of Way (MOW) Building

Casing Size/Type: HW	Sampler Type/Size: Split Spoon / 1-3/8" I.D.	Core Barrel Type:
Hammer Wt.: 300lb Fall: 24in.	Hammer Wt.: 140lb Fall: 30in.	

Groundwater Observations: @10.0 to 11.5 feet (Estimated)

Depth (ft)	SAMPLES Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
						SILTY SAND *(con't)*		-55
70	S-14	6 9 15 19	24	16			Reddish-brown f SAND, some silt, medium dense	-60
75	S-15	5 14 20 30	24	22			Reddish-brown f SAND, little silt, dense	-65
80	S-16	10 11 16 26	24	20			Reddish-brown f SAND, trace silt, medium dense	-70
85	S-17	6 7 11 28	24	6			Reddish-brown f SAND, some silt, medium dense	-75

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test
Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 90.5ft Rock: 0ft	NOTES: 1. SPT's taken with spooling winch and safety hammer 2. Hole drilled with a Diedrich D50 mounted on a rubber tracked ATV 3. Hole grouted upon completion	Sheet 4 of 5
No. of Soil Samples: 22 No. of Core Runs: 0		SM-001-M REV. 1/02

Driller	W. Hoeckele	**BORING LOG**		Hole No.:	MOW-2
Inspector:	D. D'Angelo	Town:	New Haven	Stat./Offset:	
Engineer:	Parsons Brinckerhoff	Project No.:	0301-0124	Northing:	668792
Start Date:	6-16-14	Route No.:		Easting:	952769
Finish Date:	6-17-14	Bridge No.:		Surface Elevation:	12.0

Project Description: New Haven Rail Yard Facilities Improvements - Maintenance of Way (MOW) Building

Casing Size/Type: HW	Sampler Type/Size: Split Spoon / 1-3/8" I.D.	Core Barrel Type:
Hammer Wt.: 300lb Fall: 24in.	Hammer Wt.: 140lb Fall: 30in.	

Groundwater Observations: @10.0 to 11.5 feet (Estimated)

Depth (ft)	SAMPLES Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
						SILTY SAND *(con't)*		
90	S-18	10 16 19 25	24	10			Reddish-brown f SAND, little silt, dense	
								-80
95	S-19	14 17 24 36	24	18			Reddish-brown f SAND, trace silt, dense	
							END OF BORING 96 ft	-85
100								-90
105								-95
110								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test
Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in	NOTES: 1. SPT's taken with spooling winch and safety hammer	Sheet
Earth: 90.5ft Rock: 0ft	2. Hole drilled with a Diedrich D50 mounted on a rubber tracked ATV 3. Hole grouted upon completion	5 of 5
No. of Soil Samples: 22 No. of Core Runs: 0		SM-001-M REV. 1/02

Driller W. Hoeckele	**BORING LOG**		Hole No.: MOW-3
Inspector: D. D'Angelo	Town: New Haven		Stat./Offset:
Engineer: Parsons Brinckerhoff	Project No.: 0301-0124		Northing: 668674
Start Date: 6-12-14	Route No.:		Easting: 952823
Finish Date: 6-13-14	Bridge No.:		Surface Elevation: 12.0
Project Description: New Haven Rail Yard Facilities Improvements - Maintenance of Way (MOW) Building			
Casing Size/Type: HW	Sampler Type/Size: Split Spoon / 1-3/8" I.D.		Core Barrel Type:
Hammer Wt.: 300lb Fall: 24in.	Hammer Wt.: 140lb Fall: 30in.		
Groundwater Observations: @10.0 to 11.5 feet (Estimated)			

Depth (ft)	SAMPLES Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0						FLOOR SLAB	Cold Storage Facility Floor Slab: Concrete (0"-5"), Expanded Polystyrene (5"-13"), Concrete (13"-23")	
						VOID	Void between floor slab and ground surface (23"-30")	10
						SAND		
	S-1	5 10 12 9	24	19			Reddish-brown f SAND, trace silt, medium dense (PROBABLE FILL)	
5	S-2	4 5 14 49	24	20			Reddish-brown f SAND, trace m-f gravel, medium dense (PROBABLE FILL)	
								5
						SILTY SAND		
10	S-3	31 45 38 39	24	14			Reddish-brown c-f SAND, some silt, some m-f gravel, very dense (PROBABLE FILL)	
						SILT AND SAND		0
15	S-4	9 5 5 11	24	7			Reddish-brown SILT and f SAND, trace black organic silt, loose to medium dense (PROBABLE FILL)	
								-5
						SILTY GRAVELLY SAND		
20	S-5	12 19 21 21	24	16			S-5A (Above 20'): Gray-brown c-f SAND, little f gravel, trace silt, dense (PROBABLE FILL) S-5B (Below 20'): Gray-brown f SAND, little silt, dense (PROBABLE FILL)	
								-10

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test
Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 98.5ft Rock: 0ft	NOTES: 1. SPT's taken with spooling winch and safety hammer 2. Hole drilled with a Diedrich D50 mounted on a rubber tracked ATV 3. Hole grouted upon completion	Sheet 1 of 5
No. of Soil Samples: 22 No. of Core Runs: 0		SM-001-M REV. 1/02

Driller	W. Hoeckele	**BORING LOG**		Hole No.:	MOW-3
Inspector:	D. D'Angelo	Town:	New Haven	Stat./Offset:	
Engineer:	Parsons Brinckerhoff	Project No.:	0301-0124	Northing:	668674
Start Date:	6-12-14	Route No.:		Easting:	952823
Finish Date:	6-13-14	Bridge No.:		Surface Elevation:	12.0

Project Description: New Haven Rail Yard Facilities Improvements - Maintenance of Way (MOW) Building

Casing Size/Type: HW	Sampler Type/Size: Split Spoon / 1-3/8" I.D.	Core Barrel Type:
Hammer Wt.: 300lb Fall: 24in.	Hammer Wt.: 140lb Fall: 30in.	

Groundwater Observations: @10.0 to 11.5 feet (Estimated)

Depth (ft)	SAMPLES Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
								-10
						ORGANIC CLAYEY SILT		
25	S-6	WOHWOH 3 4	24	24				
								-15
	UP-1	P U S H	24	24			Dark gray ORGANIC clayey SILT, trace shells	
30	S-7	WORWOHWOHWOH	24	24			Dark gray ORGANIC clayey SILT, trace shells, very soft	
								-20
35	S-8	WORWORWOHWOH	24	24			Dark gray ORGANIC clayey SILT, trace f sand, trace shells, very soft	
								-25
40	S-9	WORWORWOHWOH	24	24			Dark gray ORGANIC clayey SILT, trace shells, very soft	
								-30

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test
Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 98.5ft Rock: 0ft	NOTES: 1. SPT's taken with spooling winch and safety hammer 2. Hole drilled with a Diedrich D50 mounted on a rubber tracked ATV 3. Hole grouted upon completion	Sheet 2 of 5
No. of Soil Samples: 22 No. of Core Runs: 0		SM-001-M REV. 1/02

Driller	W. Hoeckele	**BORING LOG**		Hole No.:	MOW-3
Inspector:	D. D'Angelo	Town:	New Haven	Stat./Offset:	
Engineer:	Parsons Brinckerhoff	Project No.:	0301-0124	Northing:	668674
Start Date:	6-12-14	Route No.:		Easting:	952823
Finish Date:	6-13-14	Bridge No.:		Surface Elevation:	12.0

Project Description: New Haven Rail Yard Facilities Improvements - Maintenance of Way (MOW) Building

Casing Size/Type: HW	Sampler Type/Size: Split Spoon / 1-3/8" I.D.	Core Barrel Type:
Hammer Wt.: 300lb Fall: 24in.	Hammer Wt.: 140lb Fall: 30in.	

Groundwater Observations: @10.0 to 11.5 feet (Estimated)

Depth (ft)	SAMPLES Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
45	S-10	WOR WOR WOH WOH	24	24		ORGANIC CLAYEY SILT *(con't)*	Dark gray ORGANIC clayey SILT, trace shells, very soft	
								-35
50	S-11	WOH WOH 3 7	24	24			Dark gray ORGANIC clayey SILT, little f sand, transitioning to organic silt, soft	
								-40
						SILTY SAND		
55	S-12	13 10 12 18	24	14			Reddish-brown SILT, some f sand, medium dense	
								-45
60	S-13	10 20 26 35	24	15			Reddish-brown SILT, some f sand, dense	
								-50
65	S-14	12 19 14 30	24	18			Reddish-brown f SAND and SILT, dense	

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test
Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in	NOTES: 1. SPT's taken with spooling winch and safety hammer	Sheet
Earth: 98.5ft Rock: 0ft	2. Hole drilled with a Diedrich D50 mounted on a rubber tracked ATV 3. Hole grouted upon completion	3 of 5
No. of Soil Samples: 22 No. of Core Runs: 0		SM-001-M REV. 1/02

Driller	W. Hoeckele	**BORING LOG**		Hole No.:	MOW-3
Inspector:	D. D'Angelo	Town:	New Haven	Stat./Offset:	
Engineer:	Parsons Brinckerhoff	Project No.:	0301-0124	Northing:	668674
Start Date:	6-12-14	Route No.:		Easting:	952823
Finish Date:	6-13-14	Bridge No.:		Surface Elevation:	12.0

Project Description: New Haven Rail Yard Facilities Improvements - Maintenance of Way (MOW) Building

Casing Size/Type: HW	Sampler Type/Size: Split Spoon / 1-3/8" I.D.	Core Barrel Type:
Hammer Wt.: 300lb Fall: 24in.	Hammer Wt.: 140lb Fall: 30in.	

Groundwater Observations: @10.0 to 11.5 feet (Estimated)

Depth (ft)	SAMPLES Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
						SILTY SAND *(con't)*		-55
70	S-15	16 20 20 34	24	18			Reddish-brown f SAND, little silt, dense	-60
						SANDY SILT		
75	S-16	12 17 30 31	24	19			Reddish-brown SILT, some f sand, dense	-65
80	S-17	16 24 28 32	24	17			Reddish-brown SILT, some f sand, very dense	-70
						SILTY SAND		
85	S-18	20 33 38 32	24	15			Reddish-brown f SAND, little silt, very dense	-75

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test
Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in	NOTES: 1. SPT's taken with spooling winch and safety hammer	Sheet
Earth: 98.5ft Rock: 0ft	2. Hole drilled with a Diedrich D50 mounted on a rubber tracked ATV	4 of 5
No. of Soil Samples: 22 No. of Core Runs: 0	3. Hole grouted upon completion	SM-001-M REV. 1/02

Driller	W. Hoeckele	**BORING LOG**		Hole No.:	MOW-3
Inspector:	D. D'Angelo	Town:	New Haven	Stat./Offset:	
Engineer:	Parsons Brinckerhoff	Project No.:	0301-0124	Northing:	668674
Start Date:	6-12-14	Route No.:		Easting:	952823
Finish Date:	6-13-14	Bridge No.:		Surface Elevation:	12.0

Project Description: New Haven Rail Yard Facilities Improvements - Maintenance of Way (MOW) Building

Casing Size/Type: HW	Sampler Type/Size: Split Spoon / 1-3/8" I.D.	Core Barrel Type:
Hammer Wt.: 300lb Fall: 24in.	Hammer Wt.: 140lb Fall: 30in.	

Groundwater Observations: @10.0 to 11.5 feet (Estimated)

Depth (ft)	SAMPLES Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
						SILTY SAND *(con't)*		
90	S-19	13 15 20 16	24	14			Reddish-brown f SAND, little silt, dense	
								-80
95	S-20	12 21 27 27	24	17			Reddish-brown f SAND, little silt, dense	
								-85
100	S-21	15 21 23 34	24	19			Reddish-brown f SAND, little silt, dense	
							END OF BORING 101 ft	
								-90
105								
								-95
110								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test
Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in	NOTES: 1. SPT's taken with spooling winch and safety hammer	Sheet
Earth: 98.5ft Rock: 0ft	2. Hole drilled with a Diedrich D50 mounted on a rubber tracked ATV 3. Hole grouted upon completion	5 of 5
No. of Soil Samples: 22 No. of Core Runs: 0		SM-001-M REV. 1/02

Driller	W. Hoeckele	**BORING LOG**		Hole No.:	MOW-4
Inspector:	D. D'Angelo	Town:	New Haven	Stat./Offset:	
Engineer:	Parsons Brinckerhoff	Project No.:	0301-0124	Northing:	668575
Start Date:	6-9-14	Route No.:		Easting:	952874
Finish Date:	6-10-14	Bridge No.:		Surface Elevation:	12.0

Project Description: New Haven Rail Yard Facilities Improvements - Maintenance of Way (MOW) Building

Casing Size/Type: HW	Sampler Type/Size: Split Spoon / 1-3/8" I.D.	Core Barrel Type:
Hammer Wt.: 300lb Fall: 24in.	Hammer Wt.: 140lb Fall: 30in.	

Groundwater Observations: @10.0 to 11.5 feet (Estimated)

Depth (ft)	SAMPLES: Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0						FLOOR SLAB	Cold Storage Facility Floor Slab: Concrete (0"-6"), Expanded Polystyrene (6"-14"), Concrete (14"-22")	
						VOID	Void between floor slab and ground surface (22"-30")	10
	S-1	3 11 17 15	24	14		SILTY GRAVELLY SAND	Reddish-brown c-f SAND, trace silt, trace m-f gravel, medium dense (PROBABLE FILL)	
5	S-2	9 8 11 38	24	10			Reddish-brown c-f SAND, little silt, little c-f gravel, medium dense (PROBABLE FILL)	
								5
10	S-3	18 21 6 4	24	9			Reddish-brown c-f SAND, little silt, little m-f gravel, medium dense (PROBABLE FILL)	
								0
15	S-4	8 12 23 29	24	16			S-4A (Above 15'): Reddish-brown f SAND and SILT, dense (PROBABLE FILL) S-4B (Below 15'): Gray-reddish-brown c-f SAND and m-f GRAVEL, dense (PROBABLE FILL)	
								-5
						SILTY SAND		
20	S-5	20 15 16 24	24	8			Reddish-brown over gray c-f SAND, little silt, trace f gravel, dense (PROBABLE FILL)	
								-10

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test
Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in	NOTES: 1. SPT's taken with spooling winch and safety hammer	Sheet
Earth: 98.5ft Rock: 0ft	2. Hole drilled with a Diedrich D50 mounted on a rubber tracked ATV 3. Hole grouted upon completion	1 of 5
No. of Soil Samples: 22 No. of Core Runs: 0		SM-001-M REV. 1/02

Driller	W. Hoeckele	**BORING LOG**		Hole No.:	MOW-4
Inspector:	D. D'Angelo	Town:	New Haven	Stat./Offset:	
Engineer:	Parsons Brinckerhoff	Project No.:	0301-0124	Northing:	668575
Start Date:	6-9-14	Route No.:		Easting:	952874
Finish Date:	6-10-14	Bridge No.:		Surface Elevation:	12.0

Project Description: New Haven Rail Yard Facilities Improvements - Maintenance of Way (MOW) Building

Casing Size/Type: HW	Sampler Type/Size: Split Spoon / 1-3/8" I.D.	Core Barrel Type:
Hammer Wt.: 300lb Fall: 24in.	Hammer Wt.: 140lb Fall: 30in.	

Groundwater Observations: @10.0 to 11.5 feet (Estimated)

Depth (ft)	SAMPLES Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
						SILTY SAND *(con't)*		-10
						ORGANIC CLAYEY SILT		
25	S-6	WOHWOH 24 22	24	22			Dark gray ORGANIC clayey SILT, trace shells, medium stiff	
								-15
30	S-7	WOHWOHWOH 1	24	24			Gray ORGANIC clayey SILT, trace shells, very soft	
								-20
	UP-1	P U S H	24	22			Gray ORGANIC clayey SILT	
35	S-8	WOHWOHWOH 2	24	24			Gray ORGANIC clayey SILT, trace shells, very soft	
								-25
40	S-9	WORWOHWOHWOH	24	19			Gray ORGANIC clayey SILT, trace f sand, trace shells, very soft	
								-30

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test
Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in	NOTES: 1. SPT's taken with spooling winch and safety hammer	Sheet
Earth: 98.5ft Rock: 0ft	2. Hole drilled with a Diedrich D50 mounted on a rubber tracked ATV	2 of 5
No. of Soil Samples: 22 No. of Core Runs: 0	3. Hole grouted upon completion	SM-001-M REV. 1/02

Driller	W. Hoeckele	**BORING LOG**		Hole No.:	MOW-4
Inspector:	D. D'Angelo	Town:	New Haven	Stat./Offset:	
Engineer:	Parsons Brinckerhoff	Project No.:	0301-0124	Northing:	668575
Start Date:	6-9-14	Route No.:		Easting:	952874
Finish Date:	6-10-14	Bridge No.:		Surface Elevation:	12.0

Project Description: New Haven Rail Yard Facilities Improvements - Maintenance of Way (MOW) Building

Casing Size/Type: HW	Sampler Type/Size: Split Spoon / 1-3/8" I.D.	Core Barrel Type:
Hammer Wt.: 300lb Fall: 24in.	Hammer Wt.: 140lb Fall: 30in.	

Groundwater Observations: @10.0 to 11.5 feet (Estimated)

Depth (ft)	SAMPLES Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
45	S-10	WOH 4 3 5	24	20		ORGANIC CLAYEY SILT *(con't)*	Gray ORGANIC clayey SILT, trace shells, medium stiff	
								-35
50	S-11	4 15 28 26	24	18		PEAT / SILTY SAND	S-11A (Above 49.5'): Gray ORGANIC clayey SILT, trace shells, over 2" layer of peat, medium stiff to stiff S-11B (Below 49.5'): Gray c-f SAND, trace silt, dense	
								-40
55	S-12	13 18 24 17	24	14			Gray-brown c-f SAND, trace f gravel, trace silt, dense	
								-45
60	S-13	13 15 18 24	24	15			Reddish-brown f SAND, little silt, dense	
								-50
						SILT AND SAND		
65	S-14	11 23 27 36	24	13			Reddish-brown SILT and f SAND, dense to very dense	

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test
Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 98.5ft Rock: 0ft	NOTES: 1. SPT's taken with spooling winch and safety hammer 2. Hole drilled with a Diedrich D50 mounted on a rubber tracked ATV 3. Hole grouted upon completion	Sheet 3 of 5
No. of Soil Samples: 22 No. of Core Runs: 0		SM-001-M REV. 1/02

Driller	W. Hoeckele	**BORING LOG**		Hole No.:	MOW-4
Inspector:	D. D'Angelo	Town:	New Haven	Stat./Offset:	
Engineer:	Parsons Brinckerhoff	Project No.:	0301-0124	Northing:	668575
Start Date:	6-9-14	Route No.:		Easting:	952874
Finish Date:	6-10-14	Bridge No.:		Surface Elevation:	12.0

Project Description: New Haven Rail Yard Facilities Improvements - Maintenance of Way (MOW) Building

Casing Size/Type: HW	Sampler Type/Size: Split Spoon / 1-3/8" I.D.	Core Barrel Type:
Hammer Wt.: 300lb Fall: 24in.	Hammer Wt.: 140lb Fall: 30in.	

Groundwater Observations: @10.0 to 11.5 feet (Estimated)

Depth (ft)	SAMPLES Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
						SILT AND SAND *(con't)*		-55
						SANDY SILT		
70	S-15	15 26 36 35	24	17			Reddish-brown SILT, some f sand, very dense	
								-60
75	S-16	15 20 34 35	24	14			Reddish-brown SILT, some f sand, very dense	
								-65
						SILT AND SAND		
80	S-17	17 25 30 30	24	12			Reddish-brown SILT and f SAND, very dense	
								-70
						SANDY SILT		
85	S-18	12 17 25 40	24	14			Reddish-brown SILT, some f sand, dense	
								-75
						SILTY SAND		

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test
Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in	NOTES: 1. SPT's taken with spooling winch and safety hammer	Sheet
Earth: 98.5ft Rock: 0ft	2. Hole drilled with a Diedrich D50 mounted on a rubber tracked ATV	4 of 5
No. of Soil Samples: 22 No. of Core Runs: 0	3. Hole grouted upon completion	SM-001-M REV. 1/02

Driller	W. Hoeckele	**BORING LOG**		Hole No.:	MOW-4
Inspector:	D. D'Angelo	Town:	New Haven	Stat./Offset:	
Engineer:	Parsons Brinckerhoff	Project No.:	0301-0124	Northing:	668575
Start Date:	6-9-14	Route No.:		Easting:	952874
Finish Date:	6-10-14	Bridge No.:		Surface Elevation:	12.0

Project Description: New Haven Rail Yard Facilities Improvements - Maintenance of Way (MOW) Building

Casing Size/Type: HW	Sampler Type/Size: Split Spoon / 1-3/8" I.D.	Core Barrel Type:
Hammer Wt.: 300lb Fall: 24in.	Hammer Wt.: 140lb Fall: 30in.	

Groundwater Observations: @10.0 to 11.5 feet (Estimated)

Depth (ft)	SAMPLES Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
						SILTY SAND *(con't)*		
90	S-19	22 36 38 36	24	12			Reddish-brown f SAND, little silt, very dense	
								-80
95	S-20	22 25 21 20	24	13			Reddish-brown f SAND, little silt, dense	
								-85
100	S-21	28 30 30 29	24	14			Reddish-brown f SAND, little silt, very dense	
							END OF BORING 101 ft	
								-90
105								
								-95
110								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test
Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in	NOTES: 1. SPT's taken with spooling winch and safety hammer	Sheet
Earth: 98.5ft Rock: 0ft	2. Hole drilled with a Diedrich D50 mounted on a rubber tracked ATV	5 of 5
No. of Soil Samples: 22 No. of Core Runs: 0	3. Hole grouted upon completion	SM-001-M REV. 1/02

Driller W. Hoeckele	**BORING LOG**		Hole No.: MOW-5
Inspector: D. D'Angelo	Town: New Haven		Stat./Offset:
Engineer: Parsons Brinckerhoff	Project No.: 0301-0124		Northing: 668648
Start Date: 6-10-14	Route No.:		Easting: 952927
Finish Date: 6-11-14	Bridge No.:		Surface Elevation: 12.0
Project Description: New Haven Rail Yard Facilities Improvements - Maintenance of Way (MOW) Building			
Casing Size/Type: HW	Sampler Type/Size: Split Spoon / 1-3/8" I.D.		Core Barrel Type:
Hammer Wt.: 300lb Fall: 24in.	Hammer Wt.: 140lb Fall: 30in.		
Groundwater Observations: @10.0 to 11.5 feet (Estimated)			

Depth (ft)	SAMPLES Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0						FLOOR SLAB	Cold Storage Facility Floor Slab: Concrete (0"-6"), Expanded Polystyrene (6"-14"), Concrete (14"-22")	
						VOID	Void between floor slab and ground surface (22"-26")	10
	S-1	2 2 21 51	24	11		SILTY GRAVELLY SAND	Reddish-brown c-f SAND, some silt, little m-f gravel, loose to medium dense (PROBABLE FILL)	
5	S-2	13 18 13 19	24	12			Reddish-brown c-f SAND, little m-f gravel, trace silt, dense (PROBABLE FILL)	
								5
10	S-3	15 11 10 15	24	9			Reddish-brown and dark gray c-f SAND, little silt, trace m-f gravel, medium dense (PROBABLE FILL)	
								0
						SAND AND GRAVEL		
15	S-4	12 12 15 23	24	14			Gray-brown c-f SAND, little m-f gravel, trace silt, medium dense (PROBABLE FILL)	
								-5
20	S-5	14 15 16 17	24	6			Gray-brown c-f SAND and m-f GRAVEL, dense (PROBABLE FILL)	
								-10

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test
Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 98.8ft Rock: 0ft	NOTES: 1. SPT's taken with spooling winch and safety hammer 2. Hole drilled with a Diedrich D50 mounted on a rubber tracked ATV 3. Hole grouted upon completion	Sheet 1 of 5
No. of Soil Samples: 23 No. of Core Runs: 0		SM-001-M REV. 1/02

Driller	W. Hoeckele	**BORING LOG**		Hole No.:	MOW-5
Inspector:	D. D'Angelo	Town:	New Haven	Stat./Offset:	
Engineer:	Parsons Brinckerhoff	Project No.:	0301-0124	Northing:	668648
Start Date:	6-10-14	Route No.:		Easting:	952927
Finish Date:	6-11-14	Bridge No.:		Surface Elevation:	12.0

Project Description: New Haven Rail Yard Facilities Improvements - Maintenance of Way (MOW) Building

Casing Size/Type: HW	Sampler Type/Size: Split Spoon / 1-3/8" I.D.	Core Barrel Type:
Hammer Wt.: 300lb Fall: 24in.	Hammer Wt.: 140lb Fall: 30in.	

Groundwater Observations: @10.0 to 11.5 feet (Estimated)

Depth (ft)	SAMPLES Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
								-10
						ORGANIC CLAYEY SILT		
25	S-6	WOH 2 3 3	24	24			Dark gray ORGANIC clayey SILT, trace f sand, trace shells, medium stiff	
								-15
	UP-1	P U S H	24	11			Dark gray ORGANIC clayey SILT	
30	S-7	WOHWOHWOH 3	24	24			Dark gray ORGANIC clayey SILT, trace shells, very soft	
								-20
35	S-8	WOHWOHWOHWOH	24	24			Dark gray ORGANIC clayey SILT, trace shells, very soft	
								-25
	UP-2	P U S H	24	23			Dark gray ORGANIC clayey SILT, trace shells	
40	S-9	WORWOH 3 4	24	24			Dark gray ORGANIC clayey SILT, trace shells, soft	
								-30

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test
Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 98.8ft Rock: 0ft	NOTES: 1. SPT's taken with spooling winch and safety hammer 2. Hole drilled with a Diedrich D50 mounted on a rubber tracked ATV 3. Hole grouted upon completion	Sheet 2 of 5
No. of Soil Samples: 23 No. of Core Runs: 0		SM-001-M REV. 1/02

Driller	W. Hoeckele	**BORING LOG**		Hole No.:	MOW-5
Inspector:	D. D'Angelo	Town:	New Haven	Stat./Offset:	
Engineer:	Parsons Brinckerhoff	Project No.:	0301-0124	Northing:	668648
Start Date:	6-10-14	Route No.:		Easting:	952927
Finish Date:	6-11-14	Bridge No.:		Surface Elevation:	12.0

Project Description: New Haven Rail Yard Facilities Improvements - Maintenance of Way (MOW) Building

Casing Size/Type: HW	Sampler Type/Size: Split Spoon / 1-3/8" I.D.	Core Barrel Type:
Hammer Wt.: 300lb Fall: 24in.	Hammer Wt.: 140lb Fall: 30in.	

Groundwater Observations: @10.0 to 11.5 feet (Estimated)

Depth (ft)	SAMPLES Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
45	S-10	WOR WOR WOH 5	24	24		ORGANIC CLAYEY SILT *(con't)*	Dark gray ORGANIC clayey SILT, trace shells, very soft	
								-35
						SILTY SAND		
50	S-11	16 24 28 31	24	16			Gray c-f SAND, trace silt, very dense	
								-40
55	S-12	10 10 11 18	24	18			Reddish-brown f SAND, some silt, medium dense	
								-45
60	S-13	12 12 19 23	24	12			Reddish-brown f SAND, little silt, dense	
								-50
						SILT AND SAND		
65	S-14	8 10 15 22	24	19			Reddish-brown SILT and f SAND, dense	

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test
Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in	NOTES: 1. SPT's taken with spooling winch and safety hammer	Sheet
Earth: 98.8ft Rock: 0ft	2. Hole drilled with a Diedrich D50 mounted on a rubber tracked ATV	3 of 5
No. of Soil Samples: 23 No. of Core Runs: 0	3. Hole grouted upon completion	SM-001-M REV. 1/02

Driller	W. Hoeckele	**BORING LOG**		Hole No.:	MOW-5
Inspector:	D. D'Angelo	Town:	New Haven	Stat./Offset:	
Engineer:	Parsons Brinckerhoff	Project No.:	0301-0124	Northing:	668648
Start Date:	6-10-14	Route No.:		Easting:	952927
Finish Date:	6-11-14	Bridge No.:		Surface Elevation:	12.0

Project Description: New Haven Rail Yard Facilities Improvements - Maintenance of Way (MOW) Building

Casing Size/Type: HW	Sampler Type/Size: Split Spoon / 1-3/8" I.D.	Core Barrel Type:
Hammer Wt.: 300lb Fall: 24in.	Hammer Wt.: 140lb Fall: 30in.	

Groundwater Observations: @10.0 to 11.5 feet (Estimated)

Depth (ft)	SAMPLES Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
						SILT AND SAND *(con't)*		-55
						SILTY SAND		
70	S-15	18 29 27 34	24	16			Reddish-brown f SAND, some silt, very dense	
								-60
75	S-16	13 21 20 23	24	18			Reddish-brown f SAND, little silt, dense	
								-65
80	S-17	10 16 16 29	24	14			Reddish-brown f SAND, some silt, dense	
								-70
						SANDY SILT		
85	S-18	10 16 28 33	24	21			Reddish-brown SILT, some f sand dense	
								-75
						SILTY SAND		

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test
Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in	NOTES: 1. SPT's taken with spooling winch and safety hammer	Sheet
Earth: 98.8ft Rock: 0ft	2. Hole drilled with a Diedrich D50 mounted on a rubber tracked ATV	4 of 5
No. of Soil Samples: 23 No. of Core Runs: 0	3. Hole grouted upon completion	SM-001-M REV. 1/02

Driller	W. Hoeckele	**BORING LOG**		Hole No.:	MOW-5
Inspector:	D. D'Angelo	Town:	New Haven	Stat./Offset:	
Engineer:	Parsons Brinckerhoff	Project No.:	0301-0124	Northing:	668648
Start Date:	6-10-14	Route No.:		Easting:	952927
Finish Date:	6-11-14	Bridge No.:		Surface Elevation:	12.0

Project Description: New Haven Rail Yard Facilities Improvements - Maintenance of Way (MOW) Building

Casing Size/Type: HW	Sampler Type/Size: Split Spoon / 1-3/8" I.D.	Core Barrel Type:
Hammer Wt.: 300lb Fall: 24in.	Hammer Wt.: 140lb Fall: 30in.	

Groundwater Observations: @10.0 to 11.5 feet (Estimated)

Depth (ft)	SAMPLES Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
						SILTY SAND *(con't)*		
90	S-19	27 34 35 48	24	20			Reddish-brown f SAND, some silt, very dense	
								-80
95	S-20	11 20 31 38	24	19			Reddish-brown f SAND, little silt, very dense	
								-85
100	S-21	20 33 30 36	24	18			Reddish-brown f SAND, some silt, very dense	
							END OF BORING 101 ft	-90
105								-95
110								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test
Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in	NOTES: 1. SPT's taken with spooling winch and safety hammer	Sheet
Earth: 98.8ft Rock: 0ft	2. Hole drilled with a Diedrich D50 mounted on a rubber tracked ATV	5 of 5
No. of Soil Samples: 23 No. of Core Runs: 0	3. Hole grouted upon completion	SM-001-M REV. 1/02

APPENDIX B

LABORATORY DATA

LABORATORY TESTING DATA SHEET

Project Name New Haven Rail Yard - Facities Improvement
Project Location New Haven, CT
Reviewed By
Project No. 74-13-0003.23
Assigned By David D'Angelo
Project Manager David D'Angelo
Date 7/9/2014
Date Reviewed 7/9/2014

Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests								Strength Tests					Consol.	
				Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Torvane or Type Test	σ_c psf	Failure Criteria	$\sigma_1 - \sigma_3$ psf	Strain %	$\frac{C_c}{1 + e_0}$	Laboratory Log and Soil Description
MOW-1	S-1	5.5-7.5	6				8.7											Brown f-c GRAVEL, some f-c Sand, trace Silt (GP-GM)
MOW-1	S-3	14-16	7	46.8	49	36	95.2	18										Dark Brown Organic SILT, trace Sand (OL)
MOW-1	S-7	24-26	8				12.2											Gray fine SAND, little Silt (SM)
MOW-1	S-11	54-56	9				6.7											Brown f-m SAND, trace Silt, trace Gravel (SP-SM)
MOW-1	S-14	69-71	10				61.3											Red-brown SILT and fine SAND (ML)
MOW-1	S-17	84-86	11				19.2											Red-brown fine SAND, little Silt (SM)
MOW-1	S-19	94-96	12				4.9											Red-brown f-m SAND, trace Silt (SP)

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401-467-6454

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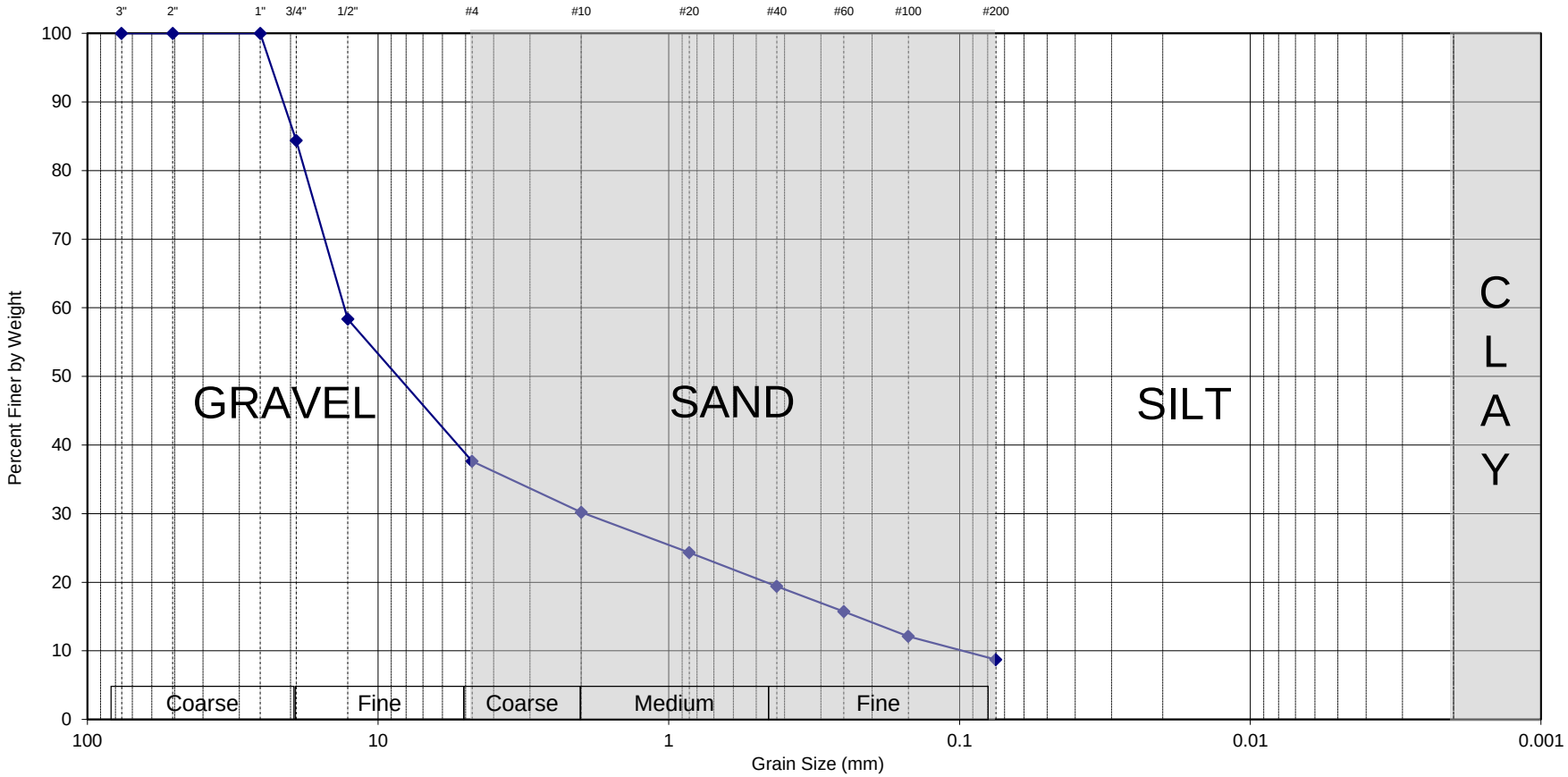
U.S. STANDARD SIEVE AND HYDROMETER



Gravel	Sand	Fines
62.4%	28.9%	8.7%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
6	MOW-1	S-1	5.5-7.5'	Brown f-c GRAVEL, some f-c Sand, trace Silt (GP-GM)				

Sieve Size	% Passing
¾"	84.4
½"	58.3
#4	37.6
#10	30.2
#20	24.3
#40	19.4
#60	15.7
#100	12.1
#200	8.7

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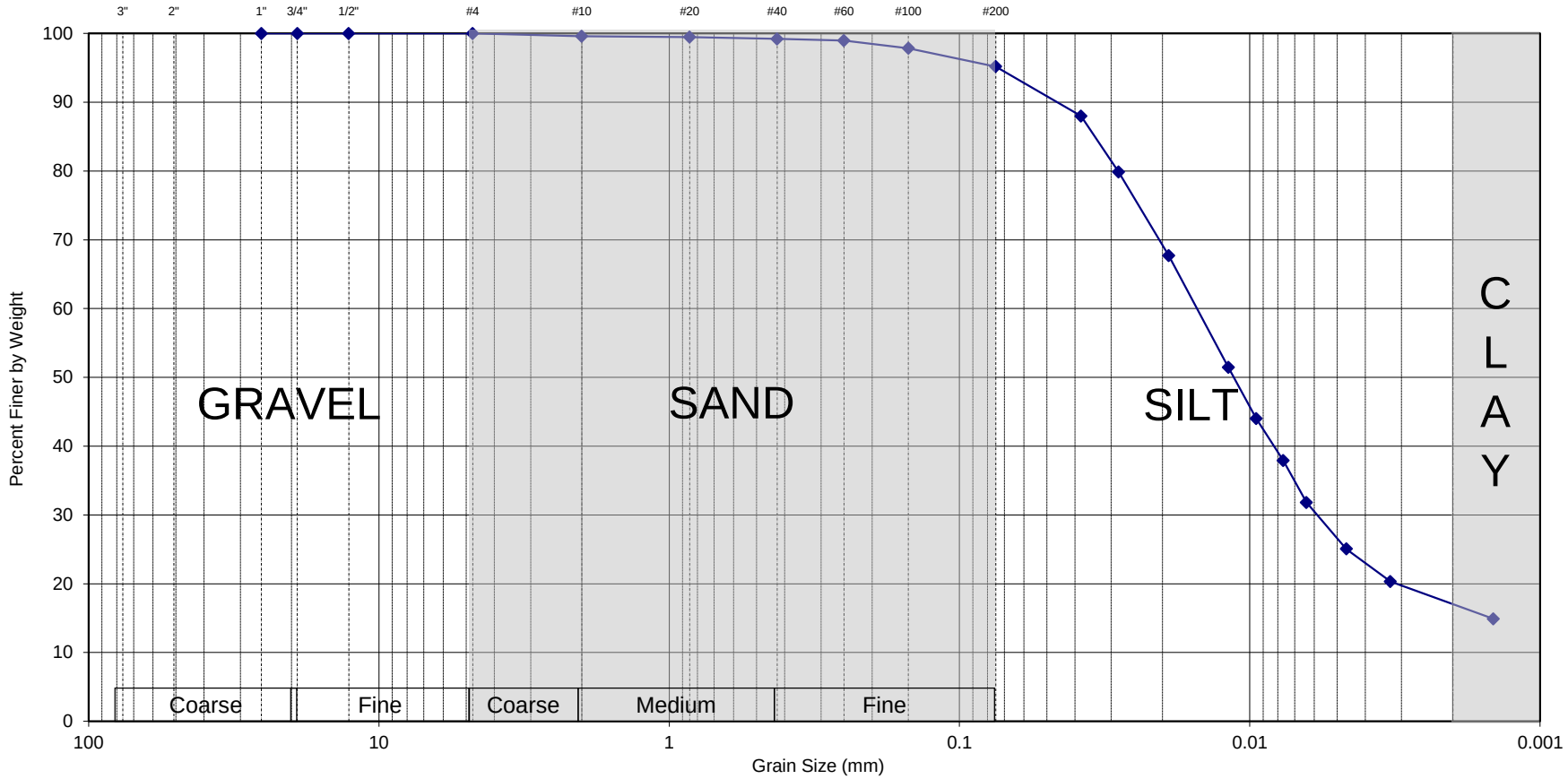
New Haven Rail Yard - Facility Improvements
New Haven, CT
Thielsch CTS Project # 74-14-0003.23

Tested by: LM/GG Date: 6/30/14
Reviewed by: MBP Date: 7/8/14

ASTM D422

U.S. STANDARD SIEVE AND HYDROMETER



Gravel	Sand	Fines
0.0%	4.8%	95.2%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
7	MOW-1	S-3	14-16'	Dark Brown Organic SILT, trace Sand	46.8	49	36	13

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	100.0
#10	99.6
#20	99.5
#40	99.2
#60	99.0
#100	97.8
#200	95.2

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New Haven Rail Yard - Facility Improvements
New Haven, CT
Thielsch CTS Project # 74-14-0003.23

Tested by: LM Date: 7/9/14
Reviewed by: MBP Date: 7/10/14

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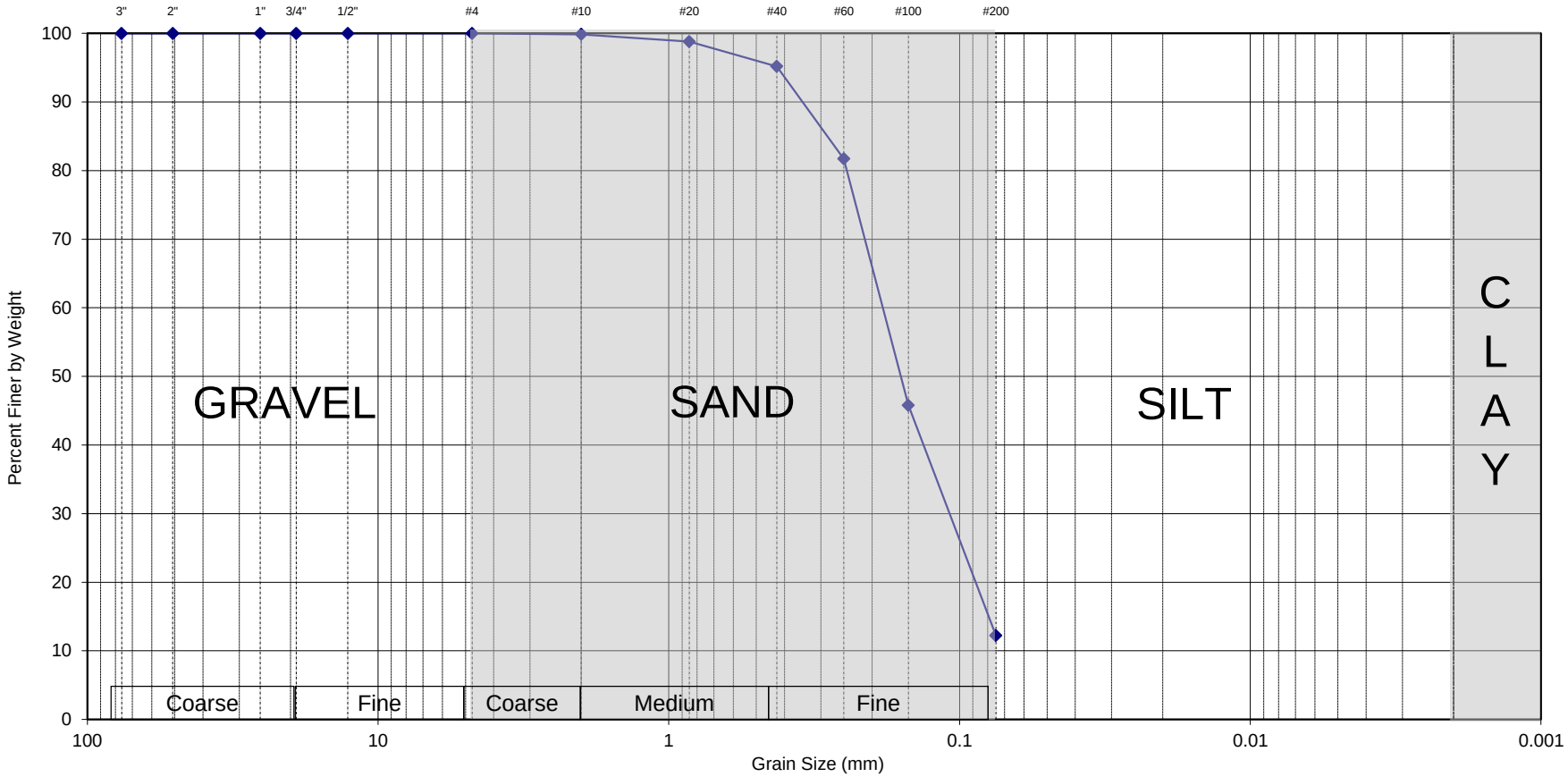

Gravel	Sand	Fines
0.0%	87.8%	12.2%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
8	MOW-1	S-7	24-26'	Gray fine SAND, little Silt (SM)				

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	100.0
#10	99.9
#20	98.8
#40	95.2
#60	81.7
#100	45.8
#200	12.2

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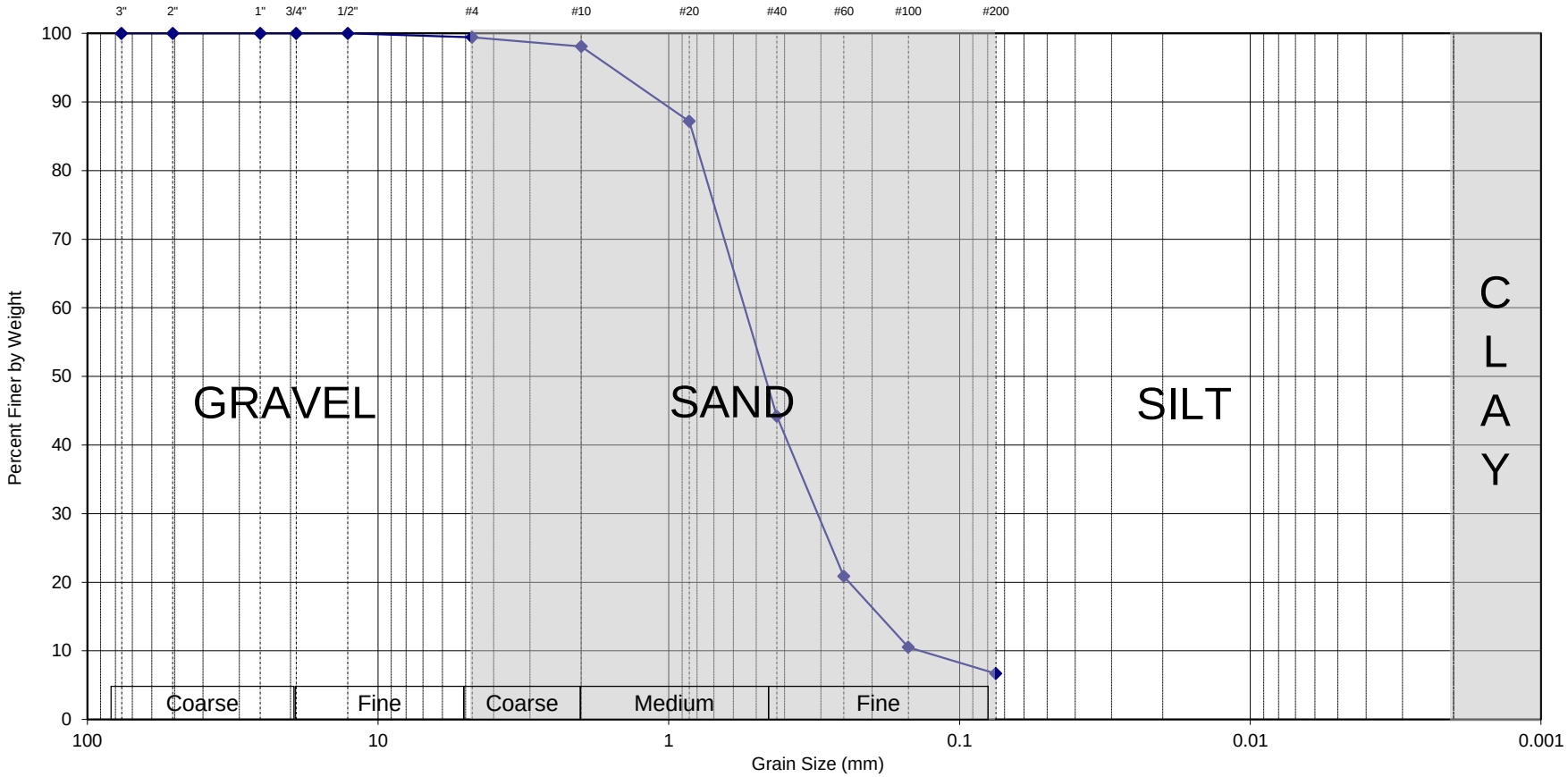

Gravel	Sand	Fines
0.6%	92.8%	6.7%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
9	MOW-1	S-11	54-56'	Brown f-m SAND, trace Silt, trace Gravel (SP-SM)				

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	99.4
#10	98.1
#20	87.2
#40	44.2
#60	20.9
#100	10.5
#200	6.7

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New Haven, CT
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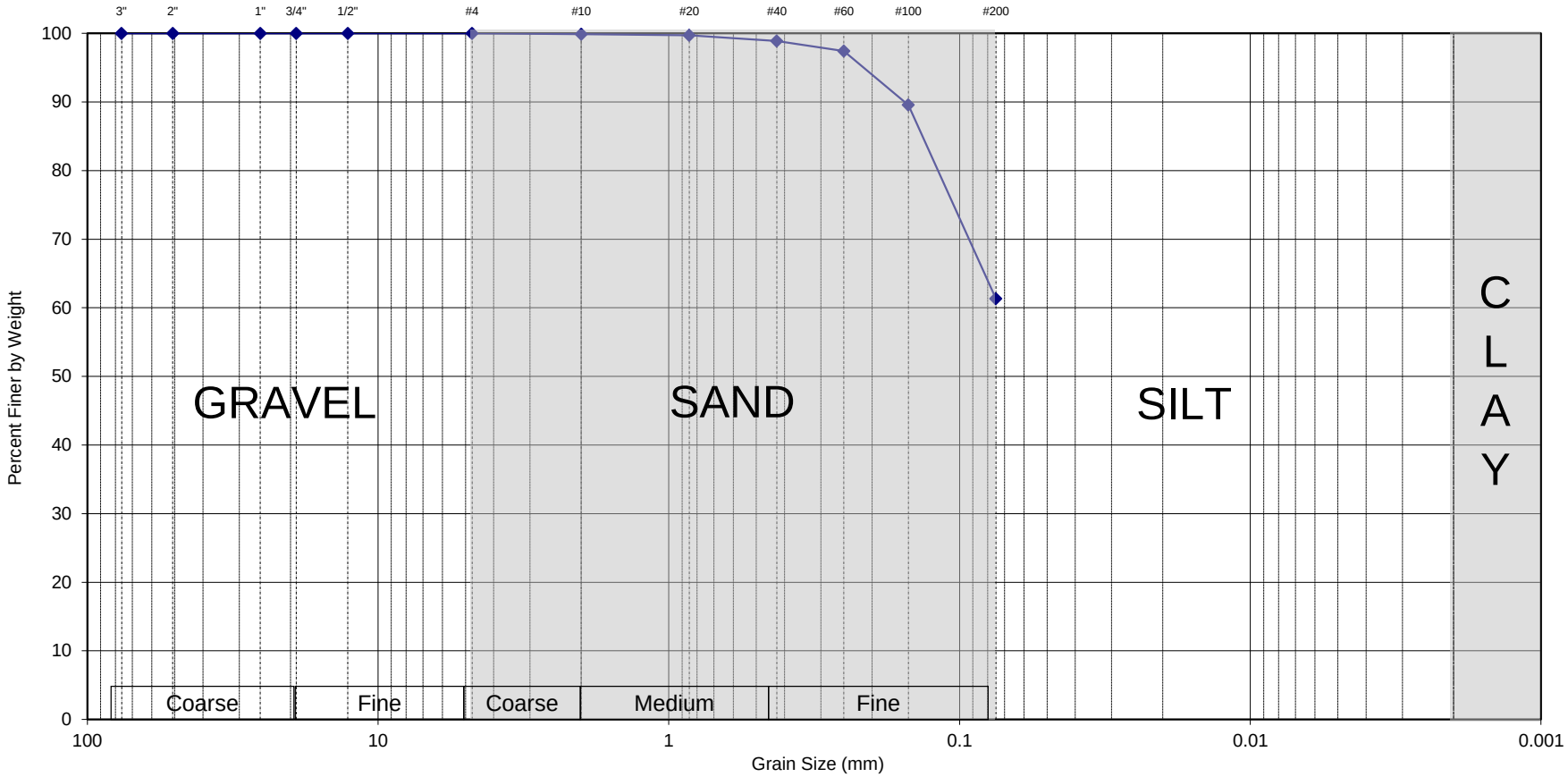

Gravel	Sand	Fines
0.0%	38.7%	61.3%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
10	MOW-1	S-14	69-71'	Red-brown SILT and fine SAND (ML)				

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	100.0
#10	99.9
#20	99.7
#40	98.9
#60	97.4
#100	89.5
#200	61.3

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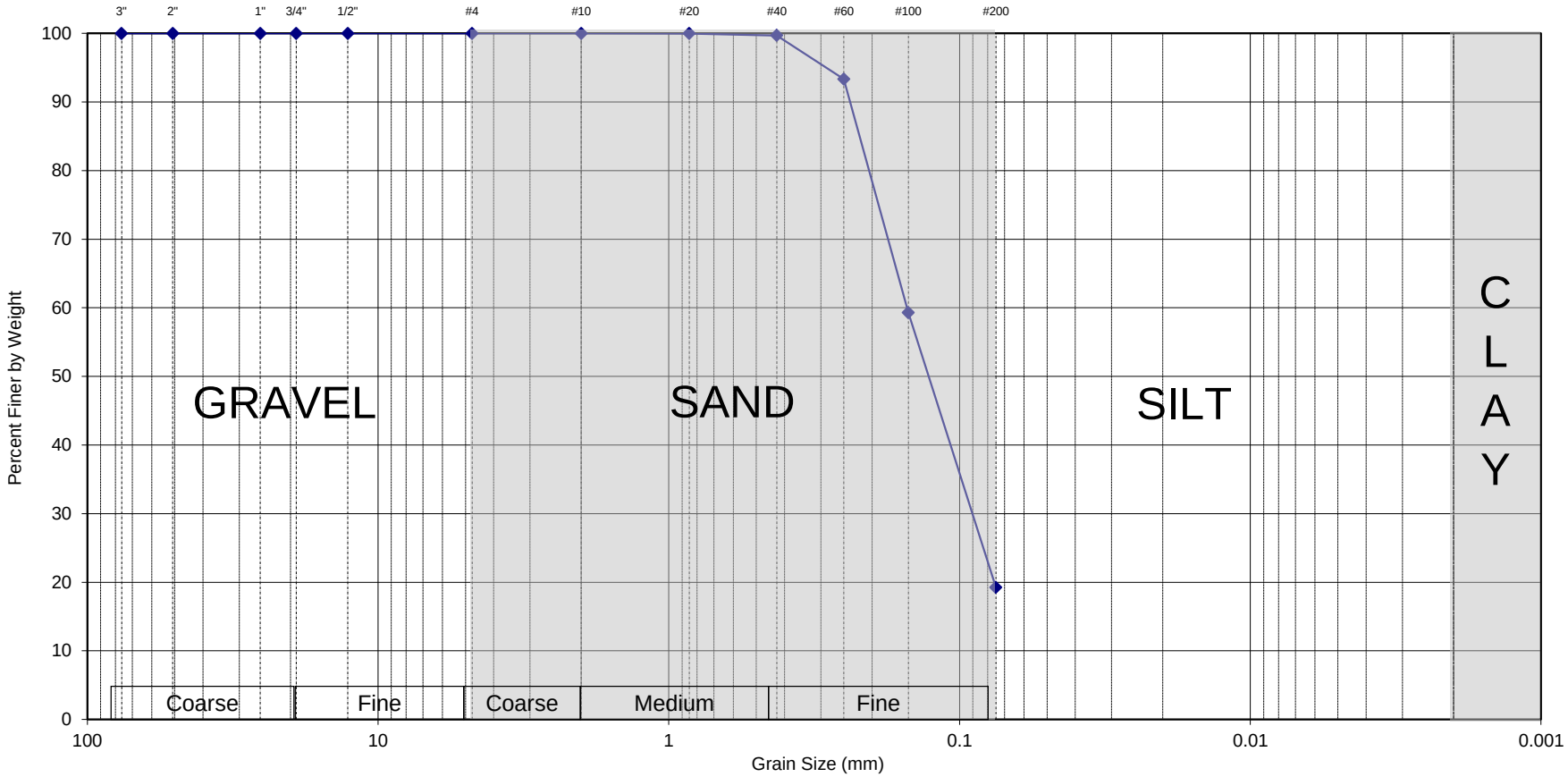

Gravel	Sand	Fines
0.0%	80.8%	19.2%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
11	MOW-1	S-17	84-86'	Red-brown fine SAND, little Silt (SM)				

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	100.0
#10	100.0
#20	100.0
#40	99.7
#60	93.3
#100	59.3
#200	19.2

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New Haven, CT
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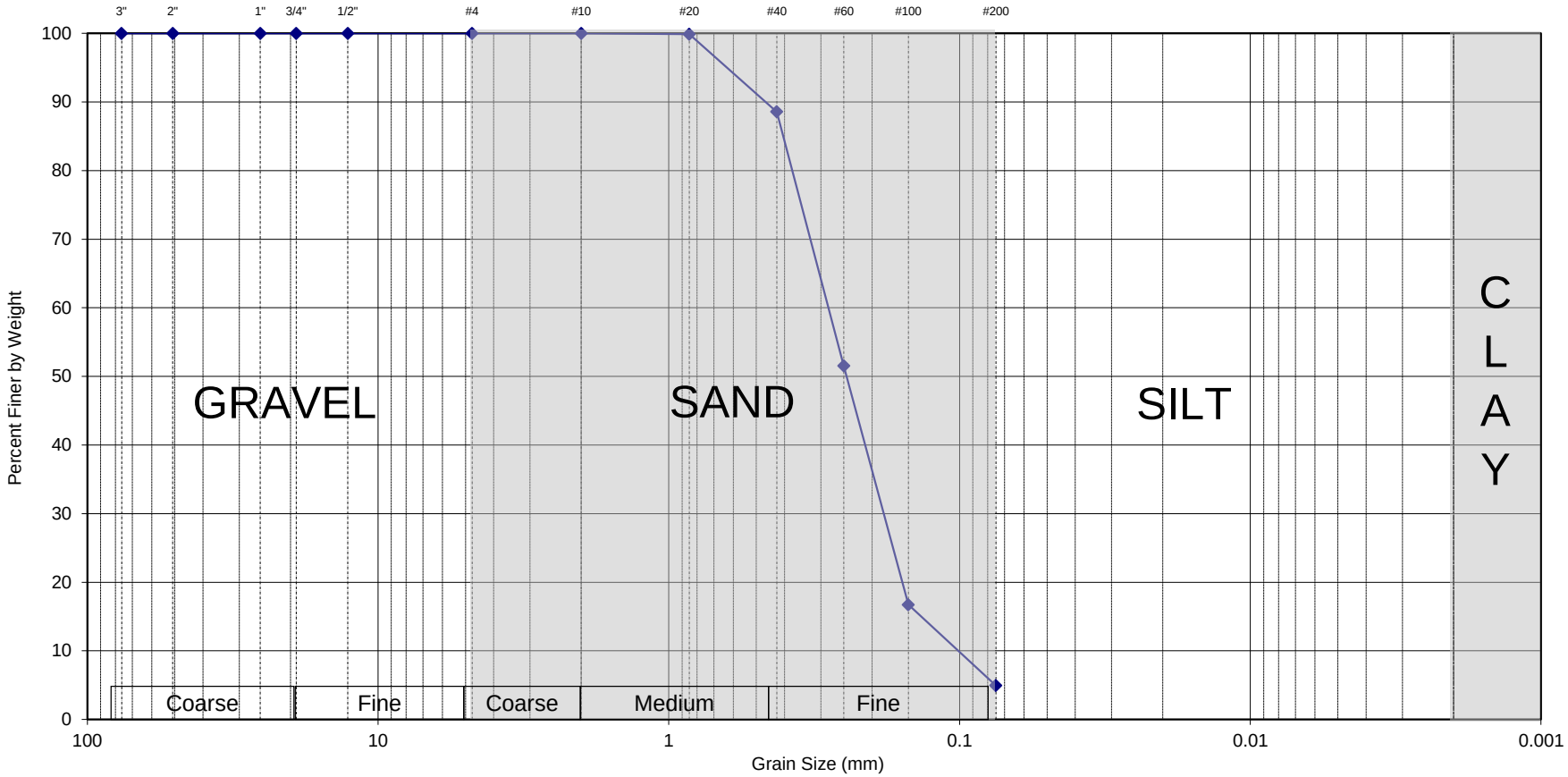

Gravel	Sand	Fines
0.0%	95.1%	4.9%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
12	MOW-1	S-19	94-96'	Red-brown f-m SAND, trace Silt (SP)				

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	100.0
#10	100.0
#20	99.9
#40	88.6
#60	51.5
#100	16.7
#200	4.9

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New Haven Rail Yard - Facility Improvements
New Haven, CT
Thielsch CTS Project # 74-14-0003.23

Tested by: LM Date: 7/9/14
Reviewed by: MBP Date: 7/10/14

LABORATORY TESTING DATA SHEET

Project Name New Haven Rail Yard - Facities Improvement
Project Location New Haven, CT
Reviewed By
Project No. 74-13-0003.23
Assigned By David D'Angelo
Project Manager David D'Angelo
Date 7/10/2014
Date Reviewed 7/10/2014

Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests								Strength Tests					Consol.	
				Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Torvane or Type Test	σ_c psf	Failure Criteria	$\sigma_1 - \sigma_3$ psf	Strain %	$\frac{C_c}{1 + e_0}$	Laboratory Log and Soil Description
MOW-2	S-1	5.5-7.5	13				22.6											Brown f-c SAND, some Silt, some fine Gravel (SM)
MOW-2	S-3	14-16	14				7.0											Gray-brown f-c SAND, little f-c Gravel, trace Silt (SW-SM)
MOW-2	S-5	24-26	15	68.8	76	42	93.8	29										Gray Organic SILT, trace Sand (OH)
MOW-2	S-8	39-41	16				26.9											Gray fine SAND, some Silt (SM)
MOW-2	S-11	54-56	17				38.5											Red-brown fine SAND and SILT (SM)
MOW-2	S-14	69-71	18				22.2											Red-brown fine SAND, some Silt (SM)
MOW-2	S-17	84-86	19				23.8											Red-brown fine SAND, some Silt (SM)

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Gravel	Sand	Fines
21.6%	55.8%	22.6%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
13	MOW-2	S-1	5.5-7.5'	Brown f-c SAND, some Silt, some fine Gravel (SM)				

Sieve Size	% Passing
¾"	100.0
½"	91.3
#4	78.4
#10	71.7
#20	62.3
#40	51.8
#60	42.9
#100	32.8
#200	22.6

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New Haven Rail Yard - Facility Improvements
New Haven, CT
Thielsch CTS Project # 74-14-0003.23

Tested by: LM/GG Date: 7/3/14
Reviewed by: MBP Date: 7/9/14

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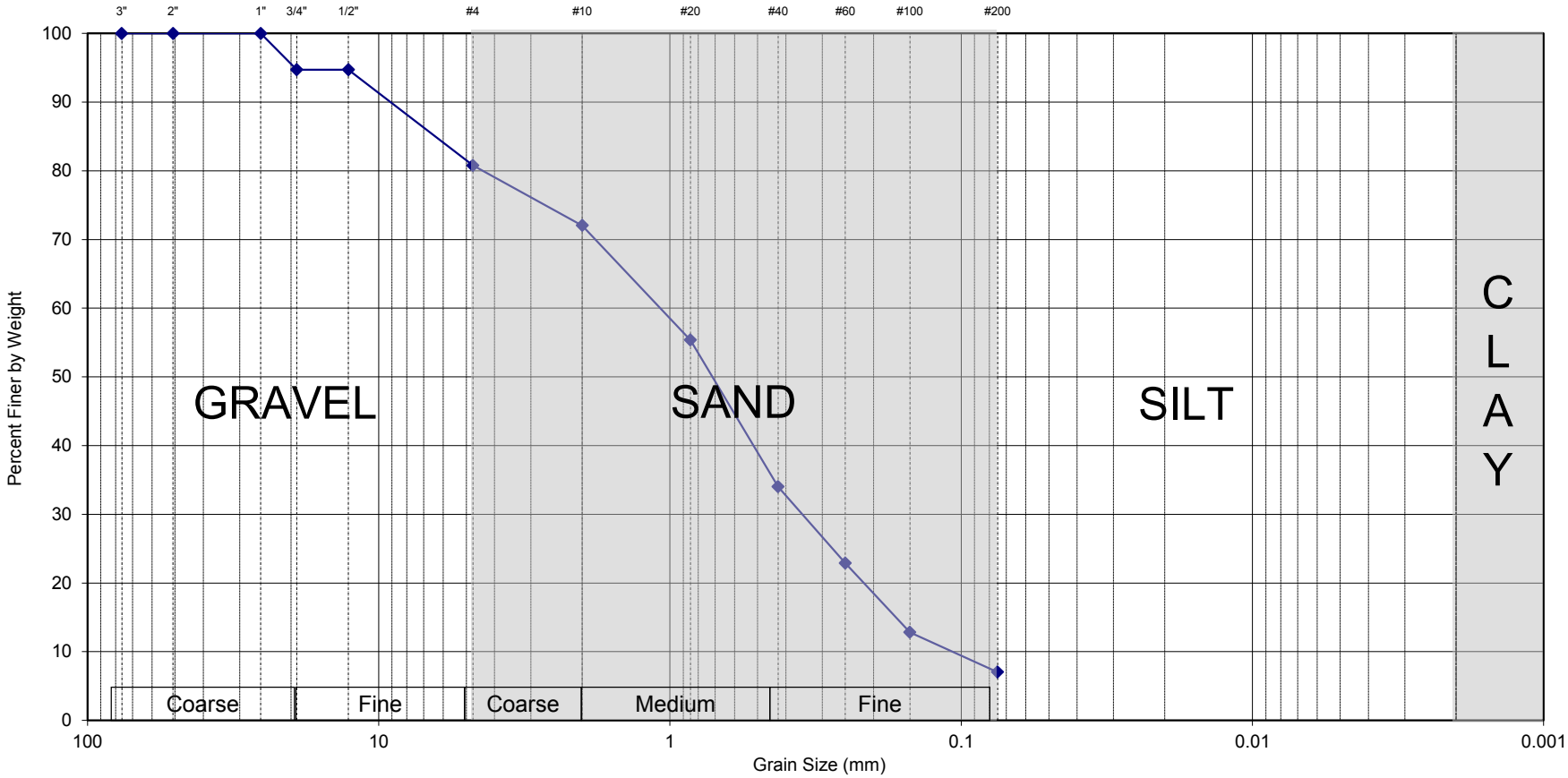
U.S. STANDARD SIEVE AND HYDROMETER



Gravel	Sand	Fines
19.2%	73.8%	7.0%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
14	MOW-2	S-3	14-16'	Gray-brown f-c SAND, little f-c Gravel, trace Silt (SW-SM)				

Sieve Size	% Passing
¾"	94.7
½"	94.7
#4	80.8
#10	72.0
#20	55.4
#40	34.0
#60	22.9
#100	12.8
#200	7.0

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New Haven Rail Yard - Facility Improvements
New Haven, CT
Thielsch CTS Project # 74-14-0003.23

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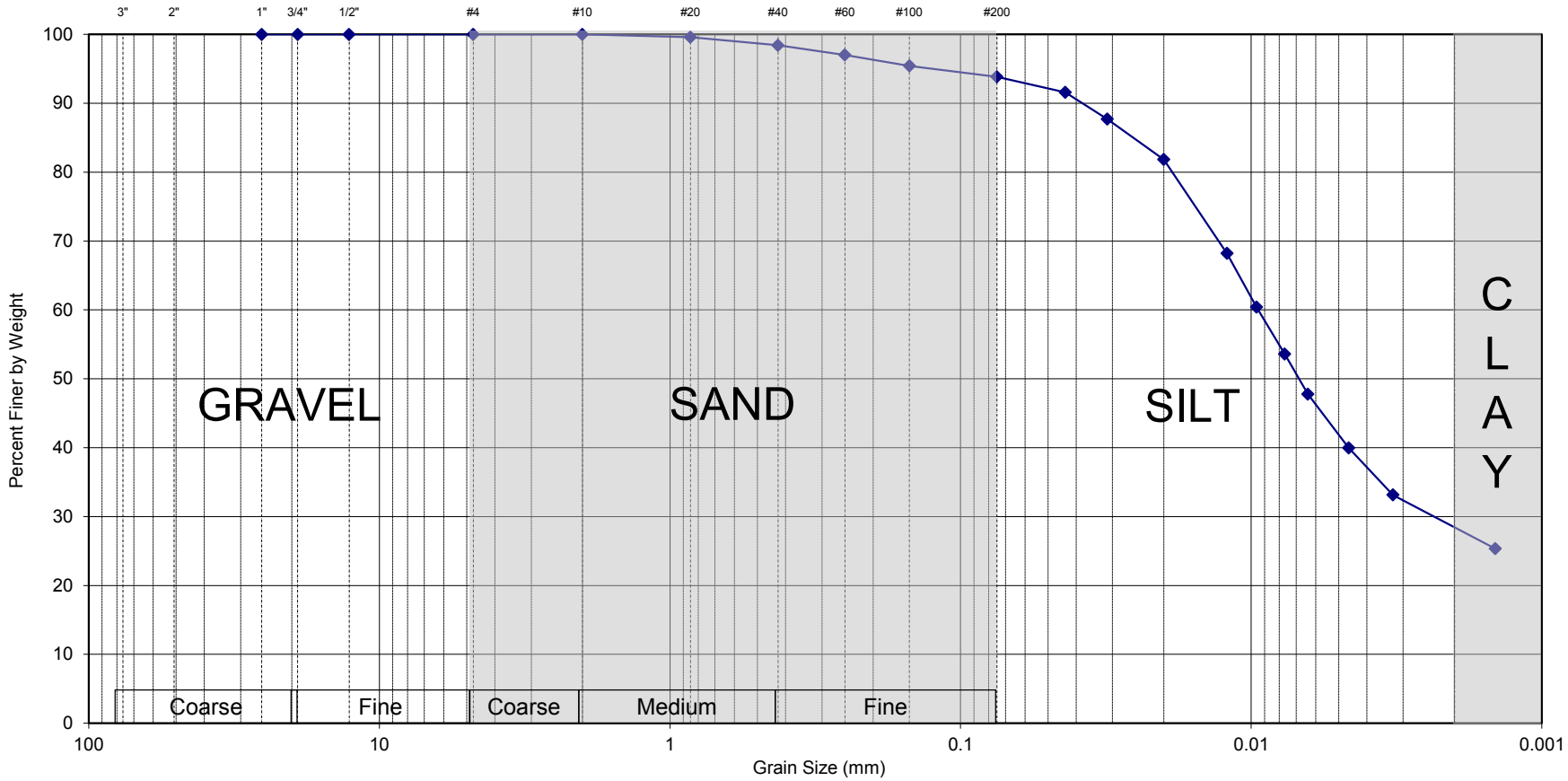
U.S. STANDARD SIEVE AND HYDROMETER



Gravel	Sand	Fines
0.0%	6.2%	93.8%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
15	MOW-2	S-5	24-26'	Gray Organic SILT, trace Sand (OH)	68.8	76	42	34

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	100.0
#10	100.0
#20	99.6
#40	98.4
#60	97.0
#100	95.4
#200	93.8

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New Haven Rail Yard - Facility Improvements
New Haven, CT
Thielsch CTS Project # 74-14-0003.23

Tested by: LM Date: 7/9/14
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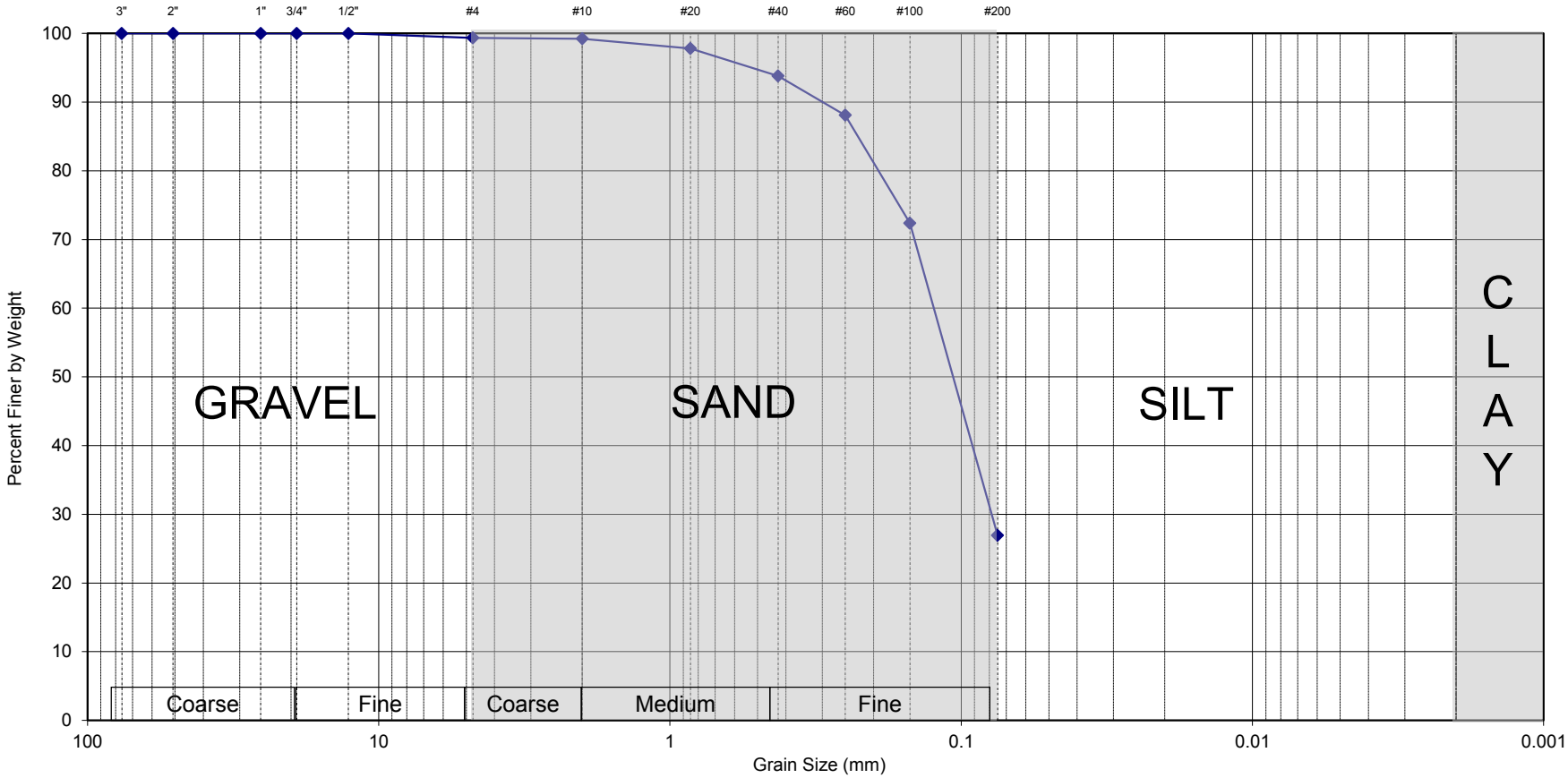
U.S. STANDARD SIEVE AND HYDROMETER



Gravel	Sand	Fines
0.7%	72.4%	26.9%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
16	MOW-2	S-8	39-41'	Gray fine SAND, some Silt (SM)				

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	99.3
#10	99.2
#20	97.8
#40	93.8
#60	88.1
#100	72.4
#200	26.9

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New Haven Rail Yard - Facility Improvements
New Haven, CT
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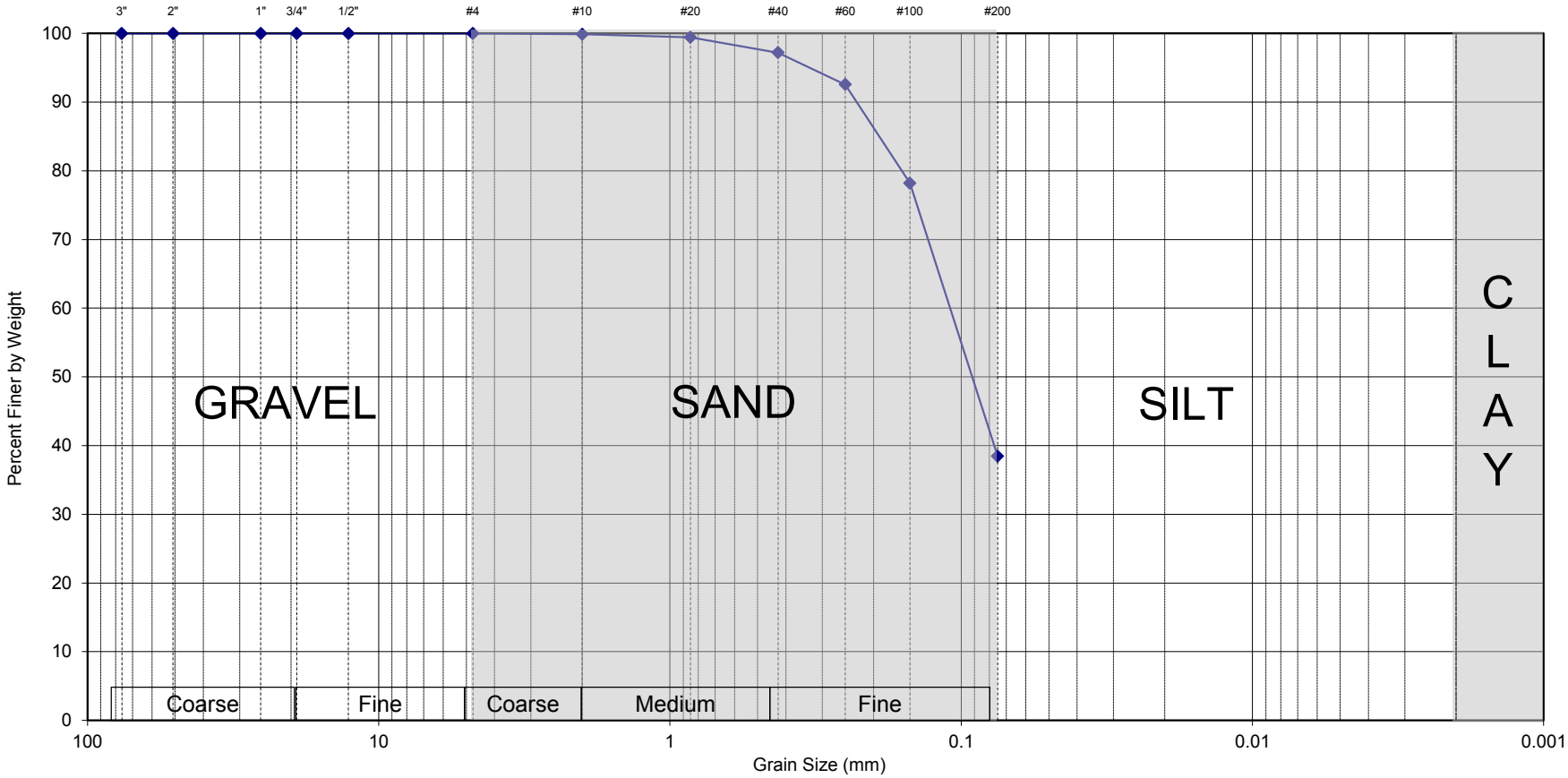

Gravel	Sand	Fines
0.0%	61.5%	38.5%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
17	MOW-2	S-11	54-56'	Red-brown fine SAND and SILT (SM)				

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	100.0
#10	99.9
#20	99.4
#40	97.2
#60	92.6
#100	78.2
#200	38.5

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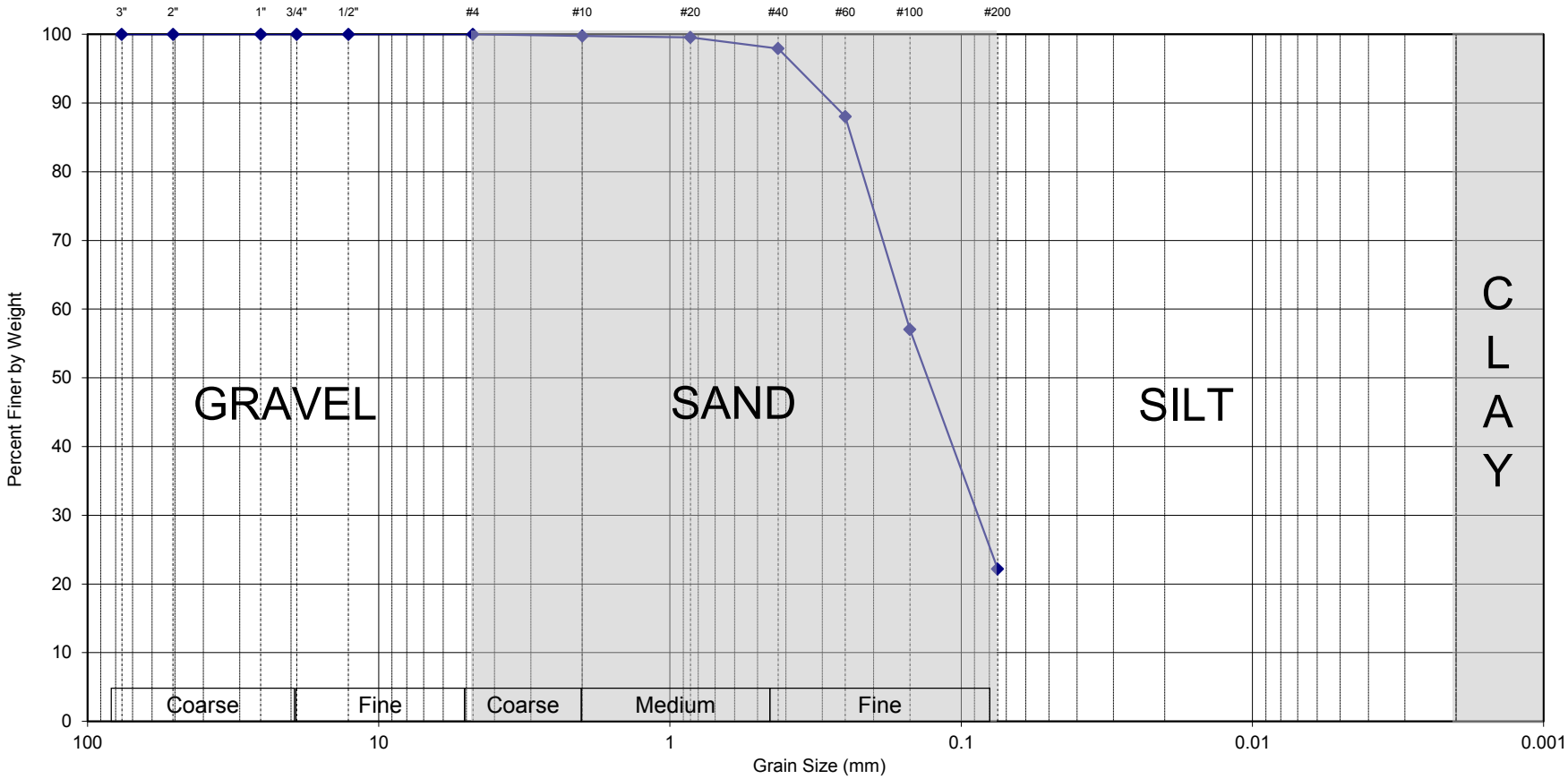

Gravel	Sand	Fines
0.0%	77.8%	22.2%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
18	MOW-2	S-14	69-71'	Red-brown fine SAND, some Silt (SM)				

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	100.0
#10	99.8
#20	99.6
#40	97.9
#60	88.0
#100	57.0
#200	22.2

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New Haven, CT
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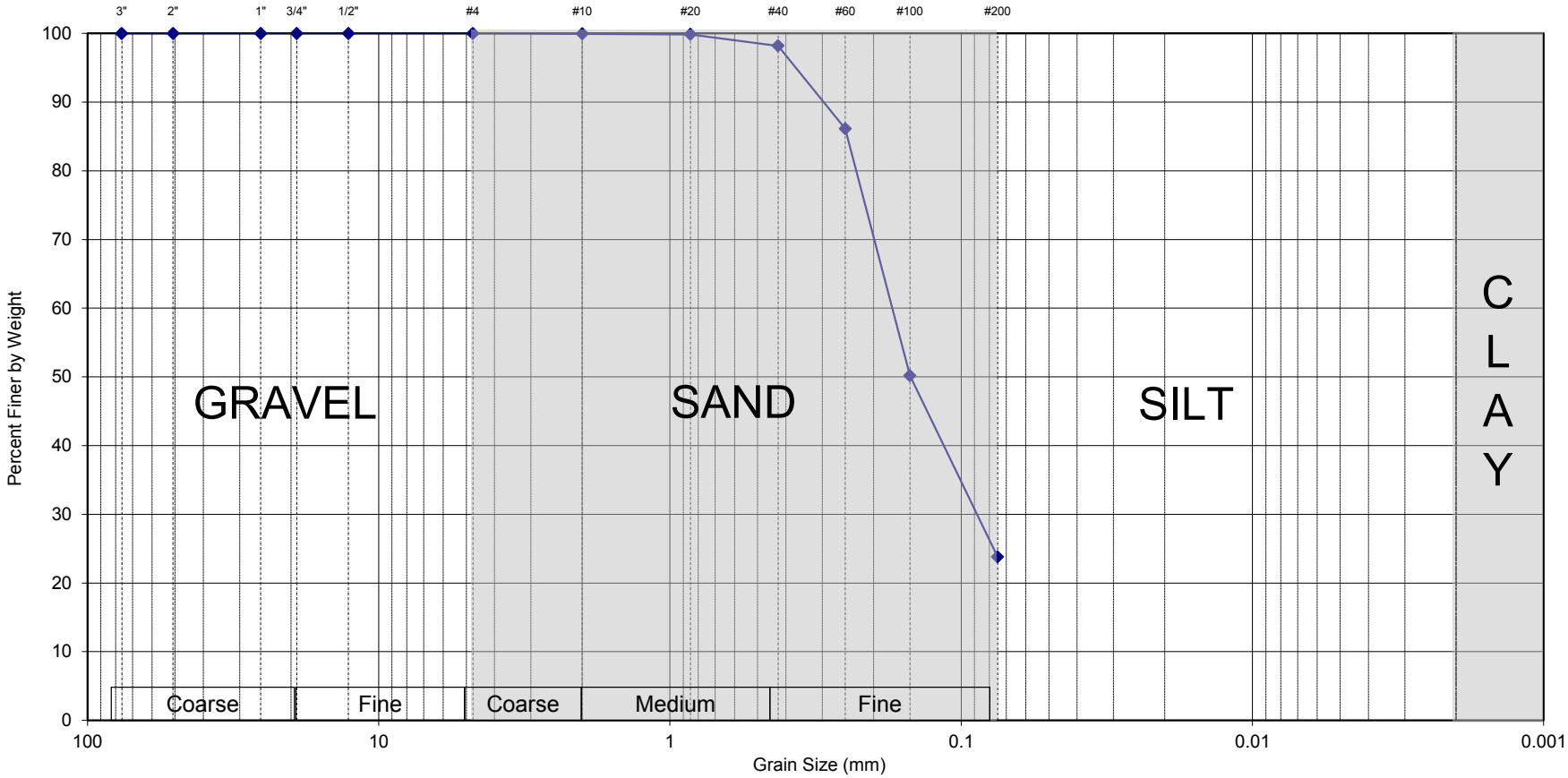

Gravel	Sand	Fines
0.0%	76.2%	23.8%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
19	MOW-2	S-17	84-86'	Red-brown fine SAND, some Silt (SM)				

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	100.0
#10	99.9
#20	99.9
#40	98.2
#60	86.1
#100	50.2
#200	23.8

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New Haven, CT
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Reviewed by: MBP Date: 7/9/14

LABORATORY TESTING DATA SHEET

Project Name New Haven Rail Yard - Facities Improvement
Project Location New Haven, CT
Reviewed By
Project No. 74-13-0003.23
Assigned By David D'Angelo
Project Manager David D'Angelo
Date 7/9/2014
Date Reviewed 7/9/2014

Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests								Strength Tests					Consol.	
				Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Torvane or Type Test	σ_c psf	Failure Criteria	$\sigma_1 - \sigma_3$ psf	Strain %	$\frac{C_c}{1 + e_0}$	Laboratory Log and Soil Description
MOW-3	S-1	2.5-4.5	20				8.2											Red-brown f-m SAND, trace Silt (SP-SM)
MOW-3	S-4	14-16	21				62.1											Red-brown SILT and fine SAND (ML)
MOW-3	S-8	34-36	22	72.0	82	42												Gray Organic SILT, trace Sand (OH)
MOW-3	S-11	49-51	23	85.3	109	72	89.4	20										Gray Organic SILT, little f-m Sand (OH)
MOW-3	S-14	64-66	24				44.9											Red-brown fine SAND and SILT (SM)
MOW-3	S-17	79-81	25				66.9											Red-brown SILT, some fine Sand (ML)
MOW-3	S-20	94-96	26				14.5											Red-brown fine SAND, little Silt (SM)

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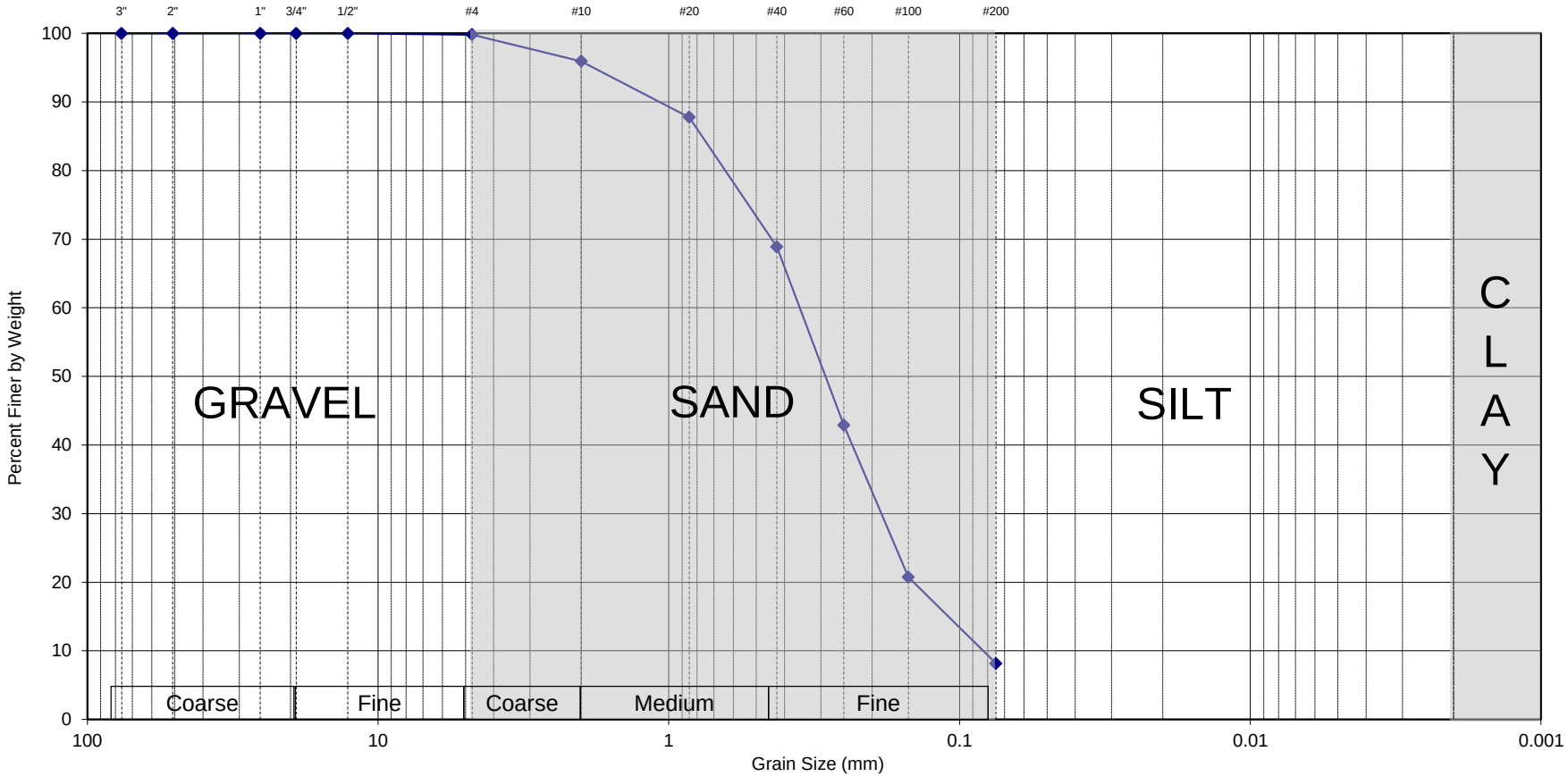
U.S. STANDARD SIEVE AND HYDROMETER



Gravel	Sand	Fines
0.2%	91.7%	8.2%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
20	MOW-3	S-1	2.5-4.5'	Red-brown f-m SAND, trace Silt (SP-SM)				

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	99.8
#10	95.9
#20	87.8
#40	68.9
#60	42.9
#100	20.7
#200	8.2

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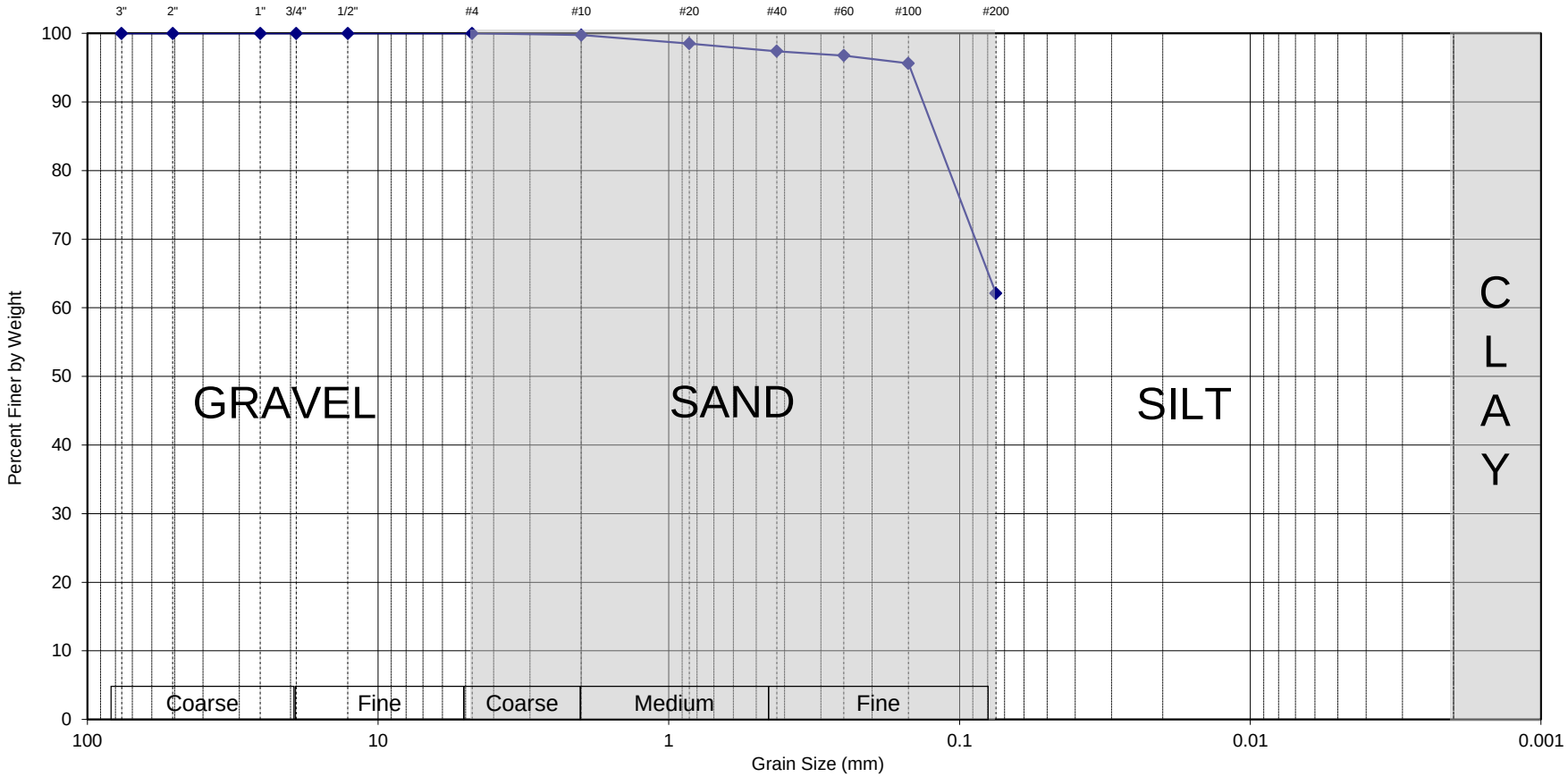
New Haven Rail Yard - Facility Improvements
New Haven, CT
Thielsch CTS Project # 74-14-0003.23

Tested by: LM Date: 7/10/14
Reviewed by: MBP Date: 7/10/14

ASTM D422

U.S. STANDARD SIEVE AND HYDROMETER



Gravel	Sand	Fines
0.0%	37.9%	62.1%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
21	MOW-3	S-4	14-16'	Red-brown SILT and fine SAND (ML)				

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	100.0
#10	99.8
#20	98.5
#40	97.4
#60	96.8
#100	95.6
#200	62.1

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195 Frances Ave., Cranston, RI 02910
401-467-6454

New Haven Rail Yard - Facility Improvements
New Haven, CT
Thielsch CTS Project # 74-14-0003.23

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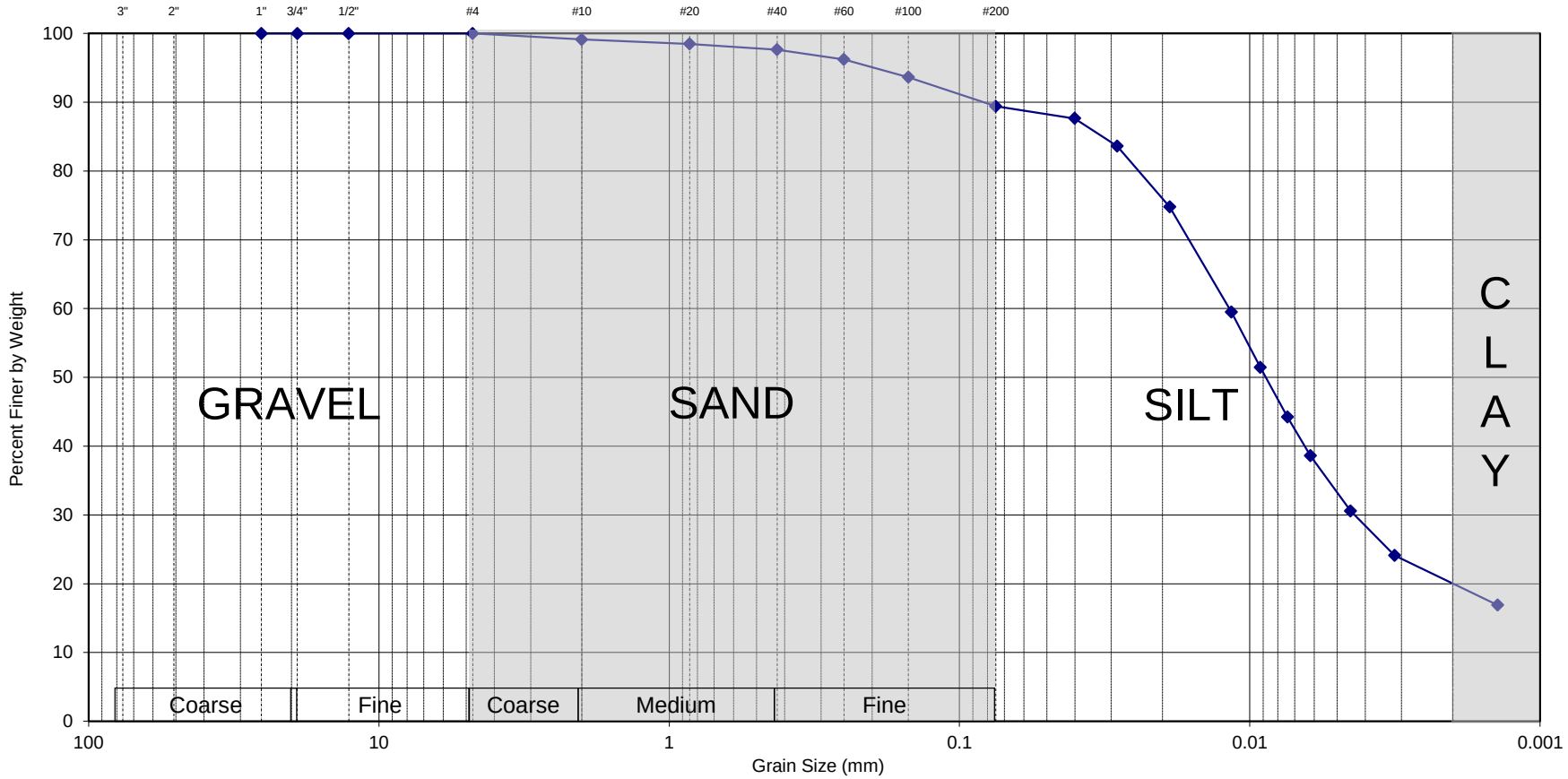
ASTM D422

U.S. STANDARD SIEVE AND HYDROMETER



Gravel	Sand	Fines
0.0%	10.6%	89.4%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
23	MOW-3	S-11	49-51'	Gray Organic SILT, little f-m Sand (OH)	85.3	109	72	37

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	100.0
#10	99.1
#20	98.5
#40	97.6
#60	96.2
#100	93.6
#200	89.4

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401-467-6454

New Haven Rail Yard - Facility Improvements
New Haven, CT
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ASTM D422

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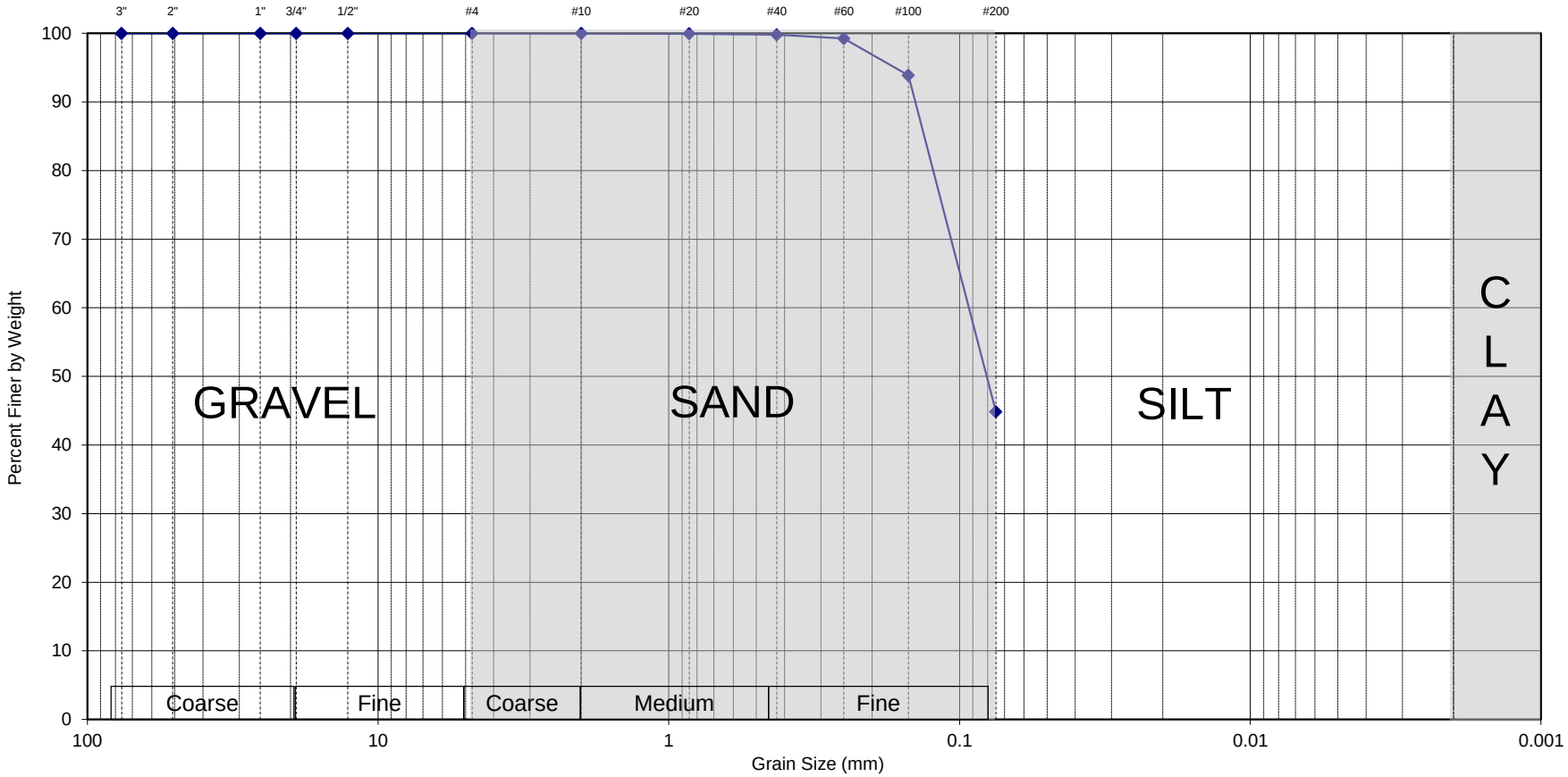

Gravel	Sand	Fines
0.0%	55.2%	44.8%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
24	MOW-3	S-14	64-66'	Red-brown fine SAND and SILT (SM)				

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	100.0
#10	100.0
#20	99.9
#40	99.8
#60	99.2
#100	93.9
#200	44.8

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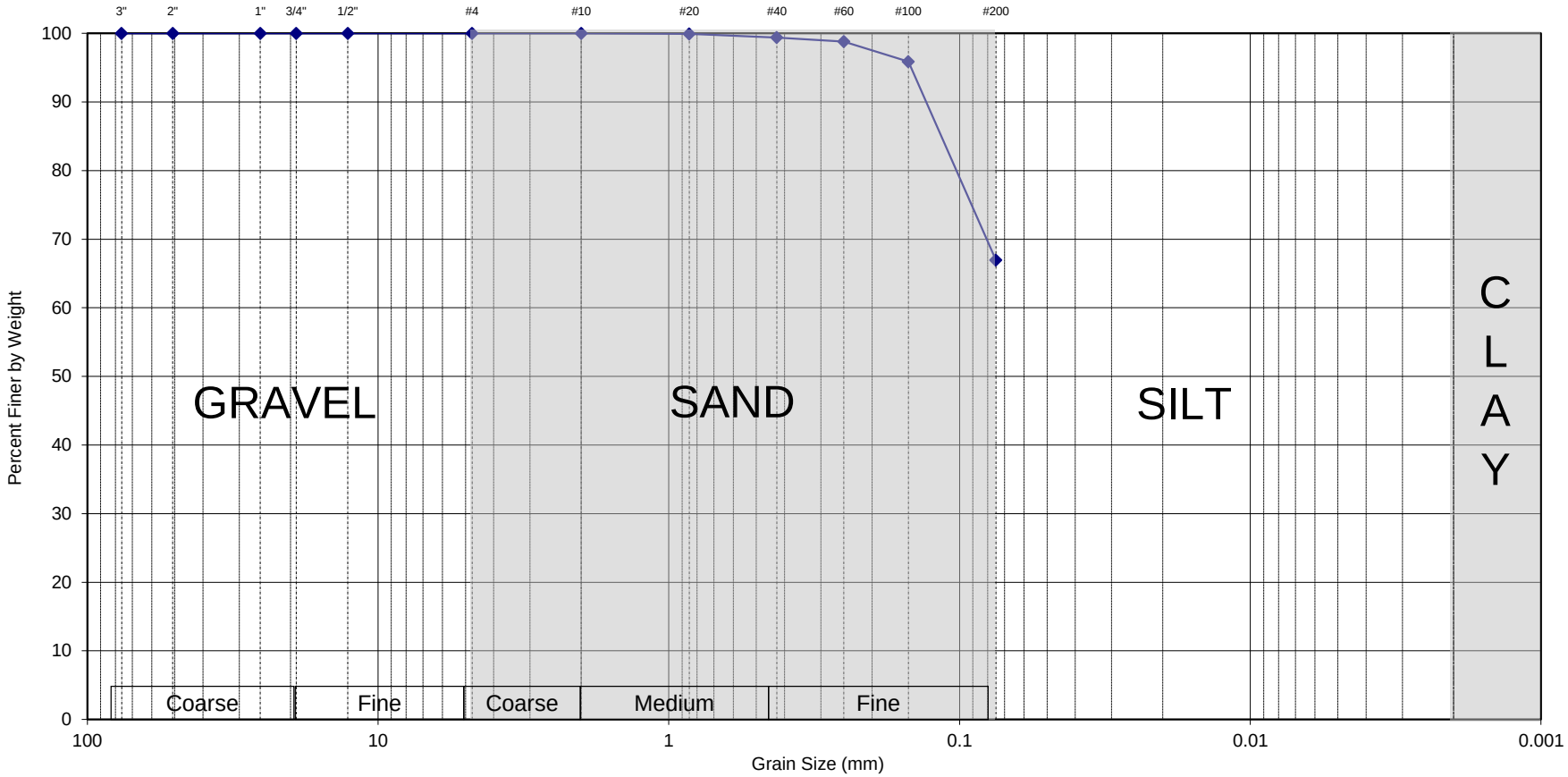

Gravel	Sand	Fines
0.0%	33.1%	66.9%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
25	MOW-3	S-17	79-81'	Red-brown SILT, some fine Sand (ML)				

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	100.0
#10	100.0
#20	99.9
#40	99.4
#60	98.8
#100	95.9
#200	66.9

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New Haven, CT
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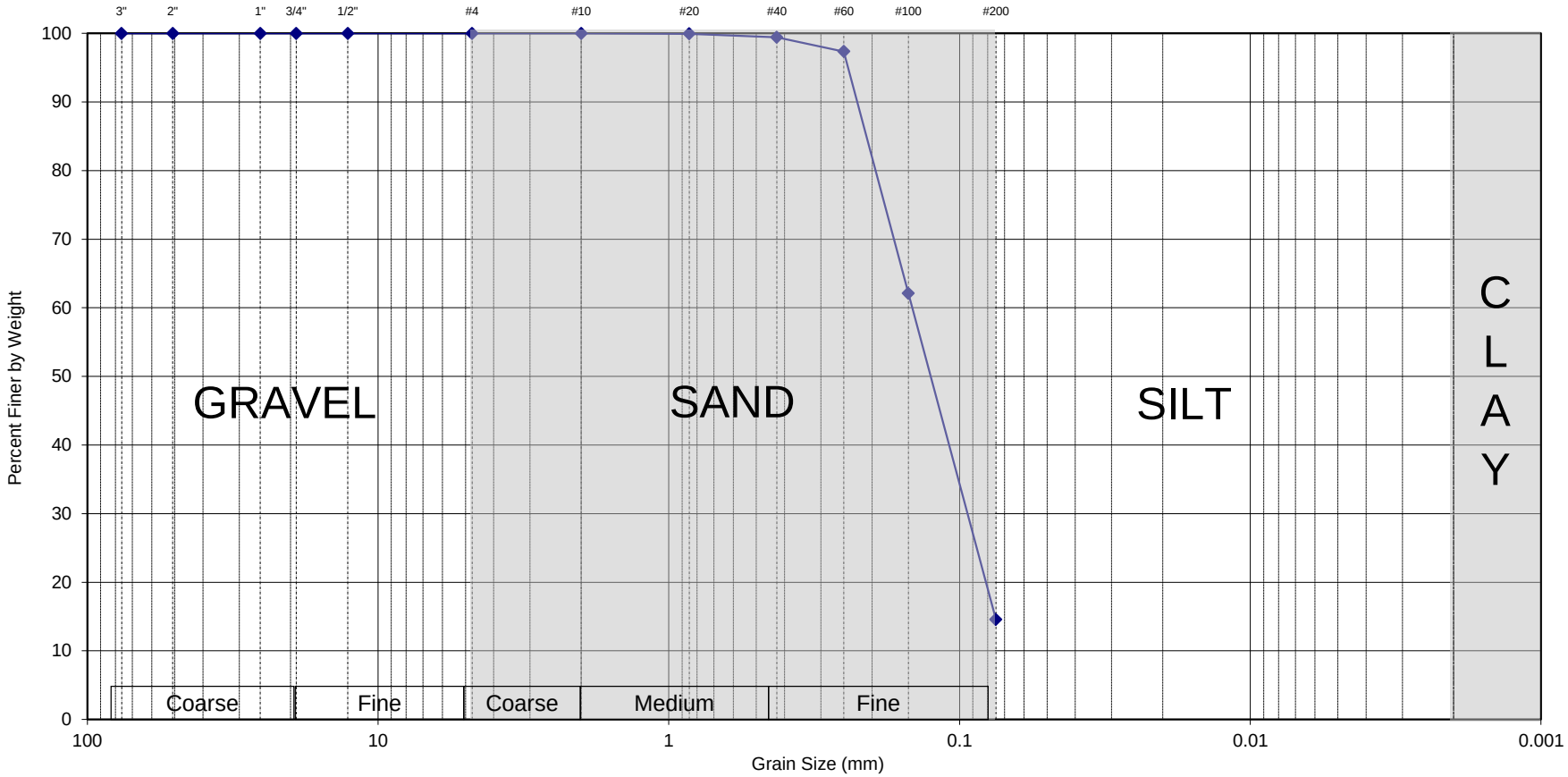

Gravel	Sand	Fines
0.0%	85.5%	14.5%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
26	MOW-3	S-20	94-96'	Red-brown fine SAND, little Silt (SM)				

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	100.0
#10	100.0
#20	99.9
#40	99.4
#60	97.3
#100	62.1
#200	14.5

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New Haven Rail Yard - Facility Improvements
New Haven, CT
Thielsch CTS Project # 74-14-0003.23

Tested by: LM Date: 7/10/14
Reviewed by: MBP Date: 7/10/14

LABORATORY TESTING DATA SHEET

Project Name New Haven Rail Yard - Facities Improvement
Project Location New Haven, CT
Reviewed By
Project No. 74-13-0003.23
Assigned By David D'Angelo
Project Manager David D'Angelo
Date 7/9/2014
Date Reviewed 7/9/2014

Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests								Strength Tests					Consol.	
				Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Torvane or Type Test	σ_c psf	Failure Criteria	$\sigma_1 - \sigma_3$ psf	Strain %	$\frac{C_c}{1 + e_0}$	Laboratory Log and Soil Description
MOW-4	S-2	4.5-6.5	27				13.4											Brown f-c SAND, little f-c Gravel, little Silt (SM)
MOW-4	S-5	19-21	28				12.5											Red-brown f-m SAND, little Silt, trace Gravel (SM)
MOW-4	S-9	39-41	29	77.8	91	49	96.3.	34										Gray Organic SILT, trace Sand (OH)
MOW-4	S-12	54-56	30				9.5											Brown f-c SAND, trace Silt, trace Gravel (SW-SM)
MOW-4	S-15	69-71	31				66.9											Red-brown SILT, some fine Sand (ML)
MOW-4	S-18	84-86	32				86.4											Red-brown SILT, little fine Sand (ML)
MOW-4	S-21	99-101	33				12.2											Brown fine SAND, little Silt, trace Gravel (SM)

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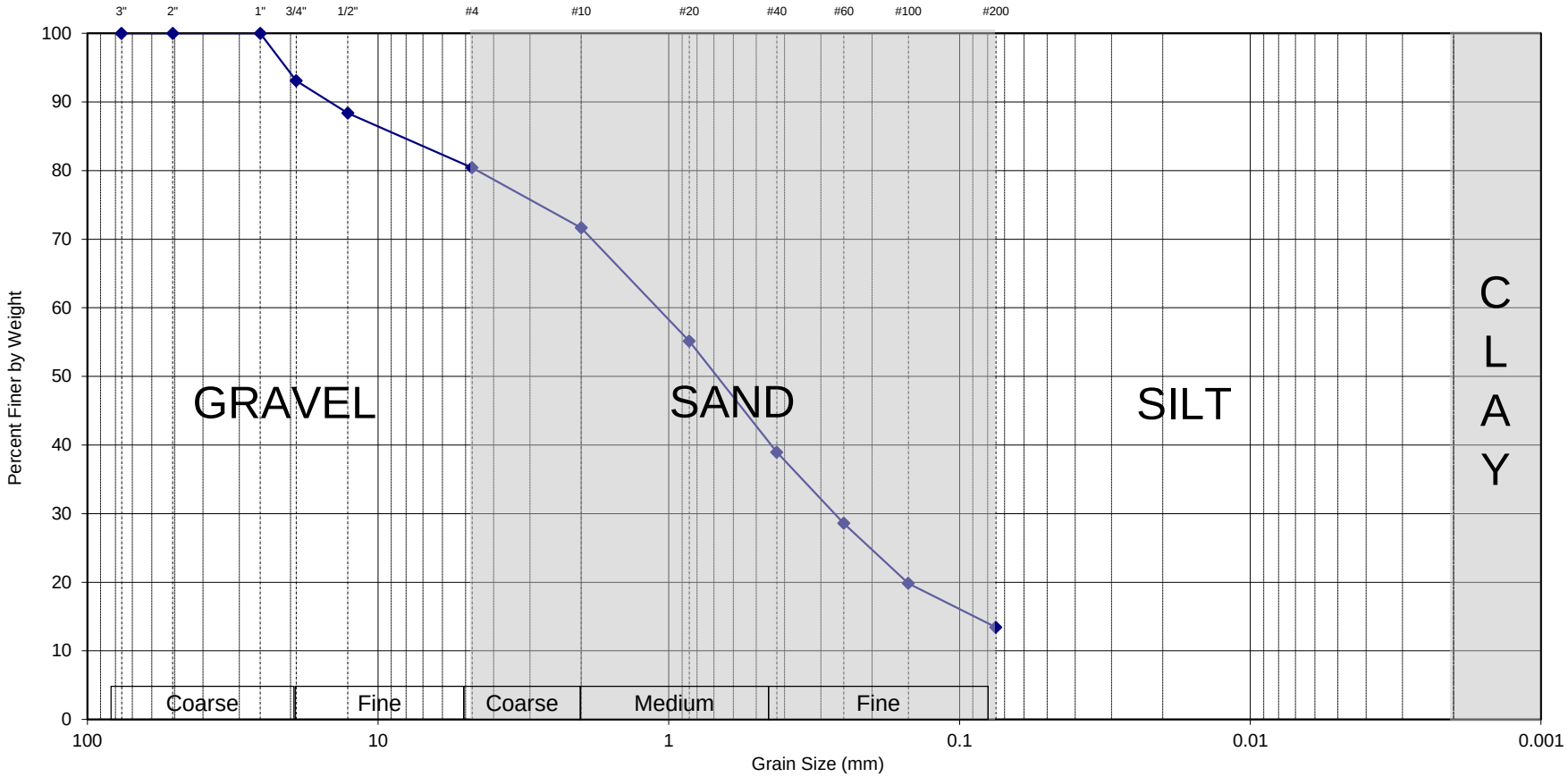

Gravel	Sand	Fines
19.6%	67.0%	13.4%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
27	MOW-4	S-2	4.5-6.5'	Brown f-c SAND, little f-c Gravel, little Silt (SM)				

Sieve Size	% Passing
¾"	93.1
½"	88.4
#4	80.4
#10	71.6
#20	55.1
#40	38.9
#60	28.6
#100	19.8
#200	13.4

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New Haven Rail Yard - Facility Improvements
New Haven, CT
Thielsch CTS Project # 74-14-0003.23

Tested by: LM/GG Date: 7/3/14
Reviewed by: MBP Date: 7/9/14

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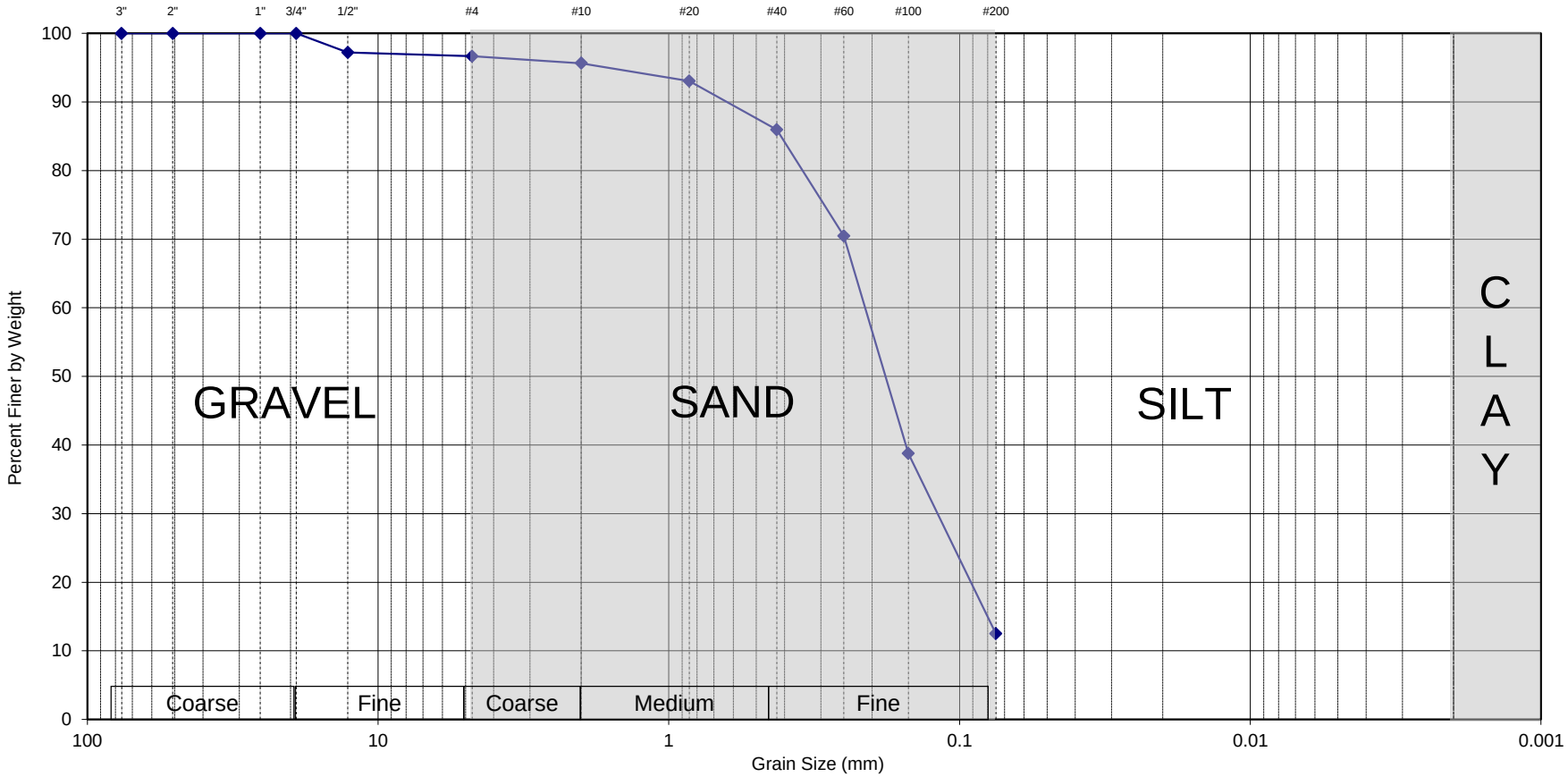
U.S. STANDARD SIEVE AND HYDROMETER



Gravel	Sand	Fines
3.3%	84.2%	12.5%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
28	MOW-4	S-5	19-21'	Red-brown f-m SAND, little Silt, trace Gravel (SM)				

Sieve Size	% Passing
¾"	100.0
½"	97.2
#4	96.7
#10	95.6
#20	93.0
#40	86.0
#60	70.5
#100	38.8
#200	12.5

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401-467-6454

New Haven Rail Yard - Facility Improvements
New Haven, CT
Thielsch CTS Project # 74-14-0003.23

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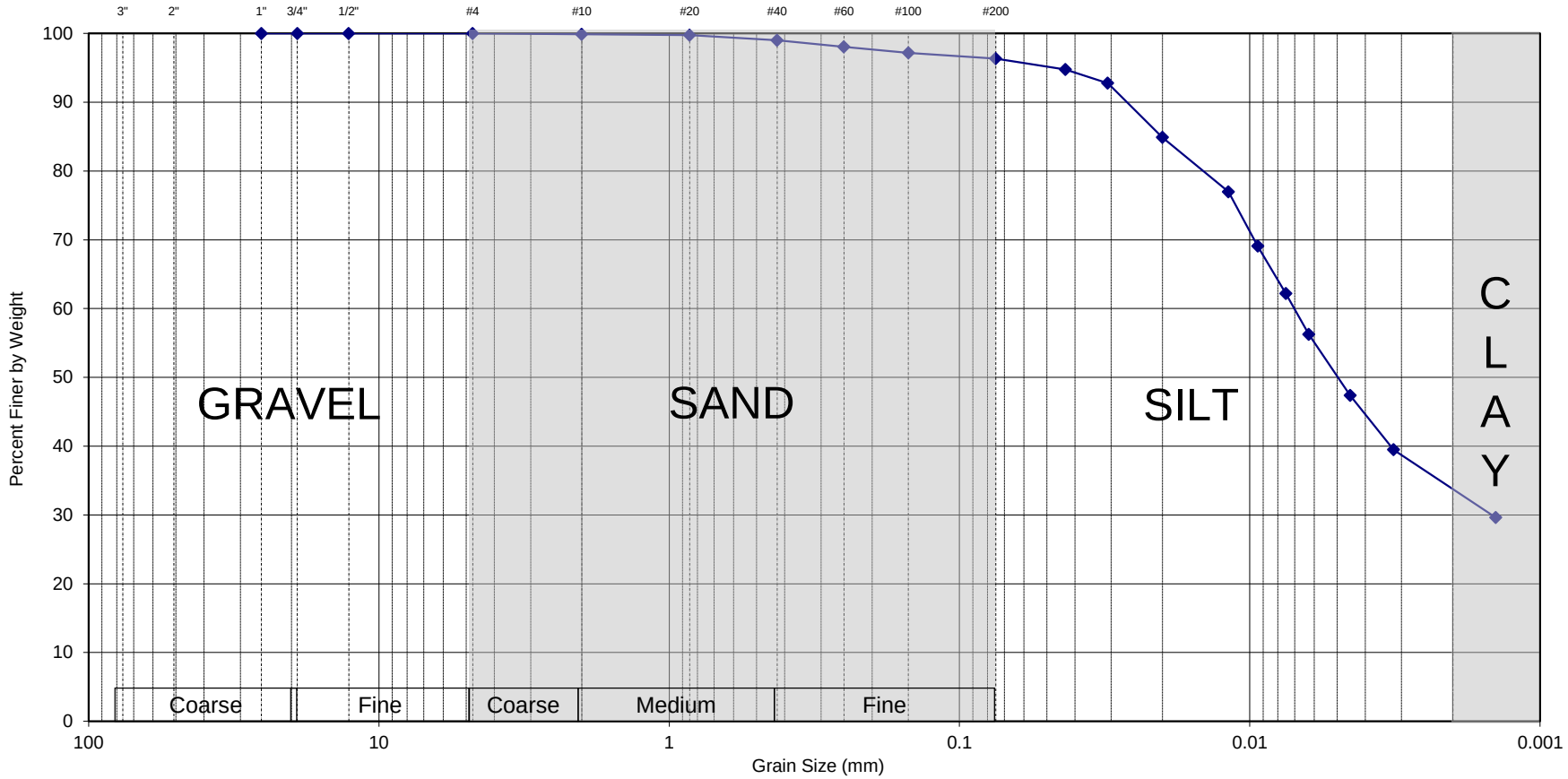
ASTM D422

U.S. STANDARD SIEVE AND HYDROMETER



Gravel	Sand	Fines
0.0%	3.7%	96.3%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
29	MOW-4	S-9	39-41'	Gray Organic SILT, trace Sand (OH)	77.8	91	49	42

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	100.0
#10	99.9
#20	99.8
#40	99.0
#60	98.0
#100	97.2
#200	96.3

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401-467-6454

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New Haven, CT
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ASTM D422

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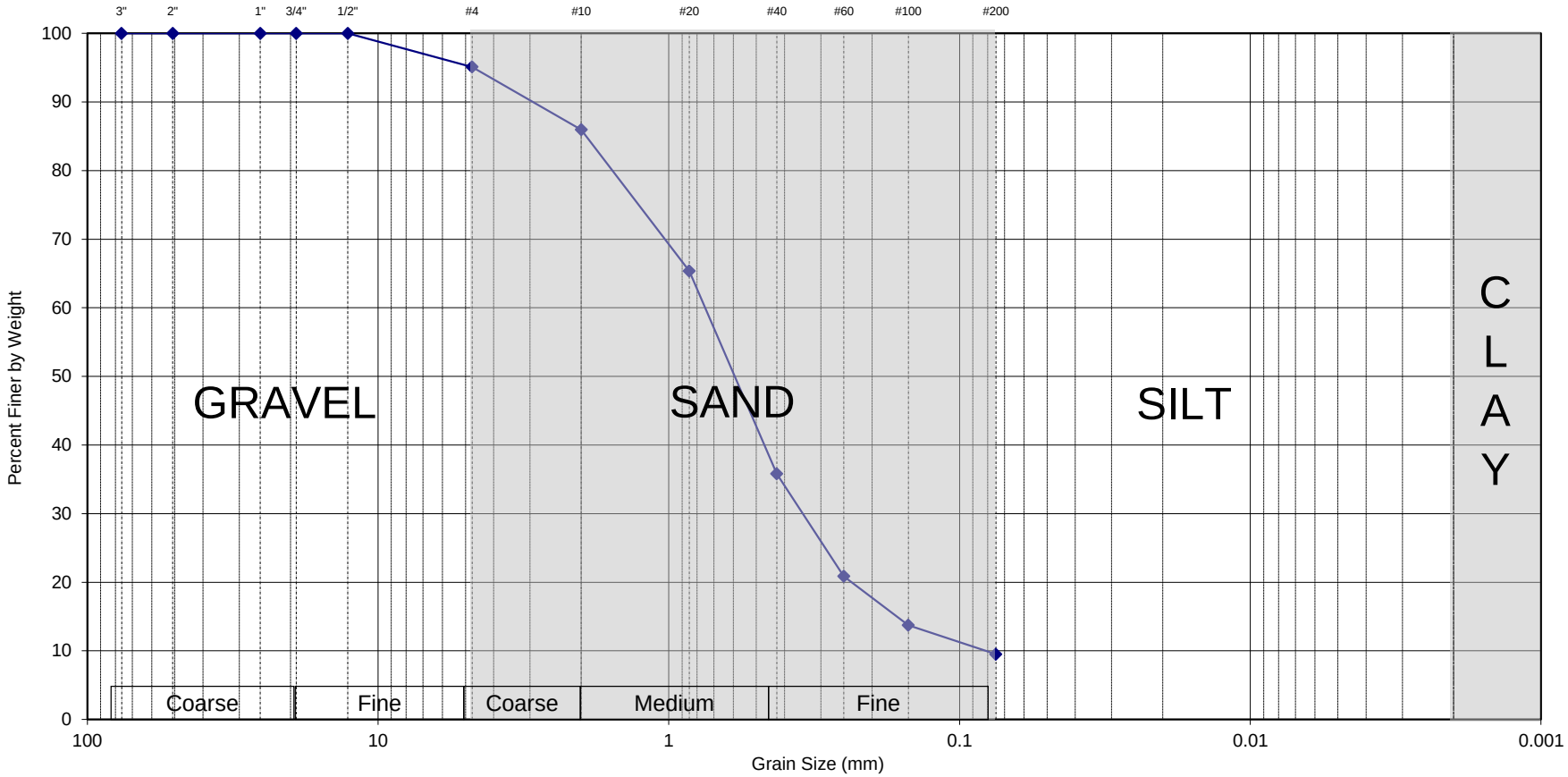

Gravel	Sand	Fines
4.9%	85.6%	9.5%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
30	MOW-4	S-12	54-56'	Brown f-c SAND, trace Silt, trace Gravel (SW-SM)				

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	95.1
#10	86.0
#20	65.4
#40	35.8
#60	20.9
#100	13.7
#200	9.5

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401-467-6454

New Haven Rail Yard - Facility Improvements
New Haven, CT
Thielsch CTS Project # 74-14-0003.23

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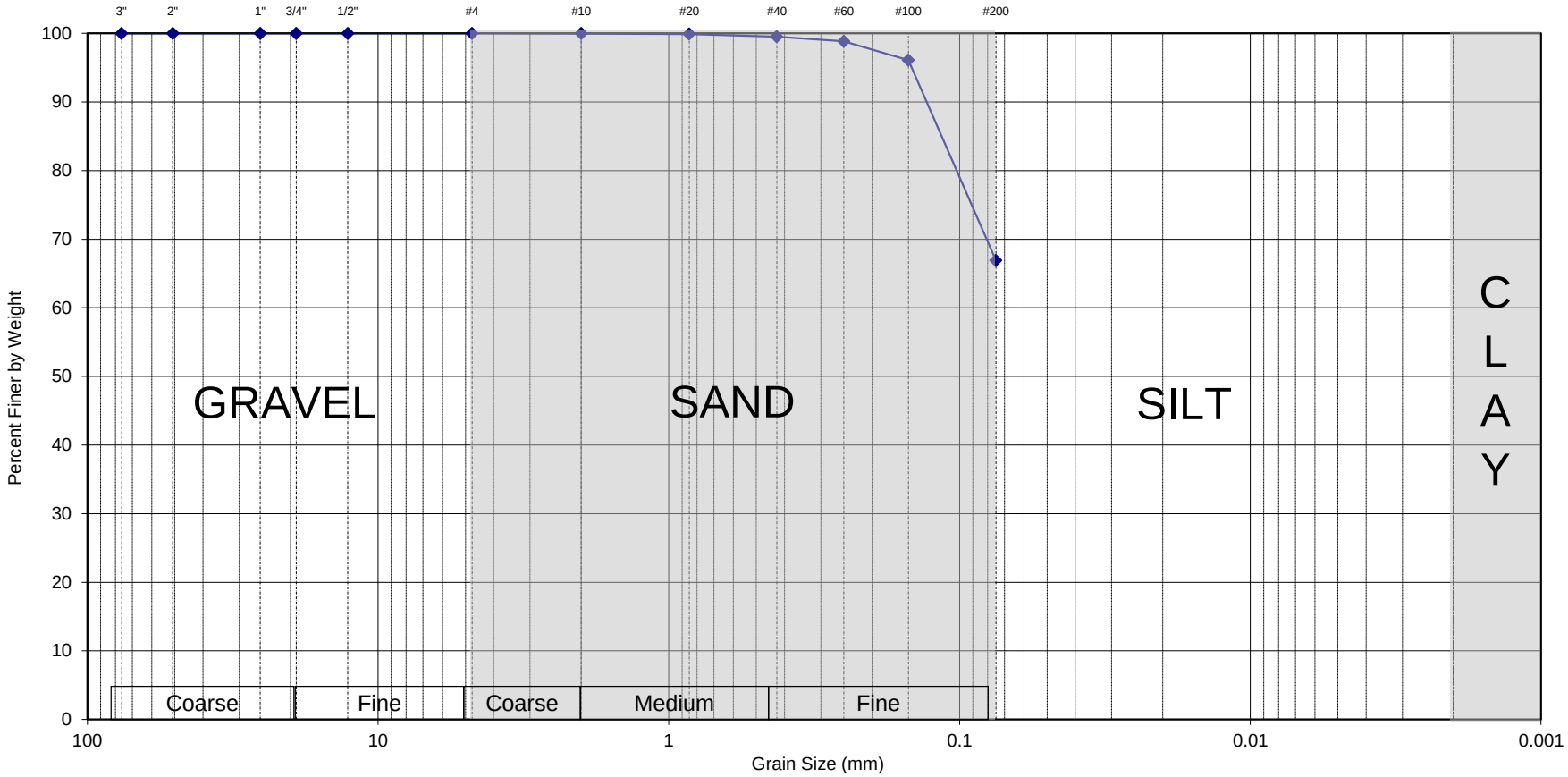

Gravel	Sand	Fines
0.0%	33.1%	66.9%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
31	MOW-4	S-15	69-71'	Red-brown SILT, some fine Sand (ML)				

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	100.0
#10	100.0
#20	99.9
#40	99.5
#60	98.8
#100	96.1
#200	66.9

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195 Frances Ave., Cranston, RI 02910
401-467-6454

New Haven Rail Yard - Facility Improvements
New Haven, CT
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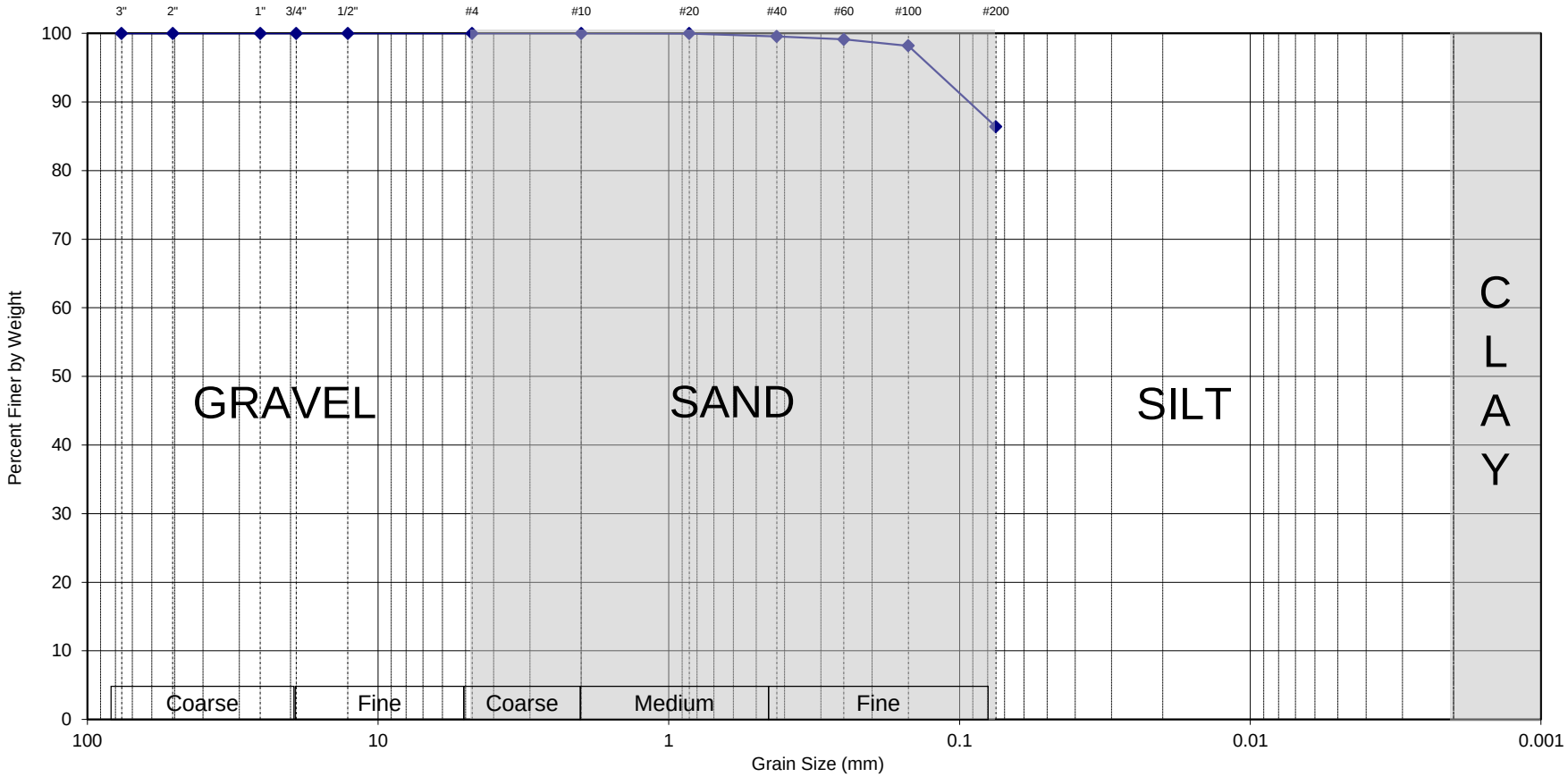

Gravel	Sand	Fines
0.0%	13.6%	86.4%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
32	MOW-4	S-18	84-86'	Red-brown SILT, little fine Sand (ML)				

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	100.0
#10	100.0
#20	100.0
#40	99.6
#60	99.1
#100	98.2
#200	86.4

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401-467-6454

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ASTM D422

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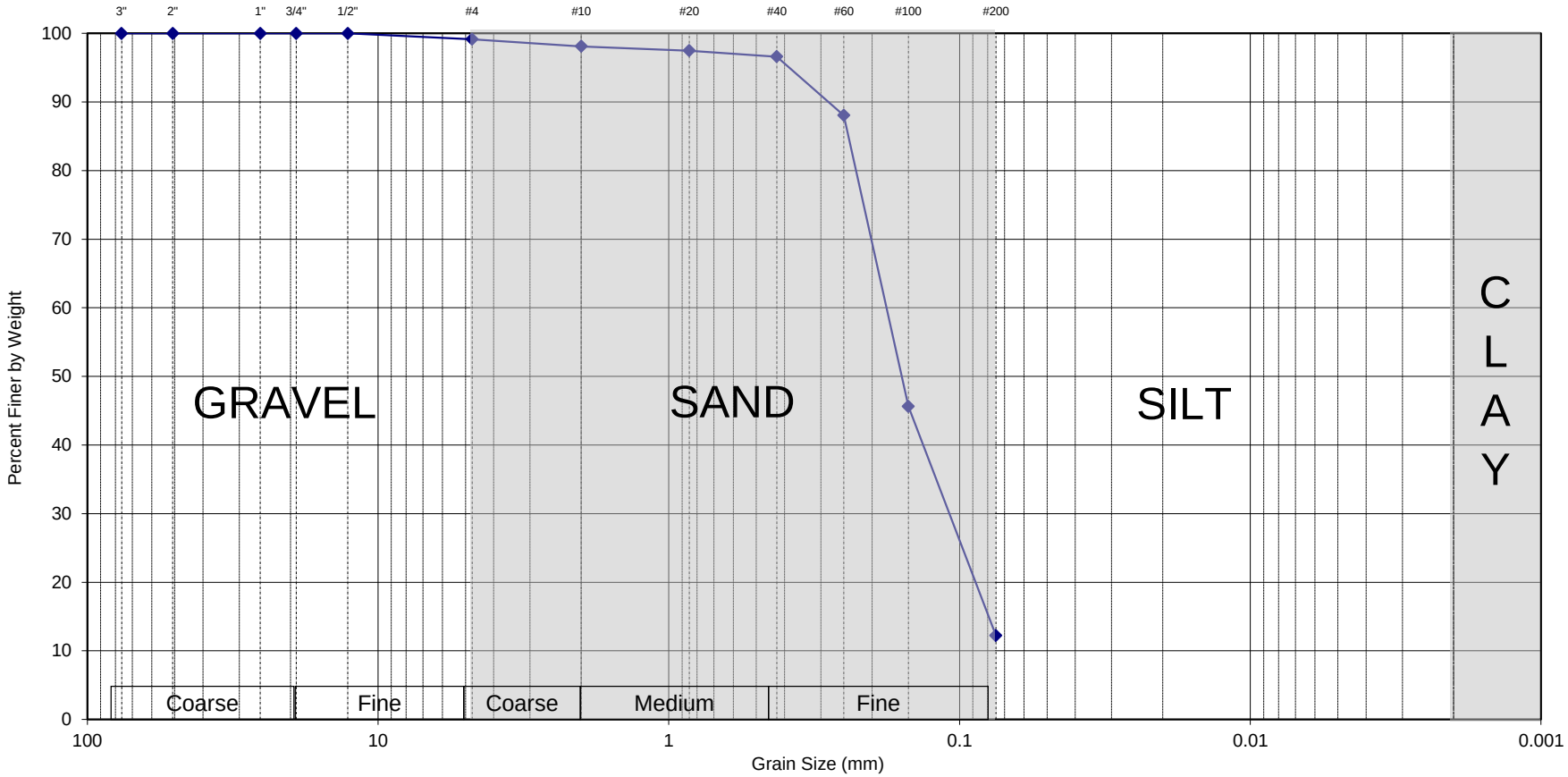

Gravel	Sand	Fines
0.9%	86.9%	12.2%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
33	MOW-4	S-21	99-101'	Brown fine SAND, little Silt, trace Gravel (SM)				

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	99.1
#10	98.1
#20	97.5
#40	96.6
#60	88.1
#100	45.6
#200	12.2

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401-467-6454

New Haven Rail Yard - Facility Improvements
New Haven, CT
Thielsch CTS Project # 74-14-0003.23

Tested by: LM/GG Date: 7/3/14
Reviewed by: MBP Date: 7/9/14

LABORATORY TESTING DATA SHEET

Project Name New Haven Rail Yard - Facities Improvement
Project Location New Haven, CT
Reviewed By

Project No. 74-13-0003.23
Assigned By David D'Angelo

Project Manager David D'Angelo
Date 7/9/2014
Date Reviewed 7/9/2014

Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests								Strength Tests					Consol.	
				Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Torvane or Type Test	σ_c psf	Failure Criteria	$\sigma_1 - \sigma_3$ psf	Strain %	$\frac{C_c}{1 + e_0}$	Laboratory Log and Soil Description
MOW-5	S-1	2.2-4.2	34				22.1											Red-brown f-c SAND, some Silt, little f-c Gravel (SM)
MOW-5	S-4	14-16	35				8.6											Dark brown f-c SAND, little fine Gravel, trace Silt (SW-SM)
MOW-5	S-6	24-25	36	84.7	103	56	98.2	30										Gray Organic SILT, trace Sand (OH)
MOW-5	S-12	54-56	37				27.9											Red-brown fine SAND, some Silt (SM)
MOW-5	S-15	69-71	38				23.1											Red-brown fine SAND, some Silt (SM)
MOW-5	S-18	84-86	39				77.6											Red-brown SILT, some fine Sand (ML)
MOW-5	S-21	99-101	40				26.6											Red-brown fine SAND, some SILT (SM)

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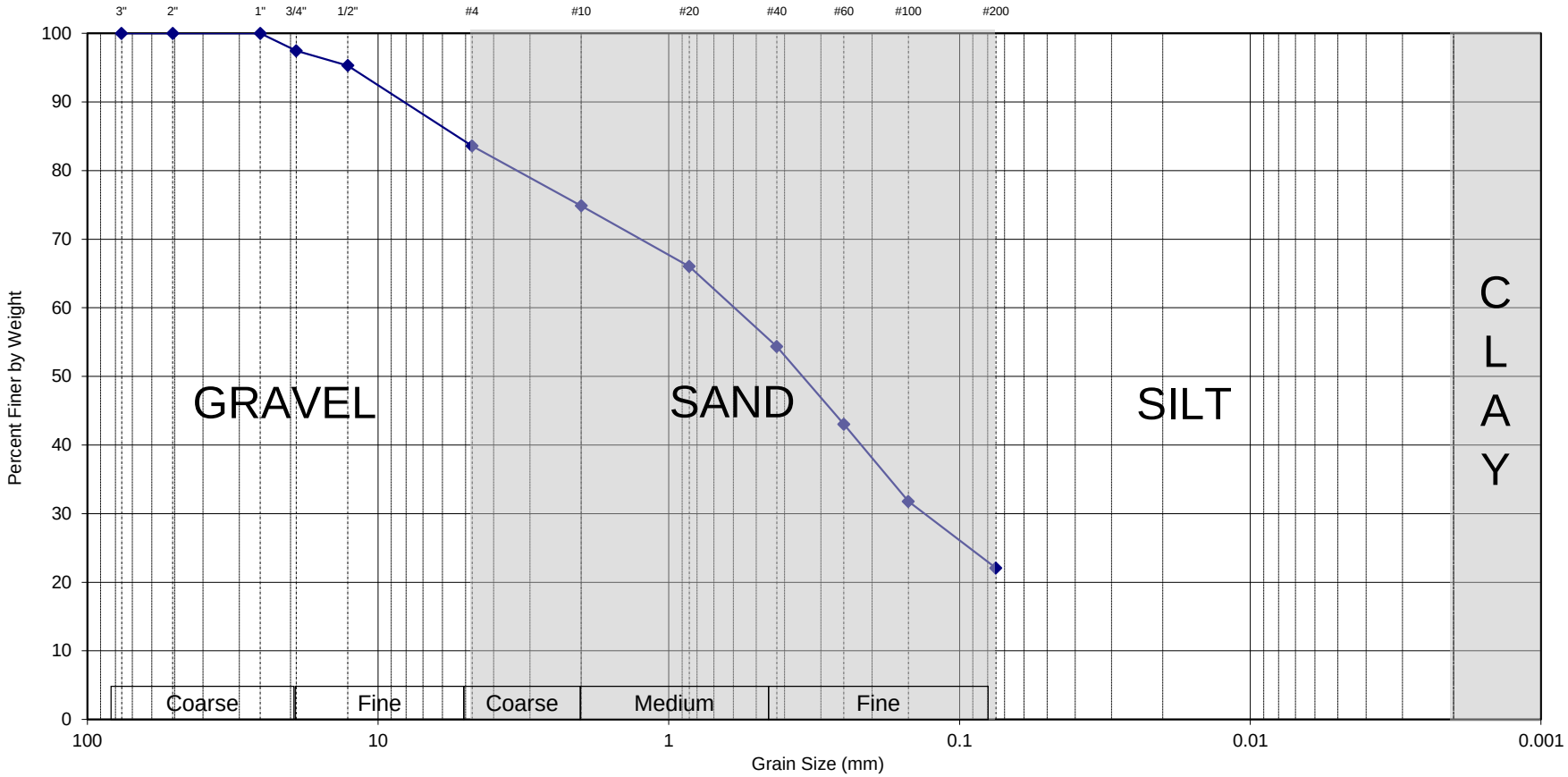


Gravel	Sand	Fines
16.4%	61.5%	22.1%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
34	MOW-5	S-1	2.2-4.2'	Red-brown f-c SAND, some Silt, little f-c Gravel (SM)				

Sieve Size	% Passing
¾"	97.4
½"	95.3
#4	83.6
#10	74.8
#20	66.0
#40	54.3
#60	43.0
#100	31.8
#200	22.1

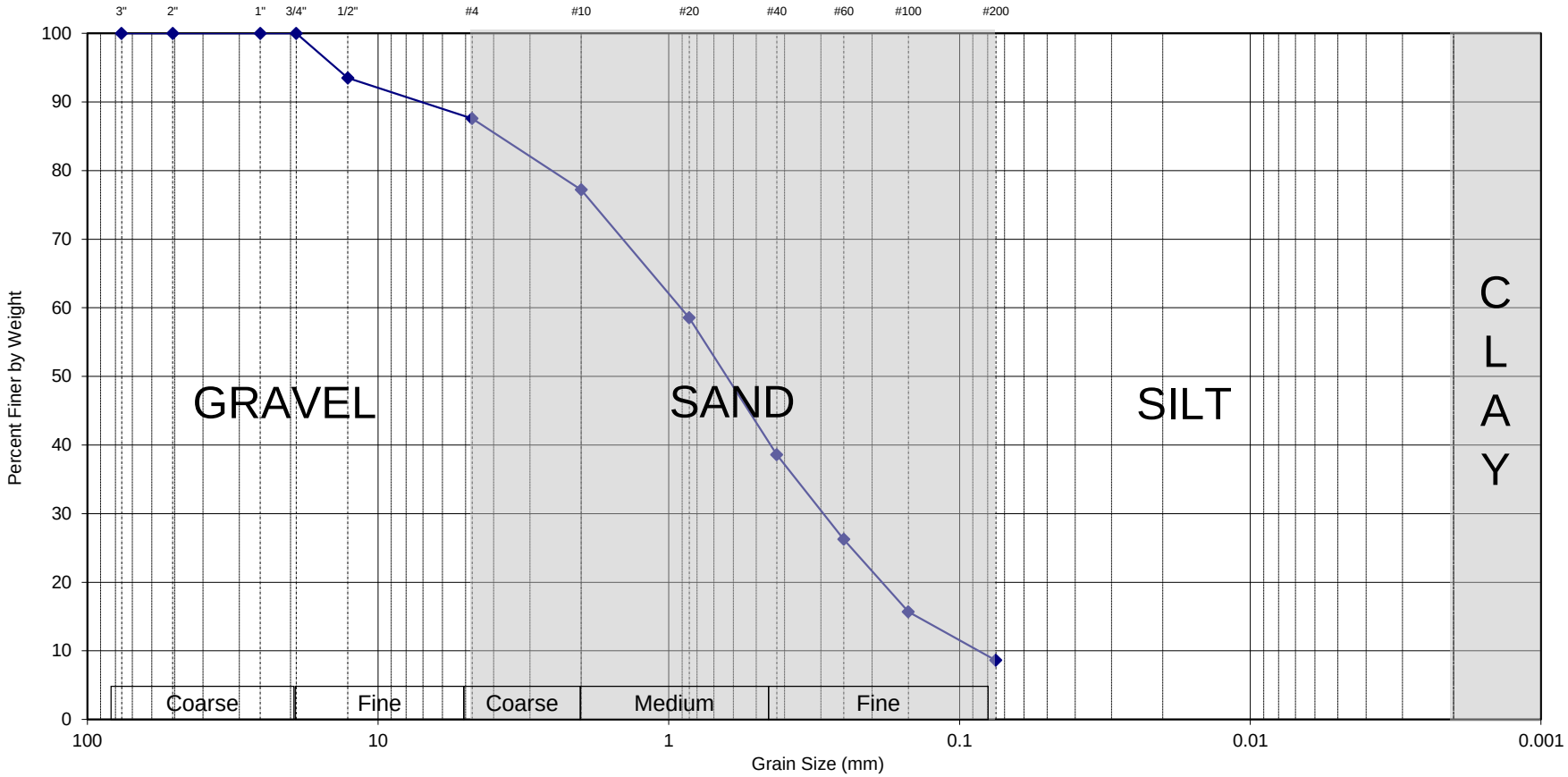
THIELSCH ENGINEERING
195 Frances Ave., Cranston, RI 02910
401-467-6454

New Haven Rail Yard - Facility Improvements
New Haven, CT
Thielsch CTS Project # 74-14-0003.23

Tested by: LM Date: 7/10/14
Reviewed by: MBP Date: 7/10/14

ASTM D422

U.S. STANDARD SIEVE AND HYDROMETER



Gravel	Sand	Fines
12.4%	79.0%	8.6%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
35	MOW-5	S-4	14-16'	Dark brown f-c SAND, little fine Gravel, trace Silt (SW-SM)				

Sieve Size	% Passing
¾"	100.0
½"	93.5
#4	87.6
#10	77.2
#20	58.5
#40	38.6
#60	26.2
#100	15.7
#200	8.6

THIELSCH ENGINEERING
195 Frances Ave., Cranston, RI 02910
401-467-6454

New Haven Rail Yard - Facility Improvements
New Haven, CT
Thielsch CTS Project # 74-14-0003.23

Tested by: LM Date: 7/10/14
Reviewed by: MBP Date: 7/10/14

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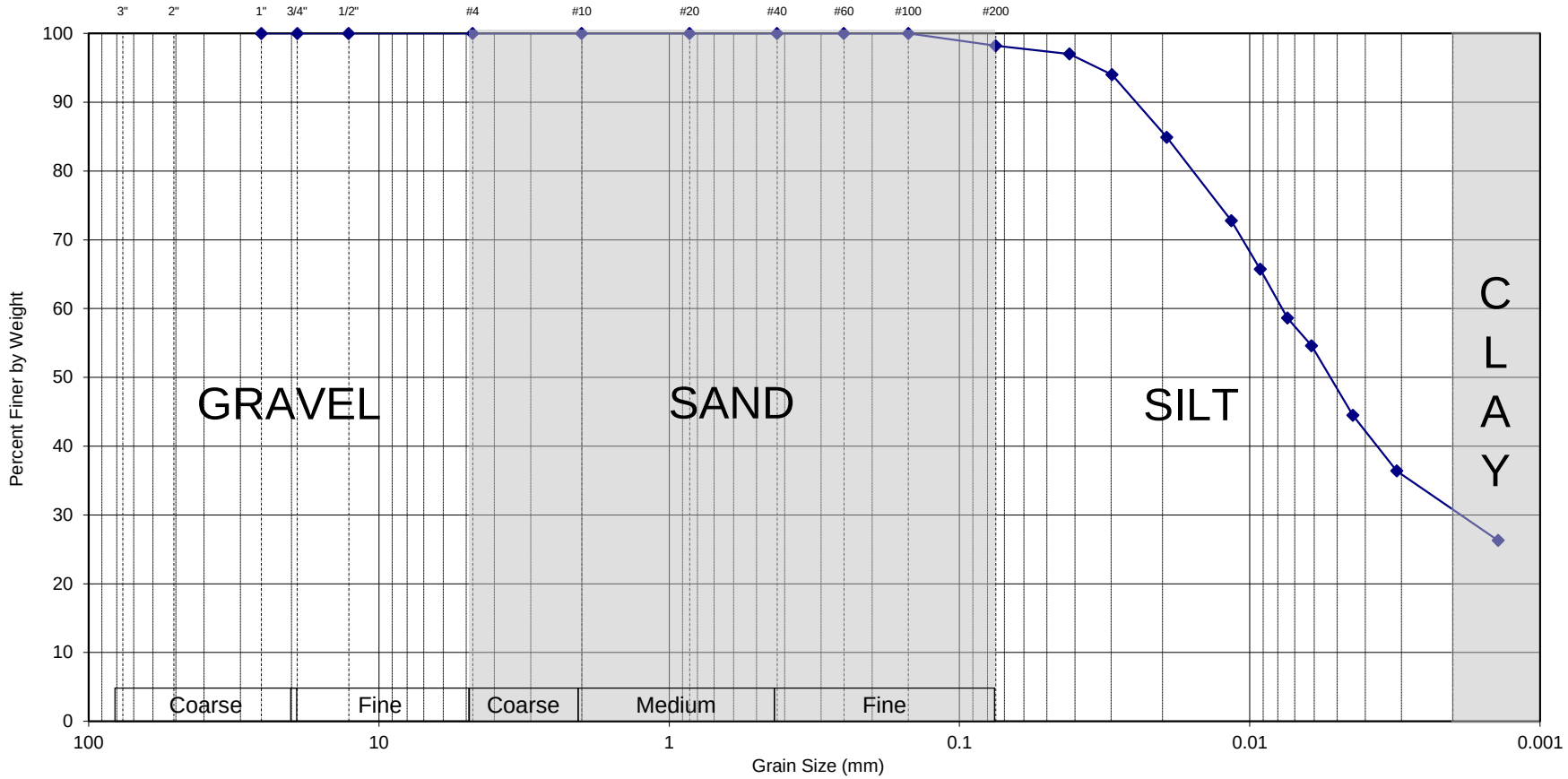

Gravel	Sand	Fines
0.0%	1.8%	98.2%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
36	MOW-5	S-6	24-25'	Gray Organic SILT,trace Sand (OH)	84.7	103	56	47

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	100.0
#10	100.0
#20	100.0
#40	100.0
#60	100.0
#100	100.0
#200	98.2

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195 Frances Ave., Cranston, RI 02910
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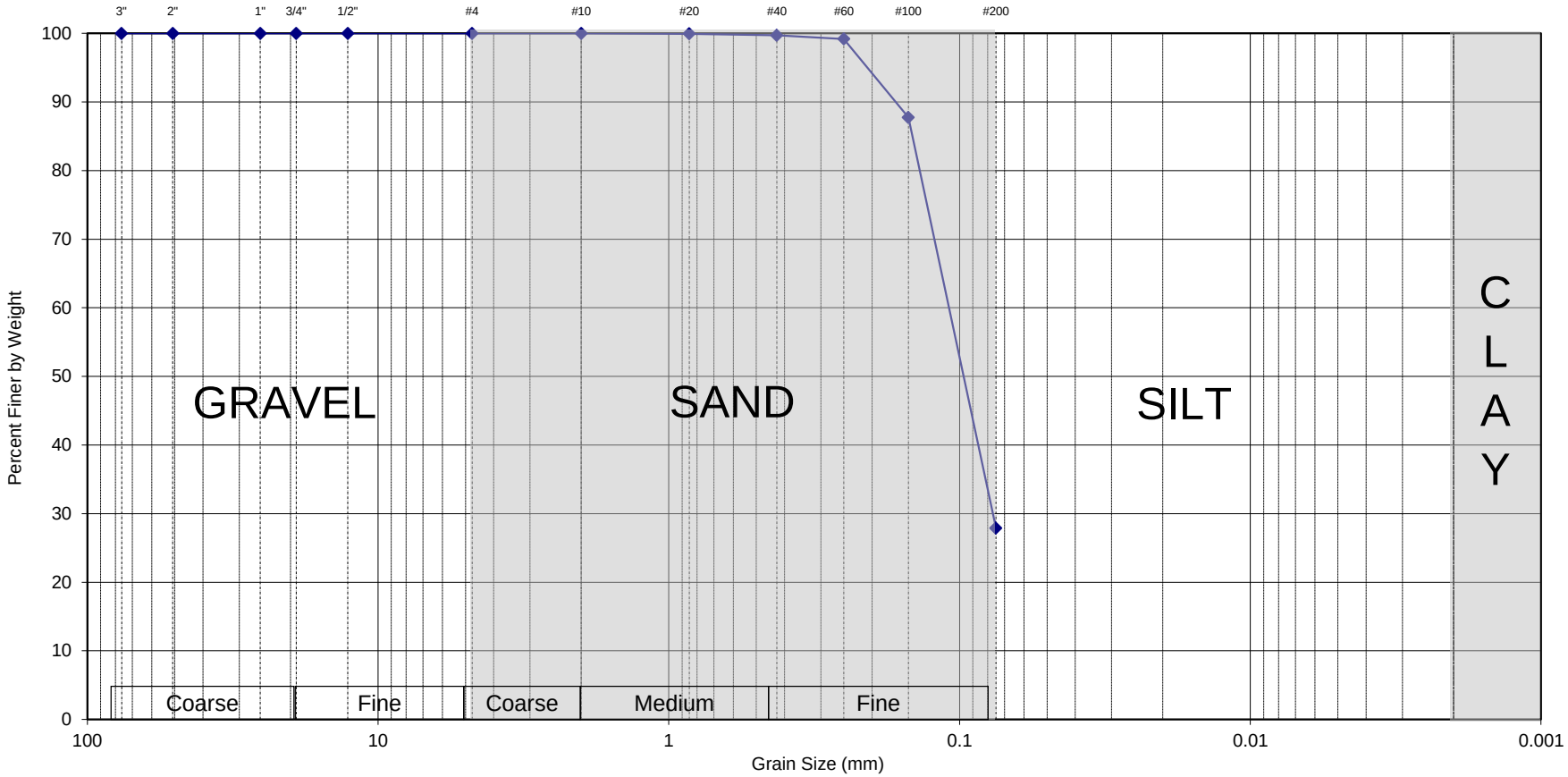
New Haven Rail Yard - Facility Improvements
New Haven, CT
Thielsch CTS Project # 74-14-0003.23

Tested by: LM Date: 7/9/14
Reviewed by: MBP Date: 7/10/14

ASTM D422

U.S. STANDARD SIEVE AND HYDROMETER



Gravel	Sand	Fines
0.0%	72.1%	27.9%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
37	MOW-5	S-12	54-56'	Red-brown fine SAND, some Silt (SM)				

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	100.0
#10	100.0
#20	99.9
#40	99.7
#60	99.2
#100	87.7
#200	27.9

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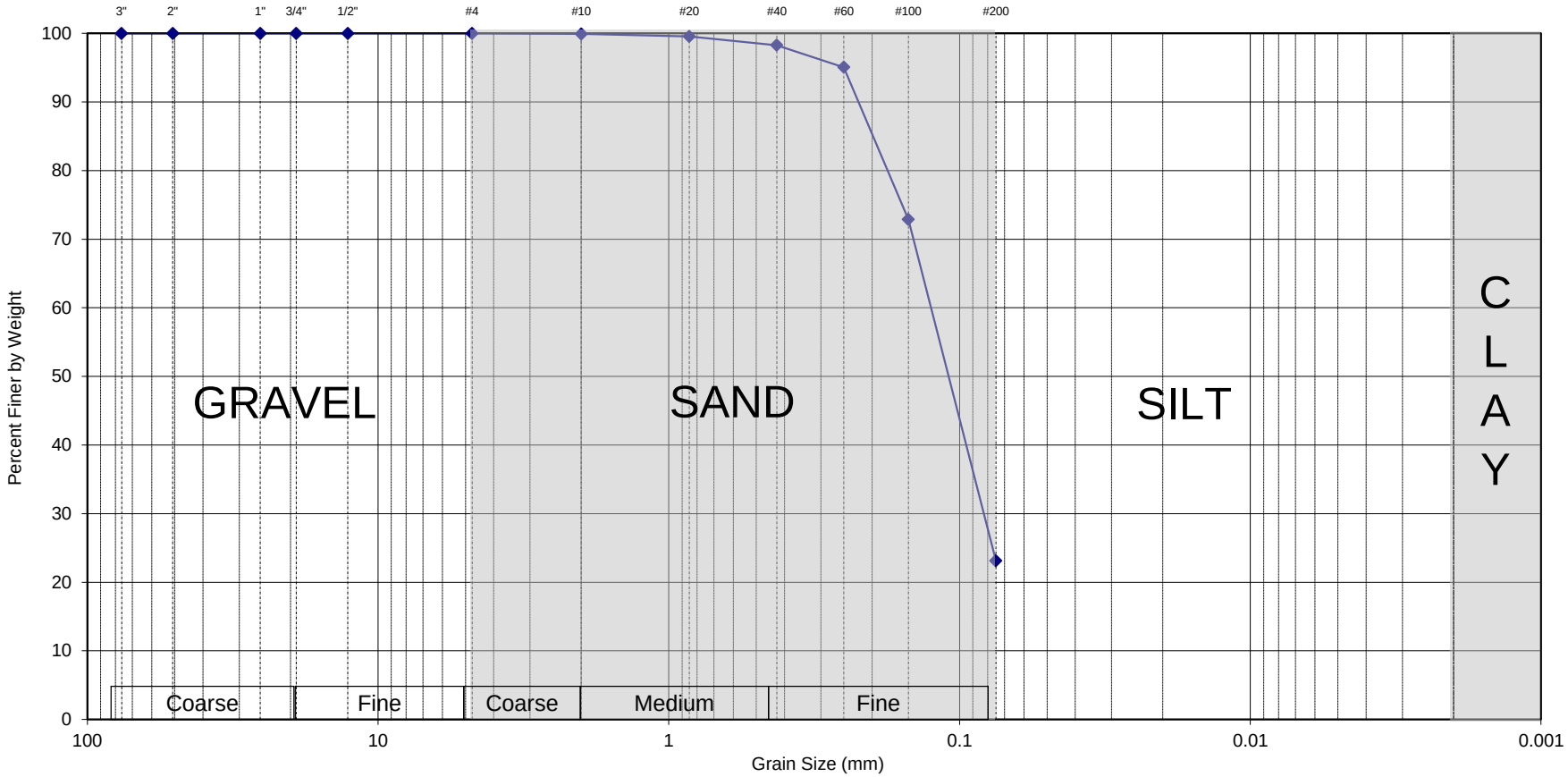
195 Frances Ave., Cranston, RI 02910
401-467-6454

New Haven Rail Yard - Facility Improvements
New Haven, CT
Thielsch CTS Project # 74-14-0003.23

Tested by: LM Date: 7/10/14
Reviewed by: MBP Date: 7/10/14

ASTM D422

U.S. STANDARD SIEVE AND HYDROMETER



Gravel	Sand	Fines
0.0%	76.9%	23.1%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
38	MOW-5	S-15	69-71'	Red-brown fine SAND, some Silt (SM)				

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	100.0
#10	99.9
#20	99.5
#40	98.3
#60	95.1
#100	72.9
#200	23.1

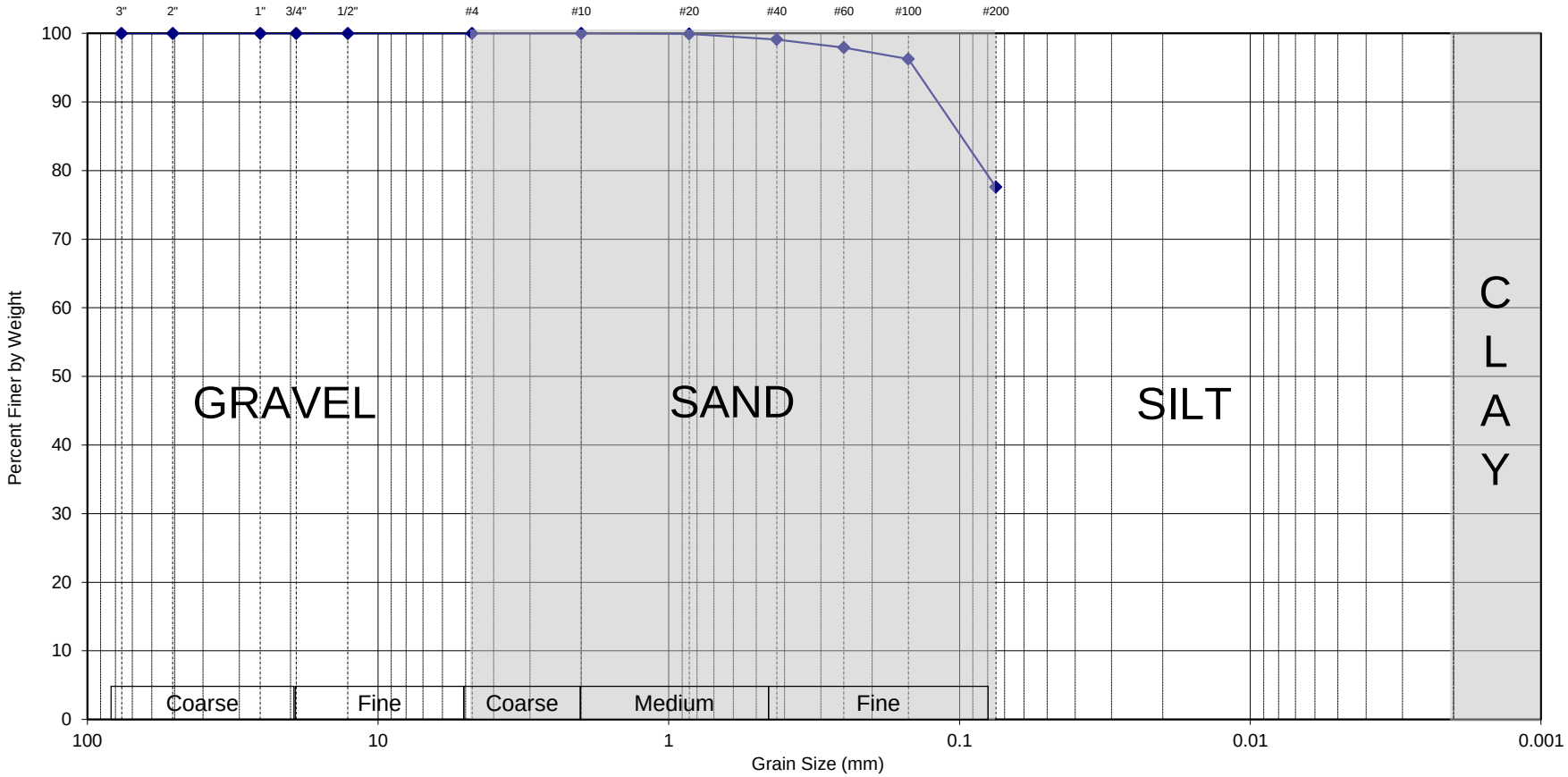
THIELSCH ENGINEERING
195 Frances Ave., Cranston, RI 02910
401-467-6454

New Haven Rail Yard - Facility Improvements
New Haven, CT
Thielsch CTS Project # 74-14-0003.23

Tested by: LM Date: 7/10/14
Reviewed by: MBP Date: 7/10/14

ASTM D422

U.S. STANDARD SIEVE AND HYDROMETER



Gravel	Sand	Fines
0.0%	22.4%	77.6%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
39	MOW-5	S-18	84-86'	Red-brown SILT, some fine Sand (ML)				

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	100.0
#10	100.0
#20	99.9
#40	99.1
#60	97.9
#100	96.2
#200	77.6

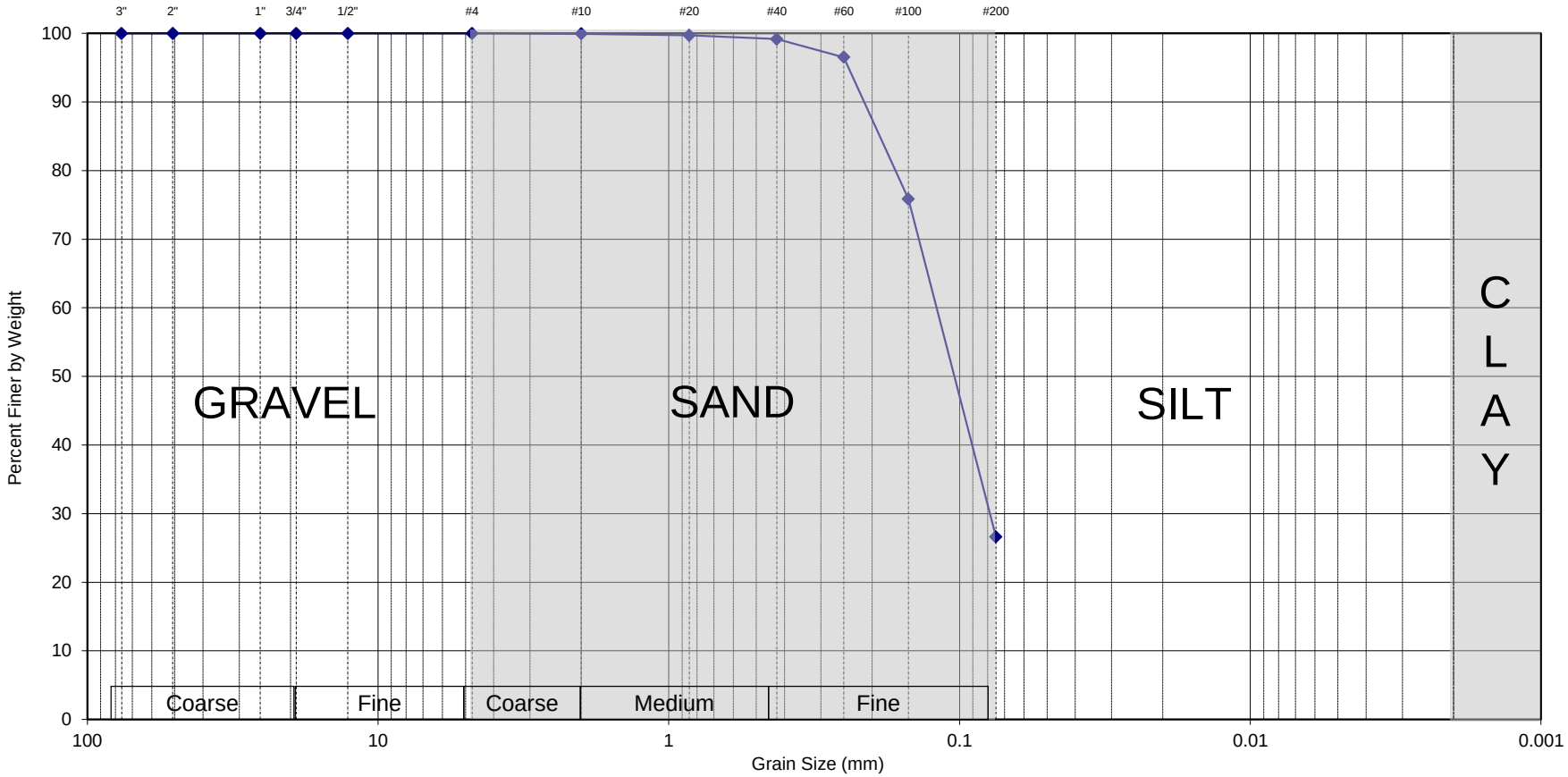
THIELSCH ENGINEERING
195 Frances Ave., Cranston, RI 02910
401-467-6454

New Haven Rail Yard - Facility Improvements
New Haven, CT
Thielsch CTS Project # 74-14-0003.23

Tested by: LM Date: 7/10/14
Reviewed by: MBP Date: 7/10/14

ASTM D422

U.S. STANDARD SIEVE AND HYDROMETER



Gravel	Sand	Fines
0.0%	73.4%	26.6%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
40	MOW-5	S-21	99-101'	Red-brown fine SAND, some SILT (SM)				

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	100.0
#10	99.9
#20	99.7
#40	99.2
#60	96.5
#100	75.9
#200	26.6

THIELSCH ENGINEERING
195 Frances Ave., Cranston, RI 02910
401-467-6454

New Haven Rail Yard - Facility Improvements
New Haven, CT
Thielsch CTS Project # 74-14-0003.23

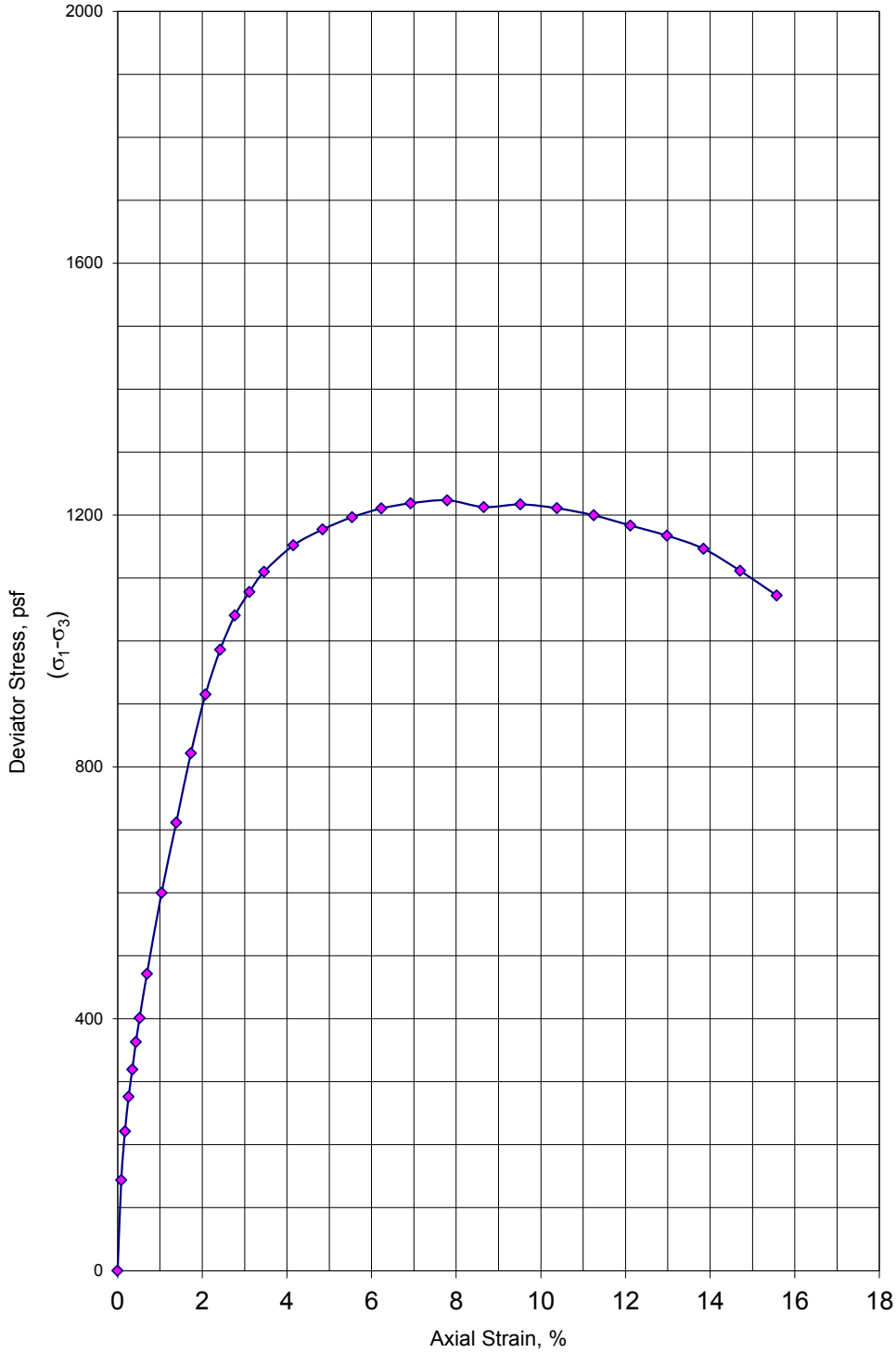
Tested by: LM Date: 7/10/14
Reviewed by: MBP Date: 7/10/14

LABORATORY TESTING DATA SHEET

Project Name New Haven Rail Yard - Facities Improvement
Project Location New Haven, CT
Reviewed By Matthew Dalgle
Project No. 74-13-0003.23
Assigned By David D'Angelo
Project Manager David D'Angelo
Date 7/8/2014
Date Reviewed 7/8/2014

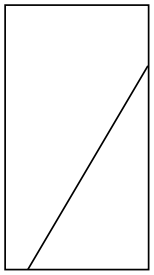
Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests: Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Strength Tests: Torvane or Type Test	σ_c psf	Failure Criteria	$\sigma_1 - \sigma_3$ psf	Strain %	Consol. $\frac{C_c}{1 + e_0}$	Laboratory Log and Soil Description
MOW-1	UP-2	22-24	1	Average Total Unit Weight (22.0-24.0') = 95.0 pcf														
		22.2		74.7								Tv= 0.30 tsf						Dark gray Organic SILT trace Shell Fragments Medium consistency
		22.25-22.75		74.5							55.7	UU	1350	σ_1-σ_3 Max	1224	7.8		
		22.8		68.3								Tv= 0.26 tsf						
		22.9-23.0		75.1							55.7						0.25	
		23.1-23.2		72.1	82	43												
		23.2-23.3					98.7	30										
		23.4		72.8								Tv= 0.28 tsf						

THIELSCH ENGINEERING



$(\sigma_1-\sigma_3)$ (psf) = 1223.7
Strain % = 7.8

Sketch at Failure



THIELSCH ENGINEERING

195 Frances Avenue
Cranston, RI 02910

SOIL DESCRIPTION:	Dark Gray Organic SILT		
LIQUID LIMIT: 82	PLASTIC LIMIT: 43	SPECIFIC GRAVITY:	NT

TEST NO. / SYMBOL	INITIAL CONDITIONS				CONDITIONS BEFORE SHEAR				FINAL CONDITIONS		RATE OF STRAIN, PERCENT PER MINUTE
	INITIAL WATER CONTENT, %	INITIAL DRY UNIT WEIGHT, pcf	SAMPLE HEIGHT, IN.	SAMPLE DIAMETER, IN.	INITIAL STRESS σ_c, ksf	FINAL BACK PRESSURE, ksf	VOLUMETRIC STRAIN, %	PORE PRESSURE RESPONSE, %	FINAL WATER CONTENT, %	FINAL DRY UNIT WEIGHT, %	
UU 1	74.5	55.7	5.778	2.860	1.35				74.5		0.519

New Haven Rail Yard - Facities Improvement
New Haven, CT
TRIAXIAL COMPRESSION TESTS (UU)

BORING:	MOW-1	FILE NO:	74-13-0003.23
SAMPLE:	UP-2	Date:	6/26/2014
DEPTH:	22.25-22.75'	Tech.:	AS
TEST NO:	UU 1	Reviewer:	MBP

Soil Consolidation Test ASTM D2435

THIELSCH ENGINEERING

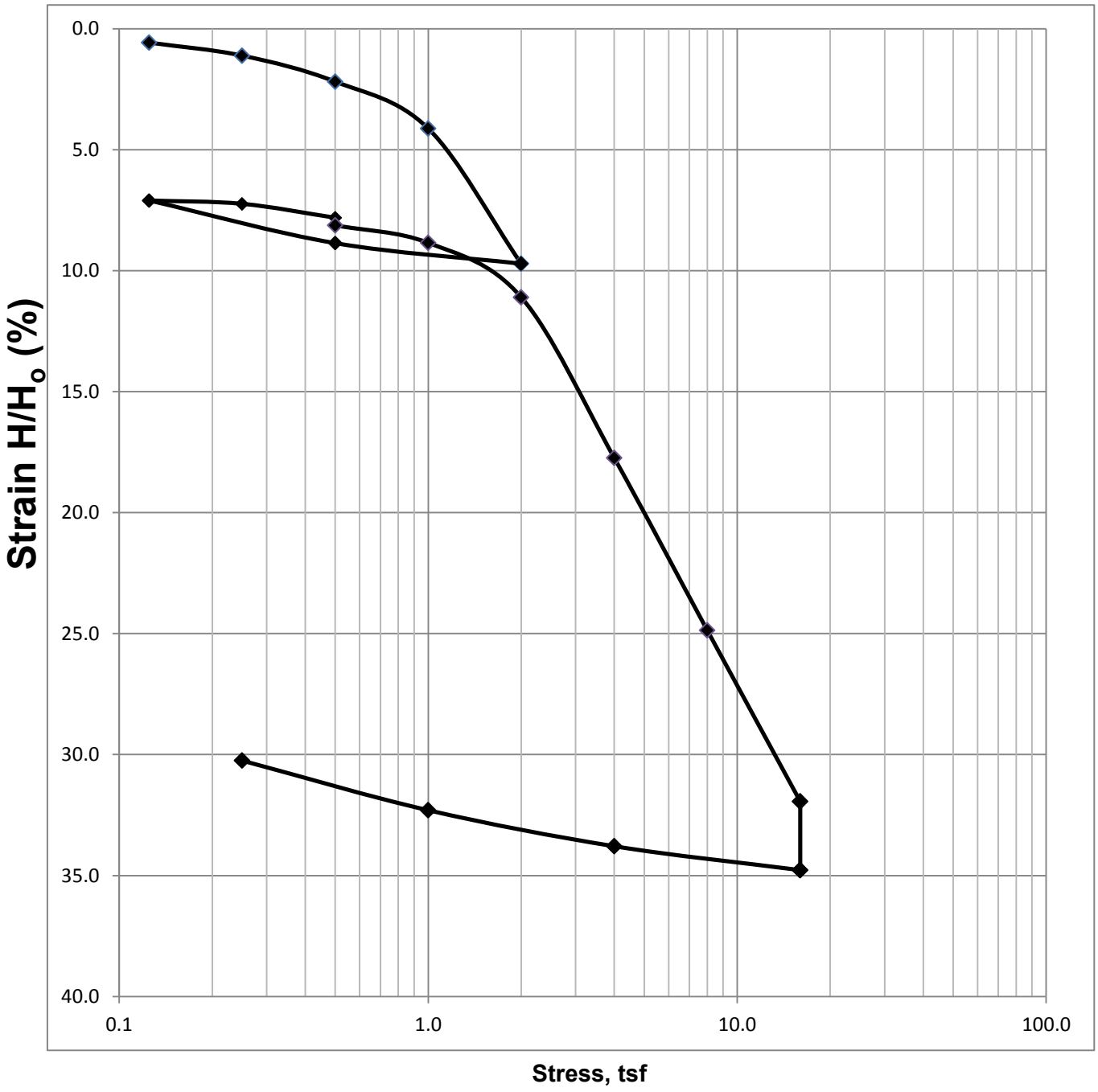
195 Frances Ave., Cranston, RI 02910

Project **New Haven Rail Yard - Facility Improvements** Project Location **New Haven, CT**

File # **74-14-0003.23**

Boring **MOW-1** Sample **UP-2** Depth **22.9-23.0'** Set Up By **AS**

Description **Dark Gray Organic SILT** Water Content % **75.1%** γd (pcf) **55.7** Test # **C 1**



One-Dimensional Consolidation Consolidation Testing Of Soil (ASTM D2435-04)
Method B (End of Primary Increments)

Project Name	New Haven Rail Yard - Facility Improvements	Technician	AS
Location	New Haven, CT	Reviewer	MBP
Project Number	74-14-0003.23		
Boring Number	MOW-1	Sample Number	UP-2
Depth	22.9-23.0'	Test Number	C 1

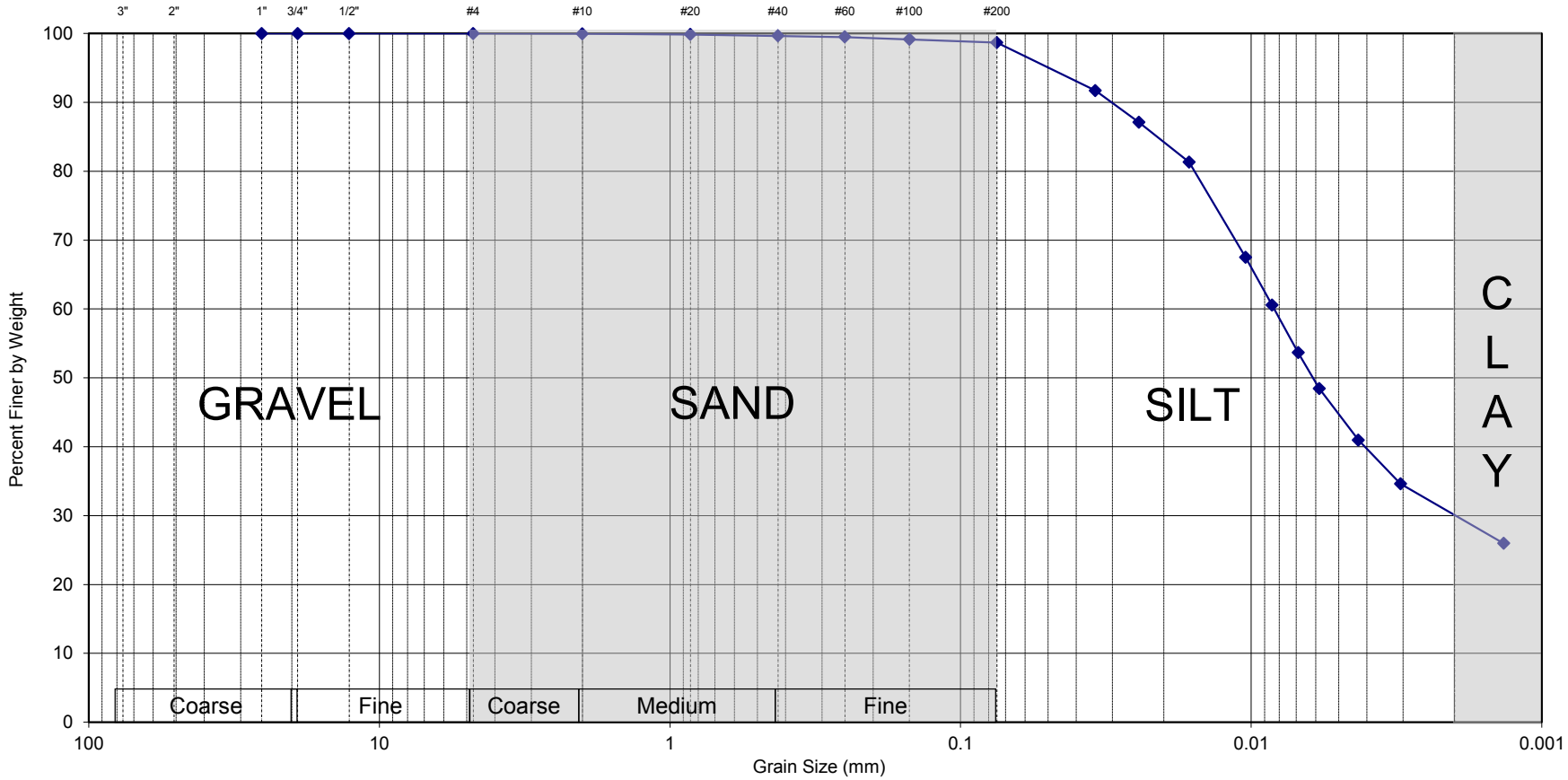
Specific Gravity	2.20 (estimated)		
Initial Water Content	75.1%	Initial Dry Unit Weight (pcf)	55.7
Final Water Content	44.7%	Final Dry Unit Weight (pcf)	79.8
Initial Sample Height (in.)	0.800	Initial Void Ratio	1.467
Final Sample Height (in.)	0.558	Final Void Ratio	0.720

Notes:

Increment Number	Stress (tsf)	Cummulative Deflection (in)	Strain (%)	T_{90} (min)	Cv_{90} (cm^2/sec)	C_α
1	0	0	0			
2	0.125	0.0046	0.575			
3	0.25	0.0089	1.113	2.0	6.98E-03	
4	0.5	0.0175	2.188	3.0	4.47E-03	
5	1	0.0330	4.125	3.0	3.97E-03	
6	2	0.0777	9.713	5.8	2.10E-03	
7	0.5	0.0709	8.863			
8	0.125	0.0568	7.100			
9	0.25	0.0579	7.238	2.0	6.20E-03	
10	0.5	0.0625	7.813	2.6	4.81E-03	
11	0.5	0.0650	8.125			0.00088
12	1	0.0708	8.850	2.6	4.51E-03	
13	2	0.0888	11.100	4.4	2.24E-03	
14	4	0.1419	17.738	4.8	1.70E-03	
15	8	0.1989	24.863	4.4	1.54E-03	
16	16	0.2555	31.938	4.0	1.55E-03	
17	16	0.2782	34.775			0.00938
18	4	0.2703	33.788			
19	1	0.2584	32.300			
20	0.25	0.2420	30.250			

ASTM D422

U.S. STANDARD SIEVE AND HYDROMETER



Gravel	Sand	Fines
0.0%	1.3%	98.7%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
1NH	MOW-1	UP-2	23.2-23.3'	Dark Gray Organic SILT, trace Sand		82	43	39

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	100.0
#10	100.0
#20	99.9
#40	99.7
#60	99.5
#100	99.1
#200	98.7

THIELSCH ENGINEERING
195 Frances Ave., Cranston, RI 02910
401-467-6454

New Haven Rail Yard - Facility Improvements
New Haven, CT
Thielsch CTS Project # 74-14-0003.23

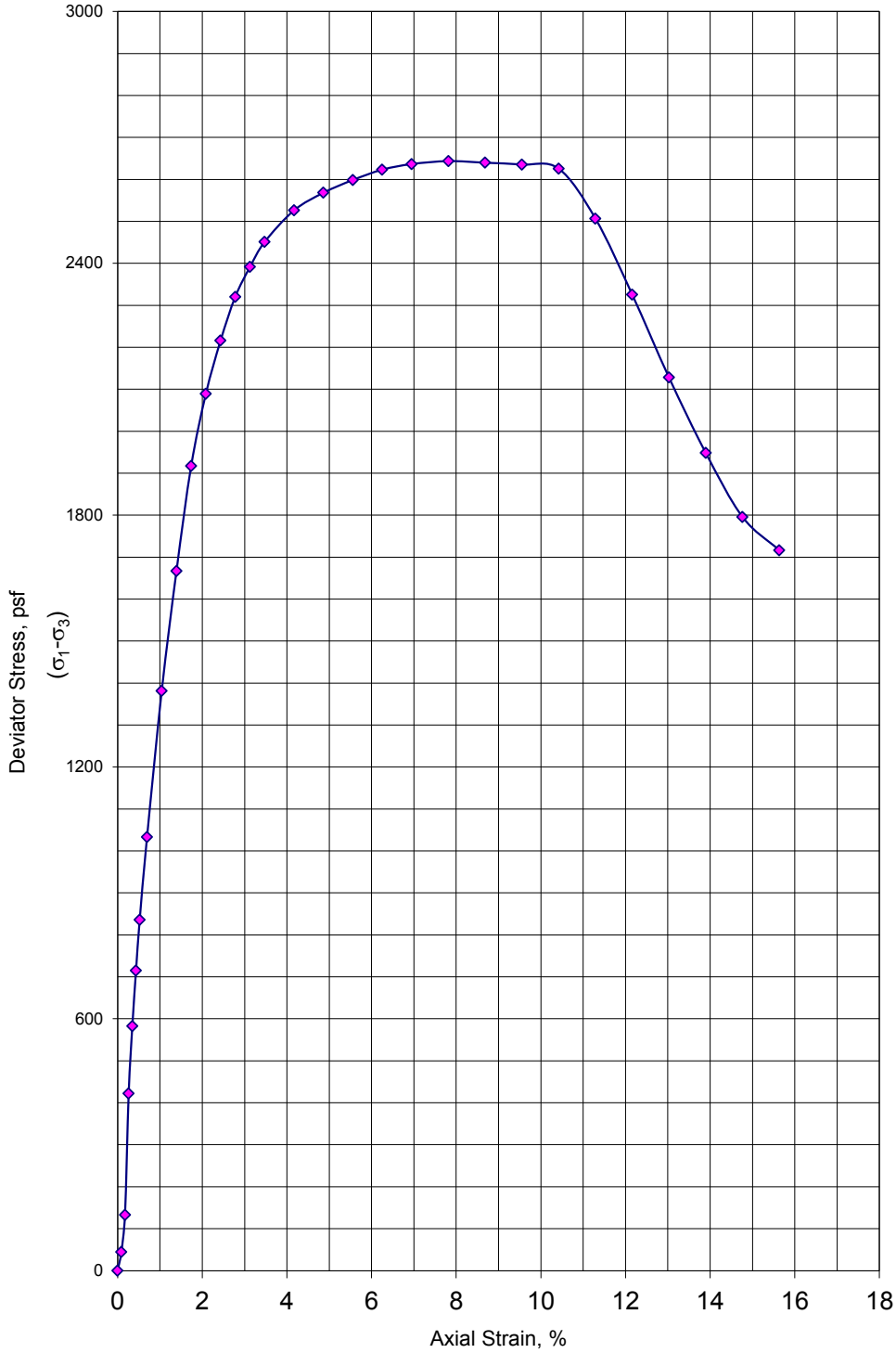
Tested by: LM Date: 7/3/14
Reviewed by: MBP Date: 7/8/14

LABORATORY TESTING DATA SHEET

Project Name New Haven Rail Yard - Facities Improvement
Project Location New Haven, CT
Reviewed By
Project No. 74-13-0003.23
Assigned By David D'Angelo
Project Manager David D'Angelo
Date 7/8/2014
Date Reviewed 7/8/2014

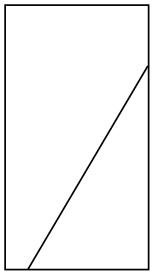
Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests: Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Strength Tests: Torvane or Type Test	σ_c psf	Failure Criteria	$\sigma_1 - \sigma_3$ psf	Strain %	Consol. $\frac{C_c}{1 + e_0}$	Laboratory Log and Soil Description
MOW-1	UP-3	47-49	2	Average Total Unit Weight (47.0-49.0') = 108.2 pcf														
		47.2		33.8								Tv= 0.37 tsf						Dark gray Organic SILT trace fine Sand trace Shell Fragments Medium consistency
		47.2-47.7		(Sample Saved)														
		47.7		36.6								Tv= 0.40 tsf						
		47.9-48.4		44.9							75.1	UU	2790	σ_1-σ_3 Max	2644	7.8		
		48.4		51.3								Tv= 0.50 tsf						
		48.5-48.6		52.1							69.0						0.23	
		48.6-48.7		54.2	69	38												
		48.7-48.8					93.2	18										
		49.0		50.0								Tv= 0.48 tsf						

THIELSCH ENGINEERING



$(\sigma_1-\sigma_3)$ (psf) = 2643.5
Strain % = 7.8

Sketch at Failure



THIELSCH ENGINEERING

195 Frances Avenue
Cranston, RI 02910

SOIL DESCRIPTION:	Dark Gray Organic SILT		
LIQUID LIMIT: 69	PLASTIC LIMIT: 38	SPECIFIC GRAVITY:	NT

TEST NO. / SYMBOL	INITIAL CONDITIONS				CONDITIONS BEFORE SHEAR				FINAL CONDITIONS		RATE OF STRAIN, PERCENT PER MINUTE
	INITIAL WATER CONTENT, %	INITIAL DRY UNIT WEIGHT, pcf	SAMPLE HEIGHT, IN.	SAMPLE DIAMETER, IN.	INITIAL STRESS σ_c, ksf	FINAL BACK PRESSURE, ksf	VOLUMETRIC STRAIN, %	PORE PRESSURE RESPONSE, %	FINAL WATER CONTENT, %	FINAL DRY UNIT WEIGHT, %	
UU 2	44.9	75.1	5.757	2.854	2.79				46.2		0.521

New Haven Rail Yard - Facities Improvement
New Haven, CT
TRIAXIAL COMPRESSION TESTS (UU)

BORING:	MOW-1	FILE NO:	74-13-0003.23
SAMPLE:	UP-3	Date:	6/30/2014
DEPTH:	47.9-48.4'	Tech.:	AS
TEST NO:	UU 2	Reviewer:	MBP

Soil Consolidation Test ASTM D2435

THIELSCH ENGINEERING

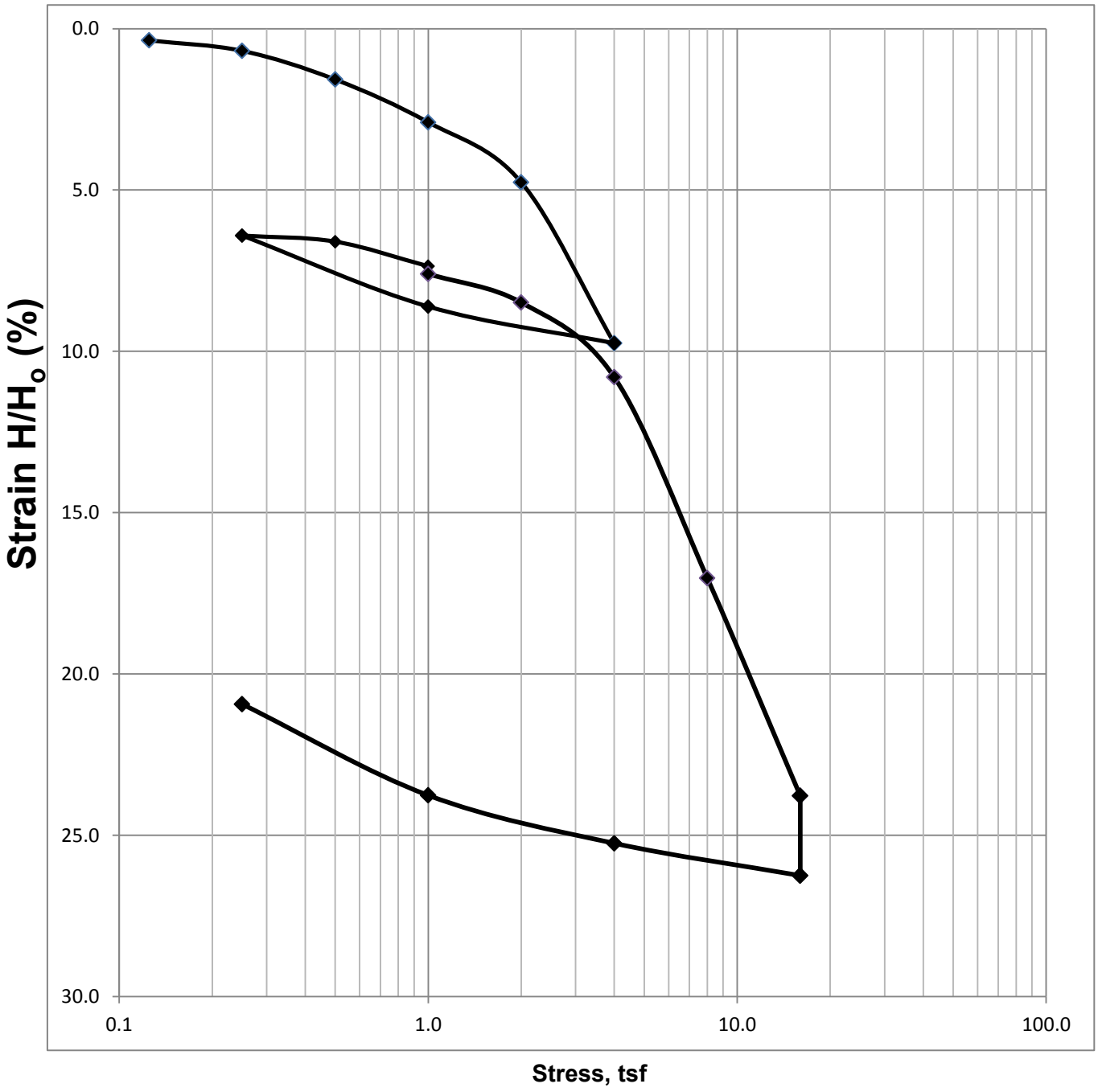
195 Frances Ave., Cranston, RI 02910

Project **New Haven Rail Yard - Facility Improvements** Project Location **New Haven, CT**

File # **74-14-0003.23**

Boring **MOW-1** Sample **UP-3** Depth **48.5-48.6'** Set Up By **AS**

Description **Dark Gray Organic SILT** Water Content % **52.1%** γd (pcf) **69.0** Test # **C 2**



One-Dimensional Consolidation Consolidation Testing Of Soil (ASTM D2435-04)
Method B (End of Primary Increments)

Project Name	New Haven Rail Yard - Facility Improvements	Technician	AS
Location	New Haven, CT	Reviewer	MBP
Project Number	74-14-0003.23		
Boring Number	MOW-1	Sample Number	UP-3
Depth	48.5-48.6'	Test Number	C 2

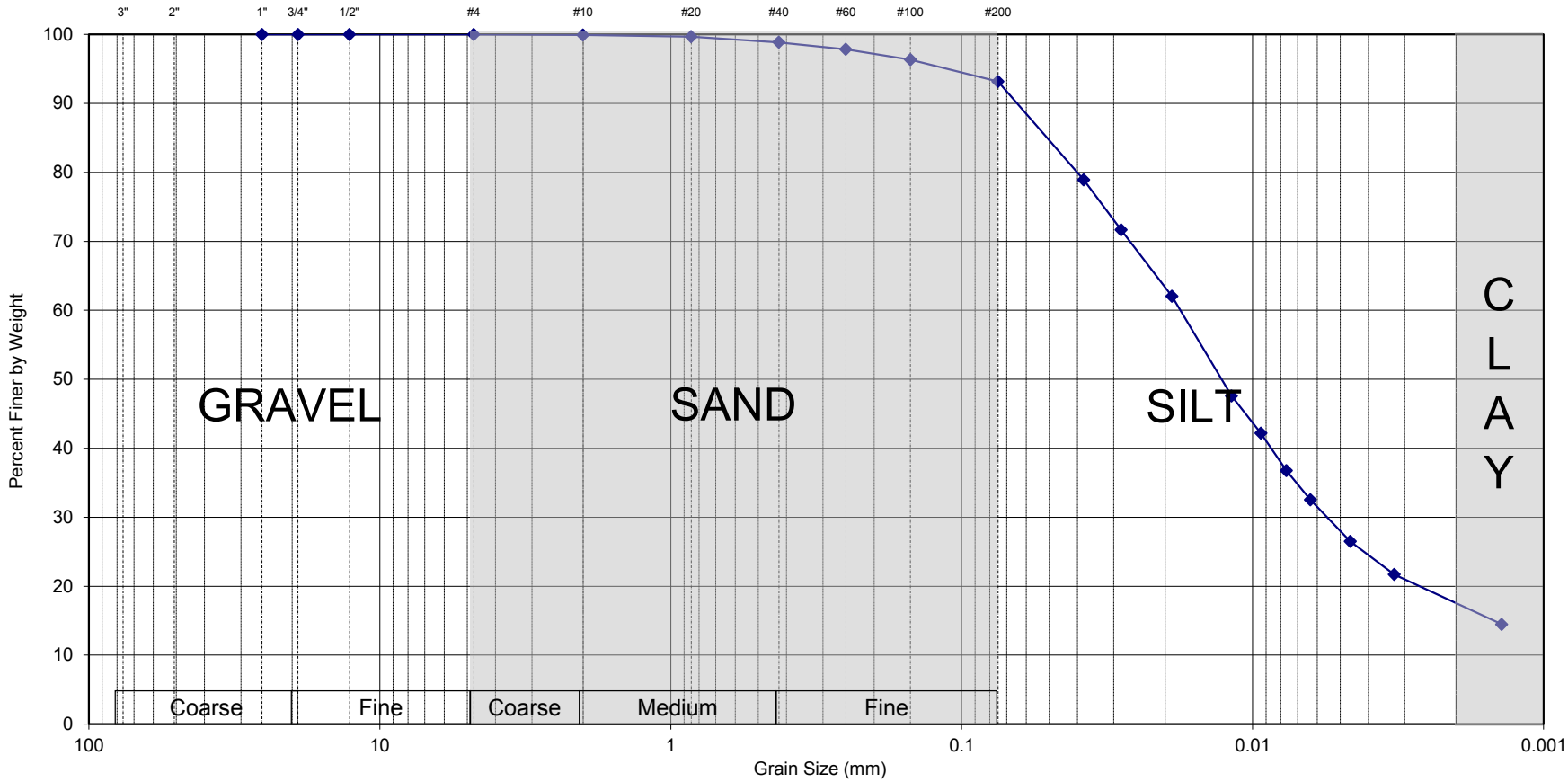
Specific Gravity	2.20 (estimated)		
Initial Water Content	52.1%	Initial Dry Unit Weight (pcf)	69.0
Final Water Content	36.7%	Final Dry Unit Weight (pcf)	87.3
Initial Sample Height (in.)	0.800	Initial Void Ratio	0.989
Final Sample Height (in.)	0.633	Final Void Ratio	0.573

Notes:

Increment Number	Stress (tsf)	Cummulative Deflection (in)	Strain (%)	T_{90} (min)	Cv_{90} (cm^2/sec)	C_α
1	0	0	0			
2	0.125	0.0029	0.363			
3	0.25	0.0055	0.688	2.6	5.52E-03	
4	0.5	0.0126	1.575	4.0	3.44E-03	
5	1	0.0232	2.900	4.0	3.31E-03	
6	2	0.0381	4.763	4.0	2.97E-03	
7	4	0.0780	9.750	7.8	1.55E-03	
8	1	0.0689	8.613			
9	0.25	0.0513	6.413			
10	0.5	0.0528	6.600	3.0	4.18E-03	
11	1	0.0589	7.363	4.8	2.57E-03	
12	1	0.0608	7.600			0.00087
13	2	0.0679	8.488	4.4	2.64E-03	
14	4	0.0864	10.800	4.8	2.08E-03	
15	8	0.1362	17.025	6.8	1.25E-03	
16	16	0.1902	23.775	6.8	1.17E-03	
17	16	0.2100	26.250			0.00925
18	4	0.2020	25.250			
19	1	0.1901	23.763			
20	0.25	0.1675	20.938			

ASTM D422

U.S. STANDARD SIEVE AND HYDROMETER



Gravel	Sand	Fines
0.0%	6.8%	93.2%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
2NH	MOW-1	UP-3	48.7-48.8'	Dark Gray Organic SILT, trace Sand		69	38	31

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	100.0
#10	99.9
#20	99.7
#40	98.9
#60	97.8
#100	96.3
#200	93.2

THIELSCH ENGINEERING
195 Frances Ave., Cranston, RI 02910
401-467-6454

New Haven Rail Yard - Facility Improvements
New Haven, CT
Thielsch CTS Project # 74-14-0003.23

Tested by: LM Date: 7/7/14
Reviewed by: MBP Date: 7/8/14

LABORATORY TESTING DATA SHEET

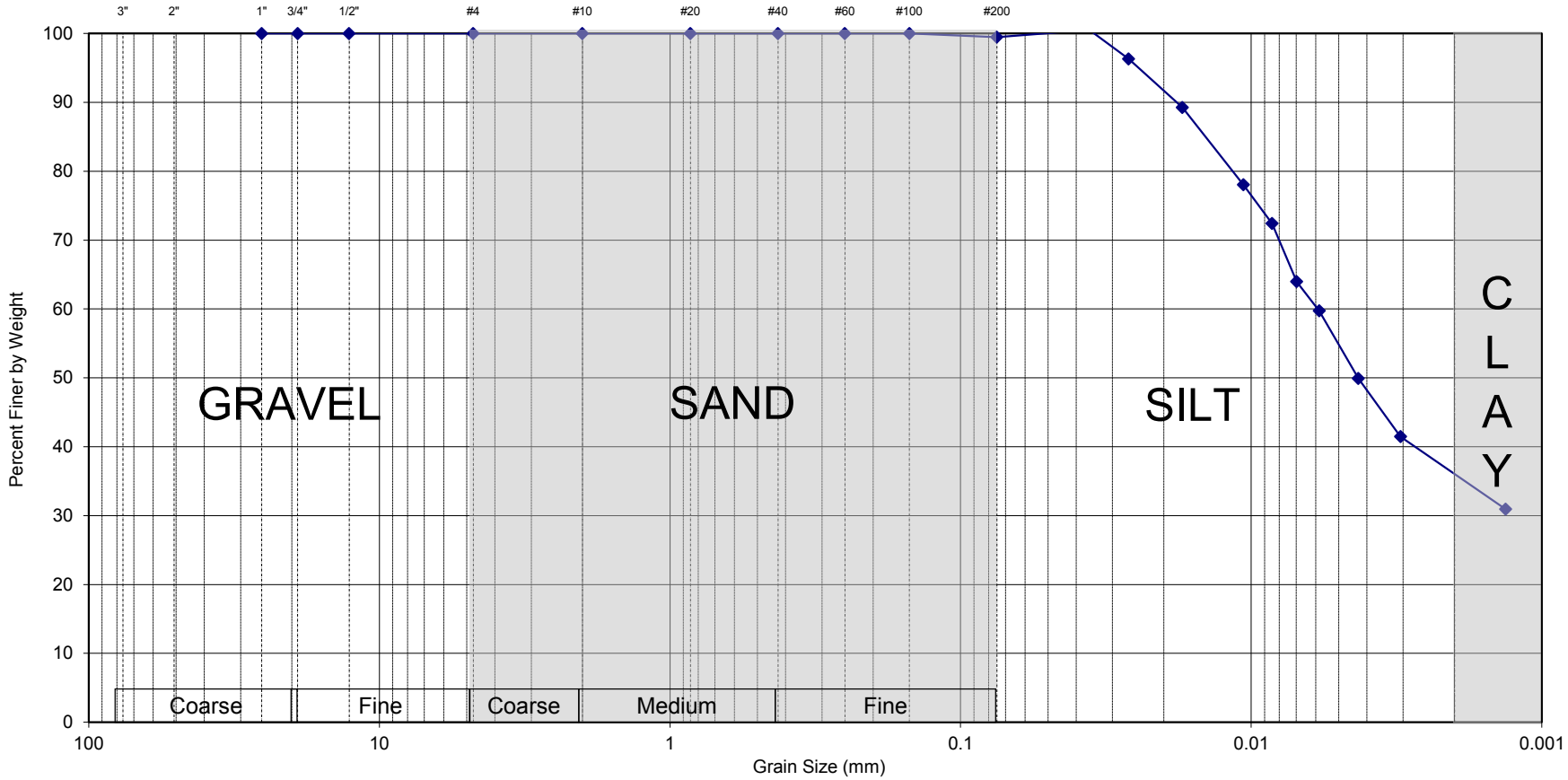
Project Name New Haven Rail Yard - Facities Improvement
Project Location New Haven, CT
Reviewed By
Project No. 74-13-0003.23
Assigned By David D'Angelo
Project Manager David D'Angelo
Date 7/9/2014
Date Reviewed 7/9/2014

Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests: Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Strength Tests: Torvane or Type Test	σ_c psf	Failure Criteria	$\sigma_1 - \sigma_3$ psf	Strain %	Consol. $\frac{C_c}{1 + e_0}$	Laboratory Log and Soil Description
MOW-3	UP-1	27-29	3	Average Total Unit Weight (27.0-29.0') = 96.1 pcf														
		27.2		65.4								Tv= 0.30 tsf						Dark gray Organic SILT trace Shell Fragments Medium consistency
		27.2-27.7		(Sample Saved)														
		27.8		82.6								Tv= 0.25 tsf						
		27.9-28.0					99.5	36										
		28.0-28.1		74.9	85	45												
		28.1-28.2		71.6							57.7						0.24	
		28.4		70.8								Tv= 0.30 tsf						
		28.4-28.9		73.2							55.8	UU	2000	σ_1-σ_3 Max	1309	9.5		

THIELSCH ENGINEERING

ASTM D422

U.S. STANDARD SIEVE AND HYDROMETER



Gravel	Sand	Fines
0.0%	0.5%	99.5%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
3NH	MOW-3	UP-1	27.9-28.0'	Dark Gray Organic SILT, trace Sand		85	45	40

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	100.0
#10	100.0
#20	100.0
#40	100.0
#60	100.0
#100	100.0
#200	99.5

THIELSCH ENGINEERING
195 Frances Ave., Cranston, RI 02910
401-467-6454

New Haven Rail Yard - Facility Improvements
New Haven, CT
Thielsch CTS Project # 74-14-0003.23

Tested by: LM Date: 7/7/14
Reviewed by: MBP Date: 7/9/14

Soil Consolidation Test ASTM D2435

THIELSCH ENGINEERING

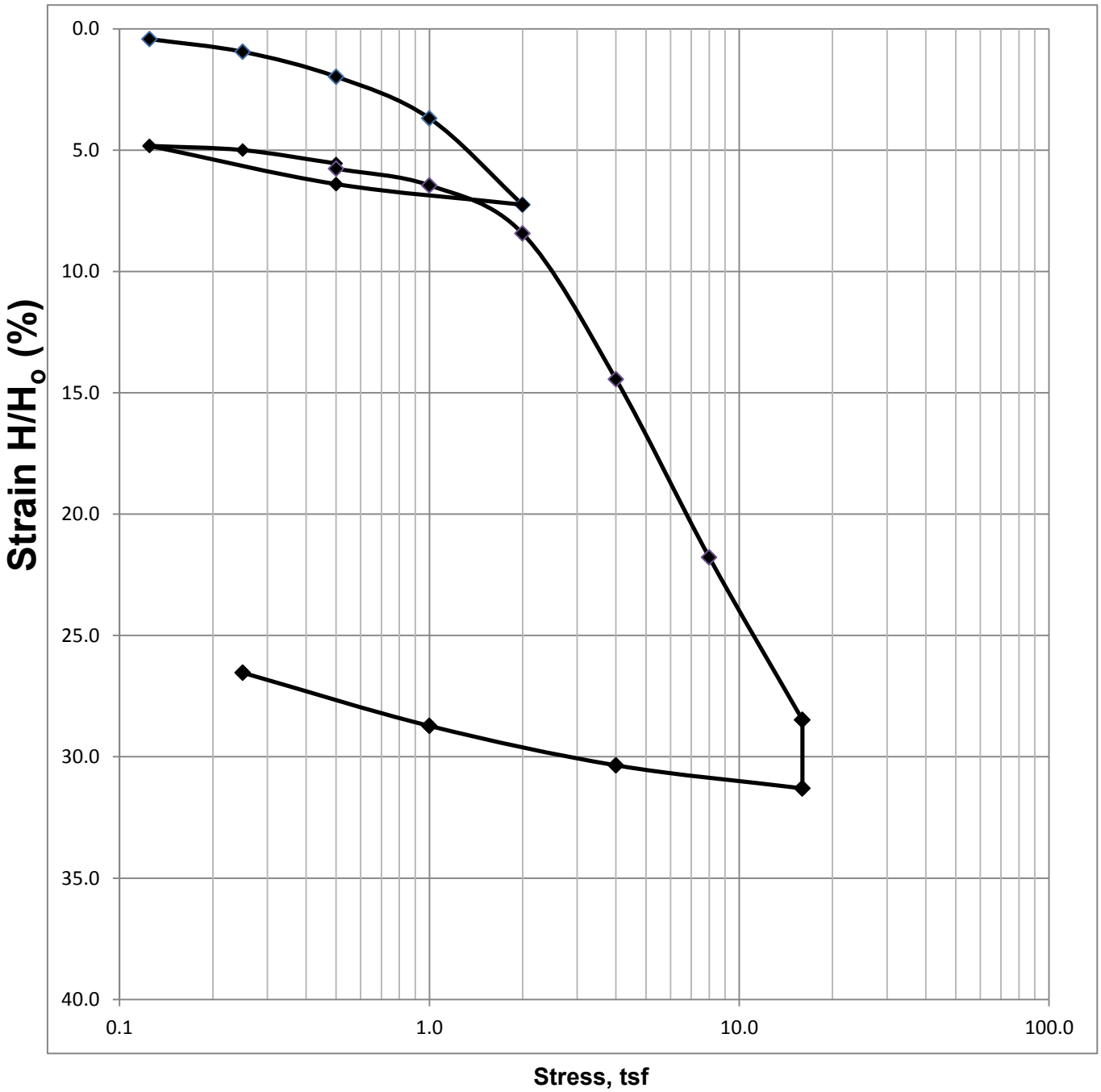
195 Frances Ave., Cranston, RI 02910

Project **New Haven Rail Yard - Facility Improvements** Project Location **New Haven, CT**

File # **74-14-0003.23**

Boring **MOW-3** Sample **UP-1** Depth **28.1-28.2'** Set Up By **AS**

Description **Dark Gray Organic SILT** Water Content % **71.6%** γd (pcf) **57.7** Test # **C 3**



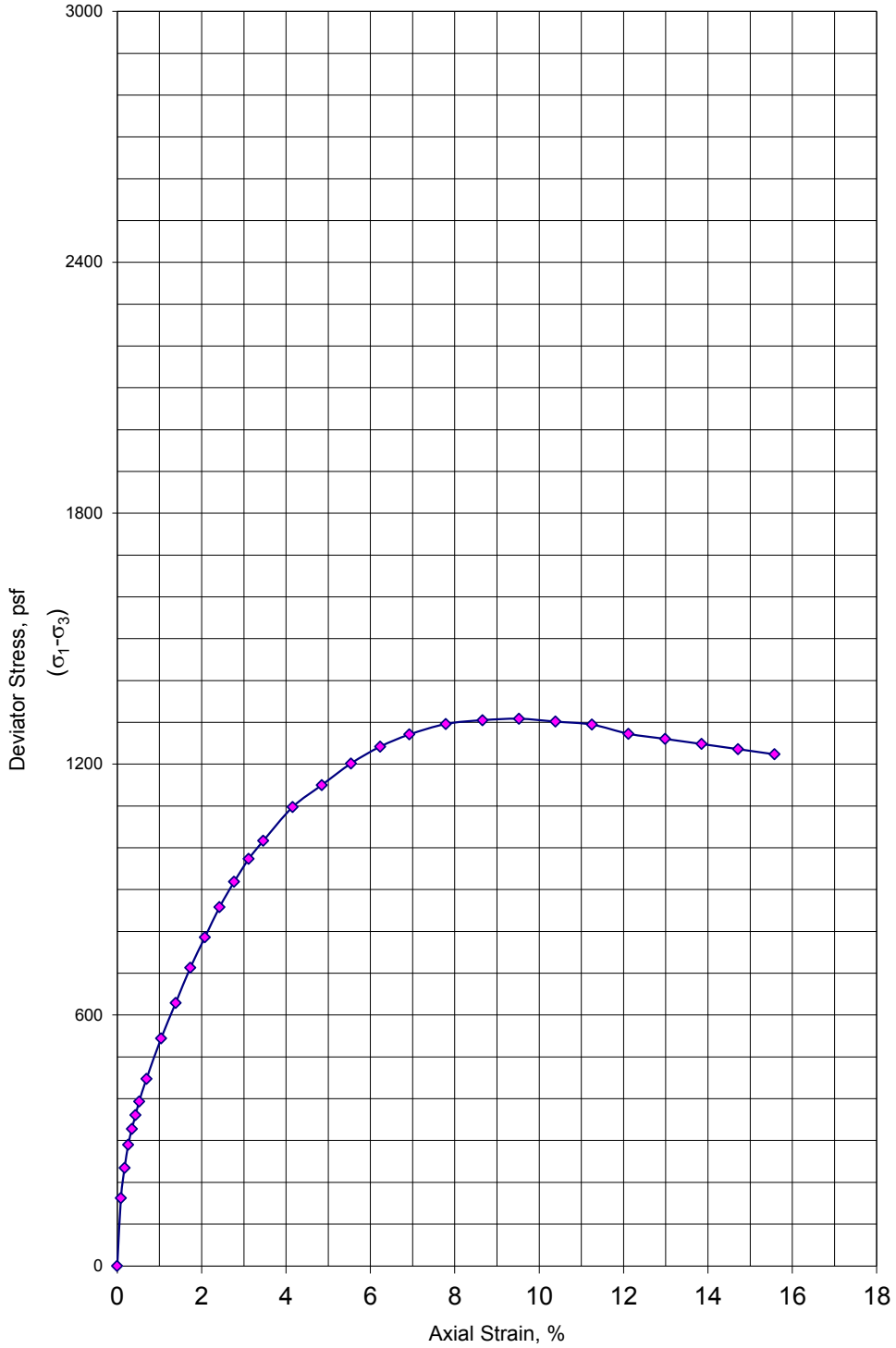
One-Dimensional Consolidation Consolidation Testing Of Soil (ASTM D2435-04)
Method B (End of Primary Increments)

Project Name	New Haven Rail Yard - Facility Improvements	Technician	AS
Location	New Haven, CT	Reviewer	MBP
Project Number	74-14-0003.23		
Boring Number	MOW-3	Sample Number	UP-1
Depth	28.1-28.2'	Test Number	C 3

Specific Gravity	2.20 (estimated)		
Initial Water Content	71.6%	Initial Dry Unit Weight (pcf)	57.7
Final Water Content	45.4%	Final Dry Unit Weight (pcf)	78.5
Initial Sample Height (in.)	0.800	Initial Void Ratio	1.380
Final Sample Height (in.)	0.588	Final Void Ratio	0.749

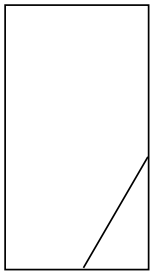
Notes:

Increment Number	Stress (tsf)	Cummulative Deflection (in)	Strain (%)	T_{90} (min)	Cv_{90} (cm^2/sec)	C_α
1	0	0	0			
2	0.125	0.0034	0.425			
3	0.25	0.0076	0.950	2.3	6.23E-03	
4	0.5	0.0158	1.975	3.0	4.51E-03	
5	1	0.0295	3.688	2.6	4.90E-03	
6	2	0.0580	7.250	3.0	4.26E-03	
7	0.5	0.0512	6.400			
8	0.125	0.0386	4.825			
9	0.25	0.0400	5.000	1.0	1.30E-02	
10	0.5	0.0444	5.550	2.0	6.48E-03	
11	0.5	0.0461	5.763			0.00075
12	1	0.0516	6.450	2.0	6.12E-03	
13	2	0.0675	8.438	2.6	4.17E-03	
14	4	0.1155	14.438	4.8	1.85E-03	
15	8	0.1742	21.775	4.0	1.87E-03	
16	16	0.2278	28.475	3.2	2.13E-03	
17	16	0.2504	31.300			0.00962
18	4	0.2428	30.350			
19	1	0.2298	28.725			
20	0.25	0.2123	26.538			



$(\sigma_1-\sigma_3)$ (psf) = 1308.7
Strain % = 9.5

Sketch at Failure



THIELSCH ENGINEERING

195 Frances Avenue
Cranston, RI 02910

SOIL DESCRIPTION:	Dark Gray Organic SILT		
LIQUID LIMIT: 85	PLASTIC LIMIT: 45	SPECIFIC GRAVITY:	NT

TEST NO. / SYMBOL	INITIAL CONDITIONS				CONDITIONS BEFORE SHEAR				FINAL CONDITIONS		RATE OF STRAIN, PERCENT PER MINUTE
	INITIAL WATER CONTENT, %	INITIAL DRY UNIT WEIGHT, pcf	SAMPLE HEIGHT, IN.	SAMPLE DIAMETER, IN.	INITIAL STRESS σ_c, ksf	FINAL BACK PRESSURE, ksf	VOLUMETRIC STRAIN, %	PORE PRESSURE RESPONSE, %	FINAL WATER CONTENT, %	FINAL DRY UNIT WEIGHT, %	
UU 3	73.2	55.8	5.776	2.848	2.00				72.0		0.519

New Haven Rail Yard - Facities Improvement
New Haven, CT
TRIAXIAL COMPRESSION TESTS (UU)

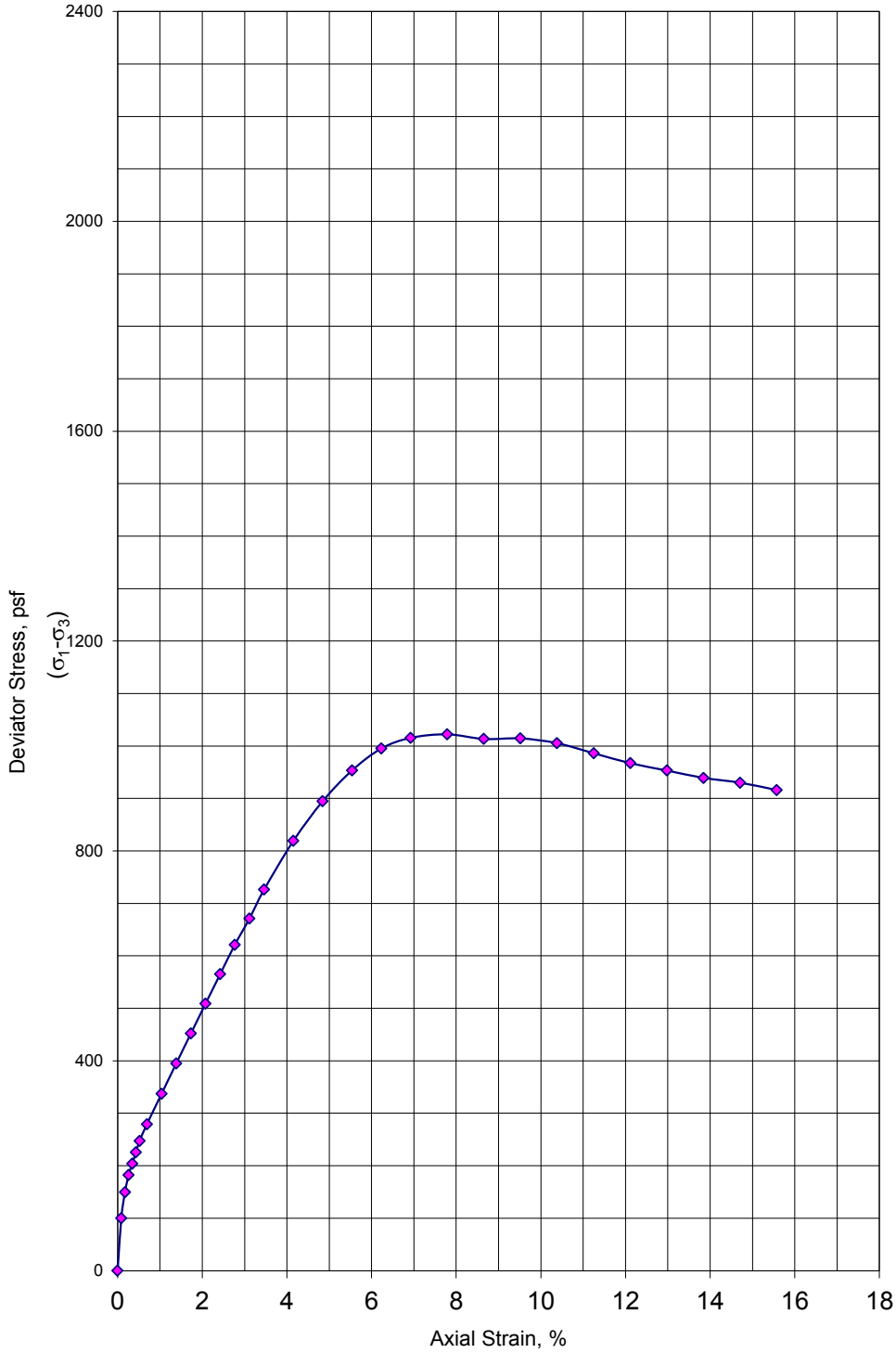
BORING:	MOW-3	FILE NO:	74-13-0003.23
SAMPLE:	UP-1	Date:	7/1/2014
DEPTH:	28.4-28.9'	Tech.:	AS
TEST NO:	UU 3	Reviewer:	MBP

LABORATORY TESTING DATA SHEET

Project Name New Haven Rail Yard - Facities Improvement
Project Location New Haven, CT
Reviewed By Matthew Dalgo
Project No. 74-13-0003.23
Assigned By David D'Angelo
Project Manager David D'Angelo
Date 7/9/2014
Date Reviewed 7/9/2014

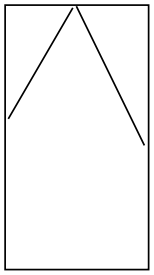
Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests: Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Strength Tests: Torvane or Type Test	σ_c psf	Failure Criteria	$\sigma_1 - \sigma_3$ psf	Strain %	Consol. $\frac{C_c}{1 + e_0}$	Laboratory Log and Soil Description
MOW-4	UP-1	32-34	4	Average Total Unit Weight (32.0-33.8') = 99.0 pcf														
		32.2		70.0								Tv= 0.19 tsf						Dark gray Organic SILT trace Shell Fragments Medium consistency
		32.3-32.8		70.7							57.9	UU	2290	σ_1-σ_3 Max	1022	7.8		
		32.8		68.8								Tv= 0.30 tsf						
		32.9-33.0					94.6	30										
		33.1-33.2		67.6	76	40												
		33.2-33.3		75.4							55.9						0.22	
		33.4		65.5								Tv= 0.19 tsf						
		33.4-33.8		(Sample Saved)														

THIELSCH ENGINEERING



$(\sigma_1-\sigma_3)$ (psf) = 1022.3
Strain % = 7.8

Sketch at Failure



THIELSCH ENGINEERING

195 Frances Avenue
Cranston, RI 02910

SOIL DESCRIPTION:	Dark Gray Organic SILT		
LIQUID LIMIT: 76	PLASTIC LIMIT: 40	SPECIFIC GRAVITY:	NT

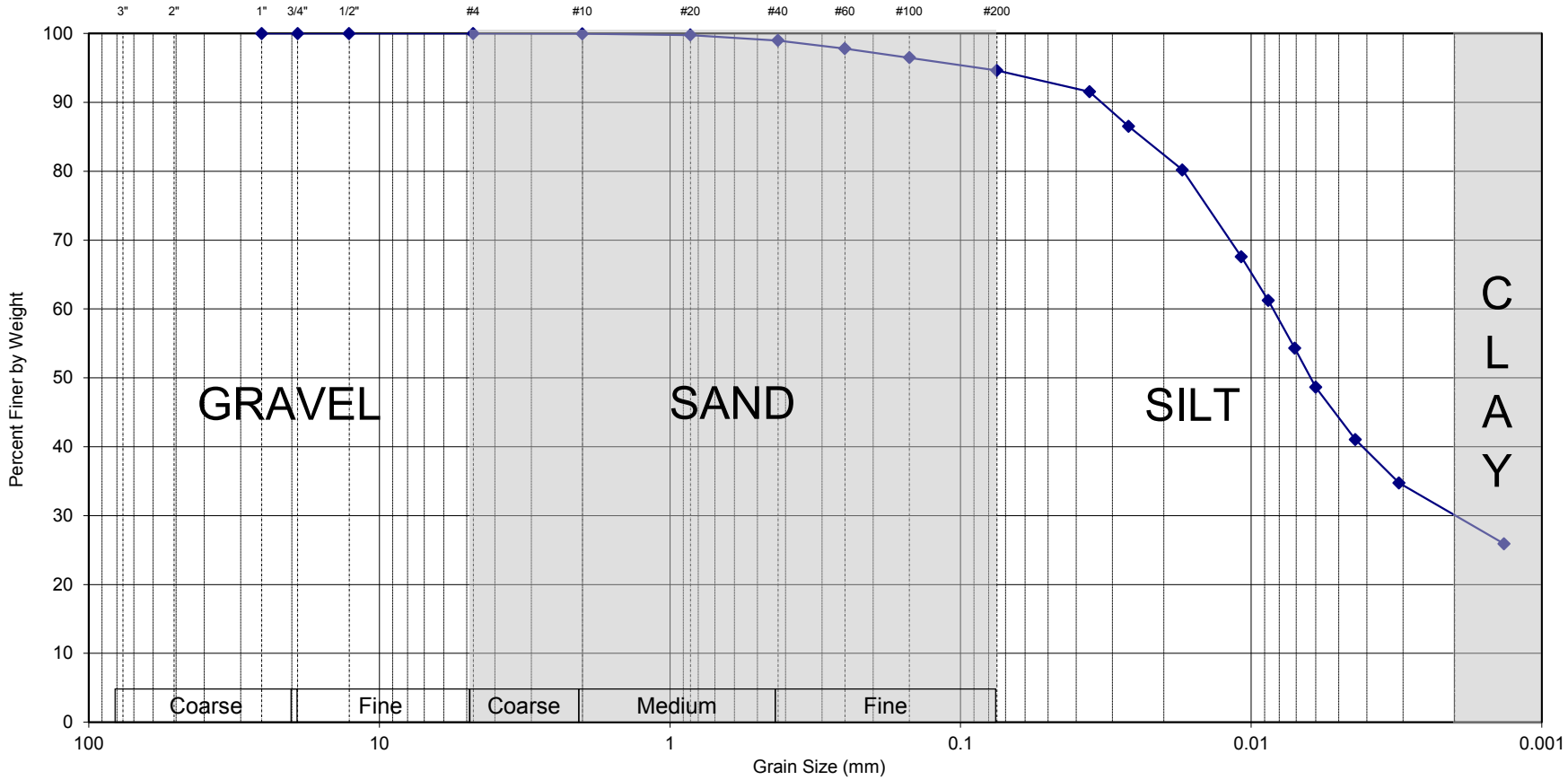
TEST NO. / SYMBOL	INITIAL CONDITIONS				CONDITIONS BEFORE SHEAR				FINAL CONDITIONS		RATE OF STRAIN, PERCENT PER MINUTE
	INITIAL WATER CONTENT, %	INITIAL DRY UNIT WEIGHT, pcf	SAMPLE HEIGHT, IN.	SAMPLE DIAMETER, IN.	INITIAL STRESS σ_c, ksf	FINAL BACK PRESSURE, ksf	VOLUMETRIC STRAIN, %	PORE PRESSURE RESPONSE, %	FINAL WATER CONTENT, %	FINAL DRY UNIT WEIGHT, %	
UU 4	70.7	57.9	5.778	2.855	2.29				70.4		0.519

New Haven Rail Yard - Facities Improvement
New Haven, CT
TRIAXIAL COMPRESSION TESTS (UU)

BORING:	MOW-4	FILE NO:	74-13-0003.23
SAMPLE:	UP-1	Date:	7/2/2014
DEPTH:	32.3-32.8'	Tech.:	AS
TEST NO:	UU 4	Reviewer:	MBP

ASTM D422

U.S. STANDARD SIEVE AND HYDROMETER



Gravel	Sand	Fines
0.0%	5.4%	94.6%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
4NH	MOW-4	UP-1	32.9-33.0'	Dark Gray Organic SILT, trace Sand		76	40	36

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	100.0
#10	100.0
#20	99.8
#40	99.0
#60	97.8
#100	96.5
#200	94.6

THIELSCH ENGINEERING
195 Frances Ave., Cranston, RI 02910
401-467-6454

New Haven Rail Yard - Facility Improvements
New Haven, CT
Thielsch CTS Project # 74-14-0003.23

Tested by: LM Date: 7/7/14
Reviewed by: MBP Date: 7/9/14

Soil Consolidation Test ASTM D2435

THIELSCH ENGINEERING

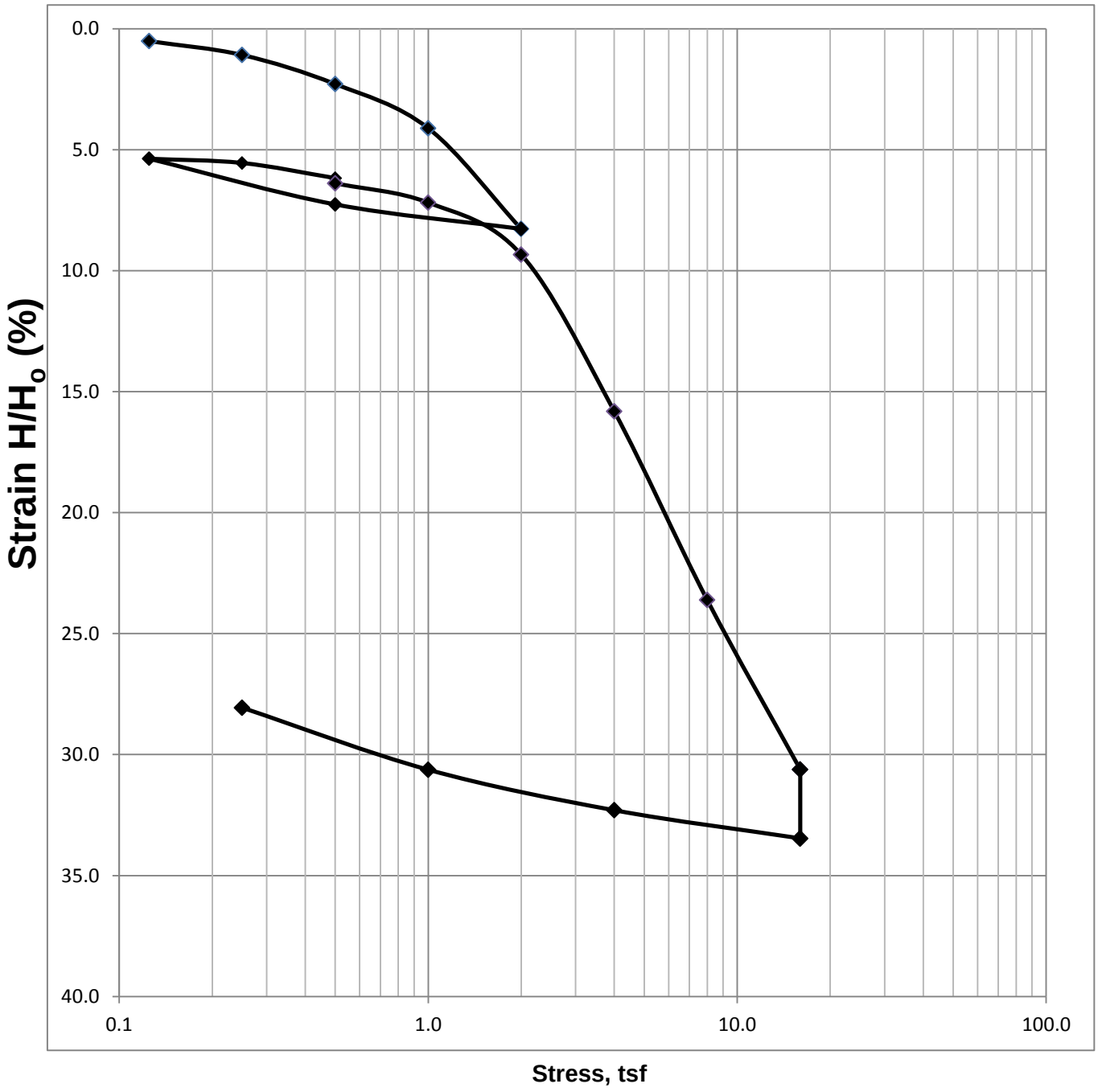
195 Frances Ave., Cranston, RI 02910

Project **New Haven Rail Yard - Facility Improvements** Project Location **New Haven, CT**

File # **74-14-0003.23**

Boring **MOW-4** Sample **U-1** Depth **33.2-33.3'** Set Up By **AS**

Description **Dark Gray Organic SILT** Water Content % **75.4%** γd (pcf) **55.9** Test # **C 4**



One-Dimensional Consolidation Consolidation Testing Of Soil (ASTM D2435-04)
Method B (End of Primary Increments)

Project Name	New Haven Rail Yard - Facility Improvements	Technician	AS
Location	New Haven, CT	Reviewer	MBP
Project Number	74-14-0003.23		
Boring Number	MOW-4	Sample Number	UP-1
Depth	33.2-33.3'	Test Number	C 4

Specific Gravity	2.20 (estimated)		
Initial Water Content	75.4%	Initial Dry Unit Weight (pcf)	55.9
Final Water Content	46.7%	Final Dry Unit Weight (pcf)	77.7
Initial Sample Height (in.)	0.800	Initial Void Ratio	1.456
Final Sample Height (in.)	0.576	Final Void Ratio	0.767

Notes:

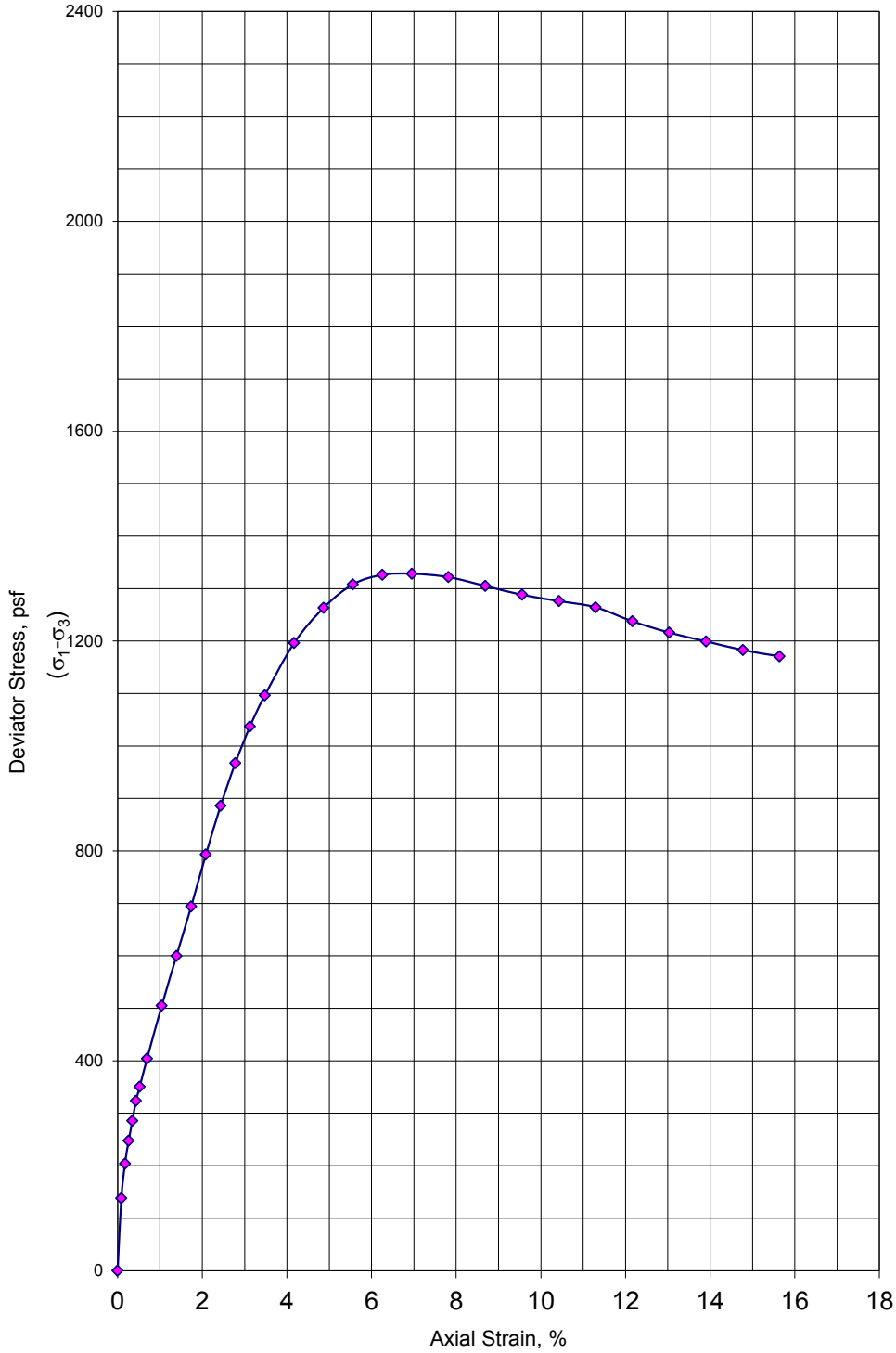
Increment Number	Stress (tsf)	Cummulative Deflection (in)	Strain (%)	T_{90} (min)	Cv_{90} (cm^2/sec)	C_α
1	0	0	0			
2	0.125	0.0041	0.513			
3	0.25	0.0087	1.088	4.0	3.48E-03	
4	0.5	0.0183	2.288	4.0	3.35E-03	
5	1	0.0329	4.113	4.0	3.07E-03	
6	2	0.0662	8.275	5.3	2.37E-03	
7	0.5	0.0581	7.263			
8	0.125	0.0430	5.375			
9	0.25	0.0444	5.550	1.0	1.28E-02	
10	0.5	0.0494	6.175	2.6	5.00E-03	
11	0.5	0.0511	6.388			0.00075
12	1	0.0575	7.188	3.0	4.00E-03	
13	2	0.0747	9.338	3.6	2.87E-03	
14	4	0.1265	15.813	6.0	1.42E-03	
15	8	0.1889	23.613	5.3	1.33E-03	
16	16	0.2449	30.613	4.0	1.62E-03	
17	16	0.2677	33.463			0.01013
18	4	0.2584	32.300			
19	1	0.2450	30.625			
20	0.25	0.2245	28.063			

LABORATORY TESTING DATA SHEET

Project Name New Haven Rail Yard - Facities Improvements
Project Location New Haven, CT
Reviewed By Matthew Pelgy
Project No. 74-13-0003.23
Assigned By David D'Angelo
Project Manager David D'Angelo
Date 7/8/2014
Date Reviewed 7/8/2014

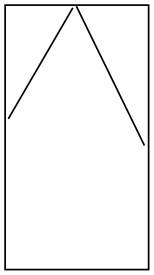
Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests: Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Strength Tests: Torvane or Type Test	σ_c psf	Failure Criteria	$\sigma_1 - \sigma_3$ psf	Strain %	Consol. $\frac{C_c}{1 + e_0}$	Laboratory Log and Soil Description
MOW-5	UP-2	37-39	5	Average Total Unit Weight (37.0-38.9') = 90.6 pcf														
		37.2		80.8								Tv= 0.18 tsf						(Top 2" of Tube Sample was disturbed)
		37.3-37.8		73.1							56.4	UU	2610	σ_1-σ_3 Max	1328	7.0		
		37.8		70.9								Tv= 0.24 tsf						Dark gray Organic SILT Medium consistency
		37.8-37.9		67.3	80	43												
		38.0-38.1		64.5							61.6						0.24	
		38.1-38.2					90.6	30										
		38.4		72.3								Tv= 0.27 tsf						

THIELSCH ENGINEERING



$(\sigma_1-\sigma_3)$ (psf) = 1328.4
Strain % = 7.0

Sketch at Failure



THIELSCH ENGINEERING

195 Frances Avenue
Cranston, RI 02910

SOIL DESCRIPTION:	Dark Gray Organic SILT		
LIQUID LIMIT: 80	PLASTIC LIMIT: 43	SPECIFIC GRAVITY:	NT

TEST NO. / SYMBOL	INITIAL CONDITIONS				CONDITIONS BEFORE SHEAR				FINAL CONDITIONS		RATE OF STRAIN, PERCENT PER MINUTE
	INITIAL WATER CONTENT, %	INITIAL DRY UNIT WEIGHT, pcf	SAMPLE HEIGHT, IN.	SAMPLE DIAMETER, IN.	INITIAL STRESS σ_c, ksf	FINAL BACK PRESSURE, ksf	VOLUMETRIC STRAIN, %	PORE PRESSURE RESPONSE, %	FINAL WATER CONTENT, %	FINAL DRY UNIT WEIGHT, %	
UU 5	73.1	56.4	5.754	2.864	2.61				72.4		0.521

New Haven Rail Yard - Facities Improvement
New Haven, CT
TRIAXIAL COMPRESSION TESTS (UU)

BORING:	MOW-5	FILE NO:	74-13-0003.23
SAMPLE:	UP-2	Date:	7/3/2014
DEPTH:	37.3-37.8'	Tech.:	AS
TEST NO:	UU 5	Reviewer:	MBP

Soil Consolidation Test ASTM D2435

THIELSCH ENGINEERING

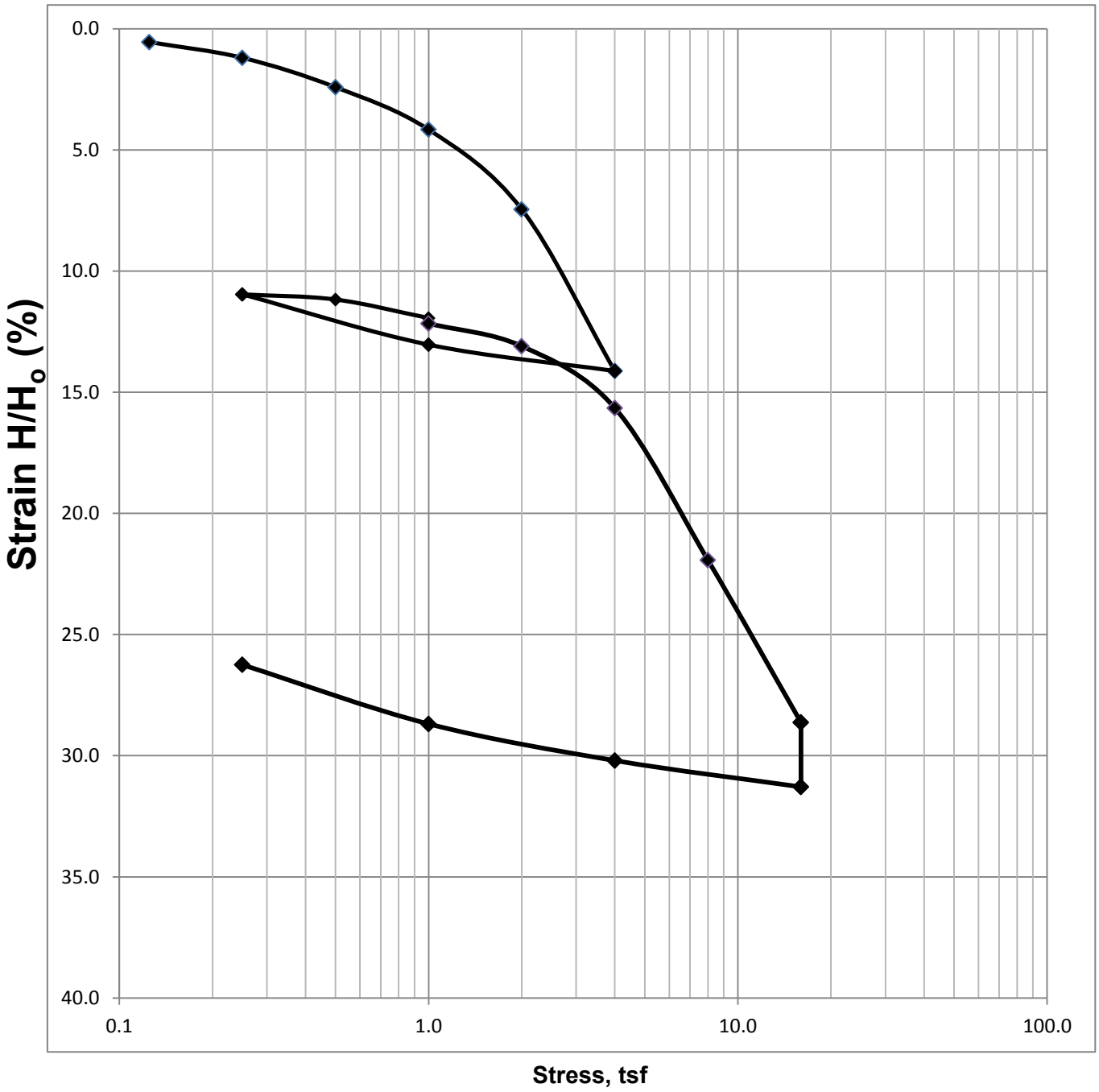
195 Frances Ave., Cranston, RI 02910

Project **New Haven Rail Yard - Facilities Improvements** Project Location **New Haven, CT**

File # **74-14-0003.23**

Boring **MOW-5** Sample **UP-2** Depth **38.0-38.1'** Set Up By **AS**

Description **Dark Gray Organic SILT** Water Content % **64.5%** γd (pcf) **61.6** Test # **C 5**



One-Dimensional Consolidation Consolidation Testing Of Soil (ASTM D2435-04)
Method B (End of Primary Increments)

Project Name	New Haven Rail Yard - Facilities Improvements	Technician	AS
Location	New Haven, CT	Reviewer	MBP
Project Number	74-14-0003.23		
Boring Number	MOW-5	Sample Number	UP-2
Depth	38.0-38.1'	Test Number	C 5

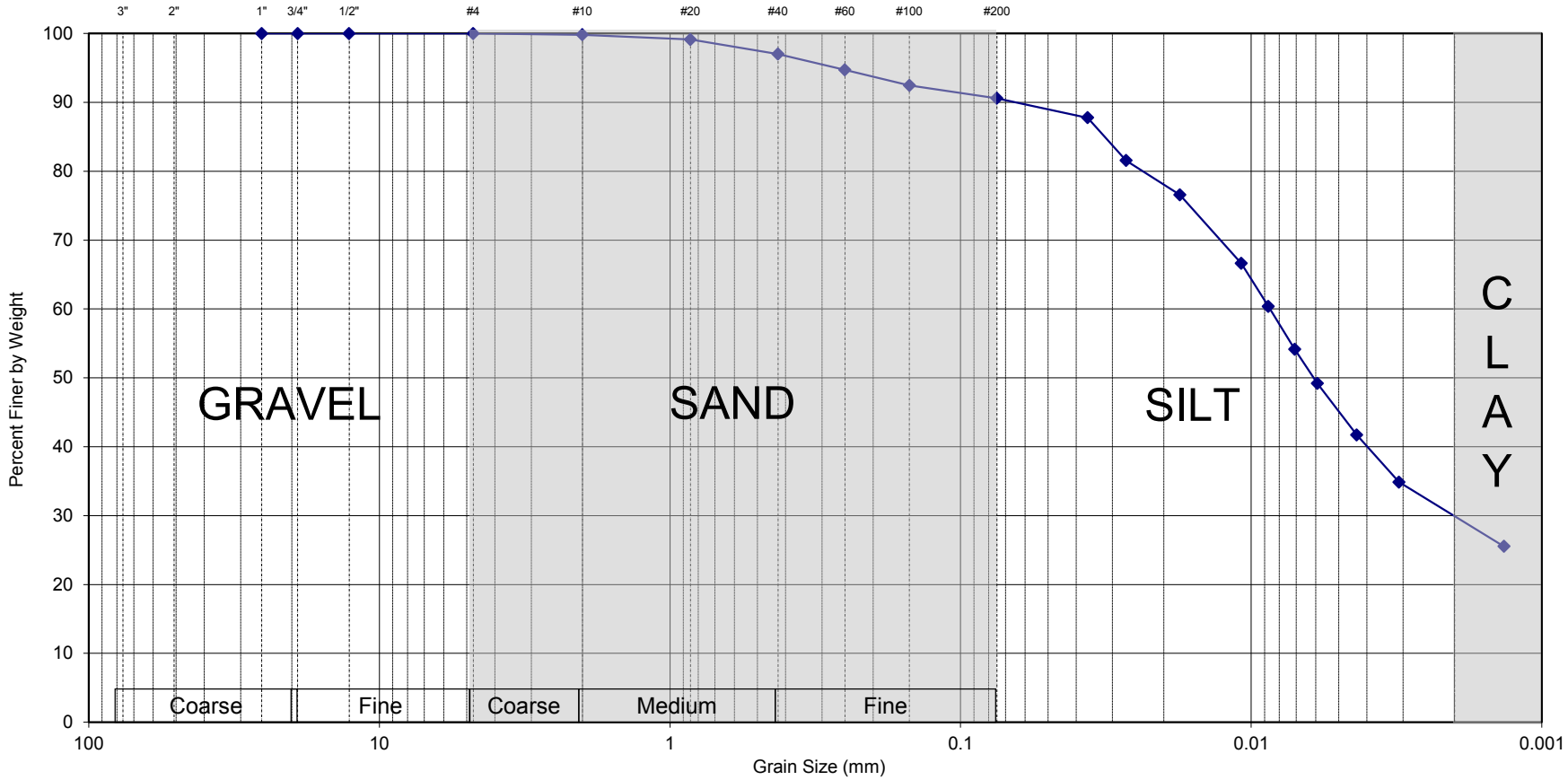
Specific Gravity	2.20 (estimated)		
Initial Water Content	64.5%	Initial Dry Unit Weight (pcf)	61.6
Final Water Content	40.5%	Final Dry Unit Weight (pcf)	83.5
Initial Sample Height (in.)	0.800	Initial Void Ratio	1.229
Final Sample Height (in.)	0.590	Final Void Ratio	0.644

Notes:

Increment Number	Stress (tsf)	Cummulative Deflection (in)	Strain (%)	T_{90} (min)	Cv_{90} (cm^2/sec)	C_α
1	0	0	0			
2	0.125	0.0044	0.550			
3	0.25	0.0096	1.200	4.8	2.87E-03	
4	0.5	0.0193	2.413	4.8	2.77E-03	
5	1	0.0333	4.163	4.8	2.58E-03	
6	2	0.0596	7.450	4.8	2.22E-03	
7	4	0.1130	14.125	9.0	1.23E-03	
8	1	0.1043	13.038			
9	0.25	0.0877	10.963			
10	0.5	0.0894	11.175	3.0	3.77E-03	
11	1	0.0955	11.938	4.8	2.33E-03	
12	1	0.0973	12.163			0.0010
13	2	0.1048	13.100	4.0	2.60E-03	
14	4	0.1252	15.650	6.0	1.48E-03	
15	8	0.1754	21.925	7.8	9.48E-04	
16	16	0.2290	28.625	6.0	1.15E-03	
17	16	0.2503	31.288			0.01088
18	4	0.2416	30.200			
19	1	0.2295	28.688			
20	0.25	0.2100	26.250			

ASTM D422

U.S. STANDARD SIEVE AND HYDROMETER



Gravel	Sand	Fines
0.0%	9.4%	90.6%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
5NH	MOW-5	UP-2	38.1-38.2'	Dark Gray Organic SILT, trace Sand		80	43	37

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	100.0
#10	99.8
#20	99.1
#40	97.0
#60	94.7
#100	92.5
#200	90.6

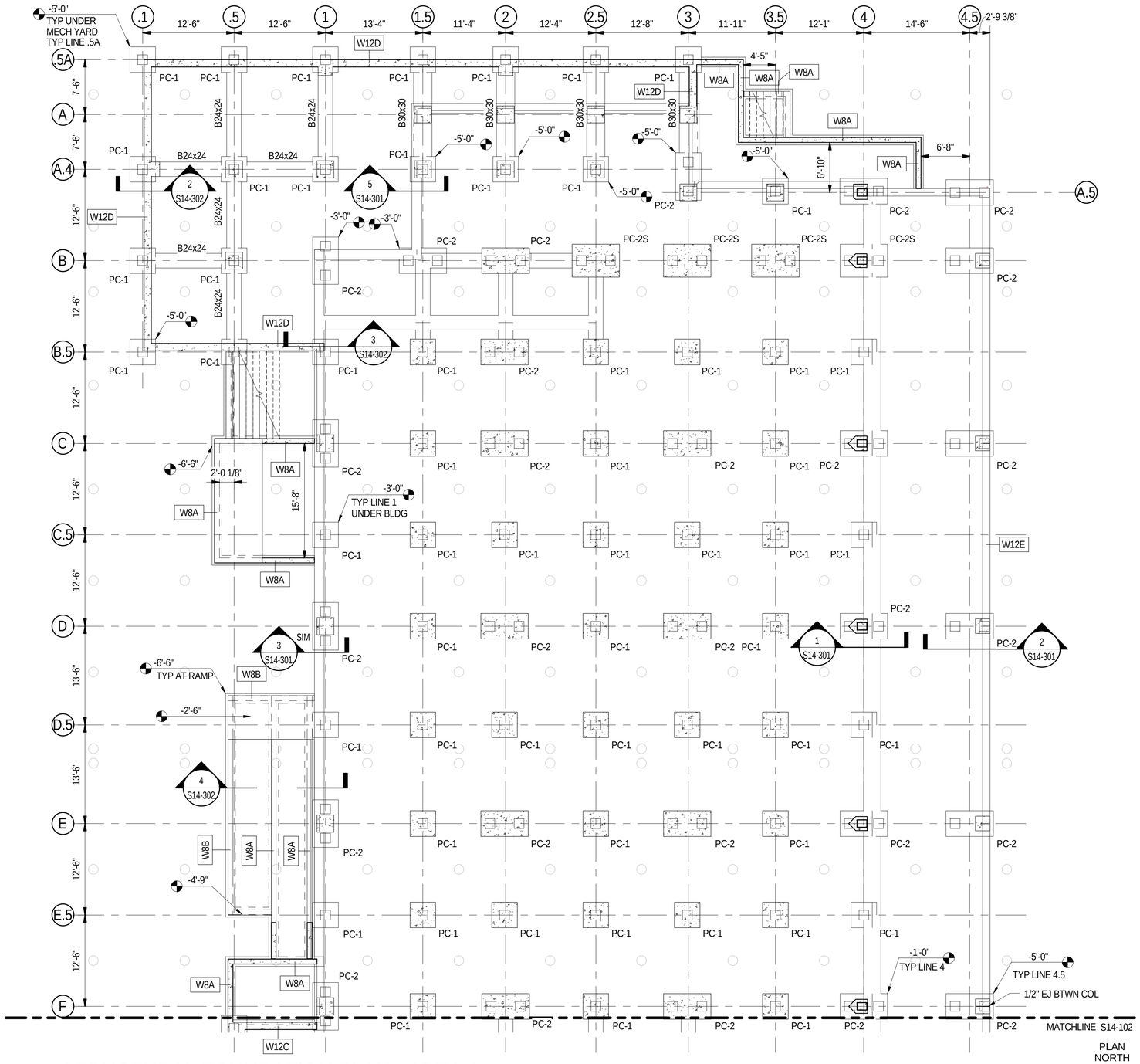
THIELSCH ENGINEERING
195 Frances Ave., Cranston, RI 02910
401-467-6454

New Haven Rail Yard - Facility Improvements
New Haven, CT
Thielsch CTS Project # 74-14-0003.23

Tested by: LM Date: 7/7/14
Reviewed by: MBP Date: 7/8/14

APPENDIX C

CURRENT DESIGN DRAWINGS



STRUCTURAL FOUNDATION PLAN - AREA A

1/8" = 1'-0"

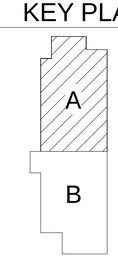
SHEET NOTES

1. TOP OF TYPICAL INTERIOR PILE CAP AT 0'-0" UNLESS NOTED OTHERWISE ON PLAN.
2. REFER TO S14-201 FOR PILE CAP DETAIL.
3. REFER TO S14-203 FOR CONCRETE PEDESTAL LOCATION AND DETAIL.
4. PILE CAP SHALL BE CENTERED TO GRID LINES, UNO.

LEGEND

- ○ EXISTING 18" DIA FRANKI PILES CUT DOWN TO 1'-0" (±) BELOW EXISTING GRADE OF ELEV 8.0' TO 7.0' NAVD88
- □ NEW PILES

KEY PLAN



CONTRACT DOCUMENTS REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

Plotted Date: 10/17/14

DESIGNER/DRAFTER: TLB/DLH
CHECKED BY: SWC
SCALE: 1/8" = 1'-0"
0 4' 8' 16'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: MOWBLDG-S-18965MOW.RVT

SIGNATURE/
BLOCK:

PROJECT TITLE:
NEW HAVEN RAIL YARD FACILITIES IMPROVEMENTS
MAINTENANCE OF WAY BUILDING

TOWN: NEW HAVEN

DRAWING TITLE: STRUCTURAL FOUNDATION PLAN - AREA A

PROJECT NO: 301-0124
DRAWING NO: S14-101
SHEET NO: 09.04

10/17/2014 11:33:07 AM
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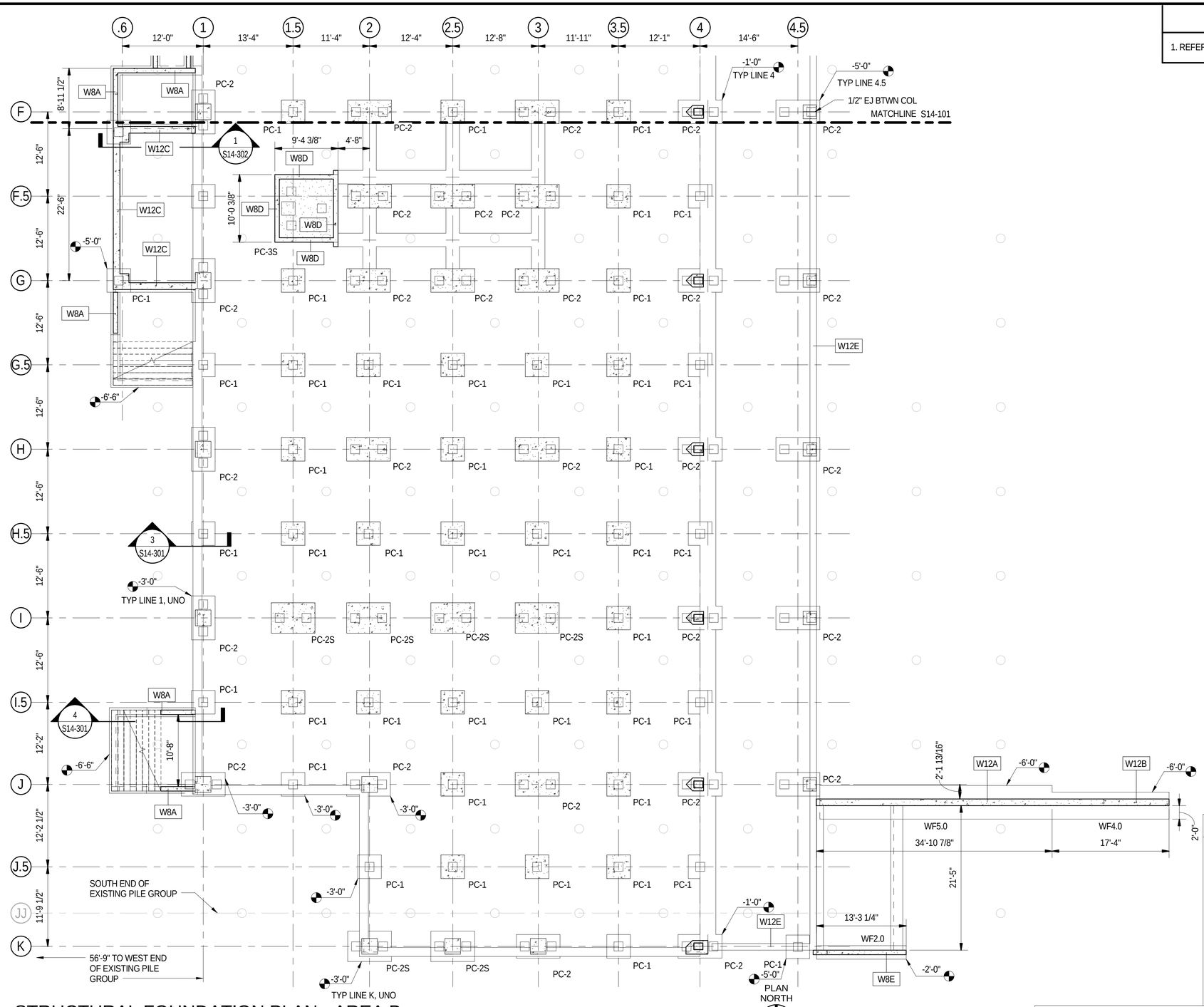
SHEET NOTES

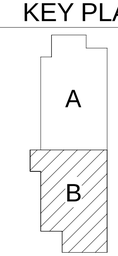
1. REFER TO S14-101 FOR SHEET NOTES.



STRUCTURAL FOUNDATION PLAN - AREA B

1/8" = 1'-0"

KEY PLAN



CONTRACT DOCUMENTS REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

Plotted Date: 10/17/14

DESIGNER/DRAFTER: TLB/DLH
CHECKED BY: SWC
SCALE: 1/8" = 1'-0"
0 4' 8' 16'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: MOWBLDG-S-18965MOW.RVT

SIGNATURE/
BLOCK:

PROJECT TITLE:
NEW HAVEN RAIL YARD FACILITIES IMPROVEMENTS
MAINTENANCE OF WAY BUILDING

TOWN: NEW HAVEN

DRAWING TITLE: STRUCTURAL FOUNDATION PLAN - AREA B

PROJECT NO: 301-0124
DRAWING NO: S14-102
SHEET NO: 09.05

10/17/2014 11:33:09 AM
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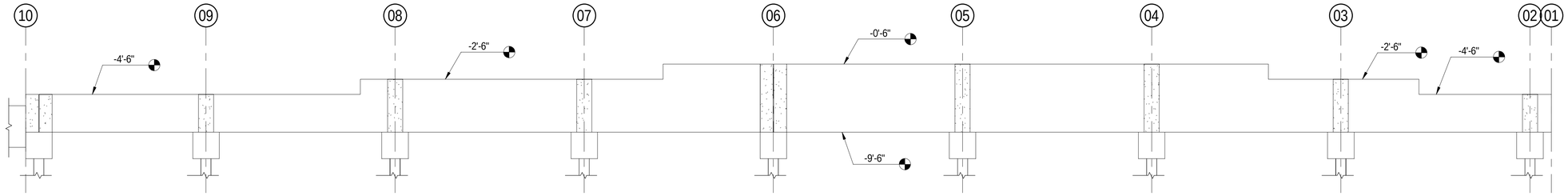
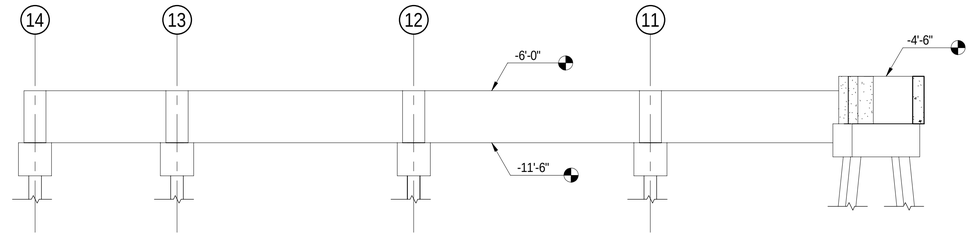
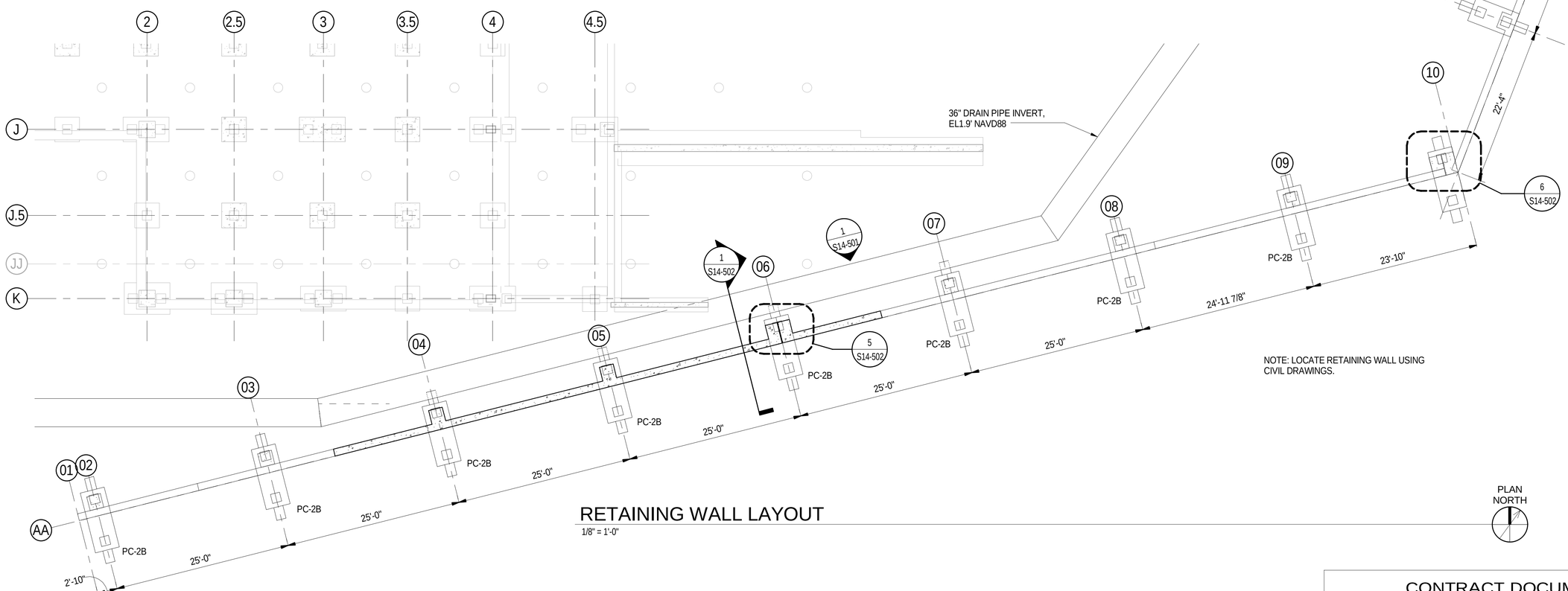


1 S14-501 NORTH ELEVATION
1/8" = 1'-0"

NOTE: DATUM ELEVATION 0'-0" IS AT FIRST FLOOR FINISHED ELEV AT 16.00 NAVD88.



2 S14-501 WEST ELEVATION
1/8" = 1'-0"



RETAINING WALL LAYOUT
1/8" = 1'-0"

CONTRACT DOCUMENTS REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

Plotted Date: 10/17/14

DESIGNER/DRAFTER: SPV/DLH
CHECKED BY: SWC
SCALE: 1/8" = 1'-0"
0 4' 8' 16'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: MOWBLDG-S-18965MOW.RVT

SIGNATURE/
BLOCK:

PROJECT TITLE:
NEW HAVEN RAIL YARD FACILITIES IMPROVEMENTS
MAINTENANCE OF WAY BUILDING

TOWN: NEW HAVEN

DRAWING TITLE: STRUCTURAL RETAINING WALL LAYOUT

PROJECT NO: 301-0124
DRAWING NO: S14-501
SHEET NO: 09.33

10/17/2014 11:33:41 AM
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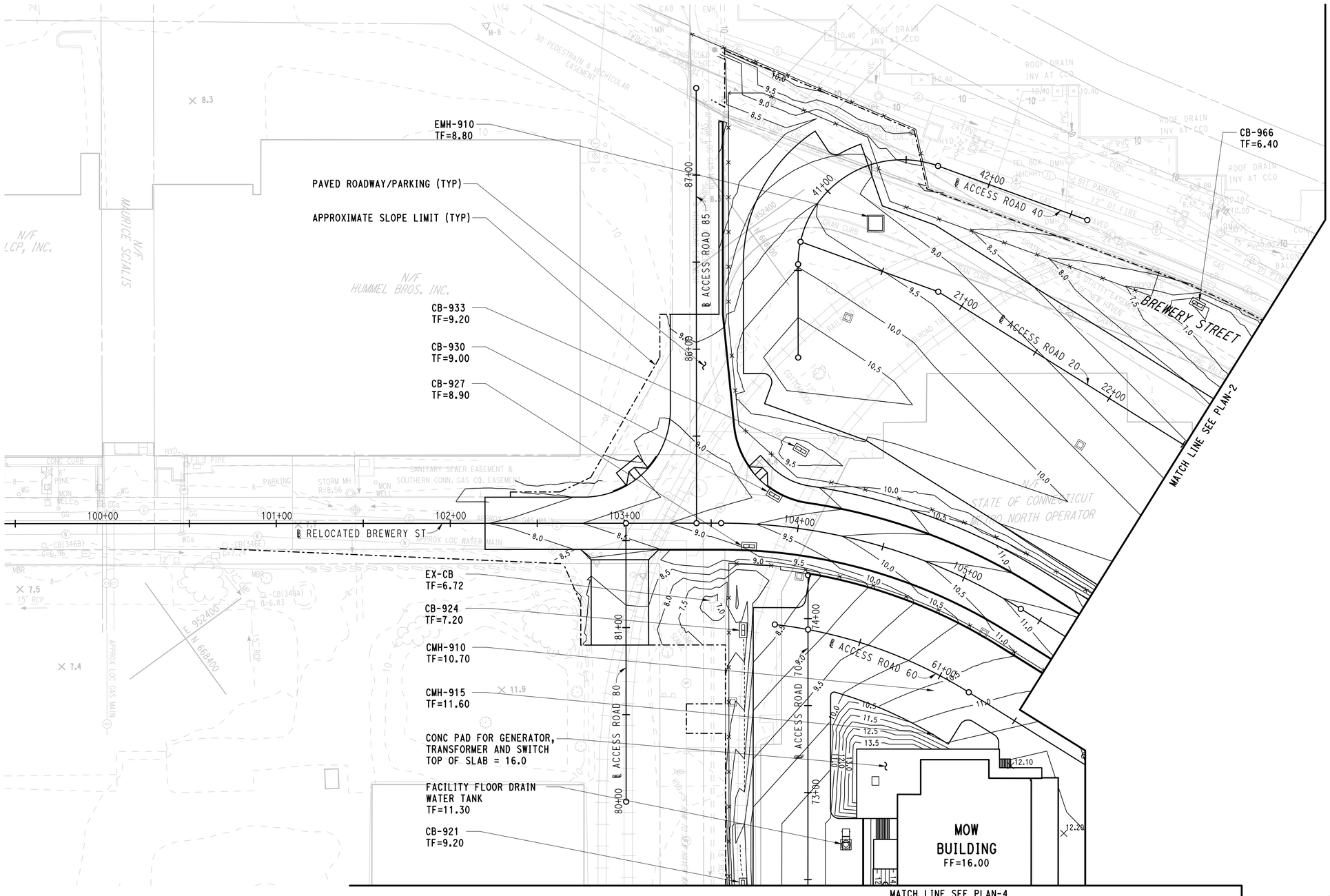


CONNECTICUT COORDINATE GRID

LEGEND

- EXISTING CONTOURS
- PROPOSED CONTOURS
- PROPOSED SPOT ELEVATION
- PROPOSED SWALE

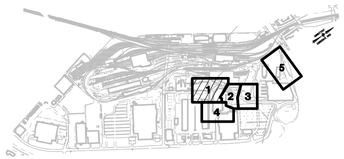
NOTES:

1. PROPOSED CONTOUR INTERVAL = 0.1 FOR PAVED AREAS.

   PROPOSED CONTOUR INTERVAL = 0.5 FOR UNPAVED AREAS.

   EXISTING CONTOUR INTERVAL = 0.1 FOR PAVEMENT TIE-INS.

2. REFER TO ROADWAY PROFILES AND CROSS SECTIONS FOR ADDITIONAL INFORMATION.



KEY PLAN

CONTRACT DOCUMENTS REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

Plotted Date: 10/17/2014

DESIGNER/DRAFTER: JFK/JLD
CHECKED BY: WPD
SCALE IN FEET 0 30 60
SCALE 1"=30'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: 20_CGRA_3010088_CC-001.dgn

SIGNATURE/
BLOCK:

PROJECT TITLE:
NEW HAVEN RAIL YARD FACILITIES IMPROVEMENTS
MAINTENANCE OF WAY BUILDING

TOWN: NEW HAVEN

DRAWING TITLE: GRADING PLAN-1

PROJECT NO. 301-0124
DRAWING NO. CC-001
SHEET NO. 04.26

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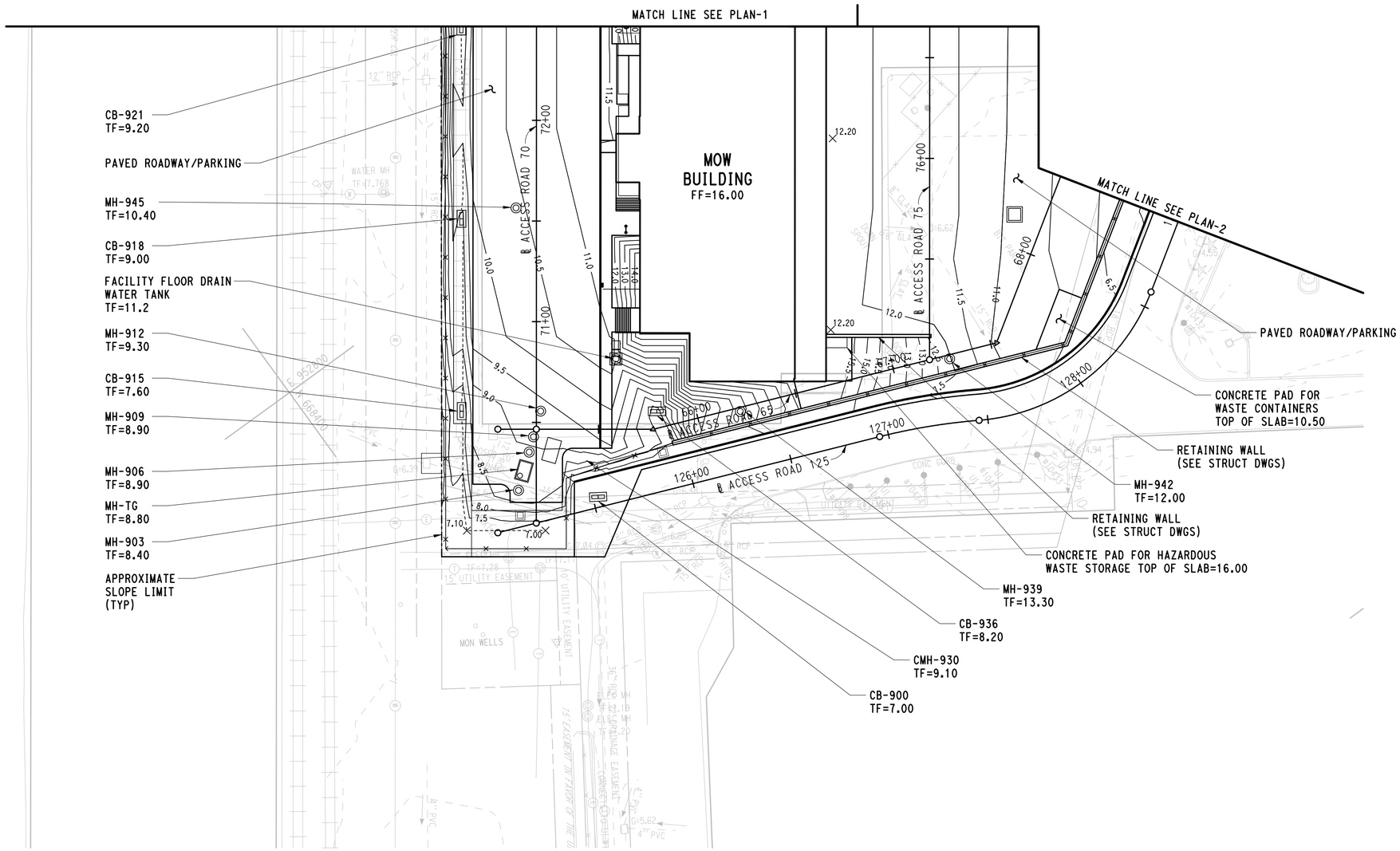
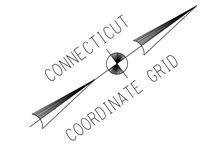




LEGEND

- EXISTING CONTOURS
- PROPOSED CONTOURS
- PROPOSED SPOT ELEVATION
- PROPOSED SWALE

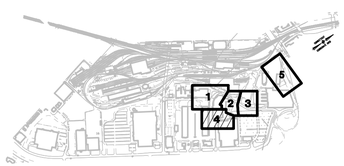
NOTES:

1. PROPOSED CONTOUR INTERVAL = 0.1 FOR PAVED AREAS.

   PROPOSED CONTOUR INTERVAL = 0.5 FOR UNPAVED AREAS.

   EXISTING CONTOUR INTERVAL = 0.1 FOR PAVEMENT TIE-INS.

2. REFER TO ROADWAY PROFILES AND CROSS SECTIONS FOR ADDITIONAL INFORMATION.



KEY PLAN

CONTRACT DOCUMENTS REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

Plotted Date: 10/22/2014

DESIGNER/DRAFTER: JFK/ JLD
CHECKED BY: WPD
SCALE IN FEET
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SCALE 1"=30'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: 20_CGRA_3010088_CC-004.dgn

SIGNATURE/
BLOCK:

PROJECT TITLE:
NEW HAVEN RAIL YARD
FACILITIES IMPROVEMENTS
MAINTENANCE OF WAY BUILDING

TOWN: NEW HAVEN

DRAWING TITLE: GRADING PLAN-4

PROJECT NO. 301-0124
DRAWING NO. CC-004
SHEET NO. 04.29

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