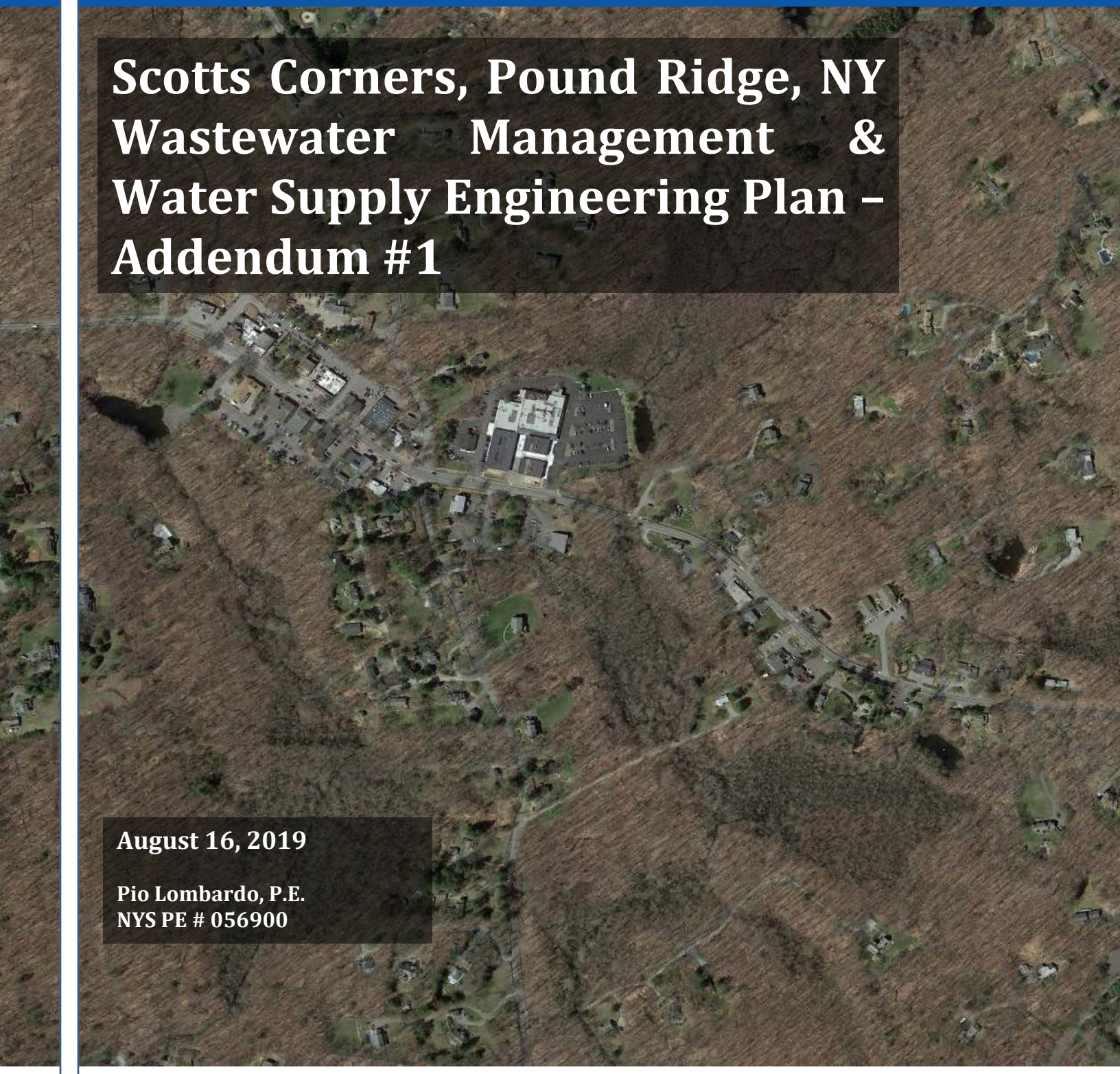
Scotts Corners, Pound Ridge, NY Wastewater Management & Water Supply Engineering Plan – Addendum #1



August 16, 2019

Pio Lombardo, P.E.
NYS PE # 056900

Prepared by:

Environmental Engineers/Consultants

LOMBARDO ASSOCIATES, INC.

188 Church Street, Newton, Massachusetts 02458

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1. INTRODUCTION

The June 25, 2019 Scotts Corner Wastewater Management and Water Supply Systems Engineering Plan recommended test pits be formed on the following four (4) properties that are being considered for locating the Scotts Corner Wastewater Treatment and/or Disposal system:

1. Pine Drive – Lower Trinity Road
2. 169 Barnegat Road
3. Town Park
4. Old Pound Road

Section 6 of the Plan describes the proposed test pit program. It is Lombardo Associates, Inc.'s (LAI) opinion that the wastewater treatment system should be located at the Pine Drive – Lower Trinity Road (also known as 29 acres) site and that any additional disposal capacity be at one of the other above sites. It is noted that disposal capacity may dictate/restrict the capacity of the wastewater system and thereby determine buildout.

While the Town of Pound Ridge obtained approvals from property owners to perform test pits on all the properties, due to budget limitations test pits were only performed on:

1. Pine Drive – Lower Trinity Road
2. 169 Barnegat Road

The Town through its Highway Superintendent provided a backhoe with operator and staff to clear the properties for access to the desired test pit locations and digging of test pits. All test pits were observed for:

- Soil type / texture
- Depth to bedrock
- Depth to groundwater

by Pio Lombardo, P.E. with Westchester County Department of Health observing the Barnegat site test pits. Test pits were performed on June 10, 2019 at the Barnegat Road Site and July 11, 2019 at Lower Trinity Pass.

One representative soil sample from each site was sent to a NYS DoH certified lab for sieve analysis to determine soils particle size distributions. This report presents the results of the above described soils testing program. In summary,

Barnegat Road Site

- ✓ Depth to limiting layer (bedrock) was up to 6 feet
- ✓ Potential drainfield area expanded
- ✓ Darcy's Law site capacity estimate revised to 32,570 gallons per day (gpd)

Lower Trinity Road / 29 Acres site

- ✓ Depth to limiting layer (bedrock) was up to 6 feet
- ✓ Potential drainfield area reduced due to shallow depth to rock
- ✓ Darcy's Law site capacity estimate revised to 35,997 gpd

2. BARNEGAT ROAD TEST PIT RESULTS

Soils testing was conducted on June 10, 2019 at the Barnegat Road site. Testing was conducted in the proposed disposal areas where no previous soils testing data was available. Figure 2-1 presents the location map for the Barnegat Road site Test Pits. Tables 2-1 and 2-2 present the location / soils descriptions and a condensed version of the soils logs respectively. Soil logs are presented in Appendix A.

Figure 2-2 presents the results of the sieve analysis for Test Pit # E. Based upon the sieve analysis, hydraulic conductivity is estimated using the following Allen Hazen empirical formula:

$K = C * (D_{10})^2$, where K = Hydraulic conductivity (cm/sec),
D_{10} = 10th percentile grain size by weight in mm
C = dimensionless coefficient with C = 1, for K in cm/sec and D_{10} in mm
1 cm/sec = 2,835 feet/day

$K = (0.0469)^2 = 0.0022$ cm/sec = 6.24 feet/day

This value is very similar to the soil survey-based value of 6.6 ft/day previously assumed. The disposal site capacity analysis was updated using field testing results. Table 2-3 presents the updated site capacity analysis of 32,570 gpd.

Table 2-1 Barnegat Road Test Pits Data

TP #	TP Location		Elev.[1]	Depth to		Soils Description
	Longitude[1]	Latitude[1]		BR	GW	
A	-73.54030	41.19948	478	4'	4+'	0-6" Topsoil, 6-24" loam, 24-48" Sand, BR@48", large cobbles
B	-73.54064	41.19917	482	8+'	8+'	0-6" Topsoil, 6-72" Sand + Silt, 72-96" Sand
D	-73.54117	41.19933	508	7+'	7'	0-6" Topsoil, 6-48" Sand + Silt, 48-84" Sand, GW 84"
E	-73.54123	41.19891	494	4'	4+'	0-6" Topsoil, 6-30" Sand + Silt, 30-48" Sand, BR 48"
F	-73.54160	41.19915	508	7+'	7'	0-6" Topsoil, 6-40" Sand + Silt, 40-84" Sand, GW 84"
G	-73.54198	41.19879	509	5.83'	5.83+'	0-6" Topsoil, 6-36" Sand + Silt, 36-70" Sand, BR 70"
H	-73.54085	41.19880	468	6'	6+'	0-6" Topsoil, 6-48" Sand + Silt, 48-72" Sand, BR 72"
I	-73.54096	41.19866	470	6'	6+'	0-6" Topsoil, 6-36" Sand + Silt, 36-72" Sand, BR 72"
J	-73.54111	41.19845	466	3.5'	3.5+'	0-6" Topsoil, 6-36" Sand + Silt, 36-42" Sand, BR 42"
K	-73.54134	41.19833	471	4'	4+'	0-6" Topsoil, 6-36" Sand + Silt, 36-48" Sand, BR 48"
M	-73.54230	41.19852	507	6'	6+'	0-6" Topsoil, 6-50" Sand + Silt, BR 50"
O	-73.54246	41.19790	480	4.42'	4.42+'	0-6" Topsoil, 6-42" Sand + Silt, 42-53" Sand, BR 53"
Total TPs	12					

[1] ***Measured with Carlson Surveyor 2 GPS Unit***

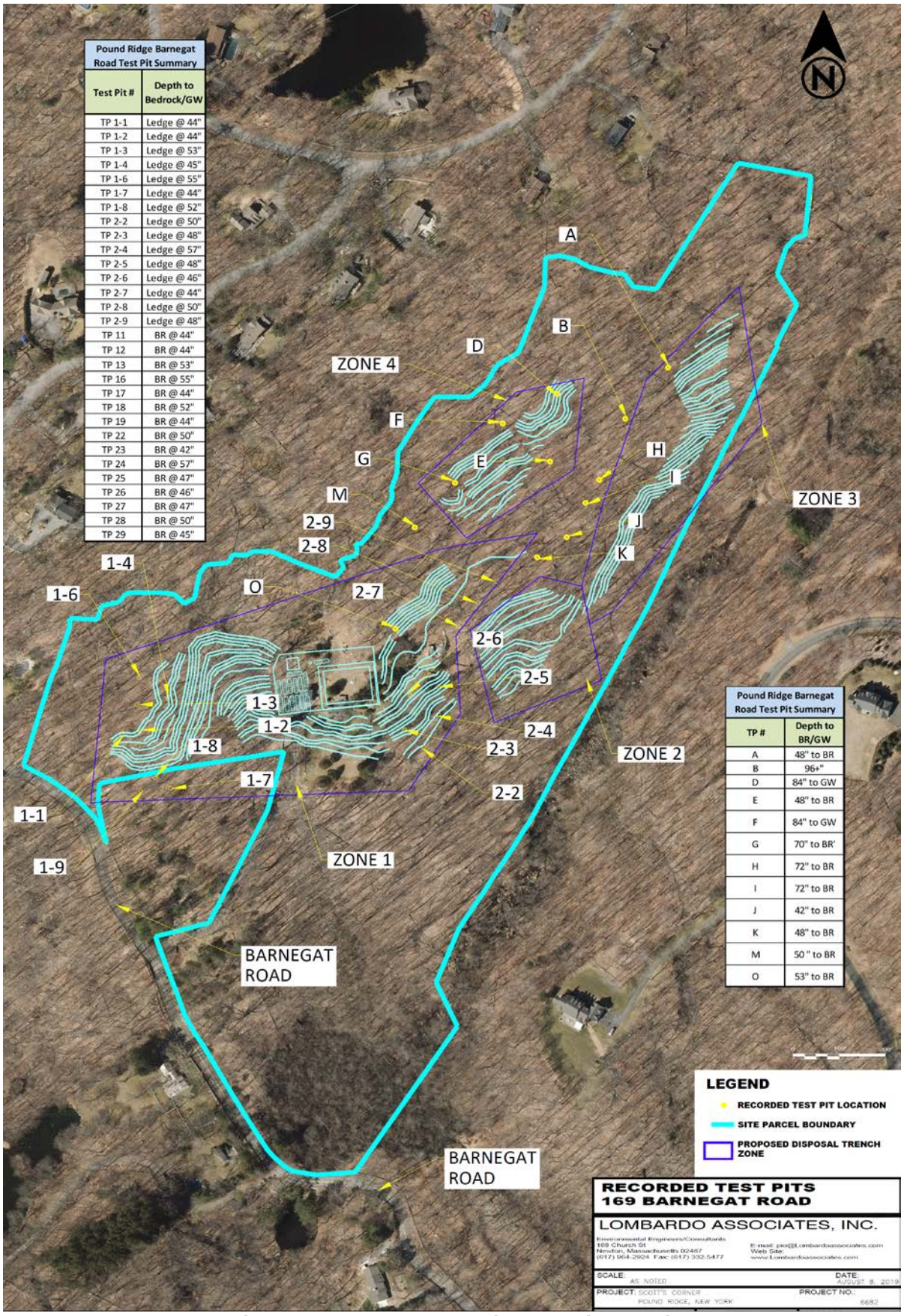


Figure 2-1 Barnegat Road - Test Pit Locations

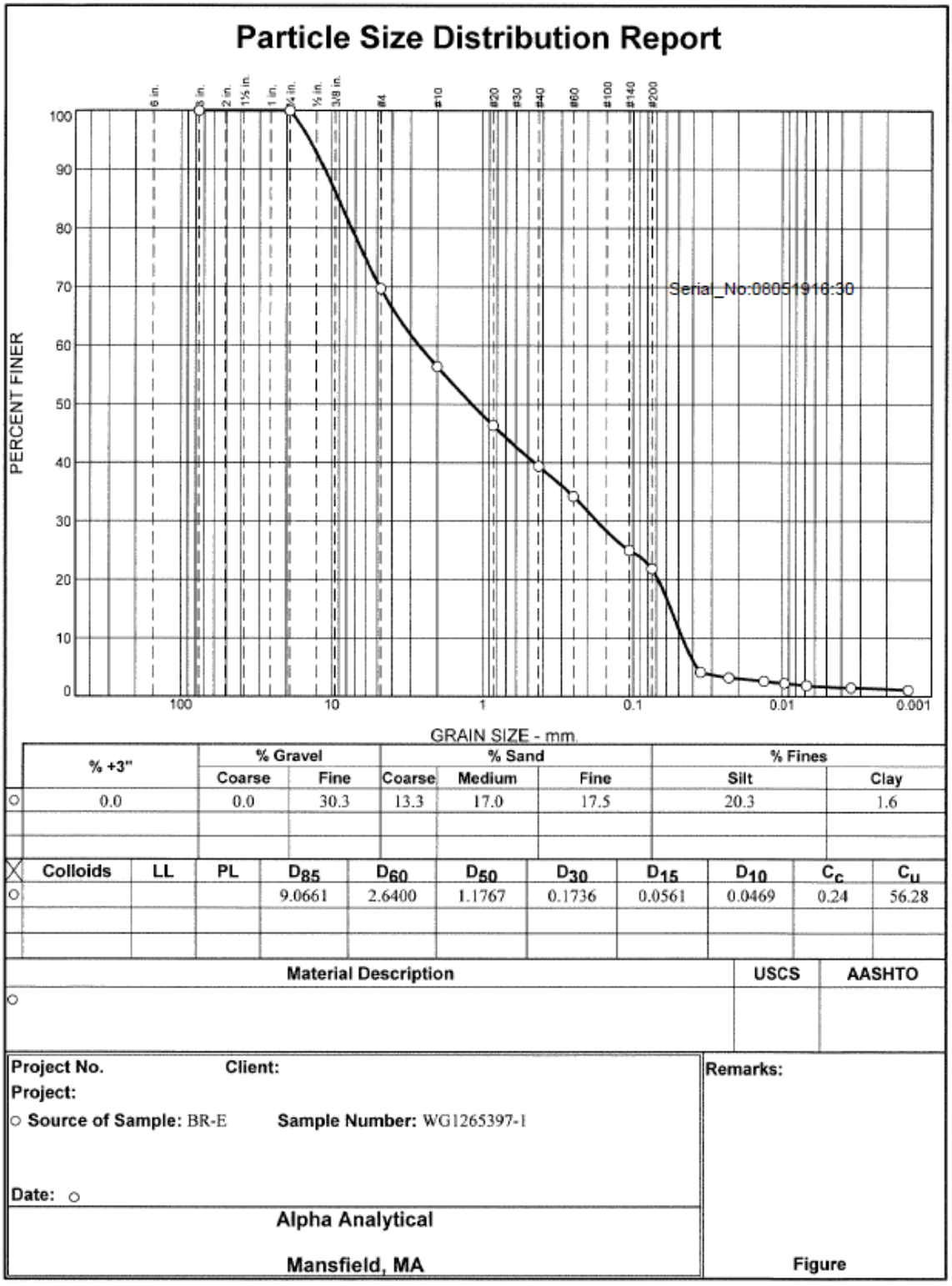
Table 2-2 Barnegat Road Test Pit Logs - Condensed

TP Depth	TP A	TP B	TP D	TP E	TP F	TP G	TP H	TP I	TP J	TP K	TP M	TP O
G.L.	6" Top Soil	6" Top Soil	6" Top Soil	6" Top Soil	6" Top Soil	6" Top Soil	6" Top Soil	6" Top Soil	6" Top Soil	6" Top Soil	6" Top Soil	6" Top Soil
6"	Loam	Sand and Silt	Sand and Silt	Sand and Silt	Sand and Silt	Sand and Silt	Sand and Silt	Sand and Silt	Sand and Silt	Sand and Silt	6" - 50" Sand and Silt	Sand and Silt
12"												
18"												
24"	Sand			Sand					Sand	Sand		
30"									Bedrock			42" - 53" Sand; Bedrock @ 53"
36"						Sand; Bedrock @ 70"	Sand	Sand		Bedrock		
42"												
48"	Bedrock w/ Large Cobbles		Sand	Bedrock	Sand and Silt						50" - 72" Sand	
54"							Bedrock	Bedrock			Water	
60"												
66"												
72"		Sand										
78"			GW		GW							
84"												
90"												
96"		Pit Bottom										

Design Professional Pio Lombardo, P.E.

Address 188 Church Street
Newton, MA 02458

FIGURE 2-2 BARNEGAT ROAD - TEST PIT # E SIEVE ANALYSIS



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	30.3	13.3	17.0	17.5	20.3	1.6

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				9.0661	2.6400	1.1767	0.1736	0.0561	0.0469	0.24	56.28

	Material Description	USCS	AASHTO
○			

Project No. **Client:**
Project:
○ **Source of Sample:** BR-E **Sample Number:** WG1265397-1
Date: ○
Alpha Analytical
Mansfield, MA

Remarks:

Figure

Table 2-3 Updated Disposal Sites Capacity Analysis – Barnegat Road

Barnegat Road Potential Drainfield Zones Capacity Analysis												
DF Zone #	GW Flux Length (ft)	Soil Testing Data Depth to GW / BR (ft)	Soil Type	Soil Based Depth to GW / BR[(1)] (ft)	Assumed Depth to GW / BR (ft)	Disp. Sys. Depth Below Grade (ft)	Max. Mound Height[(2)] (ft)	Hyd. Cond.[(3)] (ft/d)	Slope (%)	Flux Area (ft^2)	Flow - Darcy	
											(ft^3/ day)	(gpd)
1	500	3.9	ChB, ClD	>5	3.9	1.0	1.9	6.2	6.0%	950	356	**2,660**
2	830	4	ClC	>5	4.0	1.0	2.0	6.2	8.0%	1,660	829	**6,198**
3	1,100	4-8	ClC, LeB	3	6.0	1.0	4.0	6.2	8.0%	4,400	2,196	**16,430**
4	520	6.5-7	CsD	>5	7.0	1.0	5.0	6.2	6.0%	2,600	973	**7,281**
												32,570

(1) From Table 18 - Westchester County Soil Survey

(2) Assumes drip disposal @ 1-ft below grade and 1-ft minimum separation from max mounded groundwater

(3) Value calculated using results of sieve analysis for representative property soils

3 LOWER TRINITY PASS TEST PIT RESULTS

Soils testing was conducted on July 11, 2019 at the Lower Trinity Pass site. Testing was conducted in the proposed disposal areas where no previous soils testing data was available. Figure 3-1 presents the location map for the Lower Trinity Pass Site Test Pits. Table 3-1 presents the latitude, longitude and elevation of each located test pit at the Lower Trinity Pass site, along with soils description. Table 3-2 presents a detailed condensed version of all the soil logs, which are presented in Appendix A.

Figure 3-2 presents the results of the sieve analysis for Test Pit # LT-1-2. Based upon the sieve analysis, hydraulic conductivity is estimated using the following Allen Hazen empirical formula:

$K = C * (D_{10})^2$, where K = Hydraulic conductivity (cm/sec),
D_{10} = 10th percentile grain size by weight in mm
C = dimensionless coefficient with C = 1, for K in cm/sec and D_{10} in mm
1 cm/sec = 2,835 feet/day

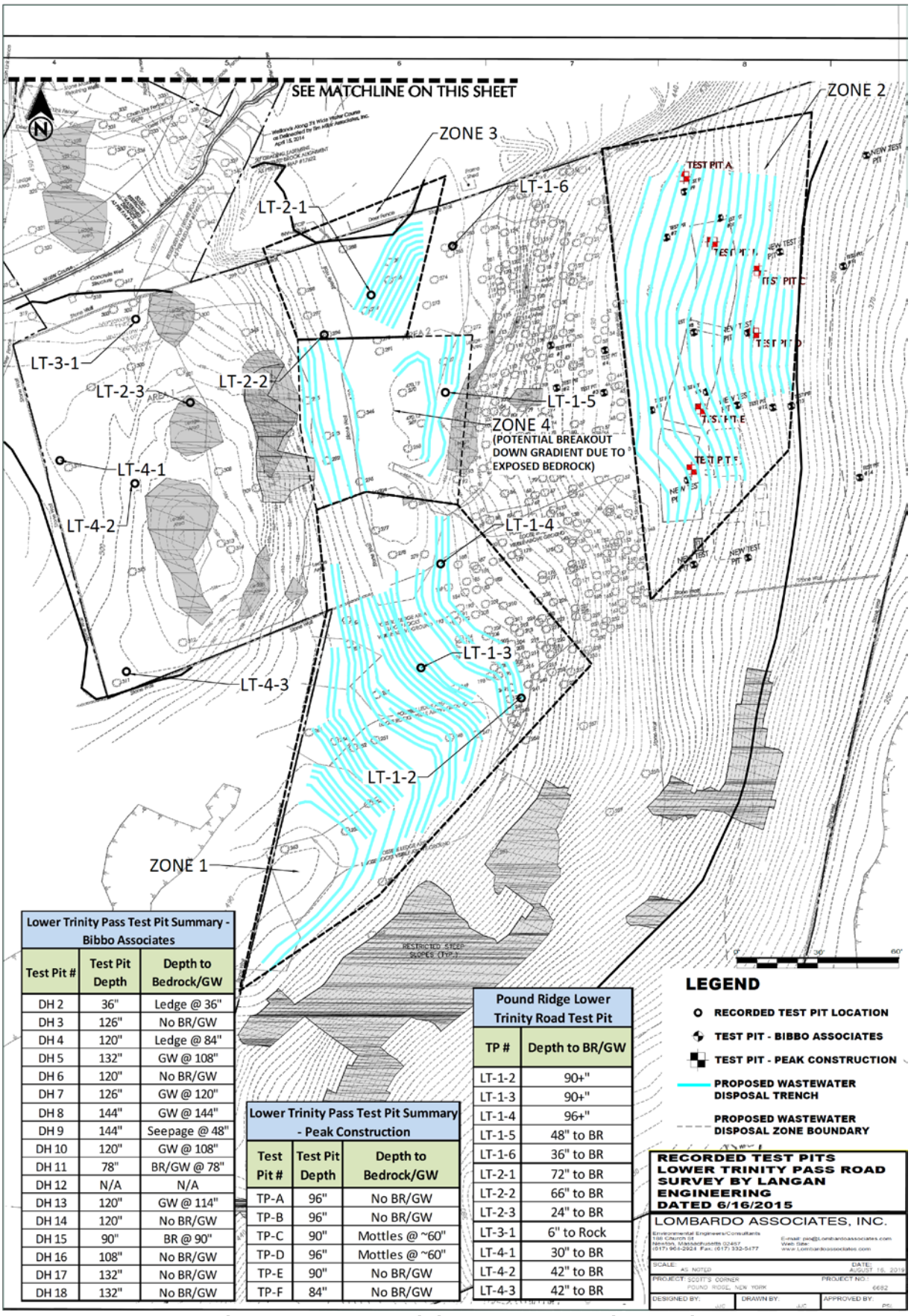
$K = (0.0439)^2 = 0.0022$ cm/sec = 5.46 feet/day

This value is very similar to the soil survey-based value of 6.6 ft/day previously assumed. The disposal site capacity analysis was updated using field testing results. Table 3-3 presents the updated site capacity analysis.

Table 3-1 Lower Trinity Pass Test Pit Locations and Data

TP #	TP Location		Elev.[1]	Depth to		Soils Description
	Longitude[1]	Latitude[1]		BR	GW	
A	-73.54030	41.19948	478	4'	4+'	0-6" Topsoil, 6-24" loam, 24-48" Sand, BR w/ large cobbles 48"
B	-73.54064	41.19917	482	8+'	8+'	0-6" Topsoil, 6-72" Sand + Silt, 72-96" Sand
D	-73.54117	41.19933	508	7+'	7'	0-6" Topsoil, 6-48" Sand + Silt, 48-84" Sand, GW 84"
E	-73.54123	41.19891	494	4'	4+'	0-6" Topsoil, 6-30" Sand + Silt, 30-48" Sand, BR 48"
F	-73.54160	41.19915	508	7+'	7'	0-6" Topsoil, 6-40" Sand + Silt, 40-84" Sand, GW 84"
G	-73.54198	41.19879	509	5.83'	5.83+'	0-6" Topsoil, 6-36" Sand + Silt, 36-70" Sand, BR 70"
H	-73.54085	41.19880	468	6'	6+'	0-6" Topsoil, 6-48" Sand + Silt, 48-72" Sand, BR 72"
I	-73.54096	41.19866	470	6'	6+'	0-6" Topsoil, 6-36" Sand + Silt, 36-72" Sand, BR 72"
J	-73.54111	41.19845	466	3.5'	3.5+'	0-6" Topsoil, 6-36" Sand + Silt, 36-42" Sand, BR 42"
K	-73.54134	41.19833	471	4'	4+'	0-6" Topsoil, 6-36" Sand + Silt, 36-48" Sand, BR 48"
M	-73.54230	41.19852	507	6'	6+'	0-6" Topsoil, 6-50" Sand + Silt, BR 50"
O	-73.54246	41.19790	480	4.42'	4.42+'	0-6" Topsoil, 6-42" Sand + Silt, 42-53" Sand, BR 53"
Total TPs	12					

[1]: Measured with Carlson Surveyor 2 GPS Unit



Lower Trinity Pass Test Pit Summary - Bibbo Associates		
Test Pit #	Test Pit Depth	Depth to Bedrock/GW
DH 2	36"	Ledge @ 36"
DH 3	126"	No BR/GW
DH 4	120"	Ledge @ 84"
DH 5	132"	GW @ 108"
DH 6	120"	No BR/GW
DH 7	126"	GW @ 120"
DH 8	144"	GW @ 144"
DH 9	144"	Seepage @ 48"
DH 10	120"	GW @ 108"
DH 11	78"	BR/GW @ 78"
DH 12	N/A	N/A
DH 13	120"	GW @ 114"
DH 14	120"	No BR/GW
DH 15	90"	BR @ 90"
DH 16	108"	No BR/GW
DH 17	132"	No BR/GW
DH 18	132"	No BR/GW

Lower Trinity Pass Test Pit Summary - Peak Construction		
Test Pit #	Test Pit Depth	Depth to Bedrock/GW
TP-A	96"	No BR/GW
TP-B	96"	No BR/GW
TP-C	90"	Mottles @ ~60"
TP-D	96"	Mottles @ ~60"
TP-E	90"	No BR/GW
TP-F	84"	No BR/GW

Pound Ridge Lower Trinity Road Test Pit	
TP #	Depth to BR/GW
LT-1-2	90+"
LT-1-3	90+"
LT-1-4	96+"
LT-1-5	48" to BR
LT-1-6	36" to BR
LT-2-1	72" to BR
LT-2-2	66" to BR
LT-2-3	24" to BR
LT-3-1	6" to Rock
LT-4-1	30" to BR
LT-4-2	42" to BR
LT-4-3	42" to BR

Figure 3-1 Lower Trinity Pass – Test Pit Locations

Table 3-2 Lower Trinity Pass Test Pits Record Logs – Condensed

TP Depth	TP LT-1-2	TP LT-1-3	TP LT-1-4	TP LT-1-5	TP LT-1-6	TP LT-2-1	TP LT-2-2	TP LT-2-3	TP LT-3-1	TP LT-4-1	TP LT-4-2	TP LT-4-3
G.L.	6" Top Soil	6" Top Soil	6" Top Soil	6" Top Soil	6" Top Soil	6" Top Soil	6" Top Soil	6" Top Soil	6" Top Soil	6" Top Soil	6" Top Soil	6" Top Soil
6"	Fine Sand	Fine Sand	Fine Sand w/ Silt	Fine Sand	Fine Sand	Sand	Very Fine Sand	Fine Sand	Rock Wall	Very Fine Sand	Very Fine Sand	Very Fine Sand
12"												
18"												
24"								Bedrock				
30"										Bedrock		
36"					Bedrock							
42"											Bedrock	Bedrock
48"				Bedrock								
54"												
60"												
66"							Bedrock					
72"						Bedrock						
78"												
84"												
90"	Pit Bottom	Pit Bottom										
96"			Pit Bottom									

Table 3-3 Updated Disposal Sites Capacity Analysis – Lower Trinity Pass Site

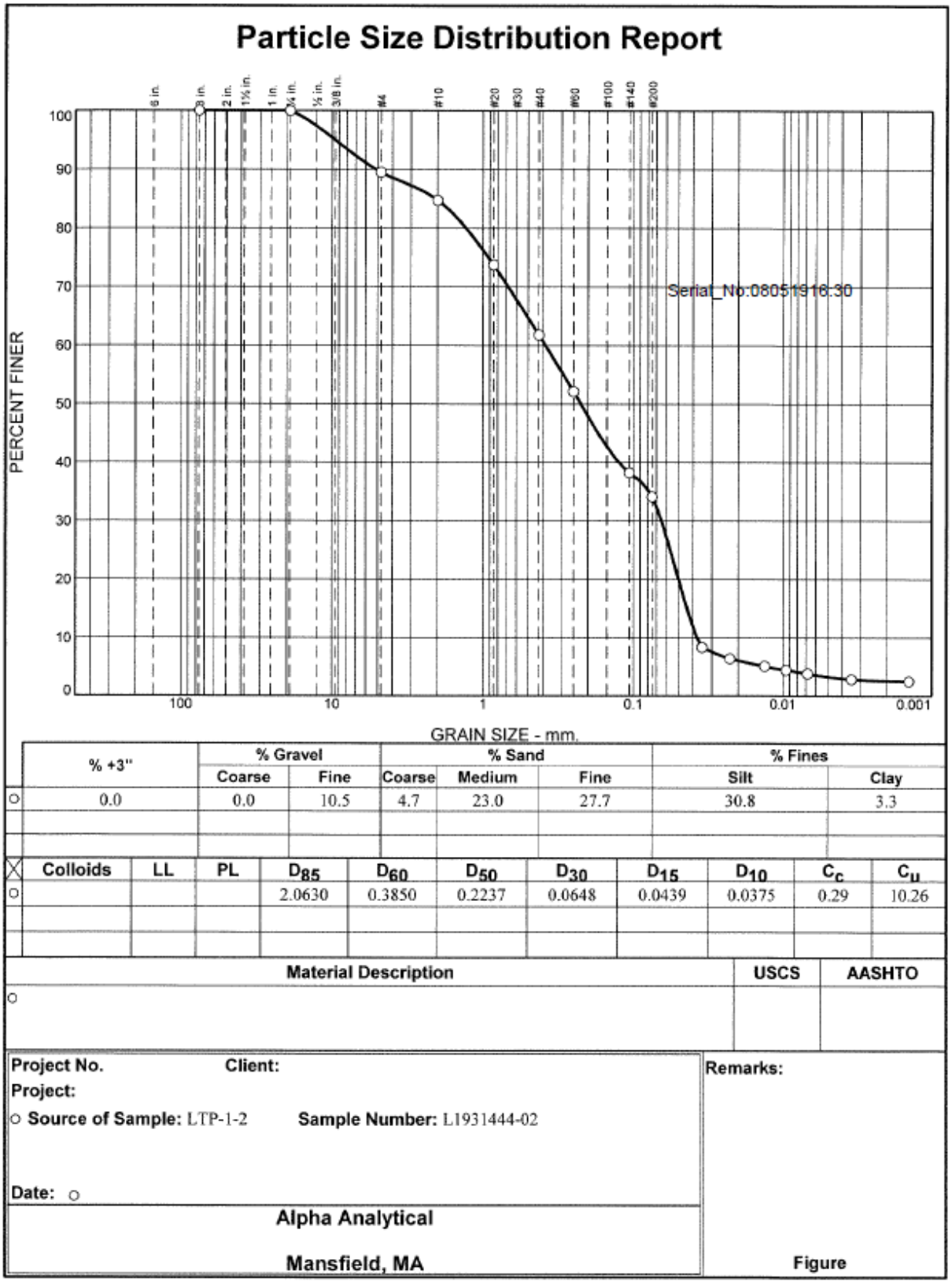
Lower Trinity Pass Potential Drainfield Zones Capacity Analysis												
DF Zone #	GW Flux Length (ft)	Soil Testing Data Depth to GW / BR (ft)	Soil Type	Soil Based Depth to GW / BR[(1)] (ft)	Assumed Depth to GW / BR (ft)	Disp. Sys. Depth Below Grade (ft)	Max. Mound Height[(2)] (ft)	Hyd. Cond.[(3)] (ft/d)	Slope (%)	Flux Area (ft^2)	Flow - Darcy	
											(ft^3/ day)	(gpd)
1	1,230	>8	CrC, CsD	>5	9.0	1.0	7.0	5.5	6.0%	8,610	2,821	**21,098**
2	480	>8	CrC	>5	8.0	1.0	6.0	5.5	10.0%	2,880	1,572	**11,762**
3	178	6.0, 5.5, 3.0	CrC	>5	5.0	1.0	3.0	5.5	10.0%	534	292	**2,181**
4	234	4	CsD	>5	4.0	1.0	2.0	5.5	5.0%	468	128	**956**
												35,997

[(1)] From Table 18 - Westchester County Soil Survey

[(2)] Assumes drip disposal @ 1-ft below grade and 1-ft minimum separation from max mounded groundwater

[(3)] Value calculated using results of sieve analysis for representative property soils

Figure 3-2 Lower Trinity Pass Test Pit # LT-1-2 Sieve Analysis



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	10.5	4.7	23.0	27.7	30.8	3.3

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				2.0630	0.3850	0.2237	0.0648	0.0439	0.0375	0.29	10.26

Material Description	USCS	AASHTO
○		

Project No. **Client:**
Project:
○ **Source of Sample:** LTP-1-2 **Sample Number:** L1931444-02

Date: ○

Alpha Analytical

Mansfield, MA

Remarks:

Figure

APPENDIX A BARNEGAT ROAD TEST PIT FIELD RECORDS

Westchestergov.com

Sheet 1 of 5

Westchester County Department of Health
Field Activity Report
Witness of Deep Test Holes

Date: 6/10/19 **Time Arrived:** 1³⁰ pm **Time Left:** 2⁴⁵ pm

Inspected By: F Beck Jr **Title:** SA [illegible] **Phone #** 864-7347

Address: 169 Barnegat Road

Municipality: Pound Ridge **Section:** – **Block:** 9457 **Lot** 12 **RS Lot #**

Persons Present: Pio Lombardo

Individual Lot ☒ **Realty Subdivision** ☐

NYC –DEP Watershed: Y/(N) ☐ Joint Review ☐ Delegated

Weather Conditions: Overcast w/ light mist/drizzle

Proposed SSTS Location: Is it well drained? (Y)/N **Approximate Slope in Septic Area:** Varies 5 - 15 %

Are there any wells, watercourses, wetlands, storm drains, etc. in area? (Y)/N
Denote on Plan/Sketch

Number of Holes Witnessed: 14

Description: Note soil classification, depth to rock and/or water, depth to root penetration.

HOLE # A	HOLE # B	HOLE # C
0-6" topsoil	0-6" topsoil	0-6" topsoil
6-24" loam	6-72" Sands + silt	6-48" Sands + silt
24-48" Sands	72-96" Sands	48-72" Sands
large cobbles rock @ 48"	bony No rock/gw	bony rock @ 72"
Total Depth 48"	Total Depth 96"	Total Depth 72"

Comments: [illegible] for commercial system. Width of area is sufficient. All holes were bony. PE is going to GPS locate holes.

Inspector's Signature

6/10/19
Date

Revised 4/16/2007

Sheet 2 of 5

Westchester County Department of Health
Soils Investigation
Continuation Sheet

Address: 169 Bouregot Road

Municipality: Pound Ridge **Section:** — **Block:** 9457 **Lot** 12 **RS Lot #** _____

HOLE # D	HOLE # E	HOLE # F
0-6" topsoil	0-6" topsoil	0-6" topsoil
6-48" Sand + silt	6-30" Sand + silt	6-40" Sand + silt
48-84" Sand	30-48" Sand	40-84" Sand
boring water @ 84"	boring rock @ 48"	water @ 84"
Total Depth 84"	Total Depth 48"	Total Depth 84"

Comments: _____

Revised 4/16/2007

Sheet 3 of 5

Westchester County Department of Health
Soils Investigation
Continuation Sheet

Address: 169 Banksgate Road

Municipality: Pound Ridge **Section:** — **Block:** 945 **Lot** 12 **RS Lot #** _____

HOLE # G	HOLE # H	HOLE # I
0-6" topsoil	0-6" topsoil	0-6" topsoil
6-36" Sandy + silt	6-48" Sandy + silt	6-36" Sandy + silt
36-70" Sandy	48-72" Sandy	36-72" Sandy
boy rock @ 70"	boy rock @ 72"	boy rock @ 72"
Total Depth 70"	Total Depth 72"	Total Depth 72"

Comments: _____

Revised 4/16/2007

Sheet 4 of 5

Westchester County Department of Health
Soils Investigation
Continuation Sheet

Address: 169 Barnegat Road

Municipality: Pound Ridge **Section:** — **Block:** 985 **Lot** 12 **RS Lot #** _____

HOLE # J	HOLE # K	HOLE # M
0-6" topsoil	0-6" topsoil	0-6" topsoil
6-36" Sand + silt	6-36" Sand + silt	6-50" Sand + silt
36-42" Sand	36-48" Sand	50-72" Sand
long rock @ 42"	long rock @ 48"	long water @ 72"
Total Depth 42"	Total Depth 48"	Total Depth 72"

Comments: _____

Revised 4/16/2007

Sheet 5 of 5

Westchester County Department of Health
Soils Investigation
Continuation Sheet

Address: 119 Barrington Road

Municipality: Pound Ridge **Section:** — **Block:** 945 **Lot** 12 **RS Lot #** _____

HOLE # N	HOLE # O	HOLE #
0-6" topsoil	0-6" topsoil	
6-50" sand + silt	6-42" sand + silt	
b-> rock @ 50"	42-53" sand	
Total Depth 50"	b-> rock @ 53"	
	Total Depth 53"	

Comments: _____

Revised 4/16/2007

APPENDIX B LOWER TRINITY TEST PIT FIELD RECORDS

TEST PIT DATA REQUIRED TO BE SUBMITTED WITH APPLICATION
DESCRIPTION OF SOILS ENCOUNTERED IN TEST HOLES

DEPTH G.L.	HOLE NO. 1-2	HOLE NO. 1-3	HOLE NO. 1-4	HOLE NO. 1-5
	Topsoil to 6"	Topsoil to 6"	Topsoil to 6"	6" Topsoil
6"	Fine Sand	Fine Sand	Fine Sand	
12"	Down to	down to	w/ Silt	Fine Sand
18"	90"	90"	down to	from 6"
24"			96"	to 48"
30"				
36"				
42"				
48"				Bedrock
54"				
60"				
66"				
72"				
78"				
84"				

WAS GROUNDWATER ENCOUNTERED? YES/(NO)
INDICATE LEVEL AT WHICH GROUND WATER IS ENCOUNTERED _____Ft./In
INDICATED LEVEL FOR WHICH WATER LEVEL RISES AFTER BEING ENCOUNTERED ___Ft./In.
DEEP TEST MADE BY Lombardo Associates DATE OF DEEP TESTS 7/11/2019

DESIGN

Soil Rate Used_____ Min/1" Drop: S.D. Usable Area Provided_____

No. of Bedrooms_____ Septic Tank Capacity_____ Gals. Masonry_____ Metal_____

Absorption Area Prov. by _____ L.F. x 24" _____ width trench. Other_____

Design Professional Name Pio Lombardo Signature

Address 188 Church St.
Newton, MA 02458

Seal

PIO STEPHEN LOMBARDO
STATE OF NEW YORK
056900
LICENSED PROFESSIONAL ENGINEER

TEST PIT DATA REQUIRED TO BE SUBMITTED WITH APPLICATION
DESCRIPTION OF SOILS ENCOUNTERED IN TEST HOLES

DEPTH G.L.	HOLE NO. 1-6	HOLE NO. 2-1	HOLE NO. 2-2	HOLE NO. 2-3
	6" Topsoil	6" Topsoil	6" Topsoil	6" Topsoil
6"				
12"	Fine Sand	Sand	V. Fine	Fine Sand
18"	from 6"	6" to 72"	Sand	6"-24"
24"	to 36"		6"-66"	Bedrock
30"				
36"	Bedrock			
42"				
48"				
54"				
60"				
66"			Bedrock	
72"		Bedrock		
78"				
84"				

WAS GROUNDWATER ENCOUNTERED? YES/(NO)
INDICATE LEVEL AT WHICH GROUND WATER IS ENCOUNTERED _____ Ft./In
INDICATED LEVEL FOR WHICH WATER LEVEL RISES AFTER BEING ENCOUNTERED ___ Ft./In.
DEEP TEST MADE BY Lombardo Associates DATE OF DEEP TESTS 7/11/2019

DESIGN

Soil Rate Used_____ Min/1" Drop: S.D. Usable Area Provided_____

No. of Bedrooms_____ Septic Tank Capacity_____ Gals. Masonry_____ Metal_____

Absorption Area Prov. by _____ L.F. x 24" _____ width trench. Other_____

Design Professional Name Pio Lombardo Signature

Address 186 Church St. Seal
Newton, MA 02458

TEST PIT DATA REQUIRED TO BE SUBMITTED WITH APPLICATION
DESCRIPTION OF SOILS ENCOUNTERED IN TEST HOLES

DEPTH G.L.	HOLE NO. 3-1	HOLE NO. 4-1	HOLE NO. 4-2	HOLE NO. 4-3
	6" Topsoil	6" Topsoil	6" Topsoil	6" Topsoil
6"	Rock wall	V. Fine Sand 6"-30"	V. Fine Sand 6"-42"	V. Fine Sand 6"-42"
12"				
18"				
24"				
30"		Bedrock		
36"				
42"			Bedrock	Bedrock
48"				
54"				
60"				
66"				
72"				
78"				
84"				

WAS GROUNDWATER ENCOUNTERED? YES/~~NO~~
INDICATE LEVEL AT WHICH GROUND WATER IS ENCOUNTERED _____Ft./In
INDICATED LEVEL FOR WHICH WATER LEVEL RISES AFTER BEING ENCOUNTERED ___Ft./In.
DEEP TEST MADE BY Lombardo Associates DATE OF DEEP TESTS 7/11/2019

DESIGN

Soil Rate Used_____ Min/1" Drop: S.D. Usable Area Provided_____

No. of Bedrooms_____ Septic Tank Capacity_____ Gals. Masonry_____ Metal_____

Absorption Area Prov. by _____ L.F. x 24" _____ width trench. Other_____

Design Professional Name Pio Lombardo Signature

Address 188 Church St. Seal
Newton, MA 02458

STATE OF NEW YORK
PIO STEPHEN LOMBARDO
LICENSED PROFESSIONAL ENGINEER

APPENDIX C LABORATORY SIEVE ANALYSIS REPORT

ANALYTICAL REPORT

Lab Number:	L1931444
Client:	Lombardo Associates, Inc. 975 Kelly Road Cumberland, MD 21502
ATTN:	Jonathan Lane
Phone:	(970) 769-8384
Project Name:	POUND RIDGE
Project Number:	6682
Report Date:	08/05/19

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com

Project Name: POUND RIDGE
Project Number: 6682

Lab Number: L1931444
Report Date: 08/05/19

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1931444-01	BR-E	SOIL	POUND RIDGE, NY	07/11/19 12:00	07/17/19
L1931444-02	LTP-1-2	SOIL	POUND RIDGE, NY	07/11/19 12:00	07/17/19

Project Name:	POUND RIDGE	**Lab Number:**	L1931444
Project Number:	6682	**Report Date:**	08/05/19

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name:	POUND RIDGE	**Lab Number:**	L1931444
Project Number:	6682	**Report Date:**	08/05/19

Case Narrative (continued)

Grain Size Analysis

The WG1265397-1 Laboratory Duplicate RPDs for % fine gravel (29%) and % total gravel (29%), performed on L1931444-01, are outside the acceptance criteria. The elevated RPDs have been attributed to the non-homogeneous nature of the native sample.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Susan E O'Neil Susan O' Neil

Title: Technical Director/Representative Date: 08/05/19

INORGANICS
&
MISCELLANEOUS

Project Name: POUND RIDGE
Project Number: 6682
Lab Number: L1931444
Report Date: 08/05/19

SAMPLE RESULTS

Lab ID: L1931444-01
Client ID: BR-E
Sample Location: POUND RIDGE, NY
Sample Depth:
Matrix: Soil

Date Collected: 07/11/19 12:00
Date Received: 07/17/19
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Grain Size Analysis - Mansfield Lab										
Cobbles	ND		%	0.100	NA	1	-	07/27/19 12:17	12,D6913/D7928	MC
% Coarse Gravel	ND		%	0.100	NA	1	-	07/27/19 12:17	12,D6913/D7928	MC
% Fine Gravel	22.7		%	0.100	NA	1	-	07/27/19 12:17	12,D6913/D7928	MC
% Total Gravel	22.7		%	0.100	NA	1	-	07/27/19 12:17	12,D6913/D7928	MC
% Coarse Sand	13.4		%	0.100	NA	1	-	07/27/19 12:17	12,D6913/D7928	MC
% Medium Sand	18.1		%	0.100	NA	1	-	07/27/19 12:17	12,D6913/D7928	MC
% Fine Sand	19.3		%	0.100	NA	1	-	07/27/19 12:17	12,D6913/D7928	MC
% Total Sand	50.8		%	0.100	NA	1	-	07/27/19 12:17	12,D6913/D7928	MC
% Silt Fine	24.7		%	0.100	NA	1	-	07/27/19 12:17	12,D6913/D7928	MC
% Clay Fine	1.80		%	0.100	NA	1	-	07/27/19 12:17	12,D6913/D7928	MC
% Total Fines	26.5		%	0.100	NA	1	-	07/27/19 12:17	12,D6913/D7928	MC

Project Name: POUND RIDGE
Project Number: 6682
Lab Number: L1931444
Report Date: 08/05/19

SAMPLE RESULTS

Lab ID: L1931444-02
Client ID: LTP-1-2
Sample Location: POUND RIDGE, NY
Sample Depth:
Matrix: Soil

Date Collected: 07/11/19 12:00
Date Received: 07/17/19
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Grain Size Analysis - Mansfield Lab										
Cobbles	ND		%	0.100	NA	1	-	07/27/19 12:17	12,D6913/D7928	MC
% Coarse Gravel	ND		%	0.100	NA	1	-	07/27/19 12:17	12,D6913/D7928	MC
% Fine Gravel	10.5		%	0.100	NA	1	-	07/27/19 12:17	12,D6913/D7928	MC
% Total Gravel	10.5		%	0.100	NA	1	-	07/27/19 12:17	12,D6913/D7928	MC
% Coarse Sand	4.70		%	0.100	NA	1	-	07/27/19 12:17	12,D6913/D7928	MC
% Medium Sand	23.0		%	0.100	NA	1	-	07/27/19 12:17	12,D6913/D7928	MC
% Fine Sand	27.7		%	0.100	NA	1	-	07/27/19 12:17	12,D6913/D7928	MC
% Total Sand	55.4		%	0.100	NA	1	-	07/27/19 12:17	12,D6913/D7928	MC
% Silt Fine	30.8		%	0.100	NA	1	-	07/27/19 12:17	12,D6913/D7928	MC
% Clay Fine	3.30		%	0.100	NA	1	-	07/27/19 12:17	12,D6913/D7928	MC
% Total Fines	34.1		%	0.100	NA	1	-	07/27/19 12:17	12,D6913/D7928	MC

Lab Duplicate Analysis
Batch Quality Control

Project Name: POUND RIDGE
Project Number: 6682

Lab Number: L1931444
Report Date: 08/05/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Grain Size Analysis - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1265397-1 QC Sample: L1931444-01 Client ID: BR-E						
Cobbles	ND	ND	%	NC		20
% Coarse Gravel	ND	ND	%	NC		20
% Fine Gravel	22.7	30.3	%	**29**	Q	20
% Total Gravel	22.7	30.3	%	**29**	Q	20
% Coarse Sand	13.4	13.3	%	1		20
% Medium Sand	18.1	17.0	%	6		20
% Fine Sand	19.3	17.5	%	10		20
% Total Sand	50.8	47.8	%	6		20
% Silt Fine	24.7	20.3	%	20		20
% Clay Fine	1.80	1.60	%	12		20
% Total Fines	26.5	21.9	%	19		20

Project Name: POUND RIDGE
Project Number: 6682

Lab Number: L1931444
Report Date: 08/05/19

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1931444-01A	Bag	A	NA		3.9	Y	Absent		A2-HYDRO-TFINE(),A2-HYDRO-CFINE(),A2-HYDRO-CGRAVEL(),A2-HYDRO-FSAND(),A2-HYDRO-MSAND(),A2-HYDRO-TGRAVEL(),A2-HYDRO-CSAND(),A2-HYDRO-SFINE(),A2-HYDRO-TSAND(),A2-HYDRO-COBBLES(),A2-HYDRO-FGRAVEL()
L1931444-02A	Bag	A	NA		3.9	Y	Absent		A2-HYDRO-TFINE(),A2-HYDRO-CFINE(),A2-HYDRO-CGRAVEL(),A2-HYDRO-FSAND(),A2-HYDRO-MSAND(),A2-HYDRO-TGRAVEL(),A2-HYDRO-CSAND(),A2-HYDRO-SFINE(),A2-HYDRO-TSAND(),A2-HYDRO-COBBLES(),A2-HYDRO-FGRAVEL()

*Values in parentheses indicate holding time in days

Project Name:	POUND RIDGE	**Lab Number:**	L1931444
Project Number:	6682	**Report Date:**	08/05/19

GLOSSARY

Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Footnotes

Report Format: Data Usability Report

Project Name:	POUND RIDGE	**Lab Number:**	L1931444
Project Number:	6682	**Report Date:**	08/05/19

1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A - Spectra identified as "Aldol Condensation Product".

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

J - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

ND - Not detected at the reporting limit (RL) for the sample.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

Report Format: Data Usability Report

Project Name:	POUND RIDGE	**Lab Number:**	L1931444
Project Number:	6682	**Report Date:**	08/05/19

REFERENCES

12 Annual Book of ASTM Standards. (American Society for Testing and Materials) ASTM International.

LIMITATION OF LIABILITIES

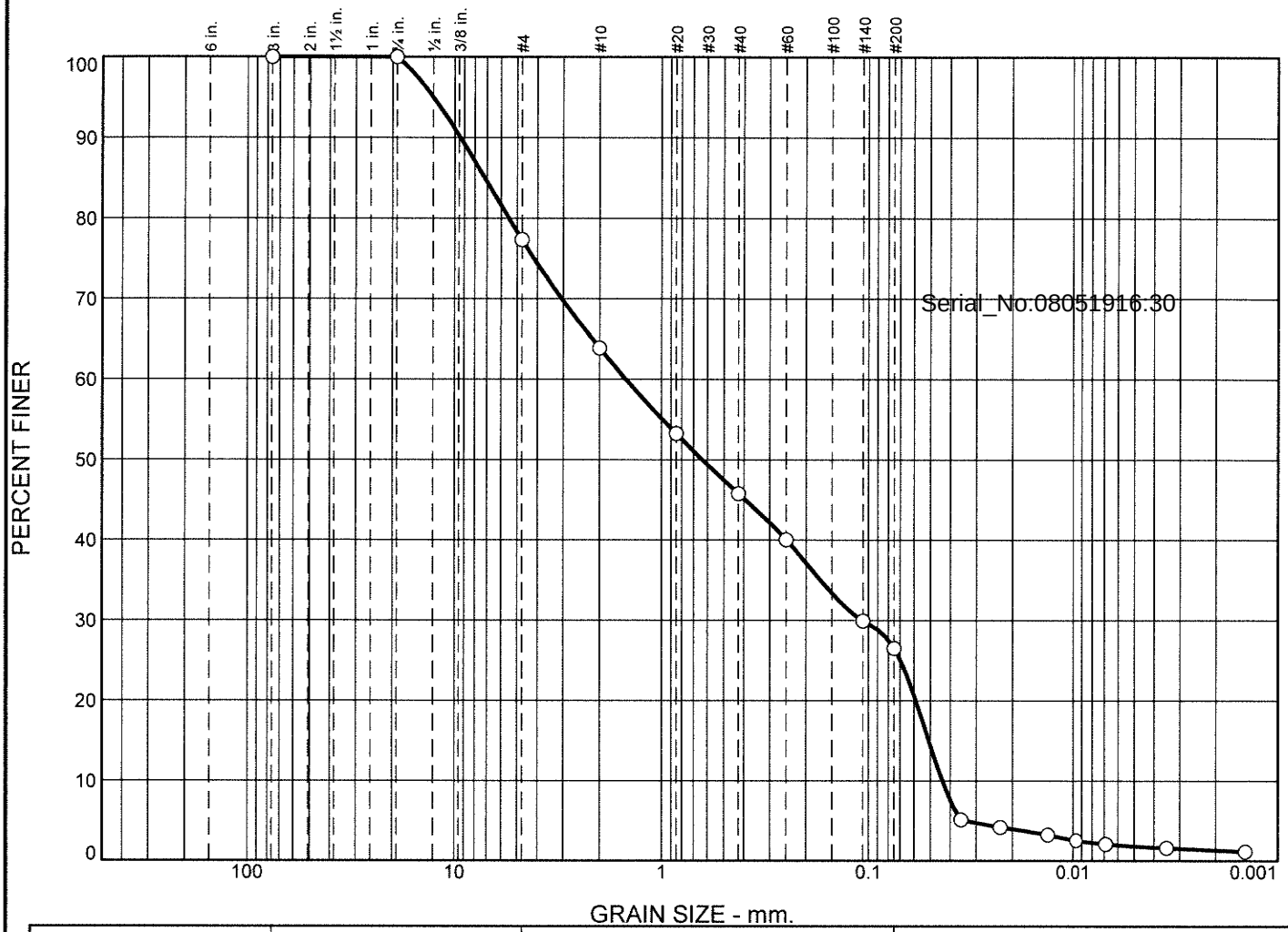
Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

ASTM D6913/D7928

GRAIN SIZE ANALYSIS

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	22.7	13.4	18.1	19.3	24.7	1.8

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				7.1710	1.4895	0.6349	0.1070	0.0509	0.0437	0.18	34.06

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** BR-E **Sample Number:** L1931444-01

Date: ○

Alpha Analytical

Mansfield, MA

Remarks:

○ Sampled by SM

Tested by SM and MCH

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/4/2019

Location: BR-E
Sample Number: L1931444-01
Testing Remarks: Sampled by SM
Tested by SM and MCH

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 93.78
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Serial_No:08051916:30

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
93.78	0.00	3	0.00	0.00	100.0
		0.75	0.00	0.00	100.0
		#4	21.26	0.00	77.3
		#10	12.60	0.00	63.9
		#20	9.99	0.00	53.2
		#40	7.00	0.00	45.8
		#60	5.37	0.00	40.1
		#140	9.49	0.00	29.9
		#200	3.19	0.00	26.5

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 26.5
Weight of hydrometer sample =90.84
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	19.5	1.0110	1.0109	0.0137	11.0	13.4	0.0355	5.1
5.00	19.5	1.0090	1.0089	0.0137	9.0	13.9	0.0229	4.2
15.00	19.5	1.0070	1.0069	0.0137	7.0	14.4	0.0135	3.2
30.00	19.5	1.0055	1.0054	0.0137	5.5	14.8	0.0097	2.5
60.00	19.5	1.0045	1.0044	0.0137	4.5	15.1	0.0069	2.1
240.00	19.5	1.0035	1.0034	0.0137	3.5	15.4	0.0035	1.6
1440.00	19.5	1.0025	1.0024	0.0137	2.5	15.6	0.0014	1.1

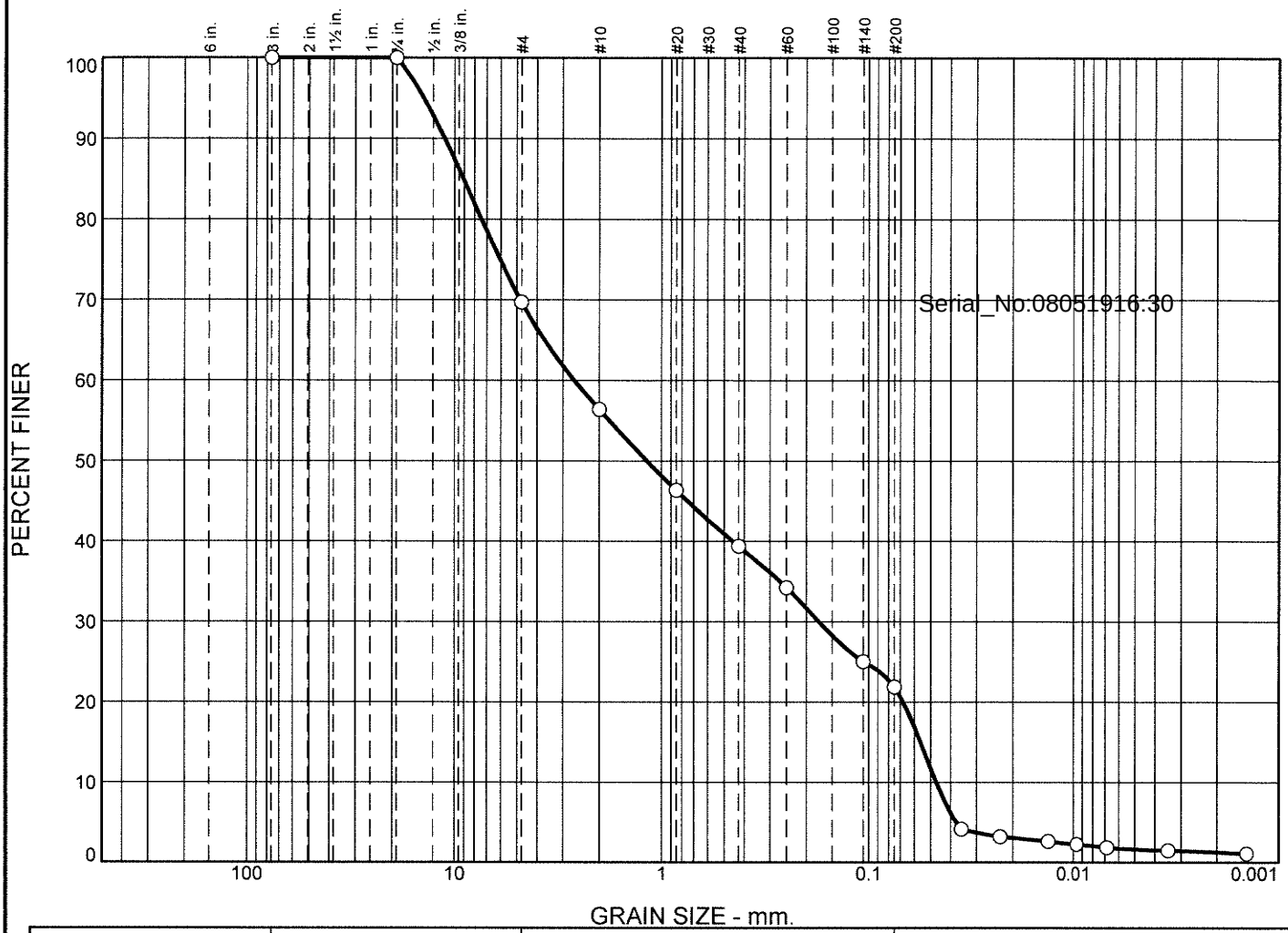
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	22.7	22.7	13.4	18.1	19.3	50.8	24.7	1.8	26.5

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0338	0.0437	0.0509	0.0590	0.1070	0.2490	0.6349	1.4895	5.4991	7.1710	9.3968	12.6832

Fineness Modulus	C_u	C_c
2.84	34.06	0.18

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	30.3	13.3	17.0	17.5	20.3	1.6

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				9.0661	2.6400	1.1767	0.1736	0.0561	0.0469	0.24	56.28

	Material Description	USCS	AASHTO
○			

Project No. **Client:**

Project:

○ **Source of Sample:** BR-E **Sample Number:** WG1265397-1

Date: ○

Alpha Analytical

Mansfield, MA

Remarks:

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/4/2019

Location: BR-E

Sample Number: WG1265397-1

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 98.65
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
98.65	0.00	3	0.00	0.00	100.0
		0.75	0.00	0.00	100.0
		#4	29.88	0.00	69.7
		#10	13.13	0.00	56.4
		#20	9.91	0.00	46.4
		#40	6.87	0.00	39.4
		#60	5.07	0.00	34.3
		#140	9.08	0.00	25.0
		#200	3.14	0.00	21.9

Serial_No:08051916:30

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 21.9
Weight of hydrometer sample =92.40
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	19.5	1.0110	1.0109	0.0137	11.0	13.4	0.0355	4.1
5.00	19.5	1.0085	1.0084	0.0137	8.5	14.0	0.0230	3.2
15.00	19.5	1.0070	1.0069	0.0137	7.0	14.4	0.0135	2.6
30.00	19.5	1.0060	1.0059	0.0137	6.0	14.7	0.0096	2.2
60.00	19.5	1.0050	1.0049	0.0137	5.0	15.0	0.0069	1.9
240.00	19.5	1.0040	1.0039	0.0137	4.0	15.2	0.0035	1.5
1440.00	19.5	1.0030	1.0029	0.0137	3.0	15.5	0.0014	1.1

Fractional Components

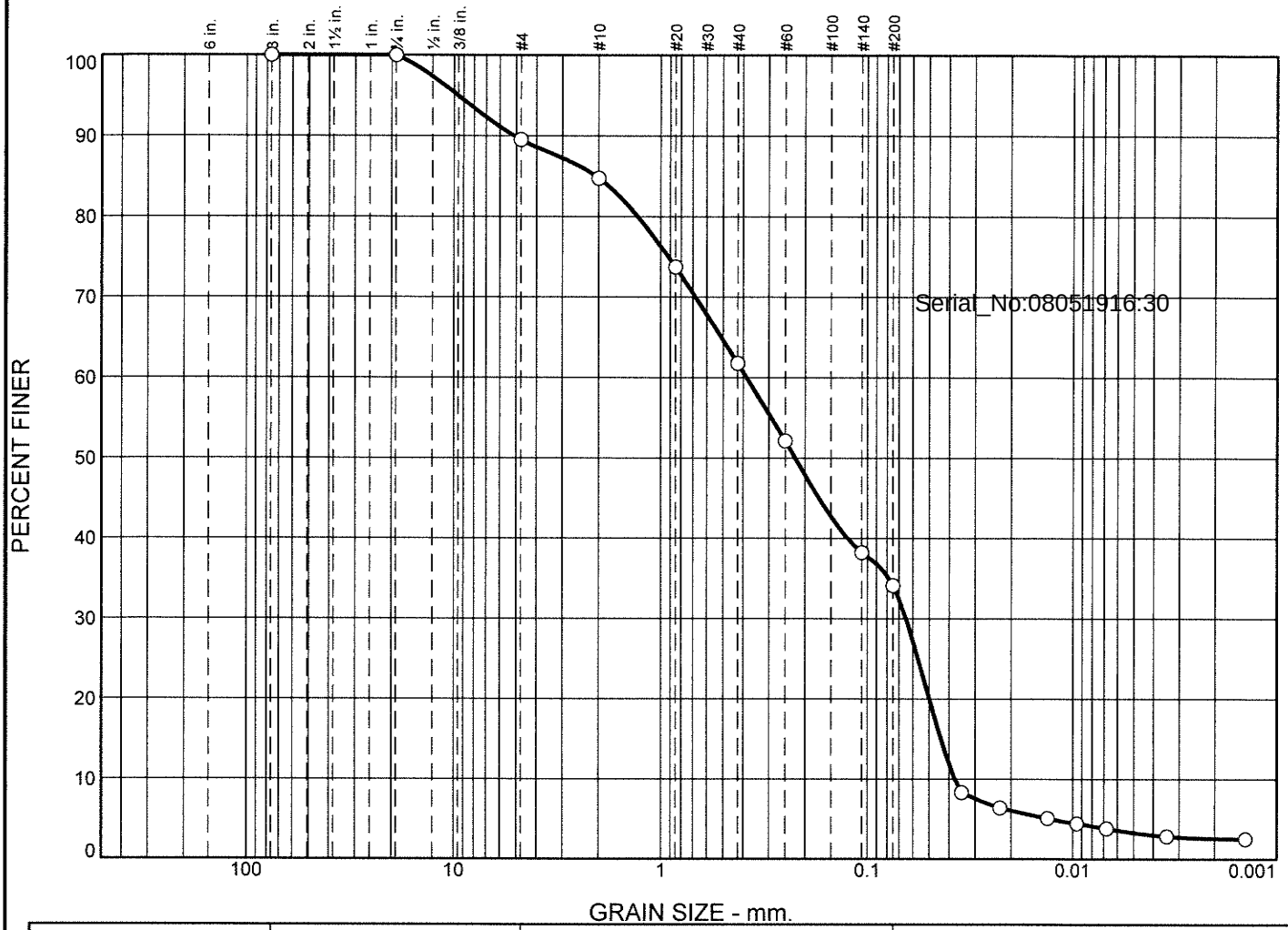
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	30.3	30.3	13.3	17.0	17.5	47.8	20.3	1.6	21.9

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0376	0.0469	0.0561	0.0681	0.1736	0.4534	1.1767	2.6400	7.4104	9.0661	11.1688	14.0818

Fineness Modulus	C_u	C_c
3.28	56.28	0.24

Alpha Analytical

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	10.5	4.7	23.0	27.7	30.8	3.3

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				2.0630	0.3850	0.2237	0.0648	0.0439	0.0375	0.29	10.26

	Material Description	USCS	AASHTO
○			

Project No. **Client:**

Project:

○ **Source of Sample:** LTP-1-2 **Sample Number:** L1931444-02

Date: ○

Alpha Analytical

Mansfield, MA

Remarks:

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/4/2019

Location: LTP-1-2

Sample Number: L1931444-02

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 83.74
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
83.74	0.00	3	0.00	0.00	100.0
		0.75	0.00	0.00	100.0
		#4	8.79	0.00	89.5
		#10	3.98	0.00	84.8
		#20	9.23	0.00	73.7
		#40	10.02	0.00	61.8
		#60	8.08	0.00	52.1
		#140	11.62	0.00	38.2
		#200	3.44	0.00	34.1

Serial_No:08051916:30

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 34.1
Weight of hydrometer sample =85.13
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	19.5	1.0130	1.0129	0.0137	13.0	12.9	0.0348	8.3
5.00	19.5	1.0100	1.0099	0.0137	10.0	13.6	0.0227	6.4
15.00	19.5	1.0080	1.0079	0.0137	8.0	14.2	0.0133	5.1
30.00	19.5	1.0070	1.0069	0.0137	7.0	14.4	0.0095	4.4
60.00	19.5	1.0060	1.0059	0.0137	6.0	14.7	0.0068	3.8
240.00	19.5	1.0045	1.0044	0.0137	4.5	15.1	0.0034	2.8
1440.00	19.5	1.0040	1.0039	0.0137	4.0	15.2	0.0014	2.5

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	10.5	10.5	4.7	23.0	27.7	55.4	30.8	3.3	34.1

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0129	0.0375	0.0439	0.0500	0.0648	0.1242	0.2237	0.3850	1.2954	2.0630	5.1401	9.5565

Fineness Modulus	C_u	C_c
1.85	10.26	0.29

Alpha Analytical

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624/624.1: m/p-xylene, o-xylene
EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility
SM 2540D: TSS
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N**, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.**
EPA 624.1: Volatile Halocarbons & Aromatics,
EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603.**

Mansfield Facility:

Drinking Water
EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.
EPA 522.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

CHAIN OF CUSTODY

PAGE _____ OF _____

Date Rec'd in Lab: 7/17/19

ALPHA Job #: L1934444

ALPHA ANALYTICAL
8 Walkup Drive
Westboro, MA 01581
Tel: 508-898-9220

320 Forbes Blvd
Mansfield, MA 02048
Tel: 508-822-9300

Client Information

Client: Lombardo Associates
Address: 188 Church St.
Newton, MA 02458
Phone: (617) 964-2924
Email: johnc@lombardoassociates.com

Additional Project Information:
Sieve Analysis (Hydrometer)
Test for Fines

Project Information

Project Name: Pound Ridge
Project Location: Pound Ridge, NY
Project #: 6682
Project Manager: Dave Sanford
ALPHA Quote #:

Turn-Around Time

☐ Standard ☐ RUSH (only confirmed if pre-approved)
Date Due:

Report Information - Data Deliverables

☐ ADEx ☐ EMAIL

Billing Information

☐ Same as Client info PO #:

Regulatory Requirements & Project Information Requirements

☐ Yes ☐ No MA MCP Analytical Methods ☐ Yes ☐ No CT RCP Analytical Methods
☐ Yes ☐ No Matrix Spike Required on this SDG? (Required for MCP Inorganics)
☐ Yes ☐ No GW1 Standards (Info Required for Metals & EPH with Targets)
☐ Yes ☐ No NPDES RGP
☐ Other State /Fed Program _____ Criteria _____

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	ANALYSIS: Sieve (See Note)	SAMPLE INFO: Filtration ☐ Field ☐ Lab to do; Preservation ☐ Lab to do	Sample Comments	TOTAL # BOTTLES
93444-01	BR-E	7/11	12 P.M			X			
-02	LTP-1-2	7/11	12 P.M.			X			

VOC: ☐ 8260 ☐ 624 ☐ 524.2
SVOC: ☐ ABN ☐ PAH
METALS: ☐ MCP 13 ☐ MCP 14 ☐ RCP 15
METALS: ☐ RCRA5 ☐ RCRA8 ☐ PP13
EPH: ☐ Ranges & Targets ☐ Ranges Only
VPH: ☐ Ranges & Targets ☐ Ranges Only
☐ PCB ☐ PEST
TPH: ☐ Quant Only ☐ Fingerprint

Container Type
P= Plastic
A= Amber glass
V= Vial
G= Glass
B= Bacteria cup
C= Cube
O= Other
E= Encore
D= BOD Bottle

Preservative
A= None
B= HCl
C= HNO_3
D= H_2SO_4
E= NaOH
F= MeOH
G= $NaHSO_4$
H = $Na_2S_2O_3$
I= Ascorbic Acid
J = NH_4Cl
K= Zn Acetate
O= Other

Container Type	
Preservative	

Relinquished By:	Date/Time	Received By:	Date/Time
	7/17/19 14:10		7/17/19 1410
	7/17/19 1553		7/17/19 1553
	7/17/19 16:25		7/17/19 16:25

All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

FORM NO: 01-01 (rev. 12-Mar-2012)