ADDENDUM

TO ALL BIDDERS OF THE

AUXILIARY WATER STORAGE TANK INSTALLATION AT RIDGE ROAD GROUND STORAGE TANK

FOR THE BOROUGH OF ROSELAND, ESSEX COUNTY, NEW JERSEY

ADDENDUM NO. 1

You are hereby notified in accordance with the Information to Bidders paragraph entitled "1.04 Addenda, Bid Specification Challenges, and Interpretations" of the above-captioned project that the following has been issued to clarify the meaning of the specifications and the conditions and specifications set forth are to be considered as binding as if the same was set forth in the original Contract Documents.

ATTACH THIS ADDENDUM TO THE SPECIFICATIONS WHEN SUBMITTING BID.

1. Please note the geotechnical investigation report is attached as part of this Addendum No. 1 and has been added to the bid documents as Appendix B.

THIS ADDENDUM MUST BE RETURNED WITH ALL BIDS

I acknowledge receipt of this Addendum:

____
Signature

____
Company

APPENDIX B

GEOTECHNICAL INVESTIGATION REPORT

Roseland Auxiliary Water Tank

Ridge Road, Roseland Borough, Essex County, New Jersey

Geotechnical Investigation Report

July 29, 2022

Prepared for:
Borough of Roseland
140 Eagle Rock Ave
Roseland, NJ 07068

Prepared by:
Remington & Vernick Engineers
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RVE Project Number: 0718T023

Submitted by:
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Signature

July 29, 2022
Date

RVE
1901
REMINGTON
& VERNICK
ENGINEERS

GEOTECNICAL INVESTIGATION REPORT

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Appendices:

INTRODUCTION

Remington & Vernick Engineers (RVE) has prepared this report which presents the findings, conclusions, and recommendations of a geotechnical investigation conducted for the construction of a new auxiliary water storage tank in the Borough of Roseland, New Jersey.

The purpose of the geotechnical investigation was to determine the subsurface conditions at the sites and to provide recommendations, from a geotechnical engineering viewpoint, for the most suitable type of foundations for the structures, site preparation, earthwork operations, and other geotechnical considerations.

SITE & PROJECT DESCRIPTION

The site of the proposed auxiliary water storage tank is located approximately 20 feet north of the existing 1 MG water reservoir tank located within the Ridge Road DPW site in Roseland, NJ. The proposed auxiliary tank is expected to be an approximately 25 foot diameter, 33 foot tall tank, capable of holding up to 122,000 gallons. The tank is expected to be founded on a shallow ring foundation. Additionally, the construction also involved the installation of additional piping and an adjacent concrete valve vault. The valve vault expected to be founded approximately 8 feet below existing grade. Presently, the site of the proposed tank is relatively flat, with a slight slope going down from west to east. Further north of the proposed water tank, there is a slightly steeper slope which extends down to the adjacent neighborhood. This steeper slope is not expected to be affected by the auxiliary tank construction. The general location of the project site is shown on the Site Location Map in Appendix A of this report.

SUBSURFACE INVESTIGATION

A Standard Penetration Test (SPT) boring investigation for this project was performed on June 3, 2022. The investigation consisted of one (1) SPT test boring drilled by Sano Drilling Inc., utilizing drilled in casing (hollow stem augers & NX core barrel) at a location selected by RVE. The boring designated as B-1 was drilled within the footprint of the proposed water tank to a depth of 23.5 feet below existing grade. Additionally, two rock probe were performed to confirm the depth to refusal encountered in boring B-1. All drilling operations were supervised by RVE and soil sampling in the field as well as logging of the soil samples was performed by a representative of RVE.

Soil samples were recovered via a two-inch O.D. split-spoon sampler; driven by a hydraulically activated 140-pound hammer, free falling 30 inches (ASTM D 1586). The number of hammer blows required to advance the 24-inch spoon in 6-inch increments (four increments in all) were recorded. The number of blows required to penetrate the middle two increments (6 to 18 inches) is known as the Standard Penetration Resistance (N). Soil samples were obtained continuously in the upper 10 ft and at 5 ft intervals thereafter. Recovered soil samples were visually classified in the field using the "Burmister Soil Identification System" and the *Unified Soil Classification System* and the results of the visual analyses were utilized to prepare the attached Soil Boring Logs located in Appendix C of this report.

The approximate location of the test borings, along with other pertinent site information, is shown on the *Boring Location Plan*, in Appendix B. The soil test boring logs are presented in Appendix C, along with a Glossary of Terms and Definitions.

SUBSURFACE CONDITIONS

Published Geologic Data

Published geology indicates the soils at the site are non-residual glacial deposits. These deposits consist of unassorted heterogeneous material including a range of clay, silt and sand sizes with varying amounts of gravel, cobbles and boulders. The depth to bedrock in the region is generally 10 to 20 feet.

The geologic information was obtained from the "Engineering Soil Survey of New Jersey," Rutgers University, Report Number 2, Essex County, Engineering Research Bulletin Number 16, 1951.

Soils Encountered

The site soils are in general agreement with the published geologic data. Naturally occurring glacial deposits were encountered beneath a 4-foot thick layer of granular fill and extended to the termination depth of the boring. A detailed description of the soils encountered is shown on the boring logs. A brief general description is given in the following sections.

> **Fill Stratum (F):** Underlaying a 3-inch layer of topsoil and a 2-inch layer of crushed stone, granular fill soils consisting of brown and reddish brown medium to fine sand with little silt and little to no clay was encountered, extending to a depth of 4 feet below existing grade. The relative density of this stratum varies from loose to compact, with normalized SPT $N1_{60}$-values ranging from 8 to over 27 blows per foot (bpf). In general, this stratum is considered to be compact.
>
> It should be noted, in the absence of foreign materials within the soil matrix, it may be difficult to differentiate between natural soils and fill or regraded soils, even when classified by experienced engineers. Accordingly, the depth of fill could vary from that indicated on the boring logs.

Glacial Stratum (G): Underlaying the fill stratum in boring B-1, natural granular glacial deposits were encountered, and extended to the termination depth of 23.5 feet below existing grade. At a depth of 8 feet below existing grade, auger and sampling spoon refusal were encountered. At this point, the boring was advanced utilizing a 5-foot NX-size double tube core barrel. The boring was advanced through boulders and cobbles to a depth of 19 feet below existing grade, at which point another split spoon sample was taken. Auger and sampling spoon refusal was again encountered at a depth of 23.5 feet below existing grade, and it was determined that additional rock coring posed a risk to the drilling equipment, so the hole was terminated at this depth. The two rock probes were also terminated at auger refusal at a depth of 23.5 feet below existing grade. The soils encountered above and below the boulders and cobbles can be described as reddish brown medium to fine sand with little silt, little medium to fine gravel and little to trace clay. The relative density of the stratum ranges from dense to very dense, with normalized SPT $N1_{60}$-values ranging from 33 to over 50 bpf.

Groundwater

Groundwater was not encountered in the boring before the introduction of water for rock coring. It should be noted that this groundwater information represents the conditions encountered at the time of the drilling operations. Groundwater levels generally can fluctuate due to changes in precipitation, infiltration, surface run-off, and other hydrogeological factors. Therefore, the groundwater level present at the time of construction may vary from that detected at the time of the drilling operations.

It should also be noted that shallow perched groundwater may be encountered during construction, especially if the work commences after a wet weather period. Dewatering of perched water or surface runoff water encountered during construction can be performed using sump pumps.

DISCUSSION & RECOMMENDATIONS

Based on the results of our field investigation, and observations, we have carried out evaluations of the existing subsurface soil conditions to determine their engineering properties for the support of the proposed new water tank and valve vault, from a geotechnical engineering point of view. The subsurface investigation indicated that the proposed site is underlain by granular glacial deposits capable of supporting the proposed construction with a shallow foundation system.

Site Preparation Procedures & Earthwork Operations

The proposed construction area is defined as the area within the proposed footprint of the structures, and a 5-ft wide zone outside this limit.

1. Clear and strip from the construction area, any existing vegetation, topsoil, forest mat or any other deleterious material.

2. Excavate the site, where necessary, to proposed subgrade elevations. Over-excavate any unsuitable material or soils encountered below this elevation. Unsuitable material includes all deleterious material, bricks, debris, rubble, or any other undesirable material designated by the on-site representative of the Geotechnical Engineer. Undesirable natural soils include all soft and loose soils encountered under the bottom of the foundation elevation. Replace the over-excavated material with controlled structural fill as defined herein.

3. After excavation to proposed subgrade and prior to the placement of any fill, the resulting subgrade should be rigorously proof rolled and compacted with a 10-ton heavy-duty vibratory roller. This should be done during a dry and favorable weather period, and under the technical supervision of a representative of the Geotechnical Engineer. A minimum of 8 overlapping passes is recommended to densify the upper 2 to 4 ft of on-site soils. The vibratory mode should be turned off within 20 ft of existing structures. No heavy equipment should be operated within 5 ft of existing structures.

4. Undercut any zones of instability disclosed by the proof rolling, as determined by the on-site representative of the Geotechnical Engineer, and replace the undercut material with controlled structural fill as defined herein. As required, raise the ground surface to proposed subgrade elevation with controlled structural fill. All material used as controlled structural fill material in the building area should comply with the requirements given herein and approved by the on-site representative of the Geotechnical Engineer.

5. All load-bearing fill should be controlled structural fill placed in loose horizontal lifts with a maximum thickness of 8 inches. Controlled structural fill should consist of inorganic, readily compactable, predominantly well-graded granular soils with no more than 12% fines (material passing the No. 200 sieve), and a maximum particle size of 3 inches. The moisture content of the fill materials should be controlled to within 2% of the optimum moisture content, as determined by ASTM D 1557, by wetting, aeration or blending, as necessary. It is recommended that controlled fill within the construction area be compacted to at least 98% and 95% of the maximum dry density, as determined by the Modified Proctor Test (ASTM D 1557), below and above the footing subgrade elevations, respectively. In addition, it is recommended that all fills be stable without significant movement under construction traffic, as judged by the on-site representative of the Geotechnical Engineer. Quality control testing of in-place fill densities should be conducted throughout the entire earthwork operation.

6. Permanent slopes should not be steeper than 2H:1V and provision should be made to protect the surface against erosion by covering the surface with riprap or a suitable vegetative cover.

Excavation

On the basis of the information provided to us concerning the project, we expect relatively shallow excavations for foundation construction. Deeper excavations may also be required for the placement of underground utilities.

Open excavations are feasible provided there is enough room so that the stability of any existing structures, including the adjacent roadways, is not affected. Existing structures may be considered not affected by the open cut excavation if a line projected downward from the bottom edge of the existing footings or foundations at a slope of 1.5H:1V does not intersect the excavation slope. Temporary side slopes of open cut excavations should not be steeper than 2H:1V.

If any existing structures will be affected by an open cut excavation, then temporary sheeting and shoring should be used to support the sides of the excavation. If temporary shoring is utilized, the soil parameters presented in the table below may be used for the design of the shoring. All excavations should be in compliance with "Excavating and Trenching Operations" manual (latest revision), issued by the US Department of Labor, OSHA 2226 and local requirements.

Temporary Shoring Design Parameters

Unit Weight of Soil (pcf)	120
Angle of Internal Friction (ϕ)	30°
Coefficient of Active Earth Pressure (K_a)	0.33
Coefficient of Earth Pressure At-rest (K_o)	0.50
Coefficient of Passive Earth Pressure (K_p)	3.0*

* A suitable factor of safety should be applied to K_p.

The lateral load information presented in this report should be used only as a guideline by the contractor. It should be a requirement for the excavation contractor to prepare a proposed sheeting or shoring design certified by a licensed professional engineer prior to construction. The excavation contractor should be responsible for the design, installation, and maintenance of all sheeting and shoring.

Regardless of the excavation option chosen, excavated soils should not be stockpiled adjacent to the sides of excavations to avoid the imposition of additional loads, unless these loads are considered in the design of the temporary shoring or side slopes.

Additionally, the effect of excavation machinery should be included in the stability of the open cut slopes, as well as the temporary shoring design.

Backfill

Clean granular portions of the existing on-site soils can be reused as backfill. Soils with organic or other deleterious materials should be discarded. The moisture content of the backfill soil must be within ±2% of the optimum value for proper compaction. Therefore, some adjustment of the moisture content may be necessary prior to use as fill material. If imported fill materials are required to complete backfilling of the excavations, they should consist of uncontaminated, relatively well-graded granular soils containing no more than 12% by weight passing the No. 200 sieve and having a maximum particle size of 3 inches, as previously discussed in this report.

Compaction of the backfill within 5 foot of any existing structures should be carried out with relatively light equipment such as a jumping jack, a walk behind roller, or similar device as approved by the on-site representative of the Geotechnical Engineer. The backfill should be placed in 8-inch lifts and compacted to at least 95% and 90% of maximum dry density, as determined by the ASTM D-1557 test procedure, in structural and paved or landscaped areas, respectively.

Dewatering

Groundwater was not encountered during the drilling operations. Dewatering due to groundwater is not expected, however shallow perched groundwater or surface run-off water into excavations should be dewatered by pumping from screened sumps.

Foundations

After site preparation operations have been satisfactorily completed, as recommended herein, the densified on-site natural soils may be utilized to support the proposed structures using a shallow foundation system such as mat or ring wall type footing. For design purposes, a maximum net allowable bearing pressure of 4,500 pounds per square foot (psf) can be used for structures founded at a minimum depth of 6 feet below existing grade. With the use of the recommended allowable bearing capacity, a satisfactory factor of safety will be provided against a shear failure and total and differential settlement will be within tolerable limits.

Footings should be founded at a minimum depth of 3 ft beneath the exterior finished grades for frost protection. The mat foundation should have perimeter frost walls or turned down edges for frost protection.

The footing subgrades should be thoroughly compacted prior to the placement of the concrete utilizing a mechanical compactor such as a jumping jack, walk-behind roller, or similar device. The contractor should exercise extreme caution not to disturb the subgrade soils. Should the subgrade be disturbed, the loosened soil should be compacted in-place or excavated to firm soil. If the excavation is to be left open for a prolonged period, a work mat should be used to protect the foundation subgrade. A work mat may consist of 6 inches of compacted dense grade aggregate or 2 inches of lean concrete.

Prior to the placement of concrete, the foundation subgrade must be inspected by a qualified representative of the Geotechnical Engineer in order to confirm the soil bearing capacity. The contractor should exercise extreme caution not to disturb the subgrade soils. Should the subgrade be disturbed, the loosened soil should be compacted in-place or excavated down to firm soil. Any water, which accumulates in the excavation bottom, should be removed promptly.

Seismic Zone

According to the New Jersey Edition of the 2018 International Building Code, Section 1613.2.2 referencing ASCE 7, Chapter 20 the project site is categorized as a Site Class "D" for seismic design purposes. This classification is based on subsoil conditions encountered in the borings.

LIMITATIONS

The conclusions and recommendations contained in this report are based upon the subsurface data obtained during this investigation and on details stated in this report. It is understood that the number of borings made are consistent with good engineering practice but actual conditions encountered may differ significantly from those projected in this report. Should conditions arise which differ from those described in this report, **RVE** should be notified immediately and provided with all information regarding differing subsurface conditions.

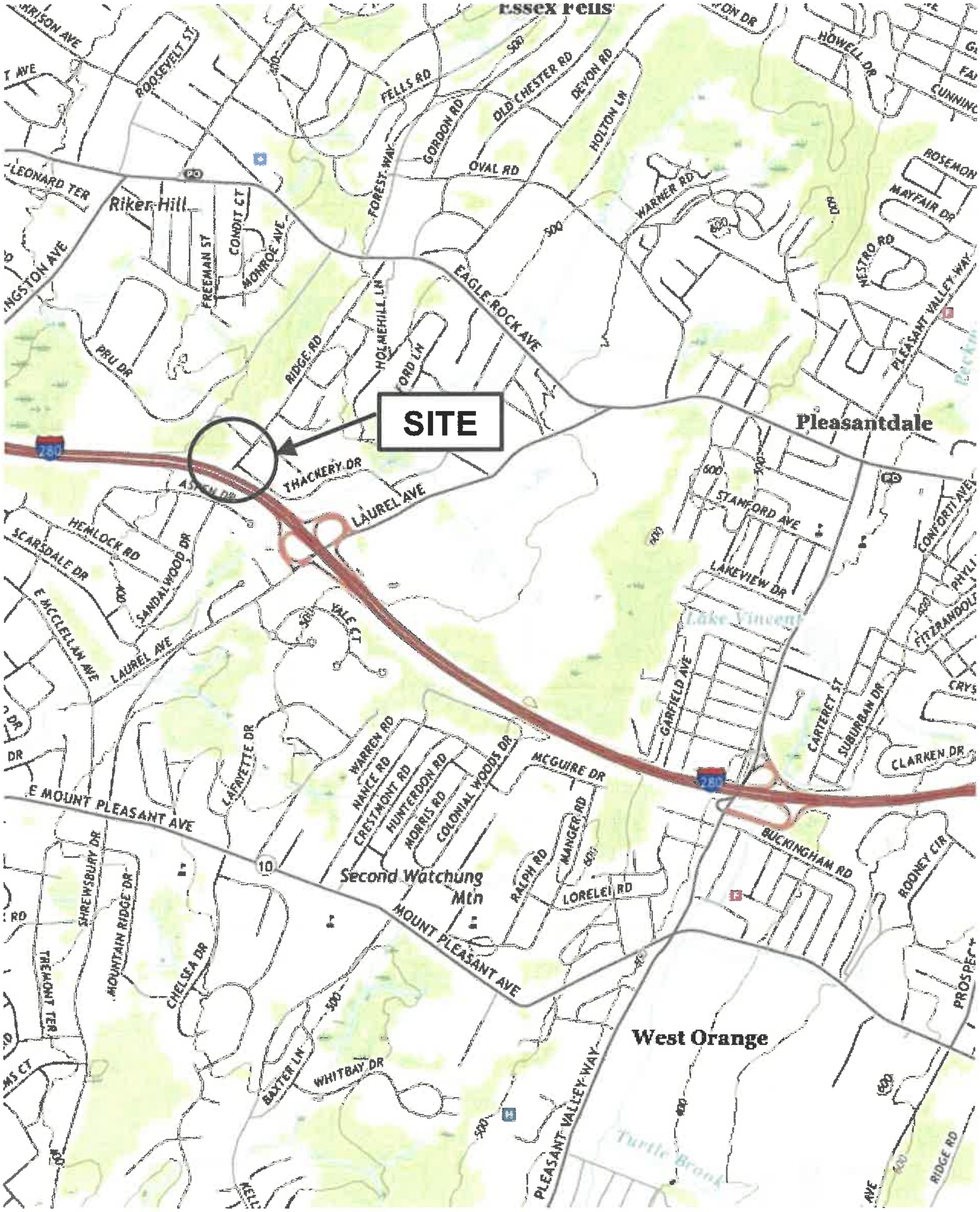
Our recommendations are based upon the assumption that the services of a qualified geotechnical engineer will be retained during construction for the observation of all critical earthwork operations and foundation installation. **RVE** cannot minimize, or provide recommended solutions for, any problems resulting from construction or differing soil conditions unless our services include full-time construction inspection to determine that the work performed is in compliance with **RVE's** recommendations, and to ensure the work is carried out in the owner's best interests.

Environmental considerations and contaminants, such as petroleum products, hazardous waste, radioactivity, irritants, pollutants, radon or other dangerous substances and conditions were not the subject of this study. Their presence and/or absence are not implied, inferred or suggested by this report or results of this study.

This report is intended for use with regard to the specific project discussed herein, and any changes in the design of the structure or location, however slight, should be brought to our attention so that we may determine how they may affect our conclusions. We are responsible for the conclusions and opinions contained in this report based on the data relating only to the specific project and location discussed herein.

Appendix A

Site Location Map/USGS Quadrangle



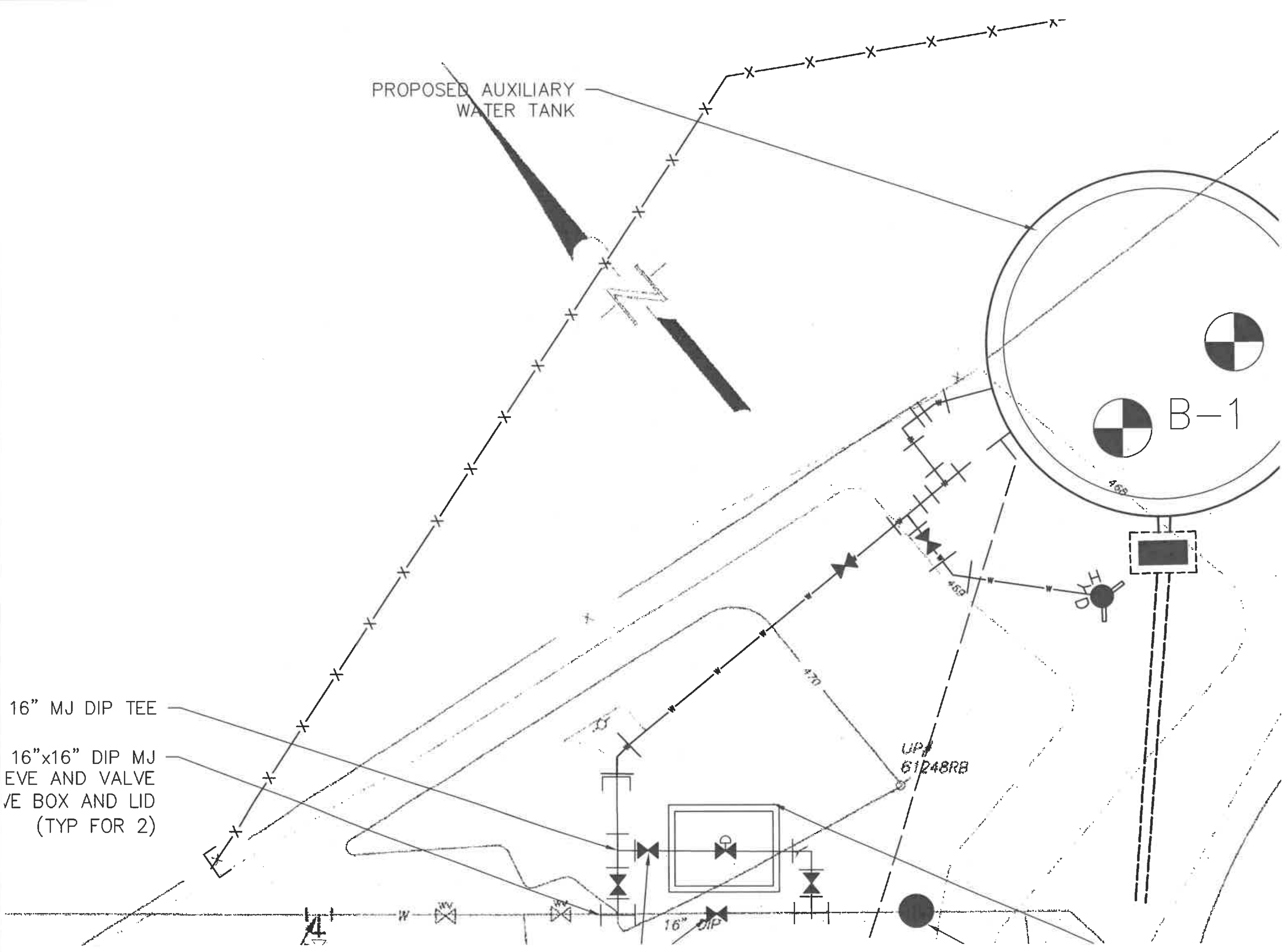
Site Location Map/USGS Quadrangle

Roseland Auxiliary Water Tank

Roseland Borough, Essex County, New Jersey

Appendix B

Soil Boring Location Plan


PROPOSED AUXILIARY WATER TANK
B—1
468
469
470
HYD
W
UP#
61248RB
16" MJ DIP TEE
16"x16" DIP MJ
EVE AND VALVE
/E BOX AND LID
(TYP FOR 2)
16" DIP
WV
4

Appendix C

Soil Boring Logs

REMINGTON & VERNICK ENGINEERS

SOIL BORING LOG

Project No. 0718-T-023 **Project** Roseland Auxiliary Water Tank **Boring No.** B-1

Date Started: 6/3/22 **Location** Ridge Road, Roseland Borough, New Jersey **Sheet** 1 **of** 1

Date Finished: 6/3/22 **Client** Borough of Roseland **Surface Elev.** Ex. Grade

Drilling Contractor: Sano Drilling Inc. **Groundwater Data**

Drilling Method: Hollow Stem Augers **Depth** None

Hammer Type: Automatic **Driller:** Ash Fisher **Date** 6/2/22

Equipment: Mobile B-57x Track Rig **Inspector:** Chris Gilbert **Time** E.O.B.

Depth (ft.)	Sample		Blow Count (Blows per 6 inches)	Recovery	Lithology	Classification of Materials (Based upon samples recovered and observation of materials returned between samples)	Stratum	Moisture Content, %	Other Tests
	Type	Number							
0	◤	S-1	13-17-3-2	12"		3" Topsoil over 2" Crushed Stone over brown m-f SAND, little Silt (Possible Fill)			
	◤	S-2	2-2-4-5	10"		Reddish brown m-f SAND, little Silt, little Clay (Possible Fill)			
5	◤	S-3	12-12-15-13	16"		Reddish brown m-f SAND, little Silt, little m-f Gravel, trace Clay			
	◤	S-4	16-21-50/3"	10"					
10 15			CORE			Hole advanced 11 feet with core barrel, BOULDERS & COBBLES encountered form 8 to 11 feet.			
20	◤	S-5	20-11-13-8	16"		Reddish brown f SAND, little Silt, little Clay, little m-f Gravel			
25 30 35						Auger and Spoon Sampling Refusal at 23.5 Feet			

MODIFIED METHOD
FOR
IDENTIFICATION OF SOILS
AFTER
DR. D. M. BURMISTER

Soil Component	**Descriptive Terms As Written on Log**	**Range of Proportions**
PRINCIPAL COMPONENT (All Letters Capitalized)	-	35% or more
MINOR COMPONENTS (First Letter Capitalized)	and (a.)	35% to 50%
	some (s.)	20% to 35%
	little (l.)	10% to 20%
	trace (tr.)	1% to 10%

Coarse Grained Soils-Gradation of Components

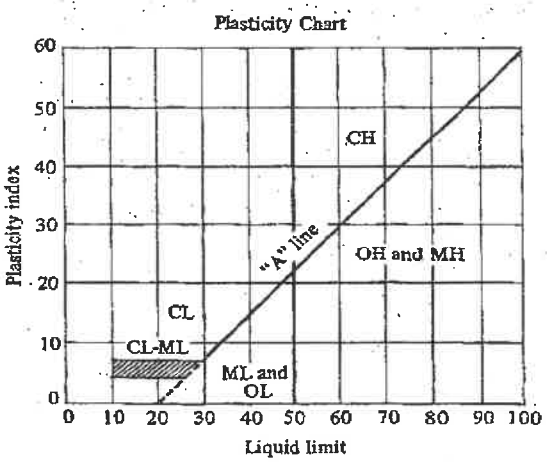
Coarse to fine	cf	All sizes
Coarse to medium	cm	Less than 10% fine
Medium to fine	mf	Less than 10% coarse
Coarse	c	Less than 10% medium & fine
Medium	m	Less than 10% coarse & fine
Fine	f	Less than 10% coarse & medium

Component	**Symbol**	**Sieve Range**
Boulders		9" and larger
Cobbles		3" to 9"
Gravel	G	
Coarse		¾" to 3"
Fine		#4 to ¾"
Sand	S	
Coarse		#4 to #10
Medium		#10 to #40
Fine		#40 to #200

Fine Grained Soils-Plasticity of Components

Component	**Symbol**	**Overall Plasticity**	**Plasticity Index**
SILT	S	Non-Plastic	0
CLAYEY SILT	CyS	Slight	1 to 5
SILT & CLAY	S & C	Low	5 to 10
CLAY & SILT	C & S	Medium	10 to 20
SILTY CLAY	SyC	High	20 to 40
CLAY	C	Very High	over 40

UNIFIED SOIL CLASSIFICATION SYSTEM. (ASTM D-2487)

Major Divisions			*Group Symbols*		*Typical Names*	*Laboratory Classification Criteria*		
Coarse-grained soils (More than half of material is larger than No. 200 sieve size)	Gravels (More than half of coarse fraction is larger than No. 4 sieve size)	Clean gravels (Little or no fines)	GW		Well-graded gravels, gravel-sand mixtures, little or no fines	Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows: Less than 5 per cent GW, GP, SW, SP More than 12 per cent GM, GC, SM, SC 5 to 12 per cent *Borderline* cases requiring dual symbols[b]	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3	
			GP		Poorly graded gravels, gravel-sand mix-tures, little or no fines		Not meeting all gradation requirements for GW	
		Gravels with fines (Appreciable amount of fines)	GM[a]	d	Silty gravels, gravel-sand-silt mixtures		Atterberg limits below "A" line or P.I. Less than 4	Above "A" line with P.I. between 4 and 7 are *borderline* cases requiring use of dual symbols
				u				
			GC		Clayey gravels, gravel-sand-clay mix-tures		Atterberg limits below "A" line with P.I. Greater than 7	
	Sands (More than half of coarse fraction is smaller than No. 4 sieve size)	Clean sands (Little or no fines)	SW		Well-graded sands, gravelly sands, little or no fines		$C_u = \frac{D_{60}}{D_{10}}$ greater than 6; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3	
			SP		Poorly graded sands, gravelly sands, little or no fines		Not meeting all gradation requirements for SW	
		Sands with fines (Appreciable amount of fines)	SM[a]	d	Silty sands, sand-silt mixtures		Atterberg limits above "A" line or P.I. Less than 4	Limits plotting in hatched zone with P.I. Between 4 and 7 are *borderline* cases requiring use of dual symbols
				u				
			SC		Clayey sands, sand-clay mixtures		Atterberg limits above "A" line with P.I. Greater than 7	
Fine-grained soils (More than half material is smaller than No. 200 sieve)	Silts and clays (Liquid limit less than 50)		ML		Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity			
			CL		Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays			
			OL		Organic silts and organic silty clays of low plasticity			
	Silts and clays (Liquid limit greater than 50)		MH		Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts			
			CH		Inorganic clays of high plasticity, fat clays			
			OH		Organic clays of medium to high plasticity, organic silts			
	Highly organic soils		Pt		Peat and other highly organic soils			

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[a] Division of GM and SM groups into subdivisions of d and u are for roads and airfields only. Subdivision is based on Atterberg limits; suffix d used when L.L. is 28 or less and the P.I. Is 6 or less; the suffix u used when L.L. is greater than 28.

[b] Borderline classifications, used for soils possessing characteristics of two groups, are designated by combinations of group symbols. For example: GW-GC, well-graded gravel-sand mixture with clay binder.

Appendix D

Corrected N-Values

NORMALIZED N VALUES

Rosaland Auxiliary Water Tank
Roseland, NJ

Boring No.	B-1
Elevation, ft	0
Groundwater Depth, ft	30
Hammer Type	Automatic
Hammer Efficiency, E	0.8

Formulas used	N60 = N(E/.6) σ' = σt - u CN = .77log(40/σ') CN < 2 Only valid for σ' ≥ 0.5 ksf N160 = N60*CN

Sample Number	Sample Depth	N-value Recored			N_{60}	γ pcf	σt ksf	u ksf	σ' ksf	CN	N160
		Depth	Elev.	Value							
1	0-2	1	-1	20	27	120	0.12	0.00	0.12	1.94	52
2	2-4	3	-3	6	8	120	0.36	0.00	0.36	1.58	13
3	4-6	5	-5	27	36	120	0.60	0.00	0.60	1.40	51
4	6-8	7	-7	50	67	120	0.84	0.00	0.84	1.29	86
5	18-20	19	-19	24	32	120	2.28	-0.69	2.97	0.87	28