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GEOTECHNICAL ENGINEERING REPORT
PROPOSED APWAN DEVELOPMENT
SILO RIDGE COUNTRY CLUB
4651 ROUTE 22
AMENIA, NEW YORK

PREPARED FOR:
VHB Engineering, Surveying and Landscape Architecture, P.C.
50 Main Street, Suite 360
White Plains, New York 10606

PREPARED BY:
TransTech Engineering Services, P.C. for
TransTech Geotechnical Services
1594 State Street
Schenectady, New York 12304

October 14, 2013
TransTech Project No. G13-3523

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1.0 INTRODUCTION

This report presents the results of a subsurface exploration program and geotechnical engineering evaluation completed by TransTech Engineering Services, P.C., on behalf of TransTech Geotechnical Services, for the proposed Apwan Development planned at Silo Ridge Country Club in the Town of Amenia, New York. VHB Engineering, Surveying and Landscape Architecture, P.C. (VHB) retained TransTech Geotechnical Services to complete this work, which was done in general accordance with our August 21, 2013 Proposal.

Based on the information provided by VHB, we understand the project will consist of a new residential development centered around the existing Silo Ridge Country Club. The development will include a new Lodge/Clubhouse with restaurant, Spa/Fitness center and Kid's Barn arranged around a central village green. The development will also include Custom Homes, Village Green Homes, Townhomes and Cottages.

The site topography is generally comprised of rolling hills with a mixture of open golf course areas and wooded areas. The site is flanked to the north and west by taller ridges. Exposed ledge rock is exposed at various locations and there are several ponds located in the lower-lying areas of the site. The approximate location of the site is shown on the attached Figure No. 1.

2.0 SUBSURFACE EXPLORATION

The subsurface exploration program consisted of twelve (12) test borings, seventeen (17) probe borings, six (6) test pits and six (6) infiltration tests. The test borings were designated as BB-1 through BB-7, BB-8A and BB-9 through BB-12. The probe borings were designated as GB-1 through GB-17 and the test pits were designated as DT-1 through DT-6. The test borings were generally located in proposed building areas. The test boring, probe boring and test pit locations were established and marked in the field by others. The approximate boring and test pit locations are shown on the attached Figure No. 2.

Auger refusal was encountered in test borings BB-1, BB-3, BB-5, BB-8, BB-9, BB-10, BB-11 and BB-12 at depths of 11.0, 44.0, 21.0, 24.0, 19.5, 19.5, 20.0 and 11.0 feet, respectively. The remaining test borings were terminated at a depth of 25 feet.

Auger refusal was encountered in probe borings GB-3, GB-8, GB-9, GB-13, GB-15 and GB-17 at depths of 19.0, 11.0, 2.0, 11.0, 18.0 and 11.0 feet, respectively. The remaining probe borings were terminated at a depth of 20 feet, with the exception of probe boring GB-6 which was terminated at a depth of 25 feet.

The test borings and probe borings were made with a Central Mine Equipment (CME) model 75 all-terrain drill rig, using hollow stem auger techniques. Split spoon samples

and Standard Penetration Tests (SPTs) were taken in the test borings continuously from the ground surface to a depth of 10 feet and at intervals of 5 feet thereafter. The split spoon sampling and SPTs were completed in general accordance with *ASTM D 1586 - "Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils"*. No sampling was performed in the probe borings.

The test pits were excavated by others using a rubber tire backhoe. The test pits were excavated prior to our inspector's arrival and were left open for our observation. Photos of the test pit excavations are presented in Appendix B.

Infiltration testing was performed by TransTech at each test pit location. The infiltration tests were performed using 4 inch diameter steel casing, which was installed to a depth of 4 feet below grade.

The test boring and test pit logs were prepared by a geotechnical engineer based on visual observation of the recovered soil and rock samples and review of the driller's field notes. The soil samples were described based on a visual/manual estimation of the grain size distribution, along with characteristics such as color, relative density, consistency, moisture, etc. The test boring and test pit logs are presented in Appendix A, along with general information and a key of terms and symbols used to prepare the logs.

3.0 LABORATORY TESTING

Laboratory testing was performed on selected soil samples recovered from the test borings. The laboratory tests were performed to confirm the visual soil classifications. The laboratory testing included the following tests:

- Natural moisture content testing was performed on ten (10) samples in accordance with ASTM D 2216 – *"Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass."*
- Grain size analysis testing was performed on ten (10) samples in general accordance with ASTM D 422 – *"Standard Test Method for Particle-Size Analysis of Soils"*, and ASTM D 1140 – *"Standard Test Method for Amount of Material in Soils Finer Than the No. 200 Sieve."*

The laboratory test results are presented in Appendix C.

4.0 INFILTRATION TEST RESULTS

Infiltration testing was performed in 4 inch diameter steel cased holes at a depth of 4 feet in general accordance with the New York State Stormwater Design Manual, Appendix D. The holes were pre-soaked overnight prior to the infiltration testing. It was observed that the pre-soak water was still present in the steel casing after 24 hours at each infiltration

test location. Water was added to achieve a 24 inch water depth at each location and the water levels were recorded over a period of 3 hours at each location. The infiltration test results are provided in the following table.

Infiltration Test Location	Groundwater Depth (ft)	Test Depth (ft)	Final Infiltration Rate (inches/hour)
DT-1	> 11	4	0.25
DT-2	7.5	4	0
DT-3	6.5	4	0.25
DT-4	> 9.5	4	0
DT-5	> 9.7	4	0
DT-6	> 11.3	4	0

5.0 SUBSURFACE CONDITIONS

5.1 Soil Profile

The subsurface profile encountered at the test boring locations generally consisted of indigenous overburden soils, with the exception of test borings BB-5, BB-6 and BB-10 where possible fill type soils were encountered overlying indigenous overburden soils. The possible fill type soils appeared to consist of re-worked indigenous soils. The possible fill type soils and indigenous soils consisted of varying fractions of clay, silt, sand and gravel soils with zones containing intermixed cobbles at various depths and locations.

SPT “N” values obtained within the cohesive possible fill type soils ranged from 5 to 17 indicating the consistency of these soils varies from “medium” to “very stiff”. SPT “N” values obtained within the cohesionless possible fill type soils ranged from 12 to 26 indicating a “firm” relative density. SPT “N” values obtained within the cohesive indigenous soils ranged from 1 to 46 indicating the consistency of these soils varies from “very soft” to “very stiff”. SPT “N” values obtained in the cohesionless indigenous overburden soils ranged from 3 to greater than 50 indicating the relative density of these soils varies from “very loose” to “very compact”.

5.2 Bedrock Conditions

Auger refusal (apparent top of bedrock) was encountered in the test borings and probe borings at depths ranging from 2.0 to 44.0 feet. In addition, highly decomposed and highly weathered bedrock was encountered in the test borings at depths ranging from 4 to 23 feet. At many locations, the test borings were advanced many feet into the top of the highly decomposed and weathered bedrock before reaching auger refusal, indicating the top of more sound rock had been encountered.

The following table presents the auger refusal depths (apparent top of more sound bedrock) for each test boring and probe boring.

Test Boring No.	Approximate Depth of Auger Refusal (Apparent Top of Bedrock) (feet)
BB-1	11.0
BB-2	NA
BB-3	NA
BB-4	NA
BB-5	21.0
BB-6	NA
BB-7	NA
BB-8	24.0
BB-9	19.5
BB-10	19.5
BB-11	20.0
BB-12	11.0
GB-1	NA
GB-2	NA
GB-3	19.0
GB-4	NA
GB-5	NA
GB-6	NA
GB-7	NA
GB-8	11.0
GB-9	2.0
GB-10	NA
GB-11	NA
GB-12	NA
GB-13	11.0
GB-14	NA
GB-15	18.0
GB-16	NA
GB-17	11.0

5.3 Groundwater Conditions

Groundwater was encountered in test borings BB-1, BB-2, BB-3, BB-4, BB-5 and BB-8 at depths ranging from 6.6 to 19.0 feet. Groundwater was also present in test pits DT-2 and DT-3 at depths of 7.5 and 6.5 feet, respectively. The following table presents the depths at which groundwater conditions were encountered in the test borings and test pits.

Test Boring No.	Depth to Free Standing Water (feet)
BB-1	10.3
BB-2	19.0
BB-3	6.6
BB-4	17.2*
BB-5	14.7*
BB-6	NA
BB-7	NA
BB-8	12.8
BB-9	NA
BB-10	NA
BB-11	NA
BB-12	NA
DT-1	NA
DT-2	7.5*
DT-3	6.5*
DT-4	NA
DT-5	NA
DT-6	NA

*Indicates groundwater level measured 24 hours after drilling/excavation.
NA indicates free standing water was not present.

It should be expected that groundwater conditions could vary with changes in soil conditions, precipitation and seasonal conditions.

6.0 GEOTECHNICAL RECOMMENDATIONS

6.1 General

The primary geotechnical considerations impacting development of the site are the presence of existing fill type soils and bedrock. We recommend that existing fill type soils, which are associated with previous grading activities at the site, be removed where present beneath proposed building areas. Undercut excavations on the order of approximately 4 to 8 feet will be required to remove possible fill type soils at test boring locations BB-5, BB-6 and BB-10. Very soft soil conditions were encountered at the transition from possible fill type soils to indigenous soils in test boring BB-6 from a depth of 8 to 10 feet. These very soft soils are susceptible to potentially excessive settlement under building foundation loads and should be undercut and replaced with imported Structural Fill within proposed building areas. Recommendations for Structural Fill material along with placement and compaction recommendations are presented in Appendix D.

It is also anticipated that bedrock could be encountered in relatively shallow foundation or utility excavations in some areas. Based on the conditions encountered in the test borings, it is anticipated that the upper more weathered and fractured bedrock zone can be excavated using a large track-mounted excavator equipped with rock teeth or a large bulldozer equipped with a single-tooth ripper. However, it is possible that zones of more competent bedrock (i.e. auger refusal depths encountered in the borings) could be encountered that may require controlled blasting to loosen the rock for excavation. Blasting should be performed by a licensed contractor and should be controlled to limit the maximum peak particle velocity (PPV) to less than two (2) inches per second (ips) at the property limits and one (1) ips at the nearest adjacent occupied structure. In addition, the peak airblast overpressure limit should be controlled to less than 0.014 pounds per square inch (psi) at the nearest adjacent occupied structure.

We point out that the controlled blasting guidelines described above are intended to prevent damage to existing structures and greatly exceed the threshold at which humans will notice vibration (approximately 0.02 ips). Accordingly, we recommend that blast vibrations be monitored and recorded at the property limits during each blast event to confirm that the limits recommended above are not exceeded. In addition, we recommend that pre-condition surveys be performed on all adjacent structures to document the condition of existing structures prior to the start of blasting operations.

No blasting should be performed within proposed building areas due to the potential for over-breakage, which could impact the integrity of building foundations.

6.2 Site Preparation

Existing topsoil, vegetation, and any other deleterious materials within the proposed building and pavement areas should be removed. Any existing fill type soils should also be removed within proposed building areas and extending 10 feet beyond the building footprint. Following removal of surface materials and excavation to design subgrade elevations, the exposed subgrades should be evaluated by a geotechnical engineer. Exposed soil subgrades should be thoroughly proof-rolled using a loaded tandem axle dump truck prior to any required fill placement. The proofrolling should be observed by a geotechnical engineer. Any areas that appear wet, loose, soft, unstable or otherwise unsuitable should be undercut based on guidance provided by the geotechnical engineer.

Undercut excavations (if required) beneath proposed foundation, floor slab and pavement areas should be backfilled with controlled imported Structural Fill. Recommendations for Structural Fill material, along with placement and compaction requirements, are presented in Appendix D. Placement of all fill and/or backfill beneath proposed building and pavement areas should be observed and tested by qualified geotechnical personnel.

It is anticipated that the on-site sand and gravel soils can be re-used as Structural Fill to raise existing site grades. The on-site clay and silt soils will lose strength and become unstable if

they become wet during construction and are not well suited for re-use as Structural Fill beneath building areas. It should be anticipated that cut and fill grading activities will require separating the sand and gravel soil layers from the silt and clay soil layers for re-use as Structural Fill beneath building areas.

6.3 Spread Foundations

It is our opinion that spread foundations can be used to support the proposed buildings. Spread foundations should bear on firm, undisturbed indigenous soil bearing grades. Existing fill type soils should be removed where present beneath proposed foundation bearing grades. The exposed soil bearing grades for foundations should be compacted to densify any soils loosened by the excavation process.

The exposed bearing grades should be observed and evaluated by a geotechnical engineer. Any soft or otherwise unsuitable soils should be undercut and replaced with compacted imported Structural Fill based on guidance provided by the geotechnical engineer. All final bearing grades should be firm, stable and free of loose soil, mud, water, frost or other deleterious materials.

Continuous wall foundations should be at least 1.5 feet in width and column/individual foundations should be at least 2.5 feet in width. Exterior foundations of heated spaces and all foundations of unheated spaces should be embedded a minimum of 4.0 feet below finished exterior grades for frost protection. Interior foundations in heated spaces should be embedded a minimum of 1.5 feet below finished floor slab elevation to develop adequate bearing capacity.

Spread foundations, which are designed and constructed in accordance with our recommendations, can be sized using a maximum allowable soil bearing pressure of 3,000 pounds per square foot (psf). The allowable soil bearing pressure is based on a factor of safety of at least 3.0.

It is estimated that spread foundations, sized and properly constructed in accordance with our recommendations, will undergo total settlement of less than 1 inch, and differential settlements should be less than ½ inch.

6.4 Slabs-on-Grade

At-grade floor slabs can be constructed as slab-on-grade following proper site preparation as outlined in Section 6.2 above. A minimum of 6 inches of Subbase Stone, as described in Appendix D, is recommended directly beneath lightly loaded interior slabs-on-grade in heated spaces. The floor slabs can be designed in accordance with procedures recommended by the Portland Cement Association or the American Concrete Institute, using a modulus of subgrade reaction of 150 pounds per cubic inch at the top of the Subbase Stone layer.

Frost heaving of non-vehicle loaded exterior slabs and sidewalks can be minimized by constructing sensitive slab areas (i.e. doorways and sidewalk/pavement transitions) over 18 inches of Drainage Stone, as described in Appendix D. The Drainage Stone layer should have an underdrain within it to provide positive drainage to a suitable downslope outlet. Although this may not eliminate all movement associated with frost heave, it should provide adequate protection against excessive differential frost heave during most winters.

We recommend a vapor barrier be provided beneath interior floor slabs, which are designated to receive a moisture sensitive floor covering, in accordance with the American Concrete Institute (ACI) Guide for Concrete Floor and Slab Construction. It is recommended that the slab-on-grade be constructed such that it floats on the subbase and subgrades and is not structurally connected to, or resting directly on, perimeter walls or column footings in order to limit differential settlement effects.

6.5 Lateral Earth Pressure Design Parameters for Basement/Retaining Walls

The design of basement walls and site retaining walls should be based on lateral earth pressures caused by the load of backfill against the walls and the surcharge effects from permanent or temporary loads. Basement walls, which are designed for restrained or non-yielding conditions, should be designed using "at rest" lateral earth pressures. Site retaining walls, which are designed to "yield" can be designed using "active" lateral earth pressures. The basement and site retaining walls should be backfilled in accordance with the recommendations presented in Section 6.6 below.

The lateral earth pressures can be computed using the following soil parameters where the wall backfill consists of imported Structural Fill, as described in Appendix D, and contains proper foundation drain(s) as discussed below. Water must not be allowed to collect against the backside of the exposed wall section unless the wall is designed for the additional hydrostatic pressure.

Recommended Soil Parameters for Basement Wall Design:

Coefficient of At-Rest Lateral Earth Pressure – 0.50
Coefficient of Active Lateral Earth Pressure – 0.33
Coefficient of Passive Lateral Earth Pressure – 3.00*
Coefficient of Sliding Friction – 0.30
Angle of Internal Friction (Structural Fill backfill) – 30 Degrees
Total Moist Unit Weight of Soil (Structural Fill backfill) – 120 pcf

* It should be noted that a horizontal displacement of approximately 0.005 x the height of the resisting soils (i.e. embedment depth of footing/wall on the resisting side) is required to achieve the full passive earth pressure coefficient of 3.00. If it is determined that the

magnitude of horizontal displacement of the footing/wall required to achieve the full passive earth pressure is too large, a reduced coefficient of passive earth pressure should be used for design.

6.6 Basement/Retaining Wall Drainage and Backfill

Basement walls and site retaining walls and should be constructed with foundation drainage systems to intercept any perched or trapped groundwater and relieve potential hydrostatic pressures from acting on the walls. The drainage system should consist of a footing drain and pervious media placed against the wall.

The footing drain should include a non-woven drainage/separation geotextile (i.e. Mirafi 160N or suitable equivalent) installed around Drainage Stone, as described in Appendix D, which surrounds a slotted under-drain pipe. The foundation Drainage Stone and surrounding geotextile should extend 1 foot above the drain pipe. The drain pipes should include clean-outs to allow periodic flushing and maintenance of the system. The drain pipes should be set at the bottom of footing elevation and should discharge to a suitable downslope outlet.

Pervious Granular Backfill or a suitable geosynthetic drainage composite should be placed against the walls, above the footing drain, to allow infiltration to the footing drain. Pervious Granular Backfill, if used against the wall, should be at least 2 feet in width. The remaining excavated area beyond the drainage composite or Pervious Granular Backfill should be backfilled with controlled Structural Fill. The Pervious Granular Fill and/or drainage composite against the wall should extend up to about 1 foot below finished exterior grade where it should be capped off with less permeable on-site soils to reduce surface infiltration. Recommendations for Pervious Granular Fill and Structural Fill material are presented in Appendix D.

6.7 Seismic Design

Based on the conditions encountered in the borings, it is our opinion the site should be classified as **Seismic Site Class "D"** according Table 1615.1.1 of the Building Code of New York State.

The mapped spectral accelerations in the project area for Site Class "B" were determined using the USGS online Seismic "Design Maps" web application, which is based on 2008 National Seismic Hazard Map data.

The spectral response accelerations for site class "B" are as follows:

- Short Period Response (S_S) - 0.182g
- 1 Second Period Response (S_1) - 0.065g

Adjusted Spectral Response Acceleration for Site Class "D":

- Short Period Response (S_{MS}) - 0.291g
- 1 Second Period Response (S_{M1}) - 0.156g

The corresponding five percent damped design spectral response accelerations (S_{DS} and S_{D1}) are as follows:

- **S_{DS} - 0.194g**
- **S_{D1} - 0.104g**

6.8 Pavement Design

Pavement design recommendations are provided for a Light Duty Asphalt Concrete Pavement and Commercial Duty Asphalt Concrete Pavement sections. The Light Duty pavement section can be used for car parking areas and the Commercial Duty pavement section should be used for main drive areas. The pavement sections recommended below are based on the assumption that the subgrades will be prepared as discussed in Section 6.2 above.

Light Duty Asphalt Concrete Pavement:

- 1.0 inches – Top Course
- 2.0 inches – Binder Course
- 10 inches – Subbase Course

Commercial Duty Asphalt Concrete Pavement:

- 1.5 inches – Top Course
- 2.5 inches – Binder Course
- 12 inches – Subbase Course
- Woven Geotextile Fabric

We point out that the pavement sections provided above are not intended for heavy construction vehicle traffic. Construction traffic should not be routed across finished pavement areas.

The installation of an underdrain or edge drain is recommended to drain the pavement subbase course and subgrades in order to limit the potential for frost action and improve pavement structure performance and design life.

Proper grading of the pavement structure subgrades is also recommended. Accumulation of water on pavement subgrades should be avoided by grading the subgrade to a slope of at least 2 percent to allow drainage to the underdrains or drainage swale.

The underdrain system must be properly designed, installed and maintained for long term performance. The underdrain system design should include a filtration geotextile (i.e. Mirafi 160N or suitable equivalent), selected considering drainage and filtration, installed around Drainage Stone surrounding a slotted or perforated drain pipe. The Drainage Stone and surrounding geotextile should extend above the drainpipe and should be hydraulically connected to the pavement subbase.

Alternatively, a "geotextile wrapped slotted pipe" system would also be acceptable, if placed in the subbase material provided the subbase layer is thickened along the underdrains. In all cases, the underdrain (i.e. pipe invert) should be set at least 6-inches below the bottom of the overall subbase layer.

Materials for the above pavement structure components should consist of the following:

A. Asphalt Concrete Top Course - NYSDOT Standard Specifications, Item No. 402.12 - Hot Mix Asphalt, Top Course.

B. Asphalt Concrete Binder Course - NYSDOT Standard Specifications, Item No. 402.25 - Hot Mix Asphalt, Binder Course.

C. Subbase Course – Should comply with NYSDOT Standard Specifications, Item No. 304.12 - Type 2 Subbase or Item No. 304.14 – Type 4 Subbase.

D. Woven Geotextile Fabric – Woven polypropylene stabilization/separation geotextile (i.e., Mirafi 500X or approved equivalent).

Adjacent geotextile panels should have a minimum overlap of 18 inches. The Subbase Stone should be placed and compacted in accordance with the recommendations presented in Appendix D. Construction of the asphaltic concrete courses (i.e., binder and top) should be performed in accordance with NYSDOT Standard Specification Section 400.

6.9 Temporary and Permanent Cut and Fill Slopes

Temporary excavations must be adequately sloped back and/or properly supported (i.e. sheeted, shored, braced, shielded etc.) in accordance with OSHA requirements as a minimum. Based on the test boring and test pit information, it would appear that the overall soil conditions encountered would be generally classified as Type C soil in accordance with OSHA criteria.

Based on the OSHA Type C soil criteria, unsupported excavations less than 20 feet would need to be sloped backed to at least a 1.5 horizontal (min) to 1 vertical slope. The contractor should confirm the OSHA soil classification and excavation requirements at the time of construction based on actual location and soil and groundwater conditions present. The contractor shall be solely responsible for all excavation safety, including the design of all excavation support systems.

We recommend that permanent cut slopes be sloped back to at least a 2.0 horizontal to 1 vertical slope and permanent fill slopes be sloped back to at least a 3.0 horizontal to 1 vertical slope. It should be understood that cut slopes may require stabilization measures if groundwater is seeping from the slopes. Stabilization measures could include placement of rip-rap or geosynthetic stabilization mats.

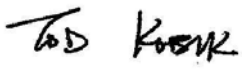
7.0 CONCLUDING REMARKS

This report was prepared to assist in planning the design and construction of the proposed Apwan Development planned at Silo Ridge Country Club in the Town of Amenia, New York. The report has been prepared for specific application to this site and this project only.

The recommendations were prepared based on our understanding of the proposed project, as described herein, and through the application of generally accepted soils and foundation engineering practices. No warranties, expressed or implied are made by the conclusions, opinions, recommendations or services provided.

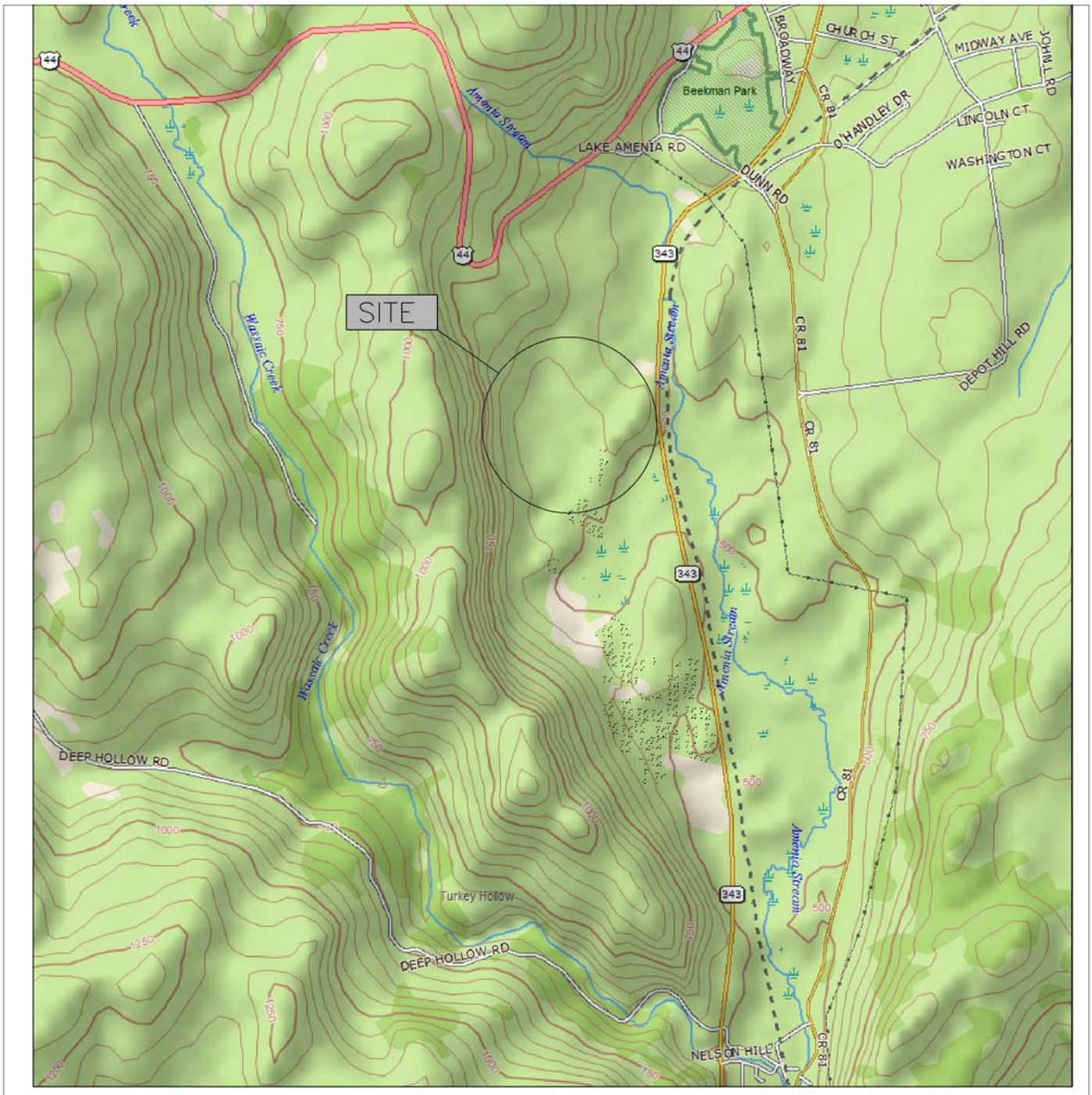
Important information regarding the use and interpretation of this report is presented in Appendix E.

Respectfully Submitted:
TransTech Engineering Services, P.C.



Tod M. Kobik, P.E.
Geotechnical Engineer

FIGURES



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SCALE: AS SHOWN

DRAWN BY: *TMK*

DATE: 10/14/2013

PROJECT No.: G13-3523

FIGURE No.: 1

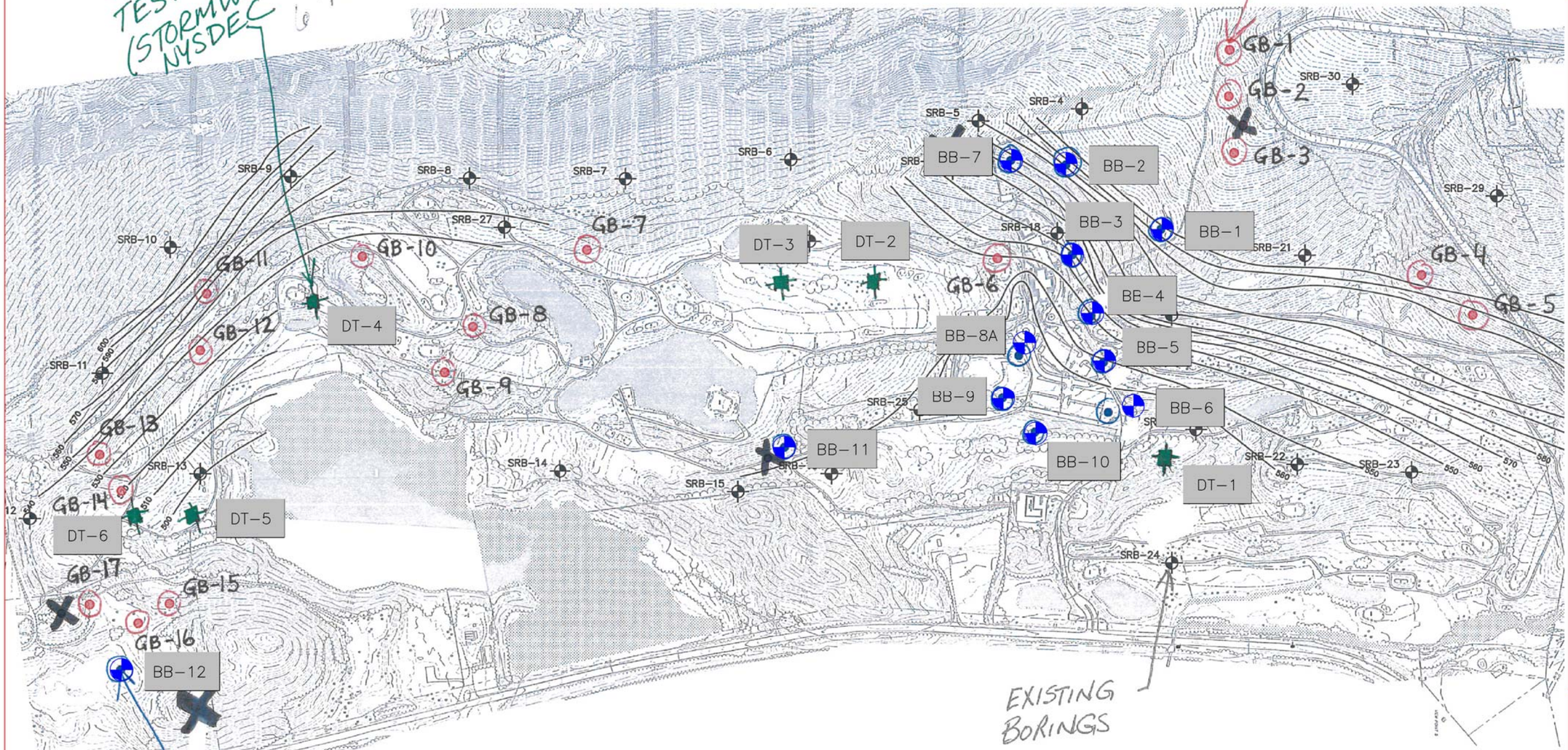
SITE LOCATION MAP

PROPOSED APWAN DEVELOPMENT
SILO RIDGE COUNTRY CLUB
4651 ROUTE 22
AMENIA, NEW YORK

GOLF COURSE PROBE BORINGS
DESIGNATED AS GB-1 THRU GB-17

DEEP TEST PITS (STORMWATER) NYSDEC
6 TOTAL

GOLF BORINGS (PROBES ON
17



EXISTING BORINGS

BUILDING/ DEVELOPMENT BORINGS 12 TOTAL

SILO RIDGE GEO TECH

SCALE: N.T.S.
DRAWN BY: TMK
DATE: 10/14/13
PROJECT No.: G13-3523
FIGURE No.: 2

PROPOSED APWAN DEVELOPMENT
SILO RIDGE COUNTRY CLUB
4651 ROUTE 22
AMENIA, NEW YORK

SUBSURFACE EXPLORATION
LOCATION PLAN

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APPENDIX A

SUBSURFACE EXPLORATION LOGS

DATE
START: 9/12/2013
FINISH: 9/12/2013

SHEET 1 OF 1

Trans Tech DRILLING SERVICES

SUBSURFACE EXPLORATION LOG

BORING NO. **BB-1**
PROJ. NO. G13-3523
SURF. ELEV. G.S.
G.W. DEPTH See Notes

PROJECT: Proposed Apwan Development
Silo Ridge Country Club

LOCATION: 4651 Route 22
Amenia, New York

DEPTH (ft.)	SAMPLES	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	REC. (ft.)	SOIL OR ROCK CLASSIFICATION	NOTES
		1	2	2	4	7	6	0.8	Brown Loose Fine-Coarse SAND AND CLAY, Little Gravel, Moist	
		2	4	6	6	5	12	1.3	Firm, Grades to "Some" Silt, "Some" Gravel, "Trace" Clay	
5		3	3	6	4	16	10	1.2	Brown-Gray Firm SILT, Some Fine-Coarse Sand, Trace Gravel, Moist	
		4	56	55	42	50/0.4	97	1.3	Highly Decomposed Rock, sampled as Gray Very Compact SILT with rock fragments	REF = Sample spoon refusal
		5	34	50/0.5			REF	0.7		
10									Boring terminated with auger refusal at 11.0 feet.	Free standing water was measured at a depth of 10.3' upon completion of drilling and sampling.
15										
20										
25										
30										
35										
40										

N = NO. BLOWS TO DRIVE 2-INCH SPLIT SPOON 12-INCHES WITH A 140 LB. PIN WT. FALLING 30-INCHES PER BLOW

CLASSIFICATION: Visual by T. Kobik

DRILLER: J. Burrowbridge

DRILL RIG TYPE : CME - 75

METHOD OF INVESTIGATION: ASTM D1586 using 3.25" I.D. Hollow Stem Augers

All recovered samples will be retained for approximately sixty (60) days, at which time the samples will be desposed of unless directed otherwise.

DATE
START: 9/12/2013
FINISH: 9/12/2013

SHEET 1 OF 1

Trans Tech DRILLING SERVICES

SUBSURFACE EXPLORATION LOG

BORING NO. **BB-2**
PROJ. NO. G13-3523
SURF. ELEV. G.S.
G.W. DEPTH 19.0'

PROJECT: Proposed Apwan Development
Silo Ridge Country Club

LOCATION: 4651 Route 22
Amenia, New York

DEPTH (ft.)	SAMPLES	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	REC. (ft.)	SOIL OR ROCK CLASSIFICATION	NOTES
		1	2	3	4	6	7	1.3	Brown Loose Fine-Coarse SAND AND SILT, Little Gravel, Moist	3" Topsoil at ground surface
		2	4	7	11	11	18	0.7	Brown Firm SILT, Some Fine-Coarse Sand, Trace Gravel, Moist	
5		3	8	4	4	4	8	1.4	Loose, Grades to "Trace" Clay	
		4	5	4	6	4	10	0.7	Wet	
		5	2	3	4	3	7	1.5	Brown Loose Fine-Coarse SAND, Some Silt, Some Gravel, Moist	
10										
		6	2	1	2	1	3	1.0	Brown Very Loose GRAVEL AND Fine-Coarse SAND, Some Silt, Trace Clay, Wet	Driller noted "wet" soil layer at a depth of 14'.
15										
		7	5	9	14	20	23	0.8	Brown-Gray Firm SILT, Some Gravel, Some Fine-Coarse Sand, Little Rock fragments, Wet	
20										
		8	22	40	50/0.5		REF	1.3	Very Compact, Dry	REF = Sample spoon refusal
25									Boring terminated at a depth of 25.0 feet.	Free standing water was measured at a depth of 19.0' upon completion of drilling and sampling.
30										
35										
40										

N = NO. BLOWS TO DRIVE 2-INCH SPLIT SPOON 12-INCHES WITH A 140 LB. PIN WT. FALLING 30-INCHES PER BLOW

CLASSIFICATION: Visual by T. Kobik

DRILLER: J. Burrowbridge

DRILL RIG TYPE : CME - 75

METHOD OF INVESTIGATION: ASTM D1586 using 3.25" I.D. Hollow Stem Augers

All recovered samples will be retained for approximately sixty (60) days, at which time the samples will be desposed of unless directed otherwise.

DATE
START: 9/12/2013
FINISH: 9/12/2013

SHEET 1 OF 2

Trans Tech DRILLING SERVICES

SUBSURFACE EXPLORATION LOG

BORING NO. **BB-3**
PROJ. NO. G13-3523
SURF. ELEV. G.S.
G.W. DEPTH 6.6'

PROJECT: Proposed Apwan Development
Silo Ridge Country Club

LOCATION: 4651 Route 22
Amenia, New York

DEPTH (ft.)	SAMPLES	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	REC. (ft.)	SOIL OR ROCK CLASSIFICATION	NOTES
		1		6	8	8	14	1.0	Brown Firm SILT, Some Fine-Coarse SAND, Some Gravel, Dry	6" Asphalt at ground surface
		2	21	10	8	8	18	0.5	Gray Firm Fine-Coarse SAND, Some Gravel, Little Silt, Dry	
5		3	3	5	7	8	12	1.5	Gray Highly Decomposed Rock, sampled as Gray Firm SILT with rock fragments	
		4	9	10	15	15	25	1.4		
		5	4	18	16	15	34	1.9	Compact	Boring was advanced to a depth of 25 feet on 9/12/13 using hollow stem auger drilling technique. Boring was completed on 9/18/13 using rotary wash drilling technique.
10										
		6	8	18	17	17	35	1.2		
15										
		7	7	20	23	24	43	1.9	Light Gray	
20										
		8	18	47	50/0.5		REF	1.4	White-Gray, Very Compact, with Fine Sand Seams, Moist	REF = Sample spoon refusal
25										Free standing water was measured at a depth of 6.6' with augers at a depth of 25.0 feet on 9/12/13.
		9	33	75	59	50	144	1.5		
30										
		10	42	49	50/0.3		REF	1.0		
35										
		11	50/0.1				REF	0.1	Contains Seam of Coarse SAND, Wet	
40										

N = NO. BLOWS TO DRIVE 2-INCH SPLIT SPOON 12-INCHES WITH A 140 LB. PIN WT. FALLING 30-INCHES PER BLOW

CLASSIFICATION: Visual by T. Kobik

DRILLER: J. Burrowbridge

DRILL RIG TYPE : CME - 75

METHOD OF INVESTIGATION: ASTM D1586 using 3.25" I.D. Hollow Stem Augers

All recovered samples will be retained for approximately sixty (60) days, at which time the samples will be desposed of unless directed otherwise.

DATE
START: 9/12/2013
FINISH: 9/18/2013

SHEET 2 OF 2

Trans Tech DRILLING SERVICES

SUBSURFACE EXPLORATION LOG

BORING NO. **BB-3**
PROJ. NO. G13-3523
SURF. ELEV. G.S.
G.W. DEPTH 6.6'

PROJECT: Proposed Apwan Development
Silo Ridge Country Club

LOCATION: 4651 Route 22
Amenia, New York

DEPTH (ft.)	SAMPLES	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	REC. (ft.)	SOIL OR ROCK CLASSIFICATION	NOTES
									Highly Decomposed Rock, sampled as White-Gray Very Compact SILT with rock fragments	REF = Sample spoon refusal NR = No recovery
		12	50/0				REF	NR	Boring terminated with auger refusal at 44.0 feet.	
45										
50										
55										
60										
65										
70										
75										
80										

N = NO. BLOWS TO DRIVE 2-INCH SPLIT SPOON 12-INCHES WITH A 140 LB. PIN WT. FALLING 30-INCHES PER BLOW

CLASSIFICATION: Visual by T. Kobik

DRILLER: J. Burrowbridge

DRILL RIG TYPE : CME - 75

METHOD OF INVESTIGATION: ASTM D1586 using 3.25" I.D. Hollow Stem Augers and Rotary Wash Drilling

All recovered samples will be retained for approximately sixty (60) days, at which time the samples will be desposed of unless directed otherwise.

DATE
START: 9/10/2013
FINISH: 9/10/2013

SHEET 1 OF 1

Trans Tech DRILLING SERVICES

SUBSURFACE EXPLORATION LOG

BORING NO. **BB-4**
PROJ. NO. G13-3523
SURF. ELEV. G.S.
G.W. DEPTH 17.2'

PROJECT: Proposed Apwan Development
Silo Ridge Country Club

LOCATION: 4651 Route 22
Amenia, New York

DEPTH (ft.)	SAMPLES	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	REC. (ft.)	SOIL OR ROCK CLASSIFICATION	NOTES
		1	6	11	9	6	20	1.5	Brown Firm Fine-Coarse SAND AND SILT, Trace rock fragments, Moist	3" Topsoil at ground surface
		2	5	5	6	6	11	0.7		
5		3	3	4	5	6	9	1.5	Loose	
		4	6	7	10	7	17	0.8	Brown Very Stiff CLAY AND GRAVEL, Little Fine-Coarse Sand, Moist	
		5	2	5	10	16	15	2.0		
10										
		6	7	19	39	28	58	2.0	Gray Very Compact GRAVEL AND SILT, Some Fine-Coarse Sand, Dry	
15										
		7	15	34	33	40	67	1.5	Gray Very Compact SILT AND GRAVEL, Some Fine-Coarse Sand, Dry	
20										
		8	7	19	26	25	45	1.5	Brown-Gray Compact Fine-Coarse SAND AND GRAVEL, Some Clay, Wet	
25									Boring terminated at a depth of 25.0 feet.	Free standing water was measured at a depth of 23.1' upon completion of drilling and sampling. Bore hole was left open overnight and free standing water was measured at a depth of 17.2' after 24 hours.
30										
35										
40										

N = NO. BLOWS TO DRIVE 2-INCH SPLIT SPOON 12-INCHES WITH A 140 LB. PIN WT. FALLING 30-INCHES PER BLOW

CLASSIFICATION: Visual by T. Kobik

DRILLER: J. Burrowbridge

DRILL RIG TYPE : CME - 75

METHOD OF INVESTIGATION: ASTM D1586 using 3.25" I.D. Hollow Stem Augers

All recovered samples will be retained for approximately sixty (60) days, at which time the samples will be desposed of unless directed otherwise.

DATE
START: 9/10/2013
FINISH: 9/10/2013

SHEET 1 OF 1

Trans Tech DRILLING SERVICES

SUBSURFACE EXPLORATION LOG

BORING NO. **BB-5**
PROJ. NO. G13-3523
SURF. ELEV. G.S.
G.W. DEPTH 14.7'

PROJECT: Proposed Apwan Development
Silo Ridge Country Club

LOCATION: 4651 Route 22
Amenia, New York

DEPTH (ft.)	SAMPLES	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	REC. (ft.)	SOIL OR ROCK CLASSIFICATION	NOTES
		1	3	2	3	3	5	1.5	POSSIBLE FILL: Brown Medium CLAY AND Fine-Coarse Sand, Little Gravel, Moist	3" Topsoil at ground surface
		2	12	15	11	12	26	0.8	POSSIBLE FILL: Brown Firm SILT AND Fine-Coarse SAND, Little Gravel, Dry	
5		3	5	8	8	9	16	1.9	Grades to "Little" Fine-Coarse Sand	
		4	5	9	8	7	17	0.7	POSSIBLE FILL: Brown Very Stiff CLAY, Some Fine-Coarse Sand, Little Gravel, Moist	
		5	6	9	9	7	18	0.4	Brown Firm SILT AND Fine SAND, Little Gravel, Trace Organics, Moist	
10										
		6	6	16	30	20	46	1.8	Compact, Grades to "Some" Fine Sand, "Trace" Gravel, Dry	
15										
		7	10	16	16	100/0.3	32	1.5	Highly Decomposed Rock, sampled as Dark Gray Fine-Medium SAND, Some Silt, Some rock fragments, Wet	
20									Boring terminated with auger refusal at a depth of 21.0 feet.	Free standing water was measured at a depth of 20.0' upon completion of drilling and sampling. Bore hole was left open overnight and free standing water was measured at a depth of 14.7' after 24 hours.
25										
30										
35										
40										

N = NO. BLOWS TO DRIVE 2-INCH SPLIT SPOON 12-INCHES WITH A 140 LB. PIN WT. FALLING 30-INCHES PER BLOW

CLASSIFICATION: Visual by T. Kobik

DRILLER: J. Burrowbridge

DRILL RIG TYPE : CME - 75

METHOD OF INVESTIGATION: ASTM D1586 using 3.25" I.D. Hollow Stem Augers

All recovered samples will be retained for approximately sixty (60) days, at which time the samples will be desposed of unless directed otherwise.

DATE
START: 9/9/2013
FINISH: 9/9/2013

SHEET 1 OF 1

Trans Tech DRILLING SERVICES

SUBSURFACE EXPLORATION LOG

BORING NO. **BB-6**
PROJ. NO. G13-3523
SURF. ELEV. G.S.
G.W. DEPTH See Notes

PROJECT: Proposed Apwan Development
Silo Ridge Country Club

LOCATION: 4651 Route 22
Amenia, New York

DEPTH (ft.)	SAMPLES	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	REC. (ft.)	SOIL OR ROCK CLASSIFICATION	NOTES
		1	3	8	11	12	19	0.9	POSSIBLE FILL: Brown Firm Fine-Coarse SAND AND SILT, Some Gravel, Dry	2" Topsoil at ground surface
		2	12	10	11	11	21	1.5	Brown-Gray	
5		3	4	10	12	12	22	0.8		
		4	10	7	5	4	12	0.4	Grades to "Little" Gravel	
		5	WH	WH	1	1	1	0.3	Brown Very Stiff CLAY, Some Fine-Coarse Sand, Trace Gravel, Trace Organics, Moist	WH = Weight of hammer and drilling rods.
10										
		6	2	3	4	4	7	0.5	Brown Loose Fine-Coarse SAND, Some Gravel, Little Silt, Dry	
15										
		7	49	49	43	32	92	0.4	Very Compact	
20										
		8	4	14	16	17	30	0.4	Dark Gray, Very Compact Grades to "AND" CLAY, "Little" Gravel, Moist	
25									Boring terminated at a depth of 25.0 feet.	Free standing water was not encountered upon completion of drilling and sampling. Bore hole was left open overnight and caved in at a depth of 16.7' after 24 hours.
30										
35										
40										

N = NO. BLOWS TO DRIVE 2-INCH SPLIT SPOON 12-INCHES WITH A 140 LB. PIN WT. FALLING 30-INCHES PER BLOW

CLASSIFICATION: Visual by T. Kobik

DRILLER: J. Burrowbridge

DRILL RIG TYPE : CME - 75

METHOD OF INVESTIGATION: ASTM D1586 using 3.25" I.D. Hollow Stem Augers

All recovered samples will be retained for approximately sixty (60) days, at which time the samples will be desposed of unless directed otherwise.

DATE
START: 9/12/2013
FINISH: 9/12/2013

SHEET 1 OF 1

Trans Tech DRILLING SERVICES

SUBSURFACE EXPLORATION LOG

BORING NO. **BB-7**
PROJ. NO. G13-3523
SURF. ELEV. G.S.
G.W. DEPTH See Notes

PROJECT: Proposed Apwan Development
Silo Ridge Country Club

LOCATION: 4651 Route 22
Amenia, New York

DEPTH (ft.)	SAMPLES	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	REC. (ft.)	SOIL OR ROCK CLASSIFICATION	NOTES
		1	2	2	2	2	4	0.5	Brown Medium CLAY AND Fine-Coarse SAND, Little Gravel, Dry	4" Topsoil at ground surface
		2	3	4	5	5	9	1.0	Stiff	
5		3	2	5	5	6	10	1.3		
		4	11	7	6	5	13	0.5		
		5	2	6	8	13	14	1.8	Grades to "AND" GRAVEL, "Little" Fine-Coarse Sand	
10										
		6	9	22	25	37	46	1.8	Hard	
15										
		7	9	17	20	23	37	1.2	Gray Compact SILT AND GRAVEL, Little Fine-Coarse Sand, Dry	
20										
		8	43	33	60	63	93	1.0	Highly Decomposed Rock, sampled as Gray Very Compact SILT with rock fragments, Dry	
25									Boring terminated at a depth of 25.0 feet.	Free standing water was not encountered upon completion of drilling and sampling.
30										
35										
40										

N = NO. BLOWS TO DRIVE 2-INCH SPLIT SPOON 12-INCHES WITH A 140 LB. PIN WT. FALLING 30-INCHES PER BLOW

CLASSIFICATION: Visual by T. Kobik

DRILLER: J. Burrowbridge

DRILL RIG TYPE : CME - 75

METHOD OF INVESTIGATION: ASTM D1586 using 3.25" I.D. Hollow Stem Augers

All recovered samples will be retained for approximately sixty (60) days, at which time the samples will be desposed of unless directed otherwise.

DATE
START: 9/11/2013
FINISH: 9/11/2013

SHEET 1 OF 1

Trans Tech DRILLING SERVICES

SUBSURFACE EXPLORATION LOG

BORING NO. **BB-8**
PROJ. NO. G13-3523
SURF. ELEV. G.S.
G.W. DEPTH 12.8'

PROJECT: Proposed Apwan Development
Silo Ridge Country Club

LOCATION: 4651 Route 22
Amenia, New York

DEPTH (ft.)	SAMPLES	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	REC. (ft.)	SOIL OR ROCK CLASSIFICATION	NOTES
		1	6	6	5	6	11	0.5	Brown Firm SILT, Some Fine-Medium SAND, Little Gravel, Dry	
		2	6	6	7	6	13	1.1		
5		3	4	6	6	7	12	0.6	Grades to "Some" Gravel	
		4	4	2	2	4	4	1.1	Loose, Grades to "Little" Gravel, Moist	
		5	10	9	17	17	26	1.9	Firm, Dry	
10										
		6	5	12	14	14	26	1.0	Brown Firm GRAVEL, Some Clay, Some Fine-Coarse Sand, Wet	Driller noted "wet" soil layer at a depth of 15 feet.
15										
		7	5	10	9	12	19	0.8	Grades to "AND" Fine-Coarse SAND	
20										REF = Sample spoon refusal
		8	100/0.4				REF	0.2	Dark Gray Weathered Rock	
25									Boring terminated with auger refusal at a depth of 24.0 feet.	Free standing water was measured at a depth of 12.8' upon completion of drilling and sampling.
30										
35										
40										

N = NO. BLOWS TO DRIVE 2-INCH SPLIT SPOON 12-INCHES WITH A 140 LB. PIN WT. FALLING 30-INCHES PER BLOW

CLASSIFICATION: Visual by T. Kobik

DRILLER: J. Burrowbridge

DRILL RIG TYPE : CME - 75

METHOD OF INVESTIGATION: ASTM D1586 using 3.25" I.D. Hollow Stem Augers

All recovered samples will be retained for approximately sixty (60) days, at which time the samples will be desposed of unless directed otherwise.

DATE
START: 9/11/2013
FINISH: 9/11/2013

SHEET 1 OF 1

Trans Tech DRILLING SERVICES

SUBSURFACE EXPLORATION LOG

BORING NO. **BB-9**
PROJ. NO. G13-3523
SURF. ELEV. G.S.
G.W. DEPTH 12.8'

PROJECT: Proposed Apwan Development
Silo Ridge Country Club

LOCATION: 4651 Route 22
Amenia, New York

DEPTH (ft.)	SAMPLES	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	REC. (ft.)	SOIL OR ROCK CLASSIFICATION	NOTES
		1	2	3	4	4	7	0.5	Brown Loose Fine-Coarse SAND AND CLAY, Some Gravel, Trace Organics, Moist	4" Topsoil at ground surface
		2	3	3	3	4	6	0.8	Grades to "AND" SILT, "Trace" Clay	
5		3	2	3	3	4	6	0.8	Contains rock fragments, Dry	
		4	5	8	11	7	19	0.5	Firm	
		5	3	6	19	39	25	1.0	Highly Decomposed Rock, sampled as Gray Firm SILT with rock fragments, Dry	
10										
		6	6	9	22	25	31	1.2	Compact	
15										
		7	100/0.1				REF	0.1	Very Compact	REF = Sample spoon refusal
20									Boring terminated with auger refusal at a depth of 19.5 feet.	Free standing water was not encountered upon completion of drilling and sampling.
25										
30										
35										
40										

N = NO. BLOWS TO DRIVE 2-INCH SPLIT SPOON 12-INCHES WITH A 140 LB. PIN WT. FALLING 30-INCHES PER BLOW

CLASSIFICATION: Visual by T. Kobik

DRILLER: J. Burrowbridge

DRILL RIG TYPE : CME - 75

METHOD OF INVESTIGATION: ASTM D1586 using 3.25" I.D. Hollow Stem Augers

All recovered samples will be retained for approximately sixty (60) days, at which time the samples will be desposed of unless directed otherwise.

DATE
START: 9/9/2013
FINISH: 9/10/2013

SHEET 1 OF 1

Trans Tech DRILLING SERVICES

SUBSURFACE EXPLORATION LOG

BORING NO. **BB-10**
PROJ. NO. G13-3523
SURF. ELEV. G.S.
G.W. DEPTH See Notes

PROJECT: Proposed Apwan Development
Silo Ridge Country Club

LOCATION: 4651 Route 22
Amenia, New York

DEPTH (ft.)	SAMPLES	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	REC. (ft.)	SOIL OR ROCK CLASSIFICATION	NOTES
		1	4	8	10	12	1.5	0.5	POSSIBLE FILL: Brown Firm Fine-Coarse SAND, Some Gravel, Some Silt, Trace Organics, Dry	3" Topsoil at ground surface
		2	4	6	6	7	12	0.5		Driller noted boulders at a depth of 2'.
		3	4	6	5	7	11	0.9	Brown Firm SILT, Little Fine Sand, Trace Organics, Dry	
5		4	7	6	3	5	9	0.5	Loose, Grades to "Little" Gravel, "Little" Rock Fragments	
		5	7	12	11	12	23	1.0	Highly Decomposed Rock, sampled as Gray Firm SILT with rock fragments, Dry	
10										
		6	11	18	15	16	33	1.5		
15										Driller noted boulder at a depth of 17'.
		7	100/0.5				REF	0.3	Sampled as Dark Gray Fine-Coarse SAND, Wet	REF = Sample spoon refusal
20									Boring terminated with auger refusal at a depth of 19.5 feet.	Free standing water was not encountered upon completion of drilling and sampling.
25										
30										
35										
40										

N = NO. BLOWS TO DRIVE 2-INCH SPLIT SPOON 12-INCHES WITH A 140 LB. PIN WT. FALLING 30-INCHES PER BLOW

CLASSIFICATION: Visual by T. Kobik

DRILLER: J. Burrowbridge

DRILL RIG TYPE : CME - 75

METHOD OF INVESTIGATION: ASTM D1586 using 3.25" I.D. Hollow Stem Augers

All recovered samples will be retained for approximately sixty (60) days, at which time the samples will be desposed of unless directed otherwise.

DATE
START: 9/11/2013
FINISH: 9/11/2013

SHEET 1 OF 1

Trans Tech DRILLING SERVICES

SUBSURFACE EXPLORATION LOG

BORING NO. **BB-11**
PROJ. NO. G13-3523
SURF. ELEV. G.S.
G.W. DEPTH See Notes

PROJECT: Proposed Apwan Development
Silo Ridge Country Club

LOCATION: 4651 Route 22
Amenia, New York

DEPTH (ft.)	SAMPLES	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	REC. (ft.)	SOIL OR ROCK CLASSIFICATION	NOTES
		1	4	6	7	9	13	1.0	Brown Firm Fine-Coarse SAND, Some Gravel, Some Silt, Dry	1" Topsoil
		2	9	13	14	14	27	0.6		
5		3	6	12	9	8	21	1.0	Grades to "AND" GRAVEL	
		4	17	16	26	28	42	0.6	Gray, Compact, Grades to "Little" Silt, "Little" rock fragments	
		5	12	28	39	41	67	1.2	Highly Decomposed Rock, sampled as Dark Gray Very Compact Rock Fragments	
10										
		6	59	45	56	100/0.4	101	1.5	Sampled as Brown-Gray Very Compact SILT with Rock Fragments	
15										
		7	100/0.3				REF	0.2	Dark Gray	REF = Sample spoon refusal
20									Boring terminated with auger refusal at a depth of 20.0 feet.	Free standing water was not encountered upon completion of drilling and sampling.
25										
30										
35										
40										

N = NO. BLOWS TO DRIVE 2-INCH SPLIT SPOON 12-INCHES WITH A 140 LB. PIN WT. FALLING 30-INCHES PER BLOW

CLASSIFICATION: Visual by T. Kobik

DRILLER: J. Burrowbridge

DRILL RIG TYPE : CME - 75

METHOD OF INVESTIGATION: ASTM D1586 using 3.25" I.D. Hollow Stem Augers

All recovered samples will be retained for approximately sixty (60) days, at which time the samples will be desposed of unless directed otherwise.

DATE
START: 9/17/2013
FINISH: 9/17/2013

SHEET 1 OF 1

Trans Tech DRILLING SERVICES

SUBSURFACE EXPLORATION LOG

BORING NO. **BB-12**
PROJ. NO. G13-3523
SURF. ELEV. G.S.
G.W. DEPTH See Notes

PROJECT: Proposed Apwan Development
Silo Ridge Country Club

LOCATION: 4651 Route 22
Amenia, New York

DEPTH (ft.)	SAMPLES	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	REC. (ft.)	SOIL OR ROCK CLASSIFICATION	NOTES
		1	5	12	15	20	27	0.3	Brown Firm Fine-Coarse SAND, Some Gravel, Some Silt, Dry	1" Topsoil
		2	28	33	36	41	69	1.0	Gray Very Compact GRAVEL AND Fine-Coarse Sand, Little Silt, Cobbles, Dry	
5		3	41	45	49	16	94	1.0	Highly Decomposed Rock, sampled as Light Gray Very Compact Rock Fragments with Little Silt, Dry	
		4	23	88	72	45	160	0.8		
		5	7	36	44	50/0.1	REF	0.6		REF = Sample spoon refusal
10										
									Boring terminated with auger refusal at a depth of 11.0 feet.	Free standing water was not encountered upon completion of drilling and sampling.
15										
20										
25										
30										
35										
40										

N = NO. BLOWS TO DRIVE 2-INCH SPLIT SPOON 12-INCHES WITH A 140 LB. PIN WT. FALLING 30-INCHES PER BLOW

CLASSIFICATION: Visual by T. Kobik

DRILLER: J. Burrowbridge

DRILL RIG TYPE : CME - 75

METHOD OF INVESTIGATION: ASTM D1586 using 3.25" I.D. Hollow Stem Augers

All recovered samples will be retained for approximately sixty (60) days, at which time the samples will be desposed of unless directed otherwise.

Trans Tech
GEOTECHNICAL SERVICES

1594 State Street
Schenectady, NY 12304
Phone (518) 372-4067
Fax (518) 372-6739

TEST PIT LOG

DATE: 9/13/13

PROJECT: Apwan Development

TEST PIT NO.: DT-1

GROUND ELEV.: NA

PROJECT NO.: G13-3523

INSPECTOR: Tod Kobik, P.E.

WEATHER: Sunny, Warm

EXCAVATION EQUIPMENT: Backhoe

DEPTH (Feet)	SOIL DESCRIPTION	NOTES
0 - 0.5'	Topsoil	
0.5' - 3.0'	Brown Fine-Coarse GRAVEL AND SAND, Some Clayey Silt, Moist	No groundwater was observed.
3.0' - 11.0'	Gray Fine-Coarse GRAVEL AND SAND, Trace Silt, Moist	

Trans Tech
GEOTECHNICAL SERVICES

1594 State Street
Schenectady, NY 12304
Phone (518) 372-4067
Fax (518) 372-6739

TEST PIT LOG

DATE: 9/13/13

PROJECT: Apwan Development

TEST PIT NO.: **DT-2**

GROUND ELEV.: NA

PROJECT NO.: G13-3523

INSPECTOR: Tod Kobik, P.E.

WEATHER: Sunny, Warm

EXCAVATION EQUIPMENT: Backhoe

DEPTH (Feet)	SOIL DESCRIPTION	NOTES
0 - 1.0'	Dark Brown Fine-Coarse SAND AND Clayey SILT with organics, Moist	
1.0' - 1.7'	Brown Fine-Coarse SAND AND Clayey Silt, Little Gravel, Moist	Groundwater was present at a depth of 7.5 feet.
1.7' - 8.0'	Gray Fine-Coarse GRAVEL AND SAND, Cobbles, Trace Silt, Moist	

Trans Tech
GEOTECHNICAL SERVICES

1594 State Street
Schenectady, NY 12304
Phone (518) 372-4067
Fax (518) 372-6739

TEST PIT LOG

DATE: 9/13/13

PROJECT: Apwan Development

TEST PIT NO.: **DT-3**

GROUND ELEV.: NA

PROJECT NO.: G13-3523

INSPECTOR: Tod Kobik, P.E.

WEATHER: Sunny, Warm

EXCAVATION EQUIPMENT: Backhoe

DEPTH (Feet)	SOIL DESCRIPTION	NOTES
0 - 1.3'	Dark Brown Fine-Coarse SAND AND Clayey SILT with organics, Moist	
1.3' - 2.3'	Brown Fine-Coarse SAND AND Clayey Silt, Little Gravel, Moist	Groundwater was present at a depth of 6.5 feet.
2.3' - 5.3'	Gray Fine-Coarse GRAVEL AND SAND, Cobbles, Trace Silt, Moist	
5.5' - 7.5'	Gray Silty CLAY, Wet	

Trans Tech
GEOTECHNICAL SERVICES

1594 State Street
Schenectady, NY 12304
Phone (518) 372-4067
Fax (518) 372-6739

TEST PIT LOG

DATE: 9/13/13

PROJECT: Apwan Development

TEST PIT NO.: **DT-4**

GROUND ELEV.: NA

PROJECT NO.: G13-3523

INSPECTOR: Tod Kobik, P.E.

WEATHER: Sunny, Warm

EXCAVATION EQUIPMENT: Backhoe

DEPTH (Feet)	SOIL DESCRIPTION	NOTES
0 - 0.7'	Topsoil	
0.7' - 9.5'	Gray Fine-Coarse GRAVEL AND SAND, Trace-Little Silt, Moist	No groundwater was observed.

Trans Tech
GEOTECHNICAL SERVICES

1594 State Street
Schenectady, NY 12304
Phone (518) 372-4067
Fax (518) 372-6739

TEST PIT LOG

DATE: 9/13/13

PROJECT: Apwan Development

TEST PIT NO.: **DT-5**

GROUND ELEV.: NA

PROJECT NO.: G13-3523

INSPECTOR: Tod Kobik, P.E.

WEATHER: Sunny, Warm

EXCAVATION EQUIPMENT: Backhoe

DEPTH (Feet)	SOIL DESCRIPTION	NOTES
0 - 0.6'	Topsoil	
0.6' - 11.3'	Gray Fine-Coarse GRAVEL AND SAND, Some Cobbles, Trace Silt, Moist	No groundwater was observed.

Trans Tech
GEOTECHNICAL SERVICES

1594 State Street
Schenectady, NY 12304
Phone (518) 372-4067
Fax (518) 372-6739

TEST PIT LOG

DATE: 9/13/13

PROJECT: Apwan Development

TEST PIT NO.: DT-6

GROUND ELEV.: NA

PROJECT NO.: G13-3523

INSPECTOR: Tod Kobik, P.E.

WEATHER: Sunny, Warm

EXCAVATION EQUIPMENT: Backhoe

DEPTH (Feet)	SOIL DESCRIPTION	NOTES
0 - 0.5'	Topsoil	
0.5' - 9.7'	Gray Fine-Coarse GRAVEL AND SAND, Some Cobbles, Trace Silt, Moist.	No groundwater was observed. A vein of Fine-Coarse SAND was present to a depth of 4.5' in west side of test pit.

EXAMPLE KEY TO SUBSURFACE EXPLORATION LOGS

DATE
START: XX/XX/XX
FINISH: XX/XX/XX
SHEET X OF X

Trans Tech DRILLING SERVICES

PROJ. NO. XX-XXXX
HOLE NO. X-X
SURF. ELEV. XXX.X'
G.W. DEPTH X.X'

PROJECT: PROJECT NAME
PROJECT NAME
LOCATION: PROJECT LOCATION
PROJECT LOCATION

DEPTH (ft)	SAMPLES	SAMPLE No.	BLOWS ON SAMPLER (0/6 | 6/12 | 12/18 | 18/24 | N)	RECOVERY (ft)	SOIL OR ROCK CLASSIFICATION	NOTES
0		1	3 | 3 | 4 | 8 | 7	1.0	3" TOPSOIL Brown SILT, some Sand, trace clay, ML (Moist-Loose)	Groundwater at 10' upon completion, and 5' 24 hrs. after completion
		2	50/.5 | | | | 50/.5	NR		
5					Gray SHALE, medium hard, weathered, thin bedded, some fractures	Run#1, 3.5'-6.0' 95% Recovery 50% RQD

(1) (2) (3) (4) (5) (6) (7) (8) (9) (10)

(7) *(numbered features explained on reverse)*

TABLE I

- Split Spoon Sample
- Shelby Tube Sample
- Geoprobe Macro-Core
- Auger or Test Pit Sample
- Rock Core

TABLE II

Identification of soil type is made on basis of an estimate of particle sizes, and in the case of fine grained soils also on basis of plasticity.

Soil Type	Soil Particle Size	
Boulder	>12"	Coarse Grained (Granular)
Cobble	3" - 12"	
Gravel - Coarse	3" - 3/4"	
- Fine	3/4" - #4	
Sand - Coarse	#4 - #10	
- Medium	#10 - #40	
- Fine	#40 - #200	
Silt - Non Plastic (Granular) Clay - Plastic (Cohesive)	<#200	Fine Grained

TABLE III

The following terms are used in classifying soils consisting of mixtures of two or more soil types. The estimate is based on weight of total sample.

Term	Percent of Total Sample
"and"	35 - 50
"some"	20 - 35
"little"	10 - 20
"trace"	less than 10

(When sampling gravelly soils with a standard split spoon, the true percentage of gravel is often not recovered due to the relatively small sampler diameter.)

TABLE IV

The relative compactness or consistency is described in accordance with the following terms:

Granular Soils		Cohesive Soils	
Term	**Blows per Foot, N**	**Term**	**Blows per Foot, N**
Very Loose	0 - 4	Very Soft	0 - 2
Loose	4 - 10	Soft	2 - 4
Firm	10 - 30	Medium	4 - 8
Compact	30 - 50	Stiff	8 - 15
Very Compact	>50	Very Stiff	15 - 30
		Hard	>30

(Large particles in the soils will often significantly influence the blows per foot recorded during the penetration test)

TABLE V

Varved	Horizontal uniform layers or seams of soil(s).
Layer	Soil deposit more than 6" thick.
Seam	Soil deposit less than 6" thick.
Parting	Soil deposit less than 1/8" thick.
Laminated	Irregular, horizontal and angled seams and partings of soil(s).

TABLE VI

Rock Classification Term		Meaning
Hardness	- Soft	Scratched by fingernail
	- Medium Hard	Scratched easily by penknife
	- Hard	Scratched with difficulty by penknife
	- Very Hard	Cannot be scratched by penknife
Weathering	- Very Weathered	Judged from the relative amounts of disintegration, iron staining, core recovery, clay seams, etc.
	- Weathered	
	- Sound	

Rock Classification Term		Meaning	
Bedding	- Laminated	(<1")	Natural breaks in Rock Layers
	- Thin Bedded	(1" - 4")	
	- Bedded	(4" - 12")	
	- Thick Bedded	(12" - 36")	
	- Massive	(>36")	

(Fracturing refers to natural breaks in the rock oriented at some angle to the rock layers)

GENERAL INFORMATION & KEY TO SUBSURFACE LOGS

The Subsurface Logs attached to this report present the general observations and mechanical data collected by the driller at the site, supplemented by classificiation of the material removed from the borings as determined through visual identification by technicians in the laboratory. It is cautioned that the materials removed from the borings represent only a small fraction of the soils at the site and may not be representative of subusurface conditions between and/or away from the boring locations or betweeen the sampled intervals. The data presented on the Subsurface Logs along with the recovered samples provide a basis for estimating the engineering characteristics of the soils at the site. The evaluation must consider all the recorded details and their relative significance to the project. It is common that evaluation of standard subsurface data indicates the need for additional testing and/or sampling to more accurately evaluate the subsurface conditions. Any evaluation of the data presented on the Subsurface Logs must be performed by qualified professionals. The following information defines some of the procedures and terms used on the Subsurface Logs to describe the conditions encountered. The paragraph numbers below correspond to the numbered features identified on the opposite page.

1. The figures in the Depth column define the scale of the Subsurface Log.

2. The Samples column shows a graphical representation of the depth and type of sampling performed. See Table I for descriptions of the symbols used to represent the various types of samples.

3. The Sample No. is used for identification on sample containers and laboratory test reports.

4. Blows on Sampler - shows the results of the "Standard Penetration Test" (SPT), recording the number of blows required to drive a split spoon sampler into the soil. The number of blows required to drive the sampler for each six inch increment is recorded. The first six inches of penetration is considered a seating drive. The sum of the number of blows required for the second and third six inch increments is termed the penetration resistance, N. The outside diameter of the sampler, hammer weight and length of drop are noted at the bottom of the Subsurface Log.

5. Recovery - Shows the length of the recovered sample.

6. All recovered soil samples are reviewed in the laboratory by an engineering technician or geotechnical engineer, unless noted otherwise. Visual descriptions are made on the basis of a combination of the driller's field descriptions and noted observations together with the sample as received in the laboratory. The method of visual classification is based primarily on the Unified Soil Classificiation System (ASTM D 2487) with regard to the particle size and plasticity (See Table No. II), and the Unified Soil Classification group symbols for the soil types are sometimes included with the soil classification. Additionally, the relative portion, by weight, of two or more granular soil types is described in accordance with "Suggested Methods of Test for Identification of Soils" by D.M. Burmister, ASTM Special Technical Publication 479, June 1970, (See Table No. III). Description of the relative soil density or consistency is based upon the penetration records as defined in Table No. IV. The description of the soil moisture is based upon the relative wetness of the soil as recovered and is decribed as dry, moist, wet or saturated. Water introduced into the boring either naturally or during drilling may have affected the moisture condition of the recovered samples. Special terms are used as required to describe soil deposition in greater detail; several such terms are listed in Table V. When sampling gravelly soils with a standard two inch diameter split spoon sampler, the true percentage of gravel is often not recovered due to the relatively small samper diameter. The presence of boulders and large gravel is sometimes, but not necessarily, detected by an evaluation of the sampler blows or through the action of the drill rig as reported by the driller.

7. Rock descriptions are based on review of the recovered rock core samples and the driller's notes. Typical rock classification terms are included in Table VI.

8. The stratification lines represent the approximate boundary between soil types and the transition may be gradual. Solid stratification lines delineate apparent changes in soil type, based upon review of recovered soil samples and the driller's notes. Dashed lines indicate a lesser degree of certainty with respect to either a change in soil type or where such a change may occur.

9. Miscellaneous observations and procedures noted by the driller are shown in this column, including water level observations. It is important to understand that the reliability of the water observations depends upon the soil type (water level does not readily stabilize in a bore hole through fine grained soils), and that any drill water used to advance the boring may have influenced the observations. Typically, the ground water level will fluctuate with seasonal changes in precipitation patterns. One or more perched or trapped water levels may exist in the ground seasonally. Generally, it is prudent to install a groundwater observation well to better define water levels.

10. The length of core run is defined as the length of penetration of the core barrel. Core recovery is the length of core recovered divided by the core run length. The Rock Quality Designation (RQD) is the total length of pieces of recovered core exceeding 4 inches divided by the core run length. The size of the core barrel used is also noted.

APPENDIX B

TEST PIT PHOTOS

Test Pit DT-1

Test Pit DT-1 Spoil Pile

Test Pit DT-2, Note Standing Water

Test Pit DT-2 Spoil Pile

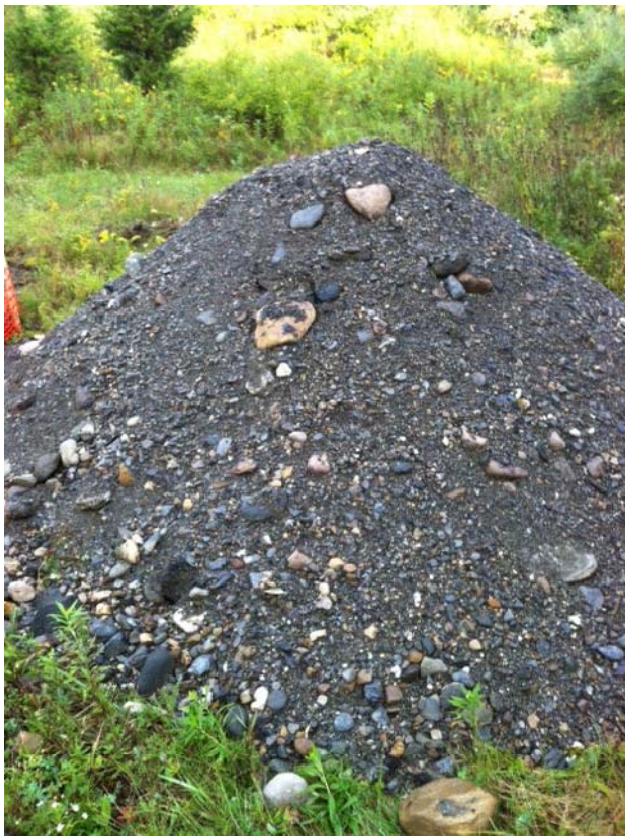
Test Pit DT-3, Note Standing Water & Clay Soil Layer

Test Pit DT-3 Spoil Pile

Test Pit DT-4

Test Pit DT-4 Spoil Pile

Test Pit DT-5



Test Pit DT-5 Spoil Pile

Test Pit DT-6

Test Pit DT-6, Note Vein of Fine-Coarse Sand in Side of Excavation

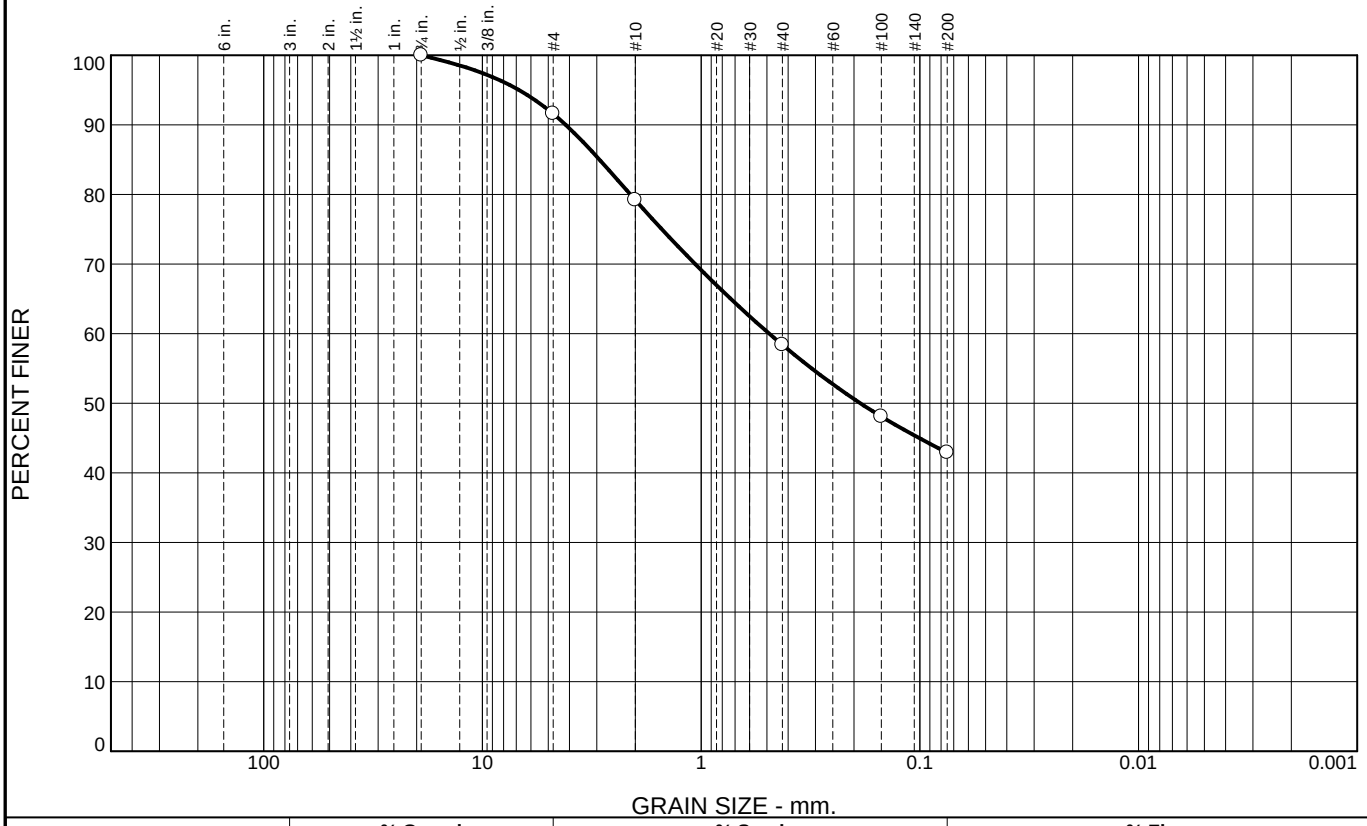
Apwan Development
October 14, 2013

Test Pit DT-6 Spoil Pile

APPENDIX C

LABORATORY TEST RESULTS

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	8.4	12.4	20.8	15.5	42.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
#4	91.6		
#10	79.2		
#40	58.4		
#100	48.1		
#200	42.9		

* (no specification provided)

Soil Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 4.1604 D_{85}= 2.9160 D_{60}= 0.4878
D_{50}= 0.1870 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Water Content: 16.8 %

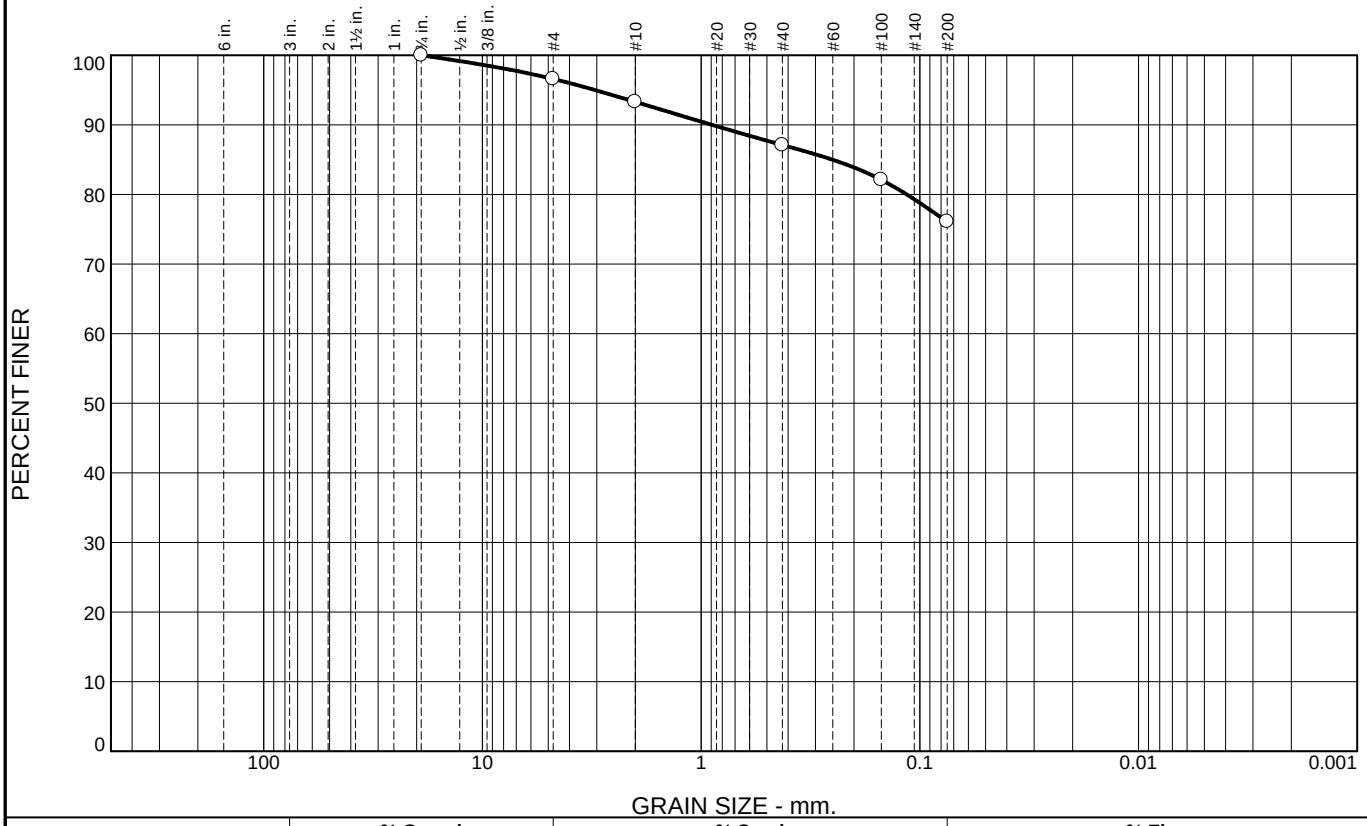
Location: B-1, S-1, 2 - 4'
Sample Number: S-2 **Depth:** 2-4' **Date:** 10/11/13

QCQA Laboratories, Inc.

Schenectady, NY

Client: VHB
Project: APWAN Development - Silo Ridge
Project No: G13-3523 **Figure** B1/S2

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	3.4	3.3	6.2	11.0	76.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
#4	96.6		
#10	93.3		
#40	87.1		
#100	82.1		
#200	76.1		

* (no specification provided)

Soil Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.8906 D_{85}= 0.2508 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Water Content: 18.4 %

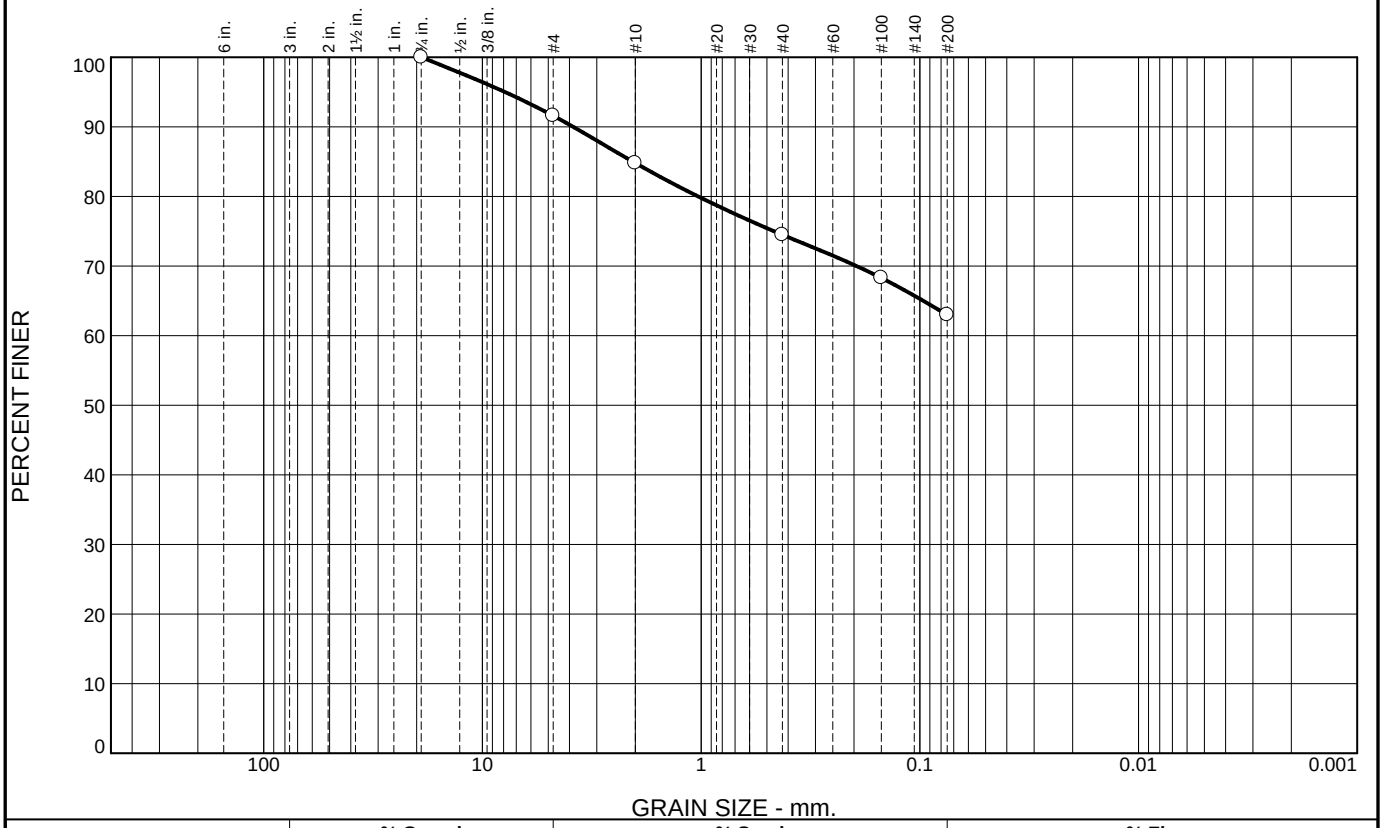
Location: B-1, S-3, 4 - 6'
Sample Number: S-3 **Depth:** 4-6' **Date:** 10/11/13

QCQA Laboratories, Inc.

Schenectady, NY

Client: VHB
Project: APWAN Development - Silo Ridge
Project No: G13-3523 **Figure** B1/S3

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	8.4	6.8	10.3	11.5	63.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
#4	91.6		
#10	84.8		
#40	74.5		
#100	68.3		
#200	63.0		

* (no specification provided)

Soil Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 3.8447 D_{85}= 2.0520 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Water Content: 15.4 %

Location: B-2, S-3, 4 - 6'
Sample Number: S-3 **Depth:** 4-6' **Date:** 10/11/13

QCQA Laboratories, Inc.

Schenectady, NY

Client: VHB
Project: APWAN Development - Silo Ridge
Project No: G13-3523 **Figure** B2/S3

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	7.4	6.4	10.6	10.2	65.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
#4	92.6		
#10	86.2		
#40	75.6		
#100	69.8		
#200	65.4		

* (no specification provided)

Soil Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 3.2936 D_{85}= 1.7065 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Water Content: 16.2 %

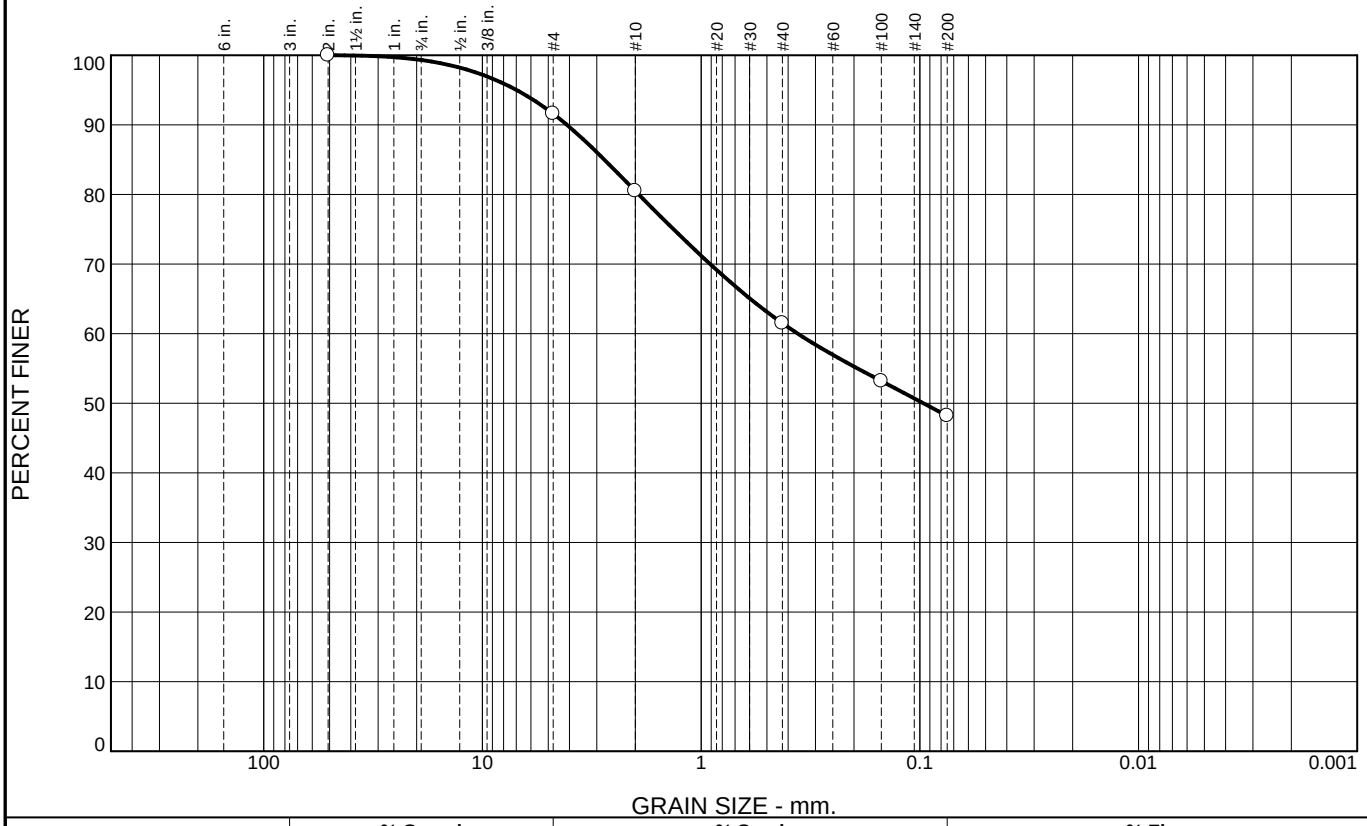
Location: B-2, S-4, 6 - 8'
Sample Number: S-4 **Depth:** 6-8' **Date:** 10/11/13

QCQA Laboratories, Inc.

Schenectady, NY

Client: VHB
Project: APWAN Development - Silo Ridge
Project No: G13-3523 **Figure** B2/S4

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.7	7.7	11.1	19.0	13.3	48.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
2	100.0		
#4	91.6		
#10	80.5		
#40	61.5		
#100	53.2		
#200	48.2		

* (no specification provided)

Soil Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 4.1081 D_{85}= 2.7708 D_{60}= 0.3613
D_{50}= 0.0962 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Water Content: 12.8 %

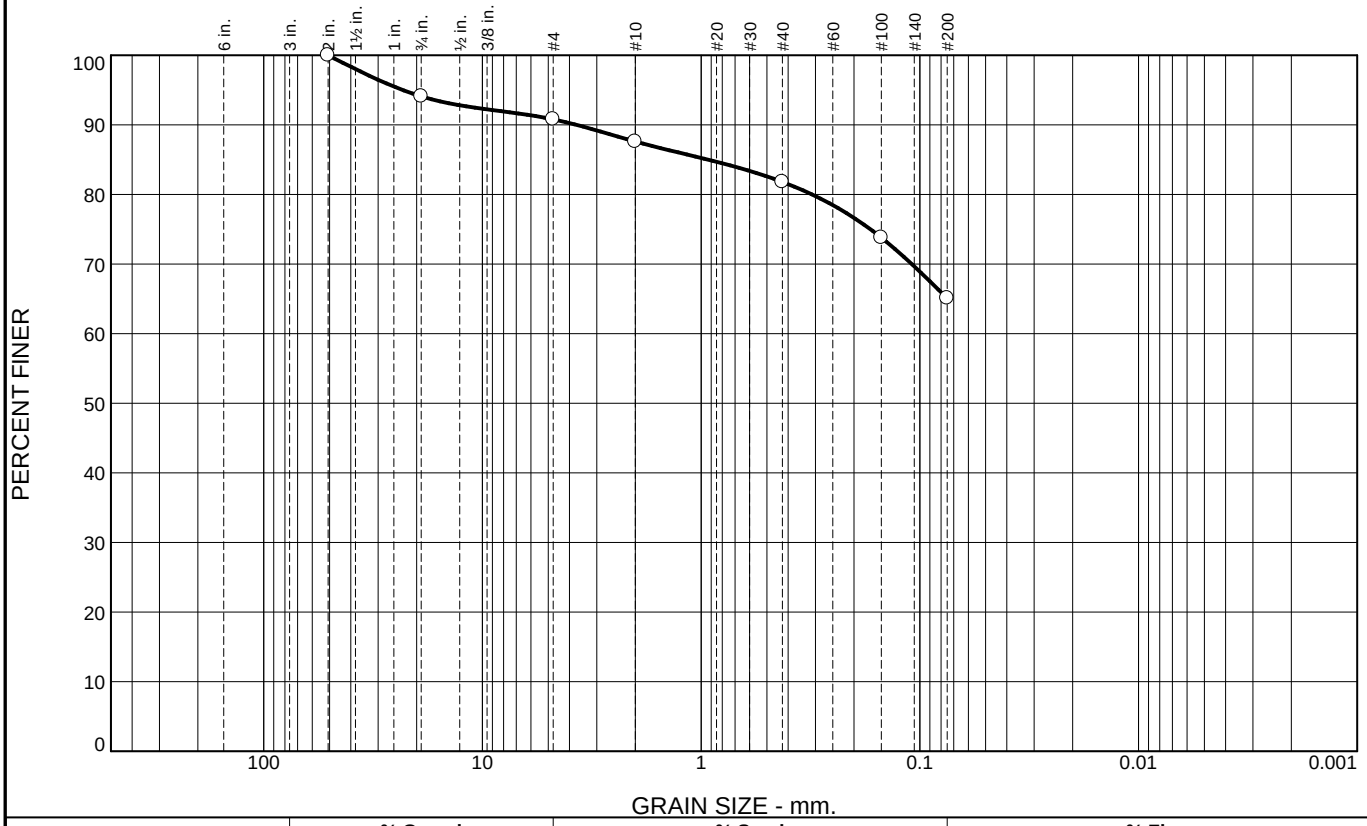
Location: B-4, S-2, 2 - 4'
Sample Number: S-2 **Depth:** 2-4' **Date:** 10/11/13

QCQA Laboratories, Inc.

Schenectady, NY

Client: VHB
Project: APWAN Development - Silo Ridge
Project No: G13-3523 **Figure** B4/S2

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	5.9	3.3	3.2	5.8	16.7	65.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
2	100.0		
.75	94.1		
#4	90.8		
#10	87.6		
#40	81.8		
#100	73.8		
#200	65.1		

* (no specification provided)

Soil Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 3.7141 D_{85}= 0.9293 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Water Content: 17.9 %

Location: B-5, S-6, 14 - 16'
Sample Number: S-6 **Depth:** 14-16' **Date:** 10/11/13

QCQA Laboratories, Inc.

Schenectady, NY

Client: VHB
Project: APWAN Development - Silo Ridge
Project No: G13-3523 **Figure** B5/S6

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	7.0	8.0	12.7	12.3	60.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
#4	93.0		
#10	85.0		
#40	72.3		
#100	65.4		
#200	60.0		

* (no specification provided)

Soil Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 3.3572 D_{85}= 2.0000 D_{60}= 0.0750
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Water Content: 16.7 %

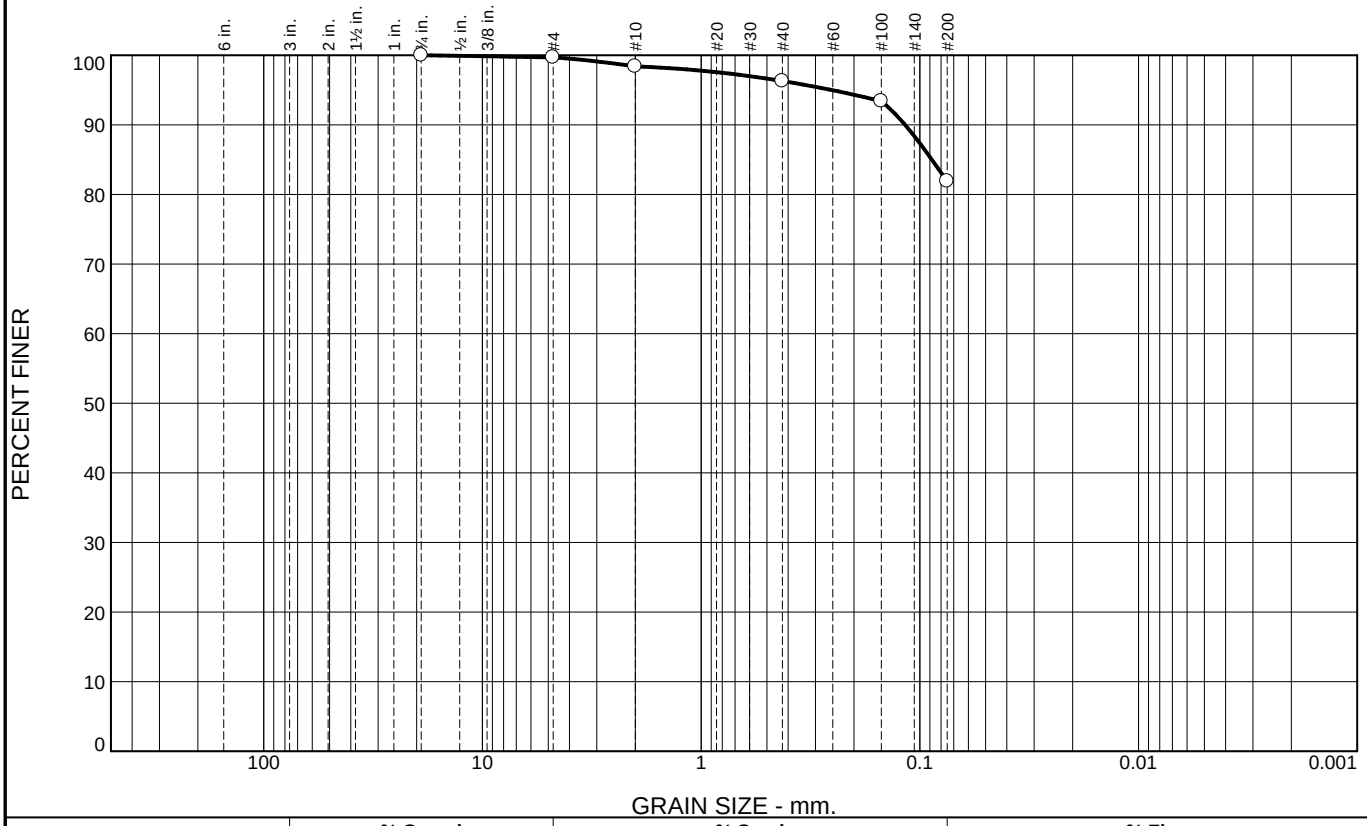
Location: B-6, S-5, 8 - 10'
Sample Number: S-5 **Depth:** 8-10 **Date:** 10/11/13

QCQA Laboratories, Inc.

Schenectady, NY

Client: VHB
Project: APWAN Development - Silo Ridge
Project No: G13-3523 **Figure** B6/S5

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.3	1.3	2.1	14.4	81.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
#4	99.7		
#10	98.4		
#40	96.3		
#100	93.4		
#200	81.9		

* (no specification provided)

Soil Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.1168 D_{85}= 0.0881 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Water Content: 22.6 %

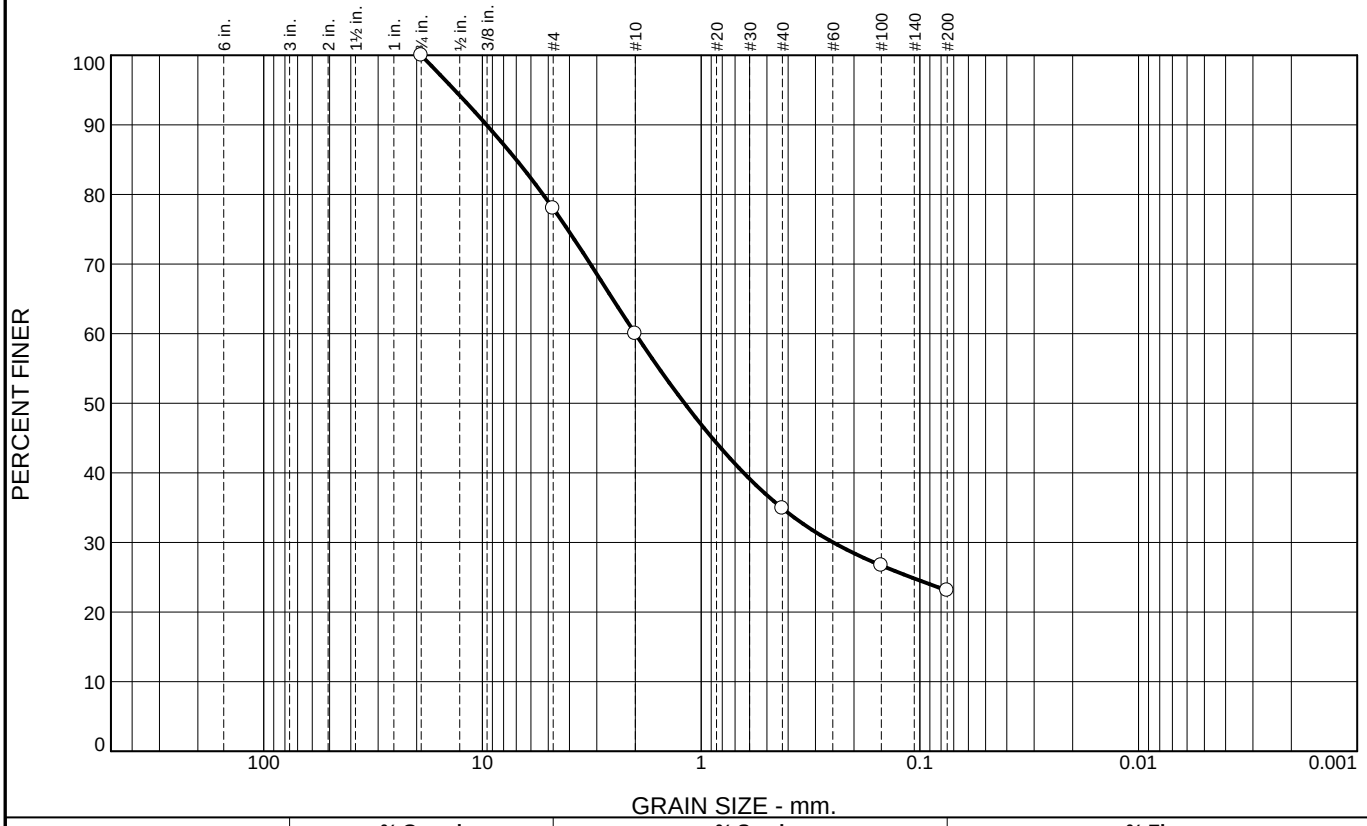
Location: B-10, S-3, 4 - 6'
Sample Number: S-3 **Depth:** 4-6' **Date:** 10/11/13

QCQA Laboratories, Inc.

Schenectady, NY

Client: VHB
Project: APWAN Development - Silo Ridge
Project No: G13-3523 **Figure** B10/S3

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	22.0	18.0	25.1	11.8	23.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
#4	78.0		
#10	60.0		
#40	34.9		
#100	26.7		
#200	23.1		

* (no specification provided)

Soil Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 9.5727 D_{85}= 7.0101 D_{60}= 2.0000
D_{50}= 1.1914 D_{30}= 0.2487 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Water Content: 5.1 %

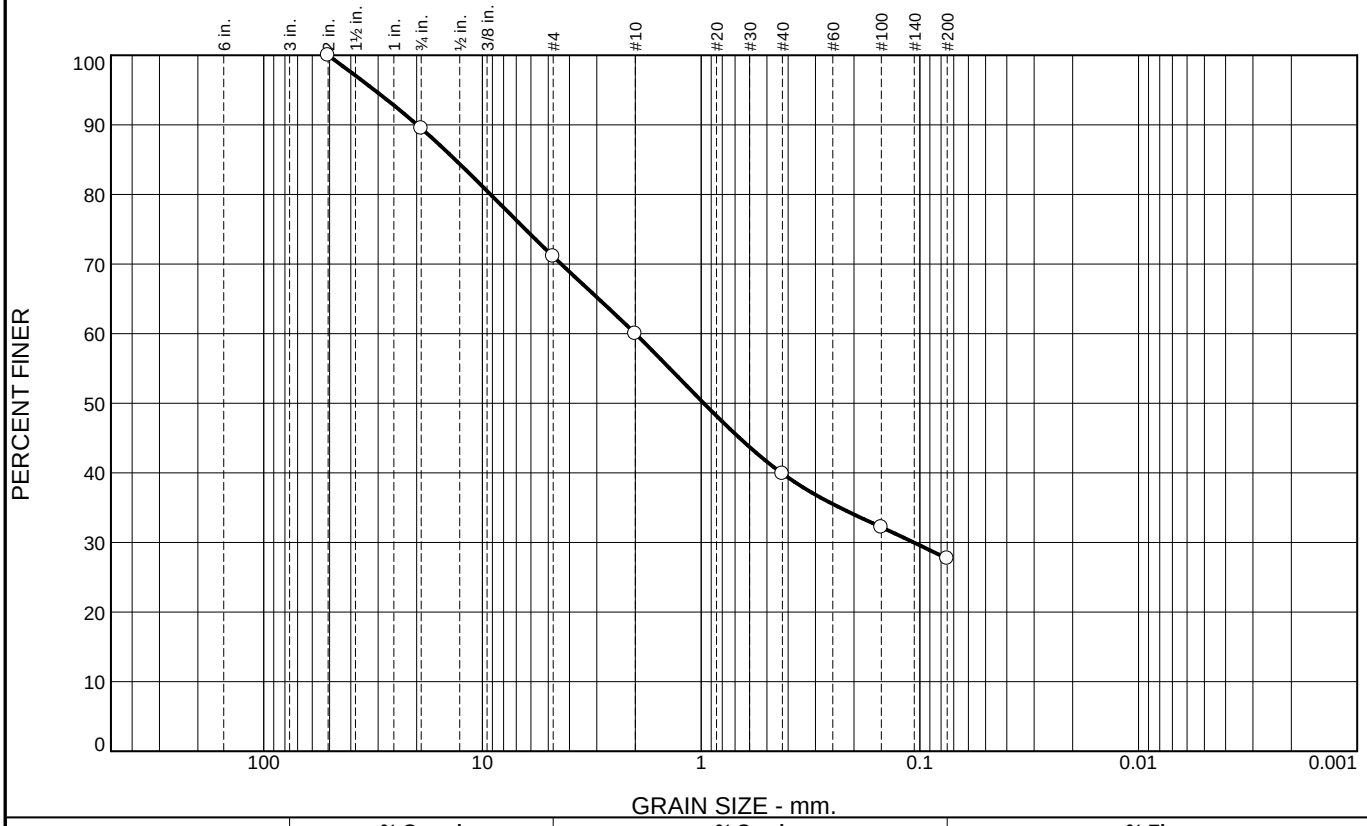
Location: B-11, S-2, 2 - 4'
Sample Number: S-2 **Depth:** 2 - 4' **Date:** 10/11/13

QCQA Laboratories, Inc.

Schenectady, NY

Client: VHB
Project: APWAN Development - Silo Ridge
Project No: G13-3523 **Figure** B11/S2

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	10.5	18.4	11.1	20.1	12.2	27.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
2	100.0		
.75	89.5		
#4	71.1		
#10	60.0		
#40	39.9		
#100	32.2		
#200	27.7		

* (no specification provided)

Soil Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 19.8675 D_{85}= 13.3223 D_{60}= 2.0000
D_{50}= 0.9720 D_{30}= 0.1065 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Water Content: 7.4 %

Location: B-12, S-1, 0 - 2'
Sample Number: S-1 **Depth:** 0-2' **Date:** 10/11/13

QCQA Laboratories, Inc.

Schenectady, NY

Client: VHB
Project: APWAN Development - Silo Ridge
Project No: G13-3523 **Figure** B12/S1

APPENDIX D

FILL MATERIAL AND PLACEMENT RECOMMENDATIONS

FILL MATERIAL AND PLACEMENT RECOMMENDATIONS

I. Fill Material Recommendations

A. Subbase Stone

The subbase stone course placed as the aggregate course beneath slab-on-grade and pavement construction should consist of a crusher run stone meeting the material and gradation requirements of New York State Department of Transportation (NYSDOT), Standard Specifications, Item 304.12 – Type 2 Subbase Course (Item 304.14 could also be used beneath pavement construction).

B. Structural Fill

Structural Fill should consist of a well graded crusher-run stone or bank-run sand and gravel, which is free of clay, expansive shale, organics and friable or deleterious particles. Imported Structural Fill should also conform to the following gradation requirements.

Sieve Size	Percent Finer by Weight
3 inch	100
¼ inch	25-85
No. 40	5-50
No. 200	0-10

C. Drainage Stone

Drainage Stone should consist of a blend of crusher run stone or crushed gravel meeting the material and gradation requirements of NYSDOT, Standard Specifications Section 703-02, Size Designations No. 1 and No. 2 (½-inch and 1-inch washed gravel or stone).

D. Pervious Granular Backfill

Pervious Granular Backfill should consist of a free draining granular fill, which meets the minimum requirements of NYSDOT, Standard Specifications Section 703-07, Concrete Sand, with 100 percent passing 3/8 inch sieve to maximum of 3 percent passing a No. 200 sieve.

E. General Fill

General Fill may be used for backfill in non-loaded areas outside of foundation, structure and slab-on-grade areas. General Fill may consist of on-site or imported soils, which are free of topsoil, organics, debris and deleterious materials and are of a moisture content suitable for proper compaction.

II. Fill Placement and Compaction Recommendations

All controlled fill placed beneath foundations, structures, utilities, slab-on-grade and pavement construction should be compacted to a minimum of 95 percent of the maximum dry density as measured by the modified Proctor test (ASTM D1557), or as directed by the geotechnical engineer. Fill placed in non-loaded grass areas can be compacted to a minimum of 90 percent of the maximum dry density (ASTM D1557).

Placement of fill should not exceed a maximum loose lift thickness of 6 to 9 inches and should be reduced in conjunction with the compaction equipment used so that the required density is attained.

Fill should have a moisture content within two percent of the optimum moisture content prior to compaction. Subgrades should be properly drained and protected from moisture and frost. Placement of fill on frozen subgrades is not acceptable. It is recommended that all fill placement and compaction be monitored and tested by qualified geotechnical personnel.

III. Quality Assurance Testing

The following minimum laboratory and field quality assurance testing frequencies are recommended to confirm fill material quality and post placement and compaction conditions. These minimum frequencies are based on generally uniform material properties and placement conditions. Should material properties vary or conditions at the time of placement vary (i.e. moisture content, placement and compaction, procedures or equipment, etc.), then additional testing is recommended. Additional testing, if required, should be determined by qualified geotechnical personnel based on evaluation of the actual fill material and construction conditions.

A. Laboratory Testing of Material Properties

- Moisture content (ASTM D-2216) - 1 test per 4000 cubic yards or no less than 2 tests per each material type.
- Grain Size Analysis (ASTM D-422) - 1 test per 4000 cubic yards or no less than 2 tests per each material type.
- Modified Proctor Moisture Density Relationship (ASTM D-1557) 1 test per 4000 cubic yards or no less than 1 test per each material type.

B. Field In-Place Moisture/Density Testing (ASTM D D-6938)

- Backfilling along trenches and foundation walls - 1 test per 50 lineal feet per lift.
- Backfilling Isolated Excavations (i.e. column foundations) - 1 test per lift.
- Filling in open areas for slab-on-grade and pavement construction - 1 test per 2500 square feet per lift.

APPENDIX E

INFORMATION REGARDING THIS GEOTECHNICAL ENGINEERING REPORT

IMPORTANT INFORMATION REGARDING THIS GEOTECHNICAL ENGINEERING REPORT

Transtech Engineering Services, P.C. (TransTech), has endeavored to prepare this report in accordance with generally accepted geotechnical engineering principles and practices. Geotechnical engineering analyses and evaluations are based partly on judgment and opinion, and are therefore far less exact than other engineering disciplines. Accordingly, TransTech believes that providing the report user with information regarding the preparation and limitations of this report will aid in the proper interpretation and implementation of the conclusions and recommendations presented in this report. The following information is provided in an effort to reduce potential geotechnical-related delays, cost over-runs and other problems that can develop during the design and construction process.

SCOPE OF SERVICES: The scope of this report is limited to the specific items identified in TransTech's Proposal for services for this project. The scope of services is limited to a geotechnical engineering evaluation of the conditions disclosed by the subsurface exploration and does not include any geoenvironmental assessment or investigation for the presence, absence or prevention of any hazardous or toxic materials or conditions (or mold) in the soil, groundwater or surface water within or beyond the project site. Unanticipated environmental problems can lead to significant project cost over-runs and TransTech recommends that the Owner retain a geoenvironmental consultant to discuss risk management guidance.

PROJECT-SPECIFIC FACTORS: The conclusions and recommendations presented in this report were prepared based on project-specific factors described in the report, such as the size, loading, type of construction and intended use of the structure; the location of the structure on the site; planned structure elevation(s) and site grading; other planned or existing site improvements, such as access roads, parking lots, underground utilities; and any other pertinent project information. Changes to the project details may alter the factors considered in development of the report conclusions and recommendations. As such, TransTech cannot accept responsibility or liability for problems that may develop if we are not consulted regarding any changes to the project-specific factors that were assumed during preparation of the report.

SUBSURFACE CONDITIONS: The subsurface exploration program for this project consisted of sampling only at discrete test locations. TransTech has used judgment to infer the subsurface conditions between the discrete test locations. The conclusions and recommendations presented in this report were based on the subsurface conditions disclosed/inferred at and between the discrete test locations at the time the subsurface exploration program was performed. We point out that surface and subsurface conditions at the site are subject to change subsequent to preparation of this report. Such changes may include floods, earthquakes, groundwater fluctuations, and construction activities at the site and/or adjoining properties. It should be understood that the actual subsurface conditions could vary from the conditions inferred by TransTech between and away from the discrete test locations, which could be revealed during construction. As such, TransTech should be retained during construction to confirm that the subsurface conditions are consistent with the conditions disclosed by the subsurface exploration program, and to refine our conclusions and recommendations in the event that the subsurface conditions differ from those disclosed by the subsurface exploration program.

USE OF THIS GEOTECHNICAL ENGINEERING REPORT: This report has been prepared for the exclusive use of our client, and any other parties specifically identified in the report, for specific application to the site and project-specific conditions described in the report. This report should not be applied to any other site or project, or for any uses other than those originally intended without TransTech's consent.

MISINTERPRETATION OF THIS REPORT: The conclusions and recommendations presented in this report are subject to misinterpretation by the design team and contractors, which can result in costly problems. The risk of misinterpretation by the design team can be reduced by having appropriate members of the design team confer with TransTech regarding the conclusions and recommendations presented in this report prior to completing the plans and specifications. In addition, TransTech should be retained to review pertinent elements of the design team's final plans and specifications prior to bidding to confirm that the recommendations presented in this report have been properly interpreted and applied. The risk of misinterpretation by contractors can be reduced by retaining TransTech to attend prebid and preconstruction conferences, and to provide construction observation.

COMPONENTS OF THIS REPORT: Subsurface exploration logs, figures, tables and any other report components are subject to misinterpretation if they are separated from this report. This may occur if copies of the boring logs or other report components are given to the contractors during the bid preparation process. To minimize this risk, report components should not be separated from the report and only complete copies of this report should be distributed as appropriate.

ALTERATION OF THIS REPORT: It is a violation of Section 7209 Subdivision 2 of the New York State Education Law for any person to alter this report in any way, except under the direction of a licensed professional engineer.