

UNDERWOOD ENGINEERING COMPANY

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CLIENT:	Solomon Builders 141 Ayers Court, Suite 1A Teaneck, NJ 07666
PROJECT:	Proposed Self Storage Facility 955 Pleasant Valley Way West Orange, NJ
REQUIREMENT:	Professional Engineering Services
LOCATION:	Slope Test Pits
DATE:	7/24/2020
UE REF. NO.:	4667-13907-2 (WO 20-5661)
ATTENTION:	Steven yenowitz Steven@solomonb.com

PURPOSE

The purpose of this report is to present the findings, conclusions and recommendations of the field inspection at the above project concerning the soil types along the rear property slope, and to verify if the rock can be excavated with standard construction equipment (i.e. excavators / hydraulic hammers).

INVESTIGATION

A representative from Underwood Engineering Company met with a representative from Solomon Builders and Representatives from Tom Krutis Excavating on July 23rd, 2020 at the above project to witness two (2) test pits utilizing a Caterpillar 321 track excavator. The test pits were performed to establish soil profile logs along the rear property slope and to determine if the rock can be excavated with standard construction equipment (i.e. excavators / hydraulic hammers).

The following documents were reviewed as part of this investigation:

1. Site Plans showing the existing conditions and proposed building locations were prepared by Stonefield Engineering & Design (Sheets C3, C3 & C5) dated 6/3/2020 Entitled "Preliminary & Final Major Site Plan, 955 Pleasant Valley Way, LLC, Proposed Self Storage Facility, Block 172.02, Lot 8.01 & 8.03, Tax Map Sheet 116, 955 Pleasant Valley Way (C.R. 636) Township of West Orange, Essex County, New Jersey".
2. A site plan (B-1) showing the proposed building location was prepared by Stonefield Engineering & Design, dated 10/18/2019, Entitled "Concept Plan B, Proposed Self-

Storage Facility, Block 172.02, Lot 8.01 & 8.03, 955 Pleasant Valley Way,
Township of West Orange, Essex County, New Jersey.”

3. A site plan (B-3) showing the proposed building location, existing conditions, test boring locations and infiltration test locations was prepared by Stonefield Engineering & Design, dated 11/13/2019, Entitled “Concept Plan B (Survey Overlay), Proposed Self-Storage Facility, Block 172.02, Lot 8.01 & 8.03, 955 Pleasant Valley Way, Township of West Orange, Essex County, New Jersey.”
4. Conceptual Structural Plans (S-1 – S-3) showing the proposed building layout and foundation sections were prepared by O’Donnell & Naccarato dated May 1st, 2020 Entitled “Conceptual Basement/FND Section, 1st Floor/FND Plan and Structural FND Section, Proposed Self Storage Facility, 955 Pleasant Valley Way, Township of West Orange, NJ 07052”
5. Preliminary Soil and Foundation Engineering Report prepared by Underwood Engineering Company for Solomon Builders (UE Refence No: 4667-13907-1) dated March 24th, 2020 revised May 20th, 2020 Entitled “Proposed Self Storage Facility, 955 Pleasant Valley Way, West Orange Township, Essex County, New Jersey”.

FINDINGS

1. The project is to consist of the proposed construction of a four (4) story self-storage facility with basement and 1,011 SF office. The overall building measures approximately 331 feet long by 110 feet wide by 55 feet tall in plan area. Floors 2 – 4 are cantilevered at the front of the building to provide covered parking and the rear of the building will be partially cut into the existing slope. The project will also consist of related parking, drive aisles and stormwater management areas. Framework for the proposed building is anticipated to be structural steel and masonry, concrete slab on grade construction.

Reinforced concrete retaining walls with an integral 12” H Pile and integral tie back system and reinforced concrete retaining walls to be designed by others are also planned / will be require for the project.

2. Based on the site grading information provided, the site will require cuts of approximately seven (7) to fifteen (15) feet through the flat to moderately sloped front / middle portion of the site and cuts of approximately sixteen (16) to twenty-nine (29) feet into the rear slope to achieve the basement and first floor finished floor elevations.

The proposed finished floor elevations are as follows: Basement Finished Floor 364.05,
First Floor Finished Floor 375.05.

3. The site soils encountered in the test pits consisted generally of the following profiles:

Zone 1: Silt and gravel with little fine to medium sands and fine to coarse sands and gravel with some amounts of silt were encountered in test pits TP-1 and TP-2 directly below the existing ground surface elevations to depths of approximately twenty (20) to fifty (50) inches below the existing ground surface elevations.

Zone 2: Silty clays and shales with little fine to coarse sands were encountered in test pits TP-1 and TP-2 directly below the Zone 1 soils to depths of approximately seventy-seven (77) to ninety-nine (99) inches below the existing ground surface elevations.

Zone 3: Siltstone / Shale rock was encountered in test pits TP-1 and TP-2 directly below the Zone 2 soils. Test Pits TP-1 and TP-2 were terminated in the Zone 3 rock at depths of approximately one hundred and eighty (180) to one hundred and eighty-seven (187) inches below the existing ground surface elevations.

4. See Appendix A, B, C, & D for Test Pit Location Plan, Test Pit Logs, Test Pit Photographs and General Soil Terms.

CONCLUSIONS / RECOMMENDATIONS

1. The Zone 2 and 3 materials encountered are consistent with the natural soils encountered in the test borings and are suitable for providing a maximum allowable bearing capacity of 4,000 Pounder Per Square Foot provided the requirements of the original geotechnical report are followed.
2. It is anticipated that the siltstone / shale rock encountered on site should be able to be excavated with standard construction equipment such as a 321 Caterpillar excavator or larger. The 321 Caterpillar excavator utilized for the test pits is smaller than what the contractors are planning on using for the actual construction and the 321 excavator was able to excavate below the proposed basement finished floor elevations.
3. All excavations must be conducted according OSHA Guidelines and temporary shoring such as H piles and lagging must be designed and implemented to prevent loss of lateral support for the surrounding subgrades, slopes, streets etc. All shoring to be designed by others prior to excavating into the slope.

QUALIFICATIONS

Conclusions and recommendations are based on the above investigation and findings. No other conclusions are to be drawn other than those specifically stated.

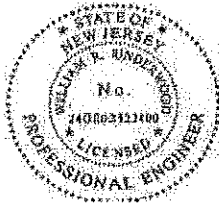
This report does not reflect any variations, which may be encountered during construction.

We should be informed immediately of such conditions so that we may modify our conclusions and recommendations, if necessary.

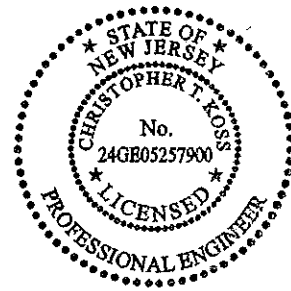
Underwood Engineering Company will not be responsible for variations in subsurface soils encountered in areas other than those tested.

Respectfully submitted,

UNDERWOOD ENGINEERING COMPANY



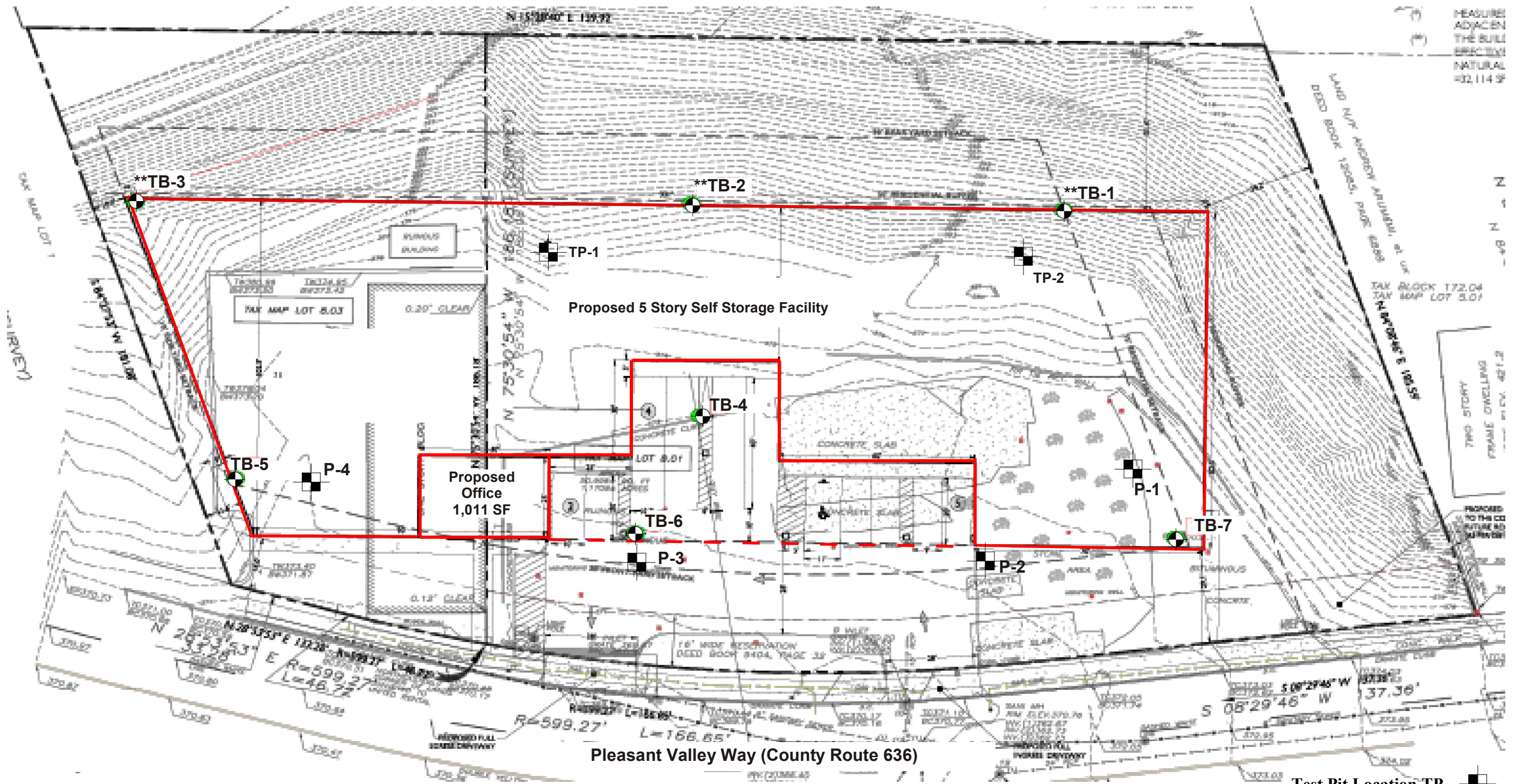
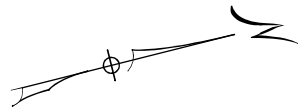
William R. Underwood, P.E.
President



Christopher T. Koss, P.E.
Project Engineer

UNDERWOOD ENGINEERING COMPANY

APPENDIX A
Test Pit Location Plan



****TB-1, TB-2 & TB-3
Not Accessible with Drill Rig**

Test Pit Location TP- 
Modified Borehole Percolation Test P- 
Test Boring Location T.B.- 

SOLOMON BUILDERS		Test Pit Location Plan			Proposed Self Storage Facility 955 Pleasant Valley Way West Orange Essex County, New Jersey
Underwood Engineering Company		Scale: N.T.S.	Date: July 27, 2020	UE Ref. No.: 4667-13907-2	

APPENDIX B

Test Pit Logs

Test Pit # 1

<u>Depth</u>	<u>Classification</u>
0" - 50"	Brown / Gray SILT and Gravel, little fine to medium Sand
50" - 99"	Red SILTY CLAY and Shale, little fine to coarse Sand
99" - 187"	Gray / Red SILTSTONE / SHALE (Test Pit terminated at approximate elevation 361.14)

Test Pit # 2

<u>Depth</u>	<u>Classification</u>
0" - 20"	Reddish brown fine to coarse SAND and Gravel, some Silt
20" - 77"	Red SILTY CLAY and Shale, little fine to coarse Sand
108" - 180"	Gray / Red SILTSTONE / SHALE (Test Pit terminated at approximate elevation 366.11)

APPENDIX C SITE PHOTOGRAPHS



Caterpillar 321 Excavator



Test Pit 1 Profile Zones 1, 2 & 3



Test Pit 2 Upper Profile Zones 1 & 2



Test Pit 2 Lower Profile Zones 2 & 3

APPENDIX D
General Soil Terms

General Soil Terms

Particle Sizes		Classifications
Boulders	Greater than 2 inches (305mm)	The major soil constituent is the principal noun, i.e. clay, silt, sand, gravel. The second major soil constituent and other minor constituents are reported as follows:
Cobbles	3 inches (76.233) to 12 inches (305mm)	
Gravel-coarse	3/4 inches (19.05mm) to 3 inches (76.2mm)	
Gravel-fine	No. 4- 3/16 inches (4 75mm) to 3/4 inches (19.05mm)	
Sand-coarse	No. 10 (2.00mm) to No. 4 (4 75mm)	Second Major Constituent-Minor Constituents (Percentage by weight)
Sand-medium	No. 40 (0.425mm) to No. 10 (2.00.)	
Sand-fine	No. 200 (0.075mm) to No. 40 (0.425mm)	
Silt	0.005mm to 0.074mm	Trace – 1 to 12%
Clay	Less than 0.005mm	Adjective – 12 to 35% (clayey, silty, etc.)
		Trace – 1 to 12%
		Little – 12 to 23
		Some – 23 to 33%
		And – Over 35%

Cohesive Soils

If clay content is sufficient so that clay dominates soil properties, clay becomes the principal noun with other major soil constituent as modifier: i.e. silty clay. Other minor soil constituents may be included in accordance with the classification breakdown for cohesionless soils: i.e. silty clay, trace of sand, little gravel

Unconfined Compressive Strength (psf)

Consistency	Approximate Range of (N)	
Very Soft	Below 500	0-2
Soft	500-1000	3-4
Medium	1000-2000	5-8
Stiff	2000-4000	9-15
Very Stiff	4000-8000	16-30
Hard	8000-16000	31-50
Very Hard	Over 16000	Over 50

Consistency of cohesive soils is based upon an evaluation of the observed resistance to deformation under load and not upon Standard Penetration Resistance (N)

Cohesionless Soils

Density Classification	Relative Density	Approximate Range of (N)
Very Loose	0-15	0-4
Loose	16-35	5-10
Medium Compact	36-65	11-30
Compact	66-85	31-50
Very Compact	86-100	Over 50

Relative Density of Cohesionless Soils is based upon the evaluation of the Standard Penetration Resistance (N), modified as required for depth effects, sampling effects, etc.

Standard Penetration Test (ASTM D 1586) – A 2.0" outside-diameter split barrel sampler is driven into undisturbed soil by means of a 140-pound weight falling freely through a vertical distance of 30 inches. The sampler is normally driven three successive 6-inch increments. The total number of blows required for the final 12 inches of penetration is the Standard Penetration Resistance (N).