SUMMIT
GEOENGINEERING SERVICES

Geotechnical Report

New Condominium Building
118 Congress Street
Portland, Maine

Prepared for:

TLA, Inc.
118 Congress St
Portland, Maine

Prepared by:

Summit Geoengineering Services
640 Main Street
Lewiston, Maine

Project #13193
December 2013

December 13, 2013
SGS #13193

118 Congress Street LLC
c/o TLA, Inc.
118 Congress St
Portland, Maine
Attn: Ed Theriault

Reference: Geotechnical Engineering Investigation, Proposed Condominium Building
118 Congress St., Portland, Maine

Dear Ed:

We have completed the geotechnical investigation for the construction of a new condominium building on Congress Street in Portland, Maine. Our scope of services included performing six test borings at the site and preparing this report summarizing our findings and geotechnical recommendations.

Our scope of services for this project did not include an environmental site assessment or further investigation for the presence or absence of hazardous or toxic material on, below, or around the site. No hazardous materials were encountered in the test borings completed at the site.

1.0 Project Description

The project consists of the construction of a new 4 story apartment building. The first or ground floor level will consist of a fully enclosed parking lot and two retail areas. The upper levels will consist of living units. The ground floor will be at or near the existing ground surface. An elevator pit, anticipated to extend to a depth of 5 feet (including the foundation) is planned for the middle of the building adjacent to Congress Street.

2.0 Explorations and Laboratory Testing

Summit Geoengineering Services (SGS) drilled a total of six borings at the site on December 3, 2013. The boring explorations were located by Summit by taping from existing site features. The boring locations were cleared from underground utilities by Dig Smart of Maine under contract to SGS. The borings using completed using 2¼-inch hollow stem augers. Borings were drilled to refusal, ranging from 4.2 to 17.5 feet. Standard penetration tests (SPT) with split

spoon samples were obtained at 5-foot intervals. The location of the borings is shown on the Test Boring Location Plan in Appendix A. Logs of the explorations are included in Appendix B.

A sample of the existing fill soil from B-2 at a depth of 5 feet was tested for grain size analysis in accordance with ASTM D422. A laboratory test report is included in Appendix C.

3.0 Subsurface Conditions

The soil at the site generally consists of the following materials and thicknesses.

- Pavement, 4 to 4-1/2 inches
- Fill, 4.5 to 9 feet
- Glacial Till, 8 to 9.5 feet
- Bedrock

The fill soil, encountered at all the boring locations, varies from brown to dark brown silty sand to brown gravelly sand to dark brown sandy silt. The fill did not contain organics or other unsuitable materials. SPT-N values in the fill ranged from 6 to 36 blows per foot (bpf) and averaged 8 bpf in the upper 2 feet. The SPT-N values in the fill at a depth of 5 feet ranged from 22 to 37 bpf and averaged 29 bpf. A SPT-N value = 4 bpf was encountered at a depth of 5 feet at the B-3 location. We believe that this fill is loosely placed soil used to backfill the excavation after removal of an underground tank. No petroleum odors were encountered in the fill soil.

The fill at a depth of 5 feet at the B-2 location, based on the grain size test, consisted of about 31% gravel, 64% sand, and 5% fines (primarily silt). This soil will be usable for the new construction at the site.

The glacial till soil is described as olive-brown sandy silt with a little gravel and trace of clay. SPT-N values in the till ranged from 40 to 73and averaged 61 bpf. The glacial till soil was not encountered at the B-1, B-5 and B-6 boring locations where refusal was encountered at depths of 4.2, 7.7, and 6.5 feet, respectively.

Refusal, presumed to be bedrock, was encountered at the following depths

DEPTH TO BEDROCK	
Boring	**Depth Below Existing Ground Surface (ft)**
B-2	17.5
B-3	17.5
B-4	13.4
B-5	7.7
B-6	6.5

Refusal at B-1 at a depth of 4.2 feet is likely on an underground obstruction, probably rubble from previous demolitions at the property.

Samples of the bedrock were not taken. Based on maps published by the Maine Geological Survey, the bedrock is part of the Spring Point Formation consisting of greenish-gray biotite-quartz schist and amphibolite.

Groundwater was not observed in the borings due to the sidewalls collapsing. Measurements taken in the drilling augers indicate that groundwater is not present at the site. This is consistent with the findings in the August 1998 Phase 2 ESA report prepared by EER.

4.0 Foundation Design Recommendations

A. Allowable Bearing Pressure

With proper site preparation, the proposed building can be supported using a conventional spread footing foundations. We recommend that the footings for the proposed building be designed using an allowable bearing pressure of 3,000 psf. Column locations and loads were not available for this report. Assuming typical loading conditions for this type of building, total settlement for this allowable bearing pressure is estimated to be less than 3/4 inch. Assuming proper subgrade preparation, differential settlement will be negligible. This bearing pressure and associated settlement are based on the following conditions:

- All pavement is removed from the building footprint prior to constructing the foundations.

- The exposed soil within the building footprint beneath the removed pavement is proofrolled by making a minimum of 6 passes in each of two perpendicular directions using a vibratory roller with a minimum operating weight of 10 tons. Proofrolling should be performed prior to excavating for the footings. The intent of proofrolling is to densify areas of looser existing fill (e.g., B-3) and thereby provide a more uniform subgrade density and bearing resistance.

- After excavation, footing trenches are proofrolled by making a minimum of 4 passes using a large walk-behind vibratory compactor.

- Rubble encountered at the base of the footing excavations, if encountered, is removed and replaced with Structural Fill or ¾ inch crushed stone.

B. Frost Protection

Based on the required frost protection depth, exterior footings should be constructed at a minimum depth of 4 feet below the exterior finished grade. This frost protection depth is based on a design air-freezing index of 1,250-degree days for the Portland area.

We recommend that the exterior of the foundation walls be backfilled with soil meeting the following gradation specification:

FOUNDATION BACKFILL	
Sieve Size	**Percent finer**
3 inch	100
¼ inch	60 to 100
No. 40	0 to 50
No. 200	0 to 7

Reference: MeDOT Specification 703.06, Type F

The maximum particle size should be limited to 6 inches. The Foundation Backfill should be compacted to a minimum of 95 percent of its maximum dry density, determined in accordance with ASTM D1557. Based on the grain size analysis, the fill in the area of B-2 will meet this gradation specification.

C. Groundwater Control

Groundwater was not observed in the borings and perimeter underdrains are not strictly necessary at this site. In order to account for potential changes in local and regional hydrogeology and infiltration of regionally generated surface water runoff it may be desired to install exterior perimeter underdrains. If used, perimeter underdrains should consist of 4 inch rigid perforated PVC placed adjacent to the exterior footings and surrounded by a minimum of 6 inches of crushed stone wrapped in filter fabric to prevent clogging from the migration of the fine soil particles in the foundation backfill soils. The underdrain pipe should be outlet to a location where it will be free flowing.

D. Seismic Design

The subgrade profile at the site is categorized as Site Class C, "Very Dense Soil and Soft Rock" in accordance with the 2009 International Building Code (IBC). The following seismic site coefficients should be used:

2009 IBC SEISMIC COEFFICIENTS	
Seismic Coefficient	**Site Class C**
Short period spectral response (S_S)	0.314
1 second spectral response (S_1)	0.077
Site coefficient (F_a)	1.2
Site Coefficient (F_v)	1.7
Design short period spectral response (S_{DS})	0.251
Design 1 second spectral response (S_{D1})	0.087

Soils susceptible to liquefaction were not encountered in the borings.

E. Slabs on Grade – Heated Areas

We recommend the slabs-on-grade in heated areas be constructed on a minimum 12-inch thick layer of Structural Fill (SF) or ¾ inch crushed stone.

STRUCTURAL FILL (SF)	
Sieve Size	**Percent finer**
3 inch	100
1/4 inch	25 to 70
No. 40	0 to 30
No. 200	0 to 7

Reference: MDOT 703.06, Type D

The maximum particle size should be limited to 6 inches. We recommend that the existing subgrade soil beneath the SF be proofrolled as described in Section 4.0A. The SF can be placed in a single 12-inch lift, assuming that it can be compacted to 95 percent of its maximum dry density determined in accordance with ASTM D1557.

The slabs can be designed using a subgrade modulus value of 175 pci for the above subgrade conditions.

F. Slabs-on-Grade – Unheated Areas

We recommend that slabs on grade in unheated areas be placed on a minimum of 30 inches of SF in order to provide frost heave protection. Concrete for exterior slabs should be air-entrained and have a minimum 28 cay compressive strength of 4,000 psi. We recommend that concrete slabs at entrances be constructed on a frost wall foundation. This construction method will exclude potential slab movements from interfering with doors.

5.0 Pavement Section Design

The mean annual freezing index for the Portland area is approximately 900 degree F days. The mean annual frost penetration depth for this freezing index and the soil at the site is approximately 30 inches. The subgrade soil in the ground floor parking area is anticipated to consist of the existing proofrolled fill soil.

Based on the subgrade soil conditions and the anticipated traffic (cars and light trucks traveling at low speeds) we recommend a minimum total pavement section thickness of approximately 60% of the mean annual frost penetration depth, or 18 inches. We further recommend that the pavement section consist of the following materials.

PAVEMENT SECTION MATERIAL THICKNESSES		
Material	**Thickness (in)**	**Specification**
Asphalt Surface Course	3/4	MeDOT 703.09 Grading D MeDOT Superpave 9.5 mm
Asphalt Binder Course	2-1/4	MeDOT Superpave 19 mm
Base Soil	3	MeDOT 703.06 Type A
Subbase Soil	12	MeDOT 703.06 Type D

The material specifications are referenced to the 1995 Maine Department of Transportation Standard Specifications for Highways and Bridges.

We recommend that the subgrade soil in pavement areas be proofrolled as described in Section 4A above. Subbase and Base soil can each be placed in a single lift. These soils should be compacted to a minimum of 95 percent of their maximum dry density, determined in accordance with ASTM D1557, Modified Proctor Density.

Groundwater is not an issue for pavement areas at this site and pavement underdrains are not necessary.

6.0 Construction Considerations

The composition of the existing fill is primarily mineral. The fill at the B-2 location and possibly other locations will be suitable for reuse at the site. We recommend that soil which appears to clean and granular be stockpiled at the site and reused as appropriate, based on laboratory grain size tests performed on samples from the stockpile.

We recommend that the pavement be removed in its entirety from beneath the building footprint. The subgrade soil within the building footprint should be proofrolled by making a minimum of 5 passes in each of two perpendicular directions using a vibratory roller with a minimum operating weight of 10 tons. Proofrolling should be performed prior to excavating for the footings. This procedure is important to provide a uniform dense subgrade soil at this site, considering the presence of the loose fill soil at the B-3 location and possibly other locations not explored.

The existing fill soil is classified as OSHA Type C. Temporary Slopes in the existing fill soil should be sloped no steeper than 1.5H:1V.

7.0 Closure

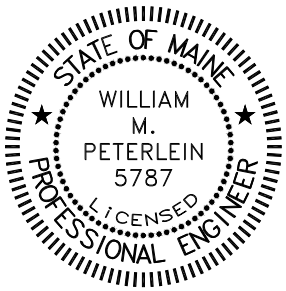
Our recommendations are based on professional judgment and generally accepted principles of geotechnical engineering. Some changes in subsurface conditions from those presented in this report may occur. Should these conditions differ materially from those described in this report, Summit should be notified so that we can re-evaluate our recommendations.

Finished grades and foundation loads were not available for this report. We recommend that SGS be given an opportunity to review the grading and foundation plans to confirm that the assumptions used to generate the recommendations in this report are valid.

We appreciate the opportunity to provide geotechnical engineering services on this phase of the project. If there are any questions please do not hesitate to contact me.

Sincerely,
Summit Geoengineering Services, Inc.

William M. Peterlein, P.E.
Principal Geotechnical Engineer



APPENDIX A

TEST BORING LOCATION PLAN

LEGEND

B-1 SUMMIT TEST BORING (DECEMBER 3, 2013)

PLAN REFERENCE

"118 CONDOMINIUMS, PARKING LEVEL", DATED NOVEMBER 1, 2013, PREPARED BY ARCHETYPE ARCHITECTS

TEST BORING LOCATION PLAN
118 CONGRESS STREET

PORTLAND, MAINE

PREPARED FOR

TLA, INC.

DATE: DEC. 4, 2013	DRAWN BY: KRF	CHECKED BY: WMP
JOB: 13193	SCALE: 1" = 25'	FILE: 13193 BOR

145 LISBON ST. - SUITE 601
LEWISTON, ME 04240
Tel.: (207) 576-3313

2002 ATLANTIC HIGHWAY
CAMDEN, ME 04843
Tel.: (207) 706-7999

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APPENDIX B

BORINGS LOGS

EXPLORATION REPORT COVER SHEET

The exploration report has been prepared by the geotechnical engineer from both field and laboratory data. Differences between field logs and exploration reports may exist.

It is common practice in the soil and foundation engineering profession that field logs and laboratory data sheets not be included in engineering reports, because they do no represent the engineer's final opinion as to appropriate descriptions for conditions encountered in the exploration and testing work. The field logs will be retained in our office for review. Results of laboratory tests are generally shown on the borings logs or are described in the text of the report as appropriate.

Drilling and Sampling Symbols:

SS = Split Spoon
ST = Shelby Tube – 2" OD, disturbed
UT = Shelby Tube – 3" OD, undisturbed
HSA = Hollow Stem Auger
CS = Casing – size as noted
Sv = Vane Shear
PP = Pocket Penetrometer
RX = Rock Core – size as noted
Hyd = Hydraulic advance of probes
WOH = Weight of Hammer
WOR = Weight of Rod
GS = Grain Size Data
PI = Plasticity Index
LL = Liquid Limit
w = Natural Water Content
USCS = unified Soil Classification System

Water Level Measurements:

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable groundwater levels. In impervious soils, the accurate determination of groundwater elevations may not be possible, even after several days of observations; additional evidence of groundwater elevations via observation or monitoring wells must be sought.

Gradation Description and Terminology:

Boulders:	Over 8 inches	Trace:	Less than 5%
Cobbles:	8 inches to 3 inches	Little:	5% to 15%
Gravel:	3 inches to No.4 sieve	Some:	15% to 25%
Sand:	No.4 to No. 200 sieve	Silty, Sandy, etc.:	Greater than 25%
Silt:	No. 200 sieve to 0.005 mm		
Clay:	less than 0.005 mm		

Density of Granular Soils and Consistency of Cohesive Soils:

CONSISTENCY OF COHESIVE SOILS		DENSITY OF GRANULAR SOILS	
SPT N-value blows/ft	**Consistency**	**SPT N-value blows/ft**	**Relative Density**
0 to 2	Very Soft	0 to 3	Very Loose
3 to 4	Soft	4 to 9	Loose
5 to 8	Firm	10 to 29	Compact
9 to 16	Stiff	30 to 49	Dense
17 to 32	Very Stiff	50 to 80	Very Dense
>32	Hard		

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SOIL BORING LOG

Project:	Residential Building	Boring #:	B-1
Location:	118 Congress Street	Project #:	13193
City, State:	Portland, Maine	Sheet:	1 of 1
		Chkd by:	

Drilling Co:	Summit Geoengineering Services
Driller:	C. Coolidge, P.E.
Summit Staff:	B. Peterlein, P.E.
Boring Elevation:	
Reference:	
Date started:	12/3/2013 Date Completed: 12/3/2013

DRILLING METHOD	SAMPLER
Vehicle: Tracked	Length: 24" SS
Model: AMS Power Probe	Diameter: 2"OD/1.5"ID
Method: 2-1/2" H.S.A.	Hammer: 140 lb
Hammer Style: Auto	Method: ASTM D1586

ESTIMATED GROUND WATER DEPTH

Date	Depth	Elevation	Reference
12/3/2013			None observed - borehole dry

Depth (ft.)	No.	Pen/Rec (in)	Depth (ft)	blows/6"	N_{60}	SAMPLE DESCRIPTION	Geological/ Test Data	Geological Stratum
						4" Pavement		
1	S-1	24/20	0.5 to 2.5	4		Brown to dark brown Silty SAND, trace Gravel,		FILL
				3		damp, loose, SM		
2				3				
				5				
3								
4								
5						End of Boring at 4.2 feet - Auger Refusal		
6								
						Note: Refusal probably on bedrock - possible		
7						boulder or rubble		
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								

Granular Soils		Cohesive Soils		% Composition
Blows/ft.	Density	Blows/ft.	Consistency	ASTM D2487
0-4	V. Loose	<2	V. soft	
5-10	Loose	2-4	Soft	< 5% Trace
11-30	Compact	5-8	Firm	5-15% Little
31-50	Dense	9-15	Stiff	15-30% Some
>50	V. Dense	16-30	V. Stiff	> 30% With
		>30	Hard	

NOTES: PP = Pocket Penetrometer, MC = Moisture Content
LL = Liquid Limit, PI = Plastic Index

Bedrock Joints
Shallow = 0 to 35 degrees
Dipping = 35 to 55 degrees
Steep = 55 to 90 degrees

Boulders = diameter > 12 inches, Cobbles = diameter < 12 inches and > 3 inches
Gravel = < 3 inch and > No 4, Sand = < No 4 and >No 200, Silt/Clay = < No 200

Soil Moisture Condition
Dry: S = 0%
Humid: S = 1 to 25%
Damp: S = 26 to 50%
Moist: S = 51 to 75%
Wet: S = 76 to 99%
Saturated: S = 100%

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SOIL BORING LOG

Project:	Residential Building	Boring #:	B-2
Location:	118 Congress Street	Project #:	13193
City, State:	Portland, Maine	Sheet:	1 of 1
		Chkd by:	

Drilling Co:	Summit Geoengineering Services	Boring Elevation:	
Driller:	C. Coolidge, P.E.	Reference:	
Summit Staff:	B. Peterlein, P.E.	Date started: 12/3/2013	Date Completed: 12/3/2013

DRILLING METHOD		SAMPLER	
Vehicle:	Tracked	Length:	24" SS
Model:	AMS Power Probe	Diameter:	2"OD/1.5"ID
Method:	2-1/2" H.S.A.	Hammer:	140 lb
Hammer Style:	Auto	Method:	ASTM D1586

ESTIMATED GROUND WATER DEPTH

Date	Depth	Elevation	Reference
12/3/2013			Borehole caved at 10 ft - dry

Depth (ft.)	No.	Pen/Rec (in)	Depth (ft)	blows/6"	N_{60}	SAMPLE DESCRIPTION	Geological/ Test Data	Geological Stratum
	S-1	24/8	0 to 2	5		Dark brown Gravelly SAND, little Silt, trace organics,		
1				4		loose, moist, SM		
				2				FILL
2				2				
3								
4								
5								
	S-2	24/20	5 to 7	7		Brown Gravelly SAND, trace Silt, dense, moist, SP	31.3% Gravel	
6				11			63.7% Sand	
				26			5% Fines	
7				15				
						Cobbles and Boulders at 7 ft		
8						Hard drilling		
9								
10								GLACIAL TILL
	S-3	24/24	10 to 12	17		Olive-brown slightly mottled Sandy SILT, tace		
11				22		Gravel and Clay, very stiff, moist, ML		
				20				
12				20				
13								
14								
15								
	S-4	24/24	15 to 17	20				
16				48		Olive-gray SILT, little Sand, trace Gravel and Clay,		
				25		hard, damp, ML		
17				19				
18						End of Boring at 17.5 ft - Auger Refusal		BEDROCK
19								
20								
21								
22								

Granular Soils		Cohesive Soils		% Composition
Blows/ft.	Density	Blows/ft.	Consistency	ASTM D2487
0-4	V. Loose	<2	V. soft	
5-10	Loose	2-4	Soft	< 5% Trace
11-30	Compact	5-8	Firm	5-15% Little
31-50	Dense	9-15	Stiff	15-30% Some
>50	V. Dense	16-30	V. Stiff	> 30% With
		>30	Hard	

NOTES: PP = Pocket Penetrometer, MC = Moisture Content
LL = Liquid Limit, PI = Plastic Index

Bedrock Joints
Shallow = 0 to 35 degrees
Dipping = 35 to 55 degrees
Steep = 55 to 90 degrees

Boulders = diameter > 12 inches, Cobbles = diameter < 12 inches and > 3 inches
Gravel = < 3 inch and > No 4, Sand = < No 4 and >No 200, Silt/Clay = < No 200

Soil Moisture Condition
Dry: S = 0%
Humid: S = 1 to 25%
Damp: S = 26 to 50%
Moist: S = 51 to 75%
Wet: S = 76 to 99%
Saturated: S = 100%

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SOIL BORING LOG

Boring #: **B-3**

Project:	Residential Building	Project #:	13193
Location:	118 Congress Street	Sheet:	1 of 1
City, State:	Portland, Maine	Chkd by:	

Drilling Co:	Summit Geoengineering Services	Boring Elevation:	
Driller:	C. Coolidge, P.E.	Reference:	
Summit Staff:	B. Peterlein, P.E.	Date started: 12/3/2013	Date Completed: 12/3/2013

DRILLING METHOD	SAMPLER
Vehicle: Tracked	Length: 24" SS
Model: AMS Power Probe	Diameter: 2"OD/1.5"ID
Method: 2-1/2" H.S.A.	Hammer: 140 lb
Hammer Style: Auto	Method: ASTM D1586

ESTIMATED GROUND WATER DEPTH

Date	Depth	Elevation	Reference
12/3/2013			Borehole caved at 3 ft - dry

Depth (ft.)	No.	Pen/Rec (in)	Depth (ft)	blows/6"	N_{60}	SAMPLE DESCRIPTION	Geological/ Test Data	Geological Stratum
						4-1/2" Pavement		
1								
	S-1	12/12	1 to 2	7		Brown SAND, little Gravel and Silt, compact, dry, SM		FILL
2				6				
3								
4								
5								
	S-2	24/18	5 to 7	1		Olive-brown SILT mixed with Gravel Sand and Clay,		
6				2		loose, damp, ML		
				2				
7				1				
8								
9								
10								
	S-3	24/24	10 to 12	16		Olive-brown to olive gray SILT, little Gravel, trace		GLACIAL TILL
11				24		Clay, hard, moist, ML		
				36				
12				49				
13								
14								
15								
	S-4	24/24	15 to 17	30		Cobble at 15 to 15.5 ft		
16				40		Olive-brown Sandy SILT, little Gravel, trace Clay,		
				40		dense, damp, ML		
17				43				
18						End of Boring at 17.5 ft - Auguer Refusal		BEDROCK
19								
20								
21								
22								

Granular Soils		Cohesive Soils		% Composition
Blows/ft.	Density	Blows/ft.	Consistency	ASTM D2487
0-4	V. Loose	<2	V. soft	
5-10	Loose	2-4	Soft	< 5% Trace
11-30	Compact	5-8	Firm	5-15% Little
31-50	Dense	9-15	Stiff	15-30% Some
>50	V. Dense	16-30	V. Stiff	> 30% With
		>30	Hard	

NOTES: PP = Pocket Penetrometer, MC = Moisture Content
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Wet: S = 76 to 99%
Saturated: S = 100%

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SOIL BORING LOG

Project:	Residential Building	Boring #:	B-4
Location:	118 Congress Street	Project #:	13193
City, State:	Portland, Maine	Sheet:	1 of 1
		Chkd by:	

Drilling Co:	Summit Geoengineering Services
Driller:	C. Coolidge, P.E.
Summit Staff:	B. Peterlein, P.E.
Boring Elevation:	
Reference:	
Date started:	12/3/2013 Date Completed: 12/3/2013

DRILLING METHOD	SAMPLER
Vehicle: Tracked	Length: 24" SS
Model: AMS Power Probe	Diameter: 2"OD/1.5"ID
Method: 2-1/2" H.S.A.	Hammer: 140 lb
Hammer Style: Auto	Method: ASTM D1586

ESTIMATED GROUND WATER DEPTH

Date	Depth	Elevation	Reference
12/3/2013			Borehole caved at 5.4 ft - dry

Depth (ft.)	No.	Pen/Rec (in)	Depth (ft)	blows/6"	N_{60}	SAMPLE DESCRIPTION	Geological/ Test Data	Geological Stratum
	S-1	12/8	0 to 1	12		2" Pavement		
1				24		Dark brown Sandy SILT, little Gravel, hard, dry, ML		FILL
2								
3								
4								
5								
	S-2	24/24	5 to 7	19		Dark brown Sandy SILT, little Gravel, hard, dry, ML		
6				24		Olive-brown fine Sandy SILT, little Gravel, trace Clay,		
				16		hard, humid, ML		
7				20				GLACIAL TILL
8						Cobble at 7 to 8 ft		
9						Dense at 9 ft		
10								
	S-3	24/24	10 to 12	13		Olive gray Sandy SILT, little Gravel, trace Clay,		
11				29		hard, humid, ML		
				41				
12				30				
13								
14						End of Boring at 13.4 ft - Auger Refusal		BEDROCK
15								
16								
17								
18								
19								
20								
21								
22								

Granular Soils		Cohesive Soils		% Composition
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31-50	Dense	9-15	Stiff	15-30% Some
>50	V. Dense	16-30	V. Stiff	> 30% With
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Humid: S = 1 to 25%
Damp: S = 26 to 50%
Moist: S = 51 to 75%
Wet: S = 76 to 99%
Saturated: S = 100%

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SOIL BORING LOG

Project:	Residential Building	Boring #:	B-5
Location:	118 Congress Street	Project #:	13193
City, State:	Portland, Maine	Sheet:	1 of 1
		Chkd by:	

Drilling Co:	Summit Geoengineering Services
Driller:	C. Coolidge, P.E.
Summit Staff:	B. Peterlein, P.E.
Boring Elevation:	
Reference:	
Date started:	12/3/2013 Date Completed: 12/3/2013

DRILLING METHOD	SAMPLER
Vehicle: Tracked	Length: 24" SS
Model: AMS Power Probe	Diameter: 2"OD/1.5"ID
Method: 2-1/2" H.S.A.	Hammer: 140 lb
Hammer Style: Auto	Method: ASTM D1586

ESTIMATED GROUND WATER DEPTH

Date	Depth	Elevation	Reference
12/3/2013			None observed in borehole

Depth (ft.)	No.	Pen/Rec (in)	Depth (ft)	blows/6"	N_{60}	SAMPLE DESCRIPTION	Geological/ Test Data	Geological Stratum
	S-1	24/18	0 to 2	2		Dark brown Silty SAND, trace Gravel, loose, humid		
1				3		SM		
				3				FILL
2				1				
3								
4								
5								
	S-2	24/24	5 to 7	6		Brown Gravelly SAND, trace to little Silt, dense, dry		
6				12		SM		
				16				
7				25				
8						End of Boring at 7.7 ft - Auger Refusal		BEDROCK
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								

Granular Soils		Cohesive Soils		% Composition
Blows/ft.	Density	Blows/ft.	Consistency	ASTM D2487
0-4	V. Loose	<2	V. soft	
5-10	Loose	2-4	Soft	< 5% Trace
11-30	Compact	5-8	Firm	5-15% Little
31-50	Dense	9-15	Stiff	15-30% Some
>50	V. Dense	16-30	V. Stiff	> 30% With
		>30	Hard	

NOTES: PP = Pocket Penetrometer, MC = Moisture Content
LL = Liquid Limit, PI = Plastic Index

Bedrock Joints
Shallow = 0 to 35 degrees
Dipping = 35 to 55 degrees
Steep = 55 to 90 degrees

Boulders = diameter > 12 inches, Cobbles = diameter < 12 inches and > 3 inches
Gravel = < 3 inch and > No 4, Sand = < No 4 and >No 200, Silt/Clay = < No 200

Soil Moisture Condition
Dry: S = 0%
Humid: S = 1 to 25%
Damp: S = 26 to 50%
Moist: S = 51 to 75%
Wet: S = 76 to 99%
Saturated: S = 100%

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GEOENGINEERING SERVICES

SOIL BORING LOG

Project:	Residential Building	Boring #:	B-6
Location:	118 Congress Street	Project #:	13193
City, State:	Portland, Maine	Sheet:	1 of 1
		Chkd by:	

Drilling Co:	Summit Geoengineering Services
Driller:	C. Coolidge, P.E.
Summit Staff:	B. Peterlein, P.E.

Boring Elevation:
Reference:
Date started: 12/3/2013 Date Completed: 12/3/2013

DRILLING METHOD	SAMPLER
Vehicle: Tracked	Length: 24" SS
Model: AMS Power Probe	Diameter: 2"OD/1.5"ID
Method: 2-1/2" H.S.A.	Hammer: 140 lb
Hammer Style: Auto	Method: ASTM D1586

ESTIMATED GROUND WATER DEPTH

Date	Depth	Elevation	Reference
12/3/2013			None observed in borehole

Depth (ft.)	No.	Pen/Rec (in)	Depth (ft)	blows/6"	N_{60}	SAMPLE DESCRIPTION	Geological/ Test Data	Geological Stratum
	S-1	24/18	0 to 2	3		3-1/2" Pavement		
1				4		Brown Gravelly SAND, trace Silt, loose, dry, SM		FILL
				3				
2				4				
3								
						Hard drilling at 3 to 5 ft		
4								
5								
	S-2	10/10	5 to 5.3	11		Brown Gravelly SAND, trace Silt, loose, dry, SM		
6				50-4"		broken cobble in spoon tip		
7						End of Boring at 6.5 ft - Auger Refusal		
8								
						Note: Refusal probably on bedrock - possible		
9						boulder or rubble		
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								

Granular Soils		Cohesive Soils		% Composition
Blows/ft.	Density	Blows/ft.	Consistency	ASTM D2487
0-4	V. Loose	<2	V. soft	
5-10	Loose	2-4	Soft	< 5% Trace
11-30	Compact	5-8	Firm	5-15% Little
31-50	Dense	9-15	Stiff	15-30% Some
>50	V. Dense	16-30	V. Stiff	> 30% With
		>30	Hard	

NOTES: PP = Pocket Penetrometer, MC = Moisture Content
LL = Liquid Limit, PI = Plastic Index

Bedrock Joints
Shallow = 0 to 35 degrees
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Boulders = diameter > 12 inches, Cobbles = diameter < 12 inches and > 3 inches
Gravel = < 3 inch and > No 4, Sand = < No 4 and >No 200, Silt/Clay = < No 200

Soil Moisture Condition
Dry: S = 0%
Humid: S = 1 to 25%
Damp: S = 26 to 50%
Moist: S = 51 to 75%
Wet: S = 76 to 99%
Saturated: S = 100%

APPENDIX C

LABORATORY TEST RESULTS

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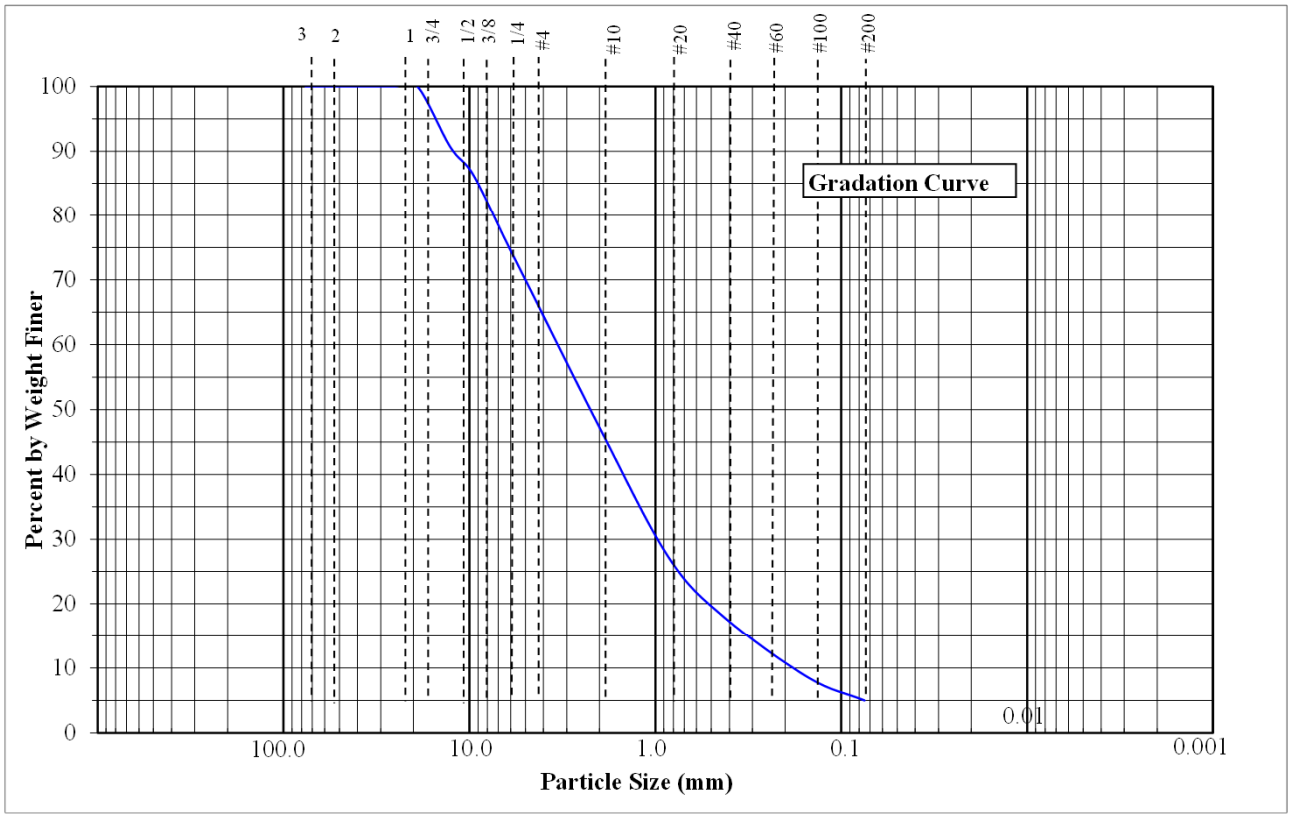
GEOENGINEERING SERVICES

GRAIN SIZE ANALYSIS - ASTM D422

PROJECT NAME:	118 Congress Street Condos	PROJECT NUMBER:	13193
CLIENT:	TLA, Inc.	SAMPLE NUMBER:	B-2, S-2
SOURCE:	B-2, 5' - 7'	DESCRIPTION:	Gravelly SAND, trace Silt, SW
DATE:	12/6/2013	TECHNICIAN:	Erika Hawklsey, E.I.

DATA

PARTICLE SIZE mm		% BY WT FINER
76.20	(3 in)	100.0
50.80	(2 in)	100.0
38.10	(1-1/2 in)	100.0
25.40	(1 in)	100.0
19.05	(3/4 in)	100.0
12.70	(1/2 in)	90.7
9.53	(3/8 in)	86.3
6.35	(1/4 in)	75.9
4.75	(No. 4)	68.7
2.00	(No. 10)	47.3
0.85	(No. 20)	27.2
0.43	(No. 40)	17.9
0.15	(No. 100)	8.5
0.075	(No. 200)	5.0



REMARKS: Moisture Content = 5.6%

2002 Atlantic Highway (PO Box 838) Camden, Maine, (207) 318-7761
145 Lisbon Street (PO Box 7216) Lewiston, Maine (207) 576-3313