patersongroup

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Environmental Engineering
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Geological Engineering
Materials Testing
Building Science
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February 12, 2016
File: PG3498-LET.01

2336925 Ontario Inc.
64 Cleopatra Drive
Ottawa, Ontario
K2G 0B4

Attention: **Mr. Mike Giampaolo**

Subject: **Geotechnical Investigation**
Proposed Building Addition
64 Cleopatra Drive - Ottawa

Dear Sir,

Paterson Group (Paterson) was commissioned by 2336925 Ontario Inc. to update the existing geotechnical report for a proposed building addition to the existing building located at 64 Cleopatra Drive, in the City of Ottawa, Ontario. The following letter report presents our findings and recommendations.

It is understood that the proposed project consists of a one (1) storey building addition along the north side of the existing two (2) storey building.

1.0 Field Investigation

The fieldwork for the investigation was conducted on October 17, 2011, and comprised of excavating five (5) test pits using a rubber tired backhoe. All fieldwork was conducted under the full-time supervision of Paterson personnel under the direction of a senior engineer from the geotechnical division.

The location and ground surface elevation at the test pit locations were surveyed by Paterson field personnel. Ground surface elevations at the test pit locations were referenced to a temporary benchmark (TBM), consisting of the top spindle of a fire hydrant located at the southeast corner of Cleopatra Drive and Caesar Avenue. A geodetic elevation of 91.05 m was provided by Ainley Group for the TBM. The locations and ground surface elevations of the test pits and the TBM are shown on Drawing PG3498-1 - Test Hole Location Plan attached to the present letter report.

2.0 Field Observations

Currently, the subject site is occupied by a two (2) storey commercial building with associated parking, access lanes and industrial storage areas. The site is relatively flat and at grade with Cleopatra Drive.

The subsurface profile encountered at the test pit locations consists of a crushed stone or pavement structure underlain by silty sand fill mixed with trace brick, concrete and pvc pipe sections. The fill layer was underlain by a native compact to dense silty sand /sandy silt deposit. Reference should be made to the Soil Profile and Test Data sheets attached to the present letter for specific details of the soil profile encountered at the test pit locations.

The test pits were dry upon completion. Groundwater levels are subject to seasonal fluctuations and could vary at the time of construction.

Based on available geological mapping, the bedrock consists of interbedded sandstone and dolomite of the March formation and is expected to range between 5 and 15 m depth in the area of the subject site.

3.0 Geotechnical Assessment

From a geotechnical perspective, the subject site is considered adequate for the proposed building addition. The proposed building addition is expected to be founded on conventional style shallow footings placed on an undisturbed, compact silty sand bearing surface.

Site Grading and Preparation

Asphaltic concrete, topsoil and deleterious fill, such as those containing organic materials, should be stripped from under any building and other settlement sensitive structures.

Fill used for grading beneath the proposed building addition footprint, unless otherwise specified, should consist of clean imported granular fill, such as Ontario Provincial Standard Specifications (OPSS) Granular A or Granular B Type II. The fill should be tested and approved prior to delivery to the site. The fill should be placed in lifts no greater than 300 mm thick and compacted using suitable compaction equipment for the lift thickness. Fill placed beneath the building should be compacted to at least 98% of the standard Proctor maximum dry density (SPMDD).

Non-specified existing fill along with site-excavated soil can be used as general landscaping fill where settlement of the ground surface is of minor concern. These materials should be spread in thin lifts and at least compacted by the tracks of the spreading equipment to minimize voids. If these materials are to be used to build up the subgrade level for areas to be paved. The non-specified existing fill should be compacted in thin lifts to a minimum density of 95% of the respective SPMDD. Non-specified existing fill and site-excavated soils are not suitable for use as backfill against foundation walls, unless used in conjunction with a composite drainage system.

Foundation Design

Footings founded on an undisturbed, compact silty sand/sandy silt bearing surface can be designed using a bearing resistance value at serviceability limit states (SLS) of **100 kPa** and a factored bearing resistance value at ultimate limit states (ULS) of **200 kPa**. A geotechnical resistance factor of 0.5 was applied to the reported bearing resistance value at ULS. Provision should be made for proof rolling the silty sand bearing surface with a vibratory compactor where loose soils are encountered prior to the placement of footings.

An undisturbed soil bearing surface consists of a surface from which all topsoil and deleterious materials, such as loose, frozen or disturbed soil, whether in situ or not, have been removed, in the dry, prior to the placement of concrete for footings.

Footings designed using the bearing resistance value at SLS provided will be subjected to potential post construction total and differential settlements of 25 and 20 mm, respectively.

The bearing medium under footing-supported structures is required to be provided with adequate lateral support with respect to excavations and different foundation levels. Adequate lateral support is provided to a soil bearing medium when a plane extending down and out from the bottom edge of the footing at a minimum of 1.5H:1V, passes only through in situ soil or engineered fill of the same or higher capacity as the soil.

Design for Earthquakes

The proposed building addition can be designed using a seismic site response **Class D** as defined in the Ontario Building Code 2012 (OBC 2012; Table 4.1.8.4.A). The soils underlying the site are not susceptible to liquefaction.

Slab on Grade Construction

With the removal of all topsoil and fill, containing deleterious or organic materials, within the footprint of the proposed building addition, the native soil or existing fill approved by the geotechnical consultant at the time of construction, will be considered an acceptable subgrade surface on which to commence backfilling for slab on grade construction. Any soft areas should be removed and backfilled with appropriate fill material. OPSS Granular A or Granular B Type II, with a maximum particle size of 50 mm, are recommended for backfilling below the floor slab. It is recommended that the upper 200 mm of sub-floor fill consists of OPSS Granular A crushed stone. All backfill materials within the proposed building footprint should be placed in maximum 300 mm thick loose lifts and compacted to at least 98% of the SPMDD.

Pavement Structure

A single access lane is anticipated. The proposed pavement structure is shown in Table 1.

Table 1 - Recommended Pavement Structure - Access Lane

Thickness (mm)	Material Description
40	**Wear Course -** HL-3 or Superpave 12.5 Asphaltic Concrete
50	**Binder Course -** HL-8 or Superpave 19.0 Asphaltic Concrete
150	**BASE** - OPSS Granular A Crushed Stone
400	**SUBBASE** - OPSS Granular B Type II
SUBGRADE - Either in situ soil, fill or OPSS Granular B Type II material placed over in situ soil or fill.	

Minimum Performance Graded (PG) 58-34 asphalt cement should be used for this project. If soft spots develop in the subgrade during compaction or due to construction traffic, the affected areas should be excavated and replaced with OPSS Granular B Type II material.

The pavement granular base and subbase should be placed in maximum 300 mm thick lifts and compacted to a minimum of 98% of the SPMDD using suitable compaction equipment.

4.0 Design and Construction Precautions

Foundation Drainage and Backfill

A perimeter drainage system is recommended for the proposed building addition and connected to the existing system, if present. The system should consist of a 100 to 150 mm diameter perforated corrugated plastic pipe, surrounded on all sides by 150 mm of 10 mm clear crushed stone, placed at the footing level around the exterior perimeter of the structure. The pipe should have a positive outlet, such as a gravity connection to the storm sewer.

Backfill against the exterior sides of the foundation walls should consist of free-draining non frost susceptible granular materials. The greater part of the site excavated materials will be frost susceptible and, as such, are not recommended for re-use as backfill against the foundation walls, unless used in conjunction with a composite drainage system, such as Miradrain G100N or Delta Drain 6000. Imported granular materials, such as clean sand or OPSS Granular B Type I granular material, should be used for backfill material.

Protection of Footings Against Frost Action

Perimeter footings of heated structures should be insulated against the deleterious effect of frost action. A minimum 1.5 m thick soil cover (or insulation equivalent) should be provided. A minimum 2.1 m thick soil cover (or insulation equivalent) should be provided for other exterior unheated footings, such as those for isolated exterior piers.

Excavation Side Slopes

The side slopes of excavation in the overburden materials should either be cut back at acceptable slopes from the start of the excavation until the structure is backfilled. It is assumed that sufficient room will be available for the greater part of the excavation to be undertaken by open-cut methods (i.e. unsupported excavations).

The excavation side slopes above the groundwater level extending to a maximum depth of 3 m should be cut back at 1.5H:1V or flatter. The flatter slope is required for excavation below groundwater level. The subsurface soil is considered to be mainly Type 2 and 3 according to the Occupational Health and Safety Act and Regulations for Construction Projects.

Excavated soil should not be stockpiled directly at the top of the excavation and heavy equipment should be kept away from the excavation sides. Slopes in excess of 3 m in height should be periodically inspected by the geotechnical consultant in order to detect if the slopes are exhibiting signs of distress.

A trench box is recommended to be used at all times to protect personnel working in steep or vertical sides. Services are expected to be installed by “cut and cover” methods and excavations will not be left open for extended periods of time.

Pipe Bedding and Backfill

The pipe bedding for sewer and water pipes should consist of at least 150 mm of OPSS Granular A material. Where the bedding is located below the groundwater level, compaction of the granular fill may be difficult. Alternative bedding materials, such as clear crushed stone and/or lean concrete could be considered depending on subgrade conditions and Paterson’s recommendations at the time of construction. The material should be placed in maximum 300 mm thick lifts and compacted to a minimum of 95% of its SPMDD. The bedding material should extent at least to the spring line of the pipe.

The cover material, which should consist of OPSS Granular A, should extend from the spring line of the pipe to at least 300 mm above the obvert of the pipe. The material should be placed in maximum 300 mm thick lifts and compacted to a minimum of 95% of its SPMDD.

Where hard surface areas are considered above the trench backfill, the trench backfill material within the frost zone (about 1.8 m below finished grade) should match the soils exposed at the trench walls to minimize differential frost heaving. The trench backfill should be placed in maximum 300 mm thick loose lifts and compacted to a minimum of 95% of the material’s SPMDD.

Groundwater Control

The contractor should be prepared to direct water away from all bearing surfaces and subgrades, regardless of the source, to prevent disturbance to the founding medium.

A temporary MOE permit to take water (PTTW) may be required for this project if more than 50,000 L/day are to be pumped during the construction phase. A minimum of 4 to 5 months should be allowed for completion of the application and issuance of the permit by the MOE.

The groundwater flow rate into the excavation through the overburden should be low to moderate for expected founding levels of the proposed building. It is anticipated that pumping from open sumps will be sufficient to control the groundwater influx through the sides of the excavations.

Corrosion Potential and Sulphate

The analytical testing results are presented in Table 2 along with industry standards for the applicable threshold values. These results are indicative that Type 10 Portland cement (Type GU, or normal cement) would be appropriate for this site.

Table 2 - Corrosion Potential

Parameter	Laboratory Result	Threshold	Commentary
Chloride	16 μg/g	Chloride content less than 400 mg/g	Negligible concern
pH	8.09	pH value less than 5.0	Neutral Soil
Resistivity	3650 ohm.cm	Resistivity greater than 1,500 ohm.cm	Moderate Corrosion Potential
Sulphate	86 μg/g	Sulphate value greater than 1 mg/g	Negligible Concern

5.0 Recommendations

A materials testing and observation services program is a requirement for the provided foundation design data to be applicable. The following aspects of the program should be performed by the geotechnical consultant:

☐ Review detailed grading plan(s) from a geotechnical perspective.

☐ Observation of all bearing surfaces prior to the placement of concrete.

☐ Sampling and testing of the concrete and fill materials used.

☐ Periodic observation of the condition of unsupported excavation side slopes in excess of 3 m in height, if applicable.

☐ Observation of all subgrades prior to backfilling.

☐ Field density tests to determine the level of compaction achieved.

☐ Sampling and testing of the bituminous concrete including mix design reviews.

Upon request, a report confirming that these works have been conducted in general accordance with our recommendations could be issued following the completion of a satisfactory materials testing and observation program by the geotechnical consultant.

6.0 Statement of Limitations

The recommendations made in this report are in accordance with our present understanding of the project. Our recommendations should be reviewed when the project drawings and specifications are complete.

A soils investigation is a limited sampling of a site. Should any conditions at the site be encountered which differ from those at the test locations, we request that we be notified immediately in order to permit reassessment of our recommendations.

The present report applies only to the project described in this document. Use of this report for purposes other than those described herein, or by person(s) other than 2336925 Ontario Inc or their agents, without review by this firm for the applicability of our recommendations to the altered use of the report.

Best Regards,

Paterson Group Inc.

Faisal I. Abou-Seido, P.Eng

LICENSED PROFESSIONAL ENGINEER
D. J. GILBERT
100116130
PROVINCE OF ONTARIO

David J. Gilbert, P.Eng.

Attachments

☐ Soil Profile and Test Data sheets
☐ Figure 1 - Key Plan
☐ Drawing PG3498-1 - Test Hole Location Plan

Report Distribution

☐ 2336925 Ontario Inc (3 copies)
☐ Paterson Group (1 copy)

patersongroup Consulting Engineers
154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Building Addition - 64 Cleopatra Drive
Ottawa, Ontario

DATUM TBM - Top spindle of fire hydrant located on southeast corner of Cleopatra Drive and Caesar Avenue. Elevation = 91.05m.

REMARKS

BORINGS BY Backhoe

DATE October 17, 2011

FILE NO. PG3498

HOLE NO. TP 1

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	90.19
		G	1				
FILL: Grey-brown silty sand with gravel, clay, trace brick						1	89.19
		G	2				
2.08		G	3			2	88.19
		G	4				
Comapct to dense, grey-brown **SILTY SAND/SANDY SILT**						3	87.19
- grey by 3.4m depth		G	5				
3.91							
End of Test Pit (TP dry upon completion)							

Pen. Resist. Blows/0.3m
● **50 mm Dia. Cone**

○ **Water Content %**
20 40 60 80

20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

Piezometer Construction

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Building Addition - 64 Cleopatra Drive
Ottawa, Ontario

DATUM TBM - Top spindle of fire hydrant located on southeast corner of Cleopatra Drive and Caesar Avenue. Elevation = 91.05m.

REMARKS

BORINGS BY Backhoe

DATE October 17, 2011

FILE NO. PG3498

HOLE NO. TP 2

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	90.18
FILL: Brown silty sand		G	1			1	89.18
1.22							
Brown **SILTY SAND** with gravel							
2.00						2	88.18
Compact, grey **SILTY SAND/SANDY SILT**		G	2				
		G	3			3	87.18
		G	4				
3.73							
End of Test Pit							
(TP dry upon completion)							

Pen. Resist. Blows/0.3m
● **50 mm Dia. Cone**

○ **Water Content %**

20 40 60 80

20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

Piezometer Construction

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Building Addition - 64 Cleopatra Drive
Ottawa, Ontario

DATUM TBM - Top spindle of fire hydrant located on southeast corner of Cleopatra Drive and Caesar Avenue. Elevation = 91.05m.

REMARKS

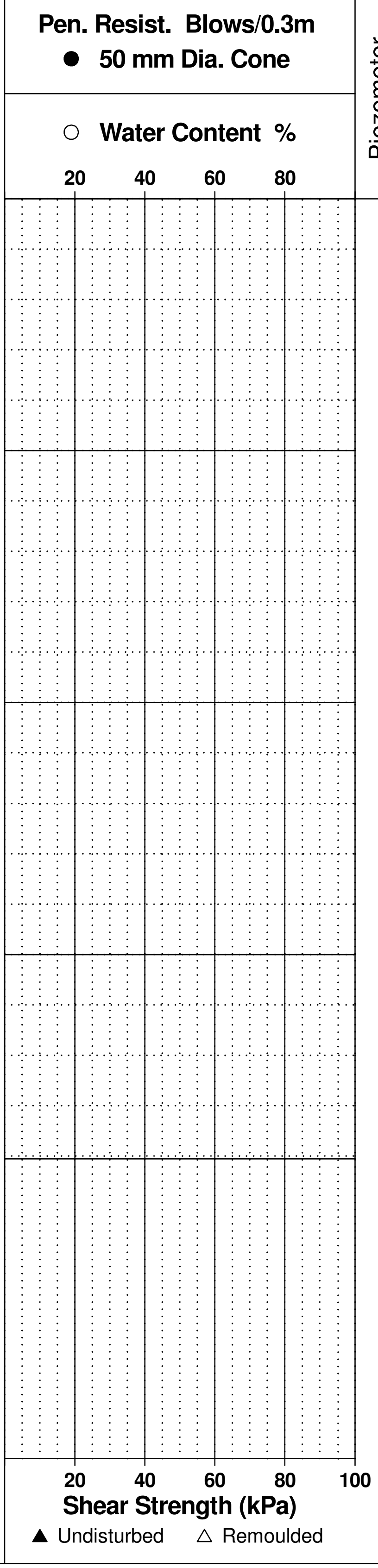
BORINGS BY Backhoe

DATE October 17, 2011

FILE NO. PG3498

HOLE NO. TP 3

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	90.21
FILL: Crushed stone with gravel 0.38	▨	G	1				
FILL: Brown silty sand with gravel, cobbles, clay and wood, trace brick and plastic	▨	G	2			1	89.21
2.13	▨					2	88.21
Compact to dense, brown **SILTY SANDSANDY SILT**		G	3			3	87.21
- grey by 3.7m depth 3.81		G	4				
End of Test Pit (TP dry upon completion)							



Piezometer Construction

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Building Addition - 64 Cleopatra Drive
Ottawa, Ontario

DATUM TBM - Top spindle of fire hydrant located on southeast corner of Cleopatra Drive and Caesar Avenue. Elevation = 91.05m.

REMARKS

BORINGS BY Backhoe

DATE October 17, 2011

FILE NO. PG3498

HOLE NO. TP 4

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content % 20 40 60 80	Piezometer Construction
GROUND SURFACE						0	90.28		
FILL: Crushed stone with sand 0.30	▨	G	1						
	▨	G	2						
FILL: Brown silty sand with gravel, cobbles, trace concrete and PVC pipe in upper 1.2m	▨					1	89.28		
	▨	G	3						
2.13	▨					2	88.28		
	░	G	4						
Compact, grey **SILTY SAND/SANDY SILT,** trace gravel	░					3	87.28		
	░	G	5						
3.73	░	G	6						
End of Test Pit (TP dry upon completion)									

20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Building Addition - 64 Cleopatra Drive
Ottawa, Ontario

DATUM TBM - Top spindle of fire hydrant located on southeast corner of Cleopatra Drive and Caesar Avenue. Elevation = 91.05m.

REMARKS

BORINGS BY Backhoe

DATE October 17, 2011

FILE NO. PG3498

HOLE NO. TP 5

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content % 20 40 60 80	Piezometer Construction
GROUND SURFACE									
25mm Asphaltic concrete over crushed stone with sand 0.20		G	1			0	90.32		
		G	2						
						1	89.32		
FILL: Brown silty sand. Gravel and cobbles in upper 1m of fill layers.		G	3						
2.44						2	88.32		
Compact to dense, grey-brown **SILTY SAND/SANDY SILT** - grey by 3.0m depth		G	4			3	87.32		
3.66		G	5						
End of Test Pit (TP dry upon completion)									

20 40 60 80 100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

SYMBOLS AND TERMS

SOIL DESCRIPTION

Behavioural properties, such as structure and strength, take precedence over particle gradation in describing soils. Terminology describing soil structure are as follows:

Desiccated	-	having visible signs of weathering by oxidation of clay minerals, shrinkage cracks, etc.
Fissured	-	having cracks, and hence a blocky structure.
Varved	-	composed of regular alternating layers of silt and clay.
Stratified	-	composed of alternating layers of different soil types, e.g. silt and sand or silt and clay.
Well-Graded	-	Having wide range in grain sizes and substantial amounts of all intermediate particle sizes (see Grain Size Distribution).
Uniformly-Graded	-	Predominantly of one grain size (see Grain Size Distribution).

The standard terminology to describe the strength of cohesionless soils is the relative density, usually inferred from the results of the Standard Penetration Test (SPT) ‘N’ value. The SPT N value is the number of blows of a 63.5 kg hammer, falling 760 mm, required to drive a 51 mm O.D. split spoon sampler 300 mm into the soil after an initial penetration of 150 mm.

Relative Density	‘N’ Value	Relative Density %
Very Loose	<4	<15
Loose	4-10	15-35
Compact	10-30	35-65
Dense	30-50	65-85
Very Dense	>50	>85

The standard terminology to describe the strength of cohesive soils is the consistency, which is based on the undisturbed undrained shear strength as measured by the in situ or laboratory vane tests, penetrometer tests, unconfined compression tests, or occasionally by Standard Penetration Tests.

Consistency	Undrained Shear Strength (kPa)	‘N’ Value
Very Soft	<12	<2
Soft	12-25	2-4
Firm	25-50	4-8
Stiff	50-100	8-15
Very Stiff	100-200	15-30
Hard	>200	>30

SYMBOLS AND TERMS (continued)

SOIL DESCRIPTION (continued)

Cohesive soils can also be classified according to their “sensitivity”. The sensitivity is the ratio between the undisturbed undrained shear strength and the remoulded undrained shear strength of the soil.

Terminology used for describing soil strata based upon texture, or the proportion of individual particle sizes present is provided on the Textural Soil Classification Chart at the end of this information package.

ROCK DESCRIPTION

The structural description of the bedrock mass is based on the Rock Quality Designation (RQD).

The RQD classification is based on a modified core recovery percentage in which all pieces of sound core over 100 mm long are counted as recovery. The smaller pieces are considered to be a result of closely-spaced discontinuities (resulting from shearing, jointing, faulting, or weathering) in the rock mass and are not counted. RQD is ideally determined from NXL size core. However, it can be used on smaller core sizes, such as BX, if the bulk of the fractures caused by drilling stresses (called “mechanical breaks”) are easily distinguishable from the normal in situ fractures.

RQD %	**ROCK QUALITY**
90-100	Excellent, intact, very sound
75-90	Good, massive, moderately jointed or sound
50-75	Fair, blocky and seamy, fractured
25-50	Poor, shattered and very seamy or blocky, severely fractured
0-25	Very poor, crushed, very severely fractured

SAMPLE TYPES

SS	-	Split spoon sample (obtained in conjunction with the performing of the Standard Penetration Test (SPT))
TW	-	Thin wall tube or Shelby tube
PS	-	Piston sample
AU	-	Auger sample or bulk sample
WS	-	Wash sample
RC	-	Rock core sample (Core bit size AXT, BXL, etc.). Rock core samples are obtained with the use of standard diamond drilling bits.

SYMBOLS AND TERMS (continued)

GRAIN SIZE DISTRIBUTION

MC% - Natural moisture content or water content of sample, %
LL - Liquid Limit, % (water content above which soil behaves as a liquid)
PL - Plastic limit, % (water content above which soil behaves plastically)
PI - Plasticity index, % (difference between LL and PL)

Dxx - Grain size which xx% of the soil, by weight, is of finer grain sizes
These grain size descriptions are not used below 0.075 mm grain size
D10 - Grain size at which 10% of the soil is finer (effective grain size)
D60 - Grain size at which 60% of the soil is finer

Cc - Concavity coefficient = $(D30)^2$ / (D10 x D60)
Cu - Uniformity coefficient = D60 / D10

Cc and Cu are used to assess the grading of sands and gravels:
Well-graded gravels have: $1 < Cc < 3$ and $Cu > 4$
Well-graded sands have: $1 < Cc < 3$ and $Cu > 6$
Sands and gravels not meeting the above requirements are poorly-graded or uniformly-graded.
Cc and Cu are not applicable for the description of soils with more than 10% silt and clay (more than 10% finer than 0.075 mm or the #200 sieve)

CONSOLIDATION TEST

p'_o - Present effective overburden pressure at sample depth
p'_c - Preconsolidation pressure of (maximum past pressure on) sample
Ccr - Recompression index (in effect at pressures below p'_c)
Cc - Compression index (in effect at pressures above p'_c)

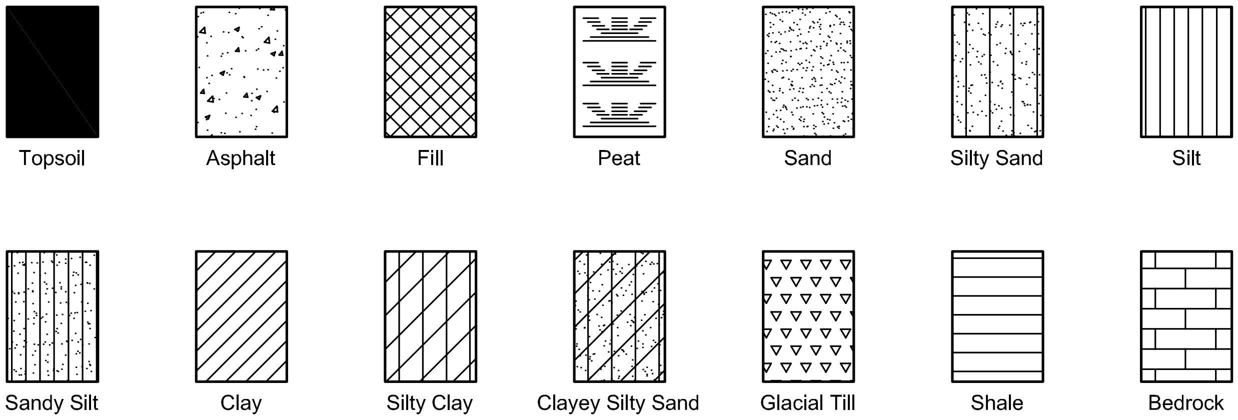
OC Ratio Overconsolidaton ratio = p'_c / p'_o
Void Ratio Initial sample void ratio = volume of voids / volume of solids
Wo - Initial water content (at start of consolidation test)

PERMEABILITY TEST

k - Coefficient of permeability or hydraulic conductivity is a measure of the ability of water to flow through the sample. The value of k is measured at a specified unit weight for (remoulded) cohesionless soil samples, because its value will vary with the unit weight or density of the sample during the test.

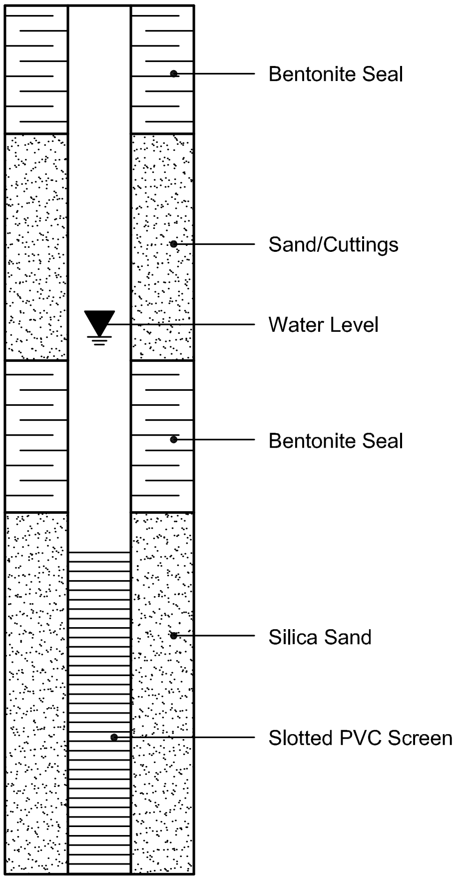
SYMBOLS AND TERMS (continued)

STRATA PLOT

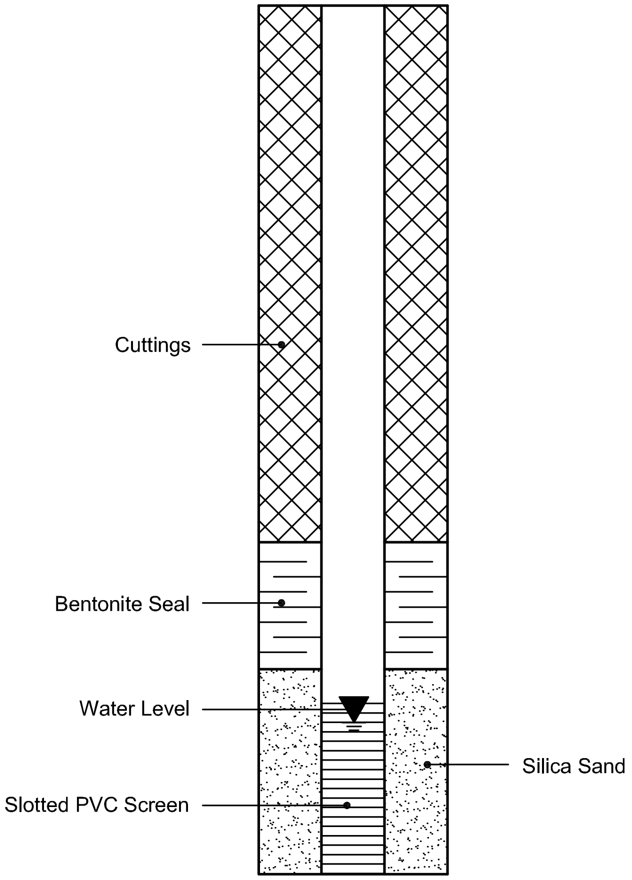


MONITORING WELL AND PIEZOMETER CONSTRUCTION

MONITORING WELL CONSTRUCTION



PIEZOMETER CONSTRUCTION



Certificate of Analysis

Report Date: 07-Nov-2011

Client: **Paterson Group Consulting Engineers**

Order Date:31-Oct-2011

Client PO: 11669

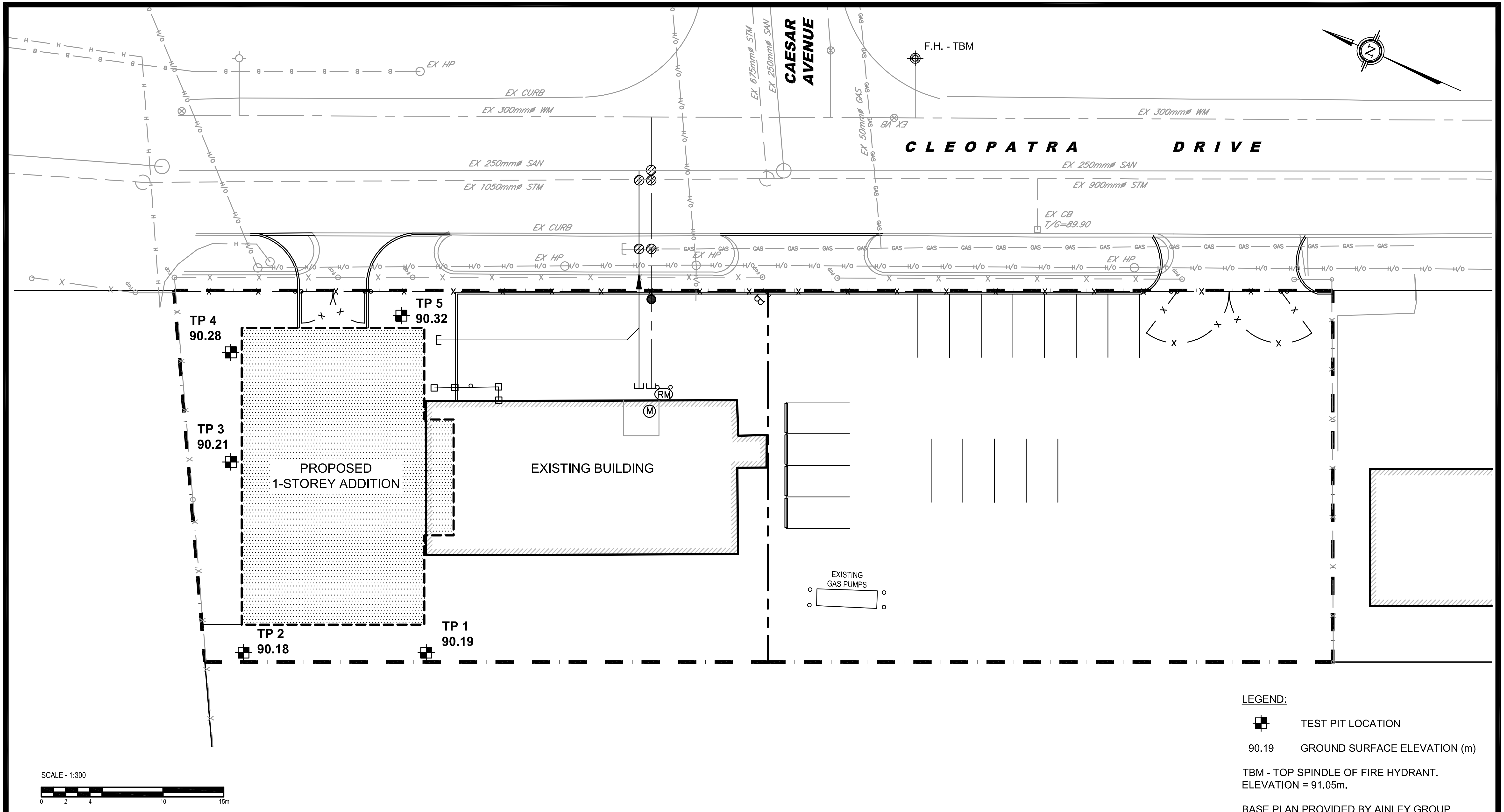
Project Description: PG2524

	Client ID:	TP3-G3	-	-	-
	Sample Date:	17-Oct-11	-	-	-
	Sample ID:	1145020-01	-	-	-
	MDL/Units	Soil	-	-	-
Physical Characteristics					
% Solids	0.1 % by Wt.	82.5	-	-	-
General Inorganics					
pH	0.1 pH Units	7.6	-	-	-
Resistivity	0.10 Ohm.m	45.9	-	-	-
Anions					
Chloride	5 ug/g dry	138	-	-	-
Sulphate	5 ug/g dry	46	-	-	-

Source: Google Maps

FIGURE 1

KEY PLAN



LEGEND:

▣	TEST PIT LOCATION
90.19	GROUND SURFACE ELEVATION (m)

TBM - TOP SPINDLE OF FIRE HYDRANT.
ELEVATION = 91.05m.

BASE PLAN PROVIDED BY AINLEY GROUP.

patersongroup
consulting engineers

154 Colonnade Road South
Ottawa, Ontario K2E 7J5
Tel: (613) 226-7381 Fax: (613) 226-6344

NO.	REVISIONS	DATE	INITIAL

2336925 ONTARIO INC.
GEOTECHNICAL INVESTIGATION
PROPOSED BUILDING ADDITION - 64 CLEOPATRA DRIVE
OTTAWA, ONTARIO

Title:
TEST HOLE LOCATION PLAN

Scale: 1:300
Date: 02/2016
Drawn by: CPB
Report No.: PG3498-LET.01
Checked by: FA
Dwg. No.: PG3498-1
Approved by: DG
Revision No.: 0

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