Geotechnical Engineering

Environmental Engineering

Hydrogeology

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Archaelogy

Materials Testing

Building Science

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Geotechnical Investigation

Proposed Residential Subdivision
1240 Old Prescott Road,
Geographic Township of Osgoode,
Ottawa (Greely), Ontario

Prepared For

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October 7, 2013

Report: PH2095-REP.02

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1.0 INTRODUCTION

Paterson Group (Paterson) was retained by 1384341 Ontario Ltd. to conduct a terrain analysis and hydrogeological study for a proposed rural residential subdivision situated on Part of Lot 4, Concession 4, former Township of Osgoode, former Village of Greely, now the City of Ottawa, Ontario. (Refer to Figure 1-Site Location Plan, which can be found in Appendix 2). The results of the Terrain Analysis and Hydrogeological Study were presented in our Report No. PH2095-REP.01, dated October 7, 2013.

The following report has been prepared specifically and solely for the aforementioned project which is described herein. It contains our findings and includes geotechnical recommendations pertaining to the design and construction of the subject development as they are understood at the time of preparation of this report.

Investigating the presence or potential presence of contamination on the subject property was not part of the scope of work of this present investigation. A Phase 1 Environmental Site Assessment is in the process of being completed, by others, at this time and the findings will be included in a standalone report under separate cover.

1.1 Project Description

The subject property encompasses a total area of approximately 20.2 hectares (50 acres) and is located within the limits of the existing Village of Greely, Ontario. It is proposed to be developed into a residential subdivision. The average minimum lot size for each of the proposed lots has been assigned at approximately 0.28 hectares (0.69 acres). It is proposed that the subdivision will be serviced by individual onsite wells and sewage systems. The subdivision roads will consist of a stanard rural cross-section with open ditches. At the time of preparation of this report, there has been consideration to the use of shallow grade ditches fitted with perforated subdrains, as proposed by the stormwater management consultant, Stantec.

2.0 METHOD OF INVESTIGATION

2.1 Field Investigation

As part of this study, a series of test holes, consisting of a combination of boreholes, and hand excavated test holes, were put down on the subject property to delineate the subsurface soil conditions beneath the site. The field investigations took place between November 2012 and September 2013. During this investigation, a total of six (6) boreholes and eight (8) test holes were constructed within the limits of the study area. The test pit locations were selected by Paterson personnel to ensure that adequate representation of the subsurface soil profile was delineated across the site.
Summary of Borehole Construction

A series of three (3) boreholes, BH1-BH3 inclusive, were put down across the subject property in November 2012. The boreholes were constructed with a CME- 55 power auger, attached to a track mounted drilling rig, and were advanced to refusal on inferred bedrock. The purpose of the construction of these initial boreholes was to evaluate the composition of the parent material beneath the site from a hydrogeological perspective.

In March, 2013, an additional three (3) boreholes, BH4 to BH6, inclusive, were put down within selected areas on the subject propety. The locations of these additional boreholes were selected to fill in gaps in the subsurface profile created by the initial drilling program.

Each of the boreholes were constructed under the full time supervision by Paterson and samples were recovered from split spoons every 1.5 m for field assessment and classification. Following the completion of the tactile evaluation of each sample, the samples were transferred to a storage bag and catalogued for transportation to the laboratory for further analysis. The depths at which the soil samples were recovered from the test holes are shown as “SS” on the Soil Profile and Test Data sheets provided in Appendix 1. The locations of the test pits put down on the subject property are referenced on Drawing No. PH2095-1, entitled “Test Hole Location Plan”, and is located in Appendix 2 of this report.

Summary of Test Hole Construction and In Situ Testing

To complement the borehole works, a series of test holes were put down within the treed areas across the remainder of the site in the areas where the boreholes were absent. The purpose of the test holes, excavated using hand equipment only, was to delineate the surficial soils located within the upper 2 m of the surface of the ground and to better define the overburden groundwater table beneath the site.

A total of eight (8) test holes were put down on the subject property in September 2013. Each hole was advanced to a depth of approximately 2.0 m below ground surface by a member of the hydrogeological department of Paterson. The surficial soils were visually and tactually classified in the field and representative samples were recovered and stored for further laboratory analysis. The depths at which the soil samples were recovered from the test holes are noted as a “G” on the Soil Profile and Test Data Sheets located in Appendix 1. The locations of the test holes put down on the subject property are referenced on Drawing No. PH2095-1, entitled “Test Hole Location Plan”, and is located in Appendix 2 of this report.

Sample Storage

All samples will be stored in the laboratory for a period of one (1) month after issuance of this report. They will then be discarded unless we are otherwise directed.

3.0 OBSERVATIONS

3.1 Stratigraphy

The surficial soils in the vicinity of the subject area generally consist of glacio-fluvial deposits of sand and glacial till associates with the glacial outwashes from the Champlain Sea. Typically, a shallow to thick deposit of medium to fine grained silty sand is present overlying a cohesive layer of silt or silty clay beneath the broader lands beyond the subject property. A cohesive to very dense non-cohesive till is typically present beneath the shallower deposits and rests atop bedrock.

Test hole locations and corresponding stratigraphy of the main soil types are summarized on the Test Hole Location Plan (Drawing No. PH2095-2 in Appendix 2) and a detailed discussion of each dominant soil strata is advanced below:

Organic Deposits (Topsoil)

The site is generally overlain by a thick layer of topsoil having a thickness of between 0.15 m and 0.45 m. The topsoil layer was noted to have significant organic content but has an overal loamy texture and composition. This is generally reflective of the sand, parent material underlying the organic layer. Of note is the fact that thickness of the organic layer increases moving east to west across the site until the hydro easement and drainage ditch. Beyond the drainage ditch to the west, the topsoil layer thins somewhat and has an average consistent thickness of approximately 0.2 m.

Silty Sand

A transition zone of silty sand is present directly beneath the topsoil across the subject property. The vertical migration of silt from the thick organic layer has resulted in the silt contamination of the underlying clean sand strata. While still considered to be a medium sand, the presence of silt is sufficient to classify, using the Unified Soil Classification System (USCS), as a silty sand. The layer has varying degrees of natural soil compaction with the most compact areas of this layer present within the heavily treed areas within the central quadrant of the site. The layer is heavily oxidized in the eastern quadrant of the site while in the central and western portions of the site, this layer is greyish-brown to brown. This suggests the this layer is influenced by the overburden groundwater levels within these central and western quadrants.

Sand

A layer of medium to coarse sand is present beneath the silty sand transition layer. The sand has a USCS classification of an SP, poorly graded sand and has a combination of coarse to medium sand grain sizes. The layer was noted to have a moisture content in the order of 20 to 35 % in the upper portions of the strata. The moisture content increases to over 40% at the lower portions of the layer. A review of published literature sources related to the moisture content of sand and the water holding capacity, suggest the sand is at, or near field capacity at the base of the layer. This is corroborated by the presence of overburden groundwater at the transitional interface between the base of the sand layer and the upper edge of the underlying soil layer.

Coarse Sand

Underlying the medium to coarse sand is a coarse sand with some fine gravel present, with little to no fines. The layer was noted to be present in each of the test holes and was also noted to be completely saturated at the time of the September 2013 works.

Silty Clay

A layer of silty clay, having variable thickness, was present thoughout the western limits of the site. The clay pinches out in portions of the central quadrant of the site, in the area of BH2 on Drawing No. PH2095-1 (see Appendix A), and thickens somewhat again moving further to the east to the edges of the study limit.

The composition of the clay was consistent with that of a silty clay of low plasticity (USCS classification of CL). The silty clay was present in a firm consistency when first encountered. The consistency changed to soft approaching the base of the layer.

Silt

A layer of compact to very dense silt was present beneath the silty clay layer in the eastern quadrant of the site and is present directly beneath the coarse sand layer where the silty clay pinches out in the central quadrant of the site. The silty clay layer, itself, pinches out to the east of the hydro easement where the silty clay is present directly beneath the coarse sand.

The consistency of the silty is such that it exhibits significant degrees of natural compaction which has significantly reduced the saturated hydraulic conductivity of the layer.

Till

A layer of very dense till was encountered in each of the boreholes put down on the subject property. The till layer appears to be significantly dense across much of the site such that practical refusal (i.e. greater than 50 blow counts per 300 mm of penetration) was encountered throughout most of the property.

Any information pertaining to soils and all test hole logs are furnished as a matter of general information only, and test hole descriptions or logs are not to be interpreted as descriptive of conditions at locations other than those described by the test holes themselves.

3.2 Groundwater

At the time of the fieldwork, the groundwater levels were measured and are recorded as shown, where applicable, on the Soil Profile and Test Data sheets. Groundwater infiltration into the test holes varied across the site from to 0.95 m to 1.65 m bgs.

The overburden groundwater appears to be perched within the coarse sand layer present above the silty clay and silt strata. The rate of infiltration into the ground appears to be limited by these lower layers of very low hydraulic conductivity.

With respect to the seasonal high groundwater levels, the soil analysis suggests that the central portion of the site, where the sand layer is grey-brown to grey within the lower portions of the layer, reasonably reflects the overburden groundwater. As such, it is opined that the overburden groundwater levels are shallowest in the central quadrant of the site, due to the bowl shaped topography and shallowness of the layers of low hydraulic conductivity.

4.0 DISCUSSION AND RECOMMENDATIONS

4.1 Geotechnical Assessment

From a geotechnical viewpoint, the subject lands are considered suitable for residential development. It is anticipated that the residential dwellings will have a basement level and will be founded on shallow footings placed in the upper portion of the overburden soils.

The above and other considerations are further discussed in the following sections.

4.2 Site Grading and Preparation

Stripping Depth

Topsoil and deleterious fill materials, should be stripped from under any buildings, paved areas, and/or other settlement sensitive structures.

Fill Placement

The lot grading and drainage plan was not available at the time of writing this report. It is recommended that this firm review the proposed lot grading plan prior to the development of the property. It is anticipated that almost fully-raised leaching beds will be required and, as such, grade raises of up to 1.5 m are expected on some lots.

All topsoil and deleterious soils, such as those containing organic matter, should be removed to expose suitable subgrade surfaces prior to the placement of fill materials beneath the building and pavement areas. At least one (1) test pit (TP2) reported encountering peat within the shallow soil stratigraphy at a depth of between 0.3 m and 0.8 m. It is likely that other peat deposits will be encountered at varying thicknesses and all peat must be removed from within the limits of development of all foundations and sewage systems. All subgrade surfaces should be inspected by geotechnical personnel prior to the placement of any fill or concrete.

4.3 Foundation Design

Shallow Foundation - Allowable Bearing Pressures and Grade Raises

Founding conditions at the site are considered to be favourable for the construction of single family homes. It is anticipated that with the removal of fill and organic soils (i.e. topsoil) the in situ soils will provide for suitable bearing media upon which to found footings for the support of the dwellings. For preliminary design purposes an allowable bearing pressure of 100 kPa, for strip footings up to 1.5 m wide, when placed on the sands, silty clay, or glacial till strata above the groundwater table. The bearing pressure is provided on the assumption that the footings will be placed on undisturbed bearing surfaces. An undisturbed soil bearing surface consists of one 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.

Where fill is required to raise the grade below the footing level, the fill located within the zone of influence of the footings should consist of engineered fill. The engineered fill should consist of OPSS Granular A or Granular B Type II placed in maximum 300 mm thick loose lifts and compacted to a minimum of 95% of its' SPMDD. The zone of influence of the footing is considered to extend out and down from the edges of the footing at a slope of 1H:1V, or flatter, to the in situ soil. On a suitably prepared engineered fill bearing surface, of at least 0.4 m thickness, an allowable bearing pressure of at least 100 kPa can be used for design purposes. The allowable bearing pressure should be confirmed by a geotechnical consultant on a lot by lot basis at the time of construction.

Given the shallow overburden groundwater elevations throughout the proposed development areas, it should be noted that a detailed analysis of founding elevations of the proposed building footings will be necessary at the time of detailed subdivision design. Care should be taken to set the founding level upwards of 300 mm above the anticipated normal high overburden groundwater table to account for temporary fluctuations in shallow groundwater levels due to the effects of infiltration from rear yard areas, infiltration galleries and stormwater management features.

4.4 Settlement

No settlement analyses were carried out as part of this study. Based on the available information, grade raises of 1.5 m or less should not be of concern from a settlement point of view. Should higher grade raises be required, it is recommended that this firm be consulted in this regard.

Footings placed on soil and designed using the allowable bearing pressures provided above will be subjected to potential post-construction total and differential settlements of 25 and 20 mm, respectively.

It is recommended that the footings for each structure be constructed on a consistent bearing medium to reduce the risk of differential settlement or special construction precautions should be taken at the bearing media transition.

4.5 Basement Slab

With the removal of all fill, disturbed in situ soils and organic material, the native soils are suitable subgrade media on which to backfill for the basement floor slab construction. It is recommended that the upper 150 to 200 mm of sub-slab fill consist of clear crushed stone (19 mm). Below the clear stone layer, Granular B Type II backfill can be used, where required. All materials should be compacted to a minimum of 95 percent of their standard Proctor maximum dry density.

4.6 Pavement

The pavement structure should conform to the local requirements for rural roadways. No site specific anticipated traffic data was provided for the design of the proposed roadways. As such, for preliminary design purposes, the pavement structure presented in Table 1 could be used for local residential streets.

TABLE 1: RECOMMENDED PAVEMENT STRUCTURE-LOCAL STREETS

THICKNESS (mm)	MATERIAL DESCRIPTION
40	**WEAR COARSE-** HL-3 Asphaltic Concrete
40	**BINDER COARSE-** HL-8 Asphaltic Concrete
150	**BASE** - OPSS Granular A Crushed Stone
375	**SUBBASE** - OPSS Granular B Type I or II
SUBGRADE -	Either suitably compacted in situ sand, silt or OPSS Granular B Type I or II material placed over in situ soil or fill

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 I or II material. The pavement granular base and subbase materials should be placed in maximum 300 mm thick lifts and compacted to a minimum of 100% of the material's SPMDD using suitable vibratory equipment.

Boulders protruding at subgrade level should be excavated. The excavation should be backfilled with acceptable materials placed in maximum 300 mm thick lift and compacted at a minimum of 95% of the material's SPMDD.

Pavement Drainage

It is recommended that the road structure granular layers be provided with adequate drainage. Satisfactory performance of the pavement structure is largely dependent on keeping the contact zone between the subgrade material and the base stone in a drained and unsaturated condition. It is recommended that the subgrade be shaped to provide a 3% slope toward the road side ditches, and that the ditches be deep enough and properly sloped to remove infiltrating water, via lateral seepage, away from the pavement base and subbase.

4.7 Slope Stability Analysis

There are no portions of the site which require specific analysis related to unstable slopes.

5.0 DESIGN AND CONSTRUCTION PRECAUTIONS

5.1 Foundation Drainage and Backfill

It is recommended that a perimeter foundation drainage system be provided for the proposed dwellings. The system should consist of a 100 mm to 150 mm diameter perforated corrugated plastic pipe, surrounded on all sides by 150 mm of 10 to 19 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 an open ditch, or a sump pit that discharges to a suitable outlet. Preference should be given to providing an outlet location that discharges directly to the ground surface.

Backfill against the exterior sides of the foundation walls should consist of free-draining non frost susceptible granular materials. Site excavated sand may be suitable for use in this regard and the in situ sand material should be approved by a geotechnical engineer prior to placement. Otherwise, imported granular materials, such as clean sand or OPSS Granular B Type I granular material, should be used for this purpose. Depending on the final basement grade, underfloor drainage could be required due to the high groundwater levels observed on portions of this site.

5.2 Protection of Footings Against Frost Action

Perimeter footings are required to be insulated against the deleterious effects of frost action. A minimum of 1.5 metres of soil cover should be provided for perimeter "heated" footings. Exterior unheated footings are more prone to deleterious movements associated with frost action than the exterior walls of the structure proper and require additional protection, such as a soil cover of 2.1 metres or a combination of soil cover and rigid insulation. The latter soil cover requirement is required for structural elements such as, exterior canopy pier footings, wing walls and retaining walls.

As an alternative to providing full soil cover, the footings can be protected from frost action by a combination of soil cover and foundation insulation. Further guideline in this regard can be provided upon request on a site specific basis.

5.3 Swimming Pools

A portion of the western quadrant of the proposed subdivision is located within an area of significant topographical relief. The lots located along the top and within the sloping areas will require a site specific geotechnical analysis to address slope stability issues related to swimming pool installation. The remainder of the site is considered suitable for in-ground or above ground swimming pools without a lot specific analysis.

5.4 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.

It is expected that foundations will be constructed above the water table, and as such the control of groundwater should be routine. It is anticipated that pumping from open sumps will be sufficient to control the groundwater influx through the sides of the excavations (with flatter excavation slopes when being used below groundwater level).

5.5 Winter Construction

Precautions must be taken if winter construction is considered for this project. In the event of construction during below zero temperatures, the founding stratum should be protected from freezing temperatures by the use of straw, propane heaters and tarpaulins or other suitable means. In this regard, the base of the excavations should be insulated from sub-zero temperatures immediately upon exposure and until such time as heat is adequately supplied to the building and the footings are protected with sufficient soil cover to prevent freezing at founding level.

5.6 Stormwater Management Considerations

The specific design details regarding the stormwater management for the subject property are not known at this time. The native sand layers are conducive to infiltration techniques to promote the movement of groundwater into the subsurface. However, care must be exercised in designing specific infiltration measures as the perched water table can create significant impediments to short term infiltration.

6.0 MATERIAL TESTING AND OBSERVATION SERVICES

It is a requirement for the foundation design data provided herein to be applicable that the following material testing and observation program be performed by the geotechnical consultant.

- Bearing medium evaluation of the in situ soil at the proposed founding level(s) prior to the construction of footings in the building excavation. Observation of all bearing surfaces prior to the placement of concrete for footings.

- Observation of all subgrades prior to backfilling and follow-up field density tests to ensure that the specified levels of compaction has been achieved for roadways and engineered backfill materials.

A report confirming that these works have been conducted in general accordance with our recommendations could be issued upon the completion of a satisfactory inspection program by the geotechnical consultant.

7.0 STATEMENT OF LIMITATIONS

The recommendations made in this report are in accordance with our present understanding of the project. We request that we be permitted to review the grading plan once available. Also, our recommendations should be reviewed when the drawings and specifications are complete.

The client should be aware that any information pertaining to soils and all test hole logs are furnished as a matter of general information only and test hole descriptions or logs are not to be interpreted as descriptive of conditions at locations other than those of the test holes.

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 1384341 Ontario Ltd. or its agent(s) is not authorized without review by this firm for the applicability of our recommendations to the altered use of the report.

PATERSON GROUP INC.

Robert A. Passmore, P.Eng.
Associate

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PROVINCE OF ONTARIO

Report Distribution:

❑ 1384341 Ontario Ltd. (10 copies)
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APPENDIX 1

SOIL PROFILE & TEST DATA SHEETS

SYMBOLS AND TERMS

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Hydrogeological Study
Proposed Residential Development - Old Prescott Road
Ottawa, Ontario

DATUM Datum provided by Stantec Geomatics Limited.

REMARKS

BORINGS BY CME 55 Power Auger

DATE November 19, 2012

FILE NO. PH2095

HOLE NO. BH 1

GROUND SURFACE

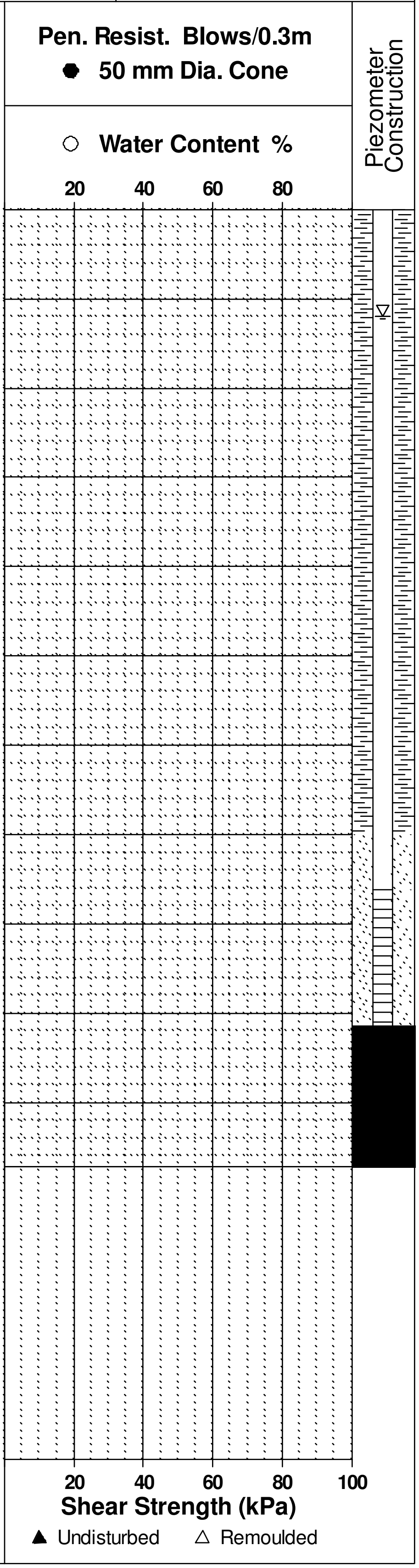
SOIL DESCRIPTION	Depth to base (m)
TOPSOIL	0.25
Very loose, brown medium to coarse **SAND** - grey by 1.5m depth	2.70
Grey **SILTY CLAY,** trace sand	3.15
Compact to very dense, grey **SILT**	10.72

Practical refusal to augering on inferred glacial till at 10.72m depth

(GWL @ 1.2m depth)

SAMPLE TYPE	NUMBER	% RECOVERY	N VALUE or RQD
AU	1		
SS	2	75	2
SS	3	75	2
SS	4	50	8
SS	5	75	17
SS	6	71	19
SS	7	75	19
SS	8	71	34
SS	9	79	48
SS	10	83	70
SS	11	42	105
SS	12		50+

DEPTH (m)	ELEV. (m)
0	102.00
1	101.00
2	100.00
3	99.00
4	98.00
5	97.00
6	96.00
7	95.00
8	94.00
9	93.00
10	92.00



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REMARKS

BORINGS BY CME 55 Power Auger

DATE November 19, 2012

FILE NO. PH2095

HOLE NO. BH 2

SOIL DESCRIPTION

GROUND SURFACE

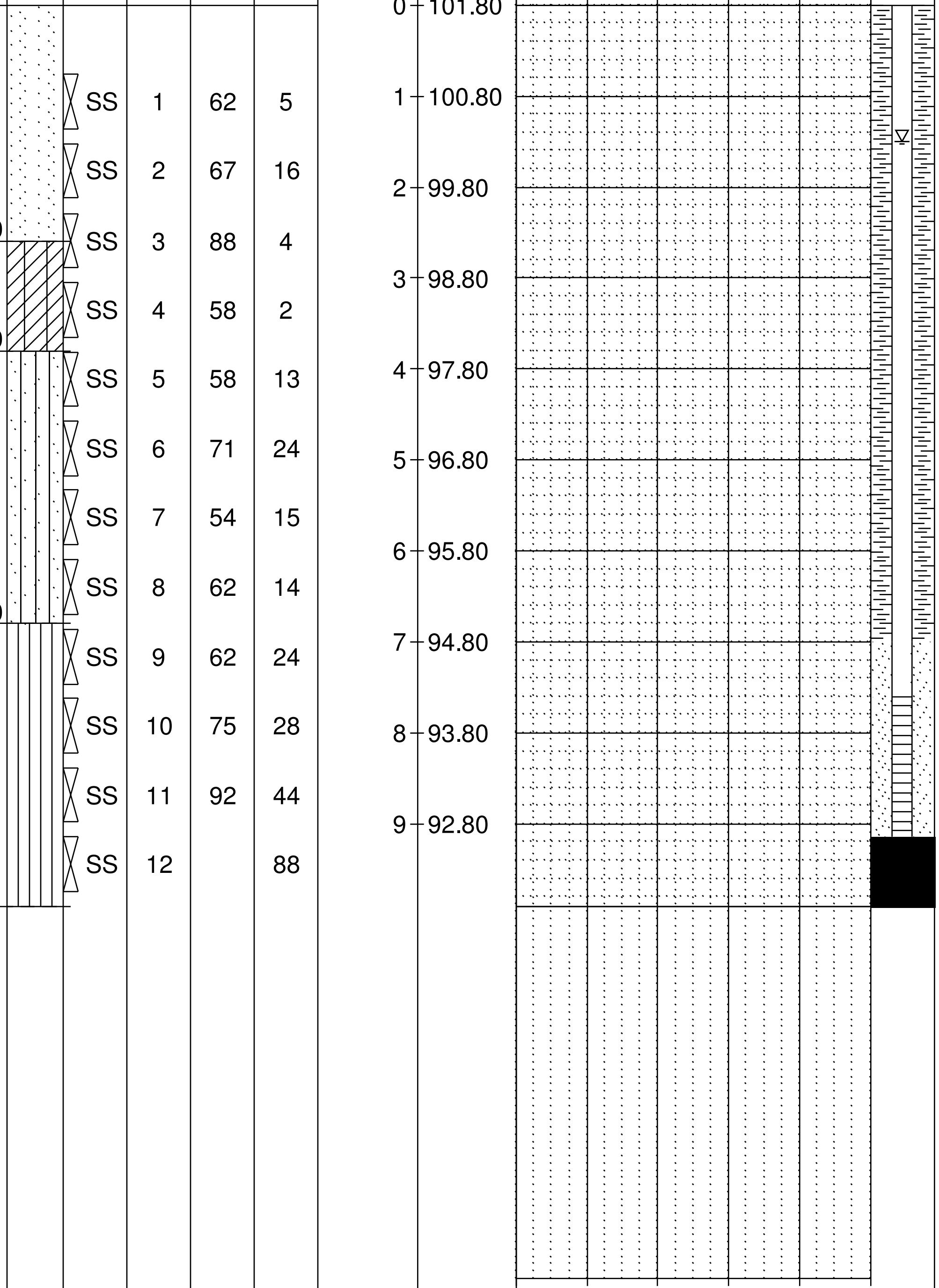
SOIL DESCRIPTION	
Loose, grey **SAND,** some silt	2.60
Grey **SILTY CLAY**	3.80
Compact, grey **SILTY SAND** to **SANDY SILT**	6.80
Compact to dense, grey **SILT,** trace sand	9.91

Practical refusal to augering on inferred glacial till at 9.91m depth.

(GWL @ 1.5m depth)

SAMPLE TYPE	SAMPLE NUMBER	% RECOVERY	N VALUE or RQD
SS	1	62	5
SS	2	67	16
SS	3	88	4
SS	4	58	2
SS	5	58	13
SS	6	71	24
SS	7	54	15
SS	8	62	14
SS	9	62	24
SS	10	75	28
SS	11	92	44
SS	12		88

DEPTH (m)	ELEV. (m)
0	101.80
1	100.80
2	99.80
3	98.80
4	97.80
5	96.80
6	95.80
7	94.80
8	93.80
9	92.80



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DATUM Datum provided by Stantec Geomatics Limited.

REMARKS

BORINGS BY CME 55 Power Auger

DATE November 19, 2012

FILE NO. PH2095

HOLE NO. BH 3

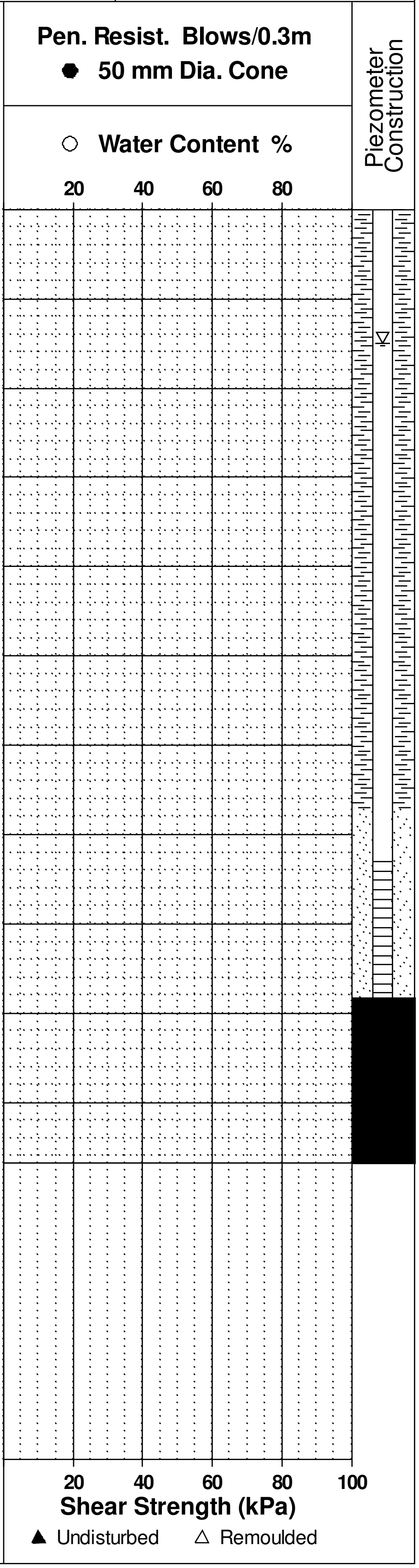
SOIL DESCRIPTION	STRATA PLOT
GROUND SURFACE	
Loose to compact, grey **SILTY SAND** to **SANDY SILT**	5.30
Grey **SILTY CLAY**	6.90
GLACIAL TILL: Grey silty clay with sand, gravel, cobbles	10.67

Practical refusal to augering on inferred glacial till at 10.67m depth

(GWL @ 1.5m depth)

SAMPLE TYPE	NUMBER	% RECOVERY	N VALUE or RQD
SS	1	79	3
SS	2	58	11
SS	3	58	9
SS	4	83	18
SS	5	83	27
SS	6	33	3
SS	7		3
SS	8		8

DEPTH (m)	ELEV. (m)
0	100.90
1	99.90
2	98.90
3	97.90
4	96.90
5	95.90
6	94.90
7	93.90
8	92.90
9	91.90
10	90.90



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REMARKS

BORINGS BY CME 55 Power Auger

DATE March 14, 2013

FILE NO. PH2095

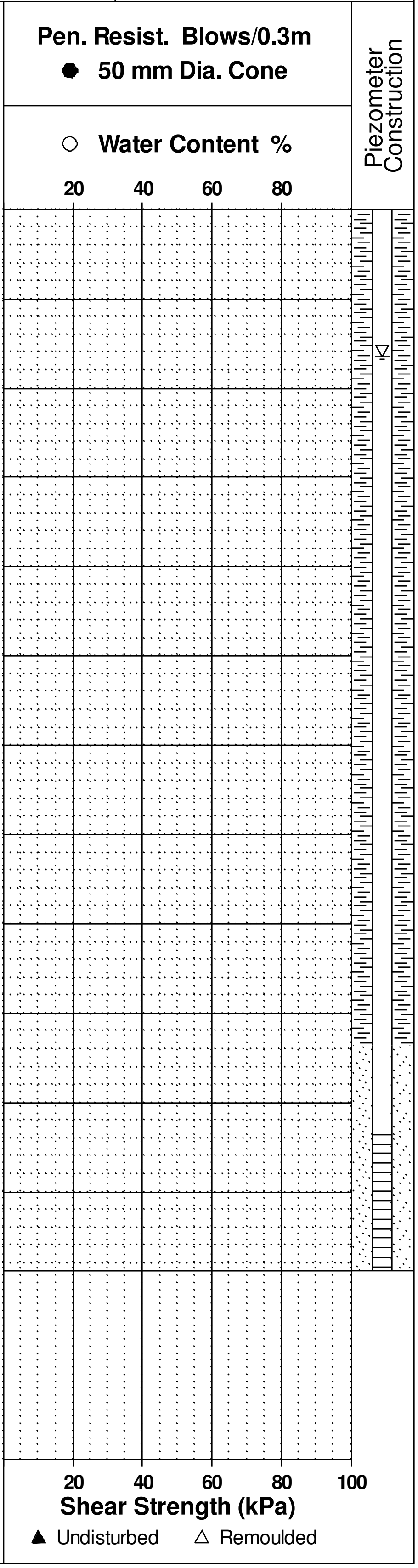
HOLE NO. BH 4

SOIL DESCRIPTION	SAMPLE TYPE	NUMBER	% RECOVERY	N VALUE or RQD
GROUND SURFACE				
TOPSOIL 0.30				
Loose, brown **SAND** 3.00	SS	1	80	5
Soft, brown **SILTY CLAY** 4.60	SS	2	100	2
Compact to dense, brown **SILTY SAND/SANDY SILT**	SS	3	70	30
	SS	4	70	34
	SS	5	60	21
	SS	6	60	22
11.89	SS	7	60	42

Practical refusal to augering on inferred glacial till at 11.89m depth

(GWL @ 1.65m depth)

DEPTH (m)	ELEV. (m)
0	103.10
1	102.10
2	101.10
3	100.10
4	99.10
5	98.10
6	97.10
7	96.10
8	95.10
9	94.10
10	93.10
11	92.10



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REMARKS

BORINGS BY CME 55 Power Auger

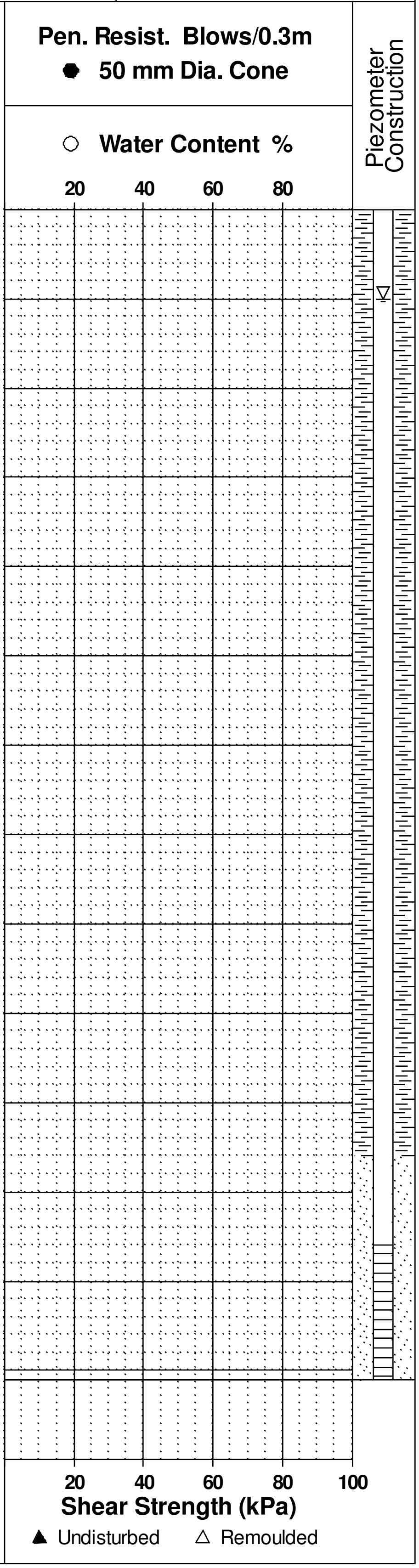
DATE March 14, 2013

FILE NO. PH2095

HOLE NO. BH 5

SOIL DESCRIPTION		SAMPLE TYPE	SAMPLE NUMBER	% RECOVERY	N VALUE or RQD
GROUND SURFACE					
TOPSOIL	0.30				
Compact, brown **SAND** - with clayey silt by 3.0m depth		SS	1	60	16
	4.60	SS	2	80	41
Very dense to dense, blue-grey **SILT**		SS	3	80	66
		SS	4	80	42
	9.10	SS	5	80	22
Loose, brown **SANDY SILT** with gravel		SS	6	90	7
	12.20	SS	7	40	4
Dense, brown **SAND** with gravel	13.11	SS	8	50	50
Practical refusal to augering on inferred glacial till at 13.11m depth (GWL @ 1.0m depth)					

DEPTH (m)	ELEV. (m)
0	101.75
1	100.75
2	99.75
3	98.75
4	97.75
5	96.75
6	95.75
7	94.75
8	93.75
9	92.75
10	91.75
11	90.75
12	89.75
13	88.75



patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Hydrogeological Study
Proposed Residential Development - Old Prescott Road
Ottawa, Ontario

DATUM Datum provided by Stantec Geomatics Limited.

REMARKS

BORINGS BY CME 55 Power Auger

DATE March 15, 2013

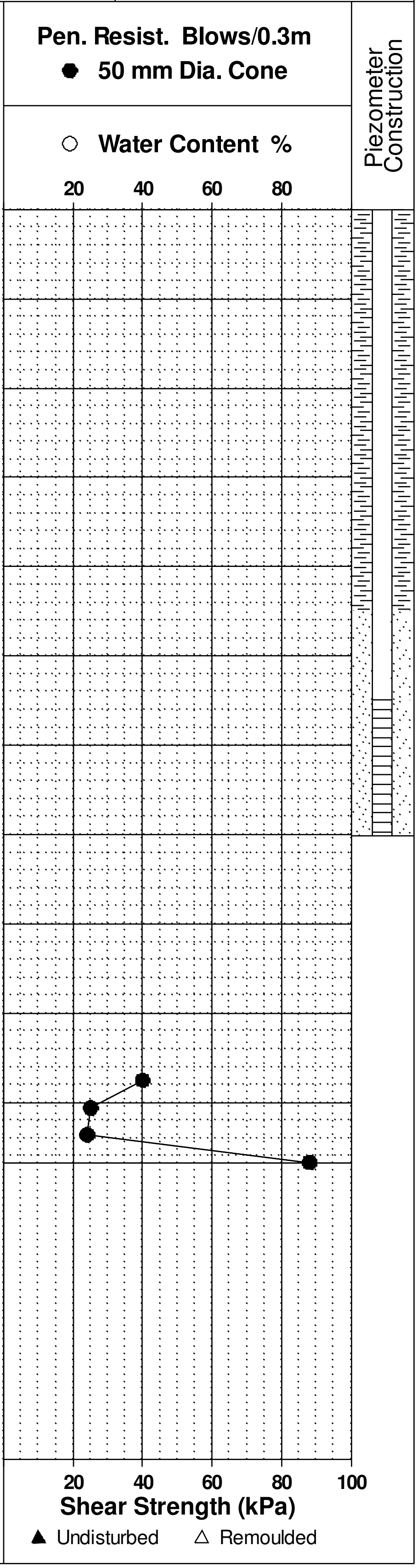
FILE NO. PH2095

HOLE NO. BH 6

SOIL DESCRIPTION	Depth (m)
GROUND SURFACE	
TOPSOIL	0.30
Compact, brown **SAND**	2.40
Brown **SILTY CLAY** with some sand - blue-grey by 4.0m depth	7.62
Dynamic Cone Penetration Test commenced at 7.62m depth Inferred **GLACIAL TILL**	10.67
Practical DCPT refusal at 10.67m depth.	

SAMPLE TYPE	NUMBER	% RECOVERY	N VALUE or RQD
SS	1	50	15
SS	2	80	5
SS	3	80	W
SS	4	70	1
SS	5	70	5

DEPTH (m)	ELEV. (m)
0	101.40
1	100.40
2	99.40
3	98.40
4	97.40
5	96.40
6	95.40
7	94.40
8	93.40
9	92.40
10	91.40



APPENDIX 2

FIGURE 1 - SITE LOCATION PLAN

DRAWING NO. PH2095-1- TEST HOLE LOCATION PLAN

Client:

1384341 ONTARIO LTD.

Consultant:

patersongroup
consulting engineers

Project:

OLD PRESCOTT ROAD SUBDIVISION

1240 OLD PRESCOTT ROAD
OTTAWA (GREELY), ONTARIO

Drawing:

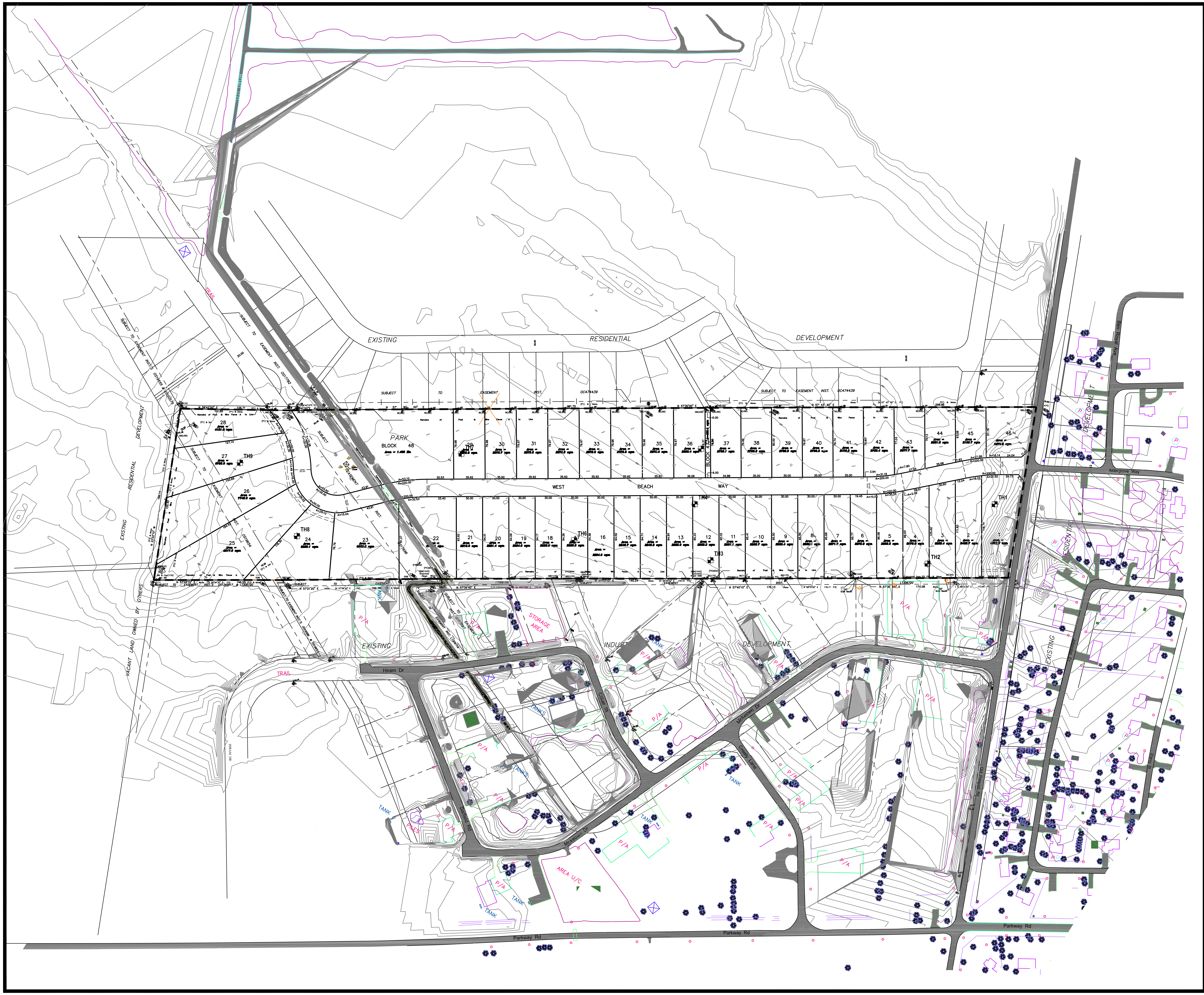
SITE LOCATION PLAN

Scale: N.T.S	Seal:
Date: 09/2013	
Drawn by: BA	
Checked by: RAP	
File: PH2095	

Drawing No.:

PH2095-FIG.1

Storage No.:PH20xx/PH2095-FIG.1.DWG



LEGEND:

⊙	TW1	TEST WELL LOCATION
Ⓓ		EXISTING DUG WELL
⊕	MW2	MONITORING WELL LOCATION
◩	TH3	TEST HOLE LOCATION

NO.	DESCRIPTION	DATE

DESIGNED BY: RAP
DRAWN BY: BA
CHECKED BY: RAP
SCALE: 1:2000
DATE: 01/2013

CLIENT

1384341 ONTARIO LTD.

PROJECT/LOCATION

OLD PRESCOTT ROAD SUBDIVISION

1240 OLD PRESCOTT ROAD
OTTAWA (GREELY), ONTARIO

DRAWING

TEST WELL LOCATION PLAN

DRAWING NO. **PH2095-1**

REVISION NO.

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