- SELLING INFORMATION -

(THIS IS NOT A TENDER)

Municipal Address:	Not assigned – Fronting on Robinson Drive, Sudbury
Legal Description:	Part of PIN 73597-0195, being Parts 5 and 6 on Plan 53R-20112, Part of Lot 8, Concession 1, Township of McKim, City of Greater Sudbury
Type of Property:	Vacant land - purchaser(s) must satisfy themselves that a building permit will be available for intended use
Zoning:	"R1-5"; Low Density Residential One
Approximate Size of Site:	50 feet by 155 feet (measuring approximately 7,750 sq ft) 15 metres by 47 metres (measuring approximately 705 sq m)
Services Available:	Municipal water and sewer are available to the lot line Curb depressions are in place (there is a no cut policy in effect)
Taxes:	To be assessed
Reference and & Lot Grading Plans:	Plan 53R-20112 included Lot Grading plan included
Development Charges:	Development charges will be payable to the City of Greater Sudbury upon the issuance of a building permit.
Soils Report:	The purchaser acknowledges being advised that the former school located on PIN 73597-0195(LT) has been demolished. The property has been in filled with non engineered fill. Anyone applying for a building permit will be required to retain the services of a geotechnical consultant as per the Geotechnical Investigation report by AMEC dated January 27, 2014. Copy of the report made available upon request.
Purchaser(s) Conditions:	Any conditions or additional provisions may be added as a Schedule to the Agreement of Purchase and Sale.

Asking Price: $119,900.00 (plus HST)

Should you have any questions, please contact City of Greater Sudbury, Real Estate Section, at (705) 674-4455 ext 4373 or email realestate@greatersudbury.ca

If you wish to submit an offer to purchase the subject lot, kindly complete the attached Agreement of Purchase and Sale and submit it to: City of Greater Sudbury, Real Estate Section, Attn: Tanya Rossmann-Gibson, Property Administrator, PO Box 5000, Stn A, 200 Brady Street, Sudbury, ON P3A 5P3.

The Vendor makes no representations or warranties about the property described above and assumes no liability for the accuracy or completeness of the above noted information. It is recommended that any interested party satisfy itself as to the suitability of the property for its own purposes.

Dated: April 24, 2015

AGREEMENT OF PURCHASE AND SALE

PURCHASER(s): _____
Agrees to purchase from
VENDOR: CITY OF GREATER SUDBURY
the following
REAL PROPERTY:
municipally known as: Vacant Land Fronting on Robinson Drive, Sudbury

being described as: Part of PIN 73597-0195(LT), being Parts 5 and 6, on Plan 53R-20112, part of Lot 8, Concession 1, Township of McKim, City of Greater Sudbury
(the "Property")

in an “as is” condition
for a
PURCHASE PRICE of --- _____ --- 00/100 Dollars (CDN $_____)
Together with any applicable HST.

DEPOSIT:
The Purchaser submits with this offer ---------- TEN THOUSAND ---------- 00/100 Dollars (CDN $10,000.00) by certified cheque payable to City of Greater Sudbury to be credited toward the Purchase Price on closing of this transaction, or returned to the Purchaser without interest or deduction, if the transaction fails to close through no fault of the Purchaser. The Purchaser agrees to pay to the Vendor on closing, the balance of the purchase price by certified cheque, subject to adjustments provided for in this agreement.

1. The Purchaser agrees to pay to the Vendor on closing, in addition to the Purchase Price any applicable HST on the Purchase Price, or in the alternative, shall deliver on closing evidence satisfactory to the Vendor’s solicitor that the Purchaser is an HST registrant, and an Undertaking to Remit any applicable HST and to Indemnify the Vendor for failure to do so, prepared in the Vendor’s standard form. The Purchaser authorizes the Vendor to verify with the Canada Revenue Agency, the Purchaser’s HST registration status and the Purchaser’s HST registration number. The Purchaser agrees to provide to the Vendor any further written authorizations or directions that may be required, in order for the Vendor to obtain this information.

1.A The Purchaser’s conditions (if any) are set out on Schedule ‘A’ attached hereto and forming part of this agreement.

2. **CONDITION – COUNCIL APPROVAL:** The Purchaser acknowledges and understands that any execution of this Agreement by the Director of Asset Services for the City of Greater Sudbury on behalf of the Vendor is expressly conditional upon the approval of the terms of the offer by the Council for the City of Greater Sudbury and does not bind the Vendor unless the within Offer is approved by Council on or before 11:59 p.m. on **the day of , 2015**. If this condition is not satisfied by the date specified, this Agreement shall be at an end, the Purchaser’s deposit shall be returned to him without interest or deduction and neither party shall have any further obligation to the other respecting this Agreement.

3. **REQUIRED DELIVERABLES ON CLOSING FROM PURCHASER:** It is a condition of Closing that the Purchaser enter into and register or cooperate in the registration on Closing at its cost, in priority to any mortgage or other encumbrance of:

a) Lot Grading Agreement: A Lot Grading Agreement in the City’s standard form, incorporating the Lot Grading /Drainage Plan prepared by a lot grading professional at the direction and expense of the City. The Purchaser shall return to the City 3 copies of the Lot Grading Agreement as prepared by the City at least 5 days before Closing. The Purchaser understands that any building permit issued for the Property will require compliance with the Lot Grading Agreement.

4. **NOTICE - SOILS AGREEMENT TO CONSTRUCT:** The Purchaser acknowledges having been advised that a former school which was located on PIN 73597-0195(LT) was demolished and the site filled with non-engineered fill which may affect all or part of the Property. The Purchaser further acknowledges that the City’s Geotechnical Investigation report by AMEC dated January 27, 2014, (the “Geotechnical Report) is and has been made available to interested Purchasers on request and the Purchaser is advised to inform himself before purchase. On application for a building permit for the Property, the Purchaser should be aware that the applicant for the building permit will be required to retain the services of a geotechnical consultant to provide a report, in accordance with the Geotechnical Report and comply with recommendations.

5. **AS IS/ WHERE IS:** It is a condition of the closing that the Purchaser accept the Property in an as is / where is condition. The Purchaser understands and agrees that any information package provided by the Vendor, any comments made by the Vendor’s staff and any plans or drawings that may have been provided by the Vendor or the Vendor’s staff are for the purpose of assisting the Purchaser to make its own enquiries. The Vendor makes no representations or warranties about and takes no responsibility for the accuracy or completeness of information provided for the assistance of the Purchaser except as expressly provided herein. Without limiting the generality of the forgoing, the Vendor makes no representation or warranty of any kind, either express or implied as to the condition of the soil, subsoil, ground and surface water or any other environmental matter.

6. **TAXES:** The Purchaser acknowledges being advised and understands that although the Property is not currently subject to real property taxes, real property taxes will be assessed upon the acquisition of the Property by the Purchaser. The Purchaser agrees to assume any local improvement levies assessed against the Property.

7. **IRREVOCABILITY**: This Offer shall be irrevocable by the Purchaser until 4:30 p.m. on **the day of , 2015**, after which time, if not accepted, this Offer shall be null and void and the deposit shall be returned to the Purchaser in full without interest.

8. **COMPLETION DATE**: This Agreement shall be completed by no later than 4:30 p.m. on **the day of , 2015**, or such other date as may be agreed to by the parties in writing. Upon completion, vacant possession of the property shall be given to the Purchaser unless otherwise provided for in this Agreement.

9. **TITLE SEARCH**: Purchaser shall be allowed until 6:00 p.m. on the 5th day before closing (Requisition Date) to examine the title to the property at his own expense and to satisfy himself there are no outstanding work orders or deficiency notices affecting the property.

10. **FUTURE USE**: The Purchaser acknowledges and agrees that the Vendor has made no representation or warranty of any kind that the future intended use of the property by the Purchaser is or will be lawful.

11. **TITLE**: Provided that the title to the property is good and free from all encumbrances except as aforesaid and except for any registered restrictions or covenants that run with the land providing that such are complied with and except for any easements to public utilities. If within the time allowed for examining the title any valid objection to title, which Vendor is unable or unwilling to remove, remedy or satisfy and which Purchaser will not waive, notwithstanding any intermediate act or negotiations in respect of such objections, this Agreement shall be at an end and all monies theretofore paid shall be returned without interest or deduction and Vendor shall not be liable for any costs or damages. The Purchaser's only right and remedy shall be such right of termination. Save as to any valid objection so made by such day and except for any objection going to the root of the title the Purchaser shall be conclusively deemed to have accepted Vendor's title to the property.

12. **ELECTRONIC REGISTRATION**: Where the transaction will be completed by electronic registration pursuant to Part III of the *Land Registration Reform Act*, R.S.O. 1990, Chapter L4, and any amendments thereto, each of the parties shall retain a lawyer to act on its behalf. The Vendor and Purchaser acknowledge and agree that the exchange of closing funds, non-registrable documents and other items (the 'Requisite Deliveries') and the release thereof to the Vendor and Purchaser will (a) not occur at the same time as the registration of the transfer/deed (and any other documents intended to be registered in connection with the completion of this transaction) and (b) be subject to conditions whereby the lawyer(s) receiving any of the Requisite Deliveries will be required to hold same in trust and to release same except in accordance with the terms of a document registration agreement between the said lawyers, the form of which is as recommended from time to time by the Law Society of Upper Canada. Unless otherwise agreed to by the lawyers, such exchange of the Requisite Deliveries will occur in the applicable Land Titles Office or such other location agreeable to both lawyers.

13. **DOCUMENTS AND DISCHARGE**: Purchaser shall not call for the production of any title deed, abstract, survey or other evidence of title to the property except such as are in the possession or control of Vendor.

14. **INSPECTION**: Purchaser acknowledges having had the opportunity to inspect the property and understands that upon acceptance of this Offer there shall be a binding agreement of purchase and sale between Purchaser and Vendor.

15. **PLANNING ACT**: This Agreement is subject to compliance with the *Planning Act*, R.S.O. 1990, c. P.13. The Purchaser shall not call upon the Vendor and neither the Vendor nor the Vendor's solicitor shall be required to complete Planning Act Statements in the electronic Transfer/Deed of Land.

16. **DOCUMENT PREPARATION**: The Transfer / Deed shall save for the Land Transfer Tax Affidavit be prepared in registerable form at the expense of the Vendor. All registration costs and other costs associated with effecting the transfer pursuant to this agreement shall be borne by the Purchaser.

17. **TIME LIMITS**: Time shall in all respects be on the essence hereof provided that the time for doing or completing of any matter provided for herein may be extended or abridged by an agreement in writing signed by Vendor and Purchaser or by their respective solicitors who may be specifically authorized in that regard.

18. **TENDER**: Any tender of documents or money hereunder may be made upon Vendor or Purchaser or their respective lawyers on the day set for completion. Money may be tendered by bank draft or cheque certified by a Chartered Bank, Trust Company, Province of Ontario Savings Office, Credit Union or Caisse Populaire.

19. **AGREEMENT IN WRITING**: If there is conflict or discrepancy between any provision added to this Agreement (including any Schedule attached hereto) and any provision in the standard pre-set portion hereof, the added provision shall supersede the standard pre-set provision to the extent of such conflict or discrepancy. This Agreement including any Schedule attached hereto, shall constitute the entire Agreement between Purchaser and Vendor. There is no representation, warranty, collateral agreement or condition, which affects this Agreement other than as expressed herein. This Agreement shall be read with all changes of gender or number required by the context.

20. **SUCCESSORS AND ASSIGNS**: The heirs, executors, administrators, successors and assigns of the undersigned are bound by the terms herein.

21. **ASSIGNMENT:** This agreement shall not be assigned by the Purchaser without prior written consent of the Vendor, which consent may be refused, or given subject to conditions.

22. **REAL ESTATE COMMISSION:** The Purchaser shall be responsible for any commission to any real estate agent retained by him and payable as the result of this agreement. The Vendor represents and warrants that it has not retained any real estate agent in regard to this property.

23. **GENDER & NUMBER:** In this agreement the use of the singular number includes the plural and vice versa and the use of any gender includes all genders.

CORPORATE SIGNING CLAUSE:

IN WITNESS whereof the PURCHASER has signed this Agreement by its duly authorized signing officers in that regard.

DATED at Sudbury, this _____ day of _____, 2015.

_____
Per:
_____

_____
Print Name, Title

_____

_____
Print Name, Title
I/We have authority to bind the corporation.

INDIVIDUAL(S) SIGNING CLAUSE:

IN WITNESS whereof the PURCHASER has signed this Agreement

DATED at Sudbury this _____day of _____, 2015, in the presence of

Witness:

_____ _____(LS) Date: _____
Name: Name:

_____ _____(LS) Date: _____
Name: Name:

IN WITNESS whereof the VENDOR has signed this Agreement by its duly authorized signing officers in that regard.

DATED at Sudbury, this _____ day of _____, 2015.

CITY OF GREATER SUDBURY
Per:

_____
Director of Asset Services

Acceptance conditional upon approval by Council for
the City of Greater Sudbury as specified in the Agreement.

ADDRESS FOR SERVICE

Vendor's Address for Service: 200 Brady Street, Box 5000,
Stn. A, Sudbury ON P3A 5P3, Attention: Real Estate Section
Tel No.: (705) 671-2489 - Real Estate Section
FAX: N/A

Vendor's Lawyer: City Legal Services
Tel No.: (705)-671-2489 - Legal Services
FAX: (705)-673-1651

Purchaser's Address for Service: _____

Tel. No.: _(705)_____ FAX: _(705)_____

Purchaser's Lawyer:_____

Address:_____

Tel. No.: _(705)_____ FAX: _(705)_____

SCHEDULE 'A'

This Schedule is attached to and forms part of the attached Agreement of Purchase and Sale between:

PURCHASER(s), _____ and

VENDOR, **CITY OF GREATER SUDBURY**,

for the purchase and sale of **VACANT LAND FRONTING ON ROBINSON DRIVE, SUDBURY**

being **Part of PIN 73597-0195(LT), being Parts 5 and 6, on Plan 53R-20112.**

This offer is conditional upon the Purchaser complying with or delivering to the Vendor, a written waiver of each the following conditions, as the case may be, on or before 11:59 p.m. on the _____ day of _____, 2015, or such other date as may be agreed to by the parties from time to time, failing which this Agreement shall be null and void. Provided the Purchaser has acted in good faith and in a timely manner to secure compliance with or satisfy itself with respect to each of the conditions, the deposit shall be returned to the Purchaser without interest or deduction.

(IF APPLICABLE, Purchaser inset conditions)

PLAN OF SURVEY OF:

PART OF LOTS 97, 98, 99 & 178
REGISTERED PLAN M-329

CITY OF GREATER SUDBURY

DISTRICT OF SUDBURY

SCALE: 1 : 400

0 10 20 30 40 METERS

2013

This copy is not to scale.

SURVEYOR'S CERTIFICATE:

I CERTIFY THAT:

1) THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT, THE SURVEYORS ACT AND THE LAND TITLES ACT AND THE REGULATIONS MADE UNDER THEM;

2) THE SURVEY WAS COMPLETED ON SEPTEMBER 9, 2013

Sept 10/2013 — A BORTOLUSSI, OLS

DATE

NOTE:

BEARINGS SHOWN HEREON ARE GRID BEARINGS REFERRED TO THE CENTRAL MERIDIAN THROUGH 81° WEST LONGITUDE OF THE UTM ZONE 17, AND ARE DERIVED FROM OBSERVED REFERENCE POINTS 'A', 'B' AND 'C' BY REAL TIME NETWORK OBSERVATIONS, NAD83-CSRS (VER4/2002)

DISTANCES SHOWN HEREON ARE ADJUSTED HORIZONTAL GROUND DISTANCES

GROUND DISTANCES CAN BE CONVERTED TO GRID DISTANCES BY MULTIPLYING BY A COMBINED SCALE FACTOR OF 0.99982

FOR BEARING COMPARISONS, A ROTATION OF 0° 07' 00" COUNTERCLOCKWISE WAS APPLIED TO BEARINGS ON PLANS 53R-11906 AND M-329

POINT ID	NORTHING	EASTING
SIB 'A'	5145360.169	498163.974
SIB 'B'	5145394.539	498314.548
ROCK BAR 'C'	5145313.118	498202.803

ALL COORDINATES ARE IN METERS, ARE RELATED TO UTM ZONE 17 (81° WEST NAD83) CSRS AND HAVE A RELATIVE ACCURACY TO MEET THE REQUIREMENTS OF URBAN AREA AT A 95% CONFIDENCE LEVEL

COORDINATES CANNOT, IN THEMSELVES, BE USED TO RE-ESTABLISH CORNERS OR BOUNDARIES ON THIS PLAN

DISTANCES AND COORDINATES SHOWN ON THIS PLAN ARE IN METERS AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

SCHEDULE

PART	LOT	CON./PLAN	PARCEL/PIN/INST.	AREA (sq. m)
1	PART OF LOT 97	REGISTERED PLAN M-329	PART OF PIN 73597-0195	541.547
2				36.720
3				132.732
4				9.000
5	PART OF LOTS 97 & 98			674.279
6				45.720
7	PART OF LOT 98			674.279
8				45.720
9	PART OF LOTS 98 & 178			674.279
10				45.720
11	PART OF LOTS 99 & 178			674.279
12				45.720

PARTS 1 TO 12 - SUBJECT TO SMOKE EASEMENT LT93875

PLAN 53R-20112

RECEIVED AND DEPOSITED

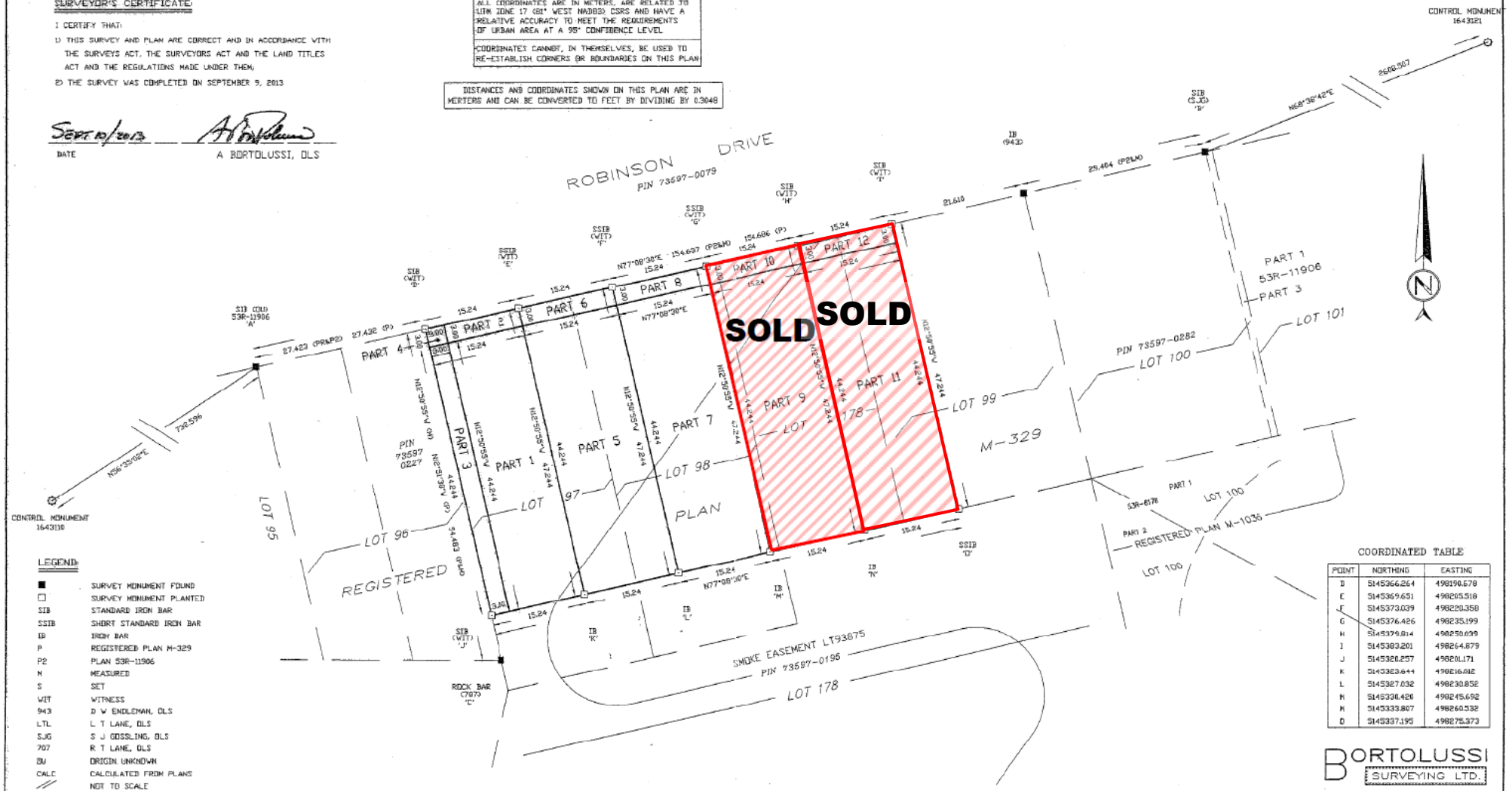
2013-09-11 — J. Dell

DATE — REPRESENTATIVE FOR THE LAND REGISTRAR FOR THE LAND TITLES DIVISION OF SUDBURY

I REQUIRE THIS PLAN TO BE DEPOSITED UNDER THE LAND TITLES ACT

Sept 10/2013 — A BORTOLUSSI

DATE — ONTARIO LAND SURVEYOR



LEGEND:

■	SURVEY MONUMENT FOUND
□	SURVEY MONUMENT PLANTED
SIB	STANDARD IRON BAR
SSIB	SHORT STANDARD IRON BAR
IB	IRON BAR
P	REGISTERED PLAN M-329
P2	PLAN 53R-11906
M	MEASURED
S	SET
WIT	WITNESS
943	D W ENDLEMAN, OLS
LTL	L T LANE, OLS
SJG	S J GOSSLING, OLS
707	R T LANE, OLS
OU	ORIGIN UNKNOWN
CALC	CALCULATED FROM PLANS
//	NOT TO SCALE

COORDINATED TABLE

POINT	NORTHING	EASTING
D	5145366.264	498190.678
E	5145369.651	498205.518
F	5145373.039	498220.358
G	5145376.426	498235.199
H	5145379.814	498250.039
I	5145383.201	498264.879
J	5145386.257	498281.171
K	5145383.644	498316.612
L	5145387.032	498330.852
M	5145330.426	498245.692
N	5145333.807	498260.532
O	5145337.195	498275.373

BORTOLUSSI SURVEYING LTD.

PROPOSED LOT GRADING PLAN

PART OF LOTS 97, 98, 99 & 178
REGISTERED PLAN M-329
GEOGRAPHIC TOWNSHIP OF McKIM
CITY OF GREATER SUDBURY
DISTRICT OF SUDBURY

SCALE: 1 : 200

0 5 10 15 20 METERS

2013

This copy is not to scale.

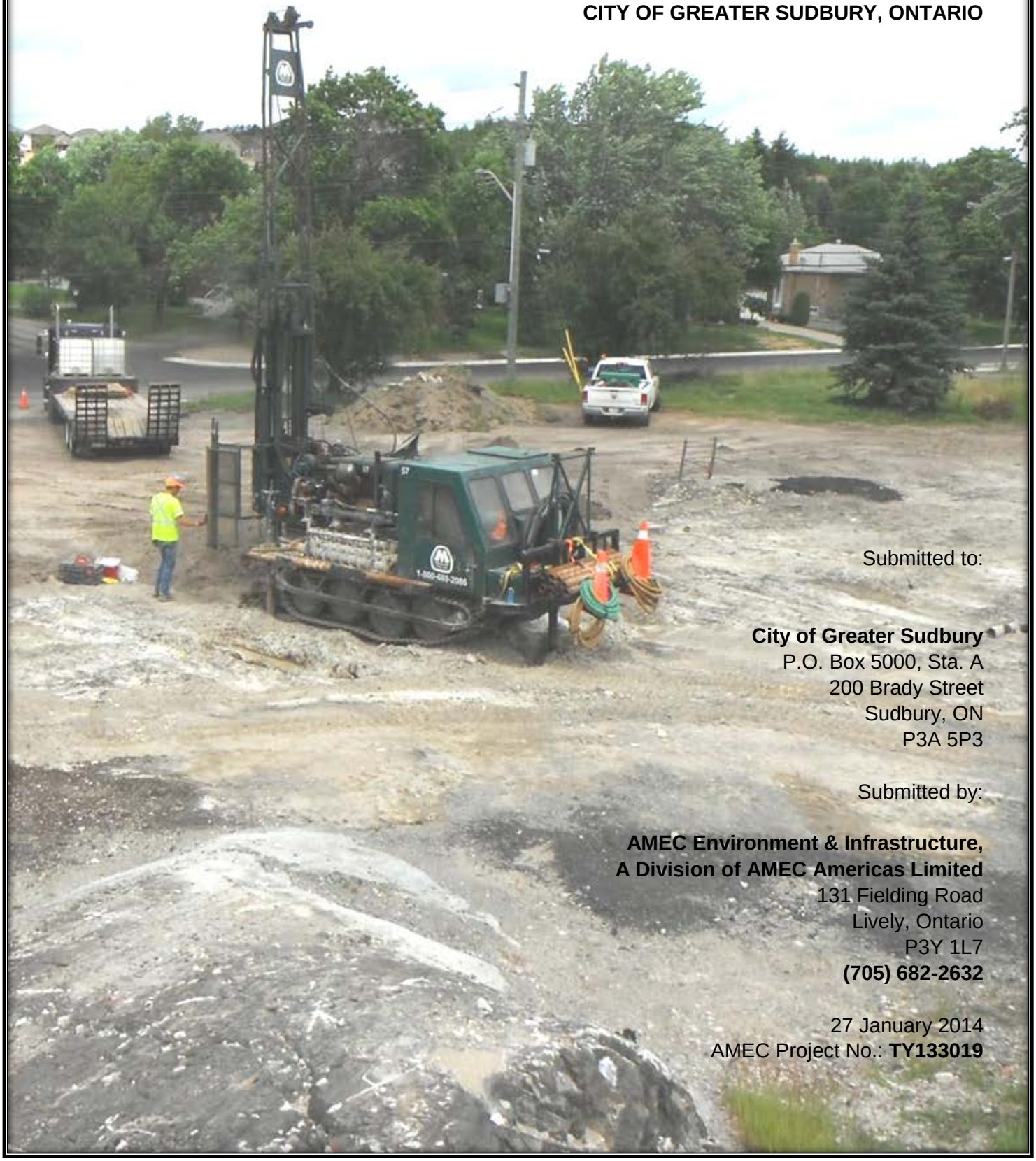
LEGEND

EXISTING ELEVATION

PROPOSED ELEVATION

DIRECTION OF FLOW

GEOTECHNICAL INVESTIGATION - REVISED
PROPOSED RESIDENTIAL DEVELOPMENT
CITY OF GREATER SUDBURY, ONTARIO



Submitted to:

City of Greater Sudbury
P.O. Box 5000, Sta. A
200 Brady Street
Sudbury, ON
P3A 5P3

Submitted by:

AMEC Environment & Infrastructure,
A Division of AMEC Americas Limited
131 Fielding Road
Lively, Ontario
P3Y 1L7
(705) 682-2632

27 January 2014
AMEC Project No.: **TY133019**

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Modified Unified Classification System for Soils

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1.0 INTRODUCTION

1.1 Background

AMEC Environment & Infrastructure, a Division of AMEC Americas Limited (AMEC), has been retained by the City of Greater Sudbury (CGS) to perform a geotechnical test hole investigation for the proposed residential development at 811 Robinson Drive (formerly Corpus Christi Catholic School) in Sudbury, Ontario (see Figure 1).

The purpose of this investigation was to determine the subsurface conditions and relevant soil properties at the subject site in order to provide recommendations for the geotechnical aspects of the proposed development design.

The anticipated construction conditions are also discussed, but only to the extent that they may influence design decisions. The feasible construction methods, however, express our opinion and are not intended to direct contractors in how to carry out construction. Contractors should also be aware that the data and their interpretation presented in this report may not be sufficient to assess all factors that may have an effect upon construction.

We assume that the work will be carried out in accordance with good engineering practices and all applicable standards and regulations. Environmental considerations were not part of the scope of work for this geotechnical investigation.

There should be an ongoing liaison with AMEC during both the design and construction phases of the project to ensure that the recommendations in this report have been interpreted and implemented correctly. Also, if any further clarification and/or elaboration are needed concerning the geotechnical aspects of this project, AMEC should be contacted immediately.

1.2 Site Description

The proposed residential development, likely to include single family dwellings, with basements, will be located at the former Corpus Christi Catholic School, now demolished and backfilled, at 811 Robinson Drive in Sudbury, Ontario. The area is generally flat and within a residential part of the community. Robinson Lake is located toward the southwest with some marsh areas in the south portion and the project site area was noted to contain bedrock outcrops.

2.0 INVESTIGATION PROGRAM

2.1 Soil Drilling Investigation

The fieldwork for this project was carried out on 10 July 2013, when three boreholes (BH13-01 to 03) and two probe holes (PH13-01 and 02) were advanced across the project site to a maximum investigation depth of 14.9 m below ground surface. The test holes were advanced with a track mounted soils drill rig supplied by Marathon Drilling Company Limited and the logs are presented in Appendix A.

The test hole locations are shown on the Test Hole Location Plan (see Figure 2). All test hole locations were field located by AMEC based on a drawing provided the CGS.

The test holes were advanced using hollow stem augers and conventional soil sampling methods under the supervision of the AMEC representative under the direction of the AMEC geotechnical engineer, providing soils information along with relative soil density. Soil samples were collected at predetermined depth intervals in accordance with Standard Penetration Testing (SPT) procedures (ASTM D-1586) utilizing a mechanical hammer. Test results are recorded on the borehole logs as 'N'-values. These values provide an indication of the various soil strata's condition with respect to compactness or consistency. The samples were placed in plastic bags and delivered to our office for further examination and testing.

Ground surface elevations at the borehole locations were surveyed by AMEC personnel. Based on a drawing provided by the CGS, the catch basin located at the northeast corner of the property was used as a benchmark with a known elevation of 252.95 m (see Figure 2). Test hole locations were also geo-referenced to UTM co-ordinates using a hand-held Global Positioning System (GPS) unit. Elevations and GPS co-ordinates can be found on the logs in Appendix A.

3.0 SOIL CONDITIONS

A summary of the subsurface conditions encountered in the boreholes is presented below.

3.1 Surficial Layer

A surficial layer of fill, mostly sand, trace gravel, silt was encountered in all boreholes (BH13-01 to 03) that ranged in thickness from 100 mm to 1.5 m. As can be seen in the borehole logs, the quality and thickness of the fill is expected to vary across the site. The backfill was placed following the razed Corpus Christi school activities and AMEC is not aware of any compaction supervision or field reports detailing the compaction activities.

3.2 Silt / Clay

Underlying the fill in all boreholes is a brown changing to grey, moist to wet silt / clay layer that extended to the bottom of the sampled boreholes between 4.8 to 6.6 m depth below the ground surface.

Field shear vane testing values ranged from 24 to greater than 100 kPa indicating a soft to very stiff condition, with a remoulded ratio of 2 to 8, indicating a medium to extra sensitive condition.

The natural moisture content, as measured in the collected split spoon samples in the silt / clay, ranged between 17 and 48%. Atterberg limit testing conducted on BH13-01 split spoon 6 indicated a liquid limit of 48%, a plastic limit of 15% and a plasticity index of 33, indicating an organic clay soil of medium plasticity.

3.3 Dynamic Cone Penetration Test

Dynamic Cone Penetration Testing (DCPT) was conducted in PH13-01 and 02 and extended from depths of 2.5 and 14.9 m below the ground surface, where refusal was encountered on possible cobbles / boulders or bedrock. The DCPT results indicate increased compactness/stiffness with depth. Bedrock coring would be required to confirm the existence and quality of bedrock.

3.4 Groundwater

Free standing groundwater was observed in the open borehole at BH13-01 on completion of drilling at 4.7 m below the ground surface. In addition, following 1.5 and 2.5 hr. periods of stabilization in BH13-01 and 02, the groundwater level was measured at 1 and 3.5 m below grade, respectively. Considering the moisture contents in the silt / clay soil, it is expected that the groundwater table will at the top of this layer. Also, trapped water can be expected within the surficial fill. The long term groundwater level is expected to fluctuate, being lower during extended dry periods and higher during wet periods.

4.0 DISCUSSION AND RECOMMENDATIONS

The anticipated building envelopes are presented on Figure 3. The proposed building envelopes are based on the CGS building set back requirements.

4.1 Foundations

It is important to note that the site grade should not be increased. If grade increases are considered, a geotechnical engineer should be consulted.

4.1.1 Conventional Spread Footings

Based on the borehole information and the anticipated relatively light loads associated with residential dwellings, foundations for the proposed development can utilize conventional spread footings founded on the undisturbed, native, silt / clay soil.

The bearing surface must be free of deleterious material such as debris, disturbed material, ice, etc. The available net allowable bearing capacity of spread footings no wider than 600 mm, at a depth of 1.8 m (for frost protection) below existing grades on the native soil is 75 kPa. The footings may need to be founded slightly deeper to avoid the fill and organics identified in BH13-01, located at the western most lot (Part 1 on Figure 3), at 2.3 m below existing grades. Settlements of spread foundations on native soils should be less than 25 mm (total) and 19 mm (differential), if the provided recommendations are followed.

The native soils are anticipated to be sensitive to both moisture and construction activity. Thus, a layer of geotextile/geogrid or a concrete mud slab should be placed in the excavations. Light compaction equipment will be required to compact the initial lift of granular fill and it may be

necessary to limit vibration to reduce disturbance to the subgrade soils and the existing facilities. Alternatively, non-shrink / flowable fill should be considered to minimize the risks associated with construction vibrations.

A geotechnical engineer must review the foundation base prior to placement of the granular pad / mud mat or foundations. This is necessary to check the assumed founding conditions and to review the foundation construction procedures, etc.

4.1.2 Engineered Fill

If required, due to the removal of existing fill, the subgrade can be raised with engineered fill. The extent of the excavation and subgrade area should extend beyond the foundation edges and extend outwards from the foundation by at least 600 mm plus H, where H is the thickness of the structural fill below the base of the structure. The engineered fill should be placed within 2% of the optimum moisture content, in lifts not exceeding 200 mm loose thickness. The final 150 mm below the building should comprise Granular 'A', compacted to at least 100% standard Proctor maximum dry density (SPMDD), where the balance can comprise well-graded Granular 'B', Type II, compacted to at least 100% SPMDD.

If founding on engineered fill over native soil, the available bearing capacity will be 75 kPa and settlements should be less than 25 mm (total) and 19 mm (differential), assuming a nominal footing width of less than 600 mm.

In the event that any of the spread and strip footings are founded on structural fill and native soils, the following precautions are suggested to accommodate the resulting potential differential movement.

(a) The transition zone of the foundation at the structural fill / native soils should be adequately reinforced on either side.

(b) Reinforced concrete foundation walls or, at the very least, grade beams on the top of the block foundation walls are usually incorporated to provide additional rigidity.

(d) The structures should be capable of absorbing any potential small differential settlements.

(e) Individual spread footings (if any) must be located entirely on native soils or entirely on structural fill to prevent unacceptable moments from being transmitted up into the structure.

(f) Control joints should be incorporated through the superstructure at the transition locations.

(g) The (actual) locations of the structural fill / native soil contacts at the founding levels can be established only during construction. It must, therefore, be necessary to contact the geotechnical consultant and the structural engineer during the excavation and foundation work.

A geotechnical engineer must review the foundation base prior to placement of the granular pad / mud mat or foundations. This is necessary to check the assumed founding conditions and to review the foundation construction procedures, etc.

4.2 Frost Protection

As noted above, for spread footings on soil, it is recommended that exterior foundations be provided with at least 1.8 m of earth cover or equivalent rigid insulation for frost protection. Where the insulating effect of snow cover is removed on a continuing basis, e.g., around doorways, sidewalks adjacent to the building, etc., it is recommended this frost protection cover be increased to 1.95 m. It would also be prudent to construct foundation walls with poured concrete, as opposed to concrete blocks and a 'bond breaker' detail included between the walls and backfill soils.

During winter construction, foundations must not be poured on frozen soil. Foundations must be adequately protected at all times from cold weather and freezing conditions.

4.3 Concrete Floor Slabs

Where slab-on-grade construction is considered, slab-on-grade support fill must be founded below any existing topsoil and deleterious materials, on the undisturbed native soil. Areas requiring over-excavation to remove deleterious material can have the subgrade elevation raised through the placement of Granular 'B', Type I. All the engineered fill under the slab should be placed within 2% of the optimum moisture content, in thin lifts (not exceeding 200 mm loose thickness), and compacted to at least 98% SPMDD. The final 150 mm below the slab should comprise Granular 'A'.

Unless proven not to be necessary, a capillary break and vapor barrier should be considered under the concrete slab. This is particularly necessary in areas where a moisture sensitive floor finish is anticipated. In the case of any depressed floor slab areas below the finished grades, a subdrainage system should be considered, in addition to the capillary break and vapor barrier.

The slab should be structurally independent from walls and columns, which are supported on foundations. This is to reduce any structural distress that may occur as a result of differential soil movement. If it is intended to place any internal, non-load bearing partitions directly on the slab-on-grade, such walls should also be structurally independent from other elements of the building founded on conventional foundation systems, so that some relative vertical movement of the walls can freely occur.

The excavated subgrade beneath the slab-on-grade should be protected at all times from rain, snow, freezing temperatures, excessive drying and the ingress of water.

4.4 Excavation

It is expected that shallow excavations in the native soils, should be stable at 1H:1V side slopes. Seepage from a surface water source should be moderate and, if necessary, can be handled by gravity drainage and pumping (properly filtered) from open sumps. Soils expected to be encountered on this site can be classified as follows:

- Silt / Clay — Type 3 (above the groundwater table)
- Submerged Silt / Clay and Fill — Type 4 (below the groundwater table)

It is expected that the slopes of excavations that penetrate below the groundwater table may collapse into the open excavation. As such, it is imperative that an experienced contractor be retained to complete these excavations.

Excavations in bedrock may be necessary and will require drilling and blasting techniques. From previous experience, this type of rock is known to be 'brittle' and contains fractures and joints. It is often difficult to blast and excavate to 'neat' lines using conventional drilling and blasting procedures, i.e., problems with 'over-break' are common. Over-break volumes are dependant on rock quality and blast patterns. Generally in this area, an over-break of about 15 % should be accounted for. This potential problem may affect quantities claimed by the contractor for rock excavation, as well as the amount of imported granular backfill required. The contractor should, therefore, make adequate allowance for potential over-break conditions. Some considerations may have to be given to pre-splitting techniques in order to reduce this possible problem in critical areas. Due consideration must also be given to controlled blasting procedures in order to prevent potential damage to adjacent structures and services.

All excavations should be carried out in accordance with the Occupational Health and Safety Regulations of the Province. A qualified geotechnical engineer should be retained to review the proposed excavation procedures.

4.5 Conventional Perimeter Drainage

The discussion in this section addresses the conventional permanent drainage systems that are installed to control the potential periodic build-up of hydrostatic pressures from infiltrations and perched groundwater.

Consideration should be given to proper drainage of any granular backfill and / or granular base under outdoor pads/sidewalks abutting the buildings, to prevent the build-up of any perched groundwater within the depth of frost penetration beneath settlement/heave sensitive areas.

Permanent perimeter tile drainage should be installed where basements are incorporated or any main floor is established less than 150 mm above the final exterior grade. Depending on the size of the floor area, under-floor tile drainage may also be required. This system must be properly filtered to ensure it does not draw in the surrounding fine soils.

In addition, the grade adjacent to the buildings must be adequately sloped away, in order to promote surface drainage away from building.

Where drainage is required, such as behind retaining walls or sub-surface structures (basement walls, etc.) the standard drainage tile wrapped in filter sock, embedded in filter gravel and connected to proper outlets (catch-basins, manholes, ditches, etc.) should suffice, so long as the system is protected against freezing.

As stipulated by the Building Code Art. 5.8.2.1, any foundation walls separating the interior space from the ground should be designed to prevent moisture transfer into this space unless it can be shown that it is not required.

4.6 Lateral Earth Pressures

For preliminary design purposes, and/ or for simple cases, the lateral earth pressure, 'p' (kPa), at any depth, 'h' (m) of a permanent earth retaining wall is given by the following expression:

$$p = K(\gamma h + q) + \gamma_w h$$

where:
- p = lateral earth pressure in kPa acting at depth h;
- K = the applicable earth pressure coefficient (see the following table);
- γ = buoyant unit weight of submerged, granular backfill adjacent to the walls, or bulk unit weight above the groundwater table;
- h = depth to point of interest in m;
- q = equivalent value of any surcharge load in kPa, if any, acting adjacent to the wall at the ground surface, and
- γ_w = unit weight of water is 9.81 kN/m^3

Table 1: Typical Unfactored Backfill Properties

Soil Unit Weight	Angle of Internal Friction Φ Degrees	Soil Unit Weight (□) kN/m^3	Earth Pressure Coefficients K (2)		
			Active (K_a)	Passive (K_p)	At Rest (K_o)
Well Graded Sand & Gravel (Granular 'B', Type I) (1)	31	21.2 to 22	0.32	3.1	0.49
Well Graded Crushed Granular (Granular 'A', or Granular 'B' Type II) (1)	34	22	0.28	3.5	0.44

Notes:

1) *Backfill compacted to ≥ 100 % SPMDD.*
2) *The calculated earth pressures caused by compacted fill, under no circumstances, should be taken as less than 12 kPa in any section of the retaining structure.*

The above expression includes a term for hydrostatic pressure from surrounding groundwater. In the case of an effective perimeter subdrainage system, hydrostatic pressures should not occur. A qualified geotechnical engineer should be retained to evaluate design lateral earth pressures.

For seismic design of retaining walls, a pseudostatic analysis of seismic earth pressures is provided in the CFEM, 4th Edition in Section 6.7.
Should the backfill be exposed to significant moisture variations and weathering, especially freeze-thaw cycles, due consideration should be given to the potential ice pressures and / or soil weakening during thawing.

Earth pressures for temporary shoring structures are calculated differently, in accordance with the applicable methods specific to the type of shoring used. In principle, the shoring system should be competent to sustain, in any section of the structure, a minimum earth pressure of 0.4 of the total overburden pressure corresponding to the total depth of the excavation.

It should be noted that the above recommendations apply for simple cases of vertical walls sustaining stable soil masses with near horizontal ground surface behind the walls. In the case of sloped ground surfaces, consideration should be given to the ensuing surcharges, as well as the long-term lateral forces that may be caused by potential slope movements (creep).

Our office would be glad to assist with detailed geotechnical recommendations on a case-by-case basis.

4.7 Earthquake Considerations

In conformance to the criteria in Table 4.1.8.4A, Part 4, Division B of the National Building Code (NBC 2005), the project site can be classified as Site Class “E-Soft soils”. The four values of the Spectral response acceleration S_a (T) for different periods and the Peak Ground Acceleration (PGA) can be obtained from Table C-2 in Appendix C, Division B of the NBC (2005). The design values of F_a and F_v for the project site should be calculated in accordance to Table 4.1.8.4 B and C.

4.8 Analytical Testing

Split spoon sample number 2 from BH13-03 was sent to an independent laboratory for analytical testing comprising pH, sulphate, resistivity and chloride determination and is presented in Appendix B and summarized below.

Laboratory testing results for the sample indicates a pH of 6.5, chloride content of 6 µg/g, sulphate content of 11 µg/g and a resistivity value of 17,900 ohm-cm.

The concentration of water soluble sulphate within the soil sample tested does not exceed the limit of 0.1%, above which CSA A.23 recommends the use of sulphate resistant cement. Therefore, sulphate resistant concrete is not required.

The resistivity, pH, sulphate and chloride content indicate limited corrosion is possible. A more detailed review of these test results should be completed by a corrosion specialist, if required.

4.9 Reuse of On-site Soils

The excavated native silt / clay is not free draining. However, when not excessively wet, it can be reused as trench backfill pipe bedding envelopes, provided it is properly pre-conditioned (brought to within 3 % of the optimum moisture content and scarified to clod size of less than 100 mm) and compacted to at least 95% SPMDD.

The existing fill material varies in quality, with various amounts of sand, gravel and silt content. The material will have to be tested prior to use, but may be installed as select subgrade material or possibly sub-base material. Adequate pre-conditioning of the on-site fill, i.e., mixing with a supply of coarser material, to reduce the percentage of fines, may allow it to be used, if test results are not acceptable.

5.0 CLOSURE

The Limitations of Report, as presented in Appendix C, forms an integral part of this report.

The recommendations included in this report, although site specific, have a general nature. Once the intended design details and construction methods are available, we recommend a geotechnical consultant be retained to review this information to ensure conformance with the assumptions and limitations considered. This is particularly important when it comes to the review of final grades, interior slab design, etc. We trust that the information presented in this report is complete within our terms of reference. If you have any questions, please do not hesitate to contact our office.

Respectfully submitted,

AMEC Environment & Infrastructure
A Division of AMEC Americas Limited

Prepared by:

David M Brown
Project Manager

Reviewed by:

Paul Belyea, M.Sc., P. Eng.
Associate Geotechnical Engineer

EXPLANATION OF BOREHOLE LOG

This form describes some of the information provided on the borehole logs, which is based primarily on examination of the recovered samples, and the results of the field and laboratory tests. Additional description of the soil/rock encountered is given in the accompanying geotechnical report.

GENERAL INFORMATION

Project details, borehole number, location coordinates and type of drilling equipment used are given at the top of the borehole log.

SOIL LITHOLOGY

Elevation and Depth

This column gives the elevation and depth of inferred geologic layers. The elevation is referred to the datum shown in the Description column.

Lithology Plot

This column presents a graphic depiction of the soil and rock stratigraphy encountered within the borehole.

Description

This column gives a description of the soil stratums, based on visual and tactile examination of the samples augmented with field and laboratory test results. Each stratum is described according to the *Modified Unified Soil Classification System*.

The compactness condition of cohesionless soils (SPT) and the consistency of cohesive soils (undrained shear strength) are defined as follows *(Ref. Canadian Foundation Engineering Manual)*:

Compactness of Cohesionless Soils	SPT N-Value
Very loose	0 to 4
Loose	4 to 10
Compact	10 to 30
Dense	30 to 50
Very Dense	> 50

Consistency of Cohesive Soils	Undrained Shear Strength kPa	Undrained Shear Strength psf
Very soft	0 to 12	0 to 250
Soft	12 to 25	250 to 500
Firm	25 to 50	500 to 1000
Stiff	50 to 100	1000 to 2000
Very stiff	100 to 200	2000 to 4000
Hard	Over 200	Over 4000

Soil Sampling

Sample types are abbreviated as follows:

SS	Split Spoon	TW	Thin Wall Open (Pushed)	RC	Rock Core	GS	Grab Sample
AS	Auger Sample	TP	Thin Wall Piston (Pushed)	WS	Washed Sample	AR	Air Return Sample

Additional information provided in this section includes sample numbering, sample recovery and numerical testing results.

Field and Laboratory Testing

Results of field testing (e.g., SPT, pocket penetrometer, and vane testing) and laboratory testing (e.g., natural moisture content, and limits) executed on the recovered samples are plotted in this section.

Instrumentation Installation

Instrumentation installations (monitoring wells, piezometers, inclinometers, etc.) are plotted in this section. Water levels, if measured during fieldwork, are also plotted. These water levels may or may not be representative of the static groundwater level depending on the nature of soil stratum where the piezometer tips are located, the time elapsed from installation to reading and other applicable factors.

Comments

This column is used to describe non-standard situations or notes of interest.

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Rev. 6 March 2012

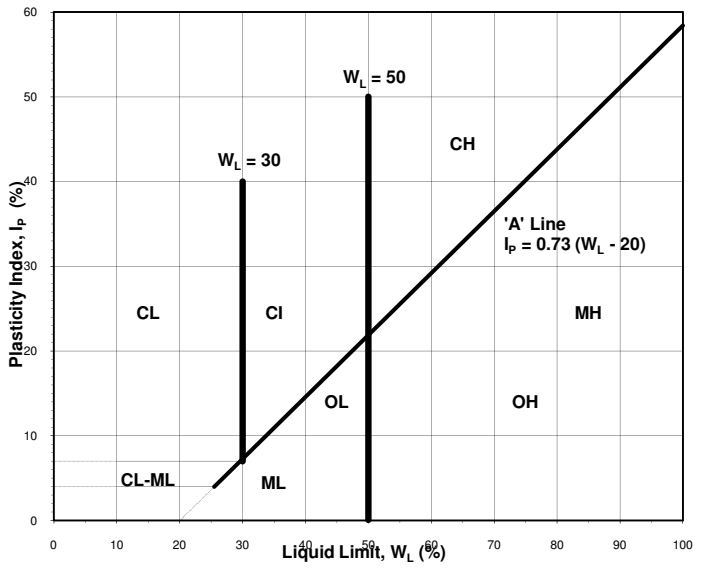
MODIFIED * UNIFIED CLASSIFICATION SYSTEM FOR SOILS

*The soil of each stratum is described using the Unified Soil Classification System (Technical Memorandum 36-357 prepared by Waterways Experiment Station, Vicksburg, Mississippi, Corps of Engineers, U.S Army. Vol. 1 March 1953.) modified slightly so that an inorganic clay of "medium plasticity" is recognized.

MAJOR DIVISION			GROUP SYMBOL	TYPICAL DESCRIPTION	LABORATORY CLASSIFICATION CRITERIA
COARSE GRAINED SOILS (MORE THAN HALF BY WEIGHT LARGER THAN 75µm)	GRAVELS MORE THAN HALF THE COARSE FRACTION LARGER THAN 4.75mm	CLEAN GRAVELS (TRACE OR NO FINES)	GW	WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	$C_u = \frac{D_{60}}{D_{10}} > 4$; $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}} = 1$ to 3
			GP	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	NOT MEETING ABOVE REQUIREMENTS
		DIRTY GRAVELS (WITH SOME OR MORE FINES)	GM	SILTY GRAVELS, GRAVEL-SAND- SILT MIXTURES	ATTERBERG LIMITS BELOW "A" LINE OR P.I MORE THAN 4
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES	ATTERBERG LIMITS BELOW "A" LINE OR P.I MORE THAN 7
	SANDS MORE THAN HALF THE COARSE FRACTION SMALLER THAN 4.75mm	CLEAN SANDS (TRACE OR NO FINES)	SW	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES	$C_u = \frac{D_{60}}{D_{10}} > 6$; $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}} = 1$ to 3
			SP	POORLY GRADED GRAVELS, GRAVEL- SAND MIXTURES, LITTLE OR NO FINES	NOT MEETING ABOVE REQUIREMENTS
		DIRTY SANDS (WITH SOME OR MORE FINES)	SM	SILTY SANDS, SAND-SILT MIXTURES	ATTERBERG LIMITS BELOW "A" LINE OR P.I MORE THAN 4
			SC	CLAYEY SANDS, SAND-CLAY MIXTURES	ATTERBERG LIMITS BELOW "A" LINE OR P.I MORE THAN 7
FINE-GRAINED SOILS (MORE THAN HALF BY WEIGHT SMALLER THAN 75µm)	SILTS BELOW "A" LINE NEGLIGIBLE ORGANIC CONTENT	W_L < 50%	ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY SANDS OF SLIGHT PLASTICITY	CLASSIFICATION IS BASED UPON PLASTICITY CHART (SEE BELOW)
		W_L < 50%	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS, FINE SANDY OR SILTY SOILS	
	CLAYS ABOVE "A" LINE NEGLIGIBLE ORGANIC CONTENT	W_L < 30%	CL	INORGANIC CLAYS OF LOW PLASTICITY, GRAVELLY, SANDY OR SILTY CLAYS, LEAN CLAYS	
		30% < W_L < 50%	CI	INORGANIC CLAYS OF MEDIUM PLASTICITY, SILTY CLAYS	
		W_L < 50%	CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS	
	ORGANIC SLITS & CLAYS BELOW "A" LINE	W_L < 50%	OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY	WHENEVER THE NATURE OF THE FINES CONTENT HAS NOT BEEN DETERMINED, IT IS DESIGNATED BY THE LETTER "F", E.G SF IS A MIXTURE OF SAND WITH SILT OR CLAY
		W_L < 50%	OH	ORGANIC CLAYS OF HIGH PLASTICITY	
HIGH ORGANIC SOILS			Pt	PEAT AND OTHER HIGHLY ORGANIC SOILS	STRONG COLOUR OR ODOUR, AND OFTEN FIBROUS TEXTURE

SOIL COMPONENTS

FRACTION	U.S STANDARD SIEVE SIZE		DEFINING RANGES OF PERCENTAGE BY WEIGHT OF MINOR COMPONENTS		
GRAVEL	COARSE	PASSING	RETAINED	PERCENT	DESCRIPTOR
		75 mm	19 mm	35-50	AND
				20-35	Y/EY
	FINE	19 mm	4.75 mm	10-20	SOME
				1-10	TRACE
SAND	COARSE	4.75 mm	2.00 mm		
	MEDIUM	2.00 mm	425 µm		
	FINE	425 µm	75 µm		
FINES (SILT OR CLAY BASED ON PLASTICITY)		75 µm			
OVERSIZED MATERIAL					
ROUNDED OR SUBROUNDED: COBBLES 75 mm to 300 mm BOULDERS > 300 mm				NOT ROUNDED: ROCK FRAGMENTS > 76 mm ROCKS > 0.76 CUBIC METRE IN VOLUME	



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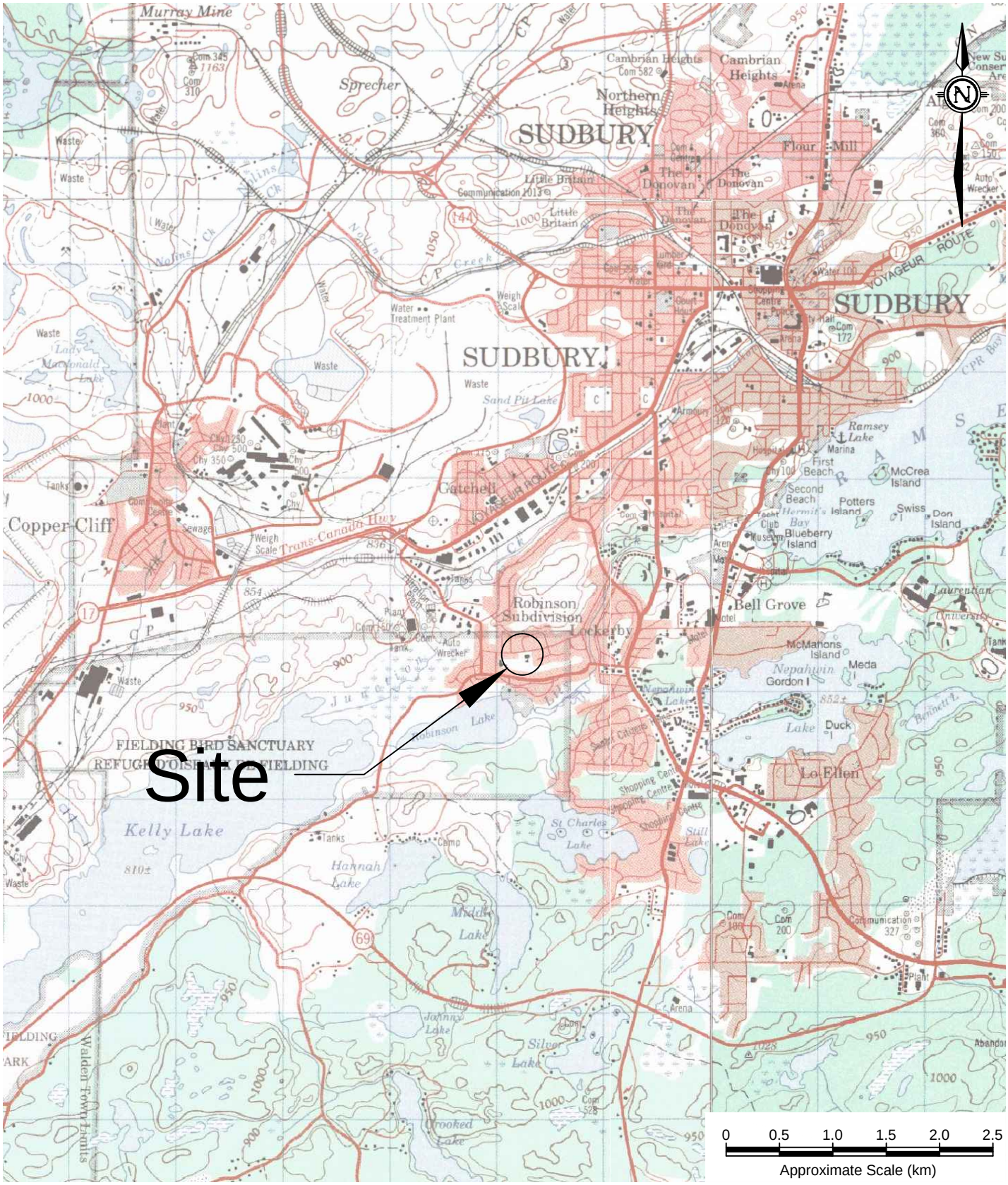
Note 1: Soils are classified and described according to their engineering properties and behaviour.

Note 2: The modifying adjectives used to define the actual or estimated percentage range by weight of minor components are consistent with the Canadian Foundation Engineering Manual (3rd Edition, Canadian Geotechnical Society, 1992.)

Rev. March 2012



AMEC Environment & Infrastructure 131 Fielding Road Lively, Ontario P3Y 1L7 705-682-2632	amec	Sudbury Greater Grand	City of Greater Sudbury

PROJECT Geotechnical Investigation Proposed Residential Development, Sudbury, Ontario	DWN BY: KKJ	CHK'D BY: DMB	DATE: October 2013 PROJECT NO: TY133019
TITLE Site Location Map	REV. NO.: 1	SCALE: as shown	FIGURE NO: 1

Image taken from pubicaly availabe ortho photos

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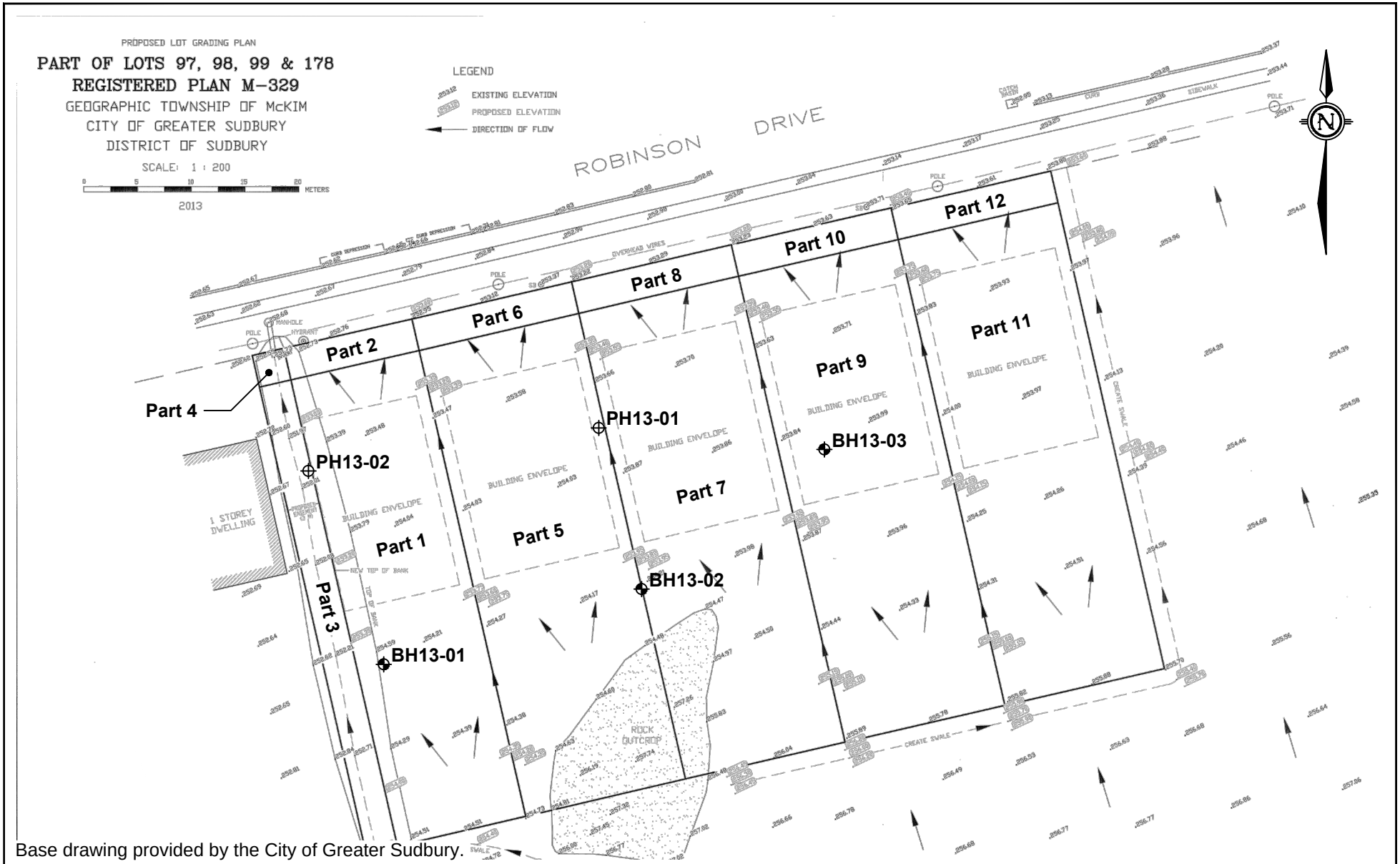
City of Greater Sudbury

PROJECT: Geotechnical Investigation Proposed Residential Development, Sudbury, Ontario	DWN BY: KKJ	CHK'D BY: DMB	DATE: October 2013 PROJECT NO: TY133019
TITLE: Test Hole Location Plan	REV. NO.: 1	SCALE: as shown	FIGURE NO: 2



Base drawing provided by the City of Greater Sudbury.

Sudbury	City of Greater Sudbury	DWN BY: MAT	PROJECT: Geotechnical Investigation Proposed Residential Development Sudbury, Ontario	REV. NO.: 1
		CHK'D BY: TJL		DATE: January 2014
AMEC Environment & Infrastructure 131 Fielding Road Lively, Ontario P3Y 1L7 705-682-2632	amec	SCALE: as shown	TITLE: Building Envelope Layout	PROJECT NO: TY133019
				FIGURE NO: 3

APPENDIX A

TEST HOLE LOGS

RECORD OF BOREHOLE No. BH13-01 Co-Ord. 0498204 E, 5145340 N

Project Number:	TY133019	Drilling Location:	Centre of Lot 1 and 5	Logged by:	AMP
Project Client:	City of Greater Sudbury	Drilling Method:	200 mm Hollow Stem Augers	Compiled by:	KKJ
Project Name:	Geotechnical Investigation - Proposed Residential Development	Drilling Machine:	Track Mounted Drill	Reviewed by:	DMB
Project Location:	811 Robinson Drive, Sudbury, Ontario	Date Started:	10 Jul 13 Date Completed: 10 Jul 13	Revision No.:	1, 9/10/13

LITHOLOGY PROFILE		SOIL SAMPLING						FIELD TESTING	LAB TESTING		COMMENTS
Lithology Plot	DESCRIPTION Local Ground Surface Elevation: 254.2 m	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)	Penetration Testing: ○ SPT ● DCPT; MTO Vane* △ Intact ▲ Remould; Nilcon Vane* ◇ Intact ◆ Remould; * Undrained Shear Strength (kPa) 15 30 45 60	Atterberg Limits: W_P W W_L; Plastic Liquid; ✳ Passing 75 um (%); ○ Moisture Content (%) 20 40 60 80	INSTRUMENTATION INSTALLATION	no installation, only bentonite
	brown FILL mostly sand, trace gravel , silt moist to wet	SS	1	16	7	0.5	253.5				
		SS	2	16	5	1.0	253.0		18		
	black ORGANICS layer observed in split spoon sample 3 at 1.5 to 1.6 m depth	SS	3	84	13	1.5 2.0	252.5 252.0		19		
	251.9 brown changing to grey SILT / CLAY moist to wet, soft to very stiff increasing clay content with depth 2.3	SS	4	100	8	2.5	251.5		39		
		VT				3.0	251.0	39	100		
		VT							89 100		
						3.5	250.5				
		SS	5	100	3	4.0	250.0		45		
		VT				4.5	249.5	12	95		
		VT						21	100		
						5.0	249.0				
		SS	6	100	0	5.5	248.5		48		
		VT				6.0	248.0	8 28			
		VT						12 37			
	247.6 END OF BOREHOLE 6.6 (no refusal)					6.5					

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▽ Groundwater depth on completion of drilling: 4.7 m.
▼ Groundwater depth recorded on July 10 3:00 PM at a depth of 1.0 m
◪ Cave in depth recorded on completion of drilling at 5.2 m.
⊠ Cave in depth recorded July 10 3:00 PM at a depth of 2.0 m.

Scale: 1 : 40

RECORD OF BOREHOLE No. BH13-02 Co-Ord. 0498228 E, 5145347 N

Project Number:	TY133019	Drilling Location:	Centre of Lot 7	Logged by:	AMP
Project Client:	City of Greater Sudbury	Drilling Method:	200 mm Hollow Stem Augers	Compiled by:	KKJ
Project Name:	Geotechnical Investigation - Proposed Residential Development	Drilling Machine:	Track Mounted Drill	Reviewed by:	DMB
Project Location:	811 Robinson Drive, Sudbury, Ontario	Date Started:	10 Jul 13	Date Completed: 10 Jul 13	Revision No.: 1, 9/10/13

LITHOLOGY PROFILE		SOIL SAMPLING						FIELD TESTING	LAB TESTING		COMMENTS
Lithology Plot	DESCRIPTION Local Ground Surface Elevation: 253.9 m	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)	PenetrationTesting: ○ SPT ● DCPT; MTO Vane* △ Intact ▲ Remould; Nilcon Vane* ◇ Intact ◆ Remould; * Undrained Shear Strength (kPa) 15 30 45 60	Atterberg Limits W_P W W_L Plastic Liquid; ✳ Passing 75 um (%); ○ Moisture Content (%) 20 40 60 80	INSTRUMENTATION INSTALLATION	no installation, only bentonite
	brown FILL mostly sand, trace gravel, silt moist 253.1	SS	1	33	17	0.5	253.5	○			
	brown 0.8 SILT / CLAY moist to wet, firm to stiff increasing clay content with depth	SS	2	33	4	1.0	253.0	○	○ 25		
		SS	3	84	10	1.5 2.0	252.5 252.0	○	○ 34		
		SS	4	100	6	2.5	251.5	○	○ 40		
		SS	5	100	5	3.0 3.5	251.0 250.5 ▼	○	○ 37		
		SS	6	65	10	4.0 ■	250.0 ☒	○	○ 26		
	249.2					4.5	249.5				
	END OF BOREHOLE 4.8 DUE TO AUGER REFUSAL ON POSSIBLE BOULDERS OR BEDROCK										

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▽ No freestanding groundwater measured in open borehole on completion of drilling.

▼ Groundwater depth recorded on July 10 3:00 PM at a depth of 3.5 m

■ Cave in depth recorded on completion of drilling at 4.1 m.

☒ Cave in depth recorded July 10 3:00 PM at a depth of 4.0 m.

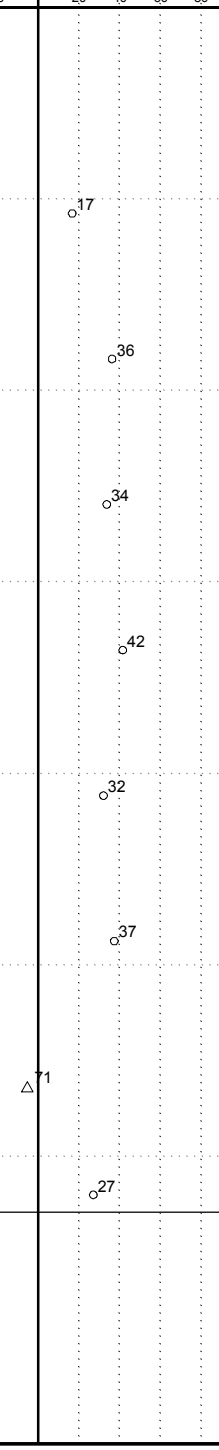
RECORD OF BOREHOLE No. BH13-03 Co-Ord. 0498245 E, 5145360 N

Project Number:	TY133019	Drilling Location:	Centre of Lot 9 and 11	Logged by:	AMP
Project Client:	City of Greater Sudbury	Drilling Method:	200 mm Hollow Stem Augers	Compiled by:	KKJ
Project Name:	Geotechnical Investigation - Proposed Residential Development	Drilling Machine:	Track Mounted Drill	Reviewed by:	DMB
Project Location:	811 Robinson Drive, Sudbury, Ontario	Date Started:	10 Jul 13	Date Completed: 10 Jul 13	Revision No.: 1, 9/10/13

Lithology Plot	DESCRIPTION (Local Ground Surface Elevation: 253.9 m)	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)
	100 mm of brown FILL over						
	brown SILT / CLAY moist to grey, soft to stiff increasing clay content with depth	SS	1	41	4		253.5
						0.5	
		SS	2	67	10		253.0
						1.0	
							252.5
		SS	3	100	11	1.5	
							252.0
						2.0	
		SS	4	100	7		251.5
						2.5	
							251.0
		SS	5	100	4	3.0	
							250.5
						3.5	
		SS	6	100	2		250.0
						4.0	
							249.5
		SS	7	100	0	4.5	
							249.0
						5.0	
		VT					248.5
		VT				5.5	
							248.0
						6.0	
	247.6	SS	8	100	>50 / 150 mm		
	END OF BOREHOLE 6.3 DUE TO AUGER REFUSAL ON POSSIBLE BOULDERS OR BEDROCK						

FIELD TESTING: Penetration Testing — SPT, DCPT; MTO Vane* Intact, Remould; Nilcon Vane* Intact, Remould; * Undrained Shear Strength (kPa) 15 30 45 60

LAB TESTING: Atterberg Limits W_P W W_L Plastic Liquid; Passing 75 um (%); Moisture Content (%) 20 40 60 80



INSTRUMENTATION INSTALLATION

COMMENTS: no installation, only bentonite

AMEC Environment & Infrastructure
A Division of AMEC Americas Limited
131 Fielding Road
Lively, Ontario
Canada P3Y 1L7
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www.amec.com

No freestanding groundwater measured in open borehole on completion of drilling.

Cave in depth recorded on completion of drilling at 5.6 m.

Scale: 1 : 40

RECORD OF PROBE HOLE No. PH13-01 Co-Ord. 0498224 E, 5145362 N

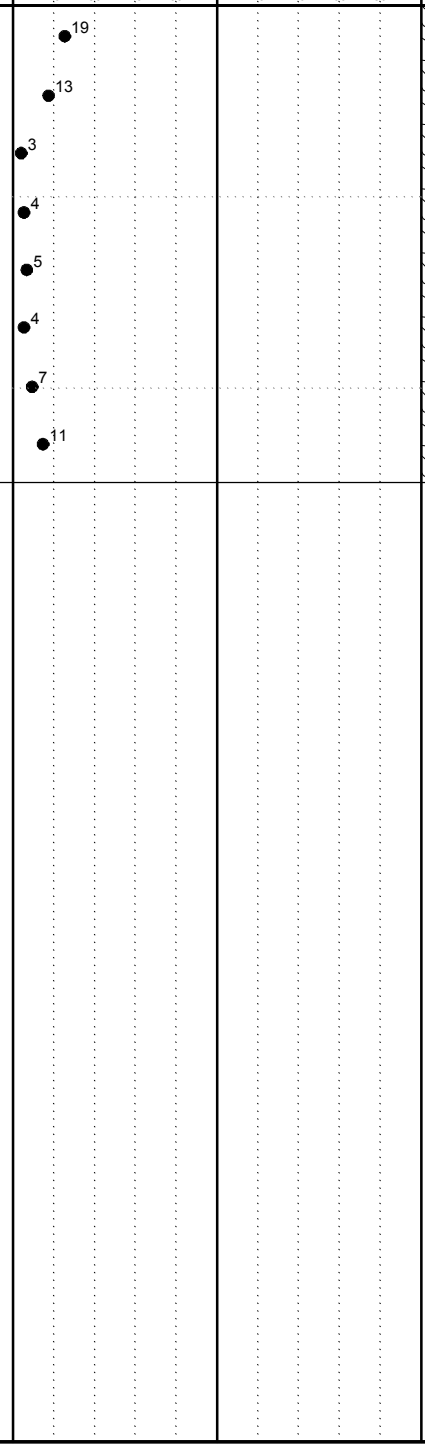
Project Number:	TY133019	Drilling Location:	Front of Lot 1	Logged by:	AMP
Project Client:	City of Greater Sudbury	Drilling Method:	200 mm Hollow Stem Augers	Compiled by:	KKJ
Project Name:	Geotechnical Investigation - Proposed Residential Development	Drilling Machine:	Track Mounted Drill	Reviewed by:	DMB
Project Location:	811 Robinson Drive, Sudbury, Ontario	Date Started:	10 Jul 13	Date Completed: 10 Jul 13	Revision No.: 1, 9/10/13

Local Ground Surface Elevation: 2.53.59 m

Dynamic Cone Penetration Test (DCPT)

0.0

END OF DCPT 2.5
DUE TO REFUSAL ON POSSIBLE COBBLES / BOULDERS OR BEDROCK



no installation, only bentonite

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No freestanding groundwater measured in open borehole on completion of drilling.

RECORD OF PROBE HOLE No. PH13-02 Co-Ord. 0498197 E, 5145358 N

Project Number:	TY133019	Drilling Location:	Front of Lot 7	Logged by:	AMP
Project Client:	City of Greater Sudbury	Drilling Method:	200 mm Hollow Stem Augers	Compiled by:	KKJ
Project Name:	Geotechnical Investigation - Proposed Residential Development	Drilling Machine:	Track Mounted Drill	Reviewed by:	DMB
Project Location:	811 Robinson Drive, Sudbury, Ontario	Date Started:	10 Jul 13	Date Completed: 10 Jul 13	Revision No.: 1, 9/10/13

Local Ground Surface Elevation: 253.3 m

Dynamic Cone Penetration Test (DCPT)

DEPTH (m)	ELEVATION (m)	DCPT 'N' Value
0.0	253.3	12
0.5	253.0	8
1.0	252.5	7
1.5	252.0	7
2.0	251.5	9
2.5	251.0	9
3.0	250.5	10
3.5	250.0	14
4.0	249.5	16
4.5	249.0	16
5.0	248.5	21
5.5	248.0	22
6.0	247.5	21
6.5	247.0	24
7.0	246.5	25
7.5	246.0	27
		23
		25
		26
		25
		25
		24
		25
		23
		23

COMMENTS: no installation, only bentonite

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▽ No freestanding groundwater measured in open borehole on completion of drilling.

Scale: 1 : 40

Continued on Next Page

RECORD OF PROBE HOLE No. PH13-02 Co-Ord. 0498197 E, 5145358 N

Project Number: **TY133019** Drilling Location: **Front of Lot 7** Logged by: **AMP**

LITHOLOGY PROFILE		SOIL SAMPLING						FIELD TESTING	LAB TESTING		COMMENTS
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)	Penetration Testing: ○ SPT ● DCPT; MTO Vane* △ Intact ▲ Remould; Nilcon Vane* ◇ Intact ◆ Remould; * Undrained Shear Strength (kPa) 15 30 45 60	Atterberg Limits W_P W W_L Plastic Liquid; ✳ Passing 75 um (%); ○ Moisture Content (%) 20 40 60 80	INSTRUMENTATION INSTALLATION	no installation, only bentonite
	Dynamic Cone Penetration Test (DCPT)					8.0	245.5	24			
								28			
						8.5	245.0	27			
								28			
						9.0	244.5	25			
						9.5	244.0	27			
								18			
						10.0	243.5	19			
								19			
						10.5	243.0	19			
						11.0	242.5	21			
								20			
						11.5	242.0	21			
						12.0	241.5	24			
								22			
						12.5	241.0	28			
						13.0	240.5	23			
								27			
						13.5	240.0	28			
						14.0	239.5	37			
								25			
						14.5	239.0	32			
								38			
	238.5						238.5	50			
	END OF DCPT 14.9 DUE TO REFUSAL ON POSSIBLE COBBLES / BOULDERS OR BEDROCK										

Scale: 1 : 40

APPENDIX B

ANALYTICAL REPORT

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: AMEC ENVIRONMENT & INFRASTRUCTURE
131 FIELDING ROAD
LIVELY, ON P3Y1L7
(705) 682-2632

ATTENTION TO: David Brown

PROJECT NO: TY33019

AGAT WORK ORDER: 13U735596

SOIL ANALYSIS REVIEWED BY: Elizabeth Polakowska, MSc (Animal Sci), PhD (Agri Sci), Inorganic Lab Supervisor

DATE REPORTED: Jul 19, 2013

PAGES (INCLUDING COVER): 4

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 13U735596

PROJECT NO: TY33019

CLIENT NAME: AMEC ENVIRONMENT & INFRASTRUCTURE

ATTENTION TO: David Brown

Inorganic Chemistry (soil)

DATE RECEIVED: 2013-07-11

DATE REPORTED: 2013-07-19

				BH13-03 SS02
		SAMPLE DESCRIPTION:		2.5-4.5
		SAMPLE TYPE:		Soil
		DATE SAMPLED:		7/10/2013
Parameter	Unit	G / S	RDL	4543632
Chloride (2:1)	µg/g		2	6
Sulphate (2:1)	µg/g		2	11
pH, 2:1 CaCl2 Extraction	pH Units		NA	6.51
Resistivity (2:1)	ohm.cm		1	17900

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

4543632 EC/Resistivity, Chloride & Sulphate were determined on a DI water extract obtained from the 2:1 leaching procedure (2 parts DI water:1 part dry soil).
pH was determined on the 0.01M CaCl2 extract obtained from the 2:1 leaching (2 parts extraction fluid :1 part wet soil).

Certified By: Elizabeth Rolakowska

AGAT Laboratories

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FAX (905)712-5122
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Quality Assurance

CLIENT NAME: AMEC ENVIRONMENT & INFRASTRUCTURE

AGAT WORK ORDER: 13U735596

PROJECT NO: TY33019

ATTENTION TO: David Brown

Soil Analysis

RPT Date: Jul 19, 2013			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Inorganic Chemistry (soil)															
Chloride (2:1)	4541427		<2	<2	0.0%	< 2	98%	80%	120%	100%	80%	120%	103%	70%	130%
Sulphate (2:1)	4541427		61	50	19.3%	< 2	108%	80%	120%	103%	80%	120%	87%	70%	130%
pH, 2:1 CaCl2 Extraction	1		7.42	7.45	0.4%	NA	100%	80%	120%	NA	0%	0%	NA	0%	0%

Comments: NA signifies Not Applicable.

Certified By: Elizabeth Rolakowska

AGAT Laboratories

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Method Summary

CLIENT NAME: AMEC ENVIRONMENT & INFRASTRUCTURE

AGAT WORK ORDER: 13U735596

PROJECT NO: TY33019

ATTENTION TO: David Brown

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Chloride (2:1)	INOR-93-6004	McKeague 4.12 & SM 4110 B	ION CHROMATOGRAPH
Sulphate (2:1)	INOR-93-6004	McKeague 4.12 & SM 4110 B	ION CHROMATOGRAPH
pH, 2:1 CaCl2 Extraction	INOR-93-6031	MSA part 3 & SM 4500-H+ B	PH METER
Resistivity (2:1)	INOR 1036		CALCULATION

APPENDIX C

LIMITATIONS OF REPORT

AMEC ENVIRONMENT & INFRASTRUCTURE

LIMITATIONS OF REPORT

The conclusions and recommendations given in this report are based on information determined at the test hole locations. The information contained herein in no way reflects on the environmental aspects of the project, unless otherwise stated. Subsurface and groundwater conditions between and beyond the test holes may differ from those encountered at the test hole locations, and conditions may become apparent during construction, which could not be detected or anticipated at the time of the site investigation. It is recommended practice that the geotechnical engineer be retained during construction to confirm that the subsurface conditions throughout the site do not deviate materially from those encountered in test holes.

The design recommendations given in this report are applicable only to the project described in the text and then only if constructed substantially in accordance with the details stated in this report. Since all details of the design may not be known, we recommend that we be retained during the final design stage to verify that the design is consistent with our recommendations, and that assumptions made in our analysis are valid.

The comments made in this report on potential construction problems and possible methods are intended only for the guidance of the designer. The number of test holes may not be sufficient to determine all the factors that may affect construction methods and costs. For example, the thickness of surficial topsoil or fill layers may vary markedly and unpredictably. The contractors bidding on this project or undertaking the construction should, therefore, make their own interpretation of the factual information presented and draw their own conclusions as to how the subsurface conditions may affect their work. This work has been undertaken in accordance with normally accepted geotechnical engineering practices. No other warranty is expressed or implied.

Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. AMEC accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.