

(In reply, please refer to)  
Our File: 14-9964

February 20, 2015



City of Winnipeg  
Municipal Accommodations Division, Project Services Branch  
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Winnipeg, Manitoba R3B 1J1  
Email: [aurbanowicz@winnipeg.ca](mailto:aurbanowicz@winnipeg.ca)

Attention: Mr. Andrew Urbanowicz  
Project Officer

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**Transcona Public Works Yard Subsurface Investigation Report**  
**Transcona Library - 1500 Plessis Road**

Dear Mr. Urbanowicz:

Dillon Consulting Limited (Dillon) is pleased to submit the following report to the City of Winnipeg (City) for the subsurface investigation conducted on the Transcona Library Site situated in the Public Works Yard located at 1500 Plessis Road in Winnipeg, Manitoba.

This report summarizes the subsurface investigation, including a brief overview of the current environmental condition of the Site, discussion of the field methodologies, field observations, figures, borehole logs and laboratory data.

### **Background**

The Transcona Public Works Yard has historically been used as an outdoor road salt/sand storage area. The City is considering developing a new municipal library in the north east section of the Yard. An 80 metre by 60 metre section of property (Site) has been designated for this development. A Phase II Environmental Site Assessment (ESA), completed by AMEC in 2012, identified pH, conductivity, and sodium adsorption ratio (SAR) concentrations that exceeded the applicable assessment criteria for the given land use. This information was collected from AMEC's 2012 Phase II ESA geophysics electromagnetic (EM) survey, conducted by Penserv Corp., to identify the extent of the road salt/sand impacts. These parameters, along with metals, are characteristic of road salt and sand.

Dillon proposed to conduct a subsurface investigation to delineate the extent of road salt/sand impacts at the Site. Obtaining this information will assist the City with developing appropriate management and/or remedial options to mitigate the environmental impacts associated with the Site in the context of the larger Transcona Public Works Yard. The City retained Dillon to complete the subsurface investigation.

The location of the Site is shown in **Figure 1** (attached). The GPS coordinates of the centre of the Site in Universal Transverse Mercator (UTM) are:

14U 0641681, 5529576.



#### Selection of Assessment Criteria

Since the Yard is zoned for commercial land use, commercial land-use assessment criteria have been selected for Site assessment purposes. Groundwater in the Winnipeg area is not used as a drinking water source and the closest surface water body or sensitive ecological habitat is located approximately 0.5 kilometres north of the Site (Kildonan Meadows Park). The most applicable exposure pathway for the Site is direct soil contact. Based on field observations, the most applicable soil type for the Site is fine grained surface soils (<1.5 metres below ground surface (mbgs)).

The criteria selected for the assessment of conductivity, sodium adsorption ratio (SAR) and pH concentrations in the soil sample analytical results are the Canadian Council of Ministers of the Environment (CCME) *Canadian Environmental Quality Guidelines for the Protection of Environmental and Human Health*, 1991, Commercial land-use.

The criteria selected for the assessment of metal concentrations in the soil sample analytical results are the Canadian Council of Ministers of the Environment (CCME) *Canadian Environmental Quality Guidelines for the Protection of Environmental and Human Health*, 1999, Commercial land-use.

There are currently no applicable soil criteria available for calcium, magnesium, potassium, sodium, chloride and sulphate in soils.

#### Subsurface Soil Investigation and Sampling

The subsurface investigation was conducted on December 9, 2014. On-Site supervision was conducted by Nanci Beaupre of Dillon and Paddock Drilling Ltd. completed the boring. Prior to drilling, Dillon coordinated public underground utility clearances (i.e., telephone, hydro, gas, sewer and water) within the areas of investigation. Drilling services were conducted using a track-mounted Sonic SDC 450 drill rig.

A total of fourteen (14) boreholes were advanced on-Site using solid stem methods. The Site plan and borehole locations are shown in **Figure 2** (attached). Boreholes were drilled to a depth of 1.5 – 3.0 m. None of the boreholes were completed as monitoring wells. Soil samples were collected from the auger flights at regular depth intervals between 0 and 3.0 m for logging of soil characteristics, as shown on the borehole logs (attached). Select soil samples were submitted for analysis to Maxxam Analytical in Winnipeg, Manitoba, based on visual and olfactory observations. A total of sixteen (16) soil samples were submitted for soluble chlorides and salinity analyses. A total of three (3) soil samples were submitted for metals analyses. The samples were stored on ice in coolers during shipment to the laboratory.

The methodology used for the field investigation was based upon the suggested methods described in *Subsurface Assessment Handbook for Contaminated Sites*, CCME, March 1994 (CCME, 1994); and, good geoscience practices. The methodology used for this investigation is summarized in **Table 1**.

**Table 1: Summary of Methodology - Subsurface Investigation**

Procedure	Instrument Used	Notes
Drilling	<ul style="list-style-type: none"><li>• Track-mounted rig</li><li>• 1.5 m solid stem augers</li></ul>	<ul style="list-style-type: none"><li>• Provided by Paddock Drilling Ltd.</li><li>• Augers withdrawn every 1.5 m for sampling at 0.75 m intervals.</li></ul>
Soil sample recovery for laboratory analysis	<ul style="list-style-type: none"><li>• Hand tools</li><li>• Sterile re-sealable bags</li></ul>	<ul style="list-style-type: none"><li>• Soil samples removed from auger with sterile nitrile gloves.</li><li>• Trimmed soil sample placed in bags using sterile nitrile gloves, gloves disposed of after one use.</li><li>• Samples sealed in bags and stored at approximately 4°C.</li></ul>
Geological description	<ul style="list-style-type: none"><li>• Hand tools</li><li>• Visual and other observations</li></ul>	<ul style="list-style-type: none"><li>• Lithology and observations recorded on borehole logs.</li></ul>

#### Data Validation

For quality assurance, a field duplicate was collected for every ten (10) soil samples obtained. The laboratory's quality assurance/quality control (QA/QC) program initially showed an unacceptable relative percent difference (greater than 50%) for select metal analyses. Maxxam Analytics repeated the analyses for the field duplicate and the surrogate sample. The repeated analysis showed the relative percent difference as acceptable, see **Table A-2** (attached). The laboratory's surrogate spike recovery sample results were also within the acceptable range for all soil samples analyzed. Therefore the results of the data validation assessment indicate the analytical data is acceptable for the purpose of the subsurface investigation.

#### Results and Discussion

The subsurface soil conditions observed during the investigation were granular fill consisting of sand, gravel and trace organics underlain by a layer of silty clay with medium plasticity. At approximately 1.5 mbgs soil conditions observed were clay with medium plasticity to a maximum drilled depth of 3.0 mbgs, as shown on the borehole logs. The thickness of the granular was very consistent (1.5 m) across the Site.

Based on the laboratory analyses of soil samples for the Site, conductivity exceeded the selected assessment criteria in the following soil samples:

- BH1 @ 0-1      • BH1 @ 5'      • BH2 @ 0-2'      • BH 3 @ 0-2'
- BH4 @ 0-2'      • BH4 @ 4'      • BH7 @ 0-2'      • BH7 @ 4'
- BH8 @ 0-2'      • BH13 @ 0-2'      • BH13 @ 4'

Based on the results of the current investigation and those of AMEC (2012) the estimated aerial extent of conductivity impacts on-Site are illustrated in **Figure 4** (attached).

Based on the laboratory analyses of soil samples for the Site, pH exceeded the selected assessment criteria in the following soil samples:

- BH2 @ 0-2'      • BH4 @ 0-2'      • BH4 @ 4'      • BH5 @ 0-2'
- BH6 @ 0-2'      • BH7 @ 0-2'      • BH7 @ 4'      • BH8 @ 0-2'
- BH9 @ 4'      • BH11 @ 0-2'      • BH11 @ 4'      • BH13 @ 4'

Based on the laboratory analyses of soil samples for the Site, SAR exceeded the selected assessment criteria in the following soil samples:

- BH1 @ 0-1'      • BH2 @ 0-2'      • BH4 @ 0-2'      • BH7 @ 0-2'
- BH7 @ 4'      • BH8 @ 0-2'      • BH13 @ 0-2'      • BH13 @ 4'

Based on the laboratory analyses of soil samples for the Site, metal concentrations were below the applicable CCME assessment criteria for all soil samples collected.

Soil analytical results are presented on **Tables A-1 and A-2** (attached). Full laboratory reports are attached to this report.

## Summary

Based on the laboratory analysis of soil samples, evidence of elevated conductivity was found above the applicable assessment criteria in **11 (eleven)** of the **16 (sixteen)** soil samples submitted to Maxxam Analytics. Concentrations generally exceeded the applicable criteria by up to 50% with the exception of BH4 at 1.2 mbgs and BH13 at 1.2 mbgs. Based on the laboratory results and our field observations, the impacted materials appear to be limited to 1.5 mbgs.

To assist with the assessment of the extent of impacted fill material on the Site, the geophysical EM survey from the AMEC 2012 Phase II ESA was used in conjunction with Dillon's borehole and soil laboratory data, as indicated in **Figure 3**. The resulting interpretation of the extent of impacted fill material is indicated in **Figure 4**. The area of impacted fill material on-Site is approximately 1225 m<sup>2</sup>, as indicated in **Figure 4**, and the total volume of impacted fill material on-Site is estimated to be 1470 m<sup>3</sup>.

City of Winnipeg

Subsurface Investigation Report, Transcona Public Works Yard, 1500 Plessis Road,  
Winnipeg, Manitoba

### Closure

This letter was prepared exclusively for the purposes, project, and site location outlined in the letter. The letter is based on information provided to or obtained by Dillon as indicated in the letter, and applies solely to site conditions existing at the time of the site investigation. Although a reasonable investigation was conducted by Dillon, our investigation was by no means exhaustive and cannot be construed as a certification of the absence of any contaminants from the site. Rather, Dillon's letter represents a reasonable review of available information within an agreed work scope, schedule and budget. Therefore, it is possible that currently unrecognized contamination or potentially hazardous materials may exist at the site, and that the levels of contamination or hazardous materials may vary across the site. Further review and updating of the letter may be required as local and site conditions, and the regulatory and planning frameworks, change over time.

If you have any questions regarding the information presented within this letter, please contact the undersigned.

Yours sincerely,

DILLON CONSULTING LIMITED



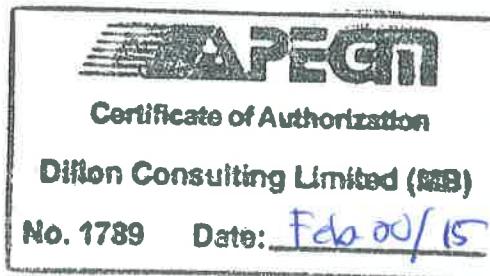
Nanci Beaupre, C.E.T.  
Environmental Technologist

NLB/knp

Attachment: Figures  
Summary Data Tables  
Borehole Logs  
Laboratory Results



Doug Bell, M.Sc., P.Geo, FGC  
Project Manager



**References**

Crystal Eyjolfson, Michael Bertram and Karen Timlick, *Phase I Environmental Site Assessment*. AMEC Environmental and Infrastructure, Winnipeg, Manitoba, July 16, 2012.

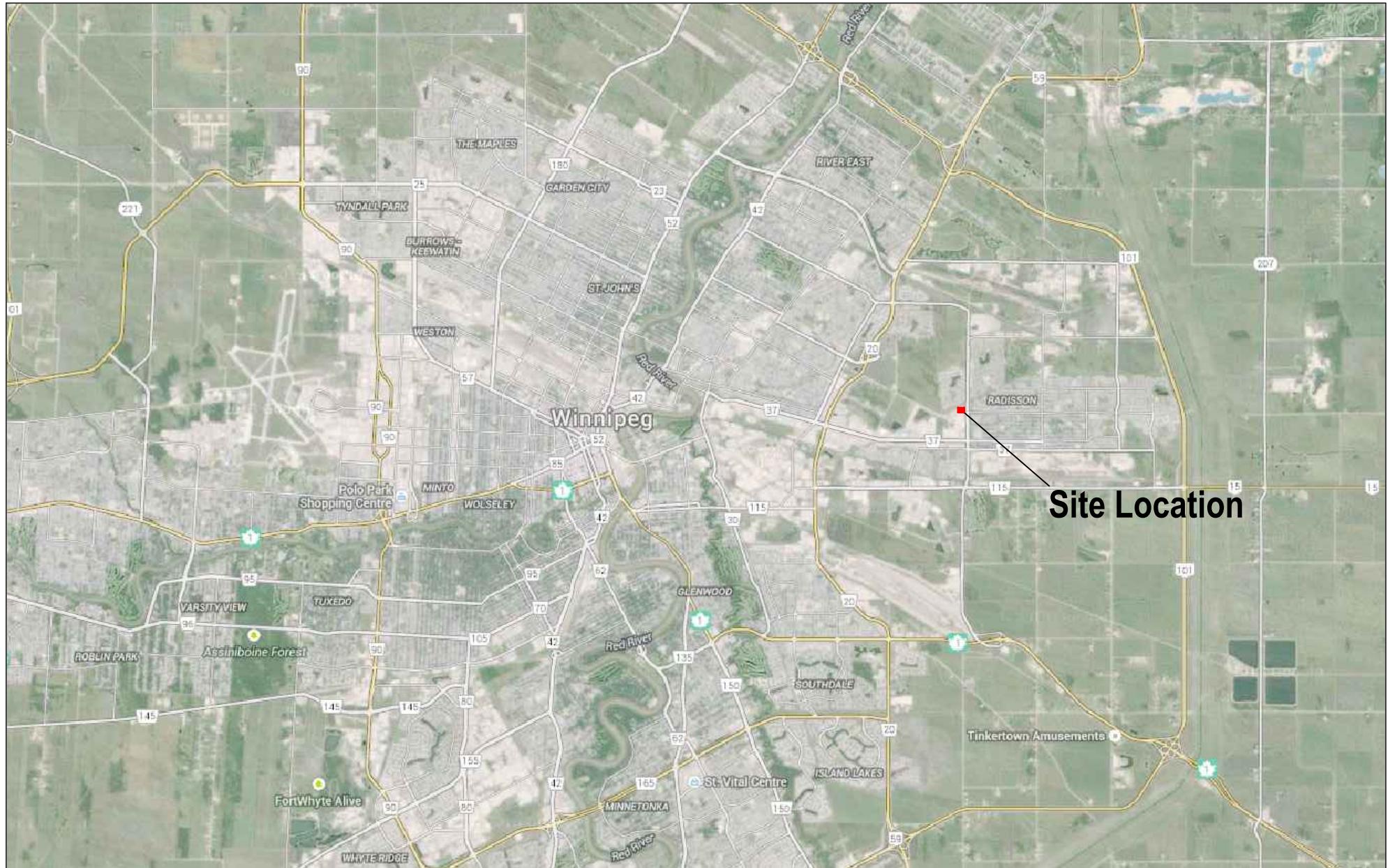
Craig Blair and Allyson Desgroseilliers, *Phase II Environmental Site Assessment*, AMEC Environmental and Infrastructure, Winnipeg, Manitoba, November, 2012.

Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines for the Protection of Environmental and Human Health, 1991, Commercial land-use.

Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines for the Protection of Environmental and Human Health, 1999, Commercial land-use.

## FIGURES

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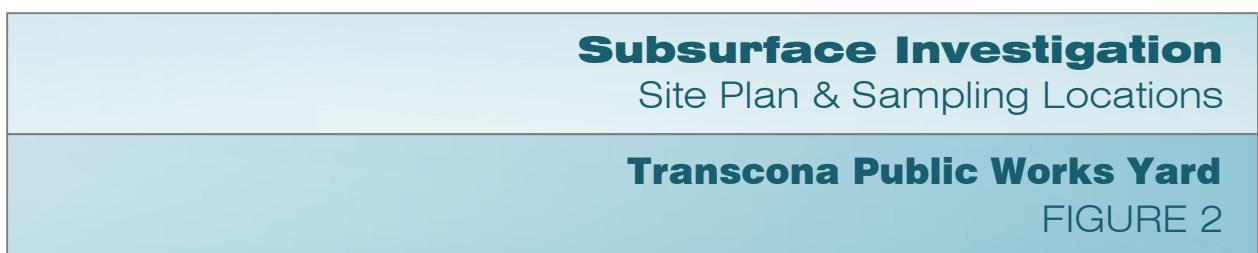
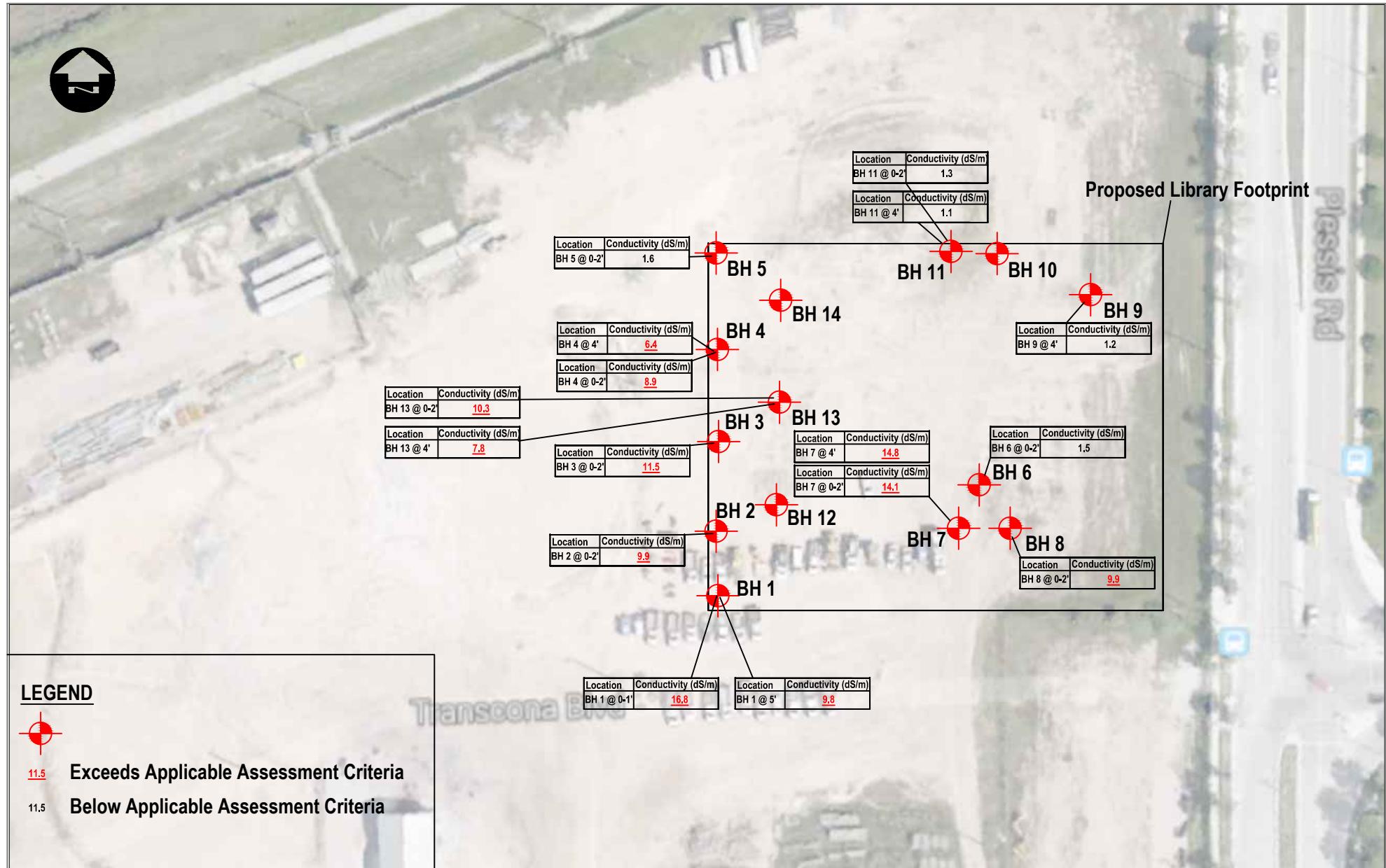
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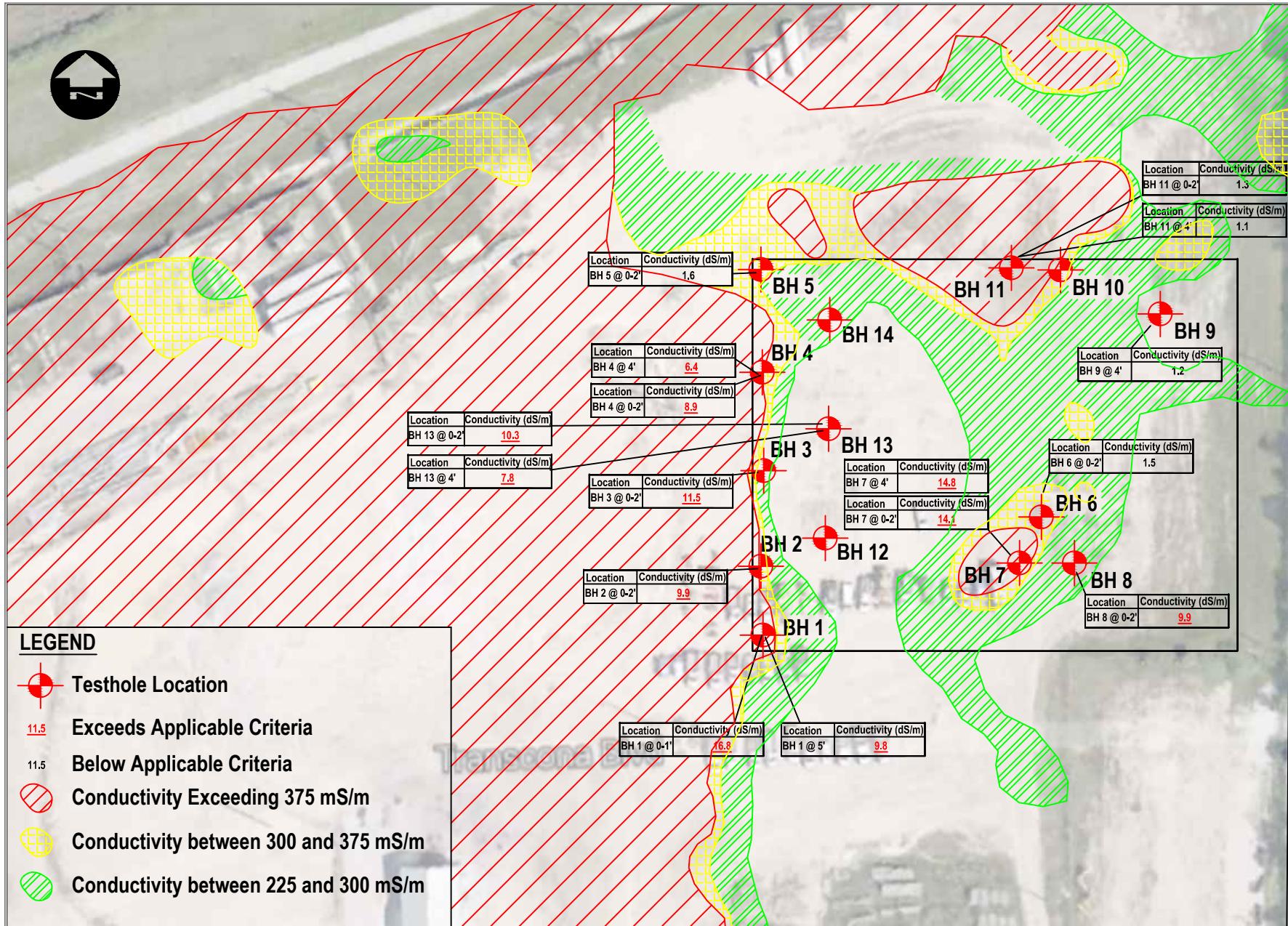
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DRAWN BY: NLB  
CHECKED BY: DDB  
PROJECT: 14-9964

DILLON  
CONSULTING

## Subsurface Investigation Site Location Plan

Transcona Public Works Yard  
Figure 1





SCALE:  
0 10 20 m

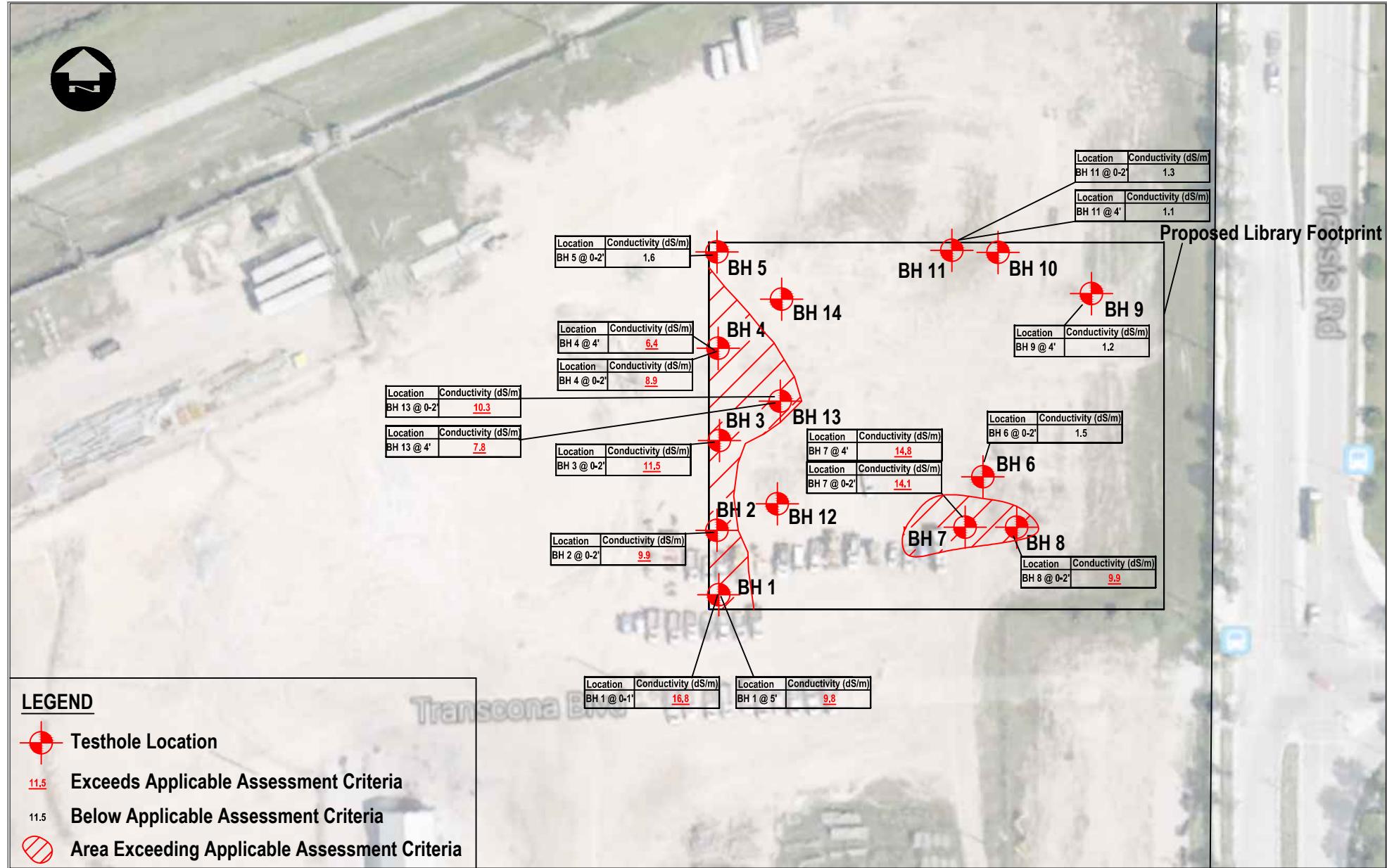
DILLON  
CONSULTING

DRAWN BY: NLB  
CHECKED BY: DDB  
PROJECT: 14-9964

## Subsurface Investigation

AMEC's EM Survey for Conductivity

Transcona Library  
FIGURE 3



SCALE:  
0 10 20 m  
SOURCE: GOOGLE

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CONSULTING

DRAWN BY: NLB  
CHECKED BY: DDB  
PROJECT: 14-9964

## Subsurface Investigation

Conductivity based on AMEC's EM Survey and Dillon's Results

Transcona Public Works Yard  
FIGURE 4

## SUMMARY DATA TABLES

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Parameters	Sampling Name			BH1 @ 0-1'	BH1 @ 5'	BH2 @ 0-2'	BH3 @ 0-2'	BH4 @ 0-2'	BH4 @ 4'
	Sampling Date			12/09/2014	12/09/2014	12/09/2014	12/09/2014	12/09/2014	12/09/2014
	UNITS	RDL	Criteria Commerical						
pH (Sat. Paste)	-	-	6 to 8	7.91	7.92	8.22	7.70	8.38	8.27
Conductivity (Sat. Paste)	dS/m	1	4 dS/m	16.8	9.8	9.9	11.5	8.9	6.4
Saturation (%)	%	0.1	-	69.9	64.8	85.0	44.1	41.0	76.4
Calcium	mg/kg	-	-	155	305	31.7	205	60.9	82.3
Magnesium	mg/kg	-	-	125	433	12.3	297	87.9	280
Potassium	mg/kg	-	-	65	13	120	36.1	15.5	<15
Sodium	mg/kg	-	-	2470	386	1860	724	637	526
Chloride	mg/kg	-	-	4290	2440	2930	2410	1350	1900
Sulphate	mg/kg	-	-	161	177	<8.5	14.3	10.0	75.8
Sodium Adsorption Ratio (SAR)	-	-	12	42.9	4.14	76.9	11.4	19.1	7.11

<sup>1</sup> Canadian Council of the Ministers of the Environment, Canadian Environmental Quality Guidelines for the Protection of Environmental and Human Health (1991), Commerical Land Use.

RDL Reportable Detection Limit

RPD Relative Percent Difference

n.c. denotes not calculated

- denotes no criteria

**44.5** Value Exceeds Selected Criteria

**44.5** RPD exceeds 50%

Parameters	Sampling Name			BH5 @ 0-2'	BH6 @ 0-2'	BH7 @ 0-2'	FD1 (BH7 @ 0-2')	RPD	BH7 @ 4'	FD2 (BH7 @ 4')	RPD
	Sampling Date			12/09/2014	12/09/2014	12/09/2014	12/09/2014		12/09/2014	12/09/2014	
	UNITS	RDL	Criteria Commerical								
pH (Sat. Paste)	-	-	6 to 8	8.34	8.59	8.81	8.80	0	8.27	8.29	0
Conductivity (Sat. Paste)	dS/m	1	4 dS/m	1.6	1.5	14.1	14.8	-5	21.1	21.5	-2
Saturation (%)	%	0.1	-	58.7	83.5	111	114	-3	96.3	93.2	3
Calcium	mg/kg	-	-	41.4	30.6	54.1	60.5	-11	61.5	58.1	6
Magnesium	mg/kg	-	-	50.3	90.2	58.3	69.4	-17	458	438	4
Potassium	mg/kg	-	-	<12	<17	137	145	-6	33	29	13
Sodium	mg/kg	-	-	115	160	3610	4040	-11	4170	4180	0
Chloride	mg/kg	-	-	270	123	5290	5890	-11	7730	7330	5
Sulphate	mg/kg	-	-	42.2	375	379	412	-8	713	662	7
Sodium Adsorption Ratio (SAR)	-	-	12	3.71	3.60	76.8	78.9	-3	40.9	42.7	-4

<sup>1</sup> Canadian Council of the Ministers of the Environment, Canadian Environmental Quality Guidelines for the Protection of Environmental and Human Health (1991), Commerical Land Use.

RDL Reportable Detection Limit

RPD Relative Percent Difference

n.c. denotes not calculated

- denotes no criteria

**44.5** Value Exceeds Selected Criteria

 RPD exceeds 50%

Parameters	Sampling Name			BH8 @ 0-2'	BH9 @ 4'	BH11 @ 0-2'	BH11 @ 4'	BH13 @ 0-2'	BH13 @ 4'
	Sampling Date			12/09/2014	12/09/2014	12/09/2014	12/09/2014	12/09/2014	12/09/2014
	UNITS	RDL	Criteria Commerical						
pH (Sat. Paste)	-	-	6 to 8	8.76	8.36	8.35	8.41	7.81	8.38
Conductivity (Sat. Paste)	dS/m	1	4 dS/m	9.9	1.2	1.3	1.1	10.3	7.8
Saturation (%)	%	0.1	-	143	85.2	70.0	88.1	69.7	87.7
Calcium	mg/kg	-	-	39.9	57.3	25.2	41.6	68.8	72.0
Magnesium	mg/kg	-	-	58.9	77.9	41.2	79.5	115	192
Potassium	mg/kg	-	-	123	<17	23	<18	56	23
Sodium	mg/kg	-	-	3050	69.5	127	81.4	1350	1150
Chloride	mg/kg	-	-	4680	82.0	77.4	225	2000	2330
Sulphate	mg/kg	-	-	383	331	261	32.4	376	175
Sodium Adsorption Ratio (SAR)	-	-	12	60.0	1.52	4.33	1.82	27.6	17.2

<sup>1</sup> Canadian Council of the Ministers of the Environment, Canadian Environmental Quality Guidelines for the Protection of Environmental and Human Health (1991), Commerical Land Use.

RDL Reportable Detection Limit

RPD Relative Percent Difference

n.c. denotes not calculated

- denotes no criteria

**44.5** Value Exceeds Selected Criteria

**RPD exceeds 50%**

Parameters	Sampling Name			BH1 @ 0-1'	BH 7@ 0-2'	FD1 (BH7 @ 0-2')	RPD	BH8 @ 0-2'	BH7@0-2' REPEAT	FD1 REPEAT	RPD
	Sampling Date			12/09/2014	12/09/2014	12/09/2014		12/09/2014	12/09/2014	12/09/2014	
	UNITS	RDL	Commerical Criteria								
<b>Total Metals</b>											
Total Aluminum (Al)	mg/kg	100	-	16800	11500	19700	53	21300	9380	8140	-14
Total Antimony (Sb)	mg/kg	0.10	40	0.18	0.14	0.18	25	0.20	0.14	0.15	7
Total Arsenic (As)	mg/kg	0.50	12	3.55	2.69	3.49	26	5.51	1.40	1.45	4
Total Barium (Ba)	mg/kg	0.10	2000	104	91.6	167	58	169	72.2	64.8	-11
Total Beryllium (Be)	mg/kg	0.40	8	0.66	0.44	0.79	57	0.83	<0.40	<0.40	n.c.
Total Bismuth (Bi)	mg/kg	0.10	-	0.15	0.11	0.18	48	0.19	<0.10	<0.10	n.c.
Total Cadmium (Cd)	mg/kg	0.050	22	0.411	0.249	0.566	78	0.581	0.270	0.185	-37
Total Calcium (Ca)	mg/kg	100	-	65100	90200	59600	-41	39000	80200	94600	16
Total Chromium (Cr)	mg/kg	1.0	87	31.5	21.6	33.6	43	36.0	20.7	16.5	-23
Total Cobalt (Co)	mg/kg	0.30	300	7.71	6.49	10.0	43	11.0	4.95	4.51	-9
Total Copper (Cu)	mg/kg	0.50	91	25.9	17.1	27.7	47	29.8	14.1	12.3	-14
Total Iron (Fe)	mg/kg	100	-	18300	14100	21500	42	22600	11100	10200	-8
Total Lead (Pb)	mg/kg	0.10	260	9.79	7.98	11.3	34	11.3	6.86	6.37	-7
Total Lithium (Li)	mg/kg	5.0	-	16.9	20.2	33.4	49	38.5	16.1	13.9	-15
Total Magnesium (Mg)	mg/kg	100	-	30200	40000	31900	-23	30600	33100	36300	9
Total Manganese (Mn)	mg/kg	0.20	-	227	510	998	65	673	365	371	2
Total Mercury (Hg)	mg/kg	0.050	24	<0.050	<0.050	<0.050	n.c.	<0.050	<0.050	<0.050	n.c.
Total Molybdenum (Mo)	mg/kg	0.10	40	0.41	0.38	0.28	-30	0.24	0.56	0.39	-36
Total Nickel (Ni)	mg/kg	0.80	50	26.8	17.6	28.3	47	32.1	13.1	11.4	-14
Total Phosphorus (P)	mg/kg	10	-	470	481	626	26	648	443	394	-12
Total Potassium (K)	mg/kg	100	-	4100	3330	5920	56	6200	2740	2450	-11
Total Selenium (Se)	mg/kg	0.50	2.9	<0.50	<0.50	<0.50	n.c.	<0.50	<0.50	<0.50	n.c.
Total Silver (Ag)	mg/kg	0.050	40	0.100	0.076	0.098	25	0.107	<0.050	0.054	n.c.
Total Sodium (Na)	mg/kg	100	-	4560	5580	10500	61	9000	4580	3890	-16
Total Strontium (Sr)	mg/kg	0.10	-	43.8	91.0	136	40	118	72.8	75.3	3
Total Thallium (Tl)	mg/kg	0.050	1	0.218	0.167	0.249	39	0.263	0.093	0.096	3
Total Tin (Sn)	mg/kg	0.10	300	0.67	0.50	0.79	45	0.81	0.41	0.36	-13
Total Titanium (Ti)	mg/kg	1.0	-	249	168	210	22	202	163	158	-3
Total Uranium (U)	mg/kg	0.050	33	1.19	0.737	1.25	52	1.34	0.537	0.567	5
Total Vanadium (V)	mg/kg	2.0	130	49.6	33.6	58.0	53	67.0	24.0	21.6	-11
Total Zinc (Zn)	mg/kg	1.0	360	56.9	50.7	80.3	45	89.6	43.4	36.9	-16
Total Zirconium (Zr)	mg/kg	0.50	-	8.97	3.07	6.02	65	7.20	1.89	1.71	-10

<sup>1</sup> Canadian Council of the Ministers of the Environment Soil Environmental Quality Guidelines for the Protection of Environmental and Human Health (1999), Commerical Land Use.

RDL Reportable Detection Limit

RPD Relative Percent Difference

n.c. denotes not calculated

- denotes no criteria

**44.5** Value Exceeds Selected Criteria

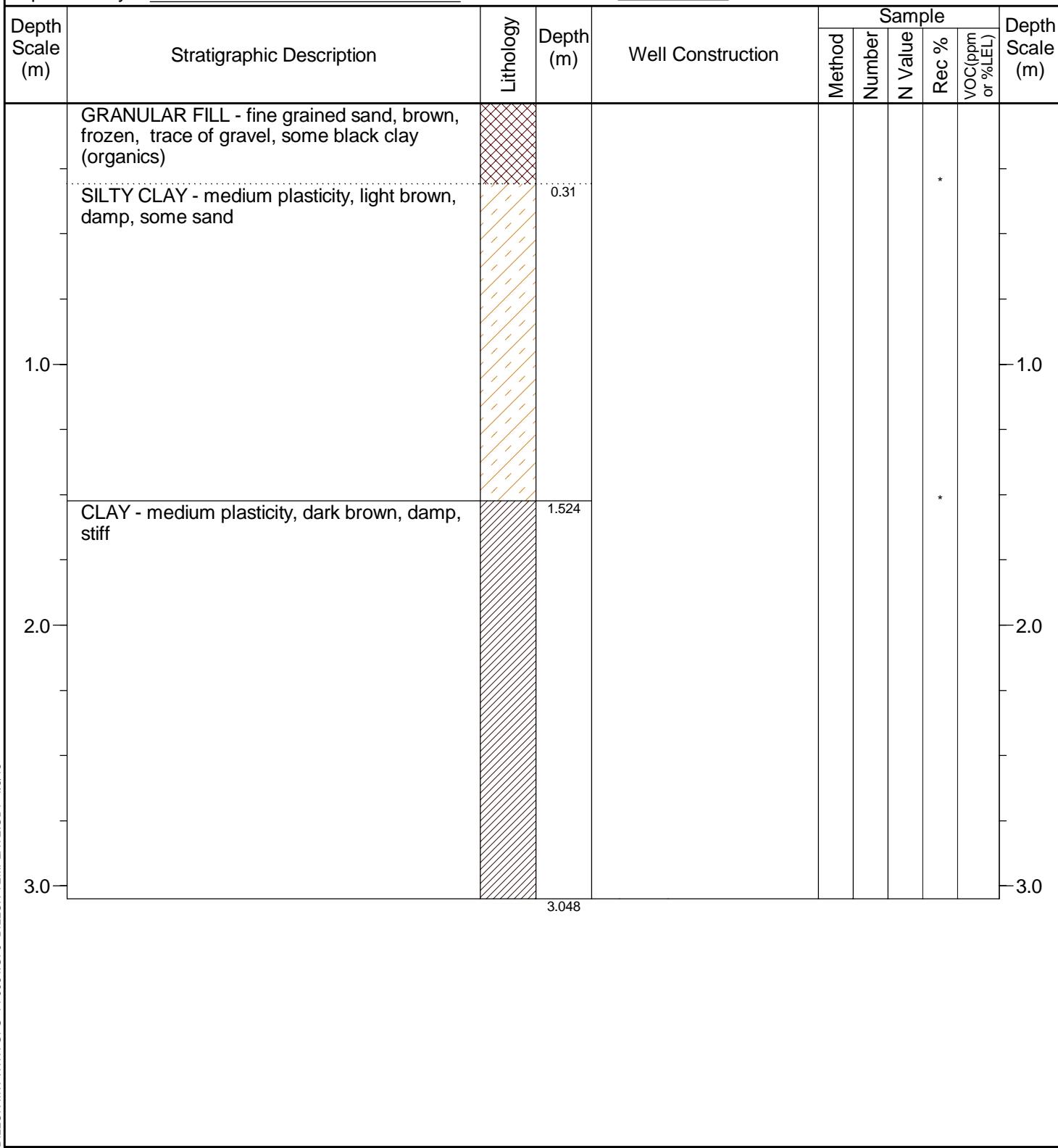
RPD exceeds 50%

**BOREHOLE LOGS**

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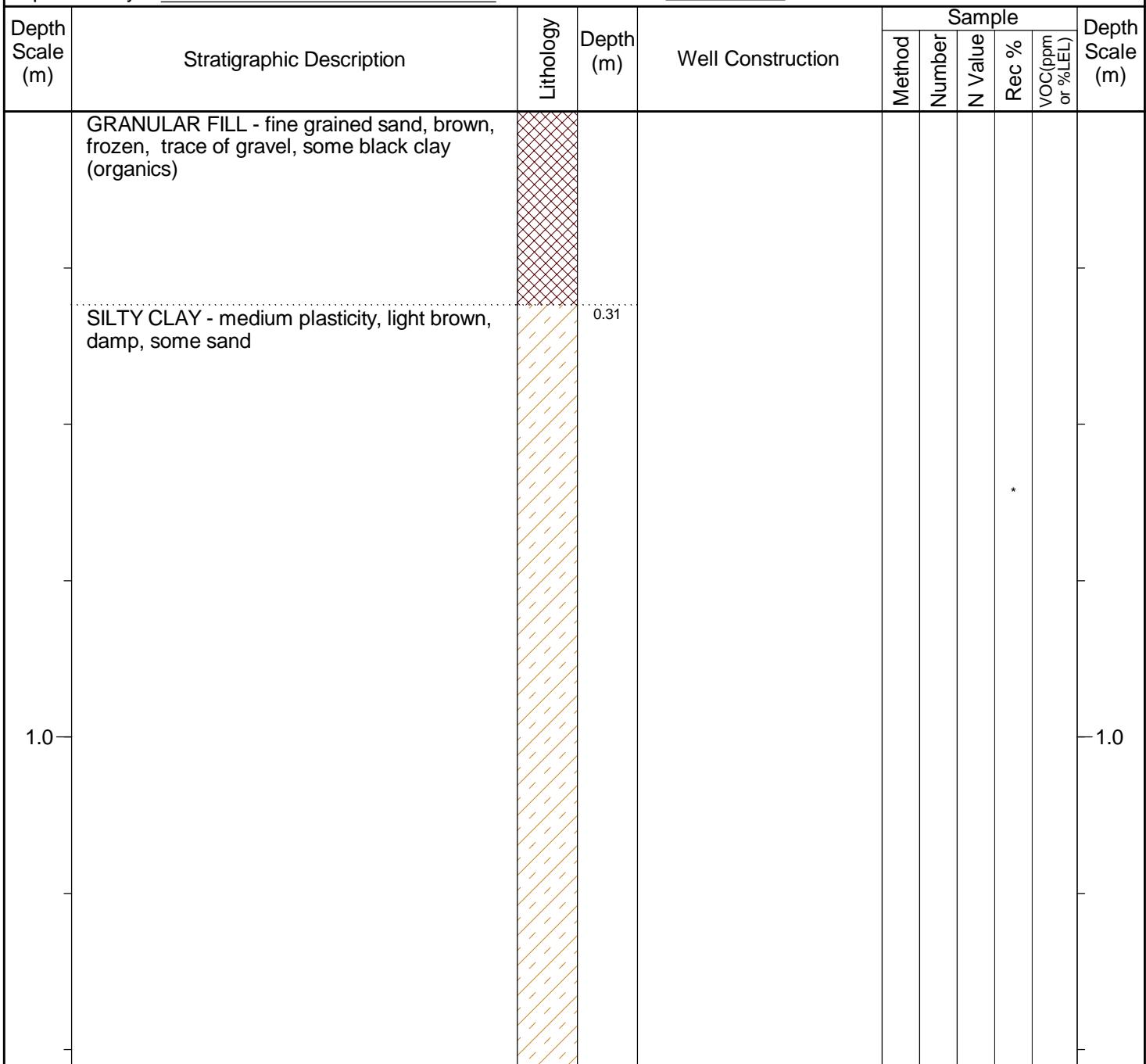
Client: City of Winnipeg  
Project No.: 14-9964  
Drilling Co.: Paddock Drilling  
Supervised by: NLB

Project: Transcona Library Subsurface Investigation  
Location: 1500 Plessis, Winnipeg, MB  
Drilling Method: Solid Stem  
Date Started: 12/9/14 Date Completed: 12/9/14



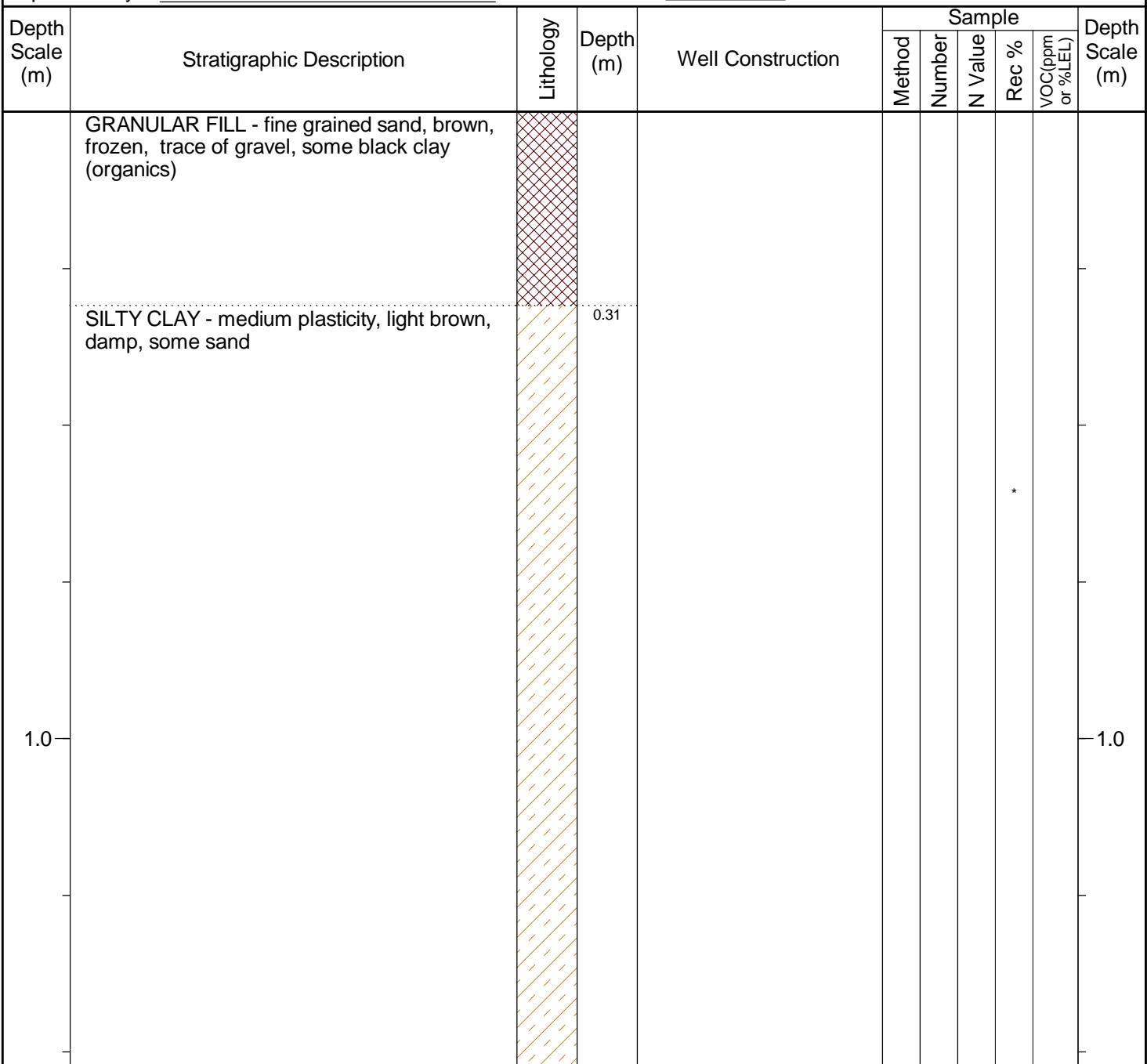
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Client: City of Winnipeg  
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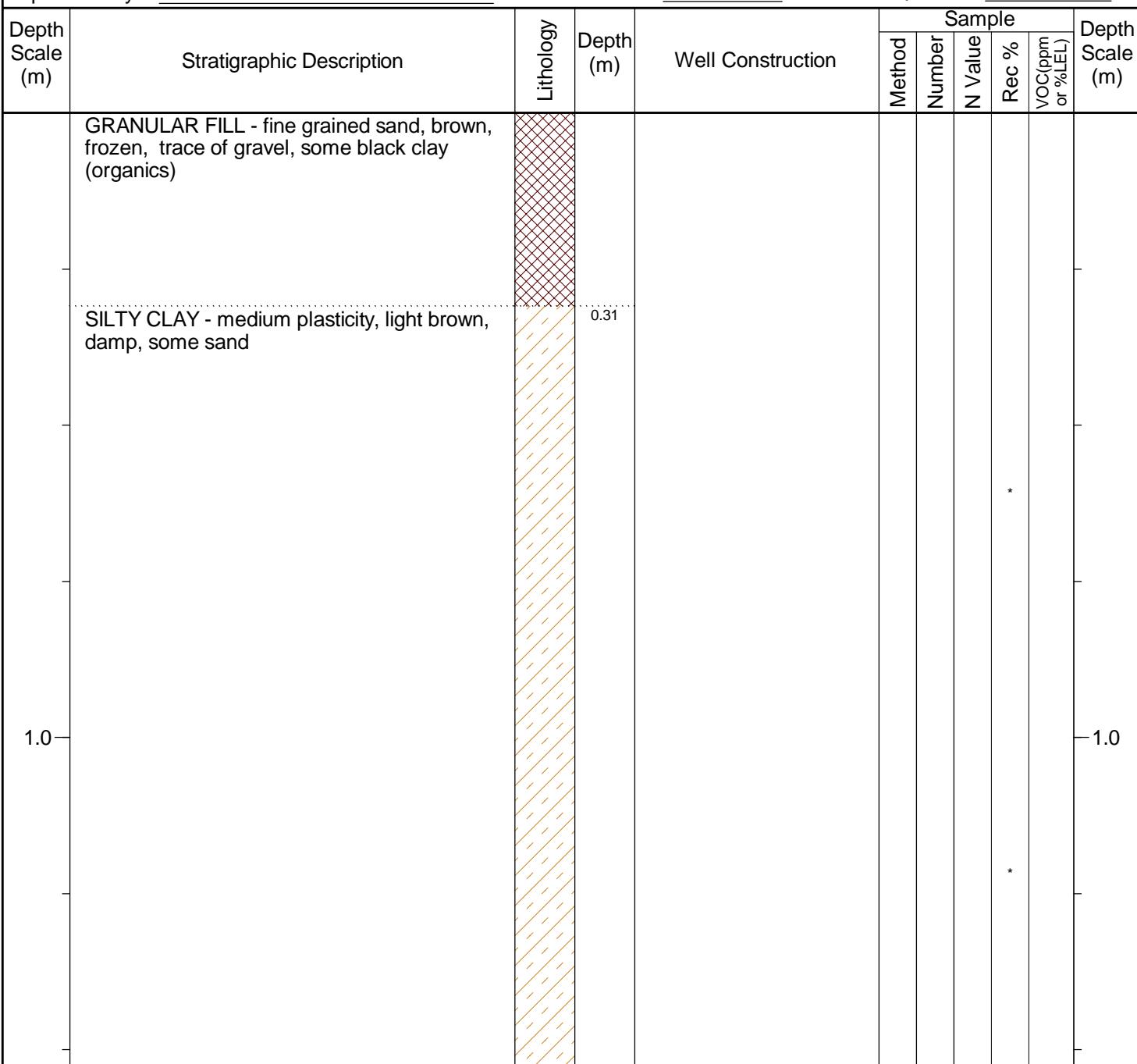
Project: Transcona Library Subsurface Investigation  
 Location: 1500 Plessis, Winnipeg, MB  
 Drilling Method: Solid Stem  
 Date Started: 12/9/14 Date Completed: 12/9/14



BH4

Client: City of Winnipeg  
Project No.: 14-9964  
Drilling Co.: Paddock Drilling  
Supervised by: NLB

Project: Transcona Library Subsurface Investigation  
Location: 1500 Plessis, Winnipeg, MB  
Drilling Method: Solid Stem  
Date Started: 12/9/14 Date Completed: 12/9/14



DILLON MW WITH GPS 14-9964.GPJ DILLON TEMPLATE.GDT 1/8/15

## LITHOLOGY SYMBOLS

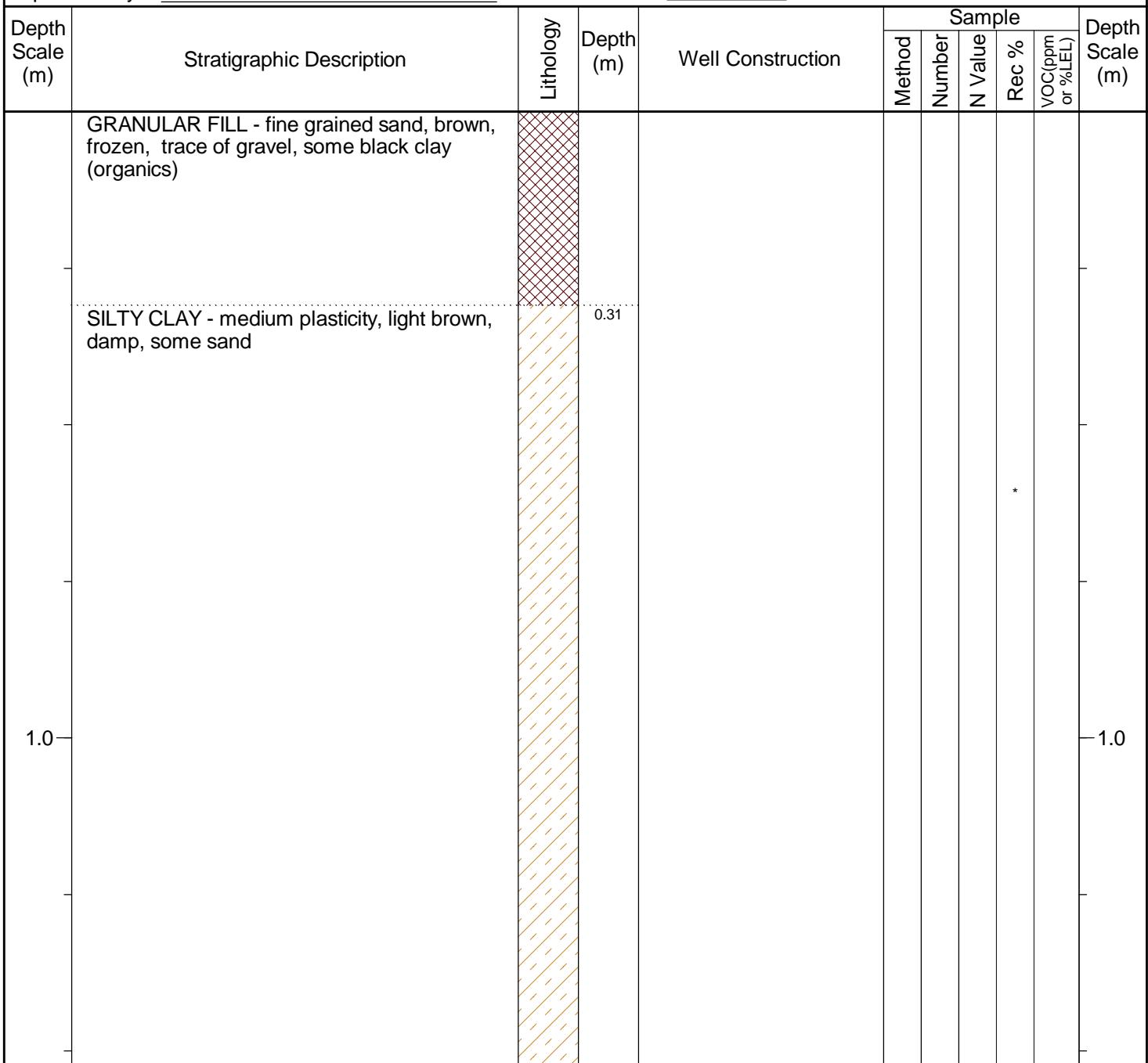
## LITHOLOGY Fill (made ground)

 Silty Clay

SAMPLE  
TYPE

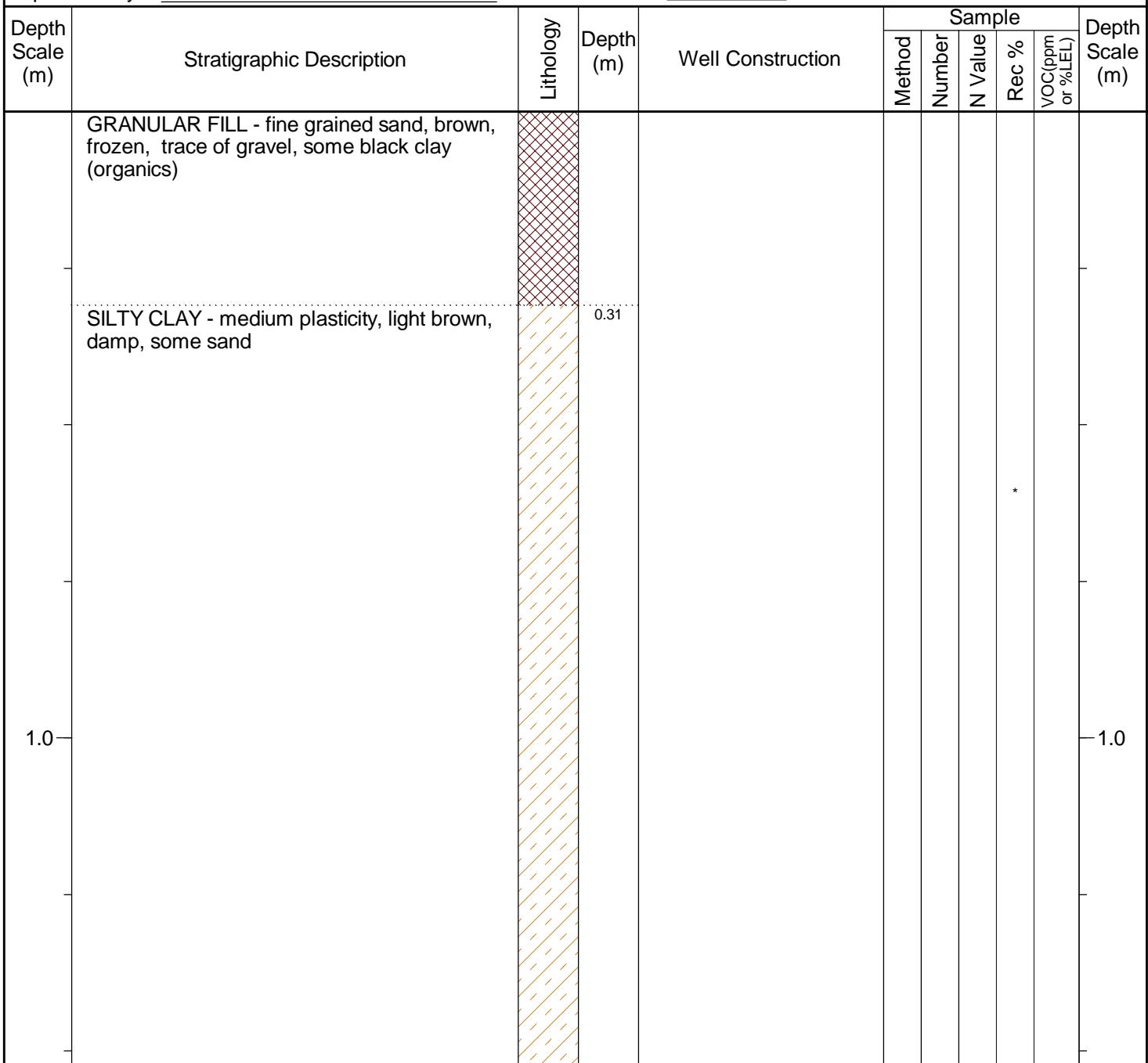
Client: City of Winnipeg  
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Project: Transcona Library Subsurface Investigation  
Location: 1500 Plessis, Winnipeg, MB  
Drilling Method: Solid Stem  
Date Started: 12/9/14 Date Completed: 12/9/14



Client: City of Winnipeg  
Project No.: 14-9964  
Drilling Co.: Paddock Drilling  
Supervised by: NLB

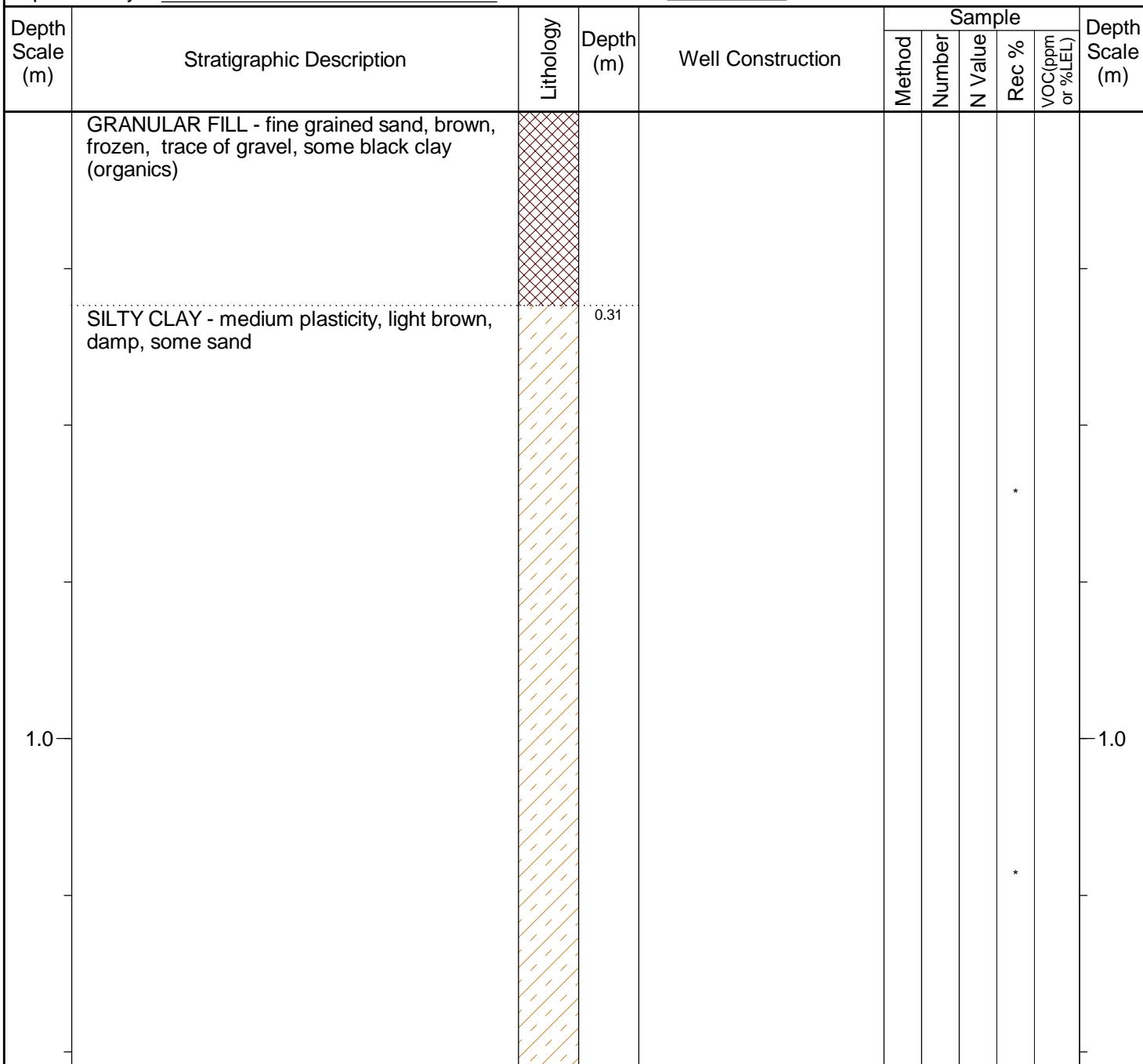
Project: Transcona Library Subsurface Investigation  
Location: 1500 Plessis, Winnipeg, MB  
Drilling Method: Solid Stem  
Date Started: 12/9/14 Date Completed: 12/9/14



BH7

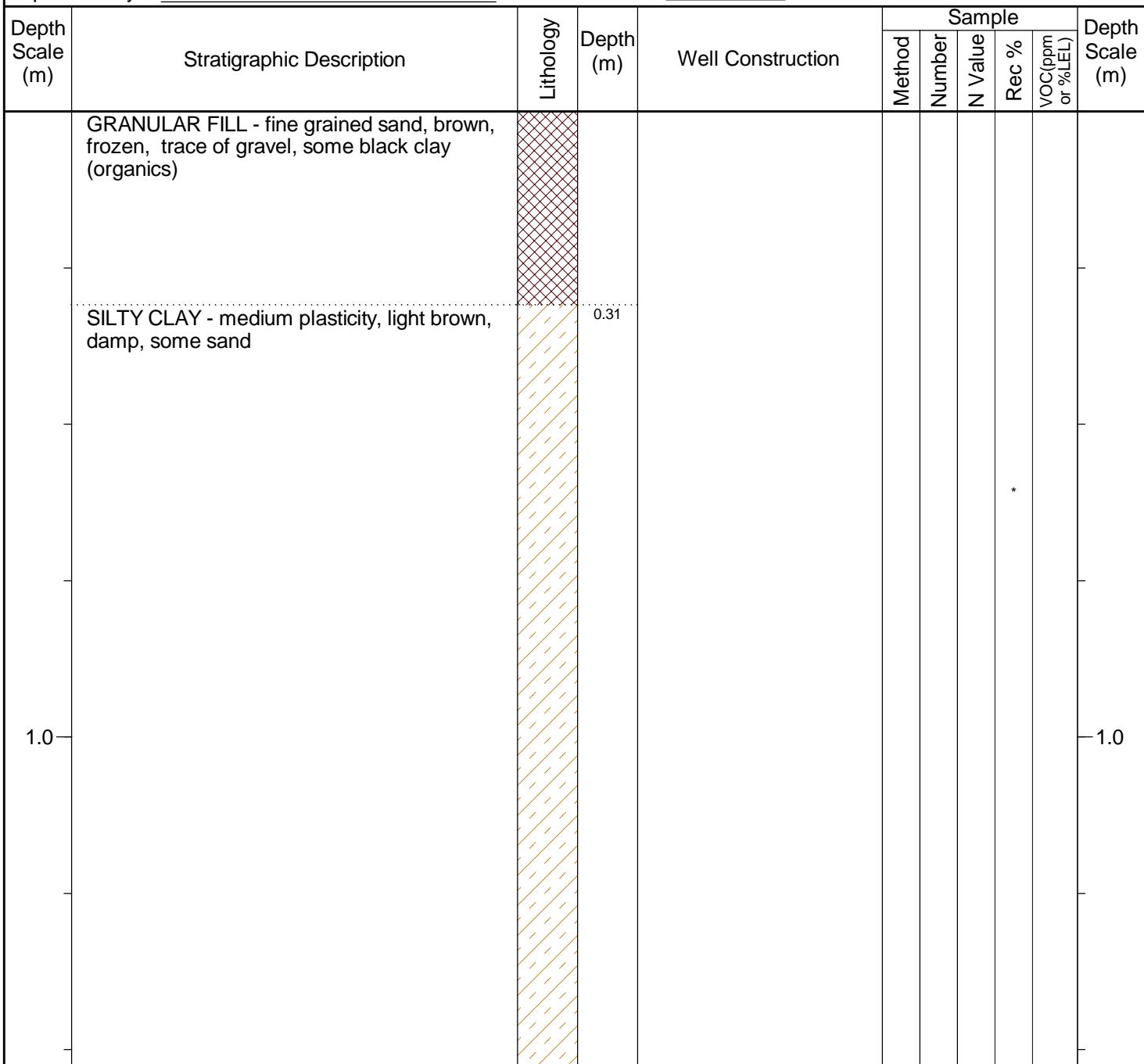
Client: City of Winnipeg  
Project No.: 14-9964  
Drilling Co.: Paddock Drilling  
Supervised by: NLB

Project: Transcona Library Subsurface Investigation  
Location: 1500 Plessis, Winnipeg, MB  
Drilling Method: Solid Stem  
Date Started: 12/9/14 Date Completed: 12/9/14



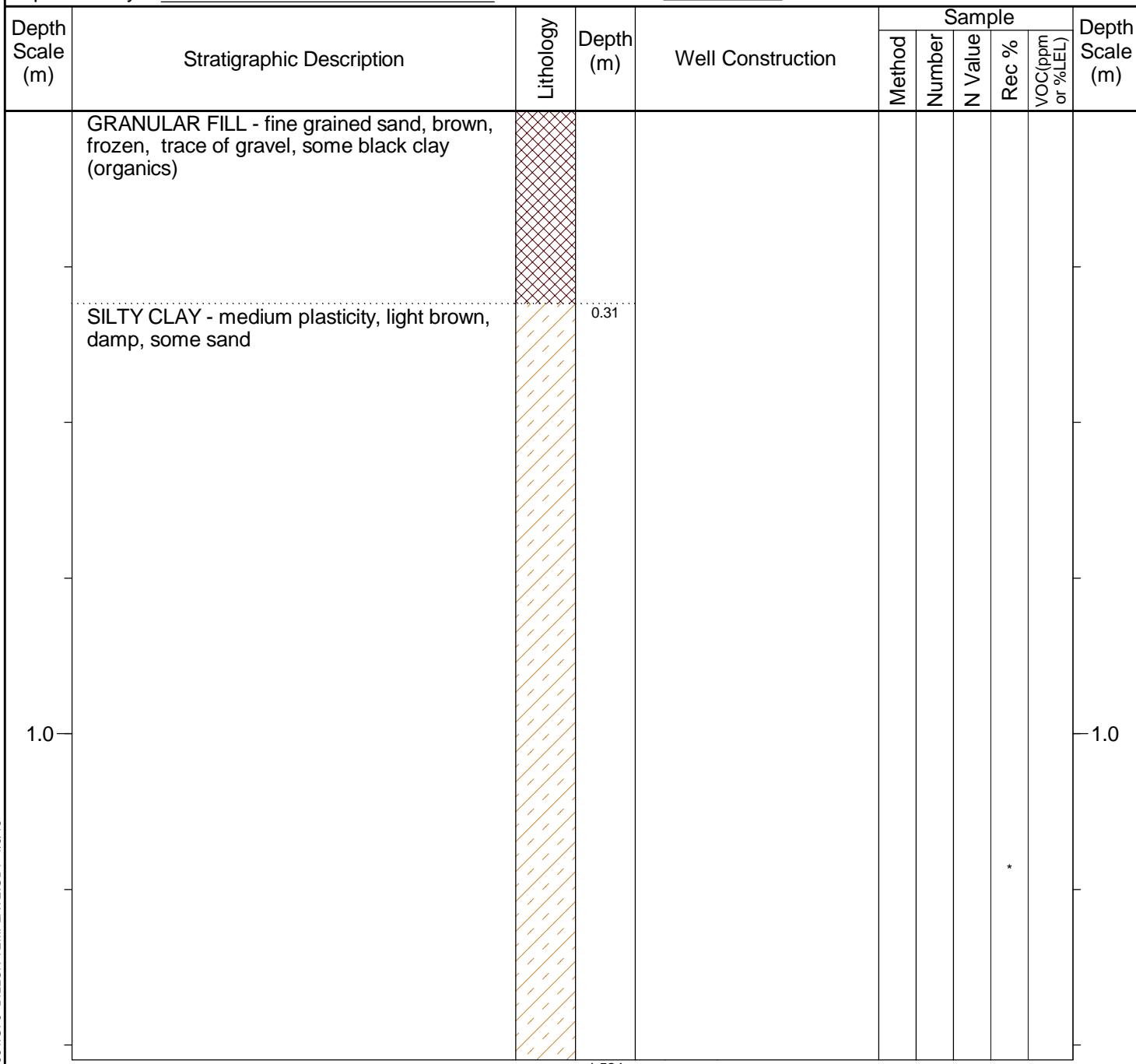
Client: City of Winnipeg  
 Project No.: 14-9964  
 Drilling Co.: Paddock Drilling  
 Supervised by: NLB

Project: Transcona Library Subsurface Investigation  
 Location: 1500 Plessis, Winnipeg, MB  
 Drilling Method: Solid Stem  
 Date Started: 12/9/14 Date Completed: 12/9/14



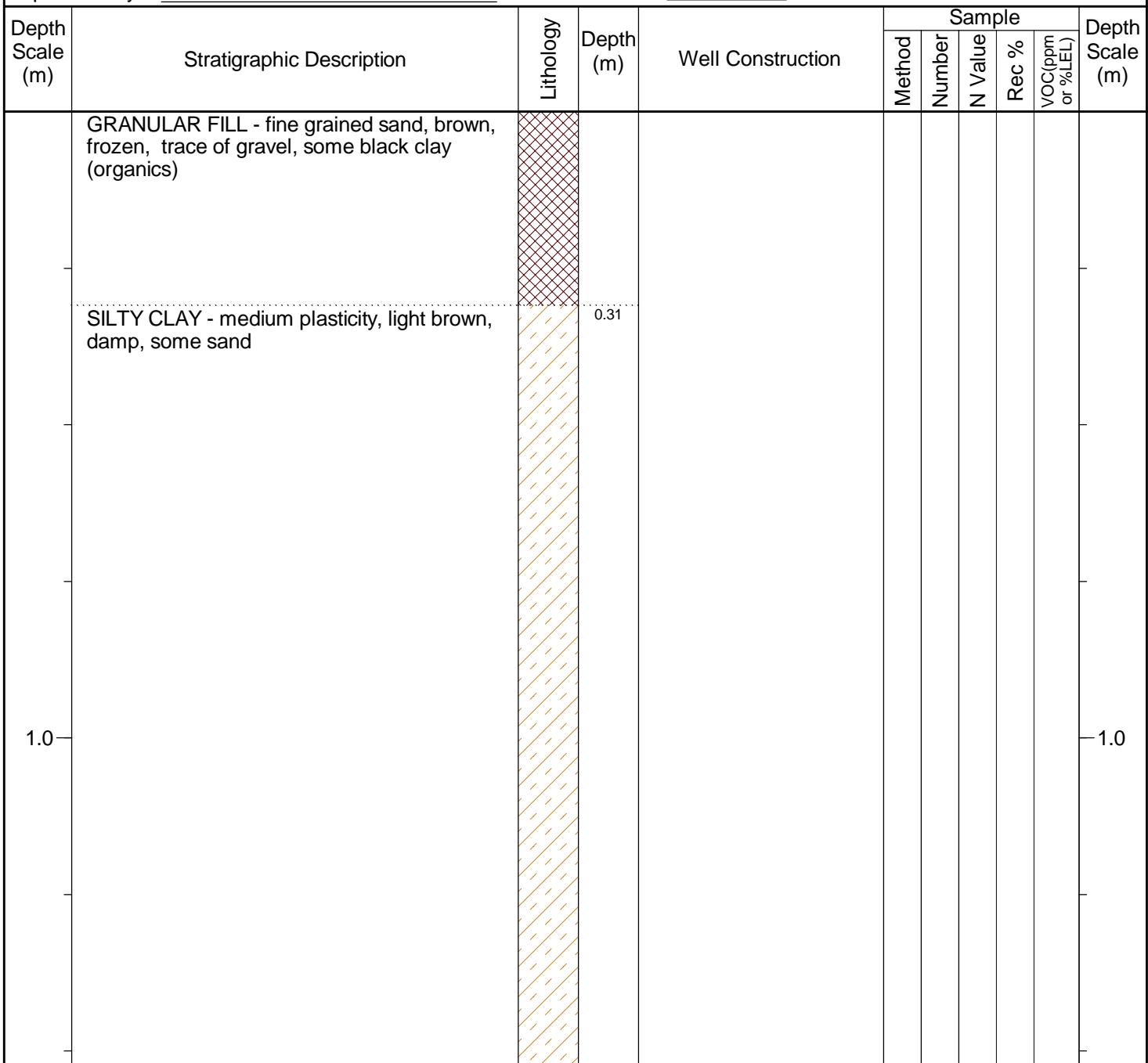
Client: City of Winnipeg  
Project No.: 14-9964  
Drilling Co.: Paddock Drilling  
Supervised by: NLB

Project: Transcona Library Subsurface Investigation  
Location: 1500 Plessis, Winnipeg, MB  
Drilling Method: Solid Stem  
Date Started: 12/9/14 Date Completed: 12/9/14



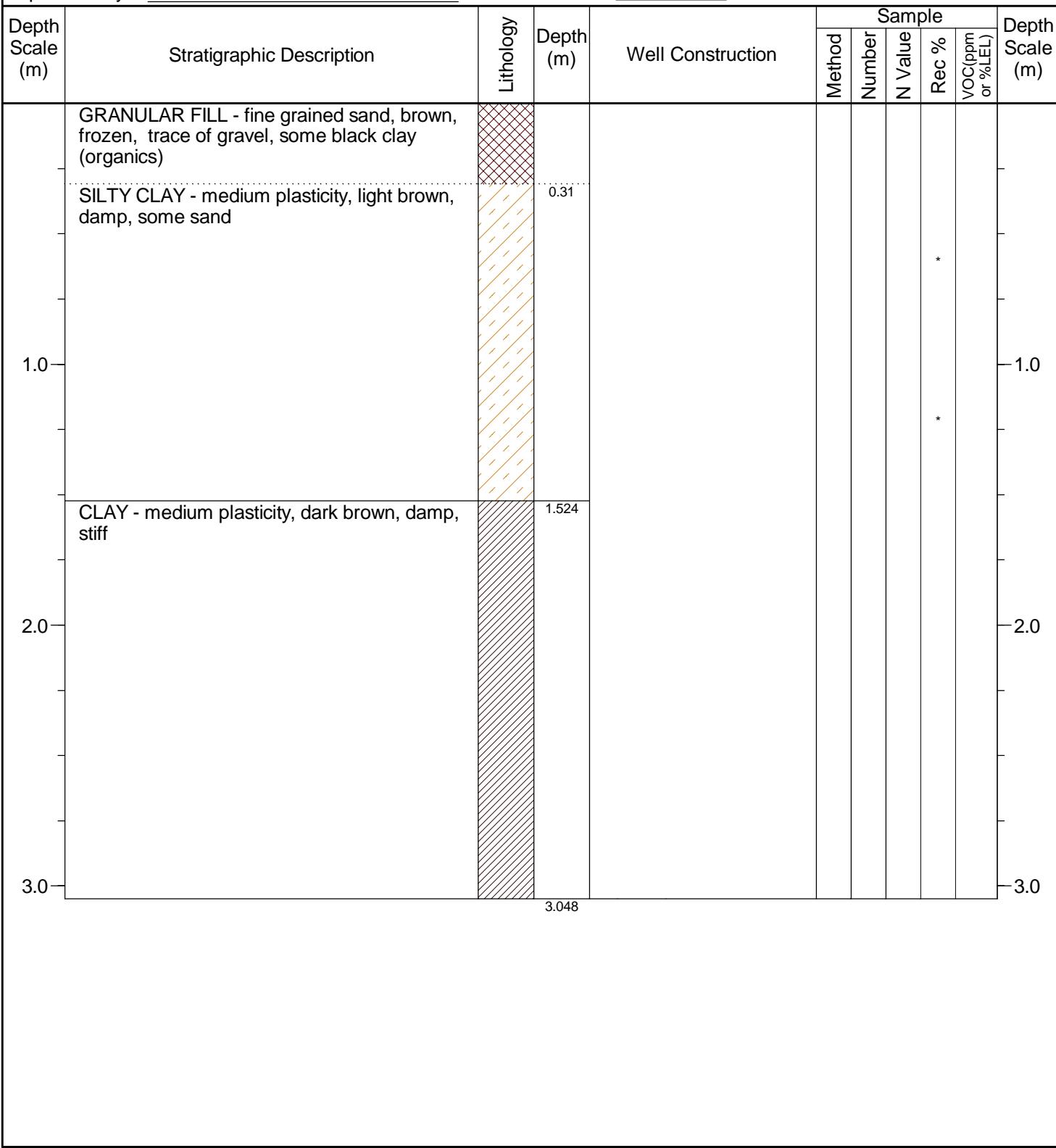
Client: City of Winnipeg  
Project No.: 14-9964  
Drilling Co.: Paddock Drilling  
Supervised by: NLB

Project: Transcona Library Subsurface Investigation  
Location: 1500 Plessis, Winnipeg, MB  
Drilling Method: Solid Stem  
Date Started: 12/9/14 Date Completed: 12/9/14



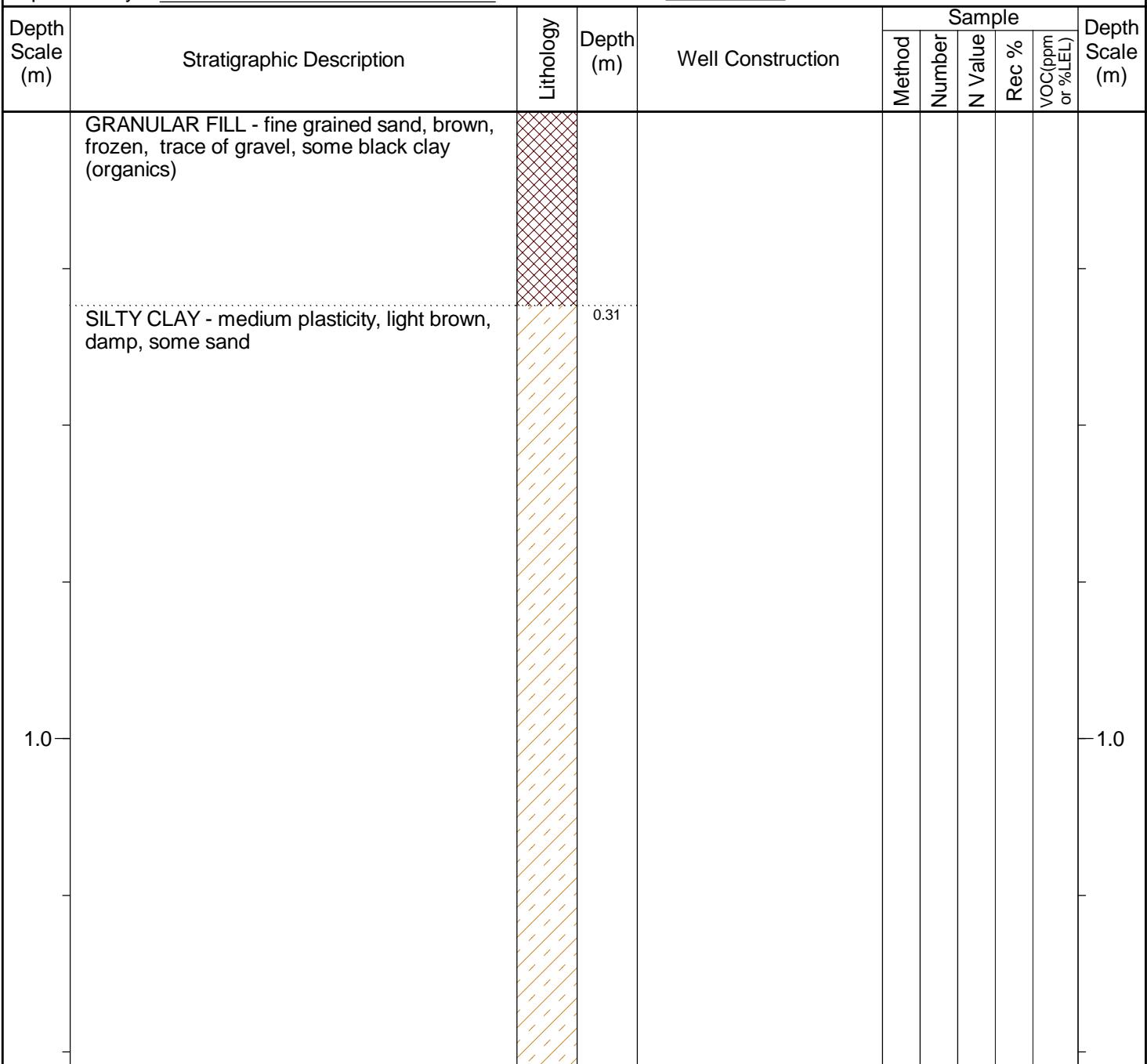
Client: City of Winnipeg  
Project No.: 14-9964  
Drilling Co.: Paddock Drilling  
Supervised by: NLB

Project: Transcona Library Subsurface Investigation  
Location: 1500 Plessis, Winnipeg, MB  
Drilling Method: Solid Stem  
Date Started: 12/9/14 Date Completed: 12/9/14



Client: City of Winnipeg  
Project No.: 14-9964  
Drilling Co.: Paddock Drilling  
Supervised by: NLB

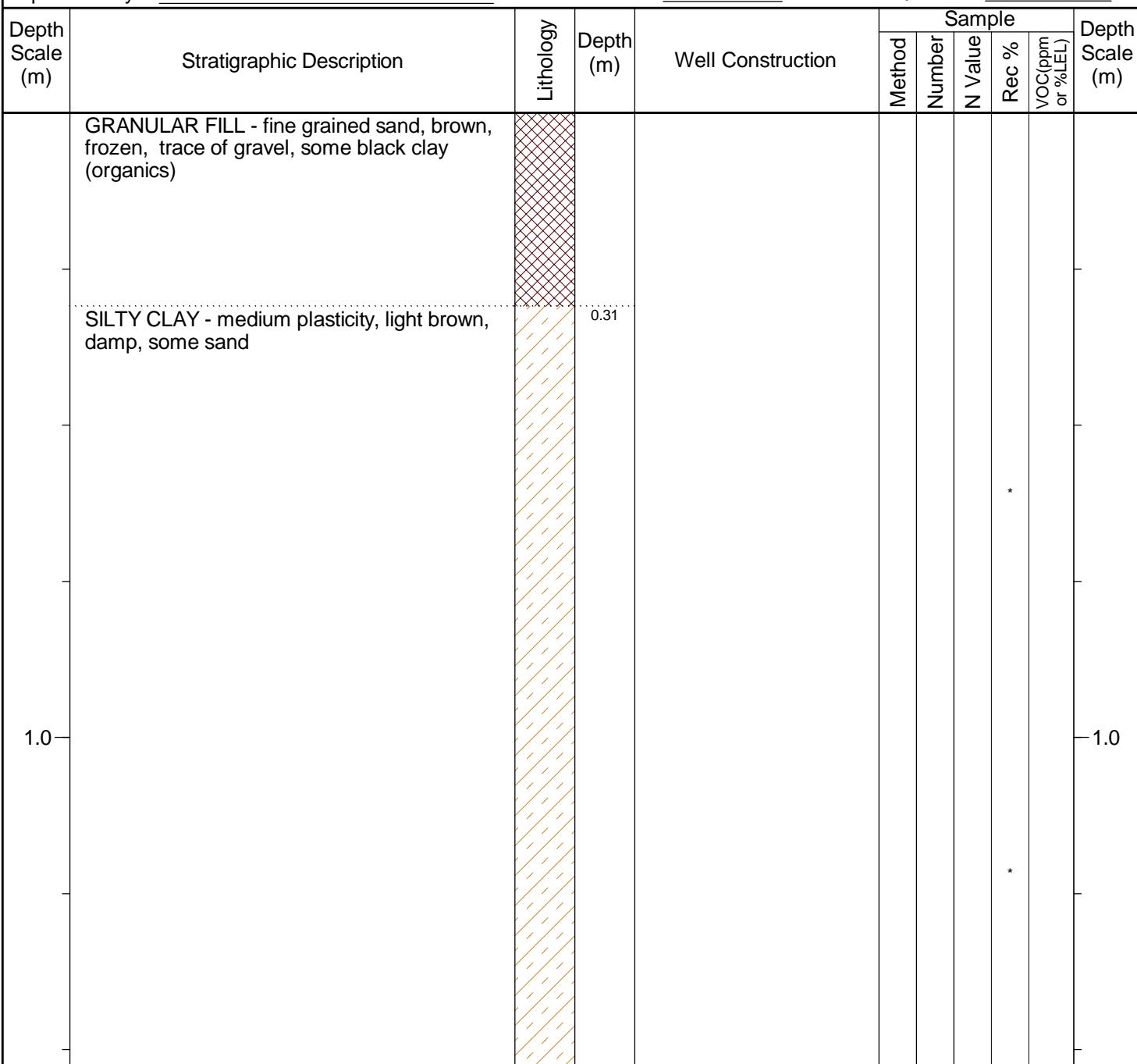
Project: Transcona Library Subsurface Investigation  
Location: 1500 Plessis, Winnipeg, MB  
Drilling Method: Solid Stem  
Date Started: 12/9/14 Date Completed: 12/9/14



BH13

Client: City of Winnipeg  
Project No.: 14-9964  
Drilling Co.: Paddock Drilling  
Supervised by: NLB

Project: Transcona Library Subsurface Investigation  
Location: 1500 Plessis, Winnipeg, MB  
Drilling Method: Solid Stem  
Date Started: 12/9/14 Date Completed: 12/9/14



DILLON MW WITH GPS 14-9964.GPJ DILLON TEMPLATE.GDT 1/8/15

## LITHOLOGY SYMBOLS

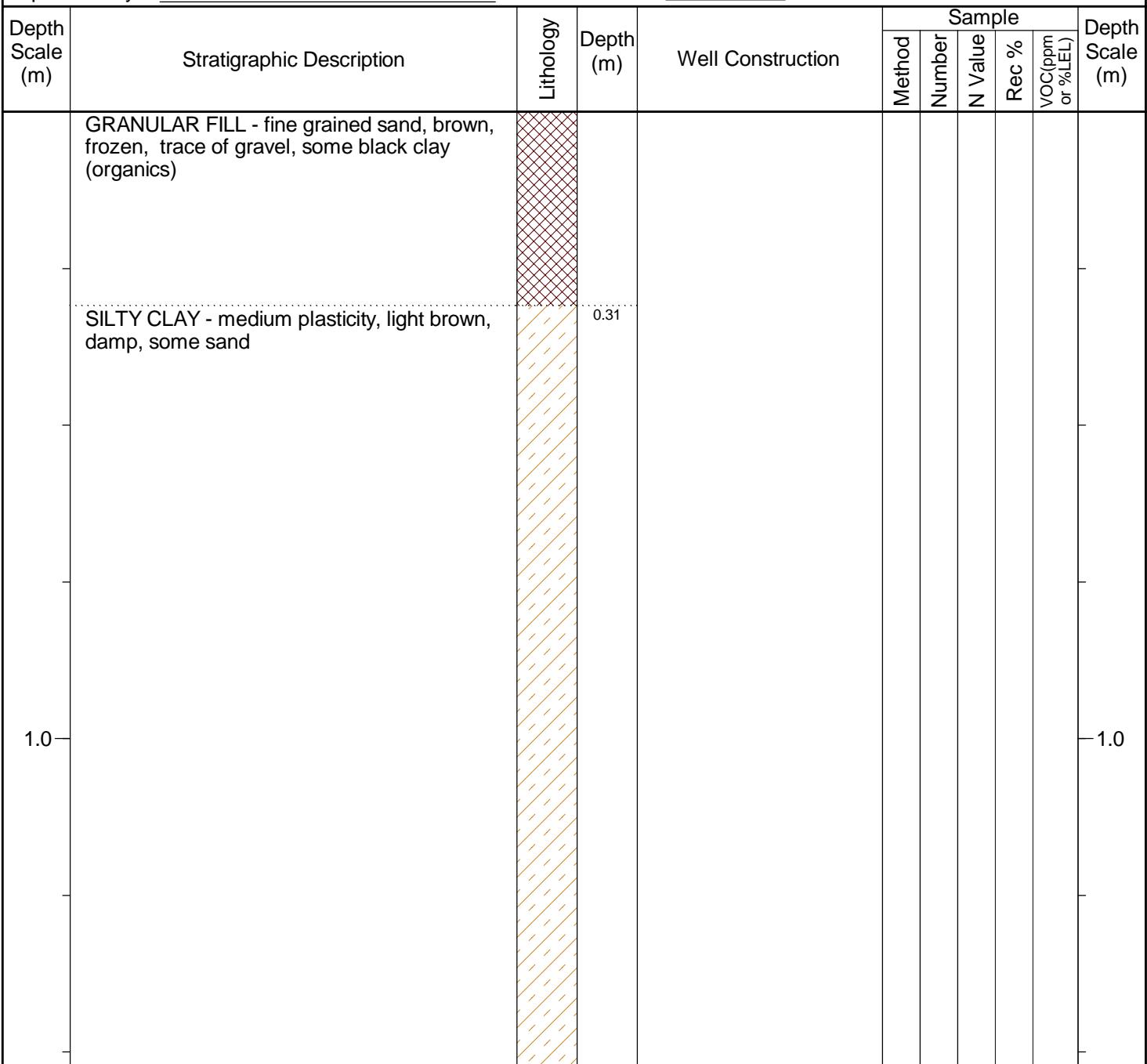
## LITHOLOGY Fill (made ground)

 Silty Clay

SAMPLE  
TYPE

Client: City of Winnipeg  
Project No.: 14-9964  
Drilling Co.: Paddock Drilling  
Supervised by: NLB

Project: Transcona Library Subsurface Investigation  
Location: 1500 Plessis, Winnipeg, MB  
Drilling Method: Solid Stem  
Date Started: 12/9/14 Date Completed: 12/9/14



## LABORATORY RESULTS

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**Attention:Nanci Beaupre**

DILLON CONSULTING LTD.  
1558 Willson Place  
Winnipeg, MB  
CANADA R3T 0Y4

Your Project #: 14-9964  
Site#: TRANSCONA LIBRARY  
Site Location: 1500 PLESSIS ROAD  
Your C.O.C. #: C456034, N000553

**Report Date:** 2015/02/05  
**Report #:** R1798145  
**Version:** 2 - Revision

**CERTIFICATE OF ANALYSIS – REVISED REPORT**

**MAXXAM JOB #: B4B2248**

Received: 2014/12/11, 08:00

Sample Matrix: Soil  
# Samples Received: 18

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Chloride (soluble) (1)	17	2014/12/13	2014/12/16	BBY6SOP-00011	SM 22 4500-Cl- G m
Chloride (soluble) (1)	1	2014/12/19	2014/12/19	BBY6SOP-00011	SM 22 4500-Cl- G m
Conductivity (Soluble) (1)	17	2014/12/13	2014/12/15	BBY6SOP-00029	SM 22 2510 B
Conductivity (Soluble) (1)	1	2014/12/19	2014/12/19	BBY6SOP-00029	SM 22 2510 B
Elements by ICPMS (total) (1)	2	2014/12/13	2014/12/15	BBY7SOP-00001	EPA 6020a R1 m
Elements by ICPMS (total) (1)	2	2015/02/04	2015/02/04	BBY7SOP-00001	EPA 6020a R1 m
pH (2:1 DI Water Extract) (1)	4	2014/12/13	2014/12/15	BBY6SOP-00028	BCMOE BCLM Mar2005 m
pH (Soluble) (1)	17	2014/12/13	2014/12/13	BBY6SOP-00025	SM 22 4500-H+ B
pH (Soluble) (1)	1	2014/12/19	2014/12/19	BBY6SOP-00025	SM 22 4500-H+ B
Sodium Adsorption Ratio SP (1)	17	N/A	2014/12/15	BBY6SOP-00030	Carter 2nd 15.2.1 m
Sodium Adsorption Ratio SP (1)	1	N/A	2014/12/19	BBY6SOP-00030	Carter 2nd 15.2.1 m
Saturated Paste (1)	17	2014/12/13	2014/12/13	BBY6SOP-00030	Carter 2nd 15.2.1 m
Saturated Paste (1)	1	2014/12/19	2014/12/19	BBY6SOP-00030	Carter 2nd 15.2.1 m
Soluble Ions Calculation ( mg/kg) (1)	17	N/A	2014/12/17	BBY WI-00033	Auto Calc
Soluble Ions Calculation ( mg/kg) (1)	1	N/A	2014/12/19	BBY WI-00033	Auto Calc
Sulphate (soluble) (soil) (1)	17	2014/12/13	2014/12/16	BBY6SOP-00017	SM 22 4500-SO42- E m
Sulphate (soluble) (soil) (1)	1	2014/12/19	2014/12/19	BBY6SOP-00017	SM 22 4500-SO42- E m
Soluble Cations (Ca,K,Mg,Na,S) (1)	17	N/A	2014/12/15	BBY7SOP-00018	EPA 6010c R3 m
Soluble Cations (Ca,K,Mg,Na,S) (1)	1	N/A	2014/12/19	BBY7SOP-00018	EPA 6010c R3 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Maxxam Vancouver

**Attention:Nanci Beaupre**

DILLON CONSULTING LTD.  
1558 Willson Place  
Winnipeg, MB  
CANADA R3T 0Y4

Your Project #: 14-9964  
Site#: TRANSCONA LIBRARY  
Site Location: 1500 PLESSIS ROAD  
Your C.O.C. #: C456034, N000553

**Report Date:** 2015/02/05  
**Report #:** R1798145  
**Version:** 2 - Revision

**CERTIFICATE OF ANALYSIS – REVISED REPORT**

**MAXXAM JOB #: B4B2248**

Received: 2014/12/11, 08:00

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Janelle Kochan, B.Sc., Project Manager  
Email: JKochan@maxxam.ca  
Phone# (204)772-7276 Ext:2209

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Total Cover Pages : 2  
Page 2 of 20

Maxxam Job #: B4B2248

Report Date: 2015/02/05

DILLON CONSULTING LTD.

Client Project #: 14-9964

Site Location: 1500 PLESSIS ROAD

Sampler Initials: NLB

### RESULTS OF CHEMICAL ANALYSES OF SOIL

Maxxam ID		LI7768		LI7769		LI7770		LI7771	LI7771		
Sampling Date		2014/12/09 10:00		2014/12/09 10:30		2014/12/09 10:45		2014/12/09 11:00	2014/12/09 11:00		
COC Number		C456034		C456034		C456034		C456034	C456034		
	Units	BH1@0-1'	RDL	BH2@0-2'	RDL	BH3@0-2'	RDL	BH4@0-2'	BH4@0-2' Lab-Dup	RDL	QC Batch

#### ANIONS

Soluble Sulphate (SO4)	mg/L	230	10	<10	10	32	10	24	25	10	7756009
Soluble Chloride (Cl)	mg/L	6130	50	3450	50	5460	50	3280	3480	50	7756008

#### Calculated Parameters

Soluble Chloride (Cl)	mg/kg	4290	35	2930	42	2410	22	1350		21	7751119
Soluble Sodium (Na)	mg/kg	2470	350	1860	4.2	724	2.2	637		2.1	7751119
Soluble Calcium (Ca)	mg/kg	155	3.5	31.7	4.2	205	2.2	60.9		2.1	7751119
Soluble Magnesium (Mg)	mg/kg	125	3.5	12.3	4.2	297	2.2	87.9		2.1	7751119
Soluble Potassium (K)	mg/kg	65	14	120	17	36.1	8.8	15.5		8.2	7751119
Soluble Sulphur (S)	mg/kg	83	21	<26	26	<13	13	<12		12	7751119
Soluble Sulphate (SO4)	mg/kg	161	7.0	<8.5	8.5	14.3	4.4	10.0		4.1	7751119

#### Physical Properties

Soluble (2:1) pH	pH	8.18	N/A								7753340
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#### Soluble Parameters

Soluble Conductivity	uS/cm	16800 (1)	1.0	9920	1.0	11500	1.0	8850	8920	1.0	7753326
Soluble pH	pH	7.91	N/A	8.22	N/A	7.70	N/A	8.38	8.41	N/A	7753323
Wet Soluble Calcium (Ca)	mg/L	222	5.0	37.3	5.0	464	5.0	148	148	5.0	7754218
Saturation %	%	69.9	1.0	85.0	1.0	44.1	1.0	41.0	40.9	1.0	7753320
Wet Soluble Magnesium (Mg)	mg/L	178	5.0	14.5	5.0	672	5.0	214	216	5.0	7754218
Wet Soluble Potassium (K)	mg/L	92	20	141	20	82	20	38	36	20	7754218
Wet Soluble Sodium (Na)	mg/L	3540 (2)	500	2190	5.0	1640	5.0	1550	1510	5.0	7754218
Wet Soluble Sulphur (S)	mg/L	118	30	<30	30	<30	30	<30	<30	30	7754218
Sodium Adsorption Ratio	N/A	42.9	0.10	76.9	0.10	11.4	0.10	19.1		0.10	7751118

RDL = Reportable Detection Limit

Lab-Dup = Laboratory Initiated Duplicate

N/A = Not Applicable

(1) Conductivity result is greater than the highest standard (12900 us/cm).

(2) Detection limits raised due to dilution to bring analyte within the calibrated range.

Maxxam Job #: B4B2248

Report Date: 2015/02/05

DILLON CONSULTING LTD.

Client Project #: 14-9964

Site Location: 1500 PLESSIS ROAD

Sampler Initials: NLB

### RESULTS OF CHEMICAL ANALYSES OF SOIL

Maxxam ID		LI7772		LI7773		LI7774		LI7775		LI7776		
Sampling Date		2014/12/09 11:15		2014/12/09 11:30		2014/12/09 12:15		2014/12/09		2014/12/09 12:45		
COC Number		C456034		C456034		C456034		C456034		C456034		
	Units	BH5@0-2'	RDL	BH6@0-2'	RDL	BH7@0-2'	RDL	FD1	RDL	BH8@0-2'	RDL	QC Batch

#### ANIONS

Soluble Sulphate (SO4)	mg/L	72	10	449	10	340	10	362	10	268	10	7756009
Soluble Chloride (Cl)	mg/L	459	5.0	147	5.0	4750	50	5170	50	3270	50	7756008

#### Calculated Parameters

Soluble Chloride (Cl)	mg/kg	270	2.9	123	4.2	5290	56	5890	57	4680	72	7751119
Soluble Sodium (Na)	mg/kg	115	2.9	160	4.2	3610	560	4040	570	3050	7.2	7751119
Soluble Calcium (Ca)	mg/kg	41.4	2.9	30.6	4.2	54.1	5.6	60.5	5.7	39.9	7.2	7751119
Soluble Magnesium (Mg)	mg/kg	50.3	2.9	90.2	4.2	58.3	5.6	69.4	5.7	58.9	7.2	7751119
Soluble Potassium (K)	mg/kg	<12	12	<17	17	137	22	145	23	123	29	7751119
Soluble Sulphur (S)	mg/kg	<18	18	166	25	127	33	143	34	127	43	7751119
Soluble Sulphate (SO4)	mg/kg	42.2	5.9	375	8.3	379	11	412	11	383	14	7751119

#### Physical Properties

Soluble (2:1) pH	pH					8.68	N/A	8.76	N/A	8.71	N/A	7753340
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#### Soluble Parameters

Soluble Conductivity	uS/cm	1630	1.0	1510	1.0	14100 (1)	1.0	14800 (1)	1.0	9900	1.0	7753326
Soluble pH	pH	8.34	N/A	8.59	N/A	8.81	N/A	8.80	N/A	8.76	N/A	7753323
Wet Soluble Calcium (Ca)	mg/L	70.4	5.0	36.7	5.0	48.6	5.0	53.1	5.0	27.9	5.0	7754218
Saturation %	%	58.7	1.0	83.5	1.0	111	1.0	114	1.0	143	1.0	7753320
Wet Soluble Magnesium (Mg)	mg/L	85.7	5.0	108	5.0	52.3	5.0	60.9	5.0	41.1	5.0	7754218
Wet Soluble Potassium (K)	mg/L	<20	20	<20	20	123	20	127	20	86	20	7754218
Wet Soluble Sodium (Na)	mg/L	196	5.0	192	5.0	3240 (2)	500	3550 (2)	500	2130	5.0	7754218
Wet Soluble Sulphur (S)	mg/L	<30	30	198	30	114	30	126	30	89	30	7754218
Sodium Adsorption Ratio	N/A	3.71	0.10	3.60	0.10	76.8	0.10	78.9	0.10	60.0	0.10	7751118

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Conductivity result is greater than the highest standard (12900 us/cm).

(2) Detection limits raised due to dilution to bring analyte within the calibrated range.

Maxxam Job #: B4B2248

Report Date: 2015/02/05

DILLON CONSULTING LTD.

Client Project #: 14-9964

Site Location: 1500 PLESSIS ROAD

Sampler Initials: NLB

### RESULTS OF CHEMICAL ANALYSES OF SOIL

Maxxam ID		LI7777		LI7778		LI7779		LI7780		LI7781		
Sampling Date		2014/12/09 12:30		2014/12/09		2014/12/09 13:00		2014/12/09 14:00		2014/12/09 14:15		
COC Number		C456034		C456034		C456034		C456034		C456034		
	Units	BH7@4'	RDL	FD2	RDL	BH9@4'	RDL	BH11@0-2'	RDL	BH11@4'	RDL	QC Batch
<b>ANIONS</b>												
Soluble Sulphate (SO <sub>4</sub> )	mg/L	740	10	710	10	389	10	373	10	37	10	7756009
Soluble Chloride (Cl)	mg/L	8030	50	7860	50	96.2	5.0	111	5.0	256	5.0	7756008
<b>Calculated Parameters</b>												
Soluble Chloride (Cl)	mg/kg	7730	48	7330	47	82.0	4.3	77.4	3.5	225	4.4	7751119
Soluble Sodium (Na)	mg/kg	4170	480	4180	470	69.5	4.3	127	3.5	81.4	4.4	7751119
Soluble Calcium (Ca)	mg/kg	61.5	4.8	58.1	4.7	57.3	4.3	25.2	3.5	41.6	4.4	7751119
Soluble Magnesium (Mg)	mg/kg	458	4.8	438	4.7	77.9	4.3	41.2	3.5	79.5	4.4	7751119
Soluble Potassium (K)	mg/kg	33	19	29	19	<17	17	23	14	<18	18	7751119
Soluble Sulphur (S)	mg/kg	237	29	224	28	108	26	54	21	125	26	7751119
Soluble Sulphate (SO <sub>4</sub> )	mg/kg	713	9.6	662	9.3	331	8.5	261	7.0	32.4	8.8	7751119
<b>Soluble Parameters</b>												
Soluble Conductivity	uS/cm	21100 (1)	1.0	21500 (1)	1.0	1150	1.0	1340	1.0	1090	1.0	7753326
Soluble pH	pH	8.27	N/A	8.29	N/A	8.36	N/A	8.35	N/A	8.41	N/A	7753323
Wet Soluble Calcium (Ca)	mg/L	63.8	5.0	62.3	5.0	67.3	5.0	36.0	5.0	47.2	5.0	7754218
Saturation %	%	96.3	1.0	93.2	1.0	85.2	1.0	70.0	1.0	88.1	1.0	7753320
Wet Soluble Magnesium (Mg)	mg/L	476	5.0	470	5.0	91.4	5.0	58.8	5.0	90.3	5.0	7754218
Wet Soluble Potassium (K)	mg/L	34	20	31	20	<20	20	32	20	<20	20	7754218
Wet Soluble Sodium (Na)	mg/L	4330 (2)	500	4490 (2)	500	81.6	5.0	181	5.0	92.4	5.0	7754218
Wet Soluble Sulphur (S)	mg/L	246	30	240	30	126	30	77	30	142	30	7754218
Sodium Adsorption Ratio	N/A	40.9	0.10	42.7	0.10	1.52	0.10	4.33	0.10	1.82	0.10	7751118

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Conductivity result is greater than the highest standard (12900 us/cm).

(2) Detection limits raised due to dilution to bring analyte within the calibrated range.

Maxxam Job #: B4B2248

Report Date: 2015/02/05

DILLON CONSULTING LTD.

Client Project #: 14-9964

Site Location: 1500 PLESSIS ROAD

Sampler Initials: NLB

### RESULTS OF CHEMICAL ANALYSES OF SOIL

Maxxam ID		LI7783		LI7784		LI7785			LJ0493		
Sampling Date		2014/12/09 15:15		2014/12/09 10:10		2014/12/09 11:10			2014/12/12 10:35		
COC Number		C456034		C456034		C456034			N000553		
	Units	BH13@4'	RDL	BH1@5'	RDL	BH4@4'	RDL	QC Batch	BH13@0-2'	RDL	QC Batch

#### ANIONS

Soluble Sulphate (SO4)	mg/L	199	10	274	10	99	10	7756009	540	10	7760641
Soluble Chloride (Cl)	mg/L	2660	50	3760	50	2480	50	7756008	2870	50	7760640

#### Calculated Parameters

Soluble Chloride (Cl)	mg/kg	2330	44	2440	32	1900	38	7751119	2000	35	7752252
Soluble Sodium (Na)	mg/kg	1150	4.4	386	3.2	526	3.8	7751119	1350	3.5	7752252
Soluble Calcium (Ca)	mg/kg	72.0	4.4	305	3.2	82.3	3.8	7751119	68.8	3.5	7752252
Soluble Magnesium (Mg)	mg/kg	192	4.4	433	3.2	280	3.8	7751119	115	3.5	7752252
Soluble Potassium (K)	mg/kg	23	18	13	13	<15	15	7751119	56	14	7752252
Soluble Sulphur (S)	mg/kg	89	26	62	19	26	23	7751119	142	21	7752252
Soluble Sulphate (SO4)	mg/kg	175	8.8	177	6.5	75.8	7.6	7751119	376	7.0	7752252

#### Soluble Parameters

Soluble Conductivity	uS/cm	7770	1.0	9750	1.0	6360	1.0	7753326	10300	1.0	7759833
Soluble pH	pH	8.38	N/A	7.92	N/A	8.27	N/A	7753323	7.81	N/A	7759829
Wet Soluble Calcium (Ca)	mg/L	82.1	5.0	470	5.0	108	5.0	7754218	98.7	5.0	7760001
Saturation %	%	87.7	1.0	64.8	1.0	76.4	1.0	7753320	69.7	1.0	7759816
Wet Soluble Magnesium (Mg)	mg/L	219	5.0	668	5.0	366	5.0	7754218	165	5.0	7760001
Wet Soluble Potassium (K)	mg/L	27	20	20	20	<20	20	7754218	81	20	7760001
Wet Soluble Sodium (Na)	mg/L	1310	5.0	596	5.0	688	5.0	7754218	1940	5.0	7760001
Wet Soluble Sulphur (S)	mg/L	102	30	95	30	33	30	7754218	203	30	7760001
Sodium Adsorption Ratio	N/A	17.2	0.10	4.14	0.10	7.11	0.10	7751118	27.6	0.10	7752251

RDL = Reportable Detection Limit

N/A = Not Applicable

Maxxam Job #: B4B2248

Report Date: 2015/02/05

DILLON CONSULTING LTD.

Client Project #: 14-9964

Site Location: 1500 PLESSIS ROAD

Sampler Initials: NLB

### ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		LI7768	LI7774		LI7774		LI7775		LI7775		
Sampling Date		2014/12/09 10:00	2014/12/09 12:15		2014/12/09 12:15		2014/12/09		2014/12/09		
COC Number		C456034	C456034		C456034		C456034		C456034		
	Units	BH1@0-1'	BH7@0-2'	QC Batch	BH7@0-2' REPEAT	QC Batch	FD1	QC Batch	FD1 REPEAT	RDL	QC Batch

#### Total Metals by ICPMS

Total Aluminum (Al)	mg/kg	16800	11500	7753331	9380	7797786	19700	7753331	8140	100	7797786
Total Antimony (Sb)	mg/kg	0.18	0.14	7753331	0.14	7797786	0.18	7753331	0.15	0.10	7797786
Total Arsenic (As)	mg/kg	3.55	2.69	7753331	1.40	7797786	3.49	7753331	1.45	0.50	7797786
Total Barium (Ba)	mg/kg	104	91.6	7753331	72.2	7797786	167	7753331	64.8	0.10	7797786
Total Beryllium (Be)	mg/kg	0.66	0.44	7753331	<0.40	7797786	0.79	7753331	<0.40	0.40	7797786
Total Bismuth (Bi)	mg/kg	0.15	0.11	7753331	<0.10	7797786	0.18	7753331	<0.10	0.10	7797786
Total Cadmium (Cd)	mg/kg	0.411	0.249	7753331	0.270	7797786	0.566	7753331	0.185	0.050	7797786
Total Calcium (Ca)	mg/kg	65100	90200	7753331	80200	7797786	59600	7753331	94600	100	7797786
Total Chromium (Cr)	mg/kg	31.5	21.6	7753331	20.7	7797786	33.6	7753331	16.5	1.0	7797786
Total Cobalt (Co)	mg/kg	7.71	6.49	7753331	4.95	7797786	10.0	7753331	4.51	0.30	7797786
Total Copper (Cu)	mg/kg	25.9	17.1	7753331	14.1	7797786	27.7	7753331	12.3	0.50	7797786
Total Iron (Fe)	mg/kg	18300	14100	7753331	11100	7797786	21500	7753331	10200	100	7797786
Total Lead (Pb)	mg/kg	9.79	7.98	7753331	6.86	7797786	11.3	7753331	6.37	0.10	7797786
Total Lithium (Li)	mg/kg	16.9	20.2	7753331	16.1	7797786	33.4	7753331	13.9	5.0	7797786
Total Magnesium (Mg)	mg/kg	30200	40000	7753331	33100	7797786	31900	7753331	36300	100	7797786
Total Manganese (Mn)	mg/kg	227	510	7753331	365	7797786	998	7753331	371	0.20	7797786
Total Mercury (Hg)	mg/kg	<0.050	<0.050	7753331	<0.050	7797786	<0.050	7753331	<0.050	0.050	7797786
Total Molybdenum (Mo)	mg/kg	0.41	0.38	7753331	0.56	7797786	0.28	7753331	0.39	0.10	7797786
Total Nickel (Ni)	mg/kg	26.8	17.6	7753331	13.1	7797786	28.3	7753331	11.4	0.80	7797786
Total Phosphorus (P)	mg/kg	470	481	7753331	443	7797786	626	7753331	394	10	7797786
Total Potassium (K)	mg/kg	4100	3330	7753331	2740	7797786	5920	7753331	2450	100	7797786
Total Selenium (Se)	mg/kg	<0.50	<0.50	7753331	<0.50	7797786	<0.50	7753331	<0.50	0.50	7797786
Total Silver (Ag)	mg/kg	0.100	0.076	7753331	<0.050	7797786	0.098	7753331	0.054	0.050	7797786
Total Sodium (Na)	mg/kg	4560	5580	7753331	4580	7797786	10500	7753331	3890	100	7797786
Total Strontium (Sr)	mg/kg	43.8	91.0	7753331	72.8	7797786	136	7753331	75.3	0.10	7797786
Total Sulphur (S)	mg/kg		1100	7753331	697	7797786	1330	7753331	668	500	7797786
Total Thallium (Tl)	mg/kg	0.218	0.167	7753331	0.093	7797786	0.249	7753331	0.096	0.050	7797786
Total Tin (Sn)	mg/kg	0.67	0.50	7753331	0.41	7797786	0.79	7753331	0.36	0.10	7797786
Total Titanium (Ti)	mg/kg	249	168	7753331	163	7797786	210	7753331	158	1.0	7797786
Total Uranium (U)	mg/kg	1.19	0.737	7753331	0.537	7797786	1.25	7753331	0.567	0.050	7797786
Total Vanadium (V)	mg/kg	49.6	33.6	7753331	24.0	7797786	58.0	7753331	21.6	2.0	7797786
Total Zinc (Zn)	mg/kg	56.9	50.7	7753331	43.4	7797786	80.3	7753331	36.9	1.0	7797786
Total Zirconium (Zr)	mg/kg	8.97	3.07	7753331	1.89	7797786	6.02	7753331	1.71	0.50	7797786

RDL = Reportable Detection Limit

Maxxam Job #: B4B2248  
Report Date: 2015/02/05

DILLON CONSULTING LTD.  
Client Project #: 14-9964  
Site Location: 1500 PLESSIS ROAD  
Sampler Initials: NLB

### ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		LI7776		
Sampling Date		2014/12/09 12:45		
COC Number		C456034		
	Units	BH8@0-2'	RDL	QC Batch

<b>Total Metals by ICPMS</b>				
Total Aluminum (Al)	mg/kg	21300	100	7753331
Total Antimony (Sb)	mg/kg	0.20	0.10	7753331
Total Arsenic (As)	mg/kg	5.51	0.50	7753331
Total Barium (Ba)	mg/kg	169	0.10	7753331
Total Beryllium (Be)	mg/kg	0.83	0.40	7753331
Total Bismuth (Bi)	mg/kg	0.19	0.10	7753331
Total Cadmium (Cd)	mg/kg	0.581	0.050	7753331
Total Calcium (Ca)	mg/kg	39000	100	7753331
Total Chromium (Cr)	mg/kg	36.0	1.0	7753331
Total Cobalt (Co)	mg/kg	11.0	0.30	7753331
Total Copper (Cu)	mg/kg	29.8	0.50	7753331
Total Iron (Fe)	mg/kg	22600	100	7753331
Total Lead (Pb)	mg/kg	11.3	0.10	7753331
Total Lithium (Li)	mg/kg	38.5	5.0	7753331
Total Magnesium (Mg)	mg/kg	30600	100	7753331
Total Manganese (Mn)	mg/kg	673	0.20	7753331
Total Mercury (Hg)	mg/kg	<0.050	0.050	7753331
Total Molybdenum (Mo)	mg/kg	0.24	0.10	7753331
Total Nickel (Ni)	mg/kg	32.1	0.80	7753331
Total Phosphorus (P)	mg/kg	648	10	7753331
Total Potassium (K)	mg/kg	6200	100	7753331
Total Selenium (Se)	mg/kg	<0.50	0.50	7753331
Total Silver (Ag)	mg/kg	0.107	0.050	7753331
Total Sodium (Na)	mg/kg	9000	100	7753331
Total Strontium (Sr)	mg/kg	118	0.10	7753331
Total Thallium (Tl)	mg/kg	0.263	0.050	7753331
Total Tin (Sn)	mg/kg	0.81	0.10	7753331
Total Titanium (Ti)	mg/kg	202	1.0	7753331
Total Uranium (U)	mg/kg	1.34	0.050	7753331
Total Vanadium (V)	mg/kg	67.0	2.0	7753331
Total Zinc (Zn)	mg/kg	89.6	1.0	7753331
Total Zirconium (Zr)	mg/kg	7.20	0.50	7753331
RDL = Reportable Detection Limit				

Maxxam Job #: B4B2248

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#### GENERAL COMMENTS

**Results relate only to the items tested.**

Maxxam Job #: B4B2248

Report Date: 2015/02/05

DILLON CONSULTING LTD.

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### QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
7753320	JGD	QC Standard	Saturation %	2014/12/13		104	%	75 - 125
7753320	JGD	Method Blank	Saturation %	2014/12/13	<1.0		%	
7753320	JGD	RPD [LI7771-01]	Saturation %	2014/12/13	0.34		%	30
7753323	JGD	QC Standard	Soluble pH	2014/12/13		102	%	97 - 103
7753323	JGD	Spiked Blank	Soluble pH	2014/12/13		101	%	97 - 103
7753323	JGD	RPD [LI7771-01]	Soluble pH	2014/12/13	0.36		%	N/A
7753326	C05	Spiked Blank	Soluble Conductivity	2014/12/15		99	%	80 - 120
7753326	C05	Method Blank	Soluble Conductivity	2014/12/15	<1.0		uS/cm	
7753326	C05	RPD [LI7771-01]	Soluble Conductivity	2014/12/15	0.81		%	35
7753331	DJ	Matrix Spike	Total Antimony (Sb)	2014/12/15		96	%	75 - 125
			Total Arsenic (As)	2014/12/15		93	%	75 - 125
			Total Barium (Ba)	2014/12/15		NC	%	75 - 125
			Total Beryllium (Be)	2014/12/15		94	%	75 - 125
			Total Cadmium (Cd)	2014/12/15		97	%	75 - 125
			Total Chromium (Cr)	2014/12/15		107	%	75 - 125
			Total Cobalt (Co)	2014/12/15		93	%	75 - 125
			Total Copper (Cu)	2014/12/15		NC	%	75 - 125
			Total Lead (Pb)	2014/12/15		93	%	75 - 125
			Total Lithium (Li)	2014/12/15		95	%	75 - 125
			Total Manganese (Mn)	2014/12/15		NC	%	75 - 125
			Total Mercury (Hg)	2014/12/15		91	%	75 - 125
			Total Molybdenum (Mo)	2014/12/15		107	%	75 - 125
			Total Nickel (Ni)	2014/12/15		96	%	75 - 125
			Total Selenium (Se)	2014/12/15		93	%	75 - 125
			Total Silver (Ag)	2014/12/15		77	%	75 - 125
			Total Strontium (Sr)	2014/12/15		93	%	75 - 125
			Total Thallium (Tl)	2014/12/15		97	%	75 - 125
			Total Tin (Sn)	2014/12/15		95	%	75 - 125
			Total Titanium (Ti)	2014/12/15		NC	%	75 - 125
			Total Uranium (U)	2014/12/15		94	%	75 - 125
			Total Vanadium (V)	2014/12/15		NC	%	75 - 125
			Total Zinc (Zn)	2014/12/15		NC	%	75 - 125
7753331	DJ	QC Standard	Total Aluminum (Al)	2014/12/15		95	%	70 - 130
			Total Antimony (Sb)	2014/12/15		105	%	70 - 130
			Total Arsenic (As)	2014/12/15		99	%	70 - 130
			Total Barium (Ba)	2014/12/15		103	%	70 - 130
			Total Cadmium (Cd)	2014/12/15		104	%	70 - 130
			Total Calcium (Ca)	2014/12/15		99	%	70 - 130
			Total Chromium (Cr)	2014/12/15		102	%	70 - 130
			Total Cobalt (Co)	2014/12/15		96	%	70 - 130
			Total Copper (Cu)	2014/12/15		96	%	70 - 130
			Total Iron (Fe)	2014/12/15		94	%	70 - 130
			Total Lead (Pb)	2014/12/15		101	%	70 - 130
			Total Magnesium (Mg)	2014/12/15		97	%	70 - 130
			Total Manganese (Mn)	2014/12/15		100	%	70 - 130
			Total Mercury (Hg)	2014/12/15		92	%	70 - 130
			Total Molybdenum (Mo)	2014/12/15		111	%	70 - 130
			Total Nickel (Ni)	2014/12/15		98	%	70 - 130
			Total Phosphorus (P)	2014/12/15		92	%	70 - 130
			Total Strontium (Sr)	2014/12/15		95	%	70 - 130
			Total Thallium (Tl)	2014/12/15		95	%	70 - 130
			Total Titanium (Ti)	2014/12/15		102	%	70 - 130

Maxxam Job #: B4B2248

Report Date: 2015/02/05

DILLON CONSULTING LTD.

Client Project #: 14-9964

Site Location: 1500 PLESSIS ROAD

Sampler Initials: NLB

### QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
7753331	DJ	Spiked Blank	Total Uranium (U)	2014/12/15	98	%	70 - 130	
			Total Vanadium (V)	2014/12/15	104	%	70 - 130	
			Total Zinc (Zn)	2014/12/15	93	%	70 - 130	
			Total Antimony (Sb)	2014/12/15	93	%	75 - 125	
			Total Arsenic (As)	2014/12/15	97	%	75 - 125	
			Total Barium (Ba)	2014/12/15	97	%	75 - 125	
			Total Beryllium (Be)	2014/12/15	98	%	75 - 125	
			Total Cadmium (Cd)	2014/12/15	91	%	75 - 125	
			Total Chromium (Cr)	2014/12/15	100	%	75 - 125	
			Total Cobalt (Co)	2014/12/15	102	%	75 - 125	
			Total Copper (Cu)	2014/12/15	103	%	75 - 125	
			Total Lead (Pb)	2014/12/15	98	%	75 - 125	
			Total Lithium (Li)	2014/12/15	96	%	75 - 125	
			Total Manganese (Mn)	2014/12/15	100	%	75 - 125	
			Total Mercury (Hg)	2014/12/15	84	%	75 - 125	
			Total Molybdenum (Mo)	2014/12/15	99	%	75 - 125	
			Total Nickel (Ni)	2014/12/15	101	%	75 - 125	
			Total Selenium (Se)	2014/12/15	97	%	75 - 125	
			Total Silver (Ag)	2014/12/15	78	%	75 - 125	
			Total Strontium (Sr)	2014/12/15	96	%	75 - 125	
			Total Thallium (Tl)	2014/12/15	98	%	75 - 125	
			Total Tin (Sn)	2014/12/15	96	%	75 - 125	
			Total Titanium (Ti)	2014/12/15	96	%	75 - 125	
			Total Uranium (U)	2014/12/15	95	%	75 - 125	
			Total Vanadium (V)	2014/12/15	100	%	75 - 125	
			Total Zinc (Zn)	2014/12/15	98	%	75 - 125	
7753331	DJ	Method Blank	Total Aluminum (Al)	2014/12/15	<100	mg/kg		
			Total Antimony (Sb)	2014/12/15	<0.10	mg/kg		
			Total Arsenic (As)	2014/12/15	<0.50	mg/kg		
			Total Barium (Ba)	2014/12/15	<0.10	mg/kg		
			Total Beryllium (Be)	2014/12/15	<0.40	mg/kg		
			Total Bismuth (Bi)	2014/12/15	<0.10	mg/kg		
			Total Cadmium (Cd)	2014/12/15	<0.050	mg/kg		
			Total Calcium (Ca)	2014/12/15	<100	mg/kg		
			Total Chromium (Cr)	2014/12/15	<1.0	mg/kg		
			Total Cobalt (Co)	2014/12/15	<0.30	mg/kg		
			Total Copper (Cu)	2014/12/15	<0.50	mg/kg		
			Total Iron (Fe)	2014/12/15	<100	mg/kg		
			Total Lead (Pb)	2014/12/15	<0.10	mg/kg		
			Total Lithium (Li)	2014/12/15	<5.0	mg/kg		
			Total Magnesium (Mg)	2014/12/15	<100	mg/kg		
			Total Manganese (Mn)	2014/12/15	<0.20	mg/kg		
			Total Mercury (Hg)	2014/12/15	<0.050	mg/kg		
			Total Molybdenum (Mo)	2014/12/15	<0.10	mg/kg		
			Total Nickel (Ni)	2014/12/15	<0.80	mg/kg		
			Total Phosphorus (P)	2014/12/15	<10	mg/kg		
			Total Potassium (K)	2014/12/15	<100	mg/kg		
			Total Selenium (Se)	2014/12/15	<0.50	mg/kg		
			Total Silver (Ag)	2014/12/15	<0.050	mg/kg		
			Total Sodium (Na)	2014/12/15	<100	mg/kg		
			Total Strontium (Sr)	2014/12/15	<0.10	mg/kg		
			Total Thallium (Tl)	2014/12/15	<0.050	mg/kg		

Maxxam Job #: B4B2248

Report Date: 2015/02/05

DILLON CONSULTING LTD.

Client Project #: 14-9964

Site Location: 1500 PLESSIS ROAD

Sampler Initials: NLB

### QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
7753331	DJ	RPD	Total Tin (Sn)	2014/12/15	<0.10		mg/kg	
			Total Titanium (Ti)	2014/12/15	<1.0		mg/kg	
			Total Uranium (U)	2014/12/15	<0.050		mg/kg	
			Total Vanadium (V)	2014/12/15	<2.0		mg/kg	
			Total Zinc (Zn)	2014/12/15	<1.0		mg/kg	
			Total Zirconium (Zr)	2014/12/15	<0.50		mg/kg	
			Total Aluminum (Al)	2014/12/15	3.7	%	35	
			Total Antimony (Sb)	2014/12/15	NC	%	30	
			Total Arsenic (As)	2014/12/15	1.7	%	30	
			Total Barium (Ba)	2014/12/15	10	%	35	
			Total Beryllium (Be)	2014/12/15	NC	%	30	
			Total Bismuth (Bi)	2014/12/15	NC	%	30	
			Total Boron (B)	2014/12/15	NC	%	30	
			Total Cadmium (Cd)	2014/12/15	NC	%	30	
			Total Calcium (Ca)	2014/12/15	2.1	%	30	
			Total Chromium (Cr)	2014/12/15	6.6	%	30	
			Total Cobalt (Co)	2014/12/15	7.0	%	30	
			Total Copper (Cu)	2014/12/15	0.63	%	30	
			Total Iron (Fe)	2014/12/15	4.8	%	30	
			Total Lead (Pb)	2014/12/15	4.5	%	35	
			Total Lithium (Li)	2014/12/15	NC	%	30	
			Total Magnesium (Mg)	2014/12/15	1.2	%	30	
			Total Manganese (Mn)	2014/12/15	4.8	%	30	
			Total Mercury (Hg)	2014/12/15	NC	%	35	
			Total Molybdenum (Mo)	2014/12/15	NC	%	35	
			Total Nickel (Ni)	2014/12/15	0.90	%	30	
			Total Phosphorus (P)	2014/12/15	3.6	%	30	
			Total Potassium (K)	2014/12/15	NC	%	35	
			Total Selenium (Se)	2014/12/15	NC	%	30	
			Total Silver (Ag)	2014/12/15	NC	%	35	
			Total Sodium (Na)	2014/12/15	NC	%	35	
			Total Strontium (Sr)	2014/12/15	0.43	%	35	
			Total Sulphur (S)	2014/12/15	NC	%	30	
			Total Tellurium (Te)	2014/12/15	NC	%	30	
			Total Thallium (Tl)	2014/12/15	NC	%	30	
			Total Thorium (Th)	2014/12/15	1.7	%	30	
			Total Tin (Sn)	2014/12/15	NC	%	35	
			Total Titanium (Ti)	2014/12/15	4.6	%	35	
			Total Tungsten (W)	2014/12/15	NC	%	30	
			Total Uranium (U)	2014/12/15	NC	%	30	
			Total Vanadium (V)	2014/12/15	2.6	%	30	
			Total Zinc (Zn)	2014/12/15	2.2	%	30	
			Total Zirconium (Zr)	2014/12/15	4.4	%	30	
7753340	C05	Spiked Blank	Soluble (2:1) pH	2014/12/15		100	%	97 - 103
7753340	C05	RPD	Soluble (2:1) pH	2014/12/15	1.1		%	N/A
7754218	GL2	QC Standard	Wet Soluble Calcium (Ca)	2014/12/15		89	%	75 - 125
			Wet Soluble Magnesium (Mg)	2014/12/15		84	%	75 - 125
			Wet Soluble Potassium (K)	2014/12/15		80	%	75 - 125
			Wet Soluble Sodium (Na)	2014/12/15		90	%	75 - 125
7754218	GL2	Method Blank	Wet Soluble Calcium (Ca)	2014/12/15	<5.0		mg/L	
			Wet Soluble Magnesium (Mg)	2014/12/15	<5.0		mg/L	
			Wet Soluble Potassium (K)	2014/12/15	<20		mg/L	

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Report Date: 2015/02/05

DILLON CONSULTING LTD.

Client Project #: 14-9964

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**QUALITY ASSURANCE REPORT(CONT'D)**

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
7754218	GL2	RPD [LI7771-01]	Wet Soluble Sodium (Na)	2014/12/15	<5.0		mg/L	
			Wet Soluble Sulphur (S)	2014/12/15	<30		mg/L	
			Wet Soluble Calcium (Ca)	2014/12/15	0.29	%	30	
			Wet Soluble Magnesium (Mg)	2014/12/15	0.79	%	30	
			Wet Soluble Potassium (K)	2014/12/15	NC	%	30	
			Wet Soluble Sodium (Na)	2014/12/15	2.8	%	30	
			Wet Soluble Sulphur (S)	2014/12/15	NC	%	30	
7756008	BB3	Matrix Spike [LI7771-01]	Soluble Chloride (Cl)	2014/12/16		NC	%	75 - 125
7756008	BB3	QC Standard	Soluble Chloride (Cl)	2014/12/16		90	%	75 - 125
7756008	BB3	Spiked Blank	Soluble Chloride (Cl)	2014/12/16		91	%	80 - 120
7756008	BB3	Method Blank	Soluble Chloride (Cl)	2014/12/16	<5.0		mg/L	
7756008	BB3	RPD [LI7771-01]	Soluble Chloride (Cl)	2014/12/16	5.8	%	30	
7756009	BB3	Matrix Spike [LI7771-01]	Soluble Sulphate (SO4)	2014/12/16		115	%	75 - 125
7756009	BB3	QC Standard	Soluble Sulphate (SO4)	2014/12/16		110	%	75 - 125
7756009	BB3	Spiked Blank	Soluble Sulphate (SO4)	2014/12/16		100	%	80 - 120
7756009	BB3	Method Blank	Soluble Sulphate (SO4)	2014/12/16	<10		mg/L	
7756009	BB3	RPD [LI7771-01]	Soluble Sulphate (SO4)	2014/12/16	NC	%	30	
7759816	JGD	QC Standard	Saturation %	2014/12/19		106	%	75 - 125
7759816	JGD	Method Blank	Saturation %	2014/12/19	<1.0	%		
7759816	JGD	RPD	Saturation %	2014/12/19	3.9	%	30	
7759829	JGD	QC Standard	Soluble pH	2014/12/19		102	%	97 - 103
7759829	JGD	Spiked Blank	Soluble pH	2014/12/19		100	%	97 - 103
7759833	C05	Spiked Blank	Soluble Conductivity	2014/12/19		96	%	80 - 120
7759833	C05	Method Blank	Soluble Conductivity	2014/12/19	<1.0		uS/cm	
7760001	GL2	QC Standard	Wet Soluble Calcium (Ca)	2014/12/19		94	%	75 - 125
			Wet Soluble Magnesium (Mg)	2014/12/19		85	%	75 - 125
			Wet Soluble Potassium (K)	2014/12/19		96	%	75 - 125
			Wet Soluble Sodium (Na)	2014/12/19		92	%	75 - 125
			Wet Soluble Calcium (Ca)	2014/12/19	<5.0		mg/L	
7760001	GL2	Method Blank	Wet Soluble Magnesium (Mg)	2014/12/19	<5.0		mg/L	
			Wet Soluble Potassium (K)	2014/12/19	<20		mg/L	
			Wet Soluble Sodium (Na)	2014/12/19	<5.0		mg/L	
			Wet Soluble Sulphur (S)	2014/12/19	<30		mg/L	
			Soluble Chloride (Cl)	2014/12/19		NC	%	75 - 125
7760640	BB3	Matrix Spike	Soluble Chloride (Cl)	2014/12/19		90	%	75 - 125
7760640	BB3	QC Standard	Soluble Chloride (Cl)	2014/12/19		108	%	80 - 120
7760640	BB3	Spiked Blank	Soluble Chloride (Cl)	2014/12/19				
7760640	BB3	Method Blank	Soluble Chloride (Cl)	2014/12/19	<5.0		mg/L	
7760640	BB3	RPD	Soluble Chloride (Cl)	2014/12/19	3.7	%	30	
7760641	BB3	QC Standard	Soluble Sulphate (SO4)	2014/12/19		107	%	75 - 125
7760641	BB3	Spiked Blank	Soluble Sulphate (SO4)	2014/12/19		117	%	80 - 120
7760641	BB3	Method Blank	Soluble Sulphate (SO4)	2014/12/19	<10		mg/L	
7797786	DJ	Matrix Spike	Total Antimony (Sb)	2015/02/04		94	%	75 - 125
			Total Arsenic (As)	2015/02/04		90	%	75 - 125
			Total Barium (Ba)	2015/02/04		NC	%	75 - 125
			Total Beryllium (Be)	2015/02/04		89	%	75 - 125
			Total Cadmium (Cd)	2015/02/04		94	%	75 - 125
			Total Chromium (Cr)	2015/02/04		96	%	75 - 125
			Total Cobalt (Co)	2015/02/04		96	%	75 - 125
			Total Copper (Cu)	2015/02/04		95	%	75 - 125
			Total Lead (Pb)	2015/02/04		96	%	75 - 125
			Total Lithium (Li)	2015/02/04		92	%	75 - 125
			Total Manganese (Mn)	2015/02/04		NC	%	75 - 125

Maxxam Job #: B4B2248

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DILLON CONSULTING LTD.

Client Project #: 14-9964

Site Location: 1500 PLESSIS ROAD

Sampler Initials: NLB

### QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
7797786	DJ	QC Standard	Total Mercury (Hg)	2015/02/04	92	%	75 - 125	
			Total Molybdenum (Mo)	2015/02/04	100	%	75 - 125	
			Total Nickel (Ni)	2015/02/04	95	%	75 - 125	
			Total Selenium (Se)	2015/02/04	91	%	75 - 125	
			Total Silver (Ag)	2015/02/04	93	%	75 - 125	
			Total Strontium (Sr)	2015/02/04	96	%	75 - 125	
			Total Thallium (Tl)	2015/02/04	96	%	75 - 125	
			Total Tin (Sn)	2015/02/04	93	%	75 - 125	
			Total Titanium (Ti)	2015/02/04	NC	%	75 - 125	
			Total Uranium (U)	2015/02/04	98	%	75 - 125	
			Total Vanadium (V)	2015/02/04	NC	%	75 - 125	
			Total Zinc (Zn)	2015/02/04	NC	%	75 - 125	
			Total Aluminum (Al)	2015/02/04	104	%	70 - 130	
			Total Antimony (Sb)	2015/02/04	111	%	70 - 130	
			Total Arsenic (As)	2015/02/04	101	%	70 - 130	
			Total Barium (Ba)	2015/02/04	104	%	70 - 130	
			Total Cadmium (Cd)	2015/02/04	104	%	70 - 130	
			Total Calcium (Ca)	2015/02/04	97	%	70 - 130	
			Total Chromium (Cr)	2015/02/04	110	%	70 - 130	
			Total Cobalt (Co)	2015/02/04	99	%	70 - 130	
			Total Copper (Cu)	2015/02/04	98	%	70 - 130	
			Total Iron (Fe)	2015/02/04	96	%	70 - 130	
			Total Lead (Pb)	2015/02/04	100	%	70 - 130	
			Total Magnesium (Mg)	2015/02/04	95	%	70 - 130	
			Total Manganese (Mn)	2015/02/04	102	%	70 - 130	
			Total Mercury (Hg)	2015/02/04	81	%	70 - 130	
			Total Molybdenum (Mo)	2015/02/04	111	%	70 - 130	
			Total Nickel (Ni)	2015/02/04	103	%	70 - 130	
			Total Phosphorus (P)	2015/02/04	89	%	70 - 130	
			Total Strontium (Sr)	2015/02/04	105	%	70 - 130	
			Total Thallium (Tl)	2015/02/04	94	%	70 - 130	
			Total Titanium (Ti)	2015/02/04	109	%	70 - 130	
			Total Uranium (U)	2015/02/04	104	%	70 - 130	
			Total Vanadium (V)	2015/02/04	107	%	70 - 130	
			Total Zinc (Zn)	2015/02/04	93	%	70 - 130	
7797786	DJ	Spiked Blank	Total Antimony (Sb)	2015/02/04	99	%	75 - 125	
			Total Arsenic (As)	2015/02/04	92	%	75 - 125	
			Total Barium (Ba)	2015/02/04	101	%	75 - 125	
			Total Beryllium (Be)	2015/02/04	94	%	75 - 125	
			Total Cadmium (Cd)	2015/02/04	97	%	75 - 125	
			Total Chromium (Cr)	2015/02/04	102	%	75 - 125	
			Total Cobalt (Co)	2015/02/04	101	%	75 - 125	
			Total Copper (Cu)	2015/02/04	104	%	75 - 125	
			Total Lead (Pb)	2015/02/04	100	%	75 - 125	
			Total Lithium (Li)	2015/02/04	99	%	75 - 125	
			Total Manganese (Mn)	2015/02/04	101	%	75 - 125	
			Total Mercury (Hg)	2015/02/04	92	%	75 - 125	
			Total Molybdenum (Mo)	2015/02/04	102	%	75 - 125	
			Total Nickel (Ni)	2015/02/04	102	%	75 - 125	
			Total Selenium (Se)	2015/02/04	92	%	75 - 125	
			Total Silver (Ag)	2015/02/04	98	%	75 - 125	
			Total Strontium (Sr)	2015/02/04	97	%	75 - 125	

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DILLON CONSULTING LTD.

Client Project #: 14-9964

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### QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
7797786	DJ	Method Blank	Total Thallium (Tl)	2015/02/04	99	%	75 - 125	
			Total Tin (Sn)	2015/02/04	96	%	75 - 125	
			Total Titanium (Ti)	2015/02/04	95	%	75 - 125	
			Total Uranium (U)	2015/02/04	98	%	75 - 125	
			Total Vanadium (V)	2015/02/04	98	%	75 - 125	
			Total Zinc (Zn)	2015/02/04	97	%	75 - 125	
			Total Aluminum (Al)	2015/02/04	<100		mg/kg	
			Total Antimony (Sb)	2015/02/04	<0.10		mg/kg	
			Total Arsenic (As)	2015/02/04	<0.50		mg/kg	
			Total Barium (Ba)	2015/02/04	<0.10		mg/kg	
			Total Beryllium (Be)	2015/02/04	<0.40		mg/kg	
			Total Bismuth (Bi)	2015/02/04	<0.10		mg/kg	
			Total Cadmium (Cd)	2015/02/04	<0.050		mg/kg	
			Total Calcium (Ca)	2015/02/04	<100		mg/kg	
			Total Chromium (Cr)	2015/02/04	<1.0		mg/kg	
			Total Cobalt (Co)	2015/02/04	<0.30		mg/kg	
			Total Copper (Cu)	2015/02/04	<0.50		mg/kg	
			Total Iron (Fe)	2015/02/04	<100		mg/kg	
			Total Lead (Pb)	2015/02/04	<0.10		mg/kg	
			Total Lithium (Li)	2015/02/04	<5.0		mg/kg	
			Total Magnesium (Mg)	2015/02/04	<100		mg/kg	
			Total Manganese (Mn)	2015/02/04	<0.20		mg/kg	
			Total Mercury (Hg)	2015/02/04	<0.050		mg/kg	
			Total Molybdenum (Mo)	2015/02/04	<0.10		mg/kg	
			Total Nickel (Ni)	2015/02/04	<0.80		mg/kg	
			Total Phosphorus (P)	2015/02/04	<10		mg/kg	
			Total Potassium (K)	2015/02/04	<100		mg/kg	
			Total Selenium (Se)	2015/02/04	<0.50		mg/kg	
7797786	DJ	RPD	Total Silver (Ag)	2015/02/04	<0.050		mg/kg	
			Total Sodium (Na)	2015/02/04	<100		mg/kg	
			Total Strontium (Sr)	2015/02/04	<0.10		mg/kg	
			Total Thallium (Tl)	2015/02/04	<0.050		mg/kg	
			Total Tin (Sn)	2015/02/04	<0.10		mg/kg	
			Total Titanium (Ti)	2015/02/04	<1.0		mg/kg	
			Total Uranium (U)	2015/02/04	<0.050		mg/kg	
			Total Vanadium (V)	2015/02/04	<2.0		mg/kg	
			Total Zinc (Zn)	2015/02/04	<1.0		mg/kg	
			Total Zirconium (Zr)	2015/02/04	<0.50		mg/kg	
			Total Aluminum (Al)	2015/02/04	6.6	%	35	
			Total Antimony (Sb)	2015/02/04	NC	%	30	
			Total Arsenic (As)	2015/02/04	NC	%	30	
			Total Barium (Ba)	2015/02/04	4.8	%	35	

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DILLON CONSULTING LTD.

Client Project #: 14-9964

Site Location: 1500 PLESSIS ROAD

Sampler Initials: NLB

### QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units	QC Limits
			Total Lead (Pb)	2015/02/04	1.6		%	35
			Total Lithium (Li)	2015/02/04	NC		%	30
			Total Magnesium (Mg)	2015/02/04	7.2		%	30
			Total Manganese (Mn)	2015/02/04	9.5		%	30
			Total Mercury (Hg)	2015/02/04	NC		%	35
			Total Molybdenum (Mo)	2015/02/04	NC		%	35
			Total Nickel (Ni)	2015/02/04	2.6		%	30
			Total Phosphorus (P)	2015/02/04	4.0		%	30
			Total Potassium (K)	2015/02/04	4.7		%	35
			Total Rubidium (Rb)	2015/02/04	NC		%	30
			Total Selenium (Se)	2015/02/04	NC		%	30
			Total Silver (Ag)	2015/02/04	NC		%	35
			Total Sodium (Na)	2015/02/04	NC		%	35
			Total Strontium (Sr)	2015/02/04	2.0		%	35
			Total Sulphur (S)	2015/02/04	NC		%	30
			Total Tellurium (Te)	2015/02/04	NC		%	30
			Total Thallium (Tl)	2015/02/04	NC		%	30
			Total Thorium (Th)	2015/02/04	7.0		%	30
			Total Tin (Sn)	2015/02/04	NC		%	35
			Total Titanium (Ti)	2015/02/04	8.3		%	35
			Total Tungsten (W)	2015/02/04	NC		%	30
			Total Uranium (U)	2015/02/04	1.1		%	30
			Total Vanadium (V)	2015/02/04	4.3		%	30
			Total Zinc (Zn)	2015/02/04	2.4		%	30
			Total Zirconium (Zr)	2015/02/04	3.3		%	30

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration).

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

Maxxam Job #: B4B2248

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DILLON CONSULTING LTD.

Client Project #: 14-9964

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Sampler Initials: NLB

### **NOTIFICATION LOG**

No Reportable Regulation Exceedences Noted.

Maxxam Job #: B4B2248  
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DILLON CONSULTING LTD.  
Client Project #: 14-9964  
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Sampler Initials: NLB

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Rob Reinert, Data Validation Coordinator

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



Maxxam Analytics International Corporation o/a Maxxam Analytics  
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### Chain Of Custody Record

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INVOICE TO:		Report Information				Project Information				Laboratory Use Only	
Company Name Contact Name Address Phone Email	#8815 DILLON CONSULTING LTD. Nanci Beaupre 1558 Wilson Place Winnipeg MB R3T 0Y4 (204) 509-2708 Fax: (204) 452-4412 nbeaupre@dillon.ca	Company Name Contact Name Address Phone Email	Same as invoice.     	Quotation # P.O. # Project # Project Name Site # Sampled By	B40752 14-9964 Transcona Library. 1500 Plessis Road. NLB	Maxxam Job # B4B2248 Chain Of Custody Record	Bottle Order #: 456034 Project Manager				
Regulatory Criteria		Special Instructions				Analysis Requested				Turnaround Time (TAT) Required	
						Please provide advance notice for rush projects					
						Regular (Standard) TAT (will be applied if Rush TAT is not specified) Standard TAT = 5-7 Working days for most tests. Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.		<input checked="" type="checkbox"/>			
						Job Specific Rush TAT (if applies to entire submission) Date Required: _____ Time Required: _____					
						Rush Confirmation Number _____ (call lab for #)					
						# of Bottles	Comments				
Samples must be kept cool (< 10°C ) from time of sampling until delivery to maxxam											
Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Regulated Drinking Water? (Y/N) Metals Field Filtered? (Y/N)	CSR/CCM/E Metals in Soil	Chloride (soluble)	Salinity 4 Package for Soil			
1 L17768	BH1C0-1'	14/12/09	1000	soil	✓ ✓ ✓					1	
2 69	BH2C0-2'	14/12/09	1030	soil	✓ ✓					1	
3 70	BH3C0-2'	14/12/09	1045	soil	✓ ✓					1	
4 71	BH4C0-2'	14/12/09	1100	soil	✓ -					1	
5 72	BH5C0-2'	14/12/09	1115	soil	✓ ✓					1	
6 73	BH6C0-2'	14/12/09	1130	soil	- ✓					1	
7 74	BH7C0-2'	14/12/09	1215	soil	✓ ✓ ✓					1	
8 75	F01	14/12/09		soil	✓ ✓ ✓					1	
9 76	BH8C0-2'	14/12/09	1245	soil	✓ ✓ ✓					1	
10 77	BH7C4'	14/12/09	1230	soil	- ✓					1	
** RELINQUISHED BY: (Signature/Print)		Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)		Date: (YY/MM/DD)	Time	# jars used and not submitted	Lab Use Only		
Nanci Beaupre		14/12/10	1900	Jennifer		2014/12/11	8:00		Time Sensitive	Temperature (°C) on Receipt	Custody Seal Intact on Cooler?
								<input type="checkbox"/>	5, 8, 4, 2, 5, 2	<input type="checkbox"/> Yes <input type="checkbox"/> No	
* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.											
White: Maxxam Yellow: Client											

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### Chain Of Custody Record

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INVOICE TO:		Report Information			Project Information			Laboratory Use Only			
Company Name Contact Name Address Phone Email	#8815 DILLON CONSULTING LTD. Nanci Beaupre 1558 Wilson Place Winnipeg MB R3T 0Y4 (204) 509-2708 Fax: (204) 452-4412 nbeaupre@dillon.ca	Company Name Contact Name Address Phone Email	Same as report     	Quotation # P.O. # Project # Project Name Site # Sampled By	B40752 14-9964 Transcma Library 1500 Plessis Road. NLB	Maxxam Job # B4B2248 Chain Of Custody Record	Bottle Order #: 456034 Project Manager				
Regulatory Criteria		Special Instructions			Analysis Requested			Turnaround Time (TAT) Required			
					Regulated Drinking Water? (Y / N) Metals Field Filtered? (Y / N)	CSR/CCME Metals in Soil	Chloride (soluble)	Salinity 4 Package for Soil	Regular (Standard) TAT (will be applied if Rush TAT is not specified) Standard TAT = 5-7 Working days for most tests. Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.		
<p><b>Note: For regulated drinking water samples - please use the Drinking Water Chain of Custody Form</b></p> <p>Samples must be kept cool (&lt; 10°C) from time of sampling until delivery to maxxam</p>											
Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Regulated Drinking Water? Metals Field Filtered?	CSR/CCME Metals in Soil	Chloride (soluble)	Salinity 4 Package for Soil	# of Bottles	Comments	
1 LI7778	F02	14/12/09		Soil			✓	✓		1	
2 79	BH9e4'	14/12/09	1300	Soil			✓	✓		1	
3 80	BH11e0-2'	14/12/09	1400	Soil			✓	✓		1	
4 81	BH11e4'	14/12/09	1415	Soil			✓	✓		1	
5 82	BH13e0-2'	14/12/09	1500	Soil			✓	✓		1	
6 83	BH13e4'	14/12/09	1515	Soil			✓	✓		1	
7 84	BH1e5'	14/12/09	1010	Soil			✓	✓		1	
8 85	BH4e4'	14/12/09	1110.	Soil			✓	✓		1	
9											
10											
** RELINQUISHED BY: (Signature/Print)		Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)		Date: (YY/MM/DD)	Time	# jars used and not submitted	Lab Use Only		
Nanci Beaupre		14/12/10	0900	Jenny Fer		2014/12/11	8:00		Time Sensitive	Temperature (°C) on Receipt	Custody Seal Intact on Cooler?
* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.											
										White: Maxxam	Yellow: Client

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