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Geotechnical Engineering
Environmental Engineering
Hydrogeology
Geological Engineering
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Building Science
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September 22, 2017
File: PE4106-LET.01

Reichmann Seniors Housing Development Corporation
22 St. Clair Avenue East, Suite 1200
Toronto, Ontario
M4T 2S3

Attention: **Ms. Victoria Lucas**

Subject: **Phase I Environmental Site Assessment Update**
412 Sparks Street
Ottawa, Ontario

Dear Ms. Lucas,

Further to your request, Paterson Group (Paterson) conducted a Phase I Environmental Site Assessment (ESA) Update for the aforementioned property. This report updates a Phase I prepared by DST Consulting Engineers, dated August 19, 2010, and is intended to meet the requirements for a Phase I ESA as per the MOECC standard O.Reg. 153/04 as amended by O.Reg. 269/11. It should be noted that the previous reports covered a larger parcel of land than the current site area. This report is to be read in conjunction with the previous reports.

Site Information

The subject site is located on the south side of Sparks Street, approximately 55 m west of Bay Street, in the City of Ottawa, Ontario. The subject site is approximately at grade with Sparks Street. The subject site is relatively flat, with regional topography sloping downward to the north and north west. The subject site is used for parking, is finished with gravel and has no permanent building structures. Site drainage primarily consists of infiltration and sheet flow to catch basins along Sparks Street, although one (1) catch basin was noted on the subject site. The configuration of the subject site is shown on Drawing PE4106-1 - Site Plan, appended to this report.

Records Review

Phase I ESA Study Area Determination

A radius of approximately 250 m was determined to be appropriate as a Phase I ESA study area for this assignment. Properties outside the 250 m radius are not considered to have the potential to impact the subject site, based on their separation distance.

First Developed Use Determination

According to the Title Search completed by DST, the site has been registered to the Christ Church Cathedral (Episcopal Church) since 1834. The subject site is depicted in the 1878 fire insurance plan (FIP) as having two (2) residences (formerly addressed 446 and 448 Sparks Street) and is first listed in the city directories as a residence in 1885/86. For the purposes of this report, the first developed use of the subject land is considered to have been for residential purposes.

Previous Environmental Reports

- ‘Phase I Environmental Site Assessment, Christ Church Cathedral Site, Ottawa, Ontario’, prepared by DST Consulting Engineers Inc. dated August 19, 2010. Note that this report included the current subject site, as well as, 439, 441, 443 and 445 Queen Street, and 71 Bronson Avenue, all lands west of the subject property.

  The historical research indicated that the subject site has belonged to Christ Church Cathedral since 1834 and that the property has been primarily used for residential purposes for the majority of that time. Information was requested from the MOECC, TSSA and Environment Canada regarding any environmental concerns with respect to the subject site. Responses from these entities indicated that no environmental records exist for the subject site. An EcoLog ERIS report was also obtained for the subject site and a surrounding radius area of 250 m, and also determined no environmental records exist for the subject site. The ERIS report identified ninety-seven (97) environmental records associated with properties within the 250 m search radius, however, due to the distance from the subject site, size of the incident and/or inferred groundwater flow direction, the identified records were considered unlikely to pose a potential for environmental impacts at the subject site. A request to the City of Ottawa was made for Historical Land Use Inventory (HLUI) information and the findings were also not considered to pose a potential for environmental impacts at the subject site.

The current subject site of 412 Sparks Street was observed at that time to exist as a parking lot, remaining as such today. No specific concerns were identified on the subject site.

Previous Geotechnical Report

- ‘Geotechnical Investigation, Proposed Multi-Storey Buildings, Cathedral Hall - Queen Street, Ottawa, Ontario’, prepared by Paterson Group Inc. dated February 15, 2011.

  In December 2010, Paterson completed a geotechnical investigation at the subject site. A total of nine (9) boreholes were advanced throughout the larger property with four (4) boreholes being placed on the subject land, to a maximum depth of 9.47 m. Bedrock on the subject land was encountered between 1.19 and 1.75 m below ground surface. Overburden soils consisted of fill (consisting of a combination of silty sand, concrete, gravel, organic material and slag) over silty sand with gravel. Borehole 1 was cored into bedrock and groundwater was encountered in the bedrock unit at approximately 2.4 m below ground surface. Groundwater was not encountered within the overburden soils.

  Throughout the geotechnical investigation, soil and bedrock samples recovered from the boreholes were inspected for any visual or olfactory evidence of contamination. No evidence of contamination or deleterious fill materials were observed in any of the boreholes during the geotechnical investigation.

Plan of Survey

It has been reported to Paterson that a current plan of survey for the subject site is being prepared. The plan of survey was unavailable at the time of issuance of this report.

Environment and Climate Change Canada

A search of the National Pollutant Release Inventory (NPRI) was conducted electronically on September 15, 2017. The subject site and adjacent properties were not listed in the NPRI database. Records were identified for pollutant release to air involving carbon monoxide and nitrogen oxides, from Cliff Central Heating and Cooling Plant at 1 Fleet Street, approximately 250 m west of the subject site. This site was also identified in the ERIS Report requested by DST in 2010.

Based on the nature of the releases, it is not considered to pose a potential for environmental impact at the subject site.

Ontario Ministry of the Environment (MOECC) Instruments

A request was submitted to the MOECC Freedom of Information office for information with respect to certificates of approval, permits to take water, certificates of property use or any other similar MOECC issued instruments for the site. At the time of issuance of this report, a response had not been received from the MOECC. A copy of the response will be forwarded to the client if it contains any pertinent information

MOECC Incident Reports

A request was submitted to the MOECC Freedom of Information office for information with respect to records concerning e requesting a search into regulatory infractions, legal undertakings against the property, spill occurrences, existing waste generator numbers, and waste registrations at the subject property and neighbouring sites. At the time of issuance of this report, a response had not been received from the MOECC. A copy of the response will be forwarded to the client if it contains any pertinent information

Areas of Natural Significance

A search for areas of natural significance and features within the Phase I study area was conducted on the web site of the Ontario Ministry of Natural Resources (MNR) on September 15, 2017. The search did not reveal any natural features or areas of natural significance within the Phase I study area.

Technical Standards and Safety Authority (TSSA)

The TSSA, Fuels Safety Branch in Toronto was contacted electronically on September 15, 2017 to inquire about current and former underground storage tanks, spills and incidents for the site and neighbouring properties. No records were found for the subject site or neighbouring properties.

City of Ottawa Landfill Document

The document entitled “Old Landfill Management Strategy, Phase I - Identification of Sites, City of Ottawa”, was reviewed. No former waste disposal sites were located within the Phase I study area.

Aerial Photographs

The latest aerial photograph within the DST report is from 2008. A review of aerial photographs from 2011 and 2014 show no change to the subject site. Major re-development has occurred approximately 25 m west of the subject site but no other significant changes have occurred to properties within the Phase I study area.

Topographic Maps

Topographic maps were obtained from Natural Resources Canada - The Atlas of Canada website. The topographic map depicts the subject site as a developed area, with an approximate elevation of 73 m above sea level (asl). Regionally, the topographic map indicates a slope down to the northwest, towards the Ottawa River. The referenced topographic map is presented in Figure 2 - Topographic Map, appended to this report.

Physiographic Maps

A physiographic map was reviewed from Natural Resources Canada's Atlas of Canada web site. According to the physiographic map, the site is located in the St. Lawrence Lowlands. According to the mapping description provided: "The lowlands are plain-like areas that were all affected by the Pleistocene glaciations and are therefore covered by surficial deposits and other features associated with ice sheets." The subject site is located in the Central St. Lawrence Lowland, which is generally less than 150 m above sea level.

Water Well Records

A search of the MOECC's web site for all drilled well records within 250 m of the subject site was conducted on September 15, 2017. The search returned sixteen (16) water well records, all of which are described as monitoring wells that were installed between 2006 and 2016. Copies of the water well records are appended to this report. Note that not all water well records provided were available for download.

Property Owner Representative Interview

Ms. Victoria Lucas of Reichmann Seniors Housing Development Corporation was interviewed via email as part of this assessment. The interview was conducted prior to the Phase I ESA site visit on September 18, 2017 Ms. Lucas was not aware of any environmental concerns with respect to the subject site.

Site Reconnaissance

Our site reconnaissance visit was conducted on September 18, 2017. Weather conditions were sunny, with a temperature of approximately 25° C. Mr. Greg van Loenen from the Environmental Department of Paterson Group conducted the site inspection. In addition to the site, the uses of neighbouring properties within the Phase I study area were also assessed at the time of the site visit.

The subject site currently exists as a gravel parking lot. During the site visit, the ground surface was examined and no evidence of significant spills, staining, or stressed vegetation were noted. No evidence of former buildings, truck or rail loading areas were noted. The surrounding properties were also observed during the site visit and are shown on Drawing PE4106-2 - Surrounding Land Use Plan.

Review and Evaluation of Information

Land Use History

The following table indicates the current and past uses of the site as well as any associated potentially contaminating activities dating back to the first developed use of the site.

Table 1 - Land Use History

Time Period	Land Use	Potentially Contaminating Activities	Areas of Potential Environmental Concern
Prior 1878	Residential	No PCAs identified on site.	None
1878 - 1991*	Residential	No PCAs identified onsite	None
1991 - present	Parking lot	No	None

*It could not be determined exactly when the building structure was removed from 412 Sparks Street, although aerial photos suggest between 1991 and 1999.

Potentially Contaminating Activities (PCAs)

No potentially contaminating activities (PCAs) were identified at the subject site. PCAs outside of the subject property but within the Phase I study area are shown on Drawing PE4106-2 - Surrounding Land Use Plan.

Areas of Potential Environmental Concern (APEC)

PCAs within the Phase I study area are not considered to have result in APECs at the subject site based on their separation distance and/or location downgradient or cross-gradient of the subject site.

Contaminants of Potential Concern (CPCs)

No contaminants of potential concern (CPCs) were identified on the subject site as no APECs were identified on the subject property.

Conceptual Site Model

Geological and Hydrogeological Setting

Based on the results of the subsurface investigation conducted at the subject site in 2010, site soils consist of sand, gravel and crushed stone over silty sand with gravel. Bedrock was shallow, generally encountered between 1.19 and 1.75 m below ground surface. Borehole 1 was cored into bedrock and groundwater was encountered at 2.3 m below ground surface.

Contaminants of Potential Concern

No contaminants of potential concern were identified on the subject property.

Existing Buildings and Structures

The subject site has no existing buildings or permanent structures.

Water Bodies

There are no water bodies on the subject site or within the Phase I study area. The closest water body is an unnamed canal approximately 250 m west of the subject site. The canal is associated with the Ottawa River which is located approximately 350 m to the north of the subject site.

Areas of Natural Significance

No areas of natural significance were identified on the subject site or within the Phase I study area.

Drinking Water Wells

The results of the MOECC water well record search are discussed above. No active drinking water wells were identified within the Phase I study area.

Neighbouring Land Use

Neighbouring land use in the Phase I study area is commercial, institutional and residential. Land use is shown on Drawing PE4106-2 - Surrounding Land Use Plan.

Potentially Contaminating Activities and Areas of Potential Environmental Concern

Potentially Contaminating Activities (PCAs) within the Phase I ESA study area are shown on Drawing PE4106-2 - Surrounding Land Use Plan. None of these PCAs were considered to have resulted in APECs on the subject site.

Assessment of Uncertainty and/or Absence of Information

The information available for review as part of the preparation of this Phase I ESA is considered to be sufficient to conclude that PCAs existed in the Phase I study area, however, none are considered to represent APECs. The presence of PCAs was confirmed by a variety of independent sources. As such, the conclusions of this report are not affected by uncertainty which may be present with respect to individual sources.

Conclusions

As a result of the additional historical research and follow-up site visit undertaken as part of this assessment in order to meet the requirements of O.Reg. 153/04 as amended by O.Reg. 269/11, it is our opinion that a Phase II ESA is not required for the subject site.

Statement of Limitations

This Phase I - Environmental Site Assessment Update report has been prepared in general accordance with the agreed scope-of-work and O.Reg. 153/04. The conclusions presented herein are based on information gathered from a historical review and field inspection program. The findings of the Phase I ESA Update are based on a review of readily available geological, historical and regulatory information and a cursory review made at the time of the field assessment.

Should any conditions be encountered at the subject site and/or historical information that differ from our findings, we request that we be notified immediately in order to allow for a reassessment. This report was prepared for the sole use of Reichmann Seniors Housing Development Corporation. Permission and notification from Reichmann and this firm will be required to release this report to any other party.

We trust that this submission satisfies your current requirements. Should you have any questions please contact the undersigned.

Paterson Group Inc.

Greg van Loenen, B.Eng.

Mark S. D'Arcy, P.Eng.

Report Distribution:

- ❑ Reichmann Senior Housing Development Corporation (1 copy)
- ❑ Paterson Group (1 copy)

Attachments:

- ❑ Figure 1 - Key Plan
- ❑ Figure 2 - Topographic Map
- ❑ Drawing PE4106-1 - Site Plan
- ❑ Drawing PE4106-2 - Surrounding Land Use Plan
- ❑ MOECC Well Records
- ❑ Qualifications of Assessors

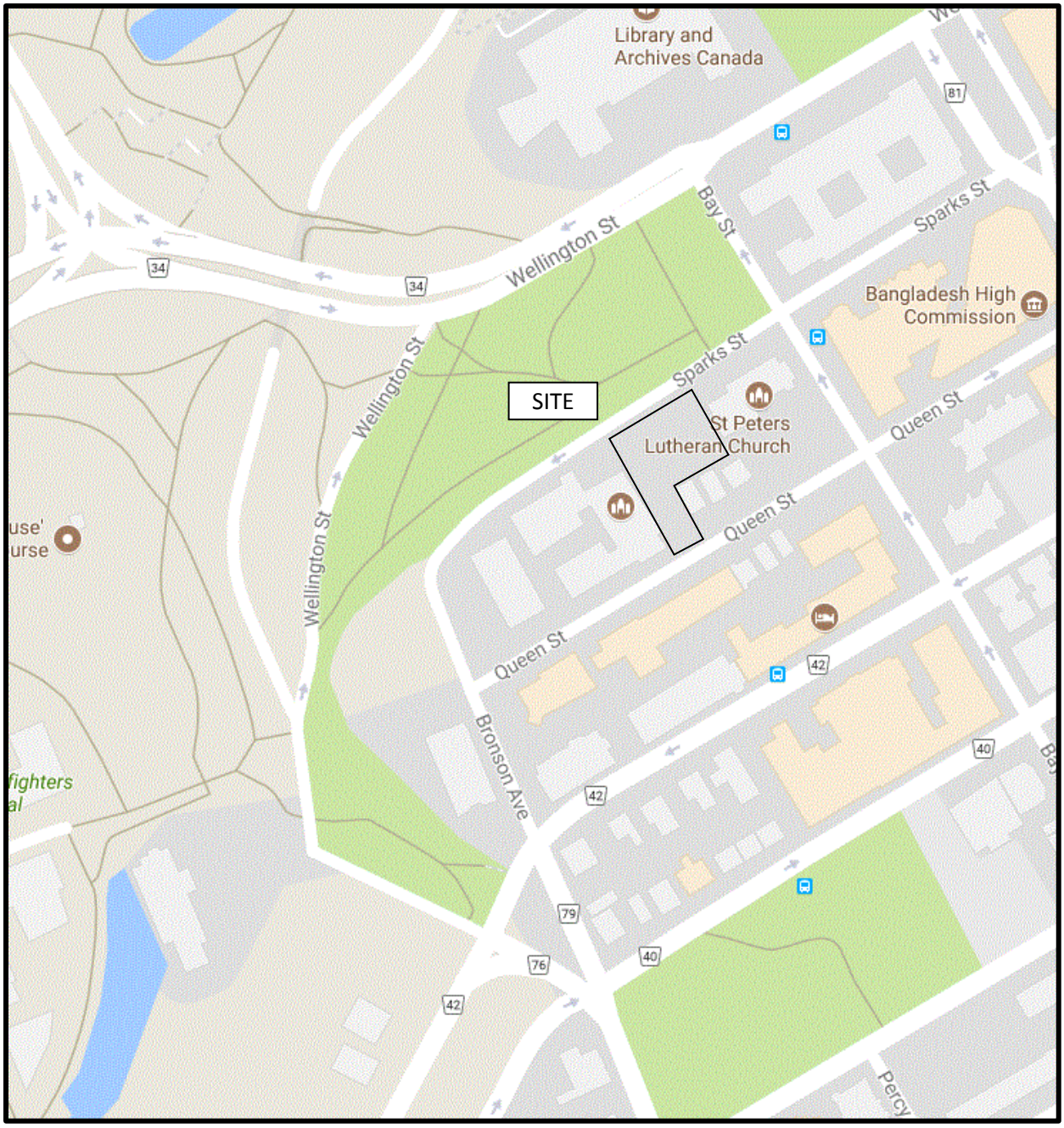

FIGURE 1

KEY PLAN

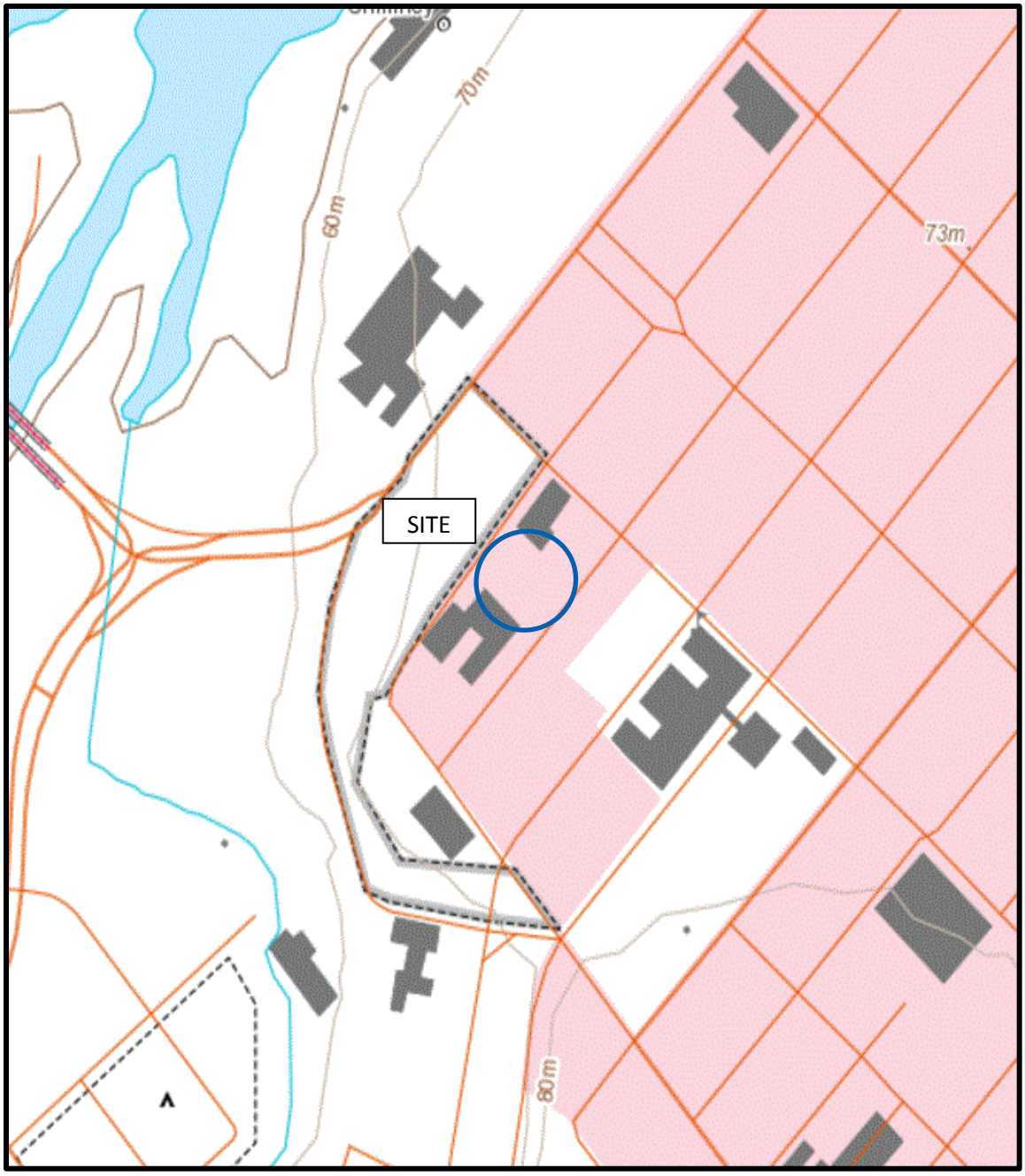

FIGURE 2

TOPOGRAPHIC MAP

PARKLAND

SPARKS STREET

BAY STREET

CB

CB

BH 2

BH 3

#412 SPARKS STREET
GRAVEL PARKING LOT

BH 1

RESIDENTIAL

#400 SPARKS STREET
ST. PETER'S EVANGELICAL
LUTHERAN CHURCH

#439 QUEEN STREET
CHRIST CHURCH CATHEDRAL

#411
QUEEN ST.
RESIDENTIAL

#409
QUEEN ST.
RESIDENTIAL

#407 QUEEN STREET
RESIDENTIAL

BH 7

QUEEN STREET

#424 QUEEN STREET
RESIDENTIAL

#410
QUEEN STREET
RESIDENTIAL /
COMMERCIAL

#408
QUEEN ST.
RESIDENTIAL/
COMMERCIAL

#406
QUEEN ST.
RESIDENTIAL/
COMMERCIAL

#402 QUEEN STREET
RESIDENTIAL /
COMMERCIAL

LEGEND:

GEOTECHNICAL BOREHOLE
LOCATION, PATERSON GROUP
REPORT PG2262, 2011

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Ottawa, Ontario K2E 7J5
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NO.	REVISIONS	DATE	INITIAL
0			

REICHMANN SENIORS HOUSING DEVELOPMENT CORP.

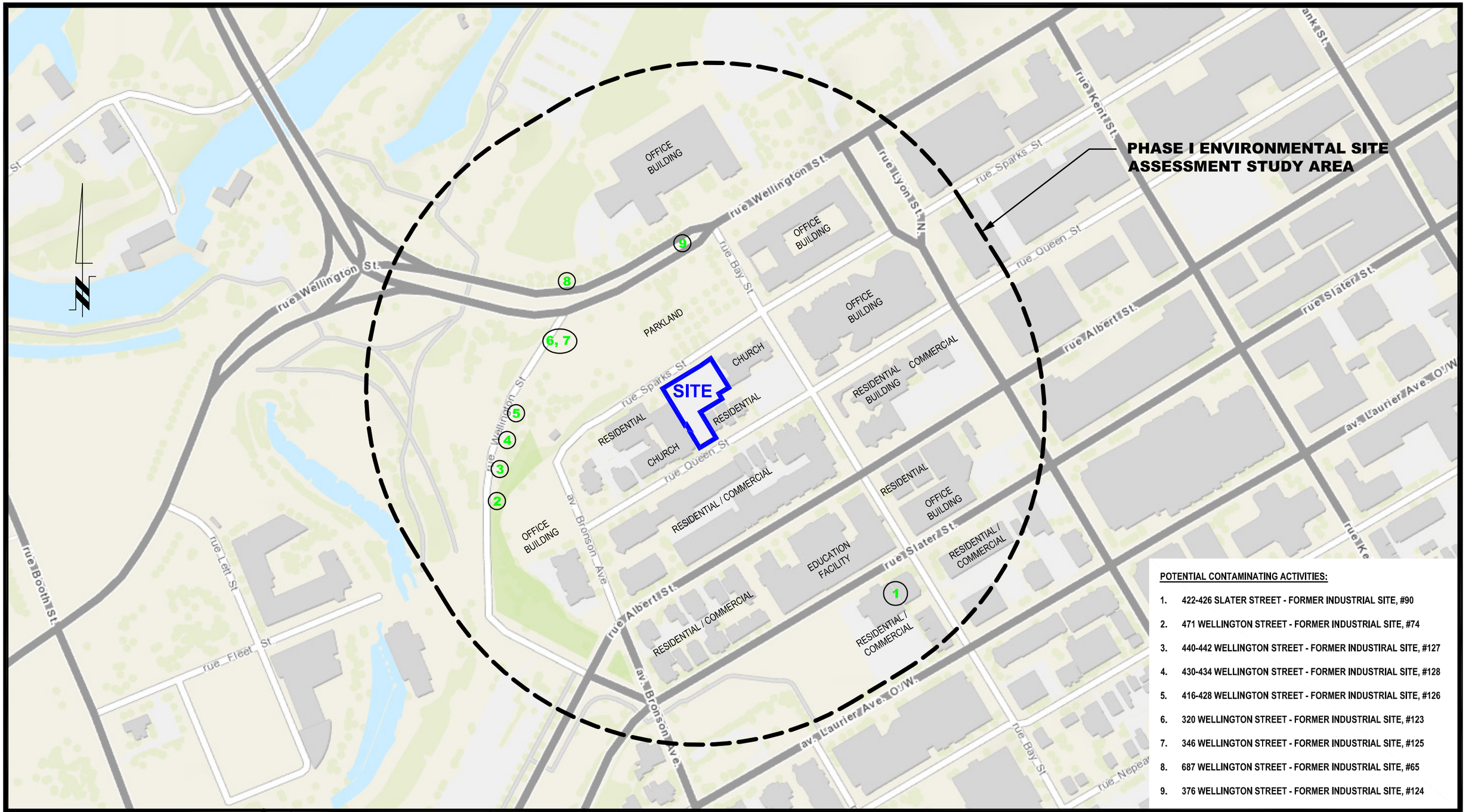
PHASE I - ENVIRONMENTAL SITE ASSESSMENT
412 SPARKS STREET

OTTAWA, ONTARIO

Title: **SITE PLAN**

Scale: 1:500	Date: 09/2017
Drawn by: MPG	Report No.: PE4106-LET.01
Checked by: GVL	Dwg. No.: PE4106-1
Approved by: MSD	Revision No.: 0

p:\autocad drawings\environmental\pe41xx\pe4106-1 site plan.dwg



POTENTIAL CONTAMINATING ACTIVITIES:

1. 422-426 SLATER STREET - FORMER INDUSTRIAL SITE, #90
2. 471 WELLINGTON STREET - FORMER INDUSTRIAL SITE, #74
3. 440-442 WELLINGTON STREET - FORMER INDUSTIRAL SITE, #127
4. 430-434 WELLINGTON STREET - FORMER INDUSTRIAL SITE, #128
5. 416-428 WELLINGTON STREET - FORMER INDUSTRIAL SITE, #126
6. 320 WELLINGTON STREET - FORMER INDUSTRIAL SITE, #123
7. 346 WELLINGTON STREET - FORMER INDUSTRIAL SITE, #125
8. 687 WELLINGTON STREET - FORMER INDUSTRIAL SITE, #65
9. 376 WELLINGTON STREET - FORMER INDUSTRIAL SITE, #124

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NO.	REVISIONS	DATE	INITIAL
0			

REICHMANN SENIORS HOUSING DEVELOPMENT CORP.

PHASE I - ENVIRONMENTAL SITE ASSESSMENT
412 SPARKS STREET

OTTAWA, ONTARIO

Title:

SURROUNDING LAND USE PLAN

Scale: 1:3000	Date: 09/2017
Drawn by: MPG	Report No.: PE4106-LET.01
Checked by: GVL	Dwg. No.: PE4106-2
Approved by: MSD	Revision No.: 0

p:\autocad drawings\environmental\pe41xx\pe4106-2 surrounding land.dwg

Ontario Ministry of the Environment

Well Tag Number (Place sticker and print number below): A033403

A033403

Well Record

Regulation 903 Ontario Water Resources Act

page 1 of 2

Instructions for Completing Form

- For use in the **Province of Ontario** only. This document is a permanent **legal** document. Please retain for future reference.
- All Sections **must** be completed in full to avoid delays in processing. Further instructions and explanations are available on the back of this form.
- Questions regarding completing this application can be directed to the Water Well Management Coordinator at 416-235-6203.
- **All metre measurements shall be reported to 1/10th of a metre.**
- Please print clearly in blue or black ink only.

Ministry Use Only

MUN | CON | LOT

Well Owner's Information and Location of Well Information

[redacted]

40 A

RR#/Street Number/Name: 556 Wellington Street

City/Town/Village: Ottawa.

Site/Compartment/Block/Tract etc.

GPS Reading: NAD 83 | Zone 18 | Easting 444414 | Northing 5029661

Unit Make/Model: Magellan

Mode of Operation: ☐ Undifferentiated ☑ Averaged ☐ Differentiated, specify

Log of Overburden and Bedrock Materials (see instructions)

General Colour	Most common material	Other Materials	General Description	Depth From	Depth To
Brown	Fill - silty sand	gravel, organic rich	No odour, moist	0	1.3
Grey Brown	Silty Fill	trace gravel, clay + brick fragments	- no odour-moist	1.3	3.5

Hole Diameter

Depth From	Depth To (Metres)	Diameter (Centimetres)
0	3.5	20

Water Record

Water found at ___ Metres / Kind of Water

- ___ m: ☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals ☐ Gas ☐ Other:
- ___ m: ☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals ☐ Gas ☐ Other:
- ___ m: ☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals ☐ Gas ☐ Other:

After test of well yield, water was: ☐ Clear and sediment free ☐ Other, specify

Chlorinated ☐ Yes ☑ No

Construction Record

Inside diam centimetres	Material	Wall thickness centimetres	Depth From	Depth To (Metres)
Casing				
51 mm	☐ Steel ☐ Fibreglass ☑ Plastic ☐ Concrete ☐ Galvanized	40	0	1.8
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
Screen				
Outside diam		Slot No.		
58 mm	☐ Steel ☐ Fibreglass ☑ Plastic ☐ Concrete ☐ Galvanized	10	1.8	2.5
No Casing or Screen				
	☐ Open hole			

Test of Well Yield

Pumping test method	Draw Down Time min	Draw Down Water Level Metres	Recovery Time min	Recovery Water Level Metres
Pump intake set at - (metres)	Static Level			
Pumping rate - (litres/min)	1		1	
Duration of pumping ___hrs +___ min	2		2	
Final water level end of pumping ___metres	3		3	
Recommended pump type. ☐ Shallow ☐ Deep	4		4	
Recommended pump depth. ___metres	5		5	
Recommended pump rate. (litres/min)	10		10	
If flowing give rate - (litres/min)	15		15	
If pumping discontinued, give reason.	20		20	
	25		25	
	30		30	
	40		40	
	50		50	
	60		60	

Plugging and Sealing Record

☑ Annular space ☐ Abandonment

Depth set at - Metres From	Depth set at - Metres To	Material and type (bentonite slurry, neat cement slurry) etc.	Volume Placed (cubic metres)
0	1.8	Bentonite	30 Kg.

Method of Construction

☐ Cable Tool ☐ Rotary (air) ☐ Diamond ☐ Digging
☐ Rotary (conventional) ☐ Air percussion ☐ Jetting ☐ Other Auger
☐ Rotary (reverse) ☐ Boring ☐ Driving

Water Use

☐ Domestic ☐ Industrial ☐ Public Supply ☐ Other Sample
☐ Stock ☐ Commercial ☐ Not used
☐ Irrigation ☐ Municipal ☐ Cooling & air conditioning

Final Status of Well

☐ Water Supply ☐ Recharge well ☐ Unfinished ☐ Abandoned, (Other)
☑ Observation well ☐ Abandoned, insufficient supply ☐ Dewatering
☐ Test Hole ☐ Abandoned, poor quality ☐ Replacement well

Well Contractor/Technician Information

Name of Well Contractor: George Downing Estate Drilling Ltd — Well Contractor's Licence No.: 1844

Business Address (street name, number, city etc.): 40 Main St. Grenville Sur La Rouge Qc J0V 1B0

Name of Well Technician (last name, first name): Dawyne Bruce — Well Technician's Licence No.: 12173

Signature of Technician/Contractor: x Bruce Dawyne — Date Submitted: 2006 10 27

Location of Well

In diagram below show distances of well from road, lot line, and building. Indicate north by arrow.

Please see attached site plan.

Audit No. Z 50468

Date Well Completed: 2006 07 05

Was the well owner's information package delivered? ☐ Yes ☑ No

Date Delivered

Ministry Use Only

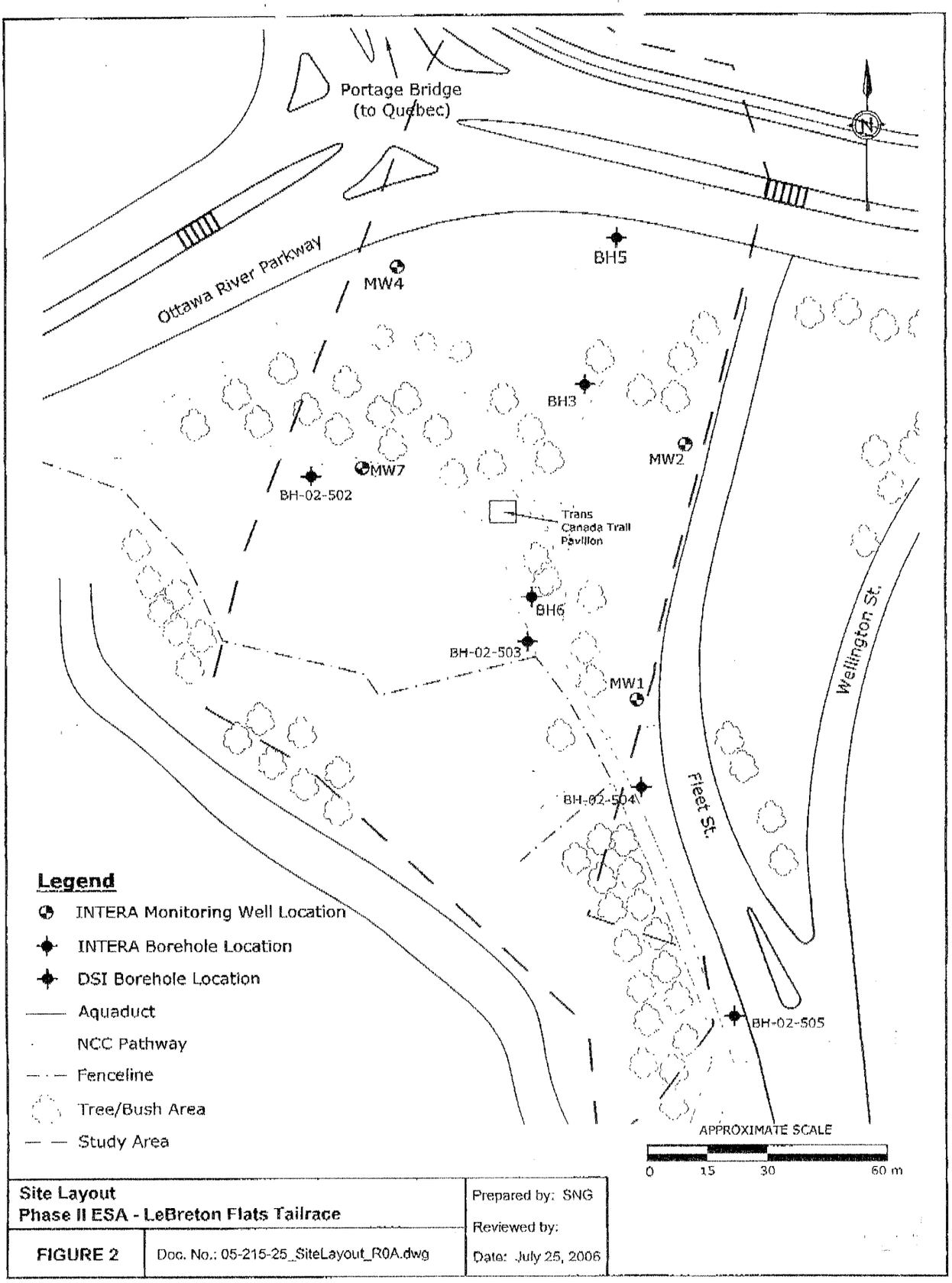
Data Source | Contractor: 1844

Date Received: AUG 04 2008 | Date of Inspection

Remarks | Well Record Number

0506E (09/03) Contractor's Copy ☐ Ministry's Copy ☑ Well Owner's Copy ☐

Cette formule est disponible en français



Site Layout **Phase II ESA - LeBreton Flats Tailrace**		Prepared by: SNG Reviewed by:
FIGURE 2	Doc. No.: 05-215-25_SiteLayout_R0A.dwg	Date: July 25, 2006

Z 50468.

Ontario — Ministry of the Environment

Measurements recorded in: ☑ Metric ☐ Imperial

Well Tag No. *(Place Sticker and/or Print Below)*: No Tag Found

S-12628

Well Record

Regulation 903 Ontario Water Resources Act

Page _____ of _____

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	☐ Well Constructed by Well Owner
	National Capital Commission		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. *(inc. area code)*
202-40 Elgin Street	Ottawa	ON	K1P5K6	(613) 239-5000

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
384 Wellington St.			

County/District/Municipality	City/Town/Village	Province	Postal Code
	Ottawa	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	18	444699	5029716		

Overburden and Bedrock Materials/Abandonment Sealing Record *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
	N/A				

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m^3/ft^3)
0	1.54	bentonite chips	
1.54	9.14	bentonite grout	

Method of Construction

☐ Cable Tool ☐ Diamond
☐ Rotary (Conventional) ☐ Jetting
☐ Rotary (Reverse) ☐ Driving
☐ Boring ☐ Digging
☐ Air percussion
☐ Other, *specify* _____

Well Use

☐ Public ☐ Commercial ☐ Not used
☐ Domestic ☐ Municipal ☐ Dewatering
☐ Livestock ☑ Test Hole ☑ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☐ Industrial
☐ Other, *specify* _____

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
3.45	PVC		0	4.57

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
4.03	PVC	10	4.57	9.14

Status of Well

☐ Water Supply
☐ Replacement Well
☑ Test Hole
☐ Recharge Well
☐ Dewatering Well
☑ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☑ Abandoned, other, *specify* Not Needed
☐ Other, *specify* _____

Water Details

Water found at Depth (m/ft)	Kind of Water	
☐ Gas	☐ Fresh ☐ Untested	☐ Other, *specify*
☐ Gas	☐ Fresh ☐ Untested	☐ Other, *specify*
☐ Gas	☐ Fresh ☐ Untested	☐ Other, *specify*

Hole Diameter

Depth (m/ft) From	Depth (m/ft) To	Diameter (cm/in)

Results of Well Yield Testing

After test of well yield, water was:
☐ Clear and sand free
☐ Other, *specify* _____

If pumping discontinued, give reason:

Pump intake set at *(m/ft)*

Pumping rate *(l/min / GPM)*

Duration of pumping _____ hrs + _____ min

Final water level end of pumping *(m/ft)*

If flowing give rate *(l/min / GPM)*

Recommended pump depth *(m/ft)*

Recommended pump rate *(l/min / GPM)*

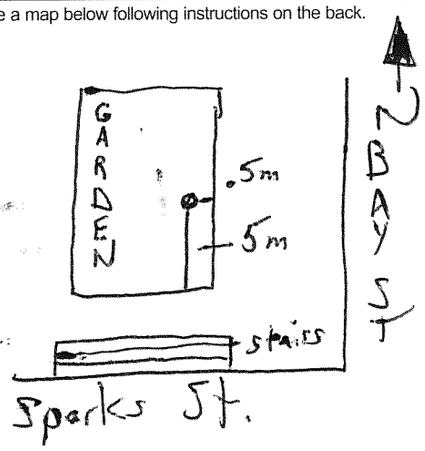
Well production *(l/min / GPM)*

Disinfected? ☐ Yes ☐ No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level				
1			1	
2			2	
3			3	
4			4	
5			5	
10			10	
15			15	
20			20	
25			25	
30			30	
40			40	
50			50	
60			60	

Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Strata Drilling Group	7141

Business Address (Street Number/Name)	Municipality
147 West Beaver Creek	Richmond Hill

Province	Postal Code	Business E-mail Address
ON	L4B1C6	wrecords@stratasoil.com

Bus. Telephone No. *(inc. area code)*	Name of Well Technician (Last Name, First Name)
9057649304	McCoy, James

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
3656		2012 06 08

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☐ Yes ☐ No	Y Y Y Y M M D D	2012 06 03

Ministry Use Only

Audit No. Z148623

Received JUL 9 2012

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Ontario — Ministry of the Environment

Measurements recorded in: ☑ Metric ☐ Imperial

Well Tag No. (Place Sticker and/or Print Below): A097305 **A 097305**

Well Record

Regulation 903 Ontario Water Resources Act

1979 Page 3 of 3

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	☐ Well Constructed by Well Owner
	~~City of Ottawa~~ Public Works	Canada	

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
	Ottawa	ON		

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
384 Wellington St.			

County/District/Municipality	City/Town/Village	Province	Postal Code
	Ottawa	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	18	444695	5029725		

Overburden and Bedrock Materials/Abandonment Sealing Record (see instructions on the back of this form)

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
GRY	Concrete	~~Fill~~, gravel	hard	0	.31
GRY	shale		hard	.31	7.62

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	.31	Concrete/flushmount	
.31	4.27	bentseal	
4.27	7.62	filter sand	

Method of Construction

☐ Cable Tool ☐ Diamond ☐ Rotary (Conventional) ☐ Jetting ☐ Rotary (Reverse) ☐ Driving ☐ Boring ☐ Digging ☑ Air percussion ☐ Other, specify

Well Use

☐ Public ☐ Commercial ☐ Not used ☐ Domestic ☐ Municipal ☐ Dewatering ☑ Test Hole ☑ Monitoring ☐ Livestock ☐ Irrigation ☐ Cooling & Air Conditioning ☐ Industrial ☐ Other, specify

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
3.45	PVC	.356	0	4.57

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
4.21	PVC	10	4.57	7.62

Status of Well

☐ Water Supply ☐ Replacement Well ☑ Test Hole ☐ Recharge Well ☐ Dewatering Well ☑ Observation and/or Monitoring Hole ☐ Alteration (Construction) ☐ Abandoned, Insufficient Supply ☐ Abandoned, Poor Water Quality ☐ Abandoned, other, specify ☐ Other, specify

Water Details

Water found at Depth (m/ft)	Kind of Water: ☐ Fresh ☐ Untested ☐ Gas ☐ Other, specify

Hole Diameter

Depth (m/ft) From	To	Diameter (cm/in)
0	.31	8.25
.31	7.62	5.71

Results of Well Yield Testing

After test of well yield, water was: ☐ Clear and sand free ☐ Other, specify

If pumping discontinued, give reason:

Pump intake set at (m/ft)

Pumping rate (l/min / GPM)

Duration of pumping ____ hrs + ____ min

Final water level end of pumping (m/ft)

If flowing give rate (l/min / GPM)

Recommended pump depth (m/ft)

Recommended pump rate (l/min / GPM)

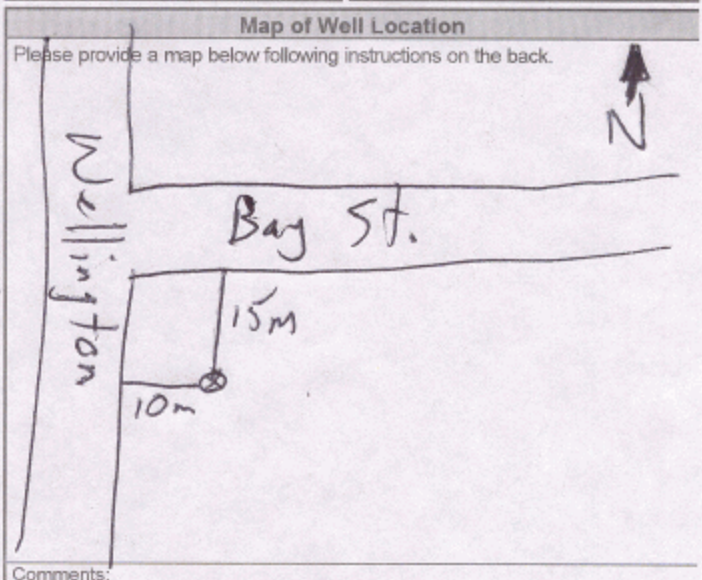
Well production (l/min / GPM)

Disinfected? ☐ Yes ☐ No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level				
1			1	
2			2	
3			3	
4			4	
5			5	
10			10	
15			15	
20			20	
25			25	
30			30	
40			40	
50			50	
60			60	

Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Strata Soil Sampling Inc	7241

Business Address (Street Number/Name)	Municipality
147-2 West Beaver Creek Rd	Richmond Hill

Province	Postal Code	Business E-mail Address
Ontario	L4B1C6	Wrecords@stratasoil.com

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
905-764-9304	Muir, Mike

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
3448	Mike Muir	2010/11/30

Well owner's information package delivered: ☐ Yes ☐ No

Date Package Delivered: Y Y Y Y M M D D

Date Work Completed: 2010/11/08

Ministry Use Only

Audit No. z113206

DEC 08 2010 Received

Ministry's Copy

Ontario — Ministry of the Environment

Measurements recorded in: ☑ Metric ☐ Imperial

Well Tag No. *(Place Sticker and/or Print Below)* Not Tag Found

5-12628

Well Record

Regulation 903 Ontario Water Resources Act

Page _____ of _____

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	☐ Well Constructed by Well Owner
	NCC (National Capital Commission)		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
#200-40 Elgin Street	Ottawa	ON	K1P5K6	(613)239-5000

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
384 Wellington St.			

County/District/Municipality	City/Town/Village	Province	Postal Code
	Ottawa	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 8 3	18	444620	5029741		

Overburden and Bedrock Materials/Abandonment Sealing Record *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
	N/A				

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m^3/ft^3)
0	0.31	concrete	
0.31	1.54	bentonite chips	
1.54	7.4	bentonite grout	

Method of Construction

☐ Cable Tool ☐ Diamond
☐ Rotary (Conventional) ☐ Jetting
☐ Rotary (Reverse) ☐ Driving
☐ Boring ☐ Digging
☐ Air percussion
☐ Other, *specify* _____

Well Use

☐ Public ☐ Commercial ☐ Not used
☐ Domestic ☐ Municipal ☐ Dewatering
☐ Livestock ☑ Test Hole ☑ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☐ Industrial
☐ Other, *specify* _____

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
3.45	PVC		0	4.57

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
4.03	PVC	10	4.57	7.4

Status of Well

☐ Water Supply
☐ Replacement Well
☐ Test Hole
☐ Recharge Well
☐ Dewatering Well
☐ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☑ Abandoned, other, *specify* Not Needed
☐ Other, *specify* _____

Water Details

Water found at Depth (m/ft)	Kind of Water: ☐ Fresh ☐ Untested ☐ Gas ☐ Other, *specify*

Hole Diameter

Depth (m/ft) From	Depth (m/ft) To	Diameter (cm/in)

Results of Well Yield Testing

After test of well yield, water was:
☐ Clear and sand free
☐ Other, *specify* _____

If pumping discontinued, give reason:

Pump intake set at *(m/ft)*

Pumping rate *(l/min / GPM)*

Duration of pumping _____ hrs + _____ min

Final water level end of pumping *(m/ft)*

If flowing give rate *(l/min / GPM)*

Recommended pump depth *(m/ft)*

Recommended pump rate *(l/min / GPM)*

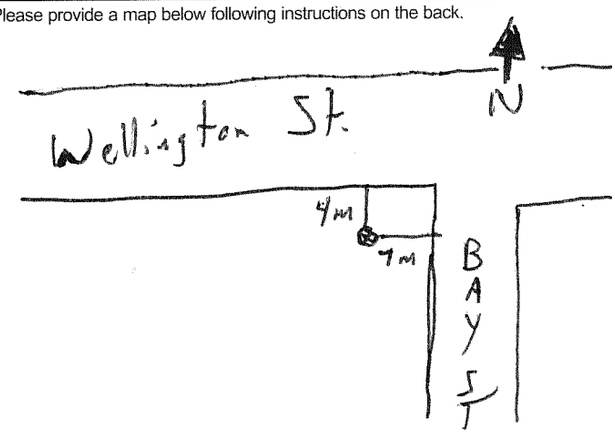
Well production *(l/min / GPM)*

Disinfected? ☐ Yes ☐ No

Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level			
1		1	
2		2	
3		3	
4		4	
5		5	
10		10	
15		15	
20		20	
25		25	
30		30	
40		40	
50		50	
60		60	

Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Strata Drilling Group	7141

Business Address (Street Number/Name)	Municipality	Province	Postal Code	Business E-mail Address
147 West Beaver Creek	Richmond Hill	ON	L4B1C6	wrecords@stratasoil.com

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)	Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
9057649304	McCoy, James	3656		2012 06 08

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☐ Yes ☐ No	Y Y Y Y M M D D	2012 06 05

Ministry Use Only

Audit No. Z148625

Received JUL 06 2012

Ministry's Copy

Ontario — Ministry of the Environment

Well Record

Regulation 903 Ontario Water Resources Act

Measurements recorded in: ☑ Metric ☐ Imperial

Well Tag No. (Place Sticker and/or Print Below) A097303 **A 097303**

1979 Page 2 of 3

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	☐ Well Constructed by Well Owner
	~~City of Ottawa~~ Public Works	Canada	

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
	Ottawa	ON		

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
364 Wellington St.			

County/District/Municipality	City/Town/Village	Province	Postal Code
	Ottawa	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	18	445485	5029764		

Overburden and Bedrock Materials/Abandonment Sealing Record (see instructions on the back of this form)

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
BRN	Topsoil		soft, dry	0	.31
BRN	sand		soft, dry	.31	1.52
GRY	shale		hard	1.52	7.62

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	.31	concrete / flushmount	
.31	4.27	bensea l	
4.27	7.62	filter sand	

Method of Construction

☐ Cable Tool ☐ Diamond ☐ Rotary (Conventional) ☐ Jetting ☐ Rotary (Reverse) ☐ Driving ☐ Boring ☐ Digging ☑ Air percussion ☐ Other, specify

Well Use

☐ Public ☐ Commercial ☐ Not used ☐ Domestic ☐ Municipal ☐ Dewatering ☐ Livestock ☑ Test Hole ☑ Monitoring ☐ Irrigation ☐ Cooling & Air Conditioning ☐ Industrial ☐ Other, specify

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
3.45	PVC	.356	0	4.57

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
4.21	PVC	10	4.57	7.62

Status of Well

☐ Water Supply ☐ Replacement Well ☑ Test Hole ☐ Recharge Well ☐ Dewatering Well ☑ Observation and/or Monitoring Hole ☐ Alteration (Construction) ☐ Abandoned, Insufficient Supply ☐ Abandoned, Poor Water Quality ☐ Abandoned, other, specify ☐ Other, specify

Water Details

Water found at Depth (m/ft)	Gas	Kind of Water: Fresh	Untested	Other, specify
	☐	☐	☐	
	☐	☐	☐	
	☐	☐	☐	

Hole Diameter

Depth (m/ft) From	To	Diameter (cm/in)
0	1.52	8.25
1.52	7.62	5.71

Results of Well Yield Testing

After test of well yield, water was: ☐ Clear and sand free ☐ Other, specify

If pumping discontinued, give reason:

Pump intake set at (m/ft)

Pumping rate (l/min / GPM)

Duration of pumping ____ hrs + ____ min

Final water level end of pumping (m/ft)

If flowing give rate (l/min / GPM)

Recommended pump depth (m/ft)

Recommended pump rate (l/min / GPM)

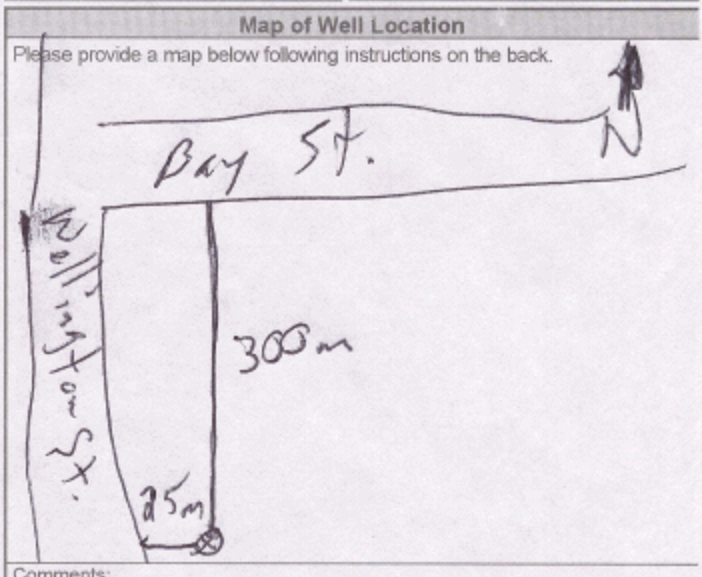
Well production (l/min / GPM)

Disinfected? ☐ Yes ☐ No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level				
1			1	
2			2	
3			3	
4			4	
5			5	
10			10	
15			15	
20			20	
25			25	
30			30	
40			40	
50			50	
60			60	

Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Strata Soil Sampling Inc	7241

Business Address (Street Number/Name)	Municipality
147-2 West Beaver Creek Rd	Richmond Hill

Province	Postal Code	Business E-mail Address
Ontario	L4B1C6	Wrecords@Stratasoil.com

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
905-764-9304	Muir, Mike

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
3448	Mike Muir	2010/11/30

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☐ Yes ☐ No		2010/11/08

Ministry Use Only

Audit No. z113207

Received DEC 08 2010

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Ontario — Ministry of the Environment

S-12620

Well Record

Regulation 903 Ontario Water Resources Act

Page _____ of _____

Measurements recorded in: ☑ Metric ☐ Imperial

Well Tag No. *(Place Sticker and/or Print Below)*: NO Tag Found

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	☐ Well Constructed by Well Owner
	Nation Capital Commission		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. *(inc. area code)*
#202-140 Elgin Street	Ottawa	ON	K1P 5K6	(613) 239-5000

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
384 Wellington St			

County/District/Municipality	City/Town/Village	Province	Postal Code
	Ottawa	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	18	444539	5029704		

Overburden and Bedrock Materials/Abandonment Sealing Record *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
	N/A				

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m^3/ft^3)
0	1.5	bentonite chips	
1.5	7.4	bentonite grout	

Method of Construction

☐ Cable Tool ☐ Diamond
☐ Rotary (Conventional) ☐ Jetting
☐ Rotary (Reverse) ☐ Driving
☐ Boring ☐ Digging
☐ Air percussion
☐ Other, *specify* _____

Well Use

☐ Public ☐ Commercial ☐ Not used
☐ Domestic ☐ Municipal ☐ Dewatering
☐ Livestock ☑ Test Hole ☑ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☐ Industrial
☐ Other, *specify* _____

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
3.45	PVC		0	4.57

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
4.03	PVC	10	4.57	7.4

Status of Well

☐ Water Supply
☐ Replacement Well
☐ Test Hole
☐ Recharge Well
☐ Dewatering Well
☐ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☑ Abandoned, other, *specify* Not Needed
☐ Other, *specify*

Water Details

Water found at Depth (m/ft)	Kind of Water	Hole Diameter Depth From	Depth To	Diameter (cm/in)
☐ Gas	☐ Fresh ☐ Untested ☐ Other, *specify*			
☐ Gas	☐ Fresh ☐ Untested ☐ Other, *specify*			
☐ Gas	☐ Fresh ☐ Untested ☐ Other, *specify*			

Results of Well Yield Testing

After test of well yield, water was:
☐ Clear and sand free
☐ Other, *specify* _____

If pumping discontinued, give reason:

Pump intake set at *(m/ft)*

Pumping rate *(l/min / GPM)*

Duration of pumping _____ hrs + _____ min

Final water level end of pumping *(m/ft)*

If flowing give rate *(l/min / GPM)*

Recommended pump depth *(m/ft)*

Recommended pump rate *(l/min / GPM)*

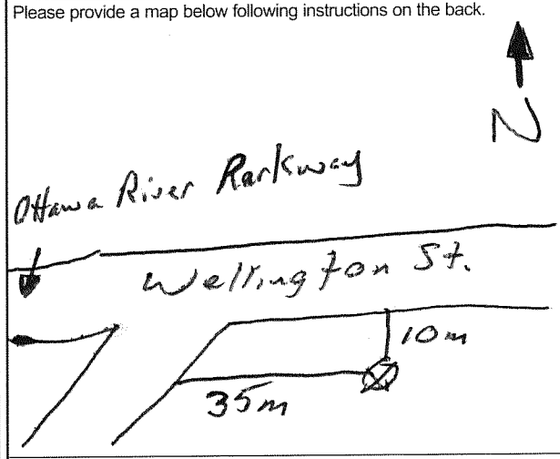
Well production *(l/min / GPM)*

Disinfected? ☐ Yes ☐ No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level				
1			1	
2			2	
3			3	
4			4	
5			5	
10			10	
15			15	
20			20	
25			25	
30			30	
40			40	
50			50	
60			60	

Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Strata Drilling Group	7241

Business Address (Street Number/Name)	Municipality
147 Beaver West Beaver Creek	Richmond Hill

Province	Postal Code	Business E-mail Address
ON	L4B1C6	wrecords@stratasoil.com

Bus. Telephone No. *(inc. area code)*	Name of Well Technician (Last Name, First Name)
9057649304	McCoy, James

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
3636		2012/06/08

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☐ Yes ☐ No	Y Y Y Y M M D D	2012/06/05

Ministry Use Only

Audit No. z148626

Received JUL 06 2012

Ministry's Copy

Mark S. D'Arcy, P. Eng.

patersongroup

Geotechnical Engineering

Environmental Engineering

Hydrogeology

Geological Engineering

Materials Testing

Building Science

Archaeological Services

POSITION

Associate and Supervisor of the Environmental Division
Senior Environmental/Geotechnical Engineer

EDUCATION

Queen's University, B.A.Sc.Eng, 1991
Geotechnical / Geological Engineering

MEMBERSHIPS

Ottawa Geotechnical Group
Professional Engineers of Ontario

EXPERIENCE

1991 to Present
Paterson Group Inc.
Associate and Senior Environmental/Geotechnical Engineer
Environmental and Geotechnical Division
Supervisor of the Environmental Division

SELECT LIST OF PROJECTS

Mary River Exploration Mine Site - Northern Baffin Island
Agricultural Supply Facilities - Eastern Ontario
Laboratory Facility – Edmonton (Alberta)
Ottawa International Airport - Contaminant Migration Study - Ottawa
Richmond Road Reconstruction - Ottawa
Billings Hurdman Interconnect - Ottawa
Bank Street Reconstruction - Ottawa
Environmental Review – Various Laboratories across Canada - CFIA
Dwyer Hill Training Centre – Ottawa
Nortel Networks Environmental Monitoring - Carling Campus – Ottawa
Remediation Program - Block D Lands – Kingston
Investigation of former landfill sites – City of Ottawa
Record of Site Condition for Railway Lands – North Bay
Commercial Properties – Guelph and Brampton
Brownfields Remediation – Alcan Site - Kingston
Montreal Road Reconstruction - Ottawa
Appleford Street Residential Development - Ottawa
Remediation Program - Ottawa Train Yards
Remediation Program - Bayshore and Heron Gate
Gladstone Avenue Reconstruction – Ottawa
Somerset Avenue West Reconstruction - Ottawa

Greg van Loenen, B. Eng.

patersongroup

Geotechnical Engineering

Environmental Engineering

Hydrogeology

Geological Engineering

Materials Testing

Building Science

Archaeological Services

POSITION

Environmental Consultant

EDUCATION

Carleton University, B.Eng., 2015
Environmental Engineering

St. Lawrence College, 2008
Environmental Technician

EXPERIENCE

2016 to Present
Paterson Group Inc.
Environmental and Geotechnical Division
Environmental Consultant

2015 to 2016
Kanellos Consulting Inc.
Environmental Consultant

Summers 2013 & 2014
GFL Environmental Inc.
Environmental Technician

2008 to 2011, summer 2012
Petroleum Enviro Services (Div. of ASM Corrosion Control)
Environmental Consultant

SELECT LIST OF PROJECTS

Nortex Industrial Site - Soil and Groundwater Remediation - Kingston, ON
Contaminated Soil and Groundwater Sampling - Various sites - Eastern ON
Designated Substance Surveys and Reports - Various sites - Eastern ON
Mould Sampling, Assessments and Reports - Various sites - Eastern ON
Surcharge and Settlement Surveys - Ottawa, ON
Tank Site Remediation Program - Various sites - Alberta
Tank Installation Drawings (PTMAA) - Various sites - Alberta