Phase II Environmental Site Assessment

185 Mill Street, Gananoque, Ontario

Type of Document
Draft

Client

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Executive Summary

Exp Services Inc. (**exp**) was retained by the Brennan Custom Homes Inc. (Brennan) to conduct a Phase II Environmental Site Assessment (ESA) on a property located at 185 Mill Street, Gananoque, Ontario (hereinafter referred to as 'Site' or 'Property').

The Phase II ESA was performed to provide characterization of the Site conditions and data to support the filing of a Record of Site Condition (RSC) in accordance with Ontario Regulation 153/04 (O.Reg. 153) as amended by Ontario Regulation 511/09 (O.Reg. 511).

- The topography of the Site slopes north-easterly from Mill Street toward the Gananoque River. The general stratigraphy at the Site, as revealed in the boreholes, consists of silty clay, sand, gravel and/or cobble fill underlain with dolostone over calcite bedrock. Varying occurrences of sand, gravel and rocks were encountered in the overburden material. Coal was observed at five locations and wood fill was observed at three locations. Dolostone bedrock at the Site ranged from ground surface to 4.57 metres below grade. Calcite bedrock at the Site ranged from 2.81 to 6.50 metres.
- The inferred direction of overburden horizontal groundwater flow based on groundwater level measurements is predominately northerly to northeasterly. The inferred direction of shallow bedrock horizontal groundwater flow based on groundwater level measurements is predominantly northerly to northeasterly. The overburden and shallow bedrock appear to be discharging into the Gananoque River.
- The vertical gradient between the overburden and shallow bedrock is in a downward direction.
- The Site is classified as a sensitive Site due to soil pH values outside the range of 5 to 9 for surface soils (depths less than 1.5 m) at 4 locations.
- As part of this Phase II ESA, various parameters were detected at concentrations above the applicable MOE (2011) Tables 1, 7 and 9 SCS in the soil samples, including PHC fractions F1, F2 and F3, trichloroethylene, cis-1,2-dichloroethylene, PAH, including naphthalene, acenaphthylene, acenaphthene, fluorine, phenanthrene, anthracene, fluoranthene, pyrene, benz(a)anthracene, benzo(b)fluoranthene, benzo(k)anthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, 2- and 1-methyl naphthalene, as well as inorganic parameters including antimony, arsenic, barium, boron, cadmium, chromium, cobalt, copper, lead, molybdenum, nickel, selenium, silver, zinc and mercury. Additionally, pH levels in the soil were outside of the acceptable range at four boreholes locations.
- As part of this Phase II ESA, trichloroethylene, vinyl chloride, 1,1-dichloroethylene, trans-1,2-dichloroethylene, cis-1,2-dichloroethylene were detected in the groundwater at concentrations above MOE (2011) Tables 1, 7 and/or 9 SCS. Additionally, laboratory RDLs for bromomethane, bromodichloromethane, chlorobenzene, 1,1-dichhloroethylene, 1,1,1-trichloroethane, 1,2-dichloroethane, benzene, carbon tetrachloride, 1,2-dichloropropane, 1,1,2-trichloroethane, ethylene dibromide, tetrachloroethylene, 1,1,1,2-tetrachloroethane, 1,1,2,2-tetrachloroethane, toluene, styrene 1,2-, 1,3- and 1,4-dichlorobenzene, and 1,3-dichloropropene were elevated

above MOE (2011) Tables 1, 7 and/or 9 SCS at various sampling locations due to high concentrations of VOCs including cis-1,2-dichloroethylene, trichloroethylene and vinyl chloride.

- Based on the results of the Phase II ESA the Site does not meet the applicable MOE (2011) SCS for soil and groundwater. In the current condition, a Record of Site Condition cannot be filed for the Site at this time. Remediation of the on-Site soil and groundwater is recommended.

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1 Introduction

Exp Services Inc. (**exp**) was retained by Brennan Custom Homes Inc. (Brennan) to conduct a Phase II Environmental Site Assessment (ESA) at 185 Mill Street, Gananoque, Ontario (hereinafter referred to as 'Site' or 'Property').

The Phase II ESA was performed to provide characterization of the Site conditions to support the filing of a Record of Site Condition (RSC) in accordance with Ontario Regulation 153/04 (O.Reg. 153), as amended by Ontario Regulation 511/09 and Ontario Regulation 179/11 (O.Reg. 153).

1.1 Site Description

The Site, located at 185 Mill Street is situated on the north-east side of Mill Street and south-west shore of the Gananoque River (Figure 1). The Site is approximately rectangular in shape and measured approximately 0.57 hectares. Two buildings are situated on the property (Figure 2). The northern building ("stone building") was constructed circa 1869 and the southern building ("brick building") was constructed circa 1897. The buildings are presently vacant and unoccupied with the doors and windows boarded up. There are remnants of a third building located at the southeast end of the property. The majority of the exterior grounds are graded with gravel. A boat launch and dock were situated along the shore of the Gananoque River at the north-east end of the Site. The Site slopes north-easterly from Mill Street toward the Gananoque River.

The approximate Universal Transverse Mercator (UTM) coordinates for the Site centroid was NAD83 18-407431 E 4908756 N. The UTM coordinates were based on measurements obtained from Google Earth. The accuracy of the centroid was estimated to range from 10 to 15 m.

1.2 Legal Description and Property Ownership

The Site is legally described as "Lot 1020, part of lots 1021, 1017, 1018, 1019, W Gananoque River, Plan 86 as in G7817, Part of the Bed of the Gananoque River in Leeds County, plan 86, Part of the Canal Reserve, W Gananoque River, Plan 86, Gananoque". The property identification number (PIN) for the Site is 44249-0189(LT). A full scale legal survey plan is provided in the attached pocket. A reduced scale version of the legal survey plan is provided in Appendix A.

At the time of the investigation, the Site was owned by Mill Street Property Ltd. The owner contact information is provided below:

Company Name	Mill Street Property Ltd.
Company Address	1046 Young Street Toronto, Ontario M4W 2L1
Contact Telephone	416-969-9996
Contact email	jpal@palltd.com

1.3 Current and Proposed Future Uses

At the time of the Phase II ESA two buildings that were formerly used for industrial purposes, a parking area, and a boat launch were situated at the Site. Accordingly, the current use of the Site is considered industrial. Reportedly, the Site is to be redeveloped as a residential condominium development.

1.4 Criteria

Analytical results obtained for Site soil and groundwater samples were assessed against Site Condition Standards (SCS) as established under subsection 169.4(1) of the Environmental Protection Act and presented in the document MOE "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the *Environmental Protection Act*", ("SGWS" Standards), (MOE, 2011). Tabulated background SCS (Table 1) applicable to environmentally sensitive Sites and effects based generic SCS (Tables 2 to 9) applicable to non-environmentally sensitive Sites are provided in the MOE SGWS Standards (2011). The effects based SCS (Tables 2 to 9) are protective of human health and the environment for different groundwater conditions (potable and non-potable), land use scenarios (residential, parkland, institutional, commercial, industrial, community and agricultural/other), soil texture (coarse or medium/fine), restoration depth (full or stratified) and proximity to a water body (within 30 metres).

Tables 1 to 9 of MOE (2011) are summarized as follows:

- Table 1 – applicable to sites where background concentrations must be met (full depth), such as sensitive sites where site-specific criteria have not been derived;
- Table 2 – applicable to sites with potable groundwater and full depth restoration;
- Table 3 – applicable to sites with non-potable groundwater and full depth restoration;
- Table 4 – applicable to sites with potable groundwater and stratified restoration;
- Table 5 – applicable to sites with non-potable groundwater and stratified restoration;
- Table 6 – applicable to sites with potable groundwater and shallow soils (less than 2 metres of overburden);
- Table 7 – applicable to sites with non-potable groundwater and shallow soils (less than 2 metres of overburden);
- Table 8 – applicable to sites with potable groundwater and that are within 30 metres of a water body; and,
- Table 9 – applicable to sites with non-potable groundwater and that are within 30 metres of a water body.

Application of the generic or background SCS to a specific site is based on a consideration of site conditions related to soil pH (*i.e.,* surface and subsurface soil), thickness and extent of overburden material, (*i.e.,* shallow soil conditions), proximity to a water body (*i.e.,* within 30 metres), and proximity to an area of environmental sensitivity or of natural significance. For some chemical constituents, consideration is also given to soil textural classification with SCS having been derived for both coarse and medium-fine textured soil conditions.

In order for classification as a non-sensitive Site the soil pH ranges of 5 to 9 for surface (depths less than 1.5 m) and 5 to 11 for subsurface soils (depths greater than 1.5 m) must be met. However, the on-Site pH value of one surficial soil sample was detected below 5 and three surficial soil samples were detected above 9. Accordingly the Site would classify as a sensitive Site and the MOE (2011) Table 1 Full Depth Background Site Condition Standards for coarse textured soil for Residential/Parkland/Institutional/Industrial/Commercial/Community property use would apply for the assessment of Site soil and groundwater analytical data.

Following remediation of the soil in the vicinity the high and low soil pH detections on the Site, the lower of MOE (2011) Table 7 Generic SCS for Shallow Soils in a Non-Potable Ground Water and Table 9 Generic Site Condition Standards for Use within 30 m of a Water Body in a Non-Potable Groundwater Condition and coarse textured soil for

Residential/Parkland/Institutional property use would apply for the assessment of Site soil based on the following considerations:

- More than one-third of the Site has an overburden thickness of less than 2 metres above bedrock;
- The Site is located within 30 m of a water body;
- Potable water for the Site and surrounding properties is provided by the James W. King Water Treatment Plant, which is supplied by the St. Lawrence River;
- The Site and surrounding properties within 30 metres of the Site were not identified as having areas of natural and scientific interest (ANSIs);
- The use of the Site was industrial with the future use of the Site to be residential;
- The predominant soil type was considered coarse textured based on qualitative observations; and;
- There was no intention to carry out a stratified restoration at the Site.

For the purposes of this Phase II ESA, the soil and groundwater results will be compared to Tables 1, 7 and 9.

2 Background Information

2.1 Physical Setting

The Ministry of Natural Resources (MNR) Natural Heritage website was reviewed to assess if the Site was considered to be an Area of Natural and Scientific Interest (ANSI). Based on the review of the MNR website, no ANSIs were identified in the Phase I ESA study area.

The Gananoque River is situated adjacent to the Site to the north-east. The Gananoque River flows in a southeasterly direction into the St. Lawrence River, located approximately 93 metres southeast of the Site. It is expected that the shallow groundwater flow be northeasterly toward the Gananoque River, however southeasterly components of flow toward the St. Lawrence River are possible.

2.2 Past Environmental Investigations

The previous Site environmental investigative reports are listed below, along with summaries of the salient findings of the reports.

The reports reviewed during the preparation of the Phase II ESA included the following:

1. Phase I Environmental Site Assessment, Cliffe Craft Limited, 185 Mill Street, Gananoque, Ontario. GeoCore Engineering Inc. September 1997.
2. Phase II Environmental Site Assessment, Cliffe Craft Limited, 185 Mill Street, Gananoque, Ontario. Oliver, Mangione, McCalla & Associates (OMM). December 1, 1997.
3. Additional Soil & Groundwater Investigations, Cliffe Craft Limited, 185 Mill Street, Gananoque, OMM. January 28, 1998.
4. Excavation of Contaminated Soil and Installation of Monitoring Wells, Cliffe Craft Limited, 185 Mill Street, Gananoque, OMM. March 31, 1999.
5. Phase I/II Environmental Site Assessment, Cliffe Craft Limited, 185 Mill Street, Town of Gananoque, Ontario. Quite-Eco Consultants Inc. July 10, 2003.
6. Groundwater Monitoring Well Installation and Sampling, 185 Mill Street, Town of Gananoque, Ontario. Quite-Eco Consultants Inc. October 31, 2005.
7. Phase I Environmental Site Assessment (Draft), 185 Mill Street, Gananoque, Ontario. **exp** Services Inc., July 17, 2013.

A summary of these reports is provided below.

1. Phase I Environmental Site Assessment, Cliffe Craft Limited, 185 Mill Street, Gananoque, Ontario. GeoCore Engineering Inc. September 1997

A Phase I ESA was conducted by GeoCore Engineering Inc. (GeoCore). The Phase I ESA was conducted to evaluate the existing environmental Site conditions and identify actual or potential significant environmental liabilities related to historic activities and operations conducted on- and off-Site. At the time of the investigation, the property was occupied by Cliffe Craft (owner) and Korkey Systems (tenant). It was reported that Cliffe Craft operated on-site since the mid-

1960's. Cliffe Craft manufactured, repaired and restored watercraft on the premises. The tenant Korkey Systems produced cleaning fluids (i.e., Spray Nine).

GeoCore identified the following pertinent items at the Site in the Phase I ESA:

- The buildings were municipally serviced with potable water but were not connected to the municipal sewer. Drains were suspected to drain directly to the Gananoque River.
- Pipe insulation may contain asbestos;
- Fluorescent light ballasts in the buildings may contain PCB's;
- One 900 litre fuel-oil aboveground storage tank (AST) was located inside the back of the motor shop. The AST was utilized for waste oil;
- One used exterior rated AST was located outside the motor shop;

The following recommendations were made by GeoCore in the Phase I ESA:

- Soil and groundwater sampling was recommended;
- Sampling for asbestos containing material (ACM) was recommended;
- Secondary containment of the waste oil AST was recommended; and
- Sealing the existing drains was recommended;

2. Phase II Environmental Site Assessment, Cliffe Craft Limited, 185 Mill Street, Gananoque, Ontario. Oliver, Mangione, McCalla & Associates. December 1, 1997.

A Phase II Environmental Site Assessment was conducted by OMM to evaluate the existing environmental Site conditions and identify actual or potential significant environmental liabilities related to historic activities and operations conducted on- and off-Site. The scope of work included the following:

- Advancement of 5 boreholes (BH-I through BH-V) on-Site into soil to depths ranging from 0.3 to 2.90 metres below ground surface;
- Installation of one groundwater monitoring well (MW-I) into the overburden;
- Construction of three hand dug test pits to depths up to 1.2 metres below ground surface;
- Sampling and analytical testing of soil from the boreholes for analysis of Total Petroleum Hydrocarbons (TPH), Benzene, Toluene, Ethylbenzene and Xylenes (BTEX), Polycyclic Aromatic Hydrocarbons (PAHs), Polychlorinated Biphenyls (PCBs) and metals.
- Sampling and analytical testing of groundwater from the monitoring well for analysis of TPH, PAHs, Volatile Organic Compounds (VOCs) and metals.
- Sampling and analytical testing of surface water from the Gananoque River that abuts the property for analysis of VOCs.
- Inspection for asbestos containing material (ACM) and lead based paint in the Site buildings.

The results are summarized as follows:

- The depth to the on-site bedrock was found to range from just below surface to 0.3 to 2.90 metres below surface grade. The predominant soil types observed were sand, gravel and clay. Black staining and/or coal fragments were observed at four boreholes locations;
- The direction of groundwater flow in the overburden aquifer was inferred to be northerly toward the Gananoque River;
- Concentrations of two parameters equaled or exceeded the applicable Site Condition Standards (SCS) at the time of the investigation (MOE (1997) Table B) in samples submitted from the soil including, beryllium and vanadium;
- Concentrations of two parameters equaled or exceeded the applicable SCS at the time of the investigation (MOE (1997) Table B) in samples submitted from the on-site overburden groundwater including, trans-1,2-dichloroethene and cis-1,2-dichloroethene;
- Concentrations were detected within the applicable SCS at the time of the investigation (MOE (1997) Table B) in samples submitted for VOC analysis from the on-site Gananoque River; and
- The designated substances asbestos and lead based paints were detected within the subject premises.

3. Additional Soil & Groundwater Investigations, Cliffe Craft Limited, 185 Mill Street, Gananoque, OMM. January 28, 1998.

Additional subsurface investigations were conducted by OMM in 1997 and 1998. The scope of work included the following:

- Construction of nine (9) test pits across the Site (TP-1b through TP-9b).
- Collection of water samples from eight (8) test pits and the existing monitoring well MW-I.
- Sampling and analytical testing of soil and groundwater from the test pits and groundwater from the existing monitoring well for analysis of VOCs.
- Collection of additional soil samples (S-1 through S-6) from the immediate vicinity of an old sewer line that serviced the brick building. The samples were collected at a depth of approximately 0.55 metres below grade.
- Sampling and analytical testing of additional soil samples for analysis of VOCs and metals.

The results are summarized as follows:

- VOC's were not detected in the soil samples and met the provincial criteria in place at the time of sampling (MOE (1997) Table B).
- VOC's were detected above the provincial criteria in place at the time of sampling (MOE (1997) Table B) in the groundwater samples at MW-I, including cis-1,2-dichloroethene (180 µg/L) and vinyl chloride (23.4 µg/L).
- Vinyl chloride, lead and zinc were found at concentrations above the provincial criteria in place at the time of sampling (MOE (1997) Table B) in the additional soil samples.
- It was concluded that it appeared that the source for the vinyl chloride, metals and other contamination detected in the soil and/or groundwater north of the brick building is from

an old sewer line, possibly from solvents and other compounds used on-site over the years that may have been disposed of down the sink.

- It was recommended that a soil remediation program including the excavation and removal of impacted material be undertaken.

4. Excavation of Contaminated Soil and Installation of Monitoring Wells, Cliffe Craft Limited, 185 Mill Street, Gananoque, OMM. March 31, 1999.

Excavation of contaminated soil and installation of an additional motoring well was undertaken by OMM. The soil remediation included the excavation with off-site disposal of approximately 240 m^3 of soil. All confirmatory samples met the provincial criteria at the time (MOE (1997) Table B). It was reported that some material impacted with cadmium, copper, lead and zinc could not be excavated in the vicinity of the dock due to structural concerns with the dock. Additionally, the excavation entailed the removal of the existing monitoring well (MW-I). Following backfilling of the excavation MW-I was replaced with a new monitoring well, MW-2. The groundwater in the new monitoring well was sampled in January 1999 for TPH and VOC. One parameter, 1,1-dichloroethane was detected at a concentration (4,700 µg/L) exceeding the provincial criteria in place at the time (MOE (1997) Table B).

5. Phase I/II Environmental Site Assessment, Cliffe Craft Limited, 185 Mill Street, Town of Gananoque, Ontario. Quinte-Eco Consultants Inc. July 10, 2003.

A combined Phase I and II ESA was conducted by Quinte-Eco Consultants. The Phase I ESA was conducted to evaluate the existing environmental Site conditions and identify actual or potential significant environmental liabilities related to historic activities and operations conducted on- and off-Site. A Phase II Environmental review of all historical research on the Site and the surrounding properties was completed for the Site. At the time of the investigation, the property was zoned "Commercial/Industrial" and was occupied by three buildings. Ground cover at the Site consisted of gravel parking areas and driveway.

The Phase I ESA noted that the Site historically (circa 1871) housed a foundry to manufacture carriages, later cabinetry and harnessing.

Quite-Eco Consults did not identify any areas of potential environmental concern (APEC's) at the Site or surrounding area, however the following pertinent items were identified in the Phase I ESA:

- Some of pipe wrap material at the steam lines that was previously identified to be ACM were present in the Site buildings. Reportedly, the remaining pipe wrap was in good condition;
- Approximately 25 fluorescent light ballasts were present in the Site buildings that may contain PCB's.
- Reportedly, surfaces previously identified to contain lead paint have been scraped and repainted with latex paint.
- One 200 gallon AST that was formerly used for waste oil collection was located inside the south building (i.e., the smaller building to the south that has since been demolished). The tank was located within a concrete block containment area. No ground staining was noted in the area of the AST.
- Repairs to boat motors were formerly conducted at the Site. The waste oil generated by these repairs was reportedly collected in the 200 gallon AST and disposed of by a licensed hauler.

A Phase II Environmental Site Assessment was conducted by Quinte-Eco Consultants to evaluate the existing environmental Site conditions and identify actual or potential significant environmental liabilities related to historic activities and operations conducted on- and off-Site. The scope of work included the following:

- Advancement of 2 boreholes (Boreholes #1 and #2) on-Site into soil to depths ranging from approximately 1.5 and 1.7 metres below ground surface;
- Installation of one groundwater monitoring wells (MW02) into the overburden to a depth of approximately 2.1 metres below ground surface;
- Sampling and analytical testing of soil from the boreholes for analysis of metals.
- Sampling and analytical testing of groundwater from the newly installed (MW02) and existing (MW01) monitoring wells for analysis of VOCs.

The results are summarized as follows:

- The depth to the on-site bedrock was found to range from 1.5 to greater than 2.1 metres below surface grade. The predominant soil types observed were sand and clay;
- Concentrations of the tested metals parameters were detected within the applicable Site Condition Standards (SCS) at the time of the investigation (MOE (1997) Table B) in samples submitted from the soil;
- Concentrations of the tested VOC parameters met applicable SCS at the time of the investigation (MOE (1997) Table B for commercial/industrial property use) in samples submitted from the on-site overburden groundwater; however vinyl chloride was detected at a concentration (2.7 µg/L) exceeding MOE (1997) Table B for residential property use (0.5 µg/L) at MW01;

It was concluded by Quinte-Eco Consultants that there were no significant environmental issues for the subject property at the time of the assessment.

6. Groundwater Monitoring Well Installation and Sampling, 185 Mill Street, Town of Gananoque, Ontario. Quite-Eco Consultants Inc. October 31, 2005.

Quite-Eco conducted a groundwater investigation entailing the installation of three monitoring wells (MW03, MW04 and MW05) into the overburden. Bedrock refusal was reported at 2.74, 1.82 and 2.13 metres at MW03, MW04 and MW-05, respectively. Groundwater samples were collected from each of the newly installed monitoring wells for analysis of VOCs and metals. Soil samples were not submitted. VOCs were not detected in the water samples at all three newly installed monitoring wells. Various metals were detected at concentrations exceeding the applicable MOE (2004) SCS as follows:

- MW03: Cadmium (3.3 µg/L), Cobalt (16 µg/L), Copper (152 µg/L), Lead (152 µg/L), Mercury (0.26 µg/L), Vanadium (31 µg/L) and Zinc (250 µg/L);
- MW04: Copper (54 µg/L), Lead (298 µg/L), Mercury (0.07 µg/L) and Zinc (209 µg/L);
- MW05: Copper (17 µg/L) and Lead (30.1 µg/L).

The highest metals concentrations were detected near the west property boundary.

7. Exp (2013) Phase I Environmental Site Assessment (Draft), 185 Mill Street, Gananoque, Ontario. exp Services Inc. July 24, 2013.

A Phase I ESA was conducted by **exp** Services Inc. to evaluate the existing environmental Site conditions and identify actual or potential significant environmental liabilities related to historical activities and operations conducted on- and off-Site. The review of all historical research was

completed for the Site and surrounding properties. The Phase I ESA identified the following areas of potential environmental concern (APECs) associated with the Phase I ESA property:

- The Site has historically been occupied by a variety of manufacturers for industrial purposes including metal work, boat manufacturing, motor/engine repair, wood products and furniture, auto body repair, and manufacture of cleaning products.
- A head race situated at the south-west end of the property was historically filled in with fill of unknown origin or quality.

  The shoreline along the north-east end of the site was historically built up with fill of unknown origin or quality.
- Reportedly, a waste oil AST was historically stored inside the former building located at the south-east end of the property and a used AST was situated outside of this building.

  The Site was historically listed as a generator of Light Fuels for residential building construction by Edgecon Contracting Corporation.
- The 1947 Fire Insurance Plan identified an 8,000 gallon fuel-oil UST at the property at 15 Clarence Street. It is unknown whether the UST still exists.

  Additionally, three large transformers were mounted on a platform at the southern exterior of the building at the 15 Clarence Street property. The 15 Clarence Street property was also listed in the Inventory of PCB Storage Sites.

  Furthermore, the 15 Clarence Street property was historically listed as a waste generator of acid waste – heavy metals, other inorganic acid wastes, alkaline wastes – heavy metals, alkaline wastes – other metals, alkaline phosphates, neutralized wastes – heavy metals, inorganic laboratory chemicals, aromatic solvents, petroleum distillates, halogenated solvents, PCB's, oil skimmings and sludges, waste oils and lubricants, detergents/soaps, and organic laboratory chemicals; organic acids.

  The property located at 26 Mill Street was historically listed as a waste generator of halogenated solvents.
- The property located at 67 Mill Street is occupied by Brennan Marine. A large AST and two 200 litre drums were observed adjacent to the west exterior wall of the building. Additionally, a marine gasoline filling station was located on the docks at the east end of the property. The retail fuel storage tank database identified a 13,638 litre storage tank for retail purposes situated at the property.
- The 1914 and 1947 Fire Insurance Plans showed a rail line (Thousand Islands Railway) adjacent to the south-west property line of the Site.

The potential contaminating activities (PCAs) associated with the APEC's were identified as follows:

- 7. Boat Manufacturing
- 10. Commercial Autobody Shops
- 27. Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles
- 28. Gasoline and Associated Products Storage in Fixed Tanks
- 30. Importation of Fill Material of Unknown Quality
- 34. Metal Fabrication

- 46. Rail Yards, Tracks and Spurs
- 52. Storage, maintenance, fuelling and repair of equipment, vehicles, and material used to maintain transportation systems
- 55. Transformer Manufacturing, Processing and Use
- 59. Wood Treating and Preservative Facility and Bulk Storage of Treated and Preserved Wood Products

The following recommendations were made in the Phase I ESA:

- Conduct a Phase II ESA (including borehole drilling, interior coring and groundwater monitoring) to further assess and, where necessary, delineate soil and potential groundwater impacts.

3 Scope of the Investigation

3.1 Overview of Site Investigation

The objective of this investigation was to support the filing of a RSC on the MOE's Environmental Brownfields Site Registry for the Site.

3.1.1 Scope of Work

The scope of work for the Phase II ESA consisted of the following activities:

- Request local utility locating companies (e.g., telephone, gas, hydro) to mark any underground utilities present at the Site;
- Retain a private utility locating company to mark any underground utilities present in the vicinity of the borehole locations and to clear the individual borehole locations;
- Attempt to locate and evaluate the condition of eight existing monitoring wells (MW-07-1 through MW-07-3 and BW-07-1 through BW-07-5) for use in assessing the on-site groundwater flow and quality;
- Advance a total of 19 boreholes at the Site to a maximum depth of approximately 9.60 metres below grade;
- Construct a total of nine overburden test pits (TP-1 through TP-6, TP-4B, TP-9 and TP-10) around the exterior of the buildings for geotechnical purposes (results of which are reported in a separate report) and two overburden test pits in each building interior (TP-7, TP-8, TP-11 and TP-12) for geotechnical and environmental purposes;
- Collect representative soil samples for laboratory chemical analysis of Petroleum Hydrocarbons (PHCs), Volatile Organic Compounds (VOCs), inorganic parameters (including metals), Polycyclic Aromatic Hydrocarbons (PAHs) and Polychlorinated Biphenyls (PCBs);
- Instrument five of the boreholes as monitoring wells, screened within the overburden (MW13-1 through MW13-5) and seven of the boreholes as monitoring wells, screened within the shallow bedrock (BW13-1 through BW13-7);
- Develop the newly installed and select existing groundwater monitoring wells;
- Collect groundwater samples from the monitoring wells for laboratory chemical analysis of PHCs, VOCs, inorganic parameters (including metals), PAHs and PCBs;
- Complete an elevation survey of all newly installed and existing monitoring wells to assist in determination of the groundwater flow direction in the shallow groundwater beneath the Site; and,
- Analyze the data and prepare a report of the findings.

3.2 Media Investigated

The focus of this Phase II ESA was on the environmental conditions of the characterization of the overburden materials and bedrock at the Site and of the shallow groundwater beneath the Site.

The specific geologic units investigated were the surficial fill material, underlying native material and shallow bedrock. These materials were investigated and sampled to characterize the soil

stratigraphy at the Site; and, to identify any potential soil impacts related to past contaminating activities that were identified during previous Site investigations.

The groundwater was sampled to identify any potential groundwater impacts related to past contaminating activities that were identified during previous Site investigations. The monitoring network is comprised of five newly constructed and two existing overburden wells and one existing and seven newly constructed monitoring wells intercepting the water table aquifer.

The rationale for the selection of borehole locations during this investigation is as follows:

- BH-1 – southeast end of Site; southeast of the brick building; and Site coverage.
- BH-2 – northern portion of Site; north of the stone building and northwest of brick building; and Site coverage.
- BH-3 – northern portion of Site; north of the brick building; and Site coverage.
- BH-4 – northern portion of Site; north of the brick building; and Site coverage.
- BH-5 – northwest end of Site; north of the stone building; and Site coverage.
- BH-6 – western portion of Site; south of the stone building; location chosen by a representative of Brennan Custom Homes to delineation of former canal as well as for geotechnical purposes for proposed parking garage and; Site coverage.
- BH-7 – southeast end of Site; southeast of the brick Building; and Site coverage.
- BH-8 – off-Site; southwest of Site; location chosen by a representative of Brennan Custom Homes for delineation of former canal as well as for geotechnical purposes for proposed parking garage.
- BH-9 – off-Site; west of Site; location chosen by a representative of Brennan Custom Homes for delineation of former canal as well as for geotechnical purposes for proposed parking garage.
- BH-10 – off-Site; west of Site; location chosen by a representative of Brennan Custom Homes for delineation of former canal as well as for geotechnical purposes for proposed parking garage.
- BH-11 – west end of Site; south of the stone building; location chosen by a representative of Brennan Custom Homes for delineation of former canal as well as for geotechnical purposes for proposed parking garage; and Site coverage.
- BH-12 – southern corner of Site; south of the brick building; and Site coverage.
- BW13-1 – eastern corner of Site; northeast of the brick building; geotechnical for brick building; and Site coverage.
- BW13-2 – north east portion of Site; north of the brick building; geotechnical for brick building; and Site coverage.
- BW13-3 – northwest end of Site; north of the stone building; and Site coverage.
- BW13-4 – west end of Site; west of the stone building; geotechnical for stone building; and Site coverage.
- BW13-5 – southwest end of Site; south of the stone building and west of the brick building; delineation of former canal; geotechnical for proposed parking garage and for brick and stone buildings; and Site coverage.

- BW13-6 – off-site; adjacent to west end of Site; west of the stone building; location chosen by a representative of Brennan Custom Homes for delineation of former canal as well as for geotechnical purposes for proposed parking garage.
- BW13-7 – southern corner of Site; south of the brick building; geotechnical for brick building; and Site coverage.

The approximate borehole and monitoring well locations are shown on Figure 3. A copy of the Sampling and Analysis Plan prepared for the Site is provided in Appendix B.

3.3 Phase I ESA Conceptual Site Model

The Site, located at 185 Mill Street is situated on the north-east side of Mill Street and south-west shore of the Gananoque River (Figure 1). The Site is approximately rectangular in shape and measures approximately 0.57 hectares (Figure 2). Two buildings are situated on the property (Figure 1b). The northern building ("stone building") was constructed circa 1869 and the southern building ("brick building") was constructed circa 1897. The buildings are presently vacant and unoccupied with the doors and windows boarded up. There are remnants of a third building located at the southeast end of the property. The majority of the exterior grounds are graded with gravel. A boat launch and dock were situated along the shore of the Gananoque River at the north-east end of the Site. The Site slopes north-easterly from Mill Street toward the Gananoque River.

Adjacent Property Use

- North – Parking lot and boat storage with Brennan Marine (beyond) located at 67 Mill Street.
- West – Mill Street with large commercial/industrial building (beyond) at 15 Clarence Street.
- South – Boathouse and derelict building with Gananoque Boat Line parking lot and ticket booth (beyond). Water Street and St. Lawrence River further beyond.
- East – Gananoque River.

The Site is bound by a Parking Lot and boat storage to the north, Gananoque Boat Line to the south, the Gananoque River to the east and Mill Street to the west (as shown in Figures 2 through 4).

Geological, Hydrogeological, Water Well Information

Based on the information provided on the physiographic, geologic and topographic maps, the Site is situated within a physiographic formation known as shallow till and rock ridges, characterized by a very thin or non-existent overburden cover. The geological map indicates that the area is located near the division of two geological formations of the late to middle Precambrian age and the Cambrian age, including: Felsic intrusive rocks including granite, granophyre, granodiorite, quartz diorite, quartz monzonite, syenite, trondhjemite, and derived gneisses; and Potsdam or Nepean formation, including sandstone.

A portion of the property is regulated by virtue of *Ontario Regulation 148/06: Development, Interference with Wetlands and Alterations to Shorelines and Watercourses,* made pursuant to the *Conservation Authorities Act* and therefore, development, including construction, filing and site grading may require a permit from the CRCA under said regulation.

Based on information provided from previous subsurface investigations and MOE Water Well Records (WWR), the predominant soil type observed was gravel, sand, silt and clay. The depth

to the on-site bedrock was found to range from 0.3 to 2.9 metres below grade. The bedrock aquifer at the Site was reported in the MOE WWR as limestone.

A water well records search indicated there were 13 water wells within 500 metres of the Site (not including on-site wells). The overburden thickness was reported to range from 0.9 metres to greater than 5.5 metres at nine locations, 34.7 metres at one location and was not reported at three locations. The underlying bedrock identified in the records was as follows: four as sandstone, three as granite and one as limestone. The use of the wells was identified as follows: five as domestic and eight were not indicated.

Potential Contaminating Activities

The potentially contaminating activities identified at the Site and within the Phase I ESA (**exp**, July 24, 2013) study area are as follows:

- 7. Boat Manufacturing
- 10. Commercial Autobody Shops
- 27. Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles
- 28. Gasoline and Associated Products Storage in Fixed Tanks
- 30. Importation of Fill Material of Unknown Quality
- 34. Metal Fabrication
- 46. Rail Yards, Tracks and Spurs
- 52. Storage, maintenance, fuelling and repair of equipment, vehicles, and material used to maintain transportation systems
- 55. Transformer Manufacturing, Processing and Use
- 59. Wood Treating and Preservative Facility and Bulk Storage of Treated and Preserved Wood Products

Utilities

At the time of this Phase II ESA the Site services were disconnected. Potable water and sanitary sewage services for the Site would be provided by the Town of Gananoque, electricity by Eastern Ontario Power and natural gas by Union Gas. Utility drawings were not available for review.

3.4 Deviations from Sampling and Analysis Plan

The field investigative and sampling program was carried out following the requirements of the Site Sampling and Analysis Plan. No significant deviations from the Sampling and Analysis Plan were reported, which affected the sampling and data quality objectives for the Site.

3.5 Impediments

With the exception of buried utilities, no physical impediments were encountered during the field investigation. The entire property was accessible at the time of the investigation.

4 Investigation Method

4.1 General

The Site investigative activities consisted of the drilling of boreholes to facilitate the collection of soil samples for geologic characterization and chemical analysis and the installation of monitoring wells for hydrogeologic property characterization and the collection of groundwater samples for chemical analysis.

Soil samples were collected at continuous intervals using split spoon sampling devices advanced ahead of the hollow stem augers, where applicable. Monitoring wells were constructed in the boreholes by a MOE licensed well contractor using manufactured well components (i.e., PVC riser pipes and screens) and materials (i.e., sand pack and grout) from documented sources.

4.2 Borehole Drilling

Prior to the commencement of drilling activities, the locations of underground utilities including telephone, natural gas, electrical lines were marked out by public locating companies. In addition, a private utility locating service was also retained to mark private services.

The fieldwork for the soil investigative portion of the Phase II ESA was carried out on May 27th through May 31st and June 3rd, 2013. A total of 19 boreholes (BH-1 through BH-12 and BW13-1 through BW13-7) were advanced at the Site by Canadian Environmental Drilling Ltd. of Inverary, Ontario, a MOE-licensed well contractor, under the full-time supervision of **exp** field staff. The borehole locations are shown in Figure 3.

The boreholes were advanced on level land to completion depths ranging from 0.53 to 9.60 m below grade, using a truck mounted drilling machine equipped with hollow stems, split spoons and diamond bit core barrels. Soil was manually removed from the auger flights between locations by the drilling contractor. No petroleum-based greases or solvents were used during drilling activities. The purpose of the borehole construction was to delineate the extent of soil contamination and to permit the installation of monitoring wells to delineate potential groundwater contamination.

4.3 Test Pitting

Prior to the commencement of test pitting activities, the locations of underground utilities including telephone, natural gas, electrical lines were marked out by public locating companies. In addition, a private utility locating service was also retained to mark private services.

The fieldwork for the test pitting investigation was undertaken on June 4, 2013. The exterior test pitting was conducted for geotechnical purposes only while the interior test pitting was conducted for both geotechnical and for the collection of soil samples.

A total of 13 test pits (TP-1 through TP-12 and TP-4B) were constructed at the Site by Canadian Environmental Drilling Ltd. of Inverary, Ontario, using a Kubota mini excavator, under the full-time supervision of **exp** field staff. Nine of the test pits (TP-1 through TP-6, TP-9, TP-10 and TP-4B) were constructed around exteriors of the buildings for geotechnical purposes while four test pits (TP-7, TP-8, TP-11 and TP-12) were constructed inside the building interiors. The test pit locations are shown in Figure 3.

Soil samples were collected for PHC, VOCs, and inorganic parameters (including metals) from the interior test pits and from one of the exterior test pit locations (TP-4B). The results are discussed in Section 5.5 below.

4.4 Soil Sampling

Soil samples for geologic characterization and chemical analysis were collected from the boreholes using 50 mm diameter, 0.6 metre long, stainless steel split-spoon sampling devices advanced ahead of the augers, where applicable. Spilt-spoon soil samples were collected where possible, beginning at the ground surface and subsequently at continuous intervals. The approximate locations of the boreholes are shown on the attached Borehole and Monitoring Well Location Plan (Figure 3).

The split spoon samplers upon retrieval from the boreholes were placed on a table and disassembled by drilling personnel. Geologic details of the recovered cores were logged by **exp** field staff and soil samples were collected from selected cores for chemical analysis. Field observations and geologic details of the soil cores recovered from the boreholes advanced at the Site are presented in boreholes logs and Ministry of Environment (MOE) WWRs (Appendix D).

Measures were taken in the field and during transport to preserve sample integrity prior to chemical analysis. Recommended volumes of soil samples selected for chemical analysis were collected from the recovered cores into pre-cleaned, analytical test group specific containers provided by the contractual laboratory, AGAT (AGAT) of Mississauga, Ontario. Dedicated nitrile gloves (i.e., one pair per sample) were used during sample handling. Soil samples were collected in duplicate. One of the soil samples was placed directly into pre-cleaned, laboratory-supplied glass sample jars/vials for chemical analyses; and, the remaining samples were placed in sealed "zip-lock" plastic bags and allowed to reach ambient temperature prior to field screening for total VOC vapours (TVOC).

The soil samples, upon being jarred, were immediately placed into clean insulated coolers chilled with ice for storage and transport. Samples were submitted within appropriate holding times, following Chain of Custody protocols, to AGAT, an accredited laboratory for the parameters tested.

Decontamination and other protocols were followed during sample collection and handling to minimize the potential for sample cross-contamination. New disposable nitrile gloves were used for the handling and sampling of each retrieved soil core. The split-spoon samplers were decontaminated between sampling intervals by the drilling contractor using a potable water/phosphate-free detergent solution followed by a rinse with potable water.

Soil samples submitted for specific chemical analysis were selected on the basis of visual and olfactory inspection of the recovered cores, measured vapour concentration at field screening, as well as the sample location and depth interval. The rationale for soil sample submission is presented in Table 1. Additional information regarding the sampling activities is provided in the Sampling and Analysis Plan (Appendix B).

4.5 Field Screening Measurements

The remaining soil samples collected during field sampling that were placed in sealed "zip-lock" plastic bags were allowed to reach ambient temperature prior to field screening with a MultiRAE Plus Photo Ionization Detector (PID). Prior to measurement of the vapour readings the PID was zeroed in ambient conditions.

Field measurements were made by inserting the instrument's probe into the plastic bag while manipulating the sample to ensure volatilization of the soil gases. These readings provide a real-time indication of the relative concentration of vapours encountered in the subsurface during drilling, and are used to aid in the assessment of the vertical and horizontal extent of contamination and the selection of soil samples for VOCs analysis. The vapour readings, in parts per million (ppm), are provided on the borehole logs in Appendix D.

Each sample was additionally examined for visual, textural and olfactory classification at the time of sampling.

4.6 Installation of Groundwater Monitoring Wells

Groundwater monitoring wells (MW13-1 through MW13-5 and BW13-1 through BW13-7) were installed in 12 of the 19 boreholes advanced at the Site (BH-4, BH-5, BH-6, BH-7, BH-12 and BW13-1 through BW13-7, respectively). The monitoring wells were installed following the procedures set out under the Ontario Water Resources Act – R.R.O. 1990, Regulation 903, amended to O.Reg. 128/03, by a licensed well drilling contractor (Canadian Environmental Drilling Ltd.). Monitoring wells were constructed out of 51 mm Schedule 40 PVC screen and riser.

Based on bedrock conditions, appropriate lengths of screen and risers were utilized. Details of the well installation are provided on the borehole logs in Appendix D. The monitoring well completion details are shown in Table 2. The well screens have a slot size of approximately 0.25 mm (slot 10) and were sealed at the base with a PVC end cap. The annular space around the well screen was backfilled with silica sand to an average height of 0.33 metres above the top of the screen. The sand pack was extended above the screen to allow for compaction of the sand pack and expansion of the overlying well seal. A granular bentonite ('Hole Plug') seal was placed in the borehole annulus from the top of the sand pack to ground surface. The monitoring wells were each completed with a lockable 'stick-up' protective steel cover or "flush-mount" protective aluminum cover with lockable well cap.

When the use of the monitoring wells are no longer required, they must be decommissioned in accordance with the procedure outlined in the Ontario Water Resources Act - R.R.O. 1990, Regulation 903 - Amended to O. Reg. 128/03.

Measures taken to minimize the potential for cross contamination or the introduction of contaminants during well construction included:

- Lubricants and adhesives were not used when constructing the boreholes/monitoring wells;
- The use of well pipe components (e.g., riser pipe and well screens) with factory machined threaded flush coupling joints; and
- Construction of wells without the use of glues or adhesives.

4.7 Monitoring Well Development

Upon completion of monitoring well installation activities, the new monitoring wells were developed to remove fine sediment particles from the sand pack and enhance hydraulic communication with the surrounding formation waters. The newly installed groundwater monitoring wells were developed on June 18th through 20th, 2013. The monitoring wells were developed using dedicated Waterra tubing and foot valves to disturb the water column and

recover groundwater containing dislodged sediment particles. Water levels and standing water volumes were determined by means of a Solinst oil-water interface meter.

Development of the monitoring wells was monitored by visual observations of turbidity and taking field measurements of pH and conductivity for every standing well (i.e., wetted casing) volume removed. Well development continued until the purged water had chemically stabilized as indicated by field parameter measurements, and the water was of sufficient clarity as indicated by visual observations. The groundwater was considered to be chemically stable when the pH measurements of three successive purge volumes agreed to within ± 1 pH units and the specific conductance within ± 10 percent. All development and purge water was collected and stored on-Site in labeled, sealed containers until the laboratory results from groundwater testing from the monitoring wells was confirmed to meet the applicable MOE SCS.

4.8 Free Product

Throughout the program, an oil interface meter (Solinst Model 122M; 1 mm detection limit) was used to check for the presence of free product (fuel oil) in the groundwater monitoring well network. Additionally, during each groundwater sampling event the purge water from each monitoring well was examined for visual and olfactory indications of petroleum hydrocarbon contamination (i.e., blobs of oil, sheen or hydrocarbon odours). These results are discussed in Section 5.5.5 below.

4.9 Field Measurements of Water Quality Parameters

Field parameters including pH and conductivity were monitored during well development using a Hanna 991301 multifunction meter.

4.10 Groundwater Sampling

The groundwater monitoring wells (MW07-1, MW07-2, MW13-1 through MW13-5, BW07-5, BW13-1 through BW13-7) were sampled on June 19th and 20th, 2013. Prior to groundwater sample collection, approximately three wetted well volumes of water were purged from each well to remove standing water and draw in fresh formation water using dedicated Waterra tubing. Water levels and wetted well volumes were determined by means of a Solinst oil-water interface meter.

Upon completion of purging, recommended groundwater sample volumes were collected into pre-clean laboratory-supplied vials or bottles provided with analytical test group specific preservatives, as required. The samples were placed in an insulated cooler pre-chilled with ice immediately upon collection. The sample bottles/vials were pre-prepared by AGAT with preservatives. Each VOC vial was inverted and inspected for gas bubbles prior to being placed in the cooler to ensure that no head-space was present in the samples. The groundwater samples were transported to AGAT under Chain of Custody protocols, within 24 hours of sample collection. Additional information regarding the sampling activities is provided in the Sampling and Analysis Plan (Appendix B).

Field QA/QC samples were collected during the groundwater sampling to evaluate the field sampling procedures.

Details of the analysis performed on the selected samples are summarized in Table 3.

4.11 Analytical Testing

The contractual laboratory selected to perform the chemical analyses was AGAT Laboratories (AGAT) of Mississauga, Ontario. AGAT is an accredited laboratory under Canadian Association for Laboratory Accreditation (CALA).

4.12 Residue Management Procedures

The residue materials produced during the borehole drilling, soil sampling programs and monitoring well sampling programs were comprised of decontamination fluids from equipment cleaning, and waters from well development and purging. All residue fluids were collected and left on-Site in labeled, sealed containers. The off-Site disposal of these materials was not within the scope of this project.

4.13 Elevation Survey

Vertical control of the newly installed boreholes/monitoring wells was obtained by conducting an elevation survey using a Nikon AX-1 Automatic Level in relation to a local benchmark. The benchmark was the top nut of a fire hydrant situated at the northwest corner of the intersection of Mill and Clarence Streets, with an assumed elevation of 100.00 m above mean sea level (AMSL).

4.14 Quality Assurance and Quality Control Measures

Quality Control/Quality Assurance (QA/QC) measures were implemented during sample collection, storage and transport to provide accurate data representative of conditions in the surficial fill and overburden soils and groundwater. The QA/QC measures included decontamination procedures to minimize the potential for sample cross contamination; the execution of standard operating procedures to collect representative and unbiased samples; the collection of quality control samples to evaluate sample precision and accuracy; the implementation of measures to preserve sample integrity; the use of an accredited laboratory for the parameters tested.

Decontamination protocols were followed during sample collection and handling to minimize the potential for cross-contamination. During the collection of soil samples, split-spoon samplers were scraped and decontaminated between sampling intervals by washing with a potable water/phosphate-free detergent solution followed by a rinse with potable water. New disposable nitrile gloves were used for the handling and collection of samples from each soil core and for sample collection from each borehole.

Soil samples selected for chemical analyses were collected from the retrieved soil cores and placed directly into pre-cleaned, laboratory-supplied glass jars or vials. Sample volumes were consistent with analytical test group requirements as specified by the receiving laboratory. The vials that contained samples intended for analysis of VOCs were pre-prepared by the laboratory with methanol and equipped with Teflon seals. The VOC samples were collected directly into the vials using a disposable soil sub-sampling device supplied by the laboratory.

Groundwater samples were collected into pre-clean laboratory-supplied vials or bottles provided with analytical test group specific preservatives. Recommended analytical test group specific sample volumes were collected as specified by the contractual laboratory. Sample vials for analysis of VOCs were inspected for the presence of gas bubbles and the presence of head space, where volatiles may partition into.

Measures were followed to preserve sample integrity between collection and receipt by the contractual laboratory. All samples, both soil and groundwater, immediately upon collection were placed in insulated coolers pre-chilled with ice for storage and transport to the contractual laboratory. Samples were received by the contractual laboratory within specific analytical test group holding time requirements.

Documentation procedures were followed to confirm sample identification and tracked sample movement. Each sample was assigned a unique identification ID number, which was recorded along with the date, time of sampling and requested analyses on labels affixed to the sampling containers, and in a bound field notebook. Chain of Custody protocols were followed to track sample handling and movement until receipt by the contractual laboratory.

Field QA/QC samples were collected during the soil and groundwater sampling, including duplicate samples to evaluate the field sampling procedures. One duplicate soil sample, labeled as A-1, was collected on May 29, 2013 from BH-2 (0 to 0.5 metres below grade). Additionally, one duplicate groundwater sample, labeled as 6-9, was collected on June 20, 2013 from MW13-1. The duplicate soil and groundwater samples were submitted for laboratory analysis of PHC F1-F4, VOC, inorganic parameters (including metals) and PAHs. Laboratory prepared trip blanks were submitted for analysis of VOC with the groundwater samples collected on June 19th and 20th, 2013. No significant deviations from the Sampling and Analysis Plan were reported which affected the sampling and data quality objectives for the Site.

5 Review and Evaluation

5.1 Geology

The soil investigation conducted at the Site consisted of the advancement of 19 boreholes to a maximum depth of 9.60 m below grade as well as one of the nine exterior overburden test pits and four into the interior and overburden. Borehole logs describing geologic details of the soil and rock cores recovered during the Site drilling activities and test pit logs describing the geologic details of the test pits are presented in Appendix D. Figures 3, 4, 5a and 5b illustrate the locations of three geological cross-sections, AA', BB' and CC', prepared from current borehole logs and are presented as Figure 6 (a through c, respectively).

5.1.1 Surficial and Subsurface Material

The general stratigraphy at the Site, as revealed in the boreholes, consists of silty clay, sand, gravel and/or cobble fill underlain with dolostone over calcite bedrock. Varying occurrences of sand, gravel and rocks were encountered in the overburden material. Coal was observed at five locations and wood fill was observed at three locations. Dolostone bedrock at the Site ranged from ground surface to 4.57 metres below grade. Calcite bedrock at the Site ranged from 2.81 to 6.50 metres. The surficial and subsurface materials encountered at the borehole locations are summarized as follows:

- BH-1: Silty clay fill with some gravel to 0.76 metres. Inferred bedrock at 0.76 metres;
- BH-2: Sand and gravel fill to 0.53 metres. Inferred bedrock at 0.53 metres;
- BH-3: Sand and gravel to 0.53 metres. Inferred bedrock at 0.53 metres;
- BH-4: Sand to 0.85 metres, underlain with sand, gravel and cobbles to 3.52. Layer of wood fill from 3.52 to 3.96 metres. Inferred bedrock at 3.96 metres;
- BH-5: Sand and gravel fill to 1.67 metres underlain with cobbles to 2.06 metres. Inferred bedrock at 2.06 metres;
- BH-6: Sand and gravel to 0.61 metres underlain with sand to 2.81 metres. Calcite at bottom of 2.81 metres. Inferred bedrock at 2.81 metres;
- BH-7: Rock fill to 0.31 metres, sand and gravel to 0.91 metres, clayey silt with some coal fragments to 1.52 metres underlain with sand and gravel to 1.91 metres. Inferred bedrock at 1.91 metres;
- BH-8: Sand and gravel to 0.74 metres underlain with clayey silt to 1.55 metres. Inferred bedrock at 1.55 metres;
- BH-9: Sand and gravel fill to 2.74 metres with layers of clayey silt, brick and wood fragments from 0.87 to 1.83 metres. Inferred bedrock at 2.74 metres;
- BH-10: Sand and gravel to 2.44 metres underlain with black to light brown sand to 2.87 metres. Coal layer from 0.97 to 1.1 metres. Inferred bedrock refusal at 2.87 metres.
- BH-11: Sand and gravel to 0.31 underlain with sand with some gravel to 2.87. Fractured dolostone bedrock from 2.87 metres to 5.87 metres;
- BH-12: Sand and gravel to 0.29 metres with thin black layer of coal at bottom, underlain with silt with gravel to 1.49 m. Inferred bedrock refusal at 1.73 metres;

- BW13-1: Sandy clay and gravel to 0.61 metres, silty clay to 0.71 metres, hard brittle grey fill material to 1.83 metres, sand, gravel and clay mixture to 4.57 metres underlain with grey dolostone to 7.72 metres;
- BW13-2: Sand, gravel and clay fill to 2.44 metres, sand gravel and wood fill to 5.79 metres, rock fill to 6.50 metres underlain with calcite to 9.60 metres;
- BW13-3: Sand, gravel and coal fill to 0.41 metres, concrete with rebar to granite rubble fill to 1.42 metres underlain with dolostone to 3.48 metres;
- BW13-4: Fill containing sand, gravel, large metal objects and brick to 1.42 metres underlain with dolostone to 5.23 metres;
- BW13-5: Sand and gravel to 0.45 metres, silt to 0.58 metres underlain with dolostone to 5.36 metres;
- BW13-6: Sand and gravel to 0.61 metres, sand to 0.78 metres, silty clay to 1.22 metres, gravel to 1.44 metres, clay to 1.67 metres underlain with dolostone to 5.38 metres and calcite to 5.69 metres; and
- BW13-7: Sand and gravel to 0.29 metres with a thin layer of coal at 0.29 metres, silt layer to 1.73 metres underlain with dolostone to 4.98 metres and calcite to 5.66 metres.

5.2 Groundwater: Elevations and Flow Direction

The Site monitoring well network consists of two existing and five newly installed wells into the overburden as well as one existing and seven constructed wells installed in the shallow dolostone or calcite bedrock. The rationale for the selection of the newly constructed monitoring well locations in the current investigation is as follows:

- MW13-1 – northern portion of Site; replacement of existing well MW07-3 due to well condition; north of the brick building; Site coverage.
- MW13-2 – northwest end of Site; north of the stone building; Site coverage.
- MW13-3 – western portion of Site; south of the stone building; Site coverage.
- MW13-4 – southeast end of Site; southeast of the brick building; Site coverage.
- MW13-5 – southern corner of Site; south of the brick building; Site coverage.
- BW13-1 – eastern corner of Site; northeast of the brick building; Site coverage.
- BW13-2 – north east portion of Site; north of the brick building; Site coverage.
- BW13-3 – northwest end of Site; north of the stone building; replacement of unlocated existing monitoring well BW07-4; Site coverage.
- BW13-4 – west end of Site; west of the stone building; replacement of unlocated existing monitoring well BW07-3; Site coverage.
- BW13-5 – south end of Site; south of Stone Building and west of the brick building; replacement of unlocated existing monitoring well BW07-2; Site coverage.
- BW13-6 – off-site; adjacent to west end of Site; west of the stone building; location chosen by representative of Brennan Custom Homes Inc. to delineate the Canal as well as for geotechnical purposes for a proposed underground parking facility.
- BW13-7 – southern corner of Site; south of the brick building; replacement of unlocated existing monitoring well BW07-1; Site coverage.

Groundwater levels were measured at the monitoring well network on June 19, 2013. Water levels were recorded using a Solinst oil-water interface meter, and groundwater elevations were calculated based on top of pipe elevation measurements recorded during the Site elevation survey. Groundwater levels and corresponding elevations are summarized in Table 4, respectively; groundwater levels are also presented in the borehole logs provided in Appendix D.

At the time of water level measurements, the wells were checked with the Solinst oil-water interface meter for the presence of free product. Free product was not detected in the monitoring well network on June 19, 2013.

Groundwater elevation contours for the overburden and shallow bedrock water table units developed from the June 19 and August 7, 2013 groundwater elevation measurements are presented on the Site plan provided as Figures 7(a and b) and 7 (c and d), respectively. The inferred direction of overburden horizontal groundwater flow based on groundwater level measurements is predominately northerly to northeasterly. The inferred direction of shallow bedrock horizontal groundwater flow based on groundwater level measurements is predominantly northerly to northeasterly. Additionally, the overburden and bedrock appear to be discharging into the Gananoque River.

The groundwater depths recorded in the overburden monitoring wells on June 19 and August 7, 2013 are as follows:

Well Location	Water Level (mbgs) June 19, 2013	Water Level (mbgs) August 19, 2013
MW07-1	0.66	0.69
MW07-2	0.38	0.44
MW13-1	0.85	0.89
MW13-2	1.79	1.85
MW13-3	2.69	2.72
MW13-4	1.24	1.32
MW13-5	1.49	Dry

where mbgs = metres below ground surface

The groundwater depths recorded in the shallow bedrock monitoring wells on June 19 and August 7, 2013 are as follows:

Well Location	Water Level (mbgs) June 19, 2013	Water Level (mbgs) August 19, 2013
BW07-5	2.50	2.53
BW13-1	0.82	0.89

Well Location	Water Level (mbgs) June 19, 2013	Water Level (mbgs) August 19, 2013
BW13-2	0.54	0.50
BW13-3	1.94	1.83
BW13-4	3.24	3.34
BW13-5	2.65	3.11
BW13-6	3.58	3.65
BW13-7	2.30	2.75

where mbgs = metres below ground surface

5.2.1 Groundwater: Hydraulic Gradients

Horizontal hydraulic gradients were estimated for the overburden flow component and shallow bedrock aquifers based on the groundwater elevations taken on June 19, 2013 from overburden monitoring wells MW13-2, MW13-4 and MW13-5 and bedrock monitoring wells BW13-2, BW13-3 and BW13-5.

The horizontal hydraulic gradient is calculated using the following equation:

$i = \Delta h/\Delta s$

Where,

i = horizontal hydraulic gradient;

Δh (m) = groundwater elevation difference; and,

Δs (m) = separation distance.

The horizontal hydraulic gradient in the overburden between MW13-2, MW13-4 and MW13-5 is calculated as 0.076 for data measured on June 19, 2013. The horizontal hydraulic gradient between MW13-2, MW13-4 and MW13-5 could not be calculated for the data measured on August 7, 2013 because MW13-5 was dry.

The horizontal hydraulic gradient in the shallow bedrock between BW13-2, BW13-3 and BW13-5 is calculated as 0.052 and 0.039 for data measured on June 19 and August 7, 2013, respectively.

The vertical hydraulic gradient for the Site was estimated based on the difference in water levels over the difference in the screen midpoints (if fully submersed screen) or the midpoint between the top of the water column and bottom of screen (if not fully submersed screen) between adjacent overburden and bedrock monitoring wells pairs (MW07-1 and BW13-1; MW07-2 and BW13-2; and MW13-5 and BW13-7) as 0.026, 0.073 and 0.35 in downward directions, respectively for data measured on June 19, 2013.

5.2.2 Groundwater: Hydraulic Conductivity

Estimates of the saturated conductivity in the water table unit were obtained from the analysis of slug/single well response tests (SWRT) performed by **exp** staff at two of the monitoring wells

(MW13-4 and BW13-4) on June 20, 2013. The SWRTs consisted of three rising head slug tests performed at each of MW13-4 and BW13-4, which are screened into the overburden and shallow dolostone bedrock, respectively.

Based on the unconfined condition of the upper level water table unit, the saturated hydraulic conductivity was estimated from the slug test data using the Hvorslev (1951) method as implemented in the software package "Aquifer Test" Version 3.5. Outputs from the Aquifer Test program are provided in Appendix C.

The average (i.e., geometric mean) saturated hydraulic conductivity estimates for the on-Site overburden and shallow dolostone units are 6.76×10^{-6} and 7.35×10^{-7} m/s, respectively. The estimated hydraulic conductivity is within the ranges published in Freeze and Cherry (1979) of 10^{-9} to 10^{-3} and 10^{-9} to 10^{-6} m/s for silt to sand, and dolostone, respectively.

5.3 Soil Texture

Based on field observations, the soil at the Site was classified as a coarse textured soil. As such, soil samples were not subjected to grain size analysis.

5.4 Soil: Field Screening

Soil samples selected for PHC and BTEX analysis were determined based on the vapour readings collected during subsurface drilling. The soil samples selected for PHC and VOC analysis contained the highest vapour readings at each borehole location and had sufficient recovery. The vapour readings, in ppm, are provided on the borehole logs in Appendix D.

5.5 Soil Quality

Soil samples were collected from the exterior borehole locations as well as the interior and exterior test pit locations for the analysis of PHC, VOCs and inorganics. Additionally, soil samples at select locations were submitted for analysis of PAH and/or PCBs. A summary of the analytical results for the soil samples, including the locations of each soil sample, the depths of borehole soil sample, a comparison of concentrations against applicable SCS, and the identification of the potential contaminants of concern, are provided in Appendix E. Copies of the laboratory Certificates of Analysis for the analyzed soil samples are provided in Appendix F. Additionally, the horizontal and vertical extent of contaminants detected at concentrations exceeding Tables 7 and/or 9 SCS are provided in Figures 4 and Figures 6 (a through c), respectively. A table summarizing the maximum known concentrations of all tested parameters in the on-site soil is provided in Table 6.

5.5.1 Petroleum Hydrocarbons (PHCs)

Summaries of the results for the soil samples analyzed for PHCs for the exterior boreholes (BH-1 through BH-11 and BW13-1 through BW13-7), interior test pits (TP-7, TP-8, TP-11 and TP-12) and exterior test pit (TP-4B) are presented in Tables E-1, respectively. The results for the soil samples submitted for PHC analysis are summarized as follows:

- PHC fraction F1 was detected at a concentration above the applicable SCS (25 µg/L) at one borehole location (BH-3). The laboratory detection limits were below the applicable SCS.
- PHC fraction F2 was detected at concentrations exceeding the applicable SCS (10 µg/g) at one borehole (BH-3) and one test pit location (TP-4B). The laboratory detection limits were below the applicable SCS.

- PHC fraction F3 was detected at concentrations exceeding the applicable SCS (240 µg/g) at two borehole locations (BH-3 and BW13-3) and two test pit locations (TP-4B and TP12). The laboratory detection limits were below the applicable SCS.
- PHC fraction F4 was detected at concentrations below the applicable SCS (120 µg/g) or below the laboratory detection limit at all tested locations. The laboratory detection limits were below the applicable SCS.

5.5.2 Volatile Organic Compounds (VOCs)

Summaries of the results for the soil samples analyzed for VOCs for the exterior boreholes (BH-1 through BH-11 and BW13-1 through BW13-7), interior test pits (TP-7, TP-8, TP-11 and TP-12) and exterior test pit (TP-4B) are presented in Tables E-1. As shown in the results, the following parameters were detected at concentrations exceeding the applicable SCS:

- Benzene was detected at concentrations above the applicable SCS (0.02 µg/g) at two borehole locations (BH-3 and BW13-3).
- Toluene was detected at concentrations above the applicable SCS (0.2 µg/g) at two borehole locations (BH-3 and BW13-3).
- Ethylbenzene was detected at concentrations above the applicable SCS (0.05 µg/g) at two borehole locations (BH-3 and BW13-3).
- Xylenes (mixture) was detected at concentrations above the applicable SCS (0.05 µg/g) at two borehole locations (BH-3 and BW13-3).
- Trichloroethylene was detected at concentrations above the applicable SCS (0.05 µg/g) at two borehole locations (BH-5 and BH-9) and four test pit locations (TP-4B, TP-7, TP-11 and TP-12).
- Cis-1,2-dichloroethylene was detected at concentrations above the applicable SCS (0.05 µg/g) at one test pit location (TP-12).

5.5.3 Inorganic Parameters (Including Metals)

Summaries of the results for the soil samples analyzed for metals and inorganics for the exterior boreholes (BH-1 through BH-11 and BW13-1 through BW13-7), interior test pits (TP-7, TP-8, TP-11 and TP-12) and exterior test pit (TP-4B) are presented in Tables E-2. As shown in the results, the following parameters were detected at concentrations exceeding the applicable SCS:

- Antimony was detected at concentrations above the applicable SCS (1.3 µg/g) at 11 borehole locations (BH-1 through BH-3, BH-5, BH-9, BH-10 BW13-1, BW13-3, BW13-4, BW13-6 and BW13-7) and five test pit locations (TP-4B, TP-7, TP-8, TP-11 and TP-12).
- Arsenic was detected at concentrations above the applicable SCS (18 µg/g) at six borehole locations (BH-2 through BH-5, BW13-3, BW13-6) and three test pit locations (TP-8, TP-11 and TP-12).
- Barium was detected at concentrations above the applicable SCS (220 µg/g) at one borehole location (BW13-6) and two test pit locations (TP-4B and TP-12).

- Hot water soluble boron was detected at concentrations above the applicable SCS (1.5 µg/g) at one borehole location (BH-5).
- Cadmium was detected at concentrations above the applicable SCS (1.2 µg/g) at five borehole locations (BH-3, BH-7, BH-9, BH-10 and BW13-1) and five test pit locations (TP-4B, TP-7, TP-8, TP-11 and TP-12).
- Chromium was detected at concentrations above the applicable SCS (70 µg/g) at three test pit locations (TP-4B, TP-7 and TP-8).
- Cobalt was detected at concentrations above the applicable SCS (21 µg/g) at one borehole location (BH-2) and two test pit locations (TP-11 and TP-12).
- Copper was detected at concentrations above the applicable SCS (92 µg/g) at four borehole locations (BH-2, BH-3, BH-10 and BW13-3) and five test pit locations (TP-4B, TP-7, TP-8, TP-11 and TP-12).
- Lead was detected at concentrations above the applicable SCS (120 µg/g) at ten borehole locations (BH-1, BH-2, BH-3, BH-9, BH-10, BW13-1, BW13-3, BW13-4, BW13-6 and BW13-7) and five test pit locations (TP-4B, TP-7, TP-8, TP-11 and TP-12).
- Molybdenum was detected at concentrations above the applicable SCS (2 µg/g) at seven borehole locations (BH-2, BH-3, BH-5, BH-10, BW13-1, BW13-3 and BW13-6) and two test pit locations (TP-11 and TP-12).
- Nickel was detected at concentrations above the applicable SCS (82 µg/g) at one borehole location (BH-10).
- Selenium was detected at concentrations above the applicable SCS (1.5 µg/g) at one borehole location (BW13-3) and two test pit locations (TP-4B and TP-11).
- Silver was detected at concentrations above the applicable SCS (0.5 µg/g) at one borehole location (BW13-4) and two test pit locations (TP-7 and TP-11).
- Zinc was detected at concentrations above the applicable SCS (290 µg/g) at five borehole locations (BH-7, BH-10, BW13-1, BW13-3 and BW13-6) and three test pit locations (TP-4B, TP-7 and TP-8).
- Mercury was detected at concentrations above the applicable SCS (0.27 µg/g) at four borehole locations (BH-3, BH-9, BH-10 and BW13-3) and four test pit locations (TP-4B, TP-8, TP-11 and TP-12).
- Electrical Conductivity was detected at concentrations above the applicable SCS (0.57 mS/cm) at five borehole locations (BH-2, BH-9, BH-10, BW13-1 and BW13-3).
- Sodium Adsorption Ratio was detected at concentrations above the applicable SCS (2.4) at two borehole locations (BH-9 and BW13-6).

5.5.4 Polycyclic Aromatic Hydrocarbons (PAHs)

Summaries of the results for the soil samples analyzed for PAHs for the exterior boreholes (BH-2, BH-3, BH-5, BH-7, BH-8, BH-9, BH-10, BW13-3, BW13-5 and BW13-6) are presented in Tables E-3. As shown in the results, the following parameters were detected at concentrations exceeding the applicable SCS:

- Naphthalene was detected at concentrations above the applicable SCS (0.09 µg/g) at seven borehole locations (BH-3, BH-5, BH-9, BH-10, BW13-3, BW13-5 and BW13-6).
- Acenapthylene was detected at concentrations above the applicable SCS (0.093 µg/g) at seven borehole locations (BH-2, BH-3, BH-5, BH-9, BW13-3, BW13-5 and BW13-6).
- Acenaphthene was detected at concentrations above the applicable SCS (0.072 µg/g) at five borehole locations (BH-3, BH-5, BH-9, BW13-5 and BW13-6).
- Fluorene was detected at concentrations above the applicable SCS (0.19 µg/g) at five borehole locations (BH-3, BH-5, BH-9, BW13-5 and BW13-6).
- Phenanthrene was detected at concentrations above the applicable SCS (0.69 µg/g) at six borehole locations (BH-3, BH-5, BH-9, BW13-3, BW13-5 and BW13-6).
- Anthracene was detected at concentrations above the applicable SCS (0.22 µg/g) at six borehole locations (BH-3, BH-5, BH-9, BW13-3, BW13-5 and BW13-6).
- Fluoranthene was detected at concentrations above the applicable SCS (0.69 µg/g) at seven borehole locations (BH-2, BH-3, BH-5, BH-9, BW13-3, BW13-5 and BW13-6).
- Pyrene was detected at concentrations above the applicable SCS (1 µg/g) at six borehole locations (BH-3, BH-5, BH-9, BW13-3, BW13-5 and BW13-6).
- Benz(a)anthracene was detected at concentrations above the applicable SCS (0.36 µg/g) at six borehole locations (BH-3, BH-5, BH-9, BW13-3, BW13-5 and BW13-6).
- Benzo(b)fluoranthene was detected at concentrations above the applicable SCS (0.47 µg/g) at six borehole locations (BH-3, BH-5, BH-9, BW13-3, BW13-5 and BW13-6).
- Benzo(k)fluoranthene was detected at concentrations above the applicable SCS (0.48 µg/g) at five borehole locations (BH-3, BH-5, BH-9, BW13-3 and BW13-6).
- Benzo(a)pyrene was detected at concentrations above the applicable SCS (0.3 µg/g) at seven borehole locations (BH-3, BH-5, BH-9, BH-10, BW13-3, BW13-5 and BW13-6).
- Indeno(1,2,3-cd)pyrene was detected at concentrations above the applicable SCS (0.23 µg/g) at six borehole locations (BH-3, BH-5, BH-9, BW13-3, BW13-5 and BW13-6).
- Dibenz(a,h)anthracene was detected at concentrations above the applicable SCS (0.09 µg/g) at six borehole locations (BH-3, BH-5, BH-9, BW13-5 and BW13-6).
- Benzo(g,h,i)perylene was detected at concentrations above the applicable SCS (0.68 µg/g) at one borehole location (BH-9).
- 1- and 2-Methyl napthalene was detected at concentrations above the applicable SCS (0.59 µg/g) at four borehole locations (BH-3, BH-5, BH-9, BW13-3 and BW13-5).

5.5.5 Polychlorinated Biphenyls (PCBs)

Summaries of the results for the soil samples analyzed for PCBs for the exterior boreholes (BH-6, BH-7, BH-8, BH-10, BW13-5, BW13-6 and BW13-7) are presented in Tables E-4. As shown in the results, the tested soil samples were below the laboratory detection limit for PCBs and the laboratory detection limits were below the applicable SCS.

5.5.6 Soil pH

Twenty-four (24) soil samples from the exterior boreholes (BH-1 through BH-11, BW13-1 through BW-13-6), exterior test pit (TP-4B) and interior test pits (TP-7, TP-8, TP-11 and TP-12) were submitted for laboratory analysis of pH. Summaries of the results for soil samples analyzed for pH are shown in Table E-2 (Appendix E). Four soil samples collected from BH-4, BH-5, BH-7 and BW13-1 were tested with pH values (3.6, 10.7, 10.3 and 12.9, respectively) outside the MOE (2011) ranges of 5 to 9 for surface (depths less than 1.5 m) and 5 to 11 for subsurface soils (depths greater than 1.5 m) for classification as a non-sensitive site. Accordingly, the Site would classify as a sensitive Site.

5.5.7 Chemical Transformation and Soil Contaminant Sources

Trichloroethylene (TCE) was detected at concentrations above the applicable SCS in soil collected from test pits beneath both Site buildings as well as locations at the northwest (BH-5) and northeast (TP-4B) ends of the Site. Additionally, a significantly higher concentration of TCE (44 µg/g) was detected in the soil at BH-9, located off-site and west of the Site. Cis-1,2-dichloroethylene (c-1,2-DCE) was a detected in the soil at a concentration above the applicable SCS at one location in the stone building. The source of the TCE in the on-Site soil is likely related to the former industrial uses of the Site and adjacent properties.

PHCs (fractions F1, F2 and/or F3) and/or BTEX were detected at concentrations above the MOE SCS in the soil at the center of the north end of the Site (BH-3 SS-1 and BW13-3). PHC fraction F3 exceeded the SCS in the soil at one location in the stone building (TP-12) and one location at the northeast end of the Site (TP-4B). Additionally, PHC fraction F2 exceeded the SCS in the soil at TP-4B. The source of the contaminants is likely related to the former industrial uses of the Site, however, spillage and leakage of vehicles, boats, equipment and containers by various users of the contractor boat dock may also be a contributing factor.

PAHs were detected at concentrations above the MOE SCS in various soil samples located throughout the Site. The source of the PAH's may be attributed to the historical industrial use of the Site and historical storage and use of coal at the Site.

Various inorganic parameters (including metals) including antimony, arsenic, barium, boron, cadmium, chromium, cobalt, copper, lead, molybdenum, nickel, selenium, silver, zinc and mercury were detected at concentrations above the applicable SCS in soil samples throughout the Site. The source of the metals in the soil is likely attributed to the former industrial use of the Site and importation of fill of unknown origin and quality throughout the Site.

5.5.8 Evidence of Non-Aqueous Phase Liquid

Visual inspection of the soil retrieved from the boreholes and test pits did not indicate the presence of sheen, the presence of a separate organic phase, or other evidence of a non-aqueous phase liquid (NAPL).

5.6 Groundwater Quality

Groundwater samples were collected from the three existing (MW07-1, MW07-2 and BW07-5) monitoring wells, the newly installed monitoring wells (MW13-1 through MW13-5 and BW13-1 through BW13-7), and the pit located in the stone building for analysis of PHCs, VOCs and metals. Additional samples were collected at some locations for PAHs and PCBs. Groundwater samples were collected from the pit on June 4th, 2013 and from the monitoring wells on June 19th and 20th, 2013.

A summary of the analytical results for the groundwater samples, including the locations of each sample, a comparison of concentrations against applicable SCS or criteria, and the identification of the potential contaminants of concern, are provided in Tables E-5 through E-8 in Appendix E. Copies of the laboratory Certificates of Analysis for the analyzed groundwater samples are provided in Appendix F. Additionally, a table summarizing the maximum known concentrations of all tested parameters in the on-site groundwater is provided in Table 6.

5.6.1 Petroleum Hydrocarbons (PHC)

Summaries of the results for the groundwater samples from the pit and the monitoring wells submitted for PHCs are presented in Table E-5 (Appendix E). As shown in the results, all groundwater samples submitted for PHC analyses had concentrations below the MOE (2011) Tables 7 and 9 SCS; and, all laboratory RDLs for PHC were below the applicable SCS.

5.6.2 Volatile Organic Compounds (VOCs)

Summaries of the results for the groundwater samples from the pit and from the monitoring wells submitted for VOCs are presented in Table E-5 (Appendix E). As shown in the results, due to high concentrations of c-1,2-DCE and/or vinyl chloride at BW07-5, BW13-1, BW13-2, BW13-4 and BW13-5 several VOC parameters at these locations had elevated laboratory RDLs above the applicable SCS. Excluding the elevated detection limits at BW07-5, BW13-1, BW13-2, BW13-4 and BW13-5, the following parameters were detected at concentrations exceeding the applicable SCS:

- TCE was detected at concentrations above the applicable SCS (0.5 µg/L) at the pit located in the stone building and at nine monitoring well locations (MW07-1, MW13-2, MW13-4 and MW13-2 through BW13-7).
- Vinyl chloride was detected at concentrations above the applicable SCS (0.5 µg/L) at the pit located in the stone building and at six monitoring well locations (BW07-5, BW13-1, BW13-2 and BW13-4 through BW13-6).
- 1,1-Dichloroethylene was detected at concentrations above the applicable SCS (0.5 µg/L) at one monitoring well location (BW13-2).
- Trans-1,2-dichloroethylene was detected at concentrations above the applicable SCS (1.6 µg/L) at one monitoring well location (BW13-2).
- Cis-1,2-dichloroethylene was detected at concentrations above the applicable SCS (0.05 µg/L) at the pit located in the stone building and at seven monitoring well locations (BW07-5, BW13-1, BW13-2 and BW13-4 through BW13-7).

5.6.3 Inorganic Parameters (Including Metals)

Summaries of the results for the groundwater samples from the pit and from the monitoring wells submitted for metals and inorganics are presented in Table E-6 (Appendix E). As shown in the results, the following parameters were detected at concentrations exceeding the applicable SCS:

- Antimony was detected at concentrations above the applicable SCS (1.5 µg/L) at three monitoring well locations (MW07-1, MW13-4, BW13-3).
- Barium was detected at concentrations above the applicable SCS (610 µg/L) at one monitoring well location (BW13-6).

- Beryllium was detected at concentrations above the applicable SCS (0.5 µg/L) at six monitoring well locations (MW07-1, MW07-2, MW13-4, BW13-1, BW13-2 and BW13-7).
- Cobalt was detected at concentrations above the applicable SCS (3.8 µg/L) at four monitoring well locations (BW07-5, BW13-3, BW13-4 and BW13-6). The detection limit for cobalt was above the applicable SCS (3.8 µg/L) at one location (BW13-5).
- Nickel was detected at concentrations above the applicable SCS (14 µg/L) at two monitoring well locations (BW07-5 and BW13-3).
- Selenium was detected at a concentration above the applicable SCS (5 µg/L) at one monitoring well locations (BW13-2).

5.6.4 Polycyclic Aromatic Hydrocarbons (PAHs)

Summaries of the results for the groundwater samples from the monitoring wells submitted for PAHs are presented in Table E-7 (Appendix E). As shown in the results, the following parameters were detected at concentrations exceeding the applicable SCS:

- Chrysene was detected at a concentration above the applicable SCS (0.1 µg/L) at one monitoring well locations (MW07-2).
- Benzo(a)pyrene was detected at a concentration above the applicable SCS (0.01 µg/L) at one monitoring well locations (MW07-2).

5.6.5 Polychlorinated Biphenyls (PCBs)

Summaries of the results for the groundwater samples from the monitoring wells submitted for PCBs are presented in Table E-8 (Appendix E). As shown in the results, all groundwater samples submitted for PAH analyses had concentrations below the MOE (2011) Tables 7 and 9 SCS; and, all laboratory RDLs for PCBs were below the applicable SCS.

5.6.6 Evidence of Non-Aqueous Phase Liquid

Free product was not detected in the monitoring well network on June 19, 2013 with the Solinst Oil-Water Interface meter. With the exception of a slight sheen noted in the groundwater purged from BW07-5, BW13-1 and BW13-2, inspection of development and purged waters and groundwater samples did not indicate the presence of sheen or other evidence of NAPL within the overburden or shallow bedrock.

5.7 Quality Assurance and Quality Control Measures

A Qualified Person ensured that standard operating procedures were adhered to by **exp** staff. Quality assurance and quality control measures were taken during the field activities to meet the objectives of the sampling and quality assurance plan to collect unbiased and representative samples to characterize existing conditions in the overburden materials and water table aquifer unit at the Site. QA/QC measures as described in Section 4.14 included:

- the collection of soil and groundwater samples following standard operating procedures;
- the implementation of decontamination procedures to minimize the potential for sample cross-contamination;
- the submission of samples to an accredited laboratory for the parameters tested;

- the collection of recommended analytical test group specific volumes into pre-cleaned laboratory supplied containers provided with necessary preservatives as required;
- sample preservation in insulated coolers pre-chilled with ice and meeting holding time requirements;
- sample documentation including Chain of Custody protocols; and,
- the collection of quality control samples.

Review of field activity documentation indicated that recommended sample volumes were collected from soil and groundwater for each analytical test group into appropriate containers and preserved with proper chemical reagents in accordance with the protocols set out in the "Protocol for Analytical Methods used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act" (MOE, 2004). Samples were preserved at the required temperatures in pre-chilled insulated coolers and met applicable holding time requirements, when relinquished to the receiving laboratory.

The field duplicate sample results were quantitatively evaluated by calculating the relative percent difference (RPD). Assessment of the duplicate soil and groundwater samples analytical results showed that the results met analytical test group specific acceptance criteria. Assessment of the duplicate soil sample analytical results showed that the results met analytical test group specific acceptance criteria, with the exception of antimony, barium, molybdenum, and mercury, as well as PAH parameters, including acenaphthylene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)perylene, 2- and 1-methyl naphthalene as follows:

- The RPD for the duplicate antimony (8.6 and 12.2 µg/g), barium (50 and 72 µg/g), molybdenum (3.9 and 6.0 µg/g) and mercury (0.16 and 0.24 µg/g) concentrations in soil are calculated as 35, 36, 42 and 40%, respectively, above the recommended alert criteria of 30%. The detected concentrations of the duplicate antimony and molybdenum samples in soil were all above the applicable MOE (2011) Table 7 and/or 9 SCS and the detected concentrations of the duplicate barium and mercury were all below the applicable MOE (2011) Table 7 and 9 SCS and are not expected to affect the quality of the results; and
- The RPD for the duplicate PAH samples of acenaphthylene (0.11 and 0.05 µg/g), benzo(b)fluoranthene (0.33 and 0.22 µg/L), benzo(k)fluoranthene (0.18 and 0.11 µg/g), benzo(a)pyrene (0.27 and 0.16 µg/g), indeno(1,2,3-cd)pyrene (0.19 and 0.08 µg/g), benzo(g,h,i)perylene (µg/g), 2- and 1-methyl naphthalene (0.07 and 0.15 µg/g) are calculated as 75, 49, 48, 51, 82, 103 and 73%, respectively, above the recommended alert criteria of 40%. The variation in the analytical PAH results is likely attributed to sample heterogeneity and not expect to affect the quality of the results.

The overall assessment indicates that the samples were collected with an acceptable level of precision, and the data is of acceptable quality for meeting objectives of the Phase II ESA.

The subcontract laboratory used during this investigation, AGAT, is accredited by Canadian Association for Laboratory Accreditation (CALA), in accordance with ISO/IEC 17025:2005 – "General Requirements for the Competence of Testing and Calibration Laboratories" for analysis of all parameters for all samples in the scope of work for which SCS have been established under Ontario Regulation 153/04. Certificates of Analysis were received from AGAT reporting the results of all the chemical analyses performed on the submitted soil and groundwater samples. A copy of the AGAT Certificates of Analysis is provided in Appendix F.

Review of the Certificates of Analysis prepared by AGAT indicates that they were in compliance with the requirements set out under subsection 47(3) of O.Reg. 153/04.

5.8 Phase II ESA Conceptual Site Model

This section presents a Conceptual Site Model (CSM) providing a narrative, graphical and tabulated description integrating information related to the Site geologic and hydrogeologic conditions, areas of potential environmental concern/potential contaminating activities and the presence and distribution of potential contaminants of concern.

Surface Features

The Phase II ESA property covers approximately 0.57 hectares. The Site was historically used for industrial purposes. Two buildings are situated on the property (Figure 1b). The northern building ("stone building") was constructed circa 1869 and the southern building ("brick building") was constructed circa 1897. The buildings are presently vacant and unoccupied with the doors and windows boarded up. There are remnants of a third building located at the southeast end of the property. The majority of the exterior grounds are graded with gravel. A boat launch and dock are situated along the shore of the Gananoque River at the north-east end of the Site. The Site slopes north-easterly from Mill Street toward the Gananoque River. The St. Lawrence River is situated approximately 93 metres southeast of the Site at its closes point. The Gananoque River flows into the St. Lawrence River.

Site Conditions

Section 43.1 of the regulation applies to the Site. The Phase II ESA property is considered to be a shallow soil property (i.e., more than 1/3 of the Site has an overburden thickness less than 2 metres); and, the Site is situated adjacent to a surface water body. The Phase II ESA property is not within an area of natural significance; it does not include and is not situated adjacent to an area of natural significance; and, it does not include land that is within 30 metres of an area of natural significance. However, the Site is an environmentally sensitive area in accordance with Section 41 of the regulation due to four soil samples with a pH outside the acceptable range for surficial soils.

As such, the applicable site condition standards for the Phase II ESA Property comprise of Table 1 SCS.

Current and Proposed Property Use

The current use of the Site is industrial. It is proposed that the Site be redeveloped as a residential property.

Geologic and Hydrogeologic Setting

Boreholes were advanced across the entire Site for proper coverage. Additional boreholes were advanced off-Site at locations chosen by a representative of Brennan Custom Homes Inc. for delineation of the former canal as well as for geotechnical purposes for a proposed underground parking facility. The Site borehole locations are identified in the borehole and monitoring well location plan provided as Figure 3.

The topography of the Site slopes north-easterly from Mill Street toward the Gananoque River. The general stratigraphy at the Site, as revealed in the boreholes, consists of silty clay, sand, gravel and/or cobble fill underlain with dolostone over calcite bedrock. Varying occurrences of sand, gravel and rocks were encountered in the overburden material. Coal was observed at five locations and wood fill was observed at three locations. Dolostone bedrock at the Site ranged from ground surface to 4.57 metres below grade. Calcite bedrock at the Site ranged from 2.81 to 6.50 metres.

The Site groundwater monitoring well network is comprised of five newly constructed and two existing overburden wells and one existing and seven newly constructed bedrock monitoring wells intercepting the water table aquifer. The newly installed overburden wells are screened from 0.41 metres below grade at the top of the screen, to 4.14 metres below grade at the bottom of the screen. The newly installed bedrock monitoring wells are screening in the dolostone and/or calcite bedrock from 0.41 metres below grade at the top of the screen, to 4.14 metres below grade at the bottom of the screen.

Groundwater depths recorded in the overburden monitoring wells ranged from 0.38 (MW07-2) to 2.69 metres below grade (MW13-3) on June 19, 2013. Groundwater depths recorded in the shallow bedrock monitoring wells ranged from 0.54 (BW13-2) to 3.58 metres below grade (BW13-6) on June 19, 2013.

Groundwater elevation contours for the overburden and shallow bedrock water table units developed from the June 19 and August 7, 2013 groundwater elevation measurements are presented on the Site plan provided as Figures 7(a and b) and 7 (c and d), respectively. The inferred direction of overburden horizontal groundwater flow based on groundwater level measurements is predominately northerly to northeasterly. The inferred direction of shallow bedrock horizontal groundwater flow based on groundwater level measurements is predominantly northerly to northeasterly. Additionally, the overburden and shallow bedrock appear to be discharging into the Gananoque River.

The horizontal hydraulic gradient in the overburden between MW13-2, MW13-4 and MW13-5 is calculated as 0.076 for data measured on June 19, 2013. The horizontal hydraulic gradient between MW13-2, MW13-4 and MW13-5 could not be calculated for the data measured on August 7, 2013 because MW13-5 was dry.

The horizontal hydraulic gradient in the shallow bedrock between BW13-2, BW13-3 and BW13-5 is calculated as 0.052 and 0.039 for data measured on June 19 and August 7, 2013, respectively.

The vertical hydraulic gradient between the overburden and shallow bedrock at the Site was calculated to be in a downward direction on June 19, 2013, ranging from 0.026 (between MW07-1 and BW13-1) and 0.35 (between MW13-5 and BW13-7).

The average (i.e., geometric mean) saturated hydraulic conductivity estimate for the on-Site overburden and bedrock units are 6.76^{-6} and 7.35^{-7} m/s, respectively.

Areas of Potential Contaminating Activity/Environmental Concern

The Phase I ESA identified six areas of potential environmental concern (APECs) at the Site and vicinity as follows:

- The Site has historically been occupied by a variety of manufacturers for industrial purposes including metal work, boat manufacturing, motor/engine repair, wood products and furniture, auto body repair, and manufacture of cleaning products.
- A head race situated at the south-west end of the property was historically filled in with fill of unknown origin or quality.

  The north-east end of the site was historically filled in with fill of unknown origin or quality.
- Reportedly, a waste oil AST was historically stored inside the former building located at the south-east end of the property and a used AST was situated outside of this building.

The Site was historically listed as a generator of Light Fuels for residential building construction by Edgecon Contracting Corporation.

- The 1947 Fire Insurance Plan identified an 8,000 gallon fuel-oil UST at the property at 15 Clarence Street. It is unknown whether the UST still exists.
- Additionally, three large transformers were mounted on a platform at the southern exterior of the building at the 15 Clarence Street property. The 15 Clarence Street property was also listed in the Inventory of PCB Storage Sites.
- Furthermore, the 15 Clarence Street property (currently known as the Textron property) was historically listed as a waste generator of acid waste – heavy metals, other inorganic acid wastes, alkaline wastes – heavy metals, alkaline wastes – other metals, alkaline phosphates, neutralized wastes – heavy metals, inorganic laboratory chemicals, aromatic solvents, petroleum distillates, halogenated solvents, PCB's, oil skimmings and sludges, waste oils and lubricants, detergents/soaps, and organic laboratory chemicals; organic acids.
- The property located at 26 Mill Street (currently known as Gananoque Community Living) was historically listed as a waste generator of halogenated solvents.
- The property located at 67 Mill Street is occupied by Brennan Marine. A large AST and two 200 litre drums were observed adjacent to the west exterior wall of the building. Additionally, a marine gasoline filling station was located on the docks at the east end of the property. The retail fuel storage tank database identified a 13,638 litre storage tank for retail purposes situated at the property.
- The 1914 and 1947 Fire Insurance Plans showed a rail line (Thousand Islands Railway) adjacent to the south-west property line of the Site.

The potential contaminating activity (PCA) associated with the APEC's are as follows:

- 7. Boat Manufacturing
- 10. Commercial Autobody Shops
- 27. Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles
- 28. Gasoline and Associated Products Storage in Fixed Tanks
- 30. Importation of Fill Material of Unknown Quality
- 34. Metal Fabrication
- 46. Rail Yards, Tracks and Spurs
- 52. Storage, maintenance, fuelling and repair of equipment, vehicles, and material used to maintain transportation systems
- 55. Transformer Manufacturing, Processing and Use
- 59. Wood Treating and Preservative Facility and Bulk Storage of Treated and Preserved Wood Products

The contaminants of potential concern (COPC) associated with the PCA included petroleum hydrocarbon compounds (PHCs), Volatile Organic Compounds (VOCs), Polycyclic Aromatic Hydrocarbons (PAHs) and Polychlorinated Biphenyls (PCBs). The COPC potentially impacted soil and groundwater.

Contaminants of Concern

For the purpose of this Phase II ESA CSM, the Contaminants of Concern (COCs) were identified by screening analytical results reported for the soil and groundwater samples collected at the Phase II property against the MOE Table 1: Full Depth Background Site Condition Standards, Table 7: Generic Site Condition Standards for Shallow Soils in a Non-Potable Ground Water Condition and Table 9: Generic Site Condition Standards for Use Within 30 m of a Water Body in a Non-Potable Ground Water Condition as presented in "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act", dated April 15, 2011.

As part of this Phase II ESA, PHC fractions F1, F2 and F3, trichloroethylene, cis-1,2-dichloroethylene, PAH, including naphthalene, acenaphthylene, acenaphthene, fluorine, phenanthrene, anthracene, fluoranthene, pyrene, benz(a)anthracene, benzo(b)fluoranthene, benzo(k)anthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, 2- and 1-methyl naphthalene, as well as inorganic parameters including antimony, arsenic, barium, boron, cadmium, chromium, cobalt, copper, lead, molybdenum, nickel, selenium, silver, zinc and mercury were detected in the soil at concentrations exceeding MOE (2011) Table 1, 7 and/or 9 SCS.

As part of this Phase II ESA, trichloroethylene, vinyl chloride, 1,1-dichloroethylene, trans-1,2-dichloroethylene, cis-1,2-dichloroethylene were detected in the groundwater at concentrations above MOE Tables 1, 7 and/or 9 SCS. Additionally, laboratory RDLs for bromomethane, bromodichloromethane, chlorobenzene, 1,1-dichhloroethylene, 1,1,1-trichloroethane, 1,2-dichloroethane, benzene, carbon tetrachloride, 1,2-dichloropropane, 1,1,2-trichloroethane, ethylene dibromide, tetrachloroethylene, 1,1,1,2-tetrachloroethane, 1,1,2,2-tetrachloroethane, toluene, styrene 1,2-, 1,3- and 1,4-dichlorobenzene, and 1,3-dichloropropene were elevated above MOE (2011) Table 1, 7 and/or 9 SCS at various sampling locations due to high concentrations of VOCs including cis-1,2-dichloroethylene, trichloroethylene and vinyl chloride.

For illustrative purposes, the lateral extent of contaminants in soil exceeding MOE (2011) Tables 1, 7 and/or 9 are shown in Figures 4 and the lateral extent of contaminants in the overburden and bedrock groundwater are shown in Figures 5a and b, respectively. The vertical extent of contaminants in soil and groundwater exceeding MOE (2011) Table 7 and/or 9 is shown in Figures 6a through 6c.

Subsurface Structures and Utilities

At the time of the Site visit, a disconnected natural gas line enters below grade into the southwest end of the brick building". Reportedly, an abandoned water main extends northwest to southeast near the southwest property line.

6 Conclusions and Recommendations

The results and findings of the Phase II ESA conducted at the Site are summarized as follows:

- The topography of the Site slopes north-easterly from Mill Street toward the Gananoque River. The general stratigraphy at the Site, as revealed in the boreholes, consists of silty clay, sand, gravel and/or cobble fill underlain with dolostone over calcite bedrock. Varying occurrences of sand, gravel and rocks were encountered in the overburden material. Coal was observed at five locations and wood fill was observed at three locations. Dolostone bedrock at the Site ranged from ground surface to 4.57 metres below grade. Calcite bedrock at the Site ranged from 2.81 to 6.50 metres.
- The inferred direction of overburden horizontal groundwater flow based on groundwater level measurements is predominately northerly to northeasterly. The inferred direction of shallow bedrock horizontal groundwater flow based on groundwater level measurements is predominantly northerly to northeasterly.
- The vertical gradient between the overburden and shallow bedrock is in a downward direction.
- The Site is classified as a sensitive Site due to soil pH values outside the range of 5 to 9 for surface soils (depths less than 1.5 m) at 4 locations.
- As part of this Phase II ESA, various parameters were detected at concentrations above the applicable MOE (2011) Tables 1, 7 and 9 SCS in the soil samples, including PHC fractions F1, F2 and F3, trichloroethylene, cis-1,2-dichloroethylene, PAH, including naphthalene, acenaphthylene, acenaphthene, fluorine, phenanthrene, anthracene, fluoranthene, pyrene, benz(a)anthracene, benzo(b)fluoranthene, benzo(k)anthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, 2- and 1-methyl naphthalene, as well as inorganic parameters including antimony, arsenic, barium, boron, cadmium, chromium, cobalt, copper, lead, molybdenum, nickel, selenium, silver, zinc and mercury. Additionally, pH levels in the soil were outside of the acceptable range at four boreholes locations.
- As part of this Phase II ESA, trichloroethylene, vinyl chloride, 1,1-dichloroethylene, trans-1,2-dichloroethylene, cis-1,2-dichloroethylene were detected in the groundwater at concentrations above MOE (2011) Tables 1, 7 and/or 9 SCS. Additionally, laboratory RDLs for bromomethane, bromodichloromethane, chlorobenzene, 1,1-dichhloroethylene, 1,1,1-trichloroethane, 1,2-dichloroethane, benzene, carbon tetrachloride, 1,2-dichloropropane, 1,1,2-trichloroethane, ethylene dibromide, tetrachloroethylene, 1,1,1,2-tetrachloroethane, 1,1,2,2-tetrachloroethane, toluene, styrene 1,2-, 1,3- and 1,4-dichlorobenzene, and 1,3-dichloropropene were elevated above MOE (2011) Tables 1, 7 and/or 9 SCS at various sampling locations due to high concentrations of VOCs including cis-1,2-dichloroethylene, trichloroethylene and vinyl chloride.
- Based on the results of the Phase II ESA the Site does not meet the applicable MOE (2011) SCS for soil and groundwater. In the current condition, a Record of Site Condition cannot be filed for the Site at this time. Remediation of the on-Site soil and groundwater is recommended.

7 General Limitations

The information presented in this report is based on a limited investigation designed to provide information to support an assessment of the current environmental conditions within the subject property. The conclusions and recommendations presented in this report reflect Site conditions existing at the time of the investigation.

More specific information with respect to the conditions between samples, or the lateral and vertical extent of materials may become apparent during future excavation operations. The interpretation of the borehole information must, therefore, be validated during any such excavation operations. Consequently, during the future development of the property, conditions not observed during this investigation may become apparent. Should this occur, **exp** Services Inc. should be contacted to assess the situation, and the need for additional testing and reporting. **Exp** has qualified personnel to provide assistance in regards to any future geotechnical and environmental issues related to this property.

The environmental investigation was carried out to address the intent of applicable provincial Regulations, Guidelines, Policies, Standards, Protocols and Objectives administered by the Ministry of the Environment. It should also be noted that current environmental Regulations, Guidelines, Policies, Standards, Protocols and Objectives are subject to change, and such changes, when put into effect, could alter the conclusions and recommendations noted throughout this report. Achieving the study objectives stated in this report has required us to arrive at conclusions based upon the best information presently known to us. No investigative method can completely eliminate the possibility of obtaining partially imprecise or incomplete information; it can only reduce the possibility to an acceptable level. Professional judgment was exercised in gathering and analyzing information obtained and in the formulation of the conclusions. Like all professional persons rendering advice, we do not act as absolute insurers of the conclusions we reach, but we commit ourselves to care and competence in reaching those conclusions.

Our undertaking at **exp**, therefore, is to perform our work within limits prescribed by our clients, with the usual thoroughness and competence of the engineering profession. It is intended that the outcome of this investigation assist in reducing the client's risk associated with environmental impairment. Our work should not be considered 'risk mitigation'. No other warranty or representation, either expressed or implied, is included or intended in this report.

This report was prepared for the exclusive use of Brennan Custom Homes Inc. and may not be reproduced in whole or in part, without the prior written consent of **exp**, or used or relied upon in whole or in part by other parties for any purposes whatsoever. Any use which a third party makes of this report, or any part thereof, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. **Exp** Services Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

Closure

We trust this report is satisfactory for your purposes. Should you have any questions, please do not hesitate to contact this office.

Yours truly,

Exp Services Inc.

Matthew Whitney, P.Eng.
Project Engineer

Paula A. Formanek, M.Sc.(Eng.), P.Geo., QP
Sr. Hydrogeologist
Branch Manager

8 References

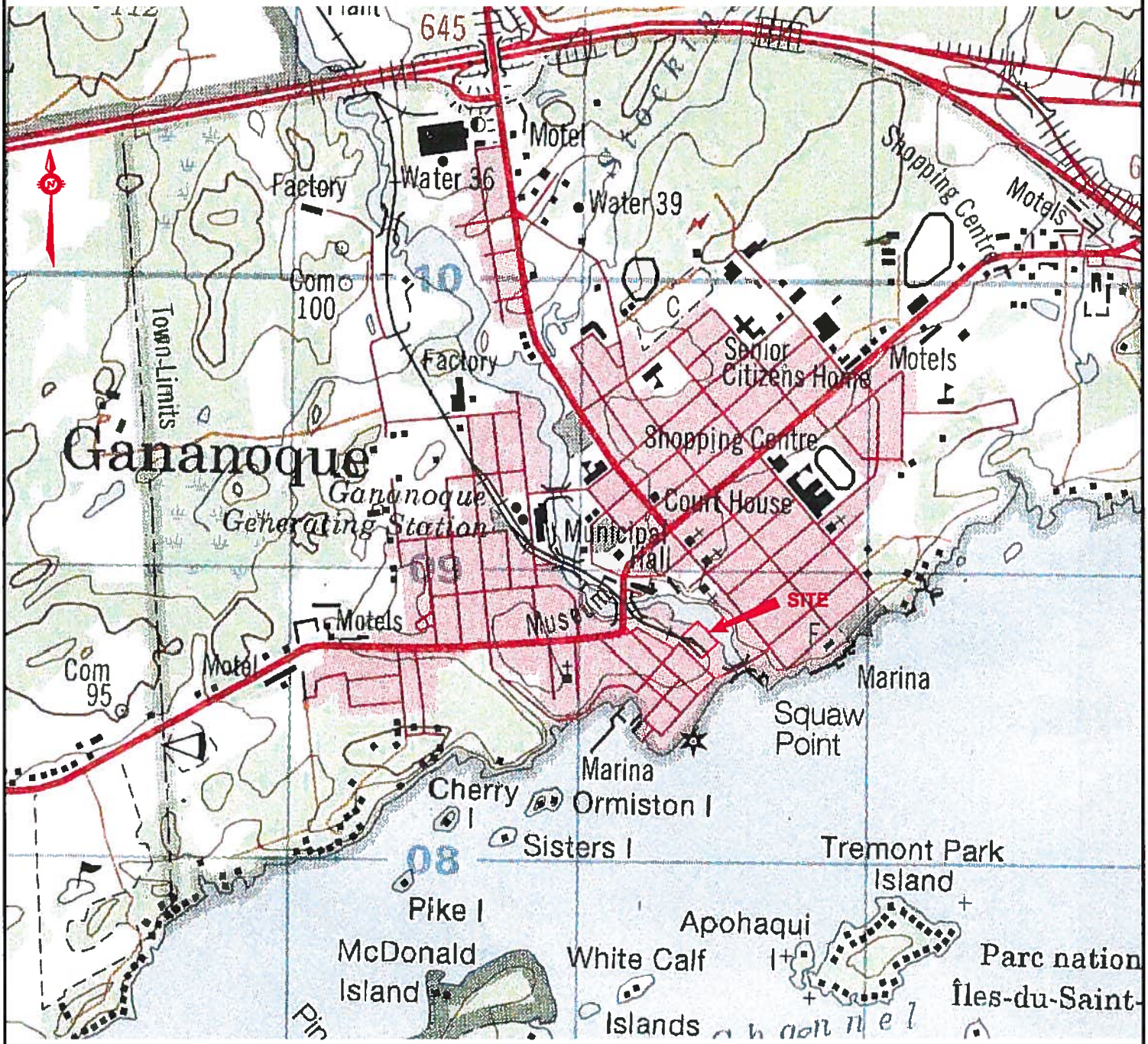
This study was conducted in general accordance with the applicable Regulations, Guidelines, Policies, Standards, Protocols and Objectives administered by the Ministry of the Environment. Specific reference is made to the following:

- Canadian Standards Association [CSA] (2000) Z769-00, Phase II Environmental Site Assessment. Canadian Standards Association, March 2000.
- *Environmental Protection Act*, R.S.O. 1990, Chapter E.19, as amended, September 2004.
- Freeze, R.A. and Cherry, J.A., Groundwater, 1979.
- Ministry of the Environment [MOE] (1996) Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario. Ontario Ministry of the Environment, December 1996.
- MOE (2011) Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the *Environmental Protection Act*. Ontario Ministry of the Environment, April 15, 2011.
- Ontario Regulation 153/04, made under the *Environmental Protection Act*, May 2004, amended by O.Reg. 511/09.
- *Ontario Water Resources Act* – R.R.O. 1990, Regulation 903, amended to O.Reg. 128/03, August 2003.

Previous Environmental Investigation Reports include:

- **Exp** Services Inc., Draft Phase I Environmental Site Assessment, 185 Mill Street, Gananoque, Ontario. July 24, 2013.

Figures



LEGEND:

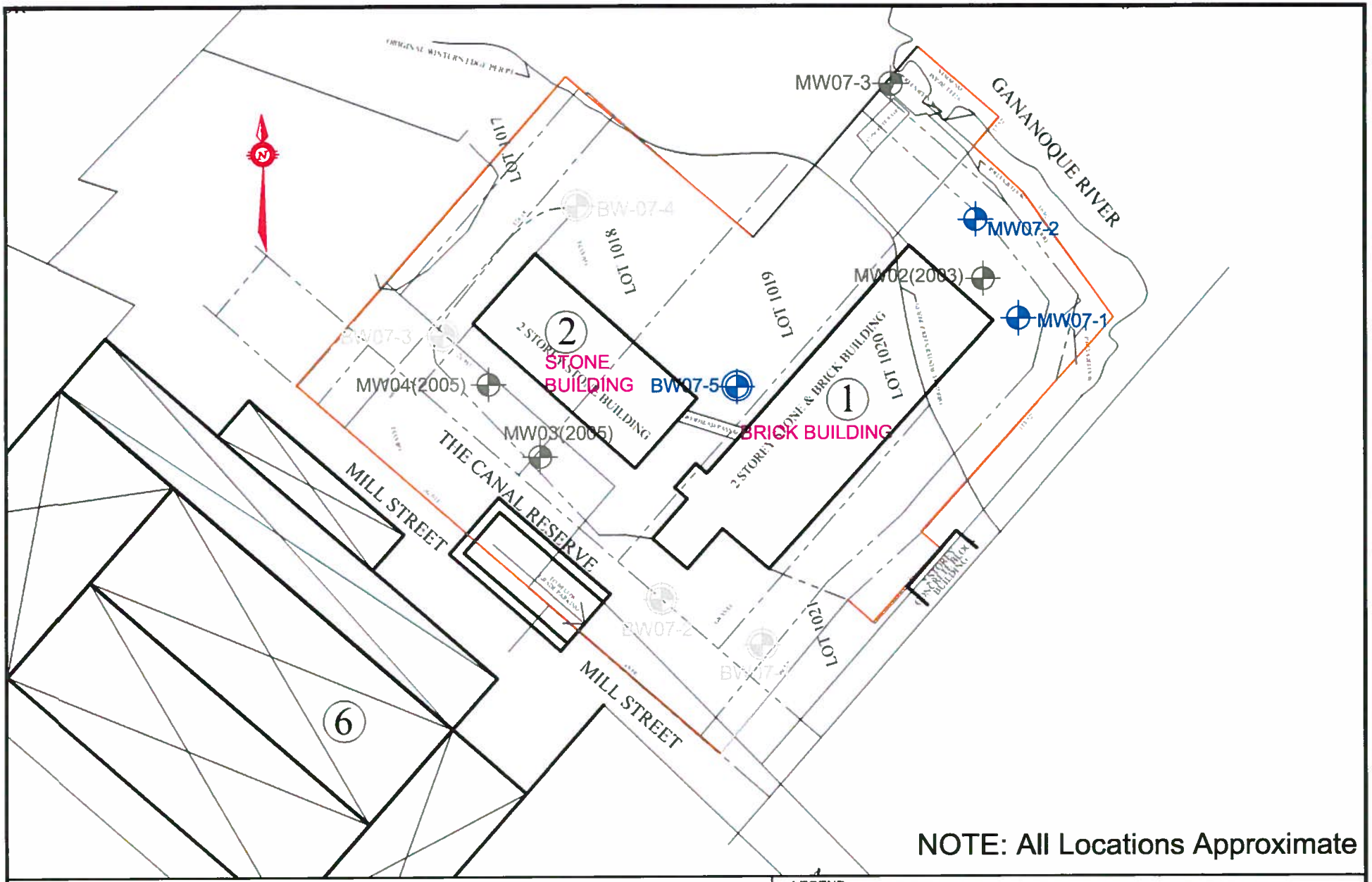
APPROXIMATE PROPERTY BOUNDARY

Source: Natural Resources Canada, NTS Map Sheet 31 C/8 "Gananoque" (2000)

exp Services Inc.

315-4 CATARAQUI STREET, KINGSTON, ONTARIO K7K 1Z7

DATE: **JULY 2013**	CLIENT: **BRENNAN CUSTOM HOMES INC.**	DRAWING NO: **KIN-26260-A0**
SCALE: **1:20 000**	TITLE: **SITE LOCATION PLAN 185 MILL STREET, GANANOQUE, ONTARIO**	**FIG. 1**



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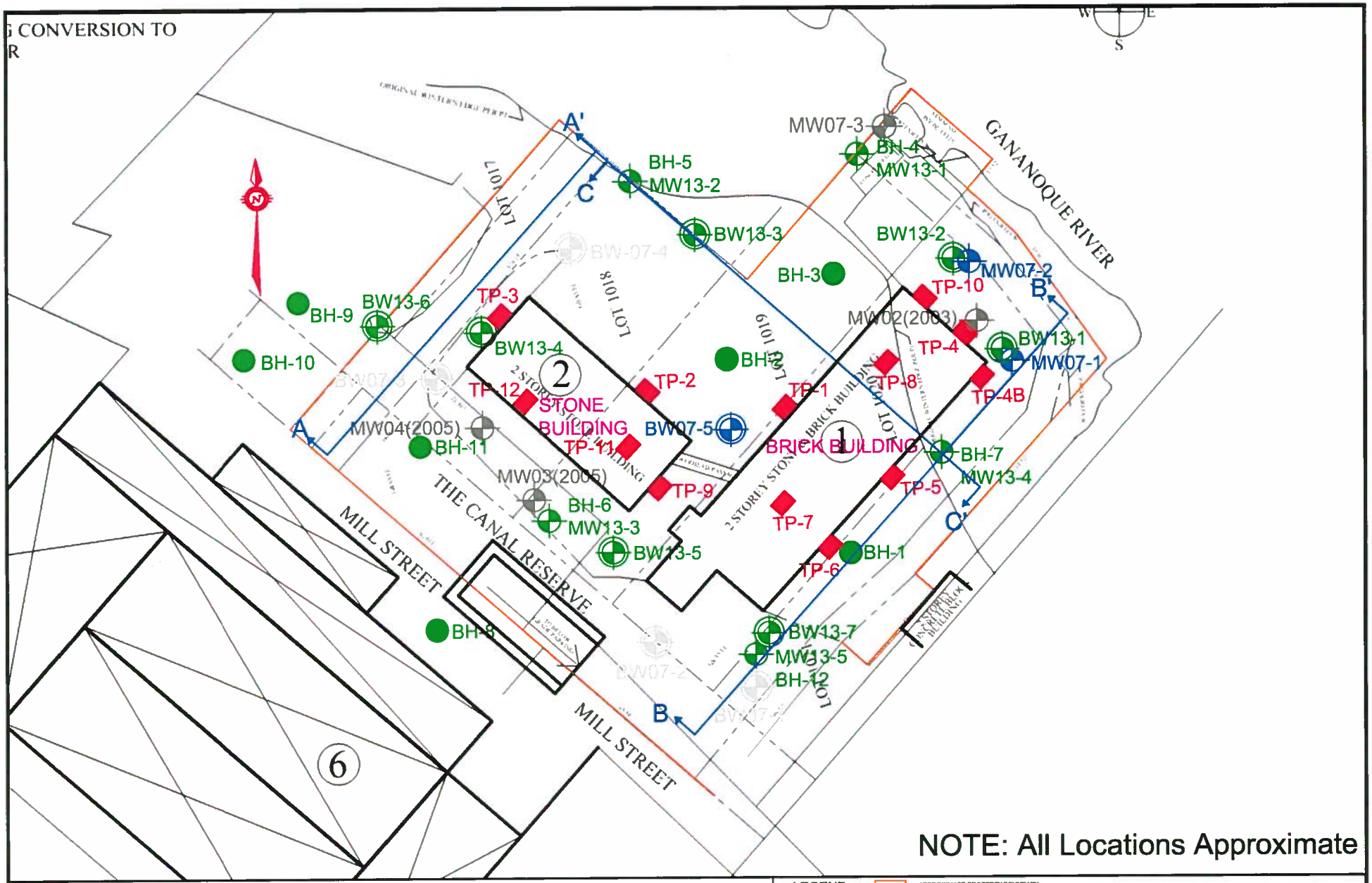
DATE: JULY 2013	CLIENT: BRENNAN CUSTOM HOMES INC.	DRAWING NO: FIG. 2
SCALE: 1:750	TITLE: SITE PLAN 185 MILL STREET, GANANOQUE, ONTARIO	PROJECT NO: KIN-26260-A0

LEGEND:

- APPROXIMATE PROPERTY BOUNDARY
- MW01(1999) EXISTING OVERBURDEN MONITORING WELL LOCATION AND ID (YEAR CONSTRUCTED)
- MW07-1 EXISTING 2007 OVERBURDEN MONITORING WELL LOCATION AND ID
- BW07-1 EXISTING 2007 BEDROCK MONITORING WELL LOCATION AND ID
- EXISTING 2007 OVERBURDEN MONITORING WELL LOCATION AND ID (COULD NOT BE LOCATED)
- EXISTING 2007 BEDROCK MONITORING WELL LOCATION AND ID (COULD NOT BE LOCATED)



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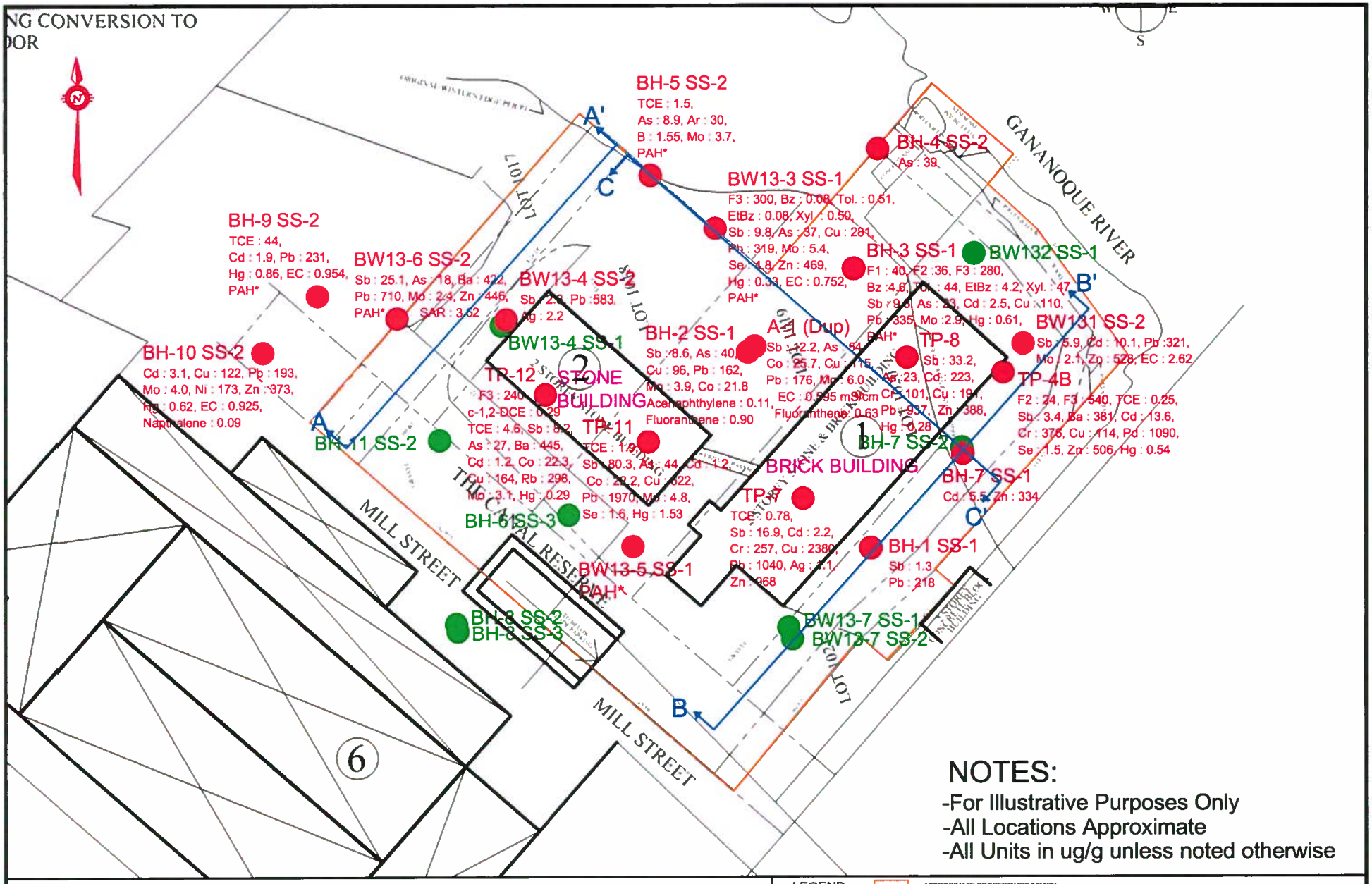
DATE: JULY 2013	CLIENT: BRENNAN CUSTOM HOMES INC.	DRAWING NO: FIG. 3
SCALE: 1:750	TITLE: BOREHOLE, MONITORING WELL AND TEST PIT LOCATION PLAN 185 MILL STREET, GANANOQUE, ONTARIO	PROJECT NO: KIN-26260-A0

LEGEND:

- APPROXIMATE PROPERTY BOUNDARY
- EXISTING OVERBURDEN MONITORING WELL LOCATION AND ID (YEAR CONSTRUCTED)
- EXISTING 2007 OVERBURDEN MONITORING WELL LOCATION AND ID
- EXISTING 2007 BEDROCK MONITORING WELL LOCATION AND ID
- EXISTING 2007 OVERBURDEN MONITORING WELL LOCATION AND ID (COULD NOT BE LOCATED)
- EXISTING 2007 BEDROCK MONITORING WELL LOCATION AND ID (COULD NOT BE LOCATED)
- OVERBURDEN MONITORING WELL LOCATION AND ID
- BEDROCK MONITORING WELL LOCATION AND ID
- BOREHOLE LOCATION AND ID
- APPROXIMATE TEST PIT LOCATION
- CROSS SECTIONAL VIEW LOCATION AND ID



exp.

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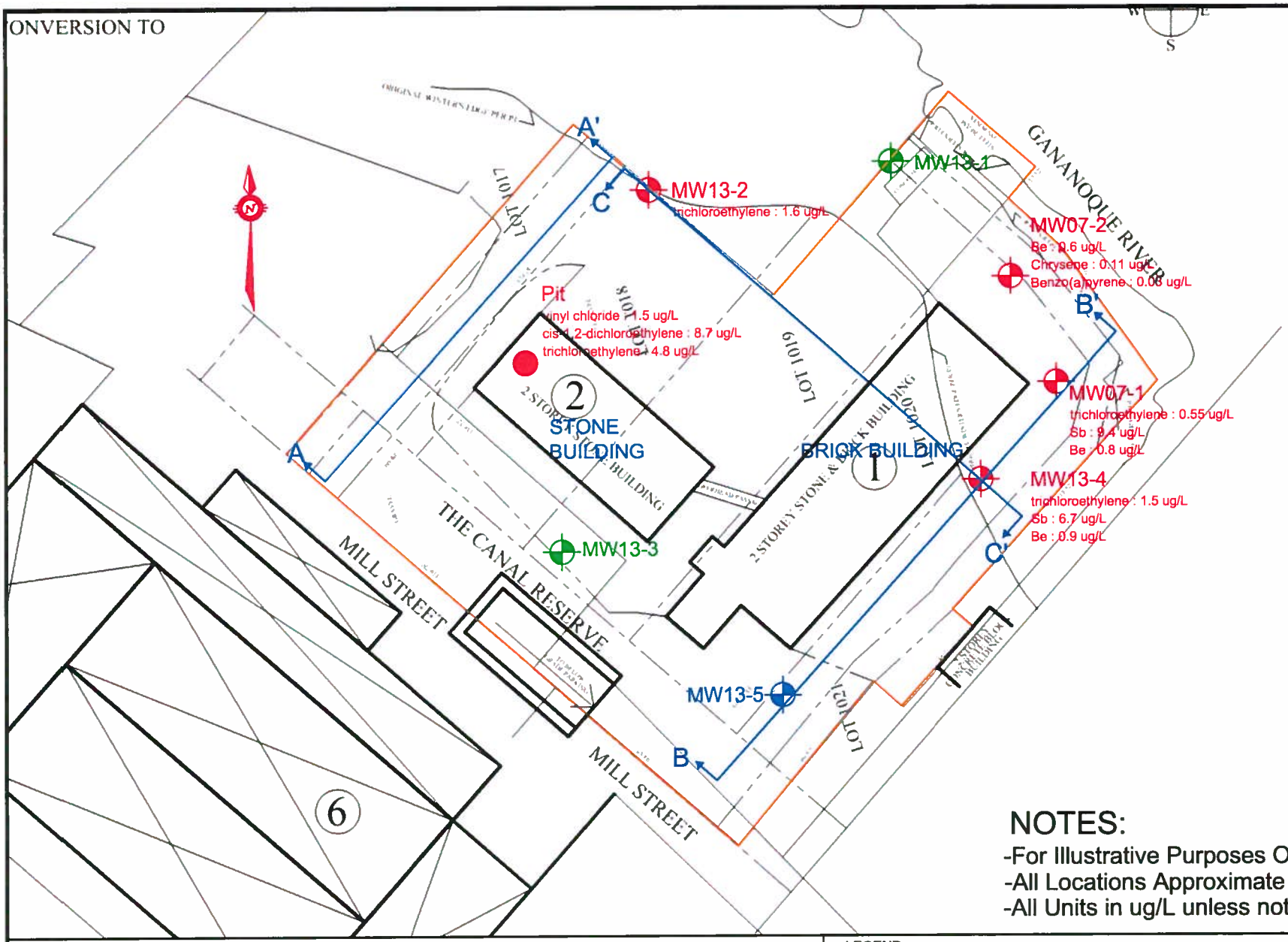
315-4 CATARAQUI STREET, KINGSTON, ONTARIO K7K 1Z7

DATE: JULY 2013	CLIENT: BRENNAN CUSTOM HOMES INC.	DRAWING NO: FIG. 4
SCALE: 1:750	TITLE: EXTENT OF CONTAMINANTS IN SOIL EXCEEDING TABLES 1, 7 AND/OR 9 SCS 185 MILL STREET, GANANOQUE, ONTARIO	PROJECT NO: KIN-26260-A0

LEGEND:

- APPROXIMATE PROPERTY BOUNDARY
- BH-1 SS-1 — SAMPLE LOCATION AND ID; ALL TESTED PARAMETERS IN SOIL DETECTED WITHIN TABLES 1, 7 AND 9 SCS
- BH-1 SS-1 F2 100 — SAMPLE LOCATION AND ID; ONE OR MORE TESTED PARAMETERS IN SOIL EXCEED TABLES 1, 7 AND/OR 9 SCS PARAMETER EXCEEDING TABLE 1, 7 AND/OR 9 SCS AND CONCENTRATION IN ug/g
- F1; F2; F3; F4 — PETROLEUM HYDROCARBON FRACTIONS F1, F2, F3 and F4
- Bz; Tol.; EtBz; Xyl — BENZENE, TOLUENE, ETHYLBENZENE, XYLENES
- TCE — TRICHLOROETHYLENE
- c-1,2-DCE — CIS-1,2-DICHLOROETHYLENE
- PAH — POLYCYCLIC AROMATIC HYDROCARBONS
- PAH* — SEVERAL PAH PARAMETERS IN SOIL EXCEEDED TABLES 1, 7 AND/OR 9 SCS IN SAMPLES BH-3 SS-1, BH-5 SS-2, BH-9 SS-2, BW13-3 SS-1, BW13-5 SS-1, BS13-6 SS-2
- A — A' — CROSS SECTIONAL VIEW LOCATION AND ID

ONVERSION TO



NOTES:

-For Illustrative Purposes Only
-All Locations Approximate
-All Units in ug/L unless noted otherwise

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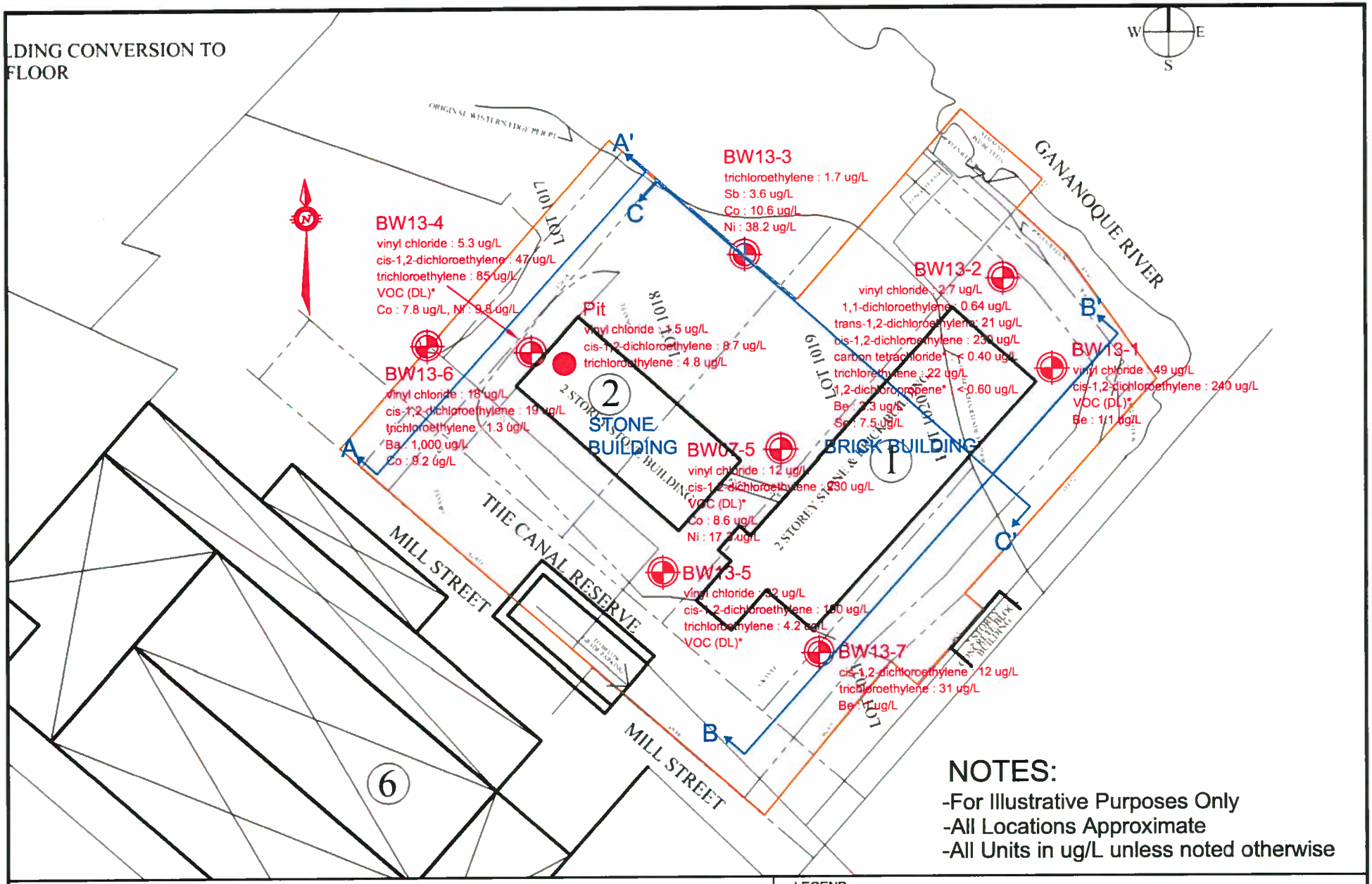
315-4 CATARAQUI STREET, KINGSTON, ONTARIO K7K 1Z7

DATE: JULY 2013	CLIENT: BRENNAN CUSTOM HOMES INC.	DRAWING NO: FIG. 5a
SCALE: 1:750	TITLE: EXTENT OF CONTAMINANTS IN OVERBURDEN GROUNDWATER EXCEEDING TABLES 1, 7 AND/OR 9 SCS 185 MILL STREET, GANANOQUE, ONTARIO	PROJECT NO: KIN-26260-A0

LEGEND:

- APPROXIMATE PROPERTY BOUNDARY
- MW07-1 — OVERBURDEN MONITORING WELL LOCATION AND ID; ALL TESTED PARAMETERS IN GROUNDWATER DETECTED WITHIN TABLES 1, 7 AND/OR 9 SCS
- MW13-5 — OVERBURDEN MONITORING WELL LOCATION AND ID; WELL DRY; NO SAMPLES COLLECTED
- MW07-1 — OVERBURDEN MONITORING WELL LOCATION AND ID; ONE OR MORE TESTED PARAMETERS IN GROUNDWATER EXCEEDS TABLES 1, 7 AND/OR 9 SCS
- PIT — PIT LOCATION; ONE OR MORE TESTED PARAMETERS IN GROUNDWATER EXCEEDS TABLES 1, 7 AND/OR 9 SCS
- vinyl chloride 5.3 ug/L — PARAMETER EXCEEDING TABLES 1, 7 AND/OR 9 SCS
- A — A' — CROSS SECTIONAL VIEW LOCATION AND ID

LDING CONVERSION TO
FLOOR



NOTES:

-For Illustrative Purposes Only
-All Locations Approximate
-All Units in ug/L unless noted otherwise

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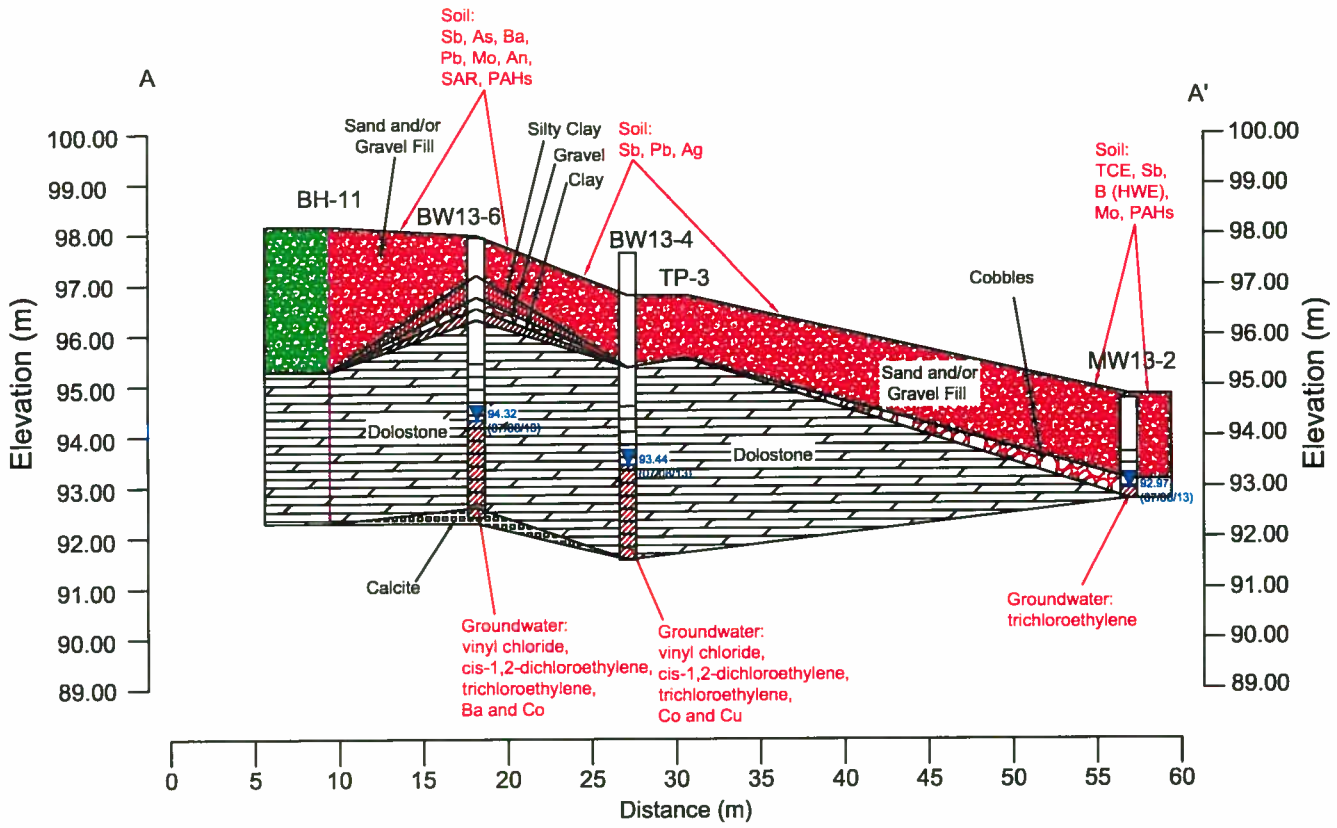
315-4 CATARAQUI STREET, KINGSTON, ONTARIO K7K 1Z7

DATE: JULY 2013	CLIENT: BRENNAN CUSTOM HOMES INC.	DRAWING NO: FIG. 5b
SCALE: 1:750	TITLE: EXTENT OF CONTAMINANTS IN SHALLOW BEDROCK GROUNDWATER EXCEEDING TABLES 1, 7 AND/OR 9 SCS 185 MILL STREET, GANANOQUE, ONTARIO	PROJECT NO: KIN-26260-A0

LEGEND:

- APPROXIMATE PROPERTY BOUNDARY
- BW07-1 — BEDROCK MONITORING WELL LOCATION AND ID; TESTED PARAMETERS IN GROUNDWATER WITHIN TABLE 1, 7 AND 9 SCS
- BW07-1 — BEDROCK MONITORING WELL LOCATION AND ID; ONE OR MORE TESTED PARAMETERS IN GROUNDWATER EXCEEDS TABLES 1, 7 AND/OR 9 SCS
- PIT — PIT LOCATION; ONE OR MORE TESTED PARAMETERS IN GROUNDWATER EXCEEDS TABLES 1, 7 AND/OR 9 SCS
- vinyl chloride 5.3 ug/L — PARAMETER EXCEEDING TABLE 1, 7 AND/OR 9 SCS
- A — A' — CROSS SECTIONAL VIEW LOCATION AND ID
- VOC (DL)* — DETECTION LIMITS FOR SEVERAL VOC PARAMETERS IN GROUNDWATER ABOVE TABLES 1, 7 AND/OR 9 SCS IN SAMPLES AT BW07-5, BW13-1, BW13-4 AND BW13-5 DUE TO HIGH CONCENTRATIONS OF CIS-1,2-DICHLOROETHYLENE AND/OR VINYL CHLORIDE



NOTE: All Locations Approximate

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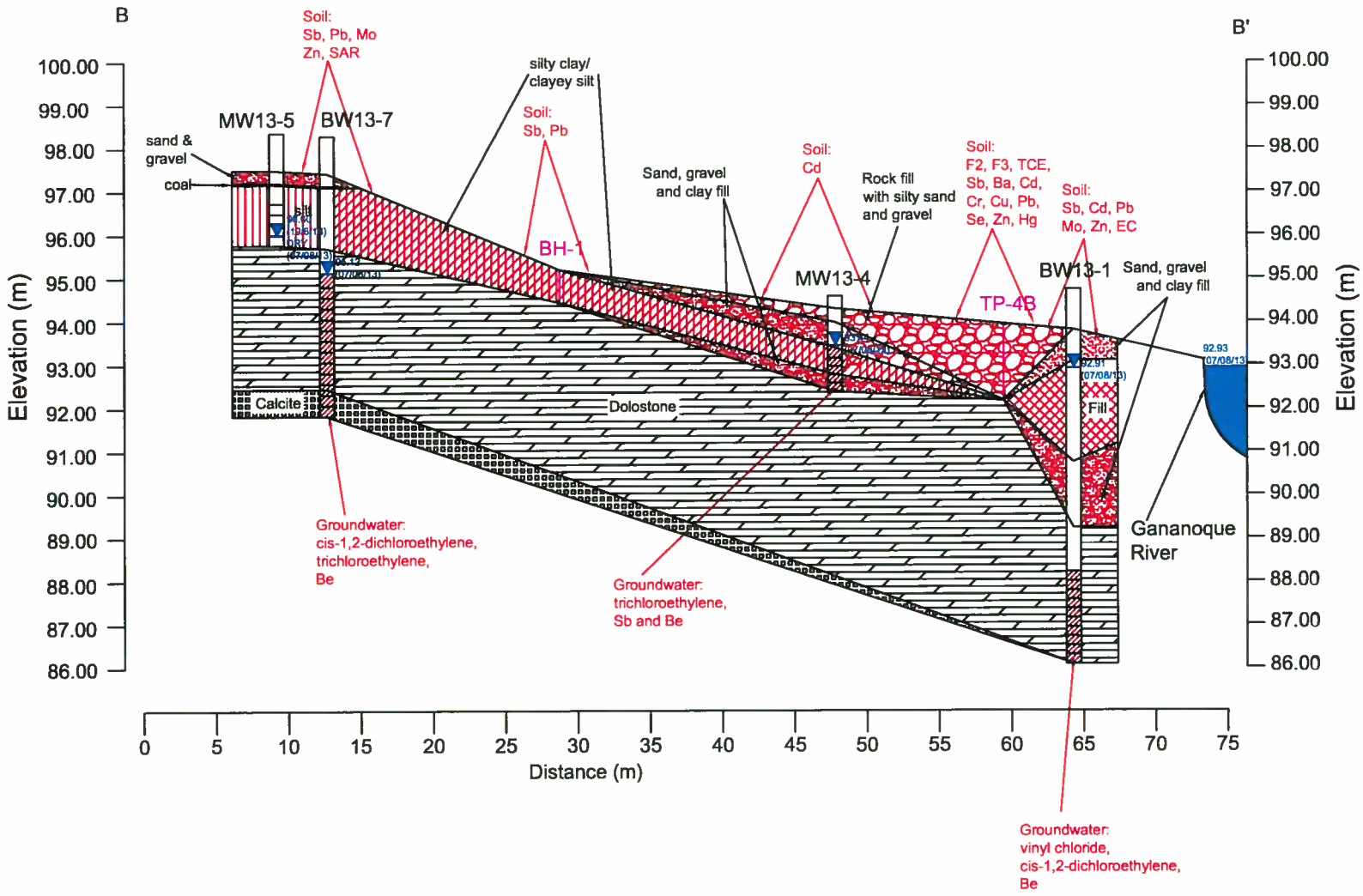
315-4 CATARAQUI STREET, KINGSTON, ONTARIO K7K 1Z7

DATE: JULY 2013	CLIENT: BRENNAN CUSTOM HOMES INC.	DRAWING NO: FIG. 6A
SCALE: Horizontal 1:450 Vertical 1:150	TITLE: CROSS SECTIONAL VIEW A-A' 185 MILL STREET, GANANOQUE, ONTARIO	PROJECT NO: KIN-26260-A0

LEGEND:

- TESTED PARAMETERS WITHIN TABLE 1, 7 AND/OR 9 SCS
- ONE OR MORE TESTED PARAMETERS ABOVE TABLE 1, 7 AND/OR 9 SCS
- vinyl chloride — PARAMETER EXCEEDING TABLE 1, 7 AND/OR 9 SCS IN SOIL OR GROUNDWATER
- 92.97 (07/08/13) — RELATIVE STATIC WATER LEVEL ELEVATION (METRES) DATE MEASURED



NOTE: All Locations Approximate

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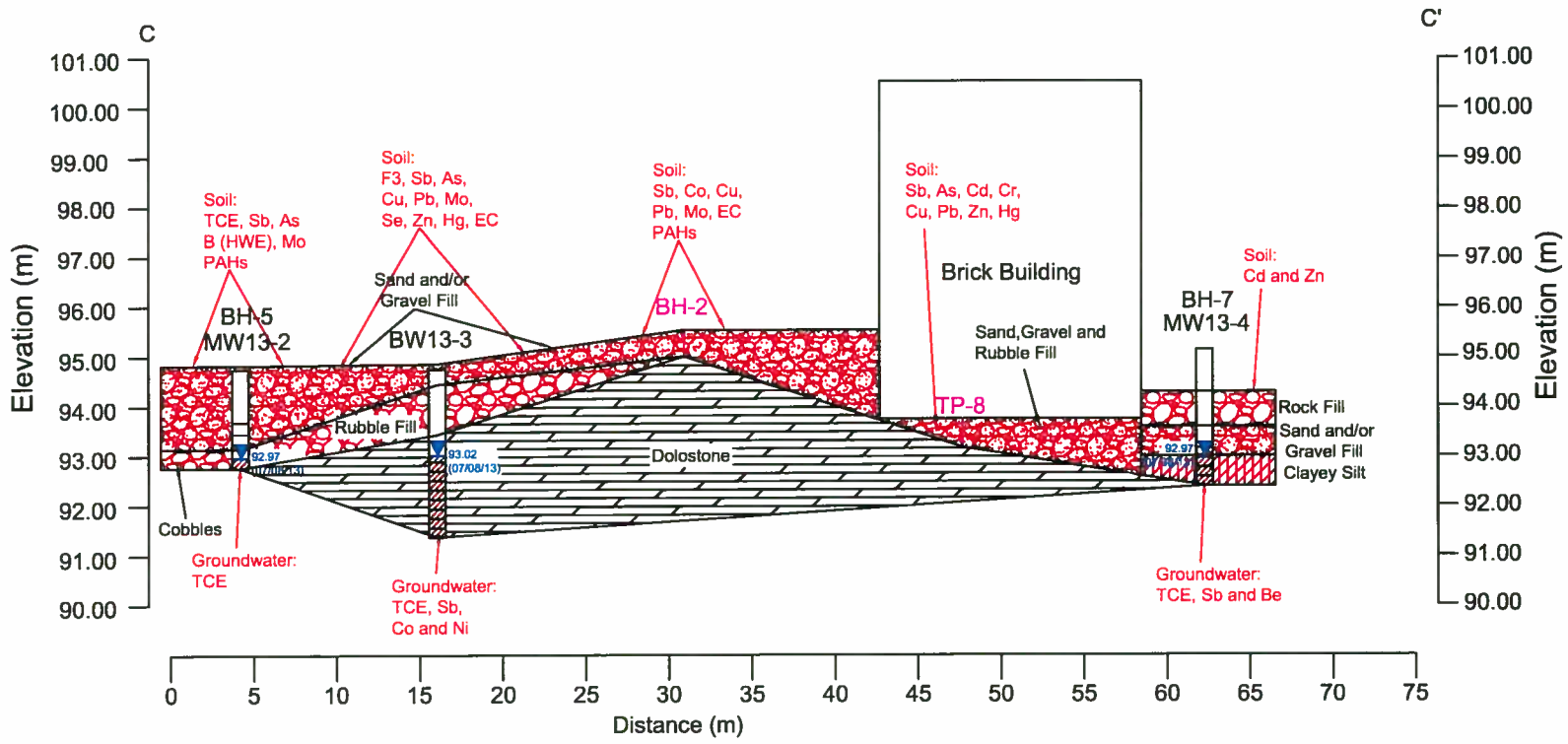
315-4 CATARAQUI STREET, KINGSTON, ONTARIO K7K 1Z7

DATE: JULY 2013	CLIENT: BRENNAN CUSTOM HOMES INC.	DRAWING NO: FIG. 6B
SCALE: Horizontal 1:450 Vertical 1:150	TITLE: CROSS SECTIONAL VIEW B-B' 185 MILL STREET, GANANOQUE, ONTARIO	PROJECT NO: KIN-26260-A0

LEGEND:

- TESTED PARAMETERS WITHIN TABLE 1, 7 AND/OR 9 SCS
- ONE OR MORE TESTED PARAMETERS ABOVE TABLE 1, 7 AND/OR 9 SCS
- vinyl chloride — PARAMETER EXCEEDING TABLE 1, 7 AND/OR 9 SCS IN SOIL OR GROUNDWATER
- 92.97 (07/08/13) — RELATIVE STATIC WATER LEVEL ELEVATION (METRES) DATE MEASURED

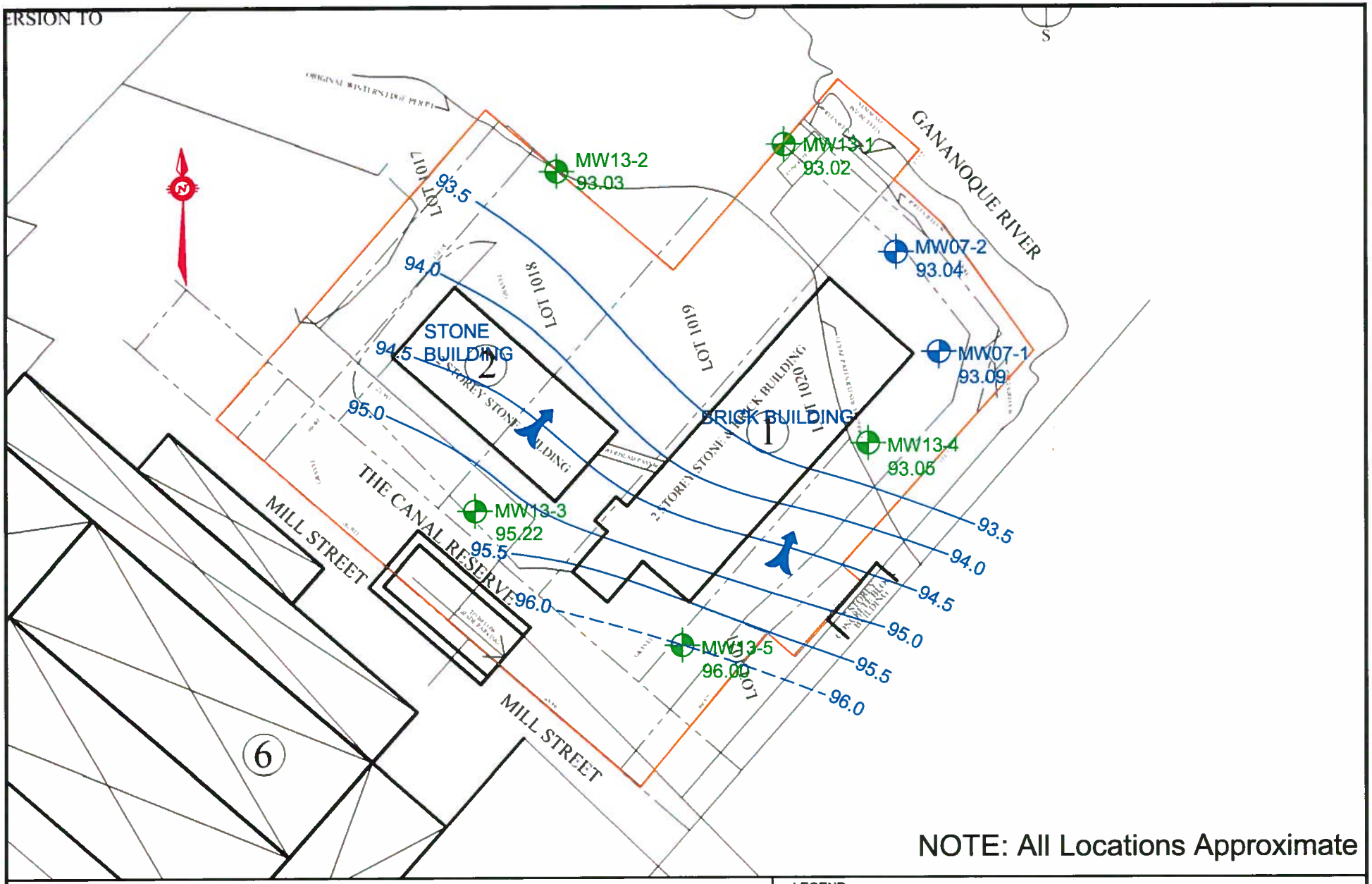


NOTE: All Locations Approximate

exp Services Inc. 315-4 CATARAQUI STREET, KINGSTON, ONTARIO K7K 1Z7		
DATE: JULY 2013	CLIENT: BRENNAN CUSTOM HOMES INC.	DRAWING NO: FIG. 6C
SCALE: Horizontal 1:450 Vertical 1:150	TITLE: CROSS SECTIONAL VIEW C-C' 185 MILL STREET, GANANOQUE, ONTARIO	PROJECT NO: KIN-26260-A0

LEGEND:

- TESTED PARAMETERS WITHIN TABLE 1, 7 AND/OR 9 SCS
- ONE OR MORE TESTED PARAMETERS ABOVE TABLE 1, 7 AND/OR 9 SCS
- vinyl chloride — PARAMETER EXCEEDING TABLE 1, 7 AND/OR 9 SCS IN SOIL OR GROUNDWATER
- 92.97 (07/08/13) — RELATIVE STATIC WATER LEVEL ELEVATION (METRES) DATE MEASURED



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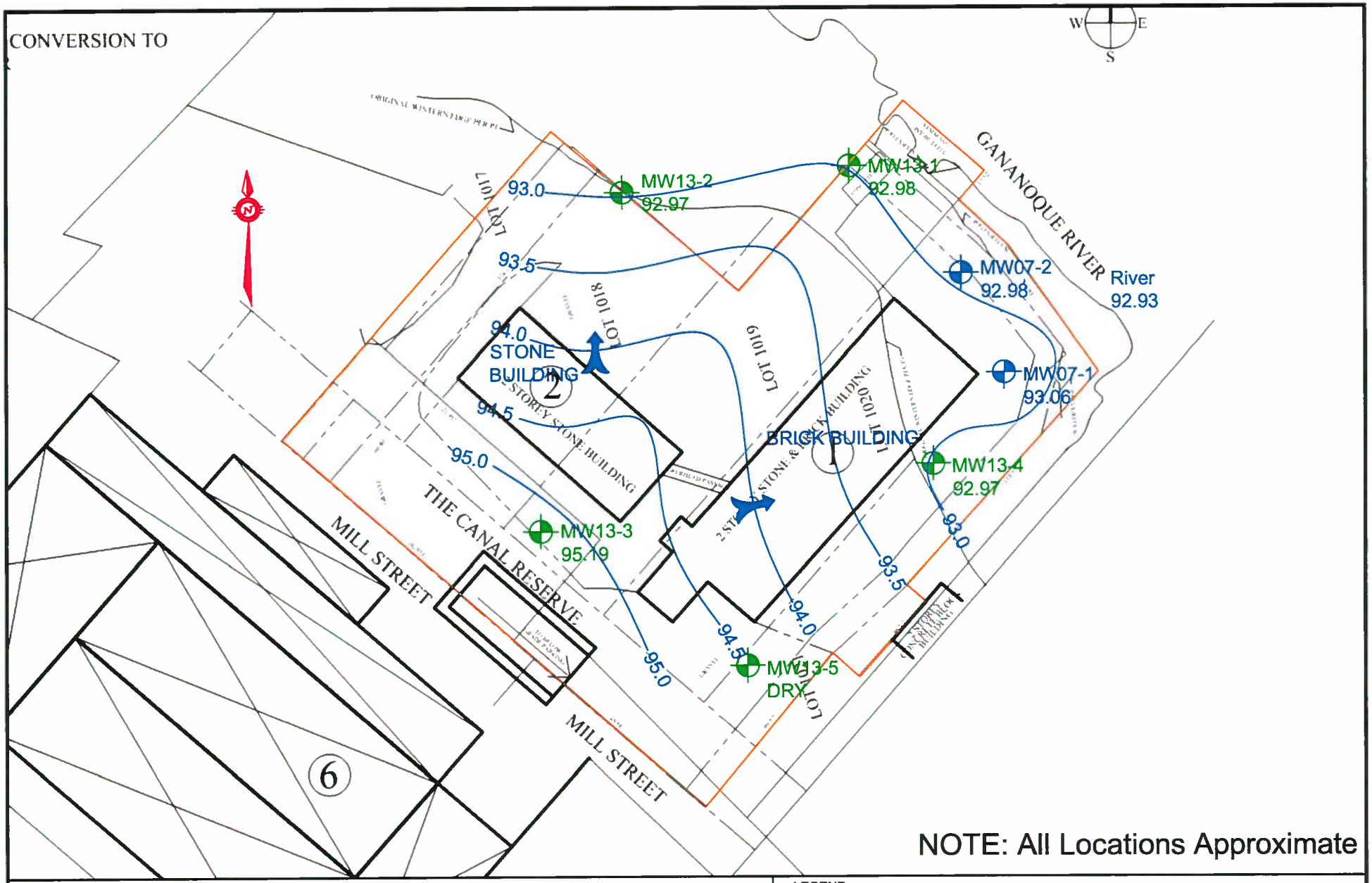
315-4 CATARAQUI STREET, KINGSTON, ONTARIO K7K 1Z7

DATE: JULY 2013	CLIENT: BRENNAN CUSTOM HOMES INC.		DRAWING NO: FIG. 7A
SCALE: 1:750	TITLE: INTERPRETED GROUNDWATER CONTOUR PLAN IN OVERBURDEN (JUNE 19, 2013) 185 MILL STREET, GANANOQUE, ONTARIO		PROJECT NO: KIN-26260-A0

LEGEND:

- APPROXIMATE PROPERTY BOUNDARY
- MW07-1 93.09 — EXISTING 2007 OVERBURDEN MONITORING WELL LOCATION AND ID; STATIC WATER LEVEL ELEVATION IN METRES
- MW13-1 93.02 — OVERBURDEN MONITORING WELL LOCATION AND ID; STATIC WATER LEVEL ELEVATION IN METRES
- Potentiometric Surface Contour
- Interpolated Potentiometric Surface Contour
- Groundwater Flow Direction



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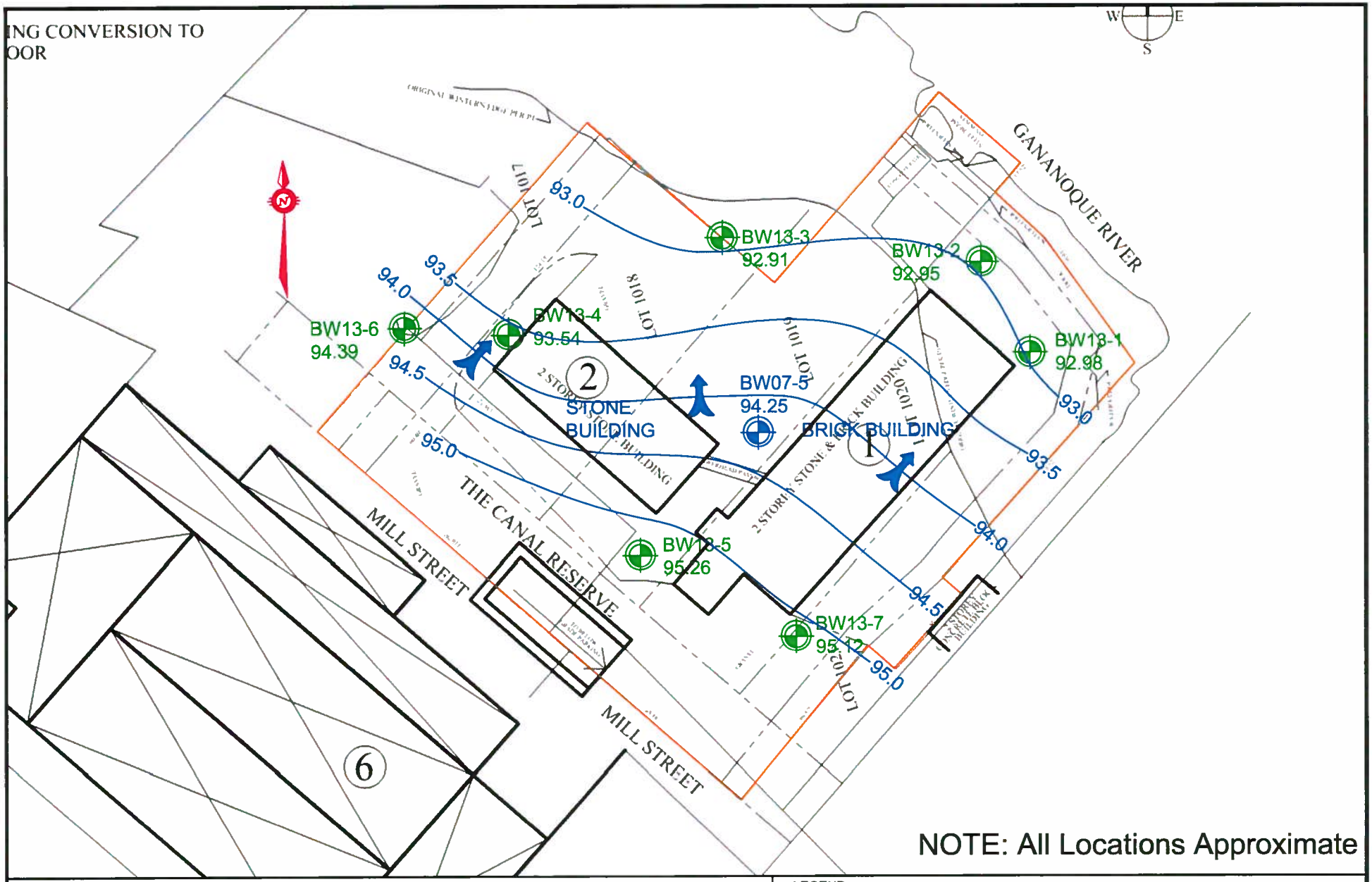
315-4 CATARAQUI STREET, KINGSTON, ONTARIO K7K 1Z7

DATE: JULY 2013	CLIENT: BRENNAN CUSTOM HOMES INC.		DRAWING NO: FIG. 7B
SCALE: 1:750	TITLE: INTERPRETED GROUNDWATER CONTOUR PLAN IN OVERBURDEN (AUGUST 7, 2013) 185 MILL STREET, GANANOQUE, ONTARIO		PROJECT NO: KIN-26260-A0

LEGEND:

- APPROXIMATE PROPERTY BOUNDARY
- MW07-1 93.09 — EXISTING 2007 OVERBURDEN MONITORING WELL LOCATION AND ID; STATIC WATER LEVEL ELEVATION IN METRES
- MW13-1 93.02 — OVERBURDEN MONITORING WELL LOCATION AND ID; STATIC WATER LEVEL ELEVATION IN METRES
- Potentiometric Surface Contour
- Interpolated Potentiometric Surface Contour
- Groundwater Flow Direction

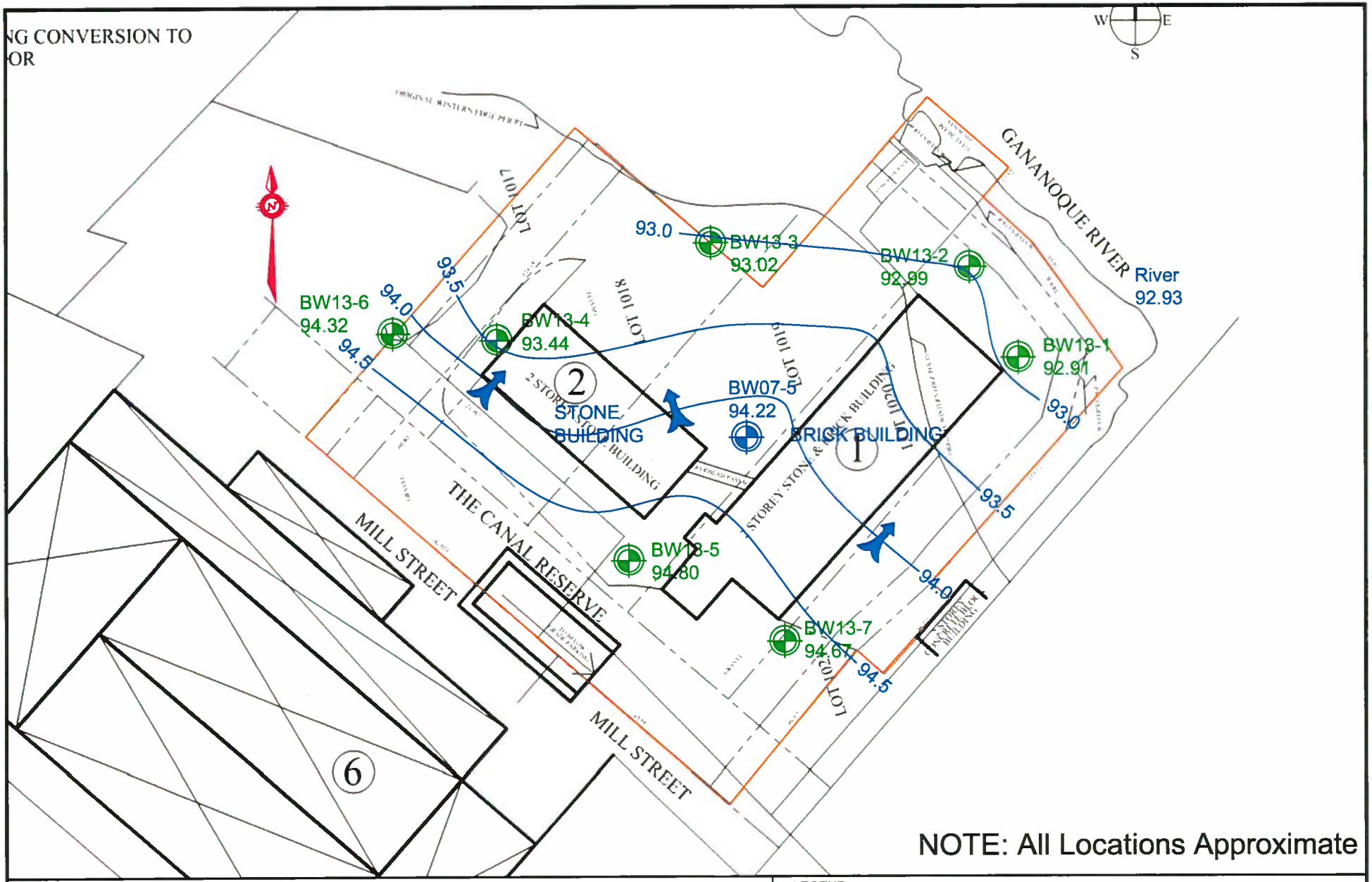


exp Services Inc.
315-4 CATARAQUI STREET, KINGSTON, ONTARIO K7K 1Z7

DATE: JULY 2013	CLIENT: BRENNAN CUSTOM HOMES INC.		DRAWING NO: FIG. 7C
SCALE: 1:750	TITLE: INTERPRETED GROUNDWATER CONTOUR PLAN IN SHALLOW BEDROCK (JUNE 19, 2013) 185 MILL STREET, GANANOQUE, ONTARIO		PROJECT NO: KIN-26260-A0

LEGEND:

- APPROXIMATE PROPERTY BOUNDARY
- BW07-1 93.09 — EXISTING 2007 BEDROCK MONITORING WELL LOCATION AND ID; STATIC WATER LEVEL ELEVATION IN METRES
- BW13-1 93.02 — BEDROCK MONITORING WELL LOCATION AND ID; STATIC WATER LEVEL ELEVATION IN METRES
- Potentiometric Surface Contour
- Interpolated Potentiometric Surface Contour
- Groundwater Flow Direction



exp Services Inc.

315-4 CATARAQUI STREET, KINGSTON, ONTARIO K7K 1Z7

DATE: JULY 2013	CLIENT: BRENNAN CUSTOM HOMES INC.	DRAWING NO: FIG. 7D
SCALE: 1:750	TITLE: INTERPRETED GROUNDWATER CONTOUR PLAN IN SHALLOW BEDROCK (AUGUST 7, 2013) 185 MILL STREET, GANANOQUE, ONTARIO	PROJECT NO: KIN-26260-A0

LEGEND:

- APPROXIMATE PROPERTY BOUNDARY
- BW07-1 93.09 — EXISTING 2007 BEDROCK MONITORING WELL LOCATION AND ID; STATIC WATER LEVEL ELEVATION IN METRES
- BW13-1 93.02 — BEDROCK MONITORING WELL LOCATION AND ID; STATIC WATER LEVEL ELEVATION IN METRES
- Potentiometric Surface Contour
- Interpolated Potentiometric Surface Contour
- Groundwater Flow Direction

Tables

Table 1: Summary of Soil Samples Submitted for Chemical Analyses
Brennan Custom Homes Inc.
185 Mill Street
Gananoque, Ontario

KIN-00026260-A0

Soil Sample Number	Sample Location	Sample Depth Interval (m)	Rationale	Analysis
BH-1 SS-1	BH-1	0 – 0.6	Site delineation/site coverage	PHC, VOC, metals
BH-2 SS-1	BH-2	0 - 0.5	Site delineation/site coverage	PHC, VOC, metals, PAH
A-1	BH-2	0 - 0.5	Duplicate of Sample BH-2 SS-1	PHC, VOC, metals, PAH
BH-3 SS-1	BH-3	0 - 0.3	Site delineation/site coverage	PHC, VOC, metals, PAH
BH-3 SS-1	BW13-3	0 - 0.4	Site delineation/site coverage	PHC, VOC, metals, PAH
BH-4 SS-1	BH-4	0.6 - 1.2	Site delineation/site coverage	PHC, VOC
BH-4 SS-2	BH-4	1.2 - 1.8	Site delineation/site coverage	metals
BH-5 SS-2	BH-5	0.6 - 1.2	Site delineation/site coverage	PHC, VOC, metals, PAH
BH-6 SS-3	BH-6	1.2 - 1.8	Site delineation/site coverage	PHC, VOC, metals, PCB
BH-7 SS-1	BH-7	0.3 - 0.9	Site delineation/site coverage	metals
BH-7 SS-2	BH-7	0.9 - 1.5	Site delineation/site coverage	PHC, VOC, PAH, PCB
BH-8 SS-2	BH-8	0.6 - 1.2	Site delineation/site coverage	PHC, VOC, metals, PAH, PCB
BH-9 SS-2	BH-9	0.6 - 1.2	Site delineation/site coverage	PHC, VOC, metals, PAH
BH-10 SS-2	BH-10	0.6 - 1.2	Site delineation/site coverage	PHC, VOC, metals, PAH, PCB
BH-11 SS-2	BH-11	0.6 - 1.2	Site delineation/site coverage	PHC, VOC, metals
BW13-1 SS-2	BW13-1	0.6 - 1.2	Site delineation/site coverage	PHC, VOC, metals
BW13-2 SS-1	BW13-2	0 - 0.6	Site delineation/site coverage	PHC, VOC, metals, PAH
BW13-4 SS-1	BW13-4	0 - 0.6	Site delineation/site coverage	PHC, VOC
BW13-4 SS-2	BW13-4	0.6 - 1.2	Site delineation/site coverage	metals
BW13-5 SS-1	BW13-5	0 - 0.6	Site delineation/site coverage	PHC, VOC, metals, PAH, PCB
BW13-6 SS-2	BW13-6	0.6 - 1.2	Site delineation/site coverage	PHC, VOC, metals, PAH, PCB
BW13-7 SS-1	BW13-7	0 - 0.6	Site delineation/site coverage	metals, PAH
BW13-7 SS-2	BW13-7	0.6 - 1.2	Site delineation/site coverage	PHC, VOC, PCB
TP4B	TP-4B	0.9 - 1.8	Site delineation/site coverage	PHC, VOC, metals
TP7	TP-7	0 - 0.8	Site delineation/site coverage	PHC, VOC, metals
TP8	TP-8	0 - 0.6	Site delineation/site coverage	PHC, VOC, metals
TP11	TP-11	0 - 0.4	Site delineation/site coverage	PHC, VOC, metals
TP12	TP-12	0 - 0.5	Site delineation/site coverage	PHC, VOC, metals

PHC = petroleum hydrocarbon compounds; VOC = volatile organic compounds; PAH = Polycyclic Aromatic Hydrocarbons; PCB = Polychlorinated Biphenyls.

Table 2: Monitoring Well Completion Details
Brennan Custom Homes Inc.
185 Mill Street
Gananoque, Ontario

KIN-00026260-A0

Monitoring Well	Ground Surface Elevation (m AMSL)	Top of Screen Elevation (m AMSL)	Bottom of Screen Elevation (m AMSL)	Screen Depth Interval (m)	Geologic Units Intercepted by Well Screen
MW13-1	93.87	92.65	89.91	2.74	Overburden
MW13-2	94.82	93.68	92.76	0.92	Overburden
MW13-3	97.91	96.61	95.10	1.51	Overburden
MW13-4	94.29	93.15	92.38	0.77	Overburden
MW13-5	97.49	96.73	95.76	0.97	Overburden
BW13-1	93.80	88.21	86.08	2.13	Dolostone
BW13-2	93.49	86.02	83.89	2.13	Calcite
BW13-3	94.85	92.89	91.37	1.52	Dolostone
BW13-4	96.79	94.61	91.56	3.05	Dolostone
BW13-5	97.91	95.76	92.71	3.05	Dolostone
BW13-6	97.97	95.48	92.44	3.04	Dolostone and Calcite
BW13-7	97.42	94.80	91.76	3.04	Dolostone and Calcite

Note: Elevations were measured in relation to a benchmark (screw on hydro pole) with an elevation of 100.00 m AMSL.
m AMSL = metres average mean sea level

Table 3: Summary of Groundwater Samples Submitted for Chemical Analyses
Brennan Custom Homes Inc.
185 Mill Street
Gananoque, Ontario

KIN-00026260-A0

Sample Identification	Sample Location	Date Sampled	Analysis
P-1	Pit - Stone Building	4-Jun-13	PHC, VOC, metals
6-1	BW13-2	19-Jun-13	PHC, VOC, metals, PAH
6-2	MW07-2	19-Jun-13	PHC, VOC, metals, PAH
6-3	BW13-1	19-Jun-13	PHC, VOC, metals, PAH
6-4	MW07-1	19-Jun-13	PHC, VOC, metals, PAH
6-5	MW13-4	19-Jun-13	PHC, VOC, metals
6-6	BW13-7	19-Jun-13	PHC, VOC, metals, PAH, PCB
6-7	MW13-2	20-Jun-13	PHC, VOC
6-8	MW13-1	20-Jun-13	PHC, VOC, metals, PAH
6-9	MW13-1 Dup	20-Jun-13	PHC, VOC, metals, PAH
6-10	BW07-5	20-Jun-13	PHC, VOC, metals
6-11	BW13-5	20-Jun-13	PHC, VOC, metals, PCB
6-12	BW13-6	20-Jun-13	PHC, VOC, metals, PAH, PCB
6-13	BW13-4	20-Jun-13	PHC, VOC, metals, PAH
6-14	BW13-3	20-Jun-13	PHC, VOC, metals, PAH
6-15	MW13-3	20-Jun-13	VOC
Trip Blank	Trip Blank	19-Jun-13	VOC
Trip Blank	Trip Blank	20-Jun-13	VOC

PHC = petroleum hydrocarbon compounds; VOC = volatile organic compounds; PAH = Polycyclic Aromatic Hydrocarbons; PCB = Polychlorinated Biphenyls.

Table 4: Summary of Groundwater Levels and Elevations – June 19, 2013
Brennan Custom Homes Inc.
185 Mill Street
Gananoque, Ontario

KIN-00026260-A0

Monitoring Well	Ground Surface Elevation (m AMSL)	Top of Pipe Elevation (m AMSL)	Depth to Groundwater (m btop)	Groundwater Elevation (m AMSL)	Depth to Groundwater (m below grade)
MW07-1	93.75	94.80	0.66	93.09	1.71
MW07-2	93.42	94.48	0.38	93.04	1.44
MW13-1	93.87	93.68	0.85	93.02	0.66
MW13-2	94.82	94.74	1.79	93.03	1.71
MW13-3	97.91	97.80	2.69	95.22	2.58
MW13-4	94.29	95.14	1.24	93.05	2.09
MW13-5	97.49	98.37	1.49	96.00	2.37
BW07-5	96.75	97.70	2.50	94.25	3.45
BW13-1	93.80	94.73	0.82	92.98	1.75
BW13-2	93.49	94.37	0.54	92.95	1.42
BW13-3	94.85	94.75	1.94	92.91	1.84
BW13-4	96.79	97.63	3.24	93.54	4.09
BW13-5	97.91	97.87	2.65	95.26	2.61
BW13-6	97.97	97.86	3.58	94.39	3.47
BW13-7	97.42	98.29	2.30	95.12	3.17
Range			**0.38 - 0.58**	**92.91 - 96.00**	**0.66 - 4.09**
Average			**1.78**	**93.86**	**2.29**

Notes:
m btop = metres below top of pipe;
m AMSL = metres average mean sea level.

Table 5: Summary of Site Physical and Land Use Characteristics
Brennan Custom Homes Inc.
185 Mill Street
Gananoque, Ontario

Characteristic	Description
Depth to bedrock	Surface to 4.57 m below grade
Average Depth to water table	1.78 m below grade (June 19, 2013)
Shallow soil property	Yes
Proximity to water body	Gananoque River (adjacent to the East)
Soil pH (surface soil/subsurface soil)	Surface soil = 3.6 – 12.9 Subsurface soil = NA
Soil Texture	Coarse
Current property use	Industrial
Future proposed property use	Residential
Proposed future buildings	Two residential condominum buildings

Table 6
Maximum Known Concentrations at Time of Certification
Petroleum Hydrocarbons, VOC's, Metals, Inorganics, PAHs and PCBs
185 Mill Street, Gananoque, Ontario

exp.

KIN-26260-A0

	Soil							Groundwater						
		CRITERIA							CRITERIA					
PARAMETER	Units	Table 1*	Table 7**	Table 9***	Maximum Concentration	Depth Range (mbgs)	Sample ID or Location	Units	Table 1*	Table 7**	Table 9***	Maximum Concentration	Depth Range (mbgs)	Sample Location
PHCs														
PHC F1 (C6-C10 Hydrocarbons)-BTEX	µg/g	25	55	25	40	0 - 0.27	BH-3	µg/L	420	420	420	56	0.76 - 1.73	BW13-5
PHC F2 (C10-C16 Hydrocarbons)	µg/g	10	98	10	36	0 - 0.27	BH-3	µg/L	150	150	150	<100	0.76 - 9.60	All Monitoring Wells and Interior Pit
PHC F3 (C16-C34 Hydrocarbons)	µg/g	240	300	240	540	0.9 - 1.8	TP-4B	µg/L	500	500	500	<100	0.76 - 9.60	All Monitoring Wells and Interior Pit
PHC F4 (C34-C50 Hydrocarbons)	µg/g	120	2,800	120	98	0 - 0.9	TP-12	µg/L	500	500	500	<100	0.76 - 9.60	All Monitoring Wells and Interior Pit
VOCs														
Dichlorodifluoromethane	µg/g	0.05	16	0.05	0.05	0 - 1.8	All Boreholes and Test Pits	µg/L	590	3,500	3,500	<4.0	5.59 - 7.72	BW13-1
Vinyl Chloride	µg/g	0.02	0.02	0.02	0.02	0 - 1.8	All Boreholes and Test Pits	µg/L	0.5	0.5	0.5	49	5.59 - 7.72	BW13-1
Bromomethane	µg/g	0.05	0.05	0.05	0.05	0 - 1.8	All Boreholes and Test Pits	µg/L	0.89	0.89	5.6	<4.0	5.59 - 7.72	BW13-1
Trichlorofluoromethane	µg/g	0.25	4	0.25	0.05	0 - 1.8	All Boreholes and Test Pits	µg/L	150	2,000	2,000	<8.0	5.59 - 7.72	BW13-1
Acetone	µg/g	0.5	16	0.5	0.5	0 - 1.8	All Boreholes and Test Pits	µg/L	2,700	100,000	100,000	36	1.30 - 2.81	MW13-3
1,1-Dichloroethylene	µg/g	0.05	0.05	0.05	0.05	0 - 1.8	All Boreholes and Test Pits	µg/L	0.5	0.5	1.6	<6.0	5.59 - 7.72	BW13-1
Methylene Chloride	µg/g	0.05	0.1	0.05	0.05	0 - 1.8	All Boreholes and Test Pits	µg/L	5	26	610	<6.0	5.59 - 7.72	BW13-1
Trans- 1,2-Dichloroethylene	µg/g	0.05	0.084	0.05	0.05	0 - 1.8	All Boreholes and Test Pits	µg/L	1.6	1.6	1.6	21	7.47 - 9.60	BW13-2
Methyl tert-butyl Ether	µg/g	0.05	0.75	0.05	0.05	0 - 1.8	All Boreholes and Test Pits	µg/L	15	15	190	<4.0	5.59 - 7.72	BW13-1
1,1-Dichloroethane	µg/g	0.05	3.5	0.05	0.02	0 - 1.8	All Boreholes and Test Pits	µg/L	0.5	11	320	<6.0	5.59 - 7.72	BW13-1
Methyl Ethyl Ketone	µg/g	0.5	16	0.5	0.5	0 - 1.8	All Boreholes and Test Pits	µg/L	400	21,000	470,000	<20.0	5.59 - 7.72	BW13-1
Cis- 1,2-Dichloroethylene	µg/g	0.05	3.4	0.05	0.29	0 - 0.9	TP-12	µg/L	1.6	1.6	1.6	240	5.59 - 7.72	BW13-1
Chloroform	µg/g	0.05	0.05	0.05	0.04	0 - 1.8	All Boreholes and Test Pits	µg/L	2	2	2.4	<4.0	5.59 - 7.72	BW13-1
1,2-Dichloroethane	µg/g	0.05	0.05	0.05	0.03	0 - 1.8	All Boreholes and Test Pits	µg/L	0.5	0.5	1.6	<4.0	5.59 - 7.72	BW13-1
1,1,1-Trichloroethane	µg/g	0.05	0.38	0.05	0.05	0 - 1.8	All Boreholes and Test Pits	µg/L	0.5	23	640	<6.0	5.59 - 7.72	BW13-1
Carbon Tetrachloride	µg/g	0.05	0.05	0.05	0.05	0 - 1.8	All Boreholes and Test Pits	µg/L	0.2	0.2	0.79	<4.0	5.59 - 7.72	BW13-1
Benzene	µg/g	0.02	0.21	0.02	4.6	0 - 0.27	BH-3	µg/L	0.5	0.5	44	<4.0	5.59 - 7.72	BW13-1
1,2-Dichloropropane	µg/g	0.05	0.05	0.05	0.03	0 - 1.8	All Boreholes and Test Pits	µg/L	0.5	0.58	16	<4.0	5.59 - 7.72	BW13-1
Trichloroethylene	µg/g	0.05	0.061	0.05	44	0.6 - 1.2	BH-9	µg/L	0.5	0.5	1.6	85	2.18 - 5.23	BW13-4
Bromodichloromethane	µg/g	0.05	13	0.05	0.05	0 - 1.8	All Boreholes and Test Pits	µg/L	2	67,000	67,000	<4.0	5.59 - 7.72	BW13-1
Methyl Isobutyl Ketone	µg/g	0.5	1.7	0.5	0.5	0 - 1.8	All Boreholes and Test Pits	µg/L	640	5,200	140,000	<20.0	5.59 - 7.72	BW13-1
1,1,2-Trichloroethane	µg/g	0.05	0.05	0.05	0.04	0 - 1.8	All Boreholes and Test Pits	µg/L	0.5	0.5	4.7	<4.0	5.59 - 7.72	BW13-1
Toluene	µg/g	0.2	2.3	0.2	44	0 - 0.27	BH-3	µg/L	0.8	320	14,000	<4.0	5.59 - 7.72	BW13-1
Dibromochloromethane	µg/g	0.05	9.4	0.05	0.05	0 - 1.8	All Boreholes and Test Pits	µg/L	2	65,000	65,000	<2.0	5.59 - 7.72	BW13-1
Ethylene Dibromide	µg/g	0.05	0.05	0.05	0.04	0 - 1.8	All Boreholes and Test Pits	µg/L	0.2	0.2	0.25	<2.0	5.59 - 7.72	BW13-1
Tetrachloroethylene	µg/g	0.05	0.28	0.05	0.05	0 - 1.8	All Boreholes and Test Pits	µg/L	0.5	0.5	1.6	<4.0	5.59 - 7.72	BW13-1
1,1,1,2-Tetrachloroethane	µg/g	0.05	0.058	0.05	0.04	0 - 1.8	All Boreholes and Test Pits	µg/L	1.1	1.1	3.3	<2.0	5.59 - 7.72	BW13-1
Chlorobenzene	µg/g	0.05	2.4	0.05	0.05	0 - 1.8	All Boreholes and Test Pits	µg/L	0.5	140	500	<2.0	5.59 - 7.72	BW13-1
Ethylbenzene	µg/g	0.05	2	0.05	4.2	0 - 0.27	BH-3	µg/L	0.5	54	1,800	<2.0	5.59 - 7.72	BW13-1
Bromoform	µg/g	0.05	0.27	0.05	0.05	0 - 1.8	All Boreholes and Test Pits	µg/L	5	5	380	<2.0	5.59 - 7.72	BW13-1
Styrene	µg/g	0.05	0.7	0.05	0.05	0 - 1.8	All Boreholes and Test Pits	µg/L	0.5	43	1,300	<2.0	5.59 - 7.72	BW13-1
1,1,2,2-Tetrachloroethane	µg/g	0.05	0.05	0.05	0.05	0 - 1.8	All Boreholes and Test Pits	µg/L	0.5	0.5	3.2	<2.0	5.59 - 7.72	BW13-1
1,3-Dichlorobenzene	µg/g	0.05	4.8	0.05	0.05	0 - 1.8	All Boreholes and Test Pits	µg/L	0.5	7,600	7,600	<2.0	5.59 - 7.72	BW13-1
1,4-Dichlorobenzene	µg/g	0.05	0.083	0.05	0.05	0 - 1.8	All Boreholes and Test Pits	µg/L	0.5	0.5	8	<2.0	5.59 - 7.72	BW13-1
1,2-Dichlorobenzene	µg/g	0.05	3.4	0.05	0.05	0 - 1.8	All Boreholes and Test Pits	µg/L	0.5	150	4,600	<2.0	5.59 - 7.72	BW13-1
1,3-Dichloropropene	µg/g	0.05	0.05	0.05	0.04	0 - 1.8	All Boreholes and Test Pits	µg/L	0.5	0.5	5.2	<5.0	5.59 - 7.72	BW13-1
Xylene Mixture	µg/g	0.05	3.1	0.05	47	0 - 0.27	BH-3	µg/L	72	72	3,300	<4.0	5.59 - 7.72	BW13-1
n-Hexane	µg/g	0.05	2.8	0.05	0.05	0 - 1.8	All Boreholes and Test Pits	µg/L	5	5	51	<4.0	5.59 - 7.72	BW13-1

* = MOE's Soil, Ground Water and Sediment Standards under Part XV 1 of the Environmental Protection Act, April 15, 2011, Table 1 - Full Depth Background Site Condition Standards (Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use)

** = MOE's Soil, Ground Water and Sediment Standards under Part XV 1 of the Environmental Protection Act, April 15, 2011, Table 7 - Generic Site Condition Standards for Shallow Soils in a Non-Potable Ground Water Condition (Residential/Parkland/Institutional Property Use)

*** = MOE's Soil, Ground Water and Sediment Standards under Part XV 1 of the Environmental Protection Act, April 15, 2011, Table 9 - Generic Site Condition Standards for Use within 30 m of a Water Body in a Non-Potable Ground Water Condition (Residential/Parkland/Institutional/Commercial/Community Property Use)

= Concentration is at or exceeds Table 1 Site Condition Standards

= Concentration is at or exceeds Tables 1 and 9 Site Condition Standards

= Concentration is at or exceeds Tables 1 and 7 Site Condition Standards

= Concentration is at or exceeds Tables 1, 7 and 9 Site Condition Standards

- = Not applicable

Table 6 (Continued)
Maximum Known Concentrations at Time of Certification
Petroleum Hydrocarbons, VOC's, Metals, Inorganics, PAHs and PCBs
185 Mill Street, Gananoque, Ontario

exp.

KIN-16759-A0

	Soil							Groundwater						
PARAMETER	Units	CRITERIA			Maximum Concentration	Depth Range (mbgs)	Sample ID or Location	Units	CRITERIA			Maximum Concentration	Depth Range (mbgs)	Sample Location
		Table 1*	Table 7**	Table 9***					Table 1*	Table 7**	Table 9***			
METALS AND INORGANICS														
Antimony	ug/g	1.3	7.5	1.3	80.3	0 - 0.4	TP-11	µg/L	1.5	16,000	16,000	9.4	1.71 - 4.61	MW07-1
Arsenic	ug/g	18	18	18	54	0 - 0.5	TP-2	µg/L	13	1,500	1,500	1.8	1.44 - 3.29	MW07-2
Barium	ug/g	220	390	220	445	0 - 0.9	TP-12	µg/L	610	23,000	23,000	1,000	2.49 - 5.53	BW13-6
Beryllium	ug/g	2.5	4	2.5	0.9	0.6 - 1.2	BW13-6	µg/L	0.5	53	53	3.3	7.47 - 9.60	BW13-2
Boron	ug/g	36	120	36	25	0 - 0.4	BW13-3	µg/L	1,700	36,000	36,000	266	7.47 - 9.60	BW13-2
Boron (Hot Water Soluble)	ug/g	NA	1.5	1.5	1.55	0.6 - 1.2	BH-5/MW13-2	-	-	-	-	-	-	-
Cadmium	ug/g	1.2	1.2	1.2	223	0 - 0.6	TP-8	µg/L	0.5	2.1	2.1	0.4	5.59 - 7.72	BW13-1
Chromium	ug/g	70	160	70	376	0.9 - 1.8	TP-4B	µg/L	11	640	640	4.8	5.59 - 7.72	BW13-1
Cobalt	ug/g	21	22	22	25.7	0 - 0.5	BH-2	µg/L	3.8	52	52	10.6	1.96 - 3.48	BW13-3
Copper	ug/g	92	140	92	2,380	0 - 0.8	TP-7	µg/L	5	69	69	9.8	2.18 - 5.23	BW13-4
Lead	ug/g	120	120	120	1,970	0 - 0.4	TP-11	µg/L	1.9	20	20	<0.5	0.76 - 9.60	All Monitoring Wells and Interior Pit
Molybdenum	ug/g	2	6.9	2	6	0 - 0.5	BH-2	µg/L	23	7,300	7,300	4.5	1.96 - 3.48	BW13-3
Nickel	ug/g	82	100	82	173	0.6 - 1.2	BH-10	µg/L	14	390	390	36.2	1.96 - 3.48	BW13-3
Selenium	ug/g	1.5	2.4	1.5	4.8	0 - 0.4	BW13-3	µg/L	5	50	50	7.5	7.47 - 9.60	BW13-2
Silver	ug/g	0.5	20	0.5	2.2	0.6 - 1.2	BW13-4	µg/L	0.3	1.2	1.2	0.2	2.49 - 5.53	BW13-6
Thallium	ug/g	1	1	1	<0.4	0 - 1.8	All Boreholes and Test Pits	µg/L	0.5	400	400	<0.3	0.76 - 9.60	All Monitoring Wells and Interior Pit
Uranium	ug/g	2.5	23	2.5	1.3	0.6 - 1.2	BW13-6	µg/L	8.9	330	330	2.3	3.45 - 6.95	BW07-5
Vanadium	ug/g	86	86	86	47	0.6 - 1.2	BW13-6	µg/L	3.9	200	200	2.2	1.14 - 1.91	MW13-4
Zinc	ug/g	290	340	290	968	0 - 0.8	TP-7	µg/L	160	890	890	65	5.59 - 7.72	BW13-1
Chromium VI	ug/g	0.66	8	0.66	<0.2	0 - 1.8	All Boreholes and Test Pits	µg/L	25	110	110	<5	0.76 - 9.60	All Monitoring Wells and Interior Pit
Cyanide	ug/g	0.051	0.051	0.051	<0.04	0 - 1.8	All Boreholes and Test Pits	µg/L	5	52	52	<2	0.76 - 9.60	All Monitoring Wells and Interior Pit
Mercury	ug/g	0.27	0.27	0.27	1.86	0.6 - 1.2	BH-9	µg/L	0.1	0.1	0.29	<0.02	0.76 - 9.60	All Monitoring Wells and Interior Pit
Electrical Conductivity (2:1)	mS/cm	0.57	0.7	0.7	2.62	0.6 - 1.2	BW13-1	uS/cm	-	-	-	1,560	7.47 - 9.60	BW13-2
Sodium Adsorption Ratio	NA	2.4	5	5	3.96	0.6 - 1.2	BH-9	-	-	-	-	-	-	-
Sodium	ug/g	-	-	-	-	-	-	µg/L	490,000	1,800,000	1,800,000	149,000	7.47 - 9.60	BW13-2
Chloride	ug/g	-	-	-	-	-	-	µg/L	790,000	1,800,000	1,800,000	276,000	7.47 - 9.60	BW13-2
PAHs														
Naphthalene	ug/g	0.09	0.6	0.09	0.65	0 - 0.5	BH-3	µg/L	7	7	1,400	<0.20	1.22 - 9.60	MW07-1, MW07-2, MW13-1, BW13-1 through BW13-4, BW13-6 and BW13-7
Acenaphthylene	ug/g	0.093	0.15	0.093	0.52	0.6 - 1.2	BW13-6	µg/L	1	1	1.4	<0.20	1.22 - 9.60	MW07-1, MW07-2, MW13-1, BW13-1 through BW13-4, BW13-6 and BW13-7
Acenaphthene	ug/g	0.072	7.9	0.072	0.34	0.6 - 1.2	BW13-6	µg/L	4.1	17	600	<0.20	1.22 - 9.60	MW07-1, MW07-2, MW13-1, BW13-1 through BW13-4, BW13-6 and BW13-7
Fluorene	ug/g	0.12	62	0.19	0.39	0.6 - 1.2	BW13-6	µg/L	120	290	290	<0.20	1.22 - 9.60	MW07-1, MW07-2, MW13-1, BW13-1 through BW13-4, BW13-6 and BW13-7
Phenanthrene	ug/g	0.69	6.2	0.69	4.8	0.6 - 1.2	BH-9	µg/L	0.1	380	380	<0.10	1.22 - 9.60	MW07-1, MW07-2, MW13-1, BW13-1 through BW13-4, BW13-6 and BW13-7
Anthracene	ug/g	0.16	0.67	0.22	0.61	0.6 - 1.2	BW13-6	µg/L	0.1	1	1	<0.10	1.22 - 9.60	MW07-1, MW07-2, MW13-1, BW13-1 through BW13-4, BW13-6 and BW13-7
Fluoranthene	ug/g	0.56	0.69	0.69	6.1	0.6 - 1.2	BH-9	µg/L	0.4	44	73	0.2	1.44 - 3.29	MW07-2
Pyrene	ug/g	1	78	1	5.3	0.6 - 1.2	BH-9	µg/L	0.2	5.7	5.7	<0.20	1.22 - 9.60	MW07-1, MW07-2, MW13-1, BW13-1 through BW13-4, BW13-6 and BW13-7
Benz(a)anthracene	ug/g	0.36	0.5	0.36	2.0	0.6 - 1.2	BH-9	µg/L	0.2	1.8	1.8	<0.20	1.22 - 9.60	MW07-1, MW07-2, MW13-1, BW13-1 through BW13-4, BW13-6 and BW13-7
Chrysene	ug/g	2.8	7	2.8	2.6	0.6 - 1.2	BH-9	µg/L	0.1	0.7	0.7	0.11	1.44 - 3.29	MW07-2
Benzo(b)fluoranthene	ug/g	0.47	0.78	0.47	2.3	0.6 - 1.2	BH-9	µg/L	0.1	0.75	0.75	<0.10	1.22 - 9.60	MW07-1, MW07-2, MW13-1, BW13-1 through BW13-4, BW13-6 and BW13-7
Benzo(k)fluoranthene	ug/g	0.48	0.78	0.48	1.0	0.6 - 1.2	BH-9	µg/L	0.1	0.4	0.4	<0.10	1.22 - 9.60	MW07-1, MW07-2, MW13-1, BW13-1 through BW13-4, BW13-6 and BW13-7
Benzo(a)pyrene	ug/g	0.3	0.3	0.3	2.2	0.6 - 1.2	BH-9	µg/L	0.01	0.81	0.81	0.03	1.44 - 3.29	MW07-2
Indeno(1,2,3-cd)pyrene	ug/g	0.23	0.38	0.23	1.0	0.6 - 1.2	BH-9	µg/L	0.2	0.2	0.2	<0.20	1.22 - 9.60	MW07-1, MW07-2, MW13-1, BW13-1 through BW13-4, BW13-6 and BW13-7
Dibenz(a,h)anthracene	ug/g	0.1	0.1	0.1	0.33	0.6 - 1.2	BH-9	µg/L	0.2	0.4	0.4	<0.20	1.22 - 9.60	MW07-1, MW07-2, MW13-1, BW13-1 through BW13-4, BW13-6 and BW13-7
Benzo(g,h,i)perylene	ug/g	0.68	6.6	0.68	0.97	0.6 - 1.2	BH-9	µg/L	0.2	0.2	0.2	<0.20	1.22 - 9.60	MW07-1, MW07-2, MW13-1, BW13-1 through BW13-4, BW13-6 and BW13-7
2-and 1-methyl Naphthalene	ug/g	0.59	0.99	0.59	1.5	0 - 0.5	BH-3	µg/L	2	1,500	1,500	<0.20	1.22 - 9.60	MW07-1, MW07-2, MW13-1, BW13-1 through BW13-4, BW13-6 and BW13-7
PCBs														
Polychlorinated Biphenyls	ug/g	0.3	0.35	0.3	<0.3	0.6 - 1.2	BH-8 and BH-10	µg/L	0.2	0.2	0.2	<0.10	2.15 - 5.66	BW13-5, BW13-6 and BW13-7

* = MOE's Soil, Ground Water and Sediment Standards under Part XV.1 of the Environmental Protection Act, April 15, 2011, Table 1 - Full Depth Background Site Condition Standards (Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use)

** = MOE's Soil, Ground Water and Sediment Standards under Part XV.1 of the Environmental Protection Act, April 15, 2011, Table 7 - Generic Site Condition Standards for Shallow Soils in a Non-Potable Ground Water Condition (Residential/Parkland/Institutional Property Use)

*** = MOE's Soil, Ground Water and Sediment Standards under Part XV.1 of the Environmental Protection Act, April 15, 2011, Table 9 - Generic Site Condition Standards for Use within 30 m of a Water Body in a Non-Potable Ground Water Condition (Residential/Parkland/Institutional/Commercial/Community Property Use)

= Concentration is at or exceeds Table 1 Site Condition Standards

= Concentration is at or exceeds Tables 1 and 9 Site Condition Standards

= Concentration is at or exceeds Tables 1 and 7 Site Condition Standards

= Concentration is at or exceeds Tables 1, 7 and 9 Site Condition Standards

- = Not applicable

Appendix A –
Survey of the Phase II Property

Appendix B –
Sampling and Analysis Plan

1. Introduction

This appendix presents the Sampling and Analysis Plan (SAAP) that was developed in support of the Phase II Environmental Site Assessment (ESA) for the property located at 185 Mill Street, Gananoque, Ontario (hereinafter referred to as the 'Site'). The Phase II ESA will be conducted to provide further characterization of the Site subsurface conditions so upon completion, pending no soil or groundwater contamination is identified and no remedial work is required, a Record of Site Condition (RSC) can be filed in accordance with Ontario Regulation 153/04 (O.Reg.153), as amended by Ontario Regulation 511/09 (O.Reg. 511). The SAAP presents the procedures and measures that will be undertaken during field investigative activities to characterize the Site conditions and meet the data quality objectives of the Phase II ESA.

The SAAP presents the sampling program proposed for the Site, the recommended procedures and protocols for sampling and related field activities, the data quality objectives, and the quality assurance/ quality control (QA/QC) measures that will be undertaken to provide for the collection of accurate, reproducible and representative data. These components are described in further detail below.

2. Field Sampling Program

The field sampling program was developed to provide for the collection of samples of the surficial and subsurface soil materials for chemical analysis of one or more of the following parameters: petroleum hydrocarbon (PHC) fractions F1 to F4, Benzene, Toluene, Ethylbenzene and Xylenes (BTEX) and pH.

The soil sampling media will consist of the surficial fill and overburden material. The soil sample intervals will extend from the ground surface and terminate at the bedrock surface, which is expected to be shallow.

The groundwater samples will be collected from the overburden and shallow bedrock groundwater zones. The overburden monitoring well network is to consist of seven newly installed and three existing wells, all screened within the overburden, while the bedrock monitoring well network is to consist of two newly installed and five existing wells, all screened within the shallow bedrock. However, only two of the three existing overburden and one of the five existing bedrock monitoring wells were available for sampling. Accordingly, the field program was modified to consist of the construction of five newly installed overburden and seven newly installed bedrock monitoring wells. The monitoring well network will be installed with 0.76 to 3.05 m long screen intervals extending to a maximum depth of approximately 9.60 m below grade.

Vertical control of the boreholes and monitoring wells will be obtained through the completion of an elevation survey with reference to a Site temporary benchmark or a local geodetic benchmark. Groundwater flow and direction in the water table aquifer will be determined through groundwater level measurements and the relative groundwater elevations established in the Site elevation survey.

3. Field Methods

To meet the requirements of the field sampling program, the following field investigative methods will be undertaken:

- Interior and Exterior Test Pit Construction;
- Borehole Drilling;
- Soil Sampling;
- Monitoring Well Installation;
- Monitoring Well Development;
- Residue Management Procedures;
- Groundwater Level Measurements;
- Elevation Survey; and
- Groundwater Sampling.

The field investigative methods will be performed as described below:

3.1 Interior and Exterior Test Pit Construction

Interior test pits will be constructed in the basement interior at the Site to facilitate the collection of soil samples for chemical analysis. A minimum of two test pits are proposed to be constructed in each Site building, to provide for the collection of samples of the subsurface materials beneath the basement floor slab, where applicable. The test pits will be constructed through the concrete floor slab, where applicable using a concrete saw (where applicable) and mini excavator. The test pits locations will be selected to assess soil quality beneath the basement of the Site.

The exterior test pits will be constructed around the building exteriors at the Site as part of the geotechnical investigation. A minimum of nine exterior test pits are proposed at the Site.

Prior to excavation, utility clearances will be obtained from public and private locators, as required. If any uncertainty regarding the location of a buried utility at a test pit location is encountered or if a location is within 1 m of a buried utility, the test pit will be initiated by hand shovel to a sufficient depth to be clear of any utilities.

3.2 Borehole Drilling

Boreholes will be advanced at the Site to facilitate the collection of soil samples for chemical analysis and geologic characterization and for the installation of groundwater monitoring wells. A total of nineteen boreholes are proposed to be advanced at the Site, up to a maximum depth of approximately 9.60 m below grade, within the overburden materials and shallow bedrock to provide for the collection of samples of the surficial and subsurface materials beneath the Site. The borehole locations will be selected to assess soil and groundwater quality at the Site.

Prior to borehole drilling, utility clearances will be obtained from public and private locators, as required. If any uncertainty regarding the location of a buried utility at a borehole location is encountered or if a location is within 1 m of a buried utility, the borehole will be initiated using hand tools to a sufficient depth to be clear of any utilities. Boreholes will be advanced into the surficial fill and overburden soils by a drilling company under the full-time supervision of **exp** staff. A truck mounted drilling machine equipped with hollow stems, split spoons and diamond bit core barrels or portable sampling equipment including split-spoons and portable diamond bit core barrel will be utilized to advance the boreholes through the overburden and bedrock materials.

3.3 Soil Sampling

Soil samples for geologic characterization and chemical analysis will be collected from the overburden boreholes using 5 cm diameter, 60 cm long, stainless steel split-spoon sampling devices advanced ahead of the augers. The split-spoon samplers will be attached to drill rods and advanced into the soil by means of a machine driven drill. Spilt-spoon soil samples will be collected where possible, beginning at the ground surface and subsequently at continuous intervals. Geologic and sampling details of the recovered cores will be logged and the samples will be assessed for the potential presence of non-aqueous phase liquids. A portion of each soil core and test pit sample will be placed in a sealed "zip-lock" plastic bag and allowed to reach ambient temperature prior to field screening with a combustible gas detector that will be calibrated by the supplier with an appropriate reference gas and zeroed in ambient conditions prior to use. The vapour measurements will be made by inserting the instrument's probe into the plastic bag while manipulating the sample to ensure volatilization of the soil gases. These readings will provide a real-time indication of the relative concentration of volatile organic vapours encountered in the subsurface during drilling. Samples for chemical analysis will be selected on the basis of visual, combustible gas and olfactory evidence of impacts and at specific intervals to define the lateral and vertical extent of known impacts.

Recommended volumes of soil samples selected for chemical analysis will be collected into pre-cleaned, laboratory supplied, analytical test group specific containers. The samples will be placed into clean

insulated coolers chilled with ice for storage and transport. Samples intended for VOC and/or petroleum hydrocarbon (PHC) fraction F1 analysis will be collected using a laboratory-supplied soil core sampler, placed into the vials containing methanol for preservation purposes and sealed using Teflon lined septa lids. The samples will be assigned unique identification numbers, and the date, time, location, and requested analyses for each sample will be documented in a bound field note book. The samples will be submitted to the contractual laboratory within analytical test group holding times under Chain of Custody (COC) protocols. New disposable chemical resistant gloves will be used during the handling and sample collection for each soil core to prevent sample cross-contamination.

3.4 Monitoring Well Installation

A total of twelve boreholes will be instrumented as groundwater monitoring wells installed with 0.76 to 3.05 m long screens intercepting the groundwater table in the overburden and shallow bedrock to depths of ranging from approximately 1.73 to 9.60 m. These monitoring wells will be installed in general accordance with the Ontario Water Resources Act- R.R.O. 1990, Regulation 903 – Amended to O. Reg. 128/03 and will be installed by a licensed well contractor.

The monitoring wells will be constructed using 51 mm diameter, Schedule 40, PVC riser pipe and number 10 slot size (0.25 mm) well screens. The base of the well screens will be sealed with PVC end caps. All well pipe connections will be factory machined threaded flush couplings. The pipe components will be pre-wrapped in plastic, which will be removed prior to insertion in the borehole to minimize the potential for contamination. No lubricants or adhesives will be used in the construction of the monitoring wells. The annular space around the well screens will be backfilled with silica sand to at least 0.15 m above the top of the screen. Granular bentonite will be placed in the borehole annulus from the top of the sand pack to approximately grade. The monitoring wells will be completed with either stick-up well casings or protective flush mount covers.

3.5 Monitoring Well Development

The newly installed monitoring wells will be developed to remove fine sediment particles potentially lodged in the sand pack and well screen to enhance hydraulic communication with the surrounding formation waters. The monitoring wells will be developed using dedicated Waterra™ foot valves and sample tubing. Monitoring well development will be monitored by visual observations of turbidity, and by taking field measurements of pH and specific conductance for every standing well (i.e. wetted casing) volume removed. Standing water volumes will be determined by means of an electronic water level meter. Water quality parameter measurements will be recorded using a pH and temperature meter and a conductivity meter. A minimum of approximately three to five wetted well volumes will be removed; and, well development will continue until the purged water has chemically stabilized as indicated by visual observations and field parameters measurements.

Well development details will be documented on a well development log sheet or in a bound hard cover notebook. All development waters will be collected and stored in labelled, sealed containers.

3.6 Residue Management Procedures

The residue materials produced during the borehole drilling, soil sampling programs and monitoring well sampling programs comprised of decontamination fluids from equipment cleaning, and waters from well development and purging will be placed in labeled, sealed drums for off-Site disposal.

3.7 Groundwater Level Measurements

Groundwater level measurements will be recorded for newly installed monitoring wells to determine groundwater flow and direction in the shallow bedrock at the Site. Water levels will be measured with respect to the top of the casing by means of a Solinst interface meter. The water levels will be recorded on water level log sheets or in a bound field notebook. The water level meter probe will be decontaminated between monitoring well locations.

3.8 Elevation Survey

An elevation survey will be conducted to obtain vertical control of the newly installed monitoring well locations. The top of casing and ground surface elevation of each monitoring well location will be surveyed against a known geodetic benchmark, or if unavailable, against a suitable arbitrary temporary benchmark. Elevations measured against a geodetic benchmark will be recorded as meters above mean sea level (m AMSL). The arbitrary temporary benchmark will be assigned an elevation of 100 m. The elevation survey will be accurate to within ± 1 cm.

3.9 Groundwater Sampling

Groundwater samples will be collected from newly installed monitoring wells for chemical analysis. The monitoring wells will be purged first of three to five wetted well volumes of water to remove standing water and draw in fresh formation water. Wetted well volumes will be determined by measuring water levels with a Solinst interface meter. Dedicated Waterra™ foot valves and sample tubing will be used for well purging and sample collection.

Recommended groundwater sample volumes will be collected into pre-cleaned, laboratory-supplied vials or bottles provided with analytical test group specific preservatives, as required. The samples will be placed in an insulated cooler chilled with ice for storage and transport. Samples for PHC F1 and VOC analysis will be collected in triplicate vials prepared with concentrated sodium bisulphate as a preservative. Each PHC F1 and VOC vial will be inverted and inspected for gas bubbles prior to being placed in the cooler to ensure that no head- space is present.

All groundwater samples will be assigned unique identification numbers, and the date, time, project number, company name, location and requested analyses for each sample will be documented in a bound hard cover notebook. The samples will be submitted to the contractual laboratory within analytical test group holding times under COC protocols. New disposable chemical resistant gloves will be used for each sampling location to prevent sample cross-contamination.

4. Field Quality Assurance/Quality Control Program

The objective of the field quality assurance/quality control (QA/QC) program is to obtain soil and groundwater samples and other field measurements that provide data of acceptable quality that meets the objectives of the Phase II ESA. The objectives of the QA/QC program will be achieved through the implementation of procedures for the collection of unbiased (i.e., non-contaminated) samples, sample documentation and the collection of appropriate QC samples to provide a measure of sample reproducibility and accuracy. The field QA/QC measures will comprise:

- Decontamination Protocols;
- Equipment Calibration;
- Sample Preservation;
- Sample Documentation; and,
- Field Quality Control Samples.

Details on the field QA/QC measures are provided below.

4.1 Decontamination Protocols

Decontamination protocols will be followed during field sampling where non-dedicated sampling equipment is used to prevent sample cross contamination. For the borehole drilling and soil sampling, split soil sampling devices will be cleaned/decontaminated between sampling intervals and auger flights between borehole locations in accordance with SOP requirements. For the monitoring well installation, well components are not to come into contact with the ground surface prior to insertion into boreholes. Electronic water level meters will be decontaminated between monitoring well locations during well development, purging activities and rising head tests. All decontamination fluids will be collected and stored in sealed, labelled containers.

4.2 Equipment Calibration

All equipment requiring calibration will be calibrated according to manufacturer's requirements using analytical grade reagents, or by the supplier prior to conducting field activities.

4.3 Sample Preservation

All samples will be preserved using appropriate analytical test group specific reagents, as required, and upon collection placed in ice-filled insulated coolers for storage and transport.

4.4 Sample Documentation

All samples will be assigned a unique identification number, which is to be recorded along with the date, time, project number, company name, location and requested analysis in a bound field notebook. All samples will be handled and transported following COC protocols.

4.5 Field Quality Control Samples

Field quality controls samples will be collected to evaluate the accuracy and reproducibility of the field sampling procedures. For groundwater samples submitted for the analysis of VOCs, one (1) trip blank prepared by the contractual laboratory will be submitted for chemical analysis to evaluate the potential for sample cross-contamination or bias. The recommended alert criteria for the trip blank sample are the detections of any test group analyte at a concentration in excess of laboratory detection limits.

Appendix C –
Slug Test Results

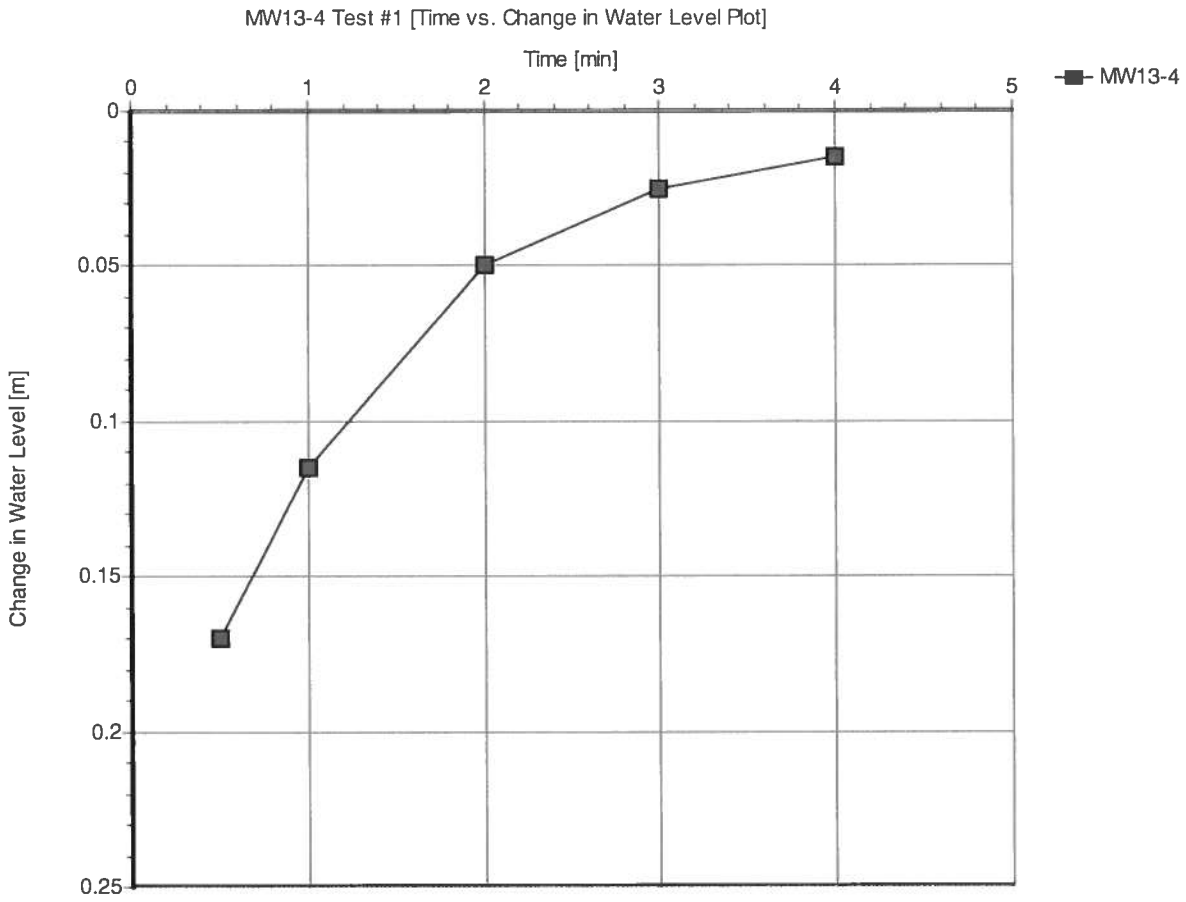
Exp Services Inc.
Suite 315 The Woolen Mill
4 Cataraqui Street
Kingston, Ontario, K7K 1Z7

Slug Test Analysis Report

Project: 185 Mill Street

Number: KIN-26260-A0

Client: Brennan Custom Homes



Slug Test: **MW13-4 Test #1**

Analysis Method: **Time vs. Change in Water Level Plot**

Analysis Results:

Test parameters:				
	Test Well:	MW13-4	Aquifer Thickness:	0.76 [m]
	Casing radius:	0.0254 [m]		
	Screen length:	0.76 [m]		
	Boring radius:	0.1 [m]		

Comments:

Evaluated by: MW

Evaluation Date: 18/07/2013

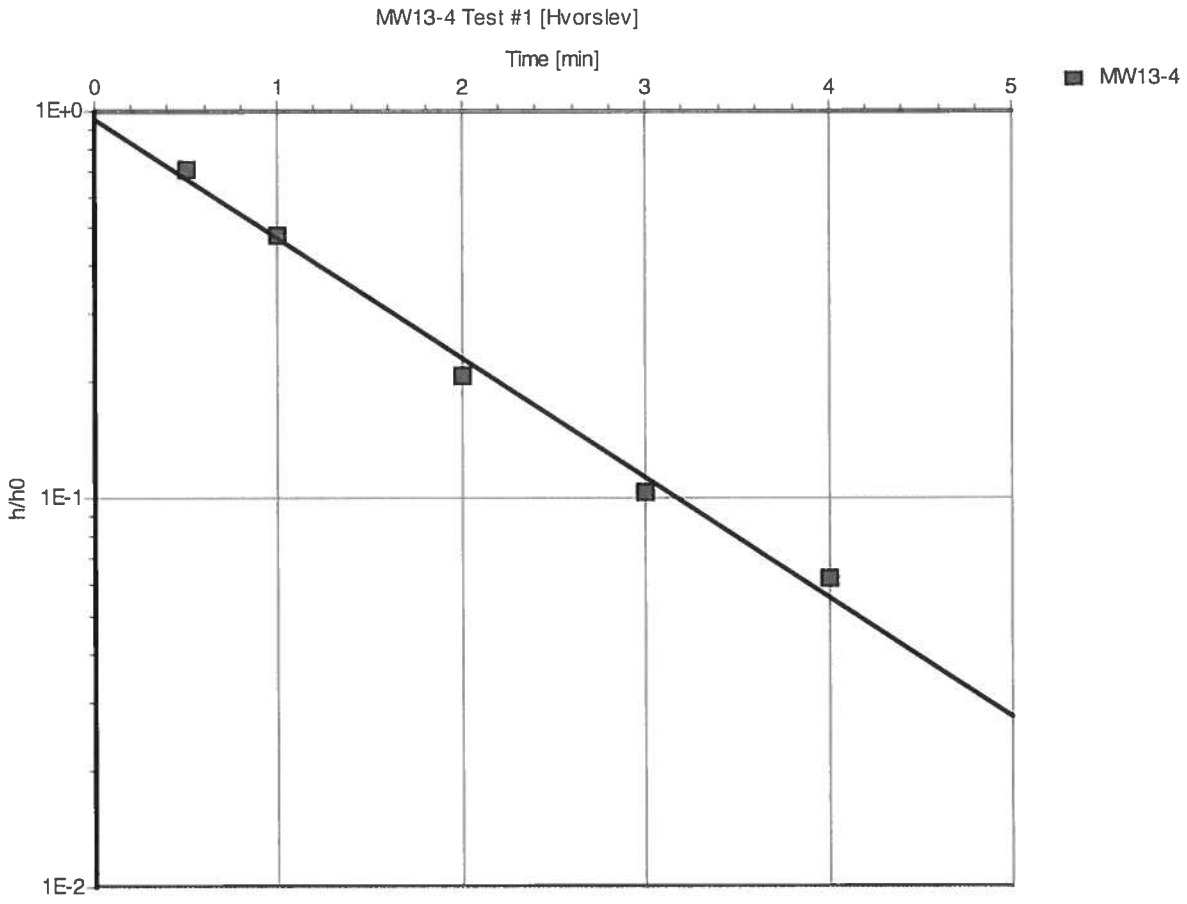
Exp Services Inc.
Suite 315 The Woolen Mill
4 Cataraqui Street
Kingston, Ontario, K7K 1Z7

Slug Test Analysis Report

Project: 185 Mill Street

Number: KIN-26260-A0

Client: Brennan Custom Homes



Slug Test: **MW13-4 Test #1**

Analysis Method: **Hvorslev**

Analysis Results:

Conductivity: 1.02E-5 [m/s]

Test parameters:

Test Well:	MW13-4	Aquifer Thickness:	0.76 [m]
Casing radius:	0.0254 [m]		
Screen length:	0.76 [m]		
Boring radius:	0.1 [m]		

Comments:

Evaluated by: MW

Evaluation Date: 18/07/2013

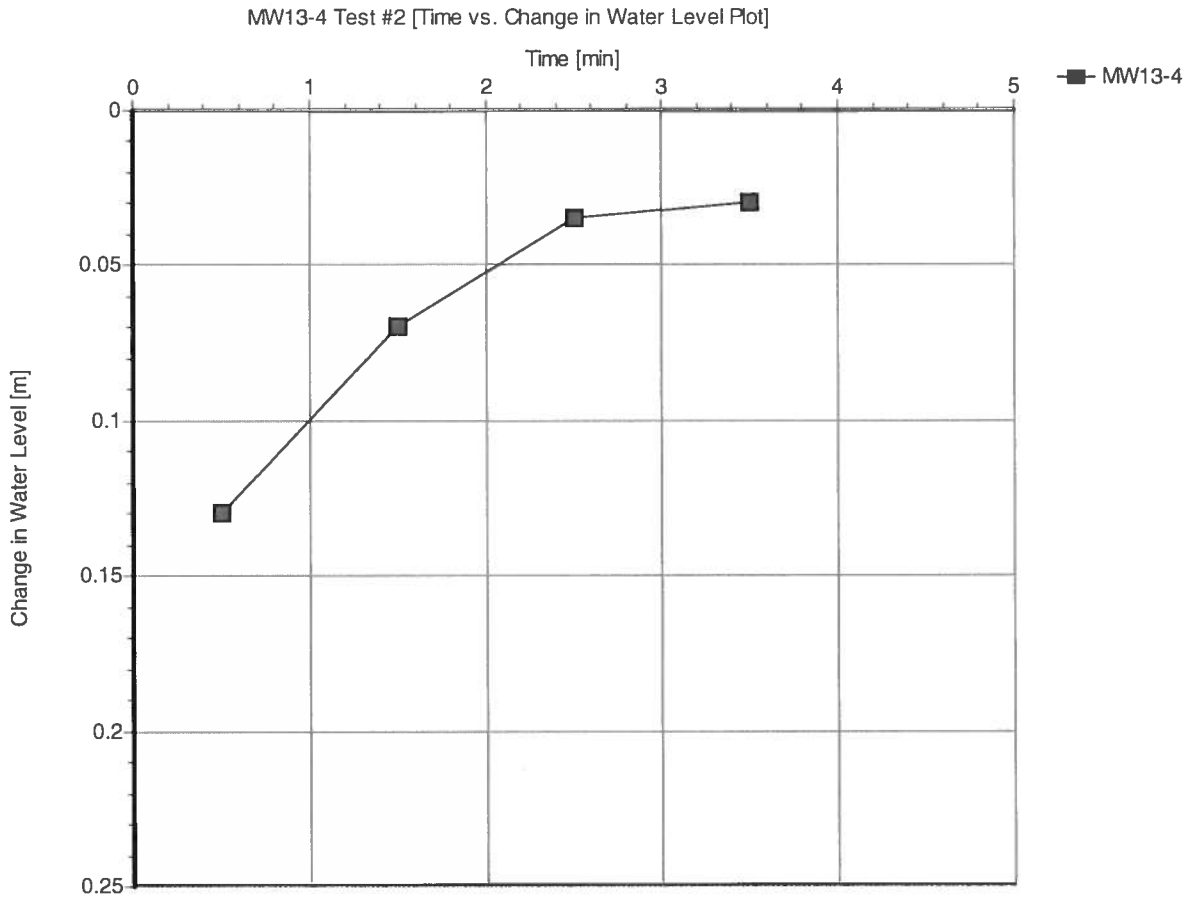
Exp Services Inc.
Suite 315 The Woolen Mill
4 Cataraqui Street
Kingston, Ontario, K7K 1Z7

Slug Test Analysis Report

Project: 185 Mill Street

Number: KIN-26260-A0

Client: Brennan Custom Homes



Slug Test: **MW13-4 Test #2**

Analysis Method: **Time vs. Change in Water Level Plot**

Analysis Results:

Test parameters:				
	Test Well:	MW13-4	Aquifer Thickness:	0.76 [m]
	Casing radius:	0.0254 [m]		
	Screen length:	0.76 [m]		
	Boring radius:	0.1 [m]		

Comments:

Evaluated by: MW

Evaluation Date: 18/07/2013

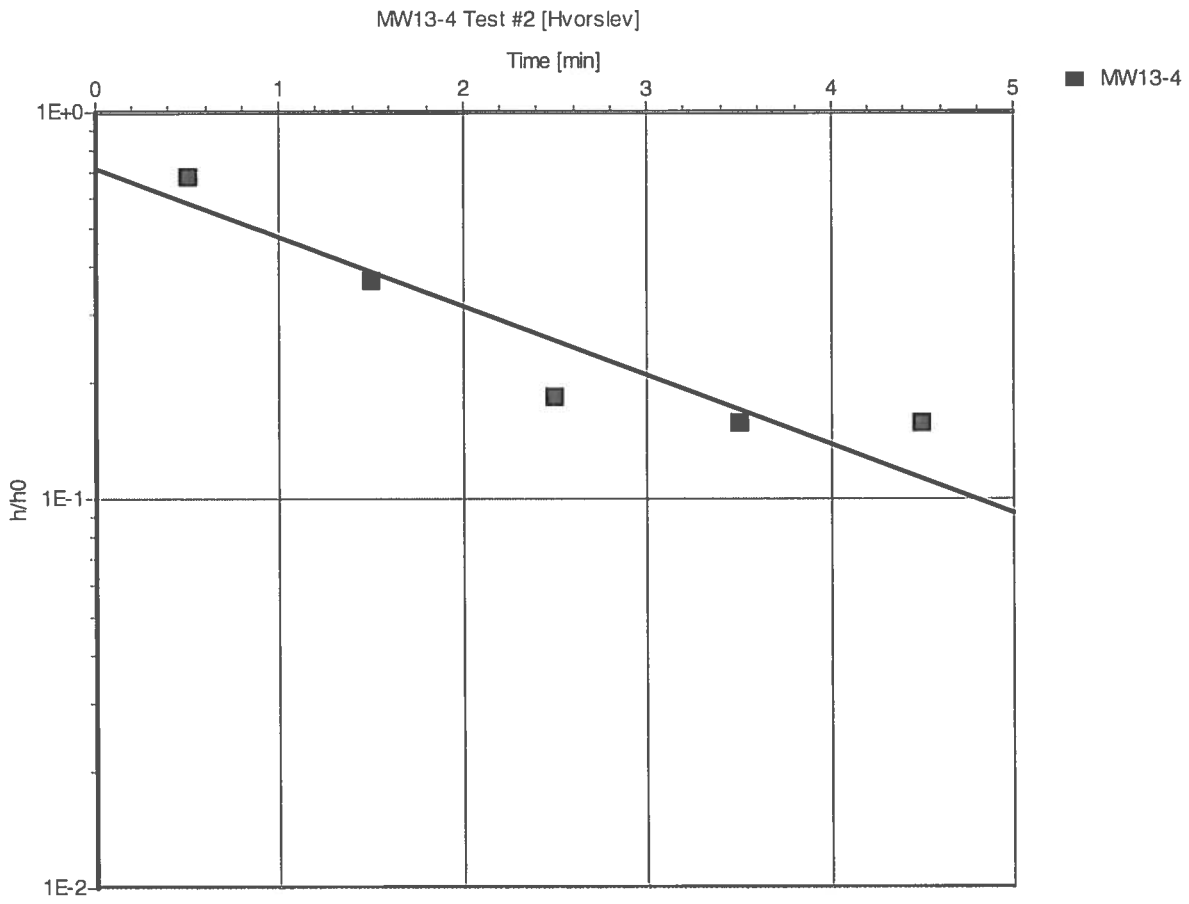
Exp Services Inc.
Suite 315 The Woolen Mill
4 Cataraqui Street
Kingston, Ontario, K7K 1Z7

Slug Test Analysis Report

Project: 185 Mill Street

Number: KIN-26260-A0

Client: Brennan Custom Homes



Slug Test: **MW13-4 Test #2**

Analysis Method: **Hvorslev**

Analysis Results:

Conductivity: 5.90E-6 [m/s]

Test parameters:

Test Well:	MW13-4	Aquifer Thickness:	0.76 [m]
Casing radius:	0.0254 [m]		
Screen length:	0.76 [m]		
Boring radius:	0.1 [m]		

Comments:

Evaluated by:

Evaluation Date: 18/07/2013

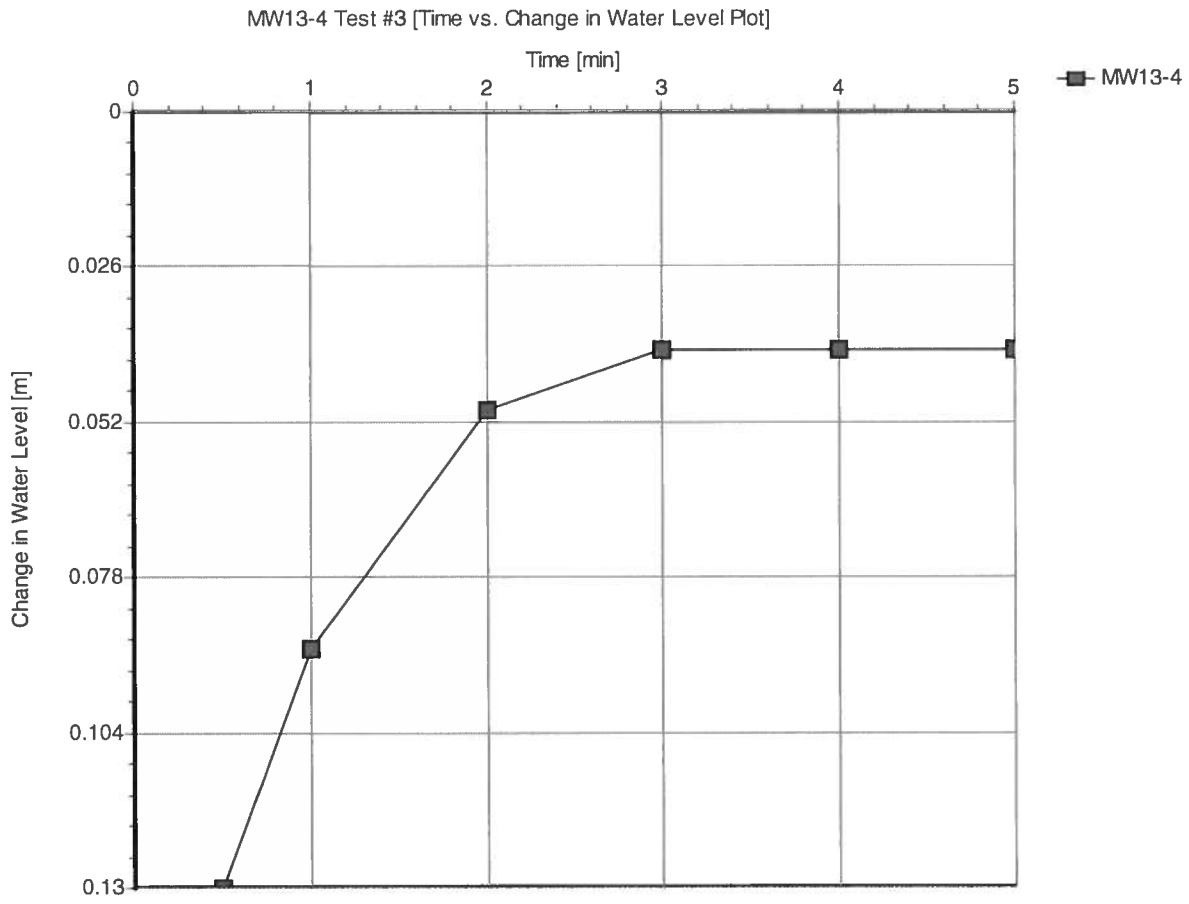
Exp Services Inc.
Suite 315 The Woolen Mill
4 Cataraqui Street
Kingston, Ontario, K7K 1Z7

Slug Test Analysis Report

Project: 185 Mill Street

Number: KIN-26260-A0

Client: Brennan Custom Homes



Slug Test: **MW13-4 Test #3**

Analysis Method: **Time vs. Change in Water Level Plot**

Analysis Results:

Test parameters:				
	Test Well:	MW13-4	Aquifer Thickness:	0.76 [m]
	Casing radius:	0.0254 [m]		
	Screen length:	0.76 [m]		
	Boring radius:	0.1 [m]		

Comments:

Evaluated by:

Evaluation Date: 18/07/2013

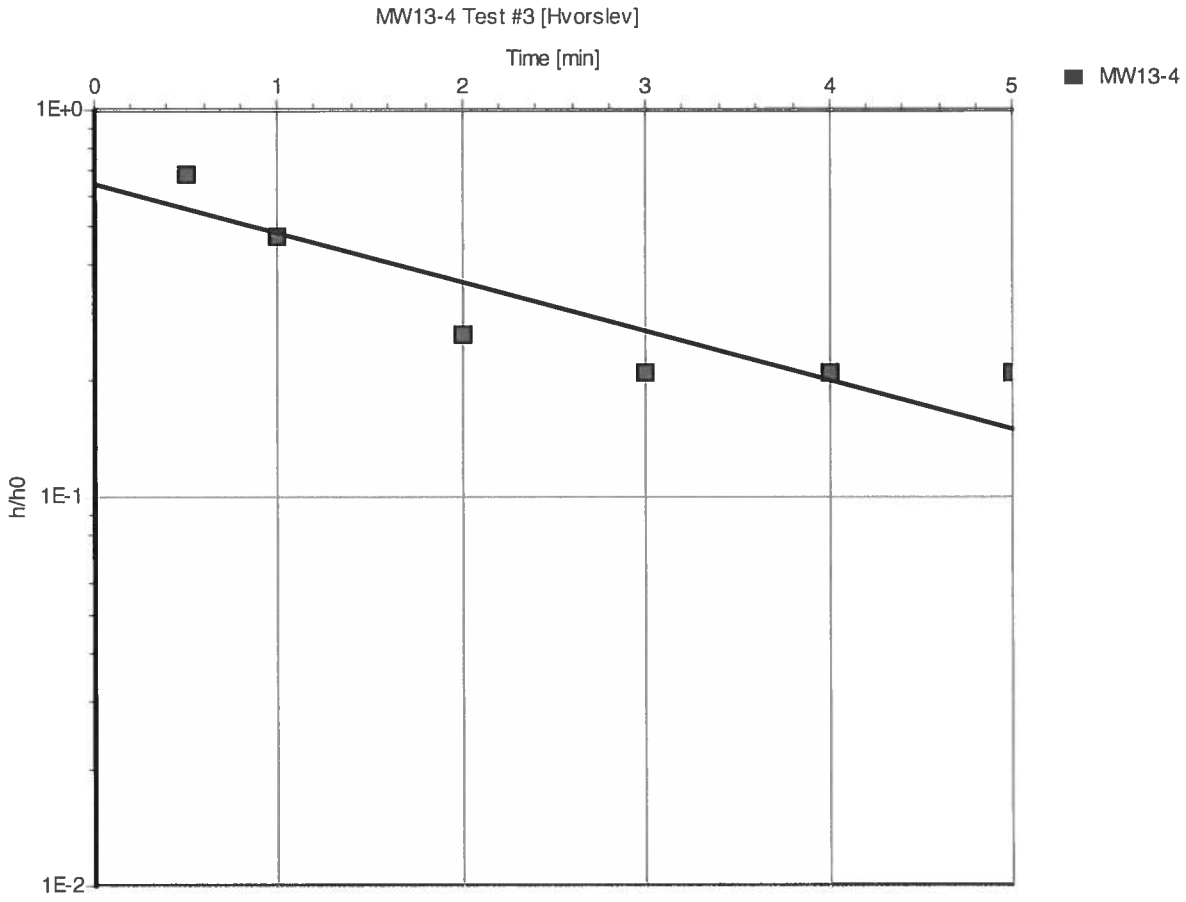
Exp Services Inc.
Suite 315 The Woolen Mill
4 Cataraqui Street
Kingston, Ontario, K7K 1Z7

Slug Test Analysis Report

Project: 185 Mill Street

Number: KIN-26260-A0

Client: Brennan Custom Homes



Slug Test: **MW13-4 Test #3**

Analysis Method: **Hvorslev**

Analysis Results:

Conductivity: 4.19E-6 [m/s]

Test parameters:

Test Well:	MW13-4	Aquifer Thickness:	0.76 [m]
Casing radius:	0.0254 [m]		
Screen length:	0.76 [m]		
Boring radius:	0.1 [m]		

Comments:

Evaluated by:

Evaluation Date: 18/07/2013

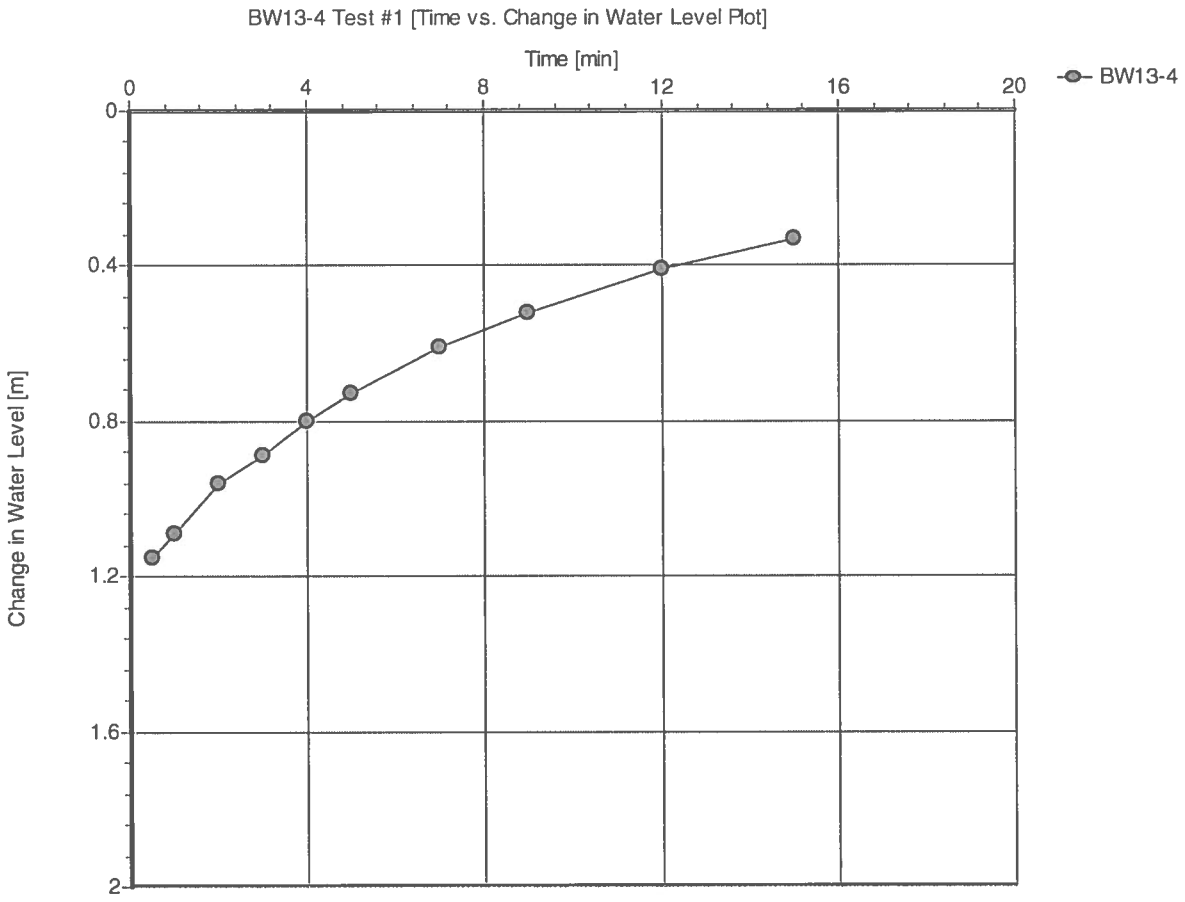
Exp Services Inc.
Suite 315 The Woolen Mill
4 Cataraqui Street
Kingston, Ontario, K7K 1Z7

Slug Test Analysis Report

Project: 185 Mill Street

Number: KIN-26260-A0

Client: Brennan Custom Homes



Slug Test: **BW13-4 Test #1**

Analysis Method: **Time vs. Change in Water Level Plot**

Analysis Results:

Test parameters:				
	Test Well:	BW13-4	Aquifer Thickness:	1.88 [m]
	Casing radius:	0.0254 [m]		
	Screen length:	3.05 [m]		
	Boring radius:	0.0381 [m]		

Comments:

Evaluated by: MW

Evaluation Date: 18/07/2013

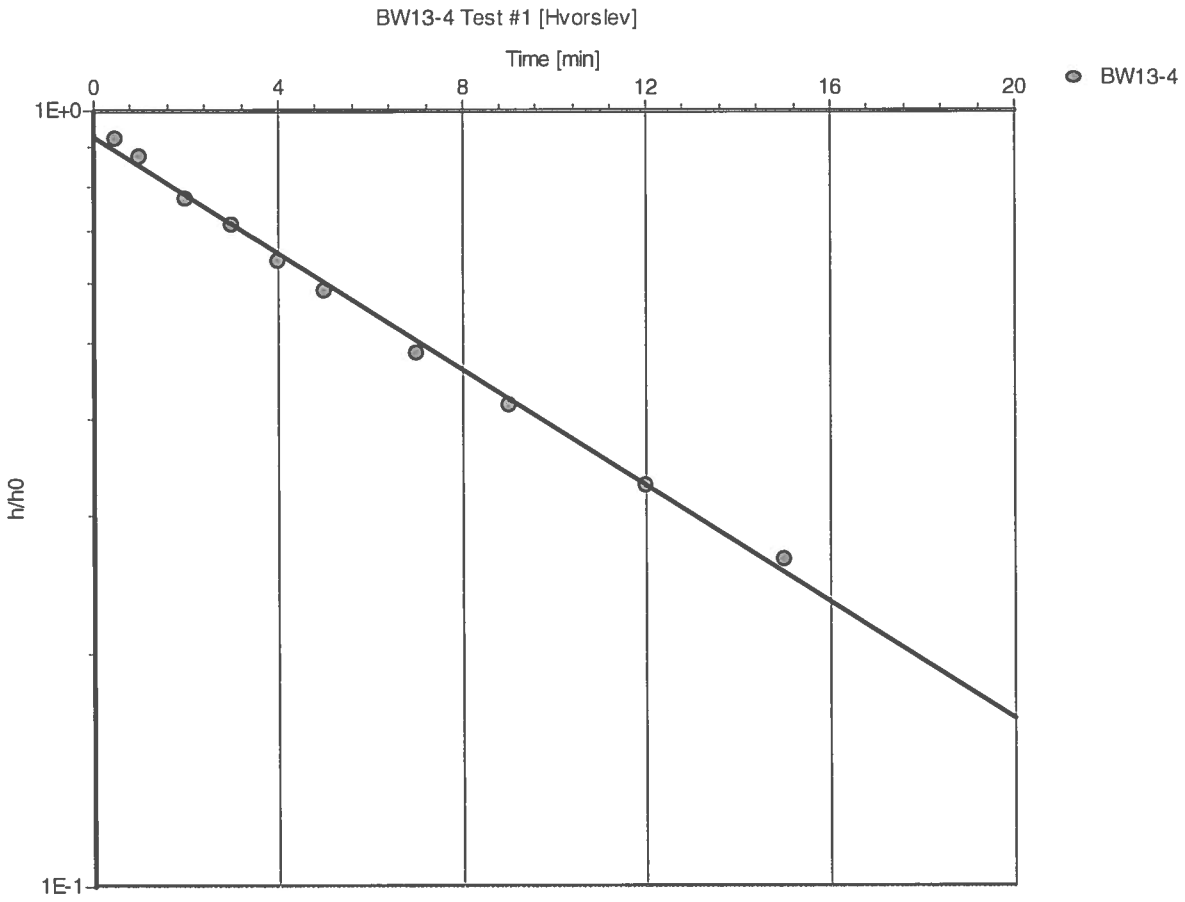
Exp Services Inc.
Suite 315 The Woolen Mill
4 Cataraqui Street
Kingston, Ontario, K7K 1Z7

Slug Test Analysis Report

Project: 185 Mill Street

Number: KIN-26260-A0

Client: Brennan Custom Homes



Slug Test: **BW13-4 Test #1**

Analysis Method: **Hvorslev**

Analysis Results:

Conductivity: 6.70E-7 [m/s]

Test parameters:

Test Well:	BW13-4	Aquifer Thickness:	1.88 [m]
Casing radius:	0.0254 [m]		
Screen length:	3.05 [m]		
Boring radius:	0.0381 [m]		

Comments:

Evaluated by: MW

Evaluation Date: 18/07/2013

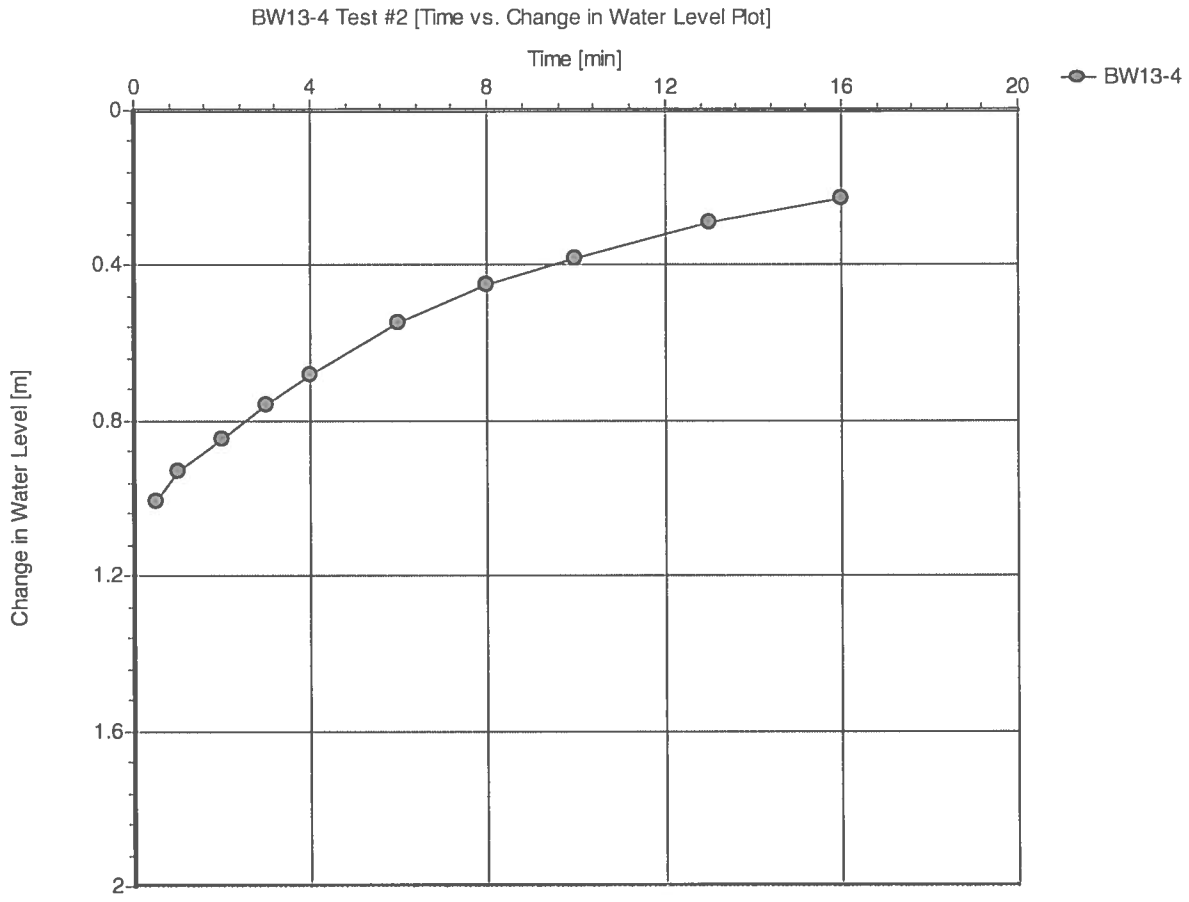
Exp Services Inc.
Suite 315 The Woolen Mill
4 Cataraqui Street
Kingston, Ontario, K7K 1Z7

Slug Test Analysis Report

Project: 185 Mill Street

Number: KIN-26260-A0

Client: Brennan Custom Homes



Slug Test: **BW13-4 Test #2**

Analysis Method: **Time vs. Change in Water Level Plot**

Analysis Results:

Test parameters:				
	Test Well:	BW13-4	Aquifer Thickness:	1.88 [m]
	Casing radius:	0.0254 [m]		
	Screen length:	3.05 [m]		
	Boring radius:	0.0381 [m]		

Comments:

Evaluated by:

Evaluation Date: 18/07/2013

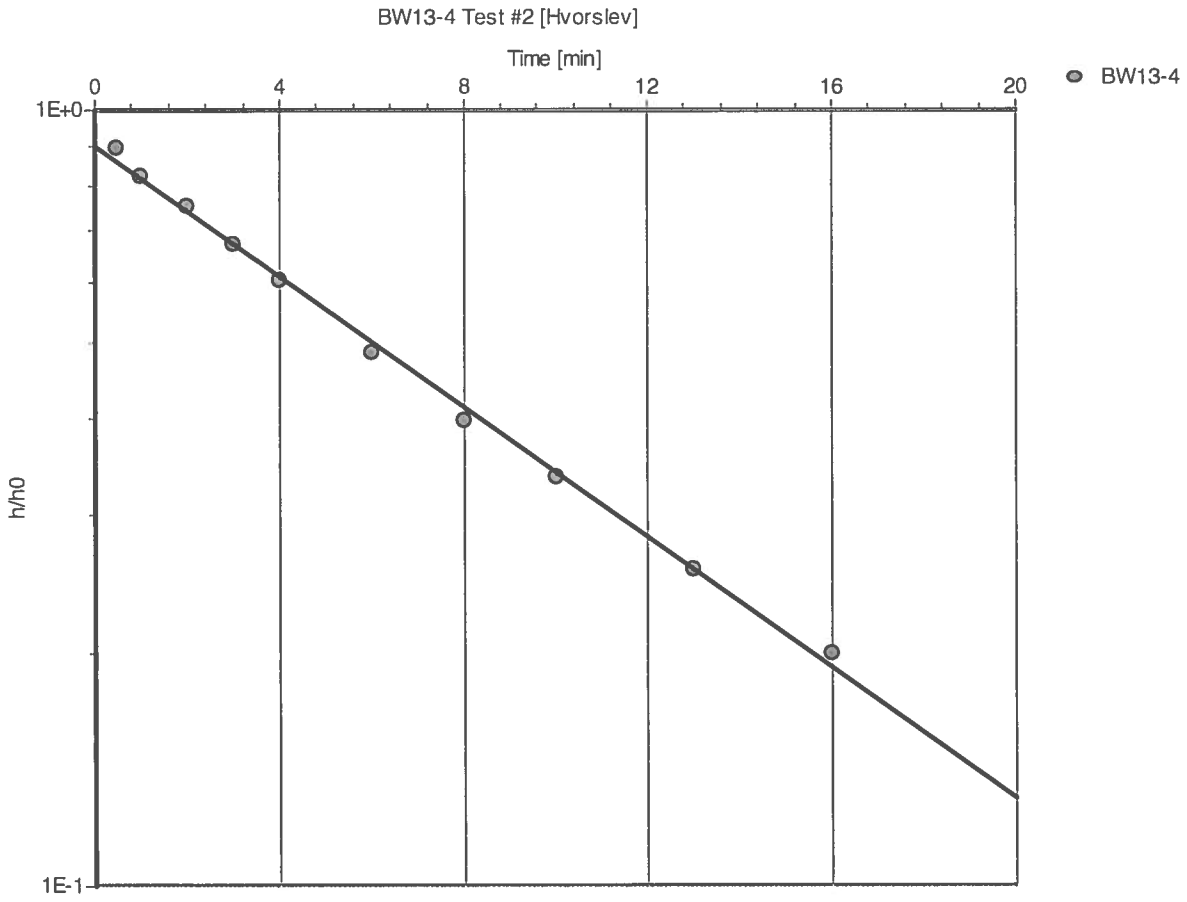
Exp Services Inc.
Suite 315 The Woolen Mill
4 Cataraqui Street
Kingston, Ontario, K7K 1Z7

Slug Test Analysis Report

Project: 185 Mill Street

Number: KIN-26260-A0

Client: Brennan Custom Homes



Slug Test: **BW13-4 Test #2**

Analysis Method: **Hvorslev**

Analysis Results:

Conductivity: 7.53E-7 [m/s]

Test parameters:

Test Well:	BW13-4	Aquifer Thickness:	1.88 [m]
Casing radius:	0.0254 [m]		
Screen length:	3.05 [m]		
Boring radius:	0.0381 [m]		

Comments:

Evaluated by:

Evaluation Date: 18/07/2013

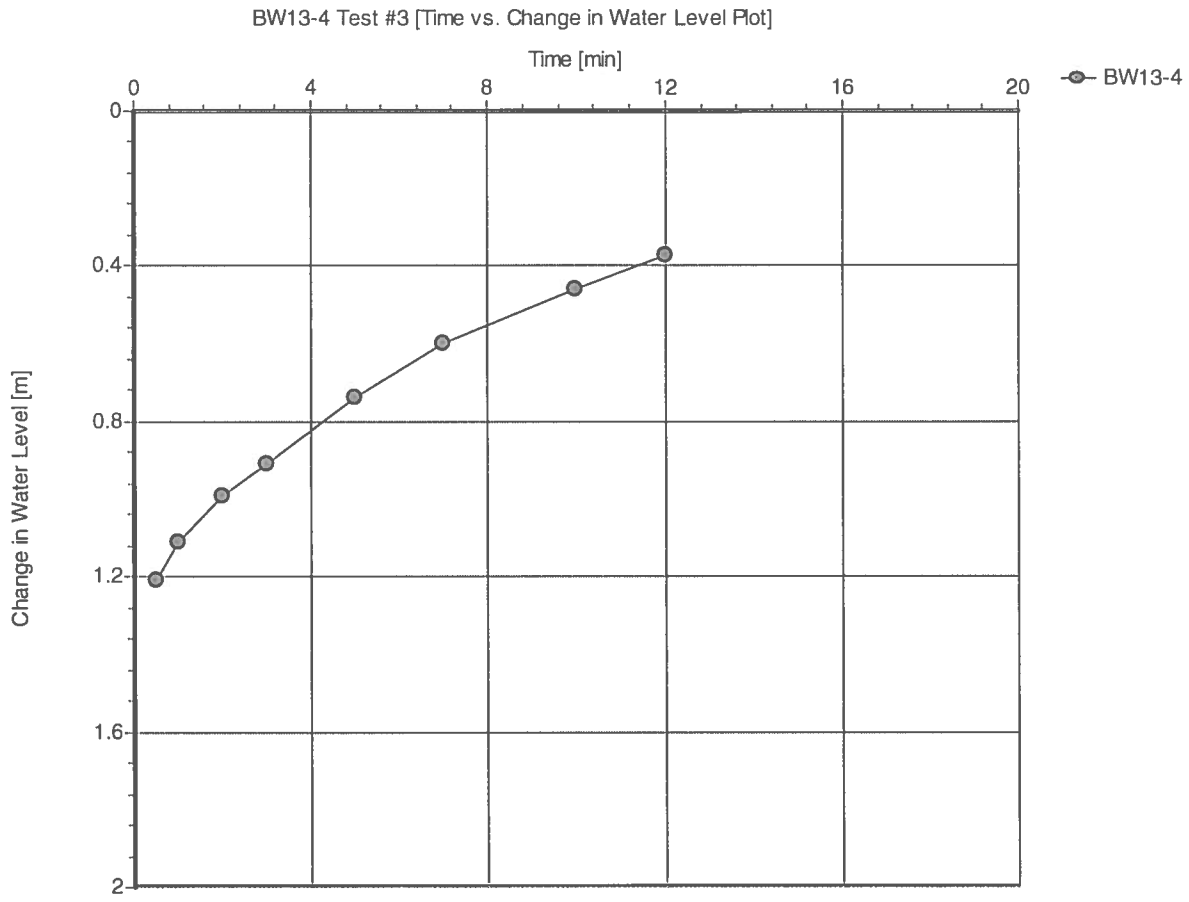
Exp Services Inc.
Suite 315 The Woolen Mill
4 Cataraqui Street
Kingston, Ontario, K7K 1Z7

Slug Test Analysis Report

Project: 185 Mill Street

Number: KIN-26260-A0

Client: Brennan Custom Homes



Slug Test: **BW13-4 Test #3**

Analysis Method: **Time vs. Change in Water Level Plot**

Analysis Results:

Test parameters:				
	Test Well:	BW13-4	Aquifer Thickness:	1.88 [m]
	Casing radius:	0.0254 [m]		
	Screen length:	3.05 [m]		
	Boring radius:	0.0381 [m]		

Comments:

Evaluated by:

Evaluation Date: 18/07/2013

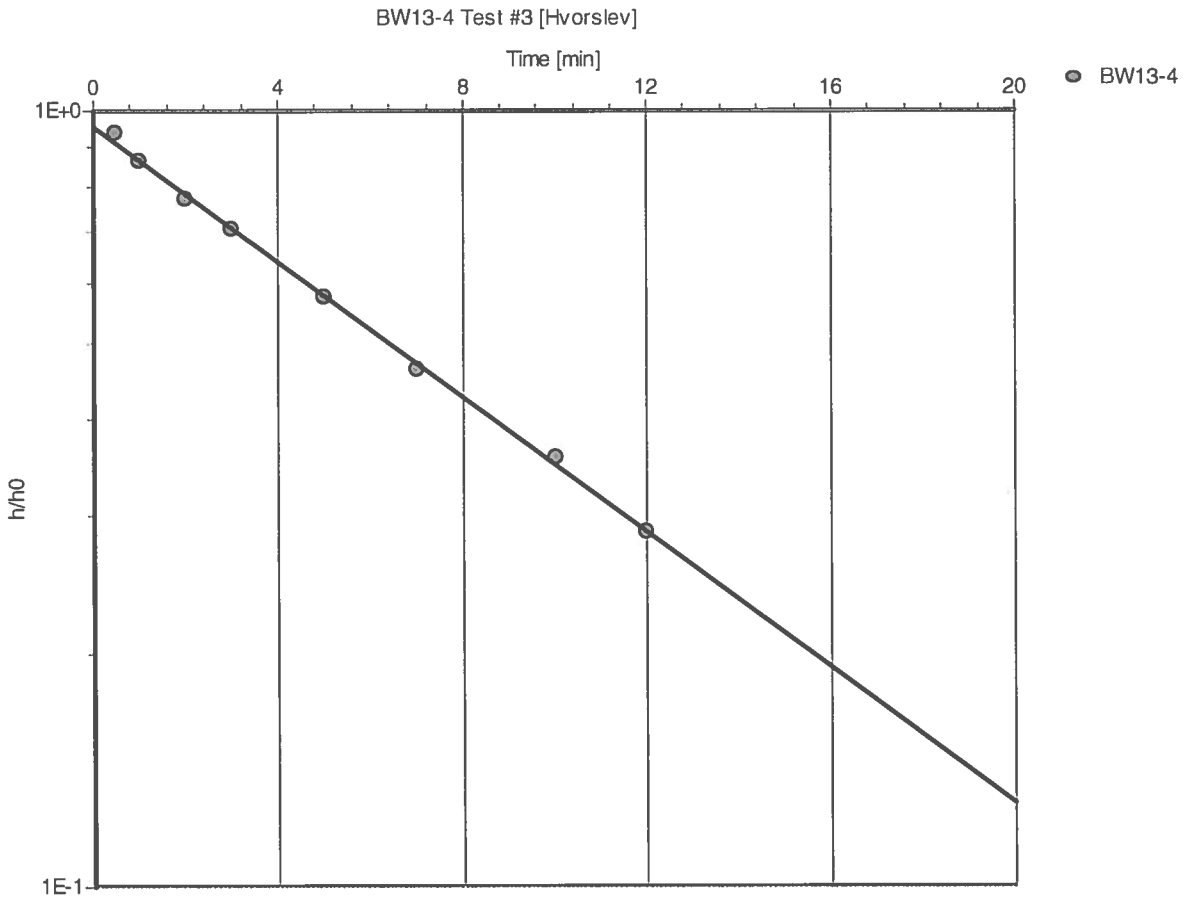
Exp Services Inc.
Suite 315 The Woolen Mill
4 Cataraqui Street
Kingston, Ontario, K7K 1Z7

Slug Test Analysis Report

Project: 185 Mill Street

Number: KIN-26260-A0

Client: Brennan Custom Homes



Slug Test: **BW13-4 Test #3**

Analysis Method: **Hvorslev**

Analysis Results:

Conductivity: 7.81E-7 [m/s]

Test parameters:

Test Well:	BW13-4	Aquifer Thickness:	1.88 [m]
Casing radius:	0.0254 [m]		
Screen length:	3.05 [m]		
Boring radius:	0.0381 [m]		

Comments:

Evaluated by: MW

Evaluation Date: 18/07/2013

Appendix D –
Borehole and Test Pit Logs and
Ministry of Environment Water Well Records

exp Services Inc.
315 The Woolen Mill
4 Cataraqui Street
Kingston, ON K7K 1Z7

Log Of Borehole: BH-1

Monitoring Well:

Project No.: KIN-26260

Project: 185 Mill Street

Client: Brennan Custom Homes Inc.

Location: Gananoque, ON

Logged by: M. Whitney

SUBSURFACE PROFILE			SAMPLE						
Depth	Symbol	Description	Depth/Elev.	Blow Counts	Sample I.D.	Vapour ppm	Recovery	Well Completion Details	Comments
ft / m		Ground Surface	95.19						
0 / 0		***Silty Clay Fill*** Silty clay fill with some gravel. No staining or odour.		4/5/13/50	SS-1	0	57%		Sample BH-1 SS-1 submitted for laboratory analysis of PHC, VOC and metals.
2			94.43	-	Aug	-	-		
3 / 1		End of Borehole							Inferred bedrock refusal at 0.76m below grade. Borehole Terminated. No well installed.
4									
5									
6 / 2									
7									
8									
9									
10 / 3									
11									
12									
13 / 4									
14									
15									
16									

Drilled By: Canadian Environmental Drilling

Drill Method: Truck Mounted Drill Rig

Drill Date: May 27, 2013

Hole Size: 200.3 mm

Datum: Relative (95.19 m)

Sheet: 1 of 1

exp Services Inc.
315 The Woolen Mill
4 Cataraqui Street
Kingston, ON K7K 1Z7

Log Of Borehole: BH-2

Monitoring Well:

Project No.: KIN-26260

Project: 185 Mill Street

Client: Brennan Custom Homes Inc.

Location: Gananoque, ON

Logged by: M. Whitney

SUBSURFACE PROFILE			SAMPLE						
Depth (ft / m)	Symbol	Description	Depth/Elev.	Blow Counts	Sample I.D.	Vapour ppm	Recovery	Well Completion Details	Comments
0 / 0		Ground Surface	95.53						
0 – 1 / 0		***Sand and Gravel Fill*** Sand and gravel fill. Grey to brown. Some slight dark colorations. No odour.	95.00	15/13/18/50	SS-1 A-1	0	61%		Sample BH-2 SS-2 and A-1 (Duplicate) submitted for laboratory analysis of PHC, VOC, PAHs and metals.
2 / 1		End of Borehole							Inferred bedrock refusal at 0.53 m below grade. Borehole Terminated. No well installed.
3 – 16 / 1 – 4									

Drilled By: Canadian Environmental Drilling

Drill Method: Truck Mounted Drill Rig

Drill Date: May 29, 2013

Hole Size: 200.3 mm

Datum: Relative (95.53 m)

Sheet: 1 of 1

exp Services Inc.
315 The Woolen Mill
4 Cataraqui Street
Kingston, ON K7K 1Z7

Log Of Borehole: BH-3

Monitoring Well:

Project No.: KIN-26260

Project: 185 Mill Street

Client: Brennan Custom Homes Inc.

Location: Gananoque, ON

Logged by: M. Whitney

SUBSURFACE PROFILE			SAMPLE						
Depth (ft / m)	Symbol	Description	Depth/Elev.	Blow Counts	Sample I.D.	Vapour ppm	Recovery	Well Completion Details	Comments
0 / 0		Ground Surface	94.78						
0 – 1		***Sand*** Sand with plant roots. Dry.		4/8/50	SS-1	0	48%		Sample BH-3 SS-1 submitted for laboratory analysis of PHC, VOC, PAHs and metals.
1 – 2		***Sand and Gravel*** Sand and gravel fill. Brown to black. No odour	94.25						
3 / 1		End of Borehole							Inferred bedrock refusal at 0.53 m below grade. Borehole Terminated. No well installed.
4 – 16									

Drilled By: Canadian Environmental Drilling

Drill Method: Truck Mounted Drill Rig

Drill Date: May 29, 2013

Hole Size: 200.3 mm

Datum: Relative (94.78 m)

Sheet: 1 of 1

exp Services Inc.
315 The Woolen Mill
4 Cataraqui Street
Kingston, ON K7K 1Z7

Log Of Borehole: BH-4

Monitoring Well: MW-13-1

Project No.: KIN-26260-A0

Project: 185 Mill Street

Client: Brennan Custom Homes Inc.

Location: Gananoque, Ontario

Logged by: M. Whitney

SUBSURFACE PROFILE			SAMPLE						
Depth (ft / m)	Symbol	Description	Depth/Elev.	Blow Counts	Sample I.D.	Vapour ppm	Recovery	Well Completion Details	Comments
0 / 0		Ground Surface	93.87					Flushmount cover	TOC=93.68 m
1		***Sand*** Sand. Brown. Dry. No odour.		4/9/20/16	SS-1	0.1	50%	Bentonite	
2		***Sand*** Sand and coal. Black. Dry. No odour.	93.02					51 mm PVC casing	
3 / 1		***Cobbles***		13/9/9/6	SS-2	0.2	75%		SWL=0.85m (June 19, 2013)
4		***Sand and Gravel*** Sand and gravel. Rusty brown. Moist. No staining. No odour.	92.65						Sample BH-4 SS-2 submitted for analysis of PHC, BTEX, metals.
5			92.35	Aug	-	-	-		
6 / 2		***Cobbles*** Augered through layer of cobbles.		1/2/5/7	SS-3	-	33%		
7		***Sand and Gravel*** Brown sand and gravel. Some cobbles. No staining. No odour. Saturated.		9/9/9/8	SS-4	-	16%	Silica sand	
8									
9									
10 / 3				6/32/23/14	SS-5	-	58%	51 mm PVC screen	
11			90.52						
12		***Sand and Gravel*** Sand and gravel. Brown. Saturated. No odour or staining.	90.35	7/3/2/3	SS-6	-	58%		
13 / 4		***Wood*** Wood.	89.91						Borehole terminated at 3.96m below grade. Bedrock not encountered.
14		End of Borehole							
15									
16									

Drilled By: Canadian Environmental Drilling

Drill Method: Truck Mounted Drill Rig

Drill Date: May 29, 2013

Hole Size: 203.2 mm

Datum: Relative (93.87 m)

Sheet: 1 of 1

exp Services Inc.
315 The Woolen Mill
4 Cataraqui Street
Kingston, ON K7K 1Z7

Log Of Borehole: BH-5

Monitoring Well: MW-13-2

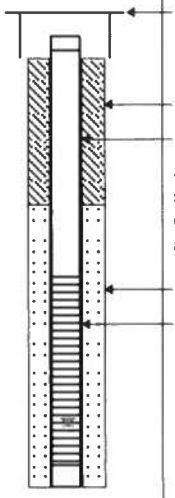
Project No.: KIN-26260-A0

Project: 185 Mill Street

Client: Brennan Custom Homes Inc.

Location: Gananoque, Ontario

Logged by: M. Whitney

SUBSURFACE PROFILE			SAMPLE						
Depth (ft / m)	Symbol	Description	Depth/Elev.	Blow Counts	Sample I.D.	Vapour ppm	Recovery	Well Completion Details	Comments
0 / 0		Ground Surface	94.82						Flushmount cover TOC=94.74 m
0 – 1 / 0		***Sand and Gravel***	94.21	19/24/15/9	SS-1	0.0	63%		Bentonite; 51 mm PVC casing
2 – 3 / 1		***Sand and Gravel*** Sand and gravel. Some brick fragments. Darker coloured layer from approximately 0.82 to 0.86 m below grade. Dry. No odour.	93.60	11/4/8/12	SS-2	0.0	50%		Sample BH-5 SS-2 submitted for analysis of PHC, BTEX, metals and PAHs.
4 – 5 / 1			93.15	7/7/50	SS-3	0.0	67%		Silica sand; 51 mm PVC screen
6 / 2		***Sand and Gravel*** Sand and gravel. Some cobbles. Split-spoon refusal at 1.67 m below grade.	92.76	Auger	-	-	-		SWL=1.79m (June 19, 2013)
7 – 9 / 2		***Cobbles*** Augered through cobbles or poor quality rock. Auger refusal at 2.06 m below grade.							Inferred bedrock at 2.06 m below grade. Borehole terminated.
10 / 3		End of Borehole							
11 – 16 / 3 – 4									

Drilled By: Canadian Environmental Drilling

Drill Method: Truck Mounted Drill Rig

Drill Date: May 29, 2013

Hole Size: 203.2 mm

Datum: Relative (94.82 m)

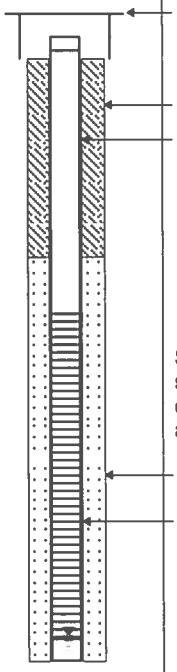
Sheet: 1 of 1

exp Services Inc.
315 The Woolen Mill
4 Cataraqui Street
Kingston, ON K7K 1Z7

Log Of Borehole: BH-6

Project No.: KIN-26260-A0
Monitoring Well: MW-13-3
Project: 185 Mill Street
Client: Brennan Custom Homes Inc.
Location: Gananoque, Ontario
Logged by: M. Whitney

SUBSURFACE PROFILE			SAMPLE						
Depth (ft / m)	Symbol	Description	Depth/Elev.	Blow Counts	Sample I.D.	Vapour ppm	Recovery	Well Completion Details	Comments
0 / 0		Ground Surface	97.91						
0–2 / 0–1		***Sand and Gravel*** Light brown sand and gravel underlain with brown sand.Dry. No odour. No staining.	97.30	23/13/10/7	SS-1	0.0	58%		
2–4 / 1		***Sand*** Sand. Some gravel at bottom of spoon. No odour. No staining.	96.69	10/5/5/5	SS-2	0.0	33%		
4–6 / 1–2		***Sand*** Fine grained sand with trace clay. Brown. Moist. No odour. No staining.	96.08	2/2/1/1	SS-3	0.0	54%		
6–8 / 2		***Sand*** Fine grained sand with trace clay. Brown. Wet. No odour. No staining.	95.47	2/1/1/2	SS-4	-	38%		
8–9 / 2–3		***Sand*** Light brown sand. Calcite bottom of spoon.	95.10	10/50	SS-5	-	50%		
10 / 3		End of Borehole							



Sample BH-6 SS-2 submitted for analysis of PHC, BTEX, PCBs and metals.

SWL=2.69m (June 19, 2013)

Inferred bedrock at 2.81 m below grade. Borehole terminated.

Drilled By: Canadian Environmental Drilling
Drill Method: Truck Mounted Drill Rig
Drill Date: May 31, 2013

Hole Size: 203.2 mm
Datum: Relative (97.91 m)
Sheet: 1 of 1

exp Services Inc.
315 The Woolen Mill
4 Cataraqui Street
Kingston, ON K7K 1Z7

Log Of Borehole: BH-7

Monitoring Well: MW-13-4

Project No.: KIN-26260

Project: 185 Mill Street

Client: Brennan Custom Homes Inc.

Location: Gananoque, ON

Logged by: M. Whitney

Depth (ft / m)	Description	Depth/Elev.	Blow Counts	Sample I.D.	Vapour ppm	Recovery	Comments
0 / 0	Ground Surface	94.29					
0 – 1 / 0	***Rock Fill*** Augered through rock fill.	93.98	-	Aug	-	-	Sample BH-7 SS-2 submitted for analysis of PHC, BTEX, PAHs, PCBs and metals.
1 – 2 / 0 – 1	***Sand and Gravel*** Sand and gravel. Dry. No staining. No odour.	93.38	8/6/8/4	SS-1	0.0	46%	
3 – 4 / 1	***Clayey Silt*** Clayey silt. Soft. Very Moist. Some black coal fragments. No odour.	92.77	2/3/8/4	SS-2	0.0	46%	
5 – 6 / 1 – 2	Soil Penetration Resistance = 0.25 kg/cm²	92.38	9/50	SS-3	-	33%	
7 – 8 / 2	***Sand and Gravel*** Sand and gravel. Saturated. No odour. No staining.						
9 – 10 / 3	End of Borehole						

Inferred bedrock refusal at 1.91 m below grade. Borehole terminated.

Drilled By: Canadian Environmental Drilling

Drill Method: Truck Mounted Drill Rig

Drill Date: May 31, 2013

Hole Size: 76.2 mm

Datum: Relative (94.29 m)

Sheet: 1 of 1

exp Services Inc.
315 The Woolen Mill
4 Cataraqui Street
Kingston, ON K7K 1Z7

Log Of Borehole: BH-8

Monitoring Well:

Project No.: KIN-26260
Project: 185 Mill Street
Client: Brennan Custom Homes Inc.
Location: Gananoque, ON
Logged by: M. Whitney

SUBSURFACE PROFILE			SAMPLE						
Depth (ft / m)	Symbol	Description	Depth/Elev.	Blow Counts	Sample I.D.	Vapour ppm	Recovery	Well Completion Details	Comments
0 / 0		Ground Surface	98.38						
1		***Sand and Gravel*** Brown to dark brown at bottom of spoon. Dry to moist. No odour. No staining.	97.77	7/7/6/6	SS-1	0.0	100%		
2		***Sand and Gravel*** Dark brown Moist. No odour. No staining.	97.64	11/5/3/4	SS-2	0.0	75%		Sample BH-8 SS-2 submitted for laboratory analysis of PAHs, PCBs and metals. BH-8 SS-3 submitted for analysis of PHC and VOCs.
3 / 1		***Clayey Silt*** Brown with some black staining. Moist. No odour.	97.16	3/3/50	SS-3	0.0	100%		
4		***Clayey Silt*** Brown. No odour or staining. Wet.	96.83						
5		End of Borehole							Inferred bedrock refusal at 1.55 m below grade. Borehole Terminated. No well installed.
6 / 2									
7									
8									
9									
10 / 3									
11									
12									
13 / 4									
14									
15									
16									

Drilled By: Canadian Environmental Drilling
Drill Method: Truck Mounted Drill Rig
Drill Date: June 3, 2013

Hole Size: 200.3 mm
Datum: Relative (98.38 m)
Sheet: 1 of 1

exp Services Inc.
315 The Woolen Mill
4 Cataraqui Street
Kingston, ON K7K 1Z7

Log Of Borehole: BH-9

Monitoring Well:

Project No.: KIN-26260
Project: 185 Mill Street
Client: Brennan Custom Homes Inc.
Location: Gananoque, ON
Logged by: M. Whitney

SUBSURFACE PROFILE			SAMPLE						
Depth (ft / m)	Symbol	Description	Depth/Elev.	Blow Counts	Sample I.D.	Vapour ppm	Recovery	Well Completion Details	Comments
0 / 0		Ground Surface	98.22						
1		***Sand and Gravel*** Dry. No staining. No odour.	97.61	24/29/23/10	SS-1	0.0	58%		
2		***Sand and Gravel*** Dark brown Moist. No odour. No staining.	97.48						
3 / 1		***Clayey Silt*** Brown with some black staining. Moist. No odour.	97.35	4/2/2/1	SS-2	0.0	58%		Sample BH-9 SS-2 submitted for laboratory analysis of PHC, VOC, PAHs and metals.
4		***Brick***	97.00						
5		***Sand and Gravel*** Black. Dry. No odour.	96.39	3/2/2/2	SS-3	0.0	42%		
6 / 2		***Sand and Gravel*** Dark grey. Wood fragments at top of spoon. Wet to Saturated.	95.79	1/1/1/4	SS-4	-	33%		
8		***Sand and Gravel*** Dark grey. No odour.	95.48	50	SS-5	-	66%		
9 / 3		***Sand and Gravel*** Sand and gravel. Wood at bottom of spoon. Split spoon refusal at 2.59 m. Augered to refusal at 2.74 m.							Inferred bedrock refusal at 2.74 m below grade. Borehole Terminated. No well installed.
12		End of Borehole							
13 / 4									
16									

Drilled By: Canadian Environmental Drilling
Drill Method: Truck Mounted Drill Rig
Drill Date: June 3, 2013

Hole Size: 200.3 mm
Datum: Relative (98.22 m)
Sheet: 1 of 1

exp Services Inc.
315 The Woolen Mill
4 Cataraqui Street
Kingston, ON K7K 1Z7

Project No.: KIN-26260
Project: 185 Mill Street
Client: Brennan Custom Homes Inc.
Location: Gananoque, ON
Logged by: M. Whitney

Log Of Borehole: BH-10
Monitoring Well:

SUBSURFACE PROFILE			SAMPLE						
Depth (ft / m)	Symbol	Description	Depth/Elev.	Blow Counts	Sample I.D.	Vapour ppm	Recovery	Well Completion Details	Comments
0 / 0		Ground Surface	98.31						
0 – 2 / 0 – 1		***Sand and Gravel*** Dry. No staining. No odour.	97.70	14/16/7/4	SS-1	0.0	71%		
2 – 4 / 1 – 1		***Sand and Gravel*** Brown sand and gravel with 0.13 m thick layer of coal at middle of spoon. Dry. No odour.	97.09	4/3/3/5	SS-2	0.0	54%		Sample BH-10 SS-2 submitted for laboratory analysis of PHC, VOC, PAHs, PCBs, and metals.
4 – 6 / 1 – 2		***Sand and Gravel*** Brown. No staining. No odour. Moist.	96.48	5/1/1/1	SS-3	0.0	21%		
6 – 8 / 2 – 2		***Sand and Gravel*** Brown. No staining. No odour. Wet to Saturated.	95.87	1/1/1/4	SS-4	-	21%		
8 – 9 / 2 – 3		***Sand*** Black sand underlain with light brown sand. Calcite at bottom of spoon. No odour.	95.44	3/50	SS-5	-	35%		
10 / 3		End of Borehole							Inferred bedrock refusal at 2.87 m below grade. Borehole Terminated. No well installed.
11 – 16 / 3 – 4									

Drilled By: Canadian Environmental Drilling
Drill Method: Truck Mounted Drill Rig
Drill Date: June 3, 2013

Hole Size: 200.3 mm
Datum: Relative (98.31 m)
Sheet: 1 of 1

exp Services Inc.
315 The Woolen Mill
4 Cataraqui Street
Kingston, ON K7K 1Z7

Log Of Borehole: BH-11

Monitoring Well:

Project No.: KIN-26260
Project: 185 Mill Street
Client: Brennan Custom Homes Inc.
Location: Gananoque, ON
Logged by: M. Whitney

SUBSURFACE PROFILE			SAMPLE						
Depth (ft / m)	Symbol	Description	Depth/Elev.	Blow Counts	Sample I.D.	Vapour ppm	Recovery	Well Completion Details	Comments
0 / 0		Ground Surface	98.15						
0 – 1		***Sand and Gravel*** Brown. Dry. No staining. No odour.	97.84	16/15/10/10	SS-1	0.0	75%		
1 – 2		***Sand*** Brown. Medium grained. Dry. No odour. No staining.	97.54	2/3/1/1	SS-2	0.0	67%		Sample BH-11 SS-2 submitted for laboratory analysis of PHC, VOC and metals.
2 – 3		***Sand and Gravel*** Brown. Medium grained. Dry. No odour. No staining.	96.93	1/1/1/1	SS-3	0.0	67%		
3 – 4		***Sand*** Brown. Becoming more coarse with depth. Wet. No staining. No odour.	96.32	1/1/1/1	SS-4	-	100%		
4 – 5		***Sand and Gravel*** Medium to dark brown. Coarse grained sand with some gravel. Saturated. No odour.	95.71	50	SS-5	-	13%		
5 – 6		***Sand and Gravel*** Dark brown. Saturated. No staining.	95.28	Core	RC-1				Inferred bedrock refusal at 2.87 m below grade.
6		***Dolostone*** Fractured. Horizontal to 15°. Some brown staining in fractures. RQD = 67% (Fair Quality)	93.81	Core	RC-2				
		Dolostone Grey. Fractured with some brown staining. Vertical brown seam from 3.99 to 4.32 m. Calcite at bottom. RQD = 70% (Fair Quality)	92.28						Borehole Terminated at 5.87m. No well installed.
		End of Borehole							

Drilled By: Canadian Environmental Drilling
Drill Method: Truck Mounted Drill Rig
Drill Date: June 3, 2013

Hole Size: 200.3 mm
Datum: Relative (98.15 m)
Sheet: 1 of 1

exp Services Inc.
315 The Woolen Mill
4 Cataraqui Street
Kingston, ON K7K 1Z7

Log Of Borehole: BH-12

Monitoring Well: MW13-5

Project No.: KIN-26260

Project: 185 Mill Street

Client: Brennan Custom Homes Inc.

Location: Gananoque, ON

Logged by: M. Whitney

SUBSURFACE PROFILE			SAMPLE						
Depth (ft / m)	Symbol	Description	Depth/Elev.	Blow Counts	Sample I.D.	Vapour ppm	Recovery	Well Completion Details	Comments
ft: -3, -2, -1, 0, 1, 2, 3, 4, 5, 6 / m: -1, 0, 1		Ground Surface	97.49					0.87 m stick-up TOC=98.37m	
		Sand and Gravel Dry. No staining. No odour.	97.20	Auger	-	-	-	Bentonite 32 mm PVC casing	
		Coal Black.							
		Silt Brown silt with gravel. No odour. No staining. Dry. (Soil Penetration Resistance = 1.25 kg/m ²)	96.88						
		Silt Stiff brown silt. No odour. No staining. Dry. (Soil Penetration Resistance = 2.25 kg/cm ²)	96.27	Auger	-	-	-	Silica sand 32 mm PVC screen	
		Silt Wet. No odour. No staining. (Soil Penetration Resistance = 1.00 kg/m ²)	95.76	Auger	-	-	-	SWL=1.49m (June 19, 2013)	
		End of Borehole							Borehole Terminated 1.73 m below grade.

Drilled By: Canadian Environmental Drilling

Drill Method: Truck Mounted Drill Rig

Drill Date: May 31, 2013

Hole Size: 200.3 mm

Datum: Relative (97.49 m)

Sheet: 1 of 1

exp Services Inc.
315 The Woolen Mill
4 Cataraqui Street
Kingston, ON K7K 1Z7

Log Of Borehole: BW13-1

Project No.: KIN-26260
Project: 185 Mill Street
Client: Brennan Custom Homes Inc.
Location: Gananoque, ON
Logged by: M. Whitney
Monitoring Well: BW13-1

SUBSURFACE PROFILE			SAMPLE						
Depth (ft / m)	Symbol	Description	Depth/Elev.	Blow Counts	Sample I.D.	Vapour ppm	Recovery	Well Completion Details	Comments
		Ground Surface	93.80					0.93 m stick-up TOC=94.73 m	
0 / 0		***Sandy Clay and Gravel*** Brown. No odour. No staining.	93.19	3/2/1/1	SS-1	0.0	25%	Bentonite; 32 mm PVC casing	
2 / 1		***Silty Clay*** Brown silty clay. No odour. No staining.		3/21/26/17	SS-2	0.0	100%	SWL=0.82m (June 19, 2013)	Sample BW13-1 SS-2 submitted for analysis of PHC, VOC and metals.
4		***Fill*** Grey fill material. Hard and brittle. Dry.	92.58						
5		***Fill*** Grey fill material. Hard and brittle. Wet.	91.97	5/2/1/1	SS-3	-	17%		
6 / 2		***Fill*** Wet clay mixed with hard grey material. Rubber tubing in bottom of spoon.	91.36	1/3/3/3	SS-4	-	13%		
8		***Fill*** Stones and wood fragments. Trace clay. No odour. No staining. Saturated.	90.75	5/3/3/2	SS-5	-	50%		
10 / 3		***Sand, Gravel and Clay*** Sand, gravel and clay mixture. Saturated. No odour. No staining.	90.14	5/3/7/6	SS-6	-	50%		
12									

Drilled By: Canadian Environmental Drilling
Drill Method: Truck Mounted Drill Rig
Drill Date: May 27, 2013

Hole Size: 76.2 mm
Datum: Relative (93.80 m)
Sheet: 1 of 2

exp Services Inc.
315 The Woolen Mill
4 Cataraqui Street
Kingston, ON K7K 1Z7

Log Of Borehole: BW13-1

Monitoring Well: BW13-1

Project No.: KIN-26260
Project: 185 Mill Street
Client: Brennan Custom Homes Inc.
Location: Gananoque, ON
Logged by: M. Whitney

SUBSURFACE PROFILE			SAMPLE						
Depth	Symbol	Description	Depth/Elev.	Blow Counts	Sample I.D.	Vapour ppm	Recovery	Well Completion Details	Comments
12		***Gravel and Silty Clay*** Grey stones to silty clay. Saturated. No odour. No staining.		4/1/1/1	SS-7	-	17%		
13			89.53						
14		***Sand, Gravel and Clay*** Sand, gravel and clay mixture. Saturated. No odour. No staining.	89.23	5/8/50	SS-8	-	50%		
15	5								Inferred bedrock refusal at 4.57 m below grade.
16		***Dolostone*** Grey. Broken layer with brown staining at 4.95m. Calcite seams at bottom 5.53 to 6.15m. RQD = 47% (Poor Quality).		Core	RC-1	-	85%		
17									
18	6								
19									
20			87.65						
21		***Dolostone*** Grey dolostone with calcite seams. RQD = 47% (Poor Quality).		Core	RC-2	-	90%		
22	7								
23									
24									
25	8		86.08						
26		End of Borehole							Borehole terminated at 7.72m below grade.
27									

Silica sand
32 mm PVC screen

Drilled By: Canadian Environmental Drilling
Drill Method: Truck Mounted Drill Rig
Drill Date: May 27, 2013

Hole Size: 76.2 mm
Datum: Relative (93.80 m)
Sheet: 2 of 2

exp Services Inc.
315 The Woolen Mill
4 Cataraqui Street
Kingston, ON K7K 1Z7

Log Of Borehole: BW13-2

Project No.: KIN-26260
Monitoring Well: BW13-2
Project: 185 Mill Street
Client: Brennan Custom Homes Inc.
Location: Gananoque, ON
Logged by: M. Whitney

SUBSURFACE PROFILE			SAMPLE						
Depth (ft / m)	Symbol	Description	Depth/Elev.	Blow Counts	Sample I.D.	Vapour ppm	Recovery	Well Completion Details	Comments
0 / 0		Ground Surface	93.49					0.88 m stick-up TOC=0.88 m	
0 / 0		***Sand and Gravel*** Dry. Brown. Black staining 0.40 to 0.61m. No odour.	92.88	16/10/10/20	SS-1	0.0	71%		Sample BW13-2 SS-1 submitted for analysis of PHC, VOC, and metals.
2 / 1		***Sand and Gravel*** Dark staining. Dry. Rock fill at bottom. Split spoon refusal at 0.84.	92.65	6/50	SS-2	0.0	33%		SWL=0.54m (June 19, 2013)
4 / 1		***Rock Fill*** Augered through rock fill.	91.97	Auger	-	-	-	Bentonite 32 mm PVC casing	
5 / 2		***Sand, Gravel and Clay*** Sand, gravel and clay mixture. Some wood fragments. Saturated. No odour. No staining.	91.36	7/15/7/7	SS-3	-	25%		
8 / 2		***Sand and Gravel*** Saturated sand and gravel fill. Rusty metal nail in split-spoon.	91.05 90.75	6/4/4/4	SS-4	-	50%		
10 / 3		***Wood Fill*** Saturated.	90.14	2/1/2/1	-	-	17%		
11 / 3		***Wood Fill*** Saturated.							
12 / 4		***Sand, Gravel, Wood*** Sand, gravel and wood fragments. No staining. No odour. Saturated.	89.53	6/2/2/2	SS-5	-	58%		
14 / 4			88.92	6/7/6/25	SS-6	-	33%		
15 / 4									

Drilled By: Canadian Environmental Drilling
Drill Method: Truck Mounted Drill Rig
Drill Date: May 27/28, 2013

Hole Size: 76.2 mm
Datum: Relative (93.49 m)
Sheet: 1 of 2

exp Services Inc.
315 The Woolen Mill
4 Cataraqui Street
Kingston, ON K7K 1Z7

Log Of Borehole: BW13-2

Project No.: KIN-26260
Project: 185 Mill Street
Client: Brennan Custom Homes Inc.
Location: Gananoque, ON
Logged by: M. Whitney
Monitoring Well: BW13-2

SUBSURFACE PROFILE			SAMPLE						
Depth	Symbol	Description	Depth/Elev.	Blow Counts	Sample I.D.	Vapour ppm	Recovery	Well Completion Details	Comments
16		***Sand, Gravel, Wood*** Brown sand, gravel and wood fragments. Saturated. No staining. No odour.	88.31	8/4/6/4	SS-7	-	33%		
17									
18		***Sand, Gravel, Wood*** Brown sand, gravel and wood fragments. Saturated. No staining. No odour.	87.70	3/1/2/2	SS-8	-	33%		
19 – 6									
20				Auger	-	-	-		
21		***Sand, Gravel, Wood*** Brown sand, gravel and wood fragments. Saturated. No staining. No odour. Granite at bottom of spoon.	86.99						
22 – 7		***Augered*** Augered through rock fill							Inferred bedrock refusal at 6.50 m below grade.
23									
24		***Calcite***		Core	RC-1	-	75%		
25									
26 – 8			85.41						Silica sand
27		***Calcite*** Fractured calcite. Vertical fracture 8.30 to 8.36m. RQD = 67% (Fair Quality).							32 mm PVC screen
28									
29 – 9				Core	RC-2	-	93%		
30									
31			83.89						
32 – 10		End of Borehole							Borehole terminated at 9.60m below grade.
33									
34									

Drilled By: Canadian Environmental Drilling
Drill Method: Truck Mounted Drill Rig
Drill Date: May 27/28, 2013

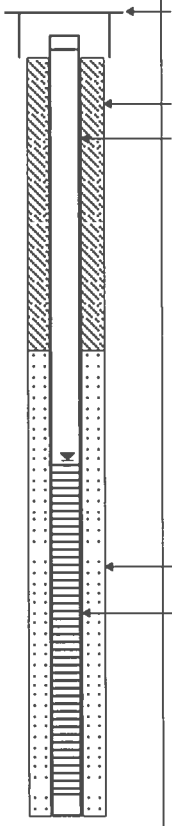
Hole Size: 76.2 mm
Datum: Relative (93.49 m)
Sheet: 2 of 2

exp Services Inc.
315 The Woolen Mill
4 Cataraqui Street
Kingston, ON K7K 1Z7

Log Of Borehole: BW13-3

Project No.: KIN-26260-A0
Monitoring Well: BW13-3
Project: 185 Mill Street
Client: Brennan Custom Homes Inc.
Location: Gananoque, Ontario
Logged by: M. Whitney

SUBSURFACE PROFILE			SAMPLE						
Depth (ft / m)	Symbol	Description	Depth/Elev.	Blow Counts	Sample I.D.	Vapour ppm	Recovery	Well Completion Details	Comments
0 / 0		Ground Surface	94.85						
0 – 1 / 0		***Sand, Gravel and Coal*** Black. Dry. No odour.	94.44	8/7/50	SS-1	0.0	75%		
1 – 4 / 1		***Rubble*** Concrete with rebar to granite rubble.	93.43	Core	RC-1	-	30%		
5 – 9 / 2		***Dolostone*** Very poor quality dolostone. Some calcite. RQD = 0% (Very Poor)	91.90	Core	RC-2	-	20%		
10 – 11 / 3		***Dolostone*** Very poor quality grey and brown dolostone. RQD = 0%. (Very Poor).	91.37	Core	RC-3	-	57%		
12 / 4		End of Borehole							



Sample BW13-3 SS-1 submitted for analysis of PHC, VOC, PAHs and, metals.

Inferred bedrock at 1.42 m below grade. Borehole terminated.

SWL=1.94m (June 19, 2013)

Borehole termintated at 3.48m below grade.

Drilled By: Canadian Environmental Drilling
Drill Method: Truck Mounted Drill Rig
Drill Date: May 28/29, 2013

Hole Size: 76.2 mm
Datum: Relative (94.85 m)
Sheet: 1 of 1

exp Services Inc.
315 The Woolen Mill
4 Cataraqui Street
Kingston, ON K7K 1Z7

Log Of Borehole: BW13-4

Project No.: KIN-26260
Monitoring Well: BW13-4
Project: 185 Mill Street
Client: Brennan Custom Homes Inc.
Location: Gananoque, ON
Logged by: M. Whitney

SUBSURFACE PROFILE			SAMPLE						
Depth (ft / m)	Symbol	Description	Depth/Elev.	Blow Counts	Sample I.D.	Vapour ppm	Recovery	Well Completion Details	Comments
0 / 0		Ground Surface	96.79					0.85 m stick-up TOC=97.63 m	
0 – 1 / 0		***Sand and Gravel*** Organic layer top 0.10 metres. Medium brown sand and gravel to sand. Dark organics top 0.10 m. Med brown sand and gravel. Various large metal objects in borehole. Dry. No staining. No odour.	96.18	2/2/3/1	SS-1	0.1	50%		Sample BW13-4 SS-1 submitted for analysis of PHC, VOC, PAHs and metals.
1 – 2 / 0 – 1			95.58	4/4/5/5	SS-2	0.1	38%	Bentonite; 32 mm PVC casing	
4 / 1			95.37	7/50	SS-3	0.0	75%		Inferred bedrock refusal at 1.42 m below grade.
5 – 2 / 1 – 2		***Fill*** Sand, gravel and red brick. Dry. No staining. No odour.							
7 – 3 / 2 – 3		***Sand and Gravel*** Brown sand and gravel. Moist. No staining. No odour.		Core	RC-1	-	78%		
10 – 11 / 3		***Dolostone*** Highly fractured grey dolostone. Horizontal to 25° fractures. RQD = 26% (Poor Quality)	93.34						SWL=3.24m (June 19, 2013)
12 – 13 / 4		***Dolostone*** Highly fractured grey dolostone with brown seams mixed with some calcite. Very broken up, cobbly layer from 3.45-4.24 metres.		Core	RC-2	-	81%	Silica sand; 32 mm PVC screen	
16 – 17 / 5		RQD=17% (Very Poor Quality)	91.56						Borehole terminated at 5.23m below grade.
19		End of Borehole							

Drilled By: Canadian Environmental Drilling
Drill Method: Truck Mounted Drill Rig
Drill Date: May 27/28, 2013

Hole Size: 76.2 mm
Datum: Relative (96.79 m)
Sheet: 1 of 1

exp Services Inc.
315 The Woolen Mill
4 Cataraqui Street
Kingston, ON K7K 1Z7

Log Of Borehole: BW13-5

Project No.: KIN-26260-A0
Monitoring Well: BW13-5
Project: 185 Mill Street
Client: Brennan Custom Homes Inc.
Location: Gananoque, Ontario
Logged by: M. Whitney

SUBSURFACE PROFILE			SAMPLE						
Depth (ft / m)	Symbol	Description	Depth/Elev.	Blow Counts	Sample I.D.	Vapour ppm	Recovery	Well Completion Details	Comments
0 / 0		Ground Surface	97.91						
0–1 / 0		***Sand and Gravel*** Brown. Dry. No odour. No staining.	97.46	25/16/8/50	SS-1	0.0	87%	Flushmount cover TOC=97.87m; Bentonite; 51 mm PVC casing	Sample BW13-5 SS-1 submitted for analysis of PHC, BTEX, PAHs, PCBs and metals.
1–2 / 0–1		***Silt*** Brown. Wet. No odour. No staining.							
2–7 / 1–2		***Dolostone*** Fractured grey dolostone with brown staining. Horizontal to 15° fractures. RQD = 25% (Poor Quality)	95.74	Core	RC-1	-	86%		
7–12 / 2–3		***Dolostone*** Fractured grey dolostone. Horizontal to 20° fractures. Vertical fracture from 2.9-3.03 metres. RQD = 26% (Poor Quality)	94.20	Core	RC-2	-	100%		SWL=2.61m (June 19, 2013)
12–17 / 3–5		***Dolostone*** Fractured grey dolostone with brown seams. Horizontal to 45° fractures. RQD = 18% (Very Poor Quality)	92.55	Core	RC-3	-	77%	Silica sand; 51 mm PVC screen	
17–23 / 5–6		End of Borehole							Borehole terminated at 5.36m below grade. Bedrock not encountered.

Drilled By: Canadian Environmental Drilling
Drill Method: Truck Mounted Drill Rig
Drill Date: May 30, 2013

Hole Size: 76.2 mm
Datum: Relative (97.91m)
Sheet: 1 of 1

exp Services Inc.
315 The Woolen Mill
4 Cataraqui Street
Kingston, ON K7K 1Z7

Log Of Borehole: BW13-6

Project No.: KIN-26260-A0
Monitoring Well: BW13-6
Project: 185 Mill Street
Client: Brennan Custom Homes Inc.
Location: Gananoque, Ontario
Logged by: M. Whitney

SUBSURFACE PROFILE			SAMPLE						
Depth (ft / m)	Symbol	Description	Depth/Elev.	Blow Counts	Sample I.D.	Vapour ppm	Recovery	Well Completion Details	Comments
0 / 0		Ground Surface	97.97						
0–2 / 0–1		***Sand and Gravel***	97.36	6/6/3/3	SS-1	0.0	63%	Flushmount cover TOC=97.86 m; Bentonite; 51 mm PVC casing	
2–3 / 1		***Sand*** Light brown. Dry. No staining. No odour.	97.19 / 96.75	2/2/3/3	SS-2	0.2	54%		Sample BW13-6 SS-2 submitted for analysis of PHC, BTEX, PAHs, PCBs and metals.
4–5 / 1		***Silty Clay*** Stiff. Dark grey/brown. Moist. No odour.	96.53 / 96.30	5/5/50	SS-3	0.1	67%		
6–7 / 2		***Gravel*** Grey. Moist. No staining. No odour.							
8–9 / 2		***Clay*** Dark brown. Damp. No odour. No staining.		Core	RC-1	-	92%	Silica sand; 51 mm PVC screen	
10 / 3		***Dolostone*** Fractured grey dolostone. Horizontal to 45° fractures. Coal Slag on top of bedrock surface. RQD = 53% (Fair Quality)	94.72						SWL=3.47m (June 19, 2013)
12–13 / 4		***Dolostone*** Highly fractured grey with brown seams. RQD = 28% (Poor Quality)	93.19	Core	RC-2	-	100%		
16–17 / 5		***Dolostone*** Very highly factured dolostone. Grey with brown seams.	92.59 / 92.28	Core	RC-3	-	100%		
19–20 / 6		***Calcite*** Highly fractured. RQD = 13% (Very Poor Quality)							Borehole terminated at 5.69m below grade.
23		End of Borehole							

Drilled By: Canadian Environmental Drilling
Drill Method: Truck Mounted Drill Rig
Drill Date: May 30, 2013

Hole Size: 76.2 mm
Datum: Relative (97.97m)
Sheet: 1 of 1

exp Services Inc.
315 The Woolen Mill
4 Cataraqui Street
Kingston, ON K7K 1Z7

Log Of Borehole: BW13-7

Monitoring Well: BW13-7

Project No.: KIN-26260

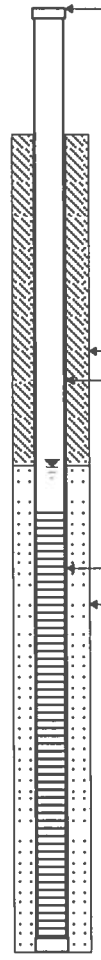
Project: 185 Mill Street

Client: Brennan Custom Homes Inc.

Location: Gananoque, ON

Logged by: M. Whitney

Depth (ft / m)	Description	Depth/Elev.	Blow Counts	Sample I.D.	Vapour ppm	Recovery	Comments
0 / 0	Ground Surface	97.42					
0 – 1 / 0	***Sand and Gravel*** Dry. No staining. No odour.	97.13	8/6/1/1	SS-1	0.0	75%	
1 – 2 / 0	***Coal*** Black.	96.81					
2 – 4 / 1	***Silt*** Brown silt with gravel. No odour. No staining. Dry. (1.25 kg/m3)	96.20	4/3/3/3	SS-2	0.0	46%	
5 – 6 / 1 – 2	***Silt*** Stiff brown silt. No odour. No staining. Dry. (2.25 kg/cm3)	95.69	2/3/50	SS-3	0.0	75%	
7 – 10 / 2 – 3	***Silt*** Wet. No odour. No staining. (1.00 kg/m3)		Core	RC-1	-	93%	
10 – 13 / 3 – 4	***Dolostone*** Fractured dolostone. Grey with brown seams. Calcite seam from 2.58 to 2.60 metres. RQD = 73% (Fair Quality)	93.97	Core	RC-2	-	98%	
13 – 16 / 4 – 5	***Dolostone*** Grey with brown seams. RQD = 72% (Fair Quality)	92.44					
16 – 18 / 5	***Calcite*** Fractured calcite. Broken up layer from 5.21 to 5.36 m. Thin dolostone layer at top of core. RQD = 41% (Poor Quality)	91.76	Core	RC-3	-	88%	
18 – 20 / 6	End of Borehole						



Sample BW13-7 SS-1 submitted for analysis of PAHs and metals. BW13-7 submitted for PHC and VOC.

Borehole Terminated 5.66 m below grade.

Drilled By: Canadian Environmental Drilling

Drill Method: Truck Mounted Drill Rig

Drill Date: May 31, 2013

Hole Size: 76.2 mm

Datum: Relative (97.42 m)

Sheet: 1 of 1

KIN-26260-A0

Ontario — Ministry of the Environment

Well Record

Regulation 903 Ontario Water Resources Act

Well Tag No. (Place Sticker and/or Print Below) A129472

Tag#: A129472

Measurements recorded in: ☐ Metric ☑ Imperial

Page 1 of 1

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	☐ Well Constructed by Well Owner
	Mill St. Property Ltd.		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
1046 Yonge Street	Toronto	ON	M4W2L1	

RECEIVED
JUL 08 2013
exp Services Inc.
Kingston

Well Location

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

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

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 8 3	18	406970	4907909		

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
Brown	Fill	Sand	Loose	0	11'

12 MW's Set on Site in Cluster

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	4'	3/8" Bentonite chips	
4'	11'	#2 Silica 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
2"	Plastic	.25"	0	5'

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
2.25	Plastic	.10	5'	11'

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
Water found at Depth (m/ft)	Kind of Water: ☐ Fresh ☐ Untested ☐ Gas ☐ Other, specify
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)
0	11'	8"

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Can Envi Drilling Technologies Inc	7132 13

Business Address (Street Number/Name)	Municipality
4102 Perth Road	Tweed

Province	Postal Code	Business E-mail Address
ON	K0K 3J0	

Bus Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
(613) 353-2231	[illegible] NATHAN

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
3315		2013/07/02

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)

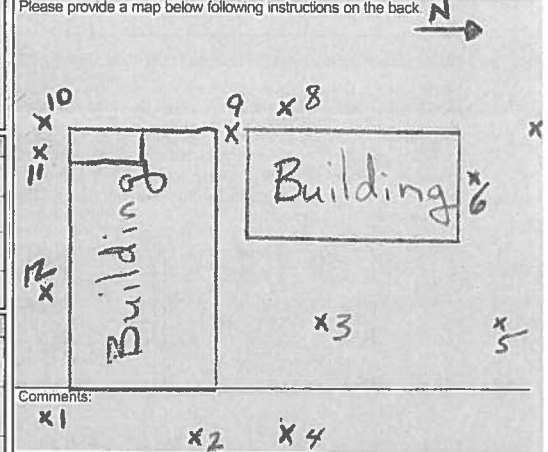
Well production (l/min / GPM)

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 owner's information package delivered	Date Package Delivered	Date Work Completed
☐ Yes ☐ No		2013/06/04

Ministry Use Only

Audit No. Z 168408

Received

0506E (2007/12) © Queen's Printer for Ontario, 2007

Well Owner's Copy

TP-4B (Brick Building Exterior):

Depth (m)	Sample ID	Comments
0-1.78	TP4B	Sand, Gravel, Clay and Rock Fill With Strong Hydrocarbon Odour
1.78	-	Bedrock

TP-7 (Brick Building Interior):

Depth (m)	Sample ID	Comments
0-0.76	TP7	Sand and Gravel Fill
0.76	-	Bedrock

TP-8 (Brick Building Interior):

Depth (m)	Sample ID	Comments
0-0.58	TP8	Sand, Gravel and Rubble Fill
0.58	-	Bedrock

TP-11 (Stone Building Interior):

Depth (m)	Sample ID	Comments
0-0.09	-	Concrete
0.09-0.11	-	Gravel
0.11-0.41	TP11	Sand and Gravel
0.41	-	Bedrock

TP-12 (Stone Building Interior):

Depth (m)	Sample ID	Comments
0-0.13	-	Concrete
0.13-0.53	TP12	Sand and Gravel
0.53	-	Bedrock

Appendix E –
Analytical Results – Soil and Groundwater

Table E-1
Soil Analysis
Petroleum Hydrocarbons and VOCs
Brennan Custom Homes, 185 Mill Street, Gananoque, Ontario

KIN-28260-A0

PARAMETER	UNITS	MDL	CRITERIA			Sample Date	27-May-13	29-May-13	29-May-13	29-May-13	29-May-13	29-May-13	31-May-13	31-May-13	3-Jun-13	3-Jun-13	3-Jun-13	03-Jun-13
			Table 1*	Table 7**	Table 9***		BH-1 0-0.6m	BH-2 0-0.5m	BH-2 (Duplicate) 0-0.5m	BH-3 0-0.27m	BH-4/MW13-1 0.6-1.2m	BH-5/MW13-2 0.6-1.2m	BH-6/MW13-3 1.2-1.8m	BH-7/MW13-4 0.9-1.5m	BH-8 0.6-1.2m	BH-9 0.6-1.2m	BH-10 0.6-1.2m	BH-11 0.6-1.2m
PETROLEUM HYDROCARBONS																		
PHC F1 (C6-C10 Hydrocarbons) - BTEX	µg/g	5	25	55	25		<5	<5	<5	40	<5	<5	<5	<5	<5	21	7	<5
PHC F2 (C10-C16 Hydrocarbons)	µg/g	10	10	98	10		<10	<10	<10	36	<10	<10	<10	<10	<10	<10	<10	<10
PHC F3 (C16-C34 Hydrocarbons)	µg/g	50	240	300	240		<50	230	210	280	<50	180	<50	<50	<50	220	<50	<50
PHC F4 (C34-C50 Hydrocarbons)	µg/g	50	120	2,800	120		<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
VOLATILE ORGANIC COMPOUNDS (VOCs)																		
Dichlorodifluoromethane	µg/g	0.05	0.05	16	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Vinyl Chloride	µg/g	0.02	0.02	0.02	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Bromomethane	µg/g	0.05	0.05	0.05	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trichlorofluoromethane	µg/g	0.05	0.25	4	0.25		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acetone	µg/g	0.50	0.5	16	0.5		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethylene	µg/g	0.05	0.05	0.05	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methylene Chloride	µg/g	0.05	0.05	0.1	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trans- 1,2-Dichloroethylene	µg/g	0.05	0.05	0.084	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl tert-butyl Ether	µg/g	0.05	0.05	0.75	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1-Dichloroethane	µg/g	0.02	0.05	3.5	0.05		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Methyl Ethyl Ketone	µg/g	0.50	0.5	16	0.5		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Cis- 1,2-Dichloroethylene	µg/g	0.02	0.05	3.4	0.05		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Chloroform	µg/g	0.04	0.05	0.05	0.05		<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
1,2-Dichloroethane	µg/g	0.03	0.05	0.05	0.05		<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
1,1,1-Trichloroethane	µg/g	0.05	0.05	0.38	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Carbon Tetrachloride	µg/g	0.05	0.05	0.05	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzene	µg/g	0.02	0.02	0.21	0.02		<0.02	<0.02	<0.02	4.6	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
1,2-Dichloropropane	µg/g	0.03	0.05	0.05	0.05		<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Trichloroethylene	µg/g	0.03	0.05	0.061	0.05		<0.03	<0.03	<0.03	<0.03	<0.03	1.5	<0.03	<0.03	<0.03	44	<0.03	<0.03
Bromodichloromethane	µg/g	0.05	0.05	13	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl Isobutyl Ketone	µg/g	0.50	0.5	1.7	0.5		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	µg/g	0.04	0.05	0.05	0.05		<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Toluene	µg/g	0.05	0.2	2.3	0.2		<0.05	<0.05	<0.05	44	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibromochloromethane	µg/g	0.05	0.05	9.4	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylene Dibromide	µg/g	0.04	0.05	0.05	0.05		<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Tetrachloroethylene	µg/g	0.05	0.05	0.28	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,1,2-Tetrachloroethane	µg/g	0.04	0.05	0.058	0.05		<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Chlorobenzene	µg/g	0.05	0.05	2.4	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	µg/g	0.05	0.05	2	0.05		<0.05	<0.05	<0.05	4.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
m & p-Xylene	µg/g	0.05	-	-	-		<0.05	<0.05	<0.05	33	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Bromoform	µg/g	0.05	0.05	0.27	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Styrene	µg/g	0.05	0.05	0.7	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,2,2-Tetrachloroethane	µg/g	0.05	0.05	0.05	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
o-Xylene	µg/g	0.05	-	-	-		<0.05	<0.05	<0.05	14	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichlorobenzene	µg/g	0.05	0.05	4.8	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,4-Dichlorobenzene	µg/g	0.05	0.05	0.083	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dichlorobenzene	µg/g	0.05	0.05	3.4	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylene Mixture	µg/g	0.05	0.05	3.1	0.05		<0.05	<0.05	<0.05	47	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichloropropene	µg/g	0.04	0.05	0.05	0.05		<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
n-Hexane	µg/g	0.05	0.05	2.8	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

* = MOE's Soil, Ground Water and Sediment Standards under Part XV 1 of the Environmental Protection Act, April 15, 2011, Table 1 - Full Depth Background Site Condition Standards (Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use)

** = MOE's Soil, Ground Water and Sediment Standards under Part XV 1 of the Environmental Protection Act, April 15, 2011, Table 7 - Generic Site Condition Standards for Shallow Soils in a Non-Potable Ground Water Condition (Residential/Parkland/Institutional Property Use)

*** = MOE's Soil, Ground Water and Sediment Standards under Part XV 1 of the Environmental Protection Act, April 15, 2011, Table 9 - Generic Site Condition Standards for Use within 30 m of a Water Body in a Non-Potable Ground Water Condition (Residential/Parkland/Institutional/Commercial/Community Property Use)

# = Concentration is at or exceeds Table 1 Site Condition Standards
# = Concentration is at or exceeds Tables 1 and 9 Site Condition Standards
# = Concentration is at or exceeds Tables 1, 7 and 9 Site Condition Standards
MDL = Method Detection Limit (lowest level of the parameter that can be quantified with confidence)
NV = No value derived
- = Not applicable

Table E-1 (Continued)
Soil Analysis
Petroleum Hydrocarbons and VOCs
Brennan Custom Homes, 185 Mill Street, Gananoque, Ontario

KIN-26260-A0

PARAMETER	UNITS	MDL	CRITERIA			Sample Date	27-May-13	27-May-13	28-May-13	29-May-13	30-May-13	30-May-13	31-May-13	4-Jun-13	4-Jun-13	4-Jun-13	4-Jun-13	4-Jun-13
			Table 1*	Table 7**	Table 9***		BW13-1 0.6-1.2m	BW13-2 0-0.6m	BW13-3 0-0.4m	BW13-4 0-0.6m	BW13-5 0-0.6m	BW13-6 0.6-1.2m	BW13-7 0.6-1.2m	TP4B 0.9 - 1.8m	TP7 0 - 0.8 m	TP8 0 - 0.6 m	TP11 0 - 0.4 m	TP12 0 - 0.9 m
PETROLEUM HYDROCARBONS																		
PHC F1 (C6-C10 Hydrocarbons) - BTEX	µg/g	5	25	55	25		<5	<5	9	<5	<5	<5	<5	<5	<5	<5	<5	<5
PHC F2 (C10-C16 Hydrocarbons)	µg/g	10	10	98	10		<10	<10	<10	<10	<10	<10	<10	24	<10	<10	<10	<10
PHC F3 (C16-C34 Hydrocarbons)	µg/g	50	240	300	240		<50	51	300	120	130	190	<50	540	57	<50	<50	240
PHC F4 (C34-C50 Hydrocarbons)	µg/g	50	120	2,800	120		<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	98
VOLATILE ORGANIC COMPOUNDS (VOCs)																		
Dichlorodifluoromethane	µg/g	0.05	0.05	16	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Vinyl Chloride	µg/g	0.02	0.02	0.02	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Bromomethane	µg/g	0.05	0.05	0.05	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trichlorofluoromethane	µg/g	0.05	0.25	4	0.25		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acetone	µg/g	0.50	0.5	16	0.5		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethylene	µg/g	0.05	0.05	0.05	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methylene Chloride	µg/g	0.05	0.05	0.1	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trans- 1,2-Dichloroethylene	µg/g	0.05	0.05	0.084	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl tert-butyl Ether	µg/g	0.05	0.05	0.75	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1-Dichloroethane	µg/g	0.02	0.05	3.5	0.05		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Methyl Ethyl Ketone	µg/g	0.50	0.5	16	0.5		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Cis- 1,2-Dichloroethylene	µg/g	0.02	0.05	3.4	0.05		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.29
Chloroform	µg/g	0.04	0.05	0.05	0.05		<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
1,2-Dichloroethane	µg/g	0.03	0.05	0.05	0.05		<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
1,1,1-Trichloroethane	µg/g	0.05	0.05	0.38	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Carbon Tetrachloride	µg/g	0.05	0.05	0.05	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzene	µg/g	0.02	0.02	0.21	0.02		<0.02	<0.02	0.08	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
1,2-Dichloropropane	µg/g	0.03	0.05	0.05	0.05		<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Trichloroethylene	µg/g	0.03	0.05	0.061	0.05		<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.25	0.78	<0.03	1.9	4.6
Bromodichloromethane	µg/g	0.05	0.05	13	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl Isobutyl Ketone	µg/g	0.50	0.5	1.7	0.5		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	µg/g	0.04	0.05	0.05	0.05		<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Toluene	µg/g	0.05	0.2	2.3	0.2		<0.05	<0.05	0.51	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibromochloromethane	µg/g	0.05	0.05	9.4	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylene Dibromide	µg/g	0.04	0.05	0.05	0.05		<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Tetrachloroethylene	µg/g	0.05	0.05	0.28	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,1,2-Tetrachloroethane	µg/g	0.04	0.05	0.058	0.05		<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Chlorobenzene	µg/g	0.05	0.05	2.4	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	µg/g	0.05	0.05	2	0.05		<0.05	<0.05	0.08	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
m & p-Xylene	µg/g	0.05	-	-	-		<0.05	<0.05	0.28	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Bromoform	µg/g	0.05	0.05	0.27	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Styrene	µg/g	0.05	0.05	0.7	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,2,2-Tetrachloroethane	µg/g	0.05	0.05	0.05	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
o-Xylene	µg/g	0.05	-	-	-		<0.05	<0.05	0.22	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichlorobenzene	µg/g	0.05	0.05	4.8	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,4-Dichlorobenzene	µg/g	0.05	0.05	0.083	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dichlorobenzene	µg/g	0.05	0.05	3.4	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylene Mixture	µg/g	0.05	0.05	3.1	0.05		<0.05	<0.05	0.50	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichloropropene	µg/g	0.04	0.05	0.05	0.05		<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
n-Hexane	µg/g	0.05	0.05	2.8	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

* = MOE's Soil, Ground Water and Sediment Standards under Part XV 1 of the Environmental Protection Act, April 15, 2011 Table 1 - Full Depth Background Site Condition Standards (Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use)

** = MOE's Soil, Ground Water and Sediment Standards under Part XV 1 of the Environmental Protection Act, April 15, 2011 Table 7 - Generic Site Condition Standards for Shallow Soils in a Non-Potable Ground Water Condition (Residential/Parkland/Institutional Property Use)

*** = MOE's Soil, Ground Water and Sediment Standards under Part XV 1 of the Environmental Protection Act, April 15, 2011 Table 9 - Generic Site Condition Standards for Use within 30 m of a Water Body in a Non-Potable Ground Water Condition (Residential/Parkland/Institutional/Commercial/Community Property Use)

# = Concentration is at or exceeds Table 1 Site Condition Standards
# = Concentration is at or exceeds Tables 1 and 9 Site Condition Standards
# = Concentration is at or exceeds Tables 1, 7 and 9 Site Condition Standards
MDL = Method Detection Limit (lowest level of the parameter that can be quantified with confidence)
NV = No value derived
- = Not applicable

Table E-2
Soil Analysis
Metals & Inorganics
Brennan Custom Homes, 185 Mill Street, Gananoque, Ontario

KIN-26260-A0

PARAMETER	UNITS	MDL	CRITERIA			Sample Date	27-May-13	29-May-13	29-May-13	29-May-13	29-May-13	29-May-13	31-May-13	31-May-13	3-Jun-13	3-Jun-13	3-Jun-13	03-Jun-13
			Table 1*	Table 7**	Table 9***		BH-1	BH-2	BH-2 (Duplicate)	BH-3	BH-4/MW13-1	BH-5/MW13-2	BH-6/MW13-3	BH-7/MW13-4	BH-8	BH-9	BH-10	BH-11
							0-0.6m	0-0.5m	0-0.5m	0-0.5m	0.6-1.2m	0.6-1.2m	1.2-1.8m	0.3-0.9m	0.6-1.2m	0.6-1.2m	0.6-1.2m	0.6-1.2m
METALS & INORGANICS																		
Antimony	ug/g	0.8	1.3	7.5	1.3		1.3	8.6	12.2	9.3	1.0	8.9	<0.8	<0.8	<0.8	5.3	1.5	<0.8
Arsenic	ug/g	1	18	18	18		8	40	54	23	39	30	2	2	2	9	10	1
Barium	ug/g	2	220	390	220		193	50	72	141	89	77	74	65	113	112	137	20
Beryllium	ug/g	0.5	2.5	4	2.5		0.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	<0.5	<0.5
Boron	ug/g	5	36	120	36		<5	10	10	15	5	17	<5	<5	<5	12	11	<5
Boron (Hot Water Soluble)	ug/g	0.10	NA	1.5	1.5		0.34	0.36	0.39	0.22	0.48	1.55	0.16	0.28	0.92	0.96	0.55	0.12
Cadmium	ug/g	0.5	1.2	1.2	1.2		0.6	<0.5	<0.5	2.5	<0.5	<0.5	<0.5	5.5	<0.5	1.9	3.1	<0.5
Chromium	ug/g	2	70	160	70		31	20	24	24	15	12	16	14	27	20	20	8
Cobalt	ug/g	0.5	21	22	22		10.5	21.8	25.7	11.4	3.8	18.2	7.1	5.3	10.6	8.1	8.7	4.5
Copper	ug/g	1	92	140	92		57	96	115	119	24	52	17	31	14	73	122	12
Lead	ug/g	1	120	120	120		218	162	176	335	55	113	7	61	20	231	193	3
Molybdenum	ug/g	0.5	2	6.9	2		0.8	3.9	6.0	2.9	1.0	3.7	<0.5	0.8	0.5	1.7	4.0	<0.5
Nickel	ug/g	1	82	100	82		20	40	45	27	7	27	12	10	16	20	173	8
Selenium	ug/g	0.4	1.5	2.4	1.5		0.7	<0.4	1.2	1.4	1.2	<0.4	0.5	<0.4	<0.4	<0.4	0.9	<0.4
Silver	ug/g	0.2	0.5	20	0.5		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Thallium	ug/g	0.4	1	1	1		<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Uranium	ug/g	0.5	2.5	23	2.5		0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	<0.5
Vanadium	ug/g	1	86	86	86		44	13	14	17	39	14	27	16	44	25	25	16
Zinc	ug/g	5	290	340	290		226	70	71	279	20	69	37	334	68	161	373	17
Chromium VI	ug/g	0.2	0.66	8	0.66		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Cyanide	ug/g	0.040	0.051	0.051	0.051		<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Mercury	ug/g	0.10	0.27	0.27	0.27		0.17	0.16	0.24	0.61	<0.10	0.18	<0.10	<0.10	<0.10	1.86	0.62	<0.10
Electrical Conductivity (2:1)	mS/cm	0.005	0.57	0.7	0.7		0.131	0.386	0.595	0.147	0.317	0.487	0.145	0.286	0.099	0.954	0.925	0.540
Sodium Adsorption Ratio	NA	NA	2.4	5	5		0.659	0.032	0.039	0.062	0.133	0.459	0.544	0.070	0.265	3.96	0.212	2.08
pH, 2:1 CaCl2 Extraction	pH Units	NA	5 to 9 (surficial); 5 to 11 (subsurface) ●				7.17	7.37	7.50	7.04	3.60	10.7	7.95	10.30	6.44	7.43	7.03	7.67

* = MOE's Soil, Ground Water and Sediment Standards under Part XV 1 of the Environmental Protection Act, April 15, 2011, Table 1 - Full Depth Background Site Condition Standards (Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use)

** = MOE's Soil, Ground Water and Sediment Standards under Part XV 1 of the Environmental Protection Act, April 15, 2011, Table 7 - Generic Site Condition Standards for Shallow Soils in a Non-Potable Ground Water Condition (Residential/Parkland/Institutional Property Use)

*** = MOE's Soil, Ground Water and Sediment Standards under Part XV 1 of the Environmental Protection Act, April 15, 2011, Table 9 - Generic Site Condition Standards for Use within 30 m of a Water Body in a Non-Potable Ground Water Condition (Residential/Parkland/Institutional/Commercial/Community Property Use)

& Boron (Hot Water Soluble) SCS applicable to surficial soils only (up to 1.5 metres below soil surface) Boron (Total) SCS applicable to subsurface soils only (greater than 1.5 metres below soil surface)

^ Sodium Adsorption Ratio SCS applicable to surficial soils only (no more than 1.5 metres below soil surface)

● In order for classification as a non-sensitive Site the soil pH ranges of 5 to 9 for surface (depths less than 1.5 m) and 5 to 11 for subsurface soils (depths greater than 1.5 m) must be met.

= Concentration is at or exceeds Table 1 Site Condition Standards

= Concentration is at or exceeds Tables 1 and 9 Site Condition Standards

= Concentration is at or exceeds Tables 1, 7 and 9 Site Condition Standards

MDL = Method Detection Limit (lowest level of the parameter that can be quantified with confidence)

NV = No value derived

- = Not applicable

Table E-2 (Continued)
Soil Analysis
Metals & Inorganics
Brennan Custom Homes, 185 Mill Street, Gananoque, Ontario

KIN-26260-A0

PARAMETER	UNITS	MDL	CRITERIA			Sample Date	27-May-13	27-May-13	28-May-13	29-May-13	30-May-13	30-May-13	31-May-13	4-Jun-13	4-Jun-13	4-Jun-13	4-Jun-13	4-Jun-13
							BW13-1	BW13-2	BW13-3	BW13-4	BW13-5	BW13-6	BW13-7	TP4B	TP7	TP8	TP11	TP12
			Table 1*	Table 7**	Table 9***		0.6-1.2m	0-0.6m	0-0.4m	0.6-1.2m	0-0.6m	0.6-1.2m	0-0.6m	0.9 - 1.8m	0 - 0.6 m	0 - 0.6 m	0 - 0.4 m	0 - 0.9 m
METALS & INORGANICS																		
Antimony	ug/g	0.8	1.3	7.5	1.3		5.9	1.2	9.8	2.3	1.2	25.1	1.3	3.4	16.9	33.2	80.3	8.2
Arsenic	ug/g	1	18	18	18		6	10	37	6	3	18	4	11	17	23	44	27
Barium	ug/g	2	220	390	220		185	153	89	184	122	422	215	381	190	205	137	445
Beryllium	ug/g	0.5	2.5	4	2.5		0.5	<0.5	<0.5	<0.5	0.7	0.9	0.6	<0.5	<0.5	<0.5	<0.5	0.6
Boron	ug/g	5	36	120	36		10	8	25	5	6	23	8	8	9	14	16	15
Boron (Hot Water Soluble)	ug/g	0.10	NA	1.5	1.5		<0.10	0.11	1.06	0.62	0.50	0.58	0.44	0.24	0.72	1.11	0.45	0.52
Cadmium	ug/g	0.5	1.2	1.2	1.2		10.1	<0.5	0.7	<0.5	<0.5	0.7	<0.5	13.6	2.2	223	1.2	1.2
Chromium	ug/g	2	70	160	70		54	12	35	11	22	38	26	376	257	101	31	31
Cobalt	ug/g	0.5	21	22	22		7.6	8.0	17.2	5.9	8.2	14.4	9.1	8.0	11.7	9.8	22.2	22.3
Copper	ug/g	1	92	140	92		81	46	281	84	18	77	51	114	2,380	191	622	164
Lead	ug/g	1	120	120	120		321	44	319	583	32	710	187	1,090	1,040	937	1,970	298
Molybdenum	ug/g	0.5	2	6.9	2		2.1	1.6	5.4	0.7	0.7	2.4	0.9	1.5	1.3	1.8	4.8	3.1
Nickel	ug/g	1	82	100	82		18	14	41	52	14	31	16	17	21	19	43	47
Selenium	ug/g	0.4	1.5	2.4	1.5		0.6	0.8	4.8	<0.4	<0.4	1.3	<0.4	1.5	0.9	0.4	1.6	1.1
Silver	ug/g	0.2	0.5	20	0.5		0.2	<0.2	<0.2	2.2	<0.2	<0.2	<0.2	<0.2	1.1	0.4	0.5	0.2
Thallium	ug/g	0.4	1	1	1		<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Uranium	ug/g	0.5	2.5	23	2.5		1.0	<0.5	<0.5	<0.5	<0.5	1.3	0.6	<0.5	<0.5	<0.5	0.6	0.5
Vanadium	ug/g	1	86	86	86		27	17	15	18	37	47	33	25	21	28	39	42
Zinc	ug/g	5	290	340	290		528	56	469	189	85	446	115	506	968	388	182	254
Chromium VI	ug/g	0.2	0.66	8	0.66		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Cyanide	ug/g	0.040	0.051	0.051	0.051		<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Mercury	ug/g	0.10	0.27	0.27	0.27		0.23	<0.10	0.33	0.19	0.12	0.23	0.23	0.54	0.11	0.28	1.53	0.29
Electrical Conductivity (2:1)	mS/cm	0.005	0.57	0.7	0.7		2.62	0.107	0.752	0.140	0.380	0.340	0.18	0.147	0.351	0.248	0.324	0.310
Sodium Adsorption Ratio	NA	NA	2.4	5	5		1.92	0.116	0.037	0.071	0.181	3.62	0.095	0.049	0.793	0.143	1.08	0.478
pH, 2:1 CaCl2 Extraction	pH Units	NA	5 to 9 (surficial); 5 to 11 (subsurface) ^				12.9	8.09	6.82	7.91	7.42	7.74	7.50	7.45	7.66	7.94	8.21	8.29

* = MOE's Soil, Ground Water and Sediment Standards under Part XV 1 of the Environmental Protection Act, April 15, 2011 Table 1 - Full Depth Background Site Condition Standards (Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use)

** = MOE's Soil, Ground Water and Sediment Standards under Part XV 1 of the Environmental Protection Act, April 15, 2011 Table 7 - Generic Site Condition Standards for Shallow Soils in a Non-Potable Ground Water Condition (Residential/Parkland/Institutional Property Use)

*** = MOE's Soil, Ground Water and Sediment Standards under Part XV 1 of the Environmental Protection Act, April 15, 2011 Table 9 - Generic Site Condition Standards for Use within 30 m of a Water Body in a Non-Potable Ground Water Condition (Residential/Parkland/Institutional/Commercial/Community Property Use)

& Boron (Hot Water Soluble) SCS applicable to surficial soils only (up to 1.5 metres below soil surface) Boron (Total) SCS applicable to subsurface soils only (greater than 1.5 metres below soil surface)

^ Sodium Adsorption Ratio SCS applicable to surficial soils only (no more than 1.5 metres below soil surface)

@ In order for classification as a non-sensitive Site the soil pH ranges of 5 to 9 for surface (depths less than 1.5 m) and 5 to 11 for subsurface soils (depths greater than 1.5 m) must be met.

= Concentration is at or exceeds Table 1 Site Condition Standards

= Concentration is at or exceeds Tables 1 and 9 Site Condition Standards

= Concentration is at or exceeds Tables 1 7 and 9 Site Condition Standards

MDL = Method Detection Limit (lowest level of the parameter that can be quantified with confidence)

NV = No value derived

- = Not applicable

Table E-3
Soil Analysis
PAHs
Brennan Custom Homes, 185 Mill Street, Gananoque, Ontario

KIN-26268-A0

PARAMETER	UNITS	MDL	CRITERIA			Sample Date	29-May-13	29-May-13	29-May-13	29-May-13	31-May-13	3-Jun-13	3-Jun-13	3-Jun-13	27-May-13	28-May-13	30-May-13	30-May-13	31-May-13
			Table 1*	Table 7**	Table 9***		BH-2	BH-2 (Duplicate)	BH-3	BH-5/MW13-2	BH-7/MW13-4	BH-8	BH-9	BH-10	BW13-2	BW13-3	BW13-5	BW13-6	BW13-7
							0-0.5m	0-0.5m	0-0.5m	0.6-1.2m	0.3-0.9m	0.6-1.2m	0.6-1.2m	0.6-1.2m	0-0.6m	0-0.4m	0-0.6m	0.6-1.2m	0-0.6m
PAH																			
Naphthalene	ug/g	0.05	0.09	0.6	0.09		<0.05	0.05	0.65	0.31	<0.05	<0.05	0.44	0.09	0.05	0.28	0.28	0.31	<0.05
Acenaphthylene	ug/g	<0.05	0.093	0.15	0.093		0.11	0.05	0.52	0.42	<0.05	<0.05	0.27	<0.05	<0.05	0.21	0.27	0.52	<0.05
Acenaphthene	ug/g	<0.05	0.072	7.9	0.072		<0.05	<0.05	0.25	0.29	<0.05	<0.05	0.13	<0.05	<0.05	<0.05	0.29	0.34	<0.05
Fluorene	ug/g	<0.05	0.12	62	0.19		<0.05	<0.05	0.31	0.32	<0.05	<0.05	0.25	<0.05	<0.05	<0.05	0.31	0.39	<0.05
Phenanthrene	ug/g	0.16	0.69	6.2	0.69		0.34	0.32	1.6	1.6	<0.05	0.10	4.8	0.15	0.16	2.3	0.73	2.9	0.17
Anthracene	ug/g	<0.05	0.16	0.67	0.22		0.07	<0.05	0.55	0.55	<0.05	<0.05	0.44	<0.05	<0.05	0.28	0.41	0.61	<0.05
Fluoranthene	ug/g	0.19	0.56	0.69	0.69		0.90	0.83	2.0	3.2	<0.05	0.13	6.1	0.12	0.19	2.7	1.0	4.0	0.27
Pyrene	ug/g	0.18	1	78	1		0.63	0.55	2.0	2.9	<0.05	0.13	5.3	0.11	0.18	2.3	1.0	3.5	0.25
Benz(a)anthracene	ug/g	0.09	0.36	0.5	0.36		0.26	0.22	1.2	1.9	<0.05	0.05	2.0	0.05	0.09	1.0	0.70	1.3	0.10
Chrysene	ug/g	0.13	2.8	7	2.8		0.40	0.37	1.7	1.9	<0.05	0.09	2.6	0.08	0.13	1.5	0.77	1.9	0.13
Benzo(b)fluoranthene	ug/g	0.10	0.47	0.78	0.47		0.33	0.20	0.99	1.2	<0.05	<0.05	2.3	0.06	0.10	1.1	0.50	1.6	0.16
Benzo(k)fluoranthene	ug/g	0.05	0.48	0.78	0.48		0.18	0.11	0.63	0.79	<0.05	<0.05	1.0	<0.05	0.05	0.50	0.34	0.80	0.06
Benzo(a)pyrene	ug/g	0.07	0.3	0.3	0.3		0.27	0.16	0.62	1.2	<0.05	<0.05	2.2	<0.05	0.07	0.75	0.43	1.2	0.11
Indeno(1,2,3-cd)pyrene	ug/g	<0.05	0.23	0.38	0.23		0.19	0.08	0.51	0.66	<0.05	<0.05	1.0	<0.05	<0.05	0.44	0.30	0.71	0.06
Dibenz(a,h)anthracene	ug/g	<0.05	0.1	0.1	0.1		0.08	<0.05	0.25	0.33	<0.05	<0.05	0.13	<0.05	<0.05	0.09	0.21	0.30	<0.05
Benzo(g,h,i)perylene	ug/g	<0.05	0.68	6.6	0.68		0.22	0.07	0.38	0.50	<0.05	<0.05	0.97	<0.05	<0.05	0.34	0.24	0.62	0.07
2-and 1-methyl Naphthalene	ug/g	0.12	0.59	0.99	0.59		0.07	0.15	1.5	0.71	<0.05	<0.05	0.39	0.24	0.12	0.84	0.61	0.56	<0.05

* = MOE's Soil, Ground Water and Sediment Standards under Part XV 1 of the Environmental Protection Act, April 15, 2011, Table 1 - Full Depth Background Site Condition Standards (Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use)

** = MOE's Soil, Ground Water and Sediment Standards under Part XV 1 of the Environmental Protection Act, April 15, 2011, Table 7 - Generic Site Condition Standards for Shallow Soils in a Non-Potable Ground Water Condition (Residential/Parkland/Institutional Property Use)

*** = MOE's Soil, Ground Water and Sediment Standards under Part XV 1 of the Environmental Protection Act, April 15, 2011, Table 9 - Generic Site Condition Standards for Use within 30 m of a Water Body in a Non-Potable Ground Water Condition (Residential/Parkland/Institutional/Commercial/Community Property Use)

# = Concentration is at or exceeds Table 1 Site Condition Standards
# = Concentration is at or exceeds Tables 1 and 9 Site Condition Standards
# = Concentration is at or exceeds Tables 1, 7 and 9 Site Condition Standards
MDL = Method Detection Limit (lowest level of the parameter that can be quantified with confidence)
- = Not applicable

Table E-4
Soil Analysis
PCBs
Brennan Custom Homes, 185 Mill Street, Gananoque, Ontario

KIN-26260-A0

PARAMETER	UNITS	MDL	CRITERIA			Sample Date	31-May-13	31-May-13	3-Jun-13	3-Jun-13	30-May-13	30-May-13	31-May-13
							BH-6/MW13-3	BH-7/MW13-4	BH-8	BH-10	BW13-5	BW13-6	BW13-7
			Table 1*	Table 7**	Table 9***		1.2-1.8m	0.9-1.5m	0.6-1.2m	0.6-1.2m	0-0.6m	0.6-1.2m	0.6-1.2m
PCBs													
Aroclor 1242	ug/g	0.1	-	-	-		<0.1	<0.1	<0.3	<0.3	<0.1	<0.1	<0.1
Aroclor 1248	ug/g	0.1	-	-	-		<0.1	<0.1	<0.3	<0.3	<0.1	<0.1	<0.1
Aroclor 1254	ug/g	0.1	-	-	-		<0.1	<0.1	<0.3	<0.3	<0.1	<0.1	<0.1
Aroclor 1260	ug/g	0.1	-	-	-		<0.1	<0.1	<0.3	<0.3	<0.1	<0.1	<0.1
Polychlorinated Biphenyls	ug/g	0.1	0.3	0.35	0.3		<0.1	<0.1	<0.3	<0.3	<0.1	<0.1	<0.1

* = MOE's Soil, Ground Water and Sediment Standards under Part XV.1 of the Environmental Protection Act, April 15, 2011, Table 1 - Full Depth Background Site Condition Standards (Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use)

** = MOE's Soil, Ground Water and Sediment Standards under Part XV.1 of the Environmental Protection Act, April 15, 2011, Table 7 - Generic Site Condition Standards for Shallow Soils in a Non-Potable Ground Water Condition (Residential/Parkland/Institutional Property Use)

*** = MOE's Soil, Ground Water and Sediment Standards under Part XV.1 of the Environmental Protection Act, April 15, 2011, Table 9 - Generic Site Condition Standards for Use within 30 m of a Water Body in a Non-Potable Ground Water Condition (Residential/Parkland/Institutional/Commercial/Community Property Use)

= Concentration is at or exceeds Table 1 Site Condition Standards

= Concentration is at or exceeds Tables 1 and 9 Site Condition Standards

= Concentration is at or exceeds Tables 1, 7 and 9 Site Condition Standards

MDL = Method Detection Limit (lowest level of the parameter that can be quantified with confidence)

- = Not applicable

Table E-5
Groundwater Analysis
Petroleum Hydrocarbons and VOCs
Brennan Custom Homes, 185 Mill Street, Gananoque, Ontario

KIN-26260-A0

PARAMETER	UNITS	MDL	CRITERIA			Sample Date	4-Jun-13	19-Jun-13	19-Jun-13	20-Jun-13	20-Jun-13	20-Jun-13	20-Jun-13	19-Jun-13	19-Jun-13	19-Jun-13	20-Jun-13
			Table 1*	Table 7**	Table 9***		Pit - Stone Bld	MW07-1	MW07-2	MW13-1	MW13-1 Dup	MW13-2	MW13-3	MW13-4	MW13-5	TRIP BLANK	TRIP BLANK
PETROLEUM HYDROCARBONS																	
PHC F1 (C6-C10 Hydrocarbons) - BTEX	µg/L	25	420	420	420		<25	<25	<25	<25	<25	<25	Insufficient Recharge	<25	Dry	-	-
PHC F2 (C10-C16 Hydrocarbons)	µg/L	100	150	150	150		<100	<100	<100	<100	<100	<100		<100		-	-
PHC F3 (C16-C34 Hydrocarbons)	µg/L	100	500	500	500		<100	<100	<100	<100	<100	<100		<100		-	-
PHC F4 (C34-C50 Hydrocarbons)	µg/L	100	500	500	500		<100	<100	<100	<100	<100	<100		<100		-	-
VOLATILE ORGANIC COMPOUNDS (VOCs)																	
Dichlorodifluoromethane	µg/L	0.20	590	3,500	3,500		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20		<0.20	<0.20
Vinyl Chloride	µg/L	0.17	0.5	0.5	0.5		1.5	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17		<0.17	<0.17
Bromomethane	µg/L	0.20	0.89	0.89	5.6		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20		<0.20	<0.20
Trichlorofluoromethane	µg/L	0.40	150	2,000	2,000		<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40		<0.40	<0.40
Acetone	µg/L	1.0	2,700	100,000	100,000		<1.0	<1.0	<0.1	<1.0	<1.0	<1.0	36	<1.0		<1.0	<1.0
1,1-Dichloroethylene	µg/L	0.30	0.5	0.5	1.6		<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30		<0.30	<0.30
Methylene Chloride	µg/L	0.30	5	26	610		<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30		<0.30	<0.30
trans- 1,2-Dichloroethylene	µg/L	0.20	1.6	1.6	1.6		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20		<0.20	<0.20
Methyl tert-butyl ether	µg/L	0.20	15	15	190		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20		<0.20	<0.20
1,1-Dichloroethane	µg/L	0.30	0.5	11	320		<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30		<0.30	<0.30
Methyl Ethyl Ketone	µg/L	1.0	400	21,000	470,000		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0		<1.0	<1.0
cis- 1,2-Dichloroethylene	µg/L	0.20	1.6	1.6	1.6		8.7	0.46	<0.20	<0.20	<0.20	<0.20	0.34	1.5		<0.20	<0.20
Chloroform	µg/L	0.20	2	2	2.4		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20		<0.20	<0.20
1,2-Dichloroethane	µg/L	0.20	0.5	0.5	1.6		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20		<0.20	<0.20
1,1,1-Trichloroethane	µg/L	0.30	0.5	23	640		<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30		<0.30	<0.30
Carbon Tetrachloride	µg/L	0.20	0.2	0.2	0.79		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20		<0.20	<0.20
Benzene	µg/L	0.20	0.5	0.5	44		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20		<0.20	<0.20
1,2-Dichloropropane	µg/L	0.20	0.5	0.58	16		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20		<0.20	<0.20
Trichloroethylene	µg/L	0.20	0.5	0.5	1.6		4.8	0.55	<0.20	<0.20	<0.20	1.6	0.25	1.5		<0.20	<0.20
Bromodichloromethane	µg/L	0.20	2	67,000	67,000		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	Dry	<0.20	<0.20
Methyl Isobutyl Ketone	µg/L	1.0	640	5,200	140,000		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0		<1.0	<1.0
1,1,2-Trichloroethane	µg/L	0.20	0.5	0.5	4.7		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20		<0.20	<0.20
Toluene	µg/L	0.20	0.8	320	14,000		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20		<0.20	<0.20
Dibromochloromethane	µg/L	0.10	2	65,000	65,000		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10		<0.10	<0.10
Ethylene Dibromide	µg/L	0.10	0.2	0.2	0.25		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10		<0.10	<0.10
Tetrachloroethylene	µg/L	0.20	0.5	0.5	1.6		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20		<0.20	<0.20
1,1,1,2-Tetrachloroethane	µg/L	0.10	1.1	1.1	3.3		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10		<0.10	<0.10
Chlorobenzene	µg/L	0.10	0.5	140	500		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10		<0.10	<0.10
Ethylbenzene	µg/L	0.10	0.5	54	1,800		<0.10	<0.10	<0.20	<0.10	<0.10	<0.10	<0.10	<0.10		<0.10	<0.10
m & p-Xylene	µg/L	0.20	-	-	-		<0.20	<0.20	<0.10	<0.20	<0.20	<0.20	<0.20	<0.20		<0.20	<0.20
Bromoform	µg/L	0.10	5	5	380		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10		<0.10	<0.10
Styrene	µg/L	0.10	0.5	43	1,300		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10		<0.10	<0.10
1,1,2,2-Tetrachloroethane	µg/L	0.10	0.5	0.5	3.2		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10		<0.10	<0.10
o-Xylene	µg/L	0.10	-	-	-		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10		<0.10	<0.10
1,3-Dichlorobenzene	µg/L	0.10	0.5	7,600	7,600		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10		<0.10	<0.10
1,4-Dichlorobenzene	µg/L	0.10	0.5	0.5	8		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10		<0.10	<0.10
1,2-Dichlorobenzene	µg/L	0.10	0.5	150	4,600		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10		<0.10	<0.10
1,3-Dichloropropene	µg/L	0.30	0.5	0.5	5.2		<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30		<0.30	<0.30
Xylene Mixture	µg/L	0.20	72	72	3,300		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20		<0.20	<0.20
n-Hexane	µg/L	0.20	5	5	51		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20		<0.20	<0.20

* = MOE's Soil, Ground Water and Sediment Standards under Part XV 1 of the Environmental Protection Act, April 15, 2011, Table 1 - Full Depth Background Site Condition Standards (All Types of Property Use)

** = MOE's Soil, Ground Water and Sediment Standards under Part XV 1 of the Environmental Protection Act, April 15, 2011, Table 7 - Generic Site Condition Standards for Shallow Soils in a Non-Potable Ground Water Condition (All Types of Property Use)

*** = MOE's Soil, Ground Water and Sediment Standards under Part XV 1 of the Environmental Protection Act, April 15, 2011, Table 9 - Generic Site Condition Standards for Use within 30 m of a Water Body in a Non-Potable Ground Water Condition (All Types of Property Use)

= Concentration is at or exceeds Table 1 Site Condition Standards

= Concentration is at or exceeds Tables 1 and 7 Site Condition Standards

= Concentration is at or exceeds Tables 1, 7 and 9 Site Condition Standards

MDL = Method Detection Limit (lowest level of the parameter that can be quantified with confidence)

- = Not applicable

Table E-5 (Continued)
Groundwater Analysis
Petroleum Hydrocarbons and VOCs
Brennan Custom Homes, 185 Mill Street, Gananoque, Ontario

KIN-26260-A0

PARAMETER	UNITS	MDL	CRITERIA			Sample Date	20-Jun-13	19-Jun-13	19-Jun-13	20-Jun-13	20-Jun-13	20-Jun-13	20-Jun-13	19-Jun-13
			Table 1*	Table 7**	Table 9***		BW07-5	BW13-1	BW13-2	BW13-3	BW13-4	BW13-5	BW13-6	BW13-7
PETROLEUM HYDROCARBONS														
PHC F1 (C6-C10 Hydrocarbons) - BTEX	µg/L	25	420	420	420		55	<25	<25	<25	35	56	<25	<25
PHC F2 (C10-C16 Hydrocarbons)	µg/L	100	150	150	150		<100	<100	<100	<100	<100	<100	<100	<100
PHC F3 (C16-C34 Hydrocarbons)	µg/L	100	500	500	500		<100	<100	<100	<100	<100	<100	<100	<100
PHC F4 (C34-C50 Hydrocarbons)	µg/L	100	500	500	500		<100	<100	<100	<100	<100	<100	<100	<100
VOLATILE ORGANIC COMPOUNDS (VOCs)														
Dichlorodifluoromethane	µg/L	0.20	590	3,500	3,500		<2.00	<4.00	<0.40	<0.20	<0.20	<2.00	<0.20	<0.20
Vinyl Chloride	µg/L	0.17	0.5	0.5	0.5		12	49	2.7	<0.17	5.3	32	18	<0.17
Bromomethane	µg/L	0.20	0.89	0.89	5.6		<2.00	<4.00	<0.40	<0.20	<2.00	<2.00	<0.20	<0.20
Trichlorofluoromethane	µg/L	0.40	150	2,000	2,000		<4.00	<8.00	<0.80	<0.40	<4.00	<4.00	<0.40	<0.40
Acetone	µg/L	1.0	2,700	100,000	100,000		<10.0	<20.00	<2.0	<1.0	<10.0	<10.0	<1.0	<1.0
1,1-Dichloroethylene	µg/L	0.30	0.5	0.5	1.6		<3.00	<6.00	0.64	<0.30	<3.00	<3.00	<0.30	<0.30
Methylene Chloride	µg/L	0.30	5	26	610		<3.00	<6.00	<0.60	<0.30	<3.00	<3.00	<0.30	<0.30
trans- 1,2-Dichloroethylene	µg/L	0.20	1.6	1.6	1.6		<2.00	<4.00	21	<0.20	<2.00	<2.00	0.2	0.29
Methyl tert-butyl ether	µg/L	0.20	15	15	190		<2.00	<4.00	<0.40	<0.20	<2.00	<2.00	<0.20	<0.20
1,1-Dichloroethane	µg/L	0.30	0.5	11	320		<3.00	<6.00	<0.60	<0.30	<3.00	<3.00	<0.30	<0.30
Methyl Ethyl Ketone	µg/L	1.0	400	21,000	470,000		<10.0	<20.00	<2.0	<1.0	<10.0	<10.0	<1.0	<1.0
cis- 1,2-Dichloroethylene	µg/L	0.20	1.6	1.6	1.6		230	240	230	1.5	47	190	19	12
Chloroform	µg/L	0.20	2	2	2.4		<2.00	<4.00	<0.40	<0.20	<2.00	<2.00	<0.20	<0.20
1,2-Dichloroethane	µg/L	0.20	0.5	0.5	1.6		<2.00	<4.00	<0.40	<0.20	<2.00	<2.00	<0.20	<0.20
1,1,1-Trichloroethane	µg/L	0.30	0.5	23	640		<3.00	<6.00	<0.60	<0.30	<3.00	<3.00	<0.30	<0.30
Carbon Tetrachloride	µg/L	0.20	0.2	0.2	0.79		<2.00	<4.00	<0.40	<0.20	<2.00	<2.00	<0.20	<0.20
Benzene	µg/L	0.20	0.5	0.5	44		<2.00	<4.00	<0.40	<0.20	<2.00	<2.00	0.32	<0.20
1,2-Dichloropropane	µg/L	0.20	0.5	0.58	16		<2.00	<4.00	<0.40	<0.20	<2.00	<2.00	<0.20	<0.20
Trichloroethylene	µg/L	0.20	0.5	0.5	1.6		<2.00	<4.00	22	1.7	85	4.2	1.3	31
Bromodichloromethane	µg/L	0.20	2	67,000	67,000		<2.00	<4.00	<0.40	<0.20	<2.00	<2.00	<0.20	<0.20
Methyl Isobutyl Ketone	µg/L	1.0	640	5,200	140,000		<10.0	<20.00	<2.0	<1.0	<10.0	<10.0	<1.0	<1.0
1,1,2-Trichloroethane	µg/L	0.20	0.5	0.5	4.7		<2.00	<4.00	<0.40	<0.20	<2.00	<2.00	<0.20	<0.20
Toluene	µg/L	0.20	0.8	320	14,000		<2.00	<4.00	<0.40	<0.20	<2.00	<2.00	<0.20	<0.20
Dibromochloromethane	µg/L	0.10	2	65,000	65,000		<1.00	<2.00	<0.20	<0.10	<1.00	<1.00	<0.10	<0.10
Ethylene Dibromide	µg/L	0.10	0.2	0.2	0.25		<1.00	<2.00	<0.20	<0.10	<1.00	<1.00	<0.10	<0.10
Tetrachloroethylene	µg/L	0.20	0.5	0.5	1.6		<2.00	<4.00	<0.40	<0.20	<2.00	<2.00	<0.20	<0.20
1,1,1,2-Tetrachloroethane	µg/L	0.10	1.1	1.1	3.3		<1.00	<2.00	<0.20	<0.10	<1.00	<1.00	<0.10	<0.10
Chlorobenzene	µg/L	0.10	0.5	140	500		<1.00	<2.00	<0.20	<0.10	<1.00	<1.00	0.44	<0.10
Ethylbenzene	µg/L	0.10	0.5	54	1,800		<1.00	<2.00	<0.20	<0.10	<1.00	<1.00	<0.10	<0.10
m & p-Xylene	µg/L	0.20	-	-	-		<2.00	<4.00	<0.40	<0.20	<2.00	<2.00	<0.20	<0.20
Bromoform	µg/L	0.10	5	5	380		<1.00	<2.00	<0.20	<0.10	<1.00	<1.00	<0.10	<0.10
Styrene	µg/L	0.10	0.5	43	1,300		<1.00	<2.00	<0.20	<0.10	<1.00	<1.00	<0.10	<0.10
1,1,2,2-Tetrachloroethane	µg/L	0.10	0.5	0.5	3.2		<1.00	<2.00	<0.20	<0.10	<1.00	<1.00	<0.10	<0.10
o-Xylene	µg/L	0.10	-	-	-		<1.00	<2.00	<0.20	<0.10	<1.00	<1.00	<0.10	<0.10
1,3-Dichlorobenzene	µg/L	0.10	0.5	7,600	7,600		<1.00	<2.00	<0.20	<0.10	<1.00	<1.00	<0.10	<0.10
1,4-Dichlorobenzene	µg/L	0.10	0.5	0.5	8		<1.00	<2.00	<0.20	<0.10	<1.00	<1.00	<0.10	<0.10
1,2-Dichlorobenzene	µg/L	0.10	0.5	150	4,600		<1.00	<2.00	<0.20	<0.10	<1.00	<1.00	<0.10	<0.10
1,3-Dichloropropene	µg/L	0.30	0.5	0.5	5.2		<3.00	<6.00	<0.60	<0.30	<3.00	<3.00	<0.30	<0.30
Xylene Mixture	µg/L	0.20	72	72	3,300		<2.00	<4.00	<0.40	<0.20	<2.00	<2.00	<0.20	<0.20
n-Hexane	µg/L	0.20	5	5	51		<2.00	<4.00	<0.40	<0.20	<2.00	<2.00	<0.20	<0.20

* = MOE's Soil, Ground Water and Sediment Standards under Part XV.1 of the Environmental Protection Act, April 15, 2011, Table 1 - Full Depth Background Site Condition Standards (All Types of Property Use)

** = MOE's Soil, Ground Water and Sediment Standards under Part XV.1 of the Environmental Protection Act, April 15, 2011, Table 7 - Generic Site Condition Standards for Shallow Soils in a Non-Potable Ground Water Condition (All Types of Property Use)

*** = MOE's Soil, Ground Water and Sediment Standards under Part XV.1 of the Environmental Protection Act, April 15, 2011, Table 9 - Generic Site Condition Standards for Use within 30 m of a Water Body in a Non-Potable Ground Water Condition (All Types of Property Use)

= Concentration is at or exceeds Table 1 Site Condition Standards

= Concentration is at or exceeds Tables 1 and 7 Site Condition Standards

= Concentration is at or exceeds Tables 1, 7 and 9 Site Condition Standards

MDL = Method Detection Limit (lowest level of the parameter that can be quantified with confidence)

- = Not applicable

Table E-6
Groundwater Analysis
Metals & Inorganics
Brennan Custom Homes, 185 Mill Street, Gananoque, Ontario

KIN-26260-A0

PARAMETER	UNITS	MDL	CRITERIA			Sample Date	4-Jun-13	19-Jun-13	19-Jun-13	20-Jun-13	20-Jun-13	20-Jun-13	20-Jun-13	19-Jun-13	
			Table 1*	Table 7**	Table 9***		Pit - Stone Bld	MW07-1	MW07-2	MW13-1	MW13-1 Dup	MW13-2	MW13-3	MW13-4	MW13-5
METALS & INORGANICS															
Antimony	µg/L	0.5	1.5	16,000	16,000		<0.5	9.4	1.3	<0.5	<0.5			6.7	
Arsenic	µg/L	1.0	13	1,500	1,500		<1.0	1.2	1.8	<1.0	<1.0			<1.0	
Barium	µg/L	2.0	610	23,000	23,000		144	63.5	120	25.4	25.9			50.2	
Beryllium	µg/L	0.5	0.5	53	53		<0.5	0.8	0.6	<0.5	<0.5			0.9	
Boron	µg/L	10.0	1,700	36,000	36,000		51.8	44.5	24.3	76.1	77.2			43.7	
Cadmium	µg/L	0.2	0.5	2.1	2.1		<0.2	<0.2	<0.2	<0.2	<0.2			<0.2	
Chromium	µg/L	2.0	11	640	640		<2.0	<2.0	<2.0	<2.0	<2.0			<2.0	
Cobalt	µg/L	0.5	3.8	52	52		<0.5	<0.5	0.5	1.8	1.7			0.8	
Copper	µg/L	1.0	5	69	69		<1.0	<1.0	1.2	<1.0	<1.0			1.3	
Lead	µg/L	0.5	1.9	20	20		<0.5	<0.5	<0.5	<0.5	<0.5			<0.5	
Molybdenum	µg/L	0.5	23	7,300	7,300		<0.5	1.4	2.4	1.8	1.7			1.9	
Nickel	µg/L	1.0	14	390	390		<1.0	<1.0	1.1	<1.0	<1.0			2.2	
Selenium	µg/L	1.0	5	50	50		<1.0	2.8	<1.0	<1.0	<1.0			3.9	
Silver	µg/L	0.2	0.3	1.2	1.2		<0.2	<0.2	<0.2	<0.2	<0.2	Insufficient Recharge	Insufficient Recharge	<0.2	Dry
Thallium	µg/L	0.3	0.5	400	400		<0.3	<0.3	<0.3	<0.3	<0.3			<0.3	
Uranium	µg/L	0.5	8.9	330	330		<0.5	<0.5	1.2	<0.5	<0.5			<0.5	
Vanadium	µg/L	0.4	3.9	200	200		1.2	0.8	<0.4	<0.4	<0.4			2.2	
Zinc	µg/L	5.0	160	890	890		<5.0	<5.0	9.6	5.4	6.1			34.7	
Mercury	µg/L	0.02	0.1	0.1	0.29		<0.02	<0.02	<0.02	<0.02	<0.02			<0.02	
Chromium VI	µg/L	5	25	110	110		<5	<5	<5	<5	<5			<5	
Cyanide	µg/L	2	5	52	52		<2	<2	<2	<2	<2			<2	
Sodium	µg/L	500	490,000	1,800,000	1,800,000		21,500	11,200	22,700	19,700	19,900			7,390	
Chloride	µg/L	500	790,000	1,800,000	1,800,000		92,400	21,200	4,610	31,800	30,400			11,700	
Nitrate as N	µg/L	250	-	-	-		852	64	<50	161	180			846	
Nitrite as N	µg/L	250	-	-	-		<250	<50	<50	<50	<100			<50	
Electrical Conductivity	uS/cm	2	-	-	-		754	470	434	636	653			404	
pH	pH Units	NA	-	-	-		7.94	7.66	7.68	7.39	7.38			7.64	

* = MOE's Soil, Ground Water and Sediment Standards under Part XV 1 of the Environmental Protection Act, April 15, 2011, Table 1 - Full Depth Background Site Condition Standards (All Types of Property Use)

** = MOE's Soil, Ground Water and Sediment Standards under Part XV 1 of the Environmental Protection Act, April 15, 2011, Table 7 - Generic Site Condition Standards for Shallow Soils in a Non-Potable Ground Water Condition (All Types of Property Use)

*** = MOE's Soil, Ground Water and Sediment Standards under Part XV 1 of the Environmental Protection Act, April 15, 2011, Table 9 - Generic Site Condition Standards for Use within 30 m of a Water Body in a Non-Potable Ground Water Condition (All Types of Property Use)

= Concentration is at or exceeds Table 1 Site Condition Standards

= Concentration is at or exceeds Tables 1 and 7 Site Condition Standards

= Concentration is at or exceeds Tables 1, 7 and 9 Site Condition Standards

MDL = Method Detection Limit (lowest level of the parameter that can be quantified with confidence)

- = Not applicable

Table E-6 (Continued)
Groundwater Analysis
Metals & Inorganics
Brennan Custom Homes, 185 Mill Street, Gananoque, Ontario

KIN-26260-A0

PARAMETER	UNITS	MDL	CRITERIA			Sample Date	20-Jun-13	19-Jun-13	19-Jun-13	20-Jun-13	20-Jun-13	20-Jun-13	20-Jun-13	19-Jun-13
			Table 1*	Table 7**	Table 9***		BW07-5	BW13-1	BW13-2	BW13-3	BW13-4	BW13-5	BW13-6	BW13-7
METALS & INORGANICS														
Antimony	µg/L	0.5	1.5	16,000	16,000		1.2	<0.5	0.9	3.6	<0.5	<0.5	<0.5	<0.5
Arsenic	µg/L	1.0	13	1,500	1,500		1.4	<1.0	1.6	<1.0	<1.0	<1.0	<1.0	<1.0
Barium	µg/L	2.0	610	23,000	23,000		228	146	122	38.4	103	126	1,000	68.3
Beryllium	µg/L	0.5	0.5	53	53		<0.5	1.1	3.3	<0.5	<0.5	<0.5	<0.5	1
Boron	µg/L	10.0	1,700	36,000	36,000		65.8	119	266	166	164	73.9	213	47.6
Cadmium	µg/L	0.2	0.5	2.1	2.1		<0.2	0.4	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chromium	µg/L	2.0	11	640	640		<2.0	4.8	3.6	<2.0	<2.0	<2.0	<2.0	2.5
Cobalt	µg/L	0.5	3.8	52	52		8.6	<0.5	0.8	10.6	7.8	<12.5	9.2	1.6
Copper	µg/L	1.0	5	69	69		<1.0	<1.0	<1.0	3.8	9.8	3.0	3.4	4.1
Lead	µg/L	0.5	1.9	20	20		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Molybdenum	µg/L	0.5	23	7,300	7,300		2.3	2.7	1.6	4.5	<0.5	1.0	0.7	<0.5
Nickel	µg/L	1.0	14	390	390		17.3	<1.0	2.0	38.2	8.3	4.5	7.3	3.7
Selenium	µg/L	1.0	5	50	50		<1.0	<1.0	7.5	1.5	2.0	<1.0	<1.0	<1.0
Silver	µg/L	0.2	0.3	1.2	1.2		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2	<0.2
Thallium	µg/L	0.3	0.5	400	400		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Uranium	µg/L	0.5	8.9	330	330		2.3	<0.5	1.2	<0.5	0.9	<0.5	<0.5	<0.5
Vanadium	µg/L	0.4	3.9	200	200		<0.4	<0.4	<0.4	0.5	<0.4	<0.4	<0.4	<0.4
Zinc	µg/L	5.0	160	890	890		15.7	65.0	<5.0	23.3	14.0	38.5	11.7	5.9
Mercury	µg/L	0.02	0.1	0.1	0.29		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Chromium VI	µg/L	5	25	110	110		<5	<5	<5	<5	<5	<5	<5	<5
Cyanide	µg/L	2	5	52	52		<2	<2	<2	<2	<2	<2	<2	<2
Sodium	µg/L	500	490,000	1,800,000	1,800,000		37,800	44,100	149,000	11,900	39,400	44,400	50,800	25,600
Chloride	µg/L	500	790,000	1,800,000	1,800,000		81,200	105,000	276,000	31,500	10,300	86,800	124,000	66,000
Nitrate as N	µg/L	250	-	-	-		<100	<250	<500	413	580	<250	<250	727
Nitrite as N	µg/L	250	-	-	-		<100	<250	<500	<50	<250	<250	<250	<100
Electrical Conductivity	uS/cm	2	NA	NA	NA		750	928	1,560	575	885	858	975	733
pH	pH Units	NA	-	-	-		7.81	7.98	7.92	7.68	7.59	7.46	7.44	7.53

* = MOE's Soil, Ground Water and Sediment Standards under Part XV.1 of the Environmental Protection Act, April 15, 2011, Table 1 - Full Depth Background Site Condition Standards (All Types of Property Use)

** = MOE's Soil, Ground Water and Sediment Standards under Part XV.1 of the Environmental Protection Act, April 15, 2011, Table 7 - Generic Site Condition Standards for Shallow Soils in a Non-Potable Ground Water Condition (All Types of Property Use)

*** = MOE's Soil, Ground Water and Sediment Standards under Part XV.1 of the Environmental Protection Act, April 15, 2011, Table 9 - Generic Site Condition Standards for Use within 30 m of a Water Body in a Non-Potable Ground Water Condition (All Types of Property Use)

= Concentration is at or exceeds Table 1 Site Condition Standards

= Concentration is at or exceeds Tables 1 and 7 Site Condition Standards

= Concentration is at or exceeds Tables 1, 7 and 9 Site Condition Standards

MDL = Method Detection Limit (lowest level of the parameter that can be quantified with confidence)

- = Not applicable

Table E-7
Groundwater Analysis
PAHs
Brennan Custom Homes, 185 Mill Street, Gananoque, Ontario

KIN-26260-A0

PARAMETER	UNITS	MDL	CRITERIA			Sample Date	19-Jun-13	19-Jun-13	20-Jun-13	20-Jun-13	19-Jun-13	19-Jun-13	20-Jun-13	20-Jun-13	20-Jun-13	19-Jun-13
							MW07-1	MW07-2	MW13-1	MW13-1 Dup	BW13-1	BW13-2	BW13-3	BW13-4	BW13-6	BW13-7
			Table 1*	Table 7**	Table 9***											
PAH																
Naphthalene	µg/L	0.20	7	7	1,400		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Acenaphthylene	µg/L	0.20	1	1	1.4		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Acenaphthene	µg/L	0.20	4.1	17	600		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Fluorene	µg/L	0.20	120	290	290		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Phenanthrene	µg/L	0.10	0.1	380	380		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Anthracene	µg/L	0.10	0.1	1	1		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Fluoranthene	µg/L	0.20	0.4	44	73		<0.20	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Pyrene	µg/L	0.20	0.2	5.7	5.7		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Benz(a)anthracene	µg/L	0.20	0.2	1.8	1.8		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Chrysene	µg/L	0.10	0.1	0.7	0.7		<0.10	0.11	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Benzo(b)fluoranthene	µg/L	0.10	0.1	0.75	0.75		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Benzo(k)fluoranthene	µg/L	0.10	0.1	0.4	0.4		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Benzo(a)pyrene	µg/L	0.01	0.01	0.81	0.81		<0.01	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	µg/L	0.20	0.2	0.2	0.2		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Dibenz(a,h)anthracene	µg/L	0.20	0.2	0.4	0.4		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Benzo(g,h,i)perylene	µg/L	0.20	0.2	0.2	0.2		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
2-and 1-methyl Naphthalene	µg/L	0.20	2	1,500	1,500		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20

* = MOE's Soil, Ground Water and Sediment Standards under Part XV.1 of the Environmental Protection Act, April 15, 2011, Table 1 - Full Depth Background Site Condition Standards (All Types of Property Use)

** = MOE's Soil, Ground Water and Sediment Standards under Part XV.1 of the Environmental Protection Act, April 15, 2011, Table 7 - Generic Site Condition Standards for Shallow Soils in a Non-Potable Ground Water Condition (All Types of Property Use)

*** = MOE's Soil, Ground Water and Sediment Standards under Part XV.1 of the Environmental Protection Act, April 15, 2011, Table 9 - Generic Site Condition Standards for Use within 30 m of a Water Body in a Non-Potable Ground Water Condition (All Types of Property Use)

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= Concentration is at or exceeds Tables 1 and 7 Site Condition Standards

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- = Not applicable

Table E-8
Groundwater Analysis
PCBs
Brennan Custom Homes, 185 Mill Street, Gananoque, Ontario

KIN-26260-A0

PARAMETER	UNITS	MDL	CRITERIA			Sample Date	20-Jun-13	20-Jun-13	19-Jun-13
			Table 1*	Table 7**	Table 9***		BW13-5	BW13-6	BW13-7
PCBs									
Aroclor 1242	µg/L	0.1		-	-		<0.1	<0.1	<0.1
Aroclor 1248	µg/L	0.1		-	-		<0.1	<0.1	<0.1
Aroclor 1254	µg/L	0.1		-	-		<0.1	<0.1	<0.1
Aroclor 1260	µg/L	0.1		-	-		<0.1	<0.1	<0.1
Polychlorinated Biphenyls	µg/L	0.1	0.2	0.2	0.2		<0.1	<0.1	<0.1

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** = MOE's Soil, Ground Water and Sediment Standards under Part XV.1 of the Environmental Protection Act, April 15, 2011, Table 7 - Generic Site Condition Standards for Shallow Soils in a Non-Potable Ground Water Condition (All Types of Property Use)

*** = MOE's Soil, Ground Water and Sediment Standards under Part XV.1 of the Environmental Protection Act, April 15, 2011, Table 9 - Generic Site Condition Standards for Use within 30 m of a Water Body in a Non-Potable Ground Water Condition (All Types of Property Use)

= Concentration is at or exceeds Table 1 Site Condition Standards

= Concentration is at or exceeds Tables 1 and 7 Site Condition Standards

= Concentration is at or exceeds Tables 1, 7 and 9 Site Condition Standards

MDL = Method Detection Limit (lowest level of the parameter that can be quantified with confidence)

\- = Not applicable