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**Phase II Environmental Site Assessment
5536 Manotick Main Street
Manotick, Ontario**

MM2103

Revised November 2019

CM3 Environmental Inc.
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1 EXECUTIVE SUMMARY

CM3 Environmental Inc. (CM3) was retained by Royal LePage Team Realty to conduct a Phase II environmental site assessment (ESA) at 5536 Manotick Main Street, Manotick, Ontario (site or subject property). The purpose of the ESA was to assess the presence of soil and/or groundwater contamination at the site. The Phase II ESA was completed in support of a real estate transaction. The Phase II ESA was not completed in support of filing of a record of site condition.

The scope of work for the Phase II ESA was developed to address potential contamination related to surrounding land uses including former dry cleaner, former gas stations and automotive garages and an active automotive repair garage. A Phase I ESA was not completed prior to the undertaking of the Phase II ESA. CM3 conducted a Phase I ESA in January 2019 following the completion of the Phase II ESA and prior to the preparation of this revised report. The areas of potential environmental concern identified in the Phase I ESA were consistent with the areas and contaminants identified in the preparation of the Phase II ESA work plan. The contaminants of concern were identified as volatile organic compounds (VOCs), petroleum hydrocarbons (PHCs) F1-F4 fractions, polycyclic aromatic hydrocarbons (PAHs) and metals.

The Phase II ESA included the advancement of six boreholes with four completed as monitoring wells and two completed as vapour monitoring wells, to assess the soil and groundwater conditions at the site. Soil samples were collected at all borehole locations for field screening and possible laboratory analysis. Ground water samples were collected from the newly installed monitoring wells and soil vapour samples were collected from the two vapour monitoring wells. Selected soil samples and groundwater samples were submitted for laboratory analysis of one or more contaminants of concern. Soil vapour samples were submitted for VOCs analysis; specifically, cis-1,2 dichloroethylene, tetrachloroethylene and trichloroethylene.

The results of the Phase II ESA analytical program were compared to the Ontario Ministry of Environment, Conservation and Parks (MECP) Site Condition Standards (SCS) from the Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011 (under Ontario Regulation 153/04). Specifically, the soil and ground water analytical results were compared to the Table 7 Full Depth Generic Site Condition Standards for Shallow Soils in a Non-Potable Groundwater Condition with coarse soils and commercial land use. The results of the soil vapour analyses were compared to MECP Ontario's Ambient Air Quality Criteria (AAQC), April 2012, for 24-hour exposure.

The stratigraphy at the site was determined based on the findings of the Phase II ESA, and consisted of fill (sand, gravel), cobbles/boulders and clay, underlain by fractured bedrock at 1.27- 3.29 m below grade (m bg). The depth to groundwater was 1.38- 2.25 m bg, within an inferred shallow unconfined overburden-fractured bedrock aquifer. The inferred groundwater flow direction at the site was southwest.

The results of the Phase II did not identify any soil or soil vapour impacts (i.e. concentrations above applicable SCS or criteria) at the subject property. Contaminants of concern were either not detected or were present at concentrations below the applicable MECP Table 7 SCS in all

analysed soil samples and below the AAQC in the soil vapour samples. Groundwater impacts were identified at two monitoring wells located near the south property boundary. Contaminants present at concentrations above the MECP Table 7 SCS included cis-1,2 dichloroethylene, trichloroethylene and/or tetrachloroethylene. All other contaminants of concern were either not detected or were present at concentrations below the applicable SCS in the analysed groundwater samples.

The groundwater impacts identified at the subject property are likely a result of migration from the former dry cleaner at 5545 Manotick Main, located southeast of the site. Groundwater impacts related to the former dry cleaner in the Village of Manotick have been documented in previous investigations.

CM3 recommends a site-specific risk assessment to address the impacts at the site. Should the removal of soil be required from site for construction purposes, additional assessment work may be necessary to qualify the soil disposal.

2 INTRODUCTION

CM3 Environmental Inc. (CM3) was retained by Royal LePage Team Realty to conduct a Phase II environmental site assessment (ESA) at 5536 Manotick Main Street, Manotick, Ontario (site or subject property). The purpose of the ESA was to assess the presence of soil and/or groundwater contamination at the site. The Phase II ESA was completed in support of a real estate transaction.

2.1 Site Description

The subject property is located on the west side of Manotick Main Street in the heart of Manotick Ontario (**Figure 1**). The civic address is 5536 Manotick Main Street, Manotick, Ontario. The legal description is Plan 18, lots 26 and 35. The property identification number for the subject property is 045870049 and is zoned as Village Mixed - Use |Zone (Sec.229-230) Subzone 9 (VM9).

The site is a 0.16 hectare (0.4 acre) rectangular shaped property, is bounded by Manotick Main Street to the east, commercial properties to the north and south and Ann Street to the west. Current access to the subject property is from the east off Manotick Main Street and from the west off Ann Street. The property consists of one two-storey building located on the southeast corner of the property and mixed asphalt and gravel parking lot with small areas of overgrown grass. A site plan is provided as **Figure 2**.

2.2 Property Ownership

The property is currently Royal LePage Team Realty, located at Suite 101, 555 Legget Drive Kanata, Ontario.

2.3 Current and Proposed Future Uses

The current land use is mixed commercial and residential. Historically the site has primarily been as a restaurant but was vacant at the time of the field investigations. It is likely that the land use will not change for any future development and the filing of a record of site condition per section 168.3.1 of the Environmental Protection Act is not required.

2.4 Applicable Site Condition Standards

The results of the soil and groundwater analyses were compared to the Ontario Ministry of Environment, Conservation and Parks (MECP) *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act*, April 15, 2011 (under Ontario Regulation 153/04). The following site conditions were used in the selection of the appropriate site condition standards (SCS) to assess the analytical results:

- No environmentally sensitive areas were located on site or in the immediate vicinity;
- Bedrock appeared to be present in two borehole locations at less than 2 meters below ground surface;
- The site was not located within 30 m of a water body;
- Groundwater was not used as a potable water source in the area; and,
- Land use was considered commercial.

The Table 7 Full Depth Generic Site Condition Standards for Shallow Soils in a Non-Potable Groundwater Condition with coarse soils and commercial land use were conservatively selected for evaluation of the analytical results based on suspected shallow bedrock in two borehole locations.

The results of the soil vapour analysis were compared to the MECP Ontario's Ambient Air Quality Criteria (AAQC), April 2012, for 24-hour exposure. As indicated in the document "AAQC is a desirable concentration of a contaminant in air, based on protection against adverse effects on health or the environment".

3 BACKGROUND INFORMATION

3.1 Physical Setting

3.1.1 *Water Bodies, Areas of Natural Significance*

The Rideau River is located approximately 250 m northeast of the site and flows to the northwest. One area of natural and scientific interest (ANSI) was identified as Manotick Drumlin Forest located, 1.5 km south of the subject site.

3.1.2 *Topography and Drainage*

Topographical maps and observations during the site reconnaissance indicate the topography of the subject property is relatively flat, at an approximate elevation of 88.24 m above sea level (m asl). The ground surface on the west side of Ann Street (west of the site) slopes upwards towards the west. Drainage at the site is likely controlled by the grading, towards municipal storm drains on the surrounding roads.

3.1.3 *Geology*

The surficial and bedrock geology of the subject property was interpreted from the Ontario Geological Survey Surficial Geology of Southern Ontario (Miscellaneous Releases, 2010) and Bedrock Geology of Ontario (Miscellaneous Releases, 2011). The surficial geology at the subject property consists of clay, silt and sand. The bedrock at the site consists of dolostone, sandstone of the Beekmantown group.

3.1.4 *Regional Hydrogeology*

The regional groundwater flow direction was inferred based on the topography at the subject property and surrounding area and the presence of local water bodies. The regional groundwater flow is inferred to be northeast towards the Rideau River.

3.2 Past Investigations

CM3 was not aware of any previous site assessments completed at the subject property prior to undertaking the Phase II ESA. CM3 reviewed excerpts (Figures) from a 1994 soil and hydrogeologic investigation of perchloroethylene (PCE) and petroleum hydrocarbon contamination in the village of Manotick, prepared by Raven Beck Environmental Ltd. and a 2004 Partial Phase I and Phase II report completed by Morey Houle Chevrier Engineering Ltd. for the properties at 5517 and 5521 Manotick Main Street, in development of the site investigation.

The above reports identified historic surrounding land uses of potential environmental concern including a former gas station and a former dry cleaner. Contaminants of concern associated with the current and historic land uses included volatile organic compounds, petroleum hydrocarbons, polycyclic aromatic hydrocarbons and metals.

CM3 conducted a Phase I ESA in January 2019 following the completion of the Phase II ESA and prior to the preparation of this revised report. The areas of potential environmental concern identified in the Phase I ESA were consistent with the areas and contaminants identified in the preparation of the Phase II ESA work plan.

4 SCOPE OF THE INVESTIGATION

4.1 Overview of Site Investigation

The purpose of the Phase II ESA was to assess the presence of soil and/or groundwater contamination at the site. The ESA was conducted in support of a real estate transaction and was completed following the Canadian Standards Association (CSA) Standard Z769-00 (R2008) and in general accordance with Ontario Regulation 153/04. The scope of work for the ESA included:

- The environmental drilling of six boreholes using portable drilling equipment with spilt spoon soil sampling and core drilling capabilities. Subsurface soil samples were collected for field observations and possible laboratory analysis of one or more of VOCs, PHCs F1-F4 fractions, PAHs and metals;
- The installation of groundwater monitoring wells four boreholes and soil vapour wells in two boreholes;
- The measurement of the depth to liquid phase hydrocarbons (LPH) if present, and groundwater in all monitoring wells;
- The collection of representative groundwater samples for analysis of one or more of VOCs, PHCs F1- F4 fractions, PAHs and metals; and,
- The collection of soil vapour samples for analysis of cis-1,2 dichloroethylene, tetrachloroethylene and trichloroethylene.

4.2 Media Investigated

The Phase II ESA included the investigation of soil, groundwater and soil vapours. Sediments were not identified on the property and were therefore not investigated.

4.3 Phase One Conceptual Site Model

A Phase I was not completed prior to the undertaking of the Phase II ESA. CM3 conducted a Phase I ESA in January 2019 following the completion of the Phase II ESA and prior to the preparation of this revised report. The areas of potential environmental concern identified in the Phase I ESA were consistent with the areas and contaminants identified in the preparation of the Phase II ESA work plan. The areas of potential environmental concern (APECs) and contaminants of concern (COCs) investigated in the Phase II ESA were:

1. 5521 Manotick Main, Former automotive repair garage northeast of the site.
2. 5527 Manotick Main, Former gas station and automotive garage northeast of the site.
3. 5536 Ann Street, Active automotive repair garage southwest of the site.
4. 5545 Manotick Main, Former Dry Cleaner and Documented Impacts southeast of the site.
5. 5549 Main Street, Former gas station and automotive garage southeast of the site.

The contaminants of concern were VOCs, PHCs F1-F4, PAHs and metals.

The APECs and COCs were and confirmed by the Phase I ESA. The locations of the APECs are provided on **Figure 2**.

4.4 Deviations from Sampling and Analysis Plan

No deviations from the original sampling plan were undertaken.

4.5 Impediments

There were no impediments to the completion of the site investigation.

5 INVESTIGATION METHODOLOGY

5.1 General

All work conducted as part of the site investigation was completed following standard operating procedures for environmental drilling and monitoring well installation methods, soil sampling and groundwater monitoring/sampling.

5.2 Borehole Drilling

Four boreholes (MW1 through MW4) were completed between October 31 and November 1, 2017 and two boreholes (VM1 and VM2) were completed on December 20, 2017, under supervision of CM3. Drilling services were provided by CCC Environmental and Geotechnical Drilling (CCC) of Ottawa, Ontario (MW1 through MW4) and OGS Drilling Inc. (OGS) of Almonte, Ontario (VM1 and VM2). Boreholes MW1, MW3 and MW4 were advanced at southwest, northeast and northwest property boundaries, respectively, and borehole MW2 was advanced at the southeast property boundary within the footprint of the existing building, to assess potential soil contamination related to the off-site APECs. Boreholes VM1 and VM2 were completed adjacent boreholes MW1 and MW2, respectively, to assess subsurface soil vapour quality at the site. The borehole locations are provided on **Figure 3**.

Boreholes/monitoring wells were completed to a maximum depth of 5.7 m bg using portable drilling equipment. Boreholes were advanced from grade to refusal at suspected bedrock using an electric jackhammer (pionjar) and 60 cm long, 5.1 cm diameter split spoon sampler. Boreholes completed in bedrock were advanced using portable coring equipment. The drilling and sampling equipment were washed and rinsed between each sample interval and borehole location to prevent cross-contamination. All excess soil cuttings from the field investigations were placed in sealed and labeled drums and stored on-site pending disposal off-site. The borehole sampling and well completion details are provided on the borehole logs **Appendix A**.

5.3 Soil Sampling

Soil samples were collected continuously, when possible, from grade to refusal on bedrock or the maximum depth of each borehole using the split spoon samplers. Samples were logged at the time of recovery for grain size, colour, moisture content, and visual or olfactory evidence of impacts. At the time of recovery, a portion of each sample was placed into a polyethylene bag for relative combustible organic vapour analysis. The remainder of each sample was placed into the appropriate laboratory supplied sample containers for the required analyses, following MECP sampling protocols. The sample containers were placed into an iced chilled cooler pending submission to the laboratory for analysis. The bagged samples were used for field screening of relative combustible vapours.

5.4 Field Screening Measurements

The bagged soil samples were allowed to equilibrate to ambient temperature prior to combustible vapour measurements. The vapour concentrations were measured and recorded from the bag

sample headspace using an RKI Eagle combustible vapour meter calibrated to hexane and operated in methane elimination mode. The intake probe of the vapour meter was inserted into the plastic bag and the highest vapour reading from each sample was recorded. The results of the vapour analysis and field screening were used in the selection of samples for laboratory analysis. Soil vapour screening was not completed on the samples from boreholes VM1 and VM2. A total of five borehole soil samples (MW1 SA1, MW2 SA5, MW3 SA5 MW4 SA1 and MW4 SA2) were submitted for laboratory analysis of PHCs F1 to F4 fractions, VOCs, PAHs and/or metals.

5.5 Ground Water Monitoring and Soil Vapour Well Installation

Boreholes MW1 through MW4 were completed as groundwater monitoring wells and boreholes VM1 and VM2 were completed as soil vapour monitoring wells. Well construction consisted of 32 mm outside diameter, flush-threaded schedule 40 PVC well screens and risers. At each groundwater monitoring well borehole, a 10-slot well screen was placed to intercept the water table to allow for the detection of LPH. The soil vapour wells were completed with a 0.30 m screen installed above the water table. A silica sand pack was placed around the outside of the well screen in the annular space of the borehole to a minimum of 0.3 m above the screened interval. A bentonite seal was placed above the sand pack to approximately 0.3 m bg. Monitoring wells were either finished above grade and capped with lockable j-plugs or were finished below grade in protective flush mounted steel casings. Soil vapour wells were finished above grade with a ball valve. The well completion details are provided on the borehole logs **Appendix A**.

Following installation, CM3 personnel developed all monitoring wells using dedicated low-density polyethylene tubing (installed at each well) and a peristaltic pump. The wells were developed to ensure that subsequent groundwater samples collected were representative of overburden groundwater conditions. The wells were developed until the purge waters were relatively free of sediment or a minimum of three standing water volumes were removed from each well.

5.6 Ground Water: Field Measurement of Water Quality Parameters

Qualitative observations with respect to the purge water quality (hydrocarbon odour, sheen, etc.) were recorded at the time of sampling, if present.

5.7 Ground Water: Sampling

5.7.1 LPH and Water Level Measurement

CM3 measured the depth to groundwater and LPH in all four monitoring wells on November 9, 2017. The depth to LPH (if present) and water were measured the nearest millimetre from the highest point of the well riser, using a Solinst® electronic oil/water interface meter. The interface probe was cleaned and rinsed with distilled water between each well to prevent cross contamination.

5.7.2 Sample Collection

CM3 collected groundwater samples from monitoring wells MW1 to MW4 on November 9, 2017. Prior to sampling, each well was purged to remove stagnant water from within the well bore and

surrounding annulus to obtain samples that were representative of formation groundwater. Groundwater purging and sampling was conducted using dedicated low-density polyethylene tubing (installed at each well) and a peristaltic pump. Water samples were collected into the appropriate sample containers and placed in an ice filled cooler pending delivery to the laboratory for analysis.

All groundwater samples were submitted for laboratory analysis of VOCs and PHCs F1-F4 fractions. Selected samples were also submitted for analysis of PAHs and metals. The groundwater samples collected for metal analysis were field filtered using dedicated a 0.45-micron Waterra FHT- Groundwater Filter.

5.8 Soil Vapour Sampling

CM3 collected subsurface air samples from monitoring points VM1 and VM2 on January 9, 2017. The sampling was completed using an AirChek XR5000 sampling pump, tubing and sampling media supplied by the analytical laboratory. The pumps were calibrated by the laboratory prior to delivery to CM3 according to the sample requirements at a volume of 100 mL/min for a 20-minute sample collection time.

To collect the samples, the media and pump were connected to the valve on the well cap using dedicated tubing, and the valve was opened. Samples were collected for a 20-minute sample period then immediately sealed and identified along with a chain of custody and delivered to the laboratory for analysis of cis-1,2 dichloroethylene, tetrachloroethylene and trichloroethylene.

5.9 Analytical Testing

Soil samples selected for analysis and all groundwater samples were submitted to Paracel Laboratories Limited (Paracel) of Ottawa, Ontario. Soil vapour samples were submitted to Paracel for analysis by Caro Analytical Services (Caro) under subcontract to Paracel.

5.10 Residue Management Procedures

All residual soil from the drilling and soil sampling operations, water from the cleaning of the sampling equipment and purge water from well development and sampling were stored on-site pending future disposal during remedial works.

5.11 Elevation Surveying

The locations of all newly installed boreholes/monitoring wells were referenced to existing site buildings and structures. The ground surface and monitoring well top of pipe elevations were referenced to existing monitoring well top of pipe elevations using a TopCon AT-B4 automatic level. The ground surface and top of pipe elevations are included in the borehole logs (**Appendix A**).

5.12 Quality Assurance and Quality Control Measures

The general field Quality Assurance and Quality Control (QA/QC) procedures followed by CM3 included, but were not limited to:

- A new pair of disposable nitrile gloves was used for each sample collected;
- Sampling equipment was dedicated to a specific location (i.e. 3/8" O.D. low density polyethylene (LDPE) tubing), when possible;
- Equipment that contacted the environmental media to be collected (interface probe, stainless-steel trowel, etc.) was decontaminated between each monitoring location or sample, by washing with a coarse brush and soapy water followed by rinsing in clean water;
- Clean, laboratory prepared sample containers containing the required preservatives were procured from the laboratory prior to field deployment;
- Sample containers were labelled prior to sample collection;
- Samples were placed in the appropriate sample containers for the selected analyses, following CM3 standard operating procedures and MECP protocols (i.e. soil sample for BTEX, PHC F1 analysis methanol preservation in pre-prepared vials); and
- Immediately following collection, all samples were stored in laboratory supplied coolers with the appropriate packing materials (i.e. bubble wrap) and ice packs, pending shipment to the laboratory. All samples were delivered to the laboratory by CM3 personnel on the same day.

All samples collected by CM3 were given unique sample identification and field staff recorded the location and identification of each sample collected using field logs and/or notebooks. Chain of Custody forms were filled out on site and travelled with all samples placed in coolers delivered to the laboratory for analysis. Each Chain of Custody included the following information: CM3 contact information, date sampled, sample matrix, number and type of containers, and requested analyses.

The field sampling program was enhanced by the in-house QA/QC program used by Paracel; a CALA accredited laboratory that uses Ministry of Environment recognized methods to conduct analyses. Paracel employs method blanks, control standard samples, certified reference material standards, method spikes, replicates, duplicates and instrument blanks as part of their internal QA/QC programs. The results of the laboratory QA/QC are reported in the laboratory certificates. If the internal QA/QC criteria are not met, the laboratory either re-analyses the affected samples or qualifies the results.

6 REVIEW AND EVALUATION

6.1 Geology

The site geology was determined based on the borehole drilling and soil logging. Surface materials included asphalt and gravel fills. The overburden soil consisted of fill (sand, gravel) and cobbles/boulders. Clay was present at boreholes MW2, MW3, MW4 and VMW2 between 0.5 m bg and 1.98 m bg. Fractured bedrock was present at 1.27-3.29 m bg. Bedrock logging was not completed as part of the ESA. The site stratigraphy is provided on the borehole logs (**Appendix A**).

6.2 Ground Water: Elevations and Flow Direction

The depth to LPH (if present) and water was measured in monitoring wells MW1 to MW4 on November 9, 2017. LPH was not present in any of the wells. The November 9, 2017 water levels were between 1.38 m bg and 2.25 m bg (97.09-97.96 m ari). The water level elevations are provided on **Table 1**.

The site groundwater flow is inferred to be southwest based on the measured groundwater elevations (**Figure 4**). The groundwater elevations and flow at the site may be influenced by the presence of underground utilities (i.e. storm sewer, gas lines) on the site and along Manotick Main Street and private underground utility services on site.

6.3 Ground Water: Hydraulic Gradients

Horizontal hydraulic gradients were determined based on the November 9, 2017 water levels and inferred groundwater flow direction. The average horizontal hydraulic gradient was approximately 0.02 m/m. Additional water level monitoring has not been completed, and as a result, the net hydraulic gradient may vary with additional data.

All monitoring wells were screened at approximately the same depth interval within the shallow overburden/bedrock so vertical hydraulic gradients at the site could not be determined. It is inferred that the observed water levels at the site are within an unconfined overburden-fractured bedrock aquifer. Additional (multi-level) monitoring wells would be required to determine the vertical gradients at the site.

6.4 Fine-Medium Soil Texture

Soil grain size analyses were not conducted as part of the investigation. The soil texture was conservatively considered to be coarse grained for the evaluation of soil analytical results in comparison to MECP SCS.

6.5 Soil Field Screening

A total of 14 soil samples were collected from the boreholes MW1 through MW4 for field screening and combustible vapour analysis. Sample MW2 SA5, collected from borehole MW2 at a depth of 2.89-3.29 m bg, showed a combustible vapour concentration of 5 parts per million (ppm). All other

soil samples collected as part of the ESA showed vapour concentrations of 0 ppm (i.e. not detected). The non-detectable vapour concentrations confirmed the field observations of no olfactory evidence of petroleum hydrocarbon contamination. The soil combustible vapour concentrations are included on the borehole logs (**Appendix A**).

6.6 Soil Quality

Soil samples MW1 SA1, MW2 SA5, MW3 SA5 MW4 SA1 and MW4 SA2 were submitted for laboratory analysis of VOCs and PHCs. Sample MW3 SA5 was also analysed for metals and sample MW4 SA1 was analysed for PAHs. The soil sample analytical results are summarized in **Table 2**. The borehole soil sample locations and soil quality are provided on **Figure 5**. The soil sample laboratory reports are provided in **Appendix B**.

VOCs and PHCs F1-F4 Fractions

VOCs and PHCs F1-F4 fractions were not detected in any of the analysed soil samples. The non-detect results met the MECP Table 7 SCS.

PAHs

Soil sample MW4 SA1 showed the presence of several PAHs, at concentrations below the MECP Table 7 SCS.

Metals

Soil sample MW3 SA5 showed the presence of several metals, at concentrations below the MECP Table 7 SCS.

6.7 Ground Water Quality

Groundwater samples MW1, MW2, MW3 and MW4 were collected on November 9, 2017 for laboratory analysis of VOCs and PHCs F1-F4 fractions. Sample MW3 was also analysed for metals and PAHs. The groundwater sample analytical results are summarized in **Table 3**. The monitoring well locations and groundwater quality are provided on **Figure 6**. The groundwater sample laboratory reports are provided in **Appendix B**.

VOCs and PHCs F1-F4 Fractions

Groundwater sample MW1 and MW2 showed the presence of cis-1,2 dichloroethylene and trichloroethylene, at concentrations above the MECP Table 7 SCS. MW2 also showed a tetrachloroethylene above the Table 7 SCS. The remaining VOCs were either present at low concentrations or not detected in the above samples and samples MW3 and MW4, meeting the applicable SCS.

PHCs F1-F4 fractions were not detected in any of the analysed groundwater samples, meeting the MECP Table 7 SCS.

PAHs

PAHs were not detected in any of the analysed samples. The non-detect results met the MECP Table 7 SCS.

Metals

Groundwater sample MW3 showed the presence of several metals, at concentrations below the MECP Table 7 SCS.

6.8 Soil Vapour Quality

Soil vapour samples were collected from VM1 and VM2 on January 9, 2018 for laboratory analysis of cis-1,2 dichloroethylene, tetrachloroethylene and trichloroethylene. Sample VM2 showed the presence of tetrachloroethylene at 6.2 µg/m³ and trichloroethylene at 0.45 µg/m³. Cis-1,2 dichloroethylene was not detected in sample VM2 and none of the parameters were detected in sample VM1. The laboratory results met the MECP AAQC for analysed parameters. The soil vapour sample analytical results are summarized in **Table 4**. The vapour well locations are provided on **Figure 3**. The soil vapour sample laboratory reports are provided in **Appendix B**.

6.9 Quality Assurance and Quality Control Results

6.9.1 Soil Sample QA/QC

The analytical laboratory (Paracel) used an internal QA/QC sample program for all analysis including method control blanks, duplicates and spikes. The results of this QA/QC program are provided in the analytical reports in **Appendix B**. In general, the Relative Percent Difference (RPD) and Percent Recovery (%REC) were within acceptable limits with a few minor exceptions that were easily rationalized by the lab, thus ensuring the quality of the data.

6.9.2 Groundwater Sample QA/QC

The analytical laboratory (Paracel) used an internal QA/QC sample program for all analysis including method control blanks, duplicates and spikes. The results of this QA/QC program are provided in the analytical reports in **Appendix B**. In general, the Relative Percent Difference (RPD) and Percent Recovery (%REC) were within acceptable limits with a few minor exceptions that were easily rationalized, thus ensuring the quality of the data.

6.10 Phase II Conceptual Site Model

6.10.1 PCAs, APECs and Utilities

Potentially contaminating activities have occurred to the northeast, southwest and southeast of the subject property. The PCAs included former gas stations, automotive repair garages, and a former dry cleaner. All the above PCAs were considered areas of potential environmental concern and the contaminants of concern were identified as VOCs, PHCs F1-F4, PCE and TCE. No PCAs or APECs were identified on the subject property.

Contamination of the subject property, if present, was determined to a result of contaminant migration in groundwater from the off-site APECs. Underground utilities that may affect the contaminant migration and distribution included municipal water and storm/sanitary sewers along Manotick Main Street and private underground services on the subject property and at neighbouring properties.

6.10.2 Physical Setting

The stratigraphy at the site consisted of fill (sand, gravel), cobbles/boulders and clay, underlain by fractured bedrock at 1.27-3.29 m bg. The maximum depth of the investigation was 5.7 m bg, within the inferred shallow unconfined overburden-fractured bedrock aquifer. The depth to groundwater was 1.38- 2.25 m bg. The inferred groundwater flow direction at the site was southwest and the average horizontal gradient was approximately 0.02 m/m. Vertical gradients could not be determined because all monitoring wells were screened at approximately the same depth interval within the shallow aquifer.

6.10.3 Distribution of Contamination

Soil

This Phase II ESA did not identify any soil impacts (i.e. concentrations above applicable SCS) at the subject property. Contaminants of concern were either not detected or were present at concentrations below the applicable MECP Table 7 SCS in all analysed soil samples. The soil quality is provided on **Figure 5**.

Groundwater

Groundwater impacts were identified at two monitoring wells located near the south property boundary. Contaminants present at concentrations above the MECP Table 7 SCS included cis-1,2 dichloroethylene, trichloroethylene and/or tetrachloroethylene. All other contaminants of concern were either not detected or were present at concentrations below the applicable SCS in the analysed samples. The maximum concentrations of the COC in are provided in the tables section of the report. The groundwater quality is provided on **Figure 5**.

The groundwater impacts identified at the subject property are likely a result of migration from the APEC identified as a former dry cleaner at 5545 Manotick Main, located southeast of the site. Groundwater impacts related to the former dry cleaners in the Village of Manotick have been documented in previous investigations.

Soil Vapours

Soil vapour sampling did not identify any potential air quality concerns. All vapour sample met the MECP Ontario's Ambient Air Quality Criteria for all analysed parameters.

6.10.4 Contamination and Exposure

The release mechanism for the VOCs impacts at the subject property is likely the former dry cleaner to the southeast of the site and contaminant transport was likely due to migration in groundwater. No human or ecological receptors were located on the subject property. Exposure to the contaminants is limited to direct exposure or ingestion of groundwater and is currently unlikely due to the site conditions. The potential for human exposure may increase during any construction activities below grade (excavation). Human exposure by indoor air may be a pathway in future development depending on the construction of the building

7 CONCLUSIONS

CM3 Environmental Inc. was retained by Royal LePage Team Realty to conduct a Phase II environmental site assessment at 5536 Manotick Main Street, Manotick, Ontario. The Phase II ESA was undertaken in support of a real estate transaction. The purpose of the ESA was to assess the presence of soil and/or groundwater contamination at the site. The results of the assessment and sampling are summarized as follows:

- Visual and/or olfactory evidence of obvious contamination was not noted in the soils during the environmental drilling of four boreholes completed as monitoring wells;
- Soil analytical results showed that all five samples submitted for laboratory analysis met the applicable MECP Table 7 Standards for VOCs, PHCs, PAHs and metals;
- The depth to groundwater was between 1.38 m to 2.25 m below grade;
- Groundwater analytical results showed that concentrations of cis-1,2 dichloroethylene, trichloroethylene and/or tetrachloroethylene exceeded the MECP Table 7 SCS in samples MW1 and MW2. All other analysed samples met the applicable SCS for all parameters; and
- Soil vapour analytical results showed that the two samples submitted for analysis met the MECP AAQC for the analysed parameters.

The Phase II ESA indicated that concentrations of contaminants of concern (if detected) in soil met the applicable MECP Table 7 SCS and the results of the soil vapour sampling met the MECP AAQC. The groundwater sampling results showed concentrations of cis-1,2 dichloroethylene, trichloroethylene and/or tetrachloroethylene exceeding the MECP Table 7 SCS in groundwater samples from wells MW1 and MW2, located near the south property boundary. The groundwater impacts are likely a result of historic contamination related to a former dry cleaner in the village of Manotick.

CM3 recommends a site-specific risk assessment to address the impacts at the site. Should the removal of soil be required from site for construction purposes, additional assessment work may be necessary to qualify the soil disposal.

7.1 Signatures

The Phase II ESA was completed by the undersigned. All work completed as part of the Phase II ESA including field activities, review and interpretation of the data and preparation of the report was conducted either by a qualified person or under supervision of a qualified person.

We trust that the above is satisfactory for your purposes at this time. Please feel free to contact the undersigned if you have any questions.

Yours sincerely,

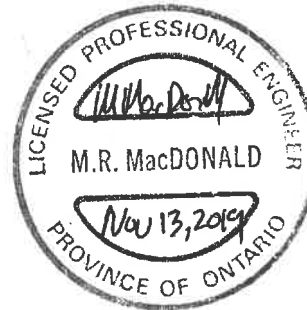
CM3 Environmental Inc.



Kris Snider
Environmental Consultant



Marc MacDonald, P.Eng, QP, EP
Principal



7.2 Statement of Limitations

This report has been prepared and the work referred to in this report has been undertaken by CM3 Environmental Inc. for Royal LePage Team Realty. It is intended for the sole and exclusive use of Royal LePage Team Realty, affiliated companies and partners and their respective insurers, agents, employees and advisors. Any use, reliance on, or decision made by any person other than Royal LePage Team Realty based on this report is the sole responsibility of such other person. Royal LePage Team Realty and CM3 Environmental Inc. make no representation or warranty to any other person with regard to this report and the work referred to in this report, and they accept no duty of care to any other person or any liability or responsibility whatsoever for any losses, expenses, damages, fines, penalties or other harm that may be suffered or incurred by any other person as a result of the use of, reliance on, any decision made or any action taken based on this report or the work referred to in this report.

The investigation undertaken by CM3 Environmental Inc. with respect to this report and any conclusions or recommendations made in this report reflect CM3 Environmental Inc.'s judgement based on the site conditions observed at the time of the site inspection on the date(s) set out in this report and on information available at the time of preparation of this report. This report has been prepared for specific application to this site and it is based, in part, upon visual observation of the site, subsurface investigation at discrete locations and depths, and specific analysis of specific chemical parameters and materials during a specific time interval, all as described in this report. Unless otherwise stated, the findings cannot be extended to previous or future site conditions, portions of the site which were unavailable for direct investigation, subsurface locations which were not investigated directly, or chemical parameters, materials or analysis which were not addressed. Substances other than those addressed by the investigation described in this report may exist within the site, substances addressed by the investigation may exist in areas of the site not investigated and concentrations of substances addressed which are different than those reported may exist in areas other than the location from which samples were taken.

As the evaluation and conclusions reported herein do not preclude the existence of other chemical compounds and/or that variations of conditions within the site may be possible, this report should be used for informational purposes only and should absolutely not be construed as a comprehensive hydrogeological or chemical characterization of the site. If site conditions change or if any additional information becomes available at a future date, modifications to the findings, conclusions and recommendations in this report may be necessary.

Other than by Royal LePage Team Realty, copying or distribution of this report or use of or reliance on the information contained herein, in whole or in part, is not permitted without the express written permission of CM3 Environmental Inc. Nothing in this report is intended to constitute or provide a legal opinion.

8 REFERENCES

Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Ontario Ministry of Environment, April 15, 2011, PIBS#7382e01;

Guide for Completing Phase Two Site Assessments under Ontario Regulation 153/04, Ontario Ministry of Environment, June 2011;

Guide for Completing Phase One Site Assessments under Ontario Regulation 153/04, Ontario Ministry of Environment, June 2011; and

Guidance for Environmental Site Assessments under Ontario Regulation 153/04 (as amended), Association of Professional Geoscientists of Ontario, April 2011.

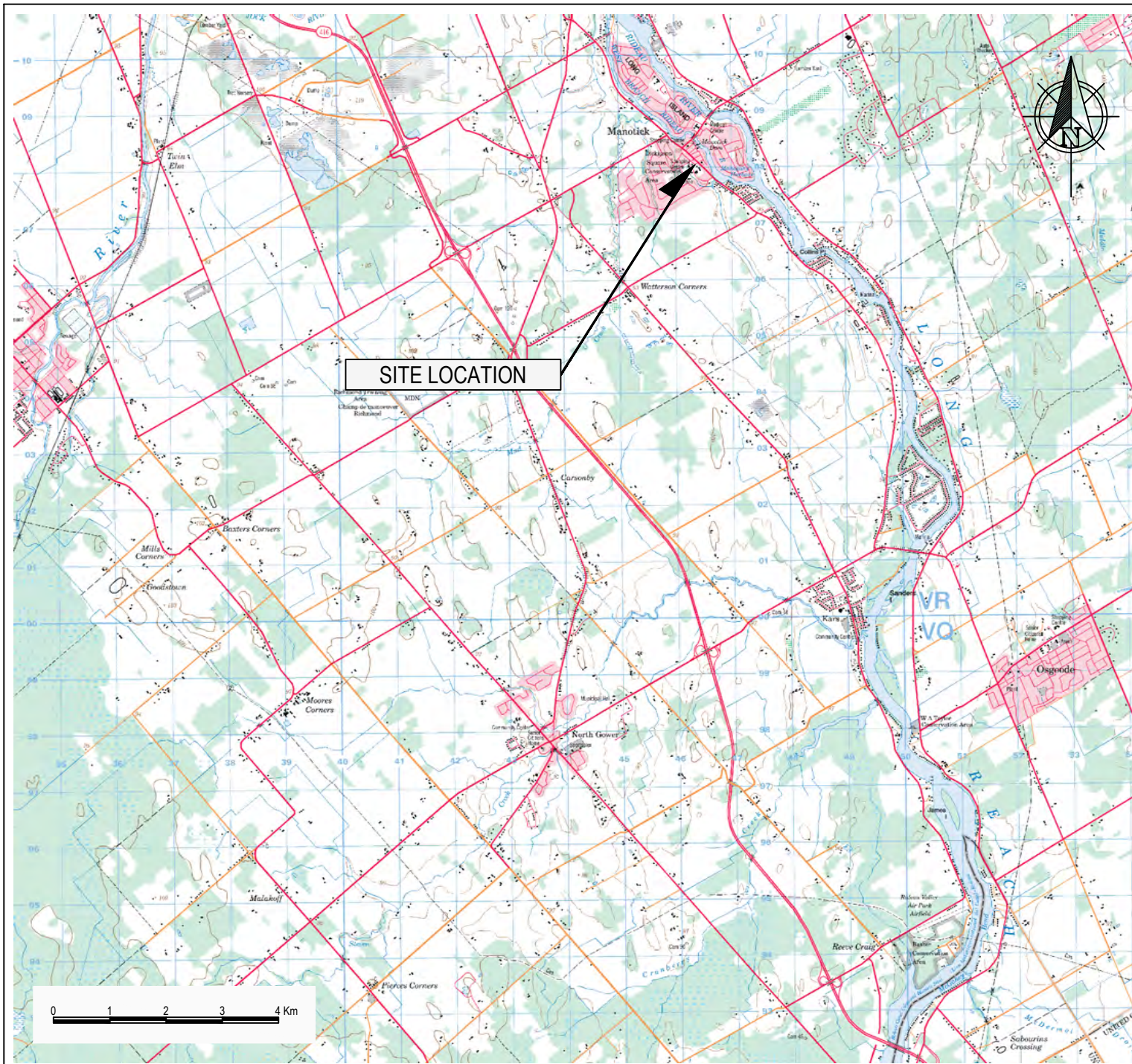
FIGURES

Phase II Environmental Site Assessment

5536 Manotick Main Street Manotick, Ontario Client

Royal LePage Team Realty

MM2103



CM3 ENVIRONMENTAL
5710 AKINS ROAD, OTTAWA, ON
K2S 1B8

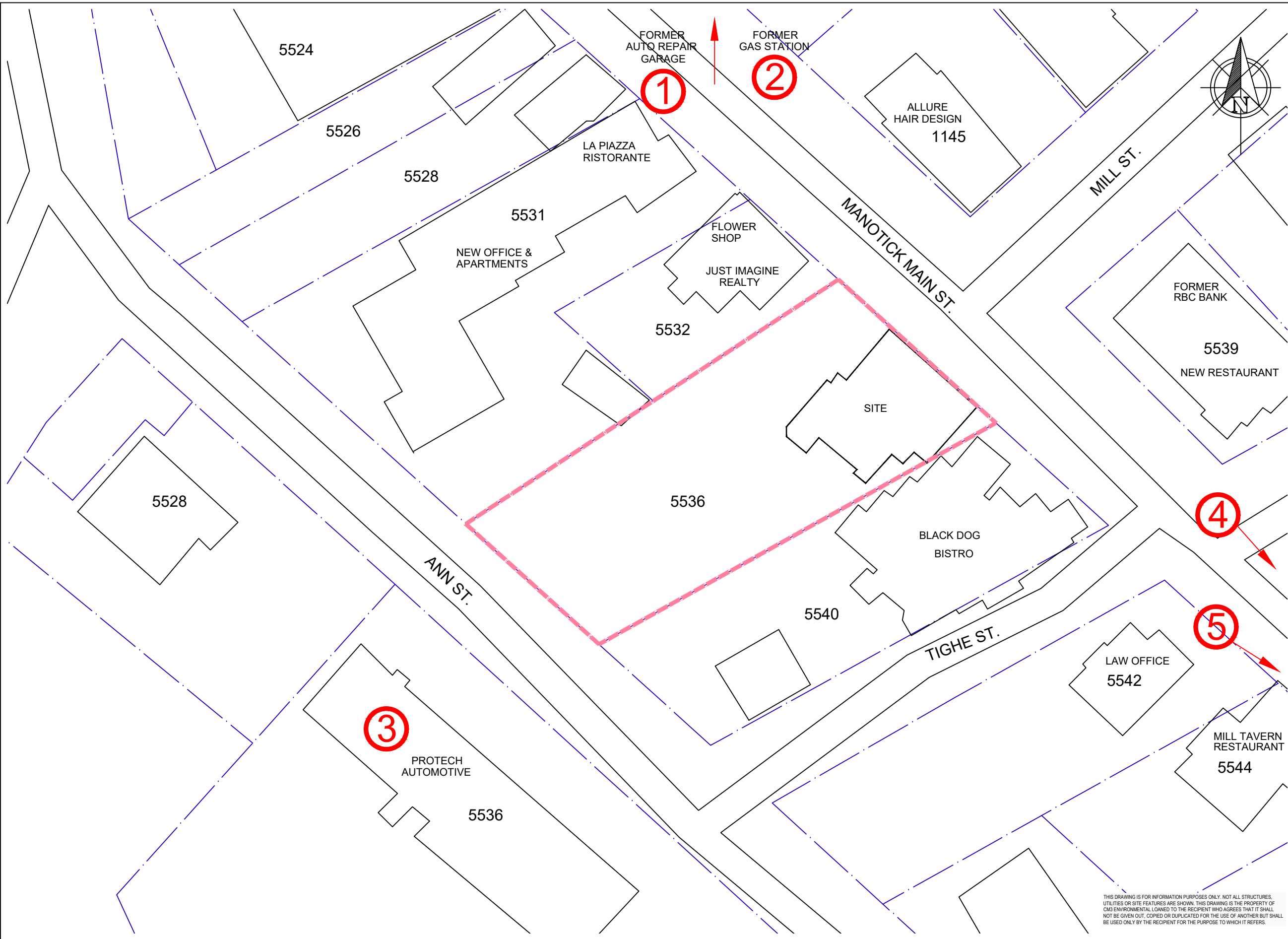


ROYAL LEPAGE TEAM REALTY

PHASE II ENVIRONMENTAL SITE
ASSESSMENT
5536 MANOTICK MAIN STREET
OTTAWA, ON

SITE LOCATION

Project:	MM2103	Drawn By:	CL
Date:	NOV 2019	Reviewed By:	MM
Scale:	AS SHOWN	Figure:	1



LEGEND

— PROPERTY BOUNDARY (APPROX.)
[Pink outline] SUBJECT PROPERTY
[Black outline] RESIDENCE/BUILDING

AREAS OF POTENTIAL ENVIRONMENTAL CONCERN

① FORMER AUTOMOTIVE GARAGE
② FORMER GAS STATION
③ ACTIVE AUTOMOTIVE GARAGE
④ FORMER DRY CLEANER
⑤ ACTIVE AUTOMOTIVE GARAGE

Scale 1:500
0 5 10 15 20
(Approx. When plotted 11x17)

CM3 ENVIRONMENTAL
5710 AKINS ROAD, OTTAWA, ON
K2S 1B8

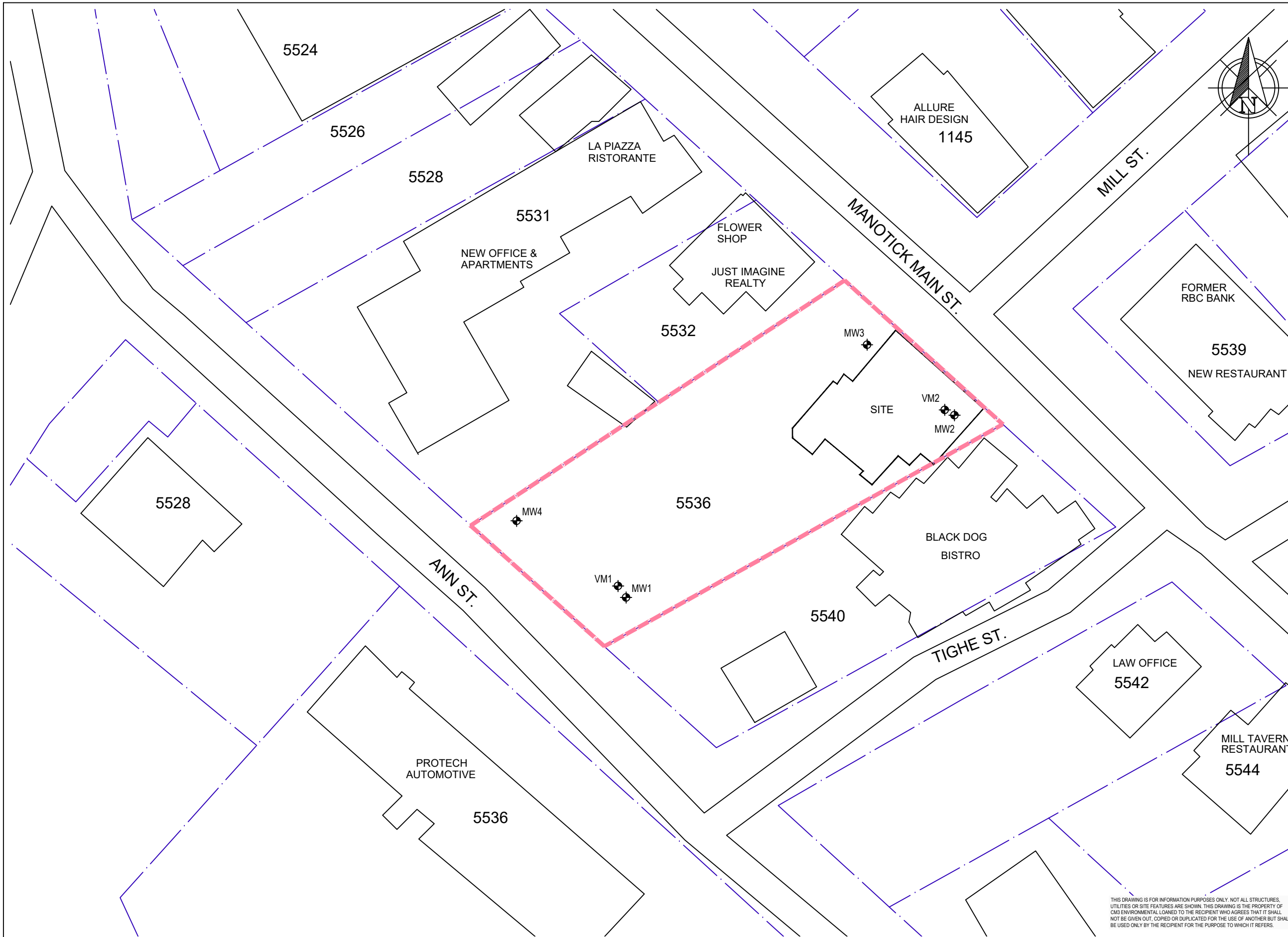
ROYAL LEPAGE TEAM REALTY

PHASE II ENVIRONMENTAL SITE ASSESSMENT
5536 MANOTICK MAIN STREET
OTTAWA, ON

SITE PLAN

Project:	MM2103	Drawn By:	CL
Date:	NOV 2019	Reviewed By:	MM
Scale:	1:500	Figure:	2

THIS DRAWING IS FOR INFORMATION PURPOSES ONLY. NOT ALL STRUCTURES, UTILITIES OR SITE FEATURES ARE SHOWN. THIS DRAWING IS THE PROPERTY OF CM3 ENVIRONMENTAL LOANED TO THE RECIPIENT WHO AGREES THAT IT SHALL NOT BE GIVEN OUT, COPIED OR DUPLICATED FOR THE USE OF ANOTHER BUT SHALL BE USED ONLY BY THE RECIPIENT FOR THE PURPOSE TO WHICH IT REFERS.



LEGEND

- PROPERTY BOUNDARY (APPROX.)
- SUBJECT PROPERTY
- RESIDENCE/BUILDING
- BOREHOLE
- MONITORING WELL

Scale 1:500

(Approx. When plotted 11x17)



CM3 ENVIRONMENTAL
5710 AKINS ROAD, OTTAWA, ON
K2S 1B8



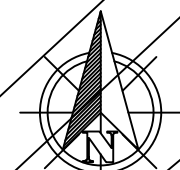
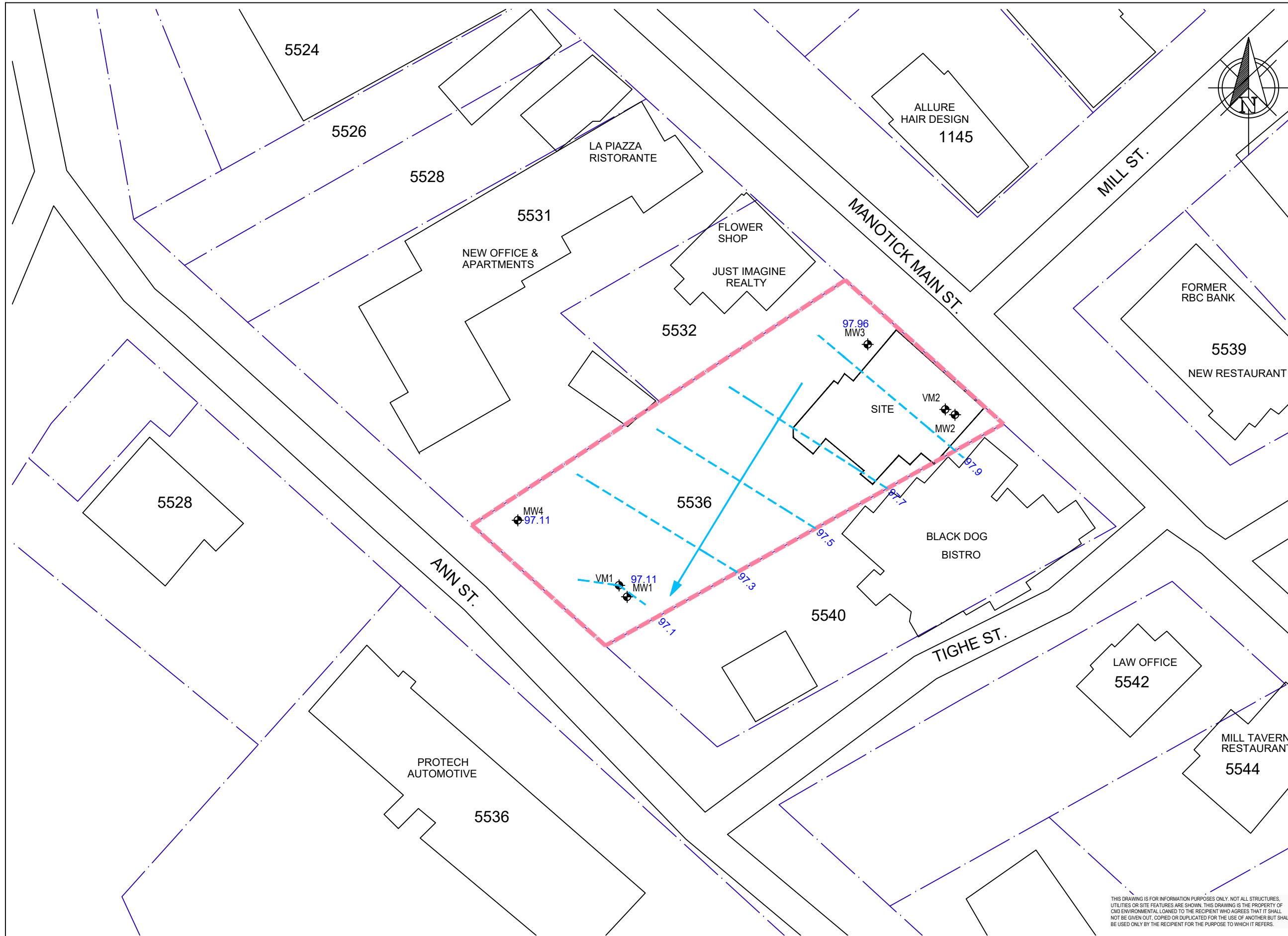
ROYAL LEPAGE TEAM REALTY

PHASE II ENVIRONMENTAL SITE
ASSESSMENT
5536 MANOTICK MAIN STREET
OTTAWA, ON

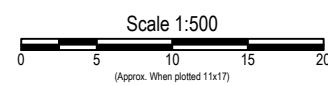
BOREHOLE AND MONITORING WELL
LOCATIONS

Project:	MM2103	Drawn By:	CL
Date:	NOV 2019	Reviewed By:	MM
Scale:	1:500	Figure:	3

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- LEGEND**
- PROPERTY BOUNDARY (APPROX.)
 - SUBJECT PROPERTY
 - RESIDENCE/BUILDING
 - BOREHOLE
 - MONITORING WELL
 - GROUNDWATER ELEVATION (m.a.r.l)
 - INFERRED GROUNDWATER ELEVATION CONTOUR
 - INFERRED GROUNDWATER FLOW DIRECTION



CM3 ENVIRONMENTAL
5710 AKINS ROAD, OTTAWA, ON
K2S 1B8



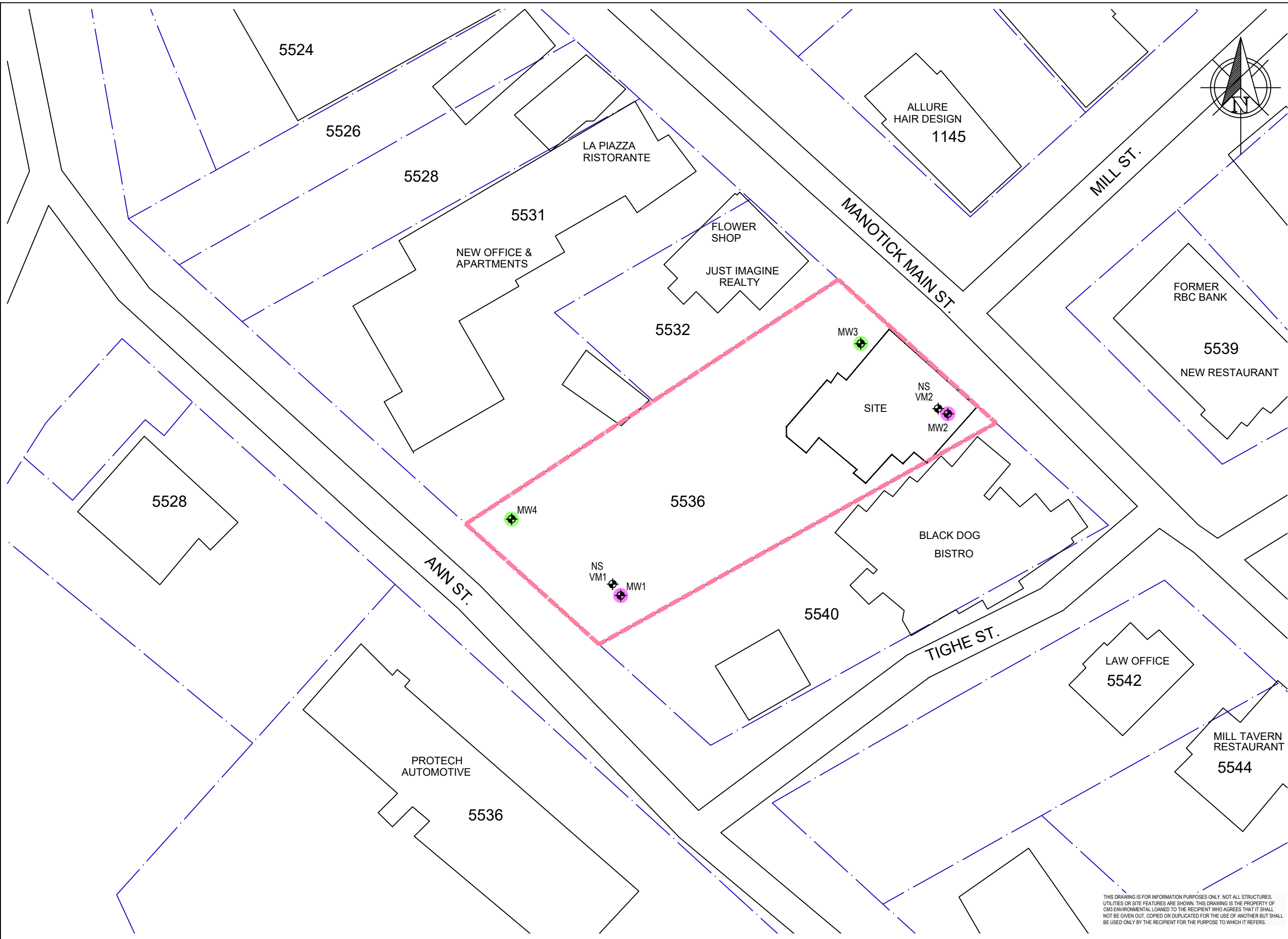
ROYAL LEPAGE TEAM REALTY

PHASE II ENVIRONMENTAL SITE
ASSESSMENT
5536 MANOTICK MAIN STREET
OTTAWA, ON

GROUNDWATER ELEVATIONS
NOVEMBER 9, 2017

Project:	MM2103	Drawn By:	CL
Date:	NOV 2019	Reviewed By:	MM
Scale:	1:500	Figure:	4

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LEGEND

- PROPERTY BOUNDARY (APPROX.)
- SUBJECT PROPERTY
- RESIDENCE/BUILDING
- BOREHOLE
- MONITORING WELL
- LPH OR HYDROCARBON SHEEN

GROUNDWATER SAMPLES ANALYSED*:

- COCs NOT DETECTED OR < MECP TABLE 7 SCS
- ONE OR MORE COC > MECP TABLE 7 SCS
- NS NOT SAMPLED

* - REFER TO TABLE 3 FOR SAMPLING DATES AND FULL RESULTS

Scale 1:500

0 5 10 15 20

(Approx. When plotted 11x17)



CM3 ENVIRONMENTAL
5710 AKINS ROAD, OTTAWA, ON
K2S 1B8



ROYAL LEPAGE TEAM REALTY

PHASE II ENVIRONMENTAL SITE ASSESSMENT
5536 MANOTICK MAIN STREET
OTTAWA, ON

GROUNDWATER QUALITY

Project:	MM2103	Drawn By:	CL
Date:	OCT 2019	Reviewed By:	MM
Scale:	1:500	Figure:	6

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TABLES

Phase II Environmental Site Assessment

5536 Manotick Main Street Manotick, Ontario Client

Royal LePage Team Realty

MM2103

**Table 1:
Groundwater Level Measurements
5536 Manotick Main Street
MM2103**

Well ID	Date	TOC (marl)	Depth to		Elevation		Comments
			LPH (mbtoc)	GW (mbtoc)	LPH (marl)	GW (marl)	
MW1	9-Nov-17	99.386	--	2.300	--	97.086	
MW2	9-Nov-17	100.696	--	2.735	--	97.961	
MW3	9-Nov-17	100.000	--	2.037	--	97.963	
MW4	9-Nov-17	98.454	--	1.342	--	97.112	

Notes:

TOC - top of casing
 marl - metres above arbitrary reference level
 mbtoc - metres below top of casing
 LPH - liquid phase hydrocarbons
 GW - groundwater
 Corr. GW - corrected water level calculated for monitoring wells containing LPH,
 assuming an LPH density of 0.86 g/ml
 NM - not measured
 -- - no value/LPH not present

Table 2:
Summary of Soil Analytical Results
5536 Manotick Main Street
MM2103

Parameter date>	MECP Table 7 SCS	MDL	MW1 SA1 31-Oct-17	MW2 SA5 31-Oct-17	MW3 SA5 1-Nov-17	MW4 SA1 1-Nov-17	MW4 SA2 1-Nov-17
BTEX							
Benzene	0.32	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Ethylbenzene	9.5	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Toluene	68	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
m/p-Xylene	NV	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
o-Xylene	NV	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylenes, total	26	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
PHCs F1-F4 Fractions							
F1 PHCs (C6-C10)	55	7	<7	<7	<7	<7	<7
F2 PHCs (C10-C16)	230	4	<4	<4	<4	<4	<4
F3 PHCs (C16-C34)	1700	8	<8	<8	<8	<8	<8
F4 PHCs (C34-C50)	3300	6	<6	<6	<6	<6	<6
PAHs							
Acenaphthene	96	0.02	-	-	-	<0.02	-
Acenaphthylene	0.15	0.02	-	-	-	<0.02	-
Anthracene	0.67	0.02	-	-	-	<0.02	-
Benzo[a]anthracene	0.96	0.02	-	-	-	0.04	-
Benzo[a]pyrene	0.3	0.02	-	-	-	0.06	-
Benzo[b]fluoranthene	0.96	0.02	-	-	-	0.04	-
Benzo[g,h,i]perylene	9.6	0.02	-	-	-	0.04	-
Benzo[k]fluoranthene	0.96	0.02	-	-	-	0.03	-
Chrysene	9.6	0.02	-	-	-	0.04	-
Dibenzo[a,h]anthracene	0.1	0.02	-	-	-	<0.02	-
Fluoranthene	9.6	0.02	-	-	-	0.1	-
Fluorene	62	0.02	-	-	-	<0.02	-
Indeno[1,2,3-cd]pyrene	0.76	0.02	-	-	-	0.04	-
1-Methylnaphthalene	76	0.02	-	-	-	<0.02	-
2-Methylnaphthalene	76	0.02	-	-	-	<0.02	-
Methylnaphthalene (1&2)	76	0.04	-	-	-	<0.04	-
Naphthalene	9.6	0.01	-	-	-	<0.01	-
Phenanthrene	12	0.02	-	-	-	0.04	-
Pyrene	96	0.02	-	-	-	0.09	-
Metals							
Boron, available	2	0.5	-	-	<0.5	-	-
Chromium (VI)	8	0.2	-	-	<0.2	-	-
Mercury	3.9	0.1	-	-	<0.1	-	-
Antimony	40	1.0	-	-	<1.0	-	-
Arsenic	18	1.0	-	-	6.7	-	-
Barium	670	1.0	-	-	119	-	-
Beryllium	8	1.0	-	-	<0.1	-	-
Boron	120	1.0	-	-	8.5	-	-
Cadmium	1.9	0.5	-	-	<0.5	-	-
Chromium	160	1.0	-	-	36	-	-
Cobalt	80	1.0	-	-	13.8	-	-
Copper	230	1.0	-	-	25.4	-	-
Lead	120	1.0	-	-	22.2	-	-
Molybdenum	40	1.0	-	-	3.2	-	-
Nickel	270	1.0	-	-	20.8	-	-
Selenium	5.5	1.0	-	-	<1.0	-	-
Silver	40	0.5	-	-	<0.5	-	-
Thallium	3.3	1.0	-	-	<1.0	-	-
Uranium	33	1.0	-	-	<1.0	-	-
Vanadium	86	1.0	-	-	60.5	-	-
Zinc	340	1.0	-	-	47.4	-	-

**Table 2:
Summary of Soil Analytical Results
5536 Manotick Main Street
MM2103**

Parameter date>	MECP Table 7 SCS	MDL	MW1 SA1 31-Oct-17	MW2 SA5 31-Oct-17	MW3 SA5 1-Nov-17	MW4 SA1 1-Nov-17	MW4 SA2 1-Nov-17
VOCs							
Acetone	16	0.5	<0.50	<0.50	<0.50	<0.50	<0.50
Bromodichloromethane	18	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Bromoform	0.61	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Bromomethane	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Carbon Tetrachloride	0.21	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chlorobenzene	2.4	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chloroform	0.47	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibromochloromethane	13	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dichlorodifluoromethane	16	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dichlorobenzene	6.8	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichlorobenzene	9.6	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,4-Dichlorobenzene	0.2	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1-Dichloroethane	17	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dichloroethane	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1-Dichloroethylene	0.064	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
cis-1,2-Dichloroethylene	55	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
trans-1,2-Dichloroethylene	1.3	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,2-Dichloropropane	0.16	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
cis-1,3-Dichloropropylene	NV	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
trans-1,3-Dichloropropylene	NV	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3-Dichloropropene, total	0.18	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylene dibromide (dibromoethane)	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Hexane	46	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl Ethyl Ketone (2-Butanone)	70	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Methyl Isobutyl Ketone	31	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Methyl tert-butyl ether	11	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methylene Chloride	1.6	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Styrene	34	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,1,2-Tetrachloroethane	0.087	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,2,2-Tetrachloroethane	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Tetrachloroethylene	4.5	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,1-Trichloroethane	6.1	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,1,2-Trichloroethane	0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trichloroethylene	0.91	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trichlorofluoromethane	4	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Vinyl Chloride	0.032	0.02	<0.02	<0.02	<0.02	<0.02	<0.02

Notes:

ppm - All concentrations provided in parts per million (ppm or micrograms per gram - µg/g)

MDL - Method detection limit

< - Less than detection limits indicated (refer to laboratory report)

NV - No standard listed

- - Not Analyzed

MECP Table 7 - Standards from the Ontario Ministry of Environment, Conservation and Parks (MECP)

Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the EPA (April 15, 2011)

MECP Table 7 commercial property use for shallow soils in a non-potable groundwater condition, coarse grained soil

Bold / Italics - Concentration exceeds MECP Table 7 Standards

Table 3:
Summary of Groundwater Analytical Results
5536 Manotick Main Street
MM2103

Parameter date>	MECP Table 7 SCS	MDL	MW1 9-Nov-17	MW2 9-Nov-17	MW3 9-Nov-17	MW4 9-Nov-17
BTEX						
Benzene	0.32	0.02	<0.02	<0.02	<0.02	<0.02
Ethylbenzene	9.5	0.05	<0.05	<0.05	<0.05	<0.05
Toluene	68	0.05	<0.05	<0.05	<0.05	<0.05
m/p-Xylene	NV	0.05	<0.05	<0.05	<0.05	<0.05
o-Xylene	NV	0.05	<0.05	<0.05	<0.05	<0.05
Xylenes, total	26	0.05	<0.05	<0.05	<0.05	<0.05
PHCs F1-F4 Fractions						
F1 PHCs (C6-C10)	420	25	<25	<25	<25	<25
F2 PHCs (C10-C16)	150	100	<100	<100	<100	<100
F3 PHCs (C16-C34)	500	100	<100	<100	<100	<100
F4 PHCs (C34-C50)	500	100	<100	<100	<100	<100
PAHs						
Acenaphthene	17	0.02	-	-	<0.05	-
Acenaphthylene	1	0.02	-	-	<0.05	-
Anthracene	1	0.02	-	-	<0.01	-
Benzo[a]anthracene	1.8	0.02	-	-	<0.01	-
Benzo[a]pyrene	0.81	0.02	-	-	<0.01	-
Benzo[b]fluoranthene	0.75	0.02	-	-	<0.05	-
Benzo[g,h,i]perylene	0.2	0.02	-	-	<0.05	-
Benzo[k]fluoranthene	0.4	0.02	-	-	<0.05	-
Chrysene	0.7	0.02	-	-	<0.05	-
Dibenzo[a,h]anthracene	0.4	0.02	-	-	<0.05	-
Fluoranthene	44	0.02	-	-	<0.01	-
Fluorene	290	0.02	-	-	<0.05	-
Indeno[1,2,3-cd]pyrene	0.2	0.02	-	-	<0.05	-
1-Methylnaphthalene	1500	0.02	-	-	<0.05	-
2-Methylnaphthalene	1500	0.02	-	-	<0.05	-
Methylnaphthalene (1&2)	1500	0.04	-	-	<0.10	-
Naphthalene	7	0.01	-	-	<0.05	-
Phenanthrene	380	0.02	-	-	<0.05	-
Pyrene	5.7	0.02	-	-	<0.01	-
Metals						
Antimony	16000	0.5	-	-	<0.5	-
Arsenic	1500	1	-	-	<1	-
Barium	23000	1	-	-	120	-
Beryllium	53	0.5	-	-	<0.5	-
Boron	36000	10	-	-	155	-
Cadmium	2.1	0.1	-	-	<0.1	-
Chromium	640	1	-	-	<1	-
Cobalt	52	0.5	-	-	1.1	-
Copper	69	0.5	-	-	3.3	-
Lead	20	0.1	-	-	<0.1	-
Molybdenum	7300	0.5	-	-	2.6	-
Nickel	390	1	-	-	6	-
Selenium	50	1	-	-	<1	-
Silver	1.2	0.1	-	-	<0.1	-
Sodium	1800000	200	-	-	925000	-
Thallium	400	0.1	-	-	0.2	-
Uranium	330	0.1	-	-	7.3	-
Vanadium	200	0.5	-	-	<0.5	-
Zinc	890	5	-	-	6	-

Table 3:
Summary of Groundwater Analytical Results
5536 Manotick Main Street
MM2103

Parameter date>	MECP Table 7 SCS	MDL	MW1 9-Nov-17	MW2 9-Nov-17	MW3 9-Nov-17	MW4 9-Nov-17
VOCs						
Acetone	100000	5.0	<5.0	<5.0	<5.0	<5.0
Bromodichloromethane	67000	0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	5	0.5	<0.5	<0.5	<0.5	<0.5
Bromomethane	0.89	0.5	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	0.2	0.2	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	140	0.5	<0.5	<0.5	<0.5	<0.5
Chloroform	2	0.5	<0.5	1.5	<0.5	<0.5
Dibromochloromethane	65000	0.5	<0.5	<0.5	<0.5	<0.5
Dichlorodifluoromethane	3500	1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	150	0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	7600	0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	0.5	0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	11	0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	0.5	0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethylene	0.5	0.5	<0.5	<0.5	<0.5	<0.5
cis-1,2-Dichloroethylene	1.6	0.5	6.5	6.4	<0.5	<0.5
trans-1,2-Dichloroethylene	1.6	0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	0.58	0.5	<0.5	<0.5	<0.5	<0.5
cis-1,3-Dichloropropylene	NV	0.5	<0.5	<0.5	<0.5	<0.5
trans-1,3-Dichloropropylene	NV	0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene, total	0.5	0.5	<0.5	<0.5	<0.5	<0.5
Ethylene dibromide (dibromoethane)	0.2	0.2	<0.2	<0.2	<0.2	<0.2
Hexane	5	1.0	<1.0	<1.0	<1.0	<1.0
Methyl Ethyl Ketone (2-Butanone)	21000	5.0	<5.0	<5.0	<5.0	<5.0
Methyl Isobutyl Ketone	5200	5.0	<5.0	<5.0	<5.0	<5.0
Methyl tert-butyl ether	15	2.0	<2.0	<2.0	<2.0	<2.0
Methylene Chloride	26	5.0	<5.0	<5.0	<5.0	<5.0
Styrene	43	0.5	<0.5	<0.5	<0.5	<0.5
1,1,1,2-Tetrachloroethane	1.1	0.5	<0.5	<0.5	<0.5	<0.5
1,1,2,2-Tetrachloroethane	0.5	0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	0.5	0.5	<0.5	33.7	<0.5	<0.5
1,1,1-Trichloroethane	23	0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	0.5	0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	0.5	0.5	2.1	4.0	<0.5	<0.5
Trichlorofluoromethane	2000	1.0	<1.0	<1.0	<1.0	<1.0
Vinyl Chloride	0.5	0.5	<0.5	<0.5	<0.5	<0.5

Notes:

ppm - All concentrations provided in parts per million (ppm or micrograms per gram - µg/g)

MDL - Method detection limit

< - Less than detection limits indicated (refer to laboratory report)

NV - No standard listed

- - Not Analyzed

MECP Table 7 - Standards from the Ontario Ministry of Environment, Conservation and Parks (MECP)

Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the EPA (April 15, 2011)

MECP Table 7 commercial property use for shallow soils in a non-potable groundwater condition, coarse grained soil

Bold / Italics - Concentration exceeds MECP Table 7 Standards

Table 4:
Summary of Soil Vapour Analytical Results
5536 Manotick Main Street
MM2103

Parameter	AAQC	MDL	VM1	VM2
date>			9-Jan-18	9-Jan-18
TVOC				
cis-1,2-Dichloroethylene	105	0.5	<0.5	<0.5
Tetrachloroethylene	NV	2.5	<2.5	6.2
Trichloroethylene	12	0.25	<0.25	0.45

Notes:

µg/m³ - All concentrations provided in micrograms per cubic meter

MDL - Method detection limit

< - Less than detection limits indicated (refer to laboratory report)

NV - No standard listed

AAQC - Ontario Ministry of Environment, Conservation and Parks (MECP)

Ambient Air Quality Criteria, 24 hour exposure limit, 2012

Bold / Italics - Concentration exceeds AAQC Standards

APPENDIX A

BOREHOLE LOGS

Phase II Environmental Site Assessment

5536 Manotick Main Street Manotick, Ontario Client

Royal LePage Team Realty

MM2103

BOREHOLE LOG

BOREHOLE NO: MW1

SURFACE ELEVATION: 98.47 m

CM³ JOB NO: MM2103

DEPTH (m)	SAMPLE TYPE	SAMPLE ID	SPT COUNT	SOIL TYPE	SOIL DESCRIPTION	FIELD TEST DATA				WELL COMPLETION	WATER LEVEL	WELL COMPLETION NOTES	ELEVATION (m)
						ORGANIC VAPOUR LEVEL (ppmv)							
						1	10	100	1000				
-1												stickup, jplug	-99
0					Ground Surface								
					GRAVEL crushed stone consturction fill, grey, dry								
		SA1			SAND medium to fine sand, brown, moist								
1		SA2			SAND sand with gravel, brown, wet							bentonite seal	
					BEDROCK grey							GW = 1.38 mbg (Nov 9, 2017)	-97
2												32 mm solid PVC pipe	-96
3												silica sand	-95
4												32 mm 010 slot PVC pipe	-94
					End of borehole at 4.70 m								
					Groundwater Information: Depth to groundwater from TOP = 2.30 m (Nov 9, 2017)								


DRILLING METHOD:	Pionjar Portable Drilling
------------------	---------------------------

Notes: SPLIT SPOON


DRILL DATE: 2017 October 31

LOGGED BY: KS


Sheet 1 of 1

					CLIENT: Royal LePage Team Realty PROJECT: Phase II ESA 5536 Manotick Main Street Manotick, Ontario		BOREHOLE LOG BOREHOLE NO: MW2 SURFACE ELEVATION: 100.21 m					
CM³ JOB NO: MM2103					FIELD TEST DATA				WELL COMPLETION	WATER LEVEL	WELL COMPLETION NOTES	ELEVATION (m)
DEPTH (m)	SAMPLE TYPE	SAMPLE ID	SPT COUNT	SOIL TYPE	ORGANIC VAPOUR LEVEL (ppmv)							
					1	10	100	1000				
-1												101
0					Ground Surface							
	SA1			SAND	medium fine sand with trace gravel and clay, brown, dry							100
	SA2			ROCK	boulders and cobbles with trace sand and clay							
1											32 mm solid PVC pipe	99
2	SA3			CLAY	with silt, stiff, brown, wet						bentonite seal	
	SA4										GW = 2.25 mbg (Nov 9, 2017)	98
3	SA5			SAND	sand, gravel, clay, brown, wet							97
				BEDROCK	grey							
4											silica sand	96
5											32 mm 010 slot PVC pipe	95
End of borehole at 5.70 m												
Groundwater Information: Depth to groundwater from TOP = 2.74 m (Nov 9, 2017)												

DRILLING METHOD: Pionjar Portable Drilling
 DRILL DATE: 2017 November 1


LOGGED BY: KS
 Notes:  SPLIT SPOON

Sheet 1 of 1

					CLIENT: Royal LePage Team Realty PROJECT: Phase II ESA 5536 Manotick Main Street Manotick, Ontario		BOREHOLE LOG BOREHOLE NO: MW3 SURFACE ELEVATION: 100.06 m								
CM ³ JOB NO: MM2103					FIELD TEST DATA				WELL COMPLETION	WATER LEVEL	WELL COMPLETION NOTES	ELEVATION (m)			
DEPTH (m)	SAMPLE TYPE	SAMPLE ID	SPT COUNT	SOIL TYPE	ORGANIC VAPOUR LEVEL (ppmv)										
					1	10	100	1000							
0					Ground Surface										
		SA1			GRAVEL gravel construction fill, grey, dry									roadbox, plug, cement	100
		SA2			CLAY with silt, stiff, brown, wet									bentonite seal	99
		SA3												32 mm solid PVC pipe	
2		SA4												GW = 2.10 mbg (Nov 9, 2017)	98
		SA5													
3					BEDROCK fractured rock, grey									silica sand	97
														32 mm 010 slot PVC pipe	
4															96
End of borehole at 4.10 m															
Groundwater Information: Depth to groundwater from TOP = 2.04 m (Nov 9, 2017)															

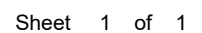
DRILLING METHOD: Pionjar Portable Drilling


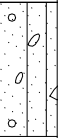


DRILL DATE: 2017 November 1
 LOGGED BY: KS

Notes:  SPLIT SPOON

Sheet 1 of 1





					CLIENT: Royal LePage Team Realty PROJECT: Phase II ESA 5536 Manotick Main Street Manotick, Ontario		BOREHOLE LOG						
CM ³ JOB NO: MM2103					BOREHOLE NO: VM2 SURFACE ELEVATION: 100.21 m								
DEPTH (m)	SAMPLE TYPE	SAMPLE ID	SPT COUNT	SOIL TYPE	SOIL DESCRIPTION	FIELD TEST DATA				WELL COMPLETION	WATER LEVEL	WELL COMPLETION NOTES	ELEVATION (m)
						ORGANIC VAPOUR LEVEL (ppmv)							
						1	10	100	1000				
-1													
					Ground Surface								
0					SAND medium fine sand with trace gravel and clay, brown, dry								101
1					ROCK boulders and cobbles with trace sand and clay								100
													99
2					CLAY with silt, stiff, brown, wet End of borehole at 2.13 m								
DRILLING METHOD: Pionjar Portable Drilling					Notes:								
DRILL DATE: 2017 December 20 LOGGED BY: KS										Sheet 1 of 1			

APPENDIX B

LABORATORY REPORTS

Phase II Environmental Site Assessment

5536 Manotick Main Street Manotick, Ontario Client

Royal LePage Team Realty

MM2103

Certificate of Analysis

CM3 Environmental Inc.

5710 Akins Road
Ottawa, ON K2S 1B8
Attn: Marc MacDonald

Client PO: MM2103
Project: MM2103
Custody: 40144

Report Date: 8-Nov-2017
Order Date: 2-Nov-2017

Order #: 1744453

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
1744453-01	MW1 SA1
1744453-02	MW2 SA5
1744453-03	MW3 SA5
1744453-04	MW4 SA1
1744453-05	MW4 SA2

Approved By:



Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis
Client: **CM3 Environmental Inc.**
Client PO: **MM2103**

Report Date: 08-Nov-2017

Order Date: 2-Nov-2017

Project Description: MM2103

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Boron, available	MOE (HWE), EPA 200.7 - ICP-OES	8-Nov-17	8-Nov-17
Chromium, hexavalent - soil	MOE E3056 - Extraction, colourimetric	6-Nov-17	7-Nov-17
Mercury by CVAA	EPA 7471B - CVAA, digestion	7-Nov-17	7-Nov-17
PHC F1	CWS Tier 1 - P&T GC-FID	3-Nov-17	7-Nov-17
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	3-Nov-17	7-Nov-17
REG 153: Metals by ICP/OES, soil	based on MOE E3470, ICP-OES	8-Nov-17	8-Nov-17
REG 153: PAHs by GC-MS	EPA 8270 - GC-MS, extraction	3-Nov-17	8-Nov-17
REG 153: VOCs by P&T GC/MS	EPA 8260 - P&T GC-MS	3-Nov-17	7-Nov-17
Solids, %	Gravimetric, calculation	8-Nov-17	8-Nov-17

Certificate of Analysis
 Client: CM3 Environmental Inc.
 Client PO: MM2103

Report Date: 08-Nov-2017

Order Date: 2-Nov-2017

Project Description: MM2103

	Client ID:	MW1 SA1	MW2 SA5	MW3 SA5	MW4 SA1
	Sample Date:	31-Oct-17	31-Oct-17	01-Nov-17	01-Nov-17
	Sample ID:	1744453-01	1744453-02	1744453-03	1744453-04
	MDL/Units	Soil	Soil	Soil	Soil

Physical Characteristics

% Solids	0.1 % by Wt.	87.8	72.4	75.1	81.5
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Metals

Antimony	1.0 ug/g dry	-	-	<1.0	-
Arsenic	1.0 ug/g dry	-	-	6.7	-
Barium	1.0 ug/g dry	-	-	119	-
Beryllium	1.0 ug/g dry	-	-	<1.0	-
Boron	1.0 ug/g dry	-	-	8.5	-
Boron, available	0.5 ug/g dry	-	-	<0.5	-
Cadmium	0.5 ug/g dry	-	-	<0.5	-
Chromium	1.0 ug/g dry	-	-	36.0	-
Chromium (VI)	0.2 ug/g dry	-	-	<0.2	-
Cobalt	1.0 ug/g dry	-	-	13.8	-
Copper	1.0 ug/g dry	-	-	25.4	-
Lead	1.0 ug/g dry	-	-	22.2	-
Mercury	0.1 ug/g dry	-	-	<0.1	-
Molybdenum	1.0 ug/g dry	-	-	3.2	-
Nickel	1.0 ug/g dry	-	-	20.8	-
Selenium	1.0 ug/g dry	-	-	<1.0	-
Silver	0.5 ug/g dry	-	-	<0.5	-
Thallium	1.0 ug/g dry	-	-	<1.0	-
Uranium	1.0 ug/g dry	-	-	<1.0	-
Vanadium	1.0 ug/g dry	-	-	60.5	-
Zinc	1.0 ug/g dry	-	-	47.4	-

Volatiles

Acetone	0.50 ug/g dry	<0.50	<0.50	<0.50	<0.50
Benzene	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
Bromodichloromethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Bromoform	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Bromomethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Carbon Tetrachloride	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Chlorobenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Chloroform	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Dibromochloromethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Dichlorodifluoromethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,2-Dichlorobenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05

Certificate of Analysis
 Client: CM3 Environmental Inc.
 Client PO: MM2103

Report Date: 08-Nov-2017

Order Date: 2-Nov-2017

Project Description: MM2103

	Client ID: Sample Date: Sample ID:	MW1 SA1 31-Oct-17 1744453-01 Soil	MW2 SA5 31-Oct-17 1744453-02 Soil	MW3 SA5 01-Nov-17 1744453-03 Soil	MW4 SA1 01-Nov-17 1744453-04 Soil
	MDL/Units				
1,3-Dichlorobenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,4-Dichlorobenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,1-Dichloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,2-Dichloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,1-Dichloroethylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
cis-1,2-Dichloroethylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
trans-1,2-Dichloroethylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,2-Dichloropropane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
cis-1,3-Dichloropropylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
trans-1,3-Dichloropropylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,3-Dichloropropene, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Ethylene dibromide (dibromoethane)	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Hexane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Methyl Ethyl Ketone (2-Butanone)	0.50 ug/g dry	<0.50	<0.50	<0.50	<0.50
Methyl Isobutyl Ketone	0.50 ug/g dry	<0.50	<0.50	<0.50	<0.50
Methyl tert-butyl ether	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Methylene Chloride	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Styrene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,1,1,2-Tetrachloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,1,2,2-Tetrachloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Tetrachloroethylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Toluene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,1,1-Trichloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
1,1,2-Trichloroethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Trichloroethylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Trichlorofluoromethane	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Vinyl chloride	0.02 ug/g dry	<0.02	<0.02	<0.02	<0.02
m,p-Xylenes	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
o-Xylene	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
Xylenes, total	0.05 ug/g dry	<0.05	<0.05	<0.05	<0.05
4-Bromofluorobenzene	Surrogate	119%	101%	114%	110%
Dibromofluoromethane	Surrogate	90.4%	91.8%	91.3%	90.6%
Toluene-d8	Surrogate	97.1%	97.9%	103%	91.3%

Hydrocarbons

F1 PHCs (C6-C10)	7 ug/g dry	<7	<7	<7	<7
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Certificate of Analysis
 Client: CM3 Environmental Inc.
 Client PO: MM2103

Report Date: 08-Nov-2017

Order Date: 2-Nov-2017

Project Description: MM2103

	Client ID: Sample Date: Sample ID:	MW1 SA1 31-Oct-17 1744453-01 Soil	MW2 SA5 31-Oct-17 1744453-02 Soil	MW3 SA5 01-Nov-17 1744453-03 Soil	MW4 SA1 01-Nov-17 1744453-04 Soil
	MDL/Units				
F2 PHCs (C10-C16)	4 ug/g dry	<4	<4	<4	<4
F3 PHCs (C16-C34)	8 ug/g dry	<8	<8	<8	<8
F4 PHCs (C34-C50)	6 ug/g dry	<6	<6	<6	<6

Semi-Volatiles

Acenaphthene	0.02 ug/g dry	-	-	-	<0.02
Acenaphthylene	0.02 ug/g dry	-	-	-	<0.02
Anthracene	0.02 ug/g dry	-	-	-	<0.02
Benzo [a] anthracene	0.02 ug/g dry	-	-	-	0.04
Benzo [a] pyrene	0.02 ug/g dry	-	-	-	0.06
Benzo [b] fluoranthene	0.02 ug/g dry	-	-	-	0.04
Benzo [g,h,i] perylene	0.02 ug/g dry	-	-	-	0.04
Benzo [k] fluoranthene	0.02 ug/g dry	-	-	-	0.03
Chrysene	0.02 ug/g dry	-	-	-	0.04
Dibenzo [a,h] anthracene	0.02 ug/g dry	-	-	-	<0.02
Fluoranthene	0.02 ug/g dry	-	-	-	0.10
Fluorene	0.02 ug/g dry	-	-	-	<0.02
Indeno [1,2,3-cd] pyrene	0.02 ug/g dry	-	-	-	0.04
1-Methylnaphthalene	0.02 ug/g dry	-	-	-	<0.02
2-Methylnaphthalene	0.02 ug/g dry	-	-	-	<0.02
Methylnaphthalene (1&2)	0.04 ug/g dry	-	-	-	<0.04
Naphthalene	0.01 ug/g dry	-	-	-	<0.01
Phenanthrene	0.02 ug/g dry	-	-	-	0.04
Pyrene	0.02 ug/g dry	-	-	-	0.09
2-Fluorobiphenyl	Surrogate	-	-	-	69.6%
Terphenyl-d14	Surrogate	-	-	-	93.8%

Certificate of Analysis
Client: CM3 Environmental Inc.
Client PO: MM2103

Report Date: 08-Nov-2017

Order Date: 2-Nov-2017

Project Description: MM2103

Client ID:	MW4 SA2	-	-	-
Sample Date:	01-Nov-17	-	-	-
Sample ID:	1744453-05	-	-	-
MDL/Units	Soil	-	-	-

Physical Characteristics

% Solids	0.1 % by Wt.	80.9	-	-	-
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Volatiles

Acetone	0.50 ug/g dry	<0.50	-	-	-
Benzene	0.02 ug/g dry	<0.02	-	-	-
Bromodichloromethane	0.05 ug/g dry	<0.05	-	-	-
Bromoform	0.05 ug/g dry	<0.05	-	-	-
Bromomethane	0.05 ug/g dry	<0.05	-	-	-
Carbon Tetrachloride	0.05 ug/g dry	<0.05	-	-	-
Chlorobenzene	0.05 ug/g dry	<0.05	-	-	-
Chloroform	0.05 ug/g dry	<0.05	-	-	-
Dibromochloromethane	0.05 ug/g dry	<0.05	-	-	-
Dichlorodifluoromethane	0.05 ug/g dry	<0.05	-	-	-
1,2-Dichlorobenzene	0.05 ug/g dry	<0.05	-	-	-
1,3-Dichlorobenzene	0.05 ug/g dry	<0.05	-	-	-
1,4-Dichlorobenzene	0.05 ug/g dry	<0.05	-	-	-
1,1-Dichloroethane	0.05 ug/g dry	<0.05	-	-	-
1,2-Dichloroethane	0.05 ug/g dry	<0.05	-	-	-
1,1-Dichloroethylene	0.05 ug/g dry	<0.05	-	-	-
cis-1,2-Dichloroethylene	0.05 ug/g dry	<0.05	-	-	-
trans-1,2-Dichloroethylene	0.05 ug/g dry	<0.05	-	-	-
1,2-Dichloropropane	0.05 ug/g dry	<0.05	-	-	-
cis-1,3-Dichloropropylene	0.05 ug/g dry	<0.05	-	-	-
trans-1,3-Dichloropropylene	0.05 ug/g dry	<0.05	-	-	-
1,3-Dichloropropene, total	0.05 ug/g dry	<0.05	-	-	-
Ethylbenzene	0.05 ug/g dry	<0.05	-	-	-
Ethylene dibromide (dibromoethane)	0.05 ug/g dry	<0.05	-	-	-
Hexane	0.05 ug/g dry	<0.05	-	-	-
Methyl Ethyl Ketone (2-Butanone)	0.50 ug/g dry	<0.50	-	-	-
Methyl Isobutyl Ketone	0.50 ug/g dry	<0.50	-	-	-
Methyl tert-butyl ether	0.05 ug/g dry	<0.05	-	-	-
Methylene Chloride	0.05 ug/g dry	<0.05	-	-	-
Styrene	0.05 ug/g dry	<0.05	-	-	-
1,1,1,2-Tetrachloroethane	0.05 ug/g dry	<0.05	-	-	-
1,1,1,2-Tetrachloroethane	0.05 ug/g dry	<0.05	-	-	-

Certificate of Analysis
 Client: CM3 Environmental Inc.
 Client PO: MM2103

Report Date: 08-Nov-2017

Order Date: 2-Nov-2017

Project Description: MM2103

	Client ID:	MW4 SA2	-	-	-
	Sample Date:	01-Nov-17	-	-	-
	Sample ID:	1744453-05	-	-	-
	MDL/Units	Soil	-	-	-
Tetrachloroethylene	0.05 ug/g dry	<0.05	-	-	-
Toluene	0.05 ug/g dry	<0.05	-	-	-
1,1,1-Trichloroethane	0.05 ug/g dry	<0.05	-	-	-
1,1,2-Trichloroethane	0.05 ug/g dry	<0.05	-	-	-
Trichloroethylene	0.05 ug/g dry	<0.05	-	-	-
Trichlorofluoromethane	0.05 ug/g dry	<0.05	-	-	-
Vinyl chloride	0.02 ug/g dry	<0.02	-	-	-
m,p-Xylenes	0.05 ug/g dry	<0.05	-	-	-
o-Xylene	0.05 ug/g dry	<0.05	-	-	-
Xylenes, total	0.05 ug/g dry	<0.05	-	-	-
4-Bromofluorobenzene	Surrogate	104%	-	-	-
Dibromofluoromethane	Surrogate	90.2%	-	-	-
Toluene-d8	Surrogate	88.4%	-	-	-

Hydrocarbons

F1 PHCs (C6-C10)	7 ug/g dry	<7	-	-	-
F2 PHCs (C10-C16)	4 ug/g dry	<4	-	-	-
F3 PHCs (C16-C34)	8 ug/g dry	<8	-	-	-
F4 PHCs (C34-C50)	6 ug/g dry	<6	-	-	-

Certificate of Analysis
 Client: CM3 Environmental Inc.
 Client PO: MM2103

Report Date: 08-Nov-2017
 Order Date: 2-Nov-2017
 Project Description: MM2103

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g						
F2 PHCs (C10-C16)	ND	4	ug/g						
F3 PHCs (C16-C34)	ND	8	ug/g						
F4 PHCs (C34-C50)	ND	6	ug/g						
Metals									
Antimony	ND	1.0	ug/g						
Arsenic	ND	1.0	ug/g						
Barium	ND	1.0	ug/g						
Beryllium	ND	1.0	ug/g						
Boron, available	ND	0.5	ug/g						
Boron	ND	1.0	ug/g						
Cadmium	ND	0.5	ug/g						
Chromium (VI)	ND	0.2	ug/g						
Chromium	ND	1.0	ug/g						
Cobalt	ND	1.0	ug/g						
Copper	ND	1.0	ug/g						
Lead	ND	1.0	ug/g						
Mercury	ND	0.1	ug/g						
Molybdenum	ND	1.0	ug/g						
Nickel	ND	1.0	ug/g						
Selenium	ND	1.0	ug/g						
Silver	ND	0.5	ug/g						
Thallium	ND	1.0	ug/g						
Uranium	ND	1.0	ug/g						
Vanadium	ND	1.0	ug/g						
Zinc	ND	1.0	ug/g						
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g						
Acenaphthylene	ND	0.02	ug/g						
Anthracene	ND	0.02	ug/g						
Benzo [a] anthracene	ND	0.02	ug/g						
Benzo [a] pyrene	ND	0.02	ug/g						
Benzo [b] fluoranthene	ND	0.02	ug/g						
Benzo [g,h,i] perylene	ND	0.02	ug/g						
Benzo [k] fluoranthene	ND	0.02	ug/g						
Chrysene	ND	0.02	ug/g						
Dibenzo [a,h] anthracene	ND	0.02	ug/g						
Fluoranthene	ND	0.02	ug/g						
Fluorene	ND	0.02	ug/g						
Indeno [1,2,3-cd] pyrene	ND	0.02	ug/g						
1-Methylnaphthalene	ND	0.02	ug/g						
2-Methylnaphthalene	ND	0.02	ug/g						
Methylnaphthalene (1&2)	ND	0.04	ug/g						
Naphthalene	ND	0.01	ug/g						
Phenanthrene	ND	0.02	ug/g						
Pyrene	ND	0.02	ug/g						
Surrogate: 2-Fluorobiphenyl	0.990		ug/g		74.3	50-140			
Surrogate: Terphenyl-d14	1.28		ug/g		96.2	50-140			
Volatiles									
Acetone	ND	0.50	ug/g						
Benzene	ND	0.02	ug/g						
Bromodichloromethane	ND	0.05	ug/g						
Bromoform	ND	0.05	ug/g						
Bromomethane	ND	0.05	ug/g						
Carbon Tetrachloride	ND	0.05	ug/g						
Chlorobenzene	ND	0.05	ug/g						
Chloroform	ND	0.05	ug/g						
Dibromochloromethane	ND	0.05	ug/g						

Certificate of Analysis
 Client: CM3 Environmental Inc.
 Client PO: MM2103

Report Date: 08-Nov-2017
 Order Date: 2-Nov-2017
 Project Description: MM2103

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Dichlorodifluoromethane	ND	0.05	ug/g						
1,2-Dichlorobenzene	ND	0.05	ug/g						
1,3-Dichlorobenzene	ND	0.05	ug/g						
1,4-Dichlorobenzene	ND	0.05	ug/g						
1,1-Dichloroethane	ND	0.05	ug/g						
1,2-Dichloroethane	ND	0.05	ug/g						
1,1-Dichloroethylene	ND	0.05	ug/g						
cis-1,2-Dichloroethylene	ND	0.05	ug/g						
trans-1,2-Dichloroethylene	ND	0.05	ug/g						
1,2-Dichloropropane	ND	0.05	ug/g						
cis-1,3-Dichloropropylene	ND	0.05	ug/g						
trans-1,3-Dichloropropylene	ND	0.05	ug/g						
1,3-Dichloropropene, total	ND	0.05	ug/g						
Ethylbenzene	ND	0.05	ug/g						
Ethylene dibromide (dibromoethane)	ND	0.05	ug/g						
Hexane	ND	0.05	ug/g						
Methyl Ethyl Ketone (2-Butanone)	ND	0.50	ug/g						
Methyl Isobutyl Ketone	ND	0.50	ug/g						
Methyl tert-butyl ether	ND	0.05	ug/g						
Methylene Chloride	ND	0.05	ug/g						
Styrene	ND	0.05	ug/g						
1,1,1,2-Tetrachloroethane	ND	0.05	ug/g						
1,1,2,2-Tetrachloroethane	ND	0.05	ug/g						
Tetrachloroethylene	ND	0.05	ug/g						
Toluene	ND	0.05	ug/g						
1,1,1-Trichloroethane	ND	0.05	ug/g						
1,1,2-Trichloroethane	ND	0.05	ug/g						
Trichloroethylene	ND	0.05	ug/g						
Trichlorofluoromethane	ND	0.05	ug/g						
Vinyl chloride	ND	0.02	ug/g						
m,p-Xylenes	ND	0.05	ug/g						
o-Xylene	ND	0.05	ug/g						
Xylenes, total	ND	0.05	ug/g						
Surrogate: 4-Bromofluorobenzene	9.58		ug/g		120	50-140			
Surrogate: Dibromofluoromethane	7.54		ug/g		94.3	50-140			
Surrogate: Toluene-d8	8.74		ug/g		109	50-140			

Certificate of Analysis
 Client: CM3 Environmental Inc.
 Client PO: MM2103

Report Date: 08-Nov-2017

Order Date: 2-Nov-2017

Project Description: MM2103

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	7	ug/g dry	ND				40	
F2 PHCs (C10-C16)	ND	4	ug/g dry	ND				30	
F3 PHCs (C16-C34)	ND	8	ug/g dry	ND				30	
F4 PHCs (C34-C50)	ND	6	ug/g dry	ND				30	
Metals									
Antimony	ND	1.0	ug/g dry	ND			0.0	30	
Arsenic	2.35	1.0	ug/g dry	2.71			14.4	30	
Barium	21.8	1.0	ug/g dry	20.0			8.4	30	
Beryllium	ND	1.0	ug/g dry	ND			0.0	30	
Boron, available	ND	0.5	ug/g dry	ND			0.0	35	
Boron	2.22	1.0	ug/g dry	2.13			4.2	30	
Cadmium	ND	0.5	ug/g dry	ND			0.0	30	
Chromium (VI)	ND	0.2	ug/g dry	ND				35	
Chromium	5.46	1.0	ug/g dry	5.03			8.1	30	
Cobalt	1.72	1.0	ug/g dry	1.69			1.8	30	
Copper	4.83	1.0	ug/g dry	4.25			12.9	30	
Lead	4.22	1.0	ug/g dry	4.13			2.1	30	
Mercury	ND	0.1	ug/g dry	ND			0.0	30	
Molybdenum	ND	1.0	ug/g dry	ND			0.0	30	
Nickel	3.35	1.0	ug/g dry	3.18			5.3	30	
Selenium	ND	1.0	ug/g dry	ND			0.0	30	
Silver	ND	0.5	ug/g dry	ND			0.0	30	
Thallium	ND	1.0	ug/g dry	ND			0.0	30	
Uranium	ND	1.0	ug/g dry	ND			0.0	30	
Vanadium	10.5	1.0	ug/g dry	10.3			1.9	30	
Zinc	26.4	1.0	ug/g dry	24.4			7.9	30	
Physical Characteristics									
% Solids	77.7	0.1	% by Wt.	78.8			1.3	25	
Semi-Volatiles									
Acenaphthene	ND	0.02	ug/g dry	ND				40	
Acenaphthylene	ND	0.02	ug/g dry	ND				40	
Anthracene	ND	0.02	ug/g dry	ND				40	
Benzo [a] anthracene	ND	0.02	ug/g dry	ND			0.0	40	
Benzo [a] pyrene	ND	0.02	ug/g dry	ND				40	
Benzo [b] fluoranthene	ND	0.02	ug/g dry	ND				40	
Benzo [g,h,i] perylene	ND	0.02	ug/g dry	ND				40	
Benzo [k] fluoranthene	ND	0.02	ug/g dry	ND				40	
Chrysene	ND	0.02	ug/g dry	ND			0.0	40	
Dibenzo [a,h] anthracene	ND	0.02	ug/g dry	ND				40	
Fluoranthene	ND	0.02	ug/g dry	ND				40	
Fluorene	ND	0.02	ug/g dry	ND				40	
Indeno [1,2,3-cd] pyrene	ND	0.02	ug/g dry	ND				40	
1-Methylnaphthalene	ND	0.02	ug/g dry	ND				40	
2-Methylnaphthalene	ND	0.02	ug/g dry	ND				40	
Naphthalene	ND	0.01	ug/g dry	ND				40	
Phenanthrene	ND	0.02	ug/g dry	ND				40	
Pyrene	ND	0.02	ug/g dry	ND			0.0	40	
Surrogate: 2-Fluorobiphenyl	1.40		ug/g dry		83.8	50-140			
Surrogate: Terphenyl-d14	1.52		ug/g dry		90.5	50-140			
Volatiles									
Acetone	ND	0.50	ug/g dry	ND				50	
Benzene	ND	0.02	ug/g dry	ND				50	
Bromodichloromethane	ND	0.05	ug/g dry	ND				50	
Bromoform	ND	0.05	ug/g dry	ND				50	
Bromomethane	ND	0.05	ug/g dry	ND				50	
Carbon Tetrachloride	ND	0.05	ug/g dry	ND				50	

Certificate of Analysis
 Client: CM3 Environmental Inc.
 Client PO: MM2103

Report Date: 08-Nov-2017

Order Date: 2-Nov-2017

Project Description: MM2103

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Chlorobenzene	ND	0.05	ug/g dry	ND				50	
Chloroform	ND	0.05	ug/g dry	ND				50	
Dibromochloromethane	ND	0.05	ug/g dry	ND				50	
Dichlorodifluoromethane	ND	0.05	ug/g dry	ND				50	
1,2-Dichlorobenzene	ND	0.05	ug/g dry	ND				50	
1,3-Dichlorobenzene	ND	0.05	ug/g dry	ND				50	
1,4-Dichlorobenzene	ND	0.05	ug/g dry	ND				50	
1,1-Dichloroethane	ND	0.05	ug/g dry	ND				50	
1,2-Dichloroethane	ND	0.05	ug/g dry	ND				50	
1,1-Dichloroethylene	ND	0.05	ug/g dry	ND				50	
cis-1,2-Dichloroethylene	ND	0.05	ug/g dry	ND				50	
trans-1,2-Dichloroethylene	ND	0.05	ug/g dry	ND				50	
1,2-Dichloropropane	ND	0.05	ug/g dry	ND				50	
cis-1,3-Dichloropropylene	ND	0.05	ug/g dry	ND				50	
trans-1,3-Dichloropropylene	ND	0.05	ug/g dry	ND				50	
Ethylbenzene	ND	0.05	ug/g dry	ND				50	
Ethylene dibromide (dibromoethane)	ND	0.05	ug/g dry	ND				50	
Hexane	ND	0.05	ug/g dry	ND				50	
Methyl Ethyl Ketone (2-Butanone)	ND	0.50	ug/g dry	ND				50	
Methyl Isobutyl Ketone	ND	0.50	ug/g dry	ND				50	
Methyl tert-butyl ether	ND	0.05	ug/g dry	ND				50	
Methylene Chloride	ND	0.05	ug/g dry	ND				50	
Styrene	ND	0.05	ug/g dry	ND				50	
1,1,1,2-Tetrachloroethane	ND	0.05	ug/g dry	ND				50	
1,1,2,2-Tetrachloroethane	ND	0.05	ug/g dry	ND				50	
Tetrachloroethylene	ND	0.05	ug/g dry	ND				50	
Toluene	ND	0.05	ug/g dry	ND				50	
1,1,1-Trichloroethane	ND	0.05	ug/g dry	ND				50	
1,1,2-Trichloroethane	ND	0.05	ug/g dry	ND				50	
Trichloroethylene	ND	0.05	ug/g dry	ND				50	
Trichlorofluoromethane	ND	0.05	ug/g dry	ND				50	
Vinyl chloride	ND	0.02	ug/g dry	ND				50	
m,p-Xylenes	ND	0.05	ug/g dry	ND				50	
o-Xylene	ND	0.05	ug/g dry	ND				50	
Surrogate: 4-Bromofluorobenzene	8.06		ug/g dry		108	50-140			
Surrogate: Dibromofluoromethane	6.93		ug/g dry		93.0	50-140			
Surrogate: Toluene-d8	7.97		ug/g dry		107	50-140			

Certificate of Analysis
 Client: CM3 Environmental Inc.
 Client PO: MM2103

Report Date: 08-Nov-2017

Order Date: 2-Nov-2017

Project Description: MM2103

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	194	7	ug/g		97.1	80-120			
F2 PHCs (C10-C16)	110	4	ug/g	ND	97.0	60-140			
F3 PHCs (C16-C34)	227	8	ug/g	ND	97.3	60-140			
F4 PHCs (C34-C50)	148	6	ug/g	ND	94.9	60-140			
Metals									
Antimony	256		ug/L	6.81	99.5	70-130			
Arsenic	310		ug/L	54.2	102	70-130			
Barium	635		ug/L	401	93.9	70-130			
Beryllium	245		ug/L	ND	98.0	70-130			
Boron, available	4.03	0.5	ug/g	ND	80.6	70-122			
Boron	298		ug/L	42.6	102	70-130			
Cadmium	238		ug/L	2.04	94.2	70-130			
Chromium (VI)	4.3	0.2	ug/g	ND	81.5	70-130			
Chromium	340		ug/L	101	95.8	70-130			
Cobalt	274		ug/L	33.8	96.2	70-130			
Copper	328		ug/L	84.9	97.2	70-130			
Lead	314		ug/L	82.6	92.6	70-130			
Molybdenum	238		ug/L	ND	95.2	70-130			
Nickel	286		ug/L	63.6	88.8	70-130			
Selenium	252		ug/L	8.87	97.1	70-130			
Silver	229		ug/L	ND	91.7	70-130			
Thallium	221		ug/L	9.98	84.3	70-130			
Uranium	265		ug/L	16.2	99.6	70-130			
Vanadium	445		ug/L	207	95.3	70-130			
Zinc	684		ug/L	488	78.5	70-130			
Semi-Volatiles									
Acenaphthene	0.282	0.02	ug/g	ND	135	50-140			
Acenaphthylene	0.246	0.02	ug/g	ND	117	50-140			
Anthracene	0.118	0.02	ug/g	ND	56.2	50-140			
Benzo [a] anthracene	0.157	0.02	ug/g	ND	75.0	50-140			
Benzo [a] pyrene	0.199	0.02	ug/g	ND	95.1	50-140			
Benzo [b] fluoranthene	0.171	0.02	ug/g	ND	81.4	50-140			
Benzo [g,h,i] perylene	0.218	0.02	ug/g	ND	104	50-140			
Benzo [k] fluoranthene	0.185	0.02	ug/g	ND	88.3	50-140			
Chrysene	0.194	0.02	ug/g	ND	92.6	50-140			
Dibenzo [a,h] anthracene	0.244	0.02	ug/g	ND	116	50-140			
Fluoranthene	0.220	0.02	ug/g	ND	105	50-140			
Fluorene	0.217	0.02	ug/g	ND	104	50-140			
Indeno [1,2,3-cd] pyrene	0.244	0.02	ug/g	ND	116	50-140			
1-Methylnaphthalene	0.202	0.02	ug/g	ND	96.5	50-140			
2-Methylnaphthalene	0.221	0.02	ug/g	ND	105	50-140			
Naphthalene	0.229	0.01	ug/g	ND	109	50-140			
Phenanthrene	0.226	0.02	ug/g	ND	108	50-140			
Pyrene	0.214	0.02	ug/g	ND	102	50-140			
Surrogate: 2-Fluorobiphenyl	1.40		ug/g		83.2	50-140			
Volatiles									
Acetone	7.76	0.50	ug/g		77.6	50-140			
Benzene	4.10	0.02	ug/g		102	60-130			
Bromodichloromethane	3.36	0.05	ug/g		84.0	60-130			
Bromoform	3.47	0.05	ug/g		86.6	60-130			

Certificate of Analysis
 Client: CM3 Environmental Inc.
 Client PO: MM2103

Report Date: 08-Nov-2017

Order Date: 2-Nov-2017

Project Description: MM2103

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Bromomethane	3.12	0.05	ug/g		78.1	50-140			
Carbon Tetrachloride	2.85	0.05	ug/g		71.2	60-130			
Chlorobenzene	4.15	0.05	ug/g		104	60-130			
Chloroform	3.45	0.05	ug/g		86.3	60-130			
Dibromochloromethane	3.63	0.05	ug/g		90.8	60-130			
Dichlorodifluoromethane	2.63	0.05	ug/g		65.7	50-140			
1,2-Dichlorobenzene	4.15	0.05	ug/g		104	60-130			
1,3-Dichlorobenzene	3.43	0.05	ug/g		85.7	60-130			
1,4-Dichlorobenzene	4.28	0.05	ug/g		107	60-130			
1,1-Dichloroethane	4.23	0.05	ug/g		106	60-130			
1,2-Dichloroethane	3.11	0.05	ug/g		77.7	60-130			
1,1-Dichloroethylene	3.40	0.05	ug/g		85.0	60-130			
cis-1,2-Dichloroethylene	3.00	0.05	ug/g		75.1	60-130			
trans-1,2-Dichloroethylene	3.32	0.05	ug/g		83.0	60-130			
1,2-Dichloropropane	4.31	0.05	ug/g		108	60-130			
cis-1,3-Dichloropropylene	3.88	0.05	ug/g		96.9	60-130			
trans-1,3-Dichloropropylene	3.45	0.05	ug/g		86.3	60-130			
Ethylbenzene	4.01	0.05	ug/g		100	60-130			
Ethylene dibromide (dibromoethane)	3.81	0.05	ug/g		95.2	60-130			
Hexane	3.86	0.05	ug/g		96.5	60-130			
Methyl Ethyl Ketone (2-Butanone)	9.13	0.50	ug/g		91.3	50-140			
Methyl Isobutyl Ketone	13.4	0.50	ug/g		134	50-140			
Methyl tert-butyl ether	8.64	0.05	ug/g		86.4	50-140			
Methylene Chloride	3.96	0.05	ug/g		99.1	60-130			
Styrene	3.86	0.05	ug/g		96.5	60-130			
1,1,1,2-Tetrachloroethane	3.86	0.05	ug/g		96.6	60-130			
1,1,2,2-Tetrachloroethane	4.66	0.05	ug/g		116	60-130			
Tetrachloroethylene	3.58	0.05	ug/g		89.6	60-130			
Toluene	4.37	0.05	ug/g		109	60-130			
1,1,1-Trichloroethane	3.08	0.05	ug/g		77.1	60-130			
1,1,2-Trichloroethane	4.31	0.05	ug/g		108	60-130			
Trichloroethylene	3.31	0.05	ug/g		82.7	60-130			
Trichlorofluoromethane	2.51	0.05	ug/g		62.8	50-140			
Vinyl chloride	2.45	0.02	ug/g		61.2	50-140			
m,p-Xylenes	8.54	0.05	ug/g		107	60-130			
o-Xylene	4.52	0.05	ug/g		113	60-130			

Certificate of Analysis
Client: CM3 Environmental Inc.
Client PO: MM2103

Report Date: 08-Nov-2017
Order Date: 2-Nov-2017
Project Description: MM2103

Qualifier Notes:

None

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable
ND: Not Detected
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.

Soil results are reported on a dry weight basis when the units are denoted with 'dry'.
Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.

Certificate of Analysis

CM3 Environmental Inc.

5710 Akins Road
Ottawa, ON K2S 1B8
Attn: Marc MacDonald

Client PO: MM2103
Project: MM2103
Custody: 40148

Report Date: 15-Nov-2017
Order Date: 9-Nov-2017

Order #: 1745514

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
1745514-01	MW1
1745514-02	MW2
1745514-03	MW3
1745514-04	MW4

Approved By:



Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis
Client: CM3 Environmental Inc.
Client PO: MM2103

Report Date: 15-Nov-2017
Order Date: 9-Nov-2017
Project Description: MM2103

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Metals, ICP-MS	EPA 200.8 - ICP-MS	10-Nov-17	10-Nov-17
PHC F1	CWS Tier 1 - P&T GC-FID	14-Nov-17	14-Nov-17
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	10-Nov-17	10-Nov-17
REG 153: PAHs by GC-MS	EPA 625 - GC-MS, extraction	15-Nov-17	15-Nov-17
REG 153: VOCs by P&T GC/MS	EPA 624 - P&T GC-MS	14-Nov-17	15-Nov-17

Certificate of Analysis
 Client: CM3 Environmental Inc.
 Client PO: MM2103

Report Date: 15-Nov-2017

Order Date: 9-Nov-2017

Project Description: MM2103

Client ID:	MW1	MW2	MW3	MW4
Sample Date:	09-Nov-17	09-Nov-17	09-Nov-17	09-Nov-17
Sample ID:	1745514-01	1745514-02	1745514-03	1745514-04
MDL/Units	Water	Water	Water	Water

Metals

Antimony	0.5 ug/L	-	-	<0.5	-
Arsenic	1 ug/L	-	-	<1	-
Barium	1 ug/L	-	-	120	-
Beryllium	0.5 ug/L	-	-	<0.5	-
Boron	10 ug/L	-	-	155	-
Cadmium	0.1 ug/L	-	-	<0.1	-
Chromium	1 ug/L	-	-	<1	-
Cobalt	0.5 ug/L	-	-	1.1	-
Copper	0.5 ug/L	-	-	3.3	-
Lead	0.1 ug/L	-	-	<0.1	-
Molybdenum	0.5 ug/L	-	-	2.6	-
Nickel	1 ug/L	-	-	6	-
Selenium	1 ug/L	-	-	<1	-
Silver	0.1 ug/L	-	-	<0.1	-
Sodium	200 ug/L	-	-	925000	-
Thallium	0.1 ug/L	-	-	0.2	-
Uranium	0.1 ug/L	-	-	7.3	-
Vanadium	0.5 ug/L	-	-	<0.5	-
Zinc	5 ug/L	-	-	6	-

Volatiles

Acetone	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Benzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Bromodichloromethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Bromoform	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Bromomethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	0.2 ug/L	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Chloroform	0.5 ug/L	<0.5	1.5	<0.5	<0.5
Dibromochloromethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Dichlorodifluoromethane	1.0 ug/L	<1.0	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5

Certificate of Analysis
 Client: CM3 Environmental Inc.
 Client PO: MM2103

Report Date: 15-Nov-2017

Order Date: 9-Nov-2017

Project Description: MM2103

	Client ID: Sample Date: Sample ID:	MW1 09-Nov-17 1745514-01 Water	MW2 09-Nov-17 1745514-02 Water	MW3 09-Nov-17 1745514-03 Water	MW4 09-Nov-17 1745514-04 Water
	MDL/Units				
1,1-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
cis-1,2-Dichloroethylene	0.5 ug/L	6.5	6.4	<0.5	<0.5
trans-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
cis-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
trans-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene, total	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Ethylene dibromide (dibromoethane)	0.2 ug/L	<0.2	<0.2	<0.2	<0.2
Hexane	1.0 ug/L	<1.0	<1.0	<1.0	<1.0
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Methyl Isobutyl Ketone	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Methyl tert-butyl ether	2.0 ug/L	<2.0	<2.0	<2.0	<2.0
Methylene Chloride	5.0 ug/L	<5.0	<5.0	<5.0	<5.0
Styrene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	0.5 ug/L	<0.5	33.7	<0.5	<0.5
Toluene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	0.5 ug/L	2.1	4.0	<0.5	<0.5
Trichlorofluoromethane	1.0 ug/L	<1.0	<1.0	<1.0	<1.0
Vinyl chloride	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
m,p-Xylenes	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
o-Xylene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Xylenes, total	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
4-Bromofluorobenzene	Surrogate	122%	129%	122%	121%
Dibromofluoromethane	Surrogate	105%	112%	90.1%	87.7%
Toluene-d8	Surrogate	118%	114%	116%	118%

Hydrocarbons

F1 PHCs (C6-C10)	25 ug/L	<25	<25	<25	<25
F2 PHCs (C10-C16)	100 ug/L	<100	<100	<100	<100
F3 PHCs (C16-C34)	100 ug/L	<100	<100	<100	<100
F4 PHCs (C34-C50)	100 ug/L	<100	<100	<100	<100

Semi-Volatiles

Certificate of Analysis
 Client: CM3 Environmental Inc.
 Client PO: MM2103

Report Date: 15-Nov-2017

Order Date: 9-Nov-2017

Project Description: MM2103

	Client ID: Sample Date: Sample ID:	MW1 09-Nov-17 1745514-01 Water	MW2 09-Nov-17 1745514-02 Water	MW3 09-Nov-17 1745514-03 Water	MW4 09-Nov-17 1745514-04 Water
	MDL/Units				
Acenaphthene	0.05 ug/L	-	-	<0.05	-
Acenaphthylene	0.05 ug/L	-	-	<0.05	-
Anthracene	0.01 ug/L	-	-	<0.01	-
Benzo [a] anthracene	0.01 ug/L	-	-	<0.01	-
Benzo [a] pyrene	0.01 ug/L	-	-	<0.01	-
Benzo [b] fluoranthene	0.05 ug/L	-	-	<0.05	-
Benzo [g,h,i] perylene	0.05 ug/L	-	-	<0.05	-
Benzo [k] fluoranthene	0.05 ug/L	-	-	<0.05	-
Chrysene	0.05 ug/L	-	-	<0.05	-
Dibenzo [a,h] anthracene	0.05 ug/L	-	-	<0.05	-
Fluoranthene	0.01 ug/L	-	-	<0.01	-
Fluorene	0.05 ug/L	-	-	<0.05	-
Indeno [1,2,3-cd] pyrene	0.05 ug/L	-	-	<0.05	-
1-Methylnaphthalene	0.05 ug/L	-	-	<0.05	-
2-Methylnaphthalene	0.05 ug/L	-	-	<0.05	-
Methylnaphthalene (1&2)	0.10 ug/L	-	-	<0.10	-
Naphthalene	0.05 ug/L	-	-	<0.05	-
Phenanthrene	0.05 ug/L	-	-	<0.05	-
Pyrene	0.01 ug/L	-	-	<0.01	-
2-Fluorobiphenyl	Surrogate	-	-	76.4%	-
Terphenyl-d14	Surrogate	-	-	108%	-

Certificate of Analysis
 Client: CM3 Environmental Inc.
 Client PO: MM2103

Report Date: 15-Nov-2017
 Order Date: 9-Nov-2017
 Project Description: MM2103

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L						
F2 PHCs (C10-C16)	ND	100	ug/L						
F3 PHCs (C16-C34)	ND	100	ug/L						
F4 PHCs (C34-C50)	ND	100	ug/L						
Metals									
Antimony	ND	0.5	ug/L						
Arsenic	ND	1	ug/L						
Barium	ND	1	ug/L						
Beryllium	ND	0.5	ug/L						
Boron	ND	10	ug/L						
Cadmium	ND	0.1	ug/L						
Chromium	ND	1	ug/L						
Cobalt	ND	0.5	ug/L						
Copper	ND	0.5	ug/L						
Lead	ND	0.1	ug/L						
Molybdenum	ND	0.5	ug/L						
Nickel	ND	1	ug/L						
Selenium	ND	1	ug/L						
Silver	ND	0.1	ug/L						
Sodium	ND	200	ug/L						
Thallium	ND	0.1	ug/L						
Uranium	ND	0.1	ug/L						
Vanadium	ND	0.5	ug/L						
Zinc	ND	5	ug/L						
Semi-Volatiles									
Acenaphthene	ND	0.05	ug/L						
Acenaphthylene	ND	0.05	ug/L						
Anthracene	ND	0.01	ug/L						
Benzo [a] anthracene	ND	0.01	ug/L						
Benzo [a] pyrene	ND	0.01	ug/L						
Benzo [b] fluoranthene	ND	0.05	ug/L						
Benzo [g,h,i] perylene	ND	0.05	ug/L						
Benzo [k] fluoranthene	ND	0.05	ug/L						
Chrysene	ND	0.05	ug/L						
Dibenzo [a,h] anthracene	ND	0.05	ug/L						
Fluoranthene	ND	0.01	ug/L						
Fluorene	ND	0.05	ug/L						
Indeno [1,2,3-cd] pyrene	ND	0.05	ug/L						
1-Methylnaphthalene	ND	0.05	ug/L						
2-Methylnaphthalene	ND	0.05	ug/L						
Methylnaphthalene (1&2)	ND	0.10	ug/L						
Naphthalene	ND	0.05	ug/L						
Phenanthrene	ND	0.05	ug/L						
Pyrene	ND	0.01	ug/L						
Surrogate: 2-Fluorobiphenyl	13.9		ug/L		69.3	50-140			
Surrogate: Terphenyl-d14	21.5		ug/L		108	50-140			
Volatiles									
Acetone	ND	5.0	ug/L						
Benzene	ND	0.5	ug/L						
Bromodichloromethane	ND	0.5	ug/L						
Bromoform	ND	0.5	ug/L						
Bromomethane	ND	0.5	ug/L						
Carbon Tetrachloride	ND	0.2	ug/L						
Chlorobenzene	ND	0.5	ug/L						
Chloroform	ND	0.5	ug/L						
Dibromochloromethane	ND	0.5	ug/L						
Dichlorodifluoromethane	ND	1.0	ug/L						
1,2-Dichlorobenzene	ND	0.5	ug/L						

Certificate of Analysis
 Client: CM3 Environmental Inc.
 Client PO: MM2103

Report Date: 15-Nov-2017
 Order Date: 9-Nov-2017
 Project Description: MM2103

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
1,3-Dichlorobenzene	ND	0.5	ug/L						
1,4-Dichlorobenzene	ND	0.5	ug/L						
1,1-Dichloroethane	ND	0.5	ug/L						
1,2-Dichloroethane	ND	0.5	ug/L						
1,1-Dichloroethylene	ND	0.5	ug/L						
cis-1,2-Dichloroethylene	ND	0.5	ug/L						
trans-1,2-Dichloroethylene	ND	0.5	ug/L						
1,2-Dichloropropane	ND	0.5	ug/L						
cis-1,3-Dichloropropylene	ND	0.5	ug/L						
trans-1,3-Dichloropropylene	ND	0.5	ug/L						
1,3-Dichloropropene, total	ND	0.5	ug/L						
Ethylbenzene	ND	0.5	ug/L						
Ethylene dibromide (dibromoethane)	ND	0.2	ug/L						
Hexane	ND	1.0	ug/L						
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L						
Methyl Isobutyl Ketone	ND	5.0	ug/L						
Methyl tert-butyl ether	ND	2.0	ug/L						
Methylene Chloride	ND	5.0	ug/L						
Styrene	ND	0.5	ug/L						
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L						
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L						
Tetrachloroethylene	ND	0.5	ug/L						
Toluene	ND	0.5	ug/L						
1,1,1-Trichloroethane	ND	0.5	ug/L						
1,1,2-Trichloroethane	ND	0.5	ug/L						
Trichloroethylene	ND	0.5	ug/L						
Trichlorofluoromethane	ND	1.0	ug/L						
Vinyl chloride	ND	0.5	ug/L						
m,p-Xylenes	ND	0.5	ug/L						
o-Xylene	ND	0.5	ug/L						
Xylenes, total	ND	0.5	ug/L						
Surrogate: 4-Bromofluorobenzene	40.1		ug/L		125	50-140			
Surrogate: Dibromofluoromethane	28.7		ug/L		89.8	50-140			
Surrogate: Toluene-d8	37.7		ug/L		118	50-140			

Certificate of Analysis
 Client: CM3 Environmental Inc.
 Client PO: MM2103

Report Date: 15-Nov-2017

Order Date: 9-Nov-2017

Project Description: MM2103

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L	ND				30	
Metals									
Antimony	ND	0.5	ug/L	ND			0.0	20	
Arsenic	ND	1	ug/L	ND			0.0	20	
Barium	20.4	1	ug/L	20.1			1.3	20	
Beryllium	ND	0.5	ug/L	ND			0.0	20	
Boron	18	10	ug/L	21			12.2	20	
Cadmium	ND	0.1	ug/L	ND			0.0	20	
Chromium	ND	1	ug/L	ND			0.0	20	
Cobalt	ND	0.5	ug/L	ND			0.0	20	
Copper	2.26	0.5	ug/L	2.17			4.1	20	
Lead	0.12	0.1	ug/L	ND			0.0	20	
Molybdenum	1.03	0.5	ug/L	1.00			3.1	20	
Nickel	ND	1	ug/L	ND			0.0	20	
Selenium	ND	1	ug/L	ND			0.0	20	
Silver	ND	0.1	ug/L	ND			0.0	20	
Sodium	15200	200	ug/L	15600			2.5	20	
Thallium	ND	0.1	ug/L	ND			0.0	20	
Uranium	ND	0.1	ug/L	ND			0.0	20	
Vanadium	ND	0.5	ug/L	ND			0.0	20	
Zinc	11	5	ug/L	7			39.4	20	QR-01
Volatiles									
Acetone	ND	5.0	ug/L	ND				30	
Benzene	ND	0.5	ug/L	ND				30	
Bromodichloromethane	ND	0.5	ug/L	ND				30	
Bromoform	ND	0.5	ug/L	ND				30	
Bromomethane	ND	0.5	ug/L	ND				30	
Carbon Tetrachloride	ND	0.2	ug/L	ND				30	
Chlorobenzene	ND	0.5	ug/L	ND				30	
Chloroform	ND	0.5	ug/L	ND				30	
Dibromochloromethane	ND	0.5	ug/L	ND				30	
Dichlorodifluoromethane	ND	1.0	ug/L	ND				30	
1,2-Dichlorobenzene	ND	0.5	ug/L	ND				30	
1,3-Dichlorobenzene	ND	0.5	ug/L	ND				30	
1,4-Dichlorobenzene	ND	0.5	ug/L	ND				30	
1,1-Dichloroethane	ND	0.5	ug/L	ND				30	
1,2-Dichloroethane	ND	0.5	ug/L	ND				30	
1,1-Dichloroethylene	ND	0.5	ug/L	ND				30	
cis-1,2-Dichloroethylene	6.04	0.5	ug/L	6.53			7.8	30	
trans-1,2-Dichloroethylene	ND	0.5	ug/L	ND				30	
1,2-Dichloropropane	ND	0.5	ug/L	ND				30	
cis-1,3-Dichloropropylene	ND	0.5	ug/L	ND				30	
trans-1,3-Dichloropropylene	ND	0.5	ug/L	ND				30	
Ethylbenzene	ND	0.5	ug/L	ND			0.0	30	
Ethylene dibromide (dibromoethane)	ND	0.2	ug/L	ND				30	
Hexane	ND	1.0	ug/L	ND				30	
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L	ND				30	
Methyl Isobutyl Ketone	ND	5.0	ug/L	ND				30	
Methyl tert-butyl ether	ND	2.0	ug/L	ND				30	
Methylene Chloride	ND	5.0	ug/L	ND				30	
Styrene	ND	0.5	ug/L	ND				30	
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L	ND				30	
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L	ND				30	
Tetrachloroethylene	ND	0.5	ug/L	ND				30	
Toluene	ND	0.5	ug/L	ND				30	
1,1,1-Trichloroethane	ND	0.5	ug/L	ND				30	
1,1,2-Trichloroethane	ND	0.5	ug/L	ND				30	

Certificate of Analysis
 Client: CM3 Environmental Inc.
 Client PO: MM2103

Report Date: 15-Nov-2017

Order Date: 9-Nov-2017

Project Description: MM2103

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Trichloroethylene	2.22	0.5	ug/L	2.06			7.5	30	
Trichlorofluoromethane	ND	1.0	ug/L	ND				30	
Vinyl chloride	ND	0.5	ug/L	ND				30	
m,p-Xylenes	ND	0.5	ug/L	ND				30	
o-Xylene	ND	0.5	ug/L	ND				30	
Surrogate: 4-Bromofluorobenzene	39.5		ug/L		123	50-140			
Surrogate: Dibromofluoromethane	34.6		ug/L		108	50-140			
Surrogate: Toluene-d8	37.6		ug/L		118	50-140			

Certificate of Analysis
 Client: CM3 Environmental Inc.
 Client PO: MM2103

Report Date: 15-Nov-2017
 Order Date: 9-Nov-2017
 Project Description: MM2103

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	1440	25	ug/L		72.2	68-117			
F2 PHCs (C10-C16)	1560	100	ug/L		86.7	60-140			
F3 PHCs (C16-C34)	3610	100	ug/L		97.1	60-140			
F4 PHCs (C34-C50)	2060	100	ug/L		83.2	60-140			
Metals									
Antimony	46.8		ug/L	ND	93.3	80-120			
Arsenic	46.7		ug/L	ND	92.7	80-120			
Barium	62.7		ug/L	20.1	85.2	80-120			
Beryllium	40.5		ug/L	ND	80.9	80-120			
Boron	58		ug/L	21	73.7	80-120			QM-07
Cadmium	41.9		ug/L	ND	83.8	80-120			
Chromium	43.2		ug/L	ND	86.2	80-120			
Cobalt	41.7		ug/L	ND	83.4	80-120			
Copper	41.8		ug/L	2.17	79.2	80-120			QM-07
Lead	39.9		ug/L	ND	79.7	80-120			QM-07
Molybdenum	43.3		ug/L	ND	86.6	80-120			
Nickel	40.7		ug/L	ND	80.8	80-120			
Selenium	48.0		ug/L	ND	95.6	80-120			
Silver	41.3		ug/L	ND	82.6	80-120			
Sodium	1050		ug/L	ND	105	80-120			
Thallium	41.5		ug/L	ND	83.0	80-120			
Uranium	43.5		ug/L	ND	87.0	80-120			
Vanadium	45.1		ug/L	ND	90.1	80-120			
Zinc	50		ug/L	7	85.0	80-120			
Semi-Volatiles									
Acenaphthene	6.09	0.05	ug/L		122	50-140			
Acenaphthylene	5.43	0.05	ug/L		109	50-140			
Anthracene	3.16	0.01	ug/L		63.2	50-140			
Benzo [a] anthracene	4.24	0.01	ug/L		84.8	50-140			
Benzo [a] pyrene	3.66	0.01	ug/L		73.2	50-140			
Benzo [b] fluoranthene	6.30	0.05	ug/L		126	50-140			
Benzo [g,h,i] perylene	4.64	0.05	ug/L		92.8	50-140			
Benzo [k] fluoranthene	6.39	0.05	ug/L		128	50-140			
Chrysene	5.33	0.05	ug/L		107	50-140			
Dibenzo [a,h] anthracene	4.95	0.05	ug/L		98.9	50-140			
Fluoranthene	5.36	0.01	ug/L		107	50-140			
Fluorene	5.34	0.05	ug/L		107	50-140			
Indeno [1,2,3-cd] pyrene	4.94	0.05	ug/L		98.9	50-140			
1-Methylnaphthalene	4.20	0.05	ug/L		84.1	50-140			
2-Methylnaphthalene	4.72	0.05	ug/L		94.5	50-140			
Naphthalene	5.29	0.05	ug/L		106	50-140			
Phenanthrene	5.11	0.05	ug/L		102	50-140			
Pyrene	5.44	0.01	ug/L		109	50-140			
Surrogate: 2-Fluorobiphenyl	14.5		ug/L		72.7	50-140			
Volatiles									
Acetone	62.4	5.0	ug/L	ND	62.4	50-140			
Benzene	39.0	0.5	ug/L	ND	97.5	50-140			
Bromodichloromethane	29.1	0.5	ug/L	1.79	68.3	50-140			
Bromoform	39.3	0.5	ug/L	ND	98.3	50-140			
Bromomethane	48.2	0.5	ug/L	ND	120	50-140			

Certificate of Analysis
 Client: CM3 Environmental Inc.
 Client PO: MM2103

Report Date: 15-Nov-2017

Order Date: 9-Nov-2017

Project Description: MM2103

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Carbon Tetrachloride	28.3	0.2	ug/L	ND	70.7	50-140			
Chlorobenzene	42.5	0.5	ug/L	ND	106	50-140			
Chloroform	35.7	0.5	ug/L	4.22	78.8	50-140			
Dibromochloromethane	40.0	0.5	ug/L	1.68	95.7	50-140			
Dichlorodifluoromethane	42.9	1.0	ug/L	ND	107	50-140			
1,2-Dichlorobenzene	42.2	0.5	ug/L	ND	105	50-140			
1,3-Dichlorobenzene	43.4	0.5	ug/L	ND	109	50-140			
1,4-Dichlorobenzene	40.2	0.5	ug/L	ND	101	50-140			
1,1-Dichloroethane	20.5	0.5	ug/L	ND	51.2	50-140			
1,2-Dichloroethane	32.9	0.5	ug/L	ND	82.3	50-140			
1,1-Dichloroethylene	45.8	0.5	ug/L	ND	114	50-140			
cis-1,2-Dichloroethylene	33.9	0.5	ug/L	ND	84.8	50-140			
trans-1,2-Dichloroethylene	39.8	0.5	ug/L	ND	99.5	50-140			
1,2-Dichloropropane	35.2	0.5	ug/L	ND	88.1	50-140			
cis-1,3-Dichloropropylene	36.8	0.5	ug/L	ND	91.9	50-140			
trans-1,3-Dichloropropylene	34.6	0.5	ug/L	ND	86.5	50-140			
Ethylbenzene	44.0	0.5	ug/L	ND	110	50-140			
Ethylene dibromide (dibromoethane)	37.5	0.2	ug/L	ND	93.7	50-140			
Hexane	36.2	1.0	ug/L	ND	90.6	50-140			
Methyl Ethyl Ketone (2-Butanone)	59.1	5.0	ug/L	ND	59.1	50-140			
Methyl Isobutyl Ketone	61.7	5.0	ug/L	ND	61.7	50-140			
Methyl tert-butyl ether	93.5	2.0	ug/L	ND	93.5	50-140			
Methylene Chloride	38.7	5.0	ug/L	ND	96.8	50-140			
Styrene	39.6	0.5	ug/L	ND	99.0	50-140			
1,1,1,2-Tetrachloroethane	39.8	0.5	ug/L	ND	99.5	50-140			
1,1,2,2-Tetrachloroethane	29.8	0.5	ug/L	ND	74.5	50-140			
Tetrachloroethylene	42.2	0.5	ug/L	ND	106	50-140			
Toluene	40.8	0.5	ug/L	ND	102	50-140			
1,1,1-Trichloroethane	38.4	0.5	ug/L	ND	95.9	50-140			
1,1,2-Trichloroethane	36.7	0.5	ug/L	ND	91.8	50-140			
Trichloroethylene	43.2	0.5	ug/L	ND	108	50-140			
Trichlorofluoromethane	53.8	1.0	ug/L	ND	134	50-140			
Vinyl chloride	46.6	0.5	ug/L	ND	117	50-140			
m,p-Xylenes	93.9	0.5	ug/L	ND	117	50-140			
o-Xylene	46.8	0.5	ug/L	ND	117	50-140			

Certificate of Analysis
Client: CM3 Environmental Inc.
Client PO: MM2103

Report Date: 15-Nov-2017
Order Date: 9-Nov-2017
Project Description: MM2103

Qualifier Notes:***QC Qualifiers :***

- QM-07 : The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on other acceptable QC.
- QR-01 : Duplicate RPD is high, however, the sample result is less than 10x the MDL.

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable
ND: Not Detected
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.

Subcontracted Analysis

CM3 Environmental Inc.

5710 Akins Road
Ottawa, ON K2S 1B8
Attn: Marc MacDonald

Tel: (613) 820-4343
Fax: (613) 820-7695

Paracel Report No **1802156**

Client Project(s): **MM2103**

Client PO: **5536 Manotick Main St.**

Reference: **Standing Offer**

CoC Number: **53535**

Order Date: 09-Jan-18

Report Date: 12-Jan-18

Sample(s) from this project were subcontracted for the listed parameters. A copy of the subcontractor's report is attached

Paracel ID	Client ID	Analysis
1802156-01	VM1	VOCs in Air - Thermal Desorption
1802156-02	VM2	VOCs in Air - Thermal Desorption

CERTIFICATE OF ANALYSIS

REPORTED TO Paracel Laboratories Ltd (Ottawa)
300-2319 St. Laurent Blvd
Ottawa, ON K1G 4J8

ATTENTION Donna Bloom

PO NUMBER

PROJECT Soil Vapour Analysis

PROJECT INFO 1802156

WORK ORDER 8010607

RECEIVED / TEMP 2018-01-10 09:55 / NA

REPORTED 2018-01-11 15:15

COC NUMBER B53535

Introduction:

CARO Analytical Services is a testing laboratory full of smart, engaged scientists driven to make the world a safer and healthier place. Through our clients' projects we become an essential element for a better world. We employ methods conducted in accordance with recognized professional standards using accepted testing methodologies and quality control efforts. CARO is accredited by the Canadian Association for Laboratories Accreditation (CALA) to ISO 17025:2005 for specific tests listed in the scope of accreditation approved by CALA.

Big Picture Sidekicks



You know that the sample you collected after snowshoeing to site, digging 5 meters, and racing to get it on a plane so you can submit it to the lab for time sensitive results needed to make important and expensive decisions (whew) is VERY important. We know that too.

We've Got Chemistry



It's simple. We figure the more you enjoy working with our fun and engaged team members; the more likely you are to give us continued opportunities to support you.

Ahead of the Curve



Through research, regulation knowledge, and instrumentation, we are your analytical centre for the technical knowledge you need, BEFORE you need it, so you can stay up to date and in the know.

If you have any questions or concerns, please contact me at estclair@caro.ca

Authorized By:

Eilish St.Clair, B.Sc., C.I.T.
Client Service Representative

1-888-311-8846 | www.caro.ca

#110 4011 Viking Way Richmond, BC V6V 2K9 | #102 3677 Highway 97N Kelowna, BC V1X 5C3 | 17225 109 Avenue Edmonton, AB T5S 1H7

TEST RESULTS

REPORTED TO PROJECT Paracel Laboratories Ltd (Ottawa)
Soil Vapour Analysis

WORK ORDER REPORTED 8010607
2018-01-11 15:15

Analyte	Result	RL	Units	Analyzed	Qualifier
VM1 (8010607-01) Matrix: Air Sampled: 2018-01-09					
Sampling Flow: 100 mL/min		Sampling Time: 20 min			
Volatile Organic Compounds (VOC)					
cis-1,2-Dichloroethylene	< 0.5	0.5	µg/m3	2018-01-10	
Tetrachloroethylene	< 2.5	2.5	µg/m3	2018-01-10	
Trichloroethylene	< 0.25	0.25	µg/m3	2018-01-10	
Surrogate: Toluene-d8	97	60-127	%	2018-01-10	

VM2 (8010607-02) | Matrix: Air | Sampled: 2018-01-09

Sampling Flow: 100 mL/min Sampling Time: 20 min

Volatile Organic Compounds (VOC)

cis-1,2-Dichloroethylene	< 0.5	0.5	µg/m3	2018-01-10	
Tetrachloroethylene	6.2	2.5	µg/m3	2018-01-10	
Trichloroethylene	0.45	0.25	µg/m3	2018-01-10	
Surrogate: Toluene-d8	99	60-127	%	2018-01-10	

APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO PROJECT Paracel Laboratories Ltd (Ottawa)
Soil Vapour Analysis

WORK ORDER REPORTED 8010607
2018-01-11 15:15

Analysis Description	Method Ref.	Technique	Location
VOC/VH/VP in Air	EPA TO-17 (1999)	Thermal Desorption (TD) GC-MSD	Richmond

Glossary of Terms:

RL	Reporting Limit (default)
<	Less than the specified Reporting Limit (RL) - the actual RL may be higher than the default RL due to various factors
µg	Micrograms
EPA	United States Environmental Protection Agency Test Methods

Volatiles in Vapour by Thermal Desorption Comments:

If the sampling pump flow rate and sampling duration are available, results are converted from a weight basis (µg) to a weight per volume basis (µg/m³). In the event of a discrepancy between the lab-calibrated flow rate and field flow rate, the field flow rate will be used, unless indicated otherwise. Inaccurate sampling information could cause a significant bias in the results.

General Comments:

The results in this report apply to the samples analyzed in accordance with the Chain of Custody document. This analytical report must be reproduced in its entirety. CARO is not responsible for any loss or damage resulting directly or indirectly from error or omission in the conduct of testing. Liability is limited to the cost of analysis. Samples will be disposed of 30 days after the test report has been issued unless otherwise agreed to in writing.

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO PROJECT Paracel Laboratories Ltd (Ottawa)
Soil Vapour Analysis

WORK ORDER REPORTED 8010607
2018-01-11 15:15

The following section displays the quality control (QC) data that is associated with your sample data. Groups of samples are prepared in "batches" and analyzed in conjunction with QC samples that ensure your data is of the highest quality. Common QC types include:

- **Method Blank (Blk):** A blank sample that undergoes sample processing identical to that carried out for the test samples. Method blank results are used to assess contamination from the laboratory environment and reagents.
- **Duplicate (Dup):** An additional or second portion of a randomly selected sample in the analytical run carried through the entire analytical process. Duplicates provide a measure of the analytical method's precision (reproducibility).
- **Blank Spike (BS):** A sample of known concentration which undergoes processing identical to that carried out for test samples, also referred to as a laboratory control sample (LCS). Blank spikes provide a measure of the analytical method's accuracy.
- **Matrix Spike (MS):** A second aliquot of sample is fortified with with a known concentration of target analytes and carried through the entire analytical process. Matrix spikes evaluate potential matrix effects that may affect the analyte recovery.
- **Reference Material (SRM):** A homogenous material of similar matrix to the samples, certified for the parameter(s) listed. Reference Materials ensure that the analytical process is adequate to achieve acceptable recoveries of the parameter(s) tested.

Each QC type is analyzed at a 5-10% frequency, i.e. one blank/duplicate/spike for every 10-20 samples. For all types of QC, the specified recovery (% Rec) and relative percent difference (RPD) limits are derived from long-term method performance averages and/or prescribed by the reference method.

Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Volatile Organic Compounds (VOC), Batch B8A0566									
Blank (B8A0566-BLK1)					Prepared: 2018-01-10, Analyzed: 2018-01-10				
cis-1,2-Dichloroethylene	< 0.0010	0.0010 µg							
Tetrachloroethylene	< 0.0050	0.0050 µg							
Trichloroethylene	< 0.0005	0.0005 µg							
Surrogate: Toluene-d8	0.138	µg	0.125		110	60-127			
LCS (B8A0566-BS1)					Prepared: 2018-01-10, Analyzed: 2018-01-10				
cis-1,2-Dichloroethylene	0.0582	0.0010 µg	0.0500		116	60-140			
Tetrachloroethylene	0.0525	0.0050 µg	0.0500		105	60-140			
Trichloroethylene	0.0549	0.0005 µg	0.0500		110	60-140			
LCS Dup (B8A0566-BSD1)					Prepared: 2018-01-10, Analyzed: 2018-01-10				
cis-1,2-Dichloroethylene	0.0596	0.0010 µg	0.0500		119	60-140	2	30	
Tetrachloroethylene	0.0549	0.0050 µg	0.0500		110	60-140	5	30	
Trichloroethylene	0.0560	0.0005 µg	0.0500		112	60-140	2	30	