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TRANSMITTAL

TRANSMITTAL No. 15-0434-004-00005

PROJECT : 15-0434-004 Hornepayne Yard 2015 ECA Compliance Monitoring and O&M

TO : Mr. Kirk Crosson
Ministry of the Environment
70 Foster Drive
Suite 110
Sault Ste. Marie ON P6A 6V4

FROM : Nick Tropea
KGS Group

DATE : February 04, 2016

SUBJECT : CN Hornepayne 2015 Env. Program Final Report

SUBMITTED FOR : ☐ Approval ☑ Your Use ☐ As Requested ☐ Review and Comment

SENT VIA :

ITEM	DESCRIPTION	STATUS
RPT	Title: MOE 2015 Environmental Program Hornepayne Yard (RPT), Revision: (0, Feb 4, 2016)	Issued for Use

REMARKS : As per the request of Nick Tropea, please see enclosed the Final Report regarding Hornepayne Yard 2015 Environmental Program Ministry of the Environment and Climate Change. One (1) hard copy will be sent to you via Purolator.

Regards,

Stacy Allison
Document Control

COPIES TO :

KGS Group
Tony Gallo

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Canadian National
Hornepayne Yard
Hornepayne, Ontario
2015 Environmental Program
Ministry of the Environment and Climate Change

January 2016

Privileged and Confidential

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EXECUTIVE SUMMARY

KGS Group was retained by Canadian National (CN) to provide environmental and engineering services for the 2015 Environmental Program at the CN Hornepayne Yard, located in Hornepayne, Ontario. This report details the operation and maintenance activities associated with remedial activities at the Yard. The Hornepayne Yard operates under the Amended Certificate of Approval No. 3528–83LQWT (C of A).

West End Diesel Recovery System

The West End Diesel Recovery System (DRS) continues to function as per design, passively collecting Light Non-Aqueous Phase Liquids (LNAPL) from the fuelling stand area. Approximately 4,519 L of LNAPL was collected during the 2015 operating year. Since commissioning in the fall of 1998, the system has recovered approximately 188,251 L.

The DRS was inspected weekly from May to November 2015. Monthly DRS effluent samples met all criteria outlined in the C of A.

Lagoon No.2 Containment System

The Lagoon No.2 Containment System (CS) continued to operate as designed and contained impacts within the Lagoon No.2 and Former Pump House areas.

The horizontal extent of the LNAPL plume has not changed from previous years, although the measured LNAPL thickness in monitoring wells fluctuates between years. The Lagoon No.2 CS recovered approximately 1,840 L of LNAPL in 2015. Since 1998, approximately 29,594 L of LNAPL has been collected from this area.

In 2015, the Lagoon No.2 CS was inspected weekly from May to November. Effluent sampled from the Lagoon No.2 outlet met all criteria outlined in the C of A. Lagoon No.2 continues to adequately attenuate impacted effluent from various Yard operations.

Former Shop Track Fuelling Area Diesel Recovery System

The skimmer unit was operated for the majority of the 2015 operating year (May to September). In total, 326 L of LNAPL was collected from this area between the operation of the skimmer unit and the collection of LNAPL from Yard operations by both KGS Group and local CN personnel. Since 2004, approximately 18,656 L of LNAPL / waste oil has been collected from this area.

Waste Oil Transfer Facility

The Waste Oil Transfer Facility did not operate in 2015. A total of 15,000 L of total fluids, collected by KGS Group led operations, were taken directly off-site for processing.

Surface Water

The surface water program continues to show that Yard effluent/surface water discharge has no visual evidence of petroleum hydrocarbon sheen. All surface water results for target parameters were below the C of A criteria.

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1.0 INTRODUCTION

Kontzamanis Graumann Smith MacMillan Inc. (KGS Group) was retained by Canadian National (CN) to provide environmental and engineering services for the 2015 Environmental Program at the CN Hornepayne Yard, located in Hornepayne, Ontario (Figure 1). This report details the operation and maintenance activities associated with both the West End Diesel Recovery System (DRS) and East End Environmental Protection Systems (EPS) (PIN # 1000/ONPR/100586, PIN # 1000/ONPR/100587, and PIN # 1000/ONPR/100591), and also details the results of the groundwater and surface water monitoring and sampling program conducted during the 2015 operating year. The East and West End systems operate under the Amended Certificate of Approval No. 3528–83LQWT (C of A), which was issued on April 29, 2010 (Appendix A).

1.1 SYSTEM DESCRIPTIONS

1.1.1 West End Diesel Recovery System

The location of the West End DRS (PIN # 1000/ONPR/100587) within the Hornepayne Yard is shown on Figure 2, while the DRS components are shown on Figure 3. The DRS was constructed in 1998 and was composed of eleven (11) underdrains placed below the former fuelling area, each at various elevations within the subsurface. Ten (10) of the underdrains remain, with nine (9) underdrains being functional. Underdrain No.7 was destroyed in 1998 during construction of the diesel recovery lagoon (DRL). During maintenance of the underdrains in 2013, a blockage was found within underdrain No.4 at approximately seven (7) feet, and could not be removed. The underdrains discharge total fluids into the DRL. A skimmer unit, located within the skimmer building at the west end of the DRL, collects LNAPL floating on the surface of the water within the DRL. Collected LNAPL is transferred by gravity to a 25,000 L waste oil recovery tank. Effluent from the DRL is discharged to a discharge trench. At the downstream end of the discharge trench is a concrete control structure, through which effluent is discharged to the Little Jackfish River. Flow through the structure is controlled using a manual butterfly valve.

1.1.2 East End Environmental Protection System

Lagoon No.2 Containment System

Figure 4 shows the location of the Lagoon No. 2 Containment System (CS) relative to the Yard, while the general components of the Lagoon No.2 CS are shown on Figure 5. The Lagoon No.2 CS contains system components located both inside and outside of the oil / water separator (OWS) building and the compressor building. Located inside the OWS building is a 45.4 gallon per minute OWS, transfer tank, and refrigerated air dryer, while the air compressor is located in the air compressor building. A horizontal waste oil tank, nine (9) pumping wells, an interception trench and collection sump, a bentonite cut-off wall, and Lagoon No.2 are located outside of both buildings. Five (5) submersible pneumatic pumps transfer total fluids from selected pumping wells to the OWS. The submersible pumps can be placed in any of the pumping wells within the network, depending on LNAPL thickness measured in the selected wells. Total fluids, collected from the interception trench and sump located approximately 100 m west of the air compressor building, are also pumped to the OWS. A submersible pump, transfers the total fluids from the interception trench into the OWS at the OWS building. An automatic float controls the fluid level within the trench. Total fluids are processed by the OWS. LNAPL drains by gravity into a transfer tank. When LNAPL inside the transfer tank attains a pre-determined level (level switch), LNAPL is pumped into a 4,560 L, double walled waste oil tank. Effluent water from the OWS is discharged directly into Lagoon No.2.

Former Shop Track Fuelling Area Diesel Recovery System

The location of the Former Shop Track Fuelling area (FSTF) (PIN # 1000/ONPR/100591) is shown on Figure 6, while the general FSTF components are shown on Figure 7. The FSTF DRS is composed of a collection sump, a submersible pump, a skimmer unit, and 4,540 L waste oil recovery tank. Total fluids from the surrounding area drain by gravity through open slats cut into the existing collection sump. The skimmer unit, which is located within the skimmer building, collects LNAPL floating on the surface of the water within the existing collection sump. Collected LNAPL is transferred by gravity to the 4,540 L waste oil recovery tank. When fluid levels within the collection sump drop to a level where the skimmer belt can no longer collect floating LNAPL on the surface of the water, then the submersible pump, complete with stop and

start floats, is activated to transfer total fluids from the collection sump to the OWS, located at the Waste Oil Transfer Facility.

Waste Oil Transfer Facility

The location of the Waste Oil Transfer Facility (WOTF) (PIN # 1000/ONPR/100591) is shown on Figure 8. The WOTF system components are shown on Figure 9. The WOTF contains system components both inside and outside the building. The WOTF consists of a control panel, holding tank, coalescing OWS, LNAPL transfer pump, CN tanker car, former fuelling stand sump pit, and submersible pump. Total fluids, collected from the Yard via operations conducted by KGS Group, local CN forces and other contractors, are placed in a 10,000 gallon holding tank. The purpose of the WOTF system is to separate the total fluids stored in the holding tank. Total fluids drain by gravity from the holding tank to the coalescing OWS, located inside the WOTF building. The total fluids are processed through the OWS. Collected LNAPL is pumped to an external tanker car, provided by CN. Effluent water from the OWS drains by gravity and discharges to Lagoon No.2.

2.0 OPERATION AND MAINTENANCE

2.1 WEST END FUELLING STAND SYSTEM

2.1.1 Operations and Inspections

KGS Group personnel installed the skimmer belt on May 20, 2015 and started operation of the skimmer unit. Both KGS Group and local personnel adjusted the skimmer belt and increased / decreased the blade tension on the skimmer belt on an as required basis during 2015. The skimmer unit was shut down and winterized on November 11, 2015 by KGS Group personnel.

In 2015, KGS Group personnel conducted monthly inspections from May to November, while local personnel conducted weekly inspections during the same time period. Inspections were conducted to assess the operation of the DRS, to measure the collection of LNAPL, and to visually inspect the final discharge location. KGS Group personnel also collected an effluent sample (when flow was present) from the final discharge location on a monthly basis. Weekly inspection forms for the 2015 operating year can be provided upon request.

2.1.2 Operation and Maintenance Issues

In 2015, the skimmer unit operated from May to November, experiencing no operational interruptions. System maintenance was conducted on a monthly basis, when required; however, none of the maintenance items caused the system to be shut down for a period longer than one (1) day.

2.1.3 Collected LNAPL

The West End DRS recovered approximately 4,519 L of LNAPL during the 2015 operating year (Figure 10). Since the commissioning of the system in the spring of 1998, the West End DRS has collected approximately 188,251 L of LNAPL (Figure 11).

2.2 EAST END ENVIRONMENTAL PROTECTION SYSTEM

2.2.1 Lagoon No.2 Containment System Operations and Inspections

KGS Group personnel installed the pneumatic pumps and the associated system components on May 21, 2015 and began system operation; however, mechanical issues with the LNAPL transfer pump (see Section 2.2.2). A new LNAPL transfer pump was purchased and installed on June 22, 2015. KGS Group personnel began system operation on June 22, 2015.

In 2015, KGS Group personnel conducted monthly inspections from May to November, while local personnel conducted weekly inspections during the same time period. Inspections were conducted to assess the operation of the Lagoon No.2 CS, to measure the collection of LNAPL, and to visually inspect the final discharge location. KGS Group personnel also collected an effluent sample from the final discharge location on a monthly basis. Weekly inspection forms for the 2015 operating year can be provided upon request.

The recovery trench submersible pump was started on June 22, 2015 and operated within normal parameters throughout the 2015 operating year.

The pneumatic pumps were rotated between five (5) of the recovery wells in 2015 (PW-2, PW-6, PW-7, PW-8, and PW-9). Pumping Wells PW-3, PW-4, PW-5, and PW-10 were not utilized due to insignificant thickness of LNAPL present and fluctuating water table levels. LNAPL from within these four (4) pumping wells was manually bailed during each inspection, when present.

2.2.2 Lagoon No.2 Containment System Operation and Maintenance Issues

Operation of the Lagoon No.2 CS was delayed in 2015 due to mechanical issues experienced with the LNAPL transfer pump. To prevent the potential for a spill, operation of the LNAPL transfer pump was stopped and the Lagoon No.2 CS was shut down until the LNAPL transfer pump could be replaced. A new LNAPL transfer pump was installed on June 22, 2015.

Operation of the Lagoon No.2 CS began on June 22, 2015, with five (5) pumps in operation within pumping wells PW-2, PW-6, PW-7, PW-8 and PW-9. On October 15, 2015, KGS Group personnel observed that the Lagoon No.2 CS was not operating. Further inspection revealed that a power outage engaged the high level alarm, triggering the automatic shut down of the

system. KGS Group personnel re-set the electrical components of the Lagoon No.2 CS and system operation was activated.

The Lagoon No.2 CS components were winterized on November 11, 2015. Green for Life of Thunder Bay, Ontario removed the total fluids from all system components on November 11, 2015. The volume of total fluids was added to the total of LNAPL recovered from this area of the Yard in 2015, and is presented on Figure 12.

2.2.3 Lagoon No.2 Collected LNAPL

The Lagoon No.2 CS recovered approximately 1,840 L of LNAPL during the 2015 operating year (Figure 12). Since LNAPL recovery began in the spring of 1998, the Lagoon No.2 CS, in its various forms, has collected approximately 29,594 L of LNAPL (Figure 13).

2.2.4 Former Shop Track Fuelling Area Diesel Recovery System Operations and Inspections

KGS Group personnel installed the skimmer belt and began operation of the skimmer unit on May 20, 2015. KGS Group and local personnel adjusted the skimmer belt and increased / decreased the blade tension on the skimmer belt on an as required basis during 2015. The skimmer unit was winterized on November 11, 2015 by KGS Group personnel.

Although the remedial system did not operate in 2015, the waste oil tank and skimmer unit were inspected on a monthly basis.

In 2015, KGS Group personnel conducted monthly inspections from May to November, while local personnel conducted weekly inspections during the same time period. Inspections were conducted to measure the collection of LNAPL placed in the waste oil tank, and inspect the skimmer unit. Weekly inspection forms for the 2015 operating year can be provided upon request.

2.2.5 Former Shop Track Fuelling Area Diesel Recovery System Operation and Maintenance Issues

During an inspection on September 23, 2015, local personnel observed the skimmer belt was not touching the surface of the water within the collection sump. Further inspection revealed the water level in the collection sump to have dropped below the length of the hydrophobic skimmer belt. KGS Group personnel instructed local personnel to manually shut down the operation of the skimmer unit on September 30, 2015. Since the water level within the collection sump did not increase, the skimmer unit remained shut down for the remainder of the 2015 operating year.

2.2.6 Former Shop Track Fuelling Area Diesel Recovery System Collected LNAPL

In total, 326 L of LNAPL was recovered / collected from this area in 2015. The FSTF area skimmer unit operated from May until September 2015, while both KGS Group and local CN personnel placed waste oil, from various Yard operations, in the waste oil tank. A summary of LNAPL collection for 2015 can be found on Figure 14. Since its commissioning in the spring of 2004, system and manual collection has recovered approximately 18,656 L of LNAPL / waste oil. A summary of historical collection can be found on Figure 15.

2.2.7 Waste Oil Transfer Facility Operations and Inspections

As there was no tanker car placed at the WOTF in 2015, the transfer system was not operated.

Level measurements were recorded as KGS Group and local CN personnel used the holding tank to store waste oil generated from Yard activities. There were no operation or maintenance issues to report for this area in 2015.

2.2.8 Waste Oil Transfer Facility Collected LNAPL

The WOTF did not operate in 2015. Green for Life of Thunder Bay, Ontario removed approximately 15,000 L of total fluids (collected from various LNAPL collection systems in the Yard) for off-site processing / disposal. Waste Manifest Forms are provided in Appendix B.

3.0 C OF A EFFLUENT AND SURFACE WATER PROGRAM

As per the requirements of the C of A, effluent and surface water samples were collected from four (4) locations in 2015. The four (4) locations area as follows:

- HOR 002 05 (Lagoon No.2 Outlet, sampled monthly during operating year),
- HOR 004 05 (Jackfish River Down Stream, sampled monthly during operating year),
- HOR 005 05 (Jackfish River Mid Stream, sampled monthly during operating year), and
- HOR 013 05 (Drainage Trench to Jackfish River, sampled monthly during operating year).

The effluent and surface water sampling locations are shown on Figure 16. KGS Group personnel collected grab samples at these locations during each monthly inspection visit or as part of the surface water-sampling program (when flow was present). Samples were submitted to Maxxam Analytics Inc. in Mississauga, Ontario for the laboratory analysis of benzene, toluene, ethylbenzene, total xylenes (BTEX), total purgeable hydrocarbons (TPH), total extractable hydrocarbons (TEH), petroleum hydrocarbon (PHC) fractions F1 to F4, methyl-t-butyl-Ether (MTBE), pH, alkalinity, hardness, and lead. The effluent samples were submitted to the laboratory accompanied with completed chain of custody (COC) forms supplied by CN via the SAP program.

Water quality analysis results are presented in Table 1. Laboratory certificates of analysis can be provided upon request.

3.1 RESULTS

3.1.1 West End DRS

Concentrations of BTEX, PHC fractions F1 to F4, MTBE, lead and pH in the effluent samples were below the applicable C of A criterion. Effluent quality analysis results are presented in Table 1. Laboratory certificates of analysis can be provided upon request.

3.1.2 Lagoon No.2 CS

Concentrations of BTEX, PHC fractions F1 to F4, MTBE, lead and pH in the effluent samples were below the applicable C of A criterion. Effluent quality analysis results are presented in Table 1. Laboratory certificates of analysis can be provided upon request.

3.1.3 Jackfish River Mid-Stream and Jackfish River Down Stream

Laboratory results show that BTEX, PHC fractions (where analysed), MTBE, lead and pH were below the applicable C of A criterion. Surface water quality analysis results are presented in Table 1. Laboratory certificates of analysis can be provided upon request.

3.2 EFFLUENT FLOW

3.2.1 Effluent Flow Estimation

In May 2015, transducers were installed in the West End (discharge trench) and East End (Lagoon No.2) to measure and record the height of the water column in order to calculate the effluent flow rate from both locations. In the West End, the transducer was installed in the discharge trench, upgradient of the final effluent discharge point to the Little Jackfish River, while in the East End, the transducer was installed in the northeast corner of Lagoon No.2, upgradient of the final effluent discharge point to the Little Jackfish River (Figures 3 and 5).

Each logger was placed within a protective "pipe and block" assembly to ensure that the logger was protected, and that the logger maintained its vertical position for accurate measurement of water depth. A continuous monitoring barometric pressure logger was installed in the West End in conjunction with the depth loggers to calibrate the water depth measurements, which are impacted by changes in atmospheric pressure. The loggers were pre-set to obtain water depth readings on an hourly basis. Data from each logger was manually downloaded on a monthly basis to ensure that the loggers were functioning as required, and to minimize data loss due to equipment malfunction or other issues. Pressure transducer calculations are provided in Appendix C.

Measurements from both effluent streams were collected from May to November 2015. Recorded water depths and barometric pressure were transferred to an excel spreadsheet, which was used to calculate flows at each location based on the specific flow formulae developed for each location. The median was used to describe the central tendency of flow data due to the skewed nature (non normal distribution) of flow. The median was chosen over the mean because the median is not impacted by extreme values in the data sets. The daily, weekly, and monthly statistical values summarizing the median, 25th percentiles, and 75th percentiles are presented in Tables 2 to 5. Percentiles were used for comparisons of the

spread between data sets, as it is less affected by extreme values in the data sets compared to the range.

3.2.2 Calibration

The calibration of flow data was conducted on a monthly basis during the 2015 operating year. Calibration consisted of the collection of physical measurements of flow by using a calibrated twenty (20) L pail. Five (5) separate measurements were collected and the median value was taken as the flow rate. This value was then compared to the calculated flow and used to ensure that the calculated flow was within 20% of the actual flow rate.

3.2.3 West End

Daily, weekly and monthly flow rates calculated at the west end are presented in Tables 2 and 3, respectively. Median flow rates ranged from 0 L/sec in October to 0.44 L/sec in May. In June 2015, the discharge pipe was observed to be plugged with organic debris, likely due to beaver activity in the area; therefore the June flow measurements and calibration were collected after the removal of the organic debris. On July 8, 2015, the logger pipe was found to be knocked over. The pipe was fixed and reset and the flow measurements and calibration were collected on July 22, 2015.

The relative percent difference (RPD) between the actual flow rate (calibrated measurement) and the calculated flow rate (flow meter measurement) was within 20%, and ranged from 12% (November) to 20% (June).

3.2.4 East End

Daily, weekly and monthly flow rates calculated at the east end are presented in Tables 4 and 5, respectively. Median flow rates ranged from 0.08 L/sec in October to 0.37 L/sec in May.

The RPD between the actual flow rate (calibrated measurement) and the calculated flow rate (flow meter measurement) was generally within 20%, and ranged from 15% (July, November) to 25% (September).

4.0 GEOLOGY AND HYDROGEOLOGY

4.1 GEOLOGY

4.1.1 West End

Native soils within the West End are generally silty sands with traces of clay. The shallow soils are typically brown turning to grey-blue at the saturation zone, which is typical of a stable water table. Localized peat layers are also found within this area. Layers of surficial imported fill, where present, range in thickness from 0 to 4 m. Historical drill logs are provided in Appendix D, while stratigraphic cross sections for the West End are presented in Appendix E (Figure E1 and E2, respectively).

4.1.2 East End

The geology of the East End typically consists of fill overtop layers of peat and silty sands. Parallel to the Little Jackfish River, the geology shifts to more coarse granular materials, sands, gravel, cobbles and boulders. Historical drill logs are provided in Appendix D, while stratigraphic cross sections for the East End are presented in Appendix E (Figures E3 and E4, respectively).

4.2 HYDROGEOLOGY

4.2.1 West End

Groundwater monitoring data for this section of the Yard is presented in Table 6. Representative contours for the fall monitoring event is shown on Figure 17.

Groundwater depth ranged from 1.35 metres below ground surface (mbgs) at OW9-3 to 3.88 mbgs at OW8-3 during the fall event. Interpreted groundwater flow direction was to the north / northeast, with local flow varying in the area of the DRS due to the influence of the underground drains and the DRL.

The average hydraulic gradient in the fall was 0.03 m/m, with local variations ranging from 0.01 to 0.05 m/m. Based on an estimated hydraulic conductivity of 10^{-8} m/s for silty clay, and an effective porosity of 0.25, the estimated groundwater velocity, local to the DRS in 2015 was calculated at 0.04 m/year.

4.2.2 East End

Groundwater monitoring data for this section of the Yard is presented in Table 6. Representative contours for the spring and fall monitoring events are shown on Figures 18 and 19, respectively.

Former Pump House Area

Groundwater depths in the Former Pump House area ranged from a depth of 1.65 mbgs at MW-20 to 1.93 mbgs at MW-43 in the spring and from 2.2 mbgs at MW-43 to 2.44 mbgs at MW-106 in the fall.

Interpreted groundwater flow direction was to the north / northwest, generally towards the Little Jackfish River. Hydraulic gradients were variable and the estimated groundwater velocities through the silty sands ranged between 1 to 3 m/year.

Lagoon No.2 Area

Groundwater depths in the Lagoon No.2 area ranged from a depth of 1.80 mbgs at MW-52 to 4.34 mbgs at MW-21 in the spring and from 2.07 mbgs at MW-104 to 4.48 mbgs at MW-21 in the fall.

Interpreted groundwater flow direction was to the north / northeast, with local flow varying in the area of Lagoon No.2 due to the influence of underground infrastructure. The average hydraulic gradient in the fall was 0.03 m/m, with local variations ranging from 0.01 to 0.04 m/m. Based on an estimated hydraulic conductivity of 10^{-6} m/s for silt and silty sands, and an effective porosity of 0.30 the estimated groundwater velocity local to Lagoon No.2 in 2015 was calculated at 3.15 m/year in the fall.

Former Shop Track Fuelling Area

Groundwater depths in the FSTF area ranged from a depth of 2.57 mbgs at MW-49 to 3.8 mbgs at MW-114 in the fall.

Interpreted groundwater flow direction was to the north / northeast towards Lagoon No.2 and the Little Jackfish River. Groundwater flow is locally influenced by underground infrastructure. The average hydraulic gradients in the spring and fall were variable, with local variations ranging from 0.01 to 0.03 m/m. Based on an estimated hydraulic conductivity of 10^{-6} m/s for silty sands and an effective porosity of 0.30 the estimated groundwater velocity local to the FSTF area in 2015 was calculated at 3 m/year in the fall.

Roundhouse Area

Representative contours for the spring and fall monitoring events are shown on Figures 18 and 19, respectively. Groundwater flow was to the north / northwest. Groundwater gradients were variable, with an estimated groundwater velocity calculated at 3 m/year through the sandy silts/silts.

5.0 GROUNDWATER SAMPLING

5.1 METHODOLOGY

5.1.1 Groundwater Sampling

Groundwater sampling events were conducted on June 23 (spring) and between October 5 and 7 (fall), 2015. Low Flow Purging was used to sample groundwater from the site. Samples were collected in appropriate laboratory sample bottles, which were pre-filled with proper preservative where required. The samples were packed in ice chests with ice and shipped to Maxxam Analytics Inc. in Mississauga, Ontario for laboratory analysis.

As per the C of A, groundwater samples from monitoring wells located within 30 m of the Little Jackfish River were submitted for the laboratory analysis of BTEX and PHC fractions F1 to F4 as part of the spring sampling event. In the fall, groundwater samples from all monitoring well locations listed on the C of A were submitted for the laboratory analysis of PHC fractions F2 to F4.

5.1.2 Assessment Criteria

Groundwater sampling results were compared to the Ontario Ministry of Environment and Climate Change (MOECC) "Soil, Groundwater and Sediment Standards for use under XV.1 of the Environmental Protection Act, dated April 15, 2011. Groundwater results for monitoring wells located within 30 m of the Little Jackfish River were assessed using MOECC Table 9 Site Conditions Standards (SCS), while results from monitoring wells outside of the 30 m from the Little Jackfish River were assessed using MOECC Table 3 SCS.

5.2 GROUNDWATER MONITORING

5.2.1 West End

Groundwater was monitored in twenty (20) monitoring wells in 2015. LNAPL was measured in five (5) monitoring wells (MW-11R, MW-121R, MW-123R, OW-57R, and OW-60R) in 2015. Measurable LNAPL varied from 0.008 m at MW-121R to 0.2 m at MW-11R.

5.2.2 Former Pump House Area

Groundwater was monitored in six (6) monitoring wells in 2015. LNAPL was not measured in any of these six (6) wells in 2015.

5.2.3 Lagoon No.2

Groundwater was monitored in thirteen (13) monitoring wells in 2015. LNAPL was measured in four (4) monitoring wells (MW-21, MW-101, OW5-2 and OW5-4) in 2015. Measurable LNAPL varied from 0.23 m at MW-101 to 0.62 m at OW5-2.

5.2.4 Former Shop Track Area

Groundwater was monitored in eleven (11) monitoring wells in 2015. LNAPL was measured in seven (7) monitoring wells (MW-50, MW-110R, MW-112R, MW-124R, MW-125R, MW-126 and OW3-2) in 2015. Measurable LNAPL varied from 0.011 m at MW-125R to 0.58 m at MW-110R.

5.2.5 Roundhouse Area

Groundwater was monitored in two (2) monitoring wells in 2015. Monitoring well MW-34R could not be located in 2015. LNAPL was not measured in either of the two (2) monitoring wells in 2015.

5.3 GROUNDWATER SAMPLING RESULTS

Laboratory results for samples collected during the groundwater monitoring and sampling program are presented on Table 7, while general groundwater field chemistry results are presented on Table 8. Laboratory certificates of analysis can be provided upon request.

5.3.1 Former Pump House Area

Within 30 m of Little Jackfish River – Groundwater was sampled from three (3) monitoring wells (MW-20, MW-43, and MW-46) located within 30 m of the Little Jackfish River in 2015. Concentrations of BTEX and PHC fractions F1 to F4 were non-detectable, or at concentrations below MOECC Table 9 SCS, with the exception of PHC fraction F2, which exceeded MOECC Table 9 SCS at MW-20 in the spring and at all three (3) locations in the fall. BTEX results were

generally similar to results from previous years (2010 to 2014), with concentrations being non-detectable or at levels below MOECC Table 9 SCS. Concentrations of toluene were measured at MW-20 for the first time in 2015. Concentrations of PHC fractions F1 to F4 were within the range of historical results.

Outside 30 m from Little Jackfish River – Groundwater was sampled from three (3) monitoring wells (MW-106, MW-107 and MW-108) located outside the 30 m limit from the Little Jackfish River in 2015. Concentrations of PHC fraction F2 exceeded MOECC Table 3 SCS at all three (3) locations in the fall, while concentrations of PHC fractions F3 exceeded MOECC Table 3 SCS at MW-106 and MW-107 in the fall. PHC fraction F4 concentrations were non-detectable; therefore, below MOECC Table 3 SCS. Concentrations of PHC fractions F2 to F4 were significantly lower at all three (3) locations in 2015 when compared to historical concentrations.

Field Chemistry – Groundwater sampled from all wells within the FPH area was impacted to some degree, making comparisons for trends in field chemistry difficult. However, the data continues to generally show that DO concentrations are slightly lower, and more reduced conditions exist in wells at this location, compared to other locations in the Yard where groundwater is not impacted. These results indicate increased biological activity is occurring within the FPH area.

5.3.2 Lagoon No.2 Area

Within 30 m of Little Jackfish River – In the spring, groundwater was sampled from three (3) monitoring wells (MW-40, OW5-1, and OW5-3) located within 30 m of the Little Jackfish River in 2015. Two (2) other monitoring wells (MW-52 and OW5-2), also located within the 30 m limit of the Little Jackfish River, were not sampled in 2015 due to the presence of measurable LNAPL on groundwater at these locations. Concentrations of BTEX and PHC fractions F1 to F4 were non-detectable, or at concentrations below MOECC Table 9 SCS, with the exception of PHC fraction F2, which exceeded MOECC Table 9 SCS at OW5-1 and OW5-3. BTEX results were generally similar to results from previous years (2010 to 2014), with concentrations being non-detectable or at levels below MOECC Table 9 SCS. Concentrations of PHC fractions F1 to F4 were slightly lower than historical results. In the fall, groundwater was sampled from four (4) of the locations as LNAPL was measured on groundwater from OW5-2. Concentrations of PHC

fractions F2 to F4 were non-detectable or at concentrations below MOECC Table 9 SCS with the exception of PHC fraction F2, which exceeded MOECC Table 9 SCS at MW-52, OW5-1 and OW5-3 and PHC fraction F3, which exceeded MOECC Table 9 SCS at MW-52.

Outside 30 m from Little Jackfish River – Groundwater was sampled from four (4) monitoring wells (MW-51, MW-102, MW-103, and MW-104) located outside the 30 m limit from the Little Jackfish River, in October 2015. Two (2) monitoring wells (MW-21 and MW-101), located outside of the 30 m limit of the Little Jackfish River were not sampled in 2015 due to the presence of measurable LNAPL on groundwater at these locations. PHC Fraction F2 to F4 concentrations in groundwater generally exceeded MOECC Table 3 SCS at each of the sampling locations, with the exception of PHC fraction F3 at MW-102 and MW-103 and PHC fraction F4 at MW-102, MW-103 and MW-104.

Field Chemistry – Field chemistry results show a definite trend of low dissolved oxygen and increased reducing conditions in groundwater from impacted wells as compared to non-impacted wells. The data suggests that there is increased biological activity within impacted areas

5.3.3 Former Shop Track Fuelling Area

Groundwater samples were collected from three (3) monitoring wells in the FSTF area in October 2015 (MW-49, MW-109, and MW-115). Groundwater could not be collected from monitoring well MW-114 as the location was observed to be dry. Concentrations of PHC fractions F2 to F4 were either non-detectable or at concentrations below MOECC Table 3 SCS at MW-49 and MW-115. Concentrations of PHC fractions F2 and F3 exceeded MOECC Table 3 SCS in groundwater sampled from MW-109.

Field Chemistry – Field chemistry results show lower dissolved oxygen concentrations and more reduced conditions in groundwater sampled form impacted areas versus non-impacted areas. The data suggest increased biological activity in impacted areas.

5.3.4 Roundhouse Area

Groundwater was sampled from one (1) monitoring well, MW-24, in October 2015. Concentrations of PHC fractions F2 to F4 were non-detectable.

6.0 CONCLUSIONS

The following conclusions are made based on the 2015 operating year:

6.1 WEST END

- The West End DRS continues to function as per design, passively collecting LNAPL from the fuelling stand area.
- The skimmer unit operated from May to November in the 2015 operating year. System operations were not interrupted throughout the 2015 operating year, with the exception of minor maintenance related interruptions. LNAPL was removed as required from the DRL.
- Weekly inspections were conducted throughout the 2015 operating year, which lasted from May 26, 2015 to November 5, 2015.
- Approximately 4,519 L of LNAPL was collected during the 2015 operating year. Since commissioning in the fall of 1998, the system has recovered approximately 188,251 L.
- Target parameter concentrations in monthly effluent samples were below their applicable C of A criterion.

6.2 EAST END

6.2.1 Lagoon No.2 Containment System Operation and Maintenance

- The Lagoon No.2 Containment System (CS) continued to operate as designed and contained impacts within the Lagoon No.2 and Former Pump House areas.
- The Lagoon No.2 CS operated from June to November in the 2015 operating year. System operation began in June as mechanical issues with the LNAPL transfer pump prevented the safe operation of the system upon startup in May 2015. A new LNAPL mechanical pump was purchased and installed on June 22, 2015. KGS Group personnel began system operation on June 22, 2015.
- Weekly inspections were conducted throughout the 2015 operating year, which lasted from May 26, 2015 to November 5, 2015.
- Approximately 1,840 L of LNAPL was collected in 2015. Since 1998, approximately 29,594 L of LNAPL has been collected.
- Target parameter concentrations in monthly effluent samples were below their applicable C of A criterion.

- Groundwater from this area was sampled in 2015 and analyzed based on the C of A Criterion. Laboratory analysis showed the continued presence of target parameters in exceedance of applicable MOECC Criteria.

- Field chemistry results show a trend of low dissolved oxygen and increased reducing conditions in groundwater from impacted wells as compared to non-impacted wells. The data continues to suggest that there is increased biological activity within impacted areas.

6.2.2 Former Shop Track Fuelling Area

- The FSTF DRS, with the exception of the skimmer unit, did not operate in 2015.

- The skimmer unit operated from May 20, 2015 to September 30, 2015.

- Approximately 326 L of LNAPL was collected by the skimmer unit and from Yard operations and maintenance by both CN and KGS Group personnel in 2015. Since 2004, approximately 18,656 L of LNAPL has been collected.

6.2.3 Waste Oil Transfer Facility

- GFL of Thunder Bay processed 15,000 L of total fluids, collected from various Yard LNAPL recovery systems, off-site due to the non-operation of the WOTF.

6.2.4 Surface Water

- No PHC sheen was observed on any of the surface water samples taken in 2015. The 2015 data showed that the Yard activities are not having any measurable or visible effects on the surface water quality of the Little Jackfish River.

- All analytical data collected from the surface water sampling locations were below the C of A criteria.

7.0 THIRD PARTY USE AND STATEMENT OF LIMITATIONS

7.1 THIRD PARTY USE OF REPORT

This report has been prepared for Canadian National Railway and any use by a third party of this report, or any reliance on or decisions made based on it, are the responsibility of such third parties. KGS Group accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions undertaken based on this report.

7.2 STATEMENT OF LIMITATIONS

KGS Group prepared the environmental conclusions and recommendations for this report in a professional manner using the degree of skill and care exercised for similar projects under similar conditions by reputable and competent environmental consultants. As the report is based on the available information, some of its conclusions could be different if the information upon which it is based is determined to be false, inaccurate or contradicted by additional information. KGS Group makes no representation concerning the legal significance of its findings or the value of the property investigated.

TABLES

TABLE 1
SURFACE WATER QUALITY ANALYSIS
CN HORNEPAYNE YARD, HORNEPAYNE, ONTARIO

Sample [1]	Date	Parameter (mg/L)																		Comments
		Benzene	Toluene	Ethyl-benzene	Xylene (-o)	Xylenes (-m,-p)	MTBE	F1 (C_6-C_{10})	F2 (C_{10}-C_{16})	F3 (C_{16}-C_{34})	F4 (C_{34}-C_{50})	T.P.H. (<C_{10})	T.E.H. (C_{10}-C_{24})	Oil & Grease	Mineral Oil & Grease	pH	Alkalinity	Hardness	Lead	
HOR 002 05 (Lagoon No.2)	Nov-15	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0004	<0.025	1.50	0.58	<0.2	<0.1	2.10	0.70	<0.5	8.0	350	370	<0.05	[3]
	Nov-15	-	-	-	-	-	-	-	1.40	0.58	<0.2	-	2.00	-	-	-	-	-	-	Lab Dup.
	Oct-15	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	<0.025	0.33	<0.2	<0.2	<0.1	0.49	1.40	<0.5	8.1	370	370	<0.05	
	Oct-15	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	<0.025	-	-	-	<0.1	-	-	-	-	-	-	<0.05	Lab Dup.
	Sep-15	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.002	<0.025	2.40	0.74	<0.2	<0.1	3.00	1.90	<0.5	8.2	390	390	<0.05	[3]
	Aug-15	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.001	<0.025	0.79	0.46	<0.2	<0.1	1.10	1.90	<0.5	7.8	350	370	<0.05	[4]
	Jul-15	0.00033	<0.0002	<0.0002	0.00025	<0.0004	<0.002	0.027	4.80	1.70	<0.2	<0.1	6.40	2.00	<0.5	7.6	400	430	<0.05	[3]
	Jun-15	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.001	<0.025	<0.1	<0.2	<0.2	<0.1	<0.2	<0.5	<0.5	7.6	280	310	<0.05	[5]
	May-15	<0.0002	<0.0002	<0.0002	0.00062	<0.0004	<0.0002	<0.025	0.24	<0.2	<0.2	<0.1	0.37	4.50	0.7	7.9	220	260	<0.05	
	Nov-14	0.00023	0.0019	0.0011	0.0055	0.0053	<0.0004	0.06	0.12	<0.2	<0.2	<0.1	<0.2	<0.5	<0.5	8.0	260	310	<0.05	[3]
	Oct-14	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	<0.025	<0.1	<0.2	<0.2	<0.1	<0.2	<0.5	<0.5	8.0	270	290	<0.05	
	Sep-14	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.001	0.082	2.70	0.85	<0.2	<0.1	3.50	1.20	<0.5	7.8	320	350	<0.05	[3]
	Aug-14	<0.0002	0.00034	<0.0002	<0.0002	<0.0004	<0.002	<0.025	0.58	0.21	<0.2	<0.1	0.80	<0.5	<0.5	8.0	310	310	<0.05	[4]
	Jul-14	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0004	<0.025	0.37	<0.2	<0.2	<0.1	0.53	1.30	0.5	7.9	330	350	<0.05	[3]
	Jun-14	<0.0002	<0.0004	<0.0002	<0.0002	<0.0002	<0.0004	<0.025	0.41	<0.2	<0.2	<0.1	0.53	0.60	0.5	7.7	280	340	<0.05	[6]
	May-14	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0005	-	0.26	<0.2	<0.2	<0.1	0.37	0.70	0.5	7.7	220	280	<0.05	[4]
	Nov-13	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	0.18	0.29	<0.2	<0.1	0.35	1.80	<0.5	7.9	370	380	<0.05	
	Oct-13	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	0.51	0.24	<0.2	<0.1	0.73	<0.5	<0.5	7.9	400	420	<0.05	
	Sep-13	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.001	-	1.00	0.51	<0.2	<0.1	1.50	0.60	<0.5	7.7	380	440	<0.05	[4]
	Aug-13	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.001	-	0.65	0.29	<0.2	<0.1	0.82	2.00	<0.5	7.7	380	450	<0.05	[4]
	Jul-13	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.002	-	2.10	0.61	<0.2	<0.1	2.60	2.30	0.8	7.7	380	410	<0.05	[3]
	Jun-13	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0005	-	0.26	<0.2	<0.2	<0.1	0.38	<0.5	<0.5	7.7	320	360	<0.05	[4]
	Nov-12	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.001	-	<0.1	<0.1	<0.1	<0.1	<0.1	1.20	<0.5	7.5	280	340	<0.05	[4]
	Oct-12	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.001	-	0.20	<0.1	<0.1	<0.1	0.29	<0.5	<0.5	8.2	260	290	<0.05	[4]
	Oct-12	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	-	-	-	-	-	-	-	-	Lab Dup.
	Sep-12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Dry
	Aug-12	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0005	-	0.33	0.18	<0.1	<0.1	0.46	3.20	0.7	7.9	430	460	<0.05	
	Jul-12	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.002	-	1.20	0.38	<0.1	<0.1	1.50	<0.5	<0.5	7.7	420	410	<0.05	
	Jun-12	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.002	-	-	-	-	<0.1	0.52	1.70	<0.5	7.8	320	380	<0.05	[4]
	May-12	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.002	-	1.00	0.50	<0.1	<0.1	2.50	<0.5	<0.5	7.7	300	350	<0.05	[4]
	Nov-11	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.002	-	1.60	0.78	<0.1	<0.1	2.50	<0.5	<0.5	7.8	433	410	<0.05	[4]
	Oct-11	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.001	-	-	-	-	<0.1	1.00	0.90	<0.5	7.9	327	330	<0.05	[3]
	Sep-11	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.002	-	1.50	0.42	<0.1	<0.1	1.90	<0.5	<0.5	7.9	432	430	<0.05	[4]
	Aug-11	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0005	-	1.60	0.82	<0.1	<0.1	2.40	<0.5	<0.5	8.0	441	430	<0.05	[4]
	Jul-11	0.0008	<0.0002	0.42	0.37	<0.0004	<0.001	-	-	-	-	0.32	8.50	<0.5	<0.5	7.6	400	410	<0.05	[3]
	Jun-11	0.0006	<0.0002	0.40	<0.0002	0.0015	<0.002	-	-	-	-	<0.1	3.70	<0.5	<0.5	7.8	288	300	<0.05	[3]
	May-11	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0005	-	0.12	0.12	<0.1	<0.1	0.24	<0.5	<0.5	8.0	-	250	<0.05	[4]
	Nov-10	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.002	-	-	-	-	<0.1	0.54	<0.5	<0.5	7.9	-	380	<0.05	[4]
	Oct-10	0.0003	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	-	-	-	<0.1	0.45	<0.5	<0.5	8.1	362	400	<0.05	[4]
	Sep-10	0.0003	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	-	-	-	<0.1	0.37	<0.5	<0.5	8.0	366	390	<0.05	[4]
	Aug-10	<0.0002	0.0002	<0.0002	<0.0002	<0.0004	<0.001	-	-	-	-	<0.1	0.39	1.20	<0.5	7.9	272	250	<0.05	[4]
	Jul-10	<0.0002	0.0002	<0.0002	<0.0002	<0.0004	<0.001	-	-	-	-	<0.1	1.50	1.90	<0.5	7.8	363	330	<0.05	[4]
	Jun-10	0.0006	<0.0002	<0.0002	<0.0002	<0.0004	<0.004	-	-	-	-	0.15	4.80	4.30	<0.5	7.6	382	360	<0.05	[3]
	May-10	<0.005	<0.01	<0.005	<0.005	<0.005	<0.01	-	-	-	-	<0.1	1.80	<0.5	<0.5	7.8	393	410	<0.05	[3]
	Nov-09	0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	0.40	1.30	<0.5	-	-	-	-	
	Oct-09	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	0.29	0.70	<0.5	-	-	-	-	
	Sep-09	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	1.05	<0.5	<0.5	-	-	-	-	
	Aug-09	<0.0002	<0.0002	<0.0002	<0.0002	0.60	-	-	-	-	-	0.11	4.00	1.40	<0.5	-	-	-	-	

TABLE 1
SURFACE WATER QUALITY ANALYSIS
CN HORNEPAYNE YARD, HORNEPAYNE, ONTARIO

Sample [1]	Date	Parameter (mg/L)																		Comments
		Benzene	Toluene	Ethyl-benzene	Xylene (-o)	Xylenes (-m,-p)	MTBE	F1 (C_6-C_{10})	F2 (C_{10}-C_{16})	F3 (C_{16}-C_{34})	F4 (C_{34}-C_{50})	T.P.H. (<C_{10})	T.E.H. (C_{10}-C_{24})	Oil & Grease	Mineral Oil & Grease	pH	Alkalinity	Hardness	Lead	
HOR 002 05 (Lagoon No.2) (Cont'd)	Jul-09	0.0004	<0.0002	<0.0002	<0.0002	0.0004	-	-	-	-	-	<0.1	0.69	3.30	0.70	-	-	-	-	
	Jun-09	0.0004	<0.0002	0.0004	<0.0002	<0.0004	-	-	-	-	-	<0.1	0.40	<0.5	<0.5	-	-	-	-	
	Nov-08	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	1.20	0.70	<0.5	-	-	-	-	
	Oct-08	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	<0.1	<0.5	<0.5	-	-	-	-	
	Sep-08	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	<0.1	3.60	<0.5	-	-	-	-	
	Aug-08	0.0005	<0.0002	0.0002	<0.0002	0.0006	-	-	-	-	-	<0.1	0.18	1.80	<0.5	-	-	-	-	
	Jul-08	0.0016	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	0.11	2.60	2.30	<0.5	-	-	-	-	
	Jun-08	0.0007	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	<0.1	<0.5	<0.5	-	-	-	-	
	May-08	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	<0.1	<0.5	<0.5	-	-	-	-	
	Nov-07	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	<0.1	2.40	0.60	-	-	-	-	
	Oct-07	0.0009	<0.0002	0.0005	<0.0002	0.002	-	-	-	-	-	<0.1	2.90	1.40	<0.5	-	-	-	-	
	Sep-07	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	1.50	2.20	<0.5	-	-	-	-	
	Aug-07	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	<0.1	0.60	<0.5	-	-	-	-	
	Jul-07	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	0.40	0.90	<0.5	-	-	-	-	
	Jun-07	<0.0002	0.0008	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	<0.1	0.80	<0.5	-	-	-	-	
	May-07	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	0.27	<0.5	<0.5	-	-	-	-	
	Nov-06	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	0.25	1.10	<0.5	-	-	-	-	
	Oct-06	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	0.22	1.40	0.70	-	-	-	-	
	Sep-06	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	0.46	1.80	<0.5	-	-	-	-	
	Aug-06	0.0005	<0.0002	0.001	0.0002	0.0022	-	-	-	-	-	0.15	3.70	3.80	1.40	-	-	-	-	
	Jul-06	<0.0002	<0.0002	0.0003	0.0003	<0.0004	-	-	-	-	-	<0.1	2.80	2.60	<0.5	-	-	-	-	
	Jun-06	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	<0.1	<0.5	<0.5	-	-	-	-	
	May-06	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	0.24	1.80	<0.5	-	-	-	-	
	Oct-05	0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	0.70	0.70	<0.5	-	-	-	-	
	Sep-05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Dry
	Aug-05	<0.0002	0.0011	0.0003	<0.0002	0.0005	-	-	0.45	0.29	<0.1	<0.1	0.48	2.50	0.80	-	-	-	-	
	Jul-05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Dry
	Jun-05	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	1.80	10.70	<0.1	-	-	-	-	
	May-05	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	<0.1	0.10	<0.1	-	-	-	-	
	Nov-04	0.0007	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	3.70	0.10	<0.1	-	-	-	-	
	Oct-04	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	<0.1	0.10	<0.1	-	-	-	-	
	Sep-04	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	0.13	0.20	<0.1	-	-	-	-	
	Aug-04	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	0.15	0.10	<0.1	-	-	-	-	
	Jul-04	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	0.38	0.10	<0.1	-	-	-	-	
	Jun-04	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	0.15	0.10	<0.1	-	-	-	-	
	May-04	<0.0002	<0.2	<0.2	0.013		-	-	-	-	-	<0.1	0.11	0.10	<0.1	-	-	-	-	
HOR 004 05 (Jackfish River, Down Stream)	Nov-15	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	<0.025	<0.1	<0.2	<0.2	<0.1	<0.2	<0.5	<0.5	7.8	90	99	<0.05	
	Nov-15	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	-	-	-	-	-	-	-	Lab Dup.
	Oct-15	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.002	<0.025	<0.1	<0.2	<0.2	<0.1	<0.2	<0.5	<0.5	8.2	140	140	<0.05	
	Sep-15	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	<0.025	<0.1	<0.2	<0.2	<0.1	<0.2	<0.5	<0.5	7.9	120	130	<0.05	
	Aug-15	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0002	<0.025	<0.1	<0.2	<0.2	<0.1	<0.2	1.30	<0.5	8.0	130	150	<0.05	
	Aug-15	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0002	<0.025	<0.1	<0.2	<0.2	<0.1	<0.2	<0.5	<0.5	8.0	130	150	<0.05	Field Dup.
	Jul-15	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	<0.025	<0.1	<0.2	<0.2	<0.1	<0.2	<0.5	<0.5	7.8	97	110	<0.05	
	Jun-15	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	<0.025	<0.1	<0.2	<0.2	<0.1	<0.2	<0.5	<0.5	7.9	85	88	<0.0005	
	Jun-15	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	<0.025	<0.1	<0.2	<0.2	<0.1	<0.2	<0.5	<0.5	7.9	86	88	<0.0005	Field Dup.
	May-15	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	<0.025	<0.1	<0.2	<0.2	<0.1	<0.2	1.10	<0.5	8.0	72	78	<0.05	
	Nov-14	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0002	<0.025	<0.1	<0.2	<0.2	<0.1	<0.2	<0.5	<0.5	8.0	87	95	<0.05	

TABLE 1
SURFACE WATER QUALITY ANALYSIS
CN HORNEPAYNE YARD, HORNEPAYNE, ONTARIO

Sample [1]	Date	Parameter (mg/L)																	Comments
		Benzene	Toluene	Ethyl-benzene	Xylene (-o)	Xylenes (-m,-p)	MTBE	F1 (C_6-C_{10})	F2 (C_{10}-C_{16})	F3 (C_{16}-C_{34})	F4 (C_{34}-C_{50})	T.P.H. (<C_{10})	T.E.H. (C_{10}-C_{24})	Oil & Grease	Mineral Oil & Grease	pH	Alkalinity	Hardness	Lead	
HOR 004 05 (Jackfish River, Down Stream) (Cont'd)	Oct-14	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	<0.025	<0.1	<0.2	<0.2	<0.1	<0.2	<0.5	<0.5	7.8	98	100	<0.05	
	Oct-14	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	<0.025	<0.1	<0.2	<0.2	<0.1	<0.2	<0.5	<0.5	7.8	97	100	<0.05	Field Dup.
	Sep-14	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	<0.025	<0.1	<0.2	<0.2	<0.1	<0.2	<0.5	<0.5	7.9	100	120	<0.05	
	Aug-14	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	<0.025	<0.1	<0.2	<0.2	<0.1	<0.2	<0.5	<0.5	8.1	120	120	<0.05	
	Aug-14	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	<0.025	<0.1	<0.2	<0.2	<0.1	<0.2	<0.5	<0.5	7.9	120	120	<0.05	Field Dup.
	Jul-14	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	<0.025	<0.1	<0.2	<0.2	<0.1	<0.2	1.00	<0.5	8.0	120	120	<0.05	
	Jun-14	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0002	<0.025	<0.1	<0.2	<0.2	<0.1	<0.2	<0.5	<0.5	7.5	71	82	<0.0005	
	Jun-14	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	<0.025	<0.1	<0.2	<0.2	-	-	<0.5	<0.5	7.5	73	85	<0.0005	Field Dup.
	Jun-14	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	<0.025	-	-	-	-	-							Lab Dup.
	May-14	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	<0.1	<0.2	<0.2	<0.1	<0.2	<0.5	<0.5	7.5	67	78	<0.05	
	Nov-13	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	<0.1	<0.2	<0.2	<0.1	<0.2	<0.5	<0.5	8.0	97	100	<0.05	
	Oct-13	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.001	-	<0.1	<0.1	<0.2	<0.1	<0.2	<0.5	<0.5	8.0	100	110	<0.05	[4]
	Oct-13	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	<0.1	<0.2	<0.2	<0.1	<0.2	0.80	<0.5	8.2	100	110	<0.05	Field Dup.
	Oct-13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.1	100	-	-	Lab Dup.
	Sep-13	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0005	-	<0.1	<0.2	<0.2	<0.1	<0.2	<0.5	<0.5	7.8	86	100	<0.05	[4]
	Aug-13	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.001	-	<0.1	<0.2	<0.2	<0.1	<0.2	0.60	<0.5	8.0	81	92	<0.05	[4]
	Aug-13	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	-	-	-	-	-	-	-	Lab Dup.
	Aug-13	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0005	-	<0.1	<0.2	<0.2	<0.1	<0.2	1.10	<0.5	8.0	81	89	<0.05	Field Dup.
	Jul-13	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	<0.1	<0.2	<0.2	<0.1	<0.2	1.10	<0.5	7.8	85	95	<0.05	
	Jun-13	<0.00025	<0.0005	<0.00025	<0.00025	<0.00025	<0.0005	-	<0.1	<0.2	<0.2	<0.1	<0.2	<0.5	<0.5	7.4	75	83	<0.05	[4]
	Jun-13	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	<0.1	<0.2	<0.2	<0.1	<0.2	0.90	<0.5	7.7	76	89	<0.05	Field Dup.
	May-13	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0002	-	<0.1	<0.2	<0.2	<0.1	<0.2	0.60	<0.5	7.7	59	68	<0.05	
	Nov-12	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	<0.1	<0.1	<0.1	<0.1	<0.1	1.10	<0.5	6.8	100	110	<0.05	
	Oct-12	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	8.4	180	190	<0.05	
	Oct-12	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	8.4	179	190	<0.05	Field Dup.
	Sep-12	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	7.8	170	180	<0.05	
	Sep-12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.8	170	-	<0.05	Lab Dup.
	Aug-12	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	<0.1	<0.1	<0.1	<0.1	<0.1	2.60	<0.5	7.9	140	150	<0.05	
	Aug-12	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	<0.1	<0.1	<0.1	<0.1	<0.1	1.20	<0.5	7.7	140	160	<0.05	Field Dup.
	Jul-12	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0005	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	8.0	100	100	<0.05	[4]
	Jul-12	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	Lab Dup.
	Jun-12	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	-	-	-	<0.1	<0.1	1.20	<0.5	8.0	88	96	<0.05	
	Jun-12	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0005	-	<0.1	<0.1	<0.1	-	-	<0.5	<0.5	7.9	87	96	<0.0005	Field Dup.
	May-12	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	7.7	89	94	<0.05	
	Nov-11	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	-	-	-	<0.1	<0.1	<0.5	<0.5	8.1	129	130	<0.05	
	Oct-11	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	-	-	-	<0.1	<0.1	<0.5	<0.5	8.1	127	130	<0.05	
	Oct-11	-	-	-	-	-	-	-	-	-	-	-	<0.1	-	-	-	-	-	-	Lab Dup.
	Oct-11	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	<0.1	<0.1	<0.1	-	-	<0.5	<0.5	8.0	127	130	<0.0005	Field Dup.
	Sep-11	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	8.2	160	160	<0.05	
	Aug-11	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	8.0	127	130	<0.05	
	Aug-11	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	8.0	127	130	<0.05	Field Dup.
	Aug-11	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	-	-	-	-	-	-	-	-	Lab Dup.
	Jul-11	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	-	-	-	<0.1	<0.1	<0.5	<0.5	8.1	101	100	<0.05	
	Jun-11	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	8.0	91	100	<0.05	
	Jun-11	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	-	-	-	<0.1	<0.1	-	-	-	-	-	-	Lab Dup.
	Jun-11	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0002	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	8.1	291	300	<0.0005	Field Dup.
	May-11	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	7.9	-	63	<0.05	

TABLE 1
SURFACE WATER QUALITY ANALYSIS
CN HORNEPAYNE YARD, HORNEPAYNE, ONTARIO

Sample [1]	Date	Parameter (mg/L)																		Comments
		Benzene	Toluene	Ethyl-benzene	Xylene (-o)	Xylenes (-m,-p)	MTBE	F1 (C_6-C_{10})	F2 (C_{10}-C_{16})	F3 (C_{16}-C_{34})	F4 (C_{34}-C_{50})	T.P.H. (<C_{10})	T.E.H. (C_{10}-C_{24})	Oil & Grease	Mineral Oil & Grease	pH	Alkalinity	Hardness	Lead	
HOR 004 05 (Jackfish River, Down Stream) (Cont'd)	Nov-10	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	-	-	-	<0.1	<0.1	<0.5	<0.5	8.0	-	100	<0.0005	
	Oct-10	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	-	-	-	<0.1	<0.1	0.90	<0.5	8.0	98	110	<0.0005	
	Oct-10	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	-	-	-	<0.1	<0.1	<0.5	<0.5	8.1	102	110	<0.0005	Field Dup.
	Sep-10	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	-	-	-	<0.1	<0.1	<0.5	<0.5	7.7	98	100	<0.0005	
	Aug-10	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0002	-	-	-	-	<0.1	<0.1	<0.5	<0.5	8.0	121	120	<0.0005	Field Dup.
	Aug-10	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0002	-	-	-	-	<0.1	<0.1	<0.5	<0.5	8.0	122	120	<0.0005	
	Jul-10	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	-	-	-	<0.1	<0.1	0.80	<0.5	7.9	123	130	<0.0005	
	Jun-10	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	-	-	-	<0.1	<0.1	<0.5	<0.5	7.9	109	110	<0.0005	Field Dup.
	Jun-10	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	-	-	-	<0.1	<0.1	0.80	<0.5	7.9	107	110	<0.0005	
	May-10	<0.0001	<0.0002	<0.0001	<0.0002	<0.0001	<0.0002	-	-	-	-	<0.1	<0.1	<0.5	<0.5	8.1	98	100	<0.0005	
	Oct-09	-	-	-	-	-	-	-	-	-	-	-	<0.1	-	-	-	-	-	-	Lab Dup.
	Oct-09	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	<0.1	<0.5	<0.5	-	-	-	-	Field Dup.
	Oct-09	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	<0.1	<0.5	<0.5	-	-	-	-	
	Aug-09	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	<0.1	<0.5	<0.5	-	-	-	-	Field Dup.
	Aug-09	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	<0.1	<0.5	<0.5	-	-	-	-	
	Jun-09	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	<0.1	<0.5	<0.5	-	-	-	-	Field Dup.
	Jun-09	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	<0.1	<0.5	<0.5	-	-	-	-	
	Oct-08	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	<0.1	2.10	<0.5	-	-	-	-	Field Dup.
	Oct-08	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	<0.1	2.10	<0.5	-	-	-	-	
	Aug-08	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	<0.1	3.30	<0.5	-	-	-	-	Field Dup.
	Aug-08	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	<0.1	1.90	<0.5	-	-	-	-	
	May-08	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	-	-	-	-	-	-	-	Lab Dup.
	May-08	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	<0.1	<0.5	<0.5	-	-	-	-	Field Dup.
	May-08	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	<0.1	<0.5	<0.5	-	-	-	-	
	May-08	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	<0.1	<0.5	<0.5	-	-	-	-	
	Oct-07	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	-	-	-	-	-	-	-	-	Lab Dup.
	Oct-07	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	1.40	<0.5	-	-	-	-	Field Dup.
	Oct-07	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	<0.1	<0.5	<0.5	-	-	-	-	
	Aug-07	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	-	-	-	-	-	-	-	Lab Dup.
	Aug-07	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	2.70	0.60	-	-	-	-	Field Dup.
	Aug-07	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	<0.1	<0.5	<0.5	-	-	-	-	
	Jun-07	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	<0.1	<0.1	<0.1	-	-	<0.5	-	-	-	-	-	Field Dup.
	Jun-07	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	<0.1	0.70	<0.5	-	-	-	-	
	Oct-06	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	-	-	-	-	Field Dup.
	Oct-06	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	<0.1	<0.5	<0.5	-	-	-	-	
	Aug-06	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	<0.1	<0.5	<0.5	-	-	-	-	Field Dup.
	Aug-06	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	<0.1	0.90	<0.5	-	-	-	-	
	Jun-06	<0.0002	0.0014	<0.0002	0.0005	0.001	-	-	-	-	-	<0.1	<0.1	<0.5	<0.5	-	-	-	-	Field Dup.
	Jun-06	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	<0.1	<0.5	<0.5	-	-	-	-	
	Oct-05	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	<0.1	0.60	<0.5	-	-	-	-	
	Oct-05	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	<0.1	0.60	<0.5	-	-	-	-	Lab Dup.
	Aug-05	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	-	-	-	-	
	May-05	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	-	-	-	-	
	May-05	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	-	-	-	-	Lab Dup.
	Sep-04	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	-	-	-	-	
	Jun-04	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	<0.1	0.10	<0.1	-	-	-	-	
HOR 005 05 (Jackfish River, Mid-Stream)	Nov-15	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	<0.025	<0.1	<0.2	<0.2	<0.1	<0.2	<0.5	<0.5	7.8	90	100	<0.05	
	Nov-15	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	-	-	-	7.8	89	-	-	Lab Dup.
	Oct-15	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	<0.025	<0.1	<0.2	<0.2	<0.1	<0.2	<0.5	<0.5	8.2	130	140	<0.05	

TABLE 1
SURFACE WATER QUALITY ANALYSIS
CN HORNEPAYNE YARD, HORNEPAYNE, ONTARIO

Sample [1]	Date	Parameter (mg/L)																	Comments
		Benzene	Toluene	Ethyl-benzene	Xylene (-o)	Xylenes (-m,-p)	MTBE	F1 (C_6-C_{10})	F2 (C_{10}-C_{16})	F3 (C_{16}-C_{34})	F4 (C_{34}-C_{50})	T.P.H. (<C_{10})	T.E.H. (C_{10}-C_{24})	Oil & Grease	Mineral Oil & Grease	pH	Alkalinity	Hardness	Lead	
HOR 005 05 (Jackfish River, Mid-Stream) (Cont'd)	Sep-15	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	<0.025	<0.1	<0.2	<0.2	<0.1	<0.2	<0.5	<0.5	8.0	120	120	<0.05	
	Aug-15	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	<0.025	<0.1	<0.2	<0.2	<0.1	<0.2	2.50	<0.5	7.9	130	150	<0.05	
	Jul-15	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	<0.025	<0.1	<0.2	<0.2	<0.1	<0.2	<0.5	<0.5	7.8	95	110	<0.05	
	Jun-15	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	<0.025	<0.1	<0.2	<0.2	<0.1	<0.2	<0.5	<0.5	7.9	86	97	<0.05	
	May-15	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	<0.025	<0.1	<0.2	<0.2	<0.1	<0.2	0.60	<0.5	7.9	70	80	<0.05	
	Nov-14	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0002	<0.025	<0.1	<0.2	<0.2	<0.1	<0.2	<0.5	<0.5	7.9	85	95	<0.05	
	Oct-14	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	<0.025	<0.1	<0.2	<0.2	<0.1	<0.2	<0.5	<0.5	7.8	93	98	<0.05	
	Oct-14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.7	91	-	-	Lab Dup.
	Sep-14	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	<0.025	<0.1	<0.2	<0.2	<0.1	<0.2	0.60	<0.5	7.9	100	120	<0.05	
	Aug-14	<0.0002	0.00025	<0.0002	<0.0002	<0.0004	<0.0002	<0.025	<0.1	<0.2	<0.2	<0.1	<0.2	<0.5	<0.5	8.0	110	110	<0.05	
	Jul-14	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	<0.025	<0.1	<0.2	<0.2	<0.1	<0.2	1.90	<0.5	8.0	110	120	<0.05	
	Jun-14	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0002	<0.025	<0.1	<0.2	<0.2	<0.1	<0.2	0.80	<0.5	7.6	71	82	<0.05	
	May-14	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	<0.1	<0.2	<0.2	<0.1	<0.2	<0.5	<0.5	7.5	67	73	<0.05	
	Nov-13	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	<0.1	<0.2	<0.2	<0.1	<0.2	<0.5	<0.5	8.0	98	100	<0.05	[4]
	Oct-13	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.001	-	<0.1	<0.2	<0.2	<0.1	<0.2	<0.5	<0.5	7.9	99	110	<0.05	[4]
	Sep-13	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0004	-	<0.1	<0.2	<0.2	<0.1	<0.2	0.70	<0.5	7.9	85	98	<0.05	[4]
	Aug-13	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0005	-	<0.1	<0.2	<0.2	<0.1	<0.2	1.40	<0.5	8.0	80	84	<0.05	[4]
	Jul-13	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	<0.1	<0.2	<0.2	<0.1	<0.2	0.90	<0.5	7.7	86	95	<0.05	
	Jun-13	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0002	-	<0.1	<0.2	<0.2	<0.1	<0.2	<0.5	<0.5	7.7	75	87	<0.05	
	May-13	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0002	-	<0.1	<0.2	<0.2	<0.1	<0.2	<0.5	<0.5	7.7	58	67	<0.05	
	Nov-12	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	<0.1	<0.1	<0.1	<0.1	<0.1	1.10	<0.5	6.8	100	110	<0.05	
	Oct-12	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0005	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	8.4	160	160	<0.05	[4]
	Sep-12	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	<0.1	<0.1	<0.1	<0.1	<0.1	1.20	<0.5	7.8	150	170	<0.05	
	Aug-12	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	<0.1	<0.1	<0.1	<0.1	<0.1	1.30	<0.5	7.3	130	150	<0.05	
	Aug-12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	Lab Dup.
	Jul-12	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0005	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	7.9	99	100	<0.05	[4]
	Jul-12	-	-	-	-	-	<0.0005	-	-	-	-	-	-	-	-	-	-	-	-	Lab Dup.
	Jun-12	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	-	-	-	<0.1	0.24	<0.5	<0.5	7.9	86	95	<0.05	
	May-12	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	7.7	89	93	<0.05	
	Nov-11	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	-	-	-	<0.1	<0.1	<0.5	<0.5	8.1	126	120	<0.05	
	Oct-11	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	-	-	-	<0.1	<0.1	<0.5	<0.5	8.1	125	130	<0.05	
	Sep-11	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	-	-	-	<0.1	<0.1	<0.5	<0.5	7.8	156	150	<0.05	
	Aug-11	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	-	-	-	<0.1	<0.1	<0.5	<0.5	8.1	128	130	<0.05	
	Aug-11	-	-	-	-	-	-	-	-	-	-	-	<0.1	-	-	-	-	-	-	Lab Dup.
	Jul-11	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	-	-	-	<0.1	<0.1	<0.5	<0.5	8.0	99	100	<0.05	
	Jul-11	-	-	-	-	-	-	-	-	-	-	-	<0.1	-	-	-	-	-	-	Lab Dup.
	Jun-11	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	8.0	91	96	<0.05	
	Jun-11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.0	91	-	-	Lab Dup.
	May-11	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	7.9	-	66	<0.05	
	Nov-10	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	-	-	-	<0.1	<0.1	<0.5	<0.5	7.8	-	110	<0.0005	
	Oct-10	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	-	-	-	<0.1	<0.1	0.70	<0.5	7.9	102	110	<0.0005	
	Sep-10	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	-	-	-	<0.1	<0.1	<0.5	<0.5	7.8	98	110	<0.0005	
	Aug-10	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	-	-	-	<0.1	<0.1	<0.5	<0.5	8.0	122	120	<0.0005	
	Jul-10	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	-	-	-	<0.1	<0.1	1.10	<0.5	7.9	123	120	<0.0005	
	Jun-10	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	-	-	-	<0.1	<0.1	0.70	<0.5	7.8	107	110	<0.0005	
	May-10	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0002	-	-	-	-	<0.1	<0.1	<0.5	<0.5	8.1	102	110	<0.0005	

TABLE 1
SURFACE WATER QUALITY ANALYSIS
CN HORNEPAYNE YARD, HORNEPAYNE, ONTARIO

Sample [1]	Date	Parameter (mg/L)																	Comments
		Benzene	Toluene	Ethyl-benzene	Xylene (-o)	Xylenes (-m,-p)	MTBE	F1 (C_6-C_{10})	F2 (C_{10}-C_{16})	F3 (C_{16}-C_{34})	F4 (C_{34}-C_{50})	T.P.H. (<C_{10})	T.E.H. (C_{10}-C_{24})	Oil & Grease	Mineral Oil & Grease	pH	Alkalinity	Hardness	Lead	
HOR 005 05 (Jackfish River, Mid-Stream) (Cont'd)	Oct-09	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	<0.1	<0.5	<0.5	-	-	-	-	
	Aug-09	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	<0.1	1.40	<0.5	-	-	-	-	
	Jun-09	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	<0.1	<0.5	<0.5	-	-	-	-	
	Oct-08	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	<0.1	<0.5	<0.5	-	-	-	-	
	Aug-08	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	<0.1	2.20	<0.5	-	-	-	-	
	May-08	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	<0.1	<0.5	<0.5	-	-	-	-	
	Oct-07	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	<0.1	<0.5	<0.5	-	-	-	-	
	Aug-07	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	<0.1	0.70	<0.5	-	-	-	-	
	Jun-07	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	<0.1	0.60	<0.5	-	-	-	-	
	Oct-06	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	<0.1	<0.5	<0.5	-	-	-	-	
	Aug-06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Dry
	Jun-06	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	<0.1	<0.5	<0.5	-	-	-	-	
	Oct-05	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	<0.1	0.60	<0.1	-	-	-	-	
	Aug-05	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	0.60	<0.5	-	-	-	-	
	May-05	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	-	-	-	-	
	Sep-04	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	-	-	-	-	
	Jun-04	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	-	-	-	-	
HOR 013 05 (West End)	Nov-15	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	<0.025	<0.1	<0.2	<0.2	<0.1	<0.2	0.90	<0.5	8.0	190	200	<0.05	
	Oct-15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Dry
	Sep-15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Dry
	Aug-15	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.001	<0.025	<0.1	0.21	<0.2	<0.1	0.27	1.60	<0.5	7.9	240	250	<0.05	[4]
	Aug-15	-	-	-	-	-	-	-	<0.1	0.21	<0.2	0.28	-	-	-	-	-	-	-	Lab Dup.
	Jul-15	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.001	<0.025	0.16	0.38	<0.2	<0.1	0.49	2.20	<0.5	8.1	280	290	<0.05	[4]
	Jun-15	0.00087	0.00041	0.00077	<0.0002	0.0028	<0.001	<0.025	0.32	0.35	<0.2	<0.1	0.66	1.20	<0.5	7.6	300	300	<0.05	[3]
	May-15	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	<0.025	<0.1	<0.2	<0.2	<0.1	<0.2	<0.5	<0.5	7.9	68	80	<0.05	
	Nov-14	0.0013	<0.0005	0.0017	0.00027	<0.00025	<0.0005	0.05	0.48	0.27	<0.2	<0.1	0.75	<0.5	<0.5	7.9	330	350	<0.05	[3]
	Oct-14	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0005	<0.025	0.20	0.33	<0.2	<0.1	0.50	<0.5	<0.5	8.1	300	310	<0.05	[4]
	Sep-14	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.001	<0.025	<0.1	<0.2	<0.2	<0.1	0.28	0.50	<0.5	8.2	250	270	<0.05	
	Aug-14	<0.0001	0.00029	<0.0001	<0.0001	<0.0001	<0.0002	<0.025	0.18	0.38	<0.2	<0.1	0.54	1.90	<0.5	8.0	270	270	<0.05	
	Jul-14	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	<0.025	0.22	0.27	<0.2	<0.1	0.49	2.00	<0.5	8.1	290	300	<0.05	
	Jul-14	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	<0.025	-	-	-	<0.1	-	-	-	-	-	-	-	Lab Dup.
	Jun-14	0.0006	<0.0004	<0.0002	<0.0002	<0.0002	<0.0004	<0.025	0.46	0.37	<0.2	<0.1	0.80	0.90	<0.5	7.7	300	350	<0.05	[6]
	Jun-14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.7	300			Lab Dup.
	May-14	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0005	-	0.30	<0.2	<0.2	<0.1	0.48	1.00	<0.5	7.8	220	240	<0.05	[4]
	Nov-13	0.0008	<0.0002	0.0008	<0.0002	<0.0004	<0.0005	-	0.41	0.48	<0.2	<0.1	0.89	<0.5	<0.5	7.9	390	400	<0.05	[3]
	Oct-13	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0004	-	0.25	0.40	<0.2	<0.1	0.63	1.70	<0.5	8.1	310	340	<0.05	[4]
	Sep-13	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.002	-	0.25	0.38	<0.2	<0.1	0.60	1.60	<0.5	8.1	300	350	<0.05	[4]
	Aug-13	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.001	-	<0.1	<0.2	<0.2	<0.1	<0.2	1.00	<0.5	7.9	300	320	<0.05	[4]
	Jul-13	<0.001	<0.002	<0.001	<0.001	0.0011	<0.002	-	0.50	0.47	<0.2	<0.1	0.97	2.40	<0.5	7.6	350	370	<0.05	[4]
	Jun-13	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.002	-	0.42	0.40	<0.2	<0.1	0.81	1.80	<0.5	7.7	290	310	<0.05	[4]
	May-13	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0002	-	<0.1	<0.2	<0.2	<0.1	<0.2	0.70	<0.5	7.7	58	63	<0.05	[4]
	Nov-12	0.0004	<0.0002	0.0005	<0.0002	0.0005	<0.002	-	0.19	0.32	<0.1	<0.1	0.48	1.30	<0.5	7.2	250	270	<0.05	[4]
	Oct-12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Dry
	Sep-12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Dry
	Aug-12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Dry
	Jul-12	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0005	-	0.13	0.17	<0.1	<0.1	0.27	<0.5	<0.5	8.1	270	280	<0.05	[4]
	Jun-12	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.002	-	-	-	-	<0.1	0.73	1.10	<0.5	8.0	330	360	<0.05	[4]
	May-12	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.002	-	0.28	0.30	<0.1	<0.1	0.58	3.30	<0.5	7.9	330	380	<0.05	

TABLE 1
SURFACE WATER QUALITY ANALYSIS
CN HORNEPAYNE YARD, HORNEPAYNE, ONTARIO

Sample [1]	Date	Parameter (mg/L)																		Comments
		Benzene	Toluene	Ethyl-benzene	Xylene (-o)	Xylenes (-m,-p)	MTBE	F1 (C_6-C_{10})	F2 (C_{10}-C_{16})	F3 (C_{16}-C_{34})	F4 (C_{34}-C_{50})	T.P.H. ($<C_{10}$)	T.E.H. (C_{10}-C_{24})	Oil & Grease	Mineral Oil & Grease	pH	Alkalinity	Hardness	Lead	
HOR 013 05 West End (Cont'd)	Nov-11	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	-	<0.1	0.11	<0.1	<0.1	0.24	<0.5	<0.5	8.2	239	240	<0.05	Dry
	Oct-11	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0004	-	-	-	-	<0.1	0.24	<0.5	<0.5	8.2	184	200	<0.05	Dry
	Aug-11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Dry
	Jul-11	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.002	-	-	-	-	<0.1	0.22	<0.5	<0.5	8.0	267	290	<0.05	[4]
	Jun-11	0.0005	<0.0002	0.0004	<0.0002	0.0005	<0.001	-	-	-	-	<0.1	0.58	<0.5	<0.5	8.0	312	330	<0.05	[4]
	May-11	0.0003	<0.0002	0.0005	<0.0002	0.0006	<0.0005	-	0.18	0.20	<0.1	<0.1	0.36	<0.5	<0.5	7.8	-	130	<0.05	
	Nov-10	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.004	-	-	-	-	<0.1	0.34	<0.5	<0.5	7.9	-	350	<0.0005	
	Oct-10	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.001	-	-	-	-	<0.1	0.28	2.60	<0.5	8.0	278	310	<0.0005	
	Sep-10	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.005	-	-	-	-	<0.1	0.23	3.40	<0.5	8.1	229	250	<0.0005	
	Aug-10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Dry
	Jul-10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Dry
	Jun-10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Dry
	May-10	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0002	-	-	-	-	<0.1	0.50	<0.5	<0.5	8.1	238	260	<0.5	[4]
	Nov-09	0.0019	<0.0002	0.0016	0.0006	0.0022	-	-	-	-	-	<0.1	0.99	5.40	<0.5	-	-	-	-	
	Oct-09	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	0.67	3.80	<0.5	-	-	-	-	
	Sep-09	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	0.95	1.60	<0.5	-	-	-	-	
	Aug-09	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	1.00	5.60	<0.5	-	-	-	-	
	Jul-09	<0.0002	0.0330	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	0.70	6.80	1.20	-	-	-	-	
	Jun-09	<0.0002	0.0004	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	0.48	2.50	<0.5	-	-	-	-	
	May-09	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	0.48	1.60	<0.5	-	-	-	-	
	Nov-08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Frozen
	Oct-08	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	<0.1	<0.5	<0.5	-	-	-	-	
	Sep-08	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	0.21	5.40	<0.5	-	-	-	-	
	Aug-08	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	0.55	7.70	<0.5	-	-	-	-	
	Jul-08	0.0015	<0.0002	0.0009	0.0008	0.0025	-	-	-	-	-	<0.1	0.96	5.30	<0.5	-	-	-	-	
	Jun-08	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	1.10	4.60	<0.5	-	-	-	-	
	May-08	0.0003	<0.0002	0.0004	<0.0002	<0.0004	-	-	-	-	-	<0.1	0.49	-	-	-	-	-	-	
	Nov-07	0.0028	<0.0002	0.0024	0.0011	0.0066	-	-	-	-	-	<0.1	1.10	5.30	1.70	-	-	-	-	
	Oct-07	0.0018	<0.0002	0.0010	0.0004	0.0016	-	-	-	-	-	<0.1	0.77	4.00	0.50	-	-	-	-	
	Sep-07	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	0.30	3.20	<0.5	-	-	-	-	
	Aug-07	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	0.51	5.30	<0.5	-	-	-	-	
	Jul-07	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	3.50	0.60	-	-	-	-	Lab Dup.
	Jul-07	0.0004	<0.0002	0.0004	<0.0002	<0.0004	-	-	-	-	-	<0.1	0.96	3.10	0.50	-	-	-	-	
	Jun-07	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	<0.1	2.40	<0.5	-	-	-	-	
	May-07	<0.0002	<0.0002	<0.0002	<0.0002	0.0005	-	-	-	-	-	<0.1	0.31	<0.5	<0.5	-	-	-	-	
	Nov-06	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	0.47	3.10	<0.5	-	-	-	-	
	Oct-06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Dry
	Sep-06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Dry
	Aug-06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Dry
	Jul-06	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	1.70	8.10	<0.5	-	-	-	-	
	Jun-06 [4]	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	1.00	11.50	1.30	-	-	-	-	
	Jun-06	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	3.80	22.10	1.80	-	-	-	-	
	May-06	0.0007	<0.0002	0.0009	0.001	0.0037	-	-	-	-	-	<0.1	1.00	3.20	<0.5	-	-	-	-	
	Oct-05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Dry
	Sep-05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Dry
	Aug-05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Dry
	Jul-05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Dry

TABLE 1
SURFACE WATER QUALITY ANALYSIS
CN HORNEPAYNE YARD, HORNEPAYNE, ONTARIO

Sample [1]	Date	Parameter (mg/L)																	Comments
		Benzene	Toluene	Ethyl-benzene	Xylene (-o)	Xylenes (-m,-p)	MTBE	F1 (C_6-C_{10})	F2 (C_{10}-C_{16})	F3 (C_{16}-C_{34})	F4 (C_{34}-C_{50})	T.P.H. (<C_{10})	T.E.H. (C_{10}-C_{24})	Oil & Grease	Mineral Oil & Grease	pH	Alkalinity	Hardness	Lead	
HOR 013 05 West End (Cont'd)	Jun-05	0.0003	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	1.60	<0.1	<0.1	-	-	-	-	
	May-05	0.0005	<0.0002	0.0021	0.0029	<0.0004	-	-	-	-	-	<0.1	1.60	0.60	0.10	-	-	-	-	
	Apr-05	0.0016	<0.0002	0.0009	0.0017	0.0011	-	-	-	-	-	<0.1	0.95	2.50	0.70	-	-	-	-	
	Nov-04	0.0031	<0.0002	0.0034	0.0092	0.0016	-	-	-	-	-	<0.1	0.20	-	-	-	-	-	-	
	Oct-04	0.0011	<0.0002	0.0010	0.0020	0.0007	-	-	-	-	-	<0.1	0.37	6.00	<0.1	-	-	-	-	
	Sep-04	0.0039	<0.0002	<0.0002	<0.0002	0.0045	-	-	-	-	-	<0.1	0.38	0.70	<0.1	-	-	-	-	
	Aug-04	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	0.91	11.00	<0.1	-	-	-	-	
	Jul-04	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	<0.1	1.90	26.00	<0.1	-	-	-	-	
	Jun-04	0.0013	<0.0002	0.0058	0.003	0.001	-	-	-	-	-	<0.1	0.14	<0.1	<0.1	-	-	-	-	
	May-04	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	-	-	-	-	-	-	-	-	-	-	-	-	-	
CERTIFICATE OF APPROVAL [1]																				
C of A Criteria		5	0.8	2	40	32	200	1,000		1,000		-	-	-	-	6.5-8.5	-	-	[2]	-

Notes:
"-" = No Data
T.P.H. = Total Purgeable Hydrocarbons (Gasoline)
T.E.H. = Total Extractable Hydrocarbons (Diesel)
MTBE = Methyl-t-butyl-Ether

1. Certificate of Approval No. 3528-83LQWT was issued for surface water locations HOR 002 05, HOR 004 05, HOR 005 05, and HOR 013 05.
2. The limit for lead shall be determined based on the hardness of water. If the hardness is less than 30 mg/L, then the limit is 1 ug/L. If the hardness is between 30 mg/L and 80 mg/L, then the limit is 3 ug/L. When hardness is greater than 80 mg/L, then the limit is 5 ug/L.
3. Due to the level of petroleum hydrocarbon compounds beyond the appropriate range, the sample required dilution. Detection limits were adjusted accordingly.
4. Due to foaming, the sample required dilution. Detection limits were adjusted accordingly.
5. Due to matrix interferences, the detection limits were adjusted accordingly.
6. Due to the high concentration of non-target analytes, the sample required dilution. Detection limts were adjusted accordingly.

BOLD - Value exceeds C of A Criteria

TABLE 2
WEST END DAILY EFFLUENT FLOW RATES
CN HORNEPAYNE YARD, HORNEPAYNE, ONTARIO

Day	Median (L/Sec)	25th Percentile	75th Percentile
21-May-15	0.44	0.44	0.44
22-May-15	0.42	0.40	0.44
23-May-15	0.36	0.34	0.38
24-May-15	0.33	0.32	0.36
25-May-15	0.33	0.32	0.33
26-May-15	0.36	0.35	0.36
27-May-15	0.37	0.36	0.37
28-May-15	0.37	0.36	0.38
29-May-15	0.37	0.36	0.37
30-May-15	0.39	0.39	0.40
31-May-15	0.39	0.37	0.39
1-Jun-15	0.38	0.38	0.39
2-Jun-15	0.39	0.38	0.40
3-Jun-15	0.41	0.41	0.41
4-Jun-15	0.43	0.42	0.44
5-Jun-15	0.44	0.43	0.44
6-Jun-15	0.00	0.00	0.42
7-Jun-15	0.00	0.00	0.00
8-Jun-15	0.00	0.00	0.00
9-Jun-15	0.00	0.00	0.00
10-Jun-15	0.00	0.00	0.00
11-Jun-15	0.00	0.00	0.00
12-Jun-15	0.00	0.00	0.00
13-Jun-15	0.00	0.00	0.00
14-Jun-15	0.00	0.00	0.00
15-Jun-15	0.00	0.00	0.00
16-Jun-15	0.00	0.00	0.00
17-Jun-15	0.00	0.00	0.00
18-Jun-15	0.00	0.00	0.00
19-Jun-15	0.00	0.00	0.00
20-Jun-15	0.00	0.00	0.00
21-Jun-15	0.00	0.00	0.00
22-Jun-15	0.00	0.00	0.10
23-Jun-15	0.41	0.41	0.44
24-Jun-15	0.39	0.35	0.42
25-Jun-15	0.41	0.37	0.41
26-Jun-15	0.38	0.37	0.40
27-Jun-15	0.35	0.28	0.37
28-Jun-15	0.20	0.15	0.22
29-Jun-15	0.14	0.13	0.15

Day	Median (L/Sec)	25th Percentile	75th Percentile
30-Jun-15	0.33	0.30	0.33
1-Jul-15	0.32	0.19	0.33
2-Jul-15	0.21	0.16	0.21
3-Jul-15	0.15	0.15	0.16
4-Jul-15	0.16	0.15	0.16
5-Jul-15	0.14	0.14	0.16
6-Jul-15	0.15	0.15	0.15
7-Jul-15	0.18	0.16	0.19
8-Jul-15	0.17	0.16	0.26
9-Jul-15	0.27	0.26	0.28
10-Jul-15	0.25	0.24	0.26
11-Jul-15	0.24	0.22	0.25
12-Jul-15	0.22	0.21	0.24
13-Jul-15	0.24	0.22	0.25
14-Jul-15	0.27	0.26	0.27
15-Jul-15	0.25	0.24	0.27
16-Jul-15	0.24	0.23	0.25
17-Jul-15	0.25	0.24	0.25
18-Jul-15	0.25	0.24	0.25
19-Jul-15	0.24	0.24	0.25
20-Jul-15	0.22	0.22	0.24
21-Jul-15	0.22	0.20	0.22
22-Jul-15	0.19	0.18	0.20
23-Jul-15	0.18	0.16	0.19
24-Jul-15	0.16	0.16	0.17
25-Jul-15	0.15	0.14	0.16
26-Jul-15	0.14	0.13	0.15
27-Jul-15	0.12	0.10	0.14
28-Jul-15	0.10	0.08	0.12
29-Jul-15	0.09	0.08	0.10
30-Jul-15	0.08	0.08	0.08
31-Jul-15	0.08	0.08	0.12
1-Aug-15	0.14	0.14	0.15
2-Aug-15	0.16	0.16	0.17
3-Aug-15	0.16	0.16	0.17
4-Aug-15	0.16	0.16	0.16
5-Aug-15	0.16	0.15	0.16
6-Aug-15	0.13	0.13	0.14
7-Aug-15	0.12	0.11	0.13
8-Aug-15	0.11	0.10	0.11

Day	Median (L/Sec)	25th Percentile	75th Percentile
9-Aug-15	0.10	0.10	0.11
10-Aug-15	0.11	0.10	0.11
11-Aug-15	0.10	0.10	0.11
12-Aug-15	0.09	0.08	0.10
13-Aug-15	0.07	0.06	0.08
14-Aug-15	0.06	0.05	0.06
15-Aug-15	0.04	0.03	0.05
16-Aug-15	0.02	0.02	0.03
17-Aug-15	0.02	0.02	0.03
18-Aug-15	0.02	0.01	0.02
19-Aug-15	0.06	0.02	0.07
20-Aug-15	0.10	0.09	0.10
21-Aug-15	0.11	0.10	0.11
22-Aug-15	0.09	0.08	0.09
23-Aug-15	0.08	0.08	0.08
24-Aug-15	0.10	0.09	0.10
25-Aug-15	0.11	0.11	0.12
26-Aug-15	0.12	0.12	0.12
27-Aug-15	0.11	0.10	0.13
28-Aug-15	0.10	0.09	0.10
29-Aug-15	0.10	0.09	0.11
30-Aug-15	0.11	0.11	0.12
31-Aug-15	0.11	0.10	0.11
1-Sep-15	0.09	0.09	0.10
2-Sep-15	0.09	0.08	0.10
3-Sep-15	0.08	0.07	0.09
4-Sep-15	0.07	0.05	0.08
5-Sep-15	0.05	0.04	0.06
6-Sep-15	0.05	0.05	0.07
7-Sep-15	0.08	0.08	0.09
8-Sep-15	0.06	0.05	0.07
9-Sep-15	0.05	0.05	0.06
10-Sep-15	0.04	0.04	0.05
11-Sep-15	0.03	0.03	0.04
12-Sep-15	0.03	0.02	0.03
13-Sep-15	0.02	0.02	0.02
14-Sep-15	0.01	0.01	0.02
15-Sep-15	0.01	0.00	0.01
16-Sep-15	0.00	0.00	0.00
17-Sep-15	0.00	0.00	0.00

Day	Median (L/Sec)	25th Percentile	75th Percentile
18-Sep-15	0.00	0.00	0.00
19-Sep-15	0.00	0.00	0.00
20-Sep-15	0.00	0.00	0.00
21-Sep-15	0.00	0.00	0.00
22-Sep-15	0.00	0.00	0.00
23-Sep-15	0.00	0.00	0.00
24-Sep-15	0.00	0.00	0.00
25-Sep-15	0.00	0.00	0.00
26-Sep-15	0.00	0.00	0.00
27-Sep-15	0.00	0.00	0.00
28-Sep-15	0.00	0.00	0.00
29-Sep-15	0.00	0.00	0.00
30-Sep-15	0.00	0.00	0.00
1-Oct-15	0.00	0.00	0.00
2-Oct-15	0.00	0.00	0.00
3-Oct-15	0.00	0.00	0.00
4-Oct-15	0.00	0.00	0.00
5-Oct-15	0.00	0.00	0.00
6-Oct-15	0.00	0.00	0.00
7-Oct-15	0.00	0.00	0.00
8-Oct-15	0.00	0.00	0.00
9-Oct-15	0.00	0.00	0.00
10-Oct-15	0.00	0.00	0.00
11-Oct-15	0.00	0.00	0.00
12-Oct-15	0.00	0.00	0.00
13-Oct-15	0.00	0.00	0.00
14-Oct-15	0.00	0.00	0.00
15-Oct-15	0.00	0.00	0.00
16-Oct-15	0.00	0.00	0.00
17-Oct-15	0.00	0.00	0.00
18-Oct-15	0.00	0.00	0.00
19-Oct-15	0.00	0.00	0.00
20-Oct-15	0.00	0.00	0.00
21-Oct-15	0.00	0.00	0.00
22-Oct-15	0.00	0.00	0.00
23-Oct-15	0.00	0.00	0.00
24-Oct-15	0.00	0.00	0.00
25-Oct-15	0.00	0.00	0.00
26-Oct-15	0.00	0.00	0.00
27-Oct-15	0.00	0.00	0.00

Day	Median (L/Sec)	25th Percentile	75th Percentile
28-Oct-15	0.00	0.00	0.00
29-Oct-15	0.03	0.02	0.05
30-Oct-15	0.07	0.07	0.08
31-Oct-15	0.09	0.08	0.09
1-Nov-15	0.15	0.14	0.15
2-Nov-15	0.15	0.14	0.15
3-Nov-15	0.16	0.15	0.16
4-Nov-15	0.16	0.16	0.16
5-Nov-15	0.16	0.16	0.16
6-Nov-15	0.18	0.17	0.18
7-Nov-15	0.18	0.17	0.18
8-Nov-15	0.17	0.17	0.18
9-Nov-15	0.16	0.16	0.17
10-Nov-15	0.17	0.17	0.18

Notes:

L/Sec = Litres per second

No flow due to organic debris plugging discharge pipe

Data logger knocked over, data biased low

The Flow Rate (Q) has been calculated using the equation:

$$Q = VA = \left(\frac{k_n}{n}\right) AR^{\frac{2}{3}}\sqrt{S}$$

where n = the interior surface of the pipe, in this case PVC which uses the constant 0.010

S = slope = 7x10^{-3} %

K_n = *Mannings Equation* Conversion Factor for Metric calculations K_n = 1 sec

A = the area (in meters^2) of water within the pipe determined by

$$A = \frac{[\theta - \sin(\theta)](D)^2}{8}$$

R = The Hydraulic Radius (in meters) is determined by

$$R = \left[\frac{(\theta - \sin\theta)}{\theta}\right]\left[\frac{D}{4}\right]$$

D = Diameter of the pipe, in this case 325 mm

$$\theta = \pi + 2(\sin^{-1})\left\{\left[\frac{(2k_1)}{D}\right]\right\}$$

h_1 = h1 -height (in mm) of culvert base

h_2 = Initial transducer height, below water line + compensated height of water above transducer

Calibration:

- A calibration of the flow rate was completed monthly by manually measuring the amount of flow coming from the discharge pipe
- The calibration was completed by recording the amount of time needed to fill a 20 L pail at the discharge pipe
- The recorded calibration measurments are as follows:

Day	Calibrated Measurment (L/Sec)	Median Flow Meter Measurment (L/Sec)	Comments	Relative Percent Difference (%)
21-May-15	0.53	0.44	No issues observed.	19
22-Jun-15	0.5	0.41	Line blocked by organic debris, minimal flow. Calibrated after blockage removed.	20
8-Jul-15	-	-	Logger pipe found knocked over, logger righted. No obstruction observed in outflow pipe.	-
20-Jul-15	0.25	0.22	No issues observed.	13
5-Aug-15	0.19	0.16	No issues observed.	17
16-Sep-15	Dry	0.01	No issues observed.	-
7-Oct-15	Dry	0.00	No issues observed.	-
10-Nov-15	0.18	0.16	No issues observed, logger removed.	12

TABLE 3
WEST END WEEKLY AND MONTHLY EFFLUENT FLOW RATES
CN HORNEPAYNE YARD, HORNEPAYNE, ONTARIO

Week			Median (L/Sec)	25th Percentile	75th Percentile
24-May-15	to	30-May-15	0.36	0.35	0.38
31-May-15	to	6-Jun-15	0.40	0.38	0.43
7-Jun-15	to	13-Jun-15	0.00	0.00	0.00
14-Jun-15	to	20-Jun-15	0.00	0.00	0.00
21-Jun-15	to	27-Jun-15	0.37	0.19	0.41
28-Jun-15	to	4-Jul-15	0.17	0.15	0.24
5-Jul-15	to	11-Jul-15	0.20	0.16	0.25
12-Jul-15	to	18-Jul-15	0.25	0.24	0.26
19-Jul-15	to	25-Jul-15	0.20	0.16	0.22
26-Jul-15	to	1-Aug-15	0.11	0.08	0.14
2-Aug-15	to	8-Aug-15	0.15	0.12	0.16
9-Aug-15	to	15-Aug-15	0.09	0.06	0.10
16-Aug-15	to	22-Aug-15	0.06	0.02	0.09
23-Aug-15	to	29-Aug-15	0.10	0.09	0.12
30-Aug-15	to	5-Sep-15	0.09	0.07	0.10
6-Sep-15	to	12-Sep-15	0.05	0.04	0.06
13-Sep-15	to	19-Sep-15	0.00	0.00	0.01
20-Sep-15	to	26-Sep-15	0.00	0.00	0.00
27-Sep-15	to	3-Oct-15	0.00	0.00	0.00
4-Oct-15	to	10-Oct-15	0.00	0.00	0.00
11-Oct-15	to	17-Oct-15	0.00	0.00	0.00
18-Oct-15	to	24-Oct-15	0.00	0.00	0.00
25-Oct-15	to	31-Oct-15	0.00	0.00	0.07
1-Nov-15	to	7-Nov-15	0.16	0.15	0.17

Month	[illegible]	[illegible]	[illegible]
June	0.00	0.00	0.38
July	0.20	0.15	0.24
August	0.10	0.08	0.12
September	0.00	0.00	0.05
October	0.00	0.00	0.00

TABLE 4
WEST END DAILY EFFLUENT FLOW RATES
CN HORNEPAYNE YARD, HORNEPAYNE, ONTARIO

[redacted]			
21-May-15	0.39	0.38	0.40
22-May-15	0.38	0.37	0.40
23-May-15	0.35	0.34	0.37
24-May-15	0.34	0.33	0.37
25-May-15	0.35	0.33	0.37
26-May-15	0.39	0.37	0.42
27-May-15	0.37	0.36	0.37
28-May-15	0.35	0.35	0.37
29-May-15	0.35	0.33	0.35
30-May-15	0.37	0.37	0.39
31-May-15	0.35	0.34	0.36
1-Jun-15	0.33	0.32	0.34
2-Jun-15	0.30	0.29	0.34
3-Jun-15	0.32	0.30	0.32
4-Jun-15	0.37	0.32	0.42
5-Jun-15	0.34	0.32	0.35
6-Jun-15	0.32	0.31	0.32
7-Jun-15	0.33	0.32	0.43
8-Jun-15	0.35	0.33	0.37
9-Jun-15	0.31	0.31	0.33
10-Jun-15	0.34	0.33	0.37
11-Jun-15	0.32	0.30	0.32
12-Jun-15	0.30	0.29	0.32
13-Jun-15	0.29	0.27	0.29
14-Jun-15	0.27	0.27	0.29
15-Jun-15	0.27	0.26	0.27
16-Jun-15	0.26	0.24	0.27
17-Jun-15	0.26	0.24	0.26
18-Jun-15	0.25	0.24	0.26
19-Jun-15	0.24	0.23	0.26
20-Jun-15	0.26	0.24	0.27
21-Jun-15	0.24	0.23	0.24
22-Jun-15	0.24	0.23	0.29
23-Jun-15	0.21	0.20	0.23
24-Jun-15	0.23	0.20	0.25
25-Jun-15	0.35	0.30	0.37
26-Jun-15	0.34	0.33	0.39
27-Jun-15	0.31	0.21	0.33
28-Jun-15	0.13	0.08	0.15
29-Jun-15	0.07	0.06	0.08
30-Jun-15	0.26	0.22	0.26
1-Jul-15	0.24	0.20	0.26
2-Jul-15	0.21	0.17	0.23
3-Jul-15	0.18	0.17	0.19
4-Jul-15	0.16	0.15	0.17
5-Jul-15	0.15	0.14	0.16
6-Jul-15	0.15	0.15	0.17
7-Jul-15	0.17	0.15	0.19
8-Jul-15	0.15	0.14	0.16
9-Jul-15	0.15	0.14	0.16
10-Jul-15	0.14	0.14	0.15
11-Jul-15	0.13	0.12	0.14
12-Jul-15	0.14	0.12	0.14
13-Jul-15	0.15	0.14	0.16
14-Jul-15	0.15	0.14	0.16
15-Jul-15	0.14	0.13	0.15
16-Jul-15	0.14	0.14	0.14
17-Jul-15	0.15	0.15	0.16
18-Jul-15	0.14	0.13	0.14
19-Jul-15	0.14	0.12	0.14
20-Jul-15	0.14	0.14	0.15
21-Jul-15	0.14	0.13	0.14
22-Jul-15	0.13	0.12	0.14
23-Jul-15	0.11	0.10	0.13
24-Jul-15	0.11	0.10	0.11
25-Jul-15	0.10	0.09	0.11
26-Jul-15	0.10	0.09	0.11
27-Jul-15	0.11	0.09	0.11
28-Jul-15	0.10	0.09	0.11
29-Jul-15	0.10	0.10	0.11
30-Jul-15	0.10	0.10	0.11
31-Jul-15	0.13	0.12	0.14
1-Aug-15	0.10	0.09	0.11
2-Aug-15	0.10	0.09	0.12
3-Aug-15	0.09	0.09	0.10
4-Aug-15	0.10	0.10	0.10
5-Aug-15	0.10	0.08	0.11
6-Aug-15	0.09	0.09	0.10
7-Aug-15	0.09	0.08	0.10
8-Aug-15	0.09	0.09	0.09
9-Aug-15	0.09	0.09	0.09
10-Aug-15	0.09	0.09	0.09
11-Aug-15	0.10	0.09	0.10
12-Aug-15	0.09	0.08	0.10
13-Aug-15	0.09	0.08	0.09
14-Aug-15	0.08	0.07	0.09
15-Aug-15	0.09	0.07	0.09
16-Aug-15	0.08	0.08	0.08
17-Aug-15	0.08	0.08	0.09
18-Aug-15	0.08	0.08	0.09
19-Aug-15	0.10	0.08	0.14
20-Aug-15	0.06	0.06	0.07
21-Aug-15	0.06	0.06	0.06
22-Aug-15	0.06	0.06	0.06
23-Aug-15	0.07	0.06	0.07
24-Aug-15	0.08	0.07	0.09
25-Aug-15	0.07	0.06	0.07
26-Aug-15	0.09	0.08	0.09
27-Aug-15	0.08	0.07	0.09
28-Aug-15	0.08	0.08	0.08
29-Aug-15	0.08	0.08	0.09
30-Aug-15	0.06	0.06	0.07
31-Aug-15	0.06	0.06	0.07
1-Sep-15	0.06	0.06	0.07
2-Sep-15	0.07	0.06	0.08
3-Sep-15	0.08	0.06	0.08
4-Sep-15	0.08	0.06	0.09
5-Sep-15	0.08	0.07	0.08
6-Sep-15	0.08	0.08	0.09
7-Sep-15	0.06	0.06	0.07
8-Sep-15	0.07	0.07	0.08
9-Sep-15	0.08	0.08	0.09
10-Sep-15	0.08	0.08	0.09
11-Sep-15	0.09	0.09	0.09
12-Sep-15	0.10	0.09	0.10
13-Sep-15	0.09	0.09	0.10
14-Sep-15	0.08	0.07	0.10
15-Sep-15	0.08	0.08	0.09
16-Sep-15	0.08	0.08	0.09
17-Sep-15	0.09	0.08	0.09
18-Sep-15	0.09	0.08	0.10
19-Sep-15	0.08	0.08	0.08
20-Sep-15	0.07	0.06	0.08
21-Sep-15	0.07	0.06	0.07
22-Sep-15	0.07	0.06	0.07
23-Sep-15	0.07	0.07	0.08
24-Sep-15	0.09	0.08	0.10
25-Sep-15	0.07	0.06	0.09
26-Sep-15	0.05	0.05	0.06
27-Sep-15	0.05	0.05	0.05
28-Sep-15	0.06	0.06	0.06
29-Sep-15	0.06	0.06	0.06
30-Sep-15	0.06	0.06	0.07
1-Oct-15	0.07	0.06	0.07
2-Oct-15	0.07	0.06	0.07
3-Oct-15	0.07	0.06	0.07
4-Oct-15	0.07	0.07	0.07
5-Oct-15	0.07	0.06	0.08
6-Oct-15	0.07	0.07	0.07
7-Oct-15	0.07	0.07	0.08
8-Oct-15	0.08	0.08	0.08
9-Oct-15	0.09	0.09	0.10
10-Oct-15	0.10	0.10	0.11
11-Oct-15	0.08	0.07	0.08
12-Oct-15	0.07	0.07	0.07
13-Oct-15	0.07	0.07	0.08
14-Oct-15	0.08	0.07	0.08
15-Oct-15	0.08	0.08	0.09
16-Oct-15	0.13	0.13	0.14
17-Oct-15	0.14	0.14	0.14
18-Oct-15	0.14	0.14	0.14
19-Oct-15	0.13	0.12	0.14
20-Oct-15	0.14	0.14	0.15
21-Oct-15	0.16	0.16	0.17
22-Oct-15	0.13	0.12	0.14
23-Oct-15	0.11	0.10	0.11
24-Oct-15	0.12	0.11	0.18
25-Oct-15	0.13	0.13	0.13
26-Oct-15	0.12	0.11	0.12
27-Oct-15	0.12	0.11	0.13
28-Oct-15	0.13	0.12	0.18
29-Oct-15	0.18	0.17	0.19
30-Oct-15	0.13	0.12	0.14
31-Oct-15	0.12	0.11	0.13
1-Nov-15	0.18	0.14	0.21
2-Nov-15	0.13	0.12	0.13
3-Nov-15	0.12	0.12	0.12
4-Nov-15	0.12	0.12	0.13
5-Nov-15	0.12	0.12	0.12
6-Nov-15	0.14	0.13	0.14
7-Nov-15	0.14	0.14	0.14
8-Nov-15	0.14	0.13	0.14
9-Nov-15	0.13	0.13	0.13
10-Nov-15	0.14	0.13	0.14

Notes:
L/Sec = Litres per second
NF = *No Flow* due to organic debris plugging discharge pipe
ND = *No Data*, data logger knocked over

The Flow Rate (Q) has been calculated using the equation:

$$Q = VA = \left(\frac{k_m}{n}\right) AR^{\frac{2}{3}}\sqrt{S}$$

where: n = the interior surface of the pipe, in this case PVC which uses the constant 0.024
S = slope = 0.000016
K_m = *Mannings Equation* Conversion Factor (for Metric calculations K_m = 1/sec)
A = the area (in meters^2) of water within the pipe determined by:

$$A = \frac{[\theta - \sin(\theta)](D)^2}{8}$$

R = The Hydraulic Radius (in meters) is determined by:

$$R = \left|\frac{\theta - \sin\theta}{\theta}\right|\left|\frac{D}{4}\right|$$

D = Diameter of the pipe, in this case 625 mm

$$\theta = \pi - 2(\sin^{-1})\left|\left(\frac{2h_3}{D}\right) - 1\right|$$

h_3 = h1 - height (in mm) of culvert base
h_3 = Initial transducer height below water line + compensated height of water above transducer

Calibration:
- A calibration of the flow rate was completed monthly by manually measuring the amount of flow coming from the discharge pipe.
- The calibration was completed by recording the amount of time needed to fill a 20 L pail at the discharge pipe.
- The recorded calibration measurments are as follows:

Day	[redacted] (L/Sec)	[redacted] (L/Sec)	[redacted] (%)
21-May-15	0.45	0.37	20
22-Jun-15	0.42	0.35	18
20-Jul-15	0.14	0.12	15
5-Aug-15	0.11	0.09	20
16-Sep-15	0.09	0.07	25
7-Oct-15	0.1	0.08	22
10-Nov-15	0.14	0.12	15

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TABLE 5
LAGOON NO.2 WEEKLY AND MONTHLY EFFLUENT FLOW RATES
CN HORNEPAYNE YARD, HORNEPAYNE, ONTARIO

Week			Median (L/s)	25th Percentile	75th Percentile
24-May-15	to	30-May-15	0.36	0.35	0.37
31-May-15	to	6-Jun-15	0.32	0.32	0.35
7-Jun-15	to	13-Jun-15	0.32	0.30	0.33
14-Jun-15	to	20-Jun-15	0.26	0.24	0.27
21-Jun-15	to	27-Jun-15	0.25	0.23	0.33
28-Jun-15	to	4-Jul-15	0.17	0.14	0.21
5-Jul-15	to	11-Jul-15	0.15	0.14	0.16
12-Jul-15	to	18-Jul-15	0.14	0.13	0.15
19-Jul-15	to	25-Jul-15	0.12	0.11	0.14
26-Jul-15	to	1-Aug-15	0.11	0.10	0.11
2-Aug-15	to	8-Aug-15	0.09	0.09	0.10
9-Aug-15	to	15-Aug-15	0.09	0.08	0.10
16-Aug-15	to	22-Aug-15	0.07	0.06	0.08
23-Aug-15	to	29-Aug-15	0.08	0.07	0.09
30-Aug-15	to	5-Sep-15	0.07	0.06	0.08
6-Sep-15	to	12-Sep-15	0.08	0.07	0.09
13-Sep-15	to	19-Sep-15	0.09	0.08	0.09
20-Sep-15	to	26-Sep-15	0.07	0.06	0.08
27-Sep-15	to	3-Oct-15	0.06	0.06	0.07
4-Oct-15	to	10-Oct-15	0.08	0.07	0.09
11-Oct-15	to	17-Oct-15	0.08	0.07	0.13
18-Oct-15	to	24-Oct-15	0.14	0.11	0.15
25-Oct-15	to	31-Oct-15	0.13	0.12	0.14
1-Nov-15	to	7-Nov-15	0.13	0.12	0.14

June	0.29	0.24	0.33
July	0.14	0.12	0.15
August	0.09	0.07	0.09
September	0.08	0.06	0.09
October	0.11	0.07	0.13

TABLE 6
GROUNDWATER MONITORING DATA
CN HORNEPAYNE, HORNEPAYNE, ONTARIO

Well No.	Date	Top of Pipe Elev. (m)	Depth to Water (m)	Depth to LNAPL (m)	LNAPL Thickness (m)	GW Elev. (m)	Corrected GW Elev. [1] (m)	Comments
WEST END								
IMW-3	6-Oct-15	326.504	1.872	-	-	324.632	-	
	15-Oct-14	326.504	1.488	-	-	325.016	-	
	11-Jun-14	326.504	1.395	-	-	325.109	-	
	7-Oct-13	326.504	1.758	-	-	324.746	-	
	11-Jun-13	326.504	1.497	-	-	325.007	-	
	2-Oct-12	326.504	1.934	-	-	324.570	-	
	5-Jun-12	326.504	1.486	-	-	325.018	-	
	4-Oct-11	326.504	1.793	-	-	324.711	-	
	27-Jun-11	326.504	1.799	-	-	324.705	-	
	4-Oct-10	326.504	1.674	-	-	324.830	-	
	22-Jun-10	326.504	1.863	-	-	324.641	-	
IMW-4	6-Oct-15	324.406	1.411	-	-	322.995	-	
	15-Oct-14	324.406	0.829	-	-	323.577	-	
	10-Jun-14	324.406	0.696	-	-	323.710	-	
	7-Oct-13	324.406	1.035	-	-	323.371	-	
	11-Jun-13	324.406	0.769	-	-	323.637	-	
	2-Oct-12	324.406	1.350	-	-	323.056	-	
	5-Jun-12	324.406	0.824	-	-	323.582	-	
	4-Oct-11	324.406	1.196	-	-	323.210	-	
	27-Jun-11	324.406	1.129	-	-	323.277	-	
	4-Oct-10	324.406	1.014	-	-	323.392	-	
	22-Jun-10	324.406	1.290	-	-	323.116	-	
IMW-8	6-Oct-15	325.553	-	-	-	-	-	Dry
	15-Oct-14	325.553	1.790	-	-	323.763	-	
	10-Jun-14	325.553	1.325	-	-	324.228	-	
	7-Oct-13	325.553	1.811	-	-	323.742	-	
	11-Jun-13	325.553	1.472	-	-	324.081	-	
	2-Oct-12	325.553	-	-	-	-	-	Dry, DTB - 2.163 m
	5-Jun-12	325.553	1.641	-	-	323.912	-	
	4-Oct-11	325.553	2.170	-	-	323.383	-	
	27-Jun-11	325.553	1.842	-	-	323.711	-	
	4-Oct-10	325.553	1.992	-	-	323.561	-	
	22-Jun-10	325.553	2.138	-	-	323.415	-	
MW-10	6-Oct-15	326.842	3.058	-	-	323.784	-	
	14-Oct-14	326.842	2.568	-	-	324.274	-	
	10-Jun-14	326.842	2.375	-	-	324.467	-	
	7-Oct-13	326.842	2.789	-	-	324.053	-	[2]
	11-Jun-13	326.842	2.627	-	-	324.215	-	[2]
	2-Oct-12	327.075	3.454	-	-	323.621	-	
	5-Jun-12	327.075	2.888	-	-	324.187	-	
	4-Oct-11	327.075	3.165	-	-	323.910	-	
	27-Jun-11	327.283	3.055	-	-	324.228	-	
	4-Oct-10	327.283	3.086	-	-	324.197	-	
	22-Jun-10	327.283	3.335	-	-	323.948	-	
MW-11R	6-Oct-15	326.880	3.440	3.240	0.200	323.440	323.600	
	15-Oct-14	326.880	3.887	2.660	1.227	322.993	324.220	

TABLE 6
GROUNDWATER MONITORING DATA
CN HORNEPAYNE, HORNEPAYNE, ONTARIO

Well No.	Date	Top of Pipe Elev. (m)	Depth to Water (m)	Depth to LNAPL (m)	LNAPL Thickness (m)	GW Elev. (m)	Corrected GW Elev. [1] (m)	Comments
WEST END								
MW-11	14-Oct-14	327.035	-	-	-	-	-	Destroyed
	10-Jun-14	327.035	-	-	-	-	-	CNL
	7-Oct-13	327.035	-	-	-	-	-	CNL
	11-Jun-13	327.035	4.001	2.963	1.038	323.034	324.072	
	2-Oct-12	327.035	4.376	3.440	0.936	322.659	323.595	
	5-Jun-12	327.035	4.324	2.810	1.514	322.711	324.225	
	4-Oct-11	327.035	4.282	3.212	1.070	322.753	323.823	
	27-Jun-11	327.035	4.227	3.017	1.210	322.808	324.018	
	4-Oct-10	327.035	4.320	2.986	1.334	322.715	324.049	
	22-Jun-10	327.035	4.407	3.196	1.211	322.628	323.839	
MW-12	6-Oct-15	326.875	2.822	-	-	324.053	-	
	15-Oct-14	326.875	2.375	-	-	324.500	-	
	10-Jun-14	326.875	1.840	-	-	325.035	-	
	7-Oct-13	326.875	2.542	-	-	324.333	-	
	11-Jun-13	326.875	2.255	-	-	324.620	-	
	2-Oct-12	326.875	3.000	-	-	323.875	-	
	5-Jun-12	326.875	2.238	-	-	324.637	-	
	4-Oct-11	326.875	2.605	-	-	324.270	-	
	27-Jun-11	326.875	2.478	-	-	324.397	-	
	4-Oct-10	326.875	2.428	-	-	324.447	-	
	22-Jun-10	326.875	2.652	-	-	324.223	-	
MW-16	6-Oct-15	-	-	-	-	-	-	Dry
	15-Oct-14	-	2.030	-	-	-	-	
	10-Jun-14	-	0.839	-	-	-	-	
	8-Oct-13	-	1.802	-	-	-	-	
	11-Jun-13	-	1.034	-	-	-	-	
	2-Oct-12	-	2.697	-	-	-	-	
	5-Jun-12	-	1.543	-	-	-	-	
	4-Oct-11	-	2.619	-	-	-	-	
	27-Jun-11	-	0.865	-	-	-	-	
	4-Oct-10	-	2.367	-	-	-	-	
	22-Jun-10	-	2.443	-	-	-	-	
MW-17	6-Oct-15	-	2.531	-	-	-	-	
	15-Oct-14	-	0.555	-	-	-	-	
	10-Jun-14	-	0.053	-	-	-	-	
	8-Oct-13	-	0.538	-	-	-	-	
	11-Jun-13	-	0.045	-	-	-	-	
	2-Oct-12	-	-	-	-	-	-	Dry, DTB - 2.180 m
	5-Jun-12	-	0.150	-	-	-	-	
	4-Oct-11	-	1.782	-	-	-	-	
	27-Jun-11	-	1.784	-	-	-	-	
	4-Oct-10	-	1.283	-	-	-	-	
	22-Jun-10	-	1.605	-	-	-	-	
MW-119	6-Oct-15	327.641	3.623	-	-	324.018	-	
	15-Oct-14	327.641	3.219	-	-	324.422	-	
	11-Jun-14	327.641	3.005	-	-	324.636	-	

TABLE 6
GROUNDWATER MONITORING DATA
CN HORNEPAYNE, HORNEPAYNE, ONTARIO

Well No.	Date	Top of Pipe Elev. (m)	Depth to Water (m)	Depth to LNAPL (m)	LNAPL Thickness (m)	GW Elev. (m)	Corrected GW Elev. (1) (m)	Comments
WEST END								
MW-119 (cont'd)	7-Oct-13	327.641	3.358	-	-	324.283	-	
	11-Jun-13	327.641	3.176	-	-	324.465	-	
	2-Oct-12	327.641	3.735	-	-	323.906	-	
	5-Jun-12	327.641	3.230	-	-	324.411	-	
	4-Oct-11	327.641	3.520	-	-	324.121	-	
	27-Jun-11	327.641	3.400	-	-	324.241	-	
	4-Oct-10	327.641	3.381	-	-	324.260	-	
	22-Jun-10	327.641	3.519	-	-	324.122	-	
MW-120	6-Oct-15	327.331	1.526	-	-	325.805	-	
	15-Oct-14	327.331	0.858	-	-	326.473	-	
	11-Jun-14	327.331	0.641	-	-	326.690	-	
	7-Oct-13	327.331	1.474	-	-	325.857	-	
	11-Jun-13	327.331	0.941	-	-	326.390	-	
	2-Oct-12	327.331	2.060	-	-	325.271	-	
	5-Jun-12	327.331	0.960	-	-	326.371	-	
	4-Oct-11	327.331	1.595	-	-	325.736	-	
	27-Jun-11	327.331	1.119	-	-	326.212	-	
	4-Oct-10	327.331	1.144	-	-	326.187	-	
	22-Jun-10	327.331	1.213	-	-	326.118	-	
MW-121R	6-Oct-15	327.158	2.392	2.384	0.008	324.766	324.772	
	15-Oct-14	327.158	0.735	-	-	326.423	-	
MW-122	6-Oct-15	327.344	3.012	-	-	324.332	-	
	15-Oct-14	327.344	2.511	2.510	0.001	324.833	324.834	
	10-Jun-14	327.344	1.637	-	-	325.707	-	
	7-Oct-13	327.344	2.759	2.757	0.002	324.585	324.587	
	11-Jun-13	327.344	2.179	-	-	325.165	-	
	2-Oct-12	327.344	3.174	3.167	0.007	324.170	324.177	
	5-Jun-12	327.344	2.455	2.436	0.019	324.889	324.908	
	4-Oct-11	327.344	2.940	2.897	0.043	324.404	324.447	
	27-Jun-11	327.344	2.734	2.695	0.039	324.610	324.649	
	4-Oct-10	327.344	2.760	2.702	0.058	324.584	324.642	
	22-Jun-10	327.344	2.938	2.896	0.042	324.406	324.448	
MW-123R	6-Oct-15	327.050	3.253	3.180	0.073	323.797	323.855	
	15-Oct-14	327.050	2.835	-	-	324.215	-	
OW 8-1	6-Oct-15	327.506	3.629	-	-	323.877	-	
	15-Oct-14	327.506	2.890	-	-	324.616	-	
	11-Jun-14	327.506	2.665	-	-	324.841	-	
	7-Oct-13	327.506	3.304	-	-	324.202	-	
	11-Jun-13	327.506	2.823	-	-	324.683	-	
	2-Oct-12	327.506	3.766	-	-	323.740	-	
	5-Jun-12	327.506	2.830	-	-	324.676	-	
	4-Oct-11	327.506	3.313	-	-	324.193	-	
	27-Jun-11	327.506	3.335	-	-	324.171	-	
	4-Oct-10	327.506	3.221	-	-	324.285	-	
	22-Jun-10	327.506	3.438	-	-	324.068	-	

TABLE 6
GROUNDWATER MONITORING DATA
CN HORNEPAYNE, HORNEPAYNE, ONTARIO

Well No.	Date	Top of Pipe Elev. (m)	Depth to Water (m)	Depth to LNAPL (m)	LNAPL Thickness (m)	GW Elev. (m)	Corrected GW Elev. [1] (m)	Comments
WEST END								
OW 8-2	6-Oct-15	327.474	3.540	-	-	323.934	-	
	15-Oct-14	327.474	3.056	-	-	324.418	-	
	11-Jun-14	327.474	2.595	-	-	324.879	-	
	7-Oct-13	327.474	1.841	-	-	325.633	-	
	11-Jun-13	327.474	2.765	-	-	324.709	-	
	2-Oct-12	327.474	3.632	-	-	323.842	-	
	5-Jun-12	327.474	2.811	-	-	324.663	-	
	4-Oct-11	327.474	3.374	-	-	324.100	-	
	27-Jun-11	327.474	3.193	-	-	324.281	-	
	4-Oct-10	327.474	3.145	-	-	324.329	-	
	22-Jun-10	327.474	3.384	-	-	324.090	-	
OW 8-3	6-Oct-15	327.669	3.882	-	-	323.787	-	
	15-Oct-14	327.669	3.440	3.434	0.006	324.229	324.235	
	11-Jun-14	327.669	3.118	-	-	324.551	-	
	7-Oct-13	327.669	3.566	3.555	0.011	324.103	324.114	
	11-Jun-13	327.669	3.303	-	-	324.366	-	
	2-Oct-12	327.669	3.997	3.960	0.037	323.672	323.709	
	5-Jun-12	327.669	3.380	3.378	0.002	324.289	324.291	
	4-Oct-11	327.669	3.775	-	-	323.894	-	
	27-Jun-11	327.669	3.552	3.548	0.004	324.117	324.121	
	4-Oct-10	327.669	3.564	-	-	324.105	-	
	22-Jun-10	327.669	3.727	3.722	0.005	323.942	323.947	
OW 9-3	6-Oct-15	325.520	1.356	-	-	324.164	-	
	15-Oct-14	325.520	0.752	-	-	324.768	-	
	10-Jun-14	325.520	0.051	-	-	325.469	-	
	7-Oct-13	325.520	0.908	-	-	324.612	-	
	11-Jun-13	325.520	0.479	-	-	325.041	-	
	2-Oct-12	325.520	1.475	-	-	324.045	-	
	5-Jun-12	325.520	0.570	-	-	324.950	-	
	4-Oct-11	325.520	1.198	-	-	324.322	-	
	27-Jun-11	325.520	0.964	-	-	324.556	-	
	4-Oct-10	325.520	0.985	-	-	324.535	-	
	22-Jun-10	325.520	1.219	-	-	324.301	-	
OW-57R	6-Oct-15	326.395	2.728	2.690	0.038	323.667	323.697	
	15-Oct-14	326.395	2.178	-	-	324.217	-	
OW-60R	6-Oct-15	327.467	3.565	3.530	0.035	323.902	323.930	
	15-Oct-14	327.467	2.947	-	-	324.520	-	
EAST END								
MW-20	5-Oct-15	324.575	2.314	-	-	322.261	-	
	23-Jun-15	324.575	1.650	-	-	322.925	-	
	15-Oct-14	324.575	1.552	-	-	323.023	-	
	10-Jun-14	324.575	1.318	-	-	323.257	-	
	8-Oct-13	324.575	1.652	-	-	322.923	-	
	11-Jun-13	324.575	1.374	-	-	323.201	-	
	2-Oct-12	324.575	2.410	-	-	322.165	-	
	5-Jun-12	324.575	1.435	-	-	323.140	-	

TABLE 6
GROUNDWATER MONITORING DATA
CN HORNEPAYNE, HORNEPAYNE, ONTARIO

Well No.	Date	Top of Pipe Elev. (m)	Depth to Water (m)	Depth to LNAPL (m)	LNAPL Thickness (m)	GW Elev. (m)	Corrected GW Elev. [1] (m)	Comments
EAST END								
MW-20 (cont'd)	4-Oct-11	324.575	2.147	-	-	322.428	-	
	28-Jun-11	324.575	1.690	-	-	322.885	-	
	5-Oct-10	324.575	1.752	-	-	322.823	-	
	22-Jun-10	324.575	2.179	-	-	322.396	-	
MW-21	5-Oct-15	325.243	4.482	4.064	0.418	320.761	321.095	
	22-Jun-15	325.243	4.340	3.882	0.458	320.903	321.269	
	15-Oct-14	325.243	4.280	3.693	0.587	320.963	321.550	
	10-Jun-14	325.243	4.064	2.986	1.078	321.179	322.257	
	8-Oct-13	325.243	4.560	4.198	0.362	320.683	321.045	
	11-Jun-13	325.243	4.154	3.634	0.520	321.089	321.609	
	2-Oct-12	325.243	4.816	4.504	0.312	320.427	320.739	
	5-Jun-12	324.475	4.226	3.412	0.814	320.249	321.063	
	4-Oct-11	325.243	4.625	4.335	0.290	320.618	320.908	
	28-Jun-11	324.475	3.701	3.316	0.385	320.774	321.159	
	5-Oct-10	324.475	3.705	3.193	0.512	320.770	321.282	
	22-Jun-10	324.475	3.822	3.435	0.387	320.653	321.040	
MW-24	5-Oct-15	325.870	4.262	-	-	321.608	-	
	15-Oct-14	325.870	1.720	-	-	324.150	-	
	10-Jun-14	325.870	0.958	-	-	324.912	-	
	8-Oct-13	325.870	1.893	-	-	323.977	-	
	11-Jun-13	325.870	1.551	-	-	324.319	-	
	2-Oct-12	325.870	4.321	-	-	321.549	-	
	5-Jun-12	325.870	1.644	-	-	324.226	-	
	4-Oct-11	325.870	2.770	-	-	323.100	-	
	28-Jun-11	325.870	2.049	-	-	323.821	-	
	5-Oct-10	325.870	1.838	-	-	324.032	-	
	22-Jun-10	325.870	2.295	-	-	323.575	-	
MW-34R	5-Oct-15	325.516	-	-	-	-	-	CNL
	15-Oct-14	325.516	3.430	3.215	0.215	322.086	322.301	
MW-40	5-Oct-15	324.140	2.948	-	-	321.192	-	
	23-Jun-15	324.140	2.465	-	-	321.675	-	
	15-Oct-14	324.140	1.974	-	-	322.166	-	
	10-Jun-14	324.140	1.395	-	-	322.745	-	
	8-Oct-13	324.140	2.660	-	-	321.480	-	
	11-Jun-13	324.140	1.843	-	-	322.297	-	
	2-Oct-12	324.140	3.287	-	-	320.853	-	
	5-Jun-12	324.140	1.823	-	-	322.317	-	
	4-Oct-11	324.140	2.965	-	-	321.175	-	
	28-Jun-11	324.140	2.756	-	-	321.384	-	
	5-Oct-10	324.140	2.336	-	-	321.804	-	
	22-Jun-10	324.140	2.961	-	-	321.179	-	
MW-43	5-Oct-15	323.695	2.200	-	-	321.495	-	
	23-Jun-15	323.695	1.939	-	-	321.756	-	
	15-Oct-14	323.695	1.626	-	-	322.069	-	
	10-Jun-14	323.695	0.936	-	-	322.759	-	
	8-Oct-13	323.695	2.002	-	-	321.693	-	

TABLE 6
GROUNDWATER MONITORING DATA
CN HORNEPAYNE, HORNEPAYNE, ONTARIO

Well No.	Date	Top of Pipe Elev. (m)	Depth to Water (m)	Depth to LNAPL (m)	LNAPL Thickness (m)	GW Elev. (m)	Corrected GW Elev. [1] (m)	Comments
EAST END								
MW-43 (cont'd)	11-Jun-13	323.695	1.542	-	-	322.153	-	
	2-Oct-12	323.695	2.550	-	-	321.145	-	
	5-Jun-12	323.695	1.474	-	-	322.221	-	
	4-Oct-11	323.695	2.239	-	-	321.456	-	
	28-Jun-11	323.695	1.937	-	-	321.758	-	
	5-Oct-10	323.695	1.929	-	-	321.766	-	
	22-Jun-10	323.695	2.225	-	-	321.470	-	
MW-46	5-Oct-15	324.385	2.426	-	-	321.959	-	
	23-Jun-15	324.385	1.740	-	-	322.645	-	
	15-Oct-14	324.385	1.792	-	-	322.593	-	
	10-Jun-14	324.385	1.620	-	-	322.765	-	
	8-Oct-13	324.385	1.955	-	-	322.430	-	
	11-Jun-13	324.385	1.795	-	-	322.590	-	
	2-Oct-12	324.385	2.571	-	-	321.814	-	
	5-Jun-12	324.385	1.795	-	-	322.590	-	
	4-Oct-11	324.385	2.316	-	-	322.069	-	
	28-Jun-11	324.385	2.028	-	-	322.357	-	
	5-Oct-10	324.385	2.022	-	-	322.363	-	
	22-Jun-10	324.385	2.366	-	-	322.019	-	
MW-49	5-Oct-15	325.260	2.571	-	-	322.689	-	
	15-Oct-14	325.260	1.300	-	-	323.960	-	
	10-Jun-14	325.260	0.385	-	-	324.875	-	
	8-Oct-13	325.260	1.168	-	-	324.092	-	
	11-Jun-13	325.260	0.765	-	-	324.495	-	
	2-Oct-12	325.260	2.695	-	-	322.565	-	
	5-Jun-12	325.260	0.980	-	-	324.280	-	
	4-Oct-11	325.260	2.338	-	-	322.922	-	
	28-Jun-11	325.260	1.161	-	-	324.099	-	
	5-Oct-10	325.260	1.664	-	-	323.596	-	
	22-Jun-10	325.260	2.370	-	-	322.890	-	
MW-50	5-Oct-15	325.500	2.753	2.720	0.033	322.747	322.773	
	15-Oct-14	325.500	1.742	1.663	0.079	323.758	323.837	
	10-Jun-14	325.500	0.430	0.381	0.049	325.070	325.119	
	8-Oct-13	325.500	1.635	1.552	0.083	323.865	323.948	
	11-Jun-13	325.500	1.118	0.898	0.220	324.382	324.602	
	2-Oct-12	325.500	3.305	2.874	0.431	322.195	322.626	
	5-Jun-12	325.500	1.365	1.240	0.125	324.135	324.260	
	4-Oct-11	325.500	2.948	2.665	0.283	322.552	322.835	
	28-Jun-11	325.500	1.672	1.568	0.104	323.828	323.932	
	5-Oct-10	325.500	2.985	1.970	1.015	322.515	323.530	
	22-Jun-10	325.500	3.153	2.673	0.480	322.347	322.827	
MW-51	5-Oct-15	324.235	3.070	-	-	321.165	-	
	15-Oct-14	324.235	2.614	-	-	321.621	-	
	10-Jun-14	324.235	1.823	-	-	322.412	-	
	8-Oct-13	324.235	3.095	-	-	321.140	-	
	11-Jun-13	324.235	2.469	-	-	321.766	-	

TABLE 6
GROUNDWATER MONITORING DATA
CN HORNEPAYNE, HORNEPAYNE, ONTARIO

Well No.	Date	Top of Pipe Elev. (m)	Depth to Water (m)	Depth to LNAPL (m)	LNAPL Thickness (m)	GW Elev. (m)	Corrected GW Elev. [1] (m)	Comments
EAST END								
MW-51 (cont'd)	2-Oct-12	324.235	3.567	3.476	0.091	320.668	320.759	
	5-Jun-12	324.235	2.374	-	-	321.861	-	
	4-Oct-11	324.235	3.310	3.290	0.020	320.925	320.945	
	28-Jun-11	324.235	3.016	-	-	321.219	-	
	5-Oct-10	324.235	2.903	2.865	0.038	321.332	321.370	
	22-Jun-10	324.235	3.171	3.165	0.006	321.064	321.070	
MW-52	5-Oct-15	323.575	2.297	-	-	321.278	-	
	23-Jun-15	323.575	1.804	1.797	0.007	321.771	321.777	
	15-Oct-14	323.575	1.789	-	-	321.786	-	
	10-Jun-14	323.575	0.998	-	-	322.577	-	
	8-Oct-13	323.575	2.125	-	-	321.450	-	
	11-Jun-13	323.575	1.468	-	-	322.107	-	
	2-Oct-12	323.575	2.720	2.661	0.059	320.855	320.914	
	5-Jun-12	323.575	1.615	-	-	321.960	-	
	4-Oct-11	323.575	2.514	-	-	321.061	-	
	28-Jun-11	323.575	2.022	-	-	321.553	-	
	5-Oct-10	323.575	2.050	-	-	321.525	-	
	22-Jun-10	323.575	2.345	-	-	321.230	-	
MW-101	5-Oct-15	324.120	3.087	2.856	0.231	321.033	321.218	
	15-Oct-14	324.120	2.614	2.432	0.182	321.506	321.688	
	10-Jun-14	324.120	1.843	1.665	0.178	322.277	322.455	
	8-Oct-13	324.120	3.150	2.915	0.235	320.970	321.205	
	11-Jun-13	324.120	2.845	2.255	0.590	321.275	321.865	
	2-Oct-12	324.120	3.590	3.256	0.334	320.530	320.864	
	5-Jun-12	324.120	2.209	-	-	321.911	-	
	4-Oct-11	324.120	3.367	3.072	0.295	320.753	321.048	
	28-Jun-11	324.120	3.098	2.835	0.263	321.022	321.285	
	5-Oct-10	324.120	2.879	2.697	0.182	321.241	321.423	
	22-Jun-10	324.120	3.242	2.957	0.285	320.878	321.163	
MW-102	5-Oct-15	324.160	2.964	-	-	321.196	-	
	15-Oct-14	324.160	2.490	-	-	321.670	-	
	10-Jun-14	324.160	1.771	-	-	322.389	-	
	8-Oct-13	324.160	2.950	-	-	321.210	-	
	11-Jun-13	324.160	2.366	2.350	0.016	321.794	321.810	
	2-Oct-12	324.160	3.364	3.350	0.014	320.796	320.810	
	5-Jun-12	324.160	2.270	-	-	321.890	-	
	4-Oct-11	324.160	3.160	-	-	321.000	-	
	28-Jun-11	324.160	2.892	-	-	321.268	-	
	5-Oct-10	324.160	2.730	-	-	321.430	-	
	22-Jun-10	324.160	3.024	-	-	321.136	-	
MW-103	5-Oct-15	323.570	2.811	-	-	320.759	-	
	15-Oct-14	323.570	1.888	-	-	321.682	-	
	10-Jun-14	323.570	1.457	-	-	322.113	-	
	8-Oct-13	323.570	2.431	-	-	321.139	-	
	11-Jun-13	323.570	1.852	-	-	321.718	-	
	2-Oct-12	323.570	2.975	-	-	320.595	-	

TABLE 6
GROUNDWATER MONITORING DATA
CN HORNEPAYNE, HORNEPAYNE, ONTARIO

Well No.	Date	Top of Pipe Elev. (m)	Depth to Water (m)	Depth to LNAPL (m)	LNAPL Thickness (m)	GW Elev. (m)	Corrected GW Elev. [1] (m)	Comments
EAST END								
MW-103 (cont'd)	5-Jun-12	323.570	1.717	-	-	321.853	-	
	4-Oct-11	323.570	2.607	-	-	320.963	-	
	28-Jun-11	323.570	2.397	-	-	321.173	-	
	5-Oct-10	323.570	2.150	-	-	321.420	-	
	22-Jun-10	323.570	2.645	-	-	320.925	-	
MW-104	5-Oct-15	323.910	2.078	-	-	321.832	-	
	15-Oct-14	323.910	2.237	-	-	321.673	-	
	10-Jun-14	323.910	1.504	-	-	322.406	-	
	8-Oct-13	323.910	2.645	-	-	321.265	-	
	11-Jun-13	323.910	1.970	-	-	321.940	-	
	2-Oct-12	323.910	3.490	3.020	0.470	320.420	320.890	
	5-Jun-12	323.910	2.042	-	-	321.868	-	
	4-Oct-11	323.910	3.026	2.898	0.128	320.884	321.012	
	28-Jun-11	323.910	2.508	-	-	321.402	-	
	5-Oct-10	323.910	2.490	-	-	321.420	-	
	22-Jun-10	323.910	2.761	-	-	321.149	-	
MW-106	5-Oct-15	323.900	2.447	-	-	321.453	-	
	15-Oct-14	323.900	1.796	1.770	0.026	322.104	322.130	
	10-Jun-14	323.900	0.761	0.727	0.034	323.139	323.173	
	8-Oct-13	323.900	2.010	1.953	0.057	321.890	321.947	
	11-Jun-13	323.900	1.457	1.339	0.118	322.443	322.561	
	2-Oct-12	323.900	3.292	2.728	0.564	320.608	321.172	
	5-Jun-12	323.900	1.610	1.582	0.028	322.290	322.318	
	4-Oct-11	323.900	2.703	2.581	0.122	321.197	321.319	
	28-Jun-11	323.900	1.874	-	-	322.026	-	
	5-Oct-10	323.900	2.035	-	-	321.865	-	
	22-Jun-10	323.900	2.426	-	-	321.474	-	
MW-107	5-Oct-15	324.010	2.355	-	-	321.655	-	
	15-Oct-14	324.010	1.571	-	-	322.439	-	
	10-Jun-14	324.010	0.597	-	-	323.413	-	
	8-Oct-13	324.010	1.644	-	-	322.366	-	
	11-Jun-13	324.010	1.122	-	-	322.888	-	
	2-Oct-12	324.010	2.727	2.720	0.007	321.283	321.290	
	5-Jun-12	324.010	1.329	-	-	322.681	-	
	4-Oct-11	324.010	2.482	-	-	321.528	-	
	28-Jun-11	324.010	1.572	-	-	322.438	-	
	5-Oct-10	324.010	1.863	-	-	322.147	-	
	22-Jun-10	324.010	2.322	-	-	321.688	-	
MW-108	5-Oct-15	324.870	2.317	-	-	322.553	-	
	15-Oct-14	324.870	0.940	-	-	323.930	-	
	10-Jun-14	324.870	0.197	-	-	324.673	-	
	8-Oct-13	324.870	0.977	-	-	323.893	-	
	11-Jun-13	324.870	0.514	-	-	324.356	-	
	2-Oct-12	324.870	2.403	-	-	322.467	-	
	5-Jun-12	324.870	0.711	-	-	324.159	-	
	4-Oct-11	324.870	2.042	-	-	322.828	-	

TABLE 6
GROUNDWATER MONITORING DATA
CN HORNEPAYNE, HORNEPAYNE, ONTARIO

Well No.	Date	Top of Pipe Elev. (m)	Depth to Water (m)	Depth to LNAPL (m)	LNAPL Thickness (m)	GW Elev. (m)	Corrected GW Elev. [1] (m)	Comments
EAST END								
MW-108 (cont'd)	28-Jun-11	324.870	0.995	-	-	323.875	-	
	5-Oct-10	324.870	1.088	-	-	323.782	-	
	22-Jun-10	324.870	2.374	-	-	322.496	-	
MW-109	5-Oct-15	325.480	2.891	-	-	322.589	-	
	15-Oct-14	325.480	2.094	-	-	323.386	-	
	10-Jun-14	325.480	1.095	0.929	0.166	324.385	324.551	
	8-Oct-13	325.480	2.144	1.867	0.277	323.336	323.613	
	11-Jun-13	325.480	1.553	1.405	0.148	323.927	324.075	
	2-Oct-12	325.480	3.170	3.137	0.033	322.310	322.343	
	5-Jun-12	325.480	2.006	1.798	0.208	323.474	323.682	
	4-Oct-11	325.480	2.932	2.890	0.042	322.548	322.590	
	28-Jun-11	325.480	2.210	1.889	0.321	323.270	323.591	
	5-Oct-10	325.480	2.498	-	-	322.982	-	
	22-Jun-10	325.480	2.935	-	-	322.545	-	
MW-110R	5-Oct-15	325.528	3.697	3.112	0.585	321.831	322.299	
	15-Oct-14	325.528	1.124	0.800	0.324	324.404	324.728	
MW-112R	5-Oct-15	325.312	2.623	2.577	0.046	322.689	322.726	
	15-Oct-14	325.312	1.301	1.294	0.007	324.011	324.018	
MW-114	5-Oct-15	325.410	3.800	-	-	321.610	-	
	15-Oct-14	325.410	3.000	-	-	322.410	-	
	10-Jun-14	325.410	2.389	-	-	323.021	-	
	8-Oct-13	325.410	3.343	-	-	322.067	-	
	11-Jun-13	325.410	2.785	-	-	322.625	-	
	2-Oct-12	325.410	-	-	-	-	-	Dry
	5-Jun-12	325.410	2.867	-	-	322.543	-	
	4-Oct-11	325.410	3.619	-	-	321.791	-	
	28-Jun-11	325.410	3.341	-	-	322.069	-	
	5-Oct-10	325.410	3.171	-	-	322.239	-	
	22-Jun-10	325.410	3.577	-	-	321.833	-	
MW-115	5-Oct-15	325.910	3.308	-	-	322.602	-	
	15-Oct-14	325.910	2.305	-	-	323.605	-	
	10-Jun-14	325.910	1.809	-	-	324.101	-	
	8-Oct-13	325.910	2.733	-	-	323.177	-	
	11-Jun-13	325.910	2.195	-	-	323.715	-	
	2-Oct-12	325.910	3.375	-	-	322.535	-	
	5-Jun-12	325.910	2.210	-	-	323.700	-	
	4-Oct-11	325.910	3.037	-	-	322.873	-	
	28-Jun-11	325.910	2.769	-	-	323.141	-	
	5-Oct-10	325.910	2.530	-	-	323.380	-	
	22-Jun-10	325.910	3.037	-	-	322.873	-	
MW-116	5-Oct-15	326.270	4.076	-	-	322.194	-	
	15-Oct-14	326.270	1.336	-	-	324.934	-	
	10-Jun-14	326.270	1.169	-	-	325.101	-	
	8-Oct-13	326.270	1.926	-	-	324.344	-	
	11-Jun-13	326.270	1.556	-	-	324.714	-	
	2-Oct-12	326.270	3.674	3.672	0.002	322.596	322.598	

TABLE 6
GROUNDWATER MONITORING DATA
CN HORNEPAYNE, HORNEPAYNE, ONTARIO

Well No.	Date	Top of Pipe Elev. (m)	Depth to Water (m)	Depth to LNAPL (m)	LNAPL Thickness (m)	GW Elev. (m)	Corrected GW Elev. [1] (m)	Comments
EAST END								
MW-116 (cont'd)	5-Jun-12	326.270	1.273	-	-	324.997	-	
	4-Oct-11	326.270	2.604	-	-	323.666	-	
	28-Jun-11	326.270	2.261	-	-	324.009	-	
	5-Oct-10	326.270	1.624	-	-	324.646	-	
	22-Jun-10	326.270	2.909	-	-	323.361	-	
MW-124R	5-Oct-15	325.202	3.609	3.502	0.107	321.593	321.679	
	15-Oct-14	325.202	3.520	2.428	1.092	321.682	322.774	
MW-125R	5-Oct-15	325.442	3.371	3.360	0.011	322.071	322.080	
	15-Oct-14	325.442	0.720	-	-	324.722	-	
MW-126	5-Oct-15	325.815	3.111	3.080	0.031	322.704	322.729	
	15-Oct-14	325.815	1.540	1.350	0.190	324.275	324.465	
	10-Jun-14	325.815	0.619	0.589	0.030	325.196	325.226	
	8-Oct-13	325.815	2.104	1.627	0.477	323.711	324.188	
	11-Jun-13	325.815	1.166	1.158	0.008	324.649	324.657	
	2-Oct-12	325.815	3.377	3.320	0.057	322.438	322.495	
	5-Jun-12	325.815	1.244	1.170	0.074	324.571	324.645	
	4-Oct-11	325.815	3.631	2.833	0.798	322.184	322.982	
	28-Jun-11	325.815	1.919	1.629	0.290	323.896	324.186	
	5-Oct-10	325.815	2.840	1.997	0.843	322.975	323.818	
	22-Jun-10	325.815	4.188	2.850	1.338	321.627	322.965	
OW 3-2	5-Oct-15	325.340	3.010	2.880	0.130	322.330	322.434	
	15-Oct-14	325.340	1.761	1.480	0.281	323.579	323.860	
	10-Jun-14	325.340	0.448	-	-	324.892	-	
	8-Oct-13	325.340	1.360	1.353	0.007	323.980	323.987	
	11-Jun-13	325.340	0.870	-	-	324.470	-	
	2-Oct-12	325.340	3.142	3.071	0.071	322.198	322.269	
	5-Jun-12	325.340	0.954	-	-	324.386	-	
	4-Oct-11	325.340	2.874	2.802	0.072	322.466	322.538	
	28-Jun-11	325.340	1.457	-	-	323.883	-	
	5-Oct-10	325.340	2.255	2.108	0.147	323.085	323.232	
	22-Jun-10	325.340	2.938	2.835	0.103	322.402	322.505	
OW 5-1	5-Oct-15	324.365	3.892	-	-	320.473	-	
	23-Jun-15	324.365	3.370	-	-	320.995	-	
	15-Oct-14	324.365	3.140	-	-	321.225	-	
	10-Jun-14	324.365	2.489	-	-	321.876	-	
	8-Oct-13	324.365	3.646	-	-	320.719	-	
	11-Jun-13	324.365	2.924	-	-	321.441	-	
	2-Oct-12	324.365	4.280	-	-	320.085	-	
	5-Jun-12	324.365	3.085	-	-	321.280	-	
	4-Oct-11	324.365	4.096	-	-	320.269	-	
	28-Jun-11	324.365	2.919	-	-	321.446	-	
	5-Oct-10	324.365	2.766	-	-	321.599	-	
	22-Jun-10	324.365	3.258	-	-	321.107	-	
OW 5-2	5-Oct-15	323.600	2.168	2.142	0.026	321.432	321.453	
	22-Jun-15	323.600	2.688	2.067	0.621	320.912	321.409	
	15-Oct-14	323.600	1.950	1.904	0.046	321.650	321.696	

TABLE 6
GROUNDWATER MONITORING DATA
CN HORNEPAYNE, HORNEPAYNE, ONTARIO

Well No.	Date	Top of Pipe Elev. (m)	Depth to Water (m)	Depth to LNAPL (m)	LNAPL Thickness (m)	GW Elev. (m)	Corrected GW Elev. [1] (m)	Comments
EAST END								
OW 5-2 (cont'd)	10-Jun-14	323.600	1.275	1.258	0.017	322.325	322.342	
	8-Oct-13	323.600	2.568	2.355	0.213	321.032	321.245	
	11-Jun-13	323.600	1.910	1.829	0.081	321.690	321.771	
	2-Oct-12	323.600	2.758	2.663	0.095	320.842	320.937	
	5-Jun-12	323.600	1.634	1.603	0.031	321.966	321.997	
	4-Oct-11	323.600	2.548	2.470	0.078	321.052	321.130	
	28-Jun-11	323.600	2.607	2.215	0.392	320.993	321.385	
	5-Oct-10	323.600	2.138	-	-	321.462	-	
	22-Jun-10	323.600	2.405	2.374	0.031	321.195	321.226	
OW 5-3	5-Oct-15	323.675	2.553	-	-	321.122	-	
	23-Jun-15	323.675	2.419	-	-	321.256	-	
	15-Oct-14	323.675	2.223	-	-	321.452	-	
	10-Jun-14	323.675	1.584	-	-	322.091	-	
	8-Oct-13	323.675	2.680	-	-	320.995	-	
	11-Jun-13	323.675	2.153	-	-	321.522	-	
	2-Oct-12	323.675	3.983	-	-	319.692	-	
	5-Jun-12	323.675	1.964	-	-	321.711	-	
	4-Oct-11	323.675	2.817	-	-	320.858	-	
	28-Jun-11	323.675	2.580	-	-	321.095	-	
	5-Oct-10	323.675	2.477	-	-	321.198	-	
	22-Jun-10	323.675	2.708	-	-	320.967	-	
OW 5-4	5-Oct-15	324.400	3.647	3.154	0.493	320.753	321.147	
	15-Oct-14	324.400	3.980	2.770	1.210	320.420	321.630	
	10-Jun-14	324.400	3.953	2.037	1.916	320.447	322.363	
	8-Oct-13	324.400	4.688	3.201	1.487	319.712	321.199	
	11-Jun-13	324.400	4.038	2.683	1.355	320.362	321.717	
	2-Oct-12	324.400	4.627	3.547	1.080	319.773	320.853	
	5-Jun-12	324.400	2.680	2.678	0.002	321.720	321.722	
	4-Oct-11	324.400	4.320	3.410	0.910	320.080	320.990	
	28-Jun-11	324.400	4.375	3.134	1.241	320.025	321.266	
	5-Oct-10	324.400	3.658	3.120	0.538	320.742	321.280	
	22-Jun-10	324.400	4.122	3.300	0.822	320.278	321.100	
OW 5-6	5-Oct-15	324.235	3.067	-	-	321.168	-	
	15-Oct-14	324.235	1.995	-	-	322.240	-	
	10-Jun-14	324.235	1.411	-	-	322.824	-	
	8-Oct-13	324.235	2.712	-	-	321.523	-	
	11-Jun-13	324.235	1.843	-	-	322.392	-	
	2-Oct-12	324.235	3.354	-	-	320.881	-	
	5-Jun-12	324.235	1.809	-	-	322.426	-	
	4-Oct-11	324.235	2.988	-	-	321.247	-	
	28-Jun-11	324.235	2.809	-	-	321.426	-	
	5-Oct-10	324.235	2.442	-	-	321.793	-	
	22-Jun-10	324.235	3.083	-	-	321.152	-	

Notes:
"-" = No Data
1. Density correction applied to groundwater elevation for wells where free product exists.
2. Well casing was damaged by snow removal operations. Casing was adjusted in 2013 and re-surveyed.

TABLE 7
EAST END GROUNDWATER LABORATORY RESULTS
CN HORNEPAYNE YARD, HORNEPAYNE, ONTARIO

Well No.	Date	Parameter [1]								Comments
		Benzene	Toluene	Ethyl-benzene	Xylenes (o,-m,-p)	F1 (C_6-C_{10})	F2 (C_{10}-C_{16})	F3 (C_{16}-C_{34})	F4 (C_{34}-C_{50})	
EAST END - TABLE 9 (Within 30 m of the Little Jackfish River)										
MW-20	5-Oct-15	-	-	-	-	-	**820**	220	<200	
	5-Oct-15	-	-	-	-	-	**760**	250	<200	Lab Dup.
	5-Oct-15	-	-	-	-	-	**820**	230	<200	Field Dup.
	23-Jun-15	0.42	0.27	<0.2	<0.4	39	**1,600**	**530**	<200	
	23-Jun-15	0.46	0.29	<0.2	<0.4	89	**1,300**	320	<200	Field Dup.
	16-Oct-14	-	-	-	-	-	**2,500**	**1,300**	<200	
	11-Jun-14	<0.2	<0.2	<0.2	<0.4	86	**11,000**	**4,200**	<200	
	11-Jun-14	<0.2	<0.2	<0.2	<0.4	120	-	-	-	Lab Dup.
	8-Oct-13	-	-	-	-	-	**3,900**	**2,000**	<200	
	12-Jun-13	<0.2	<0.2	<0.2	<0.4	89	**10,000**	**5,500**	<200	
	3-Oct-12	-	-	-	-	-	**13,000**	**7,500**	<100	
	6-Jun-12	0.60	<0.2	0.46	0.9	39	**5,800**	**3,300**	180	
	5-Oct-11	-	-	-	-	-	**2,900**	**1,500**	<100	
	29-Jun-11	<0.2	<0.2	<0.2	<0.4	<100	**2,200**	**920**	<100	
	7-Oct-10	-	-	-	-	-	**3,600**	**1,700**	<100	
	22-Jun-10	0.50	<0.2	0.9	2.7	110	**2,600**	**1,100**	<100	
MW-40	6-Oct-15	-	-	-	-	-	100	<200	<200	
	23-Jun-15	<0.2	<0.2	<0.2	<0.4	<25	<100	<200	<200	
	16-Oct-14	-	-	-	-	-	**150**	<200	<200	
	11-Jun-14	<0.2	<0.2	<0.2	<0.4	<25	130	<200	<200	
	9-Oct-13	-	-	-	-	-	**480**	310	<200	
	12-Jun-13	<0.2	<0.2	<0.2	<0.4	<25	**520**	250	<200	
	3-Oct-12	-	-	-	-	-	**410**	280	<100	
	6-Jun-12	<0.2	<0.2	<0.2	<0.4	<25	<100	<100	<100	
	5-Oct-11	-	-	-	-	-	**930**	**630**	<100	
	29-Jun-11	<0.2	<0.2	<0.2	<0.4	<100	<100	<100	<100	
	7-Oct-10	-	-	-	-	-	<100	<100	<100	
	22-Jun-10	<0.2	<0.2	<0.2	<0.4	<100	<100	<100	<100	
MW-43	5-Oct-15	-	-	-	-	-	**290**	<200	<200	
	23-Jun-15	<0.2	0.21	<0.2	<0.4	<25	<100	<200	<200	
	16-Oct-14	-	-	-	-	-	**740**	260	<200	
	11-Jun-14	<0.2	0.21	<0.2	<0.4	<25	**940**	380	<200	
	8-Oct-13	-	-	-	-	-	**1,100**	450	<200	
	12-Jun-13	<0.2	<0.2	<0.2	<0.4	<25	**640**	<200	<200	
	3-Oct-12	-	-	-	-	-	**270**	<100	<100	
	6-Jun-12	<0.2	<0.2	<0.2	0.4	<25	**230**	<100	<100	
	5-Oct-11	-	-	-	-	-	**300**	110	<100	
	29-Jun-11	<0.2	<0.2	<0.2	<0.4	<100	**830**	300	<100	
	7-Oct-10	-	-	-	-	-	**660**	170	<100	
	22-Jun-10	<0.2	<0.2	<0.2	<0.4	<100	**740**	400	<100	
MW-46	5-Oct-15	-	-	-	-	-	**320**	<200	<200	
	23-Jun-15	<0.2	<0.2	<0.2	<0.4	<25	<100	<200	<200	
	16-Oct-14	-	-	-	-	-	**260**	<200	<200	
	11-Jun-14	<0.2	<0.2	<0.2	<0.4	<25	**230**	<200	<200	
	8-Oct-13	-	-	-	-	-	**3,400**	**1,800**	<200	
	12-Jun-13	<0.2	<0.2	<0.2	<0.4	<25	**450**	210	<200	
	3-Oct-12	-	-	-	-	-	**1,400**	**2,000**	**550**	
	6-Jun-12	<0.2	<0.2	<0.2	<0.4	<100	<100	<100	<100	
	5-Oct-11	-	-	-	-	-	**620**	350	<100	
	29-Jun-11	<0.2	<0.2	<0.2	<0.4	<100	<100	<100	<100	
	7-Oct-10	-	-	-	-	-	<100	<100	<100	
	7-Oct-10	-	-	-	-	-	<100	<100	<100	Field Dup.
	22-Jun-10	<0.2	<0.2	<0.2	<0.4	<100	<100	<100	<100	
MW-52	6-Oct-15	-	-	-	-	-	**13,000**	**31,000**	<200	
	16-Oct-14	-	-	-	-	-	**27,000**	**8,800**	<200	
	16-Oct-14	-	-	-	-	-	**40,000**	**14,000**	250	Field Dup.
	11-Jun-14	1.70	<0.2	3.5	3.2	160	**54,000**	**17,000**	<200	

TABLE 7
EAST END GROUNDWATER LABORATORY RESULTS
CN HORNEPAYNE YARD, HORNEPAYNE, ONTARIO

Well No.	Date	Parameter [1]								Comments
		Benzene	Toluene	Ethyl-benzene	Xylenes (o,-m,-p)	F1 (C_6-C_{10})	F2 (C_{10}-C_{16})	F3 (C_{16}-C_{34})	F4 (C_{34}-C_{50})	
EAST END - TABLE 9 (Within 30 m of the Little Jackfish River)										
MW-52 (cont'd)	11-Jun-14	1.60	<0.2	3.4	3.6	**1,300**	**94,000**	**29,000**	<200	Field Dup.
	9-Oct-13	-	-	-	-	-	**130,000**	**36,000**	<200	
	9-Oct-13	-	-	-	-	-	**51,000**	**13,000**	<200	Field Dup.
	9-Oct-13	-	-	-	-	-	**52,000**	**13,000**	<200	Lab Dup.
	12-Jun-13	0.76	<0.2	4	6.6	140	**37,000**	**11,000**	<200	
	12-Jun-13	0.59	<0.2	3	5.8	280	**65,000**	**20,000**	<200	Field Dup.
	3-Oct-12	-	-	-	-	-	**190,000**	**50,000**	170	[5]
	6-Jun-12	<0.2	<0.2	6.1	6.8	390	**54,000**	**16,000**	120	
	6-Jun-12	<0.2	<0.2	3.1	2.4	560	**38,000**	**11,000**	120	Field Dup.
	5-Oct-11	-	-	-	-	-	**33,000**	**10,000**	<100	
	5-Oct-11	-	-	-	-	-	**9,700**	**2,800**	<100	Lab Dup.
	5-Oct-11	-	-	-	-	-	**17,000**	**4,800**	<100	Field Dup.
	29-Jun-11	6.40	<0.2	52	2.8	280	**5,500**	**1,400**	<100	
	29-Jun-11	6.10	<0.2	51	2.3	300	**8,900**	**2,700**	<100	Field Dup.
	7-Oct-10	-	-	-	-	-	**600**	150	<100	
	22-Jun-10	2.90	0.40	24	2.0	<100	**670**	<100	<100	Field Dup.
	22-Jun-10	2.60	0.30	22	2.1	<100	**560**	<100	<100	
OW 5-1	6-Oct-15	-	-	-	-	-	**520**	290	<200	
	23-Jun-15	<0.2	<0.2	<0.2	<0.4	<25	**540**	370	<200	
	16-Oct-14	-	-	-	-	-	<100	<200	<200	
	11-Jun-14	<0.2	<0.2	<0.2	<0.4	<25	**1,100**	**940**	<200	
	9-Oct-13	-	-	-	-	-	**850**	**520**	<200	
	12-Jun-13	<0.2	<0.2	<0.2	<0.4	<25	**770**	470	<200	
	3-Oct-12	-	-	-	-	-	**6,000**	**3,300**	<100	
	3-Oct-12	-	-	-	-	-	**8,400**	**4,400**	<100	[5]; Field Dup.
	6-Jun-12	<0.2	<0.2	<0.2	<0.4	<25	**330**	160	<100	
	5-Oct-11	-	-	-	-	-	**3,100**	**1,800**	120	
	29-Jun-11	<0.2	<0.2	<0.2	<0.4	<100	**210**	120	<100	
	7-Oct-10	-	-	-	-	-	**860**	**590**	<100	
	22-Jun-10	-	-	-	-	-	**1,800**	**1,000**	<100	Lab Dup.
	22-Jun-10	<0.2	<0.2	<0.2	<0.4	<100	**1,800**	**870**	<100	
OW 5-2	5-Oct-15	-	-	-	-	-	-	-	-	[6]
	16-Oct-14	-	-	-	-	-	-	-	-	[6]
	11-Jun-14	-	-	-	-	-	-	-	-	[6]
	9-Oct-13	-	-	-	-	-	**1,100,000**	**470,000**	**17,000**	
	12-Jun-13	1.00	0.24	1.2	42.0	**770**	**1,300,000**	**620,000**	**24,000**	
	3-Oct-12	-	-	-	-	-	**470,000**	**210,000**	**7,700**	
	6-Jun-12	-	-	-	-	-	-	-	-	Dry
	5-Oct-11	-	-	-	-	-	**700,000**	**340,000**	**13,000**	
	29-Jun-11	4.40	0.50	4.6	73.0	**3,100**	**390,000**	**160,000**	**6,700**	
	7-Oct-10	-	-	-	-	-	**720,000**	**290,000**	**<10,000**	[4]
	22-Jun-10	<0.2	<0.2	<0.2	<0.4	**18,000**	**3,000,000**	**1,300,000**	**33,000**	[4]
OW 5-3	6-Oct-15	-	-	-	-	-	**1,100**	340	<200	
	23-Jun-15	7.20	0.93	<0.2	0.9	170	**2,000**	420	<200	
	16-Oct-14	-	-	-	-	-	**8,100**	**5,100**	220	[6]
	11-Jun-14	2.20	0.34	<0.2	<0.4	57	**6,600**	**3,400**	<200	
	9-Oct-13	-	-	-	-	-	**20,000**	**12,000**	**770**	
	12-Jun-13	<0.2	<0.2	<0.2	<0.4	240	**63,000**	**38,000**	**1,600**	
	3-Oct-12	-	-	-	-	-	**15,000**	**9,500**	**690**	
	6-Jun-12	<0.2	0.78	<0.2	<0.4	<25	**15,000**	**8,100**	440	
	5-Oct-11	-	-	-	-	-	**11,000**	**7,000**	**540**	
	29-Jun-11	4.00	<0.2	<0.2	<0.4	**480**	**5,900**	**3,100**	190	
	7-Oct-10	-	-	-	-	-	**3,300**	**1,900**	<100	
	22-Jun-10	0.60	<0.2	<0.2	<0.4	<100	**10,000**	**4,400**	<100	

TABLE 7
EAST END GROUNDWATER LABORATORY RESULTS
CN HORNEPAYNE YARD, HORNEPAYNE, ONTARIO

Well No.	Date	Parameter [1]								Comments
		Benzene	Toluene	Ethyl-benzene	Xylenes (o,-m,-p)	F1 (C_6-C_{10})	F2 (C_{10}-C_{16})	F3 (C_{16}-C_{34})	F4 (C_{34}-C_{50})	
EAST END - TABLE 3 (Outside 30 m of the Little Jackfish River)										
MW-21	5-Oct-15	-	-	-	-	-	-	-	-	[6]
	16-Oct-14	-	-	-	-	-	-	-	-	[6]
	9-Oct-13	-	-	-	-	-	**380,000**	**140,000**	**730**	[4]
	3-Oct-12	-	-	-	-	-	**560,000**	**240,000**	**8,800**	[5]
	5-Oct-11	-	-	-	-	-	**1,600,000**	**680,000**	**26,000**	
	7-Oct-10	-	-	-	-	-	**1,600,000**	**610,000**	**11,000**	[4]
MW-24	7-Oct-15	-	-	-	-	-	<100	<200	<200	
	16-Oct-14	-	-	-	-	-	<100	<200	<200	
	8-Oct-13	-	-	-	-	-	<100	<200	<200	
	3-Oct-12	-	-	-	-	-	**1,100**	480	<100	[5]
	5-Oct-11	-	-	-	-	-	**290**	120	<100	
	5-Oct-11	-	-	-	-	-	**270**	110	<100	Lab Dup.
	7-Oct-10	-	-	-	-	-	<100	<100	<100	
MW-49	07-Oct-15	-	-	-	-	-	<100	210	<200	
	16-Oct-14	-	-	-	-	-	**1,500**	**1,400**	<200	
	9-Oct-13	-	-	-	-	-	**8,400**	**3,400**	<200	
	3-Oct-12	-	-	-	-	-	**3,300**	**4,500**	**510**	
	5-Oct-11	-	-	-	-	-	**120,000**	**130,000**	**14,000**	
	7-Oct-10	-	-	-	-	-	**1,500**	**1,200**	<100	
MW-51	7-Oct-15	-	-	-	-	-	**90,000**	**49,000**	**3,700**	
	16-Oct-14	-	-	-	-	-	**290,000**	**180,000**	**13,000**	
	9-Oct-13	-	-	-	-	-	**1,200,000**	**580,000**	**41,000**	
	3-Oct-12	-	-	-	-	-	**600,000**	**310,000**	**21,000**	
	5-Oct-11	-	-	-	-	-	**3,000,000**	**1,600,000**	**100,000**	
	7-Oct-10	-	-	-	-	-	**230,000**	**96,000**	**5,500**	[4]
MW-101	5-Oct-15	-	-	-	-	-	-	-	-	[6]
	16-Oct-14	-	-	-	-	-	-	-	-	[6]
	9-Oct-13	-	-	-	-	-	**280,000**	**120,000**	**4,900**	[4]
	3-Oct-12	-	-	-	-	-	**380,000**	**160,000**	**6,500**	[5]
	5-Oct-11	-	-	-	-	-	**2,300,000**	**1,000,000**	**44,000**	
	7-Oct-10	-	-	-	-	-	**1,800,000**	**620,000**	**13,000**	[4]
MW-102	6-Oct-15	-	-	-	-	-	**420**	210	<200	
	16-Oct-14	-	-	-	-	-	**4,500**	**2,700**	<200	
	9-Oct-13	-	-	-	-	-	**3,100**	**1,900**	<200	
	3-Oct-12	-	-	-	-	-	**1,500**	**690**	<100	[5]
	5-Oct-11	-	-	-	-	-	**1,800**	**840**	<100	
	7-Oct-10	-	-	-	-	-	**1,700**	**760**	<100	
MW-103	6-Oct-15	-	-	-	-	-	**180**	<200	<200	
	16-Oct-14	-	-	-	-	-	**5,600**	**2,500**	<200	
	16-Oct-14	-	-	-	-	-	**5,600**	**2,200**	<200	Lab Dup.
	9-Oct-13	-	-	-	-	-	**40,000**	**15,000**	460	
	3-Oct-12	-	-	-	-	-	**570**	470	<100	[5]
	5-Oct-11	-	-	-	-	-	**2,100**	**1,200**	<100	
	5-Oct-11	-	-	-	-	-	**1,200**	**580**	<100	Lab Dup.
	7-Oct-10	-	-	-	-	-	100	190	<100	
MW-104	6-Oct-15	-	-	-	-	-	**5,100**	**1,400**	<200	
	16-Oct-14	-	-	-	-	-	**56,000**	**19,000**	390	
	9-Oct-13	-	-	-	-	-	**150,000**	**45,000**	380	
	3-Oct-12	-	-	-	-	-	**1,400,000**	**420,000**	**1,700**	[5]
	5-Oct-11	-	-	-	-	-	**1,100,000**	**340,000**	**3,200**	
	7-Oct-10	-	-	-	-	-	**17,000**	**4,600**	<100	
MW-106	6-Oct-15	-	-	-	-	-	**8,800**	**3,400**	<200	
	6-Oct-15	-	-	-	-	-	**13,000**	**5,100**	<200	Lab Dup.
	6-Oct-15	-	-	-	-	-	**8,000**	**3,300**	<200	Field Dup.
	16-Oct-14	-	-	-	-	-	-	-	-	[6]

TABLE 7
EAST END GROUNDWATER LABORATORY RESULTS
CN HORNEPAYNE YARD, HORNEPAYNE, ONTARIO

Well No.	Date	Parameter [1]								Comments
		Benzene	Toluene	Ethyl-benzene	Xylenes (o,-m,-p)	F1 (C_6-C_{10})	F2 (C_{10}-C_{16})	F3 (C_{16}-C_{34})	F4 (C_{34}-C_{50})	
EAST END - TABLE 3 (Outside 30 m of the Little Jackfish River)										
MW-106 (cont'd)	8-Oct-13	-	-	-	-	-	**220,000**	**69,000**	<200	
	6-Oct-12	-	-	-	-	-	**280,000**	**90,000**	**630**	
	5-Oct-11	-	-	-	-	-	**4,900,000**	**1,700,000**	<100	
	7-Oct-10	-	-	-	-	-	**220,000**	**79,000**	210	
MW-107	6-Oct-15	-	-	-	-	-	**2,100**	**1,100**	<200	
	16-Oct-14	-	-	-	-	-	**15,000**	**67,000**	<200	
	8-Oct-13	-	-	-	-	-	**27,000**	**12,000**	<200	
	6-Oct-12	-	-	-	-	-	**170,000**	**69,000**	340	
	5-Oct-11	-	-	-	-	-	**65,000**	**31,000**	170	
	7-Oct-10	-	-	-	-	-	**43,000**	**19,000**	<100	
MW-108	5-Oct-15	-	-	-	-	-	**530**	380	<200	
	16-Oct-14	-	-	-	-	-	**1,400**	**780**	<200	
	8-Oct-13	-	-	-	-	-	**3,200**	**1,600**	<200	
	6-Oct-12	-	-	-	-	-	**1,400**	**690**	<100	
	5-Oct-11	-	-	-	-	-	**4,500**	**2,200**	140	
	7-Oct-10	-	-	-	-	-	**1,600**	400	<100	
MW-109	7-Oct-15	-	-	-	-	-	**4,300**	**1,000**	<200	
	16-Oct-14	-	-	-	-	-	**20,000**	**6,500**	<200	
	8-Oct-13	-	-	-	-	-	**2,000,000**	**850,000**	**77,000**	
	3-Oct-12	-	-	-	-	-	**560,000**	**210,000**	**6,400**	
	5-Oct-11	-	-	-	-	-	**150,000**	**58,000**	**1,300**	
	7-Oct-10	-	-	-	-	-	**42,000**	**14,000**	<100	
MW-114	7-Oct-15	-	-	-	-	-	-	-	-	Dry
	16-Oct-14	-	-	-	-	-	**45,000**	**28,000**	**810**	
	16-Oct-14	-	-	-	-	-	**54,000**	**36,000**	**990**	Field Dup.
	8-Oct-13	-	-	-	-	-	**100,000**	**61,000**	**1,400**	
	3-Oct-12	-	-	-	-	-	-	-	-	Dry
	5-Oct-11	-	-	-	-	-	**77,000**	**44,000**	**1,100**	
	7-Oct-10	-	-	-	-	-	**87,000**	**37,000**	**1,100**	
MW-115	7-Oct-15	-	-	-	-	-	<100	<200	<200	
	16-Oct-14	-	-	-	-	-	<100	<200	<200	
	8-Oct-13	-	-	-	-	-	**380**	220	<200	
	3-Oct-12	-	-	-	-	-	**3,900**	**1,500**	<100	
	3-Oct-12	-	-	-	-	-	**3,300**	**1,300**	<100	Lab Dup.
	5-Oct-11	-	-	-	-	-	**410**	130	<100	
	7-Oct-10	-	-	-	-	-	<100	<100	<100	
MW-126	5-Oct-15	-	-	-	-	-	-	-	-	[6]
	16-Oct-14	-	-	-	-	-	-	-	-	[6]
	8-Oct-13	-	-	-	-	-	**420,000**	**150,000**	**5,000**	[4]
	3-Oct-12	-	-	-	-	-	**1,000,000**	**440,000**	**32,000**	
	5-Oct-11	-	-	-	-	-	**1,300,000**	**520,000**	**45,000**	
	7-Oct-10	-	-	-	-	-	**690,000**	**260,000**	**21,000**	
OW 3-2	5-Oct-15	-	-	-	-	-	-	-	-	[6]
	16-Oct-14	-	-	-	-	-	-	-	-	[6]
	8-Oct-13	-	-	-	-	-	**1,100,000**	**430,000**	**15,000**	
	3-Oct-12	-	-	-	-	-	**190,000**	**81,000**	**1,900**	
	5-Oct-11	-	-	-	-	-	**3,000,000**	**1,200,000**	**30,000**	
	7-Oct-10	-	-	-	-	-	**1,000,000**	**390,000**	**11,000**	
QA / QC										
Method Blank	7-Oct-15	-	-	-	-	-	<100	<200	<200	
Method Blank	23-Jun-15	<0.2	<0.2	<0.2	<0.4	<25	<100	<200	<200	
Method Blank	16-Oct-14	-	-	-	-	-	<100	<200	<200	
Method Blank	3-Oct-12	-	-	-	-	-	<100	<100	<100	
Method Blank	6-Jun-12	<0.2	<0.2	<0.2	<0.4	<25	-	-	-	
Method Blank	5-Oct-11	-	-	-	-	-	<100	<100	<100	
Method Blank	29-Jun-11	<0.2	<0.2	<0.2	<0.4	-	-	-	-	

TABLE 7
EAST END GROUNDWATER LABORATORY RESULTS
CN HORNEPAYNE YARD, HORNEPAYNE, ONTARIO

Well No.	Date	Parameter [1]								Comments
		Benzene	Toluene	Ethyl-benzene	Xylenes (o,-m,-p)	F1 (C_6-C_{10})	F2 (C_{10}-C_{16})	F3 (C_{16}-C_{34})	F4 (C_{34}-C_{50})	
QA / QC										
Travel Blank	16-Oct-14	-	-	-	-	-	<100	<200	<200	
Travel Blank	11-Jun-14	-	-	-	-	-	<100	<200	<200	
Travel Blank	3-Oct-12	-	-	-	-	-	<100	<100	<100	
Travel Blank	6-Jun-12	<0.2	<0.2	<0.2	<0.4	<25	<100	<100	<100	
Travel Blank	5-Oct-11	-	-	-	-	-	<100	<100	<100	
Travel Blank	29-Jun-11	<0.2	<0.2	<0.2	<0.4	<100	<100	<100	<100	
Travel Blank	7-Oct-10	<0.2	<0.2	<0.2	<0.4	<100	<100	<100	<100	
Travel Blank	22-Jun-10	<0.2	<0.2	<0.2	<0.4	<100	<100	<100	<100	
MOECC										
Table 3 [2]		(430) 44	(18,000) 18,000	(2,300) 2,300	(4,200) 4,200	(750) 750	(150) 150	(500) 500	(500) 500	-
Table 9 [3]		44	14,000	1,800	3,300	420	150	500	500	-

Notes:
"-" = No Data
1. All concentrations in micrograms per litre (µg/L).
2. MOECC 2011 - Ontario Ministry of Environment and Climate Change. Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act (All Types of Property) Table 3 - Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition ( ) - Criterion value in brackets applies to medium and fine textured soils.
3. MOECC 2011 - Ontario Ministry of Environment and Climate Change. Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act (All Types of Property) Table 9 - Non-Potable Groundwater
4. Due to the high concentration of target analytes, the sample required dilution. The reporting limits were adjusted accordingly.
5. The sample bottle contained visible sediment, which was included in the analysis as per the Protocol for Analytical Methods Use in the Assessment of Properties, under part XV.1 of the Environmental Protection Act.
6. Sample was not collected due to the presence of measurable LNAPL.

BOLD = Value exceeds MOECC Table 9 Criteria **BOLD** = Value exceeds MOECC Table 3 Criteria

TABLE 8
EAST END GENERAL GROUNDWATER FIELD CHEMISTRY
CN HORNEPAYNE YARD, HORNEPAYNE, ONTARIO

Well No.	Date	pH (units)	E.C. (µS/cm)	D.O. (mg/L)	Temp. (°C)	O.R.P. (mV)	Colour	Turbidity	Sheen	Odour	Comments
EAST END											
MW-20	5-Oct-15	6.75	814.0	0.35	11.3	-176	clear	clear	h/c sheen	h/c odour	(2)
	23-Jun-15	6.62	592.0	3.82	7.6	-197	clear	clear	none	organic	(2)
	16-Oct-14	6.90	841.0	1.77	9.2	-107	grey	turbid	h/c sheen	h/c odour	
	11-Jun-14	6.50	596.0	3.80	8.4	-115	light grey	turbid	h/c sheen	h/c odour	
	8-Oct-13	7.10	935.0	3.94	12.0	-107	light grey	turbid	h/c sheen	h/c odour	
	12-Jun-13	6.80	879.0	1.95	7.4	-115	dark grey	turbid	slight	h/c odour	
	3-Oct-12	7.10	883.0	2.08	13.3	-123	dark grey	turbid	none	none	
	6-Jun-12	7.03	811.0	3.19	17.3	-59	beige	turbid	none	h/c odour	
	5-Oct-11	7.01	665.0	2.30	11.7	-123	beige	turbid	none	h/c odour	
	29-Jun-11	6.55	851.0	3.24	13.4	-98	beige	slightly turbid	none	h/c odour	
	7-Oct-10	6.88	827.0	2.93	15.8	-84	yellow	turbid	none	h/c odour	
	22-Jun-10	6.86	569.0	4.91	9.4	-76	black	turbid	none	h/c odour	
MW-21	5-Oct-15	-	-	-	-	-	-	-	-	-	(1)
	16-Oct-14	-	-	-	-	-	-	-	-	-	(1)
	9-Oct-13	7.20	884.0	2.23	10.7	-137	clear	clear	h/c sheen	h/c odour	
	3-Oct-12	7.40	592.0	2.05	13.0	-121	light grey	turbid	h/c sheen	h/c odour	
	5-Oct-11	6.95	352.0	4.35	11.1	-48	clear	clear	h/c sheen	h/c odour	
	7-Oct-10	7.29	590.0	1.51	16.7	under range	clear	clear	h/c sheen	h/c odour	
MW-24	7-Oct-15	6.87	548.0	1.48	7.4	86	clear	clear	none	none	(2)
	16-Oct-14	7.40	760.0	-42.00	8.3	-50	clear	turbid	none	none	

TABLE 8
EAST END GENERAL GROUNDWATER FIELD CHEMISTRY
CN HORNEPAYNE YARD, HORNEPAYNE, ONTARIO

Well No.	Date	pH (units)	E.C. (µS/cm)	D.O. (mg/L)	Temp. (°C)	O.R.P. (mV)	Colour	Turbidity	Sheen	Odour	Comments
EAST END											
MW-24	8-Oct-13	8.00	659.0	3.80	9.8	5	clear	clear	none	none	
(Cont'd)	3-Oct-12	7.20	733.0	3.85	10.2	-50	light grey	turbid	h/c sheen	h/c odour	
	5-Oct-11	7.39	411.0	4.71	9.2	60	beige	turbid	none	none	
	7-Oct-10	7.45	690.0	4.63	15.7	-20	clear	clear	none	none	
MW-40	6-Oct-15	6.64	785.0	0.75	10.6	-11	clear	clear	none	organic	(2)
	23-Jun-15	6.74	531.0	10.20	7.3	-75	clear	clear	none	none	(2)
	16-Oct-14	7.00	943.0	1.95	9.6	-81	beige	turbid	none	none	
	11-Jun-14	6.80	540.0	9.00	6.2	-98	light grey	turbid	none	none	
	9-Oct-13	7.00	891.0	1.90	10.6	-80	light grey	turbid	none	h/c odour	
	12-Jun-13	7.40	652.0	3.14	6.9	-7	white	slightly turbid	none	none	
	3-Oct-12	7.30	763.0	2.94	11.6	-36	light grey	turbid	none	none	
	6-Jun-12	7.71	716.0	3.82	14.0	33	beige	turbid	none	none	
	5-Oct-11	7.13	496.0	3.42	11.3	-13	light yellow	turbid	h/c sheen	h/c odour	
	29-Jun-11	6.78	754.0	7.95	13.3	-54	beige	turbid	none	none	
	7-Oct-10	7.09	914.0	2.58	15.1	-45	white	turbid	none	none	
	22-Jun-10	7.07	504.0	7.49	10.6	115	beige	slightly turbid	none	h/c odour	
MW-43	5-Oct-15	6.78	786.0	1.54	10.4	-17	grey	turbid	h/c sheen	h/c odour	(2)
	23-Jun-15	7.42	307.0	11.43	7.3	53	light brown	turbid	none	none	(2)
	16-Oct-14	7.00	805.0	1.99	9.3	-125	beige	turbid	none	none	
	11-Jun-14	6.80	491.0	7.22	7.5	-86	beige	turbid	h/c sheen	h/c odour	

TABLE 8
EAST END GENERAL GROUNDWATER FIELD CHEMISTRY
CN HORNEPAYNE YARD, HORNEPAYNE, ONTARIO

Well No.	Date	pH (units)	E.C. (µS/cm)	D.O. (mg/L)	Temp. (°C)	O.R.P. (mV)	Colour	Turbidity	Sheen	Odour	Comments
EAST END											
MW-43	8-Oct-13	7.80	814.0	2.30	10.5	-65	grey	turbid	none	none	
(Cont'd)	12-Jun-13	7.10	761.0	2.20	6.3	-77	light grey	turbid	none	none	
	3-Oct-12	7.00	854.0	1.19	11.4	-137	light grey	turbid	none	none	
	6-Jun-12	7.50	690.0	2.67	13.4	-65	beige	turbid	none	none	
	5-Oct-11	7.25	360.0	1.06	11.2	-123	beige	turbid	h/c sheen	h/c odour	
	29-Jun-11	6.59	568.0	6.89	12.1	-74	beige	turbid	none	none	
	7-Oct-10	7.21	807.0	2.15	14.0	-76	beige	turbid	h/c sheen	h/c odour	
	22-Jun-10	7.08	430.0	3.22	8.6	-51	beige	turbid	none	none	
MW-46	5-Oct-15	6.71	720.0	0.51	9.8	-99	clear	clear	h/c sheen	h/c odour	(2)
	23-Jun-15	6.73	514.0	0.33	6.1	-114	clear	clear	none	organic	(2)
	16-Oct-14	7.20	793.0	2.22	9.1	-82	grey	turbid	h/c sheen	h/c odour	
	11-Jun-14	6.10	566.0	4.25	6.5	-109	light grey	turbid	none	none	
	8-Oct-13	7.40	828.0	2.91	11.0	-71	light grey	turbid	h/c sheen	h/c odour	
	12-Jun-13	7.10	803.0	3.21	7.7	-74	light grey	turbid	none	none	
	3-Oct-12	6.90	830.0	2.96	12.3	-83	light grey	turbid	none	none	
	6-Jun-12	7.08	892.0	3.06	15.7	-52	beige	turbid	none	none	
	5-Oct-11	7.09	589.0	2.98	10.6	-62	beige	turbid	none	none	
	29-Jun-11	6.41	945.0	3.62	10.6	-78	beige	turbid	none	none	
	7-Oct-10	7.23	901.0	3.39	14.9	-77	beige	turbid	none	none	
	22-Jun-10	6.92	561.0	7.48	12.5	-25	grey	turbid	none	none	

TABLE 8
EAST END GENERAL GROUNDWATER FIELD CHEMISTRY
CN HORNEPAYNE YARD, HORNEPAYNE, ONTARIO

Well No.	Date	pH (units)	E.C. (µS/cm)	D.O. (mg/L)	Temp. (°C)	O.R.P. (mV)	Colour	Turbidity	Sheen	Odour	Comments
EAST END											
MW-49	7-Oct-15	6.67	845.0	0.29	11.3	12	clear	clear	none	none	[2]
	16-Oct-14	7.10	883.0	3.18	9.7	-93	light yellow	turbid	none	none	
	8-Oct-13	7.10	867.0	2.82	12.0	-73	light grey	turbid	none	h/c odour	
	3-Oct-12	-	-	-	-	-	-	-	-	-	Insufficient Sample
	5-Oct-11	-	-	-	-	-	-	-	-	-	Insufficient Sample
	7-Oct-10	6.87	984.0	2.36	15.7	14	yellow	clear	h/c sheen	h/c odour	
MW-51	7-Oct-15	6.31	1,014.0	0.84	9.5	14	grey	slightly turbid	h/c sheen	h/c odour	[2]
	16-Oct-14	6.70	897.0	1.94	9.9	-50	light grey	turbid	h/c sheen	h/c odour	
	9-Oct-13	7.60	892.0	4.22	12.5	-77	grey	turbid	none	none	
	3-Oct-12	7.40	534.0	2.27	11.5	-116	dark grey	turbid	h/c sheen	h/c odour	
	5-Oct-11	6.97	579.0	1.48	10.3	-69	beige	turbid	h/c sheen	h/c odour	
	7-Oct-10	6.94	1,113.0	1.40	15.6	-28	light grey	turbid	h/c sheen	h/c odour	
MW-52	6-Oct-15	6.58	767.0	2.14	9.6	-69	clear	clear	h/c sheen	h/c odour	[2]
	16-Oct-14	6.80	842.0	2.46	10.2	-93	light yellow	turbid	h/c sheen	h/c odour	
	11-Jun-14	7.10	315.0	6.11	7.2	-118	light grey	clear	none	none	
	9-Oct-13	7.30	902.0	2.58	9.2	-117	clear	slightly turbid	h/c sheen	h/c odour	
	12-Jun-13	7.50	406.0	2.42	6.9	-119	light grey	turbid	h/c sheen	h/c odour	
	3-Oct-12	6.90	975.0	2.03	10.9	-140	light grey	turbid	h/c sheen	h/c odour	
	6-Jun-12	7.46	479.0	2.68	14.4	-61	beige	turbid	h/c sheen	h/c odour	
	5-Oct-11	6.94	810.0	2.41	9.4	-91	clear	turbid	none	none	

TABLE 8
EAST END GENERAL GROUNDWATER FIELD CHEMISTRY
CN HORNEPAYNE YARD, HORNEPAYNE, ONTARIO

Well No.	Date	pH (units)	E.C. (µS/cm)	D.O. (mg/L)	Temp. (°C)	O.R.P. (mV)	Colour	Turbidity	Sheen	Odour	Comments
EAST END											
MW-52 (Cont'd)	29-Jun-11	6.81	904.0	3.30	11.6	-72	clear	turbid	none	h/c odour	
	7-Oct-10	6.95	929.0	1.72	14.6	-74	beigr	turbid	none	h/c odour	
	22-Jun-10	6.96	258.0	6.22	9.9	-93	clear	slightly turbid	none	h/c odour	
MW-101	5-Oct-15	-	-	-	-	-	-	-	-	-	(1)
	16-Oct-14	-	-	-	-	-	-	-	-	-	(1)
	9-Oct-13	7.10	828.0	2.59	11.2	-72	clear	clear	h/c sheen	h/c odour	
	3-Oct-12	7.30	984.0	1.91	10.9	-114	clear	turbid	h/c sheen	h/c odour	
	5-Oct-11	7.41	491.0	3.06	10.2	-88	clear	turbid	h/c sheen	h/c odour	
	7-Oct-10	7.02	1,203.0	0.93	15.8	-88	clear	clear	h/c sheen	h/c odour	
MW-102	6-Oct-15	6.90	965.0	0.34	9.4	-72	clear	clear	h/c sheen	h/c odour	(2)
	16-Oct-14	7.00	1,006.0	1.83	8.9	-132	gre	turbid	h/c sheen	h/c odour	
	9-Oct-13	7.90	962.0	2.22	8.9	-119	black	turbid	h/c sheen	h/c odour	
	3-Oct-12	7.30	717.0	1.80	12.6	-111	dark grey	turbid	h/c sheen	h/c odour	
	5-Oct-11	7.22	800.0	1.30	9.6	-100	dark grey	turbid	h/c sheen	h/c odour	
	7-Oct-10	7.15	1,085.0	1.65	13.7	-45	dark grey	turbid	h/c sheen	h/c odour	
MW-103	6-Oct-15	6.78	1,064.0	0.90	10.0	-64	clear	clear	h/c sheen	h/c odour	(2)
	16-Oct-14	6.90	756.0	1.77	9.5	-85	yellow	turbid	h/c sheen	h/c odour	
	9-Oct-13	7.70	934.0	3.11	10.1	-88	clear	clear	none	none	
	3-Oct-12	7.20	1,020.0	1.31	11.0	-33	clear	clear	none	none	

TABLE 8
EAST END GENERAL GROUNDWATER FIELD CHEMISTRY
CN HORNEPAYNE YARD, HORNEPAYNE, ONTARIO

Well No.	Date	pH (units)	E.C. (µS/cm)	D.O. (mg/L)	Temp. (°C)	O.R.P. (mV)	Colour	Turbidity	Sheen	Odour	Comments
EAST END											
MW-103	5-Oct-11	7.07	548.0	6.27	10.7	71	clear	turbid	none	none	
(Cont'd)	7-Oct-10	6.91	1,046.0	1.65	15.6	-42	clear	slightly turbid	none	none	
MW-104	6-Oct-15	6.53	931.0	0.27	11.7	-63	clear	clear	h/c sheen	h/c odour	(2)
	16-Oct-14	6.60	904.0	2.47	10.5	-97	light yellow	turbid	h/c sheen	h/c odour	
	9-Oct-13	7.20	898.0	2.24	12.1	-73	yellow	turbid	h/c sheen	h/c odour	
	3-Oct-12	7.10	112.0	1.99	11.8	-144	orange/brown	turbid	h/c sheen	h/c odour	
	5-Oct-11	6.69	384.0	9.26	12.0	-53	yellow	turbid	h/c sheen	h/c odour	
	7-Oct-10	6.81	994.0	2.71	16.2	-32	yellow	turbid	h/c sheen	h/c odour	
MW-106	6-Oct-15	6.59	752.0	1.43	11.0	-75.3	clear	clear	h/c sheen	h/c odour	(2)
	16-Oct-14	-	-	-	-	-	-	-	-	-	(1)
	8-Oct-13	6.90	753.0	2.44	11.0	-111	light grey	turbid	h/c sheen	h/c odour	
	3-Oct-12	6.80	852.0	3.16	11.8	-137	yellow	turbid	h/c sheen	h/c odour	
	5-Oct-11	6.98	840.0	2.04	10.8	-80	beige	turbid	h/c sheen	h/c odour	
	7-Oct-10	6.84	945.0	1.39	14.7	-64	clear	turbid	h/c sheen	h/c odour	
MW-107	6-Oct-15	6.69	1,001.0	0.98	10.5	-89	clear	clear	h/c sheen	h/c odour	(2)
	16-Oct-14	6.70	996.0	2.33	9.2	-115	light yellow	turbid	h/c sheen	h/c odour	
	8-Oct-13	7.00	1,076.0	2.93	10.8	-106	clear	slightly turbid	h/c sheen	h/c odour	
	3-Oct-12	7.00	1,198.0	1.96	12.8	-141	light grey	turbid	h/c sheen	h/c odour	
	5-Oct-11	6.94	704.0	2.43	10.7	-73	beige	turbid	h/c sheen	h/c odour	
	7-Oct-10	6.91	900.0	2.74	14.9	-49	light grey	turbid	h/c sheen	h/c odour	

TABLE 8
EAST END GENERAL GROUNDWATER FIELD CHEMISTRY
CN HORNEPAYNE YARD, HORNEPAYNE, ONTARIO

Well No.	Date	pH (units)	E.C. (µS/cm)	D.O. (mg/L)	Temp. (°C)	O.R.P. (mV)	Colour	Turbidity	Sheen	Odour	Comments
EAST END											
MW-108	5-Oct-15	6.64	1,037.0	0.45	10.8	-122	clear	slightly turbid	none	h/c odour	(2)
	16-Oct-14	6.60	982.0	1.61	9.6	-118	dark grey	turbid	none	h/c odour	
	8-Oct-13	7.10	816.0	2.56	10.5	-105	dark grey	turbid	h/c sheen	h/c odour	
	3-Oct-12	6.80	1,070.0	1.39	12.6	-124	dark grey	turbid	none	none	
	5-Oct-11	6.82	850.0	1.91	11.4	-106	beige	turbid	none	none	
	7-Oct-10	6.53	1,575.0	1.98	15.1	-31	grey	turbid	h/c sheen	h/c odour	
MW-109	7-Oct-15	6.62	814.0	0.37	10.3	-41	clear	clear	h/c sheen	h/c odour	(2)
	16-Oct-14	6.70	787.0	2.62	8.8	-60	clear	slightly turbid	h/c sheen	h/c odour	
	8-Oct-13	7.20	872.0	2.01	9.8	-82	clear	clear	h/c sheen	h/c odour	
	3-Oct-12	6.80	1,049.0	2.15	11.2	-96	light grey	turbid	h/c sheen	h/c odour	
	5-Oct-11	6.79	774.0	1.29	9.9	-75	light grey	turbid	h/c sheen	h/c odour	
	7-Oct-10	6.88	1,073.0	1.86	13.9	-65	clear	clear	h/c sheen	h/c odour	
MW-114	5-Oct-15	-	-	-	-	-	-	-	-	-	Dry
	16-Oct-14	7.10	959.0	3.24	8.7	-116	dark grey	turbid	h/c sheen	h/c odour	
	8-Oct-13	7.40	928.0	2.98	9.5	-120	dark grey	turbid	h/c sheen	h/c odour	
	3-Oct-12	-	-	-	-	-	-	-	-	-	Insufficient Sample
	5-Oct-11	7.62	562.0	3.90	10.8	-44	dark grey	turbid	h/c sheen	h/c odour	
	7-Oct-10	7.22	990.0	2.60	15.4	-81	dark grey	turbid	h/c sheen	h/c odour	
MW-115	7-Oct-15	6.44	2,048.0	0.41	9.4	97	light grey	slight turbidity	none	none	(2)
	16-Oct-14	6.60	1,870.0	2.44	10.0	-9	light grey	slight turbidity	none	none	

TABLE 8
EAST END GENERAL GROUNDWATER FIELD CHEMISTRY
CN HORNEPAYNE YARD, HORNEPAYNE, ONTARIO

Well No.	Date	pH (units)	E.C. (µS/cm)	D.O. (mg/L)	Temp. (°C)	O.R.P. (mV)	Colour	Turbidity	Sheen	Odour	Comments
EAST END											
MW-115	8-Oct-13	7.10	1,762.0	2.58	10.9	35	light yellow	slight turbidity	none	none	
(Cont'd)	3-Oct-12	6.80	2,360.0	4.45	11.6	-21	beige	turbid	none	none	
	5-Oct-11	6.79	652.0	3.21	11.2	144	clear	slight turbidity	none	none	
	7-Oct-10	6.74	1,926.0	3.48	17.2	40	yellow	turbid	h/c sheen	h/c odour	
MW-126	5-Oct-15	-	-	-	-	-	-	-	-	-	(1)
	16-Oct-14	-	-	-	-	-	-	-	-	-	(1)
	8-Oct-13	7.00	748.0	2.91	12.5	-100	light yellow	clear	h/c sheen	h/c odour	
	3-Oct-12	7.10	712.0	1.46	12.6	-70	clear	turbid	h/c sheen	h/c odour	
	5-Oct-11	-	-	-	-	-	-	-	-	-	Insufficient Sample
	7-Oct-10	6.86	874.0	2.33	16.6	-54	clear	clear	h/c sheen	h/c odour	
OW 3-2	5-Oct-15	-	-	-	-	-	-	-	-	-	(1)
	16-Oct-14	-	-	-	-	-	-	-	-	-	(1)
	8-Oct-13	7.00	682.0	4.28	12.1	-93	light brown	turbid	h/c sheen	h/c odour	
	3-Oct-12	7.00	814.0	2.03	12.3	-97	light grey	turbid	h/c sheen	h/c odour	
	5-Oct-11	7.90	465.0	2.40	10.5	-108	clear	turbid	h/c sheen	h/c odour	
	7-Oct-10	6.83	993.0	2.26	16.9	-53	clear	clear	h/c sheen	h/c odour	
OW 5-1	6-Oct-15	6.94	607.0	0.46	12.0	15.2	yellow	clear	h/c sheen	h/c odour	(2)
	23-Jun-15	6.61	644.0	0.61	6.8	25.2	yellow	turbid	none	none	(2)
	16-Oct-14	6.70	871.0	2.11	9.2	-85	yellow	turbid	h/c sheen	h/c odour	
	11-Jun-14	6.80	550.0	11.10	7.5	-84	light grey	turbid	none	none	

TABLE 8
EAST END GENERAL GROUNDWATER FIELD CHEMISTRY
CN HORNEPAYNE YARD, HORNEPAYNE, ONTARIO

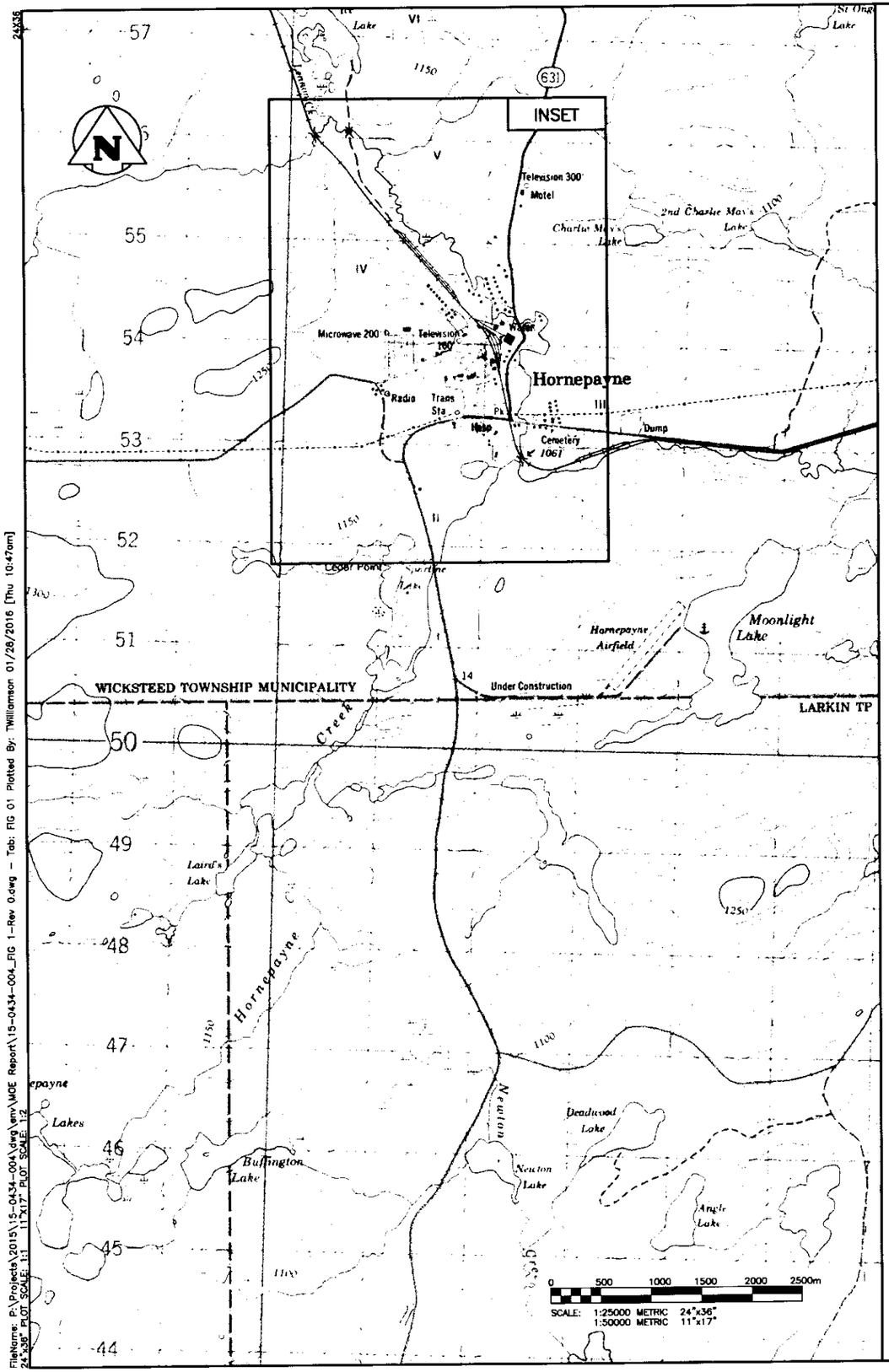
Well No.	Date	pH (units)	E.C. (µS/cm)	D.O. (mg/L)	Temp. (°C)	O.R.P. (mV)	Colour	Turbidity	Sheen	Odour	Comments
EAST END											
OW 5-1	9-Oct-13	7.10	825.0	2.11	10.0	-92	orange	turbid	none	none	
(Cont'd)	12-Jun-13	7.30	575.0	2.94	6.6	-66	light brown	turbid	none	none	
	3-Oct-12	7.40	662.0	1.40	11.2	-64	yellow/orange	turbid	none	none	
	6-Jun-12	7.71	756.0	1.80	12.3	17	orange/brown	turbid	none	none	
	5-Oct-11	7.19	418.0	3.08	9.1	5	beige	turbid	none	h/c odour	
	29-Jun-11	6.46	924.0	2.24	12.5	-14	light brown	turbid	none	none	
	7-Oct-10	7.21	837.0	2.11	13.4	-82	yellow	turbid	none	none	
	22-Jun-10	7.26	459.0	3.66	9.9	-46	beige	slightly turbid	h/c sheen	h/c odour	
OW 5-2	5-Oct-15	-	-	-	-	-	-	-	-	-	(1)
	16-Oct-14	-	-	-	-	-	-	-	-	-	(1)
	11-Jun-14	-	-	-	-	-	-	-	-	-	(1)
	9-Oct-13	7.20	774.0	3.47	11.1	-88	clear	clear	h/c sheen	h/c odour	
	12-Jun-13	6.90	823.0	2.02	7.3	-103	light yellow	turbid	h/c sheen	h/c odour	
	3-Oct-12	7.20	625.0	1.65	11.9	-104	clear	clear	none	none	
	5-Oct-11	7.23	537.0	3.44	10.2	-80	beige	turbid	h/c sheen	h/c odour	
	29-Jun-11	6.77	805.0	1.88	14.4	-79	clear	slightly turbid	h/c sheen	h/c odour	
	7-Oct-10	6.82	1,030.0	1.57	15.5	61	clear	clear	none	none	
	22-Jun-10	7.52	617.0	3.09	11.1	-118	beige	slightly turbid	h/c sheen	h/c odour	

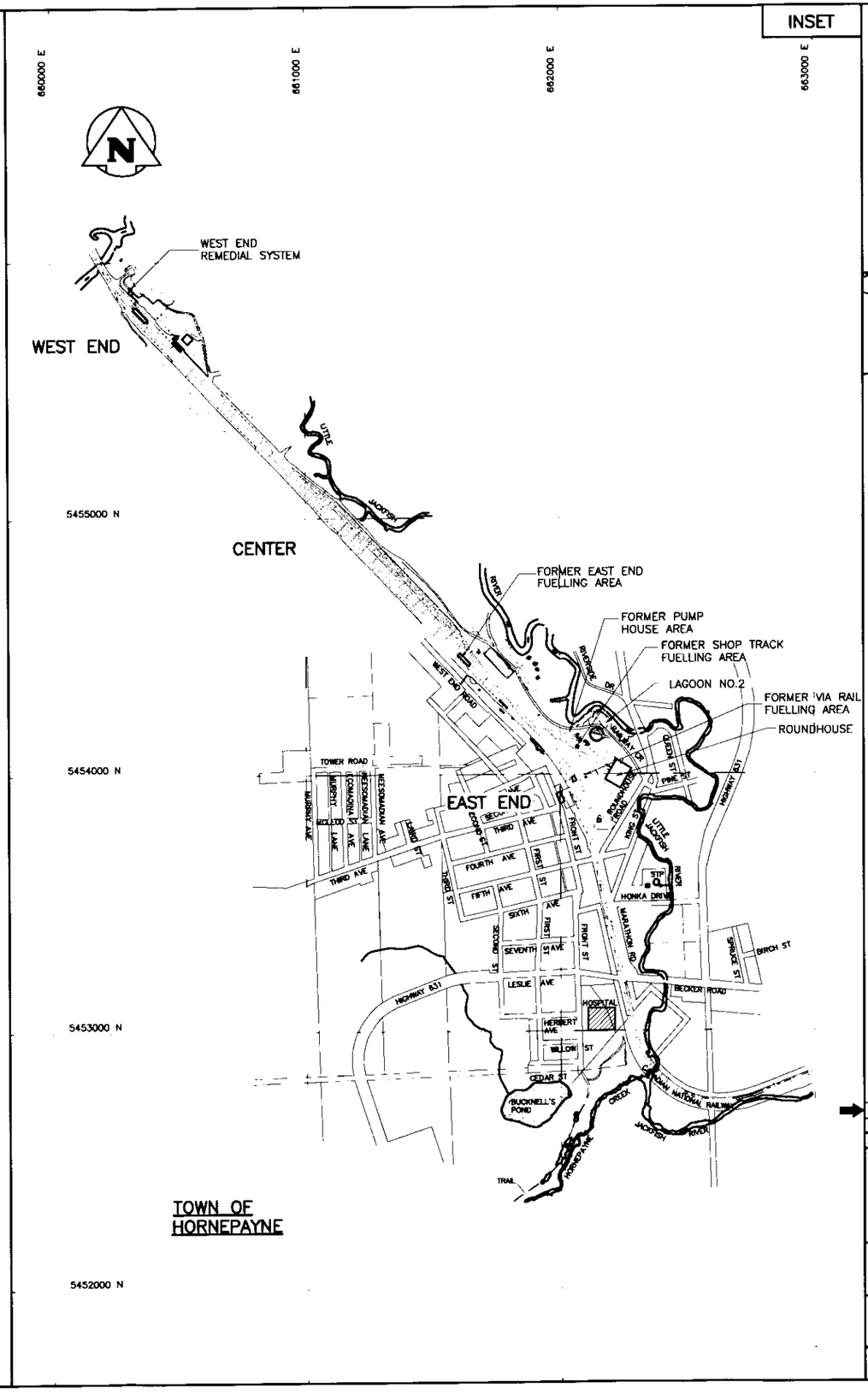
TABLE 8
EAST END GENERAL GROUNDWATER FIELD CHEMISTRY
CN HORNEPAYNE YARD, HORNEPAYNE, ONTARIO

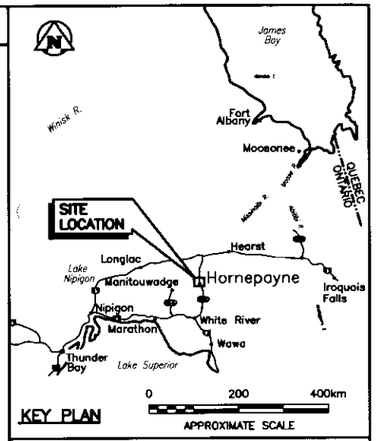
Well No.	Date	pH (units)	E.C. (µS/cm)	D.O. (mg/L)	Temp. (°C)	O.R.P. (mV)	Colour	Turbidity	Sheen	Odour	Comments
EAST END											
OW 5-3	6-Oct-15	6.86	926.0	0.56	8.7	-97.7	clear	clear	h/c sheen	h/c odour	(2)
	23-Jun-15	6.74	531.0	10.20	7.3	-75.1	clear	clear	none	none	(2)
	16-Oct-14	6.90	772.0	1.76	8.9	-125	grey	turbid	h/c sheen	h/c odour	
	11-Jun-14	6.90	440.0	10.70	6.7	-103	brown	turbid	h/c sheen	h/c odour	
	9-Oct-13	7.60	824.0	1.79	9.9	-84	grey	turbid	none	h/c odour	
	12-Jun-13	7.30	458.0	3.02	11.2	-14	yellow	turbid	h/c sheen	h/c odour	
	3-Oct-12	7.30	1,108.0	1.64	11.4	-137	dark grey	turbid	h/c sheen	h/c odour	
	6-Jun-12	7.66	583.0	1.89	14.4	-63	yellow/brown	turbid	h/c sheen	h/c odour	
	5-Oct-11	7.07	643.0	2.89	9.9	-102	grey	turbid	h/c sheen	h/c odour	
	29-Jun-11	6.40	954.0	0.46	12.2	-66	beige	turbid	none	h/c odour	
	7-Oct-10	7.14	836.0	1.51	14.4	-52	dark grey	turbid	h/c sheen	h/c odour	
	22-Jun-10	6.97	629.0	5.52	9.8	-73	beige	turbid	none	none	

Notes:
"-" = No Data
D.O. = Dissolved Oxygen
E.C. = Electrical Conductivity
O.R.P. = Oxidation Reduction Potential
1. Sample was not collected due to presence of measurable LNAPL.
2. Well sampled using Low Flow Purging methodologies.

FIGURES







KEY PLAN

NOTES:

1. LOCATION OF INSET–PLAN IN RELATION TO COORDIATES IS APPROXIMATE

REFERENCE:

BASE MAP: 1:50,000 NTS MAP 42 F/2 (HORNEPAYNE), NAD 1927, EDITION 2, PUBLISHED 1979

0 200 400 600 800 1000m

SCALE: 1:10000 METRIC 24"x36"
1:20000 METRIC 11"x17"

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PIN# 1000/ONPR/100586, 100587 & 100591 – HORNEPAYNE YARD, ON

SITE LOCATION PLAN

JANUARY 2016 | FIGURE 1 | REV: 0

FileName: P:\Projects\2015\15-0434-004\dwg\env\MOE Report\15-0434-004_FIG 1-Rev 0.dwg – Tab: FIG 01 Plotted By: TWilliamson 01/28/2016 [Thu 10:47am]
24"x36" PLOT SCALE: 1:1 11"x17" PLOT SCALE: 1:2

000687

660000 E

661000 E

662000 E

663000 E

5456000 N

5455000 N

5454000 N

DIESEL RECOVERY SYSTEM
FUELLING STAND AREA

WEST END

EAST END

LITTLE JACKFISH RIVER

LEGEND

- PLAN LIMITS
- DIESEL RECOVERY SYSTEM DETAIL PLANS
- RIVER FLOW DIRECTION

0 100 200 300 400 500m

SCALE: 1:5000 METRIC 24"x36"
1:10000 METRIC 11"x17"

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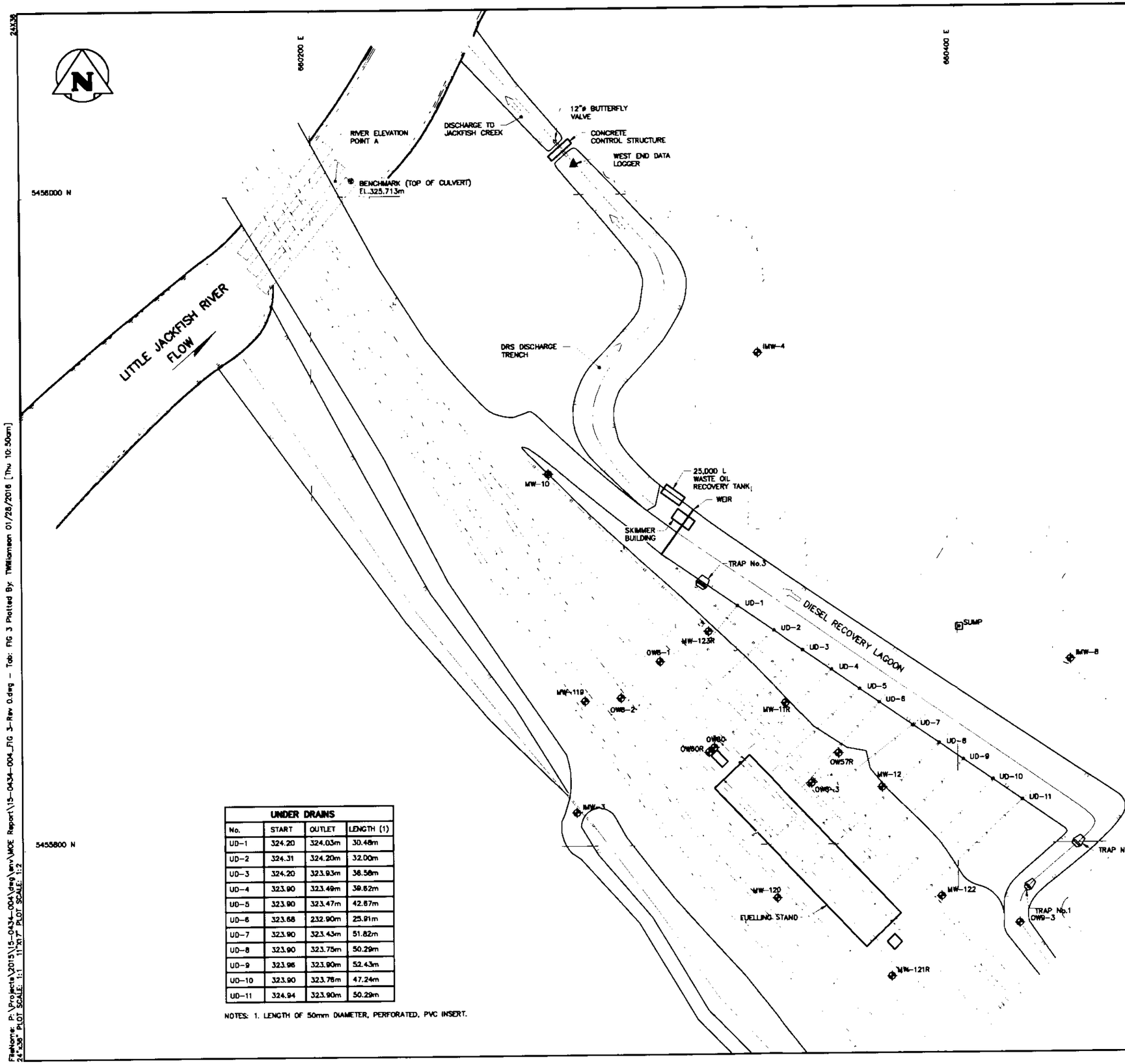
HORNEPAYNE YARD, ON

WEST END YARD PLAN

JANUARY 2016 | FIGURE 2 | REV. 0

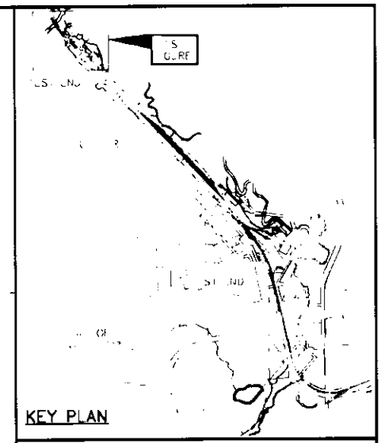
839000

FileName: P:\Projects\2015\15-0434-004\dwg\env\MOE Report\15-0434-004_FIG 2-Rev 0.dwg - Tab: FIG 02 Plotted By: TWilliamson 01/28/2016 [Thu 10:49am]
24"x36" PLOT SCALE: 1:1 11"x17" PLOT SCALE: 1:2



UNDER DRAINS			
No.	START	OUTLET	LENGTH (1)
UD-1	324.20	324.03m	30.48m
UD-2	324.31	324.20m	32.00m
UD-3	324.20	323.93m	38.56m
UD-4	323.90	323.49m	39.62m
UD-5	323.90	323.47m	42.67m
UD-6	323.68	232.90m	25.91m
UD-7	323.90	323.43m	51.82m
UD-8	323.90	323.75m	50.29m
UD-9	323.96	323.90m	52.43m
UD-10	323.90	323.78m	47.24m
UD-11	324.94	323.90m	50.29m

NOTES: 1. LENGTH OF 50mm DIAMETER, PERFORATED, PVC INSERT.



LEGEND:

- BERM
- CENTERLINE OF DITCH
- FENCE
- BURIED ELECTRICAL CABLE
- BENCHMARK
- MW-119 MONITORING WELL (INSTALLED BY KGS) (MW101-MW133, MW140-MW147)
- MW-10 MONITORING WELL (INSTALLED BY OTHERS) (ALL OTHER WELLS)
- MW-123R REPLACEMENT MONITORING WELL (INSTALLED BY KGS GROUP - 2014)
- RW8-1 RECOVERY WELL
- SUMP SUMP WELL
- RAILROAD TRACKS
- UNDERGROUND DRAIN
- DESTROYED
- FLOW MONITORING DATA LOGGER LOCATION

NOTES:

1. SITE PLAN BASED ON AUTOCAD FILE PROVIDED BY CN.

0 12 24 36 48 60m

SCALE: 1:600 METRIC 24"x36"
1:1200 METRIC 11"x17"

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HORNEPAYNE YARD, ON

WEST END SITE PLAN AND DIESEL RECOVERY SYSTEM COMPONENTS

JANUARY 2016 | FIGURE 3 | REV 0

689000

Filename: P:\Projects\2015\15-0434-004\dwg\env\MOE Report\15-0434-004_FIG 3-Rev 0.dwg - Tab: FIG 3 Plotted By: TWilkinson 01/28/2016 [Thu 10:50am]
24"x36" PLOT SCALE: 1:1 11"x17" PLOT SCALE: 1:2

24X36

N

5456000 N

5455000 N

5454000 N

660000 E

661000 E

662000 E

663000 E

WEST END

EAST END

LITTLE JACKFISH RIVER

LAGOON NO. 2 CONTAINMENT SYSTEM

LEGEND

PLAN LIMITS

DIESEL RECOVERY SYSTEM DETAIL PLANS

RIVER FLOW DIRECTION

0 100 200 300 400 500m

SCALE: 1:5000 METRIC 24"x36"
1:10000 METRIC 11"x17"

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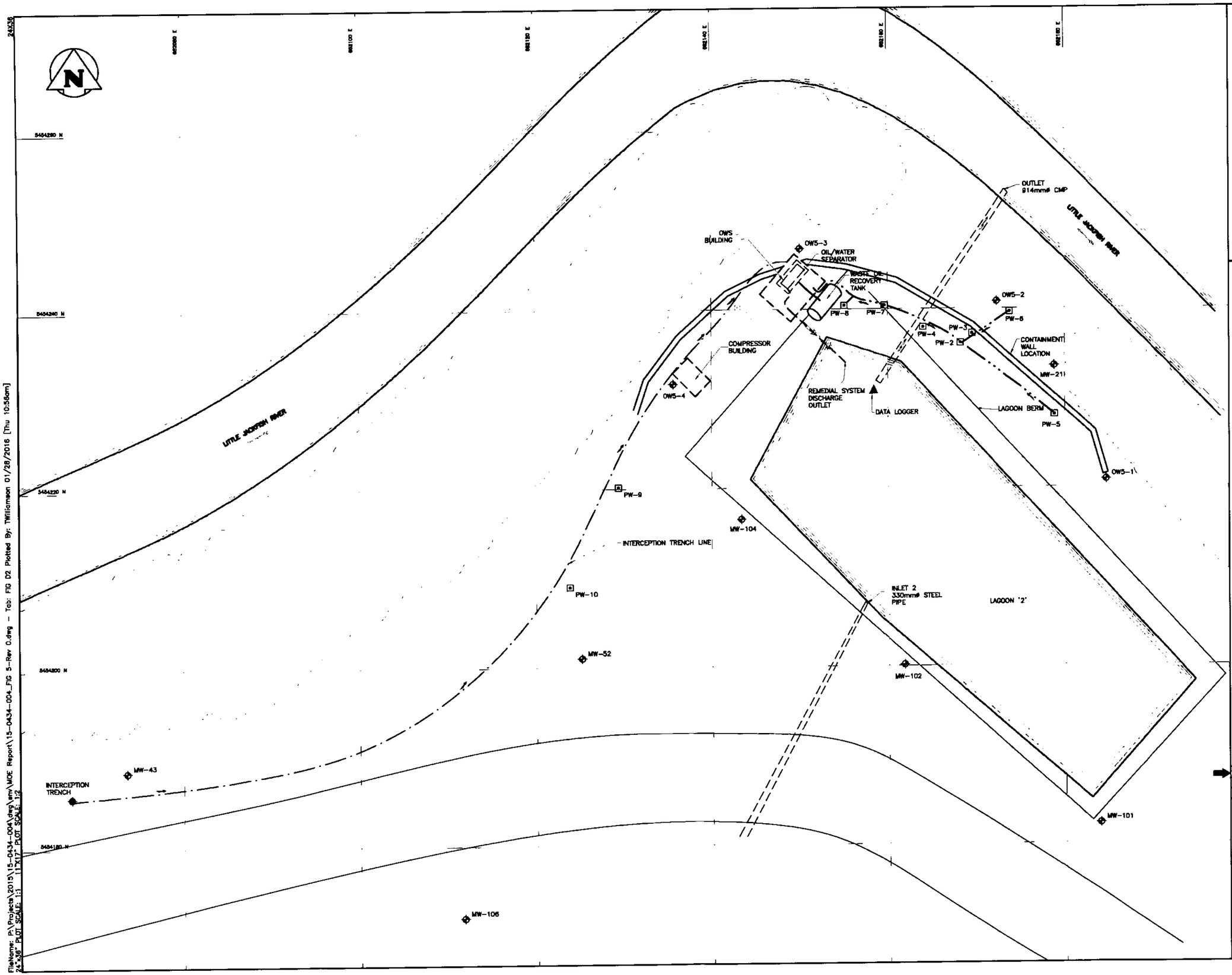
HORNEPAYNE YARD, ON

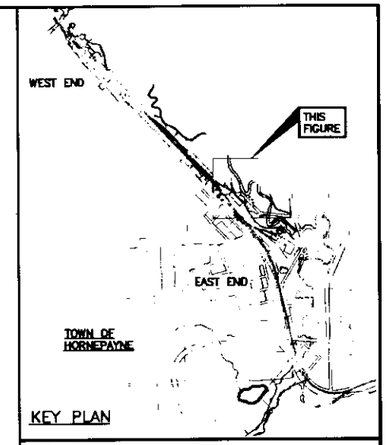
LAGOON No.2 SITE PLAN

JANUARY 2016 | FIGURE 4 | 0

FileName: P:\Projects\2015\15-0434-004\dwg\env\MOE Report\15-0434-004_FIG 4-Rev 0.dwg - Tab: FIG 01 Plotted By: TWilliamson 01/28/2016 [Thu 10:52am]
24"x36" PLOT SCALE: 1:1 11"x17" PLOT SCALE: 1:2

069000





LEGEND

- APPROXIMATED LIMITS OF TREED AREA
- EDGE OF WATER
- CULVERT
- DISCHARGE LINE
- INTERCEPTION TRENCH LINE
- MW-104 MONITORING WELL (INSTALLED BY KGS) (MW101-MW133, MW140-MW147)
- MW-52 MONITORING WELL (INSTALLED BY OTHERS) (ALL OTHER WELLS)
- INTERCEPTION TRENCH
- PW-2 PUMPING WELL
- TOTAL FLUIDS FLOW DIRECTION
- LPH FLOW DIRECTION
- WATER FLOW DIRECTION
- SURFACE WATER FLOW DIRECTION
- DESTROYED
- FLOW MONITORING DATA LOGGER LOCATION

NOTES:

1. DRAWING BASED ON BIOGENIE ENVIRONMENTAL CN AUTO CAD FILE.

0 4 8 12 16 20m

SCALE: 1:200 METRIC 24"x36"
1:400 METRIC 11"x17"

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HORNEPAYNE YARD, ON

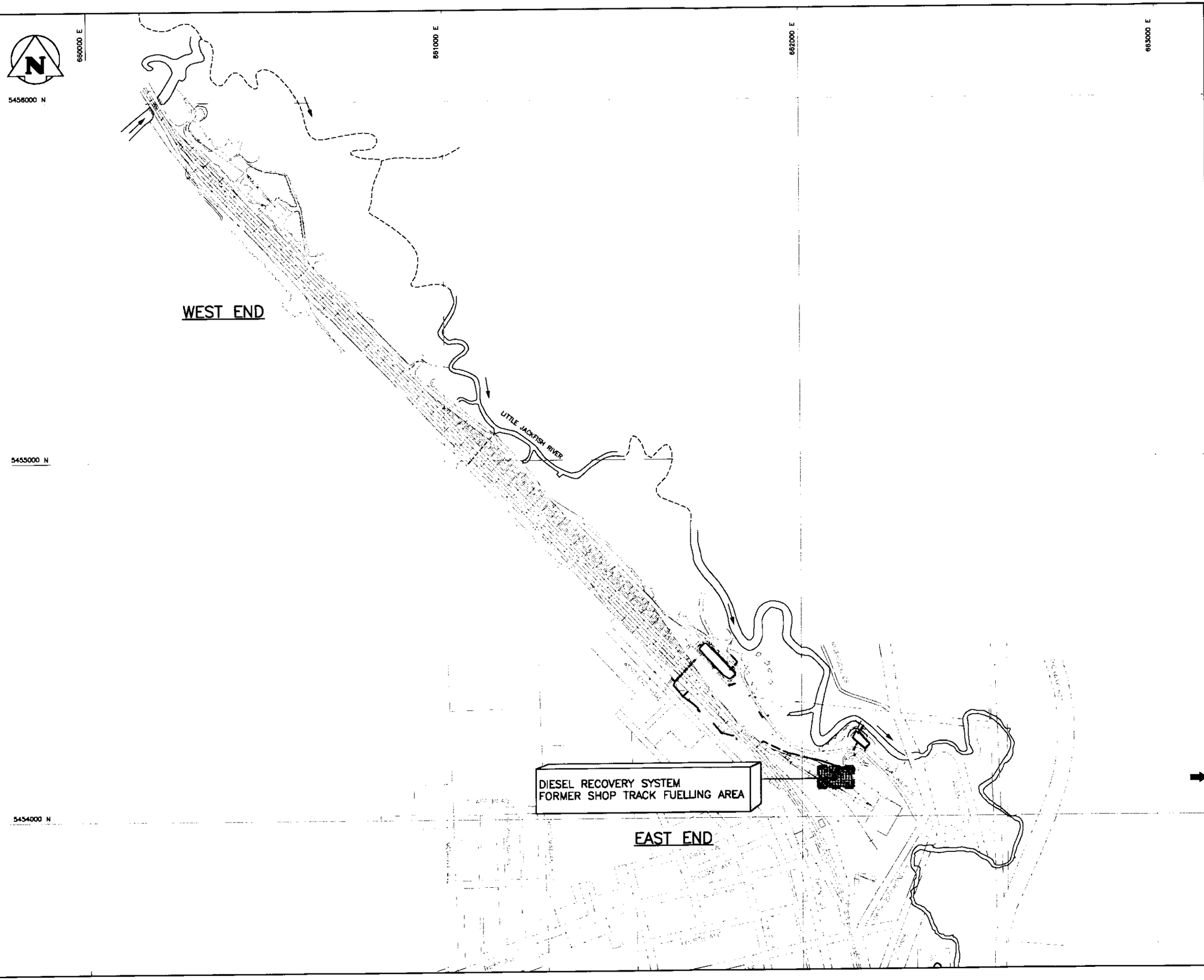
LAGOON NO.2
CONTAINMENT SYSTEM
COMPONENTS

JANUARY 2016 | FIGURE 5 | REV. 0

FileName: P:\Projects\2015\15-0434-004\dwg\mxd\MOE Report\15-0434-004_FIG 5-Rev 0.dwg - Tab: FIG D2 Plotted By: TWilliamson 01/28/2016 [Thu 10:58am]
24"x36" PLOT SCALE: 1:1 | 11"x17" PLOT SCALE: 1:2

000691

24X36



LEGEND

DIESEL RECOVERY SYSTEM DETAIL PLANS

RIVER FLOW DIRECTION

0 100 200 300 400 500m

SCALE: 1:5000 METRIC 24"x36"
1:10000 METRIC 11"x17"

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2015 REMEDIAL OPERATIONS
PIN# 1000/ONPR/100591
HORNEPAYNE YARD, ON

FORMER SHOP TRACK FUELLING AREA SITE PLAN

JANUARY 2016 | FIGURE 6 | 0

FileName: P:\Projects\2015\15-0434-004\dwg\env\MOE Report\15-0434-004_FIG 6-Rev 0.dwg - Tab: FIG E1 Plotted By: TWilliamson 01/28/2016 [Thu 10:57am]
24"x36" PLOT SCALE: 1:1 11"x17" PLOT SCALE: 1:2

24X36

10,000 GAL. HOLDING TANK

WASTE OIL TRANSFER FACILITY (50 GAL./MIN OWS)

DRIP TRAY SUMP

MW-49

LOADING ARM

DRIP TRAYS

SYSTEM DISCHARGE LINE TO OWS

MW-50

OW3-2

MW-109

MW-115

MW-114

WASTE OIL TRANSFER FACILITY

FORMER SHOP TRACK FUELLING AREA SYSTEM

ELECTRICAL

ELECTRICAL PANEL

MW-126

8'x8' BUILDING

MW-112R

5,000L AST

14'x6' CONCRETE PAD

EXISTING TRENCH

MW-124R

EXISTING CONCRETE PAD

EXISTING COLLECTION SUMP

BOLLARD (TYP.)

MW-110R

MW-125R

MW-34R

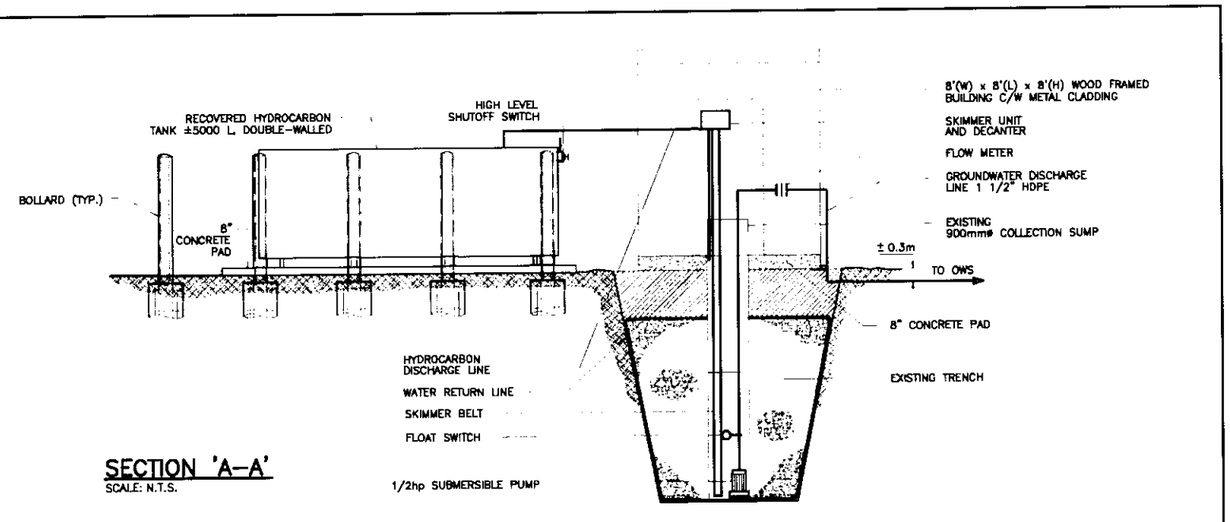
AST

AST

AST

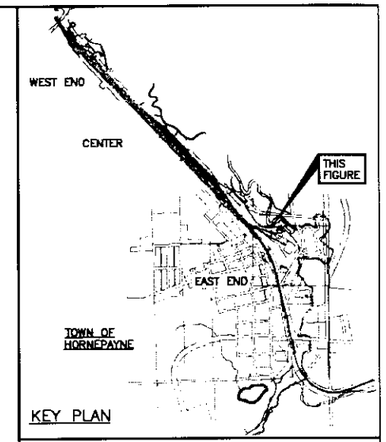
PARTIAL SITE PLAN

SCALE: 1:250



SECTION 'A-A'

SCALE: N.T.S.



KEY PLAN

LEGEND

- RAILROAD TRACK
- SANITARY SEWER
- STORM SEWER
- DISCHARGE LINE
- MW-126 — MONITORING WELL (INSTALLED BY KGS) (MW101-MW133, MW140-MW147)
- MW-50 — MONITORING WELL (INSTALLED BY OTHERS) (ALL OTHER WELLS)
- MW-110R — REPLACEMENT MONITORING WELL (INSTALLED BY KGS GROUP - 2014)
- (DES.) — DESTROYED
- MANHOLES

0 5 10 15 20 25m

SCALE: 1:250 METRIC 24"x36"
1:500 METRIC 11"x17"

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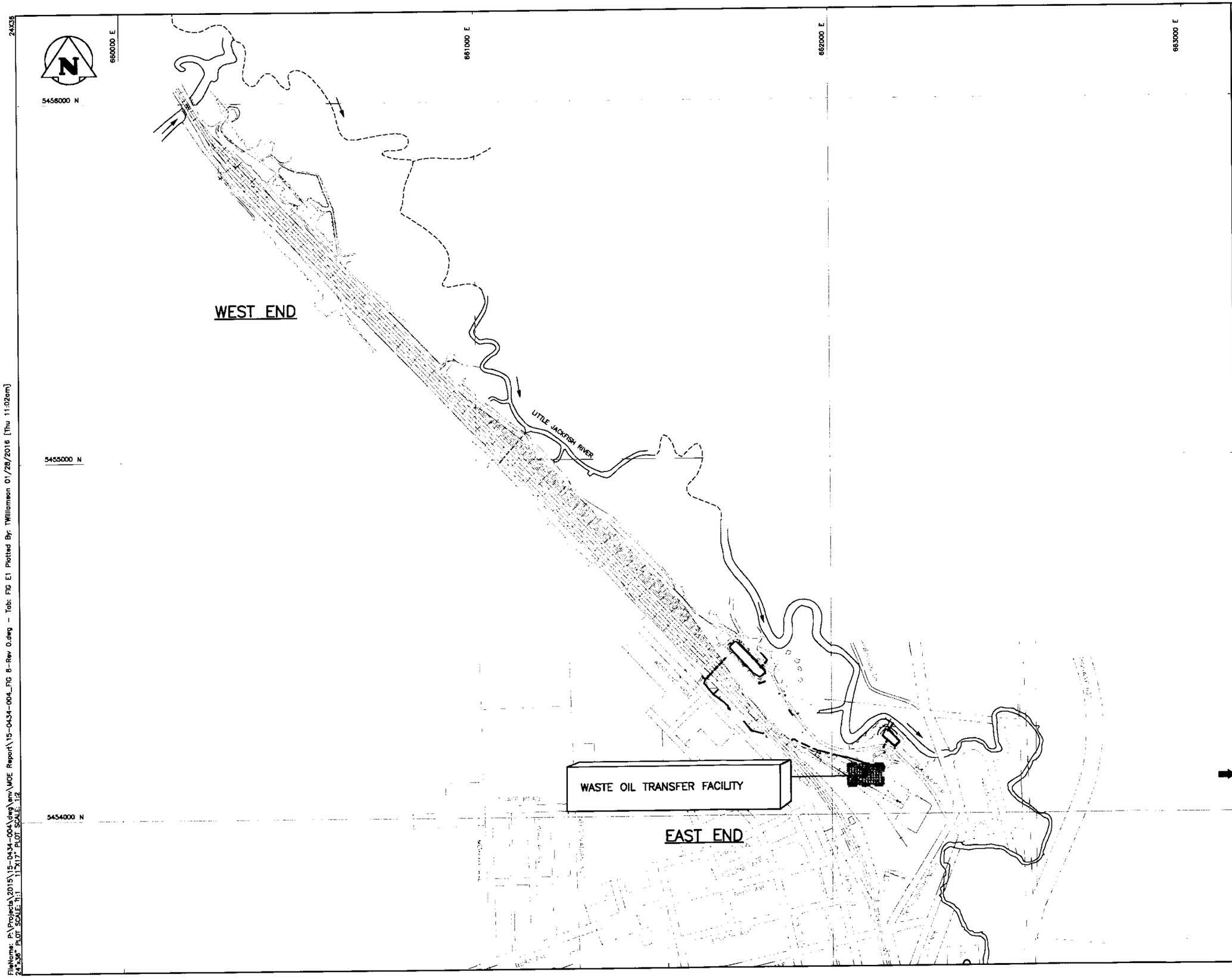
HORNEPAYNE YARD, ON

FORMER SHOP TRACK FUELLING AREA SYSTEM COMPONENTS

JANUARY 2016 | FIGURE 7 | REV. 0

FileName: P:\Projects\2015\15-0434-004\drg\env\MOE Report\15-0434-004_FIG 7-Rev 0.dwg - Tab: FIG E2 Plotted By: TWilliamson 01/28/2016 [Thu 11:00am]
24"x36" PLOT SCALE: 1:1 11"X17" PLOT SCALE: 1:2
000693



LEGEND

WASTE OIL TRANSFER FACILITY

RIVER FLOW DIRECTION

0 100 200 300 400 500m

SCALE: 1:5000 METRIC 24"x36"
1:10000 METRIC 11"x17"

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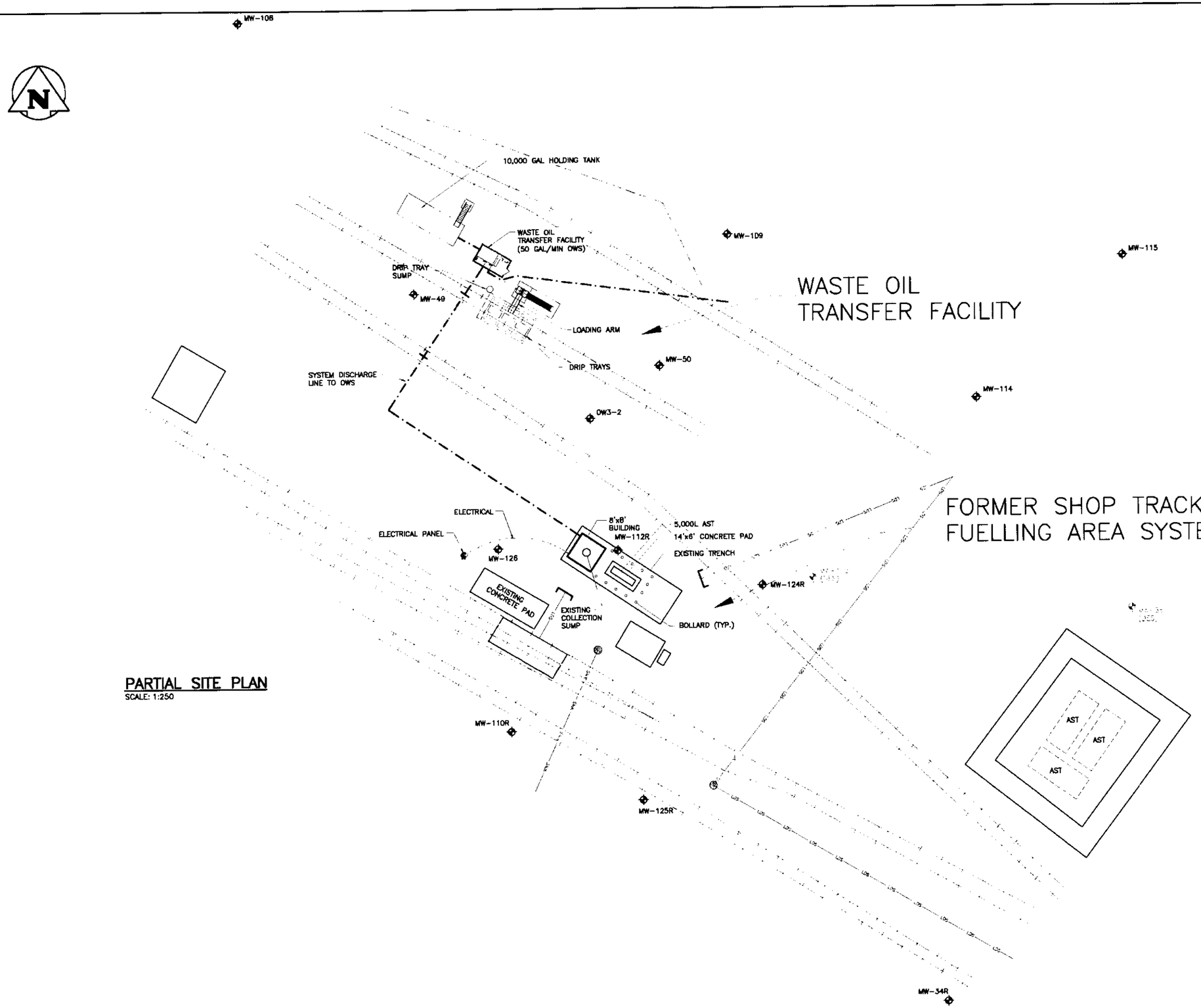
PIN# 1000/ONPR/100591
HORNEPAYNE YARD, ON

WASTE OIL TRANSFER FACILITY
SITE PLAN

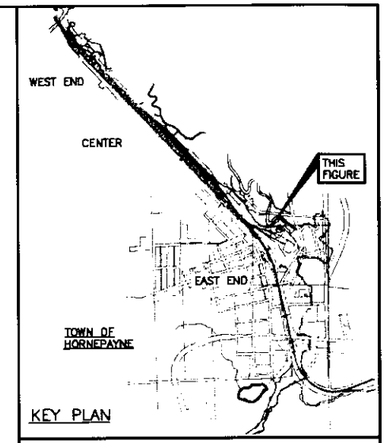
JANUARY 2016 | FIGURE 8 | REV. 0

000694

FileName: P:\Projects\2015\15-0434-004\dwg\env\MOE Report\15-0434-004_FIG 8-Rev 0.dwg - Tab: FIG E1 Plotted By: TWilliamson 01/28/2016 [Thu 11:02am]
24"x36" PLOT SCALE: 1:1 11"x17" PLOT SCALE: 1:2



PARTIAL SITE PLAN
SCALE: 1:250



KEY PLAN

LEGEND

- RAILROAD TRACK
- SANITARY SEWER
- STORM SEWER
- DISCHARGE LINE
- MW-126 MONITORING WELL (INSTALLED BY KGS) (MW101-MW133, MW140-MW147)
- MW-50 MONITORING WELL (INSTALLED BY OTHERS) (ALL OTHER WELLS)
- MW-110R REPLACEMENT MONITORING WELL (INSTALLED BY KGS - 2014)
- DESTROYED
- MANHOLES

0 5 10 15 20 25m

SCALE: 1:250 METRIC 24"x36"
1:500 METRIC 11"x17"

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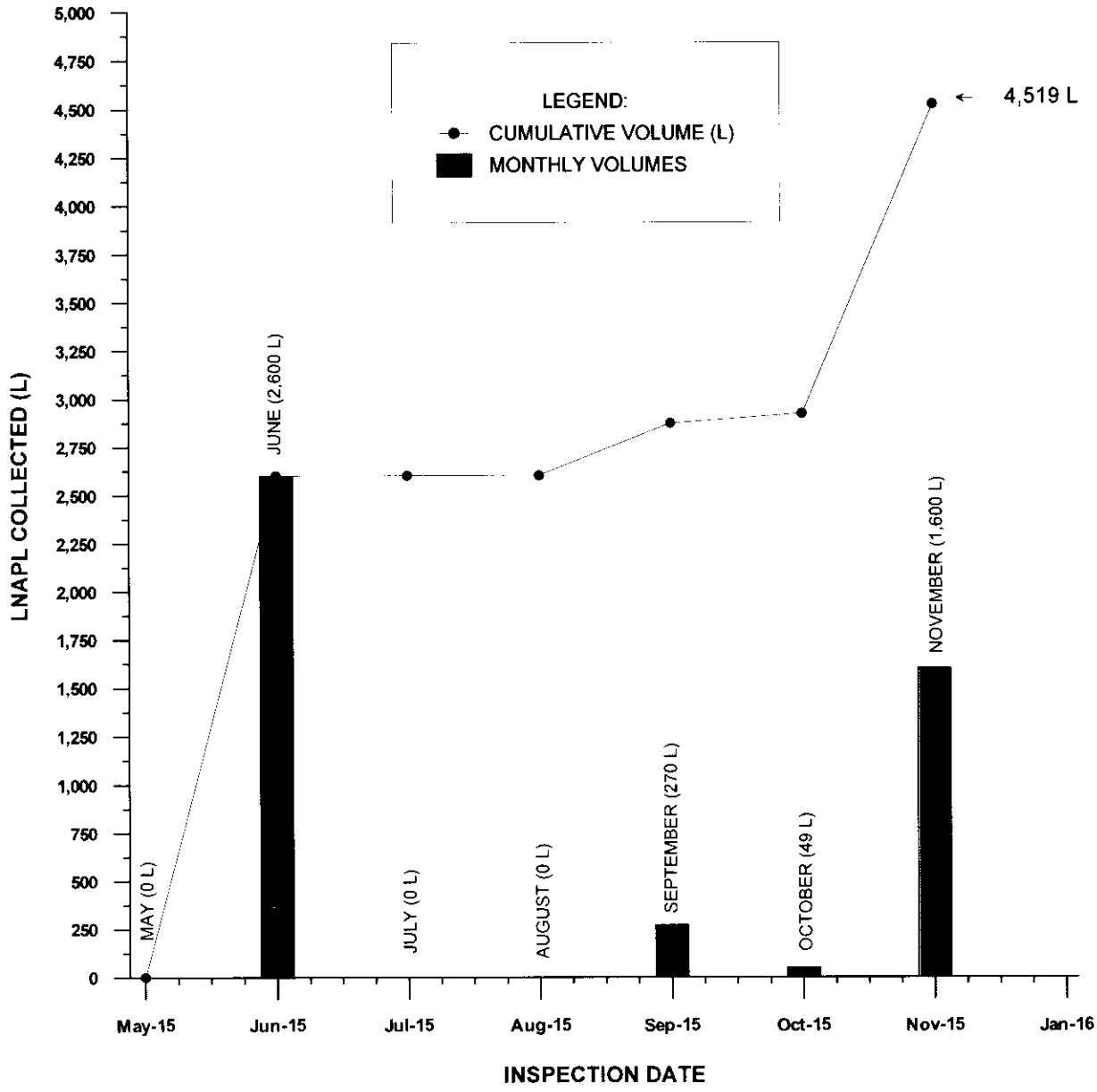
CANADIAN NATIONAL

2015 REMEDIAL OPERATIONS
PIN# 1000/ONPR/100591
HORNEPAYNE YARD, ON

WASTE OIL TRANSFER FACILITY
SYSTEM COMPONENTS

JANUARY 2016 | FIGURE 9 | REV. 0

FileName: P:\Projects\2015\15-0434-004\dwg\env\MOE Report\15-0434-004_FIG 9-Rev 0.dwg - Tab: FIG 9 Plotted By: TWilliamson 01/28/2016 [Thu 11:03am]
24"x36" PLOT SCALE: 1:1, 11"x17" PLOT SCALE: 1:2



NOTES: 4,519 L OF LNAPL WAS COLLECTED AT THE WEST END IN 2015.

May
- The skimmer unit was installed and activated on May 20.
- The skimmer unit operated within normal parameters.

June
- The skimmer unit operated within normal parameters.
- 0 L of LNAPL was collected in June.
- GFL removed approximately 2,600 L of LNAPL from Lagoon No. 5.

July
- The skimmer unit operated within normal parameters.
- 0 L of LNAPL was collected in July.

August
- The skimmer unit operated within normal parameters.
- 0 L of LNAPL was collected in August.

September
- The skimmer unit operated within normal parameters.
- 270 L of LNAPL was collected in September.

October
- The skimmer unit operated within normal parameters.
- 49 L of LNAPL was collected in October.

November
- GFL removed approximately 1,600 L of LNAPL from Lagoon No. 5.
- Skimmer unit was shutdown and winterized.

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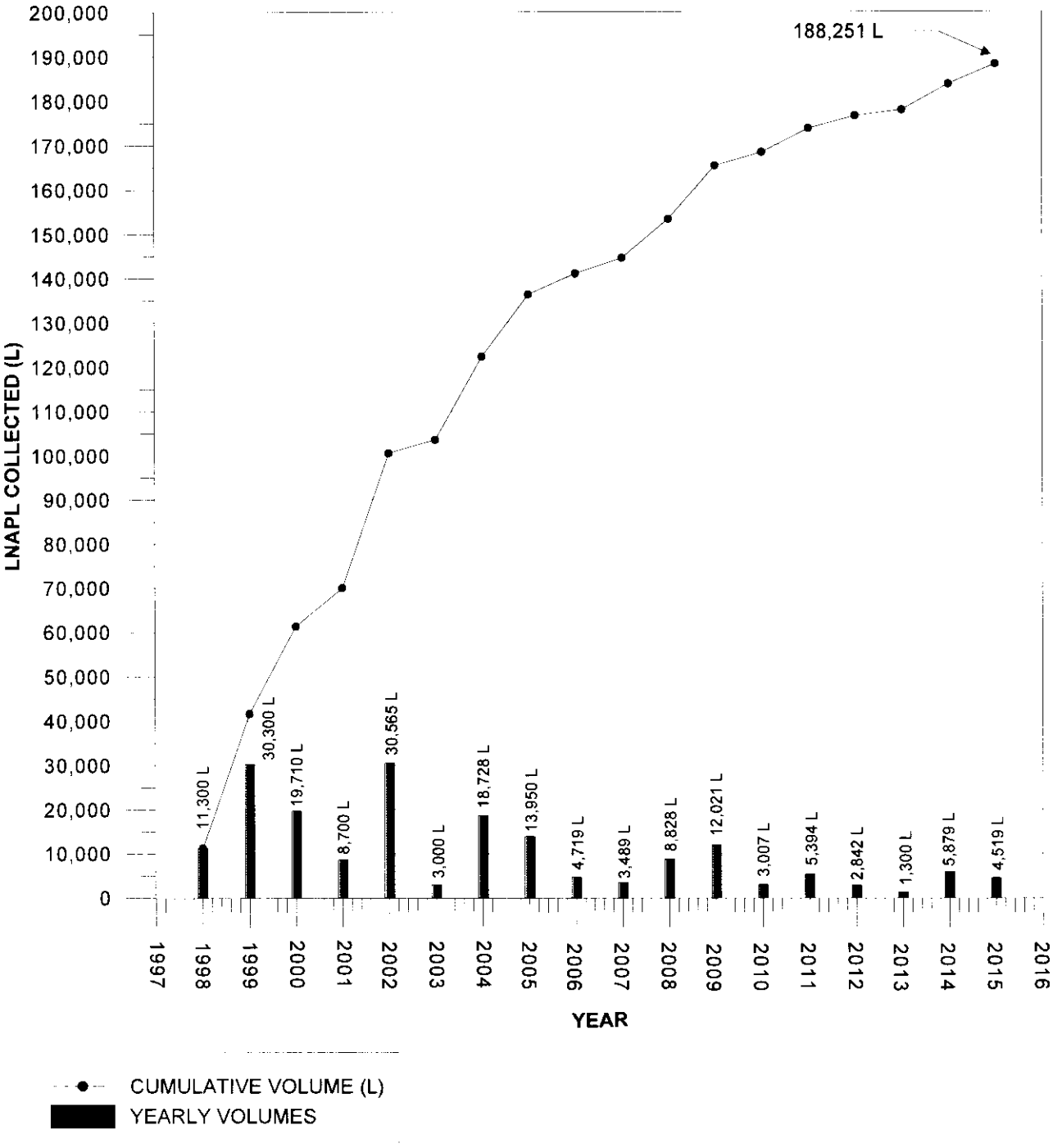
2015 LNAPL COLLECTION DATA
WEST END

JANUARY 2016 | FIGURE 10 | REV 0

P:/Projects/2015/15-0434-004/dwg/env/MOECC Report/15-0434-004_FIG 10



NO	YYMMDD	DESCRIPTION	BY
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CANADIAN NATIONAL

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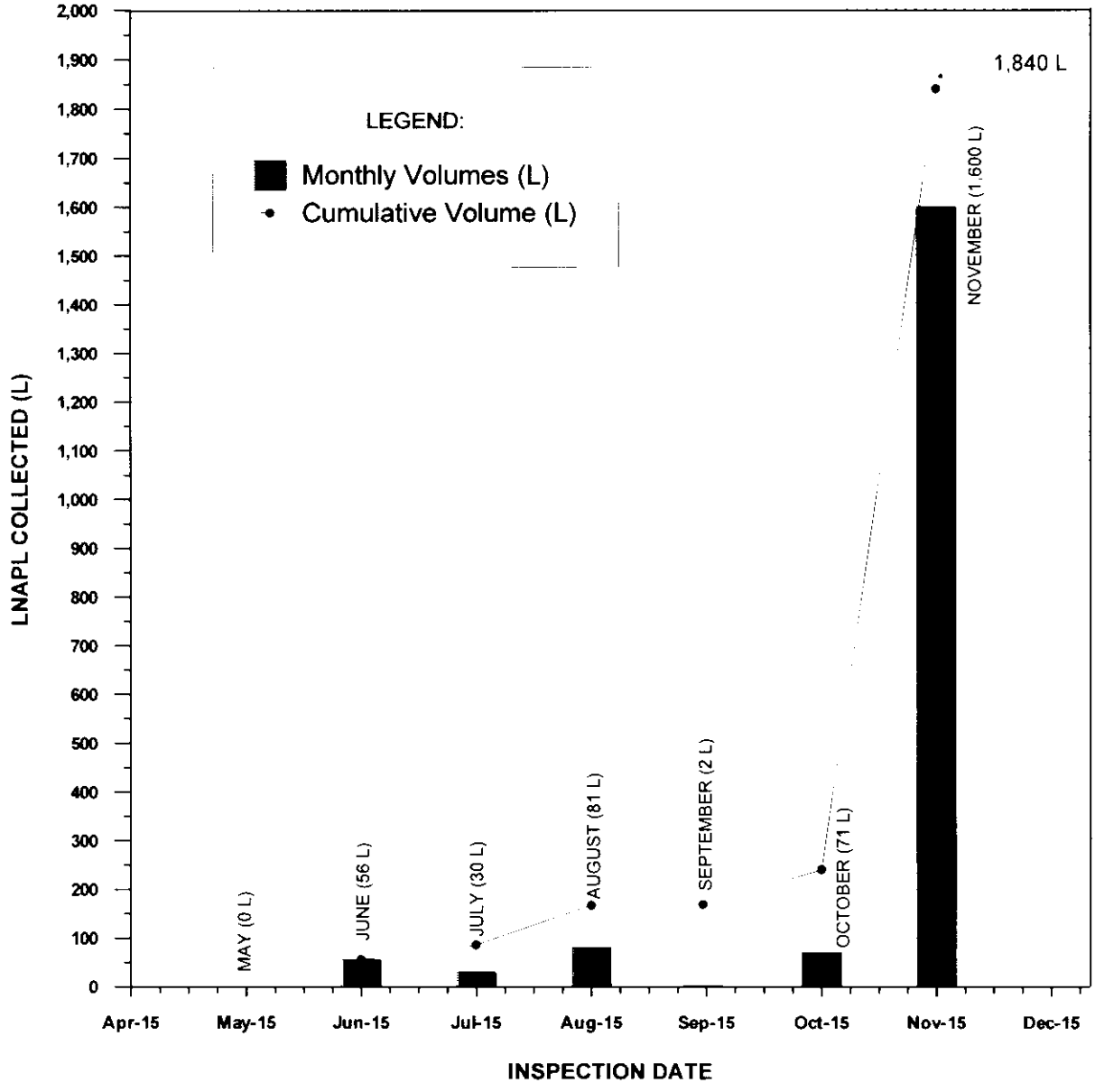
PIN# 1000/ONPR/100587, 100586
AND 100591 HORNEPAYNE YARD, ON.

HISTORICAL LNAPL COLLECTION DATA
WEST END

JANUARY 2016 | FIGURE 11 | REV 0

P:\Projects\2015\15-0434-004\dwg\env\MOECC Report\15-0434-004_FIG 11



NOTES:
A total of 1,840 L of LNAPL was collected at Lagoon No.2 in 2015.

May

- System components installed except LNAPL transfer pump..
- 0 L of LNAPL was collected

June

- LNAPL transfer pump installed and system activated.
- System operated within normal parameters.
- 56 L of LNAPL was collected.

July

- System operated within normal parameters
- 30 L of LNAPL was collected.

August

- System operated within normal parameters.
- 81 L of LNAPL was collected.

September

- System operated under normal parameters.
- 2 L of LNAPL was collected.

October

- System operated within normal parameters.
- 71 L of LNAPL was collected.

November

- System shut down and winterized
- GFL removed approximately 1,600 L of LNAPL via system maintenance.

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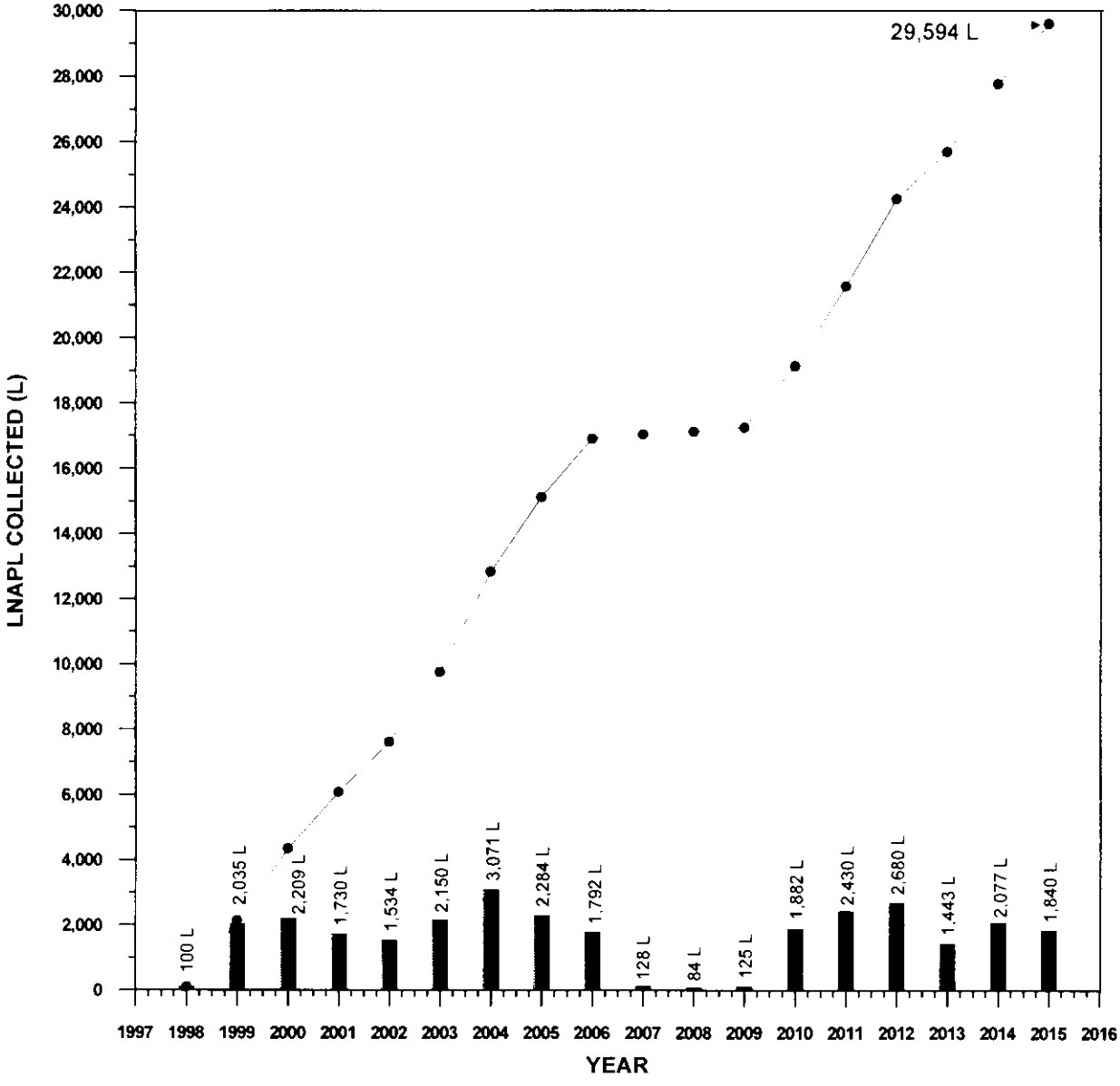
CANADIAN NATIONAL

2015 REMEDIAL OPERATIONS
PIN# 1000/ONPR/100587, 100586
AND 100591 HORNEPAYNE YARD, ON

2015 LNAPL COLLECTION DATA
LAGOON No. 2

JANUARY 2016 FIGURE 12 REV 0

P:\Projects\2015\15-0434-004\dwg\env\MOECC Report\15-0434-004_FIG 12



LEGEND:

- CUMULATIVE VOLUME (L)
- YEARLY VOLUMES

NO	YYMMDD	DESCRIPTION	BY
0	16/01/29	ISSUED WITH MOECC REPORT	TG

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KGS GROUP CONSULTING ENGINEERS

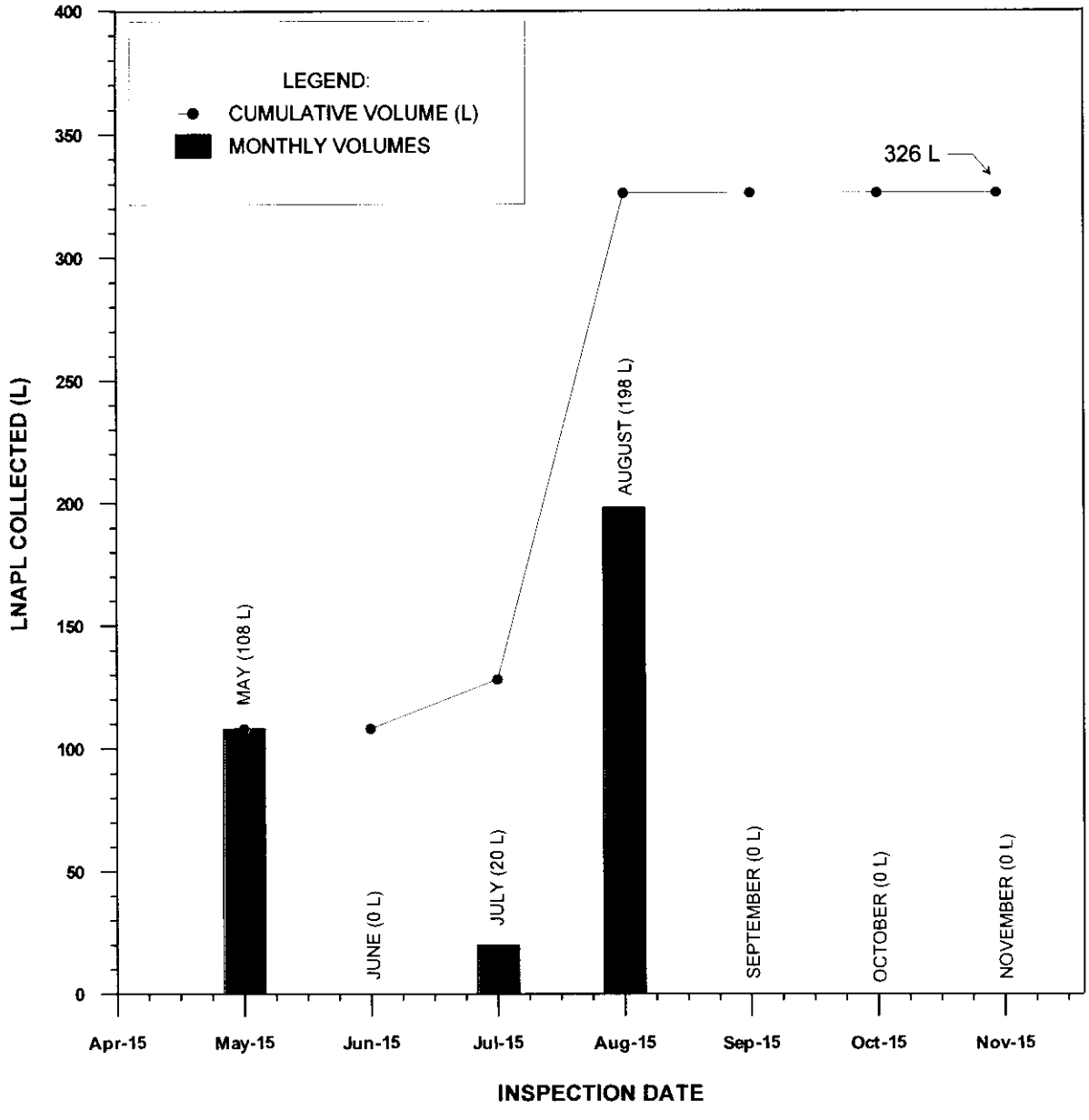
CANADIAN NATIONAL

2015 REMEDIAL OPERATIONS
PIN# 1000/ONPR/100587, 100586
AND 100591 HORNEPAYNE YARD, ON.

HISTORICAL LNAPL COLLECTION DATA
LAGOON No. 2

JANUARY 2016 | FIGURE 13 | REV. 0

P:\Projects\2015\15-0434-004\dwg\env\2015\MOECC Report\15-0434-004_FIG 13



NOTES: - A total of 326 L of LNAPL was collected by KGS Group and local personnel in 2015.

May
- Skimmer belt was installed and activated in May 2015
- The skimmer operated within normal parameters.
- 108 L of LNAPL was collected.

June
- The skimmer unit operated within normal parameters.
- 0 L of LNAPL was collected.

July
- The skimmer unit operated within normal parameters.
- 20 L of LNAPL was collected.

August
- The skimmer unit operated within normal parameters.
- 198 L of LNAPL was collected.

September
- The skimmer unit operated under normal parameters.
- Operation of the skimmer unit was shut down on September 30, 2015 due to low levels within the collection sump.
- 0 L of LNAPL was collected.

October
- The skimmer unit did not operate.
- 0 L of LNAPL was collected.

November
- Skimmer unit was winterized.

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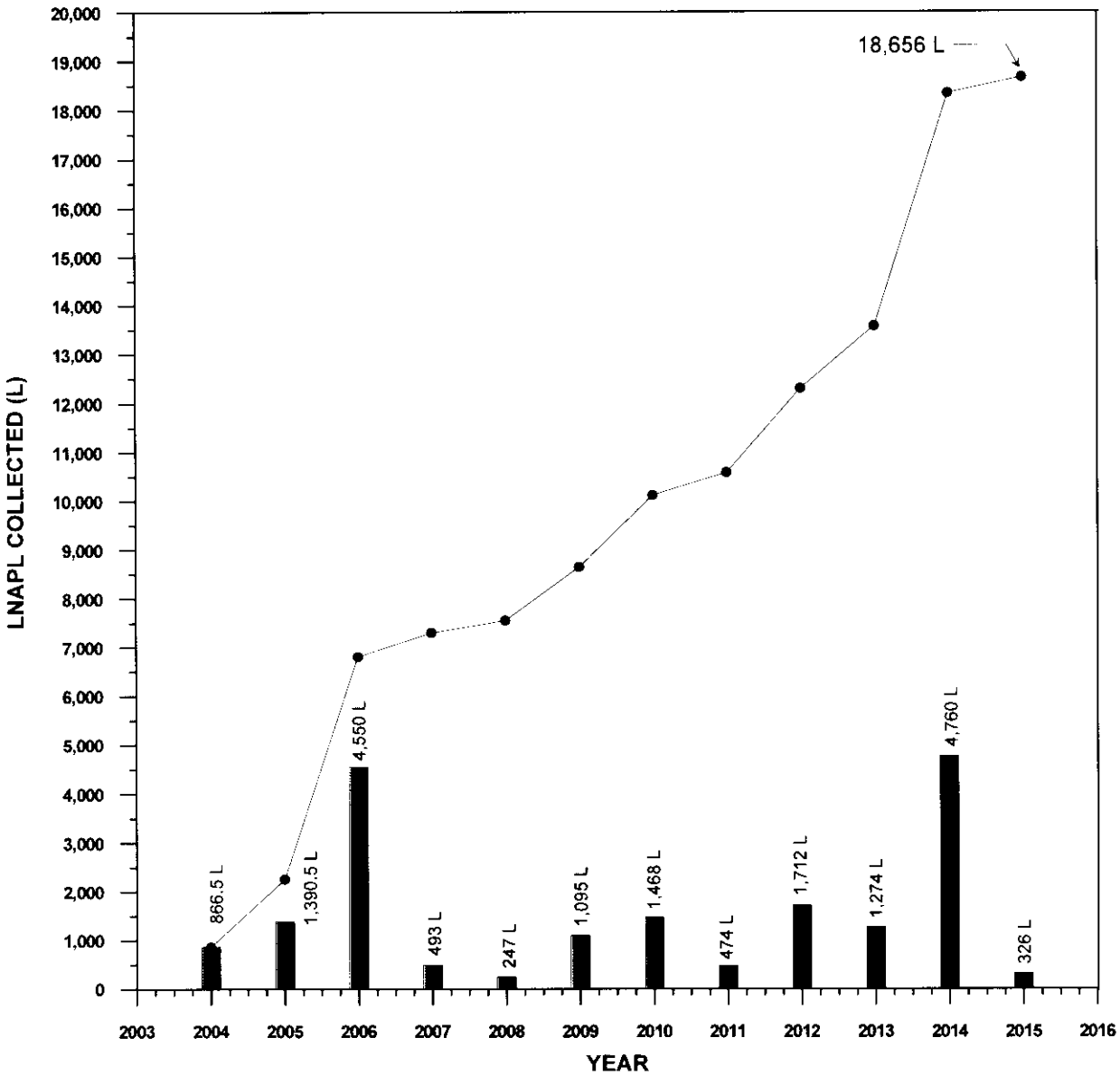
CANADIAN NATIONAL

2015 REMEDIAL OPERATIONS
PIN# 1000/ONPR/100587, 100586
AND 100591 HORNEPAYNE YARD, ON.

2015 LNAPL COLLECTION DATA
FORMER SHOP TRACK FUELLING AREA

JANUARY 2016 | FIGURE 14 | REV. 0

P:\Projects\2015\15-0434-004\dwg\env\MOECC\15-0434-004_FIG 14.grf



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0	16/01/29	ISSUED WITH MOECC REPORT	TG

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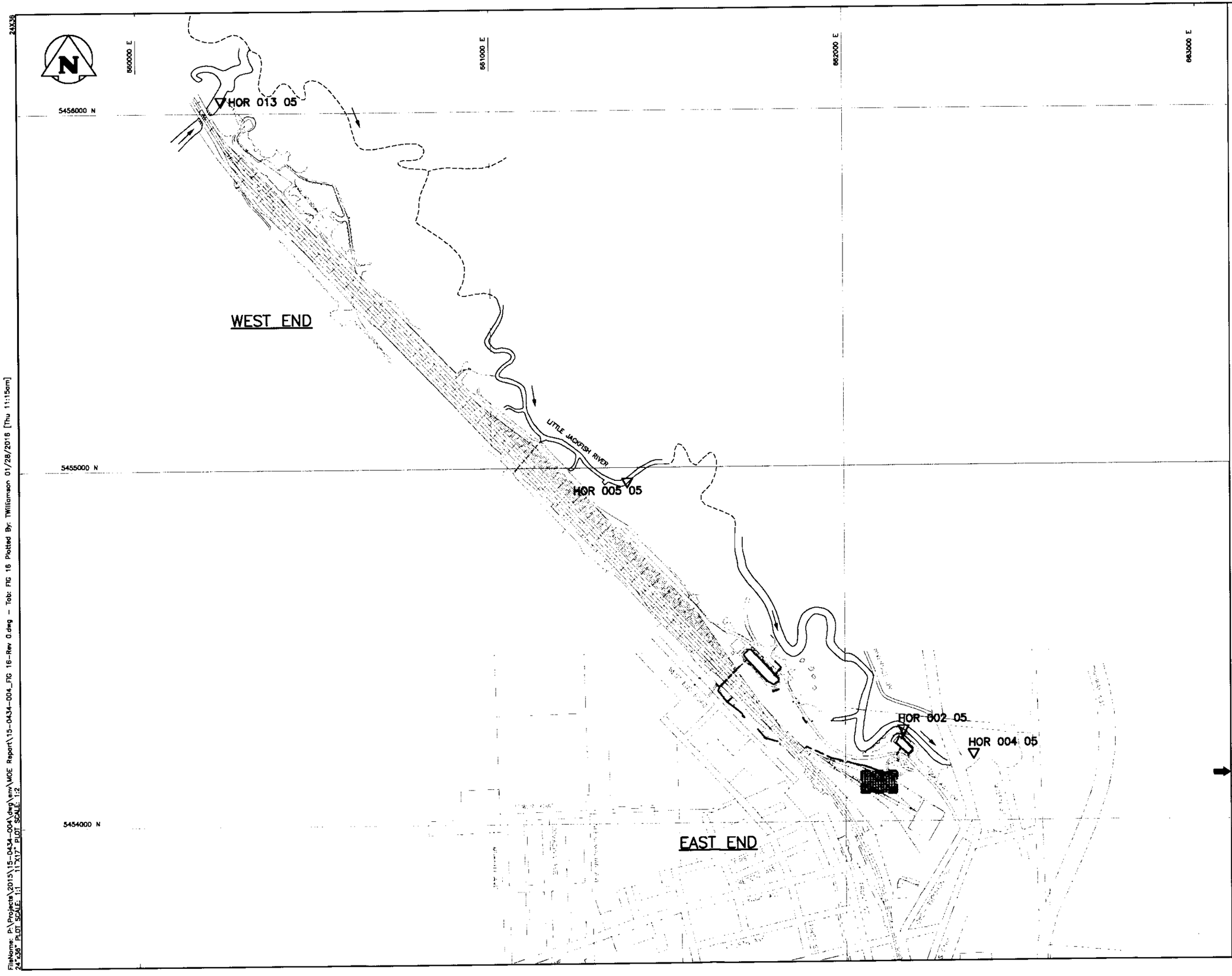
CANADIAN NATIONAL

2015 REMEDIAL OPERATIONS
PIN# 1000/ONPR/100587, 100586
AND 100591 HORNEPAYNE YARD, ON.

HISTORICAL LNAPL COLLECTION DATA
FORMER SHOP TRACK FUELLING AREA

JANUARY 2016	FIGURE 15	REV 0

P:\Projects\2015\15-0434-004\dwg\env\MOECC\15-0434-004_FIG 15.grf



LEGEND

▽ SURFACE WATER SAMPLING LOCATION

HOR 013 05

→ RIVER FLOW DIRECTION

0 100 200 300 400 500m

SCALE: 1:5000 METRIC 24"x36"
1:10000 METRIC 11"x17"

NO.	DATE	DESCRIPTION	BY
0	16/01/29	ISSUED WITH MOECC REPORT	TG

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KGS GROUP CONSULTING ENGINEERS

CANADIAN NATIONAL

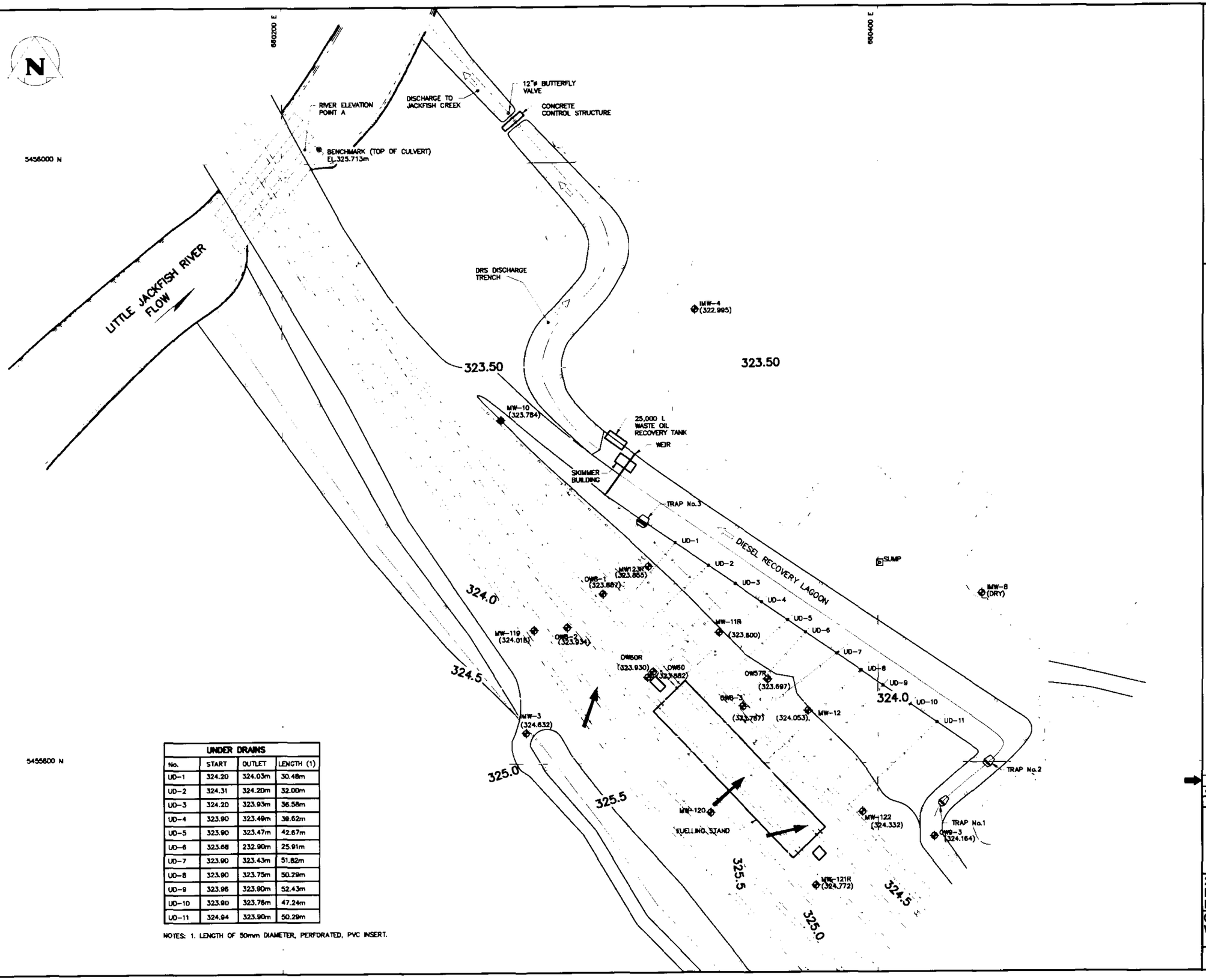
2015 REMEDIAL OPERATIONS
PIN# 1000/ONPR/100587, 100586
AND 100591 HORNEPAYNE YARD, ON

SURFACE WATER SAMPLING LOCATIONS

JANUARY 2016 | FIGURE 16 | REV. 0

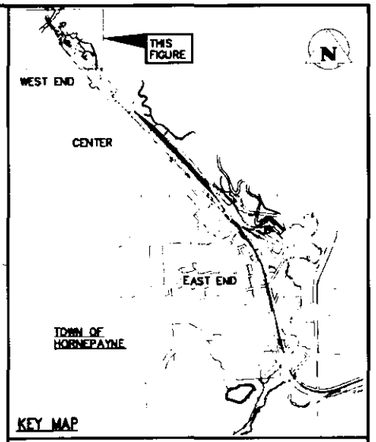
FileName: P:\Projects\2015\15-0434-004\dwg\env\MOE Report\15-0434-004_FIG 16-Rev 0.dwg — Tab: FIG 16 Plotted By: TWilliamson 01/28/2016 [Thu 11:15am]
24"x36" PLOT SCALE: 1:1 11"X17" PLOT SCALE: 1:2

000702



UNDER DRAINS			
No.	START	OUTLET	LENGTH (1)
UD-1	324.20	324.03m	30.48m
UD-2	324.31	324.20m	32.00m
UD-3	324.20	323.93m	36.58m
UD-4	323.90	323.49m	38.62m
UD-5	323.90	323.47m	42.67m
UD-6	323.68	232.90m	25.91m
UD-7	323.90	323.43m	51.82m
UD-8	323.90	323.75m	50.29m
UD-9	323.98	323.80m	52.43m
UD-10	323.90	323.78m	47.24m
UD-11	324.04	323.90m	50.29m

NOTES: 1. LENGTH OF 50mm DIAMETER, PERFORATED, PVC INSERT.



KEY MAP

LEGEND:

- BERM
- CENTERLINE OF DITCH
- FENCE
- BURIED ELECTRICAL CABLE
- BENCHMARK
- MW-11S — MONITORING WELL (INSTALLED BY KGS) (MW101–MW133, MW140–MW147)
- MW-10 — MONITORING WELL (INSTALLED BY OTHERS) (ALL OTHER WELLS)
- MW-121R — REPLACEMENT MONITORING WELL (INSTALLED BY KGS – 2014)
- RWB-1 — RECOVERY WELL
- SUMP — SUMP WELL
- RAILROAD TRACKS
- UNDERGROUND DRAIN
- DESTROYED
- 324.00 — GEODETIC GROUNDWATER CONTOUR (m)
- GROUNDWATER FLOW DIRECTION
- (322.995) — GROUNDWATER ELEVATION AT WELL

NOTES:

1. SITE PLAN BASED ON AUTOCAD FILE PROVIDED BY CN.

0 12 24 36 48 60m

SCALE: 1:600 METRIC 24"x36"
1:1200 METRIC 11"x17"

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KGS GROUP CONSULTING ENGINEERS

CN CANADIAN NATIONAL

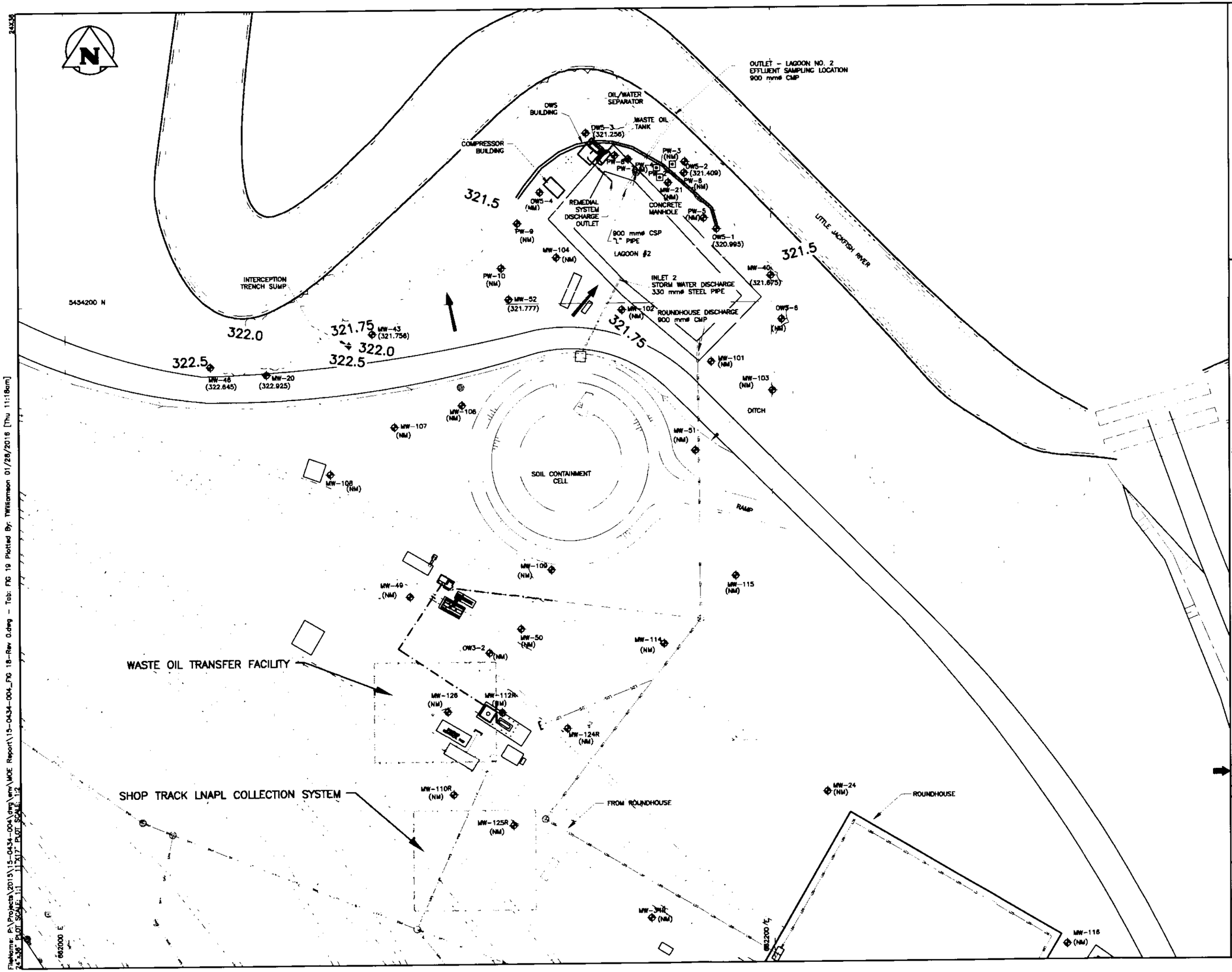
2015 REMEDIAL OPERATIONS
PIN# 1000/ONPR/100587
HORNEPAYNE YARD, ON

GROUNDWATER SURFACE CONTOURS
WEST END – FALL 2015

JANUARY 2016 | FIGURE 17 | REV 0

FileName: P:\Projects\2015\15-0434-004\dwg\mxd\MOE Report\15-0434-004_FIG 17-Rev 0.dwg – Tab: FIG 17 Plotted By: TWilliamson 01/28/2016 [Thu 11:17am]
24"x36" PLOT SCALE: 1:1 11"x17" PLOT SCALE: 1:2

000703


OUTLET - LAGOON NO. 2
EFFLUENT SAMPLING LOCATION
900 mmø CMP
OIL/WATER SEPARATOR
OWS BUILDING
WASTE OIL TANK
COMPRESSOR BUILDING
OWS-3 (321.256)
PW-3 (NM)
PW-2 (NM)
OWS-2 (321.409)
PW-6 (NM)
MW-21 (NM)
CONCRETE MANHOLE
PW-5 (NM)
OWS-1 (320.995)
OWS-4 (NM)
REMEDIAL SYSTEM DISCHARGE OUTLET
900 mmø CSP "L" PIPE
LAGOON #2
PW-9 (NM)
MW-104 (NM)
PW-10 (NM)
MW-52 (321.777)
INLET 2
STORM WATER DISCHARGE
330 mmø STEEL PIPE
ROUNDHOUSE DISCHARGE
900 mmø CMP
MW-102 (NM)
MW-40 (321.675)
OWS-6 (NM)
MW-101 (NM)
MW-103 (NM)
DITCH
LITTLE JACKFISH RIVER
INTERCEPTION TRENCH SUMP
5434200 N
322.0
321.75
322.0
322.5
MW-43 (321.756)
MW-46 (322.645)
MW-20 (322.925)
321.5
MW-106 (NM)
MW-107 (NM)
MW-51 (NM)
MW-108 (NM)
SOIL CONTAINMENT CELL
RAMP
MW-109 (NM)
MW-49 (NM)
MW-115 (NM)
MW-50 (NM)
OW3-2 (NM)
MW-114 (NM)
WASTE OIL TRANSFER FACILITY
MW-125 (NM)
MW-112R (NM)
MW-124R (NM)
SHOP TRACK LNAPL COLLECTION SYSTEM
MW-110R (NM)
MW-125R (NM)
FROM ROUNDHOUSE
MW-24 (NM)
ROUNDHOUSE
MW-34R (NM)
MW-116 (NM)
662000 E
7200 N
WEST END
CENTER
THIS FIGURE
TOWN OF HORNEPAYNE
KEY PLAN
LEGEND
RAILROAD TRACK
CULVERT
CENTERLINE OF DITCH
SANITARY SEWER
STORM SEWER
FENCE
DISCHARGE LINE
TREES/ SHRUBS
MANHOLES
SURFACE WATER FLOW DIRECTION
MW-126 MONITORING WELL (INSTALLED BY KGS) (MW101-MW133, MW140-MW147)
MW-52 MONITORING WELL (INSTALLED BY OTHERS) (ALL OTHER WELLS)
MW-110R REPLACEMENT MONITORING WELL (INSTALLED BY KGS - 2014)
PW-1 PUMPING WELL
321.50 GEODETIC GROUNDWATER CONTOUR (m)
GROUNDWATER FLOW DIRECTION
(321.756) GROUNDWATER ELEVATION AT WELL
DESTROYED
(NM) NOT MONITORED
NOTE:
1. REFERENCE JACQUES WHITFORD ENVIRONMENTAL LIMITED PROJECT 31004, DRAWING NO. 2, 1996.
2. ELEVATIONS ARE ADJUSTED FOR PRESENCE OF LNAPL.
0 10 20 30 40 50m
SCALE: 1:500 METRIC 24"x36"
1:1000 METRIC 11"x17"
0 16/01/29 ISSUED WITH MOECC REPORT TG
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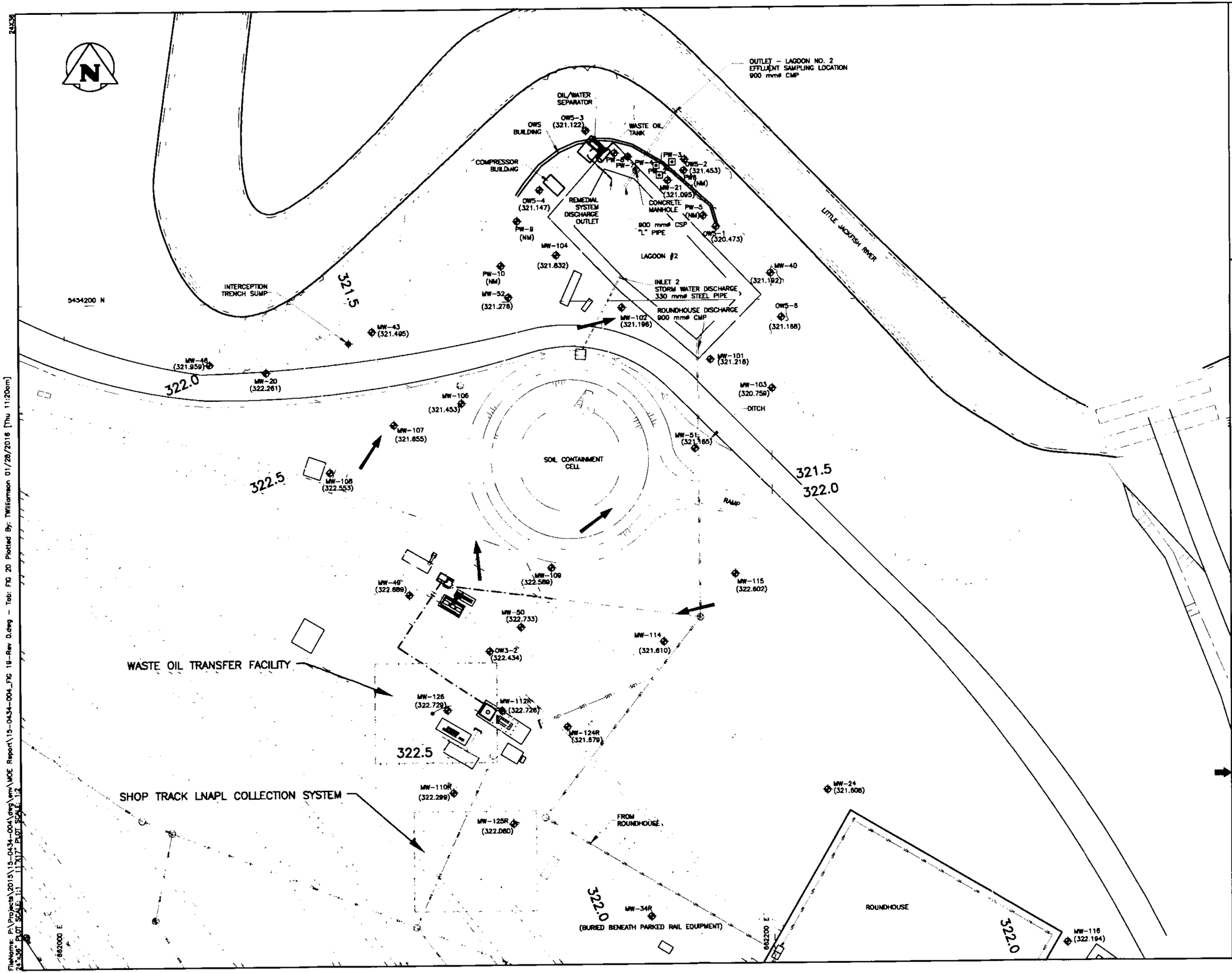
CN CANADIAN NATIONAL
2015 REMEDIAL OPERATIONS
PIN# 1000/ONPR/100591
HORNEPAYNE YARD, ON
GROUNDWATER SURFACE CONTOURS
EAST END - SPRING 2015
JANUARY 2016
FIGURE 18
REV 0
Filename: P:\Projects\2015\15-0434-004\dwg\wrv\MOE Report\15-0434-004_FIG 18-Rev 0.dwg - Tab: FIG 19 Plotted By: TWilliamson 01/28/2016 [Thu 11:18am]
24.38 PLOT SCALE: 1:1 11"x17" PLOT SCALE: 1:2
000704


OUTLET - LAGOON NO. 2
EFFLUENT SAMPLING LOCATION
900 mmø CMP
OIL/WATER SEPARATOR
OWS BUILDING
OWS-3 (321.122)
WASTE OIL TANK
COMPRESSOR BUILDING
PW-3
PW-5
PW-4
PW-2
OWS-2 (321.453)
PW-6 (NM)
MW-21 (321.095)
OWS-4 (321.147)
REMEDIAL SYSTEM DISCHARGE OUTLET
CONCRETE MANHOLE
PW-5 (NM)
900 mmø CSP "L" PIPE
OWS-1 (320.473)
PW-9 (NM)
MW-104 (321.632)
LAGOON #2
LITTLE JACKFISH RIVER
PW-10 (NM)
MW-52 (321.278)
INLET 2 STORM WATER DISCHARGE 330 mmø STEEL PIPE
MW-40 (321.192)
ROUNDHOUSE DISCHARGE 900 mmø CMP
OWS-6 (321.188)
INTERCEPTION TRENCH SUMP
5454200 N
321.5
MW-43 (321.495)
MW-102 (321.196)
MW-101 (321.218)
MW-46 (321.959)
322.0
MW-20 (322.261)
MW-103 (320.758)
DITCH
MW-106 (321.453)
MW-107 (321.855)
MW-51 (321.165)
322.5
MW-108 (322.553)
SOIL CONTAINMENT CELL
RAMP
321.5
322.0
MW-109 (322.589)
MW-49 (322.689)
MW-115 (322.602)
MW-50 (322.733)
MW-114 (321.610)
OW3-2 (322.434)
WASTE OIL TRANSFER FACILITY
MW-125 (322.729)
MW-112R (322.726)
MW-124R (321.879)
322.5
MW-110R (322.299)
SHOP TRACK LNAPL COLLECTION SYSTEM
MW-125R (322.080)
FROM ROUNDHOUSE
MW-24 (321.606)
322.0
MW-34R
(BURIED BENEATH PARKED RAIL EQUIPMENT)
662200 E
ROUNDHOUSE
322.0
MW-116 (322.194)
WEST END
CENTER
EAST END
TOWN OF HORNEPAYNE
THIS FIGURE
KEY PLAN
LEGEND
RAILROAD TRACK
CULVERT
CENTERLINE OF DITCH
SANITARY SEWER
STORM SEWER
FENCE
DISCHARGE LINE
TREES/ SHRUBS
MANHOLES
SURFACE WATER FLOW DIRECTION
MW-126 MONITORING WELL (INSTALLED BY KGS) (MW101-MW133, MW140-MW147)
MW-52 MONITORING WELL (INSTALLED BY OTHERS) (ALL OTHER WELLS)
MW-110R REPLACEMENT MONITORING WELL (INSTALLED BY KGS - 2014)
PW-1 PUMPING WELL
322.00 GEODETIC GROUNDWATER CONTOUR (m)
GROUNDWATER FLOW DIRECTION
(321.243) GROUNDWATER ELEVATION AT WELL
DESTROYED
(NM) NOT MONITORED
NOTE:
1. REFERENCE JACQUES WHITFORD ENVIRONMENTAL LIMITED PROJECT 31004, DRAWING NO. 2, 1998.
2. ELEVATIONS ARE ADJUSTED FOR PRESENCE OF LNAPL.
0 10 20 30 40 50m
SCALE: 1:500 METRIC 24"x36"
1:1000 METRIC 11"x17"
0 15/01/29 ISSUED WITH MOECC REPORT TG
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KGS GROUP CONSULTING ENGINEERS
CANADIAN NATIONAL
2015 REMEDIAL OPERATIONS
PIN# 1000/ONPR/100591
HORNEPAYNE YARD, ON
GROUNDWATER SURFACE CONTOURS
EAST END - FALL 2015
JANUARY 2016
FIGURE 19
REV 0
FileName: P:\Projects\2015\15-0434-004\dwg\mv\MOE Report\15-0434-004_FIG 19-Rev D.dwg - Tab: FIG 20 Plotted By: TWilliamson 01/28/2016 [Thu 11:20am]
24x36 PLOT SCALE: 1:1 11x17 PLOT SCALE: 1:2
000705

APPENDIX A

CERTIFICATE OF APPROVAL
No. 3528-83LQWT

Ontario

Ministry of the Environment
Ministère de l'Environnement

AMENDED CERTIFICATE OF APPROVAL
INDUSTRIAL SEWAGE WORKS
NUMBER 3528-83LQWT
Issue Date: April 29, 2010

Canadian National Railway Company
1 Administration Road
PO Box, No. 1000, Concord, Ontario L4K 1B9

Site Location: 58 Front Street - Hornepayne Yard
East and West End Systems
Hornepayne Township, District of Algoma, ON P0M 1Z0

You have applied in accordance with Section 53 of the Ontario Water Resources Act for approval of:

the establishment of sewage works for the collection, transmission, treatment and disposal of stormwater, contact stormwater runoff from the CN Hornepayne Yard and industrial sewage generated from the Lagoon Light Non-Aqueous Phase Liquid (LNAPL) Containment System, the Shop Track LNAPL Recovery System, the Waste Oil Transfer Facility and melt water/seepage from the soil contaminated cell, discharging to Little Jackfish River, consisting of the following:

EAST END ENVIRONMENTAL PROTECTION SYSTEM

- A Lagoon System to provide quantity and quality controls for both stormwater runoff, off-site discharge of petroleum hydrocarbon spills and industrial sewage. The lagoon consists of:

  - a rectangular lagoon with an impermeable liner for a total capacity of approximately 1,936 m^3, discharging to a 600 mm diameter corrugated steel pipe with an outlet at an elevation of 322.74 m, equipped with a 900 mm diameter concrete manhole acting as an settling basin for hydrocarbon and suspendid solids.

  - an increase in the lagoon berm height by 0.8 m, including 0.3 m of freeboard, to increase the volumetric capacity 835 m^3 for a total capacity of 2,771 m^3, and slopes changes from 3:1 to 4:1.

- A Containment Recovery and Collection System to contain and recover local subsurface LNAPL identified in the area, consisting of:

  - A bentonite / concrete cut-off wall at the northwest corner of the lagoon to prevent the off-site migration of LNAPL into the Little Jackfish River, equipped with ten (10) pumping wells and an interception trench with 4.5 m depth, width of 0.6 to 1.1 m and 78.5 m in length, all located between the former Pump House area and the Little Jackfish River (upgradient and downgradient from the cut-off wall), and discharging into

000707

the oil/water separator.

- An oil/water separator (fiberglass Parkson Model SRM6 OWS, or approved equivalent) located at the Pollution Control Building and discharging into the lagoon, equipped with:

- A transfer tank with a total capacity of 171 L, a transfer pump directing sewage from the transfer tank to a 4,560 L double walled waste oil tank located adjacent to the Pollution Control Building, prior to treatment at the Oil Transfer Facility.

- A Shop Track LNAPL Recovery System to contain and recover local subsurface LNAPL identified in the area, consisting of:

  - An oil skimmer, Abinaki Model 8 Oil Grabber, used to collect LNAPL draining to the Recovery Trech.

  - A rock filled Recovery Trench (20 m long, 5 m wide and 5 m depth) with a non woven geotextile to collect groundwater and LNAPL to be pumped through a 38 mm diameter HDPE discharge line to the oil water separator located at the waste oil transfer facility. This System is equipped with a collection sump located within the Pollution Control Building, transferring collected LNAPL, by gravity, to the oil recovey tank.

  - An oil recovey tank, double walled with a capacity of 5,000 L.

- A Waste Oil Transfer Facility to process petroleum hydrocarbons collected from all LNAPL collection systems within the Yard, as well as waste oil generated from both Yard and remote site operations, consisting of a waste oil holding tank of 38 m^3 double walled discharging to the oil water separator and an oil water separator.

- A Soil Containment Cell to contain hydrocarbon impacted soils generated from former and future spills within the Yard and at remote rail locations, consisting of a circular cell with a non permeable liner with a holding capacity of 13,600 m^3, equipped with a rubber tire excavator to treat top soil at 0.3 to 0.5 m depth.

All other controls, electrical equipment, instrumentation, piping, pumps, valves and appurtenances essential for the proper operation of the aforementioned sewage works.

WEST END FUELLING STAND SYSTEM

These works include the West End Fuelling Stand at the Hornepayne Yard and included in Certificate 5146-7F2H6J issued on June 17, 2008, consisting of the following:

- Approximately eleven (11) 50 mm diameter perforated pipe underdrains installed under the trackage adjacent to the West End Fuelling Platform and the contaminated soil stockpile, discharging to the retention lagoon;

- One (1) retention lagoon with a storage capacity of approximately 960 m^3 (at the maximum operating water elevation of 324.4 m), including a sheet pile weir and belt oil skimmer seasonally operated

(normally April to November) with product recovery storage tank, discharging to the lined drainage ditch;

- One (1) polyvinyl chloride lined drainage ditch extending from the retention pond to the Little Jackfish River, including the relocation of the existing concrete discharge control structure;

All other controls, electrical equipment, instrumentation, piping, valves and appurtenances essential for the proper operation of the aforementioned sewage works

All in accordance with the following submitted supporting documents:

1. Application for Approval of Industrial Sewage Works submitted by Alexandre Borges, CN Environment Officer of Canadian National Railway Company dated August 4, 2009;

2. Application's appendix A to H prepared by KGS Group Consulting Engineers, dated August 10, 2009.

3. Application for the Approval of Industrial Sewage Works submitted by Mr. Erwin Waldinsperger dated January 1998 and attachments and associated drawings, all prepared by KGS Group Consulting Engineers.

For the purpose of this Certificate of Approval and the terms and conditions specified below, the following definitions apply:

"Certificate" means this entire certificate of approval document, issued in accordance with Section 53 of the *Ontario Water Resources Act* , and includes any schedules;

"Director" means any Ministry employee appointed by the Minister pursuant to section 5 of the *Ontario Water Resources Act* ;

"District Manager" means the District Manager of the Thunder Bay District Office of the Ministry;

"Ministry" means the Ontario Ministry of the Environment;

"Regional Director" means the Regional Director of the Northern Region of the Ministry;

"Source Protection Plan" means a drinking water source protection plan prepared under the *Clean Water Act, 2006* ;

"Owner" means Canadian National Railway Company and includes its successors and assignees; and

"works" means the sewage works described in the Owner's application, this certificate and in the supporting documentation referred to herein, to the extent approved by this certificate.

You are hereby notified that this approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1. GENERAL CONDITION

(1) Except as otherwise provided by these Conditions, the Owner shall design, build, install, operate and maintain the works in accordance with the description given in this Certificate, the application for approval of the works and the submitted supporting documents and plans and specifications as listed in this Certificate.

(2) Where there is a conflict between a provision of any submitted document referred to in this Certificate and the Conditions of this Certificate, the Conditions in this Certificate shall take precedence, and where there is a conflict between the listed submitted documents, the document bearing the most recent date shall prevail.

2. CHANGE OF OWNER

(1) The Owner shall notify the District Manager and the Director, in writing, of any of the following changes within 30 days of the change occurring:

(a) change of Owner or operating authority, or both;

(b) change of address of Owner or operating authority or address of new owner or operating authority;

(c) change of partners where the Owner or operating authority is or at any time becomes a partnership, and a copy of the most recent declaration filed under the *Partnerships Registration Act* ;

(d) change of name of the corporation where the Owner or operator is or at any time becomes a corporation, and a copy of the most current "Initial Notice or Notice of Change" (Form 1, 2 or 3 of O. Reg. 189, R.R.O. 1980, as amended from time to time), filed under the *Corporations Information Act* shall be included in the notification to the District Manager;

(2) In the event of any change in ownership of the works, the Owner shall notify in writing the succeeding owner of the existence of this certificate, and a copy of such notice shall be forwarded to the District Manager.

(3) The Owner shall ensure that all communications made pursuant to this condition will refer to this certificate's number.

3. CHANGES IN PROCESSES OR PROCESS MATERIALS

The Owner shall give written notice to the District Manager of any plans to change the processes or process materials in the Owner's enterprise serviced by the works where the change may significantly

alter the quantity or quality of the influent to or effluent from the works, and no such change(s) shall be made unless with the written concurrence or approval of the District Manager.

4. OPERATIONS MANUAL

(1) The Owner shall prepare an operations manual prior to the commencement of operation of the sewage works, that includes, but not necessarily limited to, the following information:

(a) operating procedures for routine operation of the works;

(b) inspection programs, including frequency of inspection, for the works and the methods or tests employed to detect when maintenance is necessary;

(c) repair and maintenance programs, including the frequency of repair/maintenance;

(d) contingency plans and procedures for dealing with potential spill, bypasses and any other abnormal situations and for notifying the District Manager; and

(e) complaint procedures for receiving and responding to public complaints.

(2) The Owner shall maintain the operations manual up to date through revisions undertaken from time to time and retain a copy at the location of the sewage works. Upon request, the Owner shall make the manual available for inspection and copying by Ministry personnel.

5. EFFLUENT LIMITS

(1) The Owner shall design, construct and operate the works that discharge to the Little Jackfish River such that the concentrations of the materials named below as effluent parameters are not exceeded in the effluent from the works.

Table 2 - Effluent Limits

Effluent Parameter	Concentration Limit (mg/L)
Column 1	Column 2
Petroleum Hydrocarbons (F1+F2)	1000
Petroleum Hydrocarbons (F3+F4)	1000
Benzene	5
Toluene	0.8
Ethylbenzene	2.4
m&p-Xylene	32
o-Xylene	40
Methyl-t-butyl-Ether (MTBE)	200
Lead	See subsection 2
pH of the effluent maintained between 6.5 to 8.5, inclusive, at all times	

(2) The limit for Lead shall be determined based on the hardness of the water. If the hardness is less than 30 mg/L, the limit is 1 µg/L. If the hardness is between 30 mg/L and 80 mg/L, inclusive, the limit is 3 µg/L. If the hardness is greater than 80 mg/L, the limit is 5 µg/L.

(3) For the purposes of determining compliance with and enforcing subsection (1):

(a) non-compliance with respect to a Concentration Limit is deemed to have occurred when any single sample analyzed for a parameter named in Column 1 of subsection (1) is greater than the corresponding maximum concentration set out in Column 2 of subsection (1);

(b) non-compliance with respect to pH is deemed to have occurred when any single measurement is outside of the indicated range.

6. EFFLUENT - VISUAL OBSERVATIONS

Notwithstanding any other condition in this certificate, the Owner shall ensure that the effluent from the works is essentially free of floating and settleable solids and does not contain oil or any other substance in amounts sufficient to create a visible film, sheen or foam on the receiving waters.

7. EFFLUENT MONITORING - SURFACE WATER

(1) All samples and measurements taken for the purposes of this certificate are to be taken at a time and in a location characteristic of the quality and quantity of the effluent stream over the time period being monitored.

(2) Samples shall be collected and analyzed at the following sampling point(s), at the sampling frequencies and using the sample type specified for each parameter listed:

Table 3 - Effluent Monitoring - Surface Water

Sample Points: To be established to the satisfaction of the District Manager prior to commencement of operations of the works. Sampling includes estimated flows. Sampling locations at a minimum to include (as per Drawing No. 09-0434-01 H1, Rev. A, Appendix H of the Application package dated August 2009, prepared by KGS Group):

1. Effluent from Discharge Control Gate;
2. Little Jackfish River: HOR 005 05 (mid stream); and HOR 004 05 (down stream)
3. Yard discharge: HOR 002 05 (Lagoon No.2), at the end of the discharge culvert.

Frequency	Once each month (April to November) in ice-free conditions
Sample Type	Grab
Parameters	Petroleum Hydrocarbons (F1+F2), Petroleum Hydrocarbons (F3+F4), Benzene, Toluene, Ethylbenzene, m&p-Xylene, o-Xylene, Methyl-t-butyl-Ether (MTBE), Lead, pH, hardness, alkalinity, Total Purgeable Hydrocarbons, Total Extractable Hydrocarbons, Total Oil and Grease, and Mineral Oil and Grease

(3) The Owner shall supplement the monitoring program in subsection (1) with visual inspections which shall include, but not be limited to the following:

(a) A weekly inspection (April to November) of the effluent from the Discharge Control Gate and the river during discharge of treated wastewater for any visible oil sheens, colour and odours; and

(b) A weekly inspection (April to November) of the level of material in the recovered product storage tank.

(4) The methods and protocols for sampling, analysis, toxicity testing, and recording shall conform, in order of precedence, to the methods and protocols specified in the following:

(a) the Ministry's publication "Protocol for the Sampling and Analysis of Industrial/Municipal Wastewater" (August 1994), ISBN 0-7778-1880-9, as amended from time to time by more recently published editions;

(b) the publication "Standard Methods for the Examination of Water and Wastewater" (21st edition) as amended from time to time by more recently published editions; and,

(c) the Environment Canada publications "Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout" (July 1990) and "Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Daphnia magna" (July 1990);

(5) The measurement frequencies specified in subsection (2) in respect of any parameter are minimum requirements which may, after twelve (12) months of monitoring in accordance with this Condition, be modified by the District Manager in writing from time to time.

(6) A continuous flow measuring device(s) or an alternate method approved by the District Manager shall be installed and maintained to measure the flowrate of the effluent from the sewage works, with an accuracy to within plus or minus twenty per cent (20%) of the actual flowrate for the entire design range of the flow measuring device and the Owner shall measure, record and calculate the flowrate for each effluent stream on each day of sampling.

8. EFFLUENT MONITORING - GROUNDWATER

(1) All samples and measurements taken for the purposes of this certificate are to be taken at a time and in a location characteristic of the quality and quantity of the groundwater over the time period being monitored.

(2) Samples shall be collected and analyzed at the following sampling point(s), at the sampling frequencies, including groundwater levels and thickness of any light non-aqueous phase liquids (LNAPLs) using an interface probe (IP) at all monitoring wells:

Table 3 - Effluent Monitoring - Groundwater Sample Points: Sampling locations as per Drawing No. 09-0434-01 G1, Rev. A, Appendix G of the Application package dated August 2009, prepared by KGS Group).		
Effluent Parameter	**Frequency**	**Sample Location**
Benzene, Toluene, Ethylbenzene, Xylenes (BTEX), and Hydrocarbon fraction F1	Monitored and sampled once per year	Wells: MW-20, MW-40, MW-43, MW-46, MW-52, OW 5-1, OW 5-2 and OW 5-3
Hydrocarbon fraction F2 to F4	Monitored twice per year (Spring and Fall)and Sampled once per year	Wells: MW-21, MW-24, MW-49, MW-51, MW-52, MW-101, MW-102, MW-103, MW-104, MW-106, MW-107, MW-108, MW-109, MW-114, MW-115, MW-126, and OW 3-2
Hydrocarbon fraction F2 to F4	Monitored and sampled twice per year (Spring and Fall)	Wells: MW-20, MW-40, MW-43, MW-46, MW-52, OW 5-1, OW 5-2 and OW 5-3

Note: Duplicate groundwater samples shall be taken for field monitoring of Dissolved Oxygen, pH, Conductivity, Temperature and Oxidation-reduction potential.

(3) The methods and protocols for sampling, analysis, toxicity testing, and recording shall conform, in order of precedence, to the methods and protocols specified in the following:

(a) the Ministry's publication "Protocol for the Sampling and Analysis of Industrial/Municipal Wastewater" (August 1994), ISBN 0-7778-1880-9, as amended from time to time by more recently published editions.

(b) the publication "Standard Methods for the Examination of Water and Wastewater" (21st edition) as amended from time to time by more recently published editions.

(5) The measurement frequencies specified in subsection (2) in respect of any parameter are minimum requirements which may, after twelve (12) months of monitoring in accordance with this Condition, be modified by the District Manager in writing from time to time.

9. REPORTING

(1) The Owner shall report to the District Manager or designate, any exceedance of any parameter specified in Condition 6 orally, as soon as reasonably possible, and in writing within seven (7) days of the exceedance.

(2) In addition to the obligations under Part X of the *Environmental Protection Act* , the Owner shall, within 10 working days of the occurrence of any reportable spill as defined in Ontario Regulation 675/98, bypass or loss of any product, by-product, intermediate product, oil, solvent, waste material or any other polluting substance into the environment, submit a full written report of the occurrence to the District Manager describing the cause and discovery of the spill or loss, clean-up and recovery measures taken, preventative measures to be taken and schedule of implementation.

(4) The Owner shall prepare and submit a performance report to the District Manager on an annual basis within thirty (30) days following the end of the period being reported upon. The first such report shall cover the first annual period following the commencement of operation of the works and subsequent reports shall be submitted to cover successive annual periods following thereafter. The reports shall contain, but shall not be limited to, the following information:

(a) a summary and interpretation of all monitoring data and a comparison to the effluent limits outlined in Condition 5, including an overview of the success and adequacy of the sewage works;

(b) a description of any operating problems encountered and corrective actions taken;

(c) a summary of all maintenance carried out on any major structure, equipment, apparatus, mechanism or thing forming part of the sewage works;

(d) a summary of any effluent quality assurance or control measures undertaken in the reporting period;

(e) a summary of the calibration and maintenance carried out on all effluent monitoring equipment;

(f) a site plan illustrating the location of all site infrastructure, environmental protection system components, monitoring wells and surface water monitoring stations;

(g) a location map illustrating the site relative to nearby potentially sensitive groundwater/surface water features (i.e., lakes, streams, wells);

(h) a water level contour map for each monitoring event carried out during the previous year;

(i) stratigraphic cross-sections which clearly illustrate the subsurface distribution of geological materials;

(j) boreholes logs for all monitoring wells;

(k) tables illustrating historical chemistry and water level data;

(l) graphs illustrating historical water quality trends for hydrocarbon parameters at key monitoring wells;

(m) an assessment of monitoring data to evaluate system effectiveness and compliance with the applicable water quality protection criteria;

(n) recommendations for future monitoring and/or further remedial actions;

(o) a section detailing the field sampling protocols and QA/QC measures;

(p) a copy of the Certificate of Approval and any amendments;

(q) copies of laboratory reports for all sampling events in that year; and

(r) all monitoring and sampling data should also be submitted in an electronic format (i.e. a Microsoft Excel spreadsheet).

The reasons for the imposition of these terms and conditions are as follows:

1. Condition 1 is imposed to ensure that the works are built and operated in the manner in which they were described for review and upon which approval was granted. This condition is also included to emphasize the precedence of Conditions in the Certificate and the practice that the Approval is based on the most current document, if several conflicting documents are submitted for review.

2. Condition 2 is included to ensure that the Ministry records are kept accurate and current with respect to approved works and to ensure that subsequent owners of the works are made aware of the certificate and continue to operate the works in compliance with it.

3. Condition 3 is included to ensure that the works is operated in accordance with the information submitted by the owner relating to the process and materials which are served by the works, and to ensure that any contemplated changes in them which could potentially affect the characteristics of effluent from the works will be properly reviewed and approved.

4. Condition 4 is included to ensure that a comprehensive operations manual governing all significant areas of operation, maintenance and repair is prepared, implemented and kept up-to-date by the owner and made available to the Ministry. Such a manual is an integral part of the operation of the works. Its compilation and use should assist the owner in staff training, in proper plant operation and in identifying and planning for contingencies during possible abnormal conditions. The manual will also act as a benchmark for Ministry staff when reviewing the owner's operation of the work.

5. Conditions 5 and 6 are imposed to ensure that the effluent discharged from the works to the Little Jackfish River meets the Ministry's effluent quality requirements thus minimizing environmental impact on the receiver.

6. Conditions 7 and 8 are included to require the owner to demonstrate on a continual basis that the quality and quantity of the effluent from the approved works is consistent with the design and effluent limits specified in the certificate and that the approved works does not cause any impairment to the receiving

watercourse.

7. Condition 9 is included to provide a performance record for future references and to ensure that the Ministry is made aware of problems as they arise, so that the Ministry can work with the Owner in resolving the problems in a timely manner.

This Certificate of Approval revokes and replaces Certificate(s) of Approval No. 5146-7F2H6J issued on June 17, 2008.

In accordance with Section 100 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 101 of the Ontario Water Resources Act , R.S.O. 1990, Chapter 0.40, provides that the Notice requiring the hearing shall state:

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the works are located;

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, 15th Floor
Toronto, Ontario
M5G 1E5

AND

The Director
Section 53, *Ontario Water Resources Act*
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca**

The above noted sewage works are approved under Section 53 of the Ontario Water Resources Act.

DATED AT TORONTO this 29th day of April, 2010

Mansoor Mahmood, P.Eng.
Director
Section 53, *Ontario Water Resources Act*

ET/

c: District Manager, MOE Sault Ste. Marie Area Office
Tony Gallo, Kontzamanis Graumann Smith MacMillan Inc.

APPENDIX B

WASTE MANIFEST FORMS

MOVEMENT DOCUMENT / MANIFEST
DOCUMENT DE MOUVEMENT / MANIFESTE

This Movement document/manifest conforms to all federal and provincial transport and environmental legislation.
Ce document de mouvement/manifeste est conforme aux législations fédérale et provinciale sur l'environnement et le transport

PC91896-3

Movement Document / Manifest Reference No
N° de référence du document de mouvement/manifeste

A Generator / consignor — Producteur / expéditeur
Registration No. / Provincial ID No. — N° d'immatriculation - d'id. provincial
Company name / Nom de l'entreprise
Mailing address / Adresse postale — City / Ville — Province — Postal code / Code postal
E-mail / Courrier électronique — Tel. No. / N° de tél. ( )
Shipping site address / Adresse du lieu de l'expédition
City / Ville — Province — Postal code / Code postal

Intended Receiver / consignee — Réceptionnaire / destinataire prévu
2 Registration No. / Provincial ID No. — N° d'immatriculation - d'id. provincial
Mailing address / Adresse postale — City / Ville — Province — Postal code / Code postal
E-mail / Courrier électronique — Tel. No. / N° de tél. ( )
Receiving site address / Adresse du lieu de destination
City / Ville — Province — Postal code / Code postal

B Carrier — Transporteur
Registration No. / Provincial ID No. — N° d'immatriculation - d'id. provincial 23
Company name / Nom de l'entreprise
Mailing address / Adresse postale — City / Ville — Province — Postal code / Code postal
E-mail / Courrier électronique — Tel. No. / N° de tél. ( )
Vehicle / Véhicule — Registration No. / N° d'immatriculation — Prov. 24
Trailer - Rail car No. 1 / 1er remorque - wagon
Trailer - Rail car No. 2 / 2e remorque - wagon
Port of entry / Point d'entrée — Port of exit / Point de sortie 25

Carrier Certification: *I certify that I have received waste or recyclable material from the generator / consignor for delivery to the receiver / consignee as set out in Part A and that the information contained in Part B is complete and correct.* ***Attestation du transporteur:*** *J'atteste avoir reçu les déchets ou matières recyclables du producteur / expéditeur en vue de leur livraison au réceptionnaire / destinataire, tels qu'ils figurent à la partie A et que les renseignements inscrits à la partie B sont exacts et complets.* 26
Name of authorized person (print) / Nom de l'agent autorisé (caractères d'imprimerie) — Tel. No. / N° de tél. ( )
Year / Année — Month / Mois — Day / Jour — Signature

Reference Nos. of other movement documents/manifests used / N° de référence des autres documents de mouvement/manifestes utilisés 27

C Receiver / consignee — Réceptionnaire / destinataire
Registration No. / Provincial ID No. — N° d'immatriculation - d'id. provincial 28
Receiver / consignee information same as in Part A
Les renseignements du réceptionnaire / destinataire sont les mêmes qu'à la Partie A
☐ Yes / Oui ☐ No, complete the box below / Non, remplir la case ci-dessous
Company name / Nom de l'entreprise
Mailing address / Adresse postale
City / Ville — Province — Postal code / Code postal
E-mail / Courrier électronique — Tel. No. / N° de tél. ( )
Receiving site address / Adresse du lieu de destination
Date received / Date de réception: Year / Année — Month / Mois — Day / Jour — Time / Heure ☐ A.M. ☐ P.M. 29
If waste or recyclable material to be transferred, specify intended company name / Si les déchets ou matières recyclables doivent être transférés, préciser le nom du destinataire
30 Registration No. /Provincial ID No. — N° d'immatriculation/d'id provincial

Prov. code / Code prov. 3	Shipping name / Appellation réglementaire 4	Class / Classe / Sub class(es) / Classe(s) sub 5	UN No.	Packing / risk gr. / Gr. d'emballage/ de risque 7	Quantity shipped / Quantité expédiée	L or / ou Kg / Unités	No. / N°	Codes int. ext.	Physical state
(i)									
(ii)									
(iii)									
(iv)									

Quantity received / Quantité reçue	Units / L or / ou kg / Unités 31	Comments / Commentaires 32	Handling Code / Code de manutention 33	Shipment / Envoi: Accepted / Accepté	Refused / Refusé 34	Decont. 35: Pack. Cont.	Veh. Véh.

	Notice No. / N° de notification 11	Notice Line No. / N° de ligne de la notification	Shipment / Envoi 12	Of / De	D or R code / Code D ou R 13	C code / Code C 14	Basel Annex VIII or OECD Code / Annexe VIII de Bâle ou Code OCDE 15	H code / Code H 16	Y code / Code Y 17	National code in country of / Code du pays: Export / Exportation	Import / Importation 18	Customs code(s) / Code(s) de douanes 19
(i)												
(ii)												
(iii)												
(iv)												

If handling code "Other" (specify) / Si code de manutention « autre » (spécifier) 36

Receiver / consignee certification: *I certify that the information contained in Part C is correct and complete.* ***Attestation du réceptionnaire / destinataire:*** *J'atteste que tous les renseignements à la partie C sont exacts et complets.* 37
Name of authorized person (print) / Nom de l'agent autorisé (caractère d'imprimerie)
Signature — Tel. No. / N° de tél. ( )

Special handling / Manutention spéciale 22
☐ Attached /Ci-joint ☐ As follows/ Ci-contre :

Generator / consignor certification: *I certify that the information contained in Part A is correct and complete.* ***Attestation du producteur / expéditeur:*** *J'atteste que tous les renseignements à la partie A sont exacts et complets.* 20
Name of authorized person (print) / Nom de l'agent autorisé (caractère d'imprimerie) — Signature — Tel. No. / N° de tél. ( )

21 Date shipped / Date d'expédition: Year / Année — Month / Mois — Day / Jour — Time / Heure ☐ A.M. ☐ P.M. — Scheduled arrival date / Date d'arrivée prévue: Year / Année — Month / Mois — Day / Jour

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MOE 04-1912 (12/13)

Retained by Consignor (Generator) - Gardée par l'expéditeur

Copy / Copie 2 (green / verte

MOVEMENT DOCUMENT / MANIFEST
DOCUMENT DE MOUVEMENT / MANIFESTE

This Movement document/manifest conforms to all federal and provincial transport and environmental legislation
Ce document de mouvement/manifeste est conforme aux législations fédérale et provinciale sur l'environnement et le transport

LB39281-3

Movement Document / Manifest Reference No.
N° de référence du document de mouvement/manifeste

A Generator / consignor
Producteur / expéditeur

Registration No. / Provincial ID No.
N° d'immatriculation - d'id. provincial

Company name / Nom de l'entreprise

Province | Postal code / Code postal

E-mail / Courrier électronique | Tel. No. / N° de tél.

Shipping site address / Adresse du lieu de l'expédition

Province | Postal code / Code postal

Intended Receiver / consignee
Réceptionnaire / destinataire prévu

Registration No. / Provincial ID No.
N° d'immatriculation - d'id. provincial

Province | Postal code / Code postal

E-mail / Courrier électronique | Tel. No. / N° de tél.

Receiving site address / Adresse du lieu de destination

B Carrier
Transporteur

Registration No. / Provincial ID No.
N° d'immatriculation - d'id. provincial

Company name / Nom de l'entreprise

Province | Postal code / Code postal

Tel. No. / N° de tél.

Vehicle / Véhicule

Registration No. / N° d'immatriculation

Trailer / Rail car No. 1
1re remorque / wagon

Trailer / Rail car No. 2
2e remorque / wagon

Port of entry
Point d'entrée

Port of exit
Point de sortie

Carrier Certification *: I certify that I have received waste or recyclable material from the generator / consignor for delivery to the receiver / consignee as set out in Part A and that the information contained in Part B is complete and correct.*
Attestation du transporteur *: J'atteste avoir reçu les déchets ou matières recyclables du producteur / expéditeur en vue de leur livraison au réceptionnaire / destinataire, tels qu'ils figurent à la partie A et que les renseignements inscrits à la partie B sont exacts et complets.*

Name of authorized person (print)
Nom de l'agent autorisé (caractères d'imprimerie)

Tel. No. / N° de tél.

Year / Année | Month / Mois | Day / Jour | Signature

Reference Nos. of other movement document(s)/manifest(s) used
N° de référence des autres documents de mouvement/manifestes utilisés

C Receiver / consignee
Réceptionnaire / destinataire

Registration No. / Provincial ID No.
N° d'immatriculation - d'id. provincial

Receiver / consignee information same as in Part A
Les renseignements du réceptionnaire / destinataire sont les mêmes qu'à la Partie A

☐ Yes / Oui ☐ No, complete the box below / Non, remplir la case ci-dessous

Company name / Nom de l'entreprise

Province | Postal code / Code postal

E-mail / Courrier électronique | Tel. No. / N° de tél.

Receiving site address / Adresse du lieu de destination

Date received / Date de réception
Year / Année | Month / Mois | Day / Jour | Time / Heure ☐ A.M. ☐ P.M.

If waste or recyclable material to be transferred, specify intended company name: Si les déchets ou matières recyclables doivent être transférés, préciser le nom du destinataire

Registration No./Provincial ID No.
N° d'immatriculation/d'id provincial

Prov. code Code prov.	Shipping name Appellation réglementaire	Class / Classe Sub class(es) Classe(s) sub.	Packing / risk gr. Gr. d'emballage/ de risque	Quantity shipped Quantité expédiée	Units L or / ou kg Unités	Packaging/Contenant No. / N° Codes int. / ext.	Phys. state Etat phys.
(iv)							

Quantity received Quantité reçue	Units L or / ou kg Unités	Comments Commentaires	Handling Code / Code de manutention	Shipment / Envoi Accepted Accepté	Shipment / Envoi Refused Refusé	Decont Pack. Cont.	Decont Veh. Véh.

If handling code "Other" (specify)
Si code de manutention « autre » (spécifier)

Notice No. N° de notification	Notice Line No. N° de ligne de la notification	Shipment Envoi	Of / De	D or R code Code D ou R	C code Code C	Basel Annex VIII or OECD Code Annexe VIII de Bâle ou Code OCDE	H code Code H	Y code Code Y	National code in country of / Code du pays Export Exportation	Import Importation	Customs code(s) Code(s) de douanes
(i)											
(ii)											
(iii)											
(iv)											
(v)											
(vi)											

Generator / consignor certification: *I certify that the information contained in Part A is correct and complete. I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name and are classified, packaged, marked and labelled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.*
Attestation du producteur / expéditeur: *J'atteste que tous les renseignements à la partie A sont exacts et complets. Je déclare que le contenu de cet envoi est décrit ci-dessus de façon complète et exacte par la désignation officielle de transport et qu'il est classifié, emballé, marqué, étiqueté, muni de pancartes/étiquettes et à tous égards bien conditionné pour être transporté conformément aux réglementations internationales et nationales applicables.*

Name of authorized person (print)
Nom de l'agent autorisé (caractères d'imprimerie)

Tel. No. / N° de tél.

Signature

Date of shipment / Date d'expédition
Year / Année | Month / Mois | Day / Jour | Time / Heure ☐ A.M. ☐ P.M.

Scheduled arrival date / Date d'arrivée prévue
Year / Année | Month / Mois | Day / Jour

Special handling / Manutention spéciale
☐ As attached / Ci-joint ☐ As follows / Ci-contre

Name of authorized person (print)
Nom de l'agent autorisé (caractère d'imprimerie)

Receiver / consignee certification *: I certify that the information contained in Part C is correct and complete.*
Attestation du réceptionnaire / destinataire *: J'atteste que tous les renseignements à la partie C sont exacts et complets.*

Tel. No. / N° de tél.

Signature

Retained by Consignor
Gardée par l'expéditeur

Copy / Copie 2 (green / verte)

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APPENDIX C

PRESSURE TRANSDUCER CALCULATIONS

Pressure transducers measure ambient pressure, which, in conjunction with a local datum (the top of the pipe), allows for the calculation of the height of the water over the transducer. This was completed by subtracting the datum (distance from the top of the pipe to the top of the transducer) from the elevation of the top of pipe and adding the recorded height of water above the transducer. As the transducers measure absolute pressure (water pressure + atmospheric pressure), the atmospheric pressure, recorded by the barometric pressure logger, is subtracted to compensate for the influence of changing barometric pressures on the water level readings. This compensated reading is the height of the water column within the diesel recovery trench. A level survey was conducted to establish reference elevations at this discharge location. Elevations of required variables, including the top and bottom of the diesel recovery trench discharge pipe and the top and bottom of the pipe and block transducer housing, were surveyed with level loops closed within an acceptable level of error. The survey benchmark used in the west end was the top of the cement control structure at the west end. The reference elevations, in addition to the ambient pressure data points (corrected for atmospheric pressure), allow for the determination of the height of water in relation to the discharge pipe in the west end. Since the compensated height of water is known and the discharge pipe size and slope are measured, then a flow rate can be calculated using Manning's Equation, which is presented below.

$$Q = VA = \left(\frac{k_n}{n}\right) AR^{\frac{2}{3}}\sqrt{S}$$

where: n= the interior surface of the pipe, in this case PVC which uses the constant 0.012

S= the slope of the water, in this case 0.001 %

K_n = *Manning's Equation* Conversion Factor (for Metric calculations K_n = 1/sec)

A = the area (in meters^2) of water within the pipe determined by:

$$A = \frac{[\theta - sin(\theta)](D)^2}{8}$$

R = The Hydraulic Radius (in meters) is determined by:

$$R = \left[\frac{(\theta - sin\theta)}{\theta}\right]\left[\frac{D}{4}\right]$$

D = Diameter of the pipe (m)

$$\theta = \pi + 2(sin^{-1})\left[\left(\frac{(2)(h_2)}{D}\right) - 1\right]$$

h_2= h_1 -height (in meters) of pipe base

h_1 = Initial transducer height (in meters) below water line + compensated height of water above transducer

Measurements from the west end effluent stream are collected during the operating year. Recorded water depths and barometric pressure are transferred to an excel spreadsheet, which is used to calculate flows from the west end location based on the specific flow formulae developed. The median calculation is used to describe the central tendency of flow data due to the skewed nature (non normal distribution) of flow, and was chosen over the mean because the median is not impacted by extreme values in the data sets. Daily, weekly, and monthly statistical values, summarizing the median, 25th percentiles, and 75th percentiles are generated and used for comparisons of the spread between data sets, as it is less affected by extreme values in the data sets compared to the range.

Calibration consists of taking physical measurements of flow by using a calibrated twenty (20) L pail. Five (5) separate measurements are collected and the median value is recorded as the flow rate. This value is then compared to calculated flow and used to ensure that the calculated flow is within 20% of the actual flow rate.

APPENDIX D

STRATIGRAPHIC SOIL LOGS

XCG Environmental Services Inc.

Log of Well MW-10
PHASE 2
CN
HORNEPAYNE, ONTARIO

Sheet 1 of 1

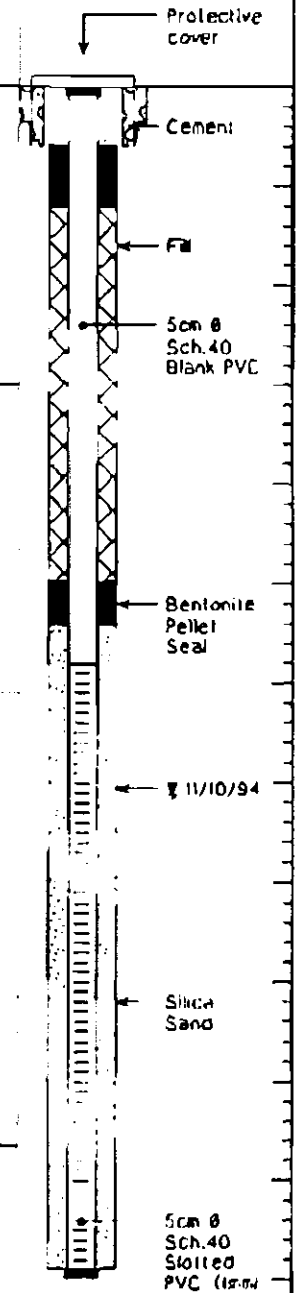
Job Number: 94580

G.S. Elevation: 327.385m

Drifter: BOART LONGYEAR DRILLING INC.	Drilling	Date	Time
Drill Method: AD-2 TRACK MOUNTED	Started	NOVEMBER 10/94	
Sample Method: STANDARD SPLIT SPOON	Finished	NOVEMBER 10/94	
Borehole Diameter: 15.2 cm	Water Level T.O.P: 3.53m	Logged By: D. G. W.	Checked By: D. P. L.

Sample No.	Blow Counts	HNu	Depth (meters)	Graphic Log	Materials Description
SS1		<1	1		SAND AND GRAVEL:sand and gravel fill, occasional cobbles
SS2	5/18 27/27	<1	2		SILTY SAND:medium brown grey with stone and cobbles, dry to moist, no odour
SS3	13/41 58	<1			grey, densely packed, gravel, dry
SS4	8/23 32/24	<1	3		SAND:densely packed coarse and fine grained sand, moist, no odour
SS5	3/1 3/4	<1	4		dark red brown peat, moist, no odour
SS6	5/11 11/8	<1	5		SILTY SAND:grey, moist to wet, no odour
SS7	3/5 7/9	<1	6		COARSE SAND:grey, fine gravel, saturated, no odour
					END OF BOREHOLE

Well Completion



000726

XG Environmental Services Inc.

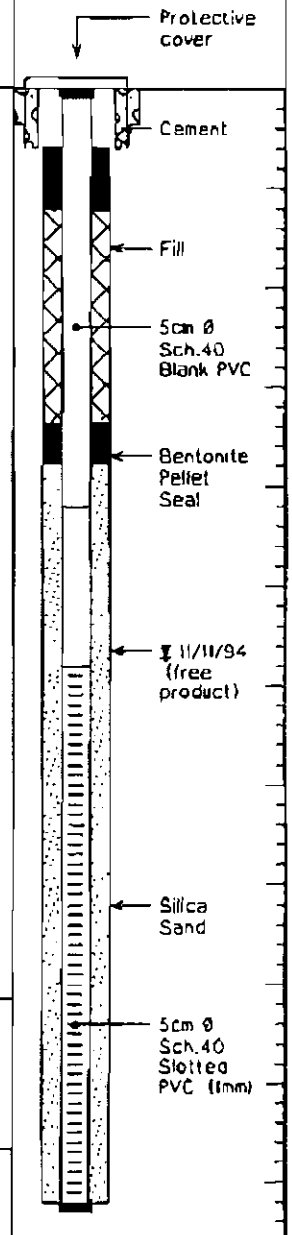
Log of Well MW-11
PHASE 2
CN
HORNEPAYNE, ONTARIO

Sheet 1 of 1
Job Number: 94560
G.S. Elevation: 327.184m

Driller: BOART LONGYEAR DRILLING INC.	Drilling	Date	Time
Drill Method: AD-2 TRACK MOUNTED	Started	NOVEMBER 11/94	
Sample Method: STANDARD SPLIT SPOON	Finished	NOVEMBER 11/94	
Borehole Diameter: 15.2 cm	Water Level T.O.P: 2.82m	Logged By: O. G. W.	Checked By: O. P. L.

Sample No.	Blow Counts	HNu	Depth (meters)	Graphic Log	Materials Description
			0		SAND AND GRAVEL: sand and gravel fill
SS1		1.5	1		medium brown sand and gravel, dry, no odour
					dark grey sand and gravel, no odour
SS2	refusal	2			grey sand and gravel fill, boulders and cobbles
SS3	refusal	140	2		
SS4	17/27 15/7	80	3		grey stained coarse sand with gravel, odours
SS5	7/21 21/18	58	4		moist
SS6	8/12 12/11	135	5		FINE SAND: grey stained, odourous, saturated, free product in split spoon
			6		END OF BOREHOLE

Well Completion



000727

KGS GROUP

SUMMARY LOG

HOLE NO.
MW-11R

SHEET 1 of 1

CLIENT	CANADIAN NATIONAL	JOB NO.	14-0434-019
PROJECT	CN Hornepayne Monitoring Well Replacement Program	GROUND ELEV.	327.24 m
		TOP OF CASING ELEV.	326.88 m
SITE	CN Hornepayne Yard, West End	WATER ELEV.	322.99 m
LOCATION	25m North of OW8-3	DATE DRILLED	9/9/2014
DRILLING METHOD	100 mm ø Hollow Stem Auger, Acker SX Skidder Mounted Rig	UTMs (NAD83)	N E

ELEV. (m)	DEPTH (m)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG/ BACKFILL	DEPTH (m)	SAMPLE TYPE	NUMBER
	0		**SAND AND GRAVEL FILL** - Medium brown, dry, dense, poorly graded, fine to medium grained sand and medium to coarse grained gravel.		0.36		
	0.5						
	1.0		- Dark grey below 1.2 m.				
	1.5		- some cobbles and boulders at 1.4 m.		1.94		
	2.0				2.24		
	2.5						
	3.0		- hydrocarbon odours and staining below 3.05 m.				
	3.5						
	4.0		- moist below 3.8 m.				
322.67	4.5		**SAND** - Grey, saturated, firm, fine grained, poorly graded.				
322.06	5.0		END OF BOREHOLE AT 5.18 m		5.18 5.29		
	5.5		Notes:				
	6.0		1. Monitoring well installed to a depth of 5.28 m with 3.05 m of screen. 2. Borehole backfilled with sand to 1.9 m then bentonite to surface. 3. Monitoring well completed with a flush mount casing and protective steel vault.				
	6.5						
	7.0						
	7.5						
	8.0						
	8.5						
	9.0						
	9.5						
	10.0						

Cu TORVANE (kPa) ◆
SPT (N) blows/0.15 m ▲
20 40 60 80
FIELD HEADSPACE TEST
Photolonizable Vapours (ppm) ●
100 200 300 400

SAMPLE TYPE

CONTRACTOR	INSPECTOR	APPROVED	DATE
Strata Drilling	G. CREWDSON		12/18/14

000728

ENVIRO & GEO P:\PROJECTS\2014\14-0434-019\GENERAL\DOCS\SOIL LOGS\THL_HORNEPAYNE REPLACEMENT WELL LOGS_11-17-2014_LBP.GPJ

XCG Environmental Services Inc.

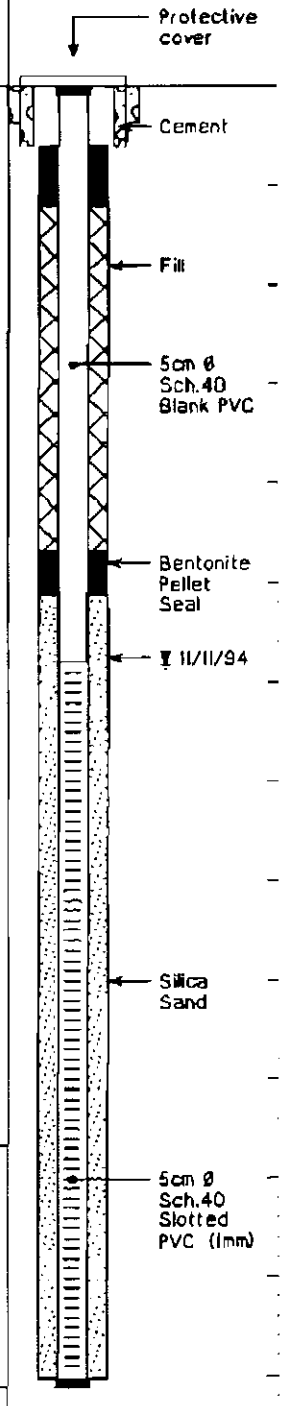
Log of Well MW-12
PHASE 2
CN
HORNEPAYNE, ONTARIO

Sheet 1 of 1
Job Number: 94560
G.S. Elevation: 326.985m

Driller: BOART LONGYEAR DRILLING INC.	Drilling	Date	Time
Drill Method: AD-2 TRACK MOUNTED	Started	NOVEMBER 11/94	
Sample Method: STANDARD SPLIT SPOON	Finished	NOVEMBER 11/94	
Borehole Diameter: 15.2 cm	Water Level T.O.P: 2.28m	Logged By: D. G. W.	Checked By: O. P. L.

Sample No.	Blow Counts	HNu	Depth (meters)	Graphic Log	Materials Description
			0		SAND AND GRAVEL: medium brown sand and gravel, dry, no odours
SS1		60	1		odourous
SS2	4/4 6/11	18	2		occasional rocks, cobbles and boulders
SS3	14/19 11/12	8	3		grey, coarse sand and fine gravel, wet, odourous
SS4	3/8 4/4	11			red brown peat and bits of wood
SS5	4/7 8/8	30	4		coarse sand and gravel, grey with traces of silt, odourous, wet to saturated
SS6	22 refusal	30/40	5		red grey oily sand with gravel, odourous; saturated
SS7	20/8 5/8	40	6		SILTY SAND: grey, slight odour
					END OF BOREHOLE

Well Completion



000729

XCG Environmental Services Inc.

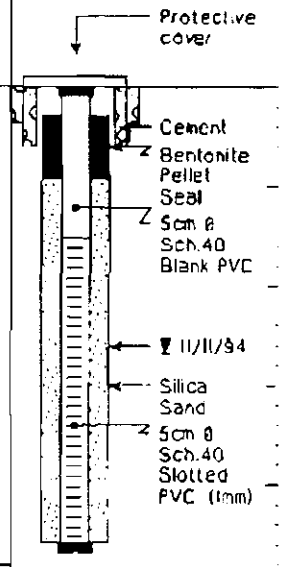
Log of Well MW-18
PHASE 2
CN
HORNEPAYNE, ONTARIO

Sheet 1 of 1
Job Number: 94560
G.S. Elevation: 325.474m

Driller: BOART LONGYEAR DRILLING INC.	Drilling	Date	Time
Drill Method: AD-2 TRACK MOUNTED	Started	NOVEMBER 11/94	
Sample Method: STANDARD SPLIT SPOON	Finished	NOVEMBER 11/94	
Borehole Diameter: 15.2 cm	Water Level T.O.P: 1.3m	Logged By: P. M.	Checked By: D. P. L.

Sample No.	Blow Counts	HNu	Depth (meters)	Graphic Log	Materials Description
SS1		1.3	1		SILTY SAND light brown, moist, no odour
SS2	8/13 14/7	2	2		wet to saturated, some iron staining in fractures
SS3	4 spoon refusal	2	3		END OF BOREHOLE (refusal on bedrock)
			4		
			5		
			6		

Well Completion



000730

XG Environmental Services Inc.

Log of Well MW-17
PHASE 2
CN
HORNEPAYNE, ONTARIO

Sheet 1 of 1

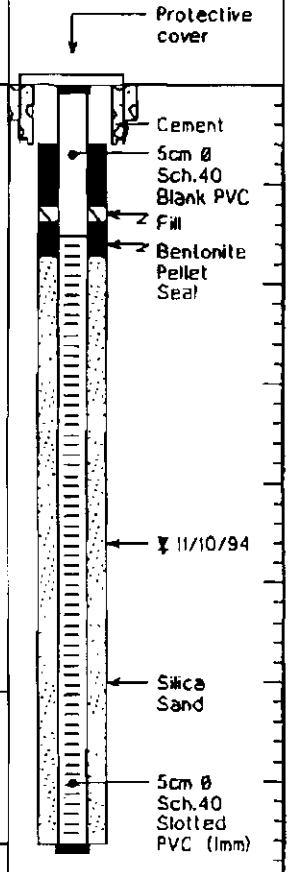
Job Number: 94560

G.S. Elevation: 325.48m

Driller: BOART LONGYEAR DRILLING INC.	**Drilling**	**Date**	**Time**
Drill Method: AD-2 TRACK MOUNTED	**Started**	NOVEMBER 10/94	
Sample Method: STANDARD SPLIT SPOON	**Finished**	NOVEMBER 10/94	
Borehole Diameter: 15.2 cm	**Water Level T.O.P:** 2.3m	**Logged By:** P. M.	**Checked By:** O. P. L.

Sample No.	Blow Counts	HNu	Depth (meters)	Graphic Log	Materials Description
SS1		2	1		SAND:reddish brown, dry
SS2	3/5 5/8	2	2		light brown, coarse sand, dry, moist, no odour
SS3	3/4 4/2	2	3		light brown, fine sand, wet to saturated, no odour
SS4	4/9 11/11	1			SILTY SAND:saturated, no odour
			4		END OF BOREHOLE
			5		
			6		

Well Completion



000731

XCG Environmental Services Inc.

Log of Well MW-20
PHASE 2
CN
HORNEPAYNE, ONTARIO

Sheet 1 of 1

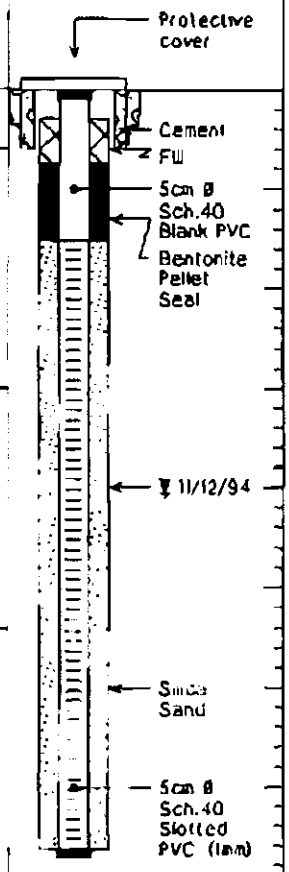
Job Number: 94560

G.S. Elevation: 324.676m

Driller: BOART LONGYEAR DRILLING INC.	Drilling	Date	Time
Drill Method: AD-2 TRACK MOUNTED	Started	NOVEMBER 12/94	
Sample Method: STANDARD SPLIT SPOON	Finished	NOVEMBER 12/94	
Borehole Diameter: 15.2 cm	Water Level T.O.P: 1.992m	Logged By: O. G. W.	Checked By: O. P. L.

Sample No.	Blow Counts	HNu	Depth (meters)	Graphic Log	Materials Description
			0		SAND AND GRAVEL: light brown
					SILTY SAND: dark brown black, organic topsoil
					grey, moist
AS1		1.5	1		
AS2		2.0			black, organic, topsoil, slight oily odour
SS3	4/8 6/7	100			coarse sand with grey staining, hydrocarbon odours
			2		
SS4	4/4 7/8	75			coarse sand, heavily stained, grey oily, saturated
			3		light brown grey, saturated, odourless
SS5		55			
			4		END OF BOREHOLE
			5		
			6		

Well Completion



000732

XCG Environmental Services Inc.

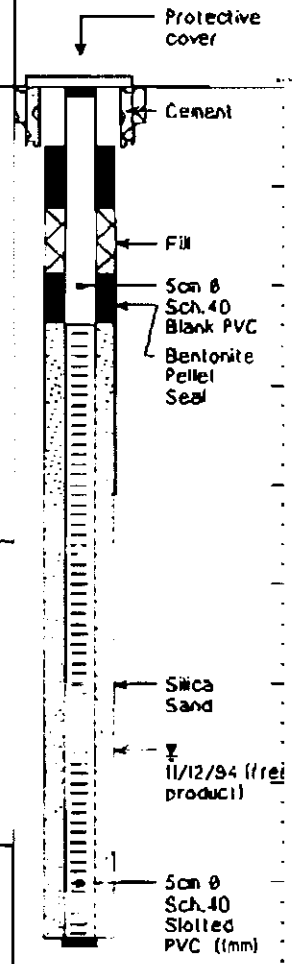
Log of Well MW-21
PHASE 2
CN
HORNEPAYNE, ONTARIO

Sheet 1 of 1
Job Number: 94560
G.S. Elevation: 324.549m

Driller: BOART LONGYEAR DRILLING INC.	Drilling	Date	Time
Drill Method: AD-2 TRACK MOUNTED	Started	NOVEMBER 12/94	
Sample Method: STANDARD SPLIT SPOON	Finished	NOVEMBER 12/94	
Borehole Diameter: 15.2 cm	Water Level T.O.P: 3.335m	Logged By: D. G. W.	Checked By: O. P. L.

Sample No.	Blow Counts	HNu	Depth (meters)	Graphic Log	Materials Description
			0		SAND AND GRAVEL:light brown grey brown
SS1		3	1		
SS2	3/4 4/4	30	2		sand and gravel fill, red brick, loosely packed, slight hydrocarbon odour
SS3	1/2 4/10	95			SILTY SAND:dark brown black, topsoil, slight odour light brown, grey staining, slight odour
SS4	12/18 17/12	80	3		moist, slight staining and odour
SS5	11/12 10/10	75	4		SAND AND GRAVEL:coarse, grey staining, saturated, slight odour
					END OF BOREHOLE
			5		
			6		

Well Completion



000733

XCG Environmental Services Inc.

Log of Boring BH-22
PHASE 2
CN
HORNEPAYNE, ONTARIO

Sheet 1 of 1

Job Number: 94560

G.S. Elevation: 324.350m

Driller: BOART LONGYEAR DRILLING INC.		Drilling	Date / Time
Drill Method: AD-2 TRACK MOUNTED		Started	NOVEMBER 12/94
Sample Method: STANDARD SPLIT SPOON		Finished	NOVEMBER 12/94
Borehole Diameter: 15.2 cm	Water Level T.O.P:	Logged By: D. G. W.	Checked By: O. P. L.

Sample No.	Blow Counts	HNu	Depth (meters)	Graphic Log	Materials Description	Monitor Vapour	Liquid Limit	Plastic Limit	RQD
			0		SILTY SAND:light brown grey, moist				
SS1		1.5	1		dark brown, moist				
SS2	3/14 35	4	2		SAND AND GRAVEL:black, oily odour, dry oily odour				
SS3	31/25 28/23	55	3		END OF BOREHOLE (auger refusal in 2 attempts within 4.57m radius)				
			4						
			5						
			6						

000734

XG Environmental Services Inc.

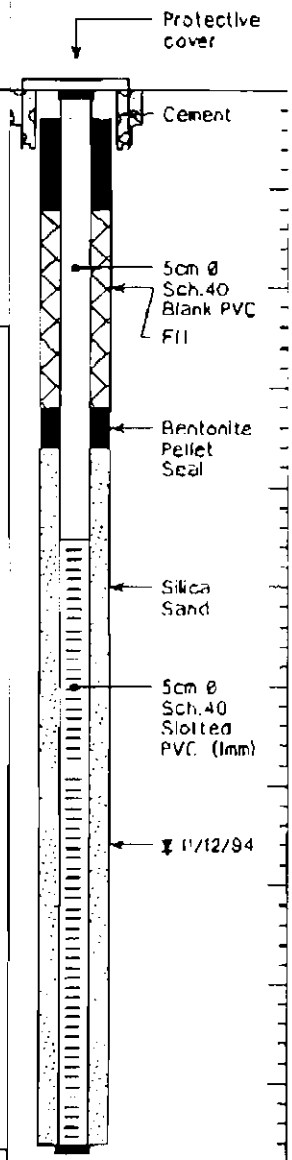
Log of Well MW-24
PHASE 2
CN
HORNEPAYNE, ONTARIO

Sheet 1 of 1
Job Number: 94560
G.S. Elevation: 325.959m

Driller: BOART LONGYEAR DRILLING INC.	Drilling	Date	Time
Drill Method: AD-2 TRACK MOUNTED	Started	NOVEMBER 12/94	
Sample Method: STANDARD SPLIT SPOON	Finished	NOVEMBER 12/94	
Borehole Diameter: 15.2 cm	Water Level T.O.P: 3.795m	Logged By: D. G. W.	Checked By: O. P. L.

Sample No.	Blow Counts	HNu	Depth (meters)	Graphic Log	Materials Description
SS1		0	1		FILL:slag ballast pieces of iron
SS2	8/10 11/10	0	2		SILTY SAND:light brown, dry to moist light brown grey, moist to wet, no odour
SS3	5/9 5/8	0			
SS4	11/12 15/8	0	3		
SS5	4/7 7/8	0	4		wet to saturated
SS6	4/8 5/10	0	5		saturated
			6		END OF BOREHOLE

Well Completion



000735

XCG Environmental Services Inc.

Log of Well MW-34
PHASE 2
CN
HORNEPAYNE, ONTARIO

Sheet 1 of 1
Job Number: 94560
G.S. Elevation: 325.787m

Driller: BOART LONGYEAR DRILLING INC.	Drilling	Date	Time
Drill Method: AD-2 TRACK MOUNTED	Started	NOVEMBER 14/94	
Sample Method: STANDARD SPLIT SPOON	Finished	NOVEMBER 14/94	
Borehole Diameter: 15.2 cm	Water Level T.O.P: 3.85m	Logged By: D. G. W.	Checked By: O. P. L.

Sample No.	Blow Counts	HNu	Depth (meters)	Graphic Log	Materials Description
					SAND AND GRAVEL:medium brown, crushed stone
					SAND:black slag sand, dry
SS1		2	1		SILTY SAND:light brown , moist
SS2	8/8 8/8	1	2		SAND AND GRAVEL:light brown, fine grain, moist
SS3	4/7 11/9	23			
			3		grey, moist, slight odour
					black grey stained, fine gravel chips, oily odours
SS4	4/10 15/10	120			
SS5	5/10 14/10	130	4		
SS6	4/7 18/17	130	5		SAND:fine sand, grey stained, odourous
					layered black grey stained sand
SS7	15/25 23/23	70			SAND AND GRAVEL:densely packed sand and coarse gravel
SS8	8/11 25/21	55	6		
					END OF BOREHOLE (SILTY SAND:grey, slight odour)

Well Completion

000736

KGS GROUP

SUMMARY LOG

HOLE NO. **MW-34R**

SHEET 1 of 1

CLIENT	CANADIAN NATIONAL
PROJECT	CN Hornepayne Monitoring Well Replacement Program
SITE	CN Hornepayne Yard, Former Shop Track Area
LOCATION	95 m SE of MW-125
DRILLING METHOD	100 mm ø Hollow Stem Auger, Acker SX Skidder Mounted Rig

JOB NO.	14-0434-019
GROUND ELEV.	325.71 m
TOP OF CASING ELEV.	325.52 m
WATER ELEV.	322.09 m
DATE DRILLED	10/9/2014
UTMs (NAD83)	N 5,454,271 E 662,194

ELEV. (m)	DEPTH (m)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG/ BACKFILL	DEPTH (m)	SAMPLE TYPE NUMBER
325.41	0		**SAND AND GRAVEL** - Medium brown, dry, loose, poorly graded, medium to coarse grained sand, and medium to coarse grained gravel.		0.19	
	0.5		**CINDERS** - Black, dry, compact.			
324.81	1.0		**SILTY SAND** - Light brown, moist, soft, non plastic, fine to medium grained sand.		1.25	
324.21	1.5		**SAND AND GRAVEL** - Light brown, moist, fine grained.		1.55	
	2.0					
	2.5					
	3.0		- grey, moist, slight hydrocarbon odour below 3.05 m.			
▼	3.5					
	4.0					
321.14	4.5		END OF BOREHOLE AT 4.57 m		4.57 4.60	
	5.0		Notes:			
	5.5		1. Monitoring well installed to a depth of 4.6 with 3.0 m of screen. 2. Borehole backfilled with sand to 1.3 m, then bentonite to surface. 3. Monitoring well completed with a lockable flush mount casing and protective steel vault.			
	6.0					
	6.5					
	7.0					
	7.5					
	8.0					
	8.5					
	9.0					
	9.5					
	10.0					

Cu TORVANE (kPa) ◆

SPT (N) blows/0.15 m ▲

20 40 60 80

FIELD HEADSPACE TEST
Photolonizable Vapours (ppm) ●

100 200 300 400

SAMPLE TYPE

CONTRACTOR	INSPECTOR	APPROVED	DATE	
Strata Drilling	G. CREWDSON		12/18/14	000737

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XCG Environmental Services Inc.

Log of Well MW-40
PHASE 3
CN
HORNEPAYNE, ONTARIO

Sheet 1 of 1

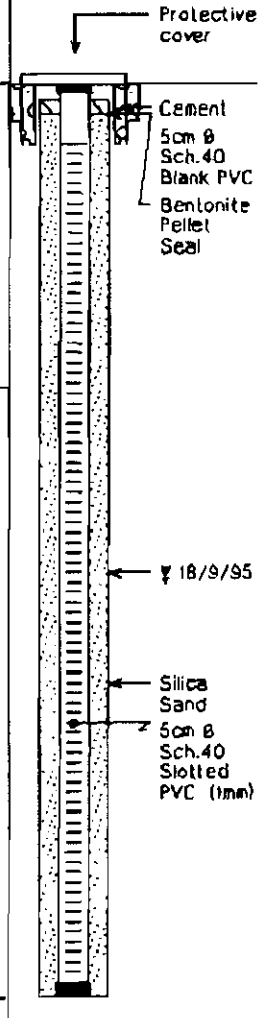
Job Number: 4057-02-02

G.S. Elevation: 324.34

Driller: BOART LONGYEAR DRILLING INC.	**Drilling**	**Date**	**Time**
Drill Method: Track Mounted CME 75	**Started**	September 7/95	
Sample Method: STANDARD SPLIT SPOON	**Finished**	September 7/95	
Borehole Diameter: 15.2 cm	**Water Level T.O.P:** 2.45	**Logged By:** TMM	**Checked By:** OPL

Sample No.	Blow Counts	HNu	Depth (meters)	Graphic Log	Materials Description
SS1	7/2 3/1	33	1		SAND: medium to coarse, brown colour, trace of gravel, moist
SS2	1/8 8/8	34	2		SANDY SILT: fine grained, tan colour, trace of clayand gravel, no odours
SS3	4/5 6/5	52	3		saturated at 2.89 metres below ground surface
SS4	4/4 4/3	23			
SS5	2/3 4/3	28	4		
			5		END OF BOREHOLE
			6		

Well Completion



XCG Environmental Services Inc.

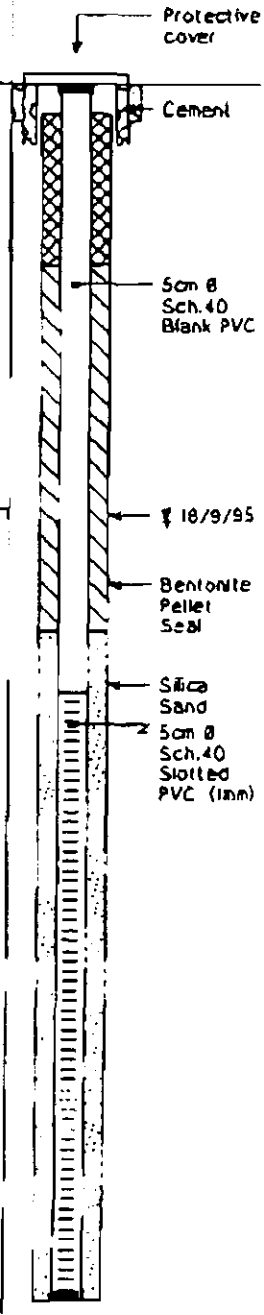
Log of Well MW-43
PHASE 3
CN
HORNEPAYNE, ONTARIO

Sheet 1 of 1
Job Number: 4057-02-02
G.S. Elevation: 323.66

Driller: BOART LONGYEAR DRILLING INC.	Drilling	Date	Time
Drill Method: Track Mounted CME 75	Started	September 8/95	
Sample Method: STANDARD SPLIT SPOON	Finished	September 8/95	
Borehole Diameter: 15.2 cm / Water Level T.O.P: 2.16	Logged By: TMM	Checked By: OPL	

Sample No.	Blow Counts	HNu	Depth (meters)	Graphic Log	Materials Description
SS1	4/5 7/4	300	1		SAND: fine to medium, grey brown colour, trace of gravel, moist
SS2	5/6 7/7	53	2		saturated at 1.68 metres below ground surface
SS3	5/7 6/6	146	3		SANDY SILT: fine grained, grey colour, trace of clay, slight HC odour
SS4	4/4 4/4	83	4		
SS5	3/3 5/3	92	5		
SS6	1/1 2/1	57	6		END OF BOREHOLE
SS7	1/3 4/3	102			

Well Completion



XCG Environmental Services Inc.

Log of Well MW-48
PHASE 3
CN
HORNEPAYNE, ONTARIO

Sheet 1 of 1
Job Number: 4057-02-02
G.S. Elevation: 324.66

Driller: BOART LONGYEAR DRILLING INC.	Drilling	Date	Time
Drill Method: Track Mounted CME 75	Started	September 8/95	
Sample Method: STANDARD SPLIT SPOON	Finished	September 8/95	
Borehole Diameter: 15.2 cm	Water Level T.O.P: 2.17	Logged By: TMM	Checked By: OPL

Sample No.	Blow Counts	HNu	Depth (meters)	Graphic Log	Materials Description	Well Completion
						Protective cover
			1		SAND: medium dark brown colour, trace of gravel, no odour trace of organic material, becomming coarser with depth	Cement Scn 8 Sch.40 Blank PVC Bentonite Pellet Seal
SS1	5/5 3/5	45	2			
SS2	1/1 1/1	48				▼ 18/9/95
SS3	1/8 7/8	28	3			Silica Sand Scn 8 Sch.40 Slotted PVC (1mm)
SS4	1/4 4/5	38	4		SANDY SILT: fine grained, grey mottled, trace of clay, saturated no odour	
			5		END OF BOREHOLE	
			6			

000740

XCG Environmental Services Inc.

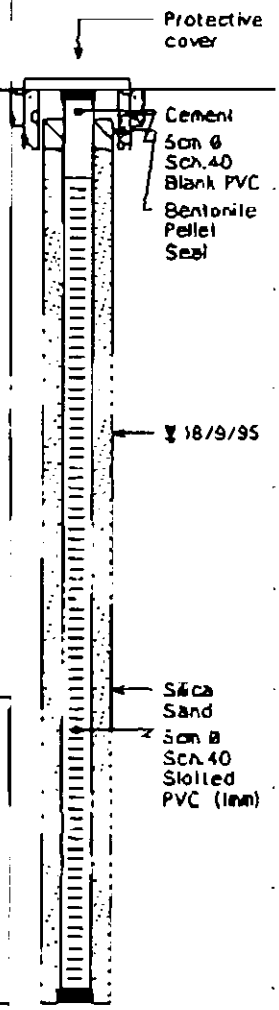
Log of Well MW-48
PHASE 3
CN
HORNEPAYNE, ONTARIO

Sheet 1 of 1
Job Number: 4057-02-02
G.S. Elevation: 325.83

Driller: BOART LONGYEAR DRILLING INC.	Drilling	Date	Time
Drill Method: Track Mounted CME 75	Started	September 8/95	
Sample Method: STANDARD SPLIT SPOON	Finished	September 9/95	
Borehole Diameter: 15.2 cm / Water Level T.O.P: 1.72	Logged By: TMM	Checked By: DPL	

Sample No.	Blow Counts	HNu	Depth (meters)	Graphic Log	Materials Description
SS1	8/5 4/2	10	1		SAND: medium, tan colour, trace of gravel and cobbles, no HC odour
SS2	8/3 3/3	11	2		
SS3	4/2 2/1	38			becomming finer
SS4	4/3 2/2	11	3		SANDY SILT: fine grained, grey colour, trace of clay and gravel, slight HC odour, saturated
SS5	1/1 1/1	18	4		
			5		END OF BOREHOLE
			6		

Well Completion



XCG Environmental Services Inc.

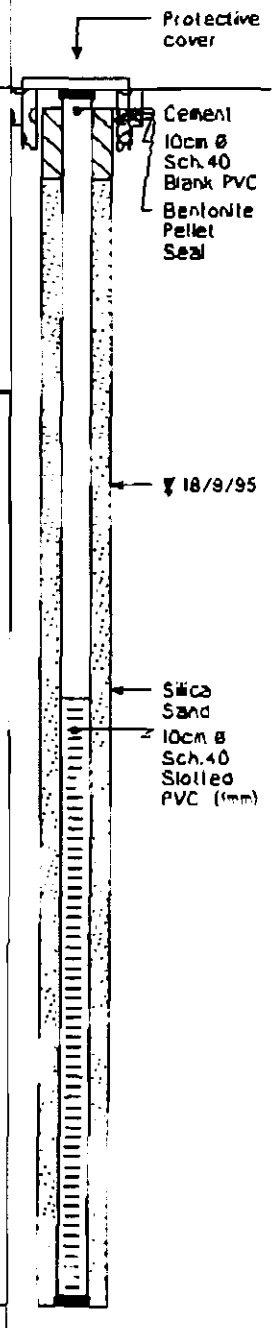
Log of Well MW/PW-50
PHASE 3
CN
HORNEPAYNE, ONTARIO

Sheet 1 of 1
Job Number: 4057-02-02
G.S. Elevation: 325.61

Driller: BOART LONGYEAR DRILLING INC.	Drilling	Date	Time
Drill Method: Track Mounted CME 75	Started	September 9/95	
Sample Method: STANDARD SPLIT SPOON	Finished	September 9/95	
Borehole Diameter: 38 cm / Water Level T.O.P: 1.98	Logged By: TMM	Checked By: OPL	

Sample No.	Blow Counts	HNu	Depth (meters)	Graphic Log	Materials Description
SS1	2/2/2	15	1		SAND: medium to coarse, grey black colour, trace of gravel, moist no odour
SS2	2/8/8	88	2		SANDY SILT: fine grained, grey colour, trace of clay, slight HC odour, saturated. HC odour increases with depth
SS3	3/6/7	87	3		
SS4	6/5/5	38	4		
SS6	4/3/3	11	5		
SS7	2/3/2	28	6		END OF BOREHOLE

Well Completion



XCG Environmental Services Inc.

Log of Well MW-51
PHASE 3
CN
HORNEPAYNE, ONTARIO

Sheet 1 of 1
Job Number: 4057-02-02
G.S. Elevation: 324.26

Driller: BOART LONGYEAR DRILLING INC.	Drilling	Date	Time
Drill Method: Track Mounted CME 75	Started	September 9/95	
Sample Method: STANDARD SPLIT SPOON	Finished	September 9/95	
Borehole Diameter: 15.2 cm / Water Level T.O.P: 3.09	Logged By: TMM	Checked By: DPL	

Sample No.	Blow Counts	HNu	Depth (meters)	Graphic Log	Materials Description	Well Completion
						Protective cover
					SAND: fine, medium and coarse, brown/black colour with slight HC odour	Cement; 5cm Ø Sch.40 Blank PVC; Bentonite Pellet Seal
SS1	no recovery		1			
SS2	3/2 2/2	29				Silica Sand
SS3	3/4 4/7	33	2			
SS4	3/3 7/4	42	3		saturated at 3.04 metres below ground surface.	▼ 18/9/95; 5cm Ø Sch.40 Slotted PVC (1mm)
SS5	3/2 2/2	15	4			
SS6	5/4 3/2	38	5		END OF BOREHOLE	
			6			

000743

XCG Environmental Services Inc.

Log of Well MW/PW-52
PHASE 3
CN
HORNEPAYNE, ONTARIO

Sheet 1 of 1

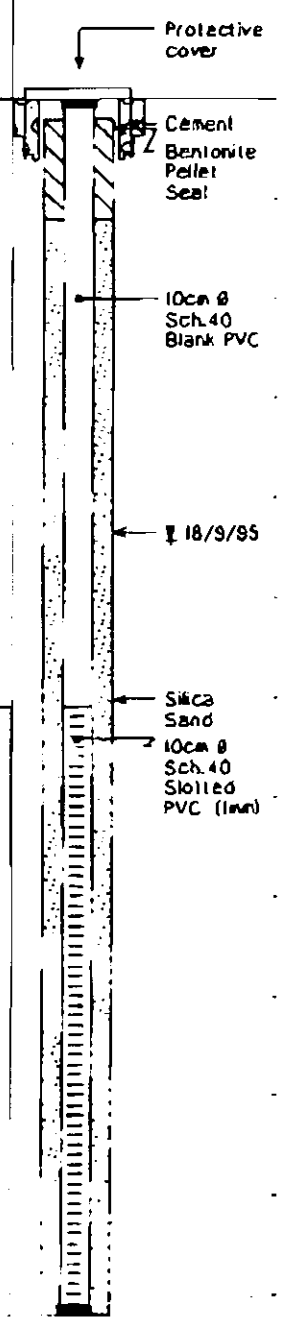
Job Number: 4057-02-02

G.S. Elevation: 323.91

Driller: BOART LONGYEAR DRILLING INC.	Drilling	Date	Time
Drill Method: Track Mounted CME 75	Started	September 9/95	
Sample Method: STANDARD SPLIT SPOON	Finished	September 9/95	
Borehole Diameter: 38 cm	Water Level T.O.P: 2.17	Logged By: THH	Checked By: OPL

Sample No.	Blow Counts	HNu	Depth (meters)	Graphic Log	Materials Description
SS1	2/4/5	54	1		SAND: fine, tan grey colour trace of gravel, moist no odour
SS2	3/5/3	18	2		
SS3	1/1/1	21	3		FINE SAND AND SILT: saturated at 3.04 mbgs
SS4	no recovery		4		becomming finer with depth
			5		
			6		END OF BOREHOLE

Well Completion



XCG Environmental Services Inc.

Log of Well MW-58
PHASE 3
CN
HORNEPAYNE, ONTARIO

Sheet 1 of 1

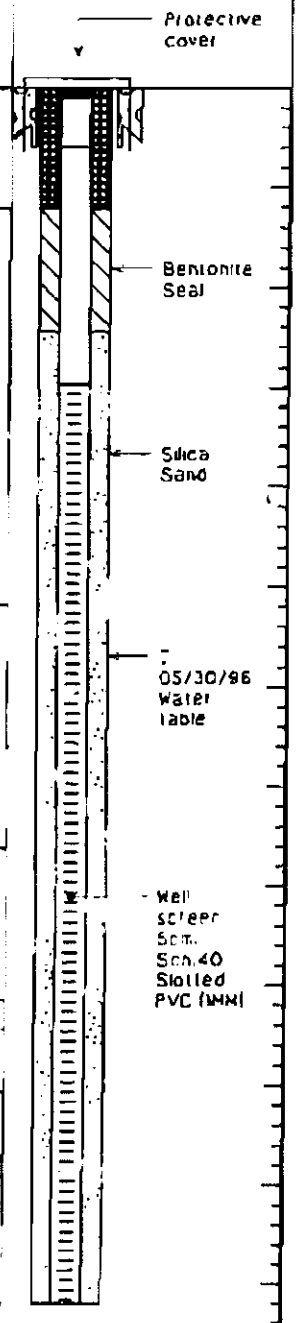
Job Number: 4057-02-04

Ground Elevation: 327.63 masl

Driller: BOART LONGYEAR DRILLING INC.	Drilling	Date	Time
Drill Method: Track Mount Hollow Stem Auger, CME 75	Started	May 14, 1996	NA
Sample Method: STANDARD SPLIT SPOON	Finished	May 14, 1996	NA
Borehole Diameter: 38 cm	Water Level:	Logged By: TMM	Checked By: KMM

SAMPLE NO.	BLOW COUNTS	MINIRAE (ppm)	Depth (meters)	Graphic Log	Materials Description
SS1			1		FILL -Coarse grained sand and gravel.
SS2	20/50	5.5			SAND -Grey/green sand and silt, fine grained with pebbles and trace of gravel (till like), moist to wet (partially frozen), dense.
SS3	20/50	14.8			-As above, with more fine grained sand, uniform, no odour
SS4	5/50	8.5	2		-As above, no odour.
					No sample recovery in this interval.
SS5	7/9 14/8	7.7	4		SAND AND GRAVEL -Coarse grained, moderately saturated, faint hydrocarbon odour. -Moist to wet.
SS6	4/6 7/9	5.3			PEAT
			5		SAND AND GRAVEL
SS7	5/9 8/12	6.7			SAND -Tan/grey fine grained, uniform, saturated.
			6		End of borehole at 6.10 m.b.g.s

Well Completion



XG Environmental Services Inc.

Log of Well MW-58
PHASE 3
CN
HORNEPAYNE, ONTARIO

Sheet 1 of 1
Job Number: 4057-02-04
Ground Elevation: 327.58 masl

Driller: BOART LONGYEAR DRILLING INC.	Drilling	Date	Time
Drill Method: Track Mount Hollow Stem Auger, CME 75	Started	May 15, 1996	NA
Sample Method: STANDARD SPLIT SPOON	Finished	May 15, 1996	NA
Borehole Diameter: 38 cm	Water Level:	Logged By: TMM	Checked By: KMM

SAMPLE NO.	BLOW COUNTS	MINIRAE (ppm)
SS1		
SS2	10/25 35/50	5.5
SS3	30/50	4.8
SS4	3/5 50	21.3
SS5	50/17 21/20	8.4
SS6	15/17 14/10	8.2
SS7	4/5 8/12	7.5
SS8	11/22 24/20	9.1
SS9	3/5 4/2	9.3

Depth (meters): 1, 2, 3, 4, 5, 6

FILL
-Sand and gravel.

-Brown to tan sand and silt, fine grained, with gravel, some pebbles, dense, frozen.

SAND AND GRAVEL
-Coarse grained sand, moist with some saturated zones.

-Dry to moist.

SAND
-Fine to medium grained, trace gravel.

SAND AND GRAVEL
-Tan to brown medium and coarse grained sand.

PEAT
-Dark brown peat layer, moist, musty odour, soft.

SAND
-Grey, fine grained, uniform, saturated.

End of borehole at 6.9 m b.g.s.

Well Completion

Protective cover
Backfill
7
05/30/96 water table
Bentonite seal
Silica sand
Well screen Schd Sch.40 Slotted PVC (1MM)

000746

BIOGÉNIE Inc

ENVIRONMENTAL SPECIALISTS
Tel.: (418) 653-4422 Fax: (418) 653-3583

BOREHOLE LOG

CONFIDENTIAL AND PRIVILEGED DOCUMENT

BOREHOLE #: OW3-2
SHEET: 1 OF 1
FILE #: CN-6089

PROJECT:	HORNEPAYNE CN	STARTING DATE:	28-09-96	COMPLT. DATE:	28-09-96
LOCATION:	AREA OF PLUME 3	SLOTTED PIPE Ø:	50 mm	TUBING Ø:	50 mm
CONTRACTOR:	Boart Longyear Drilling Inc.	DRILL TYPE:	CME 75	CORE SAMPLER Ø:	---
OPERATOR:	C. Pullen	METHOD (SOIL):	Auger	METHOD (ROCK):	---
TYPE OF TUBING:	PVC	DRILLING FLUID:	---	COMPILED BY:	P. Ouellette

DEPTH (meters)	ELEVATION (meters)	WATER TABLE	WELL DESIGN / NOTES	SAMPLE STATE	SAMPLE TYPE AND NUMBER	RECOVERY %	N VALUE	ANALYZED PARAMETERS	VOLATILE HYDROCARBON RECORD (PPM)	STRATIGRAPHY	SOIL/ROCK DESCRIPTION
0,00	326.51		Steel Cap; Cap; Cement; Bentonite; PVC Tubing								No Soil Description
2.13	323.38	▽	Silica Sand; Screen, Opening 0.05 cm								
5.15	320.36		Cap								End of Borehole at a Depth of 5.15 m

STATE OF SAMPLE: INTACT, DISTURBED, LOST, CORE SAMPLE

TYPE OF SAMPLE:
SS — SPLIT SPOON SAMPLER
TW — THIN WALL SAMPLER
CS — CORE SAMPLER

OBSERVATIONS
O — ODORLESS
W — WEAK
I — INTERMEDIATE
P — PERSISTENT
NE — NON-EXISTENT
SC — SCATTERED

▽ = WATER TABLE
** = FIELD DUPLICATE
* = ANALYZED SAMPLE

SURFACE PROTECTION: Steel Cap
SURFACE SEALANT: Cement/Bentonite
SEALANT DEPTH: 1.00 m
SCREEN LENGTH: 4.00 m
TUBING LENGTH: 1.15 m

ELEVATION:
REFERENCE LEVEL: Real
BEDROCK LEVEL: ---
GROUND LEVEL: 326.51 m
WATER TABLE LEVEL:
48 HOUR(s) AFTER DRILLING: 3

000747

BIOGÉNIE Inc
ENVIRONMENTAL SPECIALISTS

BOREHOLE LOG

CONFIDENTIAL AND PRIVILEGED DOCUMENT

BOREHOLE #: OW5-1
SHEET: 1 OF 1
FILE #: CN-6089

PROJECT: HORNEPAYNE CN
LOCATION: AREA OF PLUME B
CONTRACTOR: Boart Longyear Drilling Inc
OPERATOR: G. Pullen
TYPE OF TUBING: PVC

STARTING DATE: 01-10-96
SLOTTED PIPE Ø : 50 mm
DRILL TYPE: CME 75
METHOD (SOIL): Auger
DRILLING FLUID: ---

COMPLT. DATE: 01-10-96
TUBING Ø : 50 mm
CORE SAMPLER Ø : ---
METHOD (ROCK): ---
COMPILED BY: P. Ouellette

DEPTH (meters)	ELEVATION (meters)	NOTES	GEOLOGY: SOIL/ROCK DESCRIPTION
0.00	324.47	Steel Cap	
		Cap	
		Cement	
0.90	323.57	Bentonite	Light Brown Sand and Gravel, Dry
		PVC Tubing	Medium Brown Fine Sand with Traces of Gravel, Dry
2.40	322.07		Dark Brown Sandy Silt with Traces of Gravel, Dry
3.10	321.37	Silica Sand	Light Brown Sandy Silt with Traces of Gravel, Humid
3.27	321.20		
		Screen, Opening 0.05 cm	
8.00	316.47		Grey Clayey Silt, Humid
8.68	315.79	Cap	End of Borehole at a Depth 8.68 m

STATE OF SAMPLE: INTACT / DISTURBED / LOST / CORE SAMPLE

TYPE OF SAMPLE:
SS — SPLIT SPOON SAMPLER
TW — THIN WALL SAMPLER
CS — CORE SAMPLER

OBSERVATIONS
O — OBSERVED
W — WEAK
I — INTERMEDIATE
P — PERSISTENT
NE — NON EXISTENT
SC — SCATTERED
SA — SATURATED

▽ = WATER TABLE
** = FIELD DUPLICATE
* = ANALYZED SAMPLE

SURFACE PROTECTION: Steel Cap
SURFACE SEALANT: Bentonite
SEALANT DEPTH: 0.90 m
SCREEN LENGTH: 7.48 m
TUBING LENGTH: 1.20 m

ELEVATION:
REFERENCE LEVEL: Real
BEDROCK LEVEL: ---
GROUND LEVEL: 324.47 m
WATER TABLE LEVEL:
24 HOUR(s) AFTER DRILLING: 3.000748

BIOGÉNIE Inc
ENVIRONMENTAL SPECIALISTS

BOREHOLE LOG

CONFIDENTIAL AND PRIVILEGED DOCUMENT

BOREHOLE #: OW5-2
SHEET: 1 OF 1
FILE #: CN-6089

PROJECT: HORNEPAYNE CN
LOCATION: AREA OF PLUME 8
CONTRACTOR: Boart Longyear Drilling Inc
OPERATOR: C. Pullen
TYPE OF TUBING: PVC

STARTING DATE: 01-10-96
SLOTTED PIPE Ø : 50 mm
DRILL TYPE: CME 75
METHOD (SOIL): Auger
DRILLING FLUID: ---

COMPLT. DATE: 01-10-96
TUBING Ø : 50 mm
CORE SAMPLER Ø : ---
METHOD (ROCK): ---
COMPILED BY: P. Ouellette

LEVELING			MONITORING WELL		SAMPLE						GEOLOGY		
DEPTH (meters)	ELEVATION (meters)	WATER TABLE	WELL DESIGN	NOTES	SAMPLE STATE	SAMPLE TYPE AND NUMBER	RECOVERY %	N VALUE	ANALYZED PARAMETERS	VOLATILE HYDROCARBON RECORD (PPM)	STRATIGRAPHY	SOIL/ROCK DESCRIPTION	OBSERVATIONS
0.00	323.69			Steel Cap									
				Cap								Light Brown Sand and Gravel, Dry	
				Bentonite									
				PVC Tubing									
1.80	321.89											Greyish Clayey Silt	
				Silica Sand									
2.40	321.29											Brown Clayey Silt	
2.89	320.80												
3.00	320.69			Screen, Opening 0.05 cm								Grey Sandy Silt, Saturated	
4.00	319.69			Cap								End of Borehole at a Depth of 4.00 m	

NOTE: 0.22 m of Free-phase product observed on 02-10-96

0.51 m Top Section of Observation Well Installed Aboveground. Elevation of 323.69 m Taken at Ground Level. Water Elevation Measurements Taken from Protective Casing at an Elevation of 324.20 m

STATE OF SAMPLE:
INTACT DISTURBED LOST CORE SAMPLE

TYPE OF SAMPLE:
SS — SPLIT SPOON SAMPLER
TW — THIN WALL SAMPLER
CS — CORE SAMPLER

OBSERVATIONS
O — ODORLESS
W — WEAK
I — INTERMEDIATE
P — PERSISTENT
NE — NON-EXISTENT
SC — SCATTERED
SA — SATURATED

▽ = WATER TABLE
** = FIELD DUPLICATE
* = ANALYZED SAMPLE

SURFACE PROTECTION: Steel Cap
SURFACE SEALANT: Bentonite
SEALANT DEPTH: 0.90 m
SCREEN LENGTH: 3.10 m
TUBING LENGTH: 1.20 m

ELEVATION:
REFERENCE LEVEL: Reel
BEDROCK LEVEL: ---
GROUND LEVEL: 323.69 m
WATER TABLE LEVEL:
24 HOUR(s) AFTER DRILLING:

000749

BIOGÉNIE Inc
ENVIRONMENTAL SPECIALISTS

BOREHOLE LOG

CONFIDENTIAL AND PRIVILEGED DOCUMENT

BOREHOLE #: OW5-3
SHEET: 1 OF 1
FILE #: CN-6088

PROJECT: HORNEPAYNE CN
LOCATION: AREA OF PLUME B
CONTRACTOR: Boart Longyear Drilling Inc
OPERATOR: C. Pullen
TYPE OF TUBING: PVC

STARTING DATE: 28-09-96
SLOTTED PIPE Ø : 50 mm
DRILL TYPE: CME 75
METHOD (SOIL): Hollow Stem Auger
DRILLING FLUID: —

COMPLT. DATE: 28-09-96
TUBING Ø : 50 mm
CORE SAMPLER Ø : —
METHOD (ROCK): —
COMPILED BY: P. Ouellette

LEVELING			MONITORING WELL		SAMPLE						GEOLOGY		
DEPTH (meters)	ELEVATION (meters)	WATER TABLE	WELL DESIGN	NOTES	SAMPLE STATE	SAMPLE TYPE AND NUMBER	RECOVERY %	N VALUE	ANALYZED PARAMETERS	VOLATILE HYDROCARBON RECORD (PPM)	STRATIGRAPHY	SOIL/ROCK DESCRIPTION	OBSERVATIONS: CODE, WELL
0.00	323.75			Steel Cap									
				Cap		SS1	75	N=6	—	—		Fine to Coarse Sand with Traces of Gravel, Loose, Dry	
				Bentonite		SS2	100	N=8	—	—			
				PVC Tubing		SS3	100	N=15	—	—			
1.60	322.15					SS4	50	N=8	—	—		Dark Brown Organic Matter with Traces of Glass	
2.20	321.55					SS5	100	N=8	—	—		Brown Clayey Silt, Dry	
2.74	321.01					SS6	16	N=16	—	—		-Presence of Pieces of Wood	
3.80	320.25					SS7	25	N=17	—	—		Black Fine to Coarse Sand, Dense, Saturated	
4.25	319.60			Silica Sand		SS8	60	N=32	—	—		Light Brown Coarse Sand, Medium to Very Dense, Saturated. Presence of Gravel	
						SS9	60	N=67	—	—			
				Screen, Opening 0.06 cm		SS10	16	N=21	—	—			
						SS11	60	N=16	—	—			
						SS12	16	N=36	—	—			
7.20	316.55			Cap								End of Borehole at a Depth of 7.20 m	

STATE OF SAMPLE:
INTACT UNDISTURBED LOST CORE SAMPLE

TYPE OF SAMPLE:
SS — SPLIT SPOON SAMPLER
TW — THIN WALL SAMPLER
CS — CORE SAMPLER

OBSERVATIONS
O — OBSERVED
W — WEAK
I — INTERMEDIATE
P — PERSISTENT
NE — NON-EXISTENT
SC — SCATTERED
EA — ESTIMATED

▽ = WATER LEVEL
** = FIELD DUPLICATE
* = ANALYZED SAMPLE

SURFACE PROTECTION: Steel Cap
SURFACE SEALANT: Bentonite
SEALANT DEPTH: 0.80 m
SCREEN LENGTH: 6.00 m
TUBING LENGTH: 1.20 m

ELEVATION:
REFERENCE LEVEL: Real
BEDROCK LEVEL: —
GROUND LEVEL: 323.75 m
WATER TABLE LEVEL:
48 HOUR(s) AFTER DRILLING:

000750

BIOGÉNIE Inc

ENVIRONMENTAL SPECIALISTS

BOREHOLE LOG

CONFIDENTIAL AND PRIVILEGED DOCUMENT

BOREHOLE #: OW5-4

SHEET: 1 OF 1

FILE #: CN-6089

PROJECT: HORNEPAYNE CN | STARTING DATE: 28-09-96 | COMPLT. DATE: 28-09-96

LOCATION: AREA OF PLUME B | SLOTTED PIPE Ø : 50 mm | TUBING Ø : 50 mm

CONTRACTOR: Boart Longyear Drilling Inc | DRILL TYPE: CME 75 | CORE SAMPLER Ø : —

OPERATOR: C. Pullen | METHOD (SOIL): Hollow Stem Auger | METHOD (ROCK): —

TYPE OF TUBING: PVC | DRILLING FLUID: — | COMPILED BY: P. Ouellette

LEVELING			MONITORING WELL		SAMPLE						GEOLOGY		
DEPTH (meters)	ELEVATION (meters)	WATER TABLE	WELL DESIGN	NOTES	SAMPLE STATE	SAMPLE TYPE AND NUMBER	RECOVERY %	N VALUE	ANALYZED PARAMETERS	VOLATILE HYDROCARBON RECORD (PPM)	STRATIGRAPHY	SOIL/ROCK DESCRIPTION	OBSERVATIONS: GROS / VISUAL
0.00	324.46			Steel Cap									
				Cap		SS1	75	N = 13	—	—		Light Brown Fine to Coarse Sand with Traces of Gravel, Medium Dense, Dry	
				Bentonite		SS2	100	N = 13	—	—			
				PVC Tubing		SS3	100	N = 20	—	—			
1.90	322.56					SS4	100	N = 17	—	—		Grey Fine Sand with Traces of Silt, Medium Dense, Dry to Humid	
						SS5	100	N = 12	—	—			
						SS6	100	N = 7	—	—			
3.66	320.78	▽										Becomming Loose and Saturated, Sheen of the Water	
3.80	320.66					SS7	75	N = 13	—	—		Grey Medium to Coarse Sand with Little Gravel, Loose, Saturated	
				Silica Sand									
4.26	320.21					SS8	100	N = 8		—		Light Brown Coarse Sand with Some Gravel, Medium Dense, Saturated	
						SS9	75	N = 12	—	—			
				Screen, Opening 0.05 cm		SS10	60	N = 15	—	—			
						SS11	25	N = 13	—	—			
						SS12	0	N = 24	—	—			
7.20	317.26			Cap								End of Borehole at a Depth 7.20 m	
												NOTE: 0.29 m of Free-phase product observed on 08-10-96	

STATE OF SAMPLE:

INTACT UNDISTURBED CORE SAMPLE

TYPE OF SAMPLE:

SS — SPLIT SPOON SAMPLER
SW — THIN WALL SAMPLER
CS — CORE SAMPLER

OBSERVATIONS

O — ODORLESS
W — WEAK
I — INTERMEDIATE
P — PERSISTENT
NE — NON-EXISTENT
SC — SCATTERED
SA — SATURATED

▽ = WATER TABLE

** = FIELD DUPLICATE
* = ANALYZED SAMPLE

SURFACE PROTECTION: Steel Cap
SURFACE SEALANT: Bentonite
SEALANT DEPTH: 0.80 m
SCREEN LENGTH: 6.00 m
TUBING LENGTH: 1.20 m

ELEVATION:
REFERENCE LEVEL: Real
BEDROCK LEVEL: —
GROUND LEVEL: 324.46 m
WATER TABLE LEVEL:
24 HOUR(s) AFTER DRILLING:

000751

BIOGÉNIE Inc
ENVIRONMENTAL SPECIALISTS
[illegible]
Tél. : [illegible] Fax : [illegible]

BOREHOLE LOG

CONFIDENTIAL AND PRIVILEGED DOCUMENT

BOREHOLE #: **OW5-6**
SHEET: 1 OF 1
FILE #: CN-5089

PROJECT:	HORNEPAYNE CN	STARTING DATE:	28-08-96	COMPLT. DATE:	28-08-96
LOCATION:	AREA OF PLUME 8	SLOTTED PIPE Ø :	50 mm	TUBING Ø :	50 mm
CONTRACTOR:	Boart Longyear Drilling Inc	DRILL TYPE:	CME 75	CORE SAMPLER Ø :	—
OPERATOR:	C. Pullen	METHOD (SOIL):	Hollow Stem Auger	METHOD (ROCK):	—
TYPE OF TUBING:	PVC	DRILLING FLUID:	—	COMPILED BY:	P. Ouellette

LEVELING

DEPTH (meters)	ELEVATION (meters)	WATER TABLE
0.00	324.30	
1.50	322.80	
2.80	321.50	▽
4.80	319.50	
6.00	318.30	
7.20	317.10	

MONITORING WELL — WELL DESIGN / NOTES: Steel Cap; Cap; Bentonite; PVC Tubing; Silica Sand; Screen, Opening 0.05 cm; Cap

SAMPLE

SAMPLE STATE	SAMPLE TYPE AND NUMBER	RECOVERY %	N VALUE	ANALYZED PARAMETERS	VOLATILE HYDROCARBON RECORD (PPM)
Lost	SS1	4	N = 12	—	—
Disturbed	SS2	4	N = 4	—	—
Disturbed	SS3	100	N = 12	—	—
Disturbed	SS4	100	N = 16	—	—
Disturbed	SS5	75	N = 18	—	—
Disturbed	SS6	75	N = 8	—	—
Disturbed	SS7	91	N = 11	—	—
Disturbed	SS8	79	N = 3	—	—
Disturbed	SS9	100	N = 3	—	—
Disturbed	SS10	100	N = 6	—	—
Disturbed	SS11	25	N = 7	—	—
Lost	SS12		N = 6	—	—

GEOLOGY — SOIL/ROCK DESCRIPTION

DEPTH	SOIL/ROCK DESCRIPTION
0.00	Light Brown Fine to Coarse Sand, Traces of Silt, Loose, Dry
1.50	Light Brown Clayey Silt with Traces of Sand, Stiff, Humid
4.80	Light Brown Fine Sand to Sandy Silt, Very Loose, Saturated
6.00	Light Brown Medium to Coarse Sand, with Traces of Gravel, Loose, Saturated
7.20	End of Borehole at a Depth of 7.20 m

OBSERVATIONS: ODOR / VISUAL

STATE OF SAMPLE: INTACT DISTURBED LOST CORE SAMPLE

TYPE OF SAMPLE:
SS — SPLIT SPOON SAMPLER
TW — THIN WALL SAMPLER
CS — CORE SAMPLER

OBSERVATIONS
O — ODORLESS
W — WEAK
I — INTERMEDIATE
P — PERSISTENT
NE — NON-EXISTENT
SC — SCATTERED
SA — SATURATED

▽ = WATER TABLE
** = FIELD DUPLICATE
* = ANALYZED SAMPLE

SURFACE PROTECTION: Steel Cap
SURFACE SEALANT: Bentonite
SEALANT DEPTH: 0.80 m
SCREEN LENGTH: 6.00 m
TUBING LENGTH: 0.70 m

ELEVATION:
REFERENCE LEVEL: Real
BEDROCK LEVEL: —
GROUND LEVEL: 324.30 m
WATER TABLE LEVEL:
48 HOUR(s) AFTER DRILLING: 2.80 m

000752

BIOGÉNIE Inc
ENVIRONMENTAL SPECIALISTS

BOREHOLE LOG

CONFIDENTIAL AND PRIVILEGED DOCUMENT

BOREHOLE #: OW8-1
SHEET: 1 OF 1
FILE #: CN-8089

PROJECT: HORNEPAYNE CN
LOCATION: AREA OF PLUME B
CONTRACTOR: Boart Longyear Drilling Inc
OPERATOR: C. Fuller
TYPE OF TUBING: PVC

STARTING DATE: 27-09-96
SLOTTED PIPE Ø : 50 mm
DRILL TYPE: CME 75
METHOD (SOIL): Auger
DRILLING FLUID: —

COMPLT. DATE: 27-09-96
TUBING Ø : 50 mm
CORE SAMPLER Ø : --
METHOD (ROCK): --
COMPILED BY: P. Ouellette

LEVELING			MONITORING WELL		SAMPLE						GEOLOGY		OBSERVATIONS
	DEPTH (metres)	ELEVATION (metres)	WATER TABLE	WELL DESIGN	NOTES	SAMPLE STATE	SAMPLE TYPE AND NUMBER	RECOVERY %	N VALUE	ANALYZED PARAMETERS	VOLATILE HYDROCARBON RECORD (PPM)	STRATIGRAPHY	SOIL/ROCK DESCRIPTION	
	0.00	327.67			Steel Cap								Light Brown to Grey Fine to Coarse Sand with Traces of Gravel, Dry	
					Cap									
					Cement									
					Bentonite									
					PVC Tubing									
					Silica Sand									
	3.70	323.97												
	4.30	323.37											Grey Clayey to Sandy Silt, Dry	
					Screen, Opening 0.05 cm									
	5.80	321.87											Brown Clayey Silt, Dry	
	6.35	321.32											Grey Clayey Silt, Saturated	
	8.00	319.67			Cap								End of Borehole at a Depth of 8.00 m	

STATE OF SAMPLE: INTACT DISTURBED LOST CORE SAMPLE

TYPE OF SAMPLE:
SS — SPLIT SPOON SAMPLER
TW — THIN WALL SAMPLER
CS — CORE SAMPLER

OBSERVATIONS
O — ANGULAR
W — WEAR
I — INTERMEDIATE
P — PERSISTENT
NE — NON-EXISTENT
SC — SCATTERED
SA — SATURATED

▽ = WATER TABLE
-- = FIELD DUPLICATE
* = ANALYZED SAMPLE

SURFACE PROTECTION: Steel Cap
SURFACE SEALANT: Cement/Bentonite
SEALANT DEPTH: 0.76 m
SCREEN LENGTH: 6.60 m
TUBING LENGTH: 1.20 m

ELEVATION:
REFERENCE LEVEL: Real
BEDROCK LEVEL: --
GROUND LEVEL: 327.67 m
WATER TABLE LEVEL:
48 HOUR(s) AFTER DRILLING:

000753

BIOGÉNIE Inc
ENVIRONMENTAL SPECIALISTS

BOREHOLE LOG

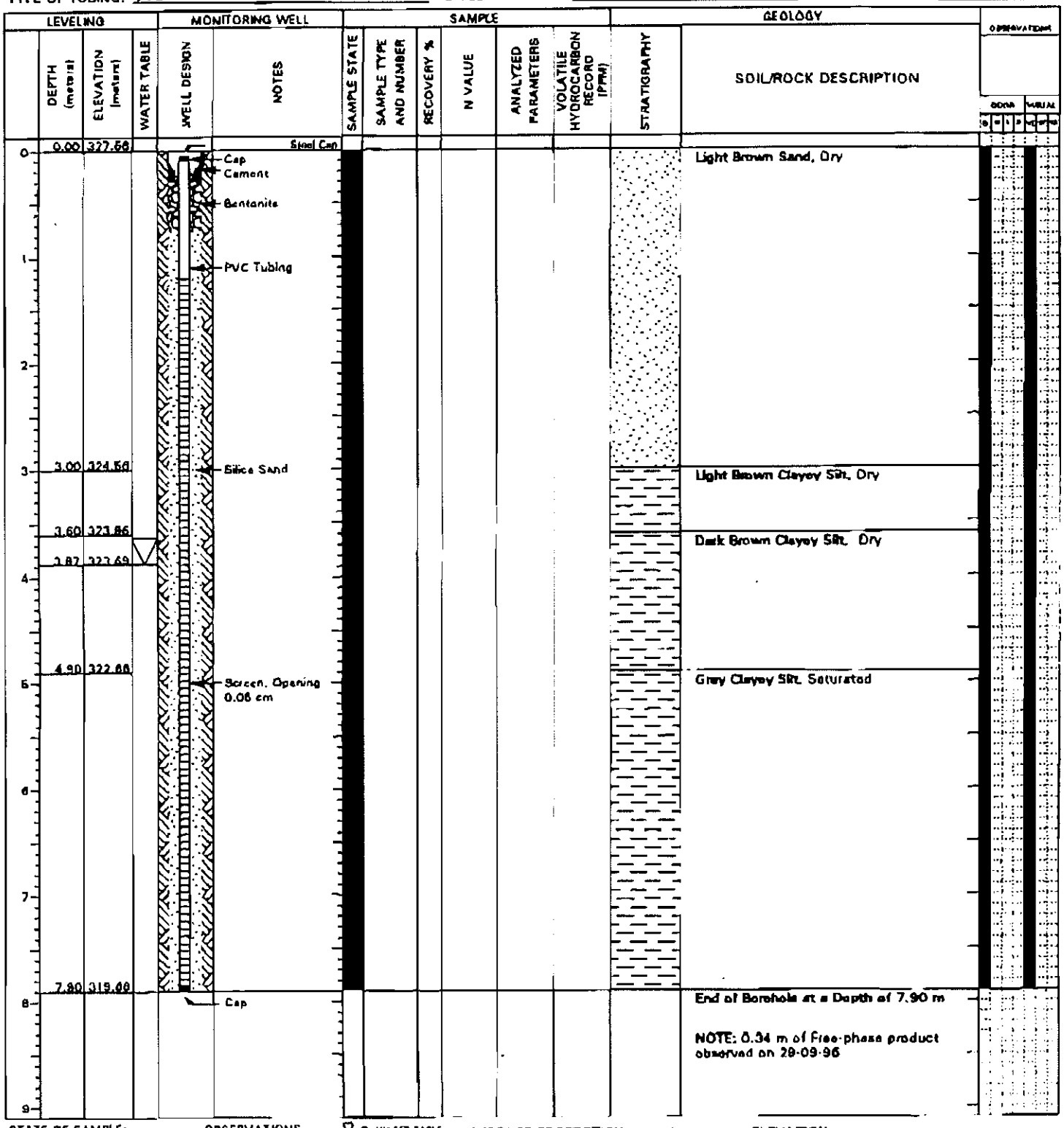
CONFIDENTIAL AND PRIVILEGED DOCUMENT

BOREHOLE #: OW8-2
SHEET: 1 OF 1
FILE #: CN-6089

PROJECT: HORNEPAYNE CN
LOCATION: AREA OF PLUME 8
CONTRACTOR: Boart Longyear Drilling Inc
OPERATOR: C. Pullen
TYPE OF TUBING: PVC

STARTING DATE: 27-09-96
SLOTTED PIPE Ø : 50 mm
DRILL TYPE: CME 75
METHOD (SOIL): Auger
DRILLING FLUID: —

COMPLT. DATE: 27-09-96
TUBING Ø : 50 mm
CORE SAMPLER Ø : —
METHOD (ROCK): —
COMPILED BY: P. Ouellette



STATE OF SAMPLE:
INTACT DISTURBED LOST CORE SAMPLE

TYPE OF SAMPLE:
SS — SPLIT SPOON SAMPLER
TW — THIN WALL SAMPLER
CS — CORE SAMPLER

OBSERVATIONS
O — ODOURLESS
W — WEAK
I — INTERMEDIATE
P — PERSISTENT
HC — HIGH CONTENT
SC — SCATTERED
SA — SATURATED

▽ = WATER TABLE
" = FIELD DUPLICATE
' = ANALYZED SAMPLE

SURFACE PROTECTION: Steel Cap
SURFACE SEALANT: Cement/Bentonite
SEALANT DEPTH: 0.75 m
SCREEN LENGTH: 6.70 m
TUBING LENGTH: 1.20 m

ELEVATION:
REFERENCE LEVEL: Real
BEDROCK LEVEL: —
GROUND LEVEL: 327.66 m
WATER TABLE LEVEL:
48 HOUR(s) AFTER DRILLING: 000754

BIOGÉNIE Inc

ENVIRONMENTAL SPECIALISTS

Tel.: (418) 653-4422 Fax: (418) 653-3583

BOREHOLE LOG

CONFIDENTIAL AND PRIVILEGED DOCUMENT

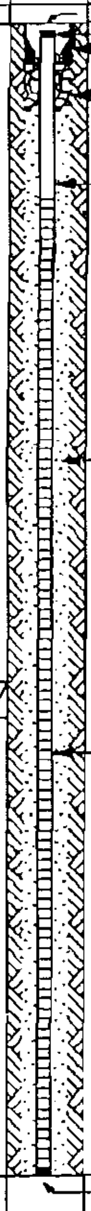
BOREHOLE #: OW8-3
SHEET: 1 OF 1
FILE #: CN-6089

PROJECT:	HORNEPAYNE CN	STARTING DATE:	27-09-96
LOCATION:	AREA OF PLUME 8	SLOTTED PIPE Ø:	50 mm
CONTRACTOR:	Boart Longyear Drilling Inc	DRILL TYPE:	CME 75
OPERATOR:	C. Pullen	METHOD (SOIL):	Auger
TYPE OF TUBING:	PVC	DRILLING FLUID:	---

COMPLT. DATE: 27-09-96
TUBING Ø: 50 mm
CORE SAMPLER Ø: ---
METHOD (ROCK): ---
COMPILED BY: P. Ouellette

DEPTH (meters)	ELEVATION (meters)	NOTES	STRATIGRAPHY / SOIL/ROCK DESCRIPTION
0.00	327.79	Steel Cap; Cap; Cement; Bentonite; PVC Tubing	Light Brown Fine Sand, Dry
3.00	324.79	Silica Sand	Grey Sand and Gravel with Traces of Silt, Dry
4.75	323.04	(water table); Screen, Opening 0.05 cm	
5.80	321.99		Grey Clayey Silt, Saturated
7.90	319.89	Cap	End of Borehole at a Depth of 7.90 m

NOTE: 2.22 m of Free-phase product observed on 29-09-96



STATE OF SAMPLE: INTACT DISTURBED LOST CORE SAMPLE

TYPE OF SAMPLE:
SS — SPLIT SPOON SAMPLER
TW — THIN WALL SAMPLER
CS — CORE SAMPLER

OBSERVATIONS
O — ODORLESS
W — WEAK
I — INTERMEDIATE
P — PERSISTENT
NE — NON EXISTENT
SC — SCATTERED
SA — SATURATED

∇ = WATER TABLE
·· = FIELD DUPLICATE
· = ANALYZED SAMPLE

SURFACE PROTECTION:	Steel Cap	ELEVATION:	
SURFACE SEALANT:	Cement/Bentonite	REFERENCE LEVEL:	Real
SEALANT DEPTH:	0.60 m	BEDROCK LEVEL:	---
SCREEN LENGTH:	6.70 m	GROUND LEVEL:	327.79 m
TUBING LENGTH:	1.20 m	WATER TABLE LEVEL:	

48 HOUR(s) AFTER DRILLING: 000755

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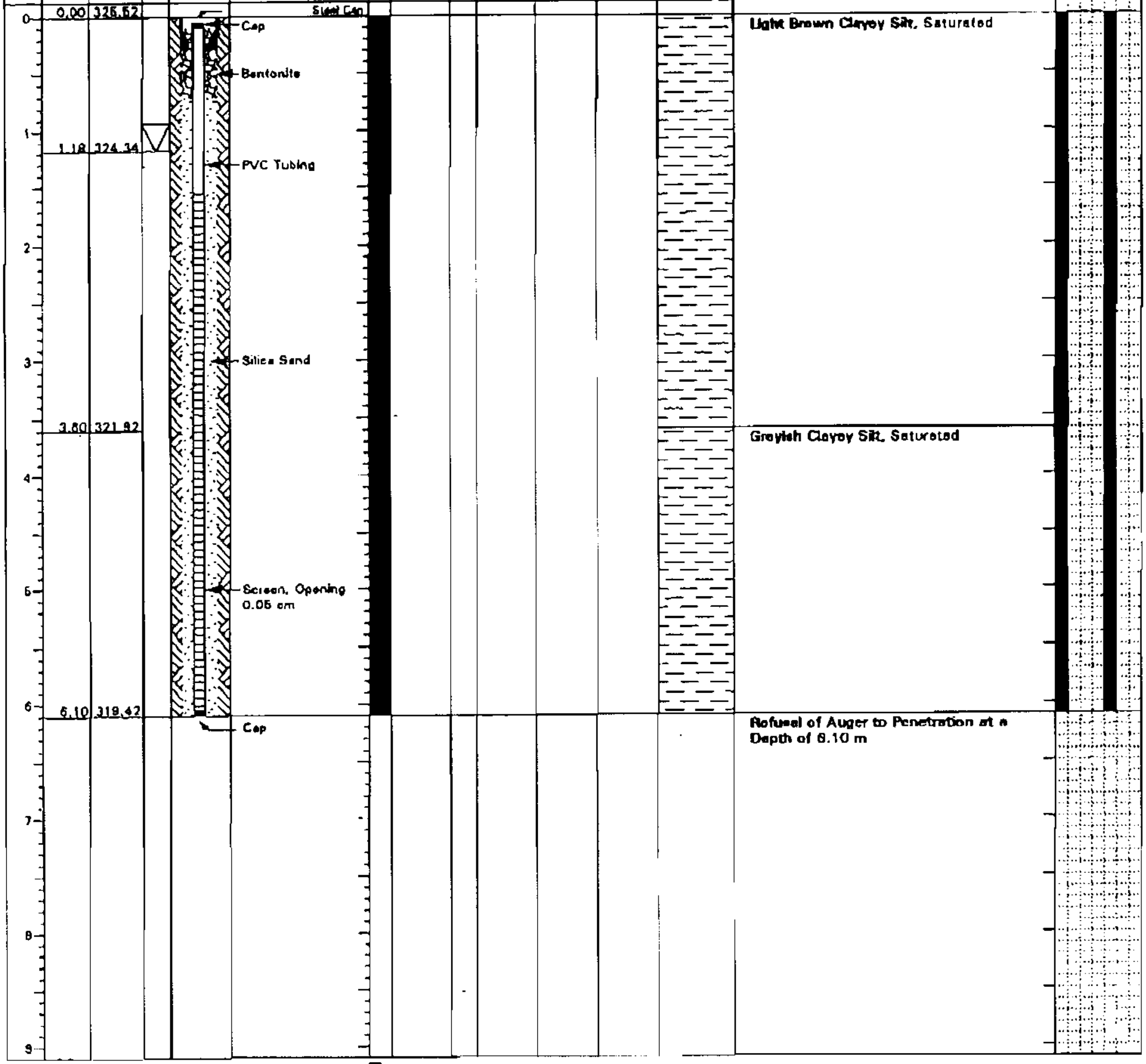
BOREHOLE LOG

CONFIDENTIAL AND PRIVILEGED DOCUMENT

BOREHOLE #: OW9-3
SHEET: 1 OF 1
FILE #: CN-6069

PROJECT:	HORNEPAYNE CN	STARTING DATE:	28-09-96	COMPLT. DATE:	29-09-96
LOCATION:	AREA OF PLUME 9	SLOTTED PIPE Ø :	50 mm	TUBING Ø :	50 mm
CONTRACTOR:	Boart Longyear Drilling Inc.	DRILL TYPE:	CME 75	CORE SAMPLER Ø :	—
OPERATOR:	C. Pullen	METHOD (SOIL):	Auger	METHOD (ROCK):	—
TYPE OF TUBING:	PVC	DRILLING FLUID:	—	COMPILED BY:	P. Ouellette

LEVELING: DEPTH (meters) | ELEVATION (meters) | WATER TABLE — MONITORING WELL: WELL DESIGN | NOTES — SAMPLE: SAMPLE STATE | SAMPLE TYPE AND NUMBER | RECOVERY % | N VALUE | ANALYZED PARAMETERS | VOLATILE HYDROCARBON RECORD (PPM) — GEOLOGY: STRATIGRAPHY | SOIL/ROCK DESCRIPTION — OBSERVATIONS



Depth (m)	Elevation (m)	Well notes	Soil/Rock description
0.00	325.52	Steel Cap; Cap; Bentonite	Light Brown Clayey Silt, Saturated
1.18	324.34	PVC Tubing; Silica Sand	
3.60	321.92	Screen, Opening 0.05 cm	Greyish Clayey Silt, Saturated
6.10	319.42	Cap	Refusal of Auger to Penetration at a Depth of 6.10 m

STATE OF SAMPLE: INTACT, DISTURBED, LOST, CORE SAMPLE

TYPE OF SAMPLE:
SS — SPLIT SPOON SAMPLER
TW — THIN WALL SAMPLER
CS — CORE SAMPLER

OBSERVATIONS
O — ODORLESS
W — WEAK
I — INTERMEDIATE
P — PERSISTENT
NE — NON-EXISTENT
SC — SCATTERED
SA — SATURATED

∇ = WATER TABLE
** = FIELD DUPLICATE
* = ANALYZED SAMPLE

SURFACE PROTECTION: Steel Cap
SURFACE SEALANT: Cement/Bentonite
SEALANT DEPTH: 0.70 m
SCREEN LENGTH: 4.60 m
TUBING LENGTH: 1.50 m

ELEVATION:
REFERENCE LEVEL: Real
BEDROCK LEVEL: —
GROUND LEVEL: 325.52 m
WATER TABLE LEVEL:
72 HOUR(s) AFTER DRILLING: 000756

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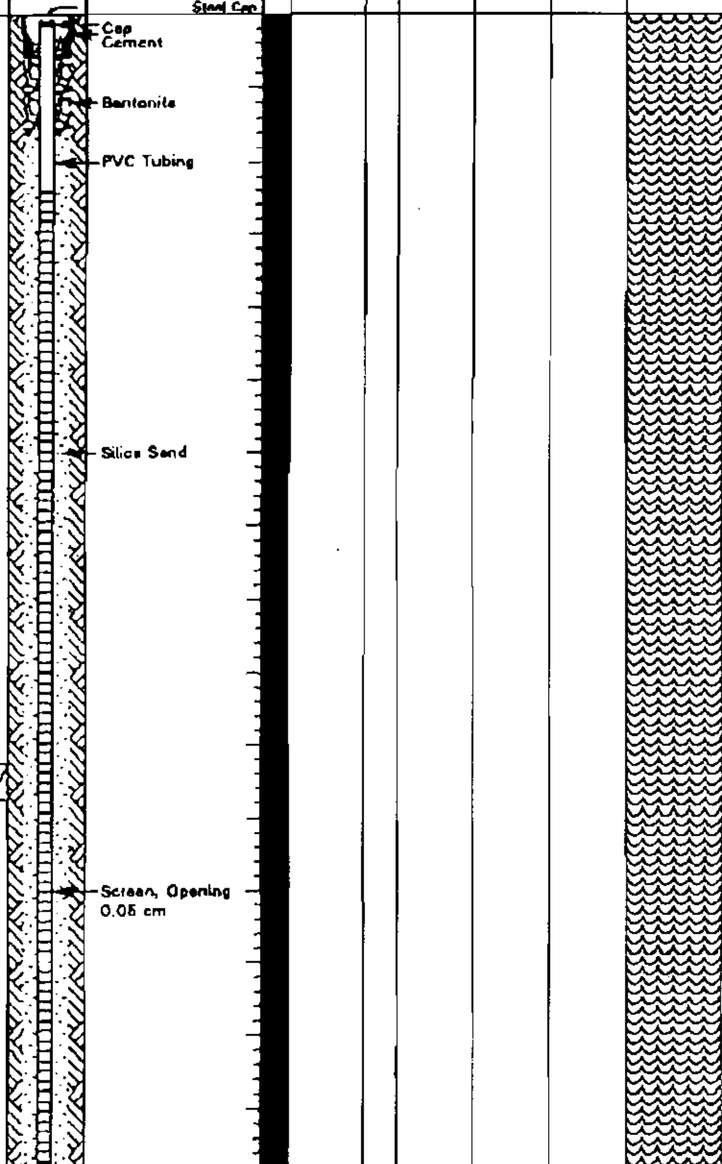
BOREHOLE LOG

CONFIDENTIAL AND PRIVILEGED DOCUMENT

BOREHOLE #: OW57
SHEET: 1 OF 1
FILE #: CN-5089

PROJECT: HORNEPAYNE CN | STARTING DATE: 03-10-96 | COMPLT. DATE: 03-10-96
LOCATION: AREA OF PLUME 8 | SLOTTED PIPE Ø: 50 mm | TUBING Ø: 50 mm
CONTRACTOR: Boart Longyear Drilling Inc | DRILL TYPE: CME 75 | CORE SAMPLER Ø: —
OPERATOR: C. Pullen | METHOD (SOIL): Auger | METHOD (ROCK): ---
TYPE OF TUBING: PVC | DRILLING FLUID: -- | COMPILED BY: P. Ouellette

DEPTH (meters)	ELEVATION (meters)	WATER TABLE	WELL DESIGN / NOTES	SOIL/ROCK DESCRIPTION
0.00	327.09		Steel Cap; Cap; Cement; Bentonite; PVC Tubing; Silica Sand; Screen, Opening 0.05 cm	No Soil Description
5.37	321.72	▽		
7.90	319.19		Cap	End of Borehole at a Depth of 7.90 m
				NOTE: 2.80 m of Free-phase product observed on 12-10-96



STATE OF SAMPLE: INTACT, DISTURBED, LOST, CORE SAMPLE

TYPE OF SAMPLE:
SS — SPLIT SPOON SAMPLER
TW — THIN WALL SAMPLER
CS — CORE SAMPLER

OBSERVATIONS:
O — ODORLESS
W — WEAK
I — INTERMEDIATE
P — PERSISTENT
NE — NON EXISTENT
SC — SCATTERED
SA — SATURATED

▽ = WATER TABLE
** = FIELD DUPLICATE
* = ANALYZED SAMPLE

SURFACE PROTECTION: Steel Cap
SURFACE SEALANT: Bentonite
SEALANT DEPTH: 0.80 m
SCREEN LENGTH: 6.70 m
TUBING LENGTH: 1.20 m

ELEVATION:
REFERENCE LEVEL: Real
BEDROCK LEVEL: ---
GROUND LEVEL: 326.96 m
WATER TABLE LEVEL:
>96 HOUR(s) AFTER DRILLING: 000757

KGS GROUP

SUMMARY LOG

HOLE NO. **OW-57R**

CLIENT	CANADIAN NATIONAL
PROJECT	CN Hornepayne Monitoring Well Replacement Program
SITE	CN Hornepayne Yard, West End
LOCATION	15m NW of MW-12
DRILLING METHOD	100 mm ø Hollow Stem Auger, Acker SX Skidder Mounted Rig

JOB NO.	14-0434-019
GROUND ELEV.	326.64 m
TOP OF CASING ELEV.	326.40 m
WATER ELEV.	324.22 m
DATE DRILLED	9/9/2014
UTMs (NAD83)	N 5,456,070 E 660,422

ELEV. (m)	DEPTH (m)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG/ BACKFILL	DEPTH (m)	SAMPLE TYPE NUMBER
	0		**SAND AND GRAVEL FILL** - Brown, moist, dense, poorly graded, fine to medium grained sand and medium to coarse grained gravel.		0.25	
	0.5					
	1.0					
	1.5		- wet below 1.4 m.		1.74	
324.54	2.0		**SAND** - Dark brown, wet, compact, poorly graded, fine grained, trace fine to medium grained gravel.		2.04	
	2.5					
323.59	3.0		**SILT** - Grey, wet, dense, non plastic, trace fine to medium grained sand.			
	3.5					
	4.0					
	4.5					
321.46	5.0		END OF BOREHOLE AT 5.18 m		5.09 5.18	
	5.5					
	6.0		Notes: 1. Installed monitoring well to a depth of 5.1 m with 3.05 m of screen. 2. Borehole backfilled with sand to 1.7 m, then bentonite to surface. 3. Monitoring well completed with a lockable flush mount casing and protective steel vault.			
	6.5					
	7.0					
	7.5					
	8.0					
	8.5					
	9.0					
	9.5					
	10.0					

Cu TORVANE (kPa) ◆
SPT (N) blows/0.15 m ▲
20 40 60 80
FIELD HEADSPACE TEST
Photoionizable Vapours (ppm) ●
100 200 300 400

SAMPLE TYPE

CONTRACTOR	INSPECTOR	APPROVED	DATE
Strata Drilling	G. CREWDSON		12/18/14

000758

ENVRO & GEO P:\PROJECTS\2014\14-0434-019\GENERAL\DOCS\SOIL LOGS\THL_HORNEPAYNE REPLACEMENT WELL LOGS_11-17-2014_LBP.GPJ

BIOGÉNIE Inc
ENVIRONMENTAL SPECIALISTS
[illegible]
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BOREHOLE LOG

CONFIDENTIAL AND PRIVILEGED DOCUMENT

BOREHOLE #: OW60
SHEET: 1 OF 1
FILE #: CN-8089

PROJECT:	HORNEPAYNE CN	STARTING DATE:	03-10-96	COMPLT. DATE:	03-10-96
LOCATION:	AREA OF PLUME 8	SLOTTED PIPE Ø:	50 mm	TUBING Ø:	50 mm
CONTRACTOR:	Boart Longyear Drilling Inc.	DRILL TYPE:	CME 75	CORE SAMPLER Ø:	--
OPERATOR:	C. Pullen	METHOD (SOIL):	Auger	METHOD (ROCK):	--
TYPE OF TUBING:	PVC	DRILLING FLUID:	--	COMPILED BY:	P. Ouilette

LEVELING: DEPTH (meters) | ELEVATION (meters) | WATER TABLE — MONITORING WELL: WELL DESIGN | NOTES — SAMPLE: SAMPLE STATE | SAMPLE TYPE AND NUMBER | RECOVERY % | N VALUE | ANALYZED PARAMETERS | VOLATILE HYDROCARBON RECORD (PPM) — GEOLOGY: STRATIGRAPHY | SOIL/ROCK DESCRIPTION — OBSERVATIONS: ODORS (n w i p) | VISUAL (ne sc sa)

Depth (m)	Elevation (m)	Soil/Rock Description
0.00	327.82	Medium Brown Sand and Gravel with Traces of Silt, Dry
2.35	325.47	Grey Fine to Medium Sand with Traces of Gravel, Humid
4.60	323.22	Brown Silt, Dry
5.44	322.38	(water table)
6.05	321.77	Grey Clayey Silt, Saturated
7.90	319.92	End of Borehole at a Depth of 7.90 m

Well design notes: Steel Cap; Cap; Cement; Bentonite; PVC Tubing; Silica Sand; Screen, Opening 0.05 cm; Cap

NOTE: 2.29 m of Free-phase product observed on 12-10-96

Depth scale: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9

STATE OF SAMPLE: INTACT, DISTURBED, LOST, CORE SAMPLE

TYPE OF SAMPLE:
SS — SPLIT SPOON SAMPLER
TW — THIN WALL SAMPLER
CS — CORE SAMPLER

OBSERVATIONS:
n — ODOURLESS
w — WEAK
i — INTERMEDIATE
p — PERSISTENT
NE — NON-EXISTENT
SC — SCATTERED
SA — SATURATED

∇ = WATER TABLE
** = FIELD DUPLICATE
* = ANALYZED SAMPLE

SURFACE PROTECTION:	Steel Cap	ELEVATION:	
SURFACE SEALANT:	Cement/Bentonite	REFERENCE LEVEL:	Real
SEALANT DEPTH:	0.60 m	BEDROCK LEVEL:	--
SCREEN LENGTH:	6.70 m	GROUND LEVEL:	327.61 m
TUBING LENGTH:	1.20 m	WATER TABLE LEVEL:	
		>90 HOUR(s) AFTER DRILLING:	

000759

KGS GROUP

SUMMARY LOG

HOLE NO. **OW-60R**

CLIENT	CANADIAN NATIONAL	JOB NO.	14-0434-019
PROJECT	CN Hornepayne Monitoring Well Replacement Program	GROUND ELEV.	327.75 m
		TOP OF CASING ELEV.	327.47 m
SITE	CN Hornepayne Yard, West End	WATER ELEV.	324.52 m
LOCATION	northwest of former fueling stand	DATE DRILLED	8/9/2014
DRILLING METHOD	100 mm ø Hollow Stem Auger, Acker SX Skidder Mounted Rig	UTMs (NAD83)	N E

ELEV. (m)	DEPTH (m)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG/ BACKFILL	DEPTH (m)	SAMPLE TYPE	NUMBER
	0		**SAND AND GRAVEL** - Medium brown, dry, trace silt.		0.28		
	0.5						
	1.0						
	1.5						
	2.0				1.93		
325.40					2.23		
	2.5		**SAND** - Grey, moist, poorly graded, fine to medium grained, trace gravel.				
	3.0						
	3.5						
	4.0						
323.15	4.5		**SILT** - Brown, dry				
322.57	5.0		END OF BOREHOLE AT 5.18 m		5.18		
					5.28		
	5.5						
	6.0						
	6.5						
	7.0						
	7.5						
	8.0						
	8.5						
	9.0						
	9.5						
	10.0						

Cu TORVANE (kPa) ◆

SPT (N) blows/0.15 m ▲

20 40 60 80

FIELD HEADSPACE TEST
Photolonizable Vapours (ppm) ●

100 200 300 400

Notes:

1. Installed monitoring well to a depth of 5.28 m with 3.05 m of screen.
2. Borehole backfilled with sand to 1.9 m, then bentonite to surface.
3. Monitoring well completed with a lockable flush mount casing and protective steel vault.

SAMPLE TYPE

CONTRACTOR	INSPECTOR	APPROVED	DATE
Strata Drilling	G. CREWDSON		12/18/14

000760

ENVIRO & GEO PROJECTS\2014\14-0434-019\GENERAL\DOCS\SOIL LOGS\TNL HORNEPAYNE REPLACEMENT WELL LOGS_11-17-2014_LBP.GPJ

KGS GROUP

SUMMARY LOG

HOLE NO **MW-101** SHEET 1 of 1

CLIENT CN ENGINEERING LINE OPERATION EAST

PROJECT CN HORNEPAYNE YARD DRILLING

SITE CN HORNEPAYNE YARD, EAST END

LOCATION 1.5 m East of Southeast Corner of Railing at Lagoon 2

DRILLING METHOD 165 mm ø Hollow Stem Auger, 25 mm ø Split Spoon, ACKER SX

JOB NO 00-434-08

GROUND ELEV 324.14 m, Geodetic

TOP OF PVC ELEV 324.13 m

WATER ELEV 321.46 m, 26/05/00

DATE DRILLED 09/05/00

ELEV (m)	DEPTH (m)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ LOG	DEPTH (m)	SAMPLE TYPE	NUMBER	RECOVERY %	FIELD HEADSPACE TEST Photoionizable Vapours (ppm) 500 1000 1500 2000
			SAND FILL - Brown, damp, loose, poorly graded, fine grained, some fine grained, subangular gravel, trace silt -slight petroleum hydrocarbon odour		0.02				
323.38					0.77				
	1.0		SAND - Grey, damp, loose, poorly graded, fine grained, some fine grained, subangular gravel -petroleum hydrocarbon odour		1.07		1		
			dense, strong petroleum hydrocarbon odour below 1.5 m				2	20	
	2.0						3	40	
			saturated below 2.3 m						
			dark grey petroleum hydrocarbon staining at 2.6 m				4	60	
321.09	3.0		GRAVEL - Grey, saturated, well graded, fine to coarse grained trace silt -strong petroleum hydrocarbon odour -dark grey petroleum hydrocarbon staining at 3.35 m				5	10	
	4.0		-sand lense (50 mm thick), dark grey, saturated, dense, poorly graded fine grained, with oily sheen at 3.91 m				6	20	
							7	20	
	5.0								
318.89			SAND - Grey, saturated, dense, poorly graded, fine grained, trace silt -slight petroleum hydrocarbon odour -lense of coarse grained gravel (25 mm ø) and cobbles at 5.5 m		5.50		8	30	
318.04	6.0				6.10				
			END OF HOLE @ 6.1 m						

Note:
1. Well flush mounted to grade.

SAMPLE TYPE: AUGER GRAB SPLIT BARREL

CONTRACTOR INSPECTOR

000761

KGS GROUP

SUMMARY LOG

HOLE NO. **MW-102**

CLIENT CN ENGINEERING LINE OPERATION EAST

PROJECT CN HORNEPAYNE YARD DRILLING

SITE CN HORNEPAYNE YARD, EAST END

LOCATION 220°, 1.5 m from East to North running Barrier

DRILLING METHOD 105 mm ø Hollow Stem Auger, 25 mm ø Split Spoon, ACKER SX

JOB NO. 00-434-08

GROUND ELEV. 324.19 m, Geodetic

TOP OF PVC ELEV. 324.16 m

WATER ELEV. 321.59 m, 26/05/00

DATE DRILLED 09/05/00

ELEV. (m)	DEPTH (m)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	SAMPLE TYPE	NUMBER	RECOVERY %	FIELD HEADSPACE TEST Photoionizable Vapours (ppm) 500 1000 1500 2000
			SAND AND GRAVEL FILL - Brown, damp, loose, poorly graded, fine grained sand and fine grained gravel, subangular grains, trace silt.		0.03		1		
323.43					0.53				
	1.0		SAND - Brown, damp, loose, poorly graded, fine to medium grained, trace fine grained gravel, trace silt.		0.93		2	60	
			-brown to grey with depth below 1.5 m				3	60	
	2.0		-slight petroleum hydrocarbon odour at 2.1 m and strong below 2.3 m				4	50	
			-saturated below 2.4 m -petroleum hydrocarbon staining between 2.45 and 2.6 m -layer of coarse grained sand and fine grained gravel at 2.6 m						
	3.0		-grey, fine to coarse grained, with fine to coarse grained gravel, occ. subangular cobbles below 3.05 m				5	5	
320.38			-no sample recovery on cobbles between 3.8 and 4.55 m						
	4.0		SAND AND GRAVEL - Grey, saturated, some cobbles, trace silt. -petroleum hydrocarbon odour				6	10	
	5.0								
318.88			SAND - Grey, saturated, loose, poorly graded, coarse grained, trace gravel and cobbles -petroleum hydrocarbon odour, sheen on water -fine grained sand lense (25 mm thick), dark grey at 5.5 m		5.44		7	30	
318.09	6.0		END OF HOLE @ 6.1 m		6.10				

Note:
1. Well flush mounted to grade.

SAMPLE TYPE AUGER GRAB SPLIT BARREL

CONTRACTOR INSPECTOR

000762

(0043408.GPJ)

KGS GROUP

SUMMARY LOG

HOLE NO. **MW-103**

SHEET 1 of 1

CLIENT CN ENGINEERING LINE OPERATION EAST

PROJECT CN HORNEPAYNE YARD DRILLING

SITE CN HORNEPAYNE YARD, EAST END

LOCATION 154°, 20 m from East-West running Barrier of Lagoon #2

DRILLING METHOD 105 mm ø Hollow Stem Auger, 25 mm ø Split Spoon, ACKER SX

JOB NO. 00-434-08

GROUND ELEV. 323.66 m, Geodetic

TOP OF PVC ELEV. 323.57 m

WATER ELEV. 321.57 m, 26/05/00

DATE DRILLED 10/05/00

ELEV. (m)	DEPTH (m)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	SAMPLE TYPE	NUMBER	RECOVERY %	FIELD HEADSPACE TEST Photoionizable Vapours (ppm) 500 1000 1500 2000
			SILT AND SAND - Dark brown, moist, soft, non plastic, and fine to medium grained sand, trace fine grained gravel.		0.09 0.12 0.37				
					0.67		1		
	1.0		-light brown below 0.75 m -damp between 0.75 and 1.5 m				2		
	2.0		-saturated, silt and fine grained sand, trace oxidation below 1.5 m				3	70	
	3.0						4	80	
	4.0								
319.09					4.57				
			END OF HOLE @ 4.57 m						
	5.0		Note: 1. Well flush mounted just above grade. Flush mount was built up with cuttings to elev. 323.86 m.						
	6.0								

SAMPLE TYPE AUGER GRAB SPLIT BARREL

CONTRACTOR INSPECTOR

000763

0434-08.GPJ

KGS GROUP

SUMMARY LOG

HOLE NO. **MW-104**

CLIENT CN ENGINEERING LINE OPERATION EAST

PROJECT CN HORNEPAYNE YARD DRILLING

SITE CN HORNEPAYNE YARD, EAST END

LOCATION 220°, 8 m from East-West running Barrier of Lagoon #2

DRILLING METHOD 105 mm ø Hollow Stem Auger, 25 mm ø Split Spoon, ACKER SX

JOB NO. 00-434-08

GROUND ELEV. 323.99 m, Geodetic

TOP OF PVC ELEV. 323.91 m

WATER ELEV. 321.72 m, 26/05/00

DATE DRILLED 10/05/00

ELEV. (m)	DEPTH (m)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	SAMPLE TYPE NUMBER	RECOVERY %	FIELD HEADSPACE TEST Photoionizable Vapours (ppm) 500 1000 1500 2000
			SAND FILL - Brown to grey, damp, loose, poorly graded, fine to medium grained, some fine grained gravel, trace silt.		0.08 0.13 0.23 0.53	1		
	1.0		-brown below 0.75 m			2		
322.47			SAND - Grey, damp, loose, poorly graded, fine grained. -strong petroleum hydrocarbon odour			3	50	
	2.0		-saturated below 2.3 m			4	70	
	3.0					5	100	
	4.0				4.13			
319.42					4.57			
	5.0		END OF HOLE @ 4.57 m Note: 1. Well flush mounted to grade.					
	6.0							

SAMPLE TYPE AUGER GRAB SPLIT BARREL

CONTRACTOR INSPECTOR

0043408.GPJ

KGS GROUP

SUMMARY LOG

HOLE NO. **MW-105**

CLIENT CN ENGINEERING LINE OPERATION EAST

PROJECT CN HORNEPAYNE YARD DRILLING

SITE CN HORNEPAYNE YARD, EAST END

LOCATION 173°, 12 m from an exposed rock located 3 m from Jackfish River

DRILLING METHOD 105 mm ø Hollow Stem Auger, 25 mm ø Split Spoon, ACKER SX

JOB NO. 00-434-08

GROUND ELEV. 323.56 m, Geodetic

TOP OF PVC ELEV. 323.43 m

WATER ELEV. 322.58 m, 26/05/00

DATE DRILLED 10/05/00

ELEV. (m)	DEPTH (m)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	SAMPLE TYPE	NUMBER	RECOVERY %
			SAND - Brown, damp, loose, poorly graded, fine grained, trace silt.		0.13 0.16 0.23 0.37		1	
	1.0		-grey, saturated, strong petroleum hydrocarbon odour below 0.75 m				2	
321.73			-petroleum hydrocarbon staining between 1.5 and 1.8 m				3	60
	2.0		SILT - Grey, wet, firm, non plastic to low plasticity, trace clay.				4	
			-trace fine grained sand below 2.3 m				5	80
	3.0							
	4.0							
318.99					4.57			
			END OF HOLE @ 4.57 m					
	5.0		Note: 1. Well flush mounted to grade.					
	6.0							

FIELD HEADSPACE TEST

Photoionizable Vapours (ppm)

500 1000 1500 2000

SAMPLE TYPE AUGER GRAB SPLIT BARREL

CONTRACTOR INSPECTOR

0043408.GPJ

KGS GROUP

SUMMARY LOG

HOLE NO. **MW-106**

CLIENT CN ENGINEERING LINE OPERATION EAST

PROJECT CN HORNEPAYNE YARD DRILLING

SITE CN HORNEPAYNE YARD, EAST END

LOCATION 260°, 3.5 m from a hydro pole

DRILLING METHOD 105 mm ø Hollow Stem Auger, 25 mm ø Split Spoon, ACKER SX

JOB NO. 00-434-08

GROUND ELEV. 323.95 m, Geodetic

TOP OF PVC ELEV. 323.90 m

WATER ELEV. 322.18 m, 26/05/00

DATE DRILLED 10/05/00

ELEV. (m)	DEPTH (m)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	SAMPLE TYPE	NUMBER	RECOVERY %	FIELD HEADSPACE TEST Photolonizable Vapours (ppm)
323.19	0		SAND FILL - Dark brown, damp, loose, poorly graded, fine to medium grained, and silt. -petroleum hydrocarbon odour		0.05 0.08 0.11 0.40		1		
	1.0		SAND AND SILT - Dark grey, moist, loose, poorly graded, fine grained, and silt. -petroleum hydrocarbon odour -wet below 1.2 m				2		
322.43			SILT AND SAND - Grey, saturated, firm, non plastic, and fine grained sand. -petroleum hydrocarbon staining at 1.5 m -sand lense (50 mm thick), fine grained, stained with petroleum hydrocarbons at 1.83 m				3	60	
	2.0						4		
321.66			SAND AND SILT - Grey, saturated, dense, poorly graded, fine grained, and silt. -petroleum hydrocarbon staining and odour at 2.44 m				5	70	
	3.0		-with silt below 3.05 m				6	60	
	4.0				4.45 4.57				
319.38			END OF HOLE @ 4.57 m						
	5.0		Note: 1. Well flush mounted to grade.						
	6.0								

SAMPLE TYPE ▣ AUGER GRAB ▣ SPLIT BARREL

CONTRACTOR INSPECTOR

000766

KGS GROUP

SUMMARY LOG

HOLE NO. **MW-107** SHEET 1 of 1

CLIENT	CN ENGINEERING LINE OPERATION EAST
PROJECT	CN HORNEPAYNE YARD DRILLING
SITE	CN HORNEPAYNE YARD, EAST END
LOCATION	226°, 14 m from a yellow painted metal well, and 1.6 m from Road
DRILLING METHOD	105 mm ø Hollow Stem Auger, 25 mm ø Split Spoon, ACKER SX

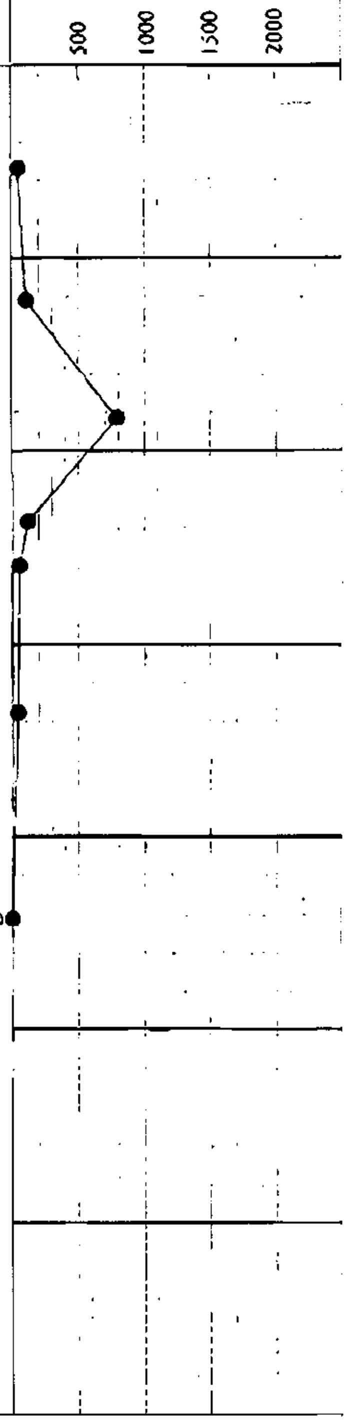
JOB NO.	00-434-08
GROUND ELEV.	324.10 m, Geodetic
TOP OF PVC ELEV.	324.01 m
WATER ELEV.	322.43 m, 26/05/00
DATE DRILLED	10/05/00

ELEV. (m)	DEPTH (m)	DESCRIPTION AND CLASSIFICATION	DEPTH (m)	SAMPLE TYPE	NUMBER	RECOVERY %
		SAND FILL - Brown to black, damp, loose, poorly graded, fine to medium grained, trace silt, trace fine grained gravel -petroleum hydrocarbon odour	0.09 0.12 0.29 0.59	Auger grab	1	
323.19	1.0	SILT - Brown, wet, soft, non plastic, some fine grained sand. -petroleum hydrocarbon staining and odour		Auger grab	2	
322.58		SAND - Brown, saturated, poorly graded, fine grained, trace silt.		Split barrel	3	75
	2.0	petroleum hydrocarbon staining and odour below 2.3 m		Split barrel	4	75
321.66		SILT - Brown, saturated, non plastic, trace clay.		Split barrel	5	
321.05	3.0	SAND AND SILT - Grey, saturated, loose, poorly graded, fine grained, and silt -petroleum hydrocarbon odour, sheen on water between 3.05 and 3.8 m -some silt below 3.8 m		Split barrel	6	80
319.83	4.0	SILT - Grey, saturated, soft, non plastic, some fine grained sand.	4.49	Split barrel	7	100
319.53		END OF HOLE @ 4.57 m	4.57			

Note:
1. Well flush mounted to grade.

FIELD HEADSPACE TEST

Photoionizable Vapours (ppm) ●



SAMPLE TYPE: AUGER GRAB / SPLIT BARREL

CONTRACTOR

INSPECTOR

APPROVED

DATE

000767

KGS GROUP

SUMMARY LOG

HOLE NO. **MW-108**

CLIENT CN ENGINEERING LINE OPERATION EAST

PROJECT CN HORNEPAYNE YARD DRILLING

SITE CN HORNEPAYNE YARD, EAST END

LOCATION 1.5 m from concrete conduite running West from Roundhouse

DRILLING METHOD 105 mm ø Hollow Stem Auger, 25 mm ø Split Spoon, ACKER SX

JOB NO. 00-434-08
GROUND ELEV. 325.01 m, Geodetic
TOP OF PVC ELEV. 324.87 m
WATER ELEV 323.40 m, 26/05/00
DATE DRILLED 10/05/00

ELEV. (m)	DEPTH (m)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	SAMPLE TYPE NUMBER	RECOVERY %
			SAND AND GRAVEL FILL - Brown, wet, loose, sand fine to coarse grained and fine grained, subangular gravel. -petroleum hydrocarbon odour		0.14 0.17	1	
			-dark grey, and silt, petroleum hydrocarbon staining and odour below 0.75 m		0.79 1.09	2	
323.49	1.0		SILT - Brown, damp, firm, non plastic, trace fine grained sand. -petroleum hydrocarbon odour			3	90
322.72	2.0		-sand lense (25 mm thick), grey, saturated, fine grained, petroleum hydrocarbon staining and odour at 2.1 m			4	
			SILTY SAND - Grey, saturated, dense, poorly graded, fine grained, with silt. -petroleum hydrocarbon staining and odour			5	80
321.96	3.0		SILT - Brown, wet, firm, non plastic, trace clay.			6	60
	4.0						
320.44			END OF HOLE @ 4.57 m		4.54 4.57		
	5.0		Note: 1. Well flush mounted to grade.				
	6.0						

FIELD HEADSPACE TEST
Photolonizable Vapours (ppm)
500 1000 1500 2000

SAMPLE TYPE ▯ AUGER GRAB ▯ SPLIT BARREL

CONTRACTOR INSPECTOR

000768

KGS GROUP

SUMMARY LOG

HOLE NO. **MW-109**

CLIENT CN ENGINEERING LINE OPERATION EAST

PROJECT CN HORNEPAYNE YARD DRILLING

SITE CN HORNEPAYNE YARD, EAST END

LOCATION 90°, 20 m from hydro pole, and 14°, 24 m from Waste Oil/Water Separator Building

DRILLING METHOD 105 mm ø Hollow Stem Auger, 25 mm ø Split Spoon, ACKER SX

JOB NO. 00-434-08

GROUND ELEV. 325.62 m, Geodetic

TOP OF PVC ELEV. 325.48 m

WATER ELEV. 323.08 m, 26/05/00

DATE DRILLED 10/05/00

ELEV. (m)	DEPTH (m)	GRAPHICS	DESCRIPTION AND CLASSIFICATION
325.01	0		**SAND AND GRAVEL FILL** - Brown, damp, loose, with red brick fragments. -petroleum hydrocarbon odour
	1.0		**SAND** - Brown, wet, loose, poorly graded, fine grained, trace to some silt. -petroleum hydrocarbon staining and odour
324.10			**SAND AND SILT** - Grey, wet, loose, fine grained sand and silt.
	2.0		
323.33			**SAND** - Grey, moist, loose, poorly graded, fine grained, trace silt.
	3.0		-saturated, strong petroleum hydrocarbon odour and staining between 3.05 and 3.35 m
322.27			**SILT** - Brown, saturated, firm, non plastic, trace fine grained sand, trace clay.
	4.0		
	5.0		
319.52	6.0		END OF HOLE @ 6.1 m

Note:
1. Well flush mounted to grade.

PIEZ. LOG

DEPTH (m)	SAMPLE TYPE	NUMBER	RECOVERY %
0.14			
0.17		1	
0.92			
1.23		2	
		3	80
		4	60
		5	70
		6	
		7	60
6.03			
6.10			

FIELD HEADSPACE TEST

Photolonizable Vapours (ppm)

500 1000 1500 2000

>2,000

SAMPLE TYPE AUGER GRAB SPLIT BARREL

CONTRACTOR INSPECTOR

000769

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KGS GROUP

SUMMARY LOG

HOLE NO. **MW-110**

CLIENT CN ENGINEERING LINE OPERATION EAST

PROJECT CN HORNEPAYNE YARD DRILLING

SITE CN HORNEPAYNE YARD, EAST END

LOCATION 236°, 1.5 m from track entering South-West train door in Roundhouse

DRILLING METHOD 105 mm ø Hollow Stem Auger, 25 mm ø Split Spoon, ACKER SX

JOB NO. 00-434-08

GROUND ELEV. 326.13 m, Geodetic

TOP OF PVC ELEV. 325.88 m

WATER ELEV. 325.04 m, 26/05/00

DATE DRILLED 11/05/00

ELEV. (m)	DEPTH (m)	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	SAMPLE TYPE	NUMBER	RECOVERY %	FIELD HEADSPACE TEST Photoionizable Vapours (ppm)
325.37	0.0	SAND FILL - Black, moist, loose, poorly graded, fine to medium grained, trace to some fine grained gravel. -petroleum hydrocarbon staining and odour		0.25 0.28		1		>2,000
	1.0	SILT AND SAND - Grey, moist, soft, non plastic, and fine to medium grained sand. -petroleum hydrocarbon staining and odour throughout layer		0.94 1.23		2		>2,000
	2.0	-wet, firm, some to with fine grained sand below 1.5 m -sand lense, fine to medium grained, stained with petroleum hydrocarbon at 1.68 m				3	70	>2,000
323.84		SILT - Grey, wet, firm, trace fine grained sand. -petroleum hydrocarbon staining and odour -sand lense (10 mm thick), stained with petroleum hydrocarbon at 2.45 m				4	60	>2,000
	3.0	-saturated, petroleum hydrocarbon sheen on water between 3.05 and 4.55 m				5	70	>2,000
	4.0					6	70	>2,000
	5.0	-brown, no petroleum hydrocarbon odour below 5.33 m		5.14		7	70	
320.03	6.0	END OF HOLE @ 6.1 m Note: 1. Well flush mounted to grade.		6.10				

FIELD HEADSPACE TEST scale: 500, 1000, 1500, 2000

SAMPLE TYPE AUGER GRAB SPLIT BARREL

CONTRACTOR

INSPECTOR

APPROVED

DATE

000770

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KGS GROUP

SUMMARY LOG

HOLE NO.
MW-110R

CLIENT	CANADIAN NATIONAL
PROJECT	CN Homepayne Monitoring Well Replacement Program
SITE	CN Homepayne Yard, East End
LOCATION	236° 1.5 m from track entering South-West train door in Roundhouse
DRILLING METHOD	100 mm ø Hollow Stem Auger, Acker SX Skidder Mounted Rig

JOB NO.	14-0434-019
GROUND ELEV.	325.74 m
TOP OF CASING ELEV.	325.53 m
WATER ELEV.	324.36 m
DATE DRILLED	10/9/2014
UTMs (NAD83)	N 5,454,318 E 662,126

Cu TORVANE (kPa) ◆
SPT (N) blows/0.15 m ▲
20 40 60 80
FIELD HEADSPACE TEST
Photoionizable Vapours (ppm) ●
100 200 300 400

ELEV. (m)	DEPTH (m)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG/ BACKFILL	DEPTH (m)	SAMPLE TYPE	NUMBER
	0						
324.98	0.5		SAND FILL - Black, moist, loose, poorly graded, fine to medium grained, trace to some fine grained gravel. - petroluem hydrocarbon staining and odour		0.21 0.63		
	1.0		SILT AND SAND - Grey, moist, soft, non plastic, and fine to medium grained sand. - petroleum hydrocarbon staining and odour throughout layer		0.93		
	1.5		- wet, firm, some to with fine grained sand below 1.5 m - sand lense, fine to medium grained, stained with petroleum hydrocarbon at 1.68 m				
323.46	2.0		SILT - Grey, wet, firm, trace fine grained sand. - petroleum hdyrocarbon staining and odour - sand lense (10 mm thick), stained with petroleum hydrocarbon at 2.45 m				
	2.5						
	3.0						
	3.5						
321.48	4.0		END OF BOREHOLE AT 4.26 m		4.00 4.26		
	4.5						
	5.0						
	5.5						
	6.0						
	6.5						
	7.0						
	7.5						
	8.0						
	8.5						
	9.0						
	9.5						
	10.0						

Notes:

1. Monitoring well installed to a depth of 4.0 m with 3.0 m of screen.
2. Borehole backfilled with sand to 0.63 m, then bentonite to surface.
3. Monitoring well completed with a flush mount casing and steel protective vault.

SAMPLE TYPE

CONTRACTOR	INSPECTOR	APPROVED	DATE
Strata Drilling	G. CREWDSON		12/18/14

000771

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KGS GROUP

SUMMARY LOG

HOLE NO. **MW-112**

CLIENT CN ENGINEERING LINE OPERATION EAST

PROJECT CN HORNEPAYNE YARD DRILLING

SITE CN HORNEPAYNE YARD, EAST END

LOCATION 335°, 2 m from yellow post marking concrete underground Oil/Water Separator

DRILLING METHOD 105 mm ø Hollow Stem Auger, 25 mm ø Split Spoon, ACKER SX

JOB NO. 00-434-08

GROUND ELEV. 325.88 m, Geodetic

TOP OF PVC ELEV. 325.81 m

WATER ELEV. 323.12 m, 26/05/00

DATE DRILLED 11/05/00

ELEV. (m)	DEPTH (m)	DESCRIPTION AND CLASSIFICATION	DEPTH (m)	SAMPLE NUMBER	RECOVERY %
		SAND FILL - Brown, damp, loose, poorly graded, fine to medium grained, some fine to medium grained gravel, trace silt.	0.07 0.10	1	
325.27		SILT - Grey, moist, soft, non plastic, trace clay, trace fine grained sand.	0.86		
	1.0	-petroleum hydrocarbon staining and odour	1.16	2	
		-no sample recovery between 1.52 and 2.29 m			
	2.0				
323.59		SAND - Grey, saturated, dense, poorly graded, fine grained, some silt.			
		-petroleum hydrocarbon staining and odour			
		-silt content decreased with depth		3	80
	3.0				
322.71		-trace silt below 3.05 m			
		SILT - Brown to grey, wet, firm, non plastic.		4	80
		-clay lense (10 mm thick) at 3.35 m			
	4.0			5	80
		-light brown at bottom of hole	4.46		
321.31		END OF HOLE @ 4.57 m	4.57		
		Note: 1. Well flush mounted to grade.			
	5.0				
	6.0				

FIELD HEADSPACE TEST

Photoionizable Vapours (ppm) ●

500 1000 1500 2000

SAMPLE TYPE ▮ AUGER GRAB ▮ SPLIT BARREL

CONTRACTOR Paddock Drilling Ltd

INSPECTOR T. CAILO

APPROVED

DATE 29/06/00

000772

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KGS GROUP

SUMMARY LOG

HOLE NO.
MW-112R

CLIENT	CANADIAN NATIONAL	JOB NO.	14-0434-019
PROJECT	CN Homepayne Monitoring Well Replacement Program	GROUND ELEV.	325.55 m
		TOP OF CASING ELEV.	325.31 m
SITE	CN Homepayne Yard, East End	WATER ELEV.	323.35 m
LOCATION	335°, 2m from yellow post marking concrete underground Oil/Water Separator	DATE DRILLED	10/9/2014
DRILLING METHOD	100 mm ø Hollow Stem Auger, Acker SX Skidder Mounted Rig	UTMs (NAD83)	N 5,454,337 E 662,158

Cu TORVANE (kPa) ◆
SPT (N) blows/0.15 m ▲
20 40 60 80
FIELD HEADSPACE TEST
Photolonizable Vapours (ppm) ●
100 200 300 400

ELEV. (m)	DEPTH (m)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG/ BACKFILL	DEPTH (m)	SAMPLE TYPE NUMBER
324.94	0.5		SAND FILL - Brown, damp, loose, poorly graded, fine to medium grained, some fine to medium grained gravel, trace silt.		0.24	
	1.0		SILT - Grey, moist, soft, non plastic, trace clay, trace fine grained sand. - petroleum hydrocarbon staining and odour		0.85 1.15	
	1.5					
323.27	2.0					
	2.5		SAND - Grey, saturated, dense, poorly graded, fine grained, some silt. - petroleum hydrocarbon staining and odour - silt content decreased with depth			
322.37	3.0		- trace silt below 3.05 m			
	3.5		SILT - Brown to grey, wet, firm, non plastic. - clay lense (10 mm thick) at 3.35 m			
321.59	4.0		END OF BOREHOLE AT 3.96 m		3.96 4.19	
	4.5		Notes: 1. Monitoring well installed to a depth of 4.2 m with 3.0 m of screen. 2. Borehole backfilled with sand to 0.85 m, then bentonite to surface. 3. Monitoring well completed with a flush mount casing and protective steel vault.			
	5.0					
	5.5					
	6.0					
	6.5					
	7.0					
	7.5					
	8.0					
	8.5					
	9.0					
	9.5					
	10.0					

SAMPLE TYPE

CONTRACTOR	INSPECTOR	APPROVED	DATE	
Strata Drilling	G. CREWDSON		12/18/14	000773

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KGS GROUP

SUMMARY LOG

HOLE NO. **MW-114**

CLIENT CN ENGINEERING LINE OPERATION EAST

PROJECT CN HORNEPAYNE YARD DRILLING

SITE CN HORNEPAYNE YARD, EAST END

LOCATION 223°, 18 m from concrete lid on Manhole #1

DRILLING METHOD 105 mm ø Hollow Stem Auger, 25 mm ø Split Spoon, ACKER SX

JOB NO. 00-434-08

GROUND ELEV. 325.45 m, Geodetic

TOP OF PVC ELEV. 325.41 m

WATER ELEV. 322.41 m, 26/05/00

DATE DRILLED 12/05/00

ELEV. (m)	DEPTH (m)	DESCRIPTION AND CLASSIFICATION
324.54	0.0	SAND FILL - Black, moist, loose, poorly graded, fine to medium grained, and fine grained, subangular gravel.
323.93	1.0	SILTY SAND - Grey, moist, loose, poorly graded, fine grained, and silt, with oxidation.
323.16	2.0	GRAVEL AND SAND - Grey, damp to moist, fine to coarse grained gravel and fine to medium grained sand.
322.40	3.0	SAND - Grey to brown, moist, loose, poorly graded, fine grained. -sand and fine grained gravel below 2.45 m
321.18	4.0	GRAVEL - Saturated, petroleum hydrocarbon staining and odour, with oily sheen on water. -some cobbles below 3.8 m
	5.0	AUGER REFUSAL ON POSSIBLE BOULDER @ 4.27 m
	6.0	Note: 1. Well flush mounted to grade.

DEPTH (m)	SAMPLE TYPE	NUMBER	RECOVERY %
0.04			
0.07			
0.24			
0.54		1	
		2	
		3	40
		4	40
		5	30
		6	10
4.15			
4.27			

FIELD HEADSPACE TEST

Photoionizable Vapours (ppm)

500 1000 1500 2000

PIEZ. LOG

SAMPLE TYPE AUGER GRAB SPLIT BARREL

CONTRACTOR INSPECTOR APPROVED DATE

000774

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KGS GROUP

SUMMARY LOG

HOLE NO. **MW-115** SHEET 1 of 1

CLIENT CN ENGINEERING LINE OPERATION EAST

PROJECT CN HORNEPAYNE YARD DRILLING

SITE CN HORNEPAYNE YARD, EAST END

LOCATION 56°, 14 m from Manhole #1

DRILLING METHOD 105 mm ø Hollow Stem Auger, 25 mm ø Split Spoon, ACKER SX

JOB NO.	00-434-08
GROUND ELEV.	325.97 m, Geodetic
TOP OF PVC ELEV.	325.93 m
WATER ELEV.	323.54 m, 26/05/00
DATE DRILLED	12/05/00

ELEV. (m) | DEPTH (m) | GRAPHICS | DESCRIPTION AND CLASSIFICATION | PIEZ LOG | DEPTH (m) | SAMPLE TYPE | NUMBER | RECOVERY % | FIELD HEADSPACE TEST — Photoionizable Vapours (ppm) ●

SILT - Brown, dry to damp, friable, non plastic, trace clay, trace fine grained sand

1.0

- olive colour, no sand below 1.5 m
- moist to wet between 1.5 and 2.3 m

2.0

- saturated below 2.3 m
- silt and fine grained sand lense (50 mm thick) at 2.45 m

322.92 3.0

SILT AND SAND - Olive colour, saturated, fine grained sand with oxidation

322.16

4.0

SAND - Brown, saturated, loose, poorly graded, fine to medium grained

321.40

END OF HOLE @ 4.57 m

Note:

1. Well flush mounted to grade

5.0

6.0

KGS GROUP — SUMMARY LOG

HOLE NO. **MW119** — SHEET 1 of 1

CLIENT	CN CORPORATE ENVIRONMENT EAST	JOB NO.	01-434-07
PROJECT	ENVIRONMENTAL INVESTIGATION	GROUND ELEV.	327.76 m, Geodetic
SITE	HORNEPAYNE YARD	TOP OF PVC ELEV.	327.64 m
LOCATION	7.5 m S of OW8-2 and 3.5 m W of OW8-2	WATER ELEV.	323.72 m, 22/08/01
DRILLING METHOD	125 mm ø Solid Stem Auger, Acker SX Drill Rig	DATE DRILLED	26/07/01

ELEV. (m)	DEPTH (m)	DESCRIPTION AND CLASSIFICATION	PIEZ LOG/ BACKFILL DEPTH (m)	SAMPLE TYPE	NUMBER
326.85		SAND AND GRAVEL FILL - Brown, damp, loose, poorly graded, fine grained sand, and fine to coarse grained, subangular gavel.		Auger grab	1
326.09		SILTY SAND - Brown, moist to wet, loose, poorly graded, fine to medium grained, some silt, trace fine to coarse grained, subangular gravel. -occ. cobbles at 1.2 m	1.22, 1.52	Auger grab	2
325.33		SILT - Grey, damp, dense, non plastic, trace fine grained sand and fine grained, subangular gravel.		Auger grab	3
324.72		SILTY SAND - Grey, damp, dense, poorly graded, fine grained, some fine grained gravel.		Auger grab	4
324.56		PEAT - Black, moist to wet, compact, some wood fragments.			
323.50		SILTY SAND - Grey, moist to wet, dense, poorly graded, medium to coarse grained, some silt, some fine to medium grained gravel. -trace clay between 3.35 and 3.8 m -compact below 3.35 m	3.86	Auger grab	5
321.67	6.0	SILT - Grey, wet, dense, non plastic, trace fine grained sand.	5.49, 6.10	Auger grab	6, 7, 8
		END OF HOLE @ 6.1 m Note: 1. Well flush mounted to grade.			

FIELD HEADSPACE TEST — Photoionizable Vapours (ppm) ● 500 1000 1500 2000

FIELD SOIL TEST (PETROFLAG) — Diesel Fuel (ppm) ○ 1000 2000 3000 4000

SAMPLE TYPE: AUGER GRAB

CONTRACTOR: Paddock Drilling Ltd — INSPECTOR: D. B. KASUR — APPROVED — DATE 16/05/02

PCURS_FT_M 0143407.GPJ

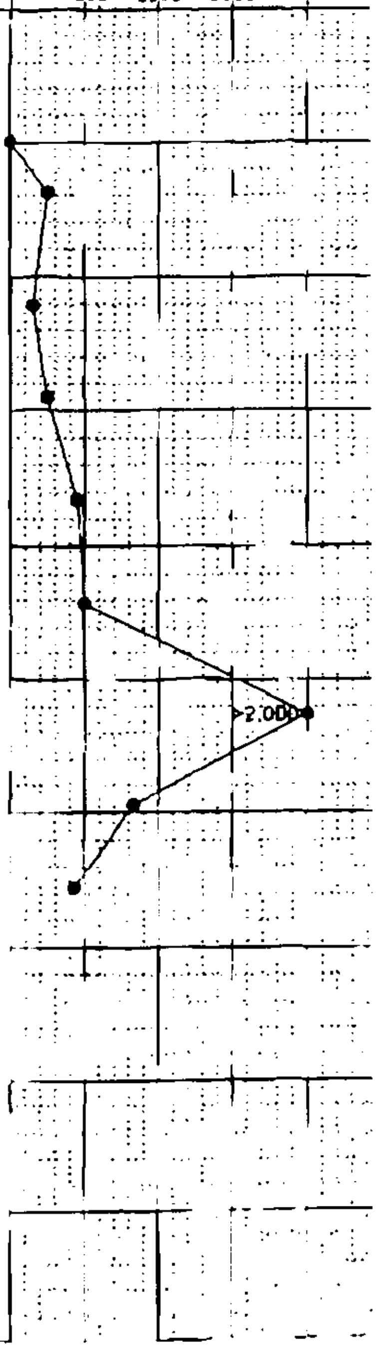
KGS GROUP

SUMMARY LOG

HOLE NO. **MW120** SHEET 1 of 1

CLIENT	CN CORPORATE ENVIRONMENT EAST	JOB NO.	01-434-07
PROJECT	ENVIRONMENTAL INVESTIGATION	GROUND ELEV.	327.40 m, Geodetic
SITE	HORNEPAYNE YARD	TOP OF PVC ELEV.	327.33 m
LOCATION	Halfway between Ends of Concrete Pad, 2 Tracks South of Fuelling Stand	WATER ELEV.	324.14 m, 22/08/01
DRILLING METHOD	125 mm ø Solid Stem Auger, Acker SX Drill Rig	DATE DRILLED	26/07/01

ELEV. (m)	DEPTH (m)	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG/ BACKFILL DEPTH (m)	SAMPLE NUMBER
	0.0 – 1.22	SAND AND GRAVEL FILL - Brown, moist, loose, fine to coarse grained sand, and medium to coarse grained, subangular gavel. -occ. cobbles at 0.45 m -damp between 0.6 and 0.9 m -wet below 0.9 m	0.20 0.30 1.07	1
326.18	1.22 – 3.05	SILT WITH GRAVEL - Brown, moist, dense, non plastic, with fine to medium grained gravel, trace fine grained sand. -dark grey between 2.0 and 2.9 m -grey, moist to wet below 2.9 m -petroleum hydrocarbon odour		2, 3, 4
324.35	3.05 – 5.79	SAND - Grey, wet, compact, poorly graded, medium to coarse grained, some medium to coarse grained gravel, some silt. -grey and black petroleum hydrocarbon staining and sheen at 3.8 m -trace organic matter at 4.9 m	4.27	5, 6, 7
321.61	5.79 – 6.70	SILT - Grey, wet, compact, non plastic, trace fine grained sand.	6.71	8, 9
320.70	6.70	END OF HOLE @ 6.7 m Note: 1. Well flush mounted to grade.		



SAMPLE TYPE: AUGER GRAB

CONTRACTOR: Paddock Drilling Ltd.

INSPECTOR: D. B. KASUR

APPROVED

DATE 16

000777

APOURS_FT_M 0143407.GPJ

KGS GROUP

SUMMARY LOG

HOLE NO. **MW121** SHEET 1 of 1

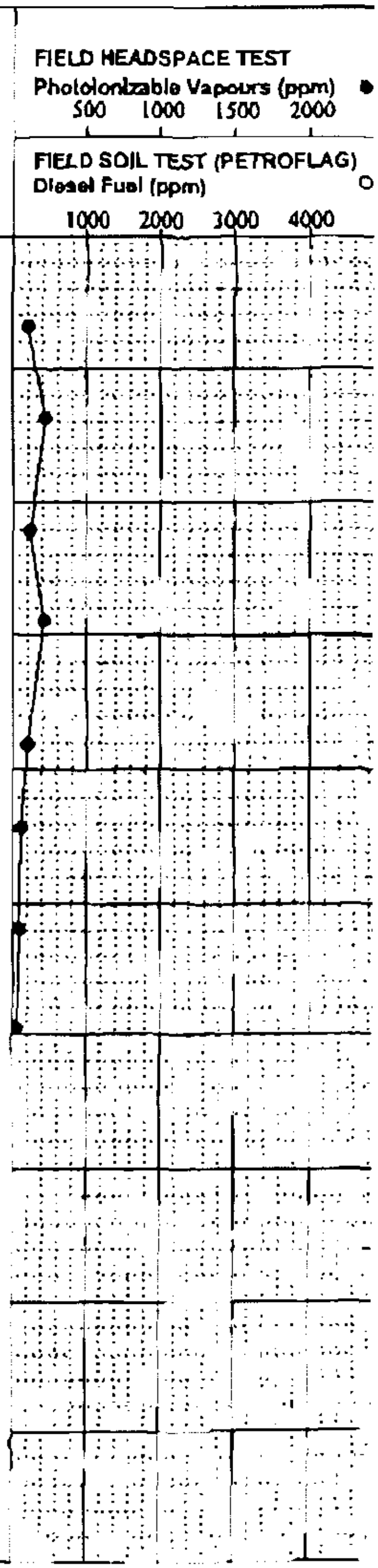
CLIENT	CN CORPORATE ENVIRONMENT EAST
PROJECT	ENVIRONMENTAL INVESTIGATION
SITE	HORNEPAYNE YARD
LOCATION	1.5 m S and 20 m E of SE Corner of Fuelling Stand Concrete Pad
DRILLING METHOD	125 mm ø Solid Stem Auger, Acker SX Drill Rig
JOB NO.	01-434-07
GROUND ELEV.	327.45 m, Geodetic
TOP OF PVC ELEV.	327.31 m
WATER ELEV.	323.31 m, 22/08/01
DATE DRILLED	26/07/01

ELEV. (m)	DEPTH (m)	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG/ BACKFILL DEPTH (m)	SAMPLE TYPE	NUMBER
	0.0	SAND AND GRAVEL FILL - Brown, damp, compact, poorly graded, fine to medium grained sand, and medium to coarse grained, subangular gavel, some silt, trace cobbles.	0.46 0.81	Auger grab	1
		-moist to wet, petroleum hydrocarbon odour at 0.9 m			
326.08		SILT - Grey, moist, dense, non plastic, some fine grained sand and gravel. -brown, damp between 1.5 and 2.45 m -very dense below 1.5 m		Auger grab	2
				Auger grab	3
		-grey, moist to wet, petroleum hydrocarbon odour below 2.45 m		Auger grab	4
324.25		PEAT - Dark brown, wet, dense, some wood fragments.			
323.79		INTERLAYERED SILTY SAND AND SANDY SILT - Grey, moist to wet, compact, interlayered sandy silt and medium to coarse grained sand, with fine to coarse grained gravel, layers 50-125 mm thick.		Auger grab	5
323.03		PEAT - Dark brown, wet, dense, some wood fragments.		Auger grab	6
322.88		SILT - Grey, wet, dense, non plastic, trace fine grained sand, traces of clay.	5.18		
322.27		SILTY SAND - Grey, wet, loose, poorly graded, medium to coarse grained, some silt, trace fine to medium grained gravel.		Auger grab	7
321.35	6.0		6.10	Auger grab	8

END OF HOLE @ 6.1 m

Note:
1. Well flush mounted to grade.

Depth scale (m): 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 4.5, 5.0, 5.5, 6.0, 6.5, 7.0, 7.5, 8.0, 8.5, 9.0, 9.5



SAMPLE TYPE [AUGER GRAB symbol] AUGER GRAB

CONTRACTOR Paddock Drilling Ltd. INSPECTOR D. B. KASUR APPROVED DATE 16

KGS GROUP

SUMMARY LOG

HOLE NO. **MW122**

SHEET 1 of 1

CLIENT CN CORPORATE ENVIRONMENT EAST

PROJECT ENVIRONMENTAL INVESTIGATION

SITE HORNEPAYNE YARD

LOCATION 1.5 m N of N Track and 1.25 m W of SE Corner of Concrete Pad Fuelling Stand

DRILLING METHOD 125 mm ø Solid Stem Auger, Acker SX Drill Rig

JOB NO. 01-434-07

GROUND ELEV. 327.45 m, Geodetic

TOP OF PVC ELEV. 327.34 m

WATER ELEV. 324.17 m, 22/08/01

DATE DRILLED 26/07/01

ELEV. (m)	DEPTH (m)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG/ BACKFILL	DEPTH (m)	SAMPLE TYPE NUMBER
	0.5		SAND AND GRAVEL FILL - Brown, moist, compact, poorly graded, medium to coarse grained sand, and fine to medium grained gravel.		0.15	1
	1.0		-some wood fragments at 0.6 m		0.30	
325.92	1.5		SAND - Brown, moist to wet, loose, poorly graded, medium to coarse grained, some fine to medium grained gravel, some silt.			2
	2.0		-grey, wet, trace silt below 2.0 m			
	2.5		-trace liquid petroleum hydrocarbon sheen at 2.0 m		2.44	3
	3.0					4
324.09	3.5		PEAT - Dark brown, wet, dense, some wood fragments.			
323.48	4.0		SAND - Grey, wet, compact, poorly graded, medium to coarse grained, trace fine to medium grained gravel, trace silt, trace grey petroleum hydrocarbon staining.			5
322.87	4.5		-liquid petroleum hydrocarbon sheen			6
	5.0		SILTY SAND - Grey, wet, loose, poorly graded, fine grained.		4.88	7
	5.5					
321.35	6.0				6.10	8
	6.5		END OF HOLE @ 6.1 m			
	7.0		Note: 1. Well flush mounted to grade.			
	7.5					
	8.0					
	8.5					
	9.0					
	9.5					

FIELD HEADSPACE TEST
Photoionizable Vapours (ppm) ●
500 1000 1500 2000

FIELD SOIL TEST (PETROFLAG)
Diesel Fuel (ppm) O
1000 2000 3000 4000

SAMPLE TYPE AUGER GRAB

CONTRACTOR Paddock Drilling Ltd.

INSPECTOR D. B. KASUR

APPROVED

DATE 16

000779

VAPOURS_FT_M 01434D1.GPJ

KGS GROUP

SUMMARY LOG

HOLE NO. **MW123**

SHEET 1 of

CLIENT CN CORPORATE ENVIRONMENT EAST

PROJECT ENVIRONMENTAL INVESTIGATION

SITE HORNEPAYNE YARD

LOCATION 1.5 m S of 2nd Post on Fence and 0.5 m E of OW8-1

DRILLING METHOD 125 mm ø Solid Stem Auger, Acker SX Drill Rig

JOB NO. 01-434-07

GROUND ELEV. 327.40 m, Geodetic

TOP OF PVC ELEV. 327.31 m

WATER ELEV. 323.23 m, 22/08/01

DATE DRILLED 26/07/01

ELEV. (m)	DEPTH (m)	DESCRIPTION AND CLASSIFICATION	DEPTH (m)
	0.5	SAND AND GRAVEL FILL - Brown, moist, dense, poorly graded, fine to medium grained sand, and medium to coarse grained, subangular gravel.	0.15
326.33	1.0		0.91
	1.5	SAND - Dark brown, damp, compact, poorly graded, fine grained, trace fine to medium grained gravel, some organics to 1.4 m depth. -grey below 1.4 m	
325.57	2.0	SILT - Grey, damp, dense, non plastic, trace fine grained sand.	
	2.5	-brown below 2.45 m	
324.35	3.0	SILTY SAND - Grey, moist to wet, dense, poorly graded, medium to coarse grained, some silt, some fine to medium grained gravel.	
	3.5	-wet, black petroleum hydrocarbon staining, trace sheen below 3.5 m	
323.43	4.0	PEAT - Dark brown, moist to wet, compact, some wood fragments.	
	4.5		
322.37	5.0	SILT - Grey, wet, dense, non plastic, trace fine grained sand, petroleum hydrocarbon staining.	4.88
	5.5		
321.60	6.0	SAND - Grey, wet, compact, poorly graded, medium to coarse grained, trace fine grained gravel, trace silt, petroleum hydrocarbon staining.	6.10
320.69	6.5		
	7.0	SILT - Grey, wet, dense, non plastic, trace fine to medium grained gravel.	
319.78	7.5		7.62
	8.0	END OF HOLE @ 7.62 m	
	8.5	Note: 1. Well flush mounted to grade.	
	9.0		
	9.5		

PIEZ. LOG/ BACKFILL

SAMPLE TYPE NUMBER: 1 2 3 4 5 6 7 8 9 10

FIELD HEADSPACE TEST
Photolonizable Vapours (ppm)
500 1000 1500 2000

FIELD SOIL TEST (PETROFLAG)
Diesel Fuel (ppm)
1000 2000 3000 4000

SAMPLE TYPE AUGER GRAB

CONTRACTOR Paddock Drilling Ltd.

INSPECTOR D. B. KASUR

APPROVED

DATE

000780

\HOURS_FT M 01-434-07.GPJ

KGS GROUP

SUMMARY LOG

HOLE NO.
MW-123R

CLIENT	CANADIAN NATIONAL
PROJECT	CN Hornepayne Monitoring Well Replacement Program
SITE	CN Hornepayne Yard, West End
LOCATION	1.5m S of 2nd Post on Fence and 0.5m E of OW8-1
DRILLING METHOD	100 mm ø Hollow Stem Auger, Acker SX Skidder Mounted Rig

JOB NO.	14-0434-019
GROUND ELEV.	327.37 m
TOP OF CASING ELEV.	327.05 m
WATER ELEV.	324.00 m
DATE DRILLED	9/9/2014
UTMs (NAD83)	N 5,456,114 E 660,380

ELEV. (m)	DEPTH (m)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG/ BACKFILL	DEPTH (m)	SAMPLE TYPE NUMBER
	0.5		SAND AND GRAVEL FILL - Brown, moist, dense, poorly graded, fine to medium grained sand and medium to coarse grained subangular gravel.		0.32	
326.31	1.0		SAND -Dark brown, damp, compact, poorly graded, fine grained, trace fine to medium grained gravel, some organics to 1.4 m depth. - grey below 1.4 m			
325.55	2.0		SILT - Grey, damp, dense, non plastic, trace fine grained sand.		2.12	
	2.5		- brown below 2.45 m		2.42	
324.32	3.0		SILTY SAND - Grey, moist to wet, dense, poorly graded, medium to coarse grained, some silt, some fine to medium grained gravel.			
	3.5		- wet, black petroleum hydrocarbon staining, trace sheen below 3.5 m			
323.41	4.0		PEAT - Dark brown, moist to wet, compact, some wood fragments.			
	4.5					
322.34	5.0		SILT - Grey, wet, dense, non plastic, trace fine grained sand, petroleum hydrocarbon staining.		5.18	
322.19			END OF BOREHOLE AT 5.18 m		5.47	
	5.5					
	6.0		Notes: 1. Monitoring well installed to a depth of 5.5 m with 3.0 m of screen. 2. Borehole backfilled with sand to 2.1 m, then bentonite to surface. 3. Monitoring well completed with a flush mount casing and protective steel vault.			
	6.5					
	7.0					
	7.5					
	8.0					
	8.5					
	9.0					
	9.5					
	10.0					

Cu TORVANE (kPa) ◆
SPT (N) blows/0.15 m ▲
20 40 60 80
FIELD HEADSPACE TEST
Photolonizable Vapours (ppm) ●
100 200 300 400

SAMPLE TYPE

CONTRACTOR	INSPECTOR	APPROVED	DATE	
Strata Drilling	G. CREWDSON		12/18/14	000781

ENVIRO & GEO P:\PROJECTS\2014\14-0434-019\GENERAL\DOCS\SOIL LOGS\THL HORNEPAYNE REPLACEMENT WELL LOGS 11-17-2014 LBP.GPJ

KGS GROUP

SUMMARY LOG

HOLE NO. **MW124**

CLIENT CN CORPORATE ENVIRONMENT EAST

PROJECT ENVIRONMENTAL INVESTIGATION

SITE HORNEPAYNE YARD

LOCATION 41 m E of OW3-2, 23.5 m E of small Hydro Post and Light, 0.5 m from Rail

DRILLING METHOD 125 mm ø Solid Stem Auger, Acker SX Drill Rig

JOB NO. 01-434-07

GROUND ELEV. 325.97 m, Geodetic

TOP OF PVC ELEV. 325.79 m

WATER ELEV. 323.06 m, 09/10/01

DATE DRILLED 27/07/01

ELEV. (m)	DEPTH (m)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ LOG/ BACKFILL	DEPTH (m)	SAMPLE TYPE NUMBER
325.36	0.5		SAND AND GRAVEL FILL - Brown, damp, dense, poorly graded, medium to coarse grained sand, and medium to coarse grained, subangular gravel.		0.46	
			SILT - Brown, moist, compact, non plastic, trace fine grained sand.		0.61	1
	1.0					
	1.5		-wet below 1.5 m -compact to dense between 1.5 and 3.5 m			2
	2.0					
	2.5		-sand lense (25 mm thick), fine to medium grained, wet, loose at 2.15 m			3
	3.0					4
	3.5		-dense, trace sand seams (1-5 mm thick), trace oxidation below 3.5 m			
	4.0					5
	4.5		-trace clay below 4.25 m		4.57	6
	5.0				5.18	
	5.5					7
	6.0					8
	6.5					
	7.0					9
318.35	7.5				7.62	10
			END OF HOLE @ 7.62 m			
	8.0		Note: 1. Well flush mounted to grade.			
	8.5					
	9.0					
	9.5					

FIELD HEADSPACE TEST
Photoionizable Vapours (ppm) ●
500 1000 1500 2000

FIELD SOIL TEST (PETROFLAG)
Diesel Fuel (ppm) ○
1000 2000 3000 4000

SAMPLE TYPE ⊞ AUGER GRAB

CONTRACTOR Paddock Drilling Ltd.

INSPECTOR D. B. KASUR

APPROVED _____ DATE _____

000782

APOURS.FT M 01-434-07.GPJ

KGS GROUP

SUMMARY LOG

HOLE NO.
MW-124R

CLIENT	CANADIAN NATIONAL	JOB NO.	14-0434-019
PROJECT	CN Hornepayne Monitoring Well Replacement Program	GROUND ELEV.	325.42 m
		TOP OF CASING ELEV.	325.20 m
SITE	CN Hornepayne Yard, Former Shop Track Area	WATER ELEV.	321.81 m
LOCATION	41m E of OW3-2, 23.5m E of small Hydro Post and Light, 0.5m from Rail	DATE DRILLED	10/9/2014
DRILLING METHOD	100 mm ø Hollow Stem Auger, Acker SX Skidder Mounted Rig	UTMs (NAD83)	N 5,454,331 E 662,158

Cu TORVANE (kPa) ◆
SPT (N) blows/0.15 m ▲
20 40 60 80
FIELD HEADSPACE TEST
Photoionizable Vapours (ppm) ●
100 200 300 400

ELEV. (m)	DEPTH (m)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG/ BACKFILL	DEPTH (m)	SAMPLE TYPE	NUMBER
324.81	0.5		SAND AND GRAVEL FILL - Brown, damp, dense, poorly graded, medium to coarse grained sand, and medium to coarse grained subangular gravel.		0.22		
			SILT - Brown, moist, compact, non plastic, trace fine grained sand.		0.62		
	1.0				0.92		
	1.5		- wet below 1.5 m				
	2.0		- compact to dense between 1.5 and 3.5 m				
	2.5		- sand lense (25 mm thick), fine to medium grained, wet, loose at 2.15 m				
	3.0						
▼	3.5		- dense, trace sand seams (1-5 mm thick), trace oxidation below 3.5 m				
321.46	4.0		END OF BOREHOLE AT 3.96 m		3.96 3.97		
	4.5						
	5.0						
	5.5						
	6.0						
	6.5						
	7.0						
	7.5						
	8.0						
	8.5						
	9.0						
	9.5						
	10.0						

Notes:

1. Monitoring well installed at a depth of 4.0 m with 3.0 m of screen
2. Borehole backfilled with sand to 0.62 m, then bentonite to surface
3. Monitoring well completed with a flush mount casing and protective steel vault.

SAMPLE TYPE

CONTRACTOR	INSPECTOR	APPROVED	DATE	
Strata Drilling	G. CREWDSON		12/18/14	000783

ENVIRO & GEO PROJECTS\2014\14-0434-019\GENERAL\DOCS\SOIL LOGS\THL_HORNEPAYNE REPLACEMENT WELL LOGS_11-17-2014.LBP.GPJ

KGS GROUP

SUMMARY LOG

HOLE NO. **MW125**

CLIENT CN CORPORATE ENVIRONMENT EAST

PROJECT ENVIRONMENTAL INVESTIGATION

SITE HORNEPAYNE YARD

LOCATION 10 m E of MW110, 3.5 m S of Rail

DRILLING METHOD 125 mm ø Solid Stem Auger, Acker SX Drill Rig

JOB NO. 01-434-07

GROUND ELEV. 326.08 m, Geodetic

TOP OF PVC ELEV. 325.86 m

WATER ELEV. 321.52 m, 09/10/01

DATE DRILLED 27/07/01

ELEV. (m)	DEPTH (m)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG/ BACKFILL	DEPTH (m)	SAMPLE TYPE NUMBER
325.31	0.5		SAND AND GRAVEL FILL - Brown, damp, dense, poorly graded, medium to coarse grained sand, and medium to coarse grained, subangular gravel.		0.46 0.61	
	1.0		SILT - Grey, moist, compact to dense, non plastic, trace fine grained sand, some grey and black petroleum hydrocarbon staining.			1
	1.5		-wet below 1.5 m			
	2.0		-silty clay layer (50 mm thick), low plasticity, soft at 2.3 m			2
	2.5		-trace oxidation at 2.45 m			
	3.0					
	3.5		-brown between 3.5 and 5.35 m -dense between 3.5 and 6.7 m		3.66	3
	4.0		-silty clay layer (25 mm thick), intermediate plasticity, soft at 3.65 m			
	4.5				4.57	
	5.0					
	5.5		-grey below 5.35 m			4
	6.0					
	6.5					
	7.0		-loose to compact, some fine grained sand between 6.7 and 7.3 m			5
318.46	7.5		-dense, trace sand below 7.3 m		7.62	
	8.0		END OF HOLE @ 7.62 m Note: 1. Well flush mounted to grade.			
	8.5					
	9.0					
	9.5					

FIELD HEADSPACE TEST
Photoionizable Vapours (ppm) ●
500 1000 1500 2000

FIELD SOIL TEST (PETROFLAG)
Diesel Fuel (ppm) C
1000 2000 3000 4000

SAMPLE TYPE AUGER GRAB

CONTRACTOR Paddock Drilling Ltd.

INSPECTOR D. B. KASUR

APPROVED _____ DATE _____

000784

KGS GROUP

SUMMARY LOG

HOLE NO. **MW-125R**

CLIENT	CANADIAN NATIONAL	JOB NO.	14-0434-019
PROJECT	CN Hornepayne Monitoring Well Replacement Program	GROUND ELEV.	325.67 m
		TOP OF CASING ELEV.	325.44 m
SITE	CN Hornepayne Yard, Former Shop Track Area	WATER ELEV.	324.72 m
LOCATION	10 m East of MW-110, 3.5 m South of Rail	DATE DRILLED	10/9/2014
DRILLING METHOD	100 mm ø Hollow Stem Auger, Acker SX Skidder Mounted Rig	UTMs (NAD83)	N 5,454,303 E 662,142

ELEV. (m)	DEPTH (m)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG/ BACKFILL	DEPTH (m)	SAMPLE TYPE NUMBER
	0.5		SAND AND GRAVEL FILL - Brown, damp, dense, poorly graded, medium to coarse grained sand, medium to coarse grained, subangular gravel.		0.22 0.42	
324.91 ▼					0.72	
	1.0		SILT - Grey, moist, compact to dense, low plasticity, trace fine grained sand, some grey and black petroleum hydrocarbon staining.			
	1.5		- wet below 1.5 m			
	2.0					
	2.5		- silty clay layer (50 mm thick), low plasticity, soft at 2.3 m - trace oxidation at 2.45 m			
	3.0					
	3.5					
	4.0		- brown between 3.5 and 4.26 m - dense between 3.5 and 4.26 m - silty clay layer (25 mm thick), intermediate plasticity, soft at 3.65 m		3.77	
321.41			END OF BOREHOLE AT 4.26 m		4.26	
	4.5					
	5.0		Notes: 1. Monitoring well installed at a depth of 3.8 m with 3.0 m of screen. 2. Borehole backfilled with sand to 0.42 m, then bentonite to surface. 3. Monitoring well completed with a flush mount casing and protective steel vault.			
	5.5					
	6.0					
	6.5					
	7.0					
	7.5					
	8.0					
	8.5					
	9.0					
	9.5					
	10.0					

Cu TORVANE (kPa) ◆
SPT (N) blows/0.15 m ▲
20 40 60 80
FIELD HEADSPACE TEST
Photoionizable Vapours (ppm) ●
100 200 300 400

SAMPLE TYPE

CONTRACTOR Strata Drilling

INSPECTOR G. CREWDSON

APPROVED

DATE 12/18/14

000785

ENVIRO & GEO P:\PROJECTS\2014\14-0434-019\GENERAL\DOCS\SOIL LOGS\THL_HORNEPAYNE REPLACEMENT WELL LOGS_11-17-2014_LBP.GPJ

KGS GROUP

SUMMARY LOG

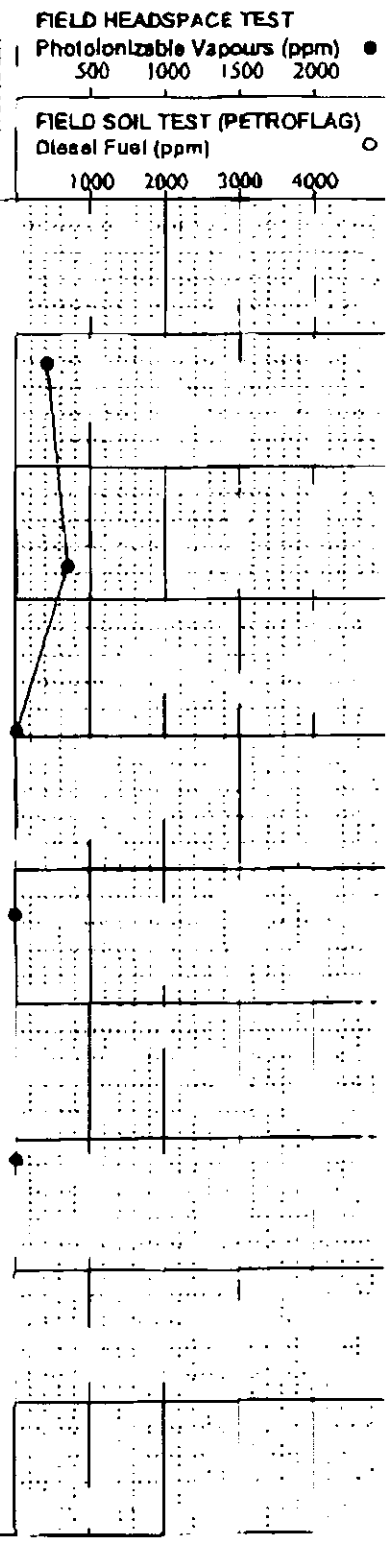
HOLE NO. **MW126**

CLIENT	CN CORPORATE ENVIRONMENT EAST	JOB NO.	01-434-07
PROJECT	ENVIRONMENTAL INVESTIGATION	GROUND ELEV.	325.98 m, Geodetic
SITE	HORNEPAYNE YARD	TOP OF PVC ELEV.	325.82 m
LOCATION	2 m North of NW Corner of Concrete Pad	WATER ELEV.	320.77 m, 09/10/01
DRILLING METHOD	125 mm ø Solid Stem Auger, Acker SX Drill Rig	DATE DRILLED	27/07/01

ELEV. (m)	DEPTH (m)	DESCRIPTION AND CLASSIFICATION	PIEZ LOG/ BACKFILL DEPTH (m)	SAMPLE TYPE / NUMBER
325.06	0.0 – 0.92	SAND AND GRAVEL FILL - Brown, damp, loose, poorly graded, fine to medium grained sand, and medium to coarse grained, subangular gravel. -black between 0.45 and 0.53 m -brown between 0.53 and 0.84 m -black below 0.84 m	0.46 0.61	
324.30	0.92 – 1.68	SILT - Grey, moist, compact, non plastic, trace fine grained sand. -wet, trace wood fragments, some black petroleum hydrocarbon staining and sheen at 1.05 m -dark brown below 1.45 m		1
322.93	1.68 – 3.05	SAND - Grey, wet, loose, poorly graded, fine grained, trace silt, some silt lenses (20-50 mm thick) to 2.6 m depth. -stained grey, some petroleum hydrocarbon sheen below 2.6 m		2
318.36	3.05 – 7.62	SILT - Grey, wet, dense, non plastic. -silty clay lense (75 mm thick), intermediate plasticity, soft at 3.95 m -brown, trace oxidation between 4.05 and 6.25 m -compact, some fine grained sand below 6.1 m -gray below 6.25 m	5.18 7.62	3 4 5

END OF HOLE @ 7.62 m

Note:
1. Well flush mounted to grade.



SAMPLE TYPE [symbol] AUGER GRAB

CONTRACTOR Paddock Drilling Ltd. INSPECTOR D. B. KASUR APPROVED DATE 16

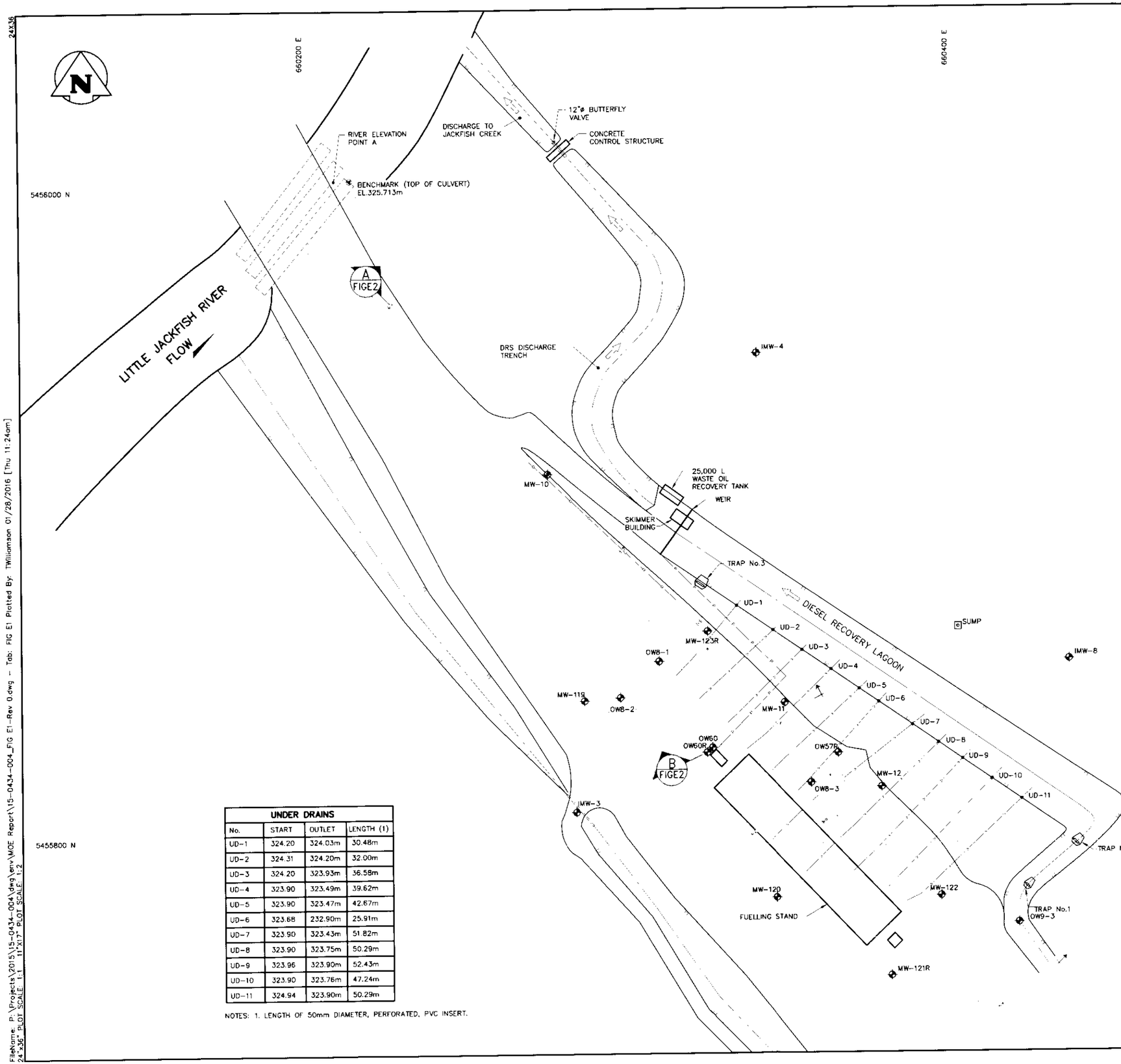
000786

APOURS_F1 M 0143407.GPJ

APPENDIX E

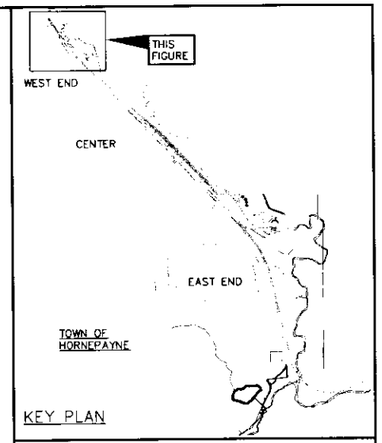
STRATIGRAPHIC CROSS SECTIONS

24X36



UNDER DRAINS			
No.	START	OUTLET	LENGTH (1)
UD-1	324.20	324.03m	30.48m
UD-2	324.31	324.20m	32.00m
UD-3	324.20	323.93m	36.58m
UD-4	323.90	323.49m	39.62m
UD-5	323.90	323.47m	42.67m
UD-6	323.68	232.90m	25.91m
UD-7	323.90	323.43m	51.82m
UD-8	323.90	323.75m	50.29m
UD-9	323.96	323.90m	52.43m
UD-10	323.90	323.76m	47.24m
UD-11	324.94	323.90m	50.29m

NOTES: 1. LENGTH OF 50mm DIAMETER, PERFORATED, PVC INSERT.



LEGEND:

- BERM
- CENTERLINE OF DITCH
- FENCE
- BURIED ELECTRICAL CABLE
- BENCHMARK
- MW-119 — MONITORING WELL (INSTALLED BY KGS) (MW101-MW133, MW140-MW147)
- MW-10 — MONITORING WELL (INSTALLED BY OTHERS) (ALL OTHER WELLS)
- MW-121R — REPLACEMENT MONITORING WELL (INSTALLED BY KGS - 2014)
- RW8-1 — RECOVERY WELL
- SUMP — SUMP WELL
- RAILROAD TRACKS
- UNDERGROUND DRAIN
- DESTROYED
- B FIGE2 — CROSS SECTION LOCATION AND REFERENCE

NOTES:

1. SITE PLAN BASED ON AUTOCAD FILE PROVIDED BY CN.

0 12 24 36 48 60m

SCALE: 1:600 METRIC 24"x36"
1:1200 METRIC 11"x17"

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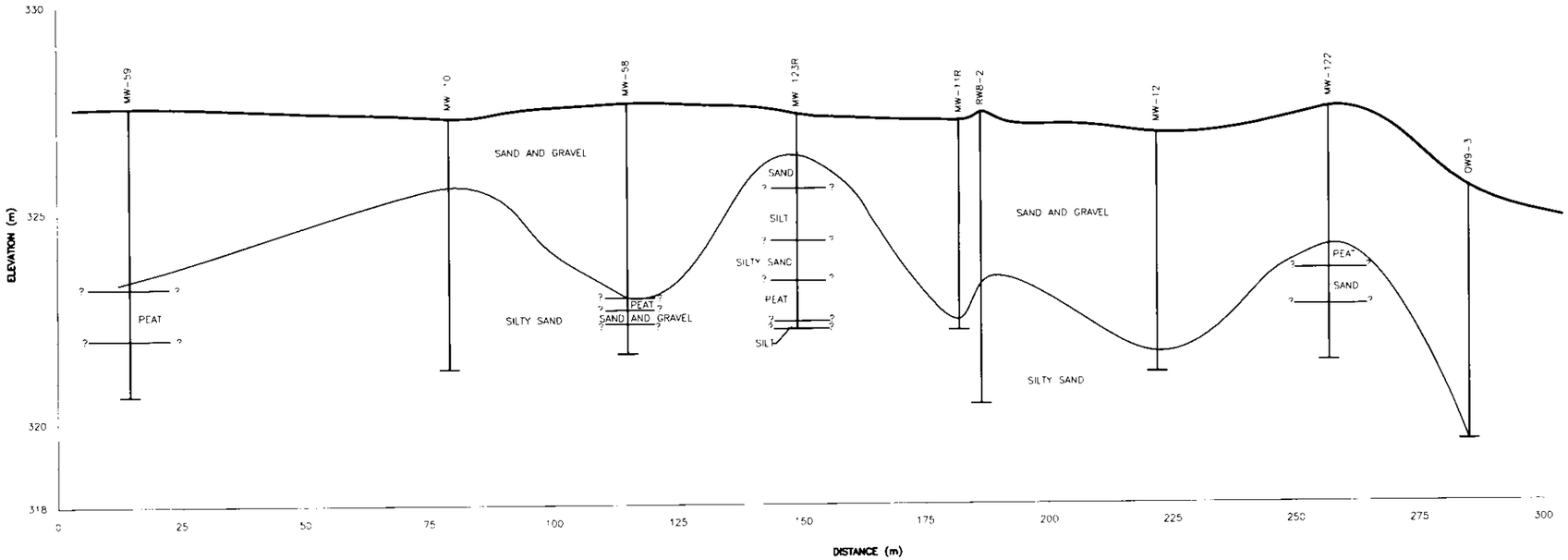
PIN# 1000/ONPR/100587
HORNEPAYNE YARD, ON

STRATIGRAPHIC CROSS SECTION
REFERENCE - WEST END

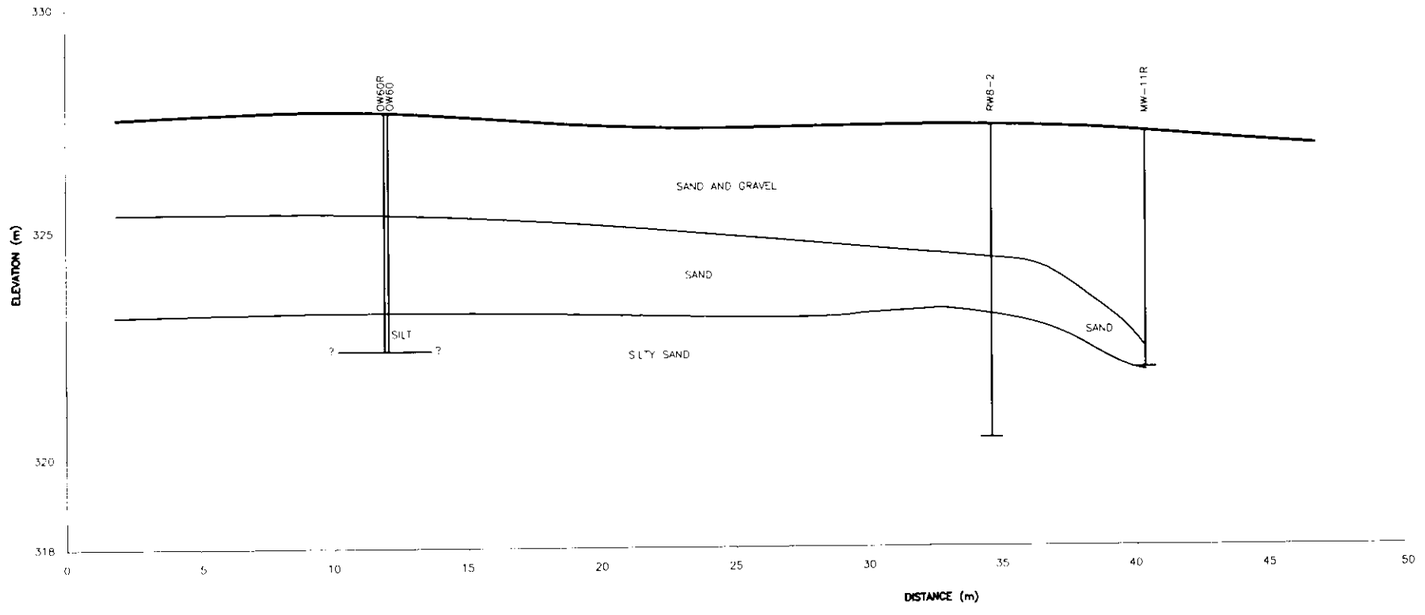
JANUARY 2016 | FIGURE E1 | 0

FileName: P:\Projects\2015\15-0434-004\dwg\env\MOE Report\15-0434-004_FIG E1-Rev 0.dwg - Tab: FIG E1 Plotted By: TWilliamson 01/28/2016 [Thu 11:24am]
24"x36" PLOT SCALE: 1:1 11"x17" PLOT SCALE: 1:2



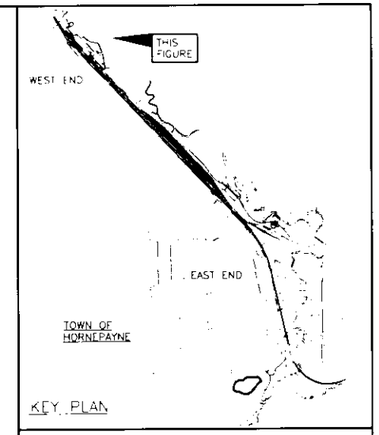
A/E1 SECTION

SECTION A – CROSS SECTION (NORTH TO SOUTH)



B/E1 SECTION

SECTION B – CROSS SECTION (WEST TO EAST)



LEGEND:

MONITORING WELL OFFSET DISTANCE FROM CROSS SECTION A:

MW-59 = 0.0m
MW-10 = 3.5m WEST
MW-58 = 3.8m WEST
MW-123R = 3.0m WEST
MW-11R = 2.0m EAST
RWB-2 = 7.0m WEST
MW-12 = 0.0m
MW-122 = 10.7m WEST
OW9-3 = 0.0m

MONITORING WELL OFFSET DISTANCE FROM CROSS SECTION B:

OW-60R = 0.0m
OW-60 = 0.0m
RWB-2 = 3.2 m SOUTH
MW-11R = 3.2m NORTH

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STRATIGRAPHIC CROSS SECTIONS
WEST END

JANUARY 2016 | FIGURE E2 | 0

FileName: P:\Projects\2015\15-0434-004\dwg\env\MOE Report\15-0434-004_FIG E2-Rev 0.dwg Tab: FIG D2 Plotted By: TWilliamson 01/28/2016 [Thu 11:26am]
24"x36" PLOT SCALE: 1:1
11"x17" PLOT SCALE: 1:2
24X36
000789

662000 E

662200 E

5454200 N

OUTLET – LAGOON NO. 2
EFFLUENT SAMPLING LOCATION
900 mmø CMP

OIL/WATER SEPARATOR

OWS BUILDING

OW5-3

WASTE OIL TANK

COMPRESSOR BUILDING

PW-3 (NM)

OW5-2

PW-7 (NM)

PW-8 (NM)

PW-4 (NM)

PW-6 (NM)

PW-2 (NM)

MW-2

OW5-4

REMEDIAL SYSTEM DISCHARGE OUTLET

CONCRETE MANHOLE

PW-5 (NM)

PW-9 (NM)

900 mmø CSP "L" PIPE

OW5-1

LITTLE JACKFISH RIVER

MW-104

LAGOON #2

MW-40

PW-10 (NM)

MW-52

INLET 2
STORM WATER DISCHARGE
330 mmø STEEL PIPE

INTERCEPTION TRENCH SUMP

MW-102

OW5-6

ROUNDHOUSE DISCHARGE
900 mmø CMP

MW-43

MW-101

B
FIGE4

MW-46

MW-20

MW-103

MW-106

DITCH

MW-107

SOIL CONTAINMENT CELL

MW-51

RAMP

MW-108

A
FIGE4

WASTE OIL TRANSFER FACILITY
FIGURE 5

MW-109

MW-115

MW-49

MW-50

MW-114

OW3-2

SHOP TRACK LNAPL COLLECTION SYSTEM
FIGURE 5

MW-126

MW-112R

MW-124R

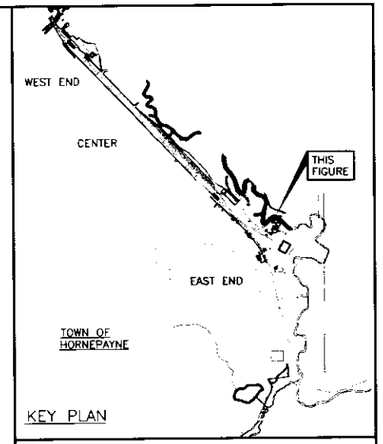
MW-110R

MW-125R

FROM ROUNDHOUSE

MW-24

ROUNDHOUSE



KEY PLAN

LEGEND

- RAILROAD TRACK
- CULVERT
- CENTERLINE OF DITCH
- SANITARY SEWER
- STORM SEWER
- FENCE
- DISCHARGE LINE
- TREES/ SHRUBS
- MANHOLES
- SURFACE WATER FLOW DIRECTION
- MW-52 MONITORING WELL (INSTALLED BY KGS) (MW101–MW133, MW140–MW147)
- MW-20 MONITORING WELL (INSTALLED BY OTHERS) (ALL OTHER WELLS)
- MW-112R REPLACEMENT MONITORING WELL (INSTALLED BY KGS 2014)
- PW-1 PUMPING WELL
- DESTROYED
- B FIGE4 CROSS SECTION LOCATION AND REFERENCE

NOTE:

1. REFERENCE JACQUES WHITFORD ENVIRONMENTAL LIMITED PROJECT 31004, DRAWING NO. 2, 1996.

0 10 20 30 40 50m

SCALE: 1:500 METRIC 24"x36"
1:1000 METRIC 11"x17"

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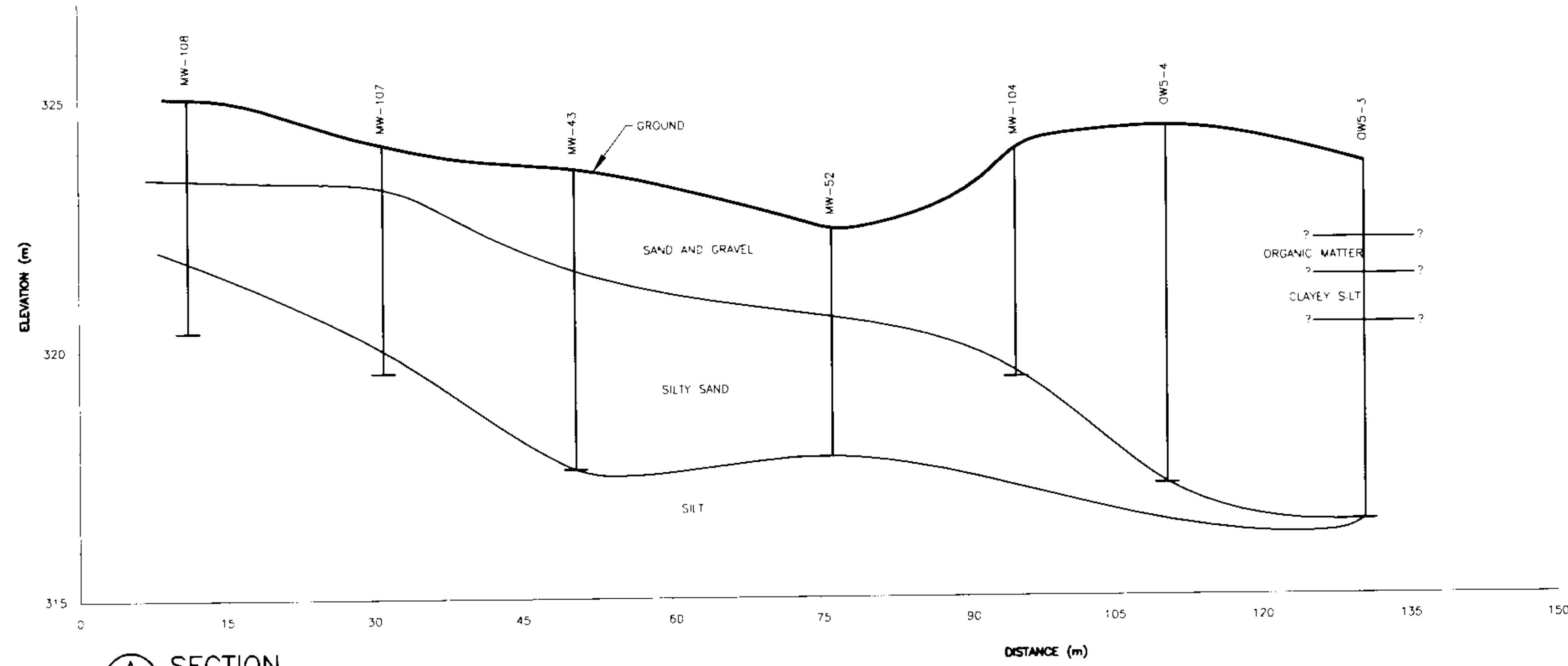
STRATIGRAPHIC CROSS SECTION
REFERENCE – LAGOON No.2

JANUARY 2016 | FIGURE E3 | REV. 0

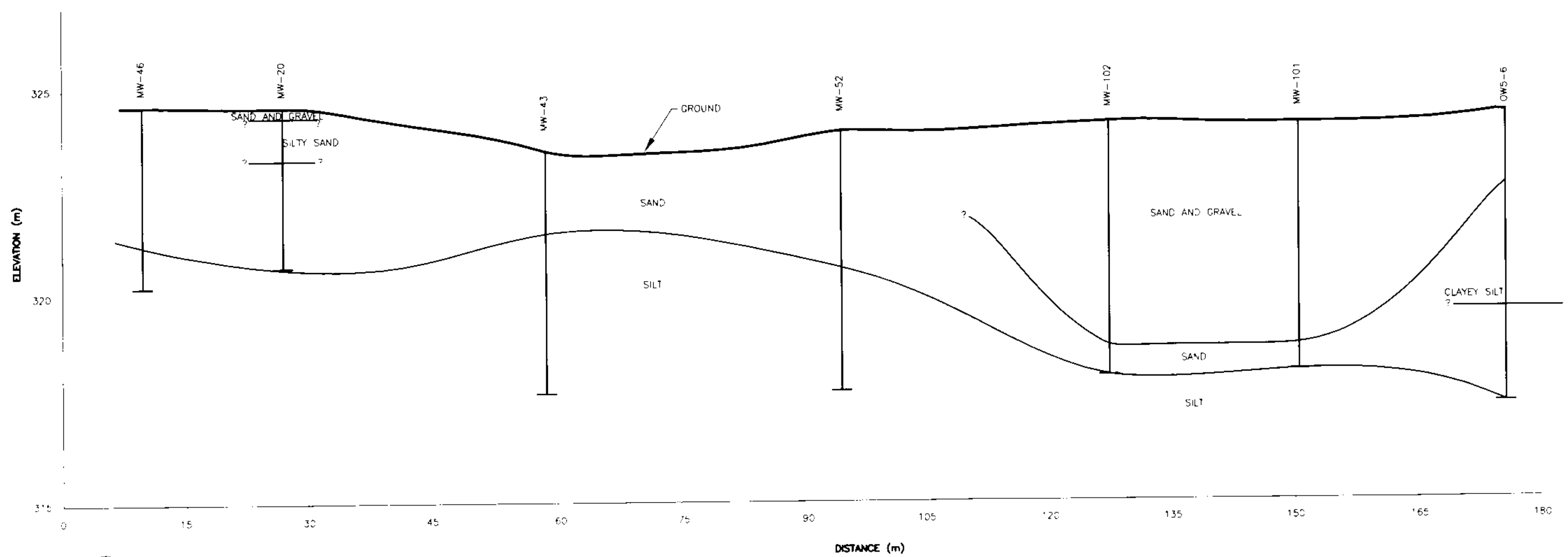
FileName: P:\Projects\2015\15-0434-004\dwg\env\MOE Report\15-0434-004_FIG E3-Rev 0.dwg – Tab: FIG E3 Plotted By: TWilliamson 01/28/2016 [Thu 11:27am]
24"x36" PLOT SCALE: 1:1 11"x17" PLOT SCALE: 1:2

000790



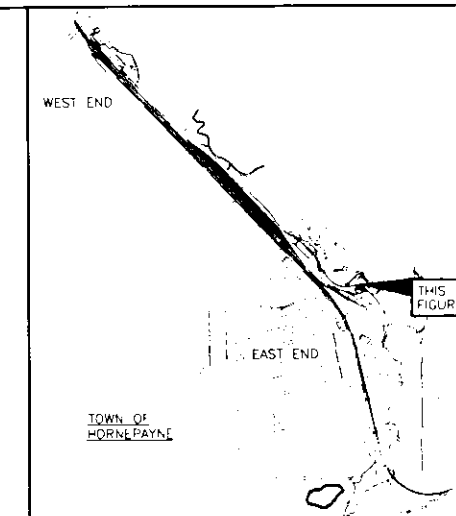
(A/E3) SECTION

SECTION A – CROSS SECTION (NORTH TO SOUTH)



(B/E3) SECTION

SECTION B – CROSS SECTION (WEST TO EAST)



KEY PLAN

LEGEND:

MONITORING WELL OFFSET DISTANCE FROM CROSS SECTION A

MW-108 = 0.0m
MW-107 = 7.4m EAST
MW-43 = 16.7m WEST
MW-52 – 10m EAST
MW-104 = 12.6m EAST
OW5-4 = 0.0m
OW5-3 = 0.0m

MONITORING WELL OFFSET DISTANCE FROM CROSS SECTION B

MW-46 = 0.0m
MW-20 = 3.6m SOUTH
MW-43 = 5.0m NORTH
MW-52 = 11.0m NORTH
MW-102 = 6.6m NORTH
MW-101 = 10.3m SOUTH
OW5-6 = 0.0m

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STRATIGRAPHIC CROSS SECTIONS
LAGOON No.2

JANUARY 2016 | FIGURE E4 | 0

FileName: P:\Projects\2015\15-0434_004\dwg\env\MOE Report\15-0434-004_FIG E4-Rev 0.dwg – Tab: FIG E4 Plotted By: TWilliamson 01/28/2016 [Thu 11:29am]
24"x36" PLOT SCALE: 1:1 11"x17" PLOT SCALE: 1:2

24X36

000791