2014/2015 MONITORING AND MAINTENANCE PROGRAM
UPPER TRINITY SOUTH (NEW HARBOUR) WASTE DISPOSAL SITE
NEW HARBOUR BARRENS, NEWFOUNDLAND AND LABRADOR

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EXECUTIVE SUMMARY

Conestoga-Rovers & Associates (CRA) was retained by the Newfoundland and Labrador Department of Environment and Conservation (ENVC) to complete the 2014/15 Monitoring and Maintenance Program at the Upper Trinity South (New Harbour) Waste Disposal Site (Site) located on the New Harbour Barrens (Route 73), Newfoundland and Labrador (NL).

The scope of work involved groundwater and surface water sampling, as well as the inspection of monitor wells and the leachate control system. The 2014/15 Site sampling event was conducted in November 2014.

The waste disposal Site is located south of Route 73 on the New Harbour Barrens and operated as a domestic waste disposal Facility (Facility) from the early 1970s until November 2009. The facility accepted waste from the communities of Blaketown, Dildo, Green's Harbour, Hopeall, Markland, Whitbourne, New Harbour, Old Shop, and South Dildo. Historically, the Site also accepted waste from the Towns of Bay Roberts and Cupids.

The facility was also used for the disposal of scrap metal including vehicles and bulk household items. Waste also included fat, seal pelt trim, sawdust, and sludge from a local seal processing plant. In addition, low-level polychlorinated biphenyl (PCB) impacted scrap metal and transformer casings were disposed on the northwest area of the facility from 1992 to 1995.

CRA understands the waste disposal Site is unlined; however, interception ditches and a leachate collection pond were constructed between 2006 and 2007 to help manage potential leachate impacts. In addition, seven monitor wells were installed around the waste disposal Site to monitor potential leachate impacts and one monitor well was installed upgradient of the waste disposal Site to monitor background analyte concentrations. In addition, one monitor well was installed in 2013/14 to replace MW-05, which had heavy silting present.

Recent maintenance activities at the Site in 2011 and 2012 included compaction and grading as well as the placement of an interim cover consisting of locally available fill to facilitate consolidation and settling of the municipal solid waste. Based on information provided by ENVC, a final soil cover was placed over the entire Site along with an engineered liner system over the PCB impacted area during closure activities in 2013.

E.1 2014/15 MONITORING AND MAINTENANCE SUMMARY

E.1.1 GROUNDWATER

Seven groundwater samples were collected from the on-Site monitor wells during the November 2014 sampling event plus one field duplicate. Another groundwater sample was collected from an off-Site monitor well intended to demonstrate background analyte concentrations from the upgradient sample location.

A review of the historical groundwater analytical data that included the November 2014 sampling event confirmed PCB and metals concentrations have been within the applicable MOE Guidelines for Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition since the December 2010 sampling event.

Based on the historical metals exceedances reported in groundwater, CRA recommend that all monitor wells continue to be sampled and analyzed for metals during future monitoring activities at the Site. In addition, CRA recommend that PCBs continue to be monitored due to the confirmed presence of PCB containing soil in the unlined waste disposal Site.

E.1.2 SURFACE WATER

Surface water sampling was intended to characterize leachate from the Site's leachate collection pond, assess potential leachate infiltration into the nearby surface water by sampling a stream directly down-gradient, and assess background analyte concentrations of the surface water in the stream by sampling at a new upgradient location for the first time. Two of the surface water locations are located down-gradient (southwest) of the waste disposal Site while a third surface water location is located up-gradient (northeast) of the waste disposal Site and Route 73. All three surface water samples were submitted for analysis of PCBs, general chemistry, and metals that included mercury.

A review of the historical surface water analytical data that included the November 2014 sampling event confirmed metals and general chemistry analytes were often within the CCME CWQGs for FAL, where available. Guidelines for PCBs in surface water are not available; however, all surface water samples from the collection pond and downgradient stream location have reported PCB concentrations as non-detectable.

Aluminum concentrations in the collection pond reported exceedances during four sampling events up to and including December 2011; however, the latest three sampling events reported Aluminum concentrations below the CCME CWQGs for FAL. In addition, Copper concentrations in the collection pond reported exceedances in seven sampling events up November 2012 and again in November 2014; however, the August 2013 sampling event reported a Copper concentration below the CCME CWQGs for FAL. Finally, Iron concentrations in the collection pond reported exceedances in the six sampling events up November 2012 and again in November 2014; however, the August 2013 sampling event reported an Iron concentration below the CCME CWQGs for FAL.

In comparison, Aluminum concentrations in the downgradient stream sample reported exceedances in three sampling events up to December 2011 and again in November 2014; however, the November 2012 and August 2013 sampling events reported Aluminum concentrations as below the CCME CWQG for FAL. The background surface water sample collected from the upgradient stream sample location also reported an Aluminium exceedance of the CCME CWQGs for FAL in the November 2014 sampling event. Copper concentrations in the downgradient stream only reported exceedances in the May 2008 and January 2010 sampling events; however, four sampling events since November 2010 reported Copper concentrations below the CCME CWQGs for FAL. Iron concentration in the downgradient stream only reported two exceedances from the May 2008 and November 2014 sampling events while all other sampling events reported Iron concentrations below the CCME CWQGs for FAL. Finally, Lead concentrations in the downgradient stream reported only one Lead exceedance in the November 2014 sampling event while all other sampling events reported Lead concentrations below the CCME CWQGs for FAL.

Nitrite concentrations in the collection pond reported exceedances in all sampling events up to November 2012; however, Nitrite was not segregated from the combined Nitrite and Nitrate analysis during the August 2013 sampling event. In comparison, Nitrite concentrations in the downgradient stream only reported exceedances in the May 2008 as well as the January and November 2010 sampling events while all other sampling events reported Nitrite concentrations below the CCME CWQG for FAL; as with the collection pond sample, Nitrite was not segregated from the combined Nitrite and Nitrate analysis during the August 2013 sampling event.

The measured pH in the downgradient stream only reported two measurements in the January 2010 and November 2014 sampling events that were outside the range for the CCME CWQG for FAL while all other collection pond and down-gradient stream surface water samples reported the pH measurement within the criterion. The

measured pH in the first background surface water sample collected from the up-gradient stream sample location reported a pH measurement in the November 2014 sampling event was also outside the range for the CCME CWGQs for FAL. Moderate to heavy rainfall was reported within the 24 hour period before the November 2014 sampling event that is suspect to have increased the acidity of the local surface water conditions. In addition, the high concentration of salts reported in the settling pond likely contributed to neutralizing the acidity of the background surface water entering the Site while the downgradient stream sample was influenced by other surface water within the catchment area of the Site that again decreased pH.

Based on the current and historical exceedances reported in surface water at the three sampling locations, CRA recommend the monitoring program be continued at the upgradient, on-Site settling pond, and downgradient locations with analysis to PCBs, metals, and general chemistry during future monitoring activities at the Site.

E.1.3 INSPECTION OF MONITOR WELLS AND LEACHATE CONTROL SYSTEM

During the November 2014 Site visit, CRA conducted an inspection of the monitor wells that were observed to be in satisfactory condition and accessible; however, silt was observed in the groundwater of the newly installed MW-05A. A second monitor well was observed as being partially damaged with the top of the PVC casing cracked with the top of the casing approximately 200 mm below the top of the steel stick-up casing. Finally, one monitor well was observed to be heavily corroded where the steel cover is fastened to the steel stick-up. CRA recommends that silted well should be developed or purged as much as possible prior to sampling in 2015, that the top of the PVC casing to should be extended to allow for improved measurements in relation to the top of casing, and that the corroded hinged steel cover stick-up be repaired or replaced during the next sampling event.

The leachate ditch system and collection pond were observed to be in good condition with no signs of blockages or erosion that would interfere with the proper flow of leachate to the collection pond.

Signs of erosion were evident around the landfill cover and rip rap, but were otherwise observed to be in good condition with no signs of deterioration from differential settlement. CRA recommends the landfill cover area that was washed out should be filled, re-graded, and hydro-seeded during the summer/fall months of 2015 to prevent further erosion of the area.

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1.0 INTRODUCTION

Conestoga-Rovers & Associates (CRA) was retained by the Newfoundland and Labrador Department of Environment and Conservation (ENVC) to complete the 2014/15 Monitoring and Maintenance Program at the Upper Trinity South (New Harbour) Waste Disposal Site (Site) located on the New Harbour Barrens, Newfoundland and Labrador (NL). A Site Location Map is shown on Figure 1.

The scope of work involved groundwater and surface water sampling, as well as the inspection of monitor wells and the leachate control system. The 2014/15 Site sampling event was conducted in November 2014.

2.0 SITE DESCRIPTION

The waste disposal Site is located south of Route 73 on the New Harbour Barrens and operated as a domestic waste disposal facility (Facility) from the early 1970s until November 2009. The facility accepted waste from the Communities of Blaketown, Dildo, Green's Harbour, Hopeall, Markland, Whitbourne, New Harbour, Old Shop, and South Dildo. Historically, the Site also accepted waste from the Towns of Bay Roberts and Cupids.

The Facility was also used for the disposal of scrap metal including vehicles and bulk household items. Waste also included fat, seal pelt trim, sawdust, and sludge from a local seal processing plant. In addition, low-level polychlorinated biphenyl (PCB) impacted scrap metal and transformer casings were disposed on the northwest area of the Facility from 1992 to 1995.

CRA understands the waste disposal Site is unlined; however, interception ditches and a leachate collection pond were constructed between 2006 and 2007 to help manage potential leachate impacts. In addition, seven monitor wells (MW-01 to MW-07) were installed around the waste disposal Site to monitor potential leachate impacts and one monitor well (MW-08) was installed upgradient of the waste disposal Site to monitor background analyte concentrations. One monitor well was installed in 2013/14 (MW-05A) to replace MW-05, which was damaged and reported as having heavy siltation.

Recent maintenance activities at the Site in 2011 and 2012 included compaction and grading as well as the placement of an interim cover consisting of locally available fill to facilitate consolidation and settling of the municipal solid waste. Based on information provided by ENVC, a final soil cover was placed over the entire Site along with an engineered cap liner system over the PCB impacted area during closure activities in 2013.

The area surrounding the waste disposal Site is comprised mostly of undeveloped vacant forest with numerous wetlands (bogs, ponds, streams, etc.).

3.0 METHODOLOGY

3.1 GROUNDWATER SAMPLING

On November 27, 2014, static water levels were measured using an electronic product/water interface probe at the on-Site and off-Site monitor wells (Table 1). The monitor wells were then developed, allowed to recover, and sampled using dedicated, disposable bailers. Seven groundwater samples were collected from the on-Site monitor wells (MW-01 to MW-04, MW-05A, and MW-06 to MW-07) during the sampling event, including one field duplicate (MW-DUP02) from MW-06. Another groundwater sample was collected from the off-Site monitor well (MW-08) intended to demonstrate background analyte concentrations from the upgradient sample location.

All groundwater samples collected from the existing monitor wells were submitted for analysis of metals, including mercury, and PCBs. Groundwater samples were submitted to Maxxam Analytics Inc. (Maxxam) in Bedford, Nova Scotia (NS) for analysis. GPS co-ordinates for the monitor wells are included in Table 2.

3.2 SURFACE WATER SAMPLING

Surface water sampling was intended to characterize leachate from the Site's leachate collection pond (SW-POND), assess potential leachate infiltration into the nearby surface water by sampling a stream directly down-gradient (SW-STREAM), and assess background analyte concentrations of the surface water in the stream by sampling at an upgradient location (SW-UPSTREAM). Two of the surface water locations (SW-POND and SW-STREAM) are located down-gradient (southwest) of the waste disposal site while the surface water location (SW-UPSTREAM) is located up-gradient (northeast) of the waste disposal site. All three surface water samples were submitted for analysis of PCBs, general chemistry, and metals that included mercury. All surface water samples were submitted to Maxxam in Bedford, NS for analysis.

3.3 INSPECTION OF MONITOR WELLS AND LEACHATE CONTROL SYSTEM

An inspection of the monitor wells and leachate control system was completed during the Site visit in November 2014 that assessed the following:

- Damage to monitor wells, including potential collapse
- Condition of leachate ditch system and collection pond (specifically blockage)
- Condition of the rip rap

4.0 GUIDELINE FRAMEWORK

4.1 GROUNDWATER

PCBs and metals (including mercury) concentrations in groundwater were assessed in relation to the Ontario Ministry of the Environment (MOE) "Soil, Ground Water, and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act" dated April 15, 2011, Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition.

4.2 SURFACE WATER

PCBs, metals (including mercury), and general chemistry concentrations in surface water were evaluated in relation to the Canadian Council of Ministers of the Environment (CCME) Canadian Water Quality Guidelines (CWQGs) for the Protection of Aquatic Life (Freshwater or FAL). The FAL were from the Canadian Environmental Quality Guidelines (Update 7.0, Online 2013).

5.0 ANALYTICAL RESULTS

Analytical results from the November 2014 sampling event are summarized below. Sample locations in the immediate area of the Site are shown on Figure 3 while sample locations from the general area, including background and surface water, are shown on Figure 4. Laboratory Certificates of Analyses are included as Appendix B. Additional discussion is presented in Section 6 regarding historical analytical results in comparison to the November 2014 sampling event.

5.1 GROUNDWATER

One background groundwater sample (MW-08) was collected from approximately 1.5 km northeast of the Site, which was submitted for analysis of PCBs and metals, including mercury. In addition, seven groundwater samples (MW-01 to MW-04, MW-05A, and MW-06 to MW-07) were collected from monitor wells around the Site, all of which were also submitted for analysis of PCBs and metals, including mercury.

5.1.1 PCBs IN GROUNDWATER

Groundwater analytical results for PCBs from the background monitor well (MW-08) and the seven monitor wells (MW-01 to MW-04, MW-05A, and MW-06 to MW-07) around the Site reported non-detectable concentrations, which were also below the applicable guidelines.

In addition, one field duplicate (MW-DUP02) collected from MW-06 also reported non-detectable PCB concentrations consistent with the original sample results.

Laboratory analytical results for PCBs in groundwater are presented in Table 3.

5.1.2 METALS IN GROUNDWATER

Groundwater analytical results for metals from the background monitor well (MW-08) and the seven monitor wells (MW-01 to MW-04, MW-05A, and MW-06 to MW-07) around the Site reported metals concentrations as below the applicable guidelines. Substantially higher concentrations of calcium, potassium, and sodium were noted in the monitor wells downgradient from Route 73 compared to the background monitor well that was upgradient from Route 73. The increased levels of these analytes are likely

associated with the application of road salt on Route 73 that has infiltrated the groundwater.

In addition, one field duplicate (MW-DUP02) collected from MW-06 reported metals concentrations consistent with the original sample results.

Laboratory analytical results for metals in groundwater are presented in Table 4.

5.2 SURFACE WATER

One background surface water sample (SW-UPSTREAM) was collected from approximately 300 metres northeast of the Site to assess background analyte concentrations of the surface water in the stream by sampling at an upgradient location, which was submitted for analysis of PCBs, general chemistry, and metals that included mercury. One surface water sample (SW-POND) was collected from the on-Site settling pond to characterize the leachate, which was submitted for analysis of PCBs, general chemistry, and metals that included mercury. One surface water sample (SW-STREAM) was also collected from a stream downgradient from the settling pond to assess the potential affects to the nearby ecological receptor, which was submitted for analysis of PCBs, general chemistry, and metals that included mercury. Surface water sample locations are shown on Figure 4 and the Laboratory Certificates of Analyses are included as Appendix B.

5.2.1 PCBs IN SURFACE WATER

Surface water analytical results for PCBs from the settling pond (SW-POND), the downgradient surface water sample (SW-STREAM), and the background upgradient surface water sample (SW-UPSTREAM) reported non-detectable concentrations. Note that CCME CWQGs (FAL) does not specify a criterion for PCBs in surface water.

Laboratory analytical results for PCBs in surface water are presented in Table 5.

5.2.2 METALS IN SURFACE WATER

Surface water analytical results for metals from the settling pond (SW-POND), the downgradient surface water sample (SW-STREAM), and the background upgradient surface water sample (SW-UPSTREAM) reported non-detectable concentrations for some of the analytes. Compared with the background upgradient stream sample results

(SW-UPSTREAM), the analytes typically reported higher concentrations in the settling pond and downgradient surface water samples (SW-POND and SW-STREAM). Aluminum was reported above the CCME CWQSs for FAL in the background upgradient (SW-UPSTREAM) and downgradient (SW-STREAM) stream surface water samples. Concentrations of Copper and Iron were reported above the CCME CWQSs for FAL in the settling pond surface water sample (SW-POND) while only Iron was noted to exceed the CCME CWQGs for FAL in the downgradient (SW-STREAM) stream surface water sample. In addition, Lead concentrations were reported as non-detectable in the background upgradient (SW-UPSTREAM) and settling pond surface water sample (SW-POND) while the downgradient surface water stream sample (SW-STREAM) reported a Lead concentration above the CCME CQWSs for FAL. Reportable concentrations for the remaining analytes were non-detectable and/or below the available CCME CWQGs for FAL. The elevated presence of Calcium, Potassium, and Sodium concentrations were reported in the surface water samples downgradient from Route 73 in the settling pond surface water sample (SW-POND) compared to the background surface water sample that was collected upgradient from Route 73; the increased levels of these analytes are likely associated with the application of road salt on Route 73 that infiltrated the surface water.

Laboratory analytical results for metals in surface water are summarized in Table 6.

5.2.3 GENERAL CHEMISTRY IN SURFACE WATER

Surface water analytical results for general chemistry from the up-gradient surface water sample (SW-UPSTREAM), on Site settling pond (SW-POND), and the downgradient surface water sample (SW-STREAM) typically reported analyte concentrations or measurements in the downgradient stream sample as below the settling pond sample and the upgradient stream sample as below the downgradient stream sample. The measured pH for the collection pond sample was within the CCME CWQGs for FAL range and the measured pH for the upgradient and down-gradient stream samples were outside the CCME CWQGs for FAL range.

Laboratory analytical results for general chemistry in surface water are summarized in Table 7.

6.0 DISCUSSION

Groundwater and surface water analytical data from the November 2014 sampling event were compared with historical analytical data to determine the potential for trends. Historical data from previous environmental assessment and/or monitoring is presented in Appendix C.

6.1 GROUNDWATER

A review of the historical groundwater analytical data that included the November 2014 sampling event confirmed PCB and metals concentrations have been within the applicable MOE Guidelines for Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition since the December 2010 sampling event. Groundwater data from the November 2014 sampling event was also noted to be consistent with the previous sampling event in August 2013.

Historical groundwater data for PCBs and metals, including the November 2014 sampling event, have been summarized in Tables C1 and C2, respectively, of Appendix C.

6.2 SURFACE WATER

A review of the historical surface water analytical data that included the November 2014 sampling event confirmed metals and general chemistry analytes were often within the CCME CWQGs for FAL, where available. Guidelines for PCBs in surface water are not available; however, all surface water samples from the collection pond and downgradient stream location have reported PCB concentrations as non-detectable. The background surface water sample collected from the upgradient stream location also reported PCB concentrations as non-detectable in November 2014.

Aluminum concentrations in the collection pond reported exceedances in the November 2007, September 2009, January 2010, and December 2011 sampling events; however, the November 2012, August 2013, and November 2014 sampling events reported Aluminum concentrations below the CCME CWQGs for FAL. In addition, Copper concentrations in the collection pond reported exceedances in the November 2007, January and September 2009, January and November 2010, December 2011, November 2012, and November 2014 sampling events; however, the August 2013 sampling event reported a Copper concentration below the CCME CWQGs

for FAL. Finally, Iron concentrations in the collection pond reported exceedances in the November 2007, May 2008, September 2009, January 2010, December 2011, November 2012, and November 2014 sampling events; however, the August 2013 sampling event reported an Iron concentration below the CCME CWQGs for FAL.

In comparison, Aluminum concentrations in the downgradient stream reported exceedances in the May 2008, January and November 2010, December 2011, and November 2014 sampling events; however, the November 2012 and August 2013 sampling events reported Aluminum concentrations as below the CCME CWQG for FAL. It is important to note that the background surface water sample collected from the upgradient stream sample location also reported an Aluminium exceedance of the CCME CWQGs for FAL in the November 2014 sampling event. In addition, Copper concentrations in the downgradient stream only reported exceedances in the May 2008 and January 2010 sampling events; however, the November 2010, December 2011, November 2012, August 2013, and November 2014 sampling events reported Copper concentrations below the CCME CWQGs for FAL. Also, an Iron concentration in the downgradient stream only reported two exceedances in the May 2008 and November 2014 sampling events while all other sampling events reported Iron concentrations below the CCME CWQGs for FAL. Finally, Lead concentrations in the downgradient stream reported only one Lead exceedance in the November 2014 sampling event while all other sampling events reported Lead concentrations below the CCME CWQGs for FAL.

Nitrite concentrations in the collection pond reported exceedances in all sampling events from November 2007 to November 2012; however, Nitrite was not segregated from the combined Nitrite and Nitrate analysis during the August 2013 sampling event. In comparison, Nitrite concentrations in the downgradient stream only reported exceedances in the May 2008 as well as the January and November 2010 sampling events while all other sampling events reported Nitrite concentrations below the CCME CWQG for FAL; as with the collection pond sample, Nitrite was not segregated from the combined Nitrite and Nitrate analysis during the August 2013 sampling event.

The measured pH in the downgradient stream only reported two measurements in the January 2010 and November 2014 sampling event that were outside the range for the CCME CWQG for FAL while all other collection pond and down-gradient stream surface water samples reported the pH measurement within the criterion. It is important to note that the measured pH in the background surface water sample collected from the up-gradient stream sample location reported a pH measurement in the November 2014 sampling event that was also outside the range for the CCME CWGQs for FAL. Moderate to heavy rainfall was reported within the 24 hour period

before the November 2014 sampling event that is suspect to have increased the acidity of the local surface water conditions. In addition, the high concentration of salts reported in the settling pond likely contributed to neutralizing the acidity of the background surface water entering the Site while the downgradient stream sample was influenced by other surface water within the catchment area of the Site.

Historical surface water data for PCBs, metals, and general chemistry, including the November 2014 sampling event, have been summarized in Tables C3 to C5, respectively, of Appendix C.

7.0 INSPECTION OF MONITOR WELLS AND LEACHATE CONTROL SYSTEM

During the November 2014 Site visit, CRA conducted an inspection of the monitor wells, leachate ditch system/collection pond, and rip rap.

All monitor wells were observed to be in satisfactory condition and accessible; however, the following issues were identified regarding the monitor wells:

- The replacement of MW-05 was completed after the August 2013 Site visit and was moved to a nearby location with new GPS co-ordinates being N5271451, E315670, UTM, Nad 83. During the November 2014 Site visit, the monitor well was sampled and observed to be in good condition; however, silt was observed in the groundwater.
- MW-06 was observed as being partially damaged with the top of the PVC casing cracked, the top of the casing was approximately 200 mm below the top of the steel stick-up casing. CRA recommends repairing the top of the PVC casing to allow for improved measurements in relation to the top of casing.
- MW-03 was observed as having the well cover partially damaged as the hinge connecting the steel cover to the steel stick up casing was heavily corroded.

The leachate ditch system and collection pond were observed to be in good condition with no sign of blockages or erosion that would interfere with the proper flow of leachate to the collection pond.

Signs of erosion were evident around the landfill cover and rip rap, but were otherwise observed to be in good condition with no signs of deterioration from differential settlement.

8.0 SUMMARY AND RECOMMENDATIONS

Conestoga-Rovers & Associates (CRA) was retained by the Newfoundland and Labrador Department of Environment and Conservation (ENVC) to complete the 2014/15 Monitoring and Maintenance Program at the Upper Trinity South (New Harbour) Waste Disposal Site (Site) located on the New Harbour Barrens (Route 73), Newfoundland and Labrador (NL).

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CRA understands the waste disposal Site is unlined; however, interception ditches and a leachate collection pond were constructed between 2006 and 2007 to help manage potential leachate impacts. In addition, seven monitor wells were installed around the waste disposal Site to monitor potential leachate impacts.

Recent Site maintenance activities in 2011 and 2012 included compaction and grading as well as the placement of an interim cover consisting of locally available fill to facilitate consolidation and settling of the municipal solid waste. Based on information provided by ENVC, a final soil cover was placed over the entire Site along with an engineered cap liner system over the PCB impacted area during closure activities in 2013.

8.1 GROUNDWATER

Seven groundwater samples were collected from the on-Site monitor wells during the November 2014 sampling event plus one field duplicate. Another groundwater sample was collected from an off-Site monitor well intended to demonstrate background analyte concentrations from the upgradient sample location.

A review of the historical groundwater analytical data that included the November 2014 sampling event confirmed PCB and metals concentrations have been within the applicable MOE Guidelines for Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition since the December 2010 sampling event.

Based on the historical metals exceedances reported in groundwater, CRA recommend that all monitor wells continue to be sampled and analyzed for metals during future monitoring activities at the Site. In addition, CRA recommend that PCBs continue to be monitored due to the confirmed presence of PCB containing soil in the unlined waste disposal Site.

8.2 SURFACE WATER

Surface water sampling was intended to characterize leachate from the Site's leachate collection pond, assess potential leachate infiltration into the nearby surface water by sampling a stream directly down-gradient, and assess background analyte concentrations of the surface water in the stream by sampling at a new upgradient location for the first time. Two of the surface water locations are located down-gradient (southwest) of the waste disposal Site while a third surface water location is located up-gradient (northeast) of the waste disposal Site and Route 73. All three surface water samples were submitted for analysis of PCBs, general chemistry, and metals that included mercury.

A review of the historical surface water analytical data that included the November 2014 sampling event confirmed metals and general chemistry analytes were often within the CCME CWQGs for FAL, where available. Guidelines for PCBs in surface water are not available; however, all surface water samples from the collection pond and downgradient stream location have reported PCB concentrations as non-detectable.

Aluminum concentrations in the collection pond reported exceedances during four sampling events up to and including December 2011; however, the latest three sampling events reported Aluminum concentrations below the CCME CWQGs for FAL. In

addition, Copper concentrations in the collection pond reported exceedances in seven sampling events up November 2012 and again in November 2014; however, the August 2013 sampling event reported a Copper concentration below the CCME CWQGs for FAL. Finally, Iron concentrations in the collection pond reported exceedances in the six sampling events up November 2012 and again in November 2014; however, the August 2013 sampling event reported an Iron concentration below the CCME CWQGs for FAL.

In comparison, Aluminum concentrations in the downgradient stream sample reported exceedances in three sampling events up to December 2011 and again in November 2014; however, the November 2012 and August 2013 sampling events reported Aluminum concentrations as below the CCME CWQG for FAL. The background surface water sample collected from the upgradient stream sample location also reported an Aluminium exceedance of the CCME CWQGs for FAL in the November 2014 sampling event. Copper concentrations in the downgradient stream only reported exceedances in the May 2008 and January 2010 sampling events; however, four sampling events since November 2010 reported Copper concentrations below the CCME CWQGs for FAL. Iron concentration in the downgradient stream only reported two exceedances from the May 2008 and November 2014 sampling events while all other sampling events reported Iron concentrations below the CCME CWQGs for FAL. Finally, Lead concentrations in the downgradient stream reported only one Lead exceedance in the November 2014 sampling event while all other sampling events reported Lead concentrations below the CCME CWQGs for FAL.

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The measured pH in the downgradient stream only reported two measurements in the January 2010 and November 2014 sampling events that were outside the range for the CCME CWQG for FAL while all other collection pond and down-gradient stream surface water samples reported the pH measurement within the criterion. The measured pH in the first background surface water sample collected from the up-gradient stream sample location reported a pH measurement in the November 2014 sampling event was also outside the range for the CCME CWGQs for FAL. Moderate to

heavy rainfall was reported within the 24 hour period before the November 2014 sampling event that is suspect to have increased the acidity of the local surface water conditions. In addition, the high concentration of salts reported in the settling pond likely contributed to neutralizing the acidity of the background surface water entering the Site while the downgradient stream sample was influenced by other surface water within the catchment area of the Site that again decreased pH.

Based on the current and historical exceedances reported in surface water at the three sampling locations, CRA recommend the monitoring program be continued at the upgradient, on-Site settling pond, and downgradient locations with analysis to PCBs, metals, and general chemistry during future monitoring activities at the Site.

8.3 INSPECTION OF MONITOR WELLS AND LEACHATE CONTROL SYSTEM

During the November 2014 Site visit, CRA conducted an inspection of the monitor wells that were observed to be in satisfactory condition and accessible; however, silt was observed in the groundwater of the newly installed MW-05A. A second monitor well was observed as being partially damaged with the top of the PVC casing cracked with the top of the casing approximately 200 mm below the top of the steel stick-up casing. Finally, one monitor well was observed to be heavily corroded where the steel cover is fastened to the steel stick-up. CRA recommends that silted well should be developed or purged as much as possible prior to sampling in 2015, that the top of the PVC casing to should be extended to allow for improved measurements in relation to the top of casing, and that the corroded hinged steel cover stick-up be repaired or replaced during the next sampling event.

The leachate ditch system and collection pond were observed to be in good condition with no signs of blockages or erosion that would interfere with the proper flow of leachate to the collection pond.

Signs of erosion were evident around the landfill cover and rip rap, but were otherwise observed to be in good condition with no signs of deterioration from differential settlement. CRA recommends the landfill cover area that was washed out should be filled, re-graded, and hydro-seeded during the summer/fall months of 2015 to prevent further erosion of the area.

9.0 REFERENCES

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Ontario Ministry of the Environment, 2011. Rational for the Development of Soil and Groundwater Standards for use at Contaminated Sites in Ontario, Prepared by: Standards Development Branch, Ontario Ministry of the Environment, April 15, 2011.

Report entitled "*2013/2014 Monitoring and Maintenance Program, Upper Trinity South (New Harbour) Waste Disposal Site, New Harbour Barrens, Newfoundland and Labrador*" prepared by CRA for Newfoundland and Labrador Department of Environment and Conservation, dated January 2014.

Report entitled "*2012-2013 Annual Report of Activities, Upper Trinity South (New Harbour) Waste Disposal Site*" prepared by AMEC for Newfoundland and Labrador Department of Environment and Conservation, dated March 2013.

Report entitled "*Human Health and Ecological Risk Assessment of the PCB Area at the Upper Trinity South (New Harbour) Waste Disposal Site, New Harbour Barrens, Newfoundland and Labrador*" prepared by Dillon Consulting Limited for Newfoundland and Labrador Department of Environment and Conservation, dated July 2013.

Report entitled "*2011-2012 Annual Report of Activities, Upper Trinity South (New Harbour) Waste Disposal Site*" prepared by SNC Lavalin Inc. for Newfoundland and Labrador Department of Environment and Conservation, dated July 2012.

Report entitled "*2010-2011 Annual Report of Activities, Upper Trinity South (New Harbour) Waste Disposal Site*" prepared by AMEC for Newfoundland and Labrador Department of Environment and Conservation, dated March 2011.

Report entitled "*Removal of PCB Impacted Material, Upper Trinity South Waste Disposal Facility, New Harbour, NL*" prepared by AMEC for Newfoundland and Labrador Department of Environment and Conservation, dated January 2011.

Report entitled "*2009 Groundwater and Surface Water Sampling Program at the Upper Trinity South (New Harbour) Waste Disposal Site*" prepared by AMEC for Newfoundland and Labrador Department of Environment and Conservation, dated March 2009

Report entitled "*2008 Groundwater and Surface Water Sampling Program at the Upper Trinity South (New Harbour) Waste Disposal Site*" prepared by AMEC for Newfoundland and Labrador Department of Environment and Conservation, dated February 2009.

Report entitled *"2007 Groundwater and Surface Water Sampling Program at the Upper Trinity South (New Harbour) Waste Disposal Site"* prepared by AMEC for Newfoundland and Labrador Department of Environment and Conservation, dated March 2008.

Report entitled *"Upper Trinity South (New Harbour) Waste Disposal Site. Implementation of the Leachate Control System"* prepared by AMEC for Newfoundland and Labrador Department of Environment and Conservation, dated March 2007.

Report entitled *"Upper Trinity South (New Harbour) Waste Disposal Site. Design of Leachate Control System"* prepared by AMEC for Newfoundland and Labrador Department of Environment and Conservation, dated June 2006.

Report entitled *"2010 Annual Report of Activities, Upper Trinity South (New Harbour) Waste Disposal Site"* prepared by SNC Lavalin Inc. for Newfoundland and Labrador Department of Environment and Conservation, dated March 2010.

Report entitled *"Implementation of Previous Recommendations, Upper Trinity South (New Harbour) Waste Disposal Site"* prepared by SNC Lavalin Inc. for Newfoundland and Labrador Department of Environment and Conservation, dated May 2010.

10.0 CLOSURE

All of Which is Respectfully Submitted,

CONESTOGA-ROVERS & ASSOCIATES

Brian Luffman, P. Eng.

Jennifer Gabriel, B.Sc.

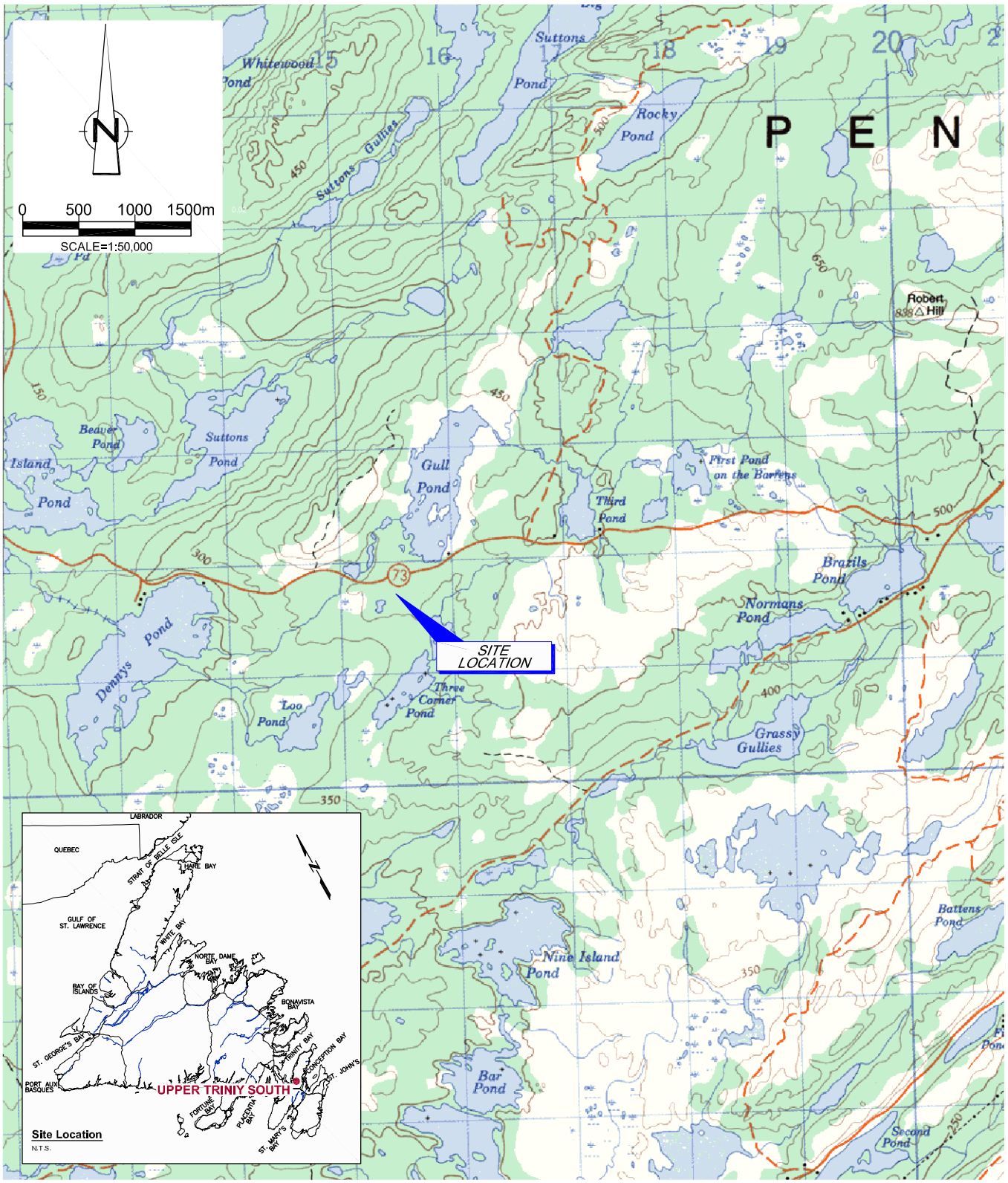
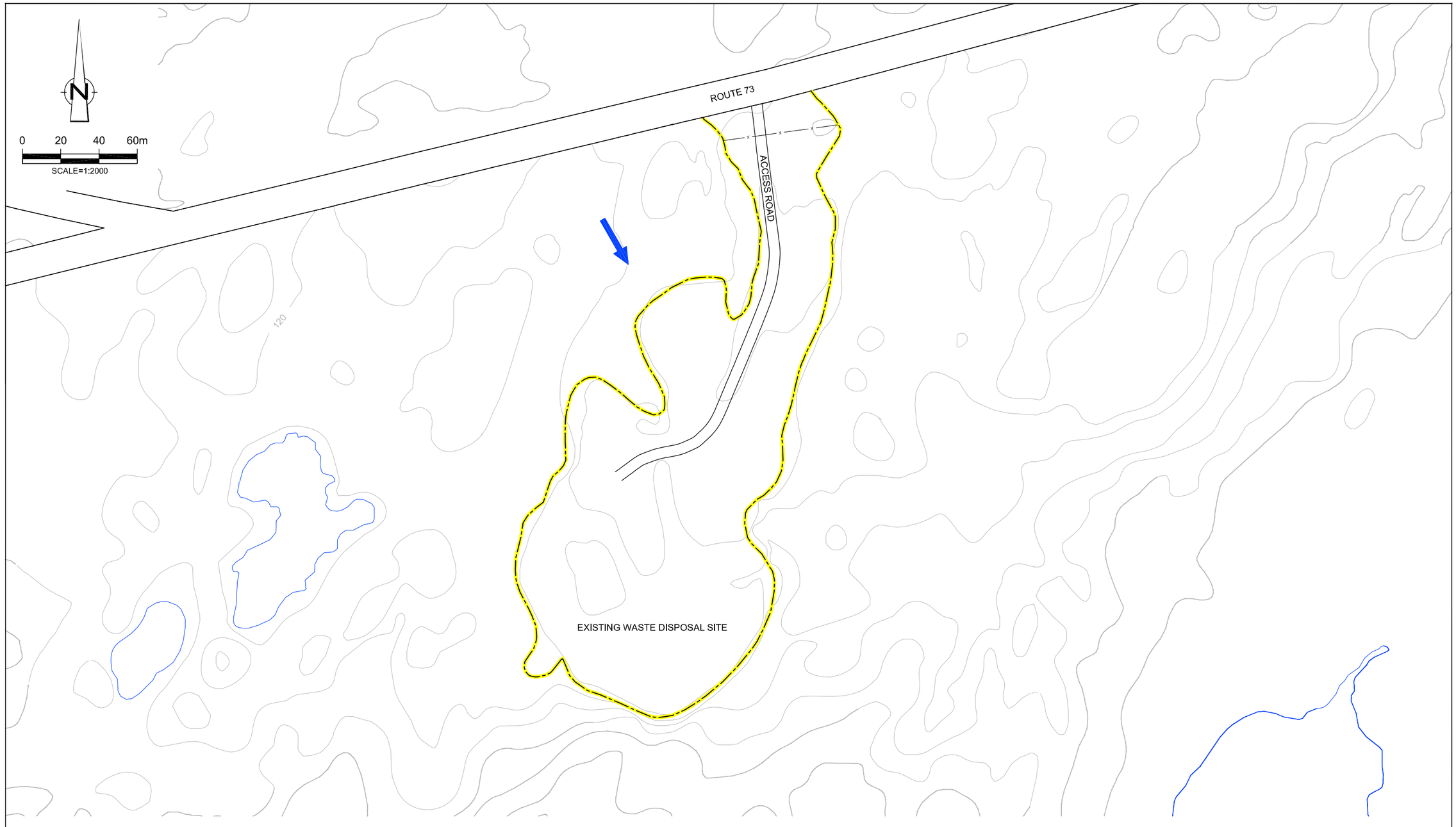


figure 1

SITE LOCATION MAP
2014/2015 MONITORING AND MAINTENANCE PROGRAM
DEPT. OF ENVIRONMENT AND CONSERVATION
Upper Trinity South (New Harbour), Waste Disposal Site, NL



LEGEND:

- PERIMETER OF WASTE DISPOSAL SITE (APPROX.)
- FENCELINE
- CONTOUR LINE (2 metre INTERVAL)
- POND
- APPROXIMATE GROUNDWATER FLOW DIRECTION

SOURCE: SNC-LAVALIN;PRJ NO. 508907-001;DWG NO. 4

figure 2

SITE PLAN
2014/2015 MONITORING AND MAINTENANCE PROGRAM
DEPT. OF ENVIRONMENT AND CONSERVATION
Upper Trinity South (New Harbour), Waste Disposal Site, NL

084308(007) GN-NL002

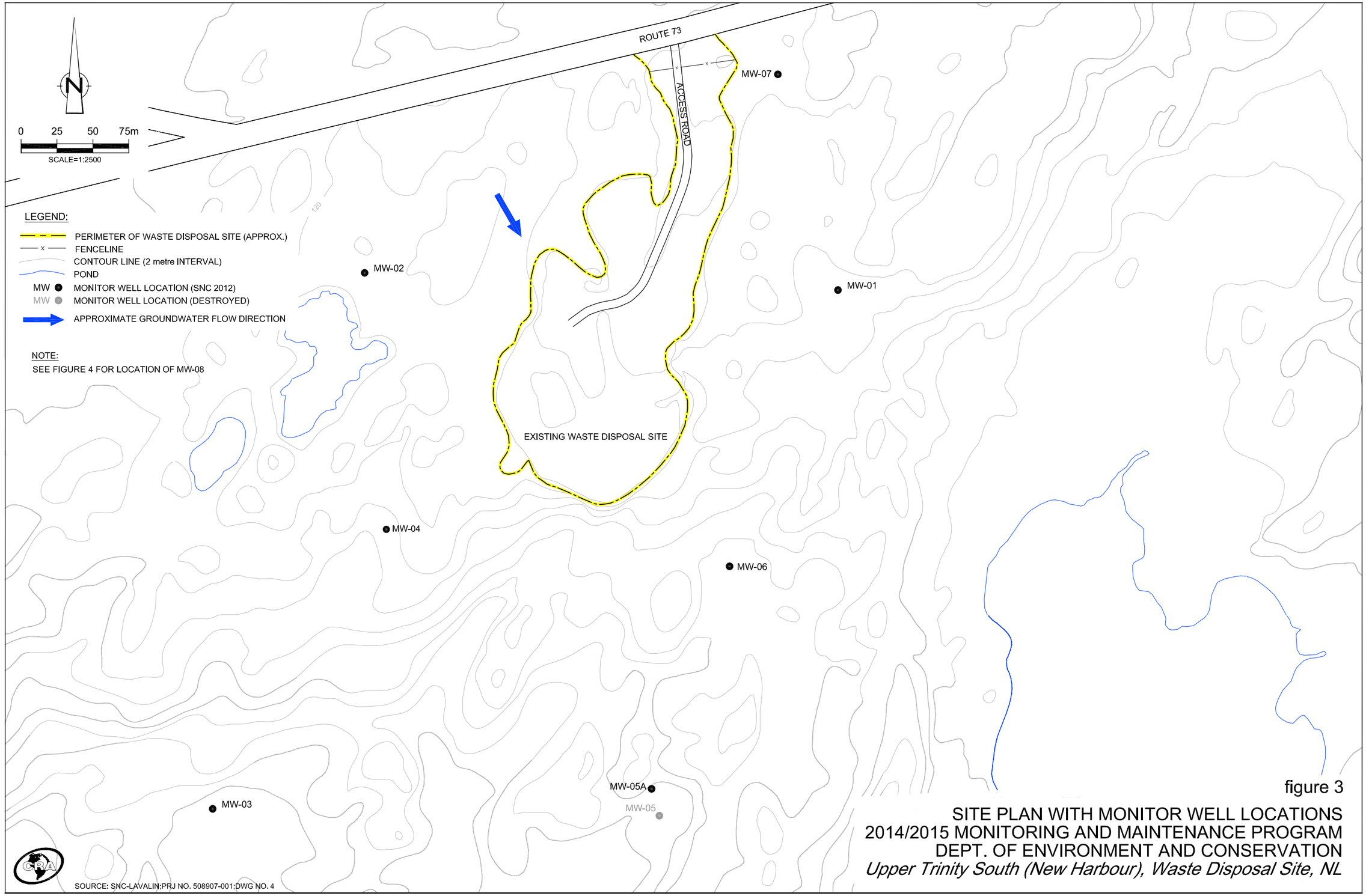


figure 3

SITE PLAN WITH MONITOR WELL LOCATIONS
2014/2015 MONITORING AND MAINTENANCE PROGRAM
DEPT. OF ENVIRONMENT AND CONSERVATION
Upper Trinity South (New Harbour), Waste Disposal Site, NL

084308(007) GN-NL003

0 75 150 225m

SCALE=1:7,500

LEGEND:

- PERIMETER OF WASTE DISPOSAL SITE (APPROX.)
- FENCELINE
- CONTOUR LINE (2 metre INTERVAL)
- POND
- MW ● MONITOR WELL LOCATION (SNC 2012)
- MW ● MONITOR WELL LOCATION (DESTROYED)
- SW △ SURFACE WATER SAMPLE LOCATION (SNC 2012)
- APPROXIMATE GROUNDWATER FLOW DIRECTION

MW-08

THIRD POND

GULL POND

SW-UPSTREAM

ROUTE 73

MW-07

MW-02

MW-01

EXISTING WASTE DISPOSAL SITE

MW-04

SW-POND

MW-06

MW-03

MW-05A

MW-05

SW-STREAM

THREE CORNER POND

SOURCE: SNC-LAVALIN;PRJ NO. 508907-001;DWG NO. 4

figure 4

AREA PLAN WITH SAMPLE LOCATIONS
2014/2015 MONITORING AND MAINTENANCE PROGRAM
DEPT. OF ENVIRONMENT AND CONSERVATION
Upper Trinity South (New Harbour), Waste Disposal Site, NL

084308(007) GN-NL004

TABLE 1

STATIC WATER LEVELS
2014/15 MONITORING AND MAINTENANCE PROGRAM
UPPER TRINITY SOUTH (NEW HARBOUR) WASTE DISPOSAL SITE
NEW HARBOUR BARRENS, NL

ID	Ground Surface Elevation	Depth to Water	Depth of Well
		Nov 27, 2014	Nov 27, 2014
	(masl)	(mbTOC)	(mbTOC)
MW-01	120.666	1.084	1.762
MW-02	122.201	2.802	3.922
MW-03	101.323	0.958	3.609
MW-04	117.108	0.829	3.610
MW-05A	106.325	1.182	5.946
MW-06	111.300	0.884	2.010
MW-07	125.215	1.192	3.560
MW-08	N/A	1.270	5.666

Notes:

m = Metres
TOC = Top of Casing
masl = Metres Above Sea Level
mbTOC = Metres Below Top of Casing
n/A = Not Available

TABLE 2

GPS CO-ORDINATES OF KEY SITE FEATURES
2014/15 MONITORING AND MAINTENANCE PROGRAM
UPPER TRINITY SOUTH (NEW HARBOUR) WASTE DISPOSAL SITE
NEW HARBOUR BARRENS, NL

ID	NORTHING	EASTING
	(m)	(m)
MW-01	5271860	315781
MW-02	5271887	315459
MW-03	5271509	315345
MW-04	5271706	315467
MW-05A*	5271451	315670
MW-06	5271686	315705
MW-07	5272017	315749
MW-08	5272974	317012
SW-POND	5271699	315578
SW-STREAM	5271330	315372
SW-UPSTREAM	5272220	316011

Notes:

-GPS coordinates based on 2011-2012 Annual Report of Activities by SNC Lavalin Inc.
-All points recorded using Universal Transverse Mercator Zone 21 as coordinate system
*-MW-05A replaced in a slightly different position, reflected by coordinates in table

MW = Monitoring Well
SW = Surface Water

TABLE 3

GROUNDWATER ANALYTICAL DATA - PCBs (ug/L)
2014/15 MONITORING AND MAINTENANCE PROGRAM
UPPER TRINITY SOUTH (NEW HARBOUR) WASTE DISPOSAL SITE
NEW HARBOUR BARRENS, NL

Parameter	RDL	MW-01	MW-03	MW-04	MW-05A	MW-06	MW-DUP02	MW-07	MW-08	Criteria*
		Nov 27, 2014	Nov 27, 2014	Nov 27, 2014	Nov 27, 2014	Nov 27, 2014	Nov 27, 2014	Nov 27, 2014	Nov 27, 2014	
Total PCBs	0.05	<	<	<	<	<	<	<	<	7.8

Notes:

Analysis completed by Maxxam Analytics Inc. laboratory in Bedford, NS.
* Ontario Ministry of the Environment (MOE) "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act", April 15, 2011, Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition

RDL = Reportable Detection Limit
MW = Monitor Well
< = Parameter below detection limit
MW-DUP02 = Field Duplicate of MW-06
0.0 = above criteria

TABLE 4

GROUNDWATER ANALYTICAL DATA - METALS (ug/L)
2014/15 MONITORING AND MAINTENANCE PROGRAM
UPPER TRINITY SOUTH (NEW HARBOUR) WASTE DISPOSAL SITE
NEW HARBOUR BARRENS, NL

Parameter	RDL	MW-01	MW-02	MW-03	MW-04	MW-05A	MW-06	MW-DUP02	MW-07	MW-08	Criteria*
		Nov 27, 2014	Nov 27, 2014	Nov 27, 2014	Nov 27, 2014	Nov 27, 2014	Nov 27, 2014	Nov 27, 2014	Nov 27, 2014	Nov 27, 2014	
Aluminum (Al)	5.0	59	77	140	53	91	180	160	2,300	1,100	-
Antimony (Sb)	1.0	<	<	<	<	<	<	<	1.4	<	20,000
Arsenic (As)	1.0	<	<	1.0	<	<	1.8	1.8	2.3	<	1,900
Barium (Ba)	1.0	1.7	2.5	4.9	6.1	3.6	2.4	1.8	13	5.7	29,000
Beryllium (Be)	1.0	<	<	<	<	<	<	<	<	<	67
Bismuth (Bi)	2.0	<	<	<	<	<	<	<	<	<	-
Boron (B)	5.0	<	<	<	<	<	<	<	<	<	45,000
Cadmium (Cd)	0.017	0.046	0.026	<	0.052	0.041	0.014	<	0.17	0.024	2.7
Calcium (Ca)	100	2,600	1,900	7,300	5,900	2,700	13,000	14,000	6,000	1,400	-
Chromium (Cr)	1.0	<	3.7	<	<	1.3	<	<	6.1	1.3	810
Cobalt (Co)	0.4	<	0.59	2.6	2.9	2.2	2.2	2.1	1.6	<	66
Copper (Cu)	2.0	<	4.2	<	4.1	9.7	2.2	<	44	7.3	87
Iron (Fe)	50	<	220	6,800	590	890	8,000	8,600	4,500	290	-
Lead (Pb)	0.5	<	<	<	<	0.92	1.8	<	4.9	<	25
Magnesium (Mg)	100	730	620	690	1,200	860	2,300	2,400	740	530	-
Manganese (Mn)	2.0	13	24	550	190	580	400	410	110	18	-
Mercury (Hg)	0.013	0.017	<	0.025	0.037	0.042	0.017	0.013	0.097	0.013	0.29[(1)]
Molybdenum (Mo)	2.0	<	<	<	<	<	<	<	<	<	9,200
Nickel (Ni)	2.0	<	<	<	<	7.5	<	<	9.3	<	490
Phosphorus (P)	100	130	110	130	110	150	450	410	420	130	-
Potassium (K)	100	180	250	280	660	1,900	2,600	2,500	5,500	260	-
Selenium (Se)	1.0	<	<	<	<	<	<	<	<	<	63
Silver (Ag)	0.1	<	<	<	<	<	<	<	0.13	<	1.5
Sodium (Na)	100	4,900	5,400	7,200	23,000	14,000	6,200	6,000	27,000	4,900	2,300,000
Strontium (Sr)	2.0	9.0	9.7	27	21	12	34	35	22	8.4	-
Thallium (Tl)	0.1	<	<	<	<	<	<	<	<	<	510
Tin (Sn)	2.0	3.2	<	5.3	8.6	2.4	2.5	2.5	4.4	<	-
Titanium (Ti)	2.0	<	<	2.6	<	5.3	7.3	5.7	89	15	-
Uranium (U)	0.1	<	<	<	<	<	<	<	0.59	<	-
Vanadium (V)	2.0	<	<	<	<	<	<	<	5.5	<	250
Zinc (Zn)	5.0	6.3	7.2	<	23	49	9.1	<	140	19	1,100

Notes:

Analysis completed by Maxxam Analytics Inc. laboratory in Bedford, NS.
* Ontario Ministry of the Environment (MOE) "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act", April 15, 2011, Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition
(1) Guideline for coarse-grained soil

0.0 = above criteria

RDL = Reportable Detection Limit

MW = Monitor Well
MW-DUP02 = Field Duplicate of MW-06

- = Not analysed/No criteria
< = Parameter below detection limit

TABLE 5

SURFACE WATER ANALYTICAL DATA - METALS (ug/L)
2014/15 MONITORING AND MAINTENANCE PROGRAM
UPPER TRINITY SOUTH (NEW HARBOUR) WASTE DISPOSAL SITE
NEW HARBOUR BARRENS, NL

Parameter	RDL	SW-POND	SW-UPSTREAM	SW-STREAM	Criteria*
		Nov 27, 2014	Nov 27, 2014	Nov 27, 2014	
Total PCBs	0.05	<	<	<	-

Notes:

Analysis completed by Maxxam Analytics Inc. laboratory in Bedford, NS.
* Criteria does not exist

RDL = Reportable Detection Limit
< = Parameter below detection limit

TABLE 6

SURFACE WATER ANALYTICAL DATA - METALS (ug/L)
2014/15 MONITORING AND MAINTENANCE PROGRAM
UPPER TRINITY SOUTH (NEW HARBOUR) WASTE DISPOSAL SITE
NEW HARBOUR BARRENS, NL

Parameter	RDL	SW-UPSTREAM	SW-POND	SW-STREAM	Criteria*
		Nov 27, 2014	Nov 27, 2014	Nov 27, 2014	
Aluminum (Al)	5.0	**240**	96	**790**	5/100[(1)]
Antimony (Sb)	1.0	<	<	<	-
Arsenic (As)	1.0	<	<	<	5.0
Barium (Ba)	1.0	1.9	9	4.9	-
Beryllium (Be)	1.0	<	<	<	-
Bismuth (Bi)	2.0	<	<	<	-
Boron (B)	5.0	<	100	<	-
Cadmium (Cd)	0.010	<	0.016	0.035	0.04/0.17[(2)]
Calcium (Ca)	100	1,000	39,000	5,000	-
Chromium (Cr)	1.0	<	<	<	8.9[(3)]
Cobalt (Co)	0.4	<	0.54	0.56	-
Copper (Cu)	2.0	<	**2.6**	<	2[(4)]
Iron (Fe)	50	220	**320**	**860**	300
Lead (Pb)	0.50	<	<	**1.6**	1[(5)]
Magnesium (Mg)	100	550	3,100	1,300	-
Manganese (Mn)	2.0	12	450	230	-
Mercury (Hg)	0.013	<	<	0.022	0.026
Molybdenum (Mo)	2.0	<	<	<	73.00
Nickel (Ni)	2.0	<	2.1	<	25, 65[(6)]
Phosphorus (P)	100	<	110	220	-
Potassium (K)	100	220	3,700	1,100	-
Selenium (Se)	1.0	<	<	<	1.0
Silver (Ag)	0.1	<	<	<	0.1
Sodium (Na)	100	4,900	16,000	11,000	-
Strontium (Sr)	2.0	5.3	94	19	-
Thallium (Tl)	0.1	<	<	<	0.8
Tin (Sn)	2.0	<	<	<	-
Titanium (Ti)	2.0	5.0	9.4	45	-
Uranium (U)	0.10	<	<	<	-
Vanadium (V)	2.0	<	<	<	-
Zinc (Zn)	5.0	<	8.2	9	30

Notes:

0.0 = above criteria

Analysis completed by Maxxam Analytics Inc. laboratory in Bedford, NS.
* Canadian Council of Ministers of the Environment (CCME) Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life (2007 - Update 7.1).

RDL = Reportable Detection Limit

< = Parameter below detection limit
- = Not analysed/No criteria

(1) Aluminum guideline = 5 ug/L at pH < 6.5
= 100 ug/L at pH ≥ 6.5

(2) Cadmium guideline = $10^{\{0.86[\log(\text{hardness})]-3.2\}}$

(3) Criteria for Chromium (III) = 8.9 ug/L, Criteria for Chromium (VI) = 1.0 ug/L

(4) Copper guideline = 2 ug/L at [$CaCO_3$] = 0-120 mg/L
= 3 ug/L at [$CaCO_3$] = 120-180 mg/L
= 4 ug/L at [$CaCO_3$] >180 mg/L

(5) Lead guideline = 1 ug/L at [$CaCO_3$] = 0-60 mg/L
= 2 ug/L at [$CaCO_3$] = 60-120 mg/L
= 4 ug/L at [$CaCO_3$] = 120-180 mg/L
= 7 ug/L at [$CaCO_3$] >180 mg/L

(6) Nickel guideline = 25 ug/L at [$CaCO_3$] = 0-60 mg/L
= 65 ug/L at [$CaCO_3$] = 60-120 mg/L
= 110 ug/L at [$CaCO_3$] = 120-180 mg/I
= 150 ug/L at [$CaCO_3$] >180 mg/L

TABLE 7

SURFACE WATER ANALYTICAL DATA - GENERAL CHEMISTRY
2014/15 MONITORING AND MAINTENANCE PROGRAM
UPPER TRINITY SOUTH (NEW HARBOUR) WASTE DISPOSAL SITE
NEW HARBOUR BARRENS, NL

Parameter	RDL	Units	SW-UPSTREAM	SW-POND	SW-STREAM	Criteria*
			Nov 27,2014	Nov 27, 2014	Nov 27, 2014	
Anion Sum	N/A	me/L	0.200	3.11	0.710	-
Bicarb. Alkalinity (calc. as CaCO3)	1	mg/L	<	95	5.0	-
Calculated TDS	1	mg/L	17	180	46	-
Carb. Alkalinity (calc. as CaCO3)	1	mg/L	<	<	<	-
Cation Sum	N/A	me/L	0.320	3.07	0.890	-
Hardness (CaCO3)	1	mg/L	4.8	110	18	-
Ion Balance (% Difference)	N/A	%	23.1	0.650	11.3	-
Langelier Index (@ 20C)	N/A	N/A	NC	-0.284	-4.01	-
Langelier Index (@ 4C)	N/A	N/A	NC	-0.534	-4.27	-
Nitrate (N)	0.05	mg/L	0.055	1.7	<	13
Saturation pH (@ 20C)	N/A	N/A	NC	7.81	9.90	-
Saturation pH (@ 4C)	N/A	N/A	NC	8.06	10.2	-
Total Alkalinity (Total as CaCO3)	30	mg/L	<	95	5.0	-
Dissolved Chloride (Cl)	1	mg/L	7.1	18	22	-
Colour	5	TCU	71	38	190	-
Nitrate + Nitrite	0.05	mg/L	0.055	1.7	<	-
Nitrite (N)	0.01	mg/L	<	0.031	<	0.06
Nitrogen (Ammonia Nitrogen)	0.05	mg/L	<	1.3	<	-
Total Organic Carbon (C)	0.5	mg/L	7.3	6.9	12	-
Orthophosphate (P)	0.01	mg/L	<	<	<	-
pH	N/A	pH	**6.16**	7.53	**5.89**	6.5 - 9
Reactive Silica (SiO2)	0.5	mg/L	2.5	5	2.4	-
Dissolved Sulphate (SO4)	2	mg/L	<	27	<	-
Turbidity	0.1	NTU	1.2	2	31	-
Conductivity	1	uS/cm	35	290	82	-

Notes: **0.0** = above criteria

Analysis completed by Maxxam Analytics Inc. laboratory in Bedford, NS.
* Canadian Council of Ministers of the Environment (CCME) Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life (2007 - Update 7.1).
NC - Not Calculated
RDL = Reportable Detection Limit
-= Not analysed/No criteria
< = Parameter below detection limit
(1)- Elevated reporting limit due to sample matrix

APPENDIX A

SITE PHOTOGRAPHS

Photo 1: View, looking northwest, towards MW-02 during the November 2014 sampling event.

Photo 2: View, looking west, towards MW-03 during the November 2014 sampling event.

Photo 3: View, looking south, towards MW-04 during the November 2014 sampling event.

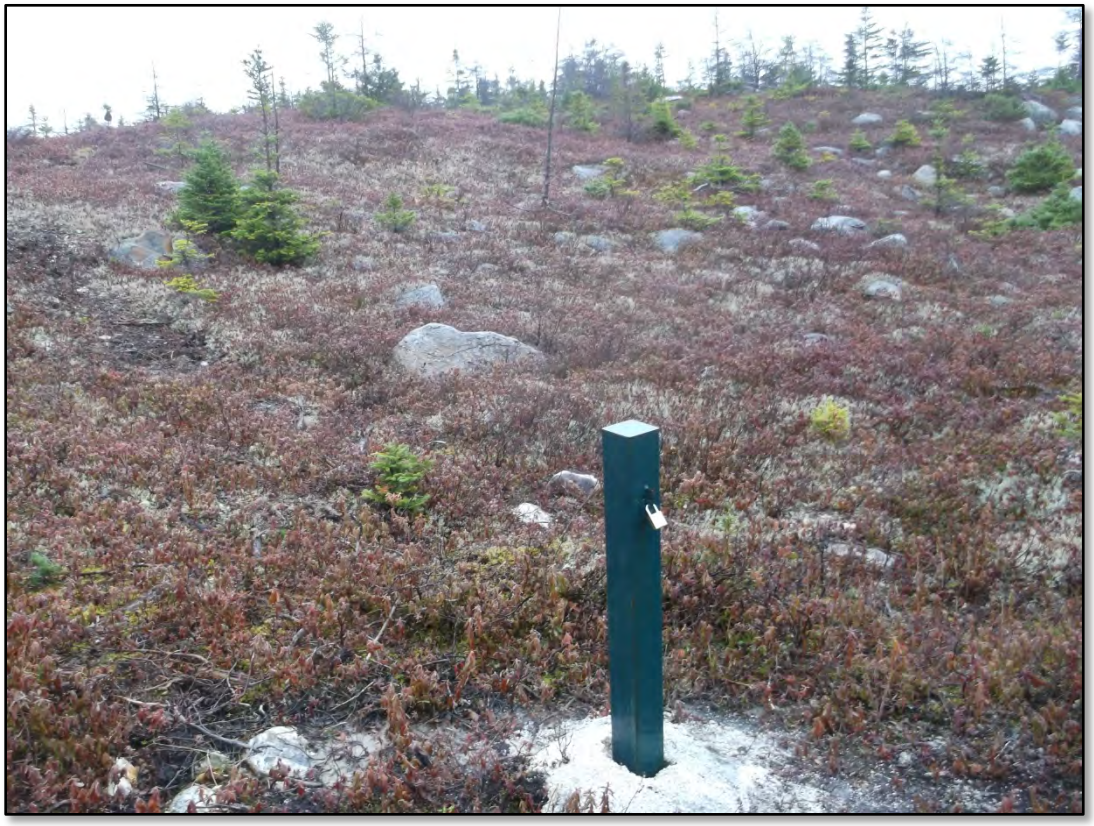


Photo 4: View, looking northeast, towards newly installed MW-05A during the November 2014 sampling event.

Photo 5: View, looking southwest, towards MW-06 during the November 2014 sampling event.

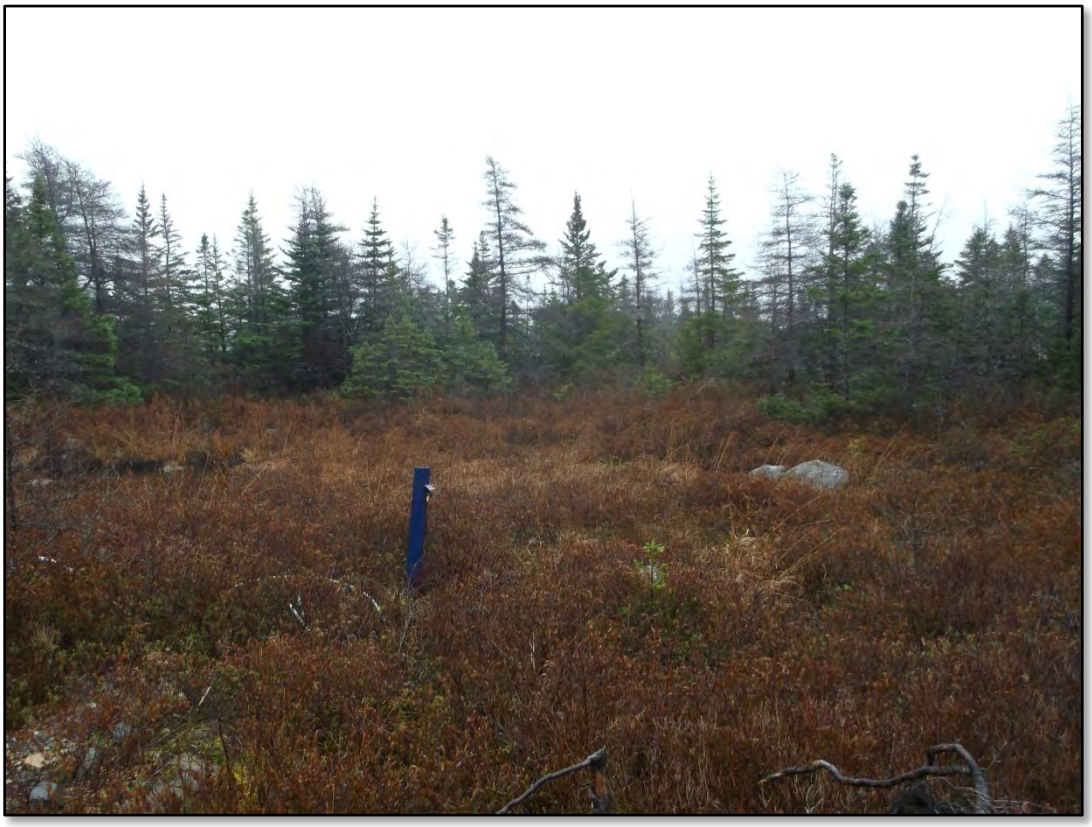


Photo 6: View, looking northeast, showing MW-07 during the November 2014 sampling event.

Photo 7: View, looking south, toward the off-Site background monitor well (MW-08) during the November 2014 sampling event.

Photo 8: View, looking west, toward the leachate collection pond on the south end of the Site during the November 2014 sampling event where SW-POND was collected.

Photo 9: View, looking north, toward the upstream pond during the November 2014 sampling event where SW-UPSTREAM sample was collected.

Photo 10: View, looking east, toward stream during the November 2014 sampling event where SW-STREAM sample was collected.

Photo 11: View, looking southwest, toward the existing waste disposal site. Note the erosion on the landfill cover.

APPENDIX B

LABORATORY CERTIFICATES OF ANALYSES

Maxxam
A Bureau Veritas Group Company

Success Through Science®

Your P.O. #: 20-019531
Your Project #: 084308-01
Site#: 1334651
Site Location: MONITORING AND MAINTENANCE/NEW HARBOUR
Your C.O.C. #: B 157526, B 157527

Attention:Brian Luffman

Conestoga-Rovers and Associates Ltd
Mount Pearl/St. John's
PO Box 8353 Stn A
1118 Topsail Rd
St. John's, NL
A1B 3N7

Report Date: 2014/12/10
Report #: R3251741
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B4M6609
Received: 2014/12/01, 09:38

Sample Matrix: Water
Samples Received: 12

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Carbonate, Bicarbonate and Hydroxide (1)	3	N/A	2014/12/08	N/A	SM 22 4500-CO2 D
Alkalinity (1)	2	N/A	2014/12/05	ATL SOP 00013	EPA 310.2 R1974 m
Alkalinity (1)	1	N/A	2014/12/09	ATL SOP 00013	EPA 310.2 R1974 m
Chloride (1)	2	N/A	2014/12/08	ATL SOP 00014	SM 22 4500-Cl- E m
Chloride (1)	1	N/A	2014/12/09	ATL SOP 00014	SM 22 4500-Cl- E m
Colour (1)	2	N/A	2014/12/04	ATL SOP 00020	SM 22 2120C m
Colour (1)	1	N/A	2014/12/08	ATL SOP 00020	SM 22 2120C m
Conductance - water (1)	2	N/A	2014/12/05	ATL SOP 00004	SM 22 2510B m
Conductance - water (1)	1	N/A	2014/12/08	ATL SOP 00004	SM 22 2510B m
Hardness (calculated as CaCO3) (1)	3	N/A	2014/12/03	ATL SOP 00048	SM 22 2340 B
Mercury - Total (CVAA,LL) (1)	12	2014/12/03	2014/12/03	ATL SOP 00026	EPA 245.1 R3 m
Metals Water Diss. MS (as rec'd) (1)	7	N/A	2014/12/03	ATL SOP 00058	EPA 6020A R1 m
Metals Water Diss. MS (as rec'd) (1)	2	N/A	2014/12/04	ATL SOP 00058	EPA 6020A R1 m
Metals Water Total MS (1, 2)	3	2014/12/02	2014/12/02	ATL SOP 00058	EPA 6020A R1 m
Ion Balance (% Difference) (1)	2	N/A	2014/12/08		Auto Calc.
Ion Balance (% Difference) (1)	1	N/A	2014/12/10		Auto Calc.
Anion and Cation Sum (1)	2	N/A	2014/12/08		Auto Calc.
Anion and Cation Sum (1)	1	N/A	2014/12/09		Auto Calc.
Nitrogen Ammonia - water (1)	2	N/A	2014/12/05	ATL SOP 00015	EPA 350.1 R2 m
Nitrogen Ammonia - water (1)	1	N/A	2014/12/09	ATL SOP 00015	EPA 350.1 R2 m
Nitrogen - Nitrate + Nitrite (1)	2	N/A	2014/12/05	ATL SOP 00016	USGS SOPINCF0452.2 m
Nitrogen - Nitrate + Nitrite (1)	1	N/A	2014/12/08	ATL SOP 00016	USGS SOPINCF0452.2 m
Nitrogen - Nitrite (1)	2	N/A	2014/12/05	ATL SOP 00017	SM 22 4500-NO2- B m
Nitrogen - Nitrite (1)	1	N/A	2014/12/08	ATL SOP 00017	SM 22 4500-NO2- B m
Nitrogen - Nitrate (as N) (1)	2	N/A	2014/12/08	ATL SOP 00018	ASTM D3867
Nitrogen - Nitrate (as N) (1)	1	N/A	2014/12/09	ATL SOP 00018	ASTM D3867
PCBs in water by GC/ECD (1)	12	2014/12/04	2014/12/05	ATL SOP 00107	EPA 8082 m
PCB Aroclor sum (water) (1)	12	N/A	2014/12/05		Auto Calc.
pH (1, 3)	2	N/A	2014/12/05	ATL SOP 00003	SM 22 4500-H+ B m

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Your P.O. #: 20-019531
Your Project #: 084308-01
Site#: 1334651
Site Location: MONITORING AND MAINTENANCE/NEW HARBOUR
Your C.O.C. #: B 157526, B 157527

Attention:Brian Luffman

Conestoga-Rovers and Associates Ltd
Mount Pearl/St. John's
PO Box 8353 Stn A
1118 Topsail Rd
St. John's, NL
A1B 3N7

Report Date: 2014/12/10
Report #: R3251741
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B4M6609
Received: 2014/12/01, 09:38

Sample Matrix: Water
Samples Received: 12

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
pH (1, 3)	1	N/A	2014/12/08	ATL SOP 00003	SM 22 4500-H+ B m
Phosphorus - ortho (1)	2	N/A	2014/12/05	ATL SOP 00021	EPA 365.2 m
Phosphorus - ortho (1)	1	N/A	2014/12/09	ATL SOP 00021	EPA 365.2 m
Sat. pH and Langelier Index (@ 20C) (1)	2	N/A	2014/12/08	ATL SOP 00049	Auto Calc.
Sat. pH and Langelier Index (@ 20C) (1)	1	N/A	2014/12/10	ATL SOP 00049	Auto Calc.
Sat. pH and Langelier Index (@ 4C) (1)	2	N/A	2014/12/08	ATL SOP 00049	Auto Calc.
Sat. pH and Langelier Index (@ 4C) (1)	1	N/A	2014/12/10	ATL SOP 00049	Auto Calc.
Reactive Silica (1)	2	N/A	2014/12/03	ATL SOP 00022	EPA 366.0 m
Reactive Silica (1)	1	N/A	2014/12/09	ATL SOP 00022	EPA 366.0 m
Sulphate (1)	2	N/A	2014/12/08	ATL SOP 00023	EPA 375.4 R1978 m
Sulphate (1)	1	N/A	2014/12/09	ATL SOP 00023	EPA 375.4 R1978 m
Total Dissolved Solids (TDS calc) (1)	2	N/A	2014/12/08		Auto Calc.
Total Dissolved Solids (TDS calc) (1)	1	N/A	2014/12/10		Auto Calc.
Organic carbon - Total (TOC) (1, 4)	2	N/A	2014/12/03	ATL SOP 00037	SM 22 5310C m
Organic carbon - Total (TOC) (1, 4)	1	N/A	2014/12/08	ATL SOP 00037	SM 22 5310C m
Turbidity (1)	3	N/A	2014/12/05	ATL SOP 00011	EPA 180.1 R2 m

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

(1) This test was performed by Maxxam Bedford
(2) New RDLs in effect due to release of NS Contaminated Sites Regulations. Reduced RDL based on MDL study performance. Low level analytical run checks being implemented.
(3) The APHA Standard Method require pH to be analyzed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the APHA Standard Method holding time.
(4) TOC / DOC present in the sample should be considered as non-purgeable TOC / DOC.

Your P.O. #: 20-019531
Your Project #: 084308-01
Site#: 1334651
Site Location: MONITORING AND MAINTENANCE/NEW HARBOUR
Your C.O.C. #: B 157526, B 157527

Attention:Brian Luffman

Conestoga-Rovers and Associates Ltd
Mount Pearl/St. John's
PO Box 8353 Stn A
1118 Topsail Rd
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A1B 3N7

Report Date: 2014/12/10
Report #: R3251741
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B4M6609
Received: 2014/12/01, 09:38

Encryption Key Rachael Mansfield
10 Dec 2014 12:26:23 -04:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Michelle Hill, Project Manager
Email: MHill@maxxam.ca
Phone# (902)420-0203 Ext:289

==========

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

Maxxam Job #: B4M6609
Report Date: 2014/12/10

Conestoga-Rovers and Associates Ltd
Client Project #: 084308-01
Site Location: MONITORING AND MAINTENANCE/NEW HARBOUR
Your P.O. #: 20-019531
Sampler Initials: AB

ATLANTIC RCAP-MS TOTAL METALS IN WATER (WATER)

Maxxam ID		YR1631		YR1632			YR1644		
Sampling Date		2014/11/27 14:00		2014/11/27 10:00			2014/11/27 13:30		
COC Number		B 157526		B 157526			B 157527		
	Units	SW-STREAM	RDL	SW-POND	RDL	QC Batch	SW-UPSTREAM	RDL	QC Batch
Calculated Parameters									
Anion Sum	me/L	0.710	N/A	3.11	N/A	3842785	0.200	N/A	3842785
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	5.0	1.0	95	1.0	3842782	<1.0	1.0	3842782
Calculated TDS	mg/L	46	1.0	180	1.0	3842789	17	1.0	3842789
Carb. Alkalinity (calc. as CaCO3)	mg/L	<1.0	1.0	<1.0	1.0	3842782	<1.0	1.0	3842782
Cation Sum	me/L	0.890	N/A	3.07	N/A	3842785	0.320	N/A	3842785
Hardness (CaCO3)	mg/L	18	1.0	110	1.0	3842783	4.8	1.0	3842783
Ion Balance (% Difference)	%	11.3	N/A	0.650	N/A	3842784	23.1	N/A	3842784
Langelier Index (@ 20C)	N/A	-4.01		-0.284		3842787	NC		3842787
Langelier Index (@ 4C)	N/A	-4.27		-0.534		3842788	NC		3842788
Nitrate (N)	mg/L	<0.050	0.050	1.7	0.050	3842786	0.055	0.050	3842786
Saturation pH (@ 20C)	N/A	9.90		7.81		3842787	NC		3842787
Saturation pH (@ 4C)	N/A	10.2		8.06		3842788	NC		3842788
Inorganics									
Total Alkalinity (Total as CaCO3)	mg/L	5.0	5.0	95	10	3845879	<5.0	5.0	3849323
Dissolved Chloride (Cl)	mg/L	22	1.0	18	1.0	3845880	7.1	1.0	3849324
Colour	TCU	190	25	38	5.0	3845893	71	25	3849329
Nitrate + Nitrite	mg/L	<0.050	0.050	1.7	0.050	3845895	0.055	0.050	3849332
Nitrite (N)	mg/L	<0.010	0.010	0.031	0.010	3845897	<0.010	0.010	3849333
Nitrogen (Ammonia Nitrogen)	mg/L	<0.050	0.050	1.3	0.050	3846477	<0.050	0.050	3849745
Total Organic Carbon (C)	mg/L	12 (1)	5.0	6.9	0.50	3846010	7.3	0.50	3851565
Orthophosphate (P)	mg/L	<0.010	0.010	<0.010	0.010	3845894	<0.010	0.010	3849331
pH	pH	5.89	N/A	7.53	N/A	3849459	6.16	N/A	3851542
Reactive Silica (SiO2)	mg/L	2.4	0.50	5.0	0.50	3845890	2.5	0.50	3849328
Dissolved Sulphate (SO4)	mg/L	<2.0	2.0	27	2.0	3845883	<2.0	2.0	3849325
Turbidity	NTU	31	0.10	2.0	0.10	3849833	1.2	0.10	3849833
Conductivity	uS/cm	82	1.0	290	1.0	3849464	35	1.0	3851549
Metals									
Total Aluminum (Al)	ug/L	790	5.0	96	5.0	3844167	240	5.0	3844167
Total Antimony (Sb)	ug/L	<1.0	1.0	<1.0	1.0	3844167	<1.0	1.0	3844167
Total Arsenic (As)	ug/L	<1.0	1.0	<1.0	1.0	3844167	<1.0	1.0	3844167

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
(1) Elevated reporting limit due to sample matrix.

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Maxxam Job #: B4M6609
Report Date: 2014/12/10

Conestoga-Rovers and Associates Ltd
Client Project #: 084308-01
Site Location: MONITORING AND MAINTENANCE/NEW HARBOUR
Your P.O. #: 20-019531
Sampler Initials: AB

ATLANTIC RCAP-MS TOTAL METALS IN WATER (WATER)

Maxxam ID		YR1631		YR1632			YR1644		
Sampling Date		2014/11/27 14:00		2014/11/27 10:00			2014/11/27 13:30		
COC Number		B 157526		B 157526			B 157527		
	Units	SW-STREAM	RDL	SW-POND	RDL	QC Batch	SW-UPSTREAM	RDL	QC Batch
Total Barium (Ba)	ug/L	4.9	1.0	9.3	1.0	3844167	1.9	1.0	3844167
Total Beryllium (Be)	ug/L	<1.0	1.0	<1.0	1.0	3844167	<1.0	1.0	3844167
Total Bismuth (Bi)	ug/L	<2.0	2.0	<2.0	2.0	3844167	<2.0	2.0	3844167
Total Boron (B)	ug/L	<50	50	100	50	3844167	<50	50	3844167
Total Cadmium (Cd)	ug/L	0.035	0.010	0.016	0.010	3844167	<0.010	0.010	3844167
Total Calcium (Ca)	ug/L	5000	100	39000	100	3844167	1000	100	3844167
Total Chromium (Cr)	ug/L	<1.0	1.0	<1.0	1.0	3844167	<1.0	1.0	3844167
Total Cobalt (Co)	ug/L	0.56	0.40	0.54	0.40	3844167	<0.40	0.40	3844167
Total Copper (Cu)	ug/L	<2.0	2.0	2.6	2.0	3844167	<2.0	2.0	3844167
Total Iron (Fe)	ug/L	860	50	320	50	3844167	220	50	3844167
Total Lead (Pb)	ug/L	1.6	0.50	<0.50	0.50	3844167	<0.50	0.50	3844167
Total Magnesium (Mg)	ug/L	1300	100	3100	100	3844167	550	100	3844167
Total Manganese (Mn)	ug/L	230	2.0	450	2.0	3844167	12	2.0	3844167
Total Molybdenum (Mo)	ug/L	<2.0	2.0	<2.0	2.0	3844167	<2.0	2.0	3844167
Total Nickel (Ni)	ug/L	<2.0	2.0	2.1	2.0	3844167	<2.0	2.0	3844167
Total Phosphorus (P)	ug/L	220	100	110	100	3844167	<100	100	3844167
Total Potassium (K)	ug/L	1100	100	3700	100	3844167	220	100	3844167
Total Selenium (Se)	ug/L	<1.0	1.0	<1.0	1.0	3844167	<1.0	1.0	3844167
Total Silver (Ag)	ug/L	<0.10	0.10	<0.10	0.10	3844167	<0.10	0.10	3844167
Total Sodium (Na)	ug/L	11000	100	16000	100	3844167	4900	100	3844167
Total Strontium (Sr)	ug/L	19	2.0	94	2.0	3844167	5.3	2.0	3844167
Total Thallium (Tl)	ug/L	<0.10	0.10	<0.10	0.10	3844167	<0.10	0.10	3844167
Total Tin (Sn)	ug/L	<2.0	2.0	<2.0	2.0	3844167	<2.0	2.0	3844167
Total Titanium (Ti)	ug/L	45	2.0	9.4	2.0	3844167	5.0	2.0	3844167
Total Uranium (U)	ug/L	<0.10	0.10	<0.10	0.10	3844167	<0.10	0.10	3844167
Total Vanadium (V)	ug/L	<2.0	2.0	<2.0	2.0	3844167	<2.0	2.0	3844167
Total Zinc (Zn)	ug/L	9.0	5.0	8.2	5.0	3844167	<5.0	5.0	3844167

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B4M6609
Report Date: 2014/12/10

Conestoga-Rovers and Associates Ltd
Client Project #: 084308-01
Site Location: MONITORING AND MAINTENANCE/NEW HARBOUR
Your P.O. #: 20-019531
Sampler Initials: AB

MERCURY BY COLD VAPOUR AA (WATER)

Maxxam ID		YR1623	YR1624	YR1625	YR1626	YR1627	YR1628	YR1629		
Sampling Date		2014/11/27 11:00	2014/11/27 12:00	2014/11/27 15:00	2014/11/27 14:30	2014/11/27 12:30	2014/11/27 13:00	2014/11/27 11:30		
COC Number		B 157526	B 157526	B 157526	B 157526	B 157526	B 157526	B 157526		
	Units	MW-01	MW-02	MW-03	MW-04	MW-05A	MW-06	MW-07	RDL	QC Batch
Metals										
Total Mercury (Hg)	ug/L	0.017	<0.013	0.025	0.037	0.042	0.017	0.097	0.013	3846098

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		YR1630	YR1631		YR1632		YR1643	YR1643		
Sampling Date		2014/11/27 10:30	2014/11/27 14:00		2014/11/27 10:00		2014/11/27 13:00	2014/11/27 13:00		
COC Number		B 157526	B 157526		B 157526		B 157527	B 157527		
	Units	MW-08	SW-STREAM	QC Batch	SW-POND	QC Batch	MW-DUP2	MW-DUP2 Lab-Dup	RDL	QC Batch
Metals										
Total Mercury (Hg)	ug/L	0.013	0.022	3846098	<0.013	3846106	0.013	0.013	0.013	3846104

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

Maxxam ID		YR1644		
Sampling Date		2014/11/27 13:30		
COC Number		B 157527		
	Units	SW-UPSTREAM	RDL	QC Batch
Metals				
Total Mercury (Hg)	ug/L	<0.013	0.013	3846104

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B4M6609
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Conestoga-Rovers and Associates Ltd
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Your P.O. #: 20-019531
Sampler Initials: AB

ELEMENTS BY ICP/MS (WATER)

Maxxam ID		YR1623	YR1624	YR1625	YR1626	YR1627	YR1628		
Sampling Date		2014/11/27 11:00	2014/11/27 12:00	2014/11/27 15:00	2014/11/27 14:30	2014/11/27 12:30	2014/11/27 13:00		
COC Number		B 157526	B 157526	B 157526	B 157526	B 157526	B 157526		
	Units	MW-01	MW-02	MW-03	MW-04	MW-05A	MW-06	RDL	QC Batch
Metals									
Dissolved Aluminum (Al)	ug/L	59	77	140	53	91	180	5.0	3845780
Dissolved Antimony (Sb)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	3845780
Dissolved Arsenic (As)	ug/L	<1.0	<1.0	1.0	<1.0	<1.0	1.8	1.0	3845780
Dissolved Barium (Ba)	ug/L	1.7	2.5	4.9	6.1	3.6	2.4	1.0	3845780
Dissolved Beryllium (Be)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	3845780
Dissolved Bismuth (Bi)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	3845780
Dissolved Boron (B)	ug/L	<50	<50	<50	<50	<50	<50	50	3845780
Dissolved Cadmium (Cd)	ug/L	0.046	0.026	<0.010	0.052	0.041	0.014	0.010	3845780
Dissolved Calcium (Ca)	ug/L	2600	1900	7300	5900	2700	13000	100	3845780
Dissolved Chromium (Cr)	ug/L	<1.0	3.7	<1.0	<1.0	1.3	<1.0	1.0	3845780
Dissolved Cobalt (Co)	ug/L	<0.40	0.59	2.6	2.9	2.2	2.2	0.40	3845780
Dissolved Copper (Cu)	ug/L	<2.0	4.2	<2.0	4.1	9.7	2.2	2.0	3845780
Dissolved Iron (Fe)	ug/L	<50	220	6800	590	890	8000	50	3845780
Dissolved Lead (Pb)	ug/L	<0.50	<0.50	<0.50	<0.50	0.92	1.8	0.50	3845780
Dissolved Magnesium (Mg)	ug/L	730	620	690	1200	860	2300	100	3845780
Dissolved Manganese (Mn)	ug/L	13	24	550	190	580	400	2.0	3845780
Dissolved Molybdenum (Mo)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	3845780
Dissolved Nickel (Ni)	ug/L	<2.0	<2.0	<2.0	<2.0	7.5	<2.0	2.0	3845780
Dissolved Phosphorus (P)	ug/L	130	110	130	110	150	450	100	3845780
Dissolved Potassium (K)	ug/L	180	250	280	660	1900	2600	100	3845780
Dissolved Selenium (Se)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	3845780
Dissolved Silver (Ag)	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	3845780
Dissolved Sodium (Na)	ug/L	4900	5400	7200	23000	14000	6200	100	3845780
Dissolved Strontium (Sr)	ug/L	9.0	9.7	27	21	12	34	2.0	3845780
Dissolved Thallium (Tl)	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	3845780
Dissolved Tin (Sn)	ug/L	3.2	<2.0	5.3	8.6	2.4	2.5	2.0	3845780
Dissolved Titanium (Ti)	ug/L	<2.0	<2.0	2.6	<2.0	5.3	7.3	2.0	3845780
Dissolved Uranium (U)	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	3845780
Dissolved Vanadium (V)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	3845780
Dissolved Zinc (Zn)	ug/L	6.3	7.2	<5.0	23	49	9.1	5.0	3845780

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B4M6609
Report Date: 2014/12/10

Conestoga-Rovers and Associates Ltd
Client Project #: 084308-01
Site Location: MONITORING AND MAINTENANCE/NEW HARBOUR
Your P.O. #: 20-019531
Sampler Initials: AB

ELEMENTS BY ICP/MS (WATER)

Maxxam ID		YR1629	YR1630		YR1643		
Sampling Date		2014/11/27 11:30	2014/11/27 10:30		2014/11/27 13:00		
COC Number		B 157526	B 157526		B 157527		
	Units	MW-07	MW-08	QC Batch	MW-DUP2	RDL	QC Batch
Metals							
Dissolved Aluminum (Al)	ug/L	2300	1100	3847537	160	5.0	3845780
Dissolved Antimony (Sb)	ug/L	1.4	<1.0	3847537	<1.0	1.0	3845780
Dissolved Arsenic (As)	ug/L	2.3	<1.0	3847537	1.8	1.0	3845780
Dissolved Barium (Ba)	ug/L	13	5.7	3847537	1.8	1.0	3845780
Dissolved Beryllium (Be)	ug/L	<1.0	<1.0	3847537	<1.0	1.0	3845780
Dissolved Bismuth (Bi)	ug/L	<2.0	<2.0	3847537	<2.0	2.0	3845780
Dissolved Boron (B)	ug/L	<50	<50	3847537	<50	50	3845780
Dissolved Cadmium (Cd)	ug/L	0.17	0.024	3847537	<0.010	0.010	3845780
Dissolved Calcium (Ca)	ug/L	6000	1400	3847537	14000	100	3845780
Dissolved Chromium (Cr)	ug/L	6.1	1.3	3847537	<1.0	1.0	3845780
Dissolved Cobalt (Co)	ug/L	1.6	<0.40	3847537	2.1	0.40	3845780
Dissolved Copper (Cu)	ug/L	44	7.3	3847537	<2.0	2.0	3845780
Dissolved Iron (Fe)	ug/L	4500	290	3847537	8600	50	3845780
Dissolved Lead (Pb)	ug/L	4.9	<0.50	3847537	<0.50	0.50	3845780
Dissolved Magnesium (Mg)	ug/L	740	530	3847537	2400	100	3845780
Dissolved Manganese (Mn)	ug/L	110	18	3847537	410	2.0	3845780
Dissolved Molybdenum (Mo)	ug/L	<2.0	<2.0	3847537	<2.0	2.0	3845780
Dissolved Nickel (Ni)	ug/L	9.3	<2.0	3847537	<2.0	2.0	3845780
Dissolved Phosphorus (P)	ug/L	420	130	3847537	410	100	3845780
Dissolved Potassium (K)	ug/L	5500	260	3847537	2500	100	3845780
Dissolved Selenium (Se)	ug/L	<1.0	<1.0	3847537	<1.0	1.0	3845780
Dissolved Silver (Ag)	ug/L	0.13	<0.10	3847537	<0.10	0.10	3845780
Dissolved Sodium (Na)	ug/L	27000	4900	3847537	6000	100	3845780
Dissolved Strontium (Sr)	ug/L	22	8.4	3847537	35	2.0	3845780
Dissolved Thallium (Tl)	ug/L	<0.10	<0.10	3847537	<0.10	0.10	3845780
Dissolved Tin (Sn)	ug/L	4.4	<2.0	3847537	2.5	2.0	3845780
Dissolved Titanium (Ti)	ug/L	89	15	3847537	5.7	2.0	3845780
Dissolved Uranium (U)	ug/L	0.59	<0.10	3847537	<0.10	0.10	3845780
Dissolved Vanadium (V)	ug/L	5.5	<2.0	3847537	<2.0	2.0	3845780
Dissolved Zinc (Zn)	ug/L	140	19	3847537	<5.0	5.0	3845780

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B4M6609
Report Date: 2014/12/10

Conestoga-Rovers and Associates Ltd
Client Project #: 084308-01
Site Location: MONITORING AND MAINTENANCE/NEW HARBOUR
Your P.O. #: 20-019531
Sampler Initials: AB

POLYCHLORINATED BIPHENYLS BY GC-ECD (WATER)

Maxxam ID		YR1623	YR1623	YR1624	YR1625	YR1626	YR1627		YR1628		
Sampling Date		2014/11/27 11:00	2014/11/27 11:00	2014/11/27 12:00	2014/11/27 15:00	2014/11/27 14:30	2014/11/27 12:30		2014/11/27 13:00		
COC Number		B 157526	B 157526	B 157526	B 157526	B 157526	B 157526		B 157526		
	Units	MW-01	MW-01 Lab-Dup	MW-02	MW-03	MW-04	MW-05A	RDL	MW-06	RDL	QC Batch
PCBs											
Aroclor 1016	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	<0.50	0.50	3847579
Aroclor 1221	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	<0.50	0.50	3847579
Aroclor 1232	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	<0.50	0.50	3847579
Aroclor 1248	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	<0.50	0.50	3847579
Aroclor 1242	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	<0.50	0.50	3847579
Aroclor 1254	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	<0.50	0.50	3847579
Aroclor 1260	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	<0.50	0.50	3847579
Calculated Total PCB	ug/L	<0.050		<0.050	<0.050	<0.050	<0.050	0.050	<0.50	0.50	3843272
Surrogate Recovery (%)											
Decachlorobiphenyl	%	74	57	68	71	76	69		70 (1)		3847579

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
(1) Elevated PCB RDL due to matrix / co-extractive interference.

Maxxam ID		YR1629	YR1630	YR1631	YR1632	YR1643	YR1644		
Sampling Date		2014/11/27 11:30	2014/11/27 10:30	2014/11/27 14:00	2014/11/27 10:00	2014/11/27 13:00	2014/11/27 13:30		
COC Number		B 157526	B 157526	B 157526	B 157526	B 157527	B 157527		
	Units	MW-07	MW-08	SW-STREAM	SW-POND	MW-DUP2	SW-UPSTREAM	RDL	QC Batch
PCBs									
Aroclor 1016	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	3847579
Aroclor 1221	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	3847579
Aroclor 1232	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	3847579
Aroclor 1248	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	3847579
Aroclor 1242	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	3847579
Aroclor 1254	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	3847579
Aroclor 1260	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	3847579
Calculated Total PCB	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	3843272
Surrogate Recovery (%)									
Decachlorobiphenyl	%	42	54	51	66	57	77		3847579

RDL = Reportable Detection Limit
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Maxxam Job #: B4M6609
Report Date: 2014/12/10

Conestoga-Rovers and Associates Ltd
Client Project #: 084308-01
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Your P.O. #: 20-019531
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GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	2.7°C

Sample YR1629-01 : Sample was TW digested to re-dissolve metals particulate.

Sample YR1631-01 : RCAp Ion Balance acceptable. Anion/cation agreement within 0.2 meq/L.

Sample YR1644-01 : RCAp Ion Balance acceptable. Anion/cation agreement within 0.2 meq/L.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

Conestoga-Rovers and Associates Ltd
Client Project #: 084308-01
MONITORING AND MAINTENANCE/NEW
Site Location: HARBOUR
Your P.O. #: 20-019531
Sampler Initials: AB

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits	% Recovery	QC Limits
3847579	Decachlorobiphenyl	2014/12/05	72 (6)	30 - 130	88	30 - 130	85	%				
3844167	Total Aluminum (Al)	2014/12/03	103	80 - 120	105	80 - 120	<5.0	ug/L	21 (1,2)	20		
3844167	Total Antimony (Sb)	2014/12/02	105	80 - 120	101	80 - 120	<1.0	ug/L				
3844167	Total Arsenic (As)	2014/12/02	99	80 - 120	99	80 - 120	<1.0	ug/L				
3844167	Total Barium (Ba)	2014/12/02	95	80 - 120	95	80 - 120	<1.0	ug/L				
3844167	Total Beryllium (Be)	2014/12/02	99	80 - 120	100	80 - 120	<1.0	ug/L				
3844167	Total Bismuth (Bi)	2014/12/02	99	80 - 120	101	80 - 120	<2.0	ug/L				
3844167	Total Boron (B)	2014/12/02	NC	80 - 120	99	80 - 120	<50	ug/L				
3844167	Total Cadmium (Cd)	2014/12/02	100	80 - 120	100	80 - 120	<0.010	ug/L				
3844167	Total Calcium (Ca)	2014/12/02	NC	80 - 120	94	80 - 120	<100	ug/L				
3844167	Total Chromium (Cr)	2014/12/02	98	80 - 120	97	80 - 120	<1.0	ug/L				
3844167	Total Cobalt (Co)	2014/12/02	97	80 - 120	98	80 - 120	<0.40	ug/L				
3844167	Total Copper (Cu)	2014/12/02	96	80 - 120	99	80 - 120	<2.0	ug/L				
3844167	Total Iron (Fe)	2014/12/03	104	80 - 120	106	80 - 120	<50	ug/L	NC (2)	20		
3844167	Total Lead (Pb)	2014/12/02	95	80 - 120	97	80 - 120	<0.50	ug/L				
3844167	Total Magnesium (Mg)	2014/12/02	NC	80 - 120	107	80 - 120	<100	ug/L				
3844167	Total Manganese (Mn)	2014/12/03	NC	80 - 120	102	80 - 120	<2.0	ug/L	2.8 (2)	20		
3844167	Total Molybdenum (Mo)	2014/12/02	107	80 - 120	103	80 - 120	<2.0	ug/L				
3844167	Total Nickel (Ni)	2014/12/02	99	80 - 120	101	80 - 120	<2.0	ug/L				
3844167	Total Phosphorus (P)	2014/12/02	106	80 - 120	106	80 - 120	<100	ug/L				
3844167	Total Potassium (K)	2014/12/02	NC	80 - 120	104	80 - 120	<100	ug/L				
3844167	Total Selenium (Se)	2014/12/02	99	80 - 120	100	80 - 120	<1.0	ug/L				
3844167	Total Silver (Ag)	2014/12/02	98	80 - 120	99	80 - 120	<0.10	ug/L				
3844167	Total Sodium (Na)	2014/12/02	NC	80 - 120	110	80 - 120	<100	ug/L				
3844167	Total Strontium (Sr)	2014/12/02	NC	80 - 120	98	80 - 120	<2.0	ug/L				
3844167	Total Thallium (Tl)	2014/12/02	100	80 - 120	100	80 - 120	<0.10	ug/L				
3844167	Total Tin (Sn)	2014/12/02	104	80 - 120	100	80 - 120	<2.0	ug/L				
3844167	Total Titanium (Ti)	2014/12/02	104	80 - 120	104	80 - 120	<2.0	ug/L				
3844167	Total Uranium (U)	2014/12/02	104	80 - 120	103	80 - 120	<0.10	ug/L				
3844167	Total Vanadium (V)	2014/12/02	100	80 - 120	99	80 - 120	<2.0	ug/L				

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QUALITY ASSURANCE REPORT(CONT'D)

Conestoga-Rovers and Associates Ltd
Client Project #: 084308-01
MONITORING AND MAINTENANCE/NEW
Site Location: HARBOUR
Your P.O. #: 20-019531
Sampler Initials: AB

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits	% Recovery	QC Limits
3844167	Total Zinc (Zn)	2014/12/02	98	80 - 120	100	80 - 120	<5.0	ug/L				
3845780	Dissolved Aluminum (Al)	2014/12/03	104	80 - 120	106	80 - 120	<5.0	ug/L				
3845780	Dissolved Antimony (Sb)	2014/12/03	104	80 - 120	106	80 - 120	<1.0	ug/L				
3845780	Dissolved Arsenic (As)	2014/12/03	103	80 - 120	103	80 - 120	<1.0	ug/L	NC (2)	20		
3845780	Dissolved Barium (Ba)	2014/12/03	99	80 - 120	100	80 - 120	<1.0	ug/L	NC (2)	20		
3845780	Dissolved Beryllium (Be)	2014/12/03	100	80 - 120	101	80 - 120	<1.0	ug/L				
3845780	Dissolved Bismuth (Bi)	2014/12/03	105	80 - 120	105	80 - 120	<2.0	ug/L				
3845780	Dissolved Boron (B)	2014/12/03	99	80 - 120	101	80 - 120	<50	ug/L				
3845780	Dissolved Cadmium (Cd)	2014/12/03	102	80 - 120	102	80 - 120	<0.010	ug/L				
3845780	Dissolved Calcium (Ca)	2014/12/03	92	80 - 120	93	80 - 120	<100	ug/L				
3845780	Dissolved Chromium (Cr)	2014/12/03	99	80 - 120	100	80 - 120	<1.0	ug/L	NC (2)	20		
3845780	Dissolved Cobalt (Co)	2014/12/03	100	80 - 120	100	80 - 120	<0.40	ug/L				
3845780	Dissolved Copper (Cu)	2014/12/03	101	80 - 120	101	80 - 120	<2.0	ug/L	0.84 (2)	20		
3845780	Dissolved Iron (Fe)	2014/12/03	107	80 - 120	108	80 - 120	<50	ug/L				
3845780	Dissolved Lead (Pb)	2014/12/03	99	80 - 120	99	80 - 120	<0.50	ug/L	1.3 (2)	20		
3845780	Dissolved Magnesium (Mg)	2014/12/03	109	80 - 120	109	80 - 120	<100	ug/L				
3845780	Dissolved Manganese (Mn)	2014/12/03	105	80 - 120	105	80 - 120	<2.0	ug/L				
3845780	Dissolved Molybdenum (Mo)	2014/12/03	104	80 - 120	103	80 - 120	<2.0	ug/L				
3845780	Dissolved Nickel (Ni)	2014/12/03	103	80 - 120	104	80 - 120	<2.0	ug/L				
3845780	Dissolved Phosphorus (P)	2014/12/03	109	80 - 120	108	80 - 120	110, RDL=100	ug/L				
3845780	Dissolved Potassium (K)	2014/12/03	107	80 - 120	105	80 - 120	<100	ug/L				
3845780	Dissolved Selenium (Se)	2014/12/03	103	80 - 120	103	80 - 120	<1.0	ug/L				
3845780	Dissolved Silver (Ag)	2014/12/03	102	80 - 120	101	80 - 120	<0.10	ug/L				
3845780	Dissolved Sodium (Na)	2014/12/03	104	80 - 120	106	80 - 120	<100	ug/L				
3845780	Dissolved Strontium (Sr)	2014/12/03	103	80 - 120	104	80 - 120	<2.0	ug/L				
3845780	Dissolved Thallium (Tl)	2014/12/03	104	80 - 120	105	80 - 120	<0.10	ug/L				
3845780	Dissolved Tin (Sn)	2014/12/03	103	80 - 120	105	80 - 120	<2.0	ug/L				
3845780	Dissolved Titanium (Ti)	2014/12/03	103	80 - 120	100	80 - 120	<2.0	ug/L				
3845780	Dissolved Uranium (U)	2014/12/03	107	80 - 120	107	80 - 120	<0.10	ug/L				
3845780	Dissolved Vanadium (V)	2014/12/03	102	80 - 120	101	80 - 120	<2.0	ug/L				

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QUALITY ASSURANCE REPORT(CONT'D)

Conestoga-Rovers and Associates Ltd
Client Project #: 084308-01
MONITORING AND MAINTENANCE/NEW
Site Location: HARBOUR
Your P.O. #: 20-019531
Sampler Initials: AB

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits	% Recovery	QC Limits
3845780	Dissolved Zinc (Zn)	2014/12/03	104	80 - 120	103	80 - 120	<5.0	ug/L	NC (2)	20		
3845879	Total Alkalinity (Total as CaCO3)	2014/12/05	67 (3)	80 - 120	108	80 - 120	<5.0	mg/L	NC (2)	25		
3845880	Dissolved Chloride (Cl)	2014/12/08	101	80 - 120	112	80 - 120	<1.0	mg/L	0.75 (2)	25	105	80 - 120
3845883	Dissolved Sulphate (SO4)	2014/12/08	NC	80 - 120	99	80 - 120	<2.0	mg/L	1.3 (2)	25		
3845890	Reactive Silica (SiO2)	2014/12/04	NC	80 - 120	104	80 - 120	<0.50	mg/L	0.34 (2)	25		
3845893	Colour	2014/12/05			96	80 - 120	<5.0	TCU	NC (2)	25		
3845894	Orthophosphate (P)	2014/12/05	91	80 - 120	95	80 - 120	<0.010	mg/L	NC (2)	25		
3845895	Nitrate + Nitrite	2014/12/05	97	80 - 120	101	80 - 120	<0.050	mg/L	NC (2)	25		
3845897	Nitrite (N)	2014/12/05	105	80 - 120	107	80 - 120	<0.010	mg/L	NC (2)	25		
3846010	Total Organic Carbon (C)	2014/12/03	NC	80 - 120	99	80 - 120	<0.50	mg/L	1.8 (2)	20		
3846098	Total Mercury (Hg)	2014/12/03	85	80 - 120	100	80 - 120	<0.013	ug/L	NC (2)	20		
3846104	Total Mercury (Hg)	2014/12/03	98 (4)	80 - 120	103	80 - 120	<0.013	ug/L	NC (5)	20		
3846106	Total Mercury (Hg)	2014/12/03	94	80 - 120	102	80 - 120	<0.013	ug/L	NC (2)	20		
3846477	Nitrogen (Ammonia Nitrogen)	2014/12/05	101	80 - 120	104	80 - 120	<0.050	mg/L	NC (2)	25		
3847537	Dissolved Aluminum (Al)	2014/12/04	NC	80 - 120	107	80 - 120	<5.0	ug/L	1.0 (2)	20		
3847537	Dissolved Antimony (Sb)	2014/12/04	108	80 - 120	98	80 - 120	<1.0	ug/L	NC (2)	20		
3847537	Dissolved Arsenic (As)	2014/12/04	100	80 - 120	100	80 - 120	<1.0	ug/L	NC (2)	20		
3847537	Dissolved Barium (Ba)	2014/12/04	96	80 - 120	97	80 - 120	<1.0	ug/L	0.12 (2)	20		
3847537	Dissolved Beryllium (Be)	2014/12/04	99	80 - 120	100	80 - 120	<1.0	ug/L	NC (2)	20		
3847537	Dissolved Bismuth (Bi)	2014/12/04	103	80 - 120	101	80 - 120	<2.0	ug/L	NC (2)	20		
3847537	Dissolved Boron (B)	2014/12/04	101	80 - 120	97	80 - 120	<50	ug/L	NC (2)	20		
3847537	Dissolved Cadmium (Cd)	2014/12/04	99	80 - 120	99	80 - 120	<0.010	ug/L	4.9 (2)	20		
3847537	Dissolved Calcium (Ca)	2014/12/04	NC	80 - 120	92	80 - 120	<100	ug/L	1.2 (2)	20		
3847537	Dissolved Chromium (Cr)	2014/12/04	96	80 - 120	97	80 - 120	<1.0	ug/L	NC (2)	20		
3847537	Dissolved Cobalt (Co)	2014/12/04	96	80 - 120	98	80 - 120	<0.40	ug/L	0.11 (2)	20		
3847537	Dissolved Copper (Cu)	2014/12/04	96	80 - 120	97	80 - 120	<2.0	ug/L	NC (2)	20		
3847537	Dissolved Iron (Fe)	2014/12/04	NC	80 - 120	104	80 - 120	<50	ug/L	0.23 (2)	20		
3847537	Dissolved Lead (Pb)	2014/12/04	96	80 - 120	97	80 - 120	<0.50	ug/L	NC (2)	20		
3847537	Dissolved Magnesium (Mg)	2014/12/04	NC	80 - 120	107	80 - 120	<100	ug/L	0.98 (2)	20		
3847537	Dissolved Manganese (Mn)	2014/12/04	NC	80 - 120	101	80 - 120	<2.0	ug/L	0.16 (2)	20		

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QUALITY ASSURANCE REPORT(CONT'D)

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Client Project #: 084308-01
MONITORING AND MAINTENANCE/NEW
Site Location: HARBOUR
Your P.O. #: 20-019531
Sampler Initials: AB

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits	% Recovery	QC Limits
3847537	Dissolved Molybdenum (Mo)	2014/12/04	106	80 - 120	100	80 - 120	<2.0	ug/L	NC (2)	20		
3847537	Dissolved Nickel (Ni)	2014/12/04	97	80 - 120	100	80 - 120	<2.0	ug/L	1.7 (2)	20		
3847537	Dissolved Phosphorus (P)	2014/12/04	105	80 - 120	109	80 - 120	<100	ug/L	NC (2)	20		
3847537	Dissolved Potassium (K)	2014/12/04	101	80 - 120	105	80 - 120	<100	ug/L	2.9 (2)	20		
3847537	Dissolved Selenium (Se)	2014/12/04	99	80 - 120	98	80 - 120	<1.0	ug/L	NC (2)	20		
3847537	Dissolved Silver (Ag)	2014/12/04	99	80 - 120	98	80 - 120	<0.10	ug/L	NC (2)	20		
3847537	Dissolved Sodium (Na)	2014/12/04	NC	80 - 120	106	80 - 120	<100	ug/L	0.026 (2)	20		
3847537	Dissolved Strontium (Sr)	2014/12/04	NC	80 - 120	99	80 - 120	<2.0	ug/L	0.29 (2)	20		
3847537	Dissolved Thallium (Tl)	2014/12/04	103	80 - 120	100	80 - 120	<0.10	ug/L	NC (2)	20		
3847537	Dissolved Tin (Sn)	2014/12/04	107	80 - 120	100	80 - 120	<2.0	ug/L	NC (2)	20		
3847537	Dissolved Titanium (Ti)	2014/12/04	96	80 - 120	101	80 - 120	<2.0	ug/L	NC (2)	20		
3847537	Dissolved Uranium (U)	2014/12/04	104	80 - 120	104	80 - 120	<0.10	ug/L	NC (2)	20		
3847537	Dissolved Vanadium (V)	2014/12/04	99	80 - 120	99	80 - 120	<2.0	ug/L	NC (2)	20		
3847537	Dissolved Zinc (Zn)	2014/12/04	99	80 - 120	100	80 - 120	<5.0	ug/L	0.33 (2)	20		
3847579	Aroclor 1016	2014/12/05					<0.050	ug/L	NC (7)	40		
3847579	Aroclor 1221	2014/12/05					<0.050	ug/L	NC (7)	40		
3847579	Aroclor 1232	2014/12/05					<0.050	ug/L	NC (7)	40		
3847579	Aroclor 1242	2014/12/05					<0.050	ug/L	NC (7)	40		
3847579	Aroclor 1248	2014/12/05					<0.050	ug/L	NC (7)	40		
3847579	Aroclor 1254	2014/12/05	87 (6)	30 - 130	104	30 - 130	<0.050	ug/L	NC (7)	40		
3847579	Aroclor 1260	2014/12/05					<0.050	ug/L	NC (7)	40		
3849323	Total Alkalinity (Total as CaCO3)	2014/12/09	NC	80 - 120	105	80 - 120	<5.0	mg/L	2.9 (2)	25		
3849324	Dissolved Chloride (Cl)	2014/12/09	96	80 - 120	95	80 - 120	<1.0	mg/L	NC (2)	25	103	80 - 120
3849325	Dissolved Sulphate (SO4)	2014/12/09	NC	80 - 120	89	80 - 120	<2.0	mg/L	4.1 (2)	25		
3849328	Reactive Silica (SiO2)	2014/12/09	98	80 - 120	103	80 - 120	<0.50	mg/L	1.6 (2)	25		
3849329	Colour	2014/12/08			106	80 - 120	<5.0	TCU	NC (2)	25		
3849331	Orthophosphate (P)	2014/12/09	92	80 - 120	96	80 - 120	<0.010	mg/L	NC (2)	25		
3849332	Nitrate + Nitrite	2014/12/08	100	80 - 120	98	80 - 120	<0.050	mg/L	NC (2)	25		
3849333	Nitrite (N)	2014/12/08	100	80 - 120	100	80 - 120	<0.010	mg/L	NC (2)	25		
3849459	pH	2014/12/05							0.44 (2)	N/A	100	97 - 103

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Maxxam Job #: B4M6609
Report Date: 2014/12/10

QUALITY ASSURANCE REPORT(CONT'D)

Conestoga-Rovers and Associates Ltd
Client Project #: 084308-01
MONITORING AND MAINTENANCE/NEW
Site Location: HARBOUR
Your P.O. #: 20-019531
Sampler Initials: AB

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits	% Recovery	QC Limits
3849464	Conductivity	2014/12/05			100	80 - 120	1.4, RDL=1.0	uS/cm	0 (2)	25		
3849745	Nitrogen (Ammonia Nitrogen)	2014/12/09	NC	80 - 120	103	80 - 120	<0.050	mg/L	4.0 (2)	25		
3849833	Turbidity	2014/12/05					<0.10	NTU	0.48 (2)	25	105	N/A
3851542	pH	2014/12/08							0.72 (2)	N/A	100	97 - 103
3851549	Conductivity	2014/12/08			101	80 - 120	1.0, RDL=1.0	uS/cm	0.13 (2)	25		
3851565	Total Organic Carbon (C)	2014/12/08	100	80 - 120	104	80 - 120	<0.50	mg/L	NC (2)	20		

N/A = Not Applicable

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

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

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

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

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

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

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

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

(1) Poor RPD due to sample inhomogeneity. Result verified by repeat digestion and analysis.

(2) Duplicate Parent ID

(3) Poor spike recovery due to sample matrix interferences.

(4) Matrix Spike Parent ID [YR1644-02]

(5) Duplicate Parent ID [YR1643-02]

(6) Matrix Spike Parent ID [YR1625-01]

(7) Duplicate Parent ID [YR1623-01]

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Maxxam Job #: B4M6609
Report Date: 2014/12/10

Conestoga-Rovers and Associates Ltd
Client Project #: 084308-01
Site Location: MONITORING AND MAINTENANCE/NEW HARBOUR
Your P.O. #: 20-019531
Sampler Initials: AB

VALIDATION SIGNATURE PAGE

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

Kevin MacDonald, Inorganics Supervisor

Mike MacGillivray, Scientific Specialist (Inorganics)

Phil Deveau

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

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www.maxxamanalytics.com E-mail: Clientservicesbedford@maxxamanalytics.com

MAXXAM Chain of Custody Record

COC #: B 157526 Page 1 of 2

This column for lab use only:
Client Code
Maxxam Job #
B4M6609

Cooler ID	Seal Present	Seal Intact	Temp 1	Temp 2	Temp 3	Average Temp
			1.8	1.9	1.3	
			1.0	0.3		

Integrity: YES NO
Integrity / Checklist by:
Labelled by:
Location / Bin #:

INVOICE INFORMATION:
Company Name: Conestoga-Rovers & Assoc
Contact Name: Brian Cuffman
Address: 1118 Topsail Road, St. John's, NL Postal Code A1B 3W7
Email: bcuffman@craworld.com
Ph (709) 364-5353 Fax: (709) 364-5368

REPORT INFORMATION (if differs from invoice):
Company Name:
Contact Name: Same
Address:
Postal Code
Email:
Ph: Fax:

PO # To Follow
Project # / Phase # 084308-01
Project Name / Site Location Monitoring / Maintenance / New Harbour
Quote 1334651
Site #
Task Order #
Sampled by Andrew Bryant / Geoff Murphy

TURNAROUND TIME
Standard ☒
10 day ☐
If RUSH Specify Date:
Pre-schedule rush work
Charge for # Jars used but not submitted: 0

Guideline Requirements / Detection Limits / Special Instructions
Please C.C
datanl@craworld.com

*Specify Matrix: Surface/Salt/Ground/Tapwater/Sewage/Effluent/Potable/NonPotable/Tissue/Soil/Sludge/Metal/Seawater

	Field Sample Identification	Matrix*	Date/Time Sampled	# & type of bottles	Field Filtered & Preserved	Lab Filtration Required	RCAP-30 Choose Total or Diss Metals	RCAP-MS Choose Total or Diss Metals	Metals Water: Total Digest (Default Method) for well water, surface water	Metals Water: Dissolved for ground water	Metals Water: Mercury	Metals Soil: Metals & Mercury Default Available Digest Method	Metals Soil: Metals Total Digest - for Ocean sediments (HNO3/HF/HCLO4)	Metals Soil: Mercury Low level by Cold Vapour AA	Metals Soil: Selenium (low level) Rec'd for CCME Residential, Parklands, Agricultural	Metals Soil: Hot Water soluble Boron (required for CCME Agricultural)	Hydrocarbons: RBCA Hydrocarbons (BTEX, C6-C32)	Hydrocarbons: Hydrocarbons Soil (Potable), NS Fuel Oil Spill Policy Low Level BTEX, C6-C32	Hydrocarbons: NB Potable Water BTEX, VPH, Low level T.E.H.	Hydrocarbons: TPH Fractionation	Hydrocarbons: PAH's	Hydrocarbons: PAH's with Acridine, Quinoline	PCBs
1	MW-01	Water	Nov 27/14 11:00am	4	X	NO				X	X											X
2	MW-02	Water	Nov 27/14 12:00pm	4	X	NO				X	X											X
3	MW-03	Water	Nov 27/14 3:00pm	4	X	NO				X	X											X
4	MW-04	Water	Nov 27/14 2:30pm	4	X	NO				X	X											X
5	MW-05A	Water	Nov 27/14 12:30pm	4	X	NO				X	X											X
6	MW-06	Water	Nov 27/14 1:00pm	4	X	NO				X	X											X
7	MW-07	Water	Nov 27/14 1:30am	4	X	NO				X	X											X
8	MW-08	Water	Nov 27/14 10:30am	4	X	NO				X	X											X
9	SW-Stream	Water	Nov 27/14 2:00pm	4	X	NO		X			X											X
10	SW-Pond	Water	Nov 27/14 10:00am	4	X	NO		X			X											X

Preserved, not field filtered
Preserved, not field filtered

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MAXXAM NL

2014 DEC 1 9:38

RELINQUISHED BY: (Signature/Print)	Date	Time	RECEIVED BY: (Signature/Print)	Date	Time
Geoff Murphy / Geoff Murphy	Nov 28/14	9:30am	Sara Mason SARA MASON	2014/11/28	3:30

B4M6609

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MAXXAM Chain of Custody Record

COC #: B 157527 Page 2 of 2

This column for lab use only:
Client Code
Maxxam Job # B4M6604

Cooler ID	Seal Present	Seal Intact	Temp 1	Temp 2	Temp 3	Average Temp
			1.0	1.0	1.0	

Integrity: YES NO
Integrity / Checklist by: JMo
Labelled by:
Location / Bin #:

INVOICE INFORMATION:
Company Name: Conestoga Rovers & Assoc
Contact Name: Brian Luffman
Address: 1118 Topsail Road
St. John's, NL Postal Code A1B 3W7
Email: bluffman@craworld.com
Ph: (709)364-5353 Fax: (709)364-5368

REPORT INFORMATION (if differs from invoice):
Company Name:
Contact Name: same
Address:
Postal Code
Email:
Ph: Fax:

PO # TO follow
Project # / Phase # 084308-01
Project Name / Site Location Monitoring & Maintenance / New Harbour
Quote 133465
Site #
Task Order #
Sampled by Andrew Bryant / Geoff Murphy

TURNAROUND TIME
Standard [X]
10 day [ ]
If RUSH Specify Date:
Pre-schedule rush work
Charge for # Jars used but not submitted [ ]

Guideline Requirements / Detection Limits / Special Instructions
Please CC
dlatan1@craworld.com

*Specify Matrix: Surface/Salt/Ground/Tapwater/Sewage/Effluent/Potable/NonPotable/Tissue/Soil/Sludge/Metal/Seawater

Field Sample Identification	Matrix*	Date/Time Sampled	# & type of bottles	Field Filtered & Preserved	Lab Filtration Required	RCAP-30 (Choose Total or Diss Metals)	RCAP-MS (Choose Total or Diss Metals)	Metals Water: Total Digest (Default Method) for well water, surface water	Metals Water: Dissolved for ground water	Metals Water: Mercury	Metals Soil: Metals & Mercury Default Available Digest Method	Metals Soil: Metals Total Digest - for Ocean sediments (HNO3/HF/HCLO4)	Metals Soil: Mercury Low level by Cold Vapour AA	Metals Soil: Selenium (low level) Req'd for CCME Residential, Parklands, Agricultural	Metals Soil: Hot Water soluble Boron (required for CCME Agricultural)	Hydrocarbons: RBCA Hydrocarbons (BTEX, C6-C32)	Hydrocarbons: Hydrocarbons Soil (Potable), NS Fuel Oil Spill Policy Low Level BTEX, C6-C32	Hydrocarbons: NB Potable Water BTEX, VPH, Low level T.E.H.	Hydrocarbons: TPH Fractionation	Hydrocarbons: PAH's	Hydrocarbons: PAH's with Acridine, Quinoline	PCBs
1 MW-Dup 2	Water	Nov 27/14 1:00pm	4	X	NO				X	X											X
2 SW-upstream	Water	Nov 27/14 1:30pm	4	X	NO		X			X											X
3																					
4																					
5																					
6																					
7																					
8																					
9																					
10																					

Preserved, not field filtered

SHIPPED FROM MAXXAM NL

2014 DEC 1 9:38

RELINQUISHED BY: (Signature/Print)	Date	Time	RECEIVED BY: (Signature/Print)	Date	Time
Geoff Murphy / Geoff Murphy	14/11/28	9:30am	Sara Mason SARA MASON	2014/11/28	3:30

White: Maxxam Yellow : Mail Pink: Client

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APPENDIX C

HISTORICAL MONITORING DATA (AMEC)

TABLE C1

HISTORICAL GROUNDWATER ANALYTICAL DATA - PCBs (ug/L)
2013/14 MONITORING AND MAINTENANCE PROGRAM
UPPER TRINITY SOUTH (NEW HARBOUR) WASTE DISPOSAL SITE
NEW HARBOUR BARRENS, NL

Sample Location	Sample Date												Criteria*
	Feb 2007	Nov 2007	May 2008	Mar 2009 [1]	Mar 2009 [2]	Oct 2009	Jan 2010	Dec 2010	Dec 2011	Nov 2012	Aug 2013	Nov 2014	
MW-01	-	<	<	<	<	0.07	<	<	< (0.06)	<	<	<	7.8
MW-02	-	<	<	-	-	<	< (0.06)	-	<	-	<	<	
MW-03	< (0.4)	<	<	<	-	<	< (0.06)	<	<	<	<	<	
MW-04	-	<	<	<	-	<	<	<	<	<	<	<	
MW-05	<	<	<	<	-	<	<	<	<	-	<	-	
MW-05A	-	-	-	-	-	-	-	-	-	-	-	<	
MW-06	-	<	<	-	-	<	<	<	< (0.06)	< (0.06)	<	<	
MW-06 DUP-02	-	-	-	-	-	-	-	-	-	-	-	<	
MW-07	-	<	<	<	<	<	<	<	<	<	<	<	
MW-DUP	-	-	-	-	-	-	<	-	-	-	<	-	
MW-08	-	-	-	-	-	-	-	<	<	<	<	<	
MW-08 DUP-01	-	-	-	-	-	-	-	-	-	<	-	-	
RDL	0.04	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	

Analysis completed for all samples from 2007 to 2012 except March 2009[2] were completed by AMEC.

Analysis completed for samples from March 2009[2], 2013, and 2014 were completed by Maxxam Analytics Inc. in Bedford, NS.

Data from February 2007 to November 2012 transcribed from the 2012-2013 Annual Report of Activities for the Upper Trinity South (New Harbour) Waste Disposal Site completed by AMEC and dated March 29, 2013.

* Ontario Ministry of the Environment (MOE) "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act", April 15, 2011, Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition

MW = Monitor Well

MW-DUP = Field Duplicate of MW-07.

MW-08 DUP-01 = Field Duplicate of MW-08.

< = Parameter below detection limit

< (0.00) = Parameter below elevated detection limit

- = No sample collected

0.0 = above criteria

RDL = Reportable Detection Limit

TABLE C2

HISTORICAL GROUNDWATER ANALYTICAL DATA - METALS (ug/L)
2013/14 MONITORING AND MAINTENANCE PROGRAM
UPPER TRINITY SOUTH (NEW HARBOUR) WASTE DISPOSAL SITE
NEW HARBOUR BARRENS, NL

Parameter	RDL [1]	Criteria [2]	MW-01											MW-02						
			Feb 2007	Nov 2007	May 2008	Jan 2009	Oct 2009	Jan 2010	Dec 2010	Dec 2011	Nov 2012	Aug 2013	Nov 2014	Feb 2007	Nov 2007	May 2008	Oct 2009	Jan 2010	Dec 2011	Nov 2014
Aluminum (Al)	5.0	-	558,000	3,530	75	72.5	176	109	250	234	130	72.4	59	3,540	70	34	56.9	45.6	432	77
Antimony (Sb)	1.0	20,000	<	<	<	< (2)	< (2)	< (2)	<	<	<	<	<	<	<	<	< (2)	< (2)	<	<
Arsenic (As)	1.0	1,900	77	<	4	< (2)	< (2)	< (2)	<	<	<	<	<	<	<	<	< (2)	< (2)	<	<
Barium (Ba)	1.0	29,000	870	15.1	2.1	< (5)	< (5)	< (5)	2	1.7	3.2	2.2	1.7	17.6	2.7	3.0	< (5)	< (5)	4.7	2.5
Beryllium (Be)	1.0	67	36.9	0.2	<	< (2)	< (2)	< (2)	<	<	<	<	<	0.5	<	<	< (2)	< (2)	<	<
Bismuth (Bi)	2.0	-	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<
Boron (B)	5.0	45,000	-	-	-	-	5.6	<	<	< (50)	< (50)	<	<	-	-	-	<	<	< (50)	<
Cadmium (Cd)	0.017	2.7	1.792	0.380	0.058	0.021	0.020	0.026	0.020	<	<	0.017	0.046	0.158	1.010	0.057	0.039	<	0.056	0.026
Calcium (Ca)	100	-	81,600	2,070	2,400	-	5,200	2,000	2,200	2,040	2,530	2,530	2,600	2,670	1,350	1,330	1,700	1,300	1,910	1,900
Chromium (Cr)	1.0	810	82	2	<	<	<	<	<	<	<	<	<	10.8	<	<	<	<	<	3.7
Cobalt (Co)	0.4	66	**79.85**	2	< (1)	<	< (4)	<	<	0.4	0.95	0.65	<	7	< (1)	< (1)	0.86	1.04	0.53	0.59
Copper (Cu)	2.0	87	**1,250**	12	2	5	18.5	3.1	3	<	<	<	<	29	1	4	8.3	<	7.1	4.2
Iron (Fe)	50	-	75,000	2,180	246	140	107	<	290	167	968	100	<	4,170	64	59	<	<	245	220
Lead (Pb)	0.5	25	**192.7**	4	< (1)	<	<	<	<	<	<	<	<	6	< (1)	< (1)	<	<	0.62	<
Magnesium (Mg)	100	-	15,500	642	745	-	1,400	600	500	611	602	721	730	1,150	449	479	600	500	258	620
Manganese (Mn)	2.0	-	2,120	58	31	34	20.5	9.7	17	15.9	83.3	52.7	13	150	13	19	8.3	33.4	4.5	24.0
Mercury (Hg)	0.013	0.29 [3]	< (0.02)	< (0.02)	0.13	0.08	0.030	0.11	-	-	-	0.033	0.017	< (0.01)	< (0.02)	0.03	-	0.015	-	<
Molybdenum (Mo)	2.0	9,200	16	< (5)	< (5)	<	<	<	<	<	<	<	<	< (5)	< (5)	< (5)	<	<	<	<
Nickel (Ni)	2.0	490	43	< (5)	< (5)	<	<	<	<	<	<	<	<	5	< (5)	< (5)	<	<	<	<
Phosphorus (P)	100	-	32,200	127	<	-	<	200	140	-	<	<	130	336	<	<	<	200	-	110
Potassium (K)	100	-	9,180	595	212	-	2,100	200	150	166	275	266	180	546	239	148	400	200	238	250
Selenium (Se)	1.0	63	1	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<
Silver (Ag)	0.1	1.5	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<
Sodium (Na)	100	2,300,000	11,800	4,090	4,750	-	12,000	3,700	4,300	4,140	5,810	4,390	4,900	12,100	4,510	5,210	5,100	5,200	5,020	5,400
Strontium (Sr)	2.0	-	-	-	-	-	13.4	6.9	7	6.9	12.3	10.2	9	-	-	-	6	6	5	9.7
Thallium (Tl)	0.1	510	-	-	-	-	<	<	<	<	<	<	<	-	-	-	<	<	<	<
Tin (Sn)	2.0	-	-	-	-	-	<	<	<	<	<	<	3.2	-	-	-	<	<	<	<
Titanium (Ti)	2.0	-	-	-	-	-	6.4	4.8	6	6.8	3.0	2.5	<	-	-	-	<	<	24	<
Uranium (U)	0.1	420	-	-	-	-	<	<	<	<	<	<	<	-	-	-	<	<	<	<
Vanadium (V)	2.0	250	108	< (5)	< (5)	<	<	<	<	<	<	<	<	3	< (5)	< (5)	<	<	<	<
Zinc (Zn)	5.0	1,100	825	12	5	6	37.3	8.4	6	5.5	5.2	9.4	6.3	22	4	6	21.1	<	19.5	7.2
pH	-	6.5 - 9.0	6.04	7.3	5.96	6.23	6.15	6.05	6.25	5.88	6.81	-	-	5.62	6.05	5.94	6.1	5.59	7.15	-
Hardness	1,000	-	268,000	7,880	9,080	8,370	19,000	7,000	8,000	-	8,800	-	-	11,500	5,220	5,220	7,000	5,000	-	-

Notes:

RDL = Reportable Detection Limit
MW = Monitor Well
- = Not analysed/No criteria

< = Parameter below detection limit
< (0.0) = Parameter below elevated detection limit
0.0 = above criteria

Analysis completed by AMEC for all samples from 2007 to 2012 .
Analysis of samples from 2013 and 2014 was completed by Maxxam Analytics Inc. in Bedford, NS.
Data to November 2012 transcribed from the 2012-2013 Annual Report of Activities for the Upper Trinity South (New Harbour) Waste Disposal Site completed by AMEC, dated March 29, 2013.

1. Typical Reportable Detection Limit referenced based on Maxxam laboratory analysis, but RDL may be lower than shown for original data.
2. Ontario Ministry of the Environment (MOE) "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act", April 15, 2011, Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition
3. Based on Coarse-grained soil conditions.

TABLE C2

HISTORICAL GROUNDWATER ANALYTICAL DATA - METALS (ug/L)
2013/14 MONITORING AND MAINTENANCE PROGRAM
UPPER TRINITY SOUTH (NEW HARBOUR) WASTE DISPOSAL SITE
NEW HARBOUR BARRENS, NL

Parameter	RDL [1]	Criteria [2]	MW-03												MW-04										
			Feb 2007	Nov 2007	Nov 2007	May 2008	Mar 2009 [1]	Oct 2009	Jan 2010	Dec 2010	Dec 2011	Nov 2012	Aug 2013	Nov 2014	Feb 2007	Nov 2007	Jul 2008	Jan 2009	Oct 2009	Jan 2010	Dec 2010	Dec 2011	Nov 2012	Aug 2013	Nov 2014
Aluminum (Al)	5.0	-	5,450	129	145	45	146	120	87.9	190	163	78.4	167	140	275,000	1,580	41	105	197	131	60	84.1	1,610	53.8	53
Antimony (Sb)	1.0	20,000	<	<	<	<	< (2)	< (2)	< (2)	<	<	<	<	<	<	<	<	< (2)	< (2)	< (2)	<	<	<	<	<
Arsenic (As)	1.0	1,900	3	1	1	<	6	< (2)	7.8	4	7.4	6.6	9.9	1	15	2	13	8	11.1	3.1	2	2	3.2	2.3	<
Barium (Ba)	1.0	29,000	64.8	25.5	25.0	7.7	12	29.3	13.4	6	9.8	10.2	12.1	4.9	356.0	14.7	34.8	92	20.4	25.8	12	14.9	51.1	11.7	6.1
Beryllium (Be)	1.0	67	1.6	<	0.2	0.3	< (2)	< (2)	< (2)	<	<	<	<	<	40.5	0.3	<	< (2)	< (2)	< (2)	<	<	<	<	<
Bismuth (Bi)	2.0	-	<	<	<	<	<	<	<	<	<	<	<	<	<	<	0.8	<	<	<	<	<	<	<	<
Boron (B)	5.0	45,000	-	-	-	-	-	29.2	22.9	11	< (50)	< (50)	<	<	-	-	-	-	22.4	37.1	22	< (50)	< (50)	<	<
Cadmium (Cd)	0.017	2.7	0.109	0.067	0.221	0.102	<	0.049	0.018	< (0.02)	0.063	<	0.03	<	1.013	0.059	0.166	<	<	<	< (0.02)	<	0.101	<	0.052
Calcium (Ca)	100	-	15,800	11,300	10,500	5,060	-	15,000	13,000	7,000	8,780	10,800	11,900	7,300	34,600	17,500	32,500	-	19,000	9,400	6,700	8,710	15,700	8,970	5,900
Chromium (Cr)	1.0	810	7.0	<	<	<	<	1.7	<	<	<	<	<	<	37.0	1	1	<	1.1	<	<	<	2.9	<	<
Cobalt (Co)	0.4	66	12	5	5	9	6	1.98	5.49	4.6	4.75	3.63	6.18	2.6	100	4	14	8.38	7.21	2.87	1.9	2.42	11.1	4.11	2.9
Copper (Cu)	2.0	87	3	4	4	4	<	5.0	<	<	3.5	<	2.1	<	137	6	<	2	2.6	<	<	<	5.3	<	4.1
Iron (Fe)	50	-	6,680	2,410	2230	312	1,400	4,390	1,590	1,500	1,030	9,570	3,220	6,800	64,100	1,170	2,430	7,600	2,030	2,020	1,100	1,950	6,530	1,680	590
Lead (Pb)	0.5	25	19	4	4	< (1)	<	1.11	<	<	<	<	0.97	<	63	2	3	0.8	<	1.14	0.6	0.68	2.44	<	<
Magnesium (Mg)	100	-	4,000	2,470	2,410	1,140	-	3,200	3,600	1,600	2,160	1,610	2,910	690	7,680	5,380	10,100	-	5,000	1,900	1,200	1,740	3,160	1,860	1,200
Manganese (Mn)	2.0	-	2,040	1,010	964	171	3,800	721	3,930	1,900	2,090	1,570	3020	550	8,950	2,370	6,740	2,500	4,510	925	370	549	1,300	465	190
Mercury (Hg)	0.013	0.29 [3]	0.02	< (0.02)	< (0.02)	0.04	**0.68**	0.037	**0.46**	-	-	-	0.26	0.025	< (0.01)	< (0.02)	< (0.02)	0.01	0.18	0.083	-	-	-	0.022	0.037
Molybdenum (Mo)	2.0	9,200	< (5)	< (5)	< (5)	< (5)	<	<	<	<	<	<	<	<	8	< (5)	< (5)	<	2.4	<	<	<	<	<	<
Nickel (Ni)	2.0	490	5	< (5)	< (5)	< (5)	<	<	<	<	6	<	2.8	<	22	< (5)	< (5)	3	<	<	<	<	3.3	<	<
Phosphorus (P)	100	-	1,090	312	199	20	-	200	<	110	-	<	<	130	11,100	93	28	-	<	100	130	-	335	104	110
Potassium (K)	100	-	6,560	3,630	3,540	633	-	4,800	2,400	1,100	1,350	1,730	1760	280	4,810	3,150	4,440	-	3,600	2,900	1,500	2,130	2,900	1200	660
Selenium (Se)	1.0	63	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<
Silver (Ag)	0.1	1.5	<	<	<	<	<	<	<	<	<	<	<	<	0.1	<	0.7	<	<	<	<	<	<	<	<
Sodium (Na)	100	2,300,000	189,000	102,000	103,000	24,500	-	96,000	73,000	32,000	32,300	37,000	36,200	7,200	60,700	91,200	149,000	-	88,000	77,000	40,000	41,900	43,500	32,800	23,000
Strontium (Sr)	2.0	-	-	-	-	-	-	56.2	38.0	21	22.9	50.5	38.2	27	-	-	-	-	51.9	34	24	29	89.7	29.1	21
Thallium (Tl)	0.1	510	-	-	-	-	-	<	<	<	<	<	<	<	-	-	-	-	<	<	<	<	<	<	<
Tin (Sn)	2.0	-	-	-	-	-	-	<	<	<	<	<	<	5.3	-	-	-	-	<	<	<	<	<	<	8.6
Titanium (Ti)	2.0	-	-	-	-	-	-	11.9	2.9	4	7.4	2.5	8.6	2.6	-	-	-	-	10.2	30.6	6	8.6	56.0	3.5	<
Uranium (U)	0.1	420	-	-	-	-	-	<	0.11	<	<	<	0.13	<	-	-	-	-	<	<	<	<	0.19	<	<
Vanadium (V)	2.0	250	9	< (5)	< (5)	< (5)	<	2.4	<	<	<	<	<	<	43	< (5)	5	4	<	3	<	<	3.6	<	<
Zinc (Zn)	5.0	1,100	41	6	5	30	<	58.2	7.4	9	18.3	<	9.1	<	212	4	8	6	16.2	<	7	7.7	19.3	7	23
pH	-	6.5 - 9.0	6.66	6.6	6.61	5.96	6.95	6.94	6.57	7.27	6.93	7.11	-	-	6.01	6.53	6.69	6.84	6.8	6.75	7.45	6.68	7.08	-	-
Hardness	1,000	-	56,000	38,400	38,401	17,400	70,700	51,000	48,000	24,000	-	3,400	-	-	118	65,900	50,700	37,700	69,000	31,000	22,000	-	52,000	-	-

Notes:

RDL = Reportable Detection Limit
MW = Monitor Well
- = Not analysed/No criteria

< = Parameter below detection limit
< (0.0) = Parameter below elevated detection lim
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Analysis completed by AMEC for all samples from 2007 to 2012 .
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1. Typical Reportable Detection Limit referenced based on Maxxam laboratory analysis, but RDL may be lower than shown for original data.
2. Ontario Ministry of the Environment (MOE) "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act", April 15, 2011, Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition
3. Based on Coarse-grained soil conditions.

TABLE C2

HISTORICAL GROUNDWATER ANALYTICAL DATA - METALS (ug/L)
2013/14 MONITORING AND MAINTENANCE PROGRAM
UPPER TRINITY SOUTH (NEW HARBOUR) WASTE DISPOSAL SITE
NEW HARBOUR BARRENS, NL

Parameter	RDL [1]	Criteria [2]	MW-05									MW-05A	MW-06											MW-DUP02
			Feb 2007	Nov 2007	May 2008	Jan 2009	Oct 2009	Jan 2010	Dec 2010	Dec 2011	Aug 2013	Nov 2014	Feb 2007	Nov 2007	May 2008	Jan 2009	Oct 2009	Jan 2010	Dec 2010	Dec 2010	Dec 2011	Nov 2012	Aug 2013	Nov 2014	Nov 2014
Aluminum (Al)	5.0	-	57,100	7,880	288	209	168	95.7	200	133	191	91	8,540	485	179	44.1	112	< (50)	160	180	176	247	1,910	180	160
Antimony (Sb)	1.0	20,000	<	<	<	< (2)	< (2)	< (2)	<	<	<	<	<	<	<	< (2)	< (2)	< (2)	<	<	<	<	<	<	<
Arsenic (As)	1.0	1,900	17	1	<	< (2)	< (2)	< (2)	<	<	1.6	<	3	<	<	< (2)	< (2)	< (20)	2	2	1.7	2.9	2.3	1.8	1.8
Barium (Ba)	1.0	29,000	114.0	23.4	1.4	< (5)	< (5)	< (5)	2	4	22.4	3.6	55.9	9.6	6.9	16	26.4	< (50)	8	8	4.6	7.4	3.4	2.4	1.8
Beryllium (Be)	1.0	67	20.8	0.2	<	< (2)	< (2)	< (2)	<	<	<	<	0.7	<	<	< (2)	< (2)	< (20)	<	<	<	<	<	<	<
Bismuth (Bi)	2.0	-	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	< (20)	<	<	<	<	<	<	<
Boron (B)	5.0	45,000	-	-	-	-	<	<	<	<	<	<	-	-	-	-	468	693	170	180	142	96	<	<	<
Cadmium (Cd)	0.017	2.7	0.627	0.192	0.059	0.020	0.067	<	< (0.02)	0.061	0.032	0.041	0.364	0.122	0.082	0.051	0.038	<	< (0.02)	< (0.02)	<	<	0.2	0.014	<
Calcium (Ca)	100	-	14,300	2,330	1,310	-	3,700	2,300	2,800	3,740	19,800	2,700	52,000	30,900	26,600	-	79,000	150,000	28,000	28,000	22,400	14,800	1,170	13,000	14,000
Chromium (Cr)	1.0	810	15.0	5.0	<	<	<	<	<	<	<	1.3	14.6	<	<	<	<	< (10)	<	<	<	<	1.7	<	<
Cobalt (Co)	0.4	66	27	4	< (1)	1.06	0.63	<	<	0.48	0.66	2.2	12	6	4	3.68	6.35	< (4)	4.2	4	2.93	2.58	0.83	2.20	2.1
Copper (Cu)	2.0	87	**237**	39	7	7	16.0	2.8	3	9.2	4.1	9.7	42	5	7	7	5.5	< (20)	2	2	2.7	<	3.1	2.2	<
Iron (Fe)	50	-	12,390	2,940	124	120	105	< (50)	79	65	3,640	890	10,276	513	178	< (50)	637	< (500)	3,100	3,200	2,870	8,380	3,330	8,000	8,600
Lead (Pb)	0.5	25	**57**	11	< (1)	0.5	<	<	<	<	1.36	0.92	**26**	< (1)	< (1)	<	<	< (5)	<	<	<	1.19	1.82	1.80	<
Magnesium (Mg)	100	-	3,490	616	502	-	1,300	800	790	825	1,090	860	11,400	5,840	5,210	-	15,000	30,000	4,600	4,800	3,920	2,400	644	2,300	2,400
Manganese (Mn)	2.0	-	487	77	15	35	26.3	11.8	20	10.7	283	580	1,830	905	520	890	1,060	889	380	400	355	480	32.4	400	410
Mercury (Hg)	0.013	0.29 [3]	< (0.01)	0.06	**1.44**	**0.85**	0.013	0.078	-	-	0.17	0.042	< (0.01)	< (0.02)	0.04	< (0.01)	0.11	0.047	-	-	-	-	0.072	0.017	0.013
Molybdenum (Mo)	2.0	9,200	3	< (5)	< (5)	<	13.6	<	<	<	8.2	<	< (5)	< (5)	< (5)	<	<	< (20)	<	<	<	<	<	<	<
Nickel (Ni)	2.0	490	20	< (5)	< (5)	<	<	<	<	<	2.3	7.5	6	< (5)	< (5)	<	2.3	< (20)	<	<	<	2.5	<	<	<
Phosphorus (P)	100	-	3,550	373	6	-	<	100	<	-	<	150	1,340	60	30	-	100	<	<	180	-	182	123	450	410
Potassium (K)	100	-	1,530	405	446	-	900	100	210	524	<	1900	20,100	9,220	10,200	-	22,000	33,000	9,000	9,000	5,180	3,540	159	2,600	2500
Selenium (Se)	1.0	63	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	< (10)	<	<	<	<	<	<	<
Silver (Ag)	0.1	1.5	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	< (1)	<	<	<	<	<	<	<
Sodium (Na)	100	2,300,000	6,800	10,200	4,030	-	8,200	4,900	5,400	5,200	9,050	14,000	53,400	27,600	21,800	-	56,000	72,000	20,000	20,000	11,800	10,000	6,220	6,200	6,000
Strontium (Sr)	2.0	-	-	-	-	-	10.2	7.8	8	8.1	136	12	-	-	-	-	228	392	70	71	56	51.9	8.7	34.0	35
Thallium (Tl)	0.1	510	-	-	-	-	<	<	<	<	<	<	-	-	-	-	<	< (1)	<	<	<	<	<	<	<
Tin (Sn)	2.0	-	-	-	-	-	<	<	<	<	<	2.4	-	-	-	-	<	< (20)	<	<	<	<	3.7	2.5	2.5
Titanium (Ti)	2.0	-	-	-	-	-	3.3	<	4	2	5.8	5.3	-	-	-	-	7.0	< (20)	6	6	5.6	7.8	46.9	7.3	5.7
Uranium (U)	0.1	420	-	-	-	-	<	<	<	<	0.52	<	-	-	-	-	<	< (1)	<	<	<	<	0.22	<	<
Vanadium (V)	2.0	250	19	6	< (5)	<	<	<	<	<	<	<	10	< (5)	< (5)	<	<	< (20)	<	<	<	<	2.6	<	<
Zinc (Zn)	5.0	1,100	163	25	6	10	20.2	5.2	12	28	19.6	49	52	10	14	8	46.5	< (50)	15	14	8.9	6.1	17.3	9.1	<
pH	-	6.5 - 9.0	6.09	6.1	6.3	6.09	6.18	5.92	6.7	6.34	-	-	6.13	6.11	6.31	6.42	6.36	6.82	7.1	7.02	6.98	6.96	-	-	-
Hardness	1,000	-	50,100	8,350	5,330	6,840	14,000	9,000	10,000	-	-	-	177,000	101,000	87,900	94,450	260,000	510,000	88,000	91,000	-	47,000	-	-	-

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TABLE C2

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2013/14 MONITORING AND MAINTENANCE PROGRAM
UPPER TRINITY SOUTH (NEW HARBOUR) WASTE DISPOSAL SITE
NEW HARBOUR BARRENS, NL

Parameter	RDL [1]	Criteria [2]	MW-07													MW-DUP		MW-08						
			Feb 2007	Nov 2007	May 2008	May 2008	Jan 2009	Jan 2009	Oct 2009	Jan 2010	Dec 2010	Dec 2011	Dec 2011	Nov 2012	Aug 2013	Aug 2013	Nov 2014	Mar 2010	Dec 2010	Dec 2011	Nov 2012	Nov 2012	Aug 2013	Nov 2014
Aluminum (Al)	5.0	-	4,527	1,740	982	1,170	830	822	2,460	1,100	2,900	1,760	1,860	4,320	1,910	1,930	2,300	626	640	1,210	1,160	1,190	1,410	1,100
Antimony (Sb)	1.0	20,000	<	<	<	<	< (2)	< (2)	< (2)	< (2)	<	<	<	<	<	<	1.4	< (2)	<	<	<	<	<	<
Arsenic (As)	1.0	1,900	2	<	2	1	< (2)	< (2)	< (2)	< (2)	1	<	<	2.5	2.3	1.9	2.3	< (2)	<	<	1.1	1.1	3.3	<
Barium (Ba)	1.0	29,000	18.7	4.8	2.4	2.8	< (5)	< (5)	< (5)	< (5)	5	3.5	3.4	9.1	3.4	4.1	13	< (5)	6	7.2	7.0	7.1	5.1	5.7
Beryllium (Be)	1.0	67	0.4	0.1	<	<	< (2)	< (2)	< (2)	< (2)	<	<	<	<	<	<	<	< (2)	<	<	<	<	<	<
Bismuth (Bi)	2.0	-	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<
Boron (B)	5.0	45,000	-	-	-	-	-	-	< (10)	<	<	< (50)	< (50)	< (50)	<	<	<	6	<	< (50)	< (50)	< (50)	<	<
Cadmium (Cd)	0.017	2.7	0.122	0.024	0.118	0.103	0.020	0.019	0.032	<	0.03	<	<	0.068	0.2	0.023	0.17	0.018	0.02	0.022	0.043	0.040	0.036	0.0274
Calcium (Ca)	100	-	3,690	1,040	791	758	-	-	1,200	500	2,000	1,130	1,080	2,040	1,170	1,170	6,000	800	810	840	729	711	593	1,400
Chromium (Cr)	1.0	810	4.0	1	<	1	<	<	2.4	<	2	1.4	1.3	4.5	1.7	1.7	6.1	<	<	<	<	<	<	1.3
Cobalt (Co)	0.4	66	4	2	< (1)	1	0.93	0.93	0.87	0.48	0.7	0.64	0.60	1.28	0.83	0.9	1.6	0.58	1.1	0.61	0.57	0.63	0.4	<
Copper (Cu)	2.0	87	14	5	3	3	<	3	4.0	<	2	2.9	2.7	7.1	3.1	3.2	44	8.8	7	15.4	13.1	12.9	11.7	7.3
Iron (Fe)	50	-	2,910	1,130	2,120	2,490	1,200	1,200	1,820	1,280	2,300	1,990	1,980	4,680	3,330	3,310	4,500	411	590	513	399	415	791	290
Lead (Pb)	0.5	25	3	1	< (1)	1	<	<	2.26	0.63	1.9	1.64	1.66	5.02	1.82	1.78	4.9	1.2	<	0.6	<	0.52	<	<
Magnesium (Mg)	100	-	962	837	490	354	-	-	700	500	450	312	323	430	644	656	740	34.7	560	546	484	518	403	530
Manganese (Mn)	2.0	-	67	19	38	45	23	22	28.9	18.7	36	30.3	29.2	78.2	32.4	33.4	110	200	41	30.9	24.8	27.7	12.7	18
Mercury (Hg)	0.013	0.29 [3]	< (0.01)	< (0.02)	0.13	0.09	0.07	0.08	0.13	0.043	-	-	-	-	0.072	0.072	0.097	<	-	-	-	-	0.048	0.013
Molybdenum (Mo)	2.0	9,200	< (5)	< (5)	< (5)	< (5)	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<
Nickel (Ni)	2.0	490	7	< (5)	< (5)	< (5)	<	<	<	<	<	<	<	3.5	<	6.1	9.3	2.7	6	5	5.3	5.5	2.9	<
Phosphorus (P)	100	-	383	104	55	66	-	-	100	100	< (1,000)	-	-	146	123	143	420	<	<	-	<	<	<	130
Potassium (K)	100	-	463	221	170	290	-	-	300	<	< (1,000)	180	190	320	159	251	5500	500	310	334	242	281	202	260
Selenium (Se)	1.0	63	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<
Silver (Ag)	0.1	1.5	<	<	<	<	<	<	<	<	<	<	<	<	<	<	0.13	<	<	0.2	<	<	0.13	<
Sodium (Na)	100	2,300,000	4,220	4,680	3,830	3,950	-	-	9,200	5,800	9, 300	8,270	8,090	21,700	6,220	6,210	27,000	5,400	4,400	4,340	5,000	5,210	3,700	4,900
Strontium (Sr)	2.0	-	-	-	-	-	-	-	9.1	< (5)	13	7.6	7.8	12.5	8.7	8.5	22	< (5)	8	7.1	7.9	8.4	6.5	8.4
Thallium (Tl)	0.1	510	-	-	-	-	-	-	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<
Tin (Sn)	2.0	-	-	-	-	-	-	-	<	<	<	<	<	<	3.7	3.3	4.4	<	<	<	<	<	<	<
Titanium (Ti)	2.0	-	-	-	-	-	-	-	54.8	19.1	49	40.4	40.6	120	46.9	45	89	7.8	8	18.2	18.2	15.9	21.9	15
Uranium (U)	0.1	420	-	-	-	-	-	-	0.14	<	0.2	0.17	0.18	0.82	0.22	0.21	0.59	0.1	<	0.1	<	<	<	<
Vanadium (V)	2.0	250	6	< (5)	< (5)	< (5)	<	<	2.6	<	<	<	<	6.9	2.6	2.3	5.5	<	<	<	<	<	<	<
Zinc (Zn)	5.0	1,100	15	9	8	19	11	15	24	8.6	17	8.3	10.8	26.6	17.3	14.8	140	16.5	30	20.2	28.2	28.6	19.2	19
pH	-	6.5 - 9.0	4.92	5.01	5.2	5.45	4.65	4.47	4.71	4.86	6.05	5.59	5.59	5.74	-	-	-	5.21	5.21	5.74	5.15	5.16	-	-
Hardness	1,000	-	13,200	5,890	3,990	3,870	5,740	5,500	6,000	3,000	7,000	-	-	6,900	-	-	-	4,000	4,000	-	3,800	3,900	-	-

Notes:

RDL = Reportable Detection Limit
MW = Monitor Well
- = Not analysed/No criteria

< = Parameter below detection limit
< (0.0) = Parameter below elevated detection lim
0.0 = above criteria

Analysis completed by AMEC for all samples from 2007 to 2012 .
Analysis of samples from 2013 and 2014 was completed by Maxxam Analytics Inc. in Bedford, NS.
Data to November 2012 transcribed from the 2012-2013 Annual Report of Activities for the Upper Trinity South (New Harbour) Waste Disposal Site completed by AMEC, dated March 29, 2013.

1. Typical Reportable Detection Limit referenced based on Maxxam laboratory analysis, but RDL may be lower than shown for original data.
2. Ontario Ministry of the Environment (MOE) "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act", April 15, 2011, Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition
3. Based on Coarse-grained soil conditions.

TABLE C3

HISTORICAL SURFACE WATER ANALYTICAL DATA - PCBs (ug/L)
2013/14 MONITORING AND MAINTENANCE PROGRAM
UPPER TRINITY SOUTH (NEW HARBOUR) WASTE DISPOSAL SITE
NEW HARBOUR BARRENS, NL

Sample Location	Sample Date											Criteria*
	Feb 2007	Nov 2007	May 2008	Mar 2009	Sep 2009	Jan 2010	Nov 2010	Dec 2011	Nov 2012	Aug 2013	Nov 2014	
SW-POND	-	<	<	<	<	<	<	< (0.06)	<	<	<	na
SW-POND-1	-	-	-	-	<	-	-	< (0.06)	-	-	-	
SW-UPSTREAM	-	-	-	-	-	-	-	-	-	-	<	
SW-STREAM	-	<	<	<	<	< (0.06)	<	<	<	<	<	
RDL	0.04	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.05	

Analysis completed by AMEC for all samples from 2007 to 2012.
Analysis for 2013 samples were completed by Maxxam Analytics Inc. in Bedford, NS.

Data from February 2007 to November 2012 transcribed from the 2012-2013 Annual Report of Activities for the Upper Trinity South (New Harbour) Waste Disposal Site completed by AMEC and dated March 29, 2013.

* Criteria does not exist

SW = Surface Water
SW-POND-1 = Field Duplicate of SW-POND.
< = Parameter below detection limit
< (0.00) = Parameter below elevated detection limit
- = No sample collected
RDL = Reportable Detection Limit

TABLE C4

HISTORICAL SURFACE WATER ANALYTICAL DATA - METALS (ug/L)
2013/14 MONITORING AND MAINTENANCE PROGRAM
UPPER TRINITY SOUTH (NEW HARBOUR) WASTE DISPOSAL SITE
NEW HARBOUR BARRENS, NL

Parameter	RDL *	Criteria**	SW-POND											
								SW-DUP1			SW-POND-1			
			Nov 2007	May 2008	Jan 2009	Sep 2009	Jan 2010	Nov 2010	Nov 2010	Dec 2011	Dec 2011	Nov 2012	Aug 2013	Nov 2014
Aluminum (Al)	5.0	100(1)	**190**	76	45.9	**180**	**635**	75.6	74.7	**202**	**262**	49.7	21.3	96
Antimony (Sb)	1.0	-	<	<	< (2)	< (2)	< (2)	<	<	<	<	<	<	<
Arsenic (As)	1.0	5.0	<	<	< (2)	< (2)	< (2)	<	<	<	<	<	<	<
Barium (Ba)	1.0	-	24.8	7.9	31	26	32.0	25	25.2	29.1	30.1	23.8	14	<
Beryllium (Be)	1.0	-	<	<	< (2)	< (2)	< (2)	<	<	<	<	<	<	<
Bismuth (Bi)	2.0	-	<	<	<	<	<	<	<	<	<	<	<	<
Boron (B)	5.0	-	-	-	-	230	369	332	329	356	362	263	232	100
Cadmium (Cd)	0.017	0.009(2)	0.064	0.067	0.035	<	0.053	0.022	0.019	0.063	0.065	0.028	<	0.016
Calcium (Ca)	100	-	51,500	30,600	-	55,000	70,000	77,100	77,400	99,000	97,500	96,000	67,200	39,000
Chromium (Cr)	1.0	8.9(3)	<	<	<	<	1.7	<	<	<	<	<	<	<
Cobalt (Co)	0.4	-	6	2	6.21	4	4.83	2.2	2.13	2.98	3.50	2.18	<	0.54
Copper (Cu)	2.0	2(4)	**10**	3	**6**	**6**	**8.9**	**7.9**	**5.1**	**6.4**	**6.7**	**2.4**	<	**2.6**
Iron (Fe)	50	300	**377**	**318**	150	**480**	**1,170**	241	244	**523**	**682**	**405**	116	**320**
Lead (Pb)	0.50	1(5)	2	1	<	0.6	2.56	<	<	0.89	1.18	<	<	<
Magnesium (Mg)	100	-	6,970	5,520	-	6,100	7,800	6,200	6,190	9,100	8,890	8,220	5,750	3,100
Manganese (Mn)	2.0	-	1,850	1,350	2,400	1,200	1,760	1,170	1,170	1,670	1,750	1310	135	450
Mercury (Hg)	0.013	0.026	< (0.02)	< (0.02)	< (0.01)	-	<	-	-	-	-	-	<	<
Molybdenum (Mo)	2.0	73.00	< (5)	< (5)	<	<	<	<	<	<	<	<	<	<
Nickel (Ni)	2.0	25(6)	< (5)	< (5)	3	<	3.5	2	<	2.2	23	<	<	2
Phosphorus (P)	100	-	51	24	-	-	<	<	120	<	<	<	<	110
Potassium (K)	100	-	16,900	12,900	-	1,200	15,000	13,600	14,000	12,900	12,700	10,600	7,600	3,700
Selenium (Se)	1.0	1.0	<	<	<	<	<	1.2	<	<	<	<	<	<
Silver (Ag)	0.1	0.1	<	<	<	<	<	<	<	<	<	<	<	<
Sodium (Na)	100	-	145,000	129,000	-	78,000	98,000	63,600	65,300	48,700	47,800	44,500	35,300	16,000
Strontium (Sr)	2.0	-	-	-	-	180	198	187	193	261	256	243	180	94
Thallium (Tl)	0.1	0.8	-	-	-	<	<	<	<	<	<	<	<	<
Tin (Sn)	2.0	-	-	-	-	<	<	<	<	<	<	<	<	<
Titanium (Ti)	2.0	-	-	-	-	16	31.7	10.4	10.1	26.3	33.8	7.9	<	9.4
Uranium (U)	0.10	-	-	-	-	<	<	<	<	<	<	<	<	<
Vanadium (V)	2.0	-	< (5)	< (5)	<	<	<	<	<	<	<	<	<	<
Zinc (Zn)	5.0	30	12	9	17	18	24.3	11.8	11.4	21.4	23.1	12.2	<	8.2
pH	-	6.5 - 9.0	7.38	6.92	7.45	7.13	7.13	7.79	7.87	7.66	7.65	7.87	7.31	7.53
Hardness	1,000	-	157,000	99,100	190,000	160,000	210,000	220,000	220,000	280,000	280,000	270,000	230,000	110

Notes:

RDL = Reportable Detection Limit
SW = Surface Water
- = Not analysed/No criteria
RDL = Reportable Detection Limit
- = Not analysed/No criteria
< = Parameter below detection limit
< (0.0) = Parameter below elevated detection limit
0.0 = above criteria

(1) Aluminum guideline = 5 ug/L at pH < 6.5
= 100 ug/L at pH ≥ 6.5

(2) Cadmium guideline = $10^{[0.83[\log(\text{hardness})]-2.46]}$

(3) Criteria for Chromium (III) = 8.9 ug/L

Analysis completed by AMEC for all samples from 2007 to 2012 .
Analysis of samples from 2013 was completed by Maxxam Analytics Inc. in Bedford, NS.
Data to November 2012 transcribed from the 2012-2013 Annual Report of Activities for the Upper Trinity South (New Harbour) Waste Disposal Site completed by AMEC, dated March 29, 2013.

* Typical Reportable Detection Limit reference based on Maxxam laboratory analysis, but RDL may be lower than shown for original data.
** Canadian Council of Ministers of the Environment (CCME) Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life (2007 - Update 7.1).

(4) Copper guideline = 2 ug/L at $[CaCO_3]$ = 0-120 mg/L
= 3 ug/L at $[CaCO_3]$ = 120-180 mg/L
= 4 ug/L at $[CaCO_3]$ >180 mg/L

(5) Lead guideline = 1 ug/L at $[CaCO_3]$ = 0-60 mg/L
= 2 ug/L at $[CaCO_3]$ = 60-120 mg/L
= 4 ug/L at $[CaCO_3]$ = 120-180 mg/L
= 7 ug/L at $[CaCO_3]$ >180 mg/L

(6) Nickel guideline = 25 ug/L at $[CaCO_3]$ = 0-60 mg/L
= 65 ug/L at $[CaCO_3]$ = 60-120 mg/L
= 110 ug/L at $[CaCO_3]$ = 120-180 mg/L
= 150 ug/L at $[CaCO_3]$ >180 mg/L

TABLE C4

HISTORICAL SURFACE WATER ANALYTICAL DATA - METALS (ug/L)
2013/14 MONITORING AND MAINTENANCE PROGRAM
UPPER TRINITY SOUTH (NEW HARBOUR) WASTE DISPOSAL SITE
NEW HARBOUR BARRENS, NL

Parameter	RDL *	Criteria**	SW-STREAM										SW-UPSTREAM
			Nov 2007	May 2008	Jan 2009	Sep 2009	Jan 2010	Nov 2010	Dec 2011	Nov 2012	Aug 29, 2013	Nov 27, 2014	Nov 2014
Aluminum (Al)	5.0	100(1)	89	**132**	60.7	83	**88.3**	**125**	**155**	51.7	26.7	**790**	**240**
Antimony (Sb)	1.0	-	<	<	< (2)	< (2)	< (2)	<	<	<	<	<	<
Arsenic (As)	1.0	5.0	<	<	< (2)	< (2)	< (2)	<	<	<	<	<	<
Barium (Ba)	1.0	-	12.7	21.2	15	6	17.6	15.8	10.8	5.6	4.1	4.9	1.9
Beryllium (Be)	1.0	-	<	<	< (2)	< (2)	< (2)	<	<	<	<	<	<
Bismuth (Bi)	2.0	-	<	<	<	<	<	<	<	<	<	<	<
Boron (B)	5.0	-	-	-	-	140	224	171	203	151	171	<	<
Cadmium (Cd)	0.017	0.009(2)	<	0.099	0.018	<	<	0.020	<	<	<	0.035	<
Calcium (Ca)	100	-	31,100	46,700	-	20,000	45,000	41,200	43,200	36,200	36,500	5,000	1,000
Chromium (Cr)	1.0	8.9(3)	<	<	<	<	<	<	<	<	<	<	<
Cobalt (Co)	0.4	-	3	3	1.77	1	2.55	2.48	1.10	0.52	0.75	0.56	<
Copper (Cu)	2.0	2(4)	2	**6**	3	<	**3.4**	2.5	2.3	<	<	<	<
Iron (Fe)	50	300	167	**411**	100	190	180	235	265	98	63	**860**	220
Lead (Pb)	0.50	1(5)	1	1	<	<	0.51	<	<	<	<	**1.6**	<
Magnesium (Mg)	100	-	5,590	6,620	-	3,100	6,900	5,020	5,720	4,800	4,530	1,300	550
Manganese (Mn)	2.0	-	2,560	1,180	850	530	1,170	1,590	331	142	145	230	12
Mercury (Hg)	0.013	0.026	< (0.02)	< (0.02)	0.01	-	0.018	-	-	-	<	0.022	<
Molybdenum (Mo)	2.0	73.00	< (5)	< (5)	<	<	<	<	<	<	<	<	<
Nickel (Ni)	2.0	25(6)	< (5)	< (5)	<	<	<	<	<	<	<	<	<
Phosphorus (P)	100	-	23	42	-	-	<	<	<	<	<	220	<
Potassium (K)	100	-	13,900	12,900	-	8,100	14,000	11,800	9,530	7,520	7,970	1,100	220
Selenium (Se)	1.0	1.0	<	<	<	<	<	<	<	<	<	<	<
Silver (Ag)	0.1	0.1	<	<	<	<	<	<	<	<	<	<	<
Sodium (Na)	100	-	152,000	94,000	-	61,000	96,000	71,200	42,600	34,500	40,100	11,000	4,900
Strontium (Sr)	2.0	-	-	-	-	62	122	102	116	94.1	103	19	5.3
Thallium (Tl)	0.1	0.8	-	-	-	<	<	<	<	<	<	<	<
Tin (Sn)	2.0	-	-	-	-	<	<	<	<	<	<	<	<
Titanium (Ti)	2.0	-	-	-	-	5	11.0	10.9	16.2	4.7	<	45	5
Uranium (U)	0.10	-	-	-	-	<	<	<	<	<	<	<	<
Vanadium (V)	2.0	-	< (5)	< (5)	<	<	<	<	<	<	<	<	<
Zinc (Zn)	5.0	30	4	25	6	14	8.7	8	6.2	<	<	9	<
pH	-	6.5 - 9.0	6.92	7.43	7.16	6.93	6.32	7.12	7.21	7.55	7.13	5.89	6.16
Hardness	1,000	-	101,000	144,000	155,000	64,000	140,000	120,000	130,000	110,000	110,000	18	4.8

Notes:

RDL = Reportable Detection Limit
SW = Surface Water
- = Not analysed/No criteria
RDL = Reportable Detection Limit
- = Not analysed/No criteria
< = Parameter below detection limit
< (0.0) = Parameter below elevated detection limit
0.0 = above criteria

(1) Aluminum guideline = 5 ug/L at pH < 6.5
= 100 ug/L at pH ≥ 6.5

(2) Cadmium guideline = $10^{\{0.83[\log(\text{hardness})]-2.46\}}$

(3) Criteria for Chromium (III) = 8.9 ug/L

Analysis completed by AMEC for all samples from 2007 to 2012 .
Analysis of samples from 2013 was completed by Maxxam Analytics Inc. in Bedford, NS.
Data to November 2012 transcribed from the 2012-2013 Annual Report of Activities for the Upper Trinity South (New Harbour) Waste Disposal Site completed by AMEC, dated March 29, 2013.

* Typical Reportable Detection Limit reference based on Maxxam laboratory analysis, but RDL may be lower than shown for original data.
** Canadian Council of Ministers of the Environment (CCME) Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life (2007 - Update 7.1).

(4) Copper guideline = 2 ug/L at $[CaCO_3]$ = 0-120 mg/L
= 3 ug/L at $[CaCO_3]$ = 120-180 mg/L
= 4 ug/L at $[CaCO_3]$ >180 mg/L

(5) Lead guideline = 1 ug/L at $[CaCO_3]$ = 0-60 mg/L
= 2 ug/L at $[CaCO_3]$ = 60-120 mg/L
= 4 ug/L at $[CaCO_3]$ = 120-180 mg/L
= 7 ug/L at $[CaCO_3]$ >180 mg/L

(6) Nickel guideline = 25 ug/L at $[CaCO_3]$ = 0-60 mg/L
= 65 ug/L at $[CaCO_3]$ = 60-120 mg/L
= 110 ug/L at $[CaCO_3]$ = 120-180 mg/L
= 150 ug/L at $[CaCO_3]$ >180 mg/L

TABLE C5

HISTORICAL SURFACE WATER ANALYTICAL DATA - GENERAL CHEMISTRY
2013/14 MONITORING AND MAINTENANCE PROGRAM
UPPER TRINITY SOUTH (NEW HARBOUR) WASTE DISPOSAL SITE
NEW HARBOUR BARRENS, NL

Parameter	RDL *	Units	Criteria**	SW-POND							SW-DUP1	SW-POND-1				
				Feb 2007	Nov 2007	May 2008	Mar 2009	Sep 2009	Jan 2010	Nov 2010	Nov 2010	Dec 2011	Dec 2011	Nov 2012	Aug 2013	Nov 2014
Anion Sum	N/A	me/L	-	-	-	-	-	-	-	-	-	-	-	-	5.75	3.11
Bicarb. Alkalinity (calc. as CaCO3)	1,000	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	160,000	95,000
Calculated TDS	1,000	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	380,000	180,000
Carb. Alkalinity (calc. as CaCO3)	1,000	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	<	<
Cation Sum	N/A	me/L	-	-	-	-	-	-	-	-	-	-	-	-	7.29	3.07
Colour	5	TCU	-	-	98	77	34	110	75	68	76	72	64	22	13	38
Conductivity	1	µS/cm	-	-	1,190	927	1,010	1,100	1,100	720	720	850	850	770	560	290
Dissolved Chloride (Cl)	1,000	µg/L	-	-	165,000	195,000	104,000	110,000	110,000	63,000	63,000	46,000	46,000	-	24,000	18,000
DOC	500	µg/L		-	22,900	19,600	12,500	-	-	-	-	-	-	-	-	-
Dissolved Sulphate (SO4)	2,000	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	73,000	27,000
Hardness (CaCO3)	1,000	µg/L	-	-	157,000	99,100	190,000	160,000	210,000	220,000	220,000	280,000	280,000	270,000	230,000	110,000
Ion Balance (% Difference)	N/A	%	-	-	-	-	-	-	-	-	-	-	-	-	11.8	0.065
Langelier Index (@ 20C)	N/A	N/A	-	-	-	-	-	-	-	-	-	-	-	-	-0.018	-0.284
Langelier Index (@ 4C)	N/A	N/A	-	-	-	-	-	-	-	-	-	-	-	-	-0.266	-0.534
Nitrate as N	50	µg/L	13,000	-	8,650	8,480	8,360	5,200	7,700	6,900	6,900	4,600	4,700	3,600	-	1,700
Nitrite as N	15	µg/L	60	-	**84**	**369**	**69**	**220**	**120**	**190**	**190**	**100**	**90**	**68**	-	31
Nitrate + Nitrite	50	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	4,100	1,700
Nitrogen (Ammonia Nitrogen)	50	µg/L	-	-	33,000	641	30,000	13,000	24,000	12,000	13,000	9,000	11,000	-	4,000	1,300
Orthophosphate (P)	10	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	<	<
pH	N/A	pH	6.5 - 9	-	7.38	6.92	7.45	7.13	7.35	7.79	7.87	7.66	7.65	7.87	7.31	7.53
Reactive Silica (SiO2)	0.5	µg/L	-	-	-	-	-	6,100	6,600	6,800	6,900	6,200	6,300	7,700	5,700	5,000
Saturation pH (@ 20C)	N/A	N/A	-	-	-	-	-	-	-	-	-	-	-	-	7.33	7.81
Saturation pH (@ 4C)	N/A	N/A	-	-	-	-	-	-	-	-	-	-	-	-	7.58	8.06
Sulphate	10,000	µg/L		-	85,300	68,100	121,000	97,000	160,000	160,000	160,000	190,000	190,000	-	-	-
Total Alkalinity (Total as CaCO3)	30,000	µg/L	-	-	214,000	76,600	167,000	150,000	190,000	130,000	130,000	130,000	140,000	180,000	160,000	95,000
Total Dissolved Solids	10,000	µg/L		-	771,000	549,000	658,000	493,000	638,000	518,000	520,000	529,000	532,000	-	-	-
Total Organic Carbon (C)	500	µg/L	-	-	26,500	19,200	12,900	11,000	16000 (1)	12,000	12,000	10,000	10,000	9,300	14,000	6,900
Total Supended Solids	2,000	µg/L		-	6,000	2,000	3,000	-	-	-	-	-	-	-	-	-
Turbidity	0.1	NTU	-	-	5.7	1.4	2.0	4.20	9.40	2.1	1.7	7.0	6.1	1.4	180	2

Notes:

RDL = Reportable Detection Limit
SW = Surface Water

- = Not analysed/No criteria
< = Parameter below detection limit
0.0 = above criteria
(1)- Elevated reporting limit due to sample matrix

Analysis completed by AMEC for all samples from 2007 to 2012 .
Analysis of samples from 2013 was completed by Maxxam Analytics Inc. in Bedford, NS.
Data to November 2012 transcribed from the 2012-2013 Annual Report of Activities for the Upper Trinity South (New Harbour) Waste Disposal Site completed by AMEC, dated March 29, 2013.

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** Canadian Council of Ministers of the Environment (CCME) Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life (2007 - Update 7.1).

TABLE C5

HISTORICAL SURFACE WATER ANALYTICAL DATA - GENERAL CHEMISTRY
2013/14 MONITORING AND MAINTENANCE PROGRAM
UPPER TRINITY SOUTH (NEW HARBOUR) WASTE DISPOSAL SITE
NEW HARBOUR BARRENS, NL

Parameter	RDL *	Units	Criteria**	SW-STREAM											SW-UPSTREAM
				Feb 2007	Nov 2007	May 2008	Mar 2009	Sep 2009	Jan 2010	Nov 2010	Dec 2011	Nov 2012	Aug 2013	Nov 2014	Nov 2014
Anion Sum	N/A	me/L	-	-	-	-	-	-	-	-	-	-	3.84	0.71	0.2
Bicarb. Alkalinity (calc. as CaCO3)	1,000	µg/L	-	-	-	-	-	-	-	-	-	-	76,000	5,000	<
Calculated TDS	1,000	µg/L	-	-	-	-	-	-	-	-	-	-	250,000	46,000	17,000
Carb. Alkalinity (calc. as CaCO3)	1,000	µg/L	-	-	-	-	-	-	-	-	-	-	<	<	<
Cation Sum	N/A	me/L	-	-	-	-	-	-	-	-	-	-	4.04	0.89	0.32
Colour	5	TCU	-	-	96	72	49	100	58	57	42	39	28	190	71
Conductivity	1	µS/cm	-	-	1,070	936	1190	470	810	540	530	400	390	82	35
Dissolved Chloride (Cl)	1,000	µg/L	-	-	213,000	134,000	206,000	84,000	110,000	77,000	45,000	-	31,000	22,000	7,100
DOC	500	µg/L		-	21,700	17,800	17,900	-	-	-	-	-	-	-	-
Dissolved Sulphate (SO4)	2,000	µg/L	-	-	-	-	-	-	-	-	-	-	49,000	<	<
Hardness (CaCO3)	1,000	µg/L	-	-	101,000	144,000	155,000	64,000	140,000	120,000	130,000	110,000	110,000	18,000	4,800
Ion Balance (% Difference)	N/A	%	-	-	-	-	-	-	-	-	-	-	2.5	11.3	23.1
Langelier Index (@ 20C)	N/A	N/A	-	-	-	-	-	-	-	-	-	-	-0.827	-4.01	NC
Langelier Index (@ 4C)	N/A	N/A	-	-	-	-	-	-	-	-	-	-	-1.08	-4.27	NC
Nitrate as N	50	µg/L	13,000	-	7,710	7,400	12,500	1,200	13,000	8,000	8,000	4,600	-	<	55
Nitrite as N	15	µg/L	60	-	35	**492**	31	<	**110**	**100**	50	13	-	<	<
Nitrate + Nitrite	50	µg/L	-	-	-	-	-	-	-	-	-	-	5,800	<	55
Nitrogen (Ammonia Nitrogen)	50	µg/L	-	-	10,800	24,100	26,500	<	8,200	780	1.6	-	1,400	<	<
Orthophosphate (P)	10	µg/L	-	-	-	-	-	-	-	-	-	-	<	<	<
pH	N/A	pH	6.5 - 9	-	6.92	7.43	7.16	6.93	**6.32**	7.12	7.21	7.55	7.13	**5.89**	**6.16**
Reactive Silica (SiO2)	0.5	µg/L	-	-	-	-	-	4,700	5,500	5,200	5,500	5,300	6,300	2,400.0	2.5
Saturation pH (@ 20C)	N/A	N/A	-	-	-	-	-	-	-	-	-	-	7.96	9.9	NC
Saturation pH (@ 4C)	N/A	N/A	-	-	-	-	-	-	-	-	-	-	8.21	10.2	NC
Sulphate	10,000	µg/L		-	59,000	90,100	107,000	57,000	110,000	96,000	100,000	-	-	-	-
Total Alkalinity (Total as CaCO3)	30,000	µg/L	-	-	90,900	143,000	129,000	50,000	65,000	41,000	44,000	52,000	76,000	5,000	<
Total Dissolved Solids	10,000	µg/L		-	698,000	496,000	775,000	274,000	493,000	371,000	321,000	-	-	-	-
Total Organic Carbon (C)	500	µg/L	-	-	23,600	17,700	18,100	14,000	19,000	13,000	8,000	9,100	8,200	12,000	7,300
Total Supended Solids	2,000	µg/L		-	<	5,000	2,000	-	-	-	-	-	-	-	-
Turbidity	0.1	NTU	-	-	1.6	3.8	1.8	1.30	13	1.8	1.8	1.2	32	31	1.2

Notes:

RDL = Reportable Detection Limit
SW = Surface Water

- = Not analysed/No criteria
< = Parameter below detection limit
0.0 = above criteria
(1)- Elevated reporting limit due to sample matrix

Analysis completed by AMEC for all samples from 2007 to 2012 .
Analysis of samples from 2013 was completed by Maxxam Analytics Inc. in Bedford, NS.
Data to November 2012 transcribed from the 2012-2013 Annual Report of Activities for the Upper Trinity South (New Harbour) Waste Disposal Site completed by AMEC, dated March 29, 2013.

* Typical Reportable Detection Limit reference based on Maxxam laboratory analysis, but RDL may be lower than shown for original data.
** Canadian Council of Ministers of the Environment (CCME) Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life (2007 - Update 7.1).