



**2013/2014 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 (DOEC) to complete the 2013/14 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 work involved groundwater and surface water sampling, as well as the inspection of monitor wells and the leachate control system. The summer Site sampling event was conducted in August 2013.

The waste disposal site is located south of Route 73 on the New Harbour Barrens and operated as a domestic waste disposal 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.

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 DOEC, 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 2013/14 MONITORING AND MAINTENANCE SUMMARY

E.1.1 GROUNDWATER

Six groundwater samples were collected from the on-Site monitor wells during the 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. Note that one monitor well location (MW-02) was dry and could not be sampled.

A review of the historical groundwater analytical data that included the August 2013 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

One surface water sample was collected from the on-Site leachate collection pond to characterize the leachate, which was submitted for analysis of PCBs, general chemistry, and metals that included mercury. One surface water sample was also collected from a stream downgradient from the collection 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.

A review of the historical surface water analytical data that included the August 2013 sampling event confirmed metals and general chemistry analytes were 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 sporadic exceedances up to the December 2011 sampling event; however, subsequent sampling events reported Aluminum concentrations as below the CCME CWQG for FAL. In addition, Copper

concentrations in the collection pond reported numerous exceedances up to the November 2012 sampling event; however, the August 2013 sampling event reported a Copper concentration below the CCME CWQGs for FAL. Finally, Iron concentrations in the collection pond also reported numerous exceedances up to the November 2012 sampling event; 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 fewer exceedances up to the December 2011 sampling event while subsequent sampling events reported Aluminum concentrations below the CCME CWQG for FAL. In addition, Copper concentrations in the downgradient stream only reported fewer exceedances up to the January 2010 sampling event while subsequent sampling events reported Copper concentrations below the CCME CWQGs for FAL. Finally, an Iron concentration in the downgradient stream only reported one exceedance in the May 2008 sampling event while all other sampling events reported Iron 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 significantly fewer exceedances up to the November 2010 sampling event 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. In addition, the measured pH in the downgradient stream only reported one measurement in the January 2010 sampling event that was outside the range for the CCME CWQG for FAL while all other downgradient surface water samples reported the pH measurement within the criterion.

Based on the historical metals exceedances reported in surface water at the on-Site collection pond, CRA recommend that surface water 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.

A background surface water sample was not available to establish any correlation of downstream exceedances to background surface water characteristics for the area; therefore, CRA also recommend that a background sample be collected from an upstream location to evaluate potential exceedances reported in the downstream sample location. If a background sample is collected in the future, CRA recommend that surface

water again be sampled and analyzed for general chemistry during future monitoring activities at the Site. A suggested location is Gull Pond northeast of the Site and Route 73.

E.1.3 INSPECTION OF MONITOR WELLS AND LEACHATE CONTROL SYSTEM

During the August 2013 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 good condition and accessible; however, the following issues were identified regarding the monitor wells:

- MW-05 was heavily silted and required significant effort and field filtering to obtain a valid groundwater sample. According to DOEC replacement of MW-05 was completed and after the August 2013 Site visit and was moved to a nearby location.
- MW-06 was observed as being partially damaged with the top of the PVC casing cracked and approximately 200 mm below the top of the steel stick-up casing. CRA recommends the PVC casing be repaired with the addition of an extension using a PVC coupling.

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.

The rip rap was observed to be in good condition, with no signs of deterioration from settling or erosion.

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1.0 INTRODUCTION

Conestoga-Rovers & Associates (CRA) was retained by the Newfoundland and Labrador Department of Environment and Conservation (DOEC) to complete the 2013/14 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 summer Site sampling event was conducted in August 2013.

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 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 (MW1-MW7) were installed around the waste disposal Site to monitor potential leachate impacts.

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 DOEC, 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.

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 August 29, 2013, static water levels were measured using an electronic product/water interface probe at the on-Site monitor wells (Table 1). The monitor wells were then developed, allowed to recover, and sampled using dedicated, disposable bailers. Six groundwater samples were collected from the on-Site monitor wells (MW-01, and MW-03 to MW-07) during the sampling event, including one field duplicate (MW-DUP) from MW-07. Another groundwater sample was collected from an off-Site monitor well (MW-08) intended to demonstrate background analyte concentrations from the upgradient sample location. Note that one monitor well location (MW-02) was dry and could not be sampled.

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 for analysis.

3.2 SURFACE WATER SAMPLING

Surface water sampling was intended to characterize leachate from the Site's leachate collection pond (SW-POND) and assess potential leachate infiltration into the nearby surface water by sampling a stream directly downgradient (SW-STREAM). The surface water locations are both located down-gradient (southwest) of the waste disposal site and 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 August 2013 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 metal (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, metal (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 August 2013 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 August 2013 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, six groundwater samples (MW-01, MW-03 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 six monitor wells (MW-01 and MW-03 to MW-07) around the Site reported non-detectable concentrations, which were also below the applicable guidelines.

In addition, one field duplicate (MW-DUP) collected from MW-07 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 six monitor wells (MW-01 and MW-03 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 the application of road salt on Route 73 that has infiltrated the groundwater.

In addition, one field duplicate (MW-DUP) collected from MW-07 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 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 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) and the downgradient surface water sample (SW-STREAM) 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) and the downgradient surface water sample (SW-STREAM) reported non-detectable concentrations for many of the analytes. Reportable concentrations for the remaining analytes were below the available CCME CWQGs for FAL. An elevated presence of calcium, potassium, and sodium concentrations in the settling pond and stream samples also suggest that road salt from Route 73 is impacting surface water in the area.

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

5.2.3 GENERAL CHEMISTRY IN SURFACE WATER

Surface water analytical results for general chemistry from the settling pond (SW-POND) and the downgradient surface water sample (SW-STREAM) typically reported analyte concentrations or measurements in the stream sample as below the settling pond sample. The measure pH for both samples was within the CCME CWQGs for FAL range.

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

6.0 DISCUSSION

Groundwater and surface water analytical data from the August 2013 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 August 2013 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 August 2013 sampling event was also noted to be consistent with the previous sampling event in November 2012.

Historical groundwater data for PCBs and metals, including the August 2013 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 August 2013 sampling event confirmed metals and general chemistry analytes were 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 in the November 2007, September 2009, January 2010, and December 2011 sampling events; however, the November 2012 and August 2013 sampling events reported Aluminum concentrations as below the CCME CWQG 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, and November 2012 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, and November 2012 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, and December 2011 sampling events; however, the November 2012 and August 2013 sampling events reported Aluminum concentrations as below the CCME CWQG for FAL. 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, and August 2013 sampling events reported Copper concentrations below the CCME CWQGs for FAL. Finally, an Iron concentration in the downgradient stream only reported one exceedance in the May 2008 sampling event while all other sampling events reported Iron 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. In addition, the measured pH in the downgradient stream only reported one measurement in the January 2010 sampling event that was outside the range for the CCME CWQG for FAL while all other downgradient surface water samples reported the pH measurement within the criterion.

A background surface water sample was not available to establish any correlation of downstream exceedances to background surface water characteristics for the area.

Historical surface water data for PCBs, metals, and general chemistry, including the August 2013 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 August 2013 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 good condition and accessible; however, the following issues were identified regarding the monitor wells:

- MW-05 was heavily silted and required significant effort and field filtering to obtain a valid groundwater sample. According to DOEC, replacement of MW-05 was completed after the August 2013 Site visit and was moved to a nearby location, with new coordinates being N5271451, E315670, UTM, Nad 83.
- MW-06 was observed as being partially damaged with the top of the PVC casing cracked and the top of the casing was approximately 200 mm below the top of the steel stick-up casing. CRA recommends replacing the top of the PVC casing.

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.

The rip rap was observed to be in good condition, with no signs of deterioration from settling or erosion.

8.0 SUMMARY AND RECOMMENDATIONS

Conestoga-Rovers & Associates (CRA) was retained by the Newfoundland and Labrador Department of Environment and Conservation (DOEC) to complete the 2013/14 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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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.

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 DOEC, 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.

8.1 GROUNDWATER

Six groundwater samples were collected from the on-Site monitor wells during the 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. Note that one monitor well location (MW-02) was dry and could not be sampled.

A review of the historical groundwater analytical data that included the August 2013 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

One surface water sample was collected from the on-Site leachate collection pond to characterize the leachate, which was submitted for analysis of PCBs, general chemistry, and metals that included mercury. One surface water sample was also collected from a stream downgradient from the collection 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.

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Based on the historical metals exceedances reported in surface water at the on-Site collection pond, CRA recommend that surface water 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.

A background surface water sample was not available to establish any correlation of downstream exceedances to background surface water characteristics for the area; therefore, CRA also recommend that a background sample be collected from an upstream location to evaluate potential exceedances reported in the downstream sample location. If a background sample is collected in the future, CRA recommend that surface water again be sampled and analyzed for general chemistry during future monitoring activities at the Site. A suggested location is Gull Pond northeast of the Site and Route 73.

8.3 INSPECTION OF MONITOR WELLS AND LEACHATE CONTROL SYSTEM

During the August 2013 Site visit, CRA conducted an inspection of the monitor wells, leachate ditch system/collection pond, and rip rap.

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- MW-06 was observed as being partially damaged with the top of the PVC casing cracked and approximately 200 mm below the top of the steel stick-up casing. CRA recommends the PVC casing be repaired with the addition of an extension using a PVC coupling.

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.

The rip rap was observed to be in good condition, with no signs of deterioration from settling or erosion.

9.0 REFERENCES

- Canadian Council of Ministers of the Environment. 1999. Canadian Environmental Quality Guidelines. Updated 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008 and 2010.
- 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 "*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.



Andrew Bryant, B.Sc.

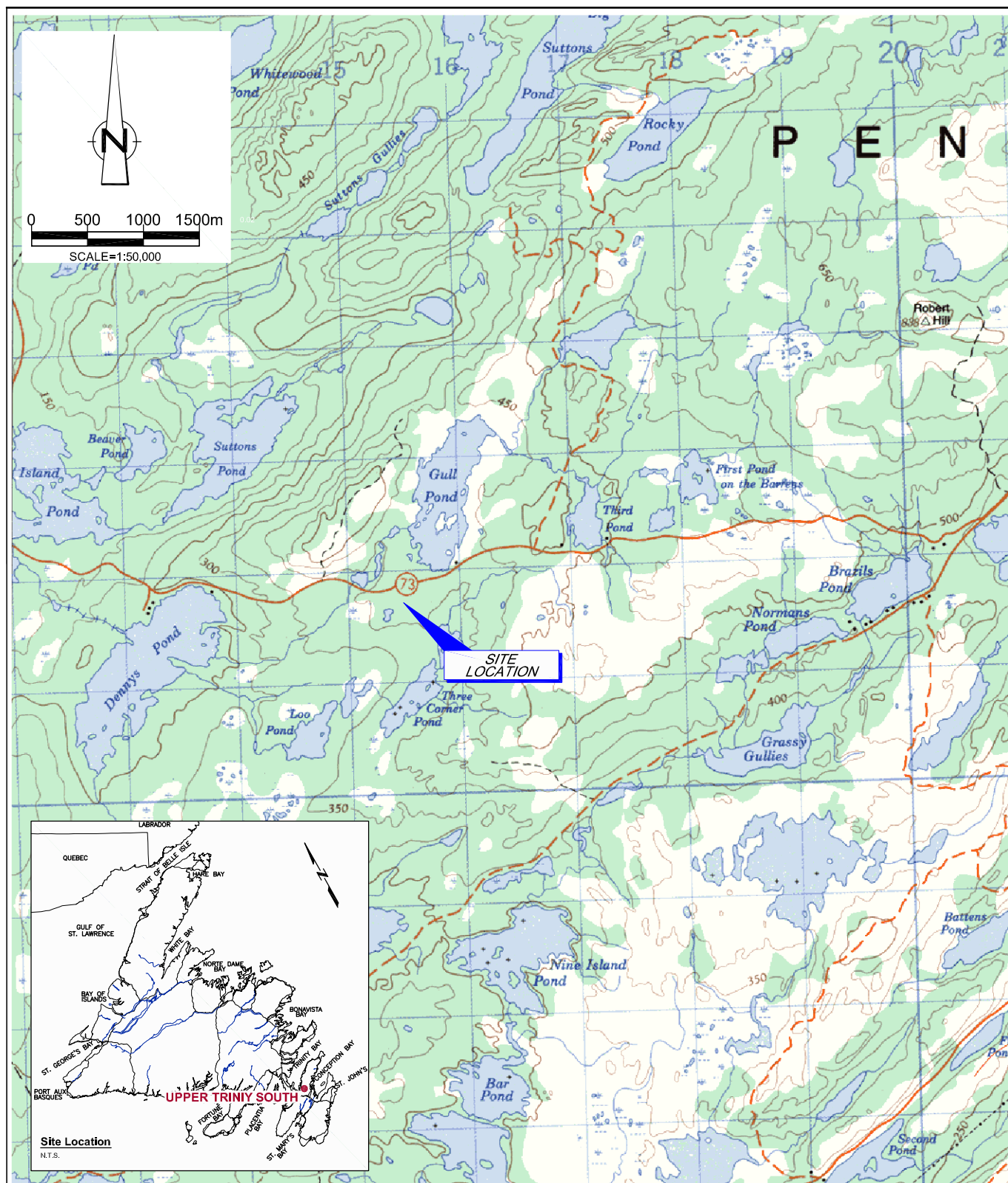
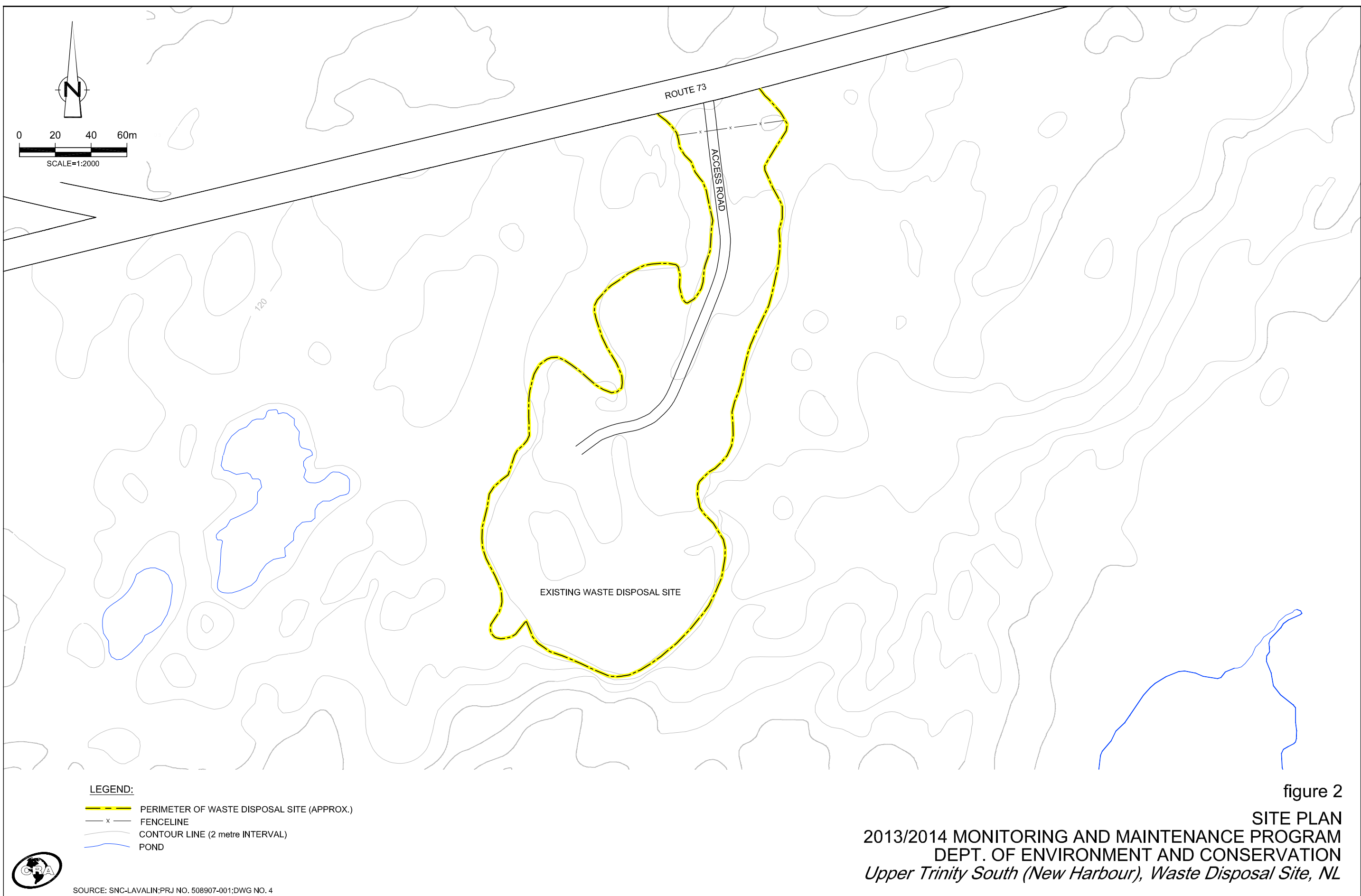
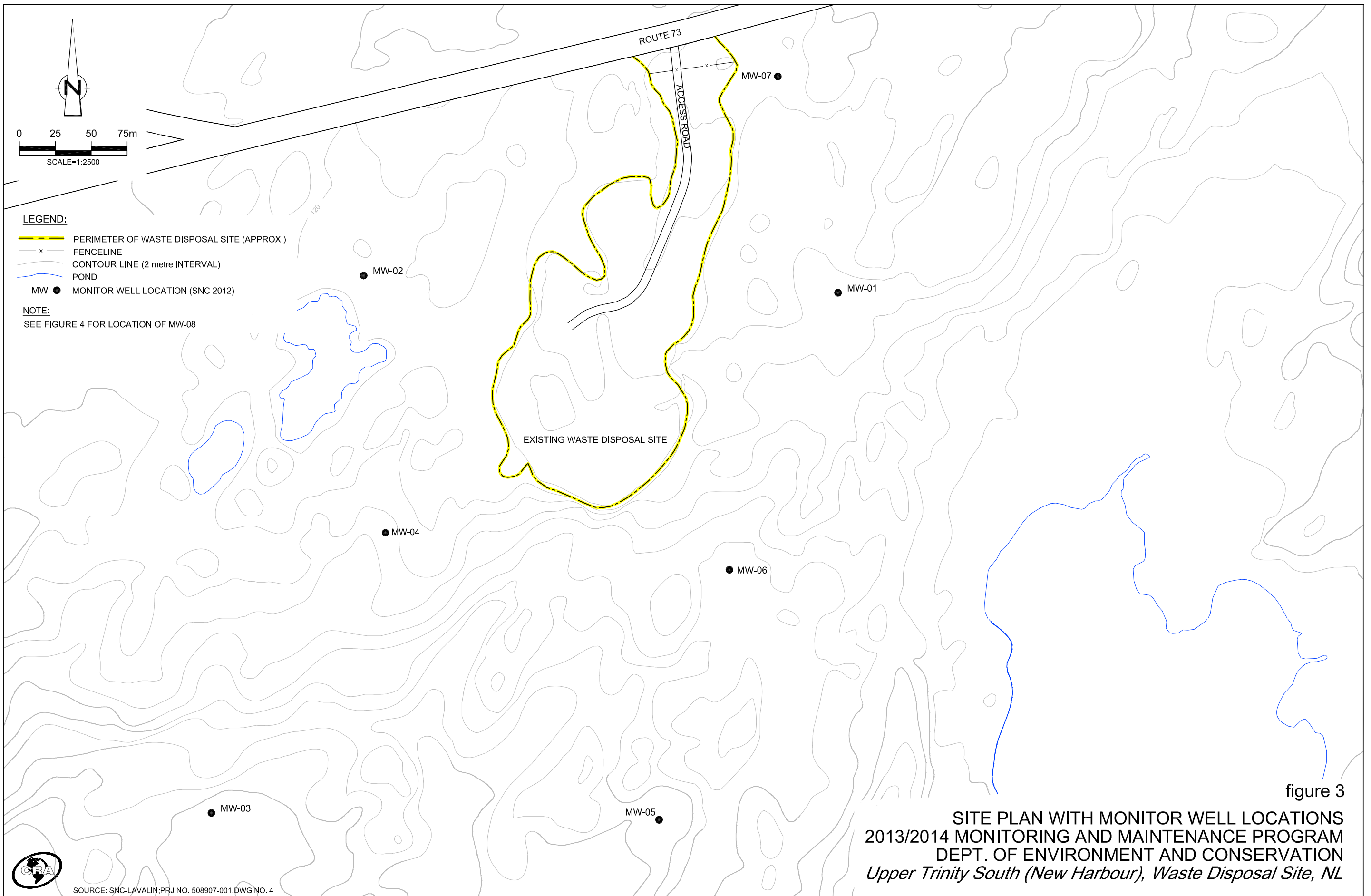


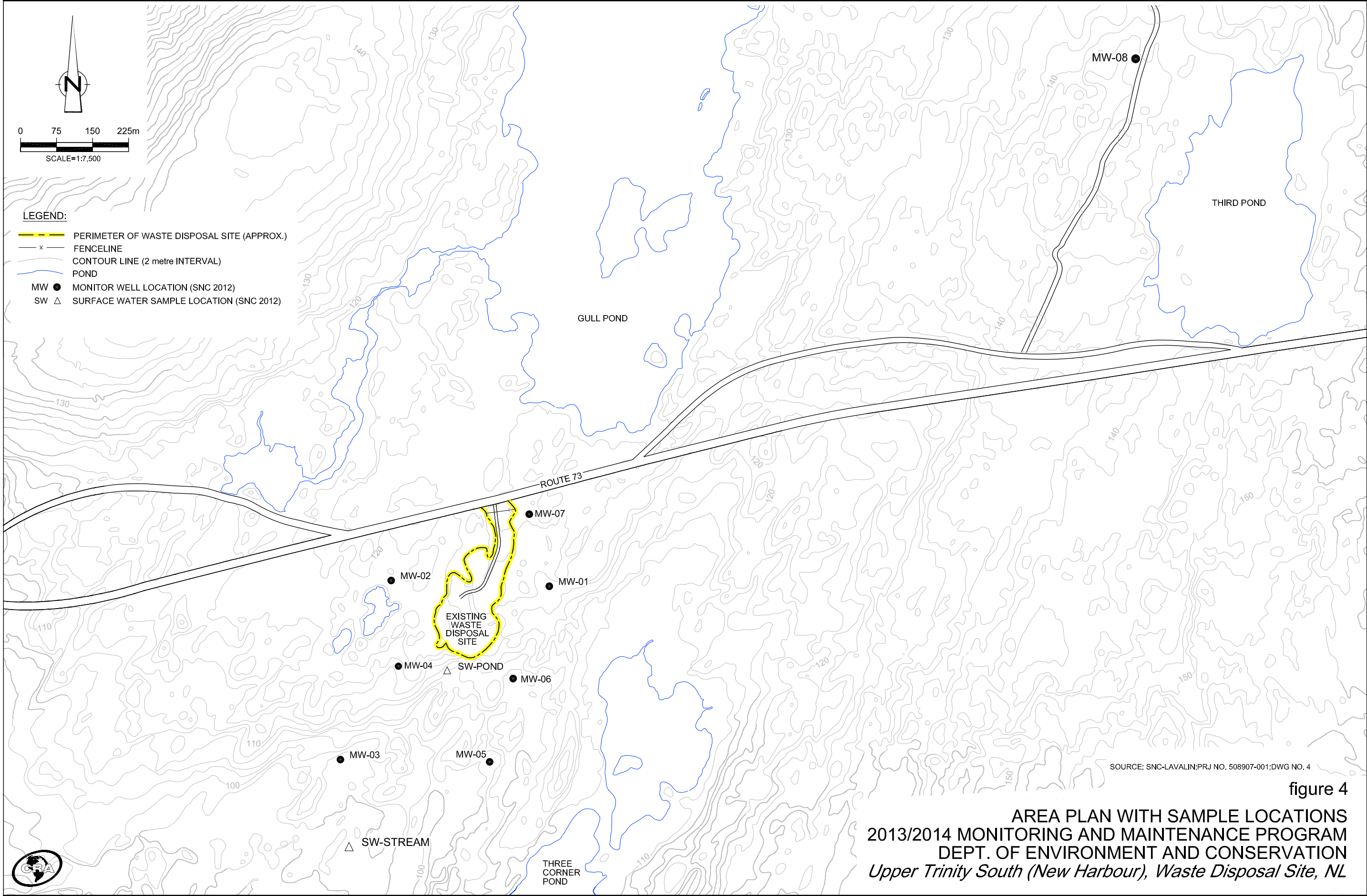
figure 1

SITE LOCATION MAP
2013/2014 MONITORING AND MAINTENANCE PROGRAM
DEPT. OF ENVIRONMENT AND CONSERVATION
Upper Trinity South (New Harbour), Waste Disposal Site, NL









**STATIC WATER LEVELS
2013/14 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
		Aug 29, 2013	Aug 29, 2013
	(masl)	(mbTOC)	(mbTOC)
MW-01	120.666	1.262	3.075
MW-02	122.201	Dry	3.944
MW-03	101.323	1.155	3.699
MW-04	117.108	1.160	3.639
MW-05	106.325	1.369	2.060
MW-06	111.300	0.990	1.999
MW-07	125.215	1.465	3.621
MW-08	N/A	1.619	5.679

Notes:

m = Metres

TOC = Top of Casing

masl = Metres Above Sea Level

mbTOC = Metres Below Top of Casing

**GPS CO-ORDINATES OF KEY SITE FEATURES
2013/14 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-05	5271505	315652
MW-06	5271686	315705
MW-07	5272017	315749
MW-08	5272974	317012
SW-POND	5271699	315578
SW-STREAM	5271330	315372

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 = Monitoring Well

SW = Surface Water

TABLE 3

GROUNDWATER ANALYTICAL DATA - PCBs (ug/L)
2013/14 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-05	MW-06	MW-07	MW-DUP	MW-08	Criteria*
		Aug 29, 2013	Aug 29, 2013	Aug 29, 2013	Aug 29, 2013	Aug 29, 2013	Aug 29, 2013	Aug 29, 2013	Aug 29, 2013	
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-DUP = Field Duplicate of MW-07

0.0 = above criteria

TABLE 4

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	MW-01	MW-03	MW-04	MW-05	MW-06	MW-07	MW-DUP	MW-08	Criteria*
		Aug 29, 2013	Aug 29, 2013	Aug 29, 2013	Aug 29, 2013	Aug 29, 2013	Aug 29, 2013	Aug 29, 2013	Aug 29, 2013	
Aluminum (Al)	5.0	72.4	167	53.8	191	418	1910	1930	1410	-
Antimony (Sb)	1.0	<	<	<	<	<	<	<	<	20,000
Arsenic (As)	1.0	<	9.9	2.3	1.6	3.3	2.3	1.9	3.3	1,900
Barium (Ba)	1.0	2.2	12.1	11.7	22.4	3.5	3.4	4.1	5.1	29,000
Beryllium (Be)	1.0	<	<	<	<	<	<	<	<	67
Bismuth (Bi)	2.0	<	<	<	<	<	<	<	<	-
Boron (B)	5.0	<	<	<	<	59	<	<	<	45,000
Cadmium (Cd)	0.017	0.017	0.03	<	0.032	0.012	0.2	0.023	0.036	2.7
Calcium (Ca)	100	2530	11900	8970	19800	11900	1170	1170	593	-
Chromium (Cr)	1.0	<	<	<	<	<	1.7	1.7	<	810
Cobalt (Co)	0.4	0.65	6.18	4.11	0.66	2.69	0.83	0.9	0.4	66
Copper (Cu)	2.0	<	2.1	<	4.1	<	3.1	3.2	11.7	87
Iron (Fe)	50	100	3220	1680	3640	9970	3330	3310	791	-
Lead (Pb)	0.5	<	0.97	<	1.36	0.95	1.82	1.78	<	25
Magnesium (Mg)	100	721	2910	1860	1090	2000	644	656	403	-
Manganese (Mn)	2.0	52.7	3020	465	283	304	32.4	33.4	12.7	-
Mercury (Hg)	0.013	0.033	0.26	0.022	0.17	0.038	0.072	0.072	0.048	0.29 ⁽¹⁾
Molybdenum (Mo)	2.0	<	<	<	8.2	<	<	<	<	9,200
Nickel (Ni)	2.0	<	2.8	<	2.3	<	<	6.1	2.9	490
Phosphorus (P)	100	<	<	104	<	581	123	143	<	-
Potassium (K)	100	266	1760	1200	<	2560	159	251	202	-
Selenium (Se)	1.0	<	<	<	<	<	<	<	<	63
Silver (Ag)	0.1	<	<	<	<	<	<	<	0.13	1.5
Sodium (Na)	100	4390	36200	32800	9050	11800	6220	6210	3700	2,300,000
Strontium (Sr)	2.0	10.2	38.2	29.1	136	33.2	8.7	8.5	6.5	-
Thallium (Tl)	0.1	<	<	<	<	<	<	<	<	510
Tin (Sn)	2.0	<	<	<	<	<	3.7	3.3	<	-
Titanium (Ti)	2.0	2.5	8.6	3.5	5.8	16.1	46.9	45	21.9	-
Uranium (U)	0.1	<	0.13	<	0.52	<	0.22	0.21	<	-
Vanadium (V)	2.0	<	<	<	<	<	2.6	2.3	<	250
Zinc (Zn)	5.0	9.4	9.1	7	19.6	5.5	17.3	14.8	19.2	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

RDL = Reportable Detection Limit

0.0 = above criteria

MW = Monitor Well

- = Not analysed/No criteria

< = Parameter below detection limit

MW-DUP = Field Duplicate of MW-07

(1) Guideline for coarse-grained soil

TABLE 5

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	SW-POND	SW-STREAM	Criteria*
		Aug 29, 2013	Aug 29, 2013	
Total PCBs	0.05	<	<	-

Notes:

Analysis completed by Maxxam Analytics Inc. laboratory in Bedford, NS.

* Criteria does not exist

RDL = Reportable Detection Limit

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	SW-POND	SW-STREAM	Criteria*
		Aug 29, 2013	Aug 29, 2013	
Aluminum (Al)	5.0	21.3	26.7	100 ⁽¹⁾
Antimony (Sb)	1.0	<	<	-
Arsenic (As)	1.0	<	<	5.0
Barium (Ba)	1.0	14	4.1	-
Beryllium (Be)	1.0	<	<	-
Bismuth (Bi)	2.0	<	<	-
Boron (B)	5.0	232	171	-
Cadmium (Cd)	0.017	<	<	0.015/0.036 ⁽²⁾
Calcium (Ca)	100	67,200	36,500	-
Chromium (Cr)	1.0	<	<	8.9 ⁽³⁾
Cobalt (Co)	0.4	<	0.75	-
Copper (Cu)	2.0	<	<	2 ⁽⁴⁾
Iron (Fe)	50	116	63	300
Lead (Pb)	0.50	<	<	1 ⁽⁵⁾
Magnesium (Mg)	100	5,750	4,530	-
Manganese (Mn)	2.0	135	145	-
Mercury (Hg)	0.013	<	<	0.026
Molybdenum (Mo)	2.0	<	<	73.00
Nickel (Ni)	2.0	<	<	25, 65 ⁽⁶⁾
Phosphorus (P)	100	<	<	-
Potassium (K)	100	7,600	7,970	-
Selenium (Se)	1.0	<	<	1.0
Silver (Ag)	0.1	<	<	0.1
Sodium (Na)	100	35,300	40,100	-
Strontium (Sr)	2.0	180	103	-
Thallium (Tl)	0.1	<	<	0.8
Tin (Sn)	2.0	<	<	-
Titanium (Ti)	2.0	<	<	-
Uranium (U)	0.10	<	<	-
Vanadium (V)	2.0	<	<	-
Zinc (Zn)	5.0	<	<	30

Notes:

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

- = Not analysed/No criteria

< = Parameter below 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 = $10^{[0.86[\log(\text{hardness})]-3.2]}$

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

(4) Copper guideline = 2 ug/L at [CaCO₃] = 0-120 mg/L
= 3 ug/L at [CaCO₃] = 120-180 mg/L
= 4 ug/L at [CaCO₃] >180 mg/L

(5) Lead guideline = 1 ug/L at [CaCO₃] = 0-60 mg/L
= 2 ug/L at [CaCO₃] = 60-120 mg/L
= 4 ug/L at [CaCO₃] = 120-180 mg/L
= 7 ug/L at [CaCO₃] >180 mg/L

(6) Nickel guideline = 25 ug/L at [CaCO₃] = 0-60 mg/L
= 65 ug/L at [CaCO₃] = 60-120 mg/L
= 110 ug/L at [CaCO₃] = 120-180 mg/L
= 150 ug/L at [CaCO₃] >180 mg/L

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	SW-POND	SW-STREAM	Criteria*
			Aug 29, 2013	Aug 29, 2013	
Anion Sum	N/A	me/L	5.75	3.84	-
Bicarb. Alkalinity (calc. as CaCO ₃)	1	mg/L	160	76	-
Calculated TDS	1	mg/L	380	250	-
Carb. Alkalinity (calc. as CaCO ₃)	1	mg/L	<	<	-
Cation Sum	N/A	me/L	7.29	4.04	-
Hardness (CaCO ₃)	1	mg/L	230	110	-
Ion Balance (% Difference)	N/A	%	11.8	2.5	-
Langelier Index (@ 20C)	N/A	N/A	-0.018	-0.827	-
Langelier Index (@ 4C)	N/A	N/A	-0.266	-1.08	-
Saturation pH (@ 20C)	N/A	N/A	7.33	7.96	-
Saturation pH (@ 4C)	N/A	N/A	7.58	8.21	-
Total Alkalinity (Total as CaCO ₃)	30	mg/L	160	76	-
Dissolved Chloride (Cl)	1	mg/L	24	31	-
Colour	5	TCU	13	28	-
Nitrate + Nitrite	0.05	mg/L	4.1	5.8	-
Nitrogen (Ammonia Nitrogen)	0.05	mg/L	4	1.4	-
Total Organic Carbon (C)	0.5	mg/L	14	8.2	-
Orthophosphate (P)	0.01	mg/L	<	<	-
pH	N/A	pH	7.31	7.13	6.5 - 9
Reactive Silica (SiO ₂)	0.5	mg/L	5.7	6.3	-
Dissolved Sulphate (SO ₄)	2	mg/L	73	49	-
Turbidity	0.1	NTU	180	32	-
Conductivity	1	uS/cm	560	390	-

Notes:

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

0.0 = above criteria

- = Not analysed/No criteria

< = Parameter below detection limit

APPENDIX A

SITE PHOTOGRAPHS



Photo 1: View, looking northeast, towards MW-02 during the August 2013 sampling event.



Photo 2: View, looking south, towards MW-04 during the August 2013 sampling event.



Photo 3: View, looking east, of MW-06 during the August 2013 sampling event.



Photo 4: View, looking northeast, showing MW-07 during the August 2013 sampling event. The old Waterra tubing by the well casing was removed.



Photo 5: View, looking south, toward the off-Site background monitor well (MW-08) during the August 2013 sampling event.



Photo 6: View, looking west, toward the leachate collection pond on the south end of the Site during the August 2013 sampling event where SW-POND was collected.

APPENDIX B

LABORATORY CERTIFICATES OF ANALYSES

Your Project #: 084308
 Site Location: MONITORING + MAINTENANCE NEW HARBOUR,NL
 Your C.O.C. #: B 155504, B 155512

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: 2013/09/10

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B3E6250

Received: 2013/08/31, 09:34

Sample Matrix: Water
 # Samples Received: 10

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Mercury - Total (CVAA,LL) (1)	10	2013/09/09	2013/09/09	ATL SOP 00026	Based on EPA245.1
Metals Water Diss. MS (as rec'd) (1)	8	N/A	2013/09/06	ATL SOP 00058	Based on EPA6020A
Metals Water Total MS (1,2)	2	2013/09/06	2013/09/09	ATL SOP 00058	Based on EPA6020A
PCBs in water by GC/ECD (1)	10	2013/09/04	2013/09/09	ATL SOP 00107	Based on EPA8082

Remarks:

Reporting results to two significant figures at the RDL is to permit statistical evaluation and is not intended to be an indication of analytical precision.

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

* Results relate only to the items tested.

(1) This test was performed by 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.

Encryption Key

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.

Total cover pages: 1

Maxxam Job #: B3E6250
Report Date: 2013/09/10

Conestoga-Rovers and Associates Ltd
Client Project #: 084308
Site Location: MONITORING + MAINTENANCE NEW HARBOUR, NL
Sampler Initials: MM

MERCURY BY COLD VAPOUR AA (WATER)

Maxxam ID		SW9196	SW9197	SW9198	SW9199	SW9200	SW9201		
Sampling Date		2013/08/29 11:30	2013/08/29 15:00	2013/08/29 12:30	2013/08/29 13:00	2013/08/29 16:00	2013/08/29 11:00		
	Units	MW-01	MW-03	MW-04	MW-05	MW-06	MW-07	RDL	QC Batch
Metals									
Total Mercury (Hg)	ug/L	0.033	0.26	0.022	0.17	0.038	0.072	0.013	3342586

Maxxam ID		SW9202		SW9203	SW9203	SW9204	SW9205		
Sampling Date		2013/08/29 17:00		2013/08/29 13:50	2013/08/29 13:50	2013/08/29 14:30	2013/08/29 16:15		
	Units	MW-08	QC Batch	SW-STREAM	SW-STREAM Lab-Dup	SW-POND	MW-DUP	RDL	QC Batch
Metals									
Total Mercury (Hg)	ug/L	0.048	3342586	<0.013	0.013	<0.013	0.072	0.013	3342590

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B3E6250
Report Date: 2013/09/10

Conestoga-Rovers and Associates Ltd
Client Project #: 084308
Site Location: MONITORING + MAINTENANCE NEW HARBOUR, NL
Sampler Initials: MM

ELEMENTS BY ICP/MS (WATER)

Maxxam ID		SW9196	SW9197	SW9198	SW9199		
Sampling Date		2013/08/29 11:30	2013/08/29 15:00	2013/08/29 12:30	2013/08/29 13:00		
	Units	MW-01	MW-03	MW-04	MW-05	RDL	QC Batch
Metals							
Dissolved Aluminum (Al)	ug/L	72.4	167	53.8	191	5.0	3338192
Dissolved Antimony (Sb)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	3338192
Dissolved Arsenic (As)	ug/L	<1.0	9.9	2.3	1.6	1.0	3338192
Dissolved Barium (Ba)	ug/L	2.2	12.1	11.7	22.4	1.0	3338192
Dissolved Beryllium (Be)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	3338192
Dissolved Bismuth (Bi)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	3338192
Dissolved Boron (B)	ug/L	<50	<50	<50	<50	50	3338192
Dissolved Cadmium (Cd)	ug/L	0.017	0.030	<0.010	0.032	0.010	3338192
Dissolved Calcium (Ca)	ug/L	2530	11900	8970	19800	100	3338192
Dissolved Chromium (Cr)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	3338192
Dissolved Cobalt (Co)	ug/L	0.65	6.18	4.11	0.66	0.40	3338192
Dissolved Copper (Cu)	ug/L	<2.0	2.1	<2.0	4.1	2.0	3338192
Dissolved Iron (Fe)	ug/L	100	3220	1680	3640	50	3338192
Dissolved Lead (Pb)	ug/L	<0.50	0.97	<0.50	1.36	0.50	3338192
Dissolved Magnesium (Mg)	ug/L	721	2910	1860	1090	100	3338192
Dissolved Manganese (Mn)	ug/L	52.7	3020	465	283	2.0	3338192
Dissolved Molybdenum (Mo)	ug/L	<2.0	<2.0	<2.0	8.2	2.0	3338192
Dissolved Nickel (Ni)	ug/L	<2.0	2.8	<2.0	2.3	2.0	3338192
Dissolved Phosphorus (P)	ug/L	<100	<100	104	<100	100	3338192
Dissolved Potassium (K)	ug/L	266	1760	1200	1700	100	3338192
Dissolved Selenium (Se)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	3338192
Dissolved Silver (Ag)	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	3338192
Dissolved Sodium (Na)	ug/L	4390	36200	32800	9050	100	3338192
Dissolved Strontium (Sr)	ug/L	10.2	38.2	29.1	136	2.0	3338192
Dissolved Thallium (Tl)	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	3338192
Dissolved Tin (Sn)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	3338192
Dissolved Titanium (Ti)	ug/L	2.5	8.6	3.5	5.8	2.0	3338192
Dissolved Uranium (U)	ug/L	<0.10	0.13	<0.10	0.52	0.10	3338192
Dissolved Vanadium (V)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	3338192
Dissolved Zinc (Zn)	ug/L	9.4	9.1	7.0	19.6	5.0	3338192

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B3E6250
Report Date: 2013/09/10

Conestoga-Rovers and Associates Ltd
Client Project #: 084308
Site Location: MONITORING + MAINTENANCE NEW HARBOUR, NL
Sampler Initials: MM

ELEMENTS BY ICP/MS (WATER)

Maxxam ID		SW9200	SW9201	SW9202	SW9203	SW9204	SW9205		
Sampling Date		2013/08/29 16:00	2013/08/29 11:00	2013/08/29 17:00	2013/08/29 13:50	2013/08/29 14:30	2013/08/29 16:15		
	Units	MW-06	MW-07	MW-08	SW-STREAM	SW-POND	MW-DUP	RDL	QC Batch
Metals									
Dissolved Aluminum (Al)	ug/L	418	1910	1410			1930	5.0	3338192
Total Aluminum (Al)	ug/L				26.7	21.3		5.0	3339922
Dissolved Antimony (Sb)	ug/L	<1.0	<1.0	<1.0			<1.0	1.0	3338192
Total Antimony (Sb)	ug/L				<1.0	<1.0		1.0	3339922
Dissolved Arsenic (As)	ug/L	3.3	2.3	3.3			1.9	1.0	3338192
Total Arsenic (As)	ug/L				<1.0	<1.0		1.0	3339922
Dissolved Barium (Ba)	ug/L	3.5	3.4	5.1			4.1	1.0	3338192
Total Barium (Ba)	ug/L				4.1	14.0		1.0	3339922
Dissolved Beryllium (Be)	ug/L	<1.0	<1.0	<1.0			<1.0	1.0	3338192
Total Beryllium (Be)	ug/L				<1.0	<1.0		1.0	3339922
Dissolved Bismuth (Bi)	ug/L	<2.0	<2.0	<2.0			<2.0	2.0	3338192
Total Bismuth (Bi)	ug/L				<2.0	<2.0		2.0	3339922
Dissolved Boron (B)	ug/L	59	<50	<50			<50	50	3338192
Total Boron (B)	ug/L				171	232		50	3339922
Dissolved Cadmium (Cd)	ug/L	0.012	0.200	0.036			0.023	0.010	3338192
Total Cadmium (Cd)	ug/L				<0.010	<0.010		0.010	3339922
Dissolved Calcium (Ca)	ug/L	11900	1170	593			1170	100	3338192
Total Calcium (Ca)	ug/L				36500	67200		100	3339922
Dissolved Chromium (Cr)	ug/L	<1.0	1.7	<1.0			1.7	1.0	3338192
Total Chromium (Cr)	ug/L				<1.0	<1.0		1.0	3339922
Dissolved Cobalt (Co)	ug/L	2.69	0.83	0.40			0.90	0.40	3338192
Total Cobalt (Co)	ug/L				0.75	<0.40		0.40	3339922
Dissolved Copper (Cu)	ug/L	<2.0	3.1	11.7			3.2	2.0	3338192
Total Copper (Cu)	ug/L				<2.0	<2.0		2.0	3339922
Dissolved Iron (Fe)	ug/L	9970	3330	791			3310	50	3338192
Total Iron (Fe)	ug/L				63	116		50	3339922
Dissolved Lead (Pb)	ug/L	0.95	1.82	<0.50			1.78	0.50	3338192
Total Lead (Pb)	ug/L				<0.50	<0.50		0.50	3339922
Dissolved Magnesium (Mg)	ug/L	2000	644	403			656	100	3338192
Total Magnesium (Mg)	ug/L				4530	5750		100	3339922
Dissolved Manganese (Mn)	ug/L	304	32.4	12.7			33.4	2.0	3338192
Total Manganese (Mn)	ug/L				145	135		2.0	3339922
Dissolved Molybdenum (Mo)	ug/L	<2.0	<2.0	<2.0			<2.0	2.0	3338192
Total Molybdenum (Mo)	ug/L				<2.0	<2.0		2.0	3339922

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Conestoga-Rovers and Associates Ltd
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Site Location: MONITORING + MAINTENANCE NEW HARBOUR, NL
Sampler Initials: MM

ELEMENTS BY ICP/MS (WATER)

Maxxam ID		SW9200	SW9201	SW9202	SW9203	SW9204	SW9205		
Sampling Date		2013/08/29 16:00	2013/08/29 11:00	2013/08/29 17:00	2013/08/29 13:50	2013/08/29 14:30	2013/08/29 16:15		
	Units	MW-06	MW-07	MW-08	SW-STREAM	SW-POND	MW-DUP	RDL	QC Batch
Dissolved Nickel (Ni)	ug/L	<2.0	<2.0	2.9			6.1	2.0	3338192
Total Nickel (Ni)	ug/L				<2.0	<2.0		2.0	3339922
Dissolved Phosphorus (P)	ug/L	581	123	<100			143	100	3338192
Total Phosphorus (P)	ug/L				<100	<100		100	3339922
Dissolved Potassium (K)	ug/L	2560	159	202			251	100	3338192
Total Potassium (K)	ug/L				7970	7600		100	3339922
Dissolved Selenium (Se)	ug/L	<1.0	<1.0	<1.0			<1.0	1.0	3338192
Total Selenium (Se)	ug/L				<1.0	<1.0		1.0	3339922
Dissolved Silver (Ag)	ug/L	<0.10	<0.10	0.13			<0.10	0.10	3338192
Total Silver (Ag)	ug/L				<0.10	<0.10		0.10	3339922
Dissolved Sodium (Na)	ug/L	11800	6220	3700			6210	100	3338192
Total Sodium (Na)	ug/L				40100	35300		100	3339922
Dissolved Strontium (Sr)	ug/L	33.2	8.7	6.5			8.5	2.0	3338192
Total Strontium (Sr)	ug/L				103	180		2.0	3339922
Dissolved Thallium (Tl)	ug/L	<0.10	<0.10	<0.10			<0.10	0.10	3338192
Total Thallium (Tl)	ug/L				<0.10	<0.10		0.10	3339922
Dissolved Tin (Sn)	ug/L	<2.0	3.7	<2.0			3.3	2.0	3338192
Total Tin (Sn)	ug/L				<2.0	<2.0		2.0	3339922
Dissolved Titanium (Ti)	ug/L	16.1	46.9	21.9			45.0	2.0	3338192
Total Titanium (Ti)	ug/L				<2.0	<2.0		2.0	3339922
Dissolved Uranium (U)	ug/L	<0.10	0.22	<0.10			0.21	0.10	3338192
Total Uranium (U)	ug/L				<0.10	<0.10		0.10	3339922
Dissolved Vanadium (V)	ug/L	<2.0	2.6	<2.0			2.3	2.0	3338192
Total Vanadium (V)	ug/L				<2.0	<2.0		2.0	3339922
Dissolved Zinc (Zn)	ug/L	5.5	17.3	19.2			14.8	5.0	3338192
Total Zinc (Zn)	ug/L				<5.0	<5.0		5.0	3339922

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B3E6250
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Conestoga-Rovers and Associates Ltd
Client Project #: 084308
Site Location: MONITORING + MAINTENANCE NEW HARBOUR, NL
Sampler Initials: MM

POLYCHLORINATED BIPHENYLS BY GC-ECD (WATER)

Maxxam ID		SW9196	SW9197	SW9198		SW9199		
Sampling Date		2013/08/29 11:30	2013/08/29 15:00	2013/08/29 12:30		2013/08/29 13:00		
	Units	MW-01	MW-03	MW-04	RDL	MW-05	RDL	QC Batch
PCBs								
Total PCB	ug/L	<0.050	<0.050	<0.050	0.050	<0.060	0.060	3336990
Surrogate Recovery (%)								
Decachlorobiphenyl	%	60 ⁽¹⁾	47 ⁽¹⁾	76		85 ⁽²⁾		3336990

Maxxam ID		SW9200	SW9201	SW9202	SW9203	SW9204	SW9205		
Sampling Date		2013/08/29 16:00	2013/08/29 11:00	2013/08/29 17:00	2013/08/29 13:50	2013/08/29 14:30	2013/08/29 16:15		
	Units	MW-06	MW-07	MW-08	SW-STREAM	SW-POND	MW-DUP	RDL	QC Batch
PCBs									
Total PCB	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	3336990
Surrogate Recovery (%)									
Decachlorobiphenyl	%	51 ⁽¹⁾	25 ⁽³⁾	36 ⁽¹⁾	88	95	22 ⁽³⁾		3336990

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

(1) - PCB sample contained sediment.

(2) - PCB sample decanted due to sediment. Elevated PCB RDL due to insufficient sample.

(3) - PCB sample contained sediment. PCB surrogate not within acceptance limits. Analysis was repeated with similar results.

Maxxam Job #: B3E6250
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Package 1	4.1°C
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Each temperature is the average of up to three cooler temperatures taken at receipt

GENERAL COMMENTS

Maxxam Job #: B3E6250
Report Date: 2013/09/10

Conestoga-Rovers and Associates Ltd
Client Project #: 084308
Site Location: MONITORING + MAINTENANCE NEW HARBOUR, NL
Sampler Initials: MM

QUALITY ASSURANCE REPORT

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits
3336990	Decachlorobiphenyl	2013/09/09	101	30 - 130	93	30 - 130	87	%		
3336990	Total PCB	2013/09/09	121	70 - 130	119	70 - 130	<0.050	ug/L	NC	40
3338192	Dissolved Aluminum (Al)	2013/09/06	95	80 - 120	98	80 - 120	<5.0	ug/L	NC	20
3338192	Dissolved Antimony (Sb)	2013/09/06	110	80 - 120	113	80 - 120	<1.0	ug/L	NC	20
3338192	Dissolved Arsenic (As)	2013/09/06	99	80 - 120	99	80 - 120	<1.0	ug/L	NC	20
3338192	Dissolved Barium (Ba)	2013/09/06	NC	80 - 120	102	80 - 120	<1.0	ug/L	1.5	20
3338192	Dissolved Beryllium (Be)	2013/09/06	98	80 - 120	96	80 - 120	<1.0	ug/L	NC	20
3338192	Dissolved Bismuth (Bi)	2013/09/06	100	80 - 120	105	80 - 120	<2.0	ug/L	NC	20
3338192	Dissolved Boron (B)	2013/09/06	99	80 - 120	98	80 - 120	<50	ug/L	NC	20
3338192	Dissolved Cadmium (Cd)	2013/09/06	101	80 - 120	100	80 - 120	<0.010	ug/L	NC	20
3338192	Dissolved Calcium (Ca)	2013/09/06	NC	80 - 120	101	80 - 120	<100	ug/L	0.4	20
3338192	Dissolved Chromium (Cr)	2013/09/06	98	80 - 120	99	80 - 120	<1.0	ug/L	NC	20
3338192	Dissolved Cobalt (Co)	2013/09/06	101	80 - 120	101	80 - 120	<0.40	ug/L	NC	20
3338192	Dissolved Copper (Cu)	2013/09/06	98	80 - 120	100	80 - 120	<2.0	ug/L	NC	20
3338192	Dissolved Iron (Fe)	2013/09/06	97	80 - 120	99	80 - 120	<50	ug/L	NC	20
3338192	Dissolved Lead (Pb)	2013/09/06	100	80 - 120	103	80 - 120	<0.50	ug/L	NC	20
3338192	Dissolved Magnesium (Mg)	2013/09/06	NC	80 - 120	100	80 - 120	<100	ug/L	1.6	20
3338192	Dissolved Manganese (Mn)	2013/09/06	NC	80 - 120	97	80 - 120	<2.0	ug/L	0.5	20
3338192	Dissolved Molybdenum (Mo)	2013/09/06	101	80 - 120	107	80 - 120	<2.0	ug/L	1.6	20
3338192	Dissolved Nickel (Ni)	2013/09/06	97	80 - 120	98	80 - 120	<2.0	ug/L	NC	20
3338192	Dissolved Phosphorus (P)	2013/09/06	102	80 - 120	103	80 - 120	<100	ug/L	NC	20
3338192	Dissolved Potassium (K)	2013/09/06	97	80 - 120	101	80 - 120	<100	ug/L	2.2	20
3338192	Dissolved Selenium (Se)	2013/09/06	95	80 - 120	95	80 - 120	<1.0	ug/L	NC	20
3338192	Dissolved Silver (Ag)	2013/09/06	93	80 - 120	99	80 - 120	<0.10	ug/L	NC	20
3338192	Dissolved Sodium (Na)	2013/09/06	NC	80 - 120	99	80 - 120	<100	ug/L	1.4	20
3338192	Dissolved Strontium (Sr)	2013/09/06	NC	80 - 120	101	80 - 120	<2.0	ug/L	1.7	20
3338192	Dissolved Thallium (Tl)	2013/09/06	101	80 - 120	105	80 - 120	<0.10	ug/L	NC	20
3338192	Dissolved Tin (Sn)	2013/09/06	105	80 - 120	106	80 - 120	<2.0	ug/L	NC	20
3338192	Dissolved Titanium (Ti)	2013/09/06	97	80 - 120	100	80 - 120	<2.0	ug/L	NC	20
3338192	Dissolved Uranium (U)	2013/09/06	108	80 - 120	109	80 - 120	<0.10	ug/L	1.1	20
3338192	Dissolved Vanadium (V)	2013/09/06	101	80 - 120	102	80 - 120	<2.0	ug/L	NC	20
3338192	Dissolved Zinc (Zn)	2013/09/06	100	80 - 120	102	80 - 120	<5.0	ug/L	NC	20
3339922	Total Aluminum (Al)	2013/09/09	102 ₍₁₎	80 - 120	101	80 - 120	<5.0	ug/L	NC	20
3339922	Total Antimony (Sb)	2013/09/09	110 ₍₁₎	80 - 120	108	80 - 120	<1.0	ug/L	NC	20
3339922	Total Arsenic (As)	2013/09/09	102 ₍₁₎	80 - 120	99	80 - 120	<1.0	ug/L	NC	20
3339922	Total Barium (Ba)	2013/09/09	99 ₍₁₎	80 - 120	99	80 - 120	<1.0	ug/L	NC	20
3339922	Total Beryllium (Be)	2013/09/09	108 ₍₁₎	80 - 120	103	80 - 120	<1.0	ug/L	NC	20
3339922	Total Bismuth (Bi)	2013/09/09	103 ₍₁₎	80 - 120	104	80 - 120	<2.0	ug/L	NC	20
3339922	Total Boron (B)	2013/09/09	NC ₍₁₎	80 - 120	105	80 - 120	<50	ug/L	NC	20
3339922	Total Cadmium (Cd)	2013/09/09	104 ₍₁₎	80 - 120	101	80 - 120	<0.010	ug/L	NC	20

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Conestoga-Rovers and Associates Ltd
Client Project #: 084308
Site Location: MONITORING + MAINTENANCE NEW HARBOUR, NL
Sampler Initials: MM

QUALITY ASSURANCE REPORT

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits
3339922	Total Calcium (Ca)	2013/09/09	NC ⁽¹⁾	80 - 120	101	80 - 120	<100	ug/L	NC	20
3339922	Total Chromium (Cr)	2013/09/09	104 ⁽¹⁾	80 - 120	102	80 - 120	<1.0	ug/L	NC	20
3339922	Total Cobalt (Co)	2013/09/09	101 ⁽¹⁾	80 - 120	100	80 - 120	<0.40	ug/L	NC	20
3339922	Total Copper (Cu)	2013/09/09	100 ⁽¹⁾	80 - 120	99	80 - 120	<2.0	ug/L	NC	20
3339922	Total Iron (Fe)	2013/09/09	109 ⁽¹⁾	80 - 120	105	80 - 120	<50	ug/L	NC	20
3339922	Total Lead (Pb)	2013/09/09	100 ⁽¹⁾	80 - 120	99	80 - 120	<0.50	ug/L	NC	20
3339922	Total Magnesium (Mg)	2013/09/09	NC ⁽¹⁾	80 - 120	105	80 - 120	<100	ug/L	NC	20
3339922	Total Manganese (Mn)	2013/09/09	NC ⁽¹⁾	80 - 120	100	80 - 120	<2.0	ug/L	NC	20
3339922	Total Molybdenum (Mo)	2013/09/09	109 ⁽¹⁾	80 - 120	105	80 - 120	<2.0	ug/L	NC	20
3339922	Total Nickel (Ni)	2013/09/09	102 ⁽¹⁾	80 - 120	102	80 - 120	<2.0	ug/L	NC	20
3339922	Total Phosphorus (P)	2013/09/09	107 ⁽¹⁾	80 - 120	104	80 - 120	<100	ug/L	NC	20
3339922	Total Potassium (K)	2013/09/09	NC ⁽¹⁾	80 - 120	106	80 - 120	<100	ug/L	NC	20
3339922	Total Selenium (Se)	2013/09/09	102 ⁽¹⁾	80 - 120	102	80 - 120	<1.0	ug/L	NC	20
3339922	Total Silver (Ag)	2013/09/09	103 ⁽¹⁾	80 - 120	100	80 - 120	<0.10	ug/L	NC	20
3339922	Total Sodium (Na)	2013/09/09	NC ⁽¹⁾	80 - 120	104	80 - 120	<100	ug/L	NC	20
3339922	Total Strontium (Sr)	2013/09/09	NC ⁽¹⁾	80 - 120	100	80 - 120	<2.0	ug/L	NC	20
3339922	Total Thallium (Tl)	2013/09/09	107 ⁽¹⁾	80 - 120	106	80 - 120	<0.10	ug/L	NC	20
3339922	Total Tin (Sn)	2013/09/09	108 ⁽¹⁾	80 - 120	105	80 - 120	<2.0	ug/L	NC	20
3339922	Total Titanium (Ti)	2013/09/09	106 ⁽¹⁾	80 - 120	103	80 - 120	<2.0	ug/L	NC	20
3339922	Total Uranium (U)	2013/09/09	110 ⁽¹⁾	80 - 120	106	80 - 120	<0.10	ug/L	NC	20
3339922	Total Vanadium (V)	2013/09/09	106 ⁽¹⁾	80 - 120	103	80 - 120	<2.0	ug/L	NC	20
3339922	Total Zinc (Zn)	2013/09/09	101 ⁽¹⁾	80 - 120	101	80 - 120	<5.0	ug/L	NC	20
3342586	Total Mercury (Hg)	2013/09/09	96	80 - 120	100	80 - 120	<0.013	ug/L	NC	25
3342590	Total Mercury (Hg)	2013/09/09	98 ⁽²⁾	80 - 120	101	80 - 120	<0.013	ug/L	NC ⁽³⁾	25

N/A = Not Applicable

RPD = Relative Percent Difference

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.

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 not sufficiently significant to permit a reliable recovery calculation.

NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.

(1) - Matrix Spike Parent ID [SW9204-02]


(2) - Matrix Spike Parent ID [SW9204-03]

(3) - Duplicate Parent ID [SW9203-03]

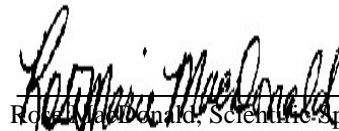
Validation Signature Page

Maxxam Job #: B3E6250

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



Kevin MacDonald, Inorganics Supervisor



Kevin MacDonald, Science Specialist (Organics)

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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.

INVOICE INFORMATION: Company Name: <u>Conestoga-Rovers & Assoc</u> Contact Name: <u>Brian Luffman</u> Address: <u>1118 Topsail Road, St. John's, NL A1B 3N7</u> Email: <u>bluffman@craworld.com</u> Ph: <u>(709) 364-5353</u> Fax: <u>(709) 364-5368</u>										REPORT INFORMATION (if differs from invoice): Company Name: <u>SA ME</u> Contact Name: <u>SA ME</u> Address: <u>SA ME</u> Email: <u>SA ME</u> Ph: <u>SA ME</u> Fax: <u>SA ME</u>										PO # <u>TD Follow</u> Project # / Phase # <u>084308</u> Project Name / Site Location <u>regulating + maintenance New Waterbury, NL</u> Quote <u>New Waterbury, NL</u> Site # <u>---</u> Task Order # <u>---</u> Sampled by <u>Mike Maher + Andrew Bryant</u>										TURNAROUND TIME Standard <input checked="" type="checkbox"/> 10 day <input type="checkbox"/> If RUSH Specify Date: <u>---</u> Pre-schedule rush work <input type="checkbox"/> Charge for # Jars used but not submitted <u>0</u>																																																																																																																																																																																																																																																	
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This column for lab use only:

Client Code

Maxxam Job #

Cooler ID	Seal Present	Seal Intact	Temp 1	Temp 2	Temp 3	Average Temp
			5.0	2.4	4.4	

Integrity YES ☒ NO ☐ Integrity / Checklist by *CEJ*

Labelled by Location / Bin #

INVOICE INFORMATION:

Company Name: *Conestoga-Rovers*

Contact Name: *Brian Luffman*

Address: *1118 Topsail Road,*

St. John's, NL Postal Code *A1B3N7*

Email: *bluffman@crworld.com*

Ph: *(709) 364-5353* Fax: *(709) 364-5368*

Guideline Requirements / Detection Limits / Special Instructions

Please c.c. data@crworld.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
1 MW-DUP	Water	Aug 29/13 4:15pm	5
2			
3			
4			
5			
6			
7			
8			
9			
10			

REPORT INFORMATION (if differs from invoice):

Company Name:

Contact Name:

Address:

Postal Code

Email:

Ph:

Fax:

PO # *To Follow*

Project # / Phase # *084308*

Project Name / Site Location *maintaining maintenance New Harbour*

Quote *B34651*

Site #

Task Order #

Sampled by *mike mahar*

Andrew Bryant

TURNAROUND TIME

Standard ☒

10 day ☐

If RUSH Specify Date:

Pre-schedule rush work

Charge for # Jars used but not submitted *0*

SHIPPED FROM

30-09-2013

MAXXAM NL

RELINQUISHED BY: (Signature/Print)

Mike Mahor

Date Time

Aug 29/13 9:00am

RECEIVED BY: (Signature/Print)

Michael Richard

Date Time

2013/8/30 12:20

Erin Fraser

Your P.O. #: 20-016290
Your Project #: 084308-99
Site Location: MONITORING & MAINTENANCE, NEW HARBOUR
Your C.O.C. #: B 155608

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: 2014/01/07

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B3M2862
Received: 2013/12/30, 11:01

Sample Matrix: Water
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Carbonate, Bicarbonate and Hydroxide (1)	2	N/A	2014/01/07	CAM SOP-00102	APHA 4500-CO2 D
Alkalinity (1)	2	N/A	2014/01/07	ATL SOP 00013	Based on EPA310.2
Chloride (1)	2	N/A	2014/01/06	ATL SOP 00014	Based on SM4500-Cl-
Colour (1)	2	N/A	2014/01/06	ATL SOP 00020	Based on SM2120C
Conductance - water (1)	2	N/A	2014/01/06	ATL SOP-00004	Based on SM2510B
Hardness (calculated as CaCO3) (1)	2	N/A	2014/01/03	ATL SOP 00048	Based on SM2340B
Metals Water Total MS (1,2)	2	2014/01/02	2014/01/02	ATL SOP 00058	Based on EPA6020A
Ion Balance (% Difference) (1)	2	N/A	2014/01/07		
Anion and Cation Sum (1)	2	N/A	2014/01/07		
Nitrogen Ammonia - water (1)	2	N/A	2014/01/06	ATL SOP 00015	Based on USEPA 350.1
Nitrogen - Nitrate + Nitrite (1)	2	N/A	2014/01/06	ATL SOP 00016	Based on USGS - Enz.
pH (1,3)	2	N/A	2014/01/06	ATL SOP 00003	Based on SM4500H+B
Phosphorus - ortho (1)	2	N/A	2014/01/06	ATL SOP 00021	Based on USEPA 365.2
Sat. pH and Langelier Index (@ 20C) (1)	2	N/A	2014/01/07	ATL SOP-00049	.
Sat. pH and Langelier Index (@ 4C) (1)	2	N/A	2014/01/07	ATL SOP-00049	.
Reactive Silica (1)	2	N/A	2014/01/06	ATL SOP 00022	Based on EPA 366.0
Sulphate (1)	2	N/A	2014/01/07	ATL SOP 00023	Based on EPA 375.4
Total Dissolved Solids (TDS calc) (1)	2	N/A	2014/01/07		
Organic carbon - Total (TOC) (1,4)	2	N/A	2014/01/06	ATL SOP 00037	Based on SM5310C
Turbidity (1)	2	N/A	2014/01/06	ATL SOP 00011	based on EPA 180.1

Remarks:

Reporting results to two significant figures at the RDL is to permit statistical evaluation and is not intended to be an indication of analytical precision.

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

* Results relate only to the items tested.

(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.



Maxxam Job #: B3M2862
Report Date: 2014/01/07

Conestoga-Rovers and Associates Ltd
Client Project #: 084308-99
Site Location: MONITORING & MAINTENANCE, NEW HARBOUR
Your P.O. #: 20-016290
Sampler Initials: AB

-2-

Encryption Key

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.

Total cover pages: 2

Maxxam Job #: B3M2862
Report Date: 2014/01/07

Conestoga-Rovers and Associates Ltd
Client Project #: 084308-99
Site Location: MONITORING & MAINTENANCE, NEW HARBOUR
Your P.O. #: 20-016290
Sampler Initials: AB

RESULTS OF ANALYSES OF WATER

Maxxam ID		UK5223			UK5224		
Sampling Date		2013/12/23 12:30			2013/12/23 13:15		
	Units	SW-POND	RDL	QC Batch	SW-STREAM	RDL	QC Batch
Calculated Parameters							
Anion Sum	me/L	5.75	N/A	3469654	3.84	N/A	3469654
Bicarb. Alkalinity (calc. as CaCO ₃)	mg/L	160	1.0	3469650	76	1.0	3469650
Calculated TDS	mg/L	380	1.0	3469659	250	1.0	3469659
Carb. Alkalinity (calc. as CaCO ₃)	mg/L	<1.0	1.0	3469650	<1.0	1.0	3469650
Cation Sum	me/L	7.29	N/A	3469654	4.04	N/A	3469654
Hardness (CaCO ₃)	mg/L	230	1.0	3469652	110	1.0	3469652
Ion Balance (% Difference)	%	11.8	N/A	3469653	2.54	N/A	3469653
Langelier Index (@ 20C)	N/A	-0.0180		3469657	-0.827		3469657
Langelier Index (@ 4C)	N/A	-0.266		3469658	-1.08		3469658
Saturation pH (@ 20C)	N/A	7.33		3469657	7.96		3469657
Saturation pH (@ 4C)	N/A	7.58		3469658	8.21		3469658
Inorganics							
Total Alkalinity (Total as CaCO ₃)	mg/L	160	25	3473701	76	5.0	3473701
Dissolved Chloride (Cl)	mg/L	24	1.0	3473704	31	1.0	3473704
Colour	TCU	13	5.0	3473708	28	5.0	3473708
Nitrate + Nitrite	mg/L	4.1	0.25	3473710	5.8	0.25	3473710
Nitrogen (Ammonia Nitrogen)	mg/L	4.0	0.25	3473814	1.4	0.050	3473814
Total Organic Carbon (C)	mg/L	14 ⁽¹⁾	5.0	3474045	8.2 ⁽¹⁾	5.0	3474045
Orthophosphate (P)	mg/L	<0.010	0.010	3473709	<0.010	0.010	3473709
pH	pH	7.31	N/A	3473760	7.13	N/A	3473762
Reactive Silica (SiO ₂)	mg/L	5.7	0.50	3473707	6.3	0.50	3473707
Dissolved Sulphate (SO ₄)	mg/L	73	10	3473706	49	10	3473706
Turbidity	NTU	180	1.0	3473823	32	0.10	3473823
Conductivity	uS/cm	560	1.0	3473761	390	1.0	3473771

N/A = Not Applicable

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

(1) - Reporting limit was increased due to turbidity.

Maxxam Job #: B3M2862
Report Date: 2014/01/07

Conestoga-Rovers and Associates Ltd
Client Project #: 084308-99
Site Location: MONITORING & MAINTENANCE, NEW HARBOUR
Your P.O. #: 20-016290
Sampler Initials: AB

ELEMENTS BY ICP/MS (WATER)

Maxxam ID		UK5223	UK5224		
Sampling Date		2013/12/23 12:30	2013/12/23 13:15		
	Units	SW-POND	SW-STREAM	RDL	QC Batch
Metals					
Total Calcium (Ca)	ug/L	80000	37000	100	3471704
Total Copper (Cu)	ug/L	63	6.6	2.0	3471704
Total Iron (Fe)	ug/L	29000	3500	50	3471704
Total Magnesium (Mg)	ug/L	7800	4600	100	3471704
Total Manganese (Mn)	ug/L	2500	7000	2.0	3471704
Total Potassium (K)	ug/L	8700	7000	100	3471704
Total Sodium (Na)	ug/L	26000	33000	100	3471704
Total Zinc (Zn)	ug/L	240	18	5.0	3471704

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B3M2862
Report Date: 2014/01/07

Conestoga-Rovers and Associates Ltd
Client Project #: 084308-99
Site Location: MONITORING & MAINTENANCE, NEW HARBOUR
Your P.O. #: 20-016290
Sampler Initials: AB

Package 1	0.2°C
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Each temperature is the average of up to three cooler temperatures taken at receipt

GENERAL COMMENTS

Sample UK5223-01: Poor RCap Ion Balance due to sample matrix. Excess cations due to presence of turbidity.

Maxxam Job #: B3M2862
Report Date: 2014/01/07

Conestoga-Rovers and Associates Ltd
Client Project #: 084308-99
Site Location: MONITORING & MAINTENANCE, NEW HARBOUR
Your P.O. #: 20-016290
Sampler Initials: AB

QUALITY ASSURANCE REPORT

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits	% Recovery	QC Limits
3471704	Total Calcium (Ca)	2014/01/02	101	80 - 120	103	80 - 120	<100	ug/L	1.6	20		
3471704	Total Copper (Cu)	2014/01/02	97	80 - 120	99	80 - 120	<2.0	ug/L	NC	20		
3471704	Total Iron (Fe)	2014/01/02	103	80 - 120	104	80 - 120	<50	ug/L	3.2	20		
3471704	Total Magnesium (Mg)	2014/01/02	109	80 - 120	110	80 - 120	<100	ug/L	0.3	20		
3471704	Total Manganese (Mn)	2014/01/02	101	80 - 120	102	80 - 120	<2.0	ug/L	0.2	20		
3471704	Total Potassium (K)	2014/01/02	105	80 - 120	106	80 - 120	<100	ug/L	1.0	20		
3471704	Total Sodium (Na)	2014/01/02	108	80 - 120	109	80 - 120	<100	ug/L	1.8	20		
3471704	Total Zinc (Zn)	2014/01/02	99	80 - 120	99	80 - 120	<5.0	ug/L	NC	20		
3473701	Total Alkalinity (Total as CaCO3)	2014/01/07	NC	80 - 120	109	80 - 120	<5.0	mg/L	0.8	25		
3473704	Dissolved Chloride (Cl)	2014/01/06	100	80 - 120	103	80 - 120	<1.0	mg/L	1.3	25	102	80 - 120
3473706	Dissolved Sulphate (SO4)	2014/01/07	100	80 - 120	102	80 - 120	<2.0	mg/L	NC	25		
3473707	Reactive Silica (SiO2)	2014/01/06	NC	80 - 120	102	80 - 120	<0.50	mg/L	1.4	25		
3473708	Colour	2014/01/06					<5.0	TCU	NC	25	102	80 - 120
3473709	Orthophosphate (P)	2014/01/06	96	80 - 120	98	80 - 120	<0.010	mg/L	NC	25		
3473710	Nitrate + Nitrite	2014/01/06	102	80 - 120	101	80 - 120	<0.050	mg/L	NC	25		
3473760	pH	2014/01/06							0	25	100	80 - 120
3473761	Conductivity	2014/01/06			100	80 - 120	1.8, RDL=1.0	uS/cm	0.7	25		
3473762	pH	2014/01/06							2.3	25	100	80 - 120
3473771	Conductivity	2014/01/06			101	80 - 120	2.0, RDL=1.0	uS/cm	NC	25		
3473814	Nitrogen (Ammonia Nitrogen)	2014/01/06	93	80 - 120	100	80 - 120	<0.050	mg/L	NC	25		
3473823	Turbidity	2014/01/06					<0.10	NTU	NC	25	102	80 - 120
3474045	Total Organic Carbon (C)	2014/01/06	88	80 - 120	89	80 - 120	<0.50	mg/L	NC	25		

N/A = Not Applicable

RDL = Reportable Detection Limit

RPD = Relative Percent Difference

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.

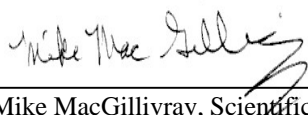
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.

NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.

Validation Signature Page

Maxxam Job #: B3M2862

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

A handwritten signature in black ink, appearing to read "Mike MacGillivray", is written over a horizontal line.

Mike MacGillivray, Scientific Specialist (Inorganics)

=====

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.

COC #: **B** 155608

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APPENDIX C

HISTORICAL MONITORING DATA

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	
MW-01	-	<	<	<	<	0.07	<	<	< (0.06)	<	<	7.8
MW-02	-	<	<	-	-	<	< (0.06)	-	<	-	<	
MW-03	< (0.4)	<	<	<	-	<	< (0.06)	<	<	<	<	
MW-04	-	<	<	<	-	<	<	<	<	<	<	
MW-05	<	<	<	<	-	<	<	<	<	-	<	
MW-06	-	<	<	-	-	<	<	<	< (0.06)	< (0.06)	<	
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	

Analysis completed for all samples from 2007 to 2012 except March 2009² were completed by AMEC.

Analysis completed for samples from March 2009² and 2013 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

< = Parameter below detection limit

0.0 = above criteria

MW-DUP = Field Duplicate of MW-07.

< (0.00) = Parameter below elevated detection limit

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

- = No sample collected

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	Feb 2007	Nov 2007	May 2008	Oct 2009	Jan 2010	Dec 2011
Aluminum (Al)	5.0	-	558,000	3,530	75	72.5	176	109	250	234	130	72.4	3,540	70	34	56.9	45.6	432
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	17.6	2.7	3.0	< (5)	< (5)	4.7
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	0.158	1.010	0.057	0.039	<	0.056
Calcium (Ca)	100	-	81,600	2,070	2,400	-	5,200	2,000	2,200	2,040	2,530	2,530	2,670	1,350	1,330	1,700	1,300	1,910
Chromium (Cr)	1.0	810	82	2	<	<	<	<	<	<	<	<	10.8	<	<	<	<	<
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
Copper (Cu)	2.0	87	1,250	12	2	5	18.5	3.1	3	<	<	<	29	1	4	8.3	<	7.1
Iron (Fe)	50	-	75,000	2,180	246	140	107	<	290	167	968	100	4,170	64	59	<	<	245
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	1,150	449	479	600	500	258
Manganese (Mn)	2.0	-	2,120	58	31	34	20.5	9.7	17	15.9	83.3	52.7	150	13	19	8.3	33.4	4.5
Mercury (Hg)	0.013	0.29 ³	< (0.02)	< (0.02)	0.13	0.08	0.030	0.11	-	-	-	0.033	< (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	-	<	<	336	<	<	<	200	-
Potassium (K)	100	-	9,180	595	212	-	2,100	200	150	166	275	266	546	239	148	400	200	238
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	12,100	4,510	5,210	5,100	5,200	5,020
Strontium (Sr)	2.0	-	-	-	-	-	13.4	6.9	7	6.9	12.3	10.2	-	-	-	6	6	5
Thallium (Tl)	0.1	510	-	-	-	-	<	<	<	<	<	<	-	-	-	<	<	<
Tin (Sn)	2.0	-	-	-	-	-	<	<	<	<	<	<	-	-	-	<	<	<
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	22	4	6	21.1	<	19.5
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 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	Feb 2007	Nov 2007	Jul 2008	Jan 2009	Oct 2009	Jan 2010	Dec 2010	Dec 2011	Nov 2012	Aug 2013
Aluminum (Al)	5.0	-	5,450	129	145	45	146	120	87.9	190	163	78.4	167	275,000	1,580	41	105	197	131	60	84.1	1,610	53.8
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	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	356.0	14.7	34.8	92	20.4	25.8	12	14.9	51.1	11.7
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	<
Calcium (Ca)	100	-	15,800	11,300	10,500	5,060	-	15,000	13,000	7,000	8,780	10,800	11,900	34,600	17,500	32,500	-	19,000	9,400	6,700	8,710	15,700	8,970
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	100	4	14	8.38	7.21	2.87	1.9	2.42	11.1	4.11
Copper (Cu)	2.0	87	3	4	4	4	<	5.0	<	<	3.5	<	2.1	137	6	<	2	2.6	<	<	<	5.3	<
Iron (Fe)	50	-	6,680	2,410	2230	312	1,400	4,390	1,590	1,500	1,030	9,570	3,220	64,100	1,170	2,430	7,600	2,030	2,020	1,100	1,950	6,530	1,680
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	7,680	5,380	10,100	-	5,000	1,900	1,200	1,740	3,160	1,860
Manganese (Mn)	2.0	-	2,040	1,010	964	171	3,800	721	3,930	1,900	2,090	1,570	3020	8,950	2,370	6,740	2,500	4,510	925	370	549	1,300	465
Mercury (Hg)	0.013	0.29 ³	0.02	< (0.02)	< (0.02)	0.04	0.68	0.037	0.46	-	-	-	0.26	< (0.01)	< (0.02)	< (0.02)	0.01	0.18	0.083	-	-	-	0.022
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	-	<	<	11,100	93	28	-	<	100	130	-	335	104
Potassium (K)	100	-	6,560	3,630	3,540	633	-	4,800	2,400	1,100	1,350	1,730	1760	4,810	3,150	4,440	-	3,600	2,900	1,500	2,130	2,900	1200
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	60,700	91,200	149,000	-	88,000	77,000	40,000	41,900	43,500	32,800
Strontium (Sr)	2.0	-	-	-	-	-	-	56.2	38.0	21	22.9	50.5	38.2	-	-	-	-	51.9	34	24	29	89.7	29.1
Thallium (Tl)	0.1	510	-	-	-	-	-	<	<	<	<	<	<	-	-	-	-	<	<	<	<	<	<
Tin (Sn)	2.0	-	-	-	-	-	-	<	<	<	<	<	<	-	-	-	-	<	<	<	<	<	<
Titanium (Ti)	2.0	-	-	-	-	-	-	11.9	2.9	4	7.4	2.5	8.6	-	-	-	-	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
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 lin

0.0 = above criteria

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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-06										
			Feb 2007	Nov 2007	May 2008	Jan 2009	Oct 2009	Jan 2010	Dec 2010	Dec 2011	Aug 2013	Feb 2007	Nov 2007	May 2008	Jan 2009	Oct 2009	Jan 2010	Dec 2010	Dec 2010	Dec 2011	Nov 2012	Aug 2013
Aluminum (Al)	5.0	-	57,100	7,880	288	209	168	95.7	200	133	191	8,540	485	179	44.1	112	< (50)	160	180	176	247	1,910
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
Barium (Ba)	1.0	29,000	114.0	23.4	1.4	< (5)	< (5)	< (5)	2	4	22.4	55.9	9.6	6.9	16	26.4	< (50)	8	8	4.6	7.4	3.4
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	0.364	0.122	0.082	0.051	0.038	<	< (0.02)	< (0.02)	<	<	0.2
Calcium (Ca)	100	-	14,300	2,330	1,310	-	3,700	2,300	2,800	3,740	19,800	52,000	30,900	26,600	-	79,000	150,000	28,000	28,000	22,400	14,800	1,170
Chromium (Cr)	1.0	810	15.0	5.0	<	<	<	<	<	<	<	14.6	<	<	<	<	< (10)	<	<	<	<	1.7
Cobalt (Co)	0.4	66	27	4	< (1)	1.06	0.63	<	<	0.48	0.66	12	6	4	3.68	6.35	< (4)	4.2	4	2.93	2.58	0.83
Copper (Cu)	2.0	87	237	39	7	7	16.0	2.8	3	9.2	4.1	42	5	7	7	5.5	< (20)	2	2	2.7	<	3.1
Iron (Fe)	50	-	12,390	2,940	124	120	105	< (50)	79	65	3,640	10,276	513	178	< (50)	637	< (500)	3,100	3,200	2,870	8,380	3,330
Lead (Pb)	0.5	25	57	11	< (1)	0.5	<	<	<	<	1.36	26	< (1)	< (1)	<	<	< (5)	<	<	<	1.19	1.82
Magnesium (Mg)	100	-	3,490	616	502	-	1,300	800	790	825	1,090	11,400	5,840	5,210	-	15,000	30,000	4,600	4,800	3,920	2,400	644
Manganese (Mn)	2.0	-	487	77	15	35	26.3	11.8	20	10.7	283	1,830	905	520	890	1,060	889	380	400	355	480	32.4
Mercury (Hg)	0.013	0.29 ³	< (0.01)	0.06	1.44	0.85	0.013	0.078	-	-	0.17	< (0.01)	< (0.02)	0.04	< (0.01)	0.11	0.047	-	-	-	-	0.072
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	6	< (5)	< (5)	<	2.3	< (20)	<	<	<	2.5	<
Phosphorus (P)	100	-	3,550	373	6	-	<	100	<	-	<	1,340	60	30	-	100	<	<	180	-	182	123
Potassium (K)	100	-	1,530	405	446	-	900	100	210	524	<	20,100	9,220	10,200	-	22,000	33,000	9,000	9,000	5,180	3,540	159
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	53,400	27,600	21,800	-	56,000	72,000	20,000	20,000	11,800	10,000	6,220
Strontium (Sr)	2.0	-	-	-	-	-	10.2	7.8	8	8.1	136	-	-	-	-	228	392	70	71	56	51.9	8.7
Thallium (Tl)	0.1	510	-	-	-	-	<	<	<	<	<	-	-	-	-	<	< (1)	<	<	<	<	<
Tin (Sn)	2.0	-	-	-	-	-	<	<	<	<	<	-	-	-	-	<	< (20)	<	<	<	<	3.7
Titanium (Ti)	2.0	-	-	-	-	-	3.3	<	4	2	5.8	-	-	-	-	7.0	< (20)	6	6	5.6	7.8	46.9
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	52	10	14	8	46.5	< (50)	15	14	8.9	6.1	17.3
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	-

Notes:

RDL = Reportable Detection Limit

MW = Monitor Well

- = Not analysed/No criteria

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.

< = Parameter below detection limit

< (0.0) = Parameter below elevated detection lin

0.0 = above criteria

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-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	Mar 2010	Dec 2010	Dec 2011	Nov 2012	Nov 2012	Aug 2013		
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	626	640	1,210	1,160	1,190	1,410		
Antimony (Sb)	1.0	20,000	<	<	<	<	< (2)	< (2)	< (2)	< (2)	<	<	<	<	<	<	< (2)	<	<	<	<	<		
Arsenic (As)	1.0	1,900	2	<	2	1	< (2)	< (2)	< (2)	< (2)	1	<	<	2.5	2.3	1.9	< (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	< (5)	6	7.2	7.0	7.1	5.1		
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	0.018	0.02	0.022	0.043	0.040	0.036		
Calcium (Ca)	100	-	3,690	1,040	791	758	-	-	1,200	500	2,000	1,130	1,080	2,040	1,170	1,170	800	810	840	729	711	593		
Chromium (Cr)	1.0	810	4.0	1	<	1	<	<	2.4	<	2	1.4	1.3	4.5	1.7	1.7	<	<	<	<	<	<		
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	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	8.8	7	15.4	13.1	12.9	11.7		
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	411	590	513	399	415	791		
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	1.2	<	0.6	<	0.52	<		
Magnesium (Mg)	100	-	962	837	490	354	-	-	700	500	450	312	323	430	644	656	34.7	560	546	484	518	403		
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	200	41	30.9	24.8	27.7	12.7		
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	<	-	-	-	-	0.048		
Molybdenum (Mo)	2.0	9,200	< (5)	< (5)	< (5)	< (5)	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<		
Nickel (Ni)	2.0	490	7	< (5)	< (5)	< (5)	<	<	<	<	<	<	<	3.5	<	6.1	2.7	6	5	5.3	5.5	2.9		
Phosphorus (P)	100	-	383	104	55	66	-	-	100	100	< (1,000)	-	-	146	123	143	<	<	-	<	<	<		
Potassium (K)	100	-	463	221	170	290	-	-	300	<	< (1,000)	180	190	320	159	251	500	310	334	242	281	202		
Selenium (Se)	1.0	63	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<		
Silver (Ag)	0.1	1.5	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	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	5,400	4,400	4,340	5,000	5,210	3,700		
Strontium (Sr)	2.0	-	-	-	-	-	-	-	9.1	< (5)	13	7.6	7.8	12.5	8.7	8.5	< (5)	8	7.1	7.9	8.4	6.5		
Thallium (Tl)	0.1	510	-	-	-	-	-	-	<	<	<	<	<	<	<	<	<	<	<	<	<	<		
Tin (Sn)	2.0	-	-	-	-	-	-	-	<	<	<	<	<	<	3.7	3.3	<	<	<	<	<	<		
Titanium (Ti)	2.0	-	-	-	-	-	-	-	54.8	19.1	49	40.4	40.6	120	46.9	45	7.8	8	18.2	18.2	15.9	21.9		
Uranium (U)	0.1	420	-	-	-	-	-	-	0.14	<	0.2	0.17	0.18	0.82	0.22	0.21	0.1	<	0.1	<	<	<		
Vanadium (V)	2.0	250	6	< (5)	< (5)	< (5)	<	<	2.6	<	<	<	<	6.9	2.6	2.3	<	<	<	<	<	<		
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	16.5	30	20.2	28.2	28.6	19.2		
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 lin

0.0 = above criteria

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.

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 - METALS (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	
SW-POND	-	<	<	<	<	<	<	< (0.06)	<	<	na
SW-POND-1	-	-	-	-	<	-	-	< (0.06)	-	-	
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	

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
Aluminum (Al)	5.0	100 ⁽¹⁾	190	76	45.9	180	635	75.6	74.7	202	262	49.7	21.3
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
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	<
Calcium (Ca)	100	-	51,500	30,600	-	55,000	70,000	77,100	77,400	99,000	97,500	96,000	67,200
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	<
Copper (Cu)	2.0	2 ⁽⁴⁾	10	3	6	6	8.9	7.9	5.1	6.4	6.7	2.4	<
Iron (Fe)	50	300	377	318	150	480	1,170	241	244	523	682	405	116
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
Manganese (Mn)	2.0	-	1,850	1,350	2,400	1,200	1,760	1,170	1,170	1,670	1,750	1310	135
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	<	<
Phosphorus (P)	100	-	51	24	-	-	<	<	120	<	<	<	<
Potassium (K)	100	-	16,900	12,900	-	1,200	15,000	13,600	14,000	12,900	12,700	10,600	7,600
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
Strontium (Sr)	2.0	-	-	-	-	180	198	187	193	261	256	243	180
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	<
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	<
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
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

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(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 [CaCO₃] = 0-120 mg/L
= 3 ug/L at [CaCO₃] = 120-180 mg/L
= 4 ug/L at [CaCO₃] >180 mg/L

(5) Lead guideline = 1 ug/L at [CaCO₃] = 0-60 mg/L
= 2 ug/L at [CaCO₃] = 60-120 mg/L
= 4 ug/L at [CaCO₃] = 120-180 mg/L
= 7 ug/L at [CaCO₃] >180 mg/L

(6) Nickel guideline = 25 ug/L at [CaCO₃] = 0-60 mg/L
= 65 ug/L at [CaCO₃] = 60-120 mg/L
= 110 ug/L at [CaCO₃] = 120-180 mg/L
= 150 ug/L at [CaCO₃] >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								
			Nov 2007	May 2008	Jan 2009	Sep 2009	Jan 2010	Nov 2010	Dec 2011	Nov 2012	Aug 29, 2013
Aluminum (Al)	5.0	100 ⁽¹⁾	89	132	60.7	83	88.3	125	155	51.7	26.7
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
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	<	<	<
Calcium (Ca)	100	-	31,100	46,700	-	20,000	45,000	41,200	43,200	36,200	36,500
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
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
Lead (Pb)	0.50	1 ⁽⁵⁾	1	1	<	<	0.51	<	<	<	<
Magnesium (Mg)	100	-	5,590	6,620	-	3,100	6,900	5,020	5,720	4,800	4,530
Manganese (Mn)	2.0	-	2,560	1,180	850	530	1,170	1,590	331	142	145
Mercury (Hg)	0.013	0.026	< (0.02)	< (0.02)	0.01	-	0.018	-	-	-	<
Molybdenum (Mo)	2.0	73.00	< (5)	< (5)	<	<	<	<	<	<	<
Nickel (Ni)	2.0	25 ⁽⁶⁾	< (5)	< (5)	<	<	<	<	<	<	<
Phosphorus (P)	100	-	23	42	-	-	<	<	<	<	<
Potassium (K)	100	-	13,900	12,900	-	8,100	14,000	11,800	9,530	7,520	7,970
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
Strontium (Sr)	2.0	-	-	-	-	62	122	102	116	94.1	103
Thallium (Tl)	0.1	0.8	-	-	-	<	<	<	<	<	<
Tin (Sn)	2.0	-	-	-	-	<	<	<	<	<	<
Titanium (Ti)	2.0	-	-	-	-	5	11.0	10.9	16.2	4.7	<
Uranium (U)	0.10	-	-	-	-	<	<	<	<	<	<
Vanadium (V)	2.0	-	< (5)	< (5)	<	<	<	<	<	<	<
Zinc (Zn)	5.0	30	4	25	6	14	8.7	8	6.2	<	<
pH	-	6.5 - 9.0	6.92	7.43	7.16	6.93	6.32	7.12	7.21	7.55	7.13
Hardness	1,000	-	101,000	144,000	155,000	64,000	140,000	120,000	130,000	110,000	110,000

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(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 [CaCO₃] = 0-120 mg/L
= 3 ug/L at [CaCO₃] = 120-180 mg/L
= 4 ug/L at [CaCO₃] >180 mg/L
(5) Lead guideline = 1 ug/L at [CaCO₃] = 0-60 mg/L
= 2 ug/L at [CaCO₃] = 60-120 mg/L
= 4 ug/L at [CaCO₃] = 120-180 mg/L
= 7 ug/L at [CaCO₃] >180 mg/L

(6) Nickel guideline = 25 ug/L at [CaCO₃] = 0-60 mg/L
= 65 ug/L at [CaCO₃] = 60-120 mg/L
= 110 ug/L at [CaCO₃] = 120-180 mg/L
= 150 ug/L at [CaCO₃] >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
Anion Sum	N/A	me/L	-	-	-	-	-	-	-	-	-	-	-	-	5.75
Bicarb. Alkalinity (calc. as CaCO3)	1,000	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	160,000
Calculated TDS	1,000	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	380,000
Carb. Alkalinity (calc. as CaCO3)	1,000	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	<
Cation Sum	N/A	me/L	-	-	-	-	-	-	-	-	-	-	-	-	7.29
Colour	5	TCU	-	-	98	77	34	110	75	68	76	72	64	22	13
Conductivity	1	µS/cm	-	-	1,190	927	1,010	1,100	1,100	720	720	850	850	770	560
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
DOC	500	µg/L		-	22,900	19,600	12,500	-	-	-	-	-	-	-	-
Dissolved Sulphate (SO4)	2,000	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	73,000
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
Ion Balance (% Difference)	N/A	%	-	-	-	-	-	-	-	-	-	-	-	-	11.8
Langelier Index (@ 20C)	N/A	N/A	-	-	-	-	-	-	-	-	-	-	-	-	-0.018
Langelier Index (@ 4C)	N/A	N/A	-	-	-	-	-	-	-	-	-	-	-	-	-0.266
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	-
Nitrite as N	15	µg/L	60	-	84	369	69	220	120	190	190	100	90	68	-
Nitrate + Nitrite	50	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	4,100
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
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
Reactive Silica (SiO2)	0.5	µg/L	-	-	-	-	-	6,100	6,600	6,800	6,900	6,200	6,300	7,700	5,700
Saturation pH (@ 20C)	N/A	N/A	-	-	-	-	-	-	-	-	-	-	-	-	7.33
Saturation pH (@ 4C)	N/A	N/A	-	-	-	-	-	-	-	-	-	-	-	-	7.58
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
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
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

Notes:

RDL = Reportable Detection Limit
SW = Surface Water

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

0.0 = above criteria

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

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									
				Feb 2007	Nov 2007	May 2008	Mar 2009	Sep 2009	Jan 2010	Nov 2010	Dec 2011	Nov 2012	Aug 2013
Anion Sum	N/A	me/L	-	-	-	-	-	-	-	-	-	-	3.84
Bicarb. Alkalinity (calc. as CaCO3)	1,000	µg/L	-	-	-	-	-	-	-	-	-	-	76,000
Calculated TDS	1,000	µg/L	-	-	-	-	-	-	-	-	-	-	250,000
Carb. Alkalinity (calc. as CaCO3)	1,000	µg/L	-	-	-	-	-	-	-	-	-	-	<
Cation Sum	N/A	me/L	-	-	-	-	-	-	-	-	-	-	4.04
Colour	5	TCU	-	-	96	72	49	100	58	57	42	39	28
Conductivity	1	µS/cm	-	-	1,070	936	1190	470	810	540	530	400	390
Dissolved Chloride (Cl)	1,000	µg/L	-	-	213,000	134,000	206,000	84,000	110,000	77,000	45,000	-	31,000
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
Ion Balance (% Difference)	N/A	%	-	-	-	-	-	-	-	-	-	-	2.5
Langelier Index (@ 20C)	N/A	N/A	-	-	-	-	-	-	-	-	-	-	-0.827
Langelier Index (@ 4C)	N/A	N/A	-	-	-	-	-	-	-	-	-	-	-1.08
Nitrate as N	50	µg/L	13,000	-	7,710	7,400	12,500	1,200	13,000	8,000	8,000	4,600	-
Nitrite as N	15	µg/L	60	-	35	492	31	<	110	100	50	13	-
Nitrate + Nitrite	50	µg/L	-	-	-	-	-	-	-	-	-	-	5,800
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
Reactive Silica (SiO2)	0.5	µg/L	-	-	-	-	-	4,700	5,500	5,200	5,500	5,300	6,300
Saturation pH (@ 20C)	N/A	N/A	-	-	-	-	-	-	-	-	-	-	7.96
Saturation pH (@ 4C)	N/A	N/A	-	-	-	-	-	-	-	-	-	-	8.21
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
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
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

Notes:

RDL = Reportable Detection Limit
SW = Surface Water

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< = Parameter below detection limit

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Analysis completed by AMEC for all samples from 2007 to 2012 .
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