TRENT-SEVERN WATERWAY
DESIGNATED SUBSTANCES AND HAZARDOUS MATERIALS SURVEY

SITE F – DAM AT LOCK 28 – BURLEIGH FALLS

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1 GENERAL

The Environment & Geoscience unit of SNC-Lavalin Inc. (SNC-Lavalin) was retained by SNC-Lavalin Hydro and Power Delivery (SNCL) on behalf of Public Services and Procurement Canada (PSPC) to conduct a Designated Substances and Hazardous Materials Survey (DSHMS) of Dam at Lock 28 – Burleigh Falls along the Trent Severn Waterway, Ontario (herein referred to as the site). The work program was undertaken to evaluate existing or potential hazardous and regulated materials in the dam and its associated structures. This report summarizes the methodology and results of the DSHMS program.

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2 SITE DESCRIPTION AND BACKGROUND

The site is located at the outlet of Lovesick Lake, within the hamlet of Burleigh Falls. The dam is owned and operated by Parks Canada (PCA). Access to the site is via Highway 28, at the north end of the dam, nearest to the Lock 28. The site location is shown on Figure 2-1.

The concrete gravity dam at Lock 28 - Burleigh Falls was built approximately in 1913. It was rehabilitated in approximately 1965 at which time the deck and piers received extensive work.

The concrete dam is a regulating dam, which is operated as required to maintain the navigation water levels on the Waterway, and to provide water control of the watershed.

The objective of the project is to replace the entire existing dam structure, including but not limited to the deck, piers, abutments, stop logs, spillways, upstream and downstream wing walls, and east and west approach slabs. The scope also includes demolition and removal from site all existing ancillary structures, which will no longer be needed following the dam replacement.

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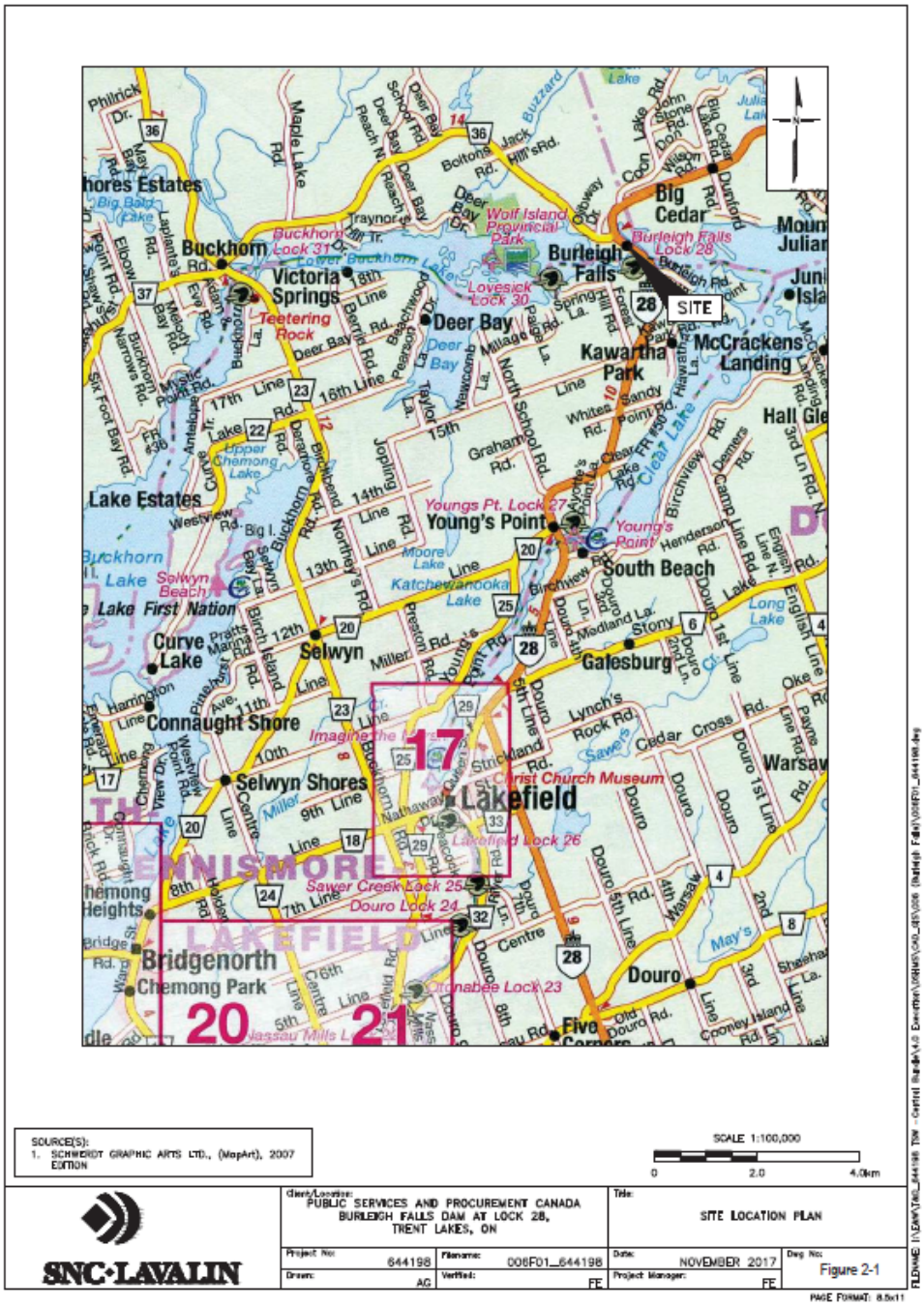

Figure 2-1 : Site Location Plan

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3 WORK PROGRAM

The objective of the DSHMS was to identify potential designated substances and/or hazardous materials of concern within the dams and associated structures which may require special handling or management during future demolition activities.

The fieldwork program was conducted on November 1, 2017 and included the following tasks:

- A visual survey of the accessible portions of the dam and associated structures to identify, document and quantify suspected designated substances and hazardous materials.
- Representative sampling and laboratory analysis of suspected asbestos-containing materials (ACMs) and lead-containing paint.
- Concrete core sampling and laboratory analysis for ACMs, Polychlorinated Biphenyls (PCBs) and silica as well as the Toxicity Characteristic Leaching Procedure (TCLP) for a parameter suite including metals and inorganics, benzo(a)pyrene, PCBs.

Representative samples collected for laboratory analysis were based on the suspected type and age of the materials and, for paint samples, the prevalence within the dam.

3.1 Limitations

The DSHMS was limited to the dam and associated structures, and did not include the lock and its associated buildings/shed. Similarly, the DSHMS was limited to materials comprising the dam and materials stored within the shed and did not include materials stored in the vicinity and/or exterior of the lock and its associated buildings/sheds.

Due to safety concerns, the dam piers / abutment walls could not inspected, hence no sample of the joint sealant between concrete slabs or of possible drainage pipes could be collected.

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4 RESULTS AND DISCUSSION

Results of the Site inspection and potential concerns identified are discussed below.

4.1 General Observations

The concrete gravity dam at Lock 28 - Burleigh Falls has a total length of approximately 240 m and consists of twelve stop log weirs 6.1 m wide and one log chute. The stop logs are operated by a hydraulic log lifter mounted on rails.

A chain link fence and metal guardrails with cables are present on the west and east side of the dam, respectively. Two manual stop logs lifters (manual winches) are noted near the south end of the dam. Various logs are also stored on the dam deck.

The existing dam appears to have no electrical services.

Photographic documentation of the Site visit is included in Appendix A.

4.2 Asbestos-Containing Materials (ACMs)

Asbestos is a general name used for highly fibrous silicate materials which are valued for their heat and chemical-resistant properties. Although there are many types of asbestos, commercially-significant types include chrysotile, amosite, and crocidolite.

The friability of an ACM is a measure of the ease with which the material can be ground or pulverized, and provides a theoretical measure of the ease with which asbestos fibres can be released into the air. Friable ACMs are generally identified as materials which can be crumbled, pulverized and/or reduced to powder by hand pressure, such as some ceiling tiles, thermal insulation and fire proofing. Non-friable ACMs are hard products with bound asbestos, such as floor tiles, pipes, siding, etc. Non-friable products are not deemed to pose a danger of releasing airborne fibres unless cut, sawn, ground or sanded.

Materials containing 0.5 percent (%) or more asbestos by dry weight are considered to be ACMs requiring specialized handling, removal, and disposal practices. Related legislation includes the *Occupational Health and Safety Act* (OHSA) and the *Designated Substance – Asbestos on Construction Projects and in Buildings and Repair Operations* regulation (Ontario Regulation [O. Reg.] 278/05) made under the OHSA. O. Reg. 278/05 outlines the responsibilities for owners, employers and workers relating to asbestos. Owners and employers are required to conduct inspections to identify ACMs in structures, buildings and equipment, develop and update an ACM inventory, provide associated notification and training for workers and building occupants, and ensure appropriate asbestos work procedures are implemented.

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O. Reg. 278/05 specifies asbestos work procedures, including requirements for worker training, personal protective equipment, air testing and decontamination. Prior to undertaking demolition or repair work, O. Reg. 278/05 requires that ACMs within the work area be removed and disposed as asbestos waste. Asbestos waste management procedures are provided in the Ontario *General–Waste Management* regulation (O. Reg. 347/90) made under the Ontario *Environmental Protection Act*. O. Reg. 347/90 (as amended) provides procedures to minimize the potential for fibre release and worker exposure during handling, transport and final deposition of asbestos wastes in a Ministry of the Environment and Climate Change licensed facility. O. Reg. 347/90 (as amended) provides no small quantity exemption for asbestos waste.

The majority of friable asbestos (i.e. sprayed insulation and pipe/boiler wrap) use in Canada ended in approximately 1973. The use of ACMs in construction (ceiling tiles, vinyl floor tiles, acoustic panels, roofing felts, gaskets, curtains, plasters, joint filling compound and asbestos-concrete pipe and panels) generally ceased voluntarily in the mid-1970s; however, experience has shown that ACMs manufactured previously and held in inventory have been used during building construction and renovation until at least the 1990s. Asbestos may still be used in vinyl floor tile and cement products because of its strength, resistance to corrosive chemicals and ability to withstand high temperatures.

Inspection for potential ACMs included, but was not limited to: asphalt sealant on expansion joints, asphalt pavement interior ceilings, flooring, interior and exterior walls, caulking and insulation. Effort was made to identify potential ACMs; however, in some instances, ACMs may be hidden or inaccessible in roofing systems, ceilings, walls and floor cavities. Estimated ACM quantities, where provided, were made based on visual observations of exposed/accessible material. Should additional unidentified materials be encountered during subsequent activities, they must be handled as ACMs until testing confirms otherwise.

With the exception of three concrete core samples, no other potential ACM was identified on the dam.

The extent, type and condition of the material were documented and samples were collected for potential laboratory analysis. Samples representative of the potential ACMs were collected by SNC-Lavalin GEM Ontario in December 2017 and included a total of three (3) bulk samples as follows:

- SF-CH17-01: Homogeneous grey concrete on the dam deck.
- SF-CH17-02: Homogeneous grey concrete on the dam deck.
- SF-CH17-03: Homogeneous grey concrete on the dam deck.

The approximate sampling locations are shown on Figure 4-1.

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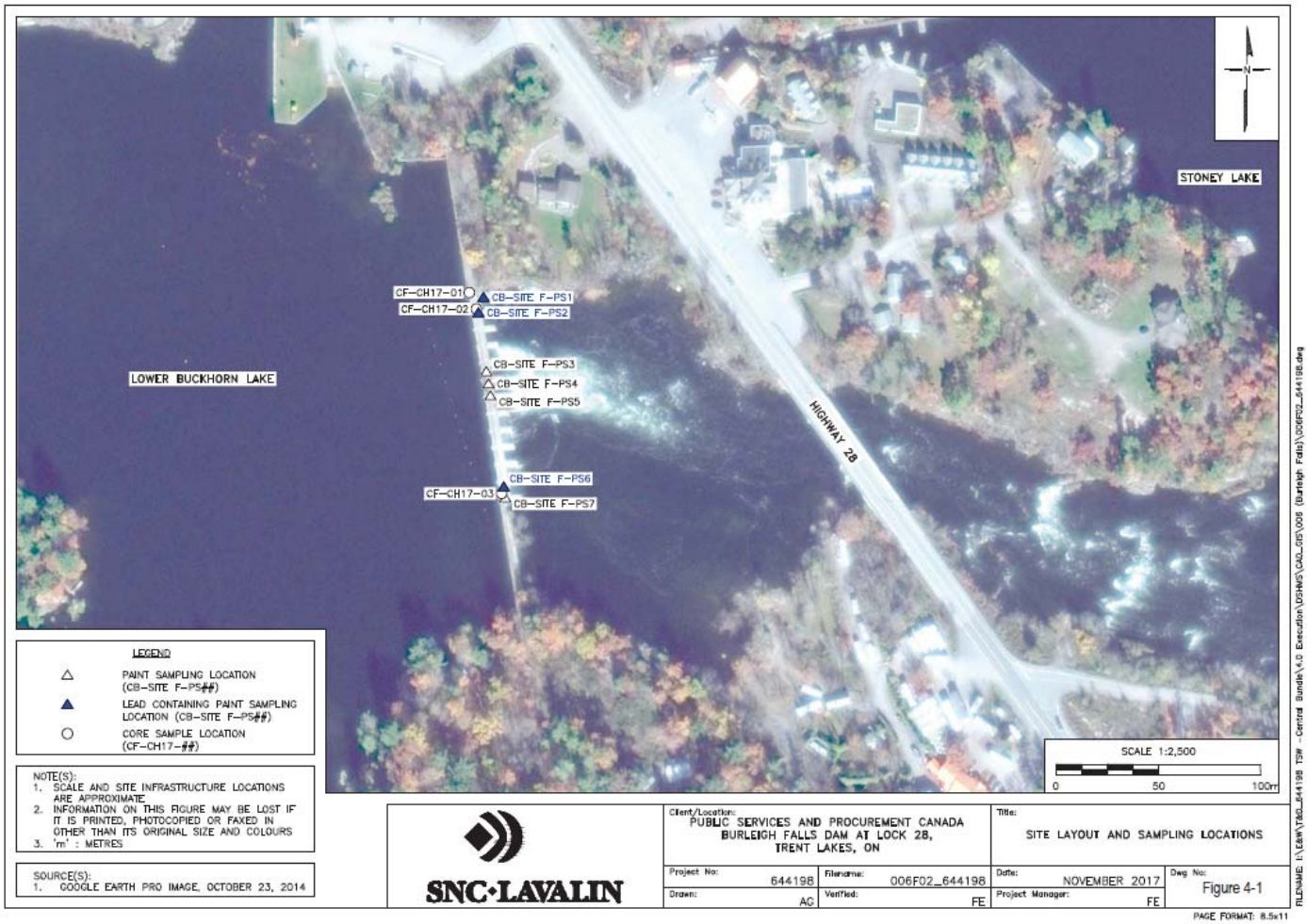

Figure 4-1 : Site Layout and Sampling Locations

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The sample for laboratory analysis was collected in sealable plastic bags and shipped by courier to Maxxam Analytics Inc. (Maxxam) of Mississauga, Ontario (core sample) under Chain of Custody protocols. Analysis of bulk samples for determination of asbestos content was performed using polarized light microscopy (PLM) procedures detailed in the following documents:

- US Environmental Protection Agency (EPA) "Methods for the Determination of Asbestos in Bulk Building Materials, US EPA Report No. 600/R-93/116".
- Occupational Health and Safety Branch of the Ontario Ministry of Labour "Code for the Determination of Asbestos from Bulk Insulation Samples".
- National Institute for Occupational Safety and Health (NIOSH) 9002 Method "Asbestos (bulk) by PLM, Issue 2".

The detection limit for asbestos analysis was 0.1% by weight. Asbestos, if present, was identified as one or more fibrous asbestos minerals, including chrysotile, amosite, and crocidolite, where possible.

An asbestos concentration of 0.5% or greater by weight was not detected in the analysed samples.

Analytical results for samples analysed are summarized in Table 4-1 and Laboratory Certificates of Analysis are provided in Appendix B.

4.3 Lead-Containing Materials (LCMs)

The "Federal Hazardous Products Act" (1976) limited the quantity of lead permissible in newly manufactured paints to 5,000 parts per million (ppm) by weight (0.5%). On May 4, 2005, the "Surface Coating Materials Regulations" was promulgated (later amended in 2011) and the limit on the amount of lead in paint was reduced to 90 ppm (or µg/g) by weight (0.009%). The requirements of this regulation are only directly applicable to surface coatings of consumer products, such as furniture, children's toys and pencils.

Additional guidance is available from the "Designated Substances" regulation (O. Reg. 490/09) made under Ontario OHSA. This regulation requires that constructors, employers and project owners in Ontario implement work procedures to protect workers involved in demolition activities which may disrupt Lead Containing Materials (LCMs). However, the Ontario Ministry of Labour (MOL) has not prescribed specific criteria for classification of lead-based paint.

In the US, paints containing levels of lead in excess of 5,000 ppm trigger specific abatement/demolition requirements as referenced in the US Department of Housing and Urban Development (HUD) Guidelines for the "Evaluation and Control of Lead-Based Paint Hazards in Housing". We note that currently there are no equivalent Canadian standards or guidelines available to assess historical applications of anti-weathering or anti-corrosion surface coatings in buildings or on equipment.

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Table 4-1 : Analytical Results - Asbestos

Sample No.		**SF-CH17-01**	**SF-CH17-02**	**SF-CH17-03**
Sampling Date		*18-Dec-17*	*21-Dec-17*	*21-Dec-17*
No. of Samples Submitted for Analysis		**1**	**1**	**1**
RESULTS	**DL**			
% Total Asbestos	0.1	nd	nd	nd
Asbestos Type				
SAMPLE DESCRIPTION				
Colour	n/a	grey	grey	grey
Layer Analysed	n/a	n/a	n/a	n/a
Description	n/a	concrete	concrete	concrete
Sampling Location	n/a	dam deck	dam deck	dam deck
Material Location (Asbestos Containing Materials) *Based on observations in the field, additional locations may be present.*	n/a	n/a	n/a	n/a
Approximate Quantity	n/a	n/a	n/a	n/a

Notes:
Analysed by Polarized Light Microscopy (PLM)
According to O.Reg. 278/05, materials containing ≥ 0.5% asbestos are considered to be "asbestos containing materials"
DL Detection Limit
Nd none detected
N/A not applicable

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As part of the sampling activities conducted at this Site, seven representative samples of paint (CB-Site F-PS1 through CB-Site F-PS7) were collected for laboratory analysis as follows:

- CB-Site F-PS1: Yellow paint – Guardrail.
- CB-Site F-PS2: Black paint – Black storage box.
- CB-Site F-PS3: Grey paint – Hydraulic stop logs lifter.
- CB-Site F-PS4: Red paint – Hydraulic stop logs lifter.
- CB-Site F-PS5: Brown paint – Hydraulic stop logs lifter.
- CB-Site F-PS6: Light brown paint – Manual stop logs lifter.
- CB-Site F-PS7: Black paint – Manual stop logs lifter.

The approximate sampling locations are shown in Figure 4-1.

Samples for laboratory analysis were collected and shipped by courier to Maxxam Analytics Inc. (Maxxam) of Mississauga, Ontario under Chain of Custody protocols.

Analysis of bulk samples for determination of lead content was performed using Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES) procedures detailed in the USEPA Method 6010D m.

The following analysed samples would be considered lead-based paints based on lead concentrations greater than 5,000 ppm:

- CB-Site F-PS1: Yellow paint – Guardrail.
- CB-Site F-PS2: Black paint – Black storage box.
- CB-Site F-PS6: Light brown paint – Manual stop logs lifter.

The lead concentrations of the remaining analysed samples are considered low (less than 5000 ppm). Analytical results are summarized in Table 4-2 and Laboratory Certificates of Analysis are provided in Appendix B.

Additionally, the battery stored in the stop logs lifter may contain lead.

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Table 4-2 : Analytical Results - Lead in Paint

Sample No.	**CB-Site F-PS1**	**CB-Site F-PS2**	**CB-Site F-PS3**	**CB-Site F-PS4**	**CB-Site F-PS5**	**CB-Site F-PS6**	**CB-Site F-PS7**
Sampling Date	*01-Nov-17*	*01-Nov-17*	*01-Nov-17*	*01-Nov-17*	*01-Nov-17*	*01-Nov-17*	*01-Nov-17*
RESULTS							
RDL (Lead mg/kg)	100.0	50.0	10.0	17.0	10.0	20.0	10.0
Total Lead Present in Sample (mg/kg or ppm)	**44,000**	**17,000**	490	370	510	**13,000**	4,900
RDL (Mercury ppm)	0.06	-	0.06	0.06	0.06	0.06	0.06
Total Mercury Present in Sample (mg/kg or ppm)	<0.06	-	0.14	0.11	0.13	<0.06	<0.06
SAMPLE DESCRIPTION							
Colour	yellow	black	grey	red	brown	light brown	black
Description	paint on guardrails	paint on storage box	paint on hydraulic stop logs lifter	paint on hydraulic stop logs lifter	paint on hydraulic stop logs lifter	paint on manual stop logs lifter	paint on manual stop logs lifter
Sample Location	dam	dam	dam	dam	dam	dam	dam

Notes:
Lead Analysed by Inductively Coupled Argon Plasma, Atomic Emission Spectroscopy (ICP-AES; EPA Method 3050)
* Detection limit adjusted due to sample matrix effects
RDL Reportable Detection Limit
N/A not applicable
< Less than RDL
- Not enough material to complete analysis
BOLD **Paints with high lead content**

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4.4 Other Designated Substances

The "Construction Projects" regulation (O. Reg. 213) and the "Designated Substances" regulation established under OHSA require that constructors, employers and project owners implement work procedures to protect workers involved in renovation or demolition activities which may disrupt designated substances including silica, benzene, mercury, arsenic, vinyl chloride, isocyanates and coke oven emissions.

Silica occurs naturally as a crystalline material in rock, sand, concrete and cement, and therefore is likely present in poured concrete slabs/floors, concrete blocks, mortar, plaster, drywall and ceramic tiles. Crystalline silica is significantly more toxic than amorphous silica and therefore, for health reasons, only crystalline silica is regulated under O. Reg. 490. Crystalline silica is a collective term that can refer to quartz, cristobalite, tridymite, and several other rare silica minerals. Quartz is the most common form of crystalline silica. Crystalline silica dust can be generated through such processes such as breaking, drilling, hammering, blasting, grinding, crushing or sandblasting silica-containing materials. Cristobalite and tridymite were not detected in the concrete core sample collected by SNC-Lavalin GEM Ontario and submitted to Maxxam, however the bulk sample analysed contained 11 wt% quartz silica.

Benzene is a constituent in gasoline and other petroleum products, and therefore potential worker exposure to these products would be regulated under O. Reg. 490. At the time of the Site inspection the following materials were observed in the stop logs lifter:

- 10 L motor oil;
- 10 L regular gasoline;
- 20 L hydraulic oil;
- Some anti-freeze.

It should be noted a gas station is present approximately 100 m northeast of the dam. Petroleum impacted soil is possible in the vicinity of the dam embankment.

Mercury has widespread use in commercial/residential products including electrical switches, barometers and thermometers. It also has many commercial, medical and industrial applications. Often mercury is also present as a constituent in surface finishing materials and paint. A potential concern of mercury is its persistence in the environment when released at a landfill following disposal. Special considerations must be taken during the disposal of items containing mercury. Potential worker exposure to mercury would be regulated under O. Reg. 490.

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The "Surface Coating Materials Regulations" (SOR/2005-109) established under the Canadian Hazardous Products Act, limits the concentration of total mercury present in paint or other similar material to 10 mg/kg (ppm). To assess the potential presence of mercury, bulk material samples from painted surfaces collected and analysed for lead content were also analysed for mercury content using methodology described above for lead analysis. In the samples analysed, mercury was not detected at a concentration greater than 10 mg/kg.

No evidence of other designated substances was observed during the site visit.

Analytical results are summarized in Table 4-2 and 4-3 and Laboratory Certificates of Analysis are provided in Appendix B.

4.5 Polychlorinated Biphenyls (PCBs)

Historical use of PCBs in electrical equipment manufactured in Canada, such as transformers, fluorescent lamp ballasts and capacitors, was common prior to approximately 1977. The use of PCBs was prohibited by the Canadian Environmental Protection Act in heat transfer and electrical equipment installed after August 1977, and in transformers and capacitors installed after June 1980. However, electrical equipment manufactured previously and held in inventory may still be in use.

No PCB containing material was observed during the Site visit.

The concrete core sample collected by SNC-Lavalin GEM Ontario and submitted to Maxxam for analysis did not detect any bulk or leachable PCBs.

Analytical results are summarized in Table 4-3 and Laboratory Certificates of Analysis are provided in Appendix B.

4.6 Ozone-Depleting Substances (ODSs)

ODSs are controlled substances under the Ontario Environmental Protection Act (R.S.O. 1990, c.E.19). The use, maintenance and disposal of refrigeration equipment containing ODSs are regulated under the "Refrigerants" regulation (O. Reg. 189/94). Under this regulation, special certification is required for those who repair and refill refrigeration equipment containing chlorofluorocarbons ("Ozone Depletion Prevention" certification).

No evidence of refrigeration equipment suspected to contain ODSs was observed during the Site visit.

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Table 4-3 : Concrete Analytical Results

	Sample Location		Leachate Quality Criteria[1]	SF-CH17	SF-CH17	SF-CH17
	Laboratory Sample ID			FWX999	FWY000	FWY001
	SNC-Lavalin Sample ID			SF-CH17-01	SF-CH17-02	SF-CH17-03
	Sampling Date (yyyy/mm/dd)			2017/12/18	2017/12/21	2017/12/21
Parameter	**RDL**	**Units**				
Leachable Metals						
Arsenic	0.2	mg/L	2.5	<	<	<
Barium	0.2	mg/L	100	0.3	0.3	0.6
Boron	0.1	mg/L	500	<	<	<
Cadmium	0.05	mg/L	0.5	<	<	<
Chromium (total)	0.1	mg/L	5	<	<	<
Lead	0.1	mg/L	5	<	<	<
Mercury	0.0010	mg/L	0.1	<	<	<
Selenium	0.1	mg/L	1	<	<	<
Silver	0.01	mg/L	5	<	<	<
Uranium	0.01	mg/L	10	<	<	<
Leachable PAHs						
Benzo(a)pyrene	0.00010	mg/L	0.001	<	<	<
Leachable PCBs						
Total PCBs	0.0030	mg/L	0.3	<	<	<
Leachable Inorganics						
Cyanide	0.010	mg/L	20	<	<	<
Fluoride	0.10	mg/L	150	0.13	<	<
Nitrate and Nitrite (as N)	1.0	mg/L	1,000	<	<	<
Nitrate-N	1.0	mg/L	n/a	<	<	<
Nitrite-N	0.10	mg/L	n/a	<	<	<
Bulk Analysis PCBs						
Arochlor 1016	0.1	µg/g	n/a	<	<	<
Arochlor 1221	0.1	µg/g	n/a	<	<	<
Arochlor 1232	0.1	µg/g	n/a	<	<	<
Arochlor 1242	0.1	µg/g	n/a	<	<	<
Arochlor 1248	0.1	µg/g	n/a	<	<	<
Arochlor 1254	0.1	µg/g	n/a	<	<	<
Arochlor 1260	0.1	µg/g	n/a	<	<	<
Arochlor 1262	0.1	µg/g	n/a	<	<	<
Arochlor 1268	0.1	µg/g	n/a	<	<	<

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	Sample Location		Leachate Quality Criteria[1]	SF-CH17	SF-CH17	SF-CH17
	Laboratory Sample ID			FWX999	FWY000	FWY001
	SNC-Lavalin Sample ID			SF-CH17-01	SF-CH17-02	SF-CH17-03
	Sampling Date (yyyy/mm/dd)			2017/12/18	2017/12/21	2017/12/21
Parameter	**RDL**	**Units**				
Bulk Silica						
Cristobalite	1	%	n/a	<	<	<
Quartz	0.25	%	n/a	11	20	11
Tridymite	0.5	%	n/a	<	<	<

All terms defined within the body of SNC-Lavalin's report.
Laboratory analysis by Maxxam Analytics Inc.
RDL - Reportable Detection Limit, unless otherwise noted
< - Denotes concentration less than indicated detection limit
"-" - Not analyzed
n/a - Not applicable
µg/g - micrograms per gram, dry weight basis
mg/L - milligrams per litre
BOLD - Concentration greater than Leachate Quality Criteria
[1] Ontario Regulation 347 as amended. "Waste Management". Schedule 4 Leachate Quality Criteria.

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4.7 Urea-Formaldehyde Foam Insulation (UFFI)

UFFI was developed in Europe in the 1950s as an improved means of insulating difficult-to-reach cavities in house walls. It was typically injected through 1 cm to 2 cm diameter holes drilled in the interior or exterior house walls. During the 1970s, when concerns about energy efficiency led to efforts to improve home insulation in Canada, UFFI became an important insulation product for existing houses. Most installations occurred between approximately 1970 and December 1980. The use of UFFI was then banned by the Canadian Hazardous Products Act since the 1980s.

No evidence of UFFI was observed during the Site visit.

4.8 Mould

Moulds are microscopic, plant-like organisms that are composed of long filaments called hyphae. When hyphae are numerous enough to be seen by eye they form a cottony mass called a mycelium. These have numerous and sometimes distinctive forms and colour.

Mould spores frequently travel through ambient air and reproduce by spores that germinate in suitable environments. The potential presence of mould was assessed based on the New York City Department of Health and Mental Hygiene publication entitled “Guidelines on Assessment and Remediation of Fungi in Indoor Environments” (2008) and “CCA 82 - Mould Guidelines for the Canadian Construction Industry by Health Canada” (2004) by Canadian Construction Association (CCA).

Visual inspections were conducted for evidence of potential mould growth and conditions which may contribute to mould growth (sources of water infiltration, water staining, etc.). Material observed with black staining and/or a textured and discoloured appearance is described as suspect mould. Mould identified visually is defined as “suspect mould” unless it is confirmed as mould by laboratory analysis.

No evidence of mould growth was observed during the Site inspection.

4.9 Other Hazardous Materials

“Workplace Hazardous Materials Information System” (WHMIS) regulation (Reg. 860) requires that hazardous materials present in a workplace must be labelled to warn building occupants and workers of potential related hazards. Worker training is also required.

It is possible that the stop logs are preserved and may contain creosote. Also, some animal feces noted on the south portion of the dam.

No other hazardous materials were observed during the Site inspection.

TRENT-SEVERN WATERWAY
DESIGNATED SUBSTANCES AND HAZARDOUS MATERIALS SURVEY

SITE F – DAM AT LOCK 28 – BURLEIGH FALLS

5 SUMMARY

The inspection and sampling program identified the following on-site materials as designated substances or hazardous materials of potential concern:

- Paint considered to be lead-based (greater than 5,000 ppm), included yellow paint on guardrails, black paint on the storage box and light brown paint on the manual stop logs lifters.
- Possible lead containing battery in the stop logs lifter.
- Crystalline silica (quartz) in concrete and mortar construction materials.
- Possible mercury in battery in the stop logs lifter.
- Petroleum products within the hydraulic stop logs lifter.
- Possible creosote on the stop logs if preserved.
- Miscellaneous hazardous consumer products stored in the hydraulic stop logs lifter.

TRENT-SEVERN WATERWAY
DESIGNATED SUBSTANCES AND HAZARDOUS MATERIALS SURVEY

SITE F – DAM AT LOCK 28 – BURLEIGH FALLS

6 PRE-ABATEMENT/DEMOLITION ACTIVITIES

Regulated substances and hazardous materials in good condition and/or sealed/contained do not require immediate mitigation measures as they do not pose a hazard to building occupants or the environment. They may, however, require special handling/disposal practices during demolition.

If work involving the disturbance of above noted materials is required, the materials should be removed, appropriately handled, and disposed or recycled in accordance with applicable legislation, codes and best-management practices. Pre-renovation/demolition activities should be conducted to minimize worker exposure to identified materials and related environmental impacts.

The following paragraphs highlight the specialized procedures that must be implemented in preparation for and/or during demolition to minimize potential hazards relating to the designated substances and hazardous materials described above.

To minimize exposure to these materials, the following pre-demolition activities should be completed:

- If encountered during the renovation/demolition program, any unidentified material suspected to contain asbestos must be treated as asbestos containing and removed/disposed of by a qualified contractor at a licensed landfill in accordance with O. Reg. 278/05 and O. Reg. 347/90 (as amended).
- O. Reg. 278/05, Section 6(1) specifies that ACMs that may be disturbed must be removed to the extent practicable in advance of building demolition (or renovation). Abatement activities of confirmed ACMs must be completed using Type 1, 2 and 3 procedures in accordance with O. Reg. 278/05, depending on the type of tools and method of removal to be used.
- Torching and grinding of lead-containing building materials should be minimized/avoided and/or appropriate exposure control methods should be implemented.
- Mercury containing equipment should be disposed at an appropriate recovery facility.
- Adequate controls of the breathable crystalline silica and protective measures (respiratory protective equipment) should be implemented during the rehabilitation activities.
- If mould damaged building materials are encountered during the demolition, appropriate mould remediation procedures are to be followed, as outlined in CCA 82 - Mould Guidelines for the Canadian Construction Industry by Health Canada" (2004) by Canadian Construction Association (CCA).
- Removal and appropriate disposal of petroleum products and other potentially hazardous consumer products stored within the stop logs lifter should be completed prior to renovation/demolition.
- Creosote treated wood shall be disposed according to the receiver practices.

TRENT-SEVERN WATERWAY
DESIGNATED SUBSTANCES AND HAZARDOUS MATERIALS SURVEY

SITE F – DAM AT LOCK 28 – BURLEIGH FALLS

7 DEMOLITION ACTIVITIES

Depending on the nature of demolition activities, significant quantities of dust may be generated. A dust management plan should be developed to develop control measures for dust and airborne particulate (including silica, lead, arsenic, mercury and mould), including using water or other liquids to control dust generation and migration. Additional guidance for working with silica and lead is available from the MOL, Occupational Health and Safety Branch Health and Safety Guidelines entitled "Guideline: Silica on Construction Projects" (2011) and "Guideline: Lead on Construction Projects" (2011), respectively. Reasonable attempts should be made to keep the work area tidy during demolition work.

TRENT-SEVERN WATERWAY
DESIGNATED SUBSTANCES AND HAZARDOUS MATERIALS SURVEY

SITE F – DAM AT LOCK 28 – BURLEIGH FALLS

8 WASTE CLASSIFICATION

Analytical results for the concrete core sample submitted for O. Reg. 347 waste classification are provided in Table 4-3. Results indicated that the concrete removed from the site during rehabilitation activities would be classified as non-hazardous waste for the purpose of off-site disposal in the Province of Ontario.

TRENT-SEVERN WATERWAY
DESIGNATED SUBSTANCES AND HAZARDOUS MATERIALS SURVEY

SITE F – DAM AT LOCK 28 – BURLEIGH FALLS

9 REFERENCES

Ontario Regulation Respecting Designated Substances (O. Reg. 490/09) and Section 30 of the Ontario Health and Safety Act (OHSA).

Designated Substance – Asbestos on Construction Projects and in Buildings and Repair Operations" made under the OHSA. O. Reg. 278/05.

Hazardous Products Act, Surface Coating Materials Regulation (SOR/2005-109, last amended by SOR/2007-230).

Ontario Regulation 347, as amended "General – Waste Management Regulation" made under the Environmental Protection Act.

CCA 82 - Mould Guidelines for the Canadian Construction Industry by Health Canada (2004). Canadian Construction Association (CCA).

Design Concept and Option Analysis Report, SNC-Lavalin Hydro & Power Delivery, May 2017.

TRENT-SEVERN WATERWAY
DESIGNATED SUBSTANCES AND HAZARDOUS MATERIALS SURVEY

SITE F – DAM AT LOCK 28 – BURLEIGH FALLS

APPENDIX A PHOTOGRAPHIC LOG

TRENT-SEVERN WATERWAY
DESIGNATED SUBSTANCES AND HAZARDOUS MATERIALS SURVEY

SITE F – DAM AT LOCK 28 – BURLEIGH FALLS

Photograph 1: View of Dam at Lock 28 – Burleigh Falls (Looking South)

Photograph 2: View of Dam deck Lock 28 – Burleigh Falls (Looking North)

TRENT-SEVERN WATERWAY
DESIGNATED SUBSTANCES AND HAZARDOUS MATERIALS SURVEY

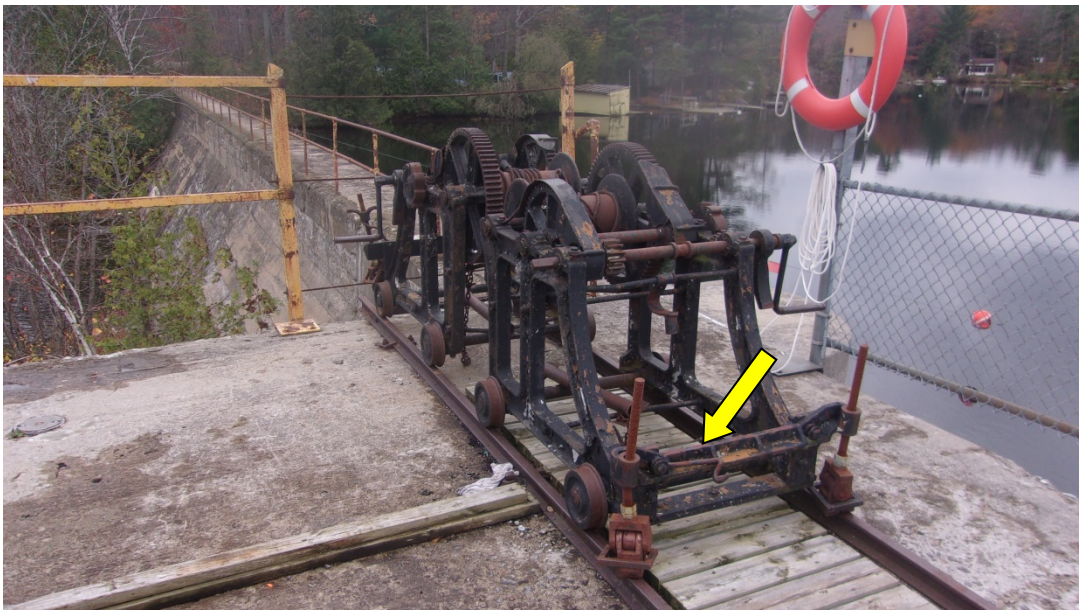
SITE F – DAM AT LOCK 28 – BURLEIGH FALLS

Photograph 3: Lead containing yellow paint on guardrails

Photograph 4: Lead containing black paint on storage box

TRENT-SEVERN WATERWAY
DESIGNATED SUBSTANCES AND HAZARDOUS MATERIALS SURVEY

SITE F – DAM AT LOCK 28 – BURLEIGH FALLS



Photograph 5: Lead containing light brown paint on manual stop log lifter

Photograph 6: Petroleum products and battery within hydraulic stop log lifter

TRENT-SEVERN WATERWAY
DESIGNATED SUBSTANCES AND HAZARDOUS MATERIALS SURVEY

SITE F – DAM AT LOCK 28 – BURLEIGH FALLS

APPENDIX B LABORATORY CERTIFICATES OF ANALYSIS

TRENT-SEVERN WATERWAY
DESIGNATED SUBSTANCES AND HAZARDOUS MATERIALS SURVEY

SITE F – DAM AT LOCK 28 – BURLEIGH FALLS

Maxxam
A Bureau Veritas Group Company

Your P.O. #: 11185
Your Project #: 644198
Site Location: CENTRAL BUNDLE - SITE F
Your C.O.C. #: na

Attention:Fabienne Etienne

SNC-Lavalin Inc
235 Lesmill Road
Toronto, ON
CANADA M3B 2V1

Report Date: 2017/11/10
Report #: R4844974
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7O7593
Received: 2017/11/03, 10:12

Sample Matrix: Solid
Samples Received: 7

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Mercury in paint	5	2017/11/07	2017/11/08	CAM SOP-00453	EPA 7471B m
Mercury in paint	1	2017/11/08	2017/11/08	CAM SOP-00453	EPA 7471B m
Metals in Paint	5	2017/11/07	2017/11/08	CAM SOP-00408	EPA 6010D m
Metals in Paint	1	2017/11/07	2017/11/09	CAM SOP-00408	EPA 6010D m
Metals in Paint	1	2017/11/10	2017/11/10	CAM SOP-00408	EPA 6010D m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported: unless indicated otherwise, associated sample data are not blank corrected.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

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TRENT-SEVERN WATERWAY
DESIGNATED SUBSTANCES AND HAZARDOUS MATERIALS SURVEY

SITE F – DAM AT LOCK 28 – BURLEIGH FALLS

Maxxam
A Bureau Veritas Group Company

Your P.O. #: 11185
Your Project #: 644198
Site Location: CENTRAL BUNDLE - SITE F
Your C.O.C. #: na

Attention:Fabienne Etienne

SNC-Lavalin Inc
235 Lesmill Road
Toronto, ON
CANADA M3B 2V1

Report Date: 2017/11/10
Report #: R4844974
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7O7593
Received: 2017/11/03, 10:12

Encryption Key

Ema Gitej
Senior Project Manager
10 Nov 2017 17:40:51

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Ema Gitej, Senior Project Manager
Email: EGitej@maxxam.ca
Phone# (905)817-5829

==========

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

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TRENT-SEVERN WATERWAY
DESIGNATED SUBSTANCES AND HAZARDOUS MATERIALS SURVEY

SITE F – DAM AT LOCK 28 – BURLEIGH FALLS

Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B7O7593
Report Date: 2017/11/10

SNC-Lavalin Inc
Client Project #: 644198
Site Location: CENTRAL BUNDLE - SITE F
Your P.O. #: 11185
Sampler Initials: N A

MERCURY BY COLD VAPOUR AA (SOLID)

Maxxam ID		FMG177	FMG179		FMG180		FMG181	FMG182		
Sampling Date		2017/11/01 13:00	2017/11/01 13:15		2017/11/01 13:25		2017/11/01 13:35	2017/11/01 13:45		
COC Number		na	na		na		na	na		
	UNITS	CB-SITE F-PS1	CB-SITE F-PS3	QC Batch	CB-SITE F-PS4	QC Batch	CB-SITE F-PS5	CB-SITE F-PS6	RDL	QC Batch
Metals										
Mercury (Hg)	mg/kg	<0.06	0.14	5252212	0.11	5254279	0.13	<0.06	0.06	5252212

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		FMG183		
Sampling Date		2017/11/01 13:50		
COC Number		na		
	UNITS	CB-SITE F-PS7	RDL	QC Batch
Metals				
Mercury (Hg)	mg/kg	<0.06	0.06	5252212

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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TRENT-SEVERN WATERWAY
DESIGNATED SUBSTANCES AND HAZARDOUS MATERIALS SURVEY

SITE F – DAM AT LOCK 28 – BURLEIGH FALLS

Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B7O7593
Report Date: 2017/11/10

SNC-Lavalin Inc
Client Project #: 644198
Site Location: CENTRAL BUNDLE - SITE F
Your P.O. #: 11185
Sampler Initials: N A

ELEMENTS BY ATOMIC SPECTROSCOPY (SOLID)

Maxxam ID		FMG177			FMG178			FMG179		
Sampling Date		2017/11/01 13:00			2017/11/01 13:05			2017/11/01 13:15		
COC Number		na			na			na		
	UNITS	CB-SITE F-PS1	RDL	QC Batch	CB-SITE F-PS2	RDL	QC Batch	CB-SITE F-PS3	RDL	QC Batch
Metals										
Lead (Pb)	mg/kg	44000	100	5252201	17000	50	5259336	490	10	5252201

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		FMG180			FMG181		FMG182		FMG183		
Sampling Date		2017/11/01 13:25			2017/11/01 13:35		2017/11/01 13:45		2017/11/01 13:50		
COC Number		na			na		na		na		
	UNITS	CB-SITE F-PS4	RDL	QC Batch	CB-SITE F-PS5	RDL	CB-SITE F-PS6	RDL	CB-SITE F-PS7	RDL	QC Batch
Metals											
Lead (Pb)	mg/kg	370	17	5253095	510	10	13000	20	4900	10	5252201

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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TRENT-SEVERN WATERWAY
DESIGNATED SUBSTANCES AND HAZARDOUS MATERIALS SURVEY

SITE F – DAM AT LOCK 28 – BURLEIGH FALLS

Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B7O7593
Report Date: 2017/11/10

SNC-Lavalin Inc
Client Project #: 644198
Site Location: CENTRAL BUNDLE - SITE F
Your P.O. #: 11185
Sampler Initials: N A

TEST SUMMARY

Maxxam ID: FMG177 **Collected:** 2017/11/01
Sample ID: CB-SITE F-PS1 **Shipped:**
Matrix: Solid **Received:** 2017/11/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury in paint	CV/AA	5252212	2017/11/07	2017/11/08	Ron Morrison
Metals in Paint	ICP	5252201	2017/11/07	2017/11/08	Archana Patel

Maxxam ID: FMG178 **Collected:** 2017/11/01
Sample ID: CB-SITE F-PS2 **Shipped:**
Matrix: Solid **Received:** 2017/11/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Metals in Paint	ICP	5259336	2017/11/10	2017/11/10	Archana Patel

Maxxam ID: FMG179 **Collected:** 2017/11/01
Sample ID: CB-SITE F-PS3 **Shipped:**
Matrix: Solid **Received:** 2017/11/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury in paint	CV/AA	5252212	2017/11/07	2017/11/08	Ron Morrison
Metals in Paint	ICP	5252201	2017/11/07	2017/11/08	Archana Patel

Maxxam ID: FMG180 **Collected:** 2017/11/01
Sample ID: CB-SITE F-PS4 **Shipped:**
Matrix: Solid **Received:** 2017/11/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury in paint	CV/AA	5254279	2017/11/08	2017/11/08	Ron Morrison
Metals in Paint	ICP	5253095	2017/11/07	2017/11/09	Archana Patel

Maxxam ID: FMG181 **Collected:** 2017/11/01
Sample ID: CB-SITE F-PS5 **Shipped:**
Matrix: Solid **Received:** 2017/11/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury in paint	CV/AA	5252212	2017/11/07	2017/11/08	Ron Morrison
Metals in Paint	ICP	5252201	2017/11/07	2017/11/08	Archana Patel

Maxxam ID: FMG182 **Collected:** 2017/11/01
Sample ID: CB-SITE F-PS6 **Shipped:**
Matrix: Solid **Received:** 2017/11/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury in paint	CV/AA	5252212	2017/11/07	2017/11/08	Ron Morrison
Metals in Paint	ICP	5252201	2017/11/07	2017/11/08	Archana Patel

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TRENT-SEVERN WATERWAY
DESIGNATED SUBSTANCES AND HAZARDOUS MATERIALS SURVEY

SITE F – DAM AT LOCK 28 – BURLEIGH FALLS

Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B7O7593
Report Date: 2017/11/10

SNC-Lavalin Inc
Client Project #: 644198
Site Location: CENTRAL BUNDLE - SITE F
Your P.O. #: 11185
Sampler Initials: N A

TEST SUMMARY

Maxxam ID: FMG183
Sample ID: CB-SITE F-PS7
Matrix: Solid

Collected: 2017/11/01
Shipped:
Received: 2017/11/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Mercury in paint	CV/AA	5252212	2017/11/07	2017/11/08	Ron Morrison
Metals in Paint	ICP	5252201	2017/11/07	2017/11/08	Archana Patel

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TRENT-SEVERN WATERWAY
DESIGNATED SUBSTANCES AND HAZARDOUS MATERIALS SURVEY

SITE F – DAM AT LOCK 28 – BURLEIGH FALLS

Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B7O7593
Report Date: 2017/11/10

SNC-Lavalin Inc
Client Project #: 644198
Site Location: CENTRAL BUNDLE - SITE F
Your P.O. #: 11185
Sampler Initials: N A

GENERAL COMMENTS

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

Package 1	13.0°C

Metals: Due to the sample matrix,all samples required dilution. Detection limits were adjusted accordingly.

Sample FMG178 [CB-SITE F-PS2] : Mercury analysis not completed due to limited weight provided.

Metals: Due to limited amount of sample available for analysis, a smaller than usual portion of the sample was used. Detection limits were adjusted accordingly.

Sample FMG180 [CB-SITE F-PS4] : Metals: Due to limited amount of sample available for analysis, a smaller than usual portion of the sample was used. Detection limits were adjusted accordingly.

Sample FMG182 [CB-SITE F-PS6] : Metals: Due to limited amount of sample available for analysis, a smaller than usual portion of the sample was used. Detection limits were adjusted accordingly.

Results relate only to the items tested.

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TRENT-SEVERN WATERWAY
DESIGNATED SUBSTANCES AND HAZARDOUS MATERIALS SURVEY

SITE F – DAM AT LOCK 28 – BURLEIGH FALLS

Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B7O7593
Report Date: 2017/11/10

SNC-Lavalin Inc
Client Project #: 644198
Site Location: CENTRAL BUNDLE - SITE F
Your P.O. #: 11185
Sampler Initials: N A

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5252201	APT	Matrix Spike	Lead (Pb)	2017/11/08		93	%	75 - 125
5252201	APT	QC Standard	Lead (Pb)	2017/11/08		109	%	75 - 125
5252201	APT	Method Blank	Lead (Pb)	2017/11/08	<1.0		mg/kg	
5252201	APT	RPD	Lead (Pb)	2017/11/08	NC		%	35
5252212	RON	Matrix Spike	Mercury (Hg)	2017/11/08		86	%	75 - 125
5252212	RON	Spiked Blank	Mercury (Hg)	2017/11/08		97	%	75 - 125
5252212	RON	Method Blank	Mercury (Hg)	2017/11/08	<0.06		mg/kg	
5252212	RON	RPD	Mercury (Hg)	2017/11/08	8.0		%	35
5253095	APT	Matrix Spike	Lead (Pb)	2017/11/09		NC	%	75 - 125
5253095	APT	QC Standard	Lead (Pb)	2017/11/09		112	%	75 - 125
5253095	APT	Method Blank	Lead (Pb)	2017/11/09	<1.0		mg/kg	
5253095	APT	RPD	Lead (Pb)	2017/11/10	6.8		%	35
5254279	RON	Matrix Spike	Mercury (Hg)	2017/11/08		NC	%	75 - 125
5254279	RON	Spiked Blank	Mercury (Hg)	2017/11/08		93	%	75 - 125
5254279	RON	Method Blank	Mercury (Hg)	2017/11/08	<0.06		mg/kg	
5254279	RON	RPD	Mercury (Hg)	2017/11/08	20		%	35
5259336	APT	Matrix Spike	Lead (Pb)	2017/11/10		NC	%	75 - 125
5259336	APT	QC Standard	Lead (Pb)	2017/11/10		106	%	75 - 125
5259336	APT	Method Blank	Lead (Pb)	2017/11/10	<1.0		mg/kg	
5259336	APT	RPD	Lead (Pb)	2017/11/10	8.7		%	35

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 spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

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TRENT-SEVERN WATERWAY
DESIGNATED SUBSTANCES AND HAZARDOUS MATERIALS SURVEY

SITE F – DAM AT LOCK 28 – BURLEIGH FALLS

Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B7O7593
Report Date: 2017/11/10

SNC-Lavalin Inc
Client Project #: 644198
Site Location: CENTRAL BUNDLE - SITE F
Your P.O. #: 11185
Sampler Initials: N A

VALIDATION SIGNATURE PAGE

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

Ewa Pranjic, M.Sc., C.Chem, Scientific Specialist

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

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TRENT-SEVERN WATERWAY
DESIGNATED SUBSTANCES AND HAZARDOUS MATERIALS SURVEY

SITE F – DAM AT LOCK 28 – BURLEIGH FALLS

Chain of Custody Form

Maxxam Analytics Inc.
5555 N. Service Road
Burlington, Ontario L7L 5H7
www.maxxamanalytics.com
Toll Free: 1-800-668-0639
Phone: (905) 332-8788
Fax: (905) 332-9169

Page 1 of 1

CLIENT INFORMATION SECTION

Company Name: SNC-Lavalin Inc., Environment & Geoscience
Project Manager: Fabienne Etienne / Adriana Lallemand
e-mail: Fabienne.Etienneh@snclavalin.com
Address: 235 Lesmill Rd, Toronto M3B 2V1
Phone: 416-635-5882 Ext. 56194 Fax: 416 635 5353
Sampled by: Fabienne Etienne

ANALYSIS REQUESTED

LEAD & Mercury in paint

MAXXAM use only	Field Sample ID	Collection Time	Collection Date	
	CB-Site F-PS1	13:00	Nov. 1 2017	X
	-PS2	13:05		
	-PS3	13:15		
	-PS4	13:25		
	-PS5	13:35		
	-PS6	13:45		
	-PS7	13:50		

TAT Requirement:
STD 10 Business day ☑
Rush 5 Business day * ☐
Rush 2 Business day * ☐
Rush 1 Business day * ☐
Other (specify): ☐

PROJECT INFORMATION
Project #: 644198
Name: Central Bundle - Site F
PO #:
Maxxam Quote #:
Maxxam Contact: K. Lamont

REPORTING REQUIREMENTS
Summary Report only ☐
Summary Report & Full Data Package ☑
EDD ☑

PROJECT SPECIFIC COMMENTS
Paint samples for Lead and Mercury content analysis

Client Signature:
Affiliation:
Date/Time: Nov. 2, 2017

Received by:
Affiliation:
Date/Time: 2017/11/03 10:12

* = need approval from Maxxam

13/13/13 NOTE

03-Nov-17 10:12
Ema Gitej
B7O7593
TLI env-1305

TRENT-SEVERN WATERWAY
DESIGNATED SUBSTANCES AND HAZARDOUS MATERIALS SURVEY

SITE F – DAM AT LOCK 28 – BURLEIGH FALLS

Maxxam
A Bureau Veritas Group Company

Your Project #: 17-2150-32
Site Location: CENTRAL BUNDLE
Your C.O.C. #: 645989-01-01

Attention: Holly Regier

SNC-Lavalin Inc
235 Lesmill Road
Toronto, ON
CANADA M3B 2V1

Report Date: 2018/02/01
Report #: R4963542
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B807545
Received: 2018/01/11, 17:17

Sample Matrix: Soil
Samples Received: 3

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Asbestos by PLM - 0.5 RDL (1)	3	N/A	2018/01/15	COR3SOP-00002	EPA 600R-93/116
Cyanide (WAD) in Leachates	3	N/A	2018/01/19	CAM SOP-00457	OMOE 3015 m
Fluoride by ISE in Leachates	3	2018/01/19	2018/01/22	CAM SOP-00449	SM 22 4500-F- C m
Mercury (TCLP Leachable) (mg/L)	3	N/A	2018/01/19	CAM SOP-00453	EPA 7470A m
Total Metals in TCLP Leachate by ICPMS	3	2018/01/19	2018/01/19	CAM SOP-00447	EPA 6020B m
Polychlorinated Biphenyl in Solids (2)	3	2018/01/17	2018/01/18	CAM SOP-00309	EPA 8082A m
Nitrate(NO3) + Nitrite(NO2) in Leachate	3	N/A	2018/01/22	CAM SOP-00440	SM 22 4500-NO3I/NO2B
PAH Compounds in Leachate by GC/MS (SIM)	3	2018/01/19	2018/01/19	CAM SOP-00318	EPA 8270D m
Polychlorinated Biphenyl in Leachate	3	2018/01/19	2018/01/19	CAM SOP-00309	EPA 8082A m
TCLP - % Solids	3	2018/01/18	2018/01/19	CAM SOP-00401	EPA 1311 Update I m
TCLP - Extraction Fluid	3	N/A	2018/01/19	CAM SOP-00401	EPA 1311 Update I m
TCLP - Initial and final pH	3	N/A	2018/01/19	CAM SOP-00401	EPA 1311 Update I m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested.

Maxxam Analytics' Asbestos Laboratory is accredited by NVLAP for bulk asbestos analysis by polarized light microscopy, NVLAP Code 600136-0.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

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Report Date: 2018/02/01
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CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B807545
Received: 2018/01/11, 17:17

Maxxam Analytics' scope of accreditation includes EPA-600/M4-82-020: "Interim Method for the Determination of Asbestos in Bulk Insulation Samples" and EPA-600/R-93/116: "Method for the Determination of Asbestos in Bulk Building Materials".

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) P.O.B. - Percent of Bulk
(2) Analysis was conducted according to Maxxam method CAM SOP-00309 and modified where applicable based on the sample matrix. This test is not Standards Council of Canada accredited for this matrix.

Encryption Key

Ema Gitej
Senior Project Manager
01 Feb 2018 18:55:10

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Ema Gitej, Senior Project Manager
Email: EGitej@maxxam.ca
Phone# (905)817-5829

==========

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

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SITE F – DAM AT LOCK 28 – BURLEIGH FALLS

Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B807545
Report Date: 2018/02/01

SNC-Lavalin Inc
Client Project #: 17-2150-32
Site Location: CENTRAL BUNDLE
Sampler Initials: MR

O.REG 558 TCLP BENZO(A)PYRENE

Maxxam ID		FWX999	FWX999	FWY000	FWY001		
Sampling Date		2017/12/18	2017/12/18	2017/12/21	2017/12/21		
COC Number		645989-01-01	645989-01-01	645989-01-01	645989-01-01		
	UNITS	SF-CH17-01	SF-CH17-01 Lab-Dup	SF-CH17-02	SF-CH17-03	RDL	QC Batch
Polyaromatic Hydrocarbons							
Leachable Benzo(a)pyrene	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	5361459
Surrogate Recovery (%)							
Leachable D10-Anthracene	%	101	98	91	95		5361459
Leachable D14-Terphenyl (FS)	%	91	88	90	100		5361459
Leachable D8-Acenaphthylene	%	91	92	92	92		5361459

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

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Maxxam Job #: B807545
Report Date: 2018/02/01

SNC-Lavalin Inc
Client Project #: 17-2150-32
Site Location: CENTRAL BUNDLE
Sampler Initials: MR

O.REG 558 TCLP INORGANICS PACKAGE (SOIL)

Maxxam ID		FWX999	FWY000	FWY001		
Sampling Date		2017/12/18	2017/12/21	2017/12/21		
COC Number		645989-01-01	645989-01-01	645989-01-01		
	UNITS	SF-CH17-01	SF-CH17-02	SF-CH17-03	RDL	QC Batch
Inorganics						
Leachable Fluoride (F-)	mg/L	0.13	<0.10	<0.10	0.10	5361008
Leachable WAD Cyanide (Free)	mg/L	<0.010	<0.010	<0.010	0.010	5361011
Leachable Nitrite (N)	mg/L	<0.10	<0.10	<0.10	0.10	5361010
Leachable Nitrate (N)	mg/L	<1.0	<1.0	<1.0	1.0	5361010
Leachable Nitrate + Nitrite (N)	mg/L	<1.0	<1.0	<1.0	1.0	5361010
Metals						
Leachable Mercury (Hg)	mg/L	<0.0010	<0.0010	<0.0010	0.0010	5360903
Leachable Arsenic (As)	mg/L	<0.2	<0.2	<0.2	0.2	5360977
Leachable Barium (Ba)	mg/L	0.3	0.3	0.6	0.2	5360977
Leachable Boron (B)	mg/L	<0.1	<0.1	<0.1	0.1	5360977
Leachable Cadmium (Cd)	mg/L	<0.05	<0.05	<0.05	0.05	5360977
Leachable Chromium (Cr)	mg/L	<0.1	<0.1	<0.1	0.1	5360977
Leachable Lead (Pb)	mg/L	<0.1	<0.1	<0.1	0.1	5360977
Leachable Selenium (Se)	mg/L	<0.1	<0.1	<0.1	0.1	5360977
Leachable Silver (Ag)	mg/L	<0.01	<0.01	<0.01	0.01	5360977
Leachable Uranium (U)	mg/L	<0.01	<0.01	<0.01	0.01	5360977

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Report Date: 2018/02/01

SNC-Lavalin Inc
Client Project #: 17-2150-32
Site Location: CENTRAL BUNDLE
Sampler Initials: MR

O.REG 558 TCLP LEACHATE PREPARATION (SOIL)

Maxxam ID		FWX999	FWY000	FWY001		
Sampling Date		2017/12/18	2017/12/21	2017/12/21		
COC Number		645989-01-01	645989-01-01	645989-01-01		
	UNITS	SF-CH17-01	SF-CH17-02	SF-CH17-03	RDL	QC Batch
Inorganics						
Final pH	pH	10.9	11.5	11.6		5360705
Initial pH	pH	10.7	10.9	10.9		5360705
TCLP - % Solids	%	100	100	100	0.2	5360699
TCLP Extraction Fluid	N/A	FLUID 1	FLUID 1	FLUID 1		5360704

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Report Date: 2018/02/01

SNC-Lavalin Inc
Client Project #: 17-2150-32
Site Location: CENTRAL BUNDLE
Sampler Initials: MR

O.REG 558 TCLP PCBS (SOIL)

Maxxam ID		FWX999	FWY000	FWY001		
Sampling Date		2017/12/18	2017/12/21	2017/12/21		
COC Number		645989-01-01	645989-01-01	645989-01-01		
	UNITS	SF-CH17-01	SF-CH17-02	SF-CH17-03	RDL	QC Batch
PCBs						
Leachable Total PCB	mg/L	<0.0030	<0.0030	<0.0030	0.0030	5360934
Surrogate Recovery (%)						
Leachable Decachlorobiphenyl	%	109	107	103		5360934

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Client Project #: 17-2150-32
Site Location: CENTRAL BUNDLE
Sampler Initials: MR

BULK ASBESTOS ANALYSIS (SOIL)

Maxxam ID		FWX999	FWX999	FWY000	FWY001	
Sampling Date		2017/12/18	2017/12/18	2017/12/21	2017/12/21	
COC Number		645989-01-01	645989-01-01	645989-01-01	645989-01-01	
	UNITS	SF-CH17-01	SF-CH17-01 Lab-Dup	SF-CH17-02	SF-CH17-03	QC Batch
Polarized Light Microscop						
Asbestos PLM	%	ASB RPT	ASB RPT	ASB RPT	ASB RPT	5353043

QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Report Date: 2018/02/01

SNC-Lavalin Inc
Client Project #: 17-2150-32
Site Location: CENTRAL BUNDLE
Sampler Initials: MR

POLYCHLORINATED BIPHENYLS BY GC-ECD (SOIL)

Maxxam ID		FWX999	FWY000	FWY001		
Sampling Date		2017/12/18	2017/12/21	2017/12/21		
COC Number		645989-01-01	645989-01-01	645989-01-01		
	UNITS	SF-CH17-01	SF-CH17-02	SF-CH17-03	RDL	QC Batch
PCBs						
Aroclor 1262	ug/g	<0.1	<0.1	<0.1	0.1	5357077
Aroclor 1016	ug/g	<0.1	<0.1	<0.1	0.1	5357077
Aroclor 1221	ug/g	<0.1	<0.1	<0.1	0.1	5357077
Aroclor 1232	ug/g	<0.1	<0.1	<0.1	0.1	5357077
Aroclor 1242	ug/g	<0.1	<0.1	<0.1	0.1	5357077
Aroclor 1248	ug/g	<0.1	<0.1	<0.1	0.1	5357077
Aroclor 1254	ug/g	<0.1	<0.1	<0.1	0.1	5357077
Aroclor 1260	ug/g	<0.1	<0.1	<0.1	0.1	5357077
Aroclor 1268	ug/g	<0.1	<0.1	<0.1	0.1	5357077
Total PCB	ug/g	<0.1	<0.1	<0.1	0.1	5357077
Surrogate Recovery (%)						
Decachlorobiphenyl	%	118	85	78		5357077

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B807545
Report Date: 2018/02/01

SNC-Lavalin Inc
Client Project #: 17-2150-32
Site Location: CENTRAL BUNDLE
Sampler Initials: MR

Asbestos Analytical Results

EPA/600R-93/116 by Polarized Light Microscopy

SF-CH17-01
Maxxam ID: FWX999 Date Analyzed: 2018/01/15

	P.O.B	Sample Morphology	Asbestos	Other Fibres	Particulate
Layer 1	100	Homogeneous grey concrete	Not Detected		Non-Fibrous

SF-CH17-02
Maxxam ID: FWY000 Date Analyzed: 2018/01/15

	P.O.B	Sample Morphology	Asbestos	Other Fibres	Particulate
Layer 1	100	Homogeneous grey concrete	Not Detected		Non-Fibrous

SF-CH17-03
Maxxam ID: FWY001 Date Analyzed: 2018/01/15

	P.O.B	Sample Morphology	Asbestos	Other Fibres	Particulate
Layer 1	100	Homogeneous grey concrete	Not Detected		Non-Fibrous

The limit of quantitation is 0.50%, although asbestos may be qualitatively detected at concentrations less than 0.50%. Samples for which asbestos is detected at <0.50% are reported as trace, "<0.50%". "Not Detected" indicates that no asbestos fibres were observed.

Calibrated Visual Estimate (%)
Date Format : yyyy/mm/dd

TRENT-SEVERN WATERWAY
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Maxxam Job #: B807545
Report Date: 2018/02/01

SNC-Lavalin Inc
Client Project #: 17-2150-32
Site Location: CENTRAL BUNDLE
Sampler Initials: MR

TEST SUMMARY

Maxxam ID: FWX999
Sample ID: SF-CH17-01
Matrix: Soil

Collected: 2017/12/18
Shipped:
Received: 2018/01/11

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Asbestos by PLM - 0.5 RDL	MIC	5353043	N/A	2018/01/15	Banu Gurgen-Keough
Cyanide (WAD) in Leachates	SKAL/CN	5361011	N/A	2018/01/19	Louise Harding
Fluoride by ISE in Leachates	ISE	5361008	2018/01/19	2018/01/22	Surinder Rai
Mercury (TCLP Leachable) (mg/L)	CV/AA	5360903	N/A	2018/01/19	Ron Morrison
Total Metals in TCLP Leachate by ICPMS	ICP1/MS	5360977	2018/01/19	2018/01/19	Arefa Dabhad
Polychlorinated Biphenyl in Solids	GC/ECD	5357077	2018/01/17	2018/01/18	Sarah Huang
Nitrate(NO3) + Nitrite(NO2) in Leachate	LACH	5361010	N/A	2018/01/22	Chandra Nandlal
PAH Compounds in Leachate by GC/MS (SIM)	GC/MS	5361459	2018/01/19	2018/01/19	Mitesh Raj
Polychlorinated Biphenyl in Leachate	GC/ECD	5360934	2018/01/19	2018/01/19	Sarah Huang
TCLP - % Solids	BAL	5360699	2018/01/18	2018/01/19	Raad Kanbour
TCLP - Extraction Fluid		5360704	N/A	2018/01/19	Raad Kanbour
TCLP - Initial and final pH	PH	5360705	N/A	2018/01/19	Raad Kanbour

Maxxam ID: FWX999 Dup
Sample ID: SF-CH17-01
Matrix: Soil

Collected: 2017/12/18
Shipped:
Received: 2018/01/11

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Asbestos by PLM - 0.5 RDL	MIC	5353043	N/A	2018/01/15	Banu Gurgen-Keough
PAH Compounds in Leachate by GC/MS (SIM)	GC/MS	5361459	2018/01/19	2018/01/19	Mitesh Raj

Maxxam ID: FWY000
Sample ID: SF-CH17-02
Matrix: Soil

Collected: 2017/12/21
Shipped:
Received: 2018/01/11

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Asbestos by PLM - 0.5 RDL	MIC	5353043	N/A	2018/01/15	Banu Gurgen-Keough
Cyanide (WAD) in Leachates	SKAL/CN	5361011	N/A	2018/01/19	Louise Harding
Fluoride by ISE in Leachates	ISE	5361008	2018/01/19	2018/01/22	Surinder Rai
Mercury (TCLP Leachable) (mg/L)	CV/AA	5360903	N/A	2018/01/19	Ron Morrison
Total Metals in TCLP Leachate by ICPMS	ICP1/MS	5360977	2018/01/19	2018/01/19	Arefa Dabhad
Polychlorinated Biphenyl in Solids	GC/ECD	5357077	2018/01/17	2018/01/18	Sarah Huang
Nitrate(NO3) + Nitrite(NO2) in Leachate	LACH	5361010	N/A	2018/01/22	Chandra Nandlal
PAH Compounds in Leachate by GC/MS (SIM)	GC/MS	5361459	2018/01/19	2018/01/19	Mitesh Raj
Polychlorinated Biphenyl in Leachate	GC/ECD	5360934	2018/01/19	2018/01/19	Sarah Huang
TCLP - % Solids	BAL	5360699	2018/01/18	2018/01/19	Raad Kanbour
TCLP - Extraction Fluid		5360704	N/A	2018/01/19	Raad Kanbour
TCLP - Initial and final pH	PH	5360705	N/A	2018/01/19	Raad Kanbour

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TRENT-SEVERN WATERWAY
DESIGNATED SUBSTANCES AND HAZARDOUS MATERIALS SURVEY

SITE F – DAM AT LOCK 28 – BURLEIGH FALLS

Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B807545
Report Date: 2018/02/01

SNC-Lavalin Inc
Client Project #: 17-2150-32
Site Location: CENTRAL BUNDLE
Sampler Initials: MR

TEST SUMMARY

Maxxam ID: FWY001
Sample ID: SF-CH17-03
Matrix: Soil

Collected: 2017/12/21
Shipped:
Received: 2018/01/11

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Asbestos by PLM - 0.5 RDL	MIC	5353043	N/A	2018/01/15	Banu Gurgen-Keough
Cyanide (WAD) in Leachates	SKAL/CN	5361011	N/A	2018/01/19	Louise Harding
Fluoride by ISE in Leachates	ISE	5361008	2018/01/19	2018/01/22	Surinder Rai
Mercury (TCLP Leachable) (mg/L)	CV/AA	5360903	N/A	2018/01/19	Ron Morrison
Total Metals in TCLP Leachate by ICPMS	ICP1/MS	5360977	2018/01/19	2018/01/19	Arefa Dabhad
Polychlorinated Biphenyl in Solids	GC/ECD	5357077	2018/01/17	2018/01/18	Sarah Huang
Nitrate(NO3) + Nitrite(NO2) in Leachate	LACH	5361010	N/A	2018/01/22	Chandra Nandlal
PAH Compounds in Leachate by GC/MS (SIM)	GC/MS	5361459	2018/01/19	2018/01/19	Mitesh Raj
Polychlorinated Biphenyl in Leachate	GC/ECD	5360934	2018/01/19	2018/01/19	Sarah Huang
TCLP - % Solids	BAL	5360699	2018/01/18	2018/01/19	Raad Kanbour
TCLP - Extraction Fluid		5360704	N/A	2018/01/19	Raad Kanbour
TCLP - Initial and final pH	PH	5360705	N/A	2018/01/19	Raad Kanbour

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Maxxam
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Maxxam Job #: B807545
Report Date: 2018/02/01

SNC-Lavalin Inc
Client Project #: 17-2150-32
Site Location: CENTRAL BUNDLE
Sampler Initials: MR

GENERAL COMMENTS

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

Package 1	13.0°C
Package 2	17.7°C

POLYCHLORINATED BIPHENYLS BY GC-ECD (SOIL)

Polychlorinated Biphenyl in Solids: Results were not moisture corrected

Results relate only to the items tested.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

TRENT-SEVERN WATERWAY
DESIGNATED SUBSTANCES AND HAZARDOUS MATERIALS SURVEY

SITE F – DAM AT LOCK 28 – BURLEIGH FALLS

Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B807545
Report Date: 2018/02/01

SNC-Lavalin Inc
Client Project #: 17-2150-32
Site Location: CENTRAL BUNDLE
Sampler Initials: MR

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5357077	SHG	Matrix Spike	Decachlorobiphenyl	2018/01/17		78	%	30 - 130
			Aroclor 1260	2018/01/17		64	%	30 - 130
			Total PCB	2018/01/17		64	%	30 - 130
5357077	SHG	Spiked Blank	Decachlorobiphenyl	2018/01/17		106	%	30 - 130
			Aroclor 1260	2018/01/17		112	%	30 - 130
			Total PCB	2018/01/17		112	%	30 - 130
5357077	SHG	RPD	Aroclor 1260	2018/01/17	12		%	50
			Total PCB	2018/01/17	12		%	50
5357077	SHG	Method Blank	Aroclor 1262	2018/01/17	<0.1		ug/g	
			Decachlorobiphenyl	2018/01/17		103	%	30 - 130
			Aroclor 1016	2018/01/17	<0.1		ug/g	
			Aroclor 1221	2018/01/17	<0.1		ug/g	
			Aroclor 1232	2018/01/17	<0.1		ug/g	
			Aroclor 1242	2018/01/17	<0.1		ug/g	
			Aroclor 1248	2018/01/17	<0.1		ug/g	
			Aroclor 1254	2018/01/17	<0.1		ug/g	
			Aroclor 1260	2018/01/17	<0.1		ug/g	
			Aroclor 1268	2018/01/17	<0.1		ug/g	
			Total PCB	2018/01/17	<0.1		ug/g	
5360903	RON	Matrix Spike	Leachable Mercury (Hg)	2018/01/19		111	%	75 - 125
5360903	RON	Leachate Blank	Leachable Mercury (Hg)	2018/01/19	<0.0010		mg/L	
5360903	RON	Spiked Blank	Leachable Mercury (Hg)	2018/01/19		99	%	80 - 120
5360903	RON	Method Blank	Leachable Mercury (Hg)	2018/01/19	<0.0010		mg/L	
5360903	RON	RPD	Leachable Mercury (Hg)	2018/01/19	NC		%	25
5360934	SHG	Matrix Spike	Leachable Decachlorobiphenyl	2018/01/19		96	%	30 - 130
			Leachable Total PCB	2018/01/19		95	%	30 - 130
5360934	SHG	Spiked Blank	Leachable Decachlorobiphenyl	2018/01/19		104	%	30 - 130
			Leachable Total PCB	2018/01/19		108	%	30 - 130
5360934	SHG	Method Blank	Leachable Decachlorobiphenyl	2018/01/19		99	%	30 - 130
			Leachable Total PCB	2018/01/19	<0.0030		mg/L	
5360934	SHG	RPD	Leachable Total PCB	2018/01/19	NC		%	40
5360977	ADA	Matrix Spike	Leachable Arsenic (As)	2018/01/19		100	%	80 - 120
			Leachable Barium (Ba)	2018/01/19		98	%	80 - 120
			Leachable Boron (B)	2018/01/19		106	%	80 - 120
			Leachable Cadmium (Cd)	2018/01/19		101	%	80 - 120
			Leachable Chromium (Cr)	2018/01/19		100	%	80 - 120
			Leachable Lead (Pb)	2018/01/19		97	%	80 - 120
			Leachable Selenium (Se)	2018/01/19		103	%	80 - 120
			Leachable Silver (Ag)	2018/01/19		97	%	80 - 120
			Leachable Uranium (U)	2018/01/19		103	%	80 - 120
5360977	ADA	Leachate Blank	Leachable Arsenic (As)	2018/01/19	<0.2		mg/L	
			Leachable Barium (Ba)	2018/01/19	<0.2		mg/L	
			Leachable Boron (B)	2018/01/19	<0.1		mg/L	
			Leachable Cadmium (Cd)	2018/01/19	<0.05		mg/L	
			Leachable Chromium (Cr)	2018/01/19	<0.1		mg/L	
			Leachable Lead (Pb)	2018/01/19	<0.1		mg/L	
			Leachable Selenium (Se)	2018/01/19	<0.1		mg/L	
			Leachable Silver (Ag)	2018/01/19	<0.01		mg/L	
			Leachable Uranium (U)	2018/01/19	<0.01		mg/L	
5360977	ADA	Spiked Blank	Leachable Arsenic (As)	2018/01/19		102	%	80 - 120
			Leachable Barium (Ba)	2018/01/19		103	%	80 - 120
			Leachable Boron (B)	2018/01/19		108	%	80 - 120

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TRENT-SEVERN WATERWAY
DESIGNATED SUBSTANCES AND HAZARDOUS MATERIALS SURVEY

SITE F – DAM AT LOCK 28 – BURLEIGH FALLS

Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B807545
Report Date: 2018/02/01

SNC-Lavalin Inc
Client Project #: 17-2150-32
Site Location: CENTRAL BUNDLE
Sampler Initials: MR

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Leachable Cadmium (Cd)	2018/01/19		99	%	80 - 120
			Leachable Chromium (Cr)	2018/01/19		102	%	80 - 120
			Leachable Lead (Pb)	2018/01/19		101	%	80 - 120
			Leachable Selenium (Se)	2018/01/19		105	%	80 - 120
			Leachable Silver (Ag)	2018/01/19		97	%	80 - 120
			Leachable Uranium (U)	2018/01/19		108	%	80 - 120
5360977	ADA	RPD	Leachable Arsenic (As)	2018/01/19	NC		%	35
			Leachable Barium (Ba)	2018/01/19	14		%	35
			Leachable Boron (B)	2018/01/19	NC		%	35
			Leachable Cadmium (Cd)	2018/01/19	NC		%	35
			Leachable Chromium (Cr)	2018/01/19	NC		%	35
			Leachable Lead (Pb)	2018/01/19	NC		%	35
			Leachable Selenium (Se)	2018/01/19	NC		%	35
			Leachable Silver (Ag)	2018/01/19	NC		%	35
			Leachable Uranium (U)	2018/01/19	NC		%	35
5361008	SAU	Matrix Spike	Leachable Fluoride (F-)	2018/01/22		94	%	80 - 120
5361008	SAU	Leachate Blank	Leachable Fluoride (F-)	2018/01/22	<0.10		mg/L	
5361008	SAU	Spiked Blank	Leachable Fluoride (F-)	2018/01/22		97	%	80 - 120
5361008	SAU	Method Blank	Leachable Fluoride (F-)	2018/01/22	<0.10		mg/L	
5361008	SAU	RPD	Leachable Fluoride (F-)	2018/01/22	NC		%	25
5361010	C_N	Matrix Spike	Leachable Nitrite (N)	2018/01/22		105	%	80 - 120
			Leachable Nitrate (N)	2018/01/22		91	%	80 - 120
			Leachable Nitrate + Nitrite (N)	2018/01/22		94	%	80 - 120
5361010	C_N	Leachate Blank	Leachable Nitrite (N)	2018/01/22	<0.10		mg/L	
			Leachable Nitrate (N)	2018/01/22	<1.0		mg/L	
			Leachable Nitrate + Nitrite (N)	2018/01/22	<1.0		mg/L	
5361010	C_N	Spiked Blank	Leachable Nitrite (N)	2018/01/22		97	%	80 - 120
			Leachable Nitrate (N)	2018/01/22		94	%	80 - 120
			Leachable Nitrate + Nitrite (N)	2018/01/22		94	%	80 - 120
5361010	C_N	Method Blank	Leachable Nitrite (N)	2018/01/22	<0.10		mg/L	
			Leachable Nitrate (N)	2018/01/22	<1.0		mg/L	
			Leachable Nitrate + Nitrite (N)	2018/01/22	<1.0		mg/L	
5361010	C_N	RPD	Leachable Nitrite (N)	2018/01/22	NC		%	25
			Leachable Nitrate (N)	2018/01/22	NC		%	25
			Leachable Nitrate + Nitrite (N)	2018/01/22	NC		%	25
5361011	LHA	Matrix Spike	Leachable WAD Cyanide (Free)	2018/01/19		93	%	80 - 120
5361011	LHA	Leachate Blank	Leachable WAD Cyanide (Free)	2018/01/19	<0.010		mg/L	
5361011	LHA	Spiked Blank	Leachable WAD Cyanide (Free)	2018/01/19		101	%	80 - 120
5361011	LHA	Method Blank	Leachable WAD Cyanide (Free)	2018/01/19	<0.0020		mg/L	
5361011	LHA	RPD	Leachable WAD Cyanide (Free)	2018/01/19	NC		%	20
5361459	RAJ	Matrix Spike [FWX999-01]	Leachable D10-Anthracene	2018/01/19		94	%	50 - 130
			Leachable D14-Terphenyl (FS)	2018/01/19		85	%	50 - 130
			Leachable D8-Acenaphthylene	2018/01/19		87	%	50 - 130
			Leachable Benzo(a)pyrene	2018/01/19		97	%	50 - 130
5361459	RAJ	Spiked Blank	Leachable D10-Anthracene	2018/01/19		98	%	50 - 130
			Leachable D14-Terphenyl (FS)	2018/01/19		92	%	50 - 130
			Leachable D8-Acenaphthylene	2018/01/19		93	%	50 - 130
			Leachable Benzo(a)pyrene	2018/01/19		108	%	50 - 130
5361459	RAJ	Method Blank	Leachable D10-Anthracene	2018/01/19		105	%	50 - 130
			Leachable D14-Terphenyl (FS)	2018/01/19		98	%	50 - 130
			Leachable D8-Acenaphthylene	2018/01/19		93	%	50 - 130

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TRENT-SEVERN WATERWAY
DESIGNATED SUBSTANCES AND HAZARDOUS MATERIALS SURVEY

SITE F – DAM AT LOCK 28 – BURLEIGH FALLS

Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B807545
Report Date: 2018/02/01

SNC-Lavalin Inc
Client Project #: 17-2150-32
Site Location: CENTRAL BUNDLE
Sampler Initials: MR

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Leachable Benzo(a)pyrene	2018/01/19	<0.10		ug/L	
5361459	RAJ	RPD [FWX999-01]	Leachable Benzo(a)pyrene	2018/01/19	NC		%	40

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.

Leachate Blank: A blank matrix containing all reagents used in the leaching procedure. Used to determine any process contamination.

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 (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

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TRENT-SEVERN WATERWAY
DESIGNATED SUBSTANCES AND HAZARDOUS MATERIALS SURVEY

SITE F – DAM AT LOCK 28 – BURLEIGH FALLS

Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B807545
Report Date: 2018/02/01

SNC-Lavalin Inc
Client Project #: 17-2150-32
Site Location: CENTRAL BUNDLE
Sampler Initials: MR

VALIDATION SIGNATURE PAGE

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

Banu Gurgen-Keough, Supervisor

Ewa Pranjic, M.Sc., C.Chem, Scientific Specialist

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

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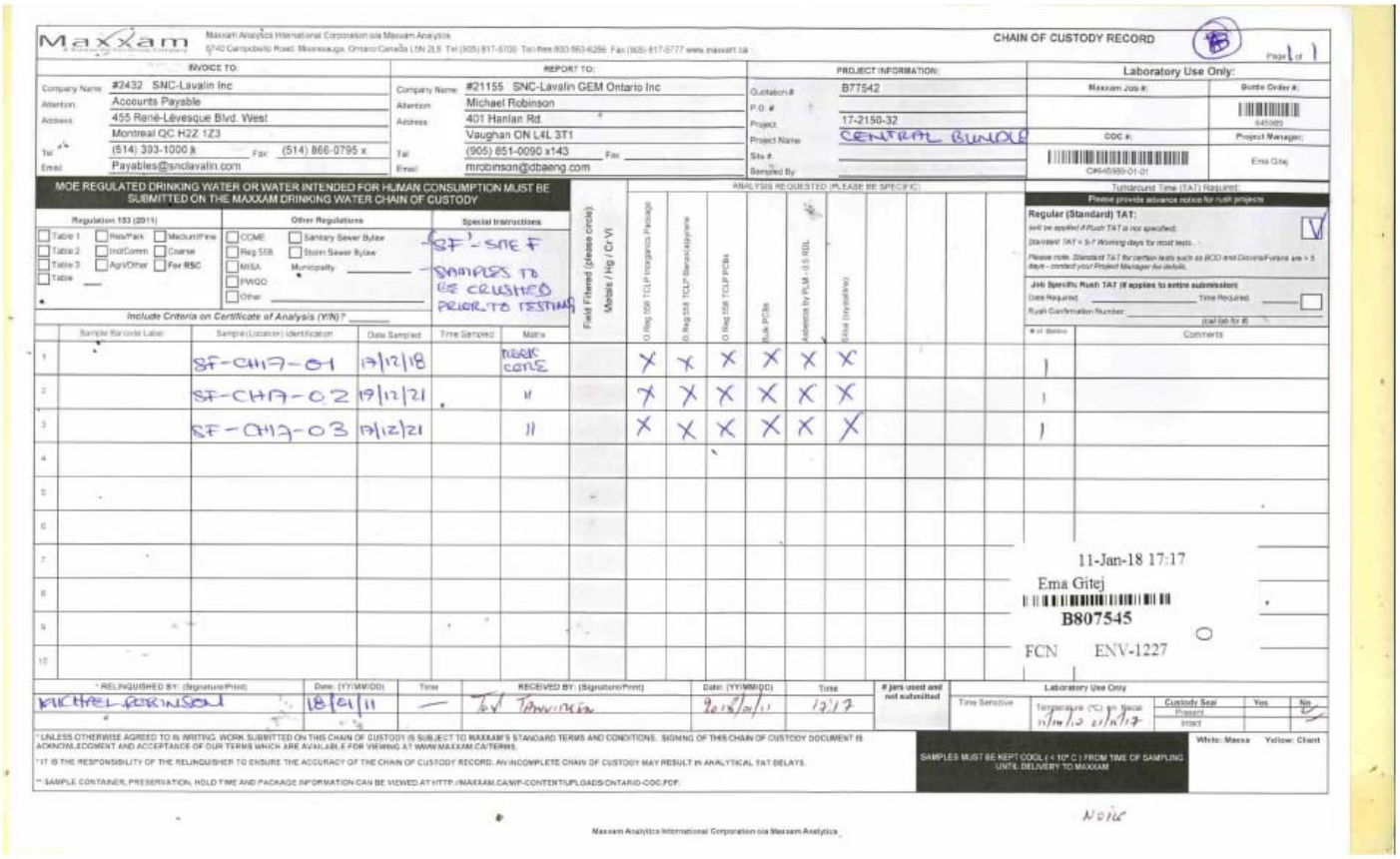
TRENT-SEVERN WATERWAY
DESIGNATED SUBSTANCES AND HAZARDOUS MATERIALS SURVEY

SITE F – DAM AT LOCK 28 – BURLEIGH FALLS



MaxXam — Maxxam Analytics International Corporation o/a Maxxam Analytics
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CHAIN OF CUSTODY RECORD — Page 1 of 1

INVOICE TO:
Company Name: #2432 SNC-Lavalin Inc
Attention: Accounts Payable
Address: 455 René-Lévesque Blvd. West, Montreal QC H2Z 1Z3
Tel: (514) 393-1000 x Fax: (514) 866-0795 x
Email: Payables@snclavalin.com

REPORT TO:
Company Name: #21155 SNC-Lavalin GEM Ontario Inc
Attention: Michael Robinson
Address: 401 Hanlan Rd, Vaughan ON L4L 3T1
Tel: (905) 851-0090 x143 Fax:
Email: mrobinson@dbaeng.com

PROJECT INFORMATION:
Quotation #: B77542
P.O. #:
Project: 17-2150-32
Project Name: CENTRAL BUNDLE
Site #:
Sampled By:

Laboratory Use Only:
Maxxam Job #: Bottle Order #: 645083
COC #: C645083-01-01 Project Manager: Ema Gitej

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE MAXXAM DRINKING WATER CHAIN OF CUSTODY

Regulation 153 (2011): Table 1, Res/Park, Medium/Fine, Table 2, Ind/Comm, Coarse, Table 3, Agri/Other, For RSC, Table ___
Other Regulations: COME, Sanitary Sewer Bylaw, Reg 558, Storm Sewer Bylaw, MISA, Municipality ___, PWQO, Other ___
Special Instructions: SF - SITE F SAMPLES TO BE CRUSHED PRIOR TO TESTING
Include Criteria on Certificate of Analysis (Y/N)? ___

ANALYSIS REQUESTED (PLEASE BE SPECIFIC):
Field Filtered (please circle): Metals / Hg / Cr VI
O.Reg 153/04 Inorganics Package; (B) Reg 558 TCLP Benzo(a)pyrene; O.Reg 558 TCLP PCBs; Bulk PCBs; Asbestos by PLM - 0.5 RDL; Silica (crystalline)

Turnaround Time (TAT) Required:
Please provide advance notice for rush projects
Regular (Standard) TAT: will be applied if Rush TAT is not specified; Standard TAT = 5-7 Working days for most tests. Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.
Job Specific Rush TAT (if applies to entire submission): Date Required: ___ Time Required: ___ Rush Confirmation Number: ___ (call lab for #)

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	# of Bottles	Comments
1		SF-CHA-01	17/12/18		BRICK CORE	1	
2		SF-CHA-02	17/12/21		"	1	
3		SF-CHA-03	17/12/21		"	1	
4							
5							
6							
7							
8							
9							
10							

11-Jan-18 17:17
Ema Gitej
B807545
FCN ENV-1227

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted	Laboratory Use Only: Time Sensitive	Temperature (°C) on Receipt	Custody Seal: Present / Intact	Yes	No
MICHAEL ROBINSON	18/01/11	—	[illegible]	2018/01/11	12:17			11/14.2 21/17			

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO MAXXAM'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.MAXXAM.CA/TERMS.
* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.
** SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT HTTP://MAXXAM.CA/WP-CONTENT/UPLOADS/ONTARIO-COC.PDF.

SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

White: Maxxa Yellow: Client

Maxxam Analytics International Corporation o/a Maxxam Analytics

Noise

TRENT-SEVERN WATERWAY
DESIGNATED SUBSTANCES AND HAZARDOUS MATERIALS SURVEY

SITE F – DAM AT LOCK 28 – BURLEIGH FALLS

Maxxam
A Bureau Veritas Group Company

January 29, 2018

Ema Gitej
MAXXAM INC
6740 Campobello Road
Mississauga, ON L5N 2L8

Maxxam Analytics Work Order 18010653

Reference: B807545

Dear Ema Gitej:

Maxxam Analytics received 3 samples on January 19, 2018 for the analyses presented in the following report.

Enclosed is a copy of the Chain-of-Custody record, acknowledging receipt of these samples. Please note that any unused portion of the samples will be discarded 30 days after the date of this report, unless you have requested otherwise.

This material is confidential and is intended solely for the person to whom it is addressed. If this is received in error, please contact the number provided below.

We appreciate the opportunity to assist you. If you have any questions concerning this report, please contact a Client Services Representative at (800) 806-5887.

Sincerely,

Daniel Elliott

Client Services Representative
Electronic signature authorized through password protection

Maxxam Analytics
22345 Roethel Drive
Novi, MI 48375

Toll Free: 800.806.5887
Lab Main: 248.344.2652
Fax: 248.344.2655
www.maxxamlabs.com

TRENT-SEVERN WATERWAY
DESIGNATED SUBSTANCES AND HAZARDOUS MATERIALS SURVEY

SITE F – DAM AT LOCK 28 – BURLEIGH FALLS

Maxxam
A Bureau Veritas Group Company

CASE NARRATIVE **Date:** *29-Jan-18*

CLIENT: MAXXAM INC
Project: B807545
Work Order No 18010653

The results of this report relate only to the samples listed in the body of this report.

Unless otherwise noted below, the following statements apply: 1) all samples were received in acceptable condition, 2) all quality control results associated with this sample set were within acceptable limits and/or do not adversely affect the reported results, and 3) the industrial hygiene results have not been blank corrected.

Analytical Comments for Method N7500B, samples -001A, -002A and -003A: The reporting limit for cristobalite was raised due to interferences.

TRENT-SEVERN WATERWAY
DESIGNATED SUBSTANCES AND HAZARDOUS MATERIALS SURVEY

SITE F – DAM AT LOCK 28 – BURLEIGH FALLS

Maxxam
A Bureau Veritas Group Company

ANALYTICAL RESULTS

Date: *29-Jan-18*

Client: MAXXAM INC **Work Order No:** 18010653

Project: B807545

Client Sample ID: FWX999-SF-CH17-01 **Matrix:** BULK

Lab ID: 18010653-001A **Collection Date:** 12/18/2017

Analyses	Result	Reporting Limit	Qual	Units	DF	Date Analyzed	Analyst
NIOSH 7500							
Cristobalite	ND	0.50		wt%	1	1/25/2018	RS
Quartz	11	0.25		wt%	1	1/25/2018	RS
Tridymite	ND	0.50		wt%	1	1/25/2018	RS

Qualifiers:

ND - Not Detected at the Reporting Limit (RL).
J - Analyte detected below the Reporting Limit
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
T - Tentatively Identified Compound (TIC)

TRENT-SEVERN WATERWAY
DESIGNATED SUBSTANCES AND HAZARDOUS MATERIALS SURVEY

SITE F – DAM AT LOCK 28 – BURLEIGH FALLS

Maxxam
A Bureau Veritas Group Company

ANALYTICAL RESULTS

Date: *29-Jan-18*

Client: MAXXAM INC **Work Order No:** 18010653

Project: B807545

Client Sample ID: FWY000-SF-CH17-02 **Matrix:** BULK

Lab ID: 18010653-002A **Collection Date:** 12/21/2017

Analyses	Result	Reporting Limit	Qual	Units	DF	Date Analyzed	Analyst
NIOSH 7500							
Cristobalite	ND	1.0		wt%	1	1/25/2018	RS
Quartz	20	0.25		wt%	1	1/25/2018	RS
Tridymite	ND	0.50		wt%	1	1/25/2018	RS

Qualifiers:

ND - Not Detected at the Reporting Limit (RL).
J - Analyte detected below the Reporting Limit
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
T - Tentatively Identified Compound (TIC)

TRENT-SEVERN WATERWAY
DESIGNATED SUBSTANCES AND HAZARDOUS MATERIALS SURVEY

SITE F – DAM AT LOCK 28 – BURLEIGH FALLS

TRENT-SEVERN WATERWAY
DESIGNATED SUBSTANCES AND HAZARDOUS MATERIALS SURVEY

SITE F – DAM AT LOCK 28 – BURLEIGH FALLS

Maxxam
A Bureau Veritas Group Company

ANALYTICAL RESULTS

Date: *29-Jan-18*

Client: MAXXAM INC **Work Order No:** 18010653

Project: B807545

Client Sample ID: FWY001-SF-CH17-03 **Matrix:** BULK

Lab ID: 18010653-003A **Collection Date:** 12/21/2017

Analyses	Result	Reporting Limit	Qual	Units	DF	Date Analyzed	Analyst
NIOSH 7500							
Cristobalite	ND	0.50		wt%	1	1/25/2018	RS
Quartz	11	0.25		wt%	1	1/25/2018	RS
Tridymite	ND	0.50		wt%	1	1/25/2018	RS

Qualifiers:

ND - Not Detected at the Reporting Limit (RL).
J - Analyte detected below the Reporting Limit
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
T - Tentatively Identified Compound (TIC)

TRENT-SEVERN WATERWAY
DESIGNATED SUBSTANCES AND HAZARDOUS MATERIALS SURVEY

SITE F – DAM AT LOCK 28 – BURLEIGH FALLS

Maxxam
A Bureau Veritas Group Company

Sent To: Bureau Veritas (Novi)
22345 Roethal Dr.
Novi, MI, 48375
Tel: (248) 344-1770

CHAIN OF CUSTODY RECORD FOR SUBCONTRACTED WORK

Page 01 of 01

COC # B807545-MBV-01-01

18010653

REPORT INFORMATION

Company: Maxxam
Address: 6740 Campobello Road, Mississauga, Ontario, L5N 2L8
Contact Name: Ema Gitej
Email: EGitej@maxxam.ca, scontractor@maxxam.ca
Phone: (905) 817-5829
Maxxam Project #: B807545

ANALYSIS REQUESTED

#	SAMPLE ID	MATRIX	DATE SAMPLED (YYYY/MM/DD)	TIME SAMPLED (HH:MM)	SAMPLER INITIALS	# CONT.	Crystalline Silica by NIOSH 7500	ADDITIONAL SAMPLE INFORMATION
1	FWX999-SF-CH17-01	SOIL	2017/12/18		MR	1	X	(P:01)
2	FW1000-SF-CH17-02	SOIL	2017/12/21		MR	1	X	(P:01)
3	FW1001-SF-CH17-03	SOIL	2017/12/21		MR	1	X	(P:01)
4								
5								
6								
7								
8								
9								
10								

REGULATORY CRITERIA

SPECIAL INSTRUCTIONS
Please inform Maxxam immediately if you are not accredited for the requested test(s).
Please return a copy of this form with the report.
SUB-MISC TO NOVI MICHIGAN FOR CRYSTALLINE

TURNAROUND TIME
☐ Rush Required
2018/01/22
Date Required
Please inform us if rush charges will be incurred.

COOLER ID:	YES	NO	Temp: (°C)
Custody Seal Present			
Custody Seal Intact			
Cooling Media Present			

COOLER ID:	YES	NO	Temp: (°C)
Custody Seal Present			
Custody Seal Intact			
Cooling Media Present			

COOLER ID:	YES	NO	Temp: (°C)
Custody Seal Present			
Custody Seal Intact			
Cooling Media Present			

RELINQUISHED BY: (SIGN & PRINT)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (SIGN & PRINT)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)
ALKA PATEL	2018/01/17	14:00	1. Ryan [illegible]	2018/1/19	11:00am
2.			2.		