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Committed to Leadership in Our Industry

April 28, 2020

Manitoba Conservation and Climate
Environmental Compliance and Enforcement
1007 Century Street
Winnipeg, MB R3H 0W4

Attn: Shannon Kohler – Acting Director, Environmental Compliance and Enforcement

Dear Ms. Kohler:

RE: 2019 Annual Report - License DGHTA No. 58 HW S2 RRRR

Please accept this as Miller Environmental Corporation's annual report for 2019 as regulated under the issued Dangerous Goods Handling & Transportation Act License No. 58 HW S2 RRRR (licence). Copies of this report will be distributed to the Manitoba Hazardous Waste Management Corporation and the Community Liaison Committee as per the requirements of clause 101 of the licence.

If you have any questions, please feel free to contact me at 204-925-9604 or by email at daveh@millerenvironmental.mb.ca.

Sincerely yours,
Miller Environmental Corporation

Dave Howes
Director of Regulatory Affairs

CC: Nada Suresh – Manitoba Conservation and Climate
Paul Bauer – Vice President/General Manager, Miller Environmental Corporation
Yolo Ortiz – Operations Manager, Miller Environmental Corporation

Miller Environmental Corporation

Operations and Environmental Monitoring Program

Annual Report 2019

Prepared April 2020

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1.0 INTRODUCTION

Miller Environmental Corporation (Miller) operates as a fully licensed hazardous waste disposal company in Manitoba. Miller incorporates procedural soundness on its operations with the mandate to ensure health and safety systems as well as mitigating all possible environmental impact while providing processing and disposal options for its customers.

Miller is the owner/operator of the Manitoba Environmental Centre (MEC), an industrial and hazardous waste processing and transfer facility located in the Rural Municipality of Montcalm. The MEC operates under the Licence No. 58 HW S2 RRRR (Licence), issued by Manitoba Sustainable Development (Appendix F).

Miller ensures high standards of operation through compliance of its internal Integrated Management System (IMS) that includes ISO 9001:2015, ISO 14001:2015 and OHSAS 18001:2007.

Our Vision

To be recognized as a trusted provider of sustainable environmental waste and process solutions.

Miller has become one of the largest waste treatment and processing companies within Western Canada providing a viable alternative to over 500 generators of hazardous waste located throughout British Columbia, Alberta, Saskatchewan, Manitoba and Ontario.

Through the years, Miller has evolved into a multi-faceted organization with the ability of collecting, processing and providing disposal of our customerôs waste, as well as emergency response and customer site services under the mandate to ensure health and safety protocols and regulatory compliance.

Millerôs success is directly related to the 84 professionals and technical staff who make up the Miller team. Staffing backgrounds in areas such as leadership, management, administrative, accounting, sales, information technology, health and safety, environmental sciences, engineering (chemical, mechanical, civil), metallurgic, logistics, maintenance, project management and chemistry, make Miller a true industry leader.

2.0 MEC OPERATIONS

2.1 Waste Management

The MEC processed 73.6 Million Litres[1] (73,681 tonnes) of industrial and hazardous waste. Highlighted increases were receipt of large volumes of hydrocarbon impacted soil.

[1]Litres and/or Kilograms, based on the type of waste (liquid or solid)

Table 1: Waste quantities processed in 2019

Waste Categories	Quantities 2018 (tonne)	Quantities 2019 (tonne)	% Change
Acid Solutions	921	1173	27.4
Alkaline Solutions *Includes caustic-phenol and caustic - sulfide solutions*	2575	3010	16.9
Aqueous Salts	462	655	41.8
Miscellaneous ï Inorganic *Includes metal impacted soil, catalyst and wastewater*	13178	8442	-35.9
Non-Halogenated Solvent	3893	4287	10.1
Fuels	743	1202	61.8
Resins and Plastics	396	522	31.8
Halogenated Organic Wastes	232	295	27.2
Oily Wastes	4232	7719	82.4
Miscellaneous ï Organic *Includes hydrocarbon impacted soil*	38694	46177	19.3
Animal Wastes	.133	.062	-53.4
Compressed Gas	229	199	-13.1

Summary of Process

The 89.4% of received wastes were processed through the physical and chemical treatment systems at the facility. The remaining volume was transferred to other Licensed Waste Management Facilities for final treatment and/or disposal.

After treatment, non-hazardous stabilized solids were disposed of as follows:

- 54.9 thousand tonnes of non-hazardous stabilized solids were disposed in the repository versus 47.6 thousand tonnes disposed in 2018 with a 15% increase.

Recycling

Metals Recovery ï 276,420 kilos of specific metal sludge continue to be sent to a smelter for recycling.

Fuel Blend ï 875,167 liters of fuel blend was generated for alternative fuel source supply. Fuel blend comprises of waste organic solvents, fuels and flammable organics sludge (i.e. oil paint). This fuel is used as an energy source at cement kilns located in eastern Canada and Midwest United States which are licensed to receive hazardous materials.

Solvent Recovery for Recycle/Reuse ï 550,220 liters of thinners and gun wash were sent for recycling at a facility located in southern Ontario.

Plastic Processing (Container Management Program) ï 466,995 pounds of plastic was processed for recycling. Plastic is shredded, cleaned and granulated for shipment to plastic manufacturers throughout North America.

Wastewater ï 249,000 liters of water were treated and shipped to the City of Winnipeg Wastewater treatment facility following the City of Winnipeg Sewer By-law No. 106/2018.

2.2 Facility Upgrade and Equipment Maintenance

Facility Maintenance and Upgrade

The following upgrades were done in compliance with the requirements of the Licence. Further information can be found in **Appendix F ï Licence No. 58 HW S2 RRRR** regarding these requirements and **Appendix J ï Site Map** for illustration of where these upgrades have been conducted.

Cell 5

Cell 5 is a 9000 m^2 engineered containment processing cell commissioned in August of 2019. The cell is divided into two sections separated by a clay berm. The east section contains a

granular working surface and concrete loading ramp, while the west section is used primarily for processing with heavy equipment on the clay surface.

Hydrovac Cell

The hydrovac cell is a 1000 m^2 engineered containment cell used for the offloading of hydrovac trucks. The cell was commissioned in August of 2019. It contains 3 steel containment bins within the cell for trucks to offload into. The cell also contains an overflow pit used to pump off liquids with a capacity of 135 m^3.

Cell 3 Liner Repair

Processing cell 3 was emptied so the liner could be inspected for leaks or damage. The surface of the floor liner was replaced with a new engineered clay liner, and large sections of the side slope that had been compromised were also replaced with new liner. Shelby tube samples collected on the repaired clay liner found the hydraulic conductivity to be less than $1.0x10^{-7}$ cm/sec as per Millerôs Licence.

Full Size Truck Scale

A 90-foot truck scale was installed at the north entrance of the MEC. A new scale shack was installed to also be used as a sign-in and safety orientation center.

Decontamination Building

In the fall of 2019, Miller initiated the construction of a new decontamination building which includes a new lunchroom and offices. This project is one of the outcomes of a comprehensive evaluation of health and safety of Miller employees. Occupancy of the building started February of 2020.

Correspondence with Manitoba Sustainable Development

Throughout 2019, Miller communicated twice with Manitoba Sustainable Development to get approvals for variances. The first was for Repository Cell use for temporary storage of solids. Detailed information can be found in **Appendix G ï Repository Cell Use for Temporary Storage of Solids Approval.** The second was for a variance associated with the expansion to processing cell 5. Detailed information can be found in **Appendix H ï Expansion to Processing Cell 5.**

Equipment Maintenance

A new system for recertifying totes (IBC) has been designed, installed, and certified by Transport Canada in Process Building 6. Fire suppression systems and safety devices are maintained and calibrated regularly. Maintenance records are available for review or inspection at the facility.

2.3 Health and Safety, Regulatory Compliance and Spill Management

Miller ensures regulatory compliance through the Integrated Management System (IMS) and the implementation of an upgraded and comprehensive Safety Manual that is being deployed through all the activities of the company. Protocols are in place for a continuous spill management as part of our regulatory process.

3.0 ENVIRONMENTAL MONITORING PROGRAM

The Environmental Monitoring Program was designed to identify and quantify any localized impact resulting from the operation of the facility. The following program is in compliance with the latest revision of the Licence.

3.1 Sampling Program

The 2019 monitoring program is included in Table 2.

Table 2: 2019 MEC Site Sampling Events

Ambient Air Sampling Events			
Date	Locations	Parameters	Sampled By
May 13-19/19	A1/A2	VOC	Miller Technical Supervisor
June 19-20/19	A1/A2	VOC, Particulates and Metal Analysis	Miller Technical Supervisor
August 8-9/19	A1/A2	VOC	Miller Technical Supervisor
August 28-29/19	A1/A2	VOC, Particulates and Metal Analysis	Winnipeg Air Testing
September 27-28/19	A1/A2	VOC	Winnipeg Air Testing
October 23-24/19	A1/A2	VOC, Particulates and Metal Analysis	Winnipeg Air Testing
Surface Water Sampling Event			
Water released in September; For various parameters as defined by Schedule B in the Licence. Sampled by: Miller Technical Supervisor			
Groundwater Sampling Events			
Date	Locations	Parameters	Sampled By
Aug. 16 to 28, 2019	OMW1 to OMW11	BTEX, TOC, Metals and Conv. Parameters	Dillon Consulting
Soil Sampling Events **Per Millerôs Licence, next soil sampling will be done in 2020**			

Total Hydrocarbons are continuously monitored through a device in the effluent of the dry scrubber.

3.1.1 Sampling and Monitoring Protocols

All sampling and monitoring protocols are performed in compliance with Millerôs Licence. The ***Appendix A – MEC Operations Environmental Sampling and Monitoring Protocols*** describes the Sampling and Monitoring Program.

3.2 Analytical Program

An ISO 17025 accredited laboratory is employed to perform all analysis in accordance with Millerôs Licence.

3.3 Results and Discussion

3.3.1 Ambient Air Sampling

Appendix B – MEC Ambient Air Monitoring Results provides results for VOCôs, metals and particulates in air. VOCs, Metals and Particulates continue to signify no impact on the environment. Full analytical results can be found in **Appendix L ï 2019 Environmental Air Monitoring Results.**

3.3.2 Surface Water Sampling

The North Pond was discharged in September of 2019. Approval was given by Manitoba Sustainable Development as indicated by ***Appendix I – Approval for Release of the North Pond.***

3.3.3 Groundwater Sampling

The MEC sampled groundwater from eleven monitoring wells. The well locations and identification are detailed in the ***Appendix C – Groundwater Sampling Wells and Air Sampling Map*** and the results can be found in ***Appendix D – Groundwater Sampling Results.*** Full analytical results can be found in **Appendix K ï Dillon Consultingï 2019 Environmental Groundwater Program.**

The results indicate that no significance environmental impact can be attributed to the MEC operation.

3.3.4 Soil Sampling

Requirements in the Licence states that soil samples will be taken every 3 years and analyzed for Metals, BTEX, CCME Hydrocarbons and PAHs. The next soil sampling event will occur in 2020.

Soil results reported in 2018 remain consistent with previous years and do not indicate any environmental impact due to MEC operations.

3.3.5 Dry Scrubber Total Hydrocarbons

As per Millerôs Licence, a total organic hydrocarbons detector operates at the discharge side of an active carbon filter in PB1. The most recent 24 months record of the continuously monitored total hydrocarbon measurements and the entire maintenance and data download performed on the air pollution device is available for inspection at any given time. The **Appendix E ï Dry Scrubber Total Hydrocarbons Readings** provides data of the 2019 operation.

3.3.6 QA/QC

QA/QC: The lab ensures that procedures are strictly followed, and quality control is applied to each of MEC processing activities. Regular sampling of incoming waste streams is fingerprinted for determination of its appropriate processing and disposal. Aside from internal testing, ISO 17025 accredited external labs are used to determine specific constituents and to verify final stabilized waste. QA/QC data is available electronically at the facility for all monitoring results. The third-party analytical lab did not report any discrepancies over the monitoring events.

Environmental Monitoring Control: In accordance with Millerôs Licence, air, groundwater and soil samples are analyzed to ensure compliance, to prevent and control any environmental impact to the community.

Participation in Process Development: Assist in finding new, feasible and innovative ways to improve processes or incorporate new systems. This not only includes lean initiatives but also includes best practices to ensure safe working and environmental conditions.

Repository Monitoring and Control: With the increase in processing capabilities, more of the processed waste can be diverted to the repository. An important function of the lab is to ensure that the operating plan of the repository is in compliance to the guidelines of clauses 54-58 of the Licence.

4.0 CONCLUSIONS

Results of the monitoring program indicates that operations at the MEC have not negatively impacted the environment.

Third party environmental consultants were utilized for majority of the Environmental Program to ensure unbiased reporting.

No reportable spills or spill incidents requiring activation of the contingency plan occurred at the facility during 2019.

The next groundwater and air monitoring events will be conducted in 2020 and the next soil monitoring event will also be conducted in 2020 which is in accordance with Millerôs Licence.

APPENDIX A-

MEC Operations Environmental Sampling

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Monitoring Program

MEC Operations

Environmental Sampling and Monitoring Program

The Sampling and Environmental Program was designed to identify and quantify any localized impact resulting from facility operation. The external monitoring program (air, soil and groundwater) concentrates on the operational areas of the site and includes six air monitoring events for volatile organic compounds, three air monitoring events for total particulate and metals, surface water (if in the event a discharge from the retention pond is required), soil monitoring (every three years) and an annual ground water monitoring program. The sample sites are all on location at the MEC. Groundwater monitoring was represented by eleven monitoring wells immediately downstream of the facility and in the periphery of the facility.

Air Sampling

Introduction

Routine operations monitoring comprises of volatile organic compounds and inorganic metals and particulates. Parameters are listed in clause 81 of operating license 58 HW S2 RRRR.

The two sampling points were consistent with past annual monitoring programs as shown below;

A1: Along the fenceline at the southeast corner of the facility.

A2: Along the fenceline at the northeast corner of the property.

Fig: 1 ï Air Sampling Locations

Station A1 is a site near the facility that will experience NW winds coming from the facility Station A2 is a site near the facility that will experience southerly winds coming from the facility to be sampled.

Stations A1 And A2 are sampled six times during the year for volatile organic compounds and 3 times per year for inorganic particulates .The sampling is partly weather dependent and periods of precipitation are to be avoided, if possible.

Methodology

The air quality methods depend on the compounds of interest and are most easily divided into methods to sample:

- Inorganic particulate matter for analysis of metals.

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- Volatile Organic Compounds.

Two separate sampling systems are used to measure the wide range of compounds. Inorganic particulate matter and metals are sampled with a high-volume sampler. Volatile organic compounds are sampled with a low volume sampling system.

Sample Methodology

The sampling was conducted in general accordance with the following methods:

- TO-17 for VOCs.
- NIOSH 7303 for Metals.
- NIOSH 0500 for Totally Suspended Particulate (TSP).

Metals and Particulates

Methodology

The sampling methodology involves drawing a sample of air through a filter, which collects particulate matter. It is then analysed for several different parameters. The air sample is collected using a calibrated high volume sampler for a 24 hour period.

Equipment

For metals and total particulates a 37mm cassette using Industrial Hygiene calibrated pump sampler-AIRCHEK 52 set at 1.0L/ Minute.

The filters are transported to and from the site inside a clean cooler. They may be kept at room temperature until analyzed.

Sample collection, Preservation, Handling and Transport

The pre-calibrated high volume sampler is placed in the field. The filters are handled while wearing nitrile or latex gloves. Make sure hands and clothes are clean to avoid contamination of sample.

Volatile Organic Compounds

Methodology

The sampling methodology involves drawing a sample of air through a Thermal Desorption Tube, which collects volatile organic compounds.

It is then analysed for several different parameters. The air sample is collected using a calibrated low volume sampler for a 24 hour period.

The U.S Environmental Protection Agency (EPA) has identified several methods for determination of organic compounds in ambient air. These methods have been matched to the potential contaminants that could be released from the MEC. Alternative and approved equivalent methods are acceptable, providing they are comparable to those developed during the baseline and operational monitoring programs.

The EPA methods are listed and described in the ñCompendium of Methods for the Determination of Toxic Organic Compounds in Ambient Airôô (EPA/625/R-96/010b, JJanuary 1999).

A slight modification of the EPA TO-17 method is used. This method involves drawing air through a Thermal Desorption Tube with subsequent analysis using GC/MS (gas chromatography/mass spectrometry).

Equipment

For volatile organic compounds thermal desorption tubes set at 0.05 l/m using an Industrial Hygiene Calibrated pump sampler-AIRCHEK 52.

The sampling tubes for volatile organic compounds are Stainless Steel ATD Prepacked Sample Tubes-Sorbent- Perkin Elmer Air Toxics Tubes.

The sampling tubes are housed in a shelter that allows unobstructed air flow with no tubing in the air stream ahead of the sampling tubes. Connectors between the Supelco tubes and the flowmeters are Swagelok. All other tubing is made of either plastic or copper.

Sample collection, Preservation, Handling and Transport

The methods follow similar procedures because they are used with the same sampling system. All operations which include handling the sampling tubes are completed while wearing nitrile or latex gloves. It is important to be sure to wash your hands carefully with soap and water prior to initiating the sampling. Make sure clothes have not come into contact with any organic compounds which might contaminate the samples. Basic procedures are outlined below;

- At Station A1, attach the tube to the sampling inlet, leave for about 10 seconds, disconnect and recap the ends. Labelthe tube as a "field blank". Leave this tube at the sampling station for the remainder of the sampling event. Do this at Station A1 only.
- Before sampling, the flow rate of the pumps must be verified and noted. When sampling tube is connected, turn the pump on, noting the date and time..
- After running for 24 hours, the pumps are again verified for flow rate, and then a flow rate over 24 hours is calculated.
- Remove the tube and recap and label it. Place all tubes in a cooler at 4°Cor colder.
- Steps are repeated for the sampling system located at Station A2.
- All data is recorded on accompanying logsheets.

Soil Sampling

Introduction

Soil sampling sites are located at locations A1, A2 and A3. Parameters are listed in clause 82 of operating license 58 HW S2 RRRR.

The following equipment is required to collect the soil samples:

- Latex gloves
- Distilled Water
- Putty knife or Spatula
- Glass containers
- Shovel
- Cooler
- Decontamination equipment (pail, lab detergent, scrub brush)

Sample collection, Preservation, Handling and Transport

If necessary, place a tarpaulin beside the sampling location to provide a clean working area. A clean small diameter hand auger is used to collect the soil samples. Soil samples are collected immediately below the ground surface. Twist the auger down and remove the sample. Using a clean putty knife, pare the soil on the outside of the auger and discard that soil. Transfer the remaining soil from the auger with a clean pair of latex gloves into appropriate sample container. Decontaminate the auger with a laboratory detergent water wash and distilled water rinse before collection at the next sampling site.

Each sample is labelled with the identification number, name of collector, date and time of sampling, preservation methods and analyses required. Place clear wide tape over all labels. Check that the sample container is capped securely. Place sample container in protective plastic bag in a cooler and maintain at 4^0C throughout transport.

Surface Water Sampling

Introduction

Surface water sampling locations are intended to monitor site drainage. They are the east and west landscaped ponds and the drainage ditch south of PTH 14. Baseline monitoring has been completed in the Letellier and St. Joseph reservoirs and at Buffalo Creek and PTH 14. Surface water sampling is completed prior to discharge only. Parameters are listed in clause 85 of operating 58 HW S2 RRRR.

Sample collection, Preservation, Handling and Transport

Surface water samples are collected by dipping the water samples out with the appropriate sampling bottles. Any significant amount of suspended matter in the sample should be separated by decantation. Use of nitrile or latex gloves is required.

Label each sample with the identification number, name of collector, date and time of sampling, preservation methods and analyses required. Place clear wide tape over all labels. Check the capping properly. Place the sample container in a protective plastic bag and put in cooler with sufficient ice or ice packs for maintaining 4^0C temperature throughout transport.

Groundwater Sampling

Introduction

The operations monitoring program is not directed at the collection of groundwater samples from the perimeter monitoring wells installed in the clay deposits of at the clay till interface. Because of the very low permeability in the soil and the distance of the wells from MEC operations, any potential contamination should be detected and acted up on using other environmental media before it could reach the perimeter wells.

Ground water monitoring wells have been installed proximate to operational buildings (soil and transfer facilities) and to the repository. These wells are named OMW 1- OMW 11 and need to be monitored for parameters of interest. Parameters are listed in clause 83 of operating 58 HW S2 RRRR.

The monitoring wells installed at the facility site consist of 306 stainless steel and rigid polyvinyl chloride (PVC). Stainless steel is highly inert in most situations but can degrade under low pH or high chloride conditions and may contribute to contamination by chromium and metals. PVC is also highly inert, but is subject to chemical attack by some pure-phase solvents such as toluene, trichloroethylene and others.

Water level measurement

Lower the probe attached to the electric wire down the well until the busser or light is activated. The depth to water is measured from the top of the well casting. The top of casing is used as a constant measuring reference and its geodetic elevation has been established. The date, time and depth to water are recorded for each well. Rinse the probe with distilled water before measuring the water level in the next well.

To obtain the depth to static water level from the ground surface, two calculations must be made. The first is to static water elevation at the top of the piezometer. To obtain the static water level from the surface, subtract the static elevation from the ground level.

Equipment

Ground water samples are collected utilizing an inertial lift system. This consists of a delrin foot valve connected to a length of 15 mm O.D. LDPE tubing. These tubes are kept in each individual sample point to avoid cross-contamination.

Sample collection, Preservation, Handling and Transport

Unlock the protective casing on the monitoring well to be sampled. If necessary, place a tarpaulin beside the well to provide a clean working area. Measure the water level using the procedures outlined above. Wear nitrile or latex gloves at all times during sampling. Install the

Waterra inertial lift pump. Raise tubing such that the foot valve is above the well screen. Lift and drop the tubing until groundwater begins to flow from the tubing.

Each well was purged of water for up to three well volumes or until the well was dry. Physical observations were observed and noted.

Insert the end of the tubing into the appropriate container and continue to lift and drop the tubing until the sample container is full. Once all samples have been collected, remove sampling system as discussed above.

Label each sample with the identification number, name of collector, date and time of sampling, preservation methods and analyses required. Parameters are listed in clause 83 of operating license 58 HW S2 RRRR. Check that the sample container is capped securely. Place sample container in a protective bag and put in cooler with sufficient ice or ice packs for maintaining 4^0C temperature throughout transport.

The Testing was done by Maxxam Analytics. Quality Assurance and Quality Control Information is available on each Certificate of Analysis. Information is available at the MEC.

APPENDIX B

MEC Ambient Air
Monitoring Results

Table 1 Sampling Parameters and Dates

Location	Sample dates	Parameters
Southeast Corner (A1) & Northeast Corner (A2)	May 13 & 14,2019	VOCs
	June 19 & 20,2019	VOCs
		Particulates
		Metals (Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, and Zinc)
	August 08 &9 ,2019	VOCs
	August 28 & 29,2019	VOCs
		Particulates
		Metals (Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, and Zinc)
	Sept. 27 & 28,2019	VOCs
	Oct. 23 &24, 2019	VOCs
		Particulates
		Metals (Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, and Zinc)

Table 2 Total Suspended Particulates *(24-hr Ave.Time)*

Date	June 19-20,2019		August 28-29, 2019		October 23-24, 2019		Criteria($\mu g/m^3$) max
Location	A1	A2	A1	A2	A1	A2	**120**
Concentration ($\mu g/m^3$)	**<29**	**<28**	**11**	**7**	**<21.5**	**<20.9**	

Table 3 Metals *(24-hr Ave.Time)*

Parameter	June 19-20,2019		August 28-29, 2019		October 23-24,2019		Criteria(µg/m^3) max
	A1	A2	A1	A2	A1	A2	
Arsenic (As)	<0.0036	<0.0035	<0.140	<0.141	<0.0858	<0.0835	0.3
Cadmium (Cd)	<0.00071	<0.00070	<0.140	<0.141	<0.0858	<0.0835	2
Chromium (Cr)	0.244	0.243	<0.350	<0.351	<0.215	<0.209	4.5
Copper (Cu)	0.0059	0.0170	<0.350	<0.351	<0.215	<0.209	50
Lead (Pb)	<0.0036	0.0046	<0.140	<0.141	<0.0858	<0.0835	2
Mercury-(Hg)	<0.0036	<0.0035	<0.009	<0.009	<0.0178	<0.0173	N/A
Nickel(Ni)	<0.0036	0.0070	<0.140	<0.141	<0.0858	<0.0835	2
Zinc (Zn)	0.443	0.769	<0.350	<0.351	<0.215	<0.209	120

Note: All readings as µg/m^3

Table 4 Summary Result for VOCs *(24-hr Ave.Time)*

VOCs	May 13-14, 2019		June 19-20, 2019		August 8-9, 2019		Aug. 28-29, 2019		Sept. 27-28, 2019		Oct. 23-24, 2019		Criteria (µg/m^3) max
	A1	A2	A1	A2	A1	A2	A1	A2	A1	A2	A1	A2	
Total Hydrocarbons	43	9.9	7.2	20	25	17	<200	<200	<200	<200	<200	<200	32000
Benzene	0.15	0.18	0.088	0.11	0.07	0.12	<2.6	<2.6	<0.51	<0.51	0.19	<0.16	2.3
Toluene	<2.7	<2.8	<2.8	3.1	<2.7	<2.8	<3.0	11	5.8	0.73	5.5	<0.16	2000
Ethyl benzene	<2.7	<2.8	<2.8	<2.8	<2.7	<2.8	<3.5	<3.5	<0.69	<0.69	0.9	<0.16	4000
Xylenes	1.0	1.4	0.14	2.7	1.1	0.91	<10.4	<10.4	3.35	<2.09	4.21	<0.48	2300

Note: All readings as µg/m^3

Maxxam Certificate of Analysis is available at the MEC.

APPENDIX C

Groundwater Sampling Wells

and

Air Sampling Map

A2
A3
OW-6
OW-11
OW-7
OW-1
OW-10
OW-4
OW-3
OW-2
OW-8
OW-9
OW-5
A1

APPENDIX D

Groundwater Sampling

Results

2019 Groundwater Sampling Results

Parameters	*OMW 1*	*OMW 2*	*OMW 3*	*OMW 4*	*OMW 5*	*OMW 6*	*OMW 7*	*OMW 8*	*OMW 9*	*OMW 10*	*OMW 11*	*Units*	*Guidelines**
pH	7.59	7.61	7.28	7.85	7.81	7.37	7.5	7.69	7.7	7.66	7.63	pH Unit	NG
Total Dissolved Solids	4300	7100	3700	5400	4800	3000	3500	7500	4200	4200	36000	mg/L	NG
Arsenic	.00068	.0011	.00041	.00098	.0008	.00057	.00048	.0015	.00047	.0046	.00041	mg/L	1.9
Cadmium	.000077	.00023	.00011	.000075	.00043	.000049	.00026	.000081	.000066	.00031	.000025	mg/L	0.0027
Chromium	.0059	<0.001	.0028	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	mg/L	0.81
Copper	.0059	0.018	0.0051	0.009	0.0032	0.0048	0.0027	0.0072	0.0034	0.032	0.0022	mg/L	0.087
Lead	0.0002	0.00054	<0.0002	0.004	0.0002	<0.00020	<0.0002	0.00041	<0.0002	0.00051	<0.0002	mg/L	0.025
Mercury	<0.000002	<0.000002	<0.000002	<0.000002	<0.002	<0.002	<0.000002	<0.000002	<0.000002	0.0000071	<0.000002	mg/L	0.0028
Nickel	0.012	0.064	0.018	0.02	0.007	0.0042	0.013	0.012	0.018	0.053	0.0043	mg/L	0.49
Zinc	0.019	0.018	<0.003	0.014	<0.0030	0.0069	<0.003	<0.003	<0.003	0.0084	<0.003	mg/L	1.1
Chloride	84	50	69	160	140	51	66	67	180	900	30	mg/L	2300
Nitrate(as N)	0.083	0.41	1.1	0.6	0.39	32	0.11	0.14	0.11	14	0.03	mg/L	NG
Sodium	340	740	290	440	420	200	230	910	140	3300	62	mg/L	2300
Sulphate	2700	4700	2300	3800	3200	1800	2200	4800	2700	26000	380	mg/L	NG
Total Organic Carbon	13	29	8.5	8.4	11	7.5	7.2	17	10	89	<13	mg/L	NG
Benzene	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	mg/L	0.43
Toluene	<0.0004	<0.0004	<0.0004	<0.0004	0.00074	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	mg/L	18
Ethyl Benzene	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	mg/L	2.3
Xylenes	<0.00089	<0.00089	<0.00089	<0.00089	<0.00089	<0.00089	<0.00089	<0.00089	<0.00089	<0.00089	<0.00089	mg/L	4.2
Calcium	490	450	450	210	390	360	500	310	470	330	130	mg/L	NG
Magnesium	360	820	320	400	370	210	260	750	420	5000	96	mg/L	NG
Potassium	10	11	9.8	7.9	13	5.8	7.9	9.7	11	25	3.8	mg/L	NG

NG= No Guidance

**Ontario Ministry of the Environment Soil, GroundWater and Sediment Standards* (April 15, 2011) Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Groundwater Condi on.

APPENDIX E

Dry Scrubber

Total Hydrocarbons

Readings

MILLER ENVIRONMENTAL CORPORATION
DRY SCRUBBER DATA TABLE
Total Volatile Hydrocarbons

2019

MONTH: January 2019

Day	Min. ppm	Max. ppm	24 Hour Average ppm
1	-2	1	0
2	-2	1	0
3	-2	962	89
4	0	321	213
5	211	215	212
6	211	215	212
7	-2	428	97
8	-2	1	0
9	1	5	3
10	1	5	3
11	1	433	19
12	1	5	3
13	1	5	3
14	1	324	3
15	1	7	2
16	1	316	2
17	0	324	2
18	1	5	2
19	0	4	2
20	0	4	2
21	1	1073	45
22	1	324	3
23	1	3104	73
24	1	1179	21
25	0	7	3
26	2	6	3
27	1	6	3
28	1	1716	59
29	2	1716	67
30	1	5	3
31	2	154	77

39.5

MONTH: February 2019

Day	Min. ppm	Max. ppm	24 Hour Average ppm
1	2	2251	136
2	2	6	4
3	2	6	4
4	2	326	71
5	2	112	40
6	2	327	20
7	2	6	4
8	1	5	4
9	2	6	4
10	2	5	4
11	1	5	3
12	1	4	2
13	1	4	3
14	1	4	3
15	1	1072	14
16	1	4	2
17	1	4	3
18	1	5	3
19	1	1607	81
20	1	111	43
21	1	645	56
22	107	111	109
23	107	111	109
24	107	111	109
25	1	966	52
26	1	4	2
27	1	324	3
28	0	5	2

32

MONTH: March 2019

Day	Min. ppm	Max. ppm	24 Hour Average ppm
1	0	4	2
2	1	4	2
3	1	4	2
4	-1	322	1
5	-1	2	0
6	-1	1178	303
7	-1	2	0
8	-1	2	1
9	-1	2	1
10	-1	2	1
11	-1	2	1
12	-1	463	10
13	-1	428	1
14	-1	1605	36
15	-1	322	1
16	-1	12	1
17	0	2	1
18	0	2	1
19	0	2	1
20	-1	2	1
21	-1	107	0
22	-1	2	0
23	-2	1	0
24	-1	2	0
25	-1	322	2
26	-2	328	3
27	-1	749	3
28	-1	1711	44
29	106	2687	116
30	106	109	107
31	106	109	107

24

MONTH: April 2019

Day	Min. ppm	Max. ppm	24 Hour Average ppm
1	-1	428	51
2	10	336	93
3	11	1193	100
4	6	544	15
5	6	544	29
6	6	10	8
7	6	10	8
8	6	1615	154
9	6	116	43
10	6	651	36
11	6	759	90
12	114	116	115
13	114	116	115
14	112	116	114
15	111	116	114
16	4	758	67
17	4	327	6
18	4	6747	114
19	4	7	6
20	4	7	5
21	4	7	5
22	4	115	80
23	4	755	49
24	4	434	8
25	5	9	7
26	5	1399	46
27	111	115	113
28	111	115	113
29	5	542	42
30	5	6	7

58

MONTH: May 2019

Day	Min. ppm	Max. ppm	24 Hour Average ppm
1	5	7	6
2	4	7	6
3	4	327	102
4	106	110	108
5	106	109	108
6	106	110	108
7	0	110	36
8	-1	2	1
9	-1	2	0
10	-1	2	0
11	-1	2	0
12	-1	2	1
13	-1	2	1
14	0	4	2
15	0	1179	77
16	1	753	84
17	0	538	45
18	107	111	109
19	107	111	109
20	107	111	109
21	1	645	52
22	1	432	80
23	1	324	74
24	1	538	6
25	0	4	2
26	0	4	2
27	0	538	39
28	0	644	3
29	0	1072	95
30	0	2	1
31	0	2	1

44

MONTH: June 2019

Day	Min. ppm	Max. ppm	24 Hour Average ppm
1	-1	2	1
2	0	4	1
3	0	4	1
4	-1	963	2
5	0	751	45
6	1	1179	110
7	-1	431	50
8	0	216	174
9	213	217	215
10	0	537	68
11	-1	2	1
12	-1	323	1
13	-1	4	1
14	-1	2	1
15	-1	2	1
16	1	432	35
17	-1	323	158
18	-1	213	113
19	-1	750	47
20	-1	2	1
21	0	535	149
22	213	216	214
23	106	428	142
24	-1	109	33
25	-4	429	18
26	-1	1390	20
27	-1	643	34
28	-1	855	101
29	0	0	0
30	0	0	0

58

MONTH: July 2019

Day	Min. ppm	Max. ppm	24 Hour Average ppm
1	0	0	0
2	-1	0	-1
3	-2	428	25
4	-2	755	61
5	4	327	99
6	110	114	111
7	110	114	111
8	4	754	119
9	2	1182	222
10	1	2464	56
11	2	539	5
12	2	1075	93
13	109	112	110
14	2	112	39
15	1	433	82
16	1	433	35
17	0	1393	24
18	1	859	75
19	0	4	2
20	0	4	2
21	1	4	2
22	0	4	1
23	-9	2	-4
24	-9	847	16
25	-9	634	90
26	-9	1276	1
27	-9	-5	-7
28	-9	-5	-7
29	-7	1062	17
30	-9	847	53
31	-9	-5	-7
			46

MONTH: August 2019

Day	Min. ppm	Max. ppm	24 Hour Average ppm
1	-9	422	67
2	-6	1705	120
3	-6	-4	-5
4	-6	-4	-5
5	-6	-4	-5
6	-6	1811	58
7	-6	4373	102
8	-6	2451	73
9	-6	1490	24
10	-6	957	2
11	-6	-4	-5
12	-6	743	45
13	-7	423	-4
14	-6	635	25
15	-6	743	35
16	-5	424	9
17	-5	-1	-3
18	-5	1173	7
19	-5	1706	103
20	-5	639	65
21	-4	967	34
22	-4	981	21
23	15	2257	299
24	339	341	340
25	339	342	340
26	16	1413	202
27	15	768	102
28	15	66	56
29	16	2915	39
30	20	1206	151
31	129	775	160
			79

MONTH: September 2019

Day	Min. ppm	Max. ppm	24 Hour Average ppm
1	129	131	130
2	127	131	129
3	-7	4746	99
4	-7	315	-6
5	-7	4585	12
6	-7	741	17
7	-7	-4	-6
8	-7	-5	-6
9	-7	1810	71
10	-7	743	116
11	-7	1490	22
12	-6	528	28
13	-9	2022	84
14	99	102	101
15	-7	104	101
16	-7	422	44
17	-7	1169	38
18	-7	741	62
19	-7	-4	-6
20	-5	3517	249
21	-6	423	135
22	-6	316	7
23	-7	743	-3
24	-7	316	-2
25	-7	316	11
26	-7	529	108
27	-7	635	74
28	-7	-5	-6
29	-7	-5	-6
30	-7	528	130

58

MONTH: October 2019

Day	Min. ppm	Max. ppm	24 Hour Average ppm
1	-5	208	62
2	-5	424	57
3	102	105	103
4	-5	424	117
5	208	212	211
6	208	212	211
7	-5	212	60
8	-5	1203	85
9	-5	637	14
10	-5	318	30
11	-5	318	5
12	-4	-2	-3
13	0	0	0
14	0	0	0
15	-4	9924	36
16	-5	-1	-3
17	-4	-2	-3
18	-4	-1	-3
19	-4	-1	-3
20	-4	0	-3
21	-4	-1	-3
22	-5	-1	-3
23	-4	639	-1
24	-4	639	24
25	102	106	104
26	104	106	105
27	104	106	105
28	-4	1174	166
29	-4	96	108
30	-4	1067	60
31	-4	854	77

55

MONTH: November 2019

Day	Min. ppm	Max. ppm	24 Hour Average ppm
1	-4	-1	-2
2	0	0	0
3	0	0	0
4	-7	746	90
5	-4	1494	156
6	-4	0	-2
7	-2	746	26
8	-2	1495	12
9	-2	0	-1
10	-2	0	-1
11	-2	0	-1
12	-2	320	24
13	-2	1816	64
14	-2	1711	61
15	-1	1070	4
16	-1	2	0
17	-1	2	0
18	-1	643	7
19	0	1071	38
20	6	650	40
21	7	739	22
22	7	1294	84
23	114	117	115
24	114	117	116
25	7	438	42
26	7	438	68
27	7	332	102
28	9	439	10
29	9	439	15
30	7	11	10

MONTH: December 2019

Day	Min. ppm	Max. ppm	24 Hour Average ppm
1	9	11	10
2	9	12	10
3	9	12	10
4	9	441	20
5	6	438	33
6	11	442	22
7	12	15	14
8	12	16	14
9	12	659	34
10	12	124	48
11	12	337	15
12	12	1090	92
13	14	446	51
14	14	17	15
15	14	17	15
16	14	444	16
17	14	446	122
18	14	231	86
19	14	553	34
20	14	17	15
21	14	17	15
22	14	17	15
23	-1	1703	57
24	0	111	14
25	-1	5	1
26	-1	4	1
27	-1	2550	131
28	-1	109	3
29	-1	109	1
30	-1	1381	126
31	-1	745	75

APPENDIX F

Licence No. 58 HW

S2 RRRR

Environmental Stewardship Division
Environmental Approvals Branch
123 Main Street, Suite 160, Winnipeg, Manitoba R3C 1A5
T 204 945-8321 **F** 204 945-5229
www.gov.mb.ca/conservation/eal

CLIENT FILE NO.: 3440.20

November 3, 2015

Vaughn Bullough, Vice President & General Manager
Miller Environmental Corporation
1803 Hekla Avenue
Winnipeg MB R2K 0K3

Dear Mr. Bullough:

Enclosed is **Licence No. 58 HW S2 RRRR** dated November 3, 2015 issued to **Miller Environmental Corporation** for the construction and continued operation of a central hazardous waste management facility, located in the Rural Municipality of Montcalm, Province of Manitoba, in accordance with the application filed under *The Dangerous Goods Handling and Transportation Act* on March 22, 2013 and subsequent proposals and additional information submitted on September 27, 2013, July 25, 2014, February 2, 2015, and April 20, 2015.

In addition to the enclosed Licence requirements, please be informed that all other applicable federal, provincial and municipal regulations and by-laws must be complied with. A Notice of Alteration must be filed with the Director for approval prior to any alteration to the facility as licensed.

For further information on the administration and application of the Licence, please feel free to contact Tyler Kneeshaw, Environment Officer at 204-239-3608.

Pursuant to Section 25 of *The Dangerous Goods Handling & Transportation Act*, this licensing decision may be appealed by any person who is affected by the issuance of this Licence to the Minister of Conservation and Water Stewardship within 30 days of the date of the Licence.

Yours truly,

"original signed by"

Tracey Braun, M.Sc.
Director
Dangerous Goods Handling & Transportation Act

Enc.

c: Don Labossiere, Donna Smiley, Tyler Kneeshaw Environmental Compliance and Enforcement
Ian Forrester, Gaetan Fontaine
Public Registries

NOTE: Confirmation of Receipt of this Licence No. 58 HW S2 RRRR *(by the Licencee only)* is required by the Director of Environmental Approvals. Please acknowledge receipt by signing in the space provided below and faxing a copy (letter only) to the Department at 204-945-5229 by November 9, 2015.

On behalf of the Miller Environmental Corporation **Date**

****A COPY OF THE LICENCE MUST BE KEPT ON SITE AT THE DEVELOPMENT AT ALL TIMES****

THE DANGEROUS GOODS HANDLING and TRANSPORTATION ACT
LOI SUR LA MANUTENTION ET LE TRANSPORT DES MARCHANDISES DANGEREUSES

LICENCE

Licence No./Licence n° **58 HW S2 RRRR**

Issue Date/Date de délivrance **October 15, 1997**

Revised: **June 2, 2000**

Revised: **August 8, 2000**

Revised: **April 11, 2013**

Revised: **November 3, 2015**

In accordance with *The Dangerous Goods Handling and Transportation Act* (C.C.S.M. c. D12)/
Conformément à la *Loi sur la manutention et le transport des marchandises dangereuses* (C.P.L.M. c. D12)

THIS LICENCE IS ISSUED TO:/CETTE LICENCE EST DONNÉE À:

MILLER ENVIRONMENTAL CORPORATION;
"the Licencee"

STAGE 2 LICENCE

for the construction and continued operation of a central hazardous waste management facility, known as the "MANITOBA ENVIRONMENTAL CENTRE" (hereinafter referred to as "the facility") located on NE 2-3-1 EPM in the Rural Municipality of Montcalm, Province of Manitoba, in accordance with the application filed under *The Dangerous Goods Handling and Transportation Act* on March 22, 2013 and subsequent proposals and additional information submitted on September 27, 2013, July 25, 2014, February 2, 2015, and April 20, 2015 and subject to the following specifications, limits, terms and conditions:

DEFINITIONS

In this Licence;

"accredited laboratory" means an analytical facility accredited by the Standards Council of Canada (SCC), or accredited by another accrediting agency recognized by Manitoba Conservation and Water Stewardship to be equivalent to the SCC, or be able to demonstrate, upon request, that it has the quality assurance/quality control (QA/QC) procedures in place equivalent to accreditation based on the international standard ISO/IEC 17025, or otherwise approved by the Director;

"active area" means a designated trench or berm confined area of the repository cell in which stabilized materials are or will be deposited;

"affected area" means a geographical area, excluding the property of the facility;

"approved" means approved in writing;

"bulk material and sludges" means substances which may be soils or other solid material that are contaminated with organics such as hydrocarbons or inorganic substances such as heavy metals;

"Community Liaison Committee" means that committee appointed by the Rural Municipality of Montcalm, to provide general oversight of the facility's operation, facilitate public consultation activities in the community and administer any independent review, monitoring or investigation of the facility's operation in accordance with the Agreement between the Licencee and the Rural Municipality of Montcalm;

"containers in transit" means containers which do not remain at the facility for a period exceeding 72 hours and which are only used for the receipt or delivery of hazardous waste;

"contaminant" means a contaminant as defined in *The Dangerous Goods Handling and Transportation Act;*

"daily" means any 24-hour period;

"dangerous goods" means any product, substance or organism designated in the regulations, or conforming with the criteria set out in the regulations, or in any regulation adopted in accordance with *The Dangerous Goods Handling and Transportation Act*, and includes hazardous wastes;

"days" means calendar days unless otherwise indicated;

"developed area" means all areas of the facility used for the receiving, movement, handling, storage, processing, or disposal of hazardous waste;

"Director" means an employee so designated pursuant to *The Dangerous Goods Handling and Transportation Act;*

"drum" means a container having a capacity of 205 litres;

"drum equivalent" means a volume of 205 litres;

"engineer(s)" means an engineer or engineers registered with the Association of Professional Engineers and Geoscientists of the Province of Manitoba;

"Environment Officer" means an employee so designated pursuant to *The Dangerous Goods Handling and Transportation Act*;

"final cover" means soil compacted to a thickness of at least 1.0 metre and topped off with at least 0.5 metre of top soil applied to the surface of the compacted repository cell that has achieved the final elevation for cell closure, and is graded to minimize ponding of water on the surface;

"groundwater" means water below the ground surface and within a zone of saturation;

"handle" means generate, use, transfer, process, mix, package, or store;

"hazardous waste" means a product, substance or organism that

a) is prescribed, designated or classified as hazardous waste in the regulations; or
b) by its nature conforms to the classification criteria for one or more classes of hazardous wastes set out in the regulations;

"HVAC" means the heating, ventilating and air conditioning system;

"lab pack" means small quantities of compatible wastes in containers that are placed in a drum and surrounded by sorbent material;

"leachate" means liquid that has percolated through solid waste and that contains dissolved and suspended materials from the solid waste;

"leachate collection system" means a system that gathers leachate so that it may be removed from a landfill and which could include a permeable drainage layer, a network of perforated piping, and sumps or manholes from which leachate can be removed;

"leachate management system" means all of the components of a system to transport, collect, and extract leachate from the repository; to include the leachate collection system, and any other infrastructure installed for the purpose of handling leachate;

"liner" means a continuous layer of reworked soil, or manufactured materials, placed beneath and on the sides of a land disposal facility active area intended to restrict the downward or lateral escape of stabilized materials, leachate, and/or gases, or to restrict the upward movement of groundwater into an area;

"monitoring well" means a well drilled to measure groundwater levels and collect groundwater samples for the purpose of physical, chemical or biological analysis to determine the concentration of groundwater constituents;

"noise nuisance" means an unwanted sound, in an affected area, which is annoying, troublesome, or disagreeable to a person:

a) residing in an affected area;
b) working in an affected area; or
c) present at a location in an affected area which is normally open to the members of the public;

if the unwanted sound

d) is the subject of at least 5 written complaints, received by the Director in a form satisfactory to the Director, and within a 90 day period, from 5 different persons falling within clauses a), b), or c), who do not live in the same household; or

e) is the subject of at least one written complaint, received by the Director in a form satisfactory to the Director, from a person falling within clauses a), b), or c), and the Director is of the opinion that if the unwanted sound had occurred in a more densely populated area there would have been at least 5 written complaints received within a 90 day period from 5 different persons who do not live in the same household;

"odour nuisance" means a continuous or repeated odour, smell or aroma, in an affected area, which is offensive, obnoxious, troublesome, annoying, unpleasant, or disagreeable to a person:

a) residing in an affected area;
b) working in an affected area; or
c) present at a location in an affected area which is normally open to the members of the public;

if the odour, smell or aroma

d) is the subject of at least 5 written complaints, received by the Director in a form satisfactory to the Director, and within a 90 day period, from 5 different persons falling within clauses a), b), or c), who do not live in the same household; or
e) is the subject of at least one written complaint, received by the Director in a form satisfactory to the Director, from a person falling within clauses a), b), or c), and the Director is of the opinion that if the odour, smell or aroma had occurred in a more densely populated area there would have been at least 5 written complaints received within a 90 day period from 5 different persons who do not live in the same household;

"opacity" means the degree to which emissions reduce the transmission of light and obscure the view of an object in the background;

"overpack" means a container with a maximum capacity of 250 litres used to temporarily contain smaller quantities of individually contained hazardous wastes;

"particulate matter" means any finely divided liquid or solid matter other than water droplets;

"particulate residue" means that part or portion of an atmospheric emission which is deposited onto a surface;

"point source" means any point of emission from the facility where contaminants are directed by a stack into the atmosphere;

"ppmv" means parts per million by volume;

"process building 1, PB1" means that area identified in the application received March 22, 2013;

"process building 2, PB2" means that area identified in the application received March 22, 2013;

"process building 3, PB3 " means that area identified in the application received March 22, 2013;

"process building 4, PB4" means that area identified in the application received March 22, 2013;

"process building 5, PB5" means that area identified in the application received March 22, 2013;

"process building 6, PB6" means that area identified in the proposal received April 20, 2015;

"record drawings" means engineering drawings complete with all dimensions which indicate all features of the Development as it has actually been built;

"residuals" means any by-product of a waste or hazardous waste treatment process;

"sanitary wastes" means human body, toilet, liquid, waterborne culinary, sink or laundry waste;

"small containers" means containers having a capacity of less than 205 litres;

"stack" means a duct, flue, pipe, chimney, vent, opening or other structure through which contaminants are emitted to the atmosphere;

"Standard Methods for the Examination of Water and Wastewater" means the most recent edition of Standard Methods for the Examination of Water and Wastewater published jointly by the American Public Health Association, the American Waterworks Association and the Water Environment Federation;

"Surface Water Management System" means a system that manages surface water and storm water from all areas, within the facility;

"tankage" means fixed, non-moveable storage vessels designed and manufactured to store wastes or hazardous wastes with a capacity of 8000 litres or greater;

"tank farm" means that area identified in the application received March 22, 2013;

"top soil" means soil that is free of roots, vegetation, weeds and stones larger than 50 mm, is capable of supporting good vegetative growth, and is suitable for use in top dressing, landscaping and seeding;

"tote" means a container with a capacity of approximately 1000 litres used to contain waste or hazardous waste material;

"treat" and **"treatment"** means blending, extracting, mixing, heating, evaporating or otherwise managing waste or hazardous waste material so as to render it less hazardous or non-hazardous;

"waste(s)" means any matter, substance, or emission which is or has been created or emitted by the transportation, storage, treatment or handling of any product whatsoever and which is or should be intended for discard or disposal; and

"wastewater" means any liquid containing a contaminant as defined in *The Dangerous Goods Handling and Transportation Act*, associated with or resulting from the facility which is discharged into the environment.

GENERAL REQUIREMENTS

This Section of the Licence contains requirements intended to provide guidance to the Licencee in implementing practices to ensure that the environment is maintained in such a manner as to sustain a

high quality of life, including social and economic development, recreation and leisure for present and future Manitobans.

The specifications, limits, terms and conditions of this Licence are severable. If any term or condition of this Licence or the application of any specification, limit, or term or condition to any circumstances is held invalid, the application of such specification, limit, or term or condition to other circumstances and the remainder of this Licence shall not be affected thereby.

Nothing in this Licence shall be construed to relieve the Licencee from civil or criminal penalties.

1. The Licencee shall implement a high standard of equipment maintenance and good housekeeping and operational practices with respect to the facility.

2. The Licencee shall reduce the production and dissemination of wastes by initiating and maintaining waste reduction and waste recycling programs.

3. In addition to any of the limits, terms or conditions specified in this Licence, the Licencee shall, upon the request of the Director:
    a) sample, monitor, analyze and/or investigate specific areas of concern regarding any segment, component or aspect of contaminant storage, containment, treatment, handling, disposal or emission systems, for such contaminants or ambient quality, aquatic toxicity, leachate characteristics and discharge or emission rates, for such duration and at such frequencies as may be specified;
    b) determine the environmental impact associated with the release of any contaminant(s) from the facility;
    c) conduct specific investigations in response to the data gathered during environmental monitoring programs; or
    d) provide the Director, within such time as may be specified, with such reports, drawings, specifications, analytical data, descriptions of sampling and analytical procedures being used, bioassay data, flow rate measurements and such other information as may from time to time be requested.

4. The Licencee shall, unless otherwise specified in this Licence:
    a) carry out all preservations and analyses on liquid samples in accordance with the methods prescribed in the most current edition of Standard Methods for the Examination of Water and Wastewater or in accordance with equivalent preservation and analytical methodologies approved by the Director;
    b) carry out all sampling of, and preservation and analyses on, water, soil or air samples in accordance with methodologies approved by the Director;
    c) have all analytical determinations undertaken by an accredited laboratory; and
    d) report the results to the Director, in writing and in an electronic form acceptable to the Director within 60 days of the samples being taken, or within another time frame as specified by the Director.

5. The Licencee shall for the purpose of compliance monitoring notify the Director orally concerning any actual or anticipated breach or failure to meet any specification, limit, term or condition of this Licence, as soon as possible after discovery, and in any event within two working days of discovery.

6. The Licencee shall submit all information required to be provided to the Director or Environment Officer under this Licence, in writing, in such form (including number of copies) and of such content as may be required by the Director or Environment Officer, and each submission shall be clearly labeled with the Licence Number and Client File Number associated with this Licence.

7. The Licencee shall submit to the Director all records, as determined by the Director, that are relevant to the control of contaminants with respect to construction, alteration, or operation of the facility or regarding the conduct of any activity at the facility.

8. The Licencee shall, unless otherwise specified by this Licence, retain all records relating to this Licence during the full life of operation of the facility, and after closure, for such period of time as may be specified by the Director. Records may be transferred from their original form to other accepted forms for information storage. These records shall be made available to an Environment Officer upon request.

9. The Licencee shall carry out, as deemed necessary by the Director, any remedial measures or modifications in respect to matters authorized under this Licence.

10. The Director or Environment Officer may, without incurring liability for so doing, enter the facility for the purpose of:
    a) investigating, inspecting and carrying out tests at the facility; and
    b) examining, making copies of, taking photographs of, or taking extracts from any records of the facility pursuant to an investigation, inspection, or test under this Licence.

11. The Licencee shall, in addition to the requirements of this Licence, carry out all aspects of the operation of the facility in compliance with the Agreements between Miller Paving Ltd., the Manitoba Hazardous Waste Management Corporation, the Community Liaison Committee, the Manitoba Government and the Rural Municipality of Montcalm and any amendments thereto.

12. The Licencee shall make available all information required by this Licence to the public and the Rural Municipality of Montcalm.

13. The Licencee shall notify the Director of any intended alteration of process at the facility, which is likely to cause a significant environmental effect, prior to implementing the alteration.

14. The Licencee shall provide to the Director letters of acceptance from both the Manitoba Hazardous Waste Management Corporation and the Citizen Liaison Committee for any alteration requested pursuant to Clause 13 of this Licence.

15. The Licencee shall inform the Director, in writing, of any intention or agreement to lease any part or portion of the facility’s property, including any buildings or structures, where such leasing might involve the establishment of any other development with a potential for emissions which may affect the environment.

LIMITS, TERMS AND CONDITIONS

Respecting Insurance Requirement

16. The Licencee shall purchase and maintain Comprehensive General Liability Insurance with a minimum limit of $10.0 million per occurrence providing coverage for the facility and all operations of the Licencee at the facility, including completed operations. The terms and conditions of coverage shall be satisfactory to the Director, and without limitations shall include coverage for bodily injury (including death), personal injury and accidental property damage, blanket contractual broad form property damage, and non-owned automobile coverages.

17. The Licencee shall purchase and maintain Automobile Liability Insurance for all owned and non-owned licenced vehicles used in connection with the operation of the facility and which provides coverage against liability arising from third party bodily injury or property damage for a minimum of $5.0 million per occurrence with terms and conditions satisfactory to the Director. If the automobile liability policy excludes coverage for sudden and accidental pollution, this coverage shall be provided under the Environmental Impairment Liability Policy or the Comprehensive General Liability Policy.

18. The Licencee shall purchase and maintain Environmental Impairment Liability Insurance providing coverage for the Licencee's on-site and off-site operations associated with the facility. The minimum limits shall be $3.0 million for gradual pollution and $5.0 million for sudden and accidental pollution, with a minimum annual aggregate of $5.0 million. Terms and conditions of coverage shall be satisfactory to the Director. Environmental impairment resulting from the loading and unloading of licenced vehicles shall be covered under the Environmental Impairment Liability Policy or under the Comprehensive General Liability Policy on a sudden and accidental basis; or via a specific endorsement on the automobile liability policy.

19. The Licencee shall provide satisfactory written evidence to the Director of the insurance coverages described in Clauses 16, 17 and 18 of this Licence, on an annual basis.

Respecting Storage and Treatment of Hazardous Waste

20. The Licencee shall not store at the facility, at any time:
    a) at the tank farm, organic liquids in excess of the storage capacity as hazardous wastes or organic products or byproducts of the treatment of hazardous waste, or uncontaminated fuel oil;
    b) within the process building PB1 in tankage:
        i. in excess of the storage capacity for treated wastewater;
        ii. in excess of the storage capacity for organic hazardous wastes or organic products or byproducts of the treatment of hazardous waste;
        iii. in excess of the storage capacity for inorganic hazardous wastes or inorganic products or byproducts of the treatment of hazardous waste;
    c) within the process building PB1, hazardous waste in totes, drums and/or small containers in excess of the storage capacity;
    d) within the process building PB3, hazardous waste in tanks, totes and drums in excess of the storage capacity;

e) within the process buildings PB4 and PB5, hazardous waste in totes, drums and/or small containers, in excess of the total capacity of the storage space;
f) within the process building PB6, hazardous waste in totes in excess of the storage capacity; and
g) hazardous waste in containers other than as described in Clause 20 a), b), c), d) or f) of this Licence, excepting containers in transit and out bound waste in trailers.

21. The Licencee shall not store hazardous waste at the facility except as described in Clause 20 of this Licence unless otherwise approved by the Director. Any approval will include consultation with, and acceptance in writing from, the Community Liaison Committee and the Manitoba Hazardous Waste Management Corporation Board.

22. The Licencee shall store hazardous waste as described in Clause 20 c), d), e) and f) of this Licence:
    a) in single pallet rows not more than 2 drum heights or 240 centimetres in height; and
    b) with a minimum aisle width between rows of 1 metre.

23. The Licencee shall not store containers of hazardous waste as described in Clause 20 c), d), e) and f) of this Licence for a period exceeding 180 days from the date of receipt of the hazardous waste, except for lab packs, overpacks and partially filled drums where the 180 day period will commence on the date the lab pack, overpack or drum is filled.

24. The Licencee shall not store more than 27 in-process lab packs at the facility. The in-process lab packs shall be segregated from the other hazardous wastes in storage.

25. Notwithstanding Clause 20 f), the Licencee may store and process used pesticide containers and used oil containers in process building PB6 with the following conditions:
    a) used pesticide containers shall be washed and shredded;
    b) used oil containers shall be shredded;
    c) all wastes shall be entered into the record tracking system; and
    d) all wastes shall be removed in accordance with Clause 23 of this Licence.

26. The Licencee shall, when storing hazardous waste in trailers as containers in transit as described in Clause 20 g) of this Licence:
    a) document the contents of each trailer; and
    b) have the documents referred to in Clause 26 a) readily available for inspection by the Director or an Environment Officer or an emergency responder.

27. The Licencee shall, when storing outbound waste in trailers, conform to the written plan submitted on September 27, 2013 for the secure parking of the trailers.

28. The Licencee shall store all types of waste at the facility in accordance with the written plan submitted on September 27, 2013, such that storage of waste in trailers will not be necessary.

Respecting the Process Building 6 (PB6)

29. The Licencee shall prior to the commencement of the container washing, container shredding and vehicle washing process at the PB6, submit a detailed building floor plan showing the locations of processing equipments and the drainage system to be installed.

Respecting the Storage and Treatment of Bulk Material and Sludges

30. The Licencee shall, prior to initiating construction of any bulk material and sludges cell(s) submit five paper copies and one electronic copy of final engineering design plans, sealed by an engineer(s) registered with the Association of Professional Engineers and Geoscientists of the Province of Manitoba, to the Director for approval. The plans will show the engineering details of each new component and the location of each new component with respect to other components.

31. The Licencee shall construct the cell(s) in accordance with the design plans approved by the Director pursuant to Clause 30 of this Licence.

32. The Licencee shall construct and maintain the bulk material and sludges cell(s) with continuous clay liners, under all interior surfaces of the cell(s) in accordance with the following specifications:
    a) the clay liner is recompacted to a minimum thickness of one metre for the side slopes and for the base; and
    b) the hydraulic conductivity of the clay liner is $1x10^{-7}$ cm/second or less.

33. The Licencee shall arrange with the assigned Environment Officer a mutually acceptable time and date for any required soil sampling between the 15th day of May and the 15th day of October of any year.

34. The Licencee shall take and test undisturbed soil samples, in accordance with “Schedule A” of this Licence, from the compacted clay liner of the bulk material and sludges cell(s). The number and location of samples and test methods will be specified by the assigned Environment Officer.

35. The Licencee shall, prior to operation of the area tested, receive the approval of the Environment Officer for the results of the tests carried out pursuant to Clause 34 of this Licence.

36. The Licencee shall initiate treatment of all bulk material and sludges if they are to be treated by landfarming, within one year of their receipt.

37. The Licencee shall store all untreated bulk material and sludges in a secure and bermed area which has been specifically constructed for that purpose.

38. The Licencee shall not store at the facility, a quantity of untreated bulk material and sludges that exceeds the capacity of which the facility is capable of treating in a year period, unless authorized by the Director.

39. The Licencee shall treat and dispose of all petroleum contaminated soils in accordance with the most current version of Manitoba Environment Guideline 96-05, Treatment and Disposal of Petroleum Contaminated Soil June 1996, as revised from time to time.

Respecting the Construction of the Repository Cell

40. The Licencee shall hire an engineer(s), registered with the Association of Professional Engineers and Geoscientists of the Province of Manitoba, to be responsible for the construction of the repository cell in accordance with the plans, specifications and design drawings submitted in support of the Proposal filed on July 25, 2014.

41. The Licencee shall prior to the construction of the repository cell, remove all top soil to a minimum depth of 150 mm and store this top soil at a suitable location for future use.

42. The Licencee shall construct and maintain the active cell with a continuous liner under all interior surfaces (base and side slopes) of the cell in accordance with the following specifications:
    a) the clay liner is recompacted to a minimum thickness of 1 meter for the side slopes and 1 meter for the base of the active area; and
    b) the in-place recompacted hydraulic conductivity of the clay liner on the side slopes and the base of active cell is $1x10^{-7}$ cm/second or less.

43. The Licencee shall take and test undisturbed soil samples, in accordance with Schedule "A" attached to this Licence, from the compacted clay liner of the active area. The number and location of samples and test methods will be specified by the assigned Environment Officer;

44. The Licencee shall arrange with the designated Environment Officer a mutually acceptable time and date for any required soil sampling between the 15th day of May and the 15th day of October of any year.

45. The Licencee shall, prior to operation of the area tested, receive the approval of the Environment Officer for the results of the tests carried out pursuant to Clause 44 of this Licence.

46. The Licencee shall construct the leachate collection system so that:
    a) the hydraulic capacity of the perforated leachate collection pipes can readily accommodate the expected quantity of leachate;
    b) leachate that enters the pipe can readily flow within the pipes;
    c) blockage of the perforations of the leachate collection pipes by sedimentation is minimized; and
    d) the leachate collection pipes have adequate structural integrity to withstand impacts from waste placement and other site operations.

47. The Licencee shall prior to the commissioning of the repository cell, undertake the construction and installation of the monitoring wells in order to monitor the ground water up gradient and down gradient from the repository in accordance with the specifications and design drawings submitted on February 2, 2015.

48. The Licencee shall:
    a) prepare "record drawings" for the repository cell of the Facility and shall label the drawings "Record Drawings"; and
    b) provide to the Director, within four months of the Environment Officer's approval of the reports required by Clause 45 of this Licence, two electronic copies of the "record drawings".

Respecting the Operation of the Repository Cell

49. The Licencee shall deposit stabilized materials generated from the stabilization process carried out at the facility in accordance with the specifications and process details submitted on July 25, 2014 in the repository cell.

50. The Licencee shall carry out a full characterization of all waste types, before the waste is deposited in the repository cell.

51. The Licencee shall maintain, at the operator's office and make available for inspection by an Environment Office upon request, records of all wastes received and deposited in the active area of the repository cell. The records shall contain, but not be limited to the following:
    a) the date wastes were deposited in the cell;
    b) the volume received; and
    c) results of laboratory analyses of the wastes.

52. The Licencee shall inspect the leachate collection system annually.

53. The Licencee shall take remedial action to correct the situation where an increase occurs in the slope of the final cover, or erosion of the final cover occurs during the post-closure period.

Respecting the Operating Plan and Operating Records

54. The Licencee shall submit for the approval of the Director, within six (6) months of the date of issuance of this Licence, an Operating Plan that includes information regarding all aspects of the repository cell, to include but not be limited to:
    a) method of tracking placement of stabilized materials;
    b) stabilized materials acceptance parameters and limitations;
    c) restrictions and procedures on volumes for stabilized materials;
    d) incident tracking and reporting parameters;
    e) dust control procedures;
    f) leachate handling and management;
    g) surface and ground water management;
    h) monitoring and reporting parameters; and
    i) identification of operational records to be maintained.

55. The Licencee shall implement the approved Operating Plan submitted pursuant to Clause 54 of this Licence.

Mitigating Erosion and Runoff

56. The Licencee shall with respect to on-site earthen construction works, construct and maintain silt fences in the drainage routes transporting surface runoff off the property of the Development until vegetation has been re-established on the disturbed areas.

57. The Licencee shall construct and maintain the final side slopes of the above ground deposit of stabilized materials, including final cover, in the cell to not exceed one unit vertical to four units horizontal (1V:4H) and the final top slope to not less than one unit vertical to twenty units horizontal (1V:20H), unless otherwise approved by the Director.

58. The Licencee shall carry out the cell closure and caping process by applying a compacted clay cap to a thickness of at least 1.0 metre and topped off with at least 0.5 metre of top soil applied to the surface of the compacted repository cell in accordance with the specifications submitted on February 2, 2015.

Respecting the Operation of the Evaporator

59. The Licencee shall prior to the installation and commissioning of the evaporator at the facility, submit the following to the Director for approval:
    a) characteristics, method and rate of discharge of concentrated wastewater and residue;
    b) design and specifications of the air pollution control systems to be installed; and
    c) schedule of procurement, installation and setting into operation of the evaporator unit, drainage system and exhaust gas ventilation system.

60. The Licencee shall submit, within 60 days of commencing to operate the evaporator, a detailed plan for the sampling and analysis of potential air pollutants, released as stationary point, to the Director for approval. The plan shall identify all compounds to be analysed, the rationale for the sampling, the methods used for the sampling and the analysis for each compound, the detection level to be attained and other items as may be identified by the Director.

61. The Licencee shall process only the types of waste water streams identified in the proposal dated April 20, 2015.

62. The Licencee shall maintain a record for all waste water processed in the Evaporator unit. The record shall contain, for each day, but not be limited to the following:
    a) volume of each load processed through the evaporator;
    b) date processed;
    c) volume and analytical test results of waste water and residue removed; and
    d) date and method of treatment and/or disposal of waste water and residue removed.

Respecting Air Emissions

63. The Licencee shall not emit from the facility:
    a) particulate matter in any air emission that:
        i. exceeds 0.23 grams per dry standard cubic metre calculated at 25 degrees Celsius and 760 millimetres of mercury, corrected to 12 percent carbon dioxide for processes involving combustion, from any point source of the facility;

ii. exhibits a visible plume with an opacity of greater than 5 percent at any point beyond the property line of the facility; or
iii. results in the deposition of visible particulate residue at any time beyond the property line of the facility; or

b) particulate matter from any point source with an opacity that equals or exceeds:
i. 20 percent as the average of any 24 consecutive opacity observations taken at 15 second intervals;
ii. 20 percent for more than 16 individual opacity observations within any 1 hour period; or
iii. 40 percent for any individual opacity observation.

64. The Licencee shall not cause or permit a noise nuisance to be created as a result of the construction, operation, or alteration of the facility, and shall take such steps as the Director may require to eliminate or mitigate a noise nuisance.

65. The Licencee shall not cause or permit an odour nuisance to be created as a result of the construction, operation, or alteration of the facility, and shall take such steps as the Director may require to eliminate or mitigate an odour nuisance.

66. The Licencee shall manage the handling, storage and treatment of hazardous waste at the facility, such that ambient air contaminants at any point of impingement beyond the boundaries of the facility, do not exceed the following concentrations:

Air Contaminant	Period of Time Air Contaminant is Measured	Concentration Limit
Total Hydrocarbons	24 hour average	32 mg/m^3
Benzene	24 hour average	2.3 $\mu g/m^3$
Toluene	24 hour average	2000 $\mu g/m^3$
Ethylbenzene	24 hour average	4000 $\mu g/m^3$
Xylenes	24 hour average	2300 $\mu g/m^3$

67. The Licencee shall not handle, treat, or otherwise manage any hazardous waste at the facility where the hazardous waste is exposed in any manner to the atmosphere within a building:
a) unless there is air collection equipment specifically designed to collect the air from these activities and this equipment is fully operational at the time of the handling, treating, or otherwise managing the hazardous waste; and
b) the collected air is directed to a fully operational air pollution control device suitable for removing the potential contaminants of concern.

68. The Licencee shall not handle, transfer, treat or otherwise manage any hazardous waste at the facility except as described in Clause 67 of this Licence unless otherwise approved by the Director. Any approval will include consultation with, and acceptance in writing from, the Community Liaison Committee and the Manitoba Hazardous Waste Management Corporation Board.

69. The Licencee shall not treat any hazardous waste at the facility at any location other than the process buildings PB1, PB2, PB3, PB4, PB5 and PB6 and the tank farm and the bulk materials and sludges cells.

70. The Licencee shall configure the air pollution control devices in accordance with the application dated March 22, 2013 and the plan submitted as per Clause 63 of this Licence.

71. The Licencee shall install appropriate instrumentation at the discharge of the air pollution control devices so that the devices can be continuously monitored for the air emissions that are being controlled.

72. The Licencee shall not operate the air pollution control devices except as described in Clause 71 of this Licence unless otherwise approved by the Director. Any approval will include consultation with, and acceptance in writing from, the Community Liaison Committee and the Manitoba Hazardous Waste Management Corporation Board.

73. The Licencee shall keep, for the inspection of an Environment Officer, the most recent 24 months record of the continuously monitored air emission measurements and all maintenance performed on the air pollution control devices and monitoring instruments.

Respecting Wastewater Emissions

74. The Licencee shall not discharge wastewater beyond the boundaries of the facility unless:
    a) the wastewater meets criteria as identified in "Schedule B" attached to this Licence; and
    b) written approval for discharge is received from the Director.

75. The Licencee shall not discharge any wastewater to the large retention ponds at the north boundary of the facility.

76. The Licencee shall provide a control structure at the discharge location of the large retention ponds such that uncontrolled or accidental discharge is prevented.

77. The Licencee shall direct all sanitary wastes only to a holding tank(s) properly designed to contain sanitary wastes.

78. The Licencee shall direct all wastewater generated as a result of any activity at the facility, other than the treatment of hazardous waste, to a sump or sumps properly designed to contain such liquids.

79. The Licencee shall manage all liquids collected in sumps at the facility in a manner approved by the Director.

MONITORING

80. The Licencee shall provide to the Director, within 30 days of the issuance of this Licence, a scaled area map showing all monitoring locations and site drainage.

Respecting Ambient Air Monitoring

81. The Licencee shall monitor the ambient air according to the following:

Frequency	Parameters	Locations*
Monthly - May to October	VOC's	A1 and A2
Alternating Month May to October	Particulates/Arsenic; Cadmium; Chromium; Copper; Lead; Mercury; Nickel; Zinc	A1 and A2

* locations as identified in Clause 80 of this Licence.

Respecting Soil Monitoring

82. The Licencee shall monitor the soil according to the following:

Frequency	Parameters	Locations*
Every Three Years	Arsenic; Cadmium; Chromium; Copper; Lead; Nickel; Zinc, Mercury; BTEX; PHC CWS; PAH.	A1, A2 and A3

* locations as identified in Clause 80 of this Licence.

Respecting Groundwater Monitoring

83. The Licencee shall monitor groundwater according to the following:

Frequency	Parameters	Locations*
Annually	BTEX; Arsenic; Cadmium; Chromium; Copper; Lead; Mercury; Nickel; Zinc/pH/Calcium; Magnesium; Sodium; Potassium; Chloride; Nitrate; Sulphate; Total Organic Carbon; Total Dissolved Solids/Static level prior to purging if possible or sampling	OMW1; OMW2; OMW3; OMW4; OMW5; OMW6; OMW7

* locations as identified in Clause 80 of this Licence.

84. The Licencee shall provide to the Director, within 60 days of the issuance of this Licence, revised protocols for all sampling that will be carried out at the facility.

Respecting Surface Water Monitoring

85. The Licencee shall monitor large retention ponds water according to the following:

Frequency	Parameters	Locations*
Prior to discharge	BTEX; PAH's; Arsenic; Cadmium; Chromium; Copper; Lead; Mercury; Nickel; Zinc/Bioassay	Discharge points

* locations as identified in Clause 83 of this Licence.

TRAINING REQUIREMENTS

Respecting Trained Personnel

86. The Licencee shall provide and maintain training for all persons who will be assigned duties at the facility in:
    a) *the Transportation of Dangerous Goods Regulations*; and
    b) the procedures pertaining to the operation of the facility including spill response.

    The records of this training shall be made available to an Environment Officer upon request.

87. The trained personnel shall be on site at all times when the facility is open to receive hazardous waste.

FACILITY SECURITY

Respecting Facility Security

88. The Licencee shall maintain a fully operational security system as described in the application dated March 22, 2013 and the proposal dated July 25, 2014, or an equivalent security system approved by the Director.

FACILITY INSPECTION

Respecting Facility Inspection

89. The Licencee shall conduct regular inspections of the facility to ensure that all pieces of equipment and the storage and treatment operations are operated in a manner that will not negatively impact the environment. Any deficiencies detected during these regular inspections,

that might negatively impact the environment shall be promptly corrected. The inspection must include, as applicable, an observation of:

a) the condition of every hazardous waste container and all piping and ancillary equipment;
b) the condition of the secondary containment system and of any other mechanism that prevents the release of hazardous waste;
c) any indications of a release of hazardous waste or of any deterioration of containers, piping, ancillary equipment or a secondary containment system that increases the likelihood of a release; and
d) recommendations for remedial action and actions undertaken.

90. The Licencee shall record each inspection required by Clause 89 of this Licence. The record shall include the date of the inspection, the name of the person who conducted the inspection and the observations made by that person during the inspection.

CONTINGENCY PLAN REQUIREMENTS

Respecting Emergency Response Contingency Plan

91. The Licencee shall prepare and maintain an emergency response contingency plan in accordance with the Canadian Centre for Occupational Health and Safety "Emergency Response Planning Guide" or other emergency planning document acceptable to the Director.

92. The emergency response contingency plan shall be designed to minimize hazards from fires, explosions or any unplanned release of hazardous waste or contaminants.

93. A copy of the emergency response contingency plan shall be kept on site and emergency response information must be posted in a conspicuous location.

SPILL RESPONSE

Respecting Spills

94. The Licencee shall, in the case of physical or mechanical equipment breakdown or process upset where such breakdown or process upset results or may result in the release of a contaminant in an amount or concentration, or at a level or rate of release, that causes or may cause a significant adverse effect, immediately report the event by calling the 24-hour environmental accident reporting line at 204-944-4888 (toll-free 1-855-944-4888). The report shall indicate the nature of the event, the time and estimated duration of the event and the reason for the event.

95. The Licencee shall, following the reporting of an event pursuant to Clause 94,
    a) identify the repairs required to the mechanical equipment;
    b) undertake all repairs to minimize unauthorized discharges of a contaminant;
    c) complete the repairs in accordance with any written instructions of the Director or an Environment Officer; and

d) submit a report to the Director about the causes of breakdown and measures taken, within one week of the repairs being done.

96. The Licencee shall take action to promptly clean up any spill or leakage and repackage the waste if any hazardous waste container leaks, cracks or otherwise causes a spill during loading or unloading. Any material resulting from such a cleanup shall be handled as hazardous waste and shall be packaged and disposed of in accordance with applicable regulations.

97. The Licencee shall equip the facility with spill cleanup equipment and supplies.

OPERATING REQUIREMENTS

98. The Licencee shall manage all solid wastes generated at the facility such that all garbage, solid waste, liquid waste, bulky metallic waste and industrial waste as defined in Manitoba Regulation 150/91 respecting Waste Disposal Grounds, as amended from time to time, shall be disposed of in a waste disposal ground operating under the authority of a permit issued pursuant to the said Regulation. Any other solid waste to be disposed of off-site, must be disposed of in a manner approved in writing by the Director.

99. The Licencee shall neither store nor treat, except as indicated, the following hazardous waste at the facility without the written approval of the Director:
    a) store but not treat hazardous waste containing polychlorobiphenyls (PCBs) that are received in small quantities as part of household hazardous waste programs;
    b) store but not treat hazardous waste containing radioactive material that are received in small quantities as part of household hazardous waste programs;
    c) infectious hazardous waste;
    d) store but not treat biomedical hazardous waste excepting pharmaceuticals and preserved specimens received periodically from research facilities or clinical laboratories;
    e) store but not treat explosives excepting ammunition, flares or fireworks received in small quantities as part of household hazardous waste programs; and
    f) hazardous waste which is readily capable of detonation or of explosive decomposition or reaction at normal temperature and pressure.

REPORTING REQUIREMENTS

Respecting Record Keeping

100. The Licencee shall maintain, on a daily basis, written records and any amendments, revisions or modifications to these records reflecting the operation of the facility. These records shall be kept available for inspection by an Environment Officer.

Respecting Annual Reporting

101. The Licencee shall, unless otherwise approved by the Director, on or before the 15th day of April of each year, submit to the Director an annual report with respect to all activities at the facility conducted pursuant to this Licence during the previous calendar year. The report shall be made

available to the public and the Rural Municipality of Montcalm. The format of the report shall be approved by the Director and contain, as a minimum, the following information.

a) the amount and type of each hazardous waste received and subsequently bulked for shipment to off-site disposal;
b) the amount and type of hazardous waste received and treated by the facility, including any residuals;
c) the amount and type of stabilized material received and subsequently deposited at the repository cell;
d) the amount and type of hazardous waste managed at the evaporator, including any residuals;
e) a summary of the hazardous waste characterization data;
f) all calibration and equipment maintenance records;
g) summary reports and details of all incidents that require implementation of the contingency plan; and
h) with respect to the monitoring programs:
    i. the date(s), location and time(s) of sampling or measurements;
    ii. the date(s) analyses were performed;
    iii. the individual(s) who performed the analyses;
    iv. documentation to verify the appropriate certification of the laboratory used to perform the analyses;
    v. quality assurance and quality control data; and
    vi. the analytical results of all monitoring.

102. Any approval by the Director for changes with respect to the requirements of Clause 101 of this Licence will include consultation with, and acceptance in writing from, the Community Liaison Committee and the Manitoba Hazardous Waste Management Corporation Board.

Respecting Decommissioning

103. The Licencee shall submit to the Director, for approval, one year in advance of the projected date for commencing the decommissioning of the facility or when it becomes evident that the closure of the facility is imminent, a detailed Closure Plan outlining the measures proposed to address environmental and health issues which might arise in the course of, and subsequent to, the decommissioning of the facility and implement the approved Closure Plan in accordance with a time frame satisfactory to the Director.

REVIEW AND REVOCATION

A. This Licence replaces Licence No. 58 HW S2 RRR which is hereby rescinded.

B. If, in the opinion of the Director, the Licencee has exceeded or is exceeding or has or is failing to meet the restrictions or conditions set out in this Licence, or in the opinion of the Director a hazardous situation exists, the Director may, temporarily or permanently, terminate, vary or suspend this Licence.

C. If, in the opinion of the Director, new evidence warrants a change in the specifications, limits, terms or conditions of this Licence, the Director may require the filing of a new application pursuant to *The Dangerous Goods Handling and Transportation Act*.

Tracey Braun, M.Sc.
Director
Dangerous Goods Handling
and Transportation Act

Client File No.: 3440:20
Consignor Registration No. MBG 02410
Consignee Registration No. MBR 01829

Schedule "A" to
Miller Environmental Corporation
Licence No. 58 HW S2 RRRR

Soil Sampling:

1. The Licence shall provide a drilling rig, acceptable to the designated Environment Officer, to extract soil samples from the specified liner of the structure. This includes all liners constructed with clay. The drill rig shall have the capacity to drill to the maximum depth of the clay liner plus an additional 2 meters. The drill rig shall be equipped with both standard and hollow stem augers. The minimum hole diameter shall be 5 inches.

2. For liners placed or found at the surface of the structure, the Licencee shall provide a machine, acceptable to the designated Environment Officer, capable of pressing a sampling tube into the liner in a straight line motion along the centre axis line of the sample tube and without sideways movement.

3. Soil samples shall be collected and shipped in accordance with ASTM Standard D 1587 (Standard Practice for the Thin-Walled Tube Sampling of Soils), D 4220 (Standard Practice for Preserving and Transporting Soil Samples) and D 3550 (Standard Practice for Ring-Lines Barrel Sampling of Soils). Thin-walled tubes shall meet the stated requirements including length, inside clearance ratio and corrosion protection. An adequate venting area shall be provided through the sampling head.

4. At the time of sample collection, the designated Environment Officer Shall advise the Licencee as to the soil testing method that must be used on each sample. The oedometer method may be used for a sample where the Environment Officer determines that the soil sample is taken from an undisturbed clay soil which has not been remoulded and which is homogeneous and unweathered. The triaxial test shall be used for all samples taken from disturbed and remoulded soils or from non homogenous and weathered soils.

5. The Licencee shall provide a report on the collection of soil samples to the designated Environment Officer and to the laboratory technician which includes but is not limited to the following: a plot plan indicating sample location, depth or elevation of sample, length of advance of the sample tube length of soil sample contained in the tube after its advancement, the soil test method specified by the Environment Officer for each soil sample and all necessary instructions from the site engineer to the laboratory technician.

6. All drill and sample holes shall be sealed with bentonite pellets after the field drilling and sampling has been completed.

Soil Testing Methods:

1. Triaxial Test Method

   a) The soil samples shall be tested for hydraulic conductivity using ASTM D5084 (Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter).

   b) Soil specimens shall have a minimum diameter of 70 mm (2.75 inches) and a minimum height of 70 mm (2.75). The soil specimens shall be selected from a section of the soil sample which contains the most porous material based on a visual inspection. The hydraulic gradient shall not exceed 30 during sample preparation and testing. Swelling of the soil specimen should be controlled to adjust for the amount of compaction measured during sample collection and extraction from the tube and the depth or elevation of the sample. The effective stress used during saturation or consolidation of the sample shall not exceed 40 kPa (5.7 psi) or the specific stress level that is expected in the field location where the sample was taken, whichever is greater.

   c) The complete laboratory report, as outlined in ASTM D5804, shall be supplied for each soil sample collected in the field.

2. Oedometer Test Method

   a) The soil samples shall be tested for hydraulic conductivity using ASTM D2435 (Standard Test Method for One-Dimensional Consolidation Properties of Soils).

   b) Soil specimens shall have a minimum diameter of 50 mm (2 inches) and a minimum height of 20 mm (0.8 inches). The soil specimens shall be selected from a section of the soil sample which contains the most porous material based on a visual inspection. The soil specimen shall be taken from an undisturbed soil sample. The soil specimen shall be completely saturated.

   c) The complete laboratory report, as outlined in ASTM D2435, shall be supplied for each soil sample collected in the field.

Schedule "B" to
Miller Environmental Corporation
Licence No. 58 HW S2 RRRR

Wastewater or discharge from the large site retention ponds shall not contain contaminants, as described below, whose concentrations exceed the appropriate set of criteria for water use classification of the receiving waterways as may be specified in the most recent version of the Manitoba Surface Water Quality Objectives:

Alkalinity (Total CaCO3)	**Lithium**
Colour	**Manganese**
Conductivity	**Mercury**
Dissolved oxygen	**Molybdenum**
Hardness (as CaCO3)	**Nickel**
Odour	**Selenium**
pH	**Silver**
Temperature	**Uranium**
Total Dissolved Solids	**Vanadium**
Turbidity	**Zinc**
Aluminum	**Chloride**
Antimony	**Fluoride**
Arsenic	**Nitrate (as N)**
Barium	**Nitrite (as N)**
Beryllium	**Sodium**
Boron	**Sulphate**
Cadmium	**Total Petroleum Hydrocarbons**
Chromium	**Benzene**
Cobalt	**Toluene**
Copper	**Ethyl Benzene**
Cyanide (free)	**Xylenes**
Iron	
Lead	

Wastewater or discharge from the large site retention ponds shall not be acutely lethal to water fleas, as determined by means of a 48-hour exposure period which results in mortality to more than 50 percent of the test water fleas exposed to undiluted discharge water, with the test carried out in accordance with section 5 or 6 of the Reference Method for Determining the Acute Lethality of Effluent to *Daphnia magna*, outlined in Environment Canada's Report, EPS 1/RM/14 July 1990, or any future amendment thereto.

APPENDIX G

Repository Cell Use for Temporary Storage of Solids

Manitoba
Sustainable Development
Environmental Stewardship Division
Environmental Approvals Branch
1007 Century Street, Winnipeg, Manitoba R3H 0W4
T 204 945-8321 F 204 945-5229
www.gov.mb.ca/sd/eal

CLIENT FILE NO.: 3440.20

January 29, 2019

Mr. Dave Howes
Miller Environmental Corporation
1803 Hekla Ave.
Winnipeg, MB R2R 0K3

Dear Mr. Howes:

Re: Repository Cell Use for Temporary Storage of Solids – Dangerous Goods Handling and Transportation Act Licence 58 HW S2 RRRR

Thank you for your December 7, 2018 letter regarding Licence 58 HW S2 RRRR. The request is for temporary storage of waste solids in an area of the Repository Cell which achieved compliance for construction requirements in the fall 2018.

Upon review of the amendment request, I have concluded that the environmental effects of the proposed alterations will be insignificant, and therefore, you are hereby authorized to carry out the proposed amendment to treat and stage waste solids contained in steel drums.

If you have any questions regarding this matter, please contact the undersigned at 204-250-7645 or cory.graham@gov.mb.ca.

Yours sincerely,

Tracey Braun

Tracey Braun, M.Sc.
Director
Environmental Approvals Branch

c: D. Labossiere, Y. Hawryliuk, T.Kneeshaw, Environmental Compliance and Enforcement
Citizen Liaison Committee
Manitoba Hazardous Waste Management Corporation
Public Registries

APPENDIX H

EXPANSION TO PROCESSING CELL 5 AREA

Manitoba
Sustainable Development
Environmental Stewardship Division
Environmental Approvals Branch
1007 Century Street, Winnipeg, Manitoba R3H 0W4
T 204 945-8321 F 204 945-5229
www.gov.mb.ca/sd

CLIENT FILE NO.: 3440.20

August 26, 2019

Mr. Dave Howes
Miller Environmental Corporation
1803 Hekla Ave.
Winnipeg, MB R2R 0K3

Dear Mr. Howes:

Re: Expansion to Processing Cell Area – Dangerous Goods Handling and Transportation Act Licence 58 HW S2 RRRR

Thank you for your June 12, 2019 letter and Notice of Alteration application regarding Licence 58 HW S2 RRRR. The request is to allow for expansion of the Processing Cell Area (Cell 5) and development of a separate sludge bin area for bulk unloading to decant liquids prior to treatment. It is noted there is no change in the processes occurring on site.

Upon review of the amendment request, with the additional information provided, the submission satisfies the requirements of Licence 58 HW S2 RRRR regarding Storage and Treatment of Bulk Material and sludge. I have concluded that the environmental effects of the proposed alterations will be insignificant, and, therefore, you are hereby authorized to carry out the proposed amendment to develop the additional capacity for processing and waste management subject to the following terms and conditions:

1. Construction and operation of the storage and treatment of bulk material and sludge cells shall be carried out in accordance with Clauses 30 to 39 of Licence 58 HW S2 RRRR;
2. Receipt of approval for use for the cell and bins from an Environment Officer is required prior to commissioning the new storage areas in accordance with Clause 35; and
3. As Constructed Drawings shall be submitted to the Department before December 1, 2019.

Please be advised that this approval is contingent on the acceptance of a revised Dangerous Goods Handling and Transportation Act Licence that will be issued in the near future. If you have any questions regarding the revised licence, please contact Ms. Cory Graham, Environmental Engineer at 204-250-7645 or by electronic mail at cory.graham@gov.mb.ca.

Yours sincerely,

Siobhan Burland Ross, M.Eng., P. Eng.
Director
The Dangerous Goods Handling and
Transportation Act

c: S. Kohler/T. Kneeshaw, Environmental Compliance and Enforcement
Citizen Liaison Committee
Manitoba Hazardous Waste Management Corporation
Public Registries

APPENDIX I

APPROVAL FOR RELEASE OF THE NORTH POND

Chelsey Gulak

From: Dave Howes
Sent: Thursday, October 10, 2019 4:53 PM
To: Paul Bauer; Yolo Ortiz; William Shannon
Cc: Richard Fontaine
Subject: Fwd: Retention Pond Discharge - file 3440.20

Importance: High

Hi guys,

Below is our approval for release of the north pond. Thanks.

Dave Howes
Director of Regulatory Affairs
Miller Environmental Corporation
ISO 9001 & 14001 & OHSAS 18001
Direct: 204π925π9604 Mobile: 204π771π2004

www.millerenvironmental.ca

Sent from my Samsung Galaxy smartphone.

ππππππππ Original message ππππππππ
From: "Graham, Cory (SD)" <Cory.Graham@gov.mb.ca>
Date: 2019π10π10 2:37 p.m. (GMTπ06:00)
To: Dave Howes <daveh@millerenvironmental.mb.ca>
Cc: "Friesen, Cordella (SD)" <Cordella.Friesen@gov.mb.ca>, "Hawryliuk, Yvonne (SD)" <Yvonne.Hawryliuk@gov.mb.ca>, "Burland Ross, Siobhan (SD)" <Siobhan.BurlandRoss@gov.mb.ca>, "Kohler, Shannon (SD)" <Shannon.Kohler@gov.mb.ca>, "Kneeshaw, Tyler (SD)" <Tyler.Kneeshaw@gov.mb.ca>
Subject: FW: Retention Pond Discharge π file 3440.20

Good Afternoon Dave,

Department Staff have reviewed the language of the licence and the request received October 10, 2019 to discharge a portion of the surface water pond, also referred to as the 'large retention ponds' or 'north pond' in order to prevent overtopping or structural damage.

As the large retention pond contains surface water, and not wastewater, the pond may be lowered in a controlled manner, in accordance with Clause 76 of Licence 58 HW S2 RRRR, effectively immediately.

Correspondence from the department will follow.

Regards,

Fru| #Udkdp /#S 1Hqj1

Phone: (204) 250-7645
Fax: (204) 945-5229

From: Dave Howes <daveh@millerenvironmental.mb.ca>
Sent: October 10 19 9:39 AM
To: +WPG530 Environmental Approvals Branch Director (SD) <EABDirector@gov.mb.ca>
Cc: Paul Bauer <paulb@millerenvironmental.mb.ca>; Yolo Ortiz <yoloo@millerenvironmental.mb.ca>
Subject: Retention Pond Discharge

Hi Cordella,

As per your conversation with Paul this morning, attached is Miller's request for discharge of our retention pond. If you have any questions or concerns, please feel free to contact me at your convenience. Thanks.

Dave Howes
Director of Regulatory Affairs
Miller Environmental Corporation
ISO 9001 & 14001 & OHSAS 18001
1803 Hekla Avenue, Winnipeg, MB R2R 0K3
Direct: 204-925-9604 Mobile: 204-771-2004

Hazardous Waste Management ◆ Emergency Response Services ◆ Specialty Recycling ◆ Soil Treatment ◆ PCB Management ◆ Confined Entry ◆ Training ◆ Project Management ◆ Chemical & Container Supply ◆ Tank Pump/Clean Out ◆ Container Cleaning ◆ Roll-off Services ◆ Plastic Recycling ◆ Custom Designed Bins

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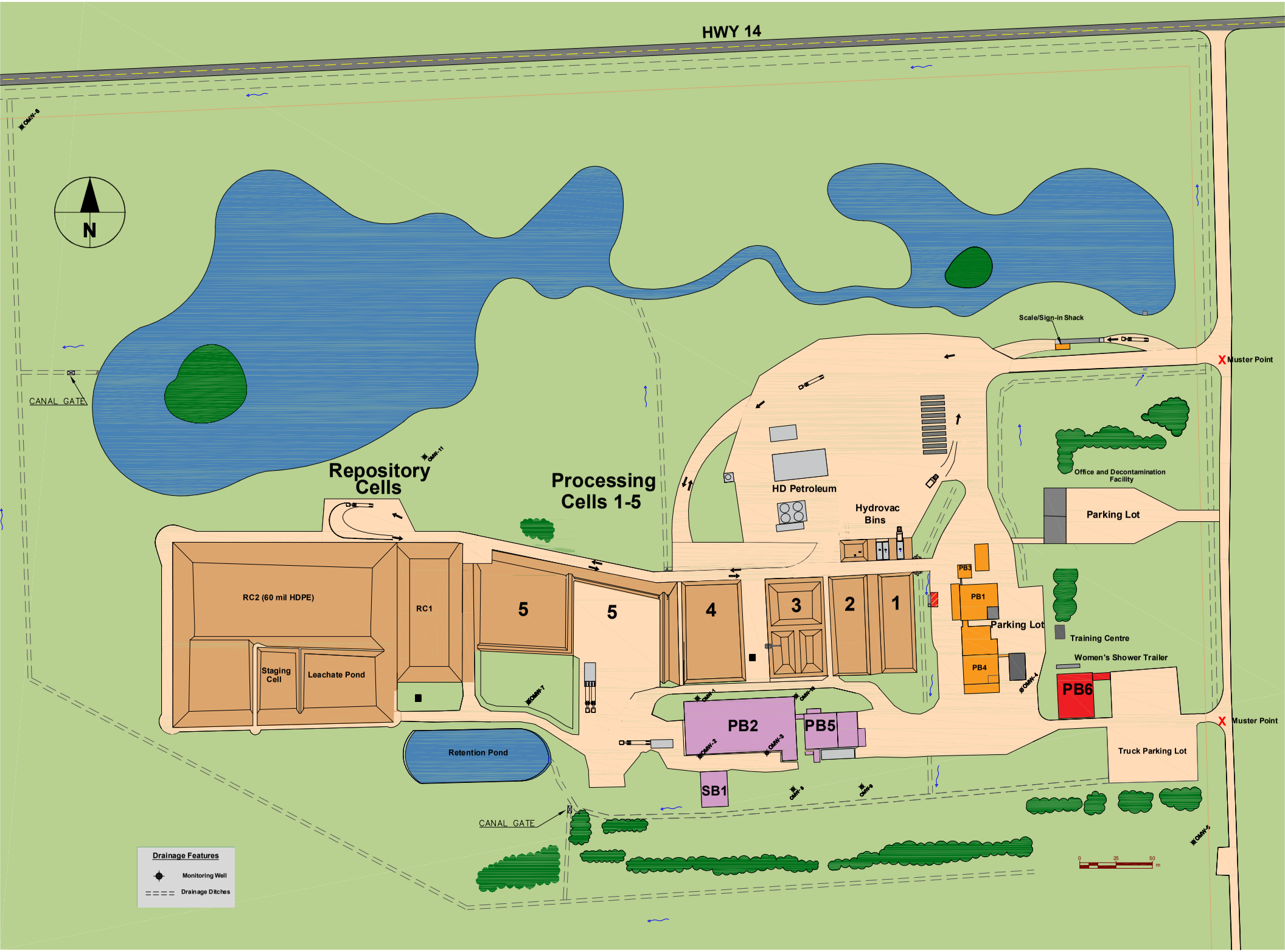
APPENDIX J

SITE MAP


HWY 14
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Repository Cells
Processing Cells 1-5
RC2 (60 mil HDPE)
RC1
Staging Cell
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Retention Pond
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HD Petroleum
Hydrovac Bins
Scale/Sign-in Shack
Office and Decontamination Facility
Parking Lot
Parking Lot
Training Centre
Women's Shower Trailer
PB1
PB2
PB3
PB4
PB5
PB6
SB1
Truck Parking Lot
Muster Point
Muster Point
CANAL GATE
Drainage Features
Monitoring Well
Drainage Ditches
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APPENDIX K

DILLON CONSULTING 2019 ENVIRONMENTAL GROUNDWATER PROGRAM

DILLON CONSULTING

MILLER ENVIRONMENTAL CORPORATION

2019 Site Monitoring Report

Manitoba Environmental Centre (MEC)
Rural Municipality of Montcalm

April 2020 – 19-1255

April 19, 2020

1558 Willson Place
Winnipeg, Manitoba
Canada
R3T 0Y4
Telephone
204.453.2301
Fax
204.452.4412

aλffŜℕ 9yØλℕ2yYŜyűl·f /2ℕLJ2ℕl·ə2y
1803 Hekla Avenue
Winnipeg, Manitoba
R2R 0K3

Miller ***Environmental Corporation*** – 2019 Site Monitoring Report – Manitoba Environmental Centre (MEC) Facility, Rev 1

Dear Mr. Dave Howes:

5λff2y /2yãdzfəyƎ [λYλűŜŘ λă LJfŜl·ăŜŘ ű2 LJℕ2ØλŘŜ è2dz ø λűK the 2019 Site Monitoring Final Report ₮2ℕ űKŜ aλffŜℕ 9yØλℕ2yYŜyűl·f /2ℕLJ2ℕl·ə2yΦ

{K2dzfŘ è2dz Kl·ØŜ l·yề ₮dzℕűKŜℕ IjdzŜăə2yã 2ℕ Ŏ2YYŜyűăΣ LJfŜl·ăŜ Ŏ2yűl·Ŏű űKŜ dzyŘŜℕăλƎyŜŘ at your convenience.

Sincerely,

DILLON CONSULTING LIMITED

For:

Nanci Beaupre, C.E.T.
Project Manager

NLB:lw

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Figure 3: DNƨdzyŘøl·úŜN Cfƨø 5ʎNŜǒəƨy˝– August 16, 2019

Figure 4: DNƨdzyŘøl·úŜN Cfƨø 5ʎNŜǒəƨy˝– August 22, 2019

Figure 5: Groundwater Exceedances 2019

Tables, Appended

Table 1: Groundwater Monitoring Results

Table 2: DNƨdzyŘøl·úŜN !yl·fèəǒl·f wŜădztűă

Table 3: lʎăúƨNʎǒl·f DNƨdzyŘøl·úŜN !yl·fèəǒl·f wŜădztűă

Table 4: Groundwater Laboratory QA/QC Results

Appendices

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References

Executive Summary

5λff2ƴ /2yãdzfəyƎ [λƳλűŜŘ ó5λff2yŭ ø l·ă ₦ŜűI·λySŘ ōè űKŜ aλftŜ₦ 9yØλ₦2yƳŜyűI·f /2₦LJ2₦I·ə2ƴó aλftŜ₦ù ű2 conduct groundwater monitoring and sampling in accordance with their environmental licence No. 58 HW S2 RRRR at the Manitoba Environmental Centre (MEC) site which is located 8 km south of {ű¢ WŜl·ƴ . l·LJəăűŜΣ a l·yλű2ōI·Σ λƴűKŜ wdz₦I·f a dzyλÖλLJI·fλűè ówφ a¢ù 2₮ a2yűÖI·fƳ¢

As part of the 2019 Groundwater Program, Dillon evaluated the applicable guidelines for the Ǝ₦2dzyŘøl·ű$₦ l·ű űKŜ ₮l·Ölλf‰è ¢KŜ ƎdzλŘŜfλyŜ ăŜfŜÖə2ƴøl·ă ōl·ăŜŘ 2ƴ a l·yλű2ōl· {dzăűI·λyl·ōfŜ 5ŜØŜf2LJƳŜyű DdzλŘl·yÖŜ Ř2ÖdzƳŜyűă øKλÖK λyÖfdzŘŜŘ űKŜ hyűI·₦λ2 aλyλăú₦è 2₮ 9yØλ₦2yƳŜyűΣ /2yãŜ₦ØI·ə2ƴl·yŘ tl·₦ł ă (formerly known as the Ministry of the Environment) Soil, Ground Water and Sediment Standards for groundwater in the absence of groundwater being used for drinking water purposes, agricultural water, λ₦₦λƎl·ə2ƴ2₦ ōŜλyƎ ŘλăÖKI·₦ƎŜŘ λyű2 l· ₮₦ŜăKøl·ű$₦ l·ljdzI·əÖ fλ₮Ŝ ₦ŜÖŜLJű2₦¢

Dillon conducted groundwater monitoring and sampling from August 16 to 28, 2019.

The eleven (11) monitoring wells on site were sampled for BTEX, inorganic metals (arsenic, cadmium, ÖK₦2Ylλdz Yl Ö2LJLJŜ₦Σ fŜl·ŘΣ YlŜ₦ÖdzN‰Σ yλÖł$fΣ l·yŘ Îλyűú l·yŘ ₦2dzəyŜ l·yl·fèăλă óLJ l Σ Öl·fÖλdzYlΣ Yl·ƎySăλdzYlΣ sodium, potassium, chloride, nitrate, sulphate, total organic carbon and total dissolved solids). Overall űKŜ Yl2yűú2₦λyƎ λƴ нлмφ Ö2yŬ₦Yl ă l· ăűl·ōfŜ ú₦ŜyŘ ₮2₦ űKŜ l·yl·fèăŜŘ LJI·₦I·YlŜűŜ₦ăΣ øλúK űKŜ ŜÈÖŜLJə2ƴ2₮ monitoring well OW-10; the remaining wells were below the applicable groundwater guidelines for the site. Monitoring well OW-млΣ øKλÖK øl·ă λyăűl·ffŜŘ λƴ нлмтΣ Ö2yűI·λySŘ l· ă2ŘλdzY Ö2yÖŜyú₦I·ə2ƴƎ₦ŜI·ű$₦ than the applicable guideline in 2019. However, this is consistent with 2017 and 2018 results. Though there are no applicable referenced guidelines available for sulphate, it should be noted that sulphate Ö2yÖŜyú₦I·ə2yã l·₦Ŝ l·fă2 ŜfŜØl·ű$Ř l·ú h ² -10. The elevated total dissolved solids (TDS) may be correlated ű2 űKŜ ŜfŜØl·ű$Ř ă2Řλdzl· l·yŘ ădzfLJKl·ű$ Ö2yÖŜyú₦I·ə2yã 2ōăŜ₦ØŜŘ l·ú úKλă f2Öl·ə2ƴ l·yŘ ăK2dzfŘ ōŜ Y2yλű2₦ŜŘ λƴűKŜ yŜÈű l·yƴdzl·f ăl·YlLJfλyƎ LJ₦2Ǝ₦I·Y ű2 Ŝyãdz₦Ŝ ăűl·ōfŜ Ö2yŘλə2yã¢

Based on the Ündings of the 2019 Groundwater Monitoring Program, groundwater at the facility is in compliance with their License requirements. The next groundwater monitoring event should be conducted in 2020.

1.0 Introduction

5λtf2ϒ /2yãdzfəyƎ [λϒλűŜŘ ó5λtf2yû ø l·ă ₪ŜűI·λyŜŘ ōè űKŜ aλffŜ₪ 9yØλ₪2yϒŜyűl·f /2₪LJ2₪I·ə2ϒó aλffŜ₪ûΣ ű2 complete the 2019 annual groundwater monitoring program (eleven (11) total monitoring well f2ŎI·ə2yãú I·ű űKŜ a I·yλű2ōI· 9yØλ₪2yϒŜyűl·f /ŜyűŵŜ ó a 9 /ú λϒűKŜ wdz₪I·f a dzyλŎλLJI·fλűè ówφ a φú 2Ŧ a2yűŎI·fϒφ

The MEC Facility is a hazardous and industrial waste processing and transfer facility, located l·LJLJ₪2ÈλϒI·ûŜfè y]ϒ ă2dzűK 2Ŧ {úφ ₩ŜI·ϒ . I·LJəăűŜΣ a I·yλű2ōI·Σ λϒűKŜ wφ a φ 2Ŧ a2yűŎI·fϒφ ¢KŜ Df2ōI·f t2ăλə2yλyƎ {èăűŜϒ óDt{ú Ŏ22₪ŘλyI·ûŜă 2Ŧ űKŜ ăλűŜ λϒ ¦ yλØŜ₪ăI·f ¢₪I·yãØŜ₪ăŜ aŜ₪ŎI·û2₪ I·₪Ŝ мп ¦ снлонп Ϋ 9 5449693 m N. The general layout of the site is shown in Figure 1 (appended).

The facility operates under licence No. 58 HW S2 RRRR, issued by Manitoba Sustainable Development (MSD), Environmental Approvals Branch.

2.0 2019 Monitoring Program

Dillon conducted the Groundwater Monitoring for the MEC Facility as per Clause 83 of the Licence No. 58 HW S2 RRRR, dated November 3, 2015 (Client File Number 3440.20). As per Clause 83, the groundwater monitoring program should be completed annually. Dillon conducted the groundwater monitoring program from August 16 to August 28, 2019.

3.0 Methodology

3.1 Health and Safety Plan

! ISI·fűK I·yŘ {I·ŦŜűè óI ɜ{ú tfI·y´øI·ă LJNŜLJI·NŜŘ Ŧ2N űKŜ ƛyØŜăəƎI·əƨy´I·yŘ ŜÈLJfI·ƛyŜŘ ű2 I·LJLJN2LJNƛI·űŜ personnel. While details of the H&S Plan are not presented within this report, the fundamental purpose 2Ŧ űKŜ LJfI·y´øI·ă ű2 ƛŘŜyəŦè I·yŘ Yƛə∃I·űŜ KI·Î I·NŘă I·ăă2ŎƛI·ûŜŘ øƛűK ø2N˺ƛy∃ I·N2dzyŘ I·y´ƛyŘdzăűNƛI·f ŦI·Ŏƛfƛűès I·yŘ LJ2űŜyəI·f Ŏ2yűI·Yƛy1·əƨy´ŜÈLJ2ădzNŜ NƛăˬăΦ ¢KŜ I ɜ{ tfI·y´ƛyŎfdzŘŜŘ 5ƛff2y˺ă ăűI·yŘI·NŘ ŎKŜŎ˺fƛăű ƛŘŜyəŦèƛy∃ ăƛűŜ KI·Î I·NŘă I·ăă2ŎƛI·ûŜŘ øƛűK I·y´ŜyØNN2yYŜyűI·f ƛyØŜăə∃I·əƨy I·yŘ NŜfƛI·yŎŜ ƨy´5ƛff2y˺ă standard Ŭeld procedures. Field personnel reviewed the H&S Plan and signed oũ prior to the start of the LJN2Ǝ3NI·Y˙Φ 5ƛff2y´I·fă2 LJI·N∃əŎƛLJI·ûŜŘ ƛy´ aƛffŜN˺ă I ɜ{ tfI·y´Ŧ2N űKŜ ŦI·Ŏƛfƛűè ƛyŎfdzŘƛyƎ NŜØƛŜøƛy∃ űKŜƛNJ I ɜ{ requirements and signing oũ prior to the start of the program.

3.2 Groundwater Sampling

Monitoring wells OW-1 through OW-11 (referenced as OWM's within the environmental licence) were Yƨyűƨ2NŜŘ I·yŘ LJdzN∃ŜŘ ƨy´ ! dz∃dzăű mcΣ нлмфΣ dzăƛy∃ ² I·ûŜNJNI· ûdzōƛy∃Φ 9I·ŎK øŜff øI·ă LJdzN∃ŜŘ Ŏ2yăŜŎdzəØŜtè dzyəf űKNŜŜ óoú øŜff Ø2fdzY´Ŝă 2Ŧ øI·ûŜN øŜNŜ NŜY´2ØŜŘΣ 2N dzyəf úKŜ øŜff øI·ă ŘNè˺ hōăŜNØI·əƨyă 2Ŧ űKŜ physical appearance of the purge water were noted.

Monitoring wells OW-1 through OW-11 were sampled on August 22 or 28, 2019, for benzene, toluene, ethylbenzene and xylenes (BTEX), inorganic metals (arsenic, cadmium, chromium, copper, lead, YˆŜNŎdzNè˺Σ yƛŎ˺ŜfΣ I·yŘ Îƛy0ú I·yŘ N2dzəyŜ I·yI·fèăƛă óLJ I Σ ŎI·fŎƛdzY´Σ Y´I·∃yŜăƛdzY´Σ ă2ŘƛdzY´Σ LJ2űI·ăăƛdzY´Σ ŎKf2NƛŘŜΣ nitrate, sulphate, total organic carbon, total dissolved solids). The groundwater samples were collected I·yŘ LJNŜăŜNØŜŘ ōè fI·ō2NJI·ű2Nè LJN2ØƛŘŜŘ LJNŜăŜNØI·əØŜă I·yŘ Ŏ2yűI·ƛyŜNăΦ ¢KŜ ∃N2dzyŘøI·ûŜN ăI·Y´LJfƛy∃ f2ŎI·əƨyã I·NŜ ăK2øy´2y´Figure 2 (appended).

The groundwater monitoring program was completed in accordance with Clause 83 of the License NŜIjdzƛNŜY´ŜyűăΦ Ly´I·ŘŘƛəƨyΣ ∃N2dzyŘøI·ûŜN Yˆ2yűƨ2NƛyƎ øŜffă h ² -8 to OW-11 were added to the groundwater monitoring network in 2017.

3.3 Quality Assurance and Quality Control

The following Quality Assurance/Quality Control (QA/QC) procedures were employed during the Ŭeld ƛyØŜăə∃I·əƨy´LJN2Ǝ3NI·YˆY

- DN2dzyŘøI·ûŜN Yˆ2yűƨ2NƛyƎ ŜIjdzƛLJY´Ŝyű øI·ă ŎfŜI·yŜŘ øƛűK !fŎ2y2È ă2fdzəƨy´I·ĐDŜN ŜI·ŎK Yˆ2yűƨ2NƛyƎ øŜff was completed;
- Groundwater samples were collected by a qualiŬed Ŭeld technician wearing disposal single-use nitrile gloves;
- Samples were collected by placing groundwater samples into laboratory-supplied containers;

- LY'YŜŘλI·ΰŜfè I·ĐŜℕ Ŏ2ffŜŎə2yΣ ∃ℕ2dzyŘøI·ΰŜℕ ăI·Y'LJfŜăΣ λyŎfdzŘλy∃ ŬŜfŘ ŘdzLJfλŎI·ΰŜăΣ øŜℕŜ LJfI·ÔŜŘ λy'I· Ŏ2ƶfŜℕ on ice and delivered to Bureau Veritas Laboratories (BV Labs) in Winnipeg, Manitoba;
- Field duplicates were labelled in the Ŭeld in such a manner that the lab was blind to the original groundwater sample as a QA/QC measure;
- A chain-of-custody form was completed and included in each sample cooler;
- BV Labs is an accredited laboratory under the Standards Council of Canada for the required analyses I·yŘ ₮2ff2øŜŘ ăΰI·yŘI·ℕŘ I·yl·fèəŎI·f LJℕ2ŎŜŘdzℕŜă ₮2ℕ ΰKŜ I·yl·fèăŜă 2₮ ΰKŜ ăI·Y'LJfŜăT I·yŘΣ
- {I·Y'LJfŜă øŜℕŜ ŜĖΰℕI·ŎΰŜŘ I·yŘ I·yl·fèÎŜŘ ōè ΰKŜ fI·ō2ℕI·ΰ2ℕè øλΰKλy'ΰKŜ ℕŜŎ2Y'YŜyŘŜŘ K2fŘλy∃ əY'Ŝă ₮2ℕ each parameter analyzed unless notes in {ŜŎə2y'c¢n.

5λff2y'ℕŜØλSøŜŘ ΰKŜ ŬŜfŘ ŘdzLJfλŎI·ΰŜ ℕŜădzfΰă¢ wŜfI·əØŜ LJŜℕŎŜyΰI·∃Ŝ ŘλũŜℕŜyŎŜă ówt5ύ øŜℕŜ ŎI·fŎdzfI·ΰŜŘ between primary samples and corresponding blind Ŭeld duplicate samples. Comparison of Ŭeld ŘdzLJfλŎI·ΰŜă ₮2ℕ ăI·Y'LJfŜă øλΰK ℕŜădzfΰă ∃ℕŜI·ΰŜℕ ΰKI·y'ŬØŜ ópύ əY'Ŝă ΰKŜ ŘŜΰŜŎə2y'fλY'λΰă øŜℕŜ Ŏ2yãλŘŜℕŜŘ I·ŎŎŜLJΰI·ōfŜ λ₮ wt5 øI·ă fŜăă ΰKI·y'o£ƒ I·yŘ λ₮ 2yŜ 2₮ ΰKŜ ℕŜădzfΰă øI·ă fŜăă ΰKI·y'ŬØŜ ópύ əY'Ŝă ΰKŜ ŘŜΰŜŎə2y' limit. RPDs were also considered acceptable if the absolute diũerence was less than the value of the ŘŜΰŜŎə2y'fλY'λΰ¢

The Sample analysis was performed by BV Labs, located in Winnipeg, Manitoba. BV Labs implemented an internal QA/QC program including laboratory duplicates, method blanks and matrix spikes to ensure data quality and integrity. BV Labs is an accredited laboratory under the Standards Council of Canada ₮2ℕ ΰKŜ ℕŜIjdzλℕŜŘ I·yl·fèăŜă I·yŘ ŘŜΰI·λfă 2y'ΰKŜ fI·ō2ℕI·ΰ2ℕè I·yŘ I·yl·fèəŎI·f Y'ŜΰK2Řă LJŜℕ₮2ℕY'ŜŘ I·ă øŜft I·ă details of BV Labs QA/QC procedures are presented in the laboratory reports in Appendix A.

5I·ΰI· Ŏ2ffŜŎΰŜŘ λy'ΰKŜ ŬŜfŘ øI·ă ΰℕI·yãÕℕλōŜŘ ΰ2 ădzY'YI·ℕè ŘI·ΰI· ΰI·ōfŜăΣ I·ĐŜℕ øKλŎK ΰKŜ ŘI·ΰI· øŜℕŜ Ŏ2yŬℕY'ŜŘ I·∃I·λyãΰ ŬŜfŘ y2ΰŜă¢ !yl·fèəŎI·f ŘI·ΰI· øŜℕŜ ℕŜŎŜλØŜŘ ₮ℕ2Y' .± [I·ōă ō2ΰK λy'KI·ℕŘ Ŏ2LJè I·yŘ ŜfŜŎΰℕ2yλŎ ₮2ℕY'I·ΰ¢ Data were transferred electronically to a database (ESdat) for analysis in excel spreadsheets and conŬrmed against the laboratory reports.

The QA/QC procedures are intended to demonstrate that samples collected and tested adequately ℕŜLJℕŜăŜyΰ Ŏ2yŘλə2yã I·ΰ ΰKŜ ăλΰŜ¢

4.0 Field Observations

4.1 Groundwater Monitoring

Groundwater levels were measured on August 16, 2019, and again during the sampling program on ! dzƎdzăű нн нлмфф DNƩdzyŘøl·úŜN fŜØŜf YŜl·ădzNŜYŜyűă øŜNŜ ƛyƛəl·ffè NŜÕƩNŘŜŘ ƛyYŜúNŜă ōŜfƩø úKŜ úƩLJ Ʃŧ casing (mbTOC) units and then converted to metres below ground surface (mbgs) and metres above sea level (masl) based on the benchmark established during the topographic survey conducted by Altus DŜ2Yl·əŏă ƛyнлмтф DN2dzyŘøl·úŜN fŜØŜfă Nl·yƎŜŘ ŦN2Y мфрн YōƎă ƛyh ² -4 to 4.18 mbgs in OW-5 (August 16, 2019) and 1.120 OW-9 to 5.950 mbgs in OW-2 (August 22, 2019). These levels corresponded úƩ ƎN2dzyŘøl·úŜN ŜfŜØl·ə2yã 2ŧ ноуфпуп Yl·ăf óh ² -4) to 235.488 masl (OW-5) on August 16, 2019, and 237.722 masl (OW-9) and 234.750 masl (OW-нúф ¢KŜ ƎN2dzyŘøl·úŜN bƩø ŘƛNŜÕə2yōl·ăŜŘ ƩyúKŜ August нлмф LJNƩƎNl·Y ƛă ƛyŘŜúŜNYƛyl·úŜф I ƛƎKŜN ƎN2dzyŘøl·úŜN ŜfŜØl·ə2yã l·LJLJŜl·N úƩ ƩŎŎdzN ƛyúKŜ ŎŜyűNNl·f area of the site near the Process Buildings (PB2 and PB5) followed by a radial bow towards the northwest and southeast. The process buildings may be inbuencing the local groundwater bow ŘƛNŜÕə2yã l·yŘ Yl·è ōŜ LJNŜØŜyəyƎ úKŜ ŘŜúŜNYƛyl·ə2yƩ2ŧ l·yƩØŜNl·ff ƎN2dzyŘøl·úŜN bƩø ŘƛNŜÕə2yф ¢KŜ groundwater bow contours are shown in Figure 3 and Figure 4 (appended) for the August 22 and August ну øl·úŜN fŜØŜf YŜl·ădzNŜYŜyűăƩ NŜăLJŜÕəØŜfèф ¢KŜ ŜÈLJŜÕúŜŘ NŜƎƛ2yl·f ƎN2dzyŘøl·úŜN bƩø ŘƛNŜÕə2yƛă to the east towards the Red River based on available groundwater maps for the area. Groundwater levels are presented in the appended Table 1 (appended).

CƛŜfŘ YŜl·ădzNŜYŜyűă 2ŧ LJ I Σ Õ2yŘdzÕəØƛúèΣ úŜYLJŜNl·údzNŜ l·yŘ 2ÈƛŘl·ə2yNŜŘdzÕə2yLJ2úŜyəl·f óhwtú øŜNŜ NŜÕƩNŘŜŘ dzăƛyƎ l· Ŏl·fƛōNl·úŜŘ l ƩNƛōl· a dzfə-Parameter water quality meter. Groundwater Ŭeld measurements were collected during groundwater sampling. A review of the results indicated:

- pH ranged from 6.26 (OW-9) to 7.45 (OW-5);
- /2yŘdzÕəØƛúè Nl·yƎŜŘ ŦN2Y мфрл Y{кÕY óh ² -11) to 25.70 mS/cm (OW-10);
- Temp ranged from 7.45°C (OW-5) to 13.21°C (OW-7); and,
- ORP ranged from -93.0 mV (OW-9) to 191.0 (OW-3).

Groundwater quality parameters are provided in Table 1 (appended).

5.0 Regulatory Guidelines

5.1 Land Use

¢KŜ hyűlŀ№λ2 aλyλăű№è 2₮ 9yØλ№2yYˆŜyűΣ /2yãŜ№ØlŀəƨyˆlŀyŘ tlŀ№ℓă ó a 9/ tú {2λfΣ D№2dzyŘ ² lŀűŜ№ lŀyŘ {ŜŘλYˆŜyű Standards outline guidelines for the environmental quality of a site based upon the land use at the subject site. Land use is assigned according to the following categories: Industrial, Commercial, wŜăλŘŜyəlŀfktlŀ№ℓflŀyŘ lŀyŘ ! Ǝ№λÕdzfűdz№lŀf¢ . lŀăŜŘ 2yˆűKŜ ÕdzN№Ŝyű flŀyŘ dzăŜ lŀă lŀyˆλyŘdzăú№λlŀf ₮lŀÕλfλűè ØλűK restricted access to the general public, the land use is classiÙed as Industrial.

5.2 Receptors

! ō№λŜ₮ 2ØŜ№ØλŜØ 2₮ űKŜ LJ2űŜyəlŀf №ŜÕŜLJű2№ă űKlŀű Yˆlŀè ōŜ lŀLJLJfλÕlŀōfŜ ű2 űKŜ ăλúŜ lŀyŘ űKŜ №lŀəƨylŀfŜ ₮2№ ăŜfŜÕəƨyˆ2№ LJlŀűKØlŀè ŜfλYˆλylŀəƨyˆlŀ№Ŝ ŘλăÕdzăăŜŘ λyˆTable 5-1 below.

Table 5-1: Exposure Pathway Summary Table

Exposure Pathway	Applicability	wlŀəƨylŀfŜ
Human Health Exposure Pathways		
Direct Contact	Yes	Areas of the site are accessible to the public and workers, and therefore ŜÈLJ2ădz№Ŝ ű2 űKŜ LJdzōfλÕ λă lŀ LJ2űŜyəlŀf¢
Vapour LyKlŀflŀəƨyˆ	Yes	The site contains an industrial building, which is expected to remain for the foreseeable future.
Potable Groundwater	No	The facility receives its potable drinking water from municipally supplied water. Lyˆlŀ ŘŘλəƨyΣ lŀ Ǝ№2dzyŘØlŀűŜ№ ØŜft ăŜlŀ№ÕK 2₮ űKŜ lŀ№Ŝlŀ λyŘλÕlŀűŜă űKlŀűlŀyˆlŀōăŜyÕŜ 2₮ Ř2YˆŜăəÕ ØlŀűŜ№ ØŜftă ØλűKλyˆpлл Yˆ ₮№2Yˆ űKŜ ăλúŜ¢
Ecological Health Exposure Pathways		
Ecological Soil Contact	Yes	The surface material at the site was mostly grass, topsoil or ŬIl with limited surface cover, plants and terrestrial invertebrates present in soils are applicable.
Groundwater Check – Livestock & L№N№λƎlŀəƨyˆ	No	Livestock watering was not expected to occur within 500 m from the site. In lŀŘŘλəƨyΣ lŀ Ǝ№2dzyŘØlŀűŜ№ ØŜft ăŜlŀ№ÕK 2₮ űKŜ lŀ№Ŝlŀ λyŘλÕlŀűŜă lŀyˆlŀōăŜyÕŜ 2₮ fλØŜăúƨÕℓ lŀyŘ ƛN№λƎlŀəƨyˆØlŀűŜ№ ØŜftă ØλűKλyˆpлл Yˆ 2₮ űKŜ ăλúŜ¢
Groundwater Check – ! ljdzlŀəÕ Life	No	The nearest surface water body is the Red River approximately 2.5 km to the Ŝlŀăű 2₮ űKŜ ăλúŜ¢ ! ă ădzÕKΣ űKŜ lŀljdzlŀəÕ fλ₮Ŝ LJlŀűKØlŀè Ølŀă yƨű lŀLJLJfλÕlŀōfŜ¢
Oũ-Site aƛƎ№lŀəƨyˆ/KŜÕℓ	Yes	t№2űŜÕəØŜ 2₮ Yˆ2№Ŝ ăŜyãλəØŜ flŀyŘ dzăŜă¢
Management Limits	Yes	t№2űŜÕəØŜ 2₮ Yˆ2№Ŝ ăŜyãλəØŜ flŀyŘ dzăŜă¢

The most stringent of the applicable guidelines presented above was used as the selected guidelines for ΰΚΣ ΰλύΣ Ι·yŘ Ι·ΝΝΣ LJΝΝΣΰΣyΰΣŘ λy˝ΰΚΣ Ι·LJLJΣyŘΣŘ ΞΝΝ2ΰzyŘøΙ·ΰΣΝΝ Ι·yΝ·fèəΟΙ·f ŘΙ·ΰΙ· ΰΙ·ōfΣäΦ

¢ΚΣ Ι·ääΣääY˝Σyΰ ΟΝΝλύΣΝΝλΙ· äΣfΣΟΰΣŘ ₮2ΝΝ Ο2Y˝LJΙ·ΝΝλä2y˝2₮ Ι·yΝ·fèəΟΙ·f ΝΝΣädzfΰä Ι·ΰ ΰΚΣ ΰλύΣ Ι·ΝΝΣ ΝΝΣ₮ΣΝΝΣyΟΣŘ Ι·yŘ described in more detail below.

Groundwater

- In the absence of potable drinking water the Ontario MECP Soil, Ground Water and Sediment Standards (April 15, 2011) ¢Ι·ōfΣ oʏ Cdzft 5ΣLJΰK DΣyΣΝΝλΟ {λΰΣ /2yŘλə2y˝{ΰΙ·yŘΙ·ΝΝŘä λy˝Ι· b2y-Potable DΝΝ2ΰzyŘøΙ·ΰΣΝΝ /2yŘλə2y˝KΙ·ØΣ ōΣΣy˝Ι·LJLJfλŠŘΦ

As per Table 5-1 groundwater from the site is not being used for drinking water purposes, agricultural øΙ·ΰΣΝΝλyƎΣ λΝΝΝλƎΙ·ə2y˝2ΝΝ ōΣλyƎ ŘλäΟΚΙ·ΝΝƎΣŘ λyΰ2 Ι· ₮ΝΝΣäKøΙ·ΰΣΝΝ Ι·IjdzΙ·əΟ fλ₮Σ ΝΝΣΟΣLJΰ2ΝΝΦ ¢ΚΣ ƎΰzλŘŠfλyΣ äΣfΣΟə2y˝ λä ōΙ·äŠŘ 2y˝ΝΝΣΟ2Y˝Y˝ΣyŘΙ·ə2yã ₮ΝΝ2Y˝ a{5 λyΟfΰzŘλyƎ ΰΚΣ !ääΣääY˝Σyΰ /ΝΝλΰΣΝΝλΙ· ₮2ΝΝ DΝΝ2ΰzyŘøΙ·ΰΣΝΝ óнлмсύ Ι·yŘ Standards for LandŬlls in Manitoba (2016). MSD's Assessment Criteria for Groundwater (2016) indicates that if there are no applicable criteria developed by CCME or Health Canada, therefore, MSD will accept ΟΝΝλύΣΝΝλΙ· ₮ΝΝ2Y˝ 2ΰΚΣΝΝ ä2ΰzΝΝλäŘλΟə2yã λyΟfΰzŘλyƎ hyύΙ·ΝΝλ2 a9/tΦ

6.0 Groundwater Sampling Results

6.1 Groundwater

Eleven (11) groundwater samples (OW-1 through OW-11) and one (1) Ŭeld duplicate were collected during the 2019 Groundwater Monitoring Program to determine the presence/absence of groundwater Ŏƨyűl·Yʎyl·əƨyˇl·ă ŁJŜℕ úĸŜ fl·ōƨℕl·úƨ℠è l·yl·fèăʎă ŘŜăÖℕʎōŜŘ ʎyˇTable 6-1 below.

Table 6-1: Summary of Groundwater Sampling and Sample Locations

Well ID		Sample Analytical	GPS Samples	
			Easting	Northing
1	OW-1	BTEX, Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Zinc, pH, Calcium, Magnesium, Sodium, Potassium, Chloride, Nitrate, Sulphate, Total Organic Carbon, Total Dissolved Solids	620129	5449651
2	OW-2	BTEX, Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Zinc, pH, Calcium, Magnesium, Sodium, Potassium, Chloride, Nitrate, Sulphate, Total Organic Carbon, Total Dissolved Solids	620131	5449611
3	OW-3	BTEX, Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Zinc, pH, Calcium, Magnesium, Sodium, Potassium, Chloride, Nitrate, Sulphate, Total Organic Carbon, Total Dissolved Solids	620177	5449612
4	OW-4	BTEX, Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Zinc, pH, Calcium, Magnesium, Sodium, Potassium, Chloride, Nitrate, Sulphate, Total Organic Carbon, Total Dissolved Solids	620353	5449656
5	OW-5	BTEX, Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Zinc, pH, Calcium, Magnesium, Sodium, Potassium, Chloride, Nitrate, Sulphate, Total Organic Carbon, Total Dissolved Solids	620471	5449552
6	OW-6	BTEX, Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Zinc, pH, Calcium, Magnesium, Sodium, Potassium, Chloride, Nitrate, Sulphate, Total Organic Carbon, Total Dissolved Solids	619663	5450045
7	OW-7	BTEX, Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Zinc, pH, Calcium, Magnesium, Sodium, Potassium, Chloride, Nitrate, Sulphate, Total Organic Carbon, Total Dissolved Solids	620013	5449648
8	OW-8	BTEX, Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Zinc, pH, Calcium, Magnesium, Sodium, Potassium, Chloride, Nitrate, Sulphate, Total Organic Carbon, Total Dissolved Solids	620187	5449586
9	OW-9	BTEX, Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Zinc, pH, Calcium, Magnesium, Sodium, Potassium, Chloride, Nitrate, Sulphate, Total Organic Carbon, Total Dissolved Solids	620242	5449589
10	OW-10	BTEX, Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Zinc, pH, Calcium, Magnesium, Sodium, Potassium, Chloride, Nitrate, Sulphate, Total Organic Carbon, Total Dissolved Solids	620193	5449653

Well ID		Sample Analytical	GPS Samples	
11	OW-11	BTEX, Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Zinc, pH, Calcium, Magnesium, Sodium, Potassium, Chloride, Nitrate, Sulphate, Total Organic Carbon, Total Dissolved Solids	619935	5449813

wŜØλŜø 2ŦűKŜ l·yl·fèəŎl·f ℕŜădztűă λyŘλŎl·űŜă űKl·ű l·ff ōdzű 2yŜ 2Ŧ űKŜ ∃ℕ2dzyŘøl·ûŜℕ ăl·YLJfŜă ădzōYλğŜŘ øŜℕŜ non-detect or below the applicable guidelines in the analyzed parameters.

Monitoring well OW-10 displayed the following exceedances to the applicable criteria:

- {2ŘλdzY øλűK l· Ŏ2yŎŜyűℕl·ə2y2Ŧ оолл Y∃к[ó∃dzλŘŜfλyŜ 2Ŧ нолл Y∃к[úΦ

Monitoring well OW-10 was installed in the spring of 2017 and the groundwater monitoring program øl·ă Ŏ2yŘdzŎûŜŘ λy űKŜ Ŧl·ff 2Ŧ нлмтΦ Ly нлмт l·yŘ нлмуΣ űKŜ ă2ŘλdzY Ŏ2yŎŜyűℕl·ə2yl·ű h ² -10 was 3100 mg/L, exceeding the guideline by 800 mg/L. In the last several years (2013 to 2016) sodium Ŏ2yŎŜyűℕl·ə2yã λy h ² -1 to OW-7 have ranged from 191 mg/L to 2080 mg/L. Future monitoring of the ă2Řλdz Ŏ2yŎŜyűℕl·ə2yã λy h ² -мл øλff LJℕ2ØλŘŜ l·ŘŘλə2yl·f Řl·úl· û2 ŜØl·fdzl·ûŜ ∃ℕ2dzyŘøl·ûŜℕ Ŏ2yŘλə2yã l·ű űKλă f2Ŏl·ə2yΦ

! ădzYYl·ℕè 2Ŧ ∃ℕ2dzyŘøl·ûŜℕ l·yl·fèəŎl·f ℕŜădztűă Ŧ2ℕ űKŜ fλŎŜyŎŜ LJl·ℕl·YŜûŜℕă l·ℕŜ ădzYYl·ℕλÎŜŘ λy űKŜ appended Table 2 (appended) and presented in Figure 5 ól·LJLJŜyŘŜŘúΦ ¢KŜ fl·ō2ℕl·û2ℕè ŎŜℕəŬŎl·ûŜ 2Ŧ l·yl·fèăλă λă l·ğl·ŎKŜŘ λy Appendix A.

6.2 Historical Comparison

Historical groundwater results are summarized in Table 3 ól·LJLJŜyŘŜŘúΣ ℕŜăLJŜŎəØŜfèΦ Dℕl·LJKλŎl·f ℕŜLJℕŜăŜyűl·ə2yã 2Ŧ űKŜ ûŜYLJ2ℕl·f Ŏ2yŎŜyűℕl·ə2yã l·ℕŜ ăK2øy Ŧ2ℕ ¦Ŝè λyŘλŎl·û2ℕ LJl·ℕl·YŜûŜℕă ól·ă ŘŜăŎℕλōŜŘ λy the License for the facility) in Appendix B.

Ly ŜØl·fdzl·əyƎ Øl·ℕλl·ə2yã ōŜűøŜŜy ènŜl·ℕăΣ λú ăă yƵûŜŘ úKl·ű úKŜ нлмт û2 нлмф ∃ℕ2dzyŘøl·ûŜℕ ăl·YLJfλyƎ programs were conducted for dissolved metals (Ŭeld Ŭltered) whereas previous sampling programs øŜℕŜ Ŏ2YLJfŜűŜŘ Ŧ2ℕ û2ûl·f YŜûl·fãΦ ! y l·yl·fèÎŜŘ ăl·YLJfŜ Ŧ2ℕ û2ûl·f YŜûl·fă λyŎfdzŘŜă ă2λf LJl·ℕəŎdzfl·ûŜă øλúKλy úKŜ ∃ℕ2dzyŘøl·ûŜℕ Yl·úℕλÈ l·yŘ ℕŜLJ2ℕúŜŘ Ŏ2yŎŜyűℕl·ə2yã l·ℕŜ KŜl·Øλfè Ŏ2ℕℕŜfl·ûŜŘ û2 ûdzℕōλŘλûè øλúKλy úKŜ ∃ℕ2dzyŘøl·ûŜℕ ăl·YLJfŜăΦ ¢KŜ Kλăû2ℕλŎl·f Y2yλû2ℕλyƎ LJℕ2∃ℕl·Y øl·ă Ŏ2yŘdzÔəyƎ l·ă LJŜℕ úKŜ tŜŜℕ wŜØλŜø 2Ŧ úKŜ 1997 to 2008 Annual Compliance Monitoring Data as completed by Pinchin Environmental Limited in нлмл l·yŘ øl·ă λyŎ2YLJfλl·yŎŜ ótλyŎKλy 9yØλℕ2yYŜyűl·fΣ нлмлúΦ l 2øŜØŜℕΣ ŎdzℕℕŜyű ōŜăű LJℕl·ŎəŎŜă λyŎfdzŘŜ úKŜ samples for metals to be Ŭeld Ŭltered using a 0.45 micron Ŭlter wherever possible (CCME 2016). {l·YLJfλyƎ Ŧ2ℕ Řλăă2fØŜŘ YŜûl·fă λă Y2ℕŜ ℕŜLJℕŜăŜyűl·əØŜ 2Ŧ úKŜ Y2ōλfŜ YŜûl·f LJl·ℕl·YŜûŜℕă øλúKλy úKŜ groundwater and is more consistent for comparison between sampling events. It is recommended that further monitoring occurs for dissolved metals.

aλffŜNΩă нлмс ! yγdzI·f hLJŜNI·ə2yã I·yŘ 9yØNN2yYŜyűI·f a2yλű2NλyE tN2ΞNI·Y λŘŜyəŬŜŘ űKŜ LJ2űŜyəI·f 2Ŧ λyŎNŜI·ăλyE ŎKN2Yλdz Ŏ2yŎŜyűNI·ə2yã λy h ² -3. Dillon's 2017 Environmental Program assisted in re-ŜØI·fdzI·əyE űKŜăŜ Ŏ2yŎŜyűNI·ə2yã űKN2dzΞK NŜŘŜØŜf2LJYŜyű 2Ŧ ΞN2dzyŘøI·ûŜN Y2yλű2NλyE øŜftăΣ ăI·YLJfλyE Ŧ2N dissolved instead of total metal parameters, and the re-ŜØI·fdzI·əy2Ŧ I·LJLJfλŎI·ōfŜ ŎNλűŜNλI·φ ! ă I· NŜădzfű 2Ŧ űKŜăŜ Y2ŘλŬŎI·ə2yã űKŜ ŎKN2Yλdz Ŏ2yŎŜyűNI·ə2y2Ŧ лφллнф YΞκ[I·yŘ űKŜ KŜÈI·ØI·fŜyű ŎKN2Yλdz Ŏ2yŎŜyűNI·ə2y2Ŧ ғлφллм λy h ² -3 remained below the applicable criteria of 0.81 and 0.14 mg/L NŜăLJŜŎəØŜfèφ Ly нлму űKŜ ŎKN2Yλdz Ŏ2yŎŜyűNI·ə2yã øŜNŜ φллптп YΞκ[I·yŘ λy нлмф űKŜ ŎKN2Yλdz Ŏ2yŎŜyűNI·ə2yã øŜNŜ лφллну YΞκ[Σ NŜY I·λyλyE ōŜf2ø űKŜ I·LJLJfλŎI·ōfŜ ŎNλűŜNλI· 2Ŧ лφум YΞκ[φ

DŜySNI·f 2ōăŜNØI·ə2yã ŦN2Y űKŜ ûŜYLJ2NI·f ΞNI·LJKă λyŎfdzŘŜY

- ¢KŜ ŜfŜØI·ûŜŘ fŜØŜfă 2Ŧ ăŜfŜŎű I·yl·fèəŎI·f LJI·NI·YŜűŜNă ădzŎK I·ă ă2ŘλdzY λy űKŜ NŜŎŜyűfè λyăűI·ffŜŘ Y2yλű2NλyE well OW-10 may be rebected of the elevated TDS experienced in this well;
- tI·NI·YŜűŜNăΣ øλúK űKŜ ŜÈŎŜLJə2y2Ŧ ă2Řλdz Y λy h ² -10, remain well below the applicable groundwater guidelines for the site; and
- I λăű2NλŎI·f úNŜyŘă ŘŜűŜNYλySŘ ŦN2Y űKŜ DNI·LJK 2Ŧ ¢SYLJ2NI·f DN2dzyŘøI·ûŜN /2yŎŜyűNI·ə2yã λyŘλŎI·ûŜŘ groundwater at the site is overall stable.

6.3 Field QA/QC Results

One (1) groundwater duplicate (OW-φ I·yŘ C5мú øŜNŜ ădzōYλğŜŘ I·ă LJI·Nű 2Ŧ űKŜ ŬŜfŘ v ! κv / LJN2ΞNI·Yφ The RPD for the groundwater duplicate was within the acceptable Quality Assurance ranges (i.e., RPD fŜăă úKI·y o‡ξ I·ú Ŏ2yŎŜyűNI·ə2yã ΞNŜI·ûŜN űKI·y ŬØŜ ópú əYŜă űKŜ ŘŜűŜŎə2y fλYλűúφ ! ădzYYI·N2è 2Ŧ űKŜ QA/QC RPD values are shown for groundwater in Table 4 (appended).

. I·ăŜŘ 2y ŬŜfŘ LJN2ŎŜŘdzNŜăΣ fI·ō2NI·û2Nè YŜűK2ŘăΣ ăI·YLJfλyE LJN2ΞNI·Y ŘŜăλΞy I·yŘ ŬŜfŘ 2ōăŜNØI·ə2yãΣ 5λff2y Ŏ2yŎfdzŘŜŘ úKI·ú úKŜ ΞN2dzyŘøI·ûŜN I·yl·fèəŎI·f NŜădzfűă øŜNŜ I·ŎŎŜLJúI·ōfŜ Ŧ2N űKŜ LJdzNLJ2ăŜă 2Ŧ úKλă Y2yλű2NλyE program.

6.4 Laboratory QA/QC Results

BV Labs conducted internal quality control tests using matrix spikes, spiked blanks, method blanks, ljdzI·fλűè Ŏ2yűN2f ăűI·yŘI·NŘă I·yŘ fI·ō ŘdzLJfλŎI·ûŜăφ ¢2 I·ăăŜăă úKŜ ljdzI·fλűè 2Ŧ űKŜ I·yl·fèəŎI·f ŘI·úI·Σ I· NŜØλŜø 2Ŧ úKŜ internal laboratory QA/QC results was completed and included a review of laboratory duplicate analysis, method blanks, surrogates, spike samples, and QA/QC standards. A review of BV Lab's Quality Control Report included in Appendix A indicated the following:

- ¢KŜ ŘŜűŜŎə2yfλYλűă øŜNŜ I·Ř2dzăűŜŘ λyăŜØŜNI·f ăI·YLJfŜă Řdz Ŝ û2 Řλfdzə2yűû2 ōNλyE I·yl·fèûŜ øλúKλyűKŜ calibrated range. Results of these parameters remained below the applicable guidelines; and,
- Matrix spikes exceeded the acceptance limits due to matrix interference. A reanalysis of the results yielded similar results.

. I·ăŜŘ 2yűKŜ ŘλăŎdzăăλ2y I·ō2ØŜ űKŜ I·yl·fèəŎI·f ŘI·úI· øŜNŜ Ŏ2yăλŘŜNŜŘ ØI·fλŘ I·yŘ NŜfλI·ōfŜ Ŧ2N űKŜ LJdzNLJ2ăŜ 2Ŧ this report.

7.0 Conclusion and Recommendations

The 2019 Groundwater Monitoring Program consisted of the groundwater monitoring and sampling of eleven (11) groundwater wells (OW-1 to OW-11) as per the requirements stated in the environmental licence for the facility. Based on a review of the monitoring program the following items are noted:

- !ˇŜØl·fdzl·əƨˇƨ₮ űĸŜ ∃dzλŘŜfλyŜ ăŜfŜŎəƨˇøl·ă ŎƨyŗdzŏűŝŘ ₮₴ℕ úĸŜ ăλűŜ l·yŘ øl·ă ōl·ăŜŘ 2ˇ a{5Ωă ∃dzλŘl·yŎŜ documents which included the Ontario MECP Soil, Ground Water and Sediment Standards for groundwater in the absence of groundwater being used as a for drinking water purposes, agricultural øl·ûŜℕƵ λNNλ∃l·əƨˇ2ℕ ōŜλyƎ ŘλăŎKl·ℕƎŜŘ λyűƨ l· ₮ℕŜăKøl·ûŜℕ l·ljdzl·əŎ fλ₮Ŝ ℕŜŎŜLJúƨ₴℗
- {ƨŘλdzY Ŏƨyŏŝyűℕl·əƨyã λyˇűĸŜ øŜft λŘŜyəŬŜŘ l·ă h ² -10 exceeded the applicable guidelines and these elevated levels are rebected in the elevated TDS experienced in this well. Sodium is a naturally occurring metal and as OW-10 and has had historical elevated levels in the 2017 and 2018 ∃ℕ2dzyŘøl·ûŜℕ Yˇƨyλúƨ₴ℕλyƎ LJNƨƎℕl·Yˇ℗ ¢KŜ ăƨŘλdzY Ŏƨyŏŝyűℕl·əƨyã ăK2dzfŘ ōŜ Yˇƨyλúƨ₴ℕŜŘ λyˇűĸŜ yŜÈú l·yyƃzl·f ∃ℕ2dzyŘøl·ûŜℕ Yˇƨyλúƨ₴ℕλyƎ LJNƨƎℕl·Yˇ űƨ Ŝyãdzℕŝ ăúl·ōfŝ Ŏƨyŗλəƨyã℗
- aλffŜ₴ăнлмс !yyƃzl·f hLJŜℕl·əƨyã l·yŘ 9yØλ₴ƨyYˇŜyűl·f aƨyλúƨ₴ℕλyƎ tℕƨƎℕl·Yˇ λŘŜyəŬŜŘ űĸŜ LJƨűŜyəl·f ƨ₮ λyŎ₴Ŝl·ăλyƎ ŎK₴ƨYλdzY Ŏƨyŏŝyűℕl·əƨyã λyˇh ² -3. Dillon's 2017 Environmental Program assisted in re-ŜØl·fdzl·əyƎ űĸŜăŝ Ŏƨyŏŝyűℕl·əƨyã úK₴2dzƎK ₴ŜŘŜØŜfƨLJYˇŜyű ƨ₮ ∃₴2dzyŘøl·ûŜℕ Yˇƨyλúƨ₴ℕλyƎ øŜftăΣ sampling for dissolved instead of total metal parameters, and the re-ŜØl·fdzl·əƨˇƨ₮ l·LJLJfλŎl·ōfŝ Ŏ₴λűŜ₴λl·℗ !ă l· ₴Ŝădzfű ƨ₮ űĸŜăŝ Yˇƨŗλŭŏl·əƨyãΣ úĸŜ ŎK₴ƨYλdzY Ŏƨyŏŝyűℕl·əƨˇƨ₮ л℗ллнф YˇƎк[l·yŘ űĸŜ ĸŜÈl·Øl·fŝyű ŎK₴ƨYλdzY Ŏƨyŏŝyűℕl·əƨˇƨ₮ ғл℗ллм λyˇ h ² -3 remained below the applicable criteria of 0.81 and 0.14 YˇƎк[₴ŜăLJŜŎəØŜfè℗ ¢Kλă YˇŜűK2Ř øl·ă ŎƨyˇəyƃzŝŘ λyˇнлму l·yŘ нлмф øKŜ₴ŝ űĸŜ ŎK₴ƨYλdzY Ŏƨyŏŝyűℕl·əƨyã øŜ₴ŝ л℗ллтп YˇƎк[λyˇнлму l·yŘ λyˇнлмф űĸŜ ŎK₴ƨYλdzY Ŏƨyŏŝyűℕl·əƨyã øŜ₴ŝ л℗ллну YˇƎк[Σ ₴ŜYˇl·λyλyƎ below the applicable criteria of 0.81 mg/L.
- D₴2dzyŘøl·ûŜℕ ăl·YˇLJfŜă ăK2dzfŘ Ŏƨyˇəyƃzŝ űƨ ōŜ ăl·YˇLJfŜŘ ₮₴ℕ Řλăă2fØŜŘ LJl·ℕl·YˇŜűŜ₴ăλyˇűĸŜ ySÈú l·yyƃzl·f groundwater monitoring program (2020).
- ¢KŜ ₴Ŝădzfűăƨ₮ űĸŜ Yˇƨyλúƨ₴ℕλyƎ LJNƨƎℕl·Yˇ ăK2dzfŘ ōŜ ădzōYˇλğŜŘ űƨ a{5 λyˇŎƨyŎdzNNŜyŎŜ øλúK űĸŜ [λŎŜyãŜ agreements.
- Review of sampling methodologies and applicable guidelines to the site should be periodically undertaken.

Based on the Ŭndings of the 2019 Groundwater Monitoring Program for groundwater, the facility is in compliance with their License requirements. The next groundwater monitoring event should be conducted in 2020.

8.0 Limitations

¢Kλă NŴŜLJƨNŰ ø l·ă LJNŴŜLJI·NŴŜŘ ŜÈÖfdzăλØŜfè ŦƨNJ ŰKŜ LJdzNŴLJƨăŜăΣ LJNŴƨ?ŜÖŰ l·yŘ ăλúŜ fƨÖl·əƨy´ƨdzúfλySŘ λy´ŰKŜ NŴŜLJƨNŰ¢ ¢KŜ NŴŜLJƨNŰ λă ōl·ăŜŘ ƨy´λyŦƨNJY l·əƨy´LJNŴƨØλŘŜŘ ű2Σ 2NJ 2ōŰIl·λySŘ ōè 5λtf2y´l·ă λyŘλÖl·ŰŜŘ λy´ŰKŜ NŴŜLJƨNŰΣ l·yŘ l·LJLJfλŜă ăƨfŜfè ű2 ăλúŜ Ö2yŘλəƨyã ŜÈλăəyƎ l·ű ŰKŜ əY´Ŝ 2Ŧ ŰKŜ ăλúŜ Øλăλú¢ ! fŰK2dzƎK l· NŴŜl·ăƨyl·ōfŜ λyØŜăəƎl·əƨy´ ø l·ă Ö2yŘdzÖŰŜŘ ōè 5λtf2yΣ 5λtf2yŴă λyØŜăəƎl·əƨy´ø l·ă yƨű ŜÈKl·dzăəØŜ l·yŘ Öl·yy?ű ōŜ Ö2yãúNŴdzŜŘ l·ă l· ÖŜNŴəŬÖl·əƨy´2Ŧ ŰKŜ l·ōăŜyÖŜ 2Ŧ l·yè Ö2yűl·Y´λyl·yűă ŦNƨY´ ŰKŜ ăλúŜ¢ wl·ŰKŜNΣ 5λtf2yŴă NŴŜLJƨNŰ NŴŜLJNŰŜăŜyűă l· NŴŜl·ăƨyl·ōfŜ NŴŜØλŜø 2Ŧ l·Øl·λtfl·ōfŜ λyƦƨNJY l·əƨy´øλúKλy´l·y´l·ƎNŴŜŜŘ ø?NJ¶ ăÖƨLJŜΣ ăÖKŜŘdzfŜ l·yŘ ōdzŘƎŜű¢ Lű λă ŰKŜNŴŜŦƨNŴŜ LJƨăăλōfŜ ŰKl·ű ÖdzNŴŜyűfè dzyNŴŜÖƨƎyλÎŜŘ Ö2yűl·Y´λyl·əƨy´ƨNJ LJƨúŜyəl·ffè Kl·Î l·NŘ2dză Y´l·ŰŜNλl·fă Y´l·è ŜÈλăű l·ű úKŜ ăλúŜΣ l·yŘ úKl·ű úKŜ fŜØŜfă 2Ŧ Ö2yűl·Y´λyl·əƨy´ƨNJ Kl·Î l·NŘ2dză Y´l·ŰŜNλl·fă Y´l·è Øl·Nè l·ÖN?ăă ŰKŜ ăλúŜ¢ CdzNŴúKŜNJ NŴŜØλŜø l·yŘ dzLJŘl·əyƎ 2Ŧ ŰKŜ NŴŜLJƨNŰ Y´l·è ōŜ NŴŜljdzλNŴŜŘ l·ă f2Öl·f l·yŘ ăλúŜ Ö2yŘλəƨyãΣ l·yŘ ŰKŜ NŴŜƎdzfl·Ű?Nè l·yŘ LJfl·yyλyƎ ŦNJl·Y´Ŝø?NJ¶ăΣ ÖKl·yƎŜ 2ØŜNJ əY´Ŝ¢

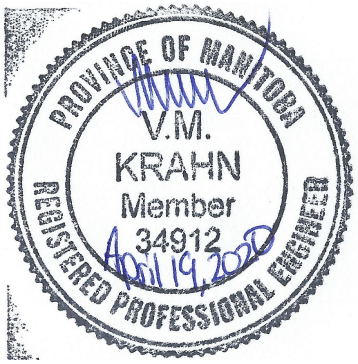
¢Kλă NŴŜLJƨNŰ ø l·ă LJNŴŜLJI·NŴŜŘ ōè 5λtf2y´Ŧ2NJ ŰKŜ ă2fŜ ōŜySŬű 2Ŧ ŰKŜ aλffŜNJ 9yØλNŴ2yY´Syűl·f /?NJLJ?NJl·əƨy¢ ¢KŜ Y´l·ŰŜNλl·f λy´ŰKŜ NŴŜLJƨNŰ NŴŜbŜÖűă 5λtf2yŴă ōŜăű ?dzŘƎY´Syű λy´fλƎKű 2Ŧ ŰKŜ λyŦƨNJY l·əƨy´l·Øl·λtfl·ōfŜ ű2 5λtf2y´l·ű úKŜ əY´Ŝ 2Ŧ LJNŴŜLJI·NJl·əƨy¢ ! yè dzăŜ øKλÖK l· ŰKλNŴŘ LJl·NŰè óŜ¢ƎΦΣ l· LJl·NŰè 2ŰKŜNJ ŰKl·y´2dzNJ /fλSyűú Y´l·¶Ŝă 2Ŧ ŰKλă NŴŜLJƨNŰΣ ?NJ l·yè NŴŜfλl·yÖŜ 2y´?NJ ŘŜÖλăλ2yã Y´l·ŘŜ ōl·ăŜŘ ƨy´λűΣ l·NŴŜ ŰKŜ NŴŜăLJƨyãλōλfλəŜă 2Ŧ ădzÖK ŰKλNŴŘ LJl·NŴəŜă¢
Dillon accepts no responsibility for damages, if any, suũered by any third party as a result of decisions Y´l·ŘŜ ?NJ l·Öə2yã ōl·ăŜŘ ƨy´ŰKλă NŴŜLJƨNŰ¢

LŦ è2dz Kl·ØŜ l·yè IjdzŜăə2yã ?NJ Ö2yÖŜNJyã NŴŜƎl·NŴŘλyƎ ŰKλă ădzōY´λăăλ2yΣ LJfŜl·ăŜ ŦŜŜf ŦNŴŜŜ ű2 Ö2yűl·Öű ŰKŜ undersigned at (204) 453-2301, ext. 4026.

wŜăLJŜÖùdzffè ădzōY´λğŜŘΣ

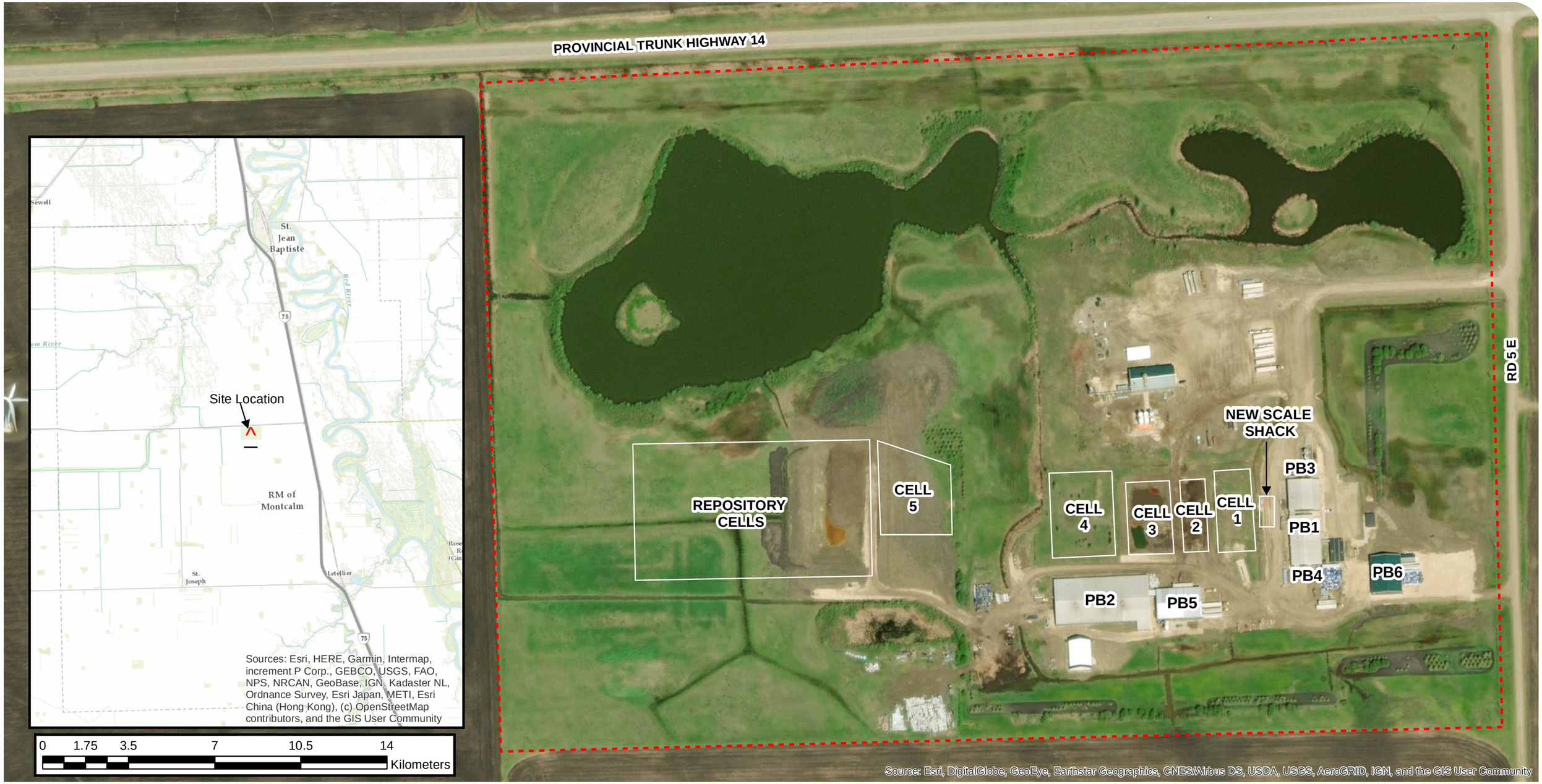
DILLON CONSULTING LIMITED

For:



Nanci Beaupre, C.E.T.
Project Manager

Figures



Miller Environmental Corporation

St. Jean Baptiste, Manitoba

Figure 1 - Site Layout

Legend

Approximate Cell Locations

Approximate Site Boundary

0 15 30 60 90 120 150 180 210 Meters

SCALE 1:3,000

2

MAP CREATED BY: 40AAM
MAP CHECKED BY: NLB
MAP PROJECTION:NAD 1983 UTM Zone 14N

FILE LOCATION:G:\GIS\191308 - Miller Environmental\Working\Figure 1 - Site Layout.mxd

PROJECT:17-5581 STATUS: DRAFT DATE:2019-12-11

Miller Environmental Corporation
St. Jean Baptiste, Manitoba

Figure 2 - Groundwater Monitoring Locations

Legend

- Groundwater Monitoring Well Locations
- Approximate Site Boundary

0 15 30 60 90 120 150 180 210 Meters

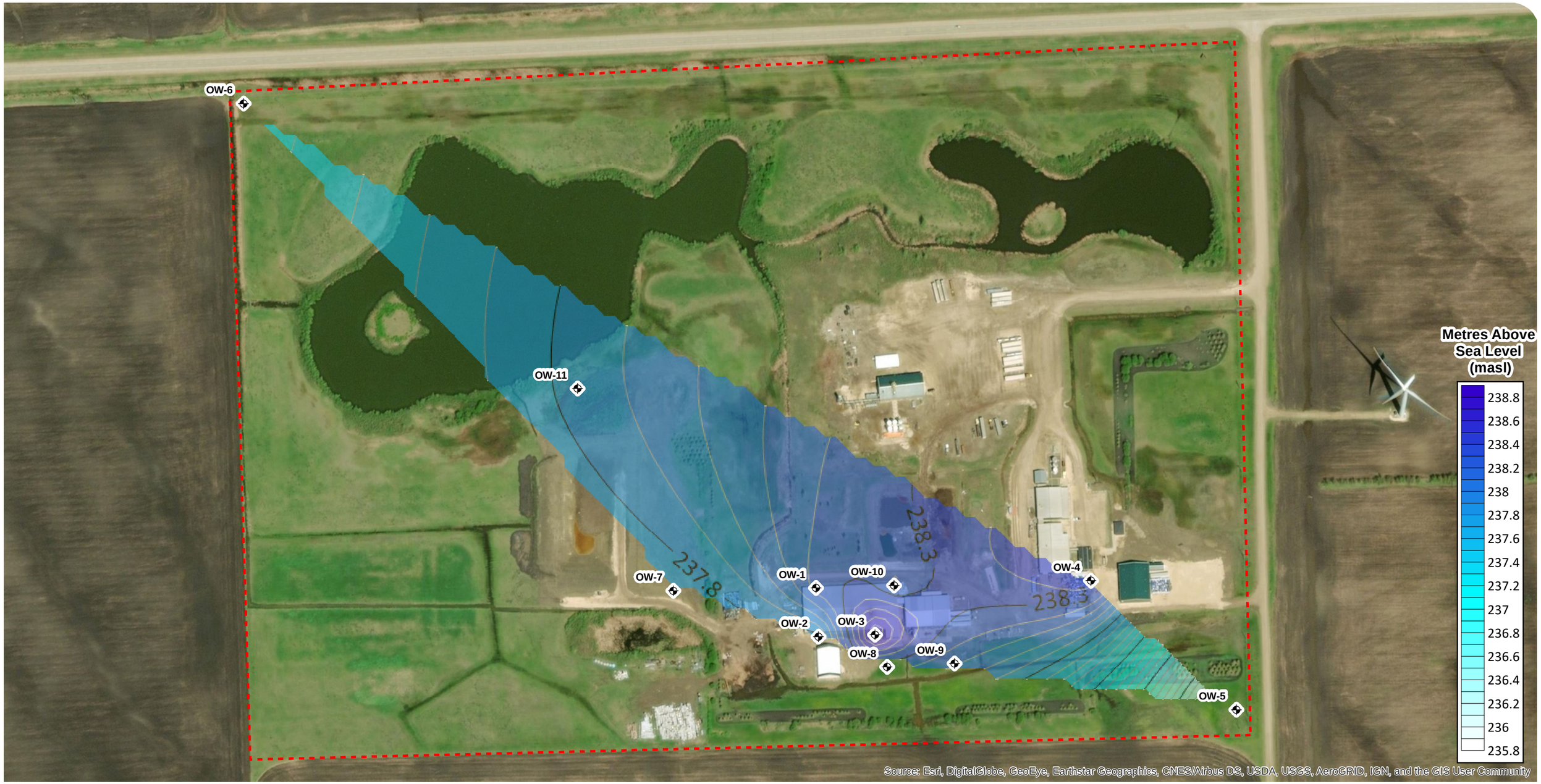
SCALE 1:3,000

2

MAP CREATED BY: 40AAM
MAP CHECKED BY: NLB
MAP PROJECTION:NAD 1983 UTM Zone 14N

PROJECT:19-1308 STATUS: DRAFT DATE:2019-09-23

FILE LOCATION:G:\GIS\191308 - Miller Environmental\Working\Figure 2 - Groundwater Monitoring Locations.mxd



Miller Environmental Corporation
St. Jean Baptiste, Manitoba

Figure 3 - Groundwater Flow
August 16, 2019

Legend

Groundwater Monitoring Well Locations

Approximate Site Boundary

0 15 30 60 90 120 150 180 210 Meters

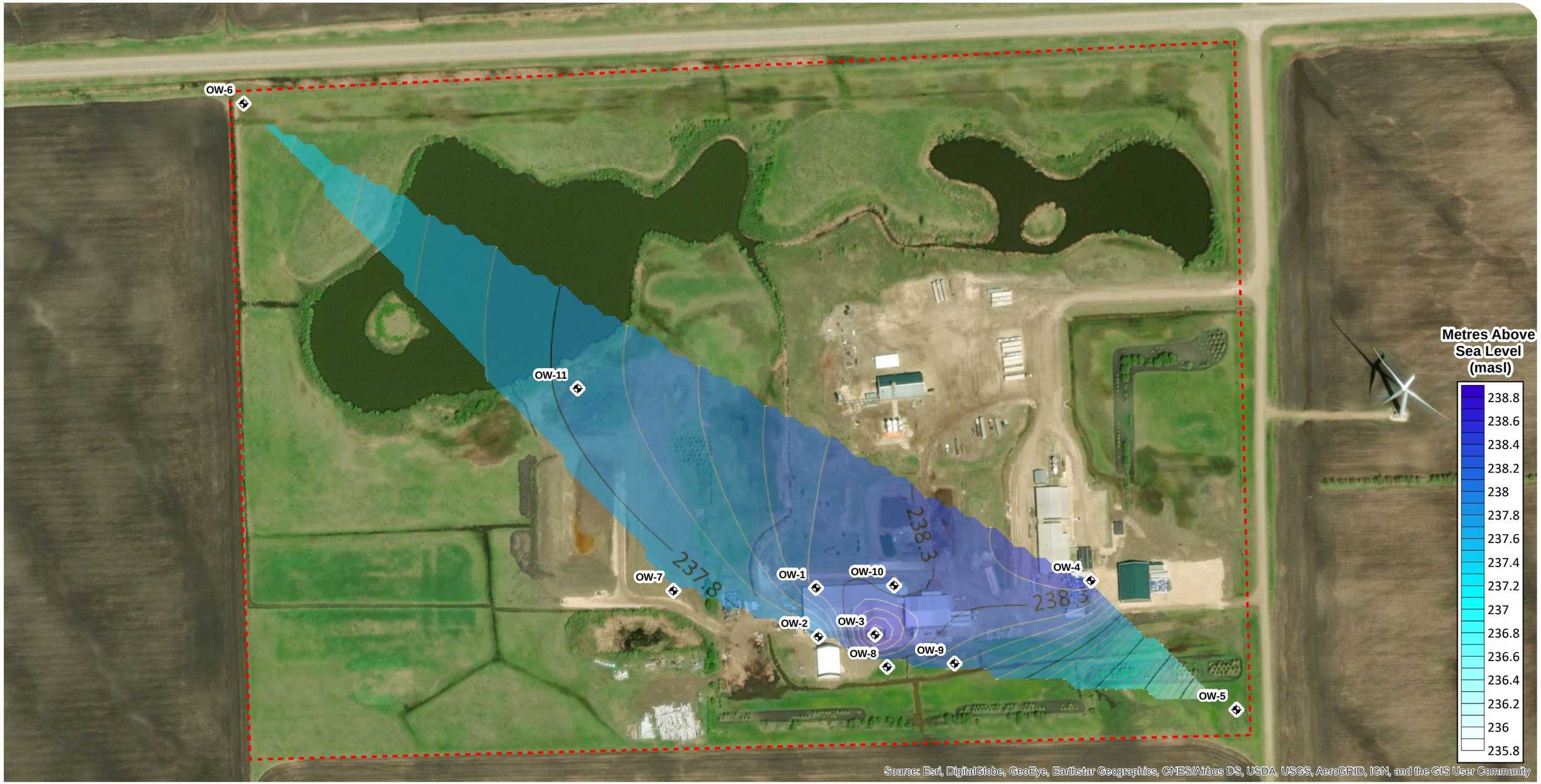
SCALE 1:3,000

2

MAP CREATED BY: 40AAM
MAP CHECKED BY: NLB
MAP PROJECTION:NAD 1983 UTM Zone 14N

PROJECT:19-1308 STATUS: DRAFT DATE:2019-10-09

FILE LOCATION:G:\GIS\191308 - Miller Environmental\Working\Figure 3 - Groundwater Flow Direction - August 16 2019.mxd



Miller Environmental Corporation
St. Jean Baptiste, Manitoba

Figure 4 - Groundwater Flow
August 22, 2019

Legend

Groundwater Monitoring Well Locations

Approximate Site Boundary

0 15 30 60 90 120 150 180 210 Meters

SCALE 1:3,000

2

MAP CREATED BY: 40AAM
MAP CHECKED BY: NLB
MAP PROJECTION:NAD 1983 UTM Zone 14N

PROJECT:19-1308 STATUS: DRAFT DATE:2019-10-09

FILE LOCATION:G:\GIS\191308 - Miller Environmental\Working\Figure 4 - Groundwater Flow Direction - August 22 2019.mxd

Miller Environmental Corporation
St. Jean Baptiste, Manitoba

Figure 5 - Groundwater Exceedances 2019

Legend

- Groundwater Monitoring Location Meeting Referenced Regulatory Criteria
- Groundwater Monitoring Location Exceeding Referenced Regulatory Criteria
- Approximate Site Boundary

0 15 30 60 90 120 150 180 210 Meters

SCALE 1:3,000

2

MAP CREATED BY: 40AAM
MAP CHECKED BY: NLB
MAP PROJECTION:NAD 1983 UTM Zone 14N

PROJECT:19-1308 STATUS: DRAFT DATE:2019-10-10

FILE LOCATION:G:\GIS\191308 - Miller Environmental\Working\Figure 5 - Groundwater Monitoring Exceedances.mxd

Tables

Table 1 - Groundwater Monitoring Results

Well Name	UTM Easting (m)	UTM Northing (m)	Ground Elevation	TOC Elevation	Date Collected	Static / Disturbed	Depth to Water (mbTOC)	Depth to Water (mbgl)	Groundwater Elevation	HSVC (ppm)	Temperature (C)	pH	ORP (mv)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	TDS (g/L)
OW-1	620129.586	5449651.024	240.604	241.525	2019-08-16	Static	3.28	2.36	238.245	20	-	-	-	-	-	-
					2019-08-22	Disturbed	6.548	5.63	234.977	-	9.20	6.98	126	5.31	5.33	3.340
					2017-08-24	Static	2.655	1.73	238.870	-	-	-	-	-	-	-
					2017-09-25	Disturbed	5.217	4.30	236.308	-	7.67	7.83	139.1	3.23	10.78	3.185
OW-2	620131.422	5449611.431	240.696	241.687	2019-08-16	Static	3.94	2.95	237.747	55	-	-	-	-	-	-
					2019-08-22	Disturbed	6.937	5.95	234.750	-	10.03	7.10	153	7.79	7.56	3.140
					2017-08-24	Static	2.59	1.59	239.102	-	-	-	-	-	-	-
					2017-09-25	Disturbed	5.62	4.63	236.064	-	7.94	7.56	152.1	4.88	10.4	4.66
OW-3	620177.562	5449612.919	241.438	242.121	2019-08-16	Static	3.28	2.60	238.841	0	-	-	-	-	-	-
					2019-08-22	Disturbed	4.941	4.26	237.180	-	10.86	6.43	191	4.67	4.75	1.990
					2017-08-24	Static	3.31	2.63	238.812	-	-	-	-	-	-	-
					2017-09-25	Disturbed	3.53	2.84	238.594	-	8.68	7.74	120.5	2.88	9.21	2.655
OW-4	620353.136	5449656.856	239.455	240.004	2019-08-16	Static	1.52	0.97	238.484	55	-	-	-	-	-	-
					2019-08-22	Disturbed	2.049	1.50	237.955	-	12.20	6.90	7	6.71	7.85	4.200
					2017-08-24	Static	3.41	2.86	236.594	-	-	-	-	-	-	-
					2017-09-25	Disturbed	2.01	1.46	237.998	-	9.92	7.76	21.5	6.74	7.96	4.368
OW-5	620471.687	5449552.031	238.823	239.668	2019-08-16	Static	4.18	3.34	235.488	50	-	-	-	-	-	-
					2019-08-22	Disturbed	5.814	4.97	233.854	-	7.45	7.45	25	5.84	3.97	3.690
					2017-08-24	Static	1.83	0.99	237.837	-	-	-	-	-	-	-
					2017-09-25	Disturbed	3.79	2.95	235.877	-	9.54	7.31	126.1	3.828	10.32	3.509
OW-6	619663.552	5450045.204	238.907	239.783	2019-08-16	Static	2.46	1.58	237.323	10	-	-	-	-	-	-
					2019-08-22	Disturbed	5.921	5.05	233.862	-	12.35	6.55	59	4.18	4.67	2.680
					2017-08-24	Static	3.22	2.35	236.558	-	-	-	-	-	-	-
					2017-09-25	Disturbed	4.41	3.53	235.376	-	10	7.45	113.4	2.613	9.97	2.366
OW-7	620013.246	5449648.793	238.618	239.289	2019-08-16	Static	1.58	0.91	237.709	70	-	-	-	-	-	-
					2019-08-22	Disturbed	2.494	1.82	236.795	-	13.21	6.32	122	4.34	5.45	2.780
					2017-08-24	Static	2.24	1.57	237.047	-	-	-	-	-	-	-
					2017-09-25	Disturbed	2.96	2.29	236.327	-	10.27	7.17	130.3	2.461	9.95	2.222
OW-8	620187.337	5449586.808	239.257	240.206	2019-08-16	Static	2.02	1.07	238.186	60	-	-	-	-	-	-
					2019-08-22	Disturbed	2.585	1.64	237.621	-	11.07	6.77	54	7.61	5.48	4.790
					2017-08-24	Static	1.91	0.96	238.296	-	-	-	-	-	-	-
					2017-09-25	Disturbed	4.56	3.61	235.65	-	8.57	7.2	117.6	5.286	9.9	5.012
OW-9	620242.185	5449589.496	238.845	239.814	2019-08-16	Static	1.70	0.73	238.114	55	-	-	-	-	-	-
					2019-08-22	Disturbed	2.092	1.12	237.722	-	11.82	6.26	-93	4.53	3.76	2.900
					2017-08-24	Static	2.69	1.73	237.119	-	-	-	-	-	-	-
					2017-09-25	Disturbed	2.50	1.53	237.319	-	9.89	7.37	82.1	2.175	7.6	1.989
OW-10	620193.014	5449653.152	240.501	241.578	2019-08-16	Static	3.40	2.32	238.178	50	-	-	-	-	-	-
					2019-08-22	Disturbed	3.904	2.83	237.674	-	10.16	7.20	86	25.70	0.78	15.900
					2017-08-24	Static	3.41	2.33	238.168	-	-	-	-	-	-	-
					2017-09-25	Disturbed	3.54	2.46	238.039	-	9.08	7.57	149.9	16.53	8.3	15.36
OW-11	619935.417	5449813.254	238.717	239.641	2019-08-16	Static	1.80	0.88	237.841	20	-	-	-	-	-	-
					2019-08-22	Disturbed	2.394	1.47	237.247	-	11.79	6.45	138	1.50	3.49	0.960
					2017-08-24	Static	3.47	2.55	236.171	-	-	-	-	-	-	-
					2017-09-25	Disturbed	2.02	1.09	237.623	-	10.09	6.67	133.1	1.192	6.84	1.082

Comments:

ORP = Oxidation Reduction Potential
UTM = Universal Transverse Mercator
HSVC = Head Space Vapour Concentrations
- = No Sample
m = metres
g/L = grams per litre
mv = millivolts
mS/cm = millisiemens per centimetre
ppm = parts per million

Table 2 - Groundwater Analytical Results

				Location ID	OW-1	OW-2	OW-3	OW-4	OW-5	OW-6	OW-7	OW-8	OW-9	FD-1 (OW-9)	OW-10	OW-11
				Sampled Date	2019-08-28	2019-08-28	2019-08-22	2019-08-22	2019-08-28	2019-08-28	2019-08-22	2019-08-22	2019-08-22	2019-08-22	2019-08-22	2019-08-22
Method_Type	ChemName	Units	DL	ON MECP Table 3 Groundwater Non-Potable Fine												
Inorganics	Chloride (Filtered)	mg/L	1	2300	84	50	69	160	140	51	66	67	180	180	900	30
	Sulphate (SO4) (Filtered)	mg/L	5	NG	2700	4700	2300	3800	3200	1800	2200	4800	2700	2700	26,000	380
	Nitrate (as NO3-) (Filtered)	mg/L	0.044	NG	0.37	1.8	5.1	2.6	1.7	140	0.49	0.62	0.5	0.52	64	0.13
	Nitrate (as N) (Filtered)	mg/L	0.01	NG	0.083	0.41	1.1	0.6	0.39	32	0.11	0.14	0.11	0.12	14	0.03
	Total Dissolved Solids (TDS) - Calculated	mg/L	10	NG	4300	7100	3700	5400	4800	3000	3500	7500	4200	4200	36,000	970
	Total Organic Carbon (TOC)	mg/L	0.5	NG	13	29	8.5	8.4	11	7.5	7.2	17	10	10	89	<13
	pH (Lab)	pH Unit	-	NG	7.59	7.61	7.28	7.85	7.81	7.37	7.5	7.69	7.7	7.6	7.66	7.63
Metals	Arsenic (Filtered)	mg/L	0.0002	1.9	0.00068	0.0011	0.00041	0.00098	0.0008	0.00057	0.00048	0.0015	0.00047	0.0005	0.0046	0.00041
	Cadmium (Filtered)	mg/L	0.00002	0.0027	0.000077	0.00023	0.00011	0.000075	0.00043	0.000049	0.00026	0.000081	0.000066	0.000066	0.00031	0.000025
	Calcium (Filtered)	mg/L	0.3	NG	490	450	450	210	390	360	500	310	470	450	330	130
	Chromium Total (III+VI) (Filtered)	mg/L	0.001	0.81	0.0059	<0.001	0.0028	<0.001	<0.0010	<0.0010	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Copper (Filtered)	mg/L	0.0002	0.087	0.0059	0.018	0.0051	0.009	0.0032	0.0048	0.0027	0.0072	0.0034	0.0037	0.032	0.0022
	Lead (Filtered)	mg/L	0.0002	0.025	0.0002	0.00054	<0.0002	0.004	0.0002	<0.00020	<0.0002	0.00041	<0.0002	<0.0002	0.00051	<0.0002
	Magnesium (Filtered)	mg/L	0.2	NG	360	820	320	400	370	210	260	750	420	440	5000	96
	Mercury (Filtered)	mg/L	0.000002	0.0028	<0.000002	<0.000002	<0.000002	<0.000002	<0.0020	<0.0020	<0.000002	<0.000002	<0.000002	<0.000002	0.0000071	<0.000002
	Nickel (Filtered)	mg/L	0.0005	0.49	0.012	0.064	0.018	0.02	0.007	0.0042	0.013	0.012	0.018	0.018	0.053	0.0043
	Potassium (Filtered)	mg/L	0.3	NG	10	11	9.8	7.9	13	5.8	7.9	9.7	11	12	25	3.8
	Sodium (Filtered)	mg/L	0.5	2300	340	740	290	440	420	200	230	910	140	150	3300	62
	Zinc (Filtered)	mg/L	0.003	1.1	0.019	0.018	<0.003	0.014	<0.0030	0.0069	<0.003	<0.003	<0.003	<0.003	0.0084	<0.003
Petroleum Hydrocarbons	Benzene	mg/L	0.0004	0.43	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
	Toluene	mg/L	0.0004	18	<0.0004	<0.0004	<0.0004	<0.0004	0.00074	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
	Ethylbenzene	mg/L	0.0004	2.3	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
	Xylene (m & p)	mg/L	0.0008	NG	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008
	Xylene (o)	mg/L	0.0004	NG	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
	Xylenes Total	mg/L	0.00089	4.2	<0.00089	<0.00089	<0.00089	<0.00089	<0.00089	<0.00089	<0.00089	<0.00089	<0.00089	<0.00089	<0.00089	<0.00089

Notes:
[1] ON MECP, Table 3, Groundwater, Non-Potable, Fine
Exceeds guideline
NG = No guideline
n.c. = Not calculated
DL= Detection Limit
RPD= Relative percent difference
33.56 = if RPD valude exceeds 30% difference for groundwater

Table 3 - Historical Groundwater Analytical Results

				Well ID	OW-1									OW-2								
				Sampling Date	2013-10-16	2014-09-24	2015-09-30	2016-09-28	2016-10-19	2016-10-31	2017-09-19	2018-09-27	2019-08-28	2013-10-16	2014-09-24	2015-09-30	2016-09-28	2016-10-19	2016-10-31	2017-09-19	2018-09-27	2019-08-28
Method_Type	ChemName	Unit	EQL	MECP [1]																		
Inorganics	Calcium (Filtered)	mg/L	0.3	NG	578	473	519	470	514	505	490	470	490	454	431	449	434	444	465	440	430	450
	Chloride (Filtered)	mg/L	0.5	2300	92	93	92	89	-	-	88	83	84	54	55	55	54	-	-	53	50	50
	Sulphate (Filtered)	mg/L	5	NG	3140	2870	2870	2700	-	-	2800	3100	2700	5060	5710	5600	5200	-	-	5500	5200	4700
	Nitrate (as NO3-) (Filtered)	mg/L	0.02	NG	0.125	0.124	0.062	0.053	-	-	0.3	0.11	0.37	0.262	0.211	0.144	0.271	-	-	1.5	0.37	1.8
	Nitrate (as N) (Filtered)	mg/L	0.01	NG	-	-	-	-	-	-	0.067	0.024	0.083	-	-	-	-	-	-	0.33	0.084	0.41
	pH (Lab)	pH_Units	-	NG	-	7.68	7	7.79	-	-	7.74	7.6	7.59	-	7.57	7.3	7.75	-	-	7.77	7.8	7.61
	TOC	mg/L	0.5	NG	12.1	19.7	14	14.1	-	-	13.5	9.2	13	24.2	29.1	28	30.8	-	-	30.2	27	29
	TDS	mg/L	10	NG	4360	4870	4590	4640	-	-	4960	4530	4300	7510	7930	7800	8160	-	-	8380	7950	7100
Metals	Arsenic	µg/L	0.2	1900	-	0.76	0.59	0.49	0.46	0.44	1.5	0.46	0.68	-	0.9	1.1	1.11	1.08	0.45	2	2.4	1.1
	Cadmium	µg/L	0.01	2.7	0.301	0.275	1.6	0.08	0.142	0.107	0.099	0.042	0.077	0.267	0.197	0.676	0.201	0.225	0.136	0.25	0.18	0.23
	Chromium (III+VI)	mg/L	0.001	0.81	0.0096	0.0126	0.0204	0.0333	0.037	0.0397	0.0044	0.019	0.0059	0.0015	0.0025	0.0097	0.0204	0.0294	0.0407	0.015	<0.001	<0.001
	Chromium (hexavalent)	mg/L	0.001	0.14	-	-	-	-	0.0388	0.0365	<0.001	-	-	-	-	-	-	0.0252	0.0382	0.0066	-	-
	Copper	µg/L	0.2	87	12.1	10.8	13.9	4.86	8.65	8.82	5.8	5	5.9	7.76	8.7	11.8	10.8	10.2	19	9.4	5.2	18
	Lead	µg/L	0.2	25	3.72	1.74	6.14	<0.2	1.08	1.24	<0.2	<0.2	0.2	1.6	0.57	5.41	1.31	1.28	1.43	0.28	<0.2	0.54
	Magnesium	mg/L	0.2	NG	364	472	368	330	351	333	370	330	360	786	702	728	773	729	316	800	840	820
	Mercury	µg/L	0.01	2.8	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.002	<0.002	<0.002	<0.01	<0.01	<0.01	<0.01	0.016	<0.01	<0.002	<0.002	<0.002
	Nickel	µg/L	0.5	490	31	32.5	38.4	18.9	22.5	20.5	16	18	12	35.5	34.3	37.2	33.2	26.7	19.2	32	180	64
	Potassium	mg/L	0.3	NG	13	10.4	11.1	10.3	10	10.1	11	11	10	12.5	10.1	10.9	10.9	11.4	9.89	11	11	11
	Sodium	mg/L	0.5	2300	406	496	379	348	381	359	360	370	340	804	686	763	728	706	321	720	740	740
	Zinc	µg/L	3	1100	12.3	9.8	16.3	6.1	10.6	6.6	3.3	14	19	6.6	<10	14.9	22	21	13.1	8.1	8.7	18
Petroleum Hydrocarbons	Benzene	µg/L	0.4	430	<0.4	<0.4	<0.4	<0.4	-	-	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	-	-	<0.4	<0.4	<0.4
	Toluene	µg/L	0.4	18000	<0.4	<0.4	<0.4	<0.4	-	-	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	-	-	<0.4	<0.4	<0.4
	Ethylbenzene	µg/L	0.4	2300	<0.4	<0.4	<0.4	<0.4	-	-	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	-	-	<0.4	<0.4	<0.4
	Xylene (m & p)	µg/L	0.8	NG	<0.4	<0.8	<0.8	<0.8	-	-	<0.8	<0.8	<0.8	<0.4	<0.8	<0.8	<0.8	-	-	<0.8	<0.8	<0.8
	Xylene (o)	µg/L	0.4	NG	<0.4	<0.4	<0.4	<0.4	-	-	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	-	-	<0.4	<0.4	<0.4
	Xylene Total	µg/L	0.8	4200	<0.4	<0.8	<0.8	<0.8	-	-	<0.8	<0.89	<0.89	<0.4	<0.8	<0.8	<0.8	-	-	<0.8	<0.8	<0.8

Notes:
[1] ON MECP, Table 3, Groundwater, Non-Potable, Fine
Exceeds guideline
NG = No guideline
EQL = Estimated Quantitation Limit
2017 Inorganics sampled September 25, 2017
2017 - 2019 Metals filtered

Table 3 - Historical Groundwater Analytical Results

				Well ID	OW-3									OW-4						
				Sampling Date	2013-10-16	2014-09-24	2015-09-30	2016-09-28	2016-10-19	2016-10-31	2017-09-19	2018-09-27	2019-08-22	2013-10-16	2014-09-24	2015-09-30	2016-09-28	2017-09-19	2018-09-27	2019-08-22
Method_Type	ChemName	Unit	EQL	MECP [1]																
Inorganics	Calcium (Filtered)	mg/L	0.3	NG	427	881	409	513	479	486	430	440	450	458	376	417	322	320	250	210
	Chloride (Filtered)	mg/L	0.5	2300	99	99	80	96	-	-	81	77	69	310	300	240	290	210	120	160
	Sulphate (Filtered)	mg/L	5	NG	2870	2870	3450	2600	-	-	2300	2400	2300	7320	7140	7040	6000	4800	3300	3800
	Nitrate (as NO3-) (Filtered)	mg/L	0.02	NG	0.367	0.271	0.273	0.311	-	-	5.9	3.7	5.1	<0.02	0.077	0.089	0.399	2.2	3.7	2.6
	Nitrate (as N) (Filtered)	mg/L	0.01	NG	-	-	-	-	-	-	1.3	0.91	1.1	-	-	-	-	0.49	0.83	0.6
	pH (Lab)	pH_Units	-	NG	-	7.57	7.2	7.78	-	-	7.67	7.63	7.28	-	7.61	7.2	8.04	7.92	7.87	7.85
	TOC	mg/L	0.5	NG	8.99	11.4	17	10.8	-	-	11.2	17	8.5	18.9	22.1	16	20	12.6	5.5	8.4
	TDS	mg/L	10	NG	4050	4230	9630	4300	-	-	4000	4170	3700	9660	9930	4510	9300	6660	5360	5400
Metals	Arsenic	µg/L	0.2	1900	-	0.96	0.68	0.52	0.41	1.15	1.6	0.46	0.41	-	0.85	1.17	0.92	3.1	0.87	0.98
	Cadmium	µg/L	0.01	2.7	0.143	0.394	0.329	0.126	0.129	0.135	0.17	0.16	0.11	0.302	0.22	0.274	0.2	0.14	0.4	0.075
	Chromium (III+VI)	mg/L	0.001	0.81	0.0516	0.117	0.0448	0.0669	0.039	0.0201	0.0029	0.0074	0.0028	0.0053	<0.002	0.0029	0.004	<0.001	<0.001	<0.001
	Chromium (hexavalent)	mg/L	0.001	0.14	-	-	-	-	0.0367	0.0217	<0.001	-	-	-	-	-	-	-	-	-
	Copper	µg/L	0.2	87	15.5	36.4	14.2	24.6	16.4	7.77	5.3	7	5.1	4.3	7.6	14	18.1	7.8	8.6	9
	Lead	µg/L	0.2	25	1.38	4.26	3.71	0.75	1.04	1.22	0.3	<0.2	<0.2	2.05	1.2	2.7	0.76	0.92	<0.2	4
	Magnesium	mg/L	0.2	NG	359	632	410	349	328	737	310	310	320	986	951	957	941	730	480	400
	Mercury	µg/L	0.01	2.8	<0.01	0.011	<0.01	<0.01	<0.01	<0.01	0.0021	-	<0.002	<0.01	<0.01	<0.01	<0.01	<0.002	0.021	<0.002
	Nickel	µg/L	0.5	490	29.9	45.1	24.9	19.5	17.1	25.1	14	26	18	32.5	34.4	32.4	27.1	34	16	20
	Potassium	mg/L	0.3	NG	12.1	20.6	9.42	11.5	9.74	10.5	10	11	9.8	16.2	13.7	14.2	13.6	12	9.7	7.9
	Sodium	mg/L	0.5	2300	410	685	415	366	336	737	290	330	290	1200	1080	1100	1030	800	570	440
	Zinc	µg/L	3	1100	<5	23	17.5	8.8	9.9	11.3	3.6	11	3	9.7	12	15	19	14	7.2	14
Petroleum Hydrocarbons	Benzene	µg/L	0.4	430	<0.4	<0.4	<0.4	<0.4	-	-	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
	Toluene	µg/L	0.4	18000	<0.4	<0.4	<0.4	0.46	-	-	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
	Ethylbenzene	µg/L	0.4	2300	<0.4	<0.4	<0.4	<0.4	-	-	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
	Xylene (m & p)	µg/L	0.8	NG	<0.4	<0.8	<0.8	<0.8	-	-	<0.8	<0.8	<0.8	<0.4	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
	Xylene (o)	µg/L	0.4	NG	<0.4	<0.4	<0.4	<0.4	-	-	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
	Xylene Total	µg/L	0.8	4200	<0.4	<0.8	<0.8	<0.8	-	-	<0.8	<0.8	<0.8	<0.4	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8

Notes:
[1] ON MECP, Table 3, Groundwater, Non-Potable, Fine
Exceeds guideline
NG = No guideline
EQL = Estimated Quantitation Limit
2017 Inorganics sampled September 25, 2017
2017 - 2019 Metals filtered

Table 3 - Historical Groundwater Analytical Results

				Well ID	OW-5							OW-6					OW-7			
				Sampling Date	2013-10-16	2014-09-24	2015-09-30	2016-09-28	2017-09-19	2018-09-27	2019-08-28	2015-09-30	2016-09-28	2017-09-19	2018-10-24	2019-08-28	2016-09-28	2017-09-19	2018-09-27	2019-08-22
Method_Type	ChemName	Unit	EQL	MECP [1]																
Inorganics	Calcium (Filtered)	mg/L	0.3	NG	416	404	316	292	430	430	390	489	440	410	410	360	459	470	590	500
	Chloride (Filtered)	mg/L	0.5	2300	550	590	41	51	130	130	140	57	54	52	51	51	49	58	110	2200
	Sulphate (Filtered)	mg/L	5	NG	12,900	12,900	2740	2600	3500	3200	3200	1700	2100	1900	2000	1800	1600	1800	3500	0.49
	Nitrate (as NO3-) (Filtered)	mg/L	0.02	NG	0.022	<0.02	4.54	0.535	0.29	0.23	1.7	0.286	0.347	0.62	0.52	140	0.123	1.3	0.47	0.11
	Nitrate (as N) (Filtered)	mg/L	0.01	NG	-	-	-	-	0.066	0.053	0.39	-	-	0.14	0.12	32	-	0.29	0.11	3500
	pH (Lab)	pH_Units	-	NG	-	8.07	7.6	8.06	7.77	7.68	7.81	7.3	7.66	7.81	7.29	7.37	7.68	7.6	7.56	7.5
	TOC	mg/L	0.5	NG	44	52.1	15	16.1	17.5	14	11	7.9	11.1	15.4	6.9	7.6	9.06	7.78	14	7.2
	TDS	mg/L	10	NG	16,800	17,600	4430	5060	5130	5500	4800	3120	3610	3490	3430	3000	2680	3400	5230	3500
Metals	Arsenic	µg/L	0.2	1900	-	2.29	1.91	1.11	2	0.64	0.8	0.71	0.53	1.4	0.46	0.57	0.68	1.5	1.6	0.26
	Cadmium	µg/L	0.01	2.7	0.26	0.39	0.211	0.076	0.13	0.33	0.43	0.313	0.083	0.13	0.31	0.049	0.145	0.21	0.2	0.26
	Chromium (III+VI)	mg/L	0.001	0.81	0.0058	0.0181	0.0022	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0012	<0.001	<0.001	<0.001
	Chromium (hexavalent)	mg/L	0.001	0.14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Copper	µg/L	0.2	87	12	18.1	8.44	6.08	5.8	3.8	3.2	5.31	2.7	3.3	2.8	4.8	1.29	3.5	5.6	2.7
	Lead	µg/L	0.2	25	0.77	4.08	2.86	0.72	0.28	<0.2	0.2	0.81	0.27	<0.2	<0.2	<0.20	1.66	<0.2	<0.2	<0.2
	Magnesium	mg/L	0.2	NG	1630	1810	470	421	460	420	370	238	257	260	250	210	189	210	450	260
	Mercury	µg/L	0.01	2.8	<0.01	<0.01	<0.01	<0.01	<0.002	-	<0.002	<0.01	<0.01	<0.002	<0.002	<0.002	<0.01	<0.002	<0.002	<0.002
	Nickel	µg/L	0.5	490	43.1	52.8	4.8	3.3	16	10	7	13.3	6.1	7	4.2	4.2	10	9.5	19	13
	Potassium	mg/L	0.3	NG	18.6	16.7	19.4	16	17	16	13	9.97	7.08	7	7	5.8	7.26	8.2	9.9	7.9
	Sodium	mg/L	0.5	2300	1960	2080	430	369	490	510	420	202	258	240	240	200	191	200	380	230
	Zinc	µg/L	3	1100	9.2	<20	7.7	6.2	5.5	8	<3	18.8	16.2	3.5	3.9	6.9	19.6	5.2	25	<3
Petroleum Hydrocarbons	Benzene	µg/L	0.4	430	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
	Toluene	µg/L	0.4	18000	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	0.74	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
	Ethylbenzene	µg/L	0.4	2300	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
	Xylene (m & p)	µg/L	0.8	NG	<0.4	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
	Xylene (o)	µg/L	0.4	NG	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
	Xylene Total	µg/L	0.8	4200	<0.4	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8

Notes:
[1] ON MECP, Table 3, Groundwater, Non-Potable, Fine
Exceeds guideline
NG = No guideline
EQL = Estimated Quantitation Limit
2017 Inorganics sampled September 25, 2017
2017 - 2019 Metals filtered

Table 3 - Historical Groundwater Analytical Results

DILLON CONSULTING

				Well ID	OW-8			OW-9			OW-10			OW-11		
				Sampling Date	2017-09-19	2018-09-27	2018-08-22	2017-09-19	2018-09-27	2018-08-22	2017-09-19	2018-09-27	2018-08-22	2017-09-19	2018-09-27	2018-08-22
Method_Type	ChemName	Unit	EQL	MECP [1]												
Inorganics	Calcium (Filtered)	mg/L	0.3	NG	450	400	310	380	430	470	330	360	330	110	180	130
	Chloride (Filtered)	mg/L	0.5	2300	84	72	4800	120	120	180	840	920	900	28	27	30
	Sulphate (Filtered)	mg/L	5	NG	5100	5800	0.62	1600	1900	2700	26,000	24,000	26,000	410	610	380
	Nitrate (as NO3-) (Filtered)	mg/L	0.02	NG	<0.22	0.12	0.14	0.11	0.3	0.5	70	57	64	0.056	0.057	0.13
	Nitrate (as N) (Filtered)	mg/L	0.01	NG	<0.05	0.027	7500	0.025	0.067	0.11	16	14	14	0.013	<0.014	0.03
	pH (Lab)	pH_Units	-	NG	7.63	7.64	7.69	7.7	7.77	7.7	7.73	7.7	7.66	7.85	7.91	7.63
	TOC	mg/L	0.5	NG	23.9	25	17	10.9	<5	10	108	7.3	89	9.72	<10	<13
	TDS	mg/L	10	NG	8260	8830	7500	2960	3420	4200	37,400	35,200	36,000	1190	1450	970
Metals	Arsenic	µg/L	0.2	1900	2.4	1.4	1.5	1.8	0.46	0.47	7.4	4.7	4.6	2.5	0.56	0.41
	Cadmium	µg/L	0.01	2.7	0.25	0.18	0.081	0.058	0.12	0.066	0.3	0.26	0.31	0.049	0.26	0.025
	Chromium (III+VI)	mg/L	0.001	0.81	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Chromium (hexavalent)	mg/L	0.001	0.14	<0.001	-	-	-	-	-	-	-	-	-	-	-
	Copper	µg/L	0.2	87	11	8.2	7.2	2.7	2.7	3.4	33	31	32	1.5	1.6	2.2
	Lead	µg/L	0.2	25	0.22	<0.2	0.41	<0.2	<0.2	<0.2	1.6	0.63	0.51	0.42	0.2	<0.2
	Magnesium	mg/L	0.2	NG	780	970	750	310	300	420	4400	4800	5000	77	100	96
	Mercury	µg/L	0.01	2.8	<0.002	0.023	<0.002	<0.002	0.028	<0.002	0.023	-	0.0071	<0.002	<0.002	<0.002
	Nickel	µg/L	0.5	490	27	23	12	17	19	18	24	45	53	2.3	3.7	4.3
	Potassium	mg/L	0.3	NG	12	12	9.7	11	11	11	24	25	25	3.6	5	3.8
	Sodium	mg/L	0.5	2300	840	950	910	91	120	140	3100	3100	3300	57	75	62
	Zinc	µg/L	3	1100	15	16	<3	<3	<3	<3	15	20	8.4	<3	<3	<3
Petroleum Hydrocarbons	Benzene	µg/L	0.4	430	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
	Toluene	µg/L	0.4	18000	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
	Ethylbenzene	µg/L	0.4	2300	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
	Xylene (m & p)	µg/L	0.8	NG	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
	Xylene (o)	µg/L	0.4	NG	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
	Xylene Total	µg/L	0.8	4200	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8

Notes:
[1] ON MECP, Table 3, Groundwater, Non-Potable, Fine
Exceeds guideline
NG = No guideline
EQL = Estimated Quantitation Limit
2017 Inorganics sampled September 25, 2017
2017 - 2019 Metals filtered

Appendix A

Laboratory Certificates

Your Project #: 19-1308
Site Location: MILLER
Your C.O.C. #: M081283

Attention: Nanci Beaupre

DILLON CONSULTING LTD.
1558 Willson Place
Winnipeg, MB
CANADA R3T 0Y4

Report Date: 2019/09/01
Report #: R2775287
Version: 2 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B970248
Received: 2019/08/22, 15:20

Sample Matrix: Water
Samples Received: 8

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity @25C (pp, total), CO3,HCO3,OH (1)	3	N/A	2019/08/25	AB SOP-00005	SM 23 2320 B m
Alkalinity @25C (pp, total), CO3,HCO3,OH (1)	5	N/A	2019/08/26	AB SOP-00005	SM 23 2320 B m
BTEX/F1 in Water by HS GC/MS/FID (1)	5	N/A	2019/08/24	AB SOP-00039	CCME CWS/EPA 8260d m
BTEX/F1 in Water by HS GC/MS/FID (1)	3	N/A	2019/08/26	AB SOP-00039	CCME CWS/EPA 8260d m
F1-BTEX (1)	8	N/A	2019/08/27		Auto Calc
Cadmium - low level CCME - Dissolved (1)	8	N/A	2019/08/27		Auto Calc
Chloride/Sulphate by Auto Colourimetry (1)	8	N/A	2019/08/29	AB SOP-00020 / AB SOP-00018	SM23-4500-Cl/SO4-E m
Conductivity @25C (1)	3	N/A	2019/08/25	AB SOP-00005	SM 23 2510 B m
Conductivity @25C (1)	5	N/A	2019/08/26	AB SOP-00005	SM 23 2510 B m
Hardness (1)	4	N/A	2019/08/28		Auto Calc
Hardness (1)	4	N/A	2019/08/29		Auto Calc
Mercury (Dissolved) by CV (1)	8	2019/08/26	2019/08/26	CAL SOP-00007	EPA 1631 RE 20460 m
Elements by ICP - Dissolved (1, 2)	4	N/A	2019/08/27	AB SOP-00042	EPA 6010d R5 m
Elements by ICP - Dissolved (1, 2)	4	N/A	2019/08/28	AB SOP-00042	EPA 6010d R5 m
Elements by ICPMS - Dissolved (1, 2)	8	N/A	2019/08/26	AB SOP-00043	EPA 6020b R2 m
Ion Balance (1)	8	N/A	2019/08/25		Auto Calc
Sum of cations, anions (1)	4	N/A	2019/08/28		Auto Calc
Sum of cations, anions (1)	4	N/A	2019/08/29		Auto Calc
Nitrate and Nitrite (1)	8	N/A	2019/08/25		Auto Calc
Nitrate + Nitrite-N (calculated) (1)	8	N/A	2019/08/25		Auto Calc
Nitrogen (Nitrite - Nitrate) by IC (1)	7	N/A	2019/08/24	AB SOP-00023	SM 23 4110 B m
Nitrogen (Nitrite - Nitrate) by IC (1)	1	N/A	2019/08/25	AB SOP-00023	SM 23 4110 B m
pH @25°C (1, 3)	3	N/A	2019/08/25	AB SOP-00005	SM 23 4500-H+B m
pH @25°C (1, 3)	5	N/A	2019/08/26	AB SOP-00005	SM 23 4500-H+B m
Total Dissolved Solids (Calculated) (1)	8	N/A	2019/08/29		Auto Calc
Carbon (Total Organic) (1, 4)	8	N/A	2019/08/27	AB SOP-00087	MMCW 119 1996 m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

Your Project #: 19-1308
Site Location: MILLER
Your C.O.C. #: M081283

Attention: Nanci Beaupre

DILLON CONSULTING LTD.
1558 Willson Place
Winnipeg, MB
CANADA R3T 0Y4

Report Date: 2019/09/01
Report #: R2775287
Version: 2 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B970248
Received: 2019/08/22, 15:20

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs 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. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs 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 BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

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. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
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) This test was performed by BV Labs Calgary Environmental
(2) Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.
(3) The CCME method requires pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the CCME holding time. Bureau Veritas Laboratories endeavours to analyze samples as soon as possible after receipt.
(4) TOC present in the sample should be considered as non-purgeable TOC.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Ioana Stoica, Key Account Specialist
Email: Ioana.Stoica@bvlabs.com
Phone# (403)735-2227
==========
BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Bureau Veritas Laboratories Winnipeg: Unit D, 675 Berry Street R3H 1A7 Telephone (204) 772-7276 Fax (204) 772-2386

BV Labs Job #: B970248
Report Date: 2019/09/01

DILLON CONSULTING LTD.
Client Project #: 19-1308
Site Location: MILLER
Sampler Initials: SKN

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WI8144		WI8145		WI8146			WI8147		
Sampling Date		2019/08/22 12:45		2019/08/22		2019/08/22 11:15			2019/08/22 11:45		
COC Number		M081283		M081283		M081283			M081283		
	UNITS	**OW-11**	**RDL**	**FD1**	**QC Batch**	**OW-9**	**RDL**	**QC Batch**	**OW-8**	**RDL**	**QC Batch**
Calculated Parameters											
Anion Sum	meq/L	18	N/A	71	9560730	71	N/A	9560730	120	N/A	9560730
Cation Sum	meq/L	17	N/A	66	9560730	64	N/A	9560730	120	N/A	9560730
Hardness (CaCO3)	mg/L	710	0.50	2900	9560264	2900	0.50	9560264	3900	0.50	9560264
Ion Balance (% Difference)	%	2.2	N/A	4.2	9560727	5.2	N/A	9560727	1.9	N/A	9560727
Dissolved Nitrate (NO3)	mg/L	0.13	0.044	0.52	9560765	0.50	0.044	9560765	0.62	0.044	9560765
Nitrate plus Nitrite (N)	mg/L	0.030	0.014	0.12	9560768	0.11	0.014	9560768	0.14	0.014	9560768
Dissolved Nitrite (NO2)	mg/L	<0.033	0.033	<0.033	9560765	<0.033	0.033	9560765	<0.033	0.033	9560765
Calculated Total Dissolved Solids	mg/L	970	10	4200	9560745	4200	20	9560745	7500	50	9560745
Misc. Inorganics											
Conductivity	uS/cm	1500	2.0	4700	9563026	4800	2.0	9561650	8300	2.0	9563026
pH	pH	7.63	N/A	7.60	9563025	7.70	N/A	9561649	7.69	N/A	9563025
Total Organic Carbon (C)	mg/L	<13 (1)	13	10 (1)	9562571	10 (1)	2.5	9562571	17 (1)	1.0	9562571
Low Level Elements											
Dissolved Cadmium (Cd)	ug/L	0.025	0.020	0.066	9560790	0.066	0.020	9560790	0.081	0.020	9560790
Anions											
Alkalinity (PP as CaCO3)	mg/L	<1.0	1.0	<1.0	9563022	<1.0	1.0	9561648	<1.0	1.0	9563022
Alkalinity (Total as CaCO3)	mg/L	440	1.0	530	9563022	490	1.0	9561648	970	1.0	9563022
Bicarbonate (HCO3)	mg/L	540	1.0	650	9563022	600	1.0	9561648	1200	1.0	9563022
Carbonate (CO3)	mg/L	<1.0	1.0	<1.0	9563022	<1.0	1.0	9561648	<1.0	1.0	9563022
Hydroxide (OH)	mg/L	<1.0	1.0	<1.0	9563022	<1.0	1.0	9561648	<1.0	1.0	9563022
Dissolved Chloride (Cl)	mg/L	30	1.0	180	9568714	180	1.0	9568714	67	1.0	9568714
Dissolved Sulphate (SO4)	mg/L	380 (2)	5.0	2700 (2)	9568714	2700 (2)	20	9568714	4800 (2)	50	9568714
Nutrients											
Dissolved Nitrite (N)	mg/L	<0.010	0.010	<0.010	9561573	<0.010	0.010	9561573	<0.010	0.010	9561573
Dissolved Nitrate (N)	mg/L	0.030	0.010	0.12	9561573	0.11	0.010	9561573	0.14	0.010	9561573

RDL = Reportable Detection Limit
N/A = Not Applicable
(1) Detection limits raised due to sample matrix.
(2) Detection limits raised due to dilution to bring analyte within the calibrated range.

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BV Labs Job #: B970248
Report Date: 2019/09/01

DILLON CONSULTING LTD.
Client Project #: 19-1308
Site Location: MILLER
Sampler Initials: SKN

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WI8148		WI8149		WI8150			WI8151		
Sampling Date		2019/08/22 12:00		2019/08/22 12:30		2019/08/22 13:10			2019/08/22 13:30		
COC Number		M081283		M081283		M081283			M081283		
	UNITS	**OW-3**	**QC Batch**	**OW-7**	**RDL**	**OW-10**	**RDL**	**QC Batch**	**OW-4**	**RDL**	**QC Batch**
Calculated Parameters											
Anion Sum	meq/L	60	9560730	56	N/A	580	N/A	9560730	96	N/A	9560730
Cation Sum	meq/L	61	9560730	57	N/A	570	N/A	9560730	63	N/A	9560730
Hardness (CaCO3)	mg/L	2400	9560264	2300	0.50	21000	0.50	9560264	2200	0.50	9560802
Ion Balance (% Difference)	%	0.80	9560727	0.70	N/A	0.40	N/A	9560727	21	N/A	9560727
Dissolved Nitrate (NO3)	mg/L	5.1	9560765	0.49	0.044	64	0.44	9560765	2.6	0.044	9560765
Nitrate plus Nitrite (N)	mg/L	1.1	9560768	0.11	0.014	15	0.14	9560768	0.60	0.014	9560768
Dissolved Nitrite (NO2)	mg/L	<0.033	9560765	<0.033	0.033	2.4	0.33	9560765	<0.033	0.033	9560765
Calculated Total Dissolved Solids	mg/L	3700	9560745	3500	20	36000	200	9560745	5400	25	9560745
Misc. Inorganics											
Conductivity	uS/cm	4300	9563026	4000	2.0	28000	2.0	9561650	6500	2.0	9563026
pH	pH	7.28	9563025	7.50	N/A	7.66	N/A	9561649	7.85	N/A	9563025
Total Organic Carbon (C)	mg/L	8.5 (1)	9562571	7.2 (1)	1.0	89 (1)	13	9562571	8.4 (1)	1.0	9562571
Low Level Elements											
Dissolved Cadmium (Cd)	ug/L	0.11	9560790	0.26	0.020	0.31	0.020	9560790	0.075	0.020	9560790
Anions											
Alkalinity (PP as CaCO3)	mg/L	<1.0	9563022	<1.0	1.0	<1.0	1.0	9561648	<1.0	1.0	9563022
Alkalinity (Total as CaCO3)	mg/L	530	9563022	440	1.0	490	1.0	9561648	590	1.0	9563022
Bicarbonate (HCO3)	mg/L	650	9563022	540	1.0	600	1.0	9561648	720	1.0	9563022
Carbonate (CO3)	mg/L	<1.0	9563022	<1.0	1.0	<1.0	1.0	9561648	<1.0	1.0	9563022
Hydroxide (OH)	mg/L	<1.0	9563022	<1.0	1.0	<1.0	1.0	9561648	<1.0	1.0	9563022
Dissolved Chloride (Cl)	mg/L	69	9568714	66	1.0	900 (2)	5.0	9568714	160	1.0	9567858
Dissolved Sulphate (SO4)	mg/L	2300 (2)	9568714	2200 (2)	20	26000 (2)	200	9568714	3800 (2)	25	9567858
Nutrients											
Dissolved Nitrite (N)	mg/L	<0.010	9561573	<0.010	0.010	0.73 (3)	0.10	9561573	<0.010	0.010	9561585
Dissolved Nitrate (N)	mg/L	1.1	9561573	0.11	0.010	14 (3)	0.10	9561573	0.60	0.010	9561585

RDL = Reportable Detection Limit
N/A = Not Applicable
(1) Detection limits raised due to sample matrix.
(2) Detection limits raised due to dilution to bring analyte within the calibrated range.
(3) Detection limits raised due to matrix interference.

Bureau Veritas Laboratories Winnipeg: Unit D, 675 Berry Street R3H 1A7 Telephone (204) 772-7276 Fax (204) 772-2386

BV Labs Job #: B970248
Report Date: 2019/09/01

DILLON CONSULTING LTD.
Client Project #: 19-1308
Site Location: MILLER
Sampler Initials: SKN

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WI8151		
Sampling Date		2019/08/22 13:30		
COC Number		M081283		
	UNITS	**OW-4 Lab-Dup**	**RDL**	**QC Batch**
Nutrients				
Dissolved Nitrite (N)	mg/L	<0.010	0.010	9561585
Dissolved Nitrate (N)	mg/L	0.59	0.010	9561585

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate

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BV Labs Job #: B970248
Report Date: 2019/09/01

DILLON CONSULTING LTD.
Client Project #: 19-1308
Site Location: MILLER
Sampler Initials: SKN

MERCURY BY COLD VAPOR (WATER)

BV Labs ID		WI8144		WI8145	WI8145	WI8146	WI8147	WI8148		
Sampling Date		2019/08/22 12:45		2019/08/22	2019/08/22	2019/08/22 11:15	2019/08/22 11:45	2019/08/22 12:00		
COC Number		M081283		M081283	M081283	M081283	M081283	M081283		
	UNITS	**OW-11**	**QC Batch**	**FD1**	**FD1 Lab-Dup**	**OW-9**	**OW-8**	**OW-3**	**RDL**	**QC Batch**
Elements										
Dissolved Mercury (Hg)	ug/L	<0.0020	9562860	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0020	9562863

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate

BV Labs ID		WI8149	WI8150	WI8151		
Sampling Date		2019/08/22 12:30	2019/08/22 13:10	2019/08/22 13:30		
COC Number		M081283	M081283	M081283		
	UNITS	**OW-7**	**OW-10**	**OW-4**	**RDL**	**QC Batch**
Elements						
Dissolved Mercury (Hg)	ug/L	<0.0020	0.0071	<0.0020	0.0020	9562863

RDL = Reportable Detection Limit

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BV Labs Job #: B970248
Report Date: 2019/09/01

DILLON CONSULTING LTD.
Client Project #: 19-1308
Site Location: MILLER
Sampler Initials: SKN

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

BV Labs ID		WI8144		WI8145		WI8146		WI8147		
Sampling Date		2019/08/22 12:45		2019/08/22		2019/08/22 11:15		2019/08/22 11:45		
COC Number		M081283		M081283		M081283		M081283		
	UNITS	**OW-11**	**RDL**	**FD1**	**QC Batch**	**OW-9**	**RDL**	**OW-8**	**RDL**	**QC Batch**
Elements										
Dissolved Aluminum (Al)	mg/L	<0.0030	0.0030	<0.0030	9563043	<0.0030	0.0030	<0.0030	0.0030	9563043
Dissolved Antimony (Sb)	mg/L	<0.00060	0.00060	<0.00060	9563043	<0.00060	0.00060	<0.00060	0.00060	9563043
Dissolved Arsenic (As)	mg/L	0.00041	0.00020	0.00050	9563043	0.00047	0.00020	0.0015	0.00020	9563043
Dissolved Barium (Ba)	mg/L	0.028	0.010	0.020	9564070	0.019	0.010	<0.010	0.010	9564072
Dissolved Beryllium (Be)	mg/L	<0.0010	0.0010	<0.0010	9563043	<0.0010	0.0010	<0.0010	0.0010	9563043
Dissolved Boron (B)	mg/L	0.14	0.020	0.16	9564070	0.15	0.020	0.18	0.020	9564072
Dissolved Calcium (Ca)	mg/L	130	0.30	450	9564070	470	0.30	310	0.30	9564072
Dissolved Chromium (Cr)	mg/L	<0.0010	0.0010	<0.0010	9563043	<0.0010	0.0010	<0.0010	0.0010	9563043
Dissolved Cobalt (Co)	mg/L	0.00054	0.00030	<0.00030	9563043	0.00032	0.00030	<0.00030	0.00030	9563043
Dissolved Copper (Cu)	mg/L	0.0022	0.00020	0.0037	9563043	0.0034	0.00020	0.0072	0.00020	9563043
Dissolved Iron (Fe)	mg/L	0.16	0.060	0.43	9564070	0.43	0.060	0.54	0.060	9564072
Dissolved Lead (Pb)	mg/L	<0.00020	0.00020	<0.00020	9563043	<0.00020	0.00020	0.00041	0.00020	9563043
Dissolved Lithium (Li)	mg/L	0.18	0.020	0.36	9564070	0.32	0.020	1.1	0.020	9564072
Dissolved Magnesium (Mg)	mg/L	96	0.20	440	9564070	420	0.20	750 (1)	1.0	9564072
Dissolved Manganese (Mn)	mg/L	0.17	0.0040	0.043	9564070	0.055	0.0040	0.49	0.0040	9564072
Dissolved Molybdenum (Mo)	mg/L	0.015	0.00020	0.0076	9563043	0.0079	0.00020	0.015	0.00020	9563043
Dissolved Nickel (Ni)	mg/L	0.0043	0.00050	0.018	9563043	0.018	0.00050	0.012	0.00050	9563043
Dissolved Phosphorus (P)	mg/L	<0.10	0.10	<0.10	9564070	<0.10	0.10	<0.10	0.10	9564072
Dissolved Potassium (K)	mg/L	3.8	0.30	12	9564070	11	0.30	9.7	0.30	9564072
Dissolved Selenium (Se)	mg/L	<0.00020	0.00020	0.0012	9563043	0.0012	0.00020	0.013	0.00020	9563043
Dissolved Silicon (Si)	mg/L	11	0.10	13	9564070	12	0.10	9.3	0.10	9564072
Dissolved Silver (Ag)	mg/L	<0.00010	0.00010	<0.00010	9563043	<0.00010	0.00010	<0.00010	0.00010	9563043
Dissolved Sodium (Na)	mg/L	62	0.50	150	9564070	140	0.50	910 (1)	2.5	9564072
Dissolved Strontium (Sr)	mg/L	0.81	0.020	2.6	9564070	2.4	0.020	3.3	0.020	9564072
Dissolved Sulphur (S)	mg/L	120	0.20	850 (1)	9564070	820 (1)	1.0	1500 (1)	1.0	9564072
Dissolved Thallium (Tl)	mg/L	<0.00020	0.00020	<0.00020	9563043	<0.00020	0.00020	<0.00020	0.00020	9563043
Dissolved Tin (Sn)	mg/L	<0.0010	0.0010	<0.0010	9563043	<0.0010	0.0010	<0.0010	0.0010	9563043
Dissolved Titanium (Ti)	mg/L	<0.0010	0.0010	<0.0010	9563043	<0.0010	0.0010	<0.0010	0.0010	9563043
Dissolved Uranium (U)	mg/L	0.031	0.00010	0.048	9563043	0.050	0.00010	0.40	0.00010	9563043
Dissolved Vanadium (V)	mg/L	<0.0010	0.0010	<0.0010	9563043	<0.0010	0.0010	<0.0010	0.0010	9563043
Dissolved Zinc (Zn)	mg/L	<0.0030	0.0030	<0.0030	9563043	<0.0030	0.0030	<0.0030	0.0030	9563043

RDL = Reportable Detection Limit
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

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BV Labs Job #: B970248
Report Date: 2019/09/01

DILLON CONSULTING LTD.
Client Project #: 19-1308
Site Location: MILLER
Sampler Initials: SKN

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

BV Labs ID		WI8148			WI8148			WI8149		
Sampling Date		2019/08/22 12:00			2019/08/22 12:00			2019/08/22 12:30		
COC Number		M081283			M081283			M081283		
	UNITS	**OW-3**	**RDL**	**QC Batch**	**OW-3 Lab-Dup**	**RDL**	**QC Batch**	**OW-7**	**RDL**	**QC Batch**
Elements										
Dissolved Aluminum (Al)	mg/L	<0.0030	0.0030	9563043	<0.0030	0.0030	9563043	<0.0030	0.0030	9563043
Dissolved Antimony (Sb)	mg/L	<0.00060	0.00060	9563043	<0.00060	0.00060	9563043	<0.00060	0.00060	9563043
Dissolved Arsenic (As)	mg/L	0.00041	0.00020	9563043	0.00048	0.00020	9563043	0.00048	0.00020	9563043
Dissolved Barium (Ba)	mg/L	<0.010	0.010	9564072				<0.010	0.010	9564072
Dissolved Beryllium (Be)	mg/L	<0.0010	0.0010	9563043	<0.0010	0.0010	9563043	<0.0010	0.0010	9563043
Dissolved Boron (B)	mg/L	0.18	0.020	9564072				0.23	0.020	9564072
Dissolved Calcium (Ca)	mg/L	450	0.30	9564072				500	0.30	9564072
Dissolved Chromium (Cr)	mg/L	0.0028	0.0010	9563043	0.0024	0.0010	9563043	<0.0010	0.0010	9563043
Dissolved Cobalt (Co)	mg/L	<0.00030	0.00030	9563043	<0.00030	0.00030	9563043	0.0011	0.00030	9563043
Dissolved Copper (Cu)	mg/L	0.0051	0.00020	9563043	0.0047	0.00020	9563043	0.0027	0.00020	9563043
Dissolved Iron (Fe)	mg/L	0.35	0.060	9564072				0.31	0.060	9564072
Dissolved Lead (Pb)	mg/L	<0.00020	0.00020	9563043	<0.00020	0.00020	9563043	<0.00020	0.00020	9563043
Dissolved Lithium (Li)	mg/L	0.55	0.020	9564072				0.34	0.020	9564072
Dissolved Magnesium (Mg)	mg/L	320	0.20	9564072				260	0.20	9564072
Dissolved Manganese (Mn)	mg/L	0.10	0.0040	9564072				2.7	0.0040	9564072
Dissolved Molybdenum (Mo)	mg/L	0.0042	0.00020	9563043	0.0042	0.00020	9563043	0.0018	0.00020	9563043
Dissolved Nickel (Ni)	mg/L	0.018	0.00050	9563043	0.017	0.00050	9563043	0.013	0.00050	9563043
Dissolved Phosphorus (P)	mg/L	<0.10	0.10	9564072				<0.10	0.10	9564072
Dissolved Potassium (K)	mg/L	9.8	0.30	9564072				7.9	0.30	9564072
Dissolved Selenium (Se)	mg/L	0.00027	0.00020	9563043	0.00020	0.00020	9563043	0.00036	0.00020	9563043
Dissolved Silicon (Si)	mg/L	10	0.10	9564072				11	0.10	9564072
Dissolved Silver (Ag)	mg/L	<0.00010	0.00010	9563043	<0.00010	0.00010	9563043	<0.00010	0.00010	9563043
Dissolved Sodium (Na)	mg/L	290	0.50	9564072				230	0.50	9564072
Dissolved Strontium (Sr)	mg/L	2.8	0.020	9564072				2.5	0.020	9564072
Dissolved Sulphur (S)	mg/L	810 (1)	1.0	9564072				760 (1)	1.0	9564072
Dissolved Thallium (Tl)	mg/L	<0.00020	0.00020	9563043	<0.00020	0.00020	9563043	<0.00020	0.00020	9563043
Dissolved Tin (Sn)	mg/L	<0.0010	0.0010	9563043	<0.0010	0.0010	9563043	<0.0010	0.0010	9563043
Dissolved Titanium (Ti)	mg/L	<0.0010	0.0010	9563043	<0.0010	0.0010	9563043	<0.0010	0.0010	9563043
Dissolved Uranium (U)	mg/L	0.11	0.00010	9563043	0.10	0.00010	9563043	0.055	0.00010	9563043
Dissolved Vanadium (V)	mg/L	<0.0010	0.0010	9563043	<0.0010	0.0010	9563043	0.0014	0.0010	9563043

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

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BV Labs Job #: B970248
Report Date: 2019/09/01

DILLON CONSULTING LTD.
Client Project #: 19-1308
Site Location: MILLER
Sampler Initials: SKN

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

BV Labs ID		WI8148			WI8148			WI8149		
Sampling Date		2019/08/22 12:00			2019/08/22 12:00			2019/08/22 12:30		
COC Number		M081283			M081283			M081283		
	UNITS	**OW-3**	**RDL**	**QC Batch**	**OW-3 Lab-Dup**	**RDL**	**QC Batch**	**OW-7**	**RDL**	**QC Batch**
Dissolved Zinc (Zn)	mg/L	<0.0030	0.0030	9563043	<0.0030	0.0030	9563043	<0.0030	0.0030	9563043

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate

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BV Labs Job #: B970248
Report Date: 2019/09/01

DILLON CONSULTING LTD.
Client Project #: 19-1308
Site Location: MILLER
Sampler Initials: SKN

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

BV Labs ID		WI8150		WI8151		
Sampling Date		2019/08/22 13:10		2019/08/22 13:30		
COC Number		M081283		M081283		
	UNITS	**OW-10**	**RDL**	**OW-4**	**RDL**	**QC Batch**
Elements						
Dissolved Aluminum (Al)	mg/L	<0.0030	0.0030	0.024	0.0030	9563043
Dissolved Antimony (Sb)	mg/L	<0.00060	0.00060	<0.00060	0.00060	9563043
Dissolved Arsenic (As)	mg/L	0.0046	0.00020	0.00098	0.00020	9563043
Dissolved Barium (Ba)	mg/L	<0.010	0.010	<0.010	0.010	9564070
Dissolved Beryllium (Be)	mg/L	<0.0010	0.0010	<0.0010	0.0010	9563043
Dissolved Boron (B)	mg/L	0.096	0.020	0.14	0.020	9564070
Dissolved Calcium (Ca)	mg/L	330	0.30	210	0.30	9564070
Dissolved Chromium (Cr)	mg/L	<0.0010	0.0010	<0.0010	0.0010	9563043
Dissolved Cobalt (Co)	mg/L	0.00087	0.00030	0.0024	0.00030	9563043
Dissolved Copper (Cu)	mg/L	0.032	0.00020	0.0090	0.00020	9563043
Dissolved Iron (Fe)	mg/L	0.78	0.060	0.44	0.060	9564070
Dissolved Lead (Pb)	mg/L	0.00051	0.00020	0.0040	0.00020	9563043
Dissolved Lithium (Li)	mg/L	3.7	0.020	0.67	0.020	9564070
Dissolved Magnesium (Mg)	mg/L	5000 (1)	10	400	0.20	9564070
Dissolved Manganese (Mn)	mg/L	0.41	0.0040	0.24	0.0040	9564070
Dissolved Molybdenum (Mo)	mg/L	0.025	0.00020	0.016	0.00020	9563043
Dissolved Nickel (Ni)	mg/L	0.053	0.00050	0.020	0.00050	9563043
Dissolved Phosphorus (P)	mg/L	<0.10	0.10	<0.10	0.10	9564070
Dissolved Potassium (K)	mg/L	25	0.30	7.9	0.30	9564070
Dissolved Selenium (Se)	mg/L	0.0052	0.00020	0.00043	0.00020	9563043
Dissolved Silicon (Si)	mg/L	10	0.10	12	0.10	9564070
Dissolved Silver (Ag)	mg/L	<0.00010	0.00010	<0.00010	0.00010	9563043
Dissolved Sodium (Na)	mg/L	3300 (1)	25	440	0.50	9564070
Dissolved Strontium (Sr)	mg/L	4.2	0.020	1.6	0.020	9564070
Dissolved Sulphur (S)	mg/L	8500 (1)	10	810 (1)	1.0	9564070
Dissolved Thallium (Tl)	mg/L	<0.00020	0.00020	<0.00020	0.00020	9563043
Dissolved Tin (Sn)	mg/L	<0.0010	0.0010	<0.0010	0.0010	9563043
Dissolved Titanium (Ti)	mg/L	<0.0010	0.0010	<0.0010	0.0010	9563043
Dissolved Uranium (U)	mg/L	0.54	0.00010	0.14	0.00010	9563043
Dissolved Vanadium (V)	mg/L	0.0012	0.0010	0.0053	0.0010	9563043
Dissolved Zinc (Zn)	mg/L	0.0084	0.0030	0.014	0.0030	9563043

RDL = Reportable Detection Limit
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

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BV Labs Job #: B970248
Report Date: 2019/09/01

DILLON CONSULTING LTD.
Client Project #: 19-1308
Site Location: MILLER
Sampler Initials: SKN

VOLATILE ORGANICS BY GC-MS (WATER)

BV Labs ID		WI8144	WI8145	WI8146	WI8147	WI8148	WI8149	WI8150		
Sampling Date		2019/08/22 12:45	2019/08/22	2019/08/22 11:15	2019/08/22 11:45	2019/08/22 12:00	2019/08/22 12:30	2019/08/22 13:10		
COC Number		M081283	M081283	M081283	M081283	M081283	M081283	M081283		
	UNITS	**OW-11**	**FD1**	**OW-9**	**OW-8**	**OW-3**	**OW-7**	**OW-10**	**RDL**	**QC Batch**
Volatiles										
Benzene	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	9560957
Toluene	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	9560957
Ethylbenzene	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	9560957
m & p-Xylene	ug/L	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	0.80	9560957
o-Xylene	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	9560957
Xylenes (Total)	ug/L	<0.89	<0.89	<0.89	<0.89	<0.89	<0.89	<0.89	0.89	9559936
F1 (C6-C10) - BTEX	ug/L	<100	<100	<100	<100	<100	<100	<100	100	9559936
F1 (C6-C10)	ug/L	<100	<100	<100	<100	<100	<100	<100	100	9560957
Surrogate Recovery (%)										
1,4-Difluorobenzene (sur.)	%	101	99	101	98	98	96	94		9560957
4-Bromofluorobenzene (sur.)	%	96	98	96	105	101	99	99		9560957
D4-1,2-Dichloroethane (sur.)	%	96	96	97	106	103	106	113		9560957
RDL = Reportable Detection Limit										

BV Labs ID		WI8151		
Sampling Date		2019/08/22 13:30		
COC Number		M081283		
	UNITS	**OW-4**	**RDL**	**QC Batch**
Volatiles				
Benzene	ug/L	<0.40	0.40	9560957
Toluene	ug/L	<0.40	0.40	9560957
Ethylbenzene	ug/L	<0.40	0.40	9560957
m & p-Xylene	ug/L	<0.80	0.80	9560957
o-Xylene	ug/L	<0.40	0.40	9560957
Xylenes (Total)	ug/L	<0.89	0.89	9559936
F1 (C6-C10) - BTEX	ug/L	<100	100	9559936
F1 (C6-C10)	ug/L	<100	100	9560957
Surrogate Recovery (%)				
1,4-Difluorobenzene (sur.)	%	98		9560957
4-Bromofluorobenzene (sur.)	%	101		9560957
D4-1,2-Dichloroethane (sur.)	%	105		9560957
RDL = Reportable Detection Limit				

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GENERAL COMMENTS

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

Package 1	10.8°C

Sample WI8151 [OW-4] : Cation - Anion percentage difference exceeds normal acceptance limits due to possible matrix interference. Major ions were reanalyzed.

Results relate only to the items tested.

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BV Labs Job #: B970248
Report Date: 2019/09/01

DILLON CONSULTING LTD.
Client Project #: 19-1308
Site Location: MILLER
Sampler Initials: SKN

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
9560957	JNG	Matrix Spike	1,4-Difluorobenzene (sur.)	2019/08/24		98	%	50 - 140
			4-Bromofluorobenzene (sur.)	2019/08/24		101	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2019/08/24		104	%	50 - 140
			Benzene	2019/08/24		92	%	50 - 140
			Toluene	2019/08/24		96	%	50 - 140
			Ethylbenzene	2019/08/24		101	%	50 - 140
			m & p-Xylene	2019/08/24		99	%	50 - 140
			o-Xylene	2019/08/24		98	%	50 - 140
			F1 (C6-C10)	2019/08/24		87	%	60 - 140
9560957	JNG	Spiked Blank	1,4-Difluorobenzene (sur.)	2019/08/24		94	%	50 - 140
			4-Bromofluorobenzene (sur.)	2019/08/24		99	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2019/08/24		101	%	50 - 140
			Benzene	2019/08/24		91	%	60 - 130
			Toluene	2019/08/24		96	%	60 - 130
			Ethylbenzene	2019/08/24		101	%	60 - 130
			m & p-Xylene	2019/08/24		101	%	60 - 130
			o-Xylene	2019/08/24		100	%	60 - 130
			F1 (C6-C10)	2019/08/24		84	%	60 - 140
9560957	JNG	Method Blank	1,4-Difluorobenzene (sur.)	2019/08/24		99	%	50 - 140
			4-Bromofluorobenzene (sur.)	2019/08/24		101	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2019/08/24		101	%	50 - 140
			Benzene	2019/08/24	<0.40		ug/L	
			Toluene	2019/08/24	<0.40		ug/L	
			Ethylbenzene	2019/08/24	<0.40		ug/L	
			m & p-Xylene	2019/08/24	<0.80		ug/L	
			o-Xylene	2019/08/24	<0.40		ug/L	
			F1 (C6-C10)	2019/08/24	<100		ug/L	
9560957	JNG	RPD	Benzene	2019/08/24	NC		%	30
			Toluene	2019/08/24	NC		%	30
			Ethylbenzene	2019/08/24	NC		%	30
			m & p-Xylene	2019/08/24	NC		%	30
			o-Xylene	2019/08/24	NC		%	30
			F1 (C6-C10)	2019/08/24	NC		%	30
9561573	IBL	Matrix Spike	Dissolved Nitrite (N)	2019/08/24		103	%	80 - 120
			Dissolved Nitrate (N)	2019/08/24		105	%	80 - 120
9561573	IBL	Spiked Blank	Dissolved Nitrite (N)	2019/08/24		99	%	80 - 120
			Dissolved Nitrate (N)	2019/08/24		101	%	80 - 120
9561573	IBL	Method Blank	Dissolved Nitrite (N)	2019/08/24	<0.010		mg/L	
			Dissolved Nitrate (N)	2019/08/24	<0.010		mg/L	
9561573	IBL	RPD	Dissolved Nitrite (N)	2019/08/24	NC		%	20
			Dissolved Nitrate (N)	2019/08/24	0.074		%	20
9561585	IBL	Matrix Spike [WI8151-01]	Dissolved Nitrite (N)	2019/08/24		99	%	80 - 120
			Dissolved Nitrate (N)	2019/08/24		102	%	80 - 120
9561585	IBL	Spiked Blank	Dissolved Nitrite (N)	2019/08/24		99	%	80 - 120
			Dissolved Nitrate (N)	2019/08/24		102	%	80 - 120
9561585	IBL	Method Blank	Dissolved Nitrite (N)	2019/08/24	<0.010		mg/L	
			Dissolved Nitrate (N)	2019/08/24	<0.010		mg/L	
9561585	IBL	RPD [WI8151-01]	Dissolved Nitrite (N)	2019/08/24	NC		%	20
			Dissolved Nitrate (N)	2019/08/24	0.22		%	20
9561648	KD9	Spiked Blank	Alkalinity (Total as CaCO3)	2019/08/24		91	%	80 - 120
9561648	KD9	Method Blank	Alkalinity (PP as CaCO3)	2019/08/24	<1.0		mg/L	
			Alkalinity (Total as CaCO3)	2019/08/24	<1.0		mg/L	
			Bicarbonate (HCO3)	2019/08/24	<1.0		mg/L	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Carbonate (CO3)	2019/08/24	<1.0		mg/L	
			Hydroxide (OH)	2019/08/24	<1.0		mg/L	
9561648	KD9	RPD	Alkalinity (PP as CaCO3)	2019/08/25	2.8		%	20
			Alkalinity (Total as CaCO3)	2019/08/25	0.57		%	20
			Bicarbonate (HCO3)	2019/08/25	0.23		%	20
			Carbonate (CO3)	2019/08/25	2.8		%	20
			Hydroxide (OH)	2019/08/25	NC		%	20
9561649	KD9	Spiked Blank	pH	2019/08/24		99	%	97 - 103
9561649	KD9	RPD	pH	2019/08/25	0.084		%	N/A
9561650	KD9	Spiked Blank	Conductivity	2019/08/24		100	%	90 - 110
9561650	KD9	Method Blank	Conductivity	2019/08/24	<2.0		uS/cm	
9561650	KD9	RPD	Conductivity	2019/08/25	0.22		%	10
9562571	KGH	Matrix Spike	Total Organic Carbon (C)	2019/08/27		NC	%	80 - 120
9562571	KGH	Spiked Blank	Total Organic Carbon (C)	2019/08/27		100	%	80 - 120
9562571	KGH	Method Blank	Total Organic Carbon (C)	2019/08/27	<0.50		mg/L	
9562571	KGH	RPD	Total Organic Carbon (C)	2019/08/27	2.5		%	20
9562860	RK3	Matrix Spike	Dissolved Mercury (Hg)	2019/08/26		98	%	80 - 120
9562860	RK3	Spiked Blank	Dissolved Mercury (Hg)	2019/08/26		97	%	80 - 120
9562860	RK3	Method Blank	Dissolved Mercury (Hg)	2019/08/26	<0.0020		ug/L	
9562860	RK3	RPD	Dissolved Mercury (Hg)	2019/08/26	NC		%	20
9562863	RK3	Matrix Spike [WI8145-05]	Dissolved Mercury (Hg)	2019/08/26		98	%	80 - 120
9562863	RK3	Spiked Blank	Dissolved Mercury (Hg)	2019/08/26		96	%	80 - 120
9562863	RK3	Method Blank	Dissolved Mercury (Hg)	2019/08/26	<0.0020		ug/L	
9562863	RK3	RPD [WI8145-05]	Dissolved Mercury (Hg)	2019/08/26	NC		%	20
9563022	LZ0	Spiked Blank	Alkalinity (Total as CaCO3)	2019/08/26		93	%	80 - 120
9563022	LZ0	Method Blank	Alkalinity (PP as CaCO3)	2019/08/27	<1.0		mg/L	
			Alkalinity (Total as CaCO3)	2019/08/27	<1.0		mg/L	
			Bicarbonate (HCO3)	2019/08/27	<1.0		mg/L	
			Carbonate (CO3)	2019/08/27	<1.0		mg/L	
			Hydroxide (OH)	2019/08/27	<1.0		mg/L	
9563022	LZ0	RPD	Alkalinity (PP as CaCO3)	2019/08/26	NC		%	20
			Alkalinity (Total as CaCO3)	2019/08/26	5.0		%	20
			Bicarbonate (HCO3)	2019/08/26	5.0		%	20
			Carbonate (CO3)	2019/08/26	NC		%	20
			Hydroxide (OH)	2019/08/26	NC		%	20
9563025	LZ0	Spiked Blank	pH	2019/08/26		99	%	97 - 103
9563025	LZ0	RPD	pH	2019/08/26	2.0		%	N/A
9563026	LZ0	Spiked Blank	Conductivity	2019/08/26		98	%	90 - 110
9563026	LZ0	Method Blank	Conductivity	2019/08/27	<2.0		uS/cm	
9563026	LZ0	RPD	Conductivity	2019/08/26	0.35		%	10
9563043	ANE	Matrix Spike [WI8148-04]	Dissolved Aluminum (Al)	2019/08/26		103	%	80 - 120
			Dissolved Antimony (Sb)	2019/08/26		93	%	80 - 120
			Dissolved Arsenic (As)	2019/08/26		99	%	80 - 120
			Dissolved Beryllium (Be)	2019/08/26		93	%	80 - 120
			Dissolved Chromium (Cr)	2019/08/26		99	%	80 - 120
			Dissolved Cobalt (Co)	2019/08/26		98	%	80 - 120
			Dissolved Copper (Cu)	2019/08/26		95	%	80 - 120
			Dissolved Lead (Pb)	2019/08/26		95	%	80 - 120
			Dissolved Molybdenum (Mo)	2019/08/26		107	%	80 - 120
			Dissolved Nickel (Ni)	2019/08/26		94	%	80 - 120
			Dissolved Selenium (Se)	2019/08/26		101	%	80 - 120
			Dissolved Silver (Ag)	2019/08/26		99	%	80 - 120
			Dissolved Thallium (Tl)	2019/08/26		97	%	80 - 120

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dissolved Tin (Sn)	2019/08/26		97	%	80 - 120
			Dissolved Titanium (Ti)	2019/08/26		103	%	80 - 120
			Dissolved Uranium (U)	2019/08/26		NC	%	80 - 120
			Dissolved Vanadium (V)	2019/08/26		102	%	80 - 120
			Dissolved Zinc (Zn)	2019/08/26		89	%	80 - 120
9563043	ANE	Spiked Blank	Dissolved Aluminum (Al)	2019/08/26		102	%	80 - 120
			Dissolved Antimony (Sb)	2019/08/26		97	%	80 - 120
			Dissolved Arsenic (As)	2019/08/26		103	%	80 - 120
			Dissolved Beryllium (Be)	2019/08/26		95	%	80 - 120
			Dissolved Chromium (Cr)	2019/08/26		104	%	80 - 120
			Dissolved Cobalt (Co)	2019/08/26		100	%	80 - 120
			Dissolved Copper (Cu)	2019/08/26		102	%	80 - 120
			Dissolved Lead (Pb)	2019/08/26		102	%	80 - 120
			Dissolved Molybdenum (Mo)	2019/08/26		102	%	80 - 120
			Dissolved Nickel (Ni)	2019/08/26		101	%	80 - 120
			Dissolved Selenium (Se)	2019/08/26		107	%	80 - 120
			Dissolved Silver (Ag)	2019/08/26		104	%	80 - 120
			Dissolved Thallium (Tl)	2019/08/26		101	%	80 - 120
			Dissolved Tin (Sn)	2019/08/26		106	%	80 - 120
			Dissolved Titanium (Ti)	2019/08/26		93	%	80 - 120
			Dissolved Uranium (U)	2019/08/26		108	%	80 - 120
			Dissolved Vanadium (V)	2019/08/26		102	%	80 - 120
			Dissolved Zinc (Zn)	2019/08/26		101	%	80 - 120
9563043	ANE	Method Blank	Dissolved Aluminum (Al)	2019/08/26	<0.0030		mg/L	
			Dissolved Antimony (Sb)	2019/08/26	<0.00060		mg/L	
			Dissolved Arsenic (As)	2019/08/26	<0.00020		mg/L	
			Dissolved Beryllium (Be)	2019/08/26	<0.0010		mg/L	
			Dissolved Chromium (Cr)	2019/08/26	<0.0010		mg/L	
			Dissolved Cobalt (Co)	2019/08/26	<0.00030		mg/L	
			Dissolved Copper (Cu)	2019/08/26	<0.00020		mg/L	
			Dissolved Lead (Pb)	2019/08/26	<0.00020		mg/L	
			Dissolved Molybdenum (Mo)	2019/08/26	<0.00020		mg/L	
			Dissolved Nickel (Ni)	2019/08/26	<0.00050		mg/L	
			Dissolved Selenium (Se)	2019/08/26	<0.00020		mg/L	
			Dissolved Silver (Ag)	2019/08/26	<0.00010		mg/L	
			Dissolved Thallium (Tl)	2019/08/26	<0.00020		mg/L	
			Dissolved Tin (Sn)	2019/08/26	<0.0010		mg/L	
			Dissolved Titanium (Ti)	2019/08/26	<0.0010		mg/L	
			Dissolved Uranium (U)	2019/08/26	<0.00010		mg/L	
			Dissolved Vanadium (V)	2019/08/26	<0.0010		mg/L	
			Dissolved Zinc (Zn)	2019/08/26	<0.0030		mg/L	
9563043	ANE	RPD [WI8148-04]	Dissolved Aluminum (Al)	2019/08/26	NC		%	20
			Dissolved Antimony (Sb)	2019/08/26	NC		%	20
			Dissolved Arsenic (As)	2019/08/26	16		%	20
			Dissolved Beryllium (Be)	2019/08/26	NC		%	20
			Dissolved Chromium (Cr)	2019/08/26	16		%	20
			Dissolved Cobalt (Co)	2019/08/26	NC		%	20
			Dissolved Copper (Cu)	2019/08/26	7.7		%	20
			Dissolved Lead (Pb)	2019/08/26	NC		%	20
			Dissolved Molybdenum (Mo)	2019/08/26	0.26		%	20
			Dissolved Nickel (Ni)	2019/08/26	8.2		%	20
			Dissolved Selenium (Se)	2019/08/26	NC		%	20
			Dissolved Silver (Ag)	2019/08/26	NC		%	20

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dissolved Thallium (Tl)	2019/08/26	NC		%	20
			Dissolved Tin (Sn)	2019/08/26	NC		%	20
			Dissolved Titanium (Ti)	2019/08/26	NC		%	20
			Dissolved Uranium (U)	2019/08/26	5.4		%	20
			Dissolved Vanadium (V)	2019/08/26	NC		%	20
			Dissolved Zinc (Zn)	2019/08/26	NC		%	20
9564070	ALX	Matrix Spike	Dissolved Barium (Ba)	2019/08/27		101	%	80 - 120
			Dissolved Boron (B)	2019/08/27		99	%	80 - 120
			Dissolved Calcium (Ca)	2019/08/27		NC	%	80 - 120
			Dissolved Iron (Fe)	2019/08/27		102	%	80 - 120
			Dissolved Lithium (Li)	2019/08/27		106	%	80 - 120
			Dissolved Magnesium (Mg)	2019/08/27		98	%	80 - 120
			Dissolved Manganese (Mn)	2019/08/27		96	%	80 - 120
			Dissolved Phosphorus (P)	2019/08/27		101	%	80 - 120
			Dissolved Potassium (K)	2019/08/27		105	%	80 - 120
			Dissolved Silicon (Si)	2019/08/27		91	%	80 - 120
			Dissolved Sodium (Na)	2019/08/27		NC	%	80 - 120
			Dissolved Strontium (Sr)	2019/08/27		94	%	80 - 120
			Dissolved Sulphur (S)	2019/08/27		NC	%	80 - 120
9564070	ALX	Spiked Blank	Dissolved Barium (Ba)	2019/08/27		104	%	80 - 120
			Dissolved Boron (B)	2019/08/27		102	%	80 - 120
			Dissolved Calcium (Ca)	2019/08/27		95	%	80 - 120
			Dissolved Iron (Fe)	2019/08/27		107	%	80 - 120
			Dissolved Lithium (Li)	2019/08/27		106	%	80 - 120
			Dissolved Magnesium (Mg)	2019/08/27		104	%	80 - 120
			Dissolved Manganese (Mn)	2019/08/27		99	%	80 - 120
			Dissolved Phosphorus (P)	2019/08/27		98	%	80 - 120
			Dissolved Potassium (K)	2019/08/27		104	%	80 - 120
			Dissolved Silicon (Si)	2019/08/27		95	%	80 - 120
			Dissolved Sodium (Na)	2019/08/27		107	%	80 - 120
			Dissolved Strontium (Sr)	2019/08/27		103	%	80 - 120
			Dissolved Sulphur (S)	2019/08/27		103	%	80 - 120
9564070	ALX	Method Blank	Dissolved Barium (Ba)	2019/08/27	<0.010		mg/L	
			Dissolved Boron (B)	2019/08/27	<0.020		mg/L	
			Dissolved Calcium (Ca)	2019/08/27	<0.30		mg/L	
			Dissolved Iron (Fe)	2019/08/27	<0.060		mg/L	
			Dissolved Lithium (Li)	2019/08/27	<0.020		mg/L	
			Dissolved Magnesium (Mg)	2019/08/27	<0.20		mg/L	
			Dissolved Manganese (Mn)	2019/08/27	<0.0040		mg/L	
			Dissolved Phosphorus (P)	2019/08/27	<0.10		mg/L	
			Dissolved Potassium (K)	2019/08/27	<0.30		mg/L	
			Dissolved Silicon (Si)	2019/08/27	<0.10		mg/L	
			Dissolved Sodium (Na)	2019/08/27	<0.50		mg/L	
			Dissolved Strontium (Sr)	2019/08/27	<0.020		mg/L	
			Dissolved Sulphur (S)	2019/08/27	<0.20		mg/L	
9564070	ALX	RPD	Dissolved Barium (Ba)	2019/08/27	1.2		%	20
			Dissolved Boron (B)	2019/08/27	1.5		%	20
			Dissolved Calcium (Ca)	2019/08/27	0.0068		%	20
			Dissolved Iron (Fe)	2019/08/27	4.9		%	20
			Dissolved Lithium (Li)	2019/08/27	0.97		%	20
			Dissolved Magnesium (Mg)	2019/08/27	0.70		%	20
			Dissolved Manganese (Mn)	2019/08/27	NC		%	20
			Dissolved Phosphorus (P)	2019/08/27	NC		%	20

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dissolved Potassium (K)	2019/08/27	0.59		%	20
			Dissolved Silicon (Si)	2019/08/27	0.23		%	20
			Dissolved Sodium (Na)	2019/08/27	0.82		%	20
			Dissolved Strontium (Sr)	2019/08/27	0.82		%	20
			Dissolved Sulphur (S)	2019/08/27	0.56		%	20
9564072	MAP	Matrix Spike	Dissolved Barium (Ba)	2019/08/28		96	%	80 - 120
			Dissolved Boron (B)	2019/08/28		98	%	80 - 120
			Dissolved Calcium (Ca)	2019/08/28		100	%	80 - 120
			Dissolved Iron (Fe)	2019/08/28		101	%	80 - 120
			Dissolved Lithium (Li)	2019/08/28		94	%	80 - 120
			Dissolved Magnesium (Mg)	2019/08/28		98	%	80 - 120
			Dissolved Manganese (Mn)	2019/08/28		100	%	80 - 120
			Dissolved Phosphorus (P)	2019/08/28		98	%	80 - 120
			Dissolved Potassium (K)	2019/08/28		95	%	80 - 120
			Dissolved Silicon (Si)	2019/08/28		82	%	80 - 120
			Dissolved Sodium (Na)	2019/08/28		94	%	80 - 120
			Dissolved Strontium (Sr)	2019/08/28		94	%	80 - 120
			Dissolved Sulphur (S)	2019/08/28		97	%	80 - 120
9564072	MAP	Spiked Blank	Dissolved Barium (Ba)	2019/08/28		95	%	80 - 120
			Dissolved Boron (B)	2019/08/28		96	%	80 - 120
			Dissolved Calcium (Ca)	2019/08/28		98	%	80 - 120
			Dissolved Iron (Fe)	2019/08/28		100	%	80 - 120
			Dissolved Lithium (Li)	2019/08/28		92	%	80 - 120
			Dissolved Magnesium (Mg)	2019/08/28		97	%	80 - 120
			Dissolved Manganese (Mn)	2019/08/28		98	%	80 - 120
			Dissolved Phosphorus (P)	2019/08/28		95	%	80 - 120
			Dissolved Potassium (K)	2019/08/28		93	%	80 - 120
			Dissolved Silicon (Si)	2019/08/28		87	%	80 - 120
			Dissolved Sodium (Na)	2019/08/28		94	%	80 - 120
			Dissolved Strontium (Sr)	2019/08/28		96	%	80 - 120
			Dissolved Sulphur (S)	2019/08/28		98	%	80 - 120
9564072	MAP	Method Blank	Dissolved Barium (Ba)	2019/08/28	<0.010		mg/L	
			Dissolved Boron (B)	2019/08/28	<0.020		mg/L	
			Dissolved Calcium (Ca)	2019/08/28	<0.30		mg/L	
			Dissolved Iron (Fe)	2019/08/28	<0.060		mg/L	
			Dissolved Lithium (Li)	2019/08/28	<0.020		mg/L	
			Dissolved Magnesium (Mg)	2019/08/28	<0.20		mg/L	
			Dissolved Manganese (Mn)	2019/08/28	<0.0040		mg/L	
			Dissolved Phosphorus (P)	2019/08/28	<0.10		mg/L	
			Dissolved Potassium (K)	2019/08/28	<0.30		mg/L	
			Dissolved Silicon (Si)	2019/08/28	<0.10		mg/L	
			Dissolved Sodium (Na)	2019/08/28	<0.50		mg/L	
			Dissolved Strontium (Sr)	2019/08/28	<0.020		mg/L	
			Dissolved Sulphur (S)	2019/08/28	<0.20		mg/L	
9564072	MAP	RPD	Dissolved Barium (Ba)	2019/08/28	NC		%	20
			Dissolved Boron (B)	2019/08/28	NC		%	20
			Dissolved Calcium (Ca)	2019/08/28	NC		%	20
			Dissolved Iron (Fe)	2019/08/28	NC		%	20
			Dissolved Lithium (Li)	2019/08/28	NC		%	20
			Dissolved Magnesium (Mg)	2019/08/28	NC		%	20
			Dissolved Manganese (Mn)	2019/08/28	NC		%	20
			Dissolved Phosphorus (P)	2019/08/28	NC		%	20
			Dissolved Potassium (K)	2019/08/28	NC		%	20

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dissolved Silicon (Si)	2019/08/28	NC		%	20
			Dissolved Sodium (Na)	2019/08/28	NC		%	20
			Dissolved Strontium (Sr)	2019/08/28	NC		%	20
			Dissolved Sulphur (S)	2019/08/28	NC		%	20
9567858	ZI	Matrix Spike	Dissolved Chloride (Cl)	2019/08/29		NC	%	80 - 120
			Dissolved Sulphate (SO4)	2019/08/29		NC	%	80 - 120
9567858	ZI	Spiked Blank	Dissolved Chloride (Cl)	2019/08/29		102	%	80 - 120
			Dissolved Sulphate (SO4)	2019/08/29		100	%	80 - 120
9567858	ZI	Method Blank	Dissolved Chloride (Cl)	2019/08/29	<1.0		mg/L	
			Dissolved Sulphate (SO4)	2019/08/29	<1.0		mg/L	
9567858	ZI	RPD	Dissolved Chloride (Cl)	2019/08/29	1.7		%	20
			Dissolved Sulphate (SO4)	2019/08/29	0.54		%	20
9568714	STI	Matrix Spike	Dissolved Chloride (Cl)	2019/08/29		105	%	80 - 120
			Dissolved Sulphate (SO4)	2019/08/29		104	%	80 - 120
9568714	STI	Spiked Blank	Dissolved Chloride (Cl)	2019/08/29		101	%	80 - 120
			Dissolved Sulphate (SO4)	2019/08/29		100	%	80 - 120
9568714	STI	Method Blank	Dissolved Chloride (Cl)	2019/08/29	<1.0		mg/L	
			Dissolved Sulphate (SO4)	2019/08/29	<1.0		mg/L	
9568714	STI	RPD	Dissolved Chloride (Cl)	2019/08/29	9.5		%	20

N/A = Not Applicable

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

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

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 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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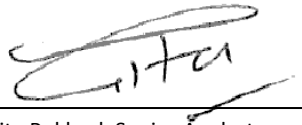
BV Labs Job #: B970248
Report Date: 2019/09/01

DILLON CONSULTING LTD.
Client Project #: 19-1308
Site Location: MILLER
Sampler Initials: SKN

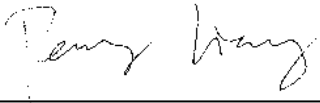
VALIDATION SIGNATURE PAGE

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

Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics



Gita Pokhrel, Senior Analyst



Harry (Peng) Liang, Senior Analyst

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports.
For Service Group specific validation please refer to the Validation Signature Page.

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851

CHAIN OF CUSTODY RECORD

M 081283

Page 1 of 1

Invoice Information	Report Information (if differs from invoice)	Project Information	Turnaround Time (TAT) Required
Company: Dillon Consulting Ltd.	Company: Dillon Consulting Ltd.	Quotation #:	☑ 5 - 7 Days Regular (Most analyses)
Contact Name: Accounts Payable	Contact Name: Nanci Beaupre/Shannon Nordal	P.O. #/ AFE#:	PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS
Address: 1558 willson Place Wpg, MB	Address: 1558 Willson Place Wpg, MB	Project #: 19-1308	Rush TAT (Surcharges will be applied)
Phone: 204-453-2301	Phone: nbeaupre@dillon.ca	Site Location: Miller	☐ Same Day ☐ 2 Days ☐ 1 Day ☐ 3-4 Days
Email: apwinnipeg@dillon.ca	Email: snordal@dillon.ca	Site #:	Date Required:
Copies:	Copies: PDF, excel, EDD	Sampled By: SKN	Rush Confirmation #:

Laboratory Use Only

	YES	NO	Cooler ID			
Seal Present		✓				
Seal Intact		✓	Temp	9.8	11.2	11.4
Cooling Media	✓					
	YES	NO	Cooler ID	MCAL		
Seal Present	✓					
Seal Intact	✓		Temp	5	6	7
Cooling Media	✓					
	YES	NO	Cooler ID			
Seal Present						
Seal Intact			Temp			
Cooling Media						

Depot Reception

Analysis Requested

	Sample Identification	Depth (Unit)	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	# of containers	BTEX F1 ☐ VOC ☐	BTEX F1-F2	BTEX F1-F4	Routine Water	Regulated Metals ☐ Tot ☐ Diss	Mercury Total ☐ Dissolved	Salinity 4	Sieve (75 micron)	Texture (% Sand, Silt, Clay)	Basic Class II Landfill	BTEX	Dissolved Metals	Routine	Dissolved Mercury	Total Organic Carbon	HOLD - DO NOT ANALYZE
1	OW-11		2019/08/22	12:45	water	7											✓	✓	✓	✓	✓	
2	FD1		2019/08/22	—	water	7											✓	✓	✓	✓	✓	
3	~~MW~~ OW-9		2019/08/22	11:15	water	7											✓	✓	✓	✓	✓	
4	OW-8		2019/08/22	11:45	water	7											✓	✓	✓	✓	✓	
5	OW-3		2019/08/22	12:00	water	7											✓	✓	✓	✓	✓	
6	OW-7		2019/08/22	12:30	water	7											✓	✓	✓	✓	✓	
7	OW-10		2019/08/22	13:10	water	7											✓	✓	✓	✓	✓	
8	OW-4		2019/08/22	13:30	water	7											✓	✓	✓	✓	✓	
9																						
10																						

Please indicate Filtered, Preserved or Both (F, P, F/P)

Regulatory Criteria

☐ AT1
☐ CCME
☐ Drinking Water
☐ D50 (Drilling Waste)
☐ Saskatchewan
☐ Other:

Special Instructions

very silty (OW-11)
very silty (ow-9)
slightly silty (OW-8)
very silty (ow-10)
*sampled & delivered on ice same day.

Relinquished by: (Signature/ Print)	DATE (YYYY/MM/DD)	Time (HH:MM)	Received by: (Signature/ Print)	DATE (YYYY/MM/DD)	Time (HH:MM)
Shannon Nordal	2019/08/22	15:20	BH Brooklyn H	2019/08/22	1520
			CL TINA UWITJG	2019/08/23	08:50

22-Aug-19 16:20
Ioana Stoica
B970248
KK7 INS-0099

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~~Temp~~: 5, 6, 7 C5-4

AB FCD-00331/7

Your Project #: 19-1308
Site Location: MILLER
Your C.O.C. #: M081284

Attention: Nanci Beaupre

DILLON CONSULTING LTD.
1558 Willson Place
Winnipeg, MB
CANADA R3T 0Y4

Report Date: 2019/09/06
Report #: R2777297
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B971940
Received: 2019/08/28, 13:25

Sample Matrix: Water
Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity @25C (pp, total), CO3,HCO3,OH (1)	4	N/A	2019/09/03	AB SOP-00005	SM 23 2320 B m
BTEX/F1 in Water by HS GC/MS/FID (1)	4	N/A	2019/08/30	AB SOP-00039	CCME CWS/EPA 8260d m
F1-BTEX (1)	4	N/A	2019/08/31		Auto Calc
Cadmium - low level CCME - Dissolved (1)	1	N/A	2019/09/03		Auto Calc
Cadmium - low level CCME - Dissolved (1)	3	N/A	2019/09/04		Auto Calc
Chloride/Sulphate by Auto Colourimetry (1)	4	N/A	2019/09/04	AB SOP-00020 / AB SOP-00018	SM23-4500-Cl/SO4-E m
Conductivity @25C (1)	4	N/A	2019/09/03	AB SOP-00005	SM 23 2510 B m
Hardness (1)	3	N/A	2019/09/04		Auto Calc
Hardness (1)	1	N/A	2019/09/05		Auto Calc
Mercury (Dissolved) by CV (1)	2	2019/09/03	2019/09/03	CAL SOP-00007	EPA 1631 RE 20460 m
Mercury (Dissolved) by CV-Lab Filtered (1)	2	2019/09/04	2019/09/04	CAL SOP-00007	EPA 1631 RE 20460 m
Elements by ICP - Dissolved (1, 2)	1	N/A	2019/09/03	AB SOP-00042	EPA 6010d R5 m
Elements by ICP - Dissolved (1, 2)	1	N/A	2019/09/04	AB SOP-00042	EPA 6010d R5 m
Elements by ICP-Dissolved-Lab Filtered (1, 2)	2	N/A	2019/08/31	AB SOP-00042	EPA 6010d R5 m
Elements by ICPMS - Dissolved (1, 2)	2	N/A	2019/08/31	AB SOP-00043	EPA 6020b R2 m
Elements by ICPMS-Dissolved-Lab Filtered (1, 3)	1	N/A	2019/08/31	AB SOP-00043	EPA 6020b R2 m
Elements by ICPMS-Dissolved-Lab Filtered (1, 3)	1	N/A	2019/09/04	AB SOP-00043	EPA 6020b R2 m
Ion Balance (1)	4	N/A	2019/08/31		Auto Calc
Sum of cations, anions (1)	1	N/A	2019/09/03		Auto Calc
Sum of cations, anions (1)	2	N/A	2019/09/04		Auto Calc
Sum of cations, anions (1)	1	N/A	2019/09/05		Auto Calc
Nitrate and Nitrite (1)	2	N/A	2019/09/03		Auto Calc
Nitrate and Nitrite (1)	2	N/A	2019/09/04		Auto Calc
Nitrate + Nitrite-N (calculated) (1)	2	N/A	2019/09/03		Auto Calc
Nitrate + Nitrite-N (calculated) (1)	2	N/A	2019/09/04		Auto Calc
Nitrogen (Nitrite - Nitrate) by IC (1)	3	N/A	2019/08/31	AB SOP-00023	SM 23 4110 B m
Nitrogen (Nitrite - Nitrate) by IC (1)	1	N/A	2019/09/03	AB SOP-00023	SM 23 4110 B m
pH @25°C (1, 4)	4	N/A	2019/09/03	AB SOP-00005	SM 23 4500-H+B m
Total Dissolved Solids (Calculated) (1)	3	N/A	2019/09/04		Auto Calc
Total Dissolved Solids (Calculated) (1)	1	N/A	2019/09/05		Auto Calc
Carbon (Total Organic) (1, 5)	4	N/A	2019/09/04	AB SOP-00087	MMCW 119 1996 m

Bureau Veritas Laboratories Winnipeg: Unit D, 675 Berry Street R3H 1A7 Telephone (204) 772-7276 Fax (204) 772-2386

Your Project #: 19-1308
Site Location: MILLER
Your C.O.C. #: M081284

Attention: Nanci Beaupre

DILLON CONSULTING LTD.
1558 Willson Place
Winnipeg, MB
CANADA R3T 0Y4

Report Date: 2019/09/06
Report #: R2777297
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: B971940
Received: 2019/08/28, 13:25

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs 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. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs 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 BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

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. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
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) This test was performed by BV Labs Calgary Environmental
(2) Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.
(3) Samples were filtered and preserved at the lab. Values may not reflect concentrations at the time of sampling. Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.
(4) The CCME method requires pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the CCME holding time. Bureau Veritas Laboratories endeavours to analyze samples as soon as possible after receipt.
(5) TOC present in the sample should be considered as non-purgeable TOC.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Janelle Kochan, B.Sc., Senior Customer Service Representative
Email: Janelle.KOCHAN@bvlabs.com
Phone# (204)259-0231

==========

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BV Labs Job #: B971940
Report Date: 2019/09/06

DILLON CONSULTING LTD.
Client Project #: 19-1308
Site Location: MILLER
Sampler Initials: SKN

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WJ6982			WJ6983		WJ6984		
Sampling Date		2019/08/28 09:45			2019/08/28 09:30		2019/08/28 10:50		
COC Number		M081284			M081284		M081284		
	UNITS	**OW-1**	**RDL**	**QC Batch**	**OW-2**	**RDL**	**OW-5**	**RDL**	**QC Batch**
Calculated Parameters									
Anion Sum	meq/L	70	N/A	9568876	110	N/A	80	N/A	9568876
Cation Sum	meq/L	70	N/A	9568876	120	N/A	68	N/A	9568876
Hardness (CaCO3)	mg/L	2700	0.50	9568869	4500	0.50	2500	0.50	9568869
Ion Balance (% Difference)	%	0.13	N/A	9568875	4.5	N/A	7.9	N/A	9568875
Dissolved Nitrate (NO3)	mg/L	0.37	0.044	9568671	1.8	0.044	1.7	0.044	9568671
Nitrate plus Nitrite (N)	mg/L	0.083	0.014	9568677	0.41	0.014	0.39	0.014	9568677
Dissolved Nitrite (NO2)	mg/L	<0.033	0.033	9568671	<0.033	0.033	<0.033	0.033	9568671
Calculated Total Dissolved Solids	mg/L	4300	20	9568882	7100	50	4800	25	9568882
Misc. Inorganics									
Conductivity	uS/cm	4900	2.0	9573144	7800	2.0	5700	2.0	9573144
pH	pH	7.59	N/A	9573142	7.61	N/A	7.81	N/A	9573142
Total Organic Carbon (C)	mg/L	13	0.50	9572450	29 (1)	2.5	11 (1)	10	9572450
Low Level Elements									
Dissolved Cadmium (Cd)	ug/L	0.077	0.020	9568633	0.23	0.020	0.043	0.020	9568633
Anions									
Alkalinity (PP as CaCO3)	mg/L	<1.0	1.0	9573140	<1.0	1.0	<1.0	1.0	9573140
Alkalinity (Total as CaCO3)	mg/L	530	1.0	9573140	590	1.0	520	1.0	9573140
Bicarbonate (HCO3)	mg/L	650	1.0	9573140	720	1.0	640	1.0	9573140
Carbonate (CO3)	mg/L	<1.0	1.0	9573140	<1.0	1.0	<1.0	1.0	9573140
Hydroxide (OH)	mg/L	<1.0	1.0	9573140	<1.0	1.0	<1.0	1.0	9573140
Dissolved Chloride (Cl)	mg/L	84	1.0	9574418	50	1.0	140	1.0	9574418
Dissolved Sulphate (SO4)	mg/L	2700 (2)	20	9574418	4700 (2)	50	3200 (2)	25	9574418
Nutrients									
Dissolved Nitrite (N)	mg/L	<0.010	0.010	9571134	<0.010	0.010	<0.010	0.010	9571136
Dissolved Nitrate (N)	mg/L	0.083	0.010	9571134	0.41	0.010	0.39	0.010	9571136

RDL = Reportable Detection Limit
N/A = Not Applicable
(1) Detection limits raised due to sample matrix.
(2) Detection limits raised due to dilution to bring analyte within the calibrated range.

Bureau Veritas Laboratories Winnipeg: Unit D, 675 Berry Street R3H 1A7 Telephone (204) 772-7276 Fax (204) 772-2386

BV Labs Job #: B971940
Report Date: 2019/09/06

DILLON CONSULTING LTD.
Client Project #: 19-1308
Site Location: MILLER
Sampler Initials: SKN

RESULTS OF CHEMICAL ANALYSES OF WATER

BV Labs ID		WJ6984			WJ6985		
Sampling Date		2019/08/28 10:50			2019/08/28 10:15		
COC Number		M081284			M081284		
	UNITS	**OW-5 Lab-Dup**	**RDL**	**QC Batch**	**OW-6**	**RDL**	**QC Batch**
Calculated Parameters							
Anion Sum	meq/L				49	N/A	9568876
Cation Sum	meq/L				44	N/A	9568876
Hardness (CaCO3)	mg/L				1800	0.50	9572364
Ion Balance (% Difference)	%				5.2	N/A	9568875
Dissolved Nitrate (NO3)	mg/L				140	0.22	9568671
Nitrate plus Nitrite (N)	mg/L				32	0.051	9568677
Dissolved Nitrite (NO2)	mg/L				<0.033	0.033	9568671
Calculated Total Dissolved Solids	mg/L				3000	20	9568882
Misc. Inorganics							
Conductivity	uS/cm				3800	2.0	9573144
pH	pH				7.37	N/A	9573142
Total Organic Carbon (C)	mg/L				7.5 (1)	2.5	9572450
Low Level Elements							
Dissolved Cadmium (Cd)	ug/L				0.049	0.020	9573337
Anions							
Alkalinity (PP as CaCO3)	mg/L				<1.0	1.0	9573140
Alkalinity (Total as CaCO3)	mg/L				410	1.0	9573140
Bicarbonate (HCO3)	mg/L				510	1.0	9573140
Carbonate (CO3)	mg/L				<1.0	1.0	9573140
Hydroxide (OH)	mg/L				<1.0	1.0	9573140
Dissolved Chloride (Cl)	mg/L	140	1.0	9574418	51	1.0	9574418
Dissolved Sulphate (SO4)	mg/L	3200	25	9574418	1800 (2)	20	9574418
Nutrients							
Dissolved Nitrite (N)	mg/L	<0.010	0.010	9571136	<0.010	0.010	9571134
Dissolved Nitrate (N)	mg/L	0.38	0.010	9571136	32 (2)	0.050	9571134

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable
(1) Detection limits raised due to sample matrix.
(2) Detection limits raised due to dilution to bring analyte within the calibrated range.

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BV Labs Job #: B971940
Report Date: 2019/09/06

DILLON CONSULTING LTD.
Client Project #: 19-1308
Site Location: MILLER
Sampler Initials: SKN

MERCURY BY COLD VAPOR (WATER)

BV Labs ID		WJ6982	WJ6983			WJ6984	WJ6985		
Sampling Date		2019/08/28 09:45	2019/08/28 09:30			2019/08/28 10:50	2019/08/28 10:15		
COC Number		M081284	M081284			M081284	M081284		
	UNITS	**OW-1**	**OW-2**	**RDL**	**QC Batch**	**OW-5**	**OW-6**	**RDL**	**QC Batch**
Elements									
Dissolved Mercury (Hg)	ug/L	<0.0020	<0.0020	0.0020	9572707				
Lab Filtered Elements									
Dissolved Mercury (Hg)	ug/L					<0.0020	<0.0020	0.0020	9575334
RDL = Reportable Detection Limit									

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BV Labs Job #: B971940
Report Date: 2019/09/06

DILLON CONSULTING LTD.
Client Project #: 19-1308
Site Location: MILLER
Sampler Initials: SKN

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

BV Labs ID		WJ6982		WJ6983			WJ6984		
Sampling Date		2019/08/28 09:45		2019/08/28 09:30			2019/08/28 10:50		
COC Number		M081284		M081284			M081284		
	UNITS	**OW-1**	**RDL**	**OW-2**	**RDL**	**QC Batch**	**OW-5**	**RDL**	**QC Batch**
Elements									
Dissolved Aluminum (Al)	mg/L	0.0034	0.0030	0.0065	0.0030	9571382			
Dissolved Antimony (Sb)	mg/L	<0.00060	0.00060	<0.00060	0.00060	9571382			
Dissolved Arsenic (As)	mg/L	0.00068	0.00020	0.0011	0.00020	9571382			
Dissolved Barium (Ba)	mg/L	<0.010	0.010	<0.010	0.010	9571373			
Dissolved Beryllium (Be)	mg/L	<0.0010	0.0010	<0.0010	0.0010	9571382			
Dissolved Boron (B)	mg/L	0.22	0.020	0.16	0.020	9571373			
Dissolved Calcium (Ca)	mg/L	490	0.30	450	0.30	9571373			
Dissolved Chromium (Cr)	mg/L	0.0059	0.0010	<0.0010	0.0010	9571382			
Dissolved Cobalt (Co)	mg/L	<0.00030	0.00030	0.0065	0.00030	9571382			
Dissolved Copper (Cu)	mg/L	0.0059	0.00020	0.018	0.00020	9571382			
Dissolved Iron (Fe)	mg/L	0.39	0.060	0.53	0.060	9571373			
Dissolved Lead (Pb)	mg/L	0.00020	0.00020	0.00054	0.00020	9571382			
Dissolved Lithium (Li)	mg/L	0.67	0.020	1.0	0.020	9571373			
Dissolved Magnesium (Mg)	mg/L	360	0.20	820 (1)	1.0	9571373			
Dissolved Manganese (Mn)	mg/L	0.032	0.0040	4.2	0.0040	9571373			
Dissolved Molybdenum (Mo)	mg/L	0.0048	0.00020	0.014	0.00020	9571382			
Dissolved Nickel (Ni)	mg/L	0.012	0.00050	0.064	0.00050	9571382			
Dissolved Phosphorus (P)	mg/L	<0.10	0.10	<0.10	0.10	9571373			
Dissolved Potassium (K)	mg/L	10	0.30	11	0.30	9571373			
Dissolved Selenium (Se)	mg/L	0.00044	0.00020	0.00059	0.00020	9571382			
Dissolved Silicon (Si)	mg/L	9.6	0.10	9.5	0.10	9571373			
Dissolved Silver (Ag)	mg/L	<0.00010	0.00010	<0.00010	0.00010	9571382			
Dissolved Sodium (Na)	mg/L	340	0.50	740 (1)	2.5	9571373			
Dissolved Strontium (Sr)	mg/L	3.3	0.020	4.7	0.020	9571373			
Dissolved Sulphur (S)	mg/L	940 (1)	1.0	1800 (1)	1.0	9571373			
Dissolved Thallium (Tl)	mg/L	<0.00020	0.00020	<0.00020	0.00020	9571382			
Dissolved Tin (Sn)	mg/L	<0.0010	0.0010	<0.0010	0.0010	9571382			
Dissolved Titanium (Ti)	mg/L	<0.0010	0.0010	<0.0010	0.0010	9571382			
Dissolved Uranium (U)	mg/L	0.12	0.00010	0.20	0.00010	9571382			
Dissolved Vanadium (V)	mg/L	0.0020	0.0010	<0.0010	0.0010	9571382			
Dissolved Zinc (Zn)	mg/L	0.019	0.0030	0.018	0.0030	9571382			

RDL = Reportable Detection Limit
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

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BV Labs Job #: B971940
Report Date: 2019/09/06

DILLON CONSULTING LTD.
Client Project #: 19-1308
Site Location: MILLER
Sampler Initials: SKN

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

BV Labs ID		WJ6982		WJ6983			WJ6984		
Sampling Date		2019/08/28 09:45		2019/08/28 09:30			2019/08/28 10:50		
COC Number		M081284		M081284			M081284		
	UNITS	**OW-1**	**RDL**	**OW-2**	**RDL**	**QC Batch**	**OW-5**	**RDL**	**QC Batch**
Lab Filtered Elements									
Dissolved Aluminum (Al)	mg/L						0.0045	0.0030	9571384
Dissolved Antimony (Sb)	mg/L						<0.00060	0.00060	9571384
Dissolved Arsenic (As)	mg/L						0.00080	0.00020	9571384
Dissolved Barium (Ba)	mg/L						<0.010	0.010	9571395
Dissolved Beryllium (Be)	mg/L						<0.0010	0.0010	9571384
Dissolved Boron (B)	mg/L						0.24	0.020	9571395
Dissolved Calcium (Ca)	mg/L						390	0.30	9571395
Dissolved Chromium (Cr)	mg/L						<0.0010	0.0010	9571384
Dissolved Cobalt (Co)	mg/L						<0.00030	0.00030	9571384
Dissolved Copper (Cu)	mg/L						0.0032	0.00020	9571384
Dissolved Iron (Fe)	mg/L						0.39	0.060	9571395
Dissolved Lead (Pb)	mg/L						0.00020	0.00020	9571384
Dissolved Lithium (Li)	mg/L						0.71	0.020	9571395
Dissolved Magnesium (Mg)	mg/L						370	0.20	9571395
Dissolved Manganese (Mn)	mg/L						0.023	0.0040	9571395
Dissolved Molybdenum (Mo)	mg/L						0.0027	0.00020	9571384
Dissolved Nickel (Ni)	mg/L						0.0071	0.00050	9571384
Dissolved Phosphorus (P)	mg/L						<0.10	0.10	9571395
Dissolved Potassium (K)	mg/L						13	0.30	9571395
Dissolved Selenium (Se)	mg/L						0.00028	0.00020	9571384
Dissolved Silicon (Si)	mg/L						7.8	0.10	9571395
Dissolved Silver (Ag)	mg/L						<0.00010	0.00010	9571384
Dissolved Sodium (Na)	mg/L						420	0.50	9571395
Dissolved Strontium (Sr)	mg/L						3.0	0.020	9571395
Dissolved Sulphur (S)	mg/L						1200 (1)	1.0	9571395
Dissolved Thallium (Tl)	mg/L						<0.00020	0.00020	9571384
Dissolved Tin (Sn)	mg/L						<0.0010	0.0010	9571384
Dissolved Titanium (Ti)	mg/L						0.0016	0.0010	9571384
Dissolved Uranium (U)	mg/L						0.058	0.00010	9571384
Dissolved Vanadium (V)	mg/L						<0.0010	0.0010	9571384
Dissolved Zinc (Zn)	mg/L						<0.0030	0.0030	9571384

RDL = Reportable Detection Limit
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

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BV Labs Job #: B971940
Report Date: 2019/09/06

DILLON CONSULTING LTD.
Client Project #: 19-1308
Site Location: MILLER
Sampler Initials: SKN

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

BV Labs ID		WJ6985		
Sampling Date		2019/08/28 10:15		
COC Number		M081284		
	UNITS	**OW-6**	**RDL**	**QC Batch**
Lab Filtered Elements				
Dissolved Aluminum (Al)	mg/L	<0.0030	0.0030	9574516
Dissolved Antimony (Sb)	mg/L	<0.00060	0.00060	9574516
Dissolved Arsenic (As)	mg/L	0.00057	0.00020	9574516
Dissolved Beryllium (Be)	mg/L	<0.0010	0.0010	9574516
Dissolved Calcium (Ca)	mg/L	360	0.30	9571395
Dissolved Chromium (Cr)	mg/L	<0.0010	0.0010	9574516
Dissolved Cobalt (Co)	mg/L	<0.00030	0.00030	9574516
Dissolved Copper (Cu)	mg/L	0.0048	0.00020	9574516
Dissolved Iron (Fe)	mg/L	0.28	0.060	9571395
Dissolved Lead (Pb)	mg/L	<0.00020	0.00020	9574516
Dissolved Magnesium (Mg)	mg/L	210	0.20	9571395
Dissolved Manganese (Mn)	mg/L	0.019	0.0040	9571395
Dissolved Molybdenum (Mo)	mg/L	0.0014	0.00020	9574516
Dissolved Nickel (Ni)	mg/L	0.0042	0.00050	9574516
Dissolved Potassium (K)	mg/L	5.8	0.30	9571395
Dissolved Selenium (Se)	mg/L	0.00063	0.00020	9574516
Dissolved Silver (Ag)	mg/L	<0.00010	0.00010	9574516
Dissolved Sodium (Na)	mg/L	200	0.50	9571395
Dissolved Thallium (Tl)	mg/L	<0.00020	0.00020	9574516
Dissolved Tin (Sn)	mg/L	<0.0010	0.0010	9574516
Dissolved Titanium (Ti)	mg/L	<0.0010	0.0010	9574516
Dissolved Uranium (U)	mg/L	0.044	0.00010	9574516
Dissolved Vanadium (V)	mg/L	<0.0010	0.0010	9574516
Dissolved Zinc (Zn)	mg/L	0.0069	0.0030	9574516
RDL = Reportable Detection Limit				

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BV Labs Job #: B971940
Report Date: 2019/09/06

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Client Project #: 19-1308
Site Location: MILLER
Sampler Initials: SKN

VOLATILE ORGANICS BY GC-MS (WATER)

BV Labs ID		WJ6982			WJ6982			WJ6983	WJ6984		
Sampling Date		2019/08/28 09:45			2019/08/28 09:45			2019/08/28 09:30	2019/08/28 10:50		
COC Number		M081284			M081284			M081284	M081284		
	UNITS	**OW-1**	**RDL**	**QC Batch**	**OW-1 Lab-Dup**	**RDL**	**QC Batch**	**OW-2**	**OW-5**	**RDL**	**QC Batch**
Volatiles											
Benzene	ug/L	<0.40	0.40	9569810	<0.40	0.40	9569810	<0.40	<0.40	0.40	9569810
Toluene	ug/L	<0.40	0.40	9569810	<0.40	0.40	9569810	<0.40	0.74	0.40	9569810
Ethylbenzene	ug/L	<0.40	0.40	9569810	<0.40	0.40	9569810	<0.40	<0.40	0.40	9569810
m & p-Xylene	ug/L	<0.80	0.80	9569810	<0.80	0.80	9569810	<0.80	<0.80	0.80	9569810
o-Xylene	ug/L	<0.40	0.40	9569810	<0.40	0.40	9569810	<0.40	<0.40	0.40	9569810
Xylenes (Total)	ug/L	<0.89	0.89	9567929				<0.89	<0.89	0.89	9567929
F1 (C6-C10) - BTEX	ug/L	<100	100	9567929				<100	<100	100	9567929
F1 (C6-C10)	ug/L	<100	100	9569810	<100	100	9569810	<100	<100	100	9569810
Surrogate Recovery (%)											
1,4-Difluorobenzene (sur.)	%	102		9569810	103		9569810	103	103		9569810
4-Bromofluorobenzene (sur.)	%	96		9569810	98		9569810	96	96		9569810
D4-1,2-Dichloroethane (sur.)	%	94		9569810	96		9569810	95	93		9569810

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate

BV Labs ID		WJ6985		
Sampling Date		2019/08/28 10:15		
COC Number		M081284		
	UNITS	**OW-6**	**RDL**	**QC Batch**
Volatiles				
Benzene	ug/L	<0.40	0.40	9569810
Toluene	ug/L	<0.40	0.40	9569810
Ethylbenzene	ug/L	<0.40	0.40	9569810
m & p-Xylene	ug/L	<0.80	0.80	9569810
o-Xylene	ug/L	<0.40	0.40	9569810
Xylenes (Total)	ug/L	<0.89	0.89	9567929
F1 (C6-C10) - BTEX	ug/L	<100	100	9567929
F1 (C6-C10)	ug/L	<100	100	9569810
Surrogate Recovery (%)				
1,4-Difluorobenzene (sur.)	%	103		9569810
4-Bromofluorobenzene (sur.)	%	97		9569810
D4-1,2-Dichloroethane (sur.)	%	96		9569810

RDL = Reportable Detection Limit

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BV Labs Job #: B971940
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DILLON CONSULTING LTD.
Client Project #: 19-1308
Site Location: MILLER
Sampler Initials: SKN

GENERAL COMMENTS

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

Package 1	8.3°C

Sample WJ6985 [OW-6] : Sample was analyzed past method specified hold time for Nitrogen (Nitrite - Nitrate) by IC. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised.

RESULTS OF CHEMICAL ANALYSES OF WATER Comments

Sample WJ6985 [OW-6] Nitrogen (Nitrite - Nitrate) by IC: Sample was originally processed within hold time. Data quality required investigation. Re-analysis was completed past recommended hold time.

Results relate only to the items tested.

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BV Labs Job #: B971940
Report Date: 2019/09/06

DILLON CONSULTING LTD.
Client Project #: 19-1308
Site Location: MILLER
Sampler Initials: SKN

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
9569810	RSU	Matrix Spike [WJ6983-06]	1,4-Difluorobenzene (sur.)	2019/08/30		102	%	50 - 140
			4-Bromofluorobenzene (sur.)	2019/08/30		98	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2019/08/30		93	%	50 - 140
			Benzene	2019/08/30		86	%	50 - 140
			Toluene	2019/08/30		87	%	50 - 140
			Ethylbenzene	2019/08/30		88	%	50 - 140
			m & p-Xylene	2019/08/30		87	%	50 - 140
			o-Xylene	2019/08/30		90	%	50 - 140
			F1 (C6-C10)	2019/08/30		79	%	60 - 140
9569810	RSU	Spiked Blank	1,4-Difluorobenzene (sur.)	2019/08/30		104	%	50 - 140
			4-Bromofluorobenzene (sur.)	2019/08/30		98	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2019/08/30		90	%	50 - 140
			Benzene	2019/08/30		84	%	60 - 130
			Toluene	2019/08/30		86	%	60 - 130
			Ethylbenzene	2019/08/30		87	%	60 - 130
			m & p-Xylene	2019/08/30		86	%	60 - 130
			o-Xylene	2019/08/30		89	%	60 - 130
			F1 (C6-C10)	2019/08/30		98	%	60 - 140
9569810	RSU	Method Blank	1,4-Difluorobenzene (sur.)	2019/08/30		104	%	50 - 140
			4-Bromofluorobenzene (sur.)	2019/08/30		96	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2019/08/30		93	%	50 - 140
			Benzene	2019/08/30	<0.40		ug/L	
			Toluene	2019/08/30	<0.40		ug/L	
			Ethylbenzene	2019/08/30	<0.40		ug/L	
			m & p-Xylene	2019/08/30	<0.80		ug/L	
			o-Xylene	2019/08/30	<0.40		ug/L	
			F1 (C6-C10)	2019/08/30	<100		ug/L	
9569810	RSU	RPD [WJ6982-06]	Benzene	2019/08/30	NC		%	30
			Toluene	2019/08/30	NC		%	30
			Ethylbenzene	2019/08/30	NC		%	30
			m & p-Xylene	2019/08/30	NC		%	30
			o-Xylene	2019/08/30	NC		%	30
			F1 (C6-C10)	2019/08/30	NC		%	30
9571134	PR6	Matrix Spike	Dissolved Nitrite (N)	2019/08/31		94	%	80 - 120
			Dissolved Nitrate (N)	2019/08/31		107	%	80 - 120
9571134	PR6	Spiked Blank	Dissolved Nitrite (N)	2019/08/31		101	%	80 - 120
			Dissolved Nitrate (N)	2019/08/31		103	%	80 - 120
9571134	PR6	Method Blank	Dissolved Nitrite (N)	2019/08/31	<0.010		mg/L	
			Dissolved Nitrate (N)	2019/08/31	<0.010		mg/L	
9571134	PR6	RPD	Dissolved Nitrite (N)	2019/08/31	NC		%	20
			Dissolved Nitrate (N)	2019/08/31	11		%	20
9571136	PR6	Matrix Spike [WJ6984-01]	Dissolved Nitrite (N)	2019/08/31		104	%	80 - 120
			Dissolved Nitrate (N)	2019/08/31		106	%	80 - 120
9571136	PR6	Spiked Blank	Dissolved Nitrite (N)	2019/08/31		100	%	80 - 120
			Dissolved Nitrate (N)	2019/08/31		102	%	80 - 120
9571136	PR6	Method Blank	Dissolved Nitrite (N)	2019/08/31	<0.010		mg/L	
			Dissolved Nitrate (N)	2019/08/31	<0.010		mg/L	
9571136	PR6	RPD [WJ6984-01]	Dissolved Nitrite (N)	2019/08/31	NC		%	20
			Dissolved Nitrate (N)	2019/08/31	0.69		%	20
9571373	MAP	Matrix Spike	Dissolved Barium (Ba)	2019/09/03		40 (1)	%	80 - 120
			Dissolved Boron (B)	2019/09/03		90	%	80 - 120
			Dissolved Calcium (Ca)	2019/09/03		NC	%	80 - 120
			Dissolved Iron (Fe)	2019/09/03		91	%	80 - 120

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dissolved Lithium (Li)	2019/09/03		90	%	80 - 120
			Dissolved Magnesium (Mg)	2019/09/03		NC	%	80 - 120
			Dissolved Manganese (Mn)	2019/09/03		92	%	80 - 120
			Dissolved Phosphorus (P)	2019/09/03		99	%	80 - 120
			Dissolved Potassium (K)	2019/09/03		92	%	80 - 120
			Dissolved Silicon (Si)	2019/09/03		95	%	80 - 120
			Dissolved Sodium (Na)	2019/09/03		NC	%	80 - 120
			Dissolved Strontium (Sr)	2019/09/03		79 (1)	%	80 - 120
			Dissolved Sulphur (S)	2019/09/03		NC	%	80 - 120
9571373	MAP	Spiked Blank	Dissolved Barium (Ba)	2019/09/03		96	%	80 - 120
			Dissolved Boron (B)	2019/09/03		94	%	80 - 120
			Dissolved Calcium (Ca)	2019/09/03		99	%	80 - 120
			Dissolved Iron (Fe)	2019/09/03		101	%	80 - 120
			Dissolved Lithium (Li)	2019/09/03		95	%	80 - 120
			Dissolved Magnesium (Mg)	2019/09/03		101	%	80 - 120
			Dissolved Manganese (Mn)	2019/09/03		99	%	80 - 120
			Dissolved Phosphorus (P)	2019/09/03		98	%	80 - 120
			Dissolved Potassium (K)	2019/09/03		93	%	80 - 120
			Dissolved Silicon (Si)	2019/09/03		100	%	80 - 120
			Dissolved Sodium (Na)	2019/09/03		93	%	80 - 120
			Dissolved Strontium (Sr)	2019/09/03		96	%	80 - 120
			Dissolved Sulphur (S)	2019/09/03		98	%	80 - 120
9571373	MAP	Method Blank	Dissolved Barium (Ba)	2019/09/03	<0.010		mg/L	
			Dissolved Boron (B)	2019/09/03	<0.020		mg/L	
			Dissolved Calcium (Ca)	2019/09/03	<0.30		mg/L	
			Dissolved Iron (Fe)	2019/09/03	<0.060		mg/L	
			Dissolved Lithium (Li)	2019/09/03	<0.020		mg/L	
			Dissolved Magnesium (Mg)	2019/09/03	<0.20		mg/L	
			Dissolved Manganese (Mn)	2019/09/03	<0.0040		mg/L	
			Dissolved Phosphorus (P)	2019/09/03	<0.10		mg/L	
			Dissolved Potassium (K)	2019/09/03	<0.30		mg/L	
			Dissolved Silicon (Si)	2019/09/03	<0.10		mg/L	
			Dissolved Sodium (Na)	2019/09/03	<0.50		mg/L	
			Dissolved Strontium (Sr)	2019/09/03	<0.020		mg/L	
			Dissolved Sulphur (S)	2019/09/03	<0.20		mg/L	
9571373	MAP	RPD	Dissolved Calcium (Ca)	2019/09/03	0.52		%	20
			Dissolved Iron (Fe)	2019/09/03	1.1		%	20
			Dissolved Magnesium (Mg)	2019/09/03	0.11		%	20
			Dissolved Manganese (Mn)	2019/09/03	0.29		%	20
			Dissolved Potassium (K)	2019/09/03	0.16		%	20
			Dissolved Sodium (Na)	2019/09/03	0.043		%	20
9571382	PC5	Matrix Spike	Dissolved Aluminum (Al)	2019/08/31		96	%	80 - 120
			Dissolved Antimony (Sb)	2019/08/31		93	%	80 - 120
			Dissolved Arsenic (As)	2019/08/31		95	%	80 - 120
			Dissolved Beryllium (Be)	2019/08/31		98	%	80 - 120
			Dissolved Chromium (Cr)	2019/08/31		94	%	80 - 120
			Dissolved Cobalt (Co)	2019/08/31		NC	%	80 - 120
			Dissolved Copper (Cu)	2019/08/31		94	%	80 - 120
			Dissolved Lead (Pb)	2019/08/31		93	%	80 - 120
			Dissolved Molybdenum (Mo)	2019/08/31		99	%	80 - 120
			Dissolved Nickel (Ni)	2019/08/31		NC	%	80 - 120
			Dissolved Selenium (Se)	2019/08/31		90	%	80 - 120
			Dissolved Silver (Ag)	2019/08/31		92	%	80 - 120

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QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dissolved Thallium (Tl)	2019/08/31		92	%	80 - 120
			Dissolved Tin (Sn)	2019/08/31		97	%	80 - 120
			Dissolved Titanium (Ti)	2019/08/31		105	%	80 - 120
			Dissolved Uranium (U)	2019/08/31		100	%	80 - 120
			Dissolved Vanadium (V)	2019/08/31		95	%	80 - 120
			Dissolved Zinc (Zn)	2019/08/31		NC	%	80 - 120
9571382	PC5	Spiked Blank	Dissolved Aluminum (Al)	2019/08/31		100	%	80 - 120
			Dissolved Antimony (Sb)	2019/08/31		94	%	80 - 120
			Dissolved Arsenic (As)	2019/08/31		96	%	80 - 120
			Dissolved Beryllium (Be)	2019/08/31		98	%	80 - 120
			Dissolved Chromium (Cr)	2019/08/31		97	%	80 - 120
			Dissolved Cobalt (Co)	2019/08/31		94	%	80 - 120
			Dissolved Copper (Cu)	2019/08/31		96	%	80 - 120
			Dissolved Lead (Pb)	2019/08/31		94	%	80 - 120
			Dissolved Molybdenum (Mo)	2019/08/31		94	%	80 - 120
			Dissolved Nickel (Ni)	2019/08/31		93	%	80 - 120
			Dissolved Selenium (Se)	2019/08/31		93	%	80 - 120
			Dissolved Silver (Ag)	2019/08/31		93	%	80 - 120
			Dissolved Thallium (Tl)	2019/08/31		93	%	80 - 120
			Dissolved Tin (Sn)	2019/08/31		92	%	80 - 120
			Dissolved Titanium (Ti)	2019/08/31		106	%	80 - 120
			Dissolved Uranium (U)	2019/08/31		100	%	80 - 120
			Dissolved Vanadium (V)	2019/08/31		98	%	80 - 120
			Dissolved Zinc (Zn)	2019/08/31		93	%	80 - 120
9571382	PC5	Method Blank	Dissolved Aluminum (Al)	2019/09/01	<0.0030		mg/L	
			Dissolved Antimony (Sb)	2019/09/01	<0.00060		mg/L	
			Dissolved Arsenic (As)	2019/09/01	<0.00020		mg/L	
			Dissolved Beryllium (Be)	2019/09/01	<0.0010		mg/L	
			Dissolved Chromium (Cr)	2019/09/01	<0.0010		mg/L	
			Dissolved Cobalt (Co)	2019/09/01	<0.00030		mg/L	
			Dissolved Copper (Cu)	2019/09/01	<0.00020		mg/L	
			Dissolved Lead (Pb)	2019/09/01	<0.00020		mg/L	
			Dissolved Molybdenum (Mo)	2019/09/01	<0.00020		mg/L	
			Dissolved Nickel (Ni)	2019/09/01	<0.00050		mg/L	
			Dissolved Selenium (Se)	2019/09/01	<0.00020		mg/L	
			Dissolved Silver (Ag)	2019/09/01	<0.00010		mg/L	
			Dissolved Thallium (Tl)	2019/09/01	<0.00020		mg/L	
			Dissolved Tin (Sn)	2019/09/01	<0.0010		mg/L	
			Dissolved Titanium (Ti)	2019/09/01	<0.0010		mg/L	
			Dissolved Uranium (U)	2019/09/01	<0.00010		mg/L	
			Dissolved Vanadium (V)	2019/09/01	<0.0010		mg/L	
			Dissolved Zinc (Zn)	2019/09/01	<0.0030		mg/L	
9571382	PC5	RPD	Dissolved Aluminum (Al)	2019/08/31	NC		%	20
			Dissolved Antimony (Sb)	2019/08/31	NC		%	20
			Dissolved Arsenic (As)	2019/08/31	16		%	20
			Dissolved Beryllium (Be)	2019/08/31	NC		%	20
			Dissolved Chromium (Cr)	2019/08/31	NC		%	20
			Dissolved Cobalt (Co)	2019/08/31	0.94		%	20
			Dissolved Copper (Cu)	2019/08/31	NC		%	20
			Dissolved Lead (Pb)	2019/08/31	7.7		%	20
			Dissolved Molybdenum (Mo)	2019/08/31	NC		%	20
			Dissolved Nickel (Ni)	2019/08/31	2.0		%	20
			Dissolved Selenium (Se)	2019/08/31	14		%	20

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QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dissolved Silver (Ag)	2019/08/31	NC		%	20
			Dissolved Thallium (Tl)	2019/08/31	NC		%	20
			Dissolved Tin (Sn)	2019/08/31	NC		%	20
			Dissolved Titanium (Ti)	2019/08/31	NC		%	20
			Dissolved Uranium (U)	2019/08/31	NC		%	20
			Dissolved Vanadium (V)	2019/08/31	NC		%	20
			Dissolved Zinc (Zn)	2019/08/31	4.1		%	20
9571384	PC5	Matrix Spike	Dissolved Aluminum (Al)	2019/08/31		120 (1)	%	80 - 120
			Dissolved Antimony (Sb)	2019/08/31		103	%	80 - 120
			Dissolved Arsenic (As)	2019/08/31		105	%	80 - 120
			Dissolved Beryllium (Be)	2019/08/31		106	%	80 - 120
			Dissolved Chromium (Cr)	2019/08/31		82	%	80 - 120
			Dissolved Cobalt (Co)	2019/08/31		96	%	80 - 120
			Dissolved Copper (Cu)	2019/08/31		87	%	80 - 120
			Dissolved Lead (Pb)	2019/08/31		84	%	80 - 120
			Dissolved Molybdenum (Mo)	2019/08/31		99	%	80 - 120
			Dissolved Nickel (Ni)	2019/08/31		93	%	80 - 120
			Dissolved Selenium (Se)	2019/08/31		84	%	80 - 120
			Dissolved Silver (Ag)	2019/08/31		81	%	80 - 120
			Dissolved Thallium (Tl)	2019/08/31		92	%	80 - 120
			Dissolved Tin (Sn)	2019/08/31		108	%	80 - 120
			Dissolved Titanium (Ti)	2019/08/31		81	%	80 - 120
			Dissolved Uranium (U)	2019/08/31		115	%	80 - 120
			Dissolved Vanadium (V)	2019/08/31		103	%	80 - 120
			Dissolved Zinc (Zn)	2019/08/31		121 (1)	%	80 - 120
9571384	PC5	Spiked Blank	Dissolved Aluminum (Al)	2019/08/31		96	%	80 - 120
			Dissolved Antimony (Sb)	2019/08/31		92	%	80 - 120
			Dissolved Arsenic (As)	2019/08/31		98	%	80 - 120
			Dissolved Beryllium (Be)	2019/08/31		96	%	80 - 120
			Dissolved Chromium (Cr)	2019/08/31		95	%	80 - 120
			Dissolved Cobalt (Co)	2019/08/31		96	%	80 - 120
			Dissolved Copper (Cu)	2019/08/31		96	%	80 - 120
			Dissolved Lead (Pb)	2019/08/31		93	%	80 - 120
			Dissolved Molybdenum (Mo)	2019/08/31		94	%	80 - 120
			Dissolved Nickel (Ni)	2019/08/31		97	%	80 - 120
			Dissolved Selenium (Se)	2019/08/31		91	%	80 - 120
			Dissolved Silver (Ag)	2019/08/31		90	%	80 - 120
			Dissolved Thallium (Tl)	2019/08/31		91	%	80 - 120
			Dissolved Tin (Sn)	2019/08/31		91	%	80 - 120
			Dissolved Titanium (Ti)	2019/08/31		100	%	80 - 120
			Dissolved Uranium (U)	2019/08/31		98	%	80 - 120
			Dissolved Vanadium (V)	2019/08/31		95	%	80 - 120
			Dissolved Zinc (Zn)	2019/08/31		97	%	80 - 120
9571384	PC5	Method Blank	Dissolved Aluminum (Al)	2019/08/31	<0.0030		mg/L	
			Dissolved Antimony (Sb)	2019/08/31	<0.00060		mg/L	
			Dissolved Arsenic (As)	2019/08/31	<0.00020		mg/L	
			Dissolved Beryllium (Be)	2019/08/31	<0.0010		mg/L	
			Dissolved Chromium (Cr)	2019/08/31	<0.0010		mg/L	
			Dissolved Cobalt (Co)	2019/08/31	<0.00030		mg/L	
			Dissolved Copper (Cu)	2019/08/31	<0.00020		mg/L	
			Dissolved Lead (Pb)	2019/08/31	<0.00020		mg/L	
			Dissolved Molybdenum (Mo)	2019/08/31	<0.00020		mg/L	
			Dissolved Nickel (Ni)	2019/08/31	<0.00050		mg/L	

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			Dissolved Selenium (Se)	2019/08/31	<0.00020		mg/L	
			Dissolved Silver (Ag)	2019/08/31	<0.00010		mg/L	
			Dissolved Thallium (Tl)	2019/08/31	<0.00020		mg/L	
			Dissolved Tin (Sn)	2019/08/31	<0.0010		mg/L	
			Dissolved Titanium (Ti)	2019/08/31	<0.0010		mg/L	
			Dissolved Uranium (U)	2019/08/31	<0.00010		mg/L	
			Dissolved Vanadium (V)	2019/08/31	<0.0010		mg/L	
			Dissolved Zinc (Zn)	2019/08/31	<0.0030		mg/L	
9571384	PC5	RPD	Dissolved Aluminum (Al)	2019/08/31	NC		%	20
			Dissolved Antimony (Sb)	2019/08/31	NC		%	20
			Dissolved Arsenic (As)	2019/08/31	13		%	20
			Dissolved Beryllium (Be)	2019/08/31	NC		%	20
			Dissolved Chromium (Cr)	2019/08/31	NC		%	20
			Dissolved Cobalt (Co)	2019/08/31	NC		%	20
			Dissolved Copper (Cu)	2019/08/31	NC		%	20
			Dissolved Lead (Pb)	2019/08/31	NC		%	20
			Dissolved Molybdenum (Mo)	2019/08/31	NC		%	20
			Dissolved Nickel (Ni)	2019/08/31	NC		%	20
			Dissolved Selenium (Se)	2019/08/31	NC		%	20
			Dissolved Silver (Ag)	2019/08/31	NC		%	20
			Dissolved Thallium (Tl)	2019/08/31	NC		%	20
			Dissolved Tin (Sn)	2019/08/31	NC		%	20
			Dissolved Titanium (Ti)	2019/08/31	NC		%	20
			Dissolved Uranium (U)	2019/08/31	NC		%	20
			Dissolved Vanadium (V)	2019/08/31	NC		%	20
			Dissolved Zinc (Zn)	2019/08/31	NC		%	20
9571395	ALX	Matrix Spike	Dissolved Barium (Ba)	2019/08/31		86	%	80 - 120
			Dissolved Boron (B)	2019/08/31		88	%	80 - 120
			Dissolved Calcium (Ca)	2019/08/31		NC	%	80 - 120
			Dissolved Iron (Fe)	2019/08/31		90	%	80 - 120
			Dissolved Lithium (Li)	2019/08/31		87	%	80 - 120
			Dissolved Magnesium (Mg)	2019/08/31		86	%	80 - 120
			Dissolved Manganese (Mn)	2019/08/31		89	%	80 - 120
			Dissolved Phosphorus (P)	2019/08/31		93	%	80 - 120
			Dissolved Potassium (K)	2019/08/31		87	%	80 - 120
			Dissolved Silicon (Si)	2019/08/31		91	%	80 - 120
			Dissolved Sodium (Na)	2019/08/31		80	%	80 - 120
			Dissolved Strontium (Sr)	2019/08/31		82	%	80 - 120
			Dissolved Sulphur (S)	2019/08/31		NC	%	80 - 120
9571395	ALX	Spiked Blank	Dissolved Barium (Ba)	2019/08/31		91	%	80 - 120
			Dissolved Boron (B)	2019/08/31		93	%	80 - 120
			Dissolved Calcium (Ca)	2019/08/31		93	%	80 - 120
			Dissolved Iron (Fe)	2019/08/31		98	%	80 - 120
			Dissolved Lithium (Li)	2019/08/31		90	%	80 - 120
			Dissolved Magnesium (Mg)	2019/08/31		94	%	80 - 120
			Dissolved Manganese (Mn)	2019/08/31		93	%	80 - 120
			Dissolved Phosphorus (P)	2019/08/31		94	%	80 - 120
			Dissolved Potassium (K)	2019/08/31		89	%	80 - 120
			Dissolved Silicon (Si)	2019/08/31		96	%	80 - 120
			Dissolved Sodium (Na)	2019/08/31		90	%	80 - 120
			Dissolved Strontium (Sr)	2019/08/31		91	%	80 - 120
			Dissolved Sulphur (S)	2019/08/31		93	%	80 - 120
9571395	ALX	Method Blank	Dissolved Barium (Ba)	2019/08/31	<0.010		mg/L	

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QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dissolved Boron (B)	2019/08/31	<0.020		mg/L	
			Dissolved Calcium (Ca)	2019/08/31	<0.30		mg/L	
			Dissolved Iron (Fe)	2019/08/31	<0.060		mg/L	
			Dissolved Lithium (Li)	2019/08/31	<0.020		mg/L	
			Dissolved Magnesium (Mg)	2019/08/31	<0.20		mg/L	
			Dissolved Manganese (Mn)	2019/08/31	<0.0040		mg/L	
			Dissolved Phosphorus (P)	2019/08/31	<0.10		mg/L	
			Dissolved Potassium (K)	2019/08/31	<0.30		mg/L	
			Dissolved Silicon (Si)	2019/08/31	<0.10		mg/L	
			Dissolved Sodium (Na)	2019/08/31	<0.50		mg/L	
			Dissolved Strontium (Sr)	2019/08/31	<0.020		mg/L	
			Dissolved Sulphur (S)	2019/08/31	<0.20		mg/L	
9571395	ALX	RPD	Dissolved Calcium (Ca)	2019/08/31	0.20		%	20
			Dissolved Iron (Fe)	2019/08/31	2.1		%	20
			Dissolved Magnesium (Mg)	2019/08/31	0.28		%	20
			Dissolved Manganese (Mn)	2019/08/31	NC		%	20
			Dissolved Potassium (K)	2019/08/31	0.18		%	20
			Dissolved Sodium (Na)	2019/08/31	0.34		%	20
9572450	KGH	Matrix Spike	Total Organic Carbon (C)	2019/09/04		NC	%	80 - 120
9572450	KGH	Spiked Blank	Total Organic Carbon (C)	2019/09/04		107	%	80 - 120
9572450	KGH	Method Blank	Total Organic Carbon (C)	2019/09/04	<0.50		mg/L	
9572450	KGH	RPD	Total Organic Carbon (C)	2019/09/04	2.0		%	20
9572707	RK3	Matrix Spike	Dissolved Mercury (Hg)	2019/09/03		99	%	80 - 120
9572707	RK3	Spiked Blank	Dissolved Mercury (Hg)	2019/09/03		101	%	80 - 120
9572707	RK3	Method Blank	Dissolved Mercury (Hg)	2019/09/03	<0.0020		ug/L	
9572707	RK3	RPD	Dissolved Mercury (Hg)	2019/09/03	NC		%	20
9573140	LZ0	Spiked Blank	Alkalinity (Total as CaCO3)	2019/09/03		92	%	80 - 120
9573140	LZ0	Method Blank	Alkalinity (PP as CaCO3)	2019/09/04	<1.0		mg/L	
			Alkalinity (Total as CaCO3)	2019/09/04	<1.0		mg/L	
			Bicarbonate (HCO3)	2019/09/04	<1.0		mg/L	
			Carbonate (CO3)	2019/09/04	<1.0		mg/L	
			Hydroxide (OH)	2019/09/04	<1.0		mg/L	
9573140	LZ0	RPD	Alkalinity (PP as CaCO3)	2019/09/03	NC		%	20
			Alkalinity (Total as CaCO3)	2019/09/03	2.3		%	20
			Bicarbonate (HCO3)	2019/09/03	2.3		%	20
			Carbonate (CO3)	2019/09/03	NC		%	20
			Hydroxide (OH)	2019/09/03	NC		%	20
9573142	LZ0	Spiked Blank	pH	2019/09/03		99	%	97 - 103
9573142	LZ0	RPD	pH	2019/09/03	0.77		%	N/A
9573144	LZ0	Spiked Blank	Conductivity	2019/09/03		102	%	90 - 110
9573144	LZ0	Method Blank	Conductivity	2019/09/04	<2.0		uS/cm	
9573144	LZ0	RPD	Conductivity	2019/09/03	0.16		%	10
9574418	STI	Matrix Spike [WJ6984-01]	Dissolved Chloride (Cl)	2019/09/04		NC	%	80 - 120
			Dissolved Sulphate (SO4)	2019/09/04		NC	%	80 - 120
9574418	STI	Spiked Blank	Dissolved Chloride (Cl)	2019/09/04		101	%	80 - 120
			Dissolved Sulphate (SO4)	2019/09/04		96	%	80 - 120
9574418	STI	Method Blank	Dissolved Chloride (Cl)	2019/09/04	<1.0		mg/L	
			Dissolved Sulphate (SO4)	2019/09/04	<1.0		mg/L	
9574418	STI	RPD [WJ6984-01]	Dissolved Chloride (Cl)	2019/09/04	1.6		%	20
			Dissolved Sulphate (SO4)	2019/09/04	0.84		%	20
9574516	ANE	Matrix Spike	Dissolved Aluminum (Al)	2019/09/04		92	%	80 - 120
			Dissolved Antimony (Sb)	2019/09/04		92	%	80 - 120
			Dissolved Arsenic (As)	2019/09/04		96	%	80 - 120

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QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dissolved Beryllium (Be)	2019/09/04		100	%	80 - 120
			Dissolved Chromium (Cr)	2019/09/04		96	%	80 - 120
			Dissolved Cobalt (Co)	2019/09/04		93	%	80 - 120
			Dissolved Copper (Cu)	2019/09/04		91	%	80 - 120
			Dissolved Lead (Pb)	2019/09/04		86	%	80 - 120
			Dissolved Molybdenum (Mo)	2019/09/04		105	%	80 - 120
			Dissolved Nickel (Ni)	2019/09/04		92	%	80 - 120
			Dissolved Selenium (Se)	2019/09/04		99	%	80 - 120
			Dissolved Silver (Ag)	2019/09/04		93	%	80 - 120
			Dissolved Thallium (Tl)	2019/09/04		89	%	80 - 120
			Dissolved Tin (Sn)	2019/09/04		101	%	80 - 120
			Dissolved Titanium (Ti)	2019/09/04		96	%	80 - 120
			Dissolved Uranium (U)	2019/09/04		95	%	80 - 120
			Dissolved Vanadium (V)	2019/09/04		97	%	80 - 120
			Dissolved Zinc (Zn)	2019/09/04		NC	%	80 - 120
9574516	ANE	Spiked Blank	Dissolved Aluminum (Al)	2019/09/04		93	%	80 - 120
			Dissolved Antimony (Sb)	2019/09/04		94	%	80 - 120
			Dissolved Arsenic (As)	2019/09/04		97	%	80 - 120
			Dissolved Beryllium (Be)	2019/09/04		100	%	80 - 120
			Dissolved Chromium (Cr)	2019/09/04		97	%	80 - 120
			Dissolved Cobalt (Co)	2019/09/04		96	%	80 - 120
			Dissolved Copper (Cu)	2019/09/04		99	%	80 - 120
			Dissolved Lead (Pb)	2019/09/04		92	%	80 - 120
			Dissolved Molybdenum (Mo)	2019/09/04		98	%	80 - 120
			Dissolved Nickel (Ni)	2019/09/04		95	%	80 - 120
			Dissolved Selenium (Se)	2019/09/04		96	%	80 - 120
			Dissolved Silver (Ag)	2019/09/04		95	%	80 - 120
			Dissolved Thallium (Tl)	2019/09/04		92	%	80 - 120
			Dissolved Tin (Sn)	2019/09/04		97	%	80 - 120
			Dissolved Titanium (Ti)	2019/09/04		99	%	80 - 120
			Dissolved Uranium (U)	2019/09/04		95	%	80 - 120
			Dissolved Vanadium (V)	2019/09/04		98	%	80 - 120
			Dissolved Zinc (Zn)	2019/09/04		94	%	80 - 120
9574516	ANE	Method Blank	Dissolved Aluminum (Al)	2019/09/04	<0.0030		mg/L	
			Dissolved Antimony (Sb)	2019/09/04	<0.00060		mg/L	
			Dissolved Arsenic (As)	2019/09/04	<0.00020		mg/L	
			Dissolved Beryllium (Be)	2019/09/04	<0.0010		mg/L	
			Dissolved Chromium (Cr)	2019/09/04	<0.0010		mg/L	
			Dissolved Cobalt (Co)	2019/09/04	<0.00030		mg/L	
			Dissolved Copper (Cu)	2019/09/04	<0.00020		mg/L	
			Dissolved Lead (Pb)	2019/09/04	<0.00020		mg/L	
			Dissolved Molybdenum (Mo)	2019/09/04	<0.00020		mg/L	
			Dissolved Nickel (Ni)	2019/09/04	<0.00050		mg/L	
			Dissolved Selenium (Se)	2019/09/04	<0.00020		mg/L	
			Dissolved Silver (Ag)	2019/09/04	<0.00010		mg/L	
			Dissolved Thallium (Tl)	2019/09/04	<0.00020		mg/L	
			Dissolved Tin (Sn)	2019/09/04	<0.0010		mg/L	
			Dissolved Titanium (Ti)	2019/09/04	<0.0010		mg/L	
			Dissolved Uranium (U)	2019/09/04	<0.00010		mg/L	
			Dissolved Vanadium (V)	2019/09/04	<0.0010		mg/L	
			Dissolved Zinc (Zn)	2019/09/04	<0.0030		mg/L	
9574516	ANE	RPD	Dissolved Aluminum (Al)	2019/09/04	NC		%	20
			Dissolved Antimony (Sb)	2019/09/04	8.3		%	20

Bureau Veritas Laboratories Winnipeg: Unit D, 675 Berry Street R3H 1A7 Telephone (204) 772-7276 Fax (204) 772-2386

BV Labs Job #: B971940
Report Date: 2019/09/06

DILLON CONSULTING LTD.
Client Project #: 19-1308
Site Location: MILLER
Sampler Initials: SKN

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dissolved Arsenic (As)	2019/09/04	3.5		%	20
			Dissolved Beryllium (Be)	2019/09/04	NC		%	20
			Dissolved Chromium (Cr)	2019/09/04	NC		%	20
			Dissolved Cobalt (Co)	2019/09/04	0.34		%	20
			Dissolved Copper (Cu)	2019/09/04	10		%	20
			Dissolved Lead (Pb)	2019/09/04	NC		%	20
			Dissolved Molybdenum (Mo)	2019/09/04	11		%	20
			Dissolved Nickel (Ni)	2019/09/04	3.0		%	20
			Dissolved Selenium (Se)	2019/09/04	5.1		%	20
			Dissolved Silver (Ag)	2019/09/04	NC		%	20
			Dissolved Thallium (Tl)	2019/09/04	NC		%	20
			Dissolved Tin (Sn)	2019/09/04	NC		%	20
			Dissolved Titanium (Ti)	2019/09/04	NC		%	20
			Dissolved Uranium (U)	2019/09/04	4.4		%	20
			Dissolved Vanadium (V)	2019/09/04	NC		%	20
			Dissolved Zinc (Zn)	2019/09/04	2.2		%	20
9575334	RK3	Matrix Spike	Dissolved Mercury (Hg)	2019/09/04		97	%	80 - 120
9575334	RK3	Spiked Blank	Dissolved Mercury (Hg)	2019/09/04		102	%	80 - 120
9575334	RK3	Method Blank	Dissolved Mercury (Hg)	2019/09/05	<0.0020		ug/L	
9575334	RK3	RPD	Dissolved Mercury (Hg)	2019/09/04	NC		%	20

N/A = Not Applicable

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

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

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 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).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

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Client Project #: 19-1308
Site Location: MILLER
Sampler Initials: SKN

VALIDATION SIGNATURE PAGE

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

Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics

Janet Gao, B.Sc., QP, Supervisor, Organics

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports.
For Service Group specific validation please refer to the Validation Signature Page.

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Edmonton: 9331-48 St. T6B 2R4. Toll Free (800) 386-7247
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CHAIN OF CUSTODY RECORD

M 081284

Page 1 of 1

Invoice Information	Report Information (if differs from invoice)	Project Information	Turnaround Time (TAT) Required
Company: Dillon Consulting Ltd.	Company: Dillon Consulting Ltd	Quotation #:	☑ 5 - 7 Days Regular (Most analyses)
Contact Name: Accounts Payable	Contact Name: Nanci Beaupre / Shannon Nordal	P.O. #/ AFE#:	PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS
Address: 1558 Willson Place Winnipeg, MB	Address: 1558 Willson Place Winnipeg, MB	Project #: 19-1308	Rush TAT (Surcharges will be applied)
Phone: 204-453-2301	Phone: nbeaupre@dillon.ca	Site Location: Miller	☐ Same Day ☐ 2 Days ☐ 1 Day ☐ 3-4 Days
Email: apwinnipeg@dillon.ca	Email: snordal@dillon.ca	Site #:	Date Required:
Copies:	Copies: PDF, excel, EDD	Sampled By: SKN	Rush Confirmation #:

Laboratory Use Only

	YES	NO	Cooler ID			
Seal Present		✓				
Seal Intact		✓	Temp	10.9	9.3	4.6
Cooling Media	✓					
	YES	NO	Cooler ID	MCAL		
Seal Present	✓					
Seal Intact	✓		Temp	5	3	2
Cooling Media	✓					
	YES	NO	Cooler ID			
Seal Present						
Seal Intact			Temp			
Cooling Media						

Depot Reception

Analysis Requested

Sample Identification	Depth (Unit)	Date Sampled (YYYY/MM/DD)	Time Sampled (HH:MM)	Matrix	# of containers	BTEX F1 ☐ VOC ☐	BTEX F1-F2	BTEX F1-F4	Routine Water	Regulated Metals Tot ☐ Diss ☐	Mercury Total ☐ Dissolved ☐	Salinity 4	Sieve (75 micron)	Texture (% Sand, Silt, Clay)	Basic Class II Landfill	BTEX	Dissolved Metals	Routine	Dissolved Mercury	Total Organic Carbon				HOLD - DO NOT ANALYZE
1 OW-1		2019/08/28	9:45	water												✓	✓	✓	✓	✓				
2 OW-2		2019/08/28	9:30	water												✓	✓	✓	✓	✓				
3 OW-5		2019/08/28	10:50	water												✓	✓	✓	✓					
4 OW-6		2019/08/28	10:15	water												✓	X	✓	X	✓				
5 FD2																Not sampled								
6																								
7																								
8																								
9																								
10																								

Please indicate Filtered, Preserved or Both (F, P, F/P)

Regulatory Criteria

☐ AT1
☐ CCME
☐ Drinking Water
☐ D50 (Drilling Waste)
☐ Saskatchewan
☐ Other:

Special Instructions

→ lab filter & preserve
→ insuff. water for metals & mercury.

same day sample & submission. packed on ice

ows & ow6 very silty

Relinquished by: (Signature/ Print)	DATE (YYYY/MM/DD)	Time (HH:MM)	Received by: (Signature/ Print)	DATE (YYYY/MM/DD)	Time (HH:MM)
Shannon Nordal / [signature]	2019/08/28	13:23	BH Brooklyn H CLEMENTINE COURTISE	2019/08/29	1325
			CH	2019/08/29	08:15

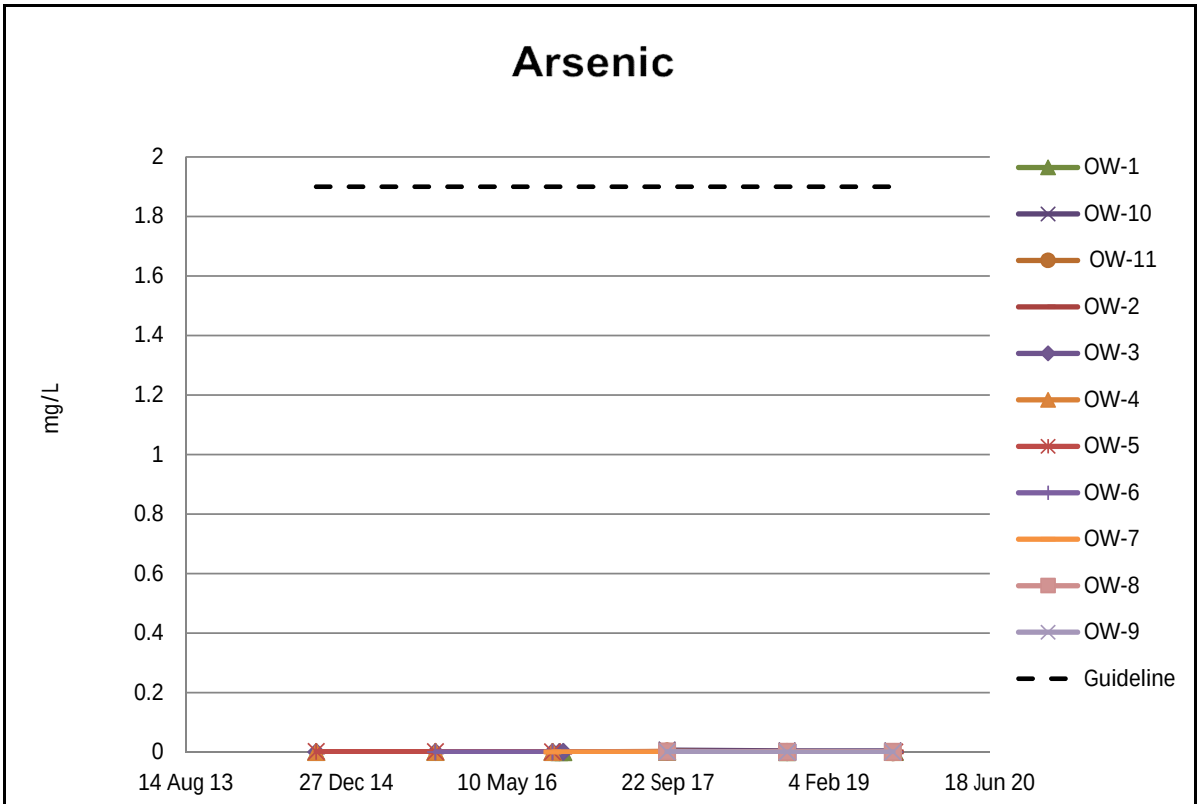
28-Aug-19 13:25
Ioana Stoica
B971940
SBZ INS-0174

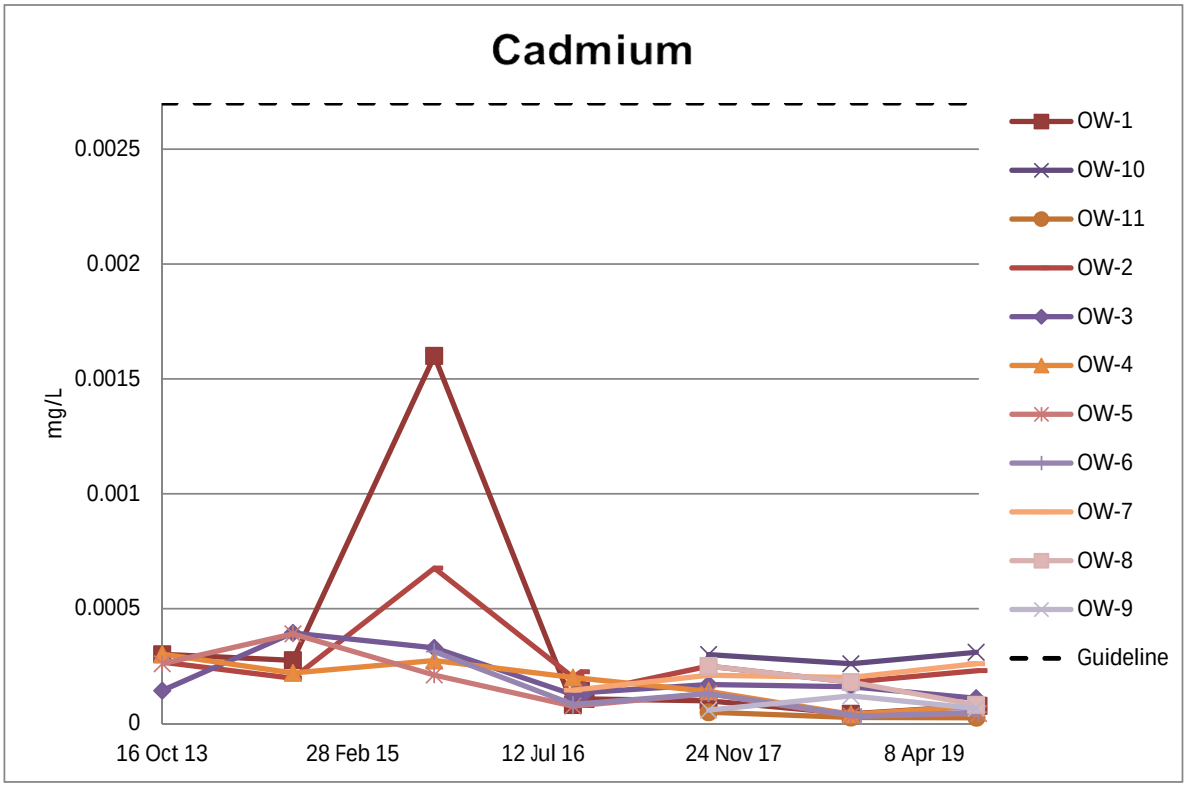
Unless otherwise agreed to in writing, work submitted on this Chain of Custody is subject to Maxxam's standard Terms and Conditions. Signing of this Chain of Custody document is acknowledgment and acceptance of our terms which are available for viewing at www.maxx

AB FCD-00331/7

Appendix B

Graph of Temporal Groundwater Concentrations





Appendix B

Graph of Temporal Groundwater Concentrations

2019 Environmental Program
Central Hazardous Waste Facility, R.M. of Montcalm

Date: Oct 19	Drawn: NLB
Scale: NTS	Chk'd:
Original:	Rev:
File Reference: 191308	

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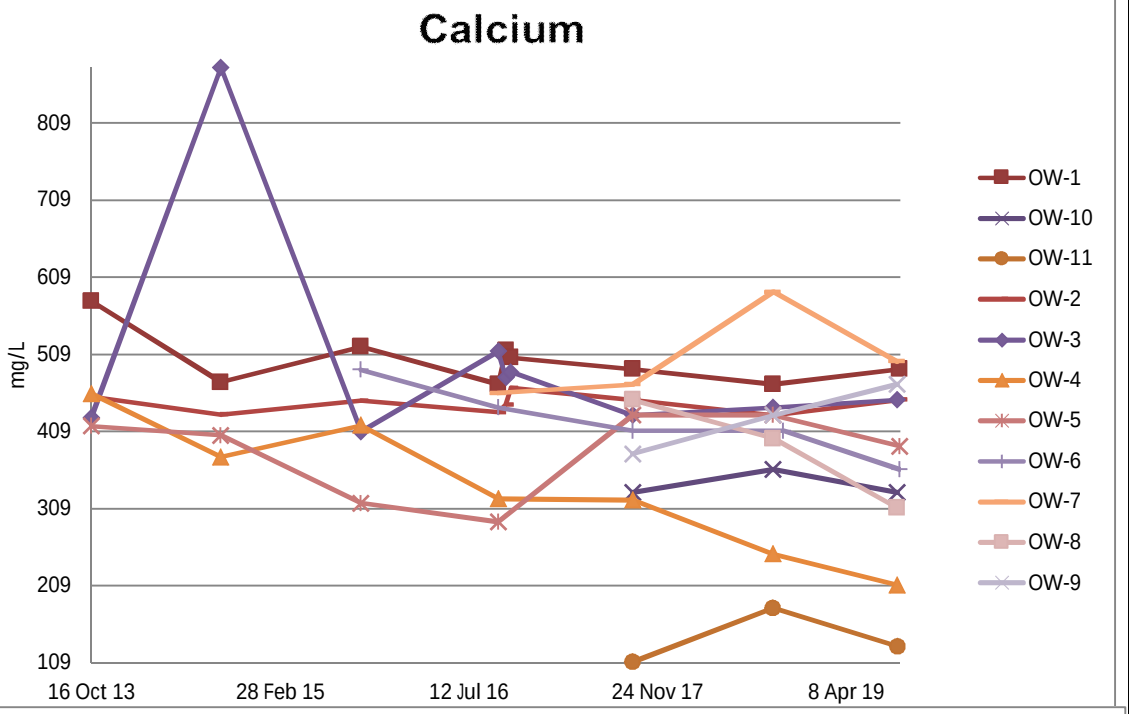

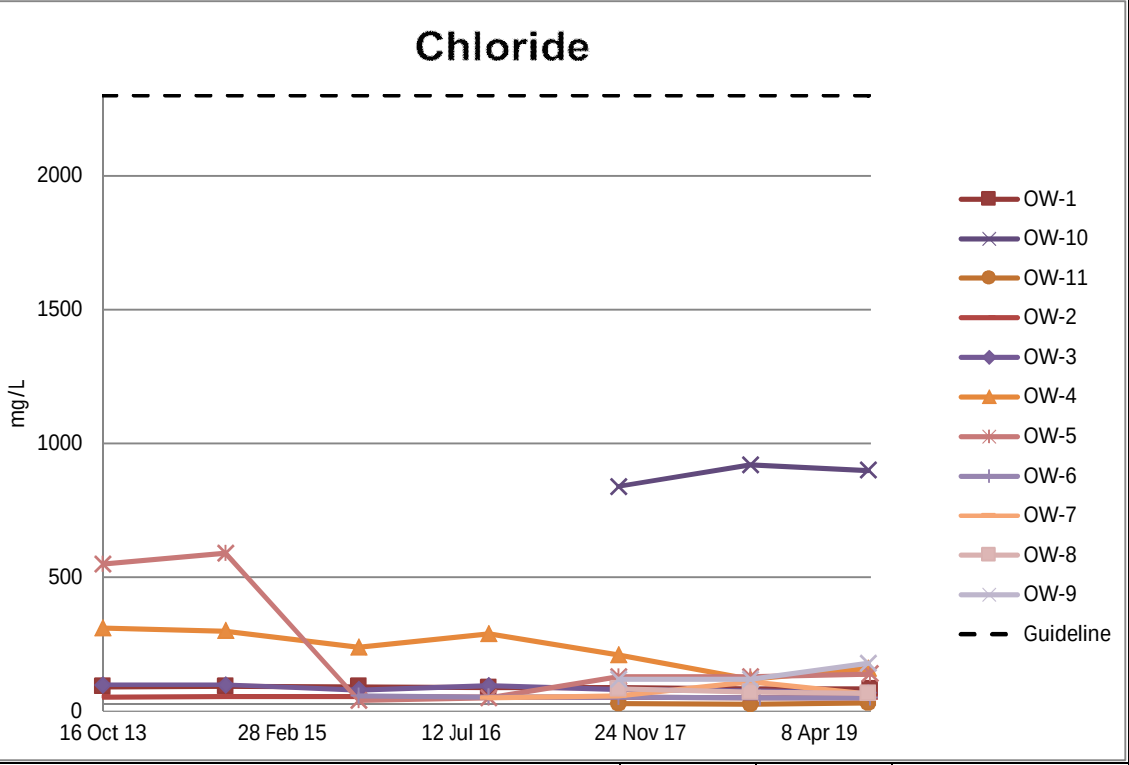

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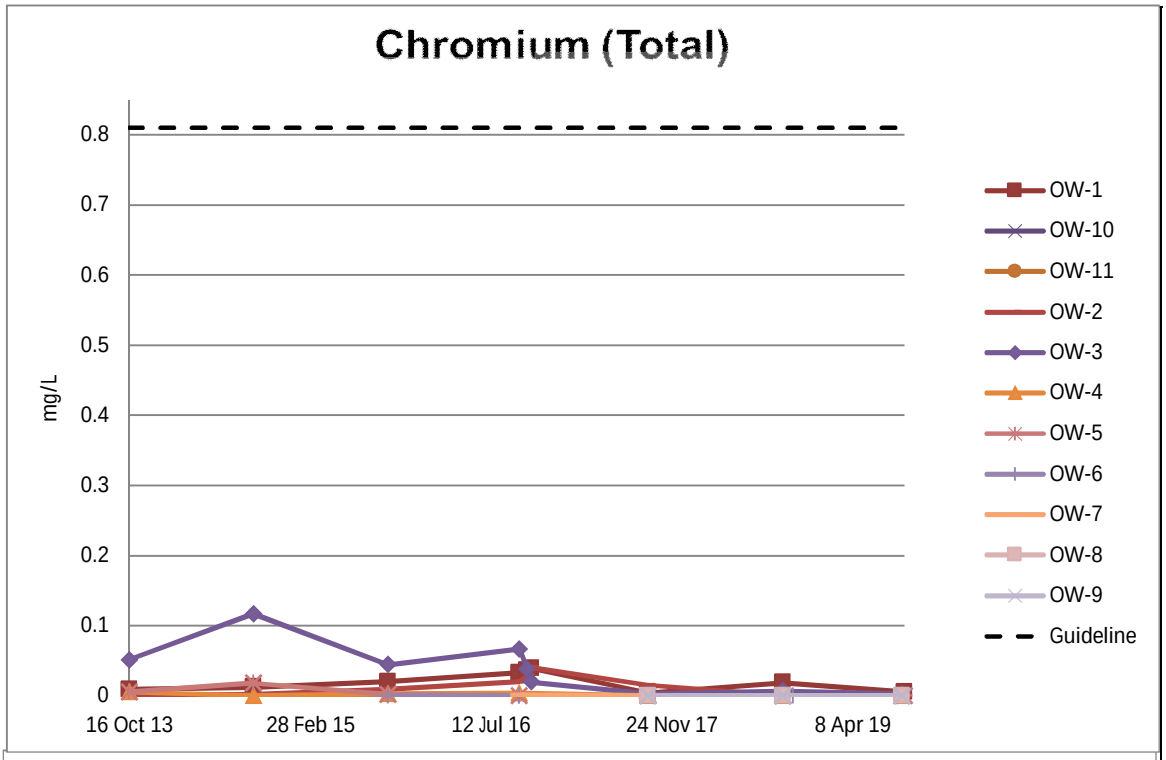

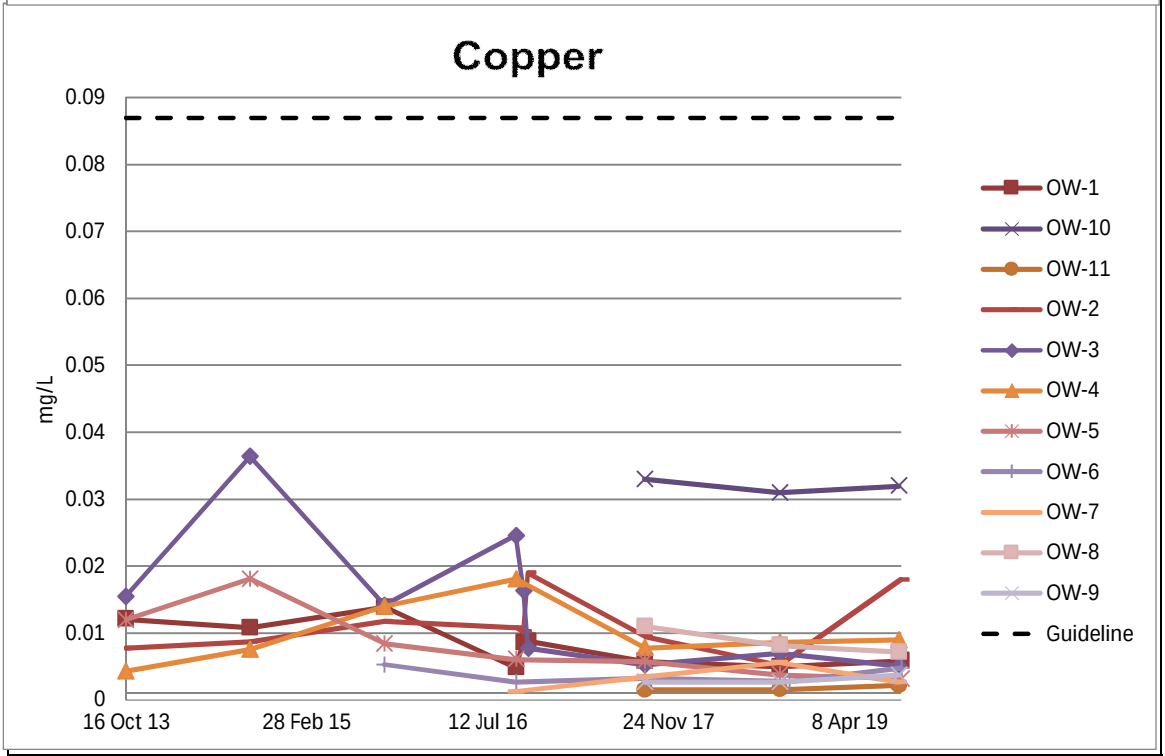

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