

Fall Clinton Creek Surface Water Quality and Hydrological Monitoring Program Report

Prepared for:
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Assessment and Abandoned Mines
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1.0 INTRODUCTION

Hemmera Envirochem Ltd. and Ecological Logistics & Research Ltd. (Hemmera/ELR) were retained by the Government of Yukon (YG), Assessment and Abandoned Mines (AAM) to conduct a water quality and hydrological monitoring program at the Clinton Creek Mine site in 2015/2016.

The Clinton Creek Mine Site (herein referred to as the Site) is an abandoned asbestos mine, formerly owned and operated by Cassiar Asbestos Corporation Limited from 1967 to 1978. Mining activities ceased in 1978 when the economic-value of the asbestos operations were exhausted (YG 2013). During operation, approximately 16 million tons of serpentinite rock containing 940,000 tonnes of white asbestos (known as chrysotile) were removed from three pits at the mine site. From 1978 to 1992, the company attempted to implement an abandonment plan and completed limited remedial activities at the Site. Since then, various weather events have destabilized creek channels and caused erosion on Site which has increased the potential for flooding. In 2002, the federal government implemented a stabilizing program at the Site under emergency provisions of the *Yukon Waters Act* (YG 2007) to mitigate further impacts. Upon devolution in 2003, AAM assumed responsibility and control of the care, maintenance and closure of the Site.

The purpose of this October 2015 sampling program was to monitor water quality, hydrology, and meteorological station data from the site as part of the overall care, maintenance and closure program objectives for the Site. The water quality and hydrology scope of work was based on program recommendations developed by Hemmera/ELR in 2015 (Hemmera 2015), while the meteorological station was installed and is managed by AAM, with maintenance work performed by other contractors.

1.1 SITE LOCATION AND HYDROLOGICAL SETTING

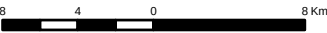
The Site is located approximately 75 km northwest of Dawson City (100 km by road), in the traditional territory of the Tr'ondëk Hwëch'in First Nation (**Figure 1**). The Site is within the Klondike Plateau Ecoregion of the Boreal Cordillera Ecozone (Smith et al. 1994), near the northern extent of the Klondike Plateau, at the edge of the Tintina Trench.

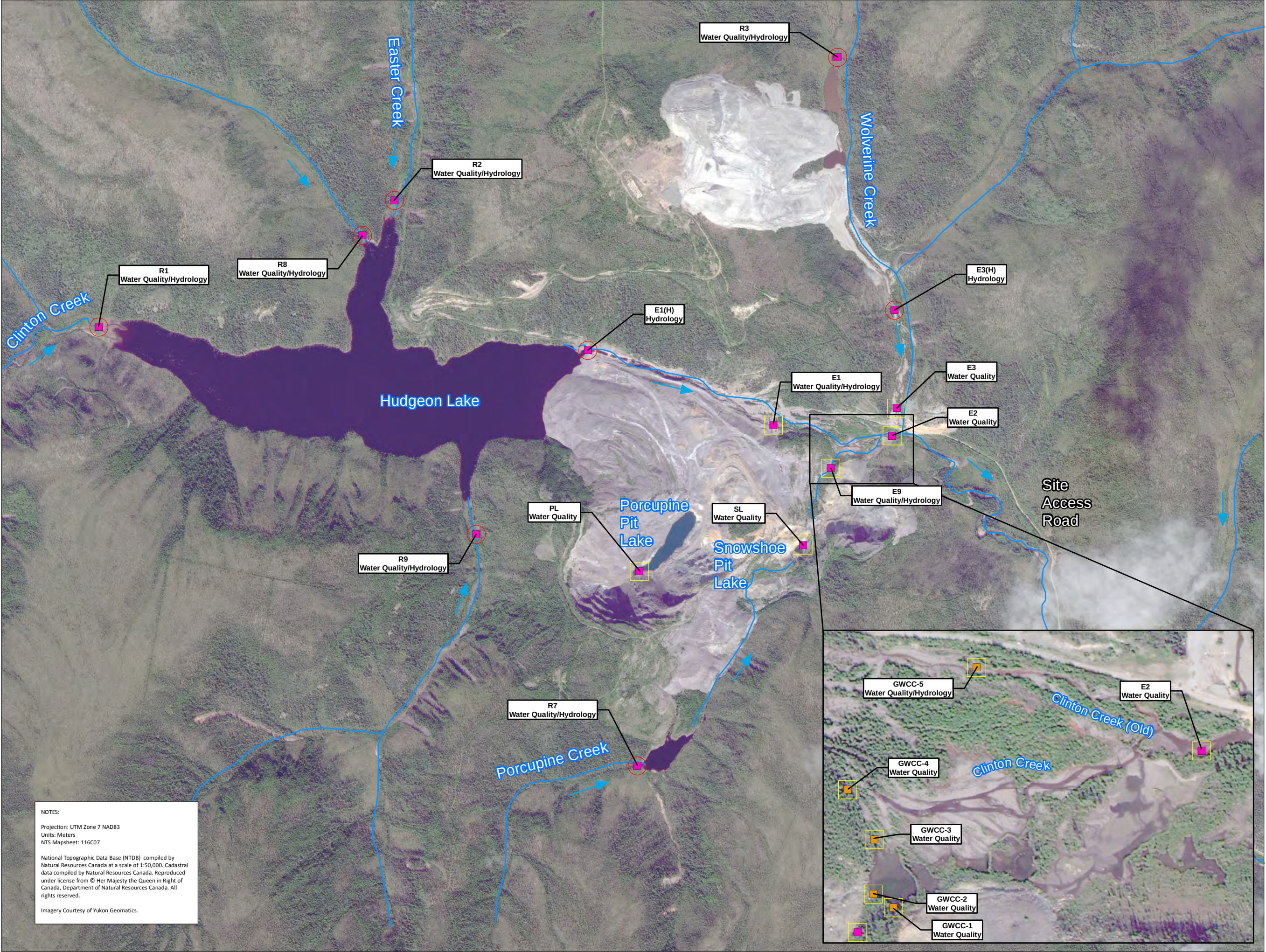
The Site falls within the drainage of the Forty Mile River, a tributary to the Yukon River. Clinton Creek flows through the Site from the west then continues southeast for approximately 8 km before flowing into the Forty Mile River. Tailings slumping into the valley have dammed Clinton Creek, forming Hudgeon Lake (**Figure 2**). The four named tributaries of Clinton Creek at or near the Site are as follows:

- Easter Creek which flows into Hudgeon Lake;
- Porcupine Creek and Wolverine Creek which flow through the Site to Clinton Creek from the south and north, respectively; and,
- Eagle Creek which flows into Clinton Creek from the north, downstream from the Site.

Slumping tailings have interrupted the flow of Wolverine Creek creating two ponds (**Figure 2**). Past mining activities have also formed two pit lakes: Porcupine Pit Lake (PL) and Snowshoe Pit Lake (SL).



 Client: 	Legend - Clinton Creek Site - Road - Limited-use road - Wetlands - Waterbodies - Vegetation  Project Area Scale: 1:400,000 	Clinton Creek Surface Water Quality and Hydrological Monitoring Program Figure 1 Project Area Overview <table border="1"> <tr> <td>Date: January 18, 2016</td> <td>Drawn by: CJ</td> </tr> <tr> <td>ELR Project #: 15-208.2</td> <td>Rev. #: 1</td> </tr> <tr> <td>Hemmera Project #: 1343-005.13</td> <td></td> </tr> </table>		Date: January 18, 2016	Drawn by: CJ	ELR Project #: 15-208.2	Rev. #: 1	Hemmera Project #: 1343-005.13	
		Date: January 18, 2016	Drawn by: CJ						
		ELR Project #: 15-208.2	Rev. #: 1						
Hemmera Project #: 1343-005.13									



Clinton Creek Surface Water Quality and Hydrological Monitoring



Client:



Legend

Water Type

- Surface Water
- Groundwater

Site Type

- Exposed
- Reference

Topographic Watercourse Data
(may not be truly representative of on-site conditions)

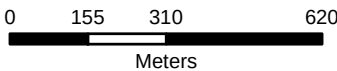


FIGURE 2
Sampling Stations
Site Area

Date: January 18, 2016

Scale: 1:15,000

ELR Project #: 15-208.2

Rev. #: 3

Hemmera Project #: 1343-005.13

1.2 FALL 2015 MONITORING PROGRAM SCOPE

In accordance with the documented *Scope of Work: Clinton Creek Surface Water Quality and Hydrological Monitoring Program (July 2015)*, provided to ELR/Hemmera by AAM, the 2015 monitoring program is focused on recording current water quality and hydrological conditions at the Site during the summer, fall, and winter of 2015/2016. The scope of work for the October sampling event included:

- Conducting surface water quality sampling at 15 designated water quality stations and seven (7) groundwater seep/pit lake stations. *In-situ* water quality measurements and samples for laboratory analysis were to be collected at each sample site;
- Measuring stream discharge at all sample sites where flowing water was present.
- Collecting survey data, staff gauge readings, and stream gauging data at two hydrometric monitoring sites.
- Downloading pressure and temperature data from two transducers; one manually and one using satellite uploaded data.
- Downloading satellite uploaded meteorological station data.
- Installing station identifier signs.
- Shipping samples to an accredited laboratory for analysis according to requirements established by AAM;
- Summarizing data from the field and laboratory program; and,
- Preparing a report that outlines the sampling program and presents the raw data.

This report summarizes the monitoring activities and the methods used to complete the field program, describes sample sites, summarizes data, including the quality assurance/quality control (QA/QC) program, and provides a summary of the overall success of the program.

1.3 2015 PROGRAM SAMPLE SITES

A total of 24 water quality and hydrology sites were included in the October program, including nine (9) reference surface water sites, eight (8) exposed surface water sites, five (5) exposed groundwater seepage sites, and two (2) pit lakes (two stations are divided into separate hydrology and water quality sites, therefore the number of sites is greater than noted above in Section 1.2). A summary of the sample sites including field-verified UTM locations, a description of the sites, and a summary of the sampling conducted at each sampling site is provided in **Table 1** below. The locations of sample sites are shown in **Figures 2 and 3**.

Reference sites were located on watercourses upstream from the Site that were not considered to be influenced by Site infrastructure or activities. Exposed sites included watercourses and water bodies under the influence of Site infrastructure (e.g. waste rock or tailings), and sites downstream of the Site that were considered to be part of the receiving environment.

Due to on-Site safety concerns, sampling was not conducted in 2014 and again in 2015 at the Porcupine Pit Lake (PL) site. Access to this site follows a roadway which begins in high ground on the northeast portion of the Site and descends along the southeast edge of the pit towards the sample site. There continues to be evidence of numerous rock falls along the length of the roadway, including one directly at the sample site. No other access route was identified that would provide safe access, and therefore the site was not sampled.

Table 1 Sample Site Descriptions and Locations

Station Code	Hydrology Data Collected	Water Quality Samples Collected	Station Description	Location (UTM, Zone 7N)	
				Easting	Northing
Exposed Sites					
E1		✓	Clinton Creek downstream of gabions	513645	7147111
E1(H)	✓		Clinton Creek at the outlet of Hudgeon Lake	512806	7147438
E2	✓ ³	✓	Clinton Creek, downstream of Porcupine Creek but upstream of Wolverine Creek	514158	7147076
E3		✓	Wolverine Creek, upstream of culvert	514178	7147189
E3(H)	✓		Wolverine Creek approximately 300 m upstream of the Clinton Creek confluence	514170	7147608
E4	✓	✓	Clinton Creek downstream of Wolverine Creek but upstream of Eagle Creek	515950	7145287
E7	✓	✓	Clinton Creek near mouth	519400	7142042
E8		✓	Forty Mile River downstream of Clinton Creek	519457	7142795
E9 ¹			Porcupine Creek at its discharge into Clinton Creek	-	-
Reference Sites					
R1	✓	✓	Clinton Creek upstream of Hudgeon Lake	510718	7147525
R2	✓	✓	Easter Creek upstream of Hudgeon Lake	512023	7148061
R3	✓	✓	Wolverine Creek, upstream of tailings	513952	7148677
R4	✓	✓	Eagle Creek, upstream of culvert	515981	7145344
R6		✓	Forty Mile River, upstream of Clinton Creek	519485	7141731
R7 ²		✓	Porcupine Creek, upstream of waste rock	513026	7145669
R8	✓	✓	Unnamed creek that enters Hudgeon Lake west of Easter Creek	511885	7147805
R9	✓	✓	Unnamed stream input on the south side of Hudgeon Lake	512343	7146753
Groundwater Seepage and Pit Sites					
GWCC-1		✓	Toe of the Waste Rock dump flowing into ponded area at Porcupine Creek	513902	7146960
GWCC-2		✓	Toe of the Waste Rock dump flowing into ponded area approx. 10 m northwest of GWCC-1	513899	7146968
GWCC-3		✓	Toe of the Waste Rock dump flowing into side channel, approx. 10 m northwest of GWCC-2	513882	7147038
GWCC-4		✓	Toe of the Waste Rock dump flowing into side channel, approx. 10 m northwest of GWCC-3	513868	7147052
GWCC-5	✓	✓	Groundwater flows in old Clinton Creek channel	513984	7147127
SL		✓	Snowshoe Pit Lake from shore	513824	7146703
PL			Porcupine Pit Lake from shore	-	-

¹ – Site E9 was not collected during the Fall 2015 program as there was no surface water flow at the site.

² – Site R7 was frozen to an extent that did not allow for a water flow measurement to be collected.

³ – Hydrology data is not regularly collected at Site E2 but was collected during the fall 2015 program. This data has been included in the program report.



NOTES:

Projection: UTM Zone 7 NAD83
Units: Meters
NTS Mapsheet: 116C07

National Topographic Data Base (NTDB) compiled by Natural Resources Canada at a scale of 1:50,000. Cadastral data compiled by Natural Resources Canada. Reproduced under license from © Her Majesty the Queen in Right of Canada, Department of Natural Resources Canada. All rights reserved.

Imagery Courtesy of Yukon Geomatics.

Clinton Creek Surface Water Quality and Hydrological Monitoring



Client:



Legend

Water Type

Surface Water

Site Type

Exposed

Reference

Topographic Watercourse Data
(may not be truly representative of on-site conditions)

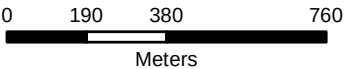


FIGURE 3
Sampling Stations
Forty Mile River Area

Date: January 18, 2016

Scale: 1:18,000

ELR Project #: 15-208.2

Rev. #: 3

Hemmera Project #: 1343-005.13

2.0 METHODS

Two Hemmera/ELR staff (Chris Harwood and Aaron Nicholson) completed the surface water quality and hydrological field program from September 30 to October 3, 2015. Specific methods used in sampling are summarized in the following sections.

2.1 SURFACE WATER QUALITY SAMPLING

2.1.1 Field Data Collection – Water Quality

Surface water quality sampling was conducted in accordance with *Standard Methods for the Examination of Water and Wastewater* (Rice et al., 2012). Field *in-situ* water quality parameters were measured and laboratory analytical samples were collected at each sample site, as described below.

Upon arriving at each sample site, the following field *in-situ* water quality data were collected and recorded using a YSI Professional Plus water quality meter and Lamotte 2020e turbidity meter:

- Water temperature (°C);
- pH (pH units);
- Oxidation-Reduction Potential (ORP; mv);
- Turbidity (NTU);
- Conductivity and Specific Conductivity (µs/cm); and,
- Dissolved oxygen (mg/L and percent saturation).

Following the collection of field *in-situ* parameters at each site, samples for laboratory analysis were collected. Samples were collected directly into laboratory-supplied containers, and were field filtered and/or preserved according to laboratory instructions. Sites R4, E1, E2, E3, E4, E7, E8, SL and all groundwater seeps (GWCC-1 through GWCC-5) were sampled over two days, with pH, conductivity, total suspended solids (TSS), nitrate, nitrite, and sulphate collected on the second day to ensure that laboratory hold times were met given the remote location of the site. The laboratory analytical bottle set for the 2015 monitoring program included nine (9) bottles for each site, as detailed in **Table 2**, below. Nitric acid (HNO₃) was used as a preservative for metals (dissolved and total), hydrochloric acid (HCl) was used to preserve samples for ultra-trace mercury testing, sulphuric acid (H₂SO₄) was used as a preservative for certain nutrient parameters and dissolved organic carbon (DOC), and sodium hydroxide (NaOH) was used as a preservative for speciated chromium.

Table 2 Analytical Sampling Bottle Set Summary

Bottle Number	Bottle Size	Bottle Type	Parameter Analyzed	Sample Treatment	Preservative Added
1 of 9	125 ml	Plastic	Low Level Dissolved Metals and Hardness	Field Filtered and Preserved	HNO ₃
2 of 9	125 ml	Plastic	Low Level Total Metals and Hardness	Preserved	HNO ₃
3 of 9	40 ml	Glass	Dissolved Mercury	Preserved	HCl
4 of 9	40 ml	Glass	Total Mercury	Preserved	HCl
5 of 9	250 ml	Glass	Nitrate, Nitrite, Ammonia-N and Total Phosphorous	Preserved	H ₂ SO ₄
6 of 9	1L	Plastic	Total Suspended Solids (TSS), Sulphate	-	None
7 of 9	125 ml	Glass	Dissolved Organic Carbon (DOC)	Field Filtered and Preserved	H ₂ SO ₄
8 of 9	125 ml	Plastic	Total Speciated Chromium Cr(VI) and Cr(III)	Preserved	NaOH
9 of 9	125 ml	Plastic	Dissolved Speciated Chromium Cr(VI) and Cr(III)	Field Filtered and Preserved	NaOH

At each sampling site, UTM coordinates were recorded using a Garmin Map 62s handheld GPS. The general condition and description of each sample site was recorded, including any identifiable features or conditions that may have influenced water quality results. Photos were taken at each sample site for reference purposes and to record sampling conditions. Photos were taken facing upstream, facing downstream, and facing across the sample site at each location. A set of the best representative photographs from each sample site can be found in **Appendix 1**.

2.1.2 Sample Care and Shipping

Samples were placed into coolers immediately following water collection and were kept cool with ice. Samples were transported by Hemmera/ELR from the Site and delivered to ALS Global Laboratories in Whitehorse, Yukon for analysis.

2.1.3 Laboratory Analysis

All surface water quality samples collected during the program were received by the analytical laboratory within 72 hours of sampling, and all primary analyses were conducted within laboratory hold time limits. Laboratory analytical reports are located in **Appendix 2**.

Laboratory analyses for the surface water quality monitoring program employed a variety of laboratory methods to determine the various water quality parameters required under this monitoring program. Specific methods were selected to ensure that reportable detection limits (RDL) were less than the Canadian Council of Ministers on the Environment (CCME) *Water Quality Guidelines for Protection of Aquatic Life* (CCME-FAL), where applicable (CCME 2014).

For the 2015 sampling year, analysis of speciated Chromium was included with the laboratory analytical program to determine whether exceedances of CCME-FAL guidelines may be occurring on site for either Chromium (III) or (IV). This was based on 2014 observations that unspeciated chromium in some cases exceeded the CCME-FAL guideline level for Chromium (III) or (IV), however no data was available to understand whether that may have represented an actual guideline exceedance. No CCME-FAL guideline level exists for unspeciated Chromium. During the Fall 2015 sampling, water samples for both dissolved and total Chromium (III) and (IV) were collected, and were submitted to the lab on hold. Once the unspeciated results were reviewed, analysis of speciated Chromium was initiated for those results where the concentration of unspeciated Chromium exceeded either the Chromium (III) or (IV) CCME-FAL guideline (i.e., where there was a potential for Chromium (III) or (IV) exceedance).

2.1.4 QA/QC Program for Laboratory Analytical Sampling

2.1.4.1 Field QA/QC

Several controls were used by Hemmera/ELR staff while in the field to help ensure that sample integrity was maintained and that data were recorded completely and accurately. All equipment used during the sampling process was dedicated to individual sites, including laboratory provided pre-cleaned sample bottles, disposable filters, and disposable syringes. Field staff wore dedicated disposable nitrile gloves for all measurements, and sampling. Field instruments (YSI field meters) were checked and/or calibrated before each site visit to ensure the parameters recorded were as accurate as possible. All sample bottle sets were pre-labeled prior to sampling with location, analyte, and sample preservation method information. Samples were preserved immediately upon collection, where required by the laboratory, and samples were kept cool with ice during transportation to the laboratory. Field site data was confirmed in the field and date/time was recorded on bottle labels at the time of sampling,

Project-specific field data sheets were created for the sampling event to help ensure all required measurements were taken, and that information was recorded correctly.

2.1.4.2 Laboratory and Sampling QA/QC

Laboratory and sampling QA/QC measures taken as part of the fall sampling program include the collection of travel blanks, duplicates, and field blanks, as per the scope of work and standard industry practice. Duplicate samples were collected at a ratio of 10% of the regular samples (2 duplicates were collected in relation to 20 sample sites). Additionally, one field blank was collected, and one travel blank accompanied the analytical supplies and samples during shipping to and from the laboratory.

The variation between sample and duplicate values was calculated as relative percent difference (RPD). RPD provides a measure of the relative difference between two values in comparison to their mean value, and is calculated as the difference between a sample and its field duplicate over the average of two values. RPD values greater than 20% indicates a greater variance than would normally be anticipated

and may be due to a number of factors (e.g., short-term change in parameter concentration, sediment in the sample, sampling or instrument error, large relative % difference but very low actual difference in concentration, such as 0.0001 vs 0.0002 mg/L). RPD was calculated according to the following formula:

$$RPD = \left(\frac{\left(\frac{x_1 - x_2}{x_1 + x_2} \right)}{2} \right) \times 100$$

RPD is not calculated if either the sample or the field duplicate concentration is less than five times the detection limit. QA/QC analytical results including RPD values are presented in **Table 4**.

Laboratory replicates and additional quality control measures (i.e., measures against lab standards) were conducted by ALS.

Duplicate laboratory analytical samples were collected at Sites E1 and GWCC-3, using the same duplicate methods. Corresponding test samples can be found in **Table 4**. Instances where the duplicate results and the test results exceeded the acceptable RPD limit of 20% are bold and underlined within the tables, and discussed in the following sections. Field and travel blank sample results are provided for comparison.

Specific QA/QC results are provided in section **3.1.3**.

2.2 HYDROLOGICAL MONITORING

Hydrological monitoring at thirteen (13) surface water and seepage sites was included in the program scope of work, following the recommendation of the Hemmera/ELR surface water and hydrology program review (Hemmera 2015). Included in the program was one (1) groundwater seepage site, seven (7) reference surface water sites, and five (5) exposed surface water sites, two of which are also monitored through automated discharge (pressure transducer) data collection. Hydrology data collection was not included in the program for sites where it was not considered safe to do so (such as the Forty Mile River), where it has not been possible to collect data (such as the majority of groundwater seeps), or where the data collection was redundant.

2.2.1 Manual Discharge Data Collection

Hemmera/ELR used a velocity-area method to measure discharge at surface water bodies during the monitoring program. Total discharge at each sample site was calculated using the area and velocity from a series of point measurements taken across the stream at each location. Stream flow and discharge calculations can be found in **Appendix 3**.

During the monitoring program, Hemmera/ELR chose hydrological monitoring locations at each sample site that were well suited to flow and velocity measurements (i.e., a straight channel with relatively flat stream bed and little vegetation or rocks, and few back-eddies that could hinder flow meter measurements). At each site, a cross section was established, and the active stream channel width was determined using a tape measure fixed to the top of the bank on each side. The stream was then divided into a series of sections (referred to as panels), where individual velocity and depth measurements were recorded. Stream channel widths were divided by 20 to establish the location of flow gauging panels. The number of panels was further reduced in cases where the resulting panel widths were less than 6.0 cm. At each point across the stream cross section, water depth and mean flow were measured (at 60% depth) using a Swoffer Model 2100 Series Current Velocity Meter.

2.2.1.1 QA/QC Program for Hydrology Field Measurements

Two sets of measurements were collected at each stream crossing location. The first crossing was used to establish the station locations and data, and the second crossing was used to collect a duplicate set of data for QA/QC purposes (to ensure station readings were accurate and that no significant variance between the two measurement sets had occurred).

2.2.1.2 Data Analysis

For each sampling point (panel) at a crossing location (sample site), stream discharge (Q ; m^3/s) was calculated by multiplying the cross sectional area of the panel (width of panel $\times$ mean depth; A ; m^2) by the measured velocity (V ; m/s), according to the following formula:

$$Q = AV$$

The total discharge for a sample site was then calculated by adding the discharge of all panels for each stream crossing location.

2.2.2 Automated Discharge Data Collection

Two pressure sensors (PS) were installed on Site in July of 2015 by Northern Avcom, on behalf of AAM; one in Hudgeon Lake, near the outlet of the lake to Clinton Creek [Site E1(H)]; and one on Wolverine Creek, about 500 m upstream of the confluence with Clinton Creek [Site E3(H)]. The purpose of the PSs is to provide regular data (15 minute intervals) on lake and stream water levels (stage) and temperature. The stage data are then used in conjunction with manually collected discharge data to create a stage-discharge relationship. Collectively, the data are then used to calculate ongoing discharge in Clinton Creek and Wolverine Creek over time.

The data collected by the PS installed in Hudgeon Lake were downloaded remotely on an ongoing basis via a satellite connection through the meteorological station, and were downloaded by Hemmera/ELR following the field event. The data from the PS on Wolverine Creek were downloaded manually during field sampling and monitoring event using a laptop computer with the required software installed.

2.2.2.1 QA/QC Program for Automated Discharge Monitoring

The data downloaded from each PS (water depth above the pressure sensor and water temperature) were checked for completeness (complete record since installation or the previous download) and reviewed for general expected ranges. For the PS installed on Wolverine Creek (E3[H]), a preliminary QA/QC review of the data can was completed in the field.

In addition to the PS data, the benchmarks and PS housings at E1(H) and E3(H) were surveyed to check for any potential movements in the PS housing or the benchmarks over time, and manual staff gauge readings are collected to provide an additional stage reading that can be used in stream discharge calculations.

2.2.2.2 Data Analysis

Stage discharge relationships for both Clinton Creek and Wolverine Creek were developed using the water level data from the PSs (stage) and the corresponding manual stream gauging measurements (discharge) from site visits. The stage and discharge data were plotted, and the stage-discharge relationship curve for each stream was developed through regression by fitting an exponential curve function through the plotted stage-discharge data points. Normally, the recorded stage measurements from the PS can then be used to calculate a time history of stream discharge. However, as data from only two manual discharge events (both at times of moderate flow) have been collected to date (July and October 2015), the stage-discharge relationship was found to poorly predict both low- and high-flow scenarios. Accordingly, calculated discharge over time was not completed for this reporting period and will be included in future event reporting after the stage discharge relationship can be refined with the collection of manual discharge data from high and low flow periods.

In addition to stage data, water temperatures from each of the PSs were also graphed to present the data from August 1 to October 31, 2015.

2.2.3 Meteorological Data Collection

The meteorological station (MS) is located on a flat area of waste rock south of Clinton Creek and the data collection and satellite communications station (with remote camera) is located on a flat area of ground north of Clinton Creek, near the outlet of Hudgeon Lake. The MS is equipped with the following instrumentation:

- Precipitation gauge (not an all-weather precipitation gauge)
- Ambient air temperature and relative humidity
- Barometric pressure
- Wind speed and direction

2.2.3.1 QA/QC Program for Meteorological Data Collection

The data downloaded from the MS were checked for completeness (e.g., complete record for the period pertaining to this report). The data were reviewed for general compliance with expected values (e.g. temperatures within expected ranges), and any omissions or anomalies in the data were reviewed and investigated. Where an anomaly is found, other data (e.g., local or regional meteorological data, or PS data) was used to check the anomalous data wherever possible.

2.2.3.2 Data Analysis

Data downloaded from the MS were converted to Microsoft Excel format to allow the data to be reviewed and graphed. Data were graphed for precipitation, ambient air temperature, relative humidity, and barometric pressure. A wind rose figure was created using WRPLOT View™, a software program designed to analyze specific meteorological data. A wind rose is a useful visual representation that presents an entire period of wind data on a single graph (wind speed, direction and frequency). The total duration of wind occurring within a specified speed range (metres per second - m/s) and compass direction are calculated as a percentage of the total reporting period. Mean hourly wind speeds are grouped into ranges (e.g., 0 to 1 m/s, 1 to 3 m/s, 3 to 6 m/s, 6 to 9 m/s etc. through to 18 m/s +). The wind direction is grouped into 16 compass direction ranges representing 22.5° each, starting at north. The wind speed and direction frequency are also tabulated to complement the wind rose figure.

3.0 RESULTS

3.1 SURFACE WATER QUALITY SAMPLING

A total of 20 water quality sites were sampled during the sampling program, including eight (8) reference surface water sites, six (6) exposed surface water sites, five (5) exposed groundwater seepage sites, and one (1) pit lake (**Table 1**). Hemmera/ELR staff found the condition at the sample sites to be representative of late fall conditions with low to moderate flows at the various sample sites, and with surface ice forming at multiple sites. The sampling was conducted starting four (4) days after the completion of AAM's drop structure repair project, which had included temporary stream crossings, work in and around Clinton Creek, and a temporary diversion of Clinton Creek. Despite this, all construction activities were finished and Hemmera/ELR did not observe any remnant potential effects of that construction (e.g., uncharacteristic sediment). No other activities or observations were made at the site which had the potential to influence water quality results (e.g. no uncharacteristic sediment, flow, or instream activities).

In conjunction with the surface water quality sampling, Hemmera/ELR installed new station markers (signs) at all of the sampled water quality stations, as well as at the two dedicated hydrology stations (E1[H] and E3[H]). Markers were not installed at E9 as the station was dry at the time of the sampling program.

3.1.1 Field *In-Situ* Water Quality Results

Field *in-situ* water quality monitoring results are presented in **Table 3**, with CCME-FAL exceedances highlighted in grey. Photographs of monitoring sites are provided in **Appendix 1**.

Surface water temperatures at reference sites ranged from 0°C (R2, R3, R7 and R9) to 0.4°C (R4), while surface water temperatures at exposed sites ranged from 1.2°C (E3) to 8.2°C (GWCC-4). Field pH readings at reference sites ranged from 5.11 (R8) to 7.99 (R4), while field pH readings at exposed sites ranged from 6.77 (GWCC-5) to 8.1 (E8).

Surface water conductivity varied significantly between sites. Reference site conductivity ranged between 110.9 µs/cm (R7) and 392.1 µs/cm (R1). Exposed stream sites ranged in conductivity from 141.5 µs/cm at Site E8 to 1,584 µs/cm at site GWCC-1.

Measured concentrations of dissolved oxygen ranged from 11.6 mg/L (SL) to 16.46 mg/L (E1) at surface water sites (both reference and exposed). The dissolved oxygen measured at all groundwater seepage sites was less than the CCME-FAL minimum of 5.5 mg/L, with the exception of GWCC-2 (8.23 mg/L). The lowest observed concentration of dissolved oxygen at the seepage sites was measured at Site GWCC-4 (2.89 mg/L). Dissolved oxygen was greater than the CCME FAL minimum of 9.5 mg/L at all surface water sites (reference and exposed).

3.1.2 Laboratory Analytical Water Quality Results

Laboratory analytical results are summarized in **Table 3**. Laboratory analytical results are presented with comparison to CCME-FAL guidelines. Exceedances for CCME-FAL guidelines are shaded within those tables.

For sites where duplicate samples were collected, test and duplicate samples were compared relative to the lab QA/QC analysis threshold of 20% RPD. These QA/QC results are provided in **Table 4** and are described below in **Section 3.1.3**.

3.1.2.1 Reference Sites

Among the reference sites, exceedances of the CCME-FAL guidelines were identified in one or more sites for aluminum, chromium (IV; hexavalent), copper, iron, and selenium.

Total aluminum exceeded the CCME-FAL guideline at all reference sites; R1 (0.202 mg/L compared to CCME-FAL guideline of 0.1 mg/L), R2 (0.202 mg/L compared to CCME-FAL guideline of 0.1 mg/L), R3 (0.166 mg/L compared to CCME-FAL guideline of 0.1 mg/L), R4 (1.29 mg/L compared to CCME-FAL guideline of 0.1 mg/L), R6 (0.103 mg/L compared to CCME-FAL guideline of 0.1 mg/L), R7 (0.384 mg/L compared to CCME-FAL guideline of 0.1 mg/L), R8 (0.0445 mg/L compared to CCME-FAL guideline of 0.005 mg/L) and R9 (0.153 mg/L compared to CCME-FAL guideline of 0.005 mg/L). Dissolved aluminum exceeded the CCME-FAL guideline at Sites R7 (0.164 mg/L compared to CCME-FAL guideline of 0.1 mg/L), R8 (0.0311 mg/L compared to CCME-FAL guideline of 0.005 mg/L), and R9 (0.0719 mg/L compared to CCME-FAL guideline of 0.005 mg/L).

Total chromium (IV) exceeded the CCME-FAL guideline level of 0.001 mg/L at Site R4 (0.0011 mg/L).

Total copper exceeded the CCME-FAL guideline at Sites R4 (0.00537 mg/L compared to CCME-FAL guideline of 0.004 mg/L), R7 (0.00644 mg/L compared to CCME-FAL guideline of 0.00261 mg/L), and R9 (0.00458 mg/L compared to CCME-FAL guideline of 0.004 mg/L). Dissolved copper exceeded the CCME-FAL guideline level at Sites R7 (0.00571 mg/L compared to CCME-FAL guideline of 0.00261 mg/L), and R9 (0.00428 mg/L compared to CCME-FAL guideline of 0.004 mg/L).

Total iron exceeded the CCME-FAL guideline level of 0.3 mg/L at Sites R1 (0.833 mg/L), R2 (0.599 mg/L), R3 (0.447 mg/L), R4 (2.34 mg/L), R6 (0.436), R7 (1.35 mg/L), and R9 (1.19 mg/L). Dissolved iron exceeded the CCME-FAL guideline level of 0.3 mg/L at Sites R1 (0.383 mg/L), R2 (0.339 mg/L), R6 (0.362 mg/L), R7 (0.922 mg/L), and R9 (0.951 mg/L).

Total selenium exceeded the CCME-FAL guideline level of 0.001 mg/L at Sites R1 (0.00193 mg/L), R4 (0.00243 mg/L), R8 (0.002 mg/L) and R9 (0.00142 mg/L). Dissolved selenium exceeded the CCME-FAL guideline level of 0.001 mg/L at Sites R1 (0.00208 mg/L), R4 (0.00247 mg/L), R8 (0.00207 mg/L), and R9 (0.00151 mg/L).

3.1.2.2 Exposed Sites

Among the exposed sites (both surface water and groundwater seeps), exceedances of the CCME-FAL guidelines were identified in one or more sites for aluminum, arsenic, chromium (IV; hexavalent), iron, and selenium.

Total aluminum exceeded the CCME-FAL guideline at Sites E3 (0.769 mg/L compared to CCME-FAL guideline of 0.1 mg/L), E8 (0.140 mg/L compared to CCME-FAL guideline of 0.1 mg/L). While no site-specific observations were made that describe why these exceedances occurred, the monitoring data from related reference sites (R3 and R6) upstream to these sites also exceeded the total aluminum guideline (**Table 5**). Despite these reference site exceedances, the concentrations of total aluminum were greater at the exposed sites (over 4.5 times higher in the case of Site E3), suggesting that some site local influence may still be occurring.

Both total and dissolved arsenic exceeded the CCME-FAL guideline level of 0.005 mg/L at Site SL (0.0146 mg/L and 0.0148 mg/L, respectively). As Site SL is an isolated pit, no potential external influences on water quality were noted during the program that may have contributed to these exceedances.

Total hexavalent chromium (VI) exceeded the CCME-FAL guideline level of 0.001 mg/L at Sites E2 (0.0011 mg/L), SL (0.0015 mg/L), GWCC-1 (0.0029 mg/L) and GWCC-2 (0.0020 mg/L). Dissolved hexavalent chromium (VI) exceeded the CCME-FAL guideline level of 0.001 mg/L at Sites SL (0.0014 mg/L), GWCC-1 (0.0026 mg/L) and GWCC-2 (0.0019 mg/L). No external influences on water quality were noted during the program that may have contributed to the exceedances at the two groundwater seeps or at Snowshoe Pit Lake. Site E2 is located on Clinton Creek directly downstream of the seeps area, and therefore the observed elevated total Chromium (VI) from seepages GWCC-1 and GWCC-2 may have contributed to the observed exceedance (**Table 5**).

Table 5 Comparison of Parameter Exceedances for Related Exposed and Reference Sites

Parameter	Exposed Site	Exposed Site Concentration (mg/L)	Relevant Upstream Reference Site or Potential Influence and Concentration (mg/L)
Total Aluminum	E3	0.769	R3 (0.166)
	E8	0.140	R6 (0.103)
Total Chromium (VI)	E2	0.0011	GWCC-1 (0.0029), GWCC-2 (0.0020)
Total Iron	E1	0.312	R1 (0.833), R2 (0.599), R9 (1.19)
	E2	0.402	R1 (0.833), R2 (0.599), R9 (1.19)
	E3	1.64	R3 (0.447)
	E4	0.463	R1 (0.833), R2 (0.599), R3 (0.447), R9 (1.19)
	E7	0.441	R1 (0.833), R2 (0.599), R3 (0.447), R4 (2.34), R9 (1.19)
	E8	0.388	R6 (0.436)
Total Selenium	E1	0.00167	R1 (0.00193), R8 (0.002), R9 (0.00142)
	E2	0.00159	R1 (0.00193), R8 (0.002), R9 (0.00142), GWCC-1 (0.00381), GWCC-2 (0.00328), GWCC-3 (0.00163), GWCC-5 (0.00264)
	E4	0.00127	R1 (0.00193), R8 (0.002), R9 (0.00142), GWCC-1 (0.00381), GWCC-2 (0.00328), GWCC-3 (0.00163), GWCC-5 (0.00264)
	E7	0.00123	R1 (0.00193), R4 (0.00243), R8 (0.002), R9 (0.00142), GWCC-1 (0.00381), GWCC-2 (0.00328), GWCC-3 (0.00163), GWCC-5 (0.00264)
Dissolved Selenium	E1	0.00166	R1 (0.00208), R8 (0.00207), R9 (0.00151)
	E2	0.00167	R1 (0.00208), R8 (0.00207), R9 (0.00151), GWCC-1 (0.00415), GWCC-2 (0.00352), GWCC-3 (0.00192), GWCC-5 (0.00282)
	E4	0.00130	R1 (0.00208), R8 (0.00207), R9 (0.00151), GWCC-1 (0.00415), GWCC-2 (0.00352), GWCC-3 (0.00192), GWCC-5 (0.00282)
	E7	0.00122	R1 (0.00208), R4 (0.00247), R8 (0.00207), R9 (0.00151), GWCC-1 (0.00415), GWCC-2 (0.00352), GWCC-3 (0.00192), GWCC-5 (0.00282)

Total iron exceeded the CCME-FAL guideline level of 0.3 mg/L at Sites E1 (0.312 mg/L), E2 (0.402 mg/L), E3 (1.64 mg/L), E4 (0.463 mg/L), E7 (0.441 mg/L), E8 (0.388 mg/L). While no site-specific observations were made that describe why these exceedances occurred, exceedances were noted at other sites upstream to these sites that may have been a contributing factor. As noted in **Table 5**; Sites E1 and E2 may have been influenced by elevated total iron at Sites R1, R2, and R9; Site E3 may have been influenced by elevated total iron at Site R3; Site E4 may have been influenced by elevated total iron at Sites R1, R2, R3, and R9; Site E7 may have been influenced by elevated total iron at Sites R1, R2, R3, R9, and R4; and, Site E8 may have been influenced by elevated total iron at Site R6.

Total selenium exceeded the CCME-FAL guideline level of 0.001 mg/L at Sites E1 (0.00167 mg/L), E2 (0.00159 mg/L), E3 (0.00112 mg/L), E3 (0.00112 mg/L), E4 (0.00127 mg/L), E7 (0.00123 mg/L), SL (0.0105 mg/L), GWCC-1 (0.00381 mg/L), GWCC-2 (0.00328 mg/L), GWCC-3 (0.00163 mg/L), and GWCC-5 (0.00264 mg/L). While no site-specific observations were made that describe why the total selenium exceedances occurred at these sites, exceedances were noted at other sites upstream to these sites that may have been a contributing factor. As noted in **Table 5**; Sites E1 and E2 may have been influenced by elevated selenium concentrations at Sites R1, R8, and R9; Sites E2 and E4 may have been influenced by the cumulative effect of elevated selenium concentrations at Sites R1, R8 and R9, and GWCC seepage Sites 1, 2, 3, and 5; and, Site E7 may have been influenced by the cumulative effect of elevated selenium concentrations at Sites R1, R4, R8, R9, and GWCC seepage Sites 1, 2, 3, and 5.

Dissolved selenium exceeded the CCME-FAL guideline level of 0.001 mg/L at Sites E1 (0.00166 mg/L), E2 (0.00167 mg/L), E3 (0.00113 mg/L), E4 (0.00130 mg/L), E7 (0.00122 mg/L), (SL (0.0110 mg/L), GWCC-1 (0.00415 mg/L), GWCC-2 (0.00352 mg/L), GWCC-3 (0.00192 mg/L), and GWCC-5 (0.00282 mg/L). While no site-specific observations were made that describe why the dissolved selenium exceedances occurred at these sites, exceedances were noted at other sites upstream to these sites that may have been a contributing factor. As noted in **Table 5**; Sites E1 and E2 may have been influenced by elevated dissolved selenium concentrations at Sites R1, R8, and R9; Sites E2 and E4 may have been influenced by the cumulative effect of elevated dissolved selenium concentrations at Sites R1, R8 and R9, and GWCC seepage Sites 1, 2, 3, and 5; and, Site E7 may have been influenced by the cumulative effect of elevated dissolved selenium concentrations at Sites R1, R4, R8, R9, and GWCC seepage Sites 1, 2, 3, and 5.

3.1.3 Quality Assurance/Quality Control (QA/QC) for Water Quality Monitoring

Two duplicate surface water samples were collected during the October sampling event. One travel blank was provided by the laboratory and accompanied the samples throughout the sampling program. One field blank was prepared during the sampling program. Detailed results of QA/QC sampling program are provided in **Table 4**, including RPD values for duplicate and sample pairs.

Travel blank and field blank analytical results were reported as less than the detection limits for all analysed parameters.

All RPD values for duplicate samples (E1 and GWCC-3) were within an acceptable range of variability (less than 20%), with the exception of the following results in the E1 sample/duplicate pair:

- Total Chromium (RPD 30.14%)
- Total Lead (RPD 33.66%)

And in the GWCC-3 sample/duplicate pair:

- Dissolved Cadmium (RPD 27.36%)

RPD values exceeding 20% for metals can indicate a sampling or analytical bias. In both duplicate-sample pairs, the RPD for all other metal parameters was within 20%, thus there does not seem to be a systemic bias. Sampling of total metals using unfiltered methods can introduce sediment from the watercourse, which could result in the observed variances. Less variability is expected in the case of dissolved metals due to the exclusion of sediments, however since there was again not an systematic bias observed in the dissolved metals duplicate taken at Site GWCC-3 (i.e., multiple metals), the observed variance is considered most likely to be a remnant of natural variability within the groundwater seep.

Laboratory replicates and additional quality control measures (i.e. matrix spikes) were conducted by ALS (**Appendix 2**). All measures against laboratory standards were also within the acceptable limits specified by the laboratory.

In summary, the results of the analytical QA/QC program show slight variability amongst metals results between sample and duplicate results for several metals, but do not suggest a systemic issue with sampling practices or contamination, as evidenced by the low level of variation between sample and duplicate results, and non-detection of parameters in the program field and travel blanks.

3.2 SURFACE WATER MANUAL DISCHARGE MONITORING RESULTS

Stream discharge monitoring was completed at 11 of the 13 prescribed sites visited during the fall monitoring program (**Table 1**). Discharge monitoring was not conducted at Sites E9 or R7 due to a lack of flow, or due to frozen conditions. Additionally, discharge data was collected at Site E2, which was not prescribed in the program scope of work.

Channel, velocity, and discharge measurements collected during the monitoring program are summarized in **Table 6**, below, while detailed data, calculations, and crossing profiles are attached in **Appendix 3**.

Table 6 Summary of Discharge Data Collected During the Monitoring Program

Site Type	Site	Wetted Width (m)	Mean Channel Depth (m)	Mean Velocity (m/s)	Mean Calculated Discharge (m ³ /s)
Reference Sites	R1	5.4	0.13	0.33	0.256
	R2	2.06	0.135	0.19	0.0786
	R3	2.73	0.24	0.1	0.0723
	R4	1.86	0.12	0.595	0.1607
	R6	Forty Mile River			
	R7	Flow too slow to measure			
	R8	0.5	0.12	0.095	0.0073
	R9	0.63	0.26	0.06	0.0153
Exposed Sites	E1(H)	10.11	0.20	0.125	0.348
	E2 ¹	5.12	0.13	0.5	0.409
	E3(H)	2.57	0.15	0.175	0.0925
	E4	6.53	0.15	0.5	0.6466
	E7	5.49	0.2	0.65	0.829
	E8	Forty Mile River			
	E9	No water present at Site			
Groundwater Seepages and Pits	GWCC-1	Not included in program			
	GWCC-2				
	GWCC-3				
	GWCC-4				
	GWCC-5	0.62	0.04	0.02	0.00075
	SL	Not included in program			
	PL				

¹ – Hydrology data is not regularly collected at Site E2 but was collected during the fall 2015 program. This data has been included in the program report.

Duplicate stream crossings were successfully carried out at all sites. R7 was flowing too slowly for the Swoffer flow meter to measure any discharge. In addition to R7, low flows were also present at R2 and GWCC-5.

3.3 AUTOMATED DISCHARGE MONITORING

3.3.1 Hudgeon Lake (E1[H])

Data from the Hudgeon Lake PS were reviewed for the period July 16 to September 30, 2015. The PS stage data and water temperature for Hudgeon Lake are presented in **Figure 4**. For the reviewed data, the maximum and minimum stages (metres of water above the pressure sensor) at Hudgeon Lake were 1.012 m (August 28) and 0.454 m (September 14), respectively. The mean stage over the same period was 0.667 (Standard Deviation [SD] = ± 0.133 m).

The maximum and minimum water temperatures at Hudgeon Lake between July 16 and September 30, 2015 were 20.4 (July 23 and 24) and 4°C (September 30) respectively, with a mean temperature of 11.6°C (SD=±4.6 °C).

The stage-discharge relationship for Clinton Creek (which flows from Hudgeon Lake) is presented in **Figure 5**. The relationship was developed from the PS stage data and two manual discharge measurements collected on July 24 and September 30. The regression coefficient (R^2) was 1 (because there were only two data points). To calculate the Clinton Creek discharge at a point in time from the stage data the following function was used, generated from the best fit curve.

$$y = 0.0000006e^{20.832x}$$

Where: y = creek discharge (m^3/s)

e = base of the natural logarithm (2.71828)

x = recorded water depth over PS (m)

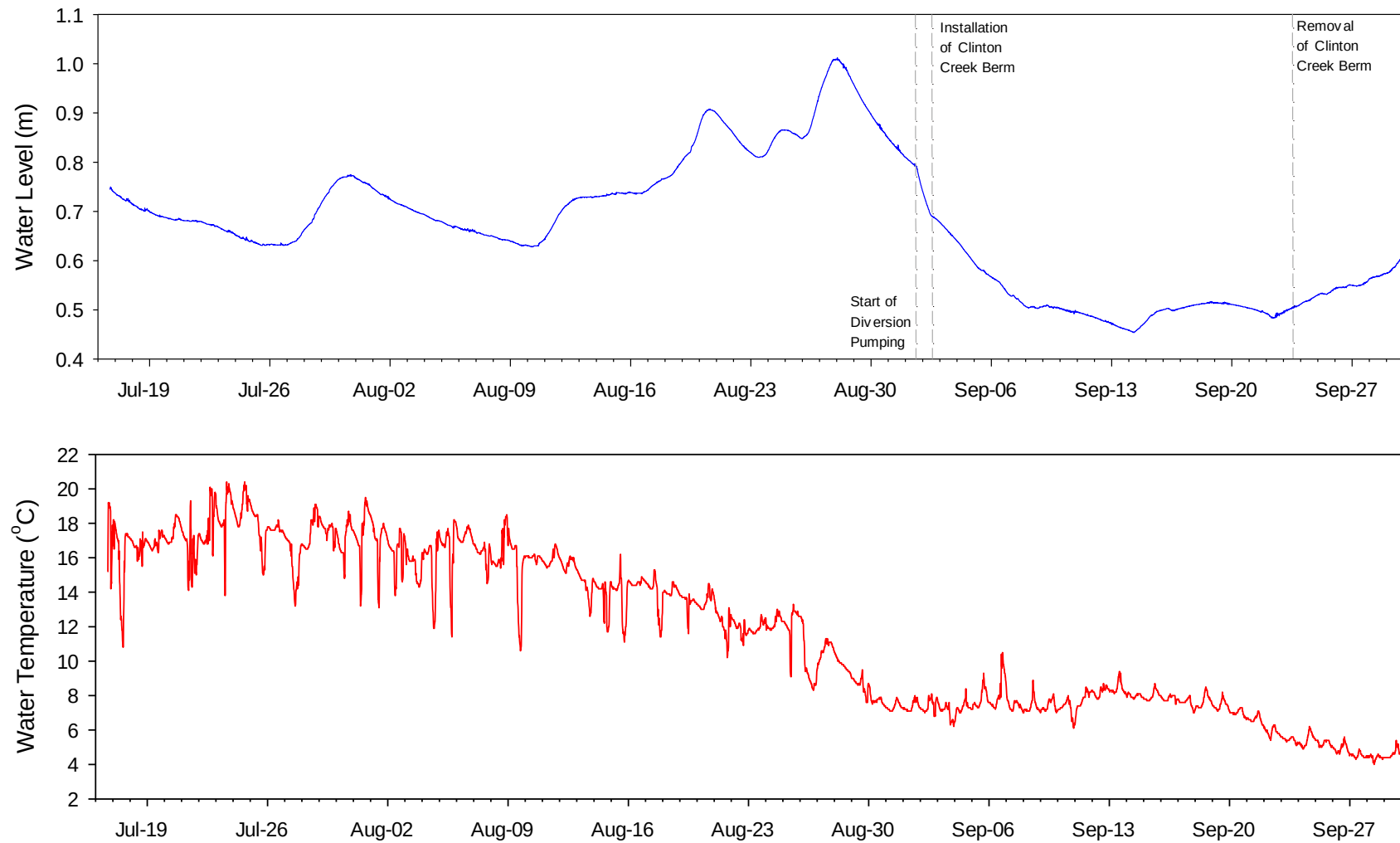


Figure 4 Plots of Water Level (stage) and Water Temperature As Read from the Hudgeon Lake PS, July 16 to September 30, 2015

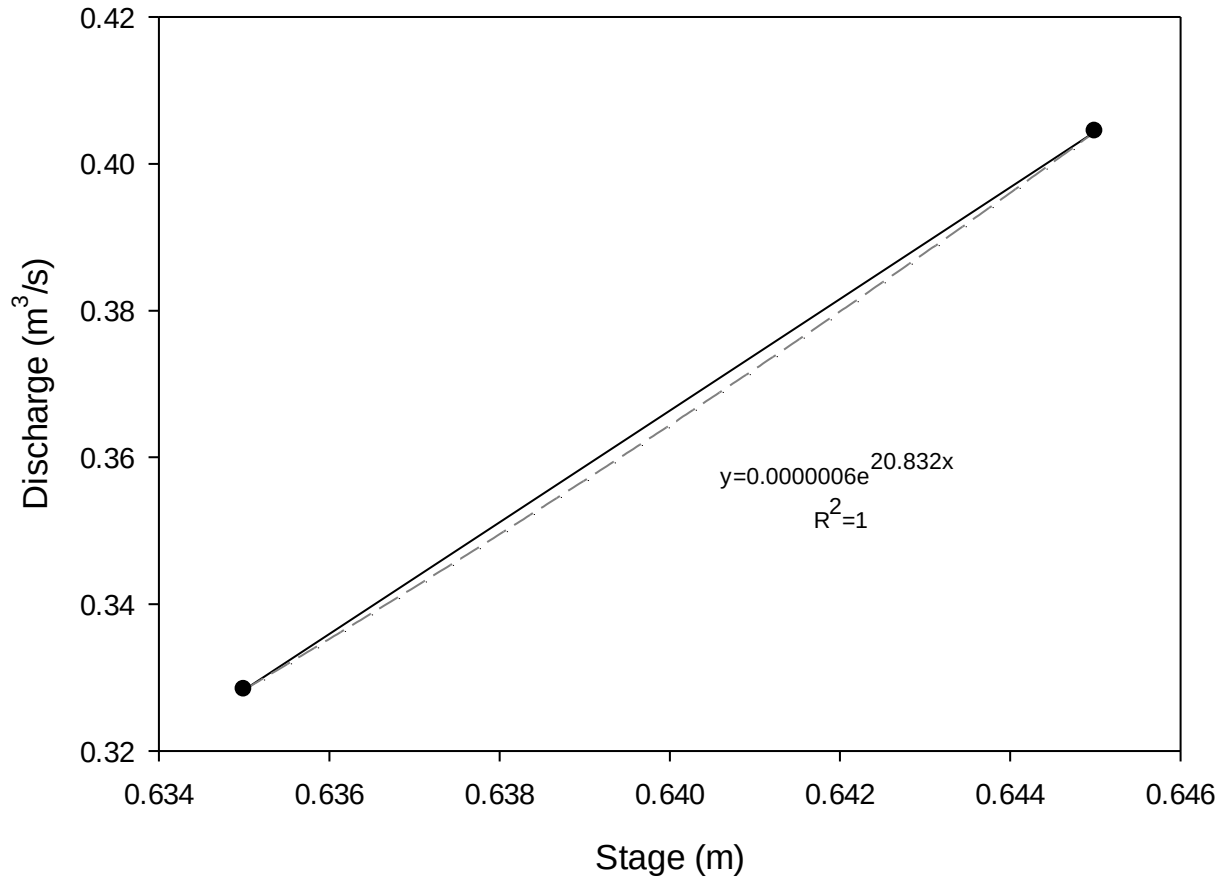


Figure 5 Stage Discharge Relationship for Clinton Creek at the Hudson Lake Outlet

Although the calculated discharge values were very similar to the manual discharge values (< 1% RPD for the manually and calculated discharge readings of July 24 and September 30), additional calculated discharge values have not been presented in this report as the stage discharge relationship does not provide accurate predictions at higher or lower stage levels. This is due to the fact that the stage discharge relationship is currently based on two points of intermediate stage and discharge, and additional calibration points at low and high flow levels are needed to build a more reliable relationship.

3.3.2 Wolverine Creek (E3[H])

Data from the Wolverine Creek PS and datalogger were reviewed for the period July 23 to October 1, 2015. The PS stage data and water temperature for Wolverine Creek are presented in **Figure 6**. For the reviewed data, the maximum and minimum stages at Wolverine Creek were 0.344 m (August 27) and 0.179 m (September 25), respectively. The mean stage over the same period was 0.242 m (SD = ± 0.036 m).

The maximum and minimum water temperatures at Wolverine Creek between July 23 and October 1, 2015 were 13.3 (July 24) and -0.1°C (September 30), respectively, with a mean water temperature of 4.8°C (SD= ±2.8 °C).

The stage-discharge relationship for Wolverine Creek is presented in **Figure 7**. The relationship was developed from the PS stage data and two manual discharge measurements collected on July 23 and October 1. The regression coefficient (R^2) was 1 (because there were only two data points). To calculate the Clinton Creek discharge at a point in time from the stage data the following function was used, generated from the best fit curve.

$$y = 0.0018e^{17.836x}$$

Where: y = creek discharge (m^3/s)

e = base of the natural logarithm (2.71828)

x = recorded water depth over PS (m)

Although the calculated discharge values were very similar to the manual discharge values (< 1% RPD for the manually and calculated discharge readings of July 23 and October 1), additional calculated discharge values have not been presented in this report as the stage discharge relationship does not provide accurate predictions at higher or lower stage levels. This is due to the fact that the stage discharge relationship is currently based on two points of intermediate stage and discharge, and additional calibration points at low and high flow levels are needed to build a more reliable relationship.

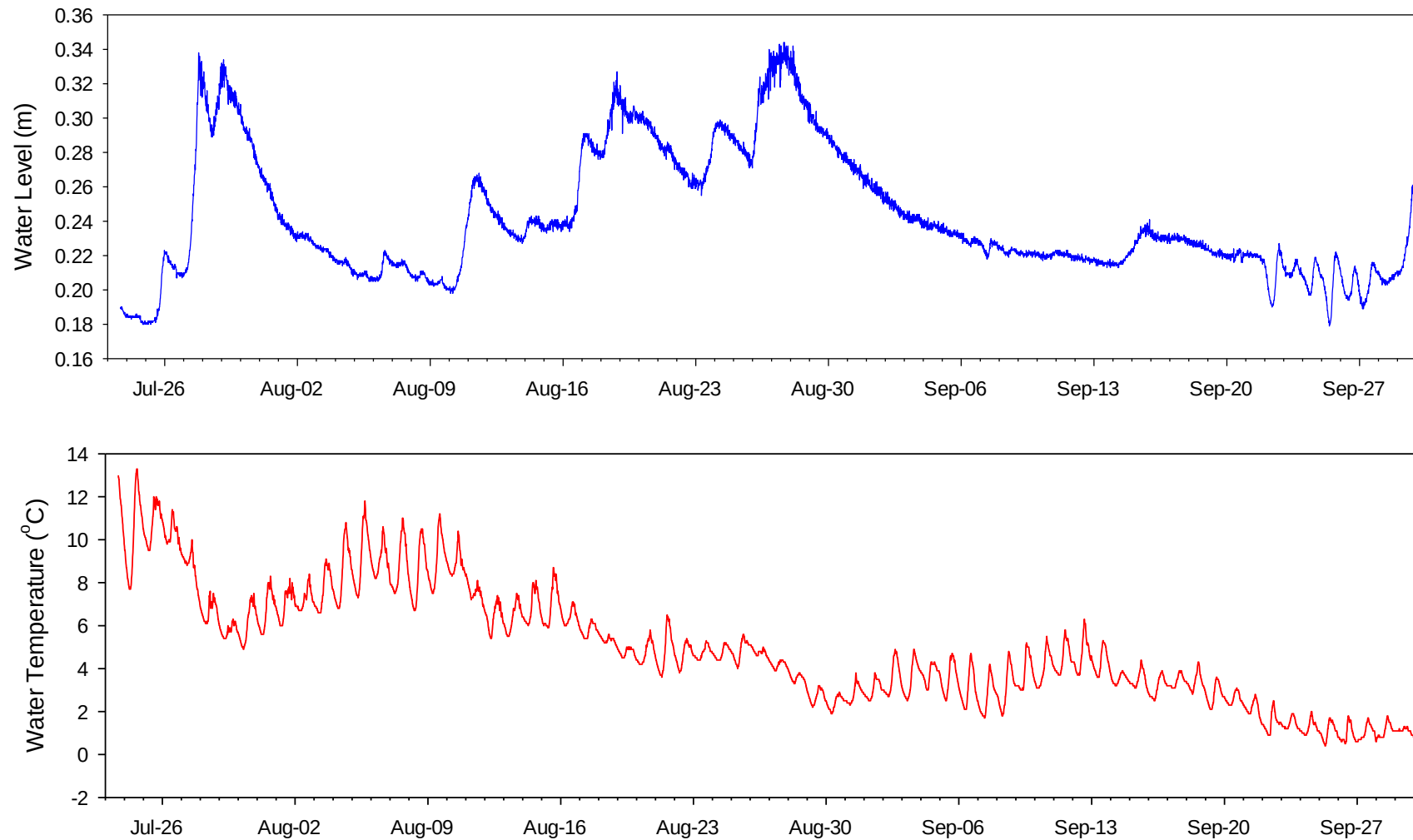


Figure 6 Plots of Water Level (stage) and Water Temperature As Read from the Wolverine Creek PS, July 16 to September 30, 2015

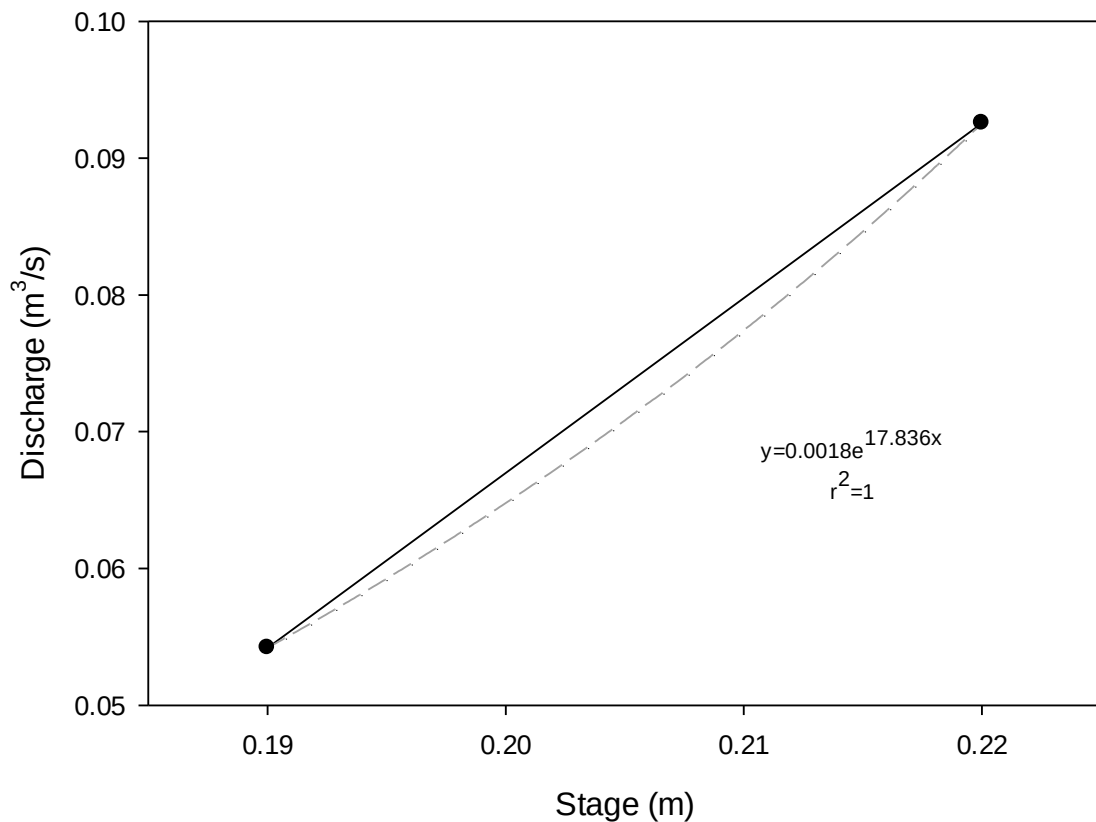


Figure 7 Stage Discharge Relationship for Wolverine Creek

3.3.3 QA/QC for Automated Discharge Monitoring

The depth data recorded by the PS in Hudgeon Lake and the corresponding **Figure 4** should be viewed objectively. Between September 2 and September 23 construction work on the drop structures in upper Clinton Creek, a short distance downstream of the Hudgeon Lake outlet, involved creating a temporary coffer dam across Clinton Creek and pumping water around the construction area to a point further downstream on Clinton Creek. Overall, more water than normal was released from Hudgeon Lake before and during the construction works which reduced the water levels in Hudgeon Lake. The PS data therefore reflect the activities that took place over the same period.

The overall increase in water levels between July 23 and August 27 were reviewed (**Figure 4**). The corresponding rainfall for July (66 mm) and August (64 mm) were relatively high compared to September (25.9 mm), indicating that rainfall caused the overall increase in the Hudgeon Lake water level over this period.

The high water temperature (20.4°C) recorded in Hudgeon Lake on July 23 and 24 was reviewed against the ambient air temperatures on and before the same dates. The ambient air temperatures recorded by the MS indicate that some of the highest temperatures (>26°C) for the month were recorded on, and a few days before, July 23, 2015. These warm air temperatures would be expected to cause warmer water temperatures, especially in shallow water (<0.7 m). Therefore, the high water temperature recorded for these dates is believed to be correct.

The stage-discharge relationships created for this report are only based on two manual discharge data collection events. Additional data collection events in different seasons are required to improve confidence levels in the stage-discharge relationship.

During the sampling and monitoring events, instrument heights at Hudgeon Lake and Wolverine Creek (PS housings and staff gauges) were surveyed against benchmarks established in July, 2015. The September survey data were then compared against the survey data collected in July. The comparison is done in order to check whether instruments (or possibly benchmarks) may have moved over time, which could affect data interpretation. A difference between the two readings of more than 3 mm (0.003 m) may indicate that either the instruments or the benchmarks had moved and that corrective action should be investigated.

The surveyed elevation differences between the July and September data, relative to the two local benchmarks (BM1 and BM2) at each monitoring site where instrumentation is installed, were:

- Wolverine Creek Staff Gauge - 0.009 (BM1) and 0.012 m (BM2)
- Wolverine Creek PS Housing - 0.000 (BM1) and 0.003 m (BM2)
- Hudgeon Lake Staff Gauge - 0.008 (BM1) and 0.006 m (BM2)
- Hudgeon Lake PS Housing - 1.371 (BM1) and 0.246 m (BM2)
- Snowshoe Pit Lake Staff Gauge - 0.003 (BM1) and 0.0002 m (BM2)

The Wolverine Creek and Hudgeon Lake staff gauge survey data present differences that are greater than the expected values and would normally indicate that either the instruments or the benchmarks have shifted over time. However, in reviewing the survey data and site photographs, survey error is believed to be the cause of the larger differences and additional staff training, survey data and site investigation will help establish if the difference are survey error or if the instruments or benchmarks have shifted.

The Hudgeon Lake PS housing survey data present values that are much higher than anticipated. On reviewing the field data sheets and speaking with field staff, it was concluded that the high values are due to the incorrect location being surveyed (i.e., not the top of the PS metal housing). Additional survey data during the next field event will help verify if the PS housing has shifted.

The course of action suggested by Hemmera/ELR regarding this survey data is to perform further surveys during the upcoming field event to determine whether the observed variances were the result of human error or other means. No other corrective measures are suggested at this time.

3.4 METEOROLOGICAL DATA

Meteorological station (MS) data were downloaded and are reported for the period of August 1 to October 31, 2015. Hemmera/ELR found all the data parameters to be complete for the period being reported. Each recorded parameter is discussed further below.

3.4.1 Hourly Ambient Air Temperature

Hourly and daily air temperatures were recorded at the MS for the period of August 1 to October 31, 2015. Hourly mean air temperatures for the reporting period are shown in **Figure 8**, with daily fluctuations in temperatures being clearly apparent and within an expected range. No anomalous data were observed. The maximum mean hourly air temperature recorded by the MS for the reporting period was 26.1°C on August 5 at 5:00 pm and the minimum temperature recorded was -10.1°C on October 31 at 10:00 pm (**Figure 8**). The mean temperature for the reporting period was 4.4°C (Standard Deviation [SD] = $\pm 6.9^\circ\text{C}$).

3.4.2 Relative Humidity

Relative humidity indicates the amount of water vapour in the air relative to the total amount of water vapour that could be present at the same temperature and is usually reported as a percentage. Higher percentages indicate more water vapour. Hourly and daily relative humidity data were recorded at the MS for the period August 1 to October 31, 2015. Mean hourly relative humidity data for the reporting period are presented in **Figure 8**. No anomalous data were observed. The maximum hourly mean relative humidity recorded by the MS over the reporting period was 97%, recorded on one day in August (17th) and on two days in October (19th and 20th). The mean relative humidity for the reporting period was to 76.6% (SD= $\pm 17.61\%$).

3.4.3 Barometric Pressure

Barometric pressure (BP) is the pressure of air exerted by the earth's atmosphere at any given location. At the Clinton Creek MS, barometric pressure is recorded in millibars (mbar), where greater atmospheric pressure correlates to a higher number of mbars. Mean hourly BP was recorded at the MS for the period of August 1 to October 31, 2015 (**Figure 8**). No anomalous data were observed. The maximum BP recorded for the reporting period was 979 mbar on October 1 at 10 and 11:00 pm. The minimum BP recorded for the same period was 926 mbar and the mean for the whole reporting period was 956 mbar (SD= ± 9.44 mbar).

3.4.4 Precipitation (rain)

A rain gauge at the MS records hourly mean rainfall in millimetres (mm). Mean hourly mean rainfall was recorded at the MS for the period of August 1 to October 31, 2015 (**Figure 8**). The maximum mean hourly rainfall recorded during the reporting period was 5.3 mm on August 19 at 1:00 pm. The calculated rainfall for the same entire day (August 19, 2015) was 8.4 mm. The minimum mean hourly rainfall recorded for the reporting period was 0 mm which accounted for approximately 90% of the entire reporting period. The total recorded rainfall for the entire reporting period was 115.3 mm.

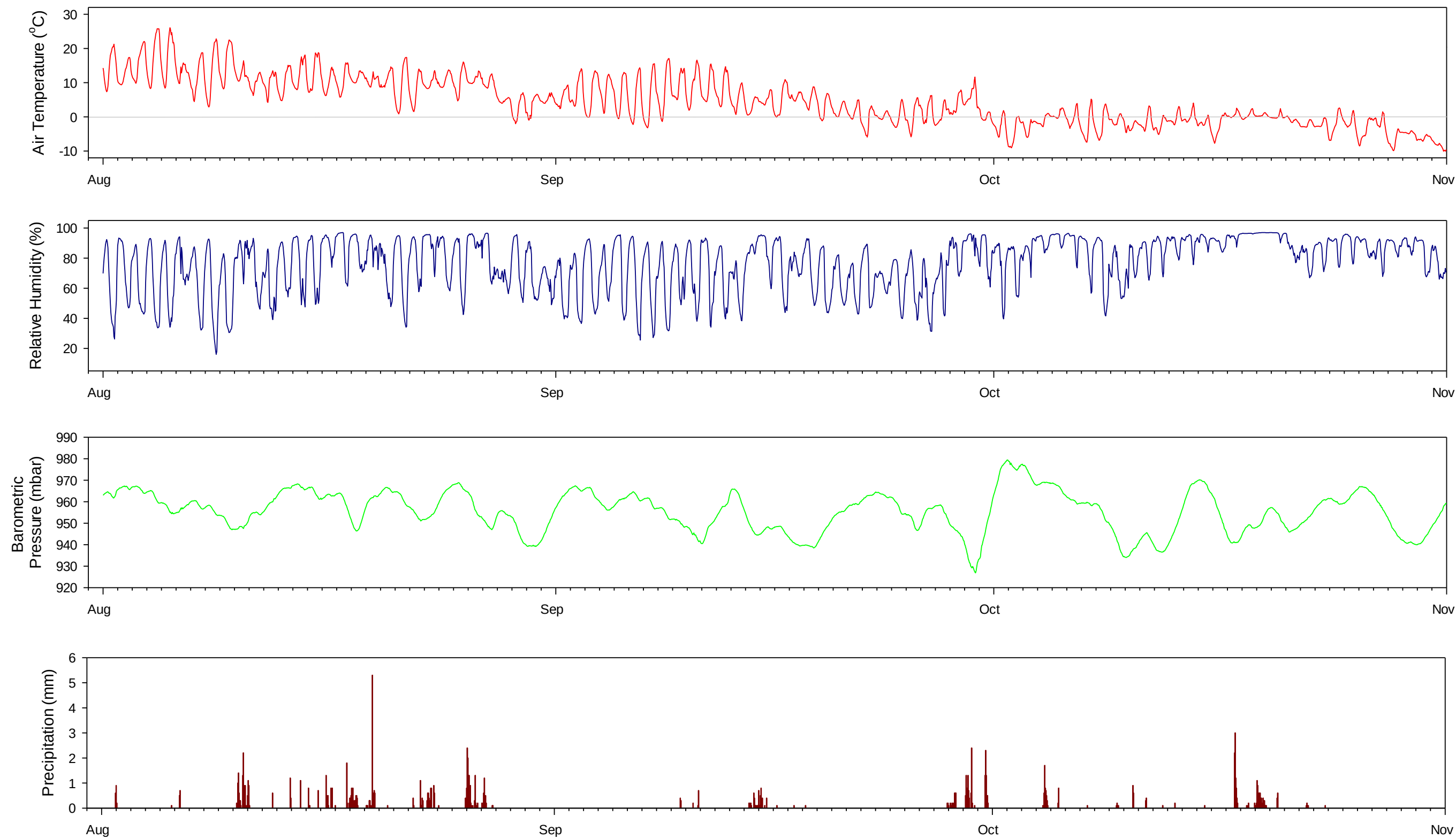
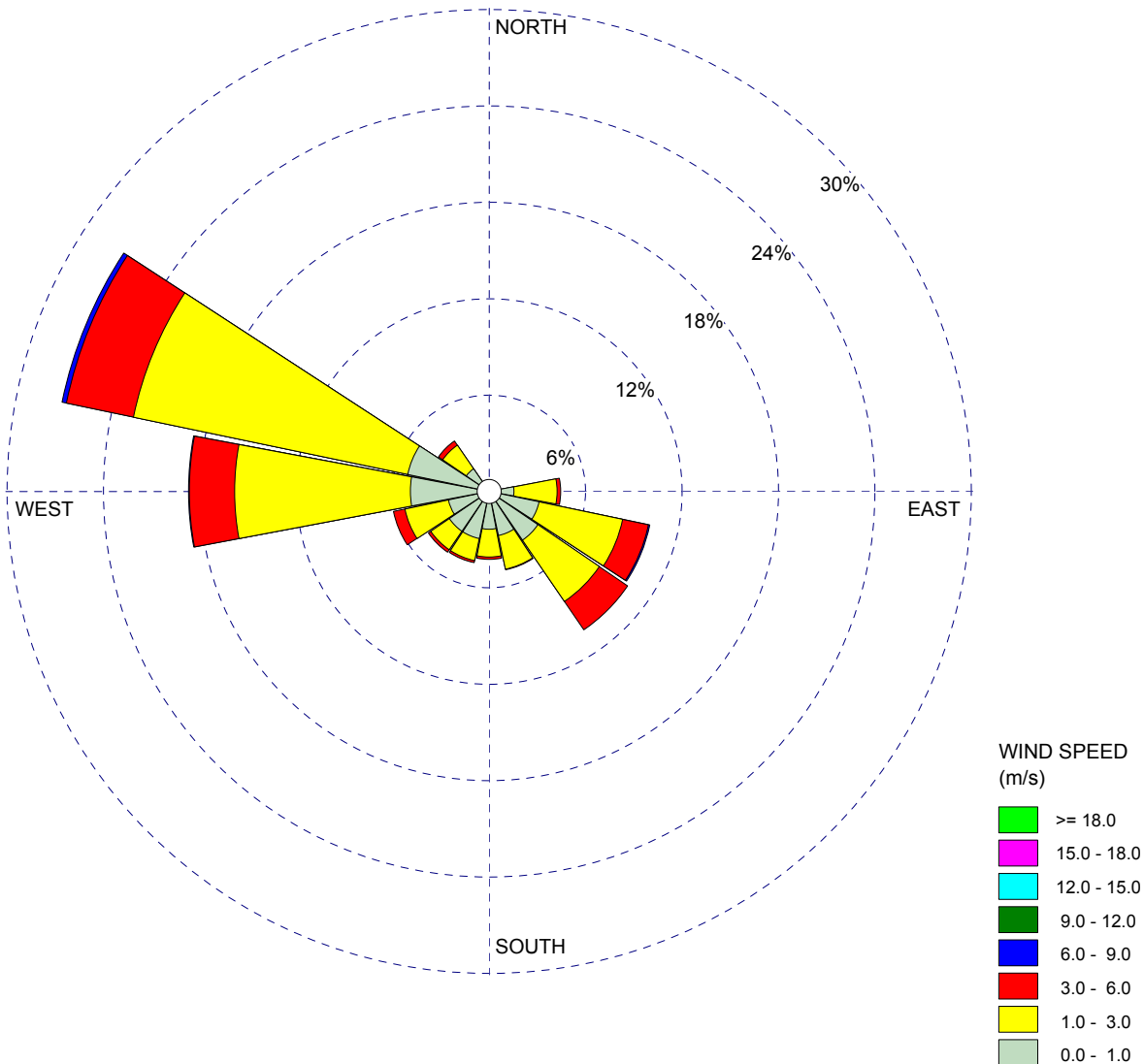


Figure 8 Temperature, Relative Humidity, Barometric Pressure, and Precipitation Data from the Clinton Creek Meteorological Station, August 1 2015 to October 31, 2015

Wind Directions		Wind Classes (m/s)								
		0.0 - 1.0	1.0 - 3.0	3.0 - 6.0	6.0 - 9.0	9.0 - 12.0	12.0 - 15.0	15.0 - 18.0	>= 18.0	Total (%)
N	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	%	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.3
ENE	%	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.6
E	%	1.5	2.7	0.2	0.0	0.0	0.0	0.0	0.0	4.4
ESE	%	3.2	5.3	1.6	0.1	0.0	0.0	0.0	0.0	10.2
SE	%	3.7	4.6	2.1	0.0	0.0	0.0	0.0	0.0	10.4
SSE	%	2.8	2.1	0.0	0.0	0.0	0.0	0.0	0.0	5.0
S	%	2.4	1.7	0.1	0.0	0.0	0.0	0.0	0.0	4.2
SSW	%	3.0	1.4	0.1	0.0	0.0	0.0	0.0	0.0	4.5
SW	%	3.0	1.4	0.2	0.0	0.0	0.0	0.0	0.0	4.6
WSW	%	2.6	2.8	0.7	0.0	0.0	0.0	0.0	0.0	6.1
W	%	4.9	10.9	2.8	0.0	0.0	0.0	0.0	0.0	18.7
WNW	%	5.2	17.4	4.3	0.3	0.0	0.0	0.0	0.0	27.1
NW	%	1.7	1.8	0.3	0.0	0.0	0.0	0.0	0.0	3.8
NNW	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sub-Total	%	34.2	52.7	12.6	0.4	0.0	0.0	0.0	0.0	100
Total	%									100

WIND ROSE PLOT: Clinton Creek
 Clinton Creek, YT
 Wind Rose. August to October 2015

DISPLAY:
 Wind Speed
 Direction (blowing from)



1 m/s equals 3.6 km/h.

DATA PERIOD:

Start Date: 8/1/2015 - 00:00
 End Date: 10/31/2015 - 23:00

COMPANY NAME: Hemmera / ELR Ltd.

Hemmera / ELR Ltd.

MODELER: GMR

GMR

TOTAL COUNT:

2208 hrs.

AVG. WIND SPEED:

1.59 m/s

DATE:

11/25/2015



PROJECT NO.: 1343-005.13

3.4.6 QA/QC for Meteorological Data

Where meteorological data were outside expected ranges or where anomalous data were suspected to be present (e.g., sharp spikes in a graph or values), alternate regional or local meteorological data were reviewed (e.g., Environment Canada data, and/or Government of Yukon, Wildland Fire data).

After reviewing the August 1 to October 31 MS data, no data were found to be outside of their expected ranges and no data were investigated further. Additionally, the data record is complete for the reporting period (no data gaps were observed).

Approximately 3.2 mm of rain was recorded at the MS when temperatures were at or less than 0° Celsius (about 32% of the total period of record). It is possible that these data represent snowfall rather than rain. Hemmera/ELR understands that the rain gauge is not fitted with a snowfall adapter, nor is the gauge an all-weather precipitation gauge; therefore, the precipitation data during the colder months of the year may not be representative of actual rainfall.

4.0 RECOMMENDATIONS

Hemmera/ELR has no recommendations for changes to the current Clinton Creek water quality and hydrological monitoring program based on the October 2015 sampling event. Hemmera/ELR continue to implement past recommendations (from the 2014 program) on Site, and will continue to do so through the winter 2016 program.

5.0 CLOSURE

Hemmera/ELR are pleased to provide the Government of Yukon, Assessment and Abandoned Mines this report that summarizes the July 2015 water quality and hydrological monitoring program at the Clinton Creek Site. Please do not hesitate to contact us should you have any questions regarding this report.

Sincerely,
Written by:
Hemmera Envirochem Inc.

Reviewed By:
Ecological Logistics & Research Ltd.

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6.0 REFERENCES

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TABLES

Table 3: Analytical Chemistry Data

Parameter		Units	Site Location	Surface Water - Reference Sites							Groundwater - Exposed Sites													
			Sample ID	R1	R2	R3	R4*	R6	R7	R8	R9	E1*	E2*	E3*	E4*	E7*	E8*	SL*	GWCC-1*	GWCC-2*	GWCC-3*	GWCC-4*	GWCC-5*	
		Date Sampled	02/10/2015	02/10/2015	03/10/2015	30/09/2015	03/10/2015	03/10/2015	02/10/2015	02/10/2015	30/09/2015	30/09/2015	30/09/2015	30/09/2015	01/10/2015	01/10/2015	01/10/2015	01/10/2015	01/10/2015	01/10/2015	01/10/2015	01/10/2015	01/10/2015	30/09/2015
		ALS Work Number	L1683192	L1683192	L1683192	L1683192	L1683192	L1683192	L1683192	L1683192	L1683192	L1683192	L1683192	L1683192	L1683192	L1683192	L1683192	L1683192	L1683192	L1683192	L1683192	L1683192	L1683192	L1683192
		CCME-FAL ^{1, 2, 3, 4}																						
Physical Tests																								
Lab pH	pH units	6.5-9.0 ⁵	8.00	8.11	8.10	8.17	7.82	7.52	7.72	7.81	8.20	8.11	8.15	8.06	8.06	7.86	8.28	7.84	7.98	7.90	7.91	7.77		
Field pH	pH units	6.5-9.0 ⁵	6.76	7.96	6.78	7.99	6.67	6.57	5.11	6.41	6.9	7.66	7.53	7.74	7.93	8.1	8	7.4	7.76	7.69	7.73	6.77		
Field Temperature	C	-	0.1	0	0	0.4	0.2	0	0.2	0	4.5	5.1	1.2	4.1	2	1.9	1.7	3.5	5	6.1	8.2	6.3		
Lab Conductivity	uS/cm	-	708	572	667	550	241	202	282	419	560	767	646	791	773	241	1510	2550	1960	1170	767	902		
Field Conductivity	uS/cm	-	392.1	290.5	368	265	117.7	110.9	156	228.1	349	494.1	377.4	489.7	442.3	141.5	883	1584	1259	793	545	596		
Field Specific Conductivity	uS/cm	-	749	556	705	500	224	212.1	296.7	436.7	574	798	691	816	789	253.7	1593	2688	2038	1241	803	926		
Field Dissolved Oxygen	mg/L	9.5 ⁶	14.61	14.52	15.18	15.77	14.77	14.92	14.49	15	16.46	13.18	15.19	13.51	14.38	14.93	11.61	4.86	8.23	5.82	2.89	2.91		
Field Oxidation - Redox Potent	mV	-	123.4	57.1	137.3	140.9	143.1	82.3	277.9	91	159.5	3.2	167.6	78.2	140.9	137.9	150.1	181.3	164.8	164.8	161.3	129.6		
Field Turbidity	NTU	-	1.28	0.74	2.16	13.2	1.27	2.7	0.63	2.11	1.33	1.53	12.2	2.28	1.43	1.53	3.6	0.11	2.9	0.14	0.21	0.28		
Total Suspended Solids	mg/L	-	18.0	6.7	8.0	5.3	8.7	24.0	<3.0	3.3	<3.0	<3.0	18.7	7.3	<3.0	<3.0	16.0	4.0	<3.0	<3.0	<3.0	<3.0		
Total Hardness (as CaCO3)	mg/L	-	416	335	384	267	133	112	141	229	323	460	388	465	452	124	979	1730	1310	735	451	523		
Anions and Nutrients																								
Nitrate (as N)	mg/L	13	0.167	0.0673	0.0736	0.222	0.108	0.211	<0.0050	0.283	0.142	0.144	0.132	0.111	0.143	0.112	0.117	0.485	0.441	0.186	0.0816	0.0200		
Nitrite (as N)	mg/L	0.06	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0013	0.0018	0.0023	0.0016	0.0012	<0.0010	<0.0010	<0.0020	<0.0050	<0.0050	<0.0020	<0.0010	<0.0010		
Ammonia, Total (as N)	mg/L	Varies ⁷	0.0421	0.0132	0.0216	0.0162	0.0056	0.0471	<0.0050	0.0529	0.0170	0.0152	0.0220	0.0063	0.0073	0.0058	0.0100	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050		
Ammonia CCME-FAL	mg/L	-	39.78	2.549	38.31	2.302	48.53	62.13	1761	89.79	20.0	3.330	6.177	3.007	2.313	1.58	2.02	6.89	2.671	2.869	2.216	23.34		
Sulfate (SO4)	mg/L	-	239	160	232	152	49.7	49.2	82.5	127	166	266	219	270	258	49.8	714	1400	1060	490	254	292		
Inorganic/Organic Carbon																								
Dissolved Organic Carbon	mg/L	-	12.8	13.1	14.4	14.1	11.9	33.4	14.3	27.8	14.9	13.4	13.5	12.7	13.4	11.3	6.70	5.23	6.95	9.00	9.94	7.83		
Dissolved Metals																								
Aluminum (Al)-Dissolved	mg/L	Varies ⁸	0.0144	0.0354	0.0329	0.0322	0.0603	0.164	0.0311	0.0719	0.0285	0.0209	0.0315	0.0167	0.0170	0.0653	0.0018	0.0013	0.0012	0.0013	0.0020	0.0023		
Aluminum CCME-FAL	mg/L	-	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.005000	0.005000	0.100	0.1000	0.1000	0.1000	0.1000	0.100	0.100	0.100	0.1000	0.1000	0.1000	0.1000		
Antimony (Sb)-Dissolved	mg/L	-	0.00020	0.00047	0.00018	0.00036	<0.00010	0.00022	0.00052	0.00022	0.00034	0.00042	0.00047	0.00042	0.00035	0.00010	0.00312	0.00132	0.00110	0.00085	0.00079	0.00062		
Arsenic (As)-Dissolved	mg/L	0.005	0.00054	0.00088	0.00054	0.00136	0.00054	0.00090	0.00032	0.00070	0.00073	0.00105	0.00071	0.00097	0.00088	0.00042	0.0148	0.00219	0.00151	0.00089	0.00128	0.00060		
Barium (Ba)-Dissolved	mg/L	-	0.0543	0.0498	0.0499	0.0572	0.0393	0.0703	0.0427	0.0730	0.0560	0.0535	0.0520	0.0521	0.0525	0.0367	0.0233	0.0194	0.0198	0.0253	0.0317	0.0512		
Beryllium (Be)-Dissolved	mg/L	-	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000030	<0.000020	0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020		
Bismuth (Bi)-Dissolved	mg/L	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050		
Boron (B)-Dissolved	mg/L	1.5	<0.010	0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	0.038	0.035	0.048	0.037	<0.010	0.047	0.300	0.111	0.057	0.0030	0.028		
Cadmium (Cd)-Dissolved	mg/L	Varies ⁹	0.0000916	0.0000202	0.0000181	0.0000405	0.0000209	0.0000283	0.0000212	0.0000557	0.0000304	0.0000506	0.0000146	0.0000423	0.0000514	0.0000174	0.0000259	0.000195	0.000176	0.0000735	0.0000491	0.000107		
Cadmium CCME-FAL	mg/L	-	0.00037	0.00037	0.00037	0.000358	0.000201	0.000174	0.000211	0.000315	0.00037	0.00037	0.00037	0.00037	0.00037	0.000189	0.00037	0.00037	0.00037	0.00037	0.00037	0.00037		
Calcium (Ca)-Dissolved	mg/L	-	94.8	63.4	74.1	62.7	33.4	24.7	34.2	55.9	72.3	87.9	72.4	85.7	83.7	31.8	225	207	181	119	84.9	122		
Chromium (Cr)-Dissolved	mg/L	-	0.00026	0.00070	0.00065	0.00052	0.00036	0.00161	0.00074	0.00100	0.00054	0.00068	0.00075	0.00063	0.00061	0.00034	0.00114	0.00240	0.00162	0.00056	0.00038	0.00048		
Chromium (III)-Dissolved	mg/L	0.0089	-	-	-	-	-	0.00161	-	0.00100	-	-	-	-	-	-	<0.00042	<0.00047	<0.00043	-	-	-		
Hexavalent Chromium-Dissolved	mg/L	0.001	-	-	-	-	-	<0.0010	-	<0.0010	-	-	-	-	-	-	0.0014	0.0026	0.0019	-	-	-		
Cobalt (Co)-Dissolved	mg/L	-	0.00069	0.00023	0.00031	0.00054	0.00038	0.00054	<0.00010	0.00064	0.00031	0.00064	0.00027	0.00063	0.00076	0.00036	0.00015	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010		
Copper (Cu)-Dissolved	mg/L	Varies ¹⁰	0.00190	0.00172	0.00194	0.00217	0.00217	0.00571	0.00164	0.00428	0.00252	0.00210	0.00183	0.00184	0.00202	0.00216	0.00077	0.00081	0.00110	0.00108	0.00108	0.00084		
Copper CCME-FAL	mg/L	-	0.004	0.004	0.004	0.004	0.00302	0.00261	0.00317	0.004	0.004	0.004	0.004	0.004	0.004	0.00284	0.004	0.004	0.004	0.004	0.004	0.004		
Iron (Fe)-Dissolved	mg/L	0.3	0.383	0.339	0.231	0.155	0.362	0.922	0.062	0.951	0.195	0.296	0.192	0.253	0.278	0.253	<0.010	<0.010	<0.010	<0.010	<0.010	0.034		
Lead (Pb)-Dissolved	mg/L	Varies ¹¹	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050		
Lead CCME-FAL	mg/L	-	0.007	0.007	0.007	0.007	0.00457	0.00368	0.00493	0.007	0.007	0.007	0.007	0.007	0.007	0.00418	0.007	0.007	0.007	0.007	0.007	0.007		
Lithium (Li)-Dissolved	mg/L	-	0.0032	0.0054	0.0037	0.0025	0.0041	<0.0010	0.0011	<0.0010	0.0039	0.0103	0.0037	0.0116	0.0107	0.0039	0.0125	0.0868	0.0166	0.0078	0.0061	0.0086		
Magnesium (Mg)-Dissolved	mg/L	-	43.5	42.8	48.4	26.9	12.1	12.3	13.6	21.7	34.7	58.5	50.2	60.9	58.9	10.9	101	296	207	106	58.0	53.0		
Manganese (Mn)-Dissolved	mg/L	-	0.433	0.115	0.130	0.0984	0.0343	0.167	0.00431	0.347	0.169	0.163	0.105	0.161	0.263	0.0247	0.00586	0.00022	0.00017	0.00013	0.00022	0.00398		
Mercury (Hg)-Dissolved	mg/L	0.000026	0.0000070	0.0000071	<0.0000050	<0.0000050	<0.0000050	0.0000057	0.0000053	0.0000073	0.0000052	0.0000083	<0.0000050	<0.0000050	0.0000066	<0.0000050	<0.0000050	<0.0000050	0.0000050	0.0000054	<0.0000050	<0.0000050		
Molybdenum (Mo)-Dissolved	mg/L	0.073	0.00142	0.000669	0.00102	0.000867	0.000406	0.000456	0.000518	0.000896	0.00121	0.00150	0.00104	0.00144	0.00129									

Table 3: Analytical Chemistry Data

		Site Location	Surface Water - Reference Sites															Groundwater - Exposed Sites				
		Sample ID	R1	R2	R3	R4*	R6	R7	R8	R9	E1*	E2*	E3*	E4*	E7*	E8*	SL*	GWCC-1*	GWCC-2*	GWCC-3*	GWCC-4*	GWCC-5*
		Date Sampled	02/10/2015	02/10/2015	03/10/2015	30/09/2015	03/10/2015	03/10/2015	02/10/2015	02/10/2015	30/09/2015	30/09/2015	30/09/2015	30/09/2015	01/10/2015	01/10/2015	01/10/2015	01/10/2015	01/10/2015	01/10/2015	01/10/2015	30/09/2015
		ALS Work Number	L1683192	L1683192	L1683192	L1683192	L1683192	L1683192	L1683192	L1683192	L1683192	L1683192	L1683192	L1683192	L1683192	L1683192	L1683192	L1683192	L1683192	L1683192	L1683192	L1683192
Parameter	Units	CCME-FAL ^{1,2,3,4}																				
Total Metals																						
Aluminum (Al)-Total	mg/L	Varies ⁸	0.202	0.202	0.166	1.29	0.103	0.384	0.0445	0.153	0.0560	0.0448	0.769	0.0851	0.0692	0.140	0.0562	0.0039	0.0348	0.0096	<0.0030	<0.0030
Aluminum CCME-FAL	mg/L	-	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.005000	0.005000	0.100	0.1000	0.1000	0.1000	0.1000	0.100	0.100	0.100	0.1000	0.1000	0.1000	0.1000
Antimony (Sb)-Total	mg/L	-	0.00026	0.00051	0.00022	0.00051	0.00014	0.00028	0.00060	0.00025	0.00045	0.00050	0.00060	0.00049	0.00043	0.00016	0.00310	0.00130	0.00112	0.00084	0.00077	0.00061
Arsenic (As)-Total	mg/L	0.005	0.00080	0.00098	0.00068	0.00283	0.00056	0.00111	0.00035	0.00080	0.00084	0.00112	0.00131	0.00114	0.00101	0.00049	0.0146	0.00212	0.00165	0.00086	0.00124	0.00059
Barium (Ba)-Total	mg/L	-	0.0601	0.0546	0.0545	0.0901	0.0379	0.0795	0.0450	0.0750	0.0578	0.0552	0.0757	0.0557	0.0559	0.0378	0.0239	0.0193	0.0202	0.0241	0.0308	0.0500
Beryllium (Be)-Total	mg/L	-	<0.000020	<0.000020	<0.000020	0.000045	<0.000020	0.000038	<0.000020	0.000023	<0.000020	<0.000020	0.000031	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Bismuth (Bi)-Total	mg/L	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000081	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Total	mg/L	1.5	<0.010	0.014	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.013	0.043	0.039	0.054	0.042	<0.010	0.051	0.326	0.119	0.060	0.041	0.032
Cadmium (Cd)-Total	mg/L	Varies ⁹	0.0000982	0.0000300	0.0000212	0.000161	0.0000185	0.0000359	0.0000316	0.0000527	0.0000408	0.0000548	0.0000623	0.0000476	0.0000579	0.0000167	0.0000286	0.000181	0.000177	0.0000897	0.0000461	0.000109
Cadmium CCME-FAL	mg/L	-	0.00037	0.00037	0.00037	0.000358	0.000201	0.000174	0.000211	0.000315	0.00037	0.00037	0.00037	0.00037	0.00037	0.000189	0.00037	0.00037	0.00037	0.00037	0.00037	0.00037
Calcium (Ca)-Total	mg/L	-	92.7	63.7	73.9	61.7	31.2	25.4	35.3	53.5	70.5	86.7	69.7	86.6	84.5	31.6	218	203	174	115	81.7	118
Chromium (Cr)-Total	mg/L	-	0.00074	0.00105	0.00095	0.00382	0.00047	0.00212	0.00081	0.00118	0.00168	0.00113	0.00249	0.00097	0.00119	0.00049	0.00260	0.00252	0.00503	0.00072	0.00047	0.00056
Chromium (III)-Total	mg/L	0.0089	-	0.00105	-	0.00272	-	0.00212	-	<0.00072	-	<0.00072	0.00149	<0.00072	-	-	0.00110	<0.00087	0.00303	-	-	-
Hexavalent Chromium	mg/L	0.001	-	<0.0010	-	0.0011	-	<0.0010	-	0.0010	-	0.0011	0.0010	0.0010	-	-	0.0015	0.0029	0.0020	-	-	-
Cobalt (Co)-Total	mg/L	-	0.00088	0.00031	0.00040	0.00152	0.00040	0.00066	<0.00010	0.00073	0.00046	0.00073	0.00075	0.00073	0.00082	0.00039	0.00029	<0.00010	0.00025	<0.00010	<0.00010	<0.00010
Copper (Cu)-Total	mg/L	Varies ¹⁰	0.00243	0.00203	0.00229	0.00537	0.00233	0.00644	0.00173	0.00458	0.00276	0.00236	0.00352	0.00205	0.00227	0.00233	0.00101	0.00088	0.00162	0.00127	0.00107	0.00087
Copper CCME-FAL	mg/L	-	0.004	0.004	0.004	0.004	0.00302	0.00261	0.00317	0.004	0.004	0.004	0.004	0.004	0.004	0.00284	0.004	0.004	0.004	0.004	0.004	0.004
Iron (Fe)-Total	mg/L	0.3	0.833	0.599	0.447	2.34	0.436	1.35	0.093	1.19	0.312	0.402	1.64	0.463	0.441	0.388	0.112	<0.010	0.134	0.024	<0.010	0.036
Lead (Pb)-Total	mg/L	Varies ¹¹	0.000278	0.000114	0.000107	0.00120	<0.000050	0.000178	<0.000050	0.000084	0.000118	0.000059	0.000694	0.000086	0.000074	<0.000050	0.000064	0.000119	<0.000050	<0.000050	<0.000050	<0.000050
Lead CCME-FAL	mg/L	-	0.007	0.007	0.007	0.007	0.00457	0.00368	0.00493	0.007	0.007	0.007	0.007	0.007	0.007	0.00418	0.007	0.007	0.007	0.007	0.007	0.007
Lithium (Li)-Total	mg/L	-	0.0034	0.0057	0.0041	0.0035	0.0041	<0.0010	0.0012	<0.0010	0.0042	0.0107	0.0044	0.0124	0.0113	0.0040	0.0123	0.0927	0.0172	0.0074	0.0062	0.0088
Magnesium (Mg)-Total	mg/L	-	42.6	41.5	49.5	26.5	11.2	12.6	13.8	21.0	34.3	58.1	49.0	61.7	59.2	10.7	101	295	200	106	55.0	51.4
Manganese (Mn)-Total	mg/L	-	0.447	0.121	0.136	0.174	0.0346	0.179	0.00872	0.355	0.186	0.178	0.137	0.172	0.277	0.0268	0.00779	0.00030	0.00239	0.00081	0.00026	0.00350
Mercury (Hg)-Total	mg/L	0.000026	0.0000140	0.0000077	0.0000063	0.0000170	0.0000054	0.0000129	0.0000077	0.0000127	0.0000078	0.0000087	0.0000113	0.0000080	0.0000073	<0.0000050	<0.0000050	<0.0000050	0.0000078	0.0000077	0.0000055	<0.0000050
Molybdenum (Mo)-Total	mg/L	0.073	0.00148	0.000719	0.00115	0.00104	0.000433	0.000508	0.000594	0.000904	0.00131	0.00159	0.00123	0.00159	0.00139	0.000473	0.00186	0.00238	0.00254	0.00258	0.00234	0.00168
Nickel (Ni)-Total	mg/L	Varies ¹²	0.00540	0.00380	0.00350	0.0180	0.00254	0.00474	0.00262	0.00399	0.00671	0.0149	0.00799	0.0159	0.0152	0.00261	0.0187	0.0743	0.0482	0.0288	0.0300	0.0183
Nickel CCME-FAL	mg/L	-	0.15	0.15	0.15	0.15	0.119	0.104	0.124	0.15	0.15	0.15	0.15	0.15	0.15	0.113	0.15	0.15	0.15	0.15	0.15	0.15
Phosphorus (P)-Total	mg/L	-	<0.050	<0.050	<0.050	0.089	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Total	mg/L	-	0.61	0.70	0.62	0.51	0.92	0.19	<0.10	0.38	0.69	0.91	0.74	0.94	0.95	0.89	1.46	3.23	1.89	1.16	0.91	0.88
Selenium (Se)-Total	mg/L	0.001	0.00193	0.000892	0.000875	0.00243	0.000201	0.000361	0.00200	0.00142	0.00167	0.00159	0.00112	0.00127	0.00123	0.000235	0.0105	0.00381	0.00328	0.00163	0.000824	0.00264
Silicon (Si)-Total	mg/L	-	4.91	6.39	6.68	7.24	5.57	6.53	6.86	5.35	4.99	5.09	7.07	5.31	5.18	5.10	5.21	6.41	5.28	4.68	5.38	4.76
Silver (Ag)-Total	mg/L	0.0001	<0.000010	<0.000010	<0.000010	0.000040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000022	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Total	mg/L	-	3.25	3.18	4.07	3.39	4.57	1.64	4.56	2.34	2.93	4.28	4.39	5.02	4.59	4.18	2.49	19.6	7.17	4.11	3.05	3.51
Strontium (Sr)-Total	mg/L	-	0.417	0.330	0.350	0.313	0.164	0.0772	0.137	0.193	0.326	0.479	0.327	0.500	0.478	0.160	1.02	2.06	0.972	0.580	0.399	0.663
Thallium (Tl)-Total	mg/L	-	<0.000010	<0.000010	<0.000010	0.000020	<0.000010	<0.000010	<0.000010	<0.000010	0.000027	0.000030	0.000019	0.000016	0.000010	<0.000010	0.000017	0.000088	0.000064	0.000057	0.000054	0.000016
Tin (Sn)-Total	mg/L	0.0008	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total	mg/L	-	0.00649	0.00681	0.00600	0.0348	0.00137	0.0132	0.00092	0.00586	0.00129	<0.0015	0.0191	0.00244	0.00186	0.00200	<0.0018	<0.00030	<0.0015	0.00038	<0.00030	<0.00030
Uranium (U)-Total	mg/L	-	0.00248	0.00323	0.00381	0.00260	0.00115	0.000127	0.000066	0.000693	0.00219	0.00242	0.00328	0.00259	0.00248	0.00107	0.00326	0.00727	0.00336	0.00183	0.00104	0.00204
Vanadium (V)-Total	mg/L	0.015	0.00079	0.00089	0.00105	0.00379	0.00063	0.00154	<0.00050	0.00085	<0.00050	<0.00050	0.00265	0.00057	<0.00050	0.00067	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Total	mg/L	-	0.0036	<0.0030	<0.0030	0.0097	0.0039	<0.0030	<0.0030	<0.0030	<0.0030	0.0030	0.0058	<0.0030	0.0035	0.0039	<0.0030	0.0079	0.0068	0.0039	<0.0030	<0.0030
Zirconium (Zr)-Total	mg/L	0.03	0.00065	0.00065	0.00067	0.00089	0.00082	0.00161	0.00062	0.00124	0.00090	0.00074	0.00072	0.00091	0.00113	0.00062	<0.00030	<0.00030	0.00042	<0.00030	<0.00030	<0.00030

Table 4: Analytical Quality Assurance and Control

		Site Location	E1 QA/QC Data				GWCC-3 QA/QC Data			
		Sample ID	E1 (FB1)	E1 (DUP-1)*	E1*	RPD (%) ¹³	GWCC-3(DUP-2)*	GWCC-3*	RPD (%) ¹³	TRAVEL_BLANK
		Date Sampled	30/09/2015	30/09/2015	30/09/2015		01/10/2015	01/10/2015		03/10/2015
		ALS Work Number	L1683192	L1683192	L1683192		L1683192	L1683192		L1683192
Parameter	Units	CCME-FAL ^{1, 2, 3, 4}								
Physical Tests										
Lab pH	pH units	6.5-9.0 ⁵	6.31	8.24	8.20	0.49	7.91	7.90	0.13	5.93
Field pH	pH units	6.5-9.0 ⁵	-	6.9	6.9	0.00	7.69	7.69	0.00	-
Field Temperature	C	-	-	4.5	4.5	0.00	6.1	6.1	0.00	-
Lab Conductivity	uS/cm	-	<2.0	561	560	0.18	1190	1170	1.69	<2.0
Field Conductivity	uS/cm	-	-	349	349	0.00	793	793	0.00	-
Field Specific Conductivity	uS/cm	-	-	574	574	0.00	1241	1241	0.00	-
Field Dissolved Oxygen	mg/L	9.5 ⁶	-	16.46	16.46	0.00	5.82	5.82	0.00	-
Field Oxidation - Redox Potent	mV	-	-	159.5	159.5	0.00	164.8	164.8	0.00	-
Field Turbidity	NTU	-	-	1.33	1.33	0.00	0.14	0.14	0.00	-
Total Suspended Solids	mg/L	-	<4.0	<3.0	<3.0	nc	<3.0	<3.0	nc	<3.0
Total Hardness (as CaCO3)	mg/L	-	<0.50	311	323	3.79	713	735	3.04	<0.50
Anions and Nutrients										
Nitrate (as N)	mg/L	13	<0.0050	0.143	0.142	0.70	0.189	0.186	1.60	<0.0050
Nitrite (as N)	mg/L	0.06	<0.0010	0.0030	0.0018	nc	<0.0010	<0.0020	nc	<0.0010
Ammonia, Total (as N)	mg/L	Varies ⁷	<0.0050	0.0179	0.0170	5.16	<0.0050	<0.0050	nc	<0.0050
Ammonia CCME-FAL	mg/L	-	-	20.0	20.0	-	2.869	2.869	-	-
Sulfate (SO4)	mg/L	-	<0.30	166	166	0.00	485	490	1.03	<0.30
Inorganic/Organic Carbon										
Dissolved Organic Carbon	mg/L	-	<0.50	15.1	14.9	1.33	9.10	9.00	1.10	-

Table 4: Analytical Quality Assurance and Control

Parameter	Units	Site Location	E1 QA/QC Data				GWCC-3 QA/QC Data			TRAVEL_BLANK
			Sample ID	E1 (FB1)	E1 (DUP-1)*	E1*	RPD (%) ¹³	GWCC-3(DUP-2)*	GWCC-3*	
			Date Sampled	30/09/2015	30/09/2015	30/09/2015		01/10/2015	01/10/2015	
			ALS Work Number	L1683192	L1683192	L1683192		L1683192	L1683192	
		CCME-FAL ^{1, 2, 3, 4}								L1683192
Dissolved Metals										
Aluminum (Al)-Dissolved	mg/L	Varies ⁸		<0.0010	0.0287	0.0285	0.70	0.0029	0.0013	nc
Aluminum CCME-FAL	mg/L	-		-	0.100	0.100	-	0.1000	0.1000	-
Antimony (Sb)-Dissolved	mg/L	-		<0.00010	0.00031	0.00034	9.23	0.00080	0.00085	6.06
Arsenic (As)-Dissolved	mg/L	0.005		<0.00010	0.00072	0.00073	1.38	0.00089	0.00089	0.00
Barium (Ba)-Dissolved	mg/L	-		<0.000050	0.0568	0.0560	1.42	0.0251	0.0253	0.79
Beryllium (Be)-Dissolved	mg/L	-		<0.000020	<0.000020	<0.000020	nc	<0.000020	<0.000020	nc
Bismuth (Bi)-Dissolved	mg/L	-		<0.000050	<0.000050	<0.000050	nc	<0.000050	<0.000050	nc
Boron (B)-Dissolved	mg/L	1.5		<0.010	<0.010	0.010	nc	0.056	0.057	1.77
Cadmium (Cd)-Dissolved	mg/L	Varies ⁹		<0.0000050	0.0000310	0.0000304	1.95	0.0000968	0.0000735	27.36
Cadmium CCME-FAL	mg/L	-		-	0.00037	0.00037	-	0.00037	0.00037	-
Calcium (Ca)-Dissolved	mg/L	-		<0.050	69.3	72.3	4.24	119	119	0.00
Chromium (Cr)-Dissolved	mg/L	-		<0.00010	0.00057	0.00054	5.41	0.00051	0.00056	9.35
Chromium (III)-Dissolved	mg/L	0.0089		-	-	-	nc	-	-	nc
Hexavalent Chromium-Dissolved	mg/L	0.001		-	-	-	nc	-	-	nc
Cobalt (Co)-Dissolved	mg/L	-		<0.00010	0.00033	0.00031	6.25	<0.00010	<0.00010	nc
Copper (Cu)-Dissolved	mg/L	Varies ¹⁰		<0.00020	0.00247	0.00252	2.00	0.00117	0.00108	8.00
Copper CCME-FAL	mg/L	-		-	0.004	0.004	-	0.004	0.004	-
Iron (Fe)-Dissolved	mg/L	0.3		<0.010	0.192	0.195	1.55	0.011	<0.010	nc
Lead (Pb)-Dissolved	mg/L	Varies ¹¹		<0.000050	<0.000050	<0.000050	nc	<0.000050	<0.000050	nc
Lead CCME-FAL	mg/L	-		-	0.007	0.007	-	0.007	0.007	-
Lithium (Li)-Dissolved	mg/L	-		<0.0010	0.0035	0.0039	10.81	0.0081	0.0078	3.77
Magnesium (Mg)-Dissolved	mg/L	-		<0.10	33.4	34.7	3.82	101	106	4.83
Manganese (Mn)-Dissolved	mg/L	-		<0.00010	0.169	0.169	0.00	0.00025	0.00013	nc
Mercury (Hg)-Dissolved	mg/L	0.000026		<0.0000050	0.0000055	0.0000052	5.61	0.0000065	0.0000054	18.49
Molybdenum (Mo)-Dissolved	mg/L	0.073		<0.000050	0.00118	0.00121	2.51	0.00248	0.00290	15.61
Nickel (Ni)-Dissolved	mg/L	Varies ¹²		<0.00050	0.00466	0.00482	3.38	0.0295	0.0269	9.22
Nickel CCME-FAL	mg/L	-		-	0.15	0.15	-	0.15	0.15	-
Phosphorus (P)-Dissolved	mg/L	-		<0.050	<0.050	<0.050	nc	<0.050	<0.050	nc
Potassium (K)-Dissolved	mg/L	-		<0.10	0.64	0.67	4.58	1.18	1.19	0.84
Selenium (Se)-Dissolved	mg/L	0.001		<0.000050	0.00159	0.00166	4.31	0.00165	0.00192	15.13
Silicon (Si)-Dissolved	mg/L	-		<0.050	4.90	5.00	2.02	4.87	4.75	2.49
Silver (Ag)-Dissolved	mg/L	0.0001		<0.000010	<0.000010	<0.000010	nc	<0.000010	<0.000010	nc
Sodium (Na)-Dissolved	mg/L	-		<0.050	2.77	2.88	3.89	4.52	4.43	2.01
Strontium (Sr)-Dissolved	mg/L	-		<0.00020	0.320	0.323	0.93	0.593	0.595	0.34
Sulfur (S)-Dissolved	mg/L	-		<0.50	53.4	55.0	2.95	159	170	6.69
Thallium (Tl)-Dissolved	mg/L	0.0008		<0.000010	0.000013	0.000022	nc	0.000058	0.000054	7.14
Tin (Sn)-Dissolved	mg/L	-		<0.00010	<0.00010	<0.00010	nc	<0.00010	<0.00010	nc
Titanium (Ti)-Dissolved	mg/L	-		<0.00030	<0.00090	0.00061	nc	<0.00030	<0.00030	nc
Uranium (U)-Dissolved	mg/L	0.015		<0.000010	0.00205	0.00206	0.49	0.00182	0.00170	6.82
Vanadium (V)-Dissolved	mg/L	-		<0.00050	<0.00050	<0.00050	nc	<0.00050	<0.00050	nc
Zinc (Zn)-Dissolved	mg/L	0.03		<0.00010	0.0018	0.0019	5.41	0.0030	0.0017	nc
Zirconium (Zr)-Dissolved	mg/L	-		<0.00030	0.00085	0.00081	4.82	<0.00030	0.00038	nc

Table 4: Analytical Quality Assurance and Control

		Site Location	E1 QA/QC Data				GWCC-3 QA/QC Data			
		Sample ID	E1 (FB1)	E1 (DUP-1)*	E1*	RPD (%) ¹³	GWCC-3(DUP-2)*	GWCC-3*	RPD (%) ¹³	TRAVEL_BLANK
		Date Sampled	30/09/2015	30/09/2015	30/09/2015		01/10/2015	01/10/2015		03/10/2015
		ALS Work Number	L1683192	L1683192	L1683192		L1683192	L1683192		L1683192
Parameter	Units	CCME-FAL ^{1, 2, 3, 4}								
Total Metals										
Aluminum (Al)-Total	mg/L	Varies ⁸	<0.0030	0.0550	0.0560	1.80	0.0098	0.0096	2.06	<0.0030
Aluminum CCME-FAL	mg/L	-	-	0.100	0.100	-	0.1000	0.1000	-	-
Antimony (Sb)-Total	mg/L	-	<0.00010	0.00037	0.00045	19.51	0.00085	0.00084	1.18	<0.00010
Arsenic (As)-Total	mg/L	0.005	<0.00010	0.00079	0.00084	6.13	0.00082	0.00086	4.76	<0.00010
Barium (Ba)-Total	mg/L	-	<0.000050	0.0582	0.0578	0.69	0.0247	0.0241	2.46	<0.000050
Beryllium (Be)-Total	mg/L	-	<0.000020	<0.000020	<0.000020	nc	<0.000020	<0.000020	nc	<0.000020
Bismuth (Bi)-Total	mg/L	-	<0.000050	<0.000050	0.000081	nc	<0.000050	<0.000050	nc	<0.000050
Boron (B)-Total	mg/L	1.5	<0.010	0.012	0.013	8.00	0.060	0.060	0.00	<0.010
Cadmium (Cd)-Total	mg/L	Varies ⁹	<0.0000050	0.0000454	0.0000408	10.67	0.0000840	0.0000897	6.56	<0.0000050
Cadmium CCME-FAL	mg/L	-	-	0.00037	0.00037	-	0.00037	0.00037	-	-
Calcium (Ca)-Total	mg/L	-	<0.050	67.5	70.5	4.35	114	115	0.87	<0.050
Chromium (Cr)-Total	mg/L	-	<0.00010	0.00124	0.00168	30.14	0.00079	0.00072	9.27	<0.00010
Chromium (III)-Total	mg/L	0.0089	-	0.00124	-	nc	-	-	nc	-
Hexavalent Chromium	mg/L	0.001	-	<0.0010	-	nc	-	-	nc	-
Cobalt (Co)-Total	mg/L	-	<0.00010	0.00042	0.00046	9.09	<0.00010	<0.00010	nc	<0.00010
Copper (Cu)-Total	mg/L	Varies ¹⁰	<0.00050	0.00265	0.00276	4.07	0.00134	0.00127	5.36	<0.00050
Copper CCME-FAL	mg/L	-	-	0.004	0.004	-	0.004	0.004	-	-
Iron (Fe)-Total	mg/L	0.3	<0.010	0.309	0.312	0.97	0.023	0.024	4.26	<0.010
Lead (Pb)-Total	mg/L	Varies ¹¹	<0.000050	0.000084	0.000118	33.66	0.000060	<0.000050	nc	<0.000050
Lead CCME-FAL	mg/L	-	-	0.007	0.007	-	0.007	0.007	-	-
Lithium (Li)-Total	mg/L	-	<0.0010	0.0037	0.0042	12.66	0.0082	0.0074	10.26	<0.0010
Magnesium (Mg)-Total	mg/L	-	<0.10	32.1	34.3	6.63	97.4	106	8.46	<0.10
Manganese (Mn)-Total	mg/L	-	<0.00010	0.178	0.186	4.40	0.00098	0.00081	18.99	<0.00010
Mercury (Hg)-Total	mg/L	0.000026	<0.0000050	0.0000080	0.0000078	2.53	0.0000068	0.0000077	12.41	<0.0000050
Molybdenum (Mo)-Total	mg/L	0.073	<0.000050	0.00128	0.00131	2.32	0.00258	0.00258	0.00	<0.000050
Nickel (Ni)-Total	mg/L	Varies ¹²	<0.00050	0.00598	0.00671	11.51	0.0293	0.0288	1.72	<0.00050
Nickel CCME-FAL	mg/L	-	-	0.15	0.15	-	0.15	0.15	-	-
Phosphorus (P)-Total	mg/L	-	<0.050	<0.050	<0.050	nc	<0.050	<0.050	nc	<0.050
Potassium (K)-Total	mg/L	-	<0.10	0.63	0.69	9.09	1.16	1.16	0.00	<0.10
Selenium (Se)-Total	mg/L	0.001	<0.000050	0.00161	0.00167	3.66	0.00162	0.00163	0.62	<0.000050
Silicon (Si)-Total	mg/L	-	<0.050	4.83	4.99	3.26	4.69	4.68	0.21	<0.050
Silver (Ag)-Total	mg/L	0.0001	<0.000010	<0.000010	<0.000010	nc	<0.000010	<0.000010	nc	<0.000010
Sodium (Na)-Total	mg/L	-	<0.050	2.80	2.93	4.54	4.24	4.11	3.11	<0.050
Strontium (Sr)-Total	mg/L	-	<0.00020	0.320	0.326	1.86	0.581	0.580	0.17	<0.00020
Thallium (Tl)-Total	mg/L	-	<0.000010	0.000016	0.000027	nc	0.000057	0.000057	0.00	<0.000010
Tin (Sn)-Total	mg/L	0.0008	<0.00010	<0.00010	<0.00010	nc	<0.00010	<0.00010	nc	<0.00010
Titanium (Ti)-Total	mg/L	-	<0.00030	0.00135	0.00129	4.55	<0.00090	0.00038	nc	<0.00030
Uranium (U)-Total	mg/L	-	<0.000010	0.00215	0.00219	1.84	0.00184	0.00183	0.54	<0.000010
Vanadium (V)-Total	mg/L	0.015	<0.00050	0.00053	<0.00050	nc	<0.00050	<0.00050	nc	<0.00050
Zinc (Zn)-Total	mg/L	-	<0.0030	<0.0030	<0.0030	nc	0.0046	0.0039	16.47	<0.0030
Zirconium (Zr)-Total	mg/L	0.03	<0.00030	0.00085	0.00090	5.71	<0.00030	<0.00030	nc	<0.00030

Notes

(1) CCME guideline exceedences shaded with dark grey. Light grey shading denotes reportable detection limit in exceedence of CCME Guideline. Where guideline value is dependent on hardness or pH, reported values have been compared against a guideline value calculated for each site based on the relevant value, and the guideline value has been noted as "varies".

(2) - = No standard or not analyzed

(3) CCME = Canadian Council of Ministers of the Environment, Canadian Environmental Quality Guidelines, 1999, updated to November 2014

(4) CCME FAL = Chapter 4, Canadian Water Quality Guidelines for the Protection of Aquatic Life, Freshwater, updated to November 2014

(5) CCME FAL stipulates pH not < 6.5 and not > 9

(6) Guideline note: Lowest acceptable dissolved oxygen concentration for cold-water biota, early life stages

(7) Ammonia varies with pH and temperature for CCME FAL; see the CCME ammonia fact sheet for details regarding the applicable criteria, ammonia-NH₃ versus total ammonia-N, and other usage guidelines. CCME values listed in the table are expressed as ammonia (N) When field pH is not available, lab pH is used. When field and lab pH are both not available, the most stringent guideline has been used.

(8) Aluminum varies with pH as follows for CCME FAL:

0.005 if pH < 6.5

0.1 if pH ≥ 6.5

when field pH is not available, lab pH is used. When field and lab pH are both not available, the most stringent guideline has been used.

(9) Cadmium varies with Hardness in mg/L as follows for CCME FAL:

0.00 if H < 17

0.00004 - 0.00037 if H ≥ 17 and H ≤ 280 as follows;

$CWQG (\mu g/L) = 10\{0.83(\log[\text{hardness}]) - 2.46\}$

0.00 if H > 280

(10) Copper varies with Hardness in mg/L as follows for CCME FAL:

0.002 if H < 82

0.002 - 0.004 if H ≥ 82 and H ≤ 180 as follows;

$CWQG (\mu g/L) = 0.2 * e\{0.8545[\ln(\text{hardness})] - 1.465\}$

0.004 if H > 180

(11) Lead varies with Hardness in mg/L as follows for CCME FAL:

0.001 if H < 60

.001 - 0.001 if H ≥ 60 and H ≤ 180 as follows;

$CWQG (\mu g/L) = e\{1.273[\ln(\text{hardness})] - 4.705\}$

0.007 if H > 180

(12) Nickel varies with Hardness in mg/L as follows for CCME FAL:

0.025 if H < 60

0.025 - 0.15 if H ≥ 60 and H ≤ 180 as follows;

$CWQG (\mu g/L) = e\{0.76[\ln(\text{hardness})] + 1.06\}$

0.15 if H > 180

(13) RPD = Relative Percent Difference. The difference between a sample and its field duplicate over the average of two values.

nc = not calculated. RPD is not calculated if either the sample or the field duplicate concentration is less than five times the detection limit.

Italics text indicates the parameter-specific standard (calculated) for a particular sample.

Bold and underlined indicates values above RDL in Field Blank or Travel Blank

Bold and Italic Indicates QAQC values exceed expected results (i.e. RDP values exceed 20%).

*Indicates that samples were collected the following day for general chemistry analysis (i.e. pH, conductivity, TSS, nitrate, nitrite, and sulphate).

This was necessary due to sampling holding time and the remote nature of the site.

APPENDIX 1

Site Photos



Photo 1: Upstream view of Site E1 (Clinton Creek downstream of gabions). Photo taken on September 30th, 2015.



Photo 2: Upstream view of Site E1(H) (hydrometric station on Clinton Creek upstream of the drop structures). Photo taken on September 30th, 2015.



Photo 3: Downstream view of Site E2 (Clinton Creek, upstream of Wolverine Creek). Photo taken on September 30th, 2015.



Photo 4: Cross sectional view of Site E3 (Wolverine Creek, upstream of culvert). Photo taken on September 30th, 2015.



Photo 5: Upstream view of Site E4 (Clinton Creek, downstream of Wolverine Creek). Photo taken on September 30th, 2015.



Photo 6: Downstream view of Site E7 (Clinton Creek, near mouth). Photo taken on October 4th, 2015.



Photo 7: Upstream view of Site E8 (Forty-mile River, downstream of Clinton Creek). Photo taken on October 1st, 2015.



Photo 8: Upstream view of Site R1 (Clinton Creek, upstream of Hudgeon Lake). Photo taken on October 2nd, 2015.



Photo 9: Upstream view of Site R2 (Easter Creek, upstream of Hudgeon Lake). Photo taken on October 2rd, 2015.



Photo 10: Upstream view of Site R3 (Wolverine Creek, upstream of tailings). Photo taken on October 3rd, 2015.



Photo 11: Downstream view of Site R4 (Eagle Creek, upstream of culvert). Photo taken on September 30th, 2015



Photo 12: Downstream view of Site R6 (Forty-Mile River upstream of Clinton Creek). Photo taken on October 3rd, 2015.



Photo 13: Upstream View of Site R7 (Porcupine Creek, upstream of waste rock). Photo taken on October 3rd, 2015.



Photo 14: Upstream view of Site R8 (Unnamed Creek, west of Easter Creek). Photo taken October 2nd, 2015.



Photo 15: Upstream view of Site R9 (Unnamed Creek, south side of Hudgeon Lake). Photo taken on October 2nd, 2015.



Photo 16: View of seepage site GWCC-1 (toe of waste rock dump, flowing into ponded area). Photo taken and staff gauge installed on October 2nd, 2015.



Photo 17: View of seepage site GWCC-2 (toe of waste rock dump, flowing into ponded area). Photo taken and staff gauge installed on October 2nd, 2015.



Photo 18: View of seepage site GWCC-3 (toe of waste rock dump, flowing into seepage channel northwest of ponded area). Photo taken and staff gauge installed on October 2nd, 2015.



Photo 19: View of seepage site GWCC-4 (toe of waste rock dump, flowing into seepage channel northwest of ponded area). Photo taken and staff gauge installed on October 2nd, 2015.



Photo 20: View of seepage site GWCC-5 (groundwater flows in old Clinton Creek channel). Photo taken and staff gauge installed on September 30th, 2015.



Photo 21: View of Site SL (Snowshoe Pit Lake). Photo taken on October 1st, 2015.



Photo 22: View of Site E3(H) (hydrometric station on Wolverine Creek). Photo taken on October 2nd, 2015.

APPENDIX 2

Water Quality Analytical Laboratory Reports



HEMMERA ENVIROCHEM INC.
ATTN: Natasha Sandys
230 - 2237 2nd Avenue
Whitehorse YK Y1A 0K7

Date Received: 05-OCT-15
Report Date: 05-NOV-15 12:23 (MT)
Version: FINAL REV. 2

Client Phone: 867-456-4865

Certificate of Analysis

Lab Work Order #: L1683192
Project P.O. #: NOT SUBMITTED
Job Reference: 1343-005.13
C of C Numbers: 1, 2, 3, 4
Legal Site Desc:

Comments:

5-NOV-2015 This report replaces the previous version and contains additional analyses as requested.

Brent Mack, B.Sc.
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ADDRESS: 8081 Lougheed Hwy, Suite 100, Burnaby, BC V5A 1W9 Canada | Phone: +1 604 253 4188 | Fax: +1 604 253 6700
ALS CANADA LTD Part of the ALS Group A Campbell Brothers Limited Company

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1683192-1 Water 30-SEP-15 11:45 E1	L1683192-2 Water 02-OCT-15 18:45 E1	L1683192-3 Water 30-SEP-15 14:30 E2	L1683192-4 Water 02-OCT-15 19:00 E2	L1683192-5 Water 30-SEP-15 16:00 E3
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)		560		767	
	Hardness (as CaCO3) (mg/L)	323		460		388
	pH (pH)		8.20		8.11	
	Total Suspended Solids (mg/L)		<3.0		<3.0	
Anions and Nutrients	Ammonia, Total (as N) (mg/L)	0.0170		0.0152		0.0220
	Nitrate (as N) (mg/L)		0.142		0.144	
	Nitrite (as N) (mg/L)		0.0018		0.0023	
	Phosphorus (P)-Total (mg/L)	0.0062		0.0024		0.0157
	Sulfate (SO4) (mg/L)		166		266	
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	14.9		13.4		13.5
	Total Organic Carbon (mg/L)					
Total Metals	Aluminum (Al)-Total (mg/L)	0.0560		0.0448		0.769
	Antimony (Sb)-Total (mg/L)	0.00045		0.00050		0.00060
	Arsenic (As)-Total (mg/L)	0.00084		0.00112		0.00131
	Barium (Ba)-Total (mg/L)	0.0578		0.0552		0.0757
	Beryllium (Be)-Total (mg/L)	<0.000020		<0.000020		0.000031
	Bismuth (Bi)-Total (mg/L)	0.000081		<0.000050		<0.000050
	Boron (B)-Total (mg/L)	0.013		0.043		0.039
	Cadmium (Cd)-Total (mg/L)	0.0000408		0.0000548		0.0000623
	Calcium (Ca)-Total (mg/L)	70.5		86.7		69.7
	Chromium (Cr)-Total (mg/L)	0.00168		0.00113		0.00249
	Cobalt (Co)-Total (mg/L)	0.00046		0.00073		0.00075
	Copper (Cu)-Total (mg/L)	0.00276		0.00236		0.00352
	Iron (Fe)-Total (mg/L)	0.312		0.402		1.64
	Lead (Pb)-Total (mg/L)	0.000118		0.000059		0.000694
	Lithium (Li)-Total (mg/L)	0.0042		0.0107		0.0044
	Magnesium (Mg)-Total (mg/L)	34.3		58.1		49.0
	Manganese (Mn)-Total (mg/L)	0.186		0.178		0.137
	Mercury (Hg)-Total (mg/L)	0.0000078		0.0000087		0.0000113
	Molybdenum (Mo)-Total (mg/L)	0.00131		0.00159		0.00123
	Nickel (Ni)-Total (mg/L)	0.00671		0.0149		0.00799
	Phosphorus (P)-Total (mg/L)	<0.050		<0.050		<0.050
	Potassium (K)-Total (mg/L)	0.69		0.91		0.74
	Selenium (Se)-Total (mg/L)	0.00167		0.00159		0.00112
	Silicon (Si)-Total (mg/L)	4.99		5.09		7.07
	Silver (Ag)-Total (mg/L)	<0.000010		<0.000010		0.000022

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1683192-6 Water 02-OCT-15 19:05 E3	L1683192-7 Water 30-SEP-15 18:25 E4	L1683192-8 Water 02-OCT-15 19:10 E4	L1683192-9 Water 01-OCT-15 17:45 E7	L1683192-10 Water 03-OCT-15 16:45 E7
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)	646		791		773
	Hardness (as CaCO3) (mg/L)		465		452	
	pH (pH)	8.15		8.06		8.06
	Total Suspended Solids (mg/L)	18.7		7.3		<3.0
Anions and Nutrients	Ammonia, Total (as N) (mg/L)		0.0063		0.0073	
	Nitrate (as N) (mg/L)	0.132		0.111		0.143
	Nitrite (as N) (mg/L)	0.0016		0.0012		<0.0010
	Phosphorus (P)-Total (mg/L)		0.0032		0.0028	
	Sulfate (SO4) (mg/L)	219		270		258
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)		12.7		13.4	
	Total Organic Carbon (mg/L)					
Total Metals	Aluminum (Al)-Total (mg/L)		0.0851		0.0692	
	Antimony (Sb)-Total (mg/L)		0.00049		0.00043	
	Arsenic (As)-Total (mg/L)		0.00114		0.00101	
	Barium (Ba)-Total (mg/L)		0.0557		0.0559	
	Beryllium (Be)-Total (mg/L)		<0.000020		<0.000020	
	Bismuth (Bi)-Total (mg/L)		<0.000050		<0.000050	
	Boron (B)-Total (mg/L)		0.054		0.042	
	Cadmium (Cd)-Total (mg/L)		0.0000476		0.0000579	
	Calcium (Ca)-Total (mg/L)		86.6		84.5	
	Chromium (Cr)-Total (mg/L)		0.00097		0.00119	
	Cobalt (Co)-Total (mg/L)		0.00073		0.00082	
	Copper (Cu)-Total (mg/L)		0.00205		0.00227	
	Iron (Fe)-Total (mg/L)		0.463		0.441	
	Lead (Pb)-Total (mg/L)		0.000086		0.000074	
	Lithium (Li)-Total (mg/L)		0.0124		0.0113	
	Magnesium (Mg)-Total (mg/L)		61.7		59.2	
	Manganese (Mn)-Total (mg/L)		0.172		0.277	
	Mercury (Hg)-Total (mg/L)		0.0000080		0.0000073	
	Molybdenum (Mo)-Total (mg/L)		0.00159		0.00139	
	Nickel (Ni)-Total (mg/L)		0.0159		0.0152	
	Phosphorus (P)-Total (mg/L)		<0.050		<0.050	
	Potassium (K)-Total (mg/L)		0.94		0.95	
	Selenium (Se)-Total (mg/L)		0.00127		0.00123	
	Silicon (Si)-Total (mg/L)		5.31		5.18	
	Silver (Ag)-Total (mg/L)		<0.000010		<0.000010	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1683192-11 Water 01-OCT-15 17:10 E8	L1683192-12 Water 03-OCT-15 16:25 E8	L1683192-13 Water 02-OCT-15 14:45 R1	L1683192-14 Water 02-OCT-15 11:15 R2	L1683192-15 Water 03-OCT-15 14:40 R3
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)		241	708	572	667
	Hardness (as CaCO3) (mg/L)	124		416	335	384
	pH (pH)		7.86	8.00	8.11	8.10
	Total Suspended Solids (mg/L)		<3.0	18.0	6.7	8.0
Anions and Nutrients	Ammonia, Total (as N) (mg/L)	0.0058		0.0421	0.0132	0.0216
	Nitrate (as N) (mg/L)		0.112	0.167	0.0673	0.0736
	Nitrite (as N) (mg/L)		<0.0010	0.0011	<0.0010	<0.0010
	Phosphorus (P)-Total (mg/L)	<0.0020		0.0095	0.0074	0.0071
	Sulfate (SO4) (mg/L)		49.8	239	160	232
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	11.3		12.8	13.1	14.4
	Total Organic Carbon (mg/L)					
Total Metals	Aluminum (Al)-Total (mg/L)	0.140		0.202	0.202	0.166
	Antimony (Sb)-Total (mg/L)	0.00016		0.00026	0.00051	0.00022
	Arsenic (As)-Total (mg/L)	0.00049		0.00080	0.00098	0.00068
	Barium (Ba)-Total (mg/L)	0.0378		0.0601	0.0546	0.0545
	Beryllium (Be)-Total (mg/L)	<0.000020		<0.000020	<0.000020	<0.000020
	Bismuth (Bi)-Total (mg/L)	<0.000050		<0.000050	<0.000050	<0.000050
	Boron (B)-Total (mg/L)	<0.010		<0.010	0.014	<0.010
	Cadmium (Cd)-Total (mg/L)	0.0000167		0.0000982	0.0000300	0.0000212
	Calcium (Ca)-Total (mg/L)	31.6		92.7	63.7	73.9
	Chromium (Cr)-Total (mg/L)	0.00049		0.00074	0.00105	0.00095
	Cobalt (Co)-Total (mg/L)	0.00039		0.00088	0.00031	0.00040
	Copper (Cu)-Total (mg/L)	0.00233		0.00243	0.00203	0.00229
	Iron (Fe)-Total (mg/L)	0.388		0.833	0.599	0.447
	Lead (Pb)-Total (mg/L)	<0.000050		0.000278	0.000114	0.000107
	Lithium (Li)-Total (mg/L)	0.0040		0.0034	0.0057	0.0041
	Magnesium (Mg)-Total (mg/L)	10.7		42.6	41.5	49.5
	Manganese (Mn)-Total (mg/L)	0.0268		0.447	0.121	0.136
	Mercury (Hg)-Total (mg/L)	<0.0000050		0.0000140	0.0000077	0.0000063
	Molybdenum (Mo)-Total (mg/L)	0.000473		0.00148	0.000719	0.00115
	Nickel (Ni)-Total (mg/L)	0.00261		0.00540	0.00380	0.00350
	Phosphorus (P)-Total (mg/L)	<0.050		<0.050	<0.050	<0.050
	Potassium (K)-Total (mg/L)	0.89		0.61	0.70	0.62
	Selenium (Se)-Total (mg/L)	0.000235		0.00193	0.000892	0.000875
	Silicon (Si)-Total (mg/L)	5.10		4.91	6.39	6.68
	Silver (Ag)-Total (mg/L)	<0.000010		<0.000010	<0.000010	<0.000010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1683192-16 Water 02-OCT-15 19:10 R4	L1683192-17 Water 30-SEP-15 17:30 R4	L1683192-18 Water 03-OCT-15 17:00 R6	L1683192-19 Water 03-OCT-15 10:30 R7	L1683192-20 Water 02-OCT-15 12:00 R8
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)	550		241	202	282
	Hardness (as CaCO3) (mg/L)		267	133	112	141
	pH (pH)	8.17		7.82	7.52	7.72
	Total Suspended Solids (mg/L)	5.3		8.7	24.0	<3.0
Anions and Nutrients	Ammonia, Total (as N) (mg/L)		0.0162	0.0056	0.0471	<0.0050
	Nitrate (as N) (mg/L)	0.222		0.108	0.211	<0.0050
	Nitrite (as N) (mg/L)	<0.0010		<0.0010	<0.0010	<0.0010
	Phosphorus (P)-Total (mg/L)		0.0412	<0.0020	0.0183	<0.0020
	Sulfate (SO4) (mg/L)	152		49.7	49.2	82.5
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)		14.1	11.9	33.4	14.3
	Total Organic Carbon (mg/L)					
Total Metals	Aluminum (Al)-Total (mg/L)		1.29	0.103	0.384	0.0445
	Antimony (Sb)-Total (mg/L)		0.00051	0.00014	0.00028	0.00060
	Arsenic (As)-Total (mg/L)		0.00283	0.00056	0.00111	0.00035
	Barium (Ba)-Total (mg/L)		0.0901	0.0379	0.0795	0.0450
	Beryllium (Be)-Total (mg/L)		0.000045	<0.000020	0.000038	<0.000020
	Bismuth (Bi)-Total (mg/L)		<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Total (mg/L)		<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Total (mg/L)		0.000161	0.0000185	0.0000359	0.0000316
	Calcium (Ca)-Total (mg/L)		61.7	31.2	25.4	35.3
	Chromium (Cr)-Total (mg/L)		0.00382	0.00047	0.00212	0.00081
	Cobalt (Co)-Total (mg/L)		0.00152	0.00040	0.00066	<0.00010
	Copper (Cu)-Total (mg/L)		0.00537	0.00233	0.00644	0.00173
	Iron (Fe)-Total (mg/L)		2.34	0.436	1.35	0.093
	Lead (Pb)-Total (mg/L)		0.00120	<0.000050	0.000178	<0.000050
	Lithium (Li)-Total (mg/L)		0.0035	0.0041	<0.0010	0.0012
	Magnesium (Mg)-Total (mg/L)		26.5	11.2	12.6	13.8
	Manganese (Mn)-Total (mg/L)		0.174	0.0346	0.179	0.00872
	Mercury (Hg)-Total (mg/L)		0.0000170	0.0000054	0.0000129	0.0000077
	Molybdenum (Mo)-Total (mg/L)		0.00104	0.000433	0.000508	0.000594
	Nickel (Ni)-Total (mg/L)		0.0180	0.00254	0.00474	0.00262
	Phosphorus (P)-Total (mg/L)		0.089	<0.050	<0.050	<0.050
	Potassium (K)-Total (mg/L)		0.51	0.92	0.19	<0.10
	Selenium (Se)-Total (mg/L)		0.00243	0.000201	0.000361	0.00200
	Silicon (Si)-Total (mg/L)		7.24	5.57	6.53	6.86
	Silver (Ag)-Total (mg/L)		0.000040	<0.000010	<0.000010	<0.000010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1683192-21 Water 02-OCT-15 16:23 R9	L1683192-22 Water 02-OCT-15 18:40 GWCC-1	L1683192-23 Water 01-OCT-15 15:05 GWCC-1	L1683192-24 Water 02-OCT-15 18:35 GWCC-2	L1683192-25 Water 01-OCT-15 14:45 GWCC-2
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)	419	2550		1960	
	Hardness (as CaCO3) (mg/L)	229		1730		1310
	pH (pH)	7.81	7.84		7.98	
	Total Suspended Solids (mg/L)	3.3	4.0		<3.0	
Anions and Nutrients	Ammonia, Total (as N) (mg/L)	0.0529		<0.0050		<0.0050
	Nitrate (as N) (mg/L)	0.283	0.485 ^{DLA}		0.441 ^{DLA}	
	Nitrite (as N) (mg/L)	0.0013	<0.0050		<0.0050	
	Phosphorus (P)-Total (mg/L)	0.0063		<0.0020		<0.0020
	Sulfate (SO4) (mg/L)	127	1400		1060	
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	27.8		5.23		6.95
	Total Organic Carbon (mg/L)					
Total Metals	Aluminum (Al)-Total (mg/L)	0.153		0.0039		0.0348
	Antimony (Sb)-Total (mg/L)	0.00025		0.00130		0.00112
	Arsenic (As)-Total (mg/L)	0.00080		0.00212		0.00165
	Barium (Ba)-Total (mg/L)	0.0750		0.0193		0.0202
	Beryllium (Be)-Total (mg/L)	0.000023		<0.000020		<0.000020
	Bismuth (Bi)-Total (mg/L)	<0.000050		<0.000050		<0.000050
	Boron (B)-Total (mg/L)	<0.010		0.326		0.119
	Cadmium (Cd)-Total (mg/L)	0.0000527		0.000181		0.000177
	Calcium (Ca)-Total (mg/L)	53.5		203		174
	Chromium (Cr)-Total (mg/L)	0.00118		0.00252		0.00503
	Cobalt (Co)-Total (mg/L)	0.00073		<0.00010		0.00025
	Copper (Cu)-Total (mg/L)	0.00458		0.00088		0.00162
	Iron (Fe)-Total (mg/L)	1.19		<0.010		0.134
	Lead (Pb)-Total (mg/L)	0.000084		0.000119		<0.000050
	Lithium (Li)-Total (mg/L)	<0.0010		0.0927		0.0172
	Magnesium (Mg)-Total (mg/L)	21.0		295		200
	Manganese (Mn)-Total (mg/L)	0.355		0.00030		0.00239
	Mercury (Hg)-Total (mg/L)	0.0000127		<0.0000050		0.0000078
	Molybdenum (Mo)-Total (mg/L)	0.000904		0.00238		0.00254
	Nickel (Ni)-Total (mg/L)	0.00399		0.0743		0.0482
	Phosphorus (P)-Total (mg/L)	<0.050		<0.050		<0.050
	Potassium (K)-Total (mg/L)	0.38		3.23		1.89
	Selenium (Se)-Total (mg/L)	0.00142		0.00381		0.00328
	Silicon (Si)-Total (mg/L)	5.35		6.41		5.28
	Silver (Ag)-Total (mg/L)	<0.000010		<0.000010		<0.000010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1683192-26 Water 02-OCT-15 18:30 GWCC-3	L1683192-27 Water 01-OCT-15 13:50 GWCC-3	L1683192-28 Water 02-OCT-15 18:45 GWCC-4	L1683192-29 Water 01-OCT-15 13:25 GWCC-4	L1683192-30 Water 02-OCT-15 18:55 GWCC-5
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)	1170		767		902
	Hardness (as CaCO3) (mg/L)		735		451	
	pH (pH)	7.90		7.91		7.77
	Total Suspended Solids (mg/L)	<3.0		<3.0		<3.0
Anions and Nutrients	Ammonia, Total (as N) (mg/L)		<0.0050		<0.0050	
	Nitrate (as N) (mg/L)	0.186		0.0816		0.0200
	Nitrite (as N) (mg/L)	<0.0020 ^{DLA}		<0.0010		<0.0010
	Phosphorus (P)-Total (mg/L)		<0.0020		<0.0020	
	Sulfate (SO4) (mg/L)	490		254		292
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)		9.00		9.94	
	Total Organic Carbon (mg/L)					
Total Metals	Aluminum (Al)-Total (mg/L)		0.0096		<0.0030	
	Antimony (Sb)-Total (mg/L)		0.00084		0.00077	
	Arsenic (As)-Total (mg/L)		0.00086		0.00124	
	Barium (Ba)-Total (mg/L)		0.0241		0.0308	
	Beryllium (Be)-Total (mg/L)		<0.000020		<0.000020	
	Bismuth (Bi)-Total (mg/L)		<0.000050		<0.000050	
	Boron (B)-Total (mg/L)		0.060		0.041	
	Cadmium (Cd)-Total (mg/L)		0.0000897		0.0000461	
	Calcium (Ca)-Total (mg/L)		115		81.7	
	Chromium (Cr)-Total (mg/L)		0.00072		0.00047	
	Cobalt (Co)-Total (mg/L)		<0.00010		<0.00010	
	Copper (Cu)-Total (mg/L)		0.00127		0.00107	
	Iron (Fe)-Total (mg/L)		0.024		<0.010	
	Lead (Pb)-Total (mg/L)		<0.000050		<0.000050	
	Lithium (Li)-Total (mg/L)		0.0074		0.0062	
	Magnesium (Mg)-Total (mg/L)		106		55.0	
	Manganese (Mn)-Total (mg/L)		0.00081		0.00026	
	Mercury (Hg)-Total (mg/L)		0.0000077		0.0000055	
	Molybdenum (Mo)-Total (mg/L)		0.00258		0.00234	
	Nickel (Ni)-Total (mg/L)		0.0288		0.0300	
	Phosphorus (P)-Total (mg/L)		<0.050		<0.050	
	Potassium (K)-Total (mg/L)		1.16		0.91	
	Selenium (Se)-Total (mg/L)		0.00163		0.000824	
	Silicon (Si)-Total (mg/L)		4.68		5.38	
	Silver (Ag)-Total (mg/L)		<0.000010		<0.000010	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID Description Sampled Date Sampled Time Client ID	L1683192-31 Water 30-SEP-15 13:30 GWCC-5	L1683192-32 Water 02-OCT-15 18:25 SL	L1683192-33 Water 01-OCT-15 09:15 SL	L1683192-34 Water 02-OCT-15 18:45 DUP-1	L1683192-35 Water 30-SEP-15 11:45 DUP-1
Grouping	Analyte						
WATER							
Physical Tests	Conductivity (uS/cm)			1510		561	
	Hardness (as CaCO3) (mg/L)	523			979		311
	pH (pH)			8.28		8.24	
	Total Suspended Solids (mg/L)			16.0		<3.0	
Anions and Nutrients	Ammonia, Total (as N) (mg/L)	<0.0050			0.0100		0.0179
	Nitrate (as N) (mg/L)			0.117		0.143	
	Nitrite (as N) (mg/L)			<0.0020 ^{DLA}		0.0030	
	Phosphorus (P)-Total (mg/L)	<0.0020			<0.0020		<0.020 ^{DLM}
	Sulfate (SO4) (mg/L)			714		166	
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)	7.83			6.70		15.1
	Total Organic Carbon (mg/L)						
Total Metals	Aluminum (Al)-Total (mg/L)	<0.0030			0.0562		0.0550
	Antimony (Sb)-Total (mg/L)	0.00061			0.00310		0.00037
	Arsenic (As)-Total (mg/L)	0.00059			0.0146		0.00079
	Barium (Ba)-Total (mg/L)	0.0500			0.0239		0.0582
	Beryllium (Be)-Total (mg/L)	<0.000020			<0.000020		<0.000020
	Bismuth (Bi)-Total (mg/L)	<0.000050			<0.000050		<0.000050
	Boron (B)-Total (mg/L)	0.032			0.051		0.012
	Cadmium (Cd)-Total (mg/L)	0.000109			0.0000286		0.0000454
	Calcium (Ca)-Total (mg/L)	118			218		67.5
	Chromium (Cr)-Total (mg/L)	0.00056			0.00260		0.00124
	Cobalt (Co)-Total (mg/L)	<0.00010			0.00029		0.00042
	Copper (Cu)-Total (mg/L)	0.00087			0.00101		0.00265
	Iron (Fe)-Total (mg/L)	0.036			0.112		0.309
	Lead (Pb)-Total (mg/L)	<0.000050			0.000064		0.000084
	Lithium (Li)-Total (mg/L)	0.0088			0.0123		0.0037
	Magnesium (Mg)-Total (mg/L)	51.4			101		32.1
	Manganese (Mn)-Total (mg/L)	0.00350			0.00779		0.178
	Mercury (Hg)-Total (mg/L)	<0.0000050			<0.0000050		0.0000080
	Molybdenum (Mo)-Total (mg/L)	0.00168			0.00186		0.00128
	Nickel (Ni)-Total (mg/L)	0.0183			0.0187		0.00598
	Phosphorus (P)-Total (mg/L)	<0.050			<0.050		<0.050
	Potassium (K)-Total (mg/L)	0.88			1.46		0.63
	Selenium (Se)-Total (mg/L)	0.00264			0.0105		0.00161
	Silicon (Si)-Total (mg/L)	4.76			5.21		4.83
	Silver (Ag)-Total (mg/L)	<0.000010			<0.000010		<0.000010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1683192-36 Water TRAVEL BLANK	L1683192-37 Water 02-OCT-15 18:30 DUP-2	L1683192-38 Water 01-OCT-15 13:50 DUP-2	L1683192-39 Water 30-SEP-15 14:45 FB1	
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)	<2.0	1190		<2.0	
	Hardness (as CaCO3) (mg/L)	<0.50		713	<0.50	
	pH (pH)	5.93	7.91		6.31	
	Total Suspended Solids (mg/L)	<3.0	<3.0		<4.0	
Anions and Nutrients	Ammonia, Total (as N) (mg/L)	<0.0050		<0.0050	<0.0050	
	Nitrate (as N) (mg/L)	<0.0050	0.189		<0.0050	
	Nitrite (as N) (mg/L)	<0.0010	<0.0010		<0.0010	
	Phosphorus (P)-Total (mg/L)	<0.0020		<0.0020	<0.0020	
	Sulfate (SO4) (mg/L)	<0.30	485		<0.30	
Organic / Inorganic Carbon	Dissolved Organic Carbon (mg/L)			9.10	<0.50	
	Total Organic Carbon (mg/L)	<0.50				
Total Metals	Aluminum (Al)-Total (mg/L)	<0.0030		0.0098	<0.0030	
	Antimony (Sb)-Total (mg/L)	<0.00010		0.00085	<0.00010	
	Arsenic (As)-Total (mg/L)	<0.00010		0.00082	<0.00010	
	Barium (Ba)-Total (mg/L)	<0.000050		0.0247	<0.000050	
	Beryllium (Be)-Total (mg/L)	<0.000020		<0.000020	<0.000020	
	Bismuth (Bi)-Total (mg/L)	<0.000050		<0.000050	<0.000050	
	Boron (B)-Total (mg/L)	<0.010		0.060	<0.010	
	Cadmium (Cd)-Total (mg/L)	<0.0000050		0.0000840	<0.0000050	
	Calcium (Ca)-Total (mg/L)	<0.050		114	<0.050	
	Chromium (Cr)-Total (mg/L)	<0.00010		0.00079	<0.00010	
	Cobalt (Co)-Total (mg/L)	<0.00010		<0.00010	<0.00010	
	Copper (Cu)-Total (mg/L)	<0.00050		0.00134	<0.00050	
	Iron (Fe)-Total (mg/L)	<0.010		0.023	<0.010	
	Lead (Pb)-Total (mg/L)	<0.000050		0.000060	<0.000050	
	Lithium (Li)-Total (mg/L)	<0.0010		0.0082	<0.0010	
	Magnesium (Mg)-Total (mg/L)	<0.10		97.4	<0.10	
	Manganese (Mn)-Total (mg/L)	<0.00010		0.00098	<0.00010	
	Mercury (Hg)-Total (mg/L)	<0.0000050		0.0000068	<0.0000050	
	Molybdenum (Mo)-Total (mg/L)	<0.000050		0.00258	<0.000050	
	Nickel (Ni)-Total (mg/L)	<0.00050		0.0293	<0.00050	
	Phosphorus (P)-Total (mg/L)	<0.050		<0.050	<0.050	
	Potassium (K)-Total (mg/L)	<0.10		1.16	<0.10	
	Selenium (Se)-Total (mg/L)	<0.000050		0.00162	<0.000050	
	Silicon (Si)-Total (mg/L)	<0.050		4.69	<0.050	
	Silver (Ag)-Total (mg/L)	<0.000010		<0.000010	<0.000010	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID Description Sampled Date Sampled Time Client ID	L1683192-1 Water 30-SEP-15 11:45 E1	L1683192-2 Water 02-OCT-15 18:45 E1	L1683192-3 Water 30-SEP-15 14:30 E2	L1683192-4 Water 02-OCT-15 19:00 E2	L1683192-5 Water 30-SEP-15 16:00 E3
Grouping	Analyte						
WATER							
Total Metals	Sodium (Na)-Total (mg/L)	2.93			4.28		4.39
	Strontium (Sr)-Total (mg/L)	0.326			0.479		0.327
	Sulfur (S)-Total (mg/L)	55.5			90.8		75.4
	Thallium (Tl)-Total (mg/L)	0.000027			0.000030		0.000019
	Tin (Sn)-Total (mg/L)	<0.00010			<0.00010		<0.00010
	Titanium (Ti)-Total (mg/L)	0.00129			<0.0015 ^{DLM}		0.0191
	Uranium (U)-Total (mg/L)	0.00219			0.00242		0.00328
	Vanadium (V)-Total (mg/L)	<0.00050			<0.00050		0.00265
	Zinc (Zn)-Total (mg/L)	<0.0030			0.0030		0.0058
	Zirconium (Zr)-Total (mg/L)	0.00090			0.00074		0.00072
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD			FIELD		FIELD
	Dissolved Metals Filtration Location	FIELD			FIELD		FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.0285			0.0209		0.0315
	Antimony (Sb)-Dissolved (mg/L)	0.00034			0.00042		0.00047
	Arsenic (As)-Dissolved (mg/L)	0.00073			0.00105		0.00071
	Barium (Ba)-Dissolved (mg/L)	0.0560			0.0535		0.0520
	Beryllium (Be)-Dissolved (mg/L)	<0.000020			<0.000020		<0.000020
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050			<0.000050		<0.000050
	Boron (B)-Dissolved (mg/L)	0.010			0.038		0.035
	Cadmium (Cd)-Dissolved (mg/L)	0.0000304			0.0000506		0.0000146
	Calcium (Ca)-Dissolved (mg/L)	72.3			87.9		72.4
	Chromium (Cr)-Dissolved (mg/L)	0.00054			0.00068		0.00075
	Cobalt (Co)-Dissolved (mg/L)	0.00031			0.00064		0.00027
	Copper (Cu)-Dissolved (mg/L)	0.00252			0.00210		0.00183
	Iron (Fe)-Dissolved (mg/L)	0.195			0.296		0.192
	Lead (Pb)-Dissolved (mg/L)	<0.000050			<0.000050		<0.000050
	Lithium (Li)-Dissolved (mg/L)	0.0039			0.0103		0.0037
	Magnesium (Mg)-Dissolved (mg/L)	34.7			58.5		50.2
	Manganese (Mn)-Dissolved (mg/L)	0.169			0.163		0.105
	Mercury (Hg)-Dissolved (mg/L)	0.0000052			0.0000083		<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	0.00121			0.00150		0.00104
	Nickel (Ni)-Dissolved (mg/L)	0.00482			0.0137		0.00528
	Phosphorus (P)-Dissolved (mg/L)	<0.050			<0.050		<0.050
	Potassium (K)-Dissolved (mg/L)	0.67			0.92		0.63
	Selenium (Se)-Dissolved (mg/L)	0.00166			0.00167		0.00113
	Silicon (Si)-Dissolved (mg/L)	5.00			5.04		6.06
	Silver (Ag)-Dissolved (mg/L)	<0.000010			<0.000010		<0.000010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID Description Sampled Date Sampled Time Client ID	L1683192-6 Water 02-OCT-15 19:05 E3	L1683192-7 Water 30-SEP-15 18:25 E4	L1683192-8 Water 02-OCT-15 19:10 E4	L1683192-9 Water 01-OCT-15 17:45 E7	L1683192-10 Water 03-OCT-15 16:45 E7
Grouping	Analyte						
WATER							
Total Metals	Sodium (Na)-Total (mg/L)			5.02		4.59	
	Strontium (Sr)-Total (mg/L)			0.500		0.478	
	Sulfur (S)-Total (mg/L)			91.8		87.3	
	Thallium (Tl)-Total (mg/L)			0.000016		0.000010	
	Tin (Sn)-Total (mg/L)			<0.00010		<0.00010	
	Titanium (Ti)-Total (mg/L)			0.00244		0.00186	
	Uranium (U)-Total (mg/L)			0.00259		0.00248	
	Vanadium (V)-Total (mg/L)			0.00057		<0.00050	
	Zinc (Zn)-Total (mg/L)			<0.0030		0.0035	
	Zirconium (Zr)-Total (mg/L)			0.00091		0.00113	
Dissolved Metals	Dissolved Mercury Filtration Location			FIELD		FIELD	
	Dissolved Metals Filtration Location			FIELD		FIELD	
	Aluminum (Al)-Dissolved (mg/L)			0.0167		0.0170	
	Antimony (Sb)-Dissolved (mg/L)			0.00042		0.00035	
	Arsenic (As)-Dissolved (mg/L)			0.00097		0.00088	
	Barium (Ba)-Dissolved (mg/L)			0.0521		0.0525	
	Beryllium (Be)-Dissolved (mg/L)			<0.000020		<0.000020	
	Bismuth (Bi)-Dissolved (mg/L)			<0.000050		<0.000050	
	Boron (B)-Dissolved (mg/L)			0.048		0.037	
	Cadmium (Cd)-Dissolved (mg/L)			0.0000423		0.0000514	
	Calcium (Ca)-Dissolved (mg/L)			85.7		83.7	
	Chromium (Cr)-Dissolved (mg/L)			0.00063		0.00061	
	Cobalt (Co)-Dissolved (mg/L)			0.00063		0.00076	
	Copper (Cu)-Dissolved (mg/L)			0.00184		0.00202	
	Iron (Fe)-Dissolved (mg/L)			0.253		0.278	
	Lead (Pb)-Dissolved (mg/L)			<0.000050		<0.000050	
	Lithium (Li)-Dissolved (mg/L)			0.0116		0.0107	
	Magnesium (Mg)-Dissolved (mg/L)			60.9		58.9	
	Manganese (Mn)-Dissolved (mg/L)			0.161		0.263	
	Mercury (Hg)-Dissolved (mg/L)			<0.0000050		0.0000066	
	Molybdenum (Mo)-Dissolved (mg/L)			0.00144		0.00129	
	Nickel (Ni)-Dissolved (mg/L)			0.0150		0.0146	
	Phosphorus (P)-Dissolved (mg/L)			<0.050		<0.050	
	Potassium (K)-Dissolved (mg/L)			0.92		0.91	
	Selenium (Se)-Dissolved (mg/L)			0.00130		0.00122	
	Silicon (Si)-Dissolved (mg/L)			5.09		5.00	
	Silver (Ag)-Dissolved (mg/L)			<0.000010		<0.000010	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID Description Sampled Date Sampled Time Client ID	L1683192-11 Water 01-OCT-15 17:10 E8	L1683192-12 Water 03-OCT-15 16:25 E8	L1683192-13 Water 02-OCT-15 14:45 R1	L1683192-14 Water 02-OCT-15 11:15 R2	L1683192-15 Water 03-OCT-15 14:40 R3
Grouping	Analyte						
WATER							
Total Metals	Sodium (Na)-Total (mg/L)	4.18			3.25	3.18	4.07
	Strontium (Sr)-Total (mg/L)	0.160			0.417	0.330	0.350
	Sulfur (S)-Total (mg/L)	16.7			79.9	53.8	80.2
	Thallium (Tl)-Total (mg/L)	<0.000010			<0.000010	<0.000010	<0.000010
	Tin (Sn)-Total (mg/L)	<0.00010			<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)	0.00200			0.00649	0.00681	0.00600
	Uranium (U)-Total (mg/L)	0.00107			0.00248	0.00323	0.00381
	Vanadium (V)-Total (mg/L)	0.00067			0.00079	0.00089	0.00105
	Zinc (Zn)-Total (mg/L)	0.0039			0.0036	<0.0030	<0.0030
	Zirconium (Zr)-Total (mg/L)	0.00062			0.00065	0.00065	0.00067
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD			FIELD	FIELD	FIELD
	Dissolved Metals Filtration Location	FIELD			FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.0653			0.0144	0.0354	0.0329
	Antimony (Sb)-Dissolved (mg/L)	0.00010			0.00020	0.00047	0.00018
	Arsenic (As)-Dissolved (mg/L)	0.00042			0.00054	0.00088	0.00054
	Barium (Ba)-Dissolved (mg/L)	0.0367			0.0543	0.0498	0.0499
	Beryllium (Be)-Dissolved (mg/L)	<0.000020			<0.000020	<0.000020	<0.000020
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050			<0.000050	<0.000050	<0.000050
	Boron (B)-Dissolved (mg/L)	<0.010			<0.010	0.011	<0.010
	Cadmium (Cd)-Dissolved (mg/L)	0.0000174			0.0000916	0.0000202	0.0000181
	Calcium (Ca)-Dissolved (mg/L)	31.8			94.8	63.4	74.1
	Chromium (Cr)-Dissolved (mg/L)	0.00034			0.00026	0.00070	0.00065
	Cobalt (Co)-Dissolved (mg/L)	0.00036			0.00069	0.00023	0.00031
	Copper (Cu)-Dissolved (mg/L)	0.00216			0.00190	0.00172	0.00194
	Iron (Fe)-Dissolved (mg/L)	0.253			0.383	0.339	0.231
	Lead (Pb)-Dissolved (mg/L)	<0.000050			<0.000050	<0.000050	<0.000050
	Lithium (Li)-Dissolved (mg/L)	0.0039			0.0032	0.0054	0.0037
	Magnesium (Mg)-Dissolved (mg/L)	10.9			43.5	42.8	48.4
	Manganese (Mn)-Dissolved (mg/L)	0.0247			0.433	0.115	0.130
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050			0.0000070	0.0000071	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	0.000424			0.00142	0.000669	0.00102
	Nickel (Ni)-Dissolved (mg/L)	0.00261			0.00460	0.00356	0.00308
	Phosphorus (P)-Dissolved (mg/L)	<0.050			<0.050	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)	0.90			0.60	0.69	0.58
	Selenium (Se)-Dissolved (mg/L)	0.000251			0.00208	0.000901	0.000846
	Silicon (Si)-Dissolved (mg/L)	5.09			4.77	6.10	6.48
	Silver (Ag)-Dissolved (mg/L)	<0.000010			<0.000010	<0.000010	<0.000010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1683192-16 Water 02-OCT-15 19:10 R4	L1683192-17 Water 30-SEP-15 17:30 R4	L1683192-18 Water 03-OCT-15 17:00 R6	L1683192-19 Water 03-OCT-15 10:30 R7	L1683192-20 Water 02-OCT-15 12:00 R8
Grouping	Analyte					
WATER						
Total Metals	Sodium (Na)-Total (mg/L)		3.39	4.57	1.64	4.56
	Strontium (Sr)-Total (mg/L)		0.313	0.164	0.0772	0.137
	Sulfur (S)-Total (mg/L)		41.7	17.1	16.8	28.4
	Thallium (Tl)-Total (mg/L)		0.000020	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Total (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)		0.0348	0.00137	0.0132	0.00092
	Uranium (U)-Total (mg/L)		0.00260	0.00115	0.000127	0.000066
	Vanadium (V)-Total (mg/L)		0.00379	0.00063	0.00154	<0.00050
	Zinc (Zn)-Total (mg/L)		0.0097	0.0039	<0.0030	<0.0030
	Zirconium (Zr)-Total (mg/L)		0.00089	0.00082	0.00161	0.00062
Dissolved Metals	Dissolved Mercury Filtration Location		FIELD	FIELD	FIELD	FIELD
	Dissolved Metals Filtration Location		FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)		0.0322	0.0603	0.164	0.0311
	Antimony (Sb)-Dissolved (mg/L)		0.00036	<0.00010	0.00022	0.00052
	Arsenic (As)-Dissolved (mg/L)		0.00136	0.00054	0.00090	0.00032
	Barium (Ba)-Dissolved (mg/L)		0.0572	0.0393	0.0703	0.0427
	Beryllium (Be)-Dissolved (mg/L)		<0.000020	<0.000020	0.000030	<0.000020
	Bismuth (Bi)-Dissolved (mg/L)		<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Dissolved (mg/L)		<0.010	<0.010	<0.010	<0.010
	Cadmium (Cd)-Dissolved (mg/L)		0.0000405	0.0000209	0.0000283	0.0000212
	Calcium (Ca)-Dissolved (mg/L)		62.7	33.4	24.7	34.2
	Chromium (Cr)-Dissolved (mg/L)		0.00052	0.00036	0.00161	0.00074
	Cobalt (Co)-Dissolved (mg/L)		0.00054	0.00038	0.00054	<0.00010
	Copper (Cu)-Dissolved (mg/L)		0.00217	0.00217	0.00571	0.00164
	Iron (Fe)-Dissolved (mg/L)		0.155	0.362	0.922	0.062
	Lead (Pb)-Dissolved (mg/L)		<0.000050	<0.000050	<0.000050	<0.000050
	Lithium (Li)-Dissolved (mg/L)		0.0025	0.0041	<0.0010	0.0011
	Magnesium (Mg)-Dissolved (mg/L)		26.9	12.1	12.3	13.6
	Manganese (Mn)-Dissolved (mg/L)		0.0984	0.0343	0.167	0.00431
	Mercury (Hg)-Dissolved (mg/L)		<0.0000050	<0.0000050	0.0000057	0.0000053
	Molybdenum (Mo)-Dissolved (mg/L)		0.000867	0.000406	0.000456	0.000518
	Nickel (Ni)-Dissolved (mg/L)		0.0104	0.00251	0.00424	0.00243
	Phosphorus (P)-Dissolved (mg/L)		<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)		0.37	0.94	0.14	<0.10
	Selenium (Se)-Dissolved (mg/L)		0.00247	0.000210	0.000373	0.00207
	Silicon (Si)-Dissolved (mg/L)		5.45	5.51	6.04	6.66
	Silver (Ag)-Dissolved (mg/L)		<0.000010	<0.000010	<0.000010	<0.000010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID Description Sampled Date Sampled Time Client ID	L1683192-21 Water 02-OCT-15 16:23 R9	L1683192-22 Water 02-OCT-15 18:40 GWCC-1	L1683192-23 Water 01-OCT-15 15:05 GWCC-1	L1683192-24 Water 02-OCT-15 18:35 GWCC-2	L1683192-25 Water 01-OCT-15 14:45 GWCC-2
Grouping	Analyte						
WATER							
Total Metals	Sodium (Na)-Total (mg/L)		2.34		19.6		7.17
	Strontium (Sr)-Total (mg/L)		0.193		2.06		0.972
	Sulfur (S)-Total (mg/L)		40.6		451		318
	Thallium (Tl)-Total (mg/L)		<0.000010		0.000088		0.000064
	Tin (Sn)-Total (mg/L)		<0.00010		<0.00010		<0.00010
	Titanium (Ti)-Total (mg/L)		0.00586		<0.00030		<0.0015 ^{DLM}
	Uranium (U)-Total (mg/L)		0.000693		0.00727		0.00336
	Vanadium (V)-Total (mg/L)		0.00085		<0.00050		<0.00050
	Zinc (Zn)-Total (mg/L)		<0.0030		0.0079		0.0068
	Zirconium (Zr)-Total (mg/L)		0.00124		<0.00030		0.00042
Dissolved Metals	Dissolved Mercury Filtration Location		FIELD		FIELD		FIELD
	Dissolved Metals Filtration Location		FIELD		FIELD		FIELD
	Aluminum (Al)-Dissolved (mg/L)		0.0719		0.0013		0.0012
	Antimony (Sb)-Dissolved (mg/L)		0.00022		0.00132		0.00110
	Arsenic (As)-Dissolved (mg/L)		0.00070		0.00219		0.00151
	Barium (Ba)-Dissolved (mg/L)		0.0730		0.0194		0.0198
	Beryllium (Be)-Dissolved (mg/L)		0.000020		<0.000020		<0.000020
	Bismuth (Bi)-Dissolved (mg/L)		<0.000050		<0.000050		<0.000050
	Boron (B)-Dissolved (mg/L)		<0.010		0.300		0.111
	Cadmium (Cd)-Dissolved (mg/L)		0.0000557		0.000195		0.000176
	Calcium (Ca)-Dissolved (mg/L)		55.9		207		181
	Chromium (Cr)-Dissolved (mg/L)		0.00100		0.00240		0.00162
	Cobalt (Co)-Dissolved (mg/L)		0.00064		<0.00010		<0.00010
	Copper (Cu)-Dissolved (mg/L)		0.00428		0.00081		0.00110
	Iron (Fe)-Dissolved (mg/L)		0.951		<0.010		<0.010
	Lead (Pb)-Dissolved (mg/L)		<0.000050		<0.000050		<0.000050
	Lithium (Li)-Dissolved (mg/L)		<0.0010		0.0868		0.0166
	Magnesium (Mg)-Dissolved (mg/L)		21.7		296		207
	Manganese (Mn)-Dissolved (mg/L)		0.347		0.00022		0.00017
	Mercury (Hg)-Dissolved (mg/L)		0.0000073		<0.0000050		0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)		0.000896		0.00232		0.00253
	Nickel (Ni)-Dissolved (mg/L)		0.00380		0.0728		0.0444
	Phosphorus (P)-Dissolved (mg/L)		<0.050		<0.050		<0.050
	Potassium (K)-Dissolved (mg/L)		0.39		3.27		1.95
	Selenium (Se)-Dissolved (mg/L)		0.00151		0.00415		0.00352
	Silicon (Si)-Dissolved (mg/L)		5.37		6.55		5.31
	Silver (Ag)-Dissolved (mg/L)		<0.000010		<0.000010		<0.000010

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID Description Sampled Date Sampled Time Client ID	L1683192-26 Water 02-OCT-15 18:30 GWCC-3	L1683192-27 Water 01-OCT-15 13:50 GWCC-3	L1683192-28 Water 02-OCT-15 18:45 GWCC-4	L1683192-29 Water 01-OCT-15 13:25 GWCC-4	L1683192-30 Water 02-OCT-15 18:55 GWCC-5
Grouping	Analyte						
WATER							
Total Metals	Sodium (Na)-Total (mg/L)			4.11		3.05	
	Strontium (Sr)-Total (mg/L)			0.580		0.399	
	Sulfur (S)-Total (mg/L)			172		82.3	
	Thallium (Tl)-Total (mg/L)			0.000057		0.000054	
	Tin (Sn)-Total (mg/L)			<0.00010		<0.00010	
	Titanium (Ti)-Total (mg/L)			0.00038		<0.00030	
	Uranium (U)-Total (mg/L)			0.00183		0.00104	
	Vanadium (V)-Total (mg/L)			<0.00050		<0.00050	
	Zinc (Zn)-Total (mg/L)			0.0039		<0.0030	
	Zirconium (Zr)-Total (mg/L)			<0.00030		<0.00030	
Dissolved Metals	Dissolved Mercury Filtration Location			FIELD		FIELD	
	Dissolved Metals Filtration Location			FIELD		FIELD	
	Aluminum (Al)-Dissolved (mg/L)			0.0013		0.0020	
	Antimony (Sb)-Dissolved (mg/L)			0.00085		0.00079	
	Arsenic (As)-Dissolved (mg/L)			0.00089		0.00128	
	Barium (Ba)-Dissolved (mg/L)			0.0253		0.0317	
	Beryllium (Be)-Dissolved (mg/L)			<0.000020		<0.000020	
	Bismuth (Bi)-Dissolved (mg/L)			<0.000050		<0.000050	
	Boron (B)-Dissolved (mg/L)			0.057		0.037	
	Cadmium (Cd)-Dissolved (mg/L)			0.0000735		0.0000491	
	Calcium (Ca)-Dissolved (mg/L)			119		84.9	
	Chromium (Cr)-Dissolved (mg/L)			0.00056		0.00038	
	Cobalt (Co)-Dissolved (mg/L)			<0.00010		<0.00010	
	Copper (Cu)-Dissolved (mg/L)			0.00108		0.00108	
	Iron (Fe)-Dissolved (mg/L)			<0.010		<0.010	
	Lead (Pb)-Dissolved (mg/L)			<0.000050		<0.000050	
	Lithium (Li)-Dissolved (mg/L)			0.0078		0.0061	
	Magnesium (Mg)-Dissolved (mg/L)			106		58.0	
	Manganese (Mn)-Dissolved (mg/L)			0.00013		0.00022	
	Mercury (Hg)-Dissolved (mg/L)			0.0000054		<0.0000050	
	Molybdenum (Mo)-Dissolved (mg/L)			0.00290		0.00225	
	Nickel (Ni)-Dissolved (mg/L)			0.0269		0.0302	
	Phosphorus (P)-Dissolved (mg/L)			<0.050		<0.050	
	Potassium (K)-Dissolved (mg/L)			1.19		0.95	
	Selenium (Se)-Dissolved (mg/L)			0.00192		0.000859	
	Silicon (Si)-Dissolved (mg/L)			4.75		5.53	
	Silver (Ag)-Dissolved (mg/L)			<0.000010		<0.000010	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID Description Sampled Date Sampled Time Client ID	L1683192-31 Water 30-SEP-15 13:30 GWCC-5	L1683192-32 Water 02-OCT-15 18:25 SL	L1683192-33 Water 01-OCT-15 09:15 SL	L1683192-34 Water 02-OCT-15 18:45 DUP-1	L1683192-35 Water 30-SEP-15 11:45 DUP-1
Grouping	Analyte						
WATER							
Total Metals	Sodium (Na)-Total (mg/L)	3.51		2.49		2.80	
	Strontium (Sr)-Total (mg/L)	0.663		1.02		0.320	
	Sulfur (S)-Total (mg/L)	92.6		231		52.6	
	Thallium (Tl)-Total (mg/L)	0.000016		0.000017		0.000016	
	Tin (Sn)-Total (mg/L)	<0.00010		<0.00010		<0.00010	
	Titanium (Ti)-Total (mg/L)	<0.00030		<0.0018 ^{DLM}		0.00135	
	Uranium (U)-Total (mg/L)	0.00204		0.00326		0.00215	
	Vanadium (V)-Total (mg/L)	<0.00050		<0.00050		0.00053	
	Zinc (Zn)-Total (mg/L)	<0.0030		<0.0030		<0.0030	
	Zirconium (Zr)-Total (mg/L)	<0.00030		<0.00030		0.00085	
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD		FIELD		FIELD	
	Dissolved Metals Filtration Location	FIELD		FIELD		FIELD	
	Aluminum (Al)-Dissolved (mg/L)	0.0023		0.0018		0.0287	
	Antimony (Sb)-Dissolved (mg/L)	0.00062		0.00312		0.00031	
	Arsenic (As)-Dissolved (mg/L)	0.00060		0.0148		0.00072	
	Barium (Ba)-Dissolved (mg/L)	0.0512		0.0233		0.0568	
	Beryllium (Be)-Dissolved (mg/L)	<0.000020		<0.000020		<0.000020	
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050		<0.000050		<0.000050	
	Boron (B)-Dissolved (mg/L)	0.028		0.047		<0.010	
	Cadmium (Cd)-Dissolved (mg/L)	0.000107		0.0000259		0.0000310	
	Calcium (Ca)-Dissolved (mg/L)	122		225		69.3	
	Chromium (Cr)-Dissolved (mg/L)	0.00048		0.00114		0.00057	
	Cobalt (Co)-Dissolved (mg/L)	<0.00010		0.00015		0.00033	
	Copper (Cu)-Dissolved (mg/L)	0.00084		0.00077		0.00247	
	Iron (Fe)-Dissolved (mg/L)	0.034		<0.010		0.192	
	Lead (Pb)-Dissolved (mg/L)	<0.000050		<0.000050		<0.000050	
	Lithium (Li)-Dissolved (mg/L)	0.0086		0.0125		0.0035	
	Magnesium (Mg)-Dissolved (mg/L)	53.0		101		33.4	
	Manganese (Mn)-Dissolved (mg/L)	0.00398		0.00586		0.169	
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050		<0.0000050		0.0000055	
	Molybdenum (Mo)-Dissolved (mg/L)	0.00159		0.00181		0.00118	
	Nickel (Ni)-Dissolved (mg/L)	0.0186		0.0166		0.00466	
	Phosphorus (P)-Dissolved (mg/L)	<0.050		<0.050		<0.050	
	Potassium (K)-Dissolved (mg/L)	0.90		1.46		0.64	
	Selenium (Se)-Dissolved (mg/L)	0.00282		0.0110		0.00159	
	Silicon (Si)-Dissolved (mg/L)	4.89		5.20		4.90	
	Silver (Ag)-Dissolved (mg/L)	<0.000010		<0.000010		<0.000010	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1683192-36 Water TRAVEL BLANK	L1683192-37 Water 02-OCT-15 18:30 DUP-2	L1683192-38 Water 01-OCT-15 13:50 DUP-2	L1683192-39 Water 30-SEP-15 14:45 FB1	
Grouping	Analyte					
WATER						
Total Metals	Sodium (Na)-Total (mg/L)	<0.050		4.24	<0.050	
	Strontium (Sr)-Total (mg/L)	<0.00020		0.581	<0.00020	
	Sulfur (S)-Total (mg/L)	<0.50		155	<0.50	
	Thallium (Tl)-Total (mg/L)	<0.000010		0.000057	<0.000010	
	Tin (Sn)-Total (mg/L)	<0.00010		<0.00010	<0.00010	
	Titanium (Ti)-Total (mg/L)	<0.00030		<0.00090 ^{DLM}	<0.00030	
	Uranium (U)-Total (mg/L)	<0.000010		0.00184	<0.000010	
	Vanadium (V)-Total (mg/L)	<0.00050		<0.00050	<0.00050	
	Zinc (Zn)-Total (mg/L)	<0.0030		0.0046	<0.0030	
	Zirconium (Zr)-Total (mg/L)	<0.00030		<0.00030	<0.00030	
Dissolved Metals	Dissolved Mercury Filtration Location			FIELD	FIELD	
	Dissolved Metals Filtration Location			FIELD	FIELD	
	Aluminum (Al)-Dissolved (mg/L)			0.0029	<0.0010	
	Antimony (Sb)-Dissolved (mg/L)			0.00080	<0.00010	
	Arsenic (As)-Dissolved (mg/L)			0.00089	<0.00010	
	Barium (Ba)-Dissolved (mg/L)			0.0251	<0.000050	
	Beryllium (Be)-Dissolved (mg/L)			<0.000020	<0.000020	
	Bismuth (Bi)-Dissolved (mg/L)			<0.000050	<0.000050	
	Boron (B)-Dissolved (mg/L)			0.056	<0.010	
	Cadmium (Cd)-Dissolved (mg/L)			0.0000968	<0.0000050	
	Calcium (Ca)-Dissolved (mg/L)			119	<0.050	
	Chromium (Cr)-Dissolved (mg/L)			0.00051	<0.00010	
	Cobalt (Co)-Dissolved (mg/L)			<0.00010	<0.00010	
	Copper (Cu)-Dissolved (mg/L)			0.00117	<0.00020	
	Iron (Fe)-Dissolved (mg/L)			0.011	<0.010	
	Lead (Pb)-Dissolved (mg/L)			<0.000050	<0.000050	
	Lithium (Li)-Dissolved (mg/L)			0.0081	<0.0010	
	Magnesium (Mg)-Dissolved (mg/L)			101	<0.10	
	Manganese (Mn)-Dissolved (mg/L)			0.00025	<0.00010	
	Mercury (Hg)-Dissolved (mg/L)			0.0000065	<0.0000050	
	Molybdenum (Mo)-Dissolved (mg/L)			0.00248	<0.000050	
	Nickel (Ni)-Dissolved (mg/L)			0.0295	<0.00050	
	Phosphorus (P)-Dissolved (mg/L)			<0.050	<0.050	
	Potassium (K)-Dissolved (mg/L)			1.18	<0.10	
	Selenium (Se)-Dissolved (mg/L)			0.00165	<0.000050	
	Silicon (Si)-Dissolved (mg/L)			4.87	<0.050	
	Silver (Ag)-Dissolved (mg/L)			<0.000010	<0.000010	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1683192-1 Water 30-SEP-15 11:45 E1	L1683192-2 Water 02-OCT-15 18:45 E1	L1683192-3 Water 30-SEP-15 14:30 E2	L1683192-4 Water 02-OCT-15 19:00 E2	L1683192-5 Water 30-SEP-15 16:00 E3
Grouping	Analyte					
WATER						
Dissolved Metals	Sodium (Na)-Dissolved (mg/L)	2.88		4.16		4.28
	Strontium (Sr)-Dissolved (mg/L)	0.323		0.471		0.324
	Sulfur (S)-Dissolved (mg/L)	55.0		90.3		76.2
	Thallium (Tl)-Dissolved (mg/L)	0.000022		0.000029		<0.000010
	Tin (Sn)-Dissolved (mg/L)	<0.00010		<0.00010		<0.00010
	Titanium (Ti)-Dissolved (mg/L)	0.00061		0.00044		0.00072
	Uranium (U)-Dissolved (mg/L)	0.00206		0.00232		0.00316
	Vanadium (V)-Dissolved (mg/L)	<0.00050		<0.00050		<0.00050
	Zinc (Zn)-Dissolved (mg/L)	0.0019		0.0018		<0.0010
	Zirconium (Zr)-Dissolved (mg/L)	0.00081		0.00069		0.00070
Speciated Metals	Chromium (III)-Dissolved (mg/L)					
	Chromium (III)-Total (mg/L)			<0.00072		0.00149
	Hexavalent Chromium (mg/L)			0.0011		0.0010
	Hexavalent Chromium-Dissolved (mg/L)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1683192-6 Water 02-OCT-15 19:05 E3	L1683192-7 Water 30-SEP-15 18:25 E4	L1683192-8 Water 02-OCT-15 19:10 E4	L1683192-9 Water 01-OCT-15 17:45 E7	L1683192-10 Water 03-OCT-15 16:45 E7
Grouping	Analyte					
WATER						
Dissolved Metals	Sodium (Na)-Dissolved (mg/L)		4.84		4.46	
	Strontium (Sr)-Dissolved (mg/L)		0.483		0.461	
	Sulfur (S)-Dissolved (mg/L)		89.9		85.5	
	Thallium (Tl)-Dissolved (mg/L)		0.000014		<0.000010	
	Tin (Sn)-Dissolved (mg/L)		<0.00010		<0.00010	
	Titanium (Ti)-Dissolved (mg/L)		0.00041		0.00048	
	Uranium (U)-Dissolved (mg/L)		0.00247		0.00236	
	Vanadium (V)-Dissolved (mg/L)		<0.00050		<0.00050	
	Zinc (Zn)-Dissolved (mg/L)		0.0014		0.0031	
	Zirconium (Zr)-Dissolved (mg/L)		0.00090		0.00113	
Speciated Metals	Chromium (III)-Dissolved (mg/L)					
	Chromium (III)-Total (mg/L)		<0.00072			
	Hexavalent Chromium (mg/L)		0.0010			
	Hexavalent Chromium-Dissolved (mg/L)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1683192-11 Water 01-OCT-15 17:10 E8	L1683192-12 Water 03-OCT-15 16:25 E8	L1683192-13 Water 02-OCT-15 14:45 R1	L1683192-14 Water 02-OCT-15 11:15 R2	L1683192-15 Water 03-OCT-15 14:40 R3
Grouping	Analyte					
WATER						
Dissolved Metals	Sodium (Na)-Dissolved (mg/L)	4.11		3.26	3.09	3.98
	Strontium (Sr)-Dissolved (mg/L)	0.158		0.421	0.323	0.337
	Sulfur (S)-Dissolved (mg/L)	16.8		80.0	53.5	78.0
	Thallium (Tl)-Dissolved (mg/L)	<0.000010		<0.000010	<0.000010	<0.000010
	Tin (Sn)-Dissolved (mg/L)	<0.00010		<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	0.00071		0.00032	0.00078	<0.00090 ^{DLM}
	Uranium (U)-Dissolved (mg/L)	0.00100		0.00247	0.00306	0.00362
	Vanadium (V)-Dissolved (mg/L)	<0.00050		<0.00050	<0.00050	0.00054
	Zinc (Zn)-Dissolved (mg/L)	0.0023		0.0016	0.0019	0.0017
	Zirconium (Zr)-Dissolved (mg/L)	0.00061		0.00069	0.00069	0.00068
Speciated Metals	Chromium (III)-Dissolved (mg/L)					
	Chromium (III)-Total (mg/L)				0.00105	
	Hexavalent Chromium (mg/L)				<0.0010	
	Hexavalent Chromium-Dissolved (mg/L)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1683192-16 Water 02-OCT-15 19:10 R4	L1683192-17 Water 30-SEP-15 17:30 R4	L1683192-18 Water 03-OCT-15 17:00 R6	L1683192-19 Water 03-OCT-15 10:30 R7	L1683192-20 Water 02-OCT-15 12:00 R8
Grouping	Analyte					
WATER						
Dissolved Metals	Sodium (Na)-Dissolved (mg/L)		3.31	4.52	1.53	4.38
	Strontium (Sr)-Dissolved (mg/L)		0.304	0.168	0.0727	0.131
	Sulfur (S)-Dissolved (mg/L)		41.7	18.2	16.4	27.2
	Thallium (Tl)-Dissolved (mg/L)		<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Dissolved (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Dissolved (mg/L)		0.00066	0.00075	0.00300	0.00062
	Uranium (U)-Dissolved (mg/L)		0.00239	0.00115	0.000105	0.000060
	Vanadium (V)-Dissolved (mg/L)		<0.00050	<0.00050	0.00081	<0.00050
	Zinc (Zn)-Dissolved (mg/L)		0.0017	0.0031	0.0014	0.0014
	Zirconium (Zr)-Dissolved (mg/L)		0.00087	0.00087	0.00162	0.00062
Speciated Metals	Chromium (III)-Dissolved (mg/L)				0.00161	
	Chromium (III)-Total (mg/L)		0.00272		0.00212	
	Hexavalent Chromium (mg/L)		0.0011		<0.0010	
	Hexavalent Chromium-Dissolved (mg/L)				<0.0010	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1683192-21 Water 02-OCT-15 16:23 R9	L1683192-22 Water 02-OCT-15 18:40 GWCC-1	L1683192-23 Water 01-OCT-15 15:05 GWCC-1	L1683192-24 Water 02-OCT-15 18:35 GWCC-2	L1683192-25 Water 01-OCT-15 14:45 GWCC-2
Grouping	Analyte					
WATER						
Dissolved Metals	Sodium (Na)-Dissolved (mg/L)	2.30		18.4		7.12
	Strontium (Sr)-Dissolved (mg/L)	0.200		2.10		1.01
	Sulfur (S)-Dissolved (mg/L)	41.7		454		326
	Thallium (Tl)-Dissolved (mg/L)	<0.000010		0.000092		0.000063
	Tin (Sn)-Dissolved (mg/L)	<0.00010		<0.00010		<0.00010
	Titanium (Ti)-Dissolved (mg/L)	0.00192		<0.00030		<0.00030
	Uranium (U)-Dissolved (mg/L)	0.000705		0.00730		0.00346
	Vanadium (V)-Dissolved (mg/L)	0.00051		<0.00050		<0.00050
	Zinc (Zn)-Dissolved (mg/L)	0.0016		0.0070		0.0054
	Zirconium (Zr)-Dissolved (mg/L)	0.00136		<0.00030		<0.00030
Speciated Metals	Chromium (III)-Dissolved (mg/L)	0.00100		<0.00047		<0.00043
	Chromium (III)-Total (mg/L)	<0.00072		<0.00087		0.00303
	Hexavalent Chromium (mg/L)	0.0010		0.0029		0.0020
	Hexavalent Chromium-Dissolved (mg/L)	<0.0010		0.0026		0.0019

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1683192-26 Water 02-OCT-15 18:30 GWCC-3	L1683192-27 Water 01-OCT-15 13:50 GWCC-3	L1683192-28 Water 02-OCT-15 18:45 GWCC-4	L1683192-29 Water 01-OCT-15 13:25 GWCC-4	L1683192-30 Water 02-OCT-15 18:55 GWCC-5
Grouping	Analyte					
WATER						
Dissolved Metals	Sodium (Na)-Dissolved (mg/L)		4.43		3.05	
	Strontium (Sr)-Dissolved (mg/L)		0.595		0.407	
	Sulfur (S)-Dissolved (mg/L)		170		84.6	
	Thallium (Tl)-Dissolved (mg/L)		0.000054		0.000057	
	Tin (Sn)-Dissolved (mg/L)		<0.00010		<0.00010	
	Titanium (Ti)-Dissolved (mg/L)		<0.00030		<0.00030	
	Uranium (U)-Dissolved (mg/L)		0.00170		0.00102	
	Vanadium (V)-Dissolved (mg/L)		<0.00050		<0.00050	
	Zinc (Zn)-Dissolved (mg/L)		0.0017		0.0010	
	Zirconium (Zr)-Dissolved (mg/L)		0.00038		<0.00030	
Speciated Metals	Chromium (III)-Dissolved (mg/L)					
	Chromium (III)-Total (mg/L)					
	Hexavalent Chromium (mg/L)					
	Hexavalent Chromium-Dissolved (mg/L)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1683192-31 Water 30-SEP-15 13:30 GWCC-5	L1683192-32 Water 02-OCT-15 18:25 SL	L1683192-33 Water 01-OCT-15 09:15 SL	L1683192-34 Water 02-OCT-15 18:45 DUP-1	L1683192-35 Water 30-SEP-15 11:45 DUP-1
Grouping	Analyte					
WATER						
Dissolved Metals	Sodium (Na)-Dissolved (mg/L)	3.54		2.48		2.77
	Strontium (Sr)-Dissolved (mg/L)	0.662		1.03		0.320
	Sulfur (S)-Dissolved (mg/L)	94.8		235		53.4
	Thallium (Tl)-Dissolved (mg/L)	0.000018		0.000021		0.000013
	Tin (Sn)-Dissolved (mg/L)	<0.00010		<0.00010		<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.00030		<0.00030		<0.00090 ^{DLM}
	Uranium (U)-Dissolved (mg/L)	0.00195		0.00319		0.00205
	Vanadium (V)-Dissolved (mg/L)	<0.00050		<0.00050		<0.00050
	Zinc (Zn)-Dissolved (mg/L)	<0.0010		<0.0010		0.0018
	Zirconium (Zr)-Dissolved (mg/L)	<0.00030		<0.00030		0.00085
Speciated Metals	Chromium (III)-Dissolved (mg/L)			<0.00042		
	Chromium (III)-Total (mg/L)			0.00110		0.00124
	Hexavalent Chromium (mg/L)			0.0015		<0.0010
	Hexavalent Chromium-Dissolved (mg/L)			0.0014		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1683192-36 Water TRAVEL BLANK	L1683192-37 Water 02-OCT-15 18:30 DUP-2	L1683192-38 Water 01-OCT-15 13:50 DUP-2	L1683192-39 Water 30-SEP-15 14:45 FB1	
Grouping	Analyte					
WATER						
Dissolved Metals	Sodium (Na)-Dissolved (mg/L)			4.52	<0.050	
	Strontium (Sr)-Dissolved (mg/L)			0.593	<0.00020	
	Sulfur (S)-Dissolved (mg/L)			159	<0.50	
	Thallium (Tl)-Dissolved (mg/L)			0.000058	<0.000010	
	Tin (Sn)-Dissolved (mg/L)			<0.00010	<0.00010	
	Titanium (Ti)-Dissolved (mg/L)			<0.00030	<0.00030	
	Uranium (U)-Dissolved (mg/L)			0.00182	<0.000010	
	Vanadium (V)-Dissolved (mg/L)			<0.00050	<0.00050	
	Zinc (Zn)-Dissolved (mg/L)			0.0030	<0.0010	
	Zirconium (Zr)-Dissolved (mg/L)			<0.00030	<0.00030	
Speciated Metals	Chromium (III)-Dissolved (mg/L)					
	Chromium (III)-Total (mg/L)					
	Hexavalent Chromium (mg/L)					
	Hexavalent Chromium-Dissolved (mg/L)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Duplicate	Antimony (Sb)-Dissolved	DLA	L1683192-1, -11, -13, -14, -15, -17, -18, -19, -20, -21, -23, -25, -27, -29, -3, -31, -33, -35, -38, -39, -5, -7, -9
Duplicate	Bismuth (Bi)-Dissolved	DLA	L1683192-1, -11, -13, -14, -15, -17, -18, -19, -20, -21, -23, -25, -27, -29, -3, -31, -33, -35, -38, -39, -5, -7, -9
Duplicate	Cadmium (Cd)-Dissolved	DLA	L1683192-1, -11, -13, -14, -15, -17, -18, -19, -20, -21, -23, -25, -27, -29, -3, -31, -33, -35, -38, -39, -5, -7, -9
Duplicate	Copper (Cu)-Dissolved	DLA	L1683192-1, -11, -13, -14, -15, -17, -18, -19, -20, -21, -23, -25, -27, -29, -3, -31, -33, -35, -38, -39, -5, -7, -9
Duplicate	Lead (Pb)-Dissolved	DLA	L1683192-1, -11, -13, -14, -15, -17, -18, -19, -20, -21, -23, -25, -27, -29, -3, -31, -33, -35, -38, -39, -5, -7, -9
Duplicate	Nickel (Ni)-Dissolved	DLA	L1683192-1, -11, -13, -14, -15, -17, -18, -19, -20, -21, -23, -25, -27, -29, -3, -31, -33, -35, -38, -39, -5, -7, -9
Duplicate	Silver (Ag)-Dissolved	DLA	L1683192-1, -11, -13, -14, -15, -17, -18, -19, -20, -21, -23, -25, -27, -29, -3, -31, -33, -35, -38, -39, -5, -7, -9
Duplicate	Thallium (Tl)-Dissolved	DLA	L1683192-1, -11, -13, -14, -15, -17, -18, -19, -20, -21, -23, -25, -27, -29, -3, -31, -33, -35, -38, -39, -5, -7, -9
Duplicate	Tin (Sn)-Dissolved	DLA	L1683192-1, -11, -13, -14, -15, -17, -18, -19, -20, -21, -23, -25, -27, -29, -3, -31, -33, -35, -38, -39, -5, -7, -9
Duplicate	Zinc (Zn)-Dissolved	DLA	L1683192-1, -11, -13, -14, -15, -17, -18, -19, -20, -21, -23, -25, -27, -29, -3, -31, -33, -35, -38, -39, -5, -7, -9
Duplicate	Dissolved Organic Carbon	M	L1683192-19, -21
Duplicate	Dissolved Organic Carbon	M	L1683192-19, -21
Matrix Spike	Sulfate (SO4)	MS-B	L1683192-10, -12, -13, -14, -15, -16, -18, -19, -2, -20, -21, -22, -24, -26, -28, -30, -32, -34, -36, -37, -39, -4, -6, -8
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1683192-1, -11, -13, -14, -15, -17, -18, -19, -20, -21, -23, -25, -27, -29, -3, -31, -33, -35, -38, -39, -5, -7, -9
Matrix Spike	Boron (B)-Dissolved	MS-B	L1683192-1, -11, -13, -14, -15, -17, -18, -19, -20, -21, -23, -25, -27, -29, -3, -31, -33, -35, -38, -39, -5, -7, -9
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L1683192-1, -11, -13, -14, -15, -17, -18, -19, -20, -21, -23, -25, -27, -29, -3, -31, -33, -35, -38, -39, -5, -7, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1683192-1, -11, -13, -14, -15, -17, -18, -19, -20, -21, -23, -25, -27, -29, -3, -31, -33, -35, -38, -39, -5, -7, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1683192-1, -11, -13, -14, -15, -17, -18, -19, -20, -21, -23, -25, -27, -29, -3, -31, -33, -35, -38, -39, -5, -7, -9
Matrix Spike	Barium (Ba)-Total	MS-B	L1683192-21, -23, -25, -27, -29, -31, -33, -35, -36, -38, -39
Matrix Spike	Boron (B)-Total	MS-B	L1683192-21, -23, -25, -27, -29, -31, -33, -35, -36, -38, -39
Matrix Spike	Manganese (Mn)-Total	MS-B	L1683192-21, -23, -25, -27, -29, -31, -33, -35, -36, -38, -39
Matrix Spike	Sodium (Na)-Total	MS-B	L1683192-21, -23, -25, -27, -29, -31, -33, -35, -36, -38, -39
Matrix Spike	Strontium (Sr)-Total	MS-B	L1683192-21, -23, -25, -27, -29, -31, -33, -35, -36, -38, -39
Matrix Spike	Dissolved Organic Carbon	MS-B	L1683192-1, -11, -13, -14, -15, -17, -18, -20, -23, -25, -27, -29, -3, -31, -33, -35, -38, -39, -5, -7, -9
Matrix Spike	Ammonia, Total (as N)	MS-B	L1683192-1, -11, -13, -14, -15, -17, -18, -19, -20, -21, -23, -25, -27, -29, -3, -31, -33, -35, -36, -38, -39, -5, -7, -9
Matrix Spike	Total Organic Carbon	MS-B	L1683192-36
Matrix Spike	Aluminum (Al)-Dissolved	MS-B	L1683192-1, -11, -13, -14, -15, -17, -18, -19, -20, -21, -23, -25, -27, -29, -3, -31, -33, -35, -38, -39, -5, -7, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1683192-1, -11, -13, -14, -15, -17, -18, -19, -20, -21, -23, -25, -27, -29, -3, -31, -33, -35, -38, -39, -5, -7, -9
Matrix Spike	Cobalt (Co)-Dissolved	MS-B	L1683192-1, -11, -13, -14, -15, -17, -18, -19, -20, -21, -23, -25, -27, -29, -3, -31, -33, -35, -38, -39, -5, -7, -9
Matrix Spike	Copper (Cu)-Dissolved	MS-B	L1683192-1, -11, -13, -14, -15, -17, -18, -19, -20, -21, -23, -25, -27, -29, -3, -31, -33, -35, -38, -39, -5, -7, -9
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L1683192-1, -11, -13, -14, -15, -17, -18, -19, -20, -21, -23, -25, -27, -29, -3, -31, -33, -35, -38, -39, -5, -7, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1683192-1, -11, -13, -14, -15, -17, -18, -19, -20, -21, -23, -25, -27, -29, -3, -31, -33, -35, -38, -39, -5, -7, -9
Matrix Spike	Uranium (U)-Dissolved	MS-B	L1683192-1, -11, -13, -14, -15, -17, -18, -19, -20, -21, -23, -25, -27, -29, -3, -31, -33, -35, -38, -39, -5, -7, -9

Reference Information

	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Copper (Cu)-Dissolved	MS-B	L1683192-1, -11, -13, -14, -15, -17, -18, -19, -20, -21, -23, -25, -27, -29, -3, -31, -33, -35, -38, -39, -5, -7, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1683192-1, -11, -13, -14, -15, -17, -18, -19, -20, -21, -23, -25, -27, -29, -3, -31, -33, -35, -38, -39, -5, -7, -9

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLA	Detection Limit adjusted for required dilution
DLM	Detection Limit Adjusted due to sample matrix effects.
M	A peak has been manually integrated.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)
Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.			
Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.			
BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)
Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.			
Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.			
CARBONS-DOC-VA	Water	Dissolved organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)". Dissolved carbon (DOC) fractions are determined by filtering the sample through a 0.45 micron membrane filter prior to analysis.			
CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".			
CR-CR3-DIS-CALC-ED	Water	Dissolved Trivalent Chromium in Water	CALCULATION
Chromium (III)-Dissolved is calculated as the difference between the dissolved chromium and the dissolved hexavalent chromium (Cr(VI)) results.			
CR-CR3-TOT-CALC-ED	Water	Total Trivalent Chromium in Water	CALCULATION
Chromium (III)-Total is calculated as the difference between the total chromium and the hexavalent chromium (Cr(VI)) results.			
CR-CR6-ED	Water	Chromium, Hexavalent (Cr +6)	APHA 3500-Cr C (Ion Chromatography)
This analysis is carried out using procedures adapted from method 3500-Cr C in "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from Method 1636 published by the United States Environmental Protection Agency (EPA). The procedure involves analysis for chromium (VI) by ion chromatography using diphenylcarbazide in a sulphuric acid solution.			
Results are based on an un-filtered, field-preserved sample.			
CR6-D-IC-ED	Water	Chromium, Dissolved Hexavalent (Cr +6)	APHA 3500-Cr C (Ion Chromatography)
This analysis is carried out using procedures adapted from method 3500-Cr C in "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from Method 1636 published by the United States Environmental Protection Agency (EPA). The procedure involves analysis for chromium (VI) by ion chromatography using diphenylcarbazide in a sulphuric acid solution.			
Results are based on a field-filtered, field-preserved sample.			
EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.
This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.			
HARDNESS-CALC-VA	Water	Hardness	APHA 2340B
Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.			
HG-D-CVAA-VA	Water	Diss. Mercury in Water by CVAAS or CVAFS	APHA 3030B/EPA 1631E (mod)
Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.			

Reference Information

HG-T-CVAA-VA	Water	Total Mercury in Water by CVAAS or CVAFS	EPA 1631E (mod)
Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.			
MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)
Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.			
Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.			
MET-DIS-LOW-ICP-VA	Water	Dissolved Metals in Water by ICPOES	EPA 3005A/6010B
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves filtration (EPA Method 3005A) and analysis by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).			
MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)
Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.			
Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.			
MET-TOT-LOW-ICP-VA	Water	Total Metals in Water by ICPOES	EPA 3005A/6010B
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).			
NH3-F-VA	Water	Ammonia in Water by Fluorescence	APHA 4500 NH3-NITROGEN (AMMONIA)
This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.			
NH3-F-VA	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC
This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.			
NO2-L-IC-N-WR	Water	Nitrite in Water by IC (Low Level)	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
NO3-L-IC-N-WR	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
P-T-PRES-COL-VA	Water	Total P in Water by Colour	APHA 4500-P Phosphorus
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.			
PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H "pH Value"
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode			
It is recommended that this analysis be conducted in the field.			
PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H pH Value
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode			
It is recommended that this analysis be conducted in the field.			
S-DIS-ICP-VA	Water	Dissolved Sulfur in Water by ICPOES	EPA SW-846 3005A/6010B
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).			
Method Limitation: This method will not give total sulfur results for all samples. Sulfide or other volatile forms of sulfur that may be present in submitted samples, is often lost during the sampling, preservation and analysis process. The data reported as total and/or dissolved sulfur represents all non-volatile forms of sulfur present in a particular sample.			

Reference Information

S-TOT-ICP-VA Water Total Sulfur in Water by ICPOES EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

Method Limitation: This method will not give total sulfur results for all samples. Sulfide or other volatile forms of sulfur that may be present in submitted samples, is often lost during the sampling, preservation and analysis process. The data reported as total and/or dissolved sulfur represents all non-volatile forms of sulfur present in a particular sample.

SO4-IC-N-WR Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TSS-MAN-WR Water Total Suspended Solids by Gravimetric APHA 2540 D

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Suspended Solids are determined by filtering a sample through a glass fibre filter and drying the filter at 104 degrees celsius.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
----------------------------	---------------------

Chain of Custody Numbers:

1	2	3	4
---	---	---	---

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

mg/kg - milligrams per kilogram based on dry weight of sample.

mg/kg ww - milligrams per kilogram based on wet weight of sample.

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.

mg/L - milligrams per litre.

< - Less than.

D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).

N/A - Result not available. Refer to qualifier code and definition for explanation.

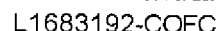
Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.



Canada Toll Free: 1 800 668 9878



Page 1 of 4

www.alsglobal.com

[illegible]

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

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NA-54-0326-000-1 From: 34 January 2011

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white-report copy.



L1683192-COFC

COC Number: 1

Page 2 of 4

Report To				Report Format / Distribution				Select Service Level Below (Rush Turnaround Time (TAT) is not available for all tests)																																																													
Company: Hemmera Environchem Inc.				Select Report Format: ☒ PDF ☒ EXCEL ☒ EDD (DIGITAL)				R ☒ Regular (Standard TAT if received by 3 pm - business days)																																																													
Contact: Natasha Sandys				Quality Control (QC) Report with Report ☒ Yes ☐ No				P ☐ Priority (2-4 bus. days if received by 3pm) 50% surcharge - contact ALS to confirm TAT																																																													
Address: 230 - 2237 2nd Avenue Whitehorse, YT				☐ Criteria on Report - provide details below if box checked				E ☐ Emergency (1-2 bus. days if received by 3pm) 100% surcharge - contact ALS to confirm TAT																																																													
Phone: 867-456-4865				Select Distribution: ☒ EMAIL ☐ MAIL ☐ FAX				E2 ☐ Same day or weekend emergency - contact ALS to confirm TAT and surcharge																																																													
				Email 1 or Fax nsandys@hemmera.com				Specify Date Required for E2, E or P:																																																													
				Email 2 chris@elr.ca				Analysis Request																																																													
Invoice To Same as Report To ☒ Yes ☐ No				Invoice Distribution				Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below																																																													
Copy of Invoice with Report ☐ Yes ☒ No				Select Invoice Distribution: ☒ EMAIL ☒ MAIL ☐ FAX				<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td>F/P</td><td>P</td><td>P</td><td>F/P</td><td>P</td><td>F/P</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>Low Level Diss. Met (incl. Hg) and Hardness</td> <td>Low Level Tot. Met (incl. Hg) and Hardness</td> <td>Chromium Speciation (III/VI) - Total</td> <td>Chromium Speciation (III/VI) - Dissolved</td> <td>Ammonia - N</td> <td>Dissolved Organic Carbon (DOC)</td> <td>Nitrate-N</td> <td>Nitrite - N</td> <td>Total Phosphorus</td> <td>Sulphate</td> <td>pH, Conductivity, Total Susp Solids</td> <td colspan="8" rowspan="2">Number of Containers</td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </table>												F/P	P	P	F/P	P	F/P															Low Level Diss. Met (incl. Hg) and Hardness	Low Level Tot. Met (incl. Hg) and Hardness	Chromium Speciation (III/VI) - Total	Chromium Speciation (III/VI) - Dissolved	Ammonia - N	Dissolved Organic Carbon (DOC)	Nitrate-N	Nitrite - N	Total Phosphorus	Sulphate	pH, Conductivity, Total Susp Solids	Number of Containers																		
F/P	P	P	F/P	P	F/P																																																																
Low Level Diss. Met (incl. Hg) and Hardness	Low Level Tot. Met (incl. Hg) and Hardness	Chromium Speciation (III/VI) - Total	Chromium Speciation (III/VI) - Dissolved	Ammonia - N	Dissolved Organic Carbon (DOC)	Nitrate-N	Nitrite - N	Total Phosphorus	Sulphate	pH, Conductivity, Total Susp Solids	Number of Containers																																																										
Company: Hemmera Environchem Inc.				Email 1 or Fax nsandys@hemmera.com																																																																	
Contact: Natasha Sandys				Email 2 chris@elr.ca																																																																	
Project Information				Oil and Gas Required Fields (client use)																																																																	
ALS Quote #: Q51108				Approver ID:				Cost Center:																																																													
Job #: 1343-005.13				GL Account:				Routing Code:																																																													
PO / AFE:				Activity Code:																																																																	
LSD:				Location:																																																																	
ALS Lab Work Order # (lab use only)				ALS Contact:				Sampler: AN/CH																																																													
ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)			Date (dd-mm-yy)	Time (hh:mm)	Sample Type																																																															
R1				02-Oct-15	14:45	Water	R	R				R	R	R	R	R	R	R	R	9																																																	
R2				02-Oct-15	11:15	Water	R	R				R	R	R	R	R	R	R	R	9																																																	
R3				03-Oct-15	14:40	Water	R	R				R	R	R	R	R	R	R	R	9																																																	
R4				02-Oct-15	19:10	Water								R	R	R	R	R	R	1																																																	
R4				30-Sep-15	17:30	Water	R	R				R	R							8																																																	
R6				03-Oct-15	17:00	Water	R	R				R	R	R	R	R	R	R	R	9																																																	
R7				03-Oct-15	10:30	Water	R	R				R	R	R	R	R	R	R	R	9																																																	
R8				02-Oct-15	12:00	Water	R	R				R	R	R	R	R	R	R	R	9																																																	
R9				02-Oct-15	16:23	Water	R	R				R	R	R	R	R	R	R	R	9																																																	
GWCC-1				02-Oct-15	18:40	Water								R	R	R	R	R	R	1																																																	
GWCC-1				01-Oct-15	15:05	Water	R	R				R	R							8																																																	
GWCC-2				02-Oct-15	18:35	Water								R	R	R	R	R	R	1																																																	
Drinking Water (DW) Samples¹ (client use)				Special Instructions / Specify Criteria to add on report (client use)				SAMPLE CONDITION AS RECEIVED (lab use only)																																																													
Are samples taken from a Regulated DW System? ☐ Yes ☒ No				Please hold samples for total and dissolved Chromium III/VI pending regular metals analysis results.				Frozen ☐ SIF Observations Yes ☐ No ☐																																																													
Are samples for human drinking water use? ☐ Yes ☒ No								Ice packs Yes ☐ No ☐ Custody seal intact Yes ☐ No ☐																																																													
								Cooling initiated ☐																																																													
								INITIAL COOLER TEMPERATURES °C																																																													
								FINAL COOLER TEMPERATURES °C																																																													
								12 coolers 8°C Avg																																																													
SHIPMENT RELEASE (client use)				INITIAL SHIPMENT RECEPTION (lab use only)				FINAL SHIPMENT RECEPTION (lab use only)																																																													
Released by:		Date:		Time:		Received by:		Date:		Time:		Received by: Shafee		Date: 03.6		Time: 1800																																																					

Short Holding Time

Rush Processing



Report To			Report Format / Distribution			Select Service Level below (Rush Turnaround Time (TAT) is not available for all tests)											
Company: Hemmera Environchem Inc.			Select Report Format: ☒ PDF ☒ EXCEL ☒ EDD (DIGITAL)			R ☒ Regular (Standard TAT if received by 3 pm - business days)											
Contact: Natasha Sandys			Quality Control (QC) Report with Report ☒ Yes ☐ No			P ☐ Priority (2-4 bus. days if received by 3pm) 50% surcharge - contact ALS to confirm TAT											
Address: 230 - 2237 2nd Avenue Whitehorse, YT			☐ Criteria on Report - provide details below if box checked			E ☐ Emergency (1-2 bus. days if received by 3pm) 100% surcharge - contact ALS to confirm TAT											
Phone: 867-456-4865			Select Distribution: ☒ EMAIL ☐ MAIL ☐ FAX			E2 ☐ Same day or weekend emergency - contact ALS to confirm TAT and surcharge											
			Email 1 or Fax nsandys@hemmera.com			Specify Date Required for E2, E or P:											
			Email 2 chris@elr.ca														
Invoice To			Invoice Distribution			Analysis Request											
Same as Report To ☒ Yes ☐ No			Select Invoice Distribution: ☒ EMAIL ☒ MAIL ☐ FAX			Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below											
Copy of Invoice with Report ☐ Yes ☒ No			Email 1 or Fax nsandys@hemmera.com														
Company: Hemmera Environchem Inc.			Email 2 chns@elr.ca														
Contact: Natasha Sandys																	
Project Information			Oil and Gas Required Fields (client use)														
ALS Quote #: Q51108			Approver ID:			Cost Center:											
Job #: 1343-005.13			GL Account:			Routing Code:											
PO / AFE:			Activity Code:														
LSD:			Location:														
ALS Lab Work Order # (lab use only)			ALS Contact:			Sampler: AN/CH											
ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)		Date (dd-mm-yy)	Time (hh:mm)	Sample Type	Low Level Diss. Met (incl. Hg) and Hardness	Low Level Tot. Met (incl. Hg) and Hardness	Chromium Speciation (III/VI) - Total	Chromium Speciation (III/VI) - Dissolved	Ammonia - N	Dissolved Organic Carbon (DOC)	Nitrate-N	Nitrite - N	Total Phosphorus	Sulphate	pH, Conductivity, Total Susp Solids	Number of Containers
	GWCC-2		01-Oct-15	14:45	Water	R	R			R	R						8
	GWCC-3		02-Oct-15	18:30	Water							R	R	R	R	R	1
	GWCC-3		01-Oct-15	13:50	Water	R	R			R	R						8
	GWCC-4		02-Oct-15	18:45	Water							R	R	R	R	R	1
	GWCC-4		01-Oct-15	13:25	Water	R	R			R	R						8
	GWCC-5		02-Oct-15	18:55	Water							R	R	R	R	R	1
	GWCC-5		30-Sep-15	13:30	Water	R	R			R	R						8
	SL		02-Oct-15	18:25	Water							R	R	R	R	R	1
	SL		01-Oct-15	9:15	Water	R	R			R	R						8
	DUP-1		02-Oct-15	18:45	Water							R	R	R	R	R	1
	DUP-1		30-Sep-15	11:45	Water	R	R			R	R						8
	Travel Blank				Water		R			R	R	R	R	R	R	R	9
Drinking Water (DW) Samples¹ (client use)			Special Instructions / Specify Criteria to add on report (client use)			SAMPLE CONDITION AS RECEIVED (lab use only)											
Are samples taken from a Regulated DW System? ☐ Yes ☒ No			Please hold samples for total and dissolved Chromium III/VI pending regular metals analysis results.			Frozen ☐ SIF Observations Yes ☐ No ☐											
Are samples for human drinking water use? ☐ Yes ☒ No						Ice packs Yes ☐ No ☐ Custody seal intact Yes ☐ No ☐											
						Cooling Initiated ☐											
						INITIAL COOLER TEMPERATURES °C											
						FINAL COOLER TEMPERATURES °C											
						12 coolers 8°C Avg											
SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)											
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by: Shree			Date: Oct 6			Time: 1800					



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Abstract

COC Number: 1

Page 4 of 4

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NA-E-M-0125a-09 Exp0738 January 2011

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

APPENDIX 3

Hydrological Monitoring Data Summaries

Stream Flow & Discharge Calculation

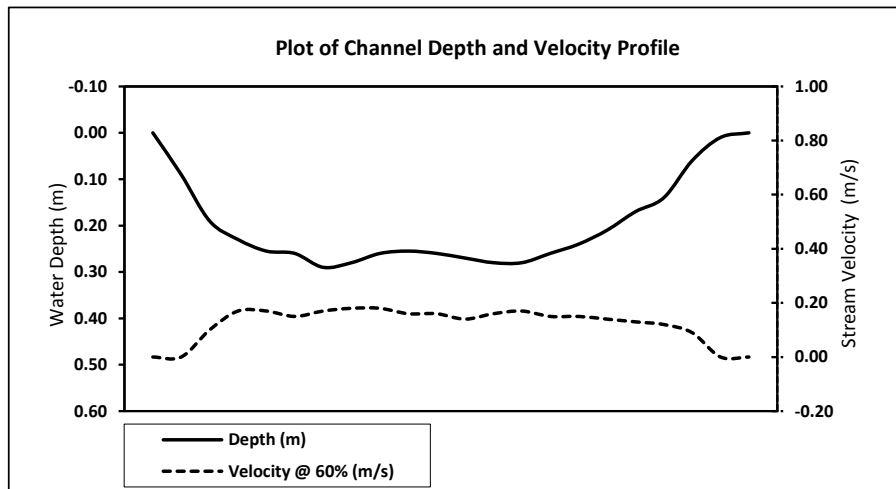
ELR Project No.	15-208		
Site / Location:	Clinton Creek		
Stream Name:	Clinton Creek		
Station Name:	E1(H)		
Date and Time:	Sept.30/2015, 11:04		
Staff:	AN,CH		
UTM Coordinates:	07W 0512856 7147421		
Technique:	SWOFFER	Left Bank	1.21
Temp., Water/Air (°C)	not recorded / ~1	Right Bank	11.32
Crossing Number	1	Wet.Width	10.11



Station No.	Distance (m)	Station Width (m)	Depth (m)	Velocity @ 60% (m/s)	Panel Area (m ²)	Panel Discharge (m ³ /s)
0	11.32	0.250	0.00	0.00	0.000	0.0000
1	10.82	0.500	0.09	0.00	0.045	0.0000
2	10.32	0.500	0.19	0.10	0.095	0.0095
3	9.82	0.500	0.23	0.17	0.115	0.0196
4	9.32	0.500	0.26	0.17	0.128	0.0217
5	8.82	0.500	0.26	0.15	0.130	0.0195
6	8.32	0.500	0.29	0.17	0.145	0.0247
7	7.82	0.500	0.28	0.18	0.140	0.0252
8	7.32	0.500	0.26	0.18	0.130	0.0234
9	6.82	0.500	0.26	0.16	0.128	0.0204
10	6.32	0.500	0.26	0.16	0.130	0.0208
11	5.82	0.500	0.27	0.14	0.135	0.0189
12	5.32	0.500	0.28	0.16	0.140	0.0224
13	4.82	0.500	0.28	0.17	0.140	0.0238
14	4.32	0.500	0.26	0.15	0.130	0.0195
15	3.82	0.500	0.24	0.15	0.120	0.0180
16	3.32	0.500	0.21	0.14	0.105	0.0147
17	2.82	0.550	0.17	0.13	0.094	0.0122
18	2.22	0.500	0.14	0.12	0.070	0.0084
19	1.82	0.450	0.06	0.09	0.027	0.0024
20	1.32	0.305	0.01	0.00	0.003	0.0000
21	1.21	0.055	0.00	0.00	0.000	0.0000
end	1.21					

Mean Depth (m)	0.20
Mean Velocity (m/s)	0.12

Discharge (m ³ /s)	0.3250
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Stream Flow & Discharge Calculation

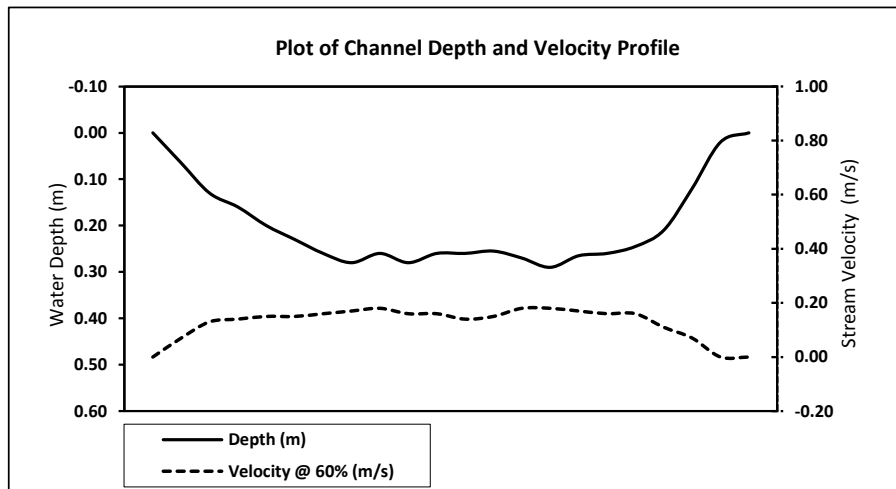
ELR Project No.	15-208		
Site / Location:	Clinton Creek		
Stream Name:	Clinton Creek		
Station Name:	E1(H)		
Date and Time:	Sept.30/2015, 11:04		
Staff:	AN,CH		
UTM Coordinates:	07W 0512856 7147421		
Technique:	SWOFFER	Left Bank	1.21
Temp., Water/Air (°C)	not recorded / ~1	Right Bank	11.32
Crossing Number	2	Wet.Width	10.11



Station No.	Distance (m)	Station Width (m)	Depth (m)	Velocity @ 60% (m/s)	Panel Area (m²)	Panel Discharge (m³/s)
0	1.21	0.250	0.00	0.00	0.000	0.0000
1	1.71	0.495	0.07	0.07	0.032	0.0023
2	2.20	0.495	0.13	0.13	0.064	0.0084
3	2.70	0.500	0.16	0.14	0.080	0.0112
4	3.20	0.500	0.20	0.15	0.100	0.0150
5	3.70	0.500	0.23	0.15	0.115	0.0173
6	4.20	0.500	0.26	0.16	0.130	0.0208
7	4.70	0.500	0.28	0.17	0.140	0.0238
8	5.20	0.500	0.26	0.18	0.130	0.0234
9	5.70	0.500	0.28	0.16	0.140	0.0224
10	6.20	0.500	0.26	0.16	0.130	0.0208
11	6.70	0.500	0.26	0.14	0.130	0.0182
12	7.20	0.500	0.26	0.15	0.128	0.0191
13	7.70	0.500	0.27	0.18	0.135	0.0243
14	8.20	0.500	0.29	0.18	0.145	0.0261
15	8.70	0.500	0.27	0.17	0.133	0.0225
16	9.20	0.500	0.26	0.16	0.130	0.0208
17	9.70	0.500	0.25	0.16	0.123	0.0196
18	10.20	0.500	0.21	0.11	0.105	0.0116
19	10.70	0.500	0.12	0.07	0.060	0.0042
20	11.20	0.310	0.02	0.00	0.006	0.0000
21	11.32	0.060	0.00	0.00	0.000	0.0000
end	11.32					

Mean Depth (m)	0.20
Mean Velocity (m/s)	0.13

Discharge (m³/s)	0.3317
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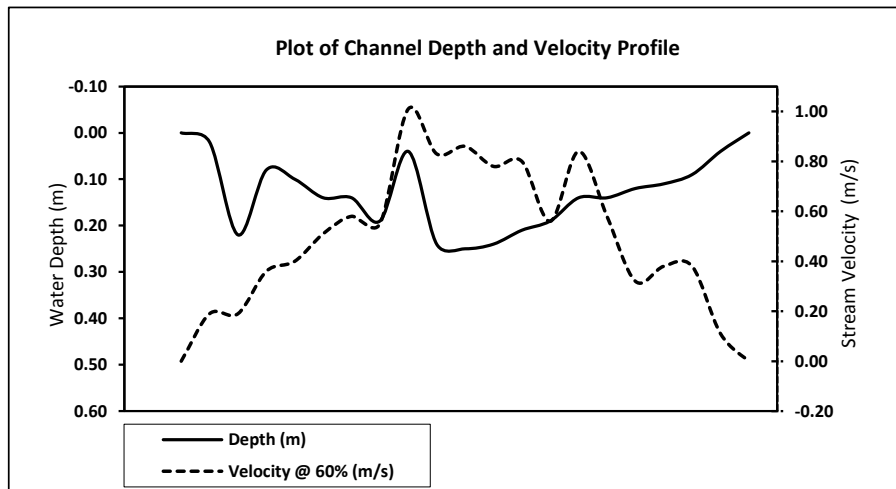
Stream Flow & Discharge Calculation

ELR Project No.	15-208		
Site / Location:	Clinton Creek		
Stream Name:	Clinton Creek		
Station Name:	E2		
Date and Time:	Sept.30/2015, 15:40		
Staff:	AN,CH		
UTM Coordinates:	07W 0514159 7147069		
Technique:	SWOFFER	Left Bank	6.11
Temp., Water/Air (°C)	5.1 / ~2	Right Bank	0.99
Crossing Number	1	Wet.Width	5.12



Station No.	Distance (m)	Station Width (m)	Depth (m)	Velocity @ 60% (m/s)	Panel Area (m²)	Panel Discharge (m³/s)
0	0.99	0.130	0.00	0.00	0.000	0.0000
1	1.25	0.355	0.02	0.19	0.007	0.0013
2	1.70	0.350	0.22	0.19	0.077	0.0146
3	1.95	0.250	0.08	0.36	0.020	0.0072
4	2.20	0.250	0.10	0.40	0.025	0.0100
5	2.45	0.250	0.14	0.51	0.035	0.0179
6	2.70	0.250	0.14	0.58	0.035	0.0203
7	2.95	0.250	0.19	0.55	0.048	0.0261
8	3.20	0.250	0.04	1.01	0.010	0.0101
9	3.45	0.250	0.24	0.83	0.060	0.0498
10	3.70	0.250	0.25	0.86	0.063	0.0538
11	3.95	0.250	0.24	0.78	0.060	0.0468
12	4.20	0.250	0.21	0.80	0.053	0.0420
13	4.45	0.250	0.19	0.56	0.048	0.0266
14	4.70	0.250	0.14	0.84	0.035	0.0294
15	4.95	0.250	0.14	0.58	0.035	0.0203
16	5.20	0.250	0.12	0.32	0.030	0.0096
17	5.45	0.250	0.11	0.38	0.028	0.0105
18	5.70	0.250	0.09	0.38	0.023	0.0086
19	5.95	0.205	0.04	0.11	0.008	0.0009
20	6.11	0.080	0.00	0.00	0.000	0.0000
end	6.11					

Mean Depth (m)	0.13	Discharge (m³/s)	0.4057
Mean Velocity (m/s)	0.49		



Stream Flow & Discharge Calculation

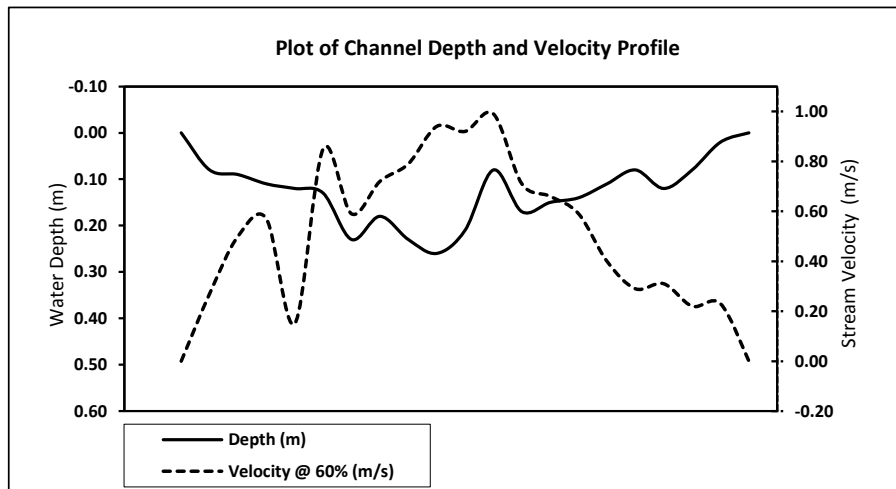
ELR Project No.	15-208		
Site / Location:	Clinton Creek		
Stream Name:	Clinton Creek		
Station Name:	E2		
Date and Time:	Sept.30/2015, 15:40		
Staff:	AN,CH		
UTM Coordinates:	07W 0514159 7147069		
Technique:	SWOFFER	Left Bank	6.11
Temp., Water/Air (°C)	5.1 / ~2	Right Bank	0.99
Crossing Number	2	Wet.Width	5.12



Station No.	Distance (m)	Station Width (m)	Depth (m)	Velocity @ 60% (m/s)	Panel Area (m²)	Panel Discharge (m³/s)
0	6.11	0.180	0.00	0.00	0.000	0.0000
1	5.75	0.305	0.08	0.27	0.024	0.0066
2	5.50	0.250	0.09	0.50	0.023	0.0113
3	5.25	0.250	0.11	0.57	0.028	0.0157
4	5.00	0.250	0.12	0.15	0.030	0.0045
5	4.75	0.250	0.13	0.85	0.033	0.0276
6	4.50	0.250	0.23	0.59	0.058	0.0339
7	4.25	0.250	0.18	0.72	0.045	0.0324
8	4.00	0.250	0.23	0.79	0.058	0.0454
9	3.75	0.250	0.26	0.94	0.065	0.0611
10	3.50	0.250	0.21	0.92	0.053	0.0483
11	3.25	0.250	0.08	0.99	0.020	0.0198
12	3.00	0.250	0.17	0.71	0.043	0.0302
13	2.75	0.250	0.15	0.66	0.038	0.0248
14	2.50	0.250	0.14	0.59	0.035	0.0207
15	2.25	0.250	0.11	0.40	0.028	0.0110
16	2.00	0.250	0.08	0.29	0.020	0.0058
17	1.75	0.250	0.12	0.31	0.030	0.0093
18	1.50	0.250	0.08	0.22	0.020	0.0044
19	1.25	0.255	0.02	0.23	0.005	0.0012
20	0.99	0.130	0.00	0.00	0.000	0.0000
end	0.99					

Mean Depth (m)	0.12
Mean Velocity (m/s)	0.51

Discharge (m³/s)	0.4138
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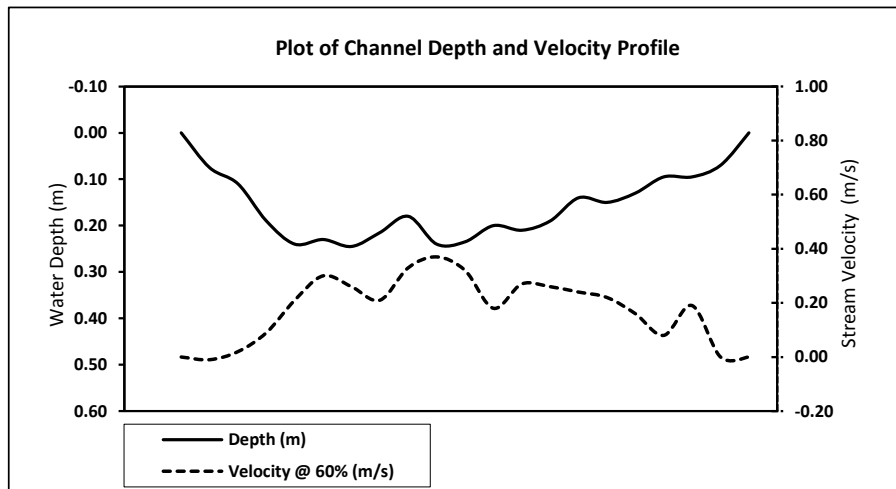
Stream Flow & Discharge Calculation

ELR Project No.	15-208		
Site / Location:	Clinton Creek		
Stream Name:	Wolverine Creek		
Station Name:	E3(H)		
Date and Time:	Oct.1/2015, 12:15		
Staff:	AN,CH		
UTM Coordinates:	07W 0514172 7147594		
Technique:	SWOFFER	Left Bank	0.53
Temp., Water/Air (°C)	not recorded / ~0	Right Bank	3.1
Crossing Number	1	Wet.Width	2.57



Station No.	Distance (m)	Station Width (m)	Depth (m)	Velocity @ 60% (m/s)	Panel Area (m²)	Panel Discharge (m³/s)
0	3.10	0.065	0.00	0.00	0.000	0.0000
1	2.97	0.130	0.08	-0.01	0.010	-0.0001
2	2.84	0.130	0.11	0.02	0.014	0.0003
3	2.71	0.130	0.19	0.09	0.025	0.0022
4	2.58	0.130	0.24	0.21	0.031	0.0066
5	2.45	0.130	0.23	0.30	0.030	0.0090
6	2.32	0.130	0.25	0.26	0.032	0.0083
7	2.19	0.130	0.22	0.21	0.028	0.0059
8	2.06	0.130	0.18	0.33	0.023	0.0077
9	1.93	0.130	0.24	0.37	0.031	0.0115
10	1.80	0.130	0.24	0.32	0.031	0.0098
11	1.67	0.130	0.20	0.18	0.026	0.0047
12	1.54	0.130	0.21	0.27	0.027	0.0074
13	1.41	0.130	0.19	0.26	0.025	0.0064
14	1.28	0.130	0.14	0.24	0.018	0.0044
15	1.15	0.130	0.15	0.22	0.020	0.0043
16	1.02	0.130	0.13	0.16	0.017	0.0027
17	0.89	0.130	0.10	0.08	0.012	0.0010
18	0.76	0.130	0.10	0.19	0.012	0.0023
19	0.63	0.115	0.07	0.00	0.008	0.0000
20	0.53	0.050	0.00	0.00	0.000	0.0000
end	0.53					

Mean Depth (m)	0.15	Discharge (m³/s)	0.0943
Mean Velocity (m/s)	0.18		



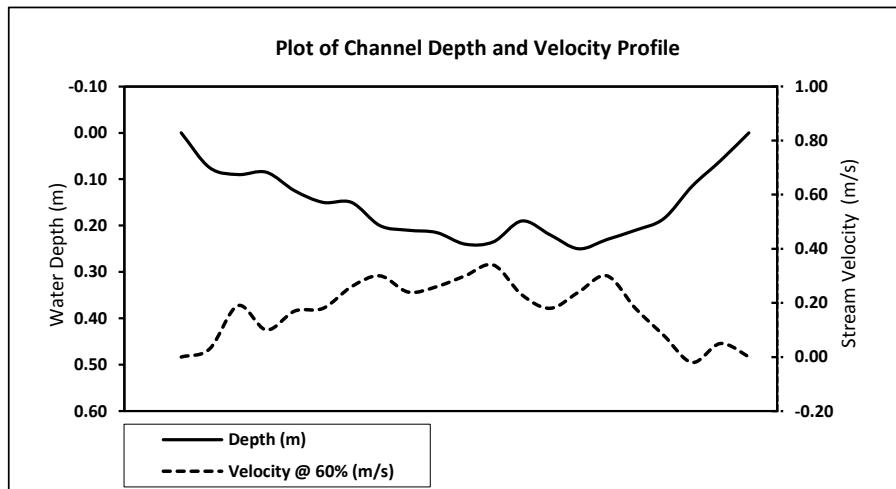
Stream Flow & Discharge Calculation

ELR Project No.	15-208		
Site / Location:	Clinton Creek		
Stream Name:	Wolverine Creek		
Station Name:	E3(H)		
Date and Time:	Oct.1/2015, 12:15		
Staff:	AN,CH		
UTM Coordinates:	07W 0514172 7147594		
Technique:	SWOFFER	Left Bank	0.53
Temp., Water/Air (°C)	not recorded / ~0	Right Bank	3.1
Crossing Number	2	Wet.Width	2.57



Station No.	Distance (m)	Station Width (m)	Depth (m)	Velocity @ 60% (m/s)	Panel Area (m²)	Panel Discharge (m³/s)
0	0.53	0.065	0.00	0.00	0.000	0.0000
1	0.66	0.130	0.08	0.03	0.010	0.0003
2	0.79	0.130	0.09	0.19	0.012	0.0022
3	0.92	0.130	0.09	0.10	0.011	0.0011
4	1.05	0.130	0.13	0.17	0.016	0.0028
5	1.18	0.130	0.15	0.18	0.020	0.0035
6	1.31	0.130	0.15	0.26	0.020	0.0051
7	1.44	0.130	0.20	0.30	0.026	0.0078
8	1.57	0.130	0.21	0.24	0.027	0.0066
9	1.70	0.130	0.22	0.26	0.028	0.0073
10	1.83	0.130	0.24	0.30	0.031	0.0094
11	1.96	0.130	0.24	0.34	0.031	0.0104
12	2.09	0.130	0.19	0.23	0.025	0.0057
13	2.22	0.130	0.22	0.18	0.029	0.0051
14	2.35	0.130	0.25	0.24	0.033	0.0078
15	2.48	0.130	0.23	0.30	0.030	0.0090
16	2.61	0.130	0.21	0.18	0.027	0.0049
17	2.74	0.130	0.19	0.08	0.024	0.0019
18	2.87	0.130	0.12	-0.02	0.015	-0.0003
19	3.00	0.115	0.06	0.05	0.007	0.0003
20	3.10	0.050	0.00	0.00	0.000	0.0000
end	3.10					

Mean Depth (m)	0.15	Discharge (m³/s)	0.0908
Mean Velocity (m/s)	0.17		



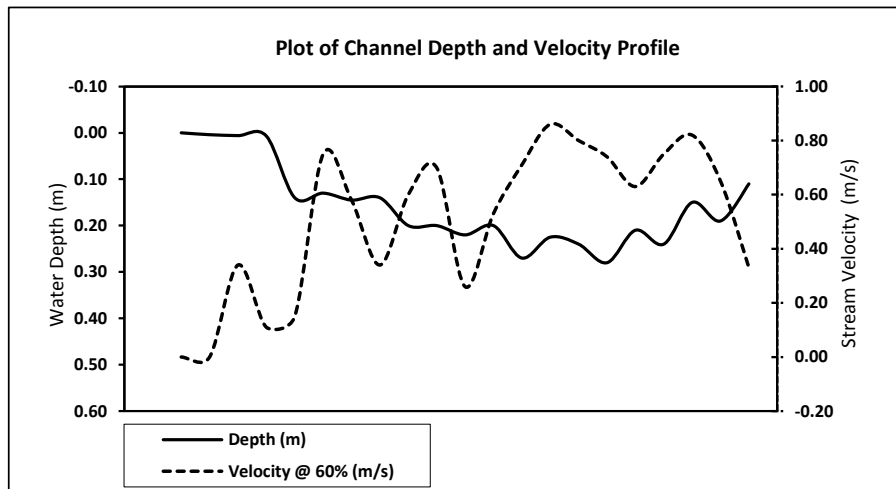
Stream Flow & Discharge Calculation

ELR Project No.	15-208		
Site / Location:	Clinton Creek		
Stream Name:	Clinton Creek		
Station Name:	E4		
Date and Time:	Sept.30/2015, 19:10		
Staff:	AN,CH		
UTM Coordinates:	07W 0515947 7145287		
Technique:	SWOFFER	Left Bank	0.7
Temp., Water/Air (°C)	4.1 / ~0	Right Bank	7.23
Crossing Number	1	Wet.Width	6.53



Station No.	Distance (m)	Station Width (m)	Depth (m)	Velocity @ 60% (m/s)	Panel Area (m²)	Panel Discharge (m³/s)
0	7.23	0.165	0.00	0.00	0.000	0.0000
1	6.90	0.330	0.00	0.00	0.001	0.0000
2	6.57	0.330	0.01	0.34	0.002	0.0007
3	6.24	0.330	0.01	0.11	0.002	0.0003
4	5.91	0.330	0.14	0.15	0.046	0.0069
5	5.58	0.330	0.13	0.75	0.043	0.0322
6	5.25	0.330	0.15	0.58	0.048	0.0278
7	4.92	0.330	0.14	0.34	0.046	0.0157
8	4.59	0.330	0.20	0.60	0.066	0.0396
9	4.26	0.330	0.20	0.70	0.066	0.0462
10	3.93	0.330	0.22	0.26	0.073	0.0189
11	3.60	0.330	0.20	0.53	0.066	0.0350
12	3.27	0.330	0.27	0.71	0.089	0.0633
13	2.94	0.330	0.23	0.86	0.074	0.0639
14	2.61	0.330	0.24	0.80	0.079	0.0634
15	2.28	0.330	0.28	0.74	0.092	0.0684
16	1.95	0.330	0.21	0.63	0.069	0.0437
17	1.62	0.330	0.24	0.75	0.079	0.0594
18	1.29	0.330	0.15	0.82	0.050	0.0406
19	0.96	0.295	0.19	0.65	0.056	0.0364
20	0.70	0.130	0.11	0.33	0.014	0.0047
end	0.70					

Mean Depth (m)	0.16	Discharge (m³/s)	0.6668
Mean Velocity (m/s)	0.51		



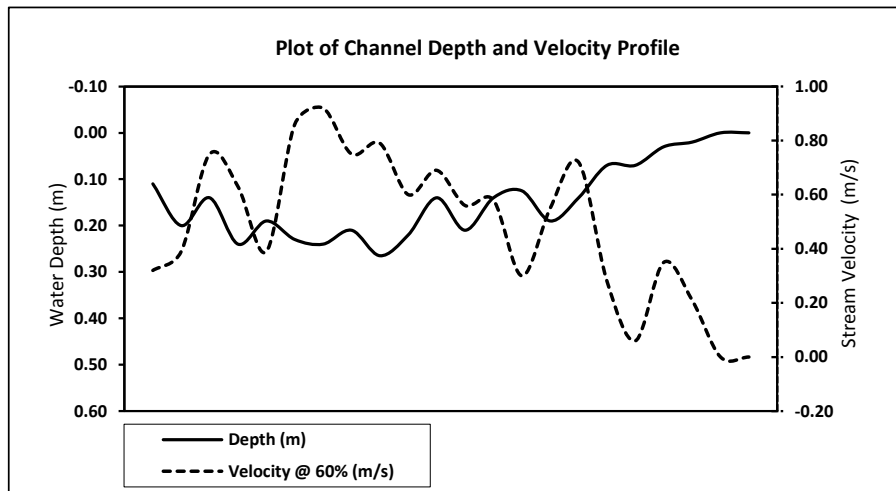
Stream Flow & Discharge Calculation

ELR Project No.	15-208		
Site / Location:	Clinton Creek		
Stream Name:	Clinton Creek		
Station Name:	E4		
Date and Time:	Sept.30/2015, 19:10		
Staff:	AN,CH		
UTM Coordinates:	07W 0515947 7145287		
Technique:	SWOFFER	Left Bank	0.7
Temp., Water/Air (°C)	4.1 / ~0	Right Bank	7.23
Crossing Number	2	Wet.Width	6.53



Station No.	Distance (m)	Station Width (m)	Depth (m)	Velocity @ 60% (m/s)	Panel Area (m²)	Panel Discharge (m³/s)
0	0.70	0.100	0.11	0.32	0.011	0.0035
1	0.90	0.265	0.20	0.39	0.053	0.0207
2	1.23	0.330	0.14	0.75	0.046	0.0347
3	1.56	0.330	0.24	0.63	0.079	0.0499
4	1.89	0.330	0.19	0.39	0.063	0.0245
5	2.22	0.330	0.23	0.86	0.076	0.0653
6	2.55	0.330	0.24	0.92	0.079	0.0729
7	2.88	0.330	0.21	0.75	0.069	0.0520
8	3.21	0.330	0.27	0.79	0.087	0.0691
9	3.54	0.330	0.22	0.60	0.073	0.0436
10	3.87	0.330	0.14	0.69	0.046	0.0319
11	4.20	0.330	0.21	0.56	0.069	0.0388
12	4.53	0.330	0.14	0.58	0.046	0.0268
13	4.86	0.330	0.13	0.30	0.041	0.0124
14	5.19	0.330	0.19	0.55	0.063	0.0345
15	5.52	0.330	0.14	0.72	0.046	0.0333
16	5.85	0.330	0.07	0.28	0.023	0.0065
17	6.18	0.330	0.07	0.06	0.023	0.0014
18	6.51	0.330	0.03	0.35	0.010	0.0035
19	6.84	0.330	0.02	0.21	0.007	0.0014
20	7.17	0.195	0.00	0.00	0.000	0.0000
21	7.23	0.030	0.00	0.00	0.000	0.0000
	7.23					

Mean Depth (m)	0.14	Discharge (m³/s)	0.6263
Mean Velocity (m/s)	0.49		



Stream Flow & Discharge Calculation

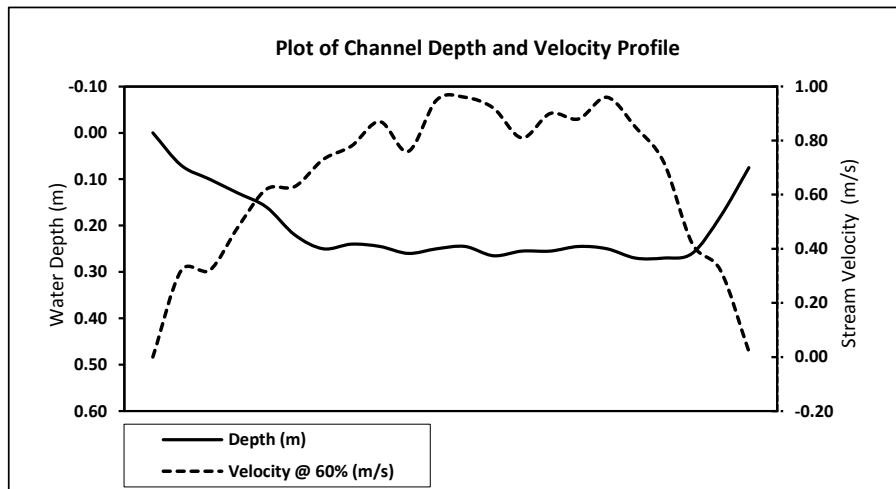
ELR Project No.	15-208		
Site / Location:	Clinton Creek		
Stream Name:	Clinton Creek		
Station Name:	E7		
Date and Time:	Oct.1/2015, 18:35		
Staff:	AN,CH		
UTM Coordinates:	07W 0519407 7142040		
Technique:	SWOFFER	Left Bank	6.02
Temp., Water/Air (°C)	2.0 / ~-1	Right Bank	0.53
Crossing Number	1	Wet.Width	5.49



Station No.	Distance (m)	Station Width (m)	Depth (m)	Velocity @ 60% (m/s)	Panel Area (m ²)	Panel Discharge (m ³ /s)
0	6.02	0.135	0.00	0.00	0.000	0.0000
1	5.75	0.260	0.07	0.32	0.018	0.0058
2	5.50	0.250	0.10	0.32	0.025	0.0080
3	5.25	0.250	0.13	0.48	0.033	0.0156
4	5.00	0.250	0.16	0.62	0.040	0.0248
5	4.75	0.250	0.22	0.63	0.055	0.0347
6	4.50	0.250	0.25	0.73	0.063	0.0456
7	4.25	0.250	0.24	0.78	0.060	0.0468
8	4.00	0.250	0.25	0.87	0.061	0.0533
9	3.75	0.250	0.26	0.76	0.065	0.0494
10	3.50	0.250	0.25	0.95	0.063	0.0594
11	3.25	0.250	0.25	0.96	0.061	0.0588
12	3.00	0.250	0.27	0.92	0.066	0.0610
13	2.75	0.250	0.26	0.81	0.064	0.0516
14	2.50	0.250	0.26	0.90	0.064	0.0574
15	2.25	0.250	0.25	0.88	0.061	0.0539
16	2.00	0.250	0.25	0.96	0.063	0.0600
17	1.75	0.250	0.27	0.85	0.068	0.0574
18	1.50	0.250	0.27	0.72	0.068	0.0486
19	1.25	0.250	0.26	0.42	0.065	0.0273
20	1.00	0.250	0.18	0.32	0.045	0.0144
21	0.75	0.235	0.08	0.02	0.018	0.0004
22	0.53	0.110	0.00	0.00	0.000	0.0000

Mean Depth (m)	0.20
Mean Velocity (m/s)	0.65

Discharge (m ³ /s)	0.8341
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Stream Flow & Discharge Calculation

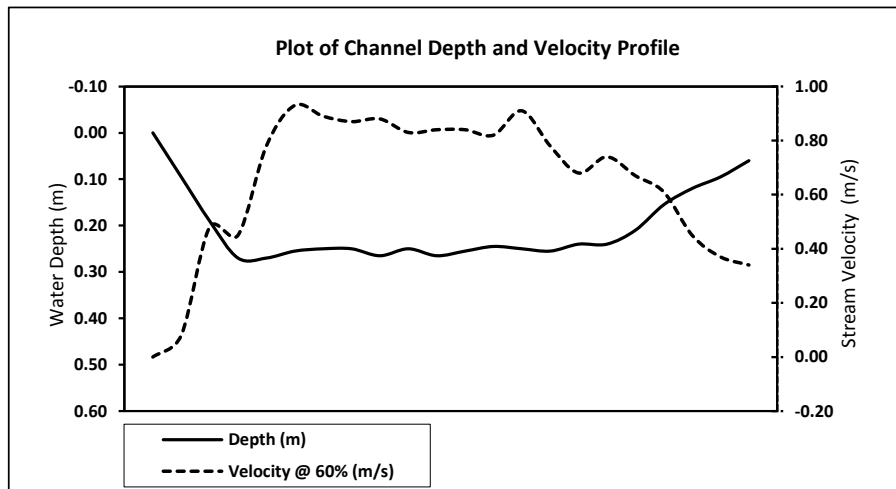
ELR Project No.	15-208		
Site / Location:	Clinton Creek		
Stream Name:	Clinton Creek		
Station Name:	E7		
Date and Time:	Oct.1/2015, 18:35		
Staff:	AN,CH		
UTM Coordinates:	07W 0519407 7142040		
Technique:	SWOFFER	Left Bank	6.02
Temp., Water/Air (°C)	2.0 / ~-1	Right Bank	0.53
Crossing Number	2	Wet.Width	5.49



Station No.	Distance (m)	Station Width (m)	Depth (m)	Velocity @ 60% (m/s)	Panel Area (m ²)	Panel Discharge (m ³ /s)
0	0.53	0.120	0.00	0.00	0.000	0.0000
1	0.77	0.245	0.10	0.08	0.023	0.0019
2	1.02	0.250	0.19	0.48	0.048	0.0228
3	1.27	0.250	0.27	0.45	0.068	0.0304
4	1.52	0.250	0.27	0.78	0.068	0.0527
5	1.77	0.250	0.26	0.93	0.064	0.0593
6	2.02	0.250	0.25	0.89	0.063	0.0556
7	2.27	0.250	0.25	0.87	0.063	0.0544
8	2.52	0.250	0.27	0.88	0.066	0.0583
9	2.77	0.250	0.25	0.83	0.063	0.0519
10	3.02	0.250	0.27	0.84	0.066	0.0557
11	3.27	0.250	0.26	0.84	0.064	0.0536
12	3.52	0.250	0.25	0.82	0.061	0.0502
13	3.77	0.250	0.25	0.91	0.062	0.0569
14	4.02	0.250	0.26	0.78	0.064	0.0497
15	4.27	0.250	0.24	0.68	0.060	0.0408
16	4.52	0.250	0.24	0.74	0.060	0.0444
17	4.77	0.250	0.21	0.67	0.053	0.0352
18	5.02	0.250	0.16	0.61	0.039	0.0236
19	5.27	0.250	0.12	0.45	0.030	0.0135
20	5.52	0.250	0.10	0.37	0.024	0.0088
21	5.77	0.250	0.06	0.34	0.015	0.0051
22	6.02	0.125	0.00	0.00	0.000	0.0000

Mean Depth (m)	0.20
Mean Velocity (m/s)	0.65

Discharge (m ³ /s)	0.8246
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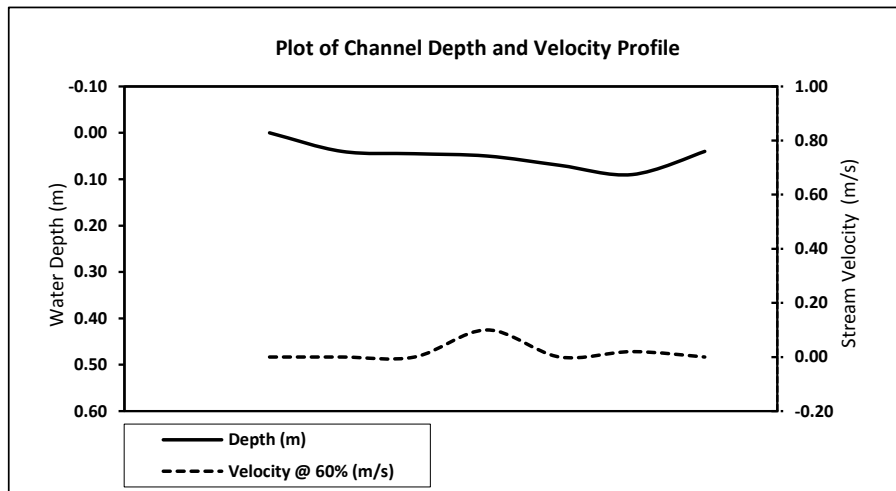


Ecological Logistics
& Research Ltd.

ELR Project No.	15-208	 Ecological Logistics & Research Ltd.	
Site / Location:	Clinton Creek		
Stream Name:	Old Clinton Creek Channel		
Station Name:	GWCC-5		
Date and Time:	Sept.30/2015, 14:00		
Staff:	AN,CH		
UTM Coordinates:	07W 0513981 7147124		
Technique:	SWOFFER	Left Bank	0.44
Temp., Water/Air (°C)	6.3 / ~0	Right Bank	1.06
Crossing Number	1	Wet.Width	0.62

[illegible]

Mean Depth (m)	0.05	Discharge (m ³ /s)	0.0007
Mean Velocity (m/s)	0.02		



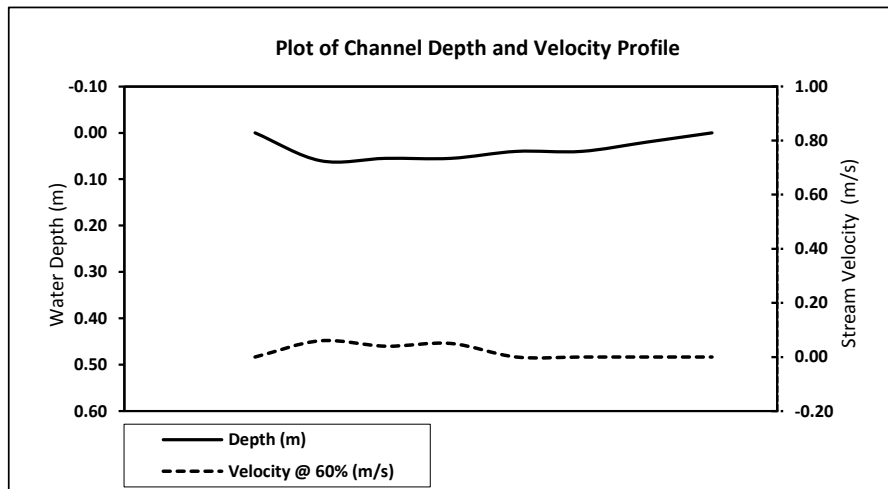
Ecological Logistics
& Research Ltd.

ELR Project No.	15-208		
Site / Location:	Clinton Creek		
Stream Name:	Old Clinton Creek Channel		
Station Name:	GWCC-5		
Date and Time:	Sept.30/2015, 14:00		
Staff:	AN,CH		
UTM Coordinates:	07W 0513981 7147124		
Technique:	SWOFFER	Left Bank	0.44
Temp., Water/Air (°C)	6.3 / ~0	Right Bank	1.06
Crossing Number	2	Wet.Width	0.62

[illegible]

Mean Depth (m)	0.03
Mean Velocity (m/s)	0.02

Discharge (m ³ /s)	0.0008
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Stream Flow & Discharge Calculation

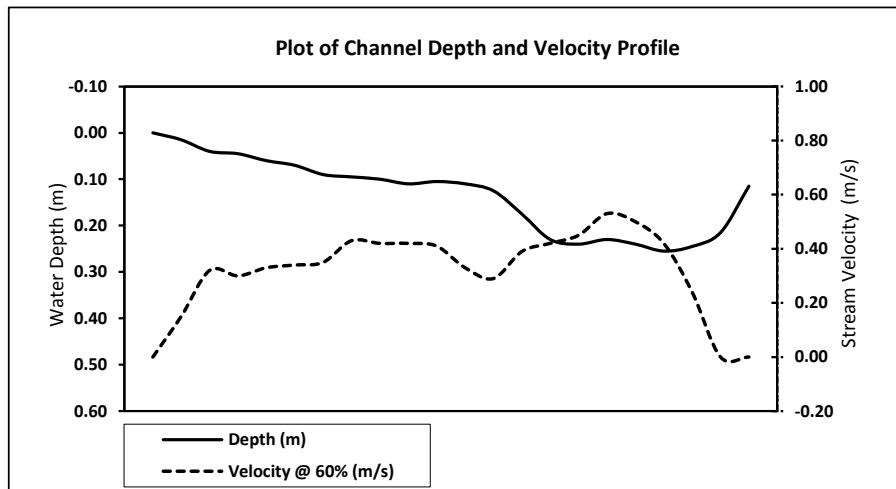
ELR Project No.	15-208		
Site / Location:	Clinton Creek		
Stream Name:	Clinton Creek		
Station Name:	R1		
Date and Time:	Oct.2/2015, 15:30		
Staff:	AN,CH		
UTM Coordinates:	07W 0510598 7147491		
Technique:	SWOFFER	Left Bank	0.33
Temp., Water/Air (°C)	0.1 / ~-1	Right Bank	5.73
Crossing Number	1	Wet.Width	5.4



Station No.	Distance (m)	Station Width (m)	Depth (m)	Velocity @ 60% (m/s)	Panel Area (m ²)	Panel Discharge (m ³ /s)
0	5.73	0.115	0.00	0.00	0.000	0.0000
1	5.50	0.240	0.02	0.15	0.004	0.0005
2	5.25	0.250	0.04	0.32	0.010	0.0032
3	5.00	0.250	0.05	0.30	0.011	0.0034
4	4.75	0.250	0.06	0.33	0.015	0.0050
5	4.50	0.250	0.07	0.34	0.018	0.0060
6	4.25	0.250	0.09	0.35	0.023	0.0079
7	4.00	0.250	0.10	0.43	0.024	0.0102
8	3.75	0.250	0.10	0.42	0.025	0.0105
9	3.50	0.250	0.11	0.42	0.028	0.0116
10	3.25	0.250	0.11	0.41	0.026	0.0108
11	3.00	0.250	0.11	0.33	0.028	0.0091
12	2.75	0.250	0.13	0.29	0.031	0.0091
13	2.50	0.250	0.18	0.39	0.044	0.0171
14	2.25	0.250	0.23	0.42	0.058	0.0242
15	2.00	0.250	0.24	0.45	0.060	0.0270
16	1.75	0.250	0.23	0.53	0.058	0.0305
17	1.50	0.250	0.24	0.50	0.060	0.0300
18	1.25	0.250	0.26	0.42	0.064	0.0268
19	1.00	0.250	0.25	0.24	0.061	0.0147
20	0.75	0.335	0.22	0.00	0.072	0.0000
21	0.33	0.210	0.12	0.00	0.024	0.0000
end	0.33					

Mean Depth (m)	0.13
Mean Velocity (m/s)	0.32

Discharge (m ³ /s)	0.2572
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Stream Flow & Discharge Calculation

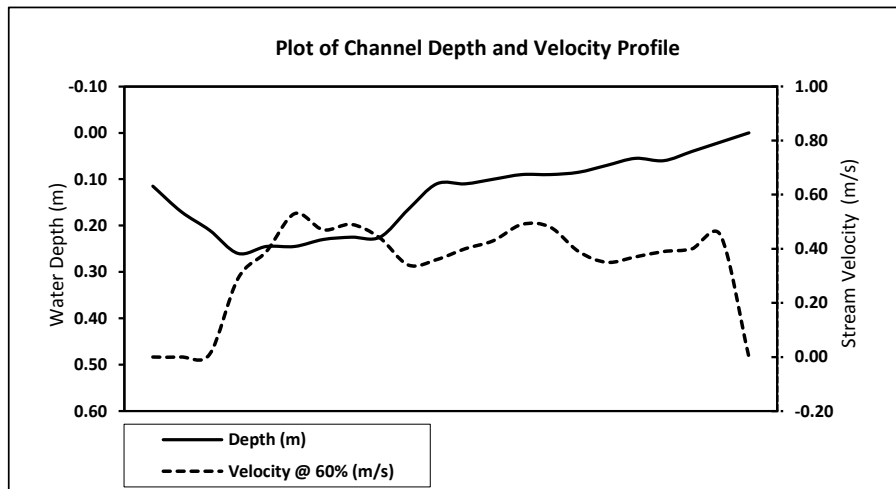
ELR Project No.	15-208		
Site / Location:	Clinton Creek		
Stream Name:	Clinton Creek		
Station Name:	R1		
Date and Time:	Oct.2/2015, 15:30		
Staff:	AN,CH		
UTM Coordinates:	07W 0510598 7147491		
Technique:	SWOFFER	Left Bank	0.33
Temp., Water/Air (°C)	0.1 / ~-1	Right Bank	5.73
Crossing Number	2	Wet.Width	5.4



Station No.	Distance (m)	Station Width (m)	Depth (m)	Velocity @ 60% (m/s)	Panel Area (m ²)	Panel Discharge (m ³ /s)
0	0.33	0.125	0.12	0.00	0.014	0.0000
1	0.58	0.250	0.17	0.00	0.043	0.0000
2	0.83	0.250	0.21	0.01	0.053	0.0005
3	1.08	0.250	0.26	0.29	0.065	0.0189
4	1.33	0.250	0.25	0.39	0.061	0.0239
5	1.58	0.250	0.25	0.53	0.061	0.0325
6	1.83	0.250	0.23	0.47	0.058	0.0270
7	2.08	0.250	0.23	0.49	0.056	0.0276
8	2.33	0.250	0.23	0.44	0.056	0.0248
9	2.58	0.250	0.17	0.34	0.041	0.0140
10	2.83	0.250	0.11	0.36	0.028	0.0099
11	3.08	0.250	0.11	0.40	0.028	0.0110
12	3.33	0.250	0.10	0.43	0.025	0.0108
13	3.58	0.250	0.09	0.49	0.023	0.0110
14	3.83	0.250	0.09	0.48	0.023	0.0108
15	4.08	0.250	0.09	0.39	0.021	0.0083
16	4.33	0.250	0.07	0.35	0.018	0.0061
17	4.58	0.250	0.06	0.37	0.014	0.0051
18	4.83	0.250	0.06	0.39	0.015	0.0059
19	5.08	0.250	0.04	0.40	0.010	0.0040
20	5.33	0.325	0.02	0.45	0.007	0.0029
21	5.73	0.200	0.00	0.00	0.000	0.0000
end	5.73					

Mean Depth (m)	0.13
Mean Velocity (m/s)	0.34

Discharge (m ³ /s)	0.2548
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Stream Flow & Discharge Calculation

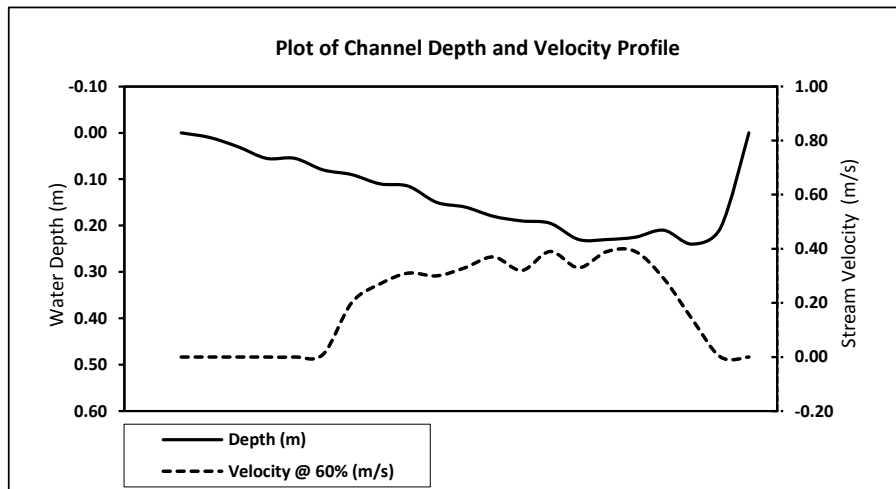
ELR Project No.	15-208		
Site / Location:	Clinton Creek		
Stream Name:	Easter Creek		
Station Name:	R2		
Date and Time:	Oct.2/2015, 11:45		
Staff:	AN,CH		
UTM Coordinates:	07W 0512027 7148065		
Technique:	SWOFFER	Left Bank	0.1
Temp., Water/Air (°C)	0.0 / ~-2	Right Bank	2.16
Crossing Number	1	Wet.Width	2.06



Station No.	Distance (m)	Station Width (m)	Depth (m)	Velocity @ 60% (m/s)	Panel Area (m ²)	Panel Discharge (m ³ /s)
0	2.16	0.050	0.00	0.00	0.000	0.0000
1	2.06	0.100	0.01	0.00	0.001	0.0000
2	1.96	0.100	0.03	0.00	0.003	0.0000
3	1.86	0.100	0.06	0.00	0.006	0.0000
4	1.76	0.100	0.06	0.00	0.006	0.0000
5	1.66	0.100	0.08	0.01	0.008	0.0001
6	1.56	0.100	0.09	0.20	0.009	0.0018
7	1.46	0.100	0.11	0.27	0.011	0.0030
8	1.36	0.100	0.12	0.31	0.012	0.0036
9	1.26	0.100	0.15	0.30	0.015	0.0045
10	1.16	0.100	0.16	0.33	0.016	0.0053
11	1.06	0.100	0.18	0.37	0.018	0.0067
12	0.96	0.100	0.19	0.32	0.019	0.0061
13	0.86	0.100	0.20	0.39	0.020	0.0076
14	0.76	0.100	0.23	0.33	0.023	0.0076
15	0.66	0.100	0.23	0.39	0.023	0.0090
16	0.56	0.100	0.23	0.39	0.023	0.0088
17	0.46	0.100	0.21	0.29	0.021	0.0061
18	0.36	0.100	0.24	0.14	0.024	0.0034
19	0.26	0.130	0.21	0.00	0.027	0.0000
20	0.10	0.080	0.00	0.00	0.000	0.0000
end	0.10					

Mean Depth (m)	0.13
Mean Velocity (m/s)	0.19

Discharge (m ³ /s)	0.0733
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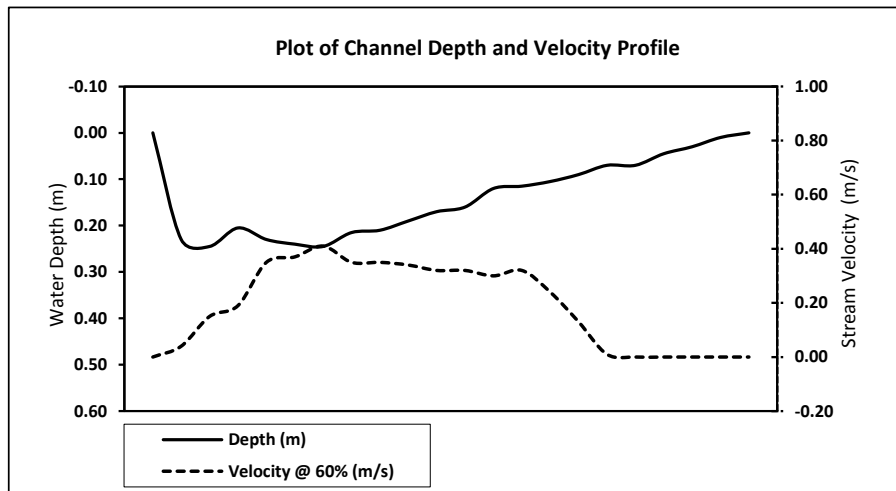
Stream Flow & Discharge Calculation

ELR Project No.	15-208		
Site / Location:	Clinton Creek		
Stream Name:	Easter Creek		
Station Name:	R2		
Date and Time:	Oct.2/2015, 11:45		
Staff:	AN,CH		
UTM Coordinates:	07W 0512027 7148065		
Technique:	SWOFFER	Left Bank	0.1
Temp., Water/Air (°C)	0.0 / ~-2	Right Bank	2.16
Crossing Number	2	Wet.Width	2.06



Station No.	Distance (m)	Station Width (m)	Depth (m)	Velocity @ 60% (m/s)	Panel Area (m²)	Panel Discharge (m³/s)
0	0.10	0.050	0.00	0.00	0.000	0.0000
1	0.20	0.100	0.23	0.04	0.023	0.0009
2	0.30	0.100	0.25	0.15	0.025	0.0037
3	0.40	0.100	0.21	0.19	0.021	0.0039
4	0.50	0.100	0.23	0.35	0.023	0.0081
5	0.60	0.100	0.24	0.37	0.024	0.0089
6	0.70	0.100	0.25	0.41	0.025	0.0100
7	0.80	0.100	0.22	0.35	0.022	0.0075
8	0.90	0.100	0.21	0.35	0.021	0.0074
9	1.00	0.100	0.19	0.34	0.019	0.0065
10	1.10	0.100	0.17	0.32	0.017	0.0054
11	1.20	0.100	0.16	0.32	0.016	0.0051
12	1.30	0.100	0.12	0.30	0.012	0.0036
13	1.40	0.100	0.12	0.32	0.012	0.0037
14	1.50	0.100	0.11	0.24	0.011	0.0025
15	1.60	0.100	0.09	0.13	0.009	0.0012
16	1.70	0.100	0.07	0.01	0.007	0.0001
17	1.80	0.100	0.07	0.00	0.007	0.0000
18	1.90	0.100	0.05	0.00	0.005	0.0000
19	2.00	0.100	0.03	0.00	0.003	0.0000
20	2.10	0.080	0.01	0.00	0.001	0.0000
21	2.16	0.030	0.00	0.00	0.000	0.0000
end	2.16					

Mean Depth (m)	0.14	Discharge (m³/s)	0.0784
Mean Velocity (m/s)	0.19		



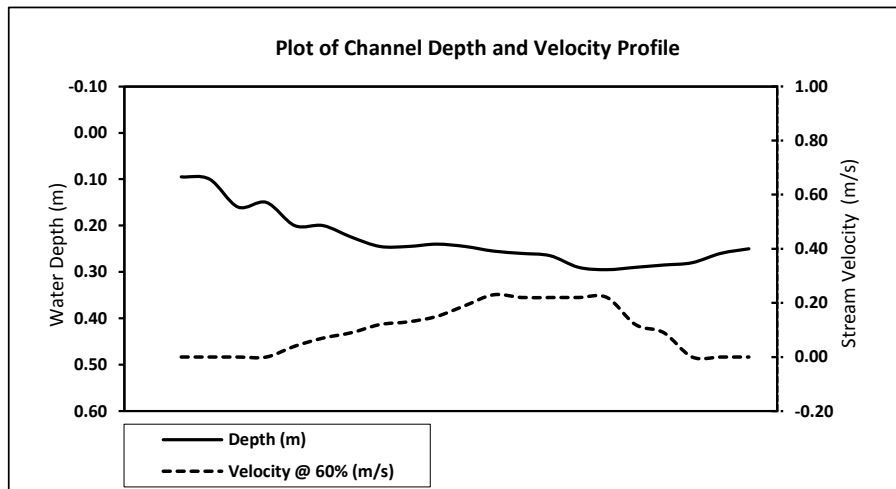
Stream Flow & Discharge Calculation

ELR Project No.	15-208		
Site / Location:	Clinton Creek		
Stream Name:	Wolverine Creek		
Station Name:	R3		
Date and Time:	Oct.2/2015, 15:10		
Staff:	AN,CH		
UTM Coordinates:	07W 0513953 7148679		
Technique:	SWOFFER	Left Bank	2.91
Temp., Water/Air (°C)	0.0 / ~-2	Right Bank	0.18
Crossing Number	1	Wet.Width	2.73



Station No.	Distance (m)	Station Width (m)	Depth (m)	Velocity @ 60% (m/s)	Panel Area (m²)	Panel Discharge (m³/s)
0	0.18	0.065	0.10	0.00	0.006	0.0000
1	0.31	0.130	0.10	0.00	0.013	0.0000
2	0.44	0.130	0.16	0.00	0.021	0.0000
3	0.57	0.130	0.15	0.00	0.020	0.0000
4	0.70	0.130	0.20	0.04	0.026	0.0010
5	0.83	0.130	0.20	0.07	0.026	0.0018
6	0.96	0.130	0.23	0.09	0.029	0.0026
7	1.09	0.130	0.25	0.12	0.032	0.0038
8	1.22	0.130	0.25	0.13	0.032	0.0041
9	1.35	0.130	0.24	0.15	0.031	0.0047
10	1.48	0.130	0.25	0.19	0.032	0.0061
11	1.61	0.130	0.26	0.23	0.033	0.0076
12	1.74	0.130	0.26	0.22	0.034	0.0074
13	1.87	0.130	0.27	0.22	0.034	0.0076
14	2.00	0.130	0.29	0.22	0.038	0.0083
15	2.13	0.130	0.30	0.22	0.038	0.0084
16	2.26	0.130	0.29	0.12	0.038	0.0045
17	2.39	0.130	0.29	0.09	0.037	0.0033
18	2.52	0.130	0.28	0.00	0.036	0.0000
19	2.65	0.195	0.26	0.00	0.051	0.0000
20	2.91	0.130	0.25	0.00	0.033	0.0000
end	2.91					

Mean Depth (m)	0.23	Discharge (m³/s)	0.0714
Mean Velocity (m/s)	0.10		



Stream Flow & Discharge Calculation

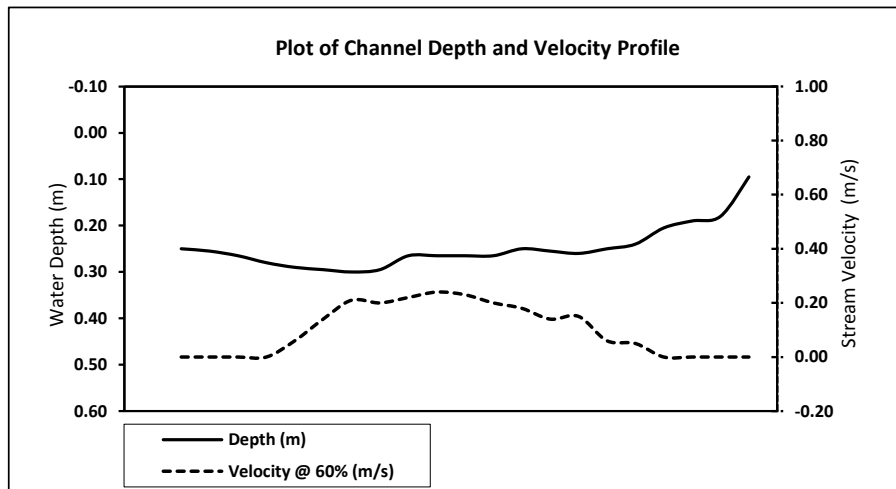
ELR Project No.	15-208		
Site / Location:	Clinton Creek		
Stream Name:	Wolverine Creek		
Station Name:	R3		
Date and Time:	Oct.2/2015, 15:10		
Staff:	AN,CH		
UTM Coordinates:	07W 0513953 7148679		
Technique:	SWOFFER	Left Bank	2.91
Temp., Water/Air (°C)	0.0 / ~-2	Right Bank	0.18
Crossing Number	2	Wet.Width	2.73



Station No.	Distance (m)	Station Width (m)	Depth (m)	Velocity @ 60% (m/s)	Panel Area (m²)	Panel Discharge (m³/s)
0	2.91	0.065	0.25	0.00	0.016	0.0000
1	2.78	0.130	0.26	0.00	0.033	0.0000
2	2.65	0.130	0.27	0.00	0.034	0.0000
3	2.52	0.130	0.28	0.00	0.036	0.0000
4	2.39	0.130	0.29	0.06	0.038	0.0023
5	2.26	0.130	0.30	0.14	0.038	0.0054
6	2.13	0.130	0.30	0.21	0.039	0.0082
7	2.00	0.130	0.30	0.20	0.038	0.0077
8	1.87	0.130	0.27	0.22	0.034	0.0076
9	1.74	0.130	0.27	0.24	0.034	0.0083
10	1.61	0.130	0.27	0.23	0.034	0.0079
11	1.48	0.130	0.27	0.20	0.034	0.0069
12	1.35	0.130	0.25	0.18	0.033	0.0059
13	1.22	0.130	0.26	0.14	0.033	0.0046
14	1.09	0.130	0.26	0.15	0.034	0.0051
15	0.96	0.130	0.25	0.06	0.033	0.0020
16	0.83	0.130	0.24	0.05	0.031	0.0016
17	0.70	0.130	0.21	0.00	0.027	0.0000
18	0.57	0.130	0.19	0.00	0.025	0.0000
19	0.44	0.195	0.18	0.00	0.035	0.0000
20	0.18	0.130	0.10	0.00	0.012	0.0000
end	0.18					

Mean Depth (m)	0.25
Mean Velocity (m/s)	0.10

Discharge (m³/s)	0.0732
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Stream Flow & Discharge Calculation

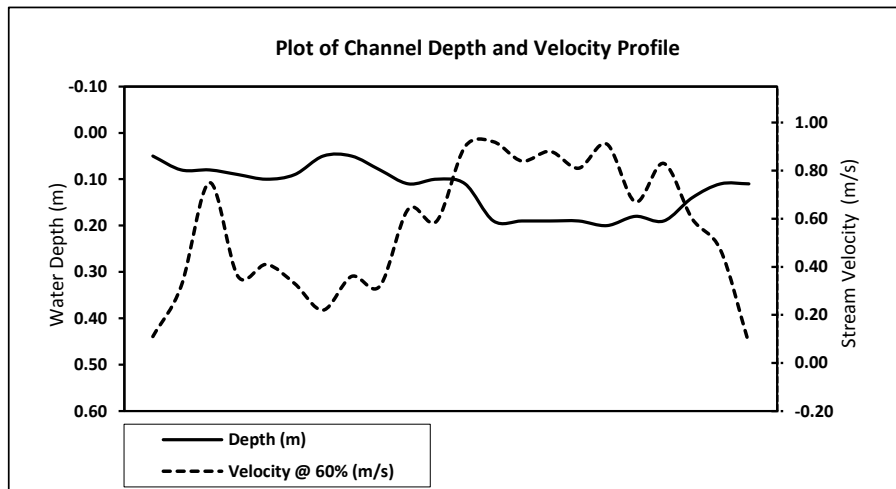
ELR Project No.	15-208		
Site / Location:	Clinton Creek		
Stream Name:	Eagle Creek		
Station Name:	R4		
Date and Time:	Sept.30/2015, 18:10		
Staff:	AN,CH		
UTM Coordinates:	07W 0515982 7145352		
Technique:	SWOFFER	Left Bank	2.19
Temp., Water/Air (°C)	0.4 / ~0	Right Bank	0.33
Crossing Number	1	Wet.Width	1.86



Station No.	Distance (m)	Station Width (m)	Depth (m)	Velocity @ 60% (m/s)	Panel Area (m²)	Panel Discharge (m³/s)
0	2.19	0.040	0.05	0.11	0.002	0.0002
1	2.11	0.085	0.08	0.32	0.007	0.0022
2	2.02	0.090	0.08	0.75	0.007	0.0054
3	1.93	0.090	0.09	0.36	0.008	0.0029
4	1.84	0.090	0.10	0.41	0.009	0.0037
5	1.75	0.090	0.09	0.33	0.008	0.0027
6	1.66	0.090	0.05	0.22	0.005	0.0010
7	1.57	0.090	0.05	0.36	0.005	0.0016
8	1.48	0.090	0.08	0.32	0.007	0.0023
9	1.39	0.090	0.11	0.64	0.010	0.0063
10	1.30	0.080	0.10	0.59	0.008	0.0047
11	1.23	0.100	0.11	0.90	0.011	0.0099
12	1.10	0.100	0.19	0.92	0.019	0.0175
13	1.03	0.080	0.19	0.84	0.015	0.0128
14	0.94	0.095	0.19	0.88	0.018	0.0159
15	0.84	0.090	0.19	0.81	0.017	0.0139
16	0.76	0.085	0.20	0.91	0.017	0.0155
17	0.67	0.090	0.18	0.67	0.016	0.0109
18	0.58	0.090	0.19	0.83	0.017	0.0142
19	0.49	0.090	0.14	0.60	0.013	0.0076
20	0.40	0.080	0.11	0.47	0.009	0.0041
21	0.33	0.035	0.11	0.08	0.004	0.0003
end	0.33					

Mean Depth (m)	0.12
Mean Velocity (m/s)	0.56

Discharge (m³/s)	0.1554
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Stream Flow & Discharge Calculation

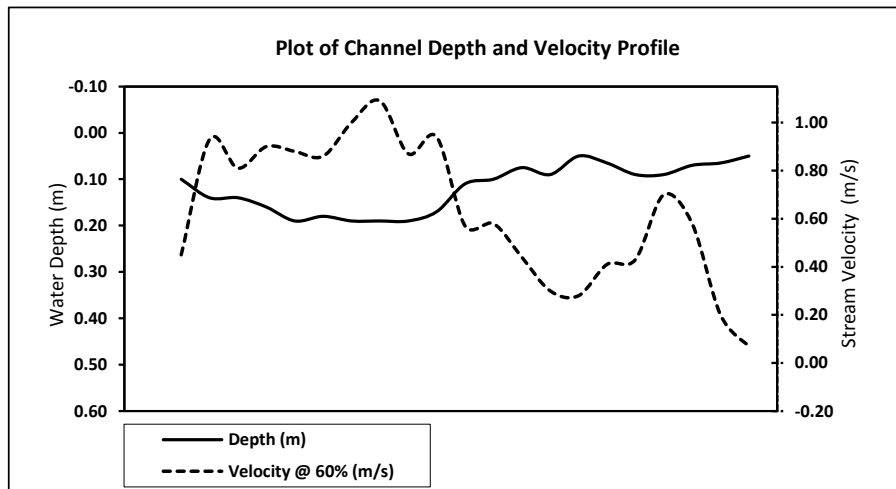
ELR Project No.	15-208
Site / Location:	Clinton Creek
Stream Name:	Eagle Creek
Station Name:	R4
Date and Time:	Sept.30/2015, 18:10
Staff:	AN,CH
UTM Coordinates:	07W 0515982 7145352
Technique:	SWOFFER
Temp., Water/Air (°C)	0.4 / ~0
Crossing Number	2

Left Bank	2.19
Right Bank	0.33
Wet.Width	1.86



Station No.	Distance (m)	Station Width (m)	Depth (m)	Velocity @ 60% (m/s)	Panel Area (m ²)	Panel Discharge (m ³ /s)
0	0.33	0.055	0.10	0.45	0.006	0.0025
1	0.44	0.100	0.14	0.93	0.014	0.0130
2	0.53	0.090	0.14	0.81	0.013	0.0102
3	0.62	0.090	0.16	0.90	0.014	0.0130
4	0.71	0.090	0.19	0.88	0.017	0.0150
5	0.80	0.090	0.18	0.86	0.016	0.0139
6	0.89	0.090	0.19	1.00	0.017	0.0171
7	0.98	0.090	0.19	1.09	0.017	0.0186
8	1.07	0.080	0.19	0.87	0.015	0.0132
9	1.14	0.090	0.17	0.94	0.015	0.0144
10	1.25	0.100	0.11	0.57	0.011	0.0063
11	1.34	0.090	0.10	0.58	0.009	0.0052
12	1.43	0.090	0.08	0.44	0.007	0.0030
13	1.52	0.090	0.09	0.30	0.008	0.0024
14	1.61	0.090	0.05	0.28	0.005	0.0013
15	1.70	0.090	0.07	0.41	0.006	0.0024
16	1.79	0.090	0.09	0.43	0.008	0.0035
17	1.88	0.090	0.09	0.70	0.008	0.0057
18	1.97	0.090	0.07	0.58	0.006	0.0037
19	2.06	0.110	0.07	0.20	0.007	0.0014
20	2.19	0.065	0.05	0.07	0.003	0.0002
end	2.19					

Mean Depth (m)	0.12	Discharge (m ³ /s)	0.1660
Mean Velocity (m/s)	0.63		

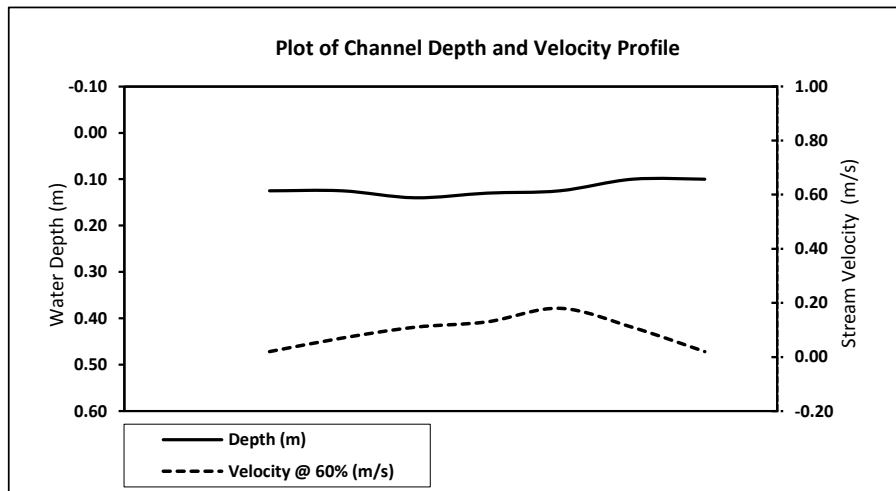


Ecological Logistics
& Research Ltd.

ELR Project No.	15-208	 Ecological Logistics & Research Ltd.	
Site / Location:	Clinton Creek		
Stream Name:	Unnamed Creek		
Station Name:	R8		
Date and Time:	Oct.2/2015, 12:55		
Staff:	AN,CH		
UTM Coordinates:	07W 0511902 7147885		
Technique:	SWOFFER	Left Bank	0.25
Temp., Water/Air (°C)	0.2 / ~0	Right Bank	0.75
Crossing Number	1	Wet.Width	0.5

[illegible]

Mean Depth (m)	0.12	Discharge (m ³ /s)	0.0071
Mean Velocity (m/s)	0.09		

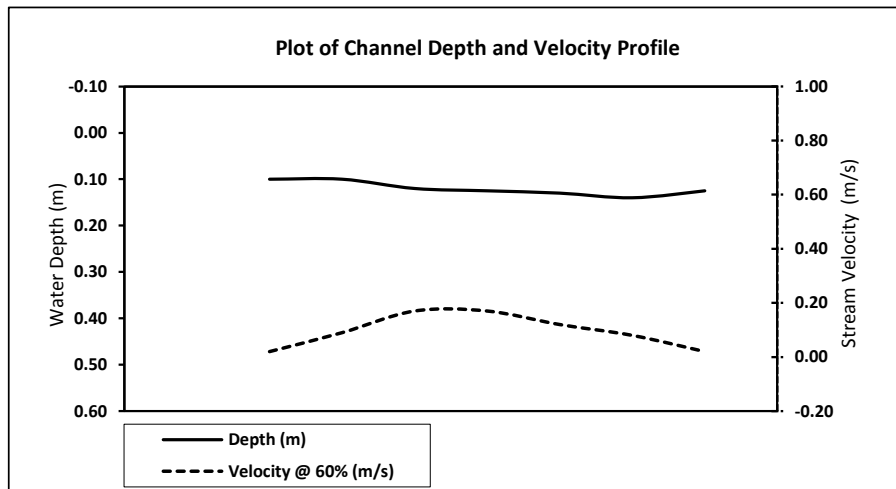


Ecological Logistics
& Research Ltd.

ELR Project No.	15-208		
Site / Location:	Clinton Creek		
Stream Name:	Unnamed Creek		
Station Name:	R8		
Date and Time:	Oct.2/2015, 12:55		
Staff:	AN,CH		
UTM Coordinates:	07W 0511902 7147885		
Technique:	SWOFFER	Left Bank	0.25
Temp., Water/Air (°C)	0.2 / ~0	Right Bank	0.75
Crossing Number	2	Wet.Width	0.5

[illegible]

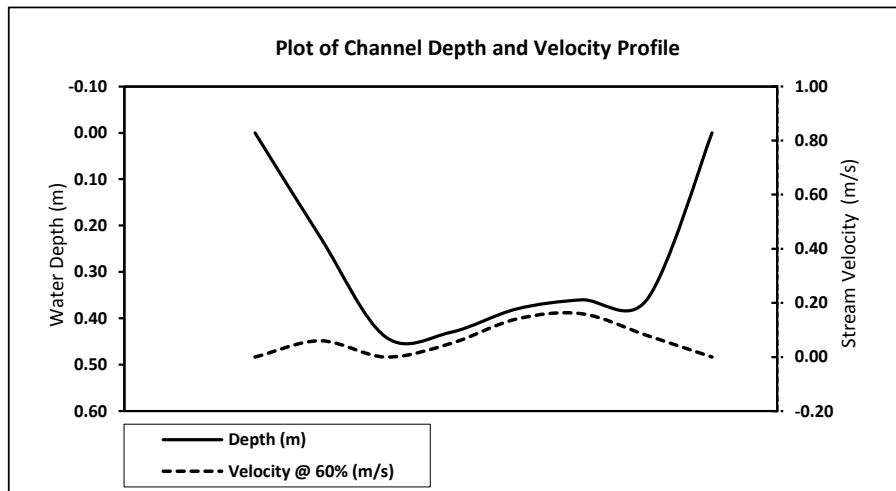
Mean Depth (m)	0.12	Discharge (m ³ /s)	0.0074
Mean Velocity (m/s)	0.10		



ELR Project No.	15-208		
Site / Location:	Clinton Creek		
Stream Name:	Unnamed Creek		
Station Name:	R9		
Date and Time:	Oct.2/2015, 17:12		
Staff:	AN,CH		
UTM Coordinates:	07W 0512343 7146744		
Technique:	SWOFFER	Left Bank	0.96
Temp., Water/Air (°C)	0.0 / ~-2	Right Bank	0.33
Crossing Number	1	Wet.Width	0.63

[illegible]

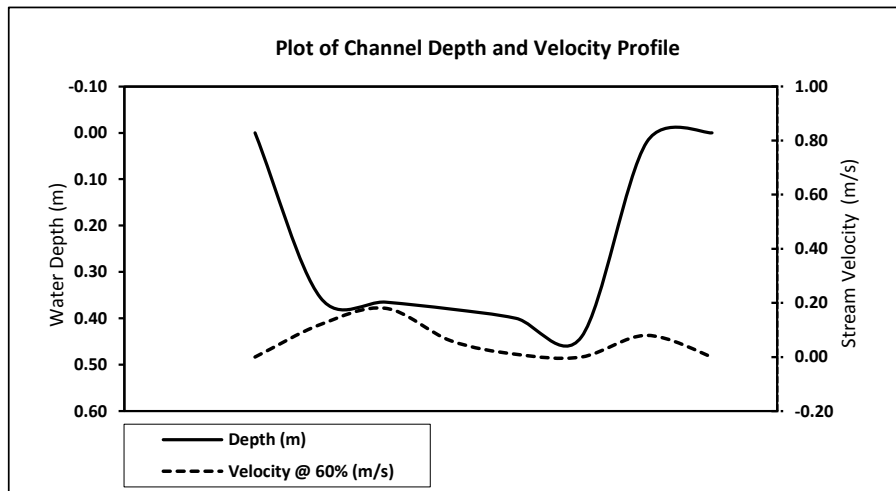
Mean Depth (m)	0.27	Discharge (m ³ /s)	0.0167
Mean Velocity (m/s)	0.06		



ELR Project No.	15-208	 Ecological Logistics & Research Ltd.	
Site / Location:	Clinton Creek		
Stream Name:	Unnamed Creek		
Station Name:	R9		
Date and Time:	Oct.2/2015, 17:12		
Staff:	AN,CH		
UTM Coordinates:	07W 0512343 7146744		
Technique:	SWOFFER		
Temp., Water/Air (°C)	0.0 / ~-2	Left Bank	0.96
Crossing Number	2	Right Bank	0.33
		Wet.Width	0.63

[illegible]

Mean Depth (m)	0.25	Discharge (m ³ /s)	0.0138
Mean Velocity (m/s)	0.06		



APPENDIX 4

Field Notes

SURFACE WATER SAMPLE COLLECTION SHEET

Sample Site:	CCZ	Project Number:	15-208	Date:	Sept. 30/2015
UTM Coordinates	Z 7 E 0513642 N 7147098	Client:	Yukon Government (AAM)	Samplers:	AN, CH
Waypoint	GPS AN Name EI	Project Name:	Clinton Creek Surface Water Monitoring Program	Weather/Temperature:	Overcast ~-2°C
Photos	Cam AN Nos. 233-236				
Sample Time (24h)	11:45				
Field Blank Collected:	☐ Yes Name _____	Duplicate Collected:	☐ Yes Name _____		
Field Parameter Measurements (note units if different than those stated)			Site Sketch		
Sample Depth (m)	0.05				
Temperature (°C)	4.5				
pH (pH Units)	6.46				
Cond. (µs/cm)	348.8				
Specific Cond. (µs/cm)	574.2				
Redox (mV)	162.1				
DO (mg/L)	16.68				
DO (%)	129.2				
Turbidity (NTU)	1.33				
Appearance & Odour (Clear, Silty, HC odours, etc.)	Clear, flowing water sampled from riffle feature. D/S of primary ford.				
Field Measurements Log					
YSI Logged?	☒ Yes ☐ No				
Time Logged on YSI	(hh:mm) 11:55				
Time Synced on YSI	☒ Yes ☐ No Actual Time (hh:mm) _____				
Unit Used	☐ Pro Plus ☐ Pen Unit Other _____				

Access Road.

Primary ford.

Clinton Creek

⊗
Sample location.
(EI Sign).

Sample Site (Con't): SCC1

Sample Date (Con't): Sept. 30/2015

Bottle Type	Parameters Analyzed	Sample Treatment ☒	Preservative Added ☒	Collected ☒	No. Bottles	Comments (note number of bottles in duplicate)
1000 500 ml (plastic)	General Chemistry	-	-	☒	1	Date/Time: <u>Sept. 30/2015</u>
125 ml (plastic)	Total Metals	-	☒ Nitric Acid	☒	1	<u>Same</u>
125 ml (plastic)	Dissolved Metals	☐ Field Filtered	☐ Nitric Acid	☐		
40 ml (glass)	Total Mercury		☒ Hydrochloric Acid	☒	1	<u>Same</u>
40 ml (glass)	Dissolved Mercury	☐ Field Filtered	☐ Hydrochloric Acid	☐		
125 ml (amber)	Ammonia (NH3)		☐ Sulfuric Acid	☐		
125 ml (amber)	Dissolved Organic Carbon (DOC)	☐ Field Filtered	☐ Sulfuric Acid	☐		
125 ml (plastic)	Total Speciated Chromium – Cr(VI) and CR(III)		☐ NaOH	☐		
125 ml (plastic)	Dissolved Speciated Chromium – Cr(VI) and CR(III)	☐ Field Filtered	☐ NaOH	☐		
1000 ml	Asbestos			☒	1	<u>Same</u>

General Notes:

Sample collected for AAM @ EZ monitoring location.

SURFACE WATER SAMPLE COLLECTION SHEET

Sample Site:	CCZ	Project Number:	15-208	Date:	Sept. 30/2015
UTM Coordinates	Z 7 E 0514159 N 7147069	Client:	Yukon Government (AAM)	Samplers:	AN, CH.
Waypoint	GPS AN Name EZ	Project Name:	Clinton Creek Surface Water Monitoring Program	Weather/Temperature:	Overcast ~ -2°C.
Photos	Cam AN Nos. 240-242				
Sample Time (24h)	14:30				
Field Blank Collected:	☐ Yes Name _____	Duplicate Collected:	☐ Yes Name _____		
Field Parameter Measurements (note units if different than those stated)			Site Sketch		
Sample Depth (m)	0.05				
Temperature (°C)	5.1				
pH (pH Units)	7.63				
Cond. (µs/cm)	494.3				
Specific Cond. (µs/cm)	798.0				
Redox (mV)	3.7				
DO (mg/L)	13.19				
DO (%)	103.7				
Turbidity (NTU)	1.53				
Appearance & Odour (Clear, Silty, HC odours, etc.)	Clear, riffle section of Clinton Creek. V/S of wolverine confluence.				
Field Measurements Log					
YSI Logged?	☒ Yes ☐ No				
Time Logged on YSI	(hh:mm) 14:50				
Time Synced on YSI	☒ Yes ☐ No Actual Time (hh:mm) _____				
Unit Used	☒ Pro Plus ☐ Pen Unit Other _____				
			Legend: == Hydro. site. ⊗ sample site □ EZ sign install. Wolverine Crk. → Clinton Crk. Access Rd.		

Sample Site (Con't): CCZ

Sample Date (Con't): Sept. 30/14:30

Bottle Type	Parameters Analyzed	Sample Treatment ☒	Preservative Added ☒	Collected ☒	No. Bottles	Comments (note number of bottles in duplicate)
500 ml (plastic)	General Chemistry	-	-	☒	1	Date/Time:
125 ml (plastic)	Total Metals	-	☒ Nitric Acid	☒	1	
125 ml (plastic)	Dissolved Metals	☐ Field Filtered	☐ Nitric Acid	☐		
40 ml (glass)	Total Mercury		☒ Hydrochloric Acid	☒	1	
40 ml (glass)	Dissolved Mercury	☐ Field Filtered	☐ Hydrochloric Acid	☐		
125 ml (amber)	Ammonia (NH ₃)		☐ Sulfuric Acid	☐		
125 ml (amber)	Dissolved Organic Carbon (DOC)	☐ Field Filtered	☐ Sulfuric Acid	☐		
125 ml (plastic)	Total Speciated Chromium – Cr(VI) and Cr(III)		☐ NaOH	☐		
125 ml (plastic)	Dissolved Speciated Chromium – Cr(VI) and Cr(III)	☐ Field Filtered	☐ NaOH	☐		
1000 ml	Asbestos			☒	1	

General Notes:

SURFACE WATER SAMPLE COLLECTION SHEET

Sample Site:	CC3	Project Number:	15-208	Date:	Sept. 30/2015			
UTM Coordinates	Z _ E _ N _	Client:	Yukon Government (AAM)	Samplers:	AN, CH.			
Waypoint	GPS AN Name CC3	Project Name:	Clinton Creek Surface Water Monitoring Program	Weather/Temperature:	Overcast ~ -2°C.			
Photos	Cam AN Nos. 243-245							
Sample Time (24h)	15:00							
Field Blank Collected:	☐ Yes Name _____	Duplicate Collected:	☐ Yes Name _____					
Field Parameter Measurements (note units if different than those stated)			Site Sketch					
Sample Depth (m)	0.1							
Temperature (°C)	3.4							
pH (pH Units)	6.91							
Cond. (µs/cm)	438.5							
Specific Cond. (µs/cm)	747.8							
Redox (mV)	880							
DO (mg/L)	14.87							
DO (%)	111.5							
Turbidity (NTU)	5.20							
Appearance & Odour (Clear, Silty, HC odours, etc.)	Clear, sampled from riffle on Clinton Creek. D/S of Wolverine confluence.							
Field Measurements Log								
YSI Logged?	☒ Yes ☐ No							
Time Logged on YSI	(hh:mm) 15:59							
Time Synced on YSI	☒ Yes ☐ No Actual Time (hh:mm) _____							
Unit Used	☒ Pro Plus ☐ Pen Unit Other _____							

Sample Site (Con't): CC3

Sample Date (Con't): Sept. 30/2015

Bottle Type	Parameters Analyzed	Sample Treatment ☒	Preservative Added ☒	Collected ☒	No. Bottles	Comments (note number of bottles in duplicate)
1000 ml (plastic)	General Chemistry	-	-	☒	1	Date/Time:
125 ml (plastic)	Total Metals	-	☒ Nitric Acid	☒	1	
125 ml (plastic)	Dissolved Metals	☐ Field Filtered	☐ Nitric Acid	☐		
40 ml (glass)	Total Mercury		☒ Hydrochloric Acid	☒	1	
40 ml (glass)	Dissolved Mercury	☐ Field Filtered	☐ Hydrochloric Acid	☐		
125 ml (amber)	Ammonia (NH3)		☐ Sulfuric Acid	☐		
125 ml (amber)	Dissolved Organic Carbon (DOC)	☐ Field Filtered	☐ Sulfuric Acid	☐		
125 ml (plastic)	Total Speciated Chromium – Cr(VI) and Cr(III)		☐ NaOH	☐		
125 ml (plastic)	Dissolved Speciated Chromium – Cr(VI) and Cr(III)	☐ Field Filtered	☐ NaOH	☐		
1000 ml	Asbestos			☒	1	

General Notes:

Sampled for AAM program. Post a flagging tape marked CC3 @ sample location.

SURFACE WATER SAMPLE COLLECTION SHEET

Sample Site:	E1	Project Number:	15-208	Date:	Sept 30/2015
UTM Coordinates	Z 7 E 0513642 N 7147098	Client:	Yukon Government (AAM)	Samplers:	AN, CH.
Waypoint	GPS AN Name E1	Project Name:	Clinton Creek Surface Water Monitoring Program	Weather/Temperature:	cloudy / sunny. ~ -2°C.
Photos	Cam AN Nos. 233-236				
Sample Time (24h)	11:45				
Field Blank Collected:	☒ Yes Name FB1	Duplicate Collected:	☒ Yes Name DUP-1		
Field Parameter Measurements (note units if different than those stated)			Site Sketch		
Sample Depth (m)	0.05				
Temperature (°C)	4.5				
pH (pH Units)	6.46				
Cond. (µs/cm)	348.8				
Specific Cond. (µs/cm)	574.2				
Redox (mV)	162.1				
DO (mg/L)	16.68				
DO (%)	129.2				
Turbidity (NTU)	1.33				
Appearance & Odour (Clear, Silty, HC odours, etc.)	Clear, flowing water. Sampled from riffle feature. D/S of primary ford.				
Field Measurements Log					
YSI Logged?	☒ Yes ☐ No				
Time Logged on YSI	(hh:mm) 11:57				
Time Synced on YSI	☒ Yes ☐ No Actual Time (hh:mm) _____				
Unit Used	☒ Pro Plus ☐ Pen Unit Other _____				

The sketch shows a road labeled 'Access Road' at the top. Below it is a 'Primary ford' crossing a creek labeled 'Clinton Creek'. A sample location is marked with a circle and labeled 'Sample location' on the left side of the creek. The creek is represented by a series of vertical lines indicating riffles or rapids.

Sample Site (Con't): E1

Sample Date (Con't): Sept. 30/2015

Bottle Type	Parameters Analyzed	Sample Treatment ☒	Preservative Added ☒	Collected ☒	No. Bottles	Comments (note number of bottles in duplicate)
500 ml (plastic)	General Chemistry	-	-	☐		Date/Time: Oct. 2/18:45.
125 ml (plastic)	Total Metals	-	☒ Nitric Acid	☒	1	Sept. 30 / 11:45.
125 ml (plastic)	Dissolved Metals	☒ Field Filtered	☒ Nitric Acid	☒	1	
40 ml (glass)	Total Mercury		☒ Hydrochloric Acid	☒	1	
40 ml (glass)	Dissolved Mercury	☒ Field Filtered	☒ Hydrochloric Acid	☒	1	
125 ml (amber)	Ammonia (NH ₃)		☒ Sulfuric Acid	☒	1	
125 ml (amber)	Dissolved Organic Carbon (DOC)	☒ Field Filtered	☒ Sulfuric Acid	☒	1	
125 ml (plastic)	Total Speciated Chromium – Cr(VI) and Cr(III)		☒ NaOH	☒	1	
125 ml (plastic)	Dissolved Speciated Chromium – Cr(VI) and Cr(III)	☒ Field Filtered	☒ NaOH	☒	1	
				☐		

General Notes:

E1 sample site sign installed during site visit.

SURFACE WATER SAMPLE COLLECTION SHEET

Sample Site:	EZ	Project Number:	15-208	Date:	Sept. 30/2015
UTM Coordinates	Z 7 E 0514159 N 7147069	Client:	Yukon Government (AAM)	Samplers:	AN, CH.
Waypoint	GPS AN Name EZ	Project Name:	Clinton Creek Surface Water Monitoring Program	Weather/Temperature:	Overcast ~-2°C
Photos	Cam AN Nos. 240-242				
Sample Time (24h)	14:30				
Field Blank Collected:	☐ Yes Name _____	Duplicate Collected:	☐ Yes Name _____		

Field Parameter Measurements (note units if different than those stated)		Site Sketch
Sample Depth (m)	0.05	
Temperature (°C)	5.1	
pH (pH Units)	7.63	
Cond. (µs/cm)	494.3	
Specific Cond. (µs/cm)	798.0	
Redox (mV)	3.7	
DO (mg/L)	13.19	
DO (%)	103.7	
Turbidity (NTU)	1.53	
Appearance & Odour (Clear, Silty, HC odours, etc.)	Clear, riffle section of Clinton Creek. U/S of Wolverine confluence.	

Field Measurements Log	
YSI Logged?	☒ Yes ☐ No
Time Logged on YSI	(hh:mm) 14:50
Time Synced on YSI	☒ Yes ☐ No Actual Time (hh:mm) _____
Unit Used	☒ Pro Plus ☐ Pen Unit Other _____

Sample Site (Con't): E 2

Sample Date (Con't): Sept. 30 / 2015

Bottle Type	Parameters Analyzed	Sample Treatment ☒	Preservative Added ☒	Collected ☒	No. Bottles	Comments (note number of bottles in duplicate)
500 ml (plastic)	General Chemistry	-	-	☒	1	Date/Time: Oct. 2 / 19:00
125 ml (plastic)	Total Metals	-	☒ Nitric Acid	☒	1	Sept. 30 / 14:30
125 ml (plastic)	Dissolved Metals	☒ Field Filtered	☒ Nitric Acid	☒	1	
40 ml (glass)	Total Mercury		☒ Hydrochloric Acid	☒	1	
40 ml (glass)	Dissolved Mercury	☒ Field Filtered	☒ Hydrochloric Acid	☒	1	
125 ml (amber)	Ammonia (NH3)		☒ Sulfuric Acid	☒	1	
125 ml (amber)	Dissolved Organic Carbon (DOC)	☒ Field Filtered	☒ Sulfuric Acid	☒	1	
125 ml (plastic)	Total Speciated Chromium – Cr(VI) and Cr(III)		☒ NaOH	☒	1	
125 ml (plastic)	Dissolved Speciated Chromium – Cr(VI) and Cr(III)	☒ Field Filtered	☒ NaOH	☒	1	
				☐		

General Notes:

SURFACE WATER SAMPLE COLLECTION SHEET

Sample Site:	E3	Project Number:	15-208	Date:	Sept. 30
UTM Coordinates	Z7E 0514176N 7147193	Client:	Yukon Government (AAM)	Samplers:	AN+CH
Waypoint	GPS AN Name E3	Project Name:	Clinton Creek Surface Water Monitoring Program	Weather/Temperature:	overcast x - 2°C
Photos	Cam AN Nos. 246-247				
Sample Time (24h)	16:00				
Field Blank Collected:	☐ Yes Name _____	Duplicate Collected:	☐ Yes Name _____		
Field Parameter Measurements (note units if different than those stated)			Site Sketch		
Sample Depth (m)	0.05 - 0.10 m	Old creek bed.			
Temperature (°C)	1.2 °C				
pH (pH Units)	7.49				
Cond. (µs/cm)	377.4				
Specific Cond. (µs/cm)	690.9				
Redox (mV)	167.4				
DO (mg/L)	15.20				
DO (%)	107.9				
Turbidity (NTU)	12.2				
Appearance & Odour (Clear, Silty, HC odours, etc.)	clear, slightly silty				
Field Measurements Log					
YSI Logged?	☒ Yes ☐ No				
Time Logged on YSI	(hh:mm) 16:24				
Time Synced on YSI	☒ Yes ☐ No Actual Time (hh:mm) _____				
Unit Used	☒ Pro Plus ☐ Pen Unit Other _____				

Sample Site (Con't): E3

Sample Date (Con't): Sept. 30/2015

Bottle Type	Parameters Analyzed	Sample Treatment ☒	Preservative Added ☒	Collected ☒	No. Bottles	Comments (note number of bottles in duplicate)
500 ml (plastic)	General Chemistry	-	-	☒	1	Date/Time: <u>Oct. 2/19:05</u>
125 ml (plastic)	Total Metals	-	☒ Nitric Acid	☒	1	<u>Sept. 30/16:00</u>
125 ml (plastic)	Dissolved Metals	☒ Field Filtered	☒ Nitric Acid	☒	1	
40 ml (glass)	Total Mercury		☒ Hydrochloric Acid	☒	1	
40 ml (glass)	Dissolved Mercury	☒ Field Filtered	☒ Hydrochloric Acid	☒	1	
125 ml (amber)	Ammonia (NH3)		☒ Sulfuric Acid	☒	1	
125 ml (amber)	Dissolved Organic Carbon (DOC)	☒ Field Filtered	☒ Sulfuric Acid	☒	1	
125 ml (plastic)	Total Speciated Chromium – Cr(VI) and Cr(III)		☒ NaOH	☒	1	
125 ml (plastic)	Dissolved Speciated Chromium – Cr(VI) and Cr(III)	☒ Field Filtered	☒ NaOH	☒	1	
				☐		

General Notes:

SURFACE WATER SAMPLE COLLECTION SHEET

Sample Site:	E4	Project Number:	15-208	Date:	Sept. 30
UTM Coordinates	Z7E 0515947N 7145287	Client:	Yukon Government (AAM)	Samplers:	AN + CH
Waypoint	GPS AN Name E4	Project Name:	Clinton Creek Surface Water Monitoring Program	Weather/Temperature:	Overcast 20°C
Photos	Cam AN Nos. 255-258				
Sample Time (24h)	18:25				
Field Blank Collected:	☐ Yes Name _____	Duplicate Collected:	☐ Yes Name _____		
Field Parameter Measurements (note units if different than those stated)			Site Sketch		
Sample Depth (m)	0.10m				
Temperature (°C)	4.1				
pH (pH Units)	7.74				
Cond. (µs/cm)	489.4				
Specific Cond. (µs/cm)	815.6				
Redox (mV)	79.9				
DO (mg/L)	13.53				
DO (%)	103.7				
Turbidity (NTU)	2.28				
Appearance & Odour (Clear, Silty, HC odours, etc.)	Clear, brown, slightly silty				
Field Measurements Log					
YSI Logged?	☒ Yes ☐ No				
Time Logged on YSI	(hh:mm) 18:32				
Time Synced on YSI	☒ Yes ☐ No Actual Time (hh:mm) _____				
Unit Used	☒ Pro Plus ☐ Pen Unit Other _____				

Sample Site (Con't): E4

Sample Date (Con't): Sept. 30/2015

Bottle Type	Parameters Analyzed	Sample Treatment ☒	Preservative Added ☒	Collected ☒	No. Bottles	Comments (note number of bottles in duplicate)
500 ml (plastic)	General Chemistry	-	-	☒	1	Date/Time: <u>Oct. 2/19:10</u>
125 ml (plastic)	Total Metals	-	☒ Nitric Acid	☒	1	<u>Sept. 30/18:25</u>
125 ml (plastic)	Dissolved Metals	☒ Field Filtered	☒ Nitric Acid	☒	1	
40 ml (glass)	Total Mercury		☒ Hydrochloric Acid	☒	1	
40 ml (glass)	Dissolved Mercury	☒ Field Filtered	☒ Hydrochloric Acid	☒	1	
125 ml (amber)	Ammonia (NH3)		☒ Sulfuric Acid	☒	1	
125 ml (amber)	Dissolved Organic Carbon (DOC)	☒ Field Filtered	☒ Sulfuric Acid	☒	1	
125 ml (plastic)	Total Speciated Chromium – Cr(VI) and Cr(III)		☒ NaOH	☒	1	
125 ml (plastic)	Dissolved Speciated Chromium – Cr(VI) and Cr(III)	☒ Field Filtered	☒ NaOH	☒	1	
				☐		

General Notes:

SURFACE WATER SAMPLE COLLECTION SHEET

Sample Site:	E7	Project Number:	15-208	Date:	Oct 1.
UTM Coordinates	Z7E 0519407N 7142040	Client:	Yukon Government (AAM)	Samplers:	AN/HCH
Waypoint	GPS AN Name E7	Project Name:	Clinton Creek Surface Water Monitoring Program	Weather/Temperature:	Clear ~ -1 °C
Photos	Cam AN Nos. 335-338				
Sample Time (24h)	17:45				
Field Blank Collected:	☐ Yes Name _____	Duplicate Collected:	☐ Yes Name _____		
Field Parameter Measurements (note units if different than those stated)			Site Sketch		
Sample Depth (m)	-0.10m				
Temperature (°C)	2.0				
pH (pH Units)	7.91				
Cond. (µs/cm)	442.2				
Specific Cond. (µs/cm)	789.4				
Redox (mV)	144.5				
DO (mg/L)	14.38				
DO (%)	104.0				
Turbidity (NTU)	1.43				
Appearance & Odour (Clear, Silty, HC odours, etc.)	Clear, slightly tea colored.				
Field Measurements Log					
YSI Logged?	☒ Yes ☐ No				
Time Logged on YSI	(hh:mm) 18:01				
Time Synced on YSI	☒ Yes ☐ No Actual Time (hh:mm) _____				
Unit Used	☒ Pro Plus ☐ Pen Unit Other _____				

Sample Site (Con't): E7

Sample Date (Con't): Oct. 1, 2015

Bottle Type	Parameters Analyzed	Sample Treatment ☒	Preservative Added ☒	Collected ☒	No. Bottles	Comments (note number of bottles in duplicate)
500 ml (plastic)	General Chemistry	-	-	☐		Date/Time: Oct 3/16:45
125 ml (plastic)	Total Metals	-	☒ Nitric Acid	☒		Oct 1
125 ml (plastic)	Dissolved Metals	☒ Field Filtered	☒ Nitric Acid	☒		
40 ml (glass)	Total Mercury		☒ Hydrochloric Acid	☒		
40 ml (glass)	Dissolved Mercury	☒ Field Filtered	☒ Hydrochloric Acid	☒		
125 ml (amber)	Ammonia (NH3)		☒ Sulfuric Acid	☒		
125 ml (amber)	Dissolved Organic Carbon (DOC)	☒ Field Filtered	☒ Sulfuric Acid	☒		
125 ml (plastic)	Total Speciated Chromium – Cr(VI) and Cr(III)		☒ NaOH	☒		
125 ml (plastic)	Dissolved Speciated Chromium – Cr(VI) and Cr(III)	☒ Field Filtered	☒ NaOH	☒		
				☐		

General Notes:

SURFACE WATER SAMPLE COLLECTION SHEET

Sample Site:	E8	Project Number:	15-208	Date:	Oct 1
UTM Coordinates	Z 7 E 0519456 N 7142792	Client:	Yukon Government (AAM)	Samplers:	AN+CH
Waypoint	GPS ~~AN~~ Name E8	Project Name:	Clinton Creek Surface Water Monitoring Program	Weather/Temperature:	clear -1°C
Photos	Cam ~~AN~~ Nos. 283-286				
Sample Time (24h)	17:10				
Field Blank Collected:	☐ Yes Name _____	Duplicate Collected:	☐ Yes Name _____		
Field Parameter Measurements (note units if different than those stated)			Site Sketch		
Sample Depth (m)	- 0.10 m	Gravel Bar 40 mile ← ← sample point Bank E8 sign Road			
Temperature (°C)	1.9				
pH (pH Units)	8.11				
Cond. (µs/cm)	141.6				
Specific Cond. (µs/cm)	255.7				
Redox (mV)	138.0				
DO (mg/L)	14.94				
DO (%)	107.6				
Turbidity (NTU)	1.53				
Appearance & Odour (Clear, Silty, HC odours, etc.)	Clear,				
Field Measurements Log					
YSI Logged?	☒ Yes ☐ No				
Time Logged on YSI	(hh:mm) 17:19				
Time Synced on YSI	☒ Yes ☐ No Actual Time (hh:mm) _____				
Unit Used	☒ Pro Plus ☐ Pen Unit Other _____				

Sample Site (Con't): E8

Sample Date (Con't): Oct 1 / 2015

Bottle Type	Parameters Analyzed	Sample Treatment ☒	Preservative Added ☒	Collected ☒	No. Bottles	Comments (note number of bottles in duplicate)
500 ml (plastic)	General Chemistry	-	-	☐		Date/Time: <u>Oct. 3 / 16:25</u>
125 ml (plastic)	Total Metals	-	☒ Nitric Acid	☒		<u>Oct 1</u>
125 ml (plastic)	Dissolved Metals	☒ Field Filtered	☒ Nitric Acid	☒		
40 ml (glass)	Total Mercury		☒ Hydrochloric Acid	☒		
40 ml (glass)	Dissolved Mercury	☒ Field Filtered	☒ Hydrochloric Acid	☒		
125 ml (amber)	Ammonia (NH3)		☒ Sulfuric Acid	☒		
125 ml (amber)	Dissolved Organic Carbon (DOC)	☒ Field Filtered	☒ Sulfuric Acid	☒		
125 ml (plastic)	Total Speciated Chromium – Cr(VI) and Cr(III)		☒ NaOH	☒		
125 ml (plastic)	Dissolved Speciated Chromium – Cr(VI) and Cr(III)	☒ Field Filtered	☒ NaOH	☒		
				☐		

General Notes:

SURFACE WATER SAMPLE COLLECTION SHEET

Sample Site:	GWCC-1	Project Number:	15-208	Date:	Oct 1
UTM Coordinates	ZZE 0513902N 7146953	Client:	Yukon Government (AAM)	Samplers:	AN+CH
Waypoint	GPS AN Name GWCC1	Project Name:	Clinton Creek Surface Water Monitoring Program	Weather/Temperature:	Sunny ≈ 0°C
Photos	Cam AN Nos. 273-274				
Sample Time (24h)	15:05				
Field Blank Collected:	☐ Yes Name _____	Duplicate Collected:	☐ Yes Name _____		
Field Parameter Measurements (note units if different than those stated)			Site Sketch		
Sample Depth (m)	-0.10m	GWCC-1 boulders and scarp Pond			
Temperature (°C)	3.5				
pH (pH Units)	7.43				
Cond. (µs/cm)	1585				
Specific Cond. (µs/cm)	2688				
Redox (mV)	181.4				
DO (mg/L)	4.89				
DO (%)	37.0				
Turbidity (NTU)	0.11				
Appearance & Odour (Clear, Silty, HC odours, etc.)	Clear				
Field Measurements Log					
YSI Logged?	☒ Yes ☐ No				
Time Logged on YSI	(hh:mm) 15:12				
Time Synced on YSI	☒ Yes ☐ No Actual Time (hh:mm) _____				
Unit Used	☒ Pro Plus ☐ Pen Unit Other _____				

Sample Site (Con't): GWCC-1

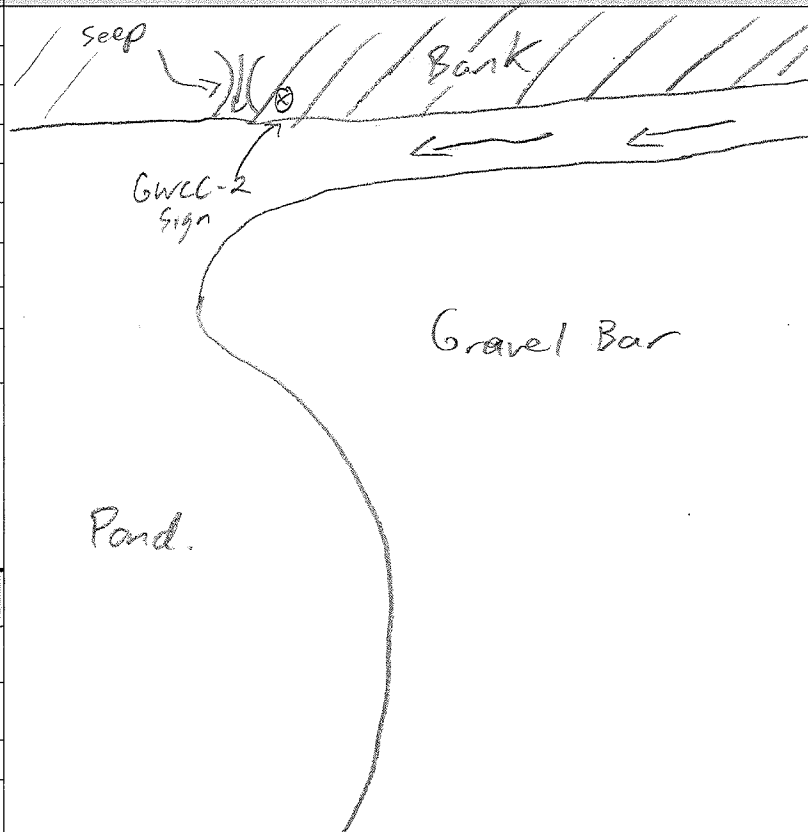
Sample Date (Con't): Oct 1.

Bottle Type	Parameters Analyzed	Sample Treatment ☒	Preservative Added ☒	Collected ☒	No. Bottles	Comments (note number of bottles in duplicate)
500 ml (plastic)	General Chemistry	-	-	☐		Date/Time: Oct 2 / 18:40
125 ml (plastic)	Total Metals	-	☒ Nitric Acid	☒		Oct 1 / 15:05
125 ml (plastic)	Dissolved Metals	☒ Field Filtered	☒ Nitric Acid	☒		
40 ml (glass)	Total Mercury		☒ Hydrochloric Acid	☒		
40 ml (glass)	Dissolved Mercury	☒ Field Filtered	☒ Hydrochloric Acid	☒		
125 ml (amber)	Ammonia (NH3)		☒ Sulfuric Acid	☒		
125 ml (amber)	Dissolved Organic Carbon (DOC)	☒ Field Filtered	☒ Sulfuric Acid	☒		
125 ml (plastic)	Total Speciated Chromium – Cr(VI) and Cr(III)		☒ NaOH	☒		
125 ml (plastic)	Dissolved Speciated Chromium – Cr(VI) and Cr(III)	☒ Field Filtered	☒ NaOH	☒		
				☐		

General Notes:

SURFACE WATER SAMPLE COLLECTION SHEET

Sample Site:	GWCC-2	Project Number:	15-208	Date:	Oct 1
UTM Coordinates	Z 7 E 0513903 N 7146968	Client:	Yukon Government (AAM)	Samplers:	AN+CH
Waypoint	GPS AN Name GWCC2	Project Name:	Clinton Creek Surface Water Monitoring Program	Weather/Temperature:	Sunny ~0°C
Photos	Cam AN Nos. 271-272				
Sample Time (24h)	14:45				
Field Blank Collected:	☐ Yes Name _____	Duplicate Collected:	☐ Yes Name _____		
Field Parameter Measurements (note units if different than those stated)			Site Sketch		
Sample Depth (m)	From cascade.				
Temperature (°C)	5.0				
pH (pH Units)	7.78				
Cond. (µs/cm)	1258				
Specific Cond. (µs/cm)	2036				
Redox (mV)	165.3				
DO (mg/L)	8.46				
DO (%)	66.6				
Turbidity (NTU)	~~0.1~~ 2.90				
Appearance & Odour (Clear, Silty, HC odours, etc.)	Clear. some algal growth.				
Field Measurements Log					
YSI Logged?	☒ Yes ☐ No				
Time Logged on YSI	(hh:mm) 14:49				
Time Synced on YSI	☒ Yes ☐ No Actual Time (hh:mm) _____				
Unit Used	☒ Pro Plus ☐ Pen Unit Other _____				



Sample Site (Con't): GWCC-2

Sample Date (Con't): Oct 1, 2015

Bottle Type	Parameters Analyzed	Sample Treatment ☒	Preservative Added ☒	Collected ☒	No. Bottles	Comments (note number of bottles in duplicate)
500 ml (plastic)	General Chemistry	-	-	☐		Date/Time: Oct 2/18:35
125 ml (plastic)	Total Metals	-	☒ Nitric Acid	☒		Oct 1/14:45.
125 ml (plastic)	Dissolved Metals	☒ Field Filtered	☒ Nitric Acid	☒		
40 ml (glass)	Total Mercury		☒ Hydrochloric Acid	☒		
40 ml (glass)	Dissolved Mercury	☒ Field Filtered	☒ Hydrochloric Acid	☒		
125 ml (amber)	Ammonia (NH3)		☒ Sulfuric Acid	☒		
125 ml (amber)	Dissolved Organic Carbon (DOC)	☒ Field Filtered	☒ Sulfuric Acid	☒		
125 ml (plastic)	Total Speciated Chromium – Cr(VI) and Cr(III)		☒ NaOH	☒		
125 ml (plastic)	Dissolved Speciated Chromium – Cr(VI) and Cr(III)	☒ Field Filtered	☒ NaOH	☒		✓
				☐		

General Notes:

SURFACE WATER SAMPLE COLLECTION SHEET

Sample Site:	GWCC-3	Project Number:	15-208	Date:	Oct 1
UTM Coordinates	Z7 E 0513882 N 7147041	Client:	Yukon Government (AAM)	Samplers:	AN + CH
Waypoint	GPS AN Name	Project Name:	Clinton Creek Surface Water Monitoring Program	Weather/Temperature:	Partly cloudy ~ -2°C
Photos	Cam AN Nos. 269-270				
Sample Time (24h)	13:50				
Field Blank Collected:	☐ Yes Name	Duplicate Collected:	☒ Yes Name Dup-2		
Field Parameter Measurements (note units if different than those stated)			Site Sketch		
Sample Depth (m)	N/A.				
Temperature (°C)	6.9				
pH (pH Units)	7.60				
Cond. (µs/cm)	798				
Specific Cond. (µs/cm)	1221				
Redox (mV)	165.4				
DO (mg/L)	4.48				
DO (%)	36.7				
Turbidity (NTU)	0.14				
Appearance & Odour (Clear, Silty, HC odours, etc.)	Heavy vegetation detritus. Clear.				
Field Measurements Log					
YSI Logged?	☒ Yes ☐ No				
Time Logged on YSI	(hh:mm) 14:03				
Time Synced on YSI	☒ Yes ☐ No Actual Time (hh:mm)				
Unit Used	☒ Pro Plus ☐ Pen Unit Other				

Sample Site (Con't): GWCC-3

Sample Date (Con't): Oct 1, 2015

Bottle Type	Parameters Analyzed	Sample Treatment ☒	Preservative Added ☒	Collected ☒	No. Bottles	Comments (note number of bottles in duplicate)
500 ml (plastic)	General Chemistry	-	-	☐		Date/Time: Oct 2/18:30
125 ml (plastic)	Total Metals	-	☒ Nitric Acid	☒		Oct 1/13:50
125 ml (plastic)	Dissolved Metals	☒ Field Filtered	☒ Nitric Acid	☒		Oct 1
40 ml (glass)	Total Mercury		☒ Hydrochloric Acid	☒		↓
40 ml (glass)	Dissolved Mercury	☒ Field Filtered	☒ Hydrochloric Acid	☒		
125 ml (amber)	Ammonia (NH3)		☒ Sulfuric Acid	☒		
125 ml (amber)	Dissolved Organic Carbon (DOC)	☒ Field Filtered	☒ Sulfuric Acid	☒		
125 ml (plastic)	Total Speciated Chromium – Cr(VI) and Cr(III)		☒ NaOH	☒		
125 ml (plastic)	Dissolved Speciated Chromium – Cr(VI) and Cr(III)	☒ Field Filtered	☒ NaOH	☒		
				☐		

General Notes:

Dup 2 collected (full set as above)

Due to low flow water was first collected in clean, new 1 litre bottle and then distributed.

SURFACE WATER SAMPLE COLLECTION SHEET

Sample Site:	GWCC-4	Project Number:	15-208	Date:	Oct. 1
UTM Coordinates	Z 7 E 0513874 N 7147055	Client:	Yukon Government (AAM)	Samplers:	AN & CH
Waypoint	GPS AN Name GWCC4	Project Name:	Clinton Creek Surface Water Monitoring Program	Weather/Temperature:	Partly Cloudy ~ -2°C
Photos	Cam AN Nos. 267-268				
Sample Time (24h)	13:25	Duplicate Collected:	☐ Yes Name _____		
Field Blank Collected:	☐ Yes Name _____				
Field Parameter Measurements (note units if different than those stated)			Site Sketch		
Sample Depth (m)	-0.05	The sketch shows a cross-section of a creek bank. A dashed line labeled 'Access' leads from the bottom right towards the creek. On the bank, there are 'boulders around GW stop'. A 'GWCC-4 sign' is marked on the bank. Arrows indicate the direction of the creek flow, labeled 'Clinton Creek'.			
Temperature (°C)	8.2				
pH (pH Units)	7.80				
Cond. (µs/cm)	546				
Specific Cond. (µs/cm)	804				
Redox (mV)	161.1				
DO (mg/L)	2.88				
DO (%)	24.3				
Turbidity (NTU)	0.21				
Appearance & Odour (Clear, Silty, HC odours, etc.)	Clear. High volume vegetation debris				
Field Measurements Log					
YSI Logged?	☒ Yes ☐ No				
Time Logged on YSI	(hh:mm) 13:32				
Time Synced on YSI	☒ Yes ☐ No Actual Time (hh:mm) _____				
Unit Used	☒ Pro Plus ☐ Pen Unit Other _____				

Sample Site (Con't): GWCC-4

Sample Date (Con't): Oct. 1/2015

Bottle Type	Parameters Analyzed	Sample Treatment ☒	Preservative Added ☒	Collected ☒	No. Bottles	Comments (note number of bottles in duplicate)
500 ml (plastic)	General Chemistry	-	-	☐	1	Date/Time: <u>Oct. 2/18:45</u>
125 ml (plastic)	Total Metals	-	☒ Nitric Acid	☒	1	<u>Oct 1 17:25</u>
125 ml (plastic)	Dissolved Metals	☒ Field Filtered	☒ Nitric Acid	☒	1	
40 ml (glass)	Total Mercury		☒ Hydrochloric Acid	☐	1	
40 ml (glass)	Dissolved Mercury	☒ Field Filtered	☒ Hydrochloric Acid	☒	1	
125 ml (amber)	Ammonia (NH ₃)		☒ Sulfuric Acid	☒	1	
125 ml (amber)	Dissolved Organic Carbon (DOC)	☒ Field Filtered	☒ Sulfuric Acid	☒	1	
125 ml (plastic)	Total Speciated Chromium – Cr(VI) and Cr(III)		☒ NaOH	☒	1	
125 ml (plastic)	Dissolved Speciated Chromium – Cr(VI) and Cr(III)	☒ Field Filtered	☒ NaOH	☒	1	
				☐		

General Notes:

Access from across Clinton Creek is ideal. Requires waders.

SURFACE WATER SAMPLE COLLECTION SHEET

Sample Site:	GWCC-5	Project Number:	15-208	Date:	Sept. 30, 2015
UTM Coordinates	Z7 E 0513981 N 7147124	Client:	Yukon Government (AAM)	Samplers:	A.N. & CH
Waypoint	GPS AN Name GWCC5	Project Name:	Clinton Creek Surface Water Monitoring Program	Weather/Temperature:	Overcast 0°C
Photos	Cam AN Nos. 237-239				
Sample Time (24h)	13:30				
Field Blank Collected:	☐ Yes Name _____	Duplicate Collected:	☐ Yes Name _____		
Field Parameter Measurements (note units if different than those stated)			Site Sketch		
Sample Depth (m)	0.02	Road. Access Sign (GWCC-5) Pond (heavy algal growth)			
Temperature (°C)	6.3				
pH (pH Units)	6.18				
Cond. (µs/cm)	596				
Specific Cond. (µs/cm)	927				
Redox (mV)	155.2				
DO (mg/L)	3.73				
DO (%)	30.0				
Turbidity (NTU)	0.28				
Appearance & Odour (Clear, Silty, HC odours, etc.)	Clear. Heavy algal growth.				
Field Measurements Log					
YSI Logged?	☒ Yes ☐ No				
Time Logged on YSI	(hh:mm) 13:41				
Time Synced on YSI	☒ Yes ☐ No Actual Time (hh:mm) _____				
Unit Used	☒ Pro Plus ☐ Pen Unit Other _____				

Sample Site (Con't): GWCC-5

Sample Date (Con't): Sept 30, 2015

Bottle Type	Parameters Analyzed	Sample Treatment ☒	Preservative Added ☒	Collected ☒	No. Bottles	Comments (note number of bottles in duplicate)
500 ml (plastic)	General Chemistry	-	-	☒	1	Date/Time: Oct. 2 / 18:55
125 ml (plastic)	Total Metals	-	☒ Nitric Acid	☒	1	Sept. 30 / 13:30
125 ml (plastic)	Dissolved Metals	☒ Field Filtered	☒ Nitric Acid	☒	1	
40 ml (glass)	Total Mercury		☒ Hydrochloric Acid	☒	1	
40 ml (glass)	Dissolved Mercury	☒ Field Filtered	☒ Hydrochloric Acid	☒	1	
125 ml (amber)	Ammonia (NH3)		☒ Sulfuric Acid	☒	1	
125 ml (amber)	Dissolved Organic Carbon (DOC)	☒ Field Filtered	☒ Sulfuric Acid	☒	1	
125 ml (plastic)	Total Speciated Chromium – Cr(VI) and Cr(III)		☒ NaOH	☒	1	
125 ml (plastic)	Dissolved Speciated Chromium – Cr(VI) and Cr(III)	☒ Field Filtered	☒ NaOH	☒	1	
				☐		

General Notes:

Cleared algae from stream prior to hydrology

Photos

US = 237

DS = 238

Across = 239

SURFACE WATER SAMPLE COLLECTION SHEET

Sample Site:	HL	Project Number:	15-208	Date:	Oct 1
UTM Coordinates	Z 7 E 0512864 N 7147424	Client:	Yukon Government (AAM)	Samplers:	AN+CH
Waypoint	GPS <u>AN</u> Name <u>HL</u>	Project Name:	Clinton Creek Surface Water Monitoring Program	Weather/Temperature:	Overcast ~ -5°C
Photos	Cam <u>AN</u> Nos. <u>287-290</u>				
Sample Time (24h)	9:30	Duplicate Collected:	☐ Yes Name _____		
Field Blank Collected:	☐ Yes Name _____				
Field Parameter Measurements (note units if different than those stated)			Site Sketch		
Sample Depth (m)	0.10m				
Temperature (°C)	3.0				
pH (pH Units)	7.90				
Cond. (µs/cm)	333.3				
Specific Cond. (µs/cm)	575.6				
Redox (mV)	132.5				
DO (mg/L)	11.05				
DO (%)	82.1				
Turbidity (NTU)	0.90				
Appearance & Odour (Clear, Silty, HC odours, etc.)	Clear slightly tea coloured				
Field Measurements Log			← Hudgman Lake.		
YSI Logged?	☒ Yes ☐ No				
Time Logged on YSI	(hh:mm) 9:35				
Time Synced on YSI	☒ Yes ☐ No Actual Time (hh:mm) _____				
Unit Used	☒ Pro Plus ☐ Pen Unit Other _____				

Sample Site (Con't):

HL

Sample Date (Con't):

Oct. 2, 2015

Bottle Type	Parameters Analyzed	Sample Treatment ☒	Preservative Added ☒	Collected ☒	No. Bottles	Comments (note number of bottles in duplicate)
500 ml (plastic)	General Chemistry	-	-	☒	1	Date/Time:
125 ml (plastic)	Total Metals	-	☒ Nitric Acid	☒	1	
125 ml (plastic)	Dissolved Metals	☐ Field Filtered	☐ Nitric Acid	☐		
40 ml (glass)	Total Mercury		☒ Hydrochloric Acid	☒	1	
40 ml (glass)	Dissolved Mercury	☐ Field Filtered	☐ Hydrochloric Acid	☐		
125 ml (amber)	Ammonia (NH3)		☐ Sulfuric Acid	☐		
125 ml (amber)	Dissolved Organic Carbon (DOC)	☐ Field Filtered	☐ Sulfuric Acid	☐		
125 ml (plastic)	Total Speciated Chromium – Cr(VI) and Cr(III)		☐ NaOH	☐		
125 ml (plastic)	Dissolved Speciated Chromium – Cr(VI) and Cr(III)	☐ Field Filtered	☐ NaOH	☐		
1000 mL	Asbestos			☒	1	

General Notes:

Sampled for:
Asbestos
General
Total Metals
Total Mercury

SURFACE WATER SAMPLE COLLECTION SHEET

Sample Site:	R1	Project Number:	15-208	Date:	Oct 2
UTM Coordinates	ZZE 0510598 N 7147491	Client:	Yukon Government (AAM)	Samplers:	AN+CH
Waypoint	GPS AN Name R1	Project Name:	Clinton Creek Surface Water Monitoring Program	Weather/Temperature:	Overcast 2-1°C
Photos	Cam AN Nos. 305-309				
Sample Time (24h)	14:45	Duplicate Collected:	☐ Yes Name _____		
Field Blank Collected:	☐ Yes Name _____				
Field Parameter Measurements (note units if different than those stated)			Site Sketch		
Sample Depth (m)	0.10				
Temperature (°C)	0.1				
pH (pH Units)	7.11				
Cond. (µs/cm)	392.3				
Specific Cond. (µs/cm)	749.0				
Redox (mV)	141.6				
DO (mg/L)	14.60				
DO (%)	100.3				
Turbidity (NTU)	1.28				
Appearance & Odour (Clear, Silty, HC odours, etc.)	Clear				
Field Measurements Log					
YSI Logged?	☒ Yes ☐ No				
Time Logged on YSI	(hh:mm) 14:54				
Time Synced on YSI	☒ Yes ☐ No Actual Time (hh:mm) _____				
Unit Used	☒ Pro Plus ☐ Pen Unit Other _____				

Sample Site (Con't): R1

Sample Date (Con't): Oct 2, 2015

Bottle Type	Parameters Analyzed	Sample Treatment ☒	Preservative Added ☒	Collected ☒	No. Bottles	Comments (note number of bottles in duplicate)
500 ml (plastic)	General Chemistry	-	-	☒	1	Date/Time: <u>Oct 2 14:45</u>
125 ml (plastic)	Total Metals	-	☒ Nitric Acid	☒	1	↓
125 ml (plastic)	Dissolved Metals	☒ Field Filtered	☒ Nitric Acid	☒	1	
40 ml (glass)	Total Mercury		☒ Hydrochloric Acid	☒	1	
40 ml (glass)	Dissolved Mercury	☒ Field Filtered	☒ Hydrochloric Acid	☒	1	
125 ml (amber)	Ammonia (NH3)		☒ Sulfuric Acid	☒	1	
125 ml (amber)	Dissolved Organic Carbon (DOC)	☒ Field Filtered	☒ Sulfuric Acid	☒	1	
125 ml (plastic)	Total Speciated Chromium -- Cr(VI) and Cr(III)		☒ NaOH	☒	1	
125 ml (plastic)	Dissolved Speciated Chromium -- Cr(VI) and Cr(III)	☒ Field Filtered	☒ NaOH	☒	1	
				☐		

General Notes:

SURFACE WATER SAMPLE COLLECTION SHEET

Sample Site:	R2	Project Number:	15-208	Date:	Oct 2, 2015
UTM Coordinates	Z 7 E 0512027 N 7148065	Client:	Yukon Government (AAM)	Samplers:	AN, CH
Waypoint	GPS AN Name R2	Project Name:	Clinton Creek Surface Water Monitoring Program	Weather/Temperature:	Overcast ~ -2°C
Photos	Cam AN Nos. 291-294				
Sample Time (24h)	10:15	Duplicate Collected:	☐ Yes Name _____		
Field Blank Collected:	☐ Yes Name _____				
Field Parameter Measurements (note units if different than those stated)			Site Sketch		
Sample Depth (m)	-0.10 m				
Temperature (°C)	0.0				
pH (pH Units)	7.96				
Cond. (µs/cm)	290.3				
Specific Cond. (µs/cm)	555.8				
Redox (mV)	58.5				
DO (mg/L)	14.49				
DO (%)	99.4				
Turbidity (NTU)	0.74				
Appearance & Odour (Clear, Silty, HC odours, etc.)	Clear				
Field Measurements Log					
YSI Logged?	☒ Yes ☐ No				
Time Logged on YSI	(hh:mm) 11:07				
Time Synced on YSI	☒ Yes ☐ No Actual Time (hh:mm) _____				
Unit Used	☒ Pro Plus ☐ Pen Unit Other _____				

Sample Site (Con't): Oct 2, 2015

Sample Date (Con't): R2

Bottle Type	Parameters Analyzed	Sample Treatment ☒	Preservative Added ☒	Collected ☒	No. Bottles	Comments (note number of bottles in duplicate)
500 ml (plastic)	General Chemistry	-	-	☒		Date/Time: <u>Oct 2, 2015</u>
125 ml (plastic)	Total Metals	-	☒ Nitric Acid	☒		
125 ml (plastic)	Dissolved Metals	☒ Field Filtered	☒ Nitric Acid	☒		
40 ml (glass)	Total Mercury		☒ Hydrochloric Acid	☒		
40 ml (glass)	Dissolved Mercury	☒ Field Filtered	☒ Hydrochloric Acid	☒		
125 ml (amber)	Ammonia (NH ₃)		☒ Sulfuric Acid	☒		
125 ml (amber)	Dissolved Organic Carbon (DOC)	☒ Field Filtered	☒ Sulfuric Acid	☒		
125 ml (plastic)	Total Speciated Chromium – Cr(VI) and Cr(III)		☒ NaOH	☒		
125 ml (plastic)	Dissolved Speciated Chromium – Cr(VI) and Cr(III)	☒ Field Filtered	☒ NaOH	☒		
				☒		

General Notes:

SURFACE WATER SAMPLE COLLECTION SHEET

Sample Site:	R3	Project Number:	15-208	Date:	Oct 3, 2015
UTM Coordinates	Z7E 0513953 N 748679	Client:	Yukon Government (AAM)	Samplers:	AN/HCH
Waypoint	GPS AN Name R3	Project Name:	Clinton Creek Surface Water Monitoring Program	Weather/Temperature:	Overcast snowing ~ -20C
Photos	Cam AN Nos. 323-331				
Sample Time (24h)	14:45				
Field Blank Collected:	☐ Yes Name _____	Duplicate Collected:	☐ Yes Name _____		
Field Parameter Measurements (note units if different than those stated)			Site Sketch		
Sample Depth (m)	-0.10m				
Temperature (°C)	0.0				
pH (pH Units)	6.67				
Cond. (µs/cm)	367.6				
Specific Cond. (µs/cm)	703.9				
Redox (mV)	143.4				
DO (mg/L)	15.20				
DO (%)	104.1				
Turbidity (NTU)	2.16				
Appearance & Odour (Clear, Silty, HC odours, etc.)	Clear				
Field Measurements Log					
YSI Logged?	☒ Yes ☐ No				
Time Logged on YSI	(hh:mm) 14:48				
Time Synced on YSI	☒ Yes ☐ No Actual Time (hh:mm) _____				
Unit Used	☒ Pro Plus ☐ Pen Unit Other _____				

Vegetation.

R3 Sign

To Tailings.

Sample Site (Con't): R3

Sample Date (Con't): Oct. 3/2015

Bottle Type	Parameters Analyzed	Sample Treatment ☒	Preservative Added ☒	Collected ☒	No. Bottles	Comments (note number of bottles in duplicate)
500 ml (plastic)	General Chemistry	-	-	☒	1	Date/Time: <u>Oct. 3/2015</u>
125 ml (plastic)	Total Metals	-	☒ Nitric Acid	☒	1	<u>@ 14:45</u>
125 ml (plastic)	Dissolved Metals	☒ Field Filtered	☒ Nitric Acid	☒	1	
40 ml (glass)	Total Mercury		☒ Hydrochloric Acid	☒	1	
40 ml (glass)	Dissolved Mercury	☒ Field Filtered	☒ Hydrochloric Acid	☒	1	
125 ml (amber)	Ammonia (NH ₃)		☒ Sulfuric Acid	☒	1	
125 ml (amber)	Dissolved Organic Carbon (DOC)	☒ Field Filtered	☒ Sulfuric Acid	☒	1	
125 ml (plastic)	Total Speciated Chromium – Cr(VI) and Cr(III)		☒ NaOH	☒	1	
125 ml (plastic)	Dissolved Speciated Chromium – Cr(VI) and Cr(III)	☒ Field Filtered	☒ NaOH	☒	1	
				☐		

General Notes:

SURFACE WATER SAMPLE COLLECTION SHEET

Sample Site:	R4	Project Number:	15-208	Date:	Sept. 30
UTM Coordinates	27E 0515982N 7145352	Client:	Yukon Government (AAM)	Samplers:	AN+CH
Waypoint	GPS AN Name R4	Project Name:	Clinton Creek Surface Water Monitoring Program	Weather/Temperature:	Overcast 20°C
Photos	Cam AN Nos. 252-254				
Sample Time (24h)	17:30	Duplicate Collected:	☐ Yes Name _____		
Field Blank Collected:	☐ Yes Name _____				
Field Parameter Measurements (note units if different than those stated)			Site Sketch		
Sample Depth (m)	0.10m				
Temperature (°C)	0.4				
pH (pH Units)	7.98				
Cond. (µs/cm)	264.9				
Specific Cond. (µs/cm)	500.3				
Redox (mV)	142.2				
DO (mg/L)	15.76				
DO (%)	109.1				
Turbidity (NTU)	13.2				
Appearance & Odour (Clear, Silty, HC odours, etc.)	clear, slightly brown/silty.				
Field Measurements Log					
YSI Logged?	☒ Yes ☐ No				
Time Logged on YSI	(hh:mm) 17:28				
Time Synced on YSI	☒ Yes ☐ No Actual Time (hh:mm) _____				
Unit Used	☐ Pro Plus ☐ Pen Unit Other _____				

Sample Site (Con't): R4

Sample Date (Con't): Sept. 30, 2015

Bottle Type	Parameters Analyzed	Sample Treatment ☒	Preservative Added ☒	Collected ☒	No. Bottles	Comments (note number of bottles in duplicate)
500 ml (plastic)	General Chemistry	-	-	☒	1	Date/Time: Oct 2/19:20
125 ml (plastic)	Total Metals	-	☒ Nitric Acid	☒	1	Sept 30/17:30
125 ml (plastic)	Dissolved Metals	☒ Field Filtered	☒ Nitric Acid	☒	1	↓
40 ml (glass)	Total Mercury		☒ Hydrochloric Acid	☒	1	
40 ml (glass)	Dissolved Mercury	☒ Field Filtered	☒ Hydrochloric Acid	☒	1	
125 ml (amber)	Ammonia (NH3)		☒ Sulfuric Acid	☒	1	
125 ml (amber)	Dissolved Organic Carbon (DOC)	☒ Field Filtered	☒ Sulfuric Acid	☒	1	
125 ml (plastic)	Total Speciated Chromium -- Cr(VI) and CR(III)		☒ NaOH	☒	1	↓
125 ml (plastic)	Dissolved Speciated Chromium -- Cr(VI) and CR(III)	☒ Field Filtered	☒ NaOH	☒	1	
				☐		

General Notes:

SURFACE WATER SAMPLE COLLECTION SHEET

Sample Site:	R6	Project Number:	15-208	Date:	Oct. 3/2015
UTM Coordinates	Z7 E 0519485 N 7141741	Client:	Yukon Government (AAM)	Samplers:	AN, CH.
Waypoint	GPS <u>AN</u> Name <u>R6</u>	Project Name:	Clinton Creek Surface Water Monitoring Program	Weather/Temperature:	Snowing ~ -40C.
Photos	Cam <u>AN</u> Nos. <u>332-334</u>				
Sample Time (24h)	17:00	Duplicate Collected:	☐ Yes Name _____		
Field Blank Collected:	☐ Yes Name _____				
Field Parameter Measurements (note units if different than those stated)			Site Sketch		
Sample Depth (m)	0.10m				
Temperature (°C)	0.2				
pH (pH Units)	6.63				
Cond. (µs/cm)	1182				
Specific Cond. (µs/cm)	224.7				
Redox (mV)	144.5				
DO (mg/L)	17.67				
DO (%)	100.9				
Turbidity (NTU)	1.27				
Appearance & Odour (Clear, Silty, HC odours, etc.)	Clear. Ice flows in River.				
Field Measurements Log					
YSI Logged?	☒ Yes ☐ No				
Time Logged on YSI	(hh:mm) 17:11				
Time Synced on YSI	☒ Yes ☐ No Actual Time (hh:mm) _____				
Unit Used	☒ Pro Plus ☐ Pen Unit Other _____				

Sample Site (Con't):

R6

Sample Date (Con't):

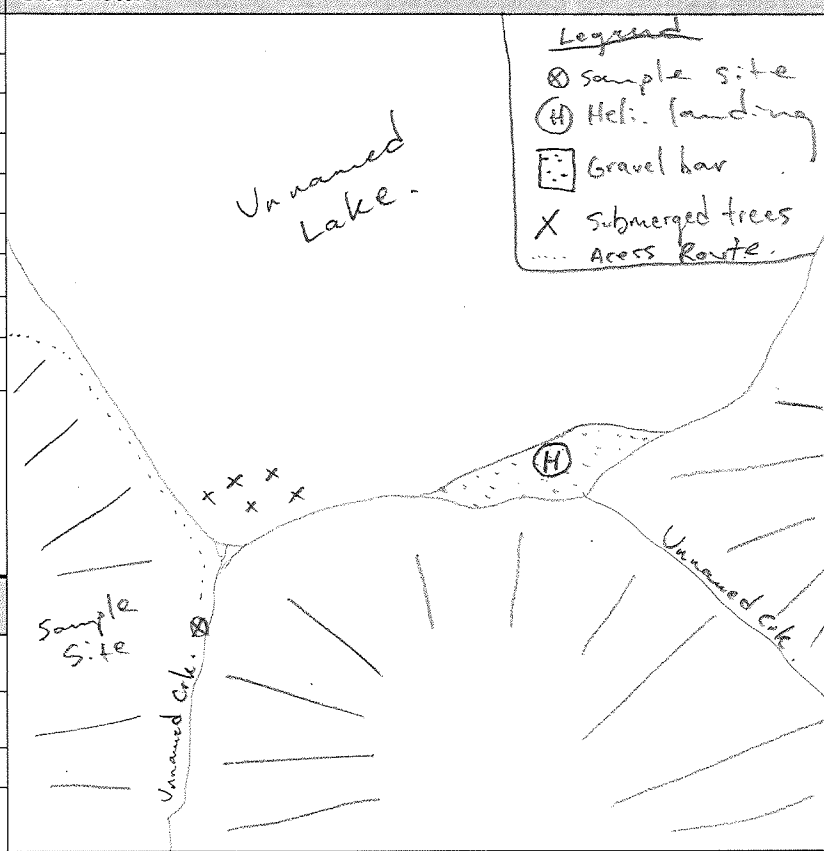
0-1.3/2015

Bottle Type	Parameters Analyzed	Sample Treatment ☒	Preservative Added ☒	Collected ☒	No. Bottles	Comments (note number of bottles in duplicate)
500 ml (plastic)	General Chemistry	-	-	☒	1	Date/Time: 0-1.3/2015
125 ml (plastic)	Total Metals	-	☒ Nitric Acid	☒	1	@17:00
125 ml (plastic)	Dissolved Metals	☒ Field Filtered	☒ Nitric Acid	☒	1	
40 ml (glass)	Total Mercury		☒ Hydrochloric Acid	☒	1	
40 ml (glass)	Dissolved Mercury	☒ Field Filtered	☒ Hydrochloric Acid	☒	1	
125 ml (amber)	Ammonia (NH3)		☒ Sulfuric Acid	☒	1	
125 ml (amber)	Dissolved Organic Carbon (DOC)	☒ Field Filtered	☒ Sulfuric Acid	☒	1	
125 ml (plastic)	Total Speciated Chromium – Cr(VI) and CR(III)		☒ NaOH	☒	1	
125 ml (plastic)	Dissolved Speciated Chromium – Cr(VI) and CR(III)	☒ Field Filtered	☒ NaOH	☒	1	
				☐		

General Notes:

SURFACE WATER SAMPLE COLLECTION SHEET

Sample Site:	R7	Project Number:	15-208	Date:	Oct 3/2015
UTM Coordinates	Z7 E 0513625 N 7145667	Client:	Yukon Government (AAM)	Samplers:	AN, CH.
Waypoint	GPS AN Name R7	Project Name:	Clinton Creek Surface Water Monitoring Program	Weather/Temperature:	Overcast. ~0°C.
Photos	Cam AN Nos. 322-326				
Sample Time (24h)	10:30				
Field Blank Collected:	☐ Yes Name _____	Duplicate Collected:	☐ Yes Name _____		
Field Parameter Measurements (note units if different than those stated)			Site Sketch		
Sample Depth (m)	0.10				
Temperature (°C)	0.0				
pH (pH Units)	6.54				
Cond. (µs/cm)	110.9				
Specific Cond. (µs/cm)	212.2				
Redox (mV)	83.7				
DO (mg/L)	14.94				
DO (%)	102.2				
Turbidity (NTU)	2.70				
Appearance & Odour (Clear, Silty, HC odours, etc.)	Sampled from middle of cascade. Broke through ice to collect sample and in situ measurements.				
Field Measurements Log					
YSI Logged?	☒ Yes ☐ No				
Time Logged on YSI	(hh:mm) 10:42				
Time Synced on YSI	☒ Yes ☐ No Actual Time (hh:mm) _____				
Unit Used	☒ Pro Plus ☐ Pen Unit Other _____				



Sample Site (Con't): R7

Sample Date (Con't): Oct. 3/2015

Bottle Type	Parameters Analyzed	Sample Treatment ☒	Preservative Added ☒	Collected ☒	No. Bottles	Comments (note number of bottles in duplicate)
500 ml (plastic)	General Chemistry	-	-	☒	1	Date/Time: ~~Sept.~~ Oct. 3/2015
125 ml (plastic)	Total Metals	-	☒ Nitric Acid	☒	1	10:30
125 ml (plastic)	Dissolved Metals	☒ Field Filtered	☒ Nitric Acid	☒	1	
40 ml (glass)	Total Mercury		☒ Hydrochloric Acid	☒	1	
40 ml (glass)	Dissolved Mercury	☒ Field Filtered	☒ Hydrochloric Acid	☒	1	
125 ml (amber)	Ammonia (NH ₃)		☒ Sulfuric Acid	☒	1	
125 ml (amber)	Dissolved Organic Carbon (DOC)	☒ Field Filtered	☒ Sulfuric Acid	☒	1	
125 ml (plastic)	Total Speciated Chromium – Cr(VI) and Cr(III)		☒ NaOH	☒	1	
125 ml (plastic)	Dissolved Speciated Chromium – Cr(VI) and Cr(III)	☒ Field Filtered	☒ NaOH	☒	1	
				~~☒~~		

General Notes:

Sample site found frozen during site visit. Running water observed under ice. Ice was broken in order to collect sample. Hydrology measurements could not be completed due to ice cover (refer to photos).
Track/access saved on GPS as "R7 Access", AN GPS.

SURFACE WATER SAMPLE COLLECTION SHEET

Sample Site:	R8	Project Number:	15-208	Date:	Oct 2.
UTM Coordinates	Z7E 0511902N 7147885	Client:	Yukon Government (AAM)	Samplers:	AN & CH
Waypoint	GPS AN Name R8	Project Name:	Clinton Creek Surface Water Monitoring Program	Weather/Temperature:	Sunny ~ 0°C
Photos	Cam AN Nos. 301-304				
Sample Time (24h)	12:00				
Field Blank Collected:	☐ Yes Name _____	Duplicate Collected:	☐ Yes Name _____		
Field Parameter Measurements (note units if different than those stated)			Site Sketch		
Sample Depth (m)	-0.10m				
Temperature (°C)	0.2				
pH (pH Units)	4.61				
Cond. (µs/cm)	161.8				
Specific Cond. (µs/cm)	306.0				
Redox (mV)	291.0				
DO (mg/L)	14.57				
DO (%)	100.0				
Turbidity (NTU)	0.63				
Appearance & Odour (Clear, Silty, HC odours, etc.)	Clear.				
Field Measurements Log					
YSI Logged?	☒ Yes ☐ No				
Time Logged on YSI	(hh:mm) 12:23				
Time Synced on YSI	☒ Yes ☐ No Actual Time (hh:mm) _____				
Unit Used	☒ Pro Plus ☐ Pen Unit Other _____				

Sample Site (Con't): R8

Sample Date (Con't): Oct 2

Bottle Type	Parameters Analyzed	Sample Treatment ☒	Preservative Added ☒	Collected ☒	No. Bottles	Comments (note number of bottles in duplicate)
500 ml (plastic)	General Chemistry	-	-	☒	1	Date/Time: <u>Oct 2 / 12:00</u>
125 ml (plastic)	Total Metals	-	☒ Nitric Acid	☒	1	↓
125 ml (plastic)	Dissolved Metals	☒ Field Filtered	☒ Nitric Acid	☒	1	
40 ml (glass)	Total Mercury		☒ Hydrochloric Acid	☒	1	
40 ml (glass)	Dissolved Mercury	☒ Field Filtered	☒ Hydrochloric Acid	☒	1	
125 ml (amber)	Ammonia (NH3)		☒ Sulfuric Acid	☒	1	
125 ml (amber)	Dissolved Organic Carbon (DOC)	☒ Field Filtered	☒ Sulfuric Acid	☒	1	
125 ml (plastic)	Total Speciated Chromium – Cr(VI) and Cr(III)		☒ NaOH	☒	1	
125 ml (plastic)	Dissolved Speciated Chromium – Cr(VI) and Cr(III)	☒ Field Filtered	☒ NaOH	☒	1	↓
				☐	1	

General Notes:

SURFACE WATER SAMPLE COLLECTION SHEET

Sample Site:	R9	Project Number:	15-208	Date:	Oct 2, 2015
UTM Coordinates	ZZ E 0512343 N 7146744	Client:	Yukon Government (AAM)	Samplers:	AN+CH
Waypoint	GPS AN Name R9	Project Name:	Clinton Creek Surface Water Monitoring Program	Weather/Temperature:	Overcast -2°C
Photos	Cam AN Nos. 314-319				
Sample Time (24h)	16:23				
Field Blank Collected:	☐ Yes Name _____	Duplicate Collected:	☐ Yes Name _____		
Field Parameter Measurements (note units if different than those stated)			Site Sketch		
Sample Depth (m)	-0.10m				
Temperature (°C)	0				
pH (pH Units)	6.48				
Cond. (µs/cm)	1228.8				
Specific Cond. (µs/cm)	437.7				
Redox (mV)	153.8				
DO (mg/L)	15.15				
DO (%)	103.9				
Turbidity (NTU)	2.11				
Appearance & Odour (Clear, Silty, HC odours, etc.)	Clear, tea colour.				
Field Measurements Log					
YSI Logged?	☒ Yes ☐ No				
Time Logged on YSI	(hh:mm) 16:34				
Time Synced on YSI	☒ Yes ☐ No Actual Time (hh:mm) _____				
Unit Used	☒ Pro Plus ☐ Pen Unit Other _____				

Sample Site (Con't):

R9

Sample Date (Con't):

Oct 2, 2015

Bottle Type	Parameters Analyzed	Sample Treatment ☒	Preservative Added ☒	Collected ☒	No. Bottles	Comments (note number of bottles in duplicate)
500 ml (plastic)	General Chemistry	-	-	☒		Date/Time: Oct 2 16:23
125 ml (plastic)	Total Metals	-	☒ Nitric Acid	☒		↓
125 ml (plastic)	Dissolved Metals	☒ Field Filtered	☒ Nitric Acid	☒		
40 ml (glass)	Total Mercury		☒ Hydrochloric Acid	☒		
40 ml (glass)	Dissolved Mercury	☒ Field Filtered	☒ Hydrochloric Acid	☒		
125 ml (amber)	Ammonia (NH ₃)		☒ Sulfuric Acid	☒		
125 ml (amber)	Dissolved Organic Carbon (DOC)	☒ Field Filtered	☒ Sulfuric Acid	☒		
125 ml (plastic)	Total Speciated Chromium – Cr(VI) and Cr(III)		☒ NaOH	☒		
125 ml (plastic)	Dissolved Speciated Chromium – Cr(VI) and Cr(III)	☒ Field Filtered	☒ NaOH	☒		↓
				☐		

General Notes:

Accidentally logged one R9 on YSI as R1.
Re-logged R9.

SURFACE WATER SAMPLE COLLECTION SHEET

Sample Site:	SL	Project Number:	15-208	Date:	Oct 1						
UTM Coordinates	Z 7 E 0513822 N 7146698	Client:	Yukon Government (AAM)	Samplers:	AN & CH						
Waypoint	GPS <u>AN</u> Name <u>SL</u>	Project Name:	Clinton Creek Surface Water Monitoring Program	Weather/Temperature:	Partly cloudy Σ -5°C						
Photos	Cam <u>AN</u> Nos. <u>759-262</u>										
Sample Time (24h)	9:15										
Field Blank Collected:	☐ Yes Name _____	Duplicate Collected:	☐ Yes Name _____								
Field Parameter Measurements (note units if different than those stated)			Site Sketch								
Sample Depth (m)	0.1 m	Refer to hydrology sheet drawing.									
Temperature (°C)	1.8										
pH (pH Units)	7.92										
Cond. (µs/cm)	882										
Specific Cond. (µs/cm)	1583										
Redox (mV)	150.9										
DO (mg/L)	11.70										
DO (%)	84.6										
Turbidity (NTU)	3.60										
Appearance & Odour (Clear, Silty, HC odours, etc.)	Surface re. muddy, brown.										
Field Measurements Log											
YSI Logged?	☒ Yes ☐ No										
Time Logged on YSI	(hh:mm) 9:51										
Time Synced on YSI	☒ Yes ☐ No Actual Time (hh:mm) _____										
Unit Used	☒ Pro Plus ☐ Pen Unit Other _____										

Note: Needed

Sample Site (Con't): 9L

Sample Date (Con't): Oct 1 / 2015

Bottle Type	Parameters Analyzed	Sample Treatment ☒	Preservative Added ☒	Collected ☒	No. Bottles	Comments (note number of bottles in duplicate)
500 ml (plastic)	General Chemistry	-	-	☒	1	Date/Time: Oct. 2/18:25
125 ml (plastic)	Total Metals	-	☒ Nitric Acid	☒	1	Oct. 1/9:14
125 ml (plastic)	Dissolved Metals	☒ Field Filtered	☐ Nitric Acid	☒	1	
40 ml (glass)	Total Mercury		☒ Hydrochloric Acid	☒	1	
40 ml (glass)	Dissolved Mercury	☒ Field Filtered	☒ Hydrochloric Acid	☒	1	
125 ml (amber)	Ammonia (NH ₃)		☒ Sulfuric Acid	☒	1	
125 ml (amber)	Dissolved Organic Carbon (DOC)	☒ Field Filtered	☒ Sulfuric Acid	☒	1	
125 ml (plastic)	Total Speciated Chromium – Cr(VI) and Cr(III)		☒ NaOH	☒	1	
125 ml (plastic)	Dissolved Speciated Chromium – Cr(VI) and Cr(III)	☒ Field Filtered	☒ NaOH	☒	1	
				☐		

General Notes:

Needed to break through thin surface ice to collect sample

SURFACE WATER SAMPLE COLLECTION SHEET

Sample Site:	WC	Project Number:	15-208	Date:	Sept. 30	Sept. 30/2015
UTM Coordinates	Z7E 0514183N 7147108	Client:	Yukon Government (AAM)	Samplers:	AN & CH	AN, CH
Waypoint	GPS AN Name WP	Project Name:	Clinton Creek Surface Water Monitoring Program	Weather/Temperature:	overcast ~ -2°C.	
Photos	Cam AN Nos. 248-251					
Sample Time (24h)	16:50	Duplicate Collected:	☐ Yes Name _____			
Field Blank Collected:	☐ Yes Name _____					
Field Parameter Measurements (note units if different than those stated)				Site Sketch		
Sample Depth (m)	0.10m					
Temperature (°C)	1.3					
pH (pH Units)	7.89					
Cond. (µs/cm)	377.4					
Specific Cond. (µs/cm)	689.8					
Redox (mV)	161.7					
DO (mg/L)	15.28					
DO (%)	108.6					
Turbidity (NTU)	12.9					
Appearance & Odour (Clear, Silty, HC odours, etc.)	clear, silty					
Field Measurements Log						
YSI Logged?	☒ Yes ☐ No					
Time Logged on YSI	(hh:mm) 16:46 ~~16:46~~					
Time Synced on YSI	☒ Yes ☐ No Actual Time (hh:mm) _____					
Unit Used	☒ Pro Plus ☐ Pen Unit Other _____					

Sample Site (Con't): WC

Sample Date (Con't): Sept. 30/2015

Bottle Type	Parameters Analyzed	Sample Treatment ☒	Preservative Added ☒	Collected ☒	No. Bottles	Comments (note number of bottles in duplicate)
500 ml (plastic)	General Chemistry	-	-	☒	1	Date/Time: <u>Sept. 30 / 16:50</u>
125 ml (plastic)	Total Metals	-	☒ Nitric Acid	☒	1	↓
125 ml (plastic)	Dissolved Metals	☐ Field Filtered	☐ Nitric Acid	☐		
40 ml (glass)	Total Mercury		☒ Hydrochloric Acid	☒	1	
40 ml (glass)	Dissolved Mercury	☐ Field Filtered	☐ Hydrochloric Acid	☐		
125 ml (amber)	Ammonia (NH3)		☐ Sulfuric Acid	☐		
125 ml (amber)	Dissolved Organic Carbon (DOC)	☐ Field Filtered	☐ Sulfuric Acid	☐		
125 ml (plastic)	Total Speciated Chromium – Cr(VI) and Cr(III)		☐ NaOH	☐		
125 ml (plastic)	Dissolved Speciated Chromium – Cr(VI) and Cr(III)	☐ Field Filtered	☐ NaOH	☐		
1000 mL (plastic)	Asbestos			☒	1	

General Notes:

APPENDIX 5
Response to AAM Review Comments

Response to Comments from Draft Report Version (as Received from AAM on December 30, 2015)

Comment No.	Page	Comment	Response
1	1	Make reference somewhere in section 1 that the hydrology and water quality portion of the scope was developed based on the Program written by Hemmera/ELR.	The text has been updated to make reference to Hemmera/ELR's program recommendations.
2	7	Why was hydrology data collected at this station (i.e. while the program written by Hemmera/ELR indicates that hydrology monitoring should be discontinued at this station)?	The hydrology data at Site E3 was collected in error (collected where not required), and a note has been placed in the report to identify this data as being in addition to the regular program.
3	9	Two?	Two is correct, the text has been updated.
4	18	Should also note here that stations E3 and E8 had concentrations that were substantially higher than upstream reference stations.	The text has been updated to describe this scenario of results. Only site E3 was highlighted, as in the case of E8, the exposed site is only 1.4 x the value of the Reference site (as opposed to 4.5 x the value for Site E3).
5	19	In Table 5 on page 16 under total chromium for Station E3, it is indicated that the relevant upstream stations are GWCC-1 and GWCC-2 although I don't believe that E3 is impacted by these.	Site name E3 has been replaced with E2 in Table 5 for that parameter to match with the report text.
6	21	What about the total metals at E1; can the same (or different) conclusion be made?	Yes, the same conclusion can be made, and the text has been updated accordingly.
7	21	Can also reference program developed by Hemmera/ELR (or include site selection rationale from it).	Have made a reference – we have added this to Section 2.2 (methods) as it seemed like a more appropriate location for the description.
8	28	Only 1mm difference; still represents “greater than the expected values”?	Each of the given values represents the difference in survey readings between two survey events at one of two benchmarks (hence two values). The text has been amended slightly to help make this clearer.
9	32	Revise wording: westerly is when wind comes from the west; when looking at wind rose it appears that wind is east-south-easterly and easterly.	We have checked this and confirmed that the windrose Figure indicates where the wind is blowing (this is stated in the top right corner of the windrose; Figure 9). The current text is also corroborated by the wind speed values and directions presented in Table 7. The original text has not been altered. However, the Figure number on the windrose should be Figure 9 (not Figure 8). The number has been changed.