

Technical Memo

To : Mal Wensierski, Carol Siemiginowski

Date : 1/11/2016

Lafarge Canada Inc.

Re. : 2015 Monitoring Summary

6509 Airport Road, Mississauga, ON L4V 1S7 Project: Oro Pit

CC:

From : Andrew Pentney

As requested we are providing a summary of the 2015 groundwater monitoring program results for the Oro Pit for your records. Previous memos (March 17, 2014 and February 10, 2015) outlined the complete monitoring program requirements in detail and summarized the 2012 to 2014 site monitoring results, including private well surveys in the area of the pit.

The 2015 monitoring program included bi-monthly water level measurements at on-site observation wells and two water quality sampling events.

Extraction activities began at the Oro Pit in January 2015. The adjacent Greek Pit is well established and extraction has occurred at that site for a number of years.

Monitoring Program

The monitoring completed in 2015 constitutes the first year of measurements during Oro Pit extraction operations. Baseline conditions were established over the 2012 to 2014 period.

The site location and monitoring network is shown in **Figure 1** (attached). Existing Oro Pit monitors include locations M6, DC-1, DC-2, DC-4 and DC-5. In addition monitor OW1, at the Greek Pit is included in the program.

Based on the water table configuration, groundwater flows from the area of DC-1, and moves radially north, northeast and east across the site (north to DC-2; northeast to Greek Pit OW1; and, east to the Roehner Pit). The current extraction area is immediately north of M6, therefore locations M6 and DC-4 are upgradient of the current extraction area. Location OW1 is downgradient of the current extraction area.

Monitoring completed in 2014 at the Oro Pit included bi-monthly water level measurements at monitoring wells M6, DC-1, DC-2, DC-4, DC-5 and OW1. In addition water quality samples were obtained at M6, DC-4 and OW1 in January and November 2015. The January 2015 results were reported in the February 2015 report.

Monitoring Results Summary

Water level monitoring results at on-site wells are summarized in the attached table and hydrograph. As illustrated, water level elevations and overall water table fluctuations are consistent through 2013, 2014 and 2015, and comparable to historical (1991) results.

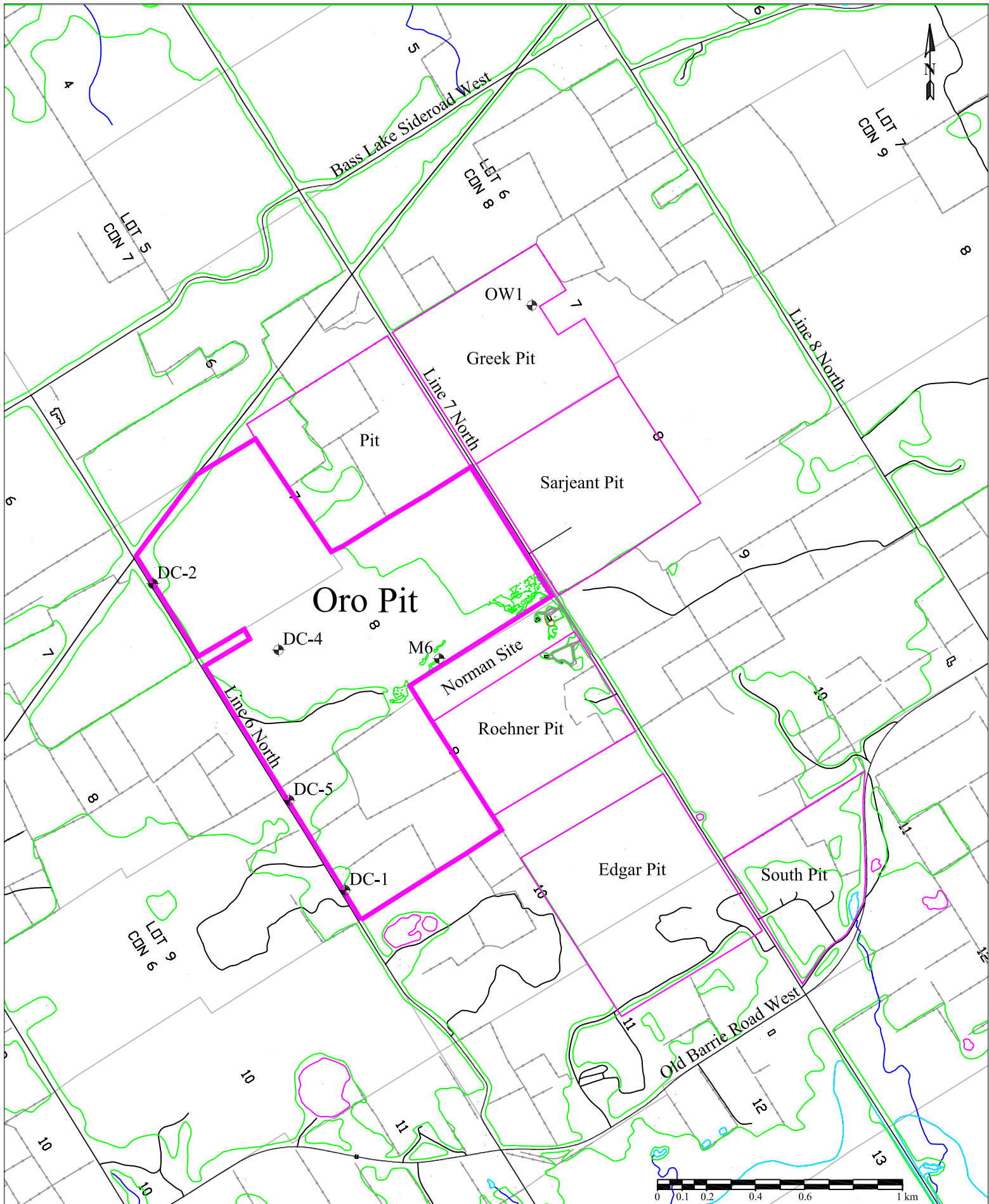
The November 2015 water quality sample results are attached for reference. Note that colour and turbidity results are elevated at each of the monitoring well locations (indicative of silt or clay within the sample water) due to the typical construction of these wells and the fact that they are pumped very intermittently.

The colour and turbidity results at the monitoring wells do not have any implications related to water supply within the aquifer.

No significant water quality concerns are noted and no impacts due to Oro Pit or Greek Pit operations are apparent. Although chloride concentrations are slightly higher at OW1 as compared to M6 and DC-4, the results remain well below suggested drinking water criteria related to aesthetics and health. The results indicate that the groundwater quality within the water table system on-site is slightly hard, however overall meets the MOE drinking water health related guidelines. No Phenols were detected in November 2015, indicating the single Phenols detection observed over the monitoring program to date, at DC-4 in January 2015 (just the above detection limit), was likely due to sampling or analysis error. Continued monitoring is recommended, and will occur as part of the stipulated monitoring program.

Attached:

- Figure 1: Site Location
- Water Level Summary Table
- Water Level Hydrograph
- Water Quality Sampling Analysis Laboratory Report



- Pit licence boundary (approx)
- river, stream, pond
- treeline
- monitoring well location

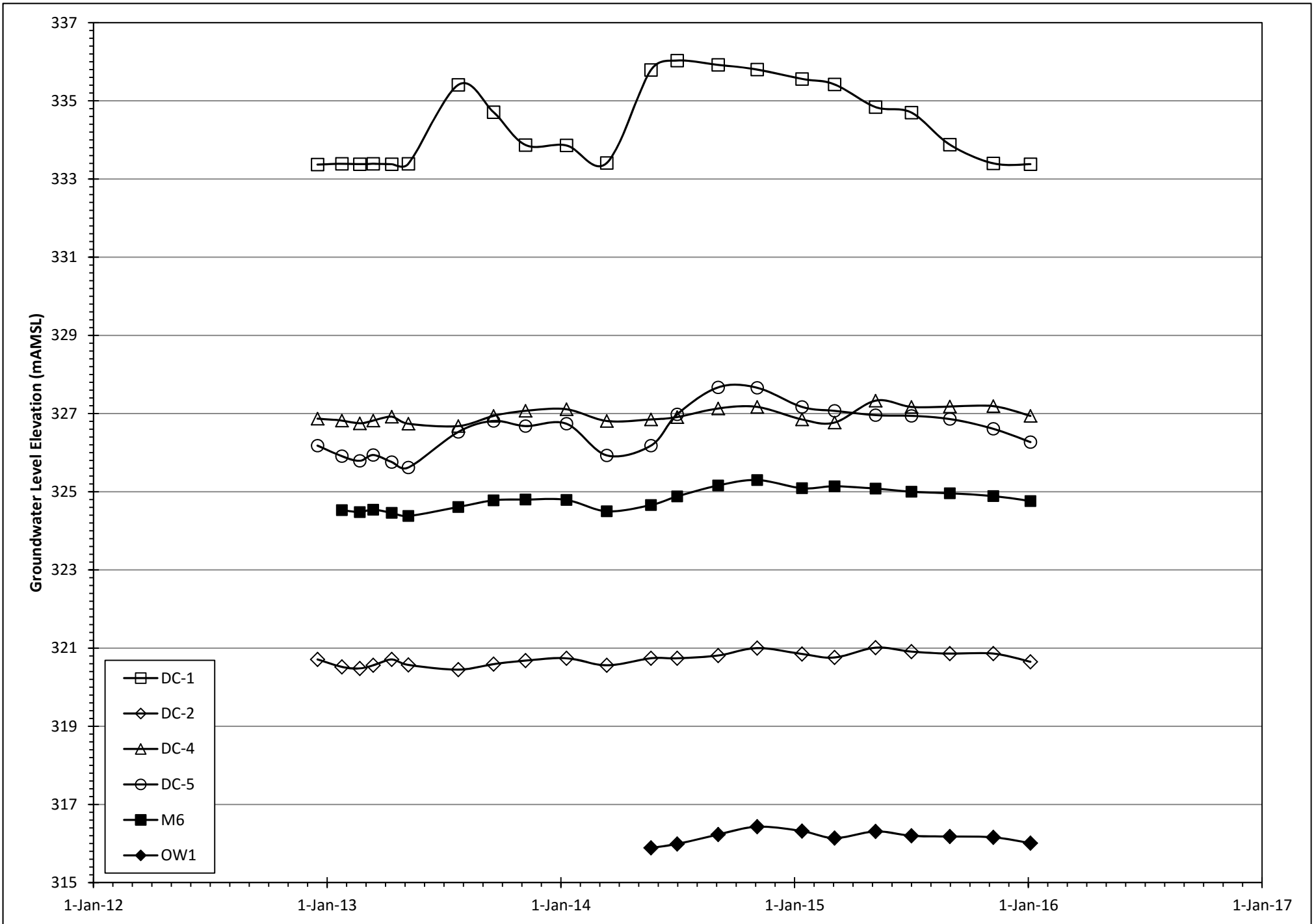
modified from: OBM mapping, Site Plan
 UNDER LICENSE, WITHOUT PREJUDICE OR ENDORSEMENT,
 FROM THE QUEEN'S PRINTER OF ONTARIO, 2005

March 2014
 Scale: as shown

Groundwater
 Science Corp.

Figure 1: Site Location

Lafarge Canada Inc.
 Oro Pit Monitoring Program





GROUNDWATER SCIENCE
ATTN: ANDREW PENTNEY
328 Daleview Place
WATERLOO ON N2L 5M5

Date Received: 19-NOV-15
Report Date: 26-NOV-15 14:36 (MT)
Version: FINAL

Client Phone: 519-746-6916

Certificate of Analysis

Lab Work Order #: L1704397
Project P.O. #: NOT SUBMITTED
Job Reference: ORO PIT
C of C Numbers: 14-459326
Legal Site Desc:

Austin Paterson
Account Manager

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ADDRESS: 60 Northland Road, Unit 1, Waterloo, ON N2V 2B8 Canada | Phone: +1 519 886 6910 | Fax: +1 519 886 9047
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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1704397-1 GREEK OW1 Sampled By: CLIENT on 18-NOV-15 @ 12:10 Matrix: WATER							
Physical Tests							
Color, Apparent	142		1.0	C.U.		19-NOV-15	R3316246
Conductivity	396		3.0	umhos/cm		19-NOV-15	R3314717
Hardness (as CaCO3)	209		10	mg/L		20-NOV-15	
pH	8.10		0.10	pH units		19-NOV-15	R3314713
Total Dissolved Solids	211	DLDS	20	mg/L		21-NOV-15	R3316405
Turbidity	>1000		0.10	NTU		19-NOV-15	R3314338
Anions and Nutrients							
Alkalinity, Total (as CaCO3)	208		10	mg/L		20-NOV-15	R3315015
Ammonia, Total (as N)	0.052		0.050	mg/L		20-NOV-15	R3315041
Chloride (Cl)	3.14		0.50	mg/L		20-NOV-15	R3315978
Fluoride (F)	0.032		0.020	mg/L		20-NOV-15	R3315978
Nitrate (as N)	2.01		0.020	mg/L		20-NOV-15	R3315978
Nitrite (as N)	<0.010		0.010	mg/L		20-NOV-15	R3315978
Phosphate-P (ortho)	<0.0030		0.0030	mg/L		20-NOV-15	R3316236
Sulfate (SO4)	7.01		0.30	mg/L		20-NOV-15	R3315978
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					19-NOV-15	R3314311
Aluminum (Al)-Dissolved	<0.010		0.010	mg/L	19-NOV-15	19-NOV-15	R3314959
Antimony (Sb)-Dissolved	<0.0050		0.0050	mg/L	19-NOV-15	19-NOV-15	R3314959
Arsenic (As)-Dissolved	<0.0010		0.0010	mg/L	19-NOV-15	19-NOV-15	R3314959
Barium (Ba)-Dissolved	0.038		0.010	mg/L	19-NOV-15	19-NOV-15	R3314959
Beryllium (Be)-Dissolved	<0.0010		0.0010	mg/L	19-NOV-15	19-NOV-15	R3314959
Bismuth (Bi)-Dissolved	<0.0010		0.0010	mg/L	19-NOV-15	19-NOV-15	R3314959
Boron (B)-Dissolved	<0.050		0.050	mg/L	19-NOV-15	19-NOV-15	R3314959
Cadmium (Cd)-Dissolved	<0.000090		0.000090	mg/L	19-NOV-15	19-NOV-15	R3314959
Calcium (Ca)-Dissolved	63.2		0.50	mg/L	19-NOV-15	19-NOV-15	R3314959
Chromium (Cr)-Dissolved	0.00147		0.00050	mg/L	19-NOV-15	19-NOV-15	R3314959
Cobalt (Co)-Dissolved	<0.00050		0.00050	mg/L	19-NOV-15	19-NOV-15	R3314959
Copper (Cu)-Dissolved	<0.0010		0.0010	mg/L	19-NOV-15	19-NOV-15	R3314959
Iron (Fe)-Dissolved	<0.050		0.050	mg/L	19-NOV-15	19-NOV-15	R3314959
Lead (Pb)-Dissolved	<0.0010		0.0010	mg/L	19-NOV-15	19-NOV-15	R3314959
Magnesium (Mg)-Dissolved	12.4		0.50	mg/L	19-NOV-15	19-NOV-15	R3314959
Manganese (Mn)-Dissolved	<0.0010		0.0010	mg/L	19-NOV-15	19-NOV-15	R3314959
Molybdenum (Mo)-Dissolved	<0.0010		0.0010	mg/L	19-NOV-15	19-NOV-15	R3314959
Nickel (Ni)-Dissolved	<0.0020		0.0020	mg/L	19-NOV-15	19-NOV-15	R3314959
Phosphorus (P)-Dissolved	<0.050		0.050	mg/L	19-NOV-15	19-NOV-15	R3314959
Potassium (K)-Dissolved	<1.0		1.0	mg/L	19-NOV-15	19-NOV-15	R3314959
Selenium (Se)-Dissolved	<0.00040		0.00040	mg/L	19-NOV-15	19-NOV-15	R3314959
Silicon (Si)-Dissolved	4.9		1.0	mg/L	19-NOV-15	19-NOV-15	R3314959
Silver (Ag)-Dissolved	<0.00010		0.00010	mg/L	19-NOV-15	19-NOV-15	R3314959
Sodium (Na)-Dissolved	2.42		0.50	mg/L	19-NOV-15	19-NOV-15	R3314959

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1704397-1 GREEK OW1 Sampled By: CLIENT on 18-NOV-15 @ 12:10 Matrix: WATER							
Dissolved Metals							
Strontium (Sr)-Dissolved	0.116		0.0010	mg/L	19-NOV-15	19-NOV-15	R3314959
Thallium (Tl)-Dissolved	<0.00030		0.00030	mg/L	19-NOV-15	19-NOV-15	R3314959
Tin (Sn)-Dissolved	<0.0010		0.0010	mg/L	19-NOV-15	19-NOV-15	R3314959
Titanium (Ti)-Dissolved	<0.0020		0.0020	mg/L	19-NOV-15	19-NOV-15	R3314959
Tungsten (W)-Dissolved	<0.010		0.010	mg/L	19-NOV-15	19-NOV-15	R3314959
Uranium (U)-Dissolved	<0.0050		0.0050	mg/L	19-NOV-15	19-NOV-15	R3314959
Vanadium (V)-Dissolved	<0.0010		0.0010	mg/L	19-NOV-15	19-NOV-15	R3314959
Zinc (Zn)-Dissolved	0.0122		0.0030	mg/L	19-NOV-15	19-NOV-15	R3314959
Zirconium (Zr)-Dissolved	<0.0040		0.0040	mg/L	19-NOV-15	19-NOV-15	R3314959
Aggregate Organics							
Phenols (4AAP)	<0.0010		0.0010	mg/L		25-NOV-15	R3319895
L1704397-2 DC-4 Sampled By: CLIENT on 18-NOV-15 @ 13:00 Matrix: WATER							
Physical Tests							
Color, Apparent	69.0		1.0	C.U.		19-NOV-15	R3316246
Conductivity	348		3.0	umhos/cm		19-NOV-15	R3314717
Hardness (as CaCO3)	185		10	mg/L		20-NOV-15	
pH	8.18		0.10	pH units		19-NOV-15	R3314713
Total Dissolved Solids	173	DLDS	20	mg/L		21-NOV-15	R3316405
Turbidity	>1000		0.10	NTU		19-NOV-15	R3314338
Anions and Nutrients							
Alkalinity, Total (as CaCO3)	171		10	mg/L		20-NOV-15	R3315015
Ammonia, Total (as N)	<0.050		0.050	mg/L		20-NOV-15	R3315041
Chloride (Cl)	0.69		0.50	mg/L		20-NOV-15	R3315978
Fluoride (F)	0.045		0.020	mg/L		20-NOV-15	R3315978
Nitrate (as N)	0.522		0.020	mg/L		20-NOV-15	R3315978
Nitrite (as N)	<0.010		0.010	mg/L		20-NOV-15	R3315978
Phosphate-P (ortho)	<0.0030		0.0030	mg/L		20-NOV-15	R3316236
Sulfate (SO4)	15.1		0.30	mg/L		20-NOV-15	R3315978
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					19-NOV-15	R3314311
Aluminum (Al)-Dissolved	0.016		0.010	mg/L	19-NOV-15	19-NOV-15	R3314959
Antimony (Sb)-Dissolved	<0.0050		0.0050	mg/L	19-NOV-15	19-NOV-15	R3314959
Arsenic (As)-Dissolved	<0.0010		0.0010	mg/L	19-NOV-15	19-NOV-15	R3314959
Barium (Ba)-Dissolved	0.045		0.010	mg/L	19-NOV-15	19-NOV-15	R3314959
Beryllium (Be)-Dissolved	<0.0010		0.0010	mg/L	19-NOV-15	19-NOV-15	R3314959
Bismuth (Bi)-Dissolved	<0.0010		0.0010	mg/L	19-NOV-15	19-NOV-15	R3314959
Boron (B)-Dissolved	<0.050		0.050	mg/L	19-NOV-15	19-NOV-15	R3314959
Cadmium (Cd)-Dissolved	<0.000090		0.000090	mg/L	19-NOV-15	19-NOV-15	R3314959
Calcium (Ca)-Dissolved	48.5		0.50	mg/L	19-NOV-15	19-NOV-15	R3314959
Chromium (Cr)-Dissolved	0.00099		0.00050	mg/L	19-NOV-15	19-NOV-15	R3314959

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1704397-2 DC-4 Sampled By: CLIENT on 18-NOV-15 @ 13:00 Matrix: WATER							
Dissolved Metals							
Cobalt (Co)-Dissolved	<0.00050		0.00050	mg/L	19-NOV-15	19-NOV-15	R3314959
Copper (Cu)-Dissolved	<0.0010		0.0010	mg/L	19-NOV-15	19-NOV-15	R3314959
Iron (Fe)-Dissolved	<0.050		0.050	mg/L	19-NOV-15	19-NOV-15	R3314959
Lead (Pb)-Dissolved	<0.0010		0.0010	mg/L	19-NOV-15	19-NOV-15	R3314959
Magnesium (Mg)-Dissolved	15.4		0.50	mg/L	19-NOV-15	19-NOV-15	R3314959
Manganese (Mn)-Dissolved	0.0755		0.0010	mg/L	19-NOV-15	19-NOV-15	R3314959
Molybdenum (Mo)-Dissolved	0.0012		0.0010	mg/L	19-NOV-15	19-NOV-15	R3314959
Nickel (Ni)-Dissolved	<0.0020		0.0020	mg/L	19-NOV-15	19-NOV-15	R3314959
Phosphorus (P)-Dissolved	<0.050		0.050	mg/L	19-NOV-15	19-NOV-15	R3314959
Potassium (K)-Dissolved	1.5		1.0	mg/L	19-NOV-15	19-NOV-15	R3314959
Selenium (Se)-Dissolved	<0.00040		0.00040	mg/L	19-NOV-15	19-NOV-15	R3314959
Silicon (Si)-Dissolved	5.0		1.0	mg/L	19-NOV-15	19-NOV-15	R3314959
Silver (Ag)-Dissolved	<0.00010		0.00010	mg/L	19-NOV-15	19-NOV-15	R3314959
Sodium (Na)-Dissolved	2.49		0.50	mg/L	19-NOV-15	19-NOV-15	R3314959
Strontium (Sr)-Dissolved	0.113		0.0010	mg/L	19-NOV-15	19-NOV-15	R3314959
Thallium (Tl)-Dissolved	<0.00030		0.00030	mg/L	19-NOV-15	19-NOV-15	R3314959
Tin (Sn)-Dissolved	<0.0010		0.0010	mg/L	19-NOV-15	19-NOV-15	R3314959
Titanium (Ti)-Dissolved	<0.0020		0.0020	mg/L	19-NOV-15	19-NOV-15	R3314959
Tungsten (W)-Dissolved	<0.010		0.010	mg/L	19-NOV-15	19-NOV-15	R3314959
Uranium (U)-Dissolved	<0.0050		0.0050	mg/L	19-NOV-15	19-NOV-15	R3314959
Vanadium (V)-Dissolved	<0.0010		0.0010	mg/L	19-NOV-15	19-NOV-15	R3314959
Zinc (Zn)-Dissolved	0.0106		0.0030	mg/L	19-NOV-15	19-NOV-15	R3314959
Zirconium (Zr)-Dissolved	<0.0040		0.0040	mg/L	19-NOV-15	19-NOV-15	R3314959
Aggregate Organics							
Phenols (4AAP)	<0.0010		0.0010	mg/L		25-NOV-15	R3319895
L1704397-3 M6 Sampled By: CLIENT on 18-NOV-15 @ 13:45 Matrix: WATER							
Physical Tests							
Color, Apparent	70.6		1.0	C.U.		19-NOV-15	R3316246
Conductivity	347		3.0	umhos/cm		19-NOV-15	R3314717
Hardness (as CaCO3)	182		10	mg/L		20-NOV-15	
pH	8.15		0.10	pH units		19-NOV-15	R3314713
Total Dissolved Solids	181	DLDS	20	mg/L		21-NOV-15	R3316405
Turbidity	>1000		0.10	NTU		19-NOV-15	R3314338
Anions and Nutrients							
Alkalinity, Total (as CaCO3)	182		10	mg/L		20-NOV-15	R3315015
Ammonia, Total (as N)	0.141		0.050	mg/L		20-NOV-15	R3315041
Chloride (Cl)	0.59		0.50	mg/L		20-NOV-15	R3315978
Fluoride (F)	0.038		0.020	mg/L		20-NOV-15	R3315978
Nitrate (as N)	1.06		0.020	mg/L		20-NOV-15	R3315978
Nitrite (as N)	<0.010		0.010	mg/L		20-NOV-15	R3315978

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1704397-3 M6							
Sampled By: CLIENT on 18-NOV-15 @ 13:45							
Matrix: WATER							
Anions and Nutrients							
Phosphate-P (ortho)	<0.0030		0.0030	mg/L		20-NOV-15	R3316236
Sulfate (SO4)	8.78		0.30	mg/L		20-NOV-15	R3315978
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					19-NOV-15	R3314311
Aluminum (Al)-Dissolved	<0.010		0.010	mg/L	19-NOV-15	19-NOV-15	R3314959
Antimony (Sb)-Dissolved	<0.0050		0.0050	mg/L	19-NOV-15	19-NOV-15	R3314959
Arsenic (As)-Dissolved	<0.0010		0.0010	mg/L	19-NOV-15	19-NOV-15	R3314959
Barium (Ba)-Dissolved	0.063		0.010	mg/L	19-NOV-15	19-NOV-15	R3314959
Beryllium (Be)-Dissolved	<0.0010		0.0010	mg/L	19-NOV-15	19-NOV-15	R3314959
Bismuth (Bi)-Dissolved	<0.0010		0.0010	mg/L	19-NOV-15	19-NOV-15	R3314959
Boron (B)-Dissolved	<0.050		0.050	mg/L	19-NOV-15	19-NOV-15	R3314959
Cadmium (Cd)-Dissolved	<0.000090		0.000090	mg/L	19-NOV-15	19-NOV-15	R3314959
Calcium (Ca)-Dissolved	48.9		0.50	mg/L	19-NOV-15	19-NOV-15	R3314959
Chromium (Cr)-Dissolved	0.00190		0.00050	mg/L	19-NOV-15	19-NOV-15	R3314959
Cobalt (Co)-Dissolved	<0.00050		0.00050	mg/L	19-NOV-15	19-NOV-15	R3314959
Copper (Cu)-Dissolved	<0.0010		0.0010	mg/L	19-NOV-15	19-NOV-15	R3314959
Iron (Fe)-Dissolved	<0.050		0.050	mg/L	19-NOV-15	19-NOV-15	R3314959
Lead (Pb)-Dissolved	<0.0010		0.0010	mg/L	19-NOV-15	19-NOV-15	R3314959
Magnesium (Mg)-Dissolved	14.5		0.50	mg/L	19-NOV-15	19-NOV-15	R3314959
Manganese (Mn)-Dissolved	0.0016		0.0010	mg/L	19-NOV-15	19-NOV-15	R3314959
Molybdenum (Mo)-Dissolved	<0.0010		0.0010	mg/L	19-NOV-15	19-NOV-15	R3314959
Nickel (Ni)-Dissolved	<0.0020		0.0020	mg/L	19-NOV-15	19-NOV-15	R3314959
Phosphorus (P)-Dissolved	<0.050		0.050	mg/L	19-NOV-15	19-NOV-15	R3314959
Potassium (K)-Dissolved	1.1		1.0	mg/L	19-NOV-15	19-NOV-15	R3314959
Selenium (Se)-Dissolved	<0.00040		0.00040	mg/L	19-NOV-15	19-NOV-15	R3314959
Silicon (Si)-Dissolved	5.6		1.0	mg/L	19-NOV-15	19-NOV-15	R3314959
Silver (Ag)-Dissolved	<0.00010		0.00010	mg/L	19-NOV-15	19-NOV-15	R3314959
Sodium (Na)-Dissolved	2.14		0.50	mg/L	19-NOV-15	19-NOV-15	R3314959
Strontium (Sr)-Dissolved	0.122		0.0010	mg/L	19-NOV-15	19-NOV-15	R3314959
Thallium (Tl)-Dissolved	<0.00030		0.00030	mg/L	19-NOV-15	19-NOV-15	R3314959
Tin (Sn)-Dissolved	<0.0010		0.0010	mg/L	19-NOV-15	19-NOV-15	R3314959
Titanium (Ti)-Dissolved	<0.0020		0.0020	mg/L	19-NOV-15	19-NOV-15	R3314959
Tungsten (W)-Dissolved	<0.010		0.010	mg/L	19-NOV-15	19-NOV-15	R3314959
Uranium (U)-Dissolved	<0.0050		0.0050	mg/L	19-NOV-15	19-NOV-15	R3314959
Vanadium (V)-Dissolved	<0.0010		0.0010	mg/L	19-NOV-15	19-NOV-15	R3314959
Zinc (Zn)-Dissolved	0.0076		0.0030	mg/L	19-NOV-15	19-NOV-15	R3314959
Zirconium (Zr)-Dissolved	<0.0040		0.0040	mg/L	19-NOV-15	19-NOV-15	R3314959
Aggregate Organics							
Phenols (4AAP)	<0.0010		0.0010	mg/L		25-NOV-15	R3319895

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1704397-1, -2, -3
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1704397-1, -2, -3
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L1704397-1, -2, -3
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L1704397-1, -2, -3
Matrix Spike	Silicon (Si)-Dissolved	MS-B	L1704397-1, -2, -3
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1704397-1, -2, -3
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1704397-1, -2, -3
Matrix Spike	Uranium (U)-Dissolved	MS-B	L1704397-1, -2, -3
Matrix Spike	Ammonia, Total (as N)	MS-B	L1704397-1, -2, -3
Matrix Spike	Chloride (Cl)	MS-B	L1704397-1, -2, -3
Matrix Spike	Nitrate (as N)	MS-B	L1704397-1, -2, -3

Sample Parameter Qualifier key listed:

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
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**
ALK-WT	Water	Alkalinity, Total (as CaCO ₃)	EPA 310.2
CL-IC-WT	Water	Chloride by IC Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.	EPA 300.1 (mod)
Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).			
COLOUR-WT	Water	Colour Apparent colour is determined by analysis of the decanted sample using the platinum-cobalt colourimetric method.	APHA 2120
EC-WT	Water	Conductivity Water samples can be measured directly by immersing the conductivity cell into the sample.	APHA 2510 B
F-IC-N-WT	Water	Fluoride in Water by IC Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.	EPA 300.1 (mod)
HARDNESS-CALC-WT	Water	Hardness Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO ₃ equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.	APHA 2340 B
MET-D-CCMS-WT	Water	Dissolved Metals in Water by CRC ICPMS Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.	APHA 3030B/6020A (mod)
Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.			
Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).			
NH3-WT	Water	Ammonia, Total as N Sample is measured colorimetrically. When sample is turbid a distillation step is required, sample is distilled into a solution of boric acid and measured colorimetrically.	EPA 350.1
NO2-IC-WT	Water	Nitrite in Water by IC Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.	EPA 300.1 (mod)
NO3-IC-WT	Water	Nitrate in Water by IC Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.	EPA 300.1 (mod)
PH-WT	Water	pH Water samples are analyzed directly by a calibrated pH meter.	APHA 4500 H-Electrode
Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).			
PHENOLS-4AAP-WT	Water	Phenol (4AAP)	EPA 9066

Reference Information

An automated method is used to distill the sample. The distillate is then buffered to pH 9.4 which reacts with 4AAP and potassium ferricyanide to form a red complex which is measured colorimetrically.

PO4-DO-COL-WT Water Diss. Orthophosphate in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

SO4-IC-N-WT Water Sulfate in Water by IC EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-WT Water Total Dissolved Solids APHA 2540C
A well-mixed sample is filtered through glass fibres filter. A known volume of the filtrate is evaporated and dried at 105–5°C overnight and then 180–10°C for 1hr.

TURBIDITY-WT Water Turbidity APHA 2130 B
Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

** 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
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

Chain of Custody Numbers:

14-459326

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

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

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

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

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

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.