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Soils Materials Environment

3283920 Nova Scotia Limited

Level 2 Groundwater Assessment
Lot B, Peggy's Cove Road, Upper Tantallon, NS

Report

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REVISION AND PUBLICATION REGISTER		
Revision N°	Date	Modification And/Or Publication Details
00	9-May-2016	Draft Report Issued
01	31-May-2016	Final Report Issued
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1 INTRODUCTION

3283920 Nova Scotia Limited is in the process of developing a new mixed use development at Lot B on Peggy's Cove Road (Highway 333) in Upper Tantallon, NS. In support of the development of a water supply to service the new development, Englobe Corp. (Englobe) has been contracted to conduct a Level 2 Groundwater Assessment.

The purpose of the work was to provide a Level 2 Groundwater Assessment in accordance with the NSE Guidelines for Groundwater Assessments of Subdivisions Serviced by Private Wells (2011). A Level 1 Groundwater Assessment was previously prepared for the property. This report summarizes the findings of the groundwater assessment.

2 OBJECTIVES

The objective of the Level 2 Groundwater Assessment is to further characterize the local geology and hydrogeology at the site in accordance with the NSE Guidelines for Groundwater Assessments of Subdivisions Serviced by Private Wells (2011), in conjunction with application under general development agreement requirements for the site.

This assessment is not intended to provide a guarantee that wells at the proposed site will have an adequate supply of potable water; however, it is intended that based on the work to date, this report will address the pertinent water supply issues in the area.

3 SCOPE OF THE ASSESSMENT

All work has been conducted following generally accepted scientific and engineering practices to satisfy the following information requirements that have been indicated by NSE:

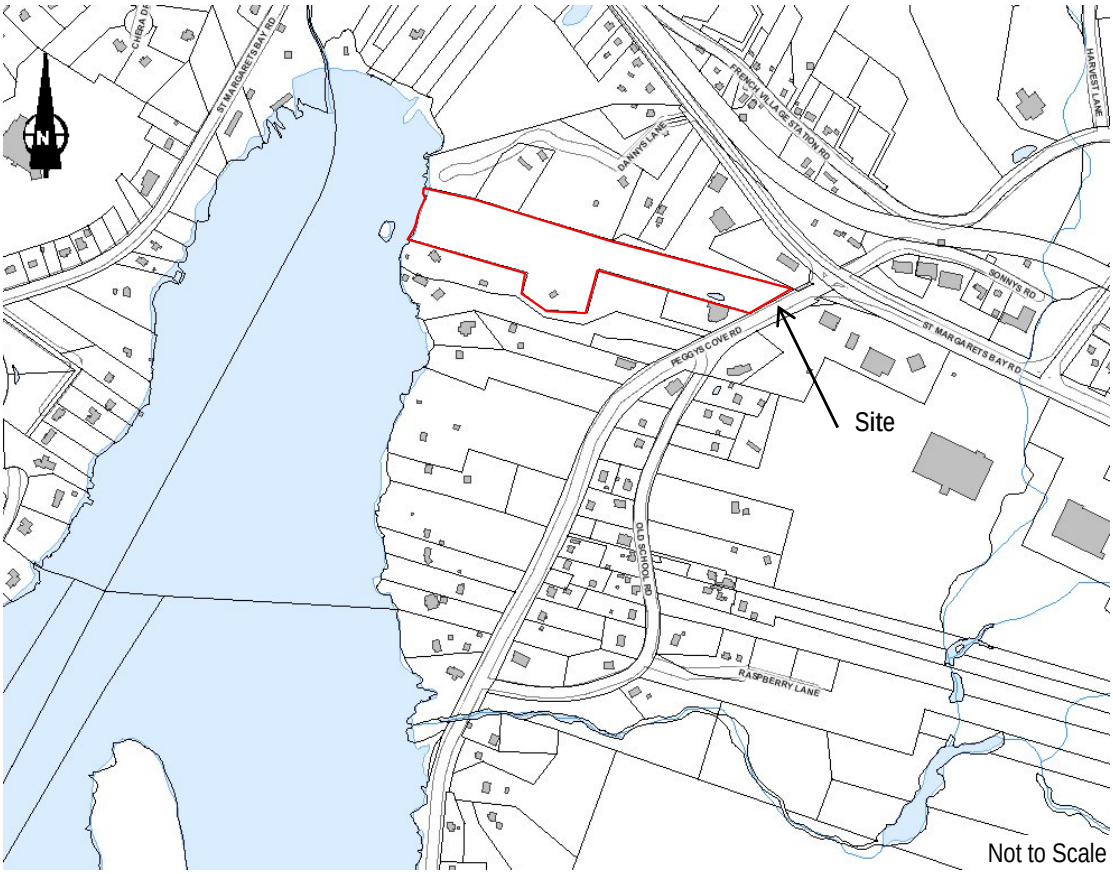
- Review existing information;
- Conduct a well survey of the area;
- Install test wells;
- Conduct pump testing;
- Monitor off-site potable water wells;
- Conduct water quality testing; and
- Offer conclusions and recommendations for water quantity or quality issues.

4 SITE DESCRIPTION

The current area of interest is comprised of one property that is located on the western side of Peggy's Cove Road, near the intersection with St. Margaret's Bay Road. The subject area

is approximately 3.48 hectares. A site location map is presented in Figure 4-1.

Figure 4-1. Site Location Map, Lot B, Peggy's Cove Road, Upper Tantallon, NS.



The subject area is predominately undeveloped, although there is an abandoned building present on the site. The Site is crossed by utility lines over an existing Nova Scotia Power (NSP) easement, and over private lines that supply Civic No. 13576 and the former building at the site. The topography is gently rolling, with the exception of a relatively steep slope downward from east to west towards St. Margaret's Bay. The eastern portion of the Site, from near Peggy's Cove Road, is relatively flat and occupied by a large wetland. There is an open water pond in the wetland, which we understand is a man-made feature. There were no observable inlets or outlets to the wetland, although the wetland extends offsite to the north and to the south. Based on our review and functional assessment of the wetland, discharge is via subsurface migration to the south and some channelized flow (at Civic No. 13570 Peggy's Cove Road) that ultimately extends beneath St. Margaret's Bay Road and migrates southward.

Access to the site is currently via a shared driveway with Civic No. 13576 and Civic No. 13570 Peggy's Cove Road. Recently, a temporary access road across the site was constructed for providing access for the potable water well drill rig. Neighboring properties

include a mix of low density residential and commercial properties, and are summarized in Table 4-1

Table 4-1. Summary of surrounding properties.

ADDRESS	LAND USE	ADJACENT
Lot B Peggy's Cove Road Vacant	Subject Site	-
13578 Peggy's Cove Road	Acadian Maple Products (commercial)	Yes
13576 Peggy's Cove Road	Residential dwelling	Yes
13570 Peggy's Cove Road	Rum Hollow Bed and Breakfast (residential)	Yes
13560 Peggy's Cove Road	Vacant, tree covered	No
13595 Peggy's Cove Road	Irving Service Station and commercial development	No
13589 Peggy's Cove Road	Commercial development	No
13548 Peggy's Cove Road	Residential dwelling	No
13544 Peggy's Cove Road	Residential dwelling	No
38 Danny's Lane	Residential dwelling	Yes
92 Danny's Lane	Residential dwelling	Yes
5302 St. Margaret's Bay Road	Residential dwelling	No
5298 St. Margaret's Bay Road	Residential dwelling	No
5280 St. Margaret's Bay Road	Investments Inc. (commercial)	Yes
5250 St. Margaret's Bay Road	Tantallon Veterinary Hospital (commercial)	Yes

4.1 Future Development

A concept plan has been prepared, but not yet finalized, and a preliminary copy is provided in Appendix 1. The concept plan will be finalized in consultation with HRM during the Development Agreement process. In general, the development will consist of a detached 14,000 sq.ft. commercial office building (Building C) adjacent to Peggy's Cove Road, two multi-unit 3.5 storey residential buildings (46 units; Building A and 48 units; Building B) in the center of the site and several groups of townhouse residences. The buildings will be serviced with roadways and parking areas.

The subject site along Peggy's Cove Road is located in an area that does not currently have central servicing for water and sewer. The servicing concept plan for the development is centrally supplied water (from drilled potable water wells and central storage) for the residential building and one commercial building, and a standalone sewage treatment plant (STP) to service the entire development.

The exact water distribution layout and central storage and treatment location has not yet been finalized. Buried piping will distribute water to and transport water from the building structure(s). Currently, it is anticipated that some of the test wells will be converted into production wells.

The proposed STP location is on the western side of the site, and the effluent discharge will drain towards St. Margaret's Bay. All STP design and effluent discharge will satisfy NSE requirements. The proposed STP location and the current location of the test wells satisfy the minimum setback requirements.

It is anticipated that all of the water and sewerage features will be buried with equipment accessed through hatches in buried chambers of tanks.

The development will be phased, with Building A and C comprising Phase 1. Phase 2 will consist of Building B and the subsequent residential townhouse units; additional detailed assessment will be carried out prior to design of Phase 2.11

5 DESCRIPTION OF HYDROGEOLOGY

The hydrogeology of the site is fully described in the Level 1 Hydrogeological Assessment. As described in the WSP report *"the study site is located in the "plutonic" bedrock groundwater region and the "Glaciolacustrine/Till Plains/Colluvial" surficial groundwater region. Based on nearby wells, it is expected that the surficial geology is too thin to provide adequate groundwater for the development. Therefore, groundwater supply wells for this development are expected to be completed in the underlying plutonic bedrock.*

Groundwater wells in the plutonic groundwater region typically produce lower yields than sedimentary, carbonate/evaporate and volcanic regions due to the rocks inability to store and transmit large amounts of water through the rock itself, instead water must move through fractures in the rock. The quantity and connectivity of fracturing varies significantly, which has an impact on their ability to supply groundwater. The average yield from wells drilled in the plutonic groundwater region is 22.3 Lpm."

The site is located in the Granite Hydrostatic Unit (HU), and although generally in the area, surficial geology in the area is a thin veneer over bedrock, at the immediate site, there are approximately 12m of glacial overburden (in select areas). Thicker deposits of saturated glacial deposits can serve to provide small quantities of water for residential and small scale commercial/industrial land uses. The thicker deposits are also sources of recharge to underlying less productive bedrock units.

6 METHODOLOGY

6.1 Water Well Survey

The well survey was carried out following the Level 1 report, and consisted of further review of the information on the Nova Scotia Well Log Database. Based on review of the local topography and drainage systems, the well survey was conducted within approximately 500m of the site. Thirteen dwellings or commercial businesses were identified, although, as

discussed in the Level 1 report, there are very few well logs available since it appears that well coordinates were incorrectly recorded (or not recorded) in the database.

For the immediately adjacent properties, only one Well Log was located.

The well survey consisted of an interview and questionnaire with home owners and business owners within approximately 500m of the site regarding the quality and quantity of their potable water, and any recent changes.

6.2 Well Installation

6.2.1 Test Wells

Between December 11 and 16, 2015, four Test Wells were installed on the property by Bluenose Well Drilling Ltd. All permitting and well construction supervision was supervised by Englobe. Chip samples were collected at 3-metre intervals and are stored at Englobe in Dartmouth, NS. The Test Wells are identified on Figure 2 in Appendix 1.

The wells were situated to satisfy minimum set-back requirements from property lines, the proposed onsite STP location and the location of adjacent septic treatment facilities. Proposed building and roadway locations were also considered, so that the test wells could be converted to production wells, should sufficient water yields be realized.

6.2.2 Wetland Piezometer

On December 11, 2015, Englobe personnel manually installed one piezometer in the wetland located in the eastern portion of the site to evaluate the potential for migration of shallow surface water via fractures into the local aquifer.

The piezometer location is identified as P-1, and is presented on Figure 2 (Appendix 1). The piezometer consisted of a manual borehole advanced with a hand auger to practical refusal (likely on a boulder). The piezometer was constructed of 25mm outside diameter (OD) polyvinyl chloride (PVC) threaded Schedule 20 slot screen and solid riser. The screened sections of the piezometer extended the entire depth of the borehole. The location was marked in the field for any future field programs and its position acquired by the project surveyor. A data logger was installed in the piezometer on January 16, 2016 in advance of the pump testing program. Pre-pump test water samples were also collected.

6.3 Off-site Observation Wells

On January 16, 2016, Aquaterra Resources Services Limited (Aquaterra) under the direction of Englobe personnel installed data loggers in the private (drilled) potable water wells at 38 Danny's Lane (PW1), 13578 Peggy's Cove Road (PW2), 13576 Peggy's Cove Road (PW3) and 13544 Peggy's Cove Road (PW4). The data loggers captured water levels in the off-site wells during the step tests and the long term pump tests. The Off-Site Observation Wells are identified on Figure 2 in Appendix 1.

Pre-pump test water samples were collected for general chemistry and total metals analyses. Pre-pump test water samples were also collected from the drilled potable water well at 13548 Peggy's Cove Road (PW5) for general chemistry and total metals analyses, and at the dug potable water well at 13570 Peggy's Cove Road (DW1) for total and *E.coli* coliforms, general chemistry and total metals analyses.

6.4 Pump Testing

6.4.1 Step Testing

Based on the estimated yields determined during drilling, step tests were conducted at each of the Test Wells. The step testing was carried out by Aquaterra between January 26 and February 1, 2016 under the supervision of Englobe. The purpose of step testing is to provide basic information on pumping wells and aquifer hydraulic characteristics. The main purpose is to determine well performance with increasing flow rates, which is a prerequisite to long term constant flow rate pumping tests.

During the step tests, each step lasted one hour at increasing flow rates. One hour of recovery measurements followed the final step at each well. Only three steps (instead of four) were conducted at the wells since drawdown increased significantly during the third step. Flow was measured using a flow meter, water levels were collected manually and with dataloggers to record drawdown information. A barologger was utilized to collect pressure and temperature data during the step test. A summary of the step tests is provided in Table 6-1.

Table 6-1. Summary of step tests.

	WELL 1 (igpm)	WELL 2 (igpm)	WELL 3 (igpm)	WELL 4 (igpm)
DATE	27-Jan-2016	26-Jan-2016	1-Feb-2016	28-Jan-2016
Step 1	1.9 (8.6 Lpm)	1.1 (4.5 Lpm)	3.9 (18 Lpm)	3.1 (14 Lpm)
Step 2	4.2 (19.1 Lpm)	2 (9.1 Lpm)	8.1 (37 Lpm)	6 (27 Lpm)
Step 3	4.6 (20.9 Lpm)	4 (4.5 Lpm)	11.5 (52 Lpm)*	9 (41 Lpm)
Recovery	60 minutes	60 minutes	60 minutes	60 minutes

Note: * Step 3 terminated after 25min because water levels were approaching the pump depth

As noted above, dataloggers recorded drawdown in four observation wells at neighbouring properties to monitor interference between the pumping well and these private water supply wells. A datalogger also recorded water levels in the wetland on the property.

Distances between the various wells and the piezometer are summarized in Table 6-2.

Table 6-2. Distance between each well.

Distance (m)	Well 1	Well 2	Well 3	Well 4	P1	PW1 38 Danny's Lane	PW2 13578 Peggy's Cove Rd	PW3 13576 Peggy's Cove Rd	PW4 13546 Peggy's Cove Rd
Well 1									
Well 2	87.6								
Well 3	153.8	74.4							
Well 4	106.6	63.5	77.4						
P1	216.7	130.7	63.3	126.4					
PW1 38 Danny's Lane	156.9	125.9	116.5	62.4	142.0				
PW2 13578 Peggy's Cove Rd	306.9	219.0	155.1	227.5	101.9	242.1			
PW3 13576 Peggy's Cove Rd	136.2	224.3	290.8	234.7	352.0	269.4	445.0		
PW4 13546 Peggy's Cove Rd	87.9	123.0	185.9	173.8	247.4	232.9	318.8	158.8	

6.4.2 Long Term Pump Testing

Based on the results of the step tests, a long term 72-hour pumping test was designed to assess the effect of pumping at Wells 3 and 4 simultaneously. Well 1 and 2 were considered more appropriate to use as observation wells, so no long term pumping was conducted at these locations during this program.

The long term pumping test commenced on February 29, 2016 with pumping at Wells 3 and 4 at the rates presented in Table 6-3. Both wells were pumped continuously for 72 hours. Following the pumping, both wells were allowed to recover for approximately 24 hours. Table 6-3 summarizes the details of the pump testing program.

Flow was measured using a flow meter and water levels were collected manually at Wells 3 and 4. Data loggers were also used to collect water levels at Well 3 and 4, although the datalogger in Well 4 was lost and efforts to recover it were not successful. Field conductivities, pH and temperatures were collected from the pump discharge through the long term test. A barologger was utilized to collect pressure and temperature data during the long term pump test.

Table 6-3. Summary of Pumping Program.

Location	10:00am February 29, 2016 (t = 0 minutes)	10:00am March 1, 2016 (t = 1440 minutes)	10:00am March 2, 2016 (t = 2880 minutes)	10:00am March 3, 2016 (t = 4320 minutes)	10:00am March 4, 2016 (t = 5760 minutes)
Well 1	Observation	Observation	Observation	Observation	Observation
Well 2	Observation	Observation	Observation	Observation	Observation
Well 3 (7.0 to 7.3 igpm)	Pumping	Pumping	Pumping	Pumping	Recovery
Well 4 (at 5.3 igpm)	Pumping	Pumping	Pumping	Pumping	Recovery
P-1	Observation	Observation	Observation	Observation	Observation
PW1 38 Danny's Lane	Observation	Observation	Observation	Observation	Observation
PW2 13578 Peggy's Cove Road	Observation	Observation	Observation	Observation	Observation
PW3 13576 Peggy's Cove Road	Observation	Observation	Observation	Observation	Observation
PW4 13546 Peggy's Cove Road	Observation	Observation	Observation	Observation	Observation

Dataloggers recorded drawdown in the observation wells onsite (Well 1 and Well 2) and neighbouring properties (PW1, PW2, PW3 and PW4) to monitor interference between the pumping well and these water wells. Dataloggers also recorded drawdown in one manually installed piezometer (P-1) that was located in the adjacent wetland to assess the potential for groundwater under the influence of surface water.

Water samples were collected from Well 3 and Well 4 during the long term pump test. A summary of the analytical testing conducted is provided in Table 6-4. Note, bromide, fluoride and VOC analyses were conducted at 72-hours. Samples from the pumping wells were collected from the pump discharge.Samples from the off-site observation wells were collected through dedicated disposable bailers, outside taps or kitchen taps, prior to any water treatment devices.

In accordance with laboratory sampling protocols, water samples were collected; specifically, we used 120 mL plastic containers for metals (preserved with nitric acid in the field), 200-mL plastic containers for general inorganic chemistry (including fluoride), and 100-mL amber glass bottles with sulfuric acid preservative for Total Organic Carbon (TOC). Water samples

collected for volatile organic compounds (VOCs) were placed in 40-mL glass vials with sodium bisulphate preservative. Water samples for total and *E.coli* coliforms were placed in 300-ml plastic containers with sodium thiosulphate preservative. No samples were filtered.

The water sample containers were immediately placed in ice-packed coolers and were transported to Maxxam Analytics laboratory in Bedford, Nova Scotia, for detailed chemical analysis as listed above and in Table 6-4.

Table 6-4. Summary of Laboratory Analytical Program.

		Total and *E.coli* coliforms	General Chemistry	Total Metals	Fluoride	Bromide	VOCs
WELL 3	36hr (1-Mar)	✓	✓	✓			
	72hr (3-Mar)	✓	✓	✓	✓	✓	✓
WELL 4	36hr (1-Mar)	✓	✓	✓			
	72hr (3-Mar)	✓	✓	✓	✓	✓	✓
P-1	18-Jan-16		✓	✓			
	3-Mar-16		✓	✓			
PW1	18-Jan-16		✓	✓			
	4-Mar-16		✓	✓			
PW2	18-Jan-16		✓	✓			
	4-Mar-16		✓	✓			
PW3	18-Jan-16		✓	✓			
	4-Mar-16		✓	✓			
PW4	18-Jan-16		✓	✓			
	4-Mar-16		✓	✓			
PW5	18-Jan-16		✓	✓			
	4-Mar-16		✓	✓			
DW1	18-Jan-16	✓	✓	✓			
	3-Mar-16		✓	✓			

7 RESULTS

7.1 Water Well Survey

As previously noted, information available from the Nova Scotia Well Log Database offered very little useful information for this immediate area. In general, the available Well Logs did not record civic or lot numbers, so it was difficult to correlate the Well Log to its location. Well Logs were located for only 11 of the 85 properties in the well survey area; the only adjacent properties for which well logs were found were 13578 Peggy's Cove Road and 38 Danny's Lane.

The information collected from the well logs and during the community survey indicates that there were no reported significant water quality or quantity issues in this area, other than at St. Lukes (on St. Margaret's Bay Road). Several of the properties reported arsenic issues and numerous properties had odour issues.

A summary of the Well Survey results and copies of the available Well Logs are provided in Appendix 2.

7.2 Test Well

The on-site well locations were selected with consideration for on-site sewage disposal, proposed building locations and for future usefulness as a potable water source. The well depths were determined by yield for use as a normal commercial well. The location of the test wells is shown on Figure 2 (Appendix 1), along with the off-site potable water wells utilized as observation points.

Generally, the wells encountered up to 13m of overburden material (glacial till characterized as silty sand and gravel) overlying granite bedrock. The bedrock was plutonic (granite). The upper layers of the granite contained mica and select zones had iron staining. The granite had various layers of red, grey, pink and white, with the deeper layers (90m) generally pink or white.

The wells were constructed with a drive shoe and a bentonite seal in the annular space around the drive shoe in order to protect the groundwater resource from surface water contamination. The wells were each capped with a standard cover.

The well specific details are summarized in Table 7-1. A copy of the well records is provided in Appendix 3.

Table 7-1. Summary of Well Details.

	WELL 1	WELL 2	WELL 3	WELL 4
Driller	Bluenose Well Drilling Ltd.	Bluenose Well Drilling Ltd.	Bluenose Well Drilling Ltd.	Bluenose Well Drilling Ltd.
Date:	December 14, 2015	December 10, 2015	December 16, 2015	December 15, 2015
Location:	N.: 4950093.6 E.: 5548601.2	N.: 4950079.23 E.: 5548687.91	N.: 4950086.74 E.: 5548755.94	N.: 4950141.84 E.: 5548698.63
Stratigraphic Log:	0 – 6.1m: sand and gravel 6.1 – 12.19 m: clay and sand 12.19 –17.07 m: broken granite 17.07 –129.54 m: granite	0 – 3.05 m: clay and boulders 3.05 – 12.19 m: clay, sand and gravel 12.19 –105.16 m: granite	0 – 7.92 m: sand, clay and boulders 7.92 – 11.58 m: granite 11.58 –12.19 m: gravel 12.19 –62.48 m: granite	0 – 13.11 m: sand, silt and boulders 13.11 –92.96 m: granite

	WELL 1	WELL 2	WELL 3	WELL 4
Total Depth:	129.54 m	105.16 m	62.48 m	92.96 m
Casing:	0.15 m (6-inch dia) to 20.7 m	0.15 m (6-inch dia) to 15.2 m	0.15 m (6-inch dia) to 14.3 m	0.15 m (6-inch dia) to 15.8 m
Static Water Level:	7.85 mbgs	8.10 mbgs	4.19 mbgs	5.15 mbgs
Estimated Yield (drillers):	5.5 igpm	5 igpm	12 igpm	12 igpm
Water Bearing Fractures:	73.15 mbgs 117.35 mbgs 124.05 mbgs	94.49 mbgs	44.81 mbgs 50.29 mbgs 51.82 mbgs	27.43 mbgs 54.86 mbgs 67.06 mbgs 73.15 mbgs 86.87 mbgs
Test Pump:	Webtrol 1 horsepower, 18 usgpm series	Webtrol 1 horsepower, 18 usgpm series	Webtrol 1 horsepower, 18 usgpm series	Goulds 1 horsepower, 5 usgpm series
Pump Setting	91 mbgs	91 mbgs	55 mbgs	90 mbgs

Note: mbgs – meters below ground surface

7.3 Step Testing

Step tests provide basic information on aquifer characteristics. Their main purposes are to determine well performance, and the hydraulic behavior of a well with increasing pumping rates. They are a prerequisite to constant rate pumping tests. The step tests were performed by Aquaterra.

The data collected during the Step Test is summarized below. A full copy of the data is provided in Appendix 4.

Table 7-2. Summary of Step Test Data

WELL ID	B(t)[1]	C[2]	Q_{MIN} (igpm)	Q_{MAX} (igpm)	Q_{REC} (ipgm)
Well 1	0.3637	0.0652	2.0	2.5	1.7
Well 2	1.5392	0.0499	1.5	2.0	2.8
Well 3	0.5436	0.0077	6.0	8.0	7.0
Well 4	0.2661	0.0087	-	9.0	4.5

Notes:
1 – B(t)= aquifer loss coefficient
2 – C = well loss coefficient

The Step Test was comprised of three steps with increasing flow rates, to determine the optimal flow rate to be used during 72 hour pumping test. The recommended cumulative

pumping rate is 16 igpm for the entire pump test (72 hours). Based on the results, Well 3 appears to be the most productive well, followed by Well 4. The highest aquifer loss coefficient was present in Well 2 and Well 1 appears to have the greatest well loss coefficient.

Figure 7-1 depicts the maximum drawdown after 60 minutes of pumping. Well 1 and Well 2 have similar characteristics, and Well 3 and Well 4 have similar characteristics. At the recommended pumping rates the well efficiencies are between 60% and 70% for Well 2, Well 3 and Well 4. The well efficiency of Well 1 is the lowest around 40%. Well efficiencies are shown as red circles on Figure 7-2. It is anticipated that Well 1 and Well 2 will be discarded as a water supply wells due to its poor performance during the step test. The specific drawdown is presented in Figure 7-3. The slope of the lines is the well loss coefficient (C), and the axis intercept is the aquifer loss coefficient (B(t)).

Figure 7-1. Maximal Drawdown after 60 Minutes of Pumping, Lot B, Peggy's Cove Road, Upper Tantallon, NS.

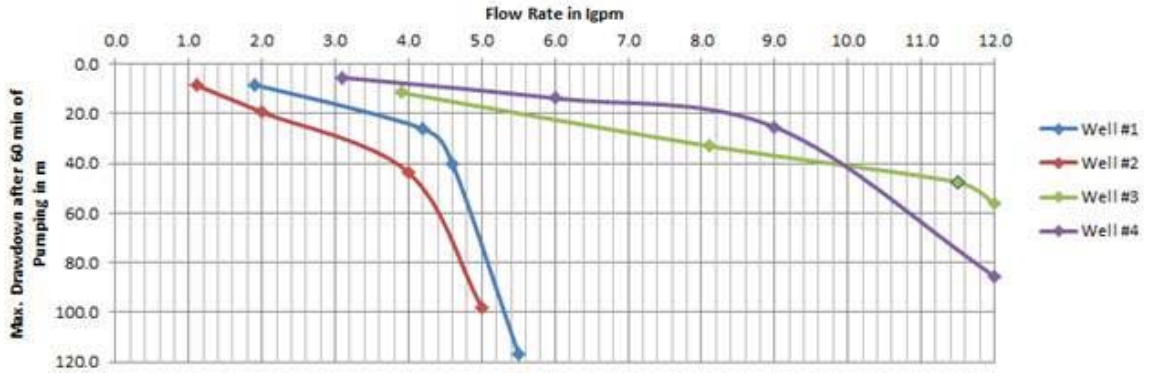


Figure 7-2. Well Efficiencies, Lot B, Peggy's Cove Road, Upper Tantallon, NS.

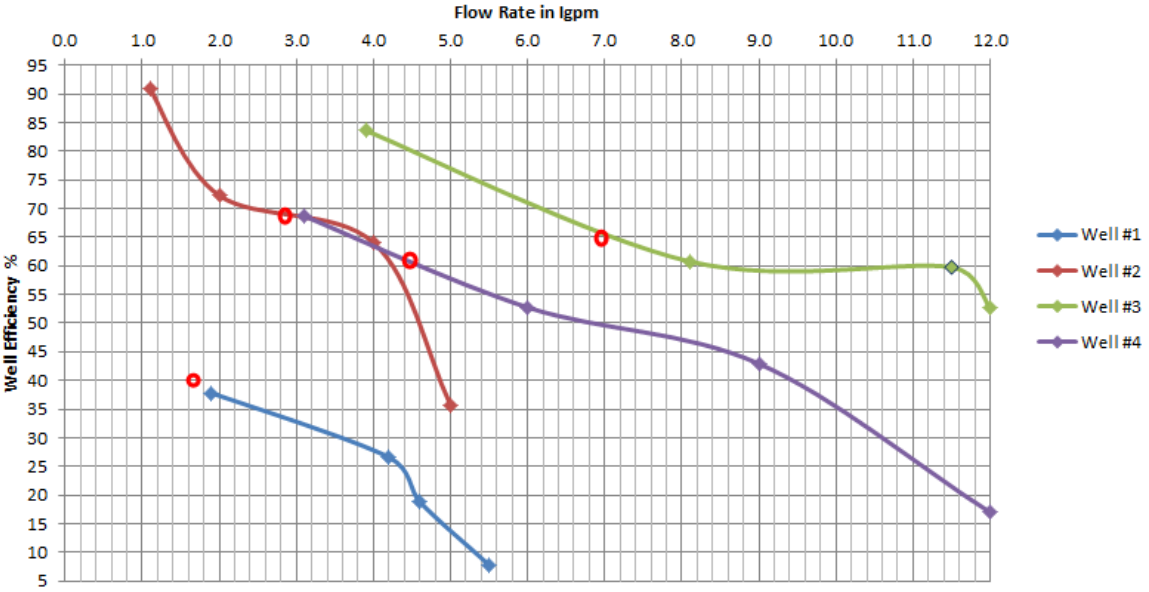
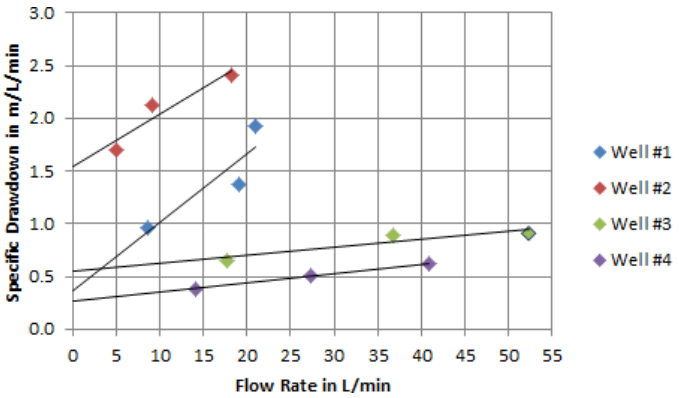


Figure 7-3. Well Efficiencies, Lot B, Peggy's Cove Road, Upper Tantallon, NS.



As previously mentioned, based on the recommended pumping rates, Well 1 and Well 2 served better as observation wells while Well 3 and Well 4 would be pumped.

7.4 Long Term Pumping Test

Constant rate pumping tests are used to characterize an aquifer on a large scale, such as Transmissivity, Hydraulic Conductivity, and Specific Storage values, as well as identifying boundary conditions in the aquifer (recharge, and no-flow boundaries), which may affect long term performance of a pumping well. The information obtained from the analysis of a constant rate pumping test is useful to evaluate long term pumping rates, and the sustainability of a groundwater resource.

Based on the drawdown measured during the Step Test, the recommended flow rates at Well 3 and Well 4 for the long term pumping test were 7.0 igpm and 4.5 igpm, respectively. The average flow rate for the long term pumping test were set at 7.1 igpm (32.3 Lpm) for 72 hours for Well 3 and 5.2 igpm (23.6 Lpm) for 72 hours for Well 4.

The hydraulic parameters and the pumping capacities of Test Wells 3 and 4 were determined with the information gathered simultaneously from the long term pump test and during the recovery period.

In steady-state, the Dupuit (1944) equation, which was developed for homogeneous and isotropic porous confined aquifer, was used. Steady-state analysis is shown on Graph 101 presented in Appendix 5 and is discussed in Section 7.4.2. A full copy of the long term pump test data is provided in Appendix 6.

During the transition portion of the flow noted under pumping conditions, the data gathered from the wells was interpreted using the analytical method established by Theis method (1935) with the Jacob approximation (1946). This analytical method was developed for homogeneous and isotropic porous confined aquifer. The Jacob approximation was also utilized to interpret the data from the recovery portion of the test. Transient analysis for pumping and recovery are shown on the appended Graphs 102, 103, 104, and 105 presented in Appendix 5 and are discussed in Section 7.4.3.

The data collected during the 72 hour pumping test is provided in Appendix 5. A summary is provided in Table 7-3.

Based on the above information and as shown on Figure 101 (Appendix 5), four wells responded to the pumping of Well 3 and Well 4. The analysis of the pumping test was based on water levels in the pumping wells (Well 3 and Well 4) as well as the wells that showed a response to the pumping (PW1, PW2, Well 1 and Well 2). Although there was a measured change in water levels at PW3 and PW4, these changes are associated with typical residential pump use and cannot be associated with the effects of the pumping at Lot B, Peggy's Cove Road, Upper Tantallon.

Table 7-3. Summary of Long Term Testing.

	Well 1	Well 2	Well 3	Well 4	P-1	PW1 38 Danny's Lane	PW2 13578 Peggy's Cove Rd	PW3 13576 Peggy's Cove Rd	PW4 13546 Peggy's Cove Rd
Status:	Observation	Observation	Pumping	Pumping	Observation	Observation	Observation	Observation	Observation
Static Level (mbgs):	9.77 (29-Feb-16)	4.63 (29-Feb-16)	4.10 (29-Feb-16)	5.56 (29-Feb-16)	0.505 (16-Jan-16)	8.63 (26-Feb-16)	8.8 (27-Feb-16)	10.02 (26-Feb-16)	4.39 (26-Feb-16)
Depth of well (mbgs):	129.54	105.16	62.48	92.96	2.74	Unknown	91.44	Unknown	Unknown
Dynamic Water Level at 4320 minutes (mbgs):	13.45	15.97	41.92	27.44	1.16	14.18	12.25	10.63	4.47
Final Drawdown, m (after 72 hours):	3.22	10.97	39.3	21.57	0.345	5.31	3.25	0.17	-0.07
Maximum Observed Drawdown (m)	3.68	11.34	37.82	21.88	0.22	8.36**	27.04***	0.61	0.08*

Notes:
1 – The set depth of the pumps in the neighbouring wells is unknown.
2 – Negative drawdown in the neighbouring wells indicates that water levels were higher than water levels measured at the start of the test.
3 –The negative value confirms that this well is not affected by the pumping of Wells 3 and 4; the values registered in PW3 and PW4 simply show the residential pump cycles at their locations.
4– The static water levels measured in the private wells show a certain degree of uncertainly due to private pumping during the pumping test.
5 – * indicates an increase not a drawdown.
6 – ** Maximum drawdown during test was not achieved at the 4320 minutes (termination of pump test). Based on data from datalogger pre pump test maximum drawdown at PW 1 was 2.74 m. During the test the maximum drawdown was achieved on March 2, 2016 at 10:50 with a drawdown of 8.36 m (8.49 mbgs).
7 – *** Maximum drawdown during test was not achieved at the 4320 minutes (termination of pump test). Based on data from datalogger pre pump test maximum drawdown at PW2 was 13.00 m. During the test the maximum drawdown was achieved on March 1, 2016 at 14:50 with a drawdown of 27.04 m (17.02 mbgs).

7.4.1 Pumping and Recovery Data

7.4.1.1 *Well 3 – Pumping Well*

Pumping

Pumping of Well 3 began February 29, 2016 at 10:15 am. The interpretation of the drawdown graphs with respect to time indicates the water level in Well 3 progresses downwards rapidly during the first several minutes to hours of pumping and stabilizes after approximately 2,880 minutes of pumping, where a pseudo-permanent mode is attained. A water level of approximately 43.83 meters below top of casing (mbTOC) was measured at the termination of pumping. The pumping data indicates two (2) anomalies, occurring at 720 minutes and 1,080 minutes. The first anomaly shows a drop in water level to 43.86 mbgs, a drop of 4.56 m from the reading taken at 660 minutes. The water level recovered to 39.18 mbgs at the 840 minute reading where it slowly continued to drop. The cause of this anomaly is unknown. The cause of the second anomaly is attributed to the carburetor icing over during pumping causing the pumping to be sporadic. Pumping of Well 3 was terminated on March 3, 2016 at 10:15 am.

Recovery

Following the end of pumping of this well, a recovery of 38.85 m was measured on March 4, 2016, at 9:06 am. The original static water level measured on February 29, 2016 at 10:10 am was 4.10 mbgs with a final static water level measured on March 4, 2016 at 9:06 am was 4.98 mbgs. The final water level represents an 82% recovery to the original static water level prior to pumping. No data anomalies were observed during this period. The termination of Well 4 pumping is not discernable in the recovery data of Well 3.

7.4.1.2 *Well 4 – Pumping Well*

Pumping

As previously mentioned, while efforts were made to recover the datalogger in Well 4, they were unsuccessful. Therefore the interpretation of the drawdown in Well 4 is based on the manual measurements completed during the pumping test. Pumping of Well 4 commenced February 29, 2016 at 10:30 am. The interpretation of the drawdown graphs with respect to time indicates the water level in Well 4 progresses downwards rapidly during the first several minutes to hours of pumping. After that, the water level stabilizes after approximately 960 minutes. At the termination of the test, the water level was recorded at a depth of 27.44 mbTOC. The pumping data indicates one (1) anomaly, occurring at 1,080 minutes and lasting for 24 minutes. The cause of this anomaly is attributed to the carburetor icing over during pumping causing the pumping to terminate for 24 minutes.

Recovery

Following the end of pumping of this well, a recovery of 19.71 m was measured on March 3,

2016. The original static water level measured on February 29, 2016 at 10:30 am was 5.56 mbgs with a final static water level measured on March 4, 2016 at 9:30 am was 7.73 mbgs. The final water level represents a 72% recovery to the original static water level prior to pumping. No data anomalies were observed during this period. The termination of Well 3 pumping is not discernable in the recovery data of Well 4.

7.4.1.3 *PW1 38 Danny's Lane – Observation Well*

Pumping

PW1 located at 38 Danny's Lane, Upper Tantallon, showed a response to the pumping of Well 3 and 4. A maximum drawdown of 8.36 m was observed on March 2, 2016 at 10:50 am. The dataloggers were installed February 26, 2016 and a prepump test maximum drawdown of 2.47 m was observed on February 28, 2016 at 17:30. The amplitude of this variation between prepumping and during pumping maximum drawdowns is 5.89 m.

Recovery

The hydrograph (Figure 101, Appendix 5) shows that PW1 began to recharge prior to the termination of the pump test. The barometrically corrected water level at PW1 at the beginning of the pump test was measured at 20.60 mASL. The last measurement after the recovery period was 18.51 mASL, showing a difference of 2.09 m therefore achieving a 90% recovery of the original static.

The termination of pumping at Wells 3 and 4 was observed in PW 1.

7.4.1.4 *PW2 13578 Peggy's Cove Road – Observation Well*

Pumping

PW2 located at 13578, Upper Tantallon showed a minimal response to the pumping of Well 3 and 4. The data acquired from the datalogger prior to the commencement of pumping at Well 3 and Well 4 shows an average drawdown at this well of 13.04 m. A barometrically corrected water level of 18.20 mASL was recorded on February 27, 2016 showing the average static water level. While it is unclear what the extent of the drawdown at this well was as a result of the pumping test or due to on site pumping at 13578 Peggy's Cove Road, the maximum drawdown observed at PW2 during the pump test was 27.04 m. The maximum drawdown observed prior to the pump test was 13.04 m and was recorded using a datalogger on February 27, 2016 at 15:30. During pumping, typical recharge levels of PW2 were recorded at a barometrically corrected water level of 17.16 mASL, showing a drop in typical static water levels of approximately 1.04 m.

The pumping of Well 3 and Well 4 has a minimal influence (approximately 1.04 m decrease in static water levels) on PW2.

Recovery

At the termination of pumping at Well 3 and Well 4, the highest achieved barometrically

corrected recovery level was recorded at 17.83 mASL. The original barometrically corrected static water level recorded on February 27, 2016 at 8:00 am was 18.21 mASL. A 98% recovery was achieved in PW 2 after the 23 hour recovery period. A review of the data presented in Figure 101 (Appendix 5) shows an observable effect in PW2 after the termination of pumping. It must be noted that during the recovery period the pump was running at PW2 and shows a drawdown, however; this is not related to the pumping test.

7.4.1.5 *Well 1 – Observation Well*

Pumping

There was an observable effect of the pumping of Well 3 and Well 4 at Well 1. A barometrically corrected static water level of 12.37 mASL was recorded on February 29, 2016 prior to the pumping of Well 3 and Well 4. A barometrically corrected water level of 9.15 mASL was recorded at the termination of the 72 hour pumping. A maximum drawdown of 3.22 m was observed in this well during the pump test.

Recovery

At the termination of pumping at Well 3 and Well 4, the highest achieved barometrically corrected recovery level was recorded at 11.10 mASL. The original barometrically corrected static water level recorded on February 29, 2016 was 12.37 mASL. A 90% recovery was achieved in Well 1 after the 23 hour recovery period. A review of the data presented in Figure 101 (Appendix 5) shows an observable effect in Well 1 after the termination of pumping.

7.4.1.6 *Well 2 – Observation Well*

Pumping

There was an observable effect of the pumping of Well 3 and Well 4 at Well 2. A barometrically corrected static water level of 20.53 mASL was recorded on February 29, 2016 prior to the pumping of Well 3 and Well 4. A barometrically corrected water level of 11.63 mASL was recorded at the termination of the 72 hour pumping. A maximum drawdown of 8.91 m was observed in this well during the pump test.

Recovery

At the termination of pumping at Well 3 and Well 4, the highest achieved barometrically corrected recovery level was recorded at 20.20 mASL. The original barometrically corrected static water level recorded on February 29, 2016 was 20.53 mASL. A 98% recovery was achieved in Well 2 after the 23 hour recovery period. A review of the data presented in Figure 101 (Appendix 5) shows an observable effect in Well 2 after the termination of pumping.

7.4.1.7 *PW3 13576 Peggy's Cove Road – Observation Well*

Pumping

PW3 located at 13576 Peggy's Cove Road did not show a response to the pumping of Well 3

and 4. As previously mentioned, although there was a measured change in water levels at PW3 during the pumping of Well 3 and Well 4, these changes are associated with typical residential pump use and cannot be associated with the effects of the pumping at Lot B, Peggy's Cove Road, Upper Tantallon. A review of the tide levels (obtained from the Bedford Institute Station in Nova Scotia) and the datalogger data for PW3 shows that this well is being influenced by the tide and not by the pumping of Well 3 or Well 4.

There was no observable effect of pumping at Well 3 or Well 4 on this observation well.

Recovery

There was no observable effect of termination of pumping at Well 3 or 4.

7.4.1.8 *PW4 13546 Peggy's Cove Road – Observation Well*

Pumping

PW4 located at 13546 Peggy's Cove Road did not show a response to the pumping of Well 3 and Well 4. As previously mentioned, although there was a small measured change in water levels at PW4 during the pumping of Well 3 and Well 4, these changes are associated with typical residential pump use and cannot be associated with the effects of the pumping at Lot B, Peggy's Cove Road, Upper Tantallon.

There was no observable effect of pumping at Well 3 or Well 4 on this observation well.

Recovery

There was no observable effect of termination of pumping at Well 3 or Well 4.

7.4.1.9 *P 1 – Observation Piezometer*

Pumping

A piezometer was installed in the wetland located on the eastern portion of the site close to Peggy's Cove Road. The piezometer was advanced to a depth 2.74 m where it was assumed it hit a boulder. No observable changes were registered in the datalogger data during the pumping of Well 3 and Well 4. The piezometer is likely installed in a localized zone perched of perched water and is not directly connected to the underlying aquifer.

There was no observable effect of pumping at Well 3 or Well 4 on this observation piezometer.

Recovery

At 10:00 am March 3, 2016 the water level in the piezometer increased 0.76 m from 1.628 mbgs to 0.50 mbgs. Pumping at Well 3 and Well 4 ceased at 10:15 and 10:30 respectively. At 10:10 am the datalogger read a level of 1.16 mbgs indicating the water level had dropped. It is likely this is an anomaly and that this is not an effect of the pumping or recovery of Well 3 or Well 4 as this occurred before pumping had terminated.

7.4.2 Steady State Analysis

A steady state analysis was conducted on pumping test data to provide a preliminary estimate of the hydraulic properties of the aquifer.

The Dupuit equation for confined aquifers was used as a first approximation for the hydraulic properties of the aquifer. The Dupuit equation is described as follows:

$$S_w = \frac{Q_w}{2\pi T} Ln(r_2 / r_1)$$

Where:

Q_w = Pumping rate (m^3/sec)
K = Hydraulic conductivity of the aquifer (m/sec)
s_w = Drawdown (m)
T = Transmissivity (m^2/sec), equal to K x B
B = Saturated fractured zone thickness in the bedrock, (m)
r_2 and r_1 = distance pumping Well / observation well (m)

As previously mentioned the plot for the steady state analysis (Dupuit) is presented in Graph 101 included in Appendix 5.

For this analysis, as two wells were pumped at the same time (Well 3 and Well 4), an intermediate imaginary well between these two wells was considered and the pumping rate used is the sum of the pumping rate of the two wells. The distance from the pumping well used (r_1 and r_2) is the distance from the imaginary well. The observation wells used are Well 1 and Well 2.

The Dupuit equation is solved using steady state drawdown conditions. As a result, drawdown at 72 hours of pumping was used to solve the Dupuit equation, assuming that steady state conditions were reached at the end of the test.

The Transmissivity value estimated based on the Dupuit equation described above and the maximum drawdown at the end of the 72 hour pumping test is 2.2 x 10^{-5} m^2/sec. Assuming that all fracture zones contributed water evenly (19.5 m thick) and that the competent bedrock (non-fractured zone) did not contribute any water, the average hydraulic conductivity value for the fractured zones is 1.1 x 10^{-6} m/sec.

7.4.3 Non-Steady State Analysis

7.4.3.1 *Non-Steady State Analysis of Drawdown*

Non-steady state analysis was conducted on the pumping test data for the pumping and the recovery period. The non-steady state analysis was based on the Theis method (1935) with the Jacob approximation (1946).

The Jacob approximation is described by the following equation:

$$T = \frac{2{,}3Q_w}{4\pi\Delta s}$$

Where:

Δs = Drawdown gap (m)

Q_w = Flow rate (m^3/sec)

T = Transmissivity (m^2/sec), equal to K x B

K = Hydraulic conductivity of the aquifer (m/sec)

B = Saturated fractured zone thickness in the bedrock, (m)

The plot for the Theis with the Jacob approximation is presented in Graphs 102 and 103 included in Appendix 5.

The Transmissivity value estimated based on the Theis method with the Jacob approximation described above is 8.4 x 10^{-6} m^2/sec for Well 3 and 9.9 x 10^{-6} m^2/sec for Well 4. An average of 9.1 x 10^{-6} m^2/sec was calculated and assuming that all fracture zones contributed water evenly (19.5 m thick) and that the competent bedrock (non-fractured zone) did not contribute any water, the average hydraulic conductivity value for the fractured zones is 4.6 x 10^{-7} m/sec. The Storage Coefficient was not considered since it is only valid for porous aquifer and not for fracture aquifer.

7.4.3.2 *Non-steady State Analysis of Recovery*

The recovery of water levels following the end of pumping was analysed using the Theis recovery method (1935) with the Jacob approximation (1946). The equation used is the same as describes at section 7.4.3.1.

The analysis plot for the Theis Recovery method with the Jacob approximation is presented in Graphs 104 and 105 included in Appendix 5.

The Transmissivity value estimated based on the Theis Recovery method with the Jacob approximation (1946) described above is 1.4 x 10^{-5} m^2/sec for Well 3 and 1.3 x 10^{-5} m^2/sec for Well 4. An average of 1.35 x 10^{-5} m^2/sec was calculated and assuming that all fracture zones contributed water evenly (19.5 m thick) and that the competent bedrock (non-fractured zone) did not contribute any water, the average hydraulic conductivity value for the fractured zones is 6,9 x 10^{-7} m/sec.

7.4.4 Summary of Hydraulic Properties

The hydraulic properties are provided using the three analytical method described in the previous Sections 7.4.12 and 7.4.3.1 and 7.4.3.2 are summarized in Table 7-4.

Note that the three methods provided Transmissivity values in the same order of magnitude. We recommend to using an average Transmissivity between the three methods where T = 1.4 x 10^{-5} m^2/sec.

With aquifer thickness of 19.5 m, hydraulic conductivity is 7,1 x 10^{-7} m/sec.

Table 7-4. Summary of Hydraulic Properties Based on Analytical Methods.

		Steady State		Pumping test		Recovery method	
		Dupuit		Jacob (1935)		Theis (1935)	
Test	Monitoring /Pumping	T (m^2/sec)	K (m/sec)	T (m^2/sec)	K (m/sec)	T (m^2/sec)	K (m/sec)
Well 3	Well 3	--	---	8.4×10^{-6}	4.3×10^{-7}	1.4×10^{-5}	7.1×10^{-7}
Well 4	Well 4	---	---	9.9×10^{-6}	$5. \times 10^{-6}$	1.3×10^{-5}	6.7×10^{-7}
Well 3 and 4	Well 1 and Well 2	2.2×10^{-5}	1.1×10^{-6}	---	---	---	---
Average		2.2×10^{-5}	1.1×10^{-6}	9.1×10^{-6}	4.7×10^{-7}	1.35×10^{-5}	6.9×10^{-7}

7.4.5 Safe Well Yield Calculations

The Twenty Year Safe Well Yield calculation is used to estimate the long-term safe pumping rate for a well, and can be calculated using the two following methods. The Safe Well Yield calculations assume continuous pumping for twenty years.

The first method is based on the Farvolden equation (Nova Scotia Environment, 2011), and is described as follows:

$$Q_{20} = 0.683 T H_A S_f$$

Where:
Q_{20} = 20 Year Safe pumping rate for the well (m^3/day)
T = Transmissivity (1.19 m^2/day)
S_f = Safety Factor, 0.7 (no units)
H_A = Available head (42.26 m)

According to the Farvolden equation, the estimated Twenty Year Safe Yield for Well 3 is 16.71 L/min (24.07 m^3/day) assuming an available head above the pump, H_A, of 42.3 m based on an installed pump depth at 47 mBTOC, and a static water level at 4.7 mBTOC.

For Well 4, the estimated twenty year safe yield is 28.05 L/min (40.39 m^3/day) assuming an available head above the pump, H_A, of 71 m based on an installed pump depth at 74 m BTOC, and a static water level at 3 mBTOC.

The second method is based on the Van der Kamp and Maathuis equation (Nova Scotia Environment, 2011), and is described as follows:

$$Q_{20} = S_f H_A Q / (S_{100\,\min} + (S_{20\,yrs} - S_{100\,\min})_{theor})$$

Where:
Q_{20} = 20 Year Safe pumping rate for the well (m^3/day)
T = Transmissivity (1.19 m^2/day)
S_f = Safety Factor, 0.7 (no units)
H_A = Available head
Q = Pumping rate used during pumping test
S_{100min} = Drawdown observed in well during the pumping test at 100 min

$(S_{20yrs}-S_{100min})theor$ = The theoretical drawdown in the well after 20 years of pumping minus the theoretical drawdown in the well at 100 minutes, based on Graphs 106 and 107 in Appendix 5.

According to the Van der Kamp and Maathuis equation, the estimated Twenty Year Safe Yield for Well 3 is 29.83 L/min (42.95 m³/day) assuming an available head above the pump, H_A, of 42.3 m based on an installed pump depth at 47 m BTOC, and a static water level at 4.7 mBTOC.

For Well 4, the estimated Twenty Year Safe Yield is 56.78 L/min (81.77 m³/day) assuming an available head above the pump, H_A, of 71 m based on an installed pump depth at 74 mBTOC, and a static water level at 3 mBTOC.

The calculated Twenty Year Safe Yields are summarized in Table 7-5.

Table 7-5. Twenty Year Safe Yields.

	Well 3		Well 4	
	m³/day	Lpm	m³/day	Lpm
Pump Depth	47m		74m	
Static Water Level	4.7m		3m	
T (m²/day)	1.2			
Available head (H_A)	42.3m		71m	
Farvolden	24.07	16.71	40.39	28.05
Van der Kamp and Maathuis	42.95	29.83	81.77	56.78

7.4.1 Recommended Flow Rate for Test Well

Long term pumping test data showed a pseudo steady state when Well 3 flow rate is 31.8 L/min (45.82 m³/day) and Well 4 flow rate is 20.46 L/min (29.45 m³/day). However, according to the Farvolden equation, the estimated Twenty Year Safe Yield for Well 3 is 16.71 L/min (24.07 m³/day) and is 28.05 L/min (40.39 m³/day) for Well 4.

We recommended a pumping rate of 16.71 L/min (24.07 m³/day) at Well 3, and a pumping rate of 20.46 (29.45 m³/day) at Well 4. This rate can be maintained on a daily basis for periods of 12 hours, allowing sufficient recovery time (12 hours) between each day. In the event that the well needs to be producing for a continuous 24 hours, we recommended that a full 24 hours of recovery be completed to allow the well to recover to static water levels. Additionally, we recommend that a low water level probe be installed inside the well above the submersible pump. This probe can be used as a safety to switch off the submersible pump in the event that water levels drop too low.

Water conservation practices should be practiced where possible. The well should also be equipped with a flow meter, prior to conversion into a production well.

There was no observed evidence that the bedrock fractures were hydraulically connected to surface water bodies (GUDI).

7.5 Interference

7.5.1 Private Wells

In general, the hydraulic interference phenomenon between the catchment zones is manifested when the influence radius is over-lapping under dynamic pumping conditions. The hydraulic interference is responsible for the drawdown augmentation on each well site that accesses the same aquifer table. The pumping flow can be depressed, especially when the hydraulic interference phenomenon is significant.

The radius of influence of pumping Wells 3 and 4 is approximately 210 m. An impact on the level of water is present inside this radius. A drawdown was measured on the private wells PW1 and PW2 during the long-term pumping test. The drawdown is very low and negligible in PW2. At PW1, the drawdown reached a maximum of 5.89 m. The information reviewed from the well log has shown that PW1 is drilled to a depth of 163 feet (below ground surface) and the depth of the pump is between 150 and 153 feet (below ground surface). The impact at PW1, when pumping Wells 3 and 4, is considered low compared to the available drawdown.

7.5.2 Surface Water

As previously mentioned, it appears the increase in water level in the mini piezometer (P-1) installed in the wetland was not affected by the pumping or termination at Well 3 or Well 4. An observable change was recorded in the datalogger installed in P-1, however; it appears this may be an anomaly as the increase of 0.76 m (0.50 mbgs) was recorded once before the levels had dropped down to 1.16 mbgs.

Well 3 and Well 4 appear to have no influence on the wetland based on the pump data.

7.6 Chemistry

All water analytical results have been tabulated in conjunction with the 2015 Canadian Drinking Water Quality Guidelines (CDWQG) and the Nova Scotia Environment (NSE) Tier 1 Environmental Quality Standards (EQS). A copy of the tabulated results is provided in Appendix 7 (Tables 1, 2 and 3). A copy of the laboratory Certificates of Analysis are also provided in Appendix 8.

7.6.1 Well 3

The Langelier Index indicates that the water has a tendency to have a low corrosive impact at both cold and hot temperatures.

A comparison to the CDWQG indicates water sampled from the well (both at 36 and 72 hours of pumping) had elevated manganese concentrations. Note this parameter only has an Aesthetic Objective (AO) under the CDWQG.

No *E.*coli or Total Coliforms were measured in any of the samples.

There was no evidence of salt water intrusion.

Fluoride satisfied the guidelines during the 72-hour testing.

No VOCs were detected in the water sample from the 72 hour interval.

The manganese concentration was elevated following continuous pumping; this elevated concentration is likely associated with the natural geology of the underlying plutonic bedrock. Typically, continuous pumping results in lower concentrations of this (and other) parameters.

Periods of pump cycling may lead to elevated iron and manganese concentrations in the well water. Elevated iron concentrations can cause coloring of the water during production, staining of plumbing, and a metallic taste. In certain cases, iron can also promote the growth of iron bacteria in water mains and service pipes. Elevated manganese concentrations can also cause staining of fixtures and metallic taste. A treatment system may be required to address excessive iron and manganese concentrations; however, these parameters are not health-related.

Little groundwater filtration occurs in a fractured bedrock aquifer, and groundwater velocities are relatively high in this type of aquifer due to the low void space. The absence of natural filtration, unlike in aquifers with porous materials (sands), causes fractured bedrock aquifers to be more vulnerable than aquifers with porous materials to potential contamination.

We recommend an ongoing groundwater testing program (yearly samples) to ensure that water quality maintains drinking water standards.

7.6.2 Well 4

The Langelier Index indicates that the water has a tendency to have a relatively low corrosive impact at both cold and hot temperatures.

A comparison to the CDWQG indicates water sampled from the well (both at 36 and 72 hours of pumping) had an elevated manganese concentration. Note this parameter only has an Aesthetic Objective (AO) under the CDWQG.

No *E.*coli Coliforms were measured in any of the samples. Total coliforms (2 CFU/100ml) were detected in the 36 hour test, although none were detected in the 72 hour test.

There was no evidence of salt water intrusion.

Fluoride satisfied the guidelines during the 72-hour testing.

No VOCs were detected in the water sample from the 72 hour interval.

The manganese concentration was elevated following continuous pumping; this elevated concentration is likely associated with the natural geology of the underlying plutonic bedrock. Typically, continuous pumping results in lower concentrations of this (and other) parameters.

Periods of pump cycling may lead to elevated iron and manganese concentrations in the well water. Elevated iron concentrations can cause coloring of the water during production, staining of plumbing, and a metallic taste. In certain cases, iron can also promote the growth

of iron bacteria in water mains and service pipes. Elevated manganese concentrations can also cause staining of fixtures and metallic taste. A treatment system may be required to address excessive iron and manganese concentrations; however, these parameters are not health-related.

Little groundwater filtration occurs in a fractured bedrock aquifer, and groundwater velocities are relatively high in this type of aquifer due to the low void space. The absence of natural filtration, unlike in aquifers with porous materials (sands), causes fractured bedrock aquifers to be more vulnerable than aquifers with porous materials to potential contamination.

7.6.3 Off-Site Wells

A comparison to the NSE Tier 1 EQS and CDWQG indicates water sampled from off-site wells mostly satisfied all NSE Tier 1 EQS and CDWQGs, with the following exceptions.

- Turbidity (post pumping) was slightly elevated in PW1;
- Aluminum (pre pumping), chloride, turbidity, iron and manganese concentrations (pre and post pumping) were elevated at PW2;
- Aluminum (pre pumping), arsenic, iron, manganese and turbidity (pre and post pumping) were elevated at PW3;
- Colour (post pumping) and iron, manganese and turbidity (pre and post pumping) were elevated at PW4;
- Turbidity (pre and post pumping) was elevated at PW5;
- Total coliforms (pre pumping) were elevated and pH (pre and post pumping) was depressed at DW1.

The elevated chloride concentration at PW2 was likely due to road salt influences. Guidelines for aluminum, iron and manganese are not health based concerns; these elevated concentrations (and colour and turbidity) are likely associated with the natural geology of the underlying plutonic bedrock.

The guideline for arsenic is health based; although the elevated arsenic concentration appears to be natural in nature and not the result of pumping at the site, the potable water at PW3 should be treated.

7.6.4 Sea Levels

Figure 102 (Appendix 5) plots the drawdowns of Well 3 and Well 4 with conductivity. These two wells (as well as PW2) experienced drawdowns below sea level. Conductivity (as well as dissolved chloride, sodium and bromide) can be used as indicators of possible salt water intrusion from the Atlantic Ocean.

At Well 3 and Well 4, bromide was analyzed in the 72-hour test; bromide at both locations was not detected. Therefore, in our opinion the slightly increasing sodium, chloride and conductivity concentrations at Well 4 are likely not related to salt water intrusion.

Although bromide was not analyzed in the water from PW2, given its proximity to the road and the parking lot servicing the commercial building, the chloride detected in this well is likely from road salt impacts.

7.6.5 Piezometers

Analytical results from water sampled from the wetland piezometer indicate that surface water generally had a depressed pH, was excessively turbid and had elevated colour. There were also elevated aluminum, iron and lead concentrations. These parameters would likely be associated with organic matter present in the wetlands. The wetland surface water values were not compared to drinking water guidelines, although these results were compared to NSE Tier 1 EQS freshwater surface water and CCME Freshwater Aquatic Life guidelines.

8 CONCLUSIONS AND RECOMMENDATIONS

8.1 Water Quantity

Long term pumping test data showed a pseudo steady state when Well 3 pumping rate is 31.8 L/min (45.82 m³/day) and Well 4 pumping rate is 20.46 L/min (29.45 m³/day). However, according to the Farvolden equation, the estimated Twenty Year Safe Yield for Well 3 is 16.71 L/min (24.07 m³/day) and is 28.05 L/min (40.39 m³/day) for Well 4.

We recommended a pumping rate of 16.71 L/min (24.07 m³/day) at Well 3 and a pumping rate of 20.46 L/min (29.45 m³/day) at Well 4. This rate can be maintained on a daily basis for periods of 12 hours, allowing sufficient recovery time (12 hours) between each day. In the event that the well needs to be producing for a continuous 24 hours, we recommended that a full 24 hours of recovery be completed to allow the well to recover to static water levels.

The proposed pump rates may not be sufficient to accommodate peak supply demands; storage is already planned for potable water use. Additional water requirements may be required for any water treatment; the additional requirements should be determined when a treatment system in chosen.

The storage capacities will be optimized during detailed design. From review of Appendix F of the NS On-Site Sewage Disposal Systems Technical Guidelines which provides guidelines for design wastewater flow rates from various types of buildings and facilities (e.g. mulit-unit residential, residential, commercial, etc), total potable consumption has been estimated to be 35,950 L/day. This number is broken down as follows:

- Multi-Unit Residential Building A (33,250 L/day):
  - First 3 bedroom unit @ 1,000 L/day = 1,000 L/day
  - 6 x 1 bedroom units @ 500 L/day = 3,000 L/day
  - 39 x 2 bedroom units x 750 L/day = 29,250 L/day
- Commercial Building C (2,700 L/day):

- 60 employees x 45 L/employee/day = 2,700 L/day

Therefore, with a combined safe yield from wells 3 (16.71L/min) and 4 (20.46 L/min) of 53,524 L/day, these wells can likely support both Buildings A and C.

Additional detailed assessment will be carried out prior to design of Phase 2 to confirm the remaining areas of the site can support additional development without negatively impacting existing water well supplies.

Water conservation practices should be practiced where possible. The wells should also be equipped with flow meters, prior to conversion into production wells, so that actual consumption can be monitored. Additionally, we recommend that a low water level probe be installed inside the wells above the submersible pumps. These probes can be used as a safety to switch off the submersible pump in the event that water levels drop too low.

8.2 Interference

The radius of influence of pumping Wells 3 and 4 is approximately 210 m. An impact on the level of water is present inside this radius. A drawdown was measured on the private wells PW1 and PW2 during the long-term pumping test. The drawdown is very low and negligible in PW2. At PW1, the drawdown reached a maximum of 5.89 m. The information reviewed from the well log has shown that PW1 is drilled to a depth of 163 feet (below ground surface) and the depth of the pump is between 150 and 153 feet (below ground surface). The impact at PW1 when pumping well 3 and 4 is considered low compared to the available drawdown.

At the recommended long term pumping rates, impacts on the neighbouring potable wells will be lower than what was observed during the long term pump test.

8.3 Chemical Quality

Manganese concentrations exceeded the CDWQG AOs for both Well 3 and 4. Well B also has detectable total coliforms in the 36 hour test, although there were no total coliforms at 72-hours.

Following continuous pumping, the manganese concentration was still elevated. The elevated manganese (and usually iron) concentrations are likely associated with the natural geology of the underlying plutonic bedrock. Typically, continuous pumping results in lower concentrations of these (and other) parameters.

Trace toluene was detected in the 72-hour sample from Well 4; given its very low reported concentration (slightly over the laboratory detection limit), this is likely an anomalous result.

Periods of pump cycling may lead to elevated iron and manganese concentrations in the well water. Elevated iron concentrations can cause coloring of the water during production, staining of plumbing, and a metallic taste. In certain cases, iron can also promote the growth of iron bacteria in water mains and service pipes. Elevated manganese concentrations can

also cause staining of fixtures and metallic taste. A treatment system may be required to address excessive iron and manganese concentrations; however, these parameters are not health-related.

Little groundwater filtration occurs in a fractured bedrock aquifer, and groundwater velocities are relatively high in this type of aquifer due to the low void space. The absence of natural filtration, unlike in aquifers with porous materials (sands), causes fractured bedrock aquifers to be more vulnerable than aquifers with porous materials to potential contamination. Adequate buffers should be implemented to protect the water quality and site drainage (particularly from parking lots that are maintained with salt during the winter) should be directed away from the well locations.

Further, we recommend an ongoing groundwater testing program (yearly samples) to ensure that water quality maintains drinking water standards.

8.3.1 Treatment Options

Water treatment requirements will depend upon the ultimate consumer of the water; however, at a minimum, the water must be treated to satisfy the Nova Scotia Environment Tier 1 EQS or CDWQG. Treatment units should be designed to suit the specific needs and water chemistry at the site; based on the current analytical results, there are no health based criteria that require treatment. Howerver, if water is stored to buffer against peak demands, chlorination (or other bacteria treatment) may be prudent. The wells do not appear to be connected to the neighbouring wetland. At this time, haloacetic acid (HAAs) and trihalomethanes (THMs) are not a concern.

Some basic treatment methods for various uses are provided in Table 8-1, below. Infrastructure, operation and maintenance costs vary with the type of treatment system installed; including additional electrical costs to run the system, and maintenance and media replacement costs depending upon the quantity of water treated.

Table 8-1. Treatment Options.

TREATMENT METHOD	USES
Activated carbon filtration	Removes organic compounds, including pesticides.
Reverse osmosis	Removes heavy metals and nitrates; often used in combination with activated carbon filters.
Distillation	Removes heavy metals and nitrates; often used in combination with activated carbon filters. Kills micro-organisms. Can be used to remove objectionable aesthetic parameters (iron, manganese)
Ozonation	Removes organic compounds, including pesticides; often used in combination with activated carbon filters. Kills micro-organisms.
Greensand Filtration	Removes objectionable aesthetic parameters (iron, manganese, H_2SO_4)
Water Softener	Removes excess calcium (hardness)

TREATMENT METHOD	USES
Chlorination	Kills bacteria and viruses. Used in conjunction with filtration to remove objectionable aesthetic parameters (iron, manganese, tannins, H_2SO_4)
Sediment Filtration	Removes sediment and turbidity
Aeration	Used in conjunction with filtration to remove objectionable aesthetic parameters (iron, manganese, H_2SO_4)
Ultraviolet	Kills all microorganisms. Use in conjunction with microfiltration to improve inactivation and remove particulate matter, including parasites.

8.4 Other Considerations

Currently, based on the proposed development activity for the site, the drinking water may be considered a public drinking water supply under the Nova Scotia *Water and Wastewater Facilities and Public Drinking Water Supplies Regulations* as the wells could:

i) regularly serve 25 or more persons per day for at least 60 days of the year.

Further, in accordance with the *Water and Wastewater Facilities and Public Drinking Water Supplies Regulations*, registered water supplies would need to be regularly sampled, tested and monitored in accordance with the *Guidelines for Monitoring Public Drinking Water Supplies*, more specifically for:

a) microbiological quality;
b) general chemical and physical quality;
c) disinfection residual, if the owner is using a disinfection system;
d) source and treated water turbidity, if the owner is using chemically assisted filtration;
e) fluoride concentrations, if the owner is using fluoridation; and
f) any substances required by the Minister or an administrator.

Based on the proposed water requirements for the subject property supplied to Englobe by the project designer, the daily water withdrawal for the site has been estimated to be in the range of 55,000 litres per day. Once the site design and the water requirements are finalized, an evaluation should be conducted to determine if the site needs to be registered as a large capacity water user.

9 LIMITATIONS

This review and assessment was conducted using the methodology described in this report. The opinions in this report are provided using generally accepted scientific judgement, principles and practices; however, due to the inherent uncertainty in these processes, no guarantee of conclusion is intended or can be given.

It is important to note that the investigation involves a sampling of the site gathered at specific test locations and the conclusions in this report are based on this information gathered.

This report was prepared by Englobe Corp. for the exclusive use of 3283920 Nova Scotia Limited. The scope of the services performed may not be appropriate to satisfy the needs of third parties. Any use which a third party makes of this report, or any reliance on or decisions made based on it, is the sole responsibility of the third party. Englobe accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

This report has been prepared by Aven Cole, M.Sc.E., P.Eng., with contributions by Reinhard Zapata, Ph.D., P.Geo. and Simon Bouchand, géol. M.Sc.A.

10 REFERENCES

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Environment Canada. 2011. 2011 Municipal Water Use Report, Municipal Water Use 2009 Statistics.

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WSP. 2014. Level I Groundwater Assessment Report, PID: 40057499, Peggy's Cove Road, Upper Tantallon, Nova Scotia.

Appendix 1 Plans

TANTALLON AGED LIVING

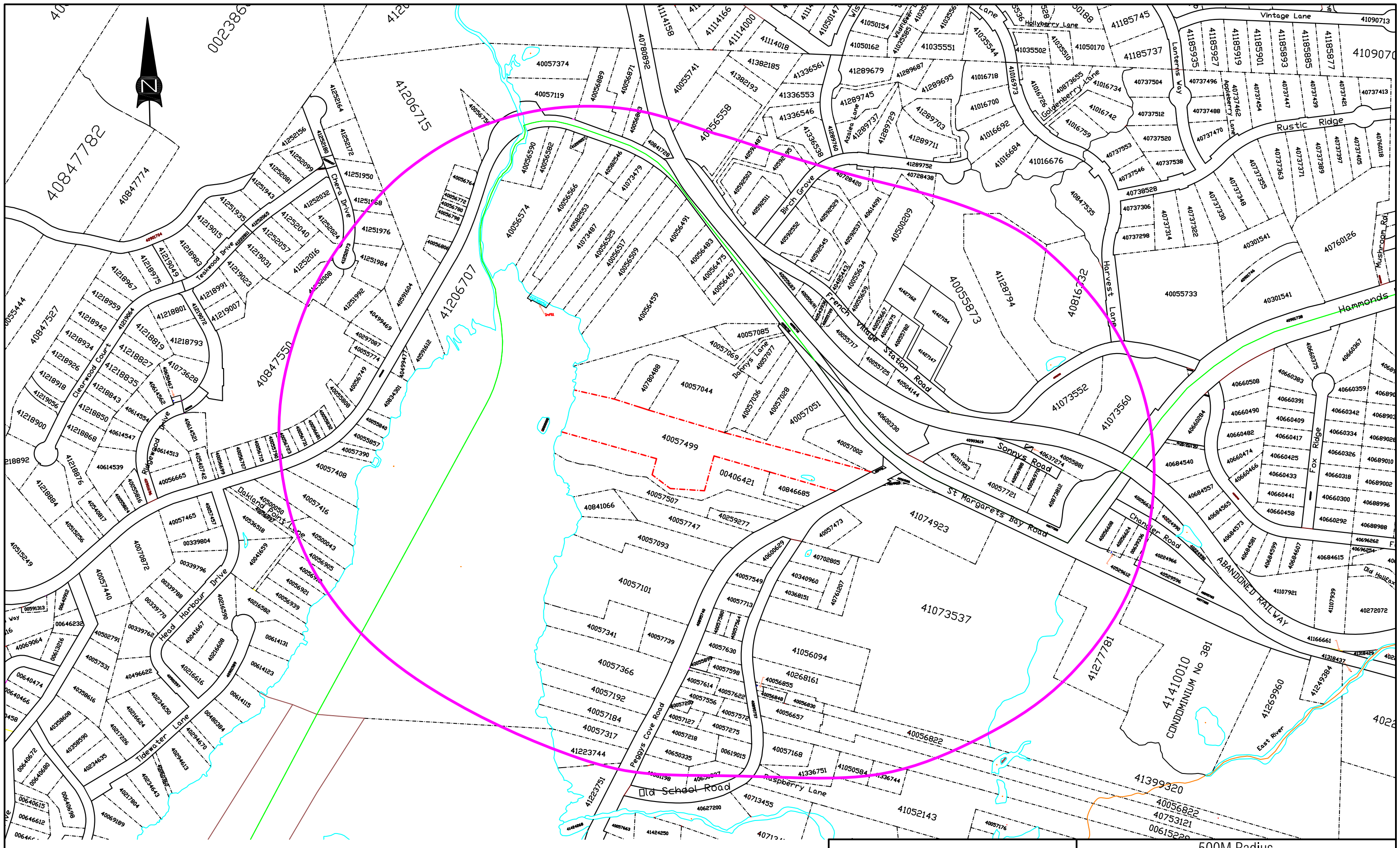
LOT B, NO. 333 HIGHWAY, UPPER TANTALLON, NS

SITE DEVELOPMENT PLAN

Project No.:	P2015.24
Scale:	1" = 100'-0"
Date:	19 May 2017

WM FARES ARCHITECTS

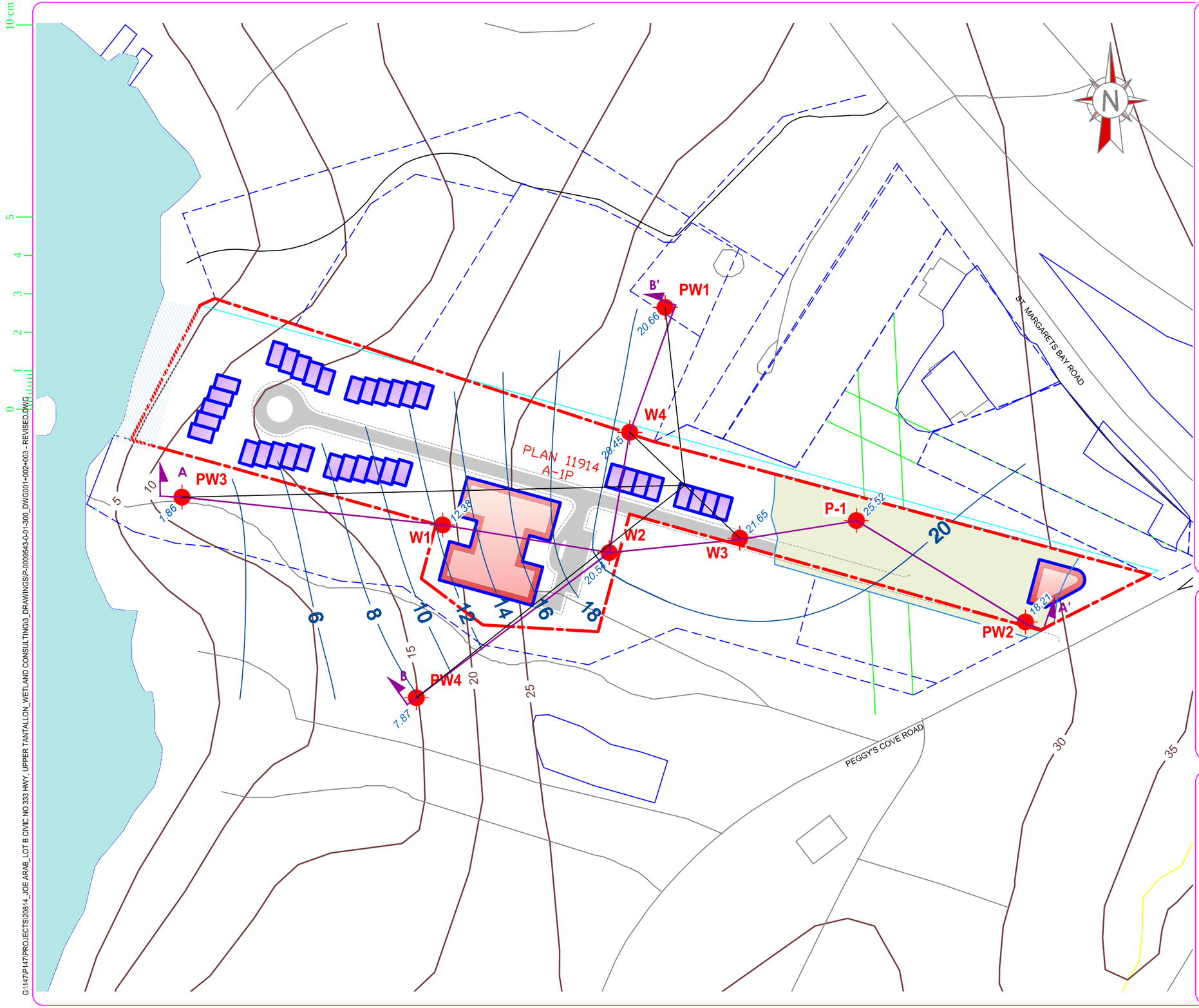
SDP2



Englobe

500M Radius
Level 2 Groundwater Assessment
Lot B, Peggy's Cove Road, Upper Tantallon, NS

DATE: June 2016	SCALE: 1:6000	DRAWN BY: JJ	CKD BY: AC	JOB No. 20814	FIGURE 1



LEGEND :

- CROSS SECTION (A – A')
- BOREHOLE LOCATION
- GROUND SURFACE ELEVATION (mASL)
- 1.86 GROUNDWATER ELEVATIONS (mASL) February 2016
- GROUNDWATER CONTOURS (mASL) February 2016

NOTES :

1-REFERENCES: Plan of Retracement Survey, No. 333 Highway , Upper Tantallon, NS, Plan # 15-0574, Dated Feb. 12, 2016, By Tim Wamboldt Survey Ltd.

2-Drawing scale may be distorted due to file conversion and/or copying. Measurements taken from the drawing must be verified in the field.

Project

Level 2 Groundwater Assessment

Lot B, Peggy's Cove Road, Upper Tantallon, Nova Scotia

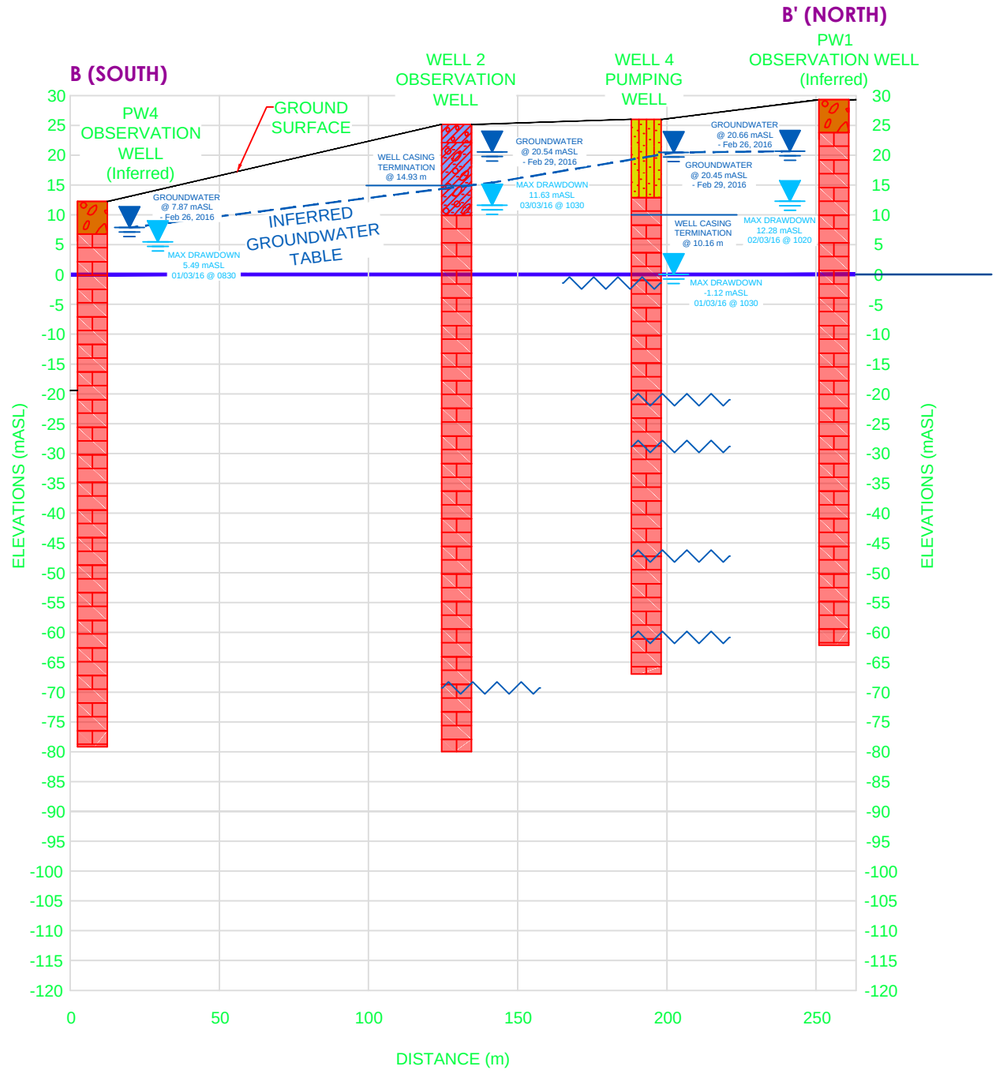
Title

SITE PLAN
FIGURE 2

Englobe

Englobe Corp.
97 Troop Avenue
Dartmouth, NS B3B 2A7
Telephone : 902.468.6486
Fax : 902.468.4919

Prepared	E.Ciochon	Discipline	HYDROGEOLOGY
Drawn	E.Ciochon	Scale	H=1:2000, V=1:1000
Checked	R.Zapata	Date	2016-04-20
Project manager	S. Meteer	Sequence no.	
M. dept.	147	Project	20814



LEGEND :

- PEAT
- GRAVEL
- SILT AND SAND
- CLAY AND BOULDERS
- CLAY, SAND AND GRAVEL
- GRANITE
- WATER LEVEL
- WATER BEARING FRACTURE
- SEA LEVEL

NOTES :

1-Assumed geology of PW1, PW3 and PW4 is similar to PW2.

2-Drawing scale may be distorted due to file conversion and/or copying. Measurements taken from the drawing must be verified in the field.

Project

Level 2 Groundwater Assessment

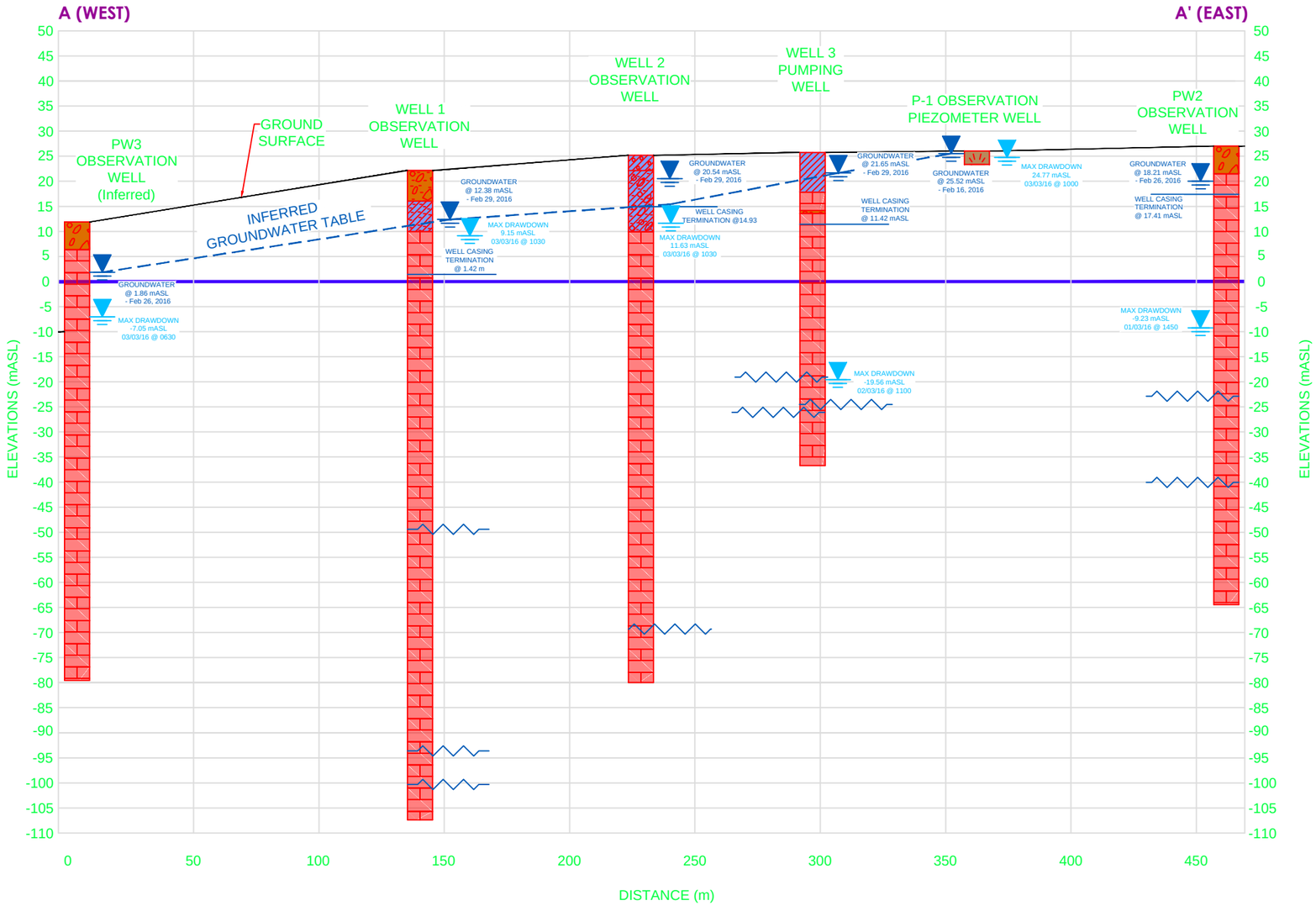
Lot B, Peggy's Cove Road, Upper Tantallon, Nova Scotia

Title

CROSS SECTION B - B'
FIGURE 3

Englobe Corp.
97 Troop Avenue
Dartmouth, NS B3B 2A7
Telephone : 902.468.6486
Fax : 902.468.4919

Prepared E.Ciochon	Discipline HYDROGEOLOGY
Drawn E.Ciochon	Scale H=1:2000, V=1:1000
Checked R.Zapata	Date 2016-04-20
Project manager S. Meteer	Sequence no.
M. dept. 147	Project 20814



LEGEND :

- SAND AND GRAVEL
- GRAVEL
- CLAY AND SAND
- CLAY AND BOULDERS
- CLAY, SAND AND GRAVEL
- GRANITE
- WATER LEVEL
- WATER BEARING FRACTURE
- SEA LEVEL
- MAXIMUM DRAWDOWN

NOTES :

1-Assumed geology of PW1, PW3 and PW4 is similar to PW2.

2-Drawing scale may be distorted due to file conversion and/or copying. Measurements taken from the drawing must be verified in the field.

Project

Level 2 Groundwater Assessment

Lot B, Peggy's Cove Road, Upper Tantallon, Nova Scotia

Title

CROSS SECTION A - A'
FIGURE 4

Englobe Corp.
97 Troop Avenue
Dartmouth, NS B3B 2A7
Telephone : 902.468.6486
Fax : 902.468.4919

Prepared E.Ciochon	Discipline HYDROGEOLOGY
Drawn E.Ciochon	Scale H=1:2000, V=1:1000
Checked R.Zapata	Date 2016-04-20
Project manager S. Meteer	Sequence no.
M. dept. 147	Project 20814

Appendix 2 Well Survey Results

Civic No.	Street	Well Log			Well Type	Year Installed	Depth (ft)	Treated? Type of Treatment	Owner	Comments: Quantity, Quality, odours, etc	Participate in Level 2?
13446	Peggy's Cove Road										
13456	Peggy's Cove Road										
13461	Peggy's Cove Road										
13462	Peggy's Cove Road										
13463	Peggy's Cove Road										
13468	Peggy's Cove Road										
13471	Peggy's Cove Road										
13476	Peggy's Cove Road										
13477	Peggy's Cove Road										
13481	Peggy's Cove Road								NA		
13486	Peggy's Cove Road								NA		
13487	Peggy's Cove Road								NA		
13493	Peggy's Cove Road								NA		
13495	Peggy's Cove Road								NA		
13496	Peggy's Cove Road	020223			Drilled				NA		
13501	Peggy's Cove Road								NA		
13506	Peggy's Cove Road				Dug				NA		NA
13509	Peggy's Cove Road				Drilled				Mel Dauphine	Good	NA
13534	Peggy's Cove Road				Dug				Morash	Uncooperative	
13535	Peggy's Cove Road				Dug				Manual (vacant)	For Sale Commercial	
13544	Peggy's Cove Road				No well				Richard Whitman	Commercial	NA
13546	Peggy's Cove Road				Drilled			no	Terry & Richard Whitman		Yes (PW4)
13548	Peggy's Cove Road				Drilled			no	Francois Dolbec		Yes - water quality only (PW5)
13549	Peggy's Cove Road (Ronald A Walker Funeral Home)				Dug				Walker Funeral		NA
13560	Peggy's Cove Road									Vacant lot	
13570	Peggy's Cove Road (Rum Hollow Seaside B&B)				Dug		20		Jim Edward	Good	Yes - water quality only (DW1)
13576	Peggy's Cove Road				Drilled	1988	200		David Flemming	Great Water	Yes (PW3)
13578	Peggy's Cove Road (Acadian Maple Products)	010106			Drilled				Acadian Maple	No	Yes (PW2)
13589	Peggy's Cove Road (Multiple Businesses)	101635			Drilled	2011			Bluenose Accounting Anthony Fielding	As	
5181	St. Margarets Bay Road (Multiple Businesses)	931034			Drilled				Redmonds/Mariposa/vet/book store	Odour	
5209	St. Margarets Bay Road (Home Hardware)				Drilled				Redmonds/Mariposa/vet/book store	odour	
5210	St. Margarets Bay Road (Irving/Circle K)	120210	940883	530088	Drilled				Irving		
5216	St. Margarets Bay Road (Super Store)				Drilled	2013			Cobalt		
5226	St. Margarets Bay Road (Businesses)				Drilled	2013			Cobalt		
5229	St. Margarets Bay Road (Mariposa Natural Mkt & Café)				Drilled				Redmonds/Mariposa/vet/book store	odour	
5236	St. Margarets Bay Road (TD Canada)				Drilled	2013			Cobalt		
5249	St. Margarets Bay Road (res or vacant?)	020958			Drilled	Looks recent			Former Country Garden Centre	Unknown	
5250	St. Margarets Bay Road (Vet)				Drilled				Vet (David)	Unknown	No
5280	St. Margarets Bay Road (Multiple Businesses)								On numbered co.		
5288	St. Margarets Bay Road (Multiple Businesses)	030230							On numbered co.		
5298	St. Margarets Bay Road				Drilled	Decades ago			Betty Kedy	Good	NA
5302	St. Margarets Bay Road				Dug	Decades ago			Joanne Kedy	Good	NA
5320	St. Margarets Bay Road				Dug	Decades ago (20')			Danny Maryatt	Slight As	NA
5328	St. Margarets Bay Road	040499			Drilled			Unknown	Margaret's elderly mom	Unknown	
5332	St. Margarets Bay Road (Green Houses)				Dug			Unknown	Garden Centre	Unknown	NA
5348	St. Margarets Bay Road				Drilled					Unkonwn	
5354	St. Margarets Bay Road	001174			Drilled					Unknown	
5374	St. Margarets Bay Road								NA		
????					Drilled				St. Lukes	Major quality issues	
36	Old School Road								NA		
43	Old School Road								NA		

44	Old School Road								NA		
48	Old School Road								NA		
49	Old School Road								NA		
52	Old School Road								NA		
53	Old School Road								NA		
57	Old School Road								NA		
58	Old School Road								NA		
61	Old School Road								NA		
70	Old School Road								NA		
74	Old School Road				Dug				Manual (13535 SMB)	For sale commercial	
75	Old School Road								NA		
77	Old School Road								NA		
81	Old School Road								NA		
85	Old School Road								NA		
89	Old School Road				Drilled				Terry Pulsifer	Good/ 2 gpm	
6	Sonnys Road								NA		
9	Sonnys Road								NA		
10	Sonnys Road (Bay Equip,emt Rentals Sales & Services)				Dug	old home			House		
14	Sonnys Road				Drilled				Bay Rentals		
60	French Village Station Road				Dug				vacant trailer for sale. Unoccupied		
61	French Village Station Road				Dug & Drilled				NA		
62	French Village Station Road				Drilled				NA		
65	French Village Station Road				Drilled				Carol Rolf (483-6623)	Good	
69	French Village Station Road	120904							NA		
73	French Village Station Road				Drilled				Horse Farm		
77	French Village Station Road								Cottage ? NA		
80	French Village Station Road				Dug				NA		
84	French Village Station Road				Spring fed dug				Heather Shaffer	Good	NA
85	French Village Station Road				Dug (11')				Darlene & Roy Shaffer	Good	
92	French Village Station Road								NA		
100	French Village Station Road	010333							Philip & Rosalie Morash		
12	Dannys Lane				Dug				Sandy Pulsifer Mom	Good/House tear down	
38	Dannys Lane	921475			Drilled	1992	165		Sandy Pulsifer	Good	Yes PW1
92	Dannys Lane				Dug	Early 2000s			Vicki Pulsifer (daughter)	Good	NA

Appendix 3 Well Logs

Print | Clear Form

NOVA SCOTIA

Drilled Well Report

NSE Well No. _____ (Departmental use)

Certified Well Contractor

Name: Travis Jacobs
Certificate No.: 847
Company: Bluenose Well Drilling Ltd
Address: 2371 Lawrencetown Rd. Lawrencetown, HRM
Helpers Name(s): Byron Jacobs

Well Owner/Contractor Information

Well drilled for: Owner _____
or Contractor/Builder/Consultant/etc.: 3283920 Nova Scotia Ltd
Civic Address of well _____
Lot No. and Subdivision of well _____
County: HRM Postal Code _____ Phone _____
Nearest Community in: ☑ NS Atlas ☑ NS Map Book _____

Stratigraphic Log

Depth in feet From	To	Colour	General Description of Overburden/Bedrock	Water Found	Well Sketch
0	20		Sand + Gravel	Y N	
20	40		clay + sand	Y N	
40	56		Broken granite	Y N	
56	425		Granite	Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	

Attach Another Sheet if Needed

Well Location

Property (PID) _____
GPS (WGS84 UTM)
Northing 4948821
Easting 0429661
☑ NS Atlas ☐ NS Map Book
Page _____ Column _____ Row _____
Roamer Letter _____ Roamer Number _____

Well Location Sketch

Well Construction Information

Total depth below surface: 425 ft
Depth to bedrock: 56 ft
Water bearing fractures encountered: _____ ft
240 ft 385 ft 407 ft _____ ft

Well Casing

Outer Casing
From 0 To 68 ft
Diameter 6 in
Wall Thickness 188 in
Material: ☑ steel or _____
ASTM spec. A-589

Inner Casing
From _____ To _____ ft
Diameter _____ in
Wall Thickness _____ in
Material: ☐ steel or _____
ASTM spec. _____

Length of casing above ground 1 ft _____ in
☑ driveshoe: type Heavywall
☑ grout: type Bentonite ☐ packer: type _____

Well Finish

☑ open hole ☐ slotted casing ☐ screen ☐ gravel pack
Screens: make _____ material _____
length _____ ft from _____ to _____ ft slot size _____
length _____ ft from _____ to _____ ft slot size _____
Gravel pack: size _____ from _____ to _____ ft

Clearance Distance to Nearest

Oil tank _____ ft
Roadway outer boundary _____ ft
Road name _____
On-site sewage system _____ ft
Off-site sewage system _____ ft
Cesspool or other potential source of contamination _____ ft (please identify source)
Watercourse _____ ft Well _____ ft

Water Yield

Method: ☑ Air blown ☐ Bail ☐ Pump
Rate 5 1/2 igpm Duration 1 hrs
Test depth 420 ft
Depth to water at end of test 420 ft
Total drawdown _____ ft
Water level recovered to _____ ft
by _____ hrs _____ mins after test ended.
Depth to static level 35 ft
☐ Overflow

Water Quality

Colour _____ Taste _____ Odour _____ Other _____

Final Status of Well

☑ Water supply
☐ Observation Well
☐ Test Hole
☐ Recharge Well
☐ Abandoned, insufficient supply
☐ Abandoned, poor quality
☐ Abandoned, salt water
☐ Unfinished
☐ Other _____

Water Use

☑ Domestic
☐ Industrial
☐ Commercial
☐ Municipal
☐ Irrigation
☐ Public Supply
☐ Agricultural
☐ Heat Pump
☐ Other _____

Method of Drilling

☑ Rotary
☐ Cable Tool
☐ Jet
☐ Other _____
☐ Drilling Fluids
Type: _____

Driller's Comments

Well #1

Certification

I certify this well has been constructed in accordance with the *Nova Scotia Environment Act and Well Construction Regulations.*
Date Well completed 11-Dec-2015
Signature _____
Date Signed 11-Dec-2015

Mail to:

Nova Scotia Department of Environment
30 Damascus Road, Suite 115
Bedford, Nova Scotia B4A 0C1

Important Home Owner's Document - Safeguard with legal documents.
Original to NSE Copy to Customer Copy to Contractor

Rev 08/13

Print | Clear Form

NOVA SCOTIA

Drilled Well Report

NSE Well No. _____ (Departmental use)

Certified Well Contractor

Name: Travis Jacobs
Certificate No.: 847
Company: Bluenose Well Drilling Ltd
Address: 2371 Lawrencetown Rd, Lawrencetown, HRM
Helpers Name(s): Byron Jacobs

Well Owner/Contractor Information

Well drilled for: Owner _____
or Contractor/Builder/Consultant/etc.: 3283920 Nova Scotia Ltd
Civic Address of well _____
Lot No. and Subdivision of well _____
County: HRM Postal Code _____ Phone _____
Nearest Community in: ☐ NS Atlas ☑ NS Map Book _____

Stratigraphic Log

Depth in feet From	To	Colour	General Description of Overburden/Bedrock	Water Found	Well Sketch
0	10		Clay, Boulders, water	Y N	
10	40		Clay, Sand + Gravel	Y N	
40	345		Granite	Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	

Attach Another Sheet if Needed

Well Location

Property (PID) _____
GPS (WGS84 UTM)
Northing 4948778 m
Easting 0429841 m
☑ NS Atlas ☐ NS Map Book
Page _____ Column _____ Row _____
Roamer Letter _____ Roamer Number _____

Well Location Sketch

Well Construction Information

Total depth below surface: 345 ft
Depth to bedrock: 40 ft
Water bearing fractures encountered: _____ ft
310 ft _____ ft _____ ft _____ ft

Well Casing

Outer Casing
From 0 To 50 ft
Diameter 6 in
Wall Thickness 188 in
Material: ☑ steel or _____
ASTM spec. A-589

Inner Casing
From _____ To _____ ft
Diameter _____ in
Wall Thickness _____ in
Material: ☐ steel or _____
ASTM spec. _____

Length of casing above ground 1 ft _____ in
☑ driveshoe: type Heavywall
☑ grout: type Bentonite ☐ packer: type _____

Well Finish

☑ open hole ☐ slotted casing ☐ screen ☐ gravel pack
Screens: make _____ material _____
length _____ ft from _____ to _____ ft slot size _____
length _____ ft from _____ to _____ ft slot size _____
Gravel pack: size _____ from _____ to _____ ft

Clearance Distance to Nearest

Oil tank _____ ft
Roadway outer boundary _____ ft
Road name _____
On-site sewage system _____ ft
Off-site sewage system _____ ft
Cesspool or other potential source of contamination _____ ft (please identify source)
Watercourse _____ ft Well _____ ft

Water Yield

Method: ☑ Air blown ☐ Bail ☐ Pump
Rate 5 igpm Duration 1 hrs
Test depth 340 ft
Depth to water at end of test 340 ft
Total drawdown _____ ft
Water level recovered to _____ ft
by _____ hrs _____ mins after test ended.
Depth to static level 21 ft
☐ Overflow

Water Quality

Colour _____ Taste _____ Odour _____ Other _____

Final Status of Well

☑ Water supply
☐ Observation Well
☐ Test Hole
☐ Recharge Well
☐ Abandoned, insufficient supply
☐ Abandoned, poor quality
☐ Abandoned, salt water
☐ Unfinished
☐ Other _____

Water Use

☑ Domestic
☐ Industrial
☐ Commercial
☐ Municipal
☐ Irrigation
☐ Public Supply
☐ Agricultural
☐ Heat Pump
☐ Other _____

Method of Drilling

☑ Rotary
☐ Cable Tool
☐ Jet
☐ Other _____
☐ Drilling Fluids
Type: _____

Driller's Comments

Well #2

Certification

I certify this well has been constructed in accordance with the *Nova Scotia Environment Act and Well Construction Regulations.*
Date Well completed 09-Dec-2015
Signature _____
Date Signed 09-Dec-2015

Mail to:

Nova Scotia Department of Environment
30 Damascus Road, Suite 115
Bedford, Nova Scotia B4A 0C1

Important Home Owner's Document - Safeguard with legal documents.

Rev 08/13

Original to NSE Copy to Customer Copy to Contractor

Print | Clear Form

NOVA SCOTIA

Drilled Well Report

NSE Well No. _____ (Departmental use)

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Helpers Name(s): Byron Jacobs

Well Owner/Contractor Information

Well drilled for: Owner _____
or Contractor/Builder/Consultant/etc. 3283920 Nova Scotia Ltd
Civic Address of well _____
Lot No. and Subdivision of well _____
County HRM Postal Code _____ Phone _____
Nearest Community in: ☑ NS Atlas ☑ NS Map Book _____

Stratigraphic Log

Depth in feet From	To	Colour	General Description of Overburden/Bedrock	Water Found	Well Sketch
0	26		Sand, clay, water, boulders	Y N	
26	38		Granite	Y N	
38	40		Gravel + water	Y N	
40	205		Granite	Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	

Attach Another Sheet if Needed

Well Location

Property (PID) _____
GPS (WGS84 UTM)
Northing 4948806 m
Easting 0429883 m
☑ NS Atlas ☐ NS Map Book
Page _____ Column _____ Row _____
Roamer Letter _____ Roamer Number _____

Well Location Sketch

Well Construction Information

Total depth below surface 205 ft
Depth to bedrock 40 ft
Water bearing fractures encountered _____ ft
147 ft 165 ft 170 ft _____ ft

Well Casing

Outer Casing
From 0 To 47 ft
Diameter 6 in
Wall Thickness 188 in
Material: ☑ steel or _____
ASTM spec. A-589

Inner Casing
From _____ To _____ ft
Diameter _____ in
Wall Thickness _____ in
Material: ☐ steel or _____
ASTM spec. _____

Length of casing above ground 1 ft _____ in
☑ driveshoe: type Heavywall
☑ grout: type Bentonite ☐ packer: type _____

Well Finish

☑ open hole ☐ slotted casing ☐ screen ☐ gravel pack
Screens: make _____ material _____
length _____ ft from _____ to _____ ft slot size _____
length _____ ft from _____ to _____ ft slot size _____
Gravel pack: size _____ from _____ to _____ ft

Clearance Distance to Nearest

Oil tank _____ ft
Roadway outer boundary _____ ft
Road name _____
On-site sewage system _____ ft
Off-site sewage system _____ ft
Cesspool or other potential source of contamination _____ ft (please identify source)
Watercourse _____ ft Well _____ ft

Water Yield

Method: ☑ Air blown ☐ Bail ☐ Pump
Rate 12 igpm Duration 1 hrs
Test depth 200 ft
Depth to water at end of test 200 ft
Total drawdown _____ ft
Water level recovered to _____ ft
by _____ hrs _____ mins after test ended.
Depth to static level 20 ft
☐ Overflow

Water Quality

Colour _____ Taste _____ Odour _____ Other _____

Final Status of Well

☑ Water supply
☐ Observation Well
☐ Test Hole
☐ Recharge Well
☐ Abandoned, insufficient supply
☐ Abandoned, poor quality
☐ Abandoned, salt water
☐ Unfinished
☐ Other _____

Water Use

☑ Domestic
☐ Industrial
☐ Commercial
☐ Municipal
☐ Irrigation
☐ Public Supply
☐ Agricultural
☐ Heat Pump
☐ Other _____

Method of Drilling

☑ Rotary
☐ Cable Tool
☐ Jet
☐ Other _____
☐ Drilling Fluids
Type: _____

Driller's Comments

well #3

Certification

I certify this well has been constructed in accordance with the *Nova Scotia Environment Act and Well Construction Regulations.*
Date Well completed 16-Dec-2015
Signature _____
Date Signed 16-Dec-2015

Mail to:

Nova Scotia Department of Environment
30 Damascus Road, Suite 115
Bedford, Nova Scotia B4A 0C1

Important Home Owner's Document - Safeguard with legal documents.

Rev 08/13

Original to NSE Copy to Customer Copy to Contractor

Print | Clear Form

NOVA SCOTIA

Drilled Well Report

NSE Well No. _____ (Departmental use)

Certified Well Contractor

Name: Travis Jacobs
Certificate No.: 847
Company: Bluenose Well Drilling Ltd
Address: 2371 Lawrencetown Rd. Lawrencetown, HRM
Helpers Name(s): Byron Jacobs

Well Owner/Contractor Information

Well drilled for: Owner _____
or Contractor/Builder/Consultant/etc.: 3283920 Nova Scotia Ltd
Civic Address of well _____
Lot No. and Subdivision of well _____
County: HRM Postal Code _____ Phone _____
Nearest Community in: ☐ NS Atlas ☑ NS Map Book _____

Stratigraphic Log

Depth in feet From	To	Colour	General Description of Overburden/Bedrock	Water Found	Well Sketch
0	43		Sand, silt, water, boulders	Y N	
43	305		Granite	Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	
				Y N	

Attach Another Sheet if Needed

Well Location

Property (PID) _____
GPS (WGS84 UTM)
Northing 4948859 m
Easting 0429828 m
☑ NS Atlas ☐ NS Map Book
Page _____ Column _____ Row _____
Roamer Letter _____ Roamer Number _____

Well Location Sketch

Well Construction Information

Total depth below surface: 305 ft
Depth to bedrock: 43 ft
Water bearing fractures encountered: 90 ft
180 ft 220 ft 240 ft 285 ft

Well Casing

Outer Casing
From 0 To 52 ft
Diameter 6 in
Wall Thickness 188 in
Material: ☑ steel or _____
ASTM spec. A-589

Inner Casing
From _____ To _____ ft
Diameter _____ in
Wall Thickness _____ in
Material: ☐ steel or _____
ASTM spec. _____

Length of casing above ground 1 ft _____ in
☑ driveshoe: type Heavywall
☑ grout: type Bentonite ☐ packer: type _____

Well Finish

☑ open hole ☐ slotted casing ☐ screen ☐ gravel pack
Screens: make _____ material _____
length _____ ft from _____ to _____ ft slot size _____
length _____ ft from _____ to _____ ft slot size _____
Gravel pack: size _____ from _____ to _____ ft

Clearance Distance to Nearest

Oil tank _____ ft
Roadway outer boundary _____ ft
Road name _____
On-site sewage system _____ ft
Off-site sewage system _____ ft
Cesspool or other potential source of contamination _____ ft (please identify source)
Watercourse _____ ft Well _____ ft

Water Yield

Method: ☑ Air blown ☐ Bail ☐ Pump
Rate 12 igpm Duration 1 hrs
Test depth 300 ft
Depth to water at end of test 300 ft
Total drawdown _____ ft
Water level recovered to _____ ft
by _____ hrs _____ mins after test ended.
Depth to static level 20 ft
☐ Overflow

Water Quality

Colour _____ Taste _____ Odour _____ Other _____

Final Status of Well

☑ Water supply
☐ Observation Well
☐ Test Hole
☐ Recharge Well
☐ Abandoned, insufficient supply
☐ Abandoned, poor quality
☐ Abandoned, salt water
☐ Unfinished
☐ Other _____

Water Use

☑ Domestic
☐ Industrial
☐ Commercial
☐ Municipal
☐ Irrigation
☐ Public Supply
☐ Agricultural
☐ Heat Pump
☐ Other _____

Method of Drilling

☑ Rotary
☐ Cable Tool
☐ Jet
☐ Other _____
☐ Drilling Fluids
Type: _____

Driller's Comments

Well #4

Certification

I certify this well has been constructed in accordance with the *Nova Scotia Environment Act and Well Construction Regulations.*
Date Well completed 16-Dec-2015
Signature _____
Date Signed 16-Dec-2015

Mail to:

Nova Scotia Department of Environment
30 Damascus Road, Suite 115
Bedford, Nova Scotia B4A 0C1

Important Home Owner's Document - Safeguard with legal documents.

Rev 08/13

Original to NSE Copy to Customer Copy to Contractor

Groundwater

Well Log Record

Well Log Record: # 010106

Well Number: 010106
Type: Drilled
Date Well Completed (mm-dd-yyyy): 8-17-2001

Go Back

Well Owner/Contractor and Location

Well Drilled for: JACTANAH'S CAFE LTD.
or Contractor/Builder/Consultant: KATHY MCDOONALD

Civic Address of Well: 13578 HIGHWAY #333, TANTALLON
Lot #: n/a
Subdivision: n/a
County: Halifax
Postal Code: B3Z 1A8
Nearest Community in Atlas/Map Book: UPPER TANTALLON

Certified Well Contractor

Driller Name: ROY, GILLES
Certificate No: 696
Company: BREWSTER WELL DRILLING

Well Status / Water Use

Final Status of Well: Water Supply Well
Water Use: Domestic
Method of Drilling: Rotary

Well Location

Nova Scotia Atlas or Map Book Reference

Atlas or Map Book: Map
Map Page No.: 20
Reference Letter: C
Reference Number: 5
Roamer Letter: P
Roamer Number: 8

NTS Map Reference

Map Sheet: n/a
Reference Map: n/a
Tract No.: n/a
Claim: n/a

GPS (WGS84 UTM)

Northing (m): 4948748
Easting (m): 430014
Property (PID): n/a
Well Location Sketch Available: Yes

Stratigraphy Log

Geology	Colour	Description	Lithology	Water Found

Geology	Colour	Description	Lithology	Water Found
From (depth in ft): 0 to: 18				
Primary Geology	Brown	n/a	Gravel & Boulders	Yes
Secondary Geology	n/a	n/a	Water	
From (depth in ft): 18 to: 300				
Primary Geology	Reddish Brown	n/a	Granite	n/a
Secondary Geology	n/a	n/a	n/a	

Well Construction Information

Total Depth Below Surface (ft): 300
Depth to Bedrock (ft): 18
Water Bearing Fractures Encountered at (ft): 180, 220
Outer Well Casing: From (ft): n/a To: 31.5
Diameter (in): 6
Length of Casing Above Ground (ft): 2 and (in): n/a
Driveshoe Make: unknown

Water Yield

Estimated Yield (igpm): n/a
Method: Air Lift
Rate (igpm): 0.75
Duration (hrs): 1
Depth to Water at end of Test (ft): n/a

Total Drawdown (ft): n/a
Water Level Recovered to (ft): n/a
Recovery Time (hrs): n/a
Depth to Static Level (ft): n/a
Overflow: n/a

Comments

COMMENTS ARE AVAILABLE FOR THIS WELL LOG. PLEASE CONTACT THE NSE INFORMATION ACCESS OFFICER AT PH: (902) 424-2549 OR EMAIL ENVACCESS@GOV.NS.CA

Go Back

Groundwater

Well Log Record

Well Log Record: # 921475

Well Number: 921475
Type: Drilled
Date Well Completed (mm-dd-yyyy): 11-2-1992

Go Back

Well Owner/Contractor and Location

Well Drilled for: PULSIFER
or Contractor/Builder/Consultant: n/a

Civic Address of Well: BAY ROAD
Lot #: n/a
Subdivision: n/a
County: Halifax
Postal Code: n/a
Nearest Community in Atlas/Map Book: UPPER TANTALLON

Certified Well Contractor

Driller Name: BREWSTER, LAURIE F.
Certificate No: 178
Company: LAURIE F. BREWSTER WELL DRILLING

Well Status / Water Use

Final Status of Well: Water Supply Well
Water Use: Domestic
Method of Drilling: n/a

Well Location

Nova Scotia Atlas or Map Book Reference

Atlas or Map Book: Map
Map Page No.: 20
Reference Letter: D
Reference Number: 5
Roamer Letter: F
Roamer Number: 8

NTS Map Reference

Map Sheet: n/a
Reference Map: n/a
Tract No.: n/a
Claim: n/a

GPS (WGS84 UTM)

Northing (m): 4948500
Easting (m): 430500
Property (PID): n/a
Well Location Sketch Available: Yes

Stratigraphy Log

Geology	Colour	Description	Lithology	Water Found
From (depth in ft): 0 to: 43				
Primary Geology	n/a	n/a	Clay	n/a
Secondary Geology	n/a	n/a	Boulders	
From (depth in ft): 43 to: 163				
Primary Geology	n/a	n/a	Granite	n/a
Secondary Geology	n/a	n/a	n/a	

Well Construction Information

Total Depth Below Surface (ft): 163
Depth to Bedrock (ft): 43
Water Bearing Fractures Encountered at (ft): 130, 163
Outer Well Casing: From (ft): n/a To: 51
Diameter (in): 6
Length of Casing Above Ground (ft): n/a and (in): n/a
Driveshoe Make: n/a

Water Yield

Estimated Yield (igpm): n/a
Method: Air Lift
Rate (igpm): 3
Duration (hrs): n/a
Depth to Water at end of Test (ft): n/a
Total Drawdown (ft): n/a
Water Level Recovered to (ft): n/a
Recovery Time (hrs): n/a

BOREHOLE LOG

PROJECT
Level 2 Hydrological Study
Peggy's Cove ROad, Upper Tantallon, NS

LOGGED/DWN. LL	CKD. AC	DATE OF INVEST. 11/12/15	JOB 20814	HOLE NO. P1

CASING RESISTANCE blows/300mm

WC % wp- □ w- ● wl- △
10 20 30 40 50

DEPTH ft m

MODIFIED USCS

SOIL SYMBOL

SOIL DESCRIPTION

DATUM m

SURFACE ELEVATION

SOIL SAMPLE: COND. | TYPE | PENE. RESIST.

DRILL TYPE: Hand Auger

Well Details | Other Tests

ft	m	MODIFIED USCS	SOIL SYMBOL	SOIL DESCRIPTION
1		PT		PEAT: mucky peat, organics, well formed, dense, dark brown, moist to wet.
2				
3	1			
4				
5				
6				
7	2			
8				
9				
10				End of borehole at 2.74m on assumed bedrock. Water level measured on
11	3			
12				
13				
14	4			
15				
16				
17	5			
18				

PLATE 1

Appendix 4 Step Test Data

Step Draw Down Test Englobe - Tantallon

WELL #1 DATE Jan 27th, 2016

Time in Minutes	Step #1 1.9 gpm	Step #2 4.2 gpm	Step #3 4.6 gpm	Step#4	Rec
0.1	11.3	19.61	37.41		51.68
1	12.15	19.82	37.63		50.72
2	12.45	20.34	37.92		49.83
3	12.6	20.72	38.23		48.82
4	12.7	21.09	38.58		47.9
5	12.77	21.58	38.92		46.98
6	12.84	22.07	39.24		46.04
7	12.88	22.49	39.57		45.15
8	12.93	22.96	39.91		44.31
9	12.99	23.42	40.2		43.45
10	13.03	23.78	40.53		42.58
15	13.19	25.9	42.2		38.57
20	13.8	27.74	43.68		35
25	15.13	29.25	45.02		31.73
30	15.75	30.7	46.26		28.83
40	16.55	33.29	48.44		24.15
50	18.7	35.54	50.21		20.73
60	19.61	37.41	51.68		18.35

Well Depth	129.6 m	425 ft		
Pump Setting	91 m	300 ft		
Draw Down Step #1	8.31 m	27 ft	8.6 lpm	1.9 gpm
Draw Down Step #2	17.8 m	58 ft	19.1 lpm	4.2 gpm
Draw Down Step #3	14.27 m	47 ft	20.9 lpm	4.6 gpm

Total draw Down after 3 steps	40.4 m	132 ft
Recovery in one hr	33.33 m	109 ft
Percent of total draw down	83%	

Pump model 3/4 hp, 5 gpm series

Step Draw Down Test Englobe - Tantallon

WELL #2 DATE Jan 26th, 2016

Time in Minutes	Step #1 1.1 gpm	Step #2 2 gpm	Step #3 4 gpm	Step#4	Rec
0.1	5.55	14.02	24.92		49.26
1	6.02	14.15	25.23		48.63
2	6.32	14.65	25.66		47.9
3	6.62	15.11	26.3		47.2
4	6.85	15.44	26.82		46.52
5	7.12	15.77	27.32		45.81
6	7.36	16.07	27.83		45.2
7	7.58	16.38	28.43		44.55
8	7.83	16.68	29.09		43.87
9	8.03	16.92	29.54		43.22
10	8.24	17.18	30.1		42.65
15	9.17	18.35	32.76		39.65
20	10.02	19.41	35.2		36.84
25	10.77	20.34	37.36		34.26
30	11.42	21.19	39.33		31.8
40	12.47	22.6	42.8		
50	13.35	24.87	46.36		24.02
60	14.02	24.92	49.26		20.93

Well Depth	105.2 m	345 ft		
Pump Setting	91 m	300 ft		
Draw Down Step #1	8.47 m	28 ft	4.5 lpm	1 gpm
Draw Down Step #2	10.9 m	36 ft	9.1 lpm	2 gpm
Draw Down Step #3	24.34 m	80 ft	18.2 lpm	4 gpm
Total draw Down after 3 steps	43.7 m	143 ft		
Recovery in one hr	28.33 m	93 ft		
Percent of total draw down	65%			

Pump model 3/4 hp, 5 gpm series

Step Draw Down Test Englobe - Tantallon

WELL #3 DATE Feb 1st,2016

Time in Minutes	Step #1 3.9 gpm	Step #2 8.1 gpm	Step #3 11.5 gpm	Step#4	Rec
0.1	4.62	16.15	37.57		52.18
1	5.85	17.09	38.74		48.84
2	6.37	18.53	40.24		46.8
3	7	19.57	41.14		44.97
4	7.61	20.35	41.86		43.19
5	8.2	21.04	42.64		41.25
6	8.73	21.7	43.38		39.42
7	9.2	22.31	43.97		37.78
8	9.61	22.9	44.56		36
9	9.94	23.48	45.15		34.42
10	10.3	24	45.66		32.76
15	11.57	26.26	48.78		25.82
20	12.76	29	50.63		20.5
25	13.53	31.95	52.18		16.59
30	14.06	32.79			13.64
40	15.49	33.98			10.22
50	15.51	35.69			8.7
60	16.15	37.57			8

Well Depth	62.5 m	205 ft		
Pump Setting	55 m	180 ft		
Draw Down Step #1	11.53 m	38 ft	18 lpm	3.9 gpm
Draw Down Step #2	21.42 m	70 ft	37 lpm	8.1 gpm
Draw Down Step #3	14.61 m	48 ft	52 lpm	11.5 gpm

Terminate pumping at the 25 min interval of the third step. Water level close to the pump

Total draw Down after 3 steps	47.56 m	156 ft
Recovery in one hr	44.18 m	145 ft
Percent of total draw down	93%	

Pump model 1 hp, 18 gpm series

Step Draw Down Test Englobe - Tantallon

WELL #4 DATE Jan 28th, 2016

Time in Minutes	Step #1 3.1 gpm	Step #2 6 gpm	Step #3 9 gpm	Step#4	Rec
0.1	5.94	11.4	19.7		31.31
1	7.69	12.05	20.41		29.24
2	8.08	12.51	20.69		27.33
3	8.02	12.88	21.12		25.55
4	8.13	13.29	21.49		24.07
5	8.22	13.61	21.86		22.8
6	8.3	13.95	22.25		21.55
7	8.46	14.24	22.71		20.54
8	8.62	14.59	23.17		19.6
9	8.7	14.94	23.6		18.77
10	8.76	15.2	24.05		18.06
15	9.08	16.25	26.29		15.47
20	9.68	16.88	27.14		13.84
25	10.05	17.18	28		12.87
30	10.44	17.91	28.6		12.05
40	10.89	18.45	29.81		10.97
50	11.15	18.49	30.62		10.22
60	11.4	19.7	31.31		9.7

Well Depth	93 m	305 ft		
Pump Setting	90 m	295 ft		
Draw Down Step #1	5.46 m	18 ft	14 lpm	3.1 gpm
Draw Down Step #2	8.3 m	27 ft	27 lpm	6 gpm
Draw Down Step #3	11.61 m	38 ft	41 lpm	9 gpm

Total draw Down after 3 steps 25.57 m 83 ft

Recovery in one hr 21.61 m 71 ft
Percent of total draw down 85%

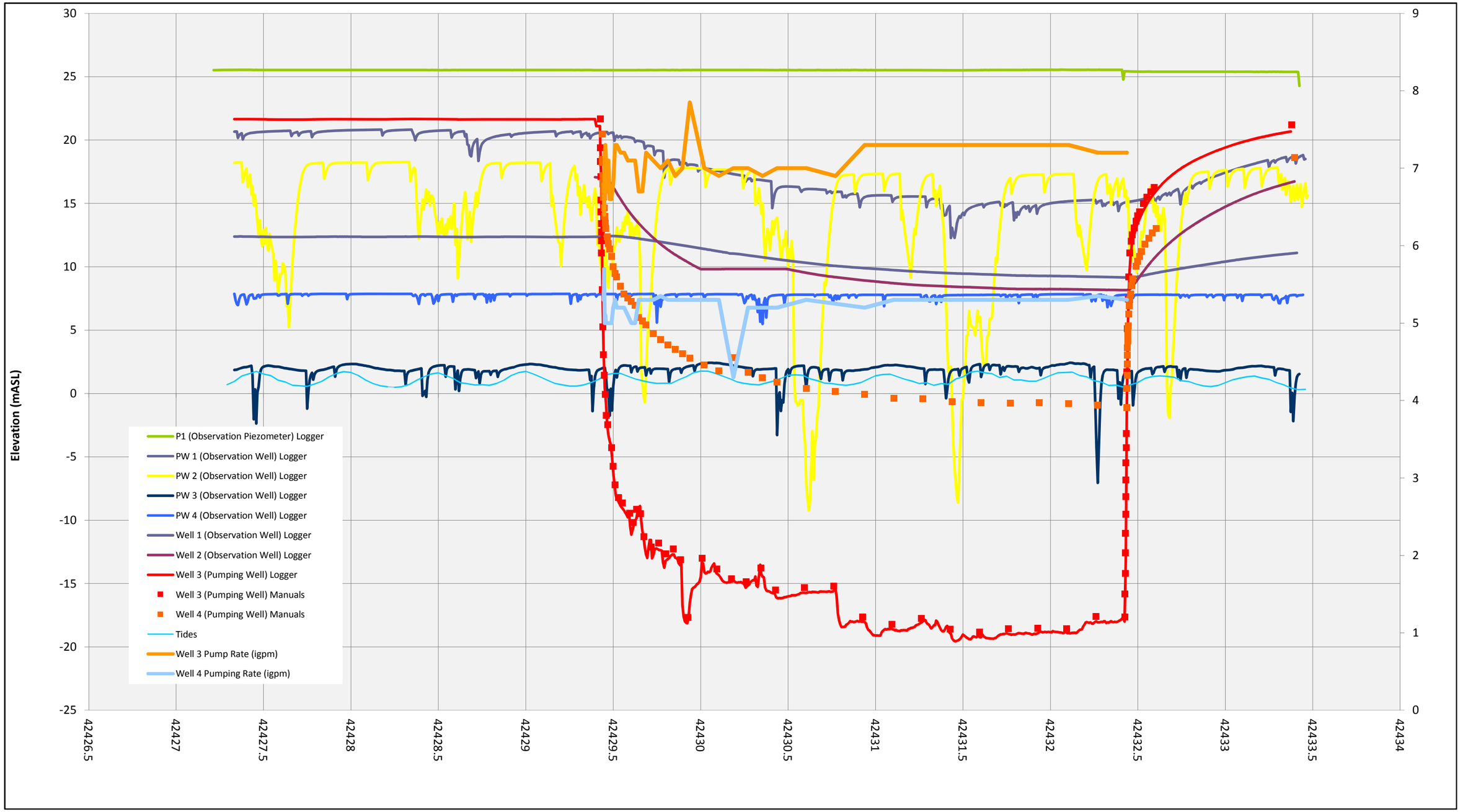
Pump model 1 hp, 18 gpm series

Appendix 5 Long Term Pump Test Plots

FIGURE 101

MEASURED GROUNDWATER ELEVATIONS
Datalogger and Manual Measurements

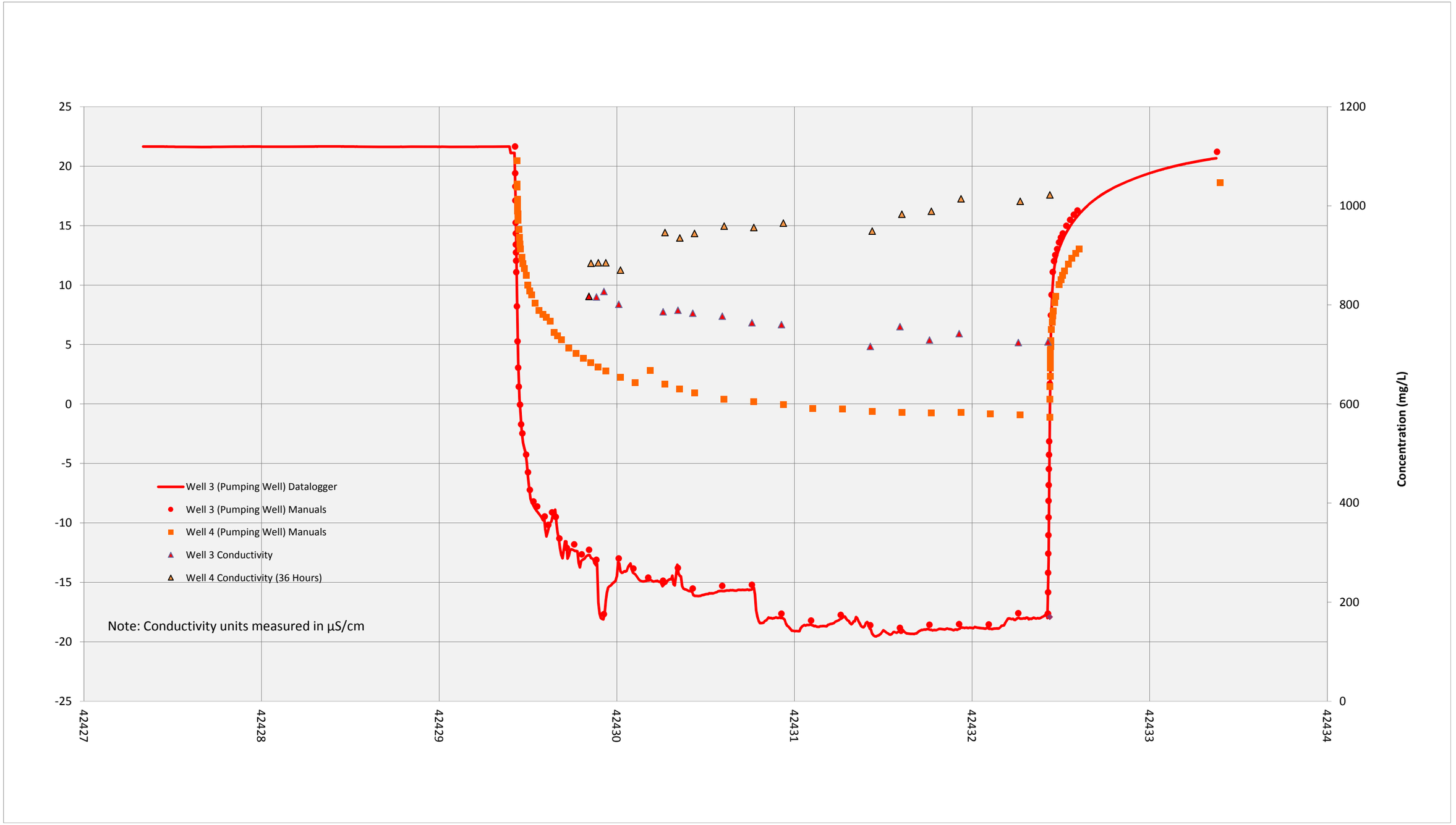
Level 2 Groundwater Assessment
Lot B, Peggy's Cover Road, Upper Tantallon, N.S.



Englobe

FIGURE 102
MEASURED GROUNDWATER ELEVATIONS AND SELECT CHEMISTRY

Level 2 Groundwater Assessment
Lot B, Peggy's Cove Road, Upper Tantallon, N.S.

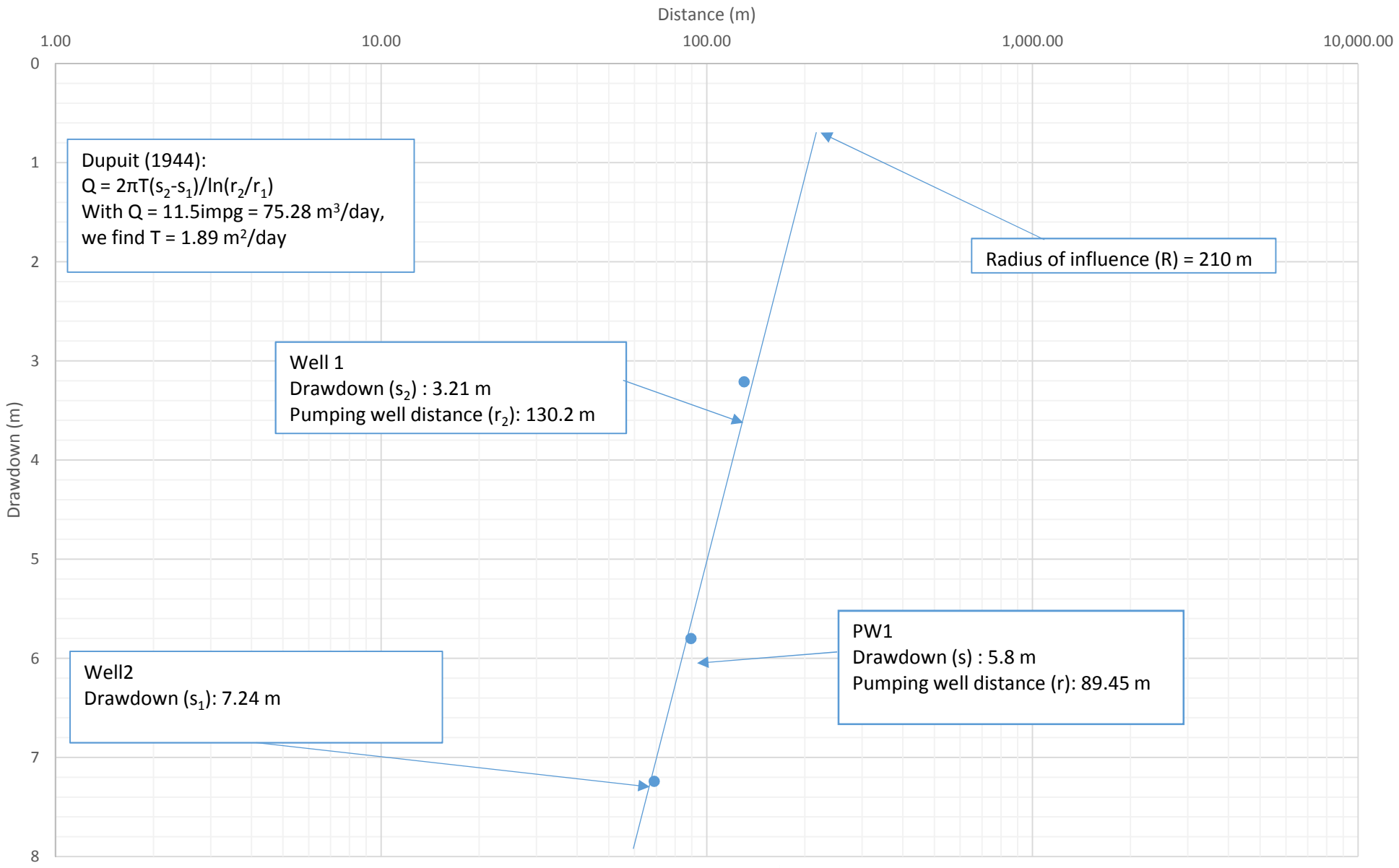


Englobe

GRAPH 101

STEADY STATE ANALYSIS (DUPUIT)

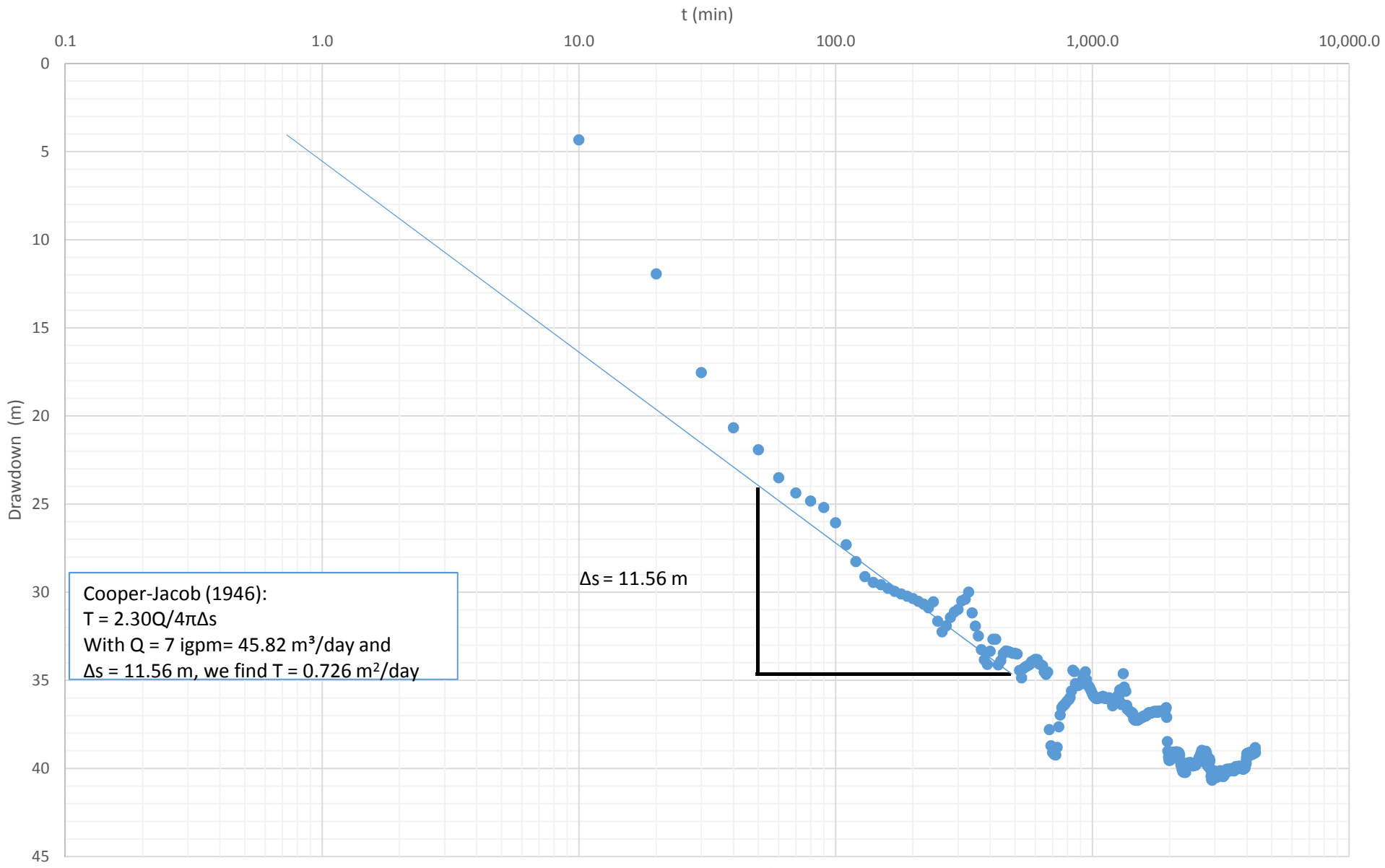
Level 2 Groundwater Assessment
Lot B, Peggy's Cove Road, Upper Tantallon, N.S.



GRAPH 102

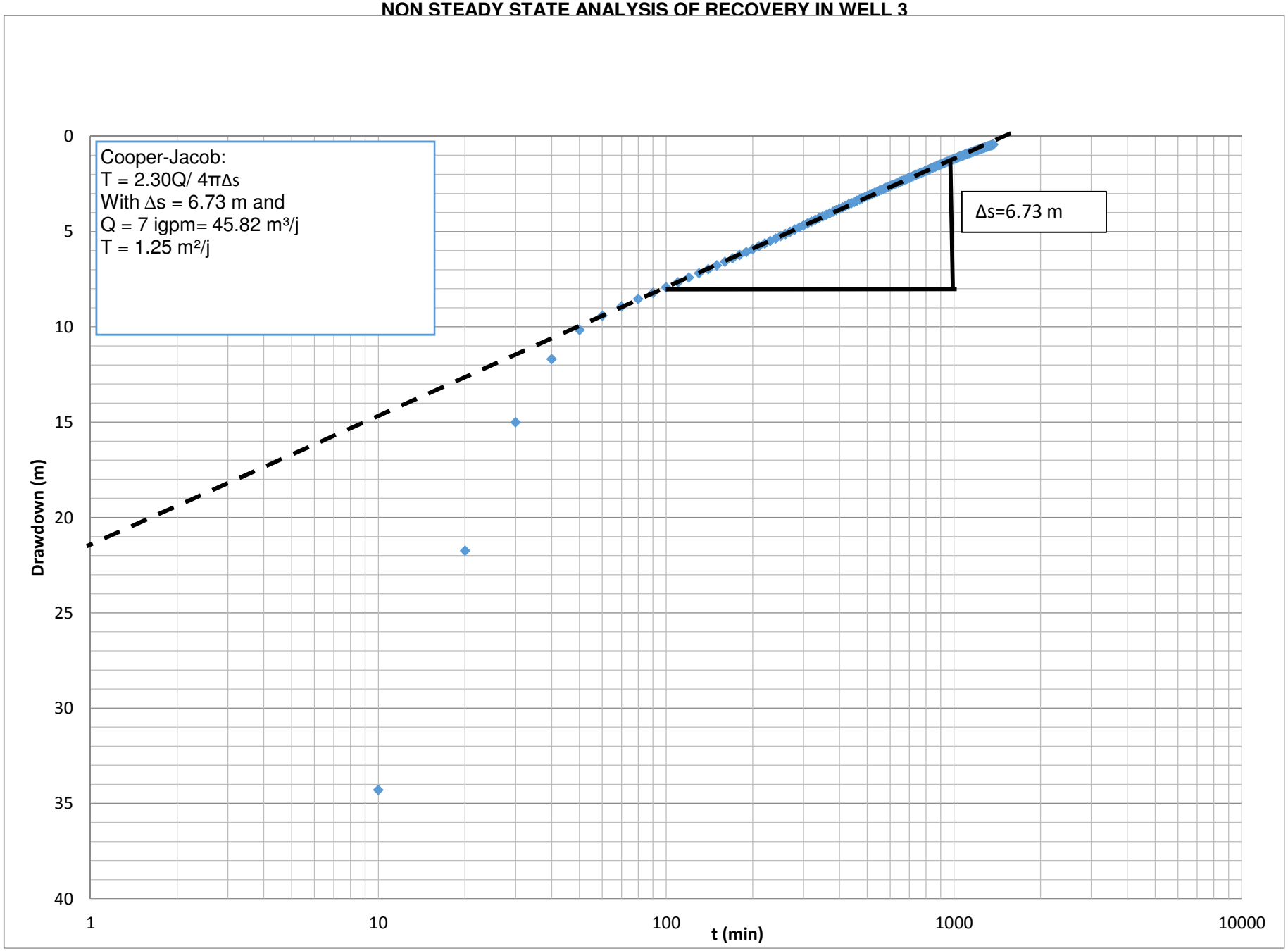
NON STEADY STATE ANALYSIS OF DRAWDOWN IN WELL 3

Level 2 Groundwater Assessment
Lot B, Peggy's Cove Road, Upper Tantallon, N.S.



GRAPH 103

NON STEADY STATE ANALYSIS OF RECOVERY IN WELL 3

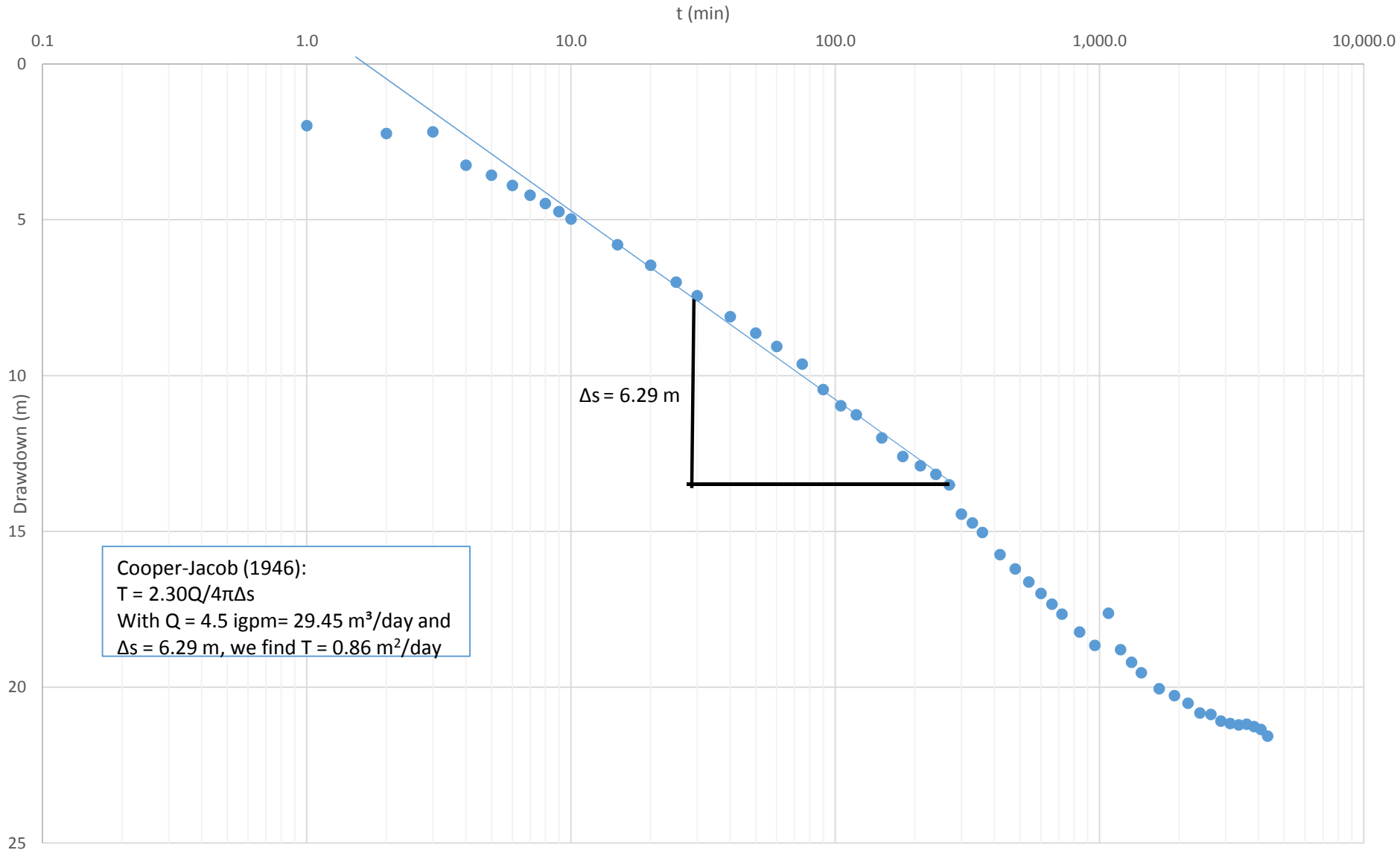


GRAPH 104

NON STEADY STATE ANALYSIS OF DRAWDOWN - WELL 4

Level 2 Groundwater Assessment

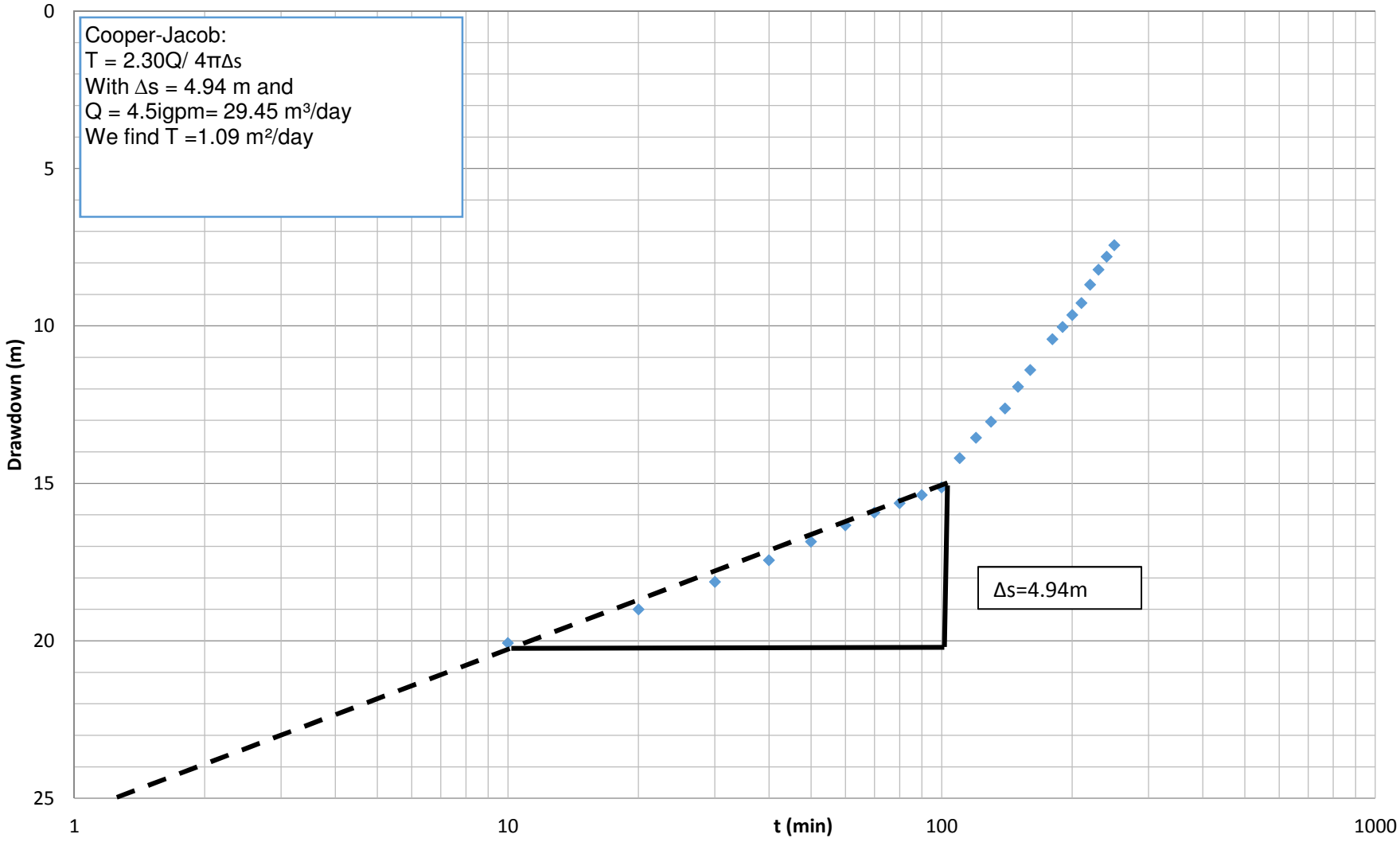
Lot B, Peggy's Cove Road, Upper Tantallon, N.S.



GRAPH 105

NON STEADY STATE ANALYSIS OF RECOVERY - WELL 4

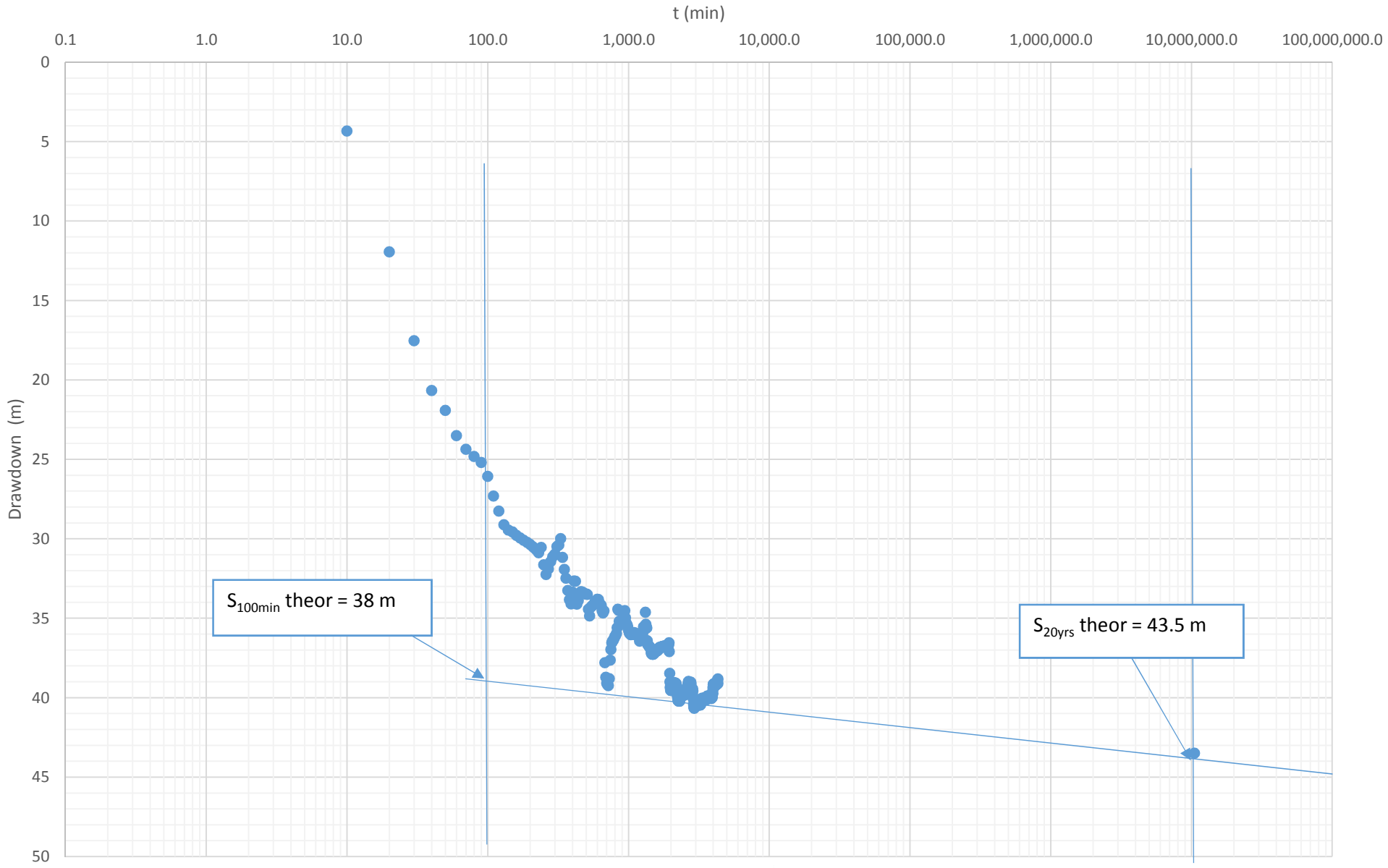
Level 2 Groundwater Assessment
Lot B, Peggy's Cove Road, Upper Tantallon, N.S.



GRAPH 106

SAFE WELL YIELD - WELL 3

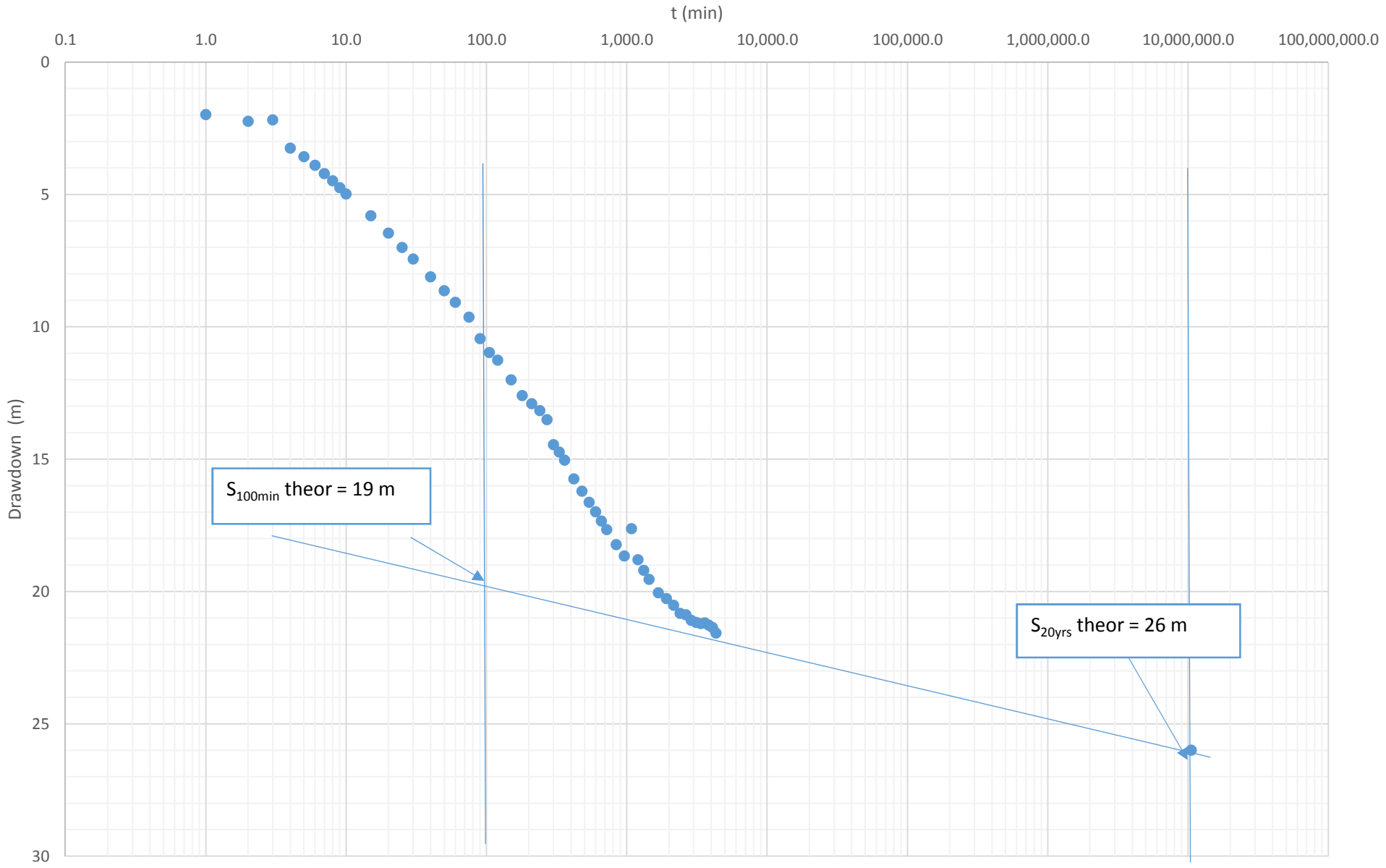
Level 2 Groundwater Assessment
Lot B, Peggy's Cove Road, Upper Tantallon, N.S.



GRAPH 107

SAFE WELL YIELD - WELL 4

Level 2 Groundwater Assessment
Lot B, Peggy's Cove Road, Upper Tantallon, N.S.



Appendix 6 Long Term Pump Test Data

Englobe - Tantallon

Well #3 Long Term test DATE February 29th to March 3rd, 2016

Time	Level(m)	Meter	Rate	Cond	Temp	Well 2	
0.1	4.53	51630				5	
1	6.78						
2	7.89						
3	9.07						
4							
5	10.94						
6	11.84						
7	12.77						
8	13.45						
9	14.14						
10	15.1	1697.8	6.8				
15	17.98	1730	6.4				
20	20.92	1766	7.2				
25	23.14	1802.7	7.3				
30	24.73	1838.1	7.1				
40	26.25	1905.3	6.7				
50	27.9	1976.2	7.1				
60	28.66	2041.8	6.6				
90	30.45	2245.6	6.8				
105	31.93	2355	7.3				
120	33.41	2464.4	7.3				
150	34.39	2681.2	7.2				
180	34.81	2894.1	7.1				
240	35.64	3105.7	7.1				
270	36.36	3530.1	7.1				
300	35.31	3732	6.7				
330	35.68	3933.1	6.7				
360	37.5	4149.1	7.2				
420	38.3	4576.2	7.1				
480	38	4996	7				
540	38.83	5421.5	7.1				
600	38.45	5837.4	6.9	817	9.1		
660	39.3	6258	7	816	10		
720	43.86	6729.5	7.85	827	10.1		
840	39.18	7569.7	7	801	9.2		
960	40.03	8402.2	6.9				
1080	40.79	9244.5	7				problems with generator during night - carburetor freezing
1200	41.05	60086.9	7	786	9.1		unit running sporatically affecting flow rate
1320	39.98	912.7	6.9	789	8.5		
1440	41.71	1755.8	7	783	9.6	14.13	
1680	41.49	3440.5	7	777	9.5		
1920	41.4	5104.5	6.9	764	10.5		
2160	43.83	6851.3	7.3	760	10.4		
2400	44.4	8609.5	7.3				
2640	43.93	70353.9	7.3			15.47	
2880	44.79	2096	7.3	716	11.3		
3120	45.02	3856.7	7.3	756	10.3	15.62	
3360	44.76	5610.1	7.3	729	10.5		heavy rain from 3360 min to 3840 min
3600	44.7	7359	7.3	742	10.4		
3840	44.73	9105.6	7.3				
4080	43.78	80839.2	7.2	724	9.1		
4320	43.83	2561.2	7.2	725	8	15.85	stick up 0.4 m GL

Pump Setting 54.8 m 180 ft
Puymp Model Webtrol 1 hp, 18 gpm series

Recovery : Well #3

Time	Level(m)	obs #2	
0	43.83	15.85	
1	42.02		
2	40.39		
3	38.77		
4	37.22		
5	35.72		
6	34.33		
7	33		
8	31.66		
9	30.46		
10	29.33		
15	24.49		
20	21.07		
25	18.72		
30	17	15.81	
40	15.08		
50	14.17		
60	13.65		
75	13.15		
90	12.59		
105	12.18		
120	11.84		
150	11.2		
180	10.7		
210	10.27		
240	9.91	13.43	
1371	4.98	7.33	

Englobe - Tantallon

Well #4 Long Term test comp DATE February 29th to March 3rd, 2016

Time	Level(m)	Meter	Rate	Cond	Temp	
0.1	5.87	45125				
1	7.85					
2	8.1					
3	8.05					
4	9.12					
5	9.44					
6	9.77					
7	10.08					
8	10.35					
9	10.61					
10	10.85	5178.8	5.3			
15	11.67	5203.8	5.7			
20	12.33	5229	5			
25	12.87	5254.5	5.1			
30	13.31	5279.5	5			
40	13.98	5330	5			
50	14.51	5380	5			
60	14.94	5430	5			
75	15.5	5504.5	5			
90	16.32	5583	5.2			
105	16.84	5661.9	5.3			
120	17.13	5739.5	5.2			
150	17.87	5895.7	5.2			
180	18.47	6051.3	5.2			
210	18.77	6205.2	5.1			
240	19.04	6355.9	5			
270	19.38	6506	5			
300	20.32	6666.1	5.3			
330	20.6	6824.2	5.3			
360	20.91	6983	5.3			
420	21.62	7303	5.3			
480	22.08	7624.2	5.35			
540	22.5	7944	5.3			
600	22.86	8263.2	5.3	884	9.8	
660	23.21	8582.8	5.3	885	9.6	
720	23.53	8903.4	5.3	885	9.8	
840	24.1	9544.5	5.3	870	10	
960	24.53	20184	5.3			
1080	23.5	697	4.3			generator problems - carburetor icing.
1200	24.67	1324.5	5.2	946	9.1	unit down for 24 min, water level recovered to 19 m
1320	25.07	1950	5.2	935	9.2	
1440	25.41	2548.2	5.2	944	9.6	
1680	25.92	2844.8	5.3	959	9.2	
1920	26.14	5106	5.25	956	9.1	
2160	26.39	6363.5	5.2	965	9.1	
2400	26.7	7629.9	5.3			
2640	26.75	8899.6	5.3			
2880	26.96	30172.3	5.3	949	10.6	
3120	27.04	1451.8	5.3	983	10.2	
3360	27.08	2730.4	5.3	989	10.4	heavy rain event from 3360 min to 3840 min
3600	27.06	4001.2	5.3	1014	10	
3840	27.14	5279.5	5.3			
4080	27.23	6564.8	5.35	1009	9.5	stick up 0.63 GL
4320	27.44	7837	5.3	1022	8.5	

Pump setting 91 m (300 ft)
Pump Model Goulds 1Hp, 10 gpm series

Well #4 Recovery

Time	Level(m)		
0	27.44		
1	25.94		
2	24.87		
3	24		
4	23.31		
5	22.72		
6	22.2		
7	21.8		
8	21.5		
9	21.24		
10	21		
15	20.07		
20	19.42		
25	18.91		
30	18.49		
40	17.8		
50	17.27		
60			
75	16.29		
90	15.9		
105	15.52		
120	15.14		
150	14.56		
180	14.08		
210	13.67		
240	13.31		
1380	7.73		

Appendix 7 Analytical Results

TABLE 1: GENERAL CHEMISTRY in Groundwater
Client: Joe Arab
Site Location: Upper Tantallon, NS
Englobe Project No.: 20814

PARAMETER	UNITS	CCME Drinking Water Guidelines[1]	NSE Tier 1 EQS[2]	SAMPLE ID																				
				WELL 3		WELL 4			PW1 (PULSIFER)		PW2 (ACADIAN MAPLE)		PW3			(FLEMING)	PW4	(WHITMAN)	PW5	(DUBEC)	DW1		(EDWARDS)	P1	
				36 hr	72 hr	36 hr		72 hr	Pre-Pump	End Pump	Pre-Pump	End Pump	Pre-Pump		End Pump		Pre-Pump	End Pump	Pre-Pump	End Pump	Pre-Pump	End Pump		Pre-Pump	End Pump
				1-Mar-16	3-Mar-16	1-Mar-16	Lab Dup	3-Mar-16	18-Jan-16	4-Mar-16	18-Jan-16	4-Mar-16	18-Jan-16	Lab Dup	4-Mar-16		19-Jan-16	4-Mar-16	19-Jan-16	4-Mar-16	18-Jan-16	3-Mar-16	Lab Dup	18-Jan-16	3-Mar-16
Escherichia Coli	CFU/100ml	0 per 100 ml	NG	0	0	0	-	0	-	-	-	-	-	-	-		-	-	-	-	0	-	-	-	-
Total Coliforms	CFU/100ml	0 per 100 ml	NG	0	0	2	-	0	-	-	-	-	-	-	-		-	-	-	-	240	-	-	-	-
Anion Sum	me/L	NG	NG	4.10	3.94	5.36	-	5.43	1.35	1.31	9.67	9.46	1.00	-	1.08		1.52	1.88	2.60	2.09	0.670	0.690		0.200	0.140
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	NG	NG	25	24	29	-	27	36	40	24	24	32	-	33		40	51	37	38	9.7	8.5		<1.0	<1.0
Bromide (Br)		NG	NG	-	<1.0	-	-	<1.0	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-
Calculated TDS	mg/L	≤ 500 (AO)	NG	250	240	310	-	320	87	81	610	540	74	-	88		98	120	170	140	47	47		20	11
Carb. Alkalinity (calc. as CaCO3)	mg/L	NG	NG	<1.0	<1.0	<1.0	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	<1.0		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0		<1.0	<1.0
Cation Sum	me/L	NG	NG	3.74	3.59	4.88	-	5.24	1.29	1.19	11.8	9.42	0.990	-	1.34		1.77	1.90	2.30	1.91	0.690	0.670		0.650	0.330
Colour	TCU	≤ 15 (AO)	NG	<5.0	<5.0	6.0	-	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0		<5.0	24	<5.0	<5.0	<5.0	<5.0	<5.0	200	220
Conductivity	uS/cm	NG	NG	440	420	590	-	610	130	120	1100	1100	91	-	100		140	190	240	220	71	76		63	51
Dissolved Chloride (Cl)	mg/L	≤ 250 (AO)	250	120	120	160	-	170	18	14	310	310	7.5	7.2	8.7		23	28	57	39	13	14	15	6.9	4.9
Dissolved Fluoride (F)		1.5 (MAC)	NG	-	0.28	-	-	0.31	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-
Dissolved Sulphate (SO4)	mg/L	≤ 500 (AO)	NG	6.8	6.7	6.9	-	7.5	5.2	4.7	15	12	4.5	4.6	5.4		3.0	3.6	11	9.7	5.1	5.5	5.5	<2.0	<2.0
Hardness (CaCO3)	mg/L	NG	NG	130	120	160	-	170	43	40	290	260	29	-	30		42	53	<1.0	<1.0	13	13		15	6.2
Ion Balance (% Difference)	%	NG	NG	4.59	4.65	4.69	-	1.78	2.27	4.80	10.1	0.210	0.500	-	10.7		7.60	0.530	6.12	4.50	1.47	1.47		52.9	40.4
Langelier Index (@ 20C)	N/A	NG	NG	-1.58	-1.66	-1.22	-	-1.35	-1.43	-1.43	-1.50	-1.64	-1.74	-	-1.74		-1.18	-0.915	NC	NC	-3.37	-3.59		NC	NC
Langelier Index (@ 4C)	N/A	NG	NG	-1.83	-1.91	-1.47	-	-1.60	-1.68	-1.68	-1.74	-1.88	-1.99	-	-1.99		-1.43	-1.17	NC	NC	-3.63	-3.85		NC	NC
Nitrate (N)	mg/L	10 (MAC)	NG	<0.050	<0.050	<0.050	-	<0.050	0.34	0.36	0.27	0.86	0.47	-	0.61		<0.050	<0.050	0.13	0.14	<0.050	<0.050		0.10	<0.050
Nitrate + Nitrite	mg/L	NG	NG	<0.050	<0.050	<0.050	-	<0.050	0.34	0.36	0.27	0.86	0.47	0.48	0.61		<0.050	<0.050	0.13	0.14	<0.050	<0.050	<0.050	0.10	<0.050
Nitrite (N)	mg/L	3.2 (MAC)	NG	<0.010	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010		<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Nitrogen (Ammonia Nitrogen)	mg/L	NG	NG	0.32	0.23	0.087	-	0.12	0.39	<0.050	0.34	<0.050	0.10	0.090	<0.050		0.074	<0.050	0.23	<0.050	1.1	0.18		0.99	0.31
Orthophosphate (P)	mg/L	NG	NG	0.36	0.38	0.30	-	0.27	0.12	0.092	0.011	0.012	0.28	0.28	0.20		0.018	0.042	0.36	0.37	0.012	0.010	0.010	0.031	0.012
pH	pH	6.5-8.5	NG	6.80	6.75	7.00	-	6.90	7.20	7.18	6.67	6.57	7.15	-	7.13		7.44	7.51	7.30	7.23	6.38	6.22		4.06	4.11
Reactive Silica (SiO2)	mg/L	NG	NG	25	27	22	-	23	14	13	7.9	11	20	19	19		9.1	14	22	22	8.6	7.5	8.1	1.5	0.71
Saturation pH (@ 20C)	N/A	NG	NG	8.38	8.41	8.22	-	8.25	8.63	8.60	8.16	8.21	8.89	-	8.87		8.61	8.42	NC	NC	9.76	9.81		NC	NC
Saturation pH (@ 4C)	N/A	NG	NG	8.63	8.66	8.47	-	8.49	8.88	8.85	8.41	8.45	9.14	-	9.12		8.87	8.67	NC	NC	10.0	10.1		NC	NC
Total Alkalinity (Total as CaCO3)	mg/L	NG	NG	25	24	29	-	27	36	40	24	24	32	33	33		40	51	37	38	9.7	8.5	8.9	<5.0	<5.0
Total Organic Carbon (C)	mg/L	NG	NG	<0.50	<0.50	<0.50	-	<0.50	0.62	<0.50	2.3	1.4	0.88	0.84	0.99		0.68	0.61	<0.50	<0.50	2.4	0.79		22 (1)	<50 (1)
Turbidity	NTU	1 (MAC)	NG	0.58	<0.10	0.83	0.86	0.73	0.64	2.4	180	160	2.9	2.6	47		32	29	2.1	1.2	0.16	0.45		>1000	>1000

Notes:

AO - Aesthetic Objective	value - exceeds CCME drinking water guidelines
MAC - Maximum Acceptable Concentration	*value* -exceeds NSE EQS
NG - no guideline	*value* -exceeds both CCME and NSE EQS
	value - wetland surface water sample

[1]Criteria taken from the Canadian Council of Ministers of the Environment (CCME) Canadian Water Quality Guidelines for Community (Drinking) Water (Update 2014)

[2] Criteria taken from the 2013 Nova Scotia Environment (NSE) Tier 1 Environmental Quality Standards (EQS) for potable water at a residential site with coarse-grained soil

(1) Analysis performed on decanted sample due to sediment.

TABLE 2: TOTAL METALS in Groundwater
Client: Joe Arab
Site Location: Upper Tantallon, NS
Englobe Project No.: 20814

PARAMETER	UNITS	CCME Drinking Water Guidelines[1]	NSE Tier 1 EQS[2]	WELL3		WELL4		PW1 (PULSIFER)			PW2 (ACADIAN MAPLE)		PW3 (FLEMING)		PW4 (WHITMAN)		PW5 (DUBEC)		DW1 (EDWARDS)		P1	
				36 hr 1-Mar-16	72 hr 3-Mar-16	36 hr 1-Mar-16	72 hr 3-Mar-16	Pre-Pump 18-Jan-16	Lab Dup	End Pump 4-Mar-16	Pre-Pump 18-Jan-16	End Pump 4-Mar-16	Pre-Pump 18-Jan-16	End Pump 4-Mar-16	Pre-Pump 19-Jan-16	End Pump 4-Mar-16	Pre-Pump 19-Jan-16	End Pump 4-Mar-16	Pre-Pump 18-Jan-16	End Pump 3-Mar-16	Pre-Pump 18-Jan-16	End Pump 3-Mar-16
Aluminum	µg/L	100	NG	7.2	6.0	7.9	6.2	7.6	6.6	7.7	89	**720**	27	**230**	44	25	5.9	6.5	89	**110**	**2500**	**840**
Antimony	µg/L	6 (MAC)	6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.2	<1.0
Arsenic	µg/L	10 (MAC)	10	5.1	5.7	3.8	3.5	5.2	5.3	5.0	2.1	1.1	***18***	***91***	3.8	8.5	9.3	9.8	<1.0	<1.0	2.5	<1.0
Barium	µg/L	1000 (MAC)	1000	370	340	320	330	42	43	35	280	310	10	83	9.8	13	<1.0	<1.0	38	36	43	15
Beryllium	µg/L	NG	4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bismuth	µg/L	NG	NG	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Boron	µg/L	5000 (MAC)	5000	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Cadmium	µg/L	5 (MAC)	5	0.021	0.010	0.035	0.026	0.017	0.015	<0.010	0.30	0.78	0.043	0.47	<0.010	<0.010	<0.010	<0.010	0.034	0.031	0.35	0.12
Calcium	µg/L	NG	NG	42000	40000	54000	57000	14000	14000	13000	90000	79000	8500	8800	13000	17000	<100	<100	3700	3700	3600	1400
Chromium	µg/L	50 (MAC)	50	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.1	<1.0	1.1	<1.0	<1.0	<1.0	<1.0	1.4	<1.0	15	1.5
Cobalt	µg/L	NG	10	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	0.56	<0.40	2.7	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	0.63	<0.40
Copper	µg/L	≤1000 (AO)	NG	<2.0	<2.0	<2.0	<2.0	160	160	73	25	33	<2.0	11	15	5.5	4.3	2.3	3.3	3.5	52	17
Iron	µg/L	≤300 (AO)	NG	<50	<50	160	120	60	60	250	**59000**	**15000**	**1000**	**9600**	**9200**	**4000**	150	100	<50	<50	**2200**	**660**
Lead	µg/L	10 (MAC)	10	<0.50	<0.50	<0.50	<0.50	1.4	1.4	0.58	4.2	7.8	3.0	5.5	1.5	1.1	<0.50	<0.50	<0.50	<0.50	***14***	4.2
Magnesium	µg/L	NG	NG	4700	4500	5800	6300	1800	1800	1700	16000	15000	1900	2100	2200	2700	<100	<100	930	950	1400	660
Manganese	µg/L	≤50 (AO)	NG	**120**	**110**	**300**	**260**	5.2	5.4	15	**1300**	**570**	**120**	**1400**	**87**	**96**	<2.0	<2.0	15	16	39	13
Molybdenum	µg/L	NG	70	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Nickel	µg/L	NG	100	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	4.1	<2.0	5.2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	11	<2.0
Phosphorus	µg/L	NG	NG	380	390	340	330	180	170	140	190	120	390	2100	220	350	370	380	<100	<100	490	170
Potassium	µg/L	NG	NG	2900	2700	3900	4000	1100	1100	940	3500	3400	900	950	1100	1200	380	680	1600	1800	360	180
Selenium	µg/L	10 (MAC)	10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.7	<1.0
Silver	µg/L	NG	100	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.24	<0.10
Sodium	µg/L	≤ 200,000 (AO)	NG	26000	26000	37000	41000	8400	8400	8100	87000	83000	7900	8300	13000	15000	52000	43000	7100	8100	2500	1700
Strontium	µg/L	NG	4400	490	460	670	740	76	75	66	540	470	32	39	49	62	<2.0	<2.0	17	17	29	11
Thallium	µg/L	NG	2	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.23	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Tin	µg/L	NG	4400	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	12	4.8
Titanium	µg/L	NG	NG	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	5.7	44	2.2	12	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	53	17
Uranium	µg/L	20 (MAC)	20	2.3	2.2	4.1	4.4	3.9	3.8	4.8	14	8.5	4.4	34	2.9	3.7	0.63	1.1	0.14	0.16	3.9	1.2
Vanadium	µg/L	NG	6.2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	4.2	<2.0
Zinc	µg/L	≤5000 (AO)	5000	<5.0	<5.0	<5.0	<5.0	21	20	14	17	43	8.7	66	5.5	19	13	14	<5.0	<5.0	110	42

Notes:

AO - Aesthetic Objective	value	- exceeds CCME drinking water guidelines
MAC - Maximum Acceptable Concentration	***value***	-exceeds NSE EQS
NG - no guideline	***value***	-exceeds both CCME and NSE EQS
	value	- wetland surface water sample

[1]Criteria taken from the Canadian Council of Ministers of the Environment (CCME) Canadian Water Quality Guidelines for Community (Drinking) Water (Update 2014)

[2] Criteria taken from the 2013 Nova Scotia Environment (NSE) Tier 1 Environmental Quality Standards (EQS) for potable water at a residential site with coarse-grained soil

TABLE 3: VOCs in Groundwater
Client: Joe Arab
Site Location: Upper Tantallon, NS
Englobe Project No.: 20814

PARAMETER	UNITS	Drinking Water Quality Guidelines [1]		NSE Tier 1 EQS[2]	SAMPLE ID		
					WELL 3 72hr		WELL 4 72hr
		MAC	AO (or OG)		3-Mar-16	Lab Dup	3-Mar-16
1,2-Dichlorobenzene	ug/L	20	< 3	200	<0.50	<0.50	<0.50
1,3-Dichlorobenzene	ug/L	NG	NG	59	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	ug/L	5	< 1	5	<1.0	<1.0	<1.0
Chlorobenzene	µg/L	NG	< 30	14	<1.0	<1.0	<1.0
1,1,1-Trichloroethane	µg/L	NG	NG	200	<1.0	<1.0	<1.0
1,1,2,2-Tetrachloroethane	µg/L	NG	NG	1	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	µg/L	NG	NG	5	<1.0	<1.0	<1.0
1,1-Dichloroethane	µg/L	NG	NG	5	<2.0	<2.0	<2.0
1,1-Dichloroethylene	µg/L	14	NG	14	<0.50	<0.50	<0.50
1,2-Dichloroethane	µg/L	5	NG	5	<1.0	<1.0	<1.0
1,2-Dichloropropane	µg/L	NG	NG	5	<0.50	<0.50	<0.50
Benzene	µg/L	5	NG	5	<1.0	<1.0	<1.0
Bromodichloromethane	µg/L	100[2]	NG	100	<1.0	<1.0	<1.0
Dibromochloromethane	µg/L		NG	100	<1.0	<1.0	<1.0
Bromoform	µg/L		NG	100	<0.50	<0.50	<0.50
Chloroform	µg/L		NG	3	<0.50	<0.50	<0.50
Bromomethane	µg/L	NG	NG	0.89	<8.0	<8.0	<8.0
Carbon Tetrachloride	µg/L	2	NG	0.56	<1.0	<1.0	<1.0
Chloroethane	µg/L	NG	NG	NG	<8.0	<8.0	<8.0
Chloromethane	µg/L	NG	NG	38	<0.50	<0.50	<0.50
cis-1,2-Dichloroethylene	µg/L	NG	NG	1.6	<0.50	<0.50	<0.50
cis-1,3-Dichloropropene	µg/L	NG	NG	NG	<1.0	<1.0	<1.0
Ethylbenzene	µg/L	NG	< 2.4	2.4	<1.0	<1.0	<1.0
Ethylene Dibromide	µg/L	NG	NG	0.2	<0.20	<0.20	<0.20
Methylene Chloride(Dichloromethane)	µg/L	50	NG	50	<3.0	<3.0	<3.0
o-Xylene	µg/L	NG	< 300	300	<1.0	<1.0	<1.0
p+m-Xylene	µg/L	NG			<2.0	<2.0	<2.0
Styrene	µg/L	NG	NG	100	<1.0	<1.0	<1.0
Tetrachloroethylene	µg/L	30	NG	30	<1.0	<1.0	<1.0
Toluene	µg/L	NG	< 24	24.0	<1.0	<1.0	1.1
trans-1,2-Dichloroethylene	µg/L	NG	NG	1.6	<0.50	<0.50	<0.50
trans-1,3-Dichloropropene	µg/L	NG	NG	NG	<0.50	<0.50	<0.50
Trichloroethylene	µg/L	5	NG	5	<1.0	<1.0	<1.0
Trichlorofluoromethane (FREON 11)	µg/L	NG	NG	NG	<8.0	<8.0	<8.0
Vinyl Chloride	µg/L	2	NG	1.1	<0.50	<0.50	<0.50

Notes:
AO - Aesthetic Objective
MAC - Maximum Acceptable Concentration
NG - no guideline

value - exceeds CCME drinking water guidelines
value -exceeds NSE EQS
value -exceeds both CCME and NSE EQS

[1]Criteria taken from the 2010 Guidelines for Canadian Drinking Water Quality
[2]Guideline for trihalomethanes
NG - no guideline
MAC - Maximum Allowable Concentration
OG - Operational Guideline
AO - Aesthetic Objective

Appendix 8 Laboratory Certificates

Your Project #: 20814
Your C.O.C. #: B 159535

Attention:Aven Cole

Englobe Corp.
97 Troop Ave
Dartmouth, NS
CANADA B3B 2A7

Report Date: 2016/01/25
Report #: R3863764
Version: 2 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B609966
Received: 2016/01/18, 15:19

Sample Matrix: Drinking Water
Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Carbonate, Bicarbonate and Hydroxide	4	N/A	2016/01/20	N/A	SM 22 4500-CO2 D
Alkalinity	4	N/A	2016/01/21	ATL SOP 00013	EPA 310.2 R1974 m
Chloride	4	N/A	2016/01/21	ATL SOP 00014	SM 22 4500-Cl- E m
TC/EC Drinking Water CFU/100mL	1	N/A	2016/01/18	ATL SOP 00096	OMOE E3407 V5.2
Colour	4	N/A	2016/01/22	ATL SOP 00020	SM 22 2120C m
Conductance - water	4	N/A	2016/01/20	ATL SOP 00004	SM 22 2510B m
Hardness (calculated as CaCO3)	1	N/A	2016/01/20	ATL SOP 00048	SM 22 2340 B
Hardness (calculated as CaCO3)	3	N/A	2016/01/21	ATL SOP 00048	SM 22 2340 B
Metals Water Total MS	1	2016/01/19	2016/01/19	ATL SOP 00058	EPA 6020A R1 m
Metals Water Total MS	3	2016/01/20	2016/01/20	ATL SOP 00058	EPA 6020A R1 m
Ion Balance (% Difference)	4	N/A	2016/01/22		Auto Calc.
Anion and Cation Sum	4	N/A	2016/01/22		Auto Calc.
Nitrogen Ammonia - water	4	N/A	2016/01/21	ATL SOP 00015	EPA 350.1 R2 m
Nitrogen - Nitrate + Nitrite	4	N/A	2016/01/22	ATL SOP 00016	USGS SOPINCF0452.2 m
Nitrogen - Nitrite	4	N/A	2016/01/21	ATL SOP 00017	SM 22 4500-NO2- B m
Nitrogen - Nitrate (as N)	4	N/A	2016/01/22	ATL SOP 00018	ASTM D3867
pH (1)	4	N/A	2016/01/20	ATL SOP 00003	SM 22 4500-H+ B m
Phosphorus - ortho	4	N/A	2016/01/21	ATL SOP 00021	EPA 365.2 m
Sat. pH and Langelier Index (@ 20C)	4	N/A	2016/01/22	ATL SOP 00049	Auto Calc.
Sat. pH and Langelier Index (@ 4C)	4	N/A	2016/01/22	ATL SOP 00049	Auto Calc.
Reactive Silica	4	N/A	2016/01/21	ATL SOP 00022	EPA 366.0 m
Sulphate	4	N/A	2016/01/21	ATL SOP 00023	EPA 375.4 R1978 m
Total Dissolved Solids (TDS calc)	4	N/A	2016/01/22		Auto Calc.
Organic carbon - Total (TOC) (2)	4	N/A	2016/01/21	ATL SOP 00037	SM 22 5310C m
Turbidity	4	N/A	2016/01/20	ATL SOP 00011	EPA 180.1 R2 m

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Carbonate, Bicarbonate and Hydroxide	1	N/A	2016/01/22	N/A	SM 22 4500-CO2 D

Your Project #: 20814
Your C.O.C. #: B 159535

Attention:Aven Cole

Englobe Corp.
97 Troop Ave
Dartmouth, NS
CANADA B3B 2A7

Report Date: 2016/01/25
Report #: R3863764
Version: 2 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B609966
Received: 2016/01/18, 15:19

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Alkalinity	1	N/A	2016/01/21	ATL SOP 00013	EPA 310.2 R1974 m
Chloride	1	N/A	2016/01/21	ATL SOP 00014	SM 22 4500-Cl- E m
Colour	1	N/A	2016/01/22	ATL SOP 00020	SM 22 2120C m
Conductance - water	1	N/A	2016/01/20	ATL SOP 00004	SM 22 2510B m
Hardness (calculated as CaCO3)	1	N/A	2016/01/21	ATL SOP 00048	SM 22 2340 B
Metals Water Total MS	1	2016/01/20	2016/01/21	ATL SOP 00058	EPA 6020A R1 m
Ion Balance (% Difference)	1	N/A	2016/01/22		Auto Calc.
Anion and Cation Sum	1	N/A	2016/01/22		Auto Calc.
Nitrogen Ammonia - water	1	N/A	2016/01/21	ATL SOP 00015	EPA 350.1 R2 m
Nitrogen - Nitrate + Nitrite	1	N/A	2016/01/22	ATL SOP 00016	USGS SOPINCF0452.2 m
Nitrogen - Nitrite	1	N/A	2016/01/21	ATL SOP 00017	SM 22 4500-NO2- B m
Nitrogen - Nitrate (as N)	1	N/A	2016/01/22	ATL SOP 00018	ASTM D3867
pH (1)	1	N/A	2016/01/22	ATL SOP 00003	SM 22 4500-H+ B m
Phosphorus - ortho	1	N/A	2016/01/21	ATL SOP 00021	EPA 365.2 m
Sat. pH and Langelier Index (@ 20C)	1	N/A	2016/01/22	ATL SOP 00049	Auto Calc.
Sat. pH and Langelier Index (@ 4C)	1	N/A	2016/01/22	ATL SOP 00049	Auto Calc.
Reactive Silica	1	N/A	2016/01/21	ATL SOP 00022	EPA 366.0 m
Sulphate	1	N/A	2016/01/21	ATL SOP 00023	EPA 375.4 R1978 m
Total Dissolved Solids (TDS calc)	1	N/A	2016/01/22		Auto Calc.
Organic carbon - Total (TOC) (2)	1	N/A	2016/01/21	ATL SOP 00037	SM 22 5310C m
Turbidity	1	N/A	2016/01/20	ATL SOP 00011	EPA 180.1 R2 m

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.

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

(1) The APHA Standard Method require pH to be analyzed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the APHA Standard Method holding time.

(2) TOC / DOC present in the sample should be considered as non-purgeable TOC / DOC.

Your Project #: 20814
Your C.O.C. #: B 159535

Attention:Aven Cole

Englobe Corp.
97 Troop Ave
Dartmouth, NS
CANADA B3B 2A7

Report Date: 2016/01/25
Report #: R3863764
Version: 2 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B609966
Received: 2016/01/18, 15:19

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Avery Withrow, Project Manager
Email: AWithrow@maxxam.ca
Phone# (902)420-0203 Ext:233
==========
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B609966
Report Date: 2016/01/25

Englobe Corp.
Client Project #: 20814
Sampler Initials: LL

ATLANTIC RCAP-MS TOTAL METALS IN WATER (DRINKING WATER)

Maxxam ID		BRF057		BRF059	BRF059		BRF060			
Sampling Date		2016/01/18 13:00		2016/01/18	2016/01/18		2016/01/18			
COC Number		B 159535		B 159535	B 159535		B 159535			
	UNITS	DW1	QC Batch	PW1	PW1 Lab-Dup	RDL	PW2	RDL	QC Batch	MDL
Calculated Parameters										
Anion Sum	me/L	0.670	4348166	1.35		N/A	9.67	N/A	4348166	N/A
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	9.7	4348162	36		1.0	24	1.0	4348162	0.20
Calculated TDS	mg/L	47	4348171	87		1.0	610	1.0	4348171	0.20
Carb. Alkalinity (calc. as CaCO3)	mg/L	<1.0	4348162	<1.0		1.0	<1.0	1.0	4348162	0.20
Cation Sum	me/L	0.690	4348166	1.29		N/A	11.8	N/A	4348166	N/A
Hardness (CaCO3)	mg/L	13	4348164	43		1.0	290	1.0	4348164	1.0
Ion Balance (% Difference)	%	1.47	4348165	2.27		N/A	10.1	N/A	4348165	N/A
Langelier Index (@ 20C)	N/A	-3.37	4348169	-1.43			-1.50		4348169	N/A
Langelier Index (@ 4C)	N/A	-3.63	4348170	-1.68			-1.74		4348170	N/A
Nitrate (N)	mg/L	<0.050	4348167	0.34		0.050	0.27	0.050	4348167	N/A
Saturation pH (@ 20C)	N/A	9.76	4348169	8.63			8.16		4348169	N/A
Saturation pH (@ 4C)	N/A	10.0	4348170	8.88			8.41		4348170	N/A
Inorganics										
Total Alkalinity (Total as CaCO3)	mg/L	9.7	4351041	36		5.0	24	5.0	4351041	N/A
Dissolved Chloride (Cl)	mg/L	13	4351046	18		1.0	310	5.0	4351046	N/A
Colour	TCU	<5.0	4351052	<5.0		5.0	<5.0	5.0	4351052	N/A
Nitrate + Nitrite (N)	mg/L	<0.050	4351056	0.34		0.050	0.27	0.050	4351056	N/A
Nitrite (N)	mg/L	<0.010	4351057	<0.010		0.010	<0.010	0.010	4351057	N/A
Nitrogen (Ammonia Nitrogen)	mg/L	1.1	4352974	0.39		0.050	0.34	0.050	4352974	N/A
Total Organic Carbon (C)	mg/L	2.4	4352827	0.62		0.50	2.3	0.50	4352827	N/A
Orthophosphate (P)	mg/L	0.012	4351053	0.12		0.010	0.011	0.010	4351053	N/A
pH	pH	6.38	4350987	7.20		N/A	6.67	N/A	4350987	N/A
Reactive Silica (SiO2)	mg/L	8.6	4351050	14		0.50	7.9	0.50	4351050	N/A
Dissolved Sulphate (SO4)	mg/L	5.1	4351048	5.2		2.0	15	2.0	4351048	N/A
Turbidity	NTU	0.16	4351045	0.64		0.10	180	1.0	4351045	0.10
Conductivity	uS/cm	71	4350989	130		1.0	1100	1.0	4350989	N/A
Metals										
Total Aluminum (Al)	ug/L	89	4349397	7.6	6.6	5.0	89	5.0	4350994	N/A
Total Antimony (Sb)	ug/L	<1.0	4349397	<1.0	<1.0	1.0	<1.0	1.0	4350994	N/A
Total Arsenic (As)	ug/L	<1.0	4349397	5.2	5.3	1.0	2.1	1.0	4350994	N/A
Total Barium (Ba)	ug/L	38	4349397	42	43	1.0	280	1.0	4350994	N/A
Total Beryllium (Be)	ug/L	<1.0	4349397	<1.0	<1.0	1.0	<1.0	1.0	4350994	N/A
Total Bismuth (Bi)	ug/L	<2.0	4349397	<2.0	<2.0	2.0	<2.0	2.0	4350994	N/A

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B609966
Report Date: 2016/01/25

Englobe Corp.
Client Project #: 20814
Sampler Initials: LL

ATLANTIC RCAP-MS TOTAL METALS IN WATER (DRINKING WATER)

Maxxam ID		BRF057		BRF059	BRF059		BRF060			
Sampling Date		2016/01/18 13:00		2016/01/18	2016/01/18		2016/01/18			
COC Number		B 159535		B 159535	B 159535		B 159535			
	UNITS	DW1	QC Batch	PW1	PW1 Lab-Dup	RDL	PW2	RDL	QC Batch	MDL
Total Boron (B)	ug/L	<50	4349397	<50	<50	50	<50	50	4350994	N/A
Total Cadmium (Cd)	ug/L	0.034	4349397	0.017	0.015	0.010	0.30	0.010	4350994	N/A
Total Calcium (Ca)	ug/L	3700	4349397	14000	14000	100	90000	100	4350994	N/A
Total Chromium (Cr)	ug/L	1.4	4349397	<1.0	<1.0	1.0	<1.0	1.0	4350994	N/A
Total Cobalt (Co)	ug/L	<0.40	4349397	<0.40	<0.40	0.40	<0.40	0.40	4350994	N/A
Total Copper (Cu)	ug/L	3.3	4349397	160	160	2.0	25	2.0	4350994	N/A
Total Iron (Fe)	ug/L	<50	4349397	60	60	50	59000	50	4350994	N/A
Total Lead (Pb)	ug/L	<0.50	4349397	1.4	1.4	0.50	4.2	0.50	4350994	N/A
Total Magnesium (Mg)	ug/L	930	4349397	1800	1800	100	16000	100	4350994	N/A
Total Manganese (Mn)	ug/L	15	4349397	5.2	5.4	2.0	1300	2.0	4350994	N/A
Total Molybdenum (Mo)	ug/L	<2.0	4349397	<2.0	<2.0	2.0	<2.0	2.0	4350994	N/A
Total Nickel (Ni)	ug/L	<2.0	4349397	<2.0	<2.0	2.0	<2.0	2.0	4350994	N/A
Total Phosphorus (P)	ug/L	<100	4349397	180	170	100	190	100	4350994	N/A
Total Potassium (K)	ug/L	1600	4349397	1100	1100	100	3500	100	4350994	N/A
Total Selenium (Se)	ug/L	<1.0	4349397	<1.0	<1.0	1.0	<1.0	1.0	4350994	N/A
Total Silver (Ag)	ug/L	<0.10	4349397	<0.10	<0.10	0.10	<0.10	0.10	4350994	N/A
Total Sodium (Na)	ug/L	7100	4349397	8400	8400	100	87000	100	4350994	N/A
Total Strontium (Sr)	ug/L	17	4349397	76	75	2.0	540	2.0	4350994	N/A
Total Thallium (Tl)	ug/L	<0.10	4349397	<0.10	<0.10	0.10	<0.10	0.10	4350994	N/A
Total Tin (Sn)	ug/L	<2.0	4349397	<2.0	<2.0	2.0	<2.0	2.0	4350994	N/A
Total Titanium (Ti)	ug/L	<2.0	4349397	<2.0	<2.0	2.0	5.7	2.0	4350994	N/A
Total Uranium (U)	ug/L	0.14	4349397	3.9	3.8	0.10	14	0.10	4350994	N/A
Total Vanadium (V)	ug/L	<2.0	4349397	<2.0	<2.0	2.0	<2.0	2.0	4350994	N/A
Total Zinc (Zn)	ug/L	<5.0	4349397	21	20	5.0	17	5.0	4350994	N/A

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B609966
Report Date: 2016/01/25

Englobe Corp.
Client Project #: 20814
Sampler Initials: LL

ATLANTIC RCAP-MS TOTAL METALS IN WATER (DRINKING WATER)

Maxxam ID		BRF061	BRF061			
Sampling Date		2016/01/18	2016/01/18			
COC Number		B 159535	B 159535			
	UNITS	PW3	PW3 Lab-Dup	RDL	QC Batch	MDL
Calculated Parameters						
Anion Sum	me/L	1.00		N/A	4348166	N/A
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	32		1.0	4348162	0.20
Calculated TDS	mg/L	74		1.0	4348171	0.20
Carb. Alkalinity (calc. as CaCO3)	mg/L	<1.0		1.0	4348162	0.20
Cation Sum	me/L	0.990		N/A	4348166	N/A
Hardness (CaCO3)	mg/L	29		1.0	4348164	1.0
Ion Balance (% Difference)	%	0.500		N/A	4348165	N/A
Langelier Index (@ 20C)	N/A	-1.74			4348169	N/A
Langelier Index (@ 4C)	N/A	-1.99			4348170	N/A
Nitrate (N)	mg/L	0.47		0.050	4348167	N/A
Saturation pH (@ 20C)	N/A	8.89			4348169	N/A
Saturation pH (@ 4C)	N/A	9.14			4348170	N/A
Inorganics						
Total Alkalinity (Total as CaCO3)	mg/L	32	33	5.0	4351041	N/A
Dissolved Chloride (Cl)	mg/L	7.5	7.2	1.0	4351046	N/A
Colour	TCU	<5.0	<5.0	5.0	4351052	N/A
Nitrate + Nitrite (N)	mg/L	0.47	0.48	0.050	4351056	N/A
Nitrite (N)	mg/L	<0.010	<0.010	0.010	4351057	N/A
Nitrogen (Ammonia Nitrogen)	mg/L	0.10	0.090	0.050	4352974	N/A
Total Organic Carbon (C)	mg/L	0.88	0.84	0.50	4352827	N/A
Orthophosphate (P)	mg/L	0.28	0.28	0.010	4351053	N/A
pH	pH	7.15		N/A	4350987	N/A
Reactive Silica (SiO2)	mg/L	20	19	0.50	4351050	N/A
Dissolved Sulphate (SO4)	mg/L	4.5	4.6	2.0	4351048	N/A
Turbidity	NTU	2.9	2.6	0.10	4351045	0.10
Conductivity	uS/cm	91		1.0	4350989	N/A
Metals						
Total Aluminum (Al)	ug/L	27		5.0	4350994	N/A
Total Antimony (Sb)	ug/L	<1.0		1.0	4350994	N/A
Total Arsenic (As)	ug/L	18		1.0	4350994	N/A
Total Barium (Ba)	ug/L	10		1.0	4350994	N/A
Total Beryllium (Be)	ug/L	<1.0		1.0	4350994	N/A
Total Bismuth (Bi)	ug/L	<2.0		2.0	4350994	N/A

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable

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Maxxam Job #: B609966
Report Date: 2016/01/25

Englobe Corp.
Client Project #: 20814
Sampler Initials: LL

ATLANTIC RCAP-MS TOTAL METALS IN WATER (DRINKING WATER)

Maxxam ID		BRF061	BRF061			
Sampling Date		2016/01/18	2016/01/18			
COC Number		B 159535	B 159535			
	UNITS	PW3	PW3 Lab-Dup	RDL	QC Batch	MDL
Total Boron (B)	ug/L	<50		50	4350994	N/A
Total Cadmium (Cd)	ug/L	0.043		0.010	4350994	N/A
Total Calcium (Ca)	ug/L	8500		100	4350994	N/A
Total Chromium (Cr)	ug/L	<1.0		1.0	4350994	N/A
Total Cobalt (Co)	ug/L	<0.40		0.40	4350994	N/A
Total Copper (Cu)	ug/L	<2.0		2.0	4350994	N/A
Total Iron (Fe)	ug/L	1000		50	4350994	N/A
Total Lead (Pb)	ug/L	3.0		0.50	4350994	N/A
Total Magnesium (Mg)	ug/L	1900		100	4350994	N/A
Total Manganese (Mn)	ug/L	120		2.0	4350994	N/A
Total Molybdenum (Mo)	ug/L	<2.0		2.0	4350994	N/A
Total Nickel (Ni)	ug/L	<2.0		2.0	4350994	N/A
Total Phosphorus (P)	ug/L	390		100	4350994	N/A
Total Potassium (K)	ug/L	900		100	4350994	N/A
Total Selenium (Se)	ug/L	<1.0		1.0	4350994	N/A
Total Silver (Ag)	ug/L	<0.10		0.10	4350994	N/A
Total Sodium (Na)	ug/L	7900		100	4350994	N/A
Total Strontium (Sr)	ug/L	32		2.0	4350994	N/A
Total Thallium (Tl)	ug/L	<0.10		0.10	4350994	N/A
Total Tin (Sn)	ug/L	<2.0		2.0	4350994	N/A
Total Titanium (Ti)	ug/L	2.2		2.0	4350994	N/A
Total Uranium (U)	ug/L	4.4		0.10	4350994	N/A
Total Vanadium (V)	ug/L	<2.0		2.0	4350994	N/A
Total Zinc (Zn)	ug/L	8.7		5.0	4350994	N/A

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

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Maxxam Job #: B609966
Report Date: 2016/01/25

Englobe Corp.
Client Project #: 20814
Sampler Initials: LL

ATLANTIC RCAP-MS TOTAL METALS IN WATER (WATER)

Maxxam ID		BRF058			
Sampling Date		2016/01/18			
COC Number		B 159535			
	UNITS	P1	RDL	QC Batch	MDL
Calculated Parameters					
Anion Sum	me/L	0.200	N/A	4348166	N/A
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	<1.0	1.0	4348162	0.20
Calculated TDS	mg/L	20	1.0	4348171	0.20
Carb. Alkalinity (calc. as CaCO3)	mg/L	<1.0	1.0	4348162	0.20
Cation Sum	me/L	0.650	N/A	4348166	N/A
Hardness (CaCO3)	mg/L	15	1.0	4348164	1.0
Ion Balance (% Difference)	%	52.9	N/A	4348165	N/A
Langelier Index (@ 20C)	N/A	NC		4348169	N/A
Langelier Index (@ 4C)	N/A	NC		4348170	N/A
Nitrate (N)	mg/L	0.10	0.050	4348167	N/A
Saturation pH (@ 20C)	N/A	NC		4348169	N/A
Saturation pH (@ 4C)	N/A	NC		4348170	N/A
Inorganics					
Total Alkalinity (Total as CaCO3)	mg/L	<5.0	5.0	4351041	N/A
Dissolved Chloride (Cl)	mg/L	6.9	1.0	4351046	N/A
Colour	TCU	200	25	4351052	N/A
Nitrate + Nitrite (N)	mg/L	0.10	0.050	4351056	N/A
Nitrite (N)	mg/L	<0.010	0.010	4351057	N/A
Nitrogen (Ammonia Nitrogen)	mg/L	0.99	0.050	4352974	N/A
Total Organic Carbon (C)	mg/L	22 (1)	2.5	4352827	N/A
Orthophosphate (P)	mg/L	0.031	0.010	4351053	N/A
pH	pH	4.06	N/A	4354666	N/A
Reactive Silica (SiO2)	mg/L	1.5	0.50	4351050	N/A
Dissolved Sulphate (SO4)	mg/L	<2.0	2.0	4351048	N/A
Turbidity	NTU	>1000	1.0	4351045	0.10
Conductivity	uS/cm	63	1.0	4351248	N/A
Metals					
Total Aluminum (Al)	ug/L	2500	5.0	4350994	N/A
Total Antimony (Sb)	ug/L	1.2	1.0	4350994	N/A
Total Arsenic (As)	ug/L	2.5	1.0	4350994	N/A
Total Barium (Ba)	ug/L	43	1.0	4350994	N/A
Total Beryllium (Be)	ug/L	<1.0	1.0	4350994	N/A
Total Bismuth (Bi)	ug/L	<2.0	2.0	4350994	N/A
Total Boron (B)	ug/L	<50	50	4350994	N/A

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
(1) Analysis performed on decanted sample due to sediment content.

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Report Date: 2016/01/25

Englobe Corp.
Client Project #: 20814
Sampler Initials: LL

ATLANTIC RCAP-MS TOTAL METALS IN WATER (WATER)

Maxxam ID		BRF058			
Sampling Date		2016/01/18			
COC Number		B 159535			
	UNITS	P1	RDL	QC Batch	MDL
Total Cadmium (Cd)	ug/L	0.35	0.010	4350994	N/A
Total Calcium (Ca)	ug/L	3600	100	4350994	N/A
Total Chromium (Cr)	ug/L	15	1.0	4350994	N/A
Total Cobalt (Co)	ug/L	0.63	0.40	4350994	N/A
Total Copper (Cu)	ug/L	52	2.0	4350994	N/A
Total Iron (Fe)	ug/L	2200	50	4350994	N/A
Total Lead (Pb)	ug/L	14	0.50	4350994	N/A
Total Magnesium (Mg)	ug/L	1400	100	4350994	N/A
Total Manganese (Mn)	ug/L	39	2.0	4350994	N/A
Total Molybdenum (Mo)	ug/L	<2.0	2.0	4350994	N/A
Total Nickel (Ni)	ug/L	11	2.0	4350994	N/A
Total Phosphorus (P)	ug/L	490	100	4350994	N/A
Total Potassium (K)	ug/L	360	100	4350994	N/A
Total Selenium (Se)	ug/L	1.7	1.0	4350994	N/A
Total Silver (Ag)	ug/L	0.24	0.10	4350994	N/A
Total Sodium (Na)	ug/L	2500	100	4350994	N/A
Total Strontium (Sr)	ug/L	29	2.0	4350994	N/A
Total Thallium (Tl)	ug/L	<0.10	0.10	4350994	N/A
Total Tin (Sn)	ug/L	12	2.0	4350994	N/A
Total Titanium (Ti)	ug/L	53	2.0	4350994	N/A
Total Uranium (U)	ug/L	3.9	0.10	4350994	N/A
Total Vanadium (V)	ug/L	4.2	2.0	4350994	N/A
Total Zinc (Zn)	ug/L	110	5.0	4350994	N/A

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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Maxxam Job #: B609966
Report Date: 2016/01/25

Englobe Corp.
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Sampler Initials: LL

MICROBIOLOGY COLILERT (DRINKING WATER)

Maxxam ID		BRF057			
Sampling Date		2016/01/18 13:00			
COC Number		B 159535			
	UNITS	DW1	RDL	QC Batch	MDL
Microbiological					
Escherichia coli	CFU/100mL	<1.0	1.0	4348900	N/A
Total Coliforms	CFU/100mL	240	1.0	4348900	N/A

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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Maxxam Job #: B609966
Report Date: 2016/01/25

Englobe Corp.
Client Project #: 20814
Sampler Initials: LL

TEST SUMMARY

Maxxam ID: BRF057
Sample ID: DW1
Matrix: Drinking Water

Collected: 2016/01/18
Shipped:
Received: 2016/01/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Carbonate, Bicarbonate and Hydroxide	CALC	4348162	N/A	2016/01/20	Automated Statchk
Alkalinity	KONE	4351041	N/A	2016/01/21	Mary Clancey
Chloride	KONE	4351046	N/A	2016/01/21	Arlene Rossiter
TC/EC Drinking Water CFU/100mL		4348900	N/A	2016/01/18	Jessica Romo
Colour	KONE	4351052	N/A	2016/01/22	Arlene Rossiter
Conductance - water	AT	4350989	N/A	2016/01/20	Tiffany Morash
Hardness (calculated as CaCO3)		4348164	N/A	2016/01/20	Automated Statchk
Metals Water Total MS	CICP/MS	4349397	2016/01/19	2016/01/19	Bryon Angevine
Ion Balance (% Difference)	CALC	4348165	N/A	2016/01/22	Automated Statchk
Anion and Cation Sum	CALC	4348166	N/A	2016/01/22	Automated Statchk
Nitrogen Ammonia - water	KONE	4352974	N/A	2016/01/21	Arlene Rossiter
Nitrogen - Nitrate + Nitrite	KONE	4351056	N/A	2016/01/22	Arlene Rossiter
Nitrogen - Nitrite	KONE	4351057	N/A	2016/01/21	Mary Clancey
Nitrogen - Nitrate (as N)	CALC	4348167	N/A	2016/01/22	Automated Statchk
pH	AT	4350987	N/A	2016/01/20	Tiffany Morash
Phosphorus - ortho	KONE	4351053	N/A	2016/01/21	Arlene Rossiter
Sat. pH and Langelier Index (@ 20C)	CALC	4348169	N/A	2016/01/22	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	4348170	N/A	2016/01/22	Automated Statchk
Reactive Silica	KONE	4351050	N/A	2016/01/21	Arlene Rossiter
Sulphate	KONE	4351048	N/A	2016/01/21	Arlene Rossiter
Total Dissolved Solids (TDS calc)	CALC	4348171	N/A	2016/01/22	Automated Statchk
Organic carbon - Total (TOC)	TECH	4352827	N/A	2016/01/21	Soraya Merchant
Turbidity	TURB	4351045	N/A	2016/01/20	Tiffany Morash

Maxxam ID: BRF058
Sample ID: P1
Matrix: Water

Collected: 2016/01/18
Shipped:
Received: 2016/01/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Carbonate, Bicarbonate and Hydroxide	CALC	4348162	N/A	2016/01/22	Automated Statchk
Alkalinity	KONE	4351041	N/A	2016/01/21	Mary Clancey
Chloride	KONE	4351046	N/A	2016/01/21	Arlene Rossiter
Colour	KONE	4351052	N/A	2016/01/22	Arlene Rossiter
Conductance - water	AT	4351248	N/A	2016/01/20	Tammy Peters
Hardness (calculated as CaCO3)		4348164	N/A	2016/01/21	Automated Statchk
Metals Water Total MS	CICP/MS	4350994	2016/01/20	2016/01/21	Bryon Angevine
Ion Balance (% Difference)	CALC	4348165	N/A	2016/01/22	Automated Statchk
Anion and Cation Sum	CALC	4348166	N/A	2016/01/22	Automated Statchk
Nitrogen Ammonia - water	KONE	4352974	N/A	2016/01/21	Arlene Rossiter
Nitrogen - Nitrate + Nitrite	KONE	4351056	N/A	2016/01/22	Arlene Rossiter
Nitrogen - Nitrite	KONE	4351057	N/A	2016/01/21	Mary Clancey
Nitrogen - Nitrate (as N)	CALC	4348167	N/A	2016/01/22	Automated Statchk
pH	AT	4354666	N/A	2016/01/22	Tammy Peters
Phosphorus - ortho	KONE	4351053	N/A	2016/01/21	Arlene Rossiter
Sat. pH and Langelier Index (@ 20C)	CALC	4348169	N/A	2016/01/22	Automated Statchk

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Maxxam Job #: B609966
Report Date: 2016/01/25

Englobe Corp.
Client Project #: 20814
Sampler Initials: LL

TEST SUMMARY

Maxxam ID: BRF058
Sample ID: P1
Matrix: Water

Collected: 2016/01/18
Shipped:
Received: 2016/01/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Sat. pH and Langelier Index (@ 4C)	CALC	4348170	N/A	2016/01/22	Automated Statchk
Reactive Silica	KONE	4351050	N/A	2016/01/21	Arlene Rossiter
Sulphate	KONE	4351048	N/A	2016/01/21	Arlene Rossiter
Total Dissolved Solids (TDS calc)	CALC	4348171	N/A	2016/01/22	Automated Statchk
Organic carbon - Total (TOC)	TECH	4352827	N/A	2016/01/21	Soraya Merchant
Turbidity	TURB	4351045	N/A	2016/01/20	Tiffany Morash

Maxxam ID: BRF059
Sample ID: PW1
Matrix: Drinking Water

Collected: 2016/01/18
Shipped:
Received: 2016/01/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Carbonate, Bicarbonate and Hydroxide	CALC	4348162	N/A	2016/01/20	Automated Statchk
Alkalinity	KONE	4351041	N/A	2016/01/21	Mary Clancey
Chloride	KONE	4351046	N/A	2016/01/21	Arlene Rossiter
Colour	KONE	4351052	N/A	2016/01/22	Arlene Rossiter
Conductance - water	AT	4350989	N/A	2016/01/20	Tiffany Morash
Hardness (calculated as CaCO3)		4348164	N/A	2016/01/21	Automated Statchk
Metals Water Total MS	CICP/MS	4350994	2016/01/20	2016/01/20	Bryon Angevine
Ion Balance (% Difference)	CALC	4348165	N/A	2016/01/22	Automated Statchk
Anion and Cation Sum	CALC	4348166	N/A	2016/01/22	Automated Statchk
Nitrogen Ammonia - water	KONE	4352974	N/A	2016/01/21	Arlene Rossiter
Nitrogen - Nitrate + Nitrite	KONE	4351056	N/A	2016/01/22	Arlene Rossiter
Nitrogen - Nitrite	KONE	4351057	N/A	2016/01/21	Mary Clancey
Nitrogen - Nitrate (as N)	CALC	4348167	N/A	2016/01/22	Automated Statchk
pH	AT	4350987	N/A	2016/01/20	Tiffany Morash
Phosphorus - ortho	KONE	4351053	N/A	2016/01/21	Arlene Rossiter
Sat. pH and Langelier Index (@ 20C)	CALC	4348169	N/A	2016/01/22	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	4348170	N/A	2016/01/22	Automated Statchk
Reactive Silica	KONE	4351050	N/A	2016/01/21	Arlene Rossiter
Sulphate	KONE	4351048	N/A	2016/01/21	Arlene Rossiter
Total Dissolved Solids (TDS calc)	CALC	4348171	N/A	2016/01/22	Automated Statchk
Organic carbon - Total (TOC)	TECH	4352827	N/A	2016/01/21	Soraya Merchant
Turbidity	TURB	4351045	N/A	2016/01/20	Tiffany Morash

Maxxam ID: BRF059 Dup
Sample ID: PW1
Matrix: Drinking Water

Collected: 2016/01/18
Shipped:
Received: 2016/01/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Metals Water Total MS	CICP/MS	4350994	2016/01/20	2016/01/20	Bryon Angevine

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Maxxam Job #: B609966
Report Date: 2016/01/25

Englobe Corp.
Client Project #: 20814
Sampler Initials: LL

TEST SUMMARY

Maxxam ID: BRF060
Sample ID: PW2
Matrix: Drinking Water

Collected: 2016/01/18
Shipped:
Received: 2016/01/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Carbonate, Bicarbonate and Hydroxide	CALC	4348162	N/A	2016/01/20	Automated Statchk
Alkalinity	KONE	4351041	N/A	2016/01/21	Mary Clancey
Chloride	KONE	4351046	N/A	2016/01/21	Arlene Rossiter
Colour	KONE	4351052	N/A	2016/01/22	Arlene Rossiter
Conductance - water	AT	4350989	N/A	2016/01/20	Tiffany Morash
Hardness (calculated as CaCO3)		4348164	N/A	2016/01/21	Automated Statchk
Metals Water Total MS	CICP/MS	4350994	2016/01/20	2016/01/20	Bryon Angevine
Ion Balance (% Difference)	CALC	4348165	N/A	2016/01/22	Automated Statchk
Anion and Cation Sum	CALC	4348166	N/A	2016/01/22	Automated Statchk
Nitrogen Ammonia - water	KONE	4352974	N/A	2016/01/21	Arlene Rossiter
Nitrogen - Nitrate + Nitrite	KONE	4351056	N/A	2016/01/22	Arlene Rossiter
Nitrogen - Nitrite	KONE	4351057	N/A	2016/01/21	Mary Clancey
Nitrogen - Nitrate (as N)	CALC	4348167	N/A	2016/01/22	Automated Statchk
pH	AT	4350987	N/A	2016/01/20	Tiffany Morash
Phosphorus - ortho	KONE	4351053	N/A	2016/01/21	Arlene Rossiter
Sat. pH and Langelier Index (@ 20C)	CALC	4348169	N/A	2016/01/22	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	4348170	N/A	2016/01/22	Automated Statchk
Reactive Silica	KONE	4351050	N/A	2016/01/21	Arlene Rossiter
Sulphate	KONE	4351048	N/A	2016/01/21	Arlene Rossiter
Total Dissolved Solids (TDS calc)	CALC	4348171	N/A	2016/01/22	Automated Statchk
Organic carbon - Total (TOC)	TECH	4352827	N/A	2016/01/21	Soraya Merchant
Turbidity	TURB	4351045	N/A	2016/01/20	Tiffany Morash

Maxxam ID: BRF061
Sample ID: PW3
Matrix: Drinking Water

Collected: 2016/01/18
Shipped:
Received: 2016/01/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Carbonate, Bicarbonate and Hydroxide	CALC	4348162	N/A	2016/01/20	Automated Statchk
Alkalinity	KONE	4351041	N/A	2016/01/21	Mary Clancey
Chloride	KONE	4351046	N/A	2016/01/21	Arlene Rossiter
Colour	KONE	4351052	N/A	2016/01/22	Arlene Rossiter
Conductance - water	AT	4350989	N/A	2016/01/20	Tiffany Morash
Hardness (calculated as CaCO3)		4348164	N/A	2016/01/21	Automated Statchk
Metals Water Total MS	CICP/MS	4350994	2016/01/20	2016/01/20	Bryon Angevine
Ion Balance (% Difference)	CALC	4348165	N/A	2016/01/22	Automated Statchk
Anion and Cation Sum	CALC	4348166	N/A	2016/01/22	Automated Statchk
Nitrogen Ammonia - water	KONE	4352974	N/A	2016/01/21	Arlene Rossiter
Nitrogen - Nitrate + Nitrite	KONE	4351056	N/A	2016/01/22	Arlene Rossiter
Nitrogen - Nitrite	KONE	4351057	N/A	2016/01/21	Mary Clancey
Nitrogen - Nitrate (as N)	CALC	4348167	N/A	2016/01/22	Automated Statchk
pH	AT	4350987	N/A	2016/01/20	Tiffany Morash
Phosphorus - ortho	KONE	4351053	N/A	2016/01/21	Arlene Rossiter
Sat. pH and Langelier Index (@ 20C)	CALC	4348169	N/A	2016/01/22	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	4348170	N/A	2016/01/22	Automated Statchk

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Maxxam Job #: B609966
Report Date: 2016/01/25

Englobe Corp.
Client Project #: 20814
Sampler Initials: LL

TEST SUMMARY

Maxxam ID: BRF061
Sample ID: PW3
Matrix: Drinking Water

Collected: 2016/01/18
Shipped:
Received: 2016/01/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Reactive Silica	KONE	4351050	N/A	2016/01/21	Arlene Rossiter
Sulphate	KONE	4351048	N/A	2016/01/21	Arlene Rossiter
Total Dissolved Solids (TDS calc)	CALC	4348171	N/A	2016/01/22	Automated Statchk
Organic carbon - Total (TOC)	TECH	4352827	N/A	2016/01/21	Soraya Merchant
Turbidity	TURB	4351045	N/A	2016/01/20	Tiffany Morash

Maxxam ID: BRF061 Dup
Sample ID: PW3
Matrix: Drinking Water

Collected: 2016/01/18
Shipped:
Received: 2016/01/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	KONE	4351041	N/A	2016/01/21	Mary Clancey
Chloride	KONE	4351046	N/A	2016/01/21	Arlene Rossiter
Colour	KONE	4351052	N/A	2016/01/22	Arlene Rossiter
Nitrogen Ammonia - water	KONE	4352974	N/A	2016/01/21	Arlene Rossiter
Nitrogen - Nitrate + Nitrite	KONE	4351056	N/A	2016/01/22	Arlene Rossiter
Nitrogen - Nitrite	KONE	4351057	N/A	2016/01/21	Mary Clancey
Phosphorus - ortho	KONE	4351053	N/A	2016/01/21	Arlene Rossiter
Reactive Silica	KONE	4351050	N/A	2016/01/21	Arlene Rossiter
Sulphate	KONE	4351048	N/A	2016/01/21	Arlene Rossiter
Organic carbon - Total (TOC)	TECH	4352827	N/A	2016/01/21	Soraya Merchant
Turbidity	TURB	4351045	N/A	2016/01/20	Tiffany Morash

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GENERAL COMMENTS

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

Package 1	7.0°C

Sample BRF058-01 : Poor RCAp Ion Balance due to sample matrix. Excess cations due to presence of turbidity.

Sample BRF060-01 : Poor RCAp Ion Balance due to sample matrix. Excess cations due to presence of turbidity.

Results relate only to the items tested.

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Maxxam Job #: B609966
Report Date: 2016/01/25

Englobe Corp.
Client Project #: 20814
Sampler Initials: LL

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4348900	JRM	Method Blank	Escherichia coli	2016/01/18	<1.0		CFU/100	
			Total Coliforms	2016/01/18	<1.0		CFU/100	
4349397	BAN	Matrix Spike	Total Aluminum (Al)	2016/01/19		100	%	80 - 120
			Total Antimony (Sb)	2016/01/19		102	%	80 - 120
			Total Arsenic (As)	2016/01/19		94	%	80 - 120
			Total Barium (Ba)	2016/01/19		NC	%	80 - 120
			Total Beryllium (Be)	2016/01/19		99	%	80 - 120
			Total Bismuth (Bi)	2016/01/19		101	%	80 - 120
			Total Boron (B)	2016/01/19		102	%	80 - 120
			Total Cadmium (Cd)	2016/01/19		99	%	80 - 120
			Total Calcium (Ca)	2016/01/19		NC	%	80 - 120
			Total Chromium (Cr)	2016/01/19		97	%	80 - 120
			Total Cobalt (Co)	2016/01/19		95	%	80 - 120
			Total Copper (Cu)	2016/01/19		94	%	80 - 120
			Total Iron (Fe)	2016/01/19		101	%	80 - 120
			Total Lead (Pb)	2016/01/19		101	%	80 - 120
			Total Magnesium (Mg)	2016/01/19		100	%	80 - 120
			Total Manganese (Mn)	2016/01/19		97	%	80 - 120
			Total Molybdenum (Mo)	2016/01/19		106	%	80 - 120
			Total Nickel (Ni)	2016/01/19		99	%	80 - 120
			Total Phosphorus (P)	2016/01/19		104	%	80 - 120
			Total Potassium (K)	2016/01/19		101	%	80 - 120
			Total Selenium (Se)	2016/01/19		98	%	80 - 120
			Total Silver (Ag)	2016/01/19		99	%	80 - 120
			Total Sodium (Na)	2016/01/19		NC	%	80 - 120
			Total Strontium (Sr)	2016/01/19		NC	%	80 - 120
			Total Thallium (Tl)	2016/01/19		103	%	80 - 120
			Total Tin (Sn)	2016/01/19		103	%	80 - 120
			Total Titanium (Ti)	2016/01/19		99	%	80 - 120
			Total Uranium (U)	2016/01/19		106	%	80 - 120
			Total Vanadium (V)	2016/01/19		96	%	80 - 120
			Total Zinc (Zn)	2016/01/19		97	%	80 - 120
4349397	BAN	Spiked Blank	Total Aluminum (Al)	2016/01/19		99	%	80 - 120
			Total Antimony (Sb)	2016/01/19		100	%	80 - 120
			Total Arsenic (As)	2016/01/19		93	%	80 - 120
			Total Barium (Ba)	2016/01/19		97	%	80 - 120
			Total Beryllium (Be)	2016/01/19		96	%	80 - 120
			Total Bismuth (Bi)	2016/01/19		103	%	80 - 120
			Total Boron (B)	2016/01/19		98	%	80 - 120
			Total Cadmium (Cd)	2016/01/19		98	%	80 - 120
			Total Calcium (Ca)	2016/01/19		100	%	80 - 120
			Total Chromium (Cr)	2016/01/19		96	%	80 - 120
			Total Cobalt (Co)	2016/01/19		97	%	80 - 120
			Total Copper (Cu)	2016/01/19		96	%	80 - 120
			Total Iron (Fe)	2016/01/19		102	%	80 - 120
			Total Lead (Pb)	2016/01/19		101	%	80 - 120
			Total Magnesium (Mg)	2016/01/19		102	%	80 - 120
			Total Manganese (Mn)	2016/01/19		98	%	80 - 120
			Total Molybdenum (Mo)	2016/01/19		99	%	80 - 120
			Total Nickel (Ni)	2016/01/19		99	%	80 - 120
			Total Phosphorus (P)	2016/01/19		102	%	80 - 120
			Total Potassium (K)	2016/01/19		99	%	80 - 120
			Total Selenium (Se)	2016/01/19		96	%	80 - 120

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Total Silver (Ag)	2016/01/19		97	%	80 - 120
			Total Sodium (Na)	2016/01/19		101	%	80 - 120
			Total Strontium (Sr)	2016/01/19		99	%	80 - 120
			Total Thallium (Tl)	2016/01/19		102	%	80 - 120
			Total Tin (Sn)	2016/01/19		100	%	80 - 120
			Total Titanium (Ti)	2016/01/19		101	%	80 - 120
			Total Uranium (U)	2016/01/19		103	%	80 - 120
			Total Vanadium (V)	2016/01/19		96	%	80 - 120
			Total Zinc (Zn)	2016/01/19		95	%	80 - 120
4349397	BAN	Method Blank	Total Aluminum (Al)	2016/01/19	<5.0		ug/L	
			Total Antimony (Sb)	2016/01/19	<1.0		ug/L	
			Total Arsenic (As)	2016/01/19	<1.0		ug/L	
			Total Barium (Ba)	2016/01/19	<1.0		ug/L	
			Total Beryllium (Be)	2016/01/19	<1.0		ug/L	
			Total Bismuth (Bi)	2016/01/19	<2.0		ug/L	
			Total Boron (B)	2016/01/19	<50		ug/L	
			Total Cadmium (Cd)	2016/01/19	<0.010		ug/L	
			Total Calcium (Ca)	2016/01/19	<100		ug/L	
			Total Chromium (Cr)	2016/01/19	<1.0		ug/L	
			Total Cobalt (Co)	2016/01/19	<0.40		ug/L	
			Total Copper (Cu)	2016/01/19	<2.0		ug/L	
			Total Iron (Fe)	2016/01/19	<50		ug/L	
			Total Lead (Pb)	2016/01/19	<0.50		ug/L	
			Total Magnesium (Mg)	2016/01/19	<100		ug/L	
			Total Manganese (Mn)	2016/01/19	<2.0		ug/L	
			Total Molybdenum (Mo)	2016/01/19	<2.0		ug/L	
			Total Nickel (Ni)	2016/01/19	<2.0		ug/L	
			Total Phosphorus (P)	2016/01/19	<100		ug/L	
			Total Potassium (K)	2016/01/19	<100		ug/L	
			Total Selenium (Se)	2016/01/19	<1.0		ug/L	
			Total Silver (Ag)	2016/01/19	<0.10		ug/L	
			Total Sodium (Na)	2016/01/19	<100		ug/L	
			Total Strontium (Sr)	2016/01/19	<2.0		ug/L	
			Total Thallium (Tl)	2016/01/19	<0.10		ug/L	
			Total Tin (Sn)	2016/01/19	<2.0		ug/L	
			Total Titanium (Ti)	2016/01/19	<2.0		ug/L	
			Total Uranium (U)	2016/01/19	<0.10		ug/L	
			Total Vanadium (V)	2016/01/19	<2.0		ug/L	
			Total Zinc (Zn)	2016/01/19	<5.0		ug/L	
4349397	BAN	RPD - Sample/Sample Dup	Total Arsenic (As)	2016/01/19	NC		%	20
4350987	TMO	QC Standard	pH	2016/01/20		100	%	97 - 103
4350987	TMO	RPD - Sample/Sample Dup	pH	2016/01/20	7.7 (1)		%	N/A
4350989	TMO	Spiked Blank	Conductivity	2016/01/20		100	%	80 - 120
4350989	TMO	Method Blank	Conductivity	2016/01/20	1.5, RDL=1.0		uS/cm	
4350989	TMO	RPD - Sample/Sample Dup	Conductivity	2016/01/20	NC		%	25
4350994	BAN	Matrix Spike(BRF059)	Total Aluminum (Al)	2016/01/20		96	%	80 - 120
			Total Antimony (Sb)	2016/01/20		100	%	80 - 120
			Total Arsenic (As)	2016/01/20		95	%	80 - 120
			Total Barium (Ba)	2016/01/20		96	%	80 - 120
			Total Beryllium (Be)	2016/01/20		98	%	80 - 120
			Total Bismuth (Bi)	2016/01/20		100	%	80 - 120
			Total Boron (B)	2016/01/20		102	%	80 - 120

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Total Cadmium (Cd)	2016/01/20		101	%	80 - 120
			Total Calcium (Ca)	2016/01/20		NC	%	80 - 120
			Total Chromium (Cr)	2016/01/20		96	%	80 - 120
			Total Cobalt (Co)	2016/01/20		99	%	80 - 120
			Total Copper (Cu)	2016/01/20		NC	%	80 - 120
			Total Iron (Fe)	2016/01/20		98	%	80 - 120
			Total Lead (Pb)	2016/01/20		97	%	80 - 120
			Total Magnesium (Mg)	2016/01/20		99	%	80 - 120
			Total Manganese (Mn)	2016/01/20		98	%	80 - 120
			Total Molybdenum (Mo)	2016/01/20		103	%	80 - 120
			Total Nickel (Ni)	2016/01/20		98	%	80 - 120
			Total Phosphorus (P)	2016/01/20		102	%	80 - 120
			Total Potassium (K)	2016/01/20		100	%	80 - 120
			Total Selenium (Se)	2016/01/20		96	%	80 - 120
			Total Silver (Ag)	2016/01/20		97	%	80 - 120
			Total Sodium (Na)	2016/01/20		98	%	80 - 120
			Total Strontium (Sr)	2016/01/20		NC	%	80 - 120
			Total Thallium (Tl)	2016/01/20		99	%	80 - 120
			Total Tin (Sn)	2016/01/20		102	%	80 - 120
			Total Titanium (Ti)	2016/01/20		98	%	80 - 120
			Total Uranium (U)	2016/01/20		103	%	80 - 120
			Total Vanadium (V)	2016/01/20		96	%	80 - 120
			Total Zinc (Zn)	2016/01/20		97	%	80 - 120
4350994	BAN	Spiked Blank	Total Aluminum (Al)	2016/01/20		100	%	80 - 120
			Total Antimony (Sb)	2016/01/20		101	%	80 - 120
			Total Arsenic (As)	2016/01/20		95	%	80 - 120
			Total Barium (Ba)	2016/01/20		97	%	80 - 120
			Total Beryllium (Be)	2016/01/20		99	%	80 - 120
			Total Bismuth (Bi)	2016/01/20		102	%	80 - 120
			Total Boron (B)	2016/01/20		102	%	80 - 120
			Total Cadmium (Cd)	2016/01/20		101	%	80 - 120
			Total Calcium (Ca)	2016/01/20		102	%	80 - 120
			Total Chromium (Cr)	2016/01/20		97	%	80 - 120
			Total Cobalt (Co)	2016/01/20		99	%	80 - 120
			Total Copper (Cu)	2016/01/20		100	%	80 - 120
			Total Iron (Fe)	2016/01/20		100	%	80 - 120
			Total Lead (Pb)	2016/01/20		99	%	80 - 120
			Total Magnesium (Mg)	2016/01/20		101	%	80 - 120
			Total Manganese (Mn)	2016/01/20		99	%	80 - 120
			Total Molybdenum (Mo)	2016/01/20		102	%	80 - 120
			Total Nickel (Ni)	2016/01/20		100	%	80 - 120
			Total Phosphorus (P)	2016/01/20		104	%	80 - 120
			Total Potassium (K)	2016/01/20		103	%	80 - 120
			Total Selenium (Se)	2016/01/20		97	%	80 - 120
			Total Silver (Ag)	2016/01/20		98	%	80 - 120
			Total Sodium (Na)	2016/01/20		100	%	80 - 120
			Total Strontium (Sr)	2016/01/20		100	%	80 - 120
			Total Thallium (Tl)	2016/01/20		101	%	80 - 120
			Total Tin (Sn)	2016/01/20		102	%	80 - 120
			Total Titanium (Ti)	2016/01/20		103	%	80 - 120
			Total Uranium (U)	2016/01/20		105	%	80 - 120
			Total Vanadium (V)	2016/01/20		98	%	80 - 120
			Total Zinc (Zn)	2016/01/20		97	%	80 - 120

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Maxxam Job #: B609966
Report Date: 2016/01/25

Englobe Corp.
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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4350994	BAN	Method Blank	Total Aluminum (Al)	2016/01/20	<5.0		ug/L	
			Total Antimony (Sb)	2016/01/20	<1.0		ug/L	
			Total Arsenic (As)	2016/01/20	<1.0		ug/L	
			Total Barium (Ba)	2016/01/20	<1.0		ug/L	
			Total Beryllium (Be)	2016/01/20	<1.0		ug/L	
			Total Bismuth (Bi)	2016/01/20	<2.0		ug/L	
			Total Boron (B)	2016/01/20	<50		ug/L	
			Total Cadmium (Cd)	2016/01/20	<0.010		ug/L	
			Total Calcium (Ca)	2016/01/20	<100		ug/L	
			Total Chromium (Cr)	2016/01/20	<1.0		ug/L	
			Total Cobalt (Co)	2016/01/20	<0.40		ug/L	
			Total Copper (Cu)	2016/01/20	<2.0		ug/L	
			Total Iron (Fe)	2016/01/20	<50		ug/L	
			Total Lead (Pb)	2016/01/20	<0.50		ug/L	
			Total Magnesium (Mg)	2016/01/20	<100		ug/L	
			Total Manganese (Mn)	2016/01/20	<2.0		ug/L	
			Total Molybdenum (Mo)	2016/01/20	<2.0		ug/L	
			Total Nickel (Ni)	2016/01/20	<2.0		ug/L	
			Total Phosphorus (P)	2016/01/20	<100		ug/L	
			Total Potassium (K)	2016/01/20	<100		ug/L	
			Total Selenium (Se)	2016/01/20	<1.0		ug/L	
			Total Silver (Ag)	2016/01/20	<0.10		ug/L	
			Total Sodium (Na)	2016/01/20	<100		ug/L	
			Total Strontium (Sr)	2016/01/20	<2.0		ug/L	
			Total Thallium (Tl)	2016/01/20	<0.10		ug/L	
			Total Tin (Sn)	2016/01/20	<2.0		ug/L	
			Total Titanium (Ti)	2016/01/20	<2.0		ug/L	
			Total Uranium (U)	2016/01/20	<0.10		ug/L	
			Total Vanadium (V)	2016/01/20	<2.0		ug/L	
			Total Zinc (Zn)	2016/01/20	<5.0		ug/L	
4350994	BAN	RPD - Sample/Sample Dup	Total Aluminum (Al)	2016/01/20	NC		%	20
			Total Antimony (Sb)	2016/01/20	NC		%	20
			Total Arsenic (As)	2016/01/20	1.8		%	20
			Total Barium (Ba)	2016/01/20	0.80		%	20
			Total Beryllium (Be)	2016/01/20	NC		%	20
			Total Bismuth (Bi)	2016/01/20	NC		%	20
			Total Boron (B)	2016/01/20	NC		%	20
			Total Cadmium (Cd)	2016/01/20	NC		%	20
			Total Calcium (Ca)	2016/01/20	0.14		%	20
			Total Chromium (Cr)	2016/01/20	NC		%	20
			Total Cobalt (Co)	2016/01/20	NC		%	20
			Total Copper (Cu)	2016/01/20	0.11		%	20
			Total Iron (Fe)	2016/01/20	NC		%	20
			Total Lead (Pb)	2016/01/20	NC		%	20
			Total Magnesium (Mg)	2016/01/20	0.75		%	20
			Total Manganese (Mn)	2016/01/20	NC		%	20
			Total Molybdenum (Mo)	2016/01/20	NC		%	20
			Total Nickel (Ni)	2016/01/20	NC		%	20
			Total Phosphorus (P)	2016/01/20	NC		%	20
			Total Potassium (K)	2016/01/20	0.53		%	20
			Total Selenium (Se)	2016/01/20	NC		%	20
			Total Silver (Ag)	2016/01/20	NC		%	20
			Total Sodium (Na)	2016/01/20	0.067		%	20

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Total Strontium (Sr)	2016/01/20	0.96		%	20
			Total Thallium (Tl)	2016/01/20	NC		%	20
			Total Tin (Sn)	2016/01/20	NC		%	20
			Total Titanium (Ti)	2016/01/20	NC		%	20
			Total Uranium (U)	2016/01/20	1.5		%	20
			Total Vanadium (V)	2016/01/20	NC		%	20
			Total Zinc (Zn)	2016/01/20	NC		%	20
4351041	MCN	Matrix Spike(BRF061)	Total Alkalinity (Total as CaCO3)	2016/01/21		NC	%	80 - 120
4351041	MCN	Spiked Blank	Total Alkalinity (Total as CaCO3)	2016/01/21		105	%	80 - 120
4351041	MCN	Method Blank	Total Alkalinity (Total as CaCO3)	2016/01/21	<5.0		mg/L	
4351041	MCN	RPD - Sample/Sample Dup	Total Alkalinity (Total as CaCO3)	2016/01/21	1.9		%	25
4351045	TMO	QC Standard	Turbidity	2016/01/20		85	%	80 - 120
4351045	TMO	Method Blank	Turbidity	2016/01/20	<0.10		NTU	
4351045	TMO	RPD - Sample/Sample Dup	Turbidity	2016/01/20	13		%	20
4351046	ARS	Matrix Spike(BRF061)	Dissolved Chloride (Cl)	2016/01/21		95	%	80 - 120
4351046	ARS	QC Standard	Dissolved Chloride (Cl)	2016/01/21		103	%	80 - 120
4351046	ARS	Spiked Blank	Dissolved Chloride (Cl)	2016/01/21		102	%	80 - 120
4351046	ARS	Method Blank	Dissolved Chloride (Cl)	2016/01/21	<1.0		mg/L	
4351046	ARS	RPD - Sample/Sample Dup	Dissolved Chloride (Cl)	2016/01/21	3.8		%	25
4351048	ARS	Matrix Spike(BRF061)	Dissolved Sulphate (SO4)	2016/01/21		111	%	80 - 120
4351048	ARS	Spiked Blank	Dissolved Sulphate (SO4)	2016/01/21		102	%	80 - 120
4351048	ARS	Method Blank	Dissolved Sulphate (SO4)	2016/01/21	<2.0		mg/L	
4351048	ARS	RPD - Sample/Sample Dup	Dissolved Sulphate (SO4)	2016/01/21	NC		%	25
4351050	ARS	Matrix Spike(BRF061)	Reactive Silica (SiO2)	2016/01/21		NC	%	80 - 120
4351050	ARS	Spiked Blank	Reactive Silica (SiO2)	2016/01/21		105	%	80 - 120
4351050	ARS	Method Blank	Reactive Silica (SiO2)	2016/01/21	<0.50		mg/L	
4351050	ARS	RPD - Sample/Sample Dup	Reactive Silica (SiO2)	2016/01/21	5.8		%	25
4351052	ARS	Spiked Blank	Colour	2016/01/22		108	%	80 - 120
4351052	ARS	Method Blank	Colour	2016/01/22	<5.0		TCU	
4351052	ARS	RPD - Sample/Sample Dup	Colour	2016/01/22	NC		%	20
4351053	ARS	Matrix Spike(BRF061)	Orthophosphate (P)	2016/01/21		NC	%	80 - 120
4351053	ARS	Spiked Blank	Orthophosphate (P)	2016/01/21		102	%	80 - 120
4351053	ARS	Method Blank	Orthophosphate (P)	2016/01/21	<0.010		mg/L	
4351053	ARS	RPD - Sample/Sample Dup	Orthophosphate (P)	2016/01/21	0.64		%	25
4351056	ARS	Matrix Spike(BRF061)	Nitrate + Nitrite (N)	2016/01/22		102	%	80 - 120
4351056	ARS	Spiked Blank	Nitrate + Nitrite (N)	2016/01/22		103	%	80 - 120
4351056	ARS	Method Blank	Nitrate + Nitrite (N)	2016/01/22	<0.050		mg/L	
4351056	ARS	RPD - Sample/Sample Dup	Nitrate + Nitrite (N)	2016/01/22	1.8		%	25
4351057	MCN	Matrix Spike(BRF061)	Nitrite (N)	2016/01/21		95	%	80 - 120
4351057	MCN	Spiked Blank	Nitrite (N)	2016/01/21		95	%	80 - 120
4351057	MCN	Method Blank	Nitrite (N)	2016/01/21	<0.010		mg/L	
4351057	MCN	RPD - Sample/Sample Dup	Nitrite (N)	2016/01/21	NC		%	25
4351248	TPE	Spiked Blank	Conductivity	2016/01/20		100	%	80 - 120
4351248	TPE	Method Blank	Conductivity	2016/01/20	1.2, RDL=1.0		uS/cm	
4351248	TPE	RPD - Sample/Sample Dup	Conductivity	2016/01/20	0.79		%	25
4352827	SMT	Matrix Spike(BRF061)	Total Organic Carbon (C)	2016/01/21		106	%	80 - 120
4352827	SMT	Spiked Blank	Total Organic Carbon (C)	2016/01/21		102	%	80 - 120
4352827	SMT	Method Blank	Total Organic Carbon (C)	2016/01/21	<0.50		mg/L	
4352827	SMT	RPD - Sample/Sample Dup	Total Organic Carbon (C)	2016/01/21	NC		%	20
4352974	ARS	Matrix Spike(BRF061)	Nitrogen (Ammonia Nitrogen)	2016/01/21		102	%	80 - 120
4352974	ARS	Spiked Blank	Nitrogen (Ammonia Nitrogen)	2016/01/21		103	%	80 - 120
4352974	ARS	Method Blank	Nitrogen (Ammonia Nitrogen)	2016/01/21	<0.050		mg/L	

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Maxxam Job #: B609966
Report Date: 2016/01/25

Englobe Corp.
Client Project #: 20814
Sampler Initials: LL

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4352974	ARS	RPD - Sample/Sample Dup	Nitrogen (Ammonia Nitrogen)	2016/01/21	NC		%	20
4354666	TPE	QC Standard	pH	2016/01/22		101	%	N/A
4354666	TPE	RPD - Sample/Sample Dup	pH	2016/01/22	0.53		%	N/A

N/A = Not Applicable

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

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration).

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

(1) Duplicate results confirmed by repeat analysis.

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Maxxam Job #: B609966
Report Date: 2016/01/25

Englobe Corp.
Client Project #: 20814
Sampler Initials: LL

VALIDATION SIGNATURE PAGE

Original Signed QC contained in this report were reviewed and validated by the following individual(s).

Original Signed

Andrew VanWychen, Bedford Micro

Original Signed

Mike MacGillivray, Scientific Specialist (Inorganics)

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

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MAXXAM Chain of Custody Record

COC #: B 159535 Page 1 of 1

This column for lab use only:
Client Code 41009
Maxxam Job # B609966

Cooler ID	Seal Present	Seal Intact	Temp 1	Temp 2	Temp 3	Average Temp
			6	8	7	

Integrity: YES (NO) Integrity / Checklist by: CHN
Labelled by: Location / Bin #:

INVOICE INFORMATION:
Company Name: ENGLOBE
Contact Name: Aven Cole
Address: Lisa Ladouceur
Postal Code:
Email:
Ph: Fax:

REPORT INFORMATION (if differs from invoice):
Company Name: SAME
Contact Name:
Address:
Postal Code:
Email:
Ph: Fax:

PO #:
Project # / Phase #: 20814
Project Name / Site Location:
Quote:
Site #:
Task Order #:
Sampled by: LL

TURNAROUND TIME
Standard ☒
10 day ☐
If RUSH Specify Date:
Pre-schedule rush work
Charge for # Jars used but not submitted

Guideline Requirements / Detection Limits / Special Instructions

*Specify Matrix: Surface/Salt/Ground/Tapwater/Sewage/Effluent/Potable/NonPotable/Tissue/Soil/Sludge/Metal/Seawater

	Field Sample Identification	Matrix*	Date/Time Sampled	# & type of bottles	Field Filtered & Preserved	Lab Filtration Required	RCAP-30 Choose Total or Diss Metals	RCAP-MS Choose (Total or Diss Metals)	Total Digest (Default Method) for well water, surface water	Dissolved for ground water	Mercury	Metals Water	Metals & Mercury Default Available Digest Method	Metals Total Digest - for Ocean sediments (HNO3/HF/HCLO4)	Mercury Low level by Cold Vapour AA	Selenium (low level) Req'd for CCME Residential, Parklands, Agricultural	Hot Water soluble Boron (required for CCME Agricultural)	Metals Soil	RBCA Hydrocarbons (BTEX, C6-C32)	Hydrocarbons Soil (Potable), NS Fuel Oil Spill Policy Low Level BTEX, C6-C32	NB Potable Water BTEX, VPH, Low level T.E.H.	TPH Fractionation	PAH's	PAH's with Acridine, Quinoline	Coliforms NPN	Hydrocarbons
1	DW1	POTABLE	1/18/16 13h00	1x300 1x200 1x120 HNO3	X			X																X	
2	P1	SW	1/18/16	1x200 1x100 1x100	X			X																	
3	PW1	POTABLE	↓	↓	X			X																	
4	PW2	POTABLE			X			X																	
5	PW3	POTABLE			X			X																	
6	~~PW4~~	POTABLE			X			X																	
7																									
8																									
9																									
10																									

2016 JAN 18 15:19

RELINQUISHED BY: (Signature/Print)	Date	Time	RECEIVED BY: (Signature/Print)	Date	Time
Original Signed	1/18/16	15h15	Original Signed SARA MASON		

White: Maxxam Yellow : Mail Pink: Client ATL FCD 00149 / Revision 10

Your Project #: 20814
Your C.O.C. #: B 159534

Attention:Aven Cole

Englobe Corp.
97 Troop Ave
Dartmouth, NS
CANADA B3B 2A7

Report Date: 2016/01/26
Report #: R3866530
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B612323
Received: 2016/01/19, 13:21

Sample Matrix: Drinking Water
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Carbonate, Bicarbonate and Hydroxide	2	N/A	2016/01/22	N/A	SM 22 4500-CO2 D
Alkalinity	2	N/A	2016/01/25	ATL SOP 00013	EPA 310.2 R1974 m
Chloride	2	N/A	2016/01/26	ATL SOP 00014	SM 22 4500-Cl- E m
Colour	2	N/A	2016/01/25	ATL SOP 00020	SM 22 2120C m
Conductance - water	2	N/A	2016/01/22	ATL SOP 00004	SM 22 2510B m
Hardness (calculated as CaCO3)	2	N/A	2016/01/25	ATL SOP 00048	SM 22 2340 B
Metals Water Total MS	2	2016/01/22	2016/01/23	ATL SOP 00058	EPA 6020A R1 m
Ion Balance (% Difference)	2	N/A	2016/01/26		Auto Calc.
Anion and Cation Sum	2	N/A	2016/01/25		Auto Calc.
Nitrogen Ammonia - water	2	N/A	2016/01/21	ATL SOP 00015	EPA 350.1 R2 m
Nitrogen - Nitrate + Nitrite	2	N/A	2016/01/26	ATL SOP 00016	USGS SOPINCF0452.2 m
Nitrogen - Nitrite	2	N/A	2016/01/25	ATL SOP 00017	SM 22 4500-NO2- B m
Nitrogen - Nitrate (as N)	2	N/A	2016/01/26	ATL SOP 00018	ASTM D3867
pH (1)	2	N/A	2016/01/22	ATL SOP 00003	SM 22 4500-H+ B m
Phosphorus - ortho	2	N/A	2016/01/25	ATL SOP 00021	EPA 365.2 m
Sat. pH and Langelier Index (@ 20C)	1	N/A	2016/01/25	ATL SOP 00049	Auto Calc.
Sat. pH and Langelier Index (@ 20C)	1	N/A	2016/01/26	ATL SOP 00049	Auto Calc.
Sat. pH and Langelier Index (@ 4C)	1	N/A	2016/01/25	ATL SOP 00049	Auto Calc.
Sat. pH and Langelier Index (@ 4C)	1	N/A	2016/01/26	ATL SOP 00049	Auto Calc.
Reactive Silica	2	N/A	2016/01/25	ATL SOP 00022	EPA 366.0 m
Sulphate	2	N/A	2016/01/26	ATL SOP 00023	EPA 375.4 R1978 m
Total Dissolved Solids (TDS calc)	2	N/A	2016/01/26		Auto Calc.
Organic carbon - Total (TOC) (2)	2	N/A	2016/01/22	ATL SOP 00037	SM 22 5310C m
Turbidity	2	N/A	2016/01/22	ATL SOP 00011	EPA 180.1 R2 m

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.

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

(1) The APHA Standard Method require pH to be analyzed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the APHA Standard Method holding time.
(2) TOC / DOC present in the sample should be considered as non-purgeable TOC / DOC.

Your Project #: 20814
Your C.O.C. #: B 159534

Attention:Aven Cole

Englobe Corp.
97 Troop Ave
Dartmouth, NS
CANADA B3B 2A7

Report Date: 2016/01/26
Report #: R3866530
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B612323
Received: 2016/01/19, 13:21

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Avery Withrow, Project Manager
Email: AWithrow@maxxam.ca
Phone# (902)420-0203 Ext:233

==========

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

Maxxam Job #: B612323
Report Date: 2016/01/26

Englobe Corp.
Client Project #: 20814
Sampler Initials: MR

ATLANTIC RCAP-MS TOTAL METALS IN WATER (DRINKING WATER)

Maxxam ID		BRQ739	BRQ740			
Sampling Date		2016/01/19 11:15	2016/01/19 12:00			
COC Number		B 159534	B 159534			
	UNITS	PW4	PW5	RDL	QC Batch	MDL
Calculated Parameters						
Anion Sum	me/L	1.52	2.60	N/A	4352741	N/A
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	40	37	1.0	4352737	0.20
Calculated TDS	mg/L	98	170	1.0	4352746	0.20
Carb. Alkalinity (calc. as CaCO3)	mg/L	<1.0	<1.0	1.0	4352737	0.20
Cation Sum	me/L	1.77	2.30	N/A	4352741	N/A
Hardness (CaCO3)	mg/L	42	<1.0	1.0	4352739	1.0
Ion Balance (% Difference)	%	7.60	6.12	N/A	4352740	N/A
Langelier Index (@ 20C)	N/A	-1.18	NC		4352744	
Langelier Index (@ 4C)	N/A	-1.43	NC		4352745	
Nitrate (N)	mg/L	<0.050	0.13	0.050	4352742	N/A
Saturation pH (@ 20C)	N/A	8.61	NC		4352744	
Saturation pH (@ 4C)	N/A	8.87	NC		4352745	
Inorganics						
Total Alkalinity (Total as CaCO3)	mg/L	40	37	5.0	4355001	N/A
Dissolved Chloride (Cl)	mg/L	23	57	1.0	4355042	N/A
Colour	TCU	<5.0	<5.0	5.0	4355071	N/A
Nitrate + Nitrite (N)	mg/L	<0.050	0.13	0.050	4355084	N/A
Nitrite (N)	mg/L	<0.010	<0.010	0.010	4355093	N/A
Nitrogen (Ammonia Nitrogen)	mg/L	0.074	0.23	0.050	4352994	N/A
Total Organic Carbon (C)	mg/L	0.68	<0.50	0.50	4354732	N/A
Orthophosphate (P)	mg/L	0.018	0.36	0.010	4355079	N/A
pH	pH	7.44	7.30	N/A	4354331	N/A
Reactive Silica (SiO2)	mg/L	9.1	22	0.50	4355070	N/A
Dissolved Sulphate (SO4)	mg/L	3.0	11	2.0	4355062	N/A
Turbidity	NTU	32	2.1	0.10	4354453	0.10
Conductivity	uS/cm	140	240	1.0	4354332	N/A
Metals						
Total Aluminum (Al)	ug/L	44	5.9	5.0	4354329	N/A
Total Antimony (Sb)	ug/L	<1.0	<1.0	1.0	4354329	N/A
Total Arsenic (As)	ug/L	3.8	9.3	1.0	4354329	N/A
Total Barium (Ba)	ug/L	9.8	<1.0	1.0	4354329	N/A
Total Beryllium (Be)	ug/L	<1.0	<1.0	1.0	4354329	N/A
Total Bismuth (Bi)	ug/L	<2.0	<2.0	2.0	4354329	N/A
Total Boron (B)	ug/L	<50	<50	50	4354329	N/A

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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Maxxam Job #: B612323
Report Date: 2016/01/26

Englobe Corp.
Client Project #: 20814
Sampler Initials: MR

ATLANTIC RCAP-MS TOTAL METALS IN WATER (DRINKING WATER)

Maxxam ID		BRQ739	BRQ740			
Sampling Date		2016/01/19 11:15	2016/01/19 12:00			
COC Number		B 159534	B 159534			
	UNITS	PW4	PW5	RDL	QC Batch	MDL
Total Cadmium (Cd)	ug/L	<0.010	<0.010	0.010	4354329	N/A
Total Calcium (Ca)	ug/L	13000	<100	100	4354329	N/A
Total Chromium (Cr)	ug/L	<1.0	<1.0	1.0	4354329	N/A
Total Cobalt (Co)	ug/L	<0.40	<0.40	0.40	4354329	N/A
Total Copper (Cu)	ug/L	15	4.3	2.0	4354329	N/A
Total Iron (Fe)	ug/L	9200	150	50	4354329	N/A
Total Lead (Pb)	ug/L	1.5	<0.50	0.50	4354329	N/A
Total Magnesium (Mg)	ug/L	2200	<100	100	4354329	N/A
Total Manganese (Mn)	ug/L	87	<2.0	2.0	4354329	N/A
Total Molybdenum (Mo)	ug/L	<2.0	<2.0	2.0	4354329	N/A
Total Nickel (Ni)	ug/L	<2.0	<2.0	2.0	4354329	N/A
Total Phosphorus (P)	ug/L	220	370	100	4354329	N/A
Total Potassium (K)	ug/L	1100	380	100	4354329	N/A
Total Selenium (Se)	ug/L	<1.0	<1.0	1.0	4354329	N/A
Total Silver (Ag)	ug/L	<0.10	<0.10	0.10	4354329	N/A
Total Sodium (Na)	ug/L	13000	52000	100	4354329	N/A
Total Strontium (Sr)	ug/L	49	<2.0	2.0	4354329	N/A
Total Thallium (Tl)	ug/L	<0.10	<0.10	0.10	4354329	N/A
Total Tin (Sn)	ug/L	<2.0	<2.0	2.0	4354329	N/A
Total Titanium (Ti)	ug/L	<2.0	<2.0	2.0	4354329	N/A
Total Uranium (U)	ug/L	2.9	0.63	0.10	4354329	N/A
Total Vanadium (V)	ug/L	<2.0	<2.0	2.0	4354329	N/A
Total Zinc (Zn)	ug/L	5.5	13	5.0	4354329	N/A

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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Maxxam Job #: B612323
Report Date: 2016/01/26

Englobe Corp.
Client Project #: 20814
Sampler Initials: MR

TEST SUMMARY

Maxxam ID: BRQ739
Sample ID: PW4
Matrix: Drinking Water

Collected: 2016/01/19
Shipped:
Received: 2016/01/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Carbonate, Bicarbonate and Hydroxide	CALC	4352737	N/A	2016/01/22	Automated Statchk
Alkalinity	KONE	4355001	N/A	2016/01/25	Arlene Rossiter
Chloride	KONE	4355042	N/A	2016/01/26	Mary Clancey
Colour	KONE	4355071	N/A	2016/01/25	Mary Clancey
Conductance - water	AT	4354332	N/A	2016/01/22	Tiffany Morash
Hardness (calculated as CaCO3)		4352739	N/A	2016/01/25	Automated Statchk
Metals Water Total MS	CICP/MS	4354329	2016/01/22	2016/01/23	Bryon Angevine
Ion Balance (% Difference)	CALC	4352740	N/A	2016/01/26	Automated Statchk
Anion and Cation Sum	CALC	4352741	N/A	2016/01/25	Automated Statchk
Nitrogen Ammonia - water	KONE	4352994	N/A	2016/01/21	Arlene Rossiter
Nitrogen - Nitrate + Nitrite	KONE	4355084	N/A	2016/01/26	Mary Clancey
Nitrogen - Nitrite	KONE	4355093	N/A	2016/01/25	Arlene Rossiter
Nitrogen - Nitrate (as N)	CALC	4352742	N/A	2016/01/26	Automated Statchk
pH	AT	4354331	N/A	2016/01/22	Tiffany Morash
Phosphorus - ortho	KONE	4355079	N/A	2016/01/25	Arlene Rossiter
Sat. pH and Langelier Index (@ 20C)	CALC	4352744	N/A	2016/01/26	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	4352745	N/A	2016/01/26	Automated Statchk
Reactive Silica	KONE	4355070	N/A	2016/01/25	Mary Clancey
Sulphate	KONE	4355062	N/A	2016/01/26	Mary Clancey
Total Dissolved Solids (TDS calc)	CALC	4352746	N/A	2016/01/26	Automated Statchk
Organic carbon - Total (TOC)	TECH	4354732	N/A	2016/01/22	Soraya Merchant
Turbidity	TURB	4354453	N/A	2016/01/22	Tiffany Morash

Maxxam ID: BRQ740
Sample ID: PW5
Matrix: Drinking Water

Collected: 2016/01/19
Shipped:
Received: 2016/01/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Carbonate, Bicarbonate and Hydroxide	CALC	4352737	N/A	2016/01/22	Automated Statchk
Alkalinity	KONE	4355001	N/A	2016/01/25	Arlene Rossiter
Chloride	KONE	4355042	N/A	2016/01/26	Mary Clancey
Colour	KONE	4355071	N/A	2016/01/25	Mary Clancey
Conductance - water	AT	4354332	N/A	2016/01/22	Tiffany Morash
Hardness (calculated as CaCO3)		4352739	N/A	2016/01/25	Automated Statchk
Metals Water Total MS	CICP/MS	4354329	2016/01/22	2016/01/23	Bryon Angevine
Ion Balance (% Difference)	CALC	4352740	N/A	2016/01/26	Automated Statchk
Anion and Cation Sum	CALC	4352741	N/A	2016/01/25	Automated Statchk
Nitrogen Ammonia - water	KONE	4352994	N/A	2016/01/21	Arlene Rossiter
Nitrogen - Nitrate + Nitrite	KONE	4355084	N/A	2016/01/26	Mary Clancey
Nitrogen - Nitrite	KONE	4355093	N/A	2016/01/25	Arlene Rossiter
Nitrogen - Nitrate (as N)	CALC	4352742	N/A	2016/01/26	Automated Statchk
pH	AT	4354331	N/A	2016/01/22	Tiffany Morash
Phosphorus - ortho	KONE	4355079	N/A	2016/01/25	Arlene Rossiter
Sat. pH and Langelier Index (@ 20C)	CALC	4352744	N/A	2016/01/25	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	4352745	N/A	2016/01/25	Automated Statchk

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Maxxam Job #: B612323
Report Date: 2016/01/26

Englobe Corp.
Client Project #: 20814
Sampler Initials: MR

TEST SUMMARY

Maxxam ID: BRQ740
Sample ID: PW5
Matrix: Drinking Water

Collected: 2016/01/19
Shipped:
Received: 2016/01/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Reactive Silica	KONE	4355070	N/A	2016/01/25	Mary Clancey
Sulphate	KONE	4355062	N/A	2016/01/26	Mary Clancey
Total Dissolved Solids (TDS calc)	CALC	4352746	N/A	2016/01/26	Automated Statchk
Organic carbon - Total (TOC)	TECH	4354732	N/A	2016/01/22	Soraya Merchant
Turbidity	TURB	4354453	N/A	2016/01/22	Tiffany Morash

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Maxxam Job #: B612323
Report Date: 2016/01/26

Englobe Corp.
Client Project #: 20814
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GENERAL COMMENTS

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

Package 1	4.3°C

Sample BRQ739-01 : Poor RCAp Ion Balance due to sample matrix. Excess cations due to presence of turbidity.

Sample BRQ740-01 : Poor RCAp Ion Balance due to sample matrix. Excess cations due to presence of turbidity.

Results relate only to the items tested.

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Maxxam Job #: B612323
Report Date: 2016/01/26

Englobe Corp.
Client Project #: 20814
Sampler Initials: MR

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4352994	ARS	Matrix Spike	Nitrogen (Ammonia Nitrogen)	2016/01/22		NC	%	80 - 120
4352994	ARS	Spiked Blank	Nitrogen (Ammonia Nitrogen)	2016/01/21		103	%	80 - 120
4352994	ARS	Method Blank	Nitrogen (Ammonia Nitrogen)	2016/01/21	<0.050		mg/L	
4352994	ARS	RPD - Sample/Sample Dup	Nitrogen (Ammonia Nitrogen)	2016/01/22	2.2		%	20
4354329	BAN	Matrix Spike	Total Aluminum (Al)	2016/01/23		92	%	80 - 120
			Total Antimony (Sb)	2016/01/23		102	%	80 - 120
			Total Arsenic (As)	2016/01/23		91	%	80 - 120
			Total Barium (Ba)	2016/01/23		NC	%	80 - 120
			Total Beryllium (Be)	2016/01/23		98	%	80 - 120
			Total Bismuth (Bi)	2016/01/23		96	%	80 - 120
			Total Boron (B)	2016/01/23		101	%	80 - 120
			Total Cadmium (Cd)	2016/01/23		97	%	80 - 120
			Total Calcium (Ca)	2016/01/23		NC	%	80 - 120
			Total Chromium (Cr)	2016/01/23		91	%	80 - 120
			Total Cobalt (Co)	2016/01/23		92	%	80 - 120
			Total Copper (Cu)	2016/01/23		89	%	80 - 120
			Total Iron (Fe)	2016/01/23		93	%	80 - 120
			Total Lead (Pb)	2016/01/23		92	%	80 - 120
			Total Magnesium (Mg)	2016/01/23		98	%	80 - 120
			Total Manganese (Mn)	2016/01/23		93	%	80 - 120
			Total Molybdenum (Mo)	2016/01/23		102	%	80 - 120
			Total Nickel (Ni)	2016/01/23		92	%	80 - 120
			Total Phosphorus (P)	2016/01/23		100	%	80 - 120
			Total Potassium (K)	2016/01/23		96	%	80 - 120
			Total Selenium (Se)	2016/01/23		93	%	80 - 120
			Total Silver (Ag)	2016/01/23		95	%	80 - 120
			Total Sodium (Na)	2016/01/23		NC	%	80 - 120
			Total Strontium (Sr)	2016/01/23		NC	%	80 - 120
			Total Thallium (Tl)	2016/01/23		96	%	80 - 120
			Total Tin (Sn)	2016/01/23		102	%	80 - 120
			Total Titanium (Ti)	2016/01/23		92	%	80 - 120
			Total Uranium (U)	2016/01/23		101	%	80 - 120
			Total Vanadium (V)	2016/01/23		96	%	80 - 120
			Total Zinc (Zn)	2016/01/23		92	%	80 - 120
4354329	BAN	Spiked Blank	Total Aluminum (Al)	2016/01/22		95	%	80 - 120
			Total Antimony (Sb)	2016/01/22		97	%	80 - 120
			Total Arsenic (As)	2016/01/22		91	%	80 - 120
			Total Barium (Ba)	2016/01/22		93	%	80 - 120
			Total Beryllium (Be)	2016/01/22		96	%	80 - 120
			Total Bismuth (Bi)	2016/01/22		101	%	80 - 120
			Total Boron (B)	2016/01/22		98	%	80 - 120
			Total Cadmium (Cd)	2016/01/22		97	%	80 - 120
			Total Calcium (Ca)	2016/01/22		97	%	80 - 120
			Total Chromium (Cr)	2016/01/22		91	%	80 - 120
			Total Cobalt (Co)	2016/01/22		94	%	80 - 120
			Total Copper (Cu)	2016/01/22		94	%	80 - 120
			Total Iron (Fe)	2016/01/22		98	%	80 - 120
			Total Lead (Pb)	2016/01/22		95	%	80 - 120
			Total Magnesium (Mg)	2016/01/22		102	%	80 - 120
			Total Manganese (Mn)	2016/01/22		95	%	80 - 120
			Total Molybdenum (Mo)	2016/01/22		99	%	80 - 120
			Total Nickel (Ni)	2016/01/22		95	%	80 - 120
			Total Phosphorus (P)	2016/01/22		101	%	80 - 120

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Maxxam Job #: B612323
Report Date: 2016/01/26

Englobe Corp.
Client Project #: 20814
Sampler Initials: MR

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Total Potassium (K)	2016/01/22		97	%	80 - 120
			Total Selenium (Se)	2016/01/22		93	%	80 - 120
			Total Silver (Ag)	2016/01/22		95	%	80 - 120
			Total Sodium (Na)	2016/01/22		98	%	80 - 120
			Total Strontium (Sr)	2016/01/22		96	%	80 - 120
			Total Thallium (Tl)	2016/01/22		100	%	80 - 120
			Total Tin (Sn)	2016/01/22		101	%	80 - 120
			Total Titanium (Ti)	2016/01/22		100	%	80 - 120
			Total Uranium (U)	2016/01/22		103	%	80 - 120
			Total Vanadium (V)	2016/01/22		97	%	80 - 120
			Total Zinc (Zn)	2016/01/22		96	%	80 - 120
4354329	BAN	Method Blank	Total Aluminum (Al)	2016/01/22	<5.0		ug/L	
			Total Antimony (Sb)	2016/01/22	<1.0		ug/L	
			Total Arsenic (As)	2016/01/22	<1.0		ug/L	
			Total Barium (Ba)	2016/01/22	<1.0		ug/L	
			Total Beryllium (Be)	2016/01/22	<1.0		ug/L	
			Total Bismuth (Bi)	2016/01/22	<2.0		ug/L	
			Total Boron (B)	2016/01/22	<50		ug/L	
			Total Cadmium (Cd)	2016/01/22	<0.010		ug/L	
			Total Calcium (Ca)	2016/01/22	<100		ug/L	
			Total Chromium (Cr)	2016/01/22	<1.0		ug/L	
			Total Cobalt (Co)	2016/01/22	<0.40		ug/L	
			Total Copper (Cu)	2016/01/22	<2.0		ug/L	
			Total Iron (Fe)	2016/01/22	<50		ug/L	
			Total Lead (Pb)	2016/01/22	<0.50		ug/L	
			Total Magnesium (Mg)	2016/01/22	<100		ug/L	
			Total Manganese (Mn)	2016/01/22	<2.0		ug/L	
			Total Molybdenum (Mo)	2016/01/22	<2.0		ug/L	
			Total Nickel (Ni)	2016/01/22	<2.0		ug/L	
			Total Phosphorus (P)	2016/01/22	<100		ug/L	
			Total Potassium (K)	2016/01/22	<100		ug/L	
			Total Selenium (Se)	2016/01/22	<1.0		ug/L	
			Total Silver (Ag)	2016/01/22	<0.10		ug/L	
			Total Sodium (Na)	2016/01/22	<100		ug/L	
			Total Strontium (Sr)	2016/01/22	<2.0		ug/L	
			Total Thallium (Tl)	2016/01/22	<0.10		ug/L	
			Total Tin (Sn)	2016/01/22	<2.0		ug/L	
			Total Titanium (Ti)	2016/01/22	<2.0		ug/L	
			Total Uranium (U)	2016/01/22	<0.10		ug/L	
			Total Vanadium (V)	2016/01/22	<2.0		ug/L	
			Total Zinc (Zn)	2016/01/22	<5.0		ug/L	
4354329	BAN	RPD - Sample/Sample Dup	Total Arsenic (As)	2016/01/23	NC		%	20
4354331	TMO	QC Standard	pH	2016/01/22		100	%	97 - 103
4354331	TMO	RPD - Sample/Sample Dup	pH	2016/01/22	0.43		%	N/A
4354332	TMO	Spiked Blank	Conductivity	2016/01/22		103	%	80 - 120
4354332	TMO	Method Blank	Conductivity	2016/01/22	1.1, RDL=1.0		uS/cm	
4354332	TMO	RPD - Sample/Sample Dup	Conductivity	2016/01/22	0.29		%	25
4354453	TMO	QC Standard	Turbidity	2016/01/22		81	%	80 - 120
4354453	TMO	Method Blank	Turbidity	2016/01/22	<0.10		NTU	
4354453	TMO	RPD - Sample/Sample Dup	Turbidity	2016/01/22	18		%	20
4354732	SMT	Matrix Spike	Total Organic Carbon (C)	2016/01/22		NC	%	80 - 120
4354732	SMT	Spiked Blank	Total Organic Carbon (C)	2016/01/22		106	%	80 - 120

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Maxxam Job #: B612323
Report Date: 2016/01/26

Englobe Corp.
Client Project #: 20814
Sampler Initials: MR

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4354732	SMT	Method Blank	Total Organic Carbon (C)	2016/01/22	<0.50		mg/L	
4354732	SMT	RPD - Sample/Sample Dup	Total Organic Carbon (C)	2016/01/22	0.82		%	20
4355001	ARS	Matrix Spike	Total Alkalinity (Total as CaCO3)	2016/01/25		15 (1)	%	80 - 120
4355001	ARS	Spiked Blank	Total Alkalinity (Total as CaCO3)	2016/01/25		100	%	80 - 120
4355001	ARS	Method Blank	Total Alkalinity (Total as CaCO3)	2016/01/25	<5.0		mg/L	
4355001	ARS	RPD - Sample/Sample Dup	Total Alkalinity (Total as CaCO3)	2016/01/25	NC		%	25
4355042	MCN	Matrix Spike	Dissolved Chloride (Cl)	2016/01/26		NC	%	80 - 120
4355042	MCN	QC Standard	Dissolved Chloride (Cl)	2016/01/26		104	%	80 - 120
4355042	MCN	Spiked Blank	Dissolved Chloride (Cl)	2016/01/26		97	%	80 - 120
4355042	MCN	Method Blank	Dissolved Chloride (Cl)	2016/01/26	<1.0		mg/L	
4355042	MCN	RPD - Sample/Sample Dup	Dissolved Chloride (Cl)	2016/01/26	0.24		%	25
4355062	MCN	Matrix Spike	Dissolved Sulphate (SO4)	2016/01/26		NC	%	80 - 120
4355062	MCN	Spiked Blank	Dissolved Sulphate (SO4)	2016/01/26		108	%	80 - 120
4355062	MCN	Method Blank	Dissolved Sulphate (SO4)	2016/01/26	<2.0		mg/L	
4355062	MCN	RPD - Sample/Sample Dup	Dissolved Sulphate (SO4)	2016/01/26	0.17		%	25
4355070	MCN	Matrix Spike	Reactive Silica (SiO2)	2016/01/25		NC	%	80 - 120
4355070	MCN	Spiked Blank	Reactive Silica (SiO2)	2016/01/25		100	%	80 - 120
4355070	MCN	Method Blank	Reactive Silica (SiO2)	2016/01/25	<0.50		mg/L	
4355070	MCN	RPD - Sample/Sample Dup	Reactive Silica (SiO2)	2016/01/25	1.3		%	25
4355071	MCN	Spiked Blank	Colour	2016/01/25		99	%	80 - 120
4355071	MCN	Method Blank	Colour	2016/01/25	<5.0		TCU	
4355071	MCN	RPD - Sample/Sample Dup	Colour	2016/01/25	NC		%	20
4355079	ARS	Matrix Spike	Orthophosphate (P)	2016/01/25		101	%	80 - 120
4355079	ARS	Spiked Blank	Orthophosphate (P)	2016/01/25		102	%	80 - 120
4355079	ARS	Method Blank	Orthophosphate (P)	2016/01/25	<0.010		mg/L	
4355079	ARS	RPD - Sample/Sample Dup	Orthophosphate (P)	2016/01/25	0.35		%	25
4355084	MCN	Matrix Spike	Nitrate + Nitrite (N)	2016/01/26		52 (2)	%	80 - 120
4355084	MCN	Spiked Blank	Nitrate + Nitrite (N)	2016/01/26		107	%	80 - 120
4355084	MCN	Method Blank	Nitrate + Nitrite (N)	2016/01/26	<0.050		mg/L	
4355084	MCN	RPD - Sample/Sample Dup	Nitrate + Nitrite (N)	2016/01/26	0.24		%	25
4355093	ARS	Matrix Spike	Nitrite (N)	2016/01/25		61 (3)	%	80 - 120
4355093	ARS	Spiked Blank	Nitrite (N)	2016/01/25		96	%	80 - 120
4355093	ARS	Method Blank	Nitrite (N)	2016/01/25	<0.010		mg/L	
4355093	ARS	RPD - Sample/Sample Dup	Nitrite (N)	2016/01/25	NC		%	25

N/A = Not Applicable

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

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration).

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

(1) Poor spike recovery due to sample matrix, confirmed with repeat analysis.

(2) Poor matrix spike recovery due to sample matrix, results confirmed by repeat analysis.

(3) Poor spike recovery due to sample matrix, recovery confirmed with repeat analysis.

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B612323
Report Date: 2016/01/26

Englobe Corp.
Client Project #: 20814
Sampler Initials: MR

VALIDATION SIGNATURE PAGE

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

Original Signed

Mike MacGillivray, Scientific Specialist (Inorganics)

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

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Maxxam Analytics International Corporation

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MAXXAM Chain of Custody Record

COC #: B 159534 Page 1 of 1

This column for lab use only:
Client Code 41009
Maxxam Job # 1612323

Cooler ID	Seal Present	Seal Intact	Temp 1	Temp 2	Temp 3	Average Temp
			6	4	3	

Integrity: YES (NO) Integrity / Checklist by: CHN
Labelled by: Location / Bin #:

INVOICE INFORMATION:
Company Name: ENGLOBE
Contact Name: Aven Cole
Address: Lisa Lalonde
Postal Code:
Email:
Ph: Fax:

REPORT INFORMATION (if differs from invoice):
Company Name: SAME
Contact Name:
Address:
Postal Code:
Email:
Ph: Fax:

PO #:
Project # / Phase #: 20514
Project Name / Site Location:
Quote:
Site #:
Task Order #:
Sampled by: MR

TURNAROUND TIME
Standard ☒
10 day ☐
If RUSH Specify Date:
Pre-schedule rush work
Charge for # Jars used but not submitted

Guideline Requirements / Detection Limits / Special Instructions

*Specify Matrix: Surface/Salt/Ground/Tapwater/Sewage/Effluent/Potable/NonPotable/Tissue/Soil/Sludge/Metal/Seawater

	Field Sample Identification	Matrix*	Date/Time Sampled	# & type of bottles	Field Filtered & Preserved	Lab Filtration Required	RCAP-30 Choose Total or Diss Metals	RCAP-MS Choose Total or Diss Metals	Metals Water: Total Digest (Default Method) for well water, surface water	Metals Water: Dissolved for ground water	Metals Water: Mercury	Metals Soil: Metals & Mercury Default Available Digest Method	Metals Soil: Metals Total Digest - for Ocean sediments (HNO3/HF/HClO4)	Metals Soil: Mercury Low level by Cold Vapour AA	Metals Soil: Selenium (low level) Req'd for CCME Residential, Parklands, Agricultural	Metals Soil: Hot Water soluble Boron (required for CCME Agricultural)	Hydrocarbons: RBCA Hydrocarbons (BTEX, C6-C32)	Hydrocarbons: Hydrocarbons Soil (Potable), NS Fuel Oil Spill Policy Low Level BTEX, C6-C32	Hydrocarbons: NB Potable Water BTEX, VPH, Low level T.E.H.	Hydrocarbons: TPH Fractionation	Hydrocarbons: PAH's	Hydrocarbons: PAH's with Acridine, Quinoline
1	PW4	POTABLE	1/19/16 11:15	1x250 1x120 1x250	X			X													
2	PW5	potable	1/19/16 12:00	1x250 1x120 1x250	X			X													
3																					
4																					
5																					
6																					
7																					
8																					
9																					
10																					

RELINQUISHED BY: (Signature/Print) Original Signed Date: 15/1/16 Time: 1:20

RECEIVED BY: (Signature/Print) Original Signed Date: Time:

2016 JAN 19 13:21

White: Maxxam Yellow : Mail Pink: Client

ATL FCD 00149 / Revision 10

Maxxam
A Bureau Veritas Group Company

Your Project #: 20814
Your C.O.C. #: B 159531

Attention:Aven Cole

Englobe Corp.
97 Troop Ave
Dartmouth, NS
CANADA B3B 2A7

Report Date: 2016/03/07
Report #: R3919491
Version: 2 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B642244
Received: 2016/03/02, 08:05

Sample Matrix: Drinking Water
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Carbonate, Bicarbonate and Hydroxide	2	N/A	2016/03/03	N/A	SM 22 4500-CO2 D
Alkalinity	2	N/A	2016/03/03	ATL SOP 00013	EPA 310.2 R1974 m
Chloride	2	N/A	2016/03/04	ATL SOP 00014	SM 22 4500-Cl- E m
TC/EC Drinking Water CFU/100mL	2	N/A	2016/03/02	ATL SOP 00096	OMOE E3407 V5.2
Colour	2	N/A	2016/03/04	ATL SOP 00020	SM 22 2120C m
Conductance - water	2	N/A	2016/03/03	ATL SOP 00004	SM 22 2510B m
Hardness (calculated as CaCO3)	2	N/A	2016/03/04	ATL SOP 00048	SM 22 2340 B
Metals Water Total MS	1	2016/03/03	2016/03/03	ATL SOP 00058	EPA 6020A R1 m
Metals Water Total MS	1	2016/03/03	2016/03/04	ATL SOP 00058	EPA 6020A R1 m
Ion Balance (% Difference)	2	N/A	2016/03/07		Auto Calc.
Anion and Cation Sum	2	N/A	2016/03/04		Auto Calc.
Nitrogen Ammonia - water	2	N/A	2016/03/03	ATL SOP 00015	EPA 350.1 R2 m
Nitrogen - Nitrate + Nitrite	2	N/A	2016/03/04	ATL SOP 00016	USGS SOPINCF0452.2 m
Nitrogen - Nitrite	2	N/A	2016/03/04	ATL SOP 00017	SM 22 4500-NO2- B m
Nitrogen - Nitrate (as N)	2	N/A	2016/03/07	ATL SOP 00018	ASTM D3867
pH (1)	2	N/A	2016/03/03	ATL SOP 00003	SM 22 4500-H+ B m
Phosphorus - ortho	2	N/A	2016/03/04	ATL SOP 00021	EPA 365.2 m
Sat. pH and Langelier Index (@ 20C)	2	N/A	2016/03/07	ATL SOP 00049	Auto Calc.
Sat. pH and Langelier Index (@ 4C)	2	N/A	2016/03/07	ATL SOP 00049	Auto Calc.
Reactive Silica	1	N/A	2016/03/03	ATL SOP 00022	EPA 366.0 m
Reactive Silica	1	N/A	2016/03/04	ATL SOP 00022	EPA 366.0 m
Sulphate	2	N/A	2016/03/04	ATL SOP 00023	ASTMD516-11 m
Total Dissolved Solids (TDS calc)	2	N/A	2016/03/07		Auto Calc.
Organic carbon - Total (TOC) (2)	2	N/A	2016/03/07	ATL SOP 00037	SM 22 5310C m
Turbidity	2	N/A	2016/03/07	ATL SOP 00011	EPA 180.1 R2 m

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.

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

(1) The APHA Standard Method require pH to be analyzed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the APHA Standard Method holding time.

(2) TOC / DOC present in the sample should be considered as non-purgeable TOC / DOC.

Your Project #: 20814
Your C.O.C. #: B 159531

Attention:Aven Cole

Englobe Corp.
97 Troop Ave
Dartmouth, NS
CANADA B3B 2A7

Report Date: 2016/03/07
Report #: R3919491
Version: 2 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B642244
Received: 2016/03/02, 08:05

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Avery Withrow, Project Manager
Email: AWithrow@maxxam.ca
Phone# (902)420-0203 Ext:233

==========

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Maxxam Job #: B642244
Report Date: 2016/03/07

Englobe Corp.
Client Project #: 20814

ATLANTIC RCAP-MS TOTAL METALS IN WATER (DRINKING WATER)

Maxxam ID		BYH173			BYH174	BYH174			
Sampling Date		2016/03/01 10:30			2016/03/01 10:10	2016/03/01 10:10			
COC Number		B 159531			B 159531	B 159531			
	UNITS	WELL 3 - 36 HR	RDL	QC Batch	WELL 4 - 36 HR	WELL 4 - 36 HR Lab-Dup	RDL	QC Batch	MDL
Calculated Parameters									
Anion Sum	me/L	4.10	N/A	4401239	5.36		N/A	4401239	N/A
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	25	1.0	4401234	29		1.0	4401234	0.20
Calculated TDS	mg/L	250	1.0	4401244	310		1.0	4401244	0.20
Carb. Alkalinity (calc. as CaCO3)	mg/L	<1.0	1.0	4401234	<1.0		1.0	4401234	0.20
Cation Sum	me/L	3.74	N/A	4401239	4.88		N/A	4401239	N/A
Hardness (CaCO3)	mg/L	130	1.0	4401237	160		1.0	4401237	1.0
Ion Balance (% Difference)	%	4.59	N/A	4401238	4.69		N/A	4401238	N/A
Langelier Index (@ 20C)	N/A	-1.58		4401242	-1.22			4401242	
Langelier Index (@ 4C)	N/A	-1.83		4401243	-1.47			4401243	
Nitrate (N)	mg/L	<0.050	0.050	4401240	<0.050		0.050	4401240	N/A
Saturation pH (@ 20C)	N/A	8.38		4401242	8.22			4401242	
Saturation pH (@ 4C)	N/A	8.63		4401243	8.47			4401243	
Inorganics									
Total Alkalinity (Total as CaCO3)	mg/L	25	5.0	4403741	29		5.0	4403741	N/A
Dissolved Chloride (Cl)	mg/L	120	1.0	4403747	160		1.0	4403747	N/A
Colour	TCU	<5.0	5.0	4403767	6.0		5.0	4403767	N/A
Nitrate + Nitrite (N)	mg/L	<0.050	0.050	4403773	<0.050		0.050	4403773	N/A
Nitrite (N)	mg/L	<0.010	0.010	4403776	<0.010		0.010	4403776	N/A
Nitrogen (Ammonia Nitrogen)	mg/L	0.32	0.050	4401543	0.087		0.050	4401543	N/A
Total Organic Carbon (C)	mg/L	<0.50	0.50	4405315	<0.50		0.50	4405315	N/A
Orthophosphate (P)	mg/L	0.36	0.010	4403750	0.30		0.010	4403750	N/A
pH	pH	6.80	N/A	4403142	7.00		N/A	4403142	N/A
Reactive Silica (SiO2)	mg/L	25	1.0	4403758	22		0.50	4403758	N/A
Dissolved Sulphate (SO4)	mg/L	6.8	2.0	4403753	6.9		2.0	4403753	N/A
Turbidity	NTU	0.58	0.10	4407713	0.83	0.86	0.10	4407713	0.10
Conductivity	uS/cm	440	1.0	4403136	590		1.0	4403136	N/A
Metals									
Total Aluminum (Al)	ug/L	7.2	5.0	4403066	7.9		5.0	4403068	N/A
Total Antimony (Sb)	ug/L	<1.0	1.0	4403066	<1.0		1.0	4403068	N/A
Total Arsenic (As)	ug/L	5.1	1.0	4403066	3.8		1.0	4403068	N/A
Total Barium (Ba)	ug/L	370	1.0	4403066	320		1.0	4403068	N/A
Total Beryllium (Be)	ug/L	<1.0	1.0	4403066	<1.0		1.0	4403068	N/A
Total Bismuth (Bi)	ug/L	<2.0	2.0	4403066	<2.0		2.0	4403068	N/A

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable

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Maxxam Job #: B642244
Report Date: 2016/03/07

Englobe Corp.
Client Project #: 20814

ATLANTIC RCAP-MS TOTAL METALS IN WATER (DRINKING WATER)

Maxxam ID		BYH173			BYH174	BYH174			
Sampling Date		2016/03/01 10:30			2016/03/01 10:10	2016/03/01 10:10			
COC Number		B 159531			B 159531	B 159531			
	UNITS	WELL 3 - 36 HR	RDL	QC Batch	WELL 4 - 36 HR	WELL 4 - 36 HR Lab-Dup	RDL	QC Batch	MDL
Total Boron (B)	ug/L	<50	50	4403066	<50		50	4403068	N/A
Total Cadmium (Cd)	ug/L	0.021	0.010	4403066	0.035		0.010	4403068	N/A
Total Calcium (Ca)	ug/L	42000	100	4403066	54000		100	4403068	N/A
Total Chromium (Cr)	ug/L	<1.0	1.0	4403066	<1.0		1.0	4403068	N/A
Total Cobalt (Co)	ug/L	<0.40	0.40	4403066	<0.40		0.40	4403068	N/A
Total Copper (Cu)	ug/L	<2.0	2.0	4403066	<2.0		2.0	4403068	N/A
Total Iron (Fe)	ug/L	<50	50	4403066	160		50	4403068	N/A
Total Lead (Pb)	ug/L	<0.50	0.50	4403066	<0.50		0.50	4403068	N/A
Total Magnesium (Mg)	ug/L	4700	100	4403066	5800		100	4403068	N/A
Total Manganese (Mn)	ug/L	120	2.0	4403066	300		2.0	4403068	N/A
Total Molybdenum (Mo)	ug/L	<2.0	2.0	4403066	<2.0		2.0	4403068	N/A
Total Nickel (Ni)	ug/L	<2.0	2.0	4403066	<2.0		2.0	4403068	N/A
Total Phosphorus (P)	ug/L	380	100	4403066	340		100	4403068	N/A
Total Potassium (K)	ug/L	2900	100	4403066	3900		100	4403068	N/A
Total Selenium (Se)	ug/L	<1.0	1.0	4403066	<1.0		1.0	4403068	N/A
Total Silver (Ag)	ug/L	<0.10	0.10	4403066	<0.10		0.10	4403068	N/A
Total Sodium (Na)	ug/L	26000	100	4403066	37000		100	4403068	N/A
Total Strontium (Sr)	ug/L	490	2.0	4403066	670		2.0	4403068	N/A
Total Thallium (Tl)	ug/L	<0.10	0.10	4403066	<0.10		0.10	4403068	N/A
Total Tin (Sn)	ug/L	<2.0	2.0	4403066	<2.0		2.0	4403068	N/A
Total Titanium (Ti)	ug/L	<2.0	2.0	4403066	<2.0		2.0	4403068	N/A
Total Uranium (U)	ug/L	2.3	0.10	4403066	4.1		0.10	4403068	N/A
Total Vanadium (V)	ug/L	<2.0	2.0	4403066	<2.0		2.0	4403068	N/A
Total Zinc (Zn)	ug/L	<5.0	5.0	4403066	<5.0		5.0	4403068	N/A

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

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Maxxam Job #: B642244
Report Date: 2016/03/07

Englobe Corp.
Client Project #: 20814

MICROBIOLOGY COLILERT (DRINKING WATER)

Maxxam ID		BYH173	BYH174			
Sampling Date		2016/03/01 10:30	2016/03/01 10:10			
COC Number		B 159531	B 159531			
	UNITS	WELL 3 - 36 HR	WELL 4 - 36 HR	RDL	QC Batch	MDL
Microbiological						
Escherichia coli	CFU/100mL	<1.0	<1.0	1.0	4401389	N/A
Total Coliforms	CFU/100mL	<1.0	2.0	1.0	4401389	N/A

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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Maxxam Job #: B642244
Report Date: 2016/03/07

Englobe Corp.
Client Project #: 20814

TEST SUMMARY

Maxxam ID: BYH173
Sample ID: WELL 3 - 36 HR
Matrix: Drinking Water

Collected: 2016/03/01
Shipped:
Received: 2016/03/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Carbonate, Bicarbonate and Hydroxide	CALC	4401234	N/A	2016/03/03	Automated Statchk
Alkalinity	KONE	4403741	N/A	2016/03/03	Nancy Rogers
Chloride	KONE	4403747	N/A	2016/03/04	Nancy Rogers
TC/EC Drinking Water CFU/100mL		4401389	N/A	2016/03/02	Jason Wang
Colour	KONE	4403767	N/A	2016/03/04	Nancy Rogers
Conductance - water	AT	4403136	N/A	2016/03/03	Tiffany Morash
Hardness (calculated as CaCO3)		4401237	N/A	2016/03/04	Automated Statchk
Metals Water Total MS	CICP/MS	4403066	2016/03/03	2016/03/03	Bryon Angevine
Ion Balance (% Difference)	CALC	4401238	N/A	2016/03/07	Automated Statchk
Anion and Cation Sum	CALC	4401239	N/A	2016/03/04	Automated Statchk
Nitrogen Ammonia - water	KONE	4401543	N/A	2016/03/03	Mary Clancey
Nitrogen - Nitrate + Nitrite	KONE	4403773	N/A	2016/03/04	Nancy Rogers
Nitrogen - Nitrite	KONE	4403776	N/A	2016/03/04	Nancy Rogers
Nitrogen - Nitrate (as N)	CALC	4401240	N/A	2016/03/07	Automated Statchk
pH	AT	4403142	N/A	2016/03/03	Tiffany Morash
Phosphorus - ortho	KONE	4403750	N/A	2016/03/04	Mary Clancey
Sat. pH and Langelier Index (@ 20C)	CALC	4401242	N/A	2016/03/07	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	4401243	N/A	2016/03/07	Automated Statchk
Reactive Silica	KONE	4403758	N/A	2016/03/04	Mary Clancey
Sulphate	KONE	4403753	N/A	2016/03/04	Nancy Rogers
Total Dissolved Solids (TDS calc)	CALC	4401244	N/A	2016/03/07	Automated Statchk
Organic carbon - Total (TOC)	TECH	4405315	N/A	2016/03/07	Soraya Merchant
Turbidity	TURB	4407713	N/A	2016/03/07	Tiffany Morash

Maxxam ID: BYH174
Sample ID: WELL 4 - 36 HR
Matrix: Drinking Water

Collected: 2016/03/01
Shipped:
Received: 2016/03/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Carbonate, Bicarbonate and Hydroxide	CALC	4401234	N/A	2016/03/03	Automated Statchk
Alkalinity	KONE	4403741	N/A	2016/03/03	Nancy Rogers
Chloride	KONE	4403747	N/A	2016/03/04	Nancy Rogers
TC/EC Drinking Water CFU/100mL		4401389	N/A	2016/03/02	Jason Wang
Colour	KONE	4403767	N/A	2016/03/04	Nancy Rogers
Conductance - water	AT	4403136	N/A	2016/03/03	Tiffany Morash
Hardness (calculated as CaCO3)		4401237	N/A	2016/03/04	Automated Statchk
Metals Water Total MS	CICP/MS	4403068	2016/03/03	2016/03/04	Bryon Angevine
Ion Balance (% Difference)	CALC	4401238	N/A	2016/03/07	Automated Statchk
Anion and Cation Sum	CALC	4401239	N/A	2016/03/04	Automated Statchk
Nitrogen Ammonia - water	KONE	4401543	N/A	2016/03/03	Mary Clancey
Nitrogen - Nitrate + Nitrite	KONE	4403773	N/A	2016/03/04	Nancy Rogers
Nitrogen - Nitrite	KONE	4403776	N/A	2016/03/04	Nancy Rogers
Nitrogen - Nitrate (as N)	CALC	4401240	N/A	2016/03/07	Automated Statchk
pH	AT	4403142	N/A	2016/03/03	Tiffany Morash
Phosphorus - ortho	KONE	4403750	N/A	2016/03/04	Mary Clancey
Sat. pH and Langelier Index (@ 20C)	CALC	4401242	N/A	2016/03/07	Automated Statchk

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Maxxam Job #: B642244
Report Date: 2016/03/07

Englobe Corp.
Client Project #: 20814

TEST SUMMARY

Maxxam ID: BYH174
Sample ID: WELL 4 - 36 HR
Matrix: Drinking Water

Collected: 2016/03/01
Shipped:
Received: 2016/03/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Sat. pH and Langelier Index (@ 4C)	CALC	4401243	N/A	2016/03/07	Automated Statchk
Reactive Silica	KONE	4403758	N/A	2016/03/03	Mary Clancey
Sulphate	KONE	4403753	N/A	2016/03/04	Nancy Rogers
Total Dissolved Solids (TDS calc)	CALC	4401244	N/A	2016/03/07	Automated Statchk
Organic carbon - Total (TOC)	TECH	4405315	N/A	2016/03/07	Soraya Merchant
Turbidity	TURB	4407713	N/A	2016/03/07	Tiffany Morash

Maxxam ID: BYH174 Dup
Sample ID: WELL 4 - 36 HR
Matrix: Drinking Water

Collected: 2016/03/01
Shipped:
Received: 2016/03/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Turbidity	TURB	4407713	N/A	2016/03/07	Tiffany Morash

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GENERAL COMMENTS

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

Package 1	0.0°C

Results relate only to the items tested.

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Maxxam Job #: B642244
Report Date: 2016/03/07

Englobe Corp.
Client Project #: 20814

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4401389	JWA	Method Blank	Escherichia coli	2016/03/02	<1.0		CFU/100	
			Total Coliforms	2016/03/02	<1.0		CFU/100	
4401543	MCN	Matrix Spike	Nitrogen (Ammonia Nitrogen)	2016/03/03		NC	%	80 - 120
4401543	MCN	Spiked Blank	Nitrogen (Ammonia Nitrogen)	2016/03/03		102	%	80 - 120
4401543	MCN	Method Blank	Nitrogen (Ammonia Nitrogen)	2016/03/03	<0.050		mg/L	
4401543	MCN	RPD - Sample/Sample Dup	Nitrogen (Ammonia Nitrogen)	2016/03/03	1.4		%	20
4403066	BAN	Matrix Spike	Total Aluminum (Al)	2016/03/03		NC	%	80 - 120
			Total Antimony (Sb)	2016/03/03		101	%	80 - 120
			Total Arsenic (As)	2016/03/03		93	%	80 - 120
			Total Barium (Ba)	2016/03/03		95	%	80 - 120
			Total Beryllium (Be)	2016/03/03		95	%	80 - 120
			Total Bismuth (Bi)	2016/03/03		99	%	80 - 120
			Total Boron (B)	2016/03/03		95	%	80 - 120
			Total Cadmium (Cd)	2016/03/03		99	%	80 - 120
			Total Calcium (Ca)	2016/03/03		97	%	80 - 120
			Total Chromium (Cr)	2016/03/03		95	%	80 - 120
			Total Cobalt (Co)	2016/03/03		96	%	80 - 120
			Total Copper (Cu)	2016/03/03		96	%	80 - 120
			Total Iron (Fe)	2016/03/03		98	%	80 - 120
			Total Lead (Pb)	2016/03/03		96	%	80 - 120
			Total Magnesium (Mg)	2016/03/03		100	%	80 - 120
			Total Manganese (Mn)	2016/03/03		96	%	80 - 120
			Total Molybdenum (Mo)	2016/03/03		101	%	80 - 120
			Total Nickel (Ni)	2016/03/03		96	%	80 - 120
			Total Phosphorus (P)	2016/03/03		100	%	80 - 120
			Total Potassium (K)	2016/03/03		101	%	80 - 120
			Total Selenium (Se)	2016/03/03		95	%	80 - 120
			Total Silver (Ag)	2016/03/03		100	%	80 - 120
			Total Sodium (Na)	2016/03/03		NC	%	80 - 120
			Total Strontium (Sr)	2016/03/03		95	%	80 - 120
			Total Thallium (Tl)	2016/03/03		97	%	80 - 120
			Total Tin (Sn)	2016/03/03		101	%	80 - 120
			Total Titanium (Ti)	2016/03/03		97	%	80 - 120
			Total Uranium (U)	2016/03/03		103	%	80 - 120
			Total Vanadium (V)	2016/03/03		95	%	80 - 120
			Total Zinc (Zn)	2016/03/03		95	%	80 - 120
4403066	BAN	Spiked Blank	Total Aluminum (Al)	2016/03/03		102	%	80 - 120
			Total Antimony (Sb)	2016/03/03		100	%	80 - 120
			Total Arsenic (As)	2016/03/03		93	%	80 - 120
			Total Barium (Ba)	2016/03/03		96	%	80 - 120
			Total Beryllium (Be)	2016/03/03		94	%	80 - 120
			Total Bismuth (Bi)	2016/03/03		99	%	80 - 120
			Total Boron (B)	2016/03/03		95	%	80 - 120
			Total Cadmium (Cd)	2016/03/03		98	%	80 - 120
			Total Calcium (Ca)	2016/03/03		97	%	80 - 120
			Total Chromium (Cr)	2016/03/03		95	%	80 - 120
			Total Cobalt (Co)	2016/03/03		97	%	80 - 120
			Total Copper (Cu)	2016/03/03		96	%	80 - 120
			Total Iron (Fe)	2016/03/03		99	%	80 - 120
			Total Lead (Pb)	2016/03/03		96	%	80 - 120
			Total Magnesium (Mg)	2016/03/03		101	%	80 - 120
			Total Manganese (Mn)	2016/03/03		97	%	80 - 120
			Total Molybdenum (Mo)	2016/03/03		100	%	80 - 120
			Total Nickel (Ni)	2016/03/03		98	%	80 - 120

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Total Phosphorus (P)	2016/03/03		100	%	80 - 120
			Total Potassium (K)	2016/03/03		102	%	80 - 120
			Total Selenium (Se)	2016/03/03		95	%	80 - 120
			Total Silver (Ag)	2016/03/03		99	%	80 - 120
			Total Sodium (Na)	2016/03/03		102	%	80 - 120
			Total Strontium (Sr)	2016/03/03		97	%	80 - 120
			Total Thallium (Tl)	2016/03/03		97	%	80 - 120
			Total Tin (Sn)	2016/03/03		102	%	80 - 120
			Total Titanium (Ti)	2016/03/03		96	%	80 - 120
			Total Uranium (U)	2016/03/03		104	%	80 - 120
			Total Vanadium (V)	2016/03/03		95	%	80 - 120
			Total Zinc (Zn)	2016/03/03		96	%	80 - 120
4403066	BAN	Method Blank	Total Aluminum (Al)	2016/03/03	5.6, RDL=5.0		ug/L	
			Total Antimony (Sb)	2016/03/03	<1.0		ug/L	
			Total Arsenic (As)	2016/03/03	<1.0		ug/L	
			Total Barium (Ba)	2016/03/03	<1.0		ug/L	
			Total Beryllium (Be)	2016/03/03	<1.0		ug/L	
			Total Bismuth (Bi)	2016/03/03	<2.0		ug/L	
			Total Boron (B)	2016/03/03	<50		ug/L	
			Total Cadmium (Cd)	2016/03/03	<0.010		ug/L	
			Total Calcium (Ca)	2016/03/03	<100		ug/L	
			Total Chromium (Cr)	2016/03/03	<1.0		ug/L	
			Total Cobalt (Co)	2016/03/03	<0.40		ug/L	
			Total Copper (Cu)	2016/03/03	<2.0		ug/L	
			Total Iron (Fe)	2016/03/03	<50		ug/L	
			Total Lead (Pb)	2016/03/03	<0.50		ug/L	
			Total Magnesium (Mg)	2016/03/03	<100		ug/L	
			Total Manganese (Mn)	2016/03/03	<2.0		ug/L	
			Total Molybdenum (Mo)	2016/03/03	<2.0		ug/L	
			Total Nickel (Ni)	2016/03/03	<2.0		ug/L	
			Total Phosphorus (P)	2016/03/03	<100		ug/L	
			Total Potassium (K)	2016/03/03	<100		ug/L	
			Total Selenium (Se)	2016/03/03	<1.0		ug/L	
			Total Silver (Ag)	2016/03/03	<0.10		ug/L	
			Total Sodium (Na)	2016/03/03	<100		ug/L	
			Total Strontium (Sr)	2016/03/03	<2.0		ug/L	
			Total Thallium (Tl)	2016/03/03	<0.10		ug/L	
			Total Tin (Sn)	2016/03/03	<2.0		ug/L	
			Total Titanium (Ti)	2016/03/03	<2.0		ug/L	
			Total Uranium (U)	2016/03/03	<0.10		ug/L	
			Total Vanadium (V)	2016/03/03	<2.0		ug/L	
			Total Zinc (Zn)	2016/03/03	<5.0		ug/L	
4403066	BAN	RPD - Sample/Sample Dup	Total Iron (Fe)	2016/03/03	NC		%	20
			Total Nickel (Ni)	2016/03/03	NC		%	20
			Total Vanadium (V)	2016/03/03	NC		%	20
4403068	BAN	Matrix Spike	Total Aluminum (Al)	2016/03/04		101	%	80 - 120
			Total Antimony (Sb)	2016/03/04		NC	%	80 - 120
			Total Arsenic (As)	2016/03/04		94	%	80 - 120
			Total Barium (Ba)	2016/03/04		97	%	80 - 120
			Total Beryllium (Be)	2016/03/04		97	%	80 - 120
			Total Bismuth (Bi)	2016/03/04		99	%	80 - 120
			Total Boron (B)	2016/03/04		98	%	80 - 120
			Total Cadmium (Cd)	2016/03/04		100	%	80 - 120

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Total Calcium (Ca)	2016/03/04		NC	%	80 - 120
			Total Chromium (Cr)	2016/03/04		96	%	80 - 120
			Total Cobalt (Co)	2016/03/04		98	%	80 - 120
			Total Copper (Cu)	2016/03/04		97	%	80 - 120
			Total Iron (Fe)	2016/03/04		100	%	80 - 120
			Total Lead (Pb)	2016/03/04		97	%	80 - 120
			Total Magnesium (Mg)	2016/03/04		100	%	80 - 120
			Total Manganese (Mn)	2016/03/04		NC	%	80 - 120
			Total Molybdenum (Mo)	2016/03/04		101	%	80 - 120
			Total Nickel (Ni)	2016/03/04		97	%	80 - 120
			Total Phosphorus (P)	2016/03/04		100	%	80 - 120
			Total Potassium (K)	2016/03/04		NC	%	80 - 120
			Total Selenium (Se)	2016/03/04		92	%	80 - 120
			Total Silver (Ag)	2016/03/04		101	%	80 - 120
			Total Sodium (Na)	2016/03/04		NC	%	80 - 120
			Total Strontium (Sr)	2016/03/04		NC	%	80 - 120
			Total Thallium (Tl)	2016/03/04		98	%	80 - 120
			Total Tin (Sn)	2016/03/04		105	%	80 - 120
			Total Titanium (Ti)	2016/03/04		100	%	80 - 120
			Total Uranium (U)	2016/03/04		103	%	80 - 120
			Total Vanadium (V)	2016/03/04		97	%	80 - 120
			Total Zinc (Zn)	2016/03/04		98	%	80 - 120
4403068	BAN	Spiked Blank	Total Aluminum (Al)	2016/03/03		98	%	80 - 120
			Total Antimony (Sb)	2016/03/03		99	%	80 - 120
			Total Arsenic (As)	2016/03/03		91	%	80 - 120
			Total Barium (Ba)	2016/03/03		96	%	80 - 120
			Total Beryllium (Be)	2016/03/03		96	%	80 - 120
			Total Bismuth (Bi)	2016/03/03		100	%	80 - 120
			Total Boron (B)	2016/03/03		96	%	80 - 120
			Total Cadmium (Cd)	2016/03/03		98	%	80 - 120
			Total Calcium (Ca)	2016/03/03		97	%	80 - 120
			Total Chromium (Cr)	2016/03/03		95	%	80 - 120
			Total Cobalt (Co)	2016/03/03		97	%	80 - 120
			Total Copper (Cu)	2016/03/03		96	%	80 - 120
			Total Iron (Fe)	2016/03/03		99	%	80 - 120
			Total Lead (Pb)	2016/03/03		96	%	80 - 120
			Total Magnesium (Mg)	2016/03/03		99	%	80 - 120
			Total Manganese (Mn)	2016/03/03		97	%	80 - 120
			Total Molybdenum (Mo)	2016/03/03		100	%	80 - 120
			Total Nickel (Ni)	2016/03/03		97	%	80 - 120
			Total Phosphorus (P)	2016/03/03		98	%	80 - 120
			Total Potassium (K)	2016/03/03		102	%	80 - 120
			Total Selenium (Se)	2016/03/03		92	%	80 - 120
			Total Silver (Ag)	2016/03/03		99	%	80 - 120
			Total Sodium (Na)	2016/03/03		100	%	80 - 120
			Total Strontium (Sr)	2016/03/03		95	%	80 - 120
			Total Thallium (Tl)	2016/03/03		97	%	80 - 120
			Total Tin (Sn)	2016/03/03		103	%	80 - 120
			Total Titanium (Ti)	2016/03/03		96	%	80 - 120
			Total Uranium (U)	2016/03/03		102	%	80 - 120
			Total Vanadium (V)	2016/03/03		96	%	80 - 120
			Total Zinc (Zn)	2016/03/03		96	%	80 - 120
4403068	BAN	Method Blank	Total Aluminum (Al)	2016/03/03	<5.0		ug/L	
			Total Antimony (Sb)	2016/03/03	<1.0		ug/L	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Total Arsenic (As)	2016/03/03	<1.0		ug/L	
			Total Barium (Ba)	2016/03/03	<1.0		ug/L	
			Total Beryllium (Be)	2016/03/03	<1.0		ug/L	
			Total Bismuth (Bi)	2016/03/03	<2.0		ug/L	
			Total Boron (B)	2016/03/03	<50		ug/L	
			Total Cadmium (Cd)	2016/03/03	<0.010		ug/L	
			Total Calcium (Ca)	2016/03/03	<100		ug/L	
			Total Chromium (Cr)	2016/03/03	<1.0		ug/L	
			Total Cobalt (Co)	2016/03/03	<0.40		ug/L	
			Total Copper (Cu)	2016/03/03	<2.0		ug/L	
			Total Iron (Fe)	2016/03/03	<50		ug/L	
			Total Lead (Pb)	2016/03/03	<0.50		ug/L	
			Total Magnesium (Mg)	2016/03/03	<100		ug/L	
			Total Manganese (Mn)	2016/03/03	<2.0		ug/L	
			Total Molybdenum (Mo)	2016/03/03	<2.0		ug/L	
			Total Nickel (Ni)	2016/03/03	<2.0		ug/L	
			Total Phosphorus (P)	2016/03/03	<100		ug/L	
			Total Potassium (K)	2016/03/03	<100		ug/L	
			Total Selenium (Se)	2016/03/03	<1.0		ug/L	
			Total Silver (Ag)	2016/03/03	<0.10		ug/L	
			Total Sodium (Na)	2016/03/03	<100		ug/L	
			Total Strontium (Sr)	2016/03/03	<2.0		ug/L	
			Total Thallium (Tl)	2016/03/03	<0.10		ug/L	
			Total Tin (Sn)	2016/03/03	<2.0		ug/L	
			Total Titanium (Ti)	2016/03/03	<2.0		ug/L	
			Total Uranium (U)	2016/03/03	<0.10		ug/L	
			Total Vanadium (V)	2016/03/03	<2.0		ug/L	
			Total Zinc (Zn)	2016/03/03	<5.0		ug/L	
4403068	BAN	RPD - Sample/Sample Dup	Total Aluminum (Al)	2016/03/04	1.4		%	20
			Total Antimony (Sb)	2016/03/04	0.69		%	20
			Total Arsenic (As)	2016/03/04	NC		%	20
			Total Barium (Ba)	2016/03/04	0.47		%	20
			Total Beryllium (Be)	2016/03/04	NC		%	20
			Total Bismuth (Bi)	2016/03/04	NC		%	20
			Total Boron (B)	2016/03/04	NC		%	20
			Total Cadmium (Cd)	2016/03/04	0.94		%	20
			Total Calcium (Ca)	2016/03/04	1.5		%	20
			Total Chromium (Cr)	2016/03/04	NC		%	20
			Total Cobalt (Co)	2016/03/04	NC		%	20
			Total Copper (Cu)	2016/03/04	NC		%	20
			Total Iron (Fe)	2016/03/04	NC		%	20
			Total Lead (Pb)	2016/03/04	0.84		%	20
			Total Magnesium (Mg)	2016/03/04	1.4		%	20
			Total Manganese (Mn)	2016/03/04	0.22		%	20
			Total Molybdenum (Mo)	2016/03/04	NC		%	20
			Total Nickel (Ni)	2016/03/04	NC		%	20
			Total Phosphorus (P)	2016/03/04	NC		%	20
			Total Potassium (K)	2016/03/04	1.8		%	20
			Total Selenium (Se)	2016/03/04	1.8		%	20
			Total Silver (Ag)	2016/03/04	NC		%	20
			Total Sodium (Na)	2016/03/04	0.099		%	20
			Total Strontium (Sr)	2016/03/04	0.82		%	20
			Total Thallium (Tl)	2016/03/04	NC		%	20
			Total Tin (Sn)	2016/03/04	NC		%	20

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Total Titanium (Ti)	2016/03/04	7.0		%	20
			Total Uranium (U)	2016/03/04	NC		%	20
			Total Vanadium (V)	2016/03/04	NC		%	20
			Total Zinc (Zn)	2016/03/04	NC		%	20
4403136	TMO	Spiked Blank	Conductivity	2016/03/03		100	%	80 - 120
4403136	TMO	Method Blank	Conductivity	2016/03/03	1.6, RDL=1.0		uS/cm	
4403136	TMO	RPD - Sample/Sample Dup	Conductivity	2016/03/03	0.27		%	25
4403142	TMO	QC Standard	pH	2016/03/03		100	%	97 - 103
4403142	TMO	RPD - Sample/Sample Dup	pH	2016/03/03	2.8		%	N/A
4403741	NRG	Matrix Spike	Total Alkalinity (Total as CaCO3)	2016/03/03		NC	%	80 - 120
4403741	NRG	Spiked Blank	Total Alkalinity (Total as CaCO3)	2016/03/03		102	%	80 - 120
4403741	NRG	Method Blank	Total Alkalinity (Total as CaCO3)	2016/03/03	<5.0		mg/L	
4403741	NRG	RPD - Sample/Sample Dup	Total Alkalinity (Total as CaCO3)	2016/03/03	1.9		%	25
4403747	NRG	Matrix Spike	Dissolved Chloride (Cl)	2016/03/04		96	%	80 - 120
4403747	NRG	QC Standard	Dissolved Chloride (Cl)	2016/03/04		101	%	80 - 120
4403747	NRG	Spiked Blank	Dissolved Chloride (Cl)	2016/03/04		104	%	80 - 120
4403747	NRG	Method Blank	Dissolved Chloride (Cl)	2016/03/04	<1.0		mg/L	
4403747	NRG	RPD - Sample/Sample Dup	Dissolved Chloride (Cl)	2016/03/04	NC		%	25
4403750	MCN	Matrix Spike	Orthophosphate (P)	2016/03/04		95	%	80 - 120
4403750	MCN	Spiked Blank	Orthophosphate (P)	2016/03/04		97	%	80 - 120
4403750	MCN	Method Blank	Orthophosphate (P)	2016/03/04	<0.010		mg/L	
4403750	MCN	RPD - Sample/Sample Dup	Orthophosphate (P)	2016/03/04	NC		%	25
4403753	NRG	Matrix Spike	Dissolved Sulphate (SO4)	2016/03/04		NC	%	80 - 120
4403753	NRG	Spiked Blank	Dissolved Sulphate (SO4)	2016/03/04		100	%	80 - 120
4403753	NRG	Method Blank	Dissolved Sulphate (SO4)	2016/03/04	<2.0		mg/L	
4403753	NRG	RPD - Sample/Sample Dup	Dissolved Sulphate (SO4)	2016/03/04	2.0		%	25
4403758	MCN	Matrix Spike	Reactive Silica (SiO2)	2016/03/03		96	%	80 - 120
4403758	MCN	Spiked Blank	Reactive Silica (SiO2)	2016/03/03		95	%	80 - 120
4403758	MCN	Method Blank	Reactive Silica (SiO2)	2016/03/03	<0.50		mg/L	
4403758	MCN	RPD - Sample/Sample Dup	Reactive Silica (SiO2)	2016/03/03	0.075		%	25
4403767	NRG	Spiked Blank	Colour	2016/03/04		99	%	80 - 120
4403767	NRG	Method Blank	Colour	2016/03/04	<5.0		TCU	
4403767	NRG	RPD - Sample/Sample Dup	Colour	2016/03/04	NC		%	20
4403773	NRG	Matrix Spike	Nitrate + Nitrite (N)	2016/03/04		104	%	80 - 120
4403773	NRG	Spiked Blank	Nitrate + Nitrite (N)	2016/03/04		102	%	80 - 120
4403773	NRG	Method Blank	Nitrate + Nitrite (N)	2016/03/04	<0.050		mg/L	
4403773	NRG	RPD - Sample/Sample Dup	Nitrate + Nitrite (N)	2016/03/04	NC		%	25
4403776	NRG	Matrix Spike	Nitrite (N)	2016/03/04		94	%	80 - 120
4403776	NRG	Spiked Blank	Nitrite (N)	2016/03/04		99	%	80 - 120
4403776	NRG	Method Blank	Nitrite (N)	2016/03/04	<0.010		mg/L	
4403776	NRG	RPD - Sample/Sample Dup	Nitrite (N)	2016/03/04	NC		%	25
4405315	SMT	Matrix Spike	Total Organic Carbon (C)	2016/03/07		118	%	80 - 120
4405315	SMT	Spiked Blank	Total Organic Carbon (C)	2016/03/07		106	%	80 - 120
4405315	SMT	Method Blank	Total Organic Carbon (C)	2016/03/07	<0.50		mg/L	
4405315	SMT	RPD - Sample/Sample Dup	Total Organic Carbon (C)	2016/03/07	1.5		%	20
4407713	TMO	QC Standard	Turbidity	2016/03/07		89	%	80 - 120
4407713	TMO	Method Blank	Turbidity	2016/03/07	<0.10		NTU	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4407713	TMO	RPD - Sample/Sample Dup	Turbidity	2016/03/07	3.6		%	20

N/A = Not Applicable

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

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration).

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

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VALIDATION SIGNATURE PAGE

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

Original Signed

Andrew VanWychen, Bedford Micro

Original Signed

Mike MacGillivray, Scientific Specialist (Inorganics)

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

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MAXXAM Chain of Custody Record

COC #: B 159531 Page 1 of 1

This column for lab use only:
Client Code
Maxxam Job # B642244

Cooler ID	Seal Present	Seal Intact	Temp 1	Temp 2	Temp 3	Average Temp
			0 +1		1	

Integrity: YES (NO) | Integrity / Checklist by: SM
Labelled by | Location / Bin #

INVOICE INFORMATION:
Company Name: Englobe
Contact Name: Aven Cole
Address: Lisa Lachance
Postal Code
Email:
Ph: Fax:

REPORT INFORMATION (if differs from invoice):
Company Name: SAME
Contact Name:
Address:
Postal Code
Email:
Ph: Fax:

PO #
Project # / Phase # 20814
Project Name / Site Location
Quote
Site #
Task Order #
Sampled by

TURNAROUND TIME
Standard ☒
10 day ☐
If RUSH Specify Date:
Pre-schedule rush work
Charge for # Jars used but not submitted

Guideline Requirements / Detection Limits / Special Instructions

*Specify Matrix: Surface/Salt/Ground/Tapwater/Sewage/Effluent/Potable/NonPotable/Tissue/Soil/Sludge/Metal/Seawater

Field Sample Identification	Matrix*	Date/Time Sampled	# & type of bottles	Field Filtered & Preserved	Lab Filtration Required	RCAP-30 Choose Total or Diss Metals	RCAP-MS Choose Total or Diss Metals	Metals Water: Total Digest (Default Method) for well water, surface water	Metals Water: Dissolved for ground water	Metals Water: Mercury	Metals Soil: Metals & Mercury Default Available Digest Method	Metals Soil: Metals Total Digest - for Ocean sediments (HNO3/HF/HCLO4)	Metals Soil: Mercury Low level by Cold Vapour AA	Metals Soil: Selenium (low level) Req'd for CCME Residential, Parklands, Agricultural	Metals Soil: Hot Water soluble Boron (required for CCME Agricultural)	Hydrocarbons: RBCA Hydrocarbons (BTEX, C6-C32)	Hydrocarbons: Hydrocarbons Soil (Potable), NS Fuel Oil Spill Policy Low Level BTEX, C6-C32	Hydrocarbons: NB Potable Water BTEX, VPH, Low level T.E.H.	Hydrocarbons: TPH Fractionation	Hydrocarbons: PAH's	Hydrocarbons: PAH's with Acridine, Quinoline	E. Coli MPN	Total Coliforms MPN
1 Well 3 - 36 h	GW	1/3/16 10:30 pm	3x 200 1x 120 3x 100				X															X X
2 Well 4 - 36 h	GW	1/3/16 10:40 pm	11				X															X X
3																						
4																						
5																						
6																						
7																						
8																						
9																						
10																						

RELINQUISHED BY: (Signature/Print) Date Time
Original Signed 2/3/16 8:05

RECEIVED BY: (Signature/Print) Date Time
Original Signed
2016 MAR 2 8:05

White: Maxxam Yellow : Mail Pink: Client ATL FCD 00149 / Revision 10

Maxxam
A Bureau Veritas Group Company

Your Project #: 20814
Your C.O.C. #: 550949-01-01

Attention:Lisa Ladouceur

Englobe Corp.
97 Troop Ave
Dartmouth, NS
CANADA B3B 2A7

Report Date: 2016/03/10
Report #: R3924088
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B645502
Received: 2016/03/04, 12:14

Sample Matrix: Water
Samples Received: 5

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Carbonate, Bicarbonate and Hydroxide	5	N/A	2016/03/09	N/A	SM 22 4500-CO2 D
Alkalinity	5	N/A	2016/03/08	ATL SOP 00013	EPA 310.2 R1974 m
Chloride	5	N/A	2016/03/08	ATL SOP 00014	SM 22 4500-Cl- E m
Colour	5	N/A	2016/03/08	ATL SOP 00020	SM 22 2120C m
Conductance - water	5	N/A	2016/03/08	ATL SOP 00004	SM 22 2510B m
Hardness (calculated as CaCO3)	5	N/A	2016/03/10	ATL SOP 00048	SM 22 2340 B
Metals Water Total MS	5	2016/03/09	2016/03/09	ATL SOP 00058	EPA 6020A R1 m
Ion Balance (% Difference)	5	N/A	2016/03/10		Auto Calc.
Anion and Cation Sum	5	N/A	2016/03/10		Auto Calc.
Nitrogen Ammonia - water	5	N/A	2016/03/09	ATL SOP 00015	EPA 350.1 R2 m
Nitrogen - Nitrate + Nitrite	5	N/A	2016/03/09	ATL SOP 00016	USGS SOPINCF0452.2 m
Nitrogen - Nitrite	5	N/A	2016/03/09	ATL SOP 00017	SM 22 4500-NO2- B m
Nitrogen - Nitrate (as N)	5	N/A	2016/03/10	ATL SOP 00018	ASTM D3867
pH (1)	5	N/A	2016/03/08	ATL SOP 00003	SM 22 4500-H+ B m
Phosphorus - ortho	5	N/A	2016/03/08	ATL SOP 00021	EPA 365.2 m
Sat. pH and Langelier Index (@ 20C)	5	N/A	2016/03/10	ATL SOP 00049	Auto Calc.
Sat. pH and Langelier Index (@ 4C)	5	N/A	2016/03/10	ATL SOP 00049	Auto Calc.
Reactive Silica	5	N/A	2016/03/08	ATL SOP 00022	EPA 366.0 m
Sulphate	5	N/A	2016/03/08	ATL SOP 00023	ASTMD516-11 m
Total Dissolved Solids (TDS calc)	5	N/A	2016/03/10		Auto Calc.
Organic carbon - Total (TOC) (2)	5	N/A	2016/03/08	ATL SOP 00037	SM 22 5310C m
Turbidity	5	N/A	2016/03/08	ATL SOP 00011	EPA 180.1 R2 m

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.

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

(1) The APHA Standard Method require pH to be analyzed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the APHA Standard Method holding time.
(2) TOC / DOC present in the sample should be considered as non-purgeable TOC / DOC.

Your Project #: 20814
Your C.O.C. #: 550949-01-01

Attention:Lisa Ladouceur

Englobe Corp.
97 Troop Ave
Dartmouth, NS
CANADA B3B 2A7

Report Date: 2016/03/10
Report #: R3924088
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B645502
Received: 2016/03/04, 12:14

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Avery Withrow, Project Manager
Email: AWithrow@maxxam.ca
Phone# (902)420-0203 Ext:233
==========
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Maxxam Job #: B645502
Report Date: 2016/03/10

Englobe Corp.
Client Project #: 20814

ATLANTIC RCAP-MS TOTAL METALS IN WATER (WATER)

Maxxam ID		BYY308		BYY309		BYY310	BYY311			
Sampling Date		2016/03/04		2016/03/04		2016/03/04	2016/03/04			
COC Number		550949-01-01		550949-01-01		550949-01-01	550949-01-01			
	UNITS	PW1	RDL	PW2	RDL	PW3	PW4	RDL	QC Batch	MDL
Calculated Parameters										
Anion Sum	me/L	1.31	N/A	9.46	N/A	1.08	1.88	N/A	4407049	N/A
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	40	1.0	24	1.0	33	51	1.0	4407046	0.20
Calculated TDS	mg/L	81	1.0	540	1.0	88	120	1.0	4407053	0.20
Carb. Alkalinity (calc. as CaCO3)	mg/L	<1.0	1.0	<1.0	1.0	<1.0	<1.0	1.0	4407046	0.20
Cation Sum	me/L	1.19	N/A	9.42	N/A	1.34	1.90	N/A	4407049	N/A
Hardness (CaCO3)	mg/L	40	1.0	260	1.0	30	53	1.0	4407047	1.0
Ion Balance (% Difference)	%	4.80	N/A	0.210	N/A	10.7	0.530	N/A	4407048	N/A
Langelier Index (@ 20C)	N/A	-1.43		-1.64		-1.74	-0.915		4407051	
Langelier Index (@ 4C)	N/A	-1.68		-1.88		-1.99	-1.17		4407052	
Nitrate (N)	mg/L	0.36	0.050	0.86	0.050	0.61	<0.050	0.050	4407050	N/A
Saturation pH (@ 20C)	N/A	8.60		8.21		8.87	8.42		4407051	
Saturation pH (@ 4C)	N/A	8.85		8.45		9.12	8.67		4407052	
Inorganics										
Total Alkalinity (Total as CaCO3)	mg/L	40	5.0	24	5.0	33	51	5.0	4408316	N/A
Dissolved Chloride (Cl)	mg/L	14	1.0	310	5.0	8.7	28	1.0	4408337	N/A
Colour	TCU	<5.0	5.0	<5.0	5.0	<5.0	24	5.0	4408356	N/A
Nitrate + Nitrite (N)	mg/L	0.36	0.050	0.86	0.050	0.61	<0.050	0.050	4408362	N/A
Nitrite (N)	mg/L	<0.010	0.010	<0.010	0.010	<0.010	<0.010	0.010	4408366	N/A
Nitrogen (Ammonia Nitrogen)	mg/L	<0.050	0.050	<0.050	0.050	<0.050	<0.050	0.050	4409752	N/A
Total Organic Carbon (C)	mg/L	<0.50	0.50	1.4	0.50	0.99	0.61	0.50	4409460	N/A
Orthophosphate (P)	mg/L	0.092	0.010	0.012	0.010	0.20	0.042	0.010	4408360	N/A
pH	pH	7.18	N/A	6.57	N/A	7.13	7.51	N/A	4408767	N/A
Reactive Silica (SiO2)	mg/L	13	0.50	11	0.50	19	14	0.50	4408346	N/A
Dissolved Sulphate (SO4)	mg/L	4.7	2.0	12	2.0	5.4	3.6	2.0	4408341	N/A
Turbidity	NTU	2.4	0.10	160	1.0	47	29	0.10	4409161	0.10
Conductivity	uS/cm	120	1.0	1100	1.0	100	190	1.0	4408764	N/A
Metals										
Total Aluminum (Al)	ug/L	7.7	5.0	720	5.0	230	25	5.0	4410442	N/A
Total Antimony (Sb)	ug/L	<1.0	1.0	<1.0	1.0	<1.0	<1.0	1.0	4410442	N/A
Total Arsenic (As)	ug/L	5.0	1.0	1.1	1.0	91	8.5	1.0	4410442	N/A
Total Barium (Ba)	ug/L	35	1.0	310	1.0	83	13	1.0	4410442	N/A
Total Beryllium (Be)	ug/L	<1.0	1.0	<1.0	1.0	<1.0	<1.0	1.0	4410442	N/A
Total Bismuth (Bi)	ug/L	<2.0	2.0	<2.0	2.0	<2.0	<2.0	2.0	4410442	N/A
Total Boron (B)	ug/L	<50	50	<50	50	<50	<50	50	4410442	N/A
Total Cadmium (Cd)	ug/L	<0.010	0.010	0.78	0.010	0.47	<0.010	0.010	4410442	N/A

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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Maxxam Job #: B645502
Report Date: 2016/03/10

Englobe Corp.
Client Project #: 20814

ATLANTIC RCAP-MS TOTAL METALS IN WATER (WATER)

Maxxam ID		BYY308		BYY309		BYY310	BYY311			
Sampling Date		2016/03/04		2016/03/04		2016/03/04	2016/03/04			
COC Number		550949-01-01		550949-01-01		550949-01-01	550949-01-01			
	UNITS	PW1	RDL	PW2	RDL	PW3	PW4	RDL	QC Batch	MDL
Total Calcium (Ca)	ug/L	13000	100	79000	100	8800	17000	100	4410442	N/A
Total Chromium (Cr)	ug/L	<1.0	1.0	2.1	1.0	1.1	<1.0	1.0	4410442	N/A
Total Cobalt (Co)	ug/L	<0.40	0.40	0.56	0.40	2.7	<0.40	0.40	4410442	N/A
Total Copper (Cu)	ug/L	73	2.0	33	2.0	11	5.5	2.0	4410442	N/A
Total Iron (Fe)	ug/L	250	50	15000	50	9600	4000	50	4410442	N/A
Total Lead (Pb)	ug/L	0.58	0.50	7.8	0.50	5.5	1.1	0.50	4410442	N/A
Total Magnesium (Mg)	ug/L	1700	100	15000	100	2100	2700	100	4410442	N/A
Total Manganese (Mn)	ug/L	15	2.0	570	2.0	1400	96	2.0	4410442	N/A
Total Molybdenum (Mo)	ug/L	<2.0	2.0	<2.0	2.0	<2.0	<2.0	2.0	4410442	N/A
Total Nickel (Ni)	ug/L	<2.0	2.0	4.1	2.0	5.2	<2.0	2.0	4410442	N/A
Total Phosphorus (P)	ug/L	140	100	120	100	2100	350	100	4410442	N/A
Total Potassium (K)	ug/L	940	100	3400	100	950	1200	100	4410442	N/A
Total Selenium (Se)	ug/L	<1.0	1.0	<1.0	1.0	<1.0	<1.0	1.0	4410442	N/A
Total Silver (Ag)	ug/L	<0.10	0.10	<0.10	0.10	<0.10	<0.10	0.10	4410442	N/A
Total Sodium (Na)	ug/L	8100	100	83000	100	8300	15000	100	4410442	N/A
Total Strontium (Sr)	ug/L	66	2.0	470	2.0	39	62	2.0	4410442	N/A
Total Thallium (Tl)	ug/L	<0.10	0.10	<0.10	0.10	0.23	<0.10	0.10	4410442	N/A
Total Tin (Sn)	ug/L	<2.0	2.0	<2.0	2.0	<2.0	<2.0	2.0	4410442	N/A
Total Titanium (Ti)	ug/L	<2.0	2.0	44	2.0	12	<2.0	2.0	4410442	N/A
Total Uranium (U)	ug/L	4.8	0.10	8.5	0.10	34	3.7	0.10	4410442	N/A
Total Vanadium (V)	ug/L	<2.0	2.0	<2.0	2.0	<2.0	<2.0	2.0	4410442	N/A
Total Zinc (Zn)	ug/L	14	5.0	43	5.0	66	19	5.0	4410442	N/A

RDL = Reportable Detection Limit
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N/A = Not Applicable

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Maxxam Job #: B645502
Report Date: 2016/03/10

Englobe Corp.
Client Project #: 20814

ATLANTIC RCAP-MS TOTAL METALS IN WATER (WATER)

Maxxam ID		BYY312			
Sampling Date		2016/03/04			
COC Number		550949-01-01			
	UNITS	PW5	RDL	QC Batch	MDL
Calculated Parameters					
Anion Sum	me/L	2.09	N/A	4407049	N/A
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	38	1.0	4407046	0.20
Calculated TDS	mg/L	140	1.0	4407053	0.20
Carb. Alkalinity (calc. as CaCO3)	mg/L	<1.0	1.0	4407046	0.20
Cation Sum	me/L	1.91	N/A	4407049	N/A
Hardness (CaCO3)	mg/L	<1.0	1.0	4407047	1.0
Ion Balance (% Difference)	%	4.50	N/A	4407048	N/A
Langelier Index (@ 20C)	N/A	NC		4407051	
Langelier Index (@ 4C)	N/A	NC		4407052	
Nitrate (N)	mg/L	0.14	0.050	4407050	N/A
Saturation pH (@ 20C)	N/A	NC		4407051	
Saturation pH (@ 4C)	N/A	NC		4407052	
Inorganics					
Total Alkalinity (Total as CaCO3)	mg/L	38	5.0	4408316	N/A
Dissolved Chloride (Cl)	mg/L	39	1.0	4408337	N/A
Colour	TCU	<5.0	5.0	4408356	N/A
Nitrate + Nitrite (N)	mg/L	0.14	0.050	4408362	N/A
Nitrite (N)	mg/L	<0.010	0.010	4408366	N/A
Nitrogen (Ammonia Nitrogen)	mg/L	<0.050	0.050	4409752	N/A
Total Organic Carbon (C)	mg/L	<0.50	0.50	4409460	N/A
Orthophosphate (P)	mg/L	0.37	0.010	4408360	N/A
pH	pH	7.23	N/A	4408767	N/A
Reactive Silica (SiO2)	mg/L	22	0.50	4408346	N/A
Dissolved Sulphate (SO4)	mg/L	9.7	2.0	4408341	N/A
Turbidity	NTU	1.2	0.10	4409161	0.10
Conductivity	uS/cm	220	1.0	4408764	N/A
Metals					
Total Aluminum (Al)	ug/L	6.5	5.0	4410442	N/A
Total Antimony (Sb)	ug/L	<1.0	1.0	4410442	N/A
Total Arsenic (As)	ug/L	9.8	1.0	4410442	N/A
Total Barium (Ba)	ug/L	<1.0	1.0	4410442	N/A
Total Beryllium (Be)	ug/L	<1.0	1.0	4410442	N/A
Total Bismuth (Bi)	ug/L	<2.0	2.0	4410442	N/A
Total Boron (B)	ug/L	<50	50	4410442	N/A
Total Cadmium (Cd)	ug/L	<0.010	0.010	4410442	N/A

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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Maxxam Job #: B645502
Report Date: 2016/03/10

Englobe Corp.
Client Project #: 20814

ATLANTIC RCAP-MS TOTAL METALS IN WATER (WATER)

Maxxam ID		BYY312			
Sampling Date		2016/03/04			
COC Number		550949-01-01			
	UNITS	PW5	RDL	QC Batch	MDL
Total Calcium (Ca)	ug/L	<100	100	4410442	N/A
Total Chromium (Cr)	ug/L	<1.0	1.0	4410442	N/A
Total Cobalt (Co)	ug/L	<0.40	0.40	4410442	N/A
Total Copper (Cu)	ug/L	2.3	2.0	4410442	N/A
Total Iron (Fe)	ug/L	100	50	4410442	N/A
Total Lead (Pb)	ug/L	<0.50	0.50	4410442	N/A
Total Magnesium (Mg)	ug/L	<100	100	4410442	N/A
Total Manganese (Mn)	ug/L	<2.0	2.0	4410442	N/A
Total Molybdenum (Mo)	ug/L	<2.0	2.0	4410442	N/A
Total Nickel (Ni)	ug/L	<2.0	2.0	4410442	N/A
Total Phosphorus (P)	ug/L	380	100	4410442	N/A
Total Potassium (K)	ug/L	680	100	4410442	N/A
Total Selenium (Se)	ug/L	<1.0	1.0	4410442	N/A
Total Silver (Ag)	ug/L	<0.10	0.10	4410442	N/A
Total Sodium (Na)	ug/L	43000	100	4410442	N/A
Total Strontium (Sr)	ug/L	<2.0	2.0	4410442	N/A
Total Thallium (Tl)	ug/L	<0.10	0.10	4410442	N/A
Total Tin (Sn)	ug/L	<2.0	2.0	4410442	N/A
Total Titanium (Ti)	ug/L	<2.0	2.0	4410442	N/A
Total Uranium (U)	ug/L	1.1	0.10	4410442	N/A
Total Vanadium (V)	ug/L	<2.0	2.0	4410442	N/A
Total Zinc (Zn)	ug/L	14	5.0	4410442	N/A

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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Maxxam Job #: B645502
Report Date: 2016/03/10

Englobe Corp.
Client Project #: 20814

TEST SUMMARY

Maxxam ID: BYY308
Sample ID: PW1
Matrix: Water

Collected: 2016/03/04
Shipped:
Received: 2016/03/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Carbonate, Bicarbonate and Hydroxide	CALC	4407046	N/A	2016/03/09	Automated Statchk
Alkalinity	KONE	4408316	N/A	2016/03/08	Nancy Rogers
Chloride	KONE	4408337	N/A	2016/03/08	Nancy Rogers
Colour	KONE	4408356	N/A	2016/03/08	Nancy Rogers
Conductance - water	AT	4408764	N/A	2016/03/08	Tiffany Morash
Hardness (calculated as CaCO3)		4407047	N/A	2016/03/10	Automated Statchk
Metals Water Total MS	CICP/MS	4410442	2016/03/09	2016/03/09	Mike Leblanc
Ion Balance (% Difference)	CALC	4407048	N/A	2016/03/10	Automated Statchk
Anion and Cation Sum	CALC	4407049	N/A	2016/03/10	Automated Statchk
Nitrogen Ammonia - water	KONE	4409752	N/A	2016/03/09	Soraya Merchant
Nitrogen - Nitrate + Nitrite	KONE	4408362	N/A	2016/03/09	Nancy Rogers
Nitrogen - Nitrite	KONE	4408366	N/A	2016/03/09	Nancy Rogers
Nitrogen - Nitrate (as N)	CALC	4407050	N/A	2016/03/10	Automated Statchk
pH	AT	4408767	N/A	2016/03/08	Tiffany Morash
Phosphorus - ortho	KONE	4408360	N/A	2016/03/08	Nancy Rogers
Sat. pH and Langelier Index (@ 20C)	CALC	4407051	N/A	2016/03/10	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	4407052	N/A	2016/03/10	Automated Statchk
Reactive Silica	KONE	4408346	N/A	2016/03/08	Nancy Rogers
Sulphate	KONE	4408341	N/A	2016/03/08	Nancy Rogers
Total Dissolved Solids (TDS calc)	CALC	4407053	N/A	2016/03/10	Automated Statchk
Organic carbon - Total (TOC)	TECH	4409460	N/A	2016/03/08	Soraya Merchant
Turbidity	TURB	4409161	N/A	2016/03/08	Tiffany Morash

Maxxam ID: BYY309
Sample ID: PW2
Matrix: Water

Collected: 2016/03/04
Shipped:
Received: 2016/03/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Carbonate, Bicarbonate and Hydroxide	CALC	4407046	N/A	2016/03/09	Automated Statchk
Alkalinity	KONE	4408316	N/A	2016/03/08	Nancy Rogers
Chloride	KONE	4408337	N/A	2016/03/08	Nancy Rogers
Colour	KONE	4408356	N/A	2016/03/08	Nancy Rogers
Conductance - water	AT	4408764	N/A	2016/03/08	Tiffany Morash
Hardness (calculated as CaCO3)		4407047	N/A	2016/03/10	Automated Statchk
Metals Water Total MS	CICP/MS	4410442	2016/03/09	2016/03/09	Mike Leblanc
Ion Balance (% Difference)	CALC	4407048	N/A	2016/03/10	Automated Statchk
Anion and Cation Sum	CALC	4407049	N/A	2016/03/10	Automated Statchk
Nitrogen Ammonia - water	KONE	4409752	N/A	2016/03/09	Soraya Merchant
Nitrogen - Nitrate + Nitrite	KONE	4408362	N/A	2016/03/09	Nancy Rogers
Nitrogen - Nitrite	KONE	4408366	N/A	2016/03/09	Nancy Rogers
Nitrogen - Nitrate (as N)	CALC	4407050	N/A	2016/03/10	Automated Statchk
pH	AT	4408767	N/A	2016/03/08	Tiffany Morash
Phosphorus - ortho	KONE	4408360	N/A	2016/03/08	Nancy Rogers
Sat. pH and Langelier Index (@ 20C)	CALC	4407051	N/A	2016/03/10	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	4407052	N/A	2016/03/10	Automated Statchk
Reactive Silica	KONE	4408346	N/A	2016/03/08	Nancy Rogers

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Maxxam Job #: B645502
Report Date: 2016/03/10

Englobe Corp.
Client Project #: 20814

TEST SUMMARY

Maxxam ID: BYY309
Sample ID: PW2
Matrix: Water

Collected: 2016/03/04
Shipped:
Received: 2016/03/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Sulphate	KONE	4408341	N/A	2016/03/08	Nancy Rogers
Total Dissolved Solids (TDS calc)	CALC	4407053	N/A	2016/03/10	Automated Statchk
Organic carbon - Total (TOC)	TECH	4409460	N/A	2016/03/08	Soraya Merchant
Turbidity	TURB	4409161	N/A	2016/03/08	Tiffany Morash

Maxxam ID: BYY310
Sample ID: PW3
Matrix: Water

Collected: 2016/03/04
Shipped:
Received: 2016/03/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Carbonate, Bicarbonate and Hydroxide	CALC	4407046	N/A	2016/03/09	Automated Statchk
Alkalinity	KONE	4408316	N/A	2016/03/08	Nancy Rogers
Chloride	KONE	4408337	N/A	2016/03/08	Nancy Rogers
Colour	KONE	4408356	N/A	2016/03/08	Nancy Rogers
Conductance - water	AT	4408764	N/A	2016/03/08	Tiffany Morash
Hardness (calculated as CaCO3)		4407047	N/A	2016/03/10	Automated Statchk
Metals Water Total MS	CICP/MS	4410442	2016/03/09	2016/03/09	Mike Leblanc
Ion Balance (% Difference)	CALC	4407048	N/A	2016/03/10	Automated Statchk
Anion and Cation Sum	CALC	4407049	N/A	2016/03/10	Automated Statchk
Nitrogen Ammonia - water	KONE	4409752	N/A	2016/03/09	Soraya Merchant
Nitrogen - Nitrate + Nitrite	KONE	4408362	N/A	2016/03/09	Nancy Rogers
Nitrogen - Nitrite	KONE	4408366	N/A	2016/03/09	Nancy Rogers
Nitrogen - Nitrate (as N)	CALC	4407050	N/A	2016/03/10	Automated Statchk
pH	AT	4408767	N/A	2016/03/08	Tiffany Morash
Phosphorus - ortho	KONE	4408360	N/A	2016/03/08	Nancy Rogers
Sat. pH and Langelier Index (@ 20C)	CALC	4407051	N/A	2016/03/10	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	4407052	N/A	2016/03/10	Automated Statchk
Reactive Silica	KONE	4408346	N/A	2016/03/08	Nancy Rogers
Sulphate	KONE	4408341	N/A	2016/03/08	Nancy Rogers
Total Dissolved Solids (TDS calc)	CALC	4407053	N/A	2016/03/10	Automated Statchk
Organic carbon - Total (TOC)	TECH	4409460	N/A	2016/03/08	Soraya Merchant
Turbidity	TURB	4409161	N/A	2016/03/08	Tiffany Morash

Maxxam ID: BYY311
Sample ID: PW4
Matrix: Water

Collected: 2016/03/04
Shipped:
Received: 2016/03/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Carbonate, Bicarbonate and Hydroxide	CALC	4407046	N/A	2016/03/09	Automated Statchk
Alkalinity	KONE	4408316	N/A	2016/03/08	Nancy Rogers
Chloride	KONE	4408337	N/A	2016/03/08	Nancy Rogers
Colour	KONE	4408356	N/A	2016/03/08	Nancy Rogers
Conductance - water	AT	4408764	N/A	2016/03/08	Tiffany Morash
Hardness (calculated as CaCO3)		4407047	N/A	2016/03/10	Automated Statchk
Metals Water Total MS	CICP/MS	4410442	2016/03/09	2016/03/09	Mike Leblanc
Ion Balance (% Difference)	CALC	4407048	N/A	2016/03/10	Automated Statchk

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Maxxam Job #: B645502
Report Date: 2016/03/10

Englobe Corp.
Client Project #: 20814

TEST SUMMARY

Maxxam ID: BYY311
Sample ID: PW4
Matrix: Water

Collected: 2016/03/04
Shipped:
Received: 2016/03/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Anion and Cation Sum	CALC	4407049	N/A	2016/03/10	Automated Statchk
Nitrogen Ammonia - water	KONE	4409752	N/A	2016/03/09	Soraya Merchant
Nitrogen - Nitrate + Nitrite	KONE	4408362	N/A	2016/03/09	Nancy Rogers
Nitrogen - Nitrite	KONE	4408366	N/A	2016/03/09	Nancy Rogers
Nitrogen - Nitrate (as N)	CALC	4407050	N/A	2016/03/10	Automated Statchk
pH	AT	4408767	N/A	2016/03/08	Tiffany Morash
Phosphorus - ortho	KONE	4408360	N/A	2016/03/08	Nancy Rogers
Sat. pH and Langelier Index (@ 20C)	CALC	4407051	N/A	2016/03/10	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	4407052	N/A	2016/03/10	Automated Statchk
Reactive Silica	KONE	4408346	N/A	2016/03/08	Nancy Rogers
Sulphate	KONE	4408341	N/A	2016/03/08	Nancy Rogers
Total Dissolved Solids (TDS calc)	CALC	4407053	N/A	2016/03/10	Automated Statchk
Organic carbon - Total (TOC)	TECH	4409460	N/A	2016/03/08	Soraya Merchant
Turbidity	TURB	4409161	N/A	2016/03/08	Tiffany Morash

Maxxam ID: BYY312
Sample ID: PW5
Matrix: Water

Collected: 2016/03/04
Shipped:
Received: 2016/03/04

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Carbonate, Bicarbonate and Hydroxide	CALC	4407046	N/A	2016/03/09	Automated Statchk
Alkalinity	KONE	4408316	N/A	2016/03/08	Nancy Rogers
Chloride	KONE	4408337	N/A	2016/03/08	Nancy Rogers
Colour	KONE	4408356	N/A	2016/03/08	Nancy Rogers
Conductance - water	AT	4408764	N/A	2016/03/08	Tiffany Morash
Hardness (calculated as CaCO3)		4407047	N/A	2016/03/10	Automated Statchk
Metals Water Total MS	CICP/MS	4410442	2016/03/09	2016/03/09	Mike Leblanc
Ion Balance (% Difference)	CALC	4407048	N/A	2016/03/10	Automated Statchk
Anion and Cation Sum	CALC	4407049	N/A	2016/03/10	Automated Statchk
Nitrogen Ammonia - water	KONE	4409752	N/A	2016/03/09	Soraya Merchant
Nitrogen - Nitrate + Nitrite	KONE	4408362	N/A	2016/03/09	Nancy Rogers
Nitrogen - Nitrite	KONE	4408366	N/A	2016/03/09	Nancy Rogers
Nitrogen - Nitrate (as N)	CALC	4407050	N/A	2016/03/10	Automated Statchk
pH	AT	4408767	N/A	2016/03/08	Tiffany Morash
Phosphorus - ortho	KONE	4408360	N/A	2016/03/08	Nancy Rogers
Sat. pH and Langelier Index (@ 20C)	CALC	4407051	N/A	2016/03/10	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	4407052	N/A	2016/03/10	Automated Statchk
Reactive Silica	KONE	4408346	N/A	2016/03/08	Nancy Rogers
Sulphate	KONE	4408341	N/A	2016/03/08	Nancy Rogers
Total Dissolved Solids (TDS calc)	CALC	4407053	N/A	2016/03/10	Automated Statchk
Organic carbon - Total (TOC)	TECH	4409460	N/A	2016/03/08	Soraya Merchant
Turbidity	TURB	4409161	N/A	2016/03/08	Tiffany Morash

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GENERAL COMMENTS

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

Package 1	5.0°C

Sample BYY310-01 : Poor RCAp Ion Balance due to sample matrix. Excess cations due to presence of turbidity.

Results relate only to the items tested.

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B645502
Report Date: 2016/03/10

Englobe Corp.
Client Project #: 20814

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4408316	NRG	Matrix Spike	Total Alkalinity (Total as CaCO3)	2016/03/08		NC	%	80 - 120
4408316	NRG	Spiked Blank	Total Alkalinity (Total as CaCO3)	2016/03/08		102	%	80 - 120
4408316	NRG	Method Blank	Total Alkalinity (Total as CaCO3)	2016/03/08	<5.0		mg/L	
4408316	NRG	RPD - Sample/Sample Dup	Total Alkalinity (Total as CaCO3)	2016/03/08	1.2		%	25
4408337	NRG	Matrix Spike	Dissolved Chloride (Cl)	2016/03/08		NC	%	80 - 120
4408337	NRG	QC Standard	Dissolved Chloride (Cl)	2016/03/08		102	%	80 - 120
4408337	NRG	Spiked Blank	Dissolved Chloride (Cl)	2016/03/08		106	%	80 - 120
4408337	NRG	Method Blank	Dissolved Chloride (Cl)	2016/03/08	<1.0		mg/L	
4408337	NRG	RPD - Sample/Sample Dup	Dissolved Chloride (Cl)	2016/03/08	7.7		%	25
4408341	NRG	Matrix Spike	Dissolved Sulphate (SO4)	2016/03/08		NC	%	80 - 120
4408341	NRG	Spiked Blank	Dissolved Sulphate (SO4)	2016/03/08		113	%	80 - 120
4408341	NRG	Method Blank	Dissolved Sulphate (SO4)	2016/03/08	<2.0		mg/L	
4408341	NRG	RPD - Sample/Sample Dup	Dissolved Sulphate (SO4)	2016/03/08	2.5		%	25
4408346	NRG	Matrix Spike	Reactive Silica (SiO2)	2016/03/08		96	%	80 - 120
4408346	NRG	Spiked Blank	Reactive Silica (SiO2)	2016/03/08		102	%	80 - 120
4408346	NRG	Method Blank	Reactive Silica (SiO2)	2016/03/08	<0.50		mg/L	
4408346	NRG	RPD - Sample/Sample Dup	Reactive Silica (SiO2)	2016/03/08	14		%	25
4408356	NRG	Spiked Blank	Colour	2016/03/08		113	%	80 - 120
4408356	NRG	Method Blank	Colour	2016/03/08	<5.0		TCU	
4408356	NRG	RPD - Sample/Sample Dup	Colour	2016/03/08	NC		%	20
4408360	NRG	Matrix Spike	Orthophosphate (P)	2016/03/08		89	%	80 - 120
4408360	NRG	Spiked Blank	Orthophosphate (P)	2016/03/08		97	%	80 - 120
4408360	NRG	Method Blank	Orthophosphate (P)	2016/03/08	<0.010		mg/L	
4408360	NRG	RPD - Sample/Sample Dup	Orthophosphate (P)	2016/03/08	NC		%	25
4408362	NRG	Matrix Spike	Nitrate + Nitrite (N)	2016/03/09		103	%	80 - 120
4408362	NRG	Spiked Blank	Nitrate + Nitrite (N)	2016/03/09		103	%	80 - 120
4408362	NRG	Method Blank	Nitrate + Nitrite (N)	2016/03/09	<0.050		mg/L	
4408362	NRG	RPD - Sample/Sample Dup	Nitrate + Nitrite (N)	2016/03/09	0.81		%	25
4408366	NRG	Matrix Spike	Nitrite (N)	2016/03/09		NC	%	80 - 120
4408366	NRG	Spiked Blank	Nitrite (N)	2016/03/09		90	%	80 - 120
4408366	NRG	Method Blank	Nitrite (N)	2016/03/09	<0.010		mg/L	
4408366	NRG	RPD - Sample/Sample Dup	Nitrite (N)	2016/03/09	0.39		%	25
4408764	TMO	Spiked Blank	Conductivity	2016/03/08		103	%	80 - 120
4408764	TMO	Method Blank	Conductivity	2016/03/08	2.1, RDL=1.0		uS/cm	
4408764	TMO	RPD - Sample/Sample Dup	Conductivity	2016/03/08	0.59		%	25
4408767	TMO	QC Standard	pH	2016/03/08		100	%	97 - 103
4408767	TMO	RPD - Sample/Sample Dup	pH	2016/03/08	0.48		%	N/A
4409161	TMO	QC Standard	Turbidity	2016/03/08		98	%	80 - 120
4409161	TMO	Method Blank	Turbidity	2016/03/08	<0.10		NTU	
4409161	TMO	RPD - Sample/Sample Dup	Turbidity	2016/03/08	NC		%	20
4409460	SMT	Matrix Spike	Total Organic Carbon (C)	2016/03/08		NC	%	80 - 120
4409460	SMT	Spiked Blank	Total Organic Carbon (C)	2016/03/08		96	%	80 - 120
4409460	SMT	Method Blank	Total Organic Carbon (C)	2016/03/08	<0.50		mg/L	
4409460	SMT	RPD - Sample/Sample Dup	Total Organic Carbon (C)	2016/03/08	NC		%	20
4409752	SMT	Matrix Spike	Nitrogen (Ammonia Nitrogen)	2016/03/09		90	%	80 - 120
4409752	SMT	Spiked Blank	Nitrogen (Ammonia Nitrogen)	2016/03/09		95	%	80 - 120
4409752	SMT	Method Blank	Nitrogen (Ammonia Nitrogen)	2016/03/09	<0.050		mg/L	
4409752	SMT	RPD - Sample/Sample Dup	Nitrogen (Ammonia Nitrogen)	2016/03/09	NC		%	20
4410442	MLB	Matrix Spike	Total Aluminum (Al)	2016/03/09		NC	%	80 - 120
			Total Antimony (Sb)	2016/03/09		100	%	80 - 120
			Total Arsenic (As)	2016/03/09		97	%	80 - 120
			Total Barium (Ba)	2016/03/09		95	%	80 - 120
			Total Beryllium (Be)	2016/03/09		96	%	80 - 120

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Total Bismuth (Bi)	2016/03/09		99	%	80 - 120
			Total Boron (B)	2016/03/09		99	%	80 - 120
			Total Cadmium (Cd)	2016/03/09		98	%	80 - 120
			Total Calcium (Ca)	2016/03/09		99	%	80 - 120
			Total Chromium (Cr)	2016/03/09		97	%	80 - 120
			Total Cobalt (Co)	2016/03/09		98	%	80 - 120
			Total Copper (Cu)	2016/03/09		95	%	80 - 120
			Total Iron (Fe)	2016/03/09		101	%	80 - 120
			Total Lead (Pb)	2016/03/09		95	%	80 - 120
			Total Magnesium (Mg)	2016/03/09		NC	%	80 - 120
			Total Manganese (Mn)	2016/03/09		99	%	80 - 120
			Total Molybdenum (Mo)	2016/03/09		100	%	80 - 120
			Total Nickel (Ni)	2016/03/09		99	%	80 - 120
			Total Phosphorus (P)	2016/03/09		103	%	80 - 120
			Total Potassium (K)	2016/03/09		100	%	80 - 120
			Total Selenium (Se)	2016/03/09		99	%	80 - 120
			Total Silver (Ag)	2016/03/09		97	%	80 - 120
			Total Sodium (Na)	2016/03/09		NC	%	80 - 120
			Total Strontium (Sr)	2016/03/09		NC	%	80 - 120
			Total Thallium (Tl)	2016/03/09		97	%	80 - 120
			Total Tin (Sn)	2016/03/09		101	%	80 - 120
			Total Titanium (Ti)	2016/03/09		101	%	80 - 120
			Total Uranium (U)	2016/03/09		105	%	80 - 120
			Total Vanadium (V)	2016/03/09		98	%	80 - 120
			Total Zinc (Zn)	2016/03/09		97	%	80 - 120
4410442	MLB	Spiked Blank	Total Aluminum (Al)	2016/03/09		99	%	80 - 120
			Total Antimony (Sb)	2016/03/09		95	%	80 - 120
			Total Arsenic (As)	2016/03/09		93	%	80 - 120
			Total Barium (Ba)	2016/03/09		92	%	80 - 120
			Total Beryllium (Be)	2016/03/09		92	%	80 - 120
			Total Bismuth (Bi)	2016/03/09		99	%	80 - 120
			Total Boron (B)	2016/03/09		94	%	80 - 120
			Total Cadmium (Cd)	2016/03/09		94	%	80 - 120
			Total Calcium (Ca)	2016/03/09		96	%	80 - 120
			Total Chromium (Cr)	2016/03/09		94	%	80 - 120
			Total Cobalt (Co)	2016/03/09		95	%	80 - 120
			Total Copper (Cu)	2016/03/09		94	%	80 - 120
			Total Iron (Fe)	2016/03/09		99	%	80 - 120
			Total Lead (Pb)	2016/03/09		95	%	80 - 120
			Total Magnesium (Mg)	2016/03/09		99	%	80 - 120
			Total Manganese (Mn)	2016/03/09		96	%	80 - 120
			Total Molybdenum (Mo)	2016/03/09		96	%	80 - 120
			Total Nickel (Ni)	2016/03/09		95	%	80 - 120
			Total Phosphorus (P)	2016/03/09		99	%	80 - 120
			Total Potassium (K)	2016/03/09		98	%	80 - 120
			Total Selenium (Se)	2016/03/09		95	%	80 - 120
			Total Silver (Ag)	2016/03/09		95	%	80 - 120
			Total Sodium (Na)	2016/03/09		99	%	80 - 120
			Total Strontium (Sr)	2016/03/09		95	%	80 - 120
			Total Thallium (Tl)	2016/03/09		96	%	80 - 120
			Total Tin (Sn)	2016/03/09		96	%	80 - 120
			Total Titanium (Ti)	2016/03/09		96	%	80 - 120
			Total Uranium (U)	2016/03/09		102	%	80 - 120
			Total Vanadium (V)	2016/03/09		95	%	80 - 120

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Total Zinc (Zn)	2016/03/09		95	%	80 - 120
4410442	MLB	Method Blank	Total Aluminum (Al)	2016/03/09	5.0, RDL=5.0		ug/L	
			Total Antimony (Sb)	2016/03/09	<1.0		ug/L	
			Total Arsenic (As)	2016/03/09	<1.0		ug/L	
			Total Barium (Ba)	2016/03/09	<1.0		ug/L	
			Total Beryllium (Be)	2016/03/09	<1.0		ug/L	
			Total Bismuth (Bi)	2016/03/09	<2.0		ug/L	
			Total Boron (B)	2016/03/09	<50		ug/L	
			Total Cadmium (Cd)	2016/03/09	<0.010		ug/L	
			Total Calcium (Ca)	2016/03/09	<100		ug/L	
			Total Chromium (Cr)	2016/03/09	<1.0		ug/L	
			Total Cobalt (Co)	2016/03/09	<0.40		ug/L	
			Total Copper (Cu)	2016/03/09	<2.0		ug/L	
			Total Iron (Fe)	2016/03/09	<50		ug/L	
			Total Lead (Pb)	2016/03/09	<0.50		ug/L	
			Total Magnesium (Mg)	2016/03/09	<100		ug/L	
			Total Manganese (Mn)	2016/03/09	<2.0		ug/L	
			Total Molybdenum (Mo)	2016/03/09	<2.0		ug/L	
			Total Nickel (Ni)	2016/03/09	<2.0		ug/L	
			Total Phosphorus (P)	2016/03/09	<100		ug/L	
			Total Potassium (K)	2016/03/09	<100		ug/L	
			Total Selenium (Se)	2016/03/09	<1.0		ug/L	
			Total Silver (Ag)	2016/03/09	<0.10		ug/L	
			Total Sodium (Na)	2016/03/09	<100		ug/L	
			Total Strontium (Sr)	2016/03/09	<2.0		ug/L	
			Total Thallium (Tl)	2016/03/09	<0.10		ug/L	
			Total Tin (Sn)	2016/03/09	<2.0		ug/L	
			Total Titanium (Ti)	2016/03/09	<2.0		ug/L	
			Total Uranium (U)	2016/03/09	<0.10		ug/L	
			Total Vanadium (V)	2016/03/09	<2.0		ug/L	
			Total Zinc (Zn)	2016/03/09	<5.0		ug/L	
4410442	MLB	RPD - Sample/Sample Dup	Total Iron (Fe)	2016/03/09	NC		%	20
			Total Nickel (Ni)	2016/03/09	NC		%	20
			Total Vanadium (V)	2016/03/09	NC		%	20

N/A = Not Applicable

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

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration).

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

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VALIDATION SIGNATURE PAGE

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

Original Signed

Mike MacGillivray, Scientific Specialist (Inorganics)

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

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200 Bluewater Road, Bedford, Nova Scotia Canada B4B 1G9 Tel:(902) 420-0203 Toll-Free:(800) 565-7227 Fax:(902) 420-8612 www.maxxam.ca

Chain Of Custody Record

Page 1 of 1

INVOICE TO:		Report Information		Project Information		Laboratory Use Only	
Company Name	#41009 Englobe Corp.	Company Name		Quotation #	B42284	Maxxam Job #	Bottle Order #:
Contact Name	Accounts Payable	Contact Name	Lisa Ladouceur / Aven Cole	P.O. #		B045502	550949
Address	97 Troop Ave Dartmouth NS B3B 2A7	Address		Project #	20814	Chain Of Custody Record	Project Manager
Phone	(902) 468-6486 Fax (902) 468-4919	Phone	Fax	Project Name		C#550949-01-01	Avery Withrow
Email	Dartmouth.AP@englobecorp.com	Email	lisa.ladouceur@englobecorp.com	Site #			
				Sampled By			

Regulatory Criteria:

Special Instructions

** Specify Matrix: Surface/Ground/Tapwater/Sewage/Effluent/Seawater Potable/Nonpotable/Tissue/Soil/Sludge/Metal

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

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

Turnaround Time (TAT) Required:

Please provide advance notice for rush projects

Regular (Standard) TAT: (will be applied if Rush TAT is not specified): X

Standard TAT = 5-7 Working days for most tests.

Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

Job Specific Rush TAT (if applies to entire submission)

Date Required: Time Required:

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered & Preserved	Lab Filtration Required	RCAp-MS Total Metals in Water	VOCs	Bromide	Fluoride	E. coli	HPC	Total Coliforms				# of Bottles	Comments / Hazards / Other Required Analysis
1		PW1	3/4/16		PW			X										2x200 1x100	1x120
2		PW2						X											
3		PW3						X											
4		PW4						X											
5		~~PW~~		10h15	GW			~~X~~											
6		~~DUP~~			PW			~~X~~											
7		~~Well 3 72 hr~~		10h05				X	X	X	X	X	X					2x500 2x200 2x100	1x120 3x10
8		~~Well 4 72 hr~~		10h00				X	X		X	X	X						
9		PW5			PW			X										1x200 1x100	1x120
10																			

2016 MAR 4 12:14

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted	Lab Use Only: Time Sensitive	Temperature (°C) on Receipt	Custody Seal Intact on Cooler?
Original Signed	16/3/3		Original Signed				X	5, 5, 5	Yes / No

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

White: Maxxam Yellow: Client

Maxxam Analytics International Corporation o/a Maxxam Analytics

Maxxam
A Bureau Veritas Group Company

Your Project #: 20814
Your C.O.C. #: B 159530

Attention:Aven Cole

Englobe Corp.
97 Troop Ave
Dartmouth, NS
CANADA B3B 2A7

Report Date: 2016/03/15
Report #: R3930978
Version: 2 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B643669
Received: 2016/03/03, 12:59

Sample Matrix: Water
Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Carbonate, Bicarbonate and Hydroxide	3	N/A	2016/03/07	N/A	SM 22 4500-CO2 D
Carbonate, Bicarbonate and Hydroxide	1	N/A	2016/03/08	N/A	SM 22 4500-CO2 D
Alkalinity	4	N/A	2016/03/08	ATL SOP 00013	EPA 310.2 R1974 m
Anions (1)	2	N/A	2016/03/07	CAM SOP-00435	SM 22 4110 B m
Chloride	4	N/A	2016/03/08	ATL SOP 00014	SM 22 4500-Cl- E m
TC/EC Non Drinking Water CFU/100mL	2	N/A	2016/03/04	ATL SOP 00096	OMOE E3407 V5.2
Colour	4	N/A	2016/03/08	ATL SOP 00020	SM 22 2120C m
Conductance - water	3	N/A	2016/03/07	ATL SOP 00004	SM 22 2510B m
Conductance - water	1	N/A	2016/03/11	ATL SOP 00004	SM 22 2510B m
Fluoride	2	N/A	2016/03/07	ATL SOP 00043	SM 22 4500-F- C m
Hardness (calculated as CaCO3)	4	N/A	2016/03/10	ATL SOP 00048	SM 22 2340 B
Metals Water Total MS	4	2016/03/09	2016/03/10	ATL SOP 00058	EPA 6020A R1 m
Ion Balance (% Difference)	4	N/A	2016/03/10		Auto Calc.
Anion and Cation Sum	4	N/A	2016/03/10		Auto Calc.
Nitrogen Ammonia - water	4	N/A	2016/03/07	ATL SOP 00015	EPA 350.1 R2 m
Nitrogen - Nitrate + Nitrite	4	N/A	2016/03/09	ATL SOP 00016	USGS SOPINCF0452.2 m
Nitrogen - Nitrite	4	N/A	2016/03/09	ATL SOP 00017	SM 22 4500-NO2- B m
Nitrogen - Nitrate (as N)	4	N/A	2016/03/10	ATL SOP 00018	ASTM D3867
pH (2)	3	N/A	2016/03/07	ATL SOP 00003	SM 22 4500-H+ B m
pH (2)	1	N/A	2016/03/08	ATL SOP 00003	SM 22 4500-H+ B m
Phosphorus - ortho	4	N/A	2016/03/08	ATL SOP 00021	EPA 365.2 m
Sat. pH and Langelier Index (@ 20C)	4	N/A	2016/03/10	ATL SOP 00049	Auto Calc.
Sat. pH and Langelier Index (@ 4C)	4	N/A	2016/03/10	ATL SOP 00049	Auto Calc.
Reactive Silica	3	N/A	2016/03/08	ATL SOP 00022	EPA 366.0 m
Reactive Silica	1	N/A	2016/03/09	ATL SOP 00022	EPA 366.0 m
Sulphate	4	N/A	2016/03/08	ATL SOP 00023	ASTMD516-11 m
Total Dissolved Solids (TDS calc)	4	N/A	2016/03/10		Auto Calc.
Organic carbon - Total (TOC) (3)	4	N/A	2016/03/15	ATL SOP 00037	SM 22 5310C m
Turbidity	4	N/A	2016/03/07	ATL SOP 00011	EPA 180.1 R2 m
Volatile Organic Compounds in Water	2	N/A	2016/03/07	ATL SOP 00133	EPA 8260C R3 m

Your Project #: 20814
Your C.O.C. #: B 159530

Attention:Aven Cole

Englobe Corp.
97 Troop Ave
Dartmouth, NS
CANADA B3B 2A7

Report Date: 2016/03/15
Report #: R3930978
Version: 2 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B643669

Received: 2016/03/03, 12:59

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

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

(1) This test was performed by Maxxam Analytics Mississauga
(2) The APHA Standard Method require pH to be analyzed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the APHA Standard Method holding time.
(3) TOC / DOC present in the sample should be considered as non-purgeable TOC / DOC.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Avery Withrow, Project Manager
Email: AWithrow@maxxam.ca
Phone# (902)420-0203 Ext:233

==========

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

Maxxam Job #: B643669
Report Date: 2016/03/15

Englobe Corp.
Client Project #: 20814

ATLANTIC RCAP-MS TOTAL METALS IN WATER (WATER)

Maxxam ID		BYO985		BYO986			BYO987			
Sampling Date		2016/03/03 10:05		2016/03/03 10:00			2016/03/03 10:15			
COC Number		B 159530		B 159530			B 159530			
	UNITS	WELL 3 - 72 HR	RDL	WELL 4 - 72 HR	RDL	QC Batch	P1	RDL	QC Batch	MDL
Calculated Parameters										
Anion Sum	me/L	3.94	N/A	5.43	N/A	4403097	0.140	N/A	4403097	N/A
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	24	1.0	27	1.0	4403093	<1.0	1.0	4403093	0.20
Calculated TDS	mg/L	240	1.0	320	1.0	4403102	11	1.0	4403102	0.20
Carb. Alkalinity (calc. as CaCO3)	mg/L	<1.0	1.0	<1.0	1.0	4403093	<1.0	1.0	4403093	0.20
Cation Sum	me/L	3.59	N/A	5.24	N/A	4403097	0.330	N/A	4403097	N/A
Hardness (CaCO3)	mg/L	120	1.0	170	1.0	4403881	6.2	1.0	4403881	1.0
Ion Balance (% Difference)	%	4.65	N/A	1.78	N/A	4403096	40.4	N/A	4403096	N/A
Langelier Index (@ 20C)	N/A	-1.66		-1.35		4403100	NC		4403100	
Langelier Index (@ 4C)	N/A	-1.91		-1.60		4403101	NC		4403101	
Nitrate (N)	mg/L	<0.050	0.050	<0.050	0.050	4403098	<0.050	0.050	4403906	N/A
Saturation pH (@ 20C)	N/A	8.41		8.25		4403100	NC		4403100	
Saturation pH (@ 4C)	N/A	8.66		8.49		4403101	NC		4403101	
Inorganics										
Total Alkalinity (Total as CaCO3)	mg/L	24	5.0	27	5.0	4408316	<5.0	5.0	4408851	N/A
Dissolved Chloride (Cl)	mg/L	120	1.0	170	1.0	4408337	4.9	1.0	4408858	N/A
Colour	TCU	<5.0	5.0	<5.0	5.0	4408356	220	25	4408866	N/A
Nitrate + Nitrite (N)	mg/L	<0.050	0.050	<0.050	0.050	4408362	<0.050	0.050	4408870	N/A
Nitrite (N)	mg/L	<0.010	0.010	<0.010	0.010	4408366	<0.010	0.010	4408878	N/A
Nitrogen (Ammonia Nitrogen)	mg/L	0.23	0.050	0.12	0.050	4407708	0.31	0.050	4407708	N/A
Total Organic Carbon (C)	mg/L	<0.50	0.50	<0.50	0.50	4417833	<50 (1)	50	4417833	N/A
Orthophosphate (P)	mg/L	0.38	0.010	0.27	0.010	4408360	0.012	0.010	4408884	N/A
pH	pH	6.75	N/A	6.90	N/A	4407314	4.11	N/A	4408976	N/A
Reactive Silica (SiO2)	mg/L	27	1.0	23	0.50	4408346	0.71	0.50	4409098	N/A
Dissolved Sulphate (SO4)	mg/L	6.7	2.0	7.5	2.0	4408341	<2.0	2.0	4408861	N/A
Turbidity	NTU	<0.10	0.10	0.73	0.10	4407724	>1000	1.0	4407724	0.10
Conductivity	uS/cm	420	1.0	610	1.0	4407317	51	1.0	4414244	N/A
Metals										
Total Aluminum (Al)	ug/L	6.0	5.0	6.2	5.0	4410445	840	5.0	4410445	N/A
Total Antimony (Sb)	ug/L	<1.0	1.0	<1.0	1.0	4410445	<1.0	1.0	4410445	N/A
Total Arsenic (As)	ug/L	5.7	1.0	3.5	1.0	4410445	<1.0	1.0	4410445	N/A
Total Barium (Ba)	ug/L	340	1.0	330	1.0	4410445	15	1.0	4410445	N/A
Total Beryllium (Be)	ug/L	<1.0	1.0	<1.0	1.0	4410445	<1.0	1.0	4410445	N/A
Total Bismuth (Bi)	ug/L	<2.0	2.0	<2.0	2.0	4410445	<2.0	2.0	4410445	N/A

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
(1) Reporting limit was increased due to turbidity.

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Maxxam Job #: B643669
Report Date: 2016/03/15

Englobe Corp.
Client Project #: 20814

ATLANTIC RCAP-MS TOTAL METALS IN WATER (WATER)

Maxxam ID		BYO985		BYO986			BYO987			
Sampling Date		2016/03/03 10:05		2016/03/03 10:00			2016/03/03 10:15			
COC Number		B 159530		B 159530			B 159530			
	UNITS	WELL 3 - 72 HR	RDL	WELL 4 - 72 HR	RDL	QC Batch	P1	RDL	QC Batch	MDL
Total Boron (B)	ug/L	<50	50	<50	50	4410445	<50	50	4410445	N/A
Total Cadmium (Cd)	ug/L	0.010	0.010	0.026	0.010	4410445	0.12	0.010	4410445	N/A
Total Calcium (Ca)	ug/L	40000	100	57000	100	4410445	1400	100	4410445	N/A
Total Chromium (Cr)	ug/L	<1.0	1.0	<1.0	1.0	4410445	1.5	1.0	4410445	N/A
Total Cobalt (Co)	ug/L	<0.40	0.40	<0.40	0.40	4410445	<0.40	0.40	4410445	N/A
Total Copper (Cu)	ug/L	<2.0	2.0	<2.0	2.0	4410445	17	2.0	4410445	N/A
Total Iron (Fe)	ug/L	<50	50	120	50	4410445	660	50	4410445	N/A
Total Lead (Pb)	ug/L	<0.50	0.50	<0.50	0.50	4410445	4.2	0.50	4410445	N/A
Total Magnesium (Mg)	ug/L	4500	100	6300	100	4410445	660	100	4410445	N/A
Total Manganese (Mn)	ug/L	110	2.0	260	2.0	4410445	13	2.0	4410445	N/A
Total Molybdenum (Mo)	ug/L	<2.0	2.0	<2.0	2.0	4410445	<2.0	2.0	4410445	N/A
Total Nickel (Ni)	ug/L	<2.0	2.0	<2.0	2.0	4410445	<2.0	2.0	4410445	N/A
Total Phosphorus (P)	ug/L	390	100	330	100	4410445	170	100	4410445	N/A
Total Potassium (K)	ug/L	2700	100	4000	100	4410445	180	100	4410445	N/A
Total Selenium (Se)	ug/L	<1.0	1.0	<1.0	1.0	4410445	<1.0	1.0	4410445	N/A
Total Silver (Ag)	ug/L	<0.10	0.10	<0.10	0.10	4410445	<0.10	0.10	4410445	N/A
Total Sodium (Na)	ug/L	26000	100	41000	100	4410445	1700	100	4410445	N/A
Total Strontium (Sr)	ug/L	460	2.0	740	2.0	4410445	11	2.0	4410445	N/A
Total Thallium (Tl)	ug/L	<0.10	0.10	<0.10	0.10	4410445	<0.10	0.10	4410445	N/A
Total Tin (Sn)	ug/L	<2.0	2.0	<2.0	2.0	4410445	4.8	2.0	4410445	N/A
Total Titanium (Ti)	ug/L	<2.0	2.0	<2.0	2.0	4410445	17	2.0	4410445	N/A
Total Uranium (U)	ug/L	2.2	0.10	4.4	0.10	4410445	1.2	0.10	4410445	N/A
Total Vanadium (V)	ug/L	<2.0	2.0	<2.0	2.0	4410445	<2.0	2.0	4410445	N/A
Total Zinc (Zn)	ug/L	<5.0	5.0	<5.0	5.0	4410445	42	5.0	4410445	N/A

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Maxxam Job #: B643669
Report Date: 2016/03/15

Englobe Corp.
Client Project #: 20814

ATLANTIC RCAP-MS TOTAL METALS IN WATER (WATER)

Maxxam ID		BYO988	BYO988			
Sampling Date		2016/03/03 11:00	2016/03/03 11:00			
COC Number		B 159530	B 159530			
	UNITS	DW1	DW1 Lab-Dup	RDL	QC Batch	MDL
Calculated Parameters						
Anion Sum	me/L	0.690		N/A	4403097	N/A
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	8.5		1.0	4403905	0.20
Calculated TDS	mg/L	47		1.0	4403102	0.20
Carb. Alkalinity (calc. as CaCO3)	mg/L	<1.0		1.0	4403905	0.20
Cation Sum	me/L	0.670		N/A	4403097	N/A
Hardness (CaCO3)	mg/L	13		1.0	4403881	1.0
Ion Balance (% Difference)	%	1.47		N/A	4403096	N/A
Langelier Index (@ 20C)	N/A	-3.59			4403100	
Langelier Index (@ 4C)	N/A	-3.85			4403101	
Nitrate (N)	mg/L	<0.050		0.050	4403906	N/A
Saturation pH (@ 20C)	N/A	9.81			4403100	
Saturation pH (@ 4C)	N/A	10.1			4403101	
Inorganics						
Total Alkalinity (Total as CaCO3)	mg/L	8.5	8.9	5.0	4408851	N/A
Dissolved Chloride (Cl)	mg/L	14	15	1.0	4408858	N/A
Colour	TCU	<5.0	<5.0	5.0	4408866	N/A
Nitrate + Nitrite (N)	mg/L	<0.050	<0.050	0.050	4408870	N/A
Nitrite (N)	mg/L	<0.010	<0.010	0.010	4408878	N/A
Nitrogen (Ammonia Nitrogen)	mg/L	0.18		0.050	4407708	N/A
Total Organic Carbon (C)	mg/L	0.79		0.50	4417833	N/A
Orthophosphate (P)	mg/L	0.010	0.010	0.010	4408884	N/A
pH	pH	6.22		N/A	4407314	N/A
Reactive Silica (SiO2)	mg/L	7.5	8.1	0.50	4409098	N/A
Dissolved Sulphate (SO4)	mg/L	5.5	5.5	2.0	4408861	N/A
Turbidity	NTU	0.45		0.10	4407729	0.10
Conductivity	uS/cm	76		1.0	4407317	N/A
Metals						
Total Aluminum (Al)	ug/L	110		5.0	4410445	N/A
Total Antimony (Sb)	ug/L	<1.0		1.0	4410445	N/A
Total Arsenic (As)	ug/L	<1.0		1.0	4410445	N/A
Total Barium (Ba)	ug/L	36		1.0	4410445	N/A
Total Beryllium (Be)	ug/L	<1.0		1.0	4410445	N/A
Total Bismuth (Bi)	ug/L	<2.0		2.0	4410445	N/A

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable

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Maxxam Job #: B643669
Report Date: 2016/03/15

Englobe Corp.
Client Project #: 20814

ATLANTIC RCAP-MS TOTAL METALS IN WATER (WATER)

Maxxam ID		BYO988	BYO988			
Sampling Date		2016/03/03 11:00	2016/03/03 11:00			
COC Number		B 159530	B 159530			
	UNITS	DW1	DW1 Lab-Dup	RDL	QC Batch	MDL
Total Boron (B)	ug/L	<50		50	4410445	N/A
Total Cadmium (Cd)	ug/L	0.031		0.010	4410445	N/A
Total Calcium (Ca)	ug/L	3700		100	4410445	N/A
Total Chromium (Cr)	ug/L	<1.0		1.0	4410445	N/A
Total Cobalt (Co)	ug/L	<0.40		0.40	4410445	N/A
Total Copper (Cu)	ug/L	3.5		2.0	4410445	N/A
Total Iron (Fe)	ug/L	<50		50	4410445	N/A
Total Lead (Pb)	ug/L	<0.50		0.50	4410445	N/A
Total Magnesium (Mg)	ug/L	950		100	4410445	N/A
Total Manganese (Mn)	ug/L	16		2.0	4410445	N/A
Total Molybdenum (Mo)	ug/L	<2.0		2.0	4410445	N/A
Total Nickel (Ni)	ug/L	<2.0		2.0	4410445	N/A
Total Phosphorus (P)	ug/L	<100		100	4410445	N/A
Total Potassium (K)	ug/L	1800		100	4410445	N/A
Total Selenium (Se)	ug/L	<1.0		1.0	4410445	N/A
Total Silver (Ag)	ug/L	<0.10		0.10	4410445	N/A
Total Sodium (Na)	ug/L	8100		100	4410445	N/A
Total Strontium (Sr)	ug/L	17		2.0	4410445	N/A
Total Thallium (Tl)	ug/L	<0.10		0.10	4410445	N/A
Total Tin (Sn)	ug/L	<2.0		2.0	4410445	N/A
Total Titanium (Ti)	ug/L	<2.0		2.0	4410445	N/A
Total Uranium (U)	ug/L	0.16		0.10	4410445	N/A
Total Vanadium (V)	ug/L	<2.0		2.0	4410445	N/A
Total Zinc (Zn)	ug/L	<5.0		5.0	4410445	N/A

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

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ATLANTIC VOC IN WATER (WATER)

Maxxam ID		BYO985	BYO985	BYO986			
Sampling Date		2016/03/03 10:05	2016/03/03 10:05	2016/03/03 10:00			
COC Number		B 159530	B 159530	B 159530			
	UNITS	WELL 3 - 72 HR	WELL 3 - 72 HR Lab-Dup	WELL 4 - 72 HR	RDL	QC Batch	MDL
Chlorobenzenes							
1,2-Dichlorobenzene	ug/L	<0.50	<0.50	<0.50	0.50	4407282	N/A
1,3-Dichlorobenzene	ug/L	<1.0	<1.0	<1.0	1.0	4407282	N/A
1,4-Dichlorobenzene	ug/L	<1.0	<1.0	<1.0	1.0	4407282	N/A
Chlorobenzene	ug/L	<1.0	<1.0	<1.0	1.0	4407282	N/A
Volatile Organics							
1,1,1-Trichloroethane	ug/L	<1.0	<1.0	<1.0	1.0	4407282	N/A
1,1,2,2-Tetrachloroethane	ug/L	<0.50	<0.50	<0.50	0.50	4407282	N/A
1,1,2-Trichloroethane	ug/L	<1.0	<1.0	<1.0	1.0	4407282	N/A
1,1-Dichloroethane	ug/L	<2.0	<2.0	<2.0	2.0	4407282	N/A
1,1-Dichloroethylene	ug/L	<0.50	<0.50	<0.50	0.50	4407282	1.0
1,2-Dichloroethane	ug/L	<1.0	<1.0	<1.0	1.0	4407282	N/A
1,2-Dichloropropane	ug/L	<0.50	<0.50	<0.50	0.50	4407282	N/A
Benzene	ug/L	<1.0	<1.0	<1.0	1.0	4407282	N/A
Bromodichloromethane	ug/L	<1.0	<1.0	<1.0	1.0	4407282	0.20
Bromoform	ug/L	<1.0	<1.0	<1.0	1.0	4407282	0.20
Bromomethane	ug/L	<0.50	<0.50	<0.50	0.50	4407282	N/A
Carbon Tetrachloride	ug/L	<0.50	<0.50	<0.50	0.50	4407282	N/A
Chloroethane	ug/L	<8.0	<8.0	<8.0	8.0	4407282	N/A
Chloroform	ug/L	<1.0	<1.0	<1.0	1.0	4407282	0.20
Chloromethane	ug/L	<8.0	<8.0	<8.0	8.0	4407282	N/A
cis-1,2-Dichloroethylene	ug/L	<0.50	<0.50	<0.50	0.50	4407282	N/A
cis-1,3-Dichloropropene	ug/L	<0.50	<0.50	<0.50	0.50	4407282	N/A
Dibromochloromethane	ug/L	<1.0	<1.0	<1.0	1.0	4407282	0.20
Ethylbenzene	ug/L	<1.0	<1.0	<1.0	1.0	4407282	N/A
Ethylene Dibromide	ug/L	<0.20	<0.20	<0.20	0.20	4407282	0.50
Methylene Chloride(Dichloromethane)	ug/L	<3.0	<3.0	<3.0	3.0	4407282	N/A
o-Xylene	ug/L	<1.0	<1.0	<1.0	1.0	4407282	N/A
p+m-Xylene	ug/L	<2.0	<2.0	<2.0	2.0	4407282	N/A
Styrene	ug/L	<1.0	<1.0	<1.0	1.0	4407282	N/A
Tetrachloroethylene	ug/L	<1.0	<1.0	<1.0	1.0	4407282	N/A
Toluene	ug/L	<1.0	<1.0	1.1	1.0	4407282	N/A
trans-1,2-Dichloroethylene	ug/L	<0.50	<0.50	<0.50	0.50	4407282	N/A
trans-1,3-Dichloropropene	ug/L	<0.50	<0.50	<0.50	0.50	4407282	N/A

RDL = Reportable Detection Limit
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Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable

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ATLANTIC VOC IN WATER (WATER)

Maxxam ID		BYO985	BYO985	BYO986			
Sampling Date		2016/03/03 10:05	2016/03/03 10:05	2016/03/03 10:00			
COC Number		B 159530	B 159530	B 159530			
	UNITS	**WELL 3 - 72 HR**	**WELL 3 - 72 HR Lab-Dup**	**WELL 4 - 72 HR**	**RDL**	**QC Batch**	**MDL**
Trichloroethylene	ug/L	<1.0	<1.0	<1.0	1.0	4407282	N/A
Trichlorofluoromethane (FREON 11)	ug/L	<8.0	<8.0	<8.0	8.0	4407282	N/A
Vinyl Chloride	ug/L	<0.50	<0.50	<0.50	0.50	4407282	2.0
Surrogate Recovery (%)							
4-Bromofluorobenzene	%	100	99	99		4407282	
D4-1,2-Dichloroethane	%	95	98	96		4407282	
D8-Toluene	%	98	97	97		4407282	

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Maxxam Job #: B643669
Report Date: 2016/03/15

Englobe Corp.
Client Project #: 20814

RESULTS OF ANALYSES OF WATER

Maxxam ID		BYO985	BYO986			
Sampling Date		2016/03/03 10:05	2016/03/03 10:00			
COC Number		B 159530	B 159530			
	UNITS	WELL 3 - 72 HR	WELL 4 - 72 HR	RDL	QC Batch	MDL
Inorganics						
Dissolved Fluoride (F-)	mg/L	0.28	0.31	0.10	4407312	0.050
Bromide (Br-)	mg/L	<1.0	<1.0	1.0	4406780	N/A

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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MICROBIOLOGY (WATER)

Maxxam ID		BYO985	BYO986			
Sampling Date		2016/03/03 10:05	2016/03/03 10:00			
COC Number		B 159530	B 159530			
	UNITS	WELL 3 - 72 HR	WELL 4 - 72 HR	RDL	QC Batch	MDL
Microbiological						
Escherichia coli	CFU/100mL	<1.0	<1.0	1.0	4404941	N/A
Total Coliforms	CFU/100mL	<1.0	<1.0	1.0	4404941	N/A

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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Maxxam Job #: B643669
Report Date: 2016/03/15

Englobe Corp.
Client Project #: 20814

TEST SUMMARY

Maxxam ID: BYO985
Sample ID: WELL 3 - 72 HR
Matrix: Water

Collected: 2016/03/03
Shipped:
Received: 2016/03/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Carbonate, Bicarbonate and Hydroxide	CALC	4403093	N/A	2016/03/07	Automated Statchk
Alkalinity	KONE	4408316	N/A	2016/03/08	Nancy Rogers
Anions	IC	4406780	N/A	2016/03/07	Fari Dehdezi
Chloride	KONE	4408337	N/A	2016/03/08	Nancy Rogers
TC/EC Non Drinking Water CFU/100mL		4404941	N/A	2016/03/04	Jason Wang
Colour	KONE	4408356	N/A	2016/03/08	Nancy Rogers
Conductance - water	AT	4407317	N/A	2016/03/07	Tiffany Morash
Fluoride	AT	4407312	N/A	2016/03/07	Tiffany Morash
Hardness (calculated as CaCO3)		4403881	N/A	2016/03/10	Automated Statchk
Metals Water Total MS	CICP/MS	4410445	2016/03/09	2016/03/10	Bryon Angevine
Ion Balance (% Difference)	CALC	4403096	N/A	2016/03/10	Automated Statchk
Anion and Cation Sum	CALC	4403097	N/A	2016/03/10	Automated Statchk
Nitrogen Ammonia - water	KONE	4407708	N/A	2016/03/07	Nancy Rogers
Nitrogen - Nitrate + Nitrite	KONE	4408362	N/A	2016/03/09	Nancy Rogers
Nitrogen - Nitrite	KONE	4408366	N/A	2016/03/09	Nancy Rogers
Nitrogen - Nitrate (as N)	CALC	4403098	N/A	2016/03/10	Automated Statchk
pH	AT	4407314	N/A	2016/03/07	Tiffany Morash
Phosphorus - ortho	KONE	4408360	N/A	2016/03/08	Nancy Rogers
Sat. pH and Langelier Index (@ 20C)	CALC	4403100	N/A	2016/03/10	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	4403101	N/A	2016/03/10	Automated Statchk
Reactive Silica	KONE	4408346	N/A	2016/03/08	Nancy Rogers
Sulphate	KONE	4408341	N/A	2016/03/08	Nancy Rogers
Total Dissolved Solids (TDS calc)	CALC	4403102	N/A	2016/03/10	Automated Statchk
Organic carbon - Total (TOC)	TECH	4417833	N/A	2016/03/15	Soraya Merchant
Turbidity	TURB	4407724	N/A	2016/03/07	Tiffany Morash
Volatile Organic Compounds in Water	HS/MS	4407282	N/A	2016/03/07	Shawn Helmkay

Maxxam ID: BYO985 Dup
Sample ID: WELL 3 - 72 HR
Matrix: Water

Collected: 2016/03/03
Shipped:
Received: 2016/03/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Volatile Organic Compounds in Water	HS/MS	4407282	N/A	2016/03/07	Shawn Helmkay

Maxxam ID: BYO986
Sample ID: WELL 4 - 72 HR
Matrix: Water

Collected: 2016/03/03
Shipped:
Received: 2016/03/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Carbonate, Bicarbonate and Hydroxide	CALC	4403093	N/A	2016/03/07	Automated Statchk
Alkalinity	KONE	4408316	N/A	2016/03/08	Nancy Rogers
Anions	IC	4406780	N/A	2016/03/07	Fari Dehdezi
Chloride	KONE	4408337	N/A	2016/03/08	Nancy Rogers
TC/EC Non Drinking Water CFU/100mL		4404941	N/A	2016/03/04	Jason Wang
Colour	KONE	4408356	N/A	2016/03/08	Nancy Rogers
Conductance - water	AT	4407317	N/A	2016/03/07	Tiffany Morash

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Maxxam Job #: B643669
Report Date: 2016/03/15

Englobe Corp.
Client Project #: 20814

TEST SUMMARY

Maxxam ID: BYO986
Sample ID: WELL 4 - 72 HR
Matrix: Water

Collected: 2016/03/03
Shipped:
Received: 2016/03/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Fluoride	AT	4407312	N/A	2016/03/07	Tiffany Morash
Hardness (calculated as CaCO3)		4403881	N/A	2016/03/10	Automated Statchk
Metals Water Total MS	CICP/MS	4410445	2016/03/09	2016/03/10	Bryon Angevine
Ion Balance (% Difference)	CALC	4403096	N/A	2016/03/10	Automated Statchk
Anion and Cation Sum	CALC	4403097	N/A	2016/03/10	Automated Statchk
Nitrogen Ammonia - water	KONE	4407708	N/A	2016/03/07	Nancy Rogers
Nitrogen - Nitrate + Nitrite	KONE	4408362	N/A	2016/03/09	Nancy Rogers
Nitrogen - Nitrite	KONE	4408366	N/A	2016/03/09	Nancy Rogers
Nitrogen - Nitrate (as N)	CALC	4403098	N/A	2016/03/10	Automated Statchk
pH	AT	4407314	N/A	2016/03/07	Tiffany Morash
Phosphorus - ortho	KONE	4408360	N/A	2016/03/08	Nancy Rogers
Sat. pH and Langelier Index (@ 20C)	CALC	4403100	N/A	2016/03/10	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	4403101	N/A	2016/03/10	Automated Statchk
Reactive Silica	KONE	4408346	N/A	2016/03/08	Nancy Rogers
Sulphate	KONE	4408341	N/A	2016/03/08	Nancy Rogers
Total Dissolved Solids (TDS calc)	CALC	4403102	N/A	2016/03/10	Automated Statchk
Organic carbon - Total (TOC)	TECH	4417833	N/A	2016/03/15	Soraya Merchant
Turbidity	TURB	4407724	N/A	2016/03/07	Tiffany Morash
Volatile Organic Compounds in Water	HS/MS	4407282	N/A	2016/03/07	Shawn Helmkay

Maxxam ID: BYO987
Sample ID: P1
Matrix: Water

Collected: 2016/03/03
Shipped:
Received: 2016/03/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Carbonate, Bicarbonate and Hydroxide	CALC	4403093	N/A	2016/03/08	Automated Statchk
Alkalinity	KONE	4408851	N/A	2016/03/08	Nancy Rogers
Chloride	KONE	4408858	N/A	2016/03/08	Nancy Rogers
Colour	KONE	4408866	N/A	2016/03/08	Nancy Rogers
Conductance - water	AT	4414244	N/A	2016/03/11	Tammy Peters
Hardness (calculated as CaCO3)		4403881	N/A	2016/03/10	Automated Statchk
Metals Water Total MS	CICP/MS	4410445	2016/03/09	2016/03/10	Bryon Angevine
Ion Balance (% Difference)	CALC	4403096	N/A	2016/03/10	Automated Statchk
Anion and Cation Sum	CALC	4403097	N/A	2016/03/10	Automated Statchk
Nitrogen Ammonia - water	KONE	4407708	N/A	2016/03/07	Nancy Rogers
Nitrogen - Nitrate + Nitrite	KONE	4408870	N/A	2016/03/09	Nancy Rogers
Nitrogen - Nitrite	KONE	4408878	N/A	2016/03/09	Nancy Rogers
Nitrogen - Nitrate (as N)	CALC	4403906	N/A	2016/03/10	Automated Statchk
pH	AT	4408976	N/A	2016/03/08	Tammy Peters
Phosphorus - ortho	KONE	4408884	N/A	2016/03/08	Nancy Rogers
Sat. pH and Langelier Index (@ 20C)	CALC	4403100	N/A	2016/03/10	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	4403101	N/A	2016/03/10	Automated Statchk
Reactive Silica	KONE	4409098	N/A	2016/03/09	Nancy Rogers
Sulphate	KONE	4408861	N/A	2016/03/08	Nancy Rogers
Total Dissolved Solids (TDS calc)	CALC	4403102	N/A	2016/03/10	Automated Statchk
Organic carbon - Total (TOC)	TECH	4417833	N/A	2016/03/15	Soraya Merchant

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Maxxam Job #: B643669
Report Date: 2016/03/15

Englobe Corp.
Client Project #: 20814

TEST SUMMARY

Maxxam ID: BYO987
Sample ID: P1
Matrix: Water

Collected: 2016/03/03
Shipped:
Received: 2016/03/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Turbidity	TURB	4407724	N/A	2016/03/07	Tiffany Morash

Maxxam ID: BYO988
Sample ID: DW1
Matrix: Water

Collected: 2016/03/03
Shipped:
Received: 2016/03/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Carbonate, Bicarbonate and Hydroxide	CALC	4403905	N/A	2016/03/07	Automated Statchk
Alkalinity	KONE	4408851	N/A	2016/03/08	Nancy Rogers
Chloride	KONE	4408858	N/A	2016/03/08	Nancy Rogers
Colour	KONE	4408866	N/A	2016/03/08	Nancy Rogers
Conductance - water	AT	4407317	N/A	2016/03/07	Tiffany Morash
Hardness (calculated as CaCO3)		4403881	N/A	2016/03/10	Automated Statchk
Metals Water Total MS	CICP/MS	4410445	2016/03/09	2016/03/10	Bryon Angevine
Ion Balance (% Difference)	CALC	4403096	N/A	2016/03/10	Automated Statchk
Anion and Cation Sum	CALC	4403097	N/A	2016/03/10	Automated Statchk
Nitrogen Ammonia - water	KONE	4407708	N/A	2016/03/07	Nancy Rogers
Nitrogen - Nitrate + Nitrite	KONE	4408870	N/A	2016/03/09	Nancy Rogers
Nitrogen - Nitrite	KONE	4408878	N/A	2016/03/09	Nancy Rogers
Nitrogen - Nitrate (as N)	CALC	4403906	N/A	2016/03/10	Automated Statchk
pH	AT	4407314	N/A	2016/03/07	Tiffany Morash
Phosphorus - ortho	KONE	4408884	N/A	2016/03/08	Nancy Rogers
Sat. pH and Langelier Index (@ 20C)	CALC	4403100	N/A	2016/03/10	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	4403101	N/A	2016/03/10	Automated Statchk
Reactive Silica	KONE	4409098	N/A	2016/03/08	Nancy Rogers
Sulphate	KONE	4408861	N/A	2016/03/08	Nancy Rogers
Total Dissolved Solids (TDS calc)	CALC	4403102	N/A	2016/03/10	Automated Statchk
Organic carbon - Total (TOC)	TECH	4417833	N/A	2016/03/15	Soraya Merchant
Turbidity	TURB	4407729	N/A	2016/03/07	Tiffany Morash

Maxxam ID: BYO988 Dup
Sample ID: DW1
Matrix: Water

Collected: 2016/03/03
Shipped:
Received: 2016/03/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	KONE	4408851	N/A	2016/03/08	Nancy Rogers
Chloride	KONE	4408858	N/A	2016/03/08	Nancy Rogers
Colour	KONE	4408866	N/A	2016/03/08	Nancy Rogers
Nitrogen - Nitrate + Nitrite	KONE	4408870	N/A	2016/03/09	Nancy Rogers
Nitrogen - Nitrite	KONE	4408878	N/A	2016/03/09	Nancy Rogers
Phosphorus - ortho	KONE	4408884	N/A	2016/03/08	Nancy Rogers
Reactive Silica	KONE	4409098	N/A	2016/03/08	Nancy Rogers
Sulphate	KONE	4408861	N/A	2016/03/08	Nancy Rogers

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GENERAL COMMENTS

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

Package 1	4.7°C

Sample BYO987-01 : RCAp Ion Balance acceptable. Anion/cation agreement within 0.2 meq/L.

Results relate only to the items tested.

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Maxxam Job #: B643669
Report Date: 2016/03/15

Englobe Corp.
Client Project #: 20814

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4404941	JWA	Method Blank	Escherichia coli	2016/03/04	<1.0		CFU/100	
			Total Coliforms	2016/03/04	<1.0		CFU/100	
4406780	FD	Matrix Spike	Bromide (Br-)	2016/03/07		94	%	80 - 120
4406780	FD	Spiked Blank	Bromide (Br-)	2016/03/07		97	%	80 - 120
4406780	FD	Method Blank	Bromide (Br-)	2016/03/07	<1.0		mg/L	
4407282	SHL	Matrix Spike(BYO986)	1,2-Dichlorobenzene	2016/03/07		90	%	70 - 130
			1,3-Dichlorobenzene	2016/03/07		89	%	70 - 130
			1,4-Dichlorobenzene	2016/03/07		88	%	70 - 130
			Chlorobenzene	2016/03/07		93	%	70 - 130
			1,1,1-Trichloroethane	2016/03/07		106	%	70 - 130
			1,1,2,2-Tetrachloroethane	2016/03/07		97	%	70 - 130
			1,1,2-Trichloroethane	2016/03/07		98	%	70 - 130
			1,1-Dichloroethane	2016/03/07		108	%	70 - 130
			1,1-Dichloroethylene	2016/03/07		109	%	70 - 130
			1,2-Dichloroethane	2016/03/07		94	%	70 - 130
			1,2-Dichloropropane	2016/03/07		97	%	70 - 130
			Benzene	2016/03/07		93	%	70 - 130
			Bromodichloromethane	2016/03/07		97	%	70 - 130
			Bromoform	2016/03/07		99	%	70 - 130
			Bromomethane	2016/03/07		105	%	60 - 140
			Carbon Tetrachloride	2016/03/07		103	%	70 - 130
			Chloroethane	2016/03/07		101	%	60 - 140
			Chloroform	2016/03/07		98	%	70 - 130
			Chloromethane	2016/03/07		103	%	60 - 140
			cis-1,2-Dichloroethylene	2016/03/07		104	%	70 - 130
			cis-1,3-Dichloropropene	2016/03/07		97	%	70 - 130
			Dibromochloromethane	2016/03/07		97	%	70 - 130
			Ethylbenzene	2016/03/07		96	%	70 - 130
			Ethylene Dibromide	2016/03/07		103	%	70 - 130
			Methylene Chloride(Dichloromethane)	2016/03/07		101	%	70 - 130
			o-Xylene	2016/03/07		99	%	70 - 130
			p+m-Xylene	2016/03/07		96	%	70 - 130
			Styrene	2016/03/07		102	%	70 - 130
			Tetrachloroethylene	2016/03/07		99	%	70 - 130
			Toluene	2016/03/07		96	%	70 - 130
			trans-1,2-Dichloroethylene	2016/03/07		105	%	70 - 130
			trans-1,3-Dichloropropene	2016/03/07		102	%	70 - 130
			Trichloroethylene	2016/03/07		99	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2016/03/07		101	%	60 - 140
			Vinyl Chloride	2016/03/07		83	%	60 - 140
4407282	SHL	Matrix Spike	4-Bromofluorobenzene	2016/03/07		101	%	70 - 130
			D4-1,2-Dichloroethane	2016/03/07		100	%	70 - 130
			D8-Toluene	2016/03/07		95	%	70 - 130
4407282	SHL	Spiked Blank	1,2-Dichlorobenzene	2016/03/07		89	%	70 - 130
			1,3-Dichlorobenzene	2016/03/07		88	%	70 - 130
			1,4-Dichlorobenzene	2016/03/07		88	%	70 - 130
			Chlorobenzene	2016/03/07		93	%	70 - 130
			1,1,1-Trichloroethane	2016/03/07		105	%	70 - 130
			1,1,2,2-Tetrachloroethane	2016/03/07		93	%	70 - 130
			1,1,2-Trichloroethane	2016/03/07		96	%	70 - 130
			1,1-Dichloroethane	2016/03/07		107	%	70 - 130
			1,1-Dichloroethylene	2016/03/07		108	%	70 - 130
			1,2-Dichloroethane	2016/03/07		92	%	70 - 130
			1,2-Dichloropropane	2016/03/07		96	%	70 - 130

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			4-Bromofluorobenzene	2016/03/07		101	%	70 - 130
			Benzene	2016/03/07		93	%	70 - 130
			Bromodichloromethane	2016/03/07		95	%	70 - 130
			Bromoform	2016/03/07		97	%	70 - 130
			Bromomethane	2016/03/07		108	%	60 - 140
			Carbon Tetrachloride	2016/03/07		103	%	70 - 130
			Chloroethane	2016/03/07		101	%	60 - 140
			Chloroform	2016/03/07		97	%	70 - 130
			Chloromethane	2016/03/07		102	%	60 - 140
			cis-1,2-Dichloroethylene	2016/03/07		103	%	70 - 130
			cis-1,3-Dichloropropene	2016/03/07		100	%	70 - 130
			D4-1,2-Dichloroethane	2016/03/07		99	%	70 - 130
			D8-Toluene	2016/03/07		95	%	70 - 130
			Dibromochloromethane	2016/03/07		95	%	70 - 130
			Ethylbenzene	2016/03/07		96	%	70 - 130
			Ethylene Dibromide	2016/03/07		100	%	70 - 130
			Methylene Chloride(Dichloromethane)	2016/03/07		100	%	70 - 130
			o-Xylene	2016/03/07		98	%	70 - 130
			p+m-Xylene	2016/03/07		95	%	70 - 130
			Styrene	2016/03/07		101	%	70 - 130
			Tetrachloroethylene	2016/03/07		99	%	70 - 130
			Toluene	2016/03/07		95	%	70 - 130
			trans-1,2-Dichloroethylene	2016/03/07		104	%	70 - 130
			trans-1,3-Dichloropropene	2016/03/07		107	%	70 - 130
			Trichloroethylene	2016/03/07		99	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2016/03/07		100	%	60 - 140
			Vinyl Chloride	2016/03/07		87	%	60 - 140
4407282	SHL	Method Blank	1,2-Dichlorobenzene	2016/03/07	<0.50		ug/L	
			1,3-Dichlorobenzene	2016/03/07	<1.0		ug/L	
			1,4-Dichlorobenzene	2016/03/07	<1.0		ug/L	
			Chlorobenzene	2016/03/07	<1.0		ug/L	
			1,1,1-Trichloroethane	2016/03/07	<1.0		ug/L	
			1,1,2,2-Tetrachloroethane	2016/03/07	<0.50		ug/L	
			1,1,2-Trichloroethane	2016/03/07	<1.0		ug/L	
			1,1-Dichloroethane	2016/03/07	<2.0		ug/L	
			1,1-Dichloroethylene	2016/03/07	<0.50		ug/L	
			1,2-Dichloroethane	2016/03/07	<1.0		ug/L	
			1,2-Dichloropropane	2016/03/07	<0.50		ug/L	
			4-Bromofluorobenzene	2016/03/07		99	%	70 - 130
			Benzene	2016/03/07	<1.0		ug/L	
			Bromodichloromethane	2016/03/07	<1.0		ug/L	
			Bromoform	2016/03/07	<1.0		ug/L	
			Bromomethane	2016/03/07	<0.50		ug/L	
			Carbon Tetrachloride	2016/03/07	<0.50		ug/L	
			Chloroethane	2016/03/07	<8.0		ug/L	
			Chloroform	2016/03/07	<1.0		ug/L	
			Chloromethane	2016/03/07	<8.0		ug/L	
			cis-1,2-Dichloroethylene	2016/03/07	<0.50		ug/L	
			cis-1,3-Dichloropropene	2016/03/07	<0.50		ug/L	
			D4-1,2-Dichloroethane	2016/03/07		95	%	70 - 130
			D8-Toluene	2016/03/07		98	%	70 - 130
			Dibromochloromethane	2016/03/07	<1.0		ug/L	
			Ethylbenzene	2016/03/07	<1.0		ug/L	
			Ethylene Dibromide	2016/03/07	<0.20		ug/L	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Methylene Chloride(Dichloromethane)	2016/03/07	<3.0		ug/L	
			o-Xylene	2016/03/07	<1.0		ug/L	
			p+m-Xylene	2016/03/07	<2.0		ug/L	
			Styrene	2016/03/07	<1.0		ug/L	
			Tetrachloroethylene	2016/03/07	<1.0		ug/L	
			Toluene	2016/03/07	<1.0		ug/L	
			trans-1,2-Dichloroethylene	2016/03/07	<0.50		ug/L	
			trans-1,3-Dichloropropene	2016/03/07	<0.50		ug/L	
			Trichloroethylene	2016/03/07	<1.0		ug/L	
			Trichlorofluoromethane (FREON 11)	2016/03/07	<8.0		ug/L	
			Vinyl Chloride	2016/03/07	<0.50		ug/L	
4407282	SHL	RPD - Sample/Sample Dup	1,2-Dichlorobenzene	2016/03/07	NC		%	40
			1,3-Dichlorobenzene	2016/03/07	NC		%	40
			1,4-Dichlorobenzene	2016/03/07	NC		%	40
			Chlorobenzene	2016/03/07	NC		%	40
			1,1,1-Trichloroethane	2016/03/07	NC		%	40
			1,1,2,2-Tetrachloroethane	2016/03/07	NC		%	40
			1,1,2-Trichloroethane	2016/03/07	NC		%	40
			1,1-Dichloroethane	2016/03/07	NC		%	40
			1,1-Dichloroethylene	2016/03/07	NC		%	40
			1,2-Dichloroethane	2016/03/07	NC		%	40
			1,2-Dichloropropane	2016/03/07	NC		%	40
			Benzene	2016/03/07	NC		%	40
			Bromodichloromethane	2016/03/07	NC		%	40
			Bromoform	2016/03/07	NC		%	40
			Bromomethane	2016/03/07	NC		%	40
			Carbon Tetrachloride	2016/03/07	NC		%	40
			Chloroethane	2016/03/07	NC		%	40
			Chloroform	2016/03/07	NC		%	40
			Chloromethane	2016/03/07	NC		%	40
			cis-1,2-Dichloroethylene	2016/03/07	NC		%	40
			cis-1,3-Dichloropropene	2016/03/07	NC		%	40
			Dibromochloromethane	2016/03/07	NC		%	40
			Ethylbenzene	2016/03/07	NC		%	40
			Ethylene Dibromide	2016/03/07	NC		%	40
			Methylene Chloride(Dichloromethane)	2016/03/07	NC		%	40
			o-Xylene	2016/03/07	NC		%	40
			p+m-Xylene	2016/03/07	NC		%	40
			Styrene	2016/03/07	NC		%	40
			Tetrachloroethylene	2016/03/07	NC		%	40
			Toluene	2016/03/07	NC		%	40
			trans-1,2-Dichloroethylene	2016/03/07	NC		%	40
			trans-1,3-Dichloropropene	2016/03/07	NC		%	40
			Trichloroethylene	2016/03/07	NC		%	40
			Trichlorofluoromethane (FREON 11)	2016/03/07	NC		%	40
			Vinyl Chloride	2016/03/07	NC		%	40
4407312	TMO	Matrix Spike	Dissolved Fluoride (F-)	2016/03/07		100	%	80 - 120
4407312	TMO	Spiked Blank	Dissolved Fluoride (F-)	2016/03/07		103	%	80 - 120
4407312	TMO	Method Blank	Dissolved Fluoride (F-)	2016/03/07	<0.10		mg/L	
4407312	TMO	RPD - Sample/Sample Dup	Dissolved Fluoride (F-)	2016/03/07	NC		%	25
4407314	TMO	QC Standard	pH	2016/03/07		100	%	97 - 103
4407314	TMO	RPD - Sample/Sample Dup	pH	2016/03/07	1.2		%	N/A
4407317	TMO	Spiked Blank	Conductivity	2016/03/07		101	%	80 - 120
4407317	TMO	Method Blank	Conductivity	2016/03/07	<1.0		uS/cm	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4407317	TMO	RPD - Sample/Sample Dup	Conductivity	2016/03/07	0.14		%	25
4407708	NRG	Matrix Spike	Nitrogen (Ammonia Nitrogen)	2016/03/07		104	%	80 - 120
4407708	NRG	Spiked Blank	Nitrogen (Ammonia Nitrogen)	2016/03/07		94	%	80 - 120
4407708	NRG	Method Blank	Nitrogen (Ammonia Nitrogen)	2016/03/07	<0.050		mg/L	
4407708	NRG	RPD - Sample/Sample Dup	Nitrogen (Ammonia Nitrogen)	2016/03/07	NC		%	20
4407724	TMO	QC Standard	Turbidity	2016/03/07		94	%	80 - 120
4407724	TMO	Method Blank	Turbidity	2016/03/07	<0.10		NTU	
4407724	TMO	RPD - Sample/Sample Dup	Turbidity	2016/03/07	NC		%	20
4407729	TMO	QC Standard	Turbidity	2016/03/07		87	%	80 - 120
4407729	TMO	Method Blank	Turbidity	2016/03/07	<0.10		NTU	
4407729	TMO	RPD - Sample/Sample Dup	Turbidity	2016/03/07	NC		%	20
4408316	NRG	Matrix Spike	Total Alkalinity (Total as CaCO3)	2016/03/08		NC	%	80 - 120
4408316	NRG	Spiked Blank	Total Alkalinity (Total as CaCO3)	2016/03/08		102	%	80 - 120
4408316	NRG	Method Blank	Total Alkalinity (Total as CaCO3)	2016/03/08	<5.0		mg/L	
4408316	NRG	RPD - Sample/Sample Dup	Total Alkalinity (Total as CaCO3)	2016/03/08	1.2		%	25
4408337	NRG	Matrix Spike	Dissolved Chloride (Cl)	2016/03/08		NC	%	80 - 120
4408337	NRG	QC Standard	Dissolved Chloride (Cl)	2016/03/08		102	%	80 - 120
4408337	NRG	Spiked Blank	Dissolved Chloride (Cl)	2016/03/08		106	%	80 - 120
4408337	NRG	Method Blank	Dissolved Chloride (Cl)	2016/03/08	<1.0		mg/L	
4408337	NRG	RPD - Sample/Sample Dup	Dissolved Chloride (Cl)	2016/03/08	7.7		%	25
4408341	NRG	Matrix Spike	Dissolved Sulphate (SO4)	2016/03/08		NC	%	80 - 120
4408341	NRG	Spiked Blank	Dissolved Sulphate (SO4)	2016/03/08		113	%	80 - 120
4408341	NRG	Method Blank	Dissolved Sulphate (SO4)	2016/03/08	<2.0		mg/L	
4408341	NRG	RPD - Sample/Sample Dup	Dissolved Sulphate (SO4)	2016/03/08	2.5		%	25
4408346	NRG	Matrix Spike	Reactive Silica (SiO2)	2016/03/08		96	%	80 - 120
4408346	NRG	Spiked Blank	Reactive Silica (SiO2)	2016/03/08		102	%	80 - 120
4408346	NRG	Method Blank	Reactive Silica (SiO2)	2016/03/08	<0.50		mg/L	
4408346	NRG	RPD - Sample/Sample Dup	Reactive Silica (SiO2)	2016/03/08	14		%	25
4408356	NRG	Spiked Blank	Colour	2016/03/08		113	%	80 - 120
4408356	NRG	Method Blank	Colour	2016/03/08	<5.0		TCU	
4408356	NRG	RPD - Sample/Sample Dup	Colour	2016/03/08	NC		%	20
4408360	NRG	Matrix Spike	Orthophosphate (P)	2016/03/08		89	%	80 - 120
4408360	NRG	Spiked Blank	Orthophosphate (P)	2016/03/08		97	%	80 - 120
4408360	NRG	Method Blank	Orthophosphate (P)	2016/03/08	<0.010		mg/L	
4408360	NRG	RPD - Sample/Sample Dup	Orthophosphate (P)	2016/03/08	NC		%	25
4408362	NRG	Matrix Spike	Nitrate + Nitrite (N)	2016/03/09		103	%	80 - 120
4408362	NRG	Spiked Blank	Nitrate + Nitrite (N)	2016/03/09		103	%	80 - 120
4408362	NRG	Method Blank	Nitrate + Nitrite (N)	2016/03/09	<0.050		mg/L	
4408362	NRG	RPD - Sample/Sample Dup	Nitrate + Nitrite (N)	2016/03/09	0.81		%	25
4408366	NRG	Matrix Spike	Nitrite (N)	2016/03/09		NC	%	80 - 120
4408366	NRG	Spiked Blank	Nitrite (N)	2016/03/09		90	%	80 - 120
4408366	NRG	Method Blank	Nitrite (N)	2016/03/09	<0.010		mg/L	
4408366	NRG	RPD - Sample/Sample Dup	Nitrite (N)	2016/03/09	0.39		%	25
4408851	NRG	Matrix Spike(BYO988)	Total Alkalinity (Total as CaCO3)	2016/03/08		101	%	80 - 120
4408851	NRG	Spiked Blank	Total Alkalinity (Total as CaCO3)	2016/03/08		103	%	80 - 120
4408851	NRG	Method Blank	Total Alkalinity (Total as CaCO3)	2016/03/08	<5.0		mg/L	
4408851	NRG	RPD - Sample/Sample Dup	Total Alkalinity (Total as CaCO3)	2016/03/08	NC		%	25
4408858	NRG	Matrix Spike(BYO988)	Dissolved Chloride (Cl)	2016/03/08		NC	%	80 - 120
4408858	NRG	QC Standard	Dissolved Chloride (Cl)	2016/03/08		104	%	80 - 120
4408858	NRG	Spiked Blank	Dissolved Chloride (Cl)	2016/03/08		104	%	80 - 120
4408858	NRG	Method Blank	Dissolved Chloride (Cl)	2016/03/08	<1.0		mg/L	
4408858	NRG	RPD - Sample/Sample Dup	Dissolved Chloride (Cl)	2016/03/08	1.0		%	25
4408861	NRG	Matrix Spike(BYO988)	Dissolved Sulphate (SO4)	2016/03/08		114	%	80 - 120
4408861	NRG	Spiked Blank	Dissolved Sulphate (SO4)	2016/03/08		111	%	80 - 120

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4408861	NRG	Method Blank	Dissolved Sulphate (SO4)	2016/03/08	<2.0		mg/L	
4408861	NRG	RPD - Sample/Sample Dup	Dissolved Sulphate (SO4)	2016/03/08	NC		%	25
4408866	NRG	Spiked Blank	Colour	2016/03/08		111	%	80 - 120
4408866	NRG	Method Blank	Colour	2016/03/08	<5.0		TCU	
4408866	NRG	RPD - Sample/Sample Dup	Colour	2016/03/08	NC		%	20
4408870	NRG	Matrix Spike(BYO988)	Nitrate + Nitrite (N)	2016/03/09		102	%	80 - 120
4408870	NRG	Spiked Blank	Nitrate + Nitrite (N)	2016/03/09		101	%	80 - 120
4408870	NRG	Method Blank	Nitrate + Nitrite (N)	2016/03/09	<0.050		mg/L	
4408870	NRG	RPD - Sample/Sample Dup	Nitrate + Nitrite (N)	2016/03/09	NC		%	25
4408878	NRG	Matrix Spike(BYO988)	Nitrite (N)	2016/03/09		94	%	80 - 120
4408878	NRG	Spiked Blank	Nitrite (N)	2016/03/09		93	%	80 - 120
4408878	NRG	Method Blank	Nitrite (N)	2016/03/09	<0.010		mg/L	
4408878	NRG	RPD - Sample/Sample Dup	Nitrite (N)	2016/03/09	NC		%	25
4408884	NRG	Matrix Spike(BYO988)	Orthophosphate (P)	2016/03/08		88	%	80 - 120
4408884	NRG	Spiked Blank	Orthophosphate (P)	2016/03/08		101	%	80 - 120
4408884	NRG	Method Blank	Orthophosphate (P)	2016/03/08	<0.010		mg/L	
4408884	NRG	RPD - Sample/Sample Dup	Orthophosphate (P)	2016/03/08	NC		%	25
4408976	TPE	QC Standard	pH	2016/03/08		100	%	N/A
4408976	TPE	RPD - Sample/Sample Dup	pH	2016/03/08	0.15		%	N/A
4409098	NRG	Matrix Spike(BYO988)	Reactive Silica (SiO2)	2016/03/08		NC	%	80 - 120
4409098	NRG	Spiked Blank	Reactive Silica (SiO2)	2016/03/08		94	%	80 - 120
4409098	NRG	Method Blank	Reactive Silica (SiO2)	2016/03/08	<0.50		mg/L	
4409098	NRG	RPD - Sample/Sample Dup	Reactive Silica (SiO2)	2016/03/08	8.3		%	25
4410445	BAN	Matrix Spike	Total Aluminum (Al)	2016/03/10		102	%	80 - 120
			Total Antimony (Sb)	2016/03/10		102	%	80 - 120
			Total Arsenic (As)	2016/03/10		97	%	80 - 120
			Total Barium (Ba)	2016/03/10		94	%	80 - 120
			Total Beryllium (Be)	2016/03/10		95	%	80 - 120
			Total Bismuth (Bi)	2016/03/10		94	%	80 - 120
			Total Boron (B)	2016/03/10		NC	%	80 - 120
			Total Cadmium (Cd)	2016/03/10		97	%	80 - 120
			Total Calcium (Ca)	2016/03/10		NC	%	80 - 120
			Total Chromium (Cr)	2016/03/10		95	%	80 - 120
			Total Cobalt (Co)	2016/03/10		94	%	80 - 120
			Total Copper (Cu)	2016/03/10		NC	%	80 - 120
			Total Iron (Fe)	2016/03/10		95	%	80 - 120
			Total Lead (Pb)	2016/03/10		93	%	80 - 120
			Total Magnesium (Mg)	2016/03/10		NC	%	80 - 120
			Total Manganese (Mn)	2016/03/10		95	%	80 - 120
			Total Molybdenum (Mo)	2016/03/10		101	%	80 - 120
			Total Nickel (Ni)	2016/03/10		93	%	80 - 120
			Total Phosphorus (P)	2016/03/10		104	%	80 - 120
			Total Potassium (K)	2016/03/10		NC	%	80 - 120
			Total Selenium (Se)	2016/03/10		98	%	80 - 120
			Total Silver (Ag)	2016/03/10		96	%	80 - 120
			Total Sodium (Na)	2016/03/10		NC	%	80 - 120
			Total Strontium (Sr)	2016/03/10		NC	%	80 - 120
			Total Thallium (Tl)	2016/03/10		95	%	80 - 120
			Total Tin (Sn)	2016/03/10		102	%	80 - 120
			Total Titanium (Ti)	2016/03/10		100	%	80 - 120
			Total Uranium (U)	2016/03/10		107	%	80 - 120
			Total Vanadium (V)	2016/03/10		99	%	80 - 120
			Total Zinc (Zn)	2016/03/10		93	%	80 - 120
4410445	BAN	Spiked Blank	Total Aluminum (Al)	2016/03/10		102	%	80 - 120

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Total Antimony (Sb)	2016/03/10		95	%	80 - 120
			Total Arsenic (As)	2016/03/10		94	%	80 - 120
			Total Barium (Ba)	2016/03/10		92	%	80 - 120
			Total Beryllium (Be)	2016/03/10		90	%	80 - 120
			Total Bismuth (Bi)	2016/03/10		98	%	80 - 120
			Total Boron (B)	2016/03/10		91	%	80 - 120
			Total Cadmium (Cd)	2016/03/10		94	%	80 - 120
			Total Calcium (Ca)	2016/03/10		97	%	80 - 120
			Total Chromium (Cr)	2016/03/10		94	%	80 - 120
			Total Cobalt (Co)	2016/03/10		95	%	80 - 120
			Total Copper (Cu)	2016/03/10		94	%	80 - 120
			Total Iron (Fe)	2016/03/10		99	%	80 - 120
			Total Lead (Pb)	2016/03/10		94	%	80 - 120
			Total Magnesium (Mg)	2016/03/10		104	%	80 - 120
			Total Manganese (Mn)	2016/03/10		96	%	80 - 120
			Total Molybdenum (Mo)	2016/03/10		95	%	80 - 120
			Total Nickel (Ni)	2016/03/10		97	%	80 - 120
			Total Phosphorus (P)	2016/03/10		103	%	80 - 120
			Total Potassium (K)	2016/03/10		100	%	80 - 120
			Total Selenium (Se)	2016/03/10		95	%	80 - 120
			Total Silver (Ag)	2016/03/10		94	%	80 - 120
			Total Sodium (Na)	2016/03/10		103	%	80 - 120
			Total Strontium (Sr)	2016/03/10		97	%	80 - 120
			Total Thallium (Tl)	2016/03/10		95	%	80 - 120
			Total Tin (Sn)	2016/03/10		96	%	80 - 120
			Total Titanium (Ti)	2016/03/10		99	%	80 - 120
			Total Uranium (U)	2016/03/10		102	%	80 - 120
			Total Vanadium (V)	2016/03/10		96	%	80 - 120
			Total Zinc (Zn)	2016/03/10		94	%	80 - 120
4410445	BAN	Method Blank	Total Aluminum (Al)	2016/03/10	5.6, RDL=5.0		ug/L	
			Total Antimony (Sb)	2016/03/10	<1.0		ug/L	
			Total Arsenic (As)	2016/03/10	<1.0		ug/L	
			Total Barium (Ba)	2016/03/10	<1.0		ug/L	
			Total Beryllium (Be)	2016/03/10	<1.0		ug/L	
			Total Bismuth (Bi)	2016/03/10	<2.0		ug/L	
			Total Boron (B)	2016/03/10	<50		ug/L	
			Total Cadmium (Cd)	2016/03/10	<0.010		ug/L	
			Total Calcium (Ca)	2016/03/10	<100		ug/L	
			Total Chromium (Cr)	2016/03/10	<1.0		ug/L	
			Total Cobalt (Co)	2016/03/10	<0.40		ug/L	
			Total Copper (Cu)	2016/03/10	<2.0		ug/L	
			Total Iron (Fe)	2016/03/10	<50		ug/L	
			Total Lead (Pb)	2016/03/10	<0.50		ug/L	
			Total Magnesium (Mg)	2016/03/10	<100		ug/L	
			Total Manganese (Mn)	2016/03/10	<2.0		ug/L	
			Total Molybdenum (Mo)	2016/03/10	<2.0		ug/L	
			Total Nickel (Ni)	2016/03/10	<2.0		ug/L	
			Total Phosphorus (P)	2016/03/10	<100		ug/L	
			Total Potassium (K)	2016/03/10	<100		ug/L	
			Total Selenium (Se)	2016/03/10	<1.0		ug/L	
			Total Silver (Ag)	2016/03/10	<0.10		ug/L	
			Total Sodium (Na)	2016/03/10	<100		ug/L	
			Total Strontium (Sr)	2016/03/10	<2.0		ug/L	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			Total Thallium (Tl)	2016/03/10	<0.10		ug/L	
			Total Tin (Sn)	2016/03/10	<2.0		ug/L	
			Total Titanium (Ti)	2016/03/10	<2.0		ug/L	
			Total Uranium (U)	2016/03/10	<0.10		ug/L	
			Total Vanadium (V)	2016/03/10	<2.0		ug/L	
			Total Zinc (Zn)	2016/03/10	<5.0		ug/L	
4410445	BAN	RPD - Sample/Sample Dup	Total Aluminum (Al)	2016/03/10	0.16		%	20
			Total Antimony (Sb)	2016/03/10	NC		%	20
			Total Arsenic (As)	2016/03/10	NC		%	20
			Total Barium (Ba)	2016/03/10	NC		%	20
			Total Beryllium (Be)	2016/03/10	NC		%	20
			Total Bismuth (Bi)	2016/03/10	NC		%	20
			Total Boron (B)	2016/03/10	0.083		%	20
			Total Cadmium (Cd)	2016/03/10	5.2		%	20
			Total Calcium (Ca)	2016/03/10	1.2		%	20
			Total Chromium (Cr)	2016/03/10	NC		%	20
			Total Cobalt (Co)	2016/03/10	NC		%	20
			Total Copper (Cu)	2016/03/10	2.4		%	20
			Total Iron (Fe)	2016/03/10	3.8		%	20
			Total Lead (Pb)	2016/03/10	NC		%	20
			Total Magnesium (Mg)	2016/03/10	2.4		%	20
			Total Manganese (Mn)	2016/03/10	NC		%	20
			Total Molybdenum (Mo)	2016/03/10	NC		%	20
			Total Nickel (Ni)	2016/03/10	NC		%	20
			Total Phosphorus (P)	2016/03/10	NC		%	20
			Total Potassium (K)	2016/03/10	1.2		%	20
			Total Selenium (Se)	2016/03/10	NC		%	20
			Total Silver (Ag)	2016/03/10	NC		%	20
			Total Sodium (Na)	2016/03/10	1.6		%	20
			Total Strontium (Sr)	2016/03/10	3.2		%	20
			Total Thallium (Tl)	2016/03/10	NC		%	20
			Total Tin (Sn)	2016/03/10	NC		%	20
			Total Titanium (Ti)	2016/03/10	NC		%	20
			Total Uranium (U)	2016/03/10	NC		%	20
			Total Vanadium (V)	2016/03/10	2.5		%	20
			Total Zinc (Zn)	2016/03/10	1.1		%	20
4414244	TPE	Spiked Blank	Conductivity	2016/03/11		101	%	80 - 120
4414244	TPE	Method Blank	Conductivity	2016/03/11	1.4, RDL=1.0		uS/cm	
4414244	TPE	RPD - Sample/Sample Dup	Conductivity	2016/03/11	0.44		%	25
4417833	SMT	Matrix Spike	Total Organic Carbon (C)	2016/03/15		98	%	80 - 120
4417833	SMT	Spiked Blank	Total Organic Carbon (C)	2016/03/15		99	%	80 - 120
4417833	SMT	Method Blank	Total Organic Carbon (C)	2016/03/15	<0.50		mg/L	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
4417833	SMT	RPD - Sample/Sample Dup	Total Organic Carbon (C)	2016/03/15	NC		%	20

N/A = Not Applicable

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

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration).

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

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Maxxam Job #: B643669
Report Date: 2016/03/15

Englobe Corp.
Client Project #: 20814

VALIDATION SIGNATURE PAGE

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

Original Signed

Andrew VanWychen, Bedford Micro

Original Signed

Eric Dearman, Scientific Specialist

Original Signed

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

Original Signed

Mike MacGillivray, Scientific Specialist (Inorganics)

Original Signed

Rosemarie MacDonald, Scientific Specialist (Organics)

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

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MAXXAM Chain of Custody Record

COC #: B 159530 Page 1 of 1

This column for lab use only:
Client Code:
Maxxam Job #: B643669

Cooler ID	Seal Present	Seal Intact	Temp 1	Temp 2	Temp 3	Average Temp
			5	5	4	

Integrity: YES (NO) — Integrity / Checklist by: SM
Labelled by: — Location / Bin #:

INVOICE INFORMATION:
Company Name: Englobe
Contact Name: Ann Cole
Address: Lisa Lalonde
Postal Code:
Email:
Ph: Fax:

REPORT INFORMATION (if differs from invoice):
Company Name: SAME
Contact Name:
Address:
Postal Code:
Email:
Ph: Fax:

PO #:
Project # / Phase #: 20814-1
Project Name / Site Location:
Quote:
Site #:
Task Order #:
Sampled by:

TURNAROUND TIME
Standard ☒
10 day ☐
If RUSH Specify Date:
Pre-schedule rush work
Charge for # Jars used but not submitted

Guideline Requirements / Detection Limits / Special Instructions

*Specify Matrix: Surface/Salt/Ground/Tapwater/Sewage/Effluent/Potable/NonPotable/Tissue/Soil/Sludge/Metal/Seawater

Field Sample Identification	Matrix*	Date/Time Sampled	# & type of bottles	Field Filtered & Preserved	Lab Filtration Required	RCAP-30 Choose Total or Diss Metals	RCAP-MS (Total) or Diss Metals	Metals Water: Total Digest (Default Method) for well water, surface water	Metals Water: Dissolved for ground water	Metals Water: Mercury	Metals Soil: Metals & Mercury Default Available Digest Method	Metals Soil: Metals Total Digest - for Ocean sediments (HNO3/HF/HClO4)	Metals Soil: Mercury Low level by Cold Vapour AA	Metals Soil: Selenium (low level) Req'd for CCME Residential, Parklands, Agricultural	Metals Soil: Hot Water soluble Boron (required for CCME Agricultural)	Hydrocarbons: RBCA Hydrocarbons (BTEX, C6-C32)	Hydrocarbons: Hydrocarbons Soil (Potable), NS Fuel Oil Spill Policy Low Level BTEX, C6-C32	Hydrocarbons: NB Potable Water BTEX, VPH, Low level T.E.H.	Hydrocarbons: TPH Fractionation	Hydrocarbons: PAH's	Hydrocarbons: PAH's with Acridine, Quinoline	Total Coliforme MPN	E. Coli MPN	Fluoride	Bromide	VOCs
1 Well 3 - 72hr	GW	10h05 3/3/16	2x250cc 2x500 1x120	X			X															X	X	X	X	X
2 Well 4 - 72hr	GW	10h00 3/3/16	2x100 3x40	X			X															X	X	X	X	X
3 P1	GW	10h15 3/3/16	1x100 1x500 1x120	X			X																			
4 DW1	PW	11h00 3/3/16	↓	X			X																			
5																										
6																										
7																										
8																										
9																										
10																										

RELINQUISHED BY: (Signature/Print) Original Signed — Date: 3/3/16 — Time: 12h50

RECEIVED BY: (Signature/Print) Original Signed — Date — Time

2016 MAR 3 12:59

White: Maxxam Yellow : Mail Pink: Client

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