



SNC-LAVALIN
Environment



Division of
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December 9, 2010

Halifax Regional Municipality
Sustainable Environment Management Office

PO Box 1749
Halifax, Nova Scotia
B3J 3A5

Attention: Mr. Cameron Deacoff

Dear Mr. Deacoff,

RE: Final Report: Water Quality Monitoring within Bedford West, Sub Areas 3 & 4, Bedford, Nova Scotia – November 2010 Sampling Event

1. INTRODUCTION

SNC-Lavalin Inc., Environment Division (SLE) was retained by the Halifax Regional Municipality (HRM) to conduct water quality monitoring within Bedford West Sub-Areas 3 & 4. Water samples were collected from nine (9) specified locations during the November 2010 sampling event. The purpose of the program is to determine water quality for watersheds impacted by the proposed development in Bedford West. The Paper Mill Lake watershed is the primary watershed in the area. Testing shall take place prior to construction and shall detect any impacts on and changes to water quality during and after construction of the development project.

This report presents water quality data from Kearney Lake, Kearney Lake Run, Highway 102, Lakeshore Drive and Paper Mill Lake, collected on November 1st, 2010. The water quality test locations are presented on Figure 1.

2. METHODOLOGY

The November 2010 monitoring event consisted of the sampling and analysis of RCap, Total Phosphorous, Total Suspended Solids, Fecal Coliform Bacteria and Chlorophyll-a from nine (9) specified sampling locations. Standard field measurements (pH, temperature, dissolved oxygen and conductivity) were measured at all nine specified sampling locations for the November 2010 monitoring event. The field measurements were taken using Hach IntelliCAL probes for pH, conductivity and dissolved oxygen (Product Numbers pH30101,



Mr. Cameron Deacoff
December 9, 2010
Page 2

CDC40101 and LDO10101, respectively). The samples and field parameter readings were collected from a 1.0 metre depth.

The field parameters and site conditions for each sampling location were recorded on a field report. The field reports are attached in Attachment 1. Photographs of each sampling location are attached in Attachment 2.

A new pair of latex gloves was used at each sample location. Surface water samples were collected and placed in clean laboratory-supplied jars and stored in a chilled container together with a chain of custody record for transport to the laboratory. All surface water samples, collected from the nine sampling locations, were submitted to Maxxam Analytics Inc., located in Bedford, Nova Scotia.

Secchi depth measurements were taken from the shady side of the boat at two sample locations. The secchi disk was lowered in the water until no longer visible. The depth was measured to the nearest tenth of a metre. The disk was raised until visible in the water and the depth was measured. The secchi depth is the midpoint between the two measured depths.

3. ASSESSMENT STANDARDS

The CCME guidelines for water are broken down based on water use including Freshwater Aquatic Life, Marine Water Aquatic Life, Irrigation, Livestock Watering, Recreation and Aesthetics and Drinking Water. The surface water quality results were compared to the CCME Freshwater Aquatic Life guidelines since the specified sampling locations are located at and/or near adjacent freshwater bodies.

Analytical data for Total Suspended Solids (TSS) and Turbidity are compared to the Canadian Council of Ministers of the Environment (CCME) for the Protection of Aquatic Life (CCME Narrative Total Particulate Matter – Table 1 Suspended Sediments and Turbidity, High Flow Conditions, 1999, updated 2002).

For TSS, the guideline value is equal to a maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L. Or the concentration should not increase more than 10% of background levels when background is greater than 250 mg/L.



The CCME Guidelines for Canadian Recreational Water Quality (revised 2004) were used as reference guidelines. The guidelines indicate that the clarity of the water should be sufficiently clear that a Secchi disk is visible at a minimum of 1.2 metres. For Turbidity a limit of 50 Nephelometric Turbidity Units (NTU) is suggested. The E. coli guideline is presented as 400/100mL, since there are not five E. Coli samples taken within a 30 day time span.

4. RESULTS OF THE INVESTIGATION

4.1. FIELD MEASUREMENTS

Field Parameters were measured at all nine (9) specified sampling locations during the November 2010 monitoring event. Field measurements of dissolved oxygen, pH, conductivity and temperature are presented in Table 1. Dissolved oxygen readings were recorded at seven (7) sample locations that were outside the CCME guideline range of 5.5 - 9.5 mg/L: KL1 (10.48mg/L), KL2 (9.58 mg/L), KL3 (10.35mg/L), KL4 (10.89mg/L), HWY102-2 (2.99 mg/L), PML1 (10.43 mg/L) and PML2 (10.58mg/L). All other dissolved oxygen readings for the remaining two (2) sample locations were within the applied CCME guideline range.

4.2. LABORATORY ANALYTICAL RESULTS

4.2.1. GENERAL CHEMISTRY

The analytical results reported pH levels outside the CCME guideline range in three (3) samples: KL2 (pH = 6.11), HWY 102-1 (pH = 5.31), and HWY 102-2 (pH = 5.47). The pH levels at HWY102-1 and HWY102-2 were also outside the CCME guideline range during the June, August and October 2009. As well as June 2010 and August 2010 sampling rounds.

Turbidity concentrations at all sample locations were reported to be within the referenced CCME Recreational Water Quality guideline of 50 NTU.

Analytical results reported TSS concentrations ranging from less than 2 mg/L for samples KL2, KL3, KL4, HWY102-1, PML1, to 11 mg/L in sample PML2. TSS for sample LSD decreased from 110 mg/L in August 2010 to 7 mg/L in November 2010, which negates the



Mr. Cameron Deacoff
December 9, 2010
Page 4

CCME Aquatic Life guidelines that states that the TSS has a maximum acceptable increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L.

Total Iron concentrations were reported above the CCME FWAL guideline at KL2 with a result of (303 mg/L). All other reported metal parameters were reported to be within the applied guidelines.

General Chemistry results have been provided in Table 1. Laboratory certificates have been provided in Attachment 3.

4.2.2. MICROBIOLOGICAL

All E. Coli laboratory analytical results were reported to be within the CCME Recreational Water Quality guideline of 400 CFU/100ml.

Surface water microbiological results have been provided in Table 1. Laboratory certificates have been provided in Attachment 3.

5. CONCLUSIONS

Water quality monitoring within the Bedford West Sub-Areas 3 & 4 was conducted on November 1, 2010 and included the collection of field parameters (pH, temperature, dissolved oxygen and specific conductivity) and the collection and analysis of RCap, Total Phosphorous, Total Suspended Solids and Total Coliform and Chlorophyll-a.

Dissolved oxygen readings were recorded at seven (7) sample locations that were outside the CCME guideline range of 5.5 -9.5 mg/L: KL1 (10.48mg/L), KL2 (9.58 mg/L), KL3 (10.35mg/L), KL4 (10.89mg/L), HWY102-2 (2.99 mg/L), PML1 (10.43 mg/L) and PML2 (10.58mg/L).

The analytical results reported pH levels outside the CCME guideline range in three (3) samples: KL2 (pH = 6.11), HWY 102-1 (pH = 5.31), and HWY 102-2 (pH = 5.47). The pH levels at HWY102-1 and HWY102-2 were also outside the CCME guideline range during the June, August and October 2009. As well as June 2010 and August 2010 sampling rounds.



Mr. Cameron Deacoff
December 9, 2010
Page 5

Turbidity concentrations at all sample locations were reported to be within the referenced CCME Recreational Water Quality guideline of 50 NTU.

Total Iron concentrations were reported to be marginally above the CCME FWAL guideline (300 mg/L) at KL2 with a result of 303 mg/L. All other metals parameters were reported to be within the applied guidelines.

All E. Coli laboratory analytical results were reported to be within the applied guideline.

If you have any questions or require anything further, please contact the undersigned at (902) 492-4544.

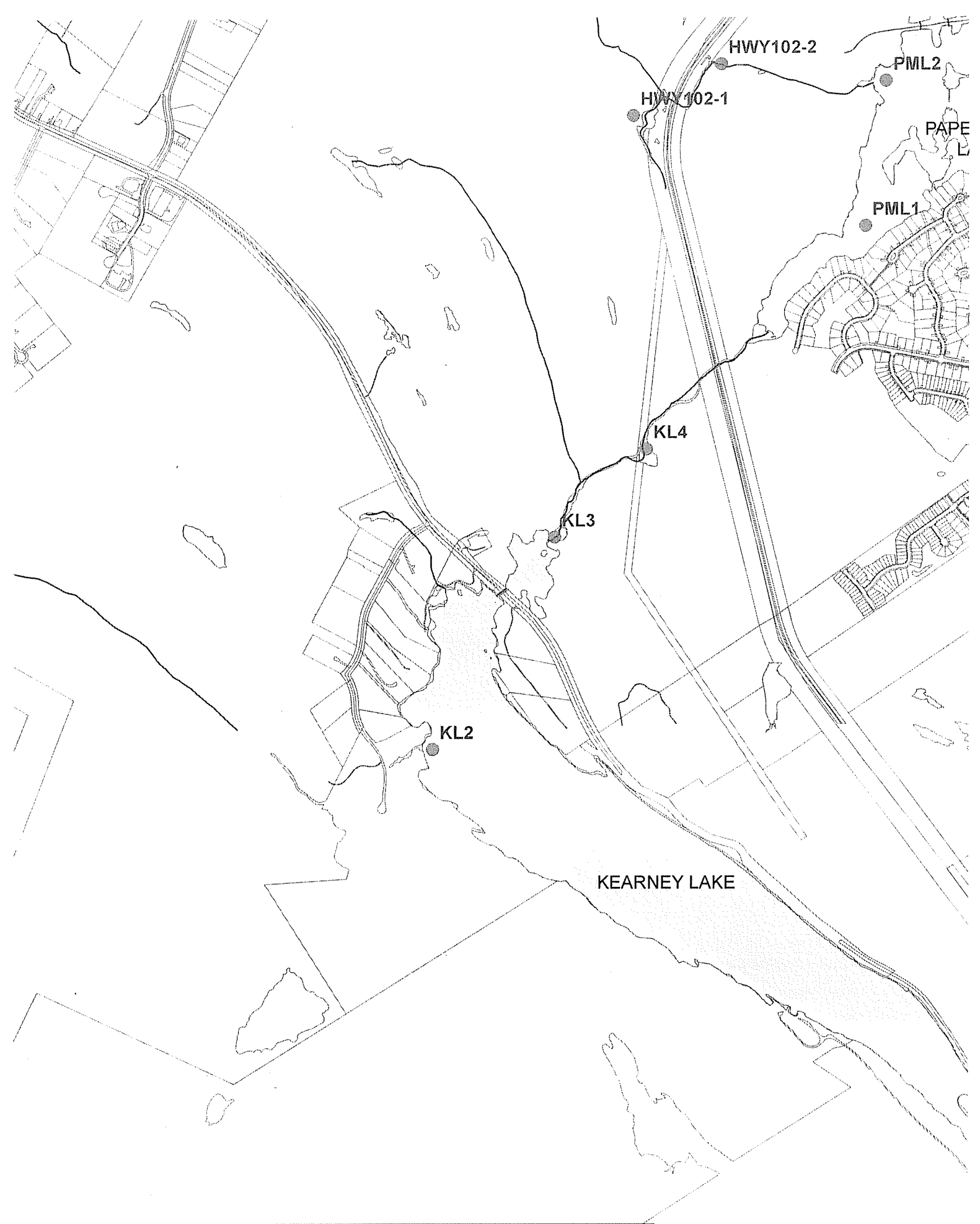
Yours truly,

SNC ♦ LAVALIN ENVIRONMENT

A handwritten signature in black ink, appearing to read "Derek Heath".

Derek Heath, P.Geol.
Project Manager

DH/ap



ATTACHMENT 1

Field Reports

SLE FIELD REPORT

Project:	Water Quality Monitoring-Bedford West Sub-Areas 3 & 4		
Client:	Halifax Regional Municipality		
Site: Lakeshore Drive	Location: Kingswood Subdivision	Site ID: LSD	
Monitoring Well <input type="checkbox"/> Pumping Well <input type="checkbox"/> Surface Water <input checked="" type="checkbox"/> Spring/Seep <input type="checkbox"/> Discharge Pipe <input type="checkbox"/> Other: <input type="checkbox"/>			
SLEI Personnel On-Site:	Allain Thebeau		

Site Conditions

Weather:	Partly cloudy, 8.0°C
Site Accessibility: Accessible	Off Lakeshore Drive

Field Parameter Data

	Remarks
Date (d.m.y)	01.11.10
Sample Depth (m)	1.0 m
pH	6.17
Dissolved Oxygen	8.47 mg/L
Secchi Depth (m)	N/A
Temperature (degrees Celsius)	7.3°C
Conductivity (µs/cm)	110.3 µs/cm
Photo Taken?	Yes

Additional Comments / Notes

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Report Completed by: Allain Thebeau	Date: November 01, 2010
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SLE FIELD REPORT

Project:	Water Quality Monitoring-Bedford West Sub-Areas 3 & 4		
Client:	Halifax Regional Municipality		
Site: Kearney Lake	Location: Kearney Lake Road	Site ID: KL1	
Monitoring Well <input type="checkbox"/> Pumping Well <input type="checkbox"/> Surface Water <input checked="" type="checkbox"/> Spring/Seep <input type="checkbox"/> Discharge Pipe <input type="checkbox"/> Other:			
SLEI Personnel On-Site:	Allain Thebeau		

Site Conditions

Weather:	Partly cloudy, 8.0°C
Site Accessibility: Accessible	Off Kearney Lake Road

Field Parameter Data

	Remarks
Date (d.m.y)	01.11.10
Sample Depth (m)	1.0 m
pH	6.61
Dissolved Oxygen	10.48 mg/L
Secchi Depth (m)	4.85m
Temperature (degrees Celsius)	8.8°C
Conductivity (µs/cm)	218.7 µs/cm
Photo Taken?	Yes

Additional Comments / Notes

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Report Completed by: Allain Thebeau	Date: November 01, 2010
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SLE FIELD REPORT

Project:	Water Quality Monitoring-Bedford West Sub-Areas 3 & 4		
Client:	Halifax Regional Municipality		
Site: Kearney Lake	Location: Collins Road	Site ID: KL2	
Monitoring Well <input type="checkbox"/> Pumping Well <input type="checkbox"/> Surface Water <input checked="" type="checkbox"/> Spring/Seep <input type="checkbox"/> Discharge Pipe <input type="checkbox"/> Other: <input type="checkbox"/>			
SLEI Personnel On-Site:	Allain Thebeau		

Site Conditions

Weather:	Partly cloudy, 8.0°C
Site Accessibility: Accessible	Off Collins Road, through wooded area

Field Parameter Data

	Remarks
Date (d.m.y)	01.11.10
Sample Depth (m)	1.0 m
pH	6.25
Dissolved Oxygen	9.58 mg/L
Secchi Depth (m)	N/A
Temperature (degrees Celsius)	8.0°C
Conductivity (µs/cm)	75.1 µs/cm
Photo Taken?	Yes

Additional Comments / Notes

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Report Completed by: Allain Thebeau	Date: November 01, 2010
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SLE FIELD REPORT

Project:	Water Quality Monitoring-Bedford West Sub-Areas 3 & 4		
Client:	Halifax Regional Municipality		
Site: Kearney Lake Run	Location: Kearney Lake Road	Site ID: KL3	
Monitoring Well <input type="checkbox"/> Pumping Well <input type="checkbox"/> Surface Water <input checked="" type="checkbox"/> Spring/Seep <input type="checkbox"/> Discharge Pipe <input type="checkbox"/> Other:			
SLEI Personnel On-Site:	Allain Thebeau		

Site Conditions

Weather:	Partly cloudy, 8.0°C
Site Accessibility: Accessible	Off Kearney Lake Road, through woods just past dam

Field Parameter Data

	Remarks
Date (d.m.y)	01.11.10
Sample Depth (m)	1.0 m
pH	6.76
Dissolved Oxygen	10.35 mg/L
Secchi Depth (m)	N/A
Temperature (degrees Celsius)	9.9°C
Conductivity (µs/cm)	199.4 µs/cm
Photo Taken?	Yes

Additional Comments / Notes

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Report Completed by: Allain Thebeau	Date: November 01, 2010
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SLE FIELD REPORT

Project:	Water Quality Monitoring-Bedford West Sub-Areas 3 & 4		
Client:	Halifax Regional Municipality		
Site: Kearney Lake Run	Location: Kearney Lake Road	Site ID: KL4	
Monitoring Well <input type="checkbox"/> Pumping Well <input type="checkbox"/> Surface Water <input checked="" type="checkbox"/> Spring/Seep <input type="checkbox"/> Discharge Pipe <input type="checkbox"/> Other: <input type="checkbox"/>			
SLEI Personnel On-Site:	Allain Thebeau		

Site Conditions

Weather:	Partly cloudy, 8.0°C
Site Accessibility: Accessible	Off Kearney Lake Road, through woods along walking path, beyond dam

Field Parameter Data

	Remarks
Date (d.m.y)	01.11.10
Sample Depth (m)	1.0 m
pH	6.07
Dissolved Oxygen	10.89 mg/L
Secchi Depth (m)	N/A
Temperature (degrees Celsius)	9.8°C
Conductivity (µs/cm)	214.8 µs/cm
Photo Taken?	Yes

Additional Comments / Notes

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Report Completed by: Allain Thebeau	Date: November 01, 2010
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SLE FIELD REPORT

Project:	Water Quality Monitoring-Bedford West Sub-Areas 3 & 4		
Client:	Halifax Regional Municipality		
Site: Highway 102	Location: Highway 102, south of Exit 3	Site ID: HWY102-1	
Monitoring Well <input type="checkbox"/> Pumping Well <input type="checkbox"/> Surface Water <input checked="" type="checkbox"/> Spring/Seep <input type="checkbox"/> Discharge Pipe <input type="checkbox"/> Other: <input type="checkbox"/>			
SLEI Personnel On-Site:	Allain Thebeau		

Site Conditions

Weather:	Partly cloudy, 8.0°C
Site Accessibility: Accessible	Off Highway 102, southbound

Field Parameter Data

	Remarks
Date (d.m.y)	01.11.10
Sample Depth (m)	1.0 m
pH	5.62
Dissolved Oxygen	6.05 mg/L
Secchi Depth (m)	N/A
Temperature (degrees Celsius)	7.4°C
Conductivity (µs/cm)	108.6 µs/cm
Photo Taken?	Yes

Additional Comments / Notes

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Report Completed by: Allain Thebeau	Date: November 01, 2010
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SLE FIELD REPORT

Project:	Water Quality Monitoring-Bedford West Sub-Areas 3 & 4		
Client:	Halifax Regional Municipality		
Site: Highway 102	Location: Highway 102, south of Exit 3	Site ID: HWY102-2	
Monitoring Well <input type="checkbox"/> Pumping Well <input type="checkbox"/> Surface Water <input checked="" type="checkbox"/> Spring/Seep <input type="checkbox"/> Discharge Pipe <input type="checkbox"/> Other: <input type="checkbox"/>			
SLEI Personnel On-Site:	Allain Thebeau		

Site Conditions

Weather:	Partly cloudy, 8.0°C
Site Accessibility: Accessible	Off Highway 102, Northbound

Field Parameter Data

	Remarks
Date (d.m.y)	01.11.10
Sample Depth (m)	1.0 m
pH	5.64
Dissolved Oxygen	2.99 mg/L
Secchi Depth (m)	N/A
Temperature (degrees Celsius)	8.7°C
Conductivity (µs/cm)	101.2 µs/cm
Photo Taken?	Yes

Additional Comments / Notes

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Report Completed by: Allain Thebeau	Date: November 01, 2010
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SLE FIELD REPORT

Project:	Water Quality Monitoring-Bedford West Sub-Areas 3 & 4		
Client:	Halifax Regional Municipality		
Site: Paper Mill Lake	Location: Off Lake Dr.	Site ID: PML1	
Monitoring Well <input type="checkbox"/> Pumping Well <input type="checkbox"/> Surface Water <input checked="" type="checkbox"/> Spring/Seep <input type="checkbox"/> Discharge Pipe <input type="checkbox"/> Other:			
SLEI Personnel On-Site:	Allain Thebeau		

Site Conditions

Weather:	Partly cloudy, 8.0°C
Site Accessibility: Accessible	Site accessible through wooded area off Lake Dr.

Field Parameter Data

	Remarks
Date (d.m.y)	01.11.10
Sample Depth (m)	1.0 m
pH	5.89
Dissolved Oxygen	10.43 mg/L
Secchi Depth (m)	N/A
Temperature (degrees Celsius)	9.1°C
Conductivity (µs/cm)	124.5 µs/cm
Photo Taken?	Yes

Additional Comments / Notes

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Report Completed by: Allain Thebeau	Date: November 01, 2010
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SLE FIELD REPORT

Project:	Water Quality Monitoring-Bedford West Sub-Areas 3 & 4		
Client:	Halifax Regional Municipality		
Site: Paper Mill Lake	Location: Off Ahmadi Cr.	Site ID: PML2	
Monitoring Well <input type="checkbox"/> Pumping Well <input type="checkbox"/> Surface Water <input checked="" type="checkbox"/> Spring/Seep <input type="checkbox"/> Discharge Pipe <input type="checkbox"/> Other:			
SLEI Personnel On-Site:	Allain Thebeau		

Site Conditions

Weather:	Partly cloudy, 8.0°C
Site Accessibility: Accessible	Site accessible from Ahmadi Crescent, off Moirs Mill Road

Field Parameter Data

	Remarks
Date (d.m.y)	01.11.10
Sample Depth (m)	1.0 m
pH	6.53
Dissolved Oxygen	10.58 mg/L
Secchi Depth (m)	2.0 m
Temperature (degrees Celsius)	10.1°C
Conductivity (µs/cm)	200.5 µs/cm
Photo Taken?	Yes

Additional Comments / Notes

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Report Completed by: Allain Thebeau	Date: November 01, 2010
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ATTACHMENT 2

Site Photographs



Photo 1: View of KL1



Photo 2: View of sample location KL2.

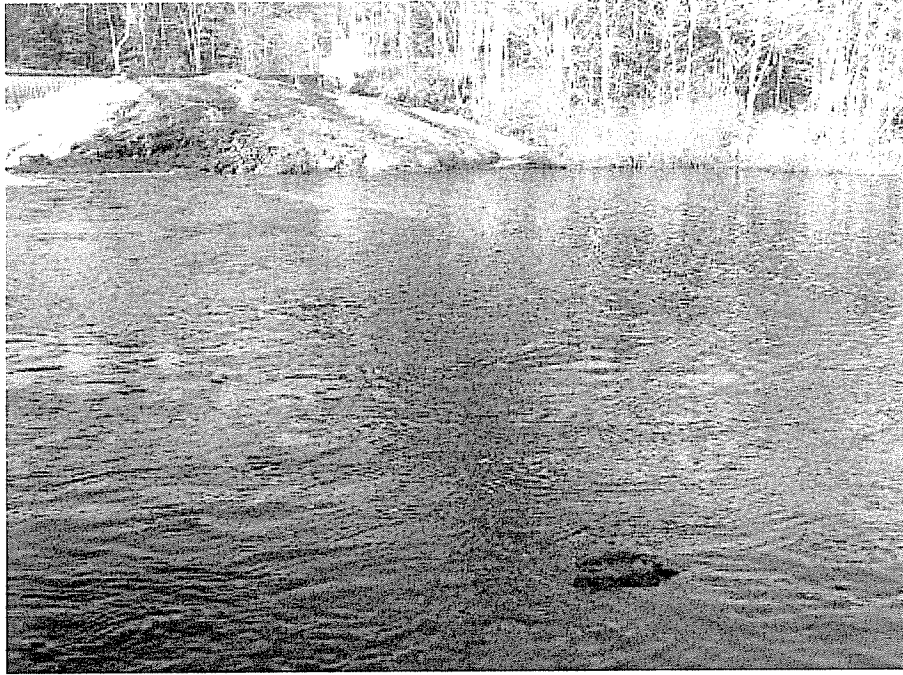


Photo 3: View of sample location KL3.

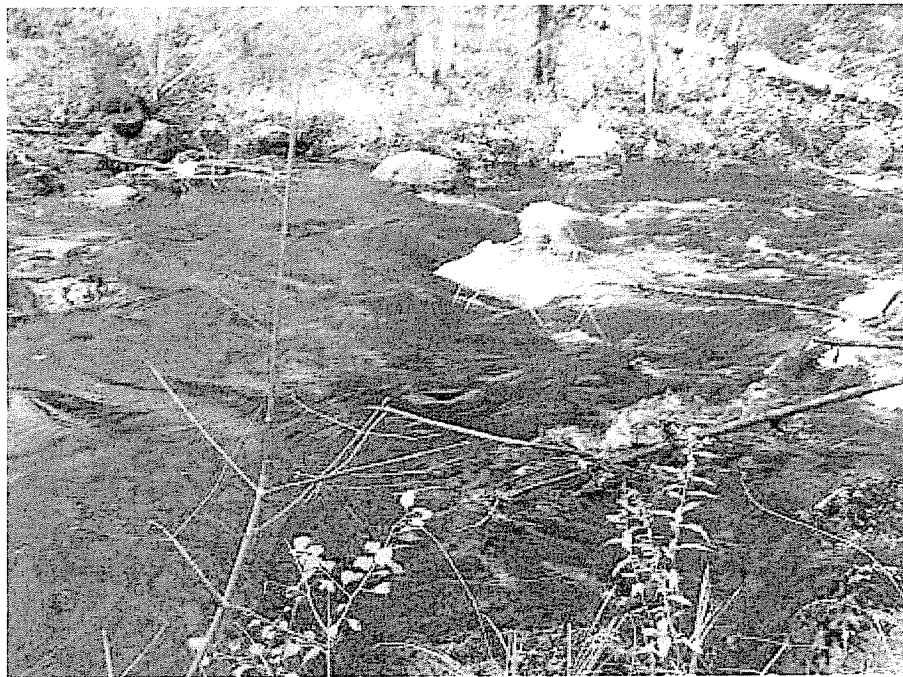


Photo 4: View of sample location KL4, looking downstream.



Photo 5: View of sample location HWY102-1.



Photo 6: View from sample location HWY102-1.



Photo 7: View from sample location HWY102-2.



Photo 8: View from sample location LSD.



Photo 9: View of sample location PML1 off of Ahmadi Crescent in Bedford.



Photo 10: View of sample location PML2.

ATTACHMENT 3

Laboratory Certificates of Analysis



Your Project #: 020331-0002
 Site: BEDFORD WEST
 Your C.O.C. #: N/A

Attention: Derek Heath
 SNC Lavalin Inc, Environment Division
 5657 Spring Garden Rd
 Suite 200
 Halifax, NS
 B3J 3R4

Report Date: 2010/11/10

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B0F5646
Received: 2010/11/01, 13:49

Sample Matrix: Water
 # Samples Received: 9

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Carbonate, Bicarbonate and Hydroxide	9	N/A	2010/11/08	CAM SOP-00102	APHA 4500-CO2 D
Alkalinity	2	N/A	2010/11/08	ATL SOP 00013 R4	Based on EPA310.2
Alkalinity	7	N/A	2010/11/09	ATL SOP 00013 R4	Based on EPA310.2
Chloride	9	N/A	2010/11/08	ATL SOP 00014 R6	Based on SM4500-Cl-
Total coliform and Ecoli water	2	N/A	2010/11/01	ATL SOP 00096 R3	Based MOE3407, SM21
Total coliform and Ecoli water	7	N/A	2010/11/02	ATL SOP 00096 R3	Based MOE3407, SM21
Colour	9	N/A	2010/11/09	ATL SOP 00020 R3	Based on SM2120C
Conductance - water	9	N/A	2010/11/05	ATL SOP 00004 R5/00006 R4	Based on SM2510B
Hardness (calculated as CaCO3)	9	N/A	2010/11/04	ATL SOP 00048	Based on SM2340B
Metals Water Total MS	9	2010/11/03	2010/11/03	ATL SOP 00059 R1	Based on EPA6020A
Ion Balance (% Difference)	9	N/A	2010/11/09		
Anion and Cation Sum	9	N/A	2010/11/09		
Nitrogen Ammonia - water	9	N/A	2010/11/09	ATL SOP 00015 R5	Based on USEPA 350.1
Nitrogen - Nitrate + Nitrite	9	N/A	2010/11/09	ATL SOP 00016 R4	Based on USGS - Enz.
pH	9	N/A	2010/11/05	ATL SOP 00003 R5/00005 R7	Based on SM4500H+
Phosphorus - ortho	9	N/A	2010/11/09	ATL SOP 00021 R3	Based on USEPA 365.1
Sat. pH and Langelier Index (@ 20C)	9	N/A	2010/11/09		
Sat. pH and Langelier Index (@ 4C)	9	N/A	2010/11/09		
Reactive Silica	7	N/A	2010/11/08	ATL SOP 00022 R3	Based on EPA 366.0
Reactive Silica	2	N/A	2010/11/09	ATL SOP 00022 R3	Based on EPA 366.0
Sulphate	9	N/A	2010/11/09	ATL SOP 00023 R3	Based on EPA 375.4
Chlorophyll A (Sub from Bedford) Ø	9	2010/11/02	2010/11/09		
Total Dissolved Solids (TDS calc)	9	N/A	2010/11/09		
Organic carbon - Total (TOC)	9	N/A	2010/11/08	ATL SOP 00037 R4	Based on SM5310C
Total Phosphorus (Colourimetric) Ø	9	2010/11/08	2010/11/09	CAM SOP-00407	APHA 4500 P,B,F
Total Suspended Solids	9	N/A	2010/11/03	ATL SOP 00007 R3	based on EPA 160.2
Turbidity	9	N/A	2010/11/09	ATL SOP 00011 R4	based on EPA 180.1

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

- (1) This test was performed by Dalhousie Department of Oceanography
- (2) This test was performed by Maxxam Analytics Mississauga



Your Project #: 020331-0002
Site: BEDFORD WEST
Your C.O.C. #: N/A

Attention: Derek Heath
SNC Lavalin Inc, Environment Division
5657 Spring Garden Rd
Suite 200
Halifax, NS
B3J 3R4

Report Date: 2010/11/10

CERTIFICATE OF ANALYSIS

-2-

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

MICHELLE HILL, Project Manager
Email: MHill@maxxam.ca
Phone# (902) 420-0203

=====
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.

Total cover pages: 2

Page 2 of 12

This document is in electronic format, hard copy is available on request.



Maxxam Job #: B0F5646
Report Date: 2010/11/10

SNC Lavalin Inc, Environment Division
Client Project #: 020331-0002
Project name: BEDFORD WEST

RESULTS OF ANALYSES OF WATER

Maxxam ID		HR9176	HR9176		HR9181	HR9182		
Sampling Date		2010/11/01 13:00	2010/11/01 13:00		2010/11/01 13:30	2010/11/01 12:00		
COC Number		N/A	N/A		N/A	N/A		
	Units	PML1	PML1 Lab-Dup	RDL	PML2	KL1	RDL	QC Batch

Calculated Parameters								
Anion Sum	me/L	1.09		N/A	1.77	1.91	N/A	2315176
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	5		1	7	6	1	2315173
Calculated TDS	mg/L	75		1	110	118	1	2315180
Carb. Alkalinity (calc. as CaCO3)	mg/L	<1		1	<1	<1	1	2315173
Cation Sum	me/L	1.20		N/A	1.86	2.02	N/A	2315176
Hardness (CaCO3)	mg/L	18		1	25	26	1	2315174
Ion Balance (% Difference)	%	4.80		N/A	2.48	2.80	N/A	2315175
Langelier Index (@ 20C)	N/A	-3.25			-2.80	-2.87		2315178
Langelier Index (@ 4C)	N/A	-3.50			-3.05	-3.12		2315179
Saturation pH (@ 20C)	N/A	9.83			9.63	9.66		2315178
Saturation pH (@ 4C)	N/A	10.1			9.88	9.91		2315179
Inorganics								
Total Alkalinity (Total as CaCO3)	mg/L	5		5	7	6	5	2322607
Dissolved Chloride (Cl)	mg/L	24		1	50	55	1	2322614
Colour	TCU	57		30	23	21	5	2322623
Nitrate + Nitrite	mg/L	0.66		0.05	0.23	0.23	0.05	2322627
Nitrogen (Ammonia Nitrogen)	mg/L	<0.05		0.05	<0.05	<0.05	0.05	2322961
Total Organic Carbon (C)	mg/L	6.7		0.5	3.6	3.1	0.5	2323265
Orthophosphate (P)	mg/L	<0.01		0.01	<0.01	<0.01	0.01	2322624
pH	pH	6.58	6.65	N/A	6.83	6.79	N/A	2322489
Total Phosphorus	mg/L	<0.002		0.002	<0.002	0.005	0.002	2323194
Reactive Silica (SiO2)	mg/L	5.9		0.5	3.3	2.9	0.5	2322620
Total Suspended Solids	mg/L	<1		1	11	3	1	2317774
Dissolved Sulphate (SO4)	mg/L	12		2	10	11	2	2322616
Turbidity	NTU	0.5		0.1	0.4	1.0	0.1	2324659
Conductivity	uS/cm	130	130	1	210	230	1	2322491
Subcontracted Analysis								
Subcontract Parameter	N/A	ATTACHED		N/A	ATTACHED	ATTACHED	N/A	2317325

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

RESULTS OF ANALYSES OF WATER

Maxxam ID		HR9183		HR9184	HR9185		
Sampling Date		2010/11/01 10:50		2010/11/01 11:40	2010/11/01 11:15		
COC Number		N/A		N/A	N/A		
	Units	KL2	RDL	KL3	KL4	RDL	QC Batch

Calculated Parameters							
Anion Sum	me/L	0.490	N/A	1.87	1.85	N/A	2315176
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	<1	1	7	7	1	2315173
Calculated TDS	mg/L	38	1	116	116	1	2315180
Carb. Alkalinity (calc. as CaCO3)	mg/L	<1	1	<1	<1	1	2315173
Cation Sum	me/L	0.740	N/A	1.98	2.03	N/A	2315176
Hardness (CaCO3)	mg/L	12	1	26	27	1	2315174
Ion Balance (% Difference)	%	20.3	N/A	2.86	4.64	N/A	2315175
Langelier Index (@ 20C)	N/A	NC		-2.73	-2.75		2315178
Langelier Index (@ 4C)	N/A	NC		-2.99	-3.00		2315179
Saturation pH (@ 20C)	N/A	NC		9.60	9.58		2315178
Saturation pH (@ 4C)	N/A	NC		9.86	9.83		2315179
Inorganics							
Total Alkalinity (Total as CaCO3)	mg/L	<5	5	7	7	5	2322607
Dissolved Chloride (Cl)	mg/L	17	1	53	53	1	2322614
Colour	TCU	95	30	20	20	5	2322623
Nitrate + Nitrite	mg/L	0.06	0.05	0.22	0.21	0.05	2322627
Nitrogen (Ammonia Nitrogen)	mg/L	<0.05	0.05	<0.05	<0.05	0.05	2322961
Total Organic Carbon (C)	mg/L	9.7	0.5	3.3	3.1	0.5	2323265
Orthophosphate (P)	mg/L	<0.01	0.01	<0.01	<0.01	0.01	2322624
pH	pH	6.11	N/A	6.87	6.83	N/A	2322489
Total Phosphorus	mg/L	0.009	0.002	0.003	<0.002	0.002	2323194
Reactive Silica (SiO2)	mg/L	4.7	0.5	3.2	3.1	0.5	2322620
Total Suspended Solids	mg/L	<1	1	<1	<1	1	2317774
Dissolved Sulphate (SO4)	mg/L	<2	2	10	10	2	2322616
Turbidity	NTU	1.0	0.1	0.6	0.8	0.1	2324659
Conductivity	uS/cm	97	1	220	250	1	2322491
Subcontracted Analysis							
Subcontract Parameter	N/A	ATTACHED	N/A	ATTACHED	ATTACHED	N/A	2317325

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

RESULTS OF ANALYSES OF WATER

Maxxam ID		HR9186		HR9187	HR9188		
Sampling Date		2010/11/01 10:00		2010/11/01 09:00	2010/11/01 12:20		
COC Number		N/A		N/A	N/A		
	Units	LSD	RDL	HWY102-1	HWY102-2	RDL	QC Batch

Calculated Parameters							
Anion Sum	me/L	0.970	N/A	0.880	0.700	N/A	2315176
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	9	1	<1	<1	1	2315173
Calculated TDS	mg/L	62	1	63	52	1	2315180
Carb. Alkalinity (calc. as CaCO3)	mg/L	<1	1	<1	<1	1	2315173
Cation Sum	me/L	1.05	N/A	1.02	0.860	N/A	2315176
Hardness (CaCO3)	mg/L	18	1	17	14	1	2315174
Ion Balance (% Difference)	%	3.96	N/A	7.37	10.3	N/A	2315175
Langelier Index (@ 20C)	N/A	-2.99		NC	NC		2315178
Langelier Index (@ 4C)	N/A	-3.24		NC	NC		2315179
Saturation pH (@ 20C)	N/A	9.66		NC	NC		2315178
Saturation pH (@ 4C)	N/A	9.91		NC	NC		2315179
Inorganics							
Total Alkalinity (Total as CaCO3)	mg/L	9	5	<5	<5	5	2322607
Dissolved Chloride (Cl)	mg/L	25	1	22	18	1	2322614
Colour	TCU	33	5	53	68	30	2322623
Nitrate + Nitrite	mg/L	0.12	0.05	1.2	0.62	0.05	2322627
Nitrogen (Ammonia Nitrogen)	mg/L	<0.05	0.05	<0.05	<0.05	0.05	2322961
Total Organic Carbon (C)	mg/L	5.3	0.5	6.3	7.4	0.5	2323265
Orthophosphate (P)	mg/L	<0.01	0.01	<0.01	<0.01	0.01	2322624
pH	pH	6.67	N/A	5.31	5.47	N/A	2322489
Total Phosphorus	mg/L	0.009	0.002	0.011	0.003	0.002	2323194
Reactive Silica (SiO2)	mg/L	4.3	0.5	5.1	5.4	0.5	2322620
Total Suspended Solids	mg/L	7	2	<2	3	2	2317774
Dissolved Sulphate (SO4)	mg/L	4	2	8	7	2	2322616
Turbidity	NTU	1.0	0.1	0.6	0.5	0.1	2324659
Conductivity	uS/cm	110	1	110	94	1	2322491
Subcontracted Analysis							
Subcontract Parameter	N/A	ATTACHED	N/A	ATTACHED	ATTACHED	N/A	2317325

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

ELEMENTS BY ICP/MS (WATER)

Maxxam ID		HR9176	HR9181	HR9182	HR9183	HR9184		
Sampling Date		2010/11/01	2010/11/01	2010/11/01	2010/11/01	2010/11/01		
		13:00	13:30	12:00	10:50	11:40		
COC Number		N/A	N/A	N/A	N/A	N/A		
	Units	PML1	PML2	KL1	KL2	KL3	RDL	QC Batch

Metals								
Total Calcium (Ca)	ug/L	5900	7960	8340	3550	8290	100	2318195
Total Copper (Cu)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	2318195
Total Iron (Fe)	ug/L	161	76	125	238	58	50	2318195
Total Magnesium (Mg)	ug/L	821	1200	1310	838	1270	100	2318195
Total Manganese (Mn)	ug/L	41.3	28.0	59.0	34.7	32.1	2.0	2318195
Total Potassium (K)	ug/L	1340	1020	901	826	990	100	2318195
Total Sodium (Na)	ug/L	18400	30800	33800	10600	33000	100	2318195
Total Zinc (Zn)	ug/L	5.7	5.8	11.1	6.5	6.4	5.0	2318195

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

Maxxam ID		HR9185	HR9186		HR9187	HR9188		
Sampling Date		2010/11/01	2010/11/01		2010/11/01	2010/11/01		
		11:15	10:00		09:00	12:20		
COC Number		N/A	N/A		N/A	N/A		
	Units	KL4	LSD	QC Batch	HWY102-1	HWY102-2	RDL	QC Batch

Metals								
Total Calcium (Ca)	ug/L	8450	5290	2318195	5090	4010	100	2318581
Total Copper (Cu)	ug/L	<2.0	<2.0	2318195	<2.0	<2.0	2.0	2318581
Total Iron (Fe)	ug/L	55	120	2318195	150	303	50	2318581
Total Magnesium (Mg)	ug/L	1310	1150	2318195	1090	1000	100	2318581
Total Manganese (Mn)	ug/L	29.4	22.8	2318195	67.0	52.9	2.0	2318581
Total Potassium (K)	ug/L	968	1030	2318195	1310	1390	100	2318581
Total Sodium (Na)	ug/L	33900	15200	2318195	14600	12100	100	2318581
Total Zinc (Zn)	ug/L	7.0	<5.0	2318195	6.9	9.3	5.0	2318581

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



Maxxam Job #: B0F5646
 Report Date: 2010/11/10

SNC Lavalin Inc, Environment Division
 Client Project #: 020331-0002
 Project name: BEDFORD WEST

MICROBIOLOGY (WATER)

Maxxam ID		HR9176	HR9181	HR9182	HR9183	HR9184		
Sampling Date		2010/11/01	2010/11/01	2010/11/01	2010/11/01	2010/11/01		
		13:00	13:30	12:00	10:50	11:40		
COC Number		N/A	N/A	N/A	N/A	N/A		
	Units	PML1	PML2	KL1	KL2	KL3	RDL	QC Batch

Microbiological								
Escherichia coli	CFU/100mL	2	6	37	6	8	1	2316410
Total Coliforms	CFU/100mL	>250	97	>250	>250	58	1	2316410

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

Maxxam ID		HR9185		HR9186	HR9187		
Sampling Date		2010/11/01		2010/11/01	2010/11/01		
		11:15		10:00	09:00		
COC Number		N/A		N/A	N/A		
	Units	KL4	QC Batch	LSD	HWY102-1	RDL	QC Batch

Microbiological							
Escherichia coli	CFU/100mL	2	2316410	6	5	1	2316065
Total Coliforms	CFU/100mL	75	2316410	280	180	1	2316065

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

MICROBIOLOGY (WATER)

Maxxam ID		HR9188		
Sampling Date		2010/11/01 12:20		
COC Number		N/A		
	Units	HWY102-2	RDL	QC Batch

Microbiological				
Escherichia coli	CFU/100mL	<1	1	2316410
Total Coliforms	CFU/100mL	41	1	2316410

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

GENERAL COMMENTS

Sample HR9176-01: Results for sodium and potassium were reported from the ICP-OES

Sample HR9181-01: Results for sodium and potassium were reported from the ICP-OES

Sample HR9182-01: Results for sodium and potassium were reported from the ICP-OES

Sample HR9183-01: Results for sodium and potassium were reported from the ICP-OES.
RCAP Ion Balance acceptable. Low ionic strength sample

Sample HR9184-01: Results for sodium and potassium were reported from the ICP-OES

Sample HR9185-01: Results for sodium and potassium were reported from the ICP-OES

Sample HR9186-01: Results for sodium and potassium were reported from the ICP-OES

Sample HR9187-01: Results for sodium and potassium were reported from the ICP-OES.
RCAP Ion Balance acceptable. Anion/cation agreement within 0.2 meq/L.

Sample HR9188-01: Results for sodium and potassium were reported from the ICP-OES.
RCAP Ion Balance acceptable. Anion/cation agreement within 0.2 meq/L.

Results relate only to the items tested.



SNC Lavalin Inc, Environment Division
 Attention: Derek Heath
 Client Project #: 020331-0002
 P.O. #:
 Project name: BEDFORD WEST

Quality Assurance Report
 Maxxam Job Number: DB0F5646

QA/QC Batch	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits	
2316065 AVW	Method Blank	Escherichia coli	2010/11/01	<1		CFU/100mL		
		Total Coliforms	2010/11/01	<1		CFU/100mL		
2316410 ODE	Method Blank	Escherichia coli	2010/11/02	<1		CFU/100mL		
		Total Coliforms	2010/11/02	<1		CFU/100mL		
2317774 JDW	QC Standard	Total Suspended Solids	2010/11/03		99	%	80 - 120	
	Method Blank	Total Suspended Solids	2010/11/03	<1		mg/L		
2318195 LKE	RPD	Total Suspended Solids	2010/11/03	1.2		%	25	
		Matrix Spike	Total Calcium (Ca)	2010/11/03		114	%	80 - 120
		Total Copper (Cu)	2010/11/03		96	%	80 - 120	
		Total Iron (Fe)	2010/11/03		91	%	80 - 120	
		Total Magnesium (Mg)	2010/11/03		89	%	80 - 120	
		Total Manganese (Mn)	2010/11/03		96	%	80 - 120	
		Total Potassium (K)	2010/11/03		104	%	80 - 120	
		Total Sodium (Na)	2010/11/03		NC	%	80 - 120	
		Total Zinc (Zn)	2010/11/03		96	%	80 - 120	
		Spiked Blank	Total Calcium (Ca)	2010/11/03		118	%	80 - 120
			Total Copper (Cu)	2010/11/03		100	%	80 - 120
			Total Iron (Fe)	2010/11/03		98	%	80 - 120
			Total Magnesium (Mg)	2010/11/03		90	%	80 - 120
			Total Manganese (Mn)	2010/11/03		99	%	80 - 120
			Total Potassium (K)	2010/11/03		103	%	80 - 120
			Total Sodium (Na)	2010/11/03		105	%	80 - 120
			Total Zinc (Zn)	2010/11/03		102	%	80 - 120
		Method Blank	Total Calcium (Ca)	2010/11/03	<100		ug/L	
			Total Copper (Cu)	2010/11/03	<2.0		ug/L	
			Total Iron (Fe)	2010/11/03	<50		ug/L	
		Total Magnesium (Mg)	2010/11/03	<100		ug/L		
		Total Manganese (Mn)	2010/11/03	<2.0		ug/L		
		Total Potassium (K)	2010/11/03	<100		ug/L		
		Total Sodium (Na)	2010/11/03	<100		ug/L		
		Total Zinc (Zn)	2010/11/03	<5.0		ug/L		
	RPD	Total Calcium (Ca)	2010/11/03	1.3		%	25	
		Total Copper (Cu)	2010/11/03	NC		%	25	
		Total Iron (Fe)	2010/11/03	NC		%	25	
		Total Magnesium (Mg)	2010/11/03	1.3		%	25	
		Total Manganese (Mn)	2010/11/03	NC		%	25	
		Total Potassium (K)	2010/11/03	NC		%	25	
		Total Sodium (Na)	2010/11/03	0.1		%	25	
		Total Zinc (Zn)	2010/11/03	NC		%	25	
2318581 LKE	Matrix Spike [HR9187-01]	Total Calcium (Ca)	2010/11/03		107	%	80 - 120	
		Total Copper (Cu)	2010/11/03		99	%	80 - 120	
		Total Iron (Fe)	2010/11/03		92	%	80 - 120	
		Total Magnesium (Mg)	2010/11/03		87	%	80 - 120	
		Total Manganese (Mn)	2010/11/03		NC	%	80 - 120	
		Total Potassium (K)	2010/11/03		100	%	80 - 120	
		Total Sodium (Na)	2010/11/03		NC	%	80 - 120	
		Total Zinc (Zn)	2010/11/03		90	%	80 - 120	
		Spiked Blank	Total Calcium (Ca)	2010/11/03		114	%	80 - 120
	Total Copper (Cu)		2010/11/03		101	%	80 - 120	
	Total Iron (Fe)		2010/11/03		95	%	80 - 120	
	Total Magnesium (Mg)		2010/11/03		92	%	80 - 120	
	Total Manganese (Mn)		2010/11/03		99	%	80 - 120	
	Total Potassium (K)		2010/11/03		98	%	80 - 120	
	Total Sodium (Na)		2010/11/03		101	%	80 - 120	



SNC Lavalin Inc, Environment Division
 Attention: Derek Heath
 Client Project #: 020331-0002
 P.O. #:
 Project name: BEDFORD WEST

Quality Assurance Report (Continued)

Maxxam Job Number: DB0F5646

QA/QC Batch	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2318581 LKE	Spiked Blank	Total Zinc (Zn)	2010/11/03		96	%	80 - 120
	Method Blank	Total Calcium (Ca)	2010/11/03	<100		ug/L	
		Total Copper (Cu)	2010/11/03	<2.0		ug/L	
		Total Iron (Fe)	2010/11/03	<50		ug/L	
		Total Magnesium (Mg)	2010/11/03	<100		ug/L	
		Total Manganese (Mn)	2010/11/03	<2.0		ug/L	
		Total Potassium (K)	2010/11/03	<100		ug/L	
		Total Sodium (Na)	2010/11/03	<100		ug/L	
		Total Zinc (Zn)	2010/11/03	<5.0		ug/L	
	RPD	Total Calcium (Ca)	2010/11/03	2.2		%	25
		Total Copper (Cu)	2010/11/03	NC		%	25
		Total Iron (Fe)	2010/11/03	NC		%	25
		Total Magnesium (Mg)	2010/11/03	NC		%	25
		Total Manganese (Mn)	2010/11/03	NC		%	25
		Total Potassium (K)	2010/11/03	2.7		%	25
		Total Sodium (Na)	2010/11/03	0.5		%	25
		Total Zinc (Zn)	2010/11/03	NC		%	25
2322489 ARS	QC Standard	pH	2010/11/05		102	%	80 - 120
	Method Blank	pH	2010/11/05	5.80		pH	
	RPD [HR9176-01]	pH	2010/11/05	1.1		%	25
2322491 ARS	QC Standard	Conductivity	2010/11/05		106	%	80 - 120
	Method Blank	Conductivity	2010/11/05	<1		uS/cm	
	RPD [HR9176-01]	Conductivity	2010/11/05	0.2		%	25
2322607 DLB	Matrix Spike	Total Alkalinity (Total as CaCO3)	2010/11/08		102	%	80 - 120
	QC Standard	Total Alkalinity (Total as CaCO3)	2010/11/09		105	%	80 - 120
	Spiked Blank	Total Alkalinity (Total as CaCO3)	2010/11/09		107	%	80 - 120
	Method Blank	Total Alkalinity (Total as CaCO3)	2010/11/09	<5		mg/L	
	RPD	Total Alkalinity (Total as CaCO3)	2010/11/08	NC		%	25
2322614 MCN	Matrix Spike	Dissolved Chloride (Cl)	2010/11/08		NC	%	80 - 120
	QC Standard	Dissolved Chloride (Cl)	2010/11/08		103	%	80 - 120
	Spiked Blank	Dissolved Chloride (Cl)	2010/11/08		102	%	80 - 120
	Method Blank	Dissolved Chloride (Cl)	2010/11/08	<1		mg/L	
	RPD	Dissolved Chloride (Cl)	2010/11/08	0.4		%	25
2322616 JOA	Matrix Spike	Dissolved Sulphate (SO4)	2010/11/09		95	%	80 - 120
	QC Standard	Dissolved Sulphate (SO4)	2010/11/09		94	%	80 - 120
	Spiked Blank	Dissolved Sulphate (SO4)	2010/11/09		85	%	80 - 120
	Method Blank	Dissolved Sulphate (SO4)	2010/11/09	<2		mg/L	
	RPD	Dissolved Sulphate (SO4)	2010/11/09	0.7		%	25
2322620 DLB	Matrix Spike	Reactive Silica (SiO2)	2010/11/09		NC	%	80 - 120
	QC Standard	Reactive Silica (SiO2)	2010/11/08		100	%	75 - 125
	Spiked Blank	Reactive Silica (SiO2)	2010/11/08		101	%	80 - 120
	Method Blank	Reactive Silica (SiO2)	2010/11/08	<0.5		mg/L	
	RPD	Reactive Silica (SiO2)	2010/11/09	0.5		%	25
2322623 JOA	QC Standard	Colour	2010/11/09		106	%	80 - 120
	Method Blank	Colour	2010/11/09	<5		TCU	
	RPD	Colour	2010/11/09	NC		%	25
2322624 JOA	Matrix Spike	Orthophosphate (P)	2010/11/09		91	%	80 - 120
	QC Standard	Orthophosphate (P)	2010/11/09		100	%	80 - 120
	Spiked Blank	Orthophosphate (P)	2010/11/09		99	%	80 - 120
	Method Blank	Orthophosphate (P)	2010/11/09	<0.01		mg/L	
	RPD	Orthophosphate (P)	2010/11/09	NC		%	25
2322627 SMT	Matrix Spike	Nitrate + Nitrite	2010/11/09		98	%	80 - 120
	QC Standard	Nitrate + Nitrite	2010/11/09		104	%	80 - 120
	Spiked Blank	Nitrate + Nitrite	2010/11/09		100	%	80 - 120
	Method Blank	Nitrate + Nitrite	2010/11/09	<0.05		mg/L	



SNC Lavalin Inc, Environment Division
 Attention: Derek Heath
 Client Project #: 020331-0002
 P.O. #:
 Project name: BEDFORD WEST

Quality Assurance Report (Continued)

Maxxam Job Number: DB0F5646

QA/QC Batch	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2322627 SMT	RPD	Nitrate + Nitrite	2010/11/09	NC		%	25
2322961 DLB	Matrix Spike	Nitrogen (Ammonia Nitrogen)	2010/11/09		100	%	80 - 120
	QC Standard	Nitrogen (Ammonia Nitrogen)	2010/11/09		102	%	80 - 120
	Spiked Blank	Nitrogen (Ammonia Nitrogen)	2010/11/09		101	%	80 - 120
	Method Blank	Nitrogen (Ammonia Nitrogen)	2010/11/09	<0.05		mg/L	
	RPD	Nitrogen (Ammonia Nitrogen)	2010/11/09	NC		%	25
2323194 VRO	Matrix Spike	Total Phosphorus	2010/11/09		93	%	80 - 120
	QC Standard	Total Phosphorus	2010/11/09		98	%	85 - 115
	Spiked Blank	Total Phosphorus	2010/11/09		99	%	85 - 115
	Method Blank	Total Phosphorus	2010/11/09	<0.002		mg/L	
	RPD	Total Phosphorus	2010/11/09	NC		%	20
2323265 CRA	Matrix Spike	Total Organic Carbon (C)	2010/11/08		NC	%	80 - 120
	QC Standard	Total Organic Carbon (C)	2010/11/08		98	%	80 - 120
	Spiked Blank	Total Organic Carbon (C)	2010/11/08		100	%	80 - 120
	Method Blank	Total Organic Carbon (C)	2010/11/08	<0.5		mg/L	
	RPD	Total Organic Carbon (C)	2010/11/08	NC (1)		%	25
2324659 ARS	QC Standard	Turbidity	2010/11/09		98	%	80 - 120
	Method Blank	Turbidity	2010/11/09	<0.1		NTU	
	RPD	Turbidity	2010/11/09	10.9		%	25

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
 Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
 QC Standard: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
 Spiked Blank: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
 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 not sufficiently significant to permit a reliable recovery calculation.
 NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.
 (1) The detection limit was increased due to matrix interference.



Dalhousie University

Department of Oceanography
Halifax, N.S.
B3H 4J1

09-November-10
1G9

Maxxam Analytics Inc., 200 Bluewater Road, Bedford, NS, B4B

Attention: Michelle Hill
algae by fluorescence

Re: Determination of chlorophyll a in

Maxxam Project#: B0F5646

Acidification Technique:

Maxxam ID	Client ID	Chl a ($\mu\text{g/L}$)
HR9176-03R	PML1	0.07
HR9181-03R	PML2	0.53
HR9182-03R	KL1	0.99
HR9183-03R	KL2	0.22
HR9184-03R	KL3	0.51
HR9185-03R	KL4	0.50
HR9186-03R	LSD	0.21
HR9187-03R	HWY102-1	8.45
HR9188-03R	HWY102-2	0.25

Welschmeyer Technique:

Maxxam ID	Client ID	Chl a ($\mu\text{g/L}$)
HR9176-03R	PML1	0.06
HR9181-03R	PML2	0.42
HR9182-03R	KL1	0.81
HR9183-03R	KL2	0.21
HR9184-03R	KL3	0.42
HR9185-03R	KL4	0.41

HR9186-03R	LSD	0.19
HR9187-03R	HWY102-1	7.52
HR9188-03R	HWY102-2	0.23

- **CHI a = chlorophyll a**
- **An underestimation of chl a occurs by the fluorescence acidification technique in the presence of Chl b. Since chl b containing chlorophytes are often present in freshwater ecosystems another technique (welschmeyer) was also employed.**
- **Reference for Welschmeyer technique Limnol. Oceanogr., 39(8) 1994, 1985-1992**

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