

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**

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## **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 1<sup>st</sup>, 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 pHC30101,



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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.



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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



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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.



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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**

Derek Heath, P.Geo.  
Project Manager

DH/ap

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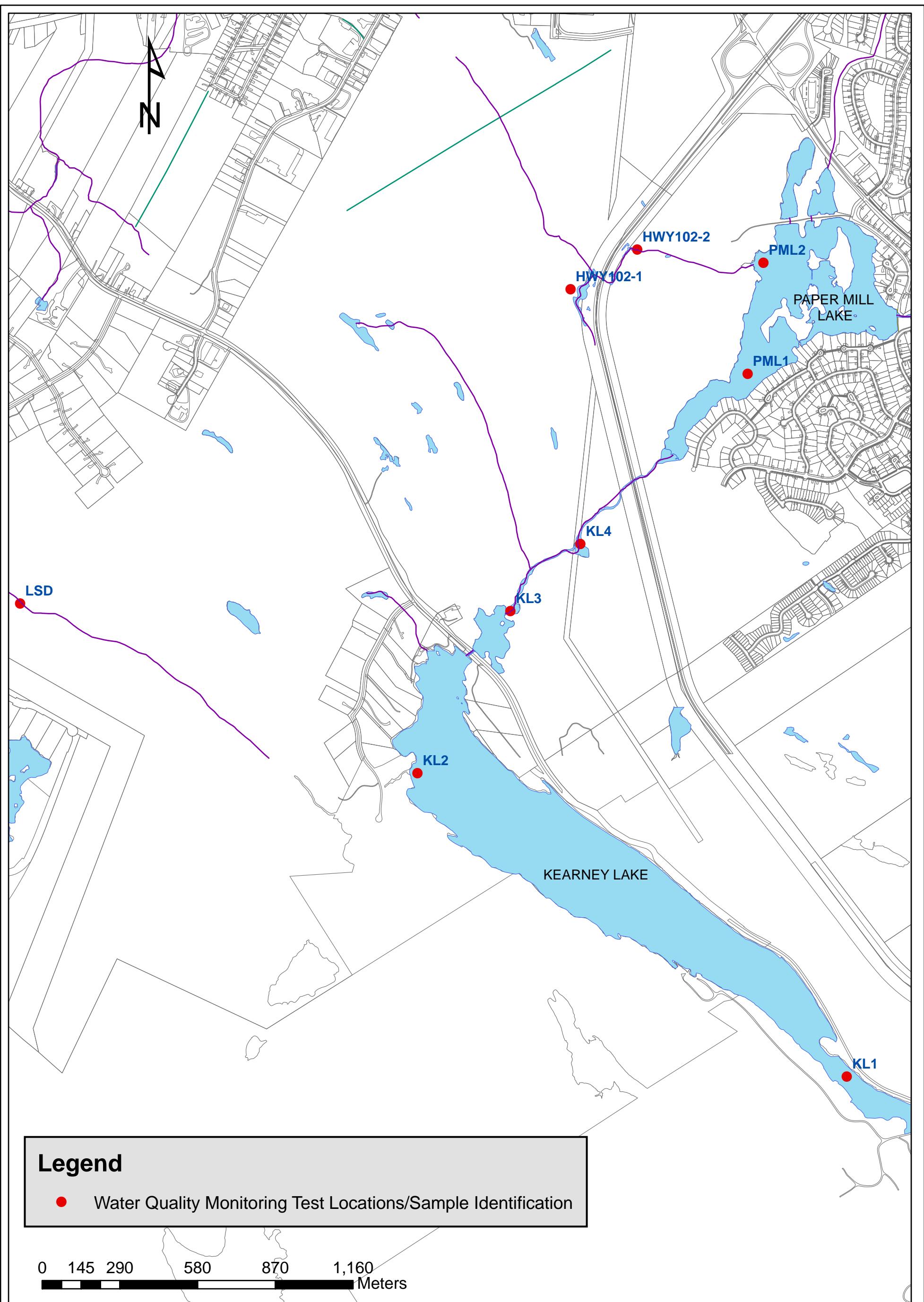


TABLE 1: BEDFORD WEST SAMPLING PROGRAM

| Nov-10                                   |           |       | CCME Guideline for Recreational Water Quality (Reference) |         | CCME Guideline FWAL (Applied) |       | Kearney Lake |            |            |            |            |            |            |            |            |            |            |            | Kearney Lake Run |            |            |            |            |            |            |            |            |            |            |            |  |
|--|-----------|-------|---|---------|-------------------------------|-------|--------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|--|
|  | Units     | RDL   |   |         |                               |       | KL1          |            |            |            |            |            | KL2        |            |            |            |            |            | KL3              |            |            |            |            |            | KL4        |            |            |            |            |            |  |
| Sample Sites                             |           |       |   |         |                               |       |              |            |            |            |            |            |            |            |            |            |            |            |                  |            |            |            |            |            |            |            |            |            |            |            |  |
| Sampling Date                            | yyy-mm-dd | --    | --  | --      | --                            |       | 2009-06-29   | 2009-08-13 | 2009-10-01 | 2010-05-31 | 2010-08-24 | 2010-11-01 | 2009-06-29 | 2009-08-13 | 2009-10-01 | 2010-05-31 | 2010-08-24 | 2010-11-01 | 2009-06-29       | 2009-08-13 | 2009-10-01 | 2010-05-31 | 2010-08-24 | 2010-11-01 | 2009-06-29 | 2009-08-13 | 2009-10-01 | 2010-05-31 | 2010-08-24 | 2010-11-01 |  |
| Sampling Time                            | hh:mm     | --    | --  | --      | 08:00                         | 11:45 | 08:30        | 11:00      | 13:10      | 12:00      | 11:00      | 10:30      | 10:45      | 10:15      | 12:25      | 10:50      | 09:00      | 11:00      | 09:30            | 11:30      | 14:12      | 11:40      | 10:00      | 11:30      | 10:00      | 11:20      | 13:50      | 11:15      |            |            |  |
| <b>FIELD DATA</b>                        |           |       |   |         |                               |       |              |            |            |            |            |            |            |            |            |            |            |            |                  |            |            |            |            |            |            |            |            |            |            |            |  |
| Secchi Depth                             | Meters    | --    | 1.2   | --      | 4.1                           | 4.2   | 5.0          | N/A        | 5.0        | 4.9        | N/A              | N/A        | N/A        | N/A        | N/A        | N/A        | N/A        | N/A        | N/A        | N/A        | N/A        |            |  |
| Temp                                     | Celsius   | 0.1   | --  | --      | 14.0                          | 22.2  | 16.7         | 12.9       | 23.3       | 8.8        | 16.8       | 18.2       | 15.4       | 13.5       | 20.4       | 8.0        | 14.0       | 21.6       | 17.3             | 14.7       | 23.1       | 9.9        | 13.4       | 21.9       | 17.3       | 14.5       | 21.9       | 9.8        |            |            |  |
| Dissolved Oxygen                         | mg/L      | 0.01  | --  | 5.5-9.5 | 10.77                         | 8.20  | 7.00         | 9.13       | 7.86       | 10.48      | 10.16      | 8.50       | 5.70       | 6.28       | 4.66       | 9.58       | 10.79      | 8.00       | 8.00             | 9.26       | 7.83       | 10.35      | 10.87      | 8.10       | 8.30       | 9.01       | 6.27       | 10.89      |            |            |  |
| pH                                       | N/A       | --    | --  | --      | 6.20                          | 6.76  | 6.67         | 7.23       | 7.32       | 6.61       | 6.33       | 6.35       | 6.19       | 6.61       | 6.96       | 6.25       | 7.27       | 6.74       | 6.97             | 7.27       | 7.33       | 6.76       | 8.00       | 6.71       | 7.19       | 6.94       | 6.07       |            |            |            |  |
| Specific Conductance                     | µS/cm     | 1     | --  | --      | 263                           | 299   | 261          | 248        | 242        | 219        | 46         | 106        | 89         | 199        | 104        | 75         | 95         | 282        | 246              | 220        | 228        | 199        | 771        | 262        | 247        | 224        | 226        | 215        |            |            |  |
| <b>INORGANICS</b>                        |           |       |   |         |                               |       |              |            |            |            |            |            |            |            |            |            |            |            |                  |            |            |            |            |            |            |            |            |            |            |            |  |
| Total Alkalinity (as CaCO <sub>3</sub> ) | mg/L      | 5     | --  | --      | 6                             | 8     | 8            | 7          | 8          | 6          | <5         | 8          | <5         | 5          | 7          | <5         | 7          | 7          | 6                | 7          | 7          | 6          | 8          | 7          | 8          | 7          | 8          | 7          |            |            |  |
| Dissolved Chloride (Cl)                  | mg/L      | 1     | --  | --      | 81                            | 74    | 64           | 62         | 60         | 55         | 17         | 23         | 16         | 21         | 25         | 17         | 66         | 63         | 60               | 55         | 55         | 53         | 67         | 65         | 60         | 56         | 56         | 53         |            |            |  |
| Colour                                   | TCU       | 30    | --  | --      | 18                            | 18    | 16           | 26         | 8          | 21         | 99         | 74         | 110        | 61         | 63         | 22         | 20         | 28         | 12               | 20         | 22         | 18         | 20         | 27         | 11         | 20         |            |            |            |            |  |
| Nitrite + Nitrate                        | mg/L      | 0.05  | --  | --      | 0.18                          | 0.09  | 0.12         | 0.21       | 0.16       | 0.23       | 0.06       | 0.11       | 0.10       | 0.07       | 0.06       | 0.14       | 0.12       | 0.14       | 0.24             | 0.15       | 0.22       | 0.15       | 0.12       | 0.14       | 0.23       | 0.19       | 0.21       |            |            |            |  |
| Nitrate (N)                              | mg/L      | 0.05  | --  | 13000   | 0.18                          | --    | --           | 0.21       | 0.16       | --         | 0.06       | --         | 0.10       | 0.07       | --         | 0.14       | --         | 0.24       | 0.15             | --         | 0.15       | --         | 0.23       | 0.19       | --         | --         | --         |            |            |            |  |
| Nitrite (N)                              | mg/L      | 0.01  | --  | 60      | <0.01                         | --    | --           | <0.01      | <0.01      | --         | --         | <0.01      | <0.01      | --         | <0.01      | --         | <0.01      | <0.01      | <0.01            | <0.01      | <0.01      | <0.01      | <0.01      | <0.01      | <0.01      | <0.01      | <0.01      |            |            |            |  |
| Nitrogen (Ammonia Nitrogen)              | mg/L      | 0.05  | --  | 19      | <0.05                         | <0.05 | <0.05        | <0.05      | <0.05      | <0.05      | <0.05      | <0.05      | <0.05      | <0.05      | <0.05      | <0.05      | <0.05      | <0.05      | <0.05            | <0.05      | <0.05      | <0.05      | <0.05      | <0.05      | <0.05      | <0.05      | <0.05      |            |            |            |  |
| Total Organic Carbon                     | mg/L      | 0.5   | --  | --      | 2.4                           | 2.9   | 3.3          | 3.2        | 3.1        | 2.8        | 2.2        | 2.9        | 2.9        | 4.8        | 6.6        | 9.7        | 2.6        | 3.9        | 4.3              | 3.6        | 3.1        | 3.3        | 2.5        | 2.6        | 4.0        | 3.3        | 2.6        | 3.1        |            |            |  |
| Orthophosphate (as P)                    | mg/L      | 0.01  | --  | --      | <0.01                         | <0.01 | <0.01        | <0.01      | <0.01      | <0.01      | <0.01      | <0.01      | <0.01      | <0.01      | <0.01      | <0.01      | <0.01      | <0.01      | <0.01            | <0.01      | <0.01      | <0.01      | <0.01      | <0.01      | <0.01      | <0.01      | <0.01      | <0.01      |            |            |  |
| pH (Lab)                                 | pH        | N/A   | 5.0-9.0   | 6.5-9   | 6.94                          | 6.65  | 6.68         | 6.91       | 7.00       | 6.79       | 6.58       | 6.78       | 6.11       | 6.38       | 6.67       | 6.62       | 6.82       | 6.99       | 6.87             | 6.61       | 6.75       | 6.83       | 6.83       | 6.93       | 6.83       | 6.83       | 6.83       | 6.83       |            |            |  |
| Total Calcium (Ca)                       | mg/L      | 0.1   | --  | --      | 9.2                           | 8.5   | 7.2          | 7.72       | 8.66       | 8.30       | 2.8        | 4.2        | 2.9        | 3.44       | 4.08       | 3.55       | 6.7        | 7.1        | 6.8              | 6.81       | 7.98       | 8.29       | 6.8        | 7.7        | 7.0        | 6.81       | 8.00       | 8.45       |            |            |  |
| Total Magnesium (Mg)                     | mg/L      | 0.1   | --  | --      | 1.5                           | 1.4   | 1.2          | 1.42       | 1.36       | 1.30       | 0.7        | 1.1        | 0.9        | 0.84       | 1.2        | 1.2        | 1.11       | 1.22       | 1.28             | 1.27       | 1.2        | 1.3        | 1.2        | 1.23       | 1.24       | 1.31       | 1.24       | 1.31       |            |            |  |
| Total Phosphorus (3M depth)              | mg/L      | 0.002 | --  | --      | <0.02                         | <0.02 | <0.002       | 0.009      | 0.007      | 0.005      | <0.02      | 0.04       | 0.034      | 0.009      | 0.009      | <0.02      | 0.005      | 0.005      | <0.002           | 0.003      | <0.02      | <0.02      | <0.002     | 0.004      | <0.002     | 0.002      | 0.002      |            |            |            |  |
| Total Potassium (K)                      | mg/L      | 0.1   | --  | --      | 1.1                           | 0.9   | 1.3          | 0.876      | 0.888      | 0.901      | 0.6        | 0.8        | 0.7        | 0.716      | 0.634      | 0.826      | 0.9        | 1.1        | 0.9              | 0.791      | 0.837      | 0.990      | 1          | 1          | 0.8        | 0.87       | 0.905      | 0.968      |            |            |  |
| Total Sodium (Na)                        | mg/L      | 0.1   | --  | --      | 51                            | 46    | 37           | 35.2       | 33.8       | 11         | 15         | 9.9        | 10.7       | 14.7       | 10.6       | 38         | 35         | 28.3       | 33.1             | 33.0       | 39         | 41         | 37         | 28.5       | 34.3       | 33.9       |            |            |            |            |  |
| Reactive Silica (SiO <sub>2</sub> )      | mg/L      | 0.5   | --  | --      | 2.6                           | 2.2   | 2.3          | 2.9        | 3.3        | 4.5        | 4.4        | 2.0        | 4.2        | 4.7        | 2.7        | 2.6        | 3.2        | 3.2        | 2.7              | 2.6        | 3.1        | 2.9        | 3.1        | 3.1        | 2.9        | 3.1        | 3.1        |            |            |            |  |
| Total Suspended Solids                   | mg/L      | 2     | --  | --      | 1                             | 1     | <1           | 4          | 17         | 3          | <2         | 2          | 5          | 6          | 7          | <1         | 1          | 1          | 2                | <2         | <1         | 1          | <1         | <2         | <2         | <1         | <2         | <1         |            |            |  |
| Dissolved Sulphate (SO <sub>4</sub> )    | mg/L      | 2     | --  | --      | 14                            | 13    | 12           | 11         | 11         | 11         | <2         | <2         | <2         | 3          | <2         | <2         |            |            |                  |            |            |            |            |            |            |            |            |            |            |            |  |

TABLE 1: BEDFORD WEST SAMPLING PROGRAM

**Notes:**

RDL = Recordable Detection Limit (represents most recent sampling event RDL)  
RDL = Recordable Detection Limit (NIST standard)

"--" = no guideline available / Not Tested.

CCME FWAL = Canadian Council of Ministers of the Environment Freshwater Aquatic Life Guideline for the protection of the environment and ecological receptors (last update: April 2011)

**Bold** words CCME FWAL Guideline - Present Result.

**Bold** indicates CCME FWAL Guideline - Previous Result.



SNC-LAVALIN

# **ATTACHMENT 1**

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## **Field Reports**

## SLE FIELD REPORT

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

### Site Conditions

|                     |                                   |
|---------------------|-----------------------------------|
| Weather:            | Partly cloudy, 8.0°C              |
| Site Accessibility: | Accessible<br>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

|  |  |
|--|--|
|  |  |
|--|--|

|                                     |                         |
|-------------------------------------|-------------------------|
| Report Completed by: Allain Thebeau | Date: November 01, 2010 |
|-------------------------------------|-------------------------|

## SLE FIELD REPORT

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

### Site Conditions

|                     |                                     |
|---------------------|-------------------------------------|
| Weather:            | Partly cloudy, 8.0°C                |
| Site Accessibility: | Accessible<br>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 |
|-------------------------------------|-------------------------|

## SLE FIELD REPORT

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

### Site Conditions

|                     |   |
|---------------------|---|
| Weather:            | Partly cloudy, 8.0°C                                |
| Site Accessibility: | Accessible<br>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

|  |  |
|--|--|
|  |  |
|--|--|

|                                     |                         |
|-------------------------------------|-------------------------|
| Report Completed by: Allain Thebeau | Date: November 01, 2010 |
|-------------------------------------|-------------------------|

## SLE FIELD REPORT

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

### Site Conditions

|                     |  |
|---------------------|--|
| Weather:            | Partly cloudy, 8.0°C   |
| Site Accessibility: | Accessible<br>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

|  |  |
|--|--|
|  |  |
|--|--|

|                                     |                         |
|-------------------------------------|-------------------------|
| Report Completed by: Allain Thebeau | Date: November 01, 2010 |
|-------------------------------------|-------------------------|

## SLE FIELD REPORT

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

### Site Conditions

|                     |   |
|---------------------|---|
| Weather:            | Partly cloudy, 8.0°C  |
| Site Accessibility: | Accessible<br>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 |
|-------------------------------------|-------------------------|

## SLE FIELD REPORT

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

### **Site Conditions**

|                     |   |
|---------------------|---|
| Weather:            | Partly cloudy, 8.0°C                      |
| Site Accessibility: | Accessible<br>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 |
|-------------------------------------|-------------------------|

## SLE FIELD REPORT

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

### **Site Conditions**

|                     |   |
|---------------------|---|
| Weather:            | Partly cloudy, 8.0°C                      |
| Site Accessibility: | Accessible<br>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 |
|-------------------------------------|-------------------------|

## SLE FIELD REPORT

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

## SLE FIELD REPORT

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

|  |  |
|--|--|
|  |  |
|--|--|

|                                     |                         |
|-------------------------------------|-------------------------|
| Report Completed by: Allain Thebeau | Date: November 01, 2010 |
|-------------------------------------|-------------------------|

# **ATTACHMENT 2**

---

## **Site Photographs**



Photo 1: View of KL1



Photo 2: View of sample location KL2.



Photo 3: View of sample location KL3.

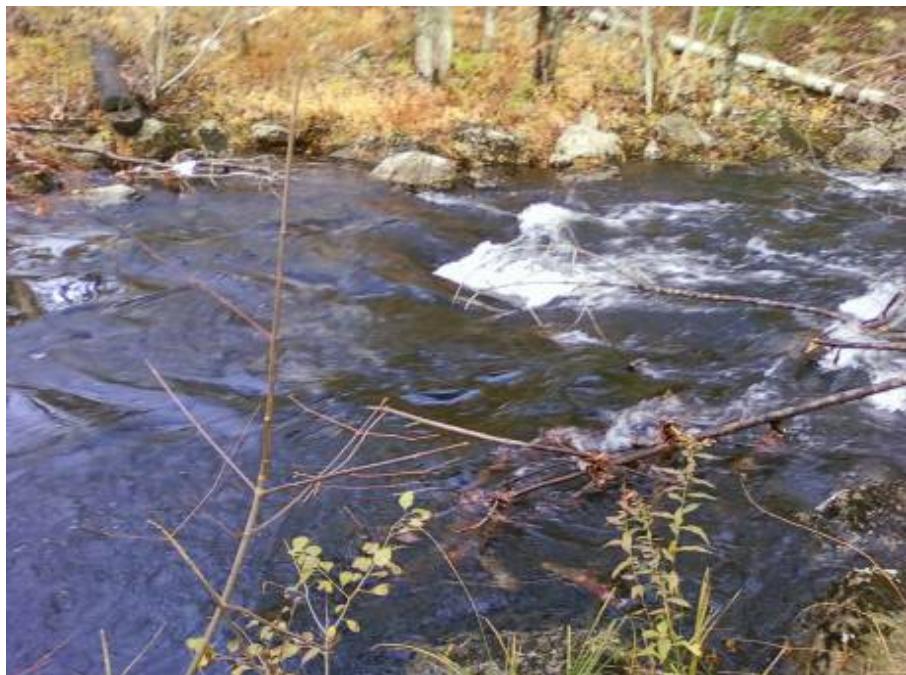


Photo 4: View of sample location KL4, looking downstream.



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<br>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<br>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) ①   | 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) ②   | 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 Oceano

(2) This test was performed by Maxxam Analytics Mississauga

..2

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<br>13:00 | 2010/11/01<br>13:00 |     | 2010/11/01<br>13:30 | 2010/11/01<br>12:00 |              |
| COC Number    |       | N/A                 | N/A                 |     | N/A                 | N/A                 |              |
|               | Units | PML1                | PML1 Lab-Dup        | RDL | PML2                | KL1                 | RDL QC Batch |

| <b>Calculated Parameters</b>                     |       |          |      |       |          |          |               |
|--|-------|----------|------|-------|----------|----------|---------------|
| Anion Sum  | me/L  | 1.09     |      | N/A   | 1.77     | 1.91     | N/A 2315176   |
| Bicarb. Alkalinity (calc. as CaCO <sub>3</sub> ) | mg/L  | 5        |      | 1     | 7        | 6        | 1 2315173     |
| Calculated TDS                                   | mg/L  | 75       |      | 1     | 110      | 118      | 1 2315180     |
| Carb. Alkalinity (calc. as CaCO <sub>3</sub> )   | mg/L  | <1       |      | 1     | <1       | <1       | 1 2315173     |
| Cation Sum                                       | me/L  | 1.20     |      | N/A   | 1.86     | 2.02     | N/A 2315176   |
| Hardness (CaCO <sub>3</sub> )                    | 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       |
| <b>Inorganics</b>                                |       |          |      |       |          |          |               |
| Total Alkalinity (Total as CaCO <sub>3</sub> )   | 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 (SiO <sub>2</sub> )              | 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 (SO <sub>4</sub> )            | 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     |
| <b>Subcontracted Analysis</b>                    |       |          |      |       |          |          |               |
| 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

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     |       | HR9183              |     | HR9184              | HR9185              |     |          |
|---------------|-------|---------------------|-----|---------------------|---------------------|-----|----------|
| Sampling Date |       | 2010/11/01<br>10:50 |     | 2010/11/01<br>11:40 | 2010/11/01<br>11:15 |     |          |
| COC Number    |       | N/A                 |     | N/A                 | N/A                 |     |          |
|               | Units | KL2                 | RDL | KL3                 | KL4                 | RDL | QC Batch |

| <b>Calculated Parameters</b>        |       |          |       |          |          |       |         |
|-------------------------------------|-------|----------|-------|----------|----------|-------|---------|
| 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 |
| <b>Inorganics</b>                   |       |          |       |          |          |       |         |
| 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 |
| <b>Subcontracted Analysis</b>       |       |          |       |          |          |       |         |
| 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

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

| <b>Calculated Parameters</b>        |       |          |       |          |          |       |         |
|-------------------------------------|-------|----------|-------|----------|----------|-------|---------|
| 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 |
| <b>Inorganics</b>                   |       |          |       |          |          |       |         |
| 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 |
| <b>Subcontracted Analysis</b>       |       |          |       |          |          |       |         |
| 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

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

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

### ELEMENTS BY ICP/MS (WATER)

| Maxxam ID     |       | HR9176              | HR9181              | HR9182              | HR9183              | HR9184              |     |          |
|---------------|-------|---------------------|---------------------|---------------------|---------------------|---------------------|-----|----------|
| Sampling Date |       | 2010/11/01<br>13:00 | 2010/11/01<br>13:30 | 2010/11/01<br>12:00 | 2010/11/01<br>10:50 | 2010/11/01<br>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<br>11:15 | 2010/11/01<br>10:00 |          | 2010/11/01<br>09:00 | 2010/11/01<br>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<br>13:00 | 2010/11/01<br>13:30 | 2010/11/01<br>12:00 | 2010/11/01<br>10:50 | 2010/11/01<br>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<br>11:15 |          | 2010/11/01<br>10:00 | 2010/11/01<br>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

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     |  | HR9188              |     |          |
|---------------|--|---------------------|-----|----------|
| Sampling Date |  | 2010/11/01<br>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 |
| <p>N/A = Not Applicable<br/>RDL = Reportable Detection Limit<br/>QC Batch = Quality Control Batch</p> |           |    |   |         |

#### 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<br>Batch<br>Num Init | QC Type                     | Parameter              | Date Analyzed<br>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      |           |
|                            | RPD                         | Total Suspended Solids | 2010/11/03                  | 1.2   |          | %         | 25        |
| 2318195 LKE                | 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<br>[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<br>Batch<br>Num Init | QC Type         | Parameter                         | Date<br>Analyzed<br>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        |
| 2322489 ARS                | QC Standard     | Total Zinc (Zn)                   | 2010/11/03                     | NC    |          | %     | 25        |
|                            | Method Blank    | pH                                | 2010/11/05                     |       | 102      | %     | 80 - 120  |
|                            | RPD [HR9176-01] | pH                                | 2010/11/05                     | 5.80  |          | pH    |           |
|                            |                 | 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<br>Batch<br>Num Init | QC Type      | Parameter                   | Date<br>Analyzed<br>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      Maxxam Analytics Inc., 200 Bluewater Road, Bedford, NS, B4B 1G9

Attention: Michelle Hill                          Re: Determination of chlorophyll a in algae by fluorescence

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 |

- CHl 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

**Received: 02-November-10  
Completed: 05-November-10**



**Cathy Ryan**