HALIFAX
REGIONAL MUNICIPALITY

3.

Halifax Regional Council
September 17, 2002

TO: Mayor Kelly and Members of Halifax Regional Council

SUBMITTED BY: Rick Paynter, P.Eng., Acting Director, Public Works & Transportation

DATE: September 4, 2002

SUBJECT: **McIntosh Run - Water Quality Monitoring**

INFORMATION REPORT

ORIGIN

Halifax Regional Council meeting of February 20, 2001, Item No. 11.1.1(ii) Testing of McIntosh Run from Long Lake to Herring Cove.

BACKGROUND

During the year 2000, a consultant on behalf of a developer and under direction from the Nova Scotia Department of Environment and Labour carried out bacterial testing of water in McIntosh Run in the vicinity of the overflow from Roach's Pond Pumping Station. Similar tests were conducted by another consultant retained by HRM. Samples were collected when there was an overflow from the pumping station, and 24 and 48 hours after the overflow had subsided. Results from both sets of tests showed high concentrations of fecal and total coliforms in McIntosh Run upstream and downstream of the overflow pipe, with no significant difference in the upstream and downstream results.

Concerns with the high concentration of fecal and total coliforms were raised at a meeting of the Halifax County/Halifax Mainland Watershed Advisory Committee. Councillor Adams brought this matter to the February 20, 2001 meeting of Halifax Regional Council and requested further testing of McIntosh Run in order to identify the source of the contamination.

DISCUSSION

Staff has undertaken a monitoring program of the water quality in McIntosh Run over a period of 15 months to cover the seasonal variations. Water samples were collected from various locations along the full length of McIntosh Run from Long Lake to Herring Cove, and these were analysed for fecal and total coliforms. A few samples were also analysed for chemical quality, including a metal scan. A sketch of the area is attached which shows the sampling locations. The results of the tests are summarized in the attached Tables 1, 2 and 3.

Results of the sampling have been reviewed by staff and compared to the results HRM has collected from other urban lakes and major streams in the urban core. The bacterial water quality in McIntosh Run is comparable with the water quality in other lakes and streams. Elevated fecal coliform counts were observed in the samples collected during wet conditions. These higher counts are typical of urban runoff. The coliform counts were significantly lower in samples collected 24 and 48 hours after the end of the rainfall.

Current results were also compared with the results from the previous investigations. The concentrations of fecal and total coliforms in the current results are consistent with the results observed in the previous investigation.

In addition to the water quality sampling, staff inspected all manholes on the trunk sanitary sewer located adjacent to McIntosh Run from Old Sambro Road to Roach's Pond Pumping Station, to see if there was any physical evidence of surcharging and potential for sewage overflow into McIntosh Run. No evidence of surcharging or overflow was observed in any of the manholes.

Storm sewer outfalls emptying into McIntosh Run were also checked, during both wet and dry weather conditions. Traces of sewage (toilet paper) were observed on the outlet grate of one outfall at the foot of Abram's Way. Subsequent investigation led to the identification of two cross connections on Abram's Way, which were then repaired. There was no evidence of sewage at any of the other storm sewer outfalls.

Based on our sampling program and our field investigations, there is no indication that the fecal coliforms upstream of the overflow from Roach's Pond Pumping Station are associated with the sanitary sewer system.

There was no significant difference in the concentration of coliform bacteria between the samples taken from upstream and downstream of the overflow pipe, although there was no overflow occurring when the wet weather samples were collected. It is recognized that during wet weather conditions, there is a potential for overflow from the pumping station into McIntosh Run. However, since the upgrading of the pumping station and construction of the retention facility in the early 1980's, the frequency of overflow has been reduced significantly. Doubling the retention capacity at Roach's Pond Pumping Station is included in the RFP for the Harbour Solutions Project. This will further reduce overflow into McIntosh Run.

Samples at selected locations in McIntosh Run were also collected and analysed for general chemical quality of the water. Chemical analysis did not reveal any abnormalities. A sample was also taken to analyse metal concentrations. With the exception of aluminum, all metal concentrations were within the parameters prescribed in the 1999 CCME Criteria for Canadian Environmental Quality Guidelines for Freshwater Aquatic Life (attached as Table 4). The high concentration of aluminum can be attributed to the natural leaching of aluminum from soils and pyritic slate as a result of acidic rains in our area. In previous work, Long Lake (which drains into McIntosh Run) has been shown to have elevated aluminum concentrations as high as 210 μg/L in 1984 to 930 μg/L in 1990. The Nova Scotia average is reported to be 145 μg/L.

There was a concern raised by the area Councillor with respect to lead and copper in Powers Pond in Herring Cove, so additional samples were collected and analysed for lead and copper. The levels of these two metals in McIntosh Run and Powers Pond were within the limits prescribed in the1999 CCME Criteria for Canadian Environmental Quality Guidelines for Freshwater Aquatic Life (attached as Table 4).

BUDGET IMPLICATIONS

N/A

FINANCIAL MANAGEMENT POLICIES/BUSINESS PLAN

This report complies with the Municipality's Multi-Year Financial Strategy, the approved Operating, Capital and Reserve budgets, policies and procedures regarding withdrawals from the utilization of Capital and Operating reserves, as well as any relevant legislation.

ALTERNATIVES

N/A

ATTACHMENTS

1. Sketch showing location of sampling.
2. Tables 1, 2, 3 and 4.

Additional copies of this report, and information on its status, can be obtained by contacting the Office of the Municipal Clerk at 490-4210, or Fax 490-4208.

Report Prepared by: Naipal S. Tomar, P.Eng., Sr. Environmental Engineer, Environmental & Right of Way Services, 490-6946

Report Approved by: John P. Sheppard, P.Eng., Manager, Environmental & Right of Way Services, 490-6958

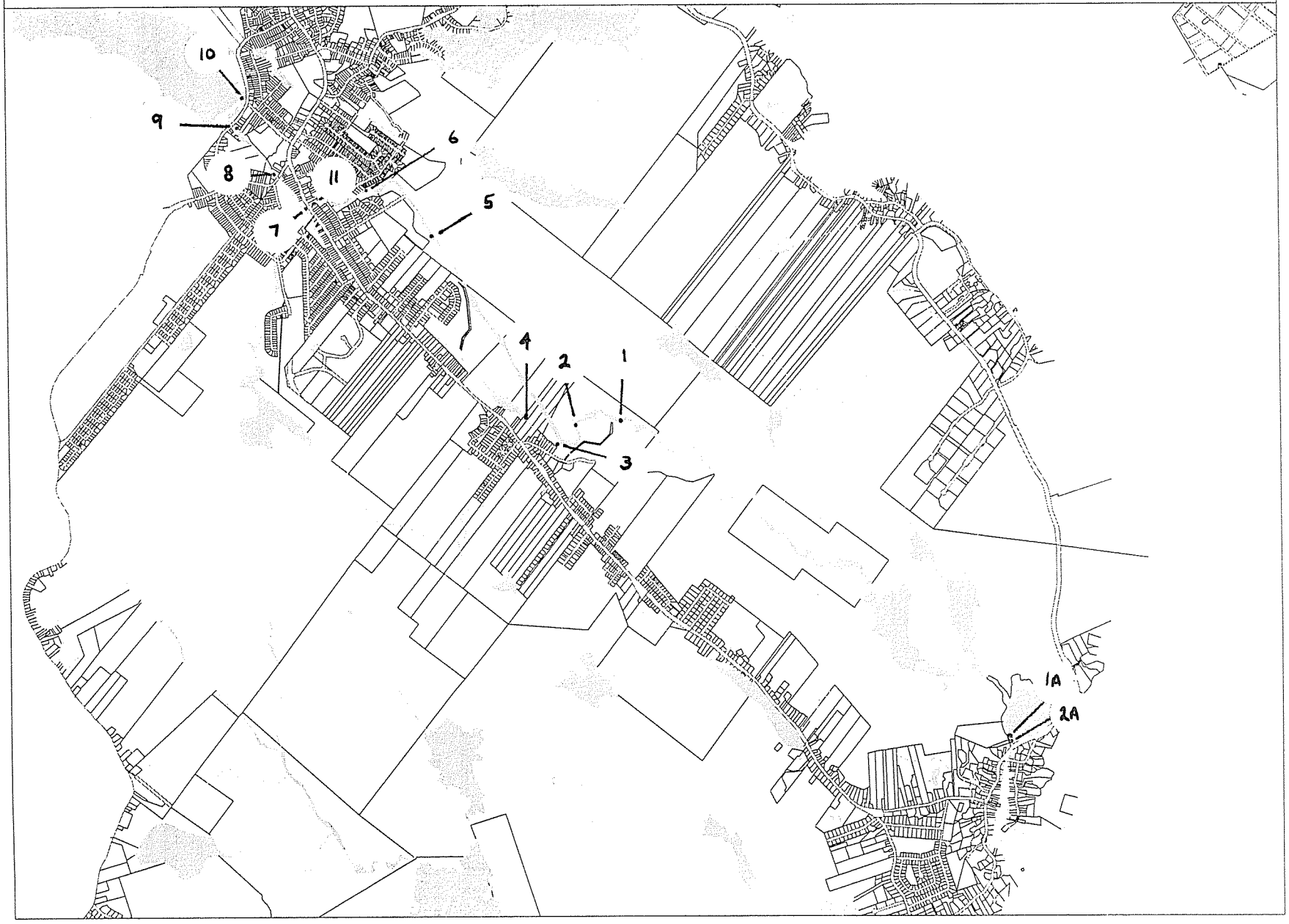
Map User: TOMARN
18-JUN-2002
ReGIS
Environment Plot

McIntosh Run

Sampling Locations

This plan was prepared for the internal purposes of Halifax Regional Municipality (HRM). HRM does not guarantee the accuracy of any representation on the plan.

Scale 1: 38334



McINTOSH RUN FECAL / TOTAL COLIFORM RESULTS

TABLE 1

Sampling Dates	Wet / Dry Period	Site 1 Fecal units / 100 mL	Site 1 Total units / 100 mL	Site 1A Fecal units / 100 mL	Site 1A Total units / 100 mL	Site 2 Fecal units / 100 mL	Site 2 Total units / 100 mL	Site 3 Fecal units / 100 mL	Site 3 Total units / 100 mL	Site 4 Fecal units / 100 mL	Site 4 Total units / 100 mL
03-Jan-2001	winter dry	44	280	n/a	n/a	8	396	36	220	18	330
07-May-2001	spring dry	4	> 200	0	> 200	5	> 200	1	> 200	0	> 200
14-May-2001	spring wet	88.	> 200	101	> 200	109	> 200	109	> 200	101	> 200
15-May-2001	24 hrs. later	27	> 200	> 200	> 200	27	> 200	> 200	> 200	200	> 200
16-May-2001	48 hrs. later	27	> 200	109	> 200	15	> 200	109	> 200	118	> 200
24-Jul-2001	summer dry	41	1500	20	1240	72	1620	41	8660	86	24,200
13-Aug-2001	summer wet	448	6490	749	4880	583	9210	3080	> 24,200	1470	> 24,200
14-Aug-2001	24 hrs. later	2	80	0	53	4	190	2	49	4	71
15-Aug-2001	48 hrs. later	1	46	0	65	7	240	2	69	3	86
05-Nov-2001	fall dry	484	1450	10	384	96	2480	10	857	10	703
04-Mar-2002	winter wet	121	794	< 10	520	52	855	30	573	20	450
05-Mar-2002	24 hrs. later	31	327	10	1080	< 10	74	41	345	20	350
06-Mar-2002	48 hrs. later	< 10	281	10	468	< 10	246	20	292	< 10	231

Sampling Dates	Wet / Dry Period	Site 5 Fecal units / 100 mL	Site 5 Total units / 100 mL	Site 6 Fecal units / 100 mL	Site 6 Total units / 100 mL	Site 7 Fecal units / 100 mL	Site 7 Total units / 100 mL	Site 8 Fecal units / 100 mL	Site 8 Total units / 100 mL	Site 9 Fecal units / 100 mL	Site 9 Total units / 100 mL
03-Jan-2001	winter dry	12	358	2	380	8	266	0	306	0	380
07-May-2001	spring dry	2	> 200	11	109	130	200	0	25	0	14
14-May-2001	spring wet	> 200	> 200	> 200	> 200	130	> 200	78	> 200	3	> 200
15-May-2001	24 hrs. later	144	> 200	15	> 200	10	> 200	10	> 200	12	> 200
16-May-2001	48 hrs. later	> 200	> 200	9	> 200	18	> 200	10	> 200	5	> 200
24-Jul-2001	summer dry	85	7700	31	2480	31	2360	< 10	3650	< 10	3870
13-Aug-2001	summer wet	2380	> 24,200	2600	> 24,200	1620	> 24,200	3260	19,900	5480	> 24,200
14-Aug-2001	24 hrs. later	10	83	1	27	2	39	1	21	0	25
15-Aug-2001	48 hrs. later	17	240	11	130	15	140	9	84	3	43
05-Nov-2001	fall dry	397	3130	233	1330	122	717	< 10	546	10	354
04-Mar-2002	winter wet	275	2910	20	3260	30	631	< 10	408	< 10	305
05-Mar-2002	24 hrs. later	63	448	10	256	62	594	< 10	183	10	187
06-Mar-2002	48 hrs. later	31	216	< 10	285	< 10	389	< 10	218	10	173

Sampling Dates	Wet / Dry Period	Site 10 Fecal units / 100 mL	Site 10 Total units / 100 mL
03-Jan-2001	winter dry	n/a	n/a
07-May-2001	spring dry	0	5
14-May-2001	spring wet	83	> 200
15-May-2001	24 hrs. later	10	> 200
16-May-2001	48 hrs. later	11	> 200
24-Jul-2001	summer dry	< 10	85
13-Aug-2001	summer wet	107	4570
14-Aug-2001	24 hrs. later	0	27
15-Aug-2001	48 hrs. later	0	0
05-Nov-2001	fall dry	< 10	158
04-Mar-2002	winter wet	41	318
05-Mar-2002	24 hrs. later	20	256
06-Mar-2002	48 hrs. later	< 10	275

n/a - not available

McINTOSH RUN GENERAL CHEMISTRY

TABLE 2

Site	Chemistry	Unit	03-Jan-01 winter dry	07-May-01 spring dry	14-May-01 spring wet	13-Aug-01 summer wet	05-Nov-01 fall dry	04-Mar-02 winter wet
1	Biological Oxygen Demand	mg / L	< 2.0	< 5	< 5	< 5	< 5	3.0
	Total Suspended Solids	mg / L	< 1.5	< 2	8.5	5.3	< 2.0	6.5
	Nitrates	mg / L		0.15	0.08	< 0.5	0.07	0.11
	Nitrites	mg / L		nd	nd	< 0.1	0.01	< 0.01
	Total Kjeldahl Nitrogen	mg / L		0.2	1	0.8	0.3	0.3
	Total Phosphorus	mg / L	0.018	0.01	nd	< 0.1	< 0.01	< 0.01
2	Biological Oxygen Demand	mg / L	< 2.0					
	Total Suspended Solids	mg / L	< 1.5					
	Nitrates	mg / L						
	Nitrites	mg / L						
	Total Kjeldahl Nitrogen	mg / L						
	Total Phosphorus	mg / L	0.013					
2A	Biological Oxygen Demand	mg / L		< 5	< 5	< 5	< 5	5.0
	Total Suspended Solids	mg / L		2.0	6.5	6.4	3.0	7.0
	Nitrates	mg / L		0.06	0.06	< 0.05	0.05	0.08
	Nitrites	mg / L		nd	nd	< 0.01	< 0.01	< 0.01
	Total Kjeldahl Nitrogen	mg / L		0.2	nd	0.5	0.4	0.3
	Total Phosphorus	mg / L		0.02	nd	< 0.1	< 0.01	< 0.01
3	Biological Oxygen Demand	mg / L	< 2.0					
	Total Suspended Solids	mg / L	< 1.5					
	Nitrates	mg / L						
	Nitrites	mg / L						
	Total Kjeldahl Nitrogen	mg / L						
	Total Phosphorus	mg / L	0.014					
11	Biological Oxygen Demand	mg / L		< 5	< 5	< 5	< 5	4.0
	Total Suspended Solids	mg / L		2.5	25	7.2	2.9	2.0
	Nitrates	mg / L		0.13	0.33	0.09	0.15	0.11
	Nitrites	mg / L		nd	nd	< 0.01	< 0.01	< 0.01
	Total Kjeldahl Nitrogen	mg / L		0.3	nd	0.4	0.2	0.4
	Total Phosphorus	mg / L		0.01	nd	< 0.1	0.04	< 0.01

nd - not detected

McINTOSH RUN METAL SCAN

TABLE 3

Site 2		Site 2A					Site 11			
Metal	04-Mar-02 winter wet	Metal	07-May-01 spring dry	27-Aug-01 summer dry	05-Nov-01 fall dry	04-Mar-02 winter wet	Metal	27-Aug-01 summer dry	05-Nov-01 fall dry	04-Mar-02 winter wet
Aluminum		Aluminum	[250]				Aluminum			
Antimony		Antimony	< 2				Antimony			
Arsenic		Arsenic	< 2				Arsenic			
Barium		Barium	11				Barium			
Beryllium		Beryllium	< 5				Beryllium			
Bismuth		Bismuth	< 2				Bismuth			
Boron		Boron	6				Boron			
Cadmium		Cadmium	< 0.3				Cadmium			
Chromium		Chromium	< 2				Chromium			
Cobalt		Cobalt	< 1				Cobalt			
Copper	< 0.01	Copper	2	2	nd	< 0.01	Copper	4	2	< 0.01
Iron		Iron	190				Iron			
Lead	< 0.05	Lead	0.8	1	0.6	< 0.05	Lead	nd	nd	< 0.05
Manganese		Manganese	53				Manganese			
Molybdenum		Molybdenum	< 2				Molybdenum			
Nickel		Nickel	2				Nickel			
Selenium		Selenium	< 2				Selenium			
Silver		Silver	< 0.5				Silver			
Strontium		Strontium	22				Strontium			
Thallium		Thallium	< 0.1				Thallium			
Tin		Tin	< 2				Tin			
Titanium		Titanium	< 2				Titanium			
Uranium		Uranium	0.1				Uranium			
Vanadium		Vanadium	< 2				Vanadium			
Zinc		Zinc	17				Zinc			

nd - not detected

All results measured in ug / L

[250] - exceeds environmental criteria (aluminum)

H:\ENG\wp\ENVSERVS\LOTUS\mcintoshmetal01.123

Table 4:

Parameter	CCME Freshwater Aquatic Life (μg/L)
Aluminum	5 - 100
Antimony	NR
Arsenic	5
Barium	NR
Beryllium	NR
Bismuth	NR
Boron	NR
Cadmium	0.017
Chromium	[1]8.9 / 1.0
Cobalt	NR
Copper	2 - 4
Iron	[1]300
Lead	1 - 7
Manganese	NR
Molybdenum	73
Nickel	25 - 150
Selemium	1
Silver	0.1
Strontium	NR
Thallium	0.8
Tin	NR
Tatanium	NR
Uranium	NR
Vanadium	NR
Zinc	30

Notes: NR - not regulated

Freshwater Criteria taken from 1999 CCME *Canadian Environmental Quality Guidelines*

[1] - Trivalent Chromium - 8.9 μg/L; Hexavalent Chromium 1.0 μg/L
[2] - Trivalent Chromium - 56 μg/L; Hexavalent Chromium 1.5 μg/L