

From: [Miki Ehrlich](#)
To: permits@mvlwb.com
Subject: Postings for MV2009L3-0007
Date: Monday, April 02, 2012 11:36:33 AM

Hi Elaine,

Please post the following to MV2009L3-0007

Post [Z:\COMPANYFILES_MUNICIPAL WLS\City of Yellowknife \(MV2009L3-0007\)\Mgmt Plans and Studies\Landfill Ops and Maintenance Manual\March 2012 Revision\Landfill O&M Manual March 2012 Revision.pdf](Z:\COMPANYFILES_MUNICIPAL WLS\City of Yellowknife (MV2009L3-0007)\Mgmt Plans and Studies\Landfill Ops and Maintenance Manual\March 2012 Revision\Landfill O&M Manual March 2012 Revision.pdf)

Under Management Plans – Landfill Operations and Maintenance

File title: MV2009L3-0007 - Landfill Operations and Maintenance Manual – Mar-29-12

Post [Z:\COMPANYFILES_MUNICIPAL WLS\City of Yellowknife \(MV2009L3-0007\)\Mgmt Plans and Studies\Stormwater Management Plan\March 2012 Revision\Stormwater Management Plan - March 2012 Revision.pdf](Z:\COMPANYFILES_MUNICIPAL WLS\City of Yellowknife (MV2009L3-0007)\Mgmt Plans and Studies\Stormwater Management Plan\March 2012 Revision\Stormwater Management Plan - March 2012 Revision.pdf)

Under Management Plans – Water Management

File title: MV2009L3-0007 – Stormwater Management Plan – Mar-29-12

Post [Z:\COMPANYFILES_MUNICIPAL WLS\City of Yellowknife \(MV2009L3-0007\)\Mgmt Plans and Studies\Annual Report\2011 City of Yellowknife Annual Water Licence Report.pdf](Z:\COMPANYFILES_MUNICIPAL WLS\City of Yellowknife (MV2009L3-0007)\Mgmt Plans and Studies\Annual Report\2011 City of Yellowknife Annual Water Licence Report.pdf)

Under reports and Studies - Annual

File title: MV2009L3-0007 – 2012 Annual Report – Mar-29-12

Post [Z:\COMPANYFILES_MUNICIPAL WLS\City of Yellowknife \(MV2009L3-0007\)\Mgmt Plans and Studies\Annual Report\Biotreatment Pad 2011 Annual Report.pdf](Z:\COMPANYFILES_MUNICIPAL WLS\City of Yellowknife (MV2009L3-0007)\Mgmt Plans and Studies\Annual Report\Biotreatment Pad 2011 Annual Report.pdf)

Under reports and Studies - Annual

File title: MV2009L3-0007 – 2011 Biotreatment Pad Annual Report – Mar-29-12

Thanks!!

Miki



March 29, 2012

Miki Ehrlich, Regulatory Officer
Mackenzie Valley Land and Water Board
P.O. Box 2130
7th Floor – 4910 50th Avenue
Yellowknife, NT X1A 2P6

RE: Water Licence – MV2009L3-0007
2011 Annual Water Licence Report

Dear Ms. Ehrlich,

Submitted herein is the City's 2011 Annual Report. This submission includes the following documents and management plans:

- 2011 City of Yellowknife Annual Water Licence Report
- 2011 Biotreatment Pad Annual Report
- Stormwater Management Plan – March 2012 Revision (for approval)
- Landfill Operations and Maintenance Manual – March 2012 Revision (for approval)

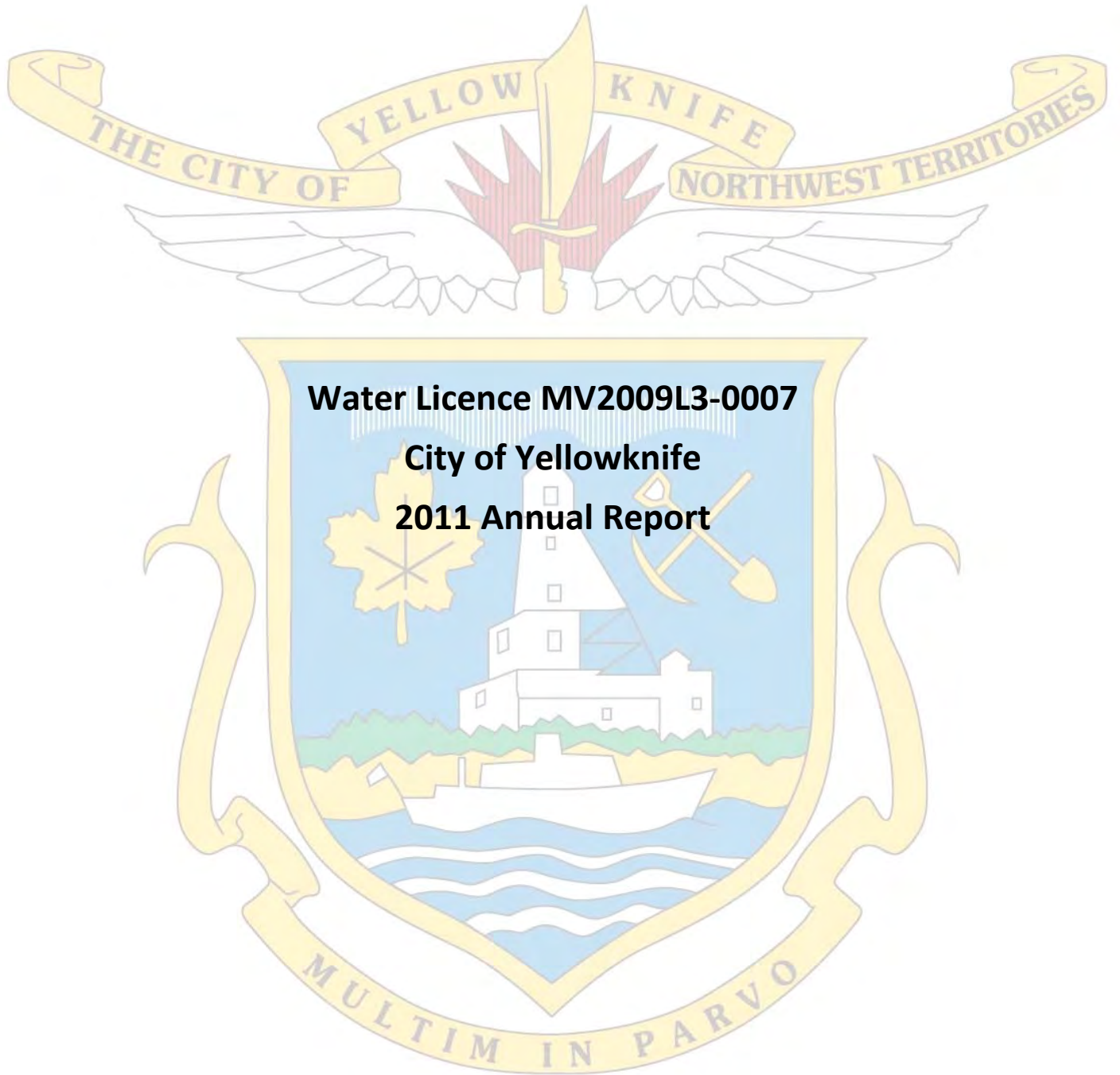
In addition, a revised Biotreatment Pad Operations and Maintenance Manual will be submitted by April 30th, 2012. In the letter of response to comments on this Plan, the City intended to submit the revised Plan with the Annual Report. However, as the approval of this Plan was received on March 21, 2012, the additional revisions were not able to be done by the end of March.

Should you have any questions or require additional information, please contact me at 920-5689 or by email at walexander@yellowknife.ca.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Wendy Alexander'.

Wendy Alexander, P.Eng.
Municipal Works Engineer
Public Works & Engineering



Water Licence MV2009L3-0007

**City of Yellowknife
2011 Annual Report**

Submitted to:

Mackenzie Valley Land and Water Board

By:

Department of Public Works & Engineering
March 2012

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Introduction

This report is being submitted by the City of Yellowknife to the Mackenzie Valley Land and Water Board as part of the requirements of Water Licence MV2009L3-0007. The numbering for each section is based on Schedule 1 – General Conditions of the licence.

a) Monthly and Annual Water Quantities

The following table summarizes the monthly and annual water quantities taken from the Yellowknife River and Yellowknife Bay.

Month	Yellowknife River (m ³)	Yellowknife Bay (m ³)
January	224,907	0
February	212,401	0
March	254,725	0
April	248,882	0
May	272,374	0
June	315,202	0
July	298,788	0
August	290,823	0
September	258,481	0
October	247,505	0
November	240,625	0
December	254,204	0
Total	3,118,917	0

b) Monthly and Annual Waste Quantities

1) Wastes Discharged to Lagoon

The following table summarizes the monthly and annual sewage quantities discharged from Lift Stations 5 and 6 into the lagoon.

Month	Lift Station 5 (m ³)	Lift Station 6 (m ³)	Total (m ³)
January	178,913	34,087	213,000
February	164,418	30,129	194,548
March	315,917	35,788	351,705
April	318,612	40,997	359,609
May	366,732	53,450	420,182
June	356,678	53,099	409,777
July	370,303	52,408	422,711

Month	Lift Station 5 (m ³)	Lift Station 6 (m ³)	Total (m ³)
August	382,287	60,335	442,622
September	258,481	50,146	308,628
October	385,300	44,014	429,314
November	342,152	36,832	378,984
December	340,164	33,863	374,027
Total	3,779,958	525,149	4,305,107

2) Wastes Received at Solid Waste Facility

The following tables summarize the monthly and annual quantities for bulk wastes received at the Solid Waste Facility (SWF).

Waste Type	Weight (tn)						
	Jan.	Feb.	Mar.	Apr.	May	June	Six Month Subtotal
Mixed Solid Waste	1298	787	934	947	3,186	1,355	8,507
Cooking Grease	4	5	8	4	3	3	27
Asbestos	48	7	1	0	1	0	57
Construction/Demolition	151	179	319	308	422	562	1,941
Asphalt	0	23	46	16	47	48	180
Concrete	9	61	94	34	216	302	716
Wood	0	0	0	0	0	0	0
Cardboard	56	59	65	71	74	72	397
Boxboard & Paper	16	20	19	15	24	18	112
Newspaper	6	7	7	9	8	12	49
Glass	28	25	37	26	39	36	191
Mixed Recycling	6	47	6	6	7	7	79
Tree Branches	5	0	1	6	72	20	104
Ash – Pellet Stoves	0	9	1	1	7	5	23
Scrap Metal	52	16	23	31	52	46	220
Total	1,679	1,245	1,561	1,474	4,158	2,486	12,603

Waste Type	Weight (tn)						
	Aug.	Sept.	Oct.	Nov.	Dec.	Six Month Subtotal	Yearly Total
Mixed Solid Waste	1,424	1,363	1,082	924	1,009	15,870	24,377
Cooking Grease	4	4	4	4	5	52	79
Asbestos	0	2	0	0	0	67	124
Construction/Demolition	662	445	373	233	296	4,336	6,277
Asphalt	334	110	45	10	5	711	891
Concrete	1260	309	249	255	8	2,909	3,625
Wood	0	20	53	38	20	131	131
Cardboard	80	88	94	104	109	953	1350
Boxboard & Paper	21	22	11	18	39	235	347
Newspaper	6	6	16	13	11	117	166
Glass	39	30	40	13	28	380	571
Mixed Recycling	7	7	12	5	8	126	205
Tree Branches	43	53	7	11	2	256	360
Ash – Pellet Stoves	0	6	0	0	1	32	55
Scrap Metal	270	43	52	24	27	721	941
Total	4,150	2,508	2,038	1,652	1,568	26,896	39,499

The following tables summarize the monthly and annual quantities for individual wastes received at the Solid Waste Facility (SWF).

Waste Type	Number Received						
	Jan.	Feb.	Mar.	Apr.	May	June	Six Month Subtotal
Automotive Batteries	88	49	97	125	217	259	835
Tires (Regular)	412	309	529	702	595	838	3,385
Tires (Oversized)	15	13	71	27	22	21	169
Appliance (With Freon)	34	22	37	41	90	66	290
Appliance (Without Freon)	132	131	135	177	326	260	1,161
Animal Carcass (small)				76	16	31	123
Animal Carcass (Large)							0
Vehicle	2	3	7	17	20	17	66
Oil Tank	2	6	0	10	14	19	51

Waste Type	Number Received						
	Aug.	Sept.	Oct.	Nov.	Dec.	Six Month Subtotal	Yearly Total
Automotive Batteries	109	98	124	99	43	92	565
Tires (Regular)	698	735	656	891	1007	402	4,389
Tires (Oversized)	77	12	59	5	93	62	308
Appliance (With Freon)	57	88	82	79	33	41	380
Appliance (Without Freon)	222	194	237	237	146	138	1,174
Animal Carcass (small)	5	3		3		3	14
Animal Carcass (Large)		1					1
Vehicle	9	9	23	13	8	5	67
Oil Tank	8	9	6	7	8	4	42

c) Annual Waste Quantities Removed From Solid Waste Facility

The following table summarizes the annual quantities of specific wastes shipped from the SWF.

Waste Type	Amount Shipped
Cardboard	652 tonnes
Boxboard	130 tonnes
Newspaper	69 tonnes
Mixed Recycling	6 tonnes
Scrap Metal (including appliances & vehicles)	432 tonnes
Batteries (lead-acid)	1,400

d) Modifications and Major Maintenance Work at Water and Waste Facilities

1) Work at Water Supply Facilities

In 2011 the City performed the following work on its water supply facilities and associated infrastructure:

- Continuation of the annual water and sewer main (and services) replacement program.
- Continuation of upgrades to water meters to WWMR/AMR compatible types.
- Continuation of installation and upgrades to back-up power units at pump houses and lift stations.
- Upgrades to infrastructure and continuation of design for the City of Yellowknife's new water treatment plant.

- Continuation of assessment of monitors and controls in pump houses and lift stations for upgrading.

2) Work on Sewage Infrastructure

In 2011 the following work was done on the sewage disposal system for the City:

- Lagoon control structure repairs (leak repair).

3) Work at Solid Waste Facility

In 2011 the following work was done at the SWF:

- Began shaping areas of the landfill to final contours in preparation for closure.
- Continued Pilot Composting Project.
- Re-organization of hazardous waste storage areas
- Construction of new landfill cell

e) Summaries of SNP Data

1) Lagoon Test Results

The following tables summarize the lagoon test results for SNP stations 0032-F1, 0032-F3 and 0032-10. Testing at 0032-10 began the last week of July and continued through the end of November when the decant period ended.

Parameter	Unit	19-Jan		16-Feb		16-Mar		20-Apr	
		F1	F3	F1	F3	F1	F3	F1	F3
Alkalinity, Total (as CaCO ₃)	mg/L	120	139	139	178	159	261	180	301
Sp. Conductivity (@25°C)	µS/cm	420	511	432	541	490	707	522	799
pH		7	7.21	7.09	7.11	7.18	7.19	6.98	7.16
Solids, Total Dissolved	mg/L	248	288	286	352	296	438	312	498
Solids, Total Suspended	mg/L	424	<3	8	12	10	60	32	34
Ammonia as Nitrogen	mg/L	1.25	3.87	1.82	5.47	2.09	6.17	2.64	7.39
Biological Oxygen Demand	mg/L	15	4	2	9	3	18	10	15
CBOD	mg/L	11	4	2	5	3	5	3	6
Organic Carbon, Total	mg/L	24.8	25.2	26.2	32.4	26.3	37.8	28.3	41.6
Ortho-Phosphate as Phosphorus	mg/L	0.952	2.47	1.16	3.72	1.28	4.82	2	5.63
Calcium	mg/L	33.5	38.8	37.4	54.7	37.6	58.5	42.5	67.4
Chloride	mg/L	38	45.7	41.2	59.7	41.7	59.3	40.4	60.4
Fluoride	mg/L	0.3	0.5	0.4	0.6	0.3	0.6	0.3	0.6
Hardness	mg/L	131	147	146	206	147	221	167	255
Magnesium	mg/L	11.6	12	12.9	16.9	13	18.1	14.7	21.2
Nitrite as Nitrogen	mg/L	0.05	0.39	0.14	0.25	0.17	0.12	0.03	0.11
Potassium	mg/L	9.1	12.5	9.8	17.1	9.9	16.6	10.7	18.6
Sodium	mg/L	27.2	33.9	29.7	44.7	29.1	43	32	19
Sulphate	mg/L	21	28	22	31	21	20	14	10
Coliforms, Fecal	CFU/100mL	<1	12	4	8	<1	<2	2	2
Fecal Streptococcus	MPN/100mL	2	14.8	3.1	10.6	2	<1	<1	1
Hexane Extractable Material	mg/L	<2	<2	<2	<2	<2	<2	2.2	3.5
Kjeldahl Nitrogen, Total	mg/L	2.47	5.64	3.45	7.67	3.9	8.6	4.2	9.7
Phosphorous, Dissolved	mg/L	0.93	2.48	1.23	3.9	1.33	4.89	2.24	5.93
Phosphorous, Total	mg/L	2.06	2.8	1.56	5.03	1.89	7.69	3.97	9.95

Parameter	Unit	18-May		15-Jun		20-Jul	
		F1	F3	F1	F3	F1	F3
Alkalinity, Total (as CaCO₃)	mg/L	35.5	11.7	48.4	65.4	58.1	62.4
Sp. Conductivity (@25°C)	µS/cm	112	40.6	137	200	160	193
pH		6.99	6.84	7.49	8.05	7.16	9.78
Solids, Total Dissolved	mg/L	92	40	106	138	118	128
Solids, Total Suspended	mg/L	12	4	10	<2	8	<3
Ammonia as Nitrogen	mg/L	0.06	0.14	0.01	0.04	0.01	0.02
Biological Oxygen Demand	mg/L	6	4	3	9	3	<2
CBOD	mg/L	6	3	3	2	<2	<2
Organic Carbon, Total	mg/L	16.9	9.7	18.9	15.7	18.9	15.1
Ortho-Phosphate as Phosphorus	mg/L	0.276	0.235	0.443	1.33	0.425	0.777
Calcium	mg/L	9.6	3.5	13.7	18.4	15.8	15.7
Chloride	mg/L	8.8	2.5	13.2	20.5	13.8	22.4
Fluoride	mg/L	0.2	<0.1	0.2	0.4	0.1	0.3
Hardness	mg/L	38.7	13.9	57	71.6	66.2	64.9
Magnesium	mg/L	3.6	1.3	5.6	6.2	6.5	6.3
Nitrite as Nitrogen	mg/L	0.16	<0.01	<0.01	<0.01	<0.01	<0.01
Potassium	mg/L	3.2	1.5	3.4	6.5	2.3	3.6
Sodium	mg/L	6	2	9.7	15.5	10.7	17.2
Sulphate	mg/L	3	<1	4	8	3	3
Coliforms, Fecal	CFU/100mL	<1	1	1	19	161	6
Fecal Streptococcus	MPN/100mL	2	<1	6.1	18.1	288	387
Hexane Extractable Material	mg/L	<2	<2	<2	<2	<2	<2
Kjeldahl Nitrogen, Total	mg/L	1.15	0.8	1.09	1.3	1.1	1
Phosphorous, Dissolved	mg/L	0.32	0.28	0.46	1.29	0.46	0.87
Phosphorous, Total	mg/L	0.66	0.48	0.55	1.37	0.58	1.05

Parameter	Unit	27-Jul			3-Aug			10-Aug		
		F1	F3	32-10	F1	F3	32-10	F1	F3	32-10
Alkalinity, Total (as CaCO ₃)	mg/L	162	203		61.9	63.9		59.9	64.7	
Sp. Conductivity (@25°C)	µS/cm	60.1	62.5		158	193		169	213	
pH		7.58	10.2	7.78	7.35	9.89	7.4	7.39	9.98	7.32
Solids, Total Dissolved	mg/L	102	54		132	140		110	120	
Solids, Total Suspended	mg/L	8	4	24	7	2	32	n/a	n/a	52
Ammonia as Nitrogen	mg/L	0.01	0.02	20.8	0.01	0.02	24.4	0.01	0.02	15.2
Biological Oxygen Demand	mg/L	2	<2	22	2	<2	71	5	2	81
CBOD	mg/L	3	2		2	<2		2	2	
Organic Carbon, Total	mg/L	19.8	15.2		21.9	17.4		23.1	18.8	
Ortho-Phosphate as Phosphorus	mg/L	0.494	0.587		0.471	0.471		0.452	0.768	
Calcium	mg/L	16.1	16.3		14.7	15.1		14.6	14	
Chloride	mg/L	14.4	24.8		12.1	21.7		12.2	21.6	
Fluoride	mg/L	0.1	0.4		0.2	0.3		0.1	0.3	
Hardness	mg/L	67.6	67.5		62.1	62.2		61.6	58.9	
Magnesium	mg/L	6.6	6.5		6.1	5.9		6.1	5.8	
Nitrite as Nitrogen	mg/L	<0.01	<0.01		0.01	<0.01		<0.01	<0.01	
Potassium	mg/L	2.4	4.5		2.3	4.8		2.4	5.6	
Sodium	mg/L	11.2	19.3		10.2	17.7		10.2	17.2	
Sulphate	mg/L	3	3		2	2		3	2	
Coliforms, Fecal	CFU/100mL	230	1	600	152	10	9200	<1	<1	9000
Fecal Streptococcus	MPN/100mL	687	291	156	19.9	21.3	710	17.9	6.3	583
Hexane Extractable Material	mg/L	<2	<2	<2	<2	<2	<2	<2	<2	3.2
Kjeldahl Nitrogen, Total	mg/L	1.05	1.03		1.21	1.13		1	1	
Phosphorous, Dissolved	mg/L	0.55	0.62		0.65	0.94		0.52	0.85	
Phosphorous, Total	mg/L	0.65	0.75	3.42	0.76	1.03	4.48	0.58	0.96	3.69

Parameter	Unit	17-Aug			24-Aug			31-Aug		
		F1	F3	32-10	F1	F3	32-10	F1	F3	32-10
Alkalinity, Total (as CaCO ₃)	mg/L	60.5	194		62.2	72.2		66.4	77.1	
Sp. Conductivity (@25°C)	µS/cm	158	3.8		161	206		191	240	
pH		7.19	8.82	6.79	7.25	8.82	5.46	7.27	7.76	8.1
Solids, Total Dissolved	mg/L	118	136		154	130		102	138	
Solids, Total Suspended	mg/L	15	<3	52	17	6	64	6	4	58
Ammonia as Nitrogen	mg/L	0.05	0.04	1.89	0.04	0.05	0.03	0.06	0.2	0.13
Biological Oxygen Demand	mg/L	5	4	39	4	3	78	10	5	26
CBOD	mg/L	5	<2		3	4		2	3	
Organic Carbon, Total	mg/L	23.8	19.1		26.6	19.4		25.4	19.3	
Ortho-Phosphate as Phosphorus	mg/L	0.512	1.5		0.539	2.15		0.548	2.39	
Calcium	mg/L	15	15		15.6	17.6		17.9	19.3	
Chloride	mg/L	12	20.4		12.1	22.4		14.4	22.6	
Fluoride	mg/L	0.1	0.3		0.1	0.3		0.1	0.3	
Hardness	mg/L	62.7	62.7		64.8	72.5		73.9	77.4	
Magnesium	mg/L	6.1	6.1		6.3	6.9		7.1	7.1	
Nitrite as Nitrogen	mg/L	<0.01	<0.01		<0.01	<0.01		<0.01	<0.01	
Potassium	mg/L	2.6	5.6		2.9	6.2		3.3	6.5	
Sodium	mg/L	9.8	16.1		10.2	18		11.2	17.8	
Sulphate	mg/L	2	2		3	2		3	2	
Coliforms, Fecal	CFU/ 100mL	<1	12	2200	2	3	340	14	6	40
Fecal Streptococcus	MPN/ 100mL	70.8	365	5160	18.1	43.7	66500	24.7	23.3	1010
Hexane Extractable Material	mg/L	20	<2	<2	<2	<2	<2	<2	<2	5
Kjeldahl Nitrogen, Total	mg/L	1.14	1.11		1.3	1.59		1.91	1.5	
Phosphorous, Dissolved	mg/L	0.62	1.68		0.63	2.19		0.65	2.59	
Phosphorous, Total	mg/L	1.01	1.87	3.36	0.96	2.39	3.5	1.46	2.79	3.2

Parameter	Unit	7-Sep			14-Sep			21-Sep		
		F1	F3	32-10	F1	F3	32-10	F1	F3	32-10
Alkalinity, Total (as CaCO ₃)	mg/L	69.6	78.6		70.3	80.2		70.7	81.1	
Sp. Conductivity (@25°C)	µS/cm	185	223		187	229		198	247	
pH		7.23	7.75	7.7	7.3	7.78	7.65	7.28	7.62	7.3
Solids, Total Dissolved	mg/L	128	136		140	154		120	150	
Solids, Total Suspended	mg/L	4	3	34	8	7	28	4	3	10
Ammonia as Nitrogen	mg/L	0.02	0.11	0.02	0.01	0.1	0.14	0.02	0.23	0.23
Biological Oxygen Demand	mg/L	2	3	22	4	6	24	3	4	7
CBOD	mg/L	2	3		3	6		2	2	
Organic Carbon, Total	mg/L	21.5	18.6		22.9	18		21	17.2	
Ortho-Phosphate as Phosphorus	mg/L	0.471	2.15		0.377	1.97		0.453	1.91	
Calcium	mg/L	18.7	20		19.2	21.2		20	23.3	
Chloride	mg/L	16.3	23.6		17	23.5		19.2	24.8	
Fluoride	mg/L	0.2	0.3		0.2	0.3		0.2	0.4	
Hardness	mg/L	77.1	79.8		79.1	82.9		82.5	89.1	
Magnesium	mg/L	7.4	7.2		7.3	7.3		7.9	7.5	
Nitrite as Nitrogen	mg/L	<0.01	<0.01		<0.01	<0.01		<0.01	0.02	
Potassium	mg/L	3.6	6.9		3.8	7.2		4.5	7.5	
Sodium	mg/L	12.4	18.5		12.6	18.9		14.6	19.7	
Sulphate	mg/L	3	2		3	4		3	6	
Coliforms, Fecal	CFU/100mL	9	1	58	47	4	74	6	6	250
Fecal Streptococcus	MPN/100mL	12.8	34.5	727	5.1	27.5	25.9	14.2	58.3	24.1
Hexane Extractable Material	mg/L	2.1	<2	12.8	<2	2.5	2.6	16.5	<2	<2
Kjeldahl Nitrogen, Total	mg/L	1.39	1.3		1.43	1.63		1.19	1.42	
Phosphorous, Dissolved	mg/L	0.49	2.41		0.44	2.19		0.54	0.34	
Phosphorous, Total	mg/L	0.71	2.56	2.88	0.62	2.45	2.93	0.63	2.35	2.76

Parameter	Unit	28-Sep			5-Oct			12-Oct		
		F1	F3	32-10	F1	F3	32-10	F1	F3	32-10
Alkalinity, Total (as CaCO ₃)	mg/L	76.4	79.5		74.4	74.1		72.5	74.7	
Sp. Conductivity (@25°C)	µS/cm	229	252		228	229		229	246	
pH		7.25	7.61	7.39	7.42	7.44	7.46	7.4	7.73	7.33
Solids, Total Dissolved	mg/L	134	184		n/a	n/a		162	176	
Solids, Total Suspended	mg/L	<1	3	10	6	6	6	44	<2	12
Ammonia as Nitrogen	mg/L	0.11	0.36	2.11	0.08	0.08	4.41	0.05	0.2	8.22
Biological Oxygen Demand	mg/L	<2	2	28	2	2	35	3	<2	18
CBOD	mg/L	<2	<2		2	<2		3	<2	
Organic Carbon, Total	mg/L	18	15.8		n/a	n/a		17.3	15.7	
Ortho-Phosphate as Phosphorus	mg/L	1.1	1.68		1.07	1.11		0.995	1.38	
Calcium	mg/L	21	23.4		21.7	22.2		19.5	21.7	
Chloride	mg/L	22.8	25.8		24.2	24.7		22.4	25	
Fluoride	mg/L	0.3	0.3		0.3	0.3		0.3	0.3	
Hardness	mg/L	82.4	88.2		84.6	86.4		76.7	82.7	
Magnesium	mg/L	7.3	7.2		7.4	7.5		6.8	6.9	
Nitrite as Nitrogen	mg/L	0.01	0.02		0.02	0.01		<0.01	0.04	
Potassium	mg/L	6.3	7.4		6.8	6.8		6	7	
Sodium	mg/L	17.4	19.8		18.7	19		16.9	18.9	
Sulphate	mg/L	5	10		9	8		9	11	
Coliforms, Fecal	CFU/100mL	6	7	1300	9	5	1650	2	1	tntc
Fecal Streptococcus	MPN/100mL	125	248	1990	13.4	57.3	96	16.4	10.7	4350
Hexane Extractable Material	mg/L	<2	<2	<2	<2	<2	8.4	<2	<2	<2
Kjeldahl Nitrogen, Total	mg/L	1.06	1.48		n/a	n/a		1.27	1.1	
Phosphorous, Dissolved	mg/L	1.24	1.86		1.18	1.17		1.18	1.58	
Phosphorous, Total	mg/L	1.47	2.05	2.83	1.39	1.34	3.01	1.31	1.69	3.03

Parameter	Unit	19-Oct			26-Oct			02-Nov		
		F1	F3	32-10	F1	F3	32-10	F1	F3	32-10
Alkalinity, Total (as CaCO ₃)	mg/L	69.5	74.6		67.2	75.8		70.4	86.8	
Sp. Conductivity (@25°C)	µS/cm	225	249		221	257		230	293	
pH		7.5	7.72	7.36	7.44	7.74	7.26	7.38	7.68	7.16
Solids, Total Dissolved	mg/L	154	170		162	182		150	190	
Solids, Total Suspended	mg/L	4	<1	12	46	<1	20	<2	<1	26
Ammonia as Nitrogen	mg/L	0.04	0.17	11	0.02	0.24	14.3	0.03	0.33	19.3
Biological Oxygen Demand	mg/L	<2	2	25	13	2	28	2	<2	n/a
CBOD	mg/L	<2	3		3	2		2	2	
Organic Carbon, Total	mg/L	16.3	15.4		16.3	14.3		16.7	16.2	
Ortho-Phosphate as Phosphorus	mg/L	0.993	1.39		0.96	1.48		0.937	1.7	
Calcium	mg/L	19.3	22.6		19.7	22.7		19.9	26.3	
Chloride	mg/L	21.9	26.2		22.3	26.1		22	30.1	
Fluoride	mg/L	0.2	0.3		0.2	0.3		0.2	0.4	
Hardness	mg/L	75.7	85.8		77.1	85.5		77.7	98.7	
Magnesium	mg/L	6.7	7.1		6.8	7		6.8	8	
Nitrite as Nitrogen	mg/L	<0.01	0.01		<0.01	<0.01		<0.01	0.02	
Potassium	mg/L	5.6	7.3		5.8	7.2		5.5	8.5	
Sodium	mg/L	16.1	19.9		16.8	19.7		16.5	23	
Sulphate	mg/L	10	12		9	13		10	14	
Coliforms, Fecal	CFU/ 100mL	3	<1	6700	5	<1	18900	7	<1	37200
Fecal Streptococcus	MPN/ 100mL	13.5	6.3	2190	14.1	<1	17200	6.3	1	21400
Hexane Extractable Material	mg/L	<2	<2	<2	<2	<2	<2	<2	<2	9.5
Kjeldahl Nitrogen, Total	mg/L	0.81	0.96		0.96	1.01		0.95	1.31	
Phosphorous, Dissolved	mg/L	1.11	1.53		1.03	1.6		1.02	1.78	
Phosphorous, Total	mg/L	1.16	1.65	3.1	1.18	1.65	3.11	1.1	1.84	3.28

Parameter	Unit	09-Nov			16-Nov			23-Nov		
		F1	F3	32-10	F1	F3	32-10	F1	F3	32-10
Alkalinity, Total (as CaCO ₃)	mg/L	74.3	84.2		75.5	89.6		81.7	95	
Sp. Conductivity (@25°C)	µS/cm	238	289		242	305		256	314	
pH		7.25	7.69	7.04	7.23	7.69	7.01	7.15	7.58	7.01
Solids, Total Dissolved	mg/L	156	184		162	192		186	214	
Solids, Total Suspended	mg/L	2	<1	26	<1	2	28	<2	<1	20
Ammonia as Nitrogen	mg/L	0.04	0.47	20.5	0.05	0.61	21.6	0.07	0.76	25.7
Biological Oxygen Demand	mg/L	<2	<2	61	<2	2	77	2	3	69
CBOD	mg/L	2	2		<2	2		2	2	
Organic Carbon, Total	mg/L	18.4	17.4		19	19		20.2	19.6	
Ortho-Phosphate as Phosphorus	mg/L	1.01	1.67		1.03	1.83		1.13	2.02	
Calcium	mg/L	21.3	25.5		21.8	26.2		23.3	27.8	
Chloride	mg/L	22.6	29.5		22.3	28.5		23.2	30.3	
Fluoride	mg/L	0.2	0.4		0.2	0.4		0.2	0.4	
Hardness	mg/L	83.2	95.4		86.7	99.1		92.1	105	
Magnesium	mg/L	7.3	7.7		7.8	8.2		8.2	8.6	
Nitrite as Nitrogen	mg/L	<0.01	<0.01		<0.01	<0.01		<0.01	<0.01	
Potassium	mg/L	5.7	8.2		5.8	8.4		6	8.9	
Sodium	mg/L	17	21.9		17.1	22.5		17.9	23.7	
Sulphate	mg/L	10	14		10	15		10	16	
Coliforms, Fecal	CFU/ 100mL	3	1	105000	8	<1	310000	1	<1	410000
Fecal Streptococcus	MPN/ 100mL	5.2	<1	23300	2	<1	160000	3.1	<1	199000
Hexane Extractable Material	mg/L	<2	<2	4.7	<2	<2	5.8	<2	<2	15.8
Kjeldahl Nitrogen, Total	mg/L	0.81	1.61		1.12	1.77		1.07	2.01	
Phosphorous, Dissolved	mg/L	1.07	1.73		1.14	1.91		1.19	2.04	
Phosphorous, Total	mg/L	1.12	1.8	2.97	1.14	1.94	3.29	1.35	2.29	3.98

Parameter	Unit	30-Nov			07-Dec		14-Dec	
		F1	F3	32-10	F1	F3	F1	F3
Alkalinity, Total (as CaCO ₃)	mg/L	85.2	96.7		87.5	98.1	90.6	100
Sp. Conductivity (@25°C)	µS/cm	273	331		292	344	279	329
pH		7.13	7.53	7.01	7.09	7.48	6.99	7.32
Solids, Total Dissolved	mg/L	180			190	208	190	216
Solids, Total Suspended	mg/L	2		24	2	<2	2	<1
Ammonia as Nitrogen	mg/L	0.1	1.45	28.1	0.13	1.6	0.15	1.74
Biological Oxygen Demand	mg/L	<2	3	108	2	3	<2	<2
CBOD	mg/L	<2	2		<2	2	<2	<2
Organic Carbon, Total	mg/L	20.3	19.5		20.8	18.9	21.1	20
Ortho-Phosphate as Phosphorus	mg/L	1.29	2.19		1.28	2	1.32	2.18
Calcium	mg/L	25.3	28.6		25.6	29	25.8	28
Chloride	mg/L	24.9	30.5		24.7	31.1	25	28.9
Fluoride	mg/L	0.2	0.4		0.3	0.4	0.3	0.3
Hardness	mg/L	98.9	107		100	109	100	105
Magnesium	mg/L	8.7	8.6		8.9	8.8	8.8	8.5
Nitrite as Nitrogen	mg/L	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01
Potassium	mg/L	6.7	9.1		6.7	9.2	6.7	8.5
Sodium	mg/L	19.4	24.1		19.2	24.2	19.3	22.8
Sulphate	mg/L	11	16		11	16	11	15
Coliforms, Fecal	CFU/ 100mL	4	<1	690000	9	<1	15	<1
Fecal Streptococcus	MPN/ 100mL	2	<1	101000	5.2	1	1	<1
Hexane Extractable Material	mg/L	<2	<2	14.9	<2	<2	<2	<2
Kjeldahl Nitrogen, Total	mg/L	0.86	2.23		1.18	2.71	0.95	2.64
Phosphorous, Dissolved	mg/L	1.28	2.13		1.28	2.04	1.34	2.16
Phosphorous, Total	mg/L	1.34	2.22	0.36	1.39	2.17	1.49	2.21

Parameter	Unit	21-Dec		28-Dec	
		F1	F3	F1	F3
Alkalinity, Total (as CaCO ₃)	mg/L	97.2	114	97.6	110
Sp. Conductivity (@25°C)	µS/cm	326	402	325	391
pH		6.89	7.22	6.96	7.19
Solids, Total Dissolved	mg/L	192	231	202	228
Solids, Total Suspended	mg/L	3	<1	2	<1
Ammonia as Nitrogen	mg/L	0.16	1.96	0.19	1.86
Biological Oxygen Demand	mg/L	3	<2	<2	<2
CBOD	mg/L	2	<2	<2	<2
Organic Carbon, Total	mg/L	20.6	20.6	22.1	21.2
Ortho-Phosphate as Phosphorus	mg/L	1.31	2.43	1.36	2.4
Calcium	mg/L	28.5	33.1	27	31.3
Chloride	mg/L	29.8	36.9	27.3	35.1
Fluoride	mg/L	0.3	0.4	0.3	0.4
Hardness	mg/L	113	126	107	118
Magnesium	mg/L	10.1	10.5	9.5	9.6
Nitrite as Nitrogen	mg/L	<0.01	<0.01	<0.01	<0.01
Potassium	mg/L	7.4	10.4	6.9	9.8
Sodium	mg/L	21.7	27.4	19.9	25.8
Sulphate	mg/L	13	19	12	18
Coliforms, Fecal	CFU/100mL	19	<1	5	<1
Fecal Streptococcus	MPN/100mL	<1	1	1	41
Hexane Extractable Material	mg/L	<2	<2	<1	<1
Kjeldahl Nitrogen, Total	mg/L	1.16	3.09	1.48	3.48
Phosphorous, Dissolved	mg/L	1.32	2.39	1.41	2.46
Phosphorous, Total	mg/L	1.72	2.56	1.61	2.59

2) Solid Waste Facility Test Results

i) Solid Waste Facility

Since September 2010, the City has been sampling SNP stations 0032-13, 0032-13A, 0032-14, 0032-15A and 0032-16 which surround the SWF.

Due to a dry season, sampling of all SNP stations. In June, all stations, with the exception of 0032-15A were sampled, and in September, only stations 0032-13, 0032-13A and 0032-14 were sampled. The remaining stations were dry at the time of sampling.

The following table summarizes the sampling results.

Parameter	Unit	14-Jun				21-Sep		
		13	13A	14	16	13	13A	14
Total Ammonia	mg/L	0.93	1.04	0.02	<0.01	21.4	3.9	0.02
Nitrate and Nitrite	mg/L	0.26	0.67	0.98	0.09	0.33	0.16	0.53
Faecal Coliform	CFU/100mL	<1	62	<1	<1	TNTC	10	<10
BOD5	mg/L	N/A	<2	<2	<2	32	5	3
Total Phenols	mg/L	<0.001	<0.001	<0.001	<0.001	0.018	0.002	<0.001
methyl-tert-butyl ether	µg/L	<1	<1	<1	<1	<1	<1	<1
Benzene	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Ethylbenzene	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
m/p Xylene	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
o-Xylene	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Total Petroleum Hydrocarbons								
Fraction 2 (>C10-C16)	mg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Fraction 3 (>C16-C34)	mg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Fraction 4 (>C34)	mg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Hydrocarbons, Total Purgeable	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Hexane Extractable Material	mg/L	<2	2.9	<2	<2	<2	<2	<2
Field Parameters								
pH		7.6	8.87	7.59	8.02	8.32	7.47	7.6
Conductivity	µS/cm	429	1750	2500	198	2630	819	1880
Major Ions								
Calcium	mg/L	34.3	31.6	226	46.2	49.8	94.4	180
Chloride	mg/L	70.2	315	387	63.5	438	96.4	273
Alkalinity	mg/L	86.4	412	251	74.4	696	230	254

Parameter	Unit	14-Jun				21-Sep		
		13	13A	14	16	13	13A	14
Magnesium	mg/L	4.2	24.5	57.6	16	37.1	10.7	49.6
Sodium	mg/L	37.8	273	222	47.9	416	66.1	180
Fluoride	mg/L	0.2	0.1	<0.1	<0.1	0.5	0.1	<0.1
Potassium	mg/L	4.6	71.5	33	6.8	121	13.2	28.4
Sulphate	mg/L	13	3	531	57	2	38	380
Total Dissolved Solids	mg/L	1120	228	1620	72	1570	708	1200
Total Hardness	mg/L	103	180	801	181	277	280	654
ICP-MS Metal Scan (Total)								
Aluminum	µg/L	60	1970	64	10.8	172	672	1430
Arsenic	µg/L	239	5.1	8.9	31.9	349	137	179
Beryllium	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Boron	µg/L	60.2	15.4	498	171	124	28.8	716
Cadmium	µg/L	<0.1	<0.1	<0.1	<0.05	0.16	0.05	0.08
Chromium	µg/L	2.1	2.6	0.7	0.1	4.9	8.8	2.2
Cobalt	µg/L	1.6	1.7	2.6	<0.1	3.3	5	6.3
Copper	µg/L	1.4	9.9	3.1	1.1	3	5.7	8.8
Iron	µg/L	5110	2780	423	9	5560	62300	18900
Lead	µg/L	0.5	3.6	<0.1	<0.1	3.9	2.8	0.5
Manganese	µg/L	559	358	92.9	1.3	621	1070	208
Mercury	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Molybdenum	µg/L	0.3	2	0.4	<0.1	1.1	2.3	0.6
Nickel	µg/L	30	4.6	15.8	2.2	45.6	10	15.5
Selenium	µg/L	<0.5	<0.5	<0.5	<0.3	0.3	0.5	<0.3
Silver	µg/L	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1
Strontium	µg/L	90.2	54.2	398	132	139	122	331
Vanadium	µg/L	0.6	3.9	0.1	0.3	1.4	4.5	1.8
Zinc	µg/L	<5	21	5	<0.4	16	10.4	10.2

ii) Compost Facility

No testing of leachate was done at the compost facility in 2011 as all leachate was used in the composting process.

iii) Biotreatment Pad

Information related to the Biotreatment Pad is provided in the 2011 Annual Biotreatment Pad Report which was submitted as a separate document with this report.

f) Abandonment and Restoration

1) Work Completed in 2011

In September 2010, a pilot project at the landfill began in which a portion of the landfill was closed out using a geosynthetic clay liner. Moisture sensors were placed underneath the liner in order to evaluate the effectiveness of the liner as a final capping material. Evaluation of the material continued in 2011, the results of which will be included as part of the Landfill Closure Plan.

2) Work Anticipated in 2012

The City will be contouring the existing landfill for closure during 2012.

g) Study Summaries

1) Completed Studies

There were no studies completed in 2011.

2) Ongoing Studies

i) Solid Waste Facilities Drainage Study (Item D.14)

In 2010 the City began working on the Solid Waste Facilities Drainage Study. This study was completed in February 2012 and the report submitted to the MVLWB on March 8, 2012.

ii) Lagoon Effluent CBOD and BOD Study (Item D.21)

The City began testing for CBOD when the current water licence came into effect in May 2010. Testing for CBOD and BOD will continue through 2012 and 2013 with a final report to be submitted by March 31, 2014.

3) Future Studies

Work on many of the studies required by MVLWB has begun. However, as the studies have proven to be taking longer than anticipated, the City submitted a request to modify the submission dates for the studies. On February 16, 2012, extensions were granted as described in the following sections.

i) Lagoon pH Study (Item D.19)

The contract for this study was awarded late in 2010. The sampling program for the report began in 2011 and was completed in February 2012. The submission date of the report has been changed from November 30, 2011 to May 31, 2012.

ii) Lagoon Effluent Characterization Study (Item D.20)

The sampling program for the report began in 2011 and was completed in February 2012. The submission date of the report has been changed from March 31, 2012, to October 31, 2012.

iii) Biotreatment Pad Treated Water Discharge Area Study (Item D22)

The contract for this study was awarded in late 2011. The field portion of the study will be conducted in the summer of 2012. The submission date of the report has been changed from March 31, 2012 to March 31, 2013.

iv) Surface Water Metal Concentrations Surrounding SWF (Item D.23)

This study is anticipated to begin in 2013 with the report submission date changed from March 31, 2013 to March 31, 2014.

v) Lagoon Phosphorous Study (Schedule 2, Item 3d)

Work on this item has been performed in conjunction with the Lagoon pH Study and the Lagoon Effluent Characterization Study. The phosphorous study will form part of the Fiddler's Lake Treatment System Plan which has had the submission date changed from March 31, 2012 to October 31, 2012.

h) Unauthorized Discharges

The week of July 20, 2011 a small leak was discovered at the control structure at the lagoon. Weekly sampling at SNP stations 0032-F1, 0032-F3 and 0032-10 began on July 27th and continued through decant.

i) Solid Waste Facility Storage Volumes

In 2011 the City used roughly 40,000 m³ of volume in the landfill for the disposal of waste. The remaining volume in the existing landfill is approximately 30,000 m³. The new cell which was

built in 2011 has a volume of 65,000 m³ and is anticipated to accommodate at least five years of waste, depending on the amount of diversion acquired. Additional cells will be built as required.

j) Monthly and Annual Compost Quantities

1) Organic Wastes Received

The following table summarizes the amount of organic wastes received, carbon amendment products used, and unsuitable materials removed from the compost facility in 2011.

Month	Amount of Materials Accepted (kg)				Material Removed (kg)
	Food waste	Yard waste	Shredded Paper	Woodchips	Garbage
Jan.	7,180		2,920	1,000	
Feb.	9,420		2,800		730
Mar.	13,250		2,910		
April	10,500		3,650		
May	12,130	500	2,920		
June	11,310	143,000	2,190		
July	9,420		2,920		1,000
Aug.	15,520		3,650		
Sept.	11,320		2,920		
Oct.	11,860		2,920		
Nov.	14,650		3,650	10,000	1,000
Dec.	11,200		4,460	1,200	
2011 Total	137,760	143,500	37,910	12,200	2,730

2) Compost Produced and Distributed

Approximately 15 tonnes of finished compost was produced in late fall 2011. The compost has undergone initial screening through a 1-1/4" mesh screen and will undergo a second screening through a 1/2" screen in spring 2012 prior to use by the City and residents.

k) Biotreatment Pad Liner Inspections

Please refer to the Annual Biotreatment Pad Report submitted with this report.

l) Stormwater Management Plan

The City's Stormwater Management Plan (SWMP) was submitted to the MVLWB on August 8, 2011 as per item D.10 of the water licence. The Plan was approved on September 29, 2011. As per the requirements of the approval letter, the SWMP has been revised to include:

- A revised stormwater effluent monitoring program
- Reference to the Spill Contingency Plan with respect to handling sewage spills
- Results of the stormwater effluent monitoring program

The City was unable to determine a sampling point for the Deh Cho Boulevard snow dump in the fall of 2011. This sampling location will be determined as part of the spring sampling program, with coordinates provided to the MVLWB.

Stormwater Infrastructure Maintenance

Between June and July approximately 70% of the City's the stormwater collection system was flushed, producing approximately 666,232 litres of water with a 30% debris content. The flushed materials were taken to the Fiddler's Lake Lagoon where they were disposed of at the truck dump area. The material was placed along the bank of the lagoon and allowed to drain into the lagoon.

The trash interceptor was installed at the school draw outlet the beginning of June and removed early in October. The screen on the interceptor was cleaned twice, once midway through the season and again when it was removed. The total amount of debris cleaned from the screen during the season was approximately 0.017m³.

m) Sewage Disposal Facilities Operation and Maintenance Plan

The submission of the City's Sewage Disposal Facilities Operation and Maintenance Plan has been revised. An interim O&M Plan will be submitted to the MVLWB by May 31, 2012, with the final plan to be submitted by May 31, 2013.

n) Spill Contingency Plan

The current Spill Contingency Plan was reviewed and no revisions were made.

o) Solid Waste Disposal Facilities Operation and Maintenance Plan

The City's revised Solid Waste Disposal Facilities Operation and Maintenance Plan was submitted on October 25, 2011. The Plan was approved on February 16, 2012 with several revisions required. The Plan has been revised to include the following:

- A list of unacceptable wastes
- Clarification of sampling and monitoring responsibilities

- Revised maps identifying the new landfill cell, snow disposal areas, and SNP Station 0032-18
- Detailed information regarding leachate sampling at the new cell; including sampling location, parameters and frequency
- Reference to the Biotreatment Pad O&M Manual
- Information on SNP Station 32-18 including sampling frequency and parameters
- Reference to the Stormwater Management Plan for the snow disposal areas

A revised copy of the Landfill O&M Plan has been submitted as a separate document with this report.

p) Biotreatment Pad Operation and Maintenance Plan

As per item H.1 of the water licence the Biotreatment Pad Operation and Maintenance Plan was submitted to the MVLWB on December 20, 2011. Approval of this plan was received on March 16, 2012. A revised O&M Manual will be submitted by April 30, 2012.

q) Hazardous Waste Management Plan

The City's Hazardous Waste Management Plan was submitted to the MVLWB on May 31, 2011 as per item H.1 of the water licence. The Plan was approved on August 18, 2011. The Plan has been reviewed and no revisions were required.

r) Stormwater Effluent Data

The following tables summarize the stormwater effluent data for 2011. The data can also be found in Appendix G of the March 2012 revision of the City's Stormwater Management Plan which has been submitted with this report.

<u>Range Lake Outfall</u>	Units	2011	
		3-Jun	12-Sep
Microbiology			
BOD	mg/L	5	<2
Escherichia Coli (E. Coli)	MPN/100mL	2	4.1
Fecal Coliforms	CFU/100mL	1	6
Physicals			
Alkalinity, Total (as CaCO ₃)	mg/L	121	107
Specific Conductivity	µS/cm	286	314
pH		8.6	8.19
Total Dissolved Solids	mg/L	588	226
Total Suspended Solids	mg/L	<3	8

Range Lake Outfall	Units	2011	
		3-Jun	12-Sep
Nutrients			
Ammonia as Nitrogen	mg/L	0.57	0.05
Nitrate+Nitrite as Nitrogen	mg/L	0.12	<0.01
Total Phosphorus	mg/L	0.05	0.03
Major Ions			
Calcium	mg/L	41.4	42.5
Chloride	mg/L	7.1	7.5
Fluoride	mg/L	0.3	0.2
Hardness	mg/L	152	167
Magnesium	mg/L	11.7	14.8
Nitrate as Nitrogen	mg/L	0.11	<0.01
Nitrite as Nitrogen	mg/L	<0.01	<0.01
Potassium	mg/L	4	4.4
Sodium	mg/L	5.9	7
Sulphate	mg/L	36	54
Organic Parameters			
Benzene	mg/L	<0.005	<0.005
Ethylbenzene	mg/L	<0.005	<0.005
F2: C10-C16	mg/L	<0.2	<0.2
F3: C16-C34	mg/L	<0.2	<0.2
F4: C34-C50	mg/L	<0.2	<0.2
Hydrocarbons, Total Extractable	mg/L		
Hydrocarbons, Total Purgeable	mg/L	<0.05	<0.05
m/p-xylene	mg/L	<0.005	<0.005
o-xylene	mg/L	<0.005	<0.005
Toluene	mg/L	<0.005	<0.005
Trace Metals, Total			
Aluminum	µg/L	20.0	16.0
Antimony	µg/L	0.9	0.9
Arsenic	µg/L	29.1	22.4
Barium	µg/L	26.5	30.6
Beryllium	µg/L	<0.1	<0.1
Cadmium	µg/L	<0.1	<0.1
Cesium	µg/L	<0.1	<0.1
Chromium	µg/L	0.2	0.2
Cobalt	µg/L	<0.1	<0.1

<u>Range Lake Outfall</u>	Units	2011	
		3-Jun	12-Sep
Copper	µg/L	1.0	0.7
Iron	µg/L	58.0	43.0
Lead	µg/L	<0.1	<0.1
Lithium	µg/L	6.4	9.1
Manganese	µg/L	24.8	16.8
Mercury	µg/L	<0.01	<0.01
Molybdenum	µg/L	0.9	0.9
Nickel	µg/L	0.9	1.1
Rubidium	µg/L	3.5	4.6
Selenium	µg/L	<0.5	<0.5
Silver	µg/L	<0.1	0.1
Strontium	µg/L	67.7	85.2
Thallium	µg/L	<0.1	<0.1
Titanium	µg/L	0.2	0.6
Uranium	µg/L	1.6	1.2
Vandium	µg/L	0.6	0.7
Zinc	µg/L	<5	<5

Jan Stirling Outfall	Units	2011	
		3-Jun	12-Sep
Microbiology			
BOD	mg/L	<2	<2
Escherichia Coli (E. Coli)	MPN/100mL	4	13.4
Fecal Coliforms	CFU/100mL	1	6
Physicals			
Alkalinity, Total (as CaCO ₃)	mg/L	72.4	94.8
Specific Conductivity	µS/cm	396	353
pH		7.73	7.96
Total Dissolved Solids	mg/L	70	244
Total Suspended Solids	mg/L	22	8
Nutrients			
Ammonia as Nitrogen	mg/L	0.05	0.01
Nitrate+Nitrite as Nitrogen	mg/L	0.62	0.51
Total Phosphorus	mg/L	0.05	0.05
Major Ions			
Calcium	mg/L	52	55.3
Chloride	mg/L	26.2	22.3
Fluoride	mg/L	0.3	0.4
Hardness	mg/L	169	188
Magnesium	mg/L	9.5	12
Nitrate as Nitrogen	mg/L	0.62	0.51
Nitrite as Nitrogen	mg/L	<0.01	<0.01
Potassium	mg/L	3.9	4.4
Sodium	mg/L	11.6	10.9
Sulphate	mg/L	94	68
Organic Parameters			
Benzene	mg/L	<0.005	<0.005
Ethylbenzene	mg/L	<0.005	<0.005
F2: C10-C16	mg/L	<0.2	<0.2
F3: C16-C34	mg/L	<0.2	<0.2
F4: C34-C50	mg/L	<0.2	<0.2
Hydrocarbons, Total Extractable	mg/L		
Hydrocarbons, Total Purgeable	mg/L	<0.05	<0.05
m/p-xylene	mg/L	<0.005	<0.005
o-xylene	mg/L	<0.005	<0.005

Jan Stirling Outfall	Units	2011	
		3-Jun	12-Sep
Toluene	mg/L	<0.005	<0.005
Trace Metals, Total			
Aluminium	µg/L	136	306
Antimony	µg/L	1.6	3.5
Arsenic	µg/L	18.1	68.6
Barium	µg/L	25.8	28.3
Beryllium	µg/L	<0.1	<0.1
Cadmium	µg/L	<0.1	<0.1
Cesium	µg/L	<0.1	<0.1
Chromium	µg/L	0.3	1.1
Cobalt	µg/L	0.6	0.5
Copper	µg/L	7.1	8.9
Iron	µg/L	283	666
Lead	µg/L	0.2	0.5
Lithium	µg/L	5.5	8.5
Manganese	µg/L	59.5	39.1
Mercury	µg/L	<0.01	<0.01
Molybdenum	µg/L	0.4	0.7
Nickel	µg/L	5.4	6.3
Rubidium	µg/L	3	3.9
Selenium	µg/L	<0.5	<0.5
Silver	µg/L	<0.1	<0.1
Strontium	µg/L	98.2	110
Thallium	µg/L	<0.1	<0.1
Titanium	µg/L	3.8	13.9
Uranium	µg/L	3.7	3.6
Vandium	µg/L	0.6	1.5
Zinc	µg/L	153	163

<u>School Draw Outfall</u>	Units	2011	
		3-Jun	12-Sep
Microbiology			
BOD	mg/L	<2	<2
Escherichia Coli (E. Coli)	MPN/100mL	1	<1
Fecal Coliforms	CFU/100mL	<1	5
Physicals			
Alkalinity, Total (as CaCO ₃)	mg/L	109	164
Specific Conductivity	µS/cm	653	601
pH		7.6	7.52
Total Dissolved Solids	mg/L	80	380
Total Suspended Solids	mg/L	20	<3
Nutrients			
Ammonia as Nitrogen	mg/L	<0.01	<0.01
Nitrate+Nitrite as Nitrogen	mg/L	1.18	0.9
Total Phosphorus	mg/L	0.02	0.01
Major Ions			
Calcium	mg/L	92.5	91.2
Chloride	mg/L	38.1	23.3
Fluoride	mg/L	0.3	0.4
Hardness	mg/L	293	296
Magnesium	mg/L	15	16.6
Nitrate as Nitrogen	mg/L	1.16	0.9
Nitrite as Nitrogen	mg/L	0.02	<0.01
Potassium	mg/L	5.2	4.8
Sodium	mg/L	15.2	11.4
Sulphate	mg/L	173	113
Organic Parameters			
Benzene	mg/L	<0.005	<0.005
Ethylbenzene	mg/L	<0.005	<0.005
F2: C10-C16	mg/L	<0.2	<0.2
F3: C16-C34	mg/L	<0.2	<0.2
F4: C34-C50	mg/L	<0.2	<0.2
Hydrocarbons, Total Extractable	mg/L		
Hydrocarbons, Total Purgeable	mg/L	<0.05	<0.05
m/p-xylene	mg/L	<0.005	<0.005
o-xylene	mg/L	<0.005	<0.005

<u>School Draw Outfall</u>	Units	2011	
		3-Jun	12-Sep
Toluene	mg/L	<0.005	<0.005
Trace Metals, Total			
Aluminum	µg/L	27	5.4
Antimony	µg/L	2	2.6
Arsenic	µg/L	2.3	4
Barium	µg/L	24.5	27.4
Beryllium	µg/L	<0.1	<0.1
Cadmium	µg/L	<0.1	<0.05
Cesium	µg/L	<0.1	<0.1
Chromium	µg/L	0.1	0.1
Cobalt	µg/L	0.4	<0.1
Copper	µg/L	8.9	8.6
Iron	µg/L	59	16
Lead	µg/L	<0.1	<0.1
Lithium	µg/L	9.9	13.7
Manganese	µg/L	6	0.7
Mercury	µg/L	<0.01	<0.01
Molybdenum	µg/L	0.9	1.1
Nickel	µg/L	11	11.9
Rubidium	µg/L	2.9	3.3
Selenium	µg/L	<0.5	<0.3
Silver	µg/L	<0.1	<0.1
Strontium	µg/L	154	154
Thallium	µg/L	<0.1	<0.1
Titanium	µg/L	1	<0.1
Uranium	µg/L	7.7	8.1
Vandium	µg/L	0.2	<0.1
Zinc	µg/L	15	9.4

Back Bay Outfall	Units	2011	
		3-Jun	12-Sep
Microbiology			
BOD	mg/L	3	<2
Escherichia Coli (E. Coli)	MPN/100mL	3	25.3
Fecal Coliforms	CFU/100mL	2	31
Physicals			
Alkalinity, Total (as CaCO ₃)	mg/L	120	252
Specific Conductivity	µS/cm	541	914
pH		7.67	7.74
Total Dissolved Solids	mg/L	284	610
Total Suspended Solids	mg/L	<3	6
Nutrients			
Ammonia as Nitrogen	mg/L	0.13	0.42
Nitrate+Nitrite as Nitrogen	mg/L	0.99	2.01
Total Phosphorus	mg/L	0.03	0.02
Major Ions			
Calcium	mg/L	68.9	142
Chloride	mg/L	44.3	83.9
Fluoride	mg/L	0.2	0.2
Hardness	mg/L	223	460
Magnesium	mg/L	12.3	25.4
Nitrate as Nitrogen	mg/L	0.96	2.01
Nitrite as Nitrogen	mg/L	0.02	<0.01
Potassium	mg/L	7.5	11.6
Sodium	mg/L	13.1	27.9
Sulphate	mg/L	83	119
Organic Parameters			
Benzene	mg/L	<0.005	<0.005
Ethylbenzene	mg/L	<0.005	<0.005
F2: C10-C16	mg/L	<0.2	<0.2
F3: C16-C34	mg/L	<0.2	<0.2
F4: C34-C50	mg/L	<0.2	<0.2
Hydrocarbons, Total Extractable	mg/L		
Hydrocarbons, Total Purgeable	mg/L	<0.05	<0.05
m/p-xylene	mg/L	<0.005	<0.005
o-xylene	mg/L	<0.005	<0.005

<u>Back Bay Outfall</u>	Units	2011	
		3-Jun	12-Sep
Toluene	mg/L	<0.005	<0.005
Trace Metals, Total			
Aluminium	µg/L	36	29
Antimony	µg/L	1	1.1
Arsenic	µg/L	6.4	7.4
Barium	µg/L	24.1	54.6
Beryllium	µg/L	<0.1	<0.1
Cadmium	µg/L	<0.1	<0.1
Cesium	µg/L	<0.1	<0.1
Chromium	µg/L	0.2	0.5
Cobalt	µg/L	0.7	1.6
Copper	µg/L	7.4	5.9
Iron	µg/L	124	1390
Lead	µg/L	<0.1	<0.1
Lithium	µg/L	4.2	5.9
Manganese	µg/L	21.8	178
Mercury	µg/L	<0.01	<0.01
Molybdenum	µg/L	0.6	0.7
Nickel	µg/L	5.1	6.5
Rubidium	µg/L	2.8	4.3
Selenium	µg/L	<0.5	<0.5
Silver	µg/L	<0.1	<0.1
Strontium	µg/L	162	401
Thallium	µg/L	<0.1	<0.1
Titanium	µg/L	1.1	1
Uranium	µg/L	1.9	3.4
Vandium	µg/L	0.2	0.7
Zinc	µg/L	394	330

<u>Niven Lake Outfall</u>	Units	2011	
		3-Jun	12-Sep
Microbiology			
BOD	mg/L	3	<2
Escherichia Coli (E. Coli)	MPN/100mL	1	<1
Fecal Coliforms	CFU/100mL	1	4
Physicals			
Alkalinity, Total (as CaCO ₃)	mg/L	162	215
Specific Conductivity	µS/cm	1400	1020
pH		7.38	7.42
Total Dissolved Solids	mg/L	438	732
Total Suspended Solids	mg/L	<3	4
Nutrients			
Ammonia as Nitrogen	mg/L	0.29	0.03
Nitrate+Nitrite as Nitrogen	mg/L	0.77	4.31
Total Phosphorus	mg/L	0.08	0.02
Major Ions			
Calcium	mg/L	137	159
Chloride	mg/L	226	68
Fluoride	mg/L	0.3	0.1
Hardness	mg/L	449	512
Magnesium	mg/L	25.7	28.1
Nitrate as Nitrogen	mg/L	0.65	4.31
Nitrite as Nitrogen	mg/L	0.12	<0.01
Potassium	mg/L	12	8.7
Sodium	mg/L	93	20.3
Sulphate	mg/L	222	221
Organic Parameters			
Benzene	mg/L	<0.005	<0.005
Ethylbenzene	mg/L	<0.005	<0.005
F2: C10-C16	mg/L	<0.2	<0.2
F3: C16-C34	mg/L	<0.2	<0.2
F4: C34-C50	mg/L	<0.2	<0.2
Hydrocarbons, Total Extractable	mg/L		
Hydrocarbons, Total Purgeable	mg/L	<0.05	<0.05
m/p-xylene	mg/L	<0.005	<0.005
o-xylene	mg/L	<0.005	<0.005

<u>Niven Lake Outfall</u>	Units	2011	
		3-Jun	12-Sep
Toluene	mg/L	<0.005	<0.005
Trace Metals, Total			
Aluminium	µg/L	275	127
Antimony	µg/L	0.6	0.7
Arsenic	µg/L	8.2	3
Barium	µg/L	80	71.5
Beryllium	µg/L	<0.1	<0.1
Cadmium	µg/L	0.4	<0.1
Cesium	µg/L	<0.1	<0.1
Chromium	µg/L	1	0.5
Cobalt	µg/L	3.3	0.5
Copper	µg/L	14.6	10.4
Iron	µg/L	717	178
Lead	µg/L	0.5	<0.1
Lithium	µg/L	8.2	13
Manganese	µg/L	451	32.4
Mercury	µg/L	<0.01	<0.01
Molybdenum	µg/L	1.9	2.5
Nickel	µg/L	13	16.8
Rubidium	µg/L	11.5	9.1
Selenium	µg/L	<0.5	<0.5
Silver	µg/L	<0.1	<0.1
Strontium	µg/L	387	404
Thallium	µg/L	<0.1	<0.1
Titanium	µg/L	11.2	6.1
Uranium	µg/L	18.6	24
Vandium	µg/L	1.1	1
Zinc	µg/L	289	27

Frame Lake Outfall	Units	2011	
		3-Jun	12-Sep
Microbiology			
BOD	mg/L	2	4
Escherichia Coli (E. Coli)	MPN/100mL	<1	6.3
Fecal Coliforms	CFU/100mL	<1	32
Physicals			
Alkalinity, Total (as CaCO ₃)	mg/L	150	161
Specific Conductivity	µS/cm	838	555
pH		7.79	8.04
Total Dissolved Solids	mg/L	328	356
Total Suspended Solids	mg/L	10	6
Nutrients			
Ammonia as Nitrogen	mg/L	0.01	0.01
Nitrate+Nitrite as Nitrogen	mg/L	1.39	0.98
Total Phosphorus	mg/L	0.02	0.03
Major Ions			
Calcium	mg/L	100	78.7
Chloride	mg/L	85.6	33.1
Fluoride	mg/L	0.2	0.3
Hardness	mg/L	341	259
Magnesium	mg/L	22.1	15.2
Nitrate as Nitrogen	mg/L	1.35	0.98
Nitrite as Nitrogen	mg/L	0.04	<0.01
Potassium	mg/L	6.3	4.7
Sodium	mg/L	37.4	15.9
Sulphate	mg/L	164	74
Organic Parameters			
Benzene	mg/L	<0.005	<0.005
Ethylbenzene	mg/L	<0.005	<0.005
F2: C10-C16	mg/L	<0.2	<0.2
F3: C16-C34	mg/L	<0.2	<0.2
F4: C34-C50	mg/L	<0.2	<0.2
Hydrocarbons, Total Extractable	mg/L		
Hydrocarbons, Total Purgeable	mg/L	<0.05	<0.05
m/p-xylene	mg/L	<0.005	<0.005
o-xylene	mg/L	<0.005	<0.005

Frame Lake Outfall	Units	2011	
		3-Jun	12-Sep
Toluene	mg/L	<0.005	<0.005
Trace Metals, Total			
Aluminium	µg/L	43	237
Antimony	µg/L	0.8	0.8
Arsenic	µg/L	8.5	6.5
Barium	µg/L	52.3	45.7
Beryllium	µg/L	<0.1	<0.1
Cadmium	µg/L	<0.1	<0.1
Cesium	µg/L	<0.1	<0.1
Chromium	µg/L	0.3	0.7
Cobalt	µg/L	0.6	0.4
Copper	µg/L	7.1	6.6
Iron	µg/L	327	412
Lead	µg/L	0.2	<0.1
Lithium	µg/L	8.8	9.4
Manganese	µg/L	122	90.5
Mercury	µg/L	<0.01	<0.01
Molybdenum	µg/L	1.3	1.1
Nickel	µg/L	5.8	5.9
Rubidium	µg/L	5.9	5.3
Selenium	µg/L	<0.5	<0.5
Silver	µg/L	<0.1	<0.1
Strontium	µg/L	204	147
Thallium	µg/L	<0.1	<0.1
Titanium	µg/L	2.5	8.3
Uranium	µg/L	11.5	7.4
Vandium	µg/L	0.3	1
Zinc	µg/L	95	84

<u>Kam Lake Outfall</u>	Units	2011	
		3-Jun	12-Sep
Microbiology			
BOD	mg/L	34	<2
Escherichia Coli (E. Coli)	MPN/100mL	115	4.1
Fecal Coliforms	CFU/100mL	80	3
Physicals			
Alkalinity, Total (as CaCO ₃)	mg/L	62.7	195
Specific Conductivity	µS/cm	498	693
pH		7.83	7.57
Total Dissolved Solids	mg/L	192	448
Total Suspended Solids	mg/L	6	<3
Nutrients			
Ammonia as Nitrogen	mg/L	0.18	0.28
Nitrate+Nitrite as Nitrogen	mg/L	0.79	0.2
Total Phosphorus	mg/L	0.29	0.04
Major Ions			
Calcium	mg/L	58	98
Chloride	mg/L	95.9	50.8
Fluoride	mg/L	0.7	0.2
Hardness	mg/L	176	319
Magnesium	mg/L	7.4	18.1
Nitrate as Nitrogen	mg/L	0.65	0.2
Nitrite as Nitrogen	mg/L	0.14	<0.01
Potassium	mg/L	5.8	4.8
Sodium	mg/L	23.1	22.1
Sulphate	mg/L	40	93
Organic Parameters			
Benzene	mg/L	<0.005	<0.005
Ethylbenzene	mg/L	<0.005	<0.005
F2: C10-C16	mg/L	<0.2	<0.2
F3: C16-C34	mg/L	1.3	<0.2
F4: C34-C50	mg/L	<0.2	<0.2
Hydrocarbons, Total Extractable	mg/L		
Hydrocarbons, Total Purgeable	mg/L	<0.05	<0.05
m/p-xylene	mg/L	<0.005	<0.005
o-xylene	mg/L	<0.005	<0.005

<u>Kam Lake Outfall</u>	Units	2011	
		3-Jun	12-Sep
Toluene	mg/L	<0.005	<0.005
Trace Metals, Total			
Aluminum	µg/L	5490	11
Antimony	µg/L	2.3	0.5
Arsenic	µg/L	17.1	13.4
Barium	µg/L	61.9	46.9
Beryllium	µg/L	<0.1	<0.1
Cadmium	µg/L	0.6	<0.1
Cesium	µg/L	0.6	<0.1
Chromium	µg/L	15	0.6
Cobalt	µg/L	5.2	0.7
Copper	µg/L	42.2	1.4
Iron	µg/L	7940	698
Lead	µg/L	21.3	<0.1
Lithium	µg/L	14.9	14.9
Manganese	µg/L	205	785
Mercury	µg/L	0.02	<0.01
Molybdenum	µg/L	9.6	1.3
Nickel	µg/L	14.2	1.7
Rubidium	µg/L	12.6	3.2
Selenium	µg/L	0.7	<0.5
Silver	µg/L	<0.1	0.2
Strontium	µg/L	118	429
Thallium	µg/L	<0.1	<0.1
Titanium	µg/L	232	0.4
Uranium	µg/L	4	6.7
Vandium	µg/L	14	0.6
Zinc	µg/L	309	11

Deh Cho Blvd. at Kam Lake Road	Units	2011	
		3-Jun	12-Sep
Microbiology			
BOD	mg/L	2	<2
Escherichia Coli (E. Coli)	MPN/100mL	23.5	22.8
Fecal Coliforms	CFU/100mL	10	11
Physicals			
Alkalinity, Total (as CaCO ₃)	mg/L	88.3	134
Specific Conductivity	µS/cm	459	448
pH		7.62	7.93
Total Dissolved Solids	mg/L	1000	282
Total Suspended Solids	mg/L	8	6
Nutrients			
Ammonia as Nitrogen	mg/L	0.09	0.01
Nitrate+Nitrite as Nitrogen	mg/L	1.19	0.45
Total Phosphorus	mg/L	0.05	0.04
Major Ions			
Calcium	mg/L	56.2	61.9
Chloride	mg/L	44.4	25.2
Fluoride	mg/L	0.4	0.2
Hardness	mg/L	185	225
Magnesium	mg/L	108	17.2
Nitrate as Nitrogen	mg/L	1.14	0.45
Nitrite as Nitrogen	mg/L	0.05	<0.01
Potassium	mg/L	3.7	4.4
Sodium	mg/L	11.5	12
Sulphate	mg/L	71	60
Organic Parameters			
Benzene	mg/L	<0.005	<0.005
Ethylbenzene	mg/L	<0.005	<0.005
F2: C10-C16	mg/L	<0.2	<0.2
F3: C16-C34	mg/L	<0.2	<0.2
F4: C34-C50	mg/L	<0.2	<0.2
Hydrocarbons, Total Extractable	mg/L		
Hydrocarbons, Total Purgeable	mg/L	<0.05	<0.05
m/p-xylene	mg/L	<0.005	<0.005
o-xylene	mg/L	<0.005	<0.005

Deh Cho Blvd. at Kam Lake Road	Units	2011	
		3-Jun	12-Sep
Toluene	mg/L	<0.005	<0.005
Trace Metals, Total			
Aluminum	µg/L	263	70
Antimony	µg/L	1.4	1.4
Arsenic	µg/L	14.4	11.6
Barium	µg/L	33.4	33.9
Beryllium	µg/L	<0.1	<0.1
Cadmium	µg/L	<0.1	<0.1
Cesium	µg/L	<0.1	<0.1
Chromium	µg/L	0.9	1.1
Cobalt	µg/L	0.7	0.1
Copper	µg/L	11.4	4.7
Iron	µg/L	414	240
Lead	µg/L	0.5	<0.1
Lithium	µg/L	3.9	8
Manganese	µg/L	64.2	36.4
Mercury	µg/L	<0.01	<0.01
Molybdenum	µg/L	0.8	0.8
Nickel	µg/L	3.7	2.3
Rubidium	µg/L	3.3	3.8
Selenium	µg/L	<0.5	<0.5
Silver	µg/L	<0.1	0.3
Strontium	µg/L	111	141
Thallium	µg/L	<0.1	<0.1
Titanium	µg/L	8.8	2.3
Uranium	µg/L	6.1	4.5
Vandium	µg/L	1	0.7
Zinc	µg/L	339	92

s) Stormwater Effluent Trends

1) Biological

With the exception of the fall 2010 sampling event for Deh Cho Boulevard and the School Draw outlet, tests for Ecoli and Fecal Coliforms have been below the Canadian Water Quality Guidelines for Recreational Use. The two areas that had test results above the guidelines will be monitored through the stormwater sampling program.

2) Heavy Metals

The Canadian Water Quality Guidelines for the Protection of Aquatic Life give limits for the metals shown in the following table.

	Unit	Lower Limit	Upper Limit
Aluminum	µg/L		100
Arsenic	µg/L		5
Cadmium	µg/L		0.017
Copper	µg/L	2	4
Iron	µg/L		300
Lead	µg/L	1	7
Mercury	µg/L		0.026
Molybdenum	µg/L		73
Nickel	µg/L	25	150
Selenium	µg/L		1
Silver	µg/L		0.1
Thallium	µg/L		0.8
Zinc	µg/L		30

Yellowknife is situated in a mineral rich area which translates to high values of certain metals in the rocks and sediments of the area. Typical samples from the stormwater outlets show concentrations of aluminum, arsenic, copper, iron, and zinc which are higher than the guidelines. The City is currently investigating the reason for these elevated concentrations and will provide an update on the investigation by March 31, 2013.

t) SNP Data Analysis

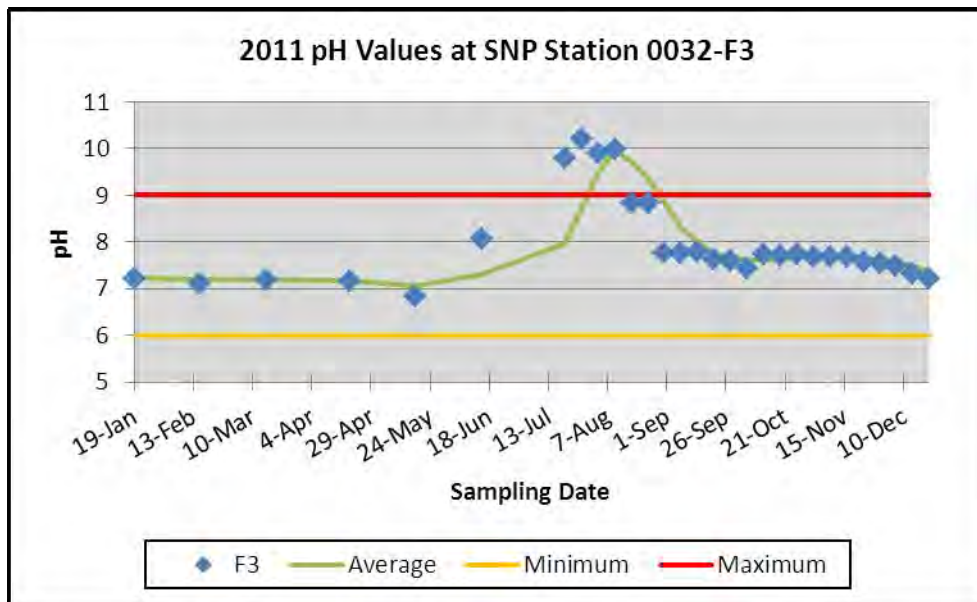
The following sections discuss the trends seen in the data collected through the SNP.

1) Lagoon Compliance Point 0032-F3

i) pH Analysis

The following graph shows the pH values at the compliance point along with the maximum and minimum values outlined by the water licence. Also shown is the running average of the pH values.

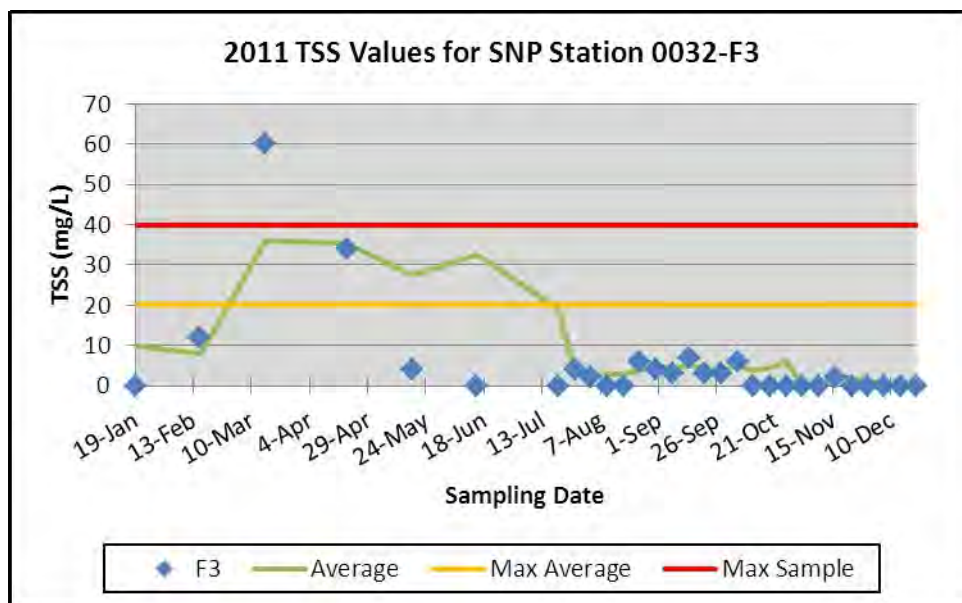
As can be seen, the pH generally stays within the licence criteria, except for a period in the summer. As mentioned in Section g, the City will be submitting a report regarding the cause of these high pH occurrences at 0032-F3 by May 31, 2012.



ii) Total Suspended Solids Analysis

The following graph shows the Total Suspended Solids (TSS) values at the compliance point along with maximum average and maximum grab sample values as set out in the water licence. Also shown is the running average of the TSS values.

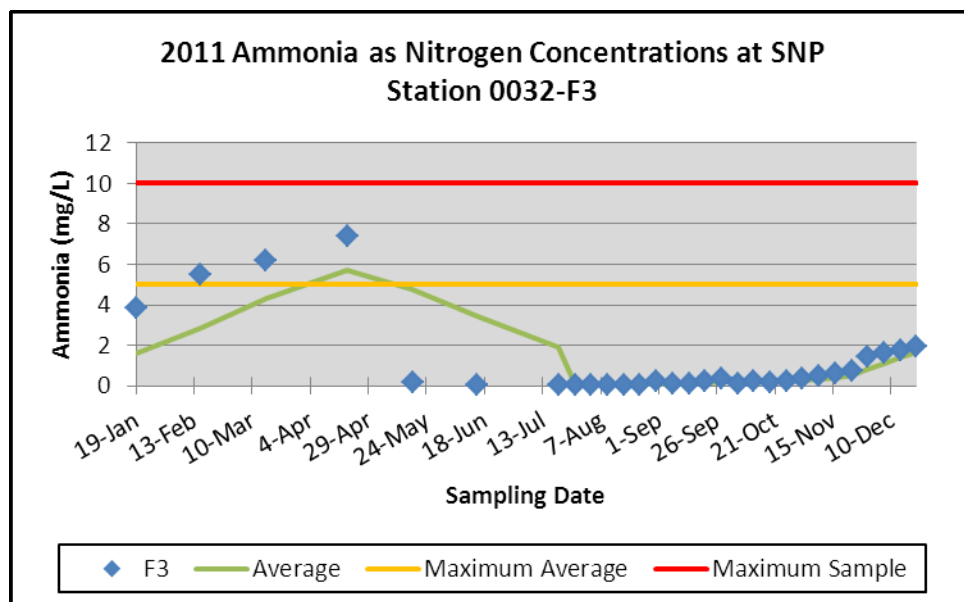
As can be seen in the graph, there has only been one sampling event that was outside of the water licence criteria. Generally, TSS are below the limits set out in the water licence.



iii) Ammonia Analysis

The following graph shows Ammonia as Nitrogen values at the compliance point along with maximum average and maximum grab sample discharge objectives as set out in the water licence. Also shown is the running average of the values.

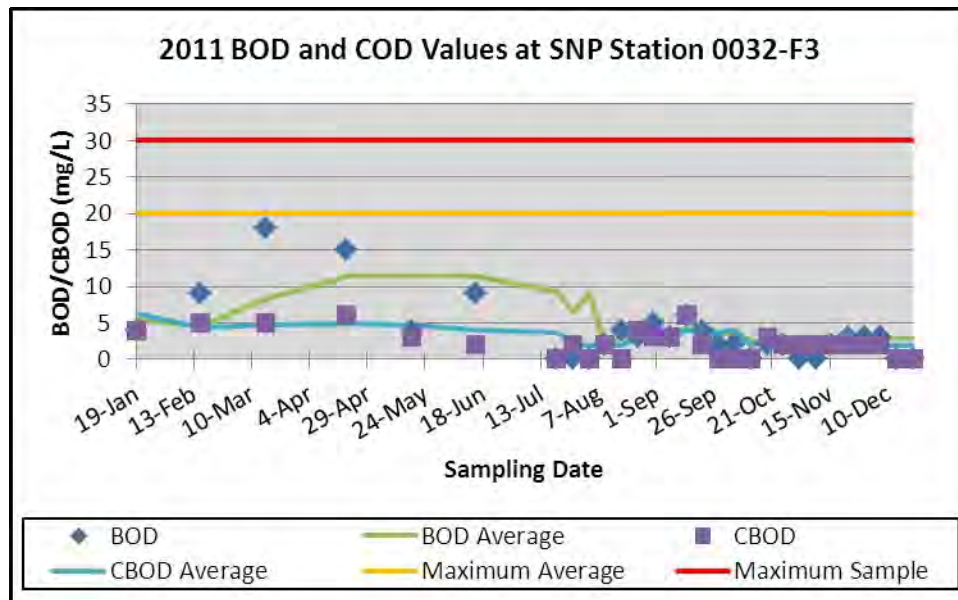
As can be seen in the graph, ammonia values increase during the winter when the water is stagnant. The values for 2011 remained below the maximum grab sample discharge objective.



iv) BOD Analysis

The graph on the following page shows the BOD values at the compliance point along with maximum average and maximum grab sample values as set out in the water licence. Also shown is the running average of the values. The graph also includes the CBOD values for the compliance point.

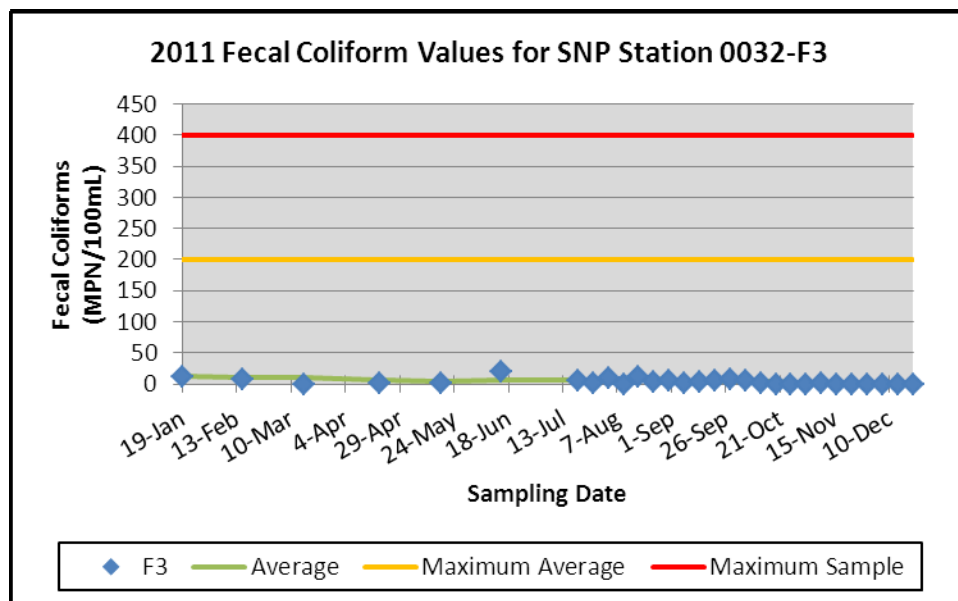
As can be seen in the graph, all samples to date have been below the water licence criteria.



v) Fecal Coliform Analysis

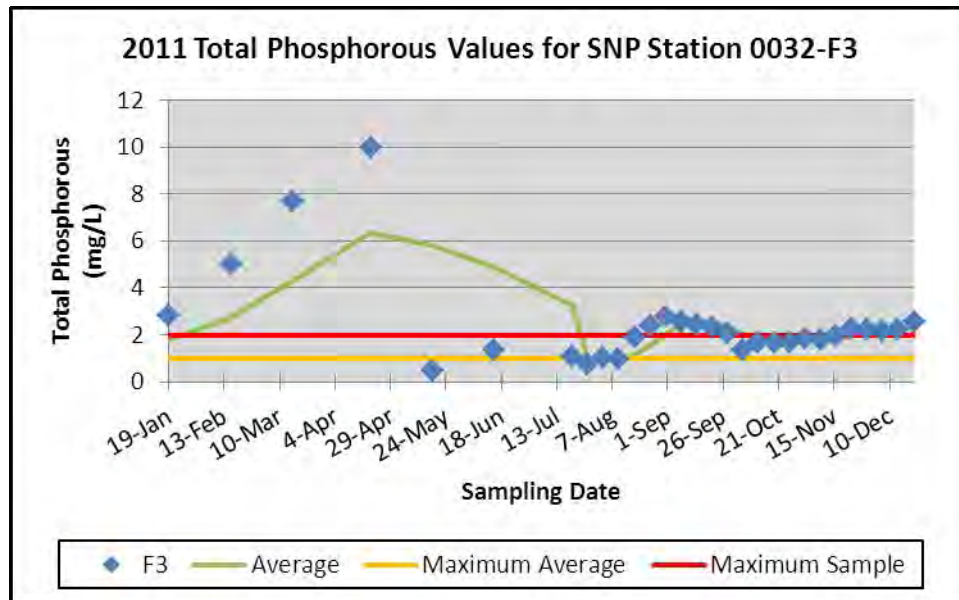
The following graph shows the Fecal Coliform values at the compliance point along with maximum average and maximum grab sample values as set out in the water licence. Also shown is the running average of the values.

As can be seen in the graph, all samples are well below the maximum average concentration value as set by the water licence.



vi) Phosphorous Analysis

The following graph shows the phosphorous concentrations at the compliance point along with maximum average and maximum grab sample discharge objectives set out in the water licence. Also shown is the running average of the values.



As can be seen in the graph, the phosphorous concentrations tend to spike in the winter when the water is stagnant.

As part of the City's Fiddler's Lake Treatment System Plan, the City will be including discussion of how phosphorous treatment will be completed to meet the discharge objective.

u) **Formal Written Correspondence with Inspector**

There was no formal written correspondence with the inspector in 2011.

v) **Additional Information Requests from MVLWB**

No additional information was requested by the MVLWB.