

MIRROR NOVA SCOTIA LIMITED

Annual Report

Otter Lake Waste Resource Management Facility

2019

1.0 Introduction

This document has been prepared by MIRROR Nova Scotia for the Halifax Regional Municipality in order to satisfy the requirements of the agreement between the Halifax Regional Municipality and MIRROR Nova Scotia.

The Otter Lake Solid Waste Management Facility has been in operation since acceptance testing during the summer of 1998. Subsequently, operations began on January 1st, 1999 with all processed mixed solid wastes being disposed of in the Residual Disposal Facility (RDF) Cells #1 through #7.

2.0 Reporting

Section 10.30 (b) Monthly Site Tonnage report

Please see the Table 1 Tonnage Report.

Table 1 (Tonnes)

OTTER LAKE LANDFILL SUMMARY 2019														
OTTER LAKE	COMMERCIAL	RESIDENTIAL	SPECIAL Compost/Haz	SPECIAL Handling	SPECIAL RECEIVED TO FEP	DIRECT TO RDF	NET RECEIVED	FEP TO RDF	TRAILER TO RDF	IN WSF	OUT WSF	METAL BOTTLES	PAPER C/B	RDF TOTAL
January 2019	0.00	3,781.84	0.00	20.65	3,802.49	3.45	3,802.49	542.35	2,245.30	1,014.84	694.12	0.00	0.81	3,485.22
February 2019	0.00	2,787.22	0.00	10.70	2,797.92	35.73	2,797.92	356.92	1,499.50	941.50	478.66	198.43	0.56	2,370.81
March 2019	0.00	3,255.62	0.00	13.53	3,269.15	3.81	3,269.15	511.85	1,723.08	1,034.22	730.32	0.00	0.36	2,969.06
April 2019	0.00	3,888.76	0.11	4.90	3,893.77	22.60	3,893.77	745.16	1,884.85	1,263.76	587.84	0.00	0.68	3,240.45
May 2019	0.00	4,370.56	0.22	17.17	4,387.95	19.85	4,387.95	1,089.44	2,000.75	1,297.76	800.37	0.00	0.41	3,910.41
June 2019	0.00	4,157.07	0.14	8.98	4,166.19	22.15	4,166.19	934.27	1,799.01	1,432.91	765.02	203.22	0.70	3,520.45
July 2019	0.00	4,114.39	0.00	12.21	4,126.60	46.41	4,126.60	1,011.96	1,853.08	1,261.56	933.26	0.00	0.74	3,844.71
August 2019	0.00	4,131.27	0.00	11.32	4,142.59	12.25	4,142.59	994.13	1,706.73	1,441.73	943.79	0.00	0.70	3,656.90
September 2019	0.00	3,843.51	0.12	41.21	3,884.84	19.97	3,884.84	959.21	1,673.65	1,251.98	791.45	246.26	0.62	3,444.28
October 2019	0.00	4,046.77	0.00	14.42	4,061.19	67.75	4,061.19	1,108.88	1,954.41	997.90	755.75	0.00	0.77	3,886.79
November 2019	0.00	3,723.42	0.00	12.99	3,736.41	23.80	3,736.41	1,043.50	1,651.25	1,041.66	652.50	0.00	0.75	3,371.05
December 2019	0.00	3,507.46	0.00	9.94	3,517.40	49.55	3,517.40	766.64	1,702.13	1,048.63	611.89	202.47	0.85	3,130.21
TOTAL 2019	0.00	45,607.89	0.59	178.02	45,786.50	327.32	45,786.50	10,064.31	21,693.74	14,028.45	8,744.97	850.38	7.95	40,830.34

RDF Received = 40,830.34

Less Metal Shipped = - 850.38

Material Landfilled = 39,979.96 Tonnes

Table 2 Transfer Station Activities (Tonnes)

RECEIVED:			
2019	COMM	SPECIAL	TOTAL
		Compost/Haz	RECEIVED
JAN	5,316.83	17.73	5,334.56
FEB	4,236.27	10.44	4,246.71
MARCH	4,982.03	18.93	5,000.96
APRIL	5,979.31	9.47	5,988.78
MAY	6,278.10	5.94	6,284.04
JUNE	5,879.78	12.59	5,892.37
JULY	6,220.88	9.08	6,229.96
AUG	6,352.34	7.35	6,359.69
SEPT	6,386.07	8.01	6,394.08
OCT	6,804.03	11.46	6,815.49
NOV	5,819.93	10.95	5,830.88
DEC	5,779.92	13.35	5,793.27
TOTALS	70,035.49	135.30	70,170.79

Section 10.30 (c)i *Information required in the Legal Entitlements and particulars regarding Capital Improvements to the Site;*

Permits received in 2017 *Approval 2008-065580 – Operations Permit including Closing Cell 6 and entering Cell 7A*

Capital Improvements *No capital improvements beyond rectification of deficiencies*

Section 10.30 (c)ii

1. Determination of Volume of Air Space Consumed for 2019

Dillon has calculated that 69,784.36 m³ were consumed in 2019 in Cell 7a (See drawings in Appendix A).

2. Reconciliation of Air Space Consumed

For 2019, Dillon was contracted to conduct surveys and calculate the compaction within Cell 7A. Those reports can be found in Appendix A.

Table 3 Daily Cover Summary (Tonnes)

2019	Alternate Cover	Rock	Soil Cover	Clay	Totals
January	745.14	199.85			944.99
February	504.69	90.44			595.13
March	665.19	257.03			922.22
April	707.87	80.99			788.86
May	684.38	241.10			925.48
June	494.04	121.30			615.34
July	623.70	199.09			822.79
August	734.16	312.90			1,047.06
September	518.33	132.93		8,190.00	8,841.26
October	794.76	329.73			1,124.49
November	666.04	88.56			754.60
December	921.67	221.52			1,143.19
Totals	8,059.97	2,275.44		8,190.00	18,525.41

3. *Estimate of Remaining Cell Volume*

Dillon has calculated that there is 478,000 cubic meters of space within Cell 7A for a remaining volume of 283,967 cubic meters remaining.

4. *Summary of Leachate Volume Delivered to Waste water Treatment Facilities along with metering data for Cells 4-6.*

A summary of leachate volumes can be found in Table 4.

Table 4 Leachate Volume Summary (Litres)

	2019
January	7,569,090
February	4,786,938
March	6,178,014
April	9,001,080
May	7,937,316
June	5,482,476
July	3,068,550
August	2,045,700
September	4,623,282
October	3,518,604
November	7,323,606
December	8,878,338
	<u>70,412,994</u>

Metering Data

Cell	Flowmeter Volume (L)
7	46,000,000 L (estimated)
6	16,000,000 L
5	3,110,860 L
4	842,360 L

Biofiler

Flowmeter data from Cells 1-3 is not available as well as leachate pumped from the lagoon. Accuracy of the flowmeters is limited due to intermittent flows.

Section 10.30 (d) Any reports or documents that were supplied to the CMC in accordance with the Community Monitoring Agreement

Documents supplied to CMC include tonnage reports containing the data within this report as well as information included in the NSE Annual report.

Section 10.30 (e) Any reports or documents required by Statutory Authority which shall in any event include an annual compaction report for the operational cell from the compaction tracking system.

Report is attached in Appendix A.

Section 10.30 (f) Annual report containing volume of landfill gas generation, by cell where possible, typical LFG composition, referred to as the "Flare Report"

Table 5 Otter Lake Landfill Gas Production and Flare Report

Otter Lake Landfill Gas Production and Flare off Report

Year	Average cfm	Full Year Estimate (cubic feet)	Notes
2019	733	390,524,420	Cells 4-7
2018	859	456,581,080	Cells 4-6 (Cell 7 on line Dec 12, 2018)
2017	874	456,581,080	Cells 4-6
2016	965	459,225,550	Cells 4-6
2015	1022	502,148,610	Cells 4-6
2014	747	536,970,820	Cells 4-6
2013	883	392,492,420	Cells 3-6
2012	1,032	542,618,690	Cells 3-5
2011	1,078	566,794,490	Cells 3-5
2010	1,105	580,623,001	Cell 1,2,3,4
2009	1,140	599,198,612	Cell 1,2,3,4
2008	1,030	541,368,000	Cell 1,2,3,4
2007	1,000	525,600,000	Cell 1,2,3, and part of 4
2006	900	473,040,000	Cell 1,2,3
2005	850	446,760,000	Cell 1, 2 and part of 3
2004	600	315,360,000	Cell 1,2
2003	400	210,240,000	Cell 1

An analysis conducted in January 2020 of typical landfill gas is attached in Appendix B.

Landfill gas is currently only metered at the flare building and skid flare.

Appendix A

Air Space Calculations and Compaction Report



MEMO

TO: Steve Copp, Landfill/EHS Manager
FROM: Christopher Shortall, P. Eng.
DATE: February 21, 2020
SUBJECT: Cell 7A Density
OUR FILE: 20-2201-1000

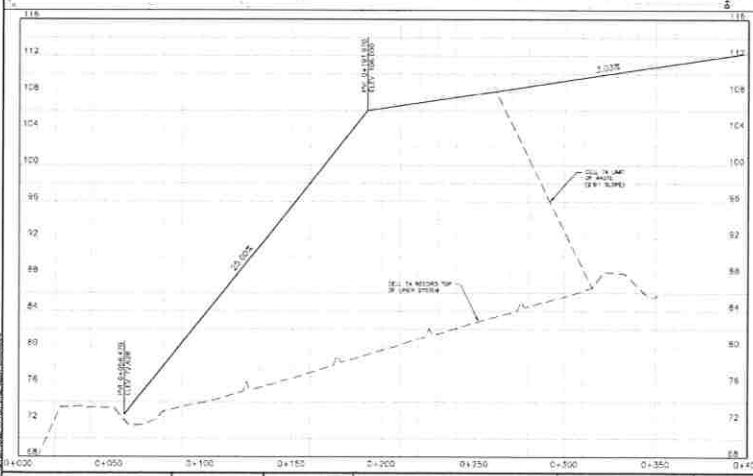
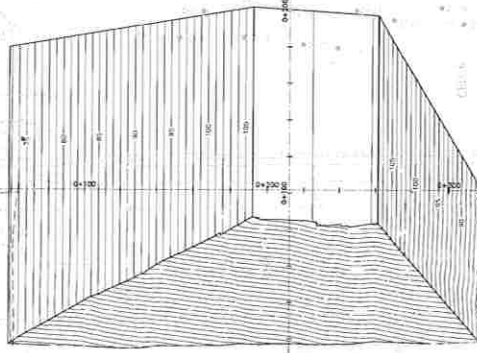
We have reviewed the provided information, presented in **Table 1**, relating to the tonnage of material placed in Cell 7A from June 11, 2017 to January 10, 2020.

Table 1 – Tonnages of Materials Placed in the Cell 7A at the RDF

Time Period	Material Delivered to the RDF	Alternative Cover	Daily Rock/Clay
June 18, 2017 – January 10, 2019	67,181	14,036	10,235
January 10, 2019 – January 10, 2020	<u>40,921</u>	<u>9,017</u>	<u>10,364</u>
	108,102	23,053	<u>20,599</u>
			151,754

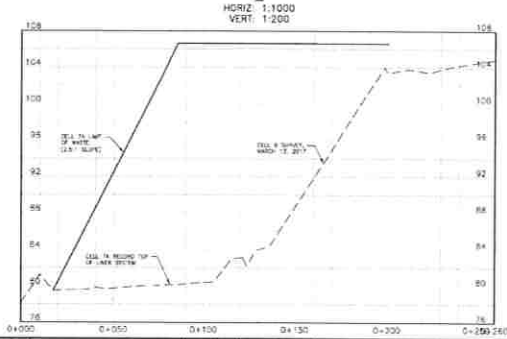
We have determined that the volume of material placed in Cell 7A, as presented in the attached **Figure 1**, is approximately 190,963 m³. Providing a density of:

$$\frac{151,754 \text{ tonnes}}{194,034 \text{ m}^3} = 782.1 \text{ kg/m}^3$$



Base Surface Composite
 Compaction Surface Cell 1A Waste
 Cut volume (m³/station) 2.232 E1 Cu. M
 Fill volume (m³/station) 482.844 E1 Cu. M
 Net volume (m³/station) 478.591 E1 Cu. M (478.59)

PRELIMINARY



Conditions of Use
 This information is provided as a guide only and is not intended to constitute a contract. The user of this information is advised to consult with a qualified professional engineer or architect for any project requiring such services. The user of this information is advised to consult with a qualified professional engineer or architect for any project requiring such services.

MIRROR NS



NO.	DESCRIPTION	DATE	BY	CHECKED
1	ISSUED FOR PERMIT	APRIL 2011		
2	REVISED	MAY 2011		

OTHER LAKE WASTE MANAGEMENT FACILITY	
CELL 1A AIR SPACE	
PROJECT NO.	17-5594
DATE	

Report ID: 342365-AQS
Report Date: 24-Jan-20

CERTIFICATE OF ANALYSIS

for
MIRROR Nova Scotia
PO Box 209
Lakeside, NS B3T 1M6

rpc

921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.1395
www.rpc.ca

Attention: Steve Copp

Fax: 902.453.3489
Date Received: 15-Jan-20
Project #: Not Available
Location: Otter Lake

Airbag Analysis

RPC Sample ID:		342365-1	342365-2	342365-3
Client Sample ID:		OL-1	OL-2	OL-3
Analytes	Units			
Oxygen	%	3	1	<1
Nitrogen	%	37	25	25
Methane	%	32	42	42
Carbon Dioxide	%	27	32	32
Hydrogen Sulphide	ppmv	100	500	100
Volatile Non-Methane Hydrocarbons	ppmv	341	251	237

This report relates only to the sample(s) and information provided to the laboratory.



Bryan Bourque
Supervisor, Compressed Air and Gases
Air Quality Services



Jodi Buckingham
Analyst, Air Quality Services
Air Quality Services

