

MIRROR NOVA SCOTIA LIMITED

# Annual Report

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Otter Lake Waste Resource Management Facility

**2020**



## Table of Contents

1.0	Introduction .....	3
2.0	Reporting.....	3
Appendix A	Air Space Calculations and Compaction Report.....	9
Appendix B	Typical Landfill Gas Analysis .....	10



## **1.0 Introduction**

This document has been prepared by MIRROR Nova Scotia for the Halifax Regional Municipality (HRM) to satisfy the requirements of the agreement between the HRM 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 1<sup>st</sup>, 1999 with all processed mixed solid wastes being disposed of in the Residual Disposal Facility (RDF) Cells #1 through #7.

## **2.0 Reporting**

As per the agreement between HRM and MIRROR Nova Scotia, the relevant information required to be reported annually, and corresponding section number is presented below.

### **Section 10.30 (b) Monthly Site Tonnage Report**

Please see Table 1 for the monthly site tonnage report. Table 2 provides a summary of tonnage received at the transfer station. Table 3 provides a summary of cover used at the RDF.



**Table 1 Monthly Site Tonnage Summary for Otter Lake Solid Waste Management Facility**

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	POP BOTTLES	PAPER C/B	RDF TOTAL
January 2020	0.00	3,730.00	0.00	16.41	3,746.41	14.81	3,746.41	612.28	2,040.65	1,093.48	787.55	0.00	0.67	0.00	3,455.29
February 2020	0.00	2,890.28	0.00	14.27	2,904.55	27.79	2,904.55	502.83	1,453.47	948.25	547.74	0.00	1.08	0.00	2,531.83
March 2020	0.00	3,721.20	0.00	9.74	3,730.94	39.44	3,730.94	767.00	1,872.25	1,091.69	703.56	139.86	0.40	31.75	3,382.25
April 2020	0.00	4,620.83	0.54	10.42	4,631.79	47.54	4,631.79	1,143.26	2,153.05	1,335.48	763.46	0.00	0.00	0.00	4,107.31
May 2020	0.00	4,654.63	0.00	9.37	4,664.00	38.56	4,664.00	1,483.61	1,939.41	1,240.98	1,008.63	173.53	0.00	0.00	4,470.21
June 2020	0.00	4,713.41	0.00	15.16	4,728.57	55.17	4,728.57	1,311.08	1,939.72	1,477.77	1,063.03	0.00	0.00	0.00	4,369.00
July 2020	0.00	4,655.18	2.99	13.20	4,671.37	44.46	4,671.37	1,220.96	2,165.26	1,285.15	908.09	0.00	0.10	0.00	4,338.77
August 2020	0.00	4,077.09	0.00	10.45	4,087.54	64.87	4,087.54	1,092.33	1,893.67	1,101.54	729.70	0.00	0.31	0.00	3,780.57
September 2020	0.00	4,550.80	0.00	5.08	4,555.88	52.73	4,555.88	1,236.35	2,124.60	1,194.93	891.00	123.94	0.46	0.00	4,304.68
October 2020	0.00	4,340.01	0.00	9.65	4,349.66	86.89	4,349.66	976.16	2,333.11	1,040.39	906.82	249.21	0.06	0.00	4,302.98
November 2020	0.00	4,211.15	0.04	7.51	4,218.70	65.64	4,218.70	951.97	2,200.74	1,065.99	1,069.70	0.62	0.24	0.00	4,288.05
December 2020	0.00	4,382.78	0.00	9.98	4,392.76	53.59	4,392.76	864.41	2,311.82	1,216.53	774.50	0.00	0.23	0.00	4,004.32
<b>TOTAL</b>	<b>0.00</b>	<b>50,547.36</b>	<b>3.57</b>	<b>131.24</b>	<b>50,682.17</b>	<b>591.49</b>	<b>50,682.17</b>	<b>12,162.24</b>	<b>24,427.75</b>	<b>14,092.18</b>	<b>10,153.78</b>	<b>687.16</b>	<b>3.55</b>	<b>31.75</b>	<b>47,335.26</b>

RDF Received = 47,335.26

Less Metal Shipped = - 687.16

Material Landfilled = 46,648.10 Tonnes





**Table 2 Transfer Station Monthly Tonnage Summary**

Otter Lake Transfer Station Data					
RECEIVED:					
2020	COMM	SPECIAL Compost/Haz	SPECIAL Handling Fee	DIRECT TO RDF	TOTAL RECEIVED
JAN	5,929.48	15.12	16.41	14.81	5,975.82
FEB	5,058.21	7.24	14.27	27.79	5,107.51
MARCH	5,402.67	13.75	9.74	39.44	5,465.60
APRIL	4,608.03	14.97	10.42	47.54	4,680.96
MAY	4,709.40	22.06	9.37	38.56	4,779.39
JUNE	5,475.02	8.51	15.16	55.17	5,553.86
JULY	5,635.53	20.62	13.20	44.46	5,713.81
AUG	5,664.06	13.61	10.45	64.87	5,752.99
SEPT	5,884.42	14.21	5.08	52.73	5,956.44
OCT	5,631.70	8.18	9.65	86.89	5,736.42
NOV	5,577.61	3.86	7.51	65.64	5,654.62
DEC	5,474.73	10.53	9.98	53.59	5,548.83
<b>TOTAL</b>	<b>65,050.86</b>	<b>152.66</b>	<b>131.24</b>	<b>591.49</b>	<b>65,926.25</b>

**Table 3 Summary of Alternate Cover used for RDF**

2020	Alternate Cover	Rock	Soil Cover	Clay	Totals
January	725.87				725.87
February	519.13	161.51			680.64
March	385.02	86.42			471.44
April	256.40	225.44			481.84
May	298.01	198.07			496.08
June	350.07	251.99			602.06
July	252.19	124.24			376.43
August	276.03	117.75			393.78
September	404.38			6,587.00	6,991.38
October	386.89	200.29			587.18
November	319.87	169.31			489.18
December	488.31	282.32			770.63
<b>Totals</b>	<b>4,662.17</b>	<b>1,817.34</b>	<b>-</b>	<b>6,587.00</b>	<b>13,066.51</b>



**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) Annual volume survey of active cells****1. Determination of Volume of Air Space Consumed for 2020**

Dillon has calculated that 57,397.60 m<sup>3</sup> were consumed in 2020 in Cell 7a (See drawings in Appendix A).

**2. Reconciliation of Air Space Consumed**

For 2020, Dillon was contracted to conduct surveys and calculate the compaction within Cell 7A. Those reports can be found in Appendix A.

**3. Estimate of Remaining Cell Volume**

Dillon has calculated that there is 478,000 m<sup>3</sup> of space within Cell 7A for a remaining volume of 224,226 m<sup>3</sup> remaining.

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

A summary of leachate volumes can be found in Table 4. A summary of metering data can be found in Table 5. 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.



**Table 4 Leachate Volume Summary (Litres)**

<b>Leachate</b>	<b>2020</b>
January	6,791,724
February	5,646,132
March	6,546,240
April	10,514,898
May	9,082,908
June	3,273,120
July	2,945,808
August	2,373,012
September	4,091,400
October	4,173,228
November	4,541,454
December	6,464,412
Totals	66,444,336

**Table 5 Summary of flowmeter data**

<b>Cell</b>	<b>Flowmeter Volume (L)</b>
7	31,000,000 (estimated)
6	11,000,000
5	2,700,000
4	1,700,000
Biofilter	

**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 Annual Monitoring Report submitted to NSE.

**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.**

Annual compaction 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 6 provides a summary of the volume of landfill gas generation. Table 7 provides a summary of average gas composition of landfill gas for 2020 as measured by our hand-held units. A laboratory analysis conducted in December 2020 of typical landfill gas is attached in Appendix B.

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

**Table 6 Otter Lake Landfill Gas Production and Flare Report**

Year	Average cfm	Full Year Estimate (cubic feet)	Notes
2020	764	401,778,140	Cells 4-7
2019	733	390,524,420	Cells 4-7
2018	796	456,581,080	Cells 4-6 (Cell 7 on line Dec 12, 2018)
2017	874	459,225,550	Cells 4-6
2016	965	502,148,610	Cells 4-6
2015	1022	536,970,820	Cells 4-6
2014	747	392,492,420	Cells 4-6

**Table 7 Average Gas Composition for 2020**

Year	Average Methane	Average Oxygen	Average Carbon Dioxide
2020			
January	41.8%	<0.5%	40%
February	41.3%	<0.5%	35%
March	40.6%	<0.5%	35%
April	40.7%	<0.5%	35%
May	41.1%	<0.5%	35%
June	41.1%	<0.5%	35%
July	40.9%	<0.5%	45%
August	40.8%	<0.5%	35%
September	41.0%	<0.5%	42%
October	41.3%	<0.5%	45%
November	40.6%	<0.5%	38%
December	39.9%	<0.5%	35%





## Appendix A Air Space Calculations and Compaction Report





# MEMO

**TO:** Steve Copp, Landfill/EHS Manager  
**FROM:** Christopher Shortall, P. Eng.  
**DATE:** February 10, 2021  
**SUBJECT:** Cell 7A Density  
**OUR FILE:** 20-2201-1000

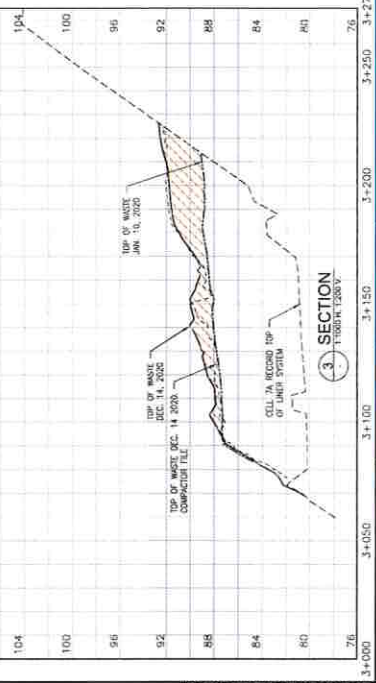
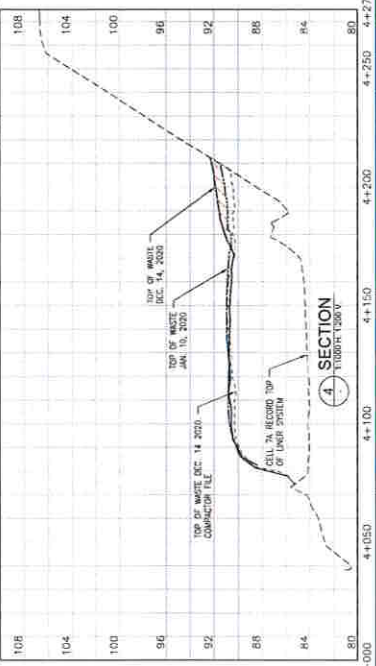
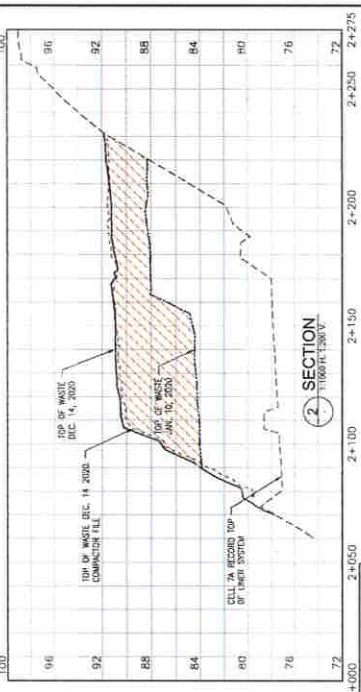
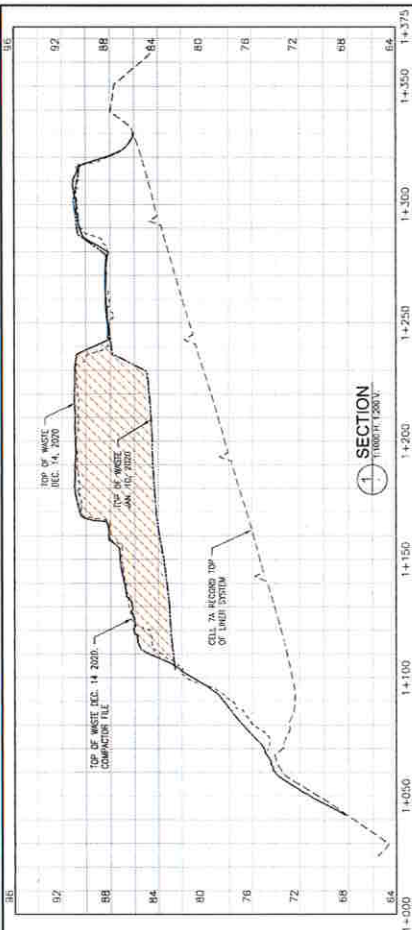
We have reviewed the provided information, presented in **Table 1**, relating to the tonnage of material placed in Cell 7A from June 11, 2017 to December 14, 2020.

**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, 2020	108,102	23,053	20,599
January 10, 2020 – December 14, 2020	<u>44,303</u>	<u>4,141</u>	<u>8,140</u>
	152,405	27,194	<u>28,739</u>
			208,338

We have determined that the volume of material placed in Cell 7A, as presented in the attached **Figure 1**, is approximately 253,774 m<sup>3</sup>. Providing a density of:

$$\frac{208,338 \text{ tonnes}}{253,774 \text{ m}^3} = 821.0 \text{ kg/m}^3$$



Volume:	Jan. 10 2020 to Dec. 14 2020 (Survey File)
Area Surface:	Dealer Survey Jan 10 2020
Compaction Surface:	Dealer Survey Dec 14 2020
Cut volume (unadjusted):	1,245.84 Cu. M.
Fill volume (unadjusted):	58,649.00 Cu. M.
Net volume (unadjusted):	-57,403.16 Cu. M. COTFS

Volume:	Jan. 10 2020 to Dec. 14 2020 (Comparator File)
Area Surface:	Dealer Survey Jan 10 2020
Compaction Surface:	Comparator Dec 14 2020
Cut volume (unadjusted):	4,183.83 Cu. M.
Fill volume (unadjusted):	57,397.86 Cu. M.
Net volume (unadjusted):	53,214.03 Cu. M. COTFS

Volume:	Total Waste since 12/13/2017 to Dec. 14, 2020
Area Surface:	Compendia Bottoms of Waste
Compaction Surface:	Compendia Waste to Dec. 14 2020
Cut volume (unadjusted):	3,480 Cu. M.
Fill volume (unadjusted):	253,777.18 Cu. M.
Net volume (unadjusted):	250,297.18 Cu. M. COTFS

**Conditions of Use**  
 Verify dimensions with the dimensions on drawings and drawings only. Do not scale dimensions from drawings. Do not make dimensions from drawings. All drawings shall be in accordance with the standards and specifications of the International Building Code and the applicable building codes. All drawings shall be in accordance with the standards and specifications of the International Building Code and the applicable building codes. All drawings shall be in accordance with the standards and specifications of the International Building Code and the applicable building codes.

**MIRROR NS**

**OTHER LAKE WASTE MANAGEMENT FACILITY**  
**CELL 7A WASTE TO DEC. 14 2020**

NO.	DATE	BY	APP.
	FEBRUARY 2021		

16-3216  
 SHEET NO. **1**

**PLAN AND SECTIONS**

## Appendix B Typical Landfill Gas Analysis



Report ID: 379709-AQS  
Report Date: 28-Dec-20

### CERTIFICATE OF ANALYSIS

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

Attention: Steve Copp

Fax: 902.453.3489  
Date Received: 18-Dec-20  
Project #: Not Available  
Location: Otter Lake Landfill

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

#### Airbag Analysis

RPC Sample ID:	379709-1	379709-2	379709-3
Client Sample ID:	OL-1	OL-2	OL-3
<b>Analytes</b>	<b>Units</b>		
Oxygen	%	<1	1
Nitrogen	%	26	27
Methane	%	41	40
Carbon Dioxide	%	33	32
Hydrogen Sulphide	ppmv	400	200
Volatile Non-Methane Hydrocarbons	ppmv	124	98

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

